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What is Amazon Connect?

Amazon Connect is an omnichannel cloud contact center. You can set up a contact center in a few steps, add agents who are located anywhere, and start engaging with your customers.

You can create personalized experiences for your customers using omnichannel communications. For example, you can dynamically offer chat and voice contact, based on such factors as customer preference and estimated wait times. Agents, meanwhile, conveniently handle all customers from just one interface. For example, they can chat with customers, and create or respond to tasks as they are routed to them.

Amazon Connect is an open platform that you can integrate with other enterprise applications, such as Salesforce. In addition, you can take advantage of the AWS ecosystem to innovate new experiences for your customers.

The following diagram shows these key characteristics of Amazon Connect.

Contents
- The power of AWS with Amazon Connect (p. 1)
- Browsers supported by Amazon Connect (p. 4)
- Supported screen readers (p. 5)
- Languages supported by Amazon Connect (p. 6)

The power of AWS with Amazon Connect

To help provide a better contact center, you can use Amazon Connect with the following AWS services.
Development

You can use AWS Lambda functions to either look up or post data to sources outside of Amazon Connect. For example, you can look up an inbound caller on Salesforce based on the customer's phone number. The function may return such results as the customer name, membership level (for example, frequent flyer), last order, and order status. Then based on that information, the call can be routed to an Amazon Lex bot or an agent.

You can also use Lambda with AWS databases like DynamoDB to create dynamic routing abilities. For example, you can retrieve a prompt in a specific language, based on input from the customer.

API Gateway and Step Functions further enhance the abilities of Lambda.

For more information, see:

- Invoke AWS Lambda functions (p. 432)
- Blog post: Building a state-aware workflow with Amazon Connect and AWS Step Functions

Storage

Amazon Connect uses Amazon Simple Storage Service (Amazon S3) to store recorded conversations and exported reports. When you set up Amazon Connect, it creates default buckets for these requirements, or you can point it to existing Amazon S3 infrastructure. For more information, see Step 4: Data storage (p. 136) in Create an Amazon Connect instance (p. 134).

VPC endpoints are not supported.

You can also manage the Amazon S3 policies to move data to Amazon S3 Glacier for less expensive long-term storage. However, it breaks the link in the contact trace record (CTR) in Amazon Connect. To fix this, use a Lambda function to rename the S3 Glacier object to match the data in the CTR.
Database

You can use AWS databases with Amazon Connect for a variety of reasons. For example, with DynamoDB, you can create quick tables of data.

You can also create tables of dynamic information for call routing. For example, a Lambda function can write inbound calls to a DynamoDB table, then query the table to see if there are other matches for the phone number. If so, a decision can be made to send the caller to the same queue as before, or to flag them as a repeat caller.

For more information, see:
- Blog post: Creating dynamic, personalized experiences in Amazon Connect

Analytics

Amazon Connect tracks all interactions using contact trace records (CTRs) (p. 792). CTRs are used for real-time and historical metrics reports. You can also use Amazon Kinesis to stream them to an AWS database like Amazon Redshift or Amazon Athena for BI analysis (Amazon QuickSight, or a third party such as Tableau). There are AWS CloudFormation templates available to set up this functionality for Amazon Redshift and Athena.

To perform analysis on your contact flow logs, you can set up an Amazon Kinesis stream to stream your contact flow log data from CloudWatch to a data warehouse service, such as Amazon Redshift. You can combine the contact flow log data with other Amazon Connect data in your warehouse, or run queries to identify trends or common issues with a contact flow.

For more information, see:
- How to access Kinesis Video Streams data (p. 598)
- Blog post: Recovering abandoned calls with Amazon Connect

Machine Learning (ML) and Artificial Intelligence (AI)

Amazon Connect uses the following services for ML/AI:

- Amazon Lex—Lets you create a chatbot to use as Interactive Voice Response (IVR). For more information, see Add an Amazon Lex bot (p. 508).
- Amazon Polly—Provides text-to-speech in all contact flows. For more information, see Add text-to-speech to prompts (p. 402) and SSML tags supported by Amazon Connect (p. 408).
- Amazon Transcribe—Grabs conversation recordings from Amazon S3, and transcribes them to text so you can review them.
- Amazon Comprehend—Takes the transcription of recordings, and applies speech analytics machine learning to the call to identify sentiment, keywords, adherence to company policies, and more.

Messaging

Amazon Connect uses the following services for messaging:

- Amazon Pinpoint—Use as an outbound messaging trigger for events; for example, bulk messaging (such as outbound marketing campaigns). For more information, see this blog post: Using Amazon Pinpoint to send text messages in Amazon Connect.
• Amazon Simple Notification Service (Amazon SNS)—Use to send and receive SMS and other channel notifications. Amazon SNS is particularly useful for sending alerts and validations.
• Amazon Simple Email Service (Amazon SES)—Use to send validation e-mails, such as a password reset bot sending a confirmation of the transaction.

Security
Amazon Connect uses the following services for added security:

• AWS Identity and Access Management (IAM)—Use to manage permissions for users. Amazon Connect users require permission for services. For more information, see Identity and access management for Amazon Connect (p. 819).
• AWS Directory Service—Amazon Connect supports user federation through the internal directory (created in the Amazon Connect instance), using Active Directory integration (MAD, ADFS) or SAML 2.0.

For more information, see:
• Plan your identity management in Amazon Connect (p. 123)
• Blog post: Enabling federation with AWS Single Sign-On and Amazon Connect

Management
Amazon Connect uses the following services for monitoring usage:

• Amazon CloudWatch—Collects logs, service metrics, performance metrics for Amazon Connect. For more information, see Monitoring your instance using CloudWatch (p. 804).
• AWS CloudFormation—Amazon Connect does not support this directly for creating instances. However, it does support AWS CloudFormation templates for associated services, like integrations, database export, and so on.
• AWS CloudTrail—Provides a record of Amazon Connect API calls. This is especially useful for tracking who accessed recorded conversations (p. 625).

For more information about Amazon Connect and AWS CloudTrail, see Logging Amazon Connect API calls with AWS CloudTrail (p. 811).

Browsers supported by Amazon Connect
Agents use the Contact Control Panel (CCP) (p. 863) in Amazon Connect to communicate with contacts. The CCP is a website that they access using a web browser.

Before you work with Amazon Connect, verify that your browser is supported using the following table.

<table>
<thead>
<tr>
<th>Browser</th>
<th>Version</th>
<th>How to check your version</th>
</tr>
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<tbody>
<tr>
<td>Google Chrome</td>
<td>Latest three versions</td>
<td>Open Chrome and type chrome://version in your address bar. The version is in the Google Chrome field at the top of the results.</td>
</tr>
<tr>
<td>Mozilla Firefox ESR</td>
<td>Versions are supported until their Firefox end-of-life date.</td>
<td>Open Firefox. On the menu, choose the Help icon and...</td>
</tr>
</tbody>
</table>
Mobile browsers

<table>
<thead>
<tr>
<th>Browser</th>
<th>Version</th>
<th>How to check your version</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>For details, see the Firefox ESR release calendar.</td>
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<tr>
<td></td>
<td></td>
<td>then choose About Firefox. The version number is listed underneath the Firefox name.</td>
</tr>
<tr>
<td>Mozilla Firefox</td>
<td>Latest three versions</td>
<td>Open Firefox. On the menu, choose the Help icon and then choose About Firefox. The version number is listed underneath the Firefox name. Please see Issue with Firefox version 86 (p. 5).</td>
</tr>
<tr>
<td>Microsoft Edge and Edge Chromium</td>
<td>Not supported</td>
<td></td>
</tr>
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</table>

For more requirements, see Agent headset and workstation requirements for the CCP (p. 266).

Browsers on mobile devices

The Amazon Connect console and Contact Control Panel (CCP) do not work on mobile browsers. However, your agents can forward the audio portion of the call to their mobile device. For instructions, see Forward calls to a mobile device (iPhone, Android) (p. 872).

Issue with Firefox version 86

The following issue may occur if you embed the Amazon Connect Contact Control Panel (CCP) into your agent application and your users access the Amazon Connect CCP using the Firefox web browser with Enhanced Tracking Protection browser setting set to Strict.

An upgrade to Firefox, specifically Firefox non-ESR version 86 released on February 23, 2021, introduced Total Cookie Protection which modified cookie sharing behavior across sites for users with Enhanced Tracking Protection set to Strict (Firefox defaults to Standard). Users with this specific browser setting and version combination may be unable to access the Amazon Connect CCP when embedded in another application, preventing them from handling contacts.

To prevent impact to your users (agents), we recommend that your users do one of the following:

- Confirm (or set) Enhanced Tracking Protection as Standard in their browser settings. Users can do this by following instructions documented here.
- Do not upgrade their Firefox browser version to v86 or higher.
- Use Google Chrome to access the Amazon Connect CCP.

Supported screen readers

You can use the following screen readers with the latest version of the Amazon Connect Contact Control Panel (the CCP URL ends with /ccp-v2):

- JAWS
- NVDA
Languages supported by Amazon Connect

Contact Control Panel

<table>
<thead>
<tr>
<th>CCP</th>
<th>Supported languages</th>
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</table>
| Contact Control Panel - latest version | • Chinese (Simplified)  
• Chinese (Traditional)  
• English  
• French  
• German  
• Italian  
• Japanese  
• Korean  
• Portuguese (Brazilian)  
• Spanish |
| Contact Control Panel - earlier version | • English  
• French  
• German  
• Italian  
• Japanese  
• Korean  
• Portuguese (Brazilian)  
• Spanish |

Chat message content

Amazon Connect provides full Unicode support. You can chat with customers in any language of your choice.

Amazon Connect Admin console

• Chinese (Simplified)  
• Chinese (Traditional)  
• English  
• French  
• German  
• Italian  
• Japanese  
• Korean  
• Portuguese (Brazilian)  
• Spanish
## Contact Lens for Amazon Connect

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<th>Post-call redaction</th>
<th>Real-time analytics</th>
<th>Real-time redaction</th>
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<td></td>
</tr>
<tr>
<td>Portuguese (Portugal)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish (Spain)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish (United States)</td>
<td></td>
<td>Spanish (United States)</td>
<td></td>
</tr>
</tbody>
</table>

### Amazon Lex

See Languages Supported in Amazon Lex in the *Amazon Lex Developer Guide*.

### Amazon Polly

See Voices in Amazon Lex in the *Amazon Polly Developer Guide*. 
Get started with Amazon Connect

Use these steps to set up your contact center.

1. Create an Amazon Connect instance (p. 134). Use an instance to contain all the resources and settings related to your contact center. You specify how you plan to manage user accounts, whether your contact center will accept incoming calls and make outbound calls, and review the location where data will be stored in your Amazon S3 bucket.

2. Set up phone numbers for your contact center (p. 155). If you're using voice, either claim a phone number that AWS provides, or port your current phone number to Amazon Connect. If you choose to port your numbers, we suggest claiming a number so you can test Amazon Connect and build your contact center while waiting for your numbers to be ported over.

3. Set up routing (p. 208). Create your queues and routing profiles, and set your hours of operation. In your routing profiles, specify the channels that agents should use: voice, chat, tasks, or all three. You also specify how many chats and tasks an agent can manage at the same time.

4. Create Amazon Connect contact flows (p. 269). Establish a contact flow to define the customer experience with your contact center from start to finish. A single contact flow works for voice, chat, and tasks, which makes your design more efficient. When you build contact flows and configure the blocks, indicate how the flow should work for voice, chat, and tasks.

5. Add users, which are your managers and agents, and configure their settings. Assign a routing profile to each agent, specify whether they are using a softphone or desk phone, and set how long they have for After contact work. For instructions, see Add users to Amazon Connect (p. 607) and Set up agents (p. 218).

6. If you're using chat, we provide several tools to help you enable your customer-facing app to engage with Amazon Connect chat. For more information, see Set up your customer's chat experience (p. 225).

Next steps

There's a lot you can do to optimize your contact center. Here are a couple of additional steps that you may find useful:

1. Set up recording behavior (p. 423). Monitor live conversations and review past conversations. This is a way that managers can coach agents and help them improve. For voice conversations, set up recording in your contact flows. For chat conversations, set up recording at the instance level.

   To learn how to monitor conversations, see Monitor live conversations (p. 617).

2. Add an Amazon Lex bot (p. 508). Use Amazon Lex in your contact center to reduce the load on your agents. For example, a bot can handle the initial interaction before the chat is routed to an agent, and also answer common questions for the customer.
Concepts

Amazon Connect enables you to create an omnichannel contact center: a contact center that provides a unified experience across multiple channels, such as voice, chat, and tasks.

- You use the same routing profiles, queues, contact flows, metrics, and reports for all channels.
- Managers monitor all channels from one dashboard.
- Agents handle all customers from just one interface. If a customer interaction starts with chat and moves to voice, the agent handling the voice call has the complete chat transcript so context is preserved.

You can create highly personalized experiences for your customers using omnichannel communications, and separate the channels where needed. For example, you can dynamically offer chat and/or voice contact based on such factors as customer preference, estimated wait times, and agent skill.

This section explains concepts that will help you set up your Amazon Connect contact center, whether you use one channel or more.

Contents
- Telephony (p. 9)
- Chat (p. 12)
- Tasks (p. 15)
- Routing profiles (p. 21)
- Queues: standard and agent (p. 22)
- Queues: priority and delay (p. 24)
- Queue-based routing (p. 26)
- Channels and concurrency (p. 26)
- Contact flows (p. 27)
- Rules (p. 28)

Telephony

Amazon Connect provides a variety of choices to enable your company to make and receive telephone calls. One of the great advantages of Amazon Connect is AWS manages the telephony infrastructure for you: carrier connections, redundancy, and routing. And, it’s designed to scale.

This topic explains the options that Amazon Connect provides for telephony, which helps you build a solution to meet your business requirements.

Contents
- Telephony architecture (p. 10)
- Toll-free numbers (p. 10)
- Direct-in-dial (DID) numbers (p. 10)
Telephony architecture

Amazon Connect provides capabilities to host both toll-free and direct dial numbers (DID) in all AWS Regions supported by Amazon Connect. You can use both types of numbers in a single instance. A complete list of supported countries and costs, including the price differences between DID and toll-free numbers can be found on the Amazon Connect pricing page.

AWS manages the connectivity to our network of carriers providing diverse connections to multiple carriers in each region supported by Amazon Connect. When Amazon Connect is deployed in a Region, we take advantage of the built-in redundancy of the AWS Availability Zone design to provide multiple carrier interfaces into multiple data centers. You can see how AWS manages the design of a region here.

In addition to the Amazon Connect service being spread across multiple Availability Zones, AWS also has multiple telephony providers. These providers have multiple links into the data centers in those Availability Zones. This ensures that if a single or even multiple links fail from a carrier, there are alternate routes available to ensure the service remains available.

Toll-free numbers

Toll-free numbers are telephone numbers with distinct prefix codes that can be dialed with no charge to the person placing the call. Such numbers allow callers to reach businesses and/or individuals out of the area without being charged a long-distance fee for the call.

In the United States, the Federal Communications Commission provides rules for obtaining and using toll-free numbers. In other countries, similar governing bodies ensure that toll-free numbers are managed and distributed in accordance with local laws.

AWS manages toll-free numbers as a Responsible Organization, or “RespOrg.” When you claim or port a number into Amazon Connect, we register that number with SOMOS. Once the number is registered, we are able to select multiple carriers to provide BOTH route and carrier redundancy. This provides the highest level of availability, ensuring the number will remain available even in the event of a complete carrier outage. This level of service does come at an additional cost, as toll-free numbers are a higher price than direct dial, but the service reliability and customer experience make this the most attractive option.

Direct-in-dial (DID) numbers

Direct inward dialing (DID), also called direct dial-in (DDI) in Europe, is a telecommunication service offered by telephone companies to subscribers. DID numbers provide a locally formatted telephone number that can match the dialing pattern of a local subscriber. For example, in Seattle, Washington, USA, the local dialing pattern is +1(206)-NXX-XXXX. The provider of the DID number would provide numbers with the +1(206) pattern to match local dialing.

In the United States, DID numbers are regulated by State Public Utilities commissions. DID numbers are managed by a single carrier. While they are portable, they can’t be load balanced/managed across multiple carriers. This makes them less reliable than toll-free numbers.

DID numbers offer you the ability to present a local calling line identification when placing outbound calls, and a local presence to inbound callers. This can be very useful to increase the likelihood outbound and queued callback calls get answered by your customers. It can also show a customer that you are local
Claiming numbers in Amazon Connect

Amazon Connect provides you the ability to claim both direct dial and toll-free numbers in supported countries from inventories maintained by AWS. To claim a number, log into your Amazon Connect instance and select **Phone numbers**. For instructions, see Claim a phone number in your country (p. 166).

Porting numbers

Porting of numbers refers to the ability to move an existing telephone number from one carrier to another provided you are the "customer-of-record." In the United States, portability is required and regulated by the Federal Communications Commission. Laws regarding the requirements for number portability vary greatly between countries. In the United States and Canada, the process is regulated and well-defined. In other countries, some have well-defined processes while some are dependent on carrier and geography.

If you are trying to port a number outside of the United States, follow the porting process (p. 155) we've documented, however, the timeline to complete may vary. If porting is not possible at all, AWS Support will let you know that it's not available.

To begin the porting process, you need to gather some documentation to enable the process to run smoothly. AWS support will need a copy of your bill showing the current carrier, number(s) to port, and the company name. Feel free to redact any pricing or company information you feel is proprietary. You will also need to provide your Amazon Connect instance ID.

For detailed porting instructions, see Port your current phone number (p. 155).

Use cases for different configurations

Starting fresh with Amazon Connect

In this case, simply select new numbers using the claim a number process. For instructions, see Claim a phone number in your country (p. 166).

Migrating to Amazon Connect from another provider/platform

If you're migrating to Amazon Connect from other platform, we recommend starting with a proof of concept, and migrating to Amazon Connect over time.

- A best practice is to forward your existing numbers to a new number (or numbers) claimed in Amazon Connect until you are fully converted.
Chat

For an introduction video, check out Getting Started with Amazon Connect chat on YouTube.

Amazon Connect Chat enables your customers to start chatting with contact center agents from any of your business applications, web or mobile. Interactions are asynchronous, enabling your customers to start a chat with an agent or Amazon Lex bot, step away from it, and then resume the conversation again. They can even switch devices and continue the chat.

Agents have a single user interface to help customers using both voice and chat. This reduces the number of tools that agents have to learn and the number of screens they have to interact with. Chat activities integrate into your existing contact center flows and the automation that you built for voice. You build your flows once and reuse them across multiple channels. Likewise, for metrics collection and the dashboards you built, they automatically benefit from the unified metrics across multiple channels.

Amazon Connect Chat is charged on a per use basis. There are no required up-front payments, long-term commitments, or minimum monthly fees. You pay per chat message, independently of the number of agents or customers using it. Regional pricing may vary. For more information, see Amazon Connect pricing.

Getting started with chat

To add chat capabilities to your Amazon Connect contact center and allow your agents to engage in chats, perform two steps:

- Enable chat at the instance level by creating an Amazon S3 bucket for storing chat transcripts (p. 136).
- Add chat to your agent's routing profile (p. 215).

Agents can then begin accepting chats through the Contact Control Panel.

Amazon Connect provides several resources to help you add chat to your website. For more information, see Set up your customer's chat experience (p. 225).
Example chat scenario

A customer and agent are chatting. The customer stops responding to the agent. The agent asks “Are you there?” and doesn’t get a reply. The agent leaves the chat. Now the chat is no longer associated with an agent. Your contact flow determines what happens next.

In this scenario, the customer eventually sends another message (“Hey, I’m back”) and the chat resumes. Depending on the logic that you define in the contact flow, the chat can be assigned to the original agent, or a different agent or queue.

Here’s how you build this scenario:

1. Create a disconnect flow. The following image shows the Sample disconnect flow (p. 281).

2. In the disconnect flow, add a Wait (p. 391) block. The Wait block has two branches:
   - **Timeout**: Run this branch if the customer hasn’t sent a message after a specified amount of time. The total duration of the chat, including multiple Wait blocks, cannot exceed 25 hours.
     
     For example, for this branch you might just want to run a Disconnect block and end the chat.
   - **Customer return**: Run this branch when the customer returns and sends a message. With this branch, you can route the customer to the previous agent, previous queue, or set a new working queue or agent.

3. In your inbound contact flow, add the Set Disconnect Flow (p. 354) block. Use it to specify that when the agent or Amazon Lex bot has disconnected from the chat and only the customer remains, the set disconnect flow should run.

   In the following block, for example, we specified that the Sample disconnect flow should run.
When do chats end?

The total duration for a chat conversation, including the time spent waiting when the customer isn't active, can't exceed 25 hours. After that the chat conversation ends.

During the 25 hours, there's no limit to the number of times a customer can stop and resume chat.

To specify wait time a shorter than 25 hours, use the `Wait` block. For example, you might wait 12 hours for the customer to resume the chat. If the customer tries to resume the chat after 12 hours, in the flow you can have an Amazon Lex bot ask if they're contacting you about the same issue or a different one.

By specifying a shorter wait time, you help ensure that customers have a good experience. Otherwise, it's possible for the customer to resume a chat after 24 hours and 58 minutes, and then be cut off after two minutes because the conversation ends automatically at the 25-hour limit.

**Tip**

If you're using Amazon Lex with chat, note that the default session timeout for an Amazon Lex session is 5 minutes. The total duration for a session can't exceed 24 hours. To change the session timeout, see Setting the Session Timeout in the *Amazon Lex Developer Guide*.

More information

For more information about chat, see the following topics:

- Test voice, chat, and task experiences (p. 146)
- How routing works with multiple channels (p. 209)
- Create a routing profile (p. 215)
- Amazon Connect Chat SDK and Sample Implementations
Tasks

Amazon Connect Tasks allows you to prioritize, assign, track, and even automate tasks across the disparate tools agents use to support customers. For example, using Tasks you can:

- Follow-up on customer issues recorded in a customer relationship management (CRM) solution such as Salesforce.
- Follow-up with a customer via a call.
- Complete actions in a business-specific system, such as processing a customer claim in an insurance application.

Currently, Amazon Connect Tasks can be used in compliance with GDPR and is pending additional certifications held by Amazon Connect.

What is a task?

A task is a unit of work that an agent must complete. This includes work that may have originated in external applications. It’s routed, prioritized, assigned, and tracked just like voice and chat.

Agents handle tasks in their Contact Control Panel (CCP), again just like any other contact. When assigned a task, agents see a notification with the description of the task, information associated with the tasks, and links to any applications that they might need to complete the task. The following image shows what an agent's CCP may look like when they manage tasks.
Amazon Connect provides different ways for you to create tasks:

1. You can use pre-built connectors with CRM applications (for example, Salesforce and Zendesk) to automatically create tasks based on a set of pre-defined conditions, without any custom development.

   For example, you can configure a rule in Amazon Connect to automatically create a task when a new case is created in Salesforce.

   For more information, see Set up applications for task creation (p. 577) and Add rules for task creation (p. 594).

2. You can integrate with your homegrown or business-specific applications to create tasks using Amazon Connect APIs.

   For more information, see the StartTaskContact API.

3. You can enable your agents to create tasks from the Contact Control Panel (CCP) without you doing any development work.

   For example, agents can create tasks to ensure follow up work is not forgotten, such as calling a customer back to provide a status update on their issue.
For more information, see Test voice, chat, and task experiences (p. 146).

Get started with tasks

1. Update your agent's routing profile (p. 215) so they can manage and create tasks.

   When you add tasks to their routing profile, you can specify that up to 10 tasks be assigned to them at a time.

2. Create quick connects (p. 410) so that agents can create/assign tasks to themselves, or other agents or shared queues.

3. Update your contact flows to route tasks.
4. Optionally, integrate with external applications (p. 577) and set up rules to automatically create tasks (p. 594) based on pre-defined conditions.

**Supported contact flow types**

You can use tasks in the following contact flow types:

- Inbound contact flow
- Customer queue flow
- Agent whisper flow
- Transfer to queue contact flow
- Transfer to agent flow

**Supported contact blocks**

You can use tasks in the following contact blocks:

- Change routing priority/age
- Check contact attributes
- Check hours of operation
- Check queue status
- Check staffing
- Disconnect / hang up
- Distribute by percentage
- End flow / resume
- Get queue metrics
- Invoke AWS Lambda function
- Loop
- Set contact attributes
- Set customer queue flow
- Set disconnect flow
- Set working queue
- Transfer to flow
- Transfer to queue
- Wait

**Using IAM? Add Task permissions**

If your organization is using custom IAM policies to manage access to the Amazon Connect console, make sure users have the appropriate permissions to set up applications for task creation. For a list of required permissions, see Tasks page (p. 830).

**Note**

If your instance was created before October 2018, for information about how to configure your service-linked roles (SLR), see Set up instances created before October 2018 to use service-linked roles (p. 855).
Track tasks in real-time and historical metrics reports

You can track the status of all tasks in real-time and historical metrics reports, just like you track contacts in other channels. For example, you can track:

- How long agents spent working on each task (Agent on contact time (p. 732)).
- The total time from when a task was created to when it was completed. (Contact handle time (p. 736)).

There are a few metrics that don't apply to tasks so you'll notice a value of 0 on the report for them:

**Real-time metrics**
- Avg interaction and hold time (p. 712)
- Avg hold time (p. 712)

**Historical metrics**
- Agent interaction and hold time (p. 731)
- Agent interaction time (p. 731)
- Average agent interaction time (p. 734)
- Average customer hold time (p. 734)

Manage tasks to custom service levels (SL)

While voice and chats may have short service level times based on seconds or minutes, you may have some tasks with service levels that are hours or days. You can create custom service level durations that are appropriate to each of your channels. For more information, see real-time custom service levels (p. 716) and historical custom service levels (p. 741).

When do tasks end?

The total duration of a task can be up to 7 days. A task ends when one of the following happens:

- An agent completes the task.
- A contact flow runs a Disconnect / hang up (p. 314) block, which ends the task.
- A task reaches the 7 day limit.
- You end the task using the StopContact API.

Search and review completed tasks

Use the Contact search (p. 784) page to search for and review completed tasks.

Following is an example image of what the Contact Summary and References look like in a contact trace record (CTR) for a task.
The following data is appended to the CTR but not stored with it. The data is included in an export.

- Contact flow ID
- Potential attributes:
  - ContactDetails (p. 776)
    - Name: the name of the task
    - Description: the description of the task
  - References (p. 783): any links to forms or other sites

More information

- Feature specifications (p. 929)
- Accept a task (p. 894)
- Create a new task (p. 896)
- Transfer a task (p. 899)
Routing profiles

A routing profile determines what types of contacts an agent can receive and the routing priority.

- Each agent is assigned to one routing profile.
- A routing profile can have multiple agents assigned to it.

Amazon Connect uses routing profiles to allow you to manage your contact center at scale. To quickly change what a group of agents does, you only need to make an update in one place: the routing profile.

Default routing profile: Basic routing profile

Amazon Connect includes a default routing profile named Basic routing profile. Along with the default contact flows (p. 269) and default queue (named BasicQueue), it powers your contact center so you don't need to do any customization. This is what enables you to get started quickly.

Routing Profiles Link Queues and Agents

When you create a routing profile, you specify:

- The channels the agents will support.
- The queues of customers that the agents will handle. You can use a single queue to handle all incoming contacts, or you can set up multiple queues. Queues are linked to agents through a routing profile.
- Priority and delay of the queues.
Queues: standard and agent

There are two types of queues:

- **Standard queues**: This is where contacts wait before they are routed to and accepted by agents.
- **Agent queues**: These queues are created automatically when you add an agent to your contact center.

Contacts are only routed to agent queues when explicitly sent there as part of a contact flow. For example, you might route contacts to a specific agent who’s responsible for certain customer issues, such as billing or premium support. Or you might use agent queues to route to an agent’s voice-mail.

Contacts waiting in agent queues are higher priority than contacts waiting in standard queues. Contacts in agent queues have the highest priority and zero delay:

- **Highest priority**: If there’s another contact in the basic queue, Amazon Connect chooses to give the agent the contact from the agent queue first.
- **Zero delay**: If the agent is available, the contact immediately gets routed to them.

**Queues in metrics reports**

In a real-time metrics report (p. 708), you can monitor how many contacts are in standard queues and agent queues. The following image shows a sample real-time metrics Queues report where an Agents table and Agents queues table have been added.
When an agent gets a contact from a standard queue, the contact never appears in the agent queue. It just goes directly to the agent.

In a historical metrics report (p. 729), by default agent queues don’t appear in a Queues table. To show them, choose the Settings icon, then choose Show agent queues.
Default queue: BasicQueue

Amazon Connect includes a default queue named BasicQueue. Along with the default contact flows (p. 269) and default routing profile (named Basic routing profile), it powers your contact center so you don’t need to do any customization. This is what enables you to get started quickly.

Queues: priority and delay

Priority and delay are powerful features that allow you to load balance contacts among groups of agents.

Example 1: Different priority but same delay

For example, one group of agents is assigned to a Sales routing profile. Since their primary job is sales, the Sales queue is Priority 1 and Delay is 0. But they can help with Support too, so that queue is Priority 2 and Delay is 0. This shown in the following table:

<table>
<thead>
<tr>
<th>Queue</th>
<th>Priority</th>
<th>Delay (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Support</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
If there are no contacts in the Sales queue, then the agents will be presented with contacts from the Support queue.

**Example 2: Same priority but different delay**

Say you set the Support queue to Priority 1 and Delay of 30 seconds, as shown in the following table:

<table>
<thead>
<tr>
<th>Queue</th>
<th>Priority</th>
<th>Delay (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Support</td>
<td>1</td>
<td>30</td>
</tr>
</tbody>
</table>

These agents will always get contacts from the Sales queue first because the delay is 0. However, when a contact in the **Support** queue ages past 30 seconds, it will also be treated as priority 1. The agents will then be presented with the contact from the **Support** queue.

**Example 3: Different Priorities and Delays**

Here’s a more complicated example for a Support routing profile:

<table>
<thead>
<tr>
<th>Queue</th>
<th>Priority</th>
<th>Delay (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 Support</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Tier 2 Support</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Tier 3 Support</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Tier 4 Support</td>
<td>3</td>
<td>80</td>
</tr>
</tbody>
</table>

This routing profile prioritizes the Tier 1 Support and Tier 2 Support queues equally because each is priority 1.

- Agents may take contacts from the Tier 3 Support queue when:
  - Customers for Tier 3 Support are waiting for 20 seconds or longer.
  - And no contacts are in the Tier 1 Support or Tier 2 Support queues.
- Agents may take contacts from the Tier 4 Support queue when:
  - Customers in the Tier 4 Support queue have been waiting 80 seconds or longer.
  - And no contacts are in the Tier 1 Support, Tier 2 Support or Tier 3 Support queues.

**Priority takes precedence.** (You might think that agents take contacts from Tier 4 Support when contacts are in Tier 1 Support, Tier 2 Support, or Tier 3 Support and waiting 20 seconds or longer, but that’s not right.)

**Example 4: Same Priority and Delay**

In this example a routing profile has only two queues, and they have the same priority and delay:

<table>
<thead>
<tr>
<th>Queue</th>
<th>Priority</th>
<th>Delay (in seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Queue-based routing

In your business, you might want to route customers to specific agents based on certain criteria, such as the skill of the agent. This is called queue-based routing, also known as skills-based routing.

For example, an airline might have some agents who handle reservations for English-speaking customers, others who handle Spanish-speaking customers, and a third group that handles both types of customers, but only over the phone.

The following illustration shows you can:

• Assign the same routing profile to multiple agents.
• Assign multiple queues to a routing profile.
• Assign a queue to multiple routing profiles.

For an overview of the steps to set up queue-based routing, see Set up queue-based routing (p. 218).

Channels and concurrency

Agents can be available concurrently on voice, chat, and tasks at the same time. Here's how this works:

Suppose an agent is configured in their routing profile for voice, up to 10 chats, and up to 10 tasks. When the agent logs in, they can be routed a chat, task, or voice call. However, once they are on a voice call, no more voice calls, chats, or tasks are routed to them until they finish the call.
If the agent accepts a chat first, up to 10 chats will be routed to them, but no voice calls or tasks. Once they are done with the chats, they're available for the next contact, which can be voice, chat, or tasks. To learn more, see How routing works (p. 209).

To learn more about what the agent experiences in the Contact Control Panel when handling multiple chats, see Chat with contacts (p. 875).

Contact flows

A contact flow defines how a customer experiences your contact center from start to finish. At the most basic level, contact flows enable you to customize your IVR (interactive voice response) system.

For example, you can give customers a set of menu options and route customers to agents based on what they enter on their phone. Although with Amazon Connect, contact flows are significantly more powerful than that: you can create dynamic, personalized flows that interact with other AWS services.

Default contact flows

When you create an instance and claim a number, you automatically have a working contact center in just 5 minutes. This is because Amazon Connect includes a set of default contact flows that have already been published. It uses them to power your contact center.

When you customize your contact center and create new flows, you're replacing the default contact flows with your own.

For example, say you create a contact flow that includes putting the customer on hold.

- You can create a prompt to play while the customer is on hold, such as "Do your holiday shopping early this year. We're offering free shipping in November." And then play some music.

- If you don't create a prompt, Amazon Connect will play the Default customer hold contact flow automatically.

To see the list of default flows in the Amazon Connect console, go to Routing, Contact Flows. They all start with Default in their name.

For a list of all the default contact flows and what they do, see Default contact flows (p. 269).

Contact flow designer

To customize your contact center, you use the contact flow designer. It's a drag-and-drop interface that allows you to customize your contact center without any coding.

Contact blocks

Contact blocks are the building blocks of your contact flows. Each block is designed for a specific function a business might want in a contact center.
The above contact flow uses five blocks:

- **Set working queue.** When the contact comes in, this block assigns it to the BasicQueue.
- **Check hours of operation.** This block checks whether the contact has arrived when the queue is operating.
- **Transfer to queue.** This block transfers the contact to the BasicQueue.
- **Play prompt.** If the queue is not open for business, or there's an error or it's at capacity, this block plays a message "We are not able to take your call right now."
- **Disconnect/hang up.** Every flow ends with this block.

In the above example, what happens when the customer is transferred to queue, but no agents are available to take their call? The **Default customer queue** flow is triggered. It plays music while the contact is waiting in queue.

For a list of the available contact blocks and descriptions about what they do, see Contact block definitions (p. 287).

**Sample contact flows**

To see how to put contact blocks together to create different flows, see Sample contact flows (p. 278).

**Rules**

A rule is an action that Amazon Connect automatically performs, based on conditions you specify.

For example, after you set up an external application to generate tasks automatically, you add rules that tell Amazon Connect when to create tasks, and how to route them.

For Contact Lens, you can create rules to automatically categorize contacts based on uttered keywords and phrases. Or, if you enable real-time analytics, you can add rules that automatically alert supervisors when a customer experience issue occurs.

Amazon Connect includes a graphical user interface that makes it easy to create rules. To learn more, see the following topics:

- Alert supervisors in real-time based on keywords and phrases (p. 648)
- Automatically categorize contacts based on uttered keywords and phrases (p. 644)
Best practices for Amazon Connect

This list of best practices can help you get the maximum benefit from Amazon Connect. These best practices are for contact flows, Lambda, chat, Amazon Lex, and the Contact Control Panel (CCP).

We also recommend reviewing Security Best Practices for Amazon Connect (p. 860).

Contact flows

- Use consistent attribute naming conventions across all AWS services. Use camel case for yourAttributeNames to avoid confusion when passing and referencing variables.
- Use standard naming conventions for attribute names. Don't use spaces or special characters that could impact downstream reporting processes such as AWS Glue crawlers.
- Create modular contact flows. Make the flows as small as possible, and then combine modular flows into an end-to-end contact experience. This helps to keep your flows manageable, and you won't require numerous regression testing cycles.
- When you set User Defined or External values in dynamic attribute fields, use only alphanumeric characters (A-Z, 0–9) and periods. No other characters are allowed.
- Ensure all error branches are routed to a block that effectively handles the error or terminates the contact.
- Use a Set logging behavior block to enable or disable logging for segments of the contact flow where sensitive information is collected and can't be stored in CloudWatch.
- Use Set recording behavior block in your contact flow to disable and enable recordings according to your use case. Keep in mind that Amazon Connect records conversations with agents only. It doesn't record IVR interactions.
- Ensure that attributes used in the flow are set and referenced correctly. If there are periods prepended to the attribute names, you are likely using JSONPath ($.) format while also selecting a variable type from the pick list. For example:, using:
  - Save text as attribute and value $.External.variableName works as expected.
  - Use attribute and value variableName works as expected.
  - Use attribute and $.External.variableName results in a prepended period.
- Before transferring a call to agent and putting that call in a queue, ensure that Check hours of operation and Check staffing blocks are used. They verify that the call is within working hours and that agents are staffed to service.
- Ensure that callbacks are offered before and after queue transfer by using Check queue status blocks. Include a condition for Queue capacity that is greater than X, where X is a number representing your expected queue capacity.
- If queue capacity exceeds the expected capacity, use a Get Customer Input block to offer a callback. This retains the caller's position in the queue and calls them back when an agent is available.
- In the Set callback number block, choose the number to be used to call the customer back in the CCP. Use System and Customer Number or a new number, collected by a Store Customer Input block, using System and Stored customer input.
- Finally, add a Transfer to queue block. Configure it to Transfer to callback queue and configure the callback options to fit your specific use case.
- Use a Loop prompts block in your Customer queue flow to interrupt with a queued callback and external transfer option at regular intervals.
- Ensure that all countries referenced in external transfers or used for outbound dialing are added to the service quota for your account/instance.
• Ensure that all numbers referenced in external transfers are in E.164 format. Drop the national trunk prefix that you use when calling locally. This prefix would be the leading 0 for most of Europe, 1 for the US. The prefix is replaced by the country code. For example, the UK mobile number 07911 123456 in E.164 format is +44 7911 123456 (tel:+447911123456).

• Ensure that there are no infinite loops in the contact flow logic. Also ensure that for each call, the contact flow connects the caller to an agent, bot, or transferred externally for further assistance.

Lambda

• Amazon Connect limits the duration of a sequence of Lambda functions to 20 seconds. It times out with an error message when the total execution time exceeds this threshold. Because customers hear silence while a Lambda function runs, we recommend adding a Play prompt block between functions to keep them engaged during the long interaction.

By breaking up a chain of Lambda functions with the Play prompt block, you can invoke multiple functions that last longer than the 20 second threshold.

Chat and Amazon Lex

• You can use the same bot for both the voice and chat channels. However, you may want the bot to respond differently based on the channel. For example, you want to return SSML for voice so a number is read as a phone number, but you want to return normal text to chat. You can do this by passing the Channel attribute. For instructions, see How to use the same bot for voice and chat (p. 466).

• For voice, some words are best spelled phonetically to get the correct pronunciation, such as last names. If this is the case with your scenario, include it in the design of your bot. Or, you can keep the voice and chat bots separate.

• Tell agents about the bot. When a contact is connected to the agent, the agent sees the entire transcript in their window. The transcript includes text from both the customer and the bot.

Contact Control Panel

• If your agents use Google Chrome 71 to Chrome 75, and they use chat or tasks, add the CCP URL to the allow list in the agent's Chrome settings. Otherwise, they won't hear the audio indicator notifying them that there's an incoming chat or task.

For instructions, see this Google Chrome Help article.
Tutorials: An introduction to Amazon Connect

The tutorials in this section are provided to help you start using Amazon Connect. They show you how to set up your first instance, and test a sample voice and chat experience. Next, they show you how to set up an IT Help Desk contact center that uses the features in Amazon Lex.

These tutorials are suitable for both knowledge workers and developers.

Prerequisite

- An AWS account. If you don’t already have one, create an account at: aws.amazon.com.

Print the tutorials

If you want to print the tutorials, choose the PDF icon at the top of any page, as shown in the following image.

A PDF version of the documentation opens. Press Ctrl+Home to return to the beginning of the PDF, then scroll down to the table of contents. Choose which pages to print.

Contents

- Tutorial 1: Set up your Amazon Connect instance (p. 31)
- Tutorial 2: Test the sample voice and chat experience (p. 38)
- Tutorial 3: Create an IT help desk (p. 45)

Tutorial 1: Set up your Amazon Connect instance

You can have multiple instances of Amazon Connect. Each instance contains all the resources related to your contact center, such as phone numbers, agent accounts, and queues.
In this tutorial, you open Amazon Connect, create an instance of Amazon Connect, and claim a phone number that you can use for testing.

Contents
- Step 1: Launch Amazon Connect (p. 32)
- Step 2: Create an instance (p. 33)
- Step 3: Claim a phone number (p. 36)

Step 1: Launch Amazon Connect

This step walks you through finding Amazon Connect in the AWS console, and opening the Amazon Connect console.

2. In the AWS Management Console, at the top of the page, choose the Services drop-down menu.
3. In the search box, type Amazon Connect.
4. Choose Amazon Connect.

If this is the first time you've been to the Amazon Connect console, you'll see the following Welcome page.
5. Choose Get started.

**Congratulations!** You found and accessed Amazon Connect. You can use these same steps to search for and launch any AWS service.

Go to Step 2: Create an instance (p. 33).

**Step 2: Create an instance**

1. On the Amazon Connect virtual contact center instances page, choose Add an instance.
2. Type a unique name for your instance. For example, the following image shows mytest10089 as a name. Choose a different name for your instance. Then choose Next.
3. On the Add administrator page, add a new administrator account for Amazon Connect. Use this account to log in to your instance later using the unique access URL. Choose Next.

   ![Add administrator page]

   a. The user name will be your Amazon Connect login. It's case sensitive.
   b. The password must be between 8-64 characters, and must contain at least one uppercase letter, one lowercase letter, and one number.

4. On the Telephony Options page, accept the default settings and choose Next.

   ![Set telephony page]

5. On the Review and create page, choose Create instance.
6. After the instance is created, choose **Get started**.

7. On the **Welcome to Amazon Connect** page, choose **Skip for now**.
8. You're now on the Amazon Connect dashboard. On the left is the navigation menu. Your instance name (also called an alias) displays in the URL.

   a. Your instance alias is located in the first part of the URL.
   b. The navigation menu.

Congratulations! You set up your instance and now you're on the Amazon Connect dashboard. Go to Step 3: Claim a phone number (p. 36).

**Step 3: Claim a phone number**

In this step, you set up a phone number so that you can experiment with Amazon Connect.

1. On the navigation menu, choose Routing, Phone numbers.
2. On the right side of the page, choose **Claim a number**.

3. Select the **DID (Direct Inward Dialing)** tab. Use the drop-down arrow to choose your country/region. When numbers are returned, choose one.

4. Write down the phone number. You call it later in this tutorial.

5. In the **Description** box, type this note: **this number is for testing**.
6. In the Contact flow / IVR box, choose the drop-down arrow, and then choose **Sample inbound flow (first contact experience)**.

7. Choose **Save**.

**Congratulations!** You set up your instance and claimed a phone number. Now you're ready to experience how chat and voice work in Amazon Connect. Go to Tutorial 2: Test the sample voice and chat experience (p. 38).

**Tutorial 2: Test the sample voice and chat experience**

To better understand what the voice and chat experiences are like for your agents and customers, you can test them without doing any development.

This tutorial shows you how to access and use the Contact Control Panel (CCP) (p. 863). The CCP is a web page that agents use to accept and manage voice and chat contacts.

**Prerequisites**

This tutorial is part of a series. If you performed Tutorial 1, you're ready to go. If not, here's what you need:

- An AWS account
- A configured Amazon Connect instance
- An Amazon Connect administrative account
- A claimed phone number

**Contents**
Step 1: Handle a voice contact

1. On the navigation menu, choose Dashboard.

2. On the Dashboard page, choose Test chat.

3. Choose Activate Contact Control Panel.

4. If your browser prompts you to grant microphone access, choose Allow.
5. If your browser prompts you to allow notifications, choose **Allow**.

6. In the test CCP, set your status to **Available**.
7. Use your mobile phone to call the phone number that you claimed earlier. If you didn't write down the number, you can find it by going to Routing, Phone numbers.

8. When your call is joined to Amazon Connect you'll hear "Press 1 to be put in queue for an agent, 2 to ..." This is the Sample inbound flow (p. 279) that Amazon Connect runs by default. You're going to change this later in the tutorial.

9. You can play around with the different options in the Sample inbound contact flow. To connect to an agent, press 1, 1, 1.

10. In the CCP, choose Accept call.
11. You’ll see what the CCP looks like when an agent is connected to a customer.

12. Choose **End call**.
Now the contact is in the After Contact Work (ACW) state. This is when the agent might enter some notes about the contact.

13. Choose **Clear contact**. This frees up the agent to take another incoming contact.

Well done! You've handled your first voice contact!

**Tip**
As an administrator, you can launch the CCP from anywhere on the Amazon Connect console by choosing the phone icon on the top of the page.

Next step
Go to Step 2: Handle a chat contact (p. 43) to experience how to handle a chat contact.

**Step 2: Handle a chat contact**

In Step 1, you used the Contact Control Panel (CCP) to manage a voice contact. In this step, you experience how to use the CCP to manage a chat contact.

1. Choose the chat bubble to start a chat.
2. The Sample inbound flow automatically transfers to you a queue. However, you can type a message as the customer and the agent receives it. For example, I need help resetting my password.

3. In the CCP, accept the incoming chat.
4. Use the CCP to send chat messages to the customer.
5. When you're done chatting, choose **End chat**. Then in the CCP, choose **Close contact**.

Congratulations! You've experienced what it's like to chat using Amazon Connect.

Next, try Tutorial 3 to set up an IT Help Desk. It shows you how to set up routing, create a contact flow, and then test the custom voice and chat experience. Go to Tutorial 3: Create an IT help desk (p. 45).

**Tutorial 3: Create an IT help desk**

This tutorial shows you how to create an IT Help Desk. It shows how to create an Amazon Lex bot that finds out why the customer is calling. You next create a contact flow to use the customer's input to route them to the right queue.

**Prerequisite**

This tutorial is part of a series. If you performed Tutorial 1, you're ready to go. If not, here's what you need:

- An AWS account
- A configured Amazon Connect instance
- An Amazon Connect administrative account
- A claimed phone number

**Contents**

- Step 1: Create an Amazon Lex bot (p. 46)
- Step 2: Add permissions to Amazon Lex bot (p. 55)
- Step 3: Set up routing (p. 57)
- Step 4: Create a contact flow (p. 62)
Step 1: Create an Amazon Lex bot

Bots provide an efficient way to offload repetitive tasks from your agents. This tutorial shows how to use the bot to find out why customers are calling the IT Help Desk. Later, we use the customer's response to route them to the right queue.

In previous tutorials, you used the Amazon Connect console. In this tutorial to set up a bot, you use the Amazon Lex console.

This step has five parts to it.

Contents
- Part 1: Create an Amazon Lex bot (p. 46)
- Part 2: Add intents to your Amazon Lex bot (p. 48)
- Part 3: Add sample utterances (p. 50)
- Part 4: Build and test the Amazon Lex bot (p. 52)
- Part 5: Publish the Amazon Lex bot and create an alias (p. 54)

Part 1: Create an Amazon Lex bot

This step assumes it's the first time you've opened the Amazon Lex console. If you've created a Amazon Lex bot before, your steps differ slightly from the ones in this section.

1. Choose the following link to open the Amazon Lex console, or enter the URL in your web browser: https://console.aws.amazon.com/lex/.

2. If this is the first time you've created Amazon Lex bot, choose Get Started. Otherwise, you are already in the Amazon Lex dashboard.

3. Choose Custom bot.
4. Enter the following information:

- **Bot name** — For this tutorial, name the bot **HelpDesk**.
- **Output voice** — Select the voice for your bot to use when speaking to callers. The default voice for Amazon Connect is Joanna.
- **Session timeout** — Choose how long the bot should wait to get input from a caller before ending the session.
- **COPPA** — Choose whether the bot is subject to the [Children's Online Privacy Protection Act](#).

The completed page looks like the following image.
5. Choose Create.

Go to Part 2: Add intents to your Amazon Lex bot (p. 48).

Part 2: Add intents to your Amazon Lex bot

An intent is the action the user wants to perform. In this part, add two intents to the bot. Each intent represents a reason that users call the Help Desk: password reset and network issues.

1. In the Amazon Lex console, choose the Editor tab.
2. Choose the + icon next to Intents, and choose **Create new intent**.

3. In the **Add intent** box, choose + **Create intent**.

4. Name the intent **PasswordReset** and choose **Add**.
5. Choose the + icon next to **Intents** again, and add an intent for **NetworkIssue**.

Go to the next topic, Part 3: Add Sample Utterances.

### Part 3: Add sample utterances

After defining the intents, add some sample utterances. Utterances are what a customer might say or chat to the bot.

1. In the Amazon Lex console, select the **PasswordReset** intent.

2. Add the sample utterance *I forgot my password*, and choose the + icon.

3. Add the utterance *reset my password*.

   The sample utterances look like what's shown in the following image.
4. Select the **NetworkIssue** intent.

5. Add a sample utterance, such as *I can't access the internet*, and choose +.
6. Repeat step 5 to add the utterance *my email is down*.

The sample utterances look like what's shown in the following image.
Step 1: Create an Amazon Lex bot

Go to Part 4: Build and test the Amazon Lex bot (p. 52).

Part 4: Build and test the Amazon Lex bot

Build and test your bot to make sure that it works as intended before you publish it.

1. In the Amazon Lex console, choose Build. The build may take a minute or two.

2. When it's finished building, choose Test Chatbot.

3. Test the PasswordReset intent. In the Test Chatbot pane, type I forgot my password, and press Enter.
4. The verification looks like what's shown in the following image.

5. To confirm that the NetworkIssue intent is working, type my email is down. The verification looks like what's shown in the following image.
Go to Part 5: Publish the Amazon Lex bot and create an alias (p. 54).

Part 5: Publish the Amazon Lex bot and create an alias

Next, publish the bot so you can add it to a contact flow in Amazon Connect.

1. In the Amazon Lex console, choose Publish.

2. In the Publish HelpDesk dialog box, use the drop-down to choose the alias that you created for your bot, such as Test.

3. Choose Publish. The publishing takes a few minutes.
4. When Amazon Lex finishes publishing, choose Close.

Well done! You created an Amazon Lex bot that has intents and utterances. Now you can add the bot to Amazon Connect. Go to Step 2: Add permissions to Amazon Lex bot (p. 55).

**Step 2: Add permissions to Amazon Lex bot**

To use a bot in your contact flow, add it to your Amazon Connect instance.

1. Open the Amazon Connect console (https://console.aws.amazon.com/connect/).
2. Choose the name of the instance that you created.
3. Do not log in on the name page (this method of logging in is for emergency access only). Rather, choose Contact flows.
4. Under **Amazon Lex**, use the drop-down arrow to choose **HelpDesk**, and then choose **+ Add Lex Bot**.

**Tip**
Only published Amazon Lex bots appear in the drop-down list.

5. When you're done, choose Amazon Connect to navigate back to instances page.

6. Choose the access URL of your instance.
This takes you back to the Amazon Connect dashboard.

**Step 3: Set up routing**

In this step, you start at the Amazon Connect console for your instance. This step shows how to set up your queues, create a routing profile, and then assign your user account to the profile.

1. On the navigation menu, go to **Routing, Queues**.

2. Choose **Add new queue**.
3. Complete the page, as shown in the following image, to add a queue named **PasswordReset**. When done, choose **Add new queue**.

4. Add a queue named **NetworkIssue**. Complete the **Add new queue** page like you did for the **PasswordReset** queue.

When done, you'll have three queues.
5. On the navigation menu, go to Users, Routing Profiles.

6. Choose Add new profile.

7. Assign a name to the new profile (for example, Test routing profile). Enter a description, select Voice, Chat, and set Maximum chats to 1.
8. In the **Routing profile queues** section, use the drop-down arrow to search for the queues you just created. Choose **NetworkIssue**, select **Voice** and **Chat**, and then choose **Add queue**.

9. Then add the **PasswordReset** queue. Select **Voice** and **Chat**, and then choose **Add queue**.

10. Under **Default outbound queue**, use the drop-down arrow to choose **BasicQueue**.
11. When done, scroll to the top of the page, and choose Add new profile to save the profile.

12. On the navigation menu, go to Users, User management.

13. Select your login name, and choose Edit.

14. Use the drop-down arrow to choose the routing profile you created, for example, Test routing profile. Choose Save.
Routing is all set up and ready to go.

**Step 4: Create a contact flow**

Although Amazon Connect comes with a set of built-in contact flows (p. 269), you can create your own contact flows to determine how a customer experiences your contact center. The contact flows contain the prompts that customers hear or see, and they transfer them to the right queue or agent, among other things.

In this step, create a contact flow that’s specific to the IT Help Desk experience that you’re creating.

1. On the navigation menu, go to *Routing, Contact flows*.

2. Choose *Create contact flow*.

3. The contact flow designer opens. Enter a name for the contact flow, such as *Test contact flow*. 
4. Choose the drop-down arrows to expand the sections to access the blocks in them.

5. Drag the following blocks onto the grid: Set logging behavior (p. 358) (in the Set group), Set voice (p. 364) (in the Set group), and Play prompt (p. 342) (in the Interact group).

6. Use your mouse to drag an arrow from the Start block to the Set logging behavior block.
7. Connect the remaining blocks, as shown in the following image.

8. Choose the **Play prompt** title to open its properties page.

9. Configure the **Play prompt** block, as shown in the following image, and then choose **Save**.
10. Add a Get customer input (p. 318) block and connect to the Play prompt block.

11. Choose the title of the Get customer input (p. 318) block to open the properties page.
12. Configure the **Get customer input** block, as shown in the following images.
13. While still in the **Get customer input** block, choose **Add an intent**.

14. Enter the names of the intents that you created in the Amazon Lex bot. They are case sensitive!
15. Choose Save.

16. Add a Play prompt block (from the Interact group) and connect it to the PasswordReset branch.

17. Choose the Play prompt title to open its properties page. Configure the Play prompt block with the message *We’re putting you in a queue to help you with password reset.* Choose Save.
18. Add a second Play prompt block and connect it to the NetworkIssue branch.

19. Choose the Play prompt title to open its properties page. Configure the Play prompt block with the message *We’re putting you in a queue to help you with your network issues.* Choose Save.

20. Add a Disconnect / hang up (p. 314) block (from the Terminate/Transfer group) to the grid. Connect the Default and Error branches to it.
21. Add a Set working queue (p. 371) block (from the Set group) to the grid. Connect the Play prompt.
22. Choose the **Set working queue** title to open its properties page. Configure the **Set working queue** block by using the drop-down arrow to choose the **PasswordReset** queue. Choose **Save**.

23. Add a **Set working queue** block for **NetworkIssue**, and configure it with the **NetworkIssue** queue.
24. Drag two **Transfer to queue** blocks (from the **Terminate/Transfer** group) onto the grid.

25. Connect each of the **Set working queue** blocks to a **Transfer to queue** block, as shown in the following image.
26. Drag another Disconnect/hang up block onto the grid. Connect all of the remaining Error and At capacity branches to it.

27. The completed contact flow looks similar to the following image.
Step 5: Assign the contact flow to the phone number

28. Choose **Save**, and then choose **Publish**.

29. When the contact flow publishes, it displays the message that it saved successfully.

If the contact flow doesn't save, double-check that all the branches are connected to blocks. That's the most common reason contact flows don't publish.

**Tip**
Any blocks that aren't connected or configured correctly generate an error. If this happens, double-check that all branches are connected.

**Step 5: Assign the contact flow to the phone number**

1. On the navigation menu, go to **Routing, Phone Numbers**.
2. Choose your phone number.
3. Use the drop-down box to choose the contact flow you just created, and then choose Save.

Everything is all set up! Now you're ready to test your IT Help Desk. Go to Step 6: Test a custom voice and chat experience (p. 76).
Step 6: Test a custom voice and chat experience

You're ready to try out the Amazon Lex bot, routing, and contact flow. The first step is to tell Amazon Connect which contact flow you want to test.

1. On the navigation menu, go to the Dashboard and choose Test chat.
2. Choose Test Settings.

3. Use the drop-down box to choose the contact flow you created, for example, Test contact flow. Choose Apply.

Test a custom chat experience

1. If needed, choose the chat bubble to start a chat.
2. Amazon Connect automatically detects a contact and runs the contact flow that you created.

3. Enter that you need help resetting a password. Then accept the incoming chat. The following image shows you what the chat and agent interfaces look like when you're trying them.
4. In the customer pane on the right, choose **End chat** to close the chat window.
5. In the test CCP, choose **Close contact** to end the After Contact Work (ACW).

**Test a custom voice experience**

1. If the test chat window is still open, choose **End chat** to close it. Then you can try the voice experience.
2. Call your phone number.
3. When prompted, say *I'm having trouble accessing the internet*. You should hear the message that you're being transferred to the NetworkIssue queue.

**Tip**
After you're transferred, you'll hear this message:
*Thank you for calling. Your call is very important to us and will be answered in the order it was received.*
This message is generated by a default contact flow (p. 269) named Default customer queue (p. 274).

4. Go to the test CCP and accept the incoming call.
5. After you accept the call, but before you're connected to the customer, you'll hear an inbound whisper stating what queue the contact is in, for example, NetworkIssue. This helps you know what the customer is calling about.

The inbound whisper is generated by a default contact flow (p. 269) named Default agent whisper (p. 276).
6. When done, end the call.
7. In the CCP, choose **Clear contact** to end After Contact Work (ACW).

**Congratulations!** You built and tested an omnichannel IT Help Desk that leverages Amazon Lex and offers customers both chat and voice.

**Tip**
If you don't want to keep the phone number that you claimed for testing, you can release it back to inventory. For instructions, see **Release a phone number** (p. 168).
Architectural guidance for Amazon Connect

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This topic provides guidance and best practices for designing and building reliable, secure, efficient, and cost-effective systems for your Amazon Connect contact center workloads. Using this guidance can help you build stable and efficient workloads, allowing you to focus on innovation, reduce costs, and improve your customer’s experience.

This content is intended for chief technology officers (CTOs), architects, developers, and operations team members.

Contents
- Amazon Connect workload layers (p. 79)
- Scenario and deployment approaches (p. 84)
- Operational Excellence (p. 93)
- Security: Design principles for developing a secure contact center (p. 105)
- Reliability (p. 113)
- Performance efficiency (p. 113)
- Cost optimization (p. 120)

Amazon Connect workload layers

You can separate Amazon Connect workloads into the following layers: telephony, Amazon Connect interface/API, agent workstation, and metric and reporting.

Telephony

Amazon Connect is integrated with multiple telephony providers with redundant dedicated network paths to three or more Availability Zones in every Region where the service is offered today. Capacity, platform resiliency, and scaling are handled as part of the managed service, allowing you to efficiently ramp from 10 to 10,000+ agents without worrying about the management or configuration of underlying platform and telephony infrastructure. Workloads are load balanced across a fleet of telephony media servers, allowing new updates and features to be delivered to you with no downtime required for maintenance or upgrades. If a particular component, data center, or an entire Availability
Zone experiences failure, the affected endpoint is taken out of rotation, allowing you to continue to provide a consistent quality experience for your customers.

When a voice call is placed to an Amazon Connect instance, the telephony layer is responsible for controlling the endpoint that your customer calls into through their carrier, across the PSTN and into Amazon Connect. This layer represents the audio path established between Amazon Connect and the customer. Through the Amazon Connect interface layer, you can configure things like outbound caller ID, assign contact flow/IVRs to phone numbers, enable live media streaming, enable call recording, and the ability to claim phone numbers without any prior traditional telephony knowledge or experience. Additionally, when migrating workloads to Amazon Connect, you have the option to port your existing phone numbers by opening a support case in your AWS Management Console. You can also forward your existing phone numbers to numbers that you’ve claimed in your Amazon Connect instance until you are fully migrated.

**Amazon Connect Interface/API**

The Amazon Connect interface layer is the access point that your agents and contact center supervisors and administrators will use to access Amazon Connect components like reporting and metrics, user configuration, call recordings, and the Contact Control Panel (CCP). This is also the layer responsible for:

- Single Sign-On (SSO) integration user authentication
• Custom desktop applications created using the Amazon Connect Streams API that may provide additional functionality and/or integrate with existing Customer Relationship Management (CRM) systems including the Amazon Connect Salesforce CTI Adapter (p. 268).
• Amazon Connect contact-facing chat interface
• Chat web server hosting the Amazon Connect Chat API
• Any Amazon API Gateway endpoints and corresponding AWS Lambda functions necessary to route chat contacts to Amazon Connect.

Anything your agents, managers, supervisors, or contacts use to access, configure, or manage Amazon Connect components from a web browser or API is considered the Amazon Connect interface layer.

Contact flow / IVR

The Contact Flow/IVR layer is the primary architectural vehicle for Amazon Connect and serves as the point of entry and first line of communication with customers reaching out to your contact center. After a customer contacts your Amazon Connect instance, a contact flow controls the interaction between Amazon Connect, the contact, and the agent, allowing you to:

• Dynamically invoke AWS Lambda functions to make API calls.
• Send real-time IVR and voice data to third-party endpoints through Amazon Kinesis.
• Access resources inside your VPC and behind your VPN.
• Call other AWS services like Amazon Pinpoint to send SMS messages from the IVR.
• Perform data dips to database like Amazon DynamoDB to service your contacts.
• Call Amazon Lex directly from the contact flow to invoke a Lex bot for Natural Language Understanding (NLU) and Automatic Speech Recognition (ASR).
• Play dynamic and natural Text-to-Speech through Amazon Polly, and use SSML and Neural Text-to-Speech (NTTS) to achieve the most natural and human-like text-to-speech voices possible.
Contact flows enable you to dynamically prompt contacts, collect and store contact attributes, and route appropriately. You can assign a contact flow to multiple phone numbers, and manage and configure it through Amazon Connect.

Agent workstation

The agent workstation layer is not managed by AWS. It consists of any physical equipment and third-party technologies, services, and endpoints that facilitate your agent's voice, data, and access the Amazon Connect interface layer. Components in the agent workstation layer include:

- The Contact Control Panel (CCP) agent hardware
- Network path
- Agent headset or handset
- VDI environment
- Operating system and web browser
- Endpoint security
- All networking components and infrastructure
- Internet Service Provider (ISP) or AWS Direct Connect dedicated network path to AWS.
- All other aspects of your agent's operating environment including power, facilities, security, and ambient noise.
Metric and reporting

The metric and reporting layer includes the components responsible for delivering, consuming, monitoring, alerting, or processing real-time and historical metrics for your agents, contacts, and contact center. This includes all native and third-party components responsible for facilitating the processing, transmission, storage, retrieval, and visualization of real-time or historical contact center metrics, activity audit, and monitoring data. For example:

- Call recordings and scheduled reports stored in Amazon Simple Storage Service (Amazon S3).
- Contact Trace Records (CTRs) that you can export to AWS database services like Amazon Redshift or your own on-premises data warehouse with Amazon Kinesis.
- Real-time dashboards you create with Amazon OpenSearch Service and Kibana.
- Amazon CloudWatch metrics generated that you can use to set alarms based on static thresholds, set up Amazon SNS notifications to alert to your administrators and supervisors, or launch AWS Lambda functions in response to the event.
Scenario and deployment approaches

Amazon Connect offers self-service configuration and enables dynamic, personal, and natural customer engagement at any scale with a variety of migration and integration options. In this section, we explain the following scenarios and deployment approaches to consider when designing a workload for Amazon Connect:

- Traditional contact center
- Inbound
- Outbound
- Hybrid contact center
- Legacy contact center migration
- Virtual desktop infrastructure (VDI)

**Traditional contact center**

The traditional contact center requires a significant telephony, media, networking, database, and compute infrastructure footprint that can span multiple vendors and data center locations to service contacts. Each individual solution and vendor have unique hardware, software, networking, and architectural requirements that have to be met while resolving versioning, compatibility, and licensing conflicts.

It is common to have separate vendors and infrastructure requirements for local and remote agent hardware and VPN connectivity, Text-To-Speech (TTS), Automatic Call Distribution (ACD), Interactive Voice Response (IVR), voice audio and data, physical desk phones, voice recording, voice transcriptions, chat, reporting, database, Computer Telephony Integration (CTI), Automatic Speech Recognition
(ASR), and Natural Language Understanding (NLP). Your contact center architecture and infrastructure becomes more complicated when you consider multi-stage development, quality assurance, and test environments.

A typical Amazon Connect deployment solves or reduces many of the challenges associated with versioning, compatibility, licensing, contact center telephony infrastructure, and maintenance. It gives you the flexibility to create instances in new locations in minutes and migrate components individually, or in parallel, to best meet your individual business objectives. You can use contact flows for your IVR/ACD, have voice and data delivered through a supported web browser to your agent’s softphone, port your existing phone numbers, redirect softphone audio to an existing desk phone, invoke an Amazon Lex bot natively within your contact flow for ASR and NLP, and use the same contact flow for chat and voice. You can use Amazon Contact Lens to automatically generate voice transcriptions, perform key word identification and sentiment analysis, and categorize contacts. For agent CTI data and real-time voice streaming, you can use Amazon Connect Agent Event Streams and Kinesis Video Streams. You can also create multi-stage development, quality assurance, and test environments at no additional cost and only pay for what you use.

**Inbound**

Inbound is a contact center term used to describe a communication request initiated by a contact to the center. Contacts can reach your Amazon Connect instance for inbound self-service or to speak with a live agent in a variety of ways, including voice and chat. Voice contacts go through the PSTN and are
routed to the Amazon Connect Instance telephony entry point through the phone number claimed in your instance. You can reserve a phone number with Amazon Connect directly, port your existing phone number, or forward voice contacts to Amazon Connect. Amazon Connect can provide local and toll-free numbers in all Regions where the service is supported.

When a phone call is placed to a number claimed in or ported to your Amazon Connect instance, the contact flow associated with the called number will be invoked. You can define the contact flow using contact blocks that can be configured with no coding knowledge required. The contact flow determines how the contact should be processed and routed, optionally prompting the contact for additional information to assist in routing decisions, storing those attributes to the contact details, and, if necessary, routing that contact to an agent with all of the call details and transcripts gathered along the way. Through the contact flow, you can invoke AWS Lambda functions to query customer information, call other AWS services like Amazon Pinpoint to send SMS text messages, and use native AWS service integrations including Amazon Lex for NLU/NLP and Kinesis Video Streams for real-time streaming of voice calls.

If an inbound contact needs to reach an agent, the contact is put into a queue and routed to an agent when they change their status to Available, according to your routing configuration. When the available agent's contact is accepted manually or through auto-accept configuration, Amazon Connect connects the contact with the agent.
When an inbound contact comes from a browser or mobile app request for a chat session, the request is routed to a web service or Amazon API Gateway endpoint that calls the Amazon Connect chat API to invoke the contact flow configured in your request. You can use the same contact flows for chat and voice, where the experience is managed and routed dynamically, based on the logic defined in the contact flow.

**Outbound**

Amazon Connect allows you the ability to programmatically make outbound contact attempts to local and international endpoints, reduce agent set-up time between contacts, and improve agent productivity. By using the Amazon Connect Streams API and StartOutboundVoiceContact, you can develop your own outbound solution or take advantage of existing partner integrations that work with your CRM data to create dynamic, personalized experiences for your contacts and empowering your agents with the tools and resources they need to service those contacts.

Outbound campaigns are typically driven by contact data exported from CRMs and separated into contact lists. Those contacts are prioritized and either delivered to the agents to initiate after a period of preview or programmatically contacted via Amazon Connect Outbound API, driven by your contact flow logic, and connecting to agents as needed. Typical outbound contact center use cases include fraud and service alerts, collections, and appointment confirmations.
Hybrid

If you have requirements to transfer contacts between Amazon Connect and legacy contact center technologies, you can use a Hybrid model architecture to pass contact data with the transfer. For example, a sales business unit on a legacy contact center platform may need to transfer a call to the service business unit that's been migrated to Amazon Connect. Without a Hybrid architecture, call details will be lost and may require the contact to repeat information. This could increase handle times and may result in contact calling again for the same purpose.

Hybrid architectures require you to claim as many phone numbers as your expected maximum concurrent contacts and an intermediary state database accessible by both Amazon Connect and your legacy contact center platform. When a transfer is required to the other platform, you will use one of these phone numbers as a unique identifier, flag it as in-use in your intermediary database, insert your contact details, and use that number as your ANI or DNIS when you transfer the contact. When the contact is received by the other contact center platform, you will query the intermediary database for the contact details based on the unique ANI or DNIS you used. Hybrid architectures are typically used as an interim migration step because of the additional cost and complexity associated.

IVR-only

You may choose to use Amazon Connect to drive the contact's IVR experience while your agent population remains on your legacy contact center platform. With this approach, you can use Amazon Connect contact flows to drive self-service and routing logic, and, if necessary, transfer the contact to the target agent or agent queue on your legacy contact center platform.

In this diagram, the contact dials a phone number claimed in your Amazon Connect instance for service. If they need to be transferred to an agent on your legacy contact center platform, an AWS Lambda
function is invoked to query an available unique phone number, flag it as in-use, and write relevant contact details to an intermediary database. The contact is then transferred to the legacy contact center platform with the phone number returned from the Lambda function. The legacy contact center will then perform a query on the intermediary database for the contact details, route accordingly, and reset the contact data in the intermediary database, allowing the phone number to be used again.

**Agent-only**

With this approach, your legacy contact center IVR drives the contact's IVR self-serve and routing logic, and, if necessary, transfers the contact to Amazon Connect to route to your agent population.

In this diagram, the contact dials a phone number claimed with your legacy contact center platform. If they need to be transferred to an agent on Amazon Connect, the legacy contact center platform will query an available unique phone number, flag it as in-use, and write relevant contact details to an intermediary database. The contact will then be transferred to Amazon Connect with the phone number returned by the legacy contact center's query. Amazon Connect will then query the contact details from the intermediary database using AWS Lambda, route accordingly, and reset the contact data in the intermediary database, allowing the phone number to be used again.

**Mixed**

In this scenario, you may have your IVR and agents operating in parallel on Amazon Connect and your legacy contact center platform to allow for site, agent group, or line-of-business migrations.
Legacy contact center migration

When you are evaluating Amazon Connect for new or existing workloads, there are several strategies you can consider. For situations that require contact details to be included when contacts are transferred between Amazon Connect and your legacy contact center solution, a Hybrid model architecture will be required until the migration is complete. The approaches described in this section allow you to move specific lines of business in phases, manage training and support, and mitigate risks associated with change.

New workload

You may decrease risk associated with changes to existing business units and increase flexibility and digital innovation potential by adopting a net new workload on Amazon Connect. Net new workloads that do not require the Hybrid model architecture are less complex, are not affected by change in business process or agent routine, and have a faster time to market. Adopting a net new workload allows you to take advantage of usage-based, pay-as-you-go pricing. Your contact center resources are available to create a new experience for their end users, test and implement it to evaluate the platform, gain confidence, and build the skills and operational mechanisms to prepare for larger migration across existing workloads.

IVR First

You may choose to use Amazon Connect to drive the contact’s IVR experience while your agent population remains on your legacy contact center platform. With this approach, you can use Amazon
Connect Contact flows to drive self-service and routing logic, and, if necessary, transfer the contact to the target agent or agent queue on your legacy contact center platform.

**IVR Last**

With this approach, your legacy contact center IVR drives the contact’s IVR self-serve and routing logic, and, if necessary, transfers the contact to Amazon Connect to route to your agent population.

**Line of business segmentation**

If your lines of business have separate IVRs or don't require contact transfers to legacy contact center platforms, you may want to consider a line of business migration approach. For example, selecting your service desk for internal support as your first line of business to migrate. After migrating your service desk IVR and agent population to Amazon Connect, you may choose to forward your existing contact to Amazon Connect, porting the endpoint after testing and business validation is completed.

**Site or agent group segmentation**

If your contact center has a global footprint, services contacts from multiple countries, or is managed independently by a respective geography or location, you may want to consider a migration approach based on a physical site or geography of agents. Each agent population and/or geography can have its own unique requirements and considerations that may not apply globally. Approaching your migration this way will allow each site or agent group to gain the skills they need to continue to operate independently before moving onto the next.

**Virtual desktop infrastructure (VDI)**

While you can use the Amazon Connect Contact Control Panel (CCP) within Virtual Desktop Infrastructure (VDI) environments, it will add another layer of complexity to your solution that warrants separate POC efforts and performance testing to optimize. The configuration/support/optimization is best handled by your VDI support team and the following deployment models are the most commonly implemented.

**VDI client with local browser access**

You can build a custom CCP with the Amazon Connect Streams API by creating a CCP with no media for call signaling. This way, the media is handled on the local desktop using standard CCP, and the signaling and call controls are handled on the remote connection with the CCP with no media. The following diagram describes that approach:
Sometimes the VDI client does not have access to a local browser. In this scenario, you can create a single CCP instance with media run from the VDI server allowing access to enterprise resources. For this deployment model UDP audio is usually enabled on the VDI OS. This deployment model requires extensive testing to calibrate the different VDI server parameters to optimize quality of experience:
Operational Excellence

Operational excellence includes the ability to run and monitor systems to deliver business value and continually improve supporting processes and procedures. This section consists of design principles, best practices, and questions surrounding the operational excellence of Amazon Connect workloads.

Prepare

Consider the following areas to prepare for an Amazon Connect workload.

AWS account

With AWS Organizations, you can set up multiple AWS accounts for each level of your development, staging, and quality assurance environments. This allows you to centrally govern your environment as you grow and scale your workloads on AWS. Whether you are a growing startup or a large enterprise, Organizations helps you to centrally manage billing; control access, compliance, and security; and share resources across your AWS accounts. This is the starting point for consuming AWS services along with a cloud adoption framework.

Region selection

Amazon Connect Region selection is contingent upon data governance requirements, use case, services available in each Region, telephony costs in each region, and latency in relation to your agents, contacts, and external transfer endpoint geography.

Telephony

- **Phone number porting** Open a porting request as far in advance of your pending go-live date as possible.

  When porting phone numbers for critical workloads, include all requirements and use case information in your claim/port number several months before the go-live date. This includes requests for live cutover support, communication prior, during, and after cutover, monitoring, and anything else specific to your use case.

  For detailed information about porting your numbers, see Port your current phone number (p. 155).

- **Carrier diversity** In the US, you should use Amazon Connect telephony services for US toll-free numbers, allowing you to route toll-free traffic across multiple suppliers in an active-active fashion at no additional charge. In situations where you are forwarding inbound traffic to an Amazon Connect phone number, you should request redundant DID or Toll-Free numbers across multiple telephony providers. If you are claiming or porting multiple DID or Toll-Free numbers outside of the US, you should request that those numbers be claimed or ported to a variety of telephony providers for increased resiliency.

- **International toll-free and high-concurrency DIDs** If you are using an existing toll-free national service to redirect inbound traffic to DIDs, you should request DID phone numbers across multiple telephony providers. A general recommendation for this configuration is 100 sessions per-DID and your AWS Solutions Architect can help with capacity calculations and setup.

- **Testing** Thoroughly test all use case scenarios, preferably using the same or similar environment as your agents and customers. Ensure that you test several inbound and outbound scenarios for quality of experience, Caller ID functionality, and measure latency to ensure it falls within acceptable range for your use case. Any deviations from your target agent and customer environments need to be measured and accounted for. For more information, including use case testing instructions and criteria, see Troubleshooting Issues with the Contact Control Panel (CCP) (p. 914).
Agent workstation

The Amazon Connect Call Control Panel (CCP) has specific network and hardware requirements that must be met to ensure the highest quality of service for your agents and contacts:

- Set Up Your Network for CCP use and ensure that your agent hardware meets minimum requirements.
- Ensure that you have used the Amazon Connect Check Amazon Connectivity Tool on the same network segment as your agents to verify that your network and environment is configured correctly for CCP use.
- Calculate PSTN latency for use cases that require agents and contacts to be in geographically distant locations
- Review the Troubleshooting Issues with the Contact Control Panel (CCP) (p. 914) section to create runbooks and playbooks for your agents and supervisors to follow should they encounter issues.
- Set up monitoring for your agent workstations and consider partner solutions for call quality monitoring. Your goal with monitoring your agent workstations should be the ability to identify the source of any potential network and resource contention. For example, consider a typical agent’s softphone network connection path to Amazon Connect:

Without setting up monitoring at the local LAN/WAN, path to AWS, and agent workstation levels, it’s difficult and often impossible to determine if a voice quality issue is originating from your agent’s workstation, their private LAN/WAN, ISP, AWS, or the contact itself. Setting up logging and alerting mechanisms proactively is critical in determining root cause and optimizing your environment for voice quality.
Configure your existing directory

If you are already using an AWS Directory Service directory to manage users, you can use the same directory to manage user accounts in Amazon Connect. This must be decided and configured when you create your Amazon Connect instance. You cannot change the identity option you select after you create the instance. For example, if you decide to change the directory you selected to enable Single Sign On (SSO) for your instance, you can delete the instance and create a new one. When you delete an instance, you lose all configuration settings and metrics data for it.

Service Quotas

Review the default service quotas for each service involved in your workload as well as the default service quotas for Amazon Connect and request increases where applicable. When requesting an increase for Amazon Connect, be sure to use expected values without additional padding for fluctuations. Fluctuations are considered automatically when you make your request.

AWS Enterprise support

AWS Enterprise Support is recommended for business and/or mission-critical workloads on AWS. Both Enterprise Support and Well-Architected Review with an AWS Solutions Architect are required to qualify for the Amazon Connect Service Level Agreement.

AWS well-architected review

Before any migration or implementation to Amazon Connect, follow our best practices by using the AWS Well-Architected Framework, Operational Excellence. The Framework provides a consistent approach for you to evaluate architectures and implement designs that will scale over time based on five pillars — operational excellence, security, reliability, performance efficiency, and cost optimization. We also recommend using AWS Enterprise Support for business and mission-critical workloads in AWS. Both Enterprise Support and Well-Architected Review with your AWS Solutions Architect are required to qualify for the Amazon Connect Service Level Agreement.

Operate

Consider the following areas to operate an Amazon Connect workload.

Logging and monitoring

See Monitoring your instance using CloudWatch (p. 804) and Logging Amazon Connect API calls with AWS CloudTrail (p. 811).

Contact attributes

Amazon Connect allows you to dynamically set and reference contact attributes within contact flows to create dynamic and personalized experiences for your contacts, create powerful self-service applications, data-driven IVRs, integrations with other AWS services, simplify phone number management, and allows for custom real-time and historical reporting and analytics. The following are Best practices and considerations you can follow to reduce complexity, prevent data loss, and ensure a consistent quality of experience for your contacts.

Note the following considerations:

- Data size – To prevent truncation, the size limitation for contact attributes you can set in a Set contact attributes block varies depending on the charset, encoding, and language used. While this is generally
enough data to play a short story for a contact, it is possible to exceed this limit, truncating any attributes set over the 32KB.

- Data sensitivity – Note if any attributes being set, queried, and referenced are sensitive or fall under any regulatory guidelines and ensure that the data is being treated appropriately for your use case.
- Data persistence – Any attributes set using the Set contact attributes block will be included in the Contact Trace Record (CTR) for your contact and available for screen pop to any custom agent desktop using the Streams API. Any time the attribute is referenced within your contact flow and logging is enabled for the flow, the name and value of the attribute will be logged to Amazon CloudWatch.

**Best practices**

- Monitor usage – As you implement new functionality, onboard new business units, and iterate on existing contact flows, look up your current attribute usage in contact search, copy the attributes to a text editor, add the new attributes, and ensure that you do not exceed the 32KB size limitation. Be sure to account for variable length fields like firstName and lastName and ensure that, even when the maximum space is used in a field, that you are still below the 32KB limitation.
- Clean-up – If data persistence isn’t required, you can set an attribute with the same name and a blank value to prevent the data from being stored to the CTR or passed in a screen pop to an agent using the Amazon Connect Streams API while freeing up the bytes that data would have otherwise used in the CTR.
- Sensitive data – Use the **Store customer input** block to collect sensitive DTMF input from your contacts and use envelope encryption to protect both the raw data and the data keys used to encrypt them. Store sensitive data in a separate database where persistence is required, use the **Set logging behavior** contact flow block to disable logging whenever sensitive information is referenced, and remove, clean up, or obfuscate sensitive data using the **Set contact attributes** block Clean-up method outlined previously. For more information, see Compliance validation in Amazon Connect (p. 858).

**Telephony**

In the US, use toll-free phone numbers wherever possible to load balance across multiple carriers for additional route and carrier redundancy. This also helps to decrease time to resolution when compared to DID phone numbers, which must be managed by a single carrier. In situations where you use DIDs, load balance across numbers from multiple carriers, when possible, to increase reliability. Make sure that you handle all error paths in your contact flow appropriately, and implement the best practices, requirements, and recommendations located in Troubleshooting Issues with the Contact Control Panel (CCP) (p. 914).

If you’re forwarding your existing telephony provider’s phone numbers to Amazon Connect, ensure that the process to change the forward destination to an alternative DID/toll-free number or otherwise remove the forward is defined and well-understood by your operations team. Ensure that you have Runbooks and Playbooks specifically for production readiness assessments, phone number porting and forwarding processes, and troubleshooting audio issues that could arise when transferring calls from your existing telephony provider. You also want a repeatable process that your operations team can follow to determine if the source of these audio issues is Amazon Connect or your existing telephony provider.

**Amazon Connect APIs**

Amazon Connect throttling quotas are by account, and not instance. You should consider the following best practices when working with Amazon Connect APIs:

**Implement a caching/queuing solution**

To decrease API data query overhead and avoid throttling, you can use an intermediary database like Amazon DynamoDB to store API call results rather than calling the API from all endpoints interested in
the API data. For example, the following diagram represents the use of the Amazon Connect metric API from multiple sources that need to consume this information:

Rather than having separate AWS Lambda functions, each with their own polling requirements, you can have a single AWS Lambda function write all interesting data to Amazon DynamoDB. Rather than having each endpoint go to the API directly to retrieve the data, they point to DynamoDB, as illustrated in the following diagram:
This architecture allows you to change polling intervals and add endpoints, as needed, without worrying about exceeding service quotas, giving you the ability to scale to however many concurrent connections your database solution supports. You can use this same concept with querying any real-time data feeds from Amazon Connect. For situations where you need to perform an API action, like an Outbound API call, you can use this same concept in combination with Amazon Simple Queue Service to queue API requests using AWS Lambda with SQS.

**Exponential back off and retry strategies**

You can run into situations where API throttling limits get exceeded. This can happen when the API calls fail and are retried repeatedly or made directly from multiple concurrent endpoints without a caching or queuing solution implemented. To avoid exceeding your service quotas and impacting downstream processes, you should consider using exponential back off and retry strategies within your AWS Lambda functions in combination with caching and queueing.

**Change management**

Two of the primary drivers for moving workloads to the Amazon Connect are flexibility and speed to market. To ensure operational excellence without sacrificing agility, follow these best practices:

- **Modular contact flows**: Contact flows in Amazon Connect are similar to modern application building where smaller, purpose-built components allow for more flexibility, control, and ease of management when compared to monolithic alternatives. You can make your contact flows small and re-usable, combining the modular flows into an end-to-end experience with Transfer to flow blocks. This approach allows you to reduce risk during change implementation, allow you to test single, smaller changes rather than regression testing the entire experience, and will make it easier to identify and address issues with your contact flows during testing.

- **Repositories**: Back up all versions of all flows to a repository of your choice using contact flow Import/Export as part of your change management process.
- **Distribute by percentage:** To reduce risk encountered during change management and experiment with new experiences for your contacts, you can use the **Distribute by percentage** block to route a subset of your traffic to new contact flows while leaving the other traffic on the original experience.

- **Measuring results:** Data driven decision making is key to successfully driving meaningful changes for your business. Having a key metric to measure your changes against is absolutely necessary. For all changes you’re making, you need to plan for how you will measure success. For example, if you’re implementing self-service functionality for your contacts, what percentage of contacts do you expect to self-serve to consider the workload successful or what other metrics are you measuring to determine success?

- **Rollbacks:** Ensure that there is a clear, well-defined, and well-understood process to back out any changes to the previous state, specific to the change performed. For example, if you publish a new contact flow version, ensure that the change instructions include documentation on how to roll back to the previous contact flow version.

### Routing profiles

Understanding how priority, delay, and overflow routing work within Amazon Connect is critical to maximizing agent productivity, reducing contact wait times, and ensuring the best quality of experience for your contacts.

### Routing in Amazon Connect

Contact routing in Amazon Connect is done through a collection of queues and routing configurations called a routing profile. A queue is equivalent to a skill or proficiency that agent needs to possess to service contacts for that queue. A routing profile can be viewed a set of skills that you can match to your contact's needs.

Within your contact flow, you can prompt for additional information and, if they need to reach an agent, you can use the contact flow configuration to place them in the appropriate queue. In the following example, Savings, Checking, and Loans are individual queues or skills and the three routing profiles are unique skillsets, or groups of skills:

Each agent is assigned to only one routing profile based on their skillset, and many agents with similar skillset can share the same routing profile:
Each phone number or chat endpoint will be associated with one contact flow. The contact flow executes its logic, which may involve prompting the customer for information, to determine the contact’s needs, and eventually routes the contact into an appropriate queue. The following diagram depicts how routing profile, queue, and contact flow work together to service a contact:

To illustrate how you might determine various queues, routing profiles, and agent assignments to the routing profiles, consider the following table:
On the top row, you’ve identified your skills or queues. In the left column, you have your list of agents, and in the middle, you’ve checked the skills supported by each of the agents. You can sort the matrix grouped by the common set of skill requirements across our agent population. This helps identify the routing profiles as one marked in the green box (which consists of two queues), which you can assign agents to. As a result of this exercise, you have identified four routing profiles, and assign your 13 agents to them accordingly.

Based on the previous table, an incoming call from a contact needing the Savings skill could be served by three groups of agents in the three routing profiles 1, 2, and 4 as depicted in the following diagram:

Priority and delay

Using the combination of priority and delay in different Routing Profiles, you can create flexible routing strategies.
The preceding routing profile example shows a set of queues, and their respective priority and delay. The lower the number, the higher the priority. All higher priority calls must be processed before a lower priority call will be processed. This is a difference from systems that will eventually process lower priority calls based upon a weighting factor.

You can also add a delay to each of the queues within each of the routing profiles. Any call coming into the queue will be held for the specified period of delay assigned to the designated queue. The call will be held for the delay period, even when agents are available. You might use this in situations where you have a group of agents who are reserved to help you meet your Service Level Agreements (SLAs), but are otherwise assigned to other tasks or queues. If a call doesn’t get answered within a specified period of time, these agents would become eligible to receive a call from the designated queue. For example, consider the following diagram:

This diagram shows an SLA of 30 seconds. A call comes in for the Savings queue. The Savings queue immediately looks for an agent in the “Savings” routing profile due to the configuration of 0 delay in the profile for the queue. Because of the configuration of 15 delay for Senior Agents, they will not be eligible to receive the Savings contact for 15 seconds. After 15 seconds elapses, the contact becomes available for a Senior Level agent and Amazon Connect looks for the Longest Available across both routing profiles.
Path to service

When you are designing customer experiences in Amazon Connect, plan to ensure a path to service. There are many planned and unplanned events that can impact the customer experience as they traverse through Amazon Connect contact flows. The following sample customer experience shows some suggested checks to ensure a consistent quality experience for your contacts:

This sample customer experience takes into account planned events such as Holidays and Business hours as well as unplanned events, like agents not staffed during business hours. With this logic, you can also account for emergency situations, such as contact center closures because of inclement weather or service disruptions. Consider the following concepts as illustrated in the diagram:

- **Self-service**: In a typical IVR, you can include any greetings and disclaimer messages such as call recording announcements upfront, which can be followed by self-service options. Self-service brings cost and performance optimizations for your contact center and enables your organization to serve customers 24x7, regardless of holidays, business hours, or availability of agents. Always include a path to service in case customers are unable to self-serve and need human assistance. For example, if you are using Amazon Lex bots for self-service, you can make use of fallback intents to escalate conversations for human assistance.
• **Holidays**: Many enterprise customers have a central repository that holds corporate holidays. You can use an AWS Lambda function to data dip into that repository and offer holiday treatment to customers. Additionally, you can also store corporate holidays in DynamoDB along with a custom message for each holiday. For example, if your enterprise observes December 25 as Christmas, you could have a holiday prompt or Text to Speech, "We are currently closed for Christmas. Please call back on December 26 when our normal business hours will resume."

[Diagram showing Amazon Connect, Lambda, and DynamoDB]

• **Business hours**: After holidays have been verified, you can check for business hours and, if outside of business hours, you can change the experience dynamically for your contacts. If the contact occurs during business hours, you can identify customer intent for calls and map to certain queues in your contact center, increasing the likelihood of getting to the correct agent, and decreasing the amount of time it takes your contact to reach service. It is highly recommended to map defaults as customers could be calling for a reason you haven't accounted for yet or may respond in a way you don’t expect.

• **Emergency messages**: After you have identified customer intent for call, it is suggested to implement an emergency check treatment. In the event of an emergency situation that impacts your contact center, you can store an emergency True/False flag in an intermediary database like DynamoDB. To allow your supervisors and administrators to set this flag dynamically, with no code, you can build a separate IVR that authenticates your Amazon Connect administrators based upon ANI and PIN number verification for internal use only. In the event of emergency, your supervisors can call into that dedicated line from their phones and after authentication set the Emergency flag to true for scenarios such as contact center closure due to inclement weather or ISP outage at the physical location of contact center.

• **Emergency message API**: You can also consider building an AWS API gateway with AWS Lambda function at the back end to set the Emergency flag to true/false securely in the database. Your supervisors can securely access that API through web to toggle disaster mode or dynamically toggle it in response to an external event. In your Amazon Connect instance, every contact that comes in through the contact flow will use AWS Lambda to check for that emergency flag and, in case of disaster mode, you can dynamically make announcements and provide a customer with a path to service. This will further ensure business continuity and mitigate the impact of situations like these from affecting your customers.

• **Check agent staffing**: Before transferring to the queue in your contact flow, you can check agent staffing to ensure that an agent is logged in to service the contact. For example, you may have an agent busy servicing another contact that might become available in the next five minutes, or you may not have anyone logged into the system at all. During these instances, you will prefer a different customer experience rather than making them wait in the queue for an agent to become available.

• **Route to service**: When you transfer the call to the queue, you can offer queued callbacks, queue overflows, or tiered routing using Amazon Connect routing profiles to offer a consistent, high-quality experience for your callers that meet your Service Level requirements.

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**Resources**

**Documentation**
Security: Design principles for developing a secure contact center

Security includes the ability to protect information, systems, and assets while delivering business value through risk assessments and mitigation strategies. This section provides an overview of design principles, best practices, and questions surrounding security for Amazon Connect workloads.

Amazon Connect Security Journey

After you've made the decision to move your workload to Amazon Connect, in addition to reviewing Security in Amazon Connect (p. 814) and Security Best Practices for Amazon Connect (p. 860), follow these guidelines and steps to understand and implement your security requirements relative to the following core security areas:

Understanding the AWS Security Model

When you move computer systems and data to the cloud, security responsibilities become shared between you and AWS. AWS is responsible for securing the underlying infrastructure that supports the cloud, and you're responsible for anything you put on the cloud or connect to the cloud.
Which AWS services you use will determine how much configuration work you have to perform as part of your security responsibilities. When you use Amazon Connect, the shared model reflects AWS and customer responsibilities at a high-level, as shown in the following diagram.

**AWS Shared Responsibility Model for Amazon Connect**

**Compliance Foundations**

Third-party auditors assess the security and compliance of Amazon Connect as part of multiple AWS compliance programs. These include SOC, PCI, HIPAA, C5 (Frankfurt), and HITRUST CSF.

For a list of AWS services in scope of specific compliance programs, see AWS Services in Scope by Compliance Program. For general information, see AWS Services Compliance Programs.
Region selection

Region selection to host the Amazon Connect instance depends on data sovereignty restrictions and where the contacts and agents are based. After that decision is made, review network requirements for Amazon Connect and ports and protocols that you need to allow. Additionally, to reduce the blast radius use the domain allow list or allowed IP address ranges for your Amazon Connect instance.

For more information, see Set up your network (p. 496).

AWS services integration

We recommend reviewing each AWS service in your solution against the security requirements of your organization. See the following resources:

- Security in AWS Lambda
- Security and Compliance in DynamoDB
- Security in Amazon Lex

Data Security in Amazon Connect

During your security journey, your security teams may require a deeper understanding of how data is handled in Amazon Connect. See the following resources:

- Detailed network paths for Amazon Connect (p. 503)
- Infrastructure security in Amazon Connect (p. 860)
- Compliance validation in Amazon Connect (p. 858)

Workload diagram

Review your workload diagram and architect an optimum solution on AWS. This includes analyzing and deciding which additional AWS services should be included in your solution and any third-party and on-premises applications that need to be integrated.

For example, a workload for automatically distributing scheduled reports for Amazon Connect stores the scheduled reports in an S3 bucket. A CloudWatch event initiates an AWS Lambda function when a new report is added to the S3 bucket. It then sends an email with the report attached. The following workload diagram shows Amazon Connect along with AWS Lambda, Amazon S3, Amazon CloudWatch, and Amazon Simple Email Service (Amazon SES).
AWS Identity and Access Management (IAM)

Types of Amazon Connect Personas

There are four types of Amazon Connect personas, based on the activities being performed.

1. IAM administrator – IAM administrators create or modify Amazon Connect resources and may also delegate administrative access to other principals. The scope of this persona is focused on creating and administering your Amazon Connect instance.

2. Amazon Connect administrator – Service administrators determine which Amazon Connect features and resources employees should access within the Amazon Connect console. The service administrator assigns security profiles to determine who can access the Amazon Connect console and what tasks they can perform. The scope of this persona is focused on creating and administering your Amazon Connect contact center.

3. Amazon Connect agent – Agents interact with Amazon Connect to perform their job duties. Service users may be contact center agents or supervisors.

4. Amazon Connect Service contact – The customer who interacts with your Amazon Connect contact center.

IAM Administrator Best Practices

IAM Administrative access should be limited to approved personnel within your organization. IAM administrators should also understand what IAM features are available to use with Amazon Connect. For IAM best practices, see Security best practices in IAM in the IAM User Guide. Also see Amazon Connect identity-based policy examples (p. 840).

Amazon Connect Service Administrator Best Practices

Service administrators are responsible for managing Amazon Connect users, including adding users to Amazon Connect give them their credentials, and assign the appropriate permissions so they can access
Detective controls

the features needed to do their job. Administrators should start with a minimum set of permissions and grant additional permissions as necessary.

Security profiles (p. 611) help you manage who can access the Amazon Connect dashboard and Contact Control Panel, and who can perform specific tasks. Review the granular permissions granted within the default security profiles available natively. Custom security profiles can be set up to meet specific requirements. For example, a power agent who can take calls but also has access to reports. After this is finalized, users should be assigned to the correct security profiles.

Multi-Factor Authentication

For extra security, we recommend that you require multi-factor authentication (MFA) for all IAM users in your account. MFA can be set up through AWS IAM or your SAML 2.0 identity provider, or Radius server, if that's more applicable for your use case. After MFA is set up, a third text box becomes visible on the Amazon Connect login page to provide the second factor.

Identity Federation

In addition to storing users in Amazon Connect, you can enable single sign-on (SSO) to Amazon Connect (p. 124) by using identity federation. Federation is a recommended practice to allow for employee lifecycle events to be reflected in Amazon Connect when they are made in the source identity provider.

Access to Integrated Applications

Steps within your contact flows may need credentials to access information in external applications and systems. To provide credentials to access other AWS services in a secure way, use IAM roles. An IAM role is an entity that has its own set of permissions, but that isn't a user or group. Roles also don't have their own permanent set of credentials and are automatically rotated.

Credentials such as API keys should be stored outside of your contact flow application code, where they can be retrieved programmatically. To accomplish this, you can use AWS Secrets Manager or an existing third-party solution. Secrets Manager enables you to replace hardcoded credentials in your code, including passwords, with an API call to Secrets Manager to retrieve the secret programmatically.

Detective controls

Logging and monitoring are important for the availability, reliability and, performance of contact center. You should log relevant information from Amazon Connect contact flows to Amazon CloudWatch and build alerts and notifications based on the same.

You should define log retention requirements and lifecycle policies early on, and plan to move log files to cost-efficient storage locations as soon as practical. Amazon Connect public APIs log to AWS CloudTrail. You should review and automate actions set up based on CloudTrail logs.

Amazon S3 is the best choice for long-term retention and archiving of log data, especially for organizations with compliance programs that require log data to be auditable in its native format. After log data is in an S3 bucket, define lifecycle rules to automatically enforce retention policies and move these objects to other, cost-effective storage classes, such as Amazon S3 Standard - Infrequent Access (Standard - IA) or Amazon S3 Glacier.

The AWS cloud provides flexible infrastructure and tools to support both sophisticated in cooperation with offerings and self-managed centralized-logging solutions. This includes solutions such as Amazon OpenSearch Service and Amazon CloudWatch Logs.

Fraud detection and prevention for incoming contacts can be implemented by customizing Amazon Connect contact flows per the customer requirements. As an example, customers can check incoming contacts against previous contact activity in DynamoDB, and then take action, such as disconnecting a contact because they are a blocked contact.
Infrastructure protection

Although there is no infrastructure to manage in Amazon Connect, there could be scenarios where your Amazon Connect instance needs to interact with other components or applications deployed in infrastructure residing on-premises. Consequently, it is important to ensure that networking boundaries are considered under this assumption. Review and implement specific Amazon Connect infrastructure security considerations. Also, review contact center agent and supervisor desktops or VDI solutions for security considerations.

You can configure a Lambda function to connect to private subnets in a virtual private cloud (VPC) in your account. Use Amazon Virtual Private Cloud to create a private network for resources such as databases, cache instances, or internal services. Amazon Connect your function to the VPC to access private resources during execution.

Data protection

Customers should analyze the data traversing through and interacting with the contact center solution.

- Third party and external data
- On-premises data in hybrid Amazon Connect architectures

After analyzing the scope of the data, data classifications should be performed paying attention to identifying sensitive data. Amazon Connect conforms to the AWS shared security model. Data protection in Amazon Connect (p. 814) includes best practices like using MFA and TLS and the use of other AWS services, including Amazon Macie.

Amazon Connect handles variety of data related to contact centers (p. 815). This includes phone call media, call recordings, chat transcripts, contact metadata as well as contact flows, routing profiles and queues. Amazon Connect handles data at rest by segregating data by account ID and instance ID. All data exchanged with Amazon Connect is protected in transit between the user’s web browser and Amazon Connect using open standard TLS encryption.

You can specify AWS KMS keys to be used for encryption including bring your own key (BYOK). Additionally, you can use key management options within Amazon S3.

Protecting Data Using Client-Side Encryption

Your use case may require encryption of sensitive data that is collected by contact flows. For example, to gather appropriate personal information to customize the customer experience when they interact with your IVR. To do this you can use public-key cryptography with the AWS Encryption SDK. The AWS Encryption SDK is a client-side encryption library designed to make it efficient for everyone to encrypt and decrypt data using open standards and best practices.

Input validation

Perform input validation to ensure that only properly formed data is entering the contact flow. This should happen as early as possible in the contact flow. For example, when prompting a customer to say or enter a telephone number, they may or may not include the country code.

Amazon Connect security vectors

Amazon Connect security can be divided into three logical layers as illustrated in the following diagram:
1. **Agent workstation.** The agent workstation layer is not managed by AWS and consists of any physical equipment and third-party technologies, services, and endpoints that facilitate your agent’s voice, data, and access the Amazon Connect interface layer. 

Follow your security best practices for this layer with special attention to the following:

- Mitigate insider threat and compliance risk associated with workloads that handle sensitive information, by creating a secure IVR solution that enables you to bypass agent access to sensitive information. By encrypting contact input in your contact flows, you’re able to capture information securely without exposing it to your agents, their workstations, or their operating environments. For more information, see Encrypt customer input (p. 437).
- You are responsible for maintaining the allow list of AWS IP addresses, ports, and protocols needed to use Amazon Connect.

2. **AWS:** The AWS layer includes Amazon Connect and AWS integrations including AWS Lambda, Amazon DynamoDB, Amazon API Gateway, Amazon S3, and other services. Follow the security pillar guidelines for AWS services, with special attention to the following:

- Integrations with other AWS services: Identify each AWS service in the use case as well as any third-party integration points applicable for this use case.
• Amazon Connect can integrate with AWS Lambda functions that run inside of a customer VPC through the VPC endpoints for Lambda.

3. **External**: The External layer includes contact points including chat, click-to-call endpoints, and the PSTN for voice calls, integrations you may have with legacy contact center solutions in a Hybrid contact center architecture, and integrations you may have with other third-party solutions. Any entry point or exit point for a third party in your workload is considered the external layer.

This layer also covers integrations customers may have with other third-party solutions and applications such as CRM systems, work force management (WFM), and reporting and visualization tools and applications, such as Tableau and Kibana. You should consider the following areas when securing the external layer:

- You can create contact filters for repeat and fraudulent contacts using AWS Lambda to write contact details to DynamoDB from within your contact flow, including ANI, IP address for click-to-dial and chat endpoints, and any other identifying information to track how many contact requests occur during a given period of time. This approach allows you to query and add contacts to deny lists, automatically disconnecting them if they exceed reasonable levels.
- ANI Fraud detection solutions using Amazon Connect telephony metadata (p. 453) and partner solutions can be used to protect against caller ID spoofing.
- Amazon Connect Voice ID (p. 689) and other voice biometric partner solutions can be used to enhance and streamline the authentication process. Active voice biometric authentication allows contacts the option to speak specific phrases and use those for voice signature authentication. Passive voice biometrics allow contacts to register their unique voiceprint and use their voiceprint to authenticate with any voice input that meets sufficient length requirements for authentication.
- Maintain the application integration (p. 507) section in the Amazon Connect console for adding any third-party application or integration points to your allow list, and remove unused endpoints.
- Send only the data necessary to meet minimum requirements to external systems that handle sensitive data. For example, if you have only one business unit using your call recording analytics solution, you can set an AWS Lambda trigger in your S3 bucket to process contact trace records (CTRs), check for the business unit's specific queues in the CTR data, and if it is a queue that belongs to the unit, send only that call recording to the external solution. With this approach, you only send the data necessary and avoid the cost and overhead associated with processing unnecessary recordings.

For an integration that enables Amazon Connect to communicate with Amazon Kinesis and Amazon Redshift to enable the streaming of contact trace records (CTRs), see Amazon Connect integration: Data streaming.

**Resources**

**Documentation**

- AWS Cloud Security
- Security in Amazon Connect (p. 814)
- IAM Best Practices
- AWS Compliance
- AWS Security blog

**Whitepaper**

- Security Pillar
- AWS Security Overview
- AWS Security Best Practices
Reliability

Reliability includes the ability of a system to recover from infrastructure or service disruptions, dynamically acquire computing resources to meet demand, and mitigate disruptions such as misconfigurations or transient network issues. As resiliency is handled as part of the service, there are no reliability practices unique to Amazon Connect beyond of what is covered in Operational Excellence (p. 93). You can find prescriptive guidance on implementation in the Reliability Pillar whitepaper.

Resources

Documentation

- AWS Service quotas
- Resilience in Amazon Connect (p. 859)
- Amazon CloudWatch

Whitepaper

- Reliability Pillar

Video

- Embracing Failure: Fault-Injection and Service Reliability

Product

- Trusted advisor: An online tool that provides you real-time guidance to help you provision your resources following AWS best practices.

Performance efficiency

Performance efficiency includes the ability to use computing resources efficiently to meet system requirements, and to maintain that efficiency as demand changes and technologies evolve. This section provides an overview of design principles, best practices, and questions surrounding performance efficiency for Amazon Connect workloads. You can find prescriptive guidance on implementation in the Performance Efficiency Pillar whitepaper.

Architectural design

There are two fundamental architectural design principles to consider when designing experiences for the contact center:

- Reductionism is a philosophical tenet stating that by analyzing a system to its ultimate component parts, you can unravel it at deeper levels.
- Holism, in contrast, states that by considering the whole picture one gets a deeper and more complete view of a situation than by analyzing it into its component parts.

The reductionist approach focuses on each individual component (IVR, ACD, Speech Recognition) on its own and often results in a disjointed customer experience that, when evaluated individually, may meet performance requirements for the use case. However, when evaluated end-to-end, can result in decreased quality of experience for your contacts while funneling development efforts into operational silos. This approach complicates regression testing, increases time to market, and limits the development of cross-discipline operational resources critical to the success of your contact center.

A holistic view of the contact center is shown in the following diagram:
reaching your company. This can be accomplished through dynamic data-driven contact design and routing, resulting in an experience that conforms to your contact and their individual needs.

You can start with the default experience, building out your contact flows, but refactoring your single contact flow into two to enable future segmentation:

In your next iteration, identify additional experiences that you need to plan for and build routing and, if necessary, contact flows for each. For example, you may want to play different prompts for a contact that is past due on their bill or that may have tried to contact multiple times for the same purpose. With this approach, you are working towards personalized, dynamic experiences that are pertinent to your contacts and why they are contacting you. In addition to improving the quality of experience for your contacts and decreasing handle times, you're encouraging contact self-service by providing a more intelligent and flexible experience. Your next iteration may look like the following illustration:
A contact flow defines the customer experience with your contact center from start to finish. Your contact flow configuration can have a direct impact on performance, operational efficiency, and ease of maintenance.

Many large businesses support multiple phone numbers, business units, prompts, queues, and other Amazon Connect resources. While it is possible to have unique contact flows for each phone number and line of business, it can lead to a one-to-one mapping of phone numbers and contact flows. This results in unnecessary service quota requests and a large number of contact flows to support and maintain. A one-to-one mapping of DNIS and Contact flow implementation is illustrated in the following figure:
Alternatively, you should consider an approach that results in Multiple DNIS to one or few contact flows by using the dynamic nature of Amazon Connect contact flows. With this approach, you can store configuration information like Prompts, Queues, Business Hours, Whisper Prompts/Flows, Queues, Queue Treatments and Hold Messages etc., in NoSQL Database DynamoDB. In Amazon Connect, you can associate multiple phone numbers to the same contact flow and use the Lambda function to look up configurations for that phone number. This allows you to dynamically define the contact's experience based on the attributes returned from DynamoDB.

For example, you can play prompts or use Text-to-Speech (TTS) to greet callers based upon the lookups in DynamoDB or associate queues using dynamic attributes supported in contact flow blocks. The result with this approach is a contact flow implementation that is efficient to build, maintain, and support:
Load testing

If you need to run load or scale testing, you can employ third-party or partner solutions to run load tests, or develop your own custom solution using the Amazon Connect StartOutboundVoiceContact API to generate calls combined with browser automation scripts to simulate agent behavior. Before performing load tests, review and follow the Amazon Connect Load Testing Policy.

Agent enablement

Amazon Connect provides a readily available browser-based Contact Control Panel (CCP) for agents to interact with customer contacts. Your agents use the CCP to accept contacts, chat with contacts, transfer them to other agents, put them on hold, and perform other key tasks. You can realize significant performance efficiency through the creation of custom agent desktop solutions using the Amazon Connect Streams API. Consider using the Streams API to increase performance efficiency in the following areas:

- **CRM integration** - The Streams API allows you to embed the CCP in your CRM application, create your own interface, or integrate with other AWS services and partner solutions to provide your agents with the tools and resources they need to service your contacts. With a custom desktop, like the Amazon Connect and Salesforce integration (p. 268), your agents can get a comprehensive view of customer and contact in a single interface without managing multiple screens and interfaces.
- **Authentication** - You can configure SAML for identity management in Amazon Connect and use AWS SSO (SSO) to allow your agents to use the same credentials they use to access your other systems and avoid the need to enter them multiple times.
- **Agent automation** - In addition to streamlining your agent experience, you can automate common, repeatable tasks. For example, automatically creating cases or pre-filling webforms and offering a screen pop with relevant information when a contact is offered. This can reduce handle times and improve the quality of experience for your agents and contacts.
- **Enhanced capabilities** - You can also enhance/extend the CCP functionality to include real-time Transcriptions, Translations, Suggested Actions and Knowledge base integrations. Integrating enhanced capabilities with your agent desktop will allow skilled agents to service contacts more efficiently and unskilled agents to provide service when skilled agents aren’t available. For example, you can use this approach to automatically translate a chat contact for unskilled agent that doesn’t know the language. When your agent replies, you can automatically translate the text to the contact’s language, allowing for real-time bilingual communication.

Using other AWS services

This section discusses AWS services that you can use to improve performance, identify areas of opportunity, and gain valuable insights into your contact data.

**AWS Lambda**

You can use AWS Lambda in your Amazon Connect contact flows to perform data dops for customer information, send SMS text messages, and with other services like Amazon S3 to automatically distribute scheduled reports. For more information, see Best Practices for Working with AWS Lambda functions.

**AWS Direct Connect**

AWS Direct Connect is a cloud service solution that makes it more efficient to establish a dedicated network connection from your premises to AWS. It provides a durable, consistent connection rather than relying on your ISP to dynamically route requests to AWS resources. It allows you to configure your edge router to redirect AWS traffic across dedicated fiber rather than traversing the public WAN and establish
private connectivity between AWS and your data center, office, or colocation environment. In many cases, this can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based connections.

While AWS Direct Connect does not solve issues specific to private LAN/WAN traversal to your edge router, it can help solve for latency and connectivity issues between your edge router and AWS resources. It can also solve for latency and poor call quality between your edge router and AWS resources. Depending on your VDI environment, you may not be able to take advantage of AWS Direct Connect as it requires you to configure your edge router to redirect AWS traffic across dedicated fiber rather than traversing the public WAN. If the VDI environment is hosted outside of your local DXC-enabled network, you may not be able to take full advantage of AWS Direct Connect.

Do not use AWS Direct Connect for “QoS” or “increased security.” AWS Direct Connect can cause performance degradation in cases where the latency from the agent workstation is higher than the ISP’s path to the Amazon Connect instance. AWS Direct Connect does not offer additional security when compared to an ISP as Amazon Connect voice and data is already encrypted.

Amazon Polly

Amazon Connect offers a native integration with Amazon Polly, allowing you to play dynamic and natural Text-to-Speech (TTS), use Speech Synthesis Markup Language (SSML), and take advantage of Neural Text-to-Speech (NTTS) to achieve the most natural and human-like text-to-speech voices possible.

Amazon Lex

Your contact’s path to service can be a challenging experience that doesn’t always meet up to their expectations. Your contacts may wait on hold, repeat information, need to be transferred, and ultimately, spend too much time getting what they need. AI is playing a role in improving this customer experience in call centers to include engagement through chatbots — intelligent, natural language virtual assistants. These chatbots are able to recognize human speech and understand the caller’s intent without requiring the caller to speak in specific phrases. Contacts can perform tasks such as changing a password, requesting a balance on an account, or scheduling an appointment without ever speaking to an agent.

Amazon Lex is a service that allows you to create intelligent conversational chatbots. It lets you turn your Amazon Connect contact center contact flows into natural conversations that provide personalized experiences for your callers. Using the same technology that powers Amazon Alexa, an Amazon Lex chatbot can be attached to your Amazon Connect contact flow to recognize the intent of your caller, ask follow-up questions, and provide answers. Amazon Lex maintains context and manages the dialogue, dynamically adjusting the responses based on the conversation, so your contact center can perform common tasks for callers, to address many customer inquiries through self-service interactions. Additionally, Amazon Lex chatbots support an optimal (8 kHz) telephony audio sampling rate, to provide increased speech recognition accuracy and fidelity for your contact center voice interactions.

Building an effective Amazon Lex bot requires providing simple and realistic utterances as training sets to the bot, periodically reviewing your bot’s performance, updating your utterance set, and modifying the bot based on such a review. For more information, see the following resources:

- Monitoring in Amazon Lex
- Building Better bots using Amazon Lex

Amazon Kinesis

For situations where you need to gain additional insight from your contact metrics and real-time data from Amazon Connect, you can:
• Export your Contact Trace Record (CTR) data to Amazon Redshift using Amazon Kinesis.
• Use Amazon Kinesis video stream (KVS) and AWS Lambda to transcribe call recordings or voice contacts in real-time using Amazon Transcribe and send the resulting text to Amazon Comprehend for sentiment analysis.
• Leverage the Amazon Connect Agent Event Kinesis Stream (p. 754) for real-time agent CTI and schedule adherence data.

Amazon OpenSearch Service and Kibana

Using Amazon OpenSearch Service and Kibana to process real-time Amazon Connect data gives you a flexible way to query and visualize real-time and historical Amazon Connect data beyond native reporting capabilities.

Amazon Connect Contact Lens

Contact Lens for Amazon Connect is a set of machine learning (ML) capabilities integrated into Amazon Connect that allow contact center supervisors to better understand the sentiment, trends, and compliance risks of customer conversations to effectively train agents, replicate successful interactions, and identify crucial company and product feedback. Contact Lens for Amazon Connect transcribes contact center calls to create a fully searchable archive and surface valuable customer insights.

Resources

Documentation
• Best practices design patterns: optimizing Amazon S3 performance
• Amazon EBS volume performance on Linux instances

Whitepaper
• Performance Efficiency Pillar

Video
• AWS re:Invent 2016: Scaling Up to Your First 10 Million Users (ARC201)
• AWS re:Invent 2017: Deep Dive on Amazon EC2 Instances

Cost optimization

Cost Optimization includes the ability to run systems to deliver business value at the lowest price point. This section provides an overview of design principles, best practices, and questions surrounding cost optimization for Amazon Connect workloads. You can find prescriptive guidance on implementation in the Cost Optimization Pillar whitepaper.

There are five areas to consider for cost optimization for Amazon Connect workloads.

Region selection

Amazon Connect Region selection is one of the first decision customers make when adopting Amazon Connect for their contact center workloads. While latency and voice quality are important aspects to
Region selection, you should evaluate Region selection from a cost perspective as well. Telephony pricing for Claimed Phone Numbers Per Day and Per Minute Inbound Usage can be different for countries depending upon the AWS Region in which you select to instantiate your Amazon Connect Instance. You can find telephony price for each Region at Amazon Connect Pricing page.

There may be scenarios where Region selection can result in significant cost savings without compromising call quality and latency. For example, your customers could be based in Spain calling Spanish phone numbers on Amazon Connect. Your agents may be located in Mexico to take those phone calls. During Region selection, you could opt for US East (N. Virginia) Region for its obvious proximity to agents. However, using the EU (Frankfurt) Region for Amazon Connect can result in significant cost savings in telephony usage thus reducing your overall Amazon Connect bill.

**Callbacks**

You can provide a callback in your contact flow for callers during high call volume periods or long wait times. You can use callbacks to reduce cost and improve the quality of experience for your contacts. When your contact opts-in for the callback, Amazon Connect will retain the position in the queue and allow the caller to disconnect. When an agent becomes available to service your contact, Amazon Connect will place an outbound call to the number configured to connect the contact to your agent. A sample callback contact flow is included in every instance at creation. You can also use AWS Lambda and Amazon DynamoDB to prevent duplicate callback requests.

**Storage**

With Amazon Connect, you can configure your instance and contact flows to store call recordings and chat transcripts of caller's interactions for compliance, quality monitoring, and training purposes. Voice contacts are not recorded unless an agent is connected to the caller. If multiple agents are connected, each will have an associated call recording or transcript. Amazon Connect stores voice recordings in Amazon S3 according to your Amazon S3 Lifecycle policy configuration. With the call recordings stored in Amazon S3, you can use Amazon S3 tiers of storage to manage retention and optimize cost. For example, you can transition objects using Amazon S3 Lifecycle to move call recordings and transcripts over three months old to S3 Glacier to reduce storage cost.

**Self-service**

Amazon Connect’s pay-as-you-go pricing model can result in lower costs as compared to traditional licensing-based contact centers. However, the traditional contact center infrastructure that spans automatic call distribution (ACD) systems, IVR, telephony and work force management (WFM) systems plays a proportionately small contribution to the overall cost of contact center operations. The largest contributor to the cost of the contact center often comes from human capital and the real estate required to provide an operating environment for your agents. Amazon Connect contact flows can be used natively with Amazon Lex for NLU, NLP, and ASR and Amazon Polly for lifelike Text-to-Speech (TTS) to build highly engaging user experiences and natural conversational interactions across voice and text. By using an Amazon Lex chatbot in your Amazon Connect call center, callers can perform tasks such as changing a password, requesting a balance on an account, or scheduling an appointment, without needing to speak to an agent. These self-service options result in better customer experience and lowers your cost per contact.
Click-to-call

You can use click-to-call in Amazon Connect to initiate a voice call using the StartOutboundVoiceContact API for authentication through web or mobile application to reduce call handle times and improve the quality of experience. With this approach, you’re able to offer your contact the ability to bypass IVR authentication, pass contextual information like URLs, recent web/mobile activity, and user data to your contact flows to create dynamic, personalized experiences. For example, a contact browsing your website to purchase an item or member of a financial institution who is already authenticated in the mobile app and wants to speak with an agent about a recent transaction.

Redirect voice contacts to chat

With Amazon Connect, you can allow agents to handle multiple chat conversations simultaneously where they would only able to handle one voice conversation. When you don’t have a voice agent available, you can send an SMS text message to your customer to offer a link to chat with an agent right away.

Resources

Documentation
- Analyzing Your Costs with Cost Explorer
- AWS Cloud Economics Center
- What are AWS Cost and Usage Reports

Whitepaper
- Cost Optimization Pillar
Plan your identity management in Amazon Connect

Before you set up your Amazon Connect instance (p. 134), you should decide how you want to manage your Amazon Connect users. **You cannot change the option you select for identity management after you create the instance.**

If you want to change the option or directory you selected, you can delete the instance and create a new one. When you delete an instance, however, you lose all configuration settings and metrics data for it.

Amazon Connect is integrated with AWS Directory Service. When you create your instance, you’ll be prompted to choose from one of the following identity management solutions supported in Amazon Connect:

- **Store users with Amazon Connect**—Choose this option if you want to create and manage user accounts within Amazon Connect. An AWS Directory Service instance will be created in your AWS account.

  When you manage users in Amazon Connect, the user name and password for each user is specific to Amazon Connect. Users must remember a separate user name and password to log in to Amazon Connect.

- **Link to an existing directory**—Choose this option to use an existing Active Directory. Users will log in to Amazon Connect using their corporate credentials.

  If you choose this option, the directory must be associated with your account, set up in AWS Directory Service, and be active in the same Region in which you create your instance. If you plan to choose this option, you should prepare your directory before you create your Amazon Connect instance. For more information, see Use an existing directory for identity management (p. 123).

- **SAML 2.0-based authentication**—Choose this option if you want to use your existing network identity provider to federate users with Amazon Connect. Users can only log in to Amazon Connect by using the link configured through your identity provider. If you plan to choose this option, you should configure your environment for SAML before you create your Amazon Connect instance. For more information, see:
  - Configure SAML with IAM for Amazon Connect (p. 124)

Use an existing directory for identity management

If you are already using a AWS Directory Service directory to manage users, you can use the same directory to manage user accounts in Amazon Connect. You can also create a new directory in AWS Directory Service to use for Amazon Connect. The directory you choose must be associated with your AWS account, and must be active in the AWS Region in which you create your instance. You can associate an AWS Directory Service directory with only one Amazon Connect instance at a time. To use the directory with a different instance, you must delete the instance with which it is already associated.

The following AWS Directory Service directories are supported in Amazon Connect:

- **Microsoft Active Directory**—AWS Directory Service lets you run Microsoft Active Directory as a managed service.
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Configure SAML with IAM for Amazon Connect

- **Active Directory Connector**—AD Connector is a directory gateway you can use to redirect directory requests to your on-premises Microsoft Active Directory.
- **Simple Active Directory**—Simple AD is a standalone managed directory that is powered by a Samba 4 Active Directory compatible server.

You cannot change the identity option you select after you create the instance. If you decide to change the directory you selected, you can delete the instance and create a new one. When you delete an instance, you lose all configuration settings and metrics data for it.

There is no additional charge for using an existing or a proprietary directory in Amazon Connect. For information about the costs associated with using AWS Directory Service, see AWS Directory Service Pricing Overview.

The following limitations apply to all new directories created using AWS Directory Service:

- Directories can only have alphanumeric names. Only the '.' character can be used.
- Directories cannot be unbound from an Amazon Connect instance after they have been associated.
- Only one directory can be added to an Amazon Connect instance.
- Directories cannot be shared across multiple Amazon Connect instances.

## Configure SAML with IAM for Amazon Connect

Amazon Connect supports identity federation by configuring Security Assertion Markup Language (SAML) 2.0 with AWS IAM to enable web-based single sign-on (SSO) from your organization to your Amazon Connect instance. This allows your users to sign in to a portal in your organization hosted by a SAML 2.0 compatible identity provider (IdP) and log in to an Amazon Connect instance with a single sign-on experience without having to provide separate credentials for Amazon Connect.

### Important notes

Before you begin, note the following:

- Choosing SAML 2.0-based authentication as the identity management method for your Amazon Connect instance requires the configuration of AWS Identity and Access Management federation.
- The user name in Amazon Connect must match the RoleSessionName SAML attribute specified in the SAML response returned by the identity provider.
- An Amazon Connect user can only be associated with a single AWS IAM Role. Changing the AWS IAM Role used for federation will cause previously federated users to fail on login. For more information about Identity and Access Management user and role management, see IAM roles.

### Overview of using SAML with Amazon Connect

The following diagram shows the flow for SAML requests to authenticate users and federate with Amazon Connect.
SAML requests go through the following steps:

1. The user browses to an internal portal that includes a link to log in to Amazon Connect. The link is defined in the identity provider.
2. The federation service requests authentication from the organization's identity store.
3. The identity store authenticates the user and returns the authentication response to the federation service.
4. When authentication is successful, the federation service posts the SAML assertion to the user's browser.
5. The user's browser posts the SAML assertion to the AWS sign in SAML endpoint (https://signin.aws.amazon.com/saml). AWS sign in receives the SAML request, processes the request, authenticates the user, and forwards the authentication token to Amazon Connect.
6. Using the authentication token from AWS, Amazon Connect authorizes the user and opens Amazon Connect in their browser.

**Enabling SAML-based authentication for Amazon Connect**

The following steps are required to enable and configure SAML authentication for use with your Amazon Connect instance:

1. Create an Amazon Connect instance and select SAML 2.0-based authentication for identity management.
2. Enable SAML federation between your identity provider and AWS.
3. Add Amazon Connect users to your Amazon Connect instance. Log in to your instance using the administrator account created when you created your instance. Go to the **User Management** page and add users.
Important
Due to the association of an Amazon Connect user and an AWS IAM Role, the user name must match exactly the RoleSessionName as configured with your AWS IAM federation integration, which typically ends up being the user name in your directory.

The format should match the intersection of the format conditions of the RoleSessionName and an Amazon Connect user, as shown in the following diagram:

Format:
- String: Upper- and lower-case alphanumeric characters with no spaces
- Length constraints: Minimum length of 2. Maximum length of 64.
- Special characters: @ - .

4. Configure your identity provider for the SAML assertions, authentication response, and relay state. Users log in to your identity provider. When successful, they are redirected to your Amazon Connect instance. The IAM role is used to federate with AWS, which allows access to Amazon Connect.

Select SAML 2.0-based authentication during instance creation

When you are creating your Amazon Connect instance, select the SAML 2.0-based authentication option for identity management. On the second step, when you create the administrator for the instance, the user name that you specify must exactly match a user name in your existing network directory. There is no option to specify a password for the administrator because passwords are managed through your existing directory. The administrator is created in Amazon Connect and assigned the Admin security profile.

You can log in to your Amazon Connect instance, through your IdP, using the administrator account to add additional users.
Enable SAML federation between your identity provider and AWS

To enable SAML-based authentication for Amazon Connect, you must create an identity provider in the IAM console. For more information, see Enabling SAML 2.0 Federated Users to Access the AWS Management Console.

The process to create an identity provider for AWS is the same for Amazon Connect. Step 6 in the above flow diagram shows the client is sent to your Amazon Connect instance instead of the AWS Management Console.

The steps necessary to enable SAML federation with AWS include:

1. Create a SAML provider in AWS. For more information, see Creating SAML Identity Providers.
2. Create an IAM role for SAML 2.0 federation with the AWS Management Console. Create only one role for federation (only one role is needed and used for federation). The IAM role determines which permissions the users that log in through your identity provider have in AWS. In this case, the permissions are for accessing Amazon Connect. You can control the permissions to features of Amazon Connect by using security profiles in Amazon Connect. For more information, see Creating a Role for SAML 2.0 Federation (Console).

   **Important**
   Replacing this Role causes previously federated users to fail at login because it breaks existing user logins due to the immutable Amazon Connect user association with the previous Role.

   In step 5, choose Allow programmatic and AWS Management Console access. Create the trust policy described in the topic in the procedure To prepare to create a role for SAML 2.0 federation. Then create a policy to assign permissions to your Amazon Connect instance. Permissions start on step 9 of the To create a role for SAML-based federation procedure.

To create a policy for assigning permissions to the IAM role for SAML federation

1. On the Attach permissions policy page, choose Create policy.
2. On the Create policy page, choose JSON.
3. Copy one of the following example policies and paste it into the JSON policy editor, replacing any existing text. You can use either policy to enable SAML federation, or customize them for your specific requirements.

   Use this policy to enable federation for all users in a specific Amazon Connect instance. For SAML-based authentication, replace the value for the Resource to the ARN for the instance that you created:

   ```json
   {
     "Version": "2012-10-17",
     "Statement": [
       {
         "Sid": "Statement1",
         "Effect": "Allow",
         "Action": "connect:GetFederationToken",
         "Resource": [
           "arn:aws:connect:us-east-1:361814831152:instance/2fb42df9-78a2-2e74-d572-c8af67ed289b/user/${aws:userid}"
         ]
       }
     ]
   }
   ```
Use this policy to enable federation to a specific Amazon Connect instances. Replace the value for the `connect:InstanceId` to the instance ID for your instance.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "Statement2",
            "Effect": "Allow",
            "Action": "connect:GetFederationToken",
            "Resource": "*",
            "Condition": {
                "StringEquals": {
                    "connect:InstanceId": "2fb42df9-78a2-2e74-d572-c8af67ed289b"
                }
            }
        }
    ]
}
```

Use this policy to enable federation for multiple instances. Note the brackets around the listed instance IDs.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "Statement2",
            "Effect": "Allow",
            "Action": "connect:GetFederationToken",
            "Resource": "*",
            "Condition": {
                "StringEquals": {
                    "connect:InstanceId": [
                        "2fb42df9-78a2-2e74-d572-c8af67ed289b",
                        "1234567-78a2-2e74-d572-c8af67ed289b"
                    ]
                }
            }
        }
    ]
}
```

4. After you create the policy, choose Next: Review. Then return to step 10 in the To create a role for SAML-based federation procedure in the Creating a Role for SAML 2.0 Federation (Console) topic.

3. Configure your network as a SAML provider for AWS. For more information, see Enabling SAML 2.0 Federated Users to Access the AWS Management Console.

4. Configure SAML Assertions for the Authentication Response. For more information, Configuring SAML Assertions for the Authentication Response.

5. For Amazon Connect, leave the Application Start URL blank.

6. Configure the relay state of your identity provider to point to your Amazon Connect instance. The URL to use for the relay state is comprised as follows:

   `https://region-id.console.aws.amazon.com/connect/federate/instance-id`

Replace the `region-id` with the Region name where you created your Amazon Connect instance, such as us-east-1 for US East (N. Virginia). Replace the `instance-id` with the instance ID for your instance.

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Use a destination in your relay state URL

When you configure the relay state for your identity provider, you can use the destination argument in the URL to navigate users to a specific page in your Amazon Connect instance. For example, use a link to open the CCP directly when an agent logs in. The user must be assigned a security profile that grants access to that page in the instance. For example, to send agents to the CCP, use a URL similar to the following for the relay state. You must use URL encoding for the destination value used in the URL:


Add users to your Amazon Connect instance

Add users to your connect instance, making sure that the user names exactly match the users names in your existing directory. If the names do not match, users can log in to the identity provider, but not to Amazon Connect because no user account with that user name exists in Amazon Connect. You can add users manually on the User management page, or you can bulk upload users with the CSV template. After you add the users to Amazon Connect, you can assign security profiles and other user settings.

When a user logs in to the identity provider, but no account with the same user name is found in Amazon Connect, the following Access denied message is displayed.

Bulk upload users with the template

You can import your users by adding them to a CSV file. You can then import the CSV file to your instance, which adds all users in the file. If you add users by uploading a CSV file, make sure that you use the template for SAML users. You can find on the User management page in Amazon Connect. A different template is used for SAML-based authentication. If you previously downloaded the template, you should download the version available on the User management page after you set up your instance with SAML-based authentication. The template should not include a column for email or password.

SAML user logging in and session duration

When you use SAML in Amazon Connect, users must log in to Amazon Connect through your identity provider (IdP). Your IdP is configured to integrate with AWS. After authentication, a token for their
session is created. The user is then redirected to your Amazon Connect instance and automatically logged in to Amazon Connect using single sign-on.

As a best practice, you should also define a process for your Amazon Connect users to log out when they are finished using Amazon Connect. They should log out from both Amazon Connect and your identity provider. If they do not, the next person that logs in to the same computer can log in to Amazon Connect without a password since the token for the previous sessions is still valid for the duration of the session, by default, 10 hours.

**About session expiration**

Amazon Connect sessions expire 10 hours after a user logs in. After 10 hours, users are automatically logged out, even if they are currently on a call. If your agents stay logged in for more than 10 hours, they need to refresh the session token before it expires. To create a new session, agents need to log out of Amazon Connect and your IdP and then log in again. This resets the session timer set on the token so that agents are not logged out during an active contact with a customer. When a session expires while a user is logged in, the following message is displayed. To use Amazon Connect again, the user needs to log in to your identity provider.

---

**Troubleshoot SAML with Amazon Connect**

This article explains how to troubleshoot and resolve some of the most common issues customers encounter when using SAML with Amazon Connect.

**Error Message: Access Denied. Your account has been authenticated, but has not been onboarded to this application.**

What does this mean?

This error means that the user has successfully authenticated via SAML into the AWS SAML login endpoint. However, the user could not be matched/found inside Amazon Connect. This usually indicates one of the following:

- The username in Amazon Connect doesn't match the `RoleSessionName` SAML attribute specified in the SAML response returned by the identity provider.
- The user doesn't exist in Amazon Connect.
Resolution

Use the following steps to check the RoleSessionName SAML attribute specified in the SAML response returned by the identity provider, and then retrieve and compare with the login name in Amazon Connect.

1. Perform a HAR capture (HTTP ARchive) for the end-to-end login process. This captures the network requests from the browser side. Save the HAR file with your preferred file name, for example, saml.har.

   For instructions, see How do I create a HAR file from my browser for an AWS Support case?

2. Use a text editor to find the SAMLResponse in the HAR file. Or, run the following commands:

   ```bash
   $ grep -o "SAMLResponse=.*&" azuresaml.har | sed -E 's/SAMLResponse=(.*)&/
   \1/' > samlresponse.txt
   ```

   • This searches for the SAMLResponse in the HAR file and saves it to a samlresponse.txt file.
   • The response is URL encoded and the contents are Base64 encoded.

3. Decode the URL response and then decode the Base64 contents using a third-party tool or a simple script. For example:

   ```bash
   $ cat samlresponse.txt | python3 -c "import sys; from urllib.parse
   import unquote; print(unquote(sys.stdin.read()));" | base64 --decode >
   samlresponsedecoded.txt
   ```

   This script uses a simple python command to decode the SAMLResponse from its original URL encoded format. Then it decodes the response from Base64 and outputs the SAML Response in plain text format.

4. Check the decoded response for the needed attribute. For example, the following image shows how to check RoleSessionName:

   ```bash
   $ export username=`grep -Eo 'RoleSessionName.*$\</AttributeValue\>'
   samlresponsedecoded.txt | sed -E 's/.*/\<Attribute\</AttributeValue\>/\1/'
   ```

5. Check whether the username returned in from the previous step exists as a user in your Amazon Connect instance:

   ```bash
   $ aws connect list-users --instance-id [INSTANCE_ID] | grep $username
   ```

   • If the final grep does not return a result then this means that the user does not exist in your Amazon Connect instance or it has been created with a different case/capitalization.
   • If your Amazon Connect instance has many users, the response from the ListUsers API call maybe paginated. Use the NextToken returned by the API to fetch the rest of the users. For more information, see ListUsers.

Example SAML Response

Following is an image from a sample SAML Response. In this case, the identity provider (IdP) is Azure Active Directory (Azure AD).
Error Message: Bad Request. The request was not valid and could not be processed.

What does this mean?

One of the most common reasons for this error is an Amazon Connect user logged in previously using a different identity provider. For example, first they logged in using this attribute name:

```
<Attribute Name="https://aws.amazon.com/SAML/Attributes/Role"/>
```

Then the same user tried to login but with a different Role SAML Attribute, for example:

```
<Attribute Name="https://aws.amazon.com/SAML/Attributes/Role">
  <AttributeValue>arn:aws:iam::11111111111:role/Azure_Second_Role,arn:aws:iam::11111111111:saml-provider/AzureAD_Connect_Second_Provider</AttributeValue>
</Attribute>
```

Resolution

The recommended solution is to reuse the existing Role associated with the Amazon Connect user and edit the trust relationship to reference a new identity provider or service principal to meet your new authentication requirements. If you do need to associate an Amazon Connect user with a new Role, you need to delete and recreate the user in the existing Amazon Connect instance which will result in the loss of data for that user.

For instructions for doing this in the Amazon Connect console, see Manage users in Amazon Connect (p. 607). Or, use these commands for doing this from the AWS CLI:

1. Get the user ID:

   `aws connect list-users --instance-id [INSTANCE_ID]`
2. Delete the user account:

```bash
aws connect delete-user --instance-id [INSTANCE_ID] --user-id [USER_ID]
```

3. Create the user account:

```bash
aws create-user --username [USER_ID] --phone-config [PHONE_CONFIG]
```

You can also complete these actions using the **AWS SDKs**.

**Error Message: Access denied, Please contact your AWS account administrator for assistance.**

### What does this mean?

The role that the user has assumed has successfully authenticated via SAML. However, the role doesn't have permission to call the GetFederationToken API for Amazon Connect. This call is required so the user can log in to your Amazon Connect instance using SAML.

### Resolution

1. Attach a policy that has the permissions for `connect:GetFederationToken` to the role found in the error message. Following is a sample policy:

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "Statement1",
      "Effect": "Allow",
      "Action": "connect:GetFederationToken",
    }
  ]
}
```

2. Use the IAM console to attach the policy. Or, use the `attach-role-policy` API, for example:

```bash
$ aws iam attach-role-policy --role-name [ASSUMED_ROLE] --policy_arn [POLICY_WITH_GETFEDERATIONTOKEN]
```
Set up your contact center

Amazon Connect enables you to create a virtual contact center in the AWS cloud. To get started, create a virtual contact center instance. For more information, see Get started with Amazon Connect (p. 8).

After you create an instance, you can edit its settings, such as telephony, data storage, and data streaming. After that, you can assign your contact center a phone number or import your own phone number. You can add agents to your contact center, and assign them permissions appropriate to their roles. You can set up a single queue for incoming contacts, or set up multiple queues so that you can route contacts to agents with specific skills.

A key part of setting up your contact center is to define how your customers experience it. You do this by creating contact flows.

Finally, you'll need to provide your agents access to the Contact Control Panel (CCP), which they will use to interact with contacts.

Contents
- Create an Amazon Connect instance (p. 134)
- Test voice, chat, and task experiences (p. 146)
- Set up phone numbers for your contact center (p. 155)
- Set up outbound communications (p. 202)
- Set up routing (p. 208)
- Set up agents (p. 218)
- Set up your customer's chat experience (p. 225)
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- Embed the CCP into Salesforce (p. 268)
- Embed the CCP into Zendesk (p. 268)

Create an Amazon Connect instance

The first step in setting up your Amazon Connect contact center is to create a virtual contact center instance. Each instance contains all the resources and settings related to your contact center.

Things to know before you begin

- When you sign up for Amazon Web Services (AWS), your AWS account is automatically signed up for all services in AWS, including Amazon Connect. You are charged only for the services that you use. To create an AWS account, see How do I create and activate an AWS account?
- To allow an IAM user to create an instance, ensure that they have the permissions granted by the AmazonConnect_FullAccess policy.
- For a list of the minimum IAM permissions required to create an instance, see Required permissions for using custom IAM policies to manage access to the Amazon Connect console (p. 823).
- Amazon Connect is not available to customers in India using Amazon Web Services through Amazon Internet Services Pvt. Ltd (AISPL). You will receive an error message if you try to create an instance in Amazon Connect.
When you create an instance, you must decide how you want to manage users. **You can't change the identity management option after you create the instance.** For more information, see Plan your identity management in Amazon Connect (p. 123).

**Step 1: Set identity**

Permissions to access Amazon Connect features and resource are assigned to user accounts within Amazon Connect. When you create an instance, you must decide how you want to manage users. You can't change the identity management option after you create the instance. For more information, see Plan your identity management in Amazon Connect (p. 123).

**To configure identity management for your instance**

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. Choose **Get started**. If you have previously created an instance, choose **Add an instance** instead.
3. Choose one of the following options:
   
   - **Store users in Amazon Connect** - Use Amazon Connect to create and manage user accounts. You cannot share users with other applications.
   
   - **Link to an existing directory** - Use an AWS Directory Service directory to manage your users. You can use each directory with one Amazon Connect instance at a time.
   
   - **SAML 2.0-based authentication** - Use an existing identity provider (IdP) to federate users with Amazon Connect.
4. If you chose **Store users within Amazon Connect** or **SAML 2.0-based authentication**, provide the left-most label for **Access URL**. This label must be unique across all Amazon Connect instances in all Regions. You can't change the access URL after you create your instance.
5. If you chose **Link to an existing directory**, select the AWS Directory Service directory for **Directory**. The directory name is used as the left-most label for **Access URL**.
6. Choose **Next**.

**Step 2: Add administrator**

After you specify the user name of the administrator for the Amazon Connect instance, a user account is created in Amazon Connect and the user is assigned the **Admin** security profile.

**To specify the administrator for your instance**

1. Do one of the following, based on the option that you chose in the previous step:
   
   - If you chose **Store users within Amazon Connect**, select **Specify an administrator**, and provide a name, password, and email address for the user account in Amazon Connect.
   
   - If you chose **Link to an existing directory**, for **Username**, type the name of an existing user in the AWS Directory Service directory. The password for this user is managed through the directory.
   
   - If you chose **SAML 2.0-based authentication**, select **Add a new admin** and provide a name for the user account in Amazon Connect. The password for this user is managed through the IdP.
2. Choose **Next**.

**Step 3: Set telephony**

Use the options in this section to choose whether you want your agents to receive calls from customers, make outbound calls, and hear early media audio.
Early media

When early media audio is enabled, for outbound calls your agents can hear pre-connection audio such as busy signals, failure-to-connect errors, or other informational messages provided by telephony providers.

By default, early media is enabled for you. Note the following exception:

- Your instance was created before April 17, 2020, and you weren't enrolled in the preview program. You need to enable early media audio. For instructions, see Update telephony options (p. 139).

To configure telephony options for your instance

1. To allow inbound calls to your contact center, choose Allow incoming calls.
2. To enable outbound calling from your contact center, choose Allow outgoing calls.
3. Choose Next.

Step 4: Data storage

Note

Amazon Connect does not support Amazon S3 Object Lock in compliance mode to store objects using a write-once-read-many (WORM) model.

When you create an instance, by default we create an Amazon S3 bucket. Data, such as reports and recordings of conversations, is encrypted using AWS Key Management Service, and then stored in the Amazon S3 bucket.

This bucket and key are used for both recordings of conversations and exported reports. Alternatively, you can specify separate buckets and keys for recordings of conversations and exported reports. For instructions, see Update instance settings (p. 139).

By default, Amazon Connect creates buckets for storing call recordings, chat transcripts, exported reports, and contact flow logs.

- When a bucket is created to store call recordings, call recording is enabled at the instance level. The next step for setting up this functionality is to set up recording behavior in a contact flow (p. 423).
- When a bucket is created to store chat transcripts, chat transcription is enabled at the instance level. Now all chat transcripts will be stored. Only if you want to monitor chat conversations do you need to set up recording behavior in a contact flow (p. 423).
- Live media streaming is not enabled by default.

Review and copy the location of the S3 bucket and contact flow logs

1. If desired, copy the location of the S3 bucket where your data encryption is store, adn the location of the contact flow logs in CloudWatch.
2. Choose Next.

Step 5: Review and create

To create your instance

1. Review the configuration choices. Remember that you cannot change the identity management options after you create the instance.
2. (Optional) To change any of the configuration options, choose **Edit**.

3. Choose **Create instance**.

4. (Optional) To continue configuring your instance, choose **Get started** and then choose **Let's go**. If you prefer, you can access your instance and configure it later on. For more information, see Next steps (p. 137).

   If you chose to manage your users directly within Amazon Connect or through an AWS Directory Service directory, you can access the instance using its access URL. If you chose to manage your users through SAML-based authentication, you can access the instance using the IdP.

### Next steps

After you create an instance, you can assign your contact center a phone number or import your own phone number. For more information, see Set up phone numbers for your contact center (p. 155).

### Create a dev (Sandbox) or test (QA) instance

You might want to create multiple contact center instances, for example, one as a Sandbox for development, another for QA, and a third for Production.

Each instance functions only within the AWS Region in which you create it.

**Important**

There's no way to migrate all resources between virtual contact center instances. You can migrate some instance resources manually or with the assistance of AWS Support. Other resources must be recreated.

For more information, see Can I migrate my Amazon Connect instance from a test environment to a production environment?

### To create another instance

1. In the AWS Management Console, choose **Amazon Connect**.
2. Choose **Add an instance**.
3. Complete the steps on the Amazon Connect resource configuration page. For instructions see Create an Amazon Connect instance (p. 134).

### Find your Amazon Connect instance ID/ARN

When you open a support ticket, you may be asked to provide your Amazon Connect instance ID (also called the ARN). Use the following steps to find it.

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your **instance name**, which appears in your Amazon Connect URL.
Find your Amazon Connect instance name

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, the instance name appears in the **Instance Alias** column. This instance name appears in the URL you use to access Amazon Connect.
Update instance settings

To update the instance settings:

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.

3. Complete the following procedures.

Update telephony options

1. In the navigation pane, choose Telephony.
2. To enable customers to call into your contact center, choose Receive inbound calls with Amazon Connect.
3. To enable outbound calling from your contact center, choose Make outbound calls with Amazon Connect.
4. By enabling early media audio, your agents can hear pre-connection audio such as busy signals, failure-to-connect errors, or other informational messages from telephony providers, when making outbound calls. Choose Enable early media.
5. Choose Save.

Update data storage

1. In the navigation pane, choose Data storage.
2. To specify the bucket and KMS key for recordings of voice conversations, choose Call recordings, Edit, specify the bucket name and prefix, select the KMS key by name, and then choose Save.

When this bucket is created, call recording is enabled at the instance level. The next step for setting up this functionality is to set up recording behavior in a contact flow (p. 423).
3. To specify the bucket and KMS key for recordings (transcripts) of chat conversations, choose Chat transcripts, Edit, specify the bucket name and prefix, select the KMS key by name, and then choose Save.

When this bucket is created, chat transcripts are enabled at the instance level. Now all chat transcripts will be stored here.

4. To enable live media streaming, choose Live media streaming, Edit. For more information, see Capture customer audio: live media streaming (p. 597).

5. To specify the bucket and KMS key for exported reports, choose Exported reports, Edit, specify the bucket name and prefix, select the KMS key by name, and then choose Save.

6. To enable file sharing for both agents and customers, next to Attachments choose Edit, then Enable Attachments sharing. For more information about this option and additional steps, see Enable attachments to share files using chat (p. 141).

### Update data streaming options

1. In the navigation pane, choose Data streaming.

2. Choose Enable data streaming. For more information, see Enable data streaming for your instance (p. 144).

3. For Contact Trace Records, do one of the following:
   - Choose Kinesis Firehose and select an existing delivery stream, or choose Create a new Kinesis Firehose to open the Kinesis Firehose console and create the delivery stream.
   - Choose Kinesis Stream and select an existing stream, or choose Create a new Kinesis Firehose to open the Kinesis console and create the stream.

4. For Agent Events, select an existing Kinesis stream or choose Create a new Kinesis Stream to open the Kinesis console and create the stream.

5. Choose Save.

### Update analytics tools options

1. In the navigation pane, choose Analytics tools.

2. Choose Enable Contact Lens. For more information, see Analyze conversations using Contact Lens for Amazon Connect (p. 630).

3. Choose Save.

### Update contact flow settings

1. In the navigation pane, choose Contact flows.

2. (Optional) To add a signing key for use in contact flows, choose Add key. For more information, see Encrypt customer input (p. 437).

3. (Optional) To integrate with Amazon Lex, select a Lex bot. For more information, see Add an Amazon Lex bot (p. 508).

4. (Optional) To integrate with AWS Lambda, select a Lambda function. For more information, see Invoke AWS Lambda functions (p. 432).

5. (Optional) To enable contact flow logs, choose Enable Contact flow logs. For more information, see Track events as customers interact with contact flows (p. 439).

6. (Optional) To use the best available voice from Amazon Polly, choose Use the best available voice. For more information, see Amazon Polly best sounding voice (p. 402).

7. (Optional) Use the voices available in Amazon Polly.
Enable attachments to share files using chat

You can allow customers and agents to share files using chat. After you complete the steps in this topic, an attachment icon automatically appears in your agent's Contact Control Panel so they can share attachments on chats.

You will need to update your customer-facing user interface to support attachment sharing.

**Using a custom agent application?** Check out the APIs we've added to support attachment sharing: StartAttachmentUpload, CompleteAttachmentUpload, and GetAttachment.

**Step 1: Enable attachments**

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your **instance name**, which appears in your Amazon Connect URL.

![Amazon Connect instances](image)

3. On the **Data storage** page, under the **Attachments**, choose **Edit**, select **Enable Attachments sharing**, and then choose **Save**.

   Storage options appear, similar to the following image.
4. You can change the Amazon S3 bucket location where attachments are stored. By default, your existing Amazon Connect bucket is used, with a new prefix for attachments.

The attachments feature leverages two Amazon S3 locations: a staging location and a final location.

Note the following about the staging location:

- The staging location is used as part of a business validation flow. Amazon Connect uses it to validate the file size and type before it is shared with the chat participant.
- The staging prefix is created by Amazon Connect based on the bucket path you have selected. Specifically, it includes the S3 prefix for where you are saving files, with `staging` appended to it.
- We recommend that you change the data retention policy for the staging prefix to one day. This way you won’t be charged for storing the staging files. For instructions, see How do I create a lifecycle rule for an S3 bucket? in the Amazon S3 User Guide.

Warning

Only change the lifecycle for the `file staging location`. If you accidentally change the lifecycle for the entire Amazon S3 bucket, all transcripts and attachments will be deleted.

Step 2: Configure a CORS policy on your attachments bucket

To allow customers and agents to upload and download files, update your cross-origin resource sharing (CORS) policy to allow `PUT` and `GET` requests for the Amazon S3 bucket you are using for attachments. This is more secure than enabling public read/write on your Amazon S3 bucket, which we don’t recommend.
To configure CORS on the attachments bucket

1. Find the name of the Amazon S3 bucket for storing attachments:
   a. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
   b. In the Amazon Connect console, choose Data storage, and locate the Amazon S3 bucket name.
2. Open the Amazon S3 console at https://console.aws.amazon.com/s3/.
3. In the Amazon S3 console, select your Amazon S3 bucket.
4. Choose the Permissions tab, and then scroll down to the Cross-origin resource sharing (CORS) section.
5. Add a CORS policy that has one of the following rules on your attachments bucket. For example CORS policies, see Cross-origin resource sharing: Use-case scenarios in the Amazon S3 Developer Guide.

   • Option 1: List the endpoints from where attachments will be sent and received, such as the name of your business web site. This rule allows cross-origin PUT and GET requests from your website (for example, http://www.example1.com).

     Your CORS policy might look like the following example:

     ```json
     [
     {  
       "AllowedMethods": [
          "PUT",
          "GET"
       ],
       "AllowedOrigins": [
          "http://www.example1.com",  // List the endpoints from where attachments will be sent and received,
          "http://www.example2.com"  // such as the name of your business web site.
       ],
       "AllowedHeaders": [
         "*"
       ]
     }
     ]
     ```

   • Option 2: Add the * wildcard to AllowedOrigin. This rule allows cross-origin PUT and GET requests from all origins, so you don’t have to list your endpoints.

     Your CORS policy might look like the following example:

     ```json
     [
     {  
       "AllowedMethods": [
          "PUT",
          "GET"
       ],
       "AllowedOrigins": [
         "*
       ],
       "AllowedHeaders": [
         "*"
       ]
     }
     ]
     ```
Step 3: Update your chat UI

To help you update the chat user interface that your customers use, we've posted an updated version of chat interface JS. It exposes an attachment icon on the UI and supports the backend calls for attachment sharing. See Amazon Connect Chat UI Examples on GitHub.

Enable data streaming for your instance

You can export contact trace records (CTRs) and agent events from Amazon Connect and perform real-time analysis on contacts. Data streaming sends data to Amazon Kinesis.

To enable data streaming for your instance

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.
3. In the navigation pane, choose Data streaming.
4. Choose Enable data streaming.
5. For Contact Trace Records, do one of the following:
   a. Choose Kinesis Firehose and select an existing delivery stream, or choose Create a new Kinesis firehose to open the Kinesis Firehose console and create the delivery stream.
   b. Choose Kinesis Stream and select an existing stream, or choose Create a Kinesis stream to open the Kinesis console and create the stream.
6. For Agent Events, select an existing Kinesis stream or choose Create a new Kinesis stream to open the Kinesis console and create the stream.
7. Choose Save.

Using server-side encryption for the Kinesis stream

If you enable server-side encryption for the Kinesis stream you select, Amazon Connect cannot publish to the stream because it does not have permission to call kms:GenerateDataKey so that it can encrypt data sent to Kinesis. To work-around this, do the following steps:

1. Enable encryption for recordings of conversations or scheduled reports.
2. Create a customer managed key to use for encryption.
3. Choose the same customer managed key for the Kinesis data stream that you use for scheduled reports or recordings of conversations.

For more information, see Creating Keys in the AWS Key Management Service Developer Guide.
Emergency admin login

As a best practice, users assigned to the Amazon Connect Admin security profile should always use their Amazon Connect instance URL to login:

- Log in to your contact center at https://instance name.my.connect.aws/.

This method ensures the appropriate levels security.

However, if there's an emergency, you can log in from the Amazon Connect console using your AWS account credentials. For example, you may need to login in this way in the following situations:

- You forgot your Amazon Connect administrator password and no other Amazon Connect administrators are around to reset it.
- Someone deleted the Amazon Connect Admin security profile by mistake.

To login for emergency access

1. Make sure you have your AWS account credentials at hand.
2. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
3. If prompted to login, enter your AWS account credentials.
4. Choose the name of the instance from the Instance alias column.
5. In the navigation pane, choose Overview.
6. Choose Log in for emergency access.

You aren't prompted for your credentials because you are federated in from the AWS console.

Important
For daily usage, we strongly recommend always using your instance URL to login. The procedure provided in this article should only be used for emergency access when using the instance URL is not an option.

To log out

To log out of your instance, go to the title bar at the top of the screen and select the icon with the arrow (Log out) that appears next to your user name.

Delete your instance

If you no longer want to use an instance, you can delete it. When you delete an instance, the phone number claimed for the instance is released back to inventory. You lose all settings, data, metrics, and
reports associated with the instance. When customers call the phone number you’ve released, they’ll get a message that it’s not a working phone number.

**Important**
You cannot undo the deletion of an instance or restore settings or data from the instance after it is deleted.

**To delete an instance**

1. Open the Amazon Connect console at [https://console.aws.amazon.com/connect/](https://console.aws.amazon.com/connect/).
2. Select the check box for the instance and choose **Delete**. If you don’t see the **Delete** button, you don’t have permissions to delete instances. Contact your AWS administrator for help.
3. When prompted, type the name of the instance and choose **Delete**.

**Error message: "Region Unsupported. Amazon Connect is not available in [Region]"**

If you get this error message, it means you created the Amazon Connect instance in a Region different than the one you’re in now, such as US East (Ohio), and Amazon Connect isn’t available in that Region.

**To switch Regions to the Amazon Connect instance**

1. At the AWS Management console, switch your Region to US East (Virginia) or whichever Region you were in when you created the Amazon Connect instance.

![AWS Management Console](image)

2. Choose **Amazon Connect** to open the Amazon Connect console.
3. You’ll see the Amazon Connect instance and can delete it. If you don’t see the instance, go back to the AWS Management Console and choose another Region, such as US West (Oregon), and then do steps 2 and 3.

**Test voice, chat, and task experiences**

To learn what the voice, chat, and task experiences are like for your agents and customers, you can test them without doing any development.

**Test voice**

After you claim a number you can immediately call it to hear what the experience will be like for your customers. Amazon Connect uses the **default contact flows (p. 269)** to power your initial experience.

To test a customized contact flow, **assign a phone number (p. 400)** to it and then call that number.
Test chat

Amazon Connect includes a simulated web page that shows how your customers can interact with you, and a Contact Control Panel (CCP) that shows the agent experience. Here's how to test chat:

1. On the navigation menu, choose **Dashboard**.

2. Choose **Test chat**.

   If you don't see the option to test chat, click here.

3. On the **Test Chat** page, choose **Test Settings**.

4. Under **System Settings**, choose the contact flow you want to test with chat, and then click **Apply**. By default, it runs the **Sample inbound flow** (p. 279).

5. In the chat window, click the icon as shown below.

6. Type a message similar to what one of your customers might type. In the agent window, type a reply.

7. To see what it's like for an agent to handle multiple chat conversations, copy the dashboard URL into another browser window, and start another chat. The chat goes to the same instance of the CCP that you already have open.
**Tip**

The test environment uses the BasicQueue and Basic Routing Profile. The Basic Routing Profile is set up for 2 chats. If you want to test what it's like to have more than two chats, change the Basic Routing Profile to 5 chats. For instructions, see Create a routing profile (p. 215).

To learn more about what the agent experiences when managing chat conversations, see Chat with contacts (p. 875).

**Test tasks**

The first step in testing the task experience is to create a quick connect for the queue you want to assign the example tasks to.

**Step 1: Create a quick connect**

1. On the navigation menu, choose Routing, Quick connects, Add a new.
2. Enter a name for the quick connect. For example, if you want to assign the test task to yourself, enter your name (for example, Jane Doe).
3. Under Type, use the dropdown list to choose Queue.
4. Under Destination, use the dropdown list to choose a queue you set up for yourself (assuming you want to assign the test task to yourself).
5. Under Contact flow, choose Default queue transfer.
6. Under Description, enter something like Test quick connect.
7. Choose Save.

**Step 2: Make the quick connect visible in the CCP by assigning it to a queue**

1. After you create the quick connect, go to Routing, Queues and then choose the appropriate queue for the contact to be routed to.
2. On the Edit queue page, in the Quick connects box, search for the quick connect you created. For example, it might have your name.
3. Select the quick connect and then choose Save.

**Step 3: Assign the queue to the agent's routing profile**

1. Go to Users, Routing profiles and choose the agent's routing profile.
2. Under Set channels and concurrency choose Tasks.
3. Add the agent's queue to the routing profile, and choose Task for the channel.
   
   If the agent can receive transfers through other channels, select them as well.
4. Choose Save.

**Step 4: Test tasks**

1. Open the CCP. Select the Task tab, and then choose Create task.
Or, if you're testing the chat experience, for example, you can choose the Task icon, as shown in the following image.
2. Complete the Create task page. For Assign to, enter the name of the user you created for the quick connect. Choose Create.
3. If you chose yourself, the task will be routed to you. Choose **Accept task**.
4. Review the task, and choose **End task** when done.
View metrics for the test experiences

When you're testing the voice, chat, and task experiences, you may also want to explore metrics.

1. On the left navigation menu, choose Metrics and quality, Real-time metrics, Queues.
2. You can review the real-time metrics as you test the different channels.
3. To view metrics by channel in a real-time metrics report, go to Settings, Groupings, Queues grouped by channels, Apply. Your report will look similar to the following image.
Set up your phone numbers

After you create an Amazon Connect instance, you can claim a phone number to use for your contact center. You can use this phone number to place a test call in to your contact center to confirm that it is working correctly. You can also use it in your production environment.

For pricing information about claimed phone number costs, see Amazon Connect pricing.

If you want to keep a phone number you already have, you can port the phone number and use it with Amazon Connect. After a phone number is ported to Amazon Connect, it appears in the list of available phone numbers for you to assign to contact flows.

Contents

- Port your current phone number (p. 155)
- Claim a phone number in your country (p. 166)
- Claim a phone number you already own in another country (p. 166)
- Claim phone numbers for Amazon Connect in the Asia Pacific (Tokyo) Region (p. 167)
- Request numbers, international numbers, or termination points (p. 167)
- Release a phone number (p. 168)
- Telecoms regulations (p. 169)

Port your current phone number

You can port your existing phone numbers to your Amazon Connect contact center.

Contents

- Things to know before porting (p. 156)
- Porting your phone numbers (p. 159)
Things to know before porting

The topics in this section explain which numbers can be ported, how long it takes, and what fees you might incur.

Contents
- What is phone number porting? (p. 156)
- How much does number porting cost? (p. 157)
- Can my number be ported to Amazon Connect? (p. 157)
- How long does it take to port numbers? (p. 158)
- Can I cancel a porting that is already scheduled? (p. 159)
- When do I cancel my current telecom service? (p. 159)

What is phone number porting?

Porting a phone number is the process of moving a phone number from one telephony service provider, or carrier, to another. Many businesses and organizations already have a phone number that is advertised to their customers, and changing this number would be disruptive.

If you port a phone number from your current carrier to Amazon Connect, you can keep using the same phone number for your contact center. This helps to eliminate the need to update your business contact information.

Downtime and service disruption during the porting process

The porting process requires the losing carrier to remove your number from their systems, the winning carrier to add your number to their systems, and for number routing to be updated. Most porting activities complete within 15-30 minutes, with possible call disruptions. To ensure that they have engineers available to troubleshoot issues, most losing carriers complete porting actions only during normal business hours. Carriers typically communicate a two-hour porting window to accommodate for resolving any issues that could arise.

For detailed information about available porting dates and times, see Region requirements for ordering and porting phone numbers (p. 169) for your country or region.

What happens to a number after it is ported

As long as you continue to pay for the phone number, and do not release it from your Amazon Connect instance, it stays assigned to your account, and you are billed accordingly.

To release a phone number, follow the steps in Release a phone number (p. 168).

When a phone number is released from your Amazon Connect instance:
- You will no longer be charged for it.
- You cannot reclaim the phone number.
- Amazon Connect reserves the right to allow it to be claimed by another customer.

If you move your contact center away from Amazon Connect, and want to port your phone number away from Amazon Connect, submit an Amazon Connect support ticket (p. 160).
How much does number porting cost?

Amazon Connect does not charge fees for porting numbers. Your existing carrier may have fees associated with the disconnection and early termination of your service.

After a phone number is ported to Amazon Connect, standard pricing applies for Amazon Connect service usage and associated telephony rates.

Can my number be ported to Amazon Connect?

Not all phone numbers can be ported. The ability to port a specific phone number depends on several factors. For example:

- The regulations in the country of the phone number.
- Agreements between the losing and winning carriers.
- The type of phone number being ported.
- Your service contract with your current service provider.

To find out if a phone number that you currently own can be ported to Amazon Connect:

1. See if your country supports number porting: Region requirements for ordering and porting phone numbers (p. 169).
2. Then get started by submitting an Amazon Connect support ticket for number verification (p. 160).

Porting numbers purchased from other contact center providers

In most cases, you can port numbers that were purchased from other contact center providers. Confirm with your current contact center provider who holds the assignment to the number, and work with them to ensure the correct information is provided on the Letter of Authorization (LOA).

Port short phone numbers

Due to Telecom regulations in various countries, the short phone number will need to be evaluated on a case-by-case basis. To verify if your phone number can be ported to Amazon Connect, submit an Amazon Connect support ticket (p. 160).

Port a number to one EU Region only

The Amazon Connect Regions of EU-CENTRAL-1 and EU-WEST-2 are symmetrical European regions that offer the same carrier coverage for telephony. If a phone number cannot be ported to an instance in one of these Regions, then it cannot be ported to an instance in the other.

If you had a phone number ported into the EU-CENTRAL-1 or EU-WEST-2 Regions, and want to move it to the other Region, submit an Amazon Connect support ticket (p. 160) for assistance.

The same is true for the North America Regions of US-EAST-1 and US-WEST-2.

Port a subset of numbers from a block

If you have a block of numbers, in some instances we can port a subset or portion of your phone numbers. In other cases, it is required by the carrier to port full block of phone numbers.

If you want to port only a subset of the phone numbers you currently own to Amazon Connect, submit an Amazon Connect support ticket (p. 160) to verify whether the phone numbers can be ported. We will verify the actions that can be completed and assist you with next steps.
Note
If you only port a subset of the phone numbers, you will still be liable for the remaining phone numbers with the original carrier and any associated fees.
If your intent is to release the remaining phone numbers not being ported to Amazon Connect, we recommend waiting until the requested porting has been completed to avoid any unwanted disruptions to service.

Letter of compromise
Before porting phone numbers, some customers ask for a letter of compromise stating that they will be allowed to move their phone numbers from Amazon Connect to another service if their contact center moves. Due to Telecom regulations in various countries, the phone number will need to be evaluated on a case-by-case basis. Please submit a ticket to Amazon Connect support (p. 160) to verify if your phone number can be ported to Amazon Connect.

How long does it take to port numbers?

Important
Open a porting request as far in advance of your pending go-live date as possible.

The amount of time that it takes to port numbers depends on the country, complexity of the request, the type and quantity of numbers being ported, and your current carrier. Telecom carriers also may implement porting block days because of holidays and network maintenance. Because of this, we require porting requests to be open several months before pending go-live dates.

Inside the US and Canada
Phone numbers in the US or Canada typically take between two to four weeks to port, after phone number portability has been verified, and all required documents are correctly submitted to the carrier.

Outside the US and Canada
Phone numbers outside the US and Canada require between two to six months to complete the full porting process. This includes:

- Time for you to submit all the documents to AWS Support.
- Time for the Amazon Connect service provider to verify whether they can port all of the phone numbers that you have requested.
- Time for the losing provider to verify the provided documents.

After all documents are verified by the losing provider, the losing provider and the Amazon Connect service provider will schedule a mutually agreed date to port the numbers to Amazon Connect.

What affects porting timelines?
Porting timelines can be negatively impacted when incorrect information is provided on the required Letter of Authorization (LOA). This causes the LOA to be rejected and resets the porting timelines.

Port many numbers over multiple countries or carriers
Complex porting requests have their own timelines. The timelines discussed elsewhere in this topic do not apply to complex porting requests.

Complex porting requests for more than 10 distinct number ranges or 10 distinct locations are considered a project and require advanced coordination with your AWS Account team. If you are a Business or Enterprise customer, engage your Amazon Connect Solutions Architect (SA) or Technical Account Manager (TAM) for assistance in planning your number porting.
To help make the process as smooth as possible, gather the following information before submitting a porting request:

- Your most recent telephony bill from the carriers that currently service the numbers to be ported.
- The country specific documentation required; see Region requirements for ordering and porting phone numbers (p. 169).
- The contact information for a central point of contact who can act on behalf of your organization in support of the porting requests.

Can I choose the port date?

Depending on the country and carriers involved, you may be able to choose the porting date and time. In most cases, however, the losing carrier picks the date and time and communicates it to Amazon Connect based on their schedule.

If you have a specific date and time you want to request, provide the information in your support case. We will work with our carrier to determine if they can support the requested date and time.

**Note**
Most carriers only support porting activity during their normal business hours. For detailed information about available porting dates and times for your country, see Region requirements for ordering and porting phone numbers (p. 169).

Can I cancel a porting that is already scheduled?

**Important**
If you need to cancel or reschedule your porting, let us know immediately.

Depending on the country of service, after a mutually agreed date and time has been provided it can be difficult to cancel.

Because of the coordination required between carriers, Amazon Connect support requires a minimum of 5 business days notice to cancel or reschedule a porting request. If you need to cancel or reschedule your porting, let us know immediately.

If a porting is successfully cancelled, timelines for the port schedule are reset and the carriers will need to identify another mutually agreed date and time. This will impact the overall timeline for porting your numbers.

**Note**
Please be advised that sometimes a porting request cannot be cancelled because of process automation, but Amazon Connect support will make every attempt possible to stop the request.

When do I cancel my current telecom service?

Do not cancel your existing telecom service until your phone numbers have been ported and confirmed working in Amazon Connect.

Canceling your existing telecom service before your number is ported releases your phone number assignment, and may result in you losing the number.

Porting your phone numbers

Porting phone numbers from your existing carrier to Amazon Connect is a multi-step process. It’s important to get started several months in advance of your scheduled go-live date, and have all of your documentation in order.
Contents

• How to port your numbers to Amazon Connect (p. 160)
• Documentation requirements for porting numbers (p. 163)
• How to verify flows before numbers are ported (p. 164)

How to port your numbers to Amazon Connect

The following steps are for a typical porting request. This process requires timely communication to make progress. If you take longer than 30 days to respond to requests for information, your porting request may be cancelled, rescheduled, or restarted from the beginning. For a list of country-specific requirements for porting numbers, see Region requirements for ordering and porting phone numbers (p. 169).

Step 1: Submit an Amazon Connect support ticket

Submit an Amazon Connect support ticket to verify if your phone number can be ported to Amazon Connect.

Premium support plan instructions

2. In the upper right corner of the page, choose Support, Support Center.
3. On the AWS Support Center page, choose Create case.
5. Under Case classification, do the following:
   a. Choose service as Connect (Contact center).
   b. Choose category as Phone Number Porting.
   c. Choose the required severity.
   d. For Contact Center Instance ARN, enter the instance ARN (also called the instance ID). For instructions on how to find your instance ARN, see Find your Amazon Connect instance ID/ARN (p. 137).
   e. Enter the subject.
   f. Under Case description, Use case description, include as much information as possible about your request, including phone number(s) to be ported, your current carrier, and the contact information for the person authorized to make changes to your current phone service. If you don’t know all of these details, you can leave information out.
6. Expand Contact options, and then choose your Preferred contact language and Contact methods.
7. Choose Submit.
8. The Amazon Connect team reviews your ticket, and gets back to you with next steps.
Basic support plan instructions


2. In the upper right corner of the page, choose Support, Support Center.

3. On the AWS Support Center page, choose Create case.

4. Choose Service limit increase.

5. Under Case details, do the following:
   a. For Limit type, choose Amazon Connect.
   b. For Contact Center Instance ARN - optional, enter the instance ARN (also called the instance ID). For instructions on how to find your instance ARN, see Find your Amazon Connect instance ID/ARN (p. 137).

6. Under Requests, Request 1 do the following:
   a. For Region, select the Region in which you created your Amazon Connect instance.
   b. For Limit, choose Phone Number Porting.
   c. For New limit value, enter the number of phone numbers to port.

7. (Optional) If you want to port more phone numbers, choose Add another request, and then repeat step 6 for each additional request.

8. Under Case description, Use case description, include as much information as possible about your request, including whether the numbers are Direct Inward Dial or toll-free, your current carrier, and the contact information for the person authorized to make changes to your current phone service. If you don't know all of these details, you may leave information out.

9. Expand Contact options, and then choose your Preferred contact language and Contact methods.

10. Choose Submit.

11. The Amazon Connect team reviews your ticket, and gets back to you with next steps.

Step 2: Complete Letter of Authorization (LOA)

If the phone number qualifies for porting, the Amazon Connect team will provide you a Letter of Authorization (LOA) to be completed by you. Complete all mandatory fields and sign the LOA.

Along with the LOA, Telecom regulations in many countries require additional documents to register a number, such as proof of business, proof of address, and proof of ID. For a list of country-specific requirements for porting numbers, see Region requirements for ordering and porting phone numbers (p. 169).

How to complete an LOA

All portings require the completion of a Letter of Authorization (LOA). The LOA authorizes your current carrier to release your number and allow it to be ported.
Port your current phone number

- If you are porting multiple numbers from different carriers and countries, submit separate tickets for each set of phone numbers to be ported from different carriers and different countries to streamline communications, tracking, and the LOA process.
- A separate LOA is required for numbers from each losing carrier.

To complete an LOA, provide the following information:

- The numbers to port.
- Information about your current carrier, such as their business name and contact information.
- Contact information for the person authorized to make changes to your phone service. The name, address, and information you provide on the LOA must match the information on file with your current carrier exactly. To help ensure the porting process goes smoothly, include a copy of the Customer Service Record (CSR) or latest phone bill from your carrier. This will have your name, address, and related telephone numbers on it. Check that the information on your LOA matches your CSR exactly.
- If you have any questions regarding specific details about your current service, consult with your current carrier to ensure the data is accurate. This will minimize the risk that the LOA is rejected.

**Important**
Your LOA form must meet the following criteria:

- It must be legible: clearly written or typed.
- It must list your company name, the company address, and contact name. This information must match what is on the current carrier’s CSR.
- It must include a true signature. Most carriers will reject an electronic or printed signature.
- It must be dated within the last 15 days.
- It must include any toll-free numbers you want to port. Up to 10 toll-free numbers can be listed on the LOA. If you are requesting more than 10 phone numbers be ported, a spreadsheet is required to be attached. Specify "See Attached" on the LOA where the phone numbers would be listed.
- It must include only those telephony numbers that belong to the same current carrier and in the same country. If you have multiple current carriers and countries, you will need to submit multiple LOAs.

To further minimize the risk of having your LOA rejected, see Common reasons why carriers reject an LOA (p. 164).

**Step 3: The porting request goes to the Amazon Connect carrier**

After you have submitted all required documentation, the Amazon Connect team submits the porting request on your behalf to the winning carrier.

- The losing and winning carrier follow an industry standard process to validate the contents of the LOA and submitted documentation.
- If the LOA contains discrepancies, it will be rejected and you will need to fix the discrepancies and submit a new LOA.
- After the carriers successfully validate the LOA, they will either confirm your requested date or provide an available date for the actual porting. This is known as the “mutually agreed date.”

**Note**
Most carriers require that portings are completed during normal business hours. For country-specific business hours, see Region requirements for ordering and porting phone numbers (p. 169).
Step 4: Assign the phone number to the contact flow, request service quota increases

About 3-4 days before the mutually agreed date and time, the Amazon Connect support team loads the phone number that will be ported into the instance ARN you have provided, and then notifies you. Now it’s time for you to perform the following steps:

1. **Associate the phone number to the desired contact flow (p. 400)** so the phone number will be ready to receive phone calls after the porting is completed. If you require assistance assigning multiple phone numbers to contact flows, let us know in your support request.

   **Important**
   If you do not assign the phone number to the contact flow, calls will not arrive successfully to your Amazon Connect contact center.

2. **Submit a service quota request (p. 926)** at least five days in advance of the mutually agreed date for any changes to your service quotas required to support your use case. For example, you may need to increase the number of concurrent calls per instance, or enable countries for outbound calling.

Step 5: Checklist of activities on your porting date

The action of porting a number can be disruptive: the process involves updating the routing of phone numbers between carriers across a country or Region, including carriers not involved in the actual porting. In rare cases it can take several hours before all routes across all Telecom carriers are fully updated.

**Steps you perform to minimize disruption to your phone services**

On the mutually agreed port date, perform the following steps:

- Double-check that the activities listed in Step 4 (p. 163) have been completed:
  1. Verify that you have assigned the number being ported into your Amazon Connect instance to the appropriate contact flow.
  2. Verify that any required service quota increases or changes for your Amazon Connect instance were implemented. For example, increase the number of concurrent calls per instance, or enable countries for outbound calling.
- Monitor call traffic from your existing contact center to confirm that incoming traffic has stopped.
- Place test calls to your Amazon Connect instance to verify calls are being routed to the correct contact flows.
- Ensure agents are logged in to the Contact Control Panel (CCP) and can answer calls as they are received.
- Monitor call traffic to your Amazon Connect instance to confirm that you are receiving the expected levels of traffic.

**Steps the Amazon Connect team performs to ensure a smooth transition**

1. After the Amazon Connect team receives confirmation that the porting has been completed, we will perform final testing to confirm that the porting was successful and the phone number is receiving calls to Amazon Connect.
2. After we have completed our testing, we will notify you and ask you to verify the successful completion of the porting.

**Documentation requirements for porting numbers**

The Letter of Authorization (LOA) is an industry standard document type used by carriers to authorize the transfer of a phone number from one carrier to another. In many cases, the LOA is specific to the
country or region, carrier, or porting relationship between the losing and winning carriers. If your number can be ported, Amazon Connect support will provide you with an LOA form appropriate for the situation.

For more information, see How to complete an LOA (p. 161).

Additionally, regulations in some countries require a local business address and specific documentation to use a phone number. For country specific requirements, see Region requirements for ordering and porting phone numbers (p. 169). If this is required, we will ask for this information to be submitted with the completed LOA.

Common reasons why carriers reject an LOA

There are four common reasons that an LOA may be initially rejected by the losing carrier:

- Unsatisfactory business relationship

  This usually means that you have an unpaid balance or the carrier charges a port away fee. After you pay the bill or fee to your carrier, we will resubmit the port request.

- Name or address mismatch

  The information you submitted on your Letter of Authorization (LOA) is different from what's on file with your carrier in their Customer Service Record (CSR). To fix this, contact your existing carrier to update your CSR information, obtain the correct CSR information, or both. Let us know when they update your information and we will resubmit the port request. Or, send us a new LOA with the correct information as provided by your existing carrier.

- Number cannot be ported

  We will work with all Amazon Connect carriers in a Region to support the porting of your numbers. In some cases, however, specific numbers may not be portable because of regulatory restrictions or carrier limitations. In these situations, consider claiming a new number from Amazon Connect.

- Missing information

  One or more fields have been left blank on the LOA. This may include a missing signature, phone number, address information, or other requested information. Review all LOAs before submitting them to ensure that you have filled out all requested data. After the LOA is updated with all the required information, we will resubmit the port request.

How to verify flows before numbers are ported

We recommend that you test your call flows before the mutually agreed date and time of porting. If you would like to test your call flows, we recommend that you claim a direct inward dial (DID) or toll-free phone number available within Amazon Connect and assign it to the call flow for testing.

When you are done testing, you can release the number from your instance so you will no longer be charged for it. For instructions, see Release a phone number (p. 168).

Until you release the number, you are charged the daily rate associated with claiming a phone number and the per minute rate for telephony minutes used. For more information see the standard pricing for Amazon Connect service usage and associated telephony rates.

After the porting process completes

After you have ported your numbers to Amazon Connect, use the topics in this section to troubleshoot issues, or to release numbers you no longer need after porting.

Contents

- Not receiving calls on the ported number (p. 165)
• Release ported numbers that you no longer need (p. 165)
• Revert to original carrier after porting (p. 165)
• Port phone numbers away from Amazon Connect (p. 165)

Not receiving calls on the ported number

After the scheduled porting window has completed, if you are not receiving phone calls on the ported phone number, update your support ticket. We will troubleshoot with our carrier to verify the porting status and identify the next steps to resolve issue.

Amazon Connect and our carriers make every effort to ensure number porting occurs with minimal downtime and without issues. In all cases, the losing carrier is responsible for initiating the number porting and releasing your number to the winning carrier.

In rare situations, a number routing issue can occur, resulting in calls not arriving to Amazon Connect from the carrier.

Release ported numbers that you no longer need

You do not have to keep phone numbers assigned to your Amazon Connect instance.

When a phone number is released from your Amazon Connect instance:

• You will no longer be charged for it.
• You cannot reclaim the phone number.
• Amazon Connect reserves the right to allow it to be claimed by another customer.

To release a phone number

1. Log in to your contact center at https://instance name.my.connect.aws/. To find the name of your instance, see Find your Amazon Connect instance ID/ARN (p. 137).
2. On the navigation menu, choose Routing, Phone numbers.
3. Choose the phone number you want to release, and then choose Release.

If the phone number is associated with a contact flow, that flow will be deactivated until another number is associated with it.

When customers call the phone number you have released, they will get a message that it is not a working phone number.

Revert to original carrier after porting

To complete the porting, the losing and gaining carriers both make configuration changes to pass the phone number ownership. After the porting is complete, the gaining carrier has sole control of the phone number.

To move the phone number again, you must complete a new LOA and any required documentation.

Port phone numbers away from Amazon Connect

If you want to port your numbers to a different carrier, open a support case tell us. Then make arrangements with your new carrier. By letting us know, it will reduce the amount of back and forth between us and your new carrier, and it will help make the process go faster.
Claim a phone number in your country

To place or receive calls in your instance, you need to claim a phone number. If you did not claim a number when you created the instance, follow these steps to claim one now.

To claim a number for your contact center

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. On the navigation menu, choose Routing, Phone numbers.
3. Choose Claim a number. You can choose a toll free number or a Direct Inward Dialing (DID) number.

   **Note**
   Use the Amazon Connect service quotas increase form for these situations:
   - If you select a country or region, but no numbers display, you can request additional numbers for the country or region.
   - If you want to request a specific area code or prefix that you don’t see listed, we’ll try to accommodate your request.
4. Enter a description for the number and, if required, attach it to a contact flow in Contact flow / IVR.
5. Choose Save.
6. Repeat this process until you have claimed all your required phone numbers.

There is a service quota for how many phone numbers you can have in each instance. For the default service quota, see Amazon Connect service quotas (p. 926). If you reach your quota, but want a different phone number, you can release one of previously claimed numbers. You cannot claim the same phone number after releasing it.

If you need more phone numbers, you can request a service quota increase using the Amazon Connect service quota increase form.

Claim a phone number you already own in another country

Let’s say your business is located in Germany. You also have agents in Japan to serve customers who live there, and you need a Japanese phone number for that contact center. To claim a phone number that you already own in another country, use the following steps to create a support case.

To claim a number that you don’t already own in another country or region, see Request numbers, international numbers, or termination points (p. 167).

1. Go to Create case.
2. Choose Service limit increase.
3. In Limit type select Amazon Connect.
4. In Use case description, provide the address of your business that’s located in the other country.
5. In Contact options, choose whether we should contact you by email or phone.
6. Choose Submit.

We'll contact you to help with your request.

Claim phone numbers for Amazon Connect in the Asia Pacific (Tokyo) Region

To claim a phone number for an Amazon Connect instance you create in the Asia Pacific (Tokyo) Region, open an AWS support case and provide documentation that your business is located in Japan. For a list of the required documentation, see Japan (JP) (p. 184), in the Region requirements for ordering and porting phone numbers (p. 169) topic.

Numbers can be claimed for business use only, not for personal use.

Amazon Connect supports claiming the following phone numbers for instances created in the Asia Pacific (Tokyo) Region.

- **Direct Inward Dialing (DID) numbers**—DID numbers are also referred to as local numbers.
  - 050 prefix numbers.
  - 03 prefix for numbers in Tokyo. Amazon Connect does not offer phone numbers for other cities in Japan at this time.

- **Toll Free numbers**
  - 0120 prefix numbers.
  - 0800 prefix numbers.

**Note**

When you claim a toll free phone number for Amazon Connect, there is no corresponding DID number with a 03 prefix also assigned, as with other toll free numbers in Japan. If you need to use a DID number, you can claim one in Amazon Connect.

Request numbers, international numbers, or termination points

**Important**

To purchase and own a phone number, country or region regulations often require:

- A local office address.
- Specific identification documents.

For identification requirements by country, see Region requirements for ordering and porting phone numbers (p. 169).

In most countries it takes 2-6 weeks for us to fulfill your request. In some cases it can take up to 60 days. If you need a number by a certain date, let us know in your AWS Support case.

**Note**

Amazon does not provide premium rate or higher cost services. If you want these services we recommend you contract with specialist providers to route calls into Amazon Connect DID’s following local country regulations.

To request international phone numbers that require documentation, or numbers not available within a specific region, create an AWS Support case. In the support case, you must specify exactly how many numbers you want for each country.
1. Go to Create case.
2. Choose Service limit increase.
3. In Limit type select Amazon Connect.
4. In Use case description, enter the number that you want to request or exactly how many numbers you want for each country. If you need the number by a certain date, include that, too.
5. In Contact options, choose whether we should contact you by email or phone.
6. Choose Submit.

We'll contact you to help with your request.

After your request is approved, the exact number of requested phone numbers appear in your Amazon Connect console for you to claim. You won't have access to all available numbers in that country.

Requirements for Custom Termination Points

In the Asia Pacific (Sydney) Region, you can request Custom Termination Points.

The term "Custom Termination Points" means custom Tier 1 telephony destinations for customer calls to Amazon Connect configured as local phone numbers. In using Custom Termination Points, you understand and agree that you:

1. Have a current toll-free national service that allows you to set Custom Termination Points as a destination for customer phone calls.
2. Cannot port or move Custom Termination Points to a different telephony provider once assigned by Amazon Connect.
3. Will be billed at the standard daily rate for claimed Australian phone numbers and DID inbound usage fees.
4. You are responsible for adding the Custom Termination Points in your existing toll-free national service.

Release a phone number

If you want a different phone number, or have extra numbers that you aren't using, you can release them back to inventory.

When a phone number is released from your Amazon Connect instance:

- You will no longer be charged for it.
- You cannot reclaim the phone number.
- Amazon Connect reserves the right to allow it to be claimed by another customer.

Tip
If you want to "close" your Amazon Connect account, do these steps for all of your phone numbers. This will ensure you aren't billed if people erroneously call numbers that you've claimed, and initiate your contact flows. You may also want to delete your instances. (p. 145)

To release a phone number

1. Log in to your contact center at https://instance name.my.connect.aws/. To find the name of your instance, see Find your Amazon Connect instance ID/ARN (p. 137).
2. On the navigation menu, choose Routing, Phone numbers.
3. Choose the phone number you want to release, and then choose Release.
If the phone number is associated with a contact flow, that flow will be deactivated until another number is associated with it.

When customers call the phone number you have released, they will get a message that it is not a working phone number.

Telecoms regulations

Contents
- Region requirements for ordering and porting phone numbers (p. 169)

Region requirements for ordering and porting phone numbers

Country or region regulations often require a local office address and specific identification documents to purchase and own a phone number. The address that you provide can be the business or personal address where the phone numbers are used.

Following is a list of ID Requirements by country or region. When you request an international number (p. 167), we'll work with you to submit your documents.

Note
After your numbers are ordered or ported, the exact number of requested phone numbers appear in your Amazon Connect console for you to claim. You won't have access to all available numbers in that country.

Argentina (AR)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes: +54 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Australia (AU)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant</td>
</tr>
</tbody>
</table>
### Supported Regions

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>Mobile prefixes: +61 4</td>
<td>Yes</td>
<td>Proof of the business name, address, and registration number. Also provide a copy of a business license or taxpayer ID certificate.</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>Mobile prefixes: +61 4</td>
<td>Yes</td>
<td>A global address is acceptable.</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>Toll-free prefixes: +61 1300, +61 1800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| Asia Pacific (Sydney) | 8AM -12 PM AEST | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| Asia Pacific (Singapore) | | |
| Asia Pacific (Tokyo) | | |

### Austria (AT)

**For ordering phone numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
</table>
| US East           | Local telephone numbers: | Yes | Proof of telecom services at your address, which must match the city code requested.  
Your business name, address, and registration number, and a copy of the ID or passport of an authorized representative. |
<p>| US West           | | | |
| Canada (Central)  | | | |
| EU (Frankfurt)    | Mobile prefixes: +43 6 | Yes | Your business name, address, the business registration, and a copy of the ID or passport of an authorized representative. |
| EU (London)       | | | |</p>
<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>A global address is acceptable.</td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: +43 800</td>
<td></td>
<td>Your business name, address, a copy of the business registration (global), and a copy of the passport of an authorized representative.</td>
</tr>
<tr>
<td></td>
<td>National prefixes: +43 720</td>
<td>Yes</td>
<td>Your business name, address, a copy of the business registration (global), and a copy of the passport of an authorized representative.</td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
|                   |                  | 2. Letter of Authorization (LOA)  
|                   |                  | 3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West           |                  |                    |
| EU (Frankfurt)    |                  |                    |
| EU (London)       |                  |                    |

Belgium (BE)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td>Mobile prefixes: +32 46</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: +32 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>National prefixes: +32 78</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### EU (London)

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice, 2. Letter of Authorization (LOA), 3. Service address for numbers, 4. Documents required for Type of Number as listed in previous table for ordering phone numbers</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Bulgaria (BG)

#### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers: Yes</td>
<td>Your residence or business address. Both must be in the relevant geographic zone.</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td>Toll-free prefixes: +359 800 Yes</td>
<td>Your name and address.</td>
<td></td>
</tr>
</tbody>
</table>

#### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice, 2. Letter of Authorization (LOA), 3. Documents required for Type of Number as listed in previous table for ordering phone numbers, 4. Bulgarian Registration Number is mandatory for customers based in Bulgaria</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Canada (CA)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWS GovCloud (US-West)</td>
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<td></td>
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</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>7 AM to 5 PM CST</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>US West</td>
<td>7 AM to 5 PM CST</td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>7 AM to 5 PM CST</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>7 AM to 5 PM CST</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td>7 AM to 5 PM CST</td>
<td></td>
</tr>
<tr>
<td>AWS GovCloud (US-West)</td>
<td>7 AM to 5 PM CST</td>
<td></td>
</tr>
</tbody>
</table>

Chile (CL)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes:</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Croatia (HR)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your residence or business address. Both must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>EU (London)</td>
<td>Mobile prefixes: + 385 95</td>
<td>Yes</td>
<td>Your business name, address, and business registration or VAT number.</td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: + 385 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Copy of Court Registration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Copy of legal representative's photo ID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
</tbody>
</table>

**Cyprus (CY)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: + 357 800</td>
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</tr>
</tbody>
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### Supported Regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
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<tbody>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| EU (Frankfurt)    | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Copy of Certificate of Directors and Secretary of the Company  
4. Copy of Certificate of Incorporation  
5. Copy of legal representative's photo ID |
| EU (London)       |                 |                                                                                     |

### Czech Republic (CZ)

### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your residence or business address. Both must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td>Mobile prefixes: +420 73</td>
<td>Yes</td>
<td>Your business name, address, and business registration or VAT number, and a copy of the ID or passport of an authorized representative.</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +420 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 3 PM to 4 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Documents required per Type of Number as listed in the previous table for ordering numbers |
| US West           |                 |                                                                                     |
| EU (Frankfurt)    |                 |                                                                                     |
| EU (London)       |                 |                                                                                     |
### Denmark (DK)

**For ordering phone numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your name, address, and business registration or VAT number.</td>
</tr>
<tr>
<td>US West</td>
<td>Mobile prefixes: +45 25, +45 92, +45 41</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +45 808</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**For porting numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td>3. Documents required per Type of Number as listed in the previous table for ordering numbers</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Estonia (EE)

**For ordering phone numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Toll-free prefixes: +372 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td>National prefixes: +372</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**For porting numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
</tbody>
</table>
### Finland (FI)

#### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your residence or business address. Both must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +358 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>National prefixes: +358 75</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West           |                  |                                                                                     |
| EU (Frankfurt)    |                  |                                                                                     |
| EU (London)       |                  |                                                                                     |

### France (FR)

#### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone as the number. You must provide proof of the address along</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. LOA template has to include a local address.
2. If this is a company, a business number is required.
### Telecoms regulations

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Mobile prefixes: +33 7</td>
<td>Yes</td>
<td>with a copy of the business registration.</td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: +33 805</td>
<td>No</td>
<td>Your business name, address, and business registration or VAT number, and a copy of the ID or passport of an authorized representative. A global address and ID are acceptable.</td>
</tr>
<tr>
<td></td>
<td>National prefixes: +339</td>
<td>Yes</td>
<td>An address in France is required.</td>
</tr>
</tbody>
</table>

**For porting numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Documents required per Type of Number as listed in the previous table for ordering numbers  
4. It is mandatory to provide RIO code from the losing carrier, or at least the SIRET (if you’re a business customers only). You can obtain the SIRET by contacting your existing telecom carrier. |
| US West           |                  |                    |
| EU (Frankfurt)    |                  |                    |
| EU (London)       |                  |                    |

**Georgia (GE)**

**For ordering phone numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>National prefixes: +995 70</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Germany (DE)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Local address in Germany is required. Businesses must provide a copy of the ID or passport of an authorized representative and business registration proof. The proof of business registration typically includes the address. The address dictates where the geographic number must be sited. The ID must be of the representative named on the business registration. Valid proofs of ID include government-issued ID from any country (for example, passport, national ID card, driver's license ID card).</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toll-free prefixes: +49 800</td>
<td>Yes</td>
<td></td>
<td>Your residence or business address outside of Germany. You must provide proof of the address. For numbers to be answered inside of Germany, a special process applies. You must obtain the number directly from the local regulator and then port it to Amazon Connect. Details about the process are provided when you make the request.</td>
</tr>
<tr>
<td>National prefixes: +49 32</td>
<td>Yes</td>
<td></td>
<td>Local address in Germany is required. Businesses must provide a copy of the ID or passport of an authorized representative and business registration proof. The proof of business registration typically includes the address. The address dictates where the geographic number must be sited.</td>
</tr>
</tbody>
</table>
### Telecoms regulations

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>passport of an authorized representative and business registration proof that has the local address on it. The ID must be of the representative named on the business registration. Valid proofs of ID include government-issued ID from any country (for example, passport, national ID card, driver's license ID card).</td>
</tr>
</tbody>
</table>

**For porting numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td>3. For business ports, end user stamp is mandatory on the LOA.</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td>4. If the number to be ported is an extended line, the main line must be ported.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
</tbody>
</table>

**Greece (GR)**

**For ordering phone numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes: +30 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Company registration certificate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Copy of LOA signatory's photo ID/Passport</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US West</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Hong Kong (HK)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>National prefixes: +852 58</td>
<td>Yes</td>
<td>Your address and proof of address.</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>Toll-free prefixes: +852 800</td>
<td>Yes</td>
<td>A global address is acceptable.</td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not support</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Hungary (HU)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>EU (London)</td>
<td>Toll-free prefixes: +36 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| EU (Frankfurt)    | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Mobile prefixes: +62 855</td>
<td>Yes</td>
<td>Proof of business address, a copy of the ID or passport of an authorized representative, and the business registration. You must also provide a description of how you plan to use the numbers.</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +353 1800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Indonesia (ID)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Mobile prefixes: +62 855</td>
<td>Yes</td>
<td>Proof of business address, a copy of the ID or passport of an authorized representative, and the business registration. You must also provide a description of how you plan to use the numbers.</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Ireland (IE)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +353 1800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Supported Regions

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (London)</td>
<td>National prefixes: +353 76</td>
<td>No</td>
<td>Nomadic numbers (076) are distributed only to Irish residents, or to individuals with a proven, substantive association with Ireland.</td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. It is mandatory to provide the main telephone number on the account.  
4. It is mandatory to provide a Wholesale Account number.  
5. Type of the line mandatory on the LOA.  
6. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West           |                 |                                                                                      |
| EU (Frankfurt)    |                 |                                                                                      |
| EU (London)       |                 |                                                                                      |

### Italy (IT)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business name, address, and VAT number.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td>You must provide the following details of an authorized representative: name and address, birth location and data, and nationality and tax code. Also provide proof of the authorized representative's identity, which can be a copy of an ID or passport.</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
<td>Any Italian address is acceptable.</td>
</tr>
<tr>
<td>(Central)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>Toll-free prefixes: +39 800</td>
<td>Yes</td>
<td>Your business name, address, and VAT number.</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Supported Regions | Type of Number | Are there ID requirements? | Acceptable Identification
---|---|---|---

You must provide the following details of an authorized representative: name and address, birth location and data, and nationality and tax code. Also provide proof of the authorized representative's identity, which can be a copy of an ID or passport. A global address is acceptable.

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East | 10 AM to 12 PM CET | 1. Last invoice
2. Letter of Authorization (LOA)
3. Migration code of the requested number is mandatory. Obtain this code from the losing carrier.
4. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West | | |
| EU (Frankfurt) | | |
| EU (London) | | |

Japan (JP)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Businesses must provide a copy of the ID or passport of an authorized representative, a ZIP file containing a proof of address, and a document that associates the authorized representative with the business. Valid proofs of address include: third-party issued bank statements, utility bills (all issued in the previous 6 months);</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported Regions</td>
<td>Type of Number</td>
<td>Are there ID requirements?</td>
<td>Acceptable Identification</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------</td>
<td>----------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>Toll-free prefixes: +81 120, +81 800</td>
<td>Yes</td>
<td>government documents (issued in the previous year); or IDs listing the submitted address, such as government-issued IDs, passports, drivers licenses, and business registration. The business address must be in the city corresponding to the requested area code of the number. Businesses must provide a copy of the ID or passport of an authorized representative, a ZIP file containing a proof of address, and a document that associates the authorized representative with the business. Valid proofs of address include: third-party issued bank statements, utility bills (all issued in the previous 6 months); government documents (issued in the previous year); or IDs listing the submitted address, such as government-issued IDs, passports, drivers licenses, and business registration. A global address is acceptable.</td>
</tr>
</tbody>
</table>

**For porting numbers**

**Note**

Local telephone numbers cannot be ported. Only toll-free numbers can be ported.

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>Toll-free prefixes: +81 120, +81 800</td>
<td>1. Last invoice 2. Letter of Authorization (LOA) 3. Documents required per Type of Number as listed in the previous table for ordering numbers</td>
</tr>
</tbody>
</table>

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Latvia (LV)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Mobile prefixes: +371 28</td>
<td>Yes</td>
<td>Your address.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A global address is acceptable.</td>
</tr>
<tr>
<td>EU (London)</td>
<td>Toll-free prefixes: +371 80</td>
<td>Yes</td>
<td>Your name and address.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A global address is acceptable.</td>
</tr>
<tr>
<td></td>
<td>National prefixes: +371 6</td>
<td>Yes</td>
<td>Your name and an address in Latvia.</td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice&lt;br&gt; 2. Letter of Authorization (LOA)&lt;br&gt; 3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lithuania (LT)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td>Your business name, address, and registration number.</td>
</tr>
<tr>
<td></td>
<td>Mobile prefixes: +370 66</td>
<td>Yes</td>
<td>A global address is acceptable.</td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: +370 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice 2. Letter of Authorization (LOA) 3. VAT number and local address is needed on the LOA. 4. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Luxembourg (LU)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers: +352 27</td>
<td>Yes</td>
<td>Your residence or business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>EU (London)</td>
<td>Toll-free prefixes: +352 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice 2. Letter of Authorization (LOA) 3. You must provide the account number from the Main Losing Carrier to which the requested DID is assigned. 4. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Malaysia (MY)

For ordering phone numbers

Inside Malaysia

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Local telephone numbers (Inbound and Outbound)</td>
<td>Yes</td>
<td>Business Registration Documentation, Letter</td>
</tr>
</tbody>
</table>
### Supported Regions

<table>
<thead>
<tr>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local telephone numbers (existing Inbound only pre 9th July 2021)</td>
<td>Yes</td>
<td>Government issued ID such as passport.</td>
</tr>
<tr>
<td>National prefixes: +60 15</td>
<td>Yes</td>
<td>Business Registration Documentation, Letter of Authority naming an authorised business user. Government issued ID such as passport.</td>
</tr>
<tr>
<td>Toll-free prefixes: +60 1800</td>
<td>Yes</td>
<td>Business Registration Documentation, Letter of Authority naming an authorised business user. Government issued ID such as passport.</td>
</tr>
</tbody>
</table>

### Outside Malaysia

<table>
<thead>
<tr>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local telephone numbers (Inbound required post 9th July 2021)</td>
<td>Yes</td>
<td>Non Malaysia Business Registration Documentation</td>
</tr>
<tr>
<td>National prefixes: +60 15</td>
<td>Yes</td>
<td>Non Malaysia Business Registration Documentation</td>
</tr>
<tr>
<td>Toll-free prefixes: +60 1800</td>
<td>Yes</td>
<td>Non Malaysia Business Registration Documentation</td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
**Malta (MT)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>National prefixes: +356</td>
<td>Yes</td>
<td>Your business name, address, a copy of the business registration (global), and a copy of the ID or passport of an authorized representative. A global address is acceptable.</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Mexico (MX)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes: +52 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET or 2 PM to 4 PM CET</td>
<td>1. Last invoice 2. Letter of Authorization (LOA) 3. Copy of LOA signatory´s photo ID 4. Copy of power of attorney</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### New Zealand (NZ)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: +64 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| Asia Pacific (Sydney) | 7 AM to 11AM NZST           | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Wholesale account number of the phone number from the current carrier. |
| Asia Pacific (Singapore) |                             |                                                                                  |
| Asia Pacific (Tokyo)  |                             |                                                                                  |

### Netherlands (NL)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Canada (Central)    | Mobile prefixes: +31 97     | Yes                        | A global business address.  
                       |                              |                            | No voice services are supported, only AWS Server Migration Service (AWS SMS). |
| EU (Frankfurt)      | Toll-free prefixes: +31 800 | Yes                        | File orders in writing. Use the form that is provided to you when you make the request. Provide the following information:  
| EU (London)         |                             |                            | • Your name and address.   |
### Supported Regions

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>• A description of the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>service for which the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>number will be used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Estimated lead time from</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>order to activation is 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>weeks.</td>
</tr>
<tr>
<td>National prefixes: +31 85</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td>3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Norway (NO)

#### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address in Norway.</td>
</tr>
<tr>
<td>US West</td>
<td>Mobile prefixes: +47 59</td>
<td>Yes</td>
<td>Your business name, address, and registration number, and a copy of the ID or passport of an authorized representative.</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +47 800</td>
<td>Yes</td>
<td>Your business address in Norway.</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>National prefixes: +47 81</td>
<td>Yes</td>
<td>Your business address in Norway.</td>
</tr>
</tbody>
</table>

Numbers are available to businesses only, not individuals. The DID type is Landline, instead of Geographic. This is because all formerly geographic numbers are now classified as landline, and do not have a geographic zone.
For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
|                   |                 | 2. Letter of Authorization (LOA)  
|                   |                 | 3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West           |                 |                    |
| EU (Frankfurt)    |                 |                    |
| EU (London)       |                 |                    |

Peru (PE)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes: +51 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Poland (PL)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Mobile prefixes: +48 73</td>
<td>Yes</td>
<td>Your business name, address and registration number, and a copy of the ID or passport of an authorized representative. A global address is acceptable.</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>Toll-free prefixes: +48 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
|                   |                 | 2. Letter of Authorization (LOA)  
|                   |                 | 3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West           |                 |                   |
| EU (Frankfurt)    |                 |                   |
| EU (London)       |                 |                   |

Portugal (PT)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone. You must also submit the required proof of Telecom services being provided to the address.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>Toll-free prefixes: +35 1800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td>National prefixes: +351 30</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
|                   |                 | 2. Letter of Authorization (LOA)  
|                   |                 | 3. Copy of legal representative's photo ID  
|                   |                 | 4. Documents required per Type of Number as listed in the previous table for ordering numbers  
| US West           |                 |                   |
| EU (Frankfurt)    |                 |                   |
| EU (London)       |                 |                   |
### Puerto Rico (PR)

**For ordering phone numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers: +1 787, +1 939</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +1 800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**For porting numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM PST</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
</tbody>
</table>

### Romania (RO)

**For ordering phone numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers: +40 376</td>
<td>Yes</td>
<td>Your address and proof of address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>EU (London)</td>
<td>Toll-free prefixes: +40 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>National prefixes: +40 376</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**For porting numbers**

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM PST</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
</tbody>
</table>
Singapore (SG)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Mobile prefixes: +65 8</td>
<td>Yes</td>
<td>Address required in country</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Documents required for company: Company registration documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Documents required for individual: Passport or user ID</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>National prefixes: +65 31</td>
<td>Yes</td>
<td>Address required in country</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Documents required for company: Company registration documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Documents required for individual: Passport or user ID</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>Toll-free prefixes: +65 800</td>
<td>Yes</td>
<td>Address required in country</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Documents required for company: Company registration documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Documents required for individual: Passport or user ID</td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>None specified</td>
<td>1. Emergency services address is required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Latest bill containing numbers from current carrier is required</td>
</tr>
</tbody>
</table>
**Slovakia (SK)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +421 800</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East             | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West             |                  |                                                                       |
| EU (Frankfurt)      |                  |                                                                       |
| EU (London)         |                  |                                                                       |

**Slovenia (SI)**

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toll-free prefixes: +386 80</td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>National prefixes: +386 82</td>
<td></td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
</tbody>
</table>
### Spain (ES)

#### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone as the phone number.</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td></td>
<td>A copy of the ID/business registration.</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>Toll-free prefixes: +34 900</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td>National prefixes: +34 518, +34 902</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

#### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| US East           | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. CIF/NIF (VAT number)  
4. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |
| US West           | 10 AM to 12 PM CET | 1. Last invoice  
2. Letter of Authorization (LOA)  
3. CIF/NIF (VAT number)  
4. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers |

### Sweden (SE)

#### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address in Sweden.</td>
</tr>
<tr>
<td>US West</td>
<td>Mobile prefixes: +46 766</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
### Telecommunications Regulations

#### Supported Regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada (Central)</td>
<td>Toll-free prefixes: +46 20</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>National prefixes: +46 77</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers:

<table>
<thead>
<tr>
<th>Region</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>US West</td>
<td></td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td>3. Your tax number has to be provided. A Swedish organization number usually contains 12 digits, starting with 16 if it is from a company, or 19 or 20 if it's personal.</td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td>4. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers</td>
</tr>
</tbody>
</table>

**Switzerland (CH)**

For ordering phone numbers:

<table>
<thead>
<tr>
<th>Region</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td>Your business address. It must be in the relevant geographic zone.</td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes: +41 800</td>
<td>Yes</td>
<td>Your business address and a copy of business registration. A global address is acceptable.</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For porting numbers:

<table>
<thead>
<tr>
<th>Region</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
</tbody>
</table>
### Supported Regions

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US West</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Letter of Authorization (LOA)
3. Documents required for the Type of Number, as listed in the previous table for ordering phone numbers

### Thailand (TH)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
<th>Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td>Local telephone numbers:</td>
<td>Yes</td>
<td><strong>For business address inside Thailand:</strong> Business must provide a copy of the ID of a company authorized representative and company certificate.</td>
<td>International caller ID is not guaranteed.</td>
</tr>
<tr>
<td>(Sydney)</td>
<td></td>
<td></td>
<td><strong>For business address outside of Thailand:</strong> Proof of business address and proof of ID, such as the business registration. Also, a copy of the ID or passport of an authorized representative.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes:</td>
<td>Yes</td>
<td>Proof of business address and proof of ID, such as the business registration. Also, a copy of the ID or passport of an authorized representative. The address cannot be in Thailand.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+66 1800</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not supported</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

199
Turkey (TR)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU (Frankfurt)</td>
<td>Local telephone numbers: +90 800</td>
<td>Yes</td>
<td>Proof of business address. It must be in the city corresponding to the requested area code.</td>
</tr>
<tr>
<td>EU (London)</td>
<td>Local telephone numbers: +90 800</td>
<td>Yes</td>
<td>The business registration and a copy of the ID or passport of an authorized representative.</td>
</tr>
<tr>
<td></td>
<td>Toll-free prefixes: +90 800</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>National prefixes: +90 850</td>
<td>Yes</td>
<td>Your business address and a copy of the ID or passport of an authorized representative.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A global address is acceptable.</td>
</tr>
</tbody>
</table>

For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
</table>
| EU (Frankfurt)    | 10 AM to 12 PM CET | 1. Last invoice  
|                   |                  | 2. Letter of Authorization (LOA)  
|                   |                  | 3. Copy of legal representative's photo ID  
|                   |                  | 4. Copy of the company registration in the Trade Registry Gazette  
| EU (London)       |                  | 5. Copy of the registration at the tax office, with an official proof of signature |

United Kingdom (UK)

For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers: +44</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Mobile prefixes: +44</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
### Supported Regions

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>National prefixes: No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>National prefixes: No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>National prefixes: Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>National prefixes: No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>National prefixes: No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU (London)</td>
<td>National prefixes: No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### For porting numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Porting Windows</th>
<th>Required Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>US West</td>
<td>10 AM to 12 PM CET</td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>10 AM to 12 PM CET</td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>10 AM to 12 PM CET</td>
<td>2. Letter of Authorization (LOA)</td>
</tr>
<tr>
<td>EU (London)</td>
<td>10 AM to 12 PM CET</td>
<td>1. Last invoice</td>
</tr>
</tbody>
</table>

### United States (US)

#### For ordering phone numbers

<table>
<thead>
<tr>
<th>Supported Regions</th>
<th>Type of Number</th>
<th>Are there ID requirements?</th>
<th>Acceptable Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East</td>
<td>Local telephone numbers:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>US West</td>
<td>Toll-free prefixes:</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>Toll-free prefixes:</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
Set up outbound communications

You can send outbound communications to customers for a variety of reasons, such as appointment reminders, subscription renewals, and debt collection. Amazon Connect provides both normal and high-volume outbound campaign capabilities.

Contents

- Set up outbound caller ID (p. 203)
- Enable outbound calls (p. 206)
- Enable High-Volume Outbound Communications (p. 206)
- Security profile permissions for outbound communications (p. 208)
Set up outbound caller ID

We recommend setting your outbound caller ID. Not doing so may result in some PSTN carriers considering your outbound calls fraudulent activity, and they may drop them.

There are a few times when your outbound caller ID—your company name and number—will appear to contacts:

- During customer callbacks.
- If an agent makes an outbound call.
- If an agent transfers a call, for example, to an external number.

Caller ID name: Set in queue

You set the caller ID name, such as the name of your company, in the queue settings. To edit queue settings, on the navigation menu choose Routing, Queues, and then choose the queue you want to edit.

If your DID phone number is in the US/CANADA: The name you use should be the same one that’s registered in the CNAM (Caller Name) database provided by Amazon Connect; this is a nationwide resource available in the US/CANADA to provide the name of the calling party on incoming calls if recipients subscribe to CNAM services from their telecom carrier.

Open an AWS Support ticket to register your US/CANADA-based phone number with your company name in the CNAM database of the Amazon Connect carrier. We’ll handle the registration process for you.
Tip
If you want each agent to have their own caller ID name while dialing out (such as Example Corp Billing Dept), create a queue for each agent/caller ID name.

Caller ID number: Set in the queue or Call phone number block

Only phone numbers that you've claimed (p. 166) or ported to Amazon Connect (p. 155) can be used as your caller ID number.

To use an external phone number as your outbound caller ID number, contact AWS Support to see if it's possible. You'll need to provide proof of ownership (p. 169).

You can set the caller ID number as follows:

- **Call phone number (p. 292) block**: Use this block in an outbound whisper flow to initiate an outbound call to a customer and, optionally, specify a custom caller ID number that is displayed to call recipients.
  
  This block is useful when you have multiple telephone numbers used to make outbound calls, but want to consistently display the same company phone number for the caller ID for calls made from your contact center.

  You can also use this block with the Set contact attributes (p. 350) block to set the callback number dynamically. For example, you can display a certain caller ID number based on the customer's account type.

- **Queue**: If no caller ID number is specified in the Call phone number (p. 292) block, then the caller ID in the queue settings is used.

  **Important**
  In Australia: The caller ID must be an Amazon Connect provided DID (Direct Inward Dialing) phone number. If a toll free number or a number not provided by Amazon Connect is used in the caller ID, local telephony suppliers may reject outbound calls due to local anti-fraud requirements.

Setting the caller ID dynamically

Use an attribute in the Call phone number (p. 292) block to set the caller ID number dynamically during the contact flow.

The attribute can be one you define in the Set contact attributes (p. 350) block in the contact flow. Or, it can be an external attribute returned from an AWS Lambda function.

The value of the attribute must be a phone number from your instance in E.164 format.

- If the number is not in E.164 format, the number from the queue associated with the outbound whisper flow is used for the caller ID number.
- If no number is set for the outbound caller ID number for the queue, the call attempt will fail.

For more information about setting the caller ID dynamically, see this AWS Support Knowledge Center article: How can I set my Amazon Connect outbound caller ID dynamically based on country?

Use E.164 format for international phone numbers

Amazon Connect requires phone numbers in E.164 format.
To express a US phone number in E.164 format, add the '+' prefix and the country code in front of the number. For example, for a US number:

- +1-800-555-1212

In the UK and many other countries internationally, local dialing requires the addition of a 0 in front of the subscriber number. However, to use E.164 formatting, this 0 must be removed. A number such as 020 718 xxxx in the UK would be formatted as +44 20 718 xxxx.

Phone numbers that are not formatted in E.164 may work, but it depends on the phone or handset that is being used as well as the carrier from which the call is originated.

When you place calls from the CCP using Amazon Connect the CCP provides the correct formatting for numbers automatically.

**How to specify a custom caller ID number using a Call phone number (p. 292) block**

1. On the navigation menu, choose **Routing, Contact flows**.
2. Choose the down arrow next to **Create contact flow**, and then choose **Create outbound whisper flow**.
3. Add a **Call phone number (p. 292)** block to the flow, and connect the **Entry point** block to it.
   
   The **Call phone number (p. 292)** block must be placed before a **Play prompt** block if one is included in your contact flow.
4. Select the **Call phone number (p. 292)** block, and then select **Caller ID number to display**.
5. Do one of the following:
   - To use a number from your instance, choose **Select a number from your instance**, and then search for or select the number to use from the drop-down.
   - Choose **Use attribute** to use a contact attribute to provide the value for the caller ID number. You can use either a **User Defined** attribute you create using a **Set contact attributes (p. 350)** block, or an **External** attribute returned from an AWS Lambda function. The value of any attribute you use must be a phone number claimed for your instance and be in E.164 format. If the number used from an attribute is not in E.164 format, the number set for the **Outbound caller ID number** for the queue is used.
6. Add any additional blocks to complete your contact flow, and connect the **Success** branch of the **Call phone number (p. 292)** block to the next block in the flow.

   There is no error branch for the block. If a call is not successfully initiated, the contact flow ends and the agent is placed in an **AfterContactWork** (ACW) state.

**Why your caller ID might not appear correctly to customers**

Amazon Connect presents Outbound Caller ID Name correctly via the Calling Line/Party Presentation service on outbound calls. In testing, with all of our telephony providers, the Outbound Caller ID Name value comes back to us intact on all the carriers we use. This service is not consistent because downstream carriers (including mobile carriers) often ignore the value we set in the Outbound Caller ID Name and CNAM is not regulated or enforced.

**How to avoid labels like "spam" and "telemarketer"**

Amazon Connect has contracted with a leading provider of CNAM services for US numbers to provide Calling Name to the extent possible. This enables outbound calls that show the enrolled Calling Line Identity (CLI) to generally avoid reputation-sensitive labels like "spam" or "telemarketer."
To enroll your numbers with this CNAM services provider, open a Support ticket. Our Support team will gather the required information to enroll your numbers. For instructions on how to access Support, see Get administrative support for Amazon Connect (p. 964).

**Note**
Only numbers in the 50 US states, Puerto Rico, and Virgin Islands are eligible.

### Enable outbound calls

Before your agents can make outbound calls to customers, you need to set up your Amazon Connect instance for outbound communications.

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your **instance name**, which appears in your Amazon Connect URL.

   ![Amazon Connect instances](image)

3. In the navigation pane, choose **Telephony**.
4. To enable outbound calling from your contact center, choose **Make outbound calls with Amazon Connect**.
5. By enabling early media audio, your agents can hear pre-connection audio such as busy signals, failure-to-connect errors, or other informational messages from telephony providers, when making outbound calls. Choose **Enable early media**.
6. Choose **Save**.

**Note**
For a list of countries you can call by default based on the Region of your instance, see Countries you can call (p. 930).
For a list of all countries available for outbound calls based on the Region of your instance, see Amazon Connect pricing. If a country is not available in your dropdown menu, open a ticket to add it to your allow list.

### Enable High-Volume Outbound Communications

High-Volume Outbound Communications is in preview release for Amazon Connect and is subject to change.

Contact centers send outbound communications to customers for a variety of reasons, such as appointment reminders, telemarketing, subscription renewals, and debt collection. By using Amazon Pinpoint Journeys and Amazon Connect, you can create high-volume outbound campaigns for voice, SMS, and email.

This topic describes how to create a high-volume outbound campaign using Amazon Connect and Amazon Pinpoint through the user interface.
Before you begin

There are a few things that you need in place before you create a high-volume outbound campaign:

- Use the Amazon AppIntegrations Service to enable high-volume outbound campaigns for your Amazon Connect instance.
- Make sure your instance is enabled for outbound calling (p. 206).
- Create a dedicated outbound communications queue to handle any contacts that will be routed to agents as a result of the campaign.
- Assign the queue to the agent’s routing profile.
- Create and publish a contact flow that includes a Check call progress (p. 297) block. This block enables you to branch based on whether a person answered the phone, for example, or a voicemail was detected.

Create a high-volume outbound campaign

1. In the navigation pane, choose High volume outbound communication, and then choose Create campaign.
2. In the Campaign details section, specify the name.
3. In the Outbound configuration section, select the published contact flow you created for outbound communications (a contact flow that includes a Check call progress (p. 297) block).
4. Select a queue to associate with this campaign. When customers are routed to an agent, they will come from this queue.

   This queue should be dedicated to outbound campaigns. You can have multiple campaigns on the same queue. We recommend that you don’t use this queue for any other purpose, and that you don’t transfer calls from this queue to a queue that’s not related to this campaign.
5. Choose the phone number to be used to make the outbound calls. The outbound phone number is specified at the queue. This is optional if you set an outbound number in the queue.

   You must use a phone number that has been ported to your Amazon Connect instance, or claimed from Amazon Connect.
6. Choose a dialer type.
7. Choose a bandwidth allocation.
8. Create the campaign ID. Copy the campaign ID, because you’ll use it in the next step.
9. Open the Amazon Pinpoint console (https://console.aws.amazon.com/pinpoint/) and Create a journey, using the name of the campaign that you created in Amazon Connect.

Campaign status

After a campaign is running, you can pause or stop it. You can delete a campaign at any time.

- Created – The campaign is created.
- Running – The campaign as running.
- Paused – The campaign is paused until it is resumed.
- Stopped – The campaign is stopped. You can’t resume a campaign that is stopped.
- Failed – An error state caused the campaign to fail.
Security profile permissions for outbound communications

To enable agents to make outbound calls, the following **Make outbound calls** permissions to the agent's security profile:

![Contact Control Panel (CCP)](image)

To enable call center managers to create high-volume outbound campaign, assign the **High-Volume Outbound Communications** permissions to their security profile.

For instructions, see Update security profiles (p. 616).

By default, the **Admin** security profile already has permissions to perform all activities.

Set up routing

In Amazon Connect, routing consists of three parts: queues, routing profiles, and contact flows. This topic discusses queues and routing profiles. For information about contact flows, see Create Amazon Connect contact flows (p. 269).

A queue holds contacts waiting to be answered by agents. You can use a single queue to handle all incoming contacts, or you can set up multiple queues.

Queues are linked to agents through a routing profile. When you create a routing profile, you specify:

- Which queues will be in it.
- Whether one queue should be prioritized over another.
- What channels agents will handle in the Contact Control Panel (CCP).
- How many contacts agents can handle simultaneously for each channel.
- Whether individual queues are for all channels or specific ones.

Each agent is assigned to one routing profile.

Contents

- How routing works (p. 209)
- Create a queue (p. 210)
- Disable a queue (p. 211)
- Set the Maximum contacts in queue limit (p. 212)
- Set the hours of operation and timezone for a queue (p. 213)
- Create a routing profile (p. 215)
How routing works

Contacts are routed through your contact center based on these factors:

- The routing profile an agent is assigned to.
- The hours of operation for a given queue.
- The routing logic you define in your contact flows.

For example, you use routing profiles to route specific types of contacts to agents with specific skill sets. If no agent with the required skill set is available, you can place the contact in the queue defined in the contact flow.

Here's the logic Amazon Connect uses to route contacts:

- Contacts in a queue are automatically prioritized and forwarded to the next available agent (that is, the agent who has been idle longest).
- Contacts are placed on hold if there are no available agents. The order in which they are serviced is determined by their time in queue, on a first-come, first-served basis.
- If multiple agents are available, the contact is routed to the agent who has been in the Available status for the longest time.
- A routing profile may assign a priority to one queue over another, but the priority within the queue is always set by the order the contact was added to the queue.

How routing works with multiple channels

When you set up a routing profile to handle multiple channels, agents must complete the interactions with inbound contacts on one channel before they can receive a contact or a task on the other.

Example: Say a routing profile is configured for voice contacts and for up to 10 chats and up to 10 tasks. Here’s how it would work:

- When agents sign on, they can be routed a chat, task, or voice contact.
- After the agents begin interacting with a voice call, no chats, tasks, or additional voice contacts are routed to them until they finish the call.
- When agents accept a chat, up to 10 chats are routed to them, but no voice contacts or tasks. After they're done with the chats, they're available for the next contact, which could be voice, chat, or task.
- When agents accept a task, up to 10 tasks are routed to them, but no voice contacts or chats. After they're done with the tasks, they're available for the next contact, which could be voice, chat, or task.

This routing model allows agents to handle both voice and chat channels. It routes contacts to the agent based on the type of contact the agent is already on. This way, if an agent is already chatting with a customer, it's more efficient for the agent to respond to more chats instead of multitasking on two different channels.

To learn how to set up multiple channels, see Create a routing profile (p. 215).

Learn more about routing

See the following topics to learn more about routing:
• Routing profiles (p. 21)
• Queue-based routing (p. 26)
• Set up queue-based routing (p. 218)

Create a queue

1. On the navigation menu, choose Routing, Queues, Add new queue.
2. Add the appropriate information about your queue and choose Add new queue.

See the following topics for detailed information about each of the above areas:

1. Set the hours of operation and timezone for a queue (p. 213)
2. Set up outbound caller ID (p. 203)
3. Set the Maximum contacts in queue limit (p. 212)
4. Create quick connects (p. 410)

The queue is automatically active.

3. Assign the queue to a routing profile; for information, see Create a routing profile (p. 215). The routing profile links the queue and agents together.
To learn how queues work, see Routing profiles (p. 21) and Queue-based routing (p. 26).

Disable a queue

You can quickly control the flow of contacts to queues by temporarily disabling a queue. When a queue is disabled, it's put in an offline mode. No new contacts are routed to the queue, but any existing contacts already in the queue are routed to agents.

Only users who have a security profile with Queues - Enable/Disable permissions can disable a queue.

To disable an active queue

1. On the navigation menu, choose Routing, Queues.
2. Hover over the name of the queue to edit. Choose the power icon that appears.
3. Choose Disable to confirm you want to disable the queue. You can immediately re-enable the queue if needed by choosing the power button again.
Set the Maximum contacts in queue limit

To determine how many contacts can be in a queue at the same time, you set the Maximum contacts in queue limit for the queue.

This setting applies to all the contacts that are in the queue, across all channels. For example, you set Maximum contacts in queue to 100 and configure the queue for calls, chats, and tasks. This means the limit is set to a total of 100 concurrent calls AND chats AND active tasks in the queue.

Important

By default you cannot set Maximum contacts in queue to be greater than your Concurrent calls per instance service quota. If you increase the service quotas for Active tasks per instance or Concurrent chats per instance, you must update Maximum contacts in queue so there's enough capacity for those channels in the queue.

For information about default service quotas and how to request an increase, see Amazon Connect service quotas (p. 926).

To set Maximum contacts in queue

1. On the navigation menu, choose Routing, Queues, Add new queue. Or, edit an existing queue.
2. Under Maximum contacts in queue choose Set limit.
3. Specify how many contacts can be in the queue before it's considered full.

Queued callbacks count towards the queue size limit, but they are routed to the error branch. For example, if you have a queue that handles both callbacks and incoming calls, and that queue reaches the size limit:

- The next callback is routed to the error branch.
- The next incoming call gets a reorder tone (also known as a fast busy tone), which indicates no transmission path to the called number is available.
Route contacts based on queue capacity

To define routing decisions based on queue capacity, use a Transfer to queue (p. 387) block to check whether a queue is full (Maximum contacts in queue (p. 212)), and then route the contact accordingly.

The Transfer to queue (p. 387) block checks the Maximum contacts in queue (p. 212). If no limit is set, the queue is limited to the number of total concurrent contacts for the following quotas:

- Active tasks per instance
- Concurrent calls per instance
- Concurrent chats per instance

Set the hours of operation and timezone for a queue

The first thing you need to do when you set up a queue is to specify the hours of operation and timezone. The hours may be referenced in contact flows. For example, when routing contacts to agents, you might use the Check hours of operation (p. 302) block first, and then route the contact to the appropriate queue.

To set the hours of operation and timezone for a queue

1. On the navigation menu, choose Routing, Hours of operation.
2. To create a template, choose Add new hours and enter a name and a description.
3. For Time zone, select a value.
4. For **Add new**, set new hours.
5. Choose **Save**.
6. Now you can specify these the hours of operation when you create a queue (p. 210), and check them in the Check hours of operation (p. 302) block.

**How to specify midnight**

To specify midnight, enter 12:00AM.

For example, if you want to set your hours to 10:00AM to midnight, you would enter: 10:00AM to 12:00AM. Your call center would be open for 14 hours. Here's the math:

- 10:00AM-12:00PM = 2 hours
- 12:00PM-12:00AM = 12 hours
- Total = 14 hours

**Examples**

**Schedule for 24x7**

<table>
<thead>
<tr>
<th>Day</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>12:00 AM</td>
<td>12:00 AM</td>
</tr>
<tr>
<td>Monday</td>
<td>12:00 AM</td>
<td>12:00 AM</td>
</tr>
<tr>
<td>Tuesday</td>
<td>12:00 AM</td>
<td>12:00 AM</td>
</tr>
<tr>
<td>Wednesday</td>
<td>12:00 AM</td>
<td>12:00 AM</td>
</tr>
<tr>
<td>Thursday</td>
<td>12:00 AM</td>
<td>12:00 AM</td>
</tr>
<tr>
<td>Friday</td>
<td>12:00 AM</td>
<td>12:00 AM</td>
</tr>
<tr>
<td>Saturday</td>
<td>12:00 AM</td>
<td>12:00 AM</td>
</tr>
</tbody>
</table>

**Schedule for Monday to Friday 9:00 AM to 5:00 PM**

Remove Sunday and Saturday from the schedule.

The final schedule looks like this:
Add lunch and other breaks

If your entire contact center were to close for lunch from 12-1, for example, then you'd enter hours to specify that, as in the following image:

In most contact centers breaks are staggered. While some agents are at lunch, for example, others are still available to handle contacts. Instead of specifying this in the hours of operation, you add custom agent statuses (p. 220) that appear in the agent's Contact Control Panel (CCP).

For example, you might create a custom status named Lunch. When the agent goes to lunch, they change their status in the CCP from Available to Lunch. During this time, no contacts are routed to them. When they return from lunch and are ready to take contacts again, they change their status back to Available.

Supervisors can change an agent's status using the real-time metrics report.

For more information, see these topics:

- Add custom agent status (p. 220)
- About agent status (p. 789)
- Change the "Agent activity" status in a real-time metrics report (p. 726)

What happens during daylight savings time

Amazon Connect uses the timezone to determine whether daylight savings time is in effect for the queues, and adjusts automatically. When a contact comes in, Amazon Connect looks at the hours and timezone to determine whether the contact can be routed to the given queue.

Use the Check Hours of Operation block

At the start of your contact flows, use the Check hours of operation (p. 302) block to determine whether your contact center is open, and to branch accordingly.

Create a routing profile

While queues are a 'waiting area' for contacts, a routing profile links queues to agents. When you create a routing profile, you specify which queues will be in it. You can also specify whether one queue should be prioritized over another.
Each agent is assigned to one routing profile. For more information about routing profiles and queues, see Routing profiles (p. 21).

To create a routing profile

1. On the navigation menu, choose Users, Routing profiles, Add new profile.
2. Enter or choose the following information:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Enter a searchable display name.</td>
</tr>
<tr>
<td>Description</td>
<td>Describe what the routing profile is for.</td>
</tr>
<tr>
<td>Set channels and concurrency</td>
<td>Choose whether agents assigned to this profile handle contacts using voice, chat, or both. Also specify whether the agent can receive tasks. For Chat, specify how many chat conversations that an agent can have simultaneously, up to 10. For Task, specify how many tasks an agent can have simultaneously, up to 10. For more on setting this option, see Tips for setting up channels and concurrency (p. 217). For information about how Amazon Connect routes contacts when multiple channels are in use, see How routing works with multiple channels (p. 209).</td>
</tr>
</tbody>
</table>

3. Under Routing profile queues, enter the following information:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Use the dropdown menu to choose a queue you've already set up. You can add multiple queues to a routing profile.</td>
</tr>
<tr>
<td>Channels</td>
<td>Choose whether the queue is for chat, voice, task, or all three.</td>
</tr>
</tbody>
</table>
### Create a routing profile

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Important</strong></td>
<td>The channel that you specify here must also be specified under <strong>Set channels and concurrency</strong>. If it isn't, contacts from that channel won't be routed to agents.</td>
</tr>
<tr>
<td><strong>Priority</strong></td>
<td>Specify the order in which contacts are to be handled for that queue. For example, a contact in a queue with a priority of 2 would be a lower priority than a contact in a queue with a priority of 1.</td>
</tr>
<tr>
<td><strong>Delay (in seconds)</strong></td>
<td>Enter the minimum amount of time a contact should be in the queue before they are routed to an available agent. To learn more about how Priority and Delay work together, see Queues: priority and delay (p. 24).</td>
</tr>
<tr>
<td><strong>Default outbound queue</strong></td>
<td>Choose a queue to be associated with outbound calls placed by the agents.</td>
</tr>
</tbody>
</table>

4. Choose **Add new profile**.

### Tips for setting up channels and concurrency

- Use **Set channels and concurrency** to toggle on and off whether agents assigned to a profile get voice, chat, and task contacts.

  For example, there are 20 queues assigned to a profile. All of the queues are enabled for voice, chat, and task. By removing the **Voice** option at the routing profile level, you can stop all voice calls to these agents, across all queues in the profile. When you want to restart voice contacts for these agents again, select **Voice**.

- For each queue in the profile, choose whether it’s for voice, chat, task, or all three.

- If you want a queue to handle voice, chat, and task, but want to assign a different priority to each channel, add the queue twice. For example, in the following image, voice is priority 1 but chat and task are priority 2.
Delete a routing profile

Currently it's not possible to delete a routing profile. To take a routing profile out of use, detach it from the agents.

To indicate that the routing profile is no longer in use, we recommend renaming it with a zz_ prefix, for example, zz_Sales.

Set up queue-based (skills-based) routing

Here's an overview of the steps to set up queue-based routing:

- Create the queues (p. 210), for example, one for each skill you want to use for routing.
- Create the routing profiles (p. 215):
  - Specify the channels supported by this routing profile.
  - Specify the queues: the channel, priority, and delay.
- Configure agent settings (p. 221) to assign the routing profiles to them.

When you create your contact flows (p. 393), you'll add the queues to them. If a contact chooses to speak to an agent in Spanish, for example, they will be routed to the Spanish Reservations queue.

For information about how routing works, and queue-based routing, see these topics:

- How routing works with multiple channels (p. 209)
- Queue-based routing (p. 26)

Set up agents

You can manage and load-balance customer contacts using agent hierarchy organization and agent status management. These tools provide filtering and agent availability management per queue, skill set, and routing profiles.

Contents

- Set up agent hierarchies (p. 219)
- Add custom agent status (p. 220)
- Configure agent settings: routing profile, phone type, and auto-accept calls (p. 221)
- Enable auto-accept call for agents (p. 222)
- Log out agents automatically when they close their CCP (p. 223)
- Set up agents to assign tasks to themselves (p. 224)
Set up agent hierarchies

Agent hierarchies are a way for you to organize agents into teams and groups for reporting purposes. It’s useful to organize them based on their location and their skill sets. For example, you might want to create large groups, such as all agents who work on a specific continent, or smaller groups such as all agents working in a specific department.

You can also configure hierarchies with up to five levels, and segment agents or teams. Here are a couple of things to note about using hierarchies:

- Removing agents from a level affects historical reporting.
- When you use the Restrict contact access permission, you can restrict contact search results based on the agent's hierarchy. For more information, see Manage who can search for contacts and access detailed information (p. 786).

Required permissions

To create agent hierarchies, you need the View - Agent hierarchy permission in your security profile.

<table>
<thead>
<tr>
<th>Type</th>
<th>All</th>
<th>View</th>
<th>Edit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Agent hierarchy</td>
<td>☐</td>
<td>☑</td>
<td>☐</td>
</tr>
<tr>
<td>Security profiles</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Agent status</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Create a new agent hierarchy

1. Log in to the Amazon Connect console with an Admin account, or an account assigned to a security profile that has permissions to create agent hierarchies.
2. Choose Users, Agent hierarchy.
3. Enter a name and choose + to create the first level of your hierarchy.
4. Choose + to add more levels to your hierarchy.
5. Choose Save to apply the changes, or Cancel to undo them.

Tip
If the Save button isn't active, you don't have permissions to create or edit the agent hierarchy.

Add groups, teams, and agents to a hierarchy

After you create a hierarchy, you can add groups, teams, and agents from the top down.
1. Select the top level of the hierarchy.
2. Choose x to add groupings to each level.
3. Choose the check icon to save the name, choose the pencil icon to edit the name.
4. Choose Save.

Choose View historical changes to view the change history. You can filter changes by date (between two dates) or by user name. If you cannot see the link, ensure that you have the proper permissions to view these changes.

Add custom agent status

Agents are responsible for setting their status in the Contact Control Panel (CCP). In fact, the only time an agent's status changes is when they manually change it in the CCP, or when their supervisor changes it (p. 726) in a real-time metrics report.

Amazon Connect provides two default status values:

- Available
- Offline

You can change the name of these values, and you can add new ones. For example, you might add a status for Lunch, and another for Training. These and the default status values will be used for reporting, metrics, and resource management.

When you add a new status, it will always be Custom, not routable.

You can't delete a status value but you can disable it so it doesn't appear on the agent's CCP.

To add a new agent status

1. Choose Users, Agent status, Add new agent status.
2. Enter a status name and description, and select whether the status should appear in the CCP to the agent.
3. Choose Save.

To change the order that the status values appear in the CCP, click the waffle next to the status value and drag it to the order you want.

<table>
<thead>
<tr>
<th>Status name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available</td>
<td>Available state</td>
</tr>
<tr>
<td>Break</td>
<td>Lunch and coffee breaks</td>
</tr>
<tr>
<td>Training</td>
<td>Training on the new tools</td>
</tr>
<tr>
<td>Offline</td>
<td>Offline state</td>
</tr>
</tbody>
</table>

To edit a status

1. Choose Users, Agent status.
2. Hover over the status name and choose the edit icon.
3. Enter the new information, and choose Save to apply the changes.

Choose View Historical Changes to view the change history. You can filter changes by date (between two dates) or by user name. If you can’t see the View historical changes link, make sure you have permissions to view these changes.

Configure agent settings: routing profile, phone type, and auto-accept calls

Before you configure your agent settings, here is some info to have on hand. Of course, you can always change this information later.

- What is their routing profile? They can only be assigned one.
- Will they have the Agent security profile or a custom profile you created?
- Are they going to use a soft phone? If so, will they be connected to contacts automatically, or will they need to press the Accept button in their Contact Control Panel (CCP)?
- Or, are they going to use a desk phone? If so, what is their number?
- How many seconds do they have for After contact work (ACW)? There’s no way you can turn off ACW time altogether so agents never go to ACW. (A value of 0 means an indefinite amount of time.)
- Are they going to be assigned to an agent hierarchy?

Note
You can’t configure how long an available agent has to connect with a contact before it’s missed. Agents have 20 seconds to accept or reject a contact. If no action is taken, the current agent’s status will be Missed and the contact is routed to the next available agent.

To configure agent settings

1. In the navigation pane, go to Users, User management.
2. Choose the user you want to configure, then choose Edit.
3. Assign a routing profile (p. 215) to them. You can only assign one.
4. Assign the Agent security profile, unless you’ve created custom security profiles.
5. Under Phone Type choose whether the agent is using a desk phone or soft phone.
   - If you select desk phone, enter their phone number.
     Important
     Outbound telephony charges occur when using a desk phone to answer inbound calls.
   - If you select soft phone, choose Auto-Accept Call if you want agents to be connected to calls automatically. This doesn’t apply to chats.
6. In After call work (ACW) timeout, type how many seconds agents have for after contact work, such as entering notes about the contact. 1 second is the minimum amount of time you can enter.

Enter 0 if you don’t want to allocate a specific amount of ACW time. It essentially means an indefinite amount of time. When the conversation ends, ACW starts; the agent must choose Close contact to end ACW.
7. Under **Agent Hierarchy** select any groups the agent should be part of.

## Enable auto-accept call for agents

When Auto-Accept Call is enabled for an available agent, the agent connects to contacts automatically.

### How long until the call is connected to the agent?

Less than one second. When a call arrives to an available agent who has Auto-Accept Call enabled, the Contact Control Panel (CCP) briefly shows the options **Accept** or **Reject**. This is expected behavior. After less than a second, the call is automatically accepted and these options disappear.

There isn't an option for increasing the amount of time before a call is automatically accepted.

Auto-Accept Call doesn't work for callbacks.

## Enable auto-accept call for existing agents

You can't enable Auto-Accept Call while editing multiple existing users in your Amazon Connect instance. You must edit existing users individually to enable it. However, you can configure the setting for multiple new users when you bulk upload new users with the CSV template.

To complete these steps, you must log in as a user who has the following permissions in their security profile: **Edit, Create, Remove, Enable / Disable, and Edit** permission.

1. Log in to the Amazon Connect console with an Admin account, or an account assigned to a security profile that has permissions to create or edit users.
2. In the left navigation bar, choose **Users, User management**.
3. In the list of users, select an agent, and then choose **Edit**.
4. On the Edit users page, under Phone Type, select the **Auto-Accept Call** check box.
5. Choose **Save**.
6. Repeat these steps for each user that you want to edit.

## Bulk upload new users with auto-accept call enabled

You can't use the CSV template to edit information for existing users. If you include duplicate users with different information in the CSV template, you will receive an error.

1. Log in to your Amazon Connect instance using your access URL (https://domain.awsapps.com/connect/login).
2. In the left navigation bar, choose Users, User management.
3. Choose Add new users.
4. Under How do you want to set up your existing users?, next to Upload my users from a template (csv), choose template to download a pre-formatted CSV file.
5. In the CSV file, configure the details for the new users who you want to add. For soft phone auto accept (yes/no), be sure to enter yes.
6. After configuring the CSV file, in your Amazon Connect instance, choose Upload my users from a template (csv), and then choose Next.
7. Under Select and upload a spreadsheet with user details, choose Choose file.
8. Choose the configured CSV file from its location on your computer.
9. In your Amazon Connect instance, choose Upload and verify.
10. Under Verify user details, verify that the information is correct for the new users, and then choose Create users.

(Optional) Verify the change in CCP logs

To confirm that Auto-Accept Call is enabled for an agent, download the CCP logs generated for that agent: in the CCP for the agent, choose Settings, Download logs. The logs are saved to your browser’s default download directory.

In the logs, the autoAccept attribute is set to "true" if this setting is enabled. The logs show something like this:

```
"type": "agent",
"initial": false,
"softphoneMediaInfo": {
  "callType": "audio_only",
  "autoAccept": true
```

Log out agents automatically when they close their CCP

When using the default Amazon Connect CCP, closing the CCP window doesn't change an agent's status from Available to Offline. An agent must change their status manually to Offline and then log out.

To change this behavior, you must create a custom CCP.

Use the Amazon Connect Streams API and the Agent API to create a custom CCP for your contact center. For an example custom CCP setup, see Perform an external screen pop with Amazon Connect.

Use the following steps to update your CCP so it switches agents to Offline and logs out agents automatically when they close the CCP window.

**Step 1: Set up the Streams API**

For instructions, see the Amazon Connect Streams Documentation.

**Step 2: Update your application code to change the agent state**

Integrate the following Streams API calls into your web application:

1. Use connect.agent() to subscribe to agent events and retrieve agent objects.
Set up agents to assign tasks to themselves

Step 3: Design for errors

If an API call fails to execute the first time and a contact takes the error branch of your contact flow, there's a chance that an agent's state won't change as expected. Be sure to include logic to account for this possibility. For example, you could delay the page unload while the API call is tried again. Or, you could pop a "Call failed" warning message in a modal dialog before the page unload.

Set up agents to assign tasks to themselves

For an agent to be able receive a task, they need a quick connect created for them. With this quick connect, agents will be able to assign tasks to themselves, and other agents will be able to assign tasks to them.

Step 1: Create a quick connect for the agent

1. On the navigation menu, choose Routing, Quick connects, Add a new.
2. Enter a name for the quick connect, such as the name of the agent. For example, if you want Jane Doe to be able to assign tasks to herself, enter Jane Doe.
3. Under Type, use the dropdown list to choose Agent.
4. Under Destination, use the dropdown list to choose the user name for the agent.
5. Under Contact flow, choose Default agent transfer, or the appropriate contact flow for your contact center.
6. Under Description, enter a description, such as Jane Doe's quick connect.
7. Choose Save.
Set up your customer's chat experience

You can provide a chat experience to your customers by using one of the following methods:

- Add a chat user interface to your website (p. 226).
- Download and customize our open source example (p. 234).
- Customize your solution using Amazon Connect APIs (p. 234). We recommend starting with the Amazon Connect ChatJS open source library when customizing your own chat experiences. For more information, see the Amazon Connect ChatJS repo on Github.

More resources to customize the chat experience

- Interactive messages provide customers with a prompt and pre-configured display options that they can select from. These messages are powered by Amazon Lex and configured through Amazon Lex using a Lambda. For instructions about how to add interactive messages through Amazon Lex, see this blog: Set up interactive messages for your Amazon Connect chatbot.

Amazon Connect supports the following templates: a list picker and a time picker. For more information, see Add interactive messages to chat (p. 524).

- Enable Apple Business Chat (p. 236)
- Amazon Connect Service API Documentation, especially the StartChatContact API.
- Amazon Connect Participant Service API.
- Amazon Connect Chat SDK and Sample Implementations
• **Amazon Connect Streams.** Use to integrate your existing apps with Amazon Connect. You can embed the Contact Control Panel (CCP) components into your app.

### Add a chat user interface to your website

To support your customers through chat, you can add a chat widget to your website that is hosted by Amazon Connect. You can configure the chat widget in the Amazon Connect console: customize the font and colors, and secure the widget so that it can be launched only from your website. As a result, you will have a short code snippet that you add to your website.

Because Amazon Connect hosts the widget, it ensures that the latest version is always live on your website.

**Tip**

Use of the chat widget is subject to default Service Quotas, such as the number of characters allowed per message. Before launching your chat widget into production, make sure that your Service Quotas are set for your organization's needs. For more information, see Amazon Connect service quotas (p. 926).

### Supported browsers

The pre-built chat widget supports the following browser versions and higher:

- Google Chrome 85.0
- Safari 13.1
- Microsoft Edge version 85
- Mozilla Firefox 81.0

### Step 1: Customize your chat widget

In this step, you customize the experience of the chat widget for your customers.

1. Open the Amazon Connect dashboard, and choose **Customize chat widget**.

2. On the **Customize chat widget** page, under **Global typeface**, use the dropdown to choose the font for the text that will appear in the chat widget.
3. **Under Chat widget**, choose the colors for the widget header, chat message bubbles, and launch and minimize icons by entering hex values (**HTML color codes**) that align the chat widget with your website branding.

As you choose colors, the chat preview updates automatically so that you can see what your widget will look like.

4. For **Minimize chat icon**, select the colors for the icon that customers will click or tap to minimize the chat widget.

5. For **Open chat icon**, select the colors for the icon that customers will click or tap to start a chat with your contact center.

6. Under **Select contact flow**, choose the inbound flow that initiates when a customer starts a chat.

7. Choose **Next**.
Step 2: Specify the website domains where you expect to display the chat widget

1. Enter the website domains where you want to place the chat widget. Chat loads only on websites that you select in this step.

Choose **Add domain** to add up to five domains.

### Important

- Double-check that your website URLs are valid and does not contain errors. Include the full URL starting with https://.
- We recommend using https:// for your production websites and applications.

2. Under **Add security for your chat widget**, we recommend choosing **Yes**, and working with your website administrator to set up your web servers to issue JSON Web Tokens (JWTs) for new chat requests. This provides you more control when initiating new chats, including the ability to verify that chat requests sent to Amazon Connect are from authenticated users.

Choosing **Yes** results in the following:

- Amazon Connect provides a 44-character security key on the next page that you can use to create JWTs.
- Amazon Connect adds a callback function within the chat widget embed script that checks for a JWT when a chat is initiated.

You must implement the callback function in the embedded snippet, as shown in the following example.

```javascript
amazon_connect('authenticate', function(callback) {
    window.fetch('/token').then(res => {
        res.json().then(data => {
```
If you choose this option, in the next step you'll get a security key for all chat requests initiated on your websites. Ask your website administrator to set up your web servers to issue JWTs using this security key.

3. Choose **Save**.

### Step 3: Confirm and copy chat widget code and security keys

In this step, you confirm your selections and copy the code for the chat widget and embed it in your website. If you chose to use JWTs in **Step 2 (p. 228)**, you can also copy the secret keys for creating them.

#### Security key

Use this 44-character security key to generate JSON web tokens from your web server. You can also update, or rotate, keys if you need to change them. When you do this, Amazon Connect provides you with a new key and maintains the old key until you have a chance to replace it. After you have the new key deployed, you can come back to Amazon Connect and delete the old key.

When your customers interact with the start chat icon on your website, the chat widget requests your web server for a JWT. When this JWT is provided, the widget will then include it as part of the end customer’s chat request to Amazon Connect. Amazon Connect then uses the secret key to decrypt the token. If successful, this confirms that the JWT was issued by your web server and Amazon Connect routes the chat request to your contact center agents.

#### JSON web token specifics

- **Algorithm:** HS256
- **Claims:**
  - *sub:* widgetId
  
  Replace widgetId with your own widgetId. To find your widgetId, see the example Chat widget script (p. 230).
  
  - *iat:* *Issued At Time.
  
  - *exp:* *Expiration (10 minute maximum).

* For information about the date format, see the following Internet Engineering Task Force (IETF) document: JSON Web Token (JWT), page 5.
The following code snippet shows an example of how to generate a JWT in Python:

```python
payload = {
    'sub': 'widgetId',  # don't add single quotes, such as 'widgetId'
    'iat': datetime.utcnow(),
    'exp': datetime.utcnow() + timedelta(seconds=JWT_EXP_DELTA_SECONDS)
}

header = {
    'typ': 'JWT',
    'alg': 'HS256'
}

encoded_token = jwt.encode(payload, CONNECT_SECRET, algorithm=JWT_ALGORITHM, headers=header)  # CONNECT_SECRET is the security key provided by Amazon Connect
```

**Chat widget script**

The following image shows an example of the JavaScript that you embed on the websites where you want customers to chat with agents. This script displays the widget in the bottom-right corner of your website.

1. An example of where to find your widgetId.

When your website loads, customers first see the **Start Chat** icon. When they choose this icon, the chat widget opens and customers are able to send a message to your agents.

To make changes to the chat widget at any time, choose **Edit**.

**Note**
Saved changes update the customer experience in a few minutes. Confirm your widget configuration before saving it.
To make changes to widget icons on the website, you will receive a new code snippet to update your website directly.

**More customizations for your chat widget**

See the following topics for more you can do to customize the chat experience:

- Pass the customer display name when a chat initializes (p. 231)
- Pass contact attributes when a chat initializes (p. 233)

**Pass the customer display name when a chat initializes**

To deliver a more personalized experience for both your customers and agents, you can customize the Amazon Connect chat widget to pass the customer display name during contact initialization. The name is visible to both the customer and agent throughout the chat interaction. This display name is recorded in the chat transcript.
1. How the customer display name may appear to the customer using the chat user interface.
2. How the customer display name may appear to the agent using the CCP.

How to pass a customer display name in the chat widget

To pass a customer display name, implement your callback function in the snippet. Amazon Connect retrieves the display name automatically.

1. Complete the steps in Add a chat user interface to your website (p. 226), if you haven't already.
2. Augment your existing widget snippet to add a `customerDisplayName` callback. It might look something like the following example:

   ```javascript
   amazon_connect('customerDisplayName', function(callback) {
       const displayName = 'Jane Doe';
       callback(displayName);
   });
   
   The important thing is that the name is passed to `callback(name)`.

Things you need to know

- Only one `customerDisplayName` function can exist at a time.
- The customer display name must follow the limitations set by the StartChatConnect API. That is, the name must be a string between 1 and 256 characters.
- An empty string, null, or undefined is invalid input for the display name. To protect against accidentally passing of these inputs, the widget logs an error, `Invalid customerDisplayName provided`, in the browser console, and then starts the chat with the default display name, **Customer**.
- Because the snippet is in the front end of your website, do not pass sensitive data as the display name. Be sure to follow the best security practices to keep your data safe and protect against attacks and bad actors.
Pass contact attributes when a chat initializes

You can use contact attributes (p. 445) to capture information about the contact who is using the chat widget. Then, you can display that information to the agent through the Contact Control Panel (CCP), or use it elsewhere in the flow.

For example, you can customize your contact flow to say the name of the customer in your welcome message. Or, you can use attributes specific to your business, such as account/member IDs, customer identifiers like names and emails, or other metadata associated with a contact.

How to pass contact attributes into the chat widget

1. Enable security in the chat widget as described in Add a chat user interface to your website (p. 226), if you haven’t already:
   a. In Step 2, under Add security for your chat widget, choose Yes.
   b. In Step 3, use the security key to generate JSON web tokens.
2. Add the contact attributes to the payload of your JWT as an attributes claim.

   Following is an example of how you might generate a JWT with contact attributes in Python:

   ```python
   import jwt
   CONNECT_SECRET = "your-securely-stored-jwt-secret"
   payload = {
       'sub': 'widget-id',
       'iat': datetime.datetime.utcnow(),
       'exp': datetime.datetime.utcnow() + datetime.timedelta(seconds=500),
       'attributes': {
           "name": "Jane",
           "memberID": "123456789",
           "email": "Jane@example.com",
           "isPremiumUser": "true",
           "age": "45"
       }
   }
   header = {
       'typ': "JWT",
       'alg': 'HS256'
   }
   encoded_token = jwt.encode((payload), CONNECT_SECRET, algorithm="HS256", headers=header)
   ```

   In the payload, you must create a string key attributes (as-is, all lowercase), with an object as its value. That object must have string-to-string key/value pairs. If anything other than a string is passed in any one of the attributes, the chat will fail to start.

   The contact attributes must follow the limitations set by the StartChatConnect API:

   • Keys must have a minimum length of 1
   • Values can have a minimum length of 0

Things you need to know

• The chat widget has a 6144 bytes limit for the entire encoded token. Since JavaScript uses UTF-16 encoding, 2 bytes are used per character, so the maximum size of the encoded_token should be around 3000 characters.
• The encoded_token should be passed in to callback(data). The authenticate snippet does not need any additional changes. For example:
• Using a JWT to pass contact attributes ensures the integrity of the data. As long as you safeguard the shared secret and follow best security practices, you can ensure that the data cannot be manipulated by a bad actor.

• Contact attributes are only encoded in the JWT, not encrypted, so it's possible to decode and read the attributes. Sensitive data should not be passed in the token.

Download and customize our open source example

You can further customize the chat experience customers use to interact with agents. Use the Amazon Connect open source library on GitHub. It’s a platform to help you get started quickly. Here’s how it works:

• The GitHub repository links to a CloudFormation template, which starts the Amazon API Gateway endpoint that initiates a Lambda function. You can use this template as an example.

• After you create the AWS CloudFormation stack, you can call this API from your app, import the pre-built chat widget, pass the response to the widget, and start chatting.

For more information about customizing the chat experience, see:

• Amazon Connect Service API Documentation, especially the StartChatConnect API.

• Amazon Connect Participant Service API.

• Amazon Connect Streams. Use to integrate your existing apps with Amazon Connect. You can embed the Contact Control Panel (CCP) components into your app.

• Amazon Connect Chat SDK and Sample Implementations

Start chats using your own applications

You can use Amazon Connect APIs to start chats in your own applications.

The StartChatConnect API is used to start the chat.

When you explore the chat experience for the first time, you’ll notice that chats aren’t counted in the Contacts Incoming metric in your historical metrics report. This is because the initiation method for the chat in the Contact Trace Record (CTR) is API.
After a chat is transferred to an agent, the **Contacts Incoming** metric is incremented. The CTR for the transfer no longer increments the API, but it does increment **Contacts Incoming**.

**Troubleshooting issues with your chat widget**

If you see the following *Something went wrong* error message when loading your chat widget, open the browser tools to view the error logs.

Following are common issues that cause this error.

**400 Invalid request**

If the logs mention a 400 invalid request, there are a few possible causes:

- Your chat widget is not being served on an allowed domain. You must specifically state the domains where you will host your widget.
- The request to the endpoint is not properly formatted. This usually occurs only if the contents of the embed snippet have been modified.
401 Unauthorized

If the logs mention a 401 unauthorized, this is a problem with the JSON Web Token (JWT) authentication. If you opt your chat widget into JWT authentication (p. 229), you must implement the callback function in the embedded snippet, as shown in the following example.

```javascript
amazon_connect('authenticate', function(callback) {
  window.fetch('/token').then(res => {
    res.json().then(data => {
      callback(data.data);
    });
  });
});
```

If you have implemented the callback already, the following scenarios may still cause a 401:

- Invalid signature
- Expired token

404 Not found

A 404 status code indicates that your `widgetId` cannot be found. Verify that your snippet is exactly how it was copied from the Amazon Connect website, and none of the identifiers have changed.

If the identifiers have not changed and you are seeing a 404, contact AWS Support.

500 Internal server error

This can be caused by your service-linked role not having the required permissions to start chat. This happens if your Amazon Connect instance was created before October 2018 because you don’t have service-linked roles set up.

**Solution:** Add the `connect:*` policy on the role that is associated with your Amazon Connect instance. For more information, see Use service-linked roles for Amazon Connect (p. 853).

If your service-linked role has the correct permissions, contact AWS Support.

Enable Apple Business Chat

Your customers can engage directly with your contact center from within their Messages application on their iPhone, iPad, and Mac.

When you enable Apple Business Chat, your customers can find answers to their questions and request help from agents to resolve issues — all while using the familiar Messages application they use every day to chat with friends and family. Any time customers use Search, Safari, Spotlight, Siri, or Maps to call your registered phone number, they will be provided with the option to chat with your contact center.

Apple Business Chat integration with Amazon Connect enables you to use the same configuration, analytics, routing, and agent UI that you already use for Amazon Connect Chat (p. 12).

Step 1: Register with Apple

Integrate Apple Business Chat with Amazon Connect by first registering with Apple as a brand. When you do, you’ll get a unique Apple Business Chat Account ID, and you can then link your Apple Business Chat account to Amazon Connect.

1. Go to the Apple Business Chat page and choose Get Started as a brand.
2. Create an Apple ID for your business, if you don't already have one.

An Apple ID is typically for the personal use of Apple services, such as storing personal content in iCloud and downloading apps from the App Store. If you have a personal Apple ID, we recommend that you create a separate one using your organization's email address to administer Business Chat. A separate administrative Apple ID lets you distinguish Business Chat communications from personal Apple communications.

3. Register a profile for a new Business Chat account by accepting Apple's Terms of Service. We recommend creating a Commercial Business Chat Account. You then provide business details, such as a logo and support hours.

4. Select Amazon Connect as your Messaging Service Provider. You can do this by selecting Amazon Connect from the drop-down or by entering the following URL:

   • https://messagingintegrations.connect.amazonaws.com/applebusinesschat

After you submit your application to Apple, you’ll see the status of your application at the top of your Business Chat Account page.

For more information about registering with Apple, see the following articles on Apple's website: Getting Started with Business Chat and Business Chat Policies and Best Practices.

Step 2: Gather required information

Gather the following information so you have it on hand when you open a support ticket in Step 3:

1. **Apple Business Chat Account ID**: After you've been approved by Apple for Business Chat, you will be issued an Apple Business Chat Account ID. For information about locating your Apple Business Chat Account ID, see Find your Apple Business Chat Account ID (p. 248).

   **Note**
   Your Apple Business Chat Account ID is a randomized string of numbers and letters. It is not the same as your Apple ID.
2. **Apple Token**: This is a unique ID that authenticates your account. For help locating your Apple token, see *Find your Apple token* (p. 249).

3. **Amazon Connect instance ARN**: This is the identifier for the instance you want to link to your Apple business account. For information about locating your instance ID, see *Find your Amazon Connect instance ID/ARN* (p. 137).

   **Note**
   Make sure you have service-linked roles enabled for the integration.
   If your instance was created before October 2018, add the `connect:*` policy on the role that is associated with your Amazon Connect instance. For more information about service-linked roles, see *Use service-linked roles for Amazon Connect* (p. 853).

4. **Amazon Connect contact flow ID**: This is the identifier for the contact flow you want to use for inbound chats. For information about locating your contact flow ID, see *Find the contact flow ID* (p. 250).

**Step 3: Link your Apple Business Chat ID to Amazon Connect**

In this step you create an Amazon Connect support ticket to link your Apple Business Chat ID to Amazon Connect.

1. Create a [special AWS Support ticket](#) to link your Apple Business Chat to Amazon Connect.

   If prompted, login using your AWS account.

   **Tip**
   Looking for technical support? [Open an AWS Support ticket here](#).

2. In the **Use case description** box, copy and paste the following template:

   ```
   Subject: Apple Business Chat Integration request
   Body:
   Apple Business Chat Account ID (required): enter your account ID
   Apple Token (required): enter your Apple token
   Amazon Connect Instance ARN (required): enter your instance ARN
   Amazon Connect Contact Flow ID (required): enter your contact flow ID
   ```

   The following image shows an example of a completed ticket:
3. Expand **Contact options**, and then choose your **Preferred contact language**, and then choose **Web** as the contact method, if it's not selected by default.

4. Choose **Submit**.

5. **AWS Support** will work directly with the Amazon Connect team on your request and follow up with any additional questions.
Next steps

After Apple Business Chat is enabled for your Amazon Connect instance, you can add Apple Business Chat features (p. 241) to your messages. For example:

- Deflect calls with Apple's Chat Suggest.
- Embed Apple Business Chat buttons on your website.
- Add list pickers and time pickers to your messages.
- Use rich links for URLs.
- Route Apple Business Chat messages using contact attributes.

Send a test message for Apple Business Chat

After onboarding to the Apple Business Chat account, use the following steps to send a test message to make sure the integration is set up properly.

Step 1: Add internal testers to your Business Chat account

1. Sign in to Apple Business Register.
2. Choose Business Chat Accounts and select the account to add testers.
3. Scroll down the page to Account Testing.
4. Add the Apple IDs of your internal testers.
5. When your list is complete and you are ready to begin testing, choose Send to new testers to send an instructional email to your testers.

An instructional email containing a link to your Business Chat conversation is sent to the Apple ID email address of each tester. If a tester does not receive the email, then recheck that their email address is provided in the Account Testing section. It's most likely that the email address is incorrect or it's not an Apple ID. For security reasons, Apple cannot verify Apple ID email addresses.

Step 2: Test sending and receiving messages

When your testers get the instructional email, they will need to activate the link in it. After doing this, they can send messages to your agents, who can then reply from the Contact Control Panel (CCP).

Note the following:

1. Design a test to trigger all of your Apple Business Chat features.
2. You should observe that messages sent from an iOS device arrive to your test business. Employees testing from your support agent desktop should be able to respond to these test messages.
3. Your testers may notice your brand colors are not visible in the Messages header. Brand color is not available while your account is in test mode. The colors for your brand will display correctly after your account goes online.
4. If you send the testing link to someone whose email is not listed in the Account Testing section, they will not be able to send messages.
5. If you provide a Redirect Page URL and your testers try to enter Business Chat from an unsupported device, they will land either on a default or redirected page. You can set your Redirect Page URL in the Unsupported Devices section at the bottom of your Business Chat account page.

To begin testing

1. Check that your testers are using a device with a supported iOS: iOS 11.3 and later, or macOS 10.13.4.
2. Ask your testers to doing the following:
   a. Use their supported devices to find the email sent to them.
   b. Open the email from the supported device, and then choose the link. It takes them to a Business Chat conversation in the Messages app.

**Troubleshoot**

If you encounter any issues when sending a test message, follow these steps:

1. Confirm that you've allowlisted your email address/Apple ID as a tester in your Business Chat account.
2. Confirm the following settings on your Apple device:
   - Go to **Settings > Messages** and check that **iMessage** is enabled.
   - Go to **Settings > Messages > Send & Receive** and check that the AppleID is correct and messages are allowed to receive.
3. Check that you're using a supported iOS. Apple devices running iOS 11.3 and later or macOS 10.13.4 and later support Business Chat.
4. When you selected Amazon Connect as your MSP in your Apple Account, did you select **Amazon Connect** from the dropdown? Or did you enter the following URL:
   - https://messagingintegrations.connect.amazonaws.com/applebusinesschat

   If you entered the URL, doublecheck for typos.

**Add Apple Business Chat features**

**Deflect calls with Apple's Chat Suggest**

With **Chat Suggest** you can allow users to choose between voice and messaging when tapping on your business phone number in Safari, Maps, Siri, or Search.

To enable Chat Suggest, send an email to the Apple Business Chat Team at **registry@apple.com** with the following information and Apple can set up the channel for you:

- Provide all of your primary phone numbers, including high call volume phone numbers.
- Provide phone contact hours to set customer expectations for your after-hours message.
- Provide intent, group, and body parameters to associate with each phone number.
- Provide an estimate of how many customers your agents can support per day. This can be increased or decreased depending on operational capacity.

To learn more about enabling Chat Suggest, see **Apple's Chat Suggest FAQs**.

**Embed Apple Business Chat buttons**

To embed Apple Business Chat buttons on your website or mobile app, do the following:

1. Add Apple's Business Chat JS (JavaScript) library to your webpage headers.
2. Add a **div** container to house the button.
3. Customize the banner, fallback support, and button color to meet your brand's needs.

   The Business Chat button must contain the following, at minimum:
For information about how you can enable these buttons, see Apple's documentation for Adding a Business Chat Button to Your Website.

Start a chat from a URL

You can give your customers the ability to start a conversation with you from your website or an email message.

For example, customers may start a chat using a URL that you provide. When they click the URL, the system redirects them to Messages so they can send your business a text message.

You decide how and where to provide the URL. You can include it as a link in an email message, on your website, or use it as the action for a button in your app.


Following are optional query string parameters you can include in the URL:

- biz-intent-id: Use to specify the intention, or purpose, of the chat.
- biz-group-id: Use to indicate the group, department, or individuals best qualified to handle the customer's specific question or problem.
- body: Use to prepopulate the message so the customer only presses Send to start the conversation.

For more information, see About Intent, Group, and Body Values on the Apple Documentation website.

Following is an example of what the URL might look like for a customer with a credit card question for the billing department:


Add list pickers and time pickers

A list picker prompts your customer to select an item, such as a product or the reason for their inquiry. A time picker prompts your customer to choose an available time slot, such as to schedule an appointment.

For information about how to set up list pickers and time pickers, see Add interactive messages to chat (p. 524).

Use rich links for URLs

Rich links show an inline preview of a URL that contains an image. Unlike normal URLs, customers can view the image immediately in a chat without choosing a “Tap to Load Preview” message.

To learn more about Apple Business Chat rich links, see Rich Links on the Apple Developer website.

Requirements for using rich links in Amazon Connect

To use rich links in Amazon Connect chat messages, your URL and images must meet the following requirements:
• Your website must use Facebook Open Graph tags. For more information, see A Guide to Sharing for Webmasters.
• The image accompanying the URL must be .jpeg, .jpg, or .png.
• The website must be HTML.

**Note**
When you first use the rich link feature, we recommend that you send the URL in a message separate from your chat text, as shown in the following example.

Use Apple Business Chat contact attributes in contact flows

Contact attributes enable you to store temporary information about the contact so you can use it in the contact flow.

For example, if you have different lines of business using Apple Business Chat, you can branch to different contact flows based on the AppleBusinessChatGroup contact attribute. Or, if you want to route Apple Business Chat messages differently from other chat messages, you can branch based on MessagingPlatform.

For more information about contact attributes, see Use Amazon Connect contact attributes (p. 445).

Use the following contact attributes to route Apple Business Chat customers.
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>MessagingPlatform</td>
<td>The messaging platform from where the customer request originated.</td>
<td>User-defined</td>
<td>$.Attributes.MessagingPlatform</td>
</tr>
<tr>
<td>AppleBusinessChatCustomerId</td>
<td>The customer’s opaque ID provided by Apple. This remains constant for the AppleID and a business. You can use this to identify if the message is from a new customer or a returning customer.</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatCustomerId</td>
</tr>
<tr>
<td>AppleBusinessChatIntent</td>
<td>You can define the intent or purpose of the chat. This parameter is included in a URL that initiates a chat session in Messages when a customer chooses the Business Chat button.</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatIntent</td>
</tr>
<tr>
<td>AppleBusinessChatGroup</td>
<td>You define the group which designates the department or individuals best qualified to handle the customer’s particular question or problem. This parameter is included in a URL that initiates a chat session in Messages when a customer chooses the Business Chat button.</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatGroup</td>
</tr>
<tr>
<td>AppleBusinessChatLocale</td>
<td>Defines the language and AWS Region preferences that the user wants to see in their user interface. It consists of a language identifier (ISO 639-1) and a Region identifier (ISO 3166). For example, <strong>en_US</strong>.</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatLocale</td>
</tr>
</tbody>
</table>
Update an Apple Business Chat integration

You will need to update your Apple Business Chat integration if you want to change the contact flow ID or other information.

1. Open an AWS Support ticket.

   If prompted, login using your AWS account.

2. In the **Use case description** box, copy and paste the following template to indicate this is an update request:

   Subject: Update Apple Business Chat Integration request
   Body:
   
   Apple Business Chat Account ID (required): enter your current account ID change to new account ID
   Apple Token (required): enter your token
   Amazon Connect Instance ARN (required): enter your current instance ARN change to new instance ARN
   Amazon Connect Contact Flow ID (required): enter your current contact flow ID change to new contact flow ID

**Note**

If you update your Amazon Connect Instance ARN, you must also update your contact flow ID.

The following image shows an example of a completed ticket:
3. Expand **Contact options**, and then choose your **Preferred contact language**, and then choose **Web** as the contact method, if it's not selected by default.

   ![Contact options](image)

   - **Preferred contact language**
   - **Contact methods**

4. Choose **Submit**.

5. **AWS Support** will work directly with the Amazon Connect team on your request and follow up with any additional questions.

### Delete an Apple Business Chat integration

1. Open an **AWS Support ticket**.
   
   If prompted, log in by using your AWS account.

2. In the **Use case description** box, copy and paste the following template to indicate this is an **delete** request:

   ```markdown
   Subject: Delete Apple Business Chat Integration
   Body:
   Apple Business Chat Account ID (required): enter your account ID
   Amazon Connect Instance ARN (required): enter your instance ARN
   Amazon Connect Contact Flow ID (required): enter your contact flow ID
   ```

   The following image shows an example of a completed ticket:
3. Expand **Contact options**, and then choose your **Preferred contact language**, and then choose **Web** as the contact method, if it's not selected by default.

4. Choose **Submit**.

5. AWS Support will work directly with the Amazon Connect team on your request and follow up with any additional questions.
Find your Apple Business Chat Account ID

1. In Apple Business Register, navigate to Message Service Provider and click or tap Test your Messaging Service Provider connection.

2. Click or tap Copy ID.
Find your Apple token

- In Apple Business Register navigate to Messaging Service Provider and choose Copy Token.
Find the contact flow ID

The contact flow ID is the contact flow you want to use for inbound Apple Business Chat messages. Contact flows define the experiences for your customer when they begin a new chat.

You can either reuse an existing contact flow that you’re already using for voice or chat contacts, or create a new one specifically for Apple Business Chat contacts. For instructions about creating a new inbound contact flow, see Create an inbound contact flow (p. 395).

For more information about contact flows, see Create Amazon Connect contact flows (p. 269).

To find your contact flow ID for Apple Business Chat

1. Log in to the Amazon Connect console with an Admin account, or an account assigned to a security profile that has permissions to view contact flows.
2. On the navigation menu, choose Routing, Contact flows.
3. Select the contact flow you want to use.

   Note
   Only choose flows that are type Contact flow (inbound). Apple Business Chat doesn't work with other contact flow types, such as Customer queue, Customer hold, Customer whisper, etc.

4. In the contact flow designer, expand Show additional flow information.

5. Under the ARN (Amazon Resource Number), copy everything after contact-flow/. For example, in the following image, you would copy the underlined part.
1. Notice the **Type** = **Contact flow (Inbound)**.
2. The contact flow ID is at the end of the ARN. Only copy this end part.

**Manage Apple Business Chat chats**

When you integrate Apple Business Chat with your Amazon Connect instance, Apple Business Chat messages behave exactly like any other chat messages arriving to your contact center.

**Note**
The Amazon Connect Chat service quota limits apply to Apple Business Chat. To learn more, see Amazon Connect service quotas (p. 926).

**Set up automatic replies**

You can use Amazon Lex to set up automatic replies to chat. For a tutorial that introduces you to setting up Amazon Lex and Amazon Connect, see Add an Amazon Lex bot (p. 508).

**Upgrade to the latest CCP**

The URL for the latest Contact Control Panel (CCP) ends with **ccp-v2**

You only need to upgrade to the latest CCP if you're using one the following options:

- The URL for your CCP ends with **/ccp#** (p. 252)
- You use the Amazon Connect Streams API (p. 263). The URL associated with **initCCP()** ends with **/ccp#**
If you’re still unsure whether your using the latest CCP, go to Compare the earlier and latest CCP (p. 253) to see if your CCP looks like the latest one.

### Upgrade on your own schedule, before your automatic upgrade date

To upgrade to the latest CCP before your automatic upgrade date, use the steps in the following sections:

- My CCP URL ends with /ccp# (p. 252)
- I use the Amazon Connect Streams API (p. 263)

### Upgrade later, automatically

If you don’t want to upgrade now, you can choose to wait until your scheduled upgrade date.

Between now and your scheduled upgrade date, we recommend the following change management steps:

- Compare how the upgraded CCP differs from the earlier one. For side-by-side visuals, see Compare the earlier and latest CCP (p. 253).
- Upgrade your CCP in a test environment. Use the latest CCP to learn how it’s different, and to check your configurations.
- Communicate to your agents when the upgrade is going to take place.
- Train your agents to help them get ready.

You can see communications about your auto-upgrade date in the Personal Health Dashboard.

### My CCP URL ends with /ccp#

Upgrading to the latest CCP is easy. If you want, you can try out the latest CCP and then at a later date make the switch. Here’s what you do:

1. **Try it out**: Change the URL in your browser from /ccp# to /ccp-v2. The latest CCP appears automatically. If you want, change it back to /ccp# to return to the earlier CCP.

2. **Upgrade**: Change the URL in your browser from /ccp# to /ccp-v2. Bookmark the URL.

3. If you access the CCP through the Amazon Connect console by choosing the phone icon on the top right of a page, you will be re-directed according to the automatic upgrade date sent by email. Please reach out to your Amazon Solution Architect if your request is more urgent.

4. After the upgrade happens, if you use the /ccp# URL, it resolves to /ccp-v2.
Verify your network settings

We highly recommend setting up your network to use Option 1 (recommended): Replace Amazon EC2 and CloudFront IP range requirements with a domain allow list (p. 496).

Using this option helps Amazon Connect Support to quickly troubleshoot any issues you have. Specifically, using \*.*.execute-api.{region}.amazonaws.com passes more metrics to our Support team to help with troubleshooting.

Update your SAML URL to ccp-v2

If you use SAML 2.0 as your identity management system, be sure to update the destination in your relay state URL to ccp-v2.

Change destination=/connect/ccp to destination=/connect/ccp-v2.

For more information, see Use a destination in your relay state URL (p. 129)

Compare the earlier and latest CCP

The images in this section show you how the latest CCP differs from the earlier CCP for common tasks that agents perform. The images show both CCP versions in their default state.

**Tip**
The chat tab appears on an agent's CCP only if their routing profile includes chat.

Set status, use chat, access quick connects and number pad

1. Agents use a dropdown to set their status.
2. If you have enabled chat for the agent's routing profile, the chat tab appears.
3. Choose the **Quick connects** button to type and call a phone number, or select a quick connect.
4. Choose the **Number pad** button to type and call a phone number. This is useful when the phone number has letters.

**Receive a call**

![Inbound call](image1)

![Connecting](image2)

![Connected](image3)

**Earlier CCP**

![Available](image4)

![Connecting](image5)

![Available](image6)

**Latest CCP**

254
Miss a call

Make a call: When to use Quick connects

- Use the **Quick connects** button to type a number or select a quick connect.
Make a call: When to use Number pad

- Choose the **Number pad** button to type and call a number. This is useful for corporate numbers with letters (for example, 1-800-EXAMPLE).

Make an outbound call

Earlier CCP
Agent ends a call before being connected to the other party

Earlier CCP

Latest CCP
1. If an agent ends a call before being connected, they are then available for a new contact to be routed to them automatically.
2. If an agent ends a call before being connected, they are prompted to choose **Clear contact**.

**Make another call while connected on a call**

![Image](image1.png)

1. You can see the call that you are on while typing another number or selecting a quick connect.
2. After choosing **Quick connects**, you can choose the **Number pad** button. Then on the **Number pad** page, you can enter a number.

**Enter DTMF input while connected on a call**

![Image](image2.png)

- While on a call, only use **Number pad** to enter DTMF input.
Conference call scenario 1: Leaving a call when one party is on hold and the other is connected

1. Choose **Leave call** to leave the call. This automatically takes the first party off hold and connects them to the second party.

2. If instead you want to end the call, choose the x next to each party's number. This disconnects each party.
Conference call scenario 2: Leaving a call when the other parties are joined

1. Choose Leave call to leave the call. The other two parties stay joined.
2. If instead you want to end the call, choose the x next to each party's number. This disconnects each party.
Conference call scenario 3: Leaving a call when the other parties are on hold

1. Choose **Leave call** to leave the call. The other two parties are automatically taken off hold and connected.

2. If instead you want to end the call, choose the x next to each party's number. This disconnects each party.
Receive a queued callback

![Earlier CCP](image1)
![Latest CCP](image2)

Miss a queued callback

![Earlier CCP](image3)
![Latest CCP](image4)
Finish After contact work (ACW)

- During After contact work (ACW), agents can finish follow-up work, and then choose Clear contact.

I use the Amazon Connect Streams API

**Note**
The Amazon Connect Streams API remains the same between the earlier and latest versions of the CCP. We recommend validating custom implementations built using the Amazon Connect Streams API when upgrading versions to ensure consistency in behavior.

Use the following steps to upgrade to the latest CCP.

1. **We recommend using the latest Amazon Connect Streams API.**

2. Update the URL associated with `initCCP()` from `/ccp#` to `/ccp-v2`. For information about `initCCP()`, see `connect.core.initCCP()` in the Amazon Connect Streams API documentation on GitHub.

3. Add your domain URL to the Approved origin list:
   2. Navigate to the Amazon Connect console.
   3. Check that you're in the correct Region for your Amazon Connect instance. Choose your instance.
4. Choose **Application integration**, and then choose **Add origin**.

5. Enter your domain URL. All domains that embed the CCP for a particular instance to be explicitly added. For more information, see this article on GitHub.

If you use Salesforce, you need to add the Salesforce domains to your allow list to prevent any issues with the CTI Adapter CCP functionality. For detailed instructions, see the Amazon Connect CTI Adapter for Salesforce Lightning installation guide or the Amazon Connect CTI Adapter for Salesforce Classic installation guide.

**Verify your network settings**

We highly recommend setting up your network to use Option 1 (recommended): Replace Amazon EC2 and CloudFront IP range requirements with a domain allow list (p. 496).

Using this option helps Amazon Connect Support to quickly troubleshoot any issues you have. Specifically, using `*.execute-api.{region}.amazonaws.com` passes more metrics to our Support team to help with troubleshooting.
Update your SAML URL to ccp-v2

If you use SAML 2.0 as your identity management system, be sure to update the destination in your relay state URL to ccp-v2.

Change destination=/connect/ccp to destination=/connect/ccp-v2.

For more information, see Use a destination in your relay state URL (p. 129)

Provide access to the Contact Control Panel

Agents use the Amazon Connect Contact Control Panel (CCP) to communicate with contacts. But before agents can access to the CCP and handle contacts, there are a few things you need to do:

1. Create a user name and password for agents to log into the CCP, by adding agents to your instance (p. 607).
2. Assign them the Agent security profile (p. 614). This grants them permissions to access the CCP.
3. Provide the user name, password, and the CCP website link to your agents so they can log in.

The CCP website link is: https://instance name.my.connect.aws/ccp-v2/

We recommend telling agents to bookmark the URL to the CCP so they can access it easily.

4. Train your agents on the CCP:
   - Watch Training video: How to use the CCP (p. 864)
   - Download a quick start cheat sheet.

Grant microphone access in Chrome or Firefox

If agents experience problems with their microphone, they may need to grant microphone access in their browser. Choose one of the following articles to get the steps appropriate for your browser:

- Use your camera and microphone in Chrome
- Firefox Page Info window

Microsoft Edge is not a supported browser for accessing the Contact Control Panel.

Important

A change introduced in Google Chrome version 64 may result in issues with receiving calls if you are using an embedded Contact Control Panel (CCP) softphone using the Amazon Connect Streams library. If you are experiencing issues with your microphone when using Chrome version 64, you can resolve the issue by building and deploying the latest version of the Amazon Connect Streams API, following the steps under Downloading Streams. You can also resolve the issue by using Firefox as your browser.

How to get help for CCP issues

Agents: Contact your manager or the technical support provided by your company.

Amazon Connect Administrators: See Troubleshooting Issues with the Contact Control Panel (CCP) (p. 914) for detailed troubleshooting steps. Or, log in to the AWS Management Console (https://console.aws.amazon.com/console) using your AWS account. In the upper right corner of the page, choose Support, and open a support ticket.
Agent headset and workstation requirements for the CCP

Agent headsets and workstations in the contact center vary widely. While the Amazon Connect CCP is built to handle high levels of jitter and high latency environments, the architecture of the workstations that agents use, and the location and environment in which they take contacts, can impact the quality of experience.

Headset requirements

The agent's Contact Control Panel (CCP) is compatible with all types of headsets.

For the best agent and customer experience, we recommend using a USB headset.

Alternatively, you can redirect the contact to an external number, in E.164 format, using an agent's existing telephony.

**Note**

- If the agent's audio device does not support up to 48khz and the browser asserts a sample rate of 48khz, audio issues such as an audible humming sound may be present in the agent's outgoing audio. This has been seen with Firefox but not with Chrome.
- For instructions on verifying the sample rate of the agent's headset and browser, see Humming sound in headset: Verify the headset and browser sample rates (p. 922)

Workstation minimum requirements

Under-powered workstations can make it difficult for agents to access the tools and resources they need to service contacts. Also, keep in mind the resource requirements when scoping workstations to ensure that they can perform under load while appropriately multitasking for the use case.

Following are the minimum system requirements for the workstations using the CCP only. You'll need to scope additional memory, bandwidth, and CPU for the operating system and anything else running on the workstation to avoid resource contention.

- **Browser**—The latest three versions of Google Chrome or Mozilla Firefox
- **Network**—100 Kbps bandwidth per connected workstation
- **Memory**—2 GB RAM
- **Processor (CPU)**—2 GHz

**iPhone and other mobile devices are not supported**

The Amazon Connect console and Contact Control Panel (CCP) do not work on mobile browsers.

**How to determine whether a workstation is the source of problems**

To determine whether a workstation is the source of problems, you need access to various levels of logging information. However, adding logging and monitoring to workstations that are already experiencing resource contention may further reduce available resources and invalidate test results. We recommended that your workstation meet the minimum requirements, so you leave additional resources available for logging, monitoring, malware scanning, operating system functions, and any other running processes.
Collect additional historical logging and data sources for correlation. If you see a correlation between the time of the event and the time the issue was reported, you may be able to determine the root cause with the following information:

- Round trip time (RTT) and packet loss to endpoints located within your Amazon Connect Region from your agent workstation, or an identical workstation on the same network segment. If no Region endpoints are available because of security policies, any public WAN endpoint suffices, for example, www.Amazon.com. Ideally, use your instance alias address (https://yourInstanceName.awsapps.com), and also your signaling address for endpoints.

You can find your Region endpoints here: Amazon Connect endpoints and quotas.

- Regular monitoring of workstations that show processes running, and the current resource usage of each process.
- Workstation performance/utilization in these areas:
  - Processor (CPU)
  - Disk / drive
  - RAM / memory
  - Network throughput and performance
- Monitor all of the preceding for your VDI desktop environment, including RTT/packet monitoring between the agent workstation and the VDI environment.

Can't hear caller or caller can't hear agent?

When the agent can't hear the caller or the caller can't hear them, it's usually because there are problems with one of the following:

- The connection between the agent's headset and computer.
- The permissions for the browser microphone.

Here's what you need to do:

- **Check that your computer recognizes your headset**—Check the settings in Device Manager to ensure that your computer recognizes the headset and allows proper headset connectivity. For example, if you're using a Windows PC:
  1. Go to Device Manager, then expand Audio inputs and outputs.
  2. If your computer recognizes your headset, you'll see it listed there.

- **Check your browser settings for your headset/microphone**
  - **Chrome**
    1. go to Settings, Site Settings, Microphone.
    2. Then check that the correct headset is enabled.
    3. To learn more, see Use your camera and microphone in Chrome.
  - **Firefox**
    1. While in the CCP, choose the lock icon in the address bar. If needed, grant permissions to the CCP.
    2. To learn more, see Firefox Page Info window.

- **Remove your ad blocker**: If you're using an ad blocker extension, remove it and see if that fixes the problem.

  **Important**
  A change introduced in Google Chrome version 64 may result in issues with receiving calls if you are using an embedded Contact Control Panel (CCP) softphone using the Amazon Connect
Can't hear indicator for incoming chat?

If an agent can't hear the audio indicator for an incoming chat, the problem is likely because Google added an audio policy flag to Chrome. This flag exists in Chrome versions 71 - 75.

To fix this, add the CCP web site to the allow list in the agent's Chrome settings. For instructions, see this Google Chrome Help article.

For more information about solving audio problems, see Troubleshooting Issues with the Contact Control Panel (CCP) (p. 914).

Embed the CCP into Salesforce

The core functionality of the Amazon Connect CTI Adapter provides a WebRTC browser-based Contact Control Panel (CCP) within Salesforce. The Amazon Connect CTI integration consists of two components:

- A managed Salesforce package
- An AWS Serverless application deployed to your AWS environment

For a detailed walk-through and setup of the full CTI Adapter capabilities for Salesforce Lightning, see the Amazon Connect CTI Adapter for Salesforce Lightning installation guide.

For the CTI Adapter for Salesforce Classic, see the Amazon Connect CTI Adapter for Salesforce Classic installation guide.

We recommend that you initially install the package into your Salesforce sandbox. After the package is installed, you can configure your Salesforce Call Center configuration within Salesforce.

Embed the CCP into Zendesk

To integrate Amazon Connect and Zendesk, you need:

- An Amazon Connect instance.
- A Zendesk Support account with a Zendesk Talk Partner Edition plan, or a Zendesk trial account.

Install and configure the Amazon Connect for Zendesk app in your Zendesk Support account, then integrate the app with Amazon Connect. After integration, you can create contact flows to use Amazon Connect with Zendesk ticketing.

For more information, see How do I integrate Amazon Connect with Zendesk?
Create Amazon Connect contact flows

A contact flow defines the customer experience with your contact center from start to finish. Amazon Connect includes a set of default contact flows (p. 269) so you can quickly set up and run a contact center. However, you may want to create custom contact flows for your specific scenario.

Contents
- Permissions required to view, edit, create contact flows (p. 269)
- Default contact flows (p. 269)
- Sample contact flows (p. 278)
- Contact block definitions (p. 287)
- Create a new contact flow (p. 393)
- Copy and paste contact flows (p. 400)
- Roll back a contact flow (p. 400)
- Associate a phone number with a contact flow (p. 400)
- Create prompts (p. 401)
- Set up contact transfers (p. 409)
- Set up recording behavior (p. 423)
- Set up queued callback (p. 425)
- Import/export contact flows (p. 431)
- Invoke AWS Lambda functions (p. 432)
- Encrypt customer input (p. 437)
- Track events as customers interact with contact flows (p. 439)
- Use Amazon Connect contact attributes (p. 445)
- Migrate contact flows to a different instance (p. 469)
- Amazon Connect Flow language (p. 469)

Permissions required to view, edit, create contact flows

To view, edit, create, and publish contact flows you need Contact flows permissions added to your security profile.

By default users who are assigned to the Admin and CallCenterManager security profiles have Contact flows permissions.

Default contact flows

Amazon Connect includes a set of default contact flows that have already been published. It uses them to power your contact center.
For example, say you create a contact flow that includes putting the customer on hold, but you don't create a prompt for it. The default contact flow, **Default agent hold**, will be played automatically. This is a way to help you get started with your call center quickly.

**Tip**
If you want to change the behavior of a default contact flow, we recommend creating a new customized flow based on the default. Then call the new flow intentionally in your contact flows rather than defaulting to it. This gives you better control over how your contact flows work.

To see the list of default flows in the Amazon Connect console, go to **Routing, Contact Flows**. They all start with **Default** in their name.

### Contents
- Change a default contact flow (p. 270)
- Default agent hold: "You are on hold" (p. 273)
- Default agent transfer: "Transferring now" (p. 274)
- Default customer queue: queue hold message and music (p. 274)
- Default customer whisper: beep sound (p. 276)
- Default agent whisper: name of the queue (p. 276)
- Set the default whisper flow for a chat conversation (p. 276)
- Default customer hold: hold music (p. 277)
- Default outbound: "This call is not being recorded" (p. 278)
- Default queue transfer: "Now transferring" (p. 278)
- Default prompts from Amazon Lex: "Sorry .. " (p. 278)

### Change a default contact flow

You can override the way the default flows work by editing them directly.

Generally we recommend creating new flows based on the defaults, rather than editing the default flow directly. You can make a copy of the default flow, assign a name that indicates it's a custom version, and then edit that one. This gives you more control over how your contact flows work.

### Change how a default contact flow works

The following steps show how to change the default message customers hear when they are put in a queue to wait for the next available agent.

1. **On the navigation menu, choose Routing, Contact flows.**
2. **Choose the default contact flow you want to customize.** For example, choose **Default customer queue** if you want to create your own message when a customer is put in queue instead of using the one we've provided.
3. To customize the message, choose the **Loop prompts** block to open the properties page.

4. Use the dropdown box to either choose different music, or set to **Text to Speech** and then type a message to be played, as shown in the following image.
5. Choose **Save** at the bottom of the properties page.

6. Choose **Publish**. Amazon Connect starts playing the new message almost immediately (it may take a few moments for it to fully take effect).
Copy a default contact flow before customizing it

Use the following steps to create a new flow based a current default.

1. On the navigation menu, choose **Routing**, **Contact flows**.
2. Choose the default contact flow you want to customize.
3. In the upper right corner of the page, choose the **Save** drop-down arrow. Choose **Save as**.
4. Assign a new name for the contact flow, for example, **Customer hold message**.

   ![Image of Save as dialog](image)

5. Add the new contact flow (in this case, **Customer hold message**) to the contact flows you create so it's run instead of the default.

Default agent hold: "You are on hold"

The **Default agent hold** flow is the experience the agent receives when placed on hold. During this flow, a **Loop prompt** block plays the message "You are on hold" to the agent every 10 seconds.

For instructions about how to override and change a default contact flow, see [Change a default contact flow](p. 270).
Default agent transfer: "Transferring now"

This default transfer flow is the what the agent experiences when transferring a contact to another agent by using Create quick connects (p. 410). A Play prompt plays the message “Transferring now.” Then the Transfer to agent block is used to transfer the contact to the agent.

**Tip**
The Transfer to Agent block is a beta feature and only works for voice interactions. To transfer a chat contact to another agent, follow these instructions: Use contact attributes to route contacts to a specific agent (p. 422).

For instructions about how to override and change a default contact flow, see Change a default contact flow (p. 270).

Default customer queue: queue hold message and music

This default contact flow is played when a customer is placed in a queue.

1. The loop has a one-time voice prompt:

   *Thank you for calling. Your call is very important to us and will be answered in the order it was received.*

2. It plays queue music in .wav format that's been uploaded to the Amazon Connect instance.

3. The customer remains in this loop until their call is answered by an agent.

Change the default message a customer hears when they are put in queue

The following steps show how to change the default message customers hear when they are put in a queue to wait for the next available agent.

1. On the navigation menu, choose Routing, Contact flows.
2. Choose Default customer queue.
3. To customize the message, choose the Loop prompts block to open the properties page.
4. Use the dropdown box to either choose different music, or set to **Text to Speech** and then type a message to be played, as shown in the following image.

5. Choose **Save** at the bottom of the properties page.
6. Choose **Publish**. Amazon Connect starts playing the new message almost immediately (it may take a few moments for it to fully take effect).

**Default customer whisper: beep sound**

This contact flow uses a **Set whisper flow (p. 368)** block to play a message for the customer when the customer and agent are joined. It uses a "beep" sound to notify a customer that their call has been connected to an agent.

Use the **Set whisper flow (p. 368)** block to override the default agent whisper in a voice conversation.

**Important**

For chat conversations, you need to include a **Set whisper flow (p. 368)** for default agent or customer whispers to play. For instructions, see **Set the default whisper flow for a chat conversation (p. 276)**.

**Default agent whisper: name of the queue**

This contact flow uses a **Set whisper flow (p. 368)** block to play a message for the agent when the customer and agent are joined.

The name of the queue is played to the agent. It identifies the queue that the customer was in. The name of the queue is retrieved from the system variable \$ .Queue.Name.

Use the **Set whisper flow (p. 368)** block to override the default agent whisper in a voice conversation.

**Important**

For chat conversations, you need to include a **Set whisper flow (p. 368)** for default agent or customer whispers to play. For instructions, see **Set the default whisper flow for a chat conversation (p. 276)**.

For more information about system variables, see **System attributes (p. 447)**.

**Set the default whisper flow for a chat conversation**

For chat conversations, you need to include a **Set whisper flow** block for default agent or customer whispers to play.

For example, to set the default whisper flow for chats that use the **Sample inbound flow (p. 279)**:

1. Go to **Routing**, **Contact flows**, and choose the Sample inbound flow.
2. Add a **Set whisper flow** block after the chat channel has branched, as shown in the following image:
3. In the **Set whisper flow** block, open the properties page, and choose the flow you want to play as the default for chat conversations. For example, you might choose **Default whisper flow** to show agents the name of the originating queue in the chat window. This is helpful when agents are managing more than one queue.

4. Choose **Save**.

**Default customer hold: hold music**

This contact flow starts when the customer is put on hold. It plays the audio that the customer hears while on hold.
For instructions about how to override and change a default contact flow, see Change a default contact flow (p. 270).

**Default outbound: "This call is not being recorded"**

This contact flow is an outbound whisper that manages what the customer experiences as part of an outbound call, before being connected with an agent.

1. It starts with an optional **Set recording behavior** block. Then a prompt plays the following message:
   
   *This call is not being recorded.*

2. The flow ends.

3. The customer remains in the system (on the call) after the flows ends.

For instructions about how to override and change a default contact flow, see Change a default contact flow (p. 270).

**Default queue transfer: "Now transferring"**

This contact flow manages what the agent experiences when they transfer a customer to another queue.

It starts with a **Check hours of operation** block to check the hours of operation for the current queue. The **In hours** option branches to the **Check staffing** block to determine whether agents are available, staffed, or online.

If it returns **True** (agents are available), the flow goes to the **Transfer to queue** block. If it returns **False** (no agents are available), the flow plays a prompt and disconnects the call.

For instructions about how to override and change a default contact flow, see Change a default contact flow (p. 270).

**Default prompts from Amazon Lex: "Sorry .. "**

If you add an Amazon Lex bot to your contact center, know that it also has some default prompts that it uses for error handling. For example:

- Sorry, can you please repeat that?
- Sorry, I could not understand. Goodbye.

**To change default Amazon Lex prompts**

1. In Amazon Lex, go to your bot.
2. On the Editor tab, choose Error Handling.
3. Change the text as needed. Choose **Save**, then **Build** and **Publish**.

**Sample contact flows**

Amazon Connect includes a set of sample contact flows that show you how to perform common functions. They are designed to help you learn how to create your own contact flows that work in a similar way. For example, if you want to add a queued callback flow to your call center, take a look at the Sample queued callback (p. 285) flow.
To explore how the sample flows work

1. Claim a number if you haven't already: go to Routing, Phone numbers, Claim a number.
2. Choose the DID tab, then choose a number.
3. In Contact flow / IVR use the drop down to choose the sample contact flow you want to try. Click Save.
4. Call the number. The sample contact flow that you selected starts.

   We recommend opening the sample contact flow in the contact flow designer and following along to see how it works while you’re experiencing it.

To open a sample flow in the contact flow designer

1. In Amazon Connect choose Routing, Contact flows.
2. On the Contact flows page, scroll down to the flows with names that start with Sample.
3. Choose the flow you want to view.

The topics in this section describe how each of the sample contact flows work.

Contents

- Sample inbound flow (first contact experience) (p. 279)
- Sample AB test (p. 280)
- Sample customer queue priority (p. 280)
- Sample disconnect flow (p. 281)
- Sample queue configurations (p. 281)
- Sample queue customer (p. 284)
- Sample queued callback (p. 285)
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- Sample Lambda integration (p. 286)
- Sample recording behavior (p. 286)
- Sample note for screenpop (p. 286)
- Sample secure input with agent (p. 287)
- Sample secure input with no agent (p. 287)

Sample inbound flow (first contact experience)

Type: Contact flow (inbound)

This sample flow is automatically assigned to the phone number that you claimed when you first set up contact flows. For more information, see Get started (p. 8).

It uses Check contact attributes to determine if the contact is contacting you by phone or chat, or if it is a task, and to route them accordingly.

- If the channel is chat or task, the contact is transferred to the Set disconnect flow.
- If the channel is voice, then based on user input the contact is either transferred to the other sample contact flows or a sample follow-up agent task is created for this contact.
Sample AB test

Type: Contact flow (inbound)

This contact flow shows how to perform an A/B call distribution based on a percentage. Here's how it works:

1. The **Play prompt** block uses Amazon Polly, the text-to-speech service, to say "Amazon Connect will now simulate rolling dice by using the Distribute randomly block. Now rolling."
2. The contact reaches the **Distribute by percentage** block, which routes the customer randomly based on a percentage.
   - **Distribute by percentage** simulates a dice roll, resulting in a values between 2 to 12 with different percentages. For example, there is 3 percent chance for the “2” option, 6 percent chance for the “3” option, and so on.
3. After the contact gets routed, the **Play prompt** tells the customer which number the dice rolled.
4. At the end of the sample, the **Transfer to flow** block transfers the customer back to the Sample inbound flow (p. 279).

Sample customer queue priority

Type: Contact flow (inbound)

**Note**
This sample flow is available in previous Amazon Connect instances. In new instances, you can see this functionality in Sample queue configurations (p. 281).

By default the priority for new contacts is 5. Lower values raise the priority of the contact. For example, a contact assigned a priority of 1 is routed first.

This sample shows how you can use the **Change routing priority/age block** to raise or lower the priority of a contact in a queue. Using this block, there are two ways you can raise or lower a customer’s priority:

- Assign them a new priority value, such as 1, to raise their priority.
- Or, increase the routing age of the contact. Customers who are queued longer are routed first, when all contacts have the same queue priority value (such as 5).

**Option 1: Raise the priority**

- The **Get Customer Input** block prompts the customer to press 1 to move to the front of the queue. This block gets the customer's input; it doesn't actually change the customer's priority.
- If the customer presses 1, they go down the "Pressed 1" branch, which takes them to the **Change routing priority/age block**. This block changes their priority in the queue to 1, which is the highest priority.

**Option 2: Change the routing age**

- The **Get Customer Input** block prompts the customer to press 2 to move behind existing contacts already in queue. This block gets the customer's input; it doesn't actually change the customer's priority.
- If the customer presses 2, they go down the "Pressed 2" branch, which takes them to a different **Change routing priority/age block**. This block increases their routing age by 10 minutes. This has the effect of moving them ahead of others in the queue who have been waiting longer.
Sample disconnect flow

Type: Contact flow (inbound)

This sample works with voice, chat, and task contacts.

Chat contacts

1. The **Play prompt** block shows a text message that the agent has disconnected.
2. A **Wait** block sets the timeout period for 15 minutes. If the customer returns in 15 minutes, the customer is transferred to a queue to chat with another agent.
3. If the customer doesn't return, the timer expires and the chat disconnects.

Voice contacts

1. Sets a user-defined attribute, DisconnectFlowRun. If it = Y, disconnect.
2. Gets customer input, whether they were happy with service.
3. Terminates flow.

Task contacts

1. Checks contact attributes, whether Agent ARN = NULL.
2. Transfers to agent's queue.
3. If at capacity, disconnects.

Sample queue configurations

Type: Contact flow (inbound)

This contact flow shows different ways you can put a customer in queue: you can change the priority of the customer, determine the wait time in queue, and give them an option for a callback. Here's how it works:

1. The customer is put in the BasicQueue.
2. After that, the **Default customer queue** flow is invoked. This block runs a **Loop prompts** block that plays the following:

   Thank you for calling. Your call is very important to us and will be answered in the order it was received.

3. The hours of operation are checked with a **Check hours of operation** block.
4. The channel is checked with a **Check contact attributes** block:

   - If chat, we check the time in queue. If it's less than 5 minutes, the customer is placed in queue for an agent. If it's more, we check the channel again and if it's chat, put the customer in queue for an agent.
   - If voice, the customer is routed down the **No Match** branch, to a **Play prompt** block and then to a **Get customer input** block.

   In the **Get customer input** block, we give the customer the option to press 1 to move to the front of the queue or 2 to move to the end of the queue.

   The two **Change routing priority / age** blocks move the customer to the front or back of the queue.
You can see this path in the following image:

5. Next we use a **Check queue status** block to check whether the time in queue is less than 300 seconds.

6. We use a **Play prompt** block to tell the customer the results.

7. We use a **Check contact attributes** block again to check the customer's channel: chat or voice/No Match.

These next steps apply to customers who were routed down the voice/No Match branch, as shown in the following image:
1. In the Get customer input block, we prompt customers to Press 1 to go into queue or 2 to enter a callback number.

2. If customers press 2, they are routed down the Pressed 2 branch to the Store customer input block.

3. The Store customer input block prompts the customer for their phone number.

4. The customer’s phone number is stored in the Stored customer input attribute, by the Set callback number block.

5. We use a Transfer to queue (p. 387) block to put the customer in a callback queue.

6. The Transfer to queue (p. 387) block is configured so Amazon Connect waits 5 seconds between the time the callback contact is initiated and the contact is enqueued, where it sits until it is offered to an available agent.

   If the initial callback doesn't reach the customer, Amazon Connect will attempt 1 callback. If it were configured for 2 attempted callbacks, it would wait 10 minutes between each one.

   Also, no special callback queue is specified. Rather, customers are in the BasicQueue, which was set at the beginning of the flow.
Transfer to queue

Ends the current contact flow and transfers the customer to a queue.

Transfer to queue  Transfer to callback queue

When you use Transfer to callback queue, you must use a 'Set customer callback number' block before this block in the flow to set the callback number for the customer.

Initial delay

5

in seconds

<table>
<thead>
<tr>
<th>Maximum amount of attempts</th>
<th>Minimum time between attempts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

minutes  seconds

Optional parameters:

☐  Set working queue

For information about queued callbacks, see the following topics:

- Set up queued callback (p. 425)
- Contact block: Transfer to queue (p. 387)
- About queued callbacks in metrics (p. 792)

Sample queue customer

Type: Contact flow (inbound)

This contact flow performs checks before placing customer into a queue. Here's how it works:
1. The **Set working queue** block determines which queue to transfer the customer to.
2. The **Check hours of operation** block perform checks to avoid the customer being queued during non-working hours.
3. The customer is transferred to the queue if it is within business hours, and the queue can handle this call. Otherwise, the customer is played a message "We are not able to take your call right now. Goodbye." And then the customer is disconnected.

**Sample queued callback**

Type: Contact flow (inbound)

**Note**
This sample flow is available in previous Amazon Connect instances. In new instances, you can see examples of queued callback in [Sample interruptible queue flow with callback](p. 285) and [Sample queue configurations](p. 281).

This contact flow provides callback queue logic. Here's how it works:

1. After a voice prompt, a working queue is selected and its queue status is checked.
2. A voice prompt tells the customer if the wait time for the selected queue is longer than 5 minutes. Customers are offered a choice to wait in the queue or to be placed into a callback queue.
3. If the customer decides to wait in the queue, the **Set customer queue flow** block places them in a queue flow that provides a callback option. That is, it places them in [Sample interruptible queue flow with callback](p. 285).
4. If the customer chooses to be placed into a callback queue, their number is stored in the **Store customer input** block. Then their callback number is set, and they are transferred to the callback queue.

For information about queued callbacks, see the following topics:

- [Set up queued callback](p. 425)
- [Contact block: Transfer to queue](p. 387)
- [About queued callbacks in metrics](p. 792)

**Sample interruptible queue flow with callback**

Type: Customer queue

This contact flow shows you how to manage what the customer experiences while in queue. It uses **Check contact attributes** to determine if the customer is contacting you by phone or chat, and to route them accordingly.

If the channel is chat, the customer is transferred to the **Loop prompts**.

If the channel is voice, the customer hears a looping audio that interrupts every 30 seconds to give them two options from the **Get customer input** block:

1. The customer can press 1 to enter a callback number. Then the **Get customer input** block prompts the customer for their phone number. Then the flow ends.
2. Press 2 ends the flow, and the customer remains in the queue.
Sample Lambda integration

Type: Contact flow (inbound)

This contact flow shows you how to invoke a Lambda function and do a data dip, that is, retrieve information about the customer. The data dip uses the caller's phone number to look up the US state they are calling from. If the customer is using chat, it returns a fun fact. Here's how it works:

1. A prompt tells the customer that a data dip is being performed.
2. The Invoke Lambda function block triggers `sampleLambdaFlowFunction`. This sample Lambda function determines the location of the phone number. The function times out in 4 seconds. If it times out, it plays a prompt that says "Sorry, we failed to find the state for your phone number's area code."
3. In the first Check contact attributes block, it checks the channel the customer is using: voice, chat, task. If chat, it returns a fun fact.
4. If voice, the second Check contact attributes block is triggered. It checks the match conditions of `State`, which is an external attribute. It uses an external contact attribute because it's getting data by using a process that's external to Amazon Connect
5. A prompt tells you that it's returning you back to Sample inbound flow, and then starts the Transfer flow block.
6. If the transfer fails, it plays a prompt and then disconnects the contact.

For more information about using attributes, see Lambda functions and attributes (p. 468).

Sample recording behavior

Type: Contact flow (inbound)

This contact flow starts by checking the channel of the contact:

- If the contact is a task, it is transferred to the Sample inbound flow.
- If the customer is using chat, they get a prompt that the Set recording block enables managers to monitor chat conversations. (To record chats, you only need to specify an Amazon S3 bucket where the conversation will be stored.)

To monitor chats, the Set recording block is configured to record both the Agent and Customer.
- If the contact is using voice, a Get customer input block prompts them to enter the number for who they want to record. Their entry triggers the Set recording behavior block with the appropriate configuration.

It ends with the customer being transferred by to the Sample inbound flow (p. 279).

For more information, see the following topics:

- Set up recording behavior (p. 423)
- Monitor live conversations (p. 617)
- Review recorded conversations (p. 620)

Sample note for screenpop

Type: Contact flow (inbound)
This contact flow shows you how to use Screenpop, a Contact Control Panel feature, to load a web page with parameters based on attributes.

In this sample flow, a **Set contact attributes** block is used to create an attribute from a text string. As an attribute, the text can be passed to the CCP to display a note to an agent.

**Sample secure input with agent**

Type: Queue transfer

This contact flow shows you how to allow customers to input sensitive data while putting the agent on hold. In a production environment, we recommend using encryption (p. 437) instead of this solution.

Here's how it works:

1. This flow begins with checking the customer's channel. If they are using chat, they are put in a queue.
2. If they are using voice, the agent and customer are put in a conference call.
3. A **Play prompt** tells the customer that the agent will be put on hold while customer enters their credit card information.
4. When the prompt is finished playing, the agent is put on hold using a **Hold customer or agent** block. If an error occurs, a prompt is played that agent was unable to put on hold, after which the contact flow is ended.
5. The customer's input is stored using the **Store Customer Input** block. This block encrypts the sensitive customer information using a signing key that must be uploaded in .pem format. For a detailed walkthrough that explains how to encrypt customer input, see Creating a secure IVR solution with Amazon Connect.
6. After the customer's data is collected, the agent and customer are put back on call using the **Conference All** option in another **Hold customer or agent** block.
7. The error branch runs if there's an error while capturing the customer's data.

**Sample secure input with no agent**

Type: Contact flow (inbound)

This contact flow shows you how to capture sensitive customer data and encrypt it using a key. Here's how it works:

1. It begins by checking the contact's channel. If they are using chat, a prompt is played that this doesn't work with chat, and they are transferred to Sample inbound flow (p. 279).
2. If they are using voice, the **Store customer input** block prompts them to enter their credit card number. The block stores and also encrypts the data using a signing key that must be uploaded in a .pem format.

   In the **Set contact attributes** block, the encrypted card number is set as contact attribute.
3. After the card number is successfully set as contact attribute, the customer is transferred back to the Sample inbound flow (p. 279).

**Contact block definitions**

You create contact flows in the contact flow designer using contact blocks. Drag and drop contact blocks onto a canvas to arrange a contact flow.
The following table lists all available contact blocks that you can use. Choose the links in the Block column for more information.

<table>
<thead>
<tr>
<th>Block</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call phone number (p. 292)</td>
<td>Initiates an outbound call from an outbound whisper flow.</td>
</tr>
<tr>
<td>Change routing priority / age (p. 295)</td>
<td>Changes the priority of the contact in queue. You may want to do this, for example, based on the contact's issue or other variable.</td>
</tr>
<tr>
<td>Check call progress (p. 297)</td>
<td>Engages with the output provided by an answering machine, and provides branches to route the contact accordingly.</td>
</tr>
<tr>
<td>Check contact attributes (p. 299)</td>
<td>Checks the values of contact attributes.</td>
</tr>
<tr>
<td>Check hours of operation (p. 302)</td>
<td>Checks whether the contact is occurring within or outside of the hours of operation defined for the queue.</td>
</tr>
<tr>
<td>Check queue status (p. 304)</td>
<td>Checks the status of the queue based on specified conditions.</td>
</tr>
<tr>
<td>Check security status (p. 308)</td>
<td>Branches based on the authentication status of the caller returned by Voice ID.</td>
</tr>
<tr>
<td>Check staffing (p. 310)</td>
<td>Checks the current working queue, or queue you specify in the block, for whether agents are available, staffed, or online. Staffed availability could be on call, or after contact work status.</td>
</tr>
<tr>
<td>Create task (p. 312)</td>
<td>Creates a new task, sets the tasks attributes, and initiates a contact flow to start the task. To learn more about Amazon Connect Tasks, see Tasks (p. 15).</td>
</tr>
<tr>
<td>Disconnect / hang up (p. 314)</td>
<td>Disconnects a contact.</td>
</tr>
<tr>
<td>Distribute by percentage (p. 315)</td>
<td>Routes customers randomly based on a percentage.</td>
</tr>
<tr>
<td>End flow / Resume (p. 317)</td>
<td>Ends the current flow without disconnecting the contact.</td>
</tr>
<tr>
<td>Get customer input (p. 318)</td>
<td>Branches based on customer intent.</td>
</tr>
<tr>
<td>Get queue metrics (p. 328)</td>
<td>Retrieves real-time metrics about queues and agents in your</td>
</tr>
<tr>
<td>Block</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hold customer or agent (p. 334)</td>
<td>Places a customer or agent on or off hold.</td>
</tr>
<tr>
<td>Invoke AWS Lambda function (p. 336)</td>
<td>Calls AWS Lambda, optionally returns key-value pairs.</td>
</tr>
<tr>
<td>Loop (p. 338)</td>
<td>Loops through, or repeats, the Looping branch for the number of loops specified.</td>
</tr>
<tr>
<td>Loop prompts (p. 340)</td>
<td>Loops a sequence of prompts while a customer or agent is on hold or in queue.</td>
</tr>
<tr>
<td>Play prompt (p. 342)</td>
<td>Plays an interruptible audio prompt, delivers a text-to-speech message, or delivers a chat response.</td>
</tr>
<tr>
<td>Set callback number (p. 348)</td>
<td>Sets a callback number.</td>
</tr>
<tr>
<td>Set contact attributes (p. 350)</td>
<td>Stores key-value pairs as contact attributes.</td>
</tr>
<tr>
<td>Set customer queue flow (p. 353)</td>
<td>Specifies the flow to invoke when a customer is transferred to a queue.</td>
</tr>
<tr>
<td>Set disconnect flow (p. 354)</td>
<td>Sets the flow to run after a disconnect event.</td>
</tr>
<tr>
<td>Set hold flow (p. 356)</td>
<td>Links from one contact flow type to another.</td>
</tr>
<tr>
<td>Set logging behavior (p. 358)</td>
<td>Enables contact flow logs so you can track events as contacts interact with contact flows.</td>
</tr>
<tr>
<td>Set security behavior (p. 361)</td>
<td>Sends audio to Amazon Connect Voice ID to verify the caller's identity, as soon as the call is connected to a contact flow.</td>
</tr>
<tr>
<td>Set recording and analytics behavior (p. 359)</td>
<td>Sets options for recording conversations.</td>
</tr>
<tr>
<td>Set voice (p. 364)</td>
<td>Sets the text-to-speech (TTS) language and voice to be used in the contact flow.</td>
</tr>
<tr>
<td>Set whisper flow (p. 368)</td>
<td>Overrides the default whisper by linking to a whisper flow.</td>
</tr>
</tbody>
</table>
### Supported channels for contact blocks

The following table lists all available contact blocks, and whether they support routing a contact through the specified channels.

<table>
<thead>
<tr>
<th>Block</th>
<th>Voice</th>
<th>Chat</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call phone number (p. 292)</td>
<td>Yes</td>
<td>No - Error branch</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Change routing priority / age (p. 295)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Check call progress (p. 297)</td>
<td>Yes</td>
<td>No - Error branch</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Check contact attributes (p. 299)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Check hours of operation (p. 302)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
## Supported channels for contact blocks

<table>
<thead>
<tr>
<th>Block</th>
<th>Voice</th>
<th>Chat</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check queue status (p. 304)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Check security status (p. 308)</td>
<td>Yes</td>
<td>No - Error branch</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Check staffing (p. 310)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Create task (p. 312)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Disconnect / hang up (p. 314)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Distribute by percentage (p. 315)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>End flow / Resume (p. 317)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Get customer input (p. 318)</td>
<td>Yes</td>
<td>Yes when Amazon Lex is used</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Otherwise, No - Error branch</td>
<td></td>
</tr>
<tr>
<td>Get queue metrics (p. 328)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Hold customer or agent (p. 334)</td>
<td>Yes</td>
<td>No - Error branch</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Invoke AWS Lambda function (p. 336)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Loop (p. 338)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Loop prompts (p. 340)</td>
<td>Yes</td>
<td>Yes</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Play prompt (p. 342)</td>
<td>Yes</td>
<td>Yes</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Set callback number (p. 348)</td>
<td>Yes</td>
<td>No - Error branch</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Set contact attributes (p. 350)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Set customer queue flow (p. 353)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Set disconnect flow (p. 354)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Set hold flow (p. 356)</td>
<td>Yes</td>
<td>No - Error branch</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Set logging behavior (p. 358)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### Contact block: Call phone number

#### Description
- Use to place an outbound call from an **Outbound Whisper** flow.

#### Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Transfer to queue (p. 387)</td>
<td>Yes</td>
</tr>
<tr>
<td>Wait (p. 391)</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Channel</td>
<td>Supported?</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

**Contact flow types**

You can use this block in the following contact flow types (p. 394):

- Outbound Whisper flow

**Properties**

**Call phone number**

Initiates a call to a customer. You can optionally set the caller ID number to display to the recipient.

If you do not specify a caller ID number, the caller ID number for the queue is displayed. Learn more

- Caller ID number to display (optional)
  - Select a number from your instance

Number

Search for phone number

- +1 7
- +1 8
Outbound whisper flows run in Amazon Connect immediately after an agent accepts the call during direct dial and callback scenarios. When the contact flow runs:

- The caller ID number is set if one is specified in the Call phone number (p. 292) block.
- If no caller ID is specified in the Call phone number (p. 292) block, the caller ID number defined for the queue is used when the call is placed.
- When there is an error with a call that is initiated by the Call phone number (p. 292) block, the call is disconnected and the agent is placed in AfterContactWork (ACW).

Only published contact flows can be selected as the outbound whisper flow for a queue.

**Configured block**

When this block is configured, it looks similar to the following image:

There is no error branch for the block. If a call is not successfully initiated, the contact flow ends and the agent is placed in AfterContactWork (ACW).

**Sample flows**

See these sample flows for scenarios that use this block:

- Sample customer queue priority (p. 280)
Sample queue configurations (p. 281)

Scenarios

See these topics for more information about caller ID works:

- Set up outbound caller ID (p. 203)

Contact block: Change routing priority / age

Description

- Change a customer's position in the queue. For example, move the contact to the front of the queue, or to the back of the queue.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Outbound Whisper flow
- Inbound contact flow
- Customer queue flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties

Change routing priority / age

Alters the priority of the contact in queue.

Routing age alters the time in queue for the contact, which will determine its priority in comparison to when other contacts are received. Queue priority sets the contact to a higher or lower priority, lower priority contacts will be routed first. (The default priority for new contacts is 5)

Set priority or routing age

Adjust by time

+ 8

seconds

This block gives you two options for changing a customer's position in queue:

- **Set priority.** The default priority for new contacts is 5. You can raise the priority of a contact - compared to other contacts in the queue - by assigning them a higher priority, such as 1 or 2.
- **Adjust by time.** You can add or subtract seconds or minutes from the amount of time the current contact spends in queue. Contacts are routed to agents on a first-come, first-served basis. So changing their amount of time in queue compared to others also changes their position in queue.

Here's how this block works:

1. Amazon Connect takes the actual “time in queue” for the contact (in this case, how long this specific contact has spent in queue so far), and adds the number of seconds you specified in the *Adjust by time* property.
2. The additional seconds makes this specific contact look artificially older than it is.
3. The routing system now perceives this contact’s “time in queue” as longer than it actually is, which affects its position within the ranked list.
Configuration tips

• When using this block, it takes at least 60 seconds for a change to take effect for contacts already in queue.
• If you need a change in a contact's priority to take effect immediately, set the priority before putting the contact in queue, that is, before using a Transfer to queue (p. 387) block.

Configured block

When this block is configured, it looks similar to the following image:

![Image of configured block]

Sample flows

See these sample flows for scenarios that use this block:

• Sample customer queue priority (p. 280)
• Sample queue configurations (p. 281)

Scenarios

See these topics for more information about how routing priority works:

• Routing profiles (p. 21)
• How routing works (p. 209)

Contact block: Check call progress

Description

• Engages with the output provided by an answering machine, and provides branches to route the contact accordingly.
• It supports the following branches:
  • Call answered: The call has been answered by a person.
  • Voicemail (beep): Amazon Connect identifies that the call ended in a voicemail and it detects a beep.
  • Voicemail (no beep):
    • Amazon Connect identifies that the call ended in a voicemail but it doesn't detect a beep.
    • Amazon Connect identifies that the call ended in a voicemail, but the beep is unknown.
- **Not detected**: Could not detect whether there is voicemail. This happens when Amazon Connect is unable to make a positive determination of whether a call was answered by a live voice or an answering machine. Typical situations that land in this state include long silences or excessive background noise.

- **Error**: If any errors are encountered due to Amazon Connect not running correctly after media has been established on the call, this is the path that will be taken by the contact flow. Media is established when the call is either answered by a live voice or by an answering machine. If the call is rejected by the network or encounters a system error while placing the outbound call, the contact flow will not be run.

**Supported channels**

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

**Contact flow types**

You can use this block in the following contact flow types (p. 394):

- All contact flow types

**Properties**

- Check call progress

  Branches on AMD (Answering Machine Detection) to determine the next steps for handling outbound calls. [Learn more.](#)

**Configured block**

When this block is configured, it looks similar to the following image:
Contact block: Check contact attributes

Description

- Branches based on a comparison to the value of a contact attribute.
- Supported comparisons include: **Equals**, **Is Greater Than**, **Is Less Than**, **Starts With**, **Contains**.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- All flows
Properties

Check contact attributes

Branches based on a comparison to the value of a contact attribute.

Examples of supported comparisons include: "equal to", "greater than", "less than" "starts with", "ends with", "contains".

Attribute to check

Type
User Defined

Attribute
PremiumCustomer

Conditions to check

x Equals yes

No Match

Add another condition

Conditions to check can be dynamic

You can check conditions like the following:

• $.AttributesverificationCode

To check for a NULL value, you need to use a Lambda.

Configuration tips

• If you have multiple conditions to compare, Amazon Connect checks them in the order they are listed.
For example, in the following image Amazon Connect compares the **greater than 60** condition first and compares **greater than 2** last.

![Conditions to check](image)

- This block doesn't support case-insensitive pattern matching. For example, if you're trying to match against the word *green* and the customer types *Green*, it would fail. You would have to include every permutation of upper and lower-case letters.

**Configured**

When this block is configured, it looks similar to the following image:

![Check contact attributes](image)

**Sample flows**

See these sample flows for scenarios that use this block:

- Sample inbound flow (first contact experience) (p. 279)
- Sample interruptible queue flow with callback (p. 285)

**Scenarios**

See these topics for scenarios that use this block:

- How to reference contact attributes (p. 458)
- Route based on contact's channel (p. 463)
- How to reference contact attributes (p. 458)
Contact block: Check hours of operation

Description

- Checks whether the contact is occurring within or outside of the hours of operation defined for the queue.
- Branches based on specified hours of operation.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer queue flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties

Check hours of operation

Checks the Hours of operation, then branches based on whether it is in Hours or Out of Hours.

If you do not select an Hours of operation, the Hours of operation for the current working queue is checked. If there is no current working queue, or that queue has no Hours of operation set, the Error branch is followed.

Parameters:

☑ Specific hours (optional). If not specified, the current queue’s hours are checked.

Basic Hours

You can set up multiple hours of operation so you have one for various queues. For instructions, see Set the hours of operation and timezone for a queue (p. 213).

Configuration tips

- Agent queues (p. 22) that are automatically created for each agent in your instance do not include an hours of operation.
- If you use this block to check the hours of operation for an agent queue, the check fails and the contact is routed down the Error branch.

Configured block

When this block is configured, it looks similar to the following image:
Related topics

- Set the hours of operation and timezone for a queue (p. 213)

Sample flows

Sample inbound flow (first contact experience) (p. 279)

Scenarios

See these topics for scenarios that use this block:

- Manage contacts in a queue (p. 420)

Contact block: Check queue status

Description

- Checks the status of the queue based on specified conditions.
- Branches based on the comparison of Time in Queue or Queue capacity.
- **Time in queue** is the amount of time the oldest contact spends in queue, before they are routed to an agent or removed from the queue.
- **Queue capacity** is number of contacts waiting in a queue.
- If no match is found, the **No Match** branch is followed.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer queue flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties

Check queue status

Branches based on the comparison of Time in Queue or Queue capacity. If no match is found, the No Match branch is followed.

Outputs:

- Time in Queue
- Is greater than 1 min.

- No Match
- Error

Add another condition

- Queue to check (optional)
  - By queue
    - Select a queue
      - BasicQueue
  - Use attribute
  - By agent

Configuration tips

The order in which you add conditions matters at the runtime. Results are evaluated against conditions in the same order in which you add them to the. Contacts are routed down the first condition to match.

For example, in the following condition order, every value matches one of first two conditions. None of the other conditions are ever matched.
In this next example, all contacts with a wait time in queue of 90 or less will match first condition only. This means <=9, <=12, <=15, <=18, <=20, <=21 are never run. Any value greater than 90 is routed down the >=21 condition branch.

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time in Queue &lt;= 90</td>
</tr>
<tr>
<td>Time in Queue &gt;= 90</td>
</tr>
<tr>
<td>Time in Queue &gt;= 9</td>
</tr>
<tr>
<td>Time in Queue &gt;= 12</td>
</tr>
<tr>
<td>Time in Queue &gt;= 15</td>
</tr>
<tr>
<td>Time in Queue &gt;= 18</td>
</tr>
<tr>
<td>Time in Queue &gt; 20</td>
</tr>
<tr>
<td>Time in Queue &gt; 21</td>
</tr>
</tbody>
</table>

**Configured block**

When this block is configured, it looks similar to the following image:

![Check queue status block](image)

**Scenarios**

See these topics for scenarios that use this block:

- **Manage contacts in a queue** (p. 420)
Contact block: Check security status

Description

- The Set security behavior (p. 361) needs to be set in the contact flow before this one. It sends audio to Amazon Connect Voice ID (p. 689) to verify the customer's identity, and returns a status.
- The Check security status block branches based on one of the following statuses returned by Voice ID:
  - Authenticated: The caller's identity has been verified. That is, the authentication score is greater than or equal to the threshold (default threshold of 90 or your custom threshold).
  - Not authenticated: The authentication score is lower than threshold that you configured.
  - Inconclusive: Unable to analyze a caller's speech for authentication. This is usually because Voice ID did not get the required 10 seconds to provide a result for verification.
  - Not enrolled: The caller has not yet been enrolled in voice authentication. When this status is returned, for example, you may want to directly route the call to an agent for enrollment.
  - Opted out: The caller has opted out of voice authentication.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer queue flow
- Customer whisper flow
- Outbound whisper flow
- Agent whisper flow
- Transfer to Agent flow
- Transfer to Queue flow

Properties

This block doesn't have any properties that you set. Rather, it creates branches for you to route contacts based on the result of the authentication threshold and voiceprint evaluation.
Check security status

Branches based on the *Set security behavior* block. [Learn more]

**Glossary**

**Authenticated**
A caller’s identity has been verified.

**Not authenticated**
The authentication score did not meet its set threshold.

**Inconclusive**
Unable to analyze a caller’s voice for authentication.

**Not enrolled**
A caller that has not yet been enrolled in voice authentication.

**Opted out**
A caller has opted out of voice authentication.

**Configured block**

When this block is configured, it looks similar to the following image:

![Configured block image](image)

**More information**

See the following topic for more information about this block:

- Use real-time caller authentication with Voice ID (p. 689)
Contact block: Check staffing

Description

- Checks the current working queue, or queue you specify in the block, for whether agents are available (p. 711), staffed (p. 716), or online (p. 715).
- Before transferring a call to agent and putting that call in a queue, use the Check hours of operation and Check staffing blocks. They verify that the call is within working hours and that agents are staffed to service.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer queue flow
- Transfer to Agent flow
- Transfer to Queue flow
In the **Status to check** dropdown box, choose one of the following options:

- **Available (p. 711)** = Check whether the agent has **Available** slots to be routed a contact.
- **Staffed (p. 716)** = Check whether agents have **Available** slots, or are **On call**, or are in **After Contact Work**.
- **Online (p. 715)** = Check whether agents are **Available**, in the **Staffed** state, or in a custom state.

**Configuration tips**

- You must set a queue before using a **Check staffing** block in your contact flow. You can use a **Set working queue (p. 371)** block to set the queue.
- If a queue is not set, the contact is routed down the **Error** branch.
- When a contact is transferred from one flow to another, the queue that is set in a contact flow is passed from that flow to the next flow.

**Configured block**

When this block is configured, it looks similar to the following image:
Scenarios

See these topics for scenarios that use this block:

- Transfer contacts to a specific agent (p. 421)

Contact block: Create task

Description

Creates a new task, sets the tasks attributes, and initiates a contact flow to start the task. To learn more about Amazon Connect Tasks, see Tasks (p. 15).

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- All flows
Configured block

When this block is configured, it looks similar to the following image:

![Create task](image)

Sample flows

See these sample flows for scenarios that use this block:

- Sample inbound flow (first contact experience) (p. 279)

Contact block: Disconnect / hang up

Description

- Disconnects the contact.

Supported channels

The following table lists how this block routes a contact that is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer queue flow
- Transfer to Agent flow
- Transfer to Queue flow
Contact block: Distribute by percentage

Description

• This block is useful for doing A/B testing. It routes customers randomly based on a percentage.
• Like flipping a coin, contacts are distributed randomly, which doesn't guarantee exact percentage splits.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

• Inbound contact flow
• Customer queue flow
• Outbound Whisper flow
• Transfer to Agent flow
• Transfer to Queue flow
Properties

Distribute by percentage

Routes customers randomly based on a percentage.

Like flipping a coin, contacts are distributed randomly, which doesn't guarantee exact percentage splits.

Percentages to branch
50% remaining (default branch)

Add another percentage

How it works

This block creates static allocation rules based on how you configure it. Internal logic generates a random number between 1-100. This number identifies which branch to take. It doesn't use current or historical volume as part of it's logic.

For example, say a block is configure like this:

- 20% = A
- 40% = B
- 40% remaining = Default

When contact a is being routed through a flow, Amazon Connect generates the random number.

- If number is between 0-20, the contact is routed down the A branch.
- Between 21-60 it's routed down the B branch.
- Greater than 60 it's routed down the Default branch.

Configured block

When this block is configured, it looks similar to the following image:
Sample flows

See these sample flows for scenarios that use this block:

- Sample AB test (p. 280)

Contact block: End flow / Resume

Description

- Ends the current flow without disconnecting the contact.
- This block is often used for the Success branch of the Transfer to queue block. The flow doesn't end until the call is picked up by an agent.
- You also might use this block when a Loop prompts block is interrupted. You can return the customer to the Loop prompts block.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Customer queue flow
- Customer whisper flow
- Outbound Whisper flow
- Agent whisper flow
Properties

End flow / Resume

Ends the current flow without disconnecting the caller.

For example, this can be used to return to Loop prompts when it has been interrupted.

When End flow / return from interruption is invoked, the customer will remain connected to the system.

Configured block

When this block is configured, it looks similar to the following image:

Contact block: Get customer input

Description

- It plays a prompt to get a response from the customer. For example, "For Sales, press one. For Support, press two."
- When customers enter DTMF input (touch-tone keypad or telephone input), the prompt is interruptible.
- When an Amazon Lex bot plays a voice prompt, customers can interrupt it with their voice. To set this up, use the barge-in-enabled session attribute.
- It then branches based on the customer's input.
- This block works for chat only when Amazon Lex is used.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.
### Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer queue flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties

Get customer input

Delivers an audio or chat message for a customer response.

The contact flow branches based on the customer input: DTMF, chat, or Amazon Lex. Learn more.

- Select from the prompt library (audio)
  - Select a prompt
    - Audio prompt
      - Search for prompt
  - Select dynamically
- Text-to-speech or chat text

DTMF

Plays an audio prompt and branches based on DTMF or Amazon Lex intents. The audio prompt is interruptible when using DTMF.

Set timeout (Minimum one second)

5 seconds

Add another condition

You can configure this block to accept DTMF input, a chat response, or an Amazon Lex intent.

DTMF tab properties

- **Audio prompt**: Select from a list of default audio prompts, or upload your own audio prompt.
• **Set timeout**: Specify how long to wait while the user decides how they want to respond to the prompt. The maximum timeout you can set is 179 seconds.

Amazon Lex tab properties

Amazon Lex

**Note**
Your language attribute in Amazon Connect must match the language model used to build your Amazon Lex V2 bot. Set the language attribute using the Set voice (p. 364) block or the Set contact attributes (p. 350) block.

• **Lex bot properties**: After you create your Lex bot, enter the name and alias of the bot here. Only built bots appear in the drop-down list.

<table>
<thead>
<tr>
<th>DTMF</th>
<th>Amazon Lex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plays an audio prompt and branches based on DTMF or Amazon Lex intents. The audio prompt is interruptible when using DTMF.</td>
<td></td>
</tr>
</tbody>
</table>

**Lex bot**

- Select a Lex bot
  - Name
    - HelpDesk (US West: Oregon)
- Alias
- PROD

- Enter an ARN

**Important**
In a production environment, always use a different alias than TestBotAlias for Amazon Lex and $LATEST for Amazon Lex classic. TestBotAlias and $LATEST support a limited number of concurrent calls to an Amazon Lex bot. For more information, see Runtime Service Quotas or Runtime Service Quotas (Amazon Lex Classic).

• **Session attributes**: Specify attributes that apply to the current contact's session only.
Amazon Lex (Classic)

- **Lex bot properties**: After you create your Lex bot, enter the name and alias of the bot here. Only published bots appear in the drop-down list.
Important
In a production environment, always use a different alias than TestBotAlias for Amazon Lex and $LATEST for Amazon Lex classic. TestBotAlias and $LATEST support a limited number of concurrent calls to an Amazon Lex bot. For more information, see Runtime Service Quotas or Runtime Service Quotas (Amazon Lex Classic).

- **Session attributes**: Specify attributes that apply to the current contact's session only.

### Configurable time-outs for voice input

To configure time-out values for voice contacts, use the following session attributes in the Get customer input block that calls your Lex bot. These attributes allow you to specify how long to wait for the customer to finish speaking before Amazon Lex collects speech input from callers, such as answering a yes/no question, or providing a date or credit card number.

**Amazon Lex**

- **Max Speech Duration**

  x-amz-lex:audio:max-length-ms:[intentName]:[slotToElicit]

  How long the customer speaks before the input is truncated and returned to Amazon Connect. You can increase the time when a lot of input is expected or you want to give customers more time to provide information.

  Default = 13000 milliseconds (13 seconds). The maximum allowed value is 15000 milliseconds.

  **Important**
  
  If you set Max Speech Duration to more than 15000 milliseconds, the contact is routed down the Error branch.

- **Start Silence Threshold**

  x-amz-lex:audio:start-timeout-ms:[intentName]:[slotToElicit]
How long to wait before assuming that the customer isn't going to speak. You can increase the allotted time in situations where you'd like to allow the customer more time to find or recall information before speaking. For example, you might want to give customers more time to get out their credit card so they can enter the number.

Default = 4000 milliseconds (4 seconds).

- **End Silence Threshold**

  x-amz-lex:audio:end-timeout-ms:[intentName]:[slotToElicit]

  How long to wait after the customer stops speaking before assuming the utterance has concluded. You can increase the allotted time in situations where periods of silence are expected while providing input.

  Default = 600 milliseconds (0.6 seconds)

Amazon Lex (Classic)

- **Max Speech Duration**

  x-amz-lex:max-speech-duration-ms:[intentName]:[slotToElicit]

  How long the customer speaks before the input is truncated and returned to Amazon Connect. You can increase the time when a lot of input is expected or you want to give customers more time to provide information.

  Default = 13000 milliseconds (13 seconds). The maximum allowed value is 15000 milliseconds.

  **Important**
  
  If you set **Max Speech Duration** to more than 15000 milliseconds, the contact is routed down the **Error** branch.

- **Start Silence Threshold**

  x-amz-lex:start-silence-threshold-ms:[intentName]:[slotToElicit]

  How long to wait before assuming that the customer isn't going to speak. You can increase the allotted time in situations where you'd like to allow the customer more time to find or recall information before speaking. For example, you might want to give customers more time to get out their credit card so they can enter the number.

  Default = 4000 milliseconds (4 seconds).

- **End Silence Threshold**

  x-amz-lex:end-silence-threshold-ms:[intentName]:[slotToElicit]

  How long to wait after the customer stops speaking before assuming the utterance has concluded. You can increase the allotted time in situations where periods of silence are expected while providing input.

  Default = 600 milliseconds (0.6 seconds)

**Barge-in configuration and usage for Amazon Lex**

You can allow customers to interrupt the Amazon Lex bot mid-sentence using their voice, without waiting for it to finishing speaking. Customers familiar with choosing from a menu of options, for example, can now do so without having to listen to the entire prompt.
Amazon Lex

- **Barge-in**

  Barge-in is enabled globally by default. You can disable it in the Amazon Lex console. For more information, see [*Enabling your bot to be interrupted by your user*](#).

Amazon Lex (Classic)

- **Barge-in**

  x-amz-lex:barge-in-enabled:[intentName]:[slotToElicit]

  Barge-in is disabled globally by default. You must set the session attribute in the **Get customer input** block that calls your Lex bot to enable it at the global, bot, or slot levels. This attribute only controls Amazon Lex barge-in; it doesn't control DTMF barge-in. For more information, see [*How to use Lex session attributes*](#).

  ![Session attributes](image.png)

**Configurable fields for DTMF input**

Use the following session attributes to specify how your Lex bot responds to DTMF input.

- **End character**

  x-amz-lex:dtmf:end-character:[IntentName][SlotName]

  The DTMF end character that ends the utterance.

  Default = #

- **Deletion character**

  x-amz-lex:dtmf:deletion-character:[IntentName][SlotName]

  The DTMF character that clears the accumulated DTMF digits and ends the utterance.

  Default = *

- **End timeout**
Get customer input

\[x\text{-amz-lex:dtmf:end-timeout-ms:[IntentName] : [SlotName]}\]

The idle time (in milliseconds) between DTMF digits to consider the utterance as concluded.

Default = 5000 milliseconds (5 seconds)

• **Max number of allow DTMF digits per utterance**

\[x\text{-amz-lex:dtmf:max-length:[IntentName] : [SlotName]}\]

The maximum number of DTMF digits allowed in a given utterance. This cannot be increased.

Default = 1024 characters

For more information, see How to use Lex session attributes (p. 465).

**Intents**

• Enter the intents you created in Amazon Lex. They are case sensitive!

<table>
<thead>
<tr>
<th>Intents</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗ PasswordReset</td>
</tr>
<tr>
<td>✗ NetworkIssue</td>
</tr>
<tr>
<td>✗ DeviceIssue</td>
</tr>
</tbody>
</table>

**Add another intent**

**Configuration tips**

• When you use text, either for text-to-speech or chat, you can use a maximum of 3,000 billed characters (6,000 total characters).

• Amazon Lex bots support both spoken utterances and keypad input when used in a contact flow.

• For both voice and DTMF, there can be only one set of session attributes per conversation. Following is the order of precedence:
  1. Lambda provided session attributes: Overrides to session attributes during customer Lambda invocation.
  2. Amazon Connect console provided session attributes: Defined in the **Get customer input** block.
  3. Service defaults: These are used only if no attributes are defined.

• You can prompt contacts to end their input with a pound key # and to cancel it using the star key *. When you use a Lex bot, if you don't prompt customers to end their input with #, they will end up waiting five seconds for Lex to stop waiting for additional key presses. It's not possible to configure Lex to wait a shorter length of time.
• To control time-out functionality, you can use Lex session attributes in this block, or in set them in your Lex Lambda function. If you choose to set the attributes in a Lex Lambda function, the default values are used until the Lex bot is invoked. For more information, see Using Lambda Functions in the Amazon Lex Developer Guide.

• When you specify one of the session attributes described in this article, you can use wildcards. They let you set multiple slots for an intent or bots.

Following are some examples of how you can use wildcards:

• To set all slots for a specific intent, such as PasswordReset, to 2000 milliseconds:

  Name = x-amz-lex:max-speech-duration-ms:PasswordReset:*
  Value = 2000

• To set all slots for all bots to 4000 milliseconds:

  Name = x-amz-lex:max-speech-duration-ms:*:*:*
  Value = 4000

Wildcards apply across bots but not across blocks in a contact flow.

For example, you have a Get_Account_Number bot. In the contact flow, you have two Get customer input blocks. The first block sets the session attribute with a wildcard. The second one doesn’t set the attribute. In this scenario, the change in behavior for the bot applies only to the first Get customer input block, where the session attribute is set.

• Because you can specify that session attributes apply to the intent and slot level, you can specify that the attribute is set only when you’re collecting a certain type of input. For example, you can specify a longer Start Silence Threshold when you’re collecting an account number than when you’re collecting a date.

• If DTMF input is provided to a Lex bot using Amazon Connect, the customer input is made available as a Lex request attribute. The attribute name is x-amz-lex:dtmf-transcript and the value can be a maximum of 1024 characters.

Following are different DTMF input scenarios:

<table>
<thead>
<tr>
<th>Customer input</th>
<th>DTMF transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>[DEL]</td>
<td>[DEL]</td>
</tr>
<tr>
<td>[END]</td>
<td>[END]</td>
</tr>
<tr>
<td>123[DEL]</td>
<td>[DEL]</td>
</tr>
<tr>
<td>123[END]</td>
<td>123</td>
</tr>
</tbody>
</table>

Where:

• [DEL] = Deletion character (Default is *)
• [END] = End character (Default is #)

**Configured block**

When this block is configured, it looks similar to the following image:
1. **Timeout**: What to do when the time in the *Set timeout* property has elapsed. This branch appears only if you're using DTMF properties since that's where the *Set timeout* property is available. It doesn't appear if you're using Amazon Lex properties.

2. **Default**: What to do if a customer enters a value other than 1 or 2.

**Sample flows**

See these sample flows for scenarios that use this block:

- Sample inbound flow (first contact experience) (p. 279)
- Sample interruptible queue flow with callback (p. 285)
- Sample queue configurations (p. 281)
- Sample recording behavior (p. 286)

**Scenarios**

See these topics for scenarios that use this block:

- Add an Amazon Lex bot (p. 508)
- How to use the same bot for voice and chat (p. 466)
- Add text-to-speech to prompts (p. 402)

**Contact block: Get queue metrics**

**Description**

- Retrieves the following real-time metrics from a queue so you can make routing decisions. If there is no current activity in your contact center, nothing is returned for these metrics.
  - Queue name (p. 715)
• Queue ARN.
• Contacts in queue (p. 714)
• Oldest contact in queue (p. 715)
• Agents online (p. 715)
• Agents available (p. 711)
• Agents staffed (p. 716)
• Agents after contact work (p. 709)
• Agents busy (p. 715)
• Agents missed (p. 710) (Agent non-response)
• Agents non-productive (p. 714)

You can choose to return metrics by channel, for example, voice or chat. You can also filter by queue or agent. These options enable you to know how many chat and voice contacts are in a queue and if you have agents available to handle those contacts.

You can route contacts based on queue status, such as number of contacts in queue or agents available. Queue metrics are aggregated across all channels and are returned as attributes. The current queue is used by default.

After a Get queue metrics block, use a Check contact attributes (p. 299) to check metric values and define routing logic based on them, such as number of contacts in a queue, number of available agents, and oldest contact in a queue.

**Supported channels**

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Contact flow types**

You can use this block in the following contact flow types (p. 394):

• All flows
## Properties

Optional parameters:

- **Set channel**
  - Filter by
    - Voice
    - Chat
  - Use attribute

- **Set queue**

You can retrieve metrics by channel, and/or by queue or agent.

- If you don't specify a channel, it returns metrics for all channels.
- If you don't specify a queue, it returns metrics for the current queue.
- Dynamic attributes can only return metrics for one channel.

For example, if you choose the following settings, **Get queue metrics** would return metrics for only the BasicQueue, filtered to include only chat contacts.
Configuration tips

Specifying a channel in the Set contact attributes block

Dynamic attributes can only return metrics for one channel.

Before you use dynamic attributes in the Get queue metrics block, you need to set the attributes in the Set contact attributes (p. 350) block, and specify which channel.

When you set a channel dynamically using text, as shown in the following image, for the attribute value enter Voice or Chat. This value is not case-sensitive.
Using the Check contact attributes block after the Get queue metrics block

After a Get queue metrics block, add a Check contact attributes (p. 299) block to branch based on the returned metrics. Use the following steps:

1. After Get queue metrics, add a Check contact attributes block.
2. In the Check contact attributes block, set Attribute to check to Queue metrics.
3. In the Attributes dropdown box, you’ll see that the following queue metrics are returned by the Get queue metrics block. Choose the metric that you want to use for the routing decision.
Configured block

When this block is configured, it looks similar to the following image:

Scenarios

See these topics for scenarios that use this block:
• How to reference contact attributes (p. 458)

**Contact block: Hold customer or agent**

**Description**

• Places a customer or agent on or off hold. This is useful when, for example, you want to put the agent on hold while the customer enters their credit card information.

• If this block is triggered during a chat conversation, the contact is routed down the **Error** branch.

**Supported channels**

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

**Contact flow types**

You can use this block in the following contact flow types (p. 394):

• Inbound contact flow

• Outbound Whisper flow

• Transfer to Agent flow

• Transfer to Queue flow
Properties

Hold customer or agent

Places a customer or agent on or off hold.

Useful scenarios include putting the agent on hold to enable the customer to interact with the contact flow in private.

Status

- Agent on hold = customer is on the call
- Conference all = agent and customer are on the call
- Customer on hold = agent is on the call

Configured block

When this block is configured, it looks similar to the following image:

Samples flows

Sample secure input with agent (p. 287)
Contact block: Invoke AWS Lambda function

Description

- Calls AWS Lambda, and optionally returns key-value pairs.
- The returned key-value pairs can be used to set contact attributes.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer Queue flow
- Customer Hold flow
- Customer Whisper flow
- Agent Hold flow
- Agent Whisper flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties

Invoke AWS Lambda function

Makes a call to AWS Lambda, and optionally returns key / value pairs.

The returned key value pairs can be used to set contact attributes.

Function ARN

- Select a function
  am:aws:lambda:us-________:function:state

- Use attributes

Function input parameters

Add a parameter

Timeout (max 8 seconds)

4

Note the following properties:

- **Timeout**: Enter how long to wait for Lambda to timeout.

  If your Lambda invocation gets throttled, the request is retried. It is also retried if a general service failure (500 error) happens.

  When a synchronous invocation returns an error, Amazon Connect retries up to three times, for a maximum of 8 seconds. At that point, the contact is routed down the **Error** branch.

Configuration tips

- To use an AWS Lambda function in a contact flow, first add the function to your instance. For more information, see Add a Lambda function to your Amazon Connect instance (p. 433),
After you add the function to your instance, you can select the function from the **Select a function** drop-down list in the block to use it in the contact flow.

**Configured block**

When this block is configured, it looks similar to the following image:

![Sample Lambda integration](image)

**Sample flows**

[Sample Lambda integration](#) (p. 286)

**Scenarios**

See these topics for scenarios that use this block:

- [Invoke AWS Lambda functions](#) (p. 432)

**Contact block: Loop**

**Description**

- Counts the number of times customers are looped through the **Looping** branch.
- After the loops are completed, the **Complete** branch is followed.
- This block is often used with a **Get customer input** block. For example, if the customer doesn't succeed in entering their account number, you can loop to give them another opportunity to enter it.

**Supported channels**

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Contact flow types

You can use this block in the following contact flow types (p. 394):

- All flows

Properties

- Number of loops
  - 2
  - 0-100
- Use attribute

Configuration tips

- If you enter 0 for the loop count, the Complete branch is followed the first time this block executes.

Configured block

When this block is configured, it looks similar to the following image:
Contact block: Loop prompts

Description

• Loops a sequence of prompts while a customer or agent is on hold or in queue.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

• Customer Queue flow
• Customer Hold flow
• Agent Hold flow
Properties

Loop prompts

Loops a sequence of prompts while a customer or agent is on hold or in queue.

When Loop prompts is used in a queue flow, audio playback can be interrupted with a flow at preset times.

Prompts

<table>
<thead>
<tr>
<th>Audio recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>CustomerHold.wav</td>
</tr>
</tbody>
</table>

Add another prompt to the loop

Interrupt

☐ Interrupt every 1 Minutes

How the Interrupt option works

Let’s say you have multiple prompts and you set Interrupt to 60 seconds. Following is what will happen:

- The block plays prompts in the order that they are listed for the entirety of the prompt length.
- If the combined play time for the prompts is 75 seconds, after 60 seconds the prompt is interrupted and reset to the 0 second point again.
- It’s possible your customers would never hear potentially important information that is supposed to play after 60 seconds.

This scenario is especially possible when using the default audio prompts that Amazon Connect provides since these audio prompts can be as long as 4 minutes.

Configuration tips

- When Loop prompts is used in a Queue flow, audio playback can be interrupted with a flow at preset times.

341
- Always use an interruption period that's greater than 20 seconds. This is the amount of time an available agent has to accept the contact. If the interruption period is less than 20 seconds, you might get contacts going down the Error branch. This is because Amazon Connect doesn't support dequeuing the customer when they are being routed to an active agent and are in the 20 second window to join.

- The internal counter for the loop is persisted for the call, not the contact flow. If you reuse the contact flow during a call, the loop counter isn't reset.

- If this block is triggered during a chat conversation, the contact is routed down the Error branch.

- Some existing contact flows have a version of the Loop prompts block that doesn't have an Error branch. In this case, a chat contact stops execution of the customer queue flow. The chat is routed when the next agent becomes available.

**Configured block**

When this block is configured, it looks similar to the following image:

![Configured block image](image)

**Sample flows**

See these sample flows for scenarios that use this block:

- Sample interruptible queue flow with callback (p. 285)

**Scenarios**

See these topics for scenarios that use this block:

- Manage contacts in a queue (p. 420)

**Contact block: Play prompt**

**Description**

- This block can play an interruptible audio prompt, play a text-to-speech message, or send a chat response.

- Amazon Connect includes a set of pre-recorded prompts for you to use. However, you can record and upload your audio prompts. For instructions, see Create prompts (p. 401).
Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer Queue flow
- Customer Whisper flow
- Agent Whisper flow
- Transfer to Agent flow
- Transfer to Queue flow

Properties

The properties give you different ways to choose the prompt to be played:

- **Select from the prompt library (audio):** Choose from one of the pre-recorded prompts included with Amazon Connect, or record and upload (p. 401) your own prompt.
• Select dynamically:

You can select which prompt to play by using an attribute.

1. Add Set contact attributes (p. 350) blocks to your flow. Configure each one to play the appropriate audio prompt. For example, the first one might play the .wav file for when your contact center is open. The second one might play the .wav file for when it's closed.

    The following image shows how you might configure a Set contact attributes (p. 350) block. In this example, the user-defined attribute is named **CompanyWelcomeMessage**. You can name your attribute anything you want.
2. In the Play prompt (p. 342) block, choose **User Defined**, and then enter the name of the attribute that you created in step 1.
3. Connect the Set contact attributes (p. 350) blocks to the Play prompt block. The following example shows how it might look if you added one of each block to test how this works.

In a real life scenario, you would have multiple Set contact attributes (p. 350). Each instance of CompanyWelcomeMessage would be set to a different ARN, depending on the scenario. For example, you might start with a Check hours of operation (p. 302) block. If your call center is closed, the flow branches to one Set contact attributes block. If it's open, the flow branches to another.

- **Text-to-speech or chat text**: You have two options:
  - **Enter text**: To play text, Amazon Connect sends it to Amazon Polly, a service that converts text into lifelike speech using Speech Synthesis Markup Language (SSML). Amazon Polly returns the speech to Amazon Connect to play.
• **Enter dynamically**: Upload .wav files that should be played, based on the value of the attribute.

• **Interpret as**: The default setting in a contact flow block for interpreting text-to-speech is Text. To use SSML for text-to-speech in your contact flow blocks, set the **Interpret as** field to SSML as shown in the following image.

When you add a prompt to a contact flow, you can use SSML tags to provide a more personalized experience for your customers. SSML tags are a way to control how Amazon Polly generates speech from the text you provide.

To learn which SSML tags Amazon Connect supports, see [SSML tags supported by Amazon Connect](p. 408).

**Configuration tips**

When you use text, either for text-to-speech or chat, you can use a maximum of 3,000 billed characters (6,000 total characters). You can also specify text in a flow using a contact attribute.

**Configured block**

When this block is configured, it looks similar to the following image:
Sample flows

All of the sample flows use the Play prompt block. Take a look at the Sample inbound flow (first contact experience) (p. 279) to see a Play prompt for chat and one for audio.

Contact block: Set callback number

Description

• Specify the attribute to set the callback number.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
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<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

• Inbound contact flow
• Customer Queue flow
• Transfer to Agent flow
• Transfer to Queue flow
Properties

Set callback number

Specifies the number to be used to call the customer back in the Contact Control Panel (CCP), or when Transfer to queue is invoked with the callback option.

Use attribute

Type

System

Attribute

Stored customer input

Configuration tips

- The Store customer input (p. 376) block often comes before this block. It stores the customer's callback number.

Configured block

When this block is configured, it looks similar to the following image:

1. The customer entered phone number that is not valid.
2. Amazon Connect is unable to dial that number. For example, if your instance is not allowed to make calls to +447 prefix phone numbers, and the customer requested callback to a +447 prefix number. Even though number is valid, Amazon Connect cannot call it.

Sample flows

See these sample flows for scenarios that use this block:

- Sample queue configurations (p. 281)
- Sample queued callback (p. 285): this sample only applies to previous instances of Amazon Connect.

Scenarios

See these topics for scenarios that use this block:

- Set up queued callback (p. 425)
- About queued callbacks in metrics (p. 792)

Contact block: Set contact attributes

Description

- Stores key-value pairs as contact attributes.
- Contact attributes are accessible by other areas of Amazon Connect, such as Contact Trace Records (CTRs).

For more information about how to use contact attributes, see Use Amazon Connect contact attributes (p. 445).

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- All flows
Properties

Set contact attributes

Stores key / value pairs as contact attributes.

Contact attributes are accessible by other areas of Amazon Connect, such as the Contact Control Panel (CCP) and Contact Trace Records (CTRs).

Attribute to save

- Use text
  
  Destination key
  
  greetingPlayed

  Value
  
  true

- Use attribute

Add another attribute

Configuration tips

- When using a user-defined destination key, you can name it anything you want but don't include the $ and . (period) characters. They are not allowed because they are both used in defining the attribute paths in JSONPath.

- You can use the Set contact attribute block to set the language attribute required for an Amazon Lex V2 bot. (Your language attribute in Amazon Connect must match the language model used to build your Amazon Lex V2 bot.)
Or, you can use the Set voice (p. 364) block to set the language required for an Amazon Lex V2 bot.

**Configured block**

When this block is configured, it looks similar to the following image:

![Configured block](image)

**Sample flows**

See these sample flows for scenarios that use this block:

- Sample inbound flow (first contact experience) (p. 279)

**Scenarios**

See these topics for scenarios that use this block:

- How to reference contact attributes (p. 458)
Contact block: Set customer queue flow

Description

- Specifies the flow to invoke when a customer is transferred to a queue.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Transfer to Agent flow
- Transfer to Queue flow

Properties

Set customer queue flow

Specifies the flow to invoke when a customer is transferred to queue.

Customer queue flow

Search for contact flow

For information about using attributes, see Use Amazon Connect contact attributes (p. 445).

Configured block

When this block is configured, it looks similar to the following image:
Sample flows

See these sample flows for scenarios that use this block:

- Sample queued callback (p. 285)

Contact block: Set disconnect flow

Description

- Specifies which contact flow to run after a disconnect event during a contact.

  A disconnect event is when:
  - A call, chat, or task is disconnected by an agent.
  - A task is disconnected as a result of a flow action.
  - A task expires. The task is automatically disconnected if it is not completed in 7 days.

  When the disconnect event occurs, the corresponding contact flow runs.

- Here are examples of when you might use this block:
  - Run post-call surveys. For example, the agent asks the customer to remain on the line for a post-call survey. The agent hangs up and a disconnect flow is run. In the disconnect flow, the customer is asked a set of questions using the Get customer input (p. 318) block. Their answers are uploaded using an Invoke AWS Lambda function (p. 336) block to an external customer feedback database. The customer is thanked and disconnected.

For more information about creating post-call surveys, see this blog post by an AWS Solution Architect: Create post call surveys in Amazon Connect.

- In a chat scenario, if a customer stops responding to the chat, use this block to decide whether to run the disconnect flow and call a Wait (p. 391) block, or end the conversation.

- In task scenarios where a task may not be completed in 7 days, use this block to run a disconnect flow to determine whether the task should be requeued, or completed/disconnected (p. 314) by a flow action.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Channel</td>
<td>Supported?</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Contact flow types**

You can use this block in the following contact flow types (p. 394):

- All flows

**Properties**

Set disconnect flow

Specifies the disconnect flow for either agent, customer, or both.

Remaining participants

Customer only

- Select a flow

  Search for contact flow

- Use attribute

**Configured block**

When this block is configured, it looks similar to the following image:
Sample flows
See these sample flows for scenarios that use this block:

- Sample inbound flow (first contact experience) (p. 279)

Scenarios
See these topics for scenarios that use this block:

- Example chat scenario (p. 13)
- Create post call surveys in Amazon Connect

Contact block: Set hold flow

Description

- Links from one contact flow type to another.
- Specifies the flow to invoke when a customer or agent is put on hold.

  If this block is triggered during a chat conversation, the contact is routed down the Error branch.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):
• Inbound contact flow
• Customer Queue flow
• Outbound whisper flow
• Transfer to Agent flow
• Transfer to Queue flow

Properties

Set hold flow

Specifies the flow to invoke when a customer or agent is put on hold. Learn more

Hold flow

- Agent
  - Select a flow
- Use attribute
  - Type
    - User Defined
    - External
    - Lex slots
    - Lex attributes
- Customer

For information about using attributes, see Use Amazon Connect contact attributes (p. 445).

Configured block

When this block is configured, it looks similar to the following image:
Contact block: Set logging behavior

Description

- Enables contact flow logs so you can track events as contacts interact with contact flows.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- All flows
Properties

Set logging behavior

When logging is enabled, data for each block in your contact flow is sent to Amazon CloudWatch Logs. Learn more

Logging behavior

- Enable
- Disable

Scenarios

See these topics for more information about contact flow logs:

- Track events as customers interact with contact flows (p. 439)

Contact block: Set recording and analytics behavior

Description

- Sets options for recording and/or monitoring (listen-in) voice and chat conversations.
- It enables features in Contact Lens for Amazon Connect. For more information, see Analyze conversations using Contact Lens for Amazon Connect (p. 630).

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):
- Inbound contact flow
- Customer Queue flow
- Transfer to Agent flow
- Transfer to Queue flow

Properties

Set recording and analytics behavior

Specify call recording behavior and configure Contact Lens speech analytics.

Call recording

Enables or disables call recording for the agent, customer, or both. Agent and customer call recordings are required to enable Contact Lens.

- On
- Agent and Customer
- Agent only
- Customer only
- Off

When configuring this block to set up recording behavior (p. 423), choose as follows:

- To record voice conversations, choose what you want to record: Agent and Customer, Agent only, or Customer only.
- To record chat conversations, you need to choose Agent and Customer.
- To enable monitoring of voice and/or chat conversations, you need to choose Agent and Customer.

For information about using this block to enable Contact Lens, see Enable Contact Lens for Amazon Connect (p. 631).

Configuration tips

- Let's say you have a flow that links to a flow that links to another flow. Each flow might have its own Set recording behavior block. The last Set recording behavior block overrides the settings of the previous two Set recording behavior blocks.
For example, you might have a contact flow with Set recording behavior to record Agent and Customer. But if the next Set recording behavior block is set to Agent only, that block overrides the behavior of the previous block.

- If an agent puts a customer on hold, the agent is still recorded, but the customer is not.
- If you want to transfer a contact to another agent or queue, and you want to continue using Contact Lens to collect data, you need to add to the flow another Set recording behavior block with Enable analytics turn on. This is because a transfer generates a second contact ID and CTR. Contact Lens needs to run on that CTR as well.

**Configured block**

When this block is configured, it looks similar to the following image:

![Configured block image](image)

**Sample flows**

See these sample flows for scenarios that use this block:

- Sample inbound flow (first contact experience) (p. 279)

**Scenarios**

See these topics for scenarios that use this block:

- Set up recording behavior (p. 423)
- Monitor live conversations (p. 617)
- Review recorded conversations (p. 620)
- Analyze conversations using Contact Lens for Amazon Connect (p. 630)

**Contact block: Set security behavior**

**Description**

- Sets options for authenticating callers using Amazon Connect Voice ID. For more information about this feature, see Use real-time caller authentication with Voice ID (p. 689).
• Sends audio to Amazon Connect Voice ID to verify the caller's identity, as soon as the call is connected to a contact flow.
• Use a Check security status (p. 308) block after this one to branch based on the results of the verification.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):
• Inbound contact flow
• Customer queue flow
• Customer whisper flow
• Outbound whisper flow
• Agent whisper flow
• Transfer to Agent flow
• Transfer to Queue flow
Properties

Set security behavior

Enables or disabled voice-based security and sets a threshold for authentication.

This block is best placed at the beginning of a flow to start capturing a caller's voice. It can be used again in the same flow to toggle voice authentication or modify the threshold for agents who turn it on. Learn more

Voice authentication

Sigma analyzes a caller's voiceprint against historical ones to verify their identity, and returns a score of 0-100.

- On
- Off

Authentication threshold

Set a minimum score between 0-100 to verify a caller's identity. The threshold set remains active for agents who turn voice authentication on. The Check security status block uses this score along with caller enrollment status to make a decision.

- Set manually
  - Threshold
    - 90
- Use attribute

- **Voice authentication**: Set to **On** to begin streaming the customer channel of the audio to Voice ID.
- **Authentication threshold**: When Voice ID compares the voiceprint of the caller to the enrolled voiceprint of the claimed identity, it generates an authentication score between 0-100. This score indicates the confidence of a match. You can configure a threshold for the score which indicates whether the caller is authenticated. The default threshold of 90 provides high security for most cases.
  - If the authentication score is below the configured threshold, Voice ID treats the call as not authenticated.
  - If the authentication score is above the configured threshold, Voice ID treats the call as authenticated.
For example, if the person is sick and calling from a mobile device in their car, the authentication score is going to be slightly lower than when the person is well and calling from a quiet room. If an imposter is calling, the authentication score is much lower.

Configuration tips

- For the **Authentication threshold**, we recommend that you start with the default of 90 and adjust until you find a good balance for your business.

Every time you increase the value of the **Authentication threshold** beyond the default of 90, there's a tradeoff:

  - The higher the threshold, the greater the false reject rate (FRR), that is, the likelihood that an agent will need to verify the customer's identity. For example, if you set it too high, such as greater than 95, agents will need to verify every customer's identity.
  - The lower the threshold, the greater the false reject rate (FRR), that is, the likelihood that Voice ID will incorrectly accept an access attempt by an unauthorized caller.

- When Voice ID verifies that the voice belongs to the enrolled customer, it returns a status of **Authenticated**. Add a Check security status (p. 308) to branch based on the returned status.

Configured block

When this block is configured, it looks similar to the following image:

More information

See the following topic for more information about this block:

- **Use real-time caller authentication with Voice ID** (p. 689)

Contact block: Set voice

Description

- Sets the text-to-speech (TTS) language and voice to use for the contact flow.
- The default voice is configured to Joanna (Conversational speaking style).
- You can choose **Override speaking style** to make it and other voices Amazon Polly Neural Text-to-Speech (NTTS). Neural voices make automated conversations sound more lifelike by improving the pitch, inflection, intonation, and tempo.

For a list of supported neural voices, see **Neural Voices** in the **Amazon Polly Developer Guide**.
• After this block is run, any TTS invocation resolves to the neural or standard voice selected.
• If this block is triggered during a chat conversation, the contact goes down the Success branch. It has no effect on the chat experience.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Success branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Success branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

• All flows
If you're using an Amazon Lex V2 bot, your language attribute in Amazon Connect must match the language model used to build your Lex bot. This is different than Amazon Lex (Classic).

- If you build an Amazon Lex V2 bot with a different language model—for example, en_AUD, fr_FR, es_ES, and more—under **Voice**, choose a voice that corresponds to that language, and then must choose **Set language attribute**, as shown in the following image.
- If you're not using an en-US voice with an Amazon Lex V2 bot and don't choose **Set language attribute**, the Get customer input (p. 318) block results in an error.
- For bots with multiple languages (for example, en_AU and en_GB) choose **Set language attribute** for one of the languages.
Set Voice

Sets the voice to interact with the customer. Learn more

Language
- English, Australian

Voice
- Olivia

Override speaking style - Neural: None

You can optionally change the speaking style to override the console settings.

- Neural speaking style
  - None

Set language attribute
- Use currently selected language as an attribute.

Configuration tips

- For the Joanna and Matthew neural voices, in American English (en-US), you can also specify a Conversational speaking style or a Newscaster speaking style.

Configured block

When this block is configured, it looks similar to the following image:
Scenarios

See these topics for scenarios that use this block:

- Add text-to-speech to prompts (p. 402)

Contact block: Set whisper flow

Description

A whisper flow is what a customer or agent experiences when they are joined in a voice or chat conversation. For example:

- An agent and customer are joined in a chat. An agent whisper might display text to the agent telling them the name of the customer, for example, which queue the customer was in, or let the agent know they're talking to club member.
- An agent and customer are joined in a call. A customer whisper might tell the customer that the call is being recorded for training purposes, for example, or thank them for being a club member.
- An agent and customer are joined in a chat. Using a contact attribute, an agent whisper flow records which agent is being connected to the conversation. This attribute is then used in a disconnect flow to route the contact back to the same agent if the customer has a follow-up question after the agent disconnects.

A whisper flow has the following characteristics:

- It's a one-sided interaction: either the customer hears or sees it, or the agent does.
- It can be used to create personalized and automated interactions.
- It runs when a customer and agent are being connected.

For voice conversations, the Set whisper flow block overrides the default agent whisper flow (p. 276) or customer whisper flow (p. 276) by linking to a whisper flow you create.

Important

For chat conversations, you need to include a Set whisper flow block for default agent or customer whispers to play. For instructions, see Set the default whisper flow for a chat conversation (p. 276).

How the Set whisper flow block works

- For inbound conversations (voice or chat), the Set whisper flow block specifies the whisper to be played to customer or the agent when they are joined.
• For outbound voice calls, it specifies the whisper to be played to customer.
• A whisper is one direction, which means only the agent or customer hears or sees it, depending on the type of whisper you selected. For example, if a customer whisper says “This call is being recorded,” the agent does not hear it.
• A whisper flow is triggered after the agent accepts the contact (either auto-accept or manual accept). The agent whisper flow runs first, before the customer is taken out of queue. After this is completed, the customer is taken out of queue and the customer whisper flow runs. Both flows run to completion before the agent and customer can talk or chat with each other.
• If an agent disconnects while the agent whisper is running, the customer remains in queue in order to be re-routed to another agent.
• If a customer disconnects while the customer whisper is running, the contact ends.
• If an agent whisper flow or customer whisper flow includes a block that chat does not support, such as Start (p. 373)/Stop (p. 375) media streaming or Set voice (p. 364), chat skips these blocks and triggers an error branch. However, it doesn’t prevent the contact flow from progressing.
• Whisper flows don’t appear in transcripts.
• Whispers can be a maximum of 2 minutes long. After that point, the contact or agent is disconnected.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):
• Inbound contact flow
• Customer Queue flow
• Transfer to Agent flow
• Transfer to Queue flow
Properties

Set whisper flow

Specifies the whisper played to a customer or agent for inbound and outbound calls. Learn more

Whisper flow

- To Agent
- To Customer
- Select a flow

Use attribute

If you choose to Select a flow, you can only select from flows that are type Agent Whisper or Customer Whisper.

For information about using attributes, see Use Amazon Connect contact attributes (p. 445).

Configuration tips

- In a single block, you can set either a customer whisper or an agent whisper, but not both. Instead, use multiple Set whisper flow blocks in your contact flow.

- If you use a Play prompt (p. 342) block instead of a Set whisper block in an agent whisper flow or customer whisper flow, in a voice conversation the prompt is audible to both the agent and the customer. In a chat, however, only the agent or customer sees the Play prompt text.

- Make sure your whispers are able to complete within two minutes. Otherwise, calls will be disconnected before being established.

- If agents appear to be stuck in the "Connecting..." state before being forcefully disconnected from calls, make sure that your configured whisper flows meet the two minute maximum.

Configured block

When this block is configured, it looks similar to the following image:
Contact block: Set working queue

Description

- This block specifies the queue to be used when Transfer to queue is invoked.
- A queue must be specified before invoking Transfer to queue except when used in a customer queue flow. It’s also the default queue for checking attributes, such as staffing, queue status, and hours of operation.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
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</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties

Set working queue

Specifies the queue to be used when Transfer to queue is invoked.

A queue must be specified prior to invoking Transfer to queue. It’s also the default queue for checking attributes, such as: staffing, queue status, and hours of operation.

Outputs:

- By queue
  - Select a queue
    - BasicQueue
  - Use attribute
  - By agent

Note the following properties:

- **By queue > Use attribute.** To set the queue dynamically, you must specify the Amazon Resource Name (ARN) for the queue rather than the queue name. To find the ARN for a queue, open the queue in the queue editor. The ARN is included as the last part of the URL displayed in the browser address bar after /queue. For example, .../queue/aaaaaaaa-bbbb-cccc-dddd-111111111111.

**Configured block**

When this block is configured, it looks similar to the following image:
Sample flows

See these sample flows for scenarios that use this block:

- Sample queue customer (p. 284)
- Sample queue configurations (p. 281)

Scenarios

See these topics for scenarios that use this block:

- Set up agent-to-agent transfers (p. 416)
- Transfer contacts to a specific agent (p. 421)

Contact block: Start media streaming

Description

Captures what the customer hears and says during a contact. You can then perform analysis on the audio streams to:

- Determine customer sentiment.
- Use the audio for training purposes.
- Identify and flag abusive callers.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>
Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer Queue flow
- Customer Whisper flow
- Outbound Whisper flow
- Agent Whisper flow
- Transfer to Agent flow
- Transfer to Queue flow

Properties

Start media streaming

Starts streaming media to Kinesis. Learn more
Only audio is supported

Select stream to start

- From the customer
- To the customer

Configuration tips

- You must enable live media streaming in your instance to successfully capture customer audio. For instructions, see Capture customer audio: live media streaming (p. 597).
- When selecting the stream to start, only choose one option. Selecting both options results in an inaudible media stream.
- Customer audio is captured until a Stop media streaming block is invoked, even if the contact is passed to another contact flow.
- You must use a Stop media streaming block to stop media streaming.
- If this block is triggered during a chat conversation, the contact is routed down the Error branch.

Configured block

When this block is configured, it looks similar to the following image:
Sample flows

Example contact flow for testing live media streaming (p. 604)

Contact block: Stop media streaming

Description

- Stops capturing customer audio after it is started with a Start media streaming block.
- You must use a Stop media streaming block to stop media streaming.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer Queue flow
- Customer Whisper flow
- Outbound Whisper flow
- Agent Whisper flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties
This block doesn't have any properties.

Configuration tips

- You must enable live media streaming in your instance to successfully capture customer audio. For instructions, see Capture customer audio: live media streaming (p. 597).
- Customer audio is captured until a Stop media streaming block is invoked, even if the contact is passed to another contact flow.
- If this block is triggered during a chat conversation, the contact is routed down the Error branch.

Configured block
When this block is configured, it looks similar to the following image:

Sample flows
Example contact flow for testing live media streaming (p. 604)

Contact block: Store customer input

Description
This block is similar to Get customer input, but this one stores the input as a contact attribute (in the Stored customer input (p. 447) system attribute) and allows you to encrypt it. This way, you can encrypt sensitive input such as credit card numbers. This block:

- Plays an interruptible prompt to get a response from the customer. For example, "Please enter your credit card number" or "Please enter the phone number we should use to call you back."
- Plays an interruptible audio prompt or play text-to-speech for a customer to respond to.
- Stores numerical input as in the Stored customer input (p. 447) system attribute.
- Allows you to specify a custom terminating keypress.
- If during a call the customer doesn't enter any input, the contact is routed down the Success branch branch with a value of Timeout. Add a Check contact attributes block to check for timeouts.

Supported channels
The following table lists how this block routes a contact who is using the specified channel.
### Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer Queue flow
- Transfer to Agent flow
- Transfer to Queue flow
Properties

Store customer input

Stores numerical input to contact attribute.

Plays an interruptible audio prompt and stores digits via DTMF as a contact attribute. Learn more

Prompt

- Select from the prompt library (audio)
  - Select a prompt
    - Audio prompt
      - Search for prompt
  - Select dynamically
- Text-to-speech or chat text

Customer input

- Custom
  - Maximum Digits: 20
  - Timeout before first entry: 5
  - in seconds
  - Encrypt entry (recommended)
  - Specify terminating keypress Learn more.
  - Disable cancel key Learn more.
- Phone number

Note the following properties:
• **Maximum Digits**: Define the maximum number of digits that a customer can enter.

• **Timeout before first entry**: Specify how long to wait for a customer to start entering their reply by voice. For example, you might enter 20 seconds, to give the customer time to get their credit card.

After the contact starts entering digits, Amazon Connect waits 5 seconds for each digit, by default. You cannot change this default setting.

• **Encrypt entry**: Encrypt the customer's entry, such as their credit card information. For step-by-step instructions to get the keys that you use to input this information, see [Creating a secure IVR solution with Amazon Connect](#).

• **Specify terminating keypress**: Define a custom terminating keypress that is used when your contacts complete their DTMF inputs. The terminating keypress can be up to five digits long, with #, *, and 0-9 characters, instead of just #.

• **Disable cancel key**: By default, when a customer enters * as input, it deletes all of the DTMF input that came before it. However, if you choose **Disable cancel key**, Amazon Connect treats the * as any other key.

If you send the DMTF input to an **Invoke AWS Lambda function** (p. 336) block, the **Disable cancel key** property affects the input, as follows:

- When **Disable cancel key** is selected, all the characters entered—including any *—are sent to the **Invoke Lambda function** block.
- When **Disable cancel key** is not selected, only the * is sent to the **Invoke Lambda function** block.

For example, let's say you chose **Disable cancel key**, and a customer entered 1#2#3*4###, where ## is the terminating keypress. The **Invoke Lambda function** block then receives the entire 1#2#3*4# as input. You could program the Lambda function to ignore the character before the * character. So, the customer input would be interpreted as 1#2#4#.

• **Phone number**: This option is useful for queued callback scenarios.

  - **Local format**: If all of your customers all calling from the same country that your instance is in, choose that country from the dropdown list. Amazon Connect then auto-populates the country code for customers so that they don’t have to enter it.

  - **International format**: If you have customers calling from different countries, choose **International format**. Amazon Connect then requires customers to enter their country code.

### Configuration tips

To use a star (*) as part of the terminating keypress, you must also choose **Disable cancel key**.

### Configured block

When this block is configured, it looks similar to the following image:
Sample flows

See these sample flows for scenarios that use this block:

- Sample secure input with agent (p. 287)
- Sample secure input with no agent (p. 287)
- Sample queue configurations (p. 281)
- Sample queued callback (p. 285)

Scenarios

Creating a secure IVR solution with Amazon Connect

Contact block: Transfer to agent (beta)

Description

- Ends the current contact flow and transfers the customer to an agent.

  **Note**
  
  If the agent is already with someone else, the contact is disconnected. If the agent is in After Contact Work, they are automatically removed from ACW at the time of transfer.

- The **Transfer to Agent** block is a beta feature and works only for voice interactions.

- We recommend using the **Set working queue** (p. 371) block for agent-to-agent transfers instead of using this block. The **Set working queue** block supports omnichannel transfers such as voice and chat. For instructions, see **Set up agent-to-agent transfers** (p. 416).

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
</tbody>
</table>
To transfer chats and tasks to agents, use the Set working queue (p. 371) block. Because Set working queue (p. 371) works for all channels, we recommend using it for voice calls too, instead of using Transfer to agents (beta). For instructions, see Set up agent-to-agent transfers (p. 416).

**Contact flow types**

You can use this block in the following contact flow types (p. 394):

- Transfer to Agent flow
- Transfer to Queue flow

**Properties**

Transfer to agent (beta)

Ends the current contact flow and transfers the customer to an agent.

This should be used with warm transfers. If the target agent is on a call or unavailable, the transfer will fail and the customer will remain with the original agent.

Transfer

**Configured block**

When this block is configured, it looks similar to the following image:
Scenarios

See these topics for scenarios that use this block:

• Set up contact transfers (p. 409)

Contact block: Transfer to flow

Description

• Ends the current contact flow and transfers the customer to a different contact flow.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

• Inbound contact flow
• Transfer to Agent flow
• Transfer to Queue flow
Properties

Transfer to flow

Ends the current flow and transfers the customer to a flow of type contact flow.

Transfer

- Select a flow
  - Sample customer queue...
- Use attribute

Only published flows appear in the dropdown list.

Configured block

When this block is configured, it looks similar to the following image:

1. The contact is routed down the Error branch if the flow you have specified to transfer to isn't a valid flow, or it's not a valid flow type (Inbound, Transfer to Agent, or Transfer to Queue).

Sample flows

See these sample flows for scenarios that use this block:

- Sample AB test (p. 280)

Scenarios

See these topics for scenarios that use this block:
• Set up contact transfers (p. 409)

Contact block: Transfer to phone number

Description

• Transfers the customer to a phone number external to your instance.
• If this block is triggered during a chat conversation, the contact is routed down the Error branch.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
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<tr>
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</tr>
<tr>
<td>Task</td>
<td>No - Error branch</td>
</tr>
</tbody>
</table>

Contact flow types

You can use this block in the following contact flow types (p. 394):

• Inbound contact flow
• Customer Queue flow
• Transfer to Agent flow
• Transfer to Queue flow
Properties

Transfer to phone number

Transfers the customer to a phone number.

Transfer to

○ Phone number

  Country code  Phone number

  🇺🇸 +1

○ Use attribute

Set timeout

○ Timeout (in seconds)

  30

○ Use attribute

Resume contact flow after disconnect

Adds success, call failed and timeout output branches.

○ Yes

○ No

Optional parameters:

□ Send DTMF

□ Caller ID number

□ Caller ID name
Note the following properties:

- **Resume contact flow after disconnect**: This works only if the external party disconnects, and the customer doesn't disconnect. (If the customer disconnects, the whole call disconnects.)
- **Send DTMF**: This property is useful to bypass some of the DTMF of the external party. For example, if you know you'll need to press 1, 1, 362 to reach the external party, you can enter that here.
- **Caller ID number**: You can choose a number from your instance to appear as the caller ID. This is useful in cases where you want to use a number that's different from the one the contact flow is actually using to make the call.
  
  **Important**
  
  If you are using Amazon Connect outside of the United States, we recommend choosing **Caller ID number** and then selecting an Amazon Connect number. Otherwise, local regulations may cause telephony providers to block or redirect non-Amazon Connect phone numbers. This will result in service-related events, such as rejected calls, poor audio quality, delay, latency, and displaying the incorrect caller ID.

  **In Australia**: The caller ID must be an Amazon Connect provided DID (Direct Inward Dialing) phone number. If a toll free number or a number not provided by Amazon Connect is used in the caller ID, local telephony suppliers may reject outbound calls due to local anti-fraud requirements.

- **Caller ID name**: You can set a caller ID name, but there's no guarantee it will appear correctly to the customer. For more information, see [Why your caller ID might not appear correctly to customers](p. 205).

**Configuration tips**

- **Submit a service quota increase request** requesting that your business be allowed to make outbound calls to the country you specified. If your business is not on the allow list for making the call, it will fail. For more information, see [Countries you can call](p. 930).

- If the country you want to select is not listed, you can submit a request to add countries you want to transfer calls to using the Amazon Connect service quotas increase form.

- You can choose to end the contact flow when the call is transferred, or choose to **Resume contact flow after disconnect**, which returns the caller to your instance and resumes the contact flow after the transferred call ends.

**Configured block**

When this block is configured, it looks similar to the following image:
Scenarios

See these topics for scenarios that use this block:

• Set up contact transfers (p. 409)
• Set up outbound caller ID (p. 203)

Contact block: Transfer to queue

Description

• In most types of contact flows, this block ends the current contact flow and places the customer in a queue.
• When used in a Customer Queue flow, however, this block transfers a contact already in a queue to another queue.
• When used in a callback scenario, Amazon Connect calls the agent first. After the agent accepts the call in the CCP, Amazon Connect calls the customer.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
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<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer Queue flow
- Transfer to Agent flow
- Transfer to Queue flow

Properties

This block has two tabs on its properties page.

Tab 1: Transfer to queue

When the **Transfer to queue** block runs, it checks the queue capacity to determine whether the queue is at capacity (full). This check for queue capacity compares the current number of contacts in the queue to the **Maximum contacts in queue** (p. 212) limit, if one is set for the queue.

If no limit is set, the queue is limited to the number of concurrent contacts set in the service quota for the instance.
The following properties are available under the Transfer to callback queue tab:
• **Initial delay**: Specify how much time has to pass between a callback contact being initiated in the contact flow, and the customer is put in queue for the next available agent.

• **Maximum number of retries**: If this were set to 1, then Amazon Connect would try to callback the customer at most two times: the initial callback, and 1 retry.

  Tip
  We strongly recommend that you double-check the number entered in **Maximum number of retries**. If you accidentally enter a high number, such as 20, it's going to result in unnecessary work for the agent and too many calls for the customer.

• **Minimum time between attempts**: If the customer doesn't answer the phone, this is how long to wait until trying again.

• **Set working queue**: You can transfer a callback queue to a different queue. This is useful if you set up a special queue just for callbacks. You can then view that queue to see how many customers are waiting for callbacks.

  Tip
  If you want to specify the **Set working queue** property, you need to add a **Set customer callback number** block before this block.

If you don't set a working queue, Amazon Connect uses the queue that was set previously in the flow.

**Configuration tips**

• When you use this block in a Customer Queue flow, you must add a **Loop prompts** block before this one.

• To use this block in most contact flows, you must add a **Set working queue** block first. The one exception to this rule is when this block is used in a Customer Queue flow.

• When you use text, either for text-to-speech or chat, you can use a maximum of 3,000 billed characters (6,000 total characters).

• Amazon Lex bots support both spoken utterances and keypad input when used in a contact flow.

• You can prompt contacts to end their input with a pound key # and to cancel it using the star key *.

**Configured block**

When this block is configured to **transfer to queue**, it looks similar to the following image. If a contact is routed down the **At capacity** branch, it remains in the current working queue.

When this block is configured to **transfer to callback queue**, it looks similar to the following image. If a contact is routed down the **Success** branch, it's transferred to the specified queue.
Scenarios

See these topics for scenarios that use this block:

- Manage contacts in a queue (p. 420)
- Set up queued callback (p. 425)
- About queued callbacks in metrics (p. 792)

Sample flows

See these sample flows for scenarios that use this block:

- Sample queue configurations (p. 281)
- Sample customer queue priority (p. 280)
- Sample queued callback (p. 285)

Contact block: Wait

Description

This block pauses the contact flow for the specified wait time.

For example, if a contact stops responding to a chat, the block pauses the contact flow for the specified wait time, then branches accordingly, such as to disconnect.

Supported channels

The following table lists how this block routes a contact who is using the specified channel.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Supported?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>No - Error branch</td>
</tr>
<tr>
<td>Chat</td>
<td>Yes</td>
</tr>
<tr>
<td>Task</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Contact flow types

You can use this block in the following contact flow types (p. 394):

- Inbound contact flow
- Customer Queue flow

Properties

It has two properties:

- **Timeout**: Run this branch if the customer hasn't sent a message after a specified amount of time. Maximum is 24 hours.
- **Customer return**: Run this branch when the customer returns and sends a message. With this branch you can route the customer to the previous (same) agent, previous (same) queue, or override and set a new working queue or agent.

Configuration tips

You can add multiple **Wait** blocks to your contact flows. For example:

- If the customer comes back in 5 minutes, connect them to the same agent. This is because that agent has all of the context.
- If the customer doesn't come back after 5 minutes, send a text saying "We missed you."
Create a new contact flow

The starting point for creating all contact flows is the contact flow designer. It's a drag-and-drop work surface that enables you to link together blocks of actions. For example, when a customer first enters your contact center, you can ask for some input and then play a prompt such as "Thank you."

For descriptions of the available action blocks, see Contact block definitions (p. 287).

Before you begin: develop a naming convention

Chances are you're going to create tens or hundreds of contact flows. To help you stay organized, it's important to develop a naming convention. Once you start creating contact flows, we strongly recommend against renaming them.

You can't delete a contact flow. To get obsolete contact flows out of your way, we recommend appending zzTrash_ to their name. This will also make them easy to find should you want to reuse them in the future.
Choose a contact flow type

Amazon Connect includes a set of nine contact flow types. Each type has only those blocks for a specific scenario. For example, the contact flow type for transferring to a queue contains only the appropriate contact blocks for that type of flow.

**Important**

- When you create a contact flow, you need to choose the right type for your scenario. Otherwise, the blocks you need may not be available.
- You can’t import flows of different types. This means if you start with one type and need to switch to another to get the right blocks, you have to start over.

The following contact flow types are available.

<table>
<thead>
<tr>
<th>Type</th>
<th>When to use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inbound contact flow</strong></td>
<td>This is the generic contact flow type that's created when you choose the <strong>Create contact flow</strong> button, and don't select a type using the drop-down arrow. It creates an inbound contact flow. This contact flow works with voice, chat, and tasks.</td>
</tr>
<tr>
<td><strong>Customer queue flow</strong></td>
<td>Use to manage what the customer experiences while in queue, before being joined to an agent. Customer queue flows are interruptible and can include actions such as an audio clip apologizing for a delay and offering an option to receive a callback, leveraging the <strong>Transfer to queue</strong> block. This contact flow works with voice, chat, and tasks.</td>
</tr>
<tr>
<td><strong>Customer hold flow</strong></td>
<td>Use to manage what the customer experiences while the customer is on hold. With this flow, one or more audio prompts can be played to a customer using the <strong>Loop prompts</strong> block while waiting on hold. This contact flow works with voice.</td>
</tr>
<tr>
<td><strong>Customer whisper flow</strong></td>
<td>Use to manage what the customer experiences as part of an inbound call immediately before being joined with an agent. The agent and customer whispers are played to completion, then the two are joined. This contact flow works with voice and chat.</td>
</tr>
<tr>
<td><strong>Outbound whisper flow</strong></td>
<td>Use to manage what the customer experiences as part of an outbound call before being connected with an agent. In this flow, the customer whisper is played to completion, then the two are joined. For example, this flow can be used to enable call recordings for outbound calls with the <strong>Set recording behavior</strong> block.</td>
</tr>
<tr>
<td>Type</td>
<td>When to use</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Agent hold flow</td>
<td>Use to manage what the agent experiences when on hold with a customer. With this flow, one or more audio prompts can be played to an agent using the Loop prompts block while the customer is on hold. This contact flow works with voice.</td>
</tr>
<tr>
<td>Agent whisper flow</td>
<td>Use to manage what the agent experiences as part of an inbound call immediately before being joined with a customer. The agent and customer whispers are played to completion, then the two are joined. This contact flow works with voice, chat, and tasks.</td>
</tr>
<tr>
<td>Transfer to agent flow</td>
<td>Use to manage what the agent experiences when transferring to another agent. This type of flow is associated with transfer to agent quick connects, and often plays messaging, then completes the transfer using the Transfer to agent block. This contact flow works with voice, chat, and tasks.</td>
</tr>
<tr>
<td>Transfer to queue flow</td>
<td>Use to manage what the agent experiences when transferring to another queue. This type of flow is associated with transfer to queue quick connects, and often plays messaging, then completes the transfer using the Transfer to queue block. This contact flow works with voice, chat, and tasks.</td>
</tr>
</tbody>
</table>

Create an inbound contact flow

Use these steps to create an inbound contact flow.

1. In the navigation pane, choose Routing, Contact flows.
2. Choose Create contact flow. This opens the contact flow designer and creates an inbound contact flow (Type = Contact flow).
3. Type a name and a description for your contact flow.
4. Search for a contact block using the Search bar, or expand the relevant group to locate the block. For descriptions of the contact blocks, see Contact block definitions (p. 287).
5. Drag and drop contract blocks onto the canvas. You can add blocks in any order or sequence, as connections between elements aren't required to be strictly linear.

Tip
You can move blocks around the canvas so the layout aligns to your preferences. To select multiple blocks at the same time, press the Ctrl key on your laptop (or the Cmd key on a Mac), choose the blocks you want, and then use your mouse to drag them as a group within...
the contact flow. You can also use the Ctrl/Cmd key to start at one point on the canvas and drag your pointer across the canvas to select all blocks included in the frame.

6. Double-click the title of the block. In the configuration pane, configure settings for that block and then choose Save to close the pane.

7. Back on the canvas, click on the first (the originating) block.

8. Choose the circle for the action to perform, such as Success.

9. Drag the arrow to the connector of the group that performs the next action. For groups that support multiple branches, drag the connector to the appropriate action.

10. Repeat the steps to create a contact flow that meets your requirements.

11. Choose Save to create a draft of the flow. Choose Publish to activate the flow immediately.

**Note**
All connectors must be connected to a block in order to successfully publish your contact flow.

### Generate logs

After your contact flow is published live, you can use contact flow logs to help analyze contact flows and quickly find errors your customers encounter. If needed, you can roll back to a previous version of the contact flow.

For more information about using contact flow logs, see Track events as customers interact with contact flows (p. 439).

### Contact initiation methods and the types of contact flows run

Every contact in your Amazon Connect contact center is initiated by one of the following methods:

- Inbound
- Outbound
- Transfer
- Callback
- API
- Queue_Transfer
- Disconnect

You can create contact flows appropriate for a given initiation method when you know which types of contact flows (p. 394) the initiation method uses.

For each initiation method, this topic explains which types of contact flows are run.

#### Inbound

The customer initiated a voice (phone) contact with your contact center.

- When the contact successfully connects with the phone number of your contact center, an Inbound contact flow (p. 394) is presented to caller.
- During the transition in the Inbound contact flow, if the customer is put in a queue, a Customer queue flow (p. 394) is played to customer.
- After the agent becomes available to handle the caller and accept the contact, a Agent whisper flow (p. 394) is played to the agent.
• After a Agent whisper flow (p. 394) completes, a Customer whisper flow (p. 394) is played to customer.

• After the both whisper flows are played successfully to the agent and the customer respectively, the caller gets connected to agent for interaction.

To summarize, for a simple inbound call, the following contact flow types are played before caller is connected to agent:

1. Inbound contact flow
2. Customer queue flow
3. Agent whisper flow
4. Customer whisper flow

**Outbound**

An agent initiated voice (phone) contact to an external number, by using their CCP to make the call.

• As soon as the destination party picks the call, they are presented with an Outbound whisper flow (p. 394).

• After an Outbound whisper flow successfully completes, the agent and the contact are connected for interaction.

To summarize, an Outbound contact flow type is the only one involved in an outbound call initiated from Amazon Connect.

**Transfer**

The contact was transferred by an agent to another agent or to a queue, using quick connects in the CCP. This results in a new CTR being created.

Before the agent transfers the contact to another agent or queue, all the flows involved in an INBOUND contact are run.

• Agent to Agent transfer using Agent Quick Connect
  • After the agent transfers the inbound contact to another agent:
    • A Agent transfer flow (p. 394) is played to the source agent.
    • After the destination agent accepts the call, a Agent whisper flow (p. 394) is played to destination agent, and then a Customer whisper flow (p. 394) is played to source agent.
    • After all three flows are successfully run, the interaction begins between the source and destination agents.
    • During this whole process, the inbound caller is on hold and a Customer hold flow (p. 394) is played to the inbound caller during hold time.

After the source agent is connected with destination agent, the source agent can do one of the following actions:

• Choose **Join**. This joins all parties on the call: source agent, destination agent, and the customer are joined in a conference call.
• Choose **Hold all**. This puts the destination agent and the customer on hold.
• Put destination agent on hold, so only the source agent can talk to the customer.
• Choose **End call**. The source agent leaves the call but the destination agent and the customer are directly connected and continue talking.
To summarize for an agent to agent transfer call, the following contact flow types are run:

1. **Agent transfer flow**
2. **Agent whisper flow** (played to the destination agent)
3. **Customer whisper flow** (played to the source agent) during whole this process
4. **Customer hold flow** played to the original caller

- Agent to Queue transfer using Queue Quick Connect
  - After the agent transfers the inbound call to another queue:
    - A **Queue transfer flow** (p. 394) is played to source agent.
    - After the agent from the transferred queue accepts the call, an **Agent whisper flow** (p. 394) is played to destination agent, and then a **Customer whisper flow** (p. 394) is played to source agent.
    - After these flows run, the source and destination agent interaction begins.
    - During this whole process, the inbound caller is on hold. A **Customer hold flow** (p. 394) is played to the inbound caller during the hold time.

After the source agent is connected with destination agent, the source agent can do one of the following:

- Choose **Join**. This joins all parties on the call: source agent, destination agent, and the customer are joined in a conference call.
- Choose **Hold all**. This puts destination agent and the customer on hold.
- Put destination agent on hold, so only the source agent can talk to the customer.
- Choose **End call**. The source agent leaves the call but the destination agent and the customer are directly connected and continue talking.

To summarize for agent to queue transfer call, the following contact flows are played:

1. **Agent transfer flow**
2. **Agent whisper flow** (played to the destination agent)
3. **Customer whisper flow** (played to the source agent) during whole this process
4. **Customer hold flow** played to the original caller

## Callback

The customer is contacted as part of a callback flow.

- As soon as agent accepts the callback contact, an **Agent whisper flow** (p. 394) is played to the agent.
- After the customer accepts the callback call, an **Outbound whisper flow** (p. 394) is played to customer.
- After these two flows are played, the agent and customer are connected and can interact.

To summarize, for callback contacts, the following contact flow types are played:

- **Agent whisper flow**
- **Outbound whisper flow**

## API

The contact was initiated with Amazon Connect by API. This could be an outbound contact you created and queued to an agent, using the **StartOutboundVoiceContact** API, or it could be a live chat that was initiated by the customer with your contact center, where you called the **StartChatConnect** API.
• After the outbound contact is successfully initiated using the StartOutboundVoiceContact API, an **Inbound contact flow (p. 394)** provided in the API request is played to the customer.

• Depending on the configuration of the **Inbound contact flow (p. 394)**, additional contact flows are played. For example, an **Inbound contact flow (p. 394)** transfers a customer to an agent for conversation. In this case, a **Customer queue flow (p. 394)** is played to customer while they waiting in queue for an agent.

• When the available agent accepts the call, an **Agent whisper flow (p. 394)** is played to agent.

• A **Customer whisper flow (p. 394)** is played to customer.

• After both whisper flows are played successfully to the agent and customer respectively, the caller is connected to agent for interaction.

To summarize API initiation methods, the following contact flows are played before the customer is connected to agent:

- **Inbound contact flow**
- **Customer queue flow**
- **Agent whisper flow**
- **Customer whisper flow**

**Queue_Transfer**

While the customer was in one queue (listening to a **Customer queue flow (p. 394)**), they were transferred into another queue using a contact flow block.

- The customer who is waiting in the queue for an agent is presented only with a **Customer queue flow (p. 394)**. No additional flows are involved.

**Disconnect**

When a **Set disconnect flow (p. 354)** block runs, it specifies which contact flow to run after a disconnect event during a contact.

- You can specify only an **Inbound contact flow (p. 394)** in this block. Since it occurs after the disconnect event, no additional flow is presented to customer.

**Override the default contact flows**

For all of the initiation methods discussed in this topic, if you don't specify contact flows for **Agent whisper flow**, **Customer whisper flow**, **Customer queue flow**, or **Outbound whisper flow**, then the default contact flow of that type runs instead. For a list of default contact flows, see Default contact flows (p. 269).

To override the defaults and use your own contact flows, use the following blocks:

- **Set customer queue flow (p. 353)**
- **Set hold flow (p. 356)**
- **Set whisper flow (p. 368)**

For more information, see Default contact flows (p. 269).
Copy and paste contact flows

You can select, cut, copy, and paste a complete flow or multiple blocks within or across flows. The following information is copied:

- All configured settings in the selected contact blocks.
- The layout arrangements.
- The connections.

Windows: CTRL+C to copy, CTRL+V to paste, and CTRL+X to cut

1. To select multiple blocks at the same time, press the Ctrl key, and choose the blocks you want.
2. Press Ctrl+C to copy the blocks.
3. Press CTRL+V to paste the blocks.

Mac: Cmd+C to copy, Cmd+V to paste, and Cmd+X to cut

1. To select multiple blocks at the same time, press the Cmd key, and choose the blocks you want.
2. Press Cmd+C to copy the blocks.
3. Press Cmd+V to paste the blocks.

Tip
Amazon Connect uses the clipboard for this feature. Paste won't work if you edit the JSON in your clipboard and introduce a typo or other error, or if you have multiple items saved to your clipboard.

Roll back a contact flow

1. In the contact flow designer, open the contact flow you want to roll back.
2. Use the drop-down to choose the version of the contact flow you want to roll back to. If you choose Latest, it reverts the flow to the most recent published version. If there isn't a published version, it reverts to the most recent saved version.

   Note
   To see a consolidated view of all changes across all flows, click the View historical changes link at the bottom of the Contact flows page. You can filter to a specific flow by date or user name.

3. Choose Publish to push that version into production.

Associate a phone number with a contact flow

After you publish a contact flow, you can associate a phone number with it.

To associate a phone number with a contact flow

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. Choose Routing, Phone numbers.
3. You can search for a specific number, filter your search by queue, or select a number from the list provided (if applicable).
Create prompts

Prompts are audio files played in call flows. For example, hold music is a prompt. Amazon Connect comes with a set of prompts that you can add to your contact flows. Or, you can add your own recordings.

We recommend that you align your prompts and routing policies with each other to ensure a smooth call flow for customers.

To create a prompt

1. In the navigation pane, choose Routing, Prompts.
2. On the Manage voice prompts page, choose Create new prompt.
3. Choose the following actions:
   - Upload—Select the file to upload.
   - Record—Select the red circle to begin recording. Use the red square to stop. You can choose Crop to cut the recorded prompt or Discard to record a new prompt.
4. For Step 2: Input basic information, enter the name of the file, and then choose Create.

Supported file types

You can upload a pre-recorded .wav file to use for your prompt, or record one in the web application.

We recommend using 8 KHz .wav files that are less than 50 MB and less than 5 minutes long. If you use higher rated audio libraries, such as 16 KHz or 16 bit files, Amazon Connect has to down sample them into 8 KHz samples due to PSTN limitations (here's a Wikipedia article that provides details: G.711). This may result in low quality audio.

Maximum length for prompts

Amazon Connect supports prompts that are less than 50 MB and less than 5 minutes long.

Bulk upload of prompts not supported in UI, API, or CLI

Currently bulk upload of prompts is not supported through the Amazon Connect console or programmatically using the API or CLI.
Add text-to-speech to prompts

You can enter text-to-speech prompts in the following contact flow blocks:

- Get customer input (p. 318)
- Loop prompts (p. 340)
- Play prompt (p. 342)
- Store customer input (p. 376)

Amazon Polly converts text-to-speech

To convert text-to-speech, Amazon Connect uses Amazon Polly, a service that converts text into lifelike speech using SSML.

Amazon Polly default voices are **free**. You are charged only for using custom voices that are associated with your account.

Amazon Polly best sounding voice

Amazon Polly periodically releases improved voices and speaking styles. You can choose to automatically resolve your text-to-speech to the most lifelike and natural sounding variant of a voice. For example, if your contact flows use Joanna, Amazon Connect automatically resolves to Joanna’s Conversational speaking style.

**Note**

If no Neural version is available, Amazon Connect defaults to the standard voice.

**To automatically use the best sounding voice**

1. Open the Amazon Connect console at [https://console.aws.amazon.com/connect/](https://console.aws.amazon.com/connect/).
2. If prompted to login, enter your AWS account credentials.
3. Choose the name of the instance from the **Instance alias** column.

4. In the navigation pane, choose **Contact flows**.
5. In the Amazon Polly section, choose **Use the best available voice**.

**How to add text-to-speech**

1. In a contact flow, add the block that will play the prompt. For example, add a **Play prompt** block.
2. In the **Properties**, choose **Text-to-speech**.
3. Enter plain text, as shown in the following image.
Add text-to-speech to prompts

SSML-enhanced input text gives you more control over how Amazon Connect generates speech from the text you provide. You can customize and control aspects of speech such as pronunciation, volume, and speed.

For a list of SSML tags you can use with Amazon Connect, see SSML tags supported by Amazon Connect (p. 408).

For more information about Amazon Polly, see Using SSML in the Amazon Polly Developer Guide.
Create dynamic text strings in Play prompt block

Use a Play prompt (p. 342) block to use an audio file to play as a greeting or message to callers. You can also use contact attributes to specify the greeting or message delivered to callers. To use the values of a contact attribute to personalize a message for a customer, include references to stored or external contact attributes in the text-to-speech message.

For example, if you retrieved the customer's name from a Lambda function, and it returns values from your customer database for FirstName and LastName, you could use these attributes to say the customer’s name in the text-to-speech block by including text similar to the following:

- Hello $.External.FirstName $.External.LastName, thank you for calling.

Alternatively, you could store the attributes returned from the Lambda function using a Set contact attributes block, and then reference the user-defined attribute created in the text to speech string.

Dynamically select which prompts to play

You can dynamically select which prompt to play by using an attribute.

1. Add Set contact attributes (p. 350) blocks to your flow. Configure each one to play the appropriate audio prompt. For example, the first one might play the .wav file for when your contact center is open. The second one might play the .wav file for when it's closed.
The following image shows how you might configure a Set contact attributes (p. 350) block. In this example, the user-defined attribute is named "CompanyWelcomeMessage." You can name your attribute anything you want.

2. In the Play prompt (p. 342) block, choose User Defined, and then enter the name of the attribute that you created in step 1.
3. Connect the Set contact attributes (p. 350) blocks to the Play prompt block. The following example shows how it might look if you added one of each block to test how this works.

Choose the voice for audio prompts

You select the text-to-speech voice and language in the Set voice (p. 364) block.

You can also use SSML in Amazon Lex bots to modify the voice used by a chat bot when interacting with your customers. For more information about using SSML in Amazon Lex bots, see Managing Messages and Managing Conversation Context in the Amazon Lex Developer Guide.
Tip
If you enter text that isn't supported for the Amazon Polly voice you are using, it won't be played. However, any other supported text in the prompt will be played. For a list of supported languages, see Languages Supported by Amazon Polly.

Use SSML tags to personalize text-to-speech

When you add a prompt to a contact flow, you can use SSML tags to provide a more personalized experience for your customers. SSML tags are a way to control how Amazon Polly generates speech from the text you provide.

The default setting in a contact flow block for interpreting text-to-speech is Text. To use SSML for text to speech in your contact flow blocks, set the Interpret as field to SSML as shown in the following image.

SSML tags aren't interpreted in chats

If you create text-to-speech text and apply SSML tags, they won't be interpreted in a chat conversation. For example, in the following image both the text and tags will be printed in the chat conversation.
SSML tags supported by Amazon Connect

Amazon Connect supports the following SSML tags. To learn more about the SSML tags, see Supported SSML Tags in the Amazon Polly Developer Guide.

**Tip**
If you use an unsupported tag in your input text, it's automatically ignored when it's processed.

<table>
<thead>
<tr>
<th>Tag</th>
<th>Use to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>speak</td>
<td>All SSML-enhanced text must be enclosed within a pair of speak tags.</td>
</tr>
<tr>
<td>break</td>
<td>Add a pause to your text. The maximum duration for a pause is 10 seconds.</td>
</tr>
<tr>
<td>lang</td>
<td>Specify another language for specific words.</td>
</tr>
<tr>
<td>mark</td>
<td>Put a custom tag within the text.</td>
</tr>
<tr>
<td>p</td>
<td>Add a pause between paragraphs in your text.</td>
</tr>
<tr>
<td>phoneme</td>
<td>Make a phonetic pronunciation for specific text.</td>
</tr>
<tr>
<td>prosody</td>
<td>Control the volume, rate, or pitch of your selected voice.</td>
</tr>
<tr>
<td>s</td>
<td>Add a pause between lines or sentences in your text.</td>
</tr>
<tr>
<td>say-as</td>
<td>Combine with the interpret-as attribute to tell Amazon Polly how to say certain characters, words, and numbers.</td>
</tr>
</tbody>
</table>
Tag | Use to...
---|---
sub | Combine with the alias attribute to substitute a different word (or pronunciation) for selected text such as an acronym or abbreviation.
w | Customize the pronunciation of words by specifying the word’s part of speech or alternate meaning.
amazon:effect name="whispered" | Indicate that the input text should be spoken in a whispered voice rather than as normal speech.

If you use an unsupported tag in your input text it is automatically ignored when it is processed.

To learn more about the SSML tags, see SSML Tags Supported by Amazon Polly.

**Neural and Conversational Speaking Styles**

For the Joanna and Matthew neural voices, in American English (en-US), you can also specify a Conversational speaking style or a Newscaster speaking style.

### Set up contact transfers

Amazon Connect enables you to set up different kinds of transfers:

- **Agent-to-agent transfers** (p. 416): For example, if you want agents to be able to transfer calls or tasks to other agents.
- **Transfers to a specific agent** (p. 421): For example, if you want to route contacts to the last agent the customer interacted with, or route contacts to agents who have specific responsibilities.
- **Transfers to queues** (p. 410): For example, if you want to transfer the contact to a sales, support, or escalation queue. To do this, create a queue quick connect (p. 415). This works with voice, chat, and task contacts.
- **Transfers to external numbers** (p. 410): For example, if you want to transfer the contact to an external number, such as an on-call pager. To do this, create an external quick connect.

### Overview of steps

**To set up call transfers and quick connects**

1. Choose a contact flow type based on what you want to do: Transfer to agent or Transfer to queue. External transfers do not require a specific type of contact flow.
2. Create and publish the contact flow.
3. Create a quick connect for the type of transfer to enable: Agent, Queue, or External.

   When you create the Agent or Queue quick connect, select a contact flow that matches the type of transfer to enable. External quick connects require only a phone number, and do not allow you to set a queue or contact flow.
4. Add the quick connect that you created to any queue used in a contact flow for which to enable contact transfer, such as the queue used in the contact flow for incoming contacts.
5. Make sure the queue is in a routing profile assigned to the agents who transfers contacts.
Create quick connects

Quick connects are a way for you to create a list of destinations for common transfers. For example, you might create a quick connect for Tier 2 support. If agents in Tier 1 support can't solve the issue, they will transfer the contact to Tier 2.

Types of quick connects

The type of a quick connect specifies the destination. You can specify one of the following destinations.

External quick connect

Contacts are transferred to an external number (such as an on-call pager).

Agent quick connect

Contacts are transferred to a specific agent as part of a contact flow.

Important

Agent and Queue quick connects only appear in the CCP when an agent goes to transfer a contact.

Queue quick connect

Contacts are transferred to a queue as part of a contact flow.

Important

Agent and Queue quick connects only appear in the CCP when an agent goes to transfer a contact.

Step 1: Create quick connects

Following are the instructions to add quick connects manually using the Amazon Connect console. To add quick connects programmatically, use the CreateQuickConnect API.

To create a quick connect

1. On the navigation menu, choose Routing, Quick connects, Add new.
2. Enter a name for the connect. Choose the type, and then specify the destination (such as a phone number or the name of an agent), contact flow (if applicable), and description.
3. To add more quick connects, choose Add new.
4. Choose Save.

Step 2: Enable agents to see quick connects

To enable your agents to see the quick connects in the CCP when they transfer a contact

1. After you create the quick connect, go to Routing, Queues and then choose the appropriate queue for the contact to be routed to.
2. On the Edit queue page, in the Quick connect box, search for the quick connect you created.
3. Select the quick connect and then choose Save.

Tip

Agents see all of the quick connects for the queues associated with their routing profile.
Example: Create an external quick connect to a mobile phone

In this example, you create an external quick connect to a person's mobile phone. This might be for a supervisor, for example, so agents can call them if needed.

Create a quick connect for a person's mobile phone number

1. On the navigation menu, choose Routing, Quick connects, Add new.
2. Enter a name for the quick connect, for example, John Doe's cell phone.
3. For Type, select External.
4. For Destination, enter the mobile phone number, starting with the country code. In the US, the country code is 1, as shown in the following image.

5. Choose Save.

Add the quick connect to a queue. Agents working this queue will see the quick connect in their CCP.

1. Go to Routing, Queues, and choose the queue you want to edit.
2. On the Edit queue page, in Outbound caller ID number, choose a number claimed for your contact center. This is required to make outbound calls.
3. At the bottom of the page, in the Quick connect box, search for the quick connect you created, for example, John Doe's cell phone.
4. Select the quick connect and then choose Save.
Test the quick connect

1. Open the Contact Control Panel.
2. Choose Quick connects.
3. Select the quick connect you created, and then choose Call.
Delete quick connects

At this time you can't delete quick connects. You can reuse them by changing the type, destination, and contact flow on the Quick connects page.

Or, you can remove them from a queue on the Edit queue page so that agents can't see them in the Contact Control Panel (CCP).
This article explains how each type of quick connect works: agent, queue, and external quick connects. It explains which contact flows are used, and what appears on the agent's Contact Control Panel (CCP).

**Tip**
For all three types of quick connects, when the quick connect is invoked, the contact that the agent is working on hears the Default customer hold (p. 277) flow unless you specify a different customer hold flow.

**Agent quick connects**

Let's say an agent named John is talking to a customer. During the conversation he needs to transfer the call to an agent named Maria. This is an agent quick connect.

Here's what John and Maria do, and what contact blocks are triggered:

1. John chooses the Quick Connect button on his CCP. (On the earlier CCP, the button is named Transfer). He selects Maria from the list of quick connects.

   When John does this, his CCP banner changes to Connected. However, the call isn't actually connected to Maria yet.

2. In our example scenario, Amazon Connect triggers an agent transfer flow that looks like the following image:
How quick connects work

The call is not yet connected to Maria.

3. John hears the first Play prompt, "Transferring to agent."

4. Maria receives a notification in her CCP to either accept or reject the call.

5. Maria accepts the incoming call. The banner in her CCP changes to Connecting.

6. The first Set whisper flow (p. 368) block is triggered. This block sets the custom agent whisper flow. It plays the Custom_Agent_Whisper to Maria, for example, "This is an internal call transferred from another agent."

   Note
   If you don't create and then select a custom agent whisper flow, Amazon Connect plays the default agent whisper flow (p. 276), which says the queue name.

7. The next Set whisper flow (p. 368) block is triggered. It plays the Custom_Customer_Whisper to John, for example, "Your call is now connecting to an agent."

   Note
   If you don't create and then select a custom customer whisper flow, Amazon Connect plays the default customer whisper flow (p. 276), which plays a beep.

8. Maria's CCP banner shows she's Connected. John and Maria are connected and can start talking.

9. Now John can do one of the following on his CCP:
   - Choose Join. This joins all parties on the call. John, Maria, and the customer have a conference call.
   - Choose Hold all. This puts Maria and the customer on hold.
   - Put Maria on hold, so he only talks to the customer.
   - Choose End call. He leaves the call but Maria and the customer are directly connected and continue talking.

Queue quick connects

Let's say John is talking to a customer. The customer needs help resetting his password, so John needs to transfer him to the PasswordReset queue. This is a queue quick connect.

Another agent, Maria, is assigned to handle contacts in the PasswordReset queue. Her status in the CCP is Available.

Here's what John and Maria do, and what contact blocks are triggered:

1. John chooses the Quick Connect button on his CCP. (On the earlier CCP, the button is named Transfer). He chooses to transfer the contact to the PasswordReset queue. As soon as John chooses the PasswordReset quick connect, his CCP banner shows Connecting.

   Important
   Even though the status of the transferred call (internal-transfer) shows on John's CCP banner as Connecting, the contact is not yet transferred to the PasswordReset queue.
2. Amazon Connect invokes the queue transfer flow that's associated with the PasswordReset quick connect. In this flow, the Transfer to queue (p. 387) block transfers the contact to the PasswordReset queue since it's specified in the block. The contact is now in the PasswordReset queue.

3. Maria is notified in her CCP to accept or reject the incoming call.

4. Maria accepts the incoming call and her CCP banner changes to Connecting.

5. The Agent whisper flow (p. 394) is played to Maria. It says "Connecting you to PasswordReset queue."

6. The Customer whisper flow (p. 394) is played to John. It says "Connecting you to PasswordReset queue."

7. Maria's CCP banner changes to Connected. John and Maria are connected and can start talking.

8. Now John can do one of the following from his CCP:
   - Choose Join. This joins all parties on the call. John, Maria, and the customer have a conference call.
   - Choose Hold all. This puts Maria and the customer on hold.
   - Put Maria on hold, so he only talks to the customer.
   - Choose End call. He leaves the call but Maria and the customer are directly connected and continue talking.

External quick connects

There are no contact flows involved in external quick connect. When an agent invokes an external quick connect, the call is directly connected the destination without invoking any flows.

Because no contact flow is involved in external quick connects, you can't set the outbound caller ID. Instead, the caller ID that you specified when you created the queue (p. 210) is used.

Set up agent-to-agent transfers

We recommend using these instructions to set up agent-to-agent voice, chat, and task transfers. You use a Set working queue (p. 371) block to transfer the contact to the agent's queue. The Set working queue block supports an omnichannel experience, whereas the Transfer to agent (beta) (p. 380) block does not.

Step 1: Create the quick connect

Following are the instructions to add quick connects manually using the Amazon Connect console. To add quick connects programmatically, use the CreateQuickConnect API.

Create a quick connect

1. On the navigation menu, choose Routing, Quick connects, Add a new destination.

2. Enter a name for the connect. Choose the type, and then specify the destination (such as a phone number or the name of an agent), contact flow (if applicable), and description.

   **Important**
   A description is required when you create a quick connect. If you don't add one, you'll get an error when you try to save the quick connect.

3. To add more quick connects, choose Add new.

4. Choose Save.

5. Go to the next procedure to enable your agents to see the quick connects in the Contact Control Panel (CCP).
Enable your agents to see the quick connects in the CCP when they transfer a contact

1. After you create the quick connect, go to Routing, Queues and then choose the appropriate queue for the contact to be routed to.
2. On the Edit queue page, in the Quick connect box, search for the quick connect you created.
3. Select the quick connect and then choose Save.

   Tip
   Agents see all of the quick connects for the queues in their routing profile.

Step 2: Set up the "Transfer to agent" contact flow

In this step, you create a contact flow that's type Transfer to agent and use a Set working queue (p. 371) block to transfer the contact to the agent.

1. In the navigation pane, choose Routing, Contact flows.
2. Use the drop-down to choose Create transfer to agent flow.
3. Type a name and a description for your contact flow.
4. In the left navigation menu, expand Set, and then drag the Set working queue block to the canvas.
5. Configure the Set working queue block as shown in the following image:
1. Choose **By agent**.
2. Choose **Use attribute**.
3. For **Type**, use the dropdown box to select **Agent**.
4. For **Attribute**, use the dropdown box to select **User name**.
6. Add a **Transfer to queue** (p. 387) block. You don't need to configure this block.
Resume a contact flow after transfer

Let's say you need to transfer a contact to an external department that's not using Amazon Connect. For example, maybe you need to transfer the caller to a shipping provider to check the status of their delivery. After the contact is disconnected from the external number, you want them to be returned to your agent, for example, when the delivery company couldn't resolve their issue.

- For advanced creation, send tracking information as DTMF digits when the call is transferred, so that the shipment information is retrieved with the transferred call before the customer is connected.

To set up a contact flow for this scenario

1. Add a Transfer to phone number block to your contact flow.
2. In the Transfer to phone number block, enter the following settings:
   - **Transfer to**
     - **Phone number**—Sets the phone number to transfer the call to.
     - **Use attribute**—Specify a contact attribute to set the phone number to transfer the call to.
   - **Set timeout**
     - **Timeout (in seconds)**—The number of seconds to wait for the recipient to answer the transferred call.
     - **Use attribute**—Specify a contact attribute to use to set the Timeout duration.
   - **Resume contact flow after disconnect**—When you select this option, after the call is transferred, the caller is returned to the contact flow when the call with the third party ends. Additional branches for Success, Call failed, and Timeout are added to the block when you select this option so that you can appropriately route contacts when there is an issue with the transfer.
   - **Optional parameters**
• **Send DTMF**—Select Send DTMF to include up to 50 Dual-Tone Multi-frequency (DTMF) characters with the transferred call. You can enter the characters to include, or use an attribute. Use the DTMF characters to navigate an automated IVR system that answers the call.

• **Caller ID number**—Specify the caller ID number used for transferred call. You can select a number from your instance, or use an attribute to set the number.

• **Caller ID name**—Specify the caller ID name used for the transferred call. You can enter a name, or use an attribute to set the name.

In some cases, the caller ID information is provided by the carrier of the party you are calling. The information may not be up-to-date with that carrier, or the number may get passed differently between systems because of hardware or configuration differences. If that is the case, the person you call may not see the phone number, or may see the name of a previously registered owner of the number, instead of the name you specify in the block.

3. Connect **Transfer to phone number** to the rest of your contact flow.

When the block executes:

1. The call is transferred to the external number.
2. Optionally, when the conversation with the external party ends, the contact is returned to the contact flow.
3. The contact then follows the **Success** branch from the block to continue the flow.
4. If the call is not successfully transferred, one of the other branches is followed: **Call failed, Timeout,** or **Error**, depending on the reason the caller did not return to the flow.

## Manage contacts in a queue

For inbound contacts, you can define advanced routing decisions to minimize queue wait times, or route contacts to specific queues, using blocks in your contact flow. For example:

- Use a **Check queue status** block to check staffing or agent availability for a queue before sending a contact to that queue.
- Or, use a **Get queue metrics** block to retrieve queue metrics.
- Then use a **Check contact attributes** block to check specific queue metric attributes, and define conditions to determine which queue to route the contact to based on attribute values. For more information about using queue metrics, see Route based on number of contacts in a queue (p. 460).

After determining which queue to transfer the contact to, use a **Transfer to queue** block in a contact flow to transfer the contact to that queue. When the **Transfer to queue** block runs, it checks the queue capacity to determine whether or not the queue is at capacity (full). This check for queue capacity compares the current number of contacts in the queue to the **Maximum contacts in queue** (p. 212) limit, if one is set for the queue. If no limit is set, the queue is limited to the number of concurrent contacts set in the **service quota** (p. 926) for the instance.

After the contact is placed in a queue, the contact remains there until an agent takes the contact, or until the contact is handled based on the routing decisions in your customer queue flow.

To change the queue associated with the call after it is already placed in a queue, use a **Loop prompts** block with a **Transfer to queue** block in a customer queue flow. In the block choose which queue to transfer the call to, or use an attribute to set the queue.

**To manage contacts in a queue using a Transfer to queue block**

1. In Amazon Connect, on the navigation menu choose **Routing, Contact flows**.
2. Choose the down arrow next to **Create contact flow**, then choose **Create customer queue flow**.

3. Under **Interact**, add a **Loop prompts** block to provide a message to the caller when the call is transferred, then every X seconds or minutes while the call is in the queue.

4. Select the **Loop prompts** block to display the settings for the block.

5. Choose **Add another prompt to the loop**.

6. Under **Prompts**, do one of the following:
   - Choose **Audio recording** in the drop-down menu, then select the audio recording to use as the prompt.
   - Choose **Text to Speech** in the drop-down menu, then enter text to use for the prompt in the **Enter text to be spoken** field.

7. To set an interrupt, choose **Interrupt every**, enter a value for the interrupt interval, and then choose a unit, either **Minutes** or **Seconds**. We recommend that you use an interval greater than 20 seconds to ensure that queued contacts that are being connected to an agent are not interrupted.

8. Choose **Save**.

9. Connect the block to the **Entry point** block in the contact flow.

10. Under **Terminate/Transfer**, drag a **Transfer to queue** block onto the designer.

11. Select the title of the block to display the settings for the block, then choose the **Transfer to queue** tab.

12. Under **Queue to check**, choose **Select a queue**, then select the queue to transfer calls to.

   Alternatively, choose **Use attribute**, then reference an attribute to specify the queue. If you use an attribute to set the queue, the value must be the queue ARN.

13. Choose **Save**.

14. Connect the **Loop prompt** block to the **Transfer to queue** block.

15. Add additional blocks to complete the contact flow that you require, such as the blocks to check queue status or metrics, then choose **Save**.

   The contact flow is not active until you publish it.

**Important**

To successfully complete the call transfer to another queue, you must include a block after the **Transfer to queue** block and connect the **Success** branch to it. For example, use an **End flow / Resume** block to end the contact flow. The flow does not end until the call is picked up by an agent.

---

**Transfer contacts to a specific agent**

Agent queues enable you to route contacts directly to a specific agent. Following are a couple of scenarios where you might want to do this:

- Route contacts to the last agent the customer interacted with. This provides a consistent customer experience.
- Route contacts to agents who have specific responsibilities. For example, you might route all billing questions to Jane.

**Note**

A queue is created for all users in your Amazon Connect instance, but only users who are assigned permissions to use the Contact Control Panel (CCP) can use it to receive contacts. The Agent and Admin security profiles are the only default security profiles that include permissions to use the CCP. If you route a contact to someone who doesn't have these permissions, the contact can never be handled.
To route a contact directly to a specific agent

1. In Amazon Connect, choose Routing, Contact flows.
2. In the contact flow designer, open an existing contact flow, or create a new one.
3. Add a block in which you can select a queue to transfer a contact to, such as a Set working queue block.
4. Select the title of the block to open the block settings.
5. Select By agent.
6. Under Select an agent, enter the user name of the agent, or select the agent's user name from the drop-down list.
7. Choose Save.
8. Connect the Success branch to the next block in your contact flow.

You can also choose to use an attribute to select the queue created for the agent user account. To do so, after you choose By agent, choose Use attribute.

Use contact attributes to route contacts to a specific agent

When you use contact attributes in a contact flow to route calls to an agent, the attribute value must be either the agent's user name, or the agent's user ID.

To determine the user ID for an agent so that you can use the value as an attribute, use the ListUsers operation to retrieve the users from your instance. The agent's user ID is returned with the results from the operation as the value of the Id in the UserSummary object.

You can also find the user ID for an agent by using Amazon Connect agent event streams (p. 754). The agent events, which are included in the agent event data stream, include the agent ARN. The user ID is included in the agent ARN after agent/.

In the following agent event data, the agent ID is 87654321-4321-4321-123456789012.
Set up recording behavior

Managers can monitor live conversations, and review and download recordings of past agent conversations. To set this up, you need to add the Set recording and analytics behavior (p. 359) block to your contact flows, assign managers the appropriate permissions, and show them how to monitor live conversations and access past recordings in Amazon Connect.

When is a conversation recorded?

A conversation is recorded only when the contact is connected to an agent. The contact is not recorded before then, when they are connected to the flow.

When a customer is on hold, the agent is still recorded.

If the agent mutes their own microphone, for example, to consult with a coworker sitting next to them, their side-bar conversation is not recorded. The customer is still recorded since their microphone hasn't been muted.

Where are recordings and transcripts stored?

Agents and contacts are stored on separate, stereo audio channels.

- The agent audio is stored in the right channel.
- All incoming audio, including the customer and anyone conferenced in, is stored in the left channel.

Recordings are stored in the Amazon S3 bucket that are created for your instance (p. 136). Any user or application with the appropriate permissions can access the recordings in the Amazon S3 bucket.

Encryption is enabled by default for all call recordings using Amazon S3 server-side encryption with KMS. The encryption is at the object level. The reports and recording objects are encrypted; there's no encryption at the bucket level.

You shouldn't disable encryption.

Important

- For voice conversations to be stored in an Amazon S3 bucket, you need to enable recording in the contact flow block using the Set recording and analytics behavior (p. 359) block.
- For chat conversations, if there's an S3 bucket for storing chat transcripts, then all chats are recorded and stored there. If no bucket exists, then no chats are recorded. However, if you want to monitor chat conversations, you still need to add the Set recording and analytics behavior (p. 359) block to the flow.
Tip
We recommend using the contact ID to search for recordings. Even though many call recordings for specific contact IDs may be named with the contact ID prefix itself (for example, 123456-aaaa-bbbb-3223-2323234.wav), there is no guarantee that the contact IDs and name of the contact recording file always match. By using Contact ID for your search on the Contact search (p. 628) page, you can find the correct recording by referring the audio file on the contact’s Contact Trace Record (CTR).

When are recordings available?

When call recording is enabled, the recording is placed in your S3 bucket shortly after the contact is disconnected. Then you can review the recording (p. 620).

Important
You can also access the recording from the customer’s contact trace record (CTR) (p. 788). The recording is available in the CTR, however, only after the contact has left the After Contact Work (ACW) state (p. 790).

How to set up recording behavior

To view a sample contact flow with the Set recording behavior block configured, see Sample recording behavior (p. 286).

To set up recording behavior in your contact flows

1. Log in to your Amazon Connect instance using an account that has permissions to edit contact flows.
2. Choose Routing, Contact flows, and then open the contact flow that handles customer contacts you want to monitor.
3. Before the contact is connected to an agent, add a Set recording and analytics behavior (p. 359) block to the contact flow.
4. To configure the Set recording and analytics behavior (p. 359) block, choose from the following:
   - To record voice conversations, choose what you want to record: Agent and Customer, Agent only, or Customer only.
   - To record chat conversations, you need to choose Agent and Customer.
   - To enable monitoring of voice and/or chat conversations, you need to choose Agent and Customer.
5. Choose Save and then Publish to publish the updated contact flow.

To set up recording behavior for outbound calls

1. Create a contact flow, using the outbound whisper flow type.
2. Add a Set recording and analytics behavior (p. 359) block to that contact flow.
3. Set up a queue that will be used for making outbound calls. In the Outbound whisper flow box, choose the contact flow that has Set recording and analytics behavior (p. 359) in it.

How to set up users to monitor conversations or review recordings

To learn what permissions managers need, and how they can monitor live conversations and review recordings of past conversations, see:
Set up queued callback

You can create contact flows that provide the ability for customers to leave their phone number and get a callback from an agent.

Here's how queued callback works:

1. When a customer leaves their number it's put in a queue and then routed to the next available agent.
2. After an agent accepts the callback in the CCP, Amazon Connect calls the customer.

   If no agents are available to work on callbacks, the callbacks stay in queue for up to 7 days after they are created. After that, they are automatically removed from the queue.

   **Tip**
   There's no way to manually remove a callback from the queue. You can either answer them, or wait 7 days until they are removed automatically.

3. If there is no answer when the Amazon Connect calls the customer, it retries based on the number of times you've specified.
4. If the call goes to voicemail, it's considered connected.
5. If the customer calls again while in the callback queue, it's treated as a new call and will be handled as usual. To avoid duplicate callback requests in a callback queue, see this blog: Preventing duplicate callback requests in Amazon Connect.

How queued callbacks affect and queue limits

- Queued callbacks count towards the queue size limit, but they are routed to the error branch. For example, if you have a queue that handles callbacks and incoming calls, and that queue reaches the size limit:
  - The next callback is routed to the error branch.
  - The next incoming call gets a reorder tone (also known as a fast busy tone), which indicates no transmission path to the called number is available.
- Consider setting up your queued callbacks to be lower priority than your queue for incoming calls. This way, your agents only work on queued callbacks when the incoming call volume is low.

Steps to set up queued callback

Use the steps provided in the following overview to set up queued callback.

- **Set up a queue** (p. 210) specifically for callbacks. In your real-time metrics reports, you can look at that queue and see how many customers are waiting for callbacks.
- **Set up caller ID** (p. 203). When setting your callback queue, specify the caller ID name and phone number that appears to customers when you call back.
- **Add the callback queue to a routing profile** (p. 215). Set this up so that contacts waiting for a call are routed to agents.
- **Create a contact flow for queued callbacks** (p. 426). You offer the option for a callback to the customer.
- **Associate a phone number with the inbound contact flow** (p. 400).
Create a contact flow for queued callbacks

To see what a flow looks like with queued callback, in new Amazon Connect instances see Sample queue configurations (p. 281). In previous instances, see Sample queued callback (p. 285).

The following procedure shows how to:

- Request a callback number from a customer.
- Store the callback number in an attribute.
- Reference the attribute in a Set callback number block to set the number to dial the customer.
- Transfer the customer to the callback queue.

At the basic level, here’s what this queued callback flow looks like, without any of the alternative branches or error handling configured.

Following are the steps to create this flow.

**To create a contact flow for queued callbacks**

1. In Amazon Connect, choose Routing, Contact flows.
2. Select an existing contact flow, or choose Create contact flow to create a new one.
   - **Tip**
     You can create this flow using different contact flow types: Customer queue flow, Transfer to agent, Transfer to queue.
3. Add a Get customer input (p. 318) block.
4. Configure the block to prompt the customer for a callback:
5. At the bottom of the block, choose **Add another condition**, and add options 1 and 2.

6. Add a **Store customer input (p. 376)** block.

7. Configure the block to prompt customers for their callback number, such as “Please enter your phone number.”
8. In the **Customer input** section, select **Phone number**, and then choose one of the following:

- **Local format**: Your customers are calling from phone numbers that are in the same country as the AWS Region where you created your Amazon Connect instance.

- **International format/Enforce E.164**: Your customers are calling from phone numbers in countries or regions other than the one where you created your instance.

9. Add a **Set callback number** (p. 348) block to your contact flow.

10. Configure the block to set **Type** to **System**. For **Attribute**, choose **Store customer input**. This attribute stores the customer’s phone number.
11. Add a **Transfer to queue** (p. 387) block.

12. In the **Transfer to queue** block, configure the **Transfer to callback queue** tab as shown in the following image:

The following properties are available:

- **Initial delay**: Specify how much time has to pass between a callback contact being initiated in the contact flow, and the customer is put in queue for the next available agent. In the previous example, the time is 99 seconds.

- **Maximum number of retries**: If this is set to 2, then Amazon Connect tries to call back the customer a maximum of three times: the initial callback, and two retries.
A retry only happens if it rings but there's no answer. If the callback goes to voicemail, it's considered connected and Amazon Connect does not retry again.

**Tip**
We strongly recommend that you double-check the number entered in Maximum number of retries. If you accidentally enter a high number, such as 20, it's going to result in unnecessary work for the agent and too many calls for the customer.

- **Minimum time between attempts**: If the customer doesn't answer the phone, this is how long to wait until trying again. In the previous example, we wait 10 minutes between attempts.

13. In the Optional parameters section, choose **Set working queue** if you want to transfer the contact to a queue that you set up specifically for callbacks.

Creating a queue just for callbacks lets you view in your real-time metrics reports how many customers are waiting for callbacks.

If you don't set a working queue, Amazon Connect uses the queue that was set previously in the flow.

14. To save and test this flow, configure the other branches and add error handling. To see an example of how this is done, see Sample queue configurations (p. 281). For previous instances, see Sample queued callback (p. 285).

15. For information about how callbacks appear in real-time metrics reports and CTRs, see About queued callbacks in metrics (p. 792).

**Learn more about queued callbacks**

See the following topics to learn more about queued callbacks:

- About queued callbacks in metrics (p. 792)
- How Initial delay affects Scheduled and In queue metrics (p. 794)
- What counts as a "Failed Callback Attempt" (p. 795)
- Example: Metrics for a queued callback (p. 796)
Import/export contact flows

Use the procedures described in this topic to import/export a few contact flows from one instance to another, or from one Region to another as you expand your customer service organization.

To migrate tens or hundreds of contact flows, use the APIs described in Migrate contact flows to a different instance (p. 469).

Note
The Contact Flow Import/Export feature is currently in Beta status. Updates and improvements that we make could result in issues in future releases importing contact flows that are exported during the beta phase.

Export limitations

You can export contact flows that meet the following requirements:

- The flow has fewer than 100 blocks.
- The total size of the flow is less than 1MB.

We recommend dividing large flows in to smaller ones to meet these requirements.

Contact flows are exported to JSON files

A contact flow is exported to a JSON file. It has the following characteristics:

- The JSON includes a section for each block in the flow.
- The name used for a specific block, parameter, or other element of the contact flow may be different than the label used for it in the user interface (UI).

By default, contact flow export files are created without a file name extension, and saved to the default location set for your browser. We suggest saving your exported contact flows to folder that contains only exported contact flows.

How to import/export contact flows

To export a contact flow

1. Log in to your Amazon Connect instance using an account that is assigned a security profile that includes view permissions for contact flows.
2. Choose Routing, Contact flows.
3. Open the contact flow to export.
4. Choose Save, Export flow.
5. Provide a name for the exported file, and choose Export.

To import a contact flow

1. Log in to your Amazon Connect instance. The account must be assigned a security profile that includes edit permissions for contact flows.
2. On the navigation menu, choose Routing, Contact flows.
3. Do one of the following:
   - To replace an existing contact flow with the one you are importing, open the contact flow to replace.
   - Create a new contact flow of the same type as the one you are importing.
4. Choose **Save, Import flow**.
5. Select the file to import, and choose **Import**. When the contact flow is imported into an existing contact flow, the name of the existing contact flow is updated, too.
6. Review and update any resolved or unresolved references as necessary.
7. To save the imported flow, choose **Save**. To publish, choose **Save and Publish**.

**Resolve resources in imported contact flows**

When you create a contact flow, the resources you include in the contact flow, such as queues and voice prompts, are referenced within the contact flow using the name of the resource and the Amazon Resource Name (ARN). The ARN is a unique identifier for a resource that is specific to the service and Region in which the resource is created. When you export a contact flow, the name and ARN for each resource referenced in the contact flow is included in the exported contact flow.

When you import a contact flow, Amazon Connect attempts to resolve the references to the Amazon Connect resources used in the contact flow, such as queues, by using the ARN for the resource. When you import a contact flow into the same Amazon Connect instance that you exported it from, the resources used in the contact flow will resolve to the existing resources in that instance. If you delete a resource, or change the permissions for a resource, Amazon Connect may not be able to resolve the resource when you import the contact flow. When a resource cannot be found using the ARN, Amazon Connect attempts to resolve the resource by finding a resource with the same name as the one used in the contact flow. If no resource with the same name is found, a warning is displayed on the block that contains a reference to the unresolved resource.

If you import a contact flow into a different Amazon Connect instance than the one it was exported from, the ARNs for the resources used are different. If you create resources in the instance with the same name as the resource in the instance where the contact flow was exported from, the resources can be resolved by name. You can also open the blocks that contain unresolved resources, or resources that were resolved by name, and change the resource to another one in the Amazon Connect instance. You can save a contact flow with unresolved or missing resources, but you cannot publish it until the resources are resolved or removed.

**Invoke AWS Lambda functions**

Amazon Connect can interact with your own systems and take different paths in contact flows dynamically. To achieve this, invoke AWS Lambda functions in a contact flow, fetch the results, and call your own services or interact with other AWS data stores or services. For more information, see the [AWS Lambda Developer Guide](https://docs.aws.amazon.com/lambda/latest/dg/).  

To invoke a Lambda function from a contact flow, complete the following tasks.

**Tasks**
- Create a Lambda function (p. 433)
- Add a Lambda function to your Amazon Connect instance (p. 433)
- Invoke a Lambda Function from a Contact Flow (p. 434)
- Configure your Lambda function to parse the event (p. 436)
Create a Lambda function

Create a Lambda function, using any runtime, and configure it. For more information, see Create a Lambda Function in the AWS Lambda Developer Guide.

If you create the Lambda function in the same Region as your contact center, you can use the Amazon Connect console to add the Lambda function to your instance as described in the next task, Add a Lambda function to your Amazon Connect instance (p. 433). This automatically adds resource permissions that allow Amazon Connect to invoke the Lambda function. Otherwise, if the Lambda function is in a different Region, you can add it to your contact flow using the contact flow designer and add the resource permissions using the add-permission command, with a principal of connect.amazonaws.com and the ARN of your Amazon Connect instance. For more information, see Using Resource-Based Policies for AWS Lambda in the AWS Lambda Developer Guide.

Add a Lambda function to your Amazon Connect instance

Before you can use an Lambda function in a contact flow, you need to add it to your Amazon Connect instance.

Add a Lambda function to your instance

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. Choose the name of the instance from the Instance Alias column.
3. In the navigation pane, choose Contact flows.
4. In the **AWS Lambda** section, use the **Function** drop-down box to select the function to add to your instance.

   **Tip**
   The drop-down lists only those functions in the same Region as your instance. If no functions are listed, choose **Create a new Lambda function**, which opens the AWS Lambda console.
   To use a Lambda in a different Region or account, in the **Invoke AWS Lambda function** (p. 336), under **Select a function**, you can enter the ARN of a Lambda. Then set up the corresponding resource-based policy on that Lambda to allow the contact flow to call it.
   To call `lambda:AddPermission`, you need to:
   - Set the principal to `connect.amazonaws.com`
   - Set the source account to be the account your instance is in.
   - Set the source ARN to the ARN of your instance.

   For more information, see [Granting function access to other accounts](#).

5. Choose **Add Lambda Function**. Confirm that the ARN of the function is added under **Lambda Functions**.

Now you can refer to that Lambda function in your contact flows.

### Invoke a Lambda Function from a Contact Flow

To view a contact flow that invokes a Lambda function, see [Sample Lambda integration](#) (p. 286).

1. Open or create a contact flow.
2. Add an **Invoke AWS Lambda function** (p. 336) block (in the **Integrate** group) to the grid. Connect the branches to and from the block.
3. Choose the title of the **Invoke AWS Lambda function** (p. 336) block to open its properties page.
4. Under **Select a function**, choose from the list of functions you’ve added to your instance.
5. (Optional) Under **Function input parameters**, choose **Add a parameter**. You can specify key-value pairs that are sent to the Lambda function when it is invoked. You can also specify a **Timeout** value for the function.
6. In **Timeout (max 8 seconds)**, specify how long to wait for Lambda to time out. After this time, the contact routes down the Error branch.
For every Lambda function invocation from a contact flow, you pass a default set of information related to ongoing contact, as well as any additional attributes defined in the Function input parameters section for the Invoke AWS Lambda function block added.

The following is an example JSON request to a Lambda function:

```json
{
   "Details": {
      "ContactData": {
         "Attributes": {},
         "Channel": "VOICE",
         "ContactId": "4a573372-1f28-4e26-b97b-XXXXXXXXXXX",
         "CustomerEndpoint": {
            "Address": "+1234567890",
            "Type": "TELEPHONE_NUMBER"
         },
         "InitialContactId": "4a573372-1f28-4e26-b97b-XXXXXXXXXXX",
         "InitializationMethod": "INBOUND | OUTBOUND | TRANSFER | CALLBACK",
         "PreviousContactId": "4a573372-1f28-4e26-b97b-XXXXXXXXXXX",
         "Queue": {
            "Name": "PasswordReset"
         },
         "SystemEndpoint": {
            "Address": "+1234567890",
            "Type": "TELEPHONE_NUMBER"
         }
      },
      "Parameters": {
         "sentAttributeKey": "sentAttributeValue"
      }
   },
   "Name": "ContactFlowEvent"
}
```

The request is divided into three parts:

- **Contact data**—This is always passed by Amazon Connect for every contact. Some parameters are optional.
- **User attributes**—These are attributes that have been previously associated with a contact, such as when using a Set contact attributes block in a contact flow. This map may be empty if there aren’t any saved attributes.
- **Parameters**—These are parameters specific to this call that were defined when you created the Lambda function.

### Invocation retry policy

If your Lambda invocation in a contact flow gets throttled, the request will be retried. It will also be retried if a general service failure (500 error) happens.

When a synchronous invocation returns an error, Amazon Connect retries up to 3 times, for a maximum of 8 seconds. At that point, the flow will progress down the Error branch.

To learn more about how Lambda retries, see Error Handling and Automatic Retries in AWS Lambda.
Invoke multiple Lambda functions

Amazon Connect limits the duration of a sequence of Lambda functions to 20 seconds. It will error out when the total execution time exceeds this threshold. Since customers hear silence while a Lambda function executes, we recommend adding a Play prompt block between functions to keep them engaged and aware of the long interaction.

By breaking up a chain of Lambda functions with the Play prompt block, you will be able invoke multiple functions that last longer than the 20 second threshold.

Configure your Lambda function to parse the event

To successfully pass attributes between your Lambda function and Amazon Connect, configure your function to correctly parse the JSON request sent from the Invoke AWS Lambda function block, and define any business logic that should be applied. How the JSON is parsed depends on the runtime you use for your function. For example, the following example shows how to access sentAttributeKey using Node.JS:

```javascript
var receivedAttribute = event['Details']['Parameters']['sentAttributeKey'];
```

Verify the function response

The Lambda function response should be a simple string map. This map can be up to 32k. If you fail to reach Lambda, the function throws an exception, the response is not understood, or the Lambda function takes more time than the limit, the contact flow jumps to the Error label.

Test the output returned from your Lambda function to confirm that it will be correctly consumed when returned to Amazon Connect. The following example shows a sample response in Node.JS:

```javascript
exports.handler = function(event, context, callback) {
  var resultMap = {
    Name:'CustomerName',
    Address:'1234 Main Road',
    CallerType:'Patient'
  }
  callback(null, resultMap);
}
```

This example shows an example response using Python:

```python
def lambda_handler(event, context):
  resultMap = {"Name":"CustomerName","Address":"1234 Main Road","CallerType":"Patient"}
  return resultMap
```

The output returned from the function must be a flat object of key/value pairs, with values that include only alphanumeric, dash, and underscore characters. Nested and complex objects are not supported. The size of the returned data must be less than 32 Kb of UTF-8 data.

The following example shows the JSON output from these Lambda functions:

```javascript
{
  "Name": "CustomerName",
  "Address": "1234 Main Road",
  "CallerType": "Patient"
}
Consume the Lambda function response

There are two ways to use the function response in your contact flow. You can either directly reference the variables returned from Lambda, or store the values returned from the function as contact attributes and then reference the stored attributes. When you use an external reference to a response from a Lambda function, the reference will always receive the response from the most recently invoked function. To use the response from a function before a subsequent function is invoked, the response must be saved as a contact attribute, or passed as a parameter to the next function.

Access variables directly

If you access the variables directly, you can use them in contact flow blocks, but they are not included in contact trace records (CTR). To access these variables directly in a contact flow block, add the block after the Invoke AWS Lambda function block, and then reference the attributes as shown in the following example:

```
Name - $.External.Name
Address - $.External.Address
CallerType - $.External_CALLERTYPE
```

Make sure that the name specified for the source attribute matches the key name returned from Lambda.

Store variables as contact attributes

If you store the variables as contact attributes, you can use them throughout your contact flow, and they are included in CTRs.

To store the values returned as contact attributes and then reference them, use a Set contact attributes block in your contact flow after the Invoke AWS Lambda function block. Choose External for the Type. Following the example we’re using, set Destination key to returnedContactName, and set the Source attribute to Name.

Add Address as a Source attribute and use returnedContactAddress as the Destination key. Then add CallerType as a Source attribute and use returnedContactType for the Destination key.

Make sure that the name specified for the source attribute matches the key name returned from Lambda.

Encrypt customer input

You can encrypt sensitive data that is collected by contact flows. To do this, you need to use public-key cryptography.

When configuring Amazon Connect, you first provide the public key. This is the key used when encrypting data. Later, you provide the X.509 certificate, which includes a signature that proves you possess the private key.

In a contact flow that collects data, you provide an X.509 certificate to encrypt data that's captured using the Stored customer input system attribute. You must upload the key in .pem format to use this feature. The encryption key is used to verify the signature of the certificate used within the contact flow.

**Note**

You can have up to two encryption keys active at one time to facilitate rotation.

To decrypt the data in the Stored customer input attribute, use the AWS Encryption SDK. For more information, see the AWS Encryption SDK Developer Guide.

For a detailed walkthrough, see Creating a secure IVR solution with Amazon Connect. It shows how to:
• Configure Amazon Connect to collect a credit card number.
• Encrypt the credit card digits.
• Send it to our backend AWS Lambda for decryption, using the customer supplied decryption key.

It provides two commands using OpenSSL:
• One to generate an RSA key pair and a self-signed X.509 certificate
• Another to extract the public key from the RSA key pair

How to decrypt data encrypted by Amazon Connect

The following code sample shows how to decrypt data using the AWS Encryption SDK.

```java
package com.amazonaws;

import com.amazonaws.encryptionsdk.AwsCrypto;
import com.amazonaws.encryptionsdk.CryptoResult;
import com.amazonaws.encryptionsdk.jce.JceMasterKey;
import org.bouncycastle.jce.provider.BouncyCastleProvider;
import java.io.IOException;
import java.nio.charset.Charset;
import java.nio.file.Files;
import java.nio.file.Paths;
import java.security.GeneralSecurityException;
import java.security.KeyFactory;
import java.security.Security;
import java.security.interfaces.RSAPrivateKey;
import java.security.spec.PKCS8EncodedKeySpec;
import java.util.Base64;
public class AmazonConnectDecryptionSample {
    // The Provider 'AmazonConnect' is used during encryption, this must be used during decryption for key
    // to be found
    private static final String PROVIDER = "AmazonConnect";

    // The wrapping algorithm used during encryption
    private static final String WRAPPING_ALGORITHM = "RSA/ECB/OAEPWithSHA-512AndMGF1Padding";

    /**
     * This sample show how to decrypt data encrypted by Amazon Connect.
     * To use, provide the following command line arguments: [path-to-private-key] [key-id] [cyphertext]
     * Where:
     * path-to-private-key is a file containing the PEM encoded private key to use for decryption
     * key-id is the key-id specified during encryption in your contact flow
     * cyphertext is the result of the encryption operation from Amazon Connect
     */
    public static void main(String[] args) throws IOException, GeneralSecurityException {
        String privateKeyFile = args[0]; // path to PEM encoded private key to use for decryption
        String keyId = args[1]; // this is the id used for key in your contact flow
        String cypherText = args[2]; // the result from contact flow
        Security.addProvider(new BouncyCastleProvider());
    }
}
```
// read the private key from file
String privateKeyPem = new String(Files.readAllBytes(Paths.get(privateKeyFile)),
Charset.forName("UTF-8"));
RSAPrivateKey privateKey = getPrivateKey(privateKeyPem);

AwsCrypto awsCrypto = new AwsCrypto();
JceMasterKey decMasterKey =
JceMasterKey.getInstance(null, privateKey, PROVIDER, keyId,
WRAPPING_ALGORITHM);
CryptoResult<String, JceMasterKey> result = awsCrypto.decryptString(decMasterKey,
cypherText);

System.out.println(“Decrypted: " + result.getResult());
}

public static RSAPrivateKey getPrivateKey(String privateKeyPem) throws IOException,
GeneralSecurityException {
String privateKeyBase64 = privateKeyPem
.replace("-----BEGIN RSA PRIVATE KEY-----\n","")
.replace("-----END RSA PRIVATE KEY------","")
.replaceAll("\n", "");
byte[] decoded = Base64.getDecoder().decode(privateKeyBase64);
KeyFactory kf = KeyFactory.getInstance("RSA");
PKCS8EncodedKeySpec keySpec = new PKCS8EncodedKeySpec(decoded);
RSAPrivateKey privKey = (RSAPrivateKey) kf.generatePrivate(keySpec);
return privKey;
}
Enable contact flow logs

A log entry added as each block in your contact flow is triggered. You can configure CloudWatch to send alerts when unexpected events occur during active contact flows.

What happens if my log group is deleted? You need to manually re-create the CloudWatch log group. Otherwise, Amazon Connect won’t publish more logs.

Pricing for contact flow logging

You are not charged for generating contact flow logs, but you are charged for using CloudWatch for generating and storing the logs. Free tier customers are charged only for usage that exceeds service quotas. For details about Amazon CloudWatch pricing, see Amazon CloudWatch Pricing.

Enable contact flow logs

Tip
Amazon Connect delivers contact flow logs at least once. They may be delivered again for multiple reasons. For example, a service retry due to an unavoidable failure.

Step 1: Enable logging for your instance

By default when you create a new Amazon Connect instance, an Amazon CloudWatch log group is created automatically to store the logs for your instance.

Use the following procedure to check that logging is enabled for your instance.

1. Open the Amazon Connect console.
2. Choose the instance alias for your instance.
3. Choose Contact flows.
4. Scroll to bottom of the page. Select Enable Contact flow logs and choose Apply.

**Step 2: Add the Set logging behavior block**

Logs are generated only for contact flows that include a Set logging behavior (p. 358) block with logging set to enabled.

You control which flows, or parts of flows, logs are generated for by including multiple Set logging behavior blocks and configuring them as needed.

When you use a Set logging behavior block to enable or disable logging for a flow, logging is also enabled or disabled for any subsequent flow that a contact is transferred to, even if the flow does not include a Set logging behavior block. To avoid logging that persists between flows, enable or disable a Set logging behavior block as needed for that specific flow.

**To enable or disable contact flow logs for a contact flow**

1. Add a Set logging behavior (p. 358) block and connect it to another block in the flow.
2. Open the properties for the block. Choose Enable or Disable.
3. Choose Save.
4. If you add a Set logging behavior block to a contact flow that is already published, you must publish it again to start generating logs for it.

**Search contact flow logs**

Before you can search contact flow logs, you must first enable contact flow logging (p. 440).

Logs will be created for conversations that occur after logging is enabled.

**To search contact flow logs**

1. Open Amazon CloudWatch console, go to Logs, Log groups.
2. Choose the log group for your instance.
   A list of log streams will be displayed.
3. To search all the log streams in the instance, choose **Search log group**.
4. In the search box, enter the string you want to search for, for example, all or a portion of the contact ID.

5. After a couple of moments (longer depending on how big your log is), Amazon CloudWatch returns results.

6. You can open each event to see what happened. The following image shows the event for when a **Play prompt** block runs in a contact flow.
Data in contact flow logs

What data is gathered in contact flow logs

Log entries for contact flows include details about the block associated with the log entry, the contact ID, and the action taken after the steps in the block were completed. Any contact interaction that occurs outside of the contact flow is not logged, such as time spent in a queue or interactions with an agent.

You can set the properties of the block to disable logging during the parts of your contact flow that interact with or capture sensitive data or customers' personal information.

If you use Amazon Lex or AWS Lambda in your contact flows, the logs show the entry and exit of the contact flow going to them, and include any information about the interaction that is sent or received during entry or exit.

Because the logs also include the contact flow ID, and the contact flow ID stays the same when you change a contact flow, you can use the logs to compare the interactions with different versions of the contact flow.

The following example log entry shows a Set working queue block of an inbound flow.

```
{
    "ContactId": "11111111-2222-3333-4444-555555555555",
    "ContactFlowModuleType": "SetQueue",
    "Timestamp": "2021-04-13T00:14:31.581Z",
    "Parameters": {
    }
}
```

Track customers between contact flows

In many cases, customers interact with multiple contact flows in your contact center, being passed from one contact flow to another to appropriately assist them with their specific issue. Contact flow logs help you track customers between different contact flows, by including the ID of the contact in each log entry.

When a customer is transferred to a different contact flow, the ID for the contact associated with their interaction is included with the log for the new flow. You can query the logs for the contact ID to trace the customer interaction through each contact flow.

In larger, high-volume contact centers, there can be multiple streams for contact flow logs. If a contact is transferred to a different contact flow, the log may be in a different stream. To make sure that you are finding all of the log data for a specific contact, you should search for the contact ID in the entire CloudWatch log group instead of in a specific log stream.
Create alerts for contact flow log events

You can configure CloudWatch to define a filter pattern that looks for specific events in your contact flow logs and then creates an alert when an entry for that event is added to the log.

For example, you can set an alert for when a contact flow block goes down an error path as a customer interacts with the flow. Log entries are typically available in CloudWatch within a short time, giving you near real-time notification of events in contact flows.

Use Amazon Connect contact attributes

One way to make your customers feel cared for is to create personalized experiences for them in your contact center. For example, you can deliver one welcome message for customers who are using a phone and another for customers using chat. To do this, you need a way to store information about the contact and then make a decision based on the value.

Contents

• What is a contact attribute? (p. 445)
• List of available contact attributes and their JSONPath reference (p. 447)
• How to reference contact attributes (p. 458)
• Display contact information to the agent in the CCP (p. 459)
• Route based on number of contacts in a queue (p. 460)
• Route based on contact’s channel (p. 463)
• Use Amazon Lex and attributes (p. 464)
• Lambda functions and attributes (p. 468)

What is a contact attribute?

In Amazon Connect, each interaction with a customer is a contact. The interaction can be a phone call (voice), a chat, or an automated interaction using an Amazon Lex bot.

Each contact can have some data that is specific to a particular interaction. This data can be accessed as a contact attribute. For example:

• The name of the customer
• The name of the agent
• The channel used for the contact, such as phone or chat
• And more

A contact attribute represents this data as a key-value pair. You might think of it as a field name together with the data entered into that field.

For example, here are a couple of key-value pairs for the customer name:

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>firstname</td>
<td>Jane</td>
</tr>
<tr>
<td>lastname</td>
<td>Doe</td>
</tr>
</tbody>
</table>
The advantage of contact attributes is that they enable you to store temporary information about the contact so you can use it in the contact flow.

For example, in your welcome messages, you can say their name or thank them for being a member. To do this, you need a way of retrieving data about that specific customer and using it in a contact flow.

**Common use cases**

Here are some common use cases for where contact attributes are used:

- Use the customer phone number to schedule a queued callback.
- Identify which agent is interacting with a customer so that a post call survey can be associated with a contact.
- Identify the number of contacts in a queue to decide if the contact should be routed to a different queue.
- Get the corresponding media streaming ARN to store in a database.
- Use the customer phone number to identify the status of a customer (for example, are they a member), or the status of their order (shipped, delayed, etc.) to route them to the appropriate queue.
- Based on a customer interaction with a bot, identify the slot (for example, the type of flowers to order) to be used in a flow.

**Types of contact attributes**

To make it faster for you to find and choose the attributes you want to use, attributes are grouped into types. For each contact block, we only surface those types of attributes that work with it.

Another way to think about types of contact attributes is to categorize them based on where the value comes from. The values for contact attributes have three sources:

- Amazon Connect provides the value, such as the agent's name, during the contact interaction. This is known as providing the value at runtime.
- An external process, such as Amazon Lex or AWS Lambda, provides the value.
- User-defined. In the contact flow, you can specify the value for an attribute.
Contact attributes in the CTR

In Contact Trace Records, contact attributes are shared across all contacts with the same InitialContactId.

For example, while carrying out transfers, a contact attribute updated in the transfer flow updates the attribute’s value in both CTR’s contact attributes (that is, the Inbound and Transfer contact attributes).

"$" is a special character

Amazon Connect treats the "$" character as a special character. You can't use it in a key when setting an attribute.

For example, let's say you're creating an interact block with text-to-speech. You set an attribute like this:

{"$one":"please read this text"}

When Amazon Connect reads this text, it reads "dollar sign one" to the contact instead of "please read this text." Also, if you were to include $ in a key and try to reference the value later using Amazon Connect, it wouldn't retrieve the value.

Amazon Connect does log and pass the full key:value pair ("_$one":"please read this text") to integrations such as Lambda.

List of available contact attributes and their JSONPath reference

The following tables describe the contact attributes available in Amazon Connect.

The JSONPath reference for each attribute is provided so you can create dynamic text strings (p. 404).

System attributes

These are predefined attributes in Amazon Connect. You can reference system attributes, but you cannot create them.

Not all blocks in a contact flow support using System attributes. For example, you cannot use a System attribute to store customer input. Instead, use a user-defined attribute to store the data input by a customer.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer number</td>
<td>The customer's phone number.</td>
<td>System</td>
<td>$.CustomerEndpoint.Address</td>
</tr>
<tr>
<td></td>
<td>When used in an outbound whisper flow, this is the number that the agents dialed to reach the customer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When used in inbound flows, this is the number from which the customer placed the call. This attribute is included in Contact Trace Records (CTRs).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When used in a Lambda</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attribute</td>
<td>Description</td>
<td>Type</td>
<td>JSONPath Reference</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------</td>
<td>-----------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Dialed number</td>
<td>The number the customer dialed to call your contact center. This attribute is included in CTRs. When used in a Lambda function, it's included in the input object under SystemEndpoint.</td>
<td>System</td>
<td>$.SystemEndpoint.Address</td>
</tr>
<tr>
<td>Customer callback number</td>
<td>The number that Amazon Connect uses to call back the customer. This number can be the one used for a queued callback, or when an agent is dialing from the CCP. Transfer to callback queue functionality, or for an agent dialing from the CCP. The default value is the number that the customer used to call your contact center. However, it can be overwritten with the Set callback number block. This attribute is not included in CTRs, and it's not accessible in Lambda input. However, you can copy the attribute to a user-defined attribute with the Set contact attribute block, which is included in CTRs. You can also pass this attribute as a Lambda input parameter in an Invoke AWS Lambda function block, which is not included in CTRs.</td>
<td>System</td>
<td>not applicable</td>
</tr>
<tr>
<td>Attribute</td>
<td>Description</td>
<td>Type</td>
<td>JSONPath Reference</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Stored customer input</td>
<td>An attribute created from the most recent invocation of a <strong>Store customer input</strong> block. The attribute values created from the most recent Store customer input block invocation. This attribute is not included in CTRs, and is not accessible in Lambda input. You can copy the attribute to a user-defined attribute with the Set contact attribute block, which is included in CTRs. You can also pass this attribute as a Lambda input parameter in an Invoke AWS Lambda function block.</td>
<td>System</td>
<td>not applicable</td>
</tr>
<tr>
<td>Queue name</td>
<td>The name of the queue.</td>
<td>System</td>
<td>$.Queue.Name</td>
</tr>
<tr>
<td>Queue ARN</td>
<td>The ARN for the queue.</td>
<td>System</td>
<td>$.Queue.ARN</td>
</tr>
<tr>
<td>Queue outbound number</td>
<td>The Outbound caller ID number for the selected queue. This attribute is only available in outbound whisper contact flows.</td>
<td>System</td>
<td>$.Queue.ARN</td>
</tr>
<tr>
<td>Text to speech voice</td>
<td>The name of the Amazon Polly voice to use for text-to-speech in a contact flow.</td>
<td>System</td>
<td>$.TextToSpeechVoiceId</td>
</tr>
<tr>
<td>Contact id</td>
<td>The unique identifier of the contact.</td>
<td>System</td>
<td>$.ContactId</td>
</tr>
<tr>
<td>Initial contact id</td>
<td>The unique identifier for the contact associated with the first interaction between the customer and your contact center. Use the initial contact ID to track contacts between contact flows.</td>
<td>System</td>
<td>$.InitialContactId</td>
</tr>
<tr>
<td>Attribute</td>
<td>Description</td>
<td>Type</td>
<td>JSONPath Reference</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Previous contact id</td>
<td>The unique identifier for the contact before it was transferred. Use the previous contact ID to trace contacts between contact flows.</td>
<td>System</td>
<td>$.PreviousContactId</td>
</tr>
<tr>
<td>Channel</td>
<td>The method used to contact your contact center: VOICE, CHAT, TASK.</td>
<td>System</td>
<td>$.Channel</td>
</tr>
<tr>
<td>Instance ARN</td>
<td>The ARN for your Amazon Connect instance.</td>
<td>System</td>
<td>$.InstanceARN</td>
</tr>
<tr>
<td>Initiation method</td>
<td>How the contact was initiated. Valid values include: INBOUND, OUTBOUND, TRANSFER, CALLBACK, QUEUE_TRANSFER, DISCONNECT, and API. Initiation method doesn't work in Agent whisper flows or Customer whisper flows.</td>
<td>System</td>
<td>$.InitiationMethod</td>
</tr>
<tr>
<td>Name</td>
<td>The name of the task.</td>
<td>System</td>
<td>$.Name</td>
</tr>
<tr>
<td>Description</td>
<td>A description of the task.</td>
<td>System</td>
<td>$.Description</td>
</tr>
<tr>
<td>References</td>
<td>Links to other documents that are related to a contact.</td>
<td>System</td>
<td>$.References.ReferenceKey.Value and $.References.ReferenceKey.Type where ReferenceKey is the user-defined Reference name.</td>
</tr>
<tr>
<td>System Endpoint Type</td>
<td>The type of the system endpoint. Valid value is TELEPHONE_NUMBER.</td>
<td>System</td>
<td>$.SystemEndpoint.Type</td>
</tr>
<tr>
<td>Attribute</td>
<td>Description</td>
<td>Type</td>
<td>JSONPath Reference</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Customer Endpoint type</td>
<td>The type of the customer endpoint. Valid value is TELEPHONE_NUMBER.</td>
<td>System</td>
<td>$.CustomerEndpoint.Type</td>
</tr>
<tr>
<td>Queue Outbound Caller ID</td>
<td>The outbound caller ID number defined for the queue. This can be useful for reverting the caller ID after setting a custom caller ID.</td>
<td>System</td>
<td>$.Queue.OutboundCallerId.Address</td>
</tr>
<tr>
<td>Queue Outbound Caller ID</td>
<td>The type of the outbound caller ID number. Valid value is TELEPHONE_NUMBER.</td>
<td>System</td>
<td>$.Queue.OutboundCallerId.Type</td>
</tr>
</tbody>
</table>

**Agent attributes**

The following table lists the agent attributes available in Amazon Connect.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent User name</td>
<td>The user name an agent uses to log in to Amazon Connect.</td>
<td>System</td>
<td>$.Agent.UserName</td>
</tr>
<tr>
<td>Agent First name</td>
<td>The agent’s first name as entered in their Amazon Connect user account.</td>
<td>System</td>
<td>$.Agent.FirstName</td>
</tr>
<tr>
<td>Agent Last name</td>
<td>The agent’s last name as entered in their Amazon Connect user account.</td>
<td>System</td>
<td>$.Agent.LastName</td>
</tr>
<tr>
<td>Agent ARN</td>
<td>The ARN of the agent.</td>
<td>System</td>
<td>$.Agent.ARN</td>
</tr>
</tbody>
</table>

**Note**

When you use an agent contact attribute in a **Transfer to agent** flow, the agent attributes reflect the target agent, not the one who initiated the transfer.

Agent attributes are available only in the following types of contact flows:

- Agent whisper
- Customer whisper
- Agent hold
- Customer whisper
- Outbound whisper
- Transfer to agent. In this case, the agent attributes reflect the target agent, not the one who initiated the transfer.
Agent attributes are not available in the following contact flow types:

- Customer queue
- Transfer to queue
- Inbound contact flow

## Queue attributes

These system attributes are returned when you use a **Get queue metrics** block in your contact flow.

If there is no current activity in your contact center, null values are returned for these attributes.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queue name</td>
<td>The name of the queue for which metrics were retrieved.</td>
<td>System</td>
<td>$.Metrics.Queue.Name</td>
</tr>
<tr>
<td>Queue ARN</td>
<td>The ARN of the queue for which metrics were retrieved.</td>
<td>System</td>
<td>$.Metrics.Queue.ARN</td>
</tr>
<tr>
<td>Contacts in queue</td>
<td>The number of contacts currently in the queue.</td>
<td>System</td>
<td>$.Metrics.Queue.Size</td>
</tr>
<tr>
<td>Oldest contact in queue</td>
<td>For the contact that has been in the queue the longest, the length of time</td>
<td>System</td>
<td>$.Metrics.Queue.OldestContactAge</td>
</tr>
<tr>
<td></td>
<td>that the contact has been in the queue, in seconds.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agents online</td>
<td>The number of agents currently online, which means logged in and in any state</td>
<td>System</td>
<td>$.Metrics.Agents.Online.Count</td>
</tr>
<tr>
<td></td>
<td>other than offline.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agents staffed</td>
<td>The number of agents currently staffed, which is agents logged in and in</td>
<td>System</td>
<td>$.Metrics.Agents.Staffed.Count</td>
</tr>
<tr>
<td></td>
<td>Available, ACW, or Busy states.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agents in After contact</td>
<td>The number of agents currently in the ACW state.</td>
<td>System</td>
<td>$.Metrics.Agents.AfterContactWork.Count</td>
</tr>
<tr>
<td>work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agents busy</td>
<td>The number of agents currently active on a contact.</td>
<td>System</td>
<td>$.Metrics.Agents.Busy.Count</td>
</tr>
</tbody>
</table>
List of attributes and their JSONPath reference

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>which is the state an agent enters after a missed contact.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Telephony call metadata attributes (call attributes)

Telephony metadata provides additional information related to call origination from telephony carriers.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-Charge-Info</td>
<td>The party responsible for the charges associated with the call.</td>
<td>System</td>
<td>$.Media.Sip.Headers.P-Charge-Info</td>
</tr>
<tr>
<td>From</td>
<td>The identity of the end user associated with the request.</td>
<td>System</td>
<td>$.Media.Sip.Headers.From</td>
</tr>
<tr>
<td>To</td>
<td>Information about the called party or the recipient of the request.</td>
<td>System</td>
<td>$.Media.Sip.Headers.To</td>
</tr>
<tr>
<td>Example value: 212555</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example value: 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example value: 710</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example value: 0235</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### List of attributes and their JSONPath reference

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Call-Forwarding-Indicator</strong></td>
<td>Call Forwarding Indicators (for example, Diversion header). Indicates domestic or international origin of call.</td>
<td>System</td>
<td>$.Media.Sip.Headers.Call-Forwarding-Indicator</td>
</tr>
<tr>
<td></td>
<td>Example value: sip: <a href="mailto:+15555555555@public-vip.us2.telphony-provider.com">+15555555555@public-vip.us2.telphony-provider.com</a>;reason=unconditional</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calling-Party-Address</strong></td>
<td>Calling Party Address (number). NPAC dip shows true line type and native geographic switch.</td>
<td>System</td>
<td>$.Media.Sip.Headers.Calling-Party-Address</td>
</tr>
<tr>
<td></td>
<td>Example value: 15555555555;noa=4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Example value: 15555555555;noa=4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**
The availability of telephony metadata is not consistent across all telephony providers and may not be available in all cases. This may result in empty values.

### Media streams attributes

The following table lists the attributes that you can use to identify the location in the live media stream where the customer audio starts and stops.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer audio stream ARN</strong></td>
<td>The ARN of the Kinesis Video stream used for Live media streaming that includes the customer data to reference.</td>
<td>Media streams</td>
<td>$.MediaStreams.Customer.Audio.StreamARN</td>
</tr>
<tr>
<td><strong>Customer audio start timestamp</strong></td>
<td>When the customer audio stream started.</td>
<td>Media streams</td>
<td>$.MediaStreams.Customer.Audio.Start</td>
</tr>
<tr>
<td><strong>Customer audio stop timestamp</strong></td>
<td>When the customer audio stream stopped the Kinesis video.</td>
<td>Media streams</td>
<td>$.MediaStreams.Customer.Audio.Stop</td>
</tr>
</tbody>
</table>
Amazon Connect Administrator Guide  
List of attributes and their JSONPath reference

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer audio start fragment number</td>
<td>The number that identifies the Kinesis Video Streams fragment, in the stream used for Live media streaming, in which the customer audio stream started.</td>
<td>Media streams</td>
<td>$.MediaStreams.Customer.Audio.StartFragmentNumber</td>
</tr>
</tbody>
</table>

### Amazon Lex contact attributes

The following table lists the attributes that are returned from Amazon Lex bots.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialog state</td>
<td>The last dialog state returned from an Amazon Lex bot. The value is 'Fulfilled' if an intent was returned to the contact flow.</td>
<td>N/A (no type appears in the UI)</td>
<td>$.Lex.DialogState</td>
</tr>
<tr>
<td>Intent name</td>
<td>The user intent returned by Amazon Lex.</td>
<td>System</td>
<td>$.Lex.IntentName</td>
</tr>
<tr>
<td>Slots</td>
<td>Map of intent slots (key/value pairs) Amazon Lex detected from the user input during the interaction.</td>
<td>Lex Slots</td>
<td>$.Lex.Slots.slotName</td>
</tr>
<tr>
<td>Session attributes</td>
<td>Map of key-value pairs representing the session-specific context information.</td>
<td>Lex Attributes</td>
<td>$.Lex.SessionAttributes.attributeKey</td>
</tr>
</tbody>
</table>

### Lambda contact attributes

Lambda attributes are returned as key-value pairs from the most recent invocation of an Invoke AWS Lambda function block. External attributes are overwritten with each invocation of the Lambda function.

To reference external attributes in JSONPath, use:

- `$.External.attributeName`

where `AttributeName` is the attribute name, or the key of the key-value pair returned from the function.
For example, if the function returns a contact ID, reference the attribute with $.External.ContactId. When referencing a contact ID returned from Amazon Connect, the JSONPath is $.ContactId.

Note
Note the inclusion of .External in the JSONPath reference when the attribute is external to Amazon Connect. Make sure to match the case for attribute names returned from external sources.

For more information about using attributes in Lambda functions, see Invoke AWS Lambda functions (p. 432).

These attributes are not included in CTRs, not passed to the next Lambda invocation, and not passed to the CCP for screenpop information. However, they can be passed as Lambda function inputs on an Invoke AWS Lambda function block, or copied to user-defined attributes via the Set contact attributes block. When used in Set contact attributes blocks, the attributes that are copied are included in CTRs, and can be used in the CCP.

User-defined attributes

For all other attributes Amazon Connect defines the key and value. For user-defined attributes, however, you provide a name for the key and the value.

Use user-defined attributes in situations where you want to store values in a contact flow, and then refer to those values later. For example, if you integrate Amazon Connect and a CRM or other system, you might want to get input from the customer such as their member number. Then you can use that member number retrieve information about the member from the CRM, and/or use the member number throughout the contact flow, etc.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any name you choose</td>
<td>A user-defined attribute has two parts:</td>
<td>User-defined</td>
<td>$.Attributes.name_of_your_destination_key</td>
</tr>
<tr>
<td></td>
<td>• Destination key: this is any name you choose for the key.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>However, the $ and . (period) characters are not allowed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>because they are both used in defining the attribute paths in JSONPath.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Value: this is can be any value you choose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>You can enter several paragraphs worth of text if you want!</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(For the Max size of the CTR attributes section, see Feature specifications (p. 929).)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To create user-defined attributes, use the Set contact attributes (p. 350) block.
Apple Business Chat attributes

Use the following contact attributes to route Apple Business Chat customers. For example, if you have different lines of business using Apple Business Chat, you can branch to different contact flows based on the AppleBusinessChatGroup contact attribute. Or, if you want to route Apple Business Chat messages differently from other chat messages, you can branch based on MessagingPlatform.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>MessagingPlatform</td>
<td>The messaging platform from where the customer request originated. Exact value: AppleBusinessChat</td>
<td>User-defined</td>
<td>$.Attributes.MessagingPlatform</td>
</tr>
<tr>
<td>AppleBusinessChatCustomerId</td>
<td>The customer's opaque ID provided by Apple. This remains constant for the AppleID and a business. You can use this to identify if the message is from a new customer or a returning customer.</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatCustomerId</td>
</tr>
<tr>
<td>AppleBusinessChatIntent</td>
<td>You can define the intent or purpose of the chat. This parameter is included in a URL that initiates a chat session in Messages when a customer chooses the Business Chat button.</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatIntent</td>
</tr>
<tr>
<td>AppleBusinessChatGroup</td>
<td>You define the group which designates the department or individuals best qualified to handle the customer’s particular question or problem. This parameter is included in a URL that initiates a chat session in Messages when a customer chooses the Business Chat button.</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatGroup</td>
</tr>
<tr>
<td>AppleBusinessChatLocale</td>
<td>Defines the language and AWS Region preferences that the user wants to see in their user interface. It consists of a language identifier (ISO 639-1)</td>
<td>User-defined</td>
<td>$.Attributes.AppleBusinessChatLocale</td>
</tr>
</tbody>
</table>
Customer Profiles attributes

Use the following contact attributes to autopopulate customer profiles in the agent app using the value of your choosing.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>profileSearchKey</td>
<td>A user-defined attribute that has two parts:</td>
<td>User-defined</td>
<td>$.Attributes.name_of_your_destination_key</td>
</tr>
<tr>
<td></td>
<td>• Destination key: this is any name you choose for the key. However, the $ and . (period) characters are not allowed because they are both used in defining the attribute paths in JSONPath.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Value: this is can be any value you choose. You can enter several paragraphs worth of text if you want! (For the Max size of the CTR attributes section, see Feature specifications (p. 929).)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How to reference contact attributes

The way you reference contact attributes depends on how they were created and how you are accessing them.

- To reference attributes in the same namespace, such as a system attribute, you use the attribute name, or the name you specified as the Destination key.
- To reference values in a different namespace, such as referencing an external attribute, you specify the JSONPath syntax to the attribute.
- To use contact attributes to access other resources, set a user-defined attribute in your contact flow and use the Amazon Resource Name (ARN) of the resource you want to access as the value for the attribute.
Lambda examples

- To reference a customer name from a Lambda function lookup, use $.External.AttributeKey, replacing AttributeKey with the key (or name) of the attribute returned from the Lambda function.
- To use an Amazon Connect prompt in a Lambda function, set a user-defined attribute to the ARN for the prompt, and then access that attribute from the Lambda function.

Amazon Lex examples

- To reference an attribute from an Amazon Lex bot, you use the format $.Lex. and then include the part of the Amazon Lex bot to reference, such as $.Lex.IntentName.
- To reference the customer input to an Amazon Lex bot slot, use $.Lex.Slots.slotName, replacing slotName with the name of the slot in the bot.

Set contact attribute example

Use a Set contact attributes (p. 350) block to set a value that is later referenced in a contact flow. For example, create a personalized greeting for customers routed to a queue based on the type of customer account. You could also define an attribute for a company name or line of business to include in the text to speech strings said to a customer. The Set contact attributes block is useful for copying attributes retrieved from external sources to user-defined attributes.

To set a contact attribute with a Set contact attributes (p. 350) block

1. In Amazon Connect, choose Routing, Contact flows.
2. Select an existing contact flow, or create a new one.
3. Add a Set contact attributes block.
4. Edit the Set contact attributes block, and choose Use text.
5. For the Destination key, provide a name for the attribute, such as Company. This is the value you use for the Attribute field when using or referencing attributes in other blocks. For the Value, use your company name.

You can also choose to use an existing attribute as the basis for creating the new attribute.

Display contact information to the agent in the CCP

You can use contact attributes to capture information about the contact and then present it to the agent through the Contact Control Panel (CCP). For example, you might want to do this to customize the agent experience when using the CCP integrated with a customer relationship management (CRM) application.

Also use them when integrating Amazon Connect with a custom application using the Amazon Connect Streams API or Amazon Connect API. You can use all user-defined attributes, in addition to the customer number and the dialed number, in the CCP using the Amazon Connect Streams JavaScript library. For more information, see Amazon Connect Streams API or Amazon Connect API.

When you use the Amazon Connect Streams API, you can access user-defined attributes by invoking contact.getAttributes(). You can access endpoints via contact.getConnections(), where a connection has a getEndpoint() invocation on it.

To access the attribute directly from a Lambda function, use $.External.AttributeName. If the attribute is stored to a user-defined attribute from a Set contact attributes block, use $.Attributes.AttributeName.
For example, included with your Amazon Connect instance, there is a contact flow named “Sample note for screenpop.” In this contact flow, a *Set contact attributes* block is used to create an attribute from a text string. The text, as an attribute, can be passed to the CCP to display a note to an agent.

## Route based on number of contacts in a queue

Amazon Connect includes queue attributes that can help you define routing conditions in your contact flows based on real-time metrics about the queues and agents in your contact center. For example, here are some common usage scenarios:

- Check the number of contacts or available agents in a queue, and how long the oldest contact has been in a queue, then route accordingly.
- To route to the queue with the fewest contacts in it:
  1. Get metrics for multiple queues.
  2. Use a *Set contact attributes* block to store the metric attributes for each queue.
  3. Compare queue metric attributes using a *Check contact attributes* block, and route the contact to the queue with the fewest calls in it, or to a callback if all queues are busy.

### Using a Check contact attributes block to route a contact to a queue

1. In Amazon Connect, choose **Routing, Contact flows**.
2. Open an existing contact flow or create a new one.
3. Optionally, under **Interact**, add a **Play prompt** block to the designer to play a greeting to your customers. Add a connector between the **Entry point** block and the **Play prompt** block.
4. Under **Set**, drag a **Get queue metrics** block to the designer, and connect the **Okay** branch of the **Play prompt** block to it.
5. Choose the title of the **Get queue metrics** block to open the properties for the block. By default, the block retrieves metrics for the current working queue. To retrieve metrics for a different queue, choose **Set queue**.
6. Choose **Select a queue**, then select the queue to retrieve metrics for from the drop-down, then choose **Save**.

   You can also determine which queue to retrieve metrics for using contact attributes.

7. Under **Branch**, drag a **Check contact attributes** block to the designer.
8. Choose the title of the block to display the settings for the block. Then, under **Attribute to check**, select **Queue metrics** in the **Type** drop-down menu.
9. Under **Attribute**, choose **Contacts in queue**.
10. To use conditions to route the contact, choose **Add another condition**.

   By default, the **Check contact attributes** block includes a single condition, **No match**. The **No match** branch is followed when there are no matches for any of the conditions you define in the block.
11. Under **Conditions to check**, select **Is less than** as the operator for the condition in the drop-down menu, then in the value field enter 5.
12. Choose **Add another condition**, then choose **Is greater or equal** from the drop-down menu, and enter 5 in the value field.
13. Choose **Save**.

   You now see two new output branches for the **Check contact attributes** block.

You can now add additional blocks to the contact flow to route the contact as desired. For example, connect the `< 5` branch to a **Transfer to queue** block to transfer calls to the queue when there are fewer...
than five calls currently in the queue. Connect the > 5 branch to a Set customer callback number block and then transfer the call to a callback queue using a **Transfer to queue** block so the customer doesn't have to stay on hold.

## Route contacts based on queue metrics

Many contact centers route customers based on the number of contacts waiting in a queue. This topic explains how to configure a contact flow that looks similar to the following image.

1. Add a **Set contact attributes** (p. 350) block to your contact flow.
2. In the **Set contact attributes** (p. 350), specify the channel. If you set a channel dynamically using text, for the attribute value enter **Voice** or **Chat**, as shown in the following image. This value is not case-sensitive.
3. Add a Get queue metrics (p. 328) block to your contact flow.

In the Get queue metrics block, dynamic attributes can only return metrics for one channel

Add a Check contact attributes block after the Get queue metrics block

After a Get queue metrics block, add a Check contact attributes (p. 299) block to branch based on the returned metrics. Use the following steps:

1. After Get queue metrics, add a Check contact attributes block.
2. In the Check contact attributes block, set Attribute to check to Queue metrics.
3. In the Attributes dropdown box, you’ll see that the following queue metrics are returned by the Get queue metrics block. Choose the metric that you want to use for the routing decision.

4. Choose Add a condition to enter the comparison for your routing decision.
Route based on contact's channel

You can personalize the customer's experience based on the channel that they use to contact you. Here's what you do:

1. Add a **Check contact attributes** block to the beginning of your contact flow.
2. Configure the block as shown in the following image:
3. If the customer is contacting you through chat, specify what should happen next.

4. If the customer is contacting you through a call (No Match), specify the next step in the flow.

Use Amazon Lex and attributes

When you reference attributes in a Get customer input block, and choose Amazon Lex as the method of collecting the input, the attribute values are retrieved and stored from the output from the customer interaction with the Amazon Lex bot. You can use an attribute for each intent or slot used in the Amazon Lex bot, as well as the sessions attributes associated with the bot. An output branch is added to the block for each intent you include. When a customer chooses an intent when interacting with the bot, the branch associated with that intent is followed in the contact flow.

For a list of Amazon Lex attributes you can use, see Amazon Lex contact attributes (p. 455).
Using an Amazon Lex bot to get customer input

1. Open an existing or create a new contact flow.
2. Under Interact, drag a Get customer input block to the designer.
3. Choose the title of the block to display the block settings, then select Text to speech (Ad hoc).
4. Choose Enter text, then enter text in the Enter text to be spoken field that is used as a message or greeting to your customers. For example, "Thank you for calling" followed by a request to enter information to fulfill the intents you defined in your Amazon Lex bot.
5. Choose the Amazon Lex tab, then from the drop-down menu, choose the Amazon Lex bot to use to get customer input.
6. By default, the Alias field is populated with $LATEST. To use a different alias of the bot, enter the alias value to use.

   **Important**
   In a production environment, always use a different alias than TestBotAlias for Amazon Lex and $LATEST for Amazon Lex classic. TestBotAlias and $LATEST support a limited number of concurrent calls to an Amazon Lex bot. For more information, see Runtime Service Quotas or Runtime Service Quotas (Amazon Lex Classic).
7. Optionally, to pass an attribute to Amazon Lex to use as a session attribute, choose Add an attribute. Specify the value to pass using either text or an attribute.
8. To create a branch from the block based on the customer intent, choose Add an intent, then enter the name of the intent exactly the same as the intent name in your bot.
9. Choose Save.

How to use Lex session attributes

When a customer starts a conversation with your bot, Amazon Lex creates a session. With session attributes, also known as Lex attributes, you can pass information between the bot and Amazon Connect during the session. For a list of Amazon Lex attributes you can use, see Amazon Lex contact attributes (p. 455).

Life cycle of session attributes

There's one set of session attributes per conversation. In cases where a Lambda is invoked to do some processing, following is the order of precedence:

- Service defaults: these attributes are only used if no attributes are defined.
- Session attributes provided by Amazon Connect: these attributes are defined in the Get customer input (p. 318) block.
- Session attributes provided by Lambda override everything prior: When a Lambda function is invoked and it does some processing, it overrides any session attributes set in the Get customer input (p. 318) block.

Let's say a customer utters that they want a car. That's the first session attribute to go through processing. When asked what kind of car, they say luxury car, this second utterance overrides any Lambda processing that took place on the first utterance.

For an example of how to create a Lambda function that processes session attributes, see Step 1: Create a Lambda Function in the Amazon Lex Developer Guide.

For the structure of the event data that Amazon Lex provides to a Lambda function, see Lambda Function Input Event and Response Format in the Amazon Lex Developer Guide.
Contact blocks that support Lex session attributes

You can use Lex session attributes in the following blocks when a Lex bot is called:

- Get customer input
- Set contact attributes
- Set hold flow
- Set working queue
- Set customer queue flow
- Set disconnect flow
- Set logging behavior
- Set callback number
- Set whisper flow
- Change routing priority/age
- Check contact attributes
- Loop
- Wait
- Invoke AWS Lambda function
- Transfer to phone number
- Transfer to flow

More information

For more information about using Amazon Lex session attributes, see Managing Conversation Context in the Amazon Lex Developer Guide.

How to use the same bot for voice and chat

You can use the same bot for both voice and chat. However, you may want the bot to respond differently based on the channel. For example, you want to return SSML for voice so a number is read as a phone number but you want to return normal text to chat. You can do this by passing the Channel attribute.

1. In the Get customer input block, choose the Amazon Lex tab.
2. Under Session attributes, choose Use attribute. Enter phoneNumber, and set to System, Customer Number, as shown in the following image.
3. Choose **Add another attribute**.

4. Select **Use attribute**. Enter **callType**, **System**, **Channel**, as shown in the following image.

5. Choose **Save**.

6. In your Lambda function, you can access this value in the SessionAttributes field in the incoming event.
Lambda functions and attributes

Retrieve data from a system your organization uses internally, such as an ordering system or other database with a Lambda function, and store the values as attributes that can then be referenced in a contact flow.

When the Lambda function returns a response from your internal system, the response is key-value pairs of data. You can reference the values returned in the External namespace, for example $.External.attributeName. To use the attributes later in a contact flow, you can copy the key-value pairs to user-defined attributes using a Set contact attributes block. You can then define logic to branch your contact based on attribute values by using a Check contact attributes block. Any contact attribute retrieved from a Lambda function is overwritten with the next invocation of a Lambda function. Make sure you store external attributes if you want to reference them later in a contact flow.

To store an external value from a Lambda function as a contact attribute

1. In Amazon Connect, choose Routing, Contact flows.
2. Select an existing contact flow, or create a new one.
3. Add an Invoke AWS Lambda function block, then choose the title of the block to open the settings for the block.
4. Add the Function ARN to your AWS Lambda function that retrieves customer data from your internal system.
5. After the Invoke AWS Lambda function block, add a Set contact attributes block and connect the Success branch of the Invoke AWS Lambda function block to it.
6. Edit the Set contact attributes block, and select Use attribute.
7. For Destination key, type a name to use as a reference to the attribute, such as customerName. This is the value you use in the Attribute field in other blocks to reference this attribute.
8. For the Type, choose External.
9. For Attribute type the name of the attribute returned from the Lambda function. The name of the attribute returned from the function will vary depending on your internal system and the function you use.

After this block executes during a contact flow, the value is saved as a user-defined attribute with the name specified by the Destination key, in this case customerName. It can be accessed in any block that uses dynamic attributes.

To branch your contact flow based on the value of an external attribute, such as an account number, use a Check contact attributes block, and then add a condition to compare the value of the attribute to. Next, branch the contact flow based on the condition.

1. In the Check contact attributes block, for Attribute to check do one of the following:
   - Select External for the Type, then enter the key name returned from the Lambda function in the Attribute field.
     Important
     Any attribute returned from an AWS Lambda function is overwritten with the next function invocation. To reference them later in a contact flow, store them as user-defined attributes.
   - Select User Defined for the Type, and in the Attribute field, type the name that you specified as the Destination key in the Set contact attributes block.
2. Choose Add another condition.
3. Under Conditions to check, choose the operator for the condition, then enter a value to compare to the attribute value. A branch is created for each comparison you enter, letting you route the contact
based on the conditions specified. If no condition is matched, the contact takes the **No Match** branch from the block.

## Migrate contact flows to a different instance

Amazon Connect lets you efficiently migrate contact flows to another instance. For example, you might want to expand into new Regions, or move contact flows from your development environment to your production environment.

To migrate a few contact flows, use the import/export feature (p. 431) in the contact flow designer.

To migrate hundreds of contact flows, you need developer skills. You use the following procedure:

1. **Source instance**
   - `ListContactFlow`: Retrieve the Amazon Resource Number (ARN) for the contact flows that you want to migrate.
   - `DescribeContactFlow`: Get information about each contact flow that you want to migrate.

2. **Destination instance**
   - `CreateContactFlow`: Create the contact flows.
   - `UpdateContactFlowContent`: Update the contact flow content.

You must also build an ARN-to-ARN mapping for queues, contact flows, and prompts between the source and target Amazon Connect instances, and replace every ARN in the source contact flow with the corresponding ARN from the target instance. Otherwise `UpdateContactFlowContent` fails with `InvalidContactFlow` error.

You can update the information in the contact flows that you migrate. For more information, see [Amazon Connect Flow Language](p. 469).

## Amazon Connect Flow language

This section describes the Amazon Connect Flow language and how to use it. The Flow language is a JSON-based representation of a series of flow actions, and the criteria for moving between them.

We’ve provided you with the Flow language so you can:

- Efficiently update contact flows that you’re migrating from one instance to another.
- Write contact flows rather than drag blocks onto the contact flow designer.

### Contents

- [Amazon Connect Flow language concepts](p. 469)
- [Example contact flow in Amazon Connect Flow language](p. 470)
- [Actions in the Amazon Connect Flow Language](p. 471)

## Amazon Connect Flow language concepts

The following terms are used in the Flow language.

### Contact

Flows can be run in context of a contact. In this case, they are referred to as *contact flows*. 
Participant

Contact flows can additionally be run in a participant context. This allows participant actions—such as playing prompts or getting customer input—to be run. Certain types of contact flows, such as "No participants remaining" disconnect flows and Workitem contact flows, don't have a participant associated.

Action types

Flow actions have the following implicit types associated with them. A type determines when an action is attempted.

- **Contact actions in the Amazon Connect Flow language (p. 474).** These actions are attempted only when the flow is run in context of a contact. They generally result in contact data being manipulated in some way.
- **Flow control actions in the Amazon Connect Flow language (p. 482).** These actions are used only to determine the path through a flow. They have no side effects. Certain data may not be available. For example, contact data isn't available if the action is determining its path based on contact data. These actions generally work in every circumstance.
- **Interactions in the Amazon Connect Flow language (p. 488).** These actions have side effects, but don't require a contact or a participant. Interactions include actions such as invoking an AWS Lambda function. They generally work in every circumstance.
- **Participant actions in the Amazon Connect Flow language (p. 490).** These actions are attempted only when the flow is run in context of a participant. They generally result in an action that the participant experiences, such as playing a prompt or disconnecting.

Example contact flow in Amazon Connect Flow language

The following example shows a simple contact flow that plays a prompt using static text and disconnects.

To learn how to get block identifiers, we recommend creating a new contact flow in Amazon Connect console, and then calling the DescribeContactFlow API for it.

```json
{
  "Version": "2019-10-30", //A string representing the version of the Flow. Currently
  the only supported version is 2019-10-30.

  "StartAction": "12345678-1234-1234-1234-123456789012", //A string representing the
  first Action to run when the flow starts running.

  "Metadata": { //An object that may be filled in with data as desired.
    "EntryPointPosition": {
      "x": 88,
      "y": 100
    },
    "ActionMetadata": {
      "12345678-1234-1234-1234-123456789012": { //The identifier of the Play

      "Position": {
        "x": 270,
```

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Actions in the Amazon Connect Flow Language

An Action is a single step of a flow's run. This topic describes the fields that must be defined.

**Identifier**

A string that must be unique among all Actions within the same Flow. This Identifier can be up to 50 characters long, and can include any characters (including unicode and spaces). They can be opaque or user-friendly.

**Type**

A string that identifies the type of action being performed for a particular step of the Flow. This type must be one of a list of allowable Types, which are covered later.

**Parameters**

An object that defines the customizable behavior of a particular Action block. Each Action has its own format of this Parameters object, which is detailed in the individual Actions definition.
The Parameters object defines customizable behavior for the Action. For example, it defines which Attributes to set or which AWS Lambda function to run. The format differs for each Action type. To find the specific format of a specific Action's Parameter object, see the individual Action's definition below.

**Transitions**

An object that defines the behavior for choosing the next Action after the current Action completes. Certain Actions terminate, meaning that they finish running the flow when they're run. This is because Transitions must be defined as an empty object.

The Transitions object defines how to proceed to the next Action during flow runtime. This object must have the following fields specified:

**NextAction**

NextAction is a string that contains the Identifier of the Action that should be run after this Action, if no error or condition is preferentially chosen.

**Errors**

Errors is a list of error objects. Each error object contains a type or category of error (ErrorType), and the Identifier of the Action that should be run subsequently when that error occurs (NextAction).

Each individual Action supports specific Errors, detailed in the Action's definition later, and the following commonly supported errors:

- NoMatchingError. This is invoked when an error occurs and no other Error matches.
- NoMatchingCondition. This is invoked if no defined condition resolves to true.

**Conditions**

Conditions are an ordered list that defines a series of checks to evaluate against the Action's result. This result changes per Action and can also change based on Parameters - examples of these are "the number of contacts in queue" for the CheckMetricData Action if the MetricType parameter refers to the NumberOfContactsInQueue, and "the value of the attribute" for the Compare Action. Conditions are evaluated in order, and the first Condition that evaluates to true will result in it being chosen as the Transition to occur, making that Condition's Target the next Action run. The Conditions object is explained in more detail below.

A Condition is a definition of how to evaluate an Action's result, and may evaluate to true or false. The Conditions object on the flow contains an ordered list of objects. Each object contains a NextAction (the Identifier of the Action to be invoked if the Condition evaluates to be true) and the Condition to evaluate:

- NextAction: A string that contains the Identifier of the Action that should be run after this Action if this Condition is the first condition to evaluate to true.
- Condition: An object that defines the evaluation logic.

**The Condition object**

The Condition object must contain the following fields:

- **Operator**: A string that indicates which comparison operator that is applied to the Operands. The list of allowed Operators and a description of their logic is defined in the following table.
- **Operands**: A list of operands to which the Operator is applied. Depending on the Operator, these Operands may be strings or they may be Condition objects. The specific Operator defines which type of Operand is expected, along with the number of Operands expected (some Operators will require
only one Operand, some will support a list of up to ten Operands). Conditions may be nested no more than five Conditions deep, and a single Condition may not contain more than 50 sub-Conditions, regardless of how deeply nested they are.

### List of Operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Description</th>
<th>Operand type</th>
<th>Operand count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equals</td>
<td>Returns true if the string specified exactly equals the result.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>TextStartsWith</td>
<td>Returns true if the result, interpreted as text, begins with the specified string.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>TextEndsWith</td>
<td>Returns true if the result, interpreted as text, ends with the specified string.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>TextContains</td>
<td>Returns true if the result, interpreted as text, contains the specified string at least once.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>NumberGreaterThan</td>
<td>Returns true if the result, interpreted as a numeric value, is larger than the specified string. If either the result or the specified string are not numeric, returns false.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>NumberGreaterOrEqualTo</td>
<td>Returns true if the result, interpreted as a numeric value, is larger than or equal to the specified string. If either the result or the specified string are not numeric, returns false.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>NumberLessThan</td>
<td>Returns true if the result, interpreted as a numeric value, is smaller than the specified string. If either the result or the specified string are not numeric, returns false.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>NumberLessOrEqualTo</td>
<td>Returns true if the result, interpreted as a numeric value, is smaller than or equal to the specified string. If either the result or the specified string are not numeric, returns false.</td>
<td>String</td>
<td>One</td>
</tr>
<tr>
<td>Operator</td>
<td>Description</td>
<td>Operand type</td>
<td>Operand count</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>a numeric value, is smaller than or equal to the specified string. If either the result or the specified string are not numeric, returns false.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example Condition**

Following is an example of a condition that returns true if the result starts with "ABC":

```json
{
    "Operator": "TextStartsWith",
    "Operands": [
        "ABC"
    ]
}
```

**Parameter restrictions for actions in the Amazon Connect Flow language**

There are several restrictions on parameters. Here's what they mean:

- Must be defined statically. This means that JSONPath cannot be used at all in this value.
- Must be defined statically or as a single valid JSONPath identifier. If JSONPath is used, it must be the entirety of the value; you can't specify an input of "My name is $.Name". Further, the JSONPath must be valid - $.Attributes.stuff is okay, $.BadValue is not okay because there's no "BadValue" path on the object used by flows.
- May be defined statically or dynamically. Anything goes. A value of "My name is $.Name" is fine here, as well as a fully static value.

**Contact actions in the Amazon Connect Flow language**

Contact actions are attempted only for flows that run in context of a contact. They generally result in contact data being manipulated in some way.

**Contents**

- CompleteOutboundCall (p. 475)
- DequeueContactAndTransferToQueue (p. 475)
- TransferContactToAgent (p. 476)
- TransferContactToQueue (p. 476)
- UpdateContactAttributes (p. 477)
- UpdateContactCallbackNumber (p. 477)
- UpdateContactEventHooks (p. 478)
- UpdateContactMediaStreamingBehavior (p. 478)
- UpdateContactRecordingBehavior (p. 479)
- UpdateContactRoutingBehavior (p. 480)
CompleteOutboundCall

When a flow is run before an outbound call is made as part of an outbound contact, this action calls the outbound destination. If this action is not used, the first participant action implicitly completes the outbound call.

Parameter object

```json
{
   "CallerId": { Optional, an override of the caller ID to present when calling
   "Number": The caller ID number to present when calling. Can either be fully static
   or a single valid JSONPath identifier
}
}
```

Results and conditions

None.

Errors

None.

Restrictions

This action can be used only when the contact is in the process of making an outbound call, but has not yet called the outbound number.

Corresponding block in the UI

Call phone number (p. 292)

DequeueContactAndTransferToQueue

This action is a combination of a "Dequeue" action and a "TransferContactToQueue" action. This means that a contact in a queue is removed from the queue, a new contact segment is created with the existing contact as its previous contact, and the new contact is placed into the specified queue (referred to as "Queue-to-queue transfer"). If this contact has not been queued, is actively being joined to an agent, or has been routed to an agent, this action fails.

Parameter object

```json
{
   "QueueId": [Optional] A queue ID or queue ARN. If AgentId is specified, this may not be specified. Must be either fully statically defined or a single, valid JSONPath identifier.
   "AgentId": [Optional] An agent ID or agent ARN, representing an agent queue. If QueueId is specified, this may not be specified. Must be either fully statically defined or a single, valid JSONPath identifier.
}
```

Results and conditions

None.
Errors

- QueueAtCapacity - if the destination queue is at capacity and the contact cannot be queued within it.
- NoMatchingError - if no other Error matches.

Restrictions

This action is only supported in the customer queue flow. It is not supported in any other type of flow.

Corresponding block in the UI

Maps to Transfer to flow (p. 382) but only when used in a Customer queue flow.

TransferContactToAgent

Ends the current contact flow and transfers the customer to an agent. If the agent is already with someone else, the contact is disconnected. Transfer contact to agent works only for voice interactions.

Parameter object

No parameters are expected.

Results and conditions

None.

Errors

None.

Restrictions

This action is supported in only transfer to agent and transfer to queue flows.

Corresponding block in the UI

Transfer to agent (beta) (p. 380)

TransferContactToQueue

This action places a contact that is not already in a queue into the contact's TargetQueue. If the contact has already been put into a queue (meaning that it is currently being routed to an agent, being joined to an agent, or is connected to an agent), the action fails.

Parameter object

No parameters are expected.

Results and conditions

None.

Errors

- QueueAtCapacity - if the destination queue is at capacity and the contact cannot be queued within it.
- NoMatchingError - if no other Error matches.
Restrictions

This action is supported in contact flows and transfer flows. It is not supported in whisper flows, customer queue flows, or hold flows.

Corresponding block in the UI

Transfer to queue (p. 387)

**UpdateContactAttributes**

Behaving the same as the public API, this sets a collection of contact attributes. With this type of operation, either all attributes are set or none are set.

**Parameter object**

```json
{
    "Attributes": { an Object that holds the attributes to be set.
        "Key": "Value" Both the key and value may be defined statically or dynamically.
    }
}
```

**Results and conditions**

None.

**Errors**

- NoMatchingError - if no other Error matches.

Restrictions

None. This can be used in any type of flow and any channel.

Corresponding block in the UI

Set contact attributes (p. 350)

**UpdateContactCallbackNumber**

Updates the contact callback number, which is the number used by the CreateCallbackContact action. This value defaults to the customer participant caller ID if this action is never used.

**Parameter object**

```json
{
    "CallbackNumber": The callback number to set. Must be a single, valid JSONPath reference, and cannot be set statically.
}
```

**Results and conditions**

None.

**Errors**

- InvalidCallbackNumber - The callback number specified was not a valid (e.164) phone number.
- CallbackNumberNotDialable - The callback number specified is not dialable by the instance.
Restrictions

This is supported only in contact flows, transfer flows, and customer queue flows. This is not supported in whispers or hold flows.

Corresponding block in the UI

Set callback number (p. 348)

UpdateContactEventHooks

Sets one or more contact event hooks, which are flows associated with contact events, such as customer whisper or agent hold.

Parameter object

```json
{
   "EventHooks": {  
      "Key": "Value" - the event hook to be set where the key is the event type and the value is the contact flow ID or ARN to run when that event occurs. Keys must be defined statically.
   }
}
```

Results and conditions

None.

Errors

- NoMatchingError - if no other Error matches.

Restrictions

This is supported in all types of flows.

Corresponding blocks in the UI

- Set customer queue flow (p. 353)
- Set hold flow (p. 356)
- Set whisper flow (p. 368)

UpdateContactMediaStreamingBehavior

Enables or disables contact media streaming for a set of participants.

Parameter object

```json
{
   "MediaStreamingState": One of "Enabled" or "Disabled". Must be specified statically.
   "Participants": [  
      A list of participants to include in the stream if enabling the stream, or disable if disabling the stream
      
      "ParticipantType": The type of participant to stream. Currently, only "Customer" is supported. Must be defined statically.
   ]
}
```
"MediaDirections": [ ] A list of the directions of media to include in the stream - "From" and "To". Must be defined statically.

"MediaStreamType": The type of media to enable or disable from the stream. Currently, only "Audio" is supported. Must be defined statically.

Results and conditions
None.

Errors
• NoMatchingError - if no other Error matches.

Restrictions
This is supported in contact flows, customer queue flows, transfer flows, and whisper flows. It is not supported in hold flows.

This is supported only by the voice channel.

Corresponding block in the UI
Start media streaming (p. 373) and Stop media streaming (p. 375)

UpdateContactRecordingBehavior
Sets contact recording behavior, including analysis behavior and which participants of the contact to record.

Parameter object

{  "RecordingBehavior": { an object that holds the recording behavior  
    "RecordedParticipants": [ ] a list of participants to record, chosen from "Agent" and "Customer". An empty list disables recording. Must be set statically.  
  }  
  "AnalyticsBehavior": { an object that holds the analytics behavior. Can only be set if the RecordedParticipants contains both Agent and Customer  
    "Enabled": either "True" or "False". Must be set statically.  
    "AnalyticsLanguage": Must be one of list of languages. Must be set statically.  
    "AnalyticsRedactionBehavior": either Enabled or Disabled. Defaults to Disabled if not set. Determines whether to redact sensitive data, such as personal information, in the Contact Lens output file and audio recording.  
    "AnalyticsRedactionResults": either "RedactedAndOriginal" or "RedactedOnly". Can be set dynamically. Determines whether the customer gets both the redacted and the original transcripts and audio files, or just the redacted transcripts and audio files.  
  }  
}

Results and conditions
None.

Errors
None.
Restrictions

This is supported only in contact flows, transfer flows, outbound whispers, and customer queue flows. This is not supported in agent/customer whispers or hold flows.

Analytics is only supported by the voice channel.

Corresponding block in the UI

Set recording and analytics behavior (p. 359)

UpdateContactRoutingBehavior

Updates the contact’s routing details. This can move the contact forward or backward in queue, specify a queue priority, and set routing attributes.

Parameter object

```
{
   "QueuePriority": An integer that represents the queue priority to be applied to the contact (lower priorities are routed preferentially). Cannot be specified if the QueueTimeAdjustmentSeconds or RoutingProficiencies is specified. Must be statically defined, must be larger than zero, and a valid integer value.
   "QueueTimeAdjustmentSeconds": An integer that represents the queue time adjust to be applied to the contact, in seconds (longer / larger queue time are routed preferentially). Cannot be specified if the QueuePriority or RoutingProficiencies is specified. Must be statically defined and a valid integer value.
   "RoutingProficiencies": { An object. Cannot be specified if either QueuePriority or QueueTimeAdjustmentSeconds is specified.
      "AgentHierarchyProficiency": { An object.
         "AgentHierarchy": The ARN of the hierarchy to preferentially route this contact to. Can be dynamic or static, but must be present.
         "ExpirationSeconds": The number of seconds after which to remove this routing proficiency. Can be dynamic or static, but must be present, and if not dynamic must be a valid integer value between 0 and 600 (inclusive).
      }  
   }
}
```

Results and conditions

None.

Errors

None.

Restrictions

This is supported only in contact flows. It is not supported in transfer flows, whisper flows, customer queue flows, or hold flows.

Corresponding block in the UI

Change routing priority / age (p. 295)

UpdateContactTargetQueue

Sets the contact’s TargetQueue. This is the queue is used by all other instructions that check a queue implicitly, and for TransferContactToQueue.
### Parameter object

```json
{
  "QueueId": [Optional] A queue ID or queue ARN. If AgentId is specified, this may not be specified. This must be either defined fully statically or as a single valid JSONPath identifier.
  "AgentId": [Optional] An agent ID or agent ARN, representing an agent queue. If QueueId is specified, this may not be specified. This must be either defined fully statically or as a single valid JSONPath identifier.
}
```

### Results and conditions

None.

### Errors

- **NoMatchingError** - if no other Error matches.

### Restrictions

This action is supported only in contact flows and transfer flows. It is not supported in whisper flows, hold flows, or customer queue flows.

### Corresponding block in the UI

*Set customer queue flow (p. 353)*

### UpdateContactTextToSpeechVoice

Updates the Amazon Polly voice used by text-to-speech for voice contacts (message with text-to-speech, or Amazon Lex bots). This defaults to Joanna if this action is never run.

#### Parameter object

```json
{
  "TextToSpeechVoice": A string holding the name of an Amazon Polly voice. Must be defined statically. If this is an invalid text to speech voice, text to speech is no longer function for this contact.
  "TextToSpeechEngine": The engine associated with the Amazon Polly voice, if it is a neural voice. Must be defined statically.
}
```

#### Results and conditions

None.

#### Errors

None.

#### Restrictions

None. This action is supported in all flow types, and across all channels.

### Corresponding block in the UI

*Set voice (p. 364)*
UpdatePreviousContactParticipantState

This action is primarily used to forceably prevent previous participants on the contact from observing the contact. Common use cases are disconnecting the agent that initiates a transfer when they transfer a contact to a secure destination, or putting the agent on hold when transferring to a quick connect that securely gathers customer input such as credit card numbers.

Parameter object

```
{
    "PreviousContactParticipantState": One of ["AgentOnHold", "CustomerOnHold", "OffHold"],
    which are only supported for voice contacts.
}
```

Execution results and conditions

None.

Errors

- `NoMatchingError` - if no other Error matches.

Restrictions

This action is supported only in contact flows and transfer flows.

Corresponding block in the UI

Hold customer or agent (p. 334)

Flow control actions in the Amazon Connect Flow language

These actions don't have any side effects and are only used to determine the path through a flow. Certain data may not be available (such as contact data, if the action is determining its path based on contact data). These actions generally work in every circumstance.

A flow control action is an action that:

- Does not need a contact or a participant to succeed.
- Controls the behavior of the flow, by either enabling or disabling flow behavior (such as logging) or by choosing a branch when the flow runs.

Contents

- CheckHoursOfOperation (p. 483)
- CheckMetricData (p. 483)
- Compare (p. 484)
- DistributeByPercentage (p. 484)
- EndFlowExecution (p. 485)
- GetMetricData (p. 485)
- Loop (p. 486)
- TransferToFlow (p. 487)
- UpdateFlowLoggingBehavior (p. 487)
• Wait (p. 488)

**CheckHoursOfOperation**

Returns whether the specified hours of operation object (or the hours of operation object associated with the current queue if no hours of operation is referenced) is in hours or out of hours as its result, allowing comparisons against it.

**Parameter object**

```
{
  "HoursOfOperationId": [Optional] An hours of operation ID or hours of operation ARN. *Must be either fully static or fully dynamic*. If not specified, the TargetQueue's hours of operation for the contact are used
}
```

**Results and conditions**

**True** or **False** based on whether the hours of operation object specified is in hours or out of hours. There must be a Condition provided for Equals **True** and a Condition for Equals **False**, and no other conditions.

**Errors**

• NoMatchingError - if no other Error matches.

**Restrictions**

This action is available in inbound flows, transfer flows, and customer queue flows. It is not available to hold flows or to whisper flows.

**Corresponding block in the UI**

Check hours of operation (p. 302)

**CheckMetricData**

A shortcut single action to avoid using GetMetricData and Compare for a set of simple metrics. This action loads the specified metric data for the specified queue, and allows comparisons to the loaded value. For example, it loads number of contacts in queue, age of oldest contact in queue, number of agents staffed on the queue, number of agents available on the queue, or number of agents online on the queue.

**Parameter object**

```
{
  "MetricType": One of [NumberOfAgentsAvailable, NumberOfAgentsStaffed, NumberOfAgentsOnline, OldestContactInQueueAgeSeconds, NumberOfContactsInQueue]. **Dynamic values are not supported**,
  "QueueId": [Optional] A queue ID or queue ARN. If AgentId is specified, this may not be specified. *Dynamic values are supported*,
  "AgentId": [Optional] An agent ID or agent ARN, representing an agent queue. If QueueId is specified, this may not be specified. *Dynamic values are supported*. If neither this nor QueueId are specified, the contact TargetQueue is used
}
```
Execution results and conditions

A number, representing the value of the metric that was requested. This can be used for conditions. If the MetricType is NumberOfAgents* then the only supported condition is "NumberGreaterThan 0", otherwise Equals and any Number* Operands are allowed.

Errors

- NoMatchingError - if no other Error matches.
- NoMatchingCondition - if no other Condition matches (only supported if the MetricType is OldestContactInQueueAgeSeconds or NumberOfContactsInQueue).

Restrictions

This action is only usable in contact flows, queue and agent transfers, and customer queue flows. It is not available in any type of whisper or hold flows.

Corresponding block in the UI

None.

Compare

Allows comparisons against the specified value.

Parameter object

```
{
  "ComparisonValue": Any **single** JSONPath identifier that is valid for the contact flow data object
}
```

Execution results and conditions

The value specified for comparison. This can be used for conditions.

Errors

- NoMatchingCondition - if no other Condition matches.

Restrictions

This action is available in every type of flow.

Corresponding block in the UI

Check contact attributes (p. 299)

DistributeByPercentage

Returns a random number between 1 and 100 (inclusive) as its result, allowing comparisons against it.

Parameter object

```
{

}
```
Results and conditions

A number between 1 and 100, inclusive, chosen randomly. Comparisons are supported, but they must be a chain of NumericLessThan comparisons, with each subsequent comparison checking the previous value, plus the percentage that is desired to go down this next action, and no Comparison comparing a value larger than 100.

Errors

- NoMatchingCondition if no Condition matches. This is the default option in the contact flow editor.

Restrictions

This action is available in inbound flows, transfer flows, and customer queue flows. It is not available to hold flows or to whisper flows.

Corresponding block in the UI

Distribute by percentage (p. 315)

EndFlowExecution

Finishes flow, but does not explicitly disconnect the participant. The participant may be disconnected by contact logic after this. For example, if a contact flow ends before the contact is put into queue, ending the flow results in the contact being ended.

Parameter object

```
{
}
```

Results and conditions

None. No conditions are supported.

Errors

None. This is always a terminal action.

Restrictions

This action is available only in whisper flows and customer queue flows. It is not available in contact flows, hold flows, or transfer flows.

Corresponding block in the UI

End flow / Resume (p. 317)

GetMetricData

Loads real time queue metrics for the queue specified by queue ID, agent ID (for agent queues), or the target queue, and makes them available on the flow run data. May be extended in the future to allow getting historical metric data in addition to current metric data, and to getting agent metrics in addition to queue metrics.

485
Parameter object

```json
{
    "QueueId": [Optional] A queue ID or queue ARN. If AgentId is specified, this may not be specified. *Dynamic values are supported*,
    "AgentId": [Optional] An agent ID or agent ARN, representing an agent queue. If QueueId is specified, this may not be specified. *Dynamic values are supported*
    "QueueChannel": [Optional] Either "Voice" or "Chat". Can be set dynamically. Determines the channel for which metrics are returned. If not specified, metrics are returned for all channels.
}
```

Execution results and conditions

None. No conditions are supported.

Errors

- NoMatchingError - if no other Error matches.

Restrictions

This action is available in every type of flow.

Corresponding block in the UI

Get queue metrics (p. 328)

Loop

When the same action (the same Action Identifier) is run multiple times, this block returns a result of "NotDone" a number of times equal to the specified loop count, then "Done" once, then reset.

Parameter object

```json
{
    "LoopCount": Number of times to loop, must be between 0 and 100 (inclusive). Must either be fully static or fully dynamic.
}
```

Execution results and conditions

"ContinueLooping" if the loop should continue. "DoneLooping" if the loop should finish. Conditions are supported, there must be a Condition provided for Equals ContinueLooping and for Equals DoneLooping, and no other Conditions can be specified.

Errors

None.

Restrictions

This is supported in every type of flow.

Corresponding block in the UI

Loop (p. 338)
**TransferToFlow**

Execution jumps to a different flow, and continues running at that flow's beginning.

**Parameter object**

```json
{
  "ContactFlowId": A contact flow ID or contact flow ARN. *Must be either fully static or a single valid JSONPath identifier*
}
```

**Execution results and conditions**

None.

**Errors**

- NoMatchingError - if no other Error matches.

**Restrictions**

This action is available in inbound flows and transfer flows. It is not available to hold flows, customer queue flows, or whisper flows.

**Corresponding block in the UI**

Transfer to flow (p. 382)

**UpdateFlowLoggingBehavior**

Enables or disables flow logging. If this is a contact flow, this same behavior remains unless it is overridden for the rest of the contact segment. It is also automatically inherited by new segments in the chain.

**Parameter object**

```json
{
  "FlowLoggingBehavior": One of [Enabled,Disabled]. *Dynamic values are not supported*
}
```

**Results and conditions**

None. No conditions are supported.

**Errors**

None.

**Restrictions**

This action is available in every type of flow.

**Corresponding block in the UI**

Set logging behavior (p. 358)
Wait

Pauses the flow for a specified duration, or until a specified event happens, whichever happens first.

Parameter object

```json
{
   "TimeoutSeconds": The amount of time to wait before the action finishes with the "WaitCompleted" result. This can be either statically defined, or a single valid JSONPath identifier. If defined statically, this must be a positive integer value no greater than 604800 (seven days),
   "Events": An optional list of all events that can trigger an interrupt. The only supported event currently is "CustomerReturned". This must be defined statically.
}
```

Execution results and conditions

If an event interrupts the wait, the run result is the event that interrupted. If no event interrupts the Wait and the time elapses, the run result is WaitCompleted. Conditions are supported, but only the "Equals" operator is supported. "WaitCompleted" is always required operand, and every specified event is also required to be present as a condition operand.

Errors

- NoMatchingError - if no other Error matches.

Restrictions

This is supported in every type of flow, but is supported only by the chat channel.

Corresponding block in the UI

Wait (p. 391)

Interactions in the Amazon Connect Flow language

Interactions actions have side effects, but they don't require a contact or a participant. They include actions such as invoking an AWS Lambda function. They generally work in every circumstance.

Contents

- CreateCallbackContact (p. 488)
- InvokeLambdaFunction (p. 489)

CreateCallbackContact

Creates a new callback contact. If no customer number is specified, and this is run in context of a contact, the contact's CustomerCallbackNumber is used as the customer number.

Parameter object

```json
{
   "QueueId": [Optional] A queue ID or queue ARN. The callback contact is routed with this queue, or if this is not specified, the contact's current TargetQueue. Must be specified fully statically or with a single valid JSONPath identifier.
}
```
"AgentId": [Optional] An agent ID or agent ARN, representing an agent queue. If QueueId is specified, this may not be specified. This must be either defined fully statically or as a single valid JSONPath identifier.

"InitialCallDelaySeconds": The amount of time, in seconds, to wait at a minimum before routing the callback contact. This gives the customer enough time to end their existing contact before being called back. Must be larger than 0, no greater than 259,200 (three days), and an integer. Must be defined statically.

"MaximumConnectionAttempts": The number of attempts at a maximum to connect this contact to a customer, if the callback is not answered. Must be larger than zero, and an integer. Must be defined statically.

"RetryDelaySeconds": The minimum amount of time to wait, in seconds, between an unanswered callback attempt is made and the next attempt to reach the customer. Must be larger than 0, no greater than 259,200 (three days), and an integer. Must be defined statically.

Results and conditions
None. No conditions are supported.

Errors

• NoMatchingError - if no other Error matches.

Restrictions
This action is supported in contact flows, transfer flows, and customer queue flows. It is not supported in whisper flows or hold flows.

Corresponding block in the UI
Set callback number (p. 348)

InvokeLambdaFunction

Invokes an AWS Lambda function with a collection of optional parameters. This AWS Lambda function is also given a copy of the flow run data if there is an associated contact with the flow.

Parameter object

{
    "LambdaFunctionARN": The ARN of the AWS Lambda function to be invoked. May be defined statically or dynamically.
    "InvocationTimeLimitSeconds": The number of seconds to wait for a response from the AWS Lambda function. Must be greater than 0, no larger than 8, and an integer. Must be set statically.
    "LambdaInvocationAttributes" { A map of additional data to send to the AWS Lambda function when invoking it. Keys and values may be set statically or dynamically.
    }
}

Results and conditions
None. Conditions are not supported. If an error does not occur, the response's attributes are available dynamically under the $.External path.

Errors

• NoMatchingError - if no other Error matches.
Restrictions
None. This action is supported by all channels and in all types of flows.

Corresponding block in the UI
Invoke AWS Lambda function (p. 336)

Participant actions in the Amazon Connect Flow language
Participant actions are attempted only when the flow is run in context of a participant. They generally result in an action that the participant experiences, such as playing a prompt or disconnecting.

Contents
- ConnectParticipantWithLexBot (p. 490)
- DisconnectParticipant (p. 491)
- GetParticipantInput (p. 492)
- MessageParticipant (p. 493)
- MessageParticipantIteratively (p. 494)
- TransferParticipantToThirdParty (p. 494)

ConnectParticipantWithLexBot
Connects the participant with the specified Amazon Lex bot. When the interaction is over, the Intent and Slots of the bot are available to the flow during its run.

Parameter object
Provide either LexBot or LexV2Bot object depending on the Amazon Lex version in the following format.

Amazon Lex

```json
{
    "PromptId": [Optional] A prompt ID or prompt ARN to play to the participant along with gathering input. May not be specified if Text or SSML is also specified. Must be specified either statically or as a single valid JSONPath identifier.
    "Text": An optional string that defines text to send to the participant along with gathering input. May not be specified if PromptId or SSML is also specified. May be specified statically or dynamically.
    "SSML": An optional string that defines SSML to send to the participant along with gathering input. May not be specified if Text or PromptId is also specified. May be specified statically or dynamically.
    "LexV2Bot": { The details of the LexV2 bot to invoke
                   "AliasArn": The alias ARN of the LexV2 bot to invoke. May be specified statically or dynamically.
               },
    "LexSessionAttributes": { A map of session attributes to pass to the Amazon LexV2 bot when it is invoked. The keys and values may be static or dynamic.
                          }
}
```

Amazon Lex (Classic)

```json
{
    "PromptId": [Optional] A prompt ID or prompt ARN to play to the participant along with gathering input. May not be specified if Text or SSML is also specified. Must be specified either statically or as a single valid JSONPath identifier.
}
```
"Text": An optional string that defines text to send to the participant along with gathering input. May not be specified if PromptId or SSML is also specified. May be specified statically or dynamically.

"SSML": An optional string that defines SSML to send to the participant along with gathering input. May not be specified if Text or PromptId is also specified. May be specified statically or dynamically.

"LexBot": { The details of the Lex bot to invoke
  "Name": The name of the Lex bot. May be specified statically or dynamically.
  "Region": The region in which this Lex bot exists. May be specified statically or dynamically.
  "Alias": The specific alias of the Lex bot to invoke. May be specified statically or dynamically.
  },

"LexSessionAttributes": { A map of session attributes to pass to the Amazon Lex bot when it is invoked. The keys and values may be static or dynamic.
  }
}

Results and conditions

If the Amazon Lex interaction succeeds, the result is the Intent of the bot. Conditions are supported, but only the Equals operator is supported within these conditions.

Errors

- NoMatchingCondition - If no specified condition evaluated to True.
- NoMatchingError - If an error occurred and no other error matched.

Restrictions

This action is supported by all channels.

This action is available only in contact flows, transfer flows, and customer queue flows. It is not available in whisper flows or hold flows.

Corresponding block in the UI

Get customer input (p. 318)

DisconnectParticipant

Disconnects the participant from the contact and stops this flow from running.

Parameter object

No parameters are expected.

Results and conditions

None. Conditions are not supported.

Errors

None.

Restrictions

None. This action can be used everywhere. If there is no participant on the contact, this functions as an EndFlowExecution action, and halts the flow from running.
Corresponding block in the UI

Disconnect / hang up (p. 314)

GetParticipantInput

Gathers customer input (a DTMF collection for voice contacts, or an entered string for other channels). There are many optional behaviors after gathering this: encryption, validation, storing to a "LastParticipantInput" section on the flow run data, specifying a custom DTMF terminator for voice contacts and so on. Details are in the parameter object section.

Parameter object

```json
{
    "PromptId": [Optional] A prompt ID or prompt ARN to play to the participant along with gathering input. May not be specified if Text or SSML is also specified. Must be either statically defined or a single valid JSONPath identifier.
    "Text": An optional string that defines text to send to the participant along with gathering input. May not be specified if PromptId or SSML is also specified. May be defined statically or dynamically.
    "SSML": An optional string that defines SSML to send to the participant along with gathering input. May not be specified if Text or PromptId is also specified. May be defined statically or dynamically.
    "InputTimeoutSeconds": The number of seconds to wait for input to be collected before proceeding with a timeout error. For the Voice channel this is the timeout until the first* DTMF digit is entered. Must be defined statically, and must be a valid integer larger than zero.
    "StoreInput": "True" or "False". Must be statically defined.
    "InputValidation": { An object that defines how to validate customer inputs, required if and only if StoreInput is True
        "PhoneNumberValidation": { Optional, one of the ways to validate inputs, make sure that it's a valid phone number. May not be specified if CustomValidation is specified.
            "NumberFormat": "Local" or "E164". If "Local" is specified, it is validated to be a local number (without the + and the country code), "E164" enforces that the customer input is a fully defined e.164 phone number. Must be defined statically.
            "CountryCode": If the number format is "Local", this must be defined. This is the two letter country code to be associated with the input number when validating. Must be defined statically.
        }
        "CustomValidation": { Optional, the other way to validate inputs. May not be specified if PhoneNumberValidation is specified.
            "MaximumLength": A number representing the maximum length of the input. Must be defined statically.
        }
    },
    "InputEncryption": { An optional object that defines how to encrypt the customer input. May only be specified if "CustomValidation" is provided.
        "EncryptionKeyId": The identifier of a key that has been uploaded in the AWS console for the purposes of customer input encryption. May be specified statically or dynamically.
        "Key": The PEM definition of the public key to use to encrypt this data. This key must be signed with the encryption key identified by the EncryptionKeyId. May be specified statically or dynamically.
    },
    "DTMFConfiguration": { An optional object to override default DTMF behavior for voice calls
        "InputTerminationSequence": Up to five digits to serve as the terminating sequence when gathering DTMF
        "DisableCancelKey": "True" or "False". If "True", the "*" key doesn't cancel gathering DTMF digits.
    }
}
Results and conditions

If the "StoreInput" option is "True", there is no run result and conditions are not supported. If the "StoreInput" option is not defined or is "False", the run result is the participant input, and conditions are supported but only the Equals operator may be used on conditions. The values being compared must be static and be a single character - 0-9 numeric, *, or #.

Errors

- NoMatchingCondition - None of the specified conditions evaluated to true. Must be defined only if StoreInput is False.
- NoMatchingError - if no other Error matches. Must always be defined.
- InvalidPhoneNumber - the stored input was not a valid phone number according to the specified PhoneNumberValidation. Must be defined only if StoreInput is true, and PhoneNumberValidation is specified.

Restrictions

This action is only supported on the voice channel.

This action can be used in contact flows, transfer flows, and customer queue flows but not in whisper flows or hold flows.

Corresponding block in the UI

Get customer input (p. 318)

MessageParticipant

Sends a message to the participant. This is an audio prompt or text-to-speech for voice contacts, or a text message for other channels.

Parameter object

```json
{
  "PromptId": [Optional] A prompt ID or prompt ARN to play to the participant along with gathering input. May not be specified if Text or SSML is also specified. Must be specified either statically or as a single valid JSONPath identifier.
  "Text": An optional string that defines text to send to the participant along with gathering input. May not be specified if PromptId or SSML is also specified. May be specified statically or dynamically.
  "SSML": An optional string that defines SSML to send to the participant along with gathering input. May not be specified if Text or PromptId is also specified. May be specified statically or dynamically.
}
```

Results and conditions

None. No conditions are supported.

Errors

None.

Restrictions

This action is supported in contact flows, transfer flows, whisper flows, and customer queue flows. It is not supported in hold flows.
"PromptId" and "SSML" are only supported for the voice channel. All other channels support only the "Text" option.

**Corresponding block in the UI**

*Play prompt (p. 342)*

**MessageParticipantIteratively**

Loops a sequence of prompts while a customer or agent is on hold or in queue. This block can be configured with an interruption timeout when in a Queue flow that interrupts the message loop to run other flow logic. The message loop can include entries for both Text and Prompts.

**Parameter object**

```json
{
    "Messages": [ A List of messages to be played in a loop. These are defined with either TTS or a Prompt
    {
        "Text": An optional string that defines text to send to the participant,
    },
    {
        "PromptId": A prompt ID or prompt ARN to play to the participant,
    },
    {
        "SSML": An optional string that defines the ssml,
    },
    "InterruptFrequencySeconds": [Optional] Time to elapse before the action completes with "MessagesInterrupted" run result
}
```

**Results and conditions**

When the timeout elapses, the action completes with the result as "MessagesInterrupted". Conditions are supported, but only the "Equals" operator is supported. The only supported operand is MessagesInterrupted.

**Errors**

- **NoMatchingError** - if no other Error matches.

**Restrictions**

This action is supported in Customer Queue, Customer Hold, and Agent Hold flows.

"PromptId" is supported only for the Voice channel, all other channels support only the "Text" option.

If this action is used on the chat channel, it immediately takes the error branch. If no error branch is available, the flow stops and the contact is routed to next available agent.

**Corresponding block in the UI**

*Loop prompts (p. 340)*

**TransferParticipantToThirdParty**

Transfers the participant to a specified phone number. Optionally continues flow running if the third party disconnects while the participant is still connected.
Parameter object

```json
{
    "ThirdPartyPhoneNumber": A phone number, in e.164 format, of the external number to which to transfer the contact. May be defined statically or dynamically.
    "ThirdPartyConnectionTimeoutSeconds": An integer, between 0 and 600 (inclusive) representing the number of seconds to wait for the third party to answer before canceling the third party call. Only used if ContinueFlowExecution is not False. Must be defined fully statically or as a single valid JSONPath identifier.
    "ContinueFlowExecution": "True" or "False". If not defined or True, the flow continues running after the third party call finishes, if False the flow does not continue, as long as the phone call to the third party succeeds. Must be defined statically.
    "ThirdPartyDTMFDigits": An optional series of DTMF digits to send to the third party when the call succeeds. Must be defined fully statically or as a single valid JSONPath identifier. Must be 50 or fewer characters chosen from numeric digits, comma, asterisk, and pound sign.
    "CallerId": { Optional, an override of the caller ID to present when dialing the third party
        "Number": The caller ID number to present when dialing the third party. Must be defined fully statically or as a single valid JSONPath identifier.
        "Name": The caller ID name to present when dialing the third party. May be defined statically or dynamically.
    }
}
```

Results and conditions

None. Conditions are not supported.

Errors

- ConnectionTimeLimitExceeded - the call has taken longer than the specified time limit to be answered by the third party, and has been canceled. Supported only when ContinueFlowExecution is True.
- CallFailed - The call was unable to connect successfully. Only supported when ContinueFlowExecution is True.
- NoMatchingError - if no other Error matches.

Restrictions

This action is only allowed by the Voice channel.

This action is allowed in contact flows, transfer flows, and customer queue flows.

Corresponding block in the UI

Transfer to phone number (p. 384)
Set up your network

Traditional VoIP solutions require you to allow both inbound and outbound for specific UDP port ranges and IPs, such as 80 and 443. These solutions also apply to TCP. In comparison, the network requirements for using the Contact Control Panel (CCP) with a softphone are less intrusive. You can establish persistent outbound send/receive connections through your web browser. As a result, you don't need to open a client-side port to listen for inbound traffic.

The following diagram shows you what each port is used for.

The following sections describe the two primary connectivity options for using the CCP.

Option 1 (recommended): Replace Amazon EC2 and CloudFront IP range requirements with a domain allow list

This first option lets you significantly reduce your blast radius.

We recommend trying Option 1 and testing it with more than 200 calls. Test for softphone errors, dropped calls, and conference/transfer functionality. If your error rate is greater than 2 percent, there might be an issue with proxy resolution. If that's the case, consider using Option 2.

To allow traffic for Amazon EC2 endpoints, allow access for the URL and port, as shown in the first row of the following table. Do this instead of allowing all of the IP address ranges listed in the ip-ranges.json file. You get the same benefit using a domain for CloudFront, as shown in the second row of the following table.
<table>
<thead>
<tr>
<th>Domain/URL allow list</th>
<th>AWS Region</th>
<th>Ports</th>
<th>Direction</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>rtc*.connect-telecom.</td>
<td>Replace {region} with the Region where your Amazon Connect instance is located</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>{region}.amazonaws.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This is used by ccp# (v1).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Please see the note following this table.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>New: additional domains to add to your allow list</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>{myInstanceName}.ccp-v2</td>
<td>Replace {myInstanceName} with the alias of your Amazon Connect instance</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>{myInstanceName}.my.connect.aws/api</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*.static.connect.aws</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>{myInstanceName}.awsapps.com/connect/ccp-v2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>{myInstanceName}.awsapps.com/connect/api</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*.cloudfront.net</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*.execute-api.</td>
<td>Replace {region} with the location of your Amazon Connect instance</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>{region}.amazonaws.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>participant.connect.</td>
<td>Replace {region} with the location of your Amazon Connect instance</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>{region}.amazonaws.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*transport.connect.</td>
<td>Replace {region} with the location of your Amazon Connect instance</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>{region}.amazonaws.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This is used by ccp-v2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>{Amazon S3 bucket name}.s3.</td>
<td>Replace Amazon S3 bucket name with the name of the location where you store attachments. Replace {region}</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>{region}.amazonaws.com</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Option 1 (recommended): Replace Amazon EC2 and CloudFront IP range requirements with a domain allow list

<table>
<thead>
<tr>
<th>Domain/URL allow list</th>
<th>AWS Region</th>
<th>Ports</th>
<th>Direction</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>with the location of your Amazon Connect instance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TurnNlb-*.{region}.elb.amazonaws.com</td>
<td>Replace <code>{region}</code> with the location of your Amazon Connect instance</td>
<td>3478 (UDP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
</tbody>
</table>

**Note**
If you’re using SAML Sign-In to your Amazon Connect instance, add the AWS Global Accelerator domain to your allow list: *.awsglobalaccelerator.com.

**Note**
The new region telecom endpoints follow a different format. Here’s a complete list of telecom endpoints:

<table>
<thead>
<tr>
<th>Region</th>
<th>Domain/URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>us-east-1</td>
<td>rtc*.connect-telecom.us-east-1.amazonaws.com</td>
</tr>
<tr>
<td>us-west-2</td>
<td>rtc*.connect-telecom.us-west-2.amazonaws.com</td>
</tr>
<tr>
<td>ap-northeast-1</td>
<td>rtc*.connect-telecom.ap-northeast-1.amazonaws.com</td>
</tr>
<tr>
<td>ap-southeast-1</td>
<td>rtc.cell-1.prod.ap-southeast-1.prod.connect.aws.a2z.com</td>
</tr>
<tr>
<td>ap-southeast-2</td>
<td>rtc*.connect-telecom.ap-southeast-2.amazonaws.com</td>
</tr>
<tr>
<td>ca-central-1</td>
<td>rtc*.connect-telecom.ca-central-1.amazonaws.com</td>
</tr>
<tr>
<td>eu-central-1</td>
<td>rtc*.connect-telecom.eu-central-1.amazonaws.com</td>
</tr>
<tr>
<td>eu-west-2</td>
<td>rtc.cell-1.prod.eu-west-2.prod.connect.aws.a2z.com</td>
</tr>
</tbody>
</table>

**Tip**
When using rtc*.connect-telecom.{region}.amazonaws.com, *.transport.connect.{region}.amazonaws.com, and https://myInstanceName.awsapps.com, in certain proxy applications, web socket handling may impact functionality. Be sure to test and validate before deploying to a production environment.
The following table lists the CloudFront domains used for static assets if you want to add domains to your allow list instead of IP ranges:

<table>
<thead>
<tr>
<th>Region</th>
<th>CloudFront Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>us-east-1</td>
<td><a href="https://dd401jc05x2yk.cloudfront.net/">https://dd401jc05x2yk.cloudfront.net/</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://d1f0uslnyc85vb.cloudfront.net/">https://d1f0uslnyc85vb.cloudfront.net/</a></td>
</tr>
<tr>
<td>us-west-2</td>
<td><a href="https://d38fzyjx9jg8fj.cloudfront.net/">https://d38fzyjx9jg8fj.cloudfront.net/</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://d366s8lxuwna4d.cloudfront.net/">https://d366s8lxuwna4d.cloudfront.net/</a></td>
</tr>
<tr>
<td>ap-northeast-1</td>
<td><a href="https://d3h58onr8hrozw.cloudfront.net/">https://d3h58onr8hrozw.cloudfront.net/</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://d13ljas036g6c.cloudfront.net/">https://d13ljas036g6c.cloudfront.net/</a></td>
</tr>
<tr>
<td>ap-southeast-1</td>
<td><a href="https://d2g7up6qvaq2o.cloudfront.net/">https://d2g7up6qvaq2o.cloudfront.net/</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://d1201dlh4w0xc.cloudfront.net/">https://d1201dlh4w0xc.cloudfront.net/</a></td>
</tr>
<tr>
<td>ap-southeast-2</td>
<td><a href="https://d2190hliw27bb8.cloudfront.net/">https://d2190hliw27bb8.cloudfront.net/</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://d3mgrlzmisce5.cloudfront.net/">https://d3mgrlzmisce5.cloudfront.net/</a></td>
</tr>
<tr>
<td>eu-central-1</td>
<td><a href="https://d1n9s7btyr4f0n.cloudfront.net/">https://d1n9s7btyr4f0n.cloudfront.net/</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://d3tqoc05lsydd3.cloudfront.net/">https://d3tqoc05lsydd3.cloudfront.net/</a></td>
</tr>
<tr>
<td>eu-west-2</td>
<td><a href="https://dl32tyuy2mmv6.cloudfront.net/">https://dl32tyuy2mmv6.cloudfront.net/</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://d2p8ibh10q5exz.cloudfront.net/">https://d2p8ibh10q5exz.cloudfront.net/</a></td>
</tr>
</tbody>
</table>

**NLB endpoints**

The following table lists the specific endpoints for the Region the Amazon Connect instance is in. If you don't want to use the TurnNlb-*.elb.{region}.amazonaws.com wildcard, you can add these endpoints to your allow list instead.

<table>
<thead>
<tr>
<th>Region</th>
<th>Turn Domain/URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>us-west-2</td>
<td>TurnNlb-8d79b4466d82ad0e.elb.us-west-2.amazonaws.com</td>
</tr>
<tr>
<td></td>
<td>TurnNlb-dbc4ebb71307fda2.elb.us-west-2.amazonaws.com</td>
</tr>
<tr>
<td>us-east-1</td>
<td>TurnNlb-d76454ac48d20c1e.elb.us-east-1.amazonaws.com</td>
</tr>
<tr>
<td>ap-northeast-1</td>
<td>TurnNlb-3c6ddabcbeb821d8.elb.ap-northeast-1.amazonaws.com</td>
</tr>
<tr>
<td>ap-southeast-1</td>
<td>TurnNlb-261982506d86d300.elb.ap-southeast-1.amazonaws.com</td>
</tr>
<tr>
<td>ap-southeast-2</td>
<td>TurnNlb-93f2de0c97c4316b.elb.ap-southeast-2.amazonaws.com</td>
</tr>
</tbody>
</table>
Option 2 (not recommended): Allow IP address ranges

The second option relies on using an allow list, also known as whitelisting, the IP addresses used by Amazon Connect. You create this allow list using the IP addresses in the AWS ip-ranges.json file.

For more information about this file, see About Amazon Connect IP address ranges (p. 501).

<table>
<thead>
<tr>
<th>IP-Ranges entry</th>
<th>AWS Region</th>
<th>Ports/Protocols</th>
<th>Direction</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMAZON_CONNECT</td>
<td>Region where your Amazon Connect instance is located (add GLOBAL AND any region-specific entry to your allow list)</td>
<td>3478 (UDP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>EC2</td>
<td>Region where your Amazon Connect instance is located (GLOBAL only if a region-specific entry doesn’t exist)</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>CLOUDFRONT</td>
<td>Global*</td>
<td>443 (TCP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
<tr>
<td>GLOBALACCELERATOR</td>
<td>Region where your Amazon Connect instance is located (add GLOBAL AND any region-specific entry to your allow list)</td>
<td>443 (HTTPS) and 80 (HTTP)</td>
<td>OUTBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
</tbody>
</table>

*CloudFront serves static content such as images or javascript from an edge location that has the lowest latency in relation to where your agents are located. IP range allow lists for CloudFront are global and require all IP ranges associated with "service": "CLOUDFRONT" in the ip-ranges.json file.
About Amazon Connect IP address ranges

In the AWS ip-ranges.json file, the whole /19 IP address range is owned by Amazon Connect. All traffic to and from the /19 range comes to and from Amazon Connect.

The /19 IP address range isn't shared with other services. It's for the exclusive use to Amazon Connect globally.

In the AWS ip-ranges.json file, you can see the same range listed twice. For example:

```json
{
  "ip_prefix": "15.193.0.0/19",
  "region": "GLOBAL",
  "service": "AMAZON"
},
{
  "ip_prefix": "15.193.0.0/19",
  "region": "GLOBAL",
  "service": "AMAZON_CONNECT"
}
```

AWS always publishes any IP range twice: one for the specific service, and one for “AMAZON” service. There could even be a third listing for a more specific use case within a service.

When there are new IP address ranges supported for Amazon Connect, they are added to the publicly available ip-ranges.json file. They are kept for a minimum of 30 days before they are used by the service. After 30 days, softphone traffic through the new IP address ranges increases over the subsequent two weeks. After two weeks, traffic is routed through the new ranges equivalent to all available ranges.

For more information about this file and IP address ranges in AWS, see AWS IP Address Ranges.

Stateless firewalls

If you're using a stateless firewall for both options, use the requirements described in the previous sections. Then you must add to your allow list the ephemeral port range used by your browser, as shown in the following table.

<table>
<thead>
<tr>
<th>IP-Range entry</th>
<th>Port</th>
<th>Direction</th>
<th>Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMAZON_CONNECT</td>
<td>49152-65535 (UDP)</td>
<td>INBOUND</td>
<td>SEND/RECEIVE</td>
</tr>
</tbody>
</table>

Allow DNS resolution for softphones

If you already added Amazon Connect IP ranges to your allow list, and you don’t have any restriction on DNS name resolution, then you don’t need to add TurnNlb-*.elb.{region}.amazonaws.com to your allow list.

- To check whether there are restrictions on DNS name resolution, while on your network, use the nslookup command. For example:

  ```bash
  nslookup TurnNlb-d76454ac48d20c1e.elb.us-east-1.amazonaws.com
  ```
If you can't resolve the DNS, you must add the TurnNLB endpoints listed above (p. 499) or TurnNLb-*.elb.{region}.amazonaws.com to your allow list.

If you don't allow this domain, your agents will get the following error in their Contact Control Panel (CCP) when they try to answer a call:

- Failed to establish softphone connection. Try again or contact your administrator with the following: Browser unable to establish media channel with turn:TurnNlb-xxxxxxxxxxxxx.elb.{region}.amazonaws.com:3478?transport=udp

Port and protocol considerations

Consider the following when implementing your network configuration changes for Amazon Connect:

- You need to allow traffic for all addresses and ranges for the Region in which you created your Amazon Connect instance.
- If you are using a proxy or firewall between the CCP and Amazon Connect, increase the SSL certificate cache timeout to cover the duration of an entire shift for your agents. Do this to avoid connectivity issues with certificate renewals during their scheduled working time. For example, if your agents are scheduled to work 8 hour shifts that include breaks, increase the interval to 8 hours plus time for breaks and lunch.
- When opening ports, Amazon EC2 and Amazon Connect require only the ports for endpoints in the same Region as your instance. CloudFront, however, serves static content from an edge location that has the lowest latency in relation to where your agents are located. IP range allow lists for CloudFront are global and require all IP ranges associated with "service": "CLOUDFRONT" in ip-ranges.json.
- Once ip-ranges.json is updated, the associated AWS service will begin using the updated IP ranges after 30 days. To avoid intermittent connectivity issues when the service begins routing traffic to the new IP ranges, be sure to add the new IP ranges to your allow list, within 30 days from the time they were added to ip-ranges.json.
- If you are using a custom CCP with the Amazon Connect Streams API, you can create a media-less CCP that does not require opening ports for communication with Amazon Connect, but still requires ports opened for communication with Amazon EC2 and CloudFront.

Region selection considerations

Amazon Connect Region selection is contingent upon data governance requirements, use case, services available in each Region, and latency in relation to your agents, contacts, and external transfer endpoint geography.

- **Agent location/network**—CCP connectivity traverses the public WAN, so it is important that the workstation has the lowest latency and fewest hops possible, specifically to the AWS Region where your resources and Amazon Connect instance are hosted. For example, hub and spoke networks that need to make several hops to reach an edge router can add latency and reduce the quality of experience.

When you set up your instance and agents, make sure to create your instance in the Region that is geographically closest to the Region where you create your instance. If you need to set up an instance in a specific Region to comply with company policies or other regulations, choose the configuration that results in the fewest network hops between your agent computers and your Amazon Connect instance.

- **Location of your callers**—Because calls are anchored to your Amazon Connect Region endpoint, they are subject to PSTN latency. Ideally your callers and transfer endpoints are geographically located
Agents using Amazon Connect remotely

Remote agents, those that use Amazon Connect from a location other than those connected to your organization’s main network, may experience issues relating to their local network if they have an unstable connection, packet loss, or high latency. This is compounded if a VPN is required to access resources. Ideally, the agents are located close to the AWS Region where your AWS resources and Amazon Connect instance are hosted, and have a stable connection to the public WAN.

Rerouting audio

When rerouting audio to an existing device, consider the location of the device in relation to your Amazon Connect Region. This is so you can account for potential additional latency. If you reroute your audio, whenever there is a call intended for the agent, an outbound call is placed to the configured device. When the agent answers the device, that agent is connected with the caller. If the agent does not answer their device, they are moved into a missed contact state until they or a supervisor changes their state back to available.

Using AWS Direct Connect

Contact Control Panel (CCP) network connectivity issues are most often rooted in your route to AWS via private WAN/LAN, ISP, or both. While AWS Direct Connect does not solve issues specific to private LAN/WAN traversal to your edge router, it can help solve for latency and connectivity issues between your edge router and AWS resources. AWS Direct Connect provides a durable, consistent connection rather than relying on your ISP to dynamically route requests to AWS resources. It also allows you to configure your edge router to redirect AWS traffic across dedicated fiber rather than traversing the public WAN.

Detailed network paths for Amazon Connect

Voice calls

The following diagram shows how voice calls flow through Amazon Connect.
1. Users access the Amazon Connect application using a web browser. All communications are encrypted in transit using TLS.

2. Users establish voice connectivity to Amazon Connect from their browser using WebRTC. Signaling communication is encrypted in transit using TLS. Audio is encrypted in transit using SRTP.

3. Voice connectivity to traditional phones (PSTN) is established between Amazon Connect and AWS's telecommunications carrier partners using private network connectivity. In cases where shared network connectivity is used, signaling communication is encrypted in transit using TLS and audio is encrypted in transit using SRTP.

4. Call recordings are stored in your Amazon S3 bucket that Amazon Connect has been given permissions to access. This data is encrypted between Amazon Connect and Amazon S3 using TLS.

5. Amazon S3 server-side encryption is used to encrypt call recordings at rest using a customer-owned KMS key.

### Authentication

The following diagram shows using the AD Connector with AWS Directory Service to connect to an existing customer Active Directory installation. The flow is similar to using AWS Managed Microsoft AD.
1. The user's web browser initiates authentication to an OAuth gateway over TLS via the public internet with user credentials (Amazon Connect login page).
2. OAuth gateway sends the authentication request over TLS to AD Connector.
3. AD Connector does LDAP authentication to Active Directory.
4. The user's web browser receives OAuth ticket back from gateway based on authentication request.
5. The client loads the Contact Control Panel (CCP). The request is over TLS and uses OAuth ticket to identify user/directory.

Using Amazon Connect in a VDI environment

Virtual Desktop Infrastructure (VDI) environments add another layer of complexity to your solution that warrants separate POC efforts and performance testing to optimize. The Amazon Connect Contact Control Panel (CCP) can operate in thick, thin, and zero client VDI environments as any other WebRTC based browser application does, and the configuration/support/optimization is best handled by your VDI support team. That being said, the following is a collection of considerations and best practices that have been helpful for our VDI-based customers.

- **Location of your agents**—Ideally, there are as few hops as possible with the lowest round trip time between the location from which your agents use the CCP and the VDI host location.
- **Host location of your VDI solution**—Ideally, your VDI host location is on the same network segment as your agents, with as few hops as possible from both internal resources as well as an edge router. You also want the lowest round-trip time possible to both WebRTC and Amazon EC2 range endpoints.
- **Network**—Each hop that traffic goes through between endpoints increases the possibility of failure and adds opportunity to introduce latency. VDI environments are particularly susceptible to call quality issues if the underlying route is not optimized or the pipe isn't either fast or wide enough. While AWS Direct Connect can improve call quality from the edge router to AWS, it will not address internal routing issues. You may need to upgrade or optimize your private LAN/WAN, or redirect to an external device to circumvent call audio issues. In most scenarios, if this is required, the CCP is not the only application that is having issues.
- **Dedicated resources**—at the Network and desktop level are recommended to prevent an impact to available agent resources from activities, such as backups and large file transfers. One way to prevent resource contention is by restricting the desktop access to Amazon Connect users who will be using
their environment similarly, instead of sharing resources with other business units who may use those resources differently.

- **Using a soft phone with remote connections**—in VDI environments can cause impact to audio quality.

  **Tip**

  If your agents connect to a remote endpoint and operates in that environment, we recommend either rerouting audio to an external E.164 endpoint or connecting the media through the local device and then signaling through the remote connection.

You can build a custom CCP with the Amazon Connect Streams API by creating a CCP with no media for call signaling. This way, the media is handled on the local desktop using standard CCP, and the signaling and call controls are handled on the remote connection with the CCP with no media. For more information about the streams API, see the GitHub repository at [https://github.com/aws/amazon-connect-streams](https://github.com/aws/amazon-connect-streams).

## CCP connectivity

When an agent logs in, the CCP attempts to connect to the Amazon EC2 signaling endpoints listed in the AWS ipranges.json file, Amazon Connect for media, and CloudFront for web artifacts such as images. When the agent logs out or the browser is closed, endpoints are reselected when the agent next logs in. If a connection to Amazon EC2 or Amazon Connect fails, errors display on the CCP. If a connection to CloudFront fails, web elements such as buttons and icons, or even the page itself fails to load correctly.

### Outbound calls

- When an outbound call is placed, the event signal is sent to the Amazon EC2 endpoint, which then communicates with Amazon Connect to place the call. Upon a successful dial attempt, the agent is bridged in, which anchors the call to the agent's Amazon Connect endpoint. Any external transfers or conferences also uses the anchor until the call is disconnected. Anchoring can help reduce PSTN latency.

### Inbound calls

- When an inbound call is received, the call is anchored to an Amazon Connect endpoint. Any external transfers or conferences also use this anchor until the call is disconnected.

- When an agent is available, the call is pushed through via a new Amazon EC2 connection to their browser and offered to the agent.

- When the agent accepts the call and either the external device has been answered or the CCP determines it can receive a call, a connection to Amazon Connect is established for call media to the agent.

### Transferred calls

- When a call is transferred, the transfer event that signals to place an outbound call to the specified transfer destination is sent to Amazon EC2, which then communicates with Amazon Connect to place the call.

- When the call is connected, the agent is bridged in, anchoring the call to the agent's existing Amazon Connect endpoint. Any external transfers or conferences also use this anchor until the call is disconnected.

- If the agent hangs up after the call is bridged, the agent's connection to the call is terminated, but Amazon Connect hangs on to the call at the Amazon Connect anchor point until there is a far side disconnect. When the call is disconnected, CTRs and associated recordings are generated and made available for the call.
Missed calls

- If the call is waiting on an agent, customer queue flow logic is used until an agent is available and the call has been successfully routed to that agent.
- If the agent does not accept the call, the agent moves into a Missed Call state and is unable to take calls until the agent, or a call center manager, changes their status to Available again. The caller does not hear ringing while the call is waiting for the agent, and continues to hold until connected with an agent as defined in the customer queue flow logic.

Panic logout

- If the browser window where the CCP is running is closed, the call remains connected, but opening the browser and logging back in will not allow you to re-establish the media connection. You are still able to transfer or end the call, but no audio path is established between the agent and caller.

Use an allow list for integrated applications

All domains that embed the CCP for a particular instance must be explicitly allowed for cross-domain access to the instance. For example, to integrate with Salesforce, you must place your Salesforce Visualforce domain in an allow list.

To allow a domain URL

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. Choose the name of the instance from Instance Alias.
3. In the navigation pane, choose Approved origins.
4. Choose Add origin.
5. Type the URL and choose Add.
Create an Amazon Lex bot

In this article we guide you through the steps to add an Amazon Lex bot to Amazon Connect.

With Amazon Lex, you can build conversational interactions (bots) that feel natural to your customers. Amazon Connect with Amazon Lex bots can also capture customer input as digits that customers enter on their numeric keypad when used in an Amazon Connect contact flow. This way customers can choose how they want to enter sensitive information such as account numbers.

To follow along with this walkthrough, you need the following:

- An active AWS account.
- An Amazon Connect instance.

**Tip**
You can also use Amazon Lex to power interactive messages for Amazon Connect chat. Interactive messages are rich messages that present a prompt and pre-configured display options that a customer can select from. These messages are powered by Amazon Lex and configured through Amazon Lex using a Lambda. For more information, see Add interactive messages to chat (p. 524).

Create an Amazon Lex bot

In this step you’ll create a custom bot to demonstrate the Press or Say integration with Amazon Connect. The bot prompts callers to press or say a number that matches the menu option for the task to complete. In this case, the input is checking their account balance.

**Amazon Lex**

1. Open the Amazon Lex console.
2. Choose Create bot.
3. On the Configure bot settings page, choose Create - Create a blank bot and provide the following information:
   - **Bot name** — For this walkthrough, name the bot AccountBalance.
   - **IAM permissions** — Select a role if you have one created. Otherwise, choose Create a role with basic Amazon Lex permissions.
   - **COPPA** — Choose whether the bot is subject to the Child Online Privacy Protection Act.
   - **Session timeout** — Choose how long the bot should wait to get input from a caller before ending the session.
4. Choose Next.
5. Provide language and voice specific information:
   - **Language** — Select language and locale from the list of Languages and locales supported by Amazon Lex.
   - **Voice interaction** — Select the voice for your bot to use when speaking to callers. The default voice for Amazon Connect is Joanna.
6. Choose Done. The AccountBalance bot is created, and the Intent page is displayed.
Amazon Lex (Classic)

1. Open the Amazon Lex console.
2. If you are creating your first bot, choose Get Started. Otherwise, choose Bots, Create.
3. On the Create your bot page, choose Custom bot and provide the following information:
   - Bot name — For this walkthrough, name the bot AccountBalance.
   - Output voice — Select the voice for your bot to use when speaking to callers. The default voice for Amazon Connect is Joanna.
   - Session timeout — Choose how long the bot should wait to get input from a caller before ending the session.
   - COPPA — Choose whether the bot is subject to the Child Online Privacy Protection Act.
4. Choose Create.

Configure the Amazon Lex bot

In this step you’ll determine how the bot responds to customers by providing intents, sample utterances, slots for input, and error handling.

For this example, you’ll configure the bot with two intents: one to look up account information, and another to speak with an agent.

**Create AccountLookup intent**

Amazon Lex

1. After you created the bot, you are on the Intents page the Amazon Lex console. If you’re not there, you can get there by choosing Bots, AccountBalance, Bot versions, Draft version, Intents. Choose Add intent, Add empty intent.
2. In the Intent name box, enter AccountLookup.
3. Scroll down the page to Sample utterances. In this step you enter utterances that allow the customer to elicit the AccountLookup intent. Enter the following utterances, and choose Add utterance after each one.
   - Check my account balance
   - One: This assigns the utterance of “one” or key press of “1” to the AccountLookup intent.
4. Scroll to the **Slots** section, and choose **Add slot**. Complete the box as follows:

   a. **Required for this intent** = selected.
   b. **Name** = **AccountNumber**.
   c. **Slot type** = **AMAZON.Number**.
   d. **Prompts** = the text to be spoken when the call is answered. For example, ask callers to enter their account number using their keypad: **Using your touch-tone keypad, please enter your account number**. Choose **Add**.
5. Scroll to the **Closing responses** section. Add a message for the bot to say to customers. For example, **Your account balance is $1,234.56**. (For this walkthrough, we aren't going to actually get the data, which is what you would do in reality.)

6. Choose **Save intent**.

**Amazon Lex (Classic)**

1. In the Amazon Lex console choose the + icon next to **Intents**, and choose **Create new intent**.
2. Name the intent AccountLookup.
3. Add a sample utterance, such as Check my account balance, and choose the + icon.
4. Add a second utterance, such as One and choose the + icon. This assigns the utterance of "one" or key press of “1” to the AccountLookup intent.

   **Tip**
   You must add an utterance of "one" in the bot, and not the number "1". This is because Amazon Lex doesn't support numeric input directly. To get around this, later in this walkthrough you'll use numeric input to interact with a Lex bot invoked from a contact flow.

5. Under Slots, add a slot named AccountNumber.

6. For Slot type, use the drop-down to choose AMAZON.NUMBER.
7. For Prompt, add the text to be spoken when the call is answered. For example, ask callers to enter their account number using their keypad: Using your touch-tone keypad, please enter your account number.

8. Choose the + icon.
9. Make sure that the Required check box is selected.
10. In the Response section, add a message for the bot to say to customers. For example, Your account balance is $1,234.56.
11. Choose Save Intent.

**Create SpeakToAgent intent**

Amazon Lex

1. Navigate to the Intents page: choose Back to intents list.
2. Choose Add intent, Add empty intent.
3. In the Intent name box, enter SpeakToAgent, and then choose Add.
4. Scroll down to Sample utterances section. Enter the following utterances, which allow the customer to elicit the SpeakToAgent intent:

   - Speak to an agent
   - Two
5. Scroll down to the Closing responses section. Add a message for the bot to say to customers. For example, **Okay, an agent will be with you shortly.**

6. Choose **Save intent.**

**Amazon Lex (Classic)**

1. In the Amazon Lex console choose the + icon next to Intents, and choose **Create new intent.**
2. Name the intent **SpeakToAgent.**
3. Select **SpeakToAgent.**
4. Add a sample utterance, such as *Speak to an agent*, and choose +.
5. Add a second utterance, such as *Two*, and choose +.
6. Add a message that lets callers know that their call is being connected to an agent. For example, "Okay, an agent will be with you shortly."
7. Choose **Save Intent.**

**Build and test the Amazon Lex bot**

After you create your bot, make sure it works as intended.

**Amazon Lex**

1. At the bottom of the page, choose **Build.** It may take a minute or two.

2. When it's finished building, choose **Test.**

3. Let's test the **AccountLookup** intent: In the **Test Draft version** pane, in the **Type a message** box, type 1 and press Enter. Then type a fictitious account number and press Enter.
a. Clear the test box.

b. Type the intents you want to test.

4. To confirm that the **SpeakToAgent** intent is working, clear the test box, and then type 2 and press Enter.
5. Close the Test Draft version pane.
Create a bot version (Optional)

In this step you create a new bot version to use in an alias. It’s how you create an alias that can be used in a production environment. Test aliases are subject to lower throttling limits. Although this is a test walkthrough, creating a version is a best practice.

Amazon Lex

1. If you’re on the Intents page, choose Back to intents list.
2. On the left menu, choose Bot versions.
3. Choose Create version.
4. Review the details of the AccountBalance bot, and then choose Create.

This creates a version of your bot (Version 1), to associate a version directly with an alias. You can switch versions on a non-test alias without having to track which version is getting published.

Create an alias for the bot

Amazon Lex
1. In the left menu, choose Aliases.
2. On the Aliases page, choose Create alias.
3. In the Alias name box, enter a name, such as Test. Later in this walkthrough you'll use this alias to specify this version of the bot in your contact flow.

   Important
   In a production environment, always use a different alias than TestBotAlias for Amazon Lex and $LATEST for Amazon Lex classic. TestBotAlias and $LATEST support a limited number of concurrent calls to an Amazon Lex bot. For more information, see Runtime Service Quotas.

4. For Associated version, choose the version you just created, such as Version 1.
5. Choose Create.

Amazon Lex (Classic)
1. Choose Publish.
2. Provide an alias for your bot. Use the alias to specify this version of the bot in the contact flow, for example, Test.

   **Important**
   In a production environment, always use a different alias than **TestBotAlias** for Amazon Lex and **$LATEST** for Amazon Lex classic. **TestBotAlias** and **$LATEST** support a limited number of concurrent calls to an Amazon Lex bot. For more information, see [Runtime Service Quotas](#).

3. Choose Publish.

## Add the Amazon Lex bot to your Amazon Connect instance

**Amazon Lex**

1. Open the [Amazon Connect console](#).
2. Select the Amazon Connect instance that you want to integrate with your Amazon Lex bot.

![Amazon Connect virtual contact center instances](#)

3. On the navigation menu, choose **Contact flows**.
4. Under **Amazon Lex**, use the dropdown to select the Region of your Amazon Lex bot, and then select your Amazon Lex bot, **AccountBalance**.
5. Select the Amazon Lex bot alias name from the dropdown (Test), and then choose **Add Lex Bot**.
Add the Amazon Lex bot to your Amazon Connect instance

Note
Amazon Connect uses Amazon Lex resource-based policies to make calls to your Amazon Lex bot. When you associate an Amazon Lex bot with your Amazon Connect instance, the resource-based policy on the bot is updated to give Amazon Connect permission to invoke the bot. For more information on Amazon Lex resource-based policies, see How Amazon Lex works with IAM.

Amazon Lex (Classic)

1. Open the Amazon Connect console.
2. Select the Amazon Connect instance that you want to integrate with your Amazon Lex bot.
3. On the navigation menu, choose Contact flows.
4. Under Amazon Lex, select the Region of your Amazon Lex classic bot from the dropdown, and then select your Amazon Lex classic bot. It's name will have the suffix “(Classic)”. Then choose Add Lex Bot.
Create a contact flow and add your Amazon Lex bot

Next, create a new contact flow that uses your Amazon Lex bot. When you create the contact flow, you configure the message played to callers.

1. Log in to your Amazon Connect instance with an account that has permissions for contact flows and Amazon Lex bots.
2. On the navigation menu, choose Routing, Contact flows, Create contact flow, and type a name for the flow.
3. Under Interact, drag a Get customer input (p. 318) block onto the designer, and connect it to the Entry point block.
4. Click the Get customer input block to open it. Choose Text to speech or chat text, Enter text.
5. Type a message that provides callers with information about what they can do. For example, use a message that matches the intents used in the bot, such as "To check your account balance, press or say 1. To speak to an agent, press or say 2."
6. Select the **Amazon Lex** tab.
7. In the **Name** dropdown, select the **AccountBalance** bot you created earlier.

   a. If you selected an Amazon Lex bot, under **Alias** use the dropdown menu to select the bot alias, **Test**.
   
   b. Amazon Lex Classic bots have the suffix "(Classic)" appended to their names. If you have selected a Classic bot, enter the alias you want to use in the **Alias** field.
c. For Amazon Lex bots, you also have the option of manually setting a bot alias ARN. Choose Set manually, then either type the ARN of the bot alias you want to use or set the ARN using a dynamic attribute.

8. Under Intents, choose Add an intent.
9. Type AccountLookup and choose Add another intent.

10. Type SpeakToAgent and choose Save.

**Important**
If you're using an Amazon Lex V2 bot, your language attribute in Amazon Connect must match the language model used to build your Lex bot. This is different than Amazon Lex (Classic). Use a Set voice (p. 366) block to indicate the Amazon Connect language model, or use a Set contact attributes (p. 350) block.

### Finish the contact flow

In this step you finish adding parts to the contact flow that run after the caller interacts with the bot:

1. If the caller presses 1 to get their account balance, use a Prompt block to play a message and disconnect the call.
2. If the caller presses 2 to speak to an agent, use a Set queue block to set the queue and transfer the caller to the queue, which ends the contact flow.

Here are the steps to create the contact flow:

1. Under Interact, drag a Play prompt block to the designer, and connect the AccountLookup node of the Get customer input block to it. After the customer gets their account balance from the Amazon Lex bot, the message in the Play prompt block plays.
2. Under Terminate/Transfer, drag a Disconnect block to the designer, and connect the Play prompt block to it. After the prompt message plays, the call is disconnected.

To complete the SpeakToAgent intent:

1. Add a Set working queue block and connect it to the SpeakToAgent node of the Get customer input block.
2. Add a Transfer to queue block.
3. Connect the Success node of the Set customer queue flow block to the Transfer queue.
4. Choose Save, then Publish.
Assign the contact flow to a phone number

When customers call in to your contact center, the contact flow to which they are sent is the one assigned to the telephone number that they called. To make the new contact flow active, assign it to a phone number for your instance.

1. Open the Amazon Connect console.
2. Choose Routing, Phone numbers.
3. On the Manage Phone numbers page, select the phone number to assign to the contact flow.
4. Add a description.
5. In the Contact flow/IVR menu, choose the contact flow that you just created.
6. Choose Save.

Try it!

To try the bot and contact flow, call the number you assigned to the contact flow. Follow the prompts.

Add interactive messages to chat

Interactive messages are rich messages that present a prompt and pre-configured display options that a customer can select from. These messages are powered by Amazon Lex and configured through Amazon Lex using a Lambda.

Tip
For step-by-step instructions on how to add interactive messages through Amazon Lex and Lambda, see this blog: Set up interactive messages for your Amazon Connect chatbot.

Amazon Connect provides two message display templates: a list picker and a time picker. These templates define how the information is going to render, and what information is surfaced in the chat.
interface. When interactive messages are sent through chat, contact flows validate that the message format follows one of these templates.

This topic provides details about these interactive message templates.

**List picker template**

Following are examples of how the list picker template renders information in a chat.

**List picker**

![List picker example](image1)

**List picker with images**

![List picker with images example](image2)

The following code is the list picker template that you can use in your Lambda. Note the following:

- **Bold text** is a mandatory parameter.
- In some cases, if the parent element exists in the request and it isn't mandatory/bold, but the fields in it are, then the fields are mandatory. For example, see `data.replyMessage` structure in the following template. If the structure exists, title is mandatory. Otherwise complete `replyMessage` is optional.

**Important**

Images should be uploaded in Amazon S3 and publicly accessible.

```json
{
  "templateType":"ListPicker",
  "version":"1.0",
  "data":{

```
"replyMessage":{
    "title":"Thanks for selecting!",
    "subtitle":"Produce selected",
    "imageType":"URL",
    "imageData":"https://interactive-msg.s3-us-west-2.amazonaws.com/fruit_34.3kb.jpg",
    "imageDescription":"Select a produce to buy" },
"content":{
    "title":"What produce would you like to buy?",
    "subtitle":"Tap to select option",
    "imageType":"URL",
    "imageData":"https://interactive-msg.s3-us-west-2.amazonaws.com/fruit_34.3kb.jpg",
    "imageDescription":"Select a produce to buy",
    "elements>":[
    { "title":"Apple",
    "subtitle":"$1.00",
    "imageType":"URL",
    "imageData":"https://interactive-message-testing.s3-us-west-2.amazonaws.com/apple_4.2kb.jpg"
    },
    { "title":"Orange",
    "subtitle":"$1.50",
    "imageType":"URL",
    "imageData":"https://interactive-message-testing.s3-us-west-2.amazonaws.com/orange_17.7kb.jpg"
    },
    { "title":"Banana",
    "subtitle":"$10.00",
    "imageType":"URL",
    "imageData":"https://interactive-message-testing.s3-us-west-2.amazonaws.com/banana_7.9kb.jpg",
    "imageDescription":"Banana" }
    ]
    }
}

List picker limits

The following table lists the limits for each of the list picker elements, should you choose to build your own Lambda from scratch. The mandatory parameters are in bold.

<table>
<thead>
<tr>
<th>Parent field</th>
<th>Field</th>
<th>Required</th>
<th>Minimum characters</th>
<th>Maximum characters</th>
<th>Other requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>templateType</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Valid template type</td>
</tr>
<tr>
<td></td>
<td>data</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>version</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Must be &quot;1.0&quot;</td>
</tr>
<tr>
<td></td>
<td>data</td>
<td>content</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Time picker template

Following are two examples of how the time picker template renders information in a chat.

<table>
<thead>
<tr>
<th>Parent field</th>
<th>Field</th>
<th>Required</th>
<th>Minimum characters</th>
<th>Maximum characters</th>
<th>Other requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>replyMessage</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>content</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>title</td>
<td>Yes</td>
<td>1</td>
<td>100</td>
<td>Should be a description for promptless templates</td>
</tr>
<tr>
<td></td>
<td>elements</td>
<td>Yes</td>
<td>1 item</td>
<td>6 items</td>
<td>This is an array of elements. Maximum 6 elements in the array.</td>
</tr>
<tr>
<td></td>
<td>subtitle</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>imageType</td>
<td>No</td>
<td>0</td>
<td>50</td>
<td>Must be &quot;URL&quot;</td>
</tr>
<tr>
<td></td>
<td>imageData</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td>Must be a valid public Amazon S3 URL</td>
</tr>
<tr>
<td></td>
<td>imageDescription</td>
<td>No</td>
<td>0</td>
<td>50</td>
<td>Cannot exist without an image</td>
</tr>
<tr>
<td></td>
<td>elements title</td>
<td>Yes</td>
<td>1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>subtitle</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>imageType</td>
<td>No</td>
<td>0</td>
<td>50</td>
<td>Must be &quot;URL&quot;</td>
</tr>
<tr>
<td></td>
<td>imageData</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td>Must be a valid public Amazon S3 URL</td>
</tr>
<tr>
<td></td>
<td>imageDescription</td>
<td>No</td>
<td>0</td>
<td>50</td>
<td>Cannot exist without an image</td>
</tr>
<tr>
<td></td>
<td>replyMessage title</td>
<td>Yes</td>
<td>1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>subtitle</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>imageType</td>
<td>No</td>
<td>0</td>
<td>50</td>
<td>Must be &quot;URL&quot;</td>
</tr>
<tr>
<td></td>
<td>imageData</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td>Must be a valid public Amazon S3 URL</td>
</tr>
<tr>
<td></td>
<td>imageDescription</td>
<td>No</td>
<td>0</td>
<td>50</td>
<td>Cannot exist without an image</td>
</tr>
</tbody>
</table>
The following code is the time picker template that you can use in your Lambda. Note the following:

- **Bold text** is a mandatory parameter.
- In some cases, if the parent element exists in the request and it isn't mandatory/bold, but the fields in it are, then the fields are mandatory. For example, see `data.replyMessage` structure in the following template. If the structure exists, title is mandatory. Otherwise complete `replyMessage` is optional.

```json
{
  "templateType":"TimePicker",
  "version":"1.0",
  "data":{
    "replyMessage":{
      "title":"Thanks for selecting",
      "subtitle":"Appointment selected",
    },
    "content":{
      "title":"Schedule appointment",
      "subtitle":"Tap to select option",
      "timeZoneOffset":-450
    },
    "location":{
      "latitude":47.616299,
      "longitude":-122.4311,
      "title":"Oscar",
      "radius":1,
    },
    "timeslots":[
      {
        "date":"2020-10-31T17:00+00:00",
        "duration":60,
      },
      {
        "date":"2020-11-15T13:00+00:00",
        "duration":60,
      }
    ]
  }
}
```
The following table lists the limits for each of the time picker elements. Use this information if you choose to build your own Lambda from scratch. The mandatory parameters are in bold.

<table>
<thead>
<tr>
<th>Parent field</th>
<th>Field</th>
<th>Required</th>
<th>Minimum characters</th>
<th>Maximum characters</th>
<th>Other requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>templateType</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Valid template type</td>
</tr>
<tr>
<td></td>
<td>data</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>version</td>
<td>Yes</td>
<td></td>
<td></td>
<td>Must be &quot;1.0&quot;</td>
</tr>
<tr>
<td>data</td>
<td>replyMessage</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>content</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>replyMessage</td>
<td>title</td>
<td>Yes</td>
<td>1</td>
<td>100</td>
<td>Should be description for promptless templates</td>
</tr>
<tr>
<td></td>
<td>subtitle</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>content</td>
<td>title</td>
<td>Yes</td>
<td>1</td>
<td>100</td>
<td>Should be description for promptless templates</td>
</tr>
<tr>
<td></td>
<td>subtitle</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>timezone offset</td>
<td>No</td>
<td>-720</td>
<td>840</td>
<td>This is an optional field when not set. Our sample client defaults to the user's timezone. If set, this displays per the timezone</td>
</tr>
<tr>
<td>Parent field</td>
<td>Field</td>
<td>Required</td>
<td>Minimum characters</td>
<td>Maximum characters</td>
<td>Other requirement</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>----------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>location</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>timeslots</td>
<td>Yes</td>
<td>1</td>
<td>20</td>
<td>This is an array of timeslots. Maximum of 20 elements in the array.</td>
</tr>
<tr>
<td>location</td>
<td>longitude</td>
<td>Yes</td>
<td>-180</td>
<td>180</td>
<td>Must be double</td>
</tr>
<tr>
<td></td>
<td>latitude</td>
<td>Yes</td>
<td>-90</td>
<td>90</td>
<td>Must be double</td>
</tr>
<tr>
<td></td>
<td>title</td>
<td>Yes</td>
<td>1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>radius</td>
<td>No</td>
<td>0</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>timeslotsdate</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
<td>Should be in ISO-8601 time format: YYYY-MM-DDTHH.MM+00.00</td>
</tr>
<tr>
<td></td>
<td>duration</td>
<td>Yes</td>
<td>1</td>
<td>3600</td>
<td></td>
</tr>
</tbody>
</table>

For example: "2020-08-14T21:21+00.00"
Enable Customer Profiles

To help agents deliver more efficient and personalized customer service, Amazon Connect enables you to combine information from external applications, such as Salesforce, with contact history from Amazon Connect. This creates a customer profile that has all the information agents need during customer interactions in a single place.

With a single view of customer information and contact history, agents can quickly confirm the customer's identity and determine the reason for the call or chat.

Currently, Amazon Connect Customer Profiles can be used in compliance with GDPR and is pending additional certifications held by Amazon Connect.

The following image shows an agent's Contact Control Panel (CCP); for the purposes of this documentation, Amazon Connect Customer Profiles highlighted in the red box. The agent's application is optimized for multi-tasking: working on calls, and multiple chats and tasks, with customer profile information in the same browser window.

1. **Product purchase history**: All the assets purchased by a customer can be populated here. The data is ingested from an external app such as Salesforce or Zendesk that you've integrated (p. 544) with Customer Profiles.

2. **Contact history**: Date, times, and duration when this customer contacted your contact center in the past.

3. **More information**: Information that an agent can use to verify the contact, such as cell phone number and shipping address.

4. **Actions**: Agents can copy the contact ID, or choose to go directly to the contact's CTR details page.
What is a customer profile?

A customer profile contains contact history and values for the standard profile attributes. The standard profile attributes are, for example, account number, address, billing address, and birth date.

After you enable Amazon Connect Customer Profiles, you can ingest data from external applications (p. 544) into the customer profiles.

You can also add custom fields and objects to the customer profiles by using the Amazon Connect Customer Profiles APIs.

Where is customer profile data stored?

Amazon Connect creates and stores a unique customer profile for every contact. It parses the external application data, and stores it as customer profile attributes.

Amazon Connect does not replace or update the data in the external application. If a data source is removed, the data from the external application is no longer available in the customer profile.

For information about how customer profile data are secured, see Data protection in Amazon Connect (p. 814).

Enable Customer Profiles for your instance

Amazon Connect provides pre-built integrations so you can quickly combine customer information from multiple external applications, with contact history from Amazon Connect. This allows you to create a customer profile that has all the information agents need during customer interactions in a single place.

Before you begin

Following is an overview of key concepts and the information that you’ll be prompted for during the setup process.

About the customer profiles domain

When you enable Amazon Connect Customer Profiles, you create a customer profiles domain: a container for all data, such as customer profiles, object types, profile keys, and encryption keys. Following are guidelines for creating Customer Profile domains:

- Each Amazon Connect instance can only be associated with one domain.
- You can create multiple domains, but they don't share external application integrations or customer data between each other.
- All the external application integrations you create are at a domain level. All of the Amazon Connect instances associated with a domain inherit the domain's integrations.
- You can change the association of your Amazon Connect instance from your current domain to a new domain at any time, by choosing a different domain. This isn't recommended, however, because the customer profiles from the earlier domain won't be moved to the new domain.

How do you want to name your customer profiles domain?

When you enable customer profiles, you are prompted to provide a friendly domain name that’s meaningful to you such as your organization name, for example, CustomerProfiles-ExampleCorp. You can change the friendly name using the API at any time.
Do you want to use a dead-letter queue?

A dead-letter queue is used for reporting errors associated with processing data from external applications.

Amazon AppFlow handles connecting to the external application and moving data from it to Amazon Connect Customer Profiles. Amazon Connect then processes the file.

- If an error occurs during the connection or while transporting the data to Amazon Connect, Amazon AppFlow surfaces the error but it doesn't write the error to the dead-letter queue.
  
  For example, a processing error could be that the external data didn't match the specified schema or that the format of the external data format isn't correct (currently only JSON is supported).

- If Amazon Connect encounters an error while processing the file, it writes the error to your dead-letter queue. You can look at the queue later and try to reprocess the error.

When you enable Customer Profiles, you have the option of specifying an Amazon SQS queue as your dead-letter queue. If you select this option, add the following resource policy to Amazon SQS so Customer Profiles has permissions to send messages to that queue:

```json
{
  "Sid": "Customer Profiles SQS policy",
  "Effect": "Allow",
  "Principal": {
    "Service": "profile.amazonaws.com"
  },
  "Action": "SQS:SendMessage",
  "Resource": "arn:aws:sqs:region:accountID:YourQueueName"
}
```

Step-by-step instructions are provided in Enable Customer Profiles (p. 533). For general information, see Basic examples of Amazon SQS policies.

Create a KMS key to be used by Customer Profiles to encrypt data (required)

When you enable Customer Profiles, you are prompted to create or provide a AWS Key Management Service KMS key. Step-by-step instructions for creating a KMS key are provided in Enable Customer Profiles (p. 533).

All data at rest for Customer Profiles is encrypted under the KMS key you choose. Your customer-managed KMS key is created, owned, and managed by you. You have full control over the KMS key (AWS KMS charges apply).

If you choose to set up a KMS key where someone else is the administrator, it must have a policy that allows kms:GenerateDataKey, kms:CreateGrant, and kms:Decrypt permissions to the Customer Profiles service principal. For information about how to change a key policy, see Changing a key policy in the AWS Key Management Service Developer Guide.

Enable Customer Profiles

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.
3. In the navigation pane, choose Customer profiles.

The Customer profiles domain page lists the applications that are available for integration.

4. Choose Enable customer profiles to get started.

5. At the Customer profiles enable page, choose Create new domain. Under Specify a domain, enter a friendly name that's meaningful to you, such as your organization name, for example, CustomerProfiles-ExampleCorp.

6. Under Specify dead-letter queue, choose whether to send failed events to a dead-letter queue. This is helpful if you want to get visibility into data that failed to be ingested. It also gives you the option to retry these failed data ingestions in the future.

Following are the steps to create a dead-letter queue:

- On the Customer profiles enable page, choose Create new or select existing SQS queue and then choose Create a new Dead Letter Queue.
A new tab in your browser opens for the Amazon SQS console. Choose **Create queue**.

On the **Create queue** page, choose **Standard**, then assign a name to your queue.

In the **Access policy** section, choose **Advanced**.
The Version name, policy ID, and Statement appear. If needed, update this section to give access to only the appropriate roles.

- At the end of the Statement section (line 15 in the following image) add a comma after }, and press Enter.

```
```

- Then copy and paste the following code:

```
```

- To replace `region, accountID, and YourQueueName` with your information, copy and paste the Resource information from line 14.
Choose Create queue.

Return to the tab in your browser for the Amazon Connect console, Customer profiles enable page. Click or tap in the Choose existing SQS queue box to select the queue you just created from the dropdown list.

7. Under Specify KMS key, create or enter your own AWS KMS key for encryption. Following are the steps to create your AWS KMS key:
   - On the Customer profiles enable page, choose Create an AWS KMS key.
• A new tab in your browser opens for the Key Management Service (KMS) console. On the Configure key page, choose Symmetric, and then choose Next.

• On the Add labels page, add a name and description for the key, and then choose Next.
• On the **Define key administrative permissions** page, choose Next.

• On the **Define key usage permissions** page, choose Next.

• On the **Review and edit key policy** page, choose Finish.

In the following example, the name of the key starts with **bcb6fdd**:

• Return to the tab in your browser for the Amazon Connect console, **Customer profiles enable** page. Click or tap in the **Specify KMS key box** for the key you created to appear in a dropdown list. Choose the key you created.

8. Choose **Submit**. The completed page looks similar to the following image.
You're done! Amazon Connect Customer Profiles is enabled. Now with every new contact that comes in, Amazon Connect creates a customer profile record. It then tracks the contact history for that phone number (voice) or email address (chat).

Your agents can create new customer profiles (p. 905) and view contact trace records for your customers.

You can also integrate with external applications that provide customer profile data. For more information, see Integrate external applications with Customer Profiles (p. 544).

Access Customer Profiles in the agent application

After you enable Amazon Connect Customer Profiles, you need to take steps to make the functionality available through the agent application. This topic explains your options.

Tip
Make sure your agents have Customer profiles permissions in their security profile so they can access Customer Profiles. For more information, see Security profile permissions for Customer Profiles (p. 543).

Option 1: Use Customer Profiles with the CCP out-of-the-box (Preview)

Customer Profiles is already embedded alongside the Contact Control Panel (CCP). Your agents will access the CCP and Customer Profiles in the same browser window using a link that looks like this:

• https://instance name.my.connect.aws/agent-app-v2/

If you access your instance using the awsapps.com domain, use the following URL:

• https://instance name.awsapps.com/connect/agent-app-v2/

For help finding your instance name, see Find your Amazon Connect instance name (p. 138).

Following is an example of what the CCP and Customer Profiles look like in the same browser window.
Option 2: Embed Customer Profiles into a custom agent application

When you embed your Contact Control Panel (CCP), you have the option of showing or hiding the pre-built CCP user interface. For example, you may want to develop a custom agent application that has a user interface you design, with customized buttons to accept and reject calls. Or, you may want to embed the pre-built CCP that's included with Amazon Connect into another custom app.

Regardless of whether you display the pre-built CCP user interface, or hide it and build your own, you use the Amazon Connect Streams library to embed the CCP and Customer Profiles into the agent's application. This way, Amazon Connect Streams is initialized, and the agent can connect and authenticate to Amazon Connect, and Customer Profiles.

For information about embedding Customer Profiles, see Initialization for CCP, Customer Profiles, and Wisdom.

Tip
When you customize the agent's application, you determine the URL agents will use to access their agent application, and it might very different from the one provided by Amazon Connect. For example, your URL could be https://example-corp.com/agent-support-app.

Use contact attributes to autopopulate customer profiles

By default, Amazon Connect Customer Profiles uses the following values to search for and autopopulate a customer profile in its user interface:

- For voice contacts: Phone number
• For chat contacts: Customer name

To customize this behavior, use the following contact attributes:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
<th>Type</th>
<th>JSONPath Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>profileSearchKey</td>
<td>The name of the attribute you want to use to search for a profile.</td>
<td>User-defined</td>
<td>Not applicable</td>
</tr>
<tr>
<td>profileSearchValue</td>
<td>The value of the key you want to search for, such as customer name or account number.</td>
<td>User-defined</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

For example, to search by email for chat contacts, you can set the profileSearchKey attribute to the _email search key, and provide the email value as the profileSearchValue.

If you have defined custom keys in your profile objects, you can search by those search keys as well. To make sure your custom keys are searchable, see Key definition details (p. 569).

The following image shows how you might use these attributes in the Set contact attributes (p. 350) block.
Assign the following **Customer profiles** permissions as needed to the agent's security profile:

- **View**: Enables agents to see the Customer profiles application. They can:
  - View profiles that are autopopulated in the agent app.
  - Search for profiles.
  - View details stored in customer profiles (for example, Name, Address).
  - Associate Contact Records to profiles, as shown in the following image.
Integrate external applications

Amazon Connect provides a set of pre-built integrations powered by Amazon AppFlow. After you enable Amazon Connect Customer Profiles, you can use these integrations to combine information from external applications such as Salesforce or Zendesk, with contact history from Amazon Connect. This creates a customer profile that has all the information agents need during customer interactions in a single place.

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.
3. In the navigation pane, choose Customer profiles.

By default, the Admin security profile already has permissions to perform all Customer profiles activities.

Integrate external applications with Customer Profiles

- **Edit**: Enables agents to edit details in the customer profile (for example, change address). They inherit View permissions by default.
- **Create**: Enables agents to create and save a new profile. They inherit View permissions by default, but don’t inherit Edit permissions.

For instructions, see Update security profiles (p. 616).

5. On the Select application page, choose which external application you want to get customer profiles data from. Select Read and acknowledge to indicate you understand the connection requirements for your application.

6. On the Establish connection page, choose one of the following:
   - Use existing connection: This allows you to reuse existing Amazon AppFlow resources you may have created in your AWS account.
   - Create new connection: Enter the information required by the external application.
7. On the **Review and integrate** page, check that the **Connection status** says **Connected**, and then choose **Create integration**.

8. After the integration is set up, back on the **Customer profiles configuration** page, choose **View objects** to see what data is being batched and sent. Currently, this process ingests records that were created or modified in the last 30 days.
Monitor your Customer Profile integrations

After your connection is established, if it stops working, delete the integration and then re-establish it.

What to do if objects aren't being sent

If an object fails to be sent, choose Flow details to learn more about what's gone wrong.

You may need to delete the configuration and re-connect to the external application.

Delete/stop Customer Profile integrations

If at any time you want to stop the ingestion of customer profile data, choose the application and then choose Delete.

- To delete customer profiles data for a specific integration, use the DeleteObjectType API.
- To delete the integrations, customer profiles, and all the customer profile data, use the DeleteDomain API.

To re-enable the ingestion of customer profile data, go through the setup steps again.

Object type mapping for the standard profile

The topics in this section provide the standard profile definition, and the object type mapping from external applications to the standard profile.

Contents

- Amazon AppFlow access requirements (p. 547)
- Standard profile definition (p. 547)
- Mapping Salesforce objects to the standard profile (p. 549)
- Mapping Zendesk objects to the standard profile (p. 557)
- Mapping Marketo objects to the standard profile (p. 559)
- Mapping ServiceNow objects to the standard profile object (p. 561)

Amazon AppFlow access requirements

Following are the Amazon AppFlow access requirements to create and delete Zendesk, Marketo, Salesforce, and ServiceNow integrations:

- appflow:CreateFlow
- appflow:DeleteFlow

Standard profile definition

The following table lists all the fields in the Customer Profiles standard profile object.
<table>
<thead>
<tr>
<th>Standard profile field</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProfileId</td>
<td>String</td>
<td>The unique identifier of a customer profile.</td>
</tr>
<tr>
<td>AccountNumber</td>
<td>String</td>
<td>A unique account number that you have given to the customer.</td>
</tr>
<tr>
<td>AdditionalInformation</td>
<td>String</td>
<td>Any additional information relevant to the customer's profile.</td>
</tr>
<tr>
<td>PartyType</td>
<td>String</td>
<td>The type of profile used to describe the customer.</td>
</tr>
<tr>
<td>BusinessName</td>
<td>String</td>
<td>The name of the customer's business.</td>
</tr>
<tr>
<td>FirstName</td>
<td>String</td>
<td>The customer's first name.</td>
</tr>
<tr>
<td>MiddleName</td>
<td>String</td>
<td>The customer's middle name.</td>
</tr>
<tr>
<td>LastName</td>
<td>String</td>
<td>The customer's last name.</td>
</tr>
<tr>
<td>BirthDate</td>
<td>String</td>
<td>The customer's birth date.</td>
</tr>
<tr>
<td>Gender</td>
<td>String</td>
<td>The gender with which the customer identifies.</td>
</tr>
<tr>
<td>PhoneNumber</td>
<td>String</td>
<td>The customer's phone number, which has not been specified as a mobile, home, or business number.</td>
</tr>
<tr>
<td>MobilePhoneNumber</td>
<td>String</td>
<td>The customer's mobile phone number.</td>
</tr>
<tr>
<td>HomePhoneNumber</td>
<td>String</td>
<td>The customer's home phone number.</td>
</tr>
<tr>
<td>BusinessPhoneNumber</td>
<td>String</td>
<td>The customer's business phone number.</td>
</tr>
<tr>
<td>EmailAddress</td>
<td>String</td>
<td>The customer's email address, which has not been specified as a personal or business address.</td>
</tr>
<tr>
<td>BusinessEmailAddress</td>
<td>String</td>
<td>The customer's business email address.</td>
</tr>
<tr>
<td>Address</td>
<td>Address</td>
<td>A generic address associated with the customer that is not mailing, shipping, or billing.</td>
</tr>
<tr>
<td>ShippingAddress</td>
<td>Address</td>
<td>The customer's shipping address.</td>
</tr>
<tr>
<td>MailingAddress</td>
<td>Address</td>
<td>The customer's mailing address.</td>
</tr>
</tbody>
</table>
### Standard profile field

<table>
<thead>
<tr>
<th>Standard profile field</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BillingAddress</td>
<td>Address</td>
<td>The customer's billing address.</td>
</tr>
<tr>
<td>Attributes</td>
<td>String-to-string map</td>
<td>Key-value pair of attributes of a customer profile.</td>
</tr>
</tbody>
</table>

### Address data type

<table>
<thead>
<tr>
<th>Standard profile field</th>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address1</td>
<td>String</td>
<td>The first line of a customer address.</td>
</tr>
<tr>
<td>Address2</td>
<td>String</td>
<td>The second line of a customer address.</td>
</tr>
<tr>
<td>Address3</td>
<td>String</td>
<td>The third line of a customer address.</td>
</tr>
<tr>
<td>Address4</td>
<td>String</td>
<td>The fourth line of a customer address.</td>
</tr>
<tr>
<td>City</td>
<td>String</td>
<td>The city in which the customer lives.</td>
</tr>
<tr>
<td>Country</td>
<td>String</td>
<td>The country in which the customer lives.</td>
</tr>
<tr>
<td>County</td>
<td>String</td>
<td>The county in which the customer lives.</td>
</tr>
<tr>
<td>PostalCode</td>
<td>String</td>
<td>The postal code of the customer address.</td>
</tr>
<tr>
<td>Province</td>
<td>String</td>
<td>The province in which the customer lives.</td>
</tr>
<tr>
<td>State</td>
<td>String</td>
<td>The state in which the customer lives.</td>
</tr>
</tbody>
</table>

### Mapping Salesforce objects to the standard profile

This topic lists which fields in Salesforce objects map to fields in the standard profile object in Customer Profiles.

#### Salesforce-Account object

Following is a list of all the fields in a Salesforce-Account object. The fields in your Salesforce-Account object may vary depending on the configuration of your Salesforce instance.

- Id
- IsDeleted
- MasterRecordId
- Name
• Type
• ParentId
• BillingStreet
• BillingCity
• BillingState
• BillingPostalCode
• BillingCountry
• BillingLatitude
• BillingLongitude
• BillingGeocodeAccuracy
• BillingAddress.City
• BillingAddress.Country
• BillingAddress.geocodeAccuracy
• BillingAddress.latitude
• BillingAddress.longitude
• BillingAddress.postalCode
• BillingAddress.state
• BillingAddress.street
• ShippingStreet
• ShippingCity
• ShippingState
• ShippingPostalCode
• ShippingCountry
• ShippingLatitude
• ShippingLongitude
• ShippingGeocodeAccuracy
• ShippingAddress.city
• ShippingAddress.country
• ShippingAddress.latitude
• ShippingAddress.longitude
• ShippingAddress.postalCode
• ShippingAddress.state
• ShippingAddress.street
• Phone
• Fax
• AccountNumber
• Website
• PhotoUrl
• Sic
• Industry
• AnnualRevenue
• NumberOfEmployees
• Ownership
• TickerSymbol
• Description
Mapping Salesforce objects

- Rating
- Site
- OwnerId
- CreatedDate
- CreatedById
- LastModifiedDate
- LastModifiedId
- SystemModstamp
- LastActivityDate
- LastViewedDate
- LastReferencedDate
- Jigsaw
- JigsawCompanyId
- CleanStatus
- AccountSource
- DunsNumber
- Tradestyle
- NaicsCode
- NaicsDesc
- YearStarted
- SicDesc
- DandbCompanyId
- IsBuyer

Mapping a Salesforce-Account object to a standard profile

A subset of the fields in the Salesforce-Account object map to the standard profile object in Customer Profiles.

The following table lists which fields can be mapped from the Salesforce-Account object to the standard profile. (The table includes the mapping for a Salesforce instance that has been configured to include Person fields.)

<table>
<thead>
<tr>
<th>Salesforce-Account source field</th>
<th>Standard profile target field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Id</td>
<td>Attributes.sfdcAccountId</td>
</tr>
<tr>
<td>Name</td>
<td>BusinessName</td>
</tr>
<tr>
<td>Phone</td>
<td>PhoneNumber</td>
</tr>
<tr>
<td>BillingStreet</td>
<td>BillingAddress.Address1</td>
</tr>
<tr>
<td>BillingCity</td>
<td>BillingAddress.City</td>
</tr>
<tr>
<td>BillingState</td>
<td>BillingAddress.State</td>
</tr>
</tbody>
</table>
### Salesforce-Account source field | Standard profile target field
--- | ---
ShippingStreet | ShippingAddress.Address1
ShippingCity | ShippingAddress.City
ShippingState | ShippingAddress.State
ShippingCountry | ShippingAddress.Country
ShippingPostalCode | ShippingAddress.PostalCode
IsPersonAccount | PartyType
PersonMobilePhone | MobilePhoneNumber
PersonHomePhone | HomePhoneNumber
PersonEmail | PersonalEmailAddress
PersonMailingAddress.Street | MailingAddress.Address1
PersonMailingAddress.City | MailingAddress.City
PersonMailingAddress.State | MailingAddress.State
PersonMailingAddress.Country | MailingAddress.Country
PersonMailingAddress.PostalCode | MailingAddress.PostalCode
PersonBirthDate | BirthDate
PersonOtherStreet | Address.Address1
PersonOtherCity | Address.City
PersonOtherState | Address.State
PersonOtherCountry | Address.Country
PersonOtherPostalCode | Address.PostalCode
FirstName | FirstName
LastName | LastName
MiddleName | MiddleName
AccountNumber | AccountNumber

The Salesforce-Account customer data from the Salesforce object is associated with an Amazon Connect customer profile using the indexes in the following table.

<table>
<thead>
<tr>
<th>Standard Index Name</th>
<th>Salesforce-Account source field</th>
</tr>
</thead>
<tbody>
<tr>
<td>_salesforceAccountId</td>
<td>Id</td>
</tr>
</tbody>
</table>

For example, you can use _salesforceAccountId as a key name with the [SearchProfiles API](https://docs.aws.amazon.com/connect/latest/api/API_SearchProfiles.html) to find a profile. You can find the Salesforce-Account objects associated with a specific profile by using the [ListProfileObjects API](https://docs.aws.amazon.com/connect/latest/API/index.html) with the ProfileId and ObjectTypeName set to Salesforce-Account.
Salesforce-Contact object

Following is a list of all the fields in a Salesforce-Contact object.

- Id
- IsDeleted
- MasterRecordId
- AccountId
- LastName
- FirstName
- Salutation
- Name
- OtherStreet
- OtherCity
- OtherState
- OtherPostalCode
- OtherCountry
- OtherLatitude
- OtherLongitude
- OtherGeocodeAccuracy
- OtherAddress.city
- OtherAddress.country
- OtherAddress.geocodeAccuracy
- OtherAddress.latitude
- OtherAddress.postalCode
- OtherAddress.state
- OtherAddress.street
- MailingStreet
- MailingCity
- MailingState
- MailingPostalCode
- MailingCountry
- MailingLatitude
- MailingLongitude
- MailingGeocodeAccuracy
- MailingAddress.city
- MailingAddress.country
- MailingAddress.geocodeAccuracy
- MailingAddress.latitude
- MailingAddress.longitude
- MailingAddress.postalCode
- MailingAddress.state
- MailingAddress.street
- Phone
Mapping a Salesforce-Contact object to a standard profile

A subset of the fields in the Salesforce-Contact object map to the standard profile object in Customer Profiles. The following table lists which fields can be mapped from the Salesforce-Contact object to the standard profile object.

<table>
<thead>
<tr>
<th>Salesforce-Contact source field</th>
<th>Standard profile target field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Id</td>
<td>Attributes.sfdcContactId</td>
</tr>
<tr>
<td>AccountId</td>
<td>Attributes.sfdcAccountId</td>
</tr>
</tbody>
</table>
### Salesforce-Contact source field

<table>
<thead>
<tr>
<th>Salesforce-Contact source field</th>
<th>Standard profile target field</th>
</tr>
</thead>
<tbody>
<tr>
<td>LastName</td>
<td>LastName</td>
</tr>
<tr>
<td>FirstName</td>
<td>FirstName</td>
</tr>
<tr>
<td>MiddleName</td>
<td>MiddleName</td>
</tr>
<tr>
<td>OtherStreet</td>
<td>Address.Address1</td>
</tr>
<tr>
<td>OtherCity</td>
<td>Address.City</td>
</tr>
<tr>
<td>OtherState</td>
<td>Address.State</td>
</tr>
<tr>
<td>OtherCountry</td>
<td>Address.Country</td>
</tr>
<tr>
<td>OtherPostalCode</td>
<td>Address.PostalCode</td>
</tr>
<tr>
<td>MailingStreet</td>
<td>MailingAddress.Address1</td>
</tr>
<tr>
<td>MailingCity</td>
<td>MailingAddress.City</td>
</tr>
<tr>
<td>MailingState</td>
<td>MailingAddress.State</td>
</tr>
<tr>
<td>MailingCountry</td>
<td>MailingAddress.Country</td>
</tr>
<tr>
<td>MailingPostalCode</td>
<td>MailingAddress.PostalCode</td>
</tr>
<tr>
<td>Phone</td>
<td>PhoneNumber</td>
</tr>
<tr>
<td>HomePhone</td>
<td>HomePhoneNumber</td>
</tr>
<tr>
<td>MobilePhone</td>
<td>MobilePhoneNumber</td>
</tr>
<tr>
<td>Email</td>
<td>EmailAddress</td>
</tr>
<tr>
<td>Birthdate</td>
<td>BirthDate</td>
</tr>
</tbody>
</table>

The Salesforce-Contact customer data from a Salesforce object is associated with an Amazon Connect customer profile using the indexes in the following table.

<table>
<thead>
<tr>
<th>Standard Index Name</th>
<th>Salesforce-Contact source field</th>
</tr>
</thead>
<tbody>
<tr>
<td>_salesforceContactId</td>
<td>Id</td>
</tr>
<tr>
<td>_salesforceAccountId</td>
<td>AccountId</td>
</tr>
</tbody>
</table>

For example, you can use _salesforceAccountld and _salesforceContactId as a key name with the SearchProfiles API to find a profile. You can find the Salesforce-Contact objects associated with a specific profile by using the ListProfileObjects API with the ProfileId and ObjectTypeName set to Salesforce-Contact.

### Salesforce-Asset object

No mapping currently exists for the Salesforce-Asset object into the standard profile, but you can still ingest it. The data is ingest as is. Following is an example of the data in the Salesforce-Asset object.

- Id
• ContactId
• AccountId
• ParentId
• RootAssetId
• Product2Id
• ProductCode
• IsCompetitorProduct
• CreatedDate
• CreatedById
• LastModifiedDate
• LastModifiedById
• SystemModstamp
• IsDeleted
• Name
• SerialNumber
• InstallDate
• PurchaseDate
• UsageEndDate
• LifecycleStartDate
• LifecycleEndDate
• Status
• Price
• Quantity
• Description
• OwnerId
• AssetProvidedByld
• AssetServiceById
• IsInternal
• AssetLevel
• StockKeepingUnit
• HasLifecycleManagement
• CurrentMrr
• CurrentLifecycleEndDate
• CurrentQuantity
• CurrentAmount
• LastViewedDate
• LastReferencedDate

The Salesforce-Asset customer data from a Salesforce object is associated with an Amazon Connect customer profile using the indexes in the following table.

<table>
<thead>
<tr>
<th>Standard Index Name</th>
<th>Salesforce-Asset source field</th>
</tr>
</thead>
<tbody>
<tr>
<td>_salesforceAssetId</td>
<td>Id</td>
</tr>
</tbody>
</table>
Mapping Zendesk objects to the standard profile

This topic lists which fields in Zendesk objects map to fields in the standard profile in Customer Profiles.

Zendesk-users object

Following is a list of all the fields in a Zendesk-users object.

- id
- url
- external_id
- email
- active
- chat_only
- customer_role_id
- role_type
- details
- last_login_at
- locale
- locale_id
- moderator
- notes
- only_private_comments
- default_group_id
- phone
- shared_phone_number
- photo
- restricted_agent
- role
- shared
- tags
- signature
- suspended
- ticket_restriction
- time_zone
Mapping Zendesk users to a standard profile

A subset of the fields in the Zendesk-users object map to the standard profile in Customer Profiles. The following table lists which fields can be mapped from the Zendesk-users object to the standard profile.

<table>
<thead>
<tr>
<th>Zendesk-users source field</th>
<th>Standard profile target field</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>Attributes.ZendeskUserId</td>
</tr>
<tr>
<td>external_id</td>
<td>Attributes.ZendeskExternalId</td>
</tr>
<tr>
<td>email</td>
<td>EmailAddress</td>
</tr>
<tr>
<td>phone</td>
<td>PhoneNumber</td>
</tr>
</tbody>
</table>

The Zendesk-users customer data from the Zendesk object is associated with an Amazon Connect customer profile using the following indexes.

<table>
<thead>
<tr>
<th>Standard Index Name</th>
<th>Zendesk-user source field</th>
</tr>
</thead>
<tbody>
<tr>
<td>_zendeskUserId</td>
<td>id</td>
</tr>
<tr>
<td>_zendeskExternalId</td>
<td>external_id</td>
</tr>
</tbody>
</table>

For example, you can use _zendeskUserId and _zendeskExternalId as a key name with the SearchProfiles API to find an Amazon Connect customer profile. You can find the Zendesk-users objects associated with a specific customer profile by using the ListProfileObjects API with the ProfileId and ObjectType set to Zendesk-users.

Zendesk-tickets object

No mapping currently exists for the Zendesk-tickets object into the standard profile, but you can still ingest it. The data is ingest as is. Following is an example of the data in the Zendesk-tickets object.

- id
- url
- type
- subject
- raw_subject
- description
- priority
- status
• recipient
• requester_id
• submitter_id
• assignee_id
• organization_id
• group_id
• collaborator_ids
• email_cc_ids
• follower_ids
• forum_topic_id
• problem_id
• has_incidents
• due_at
• tags
• via.channel
• custom_fields
• satisfaction_rating
• sharing_agreement_ids
• followup_ids
• ticket_form_id
• brand_id
• allow_channelback
• allow_attachments
• is_public
• created_at
• updated_at

The Zendesk-tickets customer data from a Zendesk object is associated with a standard profile using the indexes in the following table.

<table>
<thead>
<tr>
<th>Standard Index Name</th>
<th>Zendesk-tickets source field</th>
</tr>
</thead>
<tbody>
<tr>
<td>_zendeskTicketId</td>
<td>Id</td>
</tr>
<tr>
<td>_zendeskUserId</td>
<td>requester_id</td>
</tr>
</tbody>
</table>

For example, you can use _zendeskUserId and _zendeskExternalId as a key name with the SearchProfiles API to find an Amazon Connect customer profile. You can find the Zendesk-tickets objects associated with a specific profile by using the ListProfileObjects API with the ProfileId and ObjectTypeName set to Zendesk-tickets.

Mapping Marketo objects to the standard profile

This topic lists which fields in Marketo objects map to fields in the standard profile object in Customer Profiles.
Market-to-leads object

Following is a list of all the fields in a Marketo-leads object

- id
- firstName
- lastName
- middleName
- email
- phone
- mobilePhone
- billingStreet
- billingCity
- billingState
- billingCountry
- billingPostalCode
- address
- city
- state
- country
- postalcode
- gender
- dateOfBirth

Mapping Marketo-leads to a standard profile

A subset of fields in the Marketo-leads object map to the standard profile.

<table>
<thead>
<tr>
<th>Marketo-leads source field</th>
<th>Standard profile target field</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>Attributes.MarketoLeadId</td>
</tr>
<tr>
<td>sfdcAccountId</td>
<td>Attributes.sfdcAccountId</td>
</tr>
<tr>
<td>sfdcContactId</td>
<td>Attributes.sfdcContactId</td>
</tr>
<tr>
<td>firstName</td>
<td>FirstName</td>
</tr>
<tr>
<td>lastName</td>
<td>LastName</td>
</tr>
<tr>
<td>middleName</td>
<td>MiddleName</td>
</tr>
<tr>
<td>email</td>
<td>EmailAddress</td>
</tr>
<tr>
<td>phone</td>
<td>PhoneNumber</td>
</tr>
<tr>
<td>mobilePhone</td>
<td>MobilePhoneNumber</td>
</tr>
<tr>
<td>mobilePhone</td>
<td>MobilePhoneNumber</td>
</tr>
<tr>
<td>billingStreet</td>
<td>BillingAddress.Address1</td>
</tr>
</tbody>
</table>
Mapping ServiceNow objects to the standard profile object

This topic lists which fields in ServiceNow objects map to fields in the standard profile object in Amazon Connect Customer Profiles.

**Servicenow-sys_user object**

Following is a list of all the fields in a Servicenow-sys_user object:

- sys_id
- active
- building
- calendar_integration
• city
• company
• cost_center
• country
• date_format
• default_perspective
• department
• edu_status
• email
• employee_number
• enable_multifactor_authn
• failed_attempts
• first_name
• gender
• home_phone
• internal_integration_user
• introduction
• last_login
• last_login_device
• last_login_time
• last_name
• last_password
• ldap_server
• location
• locked_out
• manager
• middle_name
• mobile_phone
• name
• notification
• password_needs_reset
• phone
• photo
• preferred_language
• roles
• schedule
• source
• state
• street
• sys_class_name
• sys_created_by
• sys_created_on
• sys_domain.link


- sys_domain.value
- sys_domain_path
- sys_id
- sys_mod_count
- sys_updated_by
- sys_updated_on
- time_format
- time_zone
- title
- user_name
- user_password
- web_service_access_only
- zip

### Mapping Servicenow-sys_users to a standard profile object

A subset of the fields in the Servicenow-sys_users object map to the standard profile object in Customer Profiles.

The following table lists which fields can be mapped from the Servicenow-sys_users object to the standard profile.

<table>
<thead>
<tr>
<th>Servicenow-sys_users source field</th>
<th>Customer profiles target field</th>
</tr>
</thead>
<tbody>
<tr>
<td>sys_id</td>
<td>Attributes.ServiceNowSystemId</td>
</tr>
<tr>
<td>first_name</td>
<td>FirstName</td>
</tr>
<tr>
<td>last_name</td>
<td>LastName</td>
</tr>
<tr>
<td>middle_name</td>
<td>MiddleName</td>
</tr>
<tr>
<td>gender</td>
<td>Gender</td>
</tr>
<tr>
<td>email</td>
<td>EmailAddress</td>
</tr>
<tr>
<td>phone</td>
<td>PhoneNumber</td>
</tr>
<tr>
<td>home_phone</td>
<td>HomePhoneNumber</td>
</tr>
<tr>
<td>mobile_phone</td>
<td>MobilePhoneNumber</td>
</tr>
<tr>
<td>street</td>
<td>Address.Address1</td>
</tr>
<tr>
<td>city</td>
<td>Address.City</td>
</tr>
<tr>
<td>state</td>
<td>Address.State</td>
</tr>
<tr>
<td>country</td>
<td>Address.Country</td>
</tr>
<tr>
<td>zip</td>
<td>Address.PostalCode</td>
</tr>
</tbody>
</table>

The Servicenow-sys_user customer data from Servicenow object is associated with an Amazon Connect customer profile using the indexes in the following table.
For example, you can use _serviceNowSystemId and _serviceNowIncidentId as a key name with the SearchProfiles API to find an Amazon Connect customer profile. You can find the Servicenow-sys_user objects associated with a specific profile by using the ListProfileObjects API with the ProfileId and ObjectTypeName set to Servicenow-sys_user.

**Servicenow-task object**

No mapping currently exists for the Servicenow-task object into the standard profile, but you can still ingest it. The data is ingest as is. Following is an example of the data in the Servicenow-task object.

- sys_id
- active
- activity_due
- additional_assignee_list
- approval
- approval_history
- approval_set
- assigned_to
- assignment_group
- business_duration
- business_service
- calendar_duration
- closed_at
- closed_by
- cmdb_ci.display_value
- cmdb_ci.link
- comments
- comments_and_work_notes
- company
- contact_type
- contract
- correlation_display
- active
- correlation_id
- delivery_plan
- delivery_task
- description
- due_date
- escalation
- expected_start
- follow_up
• group_list
• impact
• knowledge
• location
• made_sla
• number
• opened_at
• opened_by.display_value
• order
• parent
• priority
• reassignment_count
• service_offering
• short_description
• sla_due
• state
• sys_class_name
• sys_created_by
• sys_created_on
• active
• sys_domain.global
• sys_domain.link
• sys_domain_path
• sys_mod_count
• sys_updated_by
• sys_updated_on
• time_worked
• upon_approval
• upon_reject
• urgency
• user_input
• watch_list
• work_end
• work_notes
• work_notes_list
• work_start

The Servicenow-task customer data from Servicenow is associated with an Amazon Connect customer profile using the indexes in the following table.

<table>
<thead>
<tr>
<th>Standard Index Name</th>
<th>Servicenow-task source field</th>
</tr>
</thead>
<tbody>
<tr>
<td>_serviceNowTaskId</td>
<td>sys_id</td>
</tr>
</tbody>
</table>
Mapping ServiceNow objects

### Standard Index Name | Servicenow-task source field
---|---
-serviceNowSystemId | extracted from open_by.link

For example, you can use _serviceNowTaskId and _serviceNowSystemId as a key name with the SearchProfiles API to find an Amazon Connect customer profile. You can find the Servicenow-task objects associated with a specific profile by using the ListProfileObjects API with the ProfileId and ObjectTypeName set to Servicenow-task.

#### Servicenow-incident object

No mapping currently exists for the Servicenow-incident object into the standard profile, but you can still ingest it. The data is ingest as is. Following is an example of the data in the Servicenow-incident object.

- sys_id
- business_stc
- calendar_stc
- caller_id.link
- caller_id.value
- category
- caused_by
- child_incidents
- close_code
- hold_reason
- incident_state
- notify
- parent_incident
- problem_id
- reopened_by
- reopened_time
- reopen_count
- resolved_at
- resolved_by.link
- resolved_by.value
- rfc
- severity
- subcategory

The Servicenow-incident customer data from the Servicenow object is associated with an Amazon Connect customer profile using the indexes in the following table.

### Standard Index Name | Servicenow-incident source field
---|---
-serviceNowIncidentId | sys_id
Create and ingest customer data using Amazon S3

You can define data from any source using Amazon S3 and seamlessly enrich a customer profile without the need for custom or pre-built integrations. For example, say you want to provide agents with relevant purchase history information. You can import purchase transaction data from an internal application into a spreadsheet file on S3 and then link it to a customer profile.

To set this up, you need to define an object type mapping that describes what the custom profile object looks like. This mapping defines how fields from your data can be used to either populate fields in the standard profile or how it can be used to assign the data to a specific profile.

After you create the object type mapping, you can use the PutProfileObject API to upload the custom profile data from your CRM into the custom profile object.

This topic explains how to create a mapping for your custom profile objects.

Concepts and terminology for customer object type mappings

The following terminology and concepts are central to your understanding of custom object type mappings.

Standard profile object

A *standard profile object* is a predefined object that all profiles contain.

A standard profile object contains standard fields, such as phone numbers, email addresses, name and other standard data. This data can be retrieved in a standard format regardless of the source (for example, Salesforce, ServiceNow, or Marketo).

Profile object

A *profile object* is a single unit of information known about a profile. For example, the information about a phone call, a ticket, a case, or even a click-stream record from a web site.

A single profile object can be up to 250 KB and can be any structured JSON document.

- Every profile object has a type. For example, the profile object can be Amazon Connect Contact Trace Record (CTR), ServiceNow Users, or Marketo Leads.
- The type refers to the object type mapping.
- The object type mapping defines how that specific object should be ingested into Customer Profiles.

<table>
<thead>
<tr>
<th>Standard Index Name</th>
<th>Servicenow-incident source field</th>
</tr>
</thead>
<tbody>
<tr>
<td>_serviceNowSystemId</td>
<td>extracted from caller_id.link</td>
</tr>
</tbody>
</table>
Profile

A profile contains all the information known about a specific customer or contact. It includes a single standard profile object and any number of additional profile objects.

Object type mapping

The object type mapping tells Customer Profiles how to ingest a specific type of data. It provides Customer Profiles with the following information:

- How data should be populated from the object and ingested into the standard profile object.
- What fields should be indexed in the object and how those fields should then be used to assign objects of this type to a specific profile.

Mapping template

A mapping template is a predefined object type mapping included with the Customer Profile service.

Customer Profiles includes mapping templates for Amazon Connect Contact Trace Records (CTRs), Salesforce Accounts, ServiceNow Users, and Marketo Leads. For a complete list of available mapping templates, use the ListProfileObjectTypeTemplates API.

With mapping templates you can quickly ingest data from well known sources without having to specify any additional information.

Object type mapping requirements

The following information needs to be in your object type mapping so Customer Profiles can process the incoming data:

- A definition of all the fields in the ingested object that should be mapped to the standard profile, or used for assigning the data to a profile. This tells Customer Profiles which fields in the ingested source object should be mapped to given fields in the standard profile object.
- Which fields in the source object from your custom data should be indexed and how.

When the source data is ingested by Customer Profiles, the indexed fields determine:

- Which profile a specific object belongs to.
- Which objects are related to each other and should be placed in the same profile. For example, an account number or a CTR contact ID.
- What values can be used to find a profile. For example, the contact's name can be indexed. This would allow agents to find all profiles that belong to customers with a specific name.

Key requirements

You must define at least one key. Customer Profiles uses this key to map your custom profile object to a profile.

The custom profile object mapping also needs at least one key that uniquely identifies the object so that it can be updated by specifying the same value of this field (these requirements can be satisfied with a single key).

Each key can be made up of one or more fields.

Field requirements

A field definition specifies how to read a value for that field name from a source object. The field definition also specifies what kind of data is stored in the field.
Object type names can be any alpha numerical string or the '-' and '_' character, they also cannot start with a '_' character, which is used for reserved standard object types.

Object type mapping definition details

The object type mapping definition has two parts: the field definition and the key definition.

Field definition details

The field definition defines the source, destination (target), and type of field. For example:

```
"Fields": {
  "{fieldName}": {
    "Source": "{source}",
    "Target": "{target}",
    "ContentType": "{contentType}"
  }, ...
}, ...
```

- **Source**: This can be a JSON accessor for the field or a Handlebar macro for generating the value of the field.

  The source object being parsed is named _source so all fields in the source fields need to be prefaced by this string. Only the _source object is supported.

  Use the Handlebar macro solution for generating constants and combining multiple source object fields into a single field. This is useful for indexing.

- **Target**: Specifies where in a standard object type the data of this field should be mapped.

  Populating the standard profile allows you to use data ingested from any data source with applications built on top of Customer Profiles without any specific knowledge of the format of the data being ingested.

  This field is optional. You might want to define fields solely for the purpose of including them in a key.

  The format of this field is always a JSON accessor. The only supported target object is _profile.

- **ContentType**: The following values are supported STRING, NUMBER, PHONE_NUMBER, EMAIL_ADDRESS, NAME. If no ContentType is specified STRING is assumed.

  ContentType is used to determine how to index the value so agents can search for it. For example, if ContentType is set to PHONE_NUMBER, a phone number is processed so agents can search for it in any format: the string "+15551234567" matches (555)-123-4567".

Key definition details

A key contains one or more fields that together define a key that can be used to search for objects (or the profiles they belong to) using the SearchProfiles API. The key can also be defined to uniquely identify a profile or uniquely identify the object itself.

```
"Keys": {
  "{keyName}": [{
    "StandardIdentifiers": [...],
    "FieldNames": [ "{fieldname}", ...
  }], ...
}, ...
```
Key names are global to a domain. If you have two keys, with the same name in two different object type mappings:

- Those keys should occupy the same namespace
- They can be used to potentially link profiles together between different objects. If they match between the objects, Customer Profiles places the two objects in the same profile.

To phrase this in another way: keys should have the same key name in a domain if, and only if, the same value means that they are related. For example, a phone number specified in one type of object would be related to the same phone number specified in another type of object. An internal identifier specified for an imported object from Salesforce might not be related to another object imported from Marketo, even if they have exactly the same value.

Keys definitions are used in two ways:

- Inside of Customer Profiles during ingestion, they are used to figure out what profile the object should be assigned to.
- They allow you to use the SearchProfiles API to search for the key value and find the profile.

**Standard identifiers**

Standard identifiers allow you to set attributes on the key. Decide which identifiers to use based on how you want the data to be ingested in the profiles. For example, you mark phone number with the identifier PROFILE. This means phone number is to be treated as unique identifier. If Customer Profiles gets two contacts with the same phone number, the contacts are going to be merged into a single profile.

<table>
<thead>
<tr>
<th>Identifier name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIQUE</td>
<td>This identifier must be specified by exactly one index for each object type. This key is used to uniquely identify objects of the object type for either fetching them or if needed update a submitted object at a later date. All the fields that make up the UNIQUE keys are required to be specified when submitting a new object or it is rejected.</td>
</tr>
</tbody>
</table>
| PROFILE         | This identifier means that this key uniquely identifies a profile. When this identifier is specified, it means that during ingestion Custom Profiles looks for any profile that has this key associated with it. 
  - If a profile is found, then the object is assigned to that profile. 
  - If more than one profile is found when searching for this key, the match is rejected. (Only keys that uniquely identify a profile should be used as unique keys except for special circumstances.) |
| LOOKUP_ONLY     | This identifier indicates the key is not stored after ingesting the object. The key is only to be used for determining the profile during ingestion. |
### How profile assignment works using key definitions

When Customer Profiles ingests the custom object mappings, it processes the key definitions. The following diagram shows how it processes standard identifiers in key definitions to determine which profile to assign the object to.

![Diagram showing how profile assignment works using key definitions](image)

---

**Identifier name** | **Description**
--- | ---
NEW_ONLY | If the profile does not already exist before the object is ingested, the key is associated with the profile. Otherwise the key is only used for matching objects to profiles.
SECONDARY | During the matching of an object to a profile, Customer Profiles first looks up all PROFILE keys that do not have the SECONDARY identifier. These are considered first. SECONDARY keys are only considered if no matching profile is found using these keys.
How keys are added to the index for future look ups

The following diagram shows how Customer Profiles processes the standard identifiers to determine whether to persist the key.

---

Additional properties of object types

A property type defines which key should be used to encrypt any data of the object type.

There is an option that defines if new profiles can be created by the ingestion of this object. Normally when an object is ingested that cannot be matched to an existing profile, a new profile is created as long
as this option is true. If it is not true then the ingested object is created and written to the domain dead-letter queue.

It also contains how long data of this object type should be retained in Customer Profiles.

**Note**

Retention on individual objects is set at the time of ingestion of data. Changing the retention for a specific object type only applies to new data being ingested. It does not apply to existing data already ingested.

### Inferred profiles

When a profile is created by the ingestion of an object that has no fields, the standard profile object of this new profile is empty. This empty standard profile object is an **inferred profile**.

When creating an inferred profile, the following two fields are populated in the standard object from the profile object, if available.

- If there is any field defined with the content type of `EMAIL_ADDRESS` in the ingested object then this value will be populated into the `EmailAddress` field of the standard profile.
- If there is any field with the content type of `PHONE_NUMBER` in the ingested object then this value will be populated into the `PhoneNumber` field of the standard profile.

These values are populated into the standard profile even if these fields do not have a target defined in the field definition have a target defined or not when the inferred profile is created.

### Change behavior of inferred profiles to automatically associate the CTR with one profile found

You can change the behavior of inferred profiles so CTRs are automatically associated to one profile found.

Run the following command on the CLI:

```
aws customer-profiles put-profile-object-type --domain-name {domain} --object-type-name CTR --description "No inferred CTR profiles" --template-id CTR-NoInferred
```

### Examples of object type mappings

#### An object type mapping that generates a profile

The following example shows data that populates the standard profile.

Following is the incoming object:

```json
{
    "account": 1234,
    "email": "john@examplecorp.com",
    "address": {
        "address1": "Street",
        "zip": "Zip",
        "city": "City"
    }
}```
The following code shows that incoming object mapping into a standard profile object and indexing `PersonalEmailAddress`, `fullName`, and `accountId`, which is a unique key.

```json
{
  "Fields": {
    "accountId": {
      "Source": "_source.account",
      "Target": "_profile.AccountNumber",
      "ContentType": "NUMBER"
    },
    "shippingAddress.address1": {
      "Source": "_source.address.address1",
      "Target": "_profile.ShippingAddress.Address1"
    },
    "shippingAddress.postalCode": {
      "Source": "_source.address.zip",
      "Target": "_profile.ShippingAddress.PostalCode"
    },
    "shippingAddress.city": {
      "Source": "_source.address.city",
      "Target": "_profile.ShippingAddress.City"
    },
    "personalEmailAddress": {
      "Source": "_source.email",
      "Target": "_profile.PersonalEmailAddress",
      "ContentType": "EMAIL_ADDRESS"
    },
    "fullName": {
      "Source": "{{_source.firstName}} {{_source.lastName}}"
    },
    "firstName": {
      "Source": "_source.firstName",
      "Target": "_profile.FirstName"
    },
    "lastName": {
      "Source": "_source.lastName",
      "Target": "_profile.LastName"
    }
  },
  "Keys": {
    "_email": [
      {
        "FieldNames": ["personalEmailAddress"]
      }
    ],
    "_fullName": [
      {
        "FieldNames": ["fullName"]
      }
    ],
    "_account": [
      {
        "StandardIdentifiers": ["PROFILE","UNIQUE"],
        "FieldNames": ["accountId"]
      }
    ]
  }
}
```
Note that email and fullname are indexed, but they aren't used to search for the profile. The account is the unique key. It is required to specify the object. Any time an object with the same account ID is ingested it overwrites the previous object with the same account ID.

Several fields are populated in the standard profile object (see the fields that have Target defined).

**An object type mapping that doesn't populate the standard profile**

This example shows a more complicated use case. It ingests data related to a profile but it doesn't necessarily populate the standard profile object.

Following is the incoming object:

```json
{
  "email": "john@examplecorp.com",
  "timestamp": "2010-01-01T12:34:56Z",
  "subject": "Whatever this is about",
  "body": "Body of ticket"
}
```

Following is one way of mapping this data:

```json
{
  "Fields": {
    "email": {
        "Source": "_source.email",
        "ContentType": "EMAIL_ADDRESS"
    },
    "timestamp": {
        "Source": "_source.timestamp",
        "Target": "_profile.ShippingAddress.Address1"
    }
  },
  "Keys": {
    "_email": [
      {
        "StandardIdentifiers": ["PROFILE","LOOKUP_ONLY"],
        "FieldNames": ["email"]
      }
    ],
    "ticketEmail": [
      {
        "StandardIdentifiers": ["PROFILE","SECONDARY","NEW_ONLY"],
        "FieldNames": ["email"]
      }
    ],
    "uniqueTicket": [
      {
        "StandardIdentifiers": ["UNIQUE"],
        "FieldNames": ["email","timestamp"]
      }
    ]
  }
}
```

This example ingests the data and, at first lookup, it ingests the email address.

- If the email address matches a single profile, it is used to attach the data to that specific profile. The unique identifier for the ticket is comprised of the email and the timestamp since no other unique identifier exists.
• If no profile exists with the specified email, a new profile is created with the single field of EmailAddress filled in. The ingested object is attached to this new inferred profile. The two searchable keys that can find the profile are _email and uniqueTicket.
• If more than one profile exists with the specified email address, a new profile is created with the single field of EmailAddress filled in and the object is attached to this new profile. This profile is created with the ticketEmail key defined, in addition to _email and uniqueTicket. Any subsequent tickets from that email are assigned to this new inferred profile. The reason for this is that the _email key is referring to three profiles and is thus discarded, however the ticketEmail key only refers to a single profile (the new inferred one) and is still valid.
• In cases where a new inferred profile is created, the EmailAddress field is populated from the first object that created it.

Implicit profile object types

You can use any object type that matches the name of a template ID (as returned by the ListProfileObjectTypeTemplates API) without explicitly defining it. The object type will exactly match the definition of the template definition of this object type. If an explicit object type is defined, it replaces the implicit one.

Implicit object types are included in the ListProfileObjectTypes API or returned by GetProfileObjectType operations, but they can still be deleted if you want to remove all data ingested from that object type.

Use the Customer Profiles API

For information about how to programmatically manage domains and profiles, see the Amazon Connect Customer Profiles API Reference.

For information about integrating the Amazon Connect Customer Profiles application into the application used by your agents, see Amazon Connect Streams.
Set up pre-built integrations

Use pre-built integrations to generate tasks based on events in external applications, or create customer profiles based on data in external applications. These integrations are built on top of Amazon AppFlow and Amazon EventBridge to enable easy access to your data that’s stored outside of Amazon Connect.

For more information about Amazon AppFlow and Amazon EventBridge, see the documentation: Amazon AppFlow User Guide and Amazon EventBridge User Guide.

In addition, check out the Amazon AppIntegrations Service API Reference, which enables you to access and configure AppIntegrations associations programmatically with Amazon Connect instances.

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- Set up applications for task creation (p. 577)
- Add rules for task creation (p. 594)

Set up applications for task creation

You can set up applications for task creation in just a few steps, no coding required. Amazon Connect uses Amazon EventBridge to pull data from your external application.

Tip
If your organization is using custom IAM policies to manage access to the Amazon Connect console, make sure users have the appropriate permissions to set up applications for task creation. For a list of required permissions, see Tasks page (p. 830).

If your instance was created before October 2018, for information about how to configure your service-linked roles (SLR), see Set up instances created before October 2018 to use service-linked roles (p. 855).

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- Set up application integration for Salesforce (p. 577)
- Set up application integration for Zendesk (p. 583)
- Monitor task creation (p. 591)
- Disassociate an Amazon Connect connection (p. 593)

Set up application integration for Salesforce

If you integrate with Salesforce for event creation, Amazon Connect also uses Amazon AppFlow to put the data into EventBridge. This is because of how Salesforce sends events through the Amazon AppFlow APIs. To learn more about how Amazon Connect uses EventBridge and Amazon AppFlow resources to power Salesforce integrations, see this blog post: Building Salesforce integrations with Amazon EventBridge and Amazon AppFlow.

Note
If you use custom AWS Identity and Access Management (IAM) policies, for a list of the required IAM permissions to set up Amazon Connect Tasks, see Tasks page (p. 830).
To integrate Salesforce for task creation

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.
3. Choose Tasks, and then choose Add an application.
4. On the Select application page, choose Salesforce.
5. Review the application requirements that are listed on the Select application page.

The following image shows the requirements for Salesforce.
1. To verify that Salesforce is compatible with Amazon AppFlow, log in to Salesforce, for example, https://[instance_name].my.salesforce.com.

   **Important**
   Verify that you have enabled **Change Data Capture** in Salesforce. The following image shows an example **Change Data Capture** page in Salesforce where you select the Case entities:

   ![Change Data Capture](image)

6. After you verify Salesforce requirements, on the **Select application** page, choose **Next**.

7. On the **Establish connection** page, choose one of the following:

   - **Use an existing connection**. This allows you to reuse existing EventBridge resources that are linked to Amazon AppFlow flows that you may have created in your AWS account.

   - **Create a new connection**: Enter the information required by the external application.
     1. Enter your application instance URL. This URL is used for deep-linking into the tasks created in your external application.
     2. Provide a friendly name for your connection, for example, **Salesforce - Test instance**. Later, when you add rules (p. 594), you’ll refer to this friendly name.
     3. Specify whether this is a production or sandbox environment.
8. Choose **Log in to Salesforce**.

9. In Salesforce, choose to allow access to Amazon Connect Embedded Login App [Region].
10. After Amazon Connect has successfully connected with the Salesforce, go to Salesforce and verify that the refresh token policy for Amazon Connect Embedded Login App is set to **Refresh token is valid until revoked**. This grants Amazon AppFlow access to pull data from your Salesforce account without re-authenticating.

11. On the **Establish connection** page, select the box shown in the following image, and choose **Next**.

12. On the **Review and integrate** page, check that the **Connection status** says **Connected**, and then choose **Complete integration**.
13. On the **Tasks** page, the new connection is listed.

You're done! Next, add rules that tell Amazon Connect when to create a task and how to route it. For instructions, see *Add rules for task creation (p. 594).*

**What to do when is a connection isn't successfully established**

A connection might fail to be established for Salesforce if you didn't follow the instructions next to the check boxes to verify that it's compatible with Amazon AppFlow.
A common error is not setting up the **Case** entity in the **Change Data Capture** settings to capture these events. To fix:

1. Log in to Salesforce, go to the **Change Data Capture**, and select the Case entity.

   ![Change Data Capture](image)

   1. Open the Amazon AppFlow console at [https://console.aws.amazon.com/appflow](https://console.aws.amazon.com/appflow) to select the flow that was just created, and then choose **Activate flow**.

   ![Amazon AppFlow](image)

   Alternatively, you might need to delete the Amazon AppFlow Salesforce connection and flow, and start again.

**Set up application integration for Zendesk**

**Step 1: Enable the events connector for Amazon EventBridge**

If you don’t already have the EventBridge connector for Zendesk enabled, you need to set it up first. Otherwise, go to **Step 2: Integrate Zendesk with Amazon Connect for task creation** (p. 584).

1. Copy your AWS account number:
   a. In the Amazon EventBridge console, go to **Partner event sources**.
   b. Search for or scroll to **Zendesk**, and choose **Set up**.
   c. Choose **Copy** to copy your AWS account information.

2. Go to **Setting up the events connector for Amazon EventBridge** in the Zendesk Help and follow the instructions.
Step 2: Integrate Zendesk with Amazon Connect for task creation

Note
If you use custom AWS Identity and Access Management (IAM) policies, for a list of the required IAM permissions to set up Amazon Connect Tasks, see Tasks page (p. 830).

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.

3. Choose Tasks, and then choose Add an application.

4. On the Select application page, choose Zendesk.
5. After you choose to integrate with Zendesk, the application requirements are listed on the page.

The following image shows the requirements for Zendesk. In this procedure, we walk you through the steps to select the “Support ticket” event type in Zendesk. Acknowledge the steps and choose Next.
6. On the **Establish connection** page, choose one of the following:

- **Use an existing connection.** This allows you to reuse existing EventBridge resources you may have created in your AWS account.

- **Create a new connection:** Enter the information required by the external application.
  1. Enter your application instance URL. This URL is used for deep-linking into the tasks created in your external application.
  2. Provide a friendly name for your connection, for example, **Zendesk - Test instance.** Later, when you add rules (p. 594), you'll refer to this friendly name.
7. Choose **Copy** to copy your AWS account ID, and then choose **Login to Zendesk**. This takes you away from the **Establish connection** page for now, but you return to it shortly.

8. After you're logged in to Zendesk, choose **Connect** to connect the Events Connector for Amazon EventBridge.
9. In Zendesk, on the **Amazon Web Services** page, paste in your Amazon Web Service account ID, choose your Region, choose **Support ticket**, acknowledge the terms of use, and then choose **Connect**. Zendesk creates a resource in Amazon EventBridge.
10. Return to the Establish connection page in Amazon Connect choose Next.

11. On the Establish page, you’ll see the message that Amazon Connect has successfully connected with Zendesk. Choose Next.
12. On the Review and integrate page, check that the Connection status says Connected, and then choose Complete integration.

This creates a connection that associates the EventBridge resource for Zendesk to Amazon Connect.

13. On the Tasks page, the new connection is listed.
You're done! Next, add rules that tell Amazon Connect when to create a task and how to route it. For instructions, see Add rules for task creation (p. 594).

**What to do when is a connection isn't successfully established**

A connection might fail to create a task if you do not correctly select the Support ticket event type when setting up the connection in Zendesk, after being prompted to do so in the flow. To fix this, log in to Zendesk, and update that setting, as shown in the following image.
There is also another case where you may not have selected the correct AWS Region that the Amazon Connect instance is in, when setting up EventBridge. To fix:

2. Disconnect your EventBridge connection.
3. In the Amazon Connect console, restart the flow.

**Monitor task creation**

After your connection is established, if it stops working, in Amazon Connect disassociate the connection, and then re-establish it. If that doesn't solve the issue, do the following:
Zendesk
2. Check the status of the event source connection to see if it is active.

Salesforce
2. Monitor the flow that was created for the account that was set up.

The following image shows what a flow looks like in the Amazon AppFlow console for Salesforce. It contains information about the status of the connection, and when it was last run.

For both Zendesk and Salesforce, you can go to the EventBridge console at https://console.aws.amazon.com/events/ to see your connection state and see if it is active, pending, or deleted.

The following image shows an example EventBridge console.
Disassociate an Amazon Connect connection

At any time you can disassociate a connection, and stop the automatic generation of tasks based on events from the external application.

To stop the automatic generation of tasks

1. Choose the application, and then choose **Remove connection**.

2. Type **Remove**, and then choose **Remove**.

If you need to debug, you are still able to go to Amazon AppFlow (Salesforce) or EventBridge.

To remove the connection altogether from Zendesk

1. Log in to Zendesk, and navigate to [https://[subdomain].zendesk.com/admin/platform/integrations](https://[subdomain].zendesk.com/admin/platform/integrations).
2. Disconnect the EventBridge connection.
To remove the connection altogether from Salesforce

- Open the Amazon AppFlow console at https://console.aws.amazon.com/appflow, and delete the Salesforce connection and flow that were created in Amazon Connect.

  Flows are created with the name pattern of amazon-connect-salesforce-to-eventbridge-[subdomain].

  Connections are created with the name pattern of amazon-connect-salesforce-[subdomain]

To re-enable the automatic generation of tasks, repeat the setup steps.

Add rules for task creation

After you set up an external application to generate tasks automatically, you must add rules that tell Amazon Connect when to create tasks, and how to route them.

1. Log in to Amazon Connect with a user account that is assigned the CallCenterManager security profile, or that is enabled for Rules permissions.
2. In Amazon Connect, on the navigation menu, choose Rules.
3. On the Rules page, use the Create a rule dropdown list to choose External application.
4. At the Trigger and conditions page, assign a name to the rule.

```
New rule

Name
Account_creation

Name can contain characters A-Z, 0-9, or '; '+', '*'. It cannot contain spaces.
```

5. Choose the event that will generate a task, and the instance of the external application where the event must occur.
1. Select the instance for the external application.
2. Choose the conditions that must be met to generate the task.
6. Choose Next.
7. On the Action page, specify the task to be generated when the rule is met.
1. The description of the task appears to the agent in their Contact Control Panel (CCP).
2. The task reference name appears to the agent as a link to the specified URL.
8. Choose Save.

Test the rule

1. Go the external application and create the event that initiates the action. For example, in Zendesk, create a ticket that's type Question.
2. Go to Metrics and quality, Contact search.
3. Under Channel, choose Task, and then choose Search.
4. Verify the task was created.
Capture customer audio: live media streaming

In Amazon Connect, you can capture customer audio during an interaction with your contact center by sending the audio to a Kinesis video stream. Depending on your settings, audio can be captured for the entire interaction—until the interaction with the agent is complete—or only one direction:

- What the customer hears, including what the agent says and system prompts.
- What the customer says, including when they are on hold.

The customer audio streams also include interactions with an Amazon Lex bot, if you're using one in your contact flow.

You can perform analysis on the audio streams to determine customer sentiment, use the audio for training purposes, or to later review the audio to identify and flag abusive callers.

Contents

- Plan for live media streaming (p. 597)
- Enable live media streaming in your instance (p. 598)
- How to access Kinesis Video Streams data (p. 598)
- Example contact flow for testing live media streaming (p. 604)
- Contact attributes for live media streaming (p. 605)

Plan for live media streaming

You can send all audio to and from the customer to Kinesis Video Streams. Media streaming leverages Kinesis Video Streams multi-track support so that what the customer says is on a separate track from what the customer hears.

Audio sent to Kinesis uses a sampling rate of 8 Khz.

Do you need to increase your service quotas?

When you enable media streaming in Amazon Connect, one Kinesis video stream is used per active call. By default we allocate 50 streams per instance to your account. We automatically create additional streams as needed to keep pace with active calls, unless your account reaches the Kinesis Video Streams service quota.

Check out the default Kinesis service quota for number of streams per account for your region (see the quota for the CreateStream API).

To make sure that there are enough streams available for all calls in your contact center, the value of the CreateStream API needs to be greater than the number of the maximum concurrent active calls for your instance.

If you have more than one instance for your AWS account, your CreateStream quota should be a number greater than the concurrent active calls for all of your instances combined.

To request an increase to your service quota, in the AWS Support Center, choose Create Case and then choose Service Quota Increase.
How long do you need to store audio?

Customer audio is stored in Kinesis for the time defined by your retention settings in an Amazon Connect instance. For instructions for setting this value, see Enable live media streaming in your instance (p. 598).

Tip
If you want to use the audio streaming feature, you need to retain the streams that are created by Amazon Connect. Don't delete them, unless you're going to stop using the streaming feature.

Do you need to change the audio streams?

We recommend that you refrain from modifying the streams. Doing so can cause unexpected behavior.

Who requires IAM permissions to retrieve data?

If your business is using IAM policies and permissions, the IAM admin will need to grant permissions to people who are going to retrieve data from Kinesis Video Streams. They'll need to grant them full access permissions for Kinesis Video Streams and AWS Key Management Service.

Enable live media streaming in your instance

Live media streaming (customer audio streams) is not enabled by default. You can enable customer audio streams from the settings page for your instance.

To enable live media streaming

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.
3. In the navigation pane, choose Data storage.
5. Enter a prefix for the Kinesis Video Streams created for your customer audio. This prefix makes it easier for you to identify the stream with the data.
6. Choose the KMS key to use to encrypt the data sent to Kinesis. The KMS key must be in the same Region as the instance.
7. Specify a number and unit for the Data retention period. If you select No data retention, data is not retained and can be used only for immediate consumption.
8. Choose Save under Live media streaming, and then choose Save at the bottom of the page.

After you enable live media streaming, add Start media streaming and Stop media streaming blocks to your contact flow. Configure those blocks to specify what audio you want to capture. For instructions and an example, see Example contact flow for testing live media streaming (p. 604).

How to access Kinesis Video Streams data

You must have developer skills to work with Kinesis Video Streams data. Use the steps and code samples in this section to interact with the customer audio data sent to Kinesis Video Streams.
Get started with a sample

There's an example project on GitHub to help you to get started using Amazon Connect live audio streaming and real-time transcription using Amazon Transcribe. See Amazon Connect Real-time Transcription Lambda.

This project provides a code example and a fully functional Lambda function. They help you get started capturing and transcribing Amazon Connect phone calls using Kinesis Video Streams and Amazon Transcribe.

You can use the Lambda function in this project to create other solutions, such as:

- Capturing audio in the IVR.
- Providing real-time transcription to agents.
- Creating a voicemail solution for Amazon Connect.

Build your own implementation

You may want to implement a solution other than the one provided by the previously-described sample. If so, this section describes how to make the proper API calls against the Kinesis Video Streams so you can build your own solution from scratch.

1. Go to this GitHub page, and read about the Amazon Connect Real-time Transcription Lambda project.
2. Choose the deployment folder, and download the cloudformation.template.
3. Use the following example Java classes, which are built on top of the Kinesis video parser library using the AWS SDK for Java.
   - LMSDemo—is a class with a main method that invokes LMSExample.
   - LMSExample—is similar to the examples provided in the Kinesis Video Streams Parser library. It gets media from the specified Kinesis Video Streams with the specified fragment number. This code sample includes frame processing to separate the tracks.
   - LMSFrameProcessor—is invoked by LMSExample to save data from Kinesis Video Streams to the specified output stream. Use a file output stream to save the output to a file. This code sample also includes frame processing to separate the tracks.
4. Use Audacity, or other audio tool, to import the .raw audio file, which is in a 16-bit signed PCM Mono format.

Code samples to access Kinesis Video Streams data

LMSDemo.java

```java
package com.amazonaws.kinesisvideo.parser.demo;

import com.amazonaws.auth.AWSStaticCredentialsProvider;
import com.amazonaws.auth.AWSCredentialsProvider;
import com.amazonaws.regions.Region;  
import java.io.FileOutputStream;
import java.io.IOException;
import java.io.OutputStream;
```
public class LMSDemo {

    public static void main(String args[]) throws InterruptedException, IOException {
        LMSExample example = new LMSExample(Regions.US_WEST_2,
                "<<StreamName>>",
                "<<FragmentNumber>>",
                new AWSSessionCredentialsProvider() {
                    @Override
                    public AWSSessionCredentials getCredentials() {
                        return new AWSSessionCredentials() {
                            @Override
                            public String getSessionToken() {
                                return "<<AWSSessionToken>>";
                            }
                            @Override
                            public String getAWSAccessKeyId() {
                                return "<<AWSAccessKey>>";
                            }
                            @Override
                            public String getAWSSecretKey() {
                                return "<<AWSSecretKey>>";
                            }
                        };
                    }
                    @Override
                    public void refresh() {
                    }
                },
                new FileOutputStream("<<FileName>>.raw"));
        example.execute();
    }
}

LMSEExample.java

package com.amazonaws.kinesisvideo.parser.examples;
import com.amazonaws.auth.AWSCredentialsProvider;
import com.amazonaws.kinesisvideo.parser.ebml.MkvTypeInfos;
import com.amazonaws.kinesisvideo.parser.mkv.MkvDataElement;
import com.amazonaws.kinesisvideo.parser.mkv.MkvElementVisitException;
import com.amazonaws.kinesisvideo.parser.mkv.MkvElementVisitor;
import com.amazonaws.kinesisvideo.parser.mkv.MkvEndMasterElement;
import com.amazonaws.kinesisvideo.parser.mkv.MkvStartMasterElement;
import com.amazonaws.kinesisvideo.parser.utilities.FragmentMetadataVisitor;
import com.amazonaws.kinesisvideo.parser.utilities.FrameVisitor;
import com.amazonaws.kinesisvideo.parser.utilities.LMSFrameProcessor;
import com.amazonaws.regions.Regions;
import com.amazonaws.services.kinesisvideo.model.StartSelector;
import com.amazonaws.services.kinesisvideo.model.StartSelectorType;
import java.io.Closeable;
import java.io.FileNotFoundException;
import java.io.FileOutputStream;
import java.io.IOException;
import java.io.OutputStream;
import java.io.PipedInputStream;
import java.io.PipedOutputStream;
import java.util.concurrent.ExecutorService;
import java.util.concurrent.Executors;
import java.util.concurrent.TimeUnit;

public class LMSExample extends KinesisVideoCommon {

    private final ExecutorService executorService;
    private GetMediaProcessingArguments getMediaProcessingArguments;
    private final StreamOps streamOps;
    private final OutputStream outputStreamFromCustomer;
    private final OutputStream outputStreamToCustomer;
    private final String fragmentNumber;

    public LMSExample(Regions region,
                      String streamName,
                      String fragmentNumber,
                      AWSCredentialsProvider credentialsProvider,
                      OutputStream outputStreamFromCustomer,
                      OutputStream outputStreamToCustomer) throws IOException {
        super(region, credentialsProvider, streamName);
        this.streamOps = new StreamOps(region, streamName, credentialsProvider);
        this.executorService = Executors.newFixedThreadPool(2);
        this.outputStreamFromCustomer = outputStreamFromCustomer;
        this.outputStreamToCustomer = outputStreamToCustomer;
        this.fragmentNumber = fragmentNumber;

        getMediaProcessingArguments = GetMediaProcessingArguments.create(outputStreamFromCustomer, outputStreamToCustomer);
        try (GetMediaProcessingArguments getMediaProcessingArgumentsLocal = getMediaProcessingArguments) {
            //Start a GetMedia worker to read and process data from the Kinesis Video Stream.
            GetMediaWorker getMediaWorker = GetMediaWorker.create(getRegion(),
                                                                   getCredentialsProvider(),
                                                                   getStreamName(),
                                                                   new StartSelector().withStartSelectorType(StartSelectorType.FRAGMENT_NUMBER).withAfterFragmentNumber(fragmentNumber),
                                                                   streamOps.amazonKinesisVideo,
                                                                   getMediaProcessingArgumentsLocal.getFrameVisitor());

            executorService.submit(getMediaWorker);

            //Wait for the workers to finish.
            executorService.shutdown();
            executorService.awaitTermination(120, TimeUnit.SECONDS);
            if (!executorService.isTerminated()) {
                System.out.println("Shutting down executor service by force");
                executorService.shutdownNow();
            } else {
                System.out.println("Executor service is shutdown");
            }
        } finally {
            outputStream.close();
        }
    }

    private static class LogVisitor extends MkvElementVisitor {
        private final FragmentMetadataVisitor fragmentMetadataVisitor;

        private LogVisitor(FragmentMetadataVisitor fragmentMetadataVisitor) {
            this.fragmentMetadataVisitor = fragmentMetadataVisitor;
        }
    }
}
public long getFragmentCount() {
    return fragmentCount;
}

private long fragmentCount = 0;

@Override
public void visit(MkvStartMasterElement startMasterElement) throws MkvElementVisitException {
    if (MkvTypeInfos.EBML.equals(startMasterElement.getElementMetaData().getTypeInfo())) {
        fragmentCount++;
        System.out.println("Start of segment");
    }
}

@Override
public void visit(MkvEndMasterElement endMasterElement) throws MkvElementVisitException {
    if (MkvTypeInfos.SEGMENT.equals(endMasterElement.getElementMetaData().getTypeInfo())) {
        System.out.println("End of segment");
    }
}

@Override
public void visit(MkvDataElement dataElement) throws MkvElementVisitException {
}

private static class GetMediaProcessingArguments implements Closeable {
    public FrameVisitor getFrameVisitor() {
        return frameVisitor;
    }

    private final FrameVisitor frameVisitor;

    public GetMediaProcessingArguments(FrameVisitor frameVisitor) {
        this.frameVisitor = frameVisitor;
    }

    public static GetMediaProcessingArguments create(OutputStream
        outputStreamFromCustomer, OutputStream outputStreamToCustomer) throws IOException {
        //Fragment metadata visitor to extract Kinesis Video fragment metadata from the
        FragmentMetadataVisitor fragmentMetadataVisitor = FragmentMetadataVisitor.create();

        //A visitor used to log as the GetMedia stream is processed.
        LogVisitor logVisitor = new LogVisitor(fragmentMetadataVisitor);

        //A composite visitor to encapsulate the three visitors.
        FrameVisitor frameVisitor = FrameVisitor.create(LMSFrameProcessor.create(outputStreamFromCustomer,
            outputStreamToCustomer, fragmentMetadataVisitor));

        return new GetMediaProcessingArguments(frameVisitor);
    }

    @Override
    public void close() throws IOException {
    }
}
LMSFrameProcessor.java

```java
package com.amazonaws.kinesisvideo.parser.utilities;

import com.amazonaws.kinesisvideo.parser.mkv.Frame;
import com.amazonaws.kinesisvideo.parser.utilities.FragmentMetadataVisitor;
import com.amazonaws.kinesisvideo.parser.utilities.MkvTrackMetadata;

import java.io.IOException;
import java.io.OutputStream;
import java.nio.ByteBuffer;

public class LMSFrameProcessor implements FrameVisitor.FrameProcessor {
    private OutputStream outputStreamFromCustomer;
    private OutputStream outputStreamToCustomer;
    private FragmentMetadataVisitor fragmentMetadataVisitor;

    protected LMSFrameProcessor(OutputStream outputStreamFromCustomer, OutputStream outputStreamToCustomer, FragmentMetadataVisitor fragmentMetadataVisitor) {
        this.outputStreamFromCustomer = outputStreamFromCustomer;
        this.outputStreamToCustomer = outputStreamToCustomer;
        this.fragmentMetadataVisitor = fragmentMetadataVisitor;
    }

    public static LMSFrameProcessor create(OutputStream outputStreamFromCustomer, OutputStream outputStreamToCustomer, FragmentMetadataVisitor fragmentMetadataVisitor) {
        return new LMSFrameProcessor(outputStreamFromCustomer, outputStreamToCustomer, fragmentMetadataVisitor);
    }

    @Override
    public void process(Frame frame, MkvTrackMetadata trackMetadata) {
        saveToOutputStream(frame);
    }

    private void saveToOutputStream(final Frame frame) {
        ByteBuffer frameBuffer = frame.getFrameData();
        long trackNumber = frame.getTrackNumber();
        MkvTrackMetadata metadata = fragmentMetadataVisitor.getMkvTrackMetadata(trackNumber);
        String trackName = metadata.getTrackName();

        try {
            byte[] frameBytes = new byte[frameBuffer.remaining()];
            frameBuffer.get(frameBytes);
            if (Strings.isNullOrEmpty(trackName) ||
                "AUDIO_FROM_CUSTOMER".equals(trackName)) {
                outputStreamFromCustomer.write(frameBytes);
            } else if ("AUDIO_FROM_CUSTOMER".equals(trackName)) {
                outputStreamToCustomer.write(frameBytes);
            } else {
                // Unknown track name. Not writing to output stream.
            }
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}
```
Example contact flow for testing live media streaming

Here's how you can set up a contact flow to test live media streaming:

1. Add a Start media streaming block at the point where you want to enable customer audio streaming.
2. Connect the Success branch to the rest of your flow.
3. Add a Stop media streaming block to where you want to stop streaming.
4. Configure both blocks to specify what you want to stream: From the customer and/or To the customer.

Customer audio is captured until a Stop media streaming block is invoked, even if the contact is passed to another contact flow.

Use the contact attributes for media streaming in your contact flow so that the CTR includes the attributes. You can then view the CTR to determine the media streaming data associated with a specific contact. You can also pass the attributes to an AWS Lambda function.

The following example contact flow shows how you might use media streaming with attributes for testing purposes.
After the audio is successfully streamed to Kinesis Video Streams, the contact attributes are populated from the **Invoke AWS Lambda function** block. You can use the attributes to identify the location in the stream where the customer audio starts. For instructions, see Contact attributes for live media streaming (p. 605).

### Contact attributes for live media streaming

The attributes are displayed when you select **Media streams** for the **Type** in a contact flow block that supports attributes, such as the **Start media streaming** block. They include the following:

- **Customer audio stream ARN**
  
  The ARN of the Kinesis video stream that includes the customer data to reference.

  **JSONPath format:** $.MediaStreams.Customer.Audio.StreamARN

- **Customer audio start timestamp**
  
  The time at which the customer audio stream started.

  **JSONPath format:** $.MediaStreams.Customer.Audio.StartTimestamp

- **Customer audio stop timestamp**
  
  The time at which the customer audio stream stopped.

  **JSONPath format:** $.MediaStreams.Customer.Audio.StopTimestamp

- **Customer audio start fragment number**
  
  The number that identifies the Kinesis Video Streams fragment in which the customer audio stream started.

  **JSONPath format:** $.MediaStreams.Customer.Audio.StartPosition
Customer audio stop fragment number

The number that identifies the Kinesis Video Streams fragment in which the customer audio stream stopped.

**JSONPath format:** $.MediaStreams.Customer.Audio.StopPosition

For more information about Amazon Kinesis Video Streams fragments, see Fragment in the *Amazon Kinesis Video Streams Developer Guide*. 
Manage users in Amazon Connect

As the admin one of your key responsibilities is to manage users: add users to Amazon Connect, give them their credentials, and assign the appropriate permissions so they can access the features needed to do their job.

Contents

- Add users to Amazon Connect (p. 607)
- Delete users from your Amazon Connect instance (p. 608)
- Reset a user’s password for Amazon Connect (p. 610)
- Security profiles (p. 611)

Add users to Amazon Connect

You can add users and configure them with permissions that are appropriate to their roles (for example, agents or managers). For more information, see Security profiles (p. 611). Contacts can be routed based on the skills required of the agents. For more information, see Create a routing profile (p. 215).

Required permissions for adding users

Before you can add users to Amazon Connect, you need the following permissions assigned to your security profile: Users - Create.

By default, the Amazon Connect Admin security profile has these permissions.

For information about how add more permissions to an existing security profile, see Update security profiles (p. 616).

Add a user individually

1. Log in to the Amazon Connect console with an Admin account, or an account assigned to a security profile that has permissions to create users.
2. Choose Users, User management.
3. Choose Add new users.
4. Choose Create and set up a new user and then choose Next.
5. Enter the name, email address, and password for the user.
6. Choose a routing profile and a security profile.
7. Choose Save. If the Save button isn't active, it means you're logged in with an Amazon Connect account that doesn't have the required security profile permissions.

To fix this issue, log in with an account that is assigned to the Amazon Connect Admin security profile. Or, ask another Admin to help.

8. For information about adding agents, see Configure agent settings: routing profile, phone type, and auto-accept calls (p. 221).

Add users in bulk from a .csv file

Use these steps to add several users from a .csv file such as an Excel spreadsheet.

1. Log in to the Amazon Connect console with an Admin account, or an account assigned to a security profile that has permissions to create users.
2. Choose Users, User management.
3. Choose Add new users.
4. Choose Upload my users from a template (.csv) and then choose Next.
5. Choose Download template.
6. Add your users to the template and upload it to Amazon Connect.

If you get an error message, it usually indicates that one of the required columns is missing information, or there's a typo in one of the cells.

- We recommend checking the format of the phone number as a starting point in your investigation.
- If you get an error message that Security profile is not found, check whether there's a typo in one of the cells in the security_profile_name_1 column.
- Update the .csv file and try uploading it again.

Delete users from your Amazon Connect instance

When a user is deleted from Amazon Connect, you won't be able to configure their agent settings anymore. For example, you won't be able to assign a routing profile to them.

What happens to the user's metrics?

The user's data in CTRs and reports is retained. The data is preserved for the consistency of the historical metrics.
In the historical metrics reports, the agent's data will be included in the Agent performance metrics report. However, you won't be able to see an Agent activity audit of the deleted agent because their name won't appear in the drop-down list.

**Required permissions to delete users**

Before you can update permissions in a security profile, you must be logged in with an Amazon Connect account that has the following permissions: Users - Remove.

By default, the Amazon Connect Admin security profile has these permissions.

**How to delete users**

You can't undo a deletion.

1. Log in to the Amazon Connect console with an Admin account, or an account assigned to a security profile that has permissions to remove users.
2. Choose the user account you want to delete, and then choose Remove.
3. Confirm you want to delete that account.
Reset passwords

4. Note the status of account. Choose Back to return to the User management page.

Reset a user's password for Amazon Connect

To reset a password for a user

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. Choose Users, User management.
3. Select the user and choose Edit.
4. Choose reset password. Specify a new password and then choose Submit.

   Resetting the user’s password will immediately log them out of the Contact Control Panel.
5. Communicate the new password to the user.

Reset your own lost or forgotten Amazon Connect admin password

- See Emergency admin login (p. 145).

Reset your agent or manager password

Use the following steps if you want to change your password, or if you forgot it and need a new one.

1. If you’re an Amazon Connect agent or manager, at the login page, choose Forgot Password.
2. Type the characters you see in the image, and then choose Recover Password.
3. A message will be sent to your email address with a link that you can use to reset your password.

Reset your own lost or forgotten AWS password

- To reset the password you used when you first created your AWS account, see Resetting a Lost or Forgotten Root User Password in the IAM User Guide.

Security profiles

A security profile is a group of permissions that map to a common role in a contact center. For example, the Agent security profile contains permissions needed to access the Contact Control Panel (CCP).

Security profiles help you manage who can access the Amazon Connect dashboard and Contact Control Panel (CCP), and who can perform specific tasks.

Contents

- Best practices for security profiles (p. 611)
- About inherited permissions (p. 612)
- Default security profiles (p. 614)
- Assign a security profile to a user (p. 614)
- Create a security profile (p. 615)
- Update security profiles (p. 616)

Best practices for security profiles

- Limit who has Users - Edit or Create permissions

People with these permissions pose a risk to your contact center because they can do the following:
- Reset passwords, including that of the administrator.
- Grant other users permission to the Admin security profile. People assigned to the Admin security profile have full access to your contact center.

Doing these things would enable someone to lock out those who need to access Amazon Connect, and allow in others who can steal customer data and damage your business.

To reduce the risk, as a best practice we recommend limiting the number of people who have Users - Edit or Create permissions.
- Use AWS CloudTrail (p. 811) to log the requests and responses of UpdateUserIdentityInfo. This enables you to track changes made to user information. Someone who has the ability to call the UpdateUserIdentityInfo API can change a user’s email address to one owned by an attacker, and then reset the password through email.
- Understand inherited permissions (p. 612)

Some security profiles included inherited permissions: when you assign dedicated permissions to one object, by default permissions are granted to sub-objects. For example, when you grant dedicated permission to edit users, you also grant them permission to list all security profiles for your Amazon Connect instance. This because to edit users, the person has access to drop-down list of security profiles.
Before assigning security profiles, review the list of inherited permissions.

- Track who accesses recordings (p. 625).

In the Metrics and quality permission group, you can enable a download icon for recorded conversations. When members of this group go to Metrics and quality, Contact search, and then search contacts, they will see an icon to download recordings.

**Important**

This setting isn't a security feature. **Users who don't have this permission can still download recordings using other less-discoverable ways.**

We recommend that you track who in your organization accesses recordings.

### About inherited permissions

Some security profiles included inherited permissions: when you give a user explicit permissions to View or Edit one resource type, such as queues, they implicitly inherit permissions to View another resource type, such as phone numbers.

For example, assume you explicitly grant someone permission to Edit/View queues, as shown in the following image:

![Security profile permissions](image)

By doing this you also implicitly grant them permissions to View a list of all phone numbers and hours of operation in your Amazon Connect instance, when they add them to the queue. On the Add new queue page, the phone numbers and hours of operation appear in the drop-down lists, as shown in the following image:
However, the user doesn't have permissions to **Edit** the phone numbers and hours of operation.

In this case, they also don't inherit permissions to **View** contact flows (the outbound whisper flow) and quick connects because those resources are optional.

**List of inherited permissions**

The following table lists permissions that are implicitly inherited when you assign dedicated permissions.

**Tip**
When a user has only explicit **View** permissions and not also **Edit** permissions, the objects are retrieved but Amazon Connect doesn't surface them in drop-down lists for the user to peruse.

<table>
<thead>
<tr>
<th>Dedicated permission</th>
<th>Inherited permissions</th>
</tr>
</thead>
</table>
| Users - View or Edit | When someone edits a user's information in the Amazon Connect console, they can **view** the following information in drop-down boxes when they add it to the user's account:  
  - All security profiles in the instance  
  - All routing profiles in the instance  
  - All agent hierarchies in the instance |
| Queues - View or Edit | When someone edits queues in the Amazon Connect console, they can **view** the following information in drop-down and search boxes when they add it to the queue:  
  - All quick connects in the instance  
  - All phone numbers in the instance  
  - All operating hours in the instance |
Default security profiles

Amazon Connect includes default security profiles for general roles. You can review the permissions granted by these profiles and use them if they align with the permissions that your users need. Otherwise, create a security profile that grants your users only the permissions they need.

The following table lists the default security profiles:

<table>
<thead>
<tr>
<th>Security profile</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin</td>
<td>Grants administrators permission to perform all actions.</td>
</tr>
<tr>
<td>Agent</td>
<td>Grants agents permission to access the CCP.</td>
</tr>
<tr>
<td>CallCenterManager</td>
<td>Grants managers permission to perform actions related to user management, metrics, and routing.</td>
</tr>
<tr>
<td>QualityAnalyst</td>
<td>Grants analysts permission to perform actions related to metrics.</td>
</tr>
</tbody>
</table>

Assign a security profile to a user

Required permissions to assign security profiles

Before you can assign a security profile to a user, you must be logged in with an Amazon Connect account that has the Users - Edit permission. Or, if you're creating the user's account for the first time, you need Users - Create permission.
Create a security profile

Creating a security profile enables you to grant your users only the permissions that they need.

For each permission group, there is a set of resources and supported set of actions. For example, users are part of the Users and permissions group, which supports the following actions: view, edit, create, remove, enable/disable, and edit permission.

Some actions depend on other actions. When you choose an action that depends on another action, the dependent action is automatically chosen and must also be granted. For example, if you add permission to edit users, we also add permission to view users.

Required permissions to create security profiles

Before you can create a new security profile, you must be logged in with an Amazon Connect account that has the following permissions: Security profiles - Create.

![Users and permissions](image)

By default, the Amazon Connect Admin security profile has these permissions.

How to create security profiles

1. Log in to your contact center at https://instance name.my.connect.aws/.
3. Choose Add new security profile.
4. Type a name and description for the security profile.
5. Choose the appropriate permissions for the security profile from each permission group. For each permission type, choose one or more actions. Selecting some actions results in other actions.
Update security profiles

You can update a security profile at any time to add or remove permissions.

Required permissions to update security profiles

Before you can update permissions in a security profile, you must be logged in with an Amazon Connect account that has the following permissions: Security profiles - Edit.

By default, the Amazon Connect Admin security profile has these permissions.

How to update security profiles

1. Log in to your contact center at https://instance name.my.connect.aws/. You must be logged in with an Amazon Connect account that has permissions to update security profiles.
3. Select the name of the profile.
4. Update the name, description, and permissions as needed.
5. Choose Save.
Monitor live and recorded conversations

The articles in this section explain how to monitor (listen-in) on conversations between agents and contacts.

Contents
- Monitor live conversations (p. 617)
- Review recorded conversations (p. 620)

Monitor live conversations

Managers and agents in training can monitor live conversations between agents and customers. To set this up, you need to add the Set recording behavior block to your voice/chat contact flow, assign managers and trainees the appropriate permissions, and then show them how to monitor the conversations.

Looking for how many people can monitor the same conversation at one time? See Feature specifications (p. 929).

Set up live monitoring for voice and/or chat

1. Add the Set recording and analytics behavior (p. 359) block to your contact flow. Do this to monitor calls, chats, or both.

   To enable monitoring of voice and/or chat conversations, in the block's properties choose Agent and Customer.
Assign permissions

For managers to monitor live conversations, you assign them the CallCenterManager and Agent security profiles. To allow agent trainees to monitor live conversations, you may want to create a security profile specific for this purpose.

To assign a manager permissions to monitor a live conversation

1. Go to Users, User management, choose the manager, and then choose Edit.
2. In the Security Profiles box, assign the manager to the CallCenterManager security profile. This security profile also includes a setting that makes the icon to download recordings appear in the results of the Contact search page.
3. Assign the manager to the Agent security profile so they can access the Contact Control Panel (CCP), and use it to monitor the conversation.
Monitor conversations

4. Choose **Save**.

**To create a new security profile for monitoring live conversations**

1. Choose **Users**, **Security profiles**.
2. Choose **Add new security profile**.
3. Expand **Metrics and Quality**, then choose **Access metrics** and **Manager monitor**.

<table>
<thead>
<tr>
<th>Metrics and Quality</th>
<th>All</th>
<th>Access</th>
<th>View</th>
<th>Edit</th>
<th>Create</th>
<th>Enable/Disable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access metrics</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact search</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Login/Logout report</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager monitor</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recorded conversations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saved reports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Access metrics** is needed so they can access the real-time metrics report, which is where they choose which conversations to monitor.

4. Expand **Contact Control Panel**, then choose **Access Contact Control Panel** and **Make outbound calls**.

<table>
<thead>
<tr>
<th>Contact Control Panel (CCP)</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Contact Control Panel</td>
<td>✔️</td>
</tr>
<tr>
<td>Make outbound calls</td>
<td>✔️</td>
</tr>
</tbody>
</table>

These permissions are needed so they can monitor the conversation through the Contact Control Panel.

5. Choose **Save**.

**Monitor live conversations with contacts**

**Tip**
Call barge-in is not currently supported. That is, if you're listening to a conversation, your microphone stays muted.

1. Check that the **Set recording and analytics behavior** (p. 359) block is in the contact flow you want to monitor. It has to be there whether you're monitoring calls or chats. In the block's Properties, choose **Agent and Customer**.
2. Log in to your Amazon Connect instance with a user account that is assigned the **CallCenterManager** security profile, or that is enabled for the **Manager monitor** permission.
3. Open the Contact Control Panel (CCP) by choosing the phone icon in the top-right corner of your screen. You’ll need the CCP open to connect to the conversation.

4. To choose the agent conversation you want to monitor, in Amazon Connect choose **Metrics and quality, Real-time metrics, Agents**.

5. To monitor voice conversations: Next to the names of agents in a live voice conversation, you’ll see a headset icon. Choose the icon to start monitoring the conversation.

   When you're monitoring a conversation, the status in your CCP changes to **Monitoring**.

6. To monitor chat conversations: For each agent you'll see the number of live chat conversations they're in. Click on the number. Then choose the conversation you want to start monitoring.

   When you're monitoring a conversation, the status in your CCP changes to **Monitoring**.

7. To stop monitoring the conversation, in the CCP choose **End call** or **End chat**.

   When the agent ends the conversation, monitoring stops automatically.

---

**Review recorded conversations**

Managers can review past conversations between agents and customers. To set this up, you need to set up recording behavior (p. 423), assign managers the appropriate permissions, and then show them how to access the recorded conversations.

**When is a conversation recorded?** A conversation is recorded only when the contact is connected to an agent. The contact is not recorded before then, when they are connected to the IVR. If the call is transferred externally, the call recording stops when the agent drops from the call.

**Tip**

When call recording is enabled, the recording is placed in your S3 bucket shortly after the contact is disconnected. Then the recording is available for you to review it using the steps in this article.

You can also access the recording from the customer's contact trace record (CTR) (p. 788). The recording is available in the CTR, however, only after the contact has left the After Contact Work (ACW) state (p. 790).

**Assign permissions to review recordings of past conversations**

Assign the **CallCenterManager** security profile so a user can listen to call recordings or review chat transcripts. This security profile also includes a setting that makes the icon to download recordings appear in the results of the **Contact search** page.

Or, assign the following individual permissions.
1. **Contact search**: This permission is required so you can access the **Contact search** page, which is where you can search contacts so you can listen to recordings and review transcripts.

2. **Restrict contact access**: Manage access to results on the **Contact search** page based on their agent hierarchy group.

   For example, agents who are assigned to AgentGroup-1 can only view contact trace records (CTRs) for contacts handled by agents in that hierarchy group, and any groups below them. (If they have permissions for **Recorded conversations**, they can also listen to call recordings and view transcripts.)  
   
   Agents assigned to AgentGroup-2 can only access CTRs for contacts handled by their group, and any groups below them.

   Managers and others who are in higher level groups can view CTRs for contacts handled by all the groups below them, such as AgentGroup-1 and 2.

   For this permission, **All = View** since **View** is the only action granted.

   For more information about hierarchy groups, see *Set up agent hierarchies (p. 219).*

   **Note**
   
   When you change a the hierarchy group of a user, it may take a couple of minutes for their contact search results to reflect their new permissions.

3. **Recorded conversations (redacted)**: If your organization uses Contact Lens for Amazon Connect, you can assign this permission so agents access only those call recordings and transcripts in which sensitive data has been removed.

   The redaction feature is provided as part of Contact Lens for Amazon Connect. For more information, see *Use sensitive data redaction (p. 676).*

4. **Manager monitor**: This permission allows you to monitor live conversations and listen to recordings.

5. **Recorded conversations (unredacted)**: If your organization isn’t using Contact Lens for Amazon Connect, you need this permission so you can access the recordings.
Review recordings/transcripts of past conversations

These are the steps that a manager does to review past recordings/transcripts of conversations.

1. Log in to Amazon Connect with a user account that has permissions to access recordings (p. 620).
2. In Amazon Connect choose Metrics and quality, Contact search.
3. Filter the list of contacts by date, agent login, phone number, or other criteria. Choose Search.
   
   Tip
   We recommend using the Contact ID filter to search for recordings (p. 628). This is the best way to ensure you get the right recording for the contact. Many recordings have the same name as the contact ID, but not all.

4. Conversations that were recorded have icons in the Recording/Transcript column. If you don’t have the appropriate permissions, you won’t see these icons.

5. To listen to a recording of a voice conversation, or read the transcript of a chat, choose the Play icon.

6. The following image shows a sample chat transcript.
Pause, rewind, or fast-forward a recording

1. Instead of choosing the Play icon, choose the contact ID to open the Contact Trace Record.

2. On the Contact Trace Record page, there are more controls to navigate the recording.
Troubleshoot problems pausing, rewinding, or fast-forwarding

If you are unable to pause, rewind or fast-forward recordings on the Contact search page, one possible reason could be that your network is blocking HTTP range requests. See HTTP range requests on the MDN Web Docs site. Work with your network administrator to unblock HTTP range requests.

Download recordings/transcripts of past conversations

These are the steps that a manager does to download past recordings/transcripts of conversations.

1. Log in to Amazon Connect with a user account that has permissions to access recordings (p. 620).
2. In Amazon Connect choose Metrics and quality, Contact search.
3. Filter the list of contacts by date, agent login, phone number, or other criteria. Choose Search.
4. Conversations that were recorded have icons in the **Recording/Transcript** column. If you don't have the appropriate permissions, you won't see these icons.

<table>
<thead>
<tr>
<th>Contact ID</th>
<th>Channel</th>
<th>Initiation Timestamp</th>
<th>Phone number</th>
<th>Queue</th>
<th>Agent</th>
<th>Recording/Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>b3</td>
<td>Voice</td>
<td>2/3/20 7:02 PM</td>
<td>+1</td>
<td>BasicQueue</td>
<td></td>
<td><img src="Image" alt="Recording Icon" /> <img src="Image" alt="Transcript Icon" /></td>
</tr>
<tr>
<td>eb:</td>
<td>Voice</td>
<td>2/3/20 7:04 PM</td>
<td>+1</td>
<td>BasicQueue</td>
<td></td>
<td><img src="Image" alt="Recording Icon" /> <img src="Image" alt="Transcript Icon" /></td>
</tr>
</tbody>
</table>

5. Choose the **Download** icon.

<table>
<thead>
<tr>
<th>Contact ID</th>
<th>Channel</th>
<th>Initiation Timestamp</th>
<th>Phone number</th>
<th>Queue</th>
<th>Agent</th>
<th>Recording/Transcript</th>
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<td>b3</td>
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<td>2/3/20 7:04 PM</td>
<td>+1</td>
<td>BasicQueue</td>
<td></td>
<td><img src="Image" alt="Recording Icon" /> <img src="Image" alt="Transcript Icon" /></td>
</tr>
</tbody>
</table>

6. The recording is saved automatically to your **Downloads** folder as a .wav file.

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>b3</td>
<td>2/3/2020 11:08 AM</td>
<td>WAV File</td>
</tr>
<tr>
<td>24</td>
<td>11/30/2019 6:39 PM</td>
<td>WAV File</td>
</tr>
<tr>
<td>2b</td>
<td>7/1/2019 1:49 PM</td>
<td>WAV File</td>
</tr>
<tr>
<td>2b</td>
<td>7/1/2019 1:50 PM</td>
<td>WAV File</td>
</tr>
<tr>
<td>1ff</td>
<td>11/30/2019 6:16 PM</td>
<td>WAV File</td>
</tr>
<tr>
<td>0b</td>
<td>11/24/2019 2:03 PM</td>
<td>WAV File</td>
</tr>
</tbody>
</table>

The name of the file is the contact ID.

**Track who deleted or listened to recordings**

You need an AWS account to do these steps.

**Set up logging**

1. If you have multiple instances and buckets, look up the name of the Amazon S3 bucket for your instance. Go to the Amazon Connect console, choose the instance alias, and choose **Data storage**.

2. Go to the Amazon S3 console.
3. Choose the Amazon S3 bucket where your recordings are stored.
4. Choose the **Properties** tab.
5. Choose **Object-level logging** and then choose **View CloudTrail trails**.

   It opens the AWS CloudTrail console.

6. In the navigation menu, choose **Trails** and then choose the trail name.
7. In the upper right corner, toggle **Logging** to **ON**, if it’s not on already.
8. Under **Management** events, choose the edit icon. To log only who deletes recordings, you set this to **Write-only**. To also log who listens to recordings, set to **All**. Choose **Save**.

9. Under **CloudWatch Logs** choose the edit icon. Either accept the default name for your log group (CloudTrail/DefaultLogGroup), or specify a new name. Choose **Continue**.
10. Choose **Allow**. You can now close the AWS CloudTrail console.

**Find who deleted or listened to recordings**

1. Go to the Amazon CloudWatch console.
2. Choose **Create dashboard**.

   ![Create dashboard](image)

3. Enter a name, such as **CloudTrail-logging**.
4. On the **Add to this dashboard** dialog box, choose **Query results**. Choose **Configure**.
5. In the **Select log groups**, use the drop-down arrow to choose the log group for your instance, such as **CloudTrail/DefaultLogGroup**.
6. In the query box, delete the current query, and then copy and paste the one shown below instead. This query will find all API events where the recording was deleted:

   ```
   fields @timestamp, @message
   | filter eventSource = 's3.amazonaws.com'
   | filter eventName = 'DeleteObject'
   ```

7. In the time box, choose how far back you want to search.
8. Choose **Run query**.

   It returns all of the events that are named **DeleteObject**.
9. Next to the event, choose the arrow. It expands to show you detailed information about the event, including the ID of the user who deleted the recording.
10. If a lot of records are returned, choose the **Actions** arrow, and then choose **Download query results (CSV)**. The data is exported to Excel. From there you can format the spreadsheet so it’s easier for you to search and see the names of the users who deleted recordings.

The following image shows what the @message column looks like in the CSV file.

11. If you’re also logging who listened to recordings, update the query to search for the `eventName` `GetBucketLocation`.

```sql
| fields @timestamp, @message
| filter eventSource = 's3.amazonaws.com'
| filter eventName = 'GetBucketLocation'
```

**Tips**

Mirroring CloudTrail logs to CloudWatch is useful but optional. Mirroring the CloudWatch log allows you to use CloudWatch Insight to search the events easily.

If you have a large contact center, you may not want to use object logging because it generates many logs that are stored in your Amazon S3 bucket.

Another option is to write an AWS Lambda function to process the CloudTrail events. You can also search the logs manually.

**Search for recordings by contact ID**

To find a recording of a specific contact, you only need the contact ID. You do not need to know the date range, agent, or any other information about the contact.

**Tip**

We recommend using the contact ID to search for recordings. Even though many call recordings for specific contact IDs may be named with the contact ID prefix itself (for example, 123456-aaaa-bbbbb-3223-3232324.wav), there is no guarantee that
the contact IDs and name of the contact recording file always match. By using Contact ID for your search on the Contact search page, you can find the correct recording by referring the audio file on the contact's Contact Trace Record (CTR).

1. Log in to Amazon Connect with a user account that has permissions to access recordings (p. 620).
2. In Amazon Connect choose Metrics and quality, Contact search.
3. In the Contact ID, enter the contact ID, and then choose Search.
4. Conversations that were recorded have icons in the Recording/Transcript column. If you don't have the appropriate permissions, you won't see these icons.

To learn more about searching, see Search for contacts (p. 784).
Analyze conversations using Contact Lens for Amazon Connect

Contact Lens for Amazon Connect enables you to analyze conversations between customer and agents, by using speech transcription, natural language processing, and intelligent search capabilities. It performs sentiment analysis, detects issues, and enables you to automatically categorize contacts.

Contact Lens for Amazon Connect provides both real-time and post-call analytics of customer-agent conversations.

- **Real-time analytics**: Use to detect and resolve customer issues more proactively while the call is progress. For example, it can analyze and alert you when a customer is getting frustrated because the agent is unable to resolve a complicated problem. This allows you to provide assistance proactively.

- **Post-call analytics**: Use to understand trends of customer conversations, and agent compliance. This helps you identify opportunities to coach an agent after the call.

To protect your customer’s privacy, sensitive data such as name, address, and credit card information, can be redacted from transcripts and audio recordings.

The results of the sentiment analysis appear in the customer’s Contact Trace Record (CTR). The following image shows a portion of a CTR with sentiment analysis.
Enable Contact Lens for Amazon Connect

You can enable Contact Lens in just a few steps. Just add a Set recording and analytics behavior (p. 359) block to a flow, and configure it for Contact Lens.

To enable Contact Lens in a contact flow

1. Add the Set recording and analytics behavior (p. 359) block to a contact flow.
2. In the contact block, under Call recording, choose On, Agent and Customer.

Both agent and customer call recordings are required to use Contact Lens.
3. Select **Enable Contact Lens for speech analytics**.

If you don't see this option, Contact Lens for Amazon Connect hasn't been enabled for your instance. To enable it, see *Update instance settings (p. 139)*.
4. Choose one of the following:

- **Post-call analytics**: Contact Lens analyzes the call recording after the conversation and After Contact Work (ACW) is complete. This option provides the best transcription accuracy.

- **Real-time analytics**: Contact Lens provides both real-time insights during the call, and post-call analytics after the conversation has ended and After Contact Work (ACW) is complete.

  If you choose this option, we recommend setting up alerts based on keywords and phrases that the customer may utter during the call. Contact Lens analyzes the conversation real-time to detect the specified keywords or phrases, and alerts supervisors. From there, supervisors can listen in on the live call and provide guidance to the agent to help them resolve the issue faster.

  For information about setting up alerts, see Alert supervisors in real-time based on keywords and phrases (p. 648).

  If your instance was created before October 2018, additional configuration is needed to access real-time analytics. For more information, see Service-linked role permissions for Amazon Connect (p. 854).

5. Choose the language. For a list of available languages for various Contact Lens features, see Supported languages (p. 6).

6. Choose Save.

7. If the contact is going to be transferred to another agent or queue, repeat these steps to add another Set recording and analytics behavior (p. 359) block with Enable Contact Lens for speech analytics enabled.
Tip
If you want to continue using Contact Lens to collect data after transferring a contact to another agent or queue, you need to add another Set recording and analytics behavior (p. 359) block with Enable analytics enabled for the flow. This is because a transfer generates a second contact ID and CTR. Contact Lens needs to run on that CTR as well.

How to enable redaction of sensitive data

To enable redaction of sensitive data in a contact flow, choose Redact sensitive data. No other configuration is needed. Contact Lens determines what data can be redacted.

For more information about using redaction, see Use sensitive data redaction (p. 676).

Review sensitive data redaction for accuracy

The redaction feature is designed to identify and remove sensitive data. However, due to the predictive nature of machine learning, it may not identify and remove all instances of sensitive data in a transcript generated by Contact Lens. We recommend you review any redacted output to ensure it meets your needs.

Important
The redaction feature does not meet the requirements for de-identification under medical privacy laws like the U.S. Health Insurance Portability and Accountability Act of 1996 (HIPAA), so we recommend you continue to treat it as protected health information after redaction.

For the location of redacted files and examples, see Example Contact Lens output files (p. 677).
Dynamically enable Contact Lens using contact attributes

You can dynamically enable Contact Lens and the redaction of the output files based on the language of the customer. For example, for customers using en-US, you may want only a redacted file whereas for those using en-GB, you may want both the original and redacted output files.

- Redaction: choose one of the following (they are case sensitive)
  - None
  - RedactedOnly
  - RedactedAndOriginal
- Language: Choose from the list of available languages (p. 7).

You can set these attributes in the following ways:

- User defined: use a Set contact attributes block. For general instructions about using this block, see How to reference contact attributes (p. 458). Define the Destination key and Value for redaction and language as needed.

  The following image shows how to use contact attributes for redaction. Note that Value is case sensitive.
Set contact attributes

Define and store key-value pairs as contact attributes. Learn more

Contact attributes are accessible by other areas of Amazon Connect, such as the Contact Control Panel (CCP) and Contact Trace Records (CTRs).

Attribute to save

- Use text

  Destination key
  redaction_option

  Value
  RedactedAndOriginal

- Use attribute

The following image show how to use contact attributes for language:

- Use text

  Destination key
  language

  Value
  en-US

- Use attribute

This is case sensitive!
- **Use a Lambda function (p. 468).** This is similar to how you set up user-defined contact attributes. An AWS Lambda function can return the result as a key-value pair, depending on the language of the Lambda response. The following example shows a Lambda response in JSON:

```json
{
  'redaction_option': 'RedactedOnly',
  'language': 'en-US'
}
```

### Availability of Contact Lens features by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Post-call analytics</th>
<th>Real-time analytics</th>
<th>Extended language support</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East (N. Virginia)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>US West (Oregon)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe (Frankfurt)</td>
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<td>Yes</td>
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<td>Europe (London)</td>
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<td>Yes</td>
</tr>
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<td>-</td>
</tr>
<tr>
<td>Asia Pacific (Sydney)</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Security profile permissions for Contact Lens

To keep customer data secure, you can set up permissions to have granular control on who can access information generated by Contact Lens.

The security profile permissions shown in the following image apply to Contact Lens.
Following is a description of each of these permissions:

**Contact search**

This permission isn't specific to Contact Lens, but it is required so you can access the **Contact search** page, which is where you can search contacts so you can review the analyzed recording and transcript. In addition, you can do fast, full-text search on call transcripts, and search by sentiment score and non-talk time.

**Search contacts by conversation characteristics**

On the **Contact Search** page, you can access additional filters that allow you to return results by sentiment score and non-talk time. In addition, you can search conversations that fall into specific contact categories. For more information, see **Search for sentiment score** (p. 667), **Search for non-talk time** (p. 668), and **Search a contact category** (p. 669).
Search contacts by keywords

On the Contact Search page, you can access additional filters that allow you to search call transcripts by keywords or phrases, such as “thank you for your business.” For more information, see Search for keywords (p. 666).
Contact Lens - speech analytics

On the Contact Trace Record page for a contact, you can view graphs that summarize speech analytics: customer sentiment trend, sentiment, and talk time. For example, the following image shows how this information is displayed on the CTR page for a contact.
Assign permissions

Rules

This permission allows you to view, edit, or create rules for categorizing contacts. For more information, see Automatically categorize contacts based on uttered keywords and phrases (p. 644).

Recorded conversations (redacted)

On the Contact Trace Record page for a contact, this permission allows you to listen to call recording files and view call transcripts in which the sensitive data has been removed. For more information, see Example redacted file (p. 682).

Recorded conversations (unredacted)

This permission manages access to unredacted content that contains sensitive data such as name and credit card information. It manages access to the following unredacted content:

- Original, unredacted chat transcripts
- Original, unredacted transcripts analyzed by Contact Lens
- Original, unredacted audio recordings

You can access this content on the Contact Trace Record page for a contact. For more information, see Example original, analyzed file (p. 678).

Important

If you have permissions to both Recorded conversations (redacted) and Recorded conversations (unredacted), by default only redacted recordings are made available on the Contact Trace Records page. You must remove permissions to Recorded conversations (redacted) to access unredacted conversations.

You can't access redacted and unredacted content at the same time.
Build rules with Contact Lens

Contact Lens rules allow you to automatically categorize contacts, receive alerts, or generate tasks based on uttered keywords, sentiment scores, customer attributes, and other criteria.

Step 1: Define rule conditions

1. On the navigation menu, choose Rules.
2. Select Create a rule, Contact Lens.
3. Assign a name to the rule.
4. Under When, use the dropdown list to choose post-call analysis or real-time analysis.
5. Choose Add condition.

You can combine criteria from a large set of conditions to build very specific Contact Lens rules. Following are the available conditions:

- **Words or phrases**: Choose from Exact match, Pattern match, or Semantic match (p. 661) to trigger an alert or task when keywords are uttered.
- **Agent**: Build rules that run on a subset of agents. For example, create a rule to ensure newly hired agents comply with company standards. To see agent names so you can add them to rules, you need Users - View permissions in your security profile.
- **Queues**: Build rules that run on a subset of queues. Often organizations use queues to indicate a line of business, topic, or domain. For example, you could build rules specifically for your sales queues, tracking the impact of a recent marketing campaign or alternatively rules for your customer support queues, tracking overall sentiment. To see the queue names so you can add them to rules, you need Queues - View permissions in your security profile.
- **Contact attributes**: Build rules that run on the values of custom contact attributes (p. 445). For example, you can build rules specifically for a particular line of business or for specific customers, such as based on their membership level, their current country of residence, or if they have an outstanding order. You can add up to five contact attributes to a rule.
- **Sentiment - Time period**: Build rules that run on the sentiment analysis results (positive, negative, or neutral) over a trailing window of time. For example, you can build a rule for when customer sentiment has remained negative for a set period of time.
- **Sentiment - Entire contact**: Build rules that run on the value of sentiment scores over an entire contact. For example, you can build a rule when customer sentiment has remained low for the entire contact, you can create a task for a customer experience analyst to review the call transcript and follow-up.
- **Interruptions**: Build rules that detect when the agent has interrupted the customer for more than X times.
- **Non-talk time**: Build rules that run when periods of no talk time are detected. For example, when a customer and agent have not spoken for over 30 seconds which may indicate unnecessary customer wait time or highlight a customer services process that would benefit from optimisation.

Following is a sample rule with multiple conditions.
6. Choose Next.

**Step 2: Define rule actions**

1. Under **Assign contact category**, enter a category name.

   **Note**
   In this step, you are naming a required rule action: **Assign Contact Category**. The action is to categorize all contacts based on the category name you create. The category name is reflected in the Contact Lens output.

2. Choose **Add action**. Since you already named **Assign Contact Category**, it's not available. You can choose the following:
   - Generate an EventBridge event (p. 653)
   - Create task (p. 657)
3. Choose **Next**.

4. Review and make any edits, then choose **Save**.

5. After you add rules, they are applied to new contacts that occur after the rule was added. Rules are applied when Contact Lens analyzes conversations.

   You cannot apply rules to past, stored conversations.

### Automatically categorize contacts based on uttered keywords and phrases

You can set up Contact Lens to track issues that you know exist in your contact center ("known knowns"), and monitor any changes over time.
You can label your contacts with predefined criteria you set up, that is, keywords and phrases you want to detect. Through categorization, each contact is analyzed for these criteria, and labeled.

This is useful to do when, for example, you want to ensure that agents are speaking certain words or phrases for compliance reasons. Or, for example, you want to investigate when customers use certain words and have a negative sentiment.

To set up this feature, add rules that contain the words or phrases that you want to highlight.

### Add rules to categorize contacts

#### Step 1: Define conditions

1. Log in to Amazon Connect with a user account that is assigned the **CallCenterManager** security profile, or that is enabled for **Rules** permissions.
2. On the navigation menu, choose **Rules**.
3. Select **Create a rule**, **Contact Lens**.
4. Assign a name to the rule.
5. Under **When**, use the dropdown list to choose **post-call analysis** or **real-time analysis**.
6. Choose **Add condition**, and then choose the type of match:

   - **Exact Match**: Finds only the exact words or phrases.
   - **Semantic Match**: Finds words that may be synonyms. For example, if you enter "upset" it can match "not happy," or "hardly acceptable" can match with "unacceptable," and "unsubscribe" can match with "cancel subscription."

     Similarly, it can semantically match phrases. For example, "thank you so much for helping me out," "thanks a lot and this is so helpful," and "I am so happy that you are able to help me."

     This removes the need to define an exhaustive list of keywords while creating categories, and provides you the ability to cast a wider net for searching similar phrases that are important to you.

     For best semantic matching results, provide keywords or phrases with similar meaning within a semantic matching card. Currently, you can provide a maximum of four keywords and phrases per semantic matching card.

   - **Pattern Match**: Finds matches that may be less than 100 percent exact. You can also specify the distance between words. For example, if you are looking for contacts where the word "credit" was mentioned but you do not want to see any mention of the words "credit card," you can define a
pattern matching category to look for the word "credit" that is not within a one-word distance of "card."

7. Enter the words or phrases, separated by a comma, that you want to highlight.

![Image of the Contact Lens interface with highlighted areas explaining the logic and how to add words or phrases.]

8. Choose Add. Each word or phrase separated by a comma gets its own line in the card.

![Image of the Contact Lens interface with highlighted areas explaining how to add group of words or phrases.]

The logic that Contact Lens uses to read these words or phrases is: (Hello) OR (thank you OR you OR for OR calling OR Example OR Corp) OR (we OR value OR your OR business), etc.

9. To add more words or phrases, choose Add group of words or phrases. In the following image, the first group of words or phrases are what the agent might utter, and the second group is what the customer might utter.
1. In this first card, Content Lens reads each line as an OR. For example: (Hello) OR (thank OR you OR for OR calling OR Example OR Corp) OR (we OR value OR your OR business).

2. The two cards are connected with an AND. This means, one of the rows in the first card needs to be uttered AND then one of the phrases in the second card needs to be uttered.

The logic that Contact Lens uses to read the two cards of words or phrases is (card 1) AND (card 2).

10. Choose **Add condition** to apply the rules to:

- Specific queues
- When contact attributes have certain values
- When sentiment scores have certain values

For example, the following image shows a rule that applies when an agent is working the BasicQueue or Billing and Payments queues, the customer is for autoinsurance, and the agent is located in Seattle.
Step 2: Define actions

In addition to categorizing a contact, you can define what actions Amazon Connect should take:

1. Generate an EventBridge event (p. 653)
2. Create task (p. 657)

Step 3: Review and save

1. When done, choose Save.
2. After you add rules, they are applied to new contacts that occur after the rule was added. Rules are applied when Contact Lens analyzes conversations.

   You cannot apply rules to past, stored conversations.

Alert supervisors in real-time based on keywords and phrases

After you enable real-time analytics (p. 631) in your contact flow, you can add rules that automatically alert supervisors when a customer experience issue occurs.

For example, Contact Lens can automatically send an alert when certain keywords or phrases are uttered during the conversation, or when it detects other criteria. The supervisor sees the alert on the real-time metrics dashboard. From there, supervisors can listen in to the live call, and provide guidance to the agent over chat to help them resolve the issue faster.

The following image shows an example of what a supervisor would see on the real-time metrics report when they get an alert. In this case, Contact Lens has detected an angry customer situation.
When the supervisor listens in to a live call, Contact Lens provides them with a real-time transcript and customer sentiment trend that helps them understand the situation and assess the appropriate action. The transcript also eliminates the need for customers to repeat themselves if the call is transferred to another agent. Following is a sample real-time transcript.
Add rules for real-time alerts

1. Log in to Amazon Connect with a user account that is assigned the CallCenterManager security profile, or that is enabled for Rules permissions.
2. On the navigation menu, choose Rules.
3. Select Create a rule, Contact Lens.
4. Assign a name to the rule.
5. Under When, use the dropdown list to choose real-time analysis.
6. Choose Add condition, and then choose the type of match:
   - **Exact Match**: Finds only the exact words or phrases.
   - **Pattern Match**: Finds matches that may be less than 100 percent exact. You can also specify the distance between words. For example, you might look for contacts where the word "credit" was mentioned, but you do not want to see any mention of the words "credit card." You can define a pattern matching category to look for the word "credit" that is not within a one-word distance of the word "card."

   **Tip**
   Semantic Match isn’t available for real-time analysis.
7. Enter the words or phrases, separated by a comma, that you want to highlight. Real-time rules only support any keywords or phrases that were mentioned.
8. **Choose Add.** Each word or phrase separated by a comma gets its own line.

The logic that Contact Lens uses to read these words or phrases is: (Talk OR to OR your OR manager) OR (this OR is OR not OR helpful) OR (speak OR to OR your OR supervisor), etc.

9. To add more words or phrases, choose **Add group of words or phrases.** In the following image, the first group of words or phrases are what the agent might utter. The second group is what the customer might utter.
1. In this first card, Content Lens reads each line as an OR. For example: (Hello) OR (thank OR you OR for OR calling OR Example OR Corp) OR (we OR value OR your OR business).

2. The two cards are connected with an AND. This means, one of the rows in the first card needs to be uttered AND then one of the phrases in the second card needs to be uttered.

The logic that Contact Lens uses to read the two cards of words or phrases is (card 1) AND (card 2).

10. Choose **Add condition** to apply the rules to:

- Specific queues
- When contact attributes have certain values
- When sentiment scores have certain values

For example, the following image shows a rule that applies when an agent is working the BasicQueue or Billing and Payments queues, the customer is for autoinsurance, and the agent is located in Seattle.
11. When done, choose **Save**.

12. After you add rules, they are applied to new contacts that occur after the rule was added. Rules are applied when Contact Lens analyzes conversations.

   You cannot apply rules to past, stored conversations.

### Create a Contact Lens rule that generates an EventBridge event

In real-time or post-call, you can get events and use them to trigger subsequent notifications or alerts, or aggregate reports outside of Amazon Connect. There’s a lot you can do with this data. For example:

- Get real-time alerts in a QuickSight dashboard.
- Create aggregated reports outside of Amazon Connect.
- Join data with your CRM.
- Connect your notification solution to EventBridge and make sure that by end of day, all of a certain type of events go to a certain inbox. The payload tells you the contact, agent, and queue.

**To create a rule that generates an EventBridge event**

1. When you create your rule, choose **Generate EventBridge event** for the action.
2. For **Action name**, enter the name for the event payload.

**Note**
The value you assign for **Action name** is visible in the EventBridge payload. When you aggregate events, the action name provides an additional dimension that you can use to process them. For example, you have 200 category names, but only 50 have a specific action name, such as NOTIFY_CUSTOMER_RETENTION.
3. Choose **Next**. Review and then **Save**.

4. After you add rules, they are applied to new contacts that occur after the rule was added. Rules are applied when Contact Lens analyzes conversations.

   You cannot apply rules to past, stored conversations.

5. To leverage the EventBridge data, subscribe to the EventBridge event type. See the next procedure.

**Subscribe to EventBridge event types**

To subscribe to EventBridge event types, create a custom EventBridge rule that matches the following:

- "source" = "aws.connect"
Create rules that generate EventBridge events

- "detail-type" = "Contact Lens Analysis State Change" (or Contact Lens Post Call Rules Matched or Contact Lens Realtime Rules Matched)

Example EventBridge payloads

Following is an example of what the EventBridge payload looks like when Contact Lens Post Call Rules Matched.

```json
{
  "version": "0", // set by EventBridge
  "id": "aaaaaaaa-bbbb-cccc-dddd-bf3703467718", // set by EventBridge
  "source": "aws.connect",
  "detail-type": "Contact Lens Post Call Rules Matched",
  "account": "111122223333",
  "time": "2020-04-27T18:43:48Z",
  "region": "us-east-1", // set by EventBridge
  "resources": ["arn:aws:connect:us-east-1:111122223333:instance/111111-2222-3333-7c82889931e"],
  "detail": {
    "version": "1.0",
    "ruleName": "ACCOUNT_CANCELLATION", // Rule name
    "actionName": "NOTIFY_CUSTOMER_RETENTION",
    "instanceArn": "arn:aws:connect:us-east-1:111122223333:instance/1111111-2222-3333-7c82889931e",
    "contactArn": "arn:aws:connect:us-east-1:111122223333:instance/1111111-2222-3333-a9f1-bf3703478654/contact/44444444-3333-4cf7-a9f1-bf3703478654",
    "agentArn": "arn:aws:connect:us-east-1:111122223333:instance/1111111-2222-3333-9f1-bf3703478654/agent/44444444-3333-6ty7-ac7j-8u7abg786yju",
    // Example fields
  }
}
```
Create rules that generate tasks

Following is an example of what the payload looks like when **Contact Lens Realtime Rules Matched**.

```json
{
    "version": "0", // set by EventBridge
    "id": "aaaaaaaa-bbbb-cccc-dddd-bf3703467718", // set by EventBridge
    "source": "aws.connect",
    "detail-type": "Contact Lens Realtime Rules Matched",
    "account": "111122223333",
    "time": "2020-04-27T18:43:48Z",
    "region": "us-east-1", // set by EventBridge
    "resources": ["arn:aws:connect:us-east-1:11111111-2222-3333-7c822889931e"],
    "detail": {
        "version": "1.0",
        "ruleName": "ACCOUNT_CANCELLATION", // Rule name
        "actionName": "NOTIFY_CUSTOMER_RETENTION",
        "instanceArn": "arn:aws:connect:us-east-1:111122223333:instance/11111111-2222-3333-b2f4-7c822889931e",
        "contactArn": "arn:aws:connect:us-east-1:111122223333:instance/11111111-2222-3333-a9f1-bf3703478654/contact/4444444-2222-4cf7-a9f1-bf3703478654",
        "agentArn": "arn:aws:connect:us-east-1:111122223333:instance/11111111-2222-3333-a9f1-bf3703478654/agent/4444444-2222-6ty7-ac7j-8u7abg786yju",
    }
}
```

**Create a task when a contact is categorized in real-time or post-call**

An especially powerful use of Content Lens rules is to build rules that generate tasks. This helps you identify issues in your contact center for you to follow up, and creates traceable actions with owners. Following are some examples:

- Create a task to review a contact when the customer is fraudulent. For example, you can create a follow-up task when a customer utters words or phrases that makes them appear potentially fraudulent.
- Follow up when the customer mentions specific topics that you want to later on upsell or provide additional support by reaching out.
- Follow up when there is a serious quality issue. In addition to contacts being categorized and getting alerts, you can route a task so you have owners. You also have CTRs for these tasks, so you can search for and trace them.

**To create a rule that creates a task**

1. When you create your rule, choose **Create Task** for the action.
2. Complete the task fields as follows:
Create rules that generate tasks

a. **Category name**: The category name appears in the CTR. Max length: 200 characters.

b. **Name**: The name appears in the agent's Contact Control Panel (CCP). Max length: 512 characters.

c. **Description**: The description appears in the agent's Contact Control Panel (CCP). Max length: 4096 characters.

   **Tip**
   In **Name** and **Description**, use [ ] to choose from a menu of dynamic values. For more information, see Create a task when a contact is categorized in real-time or post-call (p. 657).
d. **Task reference name**: This is a default reference that automatically appears in the agent's CCP.
   - For real-time rules, the task reference links to the Real-time details page.
   - For post-call rules, the task reference links to the CTR details page.

e. **Additional Reference name**: Max length: 4096 characters. You can add up to 25 references.

f. **Select a contact flow**: Choose the contact flow that is designed to route the task to the appropriate owner of the task. The contact flow must be saved and published for it to appear in your list of options in the dropdown.

3. The following image shows an example of how this information appears in the agent's CCP:

   ![Diagram showing an example of task information in the agent's CCP]

   In this example, the agent sees the following values for **Name**, **Description**, and **Task reference name**:
   
   a. **Name** = Action-Required-Contact Lens - ba2cf8fe....
   b. **Description** = Test
   c. **Task reference name** = taskRef and the URL to the Real-time details page

4. Choose **Next**. Review and then choose **Save** the task.

5. After you add rules, they are applied to new contacts that occur after the rule was added. Rules are applied when Contact Lens analyzes conversations.

   You cannot apply rules to past, stored conversations.
Voice and task CTRs are linked

When a rule creates a task, a CTR is automatically generated for the task. It's linked to the CTR of the voice call that met the criteria for the rule to create the task.

For example, a call comes into your contact center and generates CTR1:

| Contact ID: | CTR1-1234abc |
| Channel:   | Voice       |
| Initiation method: | Inbound    |
| Category:  | Compliance  |
| Custom Contact Attributes: |
| CustomerType: | VIP        |
| AgentLocation: | NYC        |

Next contact ID: CTR2-5678abc

The Rules engine generates a task. In the CTR for the task, the voice CTR appears as the Previous contact ID. In addition, the task CTR inherits contact attributes from the voice CTR, as illustrated in the following image:

| Contact ID: | CTR2-5678abc |
| Channel:   | Task        |
| Initiation method: | API         |
| Category:  | Compliance  |
| Custom Contact Attributes: |
| CustomerType: | VIP        |
| AgentLocation: | NYC        |

Previous contact ID: CTR1-1234abc

About dynamic values for ContactId, AgentId, QueueId, RuleName

The dynamic values in brackets [ ] are called contact attributes (p. 445). Contact attributes enable you to store temporary information about the contact so you can use it in a contact flow.

When you add contact attributes in brackets [ ] — such as ContactId, AgentId, QueueId, or RuleName — the value is passed from one CTR to another. You can use contact attributes in your contact flow to branch and route the contact accordingly.

For more information, see Use Amazon Connect contact attributes (p. 445).

How to use exact match, pattern match, and semantic match in a rule

How to use exact match

Exact Match really is an exact word match, singular or plural.
How to use pattern match

If you want to match related words, append an asterisk (*) to the criteria. For example, if you want to match on all variations of "neighbor" (neighbors, neighborhood) you would type `neighbo*`.

With **Pattern Match** you can specify the following:

- **List of values**: This is useful when you want to build expressions with interchangeable values. For example, the expression might be:

  *I'm calling about a power outage in ["Beijing" or "London" or "New York" or "Paris" or "Tokyo"]*

  Then in your list of values you would add the cities: Beijing, London, New York, Paris, Tokyo.

  The advantage of using values is that you can create one expression, instead of multiple. This reduces the number of cards that you need to create.

- **Number**: This option is used most frequently in compliance scripts, or if your looking for a context when you know somewhere in between there's a number. This way you can put all of your criteria into one expression instead of two. For example, an agent compliance script might say:

  *I have been in this industry for [num] years and would like to discuss this topic with you.*

  Or a customer might say:

  *I have been a member for [num] years.*

- **Proximity definition**: Finds matches that may be less than 100 percent exact. You can also specify the distance between words. For example, if you are looking for contacts where the word "credit" was mentioned but you do not want to see any mention of the words "credit card," you can define a pattern matching category to look for the word "credit" that is not within a one-word distance of "card."

  For example, a proximity definition might be:

  `credit* [is not within 0 to 1 word apart] card*`

How to use semantic match

Semantic matching is supported only for post-call analysis.

- An "intent" is an example of utterance. It can be a phrase or a sentence.
- You can enter up to four intents in one card (group).
- We recommend using semantically similar intents within one card to get the best results. For example, there's category for "politeness." It includes two intents: "greetings" and "goodbye". We recommend separating these intents into two cards:
  - Card 1: "How are you today" and "How's everything going". They are semantically similar greetings.
  - Card 2: "Thanks for contacting us" and "Thank you for being our customer." They are semantically similar goodbyes.

  Separating the intents into two cards provides more accuracy than putting them all into one card.

Enter a script in a rule

There are times when you may need you agents to follow an exact script. For example, a compliance script that all agents need to follow.
To enter a script in a rule, enter phrases. For example, if you want to highlight when agents say Thank you for being a member. We appreciate your business, enter two phrases:

- Thank you for being a member.
- We appreciate your business.

To apply the rule to certain lines of businesses, add a condition for which queues it applies to, or contact attributes. For example, the following image shows a rule that applies when an agent is working the BasicQueue or Billing and Payments queues, the customer is for autoinsurance, and the agent is located in Seattle.

Security profile permissions for Contact Lens rules

To view, edit, or add rules for automatic categorization, you must be assigned to a security profile that has Metrics and Quality: Rules permissions.

To see agent names so you can add them to rules, you need Users and permissions: Users - View permissions in your security profile.

To see the queue names so you can add them to rules, you need Routing: Queues - View permissions in your security profile.

For more information, see Security profile permissions for Contact Lens (p. 637).

About contact attributes in a rule

You can have up to 5 contact attributes in a rule.

You can design contact flows to use the contact attributes you specify in a rule, and then route the task accordingly. For example, a call arrives in your contact center. When Contact Lens analyzes the call, it gets a hit on the Compliance rule. The CTR that's created for the call includes information similar to the following image:
Rules are applied to new contacts

After you add rules, they are applied to new contacts that occur after the rule was added. Rules are applied when Contact Lens analyzes conversations.

You cannot apply rules to past, stored conversations.

Contact Lens notification types

Contact Lens provides the following notification types:

- Contact Lens Post Call Rules Matched: An EventBridge event is delivered whenever a Contact Lens rule is matched and has triggered post call.

  This event contains useful information about the Contact Lens rule that is triggered including the category assigned, and details of the agent, contact and queue.

- Contact Lens Real Time Call Rules Matched: An EventBridge event is delivered whenever a Contact Lens rule is matched and has triggered in real time.
This event contains useful information about the Contact Lens rule that is triggered including the category assigned, and details of the agent, contact and queue

- Contact Lens Analysis State Change: An EventBridge event is delivered when Contact Lens is unable to analyze a contact file. The event contains the Event Reason Code which provides the details on why it was unable to process the file.

You can use these notification types in a variety of scenarios. For example, use Contact Lens analysis State Change events to signal unexpected errors in the processing of a contact file where EventBridge event details can be subsequently stored in a CloudWatch log for additional review, trigger additional workflows, or alert relevant support teams for further investigation.

The Contact Lens post-call and real-time events enable numerous new use cases such as surfacing and visualization of additional insights, for example:

- Generate alerts on real-time customer sentiment drops across all calls
- Aggregating and reporting on reoccurring issues and topics
- Measuring the impact of the latest marketing campaign by detecting how many customers referenced it during a call
- Customizing agent compliance standards for each Region and lines of business, and enrolling agents into additional training where required.

Search conversations analyzed by Contact Lens

You can search the analyzed and transcribed recordings based on:

- Speaker.
- Keywords.
- Sentiment score.
- Non-talk time.

In addition, you can search conversations that are in specific contact categories (that is, the conversation has been categorized based on uttered keywords and phrases).

These criteria are described in the following sections.

**Important**
After a call ends and the agent completes After Contact Work (ACW), Contact Lens analyzes and transcribes the recording of the customer-agent conversation. The agent must choose **Clear contact** first.

Required permissions for searching conversations

Before you can search conversations, you need the following permissions, which allow you to do the type of search you want.

- **Contact search.** This is required so you can get to the Contact Search page.
- **Search contacts by conversation characteristics.** This includes non-talk time, sentiment score, and contact category.
- **Search contacts by keywords**

For more information, see Security profile permissions for Contact Lens (p. 637).
Search for keywords

For search, Contact Lens uses the standard analyzer in Amazon OpenSearch Service. This analyzer is not case sensitive. For example, if you enter thank you for your business 2 CANCELLED Flights, the search looks for:

[thank, you, for, your, business, 2, cancelled, flights]

If you enter "thank you for your business", two, "CANCELLED Flights", the search looks for:

[thank you for your business, two, cancelled flights]

To search conversations for keywords

1. In Amazon Connect, log in with a user account that is assigned the CallCenterManager security profile, or that is enabled for the Search contacts by keywords permission.
2. Choose Metrics and quality, Contact search.
3. In the Filter section, specify the time period that you want to search. Include other information to narrow your search. For instructions, see Search for contacts (p. 784).

   Tip
   When searching by date, you can search up to 8 weeks at a time.

4. In the Conversation section, enter the words to search, separated by commas. If you enter a phrase, surround it with quotation marks. You can enter up to 128 characters.

   • Choose Match any to return contacts that have any of the words present in the transcripts.

   For example, the following query means match (hello OR cancellation OR "example airline").

   • Choose Match all to return contacts that have all of the words present in the transcripts.

   For example, the following query means match ("thank you for your business" AND cancellation AND "example airline").
Search for sentiment score or evaluate sentiment shift

With Contact Lens, you can search conversations for sentiment scores on a scale of -5 (most negative) to +5 (most positive). This enables you to identify patterns and factors for why calls go well or poorly.

For example, suppose you want to identify and investigate all the calls where the customer sentiment ended negatively. You might search for all calls where the sentiment score is <= (less than or equal to) -1.

To search for sentiment scores or evaluate sentiment shift

1. In Amazon Connect, log in with a user account that is assigned the CallCenterManager security profile, or that is enabled for the Search contacts by conversation characteristics permission.
2. On the Contact search page, specify whether you want the sentiment score for words or phrases spoken by the customer or agent.
3. In Type of score analysis, specify what type of scores to return:
   - Sentiment score for the entire contact: This returns the average score for the customer or agent's portion of the conversation.
   - Evaluating sentiment shift: Identify where the customer or agent's sentiment changed during the contact.

   For example, you might search where the customer's sentiment score begins at less than or equal to -1 and ends at greater than or equal to +1.
Search for non-talk time

To help you identify which calls to investigate, you can search for non-talk time. For example, you might want to find all calls where the non-talk time is greater than 20%, and then investigate them.

Non-talk time includes hold time and any silence where both participants aren't talking for longer than three seconds. This duration can't be customized.

Use the drop-down arrow to specify whether to search conversations for the duration or percentage of non-talk time.
Search a contact category

1. On the Contact search page, choose Add filter, Contact category.
2. In the Contact categories box, type the name of the category that you want to search, and then choose Apply.

Review analyzed conversations using Contact Lens

By using Contact Lens for Amazon Connect, you can review the transcript and identify what part of the call is of interest. You won't need to listen to an entire call or read an entire transcript to find out what's interesting about it. You can focus on specific parts of the audio or transcript. Both are highlighted for you wherever there are points of interest.

For example, you might scan the transcript of the call and see a red sentiment emoji for a customer turn, which indicates the customer is expressing a negative sentiment. You can choose the timestamp and jump to that portion of audio recording.
To review analyzed conversations

1. Log in to Amazon Connect with a user account that has Contact search and Contact Lens - speech analytics permissions in the security profile.
2. In Amazon Connect, choose Metrics and quality, Contact search.
3. Use the filters on the page to narrow your search for a contact. For date, you can search up to 14 days at a time. For more information about searching for contacts, see Search for contacts (p. 784).
4. Choose the contact ID to view the Contact Trace Record (CTR) for the contact.
5. In the Recording and transcript section of the CTR, review what was spoken and when, and their sentiment.
6. If desired, choose the play prompt to listen to the recording. Or, download the recording and fast-forward to only the portion you’re interested in.

Quickly navigate transcripts and audio

Supervisors are often required to review many agents calls for quality assurance purposes. The turn-by-turn transcript and sentiment data helps you quickly identify and navigate to the portion of the recording that is of interest to you.

This topic explains how you can quickly navigate transcripts and audio to find areas that need your attention.

Turn on autoscroll to synchronize the transcript and audio

Autoscroll enables you to jump around the audio or transcript, and the two always stay in sync. For example:

- When you listen to a conversation, the transcript moves along with it, showing you sentiment emojis and detected issues.
- You can scroll through the transcript, and choose the timestamp for the turn to listen to that specific point in the recording.
Because the audio and transcript are aligned, the transcript can help you understand what the agent and customer are saying. This is especially useful when:

- The audio is bad, maybe due to a connection issue. The transcript can help you understand what's being said.
- There's a dialect or language variant. Our models are trained on different accents so the transcript can help you understand what's being said.

Scan for sentiment emojis

Sentiment emojis help you quickly scan a transcript so you can listen to that part of the conversation.

For example, where you see red emojis for customer turns and then a green emoji, you might choose the timestamp to jump to that specific point of the recording to hear how that agent helped the customer.

Scan for highlighted issues

Issues (also known as call drivers) are turns where the primary call driver or reason for the customer outreach is underlined in the transcript. You can use this information to identify common emerging patterns across customer conversations.

Tap or click category tags to navigate through transcript

When you tap or click on the category tags, Contact Lens auto-navigates to the corresponding point-of-interests in the transcript. There are also category markers in the recording playback visualization to indicate which part of the audio file has utterances related to the category.
What are sentiment scores?

A sentiment score is an analysis of text, and a rating of whether it includes mostly positive, negative, or neutral language. Supervisors can use sentiment scores to search conversations and identify calls that are associated with varying degrees of customer experiences, positive or negative. It helps them identify which of their calls to investigate.

You can view a sentiment score for the entire conversation, as well as scores for each quarter of the call.

How to investigate sentiment scores

When working to improve your contact center, you may want to focus on the following:

- Calls that start with a positive sentiment score but end negative in the last quarter.

  If you want to focus on a limited set of contacts to sample for quality assurance, for example, you can look at calls where you know the customer had a positive sentiment at the start but ended with a negative sentiment. That shows you they left the conversation unhappy about something.

- Calls that start with a negative sentiment score in the first quarter but end positive.

  Analyzing these calls will help you identify what experiences you can recreate in your contact center. You can share successful techniques with other agents.

An additional way of looking at sentiment progression is to check the sentiment trendline. You can see the variation in the customer's sentiment as the call progresses. For example, the following images show a conversation with a very low sentiment score in the first quarter of the conversation, and a very positive one at the end.
How sentiment scores are determined

To determine the sentiment score, Contact Lens for Amazon Connect analyzes the sentiment for every speaker turn during the conversation. It uses the frequency and proximity of the resulting sentiment for each speaker turn to assign a score that ranges from -5 to +5 for each portion of the call.

The final sentiment score for the entire conversation is an average of the scores assigned during the call.

Investigate non-talk time in Contact Lens

What is non-talk time?

Contact Lens for Amazon Connect also identifies the amount of non-talk time in a call. Non-talk time equals hold time, plus any silence where both participants aren't talking for more than 3 seconds. This duration can't be customized.

How to investigate non-talk time

Non-talk time can help you identify calls that have gone poorly. This may be because:

- The customer was asking a question that's new for your contact center.
It's taking the agent a long time to do something but they are well-trained. This indicates there may be an issue with the tools the agent is using. For example, the tools aren't responsive enough or aren't easy to use.

The agent didn't have a ready answer, but they are fairly new. This indicates they need more training.

You can decide whether to focus on these contacts to improve your contact center. For example, you can go to that section of the audio, and then look at the transcript to see what was going on.

In the following example, the non-talk time occurred when the agent was looking up the caller's trip ID. This could indicate there's an issue with the agent's tools. Or if the agent is new, they need more training.

Investigate issues/call drivers detected in Contact Lens

As a call center manager, you may have hundreds of calls to review so you can identify issues. Contact Lens makes this process much faster by highlighting potential issues (also known as call drivers) that need further investigation. You can quickly scan the transcript to identify issues or what the call is about, instead of listening to the entire audio of the conversation, or reading the entire transcript.

The following image shows an example of how Contact Lens highlights the primary call driver or reason for the customer outreach in the call transcript. You can use this information to identify common emerging patterns across customer conversations.

Unlike the categorization of contacts, you don't need to configure issue detection to use this feature. Issues are detected by a machine learning model, based on an analysis of each turn in the conversation.
How to review transcripts for issues/call drivers

1. Go to the transcript.
2. Scan for the highlighted text.
3. Choose the timestamp for the highlighted turn. Amazon Connect automatically takes you to that part of the audio.
4. Listen to the issue.

Tip
Issues are highlighted only in conversations that occur after the release of the issue detection feature on June 30, 2020.

Investigate loudness scores in Contact Lens

A loudness score measures how loudly the customer or agent are speaking. Contact Lens displays an analysis of the conversation that lets you identify where the customer or agent may be talking loudly and have a negative sentiment.

How to use loudness scores

We recommend using loudness scores together with sentiments. Look for areas of the conversation where the loudness score is high and the sentiment is low. Then read that portion of the transcript or listen to that section of the call.

For example, the following image shows where the customer is talking loudly and their sentiment is negative.
Use sensitive data redaction

To help you protect your customer's privacy, Contact Lens lets you automatically redact sensitive data from conversation transcripts and audio files. It redacts sensitive data, such as name, address, and credit card information using Natural Language Understanding.

No configuration is needed. Contact Lens determines what data can be redacted.

To enable redaction, choose the option on the Set recording and analytics behavior block. For more information, see How to enable redaction of sensitive data.

Sensitive data redaction is applied after a call disconnects.

**Important**
The redaction feature is designed to identify and remove sensitive data. However, due to the predictive nature of machine learning, it may not identify and remove all instances of sensitive data in a transcript generated by Contact Lens. We recommend you review any redacted output to ensure it meets your needs.

The redaction feature does not meet the requirements for de-identification under medical privacy laws like the U.S. Health Insurance Portability and Accountability Act of 1996 (HIPAA), so we recommend you continue to treat it as protected health information after redaction.

For a list of the languages supported by Contact Lens redaction, see Languages supported by Amazon Connect.

**About redacted files**

Redacted files are stored in your Amazon S3 bucket: Connect-instanceARN / Analysis. You cannot access redacted files through the Amazon Connect console.
When redaction is enabled, Contact Lens generates the following files:

- A redacted file. This file is generated by default when Redaction is enabled. It's the output schema, with sensitive data redacted. For an example file, see Example redacted file (p. 682).
- An original (raw), analyzed file. This file is generated only when you choose Get redacted and original transcripts with redacted audio in the Set recording and analytics behavior (p. 359) block. For an example file, see Example original, analyzed file (p. 678).

**Important**
The original analyzed file is the only place where the complete conversation is stored. If you delete it, there will be no record of the sensitive data that was redacted.

- A redacted audio file (wav). Sensitive data in audio files is redacted as silence. These silent times are not flagged in the Amazon Connect console or elsewhere as non-talk time.

Use your file retention policies to determine how long to keep these files.

**Use the real-time analytics API**

Use the Contact Lens API `ListRealtimeContactAnalysisSegments` to build solutions that make your contact center more efficient. Following are two use cases for this API.

**Better call transfers**

When a contact is transferred from one agent to another agent, you can transfer a transcript of the conversation to the new agent. The new agent then has context for why the customer is calling, and the customer doesn’t need to repeat everything they already said. Use the `ListRealtimeContactAnalysisSegments` API to get the entire transcript of the conversation up to a certain point, and share it with the new agent.

**Automatic call summaries**

While handling a call agents may need to make notes, such as listing action items. Since you have the entire transcript available, you can build machine learning models to identify the key notes and summarize them at the end of the conversation. These notes are then available for any other agent or supervisor to reference. This helps agents focus on the conversation and the customer rather than focus on taking notes for the call summary.

**Example Contact Lens output files**

**Example output locations**

Following are examples of what Contact Lens output files look like when they are stored in the Amazon S3 bucket for your instance.

- Original analyzed transcript file (JSON)
  - /connect-instance- bucket/Analysis/Voice/2020/02/04/contact’s_ID_analysis_2020-02-04T21:14:16Z.json
- Redacted analyzed transcript file in (JSON)
  - /connect-instance- bucket/Analysis/Voice/Redacted/2020/02/04/contact’s_ID_analysis_redacted_2020-02-04T21:14:16Z.json
Redacted audio file

/\connect-instance-\ bucket/\Analysis/Voice/
\Redacted/2020/02/04/contact's\_ID\_call\_recording\_redacted\_2020-02-04T21:14:16Z.wav

Example original, analyzed file

This section shows an example schema for a conversation that Contact Lens has analyzed. The example shows loudness, issue detection/call drivers, and what information is going to be redacted.

Note the following about the analyzed file:

- It doesn't indicate what sensitive data was redacted. All data are referred to as PII (personally identifiable information).
- Each turn includes a Redacted section only if it includes PII.
- If a Redacted section exists, it includes the offset in milliseconds. In a .wav file, the redacted portion will be silence. If desired, you can use the offset to replace the silence with something else, such as a beep.
- If two or more PII redactions exist in a turn, the first offset applies to the first PII, the second offset applies to the second PII, and so on.

```json
{
    "Participants": [
        {
            "ParticipantId": "55555555-5555-5555-5555-55555555555",  //This is the agent's ARN. It's always long.
            "ParticipantRole": "AGENT"
        },
        {
            "ParticipantId": "33333333",  //This is the customer's ID. It's always short.
            "ParticipantRole": "CUSTOMER"
        }
    ],
    "Channel": "VOICE",
    "AccountId": "BBBBBBBBBBB",
    "Version": "1.1.0",
    "JobStatus": "COMPLETED",
    "LanguageCode": "en-US",
    "CustomModels": [  //Large contact centers may want to use custom language models. If so, contact AWS support for help.
        {
            "Type": "TRANSCRIPTION_VOCABULARY",
            "Name": "MostCommonKeywordsTranscriptionV1"
        },
        {
            "Type": "TEXT_ANALYSIS_ENTITIES",
            "Name": "Top100EntitiesV2"
        }
    ],
    "ContentMetadata": {
        "Output": "Raw"  //Raw indicates this file includes sensitive data.
    },
    "CustomerMetadata": {
        "InputS3Uri": "s3://connect-cccccccccccc/connect/poc-1/CallRecordings/2019/07/22/dddddddd-dddd-dddd-dddd-dddddddddd_20190322T23:23_UTC.wav",
        "ContactId": "11111111-1111-1111-1111-11111111111",
        "InstanceId": "eeeeeee-eeee-eeee-eeee-eeeeeeeeeeeee"
    },
    "Transcript": [
        {
```
"ParticipantId" : "55555555-5555-5555-5555-55555555555",
"Id" : "tttttttt-tttt-tttt-tttt-tttttttttttt",  // Each turn has an ID.
"Content": "Hello, my name is Jane, may I have your email id?",
"BeginOffsetMillis" : 0,
"EndOffsetMillis" : 3000,
"Sentiment" : "NEUTRAL",  // The sentiment can be neutral, positive, negative, or mixed (some negative and positive, which is rare).
"LoudnessScore" : [ // This indicates the loudness score. Because it's a three-second sentence, there are three loudness scores.
  40.5,              // The Amazon Connect console shows one bar for each of these values.
  55.0,
  59.3
],                    // If a turn doesn't include sensitive data, there is no
Redaction section.
},

"ParticipantId" : "33333333",
"Id" : "ssssssss-ssss-ssss-ssss-ssssssssssss",
"Content": "My email id is jane@examplecorp.com.",  // If you delete this file, you won't see the email ID.
"BeginOffsetMillis" : 3000,
"EndOffsetMillis" : 3945,
"Sentiment" : "NEGATIVE",
"LoudnessScore" : [ 40.5,
],
"Redaction" : { // This indicates where content is going to be redacted.
  "RedactedTimestamps" : [  // From 900ms to 944ms the customer mentioned her email and
    "BeginOffsetMillis" : 900,
    "EndOffsetMillis" : 944,
  ],

"ParticipantId" : "33333333",
"Id" : "aaaaaaaa-aaaa-aaaa-aaaa-aaaaaaaaaaaaa",
"Content": "I'm having trouble submitting the application, number AAAAAAAA on the portal.
I tried but couldn't connect to my POC on the portal.
So, I'm calling on this toll free number",
"BeginOffsetMillis" : 500,
"EndOffsetMillis" : 1945,
"Sentiment" : "NEGATIVE",
"LoudnessScore" : [ 40.5,
],
"Redaction" : {
  "RedactedTimestamps" : [ {  // This indicates the characters that are detected as issues.
    "BeginOffsetMillis" : 1610,
    "EndOffsetMillis" : 1700
  }]
}

"IssuesDetected" : [{ // This indicates what text is an issue. On the Contact Trace Record page on the
  "CharacterOffsets" : {  // Amazon Connect console, this text is underlined, indicating it's an issue.
    "BeginOffsetChar" : 0,
    "EndOffsetChar" : 81
  },
  "Text": "I'm having trouble submitting the application, number AAAAAAAA on the portal."
}]}
"CharacterOffsets": {  
  "BeginOffsetChar": 136,  
  "EndOffsetChar": 177  
},  
"Text": "So, I'm calling on this toll free number"
}
],
},
"Categories": {  
  "MatchedCategories": [  // These are the categories that have been matched.  
    "Swearing",  
    "Interruptions"  
  ],  
  "MatchedDetails": {  
    "Swearing": {  
      "PointsOfInterest": [  
        {  
          "BeginOffsetMillis": 0,  // The swearing is called out with the beginning and end offset.  
          "EndOffsetMillis": 300  
        },  
        {  
          "BeginOffsetMillis": 360,  
          "EndOffsetMillis": 500  
        }  
      ]  
    },  
    "Interruptions": {  
      "PointsOfInterest": [  
        {  
          "BeginOffsetMillis": 0,  // The interruptions are called out with the beginning and end offset.  
          "EndOffsetMillis": 500  
        },  
        {  
          "BeginOffsetMillis": 360,  
          "EndOffsetMillis": 500  
        }  
      ]  
    }  
  }
},
"ConversationCharacteristics": {  
  "TotalConversationDurationMillis": 7060,  
  "NonTalkTime": {  
    "TotalTimeMillis": 172,  
    "Instances": [  
      {  
        "BeginOffsetMillis": 3,  
        "EndOffsetMillis": 60,  
        "DurationMillis": 57  
      },  
      {  
        "BeginOffsetMillis": 45,  
        "EndOffsetMillis": 160,  
        "DurationMillis": 115  
      }  
    ]  
  },  
  "TalkTime": {  
    "TotalTimeMillis": 90000,  
    "DetailsByParticipant": {  
      "55555555-5555-5555-5555-55555555555": {  
        "TotalTimeMillis": 45000  
      },  
    }  
  }
}
"33333333" :{
  "TotalTimeMillis": 45000
}
},
"TalkSpeed" :{
  "DetailsByParticipant" :{
    "55555555-5555-5555-5555-55555555555" :{
      "AverageWordsPerMinute": 34
    },
    "33333333" :{
      "AverageWordsPerMinute": 40
    }
  }
},
"Interruptions" :{
  "totalCount": 2,
  "TotalTimeMillis": 34,
  "InterruptionsByInterrupter" :{
    "55555555-5555-5555-5555-55555555555" :[
      {
        "BeginOffsetMillis": 3,
        "EndOffsetMillis": 34,
        "DurationMillis": 31  //This is how many milliseconds the agent talked over the customer.
      },
      {
        "BeginOffsetMillis": 67,
        "EndOffsetMillis": 70,
        "DurationMillis": 3
      }
    ],
    "33333333" :{
      "BeginOffsetMillis": 100,
      "EndOffsetMillis": 100,
      "Score": 3.0
    }
  }
},
"Sentiment" :{
  "OverallSentiment" :{
    "55555555-5555-5555-5555-55555555555" : 3,  //The agent's overall sentiment score.
    "33333333" : 4.2  //The customer's overall sentiment score.
  },
  "SentimentByPeriod" :{
    "QUARTER" :{
      "55555555-5555-5555-5555-55555555555" :[
        {
          "BeginOffsetMillis": 0,
          "EndOffsetMillis": 100,
          "Score": 3.0
        },
        {
          "BeginOffsetMillis": 100,
          "EndOffsetMillis": 200,
          "Score": 3.1
        },
        {
          "BeginOffsetMillis": 200,
          "EndOffsetMillis": 300,
          "Score": 3.6
        },
        {
          "BeginOffsetMillis": 300,
          "EndOffsetMillis": 400,
          "Score": 3.1
        }
      ],
      "33333333" :[
        
      ]
    }
  }
}
Example redacted file

This section shows an example redacted file. It's a twin of the original analyzed file. The only difference is that sensitive data are redacted.

```
{
    "Participants": [
        {
            "ParticipantId": "55555555-5555-5555-5555-55555555555",
            "ParticipantRole": "AGENT"
        },
        {
            "ParticipantId": "33333333",
            "ParticipantRole": "CUSTOMER"
        }
    ],
    "Channel": "VOICE",
    "AccountId": "BBBBBBBBBBB",
    "Version": "1.1.0",
    "JobStatus": "COMPLETED",
    "LanguageCode": "en-US",
    "CustomModels": [
        {
            "Type": "TRANSCRIPTION_VOCABULARY",
            "Name": "MostCommonKeywordsTranscriptionV1"
        },
        {
            "Type": "TEXT_ANALYSIS_ENTITIES",
            "Name": "Top100EntitiesV2"
        }
    ],
    "ContentMetadata": {
        "RedactionTypes": ["PII"], // It says "PII" even though the redacted content could be other sensitive data such as credit card number.
        "Output": "Redacted"
    }
}
```
{ "CustomerMetadata": { "InputS3Uri": "s3://connect-cccccccccccc/connect/poc-1/CallRecordings/2019/07/22/ ddddddddd-dddd-dddd-dddd-dddddddddddd_20190322T23:23_UTC.wav", "ContactId": "11111111-1111-1111-1111-11111111111", "InstanceId": "eeeeeee-eeee-eeee-eeee-eeeeeeeeeeee" }, "Transcript": [ { "ParticipantId": "55555555-5555-5555-5555-55555555555", "Id": "tttttttt-tttt-tttt-tttt-ttttttttt", "Content": "Hello, my name is Jane, may I have your email id?", "BeginOffsetMillis": 0, "EndOffsetMillis": 300, "Sentiment": "NEUTRAL", "LoudnessScore": [40.5, 55.0, 59.3] }, { "ParticipantId": "33333333", "Id": "sssssssss-ssss-ssss-ssss-ssssssssss", "Content": "My email id is [PII].", //This shows that the customer's email ID has been redacted. "BeginOffsetMillis": 500, "EndOffsetMillis": 945, "Sentiment": "NEGATIVE", "LoudnessScore": [40.5, 55.0, 59.3] }, { "ParticipantId": "33333333", "Id": "sssssssss-ssss-ssss-ssss-ssssssssssss", "Content": "Hi, I'm having trouble submitting the application, number [PII] on the portal. I tried but couldn't connect to my POC on the portal. So, I'm calling on this toll free number." "BeginOffsetMillis": 1500, "EndOffsetMillis": 1945, "Sentiment": "NEGATIVE", "LoudnessScore": [40.5, 55.0, 59.3] } ], "Redaction": { "RedactedTimestamps": [ { "BeginOffsetMillis": 900, "EndOffsetMillis": 944 } ] }, [ { "ParticipantId": "33333333", "Id": "sssssssss-ssss-ssss-ssss-ssssssssssss", "Content": "Hi, I'm having trouble submitting the application, number [PII] on the portal. I tried but couldn't connect to my POC on the portal. So, I'm calling on this toll free number." "BeginOffsetMillis": 1500, "EndOffsetMillis": 1945, "Sentiment": "NEGATIVE", "LoudnessScore": [40.5, 55.0, 59.3] } ], "IssuesDetected": [{ "CharacterOffsets": { "BeginOffsetChar": 0, "EndOffsetChar": 0 } }] },
"EndOffsetChar": 78,
),
"Text": "Hi, I’m having trouble submitting the application, number [PII] on the portal. I tried but couldn't connect to my POC on the portal. So, I’m calling on this toll free number."
}
",
"Categories":{
 "MatchedCategories":[
 "Greeting",
 "Interruptions"
 ],
 "MatchedDetails":{
 "Greeting":{
 "PointsOfInterest":[
 {
 "BeginOffsetMillis": 0,
 "EndOffsetMillis": 300
 },
 {
 "BeginOffsetMillis": 360,
 "EndOffsetMillis": 500
 }
 ]
 },
 "Interruptions":{
 "PointsOfInterest":[
 {
 "BeginOffsetMillis": 0,
 "EndOffsetMillis": 500
 },
 {
 "BeginOffsetMillis": 360,
 "EndOffsetMillis": 500
 }
 ]
 }
 },
 "ConversationCharacteristics":{
 "TotalConversationDurationMillis": 7060,
 "NonTalkTime":{
 "TotalTimeMillis": 172,
 "Instances":[
 {
 "BeginOffsetMillis": 3,
 "EndOffsetMillis": 60,
 "DurationMillis": 57
 },
 {
 "BeginOffsetMillis": 45,
 "EndOffsetMillis": 160,
 "DurationMillis": 115
 }
 ]
 },
 "TalkTime":{
 "TotalTimeMillis": 90000,
 "DetailsByParticipant":{
 "55555555-5555-5555-5555-55555555555":{
 "TotalTimeMillis": 45000
 },
 "33333333":{
 "TotalTimeMillis": 45000
 }
Troubleshoot issues in Contact Lens

**Why don't I see color-coded bars on my Amazon Connect console?**

If your Amazon Connect console doesn't include color-coded bars similar to those shown in the preceding image, check whether the conversation that you're trying to analyzed occurred before June 30, 2020.

This view of conversations works only if the Contact Lens is enabled, and then the conversation occurred after June 30, 2020. This is because the feature that displays analyzed conversations in this format was released on June 30, 2020, and it can only be applied to conversations that happen after that time.

**Why don't I see or hear unredacted content?**

If your organization is using the Contact Lens redaction feature, by default only redacted content appears in the Amazon Connect console.

You must have permissions to view unredacted content. For more information, see Security profile permissions for Contact Lens (p. 637).

**Error notifications: When Contact Lens can't analyze a contact**

It's possible that Contact Lens can't analyze a contact file, even though analysis is enabled on the contact flow. When this happens, Contact Lens sends error notifications using Amazon EventBridge events.

Events are emitted on a best effort basis.
Subscribe to EventBridge notifications

To subscribe to these notifications, create a custom EventBridge rule that matches the following:

- "source" = "aws.connect"
- "detail-type" = "Contact Lens Analysis State Change"

You can also add to the pattern to be notified when a specific event code occurs. For more information, see Event Patterns in the Amazon EventBridge User Guide.

The format of a notification looks like the following sample:

```json
{
"version": "0", // set by CloudWatch Events
"id": "55555555-1111-1111-1111-111111111111", // set by CloudWatch Events
"source": "aws.connect",
"detail-type": "Contact Lens Analysis State Change",
"account": "111122223333",
"time": "2020-04-27T18:43:48Z",
"region": "us-east-1", // set by CloudWatch Events
"resources": [
"arn:aws:connect:us-east-1:111122223333:instance/abcd1234-defg-5678-
h9j0-7c822889931e",
"arn:aws:connect:us-east-1:111122223333:instance/abcd1234-defg-5678-
h9j0-7c822889931e/contact/efgh4567-pqrs-5678-t9c0-111111111111"
],
"detail": {
"instance": "arn:aws:connect:us-east-1:111122223333:instance/abcd1234-defg-5678-
h9j0-7c822889931e",
"contact": "arn:aws:connect:us-east-1:111122223333:instance/abcd1234-defg-5678-
h9j0-7c822889931e/contact/efgh4567-pqrs-5678-t9c0-111111111111",
"channel": "VOICE",
"state": "FAILED",
"reasonCode": "RECORDING_FILE_CANNOT_BE_READ"
}
}
```

Event codes

The following table lists the event codes that may result when Contact Lens can't analyze a contact.

<table>
<thead>
<tr>
<th>Event reason code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVALID_ANALYSIS_CONFIGURATION</td>
<td>Contact Lens received invalid values when the contact flow was initiated, such as an unsupported or invalid language code, or an unsupported value for redaction behavior.</td>
</tr>
<tr>
<td>RECORDING_FILE_CANNOT_BE_READ</td>
<td>Contact Lens can't get the recording file. This might be because file isn't present in the S3 bucket, or there are problems with permissions.</td>
</tr>
<tr>
<td>RECORDING_FILE_TOO_SMALL</td>
<td>The recording audio file is too small for analysis (less than 105 ms).</td>
</tr>
<tr>
<td>RECORDING_FILE_TOO_LARGE</td>
<td>The recording file exceeds the duration limit for analysis (more than 14,400 seconds, or 4 hours).</td>
</tr>
<tr>
<td>Event reason code</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RECORDING_FILE_INVALID</td>
<td>The audio file is invalid.</td>
</tr>
<tr>
<td>RECORDING_FILE_CANNOT_BE_READ</td>
<td>An error occurred when Contact Lens tried to read the audio file.</td>
</tr>
<tr>
<td>RECORDING_FILE_EMPTY</td>
<td>The audio file is empty.</td>
</tr>
<tr>
<td>RECORDING_SAMPLE_RATE_NOT_SUPPORTED</td>
<td>The sample rate of the audio file is not supported. Contact Lens currently supports audio files with an 8kHz sample rate. That is the sample rate for Amazon Connect recordings.</td>
</tr>
</tbody>
</table>
Use real-time caller authentication with Voice ID

Amazon Connect Voice ID provides real-time caller authentication which makes voice interactions in contact centers more secure and efficient. Voice ID uses machine learning to verify the identity of genuine customers by analyzing a caller’s unique voice characteristics. This allows contact centers to use an additional security layer that doesn't rely on the caller answering multiple security questions, and makes it easy to enroll and verify customers without changing the natural flow of their conversation.

With Amazon Connect Voice ID you can:

- Passively enroll customers for voice authentication without requiring them to repeat a particular word or phrase.
- Verify the enrolled customer's identity by analyzing their unique voice characteristics.

How Voice ID works

There are two steps related to voice authentication: customer enrollment and customer verification.

Customer enrollment

1. When a customer calls for the first time, the agent confirms the identity of the caller by using existing security measures, such as asking for mother’s maiden name or a one-time passcode (OTP) delivered by SMS. This ensures that only genuine customers are enrolled in Voice ID.
2. After the agent makes the enrollment request, Voice ID listens to the call until it has captured 30 seconds of customer speech (excluding silence).
3. Voice ID then creates the enrollment voiceprint. A voiceprint is a mathematical representation that implicitly captures unique aspects of an individual’s voice such as speech rhythm, pitch, intonation, and loudness.

The caller does not need to say or repeat any specific phrases to enroll in Voice ID.

Customer verification

1. When the enrolled customer calls back in, they are verified through an interaction with an IVR, or during their interaction with an agent.

   Voice ID needs 10 seconds of a caller’s speech to authenticate, which can be done as part of a typical customer interaction in the IVR or with the agent (such as "what’s your first and last name?" and "what are you calling about?").
2. Voice ID uses the audio to generate the caller’s voiceprint and compares it with the enrolled voiceprint corresponding to the claimed identity, and returns an authentication result.
Enable Voice ID

To enable Voice ID, add the following blocks to your contact flow:

- **Set security behavior (p. 361):** Add this block to the start of a call. You use this block to send audio to Amazon Connect Voice ID to verify the caller's identity, as soon as the call is connected to a contact flow. Set the following properties:
  - **Voice authentication:** Set to On to begin streaming the customer channel of the audio to Voice ID.
  - **Authentication threshold:** When Voice ID compares the voiceprint of the caller to the enrolled voiceprint of the claimed identity, it generates an authentication score between 0-100. This score indicates the confidence of a match. You can configure a threshold for the score which indicates whether the caller is authenticated. The default threshold of 90 provides high security for most cases.
    - If the authentication score is below the configured threshold, Voice ID treats the call as not authenticated.
    - If the authentication score is above the configured threshold, Voice ID treats the call as authenticated.

For example, if the person is sick and calling from a mobile device in their car, the authentication score is going to be slightly lower than when the person is well and calling from a quiet room. If an imposter is calling, the authentication score is much lower.

- **Set contact attributes (p. 350):** Use to pass the customer ID to Voice ID. The customer ID may be a customer number from your CRM, for example.

- **Check security status (p. 308):** Use to check the response from Voice ID, and then branch based on one of the following statuses:
  - **Authenticated:** The caller's identity has been verified. That is, the authentication score is greater than or equal to the threshold (default threshold of 90 or your custom threshold).
  - **Not authenticated:** The authentication score is lower than threshold that you configured.
  - **Inconclusive:** Unable to analyze a caller's speech for authentication. This is usually because Voice ID did not get the required 10 seconds of speech to provide a result for verification.
  - **Not enrolled:** The caller has not been enrolled in voice authentication. When this status is returned, for example, you may want to directly route the call to an agent for enrollment.
  - **Opted out:** The caller has opted out of voice authentication.

Sample Voice ID contact flow

**Caller not enrolled**

1. When a customer calls for the first time, their customer ID is passed to Voice ID using the Set contact attributes (p. 350) block.

2. Voice ID looks for the customer ID in its database. Since it's not there, it sends a Not enrolled result message. The Check security status (p. 308) block branches based on this result, and you can decide what the next step should be. For example, you might want to customize your agent application to add Enroll button so agents can enroll the customer in voice authentication.

3. If the caller enrolls, Voice ID starts listening to the audio to create a voiceprint.

**Caller enrolled**

1. The next time the customer calls, Voice ID finds their customer ID in the database.

2. Voice ID starts listening to the audio to create a voiceprint. The voiceprint that is created this time is used for authentication purposes so Voice ID can compare if the caller had been enrolled previously.
3. It compares the caller’s current voiceprint with the stored voiceprint associated with the claimed identity. It returns a result based on the **Authentication threshold** property you configured in the Set security behavior (p. 361) block.

4. After it evaluates the speech, it returns the message **Authenticated** if the voiceprints are similar. Or it returns one of the other statuses.

5. The contact is then routed down the appropriate branch by the Check security status (p. 308) block.

### How much speech is needed for enrollment and verification

- **Enrollment**: 30 seconds of customer net speech (speech that excludes any silence) to create a voiceprint and enroll a customer.
- **Verification**: 10 seconds of customer net speech to verify that the voice belongs to the claimed identity. The speech can be from interacting with an Amazon Lex bot or an agent.

### Amazon Connect Streams Voice ID APIs

Use the following Amazon Connect Streams APIs to integrate Voice ID into your existing agent web applications.

- `enrollSpeakerInVoiceId`: Enroll a customer to Voice ID using a click of a button.
- `evaluateSpeakerWithVoiceId`: Check the customer’s Voice ID verification status.
- `optOutVoiceIdSpeaker`: Opt out a customer from Voice ID.
- `getVoiceIdSpeakerStatus`: Describe the enrollment status of a customer.
- `getVoiceIdSpeakerId`: Get the speaker ID.
- `updateVoiceIdSpeakerId`: Update the speaker ID.

### What data is stored?

Voice ID stores voiceprints and customer IDs. The data is encrypted.
Amazon Connect Wisdom: Get the content you need

The Amazon Connect Wisdom feature is in preview release for Amazon Connect and is subject to change.

With Amazon Connect Wisdom, agents can search and find content across multiple repositories, such as frequently asked questions (FAQs), wikis, articles, and step-by-step instructions for handling different customer issues. They can type questions or phrases in a search box (such as, "how long after purchase can handbags be exchanged?") without having to guess which keywords will work.

If your organization uses real-time analytics from Contact Lens for Amazon Connect to automatically detect customer issues during calls, then Amazon Connect Wisdom can proactively recommend information to help resolve the issue. For example, Contact Lens can detect phrases such as "product broke during shipping" and then display text snippets, FAQs, and instructions for exchanging damaged products.

The following image shows an agent's Contact Control Panel (CCP), and an example of how Amazon Connect Wisdom results may appear adjacent to it after an agent has searched for information.
Access Amazon Connect Wisdom with a new URL

If you're using the CCP that is provided with Amazon Connect, after you enable Amazon Connect Wisdom, share the following URL with your agents so they can access it:

**Note**
This link only works if you're signed up for the Amazon Connect Wisdom preview:

- [instance name].my.connect.aws/agent-app/

By using the new URL, your agents can view the CCP and Amazon Connect Wisdom in the same browser window.

The following list refers to the designated areas in the preceding example:

1. Real-time recommendations based on real-time analytics
2. Search for words or phrases
3. Provide feedback on the helpfulness of the results
If CCP is embedded in your agent’s application, see Amazon Connect Streams for information about how to include Amazon Connect Wisdom.

For more information about the agent’s experience using Amazon Connect Wisdom, see Search for content using Amazon Connect Wisdom (p. 908).
Monitor metrics and run reports

In Amazon Connect, data about contacts are captured in contact trace records (CTR). This data can include the amount of time a contact spends in each state: customer on hold, customer in queue, agent interaction time.

The basis for most historical and real-time metrics in Amazon Connect is the data in the CTR. When you create metrics reports, the values displayed for most (not all) metrics in the report are calculated using the data in the CTRs.

CTRs are available within your instance for 24 months from the time when the associated contact was initiated. You can also stream CTRs to Amazon Kinesis to retain the data longer, and perform advanced analysis on it.

Tip
For detailed information about the activity of agents in your contact center, use Amazon Connect agent event streams (p. 754).

Contents
- What's new in metrics (p. 695)
- Real-time metrics reports (p. 708)
- Historical metrics reports (p. 729)
- Login/Logout reports (p. 750)
- Amazon Connect agent event streams (p. 754)
- Amazon Connect contact events (p. 768)
- Contact trace records (CTR) data model (p. 774)
- Search for contacts (p. 784)
- View a CTR in the UI (p. 788)
- About agent status (p. 789)
- About contact states (p. 791)
- About queued callbacks in metrics (p. 792)
- Save custom reports (p. 798)
- Share custom reports (p. 800)
- View a shared report (p. 801)
- Publish reports (p. 802)
- Monitoring your instance using CloudWatch (p. 804)
- Logging Amazon Connect API calls with AWS CloudTrail (p. 811)

What's new in metrics

Thanks to your feedback, we've made changes to Amazon Connect metrics. This topic gives you an overview of the improvements.

Faster reload times for the Real-time metrics page

We are upgrading the performance of the Real-time metrics page so reload times are faster. The page will have the same functionality and user experience as the existing Real-time metrics page.
Upcoming changes: Download the Agent activity audit report

The following changes will be released in the future:

- After you generate a report, you will now be able to download it using the Download CSV button.
- If you don’t generate a report, the Download CSV button will be inactive.

The following image shows an example where the first report has been generated and can be downloaded, the second report hasn’t:

![Agent activity audit](image)

April 2021

The following updates were released in April 2021.

- Amazon Connect incorrectly reported that chat contacts that were created from disconnect flows were created from transfer flows.
- With these fixes, Amazon Connect correctly reflects in the CTRs and agent event stream that these chat contacts were created from disconnect flows.

There is no impact to voice or task contacts.

Chat contacts created through disconnect flows no longer increment the following metrics:

- Contact flow time (p. 735)
- Contacts incoming (p. 738)
- Contacts handled incoming (p. 737)
- Contacts transferred in (p. 739)

In addition, note the following fixes for CTRs and the agent event stream for chat contacts:

- CTRs: There was an issue in the Attributes section of a chat CTR where the initiation method is API for both disconnect and transfer contacts. With this fix, the initiation method correctly reflect Disconnect and Transfer, respectively.
- Agent event stream: Chat contacts created from disconnect flows now have Disconnect as the initiation method.
March 2021

The following updates were released in March 2021.

When customizing a historical metrics report, you have the option to select a 15 minutes interval, in addition to the current option of a 30 minutes interval.

The 15 minutes interval works the same as the 30 minutes interval. For example, you can query up to three days of data at a time, for the past 35 days.

February 2021

The following updates were released in February 2021.

New metric groupings and categories

With the release of custom service level metrics (p. 700), we also made the following changes:

- On the Table settings pages, pre-set and custom service level metrics (p. 700) are in a new group called Contact Service Levels.
- Historical metrics on the Table settings page are grouped into categories.
- The order of metric columns on historical metrics reports changed to match the order of the metrics on the Table settings page.

Following is more information about these changes.

Real-time metrics: New Contact Service Level category

A new category of metrics appears on the Table settings page: Contact Service Level.

The following image shows this new category on the Table settings page, in an expandable group. Choose the arrow next to the group to view and select the metrics you want to add to your report.
Use the **Contact Service Level** category to choose pre-set service level metrics, and to create custom service level metrics.

The following image shows the user interface for creating custom service level metrics.
Historical metrics: New categories for metrics

To make it easier to find the historical metrics you want to add to a report, metrics on the Table settings page are grouped into the following categories:

- Agents
- Contacts Abandoned
- Contact Service Level: This group contains preset and custom service levels.
- Contacts Answered
- Performance

Choose **Add Custom SL** to add custom service levels to your historical metrics report.

The order of the metric columns on the historical metrics reports has changed

The order of the metric columns on the historical metrics reports matches the updated grouping scheme and order of the metrics on the Table settings page.

This change supports the addition of custom service level metrics (p. 700). It also allows us to make future improvements for where, for example, control of how a report looks resides on the Real-time metrics page and the Historical metrics page, not the Table settings page.

Note how metric columns now appear on reports:

- When you open the Real-time metrics page, custom service levels appear at the end of the Performance group.
- Metrics on existing Scheduled reports (the processed documents that arrive in your Amazon S3 buckets) are not re-ordered automatically. However, if you update an existing report, the metrics are re-ordered to match the order on the Table settings page.
- **Service level metrics:**
  - Real-time metrics reports: Service level metrics are always added to the end of the Performance group, in ascending order.
- Historical metrics reports: When you add custom service level metrics, they are added to the end of the report in the order they were created.

**Custom service level metrics**

You have the ability to add custom service level metrics. You can also choose from additional durations, such as minutes, hours, or days.

The maximum duration for a custom service level is 7 days. That's because in Amazon Connect you can't have a contact that goes longer than 7 days.

![Table Settings](image)

**Group by channel in a historical metrics report**

To group by channel on historical metrics reports

1. On the navigation menu, choose **Metrics and quality, Historical metrics**, and then choose a report.
2. Choose **Settings**.
3. On the **Table Settings** page, choose the **Groupings** tab. Add **Channel**, and choose **Apply**.
The table shows a column for **Channel**, as shown in the following image.

### October 2020

**New historical metrics for inbound and outbound contact time**

Released the following real-time metrics:

- Avg callback connecting time (p. 711)
- Avg incoming connecting time (p. 712)
- Avg outbound connecting time (p. 712)

Released the following historical metrics:

- Agent API connecting time (p. 730)
- Agent callback connecting time (p. 731)
- Agent incoming connecting time (p. 731)
• Agent outbound connecting time (p. 732)
• Average agent API connecting time (p. 733)
• Average agent callback connecting time (p. 733)
• Average agent incoming connecting time (p. 733)
• Average agent outbound connecting time (p. 734)

One-click drill-downs for Routing profiles and Queues tables

In real-time metrics reports, for Routing profiles and Queues tables, you can open pre-filtered tables that display the associated queues, routing profiles, or agents. These one-click filters provide a way for you to drill into the performance data.

For more information, see Use one-click drill-downs for Routing profiles and Queues tables (p. 718)

June 2020: Changes for omnichannel support

Group by channel

To group queues or routing profiles by channel on real-time metrics reports

1. On the navigation menu, choose Metrics and quality, Real-time metrics, and then select either Queues or Routing profiles.

2. Choose Settings.

3. On the Table Settings page, choose the Groupings tab and then select Queues grouped by channels. Or, if you’re setting up a Routing profiles report, choose Routing profiles grouped by channels.
4. Choose **Apply**.

5. The table shows a column for **Channel**.

**Group by queue in historical metrics reports**

In the historical metrics report, when you group or filter metrics by **Queue**, the results for the following metrics aren't accurate:

- Agent idle time (not supported in queue grouping as of June, 2020)
- Agent on contact time (not supported in queue grouping as of June, 2020)
- Occupancy (not supported in queue grouping as of June, 2020)

Because of this, on the **Table Settings** page, **Metrics** tab, these metrics are inactive, as shown in the following image:
In addition, in the historical metrics report, Amazon Connect displays a hyphen (-) in place of results for these metrics, and the cells are inactive (gray).

![Historical metrics: Agents](image)

**Effect of queue grouping on saved and scheduled reports**

If the Queue grouping or filter is used on the following reports, note these effects:

- **Saved reports.** The columns for these metrics don’t appear in the saved reports when grouped by Queue. When the saved report is filtered by Queue, however, it shows “-”.
- **Scheduled reports.** These reports continue to run successfully, but no results are returned for these metrics.

**Agent on contact time (not supported in queue grouping as of June, 2020)**

On historical metrics reports when an agent handles multiple chats concurrently, **Agent on contact time** shows wall clock time: the amount of time spent chatting. However, there isn’t a metric that shows the time an agent spends chatting with each contact.

In addition, no results are returned when you use the Queue grouping or filter with **Agent on contact time**.

**Agent idle time (not supported in queue grouping as of June, 2020)**

The **Agent idle time** metric divides the idle time into each queue associated with the agent. When contacts are grouped or filtered by Queue, however, Amazon Connect doesn't provide an accurate view into the how the agent is working. Because of this, Amazon Connect doesn't show **Agent idle time** when you apply the Queue grouping or filter to your report.

**Occupancy (not supported in queue grouping as of June, 2020)**

With the addition of chat, the **Occupancy** metric is now defined as the percentage of time that an agent was active on contacts. This percentage is calculated as follows:

- \((\text{Agent on contact (wall clock time)} / (\text{Agent on contact (wall clock time)} + \text{Agent idle time}))\)
Because Agent idle time is now inaccurate when contacts are grouped or filtered by Queues, the Occupancy metric is also inaccurate. As a result, when contacts are grouped or filtered by Queues, Occupancy doesn’t appear on the report.

Occupancy no longer appears on the Dashboard page.

**November 2019**

**Name changes for "Missed" and "Agent status" and "On call"**

The following real-time metrics were renamed:

<table>
<thead>
<tr>
<th>Old name</th>
<th>New name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed</td>
<td>Agent non-response</td>
</tr>
<tr>
<td>Agent status</td>
<td>Agent activity</td>
</tr>
<tr>
<td>On call</td>
<td>On contact</td>
</tr>
</tbody>
</table>

For each metric, existing saved reports automatically start displaying the new name; you don't need to do anything for the new name to appear in your reports.

The column order for a saved report containing one of these metrics stays the same. For example, if you previously saved a report where Agent status was the third metric, now when you open that saved report, Agent activity is the name for the third metric.

For Missed, only the name of the metric changed; the underlying calculation stayed the same. We’ve changing the name of this metric to Agent non-response so it better reflects its definition:

- Agent non-response increments whenever a contact is offered to an agent, and the agent doesn’t respond to the contact for whatever reason.

  For example, the agent could have intentionally let the timer run out, or the agent could have forgotten to grant microphone access in the Contact Control Panel and never heard the ring. In these situations, Amazon Connect doesn’t drop the contact. Instead, the routing engine will offer it to another available agent, while the customer continues to wait in queue. This means a single contact could result in multiple Agent non-responses before an agent responds and handles the contact.

For On call, the name change to On Contact applies to the Real-time metrics UI only. You can continue using AGENTS_ON_CALL with the GetCurrentMetricData API to retrieve data for this metric.

**Label updates for "Agent activity" and "Contact state"**

Labels are the values returned in a report. For example, in the following image Available and Basic Routing Profile are labels.
For **Agent Activity** and **Contact State**, we renamed some of the labels that describe what the agent's current activity is and what's happening with the contact they are currently working on. This way, the labels in the Real-Time Metrics report are more consistent with the labels the agent sees in the Contact Control Panel. They also align with the data returned about these different states in other parts of Amazon Connect.

When the name of **Agent Status** changed to **Agent Activity**, the following labels changed, too:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Before: Agent Status Labels</th>
<th>After: Agent Activity Labels</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent is logged in but offline</td>
<td>Not shown</td>
<td>Not shown</td>
<td></td>
</tr>
<tr>
<td>Agent switches to <strong>Available</strong> in the CCP</td>
<td>Available</td>
<td>Available</td>
<td></td>
</tr>
<tr>
<td>Agent has an incoming call</td>
<td>CallIncoming</td>
<td>Incoming</td>
<td><strong>ContactState</strong> = <strong>Incoming</strong> contact</td>
</tr>
<tr>
<td>Agent has an incoming callback</td>
<td>CallbackIncoming</td>
<td>Incoming</td>
<td><strong>ContactState</strong> = <strong>Inbound</strong> callback</td>
</tr>
<tr>
<td>Agent accepted a callback, which is now making an outbound call to the customer</td>
<td>Calling</td>
<td>On Contact</td>
<td><strong>ContactState</strong> = <strong>Outbound</strong> callback</td>
</tr>
<tr>
<td>Agent makes outbound call (regardless of what status the agent chose in their CCP)</td>
<td>Calling</td>
<td>On Contact</td>
<td><strong>ContactState</strong> = <strong>Outbound</strong> contact</td>
</tr>
<tr>
<td>Agent missed a phone call due to timer expired</td>
<td>MissedCallAgent</td>
<td>Missed</td>
<td></td>
</tr>
<tr>
<td>Agent is interacting with customer on phone call (regardless of what status the agent chose in their CCP)</td>
<td>On call</td>
<td>On Contact</td>
<td></td>
</tr>
</tbody>
</table>
### Scenario

<table>
<thead>
<tr>
<th>Before: Agent Status Labels</th>
<th>After: Agent Activity Labels</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent puts customer on hold while on phone call (regardless of what status the agent chose in their CCP)</td>
<td>On call</td>
<td>On Contact</td>
</tr>
<tr>
<td>After agent hangs up call</td>
<td>After call work</td>
<td>After contact work</td>
</tr>
<tr>
<td>Agent is on Lunch (a custom status)</td>
<td>Lunch</td>
<td>Lunch</td>
</tr>
<tr>
<td>Supervisor's activity state if they are monitoring some agent</td>
<td>Monitoring</td>
<td>Monitoring</td>
</tr>
<tr>
<td>Agent's activity state if they are connected to customer while being monitored by a supervisor</td>
<td>On call</td>
<td>On Contact</td>
</tr>
</tbody>
</table>

The following table shows the how the labels changed for **Contact State**.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Label Name Before</th>
<th>Label Name After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent is logged in but offline</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Agent switches to <strong>Available</strong> in the CCP</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Agent has an incoming call</td>
<td>-</td>
<td>Incoming contact</td>
</tr>
<tr>
<td>Agent has an incoming callback</td>
<td>-</td>
<td>Inbound callback</td>
</tr>
<tr>
<td>Agent accepted a callback, which is now making an outbound call to the customer</td>
<td>Initial</td>
<td>Outbound callback</td>
</tr>
<tr>
<td>Agent makes outbound call (regardless of what status the agent chose in their CCP)</td>
<td>Initial</td>
<td>Outbound contact</td>
</tr>
<tr>
<td>Agent missed a phone call due to timer expired</td>
<td>Missed call</td>
<td>Missed contact</td>
</tr>
<tr>
<td>Agent is interacting with customer on phone call (regardless of what status the agent chose in their CCP)</td>
<td>Busy</td>
<td>Connected</td>
</tr>
<tr>
<td>Agent puts customer on hold while on phone call (regardless of what status the agent chose in their CCP)</td>
<td>OnHold</td>
<td>On hold</td>
</tr>
</tbody>
</table>
### Real-time metrics reports

Real-time metrics reports show real-time or near-real time metrics information about activity in your contact center. Metrics such as **Online** show the number of agents currently online in real-time, updating every 15 seconds. Metrics such as **Handled** and **Abandoned** reflect near real-time values for your contact center.

You can customize the reports, specify a time range for each report, select metrics for each report, and select filters for data to include or exclude from each report.

You can also use the [Amazon Connect Service APIs](https://docs.aws.amazon.com/AmazonConnect/latest/APIReference/what-in-this-guide.html) to create custom reports, such as real-time reports that are filtered by teams of agents.

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### Real-time metrics definitions

The following metrics are available to include in real-time metrics reports in Amazon Connect. The metrics available to include in a report depend on the report type.

**Tip**

Developers can use the `GetCurrentMetricData` API to get a subset of the following real-time metrics from the specified Amazon Connect instance.

#### Abandoned

Count of contacts disconnected by the customer while in the queue during the specified time range. Contacts queued for callback are not counted as abandoned. When you create a customized real-time metrics report, to include this metric, choose a **Queues** report for the type. On the **Filters** tab, choose **Queues**, then on the **Metrics** tab you'll have the option to include **Abandoned**.
Active

Count of active slots. This number is incremented for each contact where the contact state is either Connected, On Hold, After contact work, or Outbound ring.

In the `GetCurrentMetricData` API, this metric is `SLOTS_ACTIVE`.

ACW

Count of contacts who are in an `AfterContactWork` state. (After contact work is also known as After call work.) After a conversation between an agent and customer ends, the contact is moved into the ACW state.

In the `GetCurrentMetricData` API, this metric is `AGENTS_AFTER_CONTACT_WORK`. The name of this metric is confusing because in the Amazon Connect console, ACW counts the number of contacts who are in an ACW state, not the number of agents.

To learn more about agent status and contact states, see About agent status (p. 789) and About contact states (p. 791).

Agent Activity

If an agent is handling a single contact, this metric may have the following values: Available, Incoming, On contact, Rejected, Missed, Error, After contact work, or a custom status.

If an agent is handling concurrent contacts, Amazon Connect uses the following logic to determine the state:

- If at least one contact is in Error, Agent Activity = Error.
- Else if at least one contact is Missed contact, Agent Activity = Missed.
- Else if at least one contact is Rejected contact, Agent Activity = Rejected.
- Else if at least one contact is Connected, On Hold, or Outbound contact/Outbound callback, Agent Activity = On contact.
- Else if at least one contact is After contact work, Agent Activity = After Contact Work.
- Else if at least one contact is Incoming/Inbound Callback, Agent Activity = Incoming.
- Else if agent status is a custom status, Agent Activity is the custom status.
- Else if agent status is Available, Agent Activity = Available.

If a supervisor is using the Manager Monitor feature to monitor a particular agent as they interact with a customer, then the supervisor’s Agent Activity will display as Monitoring. The Agent Activity of the agent who is being monitored is still On Contact.

Agent First Name

The first name of the agent, as entered in their Amazon Connect user account.

Agent Hierarchy

The hierarchy the agent is assigned to, if any.

Agent hung up

Count of contacts disconnected where the agent disconnected before the customer.
Agent Last Name

The last name of the agent, as entered in their Amazon Connect user account.

Agent Name

The name of the agent, displayed as follows: Agent Last Name, Agent First Name.

Agent non-response

Count of contacts routed to an agent but not answered by that agent, including contacts abandoned by the customer.

If a contact is not answered by a given agent, we attempt to route it to another agent to handle; the contact is not dropped. Because a single contact can be missed multiple times (including by the same agent), it can be counted multiple times: once for each time it is routed to an agent but not answered.

This metric was previously named Missed.

AHT (Average Handled Time)

The average time, from start to finish, that a contact was connected with an agent (average handled time). It includes talk time, hold time, and After Contact Work (ACW) time.

AHT is calculated by averaging the amount of time between the contact being answered by an agent and the completion of work on that contact by an agent.

API contacts handled

Count of contacts that were initiated by an API operation, such as StartOutboundVoiceContact, and handled by an agent.

Availability

For each agent, the number of available slots they have that can be routed contacts.

The number of available slots for an agent are based on their routing profile (p. 215). For example, let's say an agent's routing profile specifies they can handle either one voice contact or up to three chat contacts simultaneously. If they are currently handling one chat, they have two available slots left, not three.

What causes this number to go down? A slot is considered unavailable when:

- A contact in the slot is: connected to the agent, in After Contact Work, inbound ringing, outbound ringing, missed, or in an error state.
- A contact in the slot is connected to the agent and on hold.

Amazon Connect doesn't count an agent's slots when:

- The agent has set their status in the CCP to a custom status, such as Break or Training. Amazon Connect doesn't count these slots because agents can't take inbound contacts when they've set their status to a custom status.
- The agent can't take contacts from that channel per their routing profile.

In the GetCurrentMetricData API, this metric is SLOTS_AVAILABLE.
Available

The number of agents who can take an inbound contact. An agent can only take inbound contacts when they manually set their status to Available in the CCP (or in some cases when their supervisor changes it).

This is different from how many more inbound contacts an agent could take. If you want to know how many more contacts an agent can have routed to them, look at the Availability metric. It indicates how many slots the agent has free.

What causes this number to go down? An agent is considered unavailable when:

- The agent has set their status in the CCP to a custom status, such as Break or Training. Amazon Connect doesn't count these slots because agents can't take inbound contacts when they've set their status to a custom status.
- The agent has at least one contact ongoing.
- The agent has a contact in a missed or error state, which prevents the agent from taking any more contacts until they are flipped back to routable.

In the GetCurrentMetricData API, this metric is AGENTS_AVAILABLE.

Avg abandon time

Average time, in seconds, that abandoned contacts were in the queue before being abandoned.

Avg ACW

Average time, in seconds, that contacts spent in the After contact work state, during the specified time range.

This is not the average amount of time agents spent on contacts.

To learn more about agent status and contact states, see About agent status (p. 789) and About contact states (p. 791).

Avg callback connecting time

Then average time between when callback contacts are initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.

No equivalent to this metric is available in the GetCurrentMetricData API.

The following image shows the five parts that go into calculating Avg callback connecting time. It also shows what is in the agent event stream.
**Avg hold time**

Average time, in seconds, that a contact in the queue was on hold.

This metric doesn't apply to tasks so you'll notice a value of 0 on the report for them.

**Avg incoming connecting time**

The average time between when contacts are initiated Amazon Connect reserving the agent for the contact, and the agent is connected.

In the agent event stream, this time is calculated by averaging the duration between the contact state of STATE_CHANGE event changes from CONNECTING to CONNECTED/MISSED/ERROR.

No equivalent to this metric is available in the GetCurrentMetricData API.

The following image shows the three parts that go into calculating Avg incoming connecting time. It also shows what is in the agent event stream.

**Avg interaction time**

Average time, in seconds, that contacts were connected to and interacting with agents. This does not include hold time or time spent waiting in the queue.

**Avg interaction and hold time**

Average time, in seconds, that contacts in the queue spent interacting with agents and on hold. This is calculated as follows:

Avg hold time + Avg interaction time

**Avg queue answer time**

Average time, in seconds, that a contact was in the queue before being answered by an agent. This is calculated using the amount of time that the contact was in the queue, not any time that the contact spent in prior steps of the contact flow, such as listening or responding to prompts.

**Avg outbound connecting time**

The average time between when outbound contacts are initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.

No equivalent to this metric is available in the GetCurrentMetricData API.

The following image shows the four parts that go into calculating Avg outbound connecting time. It also shows what is in the agent event stream.
Callback contacts handled

Count of contacts handled by an agent that were queued callbacks.

Capacity

Displays the maximum capacity that's set in the routing profile currently assigned to the agent. This column can be filtered by channel.

If an agent's routing profile is configured to handle either one voice or up to three chats, then their maximum capacity equals three, when not filtered by channel.

Consult

Deprecated May 2019. When used in a report, it returns a dash (-).

Count of contacts in the queue that were handled by an agent, and the agent consulted with another agent or a call center manager during the contact.

Contact State

The state of the contacts the agent is currently handling. The state can be: Connected, On Hold, After contact work, Incoming, Calling, or Missed contact.

For queued callbacks, the contact state can also Callback incoming or Callback dialing.

If a supervisor is using the Manager Monitor feature to monitor a particular agent as they interact with a customer, the supervisor's contact state is Monitoring; the agent's contact state is Connected.

Duration

Amount of time that the agent has been in the current Agent Activity State.

Error

A count of agents in Error state. An agent is included in this metric if they miss a call or reject a chat/task (most common). They could also be counted if there is a connection failure.

In the GetCurrentMetricData API, this metric is AGENTS_ERROR.

Handled

Count of contacts in the queue that were answered by an agent.
Handled in

Count of incoming contacts handled by an agent during the specified time range that were initiated using one of the following methods: inbound call, transfer to agent, transfer to queue, or queue-to-queue transfer.

Handled out

Count of contacts handled by an agent during the specified time range that were initiated by an agent placing an outbound call using the CCP.

Hold abandonons

Count of contacts that disconnected while the customer was on hold. A disconnect could be because the customer hung up while on hold, or that there was a technical issue with the contact while on hold.

In queue

Count of contacts currently in the queue.

To learn how this is different from Scheduled contacts in a callback scenario, see How Initial delay affects Scheduled and In queue metrics (p. 794).

In the GetCurrentMetricData API, this metric is CONTACTS_IN_QUEUE.

Max queued

The longest time that a contact spent waiting in the queue. This includes all contacts added to the queue, even if they were not connected with an agent, such as abandoned contacts.

NPT (Non-Productive Time)

Count of agents who have set their status in the CCP to a custom status. That is, their CCP status is other than Available or Offline.

Tip

Although agents aren't routed any new inbound contacts while their CCP status is set to a custom status, it's possible for them to change their CCP status to a custom status while still handling a contact. For example, let's say an agent is being routed contacts very quickly. To go on break, they set their status to Break proactively, while still finishing up the last contact. This allows them to go on break and avoid accidentally missing a contact that's routed to them in the sliver of time between the last contact ending and setting their status to Break. Because agents can be On call or doing ACW, for example, while their CCP is set to a custom status, this means it's possible for agents to be counted as On call and NPT at the same time.

In the GetCurrentMetricData API, this metric is AGENTS_NON_PRODUCTIVE.

Occupancy

Percentage of time that an agent was active on contacts. This percentage is calculated as follows:

\[
\frac{\text{Agent on contact (wall clock time)}}{\text{Agent on contact (wall clock time) + Agent idle time}}
\]

Where:

- (Agent on contact + Agent idle time) = total amount of agent time
- So (Agent on contact)/(total amount of agent time) = percentage of time agents were active on contacts.
Important

Occupancy doesn't account for concurrency. That is, an agent is considered 100% occupied for a given interval if they are handling at least one contact for that entire duration.

Oldest

Length of time in the queue for the contact that has been in the queue the longest.

In the GetCurrentMetricData API, this metric is OLDESTCONTACTAGE.

On contact

Count of agents currently on a contact. An agent is "on a contact" when they are handling at least one contact who is either connected, on hold, in After contact work, or outbound ring.

In the GetCurrentMetricData API, this metric is AGENTS_ON_CONTACT. This metric used to be named On call. You can still use AGENTS_ON_CALL to retrieve data for this metric.

Online

Count of agents who have set their status in the CCP to something other than Offline. For example, they may have set their status to Available, or to a custom value such as Break or Training.

The Online metric doesn't tell you how many agents can be routed contacts. For that metric, see Available (p. 711).

This metric can be confusing so let's look at an example. Say you see this in a Queues report:

- Online = 30
- On Call = 1
- NPT = 30
- ACW = 0
- Error = 0
- Available = 0

This means 30 agents have set their status in the CCP to a custom status. 1 of those 30 agents is currently on a contact.

In the GetCurrentMetricData API, this metric is AGENTS_ONLINE.

Queue

The name of the queue associated with the contact the agent is currently handling.

Queued

Count of contacts added to the queue during the specified time range.

Routing Profile

The routing profile for the agent.

Scheduled

Count of customers in the queue for which there is a callback scheduled.
To learn how this is different from In queue contacts in a callback scenario, see How Initial delay affects Scheduled and In queue metrics (p. 794).

In the GetCurrentMetricData API, this metric is CONTACTS_SCHEDULED.

**SL X**

Percentage of contacts removed from the queue between 0 and X after being added to it (Service Level). A contact is removed from the queue when one of the following occurs: an agent answers the call, the customer abandons the call, or the customer requests a call back.

For X, you can choose from pre-set times in seconds: 15, 20, 25, 30, 45, 60, 90, 120, 180, 240, 300, and 600.

**Custom service levels**

You can also create custom service level metrics. You can also choose from additional durations, such as minutes, hours, or days.

You can add up to 10 custom service levels per report.

The maximum duration for a custom service level is 7 days. That's because in Amazon Connect you can't have a contact that goes longer than 7 days.

**Staffed**

Count of agents who are online in the CCP, and not in NPT (a custom status).

Another way of thinking about this is, there are two scenarios in which Staffed is not incremented:

- The agent's status in the CCP is set to Offline.
- The agent's status in the CCP is set to a custom status.

For example, let's say an agent sets their status in the CCP to a custom status such as Break and they make an outbound call. Now the agent is On call, but Staffed is 0.

If the agent sets their status in the CCP to Available and makes an outbound call, the agent is On call and Staffed is 1.

This metric is available on the Queues report.

In the GetCurrentMetricData API, this metric is AGENTS_STAFFED.

**Transferred in**

Count of contacts transferred into the queue during the specified time range.

**Transferred in from queue**

Count of contacts transferred into the queue from another queue during a Customer queue flow.

**Transferred out**

Count of contacts transferred out of the queue during the specified time range.

**Transferred out from queue**

Count of contacts transferred out of the queue to another queue during a Customer queue flow.
Permissions required to view real-time metrics reports

To view real-time metrics reports, you need to be assigned to a security profile that has **Access metrics** permission.

To create, share, and publish saved reports, you need the **Saved reports, Create** permission.

<table>
<thead>
<tr>
<th>Metrics and Quality</th>
<th>All</th>
<th>Access</th>
<th>View</th>
<th>Edit</th>
<th>Create</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access metrics</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Contact search</td>
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<td></td>
<td></td>
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<tr>
<td>Contact attributes</td>
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<tr>
<td>Login/Logout report</td>
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<td>Manager monitor</td>
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<td>Recorded conversations</td>
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</tr>
<tr>
<td>Saved reports</td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

To view the agent's hierarchy information in a real-time metrics report, which can include their location and skill set data, you need the **View - Agent hierarchy** permission:

<table>
<thead>
<tr>
<th>Users and permissions</th>
<th>All</th>
<th>View</th>
<th>Edit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agent hierarchy</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Security profiles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agent status</td>
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</tr>
</tbody>
</table>

How often real-time metrics refresh

Data in real-time metrics reports is refreshed as follows:

- The **Real-time metrics** page refreshes every 15 seconds, as long as the page is active. For example, if you have multiple tabs open in your browser and navigate to a different tab, the real-time metric page won't be updated until you return to it.
- Metrics such as **Active** and **Availability** refresh as activity occurs, with a small system delay for processing the activity.
- Agent near real-time metrics, such as **Missed** and **Occupancy**, refresh every 5 minutes.
- Contact near real-time metrics refresh about a minute after a contact ends.
Use one-click drill-downs for Routing profiles and Queues tables

In real-time metrics reports, for **Routing profiles** and **Queues** tables, you can open pre-filtered tables that display the associated queues, routing profiles, or agents. These one-click filters provide a way for you to drill into the performance data.

**Example 1: Queues table -> Routing profiles table -> Agents table**

For example, at a **Queues** table, choose the dropdown and then choose **View routing profiles**.

Below the **Queues** table, a **Routing profiles** table appears. It is filtered to display only the routing profiles associated with the queue. On the **Routing profiles** table, you can choose quick filters to display queues or agents only associated with that routing profile.
Example 2: Queues table -> Agents table

At the Queues table, choose View agents. Below the Queues table, an Agents table appears. It is filtered to display all the agents working that queue. The agents may be associated with different routing profiles.
View how many contacts are waiting in queue

To see the number of customers waiting in queue

1. Go to Metrics and quality, Real-time metrics, Queues.
2. This column counts all customers who are in waiting a queue for an agent, including the callback customers.

View how many contacts are in an agent's queue

To see how many contacts are in an agent's personal queue, add an Agent queues table to your Real-time metrics, Queues report. Then view these two metrics:

- In Queue—how many contacts are in an agent's personal queue.
• **Queued**—the number of contacts added to their personal queue during the specified time range.

Use the following procedure.

1. Go to **Metrics and quality, Real-time metrics, Queues**.
2. Choose **New table, Agent queues**.

The **In queue** column displays how many contacts are in the agent's queue.

3. Review the metrics in then **In queue** and **Queue** columns.

   **Tip**
   An agent is included in the **Agent queues** table only if they are online or there is at least one contact in their queue.

**Add In Queue and Queue to the Agent queue table**

If **In queue** or **Queue** don't appear in your **Agent queue** table, use the following steps to add them.

1. On the **Agent queues** table, choose **Settings**.
2. Choose the **Metrics** tab.
3. Scroll to the **Performance** section and choose **In queue** and **Queue**, and then **Apply**.

The changes appear in your table immediately.
4. Choose **Save** to add this report to your list of Saved reports.

View how many contacts are waiting for a callback

To see only the number of customers who are waiting for a call back, you need to create a queue that only takes callback contacts. To learn how to do this, see **Set up routing** (p. 208).

Currently there isn't a way to see the phone numbers of the contacts waiting for callbacks.
Create a real-time metrics report

You can create a real-time metrics report to view real-time or near-real time metrics data for activity in your contact center. You must have permission to access metric data. The CallCenterManager and QualityAnalyst security profiles include this permission. For more information, see Security profiles (p. 611).

To create a real-time metrics report

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. Choose Metrics and Quality, Real-time metrics.
3. Choose one of the following report types. They group and order the data in different ways and include different metrics by default.
   - Queues
   - Agents
   - Routing profiles
4. To add another report to the page, choose New table and then choose a report type. You can add multiple reports of the same report type.

   There's no limit to the number of tables you can add, but you might start experiencing performance issues if you add a lot of them.
5. To customize a report, choose the gear icon from its table.
6. On the Time Range tab, do the following:
   a. For Trailing windows for time, select the time range, in hours, for the data to include in the report.
   b. (Optional) If you select Midnight to now, the time range is from midnight to the current time, based on the Time Zone that you select. If you select a time zone other than the one you are currently in, the time range starts at midnight for the calendar day in that time zone, not your current time zone.
7. (Optional) On the Filters tab, specify filters to scope the data to be included in the report. The available filters depend on the report type. The following are the possible filters:
   - Agents—Includes data only for the agents that you select from Include.
   - Agent Hierarchies—Includes data only for the agent hierarchies that you select from Include.
   - Queues—Includes data only for the queues that you select from Include.
   - Routing profiles—Includes data only for the routing profiles that you select from Include.
8. On the Metrics tab, choose the metrics and fields to include in the report. The available metrics and fields depend on the report type and filters that you select. For more information, see Real-time metrics definitions (p. 708).
9. When you are finished customizing the report, choose Apply.
10. (Optional) To save your report for future reference, choose Save, provide a name for the report, and then choose Save.

   To view your saved real-time metrics reports, choose Metrics and Quality, Saved reports, and then choose the Real-time metrics tab.

No metrics or too few rows in a queues report?

It's possible to run a manually configured queues report and have no metrics returned, or fewer rows than expected.
This is because a queues report only includes data for a maximum of 100 queues, using one row per queue. If a queue doesn't have any activity* during the time range for the report, it's excluded from the report rather than included with null values. This means that if you create a report, and there is no activity for any of the queues included in the report, your report will not include any data.

This applies to the `GetCurrentMetricsData` API as well. This means that if a queue is not considered active, if you query for its metrics using the API you won't get any data.

**Tip**

*Here's how we define whether a queue is active: there's at least one contact in queue or there's at least one online agent for that queue. Otherwise, it's considered inactive.*

In the following situations, you could end up with no metrics or fewer rows than expected:

1. You're attempting to run a report with no filters or groupings, and have more than 100 queues in your instance. The report pulls metrics for the first 100 queues, and then displays only those that are active.
2. You're attempting to run a report with filters and groupings, but it still has more than 100 queues matching that criteria. To process this request, Amazon Connect applies all the specified filters and groupings. This pulls the first 100 queues matching that criteria. Then out of those queues, it displays only the active ones.

   For example, let's say you have 300 queues in your instance. Of these, 200 match your criteria; 100 are active and by coincidence all happen to be Queues #100-#200. When you run the report, you'd get just 1 row (Queue #100) since the other 99 queues that were returned (Queues #1-#99) were considered inactive and were not displayed.

3. You're running a report with fewer than 100 queues. While you may expect to see metrics for all filtered queues, only active queues are shown on the real-time metrics report page. Try changing the settings for the report, such as changing the time range.

### List queues grouped by routing profile

1. Go to **Metrics and quality, Real-time metrics, Queues**.
2. Click **Settings**.
3. On the **Groupings** tab, choose **Queues grouped by routing profiles**.
4. Choose **Apply**.

### List agents grouped by routing profile

1. Go to **Metrics and quality, Real-time metrics, Queues**.
2. Choose **New table, Agents**.
3. Click **Settings**.
4. On the **Filters** tab, choose **Routing profiles**. In **Include**, select the routing profiles you want included in the table.

5. Choose **Apply**.

**Sort agents by activity in a real-time metrics report**

On the real-time metrics **Agents** report, you can sort agents by **Activity** when agents are enabled to use the same channel.

For example, the following image shows that you can sort agents by the **Activity** column because all the agents are enabled to use the same channel: voice.
However, if one or more agents are enabled to handle voice, chat, and tasks—or any two of the channels—you can’t sort them by the Activity column because of the multiple channels. In this case, there’s no option to sort by the Activity column, as shown in the following image:

![Activity column](image)

**Note**
The real-time metrics Agents report doesn't support secondary sorting. For example, you can't sort by Activity, and then sort by Duration.

### Change the "Agent activity" status in a real-time metrics report

Agents manually set their status in the Contact Control Panel (CCP). However, on the real-time metrics report, supervisors can manually change the Agent Activity status of an agent. This overrides what the agent has set in the CCP.

When you choose the Agent Activity column, you can select a status, such as Offline, Available, or Break.

![Agent activity](image)

This change appears in the agent event stream.
You can't select or change any of the contact states that appear in the Agent Activity column, such as Incoming or On contact.

![Agent Activity Column](image)

You'll get an error message, as shown in the following image.

![Error Message](image)

### Required permissions to change an agent's activity status

For someone such as a supervisor to be able to change an agent's activity status, they need to be assigned a security profile that has the following permissions:

- View - Agent Status
- Access metrics
Download a real-time metrics report

You can download the data included in your report as a comma-separated value (CSV) file so that you can use it with other applications. If there is no data for one of the selected metrics, the field in the downloaded CSV file contains a dash.

All exported times are in seconds.

**To download a real-time metrics report as a CSV file**

1. Create the report.
2. Choose the down arrow next to Save in the top-right corner of the page and choose **Download CSV**.
3. When prompted, confirm whether to open or save the file.
You can convert the seconds to minutes using an Excel formula. Alternatively, if you have a short report, you can copy and paste the data from Amazon Connect to Excel and it will preserve the format.

### Historical metrics reports

Historical metrics reports include data about past, completed activity and performance in your contact center. Amazon Connect includes built-in historical reports that you can start using right away. You can also build your own custom reports.

When creating and analyzing your historical metrics reports, keep in mind that there are two categories of metrics:

- **CTR-driven metrics**
  
  These metrics are based on formed CTR records. For a given interval, CTRs whose disconnect date falls in the interval are selected to calculate metrics. For example, if a contact starts at 05:23 and ends at 06:15, this contact contributes 52 minutes of metrics for the 06:00-06:30 interval.

  Example CTR-driven metrics are **Service level**, **Agent interaction time**, and **After contact work time**.

- **Agent activity-driven metrics**
  
  These metrics are based on agent activities, like agent status changes, agent conversation changes. The metrics reflect on the actual time the activity happens. For example, if agent handles a contact from 05:23 to 06:15, the **Agent on contact time** has 7 minutes for the 05:00-05:30 interval, 30 minutes for the 05:30-06:00 interval, and 15 minutes for the 06:00-06:30 interval.

  For example, an agent activity-driven metric is **Non-Productive Time**.

You can customize the report settings to get the view of the data that is most meaningful for your organization. You can change the time frame for the report, which metrics are included in the report,
and how data is grouped in the report. After you have customized a report, you can save it for future reference. You can generate a report using a recurring schedule that you define.

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Historical metrics definitions

The following metrics are available to include in historical metrics reports in Amazon Connect.

Tip
Developers can use the GetMetricData API to get a subset of the following historical metrics from the specified Amazon Connect instance.

After contact work time

The total time that an agent spent doing ACW for a contact.

You specify the amount of time an agent has to do ACW in their agent configuration settings (p. 221). When a conversation with a contact ends, the agent is automatically allocated to do ACW for the contact. They stop doing ACW for a contact when they indicate they are ready for another contact in the CCP.

In the GetMetricData API, this metric is AFTER_CONTACT_WORK_TIME.

- Type: String (hh:mm:ss)
- Category: CTR-driven metric

Agent answer rate

Percentage of contacts routed to an agent that were answered.

- Type: String
- Min value: 0.00%
- Max value: 100.00%
- Category: Agent activity-driven metric

Agent API connecting time

The total time between when a contact is initiated using an Amazon Connect API, and the agent is connected.

Type: String (hh:mm:ss)
Agent callback connecting time

The total time between when a callback contact is initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.

Type: String (hh:mm:ss)

Agent first name

The first name of the agent, as entered in their Amazon Connect user account. This metric is available only when grouping by agent.

- Type: String
- Length: 1-255

Agent idle time

After the agent sets their status in the CCP to Available, this is the amount of time they weren't handling contacts + any time their contacts were in an Error state.

Agent idle time doesn't include the amount of time from when Amazon Connect starts routing the contact to the agent, to when agent picks up or declines the contact.

- Type: String (hh:mm:ss)
- Category: Agent activity-driven metric

Agent incoming connecting time

The total time between when a contact is initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.

In the agent event stream, this is the duration between the contact state of STATE_CHANGE event changes from CONNECTING to CONNECTED/MISSED/ERROR.

Type: String (hh:mm:ss)

Category: Agent activity-driven metric

Agent interaction and hold time

Sum of Agent interaction time (p. 731) and Customer hold time (p. 740).

- Type: String (hh:mm:ss)
- Category: CTR-driven metric

Agent interaction time

Total time that agents spent interacting with customers on inbound and outbound contacts. This does not include Customer Hold Time (p. 740) or After Contact Work Time (p. 730).

- Type: String (hh:mm:ss)
- Category: CTR-driven metric

**Agent last name**

The last name of the agent, as entered in their Amazon Connect user account. This metric is available only when grouping by agent.

- Type: String
- Length: 1-255

**Agent name**

The name of the agent, displayed as follows: Agent last name, Agent first name. This metric is available only when grouping by agent.

**Agent non-response**

Count of contacts routed to an agent but not answered by that agent, including contacts abandoned by the customer.

If a contact is not answered by a given agent, we attempt to route it to another agent to handle; the contact is not dropped. Because a single contact can be missed multiple times (including by the same agent), it can be counted multiple times: once for each time it is routed to an agent but not answered.

This metric appears as **Contacts missed** in scheduled reports and exported CSV files.

- Type: Integer
- Category: Agent activity-driven metric

**Agent on contact time**

Total time that an agent spent on a contact, including Customer Hold Time (p. 740) and After Contact Work Time (p. 730). This does not include time spent on a contact while in a custom status.

**Tip**

If you want to include the time spent in a custom status, see Contact handle time (p. 736).

- Type: String (hh:mm:ss)
- Category: Agent activity-driven metric

**Agent outbound connecting time**

The total time between when an outbound contact is initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.

Type: String (hh:mm:ss)

Category: Agent activity-driven metric

**API contacts**

Count of contacts that were initiated using an Amazon Connect API operation, such as StartOutboundVoiceContact. This includes contacts that were not handled by an agent.
• Type: Integer
• Category: CTR-driven metric

API contacts handled
Count of contacts that were initiated using an Amazon Connect API operation, such as `StartOutboundVoiceContact`, and handled by an agent.
In the `GetMetricData` API, this metric is `API_CONTACTS_HANDLED`.

• Type: Integer
• Category: CTR-driven metric

Average after contact work time
Average amount of time that an agent spent doing After Contact Work (ACW) for contacts. This is calculated by averaging `AfterContactWorkDuration` (p. 774) (from the CTR) for all contacts included in the report, based on the selected filters.

• Type: String (`hh:mm:ss`)
• Category: CTR-driven metric

Average agent API connecting time
The average time between when a contact is initiated using an Amazon Connect API, and the agent is connected.

Type: String (`hh:mm:ss`)
Category: Agent activity-driven metric

Average agent callback connecting time
The average time between when a callback contact is initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.

Type: String (`hh:mm:ss`)
Category: Agent activity-driven metric

Average agent incoming connecting time
The average time between when contact is initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.
No equivalent to this metric is available in the `GetMetricData` API.

Type: String (`hh:mm:ss`)
Category: Agent activity-driven metric

Average agent interaction and customer hold time
Average of the sum of the agent interaction and customer hold time. This is calculated by averaging the sum of the following values from the CTR: `AgentInteractionDuration` (p. 774) and `CustomerHoldDuration` (p. 775).
In the GetMetricData API, this metric is INTERACTION_AND_HOLD_TIME.

- **Type**: String (hh:mm:ss)
- **Category**: CTR-driven metric

### Average agent interaction time

Average time that agents interacted with customers during inbound and outbound contacts. This does not include Customer Hold Time (p. 740) or After Contact Work Time (p. 730).

In the GetMetricData API, this metric is INTERACTION_TIME.

- **Type**: String (hh:mm:ss)
- **Category**: CTR-driven metric

### Average agent outbound connecting time

The average time between when an outbound contact is initiated by Amazon Connect reserving the agent for the contact, and the agent is connected.

Type: String (hh:mm:ss)

Category: Agent activity-driven metric

### Average customer hold time

Average time that customers spent on hold while connected to an agent. This is calculated by averaging CustomerHoldDuration (p. 775) (from the CTR).

In the GetMetricData API, this metric is HOLD_TIME.

- **Type**: String (hh:mm:ss)
- **Category**: CTR-driven metric

This metric doesn't apply to tasks so you'll notice a value of 0 on the report for them.

### Average handle time

The average time, from start to finish, that a contact was connected with an agent (average handled time). It includes talk time, hold time, and After Contact Work (ACW) time.

AHT is calculated by averaging the amount of time between the contact being answered by an agent and the conversation ending. It applies to both inbound and outbound calls.

In the GetMetricData API, this metric is HANDLE_TIME.

- **Type**: String (hh:mm:ss)
- **Category**: CTR-driven metric

### Average outbound after contact work time

Average time that agents spent doing After Contact Work (ACW) for an outbound contact.

- **Type**: String (hh:mm:ss)
• Category: CTR-driven metric

**Average outbound agent interaction time**

Average time that agents spent interacting with a customer during an outbound contact.

- Type: String (hh:mm:ss)
- Category: CTR-driven metric

**Average queue abandon time**

Average time that contacts waited in the queue before being abandoned. This is calculated by averaging the difference between EnqueueTimestamp (p. 781) and DequeueTimestamp (p. 781) (from the CTR) for abandoned contacts.

A contact is considered abandoned if it was removed from a queue but not answered by an agent or queued for callback.

- Type: String (hh:mm:ss)
- Category: CTR-driven metric

**Average queue answer time**

Average time that contacts waited in the queue before being answered by an agent. This is the average of Duration (p. 781) (from the CTR).

In the GetMetricData API, this metric is QUEUE_ANSWER_TIME.

- Type: String (hh:mm:ss)
- Category: CTR-driven metric

**Callback contacts**

Count of contacts that were initiated from a queued callback.

- Type: Integer
- Category: CTR-driven metric

**Callback contacts handled**

Count of contacts that were initiated from a queued callback and handled by an agent.

In the GetMetricData API, this metric is CALLBACK_CONTACTS_HANDLED.

- Type: Integer
- Category: CTR-driven metric

**Contact flow time**

Total time a contact spent in a contact flow.

Outbound contacts don't start in a contact flow, so outbound contacts aren't included.
Historical metrics definitions

• Type: String (hh:mm:ss)
• Category: CTR-driven metric

**Contact handle time**

Total time that an agent spent on contacts, including Customer Hold Time (p. 740) and After contact work time (p. 730). This includes any time spent on contacts while in a custom status.

**Tip**
If you want to exclude the amount of time spent in a custom status, see Agent on contact time (p. 732).

• Type: String (hh:mm:ss)
• Category: CTR-driven metric

**Contact abandoned**

Count of contacts disconnected by the customer while in the queue. Contacts queued for callback are not counted as abandoned. When you create customized historical reports, to include this metric, on the Groupings tab choose either Queue or Phone Number.

In the GetMetricData API, this metric is CONTACTS_ABANDONED.

• Type: Integer
• Category: CTR-driven metric

**Contacts abandoned in X seconds**

Count of contacts disconnected by the customer while in the queue for 0 to X seconds. The possible values for X are: 15, 20, 25, 30, 45, 60, 90, 120, 180, 240, 300, and 600.

In the GetMetricData API, this metric is ABANDON_TIME.

• Type: Integer
• Category: CTR-driven metric

**Contacts agent hung up first**

Count of contacts disconnected where the agent disconnected before the customer.

In the GetMetricData API, this metric is CONTACTS_AGENT_HUNG_UP_FIRST.

• Type: Integer
• Category: CTR-driven metric

**Contacts answered in X seconds**

Count of contacts that were answered by an agent between 0 and X seconds of being placed in the queue, based on the value of EnqueueTimestamp (p. 781). The possible values for X are: 15, 20, 25, 30, 45, 60, 90, 120, 180, 240, 300, and 600.

• Type: Integer
• Category: CTR-driven metric
Contacts consulted

Deprecated May 2019. When used in a report, it returns a dash (-).

Count of contacts handled by an agent who consulted with another agent in Amazon Connect. The agent interacts with the other agent, but the customer is not transferred to the other agent.

In the GetMetricData API, this metric is CONTACTS_CONSULTED.

- Type: Integer
- Category: CTR-driven metric

Contacts handled

Count of contacts that were connected to an agent.

It doesn't matter how the contact got to the agent. It could be a customer calling your contact center, or an agent calling the customer. It could be a contact transferred from one agent to another. It could be a contact where the agent answered it, but then they weren't sure what to do and they transferred the contact away again. As long as the agent was connected to the contact, it increments Contacts handled.

In the GetMetricData API, this metric is CONTACTS_HANDLED.

- Type: Integer
- Category: CTR-driven metric

Contacts handled incoming

Count of incoming contacts that were handled by an agent, including inbound contacts and transferred contacts.

In the GetMetricData API, this metric is CONTACTS_HANDLED_INCOMING

- Type: Integer
- Category: CTR-driven metric

Contacts handled outbound

Count of outbound contacts that were handled by an agent. This includes contacts that were initiated by an agent using the CCP.

In the GetMetricData API, this metric is CONTACTS_HANDLED_OUTBOUND

- Type: Integer
- Category: CTR-driven metric

Contacts hold agent disconnect

Count of contacts that were disconnected by the agent while the customer was on hold.

- Type: Integer
- Category: CTR-driven metric
Contacts hold customer disconnect
Count of contacts that were disconnected by the customer while the customer was on hold.
In the GetMetricData API, this metric is CONTACTS_HOLD_ABANDONS.
- Type: Integer
- Category: CTR-driven metric

Contacts hold disconnect
Count of contacts disconnected while the customer was on hold. This includes both contacts disconnected by the agent and contacts disconnected by the customer.
- Type: Integer
- Category: CTR-driven metric

Contacts incoming
Count of incoming contacts, including inbound contacts and transferred contacts.
- Type: Integer
- Category: CTR-driven metric

Contacts missed
Count of contacts routed to an agent but not answered by the agent, including contacts abandoned by the customer. A contact can be counted as missed multiple times, once for each time it is routed to an agent but not answered.
When you add this to a historical metrics report, it appears under the column named Agent non-response.
In the GetMetricData API, this metric is CONTACTS_MISSED
- Type: Integer
- Category: Agent activity-driven metric

Contacts put on hold
Count of contacts put on hold by an agent one or more times.
- Type: Integer
- Category: CTR-driven metric

Contacts queued
Count of contacts placed in the queue.
In the GetMetricData API, this metric is CONTACTS_QUEUED.
- Type: Integer
• Category: CTR-driven metric

Contacts transferred in

Count of contacts transferred in from queue to queue, and transferred in by an agent using the CCP.

In the GetMetricData API, this metric is CONTACTS_TRANSFERRED_IN.

• Type: Integer
• Category: CTR-driven metric

Contacts transferred in from queue

Count of contacts transferred to the queue from another in a Transfer to queue contact flow.

In the GetMetricData API, this metric is CONTACTS_TRANSFERRED_IN_FROM_Q.

• Type: Integer
• Category: CTR-driven metric

Contacts transferred out

Count of contacts transferred out from queue to queue, and transferred out by an agent using the CCP.

In the GetMetricData API, this metric is CONTACTS_TRANSFERRED_OUT.

• Type: Integer
• Category: CTR-driven metric

Contacts transferred out external

Count of contacts that an agent transferred from the queue to an external source, such as a phone number other than the phone number for your contact center.

• Type: Integer
• Category: CTR-driven metric

Contacts transferred out queue

Count of contacts transferred from the queue to another queue in a Transfer to queue contact flow.

In the GetMetricData API, this metric is CONTACTS_TRANSFERRED_OUT_FROM_QUEUE.

• Type: Integer
• Category: CTR-driven metric

Contacts transferred out internal

Count of contacts for the queue that an agent transferred to an internal source, such as a queue or another agent. An internal source is any source that can be added as a Quick Connect.
• Type: Integer
• Category: CTR-driven metric

Customer hold time

Total time that customers spent on hold after being connected to an agent. This includes time spent on a hold when being transferred, but does not include time spent in a queue.

• Type: String (hh:mm:ss)
• Category: CTR-driven metric

Error status time

For a specific agent, the total time contacts were in an error status. This metric can't be grouped or filtered by queue.

• Type: String (hh:mm:ss)
• Category: Agent activity-driven metric

Maximum queued time

The longest time that a contact spent waiting in the queue. This includes all contacts added to the queue, even if they were not connected with an agent, such as abandoned contacts.

In the GetMetricData API, this metric is QUEUED_TIME.

• Type: String (hh:mm:ss)
• Category: CTR-driven metric

Non-Productive Time

Total time that agents spent in a custom status (p. 220). That is, their CCP status is other than Available or Offline.

This metric doesn't mean that the agent was spending their time unproductively.

Tip

Agents can handle contacts while their CCP status is set to a custom status. For example, agents can be On contact or doing ACW while their CCP is set to a custom status. This means it's possible for agents to be counted as On contact and NPT at the same time.

This metric can't be grouped or filtered by queue.

• Type: String (hh:mm:ss)
• Category: Agent activity-driven metric

Occupancy

Percentage of time that agents were active on contacts. This percentage is calculated as follows:

\[
\frac{\text{Agent on contact (wall clock time)}}{\text{Agent on contact (wall clock time)} + \text{Agent idle time}}
\]
Where:

- \((\text{Agent on contact} + \text{Agent idle time}) = \text{total amount of agent time}\)
- So \((\text{Agent on contact})/(\text{total amount of agent time}) = \text{percentage of time agents were active on contacts}\).

**Important**

**Occupancy** doesn't account for concurrency. That is, an agent is considered 100% occupied for a given interval if they are handling at least one contact for that entire duration.

In the GetMetricData API, this metric is OCCUPANCY.

- Type: String
- Min value: 0.00%
- Max value: 100.00%
- Category: Agent activity-driven metric

**Online time**

Total time that an agent spent with their CCP set to a status other than **Offline**. This includes any time spent in a custom status. This metric can't be grouped or filtered by queue.

- Type: String
- Category: Agent activity-driven metric

**Service level \(X\)**

Percentage of contacts removed from the queue between 0 and \(X\) after being added to it. A contact is removed from a queue when the following occurs: an agent answers the contact, the customer abandons the contact, or the customer requests a call back.

For \(X\) you can choose from pre-set times in seconds: 15, 20, 25, 30, 45, 60, 90, 120, 180, 240, 300, and 600. This percentage is calculated as follows:

\[
\frac{\text{Contacts removed from queue in } X \text{ seconds}}{\text{Contacts queued}} \times 100
\]

In the GetMetricData API, this metric is SERVICE_LEVEL.

- Type: String
- Min value: 0.00%
- Max value: 100.00%
- Category: CTR-driven metric

**Custom service levels**

You can also create custom service level metrics. Choose from additional durations, such as minutes, hours, or days.

Custom service levels are localized to the report where they are created. For example, you create a report that has a custom service level of 75. You leave the page and then create another report. The custom service level 75 won't exist in the second report. You'll need to create it again.

The maximum duration for a custom service level is 7 days. That's because in Amazon Connect you can't have a contact that goes longer than 7 days.
You can add up to 10 custom service levels per report.

**Permissions required to view historical metrics reports**

To view historical metrics reports, you need to be assigned to a security profile that has **Access metrics** permission.

To create, share, and publish saved reports, you need the **Saved reports, Create** permission.

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This gives you access to real-time and historical metrics reports.

This gives you permission to create, share, and publish custom reports.

---

To view the Agent activity audit report, you need **Users, View** permissions:

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Create a historical metrics report

Although Amazon Connect includes built-in historical reports, you can create your own custom reports so you look at only the data that's of interest to your organization.

Requirement

- You must have permission to access metric data. The following security profiles include this permission: CallCenterManager and Quality Analyst. For more information, see Security profiles (p. 611).

Grouping options

You can group the metrics included in your reports in different ways to provide greater insight into how your contact center is performing.

You can group reports by queue, agent, agent hierarchy, routing profile, or phone number. The metric calculations, and therefore metrics values displayed in the report, are different when reports are grouped differently. For example, if you group a report by queue, the value of a metric includes all contacts associated with the queue. If you group a report by agent, the values for the metrics associated with queues might not provide much insight.

When you create a report, the values for calculated metrics are displayed as rows in the report. The rows in the report are grouped by the grouping options you select. Grouping the data enables you to generate global data for your contact center, or more specific data for queues, agents, routing profiles, or agent hierarchy defined in your contact center.

For example, consider the Contacts handled metric. This metric is a count of the contacts handled during the time range defined for the report. Here are the results based on the grouping:

- **Queue** - The metric is the total number of contacts handled during the time range from that queue by all agents in your contact center.
- **Agent** - The metric is the total number of contacts handled by that agent during the time range across all queues and routing profiles.
- **Routing Profile** - The metric is the total number of contacts handled during the time range by agents assigned that routing profile.
- **Queue, then Agent, then Routing Profile** - The metric is the total number of contacts that agent assigned that routing profile handled from that queue.

Agent activity can be included in one routing profile at a time, but agents can switch between routing profiles over the reporting time interval. If agents are assigned multiple routing profiles and handle contacts from multiple queues, there are multiple rows in the report for each routing profile assigned to the agent and the queue that the agent handled contacts from.

Filters

When you customize a report, you can add filters to control which data is included in the report. You can filter on the following:

- **Queue**—Includes data only for the specified queues. If you don't specify any queues, all queues are included.
- **Routing profile**—Includes data only for the agents assigned to the specified routing profiles. If you don't specify any routing profiles, data for all agents for all routing profiles is included.
• **Agent hierarchy**—Includes data only for the contacts handled by agents in the specified hierarchies. If you don't specify a hierarchy, data for all contacts handled by agents in all hierarchies is included. When only one hierarchy is specified, you can specify a more granular filter within the hierarchy.

• **Phone number**—Includes data only for the contacts associated with the specified phone numbers. If you don't specify a phone number, data for all contacts associated with all phone numbers is included.

### How to create a historical metrics report

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. Choose **Metrics and quality**, **Historical metrics**.
3. Choose one of the following report types, which group and order the data in different ways, and include different metrics:
   - Queues
   - Contact metrics
   - Agent metrics
   - Agents
   - Agent performance
   - Phone numbers
   - Contact metrics
4. To customize your report, choose the gear icon.
5. On the **Interval & Time range** tab, do the following:
   a. For **Interval**, choose **30 minutes** to get a row for each 30-minute period in the time range, **Daily** to get a row for each day in the time range, or **Total** to get all data for the time range in a single row.
   b. For **Time Zone**, select a time zone, which determines the hour at which a day starts. For example, to align the report with your calendar days, select the time zone for your location.

   You should use the same time zone for reports over time to get accurate and consistent metrics data for your contact center. Using different time zones for different reports may result in different data for the same time range selection.
   c. The possible values for **Time range** depend on the value that you select for **Interval**. Alternatively, you can specify a custom time range.

   For **Last x days** and **Month to date**, the current day is not included in the report. **Yesterday** specifies the previous calendar day while **Last 24 hours** specifies the 24 hours prior to the current time.
6. (Optional) On the **Groupings** tab, choose up to five groupings. If you choose one grouping option, the data is grouped by that option. If you choose multiple grouping options, the data is group by the first grouping option and then by the subsequent grouping options. For more information, see **Grouping options** (p. 743).
7. (Optional) On the **Filters** tab, specify filters to scope the data to be included in the report. The available filters depend on the groupings that you select. For more information, see **Filters** (p. 743).
8. On the **Metrics** tab, choose the metrics and fields to include in the report. An exclamation point (!) is displayed next to any metrics that are not available based on the groupings that you selected. For more information, see **Historical metrics definitions** (p. 730).
9. When you are finished customizing your report, choose **Apply**.
10. (Optional) To save your report for future use, choose **Save**, provide a name for the report, and then choose **Save**.
Historical report limits

Historical metrics reports have the following limits:

Data only for active queues

- You can get data only for active queues. A queue is inactive if there are no contacts in the queue and no agents available.

Query data for three days at a time, for the past 35 days

- When you create a report that uses intervals (such as 30 minute intervals), you can return data for three days at a time, for the past 35 days.

The availability of historical metric data is based on the retention period of CTRs

- Historical metrics are based CTRs. For the current retention period for CTRs, see Feature specifications (p. 929).

80k cell limit

There is currently an 80k cell limitation on historical metrics reports and scheduled reports. This applies to the total number of cells (columns * rows), accounting for grouping and filtering.

For example, let's say you create a historical metrics report with this criteria:

- Grouped by agents
- With an interval of 30 minutes
- For the last 24 hours
- Configured to include only 5 metrics
- Filtered to show only contacts handled in BasicQueue

If only 10 agents handled contacts in BasicQueue during this time, then you would expect to see (24*2)*5*10 = 2400 cells that count towards the 80k limit.

A message informs you if you reach the limit.

Schedule a historical metrics report

Before you schedule a historical metrics report, here are a few things you need to know:

Others can access the report

- Scheduling a report makes the report accessible by any other users in your contact center who have permissions to view saved reports. Any user with permission to edit saved reports can also modify your scheduled reports.

Scheduled reports are located in an Amazon S3 bucket

- Scheduled reports are saved as CSV files in the Amazon S3 bucket specified for reports for your contact center. When you set up the scheduled report, you can add a prefix to the location in Amazon S3 for the report files.
• When the report is exported to your Amazon S3 bucket, the file name includes the date and UTC time when the report was created. The Last modified date for the file is displayed using the time zone for the Amazon S3 bucket, and may not match the creation time for the report, which is in UTC.

There's a 15 minute delay

• For scheduled reports, there is a delay of 15 minutes after the scheduled report time before the report is generated. This is to ensure that the report includes the data for all of the activity that occurred during the time range specified for the report. Data from your contact center is not immediately processed and available to include in reports, so some data from the time range might not be captured in a report if the report is generated at the second the time range ends.

• For example, if you create a scheduled report for time frame of 8:00 AM to 5:00 PM, and there is activity in your contact center between 4:46:00 PM and 4:59:59 PM, the data about that activity may not be aggregated prior 5:00 PM when the report is scheduled to generate. Instead, the report is generated after 5:15 PM, by which time the data for the last 15 minutes of the time range is included in the report.

A scheduled Yesterday report works like a Last 24 hours report

• Usually Yesterday specifies the previous calendar day while Last 24 hours specifies the 24 hours prior to the current time. However, if you schedule to run a Yesterday report, it will work like a Last 24 hours report.

All scheduled reports use the UTC day, regardless of the timezone of the report

• For example, let's say you are in PST (Pacific Standard Time) and you schedule a Last 24 hours report to run at 16:00 every day. Here's the logic we use to run the report on May 15, 2020, for example:

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current time</td>
<td>2020-05-15T16:00:00.000Z</td>
</tr>
<tr>
<td>Minus 24 hours</td>
<td>2020-05-14T16:00:00.000Z</td>
</tr>
<tr>
<td>Get the date</td>
<td>2020-05-14</td>
</tr>
<tr>
<td>Get the time range</td>
<td>2020-05-14T00:00:00.000Z - 2020-05-15T00:00.000Z (this is the UTC day)</td>
</tr>
</tbody>
</table>

No message if a scheduled report doesn't run

• If a scheduled report fails to run, you won't get any message in the Amazon Connect UI. You just won't see the report in the Amazon S3 location.

Use your messaging system to email scheduled reports

• To email a scheduled report to a list of co-workers, you need to generate the email manually using your messaging system. Amazon Connect doesn't provide an option to email the scheduled report automatically.
How to schedule a historical metrics report

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. Create a new report and save it, or open a saved report.
3. Choose the down arrow next to Save in the top-right corner of the page and choose Schedule.
4. On the Recurrence tab, specify how often this report should be run (for example, weekly on Saturdays) and the range (for example, from midnight for the previous 5 days).
5. (Optional) On the Delivery Options tab, specify a prefix for the location in Amazon S3 for the report files.
6. Choose Create.

How to delete a scheduled report

To get to the page where you can delete a scheduled report, you need to create another temporary scheduled report.

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. On the navigation menu, choose Metrics and quality, Saved reports.
3. On the View reports page, choose the Historical metrics tab.
4. Click or tap on the saved report that has been scheduled.
5. Choose the down arrow next to Save in the top-right corner of the page and choose Schedule.
6. Choose Create.
7. On the Schedule Report page, choose Delete next to the scheduled reports you want to delete.

For instructions on deleting saved reports, see How to delete saved reports (p. 799).

Update a historical metrics report

After you save a report, you can update it at any time.

To update a historical metrics report

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. Choose Metrics and quality, Saved reports.
3. From the Historical metrics tab, choose the name of the report. Choose the gear icon, update the report settings as needed, and choose Apply.
4. To update the current report, choose Save. To save your changes to a new report, choose Save as.

Download a historical metrics report

You can download the data included in a report as a comma-separated value (CSV) file so you can use it with other applications. If there's no data for one of the selected metrics, the field in the downloaded CSV file contains a dash.

To download a historical metrics report as a CSV file

1. Log in to your contact center at https://instance name.my.connect.aws/.
2. Create a new report or open a saved report.
3. Choose the down arrow next to **Save** in the top-right corner of the page and choose **Download CSV**.
4. When prompted, confirm whether to open or save the file.

Although the times in the online report are in hh:mm:ss, all times in the downloaded report are in seconds.

You can convert the seconds to minutes using an Excel formula. Alternatively, if you have a short report, you can copy and paste the data from Amazon Connect to Excel and it will preserve the format.

### Interval downloaded in ISO date format

The interval is downloaded in ISO date format, as shown in the following image.

Tip: when you download a historical metrics report, the interval will be in ISO date format, and won’t match the UI. If needed, use Excel to convert it to the desired format.

### Download all historical metric results

If you need to download more than a page or two of historical metrics, we recommend using the following steps:
1. Schedule the report to run as often as needed.
   For example, you might schedule the Login/Logout report to run daily at midnight.
2. The full report is saved to your Amazon S3 bucket.
3. Go to your Amazon S3 bucket and download the report.

To learn how scheduled reports work, see Schedule a historical metrics report (p. 745).

Show agent queues in a Queues table

By default agent queues don't appear in a Queues table in a historical metrics report. You can choose to show them.

To show agent queues in a Queues table

1. In a historical metrics report, choose the Settings icon.

2. Choose Filters, Show agent queues, Agent queues, and then use the drop-down to choose the agent's queues you want to include in the table.
3. Choose **Apply**. The agent queues you selected appear in the Queues table in the historical metrics report.

## How many contacts in queue on a specific date

The historical metrics reports don't provide a way for you to determine how many contacts were in queue on a specific date, at a specific time.

To get this information in a historical report, you need the help of a developer. The developer uses the `GetCurrentMetricData` API to store the data so you can look it up later.

## About the agent activity audit report

The agent activity audit is like a report version of the agent event stream (p. 754). All of the data in this report is also in the agent event stream.

For example, if there’s something in the audit report you want to recreate, or if you want to recreate a different time period, you can do so using the agent event stream.

Following are the items that may appear on the agent activity audit report and what each one means:

- **Available**: The agent has set their status in the Contact Control Panel (CCP) to Available. Contacts can be routed to them.
- **Offline**: The agent has set their status in the Contact Control Panel (CCP) to Offline. Contacts cannot be routed to them.
- **[Customer status]**: The agent has set their status in the Contact Control Panel (CCP) to a custom status. Contacts cannot be routed to them.
- **Joining Customer**: The state between an inbound contact arriving in the contact flow and routing to the agent.
- **Connecting Agent**: The state between an inbound contact being routed to an agent and the agent receiving the contact.
- **Connected**: When an inbound contact has been established by the agent choosing Accept in their CCP.
- **Agent Disconnected**: When the agent doesn't choose Accept on the inbound contact in 20 seconds, or they choose Reject.
- **Calling Customer**: The state before an outbound call is established.
- **Telecom issue**: When an outbound call is ended before the call is established. For example, there was an error with the agent's soft phone connection.

## Login/Logout reports

The Login/Logout report displays the login and logout information for the users in your contact center (for example, agents, managers, and administrators). For each user session, the login and logout times are displayed as a row in the report. You can use the report to determine the time users were logged in to Amazon Connect. The report also displays the amount of time for each session that user was logged in to Amazon Connect.

**Important**

By default, when an agent closes their CCP window, they are not logged out. Unless you have customized your CCP for automatic logout (p. 223), agents must choose the Logout button. Until they choose the Logout button, the Login/Logout report shows them as logged in.
Login/Logout report limit: 10,000 rows

- If you try to generate a Login/Logout report that has more than 10,000 rows, it won't complete.
- The Login/Logout report page displays only 10,000.
- If you schedule a Login/Logout report that contains more than 10,000 rows, the report will fail. In addition, no report output will be saved to your S3 bucket, and you cannot view the report.
- If you have a contact center with a lot of users, and your reports fail to complete, you can specify a shorter time range to reduce the size of the report generated, or apply filters to the report, such as routing profile and agent hierarchy. You can then use other filters to capture all of the login/logout data for your instance.

Required permissions to access the Login/Logout report

Before you can generate a Login/Logout report, you need the following permissions assigned to your security profile: Login/Logout report - View.

By default, the Amazon Connect Admin security profile has these permissions.

For information about how add more permissions to an existing security profile, see Update security profiles (p. 616).

Generate a Login/Logout report

A Login/Logout report includes only login or logout actions by your users that occurred during the specified time range.

- If user logged in during the time range and did not log out, the report shows a login time but not a logout time.
- If the user logged in before the start of the time range, and then logged out during the time range, the report shows both the login and logout times even though the login occurred before the start of
the time range. This is so you can view the duration of the user session associated with the most recent logout.

**To generate a Login/Logout report**

1. Open your Amazon Connect dashboard.
2. Choose **Metrics and Quality, Login/Logout report**.
3. On the **Login/Logout report** page, choose the **Time range** for the records to include in the report. Choose **Custom time range** to specify a range up to 7 days.

4. Choose the **Time zone** to use for your report.
5. To filter data included in the report, for **Filter by**, choose a value.
6. Choose **Generate report, Save**.
7. Provide a name for the report, and choose **Save**.

**Edit a Saved Login/Logout Report**

After you save your report, you can edit it at any time. When you open a saved report, the time frame and date range displayed show the date and time defined when you saved the report.

**To edit a saved Login/Logout report**

1. Open your Amazon Connect dashboard.
2. Choose **Metrics and quality, Saved reports**.
3. Choose **Login/Logout report** and select the report to edit.
4. Update the **Time range, Time zone**, and **Filter by** settings.
5. To overwrite your existing report, choose **Save**.
6. To save the changes as a new report, choose Save, Save as. Provide a name for the report and choose Save as.

Download a Login/Logout report as a CSV File

When you have generated a report, you can download it as a comma-separated value (CSV) file so that you can use it other applications to work with the data, such as a spreadsheet or database.

To download a report as a CSV file

1. Open the report to download.
2. On the Login/Logout report page, at the top right corner, choose the Share report menu (arrow) next to Save.
3. Choose Download CSV. The file Login_Logout report.csv is downloaded to your computer.

Share a Login/Logout report

To make the report available to other people in your organization, you can share a report. People can access the report only if they have appropriate permissions in Amazon Connect.

To share a Login/Logout report

1. On the Login/Logout report page, at the top right corner, choose the Share report menu (arrow) next to Save.
2. Choose Share report.
3. To copy the URL to the report, choose Copy link address. You can send the URL to others in your organization by pasting the link into an email or other document.
4. To publish the report to your organization, for Publish report to organization, move the toggle to On.
5. Choose Save.

Schedule a Login/Logout report

To generate a report with the same settings on a regular basis, you can schedule the report to run daily or on specific days of the week. When you schedule a report, it is automatically published to your organization. Anyone with appropriate permissions can view the report. Users with all permissions for Login/Logout reports can also edit, schedule, or delete the report.

When you schedule your report, keep in mind that the report always runs at 12AM on the day you select, in the time zone that you choose. If you select Wednesday, the report runs at midnight Wednesday and does not include any data for Wednesday. Scheduled reports are saved as CSV files in your Amazon S3 bucket. The default time zone is UTC. To have your report run at 12AM in your local time, choose your time zone instead.

Tip
To email a scheduled report to a list of co-workers, you need to generate the email manually using your messaging system. Amazon Connect doesn't provide an option to email the scheduled report automatically.

To schedule a Login/Logout report

1. If you already have a saved report to schedule open, skip to step 4. Otherwise, in the dashboard, choose Metrics and quality, Saved reports.
Delete a Saved Login/Logout report

Too many reports in your report library? If you no longer want to use a saved report, you can delete it. When you delete a report, you are only deleting the settings for the report, not any reports that have already been generated using those settings. No CSV files created from a scheduled report are removed from your S3 bucket.

To delete a saved Login/Logout report

1. Open your Amazon Connect dashboard.
2. Choose Metrics and quality, Saved reports.
3. Hover over the row for the report to delete, and choose the Delete icon.
4. Choose Delete again.

Amazon Connect agent event streams

Amazon Connect agent event streams are Amazon Kinesis data streams that provide you with near real-time reporting of agent activity within your Amazon Connect instance. The events published to the stream include these CCP events:

- Agent login
- Agent logout
- Agent connects with a contact
- Agent status change, such as to Available to handle contacts, or on Break or at Training.
You can use the agent event streams to create dashboards that display agent information and events, integrate streams into workforce management (WFM) solutions, and configure alerting tools to trigger custom notifications of specific agent activity. Agent event streams help you manage agent staffing and efficiency.

Contents
- Enable agent event streams (p. 755)
- Sample agent event stream (p. 755)
- Determine how long an agent spends doing ACW (p. 758)
- Agent event streams data model (p. 762)

Enable agent event streams

Agent event streams are not enabled by default. Before you can enable agent event streams in Amazon Connect, create a data stream in Amazon Kinesis Data Streams. Then, choose the Kinesis stream as the stream to use for agent event streams. Though you can use the same stream for both agent event streams and contact trace records, managing and getting data from the stream is much easier when you use a separate stream for each. For more information, see the Amazon Kinesis Data Streams Developer Guide.

When data is sent to Kinesis, the partition key used is the agent ARN. All events for a single agent are sent to the same shard, and any resharding events in the stream are ignored.

Note
If you enable server-side encryption for the Kinesis stream you select for agent event streams, Amazon Connect cannot publish to the stream. This is because it does not have permission to Kinesis kms:GenerateDataKey. To work around this, first enable encryption for scheduled reports or recordings of conversations. Next, create an AWS KMS key using KMS for encryption. Finally, choose the same KMS key for your Kinesis data stream that you use for encryption of scheduled reports or recordings of conversations so that Amazon Connect has appropriate permissions to encrypt data sent to Kinesis. For more information about creating a KMS key, see Creating Keys.

To enable agent event streams

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the console, choose the name in the Instance Alias column of the instance for which to enable agent event streams.
3. Choose Data streaming, then select Enable data streaming.
4. Under Agent Events, select the Kinesis stream to use, and then choose Save.

Sample agent event stream

In the following sample agent event stream, the agent is assigned to a routing profile that requires them to take both chats and calls. They can take one call, and up to three chats at a time.

Note
For how many chats and tasks an agent can take concurrently, see Amazon Connect service quotas (p. 926).

```json
{
  "AWSAccountId": "012345678901",
  "CurrentAgentSnapshot":
```
Sample agent event stream

```json
{
  "AgentStatus": {
    "ARN": "example-ARN",  //The ARN for the agent's current agent status (not for the agent).
    "Name": "Available",  //This shows the agent status in the CCP is set to Available.
    "StartTimestamp": "2019-08-13T20:52:30.704Z"
  },
  "NextAgentStatus": {
    "Name": "Lunch",  //They set their next status, which pauses new contacts being routed to them while they finish their current contacts.
    "ARN": "example-ARN2",  //The ARN of the agent status that the agent has set as their next status.
    "EnqueueTimestamp": "2019-08-13T20:58:00.004Z",  //When the agent set their next status and paused routing of incoming contacts.
  }
},
"Configuration": {
  "AgentHierarchyGroups": null,
  "FirstName": "AgentEventStreamTest",
  "LastName": "Agent",
  "RoutingProfile": {
    "Concurrency": [
      {
        "AvailableSlots": 3,  //This shows the agent has 3 slots available.
        "Channel": "CHAT",
        "MaximumSlots": 3  //The agent's routing profile allows them to take up to 3 chats.
      },
      {
        "AvailableSlots": 1,  //The agent has 1 slot available to take a call.
        "Channel": "VOICE",
        "MaximumSlots": 1  //The agent's routing profile allows them to take 1 call at a time.
      }
    ],
    "DefaultOutboundQueue": {
      "Channels": [
        "VOICE"  //This outbound queue only works for calls.
      ],
      "Name": "OutboundQueue"
    },
    "InboundQueues": [
      {
        "Channels": [
          "VOICE",
          "CHAT"
        ],
        "Name": null  //This queue has a name of "null" because it's an agent queue,
        //and agent queues don't have names.
      },
      {
        "Channels": [
          "CHAT",
          "VOICE"
        ],
        "Name": "OutboundQueue"
      }
    ]
  }
}
```
Sample agent event stream

```json
{
  "Name": "Omni-channel-queue" //This inbound queue takes both chats and calls.
}
{
  "Name": "AgentEventStreamProfile"
},
{
  "Username": "aestest"
}
{
  "EventId": "EventId-1",
  "EventTimestamp": "2019-08-13T20:58:44.031Z",
  "EventType": "HEART_BEAT",
  "PreviousAgentSnapshot": {
    "AgentStatus": {
      "Name": "Offline",
      "StartTimestamp": "2019-08-13T20:52:30.704Z"
    },
    "Configuration": {
      "AgentHierarchyGroups": null,
      "FirstName": "AgentEventStreamTest",
      "LastName": "Agent",
      "RoutingProfile": {
        "Concurrency": [
          {
            "AvailableSlots": 3,
            "Channel": "CHAT",
            "MaximumSlots": 3
          },
          {
            "AvailableSlots": 1,
            "Channel": "VOICE",
            "MaximumSlots": 1
          }
        ],
        "DefaultOutboundQueue": {
          "Channels": [
            "VOICE"
          ],
          "Name": "OutboundQueue"
        },
        "InboundQueues": [
          {
            "Channels": [
              "VOICE",
              "CHAT"
            ],
            "Name": null
          },
          {
            "Channels": [
              "CHAT",
              "VOICE"
            ]
          }
        ]
      }
    }
  }
}
```

757
Determine how long an agent spends doing ACW

There's no event in the agent event stream that tells you how long a contact is in the ACW state, and by extension how long an agent spends doing ACW. However, there's other data in the agent event stream that you can use to figure this out.

First, identify when the contact entered ACW. Here's how to do that:

1. Identify when the conversation between the contact and agent ENDED.
2. View the `StateStartTimeStamp` for the event.

For example, in the following agent event stream output, the contact enters ACW state at `"StateStartTimeStamp": "2019-05-25T18:55:27.017Z"`.

**Tip**
In the agent event stream, events are listed in reverse chronological order. We recommend reading through following examples by starting at the bottom of each example.
Determine how long an agent spends doing ACW

```json
{
  "ARN": "arn:aws:connect:us-east-1:012345678901:instance/aaaaaaaa-bbbb-cccc-dddd-111111111111/queue/queue-ARN-for-PrimaryQueue",
  "Name": "PrimaryQueue"
},

"Name": "Basic Routing Profile"
},

"Username": "(Removed)"
},

"Contacts": [
{
  "Channel": "VOICE",
  "ContactId": "ContactId-1", //This is the same contact the agent was working on when their state was CONNECTED (below).
  Since it's still the same contact but they aren't connected, we know the contact is now in ACW state.
  "InitialContactId": null,
  "InitiationMethod": "OUTBOUND", //This indicates how the contact was initiated. OUTBOUND means the agent initiated contact with the customer.
  INBOUND means the customer initiated contact with your center.
  "Queue": {
    "Name": "BasicQueue"
  },
  "QueueTimestamp": null,
  "State": "ENDED", //This shows the conversation has ended.
  "StateStartTimestamp": "2019-05-25T18:55:27.017Z" //This is the timestamp for the ENDED event (above),
  which is when the contact entered ACW state.
}
},

"EventId": "EventId-1",
"EventType": "STATE_CHANGE", //This shows that the state of the contact has changed; above we can see the conversation ENDED.
"PreviousAgentSnapshot": {
  "AgentStatus": {
    "Name": "Available", //This just refers to the status that the agent sets manually in the CCP.
    It means they were ready to handle contacts, not say, on Break.
  },
  "Configuration": {
    "AgentHierarchyGroups": null,
    "FirstName": "(Removed)",
    "LastName": "(Removed)",
    "RoutingProfile": {
      "DefaultOutboundQueue": {
        "Name": "BasicQueue"
      },
      "InboundQueues": [
        {
```
Next, determine when a contact left ACW. Here’s how to do that:

1. Find where the CurrentAgentSnapshot has no contacts, and the state for the contact listed in the PreviousAgentSnapshot equals ENDED.

   Because a STATE_CHANGE event also occurs when the agent’s configuration is changed, such as when they are assigned a different routing profile, this step confirms you have the right event.

2. Find where the EventType = "STATE_CHANGE".

3. View the EventTimeStart for it.

For example, in the following agent event stream file, the contact left ACW at "EventTimestamp": "2019-05-25T18:55:52.022Z".

```json
{
  "AWSAccountId": "012345678901",
  "CurrentAgentSnapshot": {
    "AgentStatus": {
      "Name": "Available", //This just refers to the status that the agent sets manually in the CCP. It means they are ready to handle contacts, not say, on Break.
    }
  }
}
```
Determine how long an agent spends doing ACW

Since a contact isn’t listed here, it means ACW for ContactId-1 (below) is finished, and the agent is ready for a new contact to be routed to them.

Here’s the EventTimestamp for the STATE_CHANGE event. This is when the contact left ACW.

Here’s the STATE_CHANGE

This just refers to the status that the agent sets manually in the CCP.

It means they were at work, not say, on Break.
Finally, to calculate the amount of time the contact was in the ACW state, and thus how long the agent spent working on it:


In this example, the agent spent 5.005 seconds doing ACW for ContactId-1.

Agent event streams data model

Agent event streams are created in JavaScript Object Notation (JSON) format. For each event type, a JSON blob is sent to the Kinesis data stream. The following event types are included in agent event streams:

- LOGIN—An agent login to the contact center.
- LOGOUT—An agent logout from the contact center.
- STATE_CHANGE—One of the following changed:
  - The agent changed their status in the Contact Control Panel (CCP). For example, they changed it from Available to on Break.
  - The state of the conversation between the agent and contact changed. For example, they were connected and then on hold.
- One of the following settings changed in the agent's configuration:
  - Their routing profile
  - The queues in their routing profile
  - Auto-accept call
• Sip address
• Agent hierarchy group
• Language preference setting in the CCP
• HEART_BEAT—This event is published every 120 seconds if there are no other events published during that interval.

**Event Objects**
- AgentEvent (p. 763)
- AgentSnapshot (p. 764)
- Configuration (p. 765)
- Contact object (p. 765)
- HierarchyGroup object (p. 767)
- AgentHierarchyGroups object (p. 767)
- Queue object (p. 767)
- RoutingProfile object (p. 768)

**AgentEvent**
The `AgentEvent` object includes the following properties:

**AgentARN**
The Amazon Resource Name (ARN) for the agent account.

Type: ARN

**AWSAccountId**
The 12-digit AWS account ID for the AWS account associated with the Amazon Connect instance.

Type: String

**CurrentAgentSnapshot**
Contains agent configuration, such as username, first name, last name, routing profile, hierarchy groups, contacts, and agent status.

Type: `AgentSnapshot` object

**EventId**
Universally unique identifier (UUID) for the event.

Type: String

**EventTimestamp**
A time stamp for the event, in ISO 8601 standard format.

Type: String (`yyyy-mm-ddThh:mm:ssZ`)

**EventType**
The type of event.

Valid values: `STATE_CHANGE | HEART_BEAT | LOGIN | LOGOUT`

**InstanceARN**
Amazon Resource Name for the Amazon Connect instance in which the agent's user account is created.
Agent event streams data model

**PreviousAgentSnapshot**

Contains agent configuration, such as username, first name, last name, routing profile, hierarchy groups), contacts, and agent status. Not applicable to LOGIN or LOGOUT events.

Type: AgentSnapshot object

**Version**

The version of the agent event stream in date format, such as 2019-05-25.

Type: String

**AgentSnapshot**

The AgentSnapshot object includes the following properties:

**AgentStatus**

Agent status data, including:

- ARN—The ARN for the agent's current agent status (not for the agent).
- Name—This is the status of the agent that they manually set in the CCP (p. 789), or that the supervisor manually changes in the real-time metrics report (p. 726).

For example, their status might be Available, which means that they are ready for inbound contacts to be routed to them. Or it might be a custom status, such as Break or Training, which means that inbound contacts can't be routed to them BUT they can still make outbound calls.

- StartTimestamp—The timestamp in ISO 8601 standard format for the time at which the agent entered the status.

  Type: String (yyyy-mm-ddThh:mm:ssZ)

Type: AgentStatus object.

**NextAgentStatus**

If the agent set a next agent status, the data appears here.

- ARN—The ARN of the agent status that the agent has set as their next status.
- Name—This is the name of the agent status that the agent has set as their next status.
- EnqueueTimestamp—The timestamp in ISO 8601 standard format for the time at which the agent set their next status and paused routing of incoming contacts.

  Type: String (yyyy-mm-ddThh:mm:ssZ)

Type: NextAgentStatus object.

**Configuration**

Information about the agent, including:

- FirstName—The agent's first name.
- HierarchyGroups—The hierarchy group the agent is assigned to, if any.
- LastName—The agent's last name.
- RoutingProfile—The routing profile the agent is assigned to.
- Username—the agent's Amazon Connect user name.

Type: Configuration object
Contacts
The contacts
Type: ContactList object

Configuration
The Configuration object includes the following properties:

FirstName
The first name entered in the agent's Amazon Connect account.
Type: String
Length: 1-100

AgentHierarchyGroups
The hierarchy group, up to five levels of grouping, for the agent associated with the event.
Type: AgentHierarchyGroups object

LastName
The last name entered in the agent's Amazon Connect account.
Type: String
Length: 1-100

RoutingProfile
The routing profile assigned to the agent associated with the event.
Type: RoutingProfile object.

Username
The user name for the agent's Amazon Connect user account.
Type: String
Length: 1-100

Contact object
The Contact object includes the following properties:

ContactId
The identifier for the contact.
Type: String
Length: 1-256

InitialContactId
The original identifier of the contact that was transferred.
Type: String
Length: 1-256
Channel

The method of communication.

Valid values: VOICE, CHAT, TASKS

InitiationMethod

Indicates how the contact was initiated.

Valid values:
- **INBOUND**: The customer initiated voice (phone) contact with your contact center.
- **OUTBOUND**: An agent initiated voice (phone) contact with the customer, by using the CCP to call their number. This initiation method calls the StartOutboundVoiceContact API.
- **TRANSFER**: The customer was transferred by an agent to another agent or to a queue, using quick connects in the CCP. This results in a new CTR being created.
- **CALLBACK**: The customer was contacted as part of a callback flow.
  
  For more information about the InitiationMethod in this scenario, see About queued callbacks in metrics (p. 792).
- **API**: The contact was initiated with Amazon Connect by API. This could be an outbound contact you created and queued to an agent, using the StartOutboundVoiceContact API, or it could be a live chat that was initiated by the customer with your contact center, where you called the StartChatConnect API.
- **QUEUE_TRANSFER**: While the customer was in one queue (listening to Customer queue flow), they were transferred into another queue using a contact flow block.
- **DISCONNECT**: When a Set disconnect flow (p. 354) block is triggered, it specifies which contact flow to run after a disconnect event during a contact.

A disconnect event is when:
- A call, chat, or task is disconnected by an agent.
- A task is disconnected as a result of a flow action.
- A task expires. The task is automatically disconnected if it is not completed in 7 days.

If a new contact is created while running a disconnect flow, then the initiation method for that new contact is DISCONNECT.

State

The state of the contact.

Valid values: INCOMING | PENDING | CONNECTING | CONNECTED | CONNECTED_ONHOLD | MISSED | REJECTED | ERROR | ENDED

**Note**
The REJECTED state does not apply to voice contacts. Rejected voice contacts appear as MISSED.

StateStartTimestamp

The time at which the contact entered the current state.

Type: String (yyyy-mm-ddThh:mm:sssZ)

ConnectedToAgentTimestamp

The time at which the contact was connected to an agent.

Type: String (yyyy-mm-ddThh:mm:sssZ)

QueueTimestamp

The time at which the contact was put into a queue.
Type: String (yyyy-mm-ddThh:mm:ssZ)

Queue

The queue the contact was placed in.

Type: Queue object

HierarchyGroup object

The `HierarchyGroup` object includes the following properties:

ARN

The Amazon Resource Name (ARN) for the agent hierarchy.

Type: String

Name

The name of the hierarchy group.

Type: String

AgentHierarchyGroups object

The `AgentHierarchyGroups` object includes the following properties:

Level1

Includes details for Level1 of the hierarchy assigned to the agent.

Type: HierarchyGroup object

Level2

Includes details for Level2 of the hierarchy assigned to the agent.

Type: HierarchyGroup object

Level3

Includes details for Level3 of the hierarchy assigned to the agent.

Type: HierarchyGroup object

Level4

Includes details for Level4 of the hierarchy assigned to the agent.

Type: HierarchyGroup object

Level5

Includes details for Level5 of the hierarchy assigned to the agent.

Type: HierarchyGroup object

Queue object

The `Queue` object includes the following properties:

ARN

The Amazon Resource Name (ARN) for the queue.
Type: String

Name
   The name of the queue.
   Type: String

RoutingProfile object

The RoutingProfile object includes the following properties:

ARN
   The Amazon Resource Name (ARN) for the agent's routing profile.
   Type: String

Name
   The name of the routing profile.
   Type: String

InboundQueues
   The Queue objects associated with the agent's routing profile.
   Type: List of Queue object

DefaultOutboundQueue
   The default outbound queue for the agent's routing profile.
   Type: Queue object

Amazon Connect contact events

Amazon Connect allows you to subscribe to a near real-time stream of contact (voice calls, chat, and task) events (for example, call is queued) in your Amazon Connect contact center. These events include:

- INITIATED - A voice call, chat, or task is initiated or transferred.
- CONNECTED_TO_SYSTEM - The date and time the customer endpoint connected to Amazon Connect, in UTC time. For INBOUND, this matches InitiationTimestamp. For OUTBOUND, CALLBACK, and API, this is when the customer endpoint connected to Amazon Connect.

   **Note**
   
   CONNECTED_TO_SYSTEM event is generated for outbound calls (API only), Tasks, and Chats.

- QUEUED - A voice call, chat, or task is queued to be assigned to an agent.
- CONNECTED_TO_AGENT - A voice call, chat, or task is connected to an agent.
- DISCONNECTED - A voice call, chat, or task is disconnected.

   A disconnect event is when:
   - A call, chat, or task is disconnected by an agent.
   - A task is disconnected as a result of a flow action.
   - A task expires. The task is automatically disconnected if it is not completed in 7 days.

You can use contact events to create analytics dashboards to monitor and track contact activity, integrate into workforce management (WFM) solutions to better understand contact center
Subscribe to Amazon Connect contact events

Amazon Connect contact events are published using Amazon EventBridge, and can be enabled in a couple of steps for your Amazon Connect instance in the Amazon EventBridge console by creating a new rule. Although events are not ordered, they have a timestamp which enables you to consume the data.

Events are emitted on a best effort basis.

To subscribe to Amazon Connect contact events, go to Amazon EventBridge and create a new rule by selecting Amazon Connect as the service name, and Amazon Connect contact event as the event type. For more information about configuring rules, see Amazon EventBridge rules in the Amazon EventBridge User Guide.

The following image shows what this looks like in EventBridge:
You can then select a target of your choice which includes a Lambda function, SQS queue, or SNS topic. For information about configuring targets, Amazon EventBridge targets.

**Contact events data model**

Contact events are generated in JSON. For each event type, a JSON blob is sent to the target of your choice, as configured in the rule. The following contact events are available:

- **INITIATED** - A voice call, chat, or task is initiated or transferred.
- **QUEUED** - A voice call, chat, or task is queued to be assigned to an agent.
- **CONNECTED_TO_AGENT** - A voice call, chat, or task is connected to an agent.
- **CONNECTED_TO_SYSTEM** - This identifies that the contact has established media (either answered by a live human voice or answering machine). This event has one of the following status codes in the response schema to identify what the actual disposition was in case the contact was connected to Amazon Connect: **HUMAN_ANSWERED**, **SIT_TONE-DETECTED**, **FAX_MACHINE_DETECTED**, **VOICEMAIL_BEEP**, **VOICEMAIL_NO_BEEP**, **AMD_UNRESOLVED**, **AMD_ERROR**.
- **DISCONNECTED** - A voice call, chat, or task is disconnected. For outbound calls, the dial attempt is not successful, the attempt is connected but the call is not picked up, or the attempt results in a **SIT tone**.

A disconnect event is when:
- A call, chat, or task is disconnected by an agent.
- A task is disconnected as a result of a flow action.
- A task expires. The task is automatically disconnected if it is not completed in 7 days.

**Event Objects**

- **Contact event (p. 770)**
- **QueueInfo (p. 772)**
- **AgentInfo (p. 772)**

**Contact event**

The **Contact** object includes the following properties:

**EventType**

The type of event published.

Type: String

Valid values: INITIATED, QUEUED, CONNECTED_TO_AGENT, DISCONNECTED

**ContactId**

The identifier for the contact.

Type: String

Length: 1-256

**InitialContactId**

The original identifier of the contact that was transferred.

Type: String

Length: 1-256
**PreviousContactId**

The original identifier of the contact that was transferred.

Type: String
Length: 1-256

**InstanceARN**

Amazon Resource Name for the Amazon Connect instance in which the agent's user account is created.

Type: ARN

**Channel**

The type of channel.

Type: VOICE, CHAT, or TASK

**QueueInfo**

The queue the contact was placed in.

Type: QueueInfo object

**AgentInfo**

The agent the contact was assigned to.

Type: AgentInfo object

**InitiationMethod**

Indicates how the contact was initiated.

Valid values:

- INBOUND: The customer initiated voice (phone) contact with your contact center.
- OUTBOUND: An agent initiated voice (phone) contact with the customer, by using the CCP to call their number. This initiation method calls the StartOutboundVoiceContact API.
- TRANSFER: The contact was transferred by an agent to another agent or to a queue, using quick connects in the CCP. This results in a new CTR being created.
- CALLBACK: The customer was contacted as part of a callback flow. For more information about the InitiationMethod in this scenario, see About queued callbacks in metrics (p. 792).
- API: The contact was initiated with Amazon Connect by API. This could be an outbound contact you created and queued to an agent, using the StartOutboundVoiceContact API, or it could be a live chat that was initiated by the customer with your contact center, where you called the StartChatContact API, or it could be a tasks initiated by the customer by calling the StartTaskContact API.
- QUEUE_TRANSFER: While the contact is one queue, and was then transferred into another queue using a contact flow block.
- DISCONNECT: When a Set disconnect flow (p. 354) block is triggered, it specifies which contact flow to run after a disconnect event.

A disconnect event is when:

- A call, chat, or task is disconnected by an agent.
- A task is disconnected as a result of a flow action.
- A task expires. The task is automatically disconnected if it is not completed in 7 days.
When the disconnect event occurs, the corresponding content flow runs. If a new contact is created while running a disconnect flow, then the initiation method for that new contact is DISCONNECT.

**QueueInfo**

The `QueueInfo` object includes the following properties:

**ARN**

The Amazon Resource Name (ARN) for the queue.

Type: String

**QueueType**

The type of queue.

Type: String

**AgentInfo**

The `AgentInfo` object includes the following properties:

**AgentARN**

The Amazon Resource Name (ARN) for the agent account.

Type: ARN

**RoutingProfileArn**

The Amazon Resource Name (ARN) for the agent's routing profile.

Type: String

**Contact timestamps**

**InitiationTimestamp**

The date and time this contact was initiated, in UTC time.

Type: String (yyyy-MM-dd'T'HH:mm:ss.SSS'Z')

**ConnectedToSystemTimestamp**

The date and time the customer endpoint connected to Amazon Connect, in UTC time.

**EnqueueTimestamp**

The date and time the contact was added to the queue, in UTC time.

Type: String (yyyy-MM-dd'T'HH:mm:ss.SSS'Z')

**ConnectedToAgentTimestamp**

The date and time the contact was connected to the agent, in UTC time.

Type: String (yyyy-MM-dd'T'HH:mm:ss.SSS'Z')
**DisconnectTimestamp**

The date and time that the customer endpoint disconnected from Amazon Connect, in UTC time

Type: String (yyyyMMdd'T'HH:mm:ss.SSS'Z')

---

**Sample contact event for when a voice call is connected to an agent**

```json
{
    "version": "0",
    "id": "abcabcab-abca-abca-abca-abcabcabcabc",
    "detail-type": "Amazon Connect Contact Event",
    "source": "aws.connect",
    "account": "111122223333",
    "time": "2021-05-01T18:43:48Z", // this is the timestamp
    "region": "us-west-1",
    "resources": [ "arn:aws:..." contactArn and instanceArn
    ],
    "detail": {
        "eventType": "CONNECTED_TO_AGENT",
        "contactId": "11111111-1111-1111-1111-111111111111",
        "initialContactId": "11111111-2222-3333-4444-555555555555",
        "previousContactId": "11111111-2222-3333-4444-555555555555",
        "channel": "Voice",
        "initiationMethod": "INBOUND",
        "queueInfo": {
            "queueArn": "arn",
            "queueType": "type"
        },
        "AgentInfo": {
            "AgentArn": "arn",
            "RoutingProfileArn": ""
        }
    }
}
```

**Sample contact event for when a voice call is disconnected**

```json
{
    "version": "0",
    "id": "abcabcab-abca-abca-abca-abcabcabcabc",
    "detail-type": "Amazon Connect Contact Event",
    "source": "aws.connect",
    "account": "111122223333",
    "time": "2021-08-04T17:43:48Z", // this is the timestamp
    "region": "us-west-1",
    "resources": [ "arn:aws:..." contactArn and instanceArn
    ],
    "detail": {
        "eventType": "DISCONNECTED",
        "contactId": "11111111-1111-1111-1111-111111111111",
        "initialContactId": "11111111-2222-3333-4444-555555555555",
        "previousContactId": "11111111-2222-3333-4444-555555555555",
        "channel": "Voice",
```
Contact trace records (CTR) data model

This article describes the data model for Amazon Connect contact trace records (CTRs). CTRs capture the events associated with a contact in your contact center. Real-time and historical metrics are based on the data captured in the CTRs.

For the CTR retention period and maximum size of the CTR attributes section, see Feature specifications (p. 929).

For information about when a CTR is created (and thus can be exported or used for data reporting), see Events in the contact trace record (CTR) (p. 792).

Tip
Amazon Connect delivers CTRs at least once. CTRs may be delivered again for multiple reasons, such as new information arriving after initial delivery. For example, when you use update-contact-attributes to update a CTR, Amazon Connect delivers a new CTR. This CTR is available for 24 months from the time the associated contact was initiated.

If you're building a system that consumes CTR export streams, be sure to include logic that checks for duplicate CTRs for a contact. Use the LastUpdateTimeStamp property to determine if a copy contains new data than previous copies. Then use the ContactId property for deduplication.

Agent

Information about the agent who accepted the incoming contact.

AgentInteractionDuration

The time, in whole seconds, that an agent interacted with a customer.

Type: Integer
Min value: 0

AfterContactWorkDuration

The difference in time, in whole seconds, between AfterContactWorkStartTimestamp and AfterContactWorkEndTimestamp.

Type: Integer
Min value: 0
AfterContactWorkEndTimestamp
The date and time when the agent stopped doing After Contact Work for the contact, in UTC time.
Type: String (yyyy-mm-ddThh:mm:ssZ)

AfterContactWorkStartTimestamp
The date and time when the agent started doing After Contact Work for the contact, in UTC time.
Type: String (yyyy-mm-ddThh:mm:ssZ)

ARN
The Amazon Resource Name of the agent.
Type: ARN

ConnectedToAgentTimestamp
The date and time the contact was connected to the agent, in UTC time.
Type: String (yyyy-mm-ddThh:mm:ssZ)

CustomerHoldDuration
The time, in whole seconds, that the customer spent on hold while connected to the agent.
Type: Integer
Min value: 0

HierarchyGroups
The agent hierarchy groups for the agent.
Type: AgentHierarchyGroups (p. 776)

LongestHoldDuration
The longest time, in whole seconds, that the customer was put on hold by the agent.
Type: Integer
Min value: 0

NumberOfHolds
The number of times the customer was put on hold while connected to the agent.
Type: Integer
Min value: 0

RoutingProfile
The routing profile of the agent.
Type: RoutingProfile (p. 783)

Username
The username of the agent.
Type: String
Length: 1-100
AgentHierarchyGroup

Information about an agent hierarchy group.

**ARN**

The Amazon Resource Name (ARN) of the group.

Type: ARN

**GroupName**

The name of the hierarchy group.

Type: String
Length: 1-256

AgentHierarchyGroups

Information about the agent hierarchy. Hierarchies can be configured with up to five levels.

**Level1**

The group at level one of the agent hierarchy.

Type: AgentHierarchyGroup (p. 776)

**Level2**

The group at level two of the agent hierarchy.

Type: AgentHierarchyGroup (p. 776)

**Level3**

The group at level three of the agent hierarchy.

Type: AgentHierarchyGroup (p. 776)

**Level4**

The group at level four of the agent hierarchy.

Type: AgentHierarchyGroup (p. 776)

**Level5**

The group at level five of the agent hierarchy.

Type: AgentHierarchyGroup (p. 776)

ContactDetails

Contains user-defined attributes which are lightly typed within the contact.

**ContactDetailsName**

Type: String
Length: 1-128
ContactDetailsValue
Type: String
Length: 0-1024

ReferenceAttributeName
Type: String
Length: 1-128

ReferenceAttributesValue
Type: String
Length: 0-1024

ContactTraceRecord
Information about a contact.

Agent
If this contact successfully connected to an agent, this is information about the agent.
Type: Agent (p. 774)

AgentConnectionAttempts
The number of times Amazon Connect attempted to connect this contact with an agent.
Type: Integer
Min value: 0

Attributes
The contact attributes, formatted as a map of keys and values.
Type: Attributes

Members: AttributeName, AttributeValue

AWSAccountId
The ID of the AWS account that owns the contact.
Type: String

AWSContactTraceRecordFormatVersion
The record format version.
Type: String

Channel
How the contact reached your contact center.
Valid values: Voice, Chat, Tasks

ConnectedToSystemTimestamp
The date and time the customer endpoint connected to Amazon Connect, in UTC time. For INBOUND, this matches InitiationTimestamp. For OUTBOUND, CALLBACK, and API, this is when the customer endpoint answers.
ContactTraceRecord

Type: String (yyyy-mm-ddThh:mm:ssZ)

**ContactId**

The ID of the contact.

Type: String

Length: 1-256

**CustomerEndpoint**

The customer endpoint.

Type: Endpoint (p. 780)

**DisconnectTimestamp**

The date and time that the customer endpoint disconnected from Amazon Connect, in UTC time.

Type: String (yyyy-mm-ddThh:mm:ssZ)

**DisconnectReason**

Indicates how the contact was terminated. This data is currently available in the Amazon Connect CTR stream only.

The disconnect reason may not be accurate when there are agent or customer connectivity issues. For example, if the agent is having connectivity issues, the customer might not be able to hear them ("Are you there?") and hang up. This would be recorded as CUSTOMER_DISCONNECT and not reflect the connectivity issue.

Type: String

Voice contacts can have the following disconnect reasons:

- **CUSTOMER_DISCONNECT**: Customer disconnected first.
- **AGENT_DISCONNECT**: Agent disconnected when the contact was still on the call.
- **THIRD_PARTY_DISCONNECT**: In a third-party call, after the agent has left, the third-party disconnected the call while the contact was still on the call.
- **TELECOM_PROBLEM**: Disconnected due to an issue with connecting the call from the carrier, network congestion, network error, etc.
- **CONTACT_FLOW_DISCONNECT**: Call was disconnected in a flow.
- **OTHER**: This includes any reason not explicitly covered by the previous codes. For example, the contact was disconnected by an API.

Tasks can have the following disconnect reasons:

- **AGENT_DISCONNECT**: Agent marked the task as complete.
- **EXPIRED**: Task expired automatically because it was not assigned or completed within 7 days.
- **CONTACT_FLOW_DISCONNECT**: Task was disconnected or completed by a flow.
- **API**: The StopContact API was called to end the task.
- **OTHER**: This includes any reason not explicitly covered by the previous codes.

**InitialContactId**

If this contact is related to other contacts, this is the ID of the initial contact.

Type: String

Length: 1-256

**InitiationMethod**

Indicates how the contact was initiated.
Valid values:

- **INBOUND**: The customer initiated voice (phone) contact with your contact center.
- **OUTBOUND**: An agent initiated voice (phone) contact with the customer, by using the CCP to call their number. This initiation method calls the `StartOutboundVoiceContact` API.
- **TRANSFER**: The customer was transferred by an agent to another agent or to a queue, using quick connects in the CCP. This results in a new CTR being created.
- **CALLBACK**: The customer was contacted as part of a callback flow.

For more information about the `InitiationMethod` in this scenario, see About queued callbacks in metrics (p. 792).

- **API**: The contact was initiated with Amazon Connect by API. This could be an outbound contact you created and queued to an agent, using the `StartOutboundVoiceContact` API, or it could be a live chat that was initiated by the customer with your contact center, where you called the `StartChatConnect` API.
- **QUEUE_TRANSFER**: While the customer was in one queue (listening to Customer queue flow), they were transferred into another queue using a contact flow block.
- **DISCONNECT**: When a `Set disconnect flow` block is triggered, it specifies which contact flow to run after a disconnect event during a contact.

A disconnect event is when:

- A call, chat, or task is disconnected by an agent.
- A task is disconnected as a result of a flow action.
- A task expires. The task is automatically disconnected if it is not completed in 7 days.

If a new contact is created while running a disconnect flow, then the initiation method for that new contact is DISCONNECT.

**InitiationTimestamp**

The date and time this contact was initiated, in UTC time. For INBOUND, this is when the contact arrived. For OUTBOUND, this is when the agent began dialing. For CALLBACK, this is when the callback contact was created. For TRANSFER and QUEUE_TRANSFER, this is when the transfer was initiated. For API, this is when the request arrived.

Type: String (`yyyy-mm-ddThh:mm:ssZ`)

**InstanceARN**

The Amazon Resource Name of the Amazon Connect instance.

Type: ARN

**LastUpdateTimestamp**

The date and time this contact was last updated, in UTC time.

Type: String (`yyyy-mm-ddThh:mm:ssZ`)

**MediaStreams**

The media streams.

Type: Array of `MediaStream` (p. 781)

**NextContactId**

If this contact is not the last contact, this is the ID of the next contact.

Type: String

Length: 1-256
PreviousContactId

If this contact is not the first contact, this is the ID of the previous contact.

Type: String
Length: 1-256

Queue

If this contact was queued, this is information about the queue.

Type: QueueInfo (p. 781)

Recording

If recording was enabled, this is information about the recording.

Type: RecordingInfo (p. 781)

Recordings

If recording was enabled, this is information about the recording.

Type: Array of RecordingsInfo (p. 782)

Note
The first recording for a contact will appear in both the Recording and Recordings sections of the CTR.

SystemEndpoint

The system endpoint. For INBOUND, this is the phone number that the customer dialed. For OUTBOUND, this is the caller ID phone number that Amazon Connect used to dial the customer.

Type: Endpoint (p. 780)

TransferCompletedTimestamp

If this contact was transferred out of Amazon Connect, the date and time the transfer endpoint was connected, in UTC time.

Type: String (yyyy-mm-ddThh:mm:ssZ)

TransferredToEndpoint

If this contact was transferred out of Amazon Connect, the transfer endpoint.

Type: Endpoint (p. 780)

Endpoint

Information about an endpoint. In Amazon Connect, an endpoint is the destination for a contact, such as a customer phone number, or a phone number for your contact center.

Address

The value for the type of endpoint. For TELEPHONE_NUMBER, the value is a phone number in E.164 format.

Type: String
Length: 1-256

Type

The endpoint type. Currently, an endpoint can only be a telephone number.
Valid values: TELEPHONE_NUMBER

### MediaStream

Information about the media stream used during the contact.

**Type**

Type: MediaStreamType

Valid value: AUDIO, VIDEO, CHAT

### QueueInfo

Information about a queue.

**ARN**

The Amazon Resource Name of the queue.

Type: ARN

**DequeueTimestamp**

The date and time the contact was removed from the queue, in UTC time. Either the customer disconnected or the contact was connected to an agent.

Type: String (yyyy-mm-ddThh:mm:ssZ)

**Duration**

The difference in time, in whole seconds, between EnqueueTimestamp and DequeueTimestamp.

Type: Integer

Min value: 0

**EnqueueTimestamp**

The date and time the contact was added to the queue, in UTC time.

Type: String (yyyy-mm-ddThh:mm:ssZ)

**Name**

The name of the queue.

Type: String

Length: 1-256

### RecordingInfo

Information about a voice recording.

**DeletionReason**

If the recording was deleted, this is the reason entered for the deletion.

Type: String
Location
The location, in Amazon S3, for the recording.
Type: String
Length: 0-256

Status
The recording status.
Valid values: AVAILABLE | DELETED | NULL

Type
The recording type.
Valid values: AUDIO

RecordingsInfo
Information about a voice recording or chat transcript.

DeletionReason
If the recording/transcript was deleted, this is the reason entered for the deletion.
Type: String

FragmentStartNumber
The number that identifies the Kinesis Video Streams fragment where the customer audio stream started.
Type: String

FragmentStopNumber
The number that identifies the Kinesis Video Streams fragment where the customer audio stream stopped.
Type: String

Location
The location, in Amazon S3, for the recording/transcript.
Type: String
Length: 0-256

MediaStreamType
Information about the media stream used during the conversation.
Type: String
Valid values: AUDIO, VIDEO, CHAT

ParticipantType
Information about the conversation participant: whether they are an agent or contact.
Type: String

StartTimestamp
When the conversation started.
Type: String \( yyyy-mm-ddThh:mm:ssZ \)

**Status**

The status of the recording/transcript.

Valid values: AVAILABLE |Deleted| NULL

**StopTimestamp**

When the conversation stopped.

Type: String \( yyyy-mm-ddThh:mm:ssZ \)

**StorageType**

Where the recording/transcript is stored.

Type: String

Valid values: Amazon S3

---

**References**

Contains links to other documents that are related to a contact.

**Reference Info**

- ReferenceType
- ContentType
- Location

**RoutingProfile**

Information about a routing profile.

**ARN**

The Amazon Resource Name of the routing profile.

Type: ARN

**Name**

The name of the routing profile.

Type: String

Length: 1-100

---

**How to identify abandoned contacts**

An abandoned contact refers to a contact that was disconnected by the customer while in queue. This means that they weren't connected to an agent.

The CTR for an abandoned contact has a **Queue**, and an **Enqueue Timestamp** because it was enqueued. It won't have a **ConnectedToAgentTimestamp**, or any of the other fields that populate only after the contact has been connected to an agent.
Search for contacts

You can search for contacts as far back as two years ago.

The search results for a given query are limited to the first 10K results returned.

When you filter by Contact ID, only results for that specific contact will be returned and other criteria are ignored. For example, say you search for Contact ID 12345 and agent login Jane Doe. Results for Contact ID 12345 will be returned regardless of whether Jane Doe was the agent.

What's new in contact search

Thanks to your feedback, we've made the following changes to contact search.

To use the **Agent** filter on the **Contact search** page, in your Amazon Connect security profile you must have **Users - View** permissions, as shown in the following image:

![Users and permissions](image)

When you have **Users - View** permissions, on the **Contact search** page the **Agent** filter appears, as shown in the following image:

![Contact search page](image)
Without User - View permissions, the Agent filter is not visible, and searching contacts by Agent login is not supported, as shown in the following image:

Key search features

- Search a time range up to 8 weeks.
- Multi-select for filters such as agent names, contact queues, contact flows, and more.

This feature is available only for searches with a date range that starts November 2, 2020, or later, when the feature was released. If you search for contacts that occurred before November 2, 2020, you will be prompted to ensure only one value is selected for each filter mentioned above.

- Filters for Contact Lens for Amazon Connect (p. 630). You can search for Contact categories (p. 669) by specifying the full category name.

In the Add filter drop-down box, the Contact Lens filters have CL next to them. You can apply these filters only if your organization has enabled Contact Lens.
If you want to remove the Contact Lens filters from a user's drop-down list, remove the following permissions from their security profile:

- **Search contacts by conversation**: This controls access to the sentiment scores, non-talk time, and category searches.
- **Search contacts by keywords**: This controls access to the keywords search.
- **Contact Lens - speech analytics**: On the Contact Trace Record page, this displays graphs that summarize speech analytics.

### Manage who can search for contacts and access detailed information

Before users can search for contacts in Amazon Connect, or access detailed contact information, they need to be assigned to the **CallCenterManager** security profile, or have the following permissions:
### Required permissions

- **Access metrics - Access** *(Required):* Grants access to metrics data.

- **Contact search - View** *(Required):* Grants access to the **Contact search** page, and the ability to search for contacts.

- **Restrict contact access** *(Optional):* Manage a user’s access to results on the **Contact search** page based on their agent hierarchy group.

  For example, agents who are assigned to AgentGroup-1 can only view contact trace records (CTRs) for contacts handled by agents in that hierarchy group, and any groups below them. (If they have permissions for **Recorded conversations**, they can also listen to call recordings and view transcripts.) Agents assigned to AgentGroup-2 can only access CTRs for contacts handled by their group, and any groups below them.

  Managers and others who are in higher level groups can view CTRs for contacts handled by all the groups below them, such as AgentGroup-1 and 2.

  For this permission, **All = View** since **View** is the only action granted.

  For more information about hierarchy groups, see [Set up agent hierarchies](p. 219).

  **Note**
  
  When you change a user’s hierarchy group, it may take a couple of minutes for their contact search results to reflect their new permissions.

- **Contact Lens - speech analytics**: On the Contact Trace Record page for a contact, you can view graphs that summarize speech analytics: customer sentiment trend, sentiment, and non-talk time.

- **Recorded conversations (redacted)**: If your organization uses Contact Lens for Amazon Connect, you can assign this permission so agents access only those call recordings and transcripts in which sensitive data has been removed.

- **Recorded conversations (unredacted)**: If your organization isn’t using Contact Lens, agents need **Recorded conversations (unredacted)** to listen to call recordings or view transcripts. If desired, you can use **Restrict contact access** to ensure they only have access to detailed information for those contacts handled by their hierarchy group.
By default, the Amazon Connect Admin and CallCenterManager security profiles have these permissions.

For information about how add more permissions to an existing security profile, see Update security profiles (p. 616).

### How to search for a contact

1. Log in to Amazon Connect with a user account that has permissions to access contact records (p. 786).
2. In Amazon Connect choose Metrics and quality, Contact search.
3. Use the filters on the page to narrow your search. For date, you can search up to 8 weeks at a time.

**Tip**
To see if a conversation was recorded, you need to be assigned to a profile that has Manager monitor permissions. If a conversation was recorded, by default the search result will indicate so with an icon in the Recording column. You won't see this icon if you don't have permission to review the recordings.

### Additional fields: Add columns to your search results

Use the options under Additional fields to add columns in your search results. These options are not used to filter your search.

For example, if you want to include columns for Agent Name and Routing profile in your search output, choose those columns here.

**Tip**
The Is transferred out option indicates whether the contact was transferred to an external number. For the the date and time (in UTC time) when the transfer was connected, see TransferCompletedTimestamp in the ContactTraceRecord (p. 777).

### Download search results

You can download up to 3,000 search results at a time.

### View a CTR in the UI

1. Do a contact search (p. 784). A list of contact IDs will be returned.
2. Choose an ID to view the CTR for the contact.

The following image shows part of a CTR in the UI, for a chat conversation. Note the following:

- For chats, the initiation method is always API.
- The chat transcript is visible in the UI.
About agent status

Agents have a status. It's manually set in the Contact Control Panel (CCP).

- When they're ready to handle contacts, they set their status in the CCP to Available. This means inbound contacts can be routed to them.
- When agents want to stop taking inbound contacts, they set their status to a custom status that you create, such as Break or Training. They can also change their status to Offline.

**Tip**
Supervisors can manually change the agent's status in the real-time metrics report (p. 726).

The following diagram illustrates how the agent's status in the CCP stays constant while they are handling contacts, but in the real-time metrics report, the Agent activity state and the Contact state change.
For example, when the Agent activity state = Incoming, the Contact state = Incoming contact.

About custom agent statuses

It's possible for agents to make outbound calls when their status in the CCP is set to a custom status. Technically, agents can make an outbound call when their CCP is set to Offline.

For example, an agent wants to make an outbound call to a contact. Because they don't want contacts to be routed to them during this time, they set their status to a custom status. So when you look at your real-time metrics report, you'll see the agent is simultaneously on NPT (the metric that indicates a custom status) and On contact, for example.

About ACW (After contact work)

After a conversation between an agent and customer ends, the contact is moved into the ACW state.

When the agent finishes doing ACW for the contact, they click Clear to clear that slot so another contact can be routed to them.

To identify how long an agent spent on ACW for a contact:

- In the historical metrics report, After contact work time captures the amount of time each contact spent in ACW.
- In the agent event stream, you have to do some calculations. For more information, see Determine how long an agent spends doing ACW (p. 758).

How do you know when an agent can handle another contact?

The Availability metric tells you when agents are finished with a contact and ready to have another one routed to them.

What appears in the real-time metrics report?

To find out what the agent status is in the real-time metrics report, look at the Agent Activity metric.

What appears in the agent event stream?

In the agent event stream you'll see the AgentStatus, for example:

```json
{
  "AWSAccountId": "012345678901",
  "AgentStatus": "Available",
  "ContactState": "Incoming",
  "AgentActivityState": "Incoming",
  "MissedContact": false,
  "ACW": false,
  "OutletCallback": false,
  "IncomingCallback": false
}
```
About contact states

Contact states appear in two places: the real-time metrics reports and the agent event stream.

Contact states in the agent event stream

There are different events that can appear in the lifecycle of a contact. Each of these events appear in the agent event stream as a State. A contact can have the following states that appear in the agent event stream:

- **INCOMING** - This is specific to queued callbacks. The agent is presented with a callback.
- **PENDING** - This is specific to queued callbacks.
- **CONNECTING** - An inbound contact is being offered to the agent (it's ringing). The agent has not yet taken any action to accept or reject the contact, and they haven't missed it.
- **CONNECTED** - The agent has accepted the contact. Now the customer is in a conversation with the agent.
- **CONNECTED_ONHOLD** - They are in a conversation with the agent, and the agent has put the customer on hold.
- **MISSED** - The contact was missed by the agent.
- **ERROR** - This appears when, for example, the customer abandons the call during outbound whisper.
- **ENDED** - The conversation has ended, and the agent has started doing ACW for that contact.
- **REJECTED** - The contact was rejected by the agent. This applies to chat and tasks.

Here’s what the contact state looks like in the agent event stream:

```
"Contacts": [ 
    { 
        "Channel": "VOICE",  //This shows the agent and contact were talking on the phone. 
        "ContactId": "ContactId-1",  //This shows the agent was working with a contact identified as "ContactId-1".
        "InitialContactId": null,
        "InitiationMethod": "OUTBOUND",  //This shows the agent reached the customer by making an outbound call.
        "Queue": { 
        },
        "QueueTimestamp": null,
    },
]```
Events in the contact trace record (CTR)

A contact trace record (CTR) captures events associated with the contact in your contact center. For example, how long the contact lasted, when it started and stopped. For a list of all data that's captured in the CTR, see Contact trace records (CTR) data model (p. 774).

A CTR is opened for a customer when they are connected to your contact center. The CTR is completed when the interaction with the contact flow or agent ends (that is, the agent has completed the ACW and cleared the contact). This means it's possible for a customer to have multiple CTRs.

The following diagram shows when a CTR is created for a contact.

Each time a contact is connected to an agent, a new CTR is created. The CTRs for a contact are linked together through the contactId fields: original, next, and previous.

About queued callbacks in metrics

This topic explains how queued callbacks appear in your real-time metrics reports and the contact trace record (CTR).

Tip
To see only the number of customers who are waiting for a call back, you need to create a queue that only takes callback contacts. To learn how to do this, see Set up routing (p. 208). Currently there isn't a way to see the phone numbers of the contacts waiting for callbacks.

1. Callbacks are initiated when the Transfer to queue (p. 387) block transfers the initial contact to a callback queue.
2. The callback is then placed in the queue. It remains there until an agent is available and can be offered the contact.

3. When the callback is connected to the agent, a new CTR is created for the contact.

4. The **Initiation Timestamp** in the callback CTR corresponds to when the Transfer to queue (p. 387) block transferred the contact to a callback queue, shown in step 1.
How properties in the Transfer to Queue block affect this flow

The Transfer to queue (p. 387) block has the following properties, which affect how Amazon Connect handles the callback:

- **Initial delay**: This property affects when a callback is put in queue. Specify how much time has to pass between a callback contact being initiated in the contact flow, and the customer being put in queue for the next available agent. For more information, see How Initial delay affects Scheduled and In queue metrics (p. 794).

- **Maximum number of retries**: If this is set to 2, then Amazon Connect tries to call the customer at most three times: the initial callback, and two retries.

- **Minimum time between attempts**: If the customer doesn't answer the phone, this is how long to wait before trying again.

How Initial delay affects Scheduled and In queue metrics

In the Transfer to queue (p. 387) block, the Initial delay property affects when a callback is put in queue. For example, assume Initial delay is set to 30 seconds. Here's what appears in your real-time metrics report:

1. After 20 seconds, the callback has already been created, but it is not yet in queue because of the Initial delay setting.
2. After 35 seconds, the callback contact has been placed in queue.

3. Assume that after 40 seconds, an agent accepts the callback.

What counts as a "Failed Callback Attempt"

If an agent doesn't accept an offered callback, it doesn't count as a failed callback attempt. Rather, the routing engine offers the callback to the next available agent, until an agent accepts.

A failed callback attempt would be along the lines of: an agent accepts a callback but then something goes wrong between then and the agent being joined to the customer.

The contact is considered to be in the callback queue until an agent accepts the offered callback contact.
Amazon Connect removes the callback from the queue when it's connected to the agent. At that time, Amazon Connect starts dialing the customer. The following image shows what this looks like in a CTR:

The enqueued time on the CTR for a particular callback leg corresponds to the amount of time that the contact was in queue before that particular callback attempt was made. This is not the total enqueued time across all CTRs.

For example, an inbound call could be in queue for 5 minutes before a callback is scheduled. Then, after an initial delay of 10 seconds, the callback contact could be in a callback queue for 10 seconds before an agent accepts it. In this case, you would see two CTRs:

1. The first CTR, with InitiationMethod=INBOUND, would have an enqueued time of 5 minutes.
2. The second CTR, with InitiationMethod=CALLBACK, would have an enqueued time of 10 seconds.

Example: Metrics for a queued callback

This topic shows an example queued callback flow and reviews how the CTRs and times are set for it.

Assume we have set up the following contact flows:

- **Inbound contact flow** -- Runs when the customer calls the customer service number.
- **Customer queue flow** – Runs when the customer is waiting in queue. In this example, we build a flow that offers a callback to the customer. If the customer selects yes, this contact flow executes the Transfer to queue block to transfer the contact to the callback queue named CallbackQueue, with an initial delay of 99 seconds, and then hangs up.
- **Outbound whisper flow** -- When a queued callback is placed, the customer hears this after they pick up and before they connect to the agent. For example, "Hello, this is your scheduled callback..."
- **Agent whisper flow** -- The agent hears this right after they accept the contact, before they are joined to the customer. For example, "You are about to be connected to Customer John, who requested a refund for..."

In this example, John calls customer service. Here's what happens:

1. Inbound contact flow creates CTR-1:
   a. John calls customer service at 11:35. The Inbound contact flow runs and puts him in queue at 11:35.
   b. The Customer queue flow runs. At 11:37, John chooses to schedule a callback, so Amazon Connect initiates a callback contact at 11:37, before the inbound contact is disconnected.

2. Callback contact flow creates CTR-2:
   a. The callback contact was initiated at 11:37.
   b. Because the initial delay is 99 seconds, the callback contact is placed into CallbackQueue at 11:38:39, after the 99 seconds pass. Now the callback contact is offered to an available agent.
c. After 21 seconds, an agent available at 11:39:00 and accepts the contact. The 10-second agent whisper flow is played to the agent.

d. After the agent whisper flow is complete, Amazon Connect calls John at 11:39:10. John picks up, and listens to the 15-second outbound whisper flow.

e. When the outbound whisper flow is complete, John is connected to the agent at 11:39:25. They talk until 11:45, and then John hangs up.

This scenario results in two CTRs, which include the following metadata.

<table>
<thead>
<tr>
<th>CTR-1</th>
<th>Data</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiation Method</td>
<td>Inbound</td>
<td></td>
</tr>
<tr>
<td>Initiation Timestamp</td>
<td>11:35</td>
<td>The inbound contact is initiated in Amazon Connect.</td>
</tr>
<tr>
<td>ConnectedToSystem Timestamp</td>
<td>11:35</td>
<td>Because this is an inbound contact, InitiationTimestamp = ConnectedToSystemTimestamp.</td>
</tr>
<tr>
<td>Next Contact Id</td>
<td>points to CTR-2</td>
<td></td>
</tr>
<tr>
<td>Queue</td>
<td>InboundQueue</td>
<td></td>
</tr>
<tr>
<td>Enqueued Timestamp</td>
<td>11:35</td>
<td>The inbound contact is put in queue.</td>
</tr>
<tr>
<td>Dequeued Timestamp</td>
<td>11:37</td>
<td>Because no agent picked up, this is the same as DisconnectedTimestamp.</td>
</tr>
<tr>
<td>ConnectedToAgent Timestamp</td>
<td>N/A</td>
<td>John scheduled a callback before any agent could pick up.</td>
</tr>
<tr>
<td>Disconnected Timestamp</td>
<td>11:37:00</td>
<td>John was disconnected by contact flow.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CTR-2</th>
<th>Data</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PreviousContactId</td>
<td>points to CTR-1</td>
<td></td>
</tr>
<tr>
<td>Initiation Timestamp</td>
<td>11:37</td>
<td>The callback contact is created in Amazon Connect.</td>
</tr>
<tr>
<td>Queue</td>
<td>CallbackQueue</td>
<td></td>
</tr>
<tr>
<td>Enqueued Timestamp</td>
<td>11:38:39</td>
<td>The contact was put into the CallbackQueue, after the 99-second initial delay completes.</td>
</tr>
<tr>
<td>Dequeued Timestamp</td>
<td>11:39:00</td>
<td>After 21 seconds, an agent accepts the contact.</td>
</tr>
<tr>
<td>Queue Duration</td>
<td>120 seconds</td>
<td>This is the initial delay (99 seconds), plus any additional time sitting in queue waiting for</td>
</tr>
</tbody>
</table>
Save custom reports

You can create custom real-time, historical, and login/logout reports that include only the metrics you're interested in. For instructions, see Create a real-time metrics report (p. 723) and Create a historical metrics report (p. 743).

After you create a report, you can:

- Save (p. 798) the custom report and return to it later.
- Share (p. 800) a link to the custom report so only people in your organization who have the link AND who have the appropriate permissions (p. 801) in their security profile can access the report.
- Publish (p. 802) the report so everyone in your organization who has the appropriate permissions (p. 803) in their security profile can view the report.

Personal saved reports count towards quota

Personal saved reports count towards your service quota of reports per instance. For example, if you save a report every day, it will count towards your organization's number of saved reports for the instance.

For more information about quotas, see Amazon Connect service quotas (p. 926).

Create a naming convention

All saved reports in your Amazon Connect instance must have a unique name. We recommend creating a naming convention that indicates who the owner of the report is. For example, use the team name or owner alias as the report suffix: Agent Performance - team name. That way, if the report is published, others will know who owns it.

If your organization needs to delete reports because you've reached the service quota for reports for your instance, a naming convention that includes the team or owner alias will help you track down the report owners to find out if the report is still needed.

How to save reports

1. Customize a real-time, historical, or login/logout report to include the metrics you want.
2. Choose Save. If you don't have permissions in your security profile to create reports, this button will be inactive.
3. Assign a unique name to the report.
Tip
We recommend establishing a naming convention for reports in your organization, especially published reports. This will help everyone identify who the owner is. For example, use the team name or owner alias as the report suffix: Agent Performance - team name.

4. To view the report at a later time, go to Metrics and quality, Saved reports.

How to delete saved reports

1. On the navigation menu, choose Metrics and quality, Saved reports.
2. Choose the Historical metrics tab.
3. Go to the row that has the report you want to delete, and choose the Delete icon. If you don't have permissions in your security profile to delete reports, this option won't be available.
Share custom reports

You can only share reports that you create and save. This means you need the following permissions in your security profile to share reports: Access metrics and Create saved reports.

<table>
<thead>
<tr>
<th>Type</th>
<th>All</th>
<th>Access</th>
<th>View</th>
<th>Edit</th>
<th>Create</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access metrics</td>
<td></td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact search</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Login/Logout report</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager monitor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recorded conversations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saved reports</td>
<td></td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

This gives you access to real-time and historical metrics reports.

This gives you permission to create, share, and publish custom reports.

To share reports
1. On the report page, choose Share report.

Or, from your list of saved reports, choose the Share report icon.
2. Choose **Copy link address** and choose **Save**. This saves the link to your clipboard. Paste this link into an email or other location to share the report.

You don’t need to publish the report to your organization in order to share the link with specific people.

**Important**
Anyone who has the link and the appropriate permissions can access the report.

**View a shared report**

To view a report that someone has shared with you, you need the following:

- A link to the report.
- Permissions in your security profile:
  - **Access metrics**, if the report is a real-time or historical metrics report
  - **View Login/Logout report**, if the report is a login/logout report
  - **View Saved reports**
**Tips for viewing a shared report**

- Every time you want to view the shared report, you need to access it through the link that was shared with you.
- If you get a 505 error when you choose the link that was shared with you, it means you don't have permissions to view the report.
- There's no way to save the exact same report to your list of Saved reports. You can give the report a new name and save it to your list, but then it's a different report from the one that was shared with you. If the owner of original report makes changes, you won't see them in your renamed report.

**Publish reports**

After you create and save a custom report with the metrics you're interested in, you can publish it so everyone in your organization with the appropriate permissions (p. 803) can access the report.

After a report is published, people will be able to see the report in their list of Saved reports.

**Tip**

We recommend establishing a naming convention for reports in your organization. When reports are published, this will help everyone identify who the owner is. For example, use the team name or owner alias as the report suffix: Agent Performance - *team name*.

Only people who have permissions in their security profile to Create saved reports will be able to change the published report and save their changes to the published version.

**To publish a report**

1. On the real-time metrics, historical metrics, login/logout report, or Saved reports page, choose Share report.
2. Toggle Publish report to On, and then choose Save.
The report appears in the list of Saved reports for everyone who has appropriate permissions in their security profile.

3. To unpublish the report, move the toggle to Off.

The report is removed from everyone's list of Saved reports.

**View published reports**

To view published reports, at minimum you need the following permissions in your security profile:

- **Access metrics**, if the report is a real-time or historical metrics report
- **View Login/Logout report**, if the report is a login/logout report
- **View Saved reports**
Monitor CloudWatch metrics

To view published reports

- Go to Metrics and quality, Saved reports.
  Published reports appear in your list automatically.

Monitoring your instance using CloudWatch

Amazon Connect sends data about your instance to CloudWatch metrics so that you can collect, view, and analyze CloudWatch metrics for your Amazon Connect virtual contact center. You can use this data to monitor key operational metrics and set up alarms. Data about your contact center is sent to CloudWatch every 1 minute.

When you view the CloudWatch metrics dashboard, you can specify the refresh interval for the data displayed. The values displayed in the dashboard reflect the values for the refresh interval you define. For example, if you set the refresh interval to 1 minute, the values displayed are for a minute period. You can select a refresh interval of 10 seconds, but Amazon Connect does not send data more often than every 1 minute. Metrics that are sent to CloudWatch are available for two weeks, and then discarded. To learn more about metrics in CloudWatch, see the Amazon CloudWatch User Guide.

Amazon Connect metrics sent to CloudWatch

The AWS/Connect namespace includes the following metrics.

**CallsBreachingConcurrencyQuota**

The total number of voice calls that exceeded the concurrent calls quota for the instance. For the total number of calls that breach the quota, take a look at the Sum statistic.

For example, assume your contact center experiences the following volumes, and your service quota is 100 concurrent calls:
Amazon Connect metrics sent to CloudWatch

- 0:00 : 125 concurrent calls. This is 25 over the quota.
- 0:04 : 135 concurrent calls. This is 35 over the quota.
- 0:10 : 150 concurrent calls. This is 50 over the quota.

CallsBreachingConcurrencyQuota = 110: the total number of voice calls that exceeded the quota between 0:00 and 0:10.

Unit: Count

Dimension:
- InstanceId: The ID of your instance
- MetricGroup: VoiceCalls

CallBackNotDialableNumber

The number of times a queued callback to a customer could not be dialed because the customer's number is in a country for which outbound calls are not allowed for the instance. The countries allowed for an instance are defined by the service quotas.

Unit: Count

Dimensions:
- InstanceId: The ID of your instance
- MetricGroup: ContactFlow
- ContactFlowName: The name of your contact flow

CallRecordingUploadError

The number of call recordings that failed to upload to the Amazon S3 bucket configured for your instance. This is the bucket specified in Data Storage > Call Recordings settings for the instance.

Unit: Count

Dimensions:
- InstanceId: The ID of your instance
- MetricGroup: CallRecordings

CallsPerInterval

The number of voice calls, both inbound and outbound, received or placed per second in the instance.

Unit: Count

Dimensions:
- InstanceId: The ID of your instance
- MetricGroup: VoiceCalls

ConcurrentCalls

The number of concurrent active voice calls in the instance at the time the data is displayed in the dashboard. The value displayed for this metric is the number of concurrent active calls at the time the dashboard is displayed, and not a sum for the entire interval of the refresh interval set. All active voice calls are included, not only active calls that are connected to agents.

While all statistics are available in CloudWatch for concurrent voice calls you might be most interested in looking at the Maximum/Average statistic. The Sum statistic isn't as useful here.

Unit: Count

Dimensions:
Amazon Connect Administrator Guide
Amazon Connect metrics sent to CloudWatch

- **InstanceId**: The ID of your instance
- **MetricGroup**: **VoiceCalls**

**ConcurrentCallsPercentage**

The percentage of the concurrent active voice calls service quota used in the instance. This is calculated by:

- ConcurrentCalls / ConfiguredConcurrentCallsLimit

Unit: Percent (output displays as a decimal)

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: **VoiceCalls**

**ConcurrentTasks**

The number of concurrent active tasks in the instance at the time the data is displayed in the dashboard. The value displayed for this metric is the number of concurrent active tasks at the time the dashboard is displayed, and not a sum for the entire interval of the refresh interval set. All active tasks are included, not only active tasks that are connected to agents.

While all statistics are available in CloudWatch for concurrent tasks you might be most interested in looking at the Maximum/Average statistic. The Sum statistic isn’t as useful here.

Unit: Count

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: **Tasks**

**ConcurrentTasksPercentage**

The percentage of the concurrent active tasks service quota used in the instance. This is calculated by:

ConcurrentTasks / ConfiguredConcurrentTasksLimit

Where ConfiguredConcurrentTasksLimit is the Concurrent tasks per instance (p. 926) configured for your instance.

Unit: Percent (output displays as a decimal)

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: **Tasks**

**ContactFlowErrors**

The number of times the error branch for a contact flow was run.

Unit: Count

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: **ContactFlow**
- **ContactFlowName**: The name of your contact flow

**ContactFlowFatalErrors**

The number of times a contact flow failed to execute due to a system error.
Amazon Connect metrics sent to CloudWatch

LongestQueueWaitTime

The longest amount of time, in seconds, that a contact waited in a queue. This is the length of time a contact waited in a queue during the refresh interval selected in the CloudWatch dashboard, such as 1 minute or 5 minutes.

Unit: Seconds

Dimensions:
- InstanceId: The ID of your instance
- MetricGroup: Queue
- QueueName: The name of your queue

MissedCalls

The number of voice calls that were missed by agents during the refresh interval selected, such as 1 minute or 5 minutes. A missed call is one that is not answered by an agent within 20 seconds.

To monitor the total missed calls in a given time period, take a look at the Sum statistic in CloudWatch.

Unit: Seconds

Dimensions:
- InstanceId: The ID of your instance
- MetricGroup: VoiceCalls

MisconfiguredPhoneNumbers

The number of calls that failed because the phone number is not associated with a contact flow.

Unit: Count

Dimensions:
- InstanceId: The ID of your instance
- MetricGroup: VoiceCalls

PublicSigningKeyUsage

The number of times a contact flow security key (public signing key) was used to encrypt customer input in a contact flow.

Unit: Count

Dimensions:
- InstanceId: The ID of your instance
- SigningKeyId: The ID of your signing key

QueueCapacityExceededError

The number of calls that were rejected because the queue was full.

Unit: Count
Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: Queue
- **QueueName**: The name of your queue

**QueueSize**

The number of contacts in the queue. The value reflects the number of contacts in the queue at the
time the dashboard is accessed, not for the duration of the reporting interval.

Unit: Count

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: Queue
- **QueueName**: The name of your queue

**TasksBreachingConcurrencyQuota**

The total number of tasks that exceeded the concurrent tasks quota for the instance. For the total
number of tasks that breach the quota, take a look at the Sum statistic.

For example, assume your contact center experiences the following volumes, and your service quota
is 2500 concurrent tasks:
- 0:00 : 2525 concurrent tasks. This is 25 over the quota.
- 0:04 : 2535 concurrent tasks. This is 35 over the quota.
- 0:10 : 2550 concurrent tasks. This is 50 over the quota.

TasksBreachingConcurrencyQuota = 110: the total number of tasks that exceeded the quota
between 0:00 and 0:10.

Unit: Count

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: Tasks

**TasksExpired**

Tasks which have expired after being active for 7 days.

To monitor the total number of tasks that have expired in a given time period, take a look at the
Sum statistic in CloudWatch.

Unit: Count

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: Tasks
- **ContactId**: The ID of the task contact

**TasksExpiryWarningReached**

Tasks that have been active for 6 days 22 hours and reached expiry warning limit.

To monitor the total number of tasks that have reached expiry warning limit in a given time period,
take a look at the Sum statistic in CloudWatch.

Unit: Count
Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: Tasks
- **ContactId**: The ID of the task contact

**ThrottledCalls**

The number of voice calls that were rejected because the rate of calls per second exceeded the maximum supported quota. To increase the supported rate of calls, request an increase in the service quota for concurrent active calls per instance.

To monitor the total throttled calls in a given time period, take a look at the Sum statistic in CloudWatch.

**Unit**: Seconds

**Unit**: Count

Dimensions:
- **InstanceId**: The ID of your instance
- **MetricGroup**: VoiceCalls

**ToInstancePacketLossRate**

The ratio of packet loss for calls in the instance, reported every 10 seconds. Each data point is between 0 and 1, which represents the ratio of packets lost for the instance.

**Unit**: Percent

Dimensions:
- **Participant**: Agent
- **Type of Connection**: WebRTC
- **Instance ID**: The ID of your instance
- **Stream Type**: Voice

Amazon Connect CloudWatch metrics dimensions

In CloudWatch, a dimension is a name/value pair that uniquely identifies a metric. In the dashboard, metrics are grouped by dimension. The following dimensions are used in the CloudWatch dashboard for Amazon Connect metrics. When you view metrics in the dashboard, only metrics with data are displayed. If there is no activity during the refresh interval for which there is a metric, then no data from your instance is displayed in the dashboard. The following dimensions are used for Amazon Connect metrics in CloudWatch.

**Contact flow metrics dimension**

**Note**

If a contact flow has a dimension name in non-ASCII characters, you won't be able to see it in CloudWatch.

Filters metric data by contact flow. Includes the following metrics:

- **ContactFlowErrors**
- **ContactFlowFatalErrors**
- **PublicSigningKeyUsage**
Contact metrics dimension

Filters metric data by contacts. Includes the following metrics:

- TasksExpiryWarningReached
- TasksExpired

Instance metrics dimension

Filters meta data by instance. Includes the following metrics:

- CallsBreachingConcurrencyQuota
- CallsPerInterval
- CallRecordingUploadError
- ConcurrentCalls
- ConcurrentCallsPercentage
- ConcurrentTasks
- ConcurrentTasksPercentage
- MisconfiguredPhoneNumber
- MissedCalls
- TasksBreachingConcurrencyQuota
- ThrottledCalls

Instance ID, Participant, Stream Type, Type of Connection

Filters metric data by connection. Includes the following metrics:

- ToInstancePacketLossRate

Queue metrics dimension

**Note**

If a queue has a dimension name in non-ASCII characters, you won't be able to see it in CloudWatch.

Filters metric data by queue. Includes the following metrics:

- CallBackNotDialableNumber
- LongestQueueWaitTime
- QueueCapacityExceededError
- QueueSize

Use CloudWatch metrics to calculate concurrent call quota

Here's how to calculate your quota for concurrent calls.

With calls active in the system, look at **ConcurrentCalls** and **ConcurrentCallsPercentage**. Calculate the quota:
Use CloudWatch metrics to calculate concurrent task quota

Here's how to calculate your quota for concurrent tasks.

With tasks active in the system, look at ConcurrentTasks and ConcurrentTasksPercentage. Calculate the quota:

\[
\text{Quota} = \left( \frac{\text{ConcurrentTasks}}{\text{ConcurrentTasksPercentage}} \right) \times 100
\]

For example, if ConcurrentTasks is 20 and ConcurrentTasksPercentage is 50, your quota is calculated as \((20/50) \times 100 = 40\).

Logging Amazon Connect API calls with AWS CloudTrail

Amazon Connect is integrated with AWS CloudTrail, a service that provides a record of the Amazon Connect API calls that a user, role, or AWS service makes. CloudTrail captures Amazon Connect API calls as events. All public Amazon Connect APIs support CloudTrail.

**Note**

Events from the Amazon Connect admin console aren't recorded in CloudTrail. If you have a custom integration that uses the Amazon Connect API, those events will be logged.

Using the information that CloudTrail collects, you can identify a specific request to an Amazon Connect API, the IP address of the requester, the requester's identity, the date and time of the request, and so on. If you configure a trail, you can enable continuous delivery of CloudTrail events to an Amazon S3 bucket. If you don't configure a trail, you can view the most recent events in Event History in the CloudTrail console.

For more information about CloudTrail, including how to configure and enable it, see Creating a Trail For Your AWS Account and AWS CloudTrail User Guide.

Amazon Connect information in CloudTrail

CloudTrail is enabled on your AWS account when you create the account. When supported event activity occurs in Amazon Connect, that activity is recorded in a CloudTrail event along with other AWS service events in Event history. You can view, search, and download recent events in your AWS account. For more information, see Viewing Events with CloudTrail Event History.

For an ongoing record of events in your AWS account, including events for Amazon Connect, create a trail. A trail enables CloudTrail to deliver log files to an Amazon S3 bucket. By default, when you create a trail in the console, the trail applies to all AWS Regions. The trail logs events from all AWS Regions and delivers the log files to the Amazon S3 bucket that you specify. Additionally, you can configure other AWS services to further analyze and act upon the event data collected in CloudTrail logs. For more information, see the following:
Creating a Trail For Your AWS Account
CloudTrail Supported Services and Integrations
Configuring Amazon SNS Notifications for CloudTrail
Receiving CloudTrail Log Files from Multiple Regions and Receiving CloudTrail Log Files from Multiple Accounts

Every event or log entry contains information about who generated the request. The identity information helps you determine the following:

- Whether the request was made with root or AWS Identity and Access Management (IAM) user credentials.
- Whether the request was made with temporary security credentials for a role or federated user.
- Whether the request was made by another AWS service.

For more information, see the CloudTrail userIdentity Element.

Example: Amazon Connect log file entries

A trail is a configuration that enables delivery of events as log files to an Amazon S3 bucket that you specify. CloudTrail log files contain one or more log entries. An event represents a single request from any source and includes information about the requested action, the date and time of the action, request parameters, and so on. CloudTrail log files aren't an ordered stack trace of the public API calls, so they don't appear in any specific order.

The following example shows a CloudTrail log entry that demonstrates the GetContactAttributes action.

```
{
    "eventVersion": "1.05",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "AAAAAAA1111111EXAMPLE",
        "arn": "arn:aws:sts::123456789012:assumed-role/John",
        "accountId": "123456789012",
        "accessKeyId": "AAAAAAA1111111EXAMPLE",
        "sessionContext": {
            "attributes": {
                "mfaAuthenticated": "false",
                "creationDate": "2019-08-15T06:40:14Z"
            },
            "sessionIssuer": {
                "type": "Role",
                "principalId": "AAAAAAA1111111EXAMPLE",
                "arn": "arn:aws:iam::123456789012:role/John",
                "accountId": "123456789012",
                "userName": "John"
            }
        },
        "eventTime": "2019-08-15T06:40:55Z",
        "eventSource": "connect.amazonaws.com",
        "eventName": "GetContactAttributes",
        "awsRegion": "us-west-2",
        "sourceIPAddress": "205.251.233.179",
        "userAgent": "aws-sdk-java/1.11.590 Mac_OS_X/10.14.6 Java_HotSpot(TM)_64-Bit_Server_VM/25.202-b08 java/1.8.0_202 vendor/Oracle_Corporation",
        "requestParameters": {
            "InitialContactId": "00fbeee1-123e-111e-93e3-11111bbfbc1",
```
"InstanceId": "00fbeee1-123e-111e-93e3-11111bfbfcc1",
"responseElements": null,
"requestID": "be1bee1d-1111-11e1-1eD1-0dc1111f1ac1c",
"eventID": "00fbeee1-123e-111e-93e3-11111bfbfcc1",
"readOnly": true,
"eventType": "AwsApiCall",
"recipientAccountId": "123456789012"}
Security in Amazon Connect

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from a data center and network architecture that is built to meet the requirements of the most security-sensitive organizations.

Security is a shared responsibility between AWS and you. The shared responsibility model describes this as security of the cloud and security in the cloud:

- **Security of the cloud** – AWS is responsible for protecting the infrastructure that runs AWS services in the AWS Cloud. AWS also provides you with services that you can use securely. Third-party auditors regularly test and verify the effectiveness of our security as part of the AWS compliance programs. To learn about the compliance programs that apply to Amazon Connect, see AWS Services in Scope by Compliance Program.
- **Security in the cloud** – Your responsibility is determined by the AWS service that you use. You are also responsible for other factors including the sensitivity of your data, your company’s requirements, and applicable laws and regulations.

This documentation helps you understand how to apply the shared responsibility model when using Amazon Connect. The following topics show you how to configure Amazon Connect to meet your security and compliance objectives. You also learn how to use other AWS services that help you to monitor and secure your Amazon Connect resources.

Contents

- Data protection in Amazon Connect (p. 814)
- Identity and access management for Amazon Connect (p. 819)
- Logging and monitoring Amazon Connect (p. 857)
- Compliance validation in Amazon Connect (p. 858)
- Resilience in Amazon Connect (p. 859)
- Infrastructure security in Amazon Connect (p. 860)
- Security Best Practices for Amazon Connect (p. 860)

Data protection in Amazon Connect

The AWS shared responsibility model applies to data protection in Amazon Connect. As described in this model, AWS is responsible for protecting the global infrastructure that runs all of the AWS Cloud. You are responsible for maintaining control over your content that is hosted on this infrastructure. This content includes the security configuration and management tasks for the AWS services that you use. For more information about data privacy, see the Data Privacy FAQ. For information about data protection in Europe, see the AWS Shared Responsibility Model and GDPR blog post on the AWS Security Blog.

For data protection purposes, we recommend that you protect AWS account credentials and set up individual user accounts with AWS Identity and Access Management (IAM). That way each user is given only the permissions necessary to fulfill their job duties. We also recommend that you secure your data in the following ways:

- Use multi-factor authentication (MFA) with each account.
- Use SSL/TLS to communicate with AWS resources. We recommend TLS 1.2 or later.
• Set up API and user activity logging with AWS CloudTrail.
• Use AWS encryption solutions, along with all default security controls within AWS services.
• Use advanced managed security services such as Amazon Macie, which assists in discovering and securing personal data that is stored in Amazon S3.
• If you require FIPS 140-2 validated cryptographic modules when accessing AWS through a command line interface or an API, use a FIPS endpoint. For more information about the available FIPS endpoints, see Federal Information Processing Standard (FIPS) 140-2.

We strongly recommend that you never put confidential or sensitive information, such as your customers’ email addresses, into tags or free-form fields such as a Name field. This includes when you work with Amazon Connect or other AWS services using the console, API, AWS CLI, or AWS SDKs. Any data that you enter into tags or free-form fields used for names may be used for billing or diagnostic logs. If you provide a URL to an external server, we strongly recommend that you do not include credentials information in the URL to validate your request to that server.

Contents
• Data handled by Amazon Connect (p. 815)
• Encryption at rest (p. 818)
• Encryption in transit (p. 819)
• Key management (p. 819)

Data handled by Amazon Connect

Data held within Amazon Connect is segregated by the AWS account ID and the Amazon Connect instance ID. This ensures that data can be accessed only by the authorized users of a specific Amazon Connect instance.

Amazon Connect handles a variety of data related to the contact center, including but not limited to the following categories.

• Resources and configurations -- This includes queues, contact flows, users, and routing profiles.
• Contact metadata-- This includes connection time, handle time, source number (ANI), destination number (DNIS), and user defined contact attributes.
• Agent-related performance data -- This includes login time, status changes, and contacts handled.
• Phone call audio streams -- When enabled, this also includes call recordings.
• Chat transcripts – Included only if enabled.
• Attachments – Included only if enabled.
• Integration configuration – Includes user defined name, description and metadata when creating integration with external applications.
• Knowledge documents – This includes documents used by agents to handle contacts.
• Voiceprints – When Amazon Connect Voice ID is enabled, a voiceprint is created from the customer's voice for future authentication.

Amazon Connect stores the following Personally Identifiable Information (PII) data related to your customers:

• The customer's phone number: ANI for inbound calls, and DNIS for outbound calls or transfers.
• If you are using Amazon Connect Customer Profiles, all this data could potentially be PII. This data is always encrypted at rest using either a customer-provided KMS key or a service-owned key. The
Amazon Connect Customer Profiles data is segregated by the AWS account ID and the domain. Multiple Amazon Connect instances can share a single Customer Profiles domain.

- For Amazon Connect High-Volume Outbound Communications, Amazon Pinpoint passes customer phone numbers and relevant attributes to Amazon Connect. On the Amazon Connect side, these are always encrypted at rest using either a customer managed key or an AWS owned key. The Amazon Connect High-Volume Outbound Communications data is segregated by the Amazon Connect instance ID and are encrypted by instance-specific keys.

Amazon AppIntegrations, which enables you to integrate with external applications, stores references to other AWS resources such as Amazon EventBridge buses and rules, and client-service specified metadata. No third party data is stored other than incidentally while being processed.

**Phone call media**

Amazon Connect is in the audio path for calls handled by the service. It is therefore responsible for relaying the call’s media stream between participants. This can include the audio between a customer and a contact flow / IVR, the audio between a customer and an agent, or mixing the audio between multiple parties in a conference or during a transfer. There are two types of phone calls:

- PSTN calls. This includes inbound customer calls, outbound calls placed by agents to customers, and calls to an agent's physical phone, if this option has been enabled in the Contact Control Panel (CCP).
- Softphone calls placed to the agent's browser.

PSTN calls are connected between Amazon Connect and various telecommunications carriers using either private circuits maintained between Amazon Connect and our providers or existing AWS internet connectivity. For PSTN calls routed over the public internet, signaling is encrypted with TLS and the audio media is encrypted with SRTP.

Softphone calls are established to the agent's browser with an encrypted WebSocket connection using TLS. The audio media traffic to the browser is encrypted in transit using DTLS-SRTP.

**Call recordings**

Call recording is disabled by default in Amazon Connect. You can enable call recording in the contact flows, which allows for more detailed control over which calls are recorded.

The call recording feature has options for choosing whether to record the agent only, customer only, or agent and customer conversations. When call recording is enabled, the recording begins when the call is connected to an agent and stops when the agent disconnects. Any transfers to external numbers are not recorded after the agent leaves the call.

You can limit access to the call recordings based on user permissions. Recordings can be searched and played back within the Amazon Connect web interface.

**Call recording storage**

Call recordings are stored in two phases:

- Recordings immediately held within Amazon Connect during and after the call, but before delivery.
- Recordings delivered to your Amazon S3 bucket.

The recordings that are stored in your Amazon S3 bucket are secured using a AWS KMS key that was configured when your instance was created.
At all times, you maintain full control over the security of call recordings delivered to your Amazon S3 bucket.

**Call recording access**

You can search and listen to call recordings in Amazon Connect. To determine which users can do this, assign them the appropriate security profiles. If AWS CloudTrail is enabled, access to specific recordings by Amazon Connect users is captured in CloudTrail.

The capabilities of Amazon S3, AWS KMS, and IAM put you in full control of who has access to call recording data.

In addition, you can track who listens to or deletes recordings; see Track who deleted or listened to recordings (p. 625).

**Contact metadata**

Amazon Connect stores metadata related to contacts that flow through the system and allows authorized users to access this information. The Contact Search feature allows you to search and view contact data, such as origination phone numbers or other attributes set by the contact flow, that are associated with a contact for diagnostics or reporting purposes.

Contact data classified as PII that is stored by Amazon Connect is encrypted at rest using a key that is time-limited and specific to the Amazon Connect instance. Specifically, the customer origination phone number is cryptographically hashed with a key that is specific to the instance to allow for use in contact search. For contact search, the encryption key is not time-sensitive.

The following data stored by Amazon Connect is treated as sensitive:

- Origination phone number
- Outbound phone number
- External numbers dialed by agents for transfers
- External numbers transferred to by a contact flow
- All contact attributes

**Contact Lens real-time processing**

Content processed by Contact Lens in real-time is encrypted at rest and in transit. Data is encrypted with keys owned by Contact Lens.

**Voiceprints**

If you enable Amazon Connect Voice ID, it computes and stores voiceprints out of your customers’ speech for authenticating them in future. You must specify a Speaker ID for each customer while enrolling them for Voice ID. We strongly recommend that you use an identifier that does not contain PII for this field.

In the preview release of Voice ID, the audio data used for generating enrollment and authentication voiceprints is enqueued for deletion within 24 hours.

**High-Volume Outbound Communications**

For Amazon Connect High-Volume Outbound Communications, Amazon Pinpoint passes customer phone numbers and relevant attributes to Amazon Connect. On Amazon Connect, these are always encrypted at rest using either a customer managed key or an AWS owned key. The Amazon Connect
High-Volume Outbound Communications data is segregated by the Amazon Connect instance ID and are encrypted by instance specific keys.

**Encryption at rest**

Contact data classified as PII, or data that represents customer content being stored by Amazon Connect, is encrypted at rest (that is, before it is put, stored, or saved to a disk) using a key that is time-limited and specific to the Amazon Connect instance.

Amazon S3 server-side encryption is used to encrypt conversation recordings (voice and chat) and knowledge documents at rest with a AWS Key Management Service data key unique per customer account. Amazon AppIntegrations configuration data is encrypted the same way. For information about AWS KMS keys, see What is AWS Key Management Service? in the AWS Key Management Service Developer Guide.

Amazon Connect Voice ID stores customer voiceprints which cannot be reverse-engineered to obtain the enrolled customer’s speech or identify a customer. These are encrypted using a service-owned AWS KMS key.

Integration configuration data is encrypted at rest using a key that is time-limited and specific to the user account.

**Amazon Connect Customer Profiles encryption at rest**

All user data stored in Amazon Connect Customer Profiles is encrypted at rest. Amazon Connect Customer Profiles encryption at rest provides enhanced security by encrypting all your data at rest using encryption keys stored in AWS Key Management Service (AWS KMS). This functionality helps reduce the operational burden and complexity involved in protecting sensitive data. With encryption at rest, you can build security-sensitive applications that meet strict encryption compliance and regulatory requirements.

Organizational policies, industry or government regulations, and compliance requirements often require the use of encryption at rest to increase the data security of your applications. Customer Profiles integrated with AWS KMS to enable its encryption at rest strategy. For more information, see AWS Key Management Service Concepts in the AWS Key Management Service Developer Guide.

When creating a new domain, you must provide a KMS key that the service will use to encrypt your data in transit and at rest. The customer managed key is created, owned, and managed by you. You have full control over the customer managed key (AWS KMS charges apply).

You can specify an encryption key when you create a new domain or profile object type or switch the encryption keys on an existing resources by using the AWS Command Line Interface (AWS CLI), or the Amazon Connect Customer Profiles Encryption API. When you choose a customer managed key, Amazon Connect Customer Profiles creates a grant to the customer managed key that grants it access to the customer managed key.

AWS KMS charges apply for a customer managed key. For more information about pricing, see AWS KMS pricing.

**High-Volume Outbound Communications**

For Amazon Connect High-Volume Outbound Communications, Amazon Pinpoint passes customer phone numbers and relevant attributes to Amazon Connect. On Amazon Connect, these are always encrypted at rest using either a customer managed key or an AWS owned key. The Amazon Connect High-Volume Outbound Communications data is segregated by the Amazon Connect instance ID and are encrypted by instance specific keys.

You can provide your own customer managed key when onboarding to Amazon Connect High-Volume Outbound Communications.
The service uses this customer-managed key to encrypt sensitive data at rest. The customer-managed key is created, owned, and managed by you. You have full control over the customer-managed key.

If you do not provide your own customer-managed key, then Amazon Connect High-Volume Outbound Communications encrypts sensitive data at rest using a AWS-owned key specific to your Amazon Connect instance.

AWS KMS charges apply for a customer-managed key. For more information about pricing, see AWS KMS pricing.

## Encryption in transit

All data exchanged with Amazon Connect is protected in transit between the user’s web browser and Amazon Connect using industry-standard TLS encryption. Which version of TLS? (p. 860)

External data is additionally encrypted while being processed by KMS.

When Amazon Connect integrates with AWS services, such as AWS Lambda, Amazon Kinesis, or Amazon Polly, data is always encrypted in transit using TLS.

When event data is forwarded from external applications to Amazon Connect it is always encrypted in transit using TLS.

## Key management

You can specify AWS KMS keys, including bring your own keys (BYOK), to use for envelope encryption with Amazon S3 input/output buckets. This also applies to data used stored in Amazon Connect Customer Profiles.

Amazon AppIntegrations doesn’t support BYOK for encryption of configuration data.

The knowledge documents used by Amazon Connect Wisdom are encrypted by an AWS KMS key.

Amazon Connect High-Volume Outbound Communications encrypts all sensitive data using an AWS-owned key or a customer-managed key. As the customer-managed key is created, owned, and managed by you, you have full control over the customer-managed key (AWS KMS charges apply).

For information about AWS KMS keys see What is AWS Key Management Service? in the AWS Key Management Service Developer Guide.

## Identity and access management for Amazon Connect

AWS Identity and Access Management (IAM) is an AWS service that helps an administrator securely control access to AWS resources. IAM administrators control who can be authenticated (signed in) and authorized (have permissions) to use Amazon Connect resources. IAM is an AWS service that you can use with no additional charge.

### Topics
- Audience (p. 820)
- Authenticating with identities (p. 820)
- Managing access using policies (p. 822)
Audience

How you use AWS Identity and Access Management (IAM) differs, depending on the work that you do in Amazon Connect.

**Service user** – If you use the Amazon Connect service to do your job, then your administrator provides you with the credentials and permissions that you need. As you use more Amazon Connect features to do your work, you might need additional permissions. Understanding how access is managed can help you request the right permissions from your administrator. If you cannot access a feature in Amazon Connect, see Troubleshooting Amazon Connect identity and access (p. 852).

**Service administrator** – If you're in charge of Amazon Connect resources at your company, you probably have full access to Amazon Connect. It's your job to determine which Amazon Connect features and resources your employees should access. You must then submit requests to your IAM administrator to change the permissions of your service users. Review the information on this page to understand the basic concepts of IAM. To learn more about how your company can use IAM with Amazon Connect, see How Amazon Connect works with IAM (p. 837).

**IAM administrator** – If you’re an IAM administrator, you might want to learn details about how you can write policies to manage access to Amazon Connect. To view example Amazon Connect identity-based policies that you can use in IAM, see Amazon Connect identity-based policy examples (p. 840).

Authenticating with identities

Authentication is how you sign in to AWS using your identity credentials. For more information about signing in using the AWS Management Console, see Signing in to the AWS Management Console as an IAM user or root user in the IAM User Guide.

You must be authenticated (signed in to AWS) as the AWS account root user, an IAM user, or by assuming an IAM role. You can also use your company's single sign-on authentication or even sign in using Google or Facebook. In these cases, your administrator previously set up identity federation using IAM roles. When you access AWS using credentials from another company, you are assuming a role indirectly.

To sign in directly to the AWS Management Console, use your password with your root user email address or your IAM user name. You can access AWS programmatically using your root user or IAM users access keys. AWS provides SDK and command line tools to cryptographically sign your request using your credentials. If you don't use AWS tools, you must sign the request yourself. Do this using Signature Version 4, a protocol for authenticating inbound API requests. For more information about authenticating requests, see Signature Version 4 signing process in the AWS General Reference.

Regardless of the authentication method that you use, you might also be required to provide additional security information. For example, AWS recommends that you use multi-factor authentication (MFA) to
increase the security of your account. To learn more, see Using multi-factor authentication (MFA) in AWS in the IAM User Guide.

AWS account root user

When you first create an AWS account, you begin with a single sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account root user and is accessed by signing in with the email address and password that you used to create the account. We strongly recommend that you do not use the root user for your everyday tasks, even the administrative ones. Instead, adhere to the best practice of using the root user only to create your first IAM user. Then securely lock away the root user credentials and use them to perform only a few account and service management tasks.

IAM users and groups

An IAM user is an identity within your AWS account that has specific permissions for a single person or application. An IAM user can have long-term credentials such as a user name and password or a set of access keys. To learn how to generate access keys, see Managing access keys for IAM users in the IAM User Guide. When you generate access keys for an IAM user, make sure you view and securely save the key pair. You cannot recover the secret access key in the future. Instead, you must generate a new access key pair.

An IAM group is an identity that specifies a collection of IAM users. You can't sign in as a group. You can use groups to specify permissions for multiple users at a time. Groups make permissions easier to manage for large sets of users. For example, you could have a group named IAMAdmins and give that group permissions to administer IAM resources.

Users are different from roles. A user is uniquely associated with one person or application, but a role is intended to be assumable by anyone who needs it. Users have permanent long-term credentials, but roles provide temporary credentials. To learn more, see When to create an IAM user (instead of a role) in the IAM User Guide.

IAM roles

An IAM role is an identity within your AWS account that has specific permissions. It is similar to an IAM user, but is not associated with a specific person. You can temporarily assume an IAM role in the AWS Management Console by switching roles. You can assume a role by calling an AWS CLI or AWS API operation or by using a custom URL. For more information about methods for using roles, see Using IAM roles in the IAM User Guide.

IAM roles with temporary credentials are useful in the following situations:

- **Temporary IAM user permissions** – An IAM user can assume an IAM role to temporarily take on different permissions for a specific task.
- **Federated user access** – Instead of creating an IAM user, you can use existing identities from AWS Directory Service, your enterprise user directory, or a web identity provider. These are known as federated users. AWS assigns a role to a federated user when access is requested through an identity provider. For more information about federated users, see Federated users and roles in the IAM User Guide.
- **Cross-account access** – You can use an IAM role to allow someone (a trusted principal) in a different account to access resources in your account. Roles are the primary way to grant cross-account access. However, with some AWS services, you can attach a policy directly to a resource (instead of using a role as a proxy). To learn the difference between roles and resource-based policies for cross-account access, see How IAM roles differ from resource-based policies in the IAM User Guide.
- **Cross-service access** – Some AWS services use features in other AWS services. For example, when you make a call in a service, it's common for that service to run applications in Amazon EC2 or store objects
Managing access using policies

You control access in AWS by creating policies and attaching them to IAM identities or AWS resources. A policy is an object in AWS that, when associated with an identity or resource, defines their permissions. You can sign in as the root user or an IAM user, or you can assume an IAM role. When you then make a request, AWS evaluates the related identity-based or resource-based policies. Permissions in the policies determine whether the request is allowed or denied. Most policies are stored in AWS as JSON documents. For more information about the structure and contents of JSON policy documents, see Overview of JSON policies in the IAM User Guide.

Administrators can use AWS JSON policies to specify who has access to what. That is, which principal can perform actions on what resources, and under what conditions.

Every IAM entity (user or role) starts with no permissions. In other words, by default, users can do nothing, not even change their own password. To give a user permission to do something, an administrator must attach a permissions policy to a user. Or the administrator can add the user to a group that has the intended permissions. When an administrator gives permissions to a group, all users in that group are granted those permissions.

IAM policies define permissions for an action regardless of the method that you use to perform the operation. For example, suppose that you have a policy that allows the iam:GetRole action. A user with that policy can get role information from the AWS Management Console, the AWS CLI, or the AWS API.

Identity-based policies

Identity-based policies are JSON permissions policy documents that you can attach to an identity, such as an IAM user, group of users, or role. These policies control what actions users and roles can perform, on which resources, and under what conditions. To learn how to create an identity-based policy, see Creating IAM policies in the IAM User Guide.
Identity-based policies can be further categorized as inline policies or managed policies. Inline policies are embedded directly into a single user, group, or role. Managed policies are standalone policies that you can attach to multiple users, groups, and roles in your AWS account. Managed policies include AWS managed policies and customer managed policies. To learn how to choose between a managed policy or an inline policy, see Choosing between managed policies and inline policies in the IAM User Guide.

Resource-based policies

Resource-based policies are JSON policy documents that you attach to a resource. Examples of resource-based policies are IAM role trust policies and Amazon S3 bucket policies. In services that support resource-based policies, service administrators can use them to control access to a specific resource. For the resource where the policy is attached, the policy defines what actions a specified principal can perform on that resource and under what conditions. You must specify a principal in a resource-based policy. Principals can include accounts, users, roles, federated users, or AWS services.

Resource-based policies are inline policies that are located in that service. You can't use AWS managed policies from IAM in a resource-based policy.

Other policy types

AWS supports additional, less-common policy types. These policy types can set the maximum permissions granted to you by the more common policy types.

- Permissions boundaries – A permissions boundary is an advanced feature in which you set the maximum permissions that an identity-based policy can grant to an IAM entity (IAM user or role). You can set a permissions boundary for an entity. The resulting permissions are the intersection of entity's identity-based policies and its permissions boundaries. Resource-based policies that specify the user or role in the Principal field are not limited by the permissions boundary. An explicit deny in any of these policies overrides the allow. For more information about permissions boundaries, see Permissions boundaries for IAM entities in the IAM User Guide.

- Service control policies (SCPs) – SCPs are JSON policies that specify the maximum permissions for an organization or organizational unit (OU) in AWS Organizations. AWS Organizations is a service for grouping and centrally managing multiple AWS accounts that your business owns. If you enable all features in an organization, then you can apply service control policies (SCPs) to any or all of your accounts. The SCP limits permissions for entities in member accounts, including each AWS account root user. For more information about Organizations and SCPs, see How SCPs work in the AWS Organizations User Guide.

- Session policies – Session policies are advanced policies that you pass as a parameter when you programmatically create a temporary session for a role or federated user. The resulting session's permissions are the intersection of the user or role's identity-based policies and the session policies. Permissions can also come from a resource-based policy. An explicit deny in any of these policies overrides the allow. For more information, see Session policies in the IAM User Guide.

Multiple policy types

When multiple types of policies apply to a request, the resulting permissions are more complicated to understand. To learn how AWS determines whether to allow a request when multiple policy types are involved, see Policy evaluation logic in the IAM User Guide.

Required permissions for using custom IAM policies to manage access to the Amazon Connect console

If you're using custom IAM policies to manage access to the Amazon Connect console, your users need some or all of the permissions listed in this article, depending on the tasks they need to do.
Required permissions for custom IAM policies

**Note**
Using `connect:*` in a custom IAM policy grants your users all of the Amazon Connect permissions listed in this article.

**Note**
Certain pages on the Amazon Connect console, such as Tasks (p. 830) and Customer Profiles (p. 832), require that you add permissions to your inline policies.

**AmazonConnect_FullAccess policy**

To allow full read/write access to Amazon Connect, you must attach two policies to your IAM users, groups, or roles. Attach the **AmazonConnect_FullAccess** policy and a custom policy with the following contents:

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AttachAnyPolicyToAmazonConnectRole",
            "Effect": "Allow",
            "Action": "iam:PutRolePolicy",
            "Resource": "arn:aws:iam::*:role/aws-service-role/connect.amazonaws.com/AWSServiceRoleForAmazonConnect*"
        }
    ]
}
```

To allow an IAM user to create an instance, ensure that they have the permissions granted by the AmazonConnect_FullAccess policy.

When you use AmazonConnect_FullAccess policy, note the following:

- Additional privileges are required to create a Amazon S3 bucket with a name of your choosing, or use an existing bucket while creating or updating an instance from the Amazon Connect console. If you choose default storage locations for your call recordings, chat transcripts, call transcripts, etc, they are now prefixed with "amazon-connect-".
- The aws/connect KMS key is available to use as a default encryption option. To use a custom encryption key, assign users additional KMS privileges.
- Assign users additional privileges to attach other AWS resources like Amazon Polly, Live Media Streaming, Data Streaming, and Lex bots to their Amazon Connect instances.

**AmazonConnectReadOnlyAccess policy**

To allow read-only access, you need to attach only the **AmazonConnectReadOnlyAccess** policy.

**Amazon Connect console home page**

The following image shows a sample Amazon Connect console home page.
Use the permissions listed in the following table to manage access to this page.

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>List instance</td>
<td>connect:ListInstances</td>
</tr>
<tr>
<td></td>
<td>ds:DescribeDirectories</td>
</tr>
<tr>
<td>Describe instance: View the details of the</td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td>instance/ current settings</td>
<td>connect:ListLambdaFunctions</td>
</tr>
<tr>
<td></td>
<td>connect:ListLexBots</td>
</tr>
<tr>
<td></td>
<td>connect:ListLexBots</td>
</tr>
<tr>
<td></td>
<td>connect:ListInstanceStorageConfigs</td>
</tr>
<tr>
<td></td>
<td>connect:ListApprovedOrigins</td>
</tr>
<tr>
<td></td>
<td>connect:ListSecurityKeys</td>
</tr>
<tr>
<td></td>
<td>connect:DescribeInstanceAttributes</td>
</tr>
<tr>
<td></td>
<td>connect:DescribeInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>ds:DescribeDirectories</td>
</tr>
<tr>
<td>Create instance</td>
<td>connect:CreateInstance</td>
</tr>
<tr>
<td></td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td></td>
<td>connect:ListInstances</td>
</tr>
<tr>
<td></td>
<td>connect:AssociateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>connect:UpdateInstanceAttribute</td>
</tr>
<tr>
<td></td>
<td>ds:CheckAlias</td>
</tr>
<tr>
<td></td>
<td>ds:CreateAlias</td>
</tr>
<tr>
<td></td>
<td>ds:AuthorizeApplication</td>
</tr>
<tr>
<td></td>
<td>ds:UnauthorizeApplication</td>
</tr>
<tr>
<td></td>
<td>ds:CreateIdentityPoolDirectory</td>
</tr>
<tr>
<td></td>
<td>ds:CreateDirectory</td>
</tr>
<tr>
<td></td>
<td>ds:DescribeDirectories</td>
</tr>
<tr>
<td></td>
<td>iam:CreateServiceLinkedRole</td>
</tr>
<tr>
<td></td>
<td>kms:CreateGrant</td>
</tr>
<tr>
<td></td>
<td>kms:DescribeKey</td>
</tr>
<tr>
<td></td>
<td>kms:ListAliases</td>
</tr>
<tr>
<td></td>
<td>kms:RetireGrant</td>
</tr>
<tr>
<td></td>
<td>logs:CreateLogGroup</td>
</tr>
</tbody>
</table>
### Required permissions for custom IAM policies

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>s3:CreateBucket</td>
<td></td>
</tr>
<tr>
<td>s3:GetBucketLocation</td>
<td></td>
</tr>
<tr>
<td>s3:ListAllMyBuckets</td>
<td></td>
</tr>
<tr>
<td>servicequotas:GetServiceQuota</td>
<td></td>
</tr>
</tbody>
</table>

**Delete instance**

<table>
<thead>
<tr>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td>connect:DeleteInstance</td>
</tr>
<tr>
<td>connect:ListInstances</td>
</tr>
<tr>
<td>ds:DescribeDirectories</td>
</tr>
<tr>
<td>ds:DeleteDirectory</td>
</tr>
<tr>
<td>ds:UnauthorizeApplication</td>
</tr>
</tbody>
</table>

### Detailed instance pages

The following image shows how you navigate to each of the detailed instance pages:

To access the detailed instance pages, you need permissions to the Amazon Connect console home page (describe/list). Or, use the AmazonConnectReadOnlyAccess policy.

The following tables list the granular permissions for each detailed instance page.

**Note**

To perform **Edit** actions, users also need **List** and **Describe** permissions.

### Overview and Telephony options pages

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>View telephony options</td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td>Enable/Disable telephony options</td>
<td>connect:UpdateInstanceAttribute</td>
</tr>
</tbody>
</table>

826
## Data storage page

### Call recording section

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
</table>
| View call recording              | connect:DescribeInstance  
|                                  | connect:ListInstanceStorageConfigs  
|                                  | connect:DescribeInstanceStorageConfig                                                |
| Edit call recording              | connect:AssociateInstanceStorageConfig  
|                                  | connect:UpdateInstanceStorageConfig  
|                                  | connect:DisassociateInstanceStorageConfig                                           |
|                                  | s3:ListAllMyBuckets  
|                                  | s3:GetBucketLocation  
|                                  | s3:GetBucketAcl  
|                                  | s3:CreateBucket  
|                                  | kms:CreateGrant  
|                                  | kms:DescribeKey  
|                                  | kms:ListAliases  
|                                  | kms:RetireGrant                                                              |

## Chat transcripts section

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
</table>
| View chat transcripts            | connect:DescribeInstance  
|                                  | connect:DescribeInstanceStorageConfig  
|                                  | connect:ListInstanceStorageConfigs                                                  |
| Edit chat transcripts            | connect:AssociateInstanceStorageConfig  
|                                  | connect:UpdateInstanceStorageConfig  
|                                  | connect:DisassociateInstanceStorageConfig                                           |
|                                  | s3:ListAllMyBuckets  
|                                  | s3:GetBucketLocation  
|                                  | s3:GetBucketAcl  
|                                  | s3:CreateBucket  
|                                  | kms:CreateGrant                                                                 |

827
## Required permissions for custom IAM policies

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>kms:DescribeKey</strong></td>
<td></td>
</tr>
<tr>
<td><strong>kms:ListAliases</strong></td>
<td></td>
</tr>
<tr>
<td><strong>kms:RetireGrant</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Attachments section

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
</table>
| View chat attachments | connect:DescribeInstance  
                                           connect:DescribeInstanceStorageConfig  
                                           connect:ListInstanceStorageConfigs |
| Edit chat attachments | connect:AssociateInstanceStorageConfig  
                                           connect:UpdateInstanceStorageConfig  
                                           connect:DisassociateInstanceStorageConfig  
                                           s3:ListAllMyBuckets  
                                           s3:GetBucketLocation  
                                           s3:CreateBucket  
                                           s3:GetBucketAcl  
                                           kms:CreateGrant  
                                           kms:DescribeKey  
                                           kms:ListAliases  
                                           kms:RetireGrant |

### Live media streaming section

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
</table>
| View live media streaming | connect:DescribeInstance  
                                           connect:ListInstanceStorageConfigs  
                                           connect:DescribeInstanceStorageConfig |
| Edit live media streaming | connect:AssociateInstanceStorageConfig  
                                           connect:UpdateInstanceStorageConfig  
                                           connect:DisassociateInstanceStorageConfig  
                                           kms:CreateGrant |
<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>kms:DescribeKey</td>
</tr>
<tr>
<td></td>
<td>kms:RetireGrant</td>
</tr>
<tr>
<td>Exported reports section</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>View exported reports</td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td></td>
<td>connect:ListInstanceStorageConfigs</td>
</tr>
<tr>
<td></td>
<td>connect:DescribeInstanceStorageConfig</td>
</tr>
<tr>
<td>Edit exported reports</td>
<td>connect:AssociateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>connect:UpdateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>connect: DisassociateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>s3:ListAllMyBuckets</td>
</tr>
<tr>
<td></td>
<td>s3:GetBucketLocation</td>
</tr>
<tr>
<td></td>
<td>s3:CreateBucket</td>
</tr>
<tr>
<td></td>
<td>kms:DescribeKey</td>
</tr>
<tr>
<td></td>
<td>kms:ListAliases</td>
</tr>
<tr>
<td></td>
<td>kms:RetireGrant</td>
</tr>
<tr>
<td></td>
<td>kms:CreateGrant</td>
</tr>
<tr>
<td>Data streaming page</td>
<td></td>
</tr>
<tr>
<td>Contact trace records section</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>View data streaming - Contact</td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td>trace records</td>
<td>connect:ListInstanceStorageConfigs</td>
</tr>
<tr>
<td></td>
<td>connect:DescribeInstanceStorageConfig</td>
</tr>
<tr>
<td>Edit contact trace record</td>
<td>connect:AssociateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>connect:UpdateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>connect:DisassociateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>firehose:ListDeliveryStreams</td>
</tr>
<tr>
<td></td>
<td>firehose:DescribeDeliveryStream</td>
</tr>
<tr>
<td>Action/Use case</td>
<td>Permissions needed</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>kinesis:ListStreams</td>
</tr>
<tr>
<td></td>
<td>kinesis:DescribeStream</td>
</tr>
</tbody>
</table>

**Agent events section**

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>View data streaming - Agent events</td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td></td>
<td>connect:ListInstanceStorageConfigs</td>
</tr>
<tr>
<td></td>
<td>connect:DescribeInstanceStorageConfig</td>
</tr>
<tr>
<td>Edit agent events</td>
<td>connect:AssociateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>connect:UpdateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>connect:DisassociateInstanceStorageConfig</td>
</tr>
<tr>
<td></td>
<td>kinesis:ListStreams</td>
</tr>
<tr>
<td></td>
<td>kinesis: DescribeStream</td>
</tr>
</tbody>
</table>

**Application integration page**

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>View approved origins</td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td></td>
<td>connect:ListApprovedOrigins</td>
</tr>
<tr>
<td>Edit approved origins</td>
<td>connect: AssociateApprovedOrigin</td>
</tr>
<tr>
<td></td>
<td>connect:ListApprovedOrigins</td>
</tr>
<tr>
<td></td>
<td>connect:DisassociateApprovedOrigin</td>
</tr>
</tbody>
</table>

**Tasks page**

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>View Tasks integrations</td>
<td>app-integrations:GetEventIntegration</td>
</tr>
<tr>
<td></td>
<td>connect:ListIntegrationAssociations</td>
</tr>
<tr>
<td>Edit Tasks integrations</td>
<td>app-integrations:CreateEventIntegration</td>
</tr>
<tr>
<td></td>
<td>app-integrations:GetEventIntegration</td>
</tr>
<tr>
<td></td>
<td>app-integrations:ListEventIntegrations</td>
</tr>
<tr>
<td></td>
<td>app-integrations:DeleteEventIntegrationAssociation</td>
</tr>
<tr>
<td>Action/Use case</td>
<td>Permissions needed</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>app-integrations:CreateEventIntegrationAssociation</td>
<td>appflow:CreateFlow</td>
</tr>
<tr>
<td>appflow:CreateFlow</td>
<td>appflow:CreateConnectorProfile</td>
</tr>
<tr>
<td>appflow:DescribeFlow</td>
<td>appflow:DeleteFlow</td>
</tr>
<tr>
<td>appflow:DeleteConnectorProfile</td>
<td>appflow:DescribeConnectorEntity</td>
</tr>
<tr>
<td>appflow:ListFlows</td>
<td>appflow:ListConnectorEntities</td>
</tr>
<tr>
<td>appflow:StartFlow</td>
<td>connect:ListIntegrationAssociations</td>
</tr>
<tr>
<td>connect:DeleteIntegrationAssociation</td>
<td>connect:DeleteUseCase</td>
</tr>
<tr>
<td>connect:ListUseCases</td>
<td>events:ActivateEventSource</td>
</tr>
<tr>
<td>connect:DeleteUseCase</td>
<td>events:CreateEventBus</td>
</tr>
<tr>
<td>events:DescribeEventBus</td>
<td>events:DescribeEventSource</td>
</tr>
<tr>
<td>events:DescribeEventSource</td>
<td>events:ListEventSources</td>
</tr>
<tr>
<td>events:ListTargetsByRule</td>
<td>events:ListTargetsByRule</td>
</tr>
<tr>
<td>events:PutRule</td>
<td>events:PutTargets</td>
</tr>
<tr>
<td>events:PutTargets</td>
<td>events:DeleteRule</td>
</tr>
<tr>
<td>events:RemoveTargets</td>
<td>kms:CreateGrant</td>
</tr>
<tr>
<td>kms:CreateGrant</td>
<td>kms:DescribeKey</td>
</tr>
<tr>
<td>kms:DescribeKey</td>
<td>kms:ListAliases</td>
</tr>
<tr>
<td>kms:ListKeys</td>
<td>kms:ListGrants</td>
</tr>
</tbody>
</table>
## Customer profiles page

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>View customer profiles</td>
<td>appflow:DescribeFlow</td>
</tr>
<tr>
<td></td>
<td>appflow:DescribeConnectorEntity</td>
</tr>
<tr>
<td></td>
<td>appflow:ListFlows</td>
</tr>
<tr>
<td></td>
<td>appflow:ListConnectorEntities</td>
</tr>
<tr>
<td></td>
<td>appflow:ListConnectorProfiles</td>
</tr>
<tr>
<td></td>
<td>kms:ListKeys</td>
</tr>
<tr>
<td></td>
<td>profile:ListDomains</td>
</tr>
<tr>
<td></td>
<td>profile:ListAccountIntegrations</td>
</tr>
<tr>
<td></td>
<td>sqs:ListQueues</td>
</tr>
<tr>
<td>Edit customer profiles</td>
<td>appflow:CreateFlow</td>
</tr>
<tr>
<td></td>
<td>appflow:CreateConnectorProfile</td>
</tr>
<tr>
<td></td>
<td>appflow:DescribeFlow</td>
</tr>
<tr>
<td></td>
<td>appflow:DeleteFlow</td>
</tr>
<tr>
<td></td>
<td>appflow:DescribeConnectorEntity</td>
</tr>
<tr>
<td></td>
<td>appflow:ListFlows</td>
</tr>
<tr>
<td></td>
<td>appflow:ListConnectorEntities</td>
</tr>
<tr>
<td></td>
<td>appflow:ListConnectorProfiles</td>
</tr>
<tr>
<td></td>
<td>appflow:StartFlow</td>
</tr>
<tr>
<td></td>
<td>appflow:StopFlow</td>
</tr>
<tr>
<td></td>
<td>kms:ListKeys</td>
</tr>
<tr>
<td></td>
<td>profile:CreateDomain</td>
</tr>
<tr>
<td></td>
<td>profile:DeleteIntegration</td>
</tr>
<tr>
<td></td>
<td>profile:DeleteDomain</td>
</tr>
<tr>
<td></td>
<td>profile:ListDomains</td>
</tr>
<tr>
<td></td>
<td>profile:ListAccountIntegrations</td>
</tr>
<tr>
<td></td>
<td>profile:ListAccountIntegrations</td>
</tr>
<tr>
<td></td>
<td>profile:ListAccountIntegrations</td>
</tr>
<tr>
<td></td>
<td>profile:PutIntegration</td>
</tr>
<tr>
<td></td>
<td>profile:UpdateDomain</td>
</tr>
<tr>
<td></td>
<td>kms:ListGrants</td>
</tr>
<tr>
<td></td>
<td>kms:ListGrants</td>
</tr>
<tr>
<td></td>
<td>kms:ListGrants</td>
</tr>
<tr>
<td></td>
<td>kms:DescribeKey</td>
</tr>
</tbody>
</table>
### Required permissions for custom IAM policies

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kms:ListAliases</td>
</tr>
<tr>
<td></td>
<td>kms:ListKeys</td>
</tr>
<tr>
<td></td>
<td>sqs:ListQueues</td>
</tr>
</tbody>
</table>

**Contact flows page**

**Contact flows security keys section**

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>View contact flow security keys</td>
<td>connect:DescribeInstance</td>
</tr>
<tr>
<td></td>
<td>connect:ListSecurityKeys</td>
</tr>
<tr>
<td>Add/remove contact flow security keys</td>
<td>connect:AssociateSecurityKey</td>
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<tr>
<td></td>
<td>connect:DisassociateSecurityKey</td>
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</tbody>
</table>

**Lex bots section**

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>View Lex bots</td>
<td>connect:ListLexBots</td>
</tr>
<tr>
<td></td>
<td>connect:ListBots</td>
</tr>
<tr>
<td>Add/remove Lex bots</td>
<td>lex:GetBots</td>
</tr>
<tr>
<td></td>
<td>lex:GetBot</td>
</tr>
<tr>
<td></td>
<td>lex:CreateResourcePolicy</td>
</tr>
<tr>
<td></td>
<td>lex:DeleteResourcePolicy</td>
</tr>
<tr>
<td></td>
<td>lex:UpdateResourcePolicy</td>
</tr>
<tr>
<td></td>
<td>lex:DescribeBotAlias</td>
</tr>
<tr>
<td></td>
<td>lex:ListBotAliases</td>
</tr>
<tr>
<td></td>
<td>lex:ListBots</td>
</tr>
<tr>
<td></td>
<td>connect:AssociateBot</td>
</tr>
<tr>
<td></td>
<td>connect:DisassociateBot</td>
</tr>
<tr>
<td></td>
<td>connect:ListBots</td>
</tr>
<tr>
<td></td>
<td>connect:AssociateLexBot</td>
</tr>
<tr>
<td></td>
<td>connect:DisassociateLexBot</td>
</tr>
<tr>
<td></td>
<td>connect:ListLexBots</td>
</tr>
</tbody>
</table>
### Lambda functions section

<table>
<thead>
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<tbody>
<tr>
<td>View Lambda functions</td>
<td>connect:ListLambdaFunctions</td>
</tr>
<tr>
<td>Add/remove Lambda functions</td>
<td>connect:ListLambdaFunctions connect:AssociateLambdaFunction connect:DisassociateLambdaFunction lambda:ListFunctions lambda:AddPermission lambda:RemovePermission</td>
</tr>
</tbody>
</table>

### Contact flow logs section

<table>
<thead>
<tr>
<th>Action/Use case</th>
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<tbody>
<tr>
<td>View contact flow log config</td>
<td>connect:DescribeInstance connect:DescribeInstanceAttribute</td>
</tr>
<tr>
<td>Enable/disable contact flow log</td>
<td>logs:CreateLogGroup</td>
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### Amazon Polly section

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<tbody>
<tr>
<td>View Amazon Polly option</td>
<td>connect:DescribeInstance connect:DescribeInstanceAttribute</td>
</tr>
<tr>
<td>Update Amazon Polly option</td>
<td>connect:UpdateInstanceAttribute</td>
</tr>
</tbody>
</table>

### Federations

#### SAML federation

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAML federation</td>
<td>connect:GetFederationToken</td>
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</table>

#### Admin/Emergency federation

<table>
<thead>
<tr>
<th>Action/Use case</th>
<th>Permissions needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin/Emergency federation</td>
<td>connect:GetFederationTokens</td>
</tr>
</tbody>
</table>
Restrict AWS resources that can be associated with Amazon Connect

Each Amazon Connect instance is associated with an IAM service-linked role when the instance is created. Amazon Connect can integrate with other AWS services for use cases such as call recording storage (Amazon S3 bucket), natural language bots (Amazon Lex bots), and data streaming (Amazon Kinesis Data Streams). Amazon Connect assumes the service-linked role to interact with these other services. The policy is first added to the service-linked role as part of corresponding APIs on the Amazon Connect service (that are in turn called by the AWS console). For example, if you want to use a certain Amazon S3 bucket with your Amazon Connect instance, the bucket must be passed to the AssociateInstanceStorageConfig API.

For the set of IAM actions defined by Amazon Connect, see Actions defined by Amazon Connect.

Following are some examples of how to restrict access to other resources that may be associated with an Amazon Connect instance. They should be applied to the IAM User or Role that is interacting with Amazon Connect APIs or the Amazon Connect console.

**Note**
A policy with an explicit Deny would override the Allow policy in these examples.

For more information about what resources, condition keys, and dependent APIs you can use to restrict access, see Actions, resources, and condition keys for Amazon Connect.

**Example 1: Restrict which Amazon S3 buckets can be associated with an Amazon Connect instance**

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": [
                "connect:UpdateInstanceStorageConfig",
                "connect:AssociateInstanceStorageConfig"
            ],
            "Condition": {
                "StringEquals": {
                    "connect:StorageResourceType": "CALL_RECORDINGS"
                }
            }
        },
        {
            "Sid": "VisualEditor1",
            "Effect": "Allow",
            "Action": [
                "iam:PutRolePolicy",
                "s3:GetBucketAcl",
                "s3:GetBucketLocation"
            ],
            "Resource": ["arn:aws:iam::account-id:role/aws-service-role/connect.amazonaws.com/*",
                         "arn:aws:s3:::s3-bucket-name"
            ],
        },
        {
            "Sid": "VisualEditor2",
        }
    ]
}
```
Restrict AWS resources that can be associated with Amazon Connect

```
"Effect": "Allow",
"Action": "s3:ListAllMyBuckets",
"Resource": "*"
}
```

This example allows an IAM principal to associate an Amazon S3 bucket for call recordings for the given Amazon Connect instance ARN, and a specific Amazon S3 bucket named `my-connect-recording-bucket`. The `AttachRolePolicy` and `PutRolePolicy` actions are scoped to the Amazon Connect service-linked role (a wildcard is used in this example, but you can provide the role ARN for the instance if needed).

**Note**

To use an AWS KMS key to encrypt recordings in this bucket, an additional policy is needed.

**Example 2: Restrict which AWS Lambda functions can be associated with an Amazon Connect instance**

AWS Lambda functions are associated with an Amazon Connect instance, but the Amazon Connect service-linked role is not used to invoke them, and so is not modified. Instead, a policy is added to the function through the `lambda:AddPermission` API that allows the given Amazon Connect instance to invoke the function.

To restrict which functions can be associated with an Amazon Connect instance, you specify the Lambda function ARN that a user can use to invoke `lambda:AddPermission`:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": [
                "connect:AssociateLambdaFunction",
                "lambda:AddPermission"
            ],
            "Resource": [
                "arn:aws:lambda:*:*:function:my-function"
            ]
        }
    ]
}
```

**Example 3: Restrict which Amazon Kinesis Data Streams can be associated with an Amazon Connect instance**

This example follows a similar model to the Amazon S3 example. It restricts which specific Kinesis Data Streams may be associated with a given Amazon Connect instance for delivering contact trace records.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": [
                "connect:UpdateInstanceStorageConfig",
            ],
        }
    ]
}
```
How Amazon Connect works with IAM

Before you use IAM to manage access to Amazon Connect, you should understand what IAM features are available to use with Amazon Connect. To get a high-level view of how Amazon Connect and other AWS services work with IAM, see AWS Services That Work with IAM in the IAM User Guide.

Topics

- Amazon Connect identity-based policies (p. 837)
- Authorization based on Amazon Connect tags (p. 840)
- Amazon Connect IAM roles (p. 840)

Amazon Connect identity-based policies

With IAM identity-based policies, you can specify allowed or denied actions and resources as well as the conditions under which actions are allowed or denied. Amazon Connect supports specific actions, resources, and condition keys. To learn about all of the elements that you use in a JSON policy, see IAM JSON Policy Elements Reference in the IAM User Guide.

Actions

Administrators can use AWS JSON policies to specify who has access to what. That is, which principal can perform actions on what resources, and under what conditions.

The Action element of a JSON policy describes the actions that you can use to allow or deny access in a policy. Policy actions usually have the same name as the associated AWS API operation. There are some exceptions, such as permission-only actions that don’t have a matching API operation. There are also some operations that require multiple actions in a policy. These additional actions are called dependent actions.
Include actions in a policy to grant permissions to perform the associated operation.

Policy actions in Amazon Connect use the following prefix before the action: `connect:`. Policy statements must include either an `Action` or `NotAction` element. Amazon Connect defines its own set of actions that describe tasks that you can perform with this service.

To specify multiple actions in a single statement, separate them with commas as follows:

```
"Action": [  
  "connect:action1",  
  "connect:action2"
]
```

You can specify multiple actions using wildcards (*). For example, to specify all actions that begin with the word `describe`, include the following action:

```
"Action": "connect:Describe*"
```

To see a list of Amazon Connect actions, Actions, Resources, and Condition Keys for Amazon Connect in the IAM User Guide.

**Resources**

Amazon Connect supports resource-level permissions (specifying a resource ARN in an IAM policy). Following is a list of Amazon Connect resources:

- Instance
- Contact
- User
- Routing profile
- Security profile
- Hierarchy group
- Queue
- Contact flow
- Hours of operation
- Phone number
- Customer profile domain
- Customer profile object type
- High-volume outbound campaigns

Administrators can use AWS JSON policies to specify who has access to what. That is, which **principal** can perform **actions** on what **resources**, and under what **conditions**.

The **Resource** JSON policy element specifies the object or objects to which the action applies. Statements must include either a **Resource** or a **NotResource** element. As a best practice, specify a resource using its Amazon Resource Name (ARN). You can do this for actions that support a specific resource type, known as **resource-level permissions**.

For actions that don't support resource-level permissions, such as listing operations, use a wildcard (*) to indicate that the statement applies to all resources.

```
"Resource": "*
```

The Amazon Connect instance resource has the following ARN:
For more information about the format of ARNs, see Amazon Resource Names (ARNs) and AWS Service Namespaces.

For example, to specify the `i-1234567890abcdef0` instance in your statement, use the following ARN:

```
"Resource": "arn:aws:connect:us-east-1:123456789012:instance/i-1234567890abcdef0"
```

To specify all instances that belong to a specific account, use the wildcard (*):

```
"Resource": "arn:aws:connect:us-east-1:123456789012:instance/*"
```

Some Amazon Connect actions, such as those for creating resources, cannot be performed on a specific resource. In those cases, you must use the wildcard (*).

```
"Resource": "*"
```

Many Amazon Connect API actions involve multiple resources. For example,

To specify multiple resources in a single statement, separate the ARNs with commas.

```
"Resource": [  
  "resource1",  
  "resource2"
]
```

To see a list of Amazon Connect resource types and their ARNs, see Actions, Resources, and Condition Keys for Amazon Connect in the IAM User Guide. The same article explains with which actions you can specify the ARN of each resource.

### Condition keys

Administrators can use AWS JSON policies to specify who has access to what. That is, which principal can perform actions on what resources, and under what conditions.

The Condition element (or Condition block) lets you specify conditions in which a statement is in effect. The Condition element is optional. You can create conditional expressions that use condition operators, such as equals or less than, to match the condition in the policy with values in the request.

If you specify multiple Condition elements in a statement, or multiple keys in a single Condition element, AWS evaluates them using a logical AND operation. If you specify multiple values for a single condition key, AWS evaluates the condition using a logical OR operation. All of the conditions must be met before the statement's permissions are granted.

You can also use placeholder variables when you specify conditions. For example, you can grant an IAM user permission to access a resource only if it is tagged with their IAM user name. For more information, see IAM policy elements: variables and tags in the IAM User Guide.

AWS supports global condition keys and service-specific condition keys. To see all AWS global condition keys, see AWS global condition context keys in the IAM User Guide.

Amazon Connect defines its own set of condition keys and also supports using some global condition keys. To see all AWS global condition keys, see AWS Global Condition Context Keys in the IAM User Guide.

All Amazon EC2 actions support the `aws:RequestedRegion` and `ec2:Region` condition keys. For more information, see Example: Restricting Access to a Specific Region.
To see a list of Amazon Connect condition keys, see Actions, Resources, and Condition Keys for Amazon Connect in the IAM User Guide.

**Examples**

To view examples of Amazon Connect identity-based policies, see Amazon Connect identity-based policy examples (p. 840).

**Authorization based on Amazon Connect tags**

You can attach tags to Amazon Connect resources or pass tags in a request to Amazon Connect. To control access based on tags, you provide tag information in the condition element of a policy using the connect:ResourceTag/*key-name*, aws:RequestTag/*key-name*, or aws:TagKeys condition keys.

To view an example identity-based policy for limiting access to a resource based on the tags on that resource, see Describe and update Amazon Connect users based on tags (p. 843).

**Amazon Connect IAM roles**

An IAM role is an entity within your AWS account that has specific permissions.

**Using temporary credentials with Amazon Connect**

You can use temporary credentials to sign in with federation, assume an IAM role, or to assume a cross-account role. You obtain temporary security credentials by calling AWS STS API operations such as AssumeRole or GetFederationToken.

Amazon Connect supports using temporary credentials.

**Service-linked roles**

Service-linked roles allow AWS services to access resources in other services to complete an action on your behalf. Service-linked roles appear in your IAM account and are owned by the service. An IAM administrator can view but not edit the permissions for service-linked roles.

Amazon Connect supports service-linked roles. For details about creating or managing Amazon Connect service-linked roles, see Use service-linked roles for Amazon Connect (p. 853).

**Choosing an IAM role in Amazon Connect**

When you create a resource in Amazon Connect, you must choose a role to allow Amazon Connect to access Amazon EC2 on your behalf. If you have previously created a service role or service-linked role, then Amazon Connect provides you with a list of roles to choose from. It's important to choose a role that allows access to start and stop Amazon EC2 instances.

**Amazon Connect identity-based policy examples**

By default, IAM users and roles don't have permission to create or modify Amazon Connect resources. They also can't perform tasks using the AWS Management Console, AWS CLI, or AWS API. An IAM administrator must create IAM policies that grant users and roles permission to perform specific API operations on the specified resources they need. The administrator must then attach those policies to the IAM users or groups that require those permissions.

To learn how to create an IAM identity-based policy using these example JSON policy documents, see Creating Policies on the JSON Tab in the IAM User Guide.
Identity-based policy examples

- Policy best practices (p. 841)
- Allow IAM users to view their own permissions (p. 841)
- Grant "View User" permissions (p. 842)
- Allow IAM users to integrate with external applications (p. 842)
- Describe and update Amazon Connect users based on tags (p. 843)
- Create Amazon Connect users based on tags (p. 843)
- Create and view Amazon AppIntegrations resources (p. 844)
- Manage Amazon Connect High-Volume Outbound Communications resources (p. 844)

Policy best practices

Identity-based policies are very powerful. They determine whether someone can create, access, or delete Amazon Connect resources in your account. These actions can incur costs for your AWS account. When you create or edit identity-based policies, follow these guidelines and recommendations:

- **Get started using AWS managed policies** – To start using Amazon Connect quickly, use AWS managed policies to give your employees the permissions they need. These policies are already available in your account and are maintained and updated by AWS. For more information, see Get started using permissions with AWS managed policies in the IAM User Guide.
- **Grant least privilege** – When you create custom policies, grant only the permissions required to perform a task. Start with a minimum set of permissions and grant additional permissions as necessary. Doing so is more secure than starting with permissions that are too lenient and then trying to tighten them later. For more information, see Grant least privilege in the IAM User Guide.
- **Enable MFA for sensitive operations** – For extra security, require IAM users to use multi-factor authentication (MFA) to access sensitive resources or API operations. For more information, see Using multi-factor authentication (MFA) in AWS in the IAM User Guide.
- **Use policy conditions for extra security** – To the extent that it's practical, define the conditions under which your identity-based policies allow access to a resource. For example, you can write conditions to specify a range of allowable IP addresses that a request must come from. You can also write conditions to allow requests only within a specified date or time range, or to require the use of SSL or MFA. For more information, see IAM JSON policy elements: Condition in the IAM User Guide.

Allow IAM users to view their own permissions

This example shows how you might create a policy that allows IAM users to view the inline and managed policies that are attached to their user identity. This policy includes permissions to complete this action on the console or programmatically using the AWS CLI or AWS API.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Sid": "ViewOwnUserInfo",
         "Effect": "Allow",
         "Action": [
            "iam:GetUserPolicy",
            "iam:ListGroupsForUser",
            "iam:ListAttachedUserPolicies",
            "iam:ListUserPolicies",
            "iam:GetUser"
         ],
         "Resource": [
            "arn:aws:iam::*:user/${aws:username}"
         ]
      },
      {
```
Identity-based policy examples

Grant "View User" permissions

When you create an IAM user or group in your AWS account, you can associate an IAM policy with that group or user, which specifies the permissions that you want to grant.

For example, imagine you have a group of entry-level developers. You can create an IAM group named Junior application developers, and include all entry-level developers. Then, associate a policy with that group that grants them permissions to view Amazon Connect users. In this scenario, you might have a policy such as the following sample.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": ["connect:DescribeUser", "connect:ListUsers"],
            "Resource": "*",
        }
    ]
}
```

This sample policy grants permissions to API actions listed in the Action element.

**Note**
If you don't specify a user ARN or ID in your statement, you must also grant the permission to use all resources for the action using the "*" wildcard for the Resource element.

Allow IAM users to integrate with external applications

This example shows how you might create a policy that allows IAM users to interact with their external application integrations.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AllowAllAppIntegrationsActions",
            "Effect": "Allow",
            "Action": ["app-integrations:ListEventIntegrations",
            "app-integrations:CreateEventIntegration",
            "app-integrations:GetEventIntegration",
            "app-integrations:DeleteEventIntegration",
            "app-integrations:UpdateEventIntegration",
            "app-integrations:DescribeEventIntegration",
            "app-integrations:ListEventIntegrations"
        },
    ]
}
```
Describe and update Amazon Connect users based on tags

In an IAM policy, you can optionally specify conditions that control when a policy is in effect. For example, you can define a policy that allows IAM users to update only an Amazon Connect user who is working in the test environment.

You can define some conditions that are specific to Amazon Connect, and define other conditions that apply to all of AWS. For more information and a list of AWS-wide conditions, see Condition in IAM JSON Policy Elements Reference in the IAM User Guide.

The following sample policy allows the "describe" and "update" actions for users with specific tags.

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "connect:DescribeUser",
            "connect:UpdateUser"
         ],
         "Resource": "*",
         "Condition": {
            "StringEquals": {
               "aws:ResourceTag/Department": "Test"
            }
         }
      }
   ]
}
```

This policy allows "describe user" and "update user" but only for those Amazon Connect users tagged with tag "Department: Test" where "Department" is the tag key and "Test" is the tag value.

Create Amazon Connect users based on tags

The following sample policy allows the create actions for users with specific request tags.

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "connect:CreateUser",
            "connect:TagResource"
         ],
         "Resource": "*",
         "Condition": {
            "StringEquals": {
               "aws:ResourceTag/Department": "Test"
            }
         }
      }
   ]
}
```
This policy allows "create user" and "tag resource" but the tag "Owner: TeamA" must be present in the requests.

**Create and view Amazon AppIntegrations resources**

The following sample policy allows event integrations to be created, listed, and fetched.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "app-integrations:CreateEventIntegration",
                "app-integrations:GetEventIntegration",
                "app-integrations::ListEventIntegrations"
            ],
            "Resource": "*"
        }
    ]
}
```

**Manage Amazon Connect High-Volume Outbound Communications resources**

Onboarding permissions: The following sample policy allows Amazon Connect instances to be onboarded to Amazon Connect High-Volume Outbound Communications.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": [
                "connect:DescribeInstance",
                "kms:DescribeKey",
                "kms:CreateGrant"
            ],
            "Resource": [
                "arn:aws:kms:region:account-id:key/key-id",
                "arn:aws:connect:region:account-id:instance/instance-id"
            ]
        },
        {
            "Sid": "VisualEditor1",
            "Effect": "Allow",
            "Action": [
                "events:PutTargets",
                "iam:CreateServiceLinkedRole",
                "events:PutRule",
                "ds:DescribeDirectories"
            ]
        }
    ]
}
```
Management permissions: The following sample policy allows all read and write operations on the high-volume outbound campaigns.

```
{
    "Sid": "AllowConnectCampaignsOperations",
    "Effect": "Allow",
    "Action": [
        "connect-campaigns:CreateCampaign",
        "connect-campaigns:DeleteCampaign",
        "connect-campaigns:DescribeCampaign",
        "connect-campaigns:UpdateCampaignName",
        "connect-campaigns:GetCampaignState",
        "connect-campaigns:UpdateOutboundCallConfig",
        "connect-campaigns:UpdateDialerConfig",
        "connect-campaigns:PauseCampaign",
        "connect-campaigns:ResumeCampaign",
        "connect-campaigns:StopCampaign",
        "connect-campaigns:GetCampaignStateBatch",
        "connect-campaigns:ListCampaigns"
    ],
    "Resource": "*"
}
```

ReadOnly permissions: The following sample policy allows read-only access to the campaigns.

```
{
    "Sid": "AllowConnectCampaignsReadOnlyOperations",
    "Effect": "Allow",
    "Action": [
        "connect-campaigns:DescribeCampaign",
        "connect-campaigns:GetCampaignState",
        "connect-campaigns:GetCampaignStateBatch",
        "connect-campaigns:ListCampaigns"
    ],
    "Resource": "*",
}
```

Tag-based permissions: The following sample policy restricts access to the campaigns integrated with a particular Amazon Connect instance using tags. More permissions can be added based on the use case.

```
{
    "Sid": "AllowConnectCampaignsOperations",
    "Effect": "Allow",
    "Action": [
        "connect-campaigns:DescribeCampaign",
        "connect-campaigns:GetCampaignState"
    ],
    "Resource": "*",
    "Condition": {
        "StringEquals": {
        }
    }
}
```
Note
connect-campaigns:ListCampaigns and connect-campaigns:GetCampaignStateBatch operations cannot be restricted by Tag.

Permissions required to call PutDialRequestBatch:
You need to create this role in your account. However, this API cannot be called directly. The role created should be used in Amazon Pinpoint Journey to send contacts to campaign. AWS KMS permission is only needed if your instance was onboarded with a customer managed key in your account. If an AWS owned key was used, you can remove AWS KMS permission.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "VisualEditor0",
      "Effect": "Allow",
      "Action": "kms:Decrypt",
      "Resource": "arn:aws:kms:region:account-id:key/key-id"
    },
    {
      "Sid": "VisualEditor1",
      "Effect": "Allow",
      "Action": "connect-campaigns:PutDialRequestBatch",
    }
  ]
}
```

Trust policy:
```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "Service": "pinpoint.amazonaws.com"
      },
      "Action": "sts:AssumeRole"
    }
  ]
}
```

Amazon Connect resource-level policy examples

Amazon Connect supports resource-level permissions for IAM users, so you can specify actions for them for an instance, as shown in the following policies.

**Deny the "delete" and "update" actions**

This following sample policy denies the "delete" and "update" actions for users in one Amazon Connect instance. It uses a wild card at the end of the Amazon Connect user ARN so that "delete user" and "update user" are denied on the full user ARN (that is, all Amazon Connect users in the provided instance, such as arn:aws:connect:us-east-1:123456789012:instance/00fbeee1-123e-111e-93e3-11111bfbfcc1/agent/00dtcddd1-123e-111e-93e3-11111bfbfcc1).

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Deny",
      "Principal": {
        "Sid": "VisualEditor0",
        "Effect": "Deny",
        "Action": "connect-campaigns:ListCampaigns",
      },
      "Action": "connect-campaigns:GetCampaignStateBatch",
    }
  ]
}
```
Allow actions for integrations with specific names

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Sid": "AllowAllAppIntegrationsActions",
         "Effect": "Allow",
         "Action": [
            "app-integrations:ListEventIntegrations",
            "app-integrations:CreateEventIntegration",
            "app-integrations:GetEventIntegration",
            "app-integrations:UpdateEventIntegration",
            "app-integrations:DeleteEventIntegration"
        ],
         "Resource": "arn:aws:appintegrations::*::*:event-integration/MyNamePrefix-*"
      }
   ]
}
```

Allow "create users" but deny if you're assigned to a specific security profile

The following sample policy allows "create users" but explicitly denies using arn:aws:connect:us-west-2:123456789012:instance/00fbeee1-123e-111e-93e3-11111bfbfcc1/security-profile/11dtcggg1-123e-111e-93e3-11111bfbfcc17 as the parameter for security profile in CreateUser request.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "connect:CreateUser"
        ],
         "Resource": "*",
      },
      {
         "Effect": "Deny",
         "Action": [
            "connect:CreateUser"
        ],
      }
   ]
}
```
Allow recording actions on a contact

The following sample policy allows "start contact recording" on a contact in a specific instance. Since contactID is dynamic, * is used.

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Action": ["connect:StartContactRecording"],
         "Resource": "arn:aws:connect:us-west-2:accountID:instance/instanceId/contact/*",
         "Effect": "Allow"
      }
   ]
}
```

Set up a trusted relationship with `accountID`.

The following actions are defined for the recording APIs:

- "connect:StartContactRecording"
- "connect:StopContactRecording"
- "connect:SuspendContactRecording"
- "connect:ResumeContactRecording"

Allow more contact Actions in the same role

If the same role is used to calling other contact APIs, you can list the following contact actions:

- GetContactAttributes
- ListContactFlows
- StartChatContact
- StartOutboundVoiceContact
- StopContact
- UpdateContactAttributes

Or use a wildcard to allow all contact actions, for example: "connect:*"

Allow more resources

You can also use a wildcard to allow more resources. For example, here's how to allow contact actions on all contact resources:

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Action": ["connect:*"],
         "Resource": "arn:aws:connect:us-west-2:accountID:instance/*/contact/*",
      }
   ]
}
```
View specific Amazon AppIntegrations resources

The following sample policy allows a specific event integrations to be fetched.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "app-integrations:GetEventIntegration"
      ],
      "Resource": "arn:aws:app-integrations:us-west-2:accountID:event-integration/Name"
    }
  ]
}
```

Grant access to Amazon Connect Customer Profiles

Amazon Connect Customer Profiles use `profile` as the prefix for actions instead of `connect`. The following policy grants full access to a specific domain in Amazon Connect Customer Profiles.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "profile:*"
      ],
      "Effect": "Allow"
    }
  ]
}
```

Set up a trusted relationship with `accountID` to domain `domainName`.

Grant read-only access to Customer Profiles data

Following is an example for granting read access to the data in Amazon Connect Customer Profiles.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "profile:SearchProfiles",
        "profile:ListObjects"
      ],
      "Effect": "Allow"
    }
  ]
}
```
Grant access to Amazon Connect High-Volume Outbound Communications resources

Amazon Connect High-Volume Outbound Communications uses connect-campaign as the prefix for actions instead of connect. The following policy grants full access to a specific high-volume outbound campaign.

```json
{
    "Sid": "AllowConnectCampaignsOperations",
    "Effect": "Allow",
    "Action": [
        "connect-campaigns:DeleteCampaign",
        "connect-campaigns:DescribeCampaign",
        "connect-campaigns:UpdateCampaignName",
        "connect-campaigns:GetCampaignState"
        "connect-campaigns:UpdateOutboundCallConfig",
        "connect-campaigns:UpdateDialerConfig",
        "connect-campaigns:PauseCampaign",
        "connect-campaigns:ResumeCampaign",
        "connect-campaigns:StopCampaign"
    ],
}
```

AWS managed policies for Amazon Connect

To add permissions to users, groups, and roles, it is more efficient to use AWS managed policies than to write policies yourself. It takes time and expertise to create IAM customer managed policies that provide your team with only the permissions that they need. To get started quickly, you can use AWS managed policies. These policies cover common use cases and are available in your AWS account. For more information about AWS managed policies, see AWS managed policies in the IAM User Guide.

AWS services maintain and update AWS managed policies. You can't change the permissions in AWS managed policies. Services occasionally add additional permissions to an AWS managed policy to support new features. This type of update affects all identities (users, groups, and roles) where the policy is attached. Services are most likely to update an AWS managed policy when a new feature is launched or when new operations become available. Services do not remove permissions from an AWS managed policy, so policy updates won't break your existing permissions.

Additionally, AWS supports managed policies for job functions that span multiple services. For example, the ReadOnlyAccess AWS managed policy provides read-only access to all AWS services and resources. When a service launches a new feature, AWS adds read-only permissions for new operations and resources. For a list and descriptions of job function policies, see AWS managed policies for job functions in the IAM User Guide.

AWS managed policy: AmazonConnect_FullAccess

To allow full read/write access to Amazon Connect, you must attach two policies to your IAM users, groups, or roles. Attach the AmazonConnect_FullAccess policy and a custom policy with the following contents:

```json
{
    "Version": "2012-10-17",
    "Statement": [
        
    "Sid": "AttachAnyPolicyToAmazonConnectRole",
```
To allow an IAM user to create an instance, ensure that they have the permissions granted by the AmazonConnect_FullAccess policy.

When you use AmazonConnect_FullAccess policy, note the following:

- The `iam:PutRolePolicy` allows the user who gets that policy to configure any resource in the account to work with Amazon Connect. Because it grants such broad permissions, only assign it when necessary. Instead, create the service-linked role with access to the necessary resources and let the user have access to pass the service-linked role to Amazon Connect (which is granted by the AmazonConnect_FullAccess policy).
- Additional privileges are required to create a Amazon S3 bucket with a name of your choosing, or use an existing bucket while creating or updating an instance from the Amazon Connect console. If you choose default storage locations for your call recordings, chat transcripts, call transcripts, etc, they are now prefixed with "amazon-connect-".
- The `aws/connect KMS key is available to use as a default encryption option. To use a custom encryption key, assign users additional KMS privileges.
- Assign users additional privileges to attach other AWS resources like Amazon Polly, Live Media Streaming, Data Streaming, and Lex bots to their Amazon Connect instances.

For more information and detailed permissions, see [Required permissions for using custom IAM policies to manage access to the Amazon Connect console](p. 823).

### AWS managed policy: AmazonConnectReadOnlyAccess

To allow read-only access, you need to attach only the AmazonConnectReadOnlyAccess policy.

### Amazon Connect updates to AWS managed policies

View details about updates to AWS managed policies for Amazon Connect since this service began tracking these changes. For automatic alerts about changes to this page, subscribe to the RSS feed on the [Amazon Connect Document history](p. 965) page.

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AmazonConnectCampaignsServiceLinkedRolePolicy</strong></td>
<td>– Added new service-linked role policy for Amazon Connect High-Volume Outbound Communications. The policy provides access to retrieve all the high-volume outbound campaigns.</td>
<td>September 27, 2021</td>
</tr>
<tr>
<td><strong>AmazonConnectServiceLinkedRolePolicy</strong></td>
<td>– Added actions for Amazon Lex bots created in the account across all Regions. These actions were added.</td>
<td>June 15, 2021</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>Amazon Connect started tracking changes</td>
<td>Amazon Connect started tracking changes for its AWS managed policies.</td>
<td>June 15, 2021</td>
</tr>
</tbody>
</table>
| Added actions for Amazon Lex | Added the following actions for the all bots created in the account across all Regions. These actions were added to support integration with Amazon Lex.  
  - lex:ListBots  
  - lex:ListBotAliases | June 15, 2021 |
| AmazonConnect_FullAccess (p. 823) | – Added actions for Amazon Lex to support integration with Amazon Lex.  
  - lex:ListBots - Lists all the bots available in a given Region for your account.  
  - lex:ListBotAliases - Lists all the aliases for a given bot. | June 15, 2021 |

Troubleshooting Amazon Connect identity and access

Use the following information to help you diagnose and fix common issues that you might encounter when working with Amazon Connect and IAM.

**Topics**
- I am not authorized to perform iam:PassRole (p. 852)
- I want to view my access keys (p. 853)
- I'm an administrator and want to allow others to access Amazon Connect (p. 853)
- I want to allow people outside of my AWS account to access my Amazon Connect resources (p. 853)

**I am not authorized to perform iam:PassRole**

If you receive an error that you're not authorized to perform the `iam:PassRole` action, then you must contact your administrator for assistance. Your administrator is the person that provided you with your user name and password. Ask that person to update your policies to allow you to pass a role to Amazon Connect.

Some AWS services allow you to pass an existing role to that service, instead of creating a new service role or service-linked role. To do this, you must have permissions to pass the role to the service.

The following example error occurs when an IAM user named `marymajor` tries to use the console to perform an action in Amazon Connect. However, the action requires the service to have permissions granted by a service role. Mary does not have permissions to pass the role to the service.

```
User: arn:aws:iam::123456789012:user/marymajor is not authorized to perform: iam:PassRole
```

In this case, Mary asks her administrator to update her policies to allow her to perform the `iam:PassRole` action.
I want to view my access keys

After you create your IAM user access keys, you can view your access key ID at any time. However, you can’t view your secret access key again. If you lose your secret key, you must create a new access key pair.

Access keys consist of two parts: an access key ID (for example, AKIAIOSFODNN7EXAMPLE) and a secret access key (for example, wJalrXUtnFEMI/K7MDENG/bPxRfiCYEXAMPLEKEY). Like a user name and password, you must use both the access key ID and secret access key together to authenticate your requests. Manage your access keys as securely as you do your user name and password.

Important
Do not provide your access keys to a third party, even to help find your canonical user ID. By doing this, you might give someone permanent access to your account.

When you create an access key pair, you are prompted to save the access key ID and secret access key in a secure location. The secret access key is available only at the time you create it. If you lose your secret access key, you must add new access keys to your IAM user. You can have a maximum of two access keys. If you already have two, you must delete one key pair before creating a new one. To view instructions, see Managing access keys in the IAM User Guide.

I’m an administrator and want to allow others to access Amazon Connect

To allow others to access Amazon Connect, you must create an IAM entity (user or role) for the person or application that needs access. They will use the credentials for that entity to access AWS. You must then attach a policy to the entity that grants them the correct permissions in Amazon Connect.

To get started right away, see Creating your first IAM delegated user and group in the IAM User Guide.

I want to allow people outside of my AWS account to access my Amazon Connect resources

You can create a role that users in other accounts or people outside of your organization can use to access your resources. You can specify who is trusted to assume the role. For services that support resource-based policies or access control lists (ACLs), you can use those policies to grant people access to your resources.

To learn more, consult the following:

- To learn whether Amazon Connect supports these features, see How Amazon Connect works with IAM (p. 837).
- To learn how to provide access to your resources across AWS accounts that you own, see Providing access to an IAM user in another AWS account that you own in the IAM User Guide.
- To learn how to provide access to your resources to third-party AWS accounts, see Providing access to AWS accounts owned by third parties in the IAM User Guide.
- To learn how to provide access through identity federation, see Providing access to externally authenticated users (identity federation) in the IAM User Guide.
- To learn the difference between using roles and resource-based policies for cross-account access, see How IAM roles differ from resource-based policies in the IAM User Guide.

Use service-linked roles for Amazon Connect

Amazon Connect uses AWS Identity and Access Management (IAM) service-linked roles. A service-linked role is a unique type of IAM role that is linked directly to Amazon Connect. Service-linked roles are
Use service-linked roles

Amazon Connect Administrator Guide

predefined by Amazon Connect and include all the permissions that the service requires to call other AWS services on your behalf.

A service-linked role makes setting up Amazon Connect easier because you don't have to manually add the necessary permissions. Amazon Connect defines the permissions of its service-linked roles, and unless defined otherwise, only Amazon Connect can assume its roles. The defined permissions include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

For information about other services that support service-linked roles, see AWS services that work with IAM and look for the services that have Yes in the Service-Linked Role column. Choose a Yes with a link to view the service-linked role documentation for that service.

Service-linked role permissions for Amazon Connect

Amazon Connect uses the service-linked role named AmazonConnectServiceLinkedRolePolicy – Grants Amazon Connect permission to access AWS resources on your behalf.

The AmazonConnectServiceLinkedRolePolicy service-linked role trusts the following services to assume the role:

- connect.amazonaws.com

The role permissions policy allows Amazon Connect to complete the following actions on the specified resources. As you enable additional features in Amazon Connect, additional permissions are added for the service-linked role to access the resources associated with those features:

- Action: all Amazon Connect actions, connect:*, on all Amazon Connect resources.
- Action: Amazon S3 s3:GetObject, s3:GetObjectAcl, s3:PutObject, s3:PutObjectAcl, s3:DeleteObject, s3:GetBucketLocation, and GetBucketAcl for the S3 bucket specified for recorded conversations.
  
  It also grants s3:PutObject, s3:PutObjectAcl, and s3:GetObjectAcl to the bucket specified for exported reports.
- Action: Amazon Kinesis Data Firehose firehose:DescribeDeliveryStream and firehose:PutRecord, and firehose:PutRecordBatch for the delivery stream defined for agent event streams and CTRs.
- Action: Amazon Kinesis Data Streams kinesis:PutRecord, kinesis:PutRecords, and kinesis:DescribeStream for the stream specified for agent event streams and CTRs.
- Action: Amazon Lex lex:PostContent for the bots added to your instance.
- Action: Amazon Lex lex:ListBots, lex:ListBotAliases for the all bots created in the account across all Regions.
- Action: Amazon CloudWatch Logs logs:CreateLogStream, logs:DescribeLogStreams, and logs:PutLogEvents to the CloudWatch Logs group specified for contact flow logging.
- Action: High-Volume Outbound Communications
  
  - connect-campaigns:CreateCampaign
  - connect-campaigns:DeleteCampaign
  - connect-campaigns:DescribeCampaign
  - connect-campaigns:UpdateCampaignName
  - connect-camapigns:GetCamapignState
  - connect-camapigns:GetCamapignStateBatch
  - connect-camapigns:ListCampaigns
  - connect-camapigns:UpdateOutboundCallConfig
- connect-campaigns:UpdateDialerConfig
- connect-campaigns:PauseCampaign
- connect-campaigns:ResumeCampaign
- connect-campaigns:StopCampaign for all operations related to high-volume outbound campaigns.

You must configure permissions to allow an IAM entity (such as a user, group, or role) to create, edit, or delete a service-linked role. For more information, see Service-linked role permissions in the IAM User Guide.

Set up instances created before October 2018 to use service-linked roles

If your instance was created before October 2018, you don't have service-linked roles set up.

Add the connect:* policy on the role that is associated with your Amazon Connect instance. This enables you to access the public API for real-time transcription, and real-time transcription page that utilizes the API.

Create a service-linked role for Amazon Connect

You don't need to manually create a service-linked role. When you create a new instance in Amazon Connect in the AWS Management Console, Amazon Connect creates the service-linked role for you.

If you delete this service-linked role, and then need to create it again, you can use the same process to recreate the role in your account. When you create a new instance in Amazon Connect, Amazon Connect creates the service-linked role for you again.

You can also use the IAM console to create a service-linked role with the Amazon Connect - Full access use case. In the IAM CLI or the IAM API, create a service-linked role with the connect.amazonaws.com service name. For more information, see Creating a service-linked role in the IAM User Guide. If you delete this service-linked role, you can use this same process to create the role again.

Edit a service-linked role for Amazon Connect

Amazon Connect does not allow you to edit the AmazonConnectServiceLinkedRolePolicy service-linked role. After you create a service-linked role, you cannot change the name of the role because various entities might reference the role. However, you can edit the description of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see Editing a service-linked role in the IAM User Guide.

Checking a service-linked role has permissions for Amazon Lex

1. In the navigation pane of the IAM console, choose Roles.
2. Choose the name of the role to modify.

Delete a service-linked role for Amazon Connect

You don't need to manually delete the AmazonConnectServiceLinkedRolePolicy role. When you delete your Amazon Connect instance in the AWS Management Console, Amazon Connect cleans up the resources and deletes the service-linked role for you.

Supported Regions for Amazon Connect service-linked roles

Amazon Connect supports using service-linked roles in all of the regions where the service is available. For more information, see AWS Regions and Endpoints.
Use service-linked roles for Amazon Connect High-Volume Outbound Communications

Amazon Connect High-Volume Outbound Communications uses AWS Identity and Access Management service-linked roles. When an Amazon Connect instance is enabled to use High-Volume Outbound Communications, a unique service linked role is created by Amazon Connect High-Volume Outbound Communications which allows it to perform actions on the Amazon Connect Instance.

A service-linked role makes setting up Amazon Connect High-Volume Outbound Communications easier because you don't have to manually add the necessary permissions. Amazon Connect High-Volume Outbound Communications defines the permissions of its service-linked roles, and unless defined otherwise, only Amazon Connect High-Volume Outbound Communications can assume its roles. The defined permissions include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

For information about other services that support service-linked roles, see AWS services that work with IAM in the IAM User Guide. Look for the services that have Yes in the Service-Linked Role column. Choose a Yes with a link to view the service-linked role documentation for that service.

Service-linked role permissions for Amazon Connect High-Volume Outbound Communications

Amazon Connect High-Volume Outbound Communications uses the service-linked role prefixed AWSServiceRoleForConnectCampaigns—Grants Amazon Connect High-Volume Outbound Communications permission to access AWS resources on your behalf.

The AWSServiceRoleForConnectCampaigns service-linked role trusts the following services to assume the role:

- connect-campaigns.amazonaws.com

The role permissions policy allows Amazon Connect High-Volume Outbound Communications to complete the following actions on the specified resources:

- Action: Amazon Connect High-Volume Outbound Communications connect-campaigns:ListCampaigns for the AWS account.
- Action: Amazon Connect connect:StartOutboundVoiceContact connect:GetMetricData and connect:GetCurrentMetricData for the Amazon Connect instance specified.

You must configure permissions to allow an IAM entity (such as a user, group, or role) to create, edit, or delete a service-linked role. For more information, see Service-linked role permissions in the IAM User Guide.

Create a service-linked role for Amazon Connect High-Volume Outbound Communications

You don't need to manually create a service-linked role. When you associate an Amazon Connect instance with Amazon Connect High-Volume Outbound Communications by invoking PutConnectInstanceConfig API, Amazon Connect High-Volume Outbound Communications creates the service-linked role for you.

If you delete this service-linked role, and then need to create it again, you can use the same process to recreate the role in your account. When you associate a new Amazon Connect instance with
Amazon Connect High-Volume Outbound Communications creates the service-linked role for you again.

**Edit a service-linked role for Amazon Connect High-Volume Outbound Communications**

Amazon Connect High-Volume Outbound Communications does not allow you to edit the AWSServiceRoleForConnectCampaigns service-linked role. After you create a service-linked role, you cannot change the name of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see Editing a service-linked role in the IAM User Guide.

**Delete a service-linked role for Amazon Connect High-Volume Outbound Communications**

If you no longer need Amazon Connect High-Volume Outbound Communications, we recommend that you delete the associated service-linked role. That way you don’t have an unused entity that is not actively monitored or maintained. However, you must clean up the resources for your service-linked role before you can manually delete it.

To delete Amazon Connect High-Volume Outbound Communications resources used by the AWSServiceRoleForConnectCampaigns service-linked role:

- Delete all campaigns setup for the AWS account.
- For this public preview, contact AWS support to delete all configuration so the service-linked role can be deleted safely.

To manually delete the service-linked role using IAM

- Use the IAM console, the AWS CLI, or the AWS API to delete the AWSServiceRoleForConnectCampaigns service-linked role. For more information, see Deleting a service-linked role in the IAM User Guide.

**Supported Regions for Amazon Connect High-Volume Outbound Communications service-linked roles**

Amazon Connect High-Volume Outbound Communications supports using service-linked roles in all of the Regions where the service is available. For more information, see AWS Regions and Endpoints.

**Logging and monitoring Amazon Connect**

Monitoring is important for maintaining the reliability, availability, and performance of your contact center.

You should collect monitoring data from all of the parts of your AWS solution so that you can more easily debug a multipoint failure if one occurs. But before you start monitoring Amazon Connect, you should create a monitoring plan that includes answers to the following questions:

- What are your monitoring goals?
- What data about your Amazon Connect instance will you monitor?
- How often will you monitor your instance?
- What monitoring tools will you use?
Who will perform the monitoring tasks?
Who should be notified when something goes wrong?

See the following topics to learn how to use Amazon CloudWatch Logs and AWS CloudTrail to monitor Amazon Connect and describes the Amazon Connect metrics sent to CloudWatch:

- Monitoring your instance using CloudWatch (p. 804)
- Logging Amazon Connect API calls with AWS CloudTrail (p. 811)

Compliance validation in Amazon Connect

Third-party auditors assess the security and compliance of AWS services as part of multiple AWS compliance programs, such as SOC, PCI, FedRAMP, and HIPAA.

To learn whether Amazon Connect or other AWS services are in scope of specific compliance programs, see AWS Services in Scope by Compliance Program. For general information, see AWS Compliance Programs.

You can download third-party audit reports using AWS Artifact. For more information, see Downloading Reports in AWS Artifact.

Your compliance responsibility when using AWS services is determined by the sensitivity of your data, your company's compliance objectives, and applicable laws and regulations. AWS provides the following resources to help with compliance:

- Security and Compliance Quick Start Guides – These deployment guides discuss architectural considerations and provide steps for deploying baseline environments on AWS that are security and compliance focused.
- Architecting for HIPAA Security and Compliance Whitepaper – This whitepaper describes how companies can use AWS to create HIPAA-compliant applications.

  **Note**
  Not all services are compliant with HIPAA.

- AWS Compliance Resources – This collection of workbooks and guides might apply to your industry and location.
- Evaluating Resources with Rules in the AWS Config Developer Guide – The AWS Config service assesses how well your resource configurations comply with internal practices, industry guidelines, and regulations.
- AWS Security Hub – This AWS service provides a comprehensive view of your security state within AWS that helps you check your compliance with security industry standards and best practices.
- AWS Audit Manager – This AWS service helps you continuously audit your AWS usage to simplify how you manage risk and compliance with regulations and industry standards.

Best practices for PII compliance in Amazon Connect

Following this list of best practices can help you ensure your Amazon Connect contact center is PII (Personally Identifiable Information) compliant.

- Conduct compliance eligibility audits for all services used in your contact center, as well as any third party integration points.
- AWS Key Management Service (KMS) encrypts Amazon S3 contents at the object level, which covers recordings, logs, and saved reports by default for Amazon S3. Make sure encryption in transit and at rest rules apply downstream or to third party apps.
Best practices for PCI compliance in Amazon Connect

Following this list of best practices can help you ensure your Amazon Connect contact center is PCI-compliant.

- Conduct compliance eligibility audits for all services used in your contact center, as well as any third party integration points.
- Payment card information (PCI) should be collected via encrypted DTMF.
- If PCI is captured in call recordings, the PCI data must be scrubbed from the recording and obfuscated from any logs or transcriptions. We recommend working with an Amazon Solution Architect if you need help doing this.
- Use encryption in transit and at rest for any downstream integration points.
- Enable multi-factor authentication (MFA) for any access to PCI as Amazon Connect is a public endpoint.
- For a detailed walkthrough that explains how to encrypt PCI, see Creating a secure IVR solution with Amazon Connect.
- AWS Key Management Service (KMS) encrypts Amazon S3 contents at the object level, which covers recordings, logs, and saved reports by default for Amazon S3. Make sure encryption in transit and at rest rules apply downstream or to third party apps.
- Use encryption in the Store customer input block for sensitive DTMF information.
- Use your own KMS key when ingesting data in Amazon Connect Customer Profile domains.
- For more information, see https://www.pcisecuritystandards.org.

Best practices for HIPAA compliance in Amazon Connect

Following this list of best practices can help you ensure your Amazon Connect contact center is HIPAA compliant.

- Conduct compliance eligibility audits for all services used in your contact center, as well as any third party integration points.
- AWS Key Management Service (KMS) encrypts Amazon S3 contents at the object level, which covers recordings, logs, and saved reports by default for Amazon S3. Make sure encryption in transit and at rest rules apply downstream or to third party apps.
- Use encryption in the Store customer input block for sensitive DTMF information.
- For more information about HIPAA compliance, see https://www.hipaacompliance.org/.

Resilience in Amazon Connect

The AWS global infrastructure is built around AWS Regions and Availability Zones. AWS Regions provide multiple physically separated and isolated Availability Zones, which are connected with low-latency, high-throughput, and highly redundant networking. With Availability Zones, you can design and operate applications and databases that automatically fail over between Availability Zones without interruption.
Availability Zones are more highly available, fault tolerant, and scalable than traditional single or multiple data center infrastructures.

For more information about AWS Regions and Availability Zones, see AWS Global Infrastructure.

In addition to the AWS global infrastructure, Amazon Connect offers the following features to help support your data resiliency and backup needs:

- Contact flow versioning (p. 400)
- Ability to export your CTR data to Kinesis. This way, you can back up the CTR data across Availability Zones.

To backup call recordings, use the cross-region replication (CRR) feature to copy the call recordings to Amazon S3 buckets in different AWS Regions.

Infrastructure security in Amazon Connect

As a managed service, Amazon Connect is protected by the AWS global network security procedures that are described on the Best Practices for Security, Identity, and Compliance page.

You use AWS published API calls to access Amazon Connect through the network.

Supported versions of TLS

Clients must support Transport Layer Security (TLS) 1.2 or later.

Amazon Connect offers a new website access model with a new domain (instance name.my.connect.aws) that supports TLS 1.2 or newer versions only. It is available by default for instances created after March 2021. Existing customers can opt in to using the new domain using the following methods:

- For non-SAML Amazon Connect instances, change your access URL from .awsapps.com/connect to .my.connect.aws and log in again.
- For SAML-enabled instances, specify an extra query parameter new_domain=true in the relay state URL and log in again. For more information, see Use a destination in your relay state URL (p. 129).

Other requirements

Clients must support cipher suites with perfect forward secrecy (PFS) such as Ephemeral Diffie-Hellman (DHE) or Elliptic Curve Ephemeral Diffie-Hellman (ECDHE). Most modern systems such as Java 7 and later support these modes.

Additionally, requests must be signed by using an access key ID and a secret access key that is associated with an IAM principal. Or you can use the AWS Security Token Service (AWS STS) to generate temporary security credentials to sign requests.

You can call these API operations from any network location, but Amazon Connect does support resource-based access policies, which can include restrictions based on the source IP address.

Security Best Practices for Amazon Connect

Amazon Connect provides a number of security features to consider as you develop and implement your own security policies. The following best practices are general guidelines and don’t represent a
complete security solution. Because these best practices might not be appropriate or sufficient for your environment, treat them as helpful considerations rather than prescriptions.

Contents
- Amazon Connect Preventative Security Best Practices (p. 861)
- Amazon Connect Detective Security Best Practices (p. 862)

Amazon Connect Preventative Security Best Practices

- Ensure that all profile permissions are as restrictive as possible. Allow access to only those resources absolutely required for the user’s role. For example, don’t give agents permissions to create, read, or update users in Amazon Connect.
- Ensure that multi-factor authentication (MFA) is set up through your SAML 2.0 identity provider, or Radius server, if that’s more applicable for your use case. After MFA is set up, a third text box becomes visible on the Amazon Connect login page to provide the second factor.
- If you use an existing directory through AWS Directory Service or SAML-based authentication for identity management, ensure that you follow all security requirements appropriate for your use case.
- Use the Log in for emergency access URL on the instance page of the AWS console only in emergency situations, not for daily use. For more information, see Emergency admin login (p. 145).

Use Service Control Policies (SCPs)

Service control policies (SCPs) are a type of organization policy that you can use to manage permissions in your organization. An SCP defines a guardrail, or sets limits, on the actions that the account's administrator can delegate to the IAM users and roles in the affected accounts. You can use SCPs to protect critical resources associated with your Amazon Connect workload.

Set a Service Control Policy to prevent the deletion critical resources

If you're using SAML 2.0-based authentication and delete the AWS IAM Role that is used for authenticating Amazon Connect users, users won't be able to login to the Amazon Connect instance. You will need to delete and recreate users to be associated with a new Role. This results in the deletion of all data associated with those users.

To prevent the accidental deletion of critical resources and to protect the availability of your Amazon Connect instance, you can set a Service Control Policy (SCP) as an additional control.

Following is an example SCP that can be applied at the AWS Account, Organizational Unit, or Organizational Root to prevent the deletion of the Amazon Connect instance and associated Role:

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AmazonConnectRoleDenyDeletion",
      "Effect": "Deny",
      "Action": [
        "iam:DeleteRole"
      ],
      "Resource": [
        "arn:aws:iam::*:role/Amazon Connect user role"
      ]
    },
    {
      "Sid": "AmazonConnectInstanceDenyDeletion",
      "Effect": "Deny",
      "Action": [
        "cloudformation:DeleteStack"
      ],
      "Resource": [
        "arn:aws:cloudformation:*:*:stack/Amazon Connect stack"
      ]
    }
  ]
}
```
Amazon Connect Detective Security Best Practices

Logging and monitoring are important for the availability, reliability, and performance of contact centers. You should log relevant information from Amazon Connect contact flows to CloudWatch and build alerts and notifications based on the same.

Define log retention requirements and lifecycle policies early on, and plan to move log files to cost-efficient storage locations as soon as practical. Amazon Connect public APIs log to CloudTrail. Review and automate actions based on CloudTrail logs.

We recommend Amazon S3 for long-term retention and archiving of log data, especially for organizations with compliance programs that require log data to be auditable in its native format. Once log data is in an Amazon S3 bucket, define lifecycle rules to automatically enforce retention policies and move these objects to other, cost-effective storage classes, such as Amazon S3 Standard - Infrequent Access (Standard - IA) or Amazon S3 Glacier.

The AWS Cloud provides flexible infrastructure and tools to support both sophisticated partner offerings and self-managed centralized-logging solutions. This includes solutions such as Amazon OpenSearch Service and Amazon CloudWatch Logs.

You can implement fraud detection and prevention for incoming contacts by customizing Amazon Connect contact flows per your requirements. For example, you can check incoming contacts against previous contact activity in Dynamo DB and then take actions such as disconnecting a contact who is on a deny list.
Agent training guide for the Amazon Connect CCP

Agents use the Amazon Connect Contact Control Panel (CCP) to interact with customer contacts. It’s how they receive calls, chat with contacts, transfer them to other agents, put them on hold, and perform other key tasks.

The URL to launch the CCP is:

- https://instance name.my.connect.aws/ccp-v2/

Where instance name is provided by your IT department or whoever set up Amazon Connect for your business.

Large businesses often choose to customize their CCP. For example, they might want to integrate it with a CRM. However, this section describes how CCP works before it is customized.

We recently released an updated CCP. It provides a single interface for agents to manage voice, chat, and tasks. Even if your business is currently taking only voice contacts, we recommend using the updated CCP.

The following image shows the CCP.
1. Set your status.
2. The channels enabled for your agent routing profile.
3. Log in and out. Set your language preferences, device settings (if enabled), and phone type.
4. Name of the signed in agent.
5. Call a number or enter digits into an IVR menu.
6. Choose a predefined destination to transfer the contact. Or call an external number.

**Training video: How to use the CCP**

The following video introduces you to the Contact Control Panel (CCP). It shows how to perform common tasks such as login and setup, accept incoming calls, place calls, transfer calls, accept chat, and more.
Quick start cheat sheet for training agents

The following image shows a one-page cheat sheet to help agents learn the most common tasks in the CCP.

Click here to download a Microsoft PowerPoint slide of this image.

Your manager or IT administrator provides you with the name of your instance, agent ID, and password.
Launch the CCP

The URL to launch the CCP is:

- https://instance-name.my.connect.aws/ccp-v2/

Where instance-name is provided by your IT department or whoever set up Amazon Connect for your business. The following image shows an example URL for the CCP.
Log in and log out of the CCP

With this updated CCP, your agents can manage voice, chat, and tasks from this single interface.

As the administrator, you can also launch the CCP directly from the Amazon Connect console. Just choose the phone icon in the upper right corner.

To provide agents the ability to launch the CCP from their desktop and start handling contacts, there are a few things you need to do:

- Add agents as users to the instance. For more information, see Manage users in Amazon Connect (p. 607).
- Configure permissions for the agents. By default, agents assigned to the Agent security profile can access the CCP and make outbound calls. But you can create a custom security profile and add additional permissions. For more information, see Security profiles (p. 611).
- Give agents the URL the CCP.
- Provide agents with their user name and password so that they can log in to the CCP.

We recommend telling agents to bookmark the URL to the CCP for more convenient access.

Agents can use the CCP with a softphone on their computer, or a deskphone. If they're using a softphone, they must use Chrome or Firefox for their web browser. For more information, see Grant microphone access in Chrome or Firefox (p. 265).

Log in and log out of the Amazon Connect CCP

Before you can log in to the Contact Control Panel (CCP), your administrator must give you the following information:

- The URL to launch the CCP:
  - https://instance name.my.connect.aws/ccp-v2/

  Where instance name is provided by your IT department or whoever set up Amazon Connect for your business.
• Your agent ID.
• Your agent password.

To log in

After you have that information, here's how to log in and get started.

1. Ensure that your USB headset is securely connected to your computer.
2. Using Chrome or Firefox, open the CCP by using the URL that you received from your administrator.
3. Enter your agent ID and password, and then choose Sign In.

4. If you are prompted to allow access to your microphone and speaker, choose Allow.

You're all set to go!
Problems logging in?

If you have problems logging in to the CCP, contact your manager for help, or the IT Department for your organization.

Log out of the Amazon Connect CCP

**Important**

Closing the CCP window doesn't automatically sign out an agent. Amazon Connect still tries to route contacts to them. To change this behavior, a developer can customize CCP for your contact center. For instructions, see Log out agents automatically when they close their CCP (p. 223).

1. At the top of the CCP, choose **Settings**.
2. Choose **Log out**.

Change your audio device settings

If your organization is using a customized version of the Contact Control Panel (CCP), you can use it to change your audio device settings.
To change your audio settings

1. In your CCP, choose Settings. The Settings dialog box appears, similar to the following image.
2. Under Audio devices, use the dropdown to select your Speaker, Microphone, and Ringer.

   Note
   If you use Firefox, you can change your Microphone device setting. To change your speaker and ringer, use your computer settings.

3. Choose Save.
Forward calls to a mobile device (iPhone, Android)

You can take the audio portion of a call on your mobile device, and at the same time use your computer to access the Contact Control Panel. This topic explains how to forward calls to your mobile device.

1. In your Contact Control Panel (CCP), open Settings.
2. Under Phone type, choose Desk phone.
3. Enter the phone number for your mobile device, and choose Save.

When a contact calls, the audio portion of the call goes to your mobile device. At the same time, on your computer you can manage the call using the CCP.

Set your status to "Available"

When an agent is ready to handle calls or chats, they need to set their status in the CCP to Available. This tells Amazon Connect they are ready to handle contacts.

Amazon Connect uses information in the agent's routing profile (p. 215) to determine which contacts to route to them.

For more information about agent statuses, see About agent status (p. 789). For information about how Amazon Connect counts the Available status in the real-time metrics report, see Available (p. 711).

Set your "Next status"

Note
"Next status" is available only to customers who are using the latest Contact Control Panel (CCP). The URL for the latest CCP ends with ccp-v2.

IT administrators: For more information about the Next status feature, such as changes to the agent event stream, see July 2021 Updates (p. 938) in the Release notes.
Use the **Next status** feature to pause new contacts being routed to you, while you finish your current contacts. When all your slots are cleared, Amazon Connect automatically sets your CCP to the next status, such as **Lunch**.

The following images of the Contact Control Panel (CCP) show how to use this feature.

1. The agent is on a contact.
2. The agent chooses their next status, such as **Lunch**. They can choose only a custom (**NPT (p. 714)**) status, or **Offline**.
3. The agent is in **Next status: Lunch**. They are still on contact. No new contacts can be routed to them.
4. The contact ends. The agent finishes ACW, and chooses **Clear contact**. Instead of going back to **Available**, their CCP is automatically set to **Lunch**.

**How to cancel "Next status"**

You can easily switch from **Next status** back to **Available**. The ability to switch your status is useful, for example, if you accidentally choose **Next status: Lunch**, or if you decide not to go to **Lunch** before Amazon Connect automatically sets to that status.

The following images show this workflow.
1. While working on the same contact, the agent cancels **Next status: Lunch** and goes back to **Available**.
2. The contact ends and the agent is still **Available** for new contacts to be routed to them.

**Example 1: Set "Next status" while handling only ACW contacts**

Let's say an agent is finishing after contact work (ACW) for one or more contacts, such as a voice contact or multiple chats. They are not on contact with anyone.

Instead of choosing **Clear contact** when the agent finishes ACW, they choose **Lunch**. This puts them in **Next status: Lunch** only briefly.

Here's what happens in this scenario:

1. Agent finishes ACW and chooses **Lunch** instead of **Clear contact**.
2. Amazon Connect stops routing new contacts to them.
3. All their slots are cleared. This is so the agent doesn't have to choose **Clear contact** to end the ACW.
4. Because all the ACWs have been cleared, Amazon Connect immediately starts the automatic transition that sets the agent's status to **Lunch**.

   Agents were put into **Next status - Lunch** only briefly (milliseconds!). They might even see it in the CCP if they look fast enough.

This order of events mirrors how the CCP works when agents change their status while working on ACW. For example, an agent is finishing ACW and they set their status to **Lunch**. Here's what happens next:
Example 2: Set "Next status" while managing some chats on contact and other chats in ACW

Let's say an agent is managing two chats:

- Customer 1 is in ACW.
- Customer 2 is on contact.

While still on a contact, the agent sets their status to Offline. This puts them in the Next status: Offline state.

Here's what happens in this scenario:

1. The agent sets their status to Offline.
2. Amazon Connect stops routing new contacts to them.
3. The contact that is in ACW is cleared so the agent doesn't have to choose Clear contact. Only the connected chat remains.
4. The agent's status is Next status: Offline, and they continue working on their connected chat.
5. After they finish work on that contact, the agent chooses Clear contact to end the ACW.
6. Amazon Connect automatically sets the agent's status to Offline.

Chat with contacts

When you set your status in the CCP to Available, Amazon Connect delivers calls or chats to you, based on the settings in your routing profile (p. 215). An administrator can specify that up to five chat conversations can be routed to you at the same time.

You can't initiate chat conversations from the CCP.

**Note**

IT Administrators: To enable customers and agents to send attachments, such as files, through the chat interface, see Enable attachments to share files using chat (p. 141).

**Tip**

Amazon Connect routes contacts to you for only one channel at a time. When you're on a call, you won't be routed a chat conversation. And when you're handling chat conversations, you won't be routed a call.

When a chat contact arrives, here's how you are notified:

1. If you enabled notifications in your browser, you'll get a pop-up notification at the bottom of your screen, like this:
2. If you're on the chat tab, the page displays the name of the contact and a button for you to connect to the chat.

3. If you're on the phone tab, a banner displays the name of the contact and a button for you to connect to the chat.

4. You have 20 seconds to accept or reject a contact. If you're on a chat, and another comes in but you don't accept it, a tab appears indicating the chat was missed.

5. Choose **Accept chat** to connect to the contact.

**Note**
Chat conversations must be accepted manually. There's no auto-accept for these conversations.
6. You'll see the full transcript of what the contact has already typed. If applicable, you'll also see what a bot or another agent has entered. In the following image, John is the name of the customer, BOT is the Amazon Lex bot, and Jane is the name of the agent.

What do the timers at the top of the chat tabs mean?

When you're in a chat conversation with a contact, you'll see two timers at the top of the chat tab. These timers tell you:

- How long the contact has been connected to your contact center. This includes the time spent with the bot, if you're using one.
- How long since the last text was sent. This can be either from the customer to the agent, or from the agent to the customer. The timer is reset with each text message.
What happens to missed chats?

Let's say you take a break but forget to change your status in the CCP from Available to Break. Amazon Connect tries to route a chat to you for 20 seconds. Keep in mind that your admin can't configure this amount of time.

After 20 seconds, the contact is counted as Agent non-response (p. 710) in the real-time metrics report and the historical metrics report.

When you return from break and choose the chat tab, you'll see the missed contacts and how long they've been there. Each contact occupies a slot. This way, with all of your slots are occupied, Amazon Connect won't route any more contacts to you.
You can clear the slots so that chats are routed to you again. For each missed contact, choose the banner, and then choose **Clear contact**.

**Transfer chats to another queue**

When a chat is transferred from a bot to an agent, or from an agent to another queue, all context is preserved. This context lets the next agent read all previous messages in that contact.

**To transfer a customer to another queue**

1. Choose the **Quick Connect** button at the bottom of the CCP page.
2. Choose or search for the queue you want to transfer to, and then choose the transfer button.

3. You'll see a confirmation message. You're now doing After Contact Work (ACW) for the customer. Choose Close to end the contact.
Make a call while on a chat

Let's say you're chatting with a contact and you want to consult with someone else. While you're on a chat, you can use the updated CCP to make outbound calls using the dial pad and external quick connects (p. 410).

Note the following limitations:

• You can't access agent quick connects while you're on a chat.
• Agents can't receive calls while on a chat.

**To make an external call while you're on a chat**

1. In the CCP, choose the phone tab.
2. Choose **Number pad**.
3. Enter the external number you want to call, and then choose Call.
4. You’ll be connected to the call at the same time the chat is still ongoing, as shown in the following image.
5. To go to the chat conversation while you're on the phone, choose the chat tab.

6. To end the phone conversation, choose the phone tab, choose **End call**, and then choose **Clear contact**. You're still connected to the chat conversation.

---

## Can't make outbound call to another agent

If you're on a chat and having trouble making an outbound call to another agent, that agent may be handling a chat conversation. They can't receive a call while on a chat.

## Can't see external quick connects in the CCP

*Agent quick connects (p. 410)* are not visible in the CCP while you're on a chat.

If you can't see *external quick connects (p. 410)* in your CCP, however, check that the external quick connect has been added to your queue as described in *Step 2: Enable agents to see quick connects (p. 410).*

## Enable agent quick connects for calls during a chat

To enable agents to consult over the phone with each other while they are on chats, your Amazon Connect administrator needs to set up a direct dial number (DID) that routes to the agent. This configuration incurs additional costs.
Accept incoming calls

1. Whenever you set your status in the CCP to Available, Amazon Connect can deliver calls to you, based on the settings in your routing profile (p. 215).

2. When a call arrives, choose the Accept call button.

3. Before you're connected to the contact, Amazon Connect announces the name of the originating queue.

4. You're now talking to the contact.

5. You have 20 seconds to accept or reject a contact. If you miss a call, it will look similar to the following image. Choose Clear contact so you can accept another call.
Transfer calls to a quick connect or external number

You can transfer calls to people in a predefined list, called quick connects. You can also transfer calls to external phone numbers that you enter.

To transfer to a quick connect or to an external number

1. While you're connected to the contact, choose Quick connects on the CCP.
2. From the list of quick connects, choose the name of another agent to transfer the call to. (Your Amazon Connect administrator adds the names of agents to the list of quick connects.)

Or, to call an external number, choose Number pad, enter the number you want to call, and then choose Call.
3. After the call is connected to the transfer destination, you can choose **Join** so the caller, the transfer destination, and you are in a conference call.
4. When the call is joined, the three of you can talk. Choose Leave to complete the transfer and exit the call.
5. Complete the after contact work and then choose **Clear contact**.

The customer, the transfer destination and you are joined in a conference call.

Choose **Leave call** to complete the transfer and exit the call.
Manage transfer a call

After you initiate a transfer, the customer is placed on hold and you are connected to the transfer destination. The following image shows what actions you can take at this point.
Make outbound calls

Before you can make an outbound call, your contact center must be set up to allow agents to make calls. For more information, see Step 3: Set telephony (p. 135) in Create an Amazon Connect instance (p. 134).

For information about the caller ID that's displayed when you make an outbound call, see Set up outbound caller ID (p. 203).

**Note**

IT administrators: For a list of countries available for outbound calls based on the Region of your instance, see Amazon Connect pricing. If a country is not available in your dropdown menu, open a ticket to add it to your allow list. For more information, see Countries you can call (p. 930).

**To make an outbound call**

1. In your Contact Control Panel, choose **Number pad**.
2. Use the dropdown menu to choose the country, then enter the number.
3. Choose **Call**.
Accept a task

1. Whenever you set your status in the CCP to Available, Amazon Connect can deliver tasks to you, based on the settings in your routing profile (p. 215).

2. When a task arrives, choose Accept task.

3. Review the description of the task, and choose the links as needed to complete the task.
4. When you've completed the task, choose **End task**.

5. You will then be in ACW. When finished, choose **Close contact**.
Create a new task

You can create a task any time, even when your status is Offline. And you can assign a task to anyone who has a quick connect, including yourself.

1. Open the CCP. Select the Task tab, and then choose Create task.
2. Complete the **Create task** page. When you choose **Assign to**, you can only assign a task to someone or a queue that has quick connect. Choose **Create**.
3. If you chose yourself, the task is routed to you. Choose **Accept task**.
Transfer a task

You can transfer a task that's assigned to you to another agent or queue.

1. Open the task you want to transfer, and then choose the quick connect icon.
2. Choose from the list of people or destinations listed under Quick connects, and then choose the transfer icon.
Accept incoming contacts with Customer Profiles

When a call or chat is connected to your Contact Control Panel (CCP), Amazon Connect, in the same browser window, automatically displays customer profiles that may match the incoming phone number.

Before agents can access customer profiles, the Amazon Connect administrator must enable the Customer Profiles feature, grant agents the appropriate permissions, and integrate Customer Profiles into your agent application. For more information, see Enable Customer Profiles for your instance (p. 532).

Example 1: Auto-populate the customer profile

As soon as Amazon Connect matches the phone number (voice) or email address (chat) with an existing customer profile, it automatically displays the profile even though you may not have accepted the contact yet.
The following image shows what your Contact Control Panel (CCP) may look like when there's an incoming chat. A customer profile has been found that matches the customer, and Amazon Connect is loading the data.

This next example shows what it might look like after you've accepted and joined the chat, and Amazon Connect displays the customer's profile. In this case, Amazon Connect found the customer's profile based on their email address. If this were a voice call, by default Amazon Connect would match the customer's profile based on their phone number. Your IT department can customize (p. 541) this behavior to search for the profile based on other information about the contact.
• Choose **Associate** to associate the contact record of the current contact with the customer profile, and then choose **Confirm**.

![Confirm association dialog]

• If you choose **Associate** by mistake, you can continue to browse other customer profiles, and associate the contact with a different customer profile. Or, if you have been assigned Create permission (p. 543), you can create a new profile.

You can associate a contact with customer profile multiple times during an interaction, including during After Contact Work (ACW) time. **Only the last association remains, before you clear the contact.**

**Example 2: Accept incoming contact, no customer profile found**

If no results are returned when a call or chat comes in, do the following:

1. Search for the customer's profile using their email address, name, or account number. An **account number** is a unique identifier for the customer in your business, such as a member number or a customer relationship number.

2. If no customer profile is found, create a new profile (p. 905) for the contact. The only required information is first name.
In the following image, the agent searched for John Doe. No matches were found so they chose Create profile.

Example 3: Accept incoming contact, multiple customer profiles found

In some cases, multiple profiles may be returned for the same call or chat. Use the summary information to verify the customer's identity. For example, ask the customer to verify their email address or account number, and then associate the contact with the right customer profile.

Example 4: Search when not on contact

When there are no incoming contacts, you can search for customer profiles using phone number, name, email address, or account number. For example, you might want to use this time to search for previous contacts, or completing a profile.
Create a new customer profile

Let's say you're on a chat and there's no customer profile for the contact. You can create a new customer profile for them.

1. Choose Create profile.
2. Choose **This is the current connected customer**. This tells Amazon Connect to link the customer profile to the contact ID for the current customer.

If you don't select this check box, the profile isn't associated with the current contact. This is useful when a contact is calling from someone else's number.

Enter information in the required boxes, and then choose **Save**.

3. You'll receive a verification page that the contact has been created.
4. You can continue the conversation with the customer.

**Search for a customer profile**

Even when you're not on a contact you can search customer profiles. This is helpful in cases where, for example, you want to return to a customer profile.

1. **In the Search box,** type the customer name, email, or account ID.

2. If more than one result is returned, you can review the summary information to identify the contact that you want.
3. Choose View details to see profile information and the contact history for that customer.

Search for content using Amazon Connect Wisdom

The Wisdom feature is in preview release for Amazon Connect and is subject to change.

You can search and find content across multiple repositories, such as frequently asked questions (FAQs), wikis, articles, and step-by-step instructions for handling different customer issues.

For example, you can type questions or phrases in the search box (such as, "how long after purchase can handbags be exchanged?") without having to guess which keywords will work. Amazon Connect Wisdom searches the connected sources, and returns relevant information adjacent to your Contact Control Panel (CCP).

You can search for content at any time: while on a contact, on After Contact Work, or between contacts.

To search for content

1. In the search box, type words or phrases.

2. Choose the article that you want to view.
3. The article appears in a new browser window.
4. Choose thumbs-up or down to indicate whether the article is helpful. If the article isn't helpful, select the reason why, and choose **Send**.
Use real-time recommendations

If your organization uses Contact Lens for Amazon Connect, you may get real-time recommendations that point you to information related to the current conversation with the customer.
The following list refers to the designated areas in the preceding example:

1. Real-time recommendations based on real-time analytics
2. Search for words or phrases
3. Provide feedback on the helpfulness of the results

You can select the recommendation to view the entire article, or choose Show less to close the details of the recommendation.

As more recommendations are sent, you can toggle through them and choose those you want to read.
<table>
<thead>
<tr>
<th>2 suggestions</th>
<th>Leather Handbag Tear</th>
<th>show less</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leather Repair Kit</strong></td>
<td>helpful?</td>
<td></td>
</tr>
</tbody>
</table>

AnyCompany recommends using AnyCompany’s repair kit to fix frayed edges, tears, loose threads and stains on all larger leather goods, such as belts, handbags, luggage, and wallets. AnyCompany’s leather repair kit retails at $21.99 and can be delivered with free 3-5 day shipping. In general, when cleaning leather avoid using alcohol, turpentine…
Troubleshooting Issues with the Contact Control Panel (CCP)

Troubleshooting Contact Control Panel (CCP) issues requires support from your network operations, system administrator, and virtual desktop (VDI) solution teams to collect the appropriate level of information to identify root cause and drive resolution. To help determine the appropriate resources to engage, it's important to break issues down into those with similar symptoms. The following guidance has been helpful in assisting Amazon Connect customers in resolving CCP issues with their operations support teams.

Contents

- Use the Endpoint Test Utility (p. 914)
- Common Contact Control Panel (CCP) Issues (p. 915)
- Download CCP logs (p. 916)
- Troubleshooting Tools and Information (p. 917)
- Mobile phones (iPhone, Android) and iPads are not supported (p. 921)
- Microsoft Edge is not supported (p. 921)
- Can't make an outbound call from the CCP (p. 921)
- Attachments are not appearing in chats (p. 922)
- Humming sound in headset: Verify the headset and browser sample rates (p. 922)
- One-way audio from customers? (p. 925)
- Troubleshoot problems pausing, rewinding, or fast-forwarding recordings (p. 925)

Use the Endpoint Test Utility

To validate connectivity to Amazon Connect, or when your agents are experiencing problems with the Contact Control Panel (CCP), we recommend using the Amazon Connect Endpoint Test Utility.

The Amazon Connect Endpoint Test Utility performs the following checks:

- Validates that the browser being used supports WebRTC.
- Determines if the browser has appropriate access to media devices (microphone, speakers, etc).
- Performs latency tests for all active Amazon Connect Regions.
- Performs latency tests to a specific Amazon Connect instance, if provided.
- Validates network connectivity across required ports for media streams.

The complete results are available for download as a JSON file. You can copy the results to include in a support ticket. You can also load the results file into the tool by selecting the Load previous results option. This option displays the contents of the file visually and makes it easier to analyze the results. Additionally, you can download a bookmark specifically for the provided instance to make future tests easier to run.

Parameters to customize the Endpoint Test Utility

Use the following URL parameters to customize the Endpoint Test Utility:
• **lng**: Change the language of the tool. Currently supported languages are English (default), Spanish, and French. It accepts the following values:
  - *en*
  - *es*
  - *fr*
• **autoRun**: Run the tool automatically. It accepts the following values:
  - *true*
  - *false*
• **connectInstanceUrl**: Specify the Amazon Connect instance in the URL. It must start with https.

Example customized URL:


### Previous Check Connectivity Tool

The previous version of the tool is available here: [Amazon Connect Check Connectivity Tool](https://a.co/4pBJMng).

This tool checks which web browser the agent is running, and whether the microphone has required permissions. Click the **Test** buttons to check the ports and latency.

### Common Contact Control Panel (CCP) Issues

The following are common issues encountered when using the Amazon Connect CCP.

- **CCP does not initialize/connect**—The most common causes are missing port/IP allow list entries, not allowing browser microphone access, or not answering your external device. Be sure that you have added to the allow list all IPs covered in the Set up your network (p. 496) section of this guide, and that you have allowed microphone access to your browser when prompted.

- **Periodic connection errors**—The most common cause is network contention, or there may have been an ipranges.json update and the new entries have not been added to the allow list. For more information, see the Set up your network (p. 496) section of this guide.

- **Missed calls, state change delays, and CCP unresponsive**—In most cases, this is intermittent and directly correlated with resource contention in the agent's workstation, network, or both. This can be made worse, or caused directly, by a poor, unstable, or strained connection to AWS resources at the private WAN/LAN, public WAN levels, or local workstation resource contention.

The following are common issues with call quality when using the CCP. Call quality encompasses a large range of potential causes and is best approached by first identifying the types of issues that you're having.

- **Latency/cross-talk**—In a voice connection manifests as a delay between when something is said and when the person on the other end hears it. In some use cases that require a lot of conversation, high latency can create situations in which both parties are talking over each other. The PSTN (public switched telephone network) and agent latency need to be calculated in this scenario to identify contributing factors and take action to reduce PSTN latency, agent latency, or both. For more information, see the PSTN and agent connection latency section of this documentation.

- **One way audio**—This normally indicative of an issue with the agent's workstation at the hardware, network, resource levels, or all three. It can also be related to browser microphone permissions or headset issues. For more
information, see the How to determine whether a workstation is the source of problems (p. 266) section of this guide.

• **Volume increase or decrease**—can happen at the beginning or intermittently during the call, and it's important to differentiate the two for troubleshooting purposes. Typically, this relates to forwarding calls to or from Amazon Connect that inherit this from an issue with the third party transfer.

• **Audio choppy, cutting out, echo, reverb, or other signal noise**—could also manifest as a robotic sound or other distortion making it difficult for either the agent, caller, or both parties to understand what's being said. This is normally indicative of an issue with the agent's workstation at the hardware, network, resource levels, or all three. For more information, see the How to determine whether a workstation is the source of problems (p. 266) section of this guide.

• **Wobble**—is the effect that media codecs can have on audio that manifests as the slowing down and speeding up of audio to combat high jitter and latency. This is normally indicative of an issue with the agent's workstation at the hardware, network, resource levels, or all three. For more information, see the How to determine whether a workstation is the source of problems (p. 266) section of this guide.

• **Disconnects**—can happen at any point in the call. It is important to note when during the call that the disconnections occur to identify a pattern. For example, disconnects on call transfers to a specific external number typically relate to forwarding calls to or from Amazon Connect that inherit this from an issue with the third party transfer. They can also be related to circular transfers, which means transferring calls out of Amazon Connect and back in the same call.

## Download CCP logs

The Contact Control Panel logs store agent actions and timing.

**To download CCP logs**

1. On the agent's desktop, in their CCP, choose **Settings, Download logs**.
2. The agent-log.txt file is saved to your browser's default directory.

Troubleshooting Tools and Information

The following tools and information can be helpful with troubleshooting issues with Amazon Connect.

- **Instance ARN**—Provide your instance ARN (Amazon Resource Name) when you contact AWS support so that they can see the activity in your Amazon Connect instance. You can find the ARN for your instance on the Overview page that you access by choosing the alias of the instance from the Amazon Connect console.

- **Call recordings**—are very useful, not only to illustrate and determine reported behavior, but also to rule out audio issues from the agent's side. Recordings in Amazon Connect are done at the instance side of the interaction, before the audio traverses the agent connection. This allows you to determine if the audio issue was isolated to the agent's side of the interaction or if it existed in the audio received by the agent. You can find call recordings associated with a contact in the Contact Search report.

- **Contact IDs from the Contact Trace Record (CTR)**—Provide when you contact AWS support.

- **Agent desktop performance/process logs**—can help rule out local resource/network contention.

- **Contact Control Panel (CCP) logs**—to track agent actions and timing. To download CCP logs, choose the settings cogwheel in the CCP, and then choose **Download logs**. The logs are saved to your browser's default download directory.

- **Network utilization logging/monitoring**—specifically for latency and dropped packets on the same network segment as your agents.
• **Private WAN/LAN network diagram**—outlining connection paths to the edge router to AWS to explain network traversal.

• **Firewall allow list access**—to verify that IP/port ranges are added to the allow list (also known as whitelist) as described in Set up your network (p. 496).

• **Audio capturing and analytic tools**—for latency calculations from the agent's workstation.

• **AWS region latency test tools**—use the Endpoint Test Utility tool (p. 914).

### Gathering Helpful Information using the Streams API

For tracking and troubleshooting issues at scale, collecting data surrounding overall call quality is recommended. Anytime poor call quality is experienced, agents can note the current time and corresponding disposition code by using the disposition key chart, as shown in the following chart. Alternatively, you can use the Streams API to incorporate your own report and issue feature in the custom CCP to write these dispositions with corresponding call information to a database, like Amazon DynamoDB. For more information about the Amazon Connect Streams API, see the GitHub repository at https://github.com/aws/amazon-connect-streams.

#### Example Agent Issue Report Disposition

The following example disposition keys are listed by symptom, scenario, and severity.

**Symptom**

- S—Softphone error
- M—Missed calls
- L—Latency causes poor quality
- P—Starts off OK, gets progressively worse over time
- D—Disconnected calls
- W—One way audio; for example, the agent can hear the customer, but the customer cannot hear the agent
- V—Volume too quiet or too loud
- C—Choppy/cuts in and out intermittently

**Scenario**

- O—Outbound call
- I—Inbound call
- T—Three-way call

**Severity**

- 1—Small impact, but can use the CCP effectively
- 2—Medium impact, communication is difficult, but can still service calls
- 3—Large impact, cannot use the CCP to take calls

**Examples**

- 5:45PM agentName LT2 (latency on a three-way call with medium impact).
Analyzing the Data

The following guidelines can assist you in analyzing the data to identify issues in your environment.

- Use the Contact Trace Record (CTR) / Contact search report to identify the contact IDs for the contacts during which call quality issues occurred. The CTR includes a link to the associated call recording, and additional details that you can use for symptom verification and to provide to your AWS support representative.

- Use the agent name and timestamp in the CTR to get a sense of the types of issues you're experiencing and their prevalence by agent, symptom, scenario, and severity over time. This will allow you to see if issues are happening around the same time, surround a specific event, or are isolated to specific agents or agent actions. You can also easily identify and access associated call recordings and associated contact IDs available if you need to engage support.

- Correlate data sources, such as local network logs, CPU/disk/memory utilization and process monitor logs from the operating system on the client workstation. This lets you correlate events by agent over time to rule out local resource contention as a cause or contributor.

- Analyze data by symptom and scenario reported per minute or per hour to create heat maps of an issue by type and severity by agent over time. Doing this is especially helpful in environmental troubleshooting as you may find clustered impacts associated with scheduled activity like backups or large file transfers.

- If you can't find any evidence of local resource contention or derive any noteworthy correlations, you can use the contact IDs collected to open a support case. If issues experienced are intermittent in nature, they most likely relate to issues with the agent's workstation, network connectivity, or both.

Validation Testing

Voice quality issues can have many contributing sources. It's important to run controlled tests and monitor the same environment or workstation as those reporting the issue, and be able to reproduce the same use cases. Consider the following general testing recommendations for measuring and gathering data to investigate voice quality issues.

PSTN and Agent Connection Latency

For troubleshooting cross-talk issues, you need to differentiate and measure agent and raw PSTN latency contributions, as they require different remediation efforts.

- \[ \text{overall}\_\text{latency} \] is the total latency experienced between caller and agent. This latency can be calculated as \[ \text{overall}\_\text{latency} = \text{agent}\_\text{latency} + \text{pstn}\_\text{latency} \].

- \[ \text{pstn}\_\text{latency} \] is the latency between Amazon Connect endpoint and the caller. This latency can be calculated as \[ \text{pstn}\_\text{latency} = \text{overall}\_\text{latency} - \text{agent}\_\text{connection}\_\text{latency} \]. This latency can be improved by using a different Amazon Connect Region location or avoiding external and circular transfers to geographically distant endpoint locations.

- \[ \text{agent}\_\text{latency} \] is the latency between Amazon Connect endpoint and the agent. This latency can be calculated as \[ \text{agent}\_\text{latency} = \text{overall}\_\text{latency} - \text{recording}\_\text{latency} \]. This latency can be improved by using AWS Direct Connect for agents on-premises, avoiding the use of VPN connections, improving private WAN/LAN performance/durability, or using an Amazon Connect Region location closer to your agents. Depending on your use case, selecting a different Region selection may also increase \[ \text{pstn}\_\text{latency} \].
Amazon Connect leverages CloudFront for connectivity. Not all CloudFront ranges are advertised over AWS Direct Connect. This means not all URLs generated by Amazon Connect are reachable over a Public Virtual Interface.

- [redirect_latency] is the latency resulting in redirecting audio to an external device. This latency can be calculated by measuring [overall_latency] once with redirect and once without and take the difference between the two.
- [forward_latency] is the latency resulting in forward calls to or from Amazon Connect. This latency can be calculated by measuring [overall_latency], once with forward and once without, and take the difference between the two.

**Measuring Latency**

Measuring latency involves the following steps:

- Reproduce your use case. Any deviations need to be measured and accounted for, because they skew test results.
- Match production controls and environment as much as possible. Use the same flows, phone numbers, and endpoint locations.
- Note the geographical locations of your callers, agents, and external transfer destinations, where applicable. If you are servicing multiple countries, each country should be tested individually to provide the same test coverage that your agents experience in production.
- Note mobile and land line use in your tests. Mobile networks can add latency and need to be measured and considered for customer, agent, and transfer endpoints, where applicable.
- Reproduce the business use case. If the agents use conference and transfer, be sure to test those scenarios. If circular transfers occur, which are not recommended, be sure to test those as well.
- Reproduce the agent environment by including the workstation environment, located on the same network segment, and using equipment your agents would use.

**Requirements for Testing Latency**

To perform effective testing for latency, the following are required:

- Call recording enabled to capture [agent_latency]. Without call recording, you can calculate only [overall_latency].
- A customer phone source. For testing, confirm call quality on an actual call from a customer.
- An agent phone, if redirecting audio to an external device. You must be able to record the input and output of this device.
- A third-party transfer endpoint, if applicable. Testing is best when performed on actual calls or transfers from a third party.
- An agent workstation with sound recording or analysis software.
- Reproducible use cases. Troubleshooting can be difficult for issues that cannot be reproduced.
- NTP or other method to sync timestamps to facilitate identifying specific contacts and when they occurred, especially when activity is occurring across multiple time zones.

**Testing Inbound Calls Using a Soft Phone**

This process allows you to complete a latency test scenario in about 15 seconds. Analyzing the results and marking timestamps takes approximately 1-2 minutes per recording.

1. Go to a quiet location.
2. Configure agent workstation to play audio from external speakers and make sure they are turned up.
3. Use the agent workstation to log in to the CCP.
4. Start recording using an audio capturing tool on the agent workstation.
5. From the customer's phone source, use a speaker phone to call the incoming number for your Amazon Connect instance. This could really just be any external phone source to simulate a customer call.
6. Answer the incoming call using the soft phone on the agent workstation.
7. Make sure that the customer phone is not muted.
8. On the customer side, use an object or your hand, tap loudly on the desk or table, and then immediately mute the customer phone.
9. Wait 3 or more seconds. Repeat steps 7-8 at least 3 times.
10. Stop recording on the agent workstation.
11. Open the recording in your audio analysis tool. You should be able to see both the initial tapping sound that you made on the desk, and the tapping sound on the agent line on the other end. Take the three deltas and average for your \([\text{overall\_latency}]\).
12. Optionally, to calculate \([\text{agent\_latency}]\), open the associated Amazon Connect call recording in your audio analysis tool. You should be able to see both the initial tapping sound and the sound when it arrives to the agent at the other end. Take the three deltas and average for your \([\text{recording\_latency}]\). \[\text{agent\_latency} = \text{overall\_latency} - \text{recording\_latency}\]. Repeat as needed.

Modify the test plan as necessary to fit your use case. As the steps change, the process of recording and analyzing the audio is the same. If you need to test conferences and transfers, take measurements as normal, and then take another measurement when the conference is active with the third party transfer endpoint.

**Interpreting the Test Results**

The impact of increasing \([\text{overall\_latency}]\) begins to be noticeable at approximately 300ms and can result in crosstalk above 500ms. The impact, and what level of latency is considered acceptable, depends on your use case. For recommended remediation efforts for decreasing latency, see the PSTN and Agent Connection Latency (p. 919).

### Mobile phones (iPhone, Android) and iPads are not supported

The default version of the Contact Control Panel (CCP) does not work with mobile devices such as iPhones and iPads.

You can set up your CCP to forward the audio portion of the call to your mobile device. For instructions, see Forward calls to a mobile device (iPhone, Android) (p. 872).

### Microsoft Edge is not supported

Using Microsoft Edge or Edge Chromium with the Contact Control Panel is not supported. For a list of supported browsers, see Browsers supported by Amazon Connect (p. 4).

### Can't make an outbound call from the CCP

The top reason most agents can't make outbound calls from the CCP is because their instance of Amazon Connect has not been set up to make outbound calls.
To enable agents to make outbound calls

1. Open the Amazon Connect console at https://console.aws.amazon.com/connect/.
2. On the instances page, choose the instance alias. The instance alias is also your instance name, which appears in your Amazon Connect URL.
3. In the navigation pane, choose Telephony.
4. To enable outbound calling from your contact center, choose I want to make outbound calls with Amazon Connect.
5. Choose Save.

Attachments are not appearing in chats

The following issues may cause attachments to not display for your agents using chat.

Internal firewall settings are preventing access

Check that your firewall isn't preventing agents from accessing the files in your Amazon S3 bucket. You may need to add the Amazon S3 bucket where your files are stored to your domain allow list. For more information, see Set up your network (p. 496).

Attachments are too large, too many, or don't meet file type requirements

Check that the attachments meet the size, number, and file type requirements. For more information, see Feature specifications (p. 929).

To calculate the size of an attachment (artifactSizeInBytes), use a third-party tool such as File.size.

Humming sound in headset: Verify the headset and browser sample rates

If the agent's audio device does not support up to 48khz and the browser asserts a sample rate of 48khz, audio issues such as an audible humming sound may be present in the agent's outgoing audio. This has been seen with Firefox but not with Chrome.

Perform the following steps to verify your headset and browser sample rates.
Verify Firefox sample rate

1. Open the agent's CCP in Firefox, and set their status to **Available**.
2. Accept a call.
3. Open a second Firefox tab, and type `about:support` in the Search box.
4. Scroll down the page to **Media**.
5. Verify that the sample rates for the input and output devices are **48000**, as shown in the following image.

Verify Chrome sample rate

1. Open the agent's CCP in Chrome, and set their status to **Available**.
2. Accept a call.
3. Open a second Chrome tab, and type `chrome://about` in the Search box.
4. Scroll down the page and choose `chrome://media- internals`.
5. On the **Audio** tab, choose the **Input Controllers** and verify that the sample rate is **48000**. Then verify the sample rate for the Output Controllers.
Verify Chrome sample rate

General Information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AudioServiceLaunchOnStartup</td>
<td>&quot;Disabled&quot;</td>
</tr>
<tr>
<td>AudioServiceOutOfProcess</td>
<td>&quot;Enabled&quot;</td>
</tr>
<tr>
<td>AudioServiceOutOfProcessKillAtHang</td>
<td>&quot;Enabled, timeout = &lt;undefined&gt; seconds&quot;</td>
</tr>
<tr>
<td>AudioServiceSandbox</td>
<td>&quot;Enabled&quot;</td>
</tr>
</tbody>
</table>

Input Controllers

Controller 1:0

Output Controllers

Controller 0:0
Controller 2:0
Controller 3:0

Output Streams

Stream 3:1

Controller 1:0 Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>channel_layout</td>
<td>&quot;MONO&quot;</td>
</tr>
<tr>
<td>channels</td>
<td>1</td>
</tr>
<tr>
<td>device_id</td>
<td>&quot;default&quot;</td>
</tr>
<tr>
<td>device_type</td>
<td>&quot;pcm_low_latency&quot;</td>
</tr>
<tr>
<td>effects</td>
<td>&quot;NO_EFFECTS&quot;</td>
</tr>
<tr>
<td>frames_per_buffer</td>
<td>480</td>
</tr>
<tr>
<td>render_process_id</td>
<td>297</td>
</tr>
<tr>
<td>sample_rate</td>
<td>48000</td>
</tr>
<tr>
<td>status</td>
<td>&quot;started&quot;</td>
</tr>
<tr>
<td>web_contents_title</td>
<td>&quot;Amazon Connect Contact Control Panel&quot;</td>
</tr>
</tbody>
</table>
One-way audio from customers?

If an agent can hear the customer, but the customer can't hear the agent, this may be the result of an application taking exclusive control of agent's mic/speaker.

For instructions about how to disable it, see How do I turn off Exclusive-Mode for a Windows audio playback device?

Troubleshoot problems pausing, rewinding, or fast-forwarding recordings

If you are unable to pause, rewind or fast-forward recordings on the Contact search page, one possible reason could be that your network is blocking HTTP range requests. See HTTP range requests on the MDN Web Docs site. Work with your network administrator to unblock HTTP range requests.
Amazon Connect service quotas

All service quotas can be adjusted/increased unless otherwise noted.

- Create your instance (it must exist) and then submit a service quota increase. Use the Amazon Connect service quotas increase form. You must be signed in to your AWS account to access the form.
- It can take up to a few weeks to increase your service quota. If you're increasing your quotas as part of a larger project, be sure to add this time to your plan.
- Use the same form to submit a request to port your US phone number from your current carrier to Amazon Connect. For more information about porting phone numbers, see Port your current phone number (p. 155).

<table>
<thead>
<tr>
<th>Item</th>
<th>Default quotas for new accounts created October, 2020 or later. Learn more (p. 929)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS Lambda functions per instance</td>
<td>35</td>
</tr>
<tr>
<td>Agent status per instance</td>
<td>50</td>
</tr>
<tr>
<td>Amazon Connect instances per account</td>
<td>2</td>
</tr>
<tr>
<td>Amazon Lex bots per instance</td>
<td>50</td>
</tr>
<tr>
<td>Amazon Lex V2 bot aliases per instance</td>
<td>100</td>
</tr>
<tr>
<td>Concurrent active calls per instance</td>
<td>10</td>
</tr>
</tbody>
</table>

**What is counted?** All calls currently being handled by agents or waiting in a queue for an agent. Callbacks waiting in a callback queue are not counted until the callback is offered to an available agent.

If this quota is exceeded, contacts will get a reorder tone (also known as a fast busy tone), which indicates no transmission path to the called number is available.

**Tip**
You can calculate your configured quota using CloudWatch metrics. For instructions, see Use CloudWatch metrics to calculate concurrent call quota (p. 810).

**If you’re only taking calls:** Another way to determine your concurrent calls quota is to edit a queue and enter an exceptionally large number for the contact limit. The resulting error message will display your quota for concurrent calls. For example, in the following image, it shows the call quota for that instance is 99.
<table>
<thead>
<tr>
<th>Item</th>
<th>Default quotas for new accounts created October, 2020 or later. Learn more (p. 929)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concurrent active chats per instance</strong></td>
<td>100</td>
</tr>
<tr>
<td>This includes chats that are waiting.</td>
<td></td>
</tr>
<tr>
<td>If this quota is exceeded, the API call fails with a quota exceeded error.</td>
<td></td>
</tr>
<tr>
<td>By default Maximum contacts in queue (p. 212) is set to your Concurrent calls per instance quota. If you plan to have more chats than that in a queue, submit a request to increase the Active chats per instance quota, and then increase the Maximum contacts in queue (p. 212) setting.</td>
<td></td>
</tr>
<tr>
<td><strong>Concurrent active tasks per instance</strong></td>
<td>2500 concurrent active tasks</td>
</tr>
<tr>
<td>What is counted? All tasks that have not yet ended are considered active and are counted as concurrent tasks: tasks that are being routed in flows, waiting in a queue for an agent, being handled by agents, or being run in After Contact Work (ACW).</td>
<td></td>
</tr>
<tr>
<td>By default Maximum contacts in queue (p. 212) is set to your Concurrent calls per instance quota. If you plan to have more tasks than that in a queue, submit a request to increase the Active tasks per instance quota, and then increase the Maximum contacts in queue (p. 212) setting.</td>
<td></td>
</tr>
<tr>
<td><strong>Contact flows per instance</strong></td>
<td>100</td>
</tr>
<tr>
<td><strong>Hours of operation per instance</strong></td>
<td>100</td>
</tr>
<tr>
<td><strong>Phone numbers per instance</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Prompts per instance</strong></td>
<td>50</td>
</tr>
<tr>
<td><strong>Queues per instance</strong></td>
<td>50</td>
</tr>
<tr>
<td>Item</td>
<td>Default quotas for new accounts created October, 2020 or later. Learn more (p. 929)</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Queues per routing profile per instance | 50  
This quota refers to number of queue/channel combinations per routing profile. For example, in the following image there are two queues, but there are three queue-channel combinations: Escalation queue Voice, Escalation queue Chat, and BasicQueue Voice. This counts three towards the service limit of 50. |
| Quick connects per instance       | 100  |
| Rate of API requests              | See Amazon Connect API throttling quotas (p. 932). |
| Reports per instance              | 2000  
Personal saved reports count towards the reports per instance. For example, if one of your supervisors saves a report every day, it will count towards your overall number of saved reports per instance.  
As a best practice, we recommend you implement policies so reports don't pile up. |
| Routing profiles per instance     | 100  |
| Scheduled reports per instance    | 50  
This quota cannot be increased. |
| Security profiles per instance    | 100  |
| User hierarchy groups per instance| 500  
This quota applies to the total number of hierarchy groups you have, across all levels. There is no feature limit for how many hierarchy groups you can have for each level. For example, one level could have 500 hierarchy groups, which would reach the quota for your instance. |
| Users per instance                | 500  |
Note
Amazon Connect is not available to customers in India using Amazon Web Services through Amazon Internet Services Pvt. Ltd (AISPL). You will receive an error message if you try to create an instance in Amazon Connect.

Amazon Connect Customer Profiles service quotas

<table>
<thead>
<tr>
<th>Item</th>
<th>Default quotas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon Connect Customer Profiles domains count</td>
<td>100</td>
</tr>
<tr>
<td>Keys per object type</td>
<td>10</td>
</tr>
<tr>
<td>Maximum expiration in days</td>
<td>1,096 (3 years)</td>
</tr>
<tr>
<td></td>
<td>This is the expiration of objects and profiles.</td>
</tr>
<tr>
<td>Maximum number of integrations</td>
<td>50</td>
</tr>
<tr>
<td>Maximum size of all objects for a profile</td>
<td>5MB</td>
</tr>
<tr>
<td>Object and profile maximum size</td>
<td>250KB</td>
</tr>
<tr>
<td></td>
<td>This quota cannot be increased.</td>
</tr>
<tr>
<td>Objects per domain</td>
<td>100</td>
</tr>
<tr>
<td>Objects per profile</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>This is the maximum number of objects that can be attached to a profile.</td>
</tr>
</tbody>
</table>

About default quotas

The preceding table that lists Amazon Connect service quotas provides the default quotas for new Amazon Connect accounts as of February 2020. Because the quotas have been adjusted over time, the quotas in place for your account may be different than the quotas described here.

Feature specifications

The following table lists feature specifications. They cannot be increased.

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>File types supported for chat attachments</td>
<td>.pdf, .jpg, .jpeg, .png, .doc, .docx, .xls, .csv, .wav, .pptx, .ppt, .txt</td>
</tr>
<tr>
<td>Max file size for a chat attachment</td>
<td>20MB</td>
</tr>
<tr>
<td>Attachments per chat conversation</td>
<td>5</td>
</tr>
<tr>
<td>People who can listen in on the same agent call at the same time</td>
<td>5</td>
</tr>
</tbody>
</table>
## Countries you can call

The Region where your instance is created determines which countries you can call by default.

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants on a conference call</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The three participants are the customer, agent, and a third person who can be either another agent or an external third-party.</td>
</tr>
<tr>
<td>Contact Trace Record retention</td>
<td>24 months from the time the associated contact was initiated.</td>
</tr>
<tr>
<td></td>
<td>You can choose to stream CTRs to Kinesis so you can manage retention and perform advanced analysis.</td>
</tr>
<tr>
<td>Max size of the CTR attributes section</td>
<td>32KB</td>
</tr>
<tr>
<td>Active chats per agent</td>
<td>10</td>
</tr>
<tr>
<td>Total duration per chat</td>
<td>25 hours, including wait time</td>
</tr>
<tr>
<td>Characters per chat message</td>
<td>1024</td>
</tr>
<tr>
<td>Open websocket connections per chat participant</td>
<td>5</td>
</tr>
<tr>
<td>Maximum duration of a task</td>
<td>7 days</td>
</tr>
<tr>
<td>Maximum number of transfers for a task</td>
<td>11 transfers</td>
</tr>
<tr>
<td>Maximum number of linked tasks on an existing contact</td>
<td>11</td>
</tr>
<tr>
<td>Limit on creating and deleting instances</td>
<td>100 instances can be created or deleted in 30 days. Amazon Connect enforces a limit on the total number of instances that you can create and delete in 30 days. If you exceed this limit, you will get an error message indicating there has been an excessive number of attempts at creating or deleting instances. You must wait 30 days before you can restart creating and deleting instances in your account. For example, if you create 80 instances and delete 20 over the course of 30 days, you must wait an additional 30 days before you can create or delete any more instances. If you create and delete the same instance 100 times in 30 days, the limit also applies.</td>
</tr>
</tbody>
</table>
Submit a service quota increase request to allow calling to additional countries, or to limit the countries that you can call from. You must be signed in to your AWS account to access the form.

For a list of all the countries available for outbound calling, see Amazon Connect pricing.

If you already have an instance, the countries that you are allowed to call may be different that those listed in the following sections because we have changed the service quotas over time.

Instances created in US East, US West, Canada (Central) and AWS GovCloud (US-West)

You can call the following countries by default:

- United States
- Canada
- Mexico
- Puerto Rico
- United Kingdom: See Prefixes that are not allowed by default (p. 932)

Instances created in EU (Frankfurt) and EU (London)

You can call the following countries by default:

- United Kingdom: See Prefixes that are not allowed by default (p. 932)
- Italy
- France
- Ireland
- United States

Instances created in Asia Pacific (Tokyo)

You can call the following countries by default:

- Japan: See Prefixes that are not allowed by default (p. 932)
- Vietnam
- United States

Instances created in Asia Pacific (Singapore)

You can call the following countries by default:

- Singapore
- Australia
- Hong Kong
- United States
- United Kingdom: See Prefixes that are not allowed by default (p. 932)
Instances created in Asia Pacific (Sydney)

You can call the following countries by default:

- Australia
- New Zealand
- Philippines
- United States

Prefixes that are not allowed by default

**UK** numbers with the following prefixes are not allowed by default:

- +447  +44111  +44118  +44119  +448  +44826  +449

Before you can dial these UK mobile numbers, you must submit a service quota increase request.

**Japan** mobile numbers with the following prefixes are not allowed by default:

- +8170, 8180, and 8190

Before you can dial these Japan mobile numbers, you must submit a service quota increase request.

Amazon Connect API throttling quotas

Amazon Connect throttling quotas are by account, not by user and not by instance. For example:

- If different IAM users from the same account make requests, they are sharing a throttle bucket.
- If multiple requests are sent from different instances from the same account, they are also sharing a throttle bucket.

When you use the Amazon Connect Service API, the number of requests per second is limited to the following:

- For the GetMetricData and GetCurrentMetricData operations, a RateLimit of 5 requests per second, and a BurstLimit of 8 requests per second.
  
  **Note**
  The rate limit cannot be increased for GetMetricData and GetCurrentMetricData.

- For all other operations, a RateLimit of 2 requests per second, and a BurstLimit of 5 requests per second.

Amazon Connect Participant Service API throttling quotas

For the Amazon Connect Participant Service, the quotas are by instance.

When you use the Amazon Connect Participant Service API, the number of requests per second is limited to the following:
- **CreateParticipantConnection**: a RateLimit of 6 requests per second, and a BurstLimit of 9 requests per second.
- **DisconnectParticipant**: a RateLimit of 3 requests per second, and a BurstLimit of 5 requests per second.
- **GetTranscript**: a RateLimit of 8 requests per second, and a BurstLimit of 12 requests per second.
- **SendEvent** and **SendMessage**: a RateLimit of 10 requests per second, and a BurstLimit of 15 requests per second.

**Amazon Connect Contact Lens Service API throttling quotas**

Amazon Connect Contact Lens throttling quotas are by account, not by user and not by instance. For example:

- If different IAM users from the same account make requests, they are sharing a throttle bucket.
- If multiple requests are sent from different instances from the same account, they are also sharing a throttle bucket.

When you use the Amazon Connect Contact Lens API, the number of requests per second is limited to the following:

- **ListRealtimeContactAnalysisSegments**: a RateLimit of 1 request per second, and a BurstLimit of 2 requests per second.
Additional resources for Amazon Connect

In addition to using the contents of this guide, you can learn more about Amazon Connect by using the online resources listed in this topic.

Amazon Connect Service API documentation

The Amazon Connect Service API Documentation provides details about all the operations, types, inputs and outputs, and error codes.

Amazon Connect Participant Service API

The Amazon Connect Participant Service API provides details about the APIs used by chat participants, such as agents and customers.

Amazon AppIntegrations API

The Amazon AppIntegrations Service API Reference which enables you to access and configure AppIntegrations associations programmatically with Amazon Connect instances.

Contact Lens for Amazon Connect API

The real-time capabilities in Contact Lens for Amazon Connect are available through a synchronous API that enables you to build innovative solutions customized to your business needs. Through the real-time API, you can access an up-to-date transcript along with all the associated conversation characteristics while a call is still in progress. This helps reduce the need for agents to write detailed call summaries and enables a seamless handoff from one agent to another during a call transfer.

For more information, see Amazon Connect Contact Lens API Reference.

Amazon Connect Customer Profiles API

Use the Amazon Connect Customer Profiles API Reference to manage domains and profiles.

Amazon Connect Streams

Use the Amazon Connect Streams documentation to integrate your existing web applications with Amazon Connect. Streams gives you the power to embed the Contact Control Panel (CCP) UI components into your page, and/or handle agent and contact state events directly giving you the power.
to control agent and contact state through an object oriented event driven interface. You can use the built in interface or build your own from scratch: Streams gives you the power to choose.

Amazon Connect Chat SDK and sample implementations

See the Amazon Connect Chat SDK and Sample Implementations for examples of how to enable your app to engage with Amazon Connect chat.
Release notes

To help you keep track of the ongoing updates and improvements to Amazon Connect, we publish release notices that describe recent changes.

Updates

- Upcoming change: Faster reload times for the Real-time metrics page (p. 936)
- Upcoming change: Fix for agent event stream (p. 936)
- Coming soon: New AppIntegrations Service APIs (p. 936)
- September 2021 Updates (p. 937)
- August 2021 Updates (p. 937)
- July 2021 Updates (p. 938)
- June 2021 Updates (p. 940)
- May 2021 Updates (p. 941)
- April 2021 Updates (p. 943)
- March 2021 Updates (p. 944)
- February 2021 Updates (p. 945)
- January 2021 Updates (p. 945)
- December 2020 Updates (p. 946)
- November 2020 Updates (p. 947)
- Earlier Updates (p. 948)

Upcoming change: Faster reload times for the Real-time metrics page

We are upgrading the performance of the Real-time metrics page so reload times are faster. The page will have the same functionality and user experience as the existing Real-time metrics page.

Upcoming change: Fix for agent event stream

There is currently an issue in the contacts section of Agent Event Stream events where the initiationMethod is TRANSFER for both contacts that are initiated by queue-to-queue transfer, and contacts that were initiated by agent transfer. With this fix, the initiationMethod will correctly reflect QUEUE_TRANSFER and TRANSFER respectively, to align with the correct behavior in the Contact Trace Record.

Coming soon: New AppIntegrations Service APIs

New DataIntegration APIs for the AppIntegrations Service: CreateDataIntegration, DeleteDataIntegration, GetDataIntegration, ListDataIntegrationAssociations, ListDataIntegrations, UpdateDataIntegration.
September 2021 Updates

Preview release of Amazon Connect High-Volume Outbound Communications

Added content for the preview release of Amazon Connect High-Volume Outbound Communications. By using Amazon Pinpoint Journeys and Amazon Connect, you can now create high-volume outbound campaigns for voice, SMS, and email. For more information, see Enable High-Volume Outbound Communications.

Display name and contact attributes in chat

You can now personalize the chat experience, as you can specify the name of your customer that interacts using the chat user interface. You can also securely pass the contact attributes to capture information about the contact which can be used in the contact flow to further personalize the experience. For more information, see Pass the customer display name when a chat initializes and Pass contact attributes when a chat initializes.

Preview of agent application

Launched an updated UI for the agent application preview that combines Customer Profiles and the Contact Control Panel (CCP). For more information, see Access Customer Profiles in the agent application.

Added Create task block

Added the Create task block. It creates a new task, sets the tasks attributes, and initiates a contact flow to start the task. For more information, see Contact block: Create task.

August 2021 Updates

Improved user interface for Amazon Connect console

Released a redesigned and improved user interface for the Amazon Connect console, making it easier and faster to manage Amazon Connect instances. For more information, see Create an Amazon Connect instance (p. 134).

APIs for Hours of Operation and Agent Status (Preview)

Released for ungated preview new APIs for managing hours of operation and agent status. For more information, see Amazon Connect Service API Reference.

Contact Lens: Build rules that generate tasks and EventBridge events

Contact Lens rules now allow you to automatically generate tasks and EventBridge events based on uttered keywords, sentiment scores, customer attributes, and other criteria. For more information, see Build rules with Contact Lens (p. 642).
Networking: Allow AWS Global Accelerator

When using SAML Sign-In to your Amazon Connect instance, you now need to add the AWS Global Accelerator domain, *.awsglobalaccelerator.com, to your allow list. For more information, see Set up your network (p. 496).

July 2021 Updates

"Next status" feature for the CCP

In busy contact centers, it can be difficult for agents to take a break or go offline when contacts are being quickly routed to them. To help agents manage their time, we have released a feature that lets agents pause new contacts being routed to them while they finish their current contacts. When all their slots are cleared, Amazon Connect automatically sets agents to the next status, such as Lunch.

For details about how agents use this feature, see Set your "Next status" (p. 872).

Metrics: No changes due to "Next status"

When an agent is in Next status, their metrics are the same as when their status is Available.

For example, an agent is handling one contact and chooses Next status. Here's what you'll see in the real-time metrics report:

- Agent Activity state = On Contact
- Agent - Staffed = 1

Non-productive time (NPT) is not incremented when an agent is in Next status because the agent is still Available. NPT increments only when the agent actually enters the non-productive status, such as Lunch.

Agent event stream has new NextAgentStatus field

When an agent sets their status to Next status, Amazon Connect populates a new NextAgentStatus field with the next status selected by the agent.

At the same time, the AgentStatus field continues to display Available.

The following code snippet shows what the agent event stream looks like when an agent has set their CCP to Next status: Lunch.

```
"CurrentAgentSnapshot": {
   "AgentStatus": {
      "ARN": "example-ARN",
      "Name": "Available",
      "StartTimestamp": "2019-08-13T20:52:30.704Z"
   },
   "NextAgentStatus": {
      "Name": "Lunch",
      "ARN": "example-ARN2",
      "EnqueueTimestamp": "2019-08-13T20:58:00.004Z",
```

When an agent has not selected a **Next status**, the field is null, as shown in the following snippet:

```json
"CurrentAgentSnapshot": {
  "AgentStatus": {
    "ARN": "example-ARN",
    "Name": "Available",
    "StartTimestamp": "2019-08-13T20:52:30.704Z"
  },
  "NextAgentStatus": null
}
```

**Amazon Connect Streams API and "Next status"

The feature has the following effect:

- If you integrate with Amazon Connect Streams API and your agents interact directly with the native CCP user interface, your agents will start using this new feature immediately.
- If you integrate with Amazon Connect Streams API but your agents don't interact directly with the native CCP user interface, your contact center will continue to have the previous behavior when `agent.setState()` is called: an agent will not be able to select an NPT or Offline status while connected to at least one contact.

If you are handling state change logic yourself from Amazon Connect Streams, you will need to make additional changes explained in the Amazon Connect Streams README.

**Contact search: To search contacts by Agent login**

**requires Users - View permissions in your security profile**

To use the **Agent** filter on the Contact search page, in your Amazon Connect security profile you must have **Users - View** permissions, as shown in the following image:

![Users and permissions](image)

When you have **Users - View** permissions, on the Contact search page the **Agent** filter appears, as shown in the following image:
Without User - View permissions, the Agent filter is not visible, and searching contacts by Agent login is not supported, as shown in the following image:

---

**June 2021 Updates**

**Apple Business Chat GA**

Released Apple Business Chat for general availability (GA). For more information, see Enable Apple Business Chat (p. 236).
Quick connects management API GA

Released Amazon Connect quick connects management API for general availability (GA). For more information, see Amazon Connect Service API Reference. The quick connects API also supports AWS CloudFormation. For more information, see Amazon Connect Resource Type Reference in the AWS CloudFormation User Guide.

Support for Amazon Lex V2 console and APIs

For more information on using the Amazon Lex V2 console with Amazon Connect, see Add an Amazon Lex bot. Added these three APIs: AssociateLexBot, DisassociateLexBot, and ListLexBots. See the Amazon Connect Service API Reference.

Chat: Increase to chat agent concurrency

Chat agents can now handle up to 10 concurrent chat contacts. For more information, see Create a routing profile.

May 2021 Updates

Added contact events

Subscribe to a near real-time stream of contact events (for example, call is queued) in your Amazon Connect contact center. For more information, see Amazon Connect contact events (p. 768).

Contact search

The following changes were release for Contact search:

- Download increase: You are able to download 3,000 rows of search results to a CSV file, instead of 1,000 rows. This increase applies to contacts that occurred after Dec 01, 2020.
- Contact search supports Disconnect Reason as a new filter on the Contact search page.

The following image shows how Disconnect reason appears in the user interface as a filter.
The following image shows how you can filter by type of disconnect reason. For a definition of each disconnect reason, see the ContactTraceRecord (p. 777) section of the Contact Trace Records data model topic.

The following image shows how you add Disconnect reason as a column to your search results.
April 2021 Updates

Customer Profiles: Identity resolution

Added identity resolution APIs to Customer Profiles. For more information, see the GetMatches and MergeProfiles APIs in the Amazon Connect Customer Profiles API reference.

Contact Lens: Use category tags to navigate transcript

For more information, see Tap or click category tags to navigate through transcript (p. 671).

Fixes for chat metrics

We released fixes for the following issues identified in chat metrics:

- Amazon Connect incorrectly reported that chat contacts that were created from disconnect flows were created from transfer flows.
- When these fixes, Amazon Connect correctly reflects in the CTRs and agent event stream that these chat contacts were created from disconnect flows.

There is no impact to voice or task contacts.

Chat contacts created through disconnect flows no longer increment the following metrics:

- Contact flow time (p. 735)
- Contacts incoming (p. 738)
- Contacts handled incoming (p. 737)
- Contacts transferred in (p. 739)

In addition, note the following fixes for CTRs and the agent event stream for chat contacts:

- CTRs: There was an issue in the Attributes section of a chat CTR where the initiation method is API for both disconnect and transfer contacts. With this fix, the initiation method correctly reflects Disconnect and Transfer, respectively.
March 2021 Updates

Amazon Connect is now available in the Canada (Central) Region

Amazon Connect is now available in the Canada (Central) AWS Region. You can claim toll-free and local telephone numbers from Canadian telephony suppliers. For a list of countries were the Canada (Central) Region is supported, see Region requirements for phone numbers. For a list of Contact Lens features available in the Canada (Central) Region, see Availability of Contact Lens features by Region.

Domain for new Amazon Connect instances is "my.connect.aws"

The domain for the Amazon Connect access URL has changed to my.connect.aws.

For example:

- Current: https://[instance name].awsapps.com/connect/
- New: https://[instance name].my.connect.aws/

How does this change impact logging in to Amazon Connect?

The current access URL continues to work for Amazon Connect instances created before the release of the my.connect.aws domain. Any Amazon Connect instances created after the release automatically use the new domain.

Also, if you create new Amazon Connect instances after the release of the new domain, you must add new domains to your allow list. These domains are in addition to the ones that are currently required.

**Currently required domains added to your allow list:**

- {myInstanceName}.awsapps.com/connect/ccp-v2
- {myInstanceName}.awsapps.com/connect/api
- *.cloudfront.net

**New additional domains to add to your allow list:**

- {myInstanceName}.my.connect.aws/ccp-v2
- {myInstanceName}.my.connect.aws/api
- *.static.connect.aws

For more information, see Set up your network (p. 496).

Schedule for domain change

The change has been rolled out to all Regions.
Chat: Add a chat user interface your website

Added a chat widget that you can customize and secure so it can only be launched from your widget. For more information, see Set up your customer's chat experience (p. 225).

Provided an open source example. For more information, see Download and customize our open source example (p. 234).

Amazon Connect Endpoint Test Utility

To help you validate connectivity to Amazon Connect, or troubleshoot when your agents are experiencing problems with the Contact Control Panel (CCP), we've added the Amazon Connect Endpoint Test Utility. For more information, see Use the Endpoint Test Utility (p. 914).

February 2021 Updates

Contact Lens: Availability of real-time analytics

Content Lens real-time analytics is available in Europe (London), Europe (Frankfurt), and Asia (Tokyo). For more information, see Availability of Contact Lens features by Region (p. 637).

Ingest data into Customer Profiles using Amazon S3

Added the ability to create and ingest data from Amazon S3. For more information, see Create and ingest customer data into Customer Profiles by using Amazon S3 (p. 567).

Disconnect reason in CTR stream

The Amazon Connect CTR (contact trace records) stream now includes DisconnectReason for voice calls and tasks. DisconnectReason indicates whether an agent or customer disconnected the call, or whether a telecom or network issue caused a call to disconnect. You can also determine whether a task was completed by an agent or an automatic flow, or it expired. For more information, see ContactTraceRecord (p. 777).

Custom service levels

Added the ability to create custom service levels. For details, see New metric groupings and categories (p. 697).

January 2021 Updates

CCP: Change your audio settings

Added the ability to change audio settings from the Contact Control Panel (CCP). This applies to organizations using a customized CCP. For more information, see Change your audio device settings (p. 869).
Queue APIs (Preview)

Added APIs so you can programmatically create and manage queues. For more information, see Amazon Connect Service API Reference.

Amazon AppIntegrations APIs - GA

Released Amazon AppIntegrations APIs for general availability (GA). For more information, see Amazon AppIntegrations Service API Reference.

December 2020 Updates

Quick Connect APIs (Preview)

Added APIs so you can programmatically create and manage quick connects. For more information, see Amazon Connect Service API Reference.

Chat: Support for attachments

Added support for chat attachments. For more information, see Enable attachments to share files using chat (p. 141).

Added the following APIs:

- CompleteAttachmentUpload
- GetAttachment
- StartAttachmentUpload

Configurable DTMF timeouts for Lex bots

For more information, see Configurable fields for DTMF input (p. 325).

Tasks

Added support for tasks, allowing you to prioritize, assign, track, and even automate tasks across the disparate tools agents use to support customers. For more information, see Tasks (p. 15).

Amazon Connect APIs

Added an Amazon Connect API that provides the ability to create tasks (StartTaskContact), and a set of preview APIs.

Preview APIs:

- CreateIntegrationAssociation
- DeleteIntegrationAssociation
- ListIntegrationAssociations
- CreateUseCase
- DeleteUseCase
Amazon AppIntegrations APIs (Preview)

Added the Amazon AppIntegrations APIs (Preview), which enables you to configure and reuse connections to external applications. For more information, see Amazon AppIntegrations Service API Reference (Preview).

Customer Profiles

Added Amazon Connect Customer Profiles, enabling agents to create a customer profile for every new contact that comes in. You can also integrate with external applications that provide customer profile data. For more information, see Enable Customer Profiles (p. 531) and the Amazon Connect Customer Profiles API Reference.

Real-time analytics using Contact Lens

Added real-time analytics for Contact Lens so you can detect and resolve customer issues more proactively while the call is in progress. For more information, see Analyze conversations using Contact Lens for Amazon Connect (p. 630) and the Amazon Connect Contact Lens API Reference.

Amazon Connect Voice ID (Preview)

Added Amazon Connect Voice ID (Preview), which provides for real-time caller authentication. For more information, see Use real-time caller authentication with Voice ID (p. 689).

Amazon Connect Wisdom (Preview)

Added Amazon Connect Wisdom (Preview), which enables agents to search and find content across multiple repositories, such as frequently asked questions (FAQs), wikis, articles, and step-by-step instructions for handling different customer issues. For more information, see Amazon Connect Wisdom: Get the content you need (p. 692).

Amazon Connect with Apple Business Chat (Preview)

Added support for using Amazon Connect with Apple Business Chat. For more information, see Enable Apple Business Chat (p. 236).

November 2020 Updates

Contact search

- Made several improvements to contact search. For more information, see What's new in contact search (p. 784).

Telephony call metadata attributes

- Added call attributes to improve fraud detection and routing. For more information, see Telephony call metadata attributes (call attributes) (p. 453).
View historical changes

- The ability to View historical changes on the resource configuration pages is now available for the London Region. The following differences appear as the changes are rolled out to other Regions.
  - Total results: The number feature in the View historical changes search page, and page numbers, are replaced with Previous and Next icons.
  - The Username filter requires the entire login name.

Chat

- Added interactive message templates. For more information, see Add interactive messages to chat (p. 524).

APIs

- Added APIs so you can programmatically manage your agent hierarchies and agent groups. For more information, see Amazon Connect Service API Reference.
- Added the following APIs (in an ungated preview release):
  - CreateInstance
  - DescribeInstance
  - ListInstances
  - DeleteInstance
  - UpdateInstanceAttribute
  - UpdateInstanceStorageConfig

Earlier Updates

October 2020 Updates

The following updates were released in October 2020:

Contact flows

- Added chat support for whisper flows. For more information, see Contact block: Set whisper flow (p. 368).

Metrics

- Released the following real-time metrics:
  - Avg callback connecting time (p. 711)
  - Avg incoming connecting time (p. 712)
  - Avg outbound connecting time (p. 712)

Released the following historical metrics:

- Agent API connecting time (p. 730)
- Agent callback connecting time (p. 731)
• Agent incoming connecting time (p. 731)
• Agent outbound connecting time (p. 732)
• Average agent API connecting time (p. 733)
• Average agent callback connecting time (p. 733)
• Average agent incoming connecting time (p. 733)
• Average agent outbound connecting time (p. 734)
• In real-time metrics reports, added one-click drill-downs. These allow you to drill down into queue and routing profile data in one click. For more information, see Use one-click drill-downs for Routing profiles and Queues tables (p. 718).
• Added the Restrict contact access permission which enables you to manage a user’s access to results on the Contact search page based on their agent hierarchy group. For more information, see Search for contacts (p. 784).
• Added ContactDetails and References to the contact trace record (CTR). For more information, see Contact trace records (CTR) data model (p. 774).

September 2020 Updates

The following updates were released in September 2020:

Service quotas

• Updated the service quotas for the following Amazon Connect Participant Service APIs:
  • CreateParticipantConnection (p. 932)
  • DisconnectParticipant (p. 932)
  • GetTranscript (p. 932)

Contact flows

• Added the Amazon Connect Flow language, a JSON-based representation of a series of flow actions, and the criteria for moving between them. For more information, see Amazon Connect Flow language (p. 469).

APIs

Added the following APIs for contact flows:
• CreateContactFlow
• DescribeContactFlow
• UpdateContactFlowContent
• UpdateContactFlowName

Added the following API to list prompts:
• ListPrompts

Added the following APIs for routing profiles:
• AssociateRoutingProfileQueues
• CreateRoutingProfile
August 2020 Updates

The following updates were released in August 2020:

Contact flows

- Added the ability to automatically use the best sounding voice available from Amazon Polly for text-to-speech. For more information, see Amazon Polly best sounding voice (p. 402).
- Added the ability to select, cut, copy, and paste contact flows. For more information, see Copy and paste contact flows (p. 400).

Telephony

- Added the ability for all customers to enable/disable media support for outbound phone calls. For more information, see Step 3: Set telephony (p. 135) in the Create an Amazon Connect instance (p. 134) topic.

Monitoring

- Added logging of Amazon Connect Participant Service calls with AWS CloudTrail. For more information, see Logging Amazon Connect API calls with AWS CloudTrail (p. 811).

Contact Lens for Amazon Connect

- Updated the security profile permissions for the redaction feature. For more information, see Security profile permissions for Contact Lens (p. 637).

July 2020 Updates

The following updates were released in July 2020:

Contact flows

- The Set voice block supports speaking styles with neural text-to-speech (TTS) voices. For more information, see Contact block: Set voice (p. 364).

APIs

- Added StartContactRecording, StopContactRecording, SuspendContactRecording, ResumeContactRecording to the Amazon Connect Service API.
Contact Lens for Amazon Connect

- Updated Contact Lens for Amazon Connect for general availability. This feature lets you analyze customer-agent conversations, by using speech transcription, natural language processing, and intelligent search capabilities. For more information, see Analyze conversations using Contact Lens for Amazon Connect (p. 630).

Metrics

- Fixed content that was added in June 2020 that said Agent idle time, Agent on contact time, and Occupancy had been deprecated. That was incorrect. Rather, they are no longer available for queue groupings only. For more information, see What's new in metrics (p. 695).
- Corrected how Occupancy is calculated. The correct calculation is:

\[
\text{Occupancy} = \frac{\text{Agent on contact (wall clock time)}}{\text{Agent on contact (wall clock time)} + \text{Agent idle time}}
\]

June 2020 Updates

The following updates were released in June 2020:

Metrics

- The following historical metrics no longer appear in queue groupings:
  - Agent idle time
  - Agent on contact time
  - Occupancy
- Added upcoming metric changes: new real-time and historical metrics for inbound and outbound contact time. For more information, see What’s new in metrics (p. 695).

Contact Control Panel (CCP)

- Released the following improvements:
  - DTMF input is passed to all lines in a three-way call. Any party can enter DTMF input.
  - Resolved an issue where the DTMF tone degraded when agents interacted with Quick connect and/or Number pad during a session.
  - Resolved an issue where quick connects sometimes did not appear on a page, even after an agent refreshed it.
  - Improved the experience when a manager "listens in" to multiple chat conversations. Updated the unread message count on the CCP to include messages sent by the customer and those sent by the agent. Previously, the unread message count only included messages sent by the customer.
  - Published instructions for upgrading to the latest CCP. For more information, see Upgrade to the latest CCP (p. 251).
  - Published a training video that explains how to use the CCP. For more information, see Training video: How to use the CCP (p. 864).

Contact flows

- The Set disconnect flow block supports voice conversations. For more information, see Contact block: Set disconnect flow (p. 354).
- The **Set Voice** block supports Amazon Polly Neural Text-to-Speech (NTTS) voices. For more information, see Contact block: Set voice (p. 364).
- The **Get queue metrics** block can return metrics by channel, for example, by voice or chat. For more information, see Contact block: Get queue metrics (p. 328).

### May 2020 Update

The following updates were released in May 2020:

#### Contact flows

- Added the ability to select multiple blocks at the same time and rearrange them as a group within a contact flow. For more information, see Create an inbound contact flow (p. 395).

### April 2020 Update

The following updates were released in April 2020:

#### Telephony

- Added early media support for outbound phone calls. Enabled by default, an agent hears tones and audio messages played by phone companies—such as busy signals, failure to connect errors, or other informational messages—through their headset or audio device. For more information, see Step 3: Set telephony (p. 135) in the Create an Amazon Connect instance (p. 134) topic.
- Added the barge-in-enabled session attribute to the Get customer input (p. 318) block so customers can interrupt Amazon Lex bots with their voice.

### March 2020 Update

The following updates were released in March 2020:

#### Contact flows

- Updated the Store customer input (p. 376) block to allow you to specify a custom terminating keypress.

#### Metrics

- Announced June 2020: Changes for omnichannel support (p. 702).

#### Networking

- Updated softphone requirements in Set up your network (p. 496).

### February 2020 Update

The following updates were released in February 2020:
Service Quotas

- Adjusted Amazon Connect service quotas (p. 926) for new accounts.

Contact Flows

Updated the following blocks so you can set contact attributes:

- Set customer queue flow (p. 353)
- Set hold flow (p. 356)
- Set whisper flow (p. 368)

January 2020 Update

The following updates were released in January 2020:

Contact Control Panel (CCP)

The following updates were made to the updated Contact Control Panel (ccp-v2):

- Agents can now transfer a contact by double-clicking a quick connect. For more information, see Transfer calls to a quick connect or external number (p. 887).
- The number pad now retains the previously selected country flag so agents don't need to select it every time.
- All strings in the CCP user interface are now localized in available languages.
- Resolved an issue where the color of the call status bar incorrectly displayed as green during a conference call when the call was in the Joined state. It is now blue.
- Resolved an issue where the agent's name was displayed in error messages for missed chats, rather than the customer's name.

Networking

- Updated Set up your network (p. 496) to include requirements for the updated Contact Control Panel (ccp-v2).

December 2019 Update

The following update was released in December 2019:

Monitoring

- Added Contact Lens for Amazon Connect for preview. This feature enables you search conversations for keywords, sentiment scores, and non-talk time. For more information, see Analyze conversations using Contact Lens for Amazon Connect (p. 630).
- Added logging of Amazon Connect API calls with AWS CloudTrail. For more information, see Logging Amazon Connect API calls with AWS CloudTrail (p. 811).
November 2019 Update

The following updates were released in November 2019:

Omnichannel Support

- Added support for chat communications. For more information, see Concepts (p. 9).

Metrics

- For a description of changes, see What's new in metrics (p. 695).

Contact Flows

Added the following contact flow blocks:

- the section called “Wait”
- the section called “Set disconnect flow”

Updated the following contact flow blocks for chat:

- the section called “Play prompt”
- the section called “Get customer input”
- the section called “Store customer input”
- the section called “Set recording and analytics behavior”

User Management

- Added that you can use AWS Identity and Access Management (IAM) with Amazon Connect. For more information, see Identity and access management for Amazon Connect (p. 819).

Live Media Streaming

- Added that you can capture customer audio for the entire interaction with your contact center. For more information, see Capture customer audio: live media streaming (p. 597).

API

- Added StartChatContact, ListTagsForResource, TagResource, UntagResource to the Amazon Connect Service API.
- Added the Amazon Connect Participant Service API. These APIs are used chat participants, such as agents and customers.

Contact Control Panel (CCP)

- Updated the CCP so it supports chat. For more information, see Agent training guide for the Amazon Connect CCP (p. 863).
October 2019 Update

The following update was released in October 2019:

**Metrics**

- The real time metric **On call** is now incremented whenever an agent is handling a contact who is connected, on hold, in After Contact Work, or the agent is dialog out to a customer.

  This metric is available in the Queues tables and Routing Profile tables on the Real time metrics page. It's also returned by the GetCurrentMetricData API as AGENTS_ON_CALL.

June 2019 Update

The following update was released in June 2019:

**Contact Flows**

- Added contact flow versioning so you can choose between a saved or published version when you roll back.

May 2019 Updates

The following updates were released in May 2019:

**Metrics and Reporting**

- Improved the error messages you might encounter when creating, editing, or deleting a scheduled report.
- In the Historical metrics report UI, changed Contacts missed to Agent non-response. This metric appears as Contacts missed in scheduled reports and exported CSV files.
- In the agent event stream, fixed the formatting of the timestamp millisecond so you can better order and analyze the data. To learn more, see Amazon Connect agent event streams (p. 754).

**Contact Control Panel**

- Resolved an issue where calling a destroy action (such as `connection.destroy`) using the Amazon Connect Streams API resulted in different behavior depending on which leg of the conversation it was called from: the agent or the customer. Now calling a destroy action results in the same behavior for both: a busy conversation is moved to After Call Work (ACW) and a conversation in any other state is cleared. If you used the native Contact Control Panel instead of the Amazon Connect Streams API, you weren't impacted by this issue.

April 2019 Updates

The following updates were released in April 2019:

**Contact Control Panel**

- Resolved an issue where the hold flow didn't run in this case:
• The agent missed a call and then set themselves back to Available.
• Then they were re-routed the same call.
• The agent put that customer on hold while handling the call.

However, taking the customer off hold worked as expected and no other impact occurred.

• Resolved an issue where the Amazon Connect Streams API returned softphoneAutoAccept = FALSE even though Auto-Accept Call was enabled for the agent.

March 2019 Update

The following updates were released in March 2019:

Metrics and Reporting

• Improved the error messages you might encounter when running real-time metrics reports. For example, if you manually configure a real-time metrics report to contain more than 100 queues, we'll display this message: "You've hit the maximum limit of 100 queues. Please reconfigure your report to contain no more than 100 queues." To learn more, see No metrics or too few rows in a queues report? (p. 723)

Contact Control Panel

• Resolved an issue where, in rare cases, an agent already handling an outbound call could have been incorrectly presented with an additional queued callback, even though they are only allowed to handle one contact at a time. Since that agent would have been on contact and not idle, the agent wouldn't have been able to accept the queued callback.

In these cases, the outbound call was not impacted; the agent wouldn't have noticed any differences in the CCP. The callback was presented to another agent instead of being dropped.

February 2019 Updates

The following updates were released in February 2019:

Updates by category
• Contact Routing (p. 956)
• Contact Flows (p. 957)
• Metrics and Reporting (p. 957)
• Contact Control Panel (CCP) (p. 957)

Contact Routing

• Resolved an issue where in rare cases some contacts were not routed to the agent that was available for the longest time.
• Resolved an issue in the user interface where the value displayed for No. of agents staffed for the Basic Routing Profile on the Routing Profiles page was incorrect. The correct number of agents for the routing profile was displayed on the User Management page.
Contact Flows

- Resolved an issue with the contact flow editor when adding intents in Chrome.
- Resolved an issue where routing priority and age for queued callbacks were not saved.
- Resolved an issue where contact attributes for an outbound whisper flow were not saved.

Metrics and Reporting

- Added `EnqueueTimestamp`, `Duration`, and `DequeueTimestamp` to the contact trace record (CTR) for callback contacts.
- Resolved an issue where `InitiationTimestamp` for callback contacts did not match the time that the callback was created.
- Resolved an issue where users were given an incorrect message when they did not have permissions to edit a report.

Contact Control Panel (CCP)

- Resolved an issue where callbacks were not ringing in the CCP.

January 2019 Updates

The following updates were released in January 2019:

**Updates by category**
- Contact Routing (p. 957)
- Contact Flows (p. 957)
- Metrics and Reporting (p. 957)

Contact Routing

- Resolved an issue where in rare cases agent transfers were failing.

Contact Flows

- Resolved an issue where agent transfers were failing.
- Resolved an issue that resulted in periodic delays in publishing contact flow logs.

Metrics and Reporting

- Resolved an issue in real-time metrics reports where the page showed the wrong calculation for `Avg queue answer time`.
- Resolved an issue where some events were missing from an agent event stream.

December 2018 Updates

The following updates were released in December 2018:
Updates by category
- Metrics and Reporting (p. 958)
- Contact Control Panel (CCP) (p. 958)

Metrics and Reporting
- Resolved an issue where agent event streams were missing agent snapshots during login and logout events.
- Resolved an issue where the contact trace record detail page displayed timestamps using the timezone selected on the search page.
- Resolved an issue where the AfterContactWork status was overridden.
- Resolved an issue where the timestamps are incorrect if an agent accidentally disconnects while placing a customer on hold.

Contact Control Panel (CCP)
- Resolved an intermittent issue with initialization when an agent configuration is corrupted or null.
- Resolved an issue where pressing Enter to transfer a call did not work.

November 2018 Updates
The following updates were released in November 2018:

Updates by category
- General (p. 958)
- Contact Flows (p. 958)
- Metrics and Reporting (p. 958)

General
- Resolved an issue with auditing.
- Resolved an issue that sometimes resulted in agents being placed in a default state when a contact disconnected when attempting to connect to an agent.
- Resolved an issue that sometimes resulted in newly created agents not being able to log in correctly if the log in attempt occurred immediately after user account was created.

Contact Flows
- Added the new Loop block, which lets you loop through segments of a contact flow, such as requesting customer information additional times if valid data is not entered.

Metrics and Reporting
- Resolved an issue where callbacks handled were included in the count for incoming contacts in historical reports, but not counted in scheduled reports. Callbacks handled are no longer included in the count for incoming contacts handled in historical reports.
• Improved performance of report generation for reports with a large number of queues and agents in an instance.
• Resolved an issue with how ACW was reported, and backfilled data in customer instances to correct the ACW data for September, October, and November.

October 2018 Updates

The following updates were released in October 2018:

Updates by category
• General (p. 959)
• Metrics and Reporting (p. 959)
• API (p. 959)

General
• Resolved an issue that sometimes resulted in stuck media sessions.

Metrics and Reporting
• Resolved an issue that sometimes resulted in agent names not being displayed correctly in historical reports.
• Resolved an issue that sometimes resulted in the data related to agent Auxiliary states were incorrectly overwritten.

API
• Resolved an issue where the GetCurrentMetrics operation returned the metric OLDEST_CONTACT_AGE in milliseconds instead of seconds.

September 2018 Updates

The following updates were released in September 2018:

Updates by category
• General (p. 959)
• API (p. 959)

General
• Improved page loading times for the User management page.
• Resolved an issue that sometimes caused issues loading the Queues page when there were a large number of quick connects associated with a queue.

API
• Released the UpdateContactAttributes operation for the Amazon Connect API.
August 2018 Updates

The following updates were released in August 2018:

Updates by category

• General (p. 960)
• Contact Routing (p. 960)
• Metrics and Reporting (p. 960)

General

• Added a restriction of 64 characters for the password length for the administrator account created during instance creation.
• Resolved an issue where the Hours of operation page would not load when no days were selected for a saved Hours of operation configuration.

Contact Routing

• Increased the timeout for whispers to 2 minutes for outbound and queued callbacks so that agents have longer to prepare for the incoming call.

Metrics and Reporting

• Modified how the value for the Contacts abandoned metric so that calls that transfer to callbacks are not counted as abandoned contacts.

July 2018 Updates

The following updates were released in July 2018:

Updates by category

• New Features (p. 960)
• General (p. 961)
• Metrics and Reporting (p. 961)
• Contact Flows (p. 961)

New Features

• Caller ID number: Set in the queue or Call phone number block (p. 204)
• Add an Amazon Lex bot (p. 508)
• User Management APIs
• Manage contacts in a queue (p. 420)
General

- Added an error message when attempting to create an admin user during instance creation using “Administrator” as the user name. The user name Administrator is reserved for internal use, and cannot be used to create a user account in Amazon Connect.
- Added support for directory user names that include consecutive dashes.
- Added pagination when displaying security profiles in your instance so that more than 25 security profiles can be displayed.
- Performance optimizations to reduce latency when using the StartOutboundVoiceContact API.

Metrics and Reporting

- Resolved an issue in real-time metrics reports where applied filters were not displayed in the settings page when an additional filter was applied. The settings page now displays the applied filters correctly.

Contact Flows

- Added drop-down menus for contact attributes to make it easier to reference attributes in a contact flows.

June 2018 Updates

The following updates were released in June 2018:

Updates by category

- General (p. 961)
- Telephony and Voice (p. 961)
- Contact Flows (p. 961)
- Metrics and Reporting (p. 962)
- Contact Control Panel (CCP) (p. 962)

General

- Changed the font in the UI to Amazon Ember for better readability.

Telephony and Voice

- Introduced support for using Amazon Lex bots with Amazon Connect in the US West (Oregon) Region.
- Fixed a bug that in some cases caused a call to drop when a Loop prompt occurred at the same as a call connecting to an agent.

Contact Flows

- Renamed the Set queue block to Set working queue.
- Added a Copy to clipboard button next to the ARN of a contact flow so you can easily copy the ARN. Choose Show additional flow information under the name of the contact flow in the designer to display the ARN.
• Added a new **Call phone number** block, which lets you choose the phone number from your instance to display as the caller ID in an outbound whisper flow. For more information, see **Caller ID number: Set in the queue or Call phone number block** (p. 204).

• Released contact attributes for system metrics, including a new **Get metrics** block in contact flows. For more information, see **Route based on number of contacts in a queue** (p. 460).

### Metrics and Reporting

• Fixed an issue that caused incorrect rendering of the search field in the filters settings for some historical metrics reports.

• Fixed an issue in downloaded reports where the phone number would be blank instead of listing the phone number for calls that were callbacks.

• Login/Logout reports now support 20,000 rows per report generation, up from 10,000.

### Contact Control Panel (CCP)

• Added a mute button to the CCP and a mute function to the Streams API so agents can mute and unmute active calls.

### April and May 2018 Updates

The following updates were released in April and May 2018:

**Updates by category**

- **General** (p. 962)
- **Telephony and Voice** (p. 962)
- **Contact Flows** (p. 963)
- **Metrics and Reporting** (p. 963)
- **Contact Control Panel (CCP)** (p. 963)

### General

- **New Amazon Polly voices** are now automatically made available in Amazon Connect as soon as they are launched. You can use new voices, such as Matthew and Léa, in your contact flows.

- Updated password enforcement for Amazon Connect user accounts to match requirements for the Amazon Connect admin account created during instance creation.

- Resolved an issue that sometimes resulted in the email addresses not being saved when updating an existing user account.

### Telephony and Voice

- Service optimizations to reduce latency and improve caller ID for Japanese telephony.

- Customers can now place calls to Jersey and Guernsey in the Channel Islands.

- Added support for keypad numeric input to an Amazon Lex bots when used in an Amazon Connect contact flow. For more information, see **Amazon Connect Now Supports Keypad Input with an Amazon Lex Chatbot**.

- Reduced latency for the contact control panel, improving the agent user experience.
Contact Flows

- Resolved an issue with publishing a contact flow in the case where an AWS Lambda function block is used in a contact flow, and the input type for a parameter was changed from Send attribute with a System attribute is changed to Send text. These contact flows now publish successfully.
- Agent and customer whispers are now maintained with queued callbacks.
- Attributes now correctly persist with queue callbacks.
- Contact attributes are now maintained when using a Loop prompt block in a queue flow.

Metrics and Reporting

- Data for scheduled reports is now delayed by 15 minutes to allow for most recent data to be incorporated into reports. Previously, in some cases, report data for the final 15 minute period during the scheduled report interval did not get included in scheduled reports. This applies to all report types.
- In metric calculations, the time that an incoming call rings is attributed to idle time if the agent is in idle state before an incoming call.
- The metric Agent on contact time now includes time that an agent spent in an auxiliary busy state.
- Published new documentation about metrics.

Contact Control Panel (CCP)

- Added a Save button to the settings menu for the CCP when an agent is using a desk phone. The Save button saves the deskphone configuration between sessions.
- Agent username is now available as part of agent configuration data in the Amazon Connect Streams API.
- Contact attributes are now available when using the streams.js (Streams API) for screenpops after queued callbacks.
- Fixed issue where for some auto-accept calls, the agent continued to hear ringing after accepting and joining the call.
Get administrative support for Amazon Connect

If you are an administrator and need to contact support for Amazon Connect, choose one of the following options:

- If you have an AWS Support account, go to Support Center and submit a ticket.
- Otherwise, open the AWS Management Console and choose Amazon Connect, Support, Create case.

It's helpful to provide the following information:

- Your contact center instance ID/ARN. To find your instance ARN, see Find your Amazon Connect instance ID/ARN (p. 137).
- Your region.
- A detailed description of the issue.
Amazon Connect Document history

The following table describes important changes in each release of the Amazon Connect Administrator Guide. For notification about updates to this documentation, you can subscribe to an RSS feed.

<table>
<thead>
<tr>
<th>update-history-change</th>
<th>update-history-description</th>
<th>update-history-date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preview release of Amazon Connect High-Volume Outbound Communications (p. 965)</td>
<td>Added content for the preview release of Amazon Connect High-Volume Outbound Communications. By using Amazon Pinpoint Journeys and Amazon Connect, you can now create high-volume outbound campaigns for voice, SMS, and email. For more information, see Enable High-Volume Outbound Communications.</td>
<td>September 27, 2021</td>
</tr>
<tr>
<td>Added new service-linked role policy (p. 965)</td>
<td>Added AmazonConnectCampaignsServiceLinkedRolePolicy, a new service-linked role policy for Amazon Connect High-Volume Outbound Communications. The policy provides access to retrieve all the high-volume outbound campaigns. For more information, see Enable High-Volume Outbound Communications.</td>
<td>September 27, 2021</td>
</tr>
<tr>
<td>Display name and contact attributes in chat (p. 965)</td>
<td>You can now personalize the chat experience, as you can specify the name of your customer that interacts using the chat user interface. You can also securely pass the contact attributes to capture information about the contact which can be used in the contact flow to further personalize the experience. For more information, see Pass the customer display name when a chat initializes and Pass contact attributes when a chat initializes.</td>
<td>September 17, 2021</td>
</tr>
<tr>
<td>Preview of agent application (p. 965)</td>
<td>Launched an updated UI for the agent application preview that combines Customer Profiles and the Contact Control Panel (CCP). For more information, see Access Customer Profiles in the agent application.</td>
<td>September 16, 2021</td>
</tr>
<tr>
<td>Added Create task block (p. 965)</td>
<td>Added the <strong>Create task</strong> block. It creates a new task, sets the tasks attributes, and initiates a contact flow to start the task. For more information, see Contact block: <strong>Create task</strong>.</td>
<td>September 16, 2021</td>
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<tr>
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</tr>
<tr>
<td>More languages for Contact Lens (p. 965)</td>
<td>Contact Lens now supports the following languages for post-call and real-time analytics: Japanese, Korean, and Mandarin. The following languages are supported for real-time analytics: French (Canada), French (France), Portuguese (Brazil), German (Germany), and Italian (Italy). For more information, see Contact Lens for Amazon Connect in the <strong>Languages supported by Amazon Connect</strong> topic.</td>
<td>September 13, 2021</td>
</tr>
<tr>
<td>Updated historical metrics definitions (p. 965)</td>
<td>Updated the definitions of <strong>Contacts transferred in</strong> and <strong>Contacts transferred out</strong>. For more information, see <strong>Historical metrics definitions</strong>.</td>
<td>September 10, 2021</td>
</tr>
<tr>
<td>Improved user interface for Amazon Connect console (p. 965)</td>
<td>Released a redesigned user interface for the Amazon Connect console, making it easier and faster to manage Amazon Connect instances. For more information, see Create an Amazon Connect instance.</td>
<td>August 27, 2021</td>
</tr>
<tr>
<td>Customer Profiles is HIPAA compliant (p. 965)</td>
<td>Customer Profiles is now HIPAA compliant. Removed note stating it is not.</td>
<td>August 23, 2021</td>
</tr>
<tr>
<td>Porting numbers in Singapore (p. 965)</td>
<td>Updated documentation requirements. For more information, see Singapore in the <strong>Region requirements for ordering and porting phone numbers</strong> topic.</td>
<td>August 10, 2021</td>
</tr>
<tr>
<td>APIs for hours of operation and agent status (p. 965)</td>
<td>Released for ungated preview new APIs for managing hours of operation and agent status. For more information, see Amazon Connect Service API Reference.</td>
<td>August 6, 2021</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Date</td>
</tr>
<tr>
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</tr>
<tr>
<td>Contact Lens rules create tasks and EventBridge events (p. 965)</td>
<td>Contact Lens rules now allow you to generate tasks and EventBridge events based on uttered keywords, sentiment scores, customer attributes, and other criteria. For more information, see Build rule with Contact Lens.</td>
<td>August 5, 2021</td>
</tr>
<tr>
<td>Countries you can call by default (p. 965)</td>
<td>We have updated the list of countries you can call by default when you create a new instance in a given Region. For more information, see Countries you can call.</td>
<td>August 4, 2021</td>
</tr>
<tr>
<td>Add AWS Global Accelerator to your allowlist (p. 965)</td>
<td>When using SAML Sign-In to your Amazon Connect instance, you now need to add the AWS Global Accelerator domain, *.awsglobalaccelerator.com, to your allow list. For more information, see Set up your network.</td>
<td>August 3, 2021</td>
</tr>
<tr>
<td>New &quot;Next status&quot; feature (p. 965)</td>
<td>To help agents manage their time, we have released a feature that lets agents pause new contacts being routed to them while they finish their current contacts. For more information, see &quot;Next status&quot; feature for the CCP.</td>
<td>July 30, 2021</td>
</tr>
<tr>
<td>Update to Contact search functionality (p. 965)</td>
<td>To use the Agent filter on the Contact search page, in your Amazon Connect security profile you must have Users - View permissions. For more information, see Contact search: To search contacts by Agent login requires Users - View permissions in your security profile.</td>
<td>July 23, 2021</td>
</tr>
<tr>
<td>Added two task metrics sent to CloudWatch (p. 965)</td>
<td>Amazon Connect sends the following two new metrics to CloudWatch: ConcurrentTasks and ConcurrentTasksPercentage. For more information, see Monitoring your instance using CloudWatch.</td>
<td>July 7, 2021</td>
</tr>
<tr>
<td>Updated required permissions for custom IAM policies (p. 965)</td>
<td>Added permissions for Amazon Lex. For more information, see Amazon Connect updates to AWS managed policies.</td>
<td>June 29, 2021</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Date</td>
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<td>----------------------------------------------</td>
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<tr>
<td><strong>Apple Business Chat GA (p. 965)</strong></td>
<td>Released Apple Business Chat for general availability (GA). For more information, see <a href="#">Enable Apple Business Chat</a>.</td>
<td>June 28, 2021</td>
</tr>
<tr>
<td><strong>Quick connects management API GA (p. 965)</strong></td>
<td>Released Amazon Connect quick connects management API for general availability (GA). For more information, see <a href="#">Amazon Connect Service API Reference</a>. The quick connects API also supports AWS CloudFormation. For more information, see <a href="#">Amazon Connect Resource Type Reference</a> in the AWS CloudFormation User Guide.</td>
<td>June 24, 2021</td>
</tr>
<tr>
<td><strong>Added service quota for Amazon Lex V2 bot aliases per instance = 100 (p. 965)</strong></td>
<td>For more information about service quotas, see <a href="#">Amazon Connect service quotas</a>.</td>
<td>June 17, 2021</td>
</tr>
<tr>
<td><strong>Support for Amazon Lex V2 console and APIs (p. 965)</strong></td>
<td>For information on using the Amazon Lex V2 console, see <a href="#">Add an Amazon Lex bot</a>. Added these three APIs: AssociateLexBot, DisassociateLexBot, and ListLexBots. See the <a href="#">Amazon Connect Service API Reference</a>.</td>
<td>June 15, 2021</td>
</tr>
<tr>
<td><strong>Coming soon: Faster load times for Real-time metrics page (p. 965)</strong></td>
<td>Rollout to all Regions July 19, 2021, to September 19, 2021, subject to change. For more information, see <a href="#">Upcoming change: Faster reload times for the Real-time metrics page</a>.</td>
<td>June 11, 2021</td>
</tr>
<tr>
<td><strong>Coming soon: New DataIntegration APIs (p. 965)</strong></td>
<td>On May 20, 2021, we published that new DataIntegration APIs were added to the Amazon AppIntegrations service. These APIs are not yet available.</td>
<td>June 8, 2021</td>
</tr>
<tr>
<td><strong>Chat agent concurrency increased (p. 965)</strong></td>
<td>Increased chat agent concurrency from 5 to 10. For more information, see <a href="#">Create a routing profile</a>.</td>
<td>June 7, 2021</td>
</tr>
<tr>
<td><strong>Object type mapping for Customer Profiles (p. 965)</strong></td>
<td>Added object type mapping for the Customer Profiles standard profile. For more information, see <a href="#">Object type mapping for the standard profile</a>.</td>
<td>June 1, 2021</td>
</tr>
<tr>
<td><strong>Channels supported by blocks (p. 965)</strong></td>
<td>Added a topic that lists all the blocks and which channels each one supports. For more information, see the Channels each block supports.</td>
<td>May 18, 2021</td>
</tr>
<tr>
<td>Added contact events (p. 965)</td>
<td>Added identity resolution APIs (preview) to Customer Profiles. (p. 965)</td>
<td>Added topic on how to apply permissions that restrict which AWS resources can be associated with Amazon Connect. (p. 965)</td>
</tr>
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</tr>
<tr>
<td>For more information, see the Amazon Connect contact events.</td>
<td>For more information, see the GetMatches and MergeProfiles APIs in the Amazon Connect Customer Profiles API reference.</td>
<td>For more information, see Restrict AWS resources that can be associated with Amazon Connect.</td>
</tr>
<tr>
<td>Announcement</td>
<td>Details</td>
<td>Date</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Announced upcoming fixes for chat metrics (p. 965)</td>
<td>Currently Amazon Connect incorrectly reports that chat contacts that were created from disconnect flows were created from transfer flows. When the fixes are released, Amazon Connect will correctly reflect in the CTRs and agent event stream that these chat contacts were created from disconnect flows. For more information, see Upcoming change: Fixes for chat metrics in the Release notes.</td>
<td>March 25, 2021</td>
</tr>
<tr>
<td>Completed release of new domain name (p. 965)</td>
<td>The domain for the Amazon Connect access URL has changed to my.connect.aws. For more information, see March 2021 Updates in the Release notes.</td>
<td>March 22, 2021</td>
</tr>
<tr>
<td>Default service quota for reports per instance (p. 965)</td>
<td>Updated the default service quota for reports per instance to 2000. This default applies to accounts created in October, 2020 or later. For more information, see Amazon Connect service quotas.</td>
<td>March 16, 2021</td>
</tr>
<tr>
<td>Identification requirements for ordering and porting phone numbers (p. 965)</td>
<td>Added identification requirements for ordering phone numbers. Added requirements for ordering and porting phone numbers from Argentina, Chile, Mexico, Peru, and Puerto Rico. For more information, see Region requirements for phone numbers.</td>
<td>March 11, 2021</td>
</tr>
<tr>
<td>Use the Amazon Connect Endpoint Test Utility (p. 965)</td>
<td>To help you validate connectivity to Amazon Connect, or troubleshoot when your agents are experiencing problems with the Contact Control Panel (CCP), we added the Amazon Connect Endpoint Test Utility. For more information, see Use the Endpoint Test Utility.</td>
<td>March 5, 2021</td>
</tr>
<tr>
<td>Add a chat user interface to your website. (p. 965)</td>
<td>Added a chat widget that you can customize and add to your website. Also provided an open source example to help you get started with adding chat to your website. For more information, see Set up your customer's chat experience.</td>
<td>March 5, 2021</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Date</td>
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<td>--------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Content Lens real-time analytics</td>
<td>is available in Europe (London), Europe (Frankfurt), and Asia (Tokyo). (p. 965) For more information, see Availability of Contact Lens features by Region.</td>
<td>February 26, 2021</td>
</tr>
<tr>
<td>Added ability to create and ingest data into Customer Profiles from Amazon S3</td>
<td>(p. 965) For more information, see Create and ingest data into Customer Profiles from Amazon S3.</td>
<td>February 25, 2021</td>
</tr>
<tr>
<td>Added DisconnectReason to the CTR stream (p. 965)</td>
<td>The Amazon Connect CTR (contact trace records) stream now includes DisconnectReason for voice calls and tasks. For more information, see ContactTraceRecord.</td>
<td>February 19, 2021</td>
</tr>
<tr>
<td>Added custom service levels (p. 965)</td>
<td>Added the ability to create custom service levels, and update the metrics user interface. For details, see New metric groups and categories.</td>
<td>February 16, 2021</td>
</tr>
<tr>
<td>Change audio device settings from the CCP (p. 965)</td>
<td>Added the ability to change audio settings from the Contact Control Panel (CCP). This applies to organizations using a customized CCP. CCP: Change audio device settings.</td>
<td>January 30, 2021</td>
</tr>
<tr>
<td>Queue APIs (Preview) (p. 965)</td>
<td>Added APIs so you can programmatically create and manage queues. Queue APIs (Preview).</td>
<td>January 29, 2021</td>
</tr>
<tr>
<td>Amazon AppIntegrations APIs - GA (p. 965)</td>
<td>Released Amazon AppIntegrations APIs for general availability (GA). For more information, see Amazon AppIntegrations APIs - GA.</td>
<td>January 29, 2021</td>
</tr>
<tr>
<td>New Contact search page (p. 965)</td>
<td>Updated the Contact search page. For more information, see Search for contacts.</td>
<td>January 5, 2021</td>
</tr>
<tr>
<td>Amazon Connect Service API Reference (p. 965)</td>
<td>Added APIs so you can programmatically create and manage quick connects. For more information, see Amazon Connect Service API Reference.</td>
<td>December 22, 2020</td>
</tr>
<tr>
<td>Chat: Support for sharing attachments (p. 965)</td>
<td>Added support for sharing chat attachments. For more information, see Chat: Support for attachments.</td>
<td>December 21, 2020</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Date</td>
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<tr>
<td>Configurable DTMF timeouts for Lex bots (p. 965)</td>
<td>Added support for configurable DTMF timeouts for Lex bots. For more information, see Configurable DTMF timeouts for Lex bots.</td>
<td>December 4, 2020</td>
</tr>
<tr>
<td>Amazon Connect with Apple Business Chat (Preview) (p. 965)</td>
<td>Added support for using Amazon Connect with Apple Business Chat. For more information, see Amazon Connect with Apple Business Chat (Preview)</td>
<td>December 3, 2020</td>
</tr>
<tr>
<td>Tasks (p. 965)</td>
<td>Added support for tasks, allowing you to prioritize, assign, track, and even automate tasks across the disparate tools agents use to support customers. For more information, see Tasks.</td>
<td>December 1, 2020</td>
</tr>
<tr>
<td>Real-time analytics using Contact Lens for Amazon Connect (p. 965)</td>
<td>Added real-time analytics for Contact Lens so you can detect and resolve customer issues more proactively while the call is in progress. For more information, see Analyze Conversations with Contact Lens for Amazon Connect.</td>
<td>December 1, 2020</td>
</tr>
<tr>
<td>Amazon Connect Wisdom (Preview) (p. 965)</td>
<td>Added Amazon Connect Wisdom (Preview), which enables agents to search and find content across multiple repositories, such as frequently asked questions (FAQs), wikis, articles, and step-by-step instructions for handling different customer issues. For more information, see Amazon Connect Wisdom (Preview).</td>
<td>December 1, 2020</td>
</tr>
<tr>
<td>Amazon Connect Voice ID (Preview) (p. 965)</td>
<td>Added Amazon Connect Voice ID (Preview), which provides for real-time caller authentication. For more information, see Amazon Connect Voice ID (Preview).</td>
<td>December 1, 2020</td>
</tr>
<tr>
<td>Amazon Connect Customer Profiles (p. 965)</td>
<td>Added Amazon Connect Customer Profiles, enabling agents to create a customer profile for every new contact that comes in. You can also integrate with external applications that provide customer profile data. For more information, see Amazon Connect APIs.</td>
<td>December 1, 2020</td>
</tr>
<tr>
<td><strong>Amazon Connect APIs (p. 965)</strong></td>
<td>Added an Amazon Connect API that provides the ability to create tasks (StartTaskContact), and added a set of preview APIs. For more information, see Amazon Connect APIs.</td>
<td>December 1, 2020</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>Amazon Connect supports interact messages for chat (p. 965)</strong></td>
<td>Added interactive message templates. For more information, see Add interactive messages to chat.</td>
<td>November 24, 2020</td>
</tr>
<tr>
<td><strong>Telephony call metadata attributes (p. 965)</strong></td>
<td>Added call attributes to improve fraud detection and routing. For more information, see Telephony call metadata attributes (call attributes).</td>
<td>November 20, 2020</td>
</tr>
<tr>
<td><strong>APIs to manage user hierarchies (p. 965)</strong></td>
<td>Added APIs so you can programmatically manage your agent hierarchies and agent groups. For more information, see Amazon Connect Service API Reference.</td>
<td>November 18, 2020</td>
</tr>
<tr>
<td><strong>Service quotas (p. 965)</strong></td>
<td>Noted that up to 700 quick connects can be added to a queue. See Feature specifications. (This update was published erroneously and has since been removed.)</td>
<td>October 5, 2020</td>
</tr>
<tr>
<td><strong>Security (p. 965)</strong></td>
<td>Added new topic on Required permissions for managing access to the Amazon Connect console.</td>
<td>September 24, 2020</td>
</tr>
<tr>
<td><strong>Quick filters (p. 965)</strong></td>
<td>Added new topic that explains how to use quick filters in real-time metrics reports. For more information, see Use quick filters to drill into Routing profiles and Queues tables.</td>
<td>September 23, 2020</td>
</tr>
<tr>
<td><strong>Service quotas (p. 965)</strong></td>
<td>Updated the service quotas for the following Amazon Connect Participant Service APIs: CreateParticipantConnection, DisconnectParticipant, and GetTranscript. For more information, see Amazon Connect Participant Service API throttling quotas.</td>
<td>September 22, 2020</td>
</tr>
<tr>
<td>Topic</td>
<td>Description</td>
<td>Date</td>
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</tr>
<tr>
<td><strong>Show agent queues in a Queues table. (p. 965)</strong></td>
<td>By default, agent queues don’t appear in a Queues table in a historical metrics report. You can choose to show them. For more information, see Show agent queues in a Queues table.</td>
<td>September 18, 2020</td>
</tr>
<tr>
<td><strong>Migrate contact flows to a different instance (p. 965)</strong></td>
<td>You can migrate hundreds of contact flows using a set of contact flow APIs. For more information, see Migrate contact flows to a different instance.</td>
<td>September 18, 2020</td>
</tr>
<tr>
<td><strong>Languages supported by Amazon Connect (p. 965)</strong></td>
<td>Learn about which languages are supported in the Amazon Connect console, Contact Control Panel, Contact Lens, Amazon Lex, and Amazon Polly. For more information, see Languages supported by Amazon Connect.</td>
<td>September 18, 2020</td>
</tr>
<tr>
<td><strong>Amazon Connect Flow language (p. 965)</strong></td>
<td>You can use the Amazon Connect Flow language to efficiently update contact flows that you're migrating from one instance to another, and Write contact flows rather than drag blocks onto the contact flow designer. For more information, see Amazon Connect Flow language.</td>
<td>September 18, 2020</td>
</tr>
<tr>
<td><strong>Option 2 (not recommended): Allow IP address ranges (p. 965)</strong></td>
<td>Removed tip from Option 2: Allow IP address ranges, that said if you don’t see an entry for your region, use GLOBAL. For more information, see Option 2 (not recommended): Allow IP address ranges.</td>
<td>September 11, 2020</td>
</tr>
<tr>
<td><strong>Option 1 (recommended): Replace Amazon EC2 and CloudFront IP range requirements with a domain allow list (p. 965)</strong></td>
<td>Updated Option 1, second row of table, with a line break between {myInstanceName}.awsapps.com/connect/api and *.cloudfront.net. For more information, see Option 1 (recommended): Replace Amazon EC2 and CloudFront IP range requirements with a domain allow list.</td>
<td>September 11, 2020</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
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</tr>
<tr>
<td>Updated the <strong>Consult</strong> and <strong>Contact consulted</strong> metrics to indicate they were deprecated May 2019.</td>
<td>For more information, see Consult (p. 713) and Contacts consulted (p. 737).</td>
<td>August 27, 2020</td>
</tr>
<tr>
<td>Added topic on setting up agent-to-agent transfers.</td>
<td>For more information, see Set up agent-to-agent transfers (p. 416).</td>
<td>August 19, 2020</td>
</tr>
<tr>
<td>Added section on requirements for custom termination points.</td>
<td>For more information, see Request numbers, international numbers, or termination points (p. 167).</td>
<td>August 18, 2020</td>
</tr>
<tr>
<td>Removed the &quot;Known differences&quot; section from I use the Amazon Connect Streams API (p. 263).</td>
<td>For more information, see I use the Amazon Connect Streams API (p. 263).</td>
<td>August 3, 2020</td>
</tr>
<tr>
<td>Changed the name of the <strong>Metrics</strong> chapter to <strong>Monitor metrics &amp; run reports</strong>.</td>
<td>For more information, see Monitor metrics and run reports (p. 695).</td>
<td>July 16, 2020</td>
</tr>
<tr>
<td>Clarified that the following metrics are no longer supported in queue grouping: Agent on contact time, Agent idle time, Occupancy. Previously we stated that these metrics had been deprecated.</td>
<td>For more information, see June 2020: Changes for omnichannel support (p. 702).</td>
<td>July 8, 2020</td>
</tr>
<tr>
<td>Updated the <strong>Set disconnect flow</strong> (p. 354) block, which now supports voice conversations.</td>
<td>For more information, see Set disconnect flow (p. 354).</td>
<td>June 29, 2020</td>
</tr>
<tr>
<td>Added upcoming metric changes: new real-time and historical metrics for inbound and outbound contact time</td>
<td>For more information, see What's new in metrics (p. 695).</td>
<td>June 26, 2020</td>
</tr>
<tr>
<td>Added how to upgrade CCP</td>
<td>For more information, see Upgrade to the latest CCP (p. 251).</td>
<td>June 16, 2020</td>
</tr>
</tbody>
</table>
## Earlier updates

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added video on using CCP</td>
<td>For more information, see Training video: How to use the CCP (p. 864).</td>
<td>June 16, 2020</td>
</tr>
<tr>
<td>Deprecated metrics: Agent on contact time, Agent idle time, Occupancy</td>
<td>For more information, see June 2020: Changes for omnichannel support (p. 702).</td>
<td>June 12, 2020</td>
</tr>
<tr>
<td>Added topic on quick connects work</td>
<td>For more information, see How quick connects work (p. 414).</td>
<td>May 21, 2020</td>
</tr>
<tr>
<td>Added how to get administrative support, and added a topic on inherited permissions</td>
<td>For more information, see Get administrative support for Amazon Connect (p. 964) and About inherited permissions (p. 612).</td>
<td>April 16, 2020</td>
</tr>
<tr>
<td>Added how to customize your CCP to log out agents automatically when they close the CCP window</td>
<td>For more information, see Log out agents automatically when they close their CCP (p. 223).</td>
<td>April 16, 2020</td>
</tr>
<tr>
<td>Updated the Get customer input block to support timeout values for voice input</td>
<td>For more information, see Get customer input (p. 318).</td>
<td>April 8, 2020</td>
</tr>
<tr>
<td>Added terminating keypress</td>
<td>For more information, see Store customer input (p. 376).</td>
<td>March 31, 2020</td>
</tr>
<tr>
<td>Added NLB endpoints and required domain for softphones</td>
<td>For more information, see Set up your network (p. 496).</td>
<td>March 23, 2020</td>
</tr>
<tr>
<td>Announced upcoming changes for metrics</td>
<td>For more information, see June 2020: Changes for omnichannel support (p. 702).</td>
<td>March 23, 2020</td>
</tr>
<tr>
<td>Added topic on region requirements for phone numbers</td>
<td>For more information, see Region requirements for ordering and porting phone numbers (p. 169).</td>
<td>March 11, 2020</td>
</tr>
<tr>
<td>Added tutorials</td>
<td>For more information, see Tutorials: An introduction to Amazon Connect (p. 31).</td>
<td>March 6, 2020</td>
</tr>
<tr>
<td>Added topic on tracking who deleted recordings</td>
<td>For more information, see Track who deleted or listened to recordings (p. 625).</td>
<td>March 5, 2020</td>
</tr>
<tr>
<td>Added topic on emergency admin access</td>
<td>For more information, see Emergency admin login (p. 145).</td>
<td>March 3, 2020</td>
</tr>
<tr>
<td>Added topics on saving, sharing, and publishing reports</td>
<td>For more information, see Save custom reports (p. 798), Share custom reports (p. 800), View a shared report (p. 801), and Publish reports (p. 802).</td>
<td>January 22, 2020</td>
</tr>
<tr>
<td>Change</td>
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</tr>
<tr>
<td>Updated contact block definitions</td>
<td>For more information, see .</td>
<td>January 17, 2020</td>
</tr>
<tr>
<td>Added a section about queued callbacks in metrics reporting.</td>
<td>For more information, see About queued callbacks in metrics (p. 792).</td>
<td>January 17, 2020</td>
</tr>
<tr>
<td>Updated networking guidance for the updated CCP (ccp-v2)</td>
<td>For more information, see Set up your network (p. 496).</td>
<td>January 15, 2020</td>
</tr>
<tr>
<td>Add a topic on logging Amazon Connect API calls with AWS CloudTrail</td>
<td>For more information, see Logging Amazon Connect API calls with AWS CloudTrail (p. 811).</td>
<td>December 13, 2019</td>
</tr>
<tr>
<td>Added a section on analyzing conversations</td>
<td>For more information, see Analyze conversations using Contact Lens for Amazon Connect (p. 630).</td>
<td>December 02, 2019</td>
</tr>
<tr>
<td>Added information about live media streaming</td>
<td>For more information, see Capture customer audio: live media streaming (p. 597).</td>
<td>November 21, 2019</td>
</tr>
<tr>
<td>Added information about chat</td>
<td>For more information, see Chat (p. 12).</td>
<td>November 21, 2019</td>
</tr>
<tr>
<td></td>
<td>Also added these topics: Best practices for Amazon Connect (p. 29), About agent status (p. 789), About contact states (p. 791), and Additional resources for Amazon Connect (p. 934).</td>
<td></td>
</tr>
<tr>
<td>Added topic on using IAM</td>
<td>For more information, see Identity and access management for Amazon Connect (p. 819).</td>
<td>November 14, 2019</td>
</tr>
<tr>
<td>Added dimensions</td>
<td>Added dimensions to the Amazon Connect metrics sent to CloudWatch. See Monitoring your instance using CloudWatch (p. 804).</td>
<td>October 22, 2019</td>
</tr>
<tr>
<td>Added a networking topic</td>
<td>Consolidated networking content into Set up your network (p. 496). Updated the guidance.</td>
<td>September 30, 2019</td>
</tr>
<tr>
<td>Updated metrics topics</td>
<td>Improved the descriptions of the real-time metrics definitions. Added categories to the historical metrics definitions.</td>
<td>August 30, 2019</td>
</tr>
<tr>
<td>Updated historical metrics report section</td>
<td>Added categories to the historical metrics definitions.</td>
<td>August 27, 2019</td>
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<tr>
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<tr>
<td>Re-organized the content</td>
<td>Re-organized the content so it's task-based.</td>
<td>July 19, 2019</td>
</tr>
<tr>
<td>Added information about the updated Transfer to phone number block</td>
<td>You can use the updated Transfer to phone number block to transfer callers to a phone number external to your Amazon Connect instance, and then optionally resume the contact flow after the call with the external party ends. For more information, see Resume a contact flow after transfer (p. 419).</td>
<td>February 18, 2019</td>
</tr>
<tr>
<td>Adding information about live media streaming for customer audio streams</td>
<td>You can capture customer audio during interactions with your contact center and send it to a Kinesis video stream. For more information, see Capture customer audio: live media streaming (p. 597).</td>
<td>December 21, 2018</td>
</tr>
<tr>
<td>Added content about agent queues</td>
<td>You can use agent queues to route calls directly to a specific agent. For more information, see Transfer contacts to a specific agent (p. 421).</td>
<td>December 21, 2018</td>
</tr>
<tr>
<td>Added information about using Amazon Connect in the Asia Pacific (Tokyo) Region.</td>
<td>For more information, Claim phone numbers for Amazon Connect in the Asia Pacific (Tokyo) Region (p. 167).</td>
<td>December 10, 2018</td>
</tr>
<tr>
<td>Added information about how to determine agent ACW time from agent event streams</td>
<td>For more information, see Determine how long an agent spends doing ACW (p. 758).</td>
<td>October 30, 2018</td>
</tr>
<tr>
<td>Added troubleshooting and best practices</td>
<td>Troubleshooting Issues with the Contact Control Panel (CCP) (p. 914) covers best practices for agent connectivity using the CCP and troubleshooting connectivity and call quality issues in Amazon Connect.</td>
<td>October 18, 2018</td>
</tr>
<tr>
<td>Added information about service-linked roles in Amazon Connect</td>
<td>For more information, see Use service-linked roles for Amazon Connect (p. 853).</td>
<td>October 17, 2018</td>
</tr>
<tr>
<td>Change</td>
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</tr>
<tr>
<td>Added information about queue to queue transfers</td>
<td>You can use the new options of the <strong>Transfer to queue</strong> block to enable transferring calls that are already in a queue to another queue. For more information, see [Manage contacts in a queue](p. 420).</td>
<td>July 31, 2018</td>
</tr>
<tr>
<td>Added information about the <strong>Call phone number</strong> block</td>
<td>Updated the content about contact flows to include the new <strong>Call phone number</strong> block, including how to use the block in a contact flow. For more information, see [Caller ID number: Set in the queue or Call phone number block](p. 204).</td>
<td>July 2, 2018</td>
</tr>
<tr>
<td>Added information about contact attributes and the <strong>Get queue metrics</strong> block</td>
<td>For more information, see [Use Amazon Connect contact attributes](p. 445).</td>
<td>June 18, 2018</td>
</tr>
<tr>
<td>Added information about new metrics sent to Amazon CloudWatch Logs.</td>
<td>Monitoring your instance using CloudWatch (p. 804) includes additional metrics.</td>
<td>April 19, 2018</td>
</tr>
<tr>
<td>Added information about using SAML for identity management</td>
<td>You can configure your instance to use SAML for identity management. You can also use SAML to enable single sign-on. For more information, see [Configure SAML with IAM for Amazon Connect](p. 124).</td>
<td>March 30, 2018</td>
</tr>
<tr>
<td>Added information about agent call transfers</td>
<td>You can enable call transfers from an agent to another agent, to a queue, or to an external number.</td>
<td>December 10, 2017</td>
</tr>
<tr>
<td>Added information about manager listen-in</td>
<td>You can configure and enable a manager to listen in on agent calls. For more information, see [Monitor live conversations](p. 617).</td>
<td>December 10, 2017</td>
</tr>
<tr>
<td>Added information about contact flow logs</td>
<td>For more information, see [Enable contact flow logs](p. 440).</td>
<td>November 16, 2017</td>
</tr>
<tr>
<td>Added information about contact flow import/export</td>
<td>For more information, see [Import/export contact flows](p. 431).</td>
<td>November 16, 2017</td>
</tr>
<tr>
<td>Added information about agent event streams</td>
<td>For more information, see [Amazon Connect agent event streams](p. 754).</td>
<td>November 16, 2017</td>
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</tr>
<tr>
<td>Added information about porting your current phone number to Amazon Connect</td>
<td>For more information, see Port your current phone number (p. 155).</td>
<td>November 10, 2017</td>
</tr>
<tr>
<td>Added information about Login/Logout reports</td>
<td>For more information, see Login/Logout reports (p. 750).</td>
<td>November 1, 2017</td>
</tr>
<tr>
<td>Initial release</td>
<td>Initial release of the Amazon Connect Administrator Guide.</td>
<td>March 28, 2017</td>
</tr>
</tbody>
</table>
Amazon Connect Glossary

Channel

How a customer contacts your business: voice (a phone call), chat (a web site or app), and task.

Contact attribute

A piece of data about a contact. You can use this data to personalize the customer experience, make routing decisions about contacts as they progress through your contact center or retrieve real-time metrics about the queues and agents in your contact center to dynamically route contacts based on queue and agent availability.

Flow

Flows define the experience your customers have when they interact with your contact center. These are similar in concept to Interactive Voice Response (IVR). Contact flows are comprised of blocks, with each block defining a step or interaction in your contact center. For example, there are blocks to play a prompt, get input from a customer, branch based on customer input, or invoke an Lambda function or Amazon Lex bot.

Instance

A virtual contact center. It is 100% cloud-based and can scale to support any sized business. An Amazon Connect instance is not aligned to an EC2 instance or any other hardware concept.

Letter of Authorization

Letter of Authorization (LOA) is a legal document in which you assert to the carrier for Amazon Connect that you have the authority to port phone numbers from your current carrier to the carrier for Amazon Connect. Traditionally, this is a paper document requiring an actual signature.

Losing carrier

Also the customer’s current carrier. This is the carrier that currently owns the telephone number. The losing carrier will review all information presented on the Letter of Authorization (LOA) and will validate if it matches the information that they have on file for the customer.

Mutually agreed date and time

After the LOA has been approved by the losing carrier, the losing and winning carriers agree upon a date and time to perform the porting activity.
Omnichannel

A unified contact experience across multiple communication channels, such as voice and chat. Admins can build experiences once, and enable them for voice and chat. Managers monitor and adjust queues from one dashboard. Agents handle all customers using one interface.

Phone number portability

Number portability allows telephone customers to transfer their numbers to other carriers. Carriers and countries may have unique processes and procedures required.

Queue

A waiting area that holds contacts to be answered by agents.

Winning carrier

Also the carrier for Amazon Connect. This is the carrier that the phone number is being ported to, and will own the phone number after the porting is completed.