Amazon QuickSight User Guide
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Welcome to Amazon QuickSight!

Amazon QuickSight is a fast business analytics service you can use to build visualizations, perform ad hoc analysis, and quickly get business insights from your data. Amazon QuickSight discovers AWS data sources, enables organizations to scale to hundreds of thousands of users, and delivers responsive performance by using a robust in-memory engine (SPICE).

With Amazon QuickSight, you can do the following:

- **Get started quickly** – Just sign in, choose a data source, and create your first visualization in minutes.
- **Access data from multiple sources** – Upload files or connect to AWS data sources or external databases.
- **Take advantage of optimized visualizations** – Smart visualizations are dynamically optimized based on the data that you select.
- **Get answers fast** – Generate fast, interactive visualizations on large datasets.
- **Tell a story with your data** – Share insights and collaborate with others.

Amazon QuickSight offers Standard and Enterprise editions. Both editions offer all of the preceding benefits, while Enterprise edition additionally offers encryption at rest and integration with Microsoft AD directories in AWS Directory Service. For more information about Amazon QuickSight editions, see Editions (p. 394). For more information about Amazon QuickSight edition pricing, see Amazon QuickSight.

You use your own data sources to create Amazon QuickSight data sets, which you then use to create Analyses (p. 3) and visualize your data. You can also explore Amazon QuickSight using the sample data sets we provide, which are available in your account. These are also available for download at the following links:

- Business overview
- People overview
- Sales pipeline
- Web and marketing analytics

There are also a variety of data sets available online, for example:

- AWS Public Datasets
- 18 places to find data sets for data science projects
- Search for "BI Sample Data"
- Search for "Sample Data for Visualization"
- Search for "Free Sample Databases"

These come in a variety of formats. Some may require that you import the data into a database engine before you can access them.

To learn more about the major components and processes of Amazon QuickSight, and also the typical workflow for creating data visualizations, use the following sections:

**Topics**

- Data (p. 2)
You can use a variety of sources to provide data to Amazon QuickSight, including AWS services, on-premise databases, and files in several formats. To learn more about what data sources you can work with in Amazon QuickSight, see Supported Data Sources (p. 47).

To work with data, you create data sets based on these data sources. A data set identifies the specific data in a data source that you want to use, for example the table you want to use if you are connecting to a database data source. A data set also stores any data preparation you have performed on that data (like renaming a field or changing its data type), so you don’t have to re-prepare the data each time you want to create an analysis based on it.

After you have created a data set from a data source, you can create an analysis based on it, as shown in the following illustration:

You can create multiple analyses using the same data set. You can also use multiple data sets in a single analysis.

To learn more about creating data sets, see Creating Data Sets (p. 57).

Data Preparation

Data preparation is the process of cleaning or transforming raw data from a data source for use in Amazon QuickSight. This includes things like adding calculated fields, changing field names or data types, or creating SQL queries to refine data.

To learn more about data preparation, see Preparing Data (p. 111).

SPICE

SPICE is Amazon QuickSight's Super-fast, Parallel, In-memory Calculation Engine. SPICE is engineered from the ground up to rapidly perform advanced calculations and serve data. Importing your data into SPICE speeds your analytical queries by allowing you to take advantage of its storage and processing capacity. It also allows you to avoid taking time to retrieve data from a data source whenever you make a change to an analysis or update a visual.

Each Amazon QuickSight account receives 10 GB of SPICE capacity per paid user, which is allocated when the user signs into Amazon QuickSight for the first time. Each Amazon QuickSight account also receives one free user with 1 GB of SPICE capacity.

To learn more about using SPICE, see Managing SPICE Capacity (p. 429).
Analyses

An analysis is the baseline unit for creating and interacting with visuals, graphical representations of your data. Each analysis contains one or more visuals that you assemble for any purpose you choose, such as a sales analysis, cost analysis, or tracking a key performance indicator. Each analysis also contains a story, which you can use to save different iterations of the analysis.

To learn more about Amazon QuickSight analyses, see Working with Analyses (p. 201).

Visuals

A visual is a graphical representation of a data set using one of many available visual types. Amazon QuickSight supports a growing list of visual types including combo charts, heat and tree maps, pivot tables, and others.

After you have created a visual, you can modify it in a range of ways, for example by resizing it, or by applying a filter.

To learn more about Amazon QuickSight visuals, see Working with Amazon QuickSight Visuals (p. 245).

Stories

A story is a set of one or more scenes that you can play to step through different iterations of an analysis. A scene is a representation of an analysis at a given point in time. It shows the visuals that are on the analysis at that time, but the data in those visuals will continue to update. It is not a static snapshot. You capture a scene for use in a story.

To learn more about Amazon QuickSight stories, see Working with Stories (p. 375).

Dashboards

A dashboard is a read-only snapshot of an analysis that you can share with other Amazon QuickSight users for reporting purposes. When you create and publish a dashboard, you specify which users have access to it. These users can view and filter the dashboard visuals without changing the underlying data.

To learn more about Amazon QuickSight dashboards, see Working with Dashboards (p. 380).

Typical Amazon QuickSight Workflow

When you create an analysis, the typical workflow is as follows:

1. Connect to a data source, and then create a new data set or choose an existing data set.
2. (Optional) If you created a new data set, prepare the data (for example, by changing field names or data types).
3. Create a new analysis.
4. Add a visual to the analysis by choosing fields to visualize. You can either choose a specific visual type, or use AutoGraph and let Amazon QuickSight choose the most appropriate visual type, based on the number and data types of the fields you select.
5. (Optional) Modify the visual to meet your requirements (for example, by adding a filter or changing the visual type).
6. (Optional) Add more visuals to the analysis.
7. (Optional) Add scenes to the default story to provide a narrative about some aspect of the analysis data.

8. (Optional) Publish the analysis as a dashboard to share insights with other users.

The following graphic illustrates a typical Amazon QuickSight workflow.

Next Steps

If you are a new to Amazon QuickSight, see Signing Up for Amazon QuickSight (p. 397) to learn more about creating an Amazon QuickSight account.
Quick Start Guide for QuickSight

Welcome to the Quick Start Guide for QuickSight designed for business analysts.

Amazon QuickSight is a user-friendly tool to help you create a wide variety of charts, graphs, tables, and other data visualizations. You can then group these together to form stories and dashboards.

How Does It Work?

You begin by choosing a dataset. If you like, you can groom your dataset by adding new data elements, creating calculations, or filtering out data.

When you're satisfied that the dataset works for you, you can begin to analyze it. First, you can create a graphical representation of your data. If you don't know what kind of visual you should use, Amazon QuickSight can help you by choosing a graphic type for you.

You can continue to add more visuals based on different views of the same underlying data. To fit more visuals on a page, you can resize and rearrange them.

By creating a series of visuals, you create a story. This visual narrative tells what is happening in the subject you're investigating. You can save multiple stories, using filters to show how the data changes over time. Any of these visuals can be shared with other people, who can then further analyze the data.

If you choose, you can also publish dashboards. These are read-only snapshots that you can share for reporting.

The first user on your AWS account is free, and receives 1 GB SPICE capacity. To learn about free trials and pricing for more than one user, see Amazon QuickSight. For more information about the Standard and Enterprise editions, see Editions (p. 394)

Ready to Get Started?

Depending on your experience with Amazon QuickSight or tools like it, you can begin by looking at one of the following sections:

- Guided Tour (demos)
- Getting Started (p. 5)

Getting Started

Use the topics in this section to create your first analysis. You can use sample data to create either a simple or a more advanced analysis, or you can connect to your own data to create an analysis.

Topics
Signing In to Amazon QuickSight

If you are a current user of Amazon QuickSight, use the following procedure to sign in to the service. If you have questions, contact your Amazon QuickSight administrator for assistance.

2. Enter your Amazon QuickSight account name, and then choose to Continue.
3. If your Amazon QuickSight user account is the same as your IAM credentials, use your IAM user name for your email address or username. Otherwise, type your email address.
4. If your Amazon QuickSight user account is the same as your IAM credentials, use your IAM password. Otherwise, type the password you created for your Amazon QuickSight user account.
5. Choose to Sign in.

Note
If you don't have a Amazon QuickSight login, contact your administrator. If you don't have an administrator, or if you are the administrator, see Administration (p. 394) for more information.

Signing In to Amazon QuickSight Using an Identity Provider

If your organization uses an identity provider, you must first sign in through the identity provider before you use Amazon QuickSight.

An identity provider supports single sign-on (SSO) access. This type of access means you don't need to provide sign-in information to Amazon QuickSight. When you access Amazon QuickSight, you shouldn't see a sign-in screen.

If you do see a sign-in screen in this case, no credentials will work. You must sign in through your identity provider instead of on this sign-in screen. Then you can use Amazon QuickSight.

Quick Start: Create an Analysis with a Single Visual Using Sample Data

Use the following procedure to use the Web and Social Media Analytics sample data set to create an analysis containing a line chart visual. This visual shows the count by month of people that have added themselves to the mailing list. If you don't see the Web and Social Media Analytics sample data already in Amazon QuickSight, you can download it from http://quicksightsampleddata.s3.amazonaws.com/MarketingData_QuickSightSample.csv.

1. On the Amazon QuickSight start page, choose New analysis.
2. On the Your data sets page, choose the Web and Social Media Analytics data set and then choose Create Analysis.
3. In the Fields list pane, choose Date and then choose Mailing list adds.

Amazon QuickSight uses AutoGraph to create the visual, selecting the visual type it determines is most compatible with those fields. In this case, it is a line chart that shows mailing list adds by year, which is the date granularity default.
4. Expand the Field wells pane by choosing the expand icon.

5. Choose the X axis field well, choose Aggregate, and then choose Month.
The line chart updates to show mailing list adds by month, rather than by the default of by year.

Tutorial: Create A Multi-Visual Analysis and a Dashboard Using Sample Data

Use the procedures in the following sections to complete these tasks:

- Create and prepare a Marketing data set using the Web and Social Media Analytics sample data.
- Create a Marketing analysis using the Marketing data set and add several visuals to it.
- Modify the visuals in the Marketing analysis, including:
  - Adding another measure to an existing visual
  - Changing chart colors
  - Changing date granularity
  - Changing the size and layout of the visuals
  - Applying a filter
- Publish a dashboard based on the Marketing analysis.

Topics

- Tutorial: Create a Prepared Data Set (p. 10)
- Tutorial: Create an Analysis (p. 14)
- Tutorial: Modify Visuals (p. 18)
- Tutorial: Create a Dashboard (p. 30)
Tutorial: Create a Prepared Data Set

Use the following procedure to prepare the Marketing data set and create an analysis. If you don't see the Web and Social Media Analytics sample data already in Amazon QuickSight, you can download it from http://quicksightsampleddata.s3.amazonaws.com/MarketingData_QuickSightSample.csv.

1. On the Amazon QuickSight start page, choose Manage data.

2. On the Your data sets page, choose New data set.

3. In the FROM EXISTING DATA SOURCES section of the Create a Data Set page, choose the Web and Social Media Analytics Amazon S3 data source and then choose Edit/Preview data.

   Amazon QuickSight opens the data preparation page.

4. Name the data set.

   Highlight Group 1 in the data set name box, and type Marketing.

5. Change the field selection to remove some fields we won't be working with.

   In the Fields pane, unselect the Twitter followers cumulative and Mailing list cumulative fields.
6. Rename a field.

In the data preview pane, scroll to the **Website Pageviews** field and choose the edit icon.

Highlight the field name, type **Website page views**, and then choose **Apply**.

7. Add a calculated field that substitutes a text string for any 0-length string value in the **Events** field.

1. On the data preparation page, expand the **Fields** pane, and then choose **New Field**.
2. In the New calculated field pane, highlight the value in Calculated field name, and then type `populated_event`.

3. Choose the `ifelse` function from the Function list and then choose Add. This adds the function to the calculated field formula.

4. Scroll down in the Field list, choose the Events field, and then choose Add. This adds the field to the calculated field formula.
5. In **Formula**, type the additional functions and parameters required, highlighted following:

   ```
   ifelse(strlen((Events))=0, 'Unknown', (Events))
   ```

6. Choose **Create**.

The new calculated field is created, and appears in the **Calculated fields** section at the top of the **Fields** pane.
8. Choose **Save**.

Next Steps

Create an analysis with the Marketing data set by using the procedure in Tutorial: Create an Analysis (p. 14).

**Tutorial: Create an Analysis**

Create an analysis, add a visual using AutoGraph, and add another visual by choosing a specific visual type. This procedure builds on the data set you create and prepare using the steps in Tutorial: Create a Prepared Data Set (p. 10).

**Create the Analysis**

Create the Marketing analysis.

1. On the Amazon QuickSight start page, choose **New analysis**.
2. On the **Your data sets** page, choose the **Marketing** data set and then choose **Create Analysis**.

![Image of QuickSight interface](image)

**Create a Visual By Using AutoGraph**

Create a visual by using AutoGraph, which is selected by default.

On the analysis page, choose **Date** and **Return visitors** in the **Fields list** pane.

Amazon QuickSight creates a line chart using this data.
Create a Scatter Plot Visual

Create a visual by choosing a visual type and dragging fields to the field wells.

1. On the analysis page, choose Add and then Add visual on the application bar. A new, blank visual is created, and AutoGraph is selected by default.

2. In the Visual types pane, choose the scatter plot icon.
3. Choose fields in the **Fields list** pane to add to the **Field wells** pane.

   - Choose **Desktop Uniques** to populate the **X axis** field well.
   - Choose **Mobile Uniques** to populate the **Y axis** field well.
   - Choose **Date** to populate the **Group/Color** field well.

A scatter plot is created using these fields.
Next Steps

Modify the visuals in the Marketing analysis by using the procedure in Tutorial: Modify Visuals (p. 18).

Tutorial: Modify Visuals

Use the following procedures to modify the visuals created using the procedures in Tutorial: Create an Analysis (p. 14).

Modify the Line Chart Visual

Modify the line chart visual by making it show an additional measure by date, and also by changing the chart color.

1. In the Marketing analysis, select the line chart visual.
2. Add another measure to the visual.

   Select the New visitors SEO field in the Fields list pane. This measure is added to the Value field well, and the line chart updates with a line to represent it. Note that the visual title updates as well.
3. Change the color of the line used to represent the Return visitors measure.

Choose the line on the chart that represents Return visitors. To do this, choose the end of the line, not the middle of the line.

Choose Color Return visitors, and then choose the red icon from the color selector.
Modify the Scatter Plot Visual

Modify the scatter plot visual by changing the data granularity.

1. In the **Marketing** analysis, select the scatter plot visual.
2. Expand the **Field wells** pane by choosing the expand icon.
3. Choose the **Group/Color** field well, choose **Aggregate**, and then choose **Month**.
The scatter plot updates to show the measures by month, rather than by the default of by year.
Modify Both Visuals by Changing Visual Layout and Adding a Filter

Modify both visuals by changing visual size and location, and by adding a filter and applying it to both of them.

Change the Visual Layout

Modify both visuals by changing visual size and location.

1. In the **Marketing** analysis, select the line chart visual.
2. Choose the resize handle in the lower right corner of the visual and drag up and to the left, until the visual is half its former size both horizontally and vertically.
3. Repeat this procedure on the scatter plot visual.

4. Choose the move handle on the scatter plot visual, and drag it up to the right of the line chart visual so that they are side-by-side.
Modify Both Visuals by Adding a Filter

Modify both visuals by adding a filter and applying it to both of them.

1. In the Marketing analysis, choose the scatter plot visual.
2. Choose Filter in the tool bar.
3. On the Applied filters pane, choose the new filter icon, and then choose the Date field to filter on.
4. Choose the new filter to expand it.

5. Choose the **After** comparison type.

6. Enter a start date value of 1/1/2014.

Choose **Start Date**, choose the month expander, and then choose **January**.
Choose the year expander and then choose **2014**.
Choose the calendar and then choose 1.
7. Choose **Apply**.

The filter is applied to the currently selected visual, which is the scatter plot visual. This is indicated with a filter icon next to the visual title.
8. Apply the filter to the line chart visual as well.

Choose the selector next to the filter name, and then choose **All visuals for this data set**.

**Next Steps**

Create a dashboard from the Marketing analysis by using the procedure in [Tutorial: Create a Dashboard](p. 30).

**Tutorial: Create a Dashboard**

Use the following procedure to create a dashboard from the analysis created using the procedure in [Tutorial: Create an Analysis](p. 14).

1. In the **Marketing** analysis, choose **Share** and then **Create dashboard** on the application bar.

2. Choose **Create new dashboard as**, type the name **Marketing dashboard**, and then choose **Create dashboard**.
Create an Analysis Using Your Own Local Text File Data

To create your first analysis using your own local text file data, follow these steps:

**Topics**
- Step 1: Create a File Data Set and an Analysis (p. 31)
- Step 2: Create a Visual (p. 31)

**Step 1: Create a File Data Set and an Analysis**

Complete the following procedure to create a data set and an analysis:

1. Check [Data Source Limits (p. 48)] to make sure your target file doesn't exceed data source limits.
2. On the Amazon QuickSight start page, choose Manage data.
3. On the Your Data Sets page, choose New data set.
4. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose Upload a file.
5. In the Open dialog box, browse to a text file, select it, and then choose Open.

A file must be 1 GB or less to be uploaded to Amazon QuickSight.

6. Choose Next.
7. Choose Visualize.

**Step 2: Create a Visual**

Next, create a visual.

In the Fields list pane of the analysis page, choose the fields you want to use.

Amazon QuickSight creates the visual, using AutoGraph to determine the most appropriate visual type for the fields you selected. For more information about AutoGraph, see [Using AutoGraph (p. 318)]. For more information about modifying the visual, see [Working with Amazon QuickSight Visuals (p. 245)].
Create an Analysis Using Your Own Amazon S3 Data

To create your first analysis using your own Amazon S3 data, follow these steps:

Topics
- Step 1: Create an Amazon S3 Data Set and an Analysis (p. 32)
- Step 2: Create a Visual (p. 33)

Step 1: Create an Amazon S3 Data Set and an Analysis

Complete the following procedure to create a data set and an analysis:

1. Create a manifest file to identify the S3 files you want to import, using one of the formats specified in Supported Formats for Amazon S3 Manifest Files (p. 65).
2. Check Data Source Limits (p. 48) to make sure your target file set doesn’t exceed data source limits.
3. Either save the manifest file to a local directory or upload it into Amazon S3.
4. On the Amazon QuickSight start page, choose Manage data.
5. On the Your Data Sets page, choose New data set.
6. In the FROM NEW DATA SOURCES section of the Create a Data set page, choose the Amazon S3 icon.
7. For Data source name, type a name for the data source.
8. For Upload a manifest file, do one of the following options:
• Choose **URL** and type or paste in a URL for the manifest file. You can find this in the Amazon S3 console by right-clicking on the manifest file, choosing **Properties**, and looking at the **Link** field.

• Choose **Upload** and then choose **Upload a JSON manifest file**. In **Open**, browse to a file, select it, and then choose **Open**.

9. Choose **Connect**.

10. Choose **Visualize**.

### Step 2: Create a Visual

Next, create a visual.

In the **Fields list** pane of the analysis page, choose the fields you want to use.

Amazon QuickSight creates the visual, using AutoGraph to determine the most appropriate visual type for the fields you selected. For more information about AutoGraph, see Using AutoGraph (p. 318). For more information about modifying the visual, see Working with Amazon QuickSight Visuals (p. 245).

---

### Create an Analysis Using Your Own Database Data

To create your first analysis using your own database data, follow these steps:

**Topics**

• **Connect to a Database Data Source** (p. 34)
• **Step 2: Create a Database Data Set and an Analysis** (p. 35)
• **Step 3: Create a Visual** (p. 37)
Connect to a Database Data Source

Choose the situation that applies to you and follow the steps in the procedure to connect to your data source.

Your Amazon QuickSight Account

- Your Amazon QuickSight Account Has Autodiscovered AWS Data Sources (p. 34)
- Your Amazon QuickSight Account Does Not Have Autodiscovered AWS Data Sources (p. 34)

Your Amazon QuickSight Account Has Autodiscovered AWS Data Sources

If your Amazon QuickSight account has any autodiscovered AWS data sources, icons for those data sources appear on your start page. If you have credentials for one of these AWS data sources, use the following procedure. Otherwise, use the procedure in Your Amazon QuickSight Account Does Not Have Autodiscovered AWS Data Sources (p. 34).

1. Check Data Source Limits (p. 48) to make sure your target table or query doesn't exceed data source limits.
2. Confirm that the database credentials you plan to use have appropriate permissions as described in Required Permissions for Database Credentials (p. 75).
3. Make sure you have configured the cluster or instance for Amazon QuickSight access by following the instructions in Network and Database Configuration Requirements (p. 76).
4. On the Amazon QuickSight start page, choose Manage data.
5. On the Your Data Sets page, choose New data set.
6. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose either the RDS or the Redshift Auto-discovered icon, depending on the AWS service you want to connect to.
7. Enter the connection information for the data source, as follows:
   - For Data source name, type a name for the data source.
   - For Instance ID, choose the name of the instance or cluster you want to connect to.
   - Database name shows the default database for the Instance ID cluster or instance. If you want to use a different database on that cluster or instance, type its name.
   - For Username, type the user name of an account that has permissions to access the target database, and also to read (perform a SELECT statement on) any tables in that database that you want to use.
   - For Password, type the password associated with the user account you entered.
8. (Optional) Choose Validate connection to verify your connection information is correct.
9. Choose Create data source.

   Note
   Amazon QuickSight automatically secures connections to Amazon RDS instances and Amazon Redshift clusters by using Secure Sockets Layer (SSL). You don’t need to do anything to enable this.
10. Go to Step 2: Create a Database Data Set and an Analysis (p. 35).

Your Amazon QuickSight Account Does Not Have Autodiscovered AWS Data Sources

If you don't have any autodiscovered AWS data sources, use the following procedure:

1. Check Data Source Limits (p. 48) to make sure your target table or query doesn't exceed data source limits.
2. Confirm that the database credentials you plan to use have appropriate permissions as described in Required Permissions for Database Credentials (p. 75).

3. Make sure you have configured the cluster or instance for Amazon QuickSight access by following the instructions in Network and Database Configuration Requirements (p. 76).

4. On the Amazon QuickSight start page, choose Manage data.

5. On the Your Data Sets page, choose New data set.

6. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose the Redshift Manual connect icon if you want to connect to an Amazon Redshift cluster in another region or associated with a different AWS account, or choose the appropriate database management system icon to connect to an instance of Amazon Aurora, MariaDB, Microsoft SQL Server, MySQL, or PostgreSQL.

7. Enter the connection information for the data source, as follows:
   - For **Data source name**, type a name for the data source.
   - For **Database server**, type or paste one of the following values:
     - For an Amazon Redshift cluster or Amazon RDS instance, type the endpoint of the cluster or instance without the port number. For example, if the endpoint value is `clustername.1234abcd.us-west-2.redshift.amazonaws.com:1234`, then type `clustername.1234abcd.us-west-2.redshift.amazonaws.com`. You can get the endpoint value from the Endpoint field on the cluster or instance detail page in the AWS console.
     - For an Amazon EC2 instance of MariaDB, Microsoft SQL Server, MySQL, or PostgreSQL, type the public DNS. You can get the public DNS value from the Public DNS field on the instance detail pane in the EC2 console.
     - For a non-Amazon EC2 instance of MariaDB, Microsoft SQL Server, MySQL, or PostgreSQL, type the hostname or public IP address of the database server.
   - For **Port**, type the port that the cluster or instance uses for connections.
   - For **Database name**, type the name of the database that you want to use.
   - For **Username**, type the user name of an account that has permissions to access the target database and also to read (perform a `SELECT` statement on) any tables in that database that you want to use.
   - For **Password**, type the password associated with the user account you entered.

8. (Optional) If you are connecting to anything other than an Amazon Redshift cluster and you don’t want a secured connection, uncheck Enable SSL. We strongly recommend leaving this checked, as an unsecured connection can be open to tampering. For more information on how the target instance uses Secure Sockets Layer (SSL) to secure connections, refer to the documentation for that database management system.

   Amazon QuickSight automatically secures connections to Amazon Redshift clusters by using SSL. You don't need to do anything to enable this.

9. (Optional) Choose Validate connection to verify your connection information is correct.

10. Choose Create data source.

11. Go to Step 2: Create a Database Data Set and an Analysis (p. 35).

**Step 2: Create a Database Data Set and an Analysis**

Complete the following procedure to create a data set and an analysis:

1. For **Schema: contain sets of tables**, choose Select and then choose a schema. Note that in some cases where there is only a single schema in the database, that schema will be automatically chosen and the schema selection option won’t be displayed.
2. Choose a table and then choose **Select**.

3. Choose the **Import to SPICE for quicker analytics** radio button and then create an analysis by choosing **Visualize**.
Step 3: Create a Visual

Next, create a visual.

In the **Fields list** pane of the analysis page, choose the fields you want to use.

Amazon QuickSight creates the visual, using AutoGraph to determine the most appropriate visual type for the fields you selected. For more information about AutoGraph, see Using AutoGraph (p. 318). For more information about modifying the visual, see Working with Amazon QuickSight Visuals (p. 245).
Navigating the User Interface

This chapter explains briefly how to use the Amazon QuickSight user interface. After you sign in to Amazon QuickSight, you see the Amazon QuickSight start page. The start page provides tabs for your analyses, your dashboards, and our tutorial videos. It also provides options for searching Amazon QuickSight, accessing your user account, creating new analyses, and managing data sources.
If you have autodiscovered data sources, your start screen will look like the following screenshot. Optionally, you can dismiss this data source information by choosing the X icon near the top right.

To view videos about Amazon QuickSight, choose the Tutorial videos tab. Choose a video to play it.
To access the user account menu, choose your user icon in the upper right of any page in Amazon QuickSight. Use this menu to manage Amazon QuickSight features, visit the community, send product feedback, get help from the documentation, or sign out of Amazon QuickSight.
Manage QuickSight – If you have appropriate permissions, you can access administrative functions such as managing users, subscriptions, SPICE capacity, and account settings.

Community – Choose this option to visit the Amazon QuickSight online community.

Send feedback – This is your direct connection to the product team. Use this simple form to report problems, request features, or tell us how you are using Amazon QuickSight.

Help – This will open the official AWS documentation, which you can view online, in Kindle, or as a PDF.

Sign out – Choose this option to sign out of Amazon QuickSight and your AWS session.

Note
The following image also shows the region menu icon, which allows you to choose the AWS region where your work will be saved. Your default region is configured by your Amazon QuickSight administrator. Consult your administrator before changing your region.

Using the Amazon QuickSight Start Page

To see available dashboards, choose the All dashboards tab. Choose any dashboard to open it.
To see available analyses, choose the All analyses tab. This is the default tab when Amazon QuickSight opens. Choose any analysis to open it.

To create a new analysis, choose New analysis, near the top left. This takes you to Your Data Sets. Choose one to start analyzing it.

To see current data sets, or to create a new data set, choose Manage data, near the top right. This takes you to Your Data Sets, which displays the data sets that you have access to. (If they don't all fit on
one page, there will be an option to navigate between pages.) From here, you can choose a data set to analyze.

To create a new data set from Your Data Sets, choose New data set. From here, you can upload a file, or you can create a new data set based on a data source (a connection to external data). Icons for new data sources are at the top of the screen. Icons for existing data sources are shown below them.
From the search bar, you can search for analyses and dashboards.

**Searching Amazon QuickSight**

From the search bar, you can search for analyses and dashboards.

To use the search tool, choose the search box at the top of the page. Then type in the name, or part of the name, of the data set, analyses, or dashboard you want to find. The search is not case sensitive.
After you've located the item you are looking for, you can open it directly from the search results. You can modify a data set, create an analysis from a data set, or access an analysis or dashboard. Choose an item from the search results to open it.
### Searching Amazon QuickSight

Search results matching "Sales", showing 1-10 of 39 results.

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>sales_metrics_092016.csv analysis</td>
</tr>
<tr>
<td>sales_metrics_092016.csv</td>
</tr>
<tr>
<td>ABCO Sales Dashboard</td>
</tr>
<tr>
<td>ABCO Sales Analysis</td>
</tr>
<tr>
<td>sales_metrics_092016.csv</td>
</tr>
<tr>
<td>Sales Metrics analysis</td>
</tr>
<tr>
<td>Sales Trend</td>
</tr>
<tr>
<td>Sales Metrics analysis</td>
</tr>
<tr>
<td>Sales Metrics analysis</td>
</tr>
<tr>
<td>Sales Metrics analysis</td>
</tr>
<tr>
<td>Sales pipeline</td>
</tr>
</tbody>
</table>
Working with Data in Amazon QuickSight

You can base your Amazon QuickSight analyses on a variety of data sources, including AWS data stores, Salesforce, files in common formats, and popular database engines. You connect to these data sources and create data sets, which identify the specific data from that data source that you want to work with. Data sets also store any data preparation you have done on that data, so that you can reuse that prepared data in multiple analyses. For more information on preparing data, see Preparing Data (p. 111).

You can view your available data sets on the Your Data Sets page, which you reach by choosing Manage data on the Amazon QuickSight start page. You can view available data sources and create a new data set on the Create a Data Set page, which you reach by choosing New data set on the Your Data Sets page.

Topics
- Working with Data Sources in Amazon QuickSight (p. 47)
- Working with Data Sets (p. 56)

Supported Data Sources

Amazon QuickSight supports a variety of data sources that you can use to provide data for analyses. The following data sources are supported:

Relational Data Sources

You can use any of the following relational data stores as data sources for Amazon QuickSight:

- Amazon Athena
- Amazon Aurora
- Amazon Redshift
- Amazon Redshift Spectrum
- Amazon S3
- Amazon S3 Analytics
• Apache Spark 2.0 or later
• MariaDB 10.0 or later
• Microsoft SQL Server 2012 or later
• MySQL 5.1 or later
• PostgreSQL 9.3.1 or later
• Presto 0.167 or later
• Snowflake
• Teradata 14.0 or later

You can retrieve data from tables and materialized views in PostgreSQL instances, and from tables in all other database instances.

Amazon Redshift clusters, Amazon Athena databases, and Amazon Relational Database Service (RDS) instances must be in AWS. Other database instances must be in one of the following environments to be accessible from Amazon QuickSight:

• Amazon EC2
• On your local network
• In a data center or some other internet-accessible environment

File Data Sources

You can use files in Amazon S3 or on your local network as data sources for Amazon QuickSight. Amazon QuickSight supports files in the following formats:

• Microsoft Excel files (.xlsx files) on your local network.
• Delimited-text files (for example, .csv and .tsv files) on your local network or in Amazon S3.
• Common log format (.clf) and extended log format (.elf) files on your local network or in Amazon S3.

Files in Amazon S3 that have been compressed with zip, or gzip (www.gzip.org), can be imported as-is. If you used another compression program for files in Amazon S3, or if the files are on your local network, you need to unzip them before importing them.

Software as a Service (SaaS) Data Sources

• Salesforce

You can use reports or objects in the following editions of Salesforce as data sources for Amazon QuickSight. Joined reports aren't supported as Amazon QuickSight data sources.

• Enterprise Edition
• Unlimited Edition
• Developer Edition

Data Source Limits

Data sources that you use with Amazon QuickSight must conform to the following limits.

File Limits

Any file you import into SPICE must be 1 GB or smaller, whether that file is local or coming from Amazon S3.
If you are retrieving multiple files from Amazon S3, the total size of the files specified in the manifest file cannot exceed 10 GB. The total number of files specified in the manifest file cannot exceed 1000.

Files can have up to 1000 columns. Each column name can have up to 127 characters.

**Table and Query Limits**

Any table or query result set you import into SPICE must be 10 GB or smaller. If you want to retrieve data from a larger table, there are several methods you can use to reduce the size of the data. You can unselect columns, or apply filters. In a SQL query, you can also use predicates, such as `WHERE`, `HAVING`.

Tables can have up to 1000 columns. Each column name can have up to 127 characters.

**Field Limits**

Data in any field of a data set you import into SPICE must be 511 characters or less. Each field name can have up to 127 characters.

**Supported Data Types**

Amazon QuickSight currently supports the following primitive data types:

- **Date.** Dates must be in one of the [Supported Date Formats](p. 52).
- **Decimal.** The decimal data type supports up to four decimal places to the right of the decimal point. Values that have a higher scale than this are truncated to the fourth decimal place when displayed in data preparation or analyses and when imported into SPICE. For example, 13.00049 is truncated to 13.0004.

During data preparation, calculated fields that use decimal data with more than four decimal places use the full value to perform the calculation. If the result is again decimal data that uses more than four decimal places, the result is then truncated as described preceding. For more information, see [Handling Decimal Values in Calculated Fields](p. 139).

- **Integer**
- **String**

Make sure that any table or file that you use as a data source contains only fields that can be implicitly converted to these data types. Amazon QuickSight skips any data rows that can't be converted.

The following table lists the source data types that are supported. Boolean data types are converted to integers in Amazon QuickSight.

<table>
<thead>
<tr>
<th>Database Engine or Source</th>
<th>Numeric Data Types</th>
<th>String Data Types</th>
<th>Datetime Data Types</th>
<th>Boolean Data Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon Athena, Presto</td>
<td>bigint, decimal</td>
<td>char, varchar</td>
<td>date, timestamp</td>
<td>boolean</td>
</tr>
<tr>
<td></td>
<td>double, integer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>real, smallint,</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
tinyint                   |
<p>| Amazon Aurora, MariaDB,  | bigint, decimal    | binary, blob      | date, datetime     |                   |
| and MySQL                |                    |                   |                    |                   |</p>
<table>
<thead>
<tr>
<th>Database Engine or Source</th>
<th>Numeric Data Types</th>
<th>String Data Types</th>
<th>Datetime Data Types</th>
<th>Boolean Data Types</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>double</td>
<td>char</td>
<td>timestamp</td>
<td>boolean</td>
</tr>
<tr>
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<td>int</td>
<td>enum</td>
<td>year</td>
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<td></td>
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<td>mediumint</td>
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<td></td>
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<tr>
<td></td>
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<td>varchar</td>
<td></td>
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<tr>
<td></td>
<td>tinyint</td>
<td></td>
<td></td>
<td></td>
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<td>bigint</td>
<td>char</td>
<td>date</td>
<td>boolean</td>
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<td>decimal</td>
<td>character</td>
<td>timestamp</td>
<td></td>
</tr>
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<td></td>
<td>double</td>
<td>text</td>
<td></td>
<td></td>
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<td></td>
<td>integer</td>
<td>varchar</td>
<td>varying character</td>
<td></td>
</tr>
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<td>smallint</td>
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<tr>
<td>Apache Spark</td>
<td>bigint</td>
<td>varchar</td>
<td>date</td>
<td>boolean</td>
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<tr>
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<td>timestamp</td>
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<td>date</td>
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<td>real</td>
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<td></td>
<td>smallint</td>
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<tr>
<td></td>
<td>tinyint</td>
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</tr>
</tbody>
</table>
Microsoft SQL Server

- bigint
- bit
- decimal
- int
- money
- numeric
- real
- smallint
- smallmoney
- tinyint

• char
• nchar
• nvarchar
• text
• varchar

• date
• datetime
• datetime2
• datetimeoffset
• smalldatetime
• bit

Unsupported Data Values

If a field contains values that don't conform with the data type that Amazon QuickSight assigns to the field, the rows containing those values are skipped. For example, take the following source data.

<table>
<thead>
<tr>
<th>Sales ID</th>
<th>Sales Date</th>
<th>Sales Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>10/14/2015</td>
<td>12.43</td>
</tr>
<tr>
<td>002</td>
<td>5/3/2012</td>
<td>25.00</td>
</tr>
<tr>
<td>003</td>
<td>Unknown</td>
<td>18.17</td>
</tr>
<tr>
<td>004</td>
<td>3/8/2009</td>
<td>86.02</td>
</tr>
</tbody>
</table>

Amazon QuickSight interprets Sales Date as a date field and drops the row containing a non-date value, so only the following rows are imported.

<table>
<thead>
<tr>
<th>Sales ID</th>
<th>Sales Date</th>
<th>Sales Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>10/14/2015</td>
<td>12.43</td>
</tr>
<tr>
<td>002</td>
<td>5/3/2012</td>
<td>25.00</td>
</tr>
<tr>
<td>004</td>
<td>3/8/2009</td>
<td>86.02</td>
</tr>
</tbody>
</table>

Also, if a database field contains values that can't be interpreted by the JDBC driver for the source database engine, the uninterpretable values are replaced by null so that the rows can be imported. The only known occurrence of this issue is with MySQL date, datetime, and timestamp fields that have all-zero values, for example 0000-00-00 00:00:00. For example, take the following source data.

<table>
<thead>
<tr>
<th>Sales ID</th>
<th>Sales Date</th>
<th>Sales Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>2004-10-12 09:14:27</td>
<td>12.43</td>
</tr>
<tr>
<td>002</td>
<td>2012-04-07 12:59:03</td>
<td>25.00</td>
</tr>
<tr>
<td>003</td>
<td>0000-00-00 00:00:00</td>
<td>18.17</td>
</tr>
<tr>
<td>004</td>
<td>2015-09-30 01:41:19</td>
<td>86.02</td>
</tr>
</tbody>
</table>

In this case, the following data is imported.

<table>
<thead>
<tr>
<th>Sales ID</th>
<th>Sales Date</th>
<th>Sales Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>2004-10-12 09:14:27</td>
<td>12.43</td>
</tr>
<tr>
<td>002</td>
<td>2012-04-07 12:59:03</td>
<td>25.00</td>
</tr>
<tr>
<td>003</td>
<td>(null)</td>
<td>18.17</td>
</tr>
</tbody>
</table>
Handling Date Time Zones

Amazon QuickSight uses UTC time for querying, filtering, and displaying date data.

When date data doesn't specify a time zone, Amazon QuickSight assumes UTC values. When date data does specify a time zone, Amazon QuickSight converts it to display in UTC time. For example, a date field with a time zone offset like 2015-11-01T03:00:00-08:00 is converted to UTC and displayed in Amazon QuickSight as 2015-11-01T15:30:00.

Supported Date Formats

Data in date fields must be in one of the following supported formats, depending on the data source type.

For file uploads, Amazon S3 sources, Athena and Salesforce, Amazon QuickSight supports the use of date and time formats (both 24 hr and am/pm) described in the Joda API documentation. See Class DateTimeFormat for a complete list of Joda date formats.

For relational database sources, including Amazon Redshift, Amazon RDS, PostgreSQL, MySQL, Aurora, MariaDB, and Microsoft SQL Server, Amazon QuickSight supports the following date and time formats (24 hr only):

Amazon QuickSight supports dates in the range from Jan 1, 1900 00:00:00 UTC to Dec 31, 2037 23:59:59 UTC

1. dd/MM/yyyy HH:mm:ss, for example 31/12/2016 15:30:00.
2. dd/MM/yyyy, for example 31/12/2016.
3. dd/MMM/yyyy HH:mm:ss, for example 31/DEC/2016 15:30:00.
4. dd/MMM/yyyy, for example 31/DEC/2016.
5. dd-MMM-yyyy HH:mm:ss, for example 31-DEC-2016 15:30:00.
6. dd-MMM-yyyy, for example 31-DEC-2016.
7. dd-MM-yyyy HH:mm:ss, for example 31-12-2016 15:30:00.
8. dd-MM-yyyy, for example 31-12-2016.
9. MM/dd/yyyy HH:mm:ss, for example 12/31/2016 15:30:00.
10. MM/dd/yyyy, for example 12/31/2016.
11. MMM/dd/yyyy HH:mm:ss, for example DEC/31/2016 15:30:00.
12. MMM/dd/yyyy, for example DEC/31/2016.
13. MMM-dd-yyyy HH:mm:ss, for example DEC/31/2016 15:30:00.
14. MMM-dd-yyyy, for example DEC/31/2016.
Creating a Data Source

An associated data source is automatically created when you create an Amazon Athena, Amazon S3, Salesforce, or database data set. No data source is created when you create a data set by uploading a file.

- For information about creating an Amazon S3 data set, see Creating a Data Set Using Amazon S3 Files (p. 59).
- For information about creating an Amazon Athena data set, see Creating a Data Set Using Amazon Athena Data (p. 69).
- For information about creating a Salesforce data set, see Creating a Data Set from Salesforce (p. 72).
- For information about creating a data set from a database, see Creating Data Sets from New Database Data Sources (p. 75).

When you create a Presto or Apache Spark data set, you must configure Presto or Apache Spark for Amazon QuickSight, as described following.

Topics
- Creating a Data Source Using Presto (p. 53)
- Creating a Data Source Using Apache Spark (p. 53)

Creating a Data Source Using Presto

You can connect to a variety of databases using Amazon QuickSight as a Presto client. Presto processes the analytic queries on backend databases. Then it returns results to the Amazon QuickSight client.

The results of analytic queries run through the Presto query engine can be turned into Amazon QuickSight data sets. You can either directly query your data through Presto, or you can import the results of your query into SPICE.

Before you use Amazon QuickSight as a Presto client to run queries, you must configure Presto for Amazon QuickSight.

Amazon QuickSight requires your Presto server to be secured and authenticated using Lightweight Directory Access Protocol (LDAP), which is available to Presto version 0.167 or later. If Presto is configured to allow unauthenticated access, Amazon QuickSight refuses the connection to the server. To use Amazon QuickSight as a Presto client, you must configure LDAP authentication to work with Presto.

Presto's documentation contains information on how to set this up. To start, you'll need to configure it to enable front-end LDAP authentication over HTTPS. For general information on Presto, see the Presto documentation. For information specifically on Presto and LDAP, see Presto LDAP documentation.

To make sure that you have configured your server for Amazon QuickSight access, follow the instructions in Network and Database Configuration Requirements (p. 76).

Creating a Data Source Using Apache Spark

You can connect directly to Apache Spark using Amazon QuickSight, or you can connect to Spark through Spark SQL. Using the results of queries, or direct links to tables or views, you create data sources in Amazon QuickSight. You can either directly query your data through Spark, or you can import the results of your query into SPICE.

Before you use Amazon QuickSight with Spark products, you must configure Spark for Amazon QuickSight.
Amazon QuickSight requires your Spark server to be secured and authenticated using LDAP, which is available to Spark version 2.0 or later. If Spark is configured to allow unauthenticated access, Amazon QuickSight refuses the connection to the server. To use Amazon QuickSight as a Spark client, you must configure LDAP authentication to work with Spark.

Sparks's documentation contains information on how to set this up. To start, you'll need to configure it to enable front-end LDAP authentication over HTTPS. For general information on Spark, see the Apache Spark website. For information specifically on Spark and security, see Spark security documentation.

To make sure that you have configured your server for Amazon QuickSight access, follow the instructions in Network and Database Configuration Requirements (p. 76).

Editing a Data Source

You can edit an existing database data source to update the connection information, such as the server name or the user credentials. You can also edit an existing Amazon Athena data source to update the data source name. You can't edit Amazon S3 or Salesforce data sources.

Editing a Database Data Source

Use the following procedure to edit a database data source.

1. In the FROM EXISTING DATA SOURCES section of the Create a Data Set page, choose a database data source.
2. Choose Edit Data Source.

3. Modify the data source information.

   • If you are editing an autodiscovered database data source, you can modify any of the following settings:
     • For Data source name, type a name for the data source.
     • For Instance ID, choose the name of the instance or cluster you want to connect to from the list provided.
     • Database name shows the default database for the Instance ID cluster or instance. If you want to use a different database on that cluster or instance, type its name.
     • For Username, type the user name of an account that has permissions to access the target database and also to read (perform a SELECT statement on) any tables in that database that you want to use.
     • For Password, type the password associated with the user account you entered.
   • If you are editing an external database data source, you can modify any of the following settings:
     • For Data source name, type a name for the data source.
     • For Database server, type or paste one of the following values:
       • For an Amazon Redshift cluster, type the endpoint of the cluster without the port number. For example, if the endpoint value is clustername.1234abcd.us-west-2.redshift.amazonaws.com:1234, then type clustername.1234abcd.us-west-2.redshift.amazonaws.com:
**Deleting a Data Source**

You can get the endpoint value from the **Endpoint** field on the cluster detail page in the Amazon Redshift console.

- For an Amazon EC2 instance of PostgreSQL, MySQL, or SQL Server, type the public DNS. You can get the public DNS value from the **Public DNS** field on the instance detail pane in the EC2 console.
- For a non-Amazon EC2 instance of PostgreSQL, MySQL, or SQL Server, type the hostname or public IP address of the database server.
- For **Port**, type the port that the cluster or instance uses for connections.
- For **Database name**, type the name of the database that you want to use.
- For **Username**, type the user name of an account that has permissions to access the target database and also to read (perform a **SELECT** statement on) any tables in that database that you want to use.
- For **Password**, type the password associated with the user account you entered.

4. Choose **Validate connection**.
5. If the connection validates, choose **Update data source**. If not, correct the connection information and try validating again.
6. If you want to create a new data set using the updated data source, proceed with the instructions at **Creating a Data Set**. Otherwise, close the **Choose your table** dialog.

---

**Editing an Athena Data Source**

Use the following procedure to edit an Athena data source.

1. In the **FROM EXISTING DATA SOURCES** section of the **Create a Data Set** page, choose an Athena data source.
2. Choose **Edit Data Source**.

3. For **Data source name**, type a new name.
4. Choose **Update data source**.
5. If you want to create a new data set using the updated data source, proceed with the instructions at **Creating a Data Set Using Amazon Athena Data**. Otherwise, close the **Choose your table** dialog.

---

**Deleting a Data Source**

You can delete a data source if it is no longer necessary. Deleting a query-based database data source makes any associated data sets unusable. Deleting an Amazon S3, Salesforce, or SPICE-based database data source doesn't affect your ability to use any associated data sets, because the data is stored in SPICE. However, you can no longer refresh those data sets.
Use the following procedure to delete a data source.

1. In the FROM EXISTING DATA SOURCES section of the Create a Data Set page, choose the data source you want to delete.
2. Choose Delete.
3. Choose Yes.

Working with Data Sets

A data set identifies the specific data in a data source that you want to use, for example a table if you are connecting to a database data source, or a file if you are connecting to an Amazon S3 data source. A data set also stores any data preparation you have performed on that data (like renaming a field or changing its data type), so you don't have to re-prepare the data each time you want to create an analysis based on it.

Topics
- Importing Data into SPICE (p. 56)
- Creating Data Sets (p. 57)
- Editing a Data Set (p. 93)
- Refreshing Data (p. 94)
- Changing a Data Set (p. 99)
- Sharing Data Sets (p. 100)
- Restricting Access to a Data Set by Using Row-Level Security (p. 105)
- Deleting a Data Set (p. 109)

Importing Data into SPICE

SPICE is Amazon QuickSight's in-memory optimized calculation engine, designed specifically for fast, ad hoc data visualization. SPICE stores your data in a system architected for high availability, where it is saved until you choose to delete it. You can improve the performance of database data sets by importing the data into SPICE instead of using a direct query to the database. All data sets that aren't based on database data sources must use SPICE.

Each Amazon QuickSight account receives 10 GB of SPICE capacity per paid user, which is allocated when the user signs into Amazon QuickSight for the first time. Each Amazon QuickSight account also receives one free user with 1 GB of SPICE capacity. SPICE capacity is pooled across users for the Amazon QuickSight account. For example, if you have four users (three paid and one free), you have 31 GB of SPICE capacity available, which can be utilized by any of the users in the account. All of your default SPICE capacity is allocated to your home region, and the other regions have no SPICE capacity unless you choose to purchase some.
To free up SPICE capacity, delete any unused data sets that you have imported into SPICE. For more information about deleting a data set, see Deleting a Data Set (p. 109).

You can purchase additional SPICE capacity if you want to, and you can also release purchased SPICE capacity that you aren't using. For information about purchasing or releasing SPICE capacity, as well as monitoring SPICE usage, see Managing SPICE Capacity (p. 429).

Creating Data Sets

To create a data set, choose New data set on the Your Data Sets page. You can then create a data set based on an existing data source, or connect to a new data source and base the data set on that.

Topics
- Creating Data Sets Using New Data Sources (p. 57)
- Creating a Data Set Using an Existing Data Source (p. 85)

Creating Data Sets Using New Data Sources

To create a data set from a new data source, you must provide connection information to the data source.

- For local text or Excel files, you can simply identify the file location and upload the file.
- For Amazon S3, you must provide a manifest identifying the files or buckets that you want to use, and also the import settings for the target files.
- For Amazon Athena, all Athena databases associated with your AWS account are returned. No additional credentials are required.
- For Salesforce, you must provide credentials to connect with.
- For Amazon Redshift, Amazon RDS, Amazon EC2, or other database data sources, you must provide information about the server and database that host the data, as well as valid credentials for that instance.

Topics
- Creating a Data Set Using a Local Text File (p. 57)
- Creating a Data Set Using a Microsoft Excel File (p. 58)
- Creating a Data Set Using Amazon S3 Files (p. 59)
- Creating a Data Set Using Amazon Athena Data (p. 69)
- Creating a Data Set from Salesforce (p. 72)
- Creating Data Sets from New Database Data Sources (p. 75)

Creating a Data Set Using a Local Text File

To create a data set using a local text file data source, identify the location of a .csv, .tsv, .clf, or .elf file and then upload it. The file data will be automatically imported into SPICE as part of creating a data set.

Use the following procedure to create a data set based on a local text file.

1. Check Data Source Limits (p. 48) to make sure that your target file doesn't exceed data source limits.
2. On the Amazon QuickSight start page, choose Manage data.
3. On the Your Data Sets page, choose New data set.
4. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose Upload a file.
5. In the Open dialog box, browse to a file, select it, and then choose Open.

A file must be 1 GB or less to be uploaded to Amazon QuickSight.
6. To prepare the data before creating the data set, choose Edit/Preview data, otherwise choose Visualize to create an analysis using the data as-is. If you choose the former, you can specify a data set name as part of preparing the data. If you choose the latter, a data set with the same name as the source file is created. To learn more about data preparation, see Preparing Data (p. 111).

Creating a Data Set Using a Microsoft Excel File

To create a data set using a Microsoft Excel file data source, upload an .xlsx file from a local or networked drive. The data will be imported into SPICE.

For more information about creating new Amazon S3 data sets using Amazon S3 data sources, see Creating a Data Set Using an Existing Amazon S3 Data Source (p. 85) or Creating a Data Set Using Amazon S3 Files (p. 59).

Use the following procedure to create a data set based on an Excel file.
1. Check Data Source Limits (p. 48) to make sure that your target file doesn't exceed data source limits.
2. On the Amazon QuickSight start page, choose Manage data.
3. On the Your Data Sets page, choose New data set.
4. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose Upload a file.
5. In the Open dialog box, choose a file, and then choose Open.

A file must be 1 GB or less to be uploaded to Amazon QuickSight.
6. If the Excel file contains multiple sheets, choose the sheet to import. You can change this later by preparing the data.

7. Note
On the following screens, you have multiple chances to prepare the data. Each of these takes you to the Prepare Data screen. This screen is the same one where you can access after the data import is complete. It allows you to change the upload settings even after the upload is complete.
Choose **Select** to confirm your settings. Or, you can choose **Edit/Preview data** to prepare the data immediately.

8. A preview of the data appears on the next screen. You can't make changes directly to the data preview. If the data headings and content don't look correct, you can choose **Edit settings and prepare data** to correct the file upload settings.

Otherwise, choose **Next**.

9. On the **Data Source Details** screen, you can choose **Edit/Preview data**. You can specify a data set name in the **Prepare Data** screen.

If you don't need to prepare the data, you can choose to create an analysis using the data as-is. Choose **Visualize**. Doing this names the data set the same as the source file, and takes you to the **Analysis** screen. To learn more about data preparation and excel upload settings, see **Preparing Data** (p. 111).

---

**Creating a Data Set Using Amazon S3 Files**

To create a data set using one or more text files (.csv, .tsv, .clf, or .elf) from Amazon S3, create a manifest that Amazon QuickSight can use to identify the files that you want to use, and also the upload settings.
Creating Data Sets

needed to import them. When you create a data set using Amazon S3, the file data is automatically imported into SPICE.

You must grant Amazon QuickSight access to any Amazon S3 buckets that you want to read files from. For information about granting Amazon QuickSight access to AWS resources, see Managing Amazon QuickSight Permissions to AWS Resources (p. 451).

Use the following procedure to create an Amazon S3 data set.

1. Check Data Source Limits (p. 48) to make sure that your target file set doesn't exceed data source limits.
2. Create a manifest file to identify the text files you want to import, using one of the formats specified in Supported Formats for Amazon S3 Manifest Files (p. 65).
3. You can save the manifest file to a local directory, or upload it into Amazon S3.
4. On the Amazon QuickSight start page, choose Manage data.
5. On the Your Data Sets page, choose New data set.
6. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose the Amazon S3 icon.
7. For Data source name, type a description of the data source. This name should be something that helps you distinguish this data source from others.
8. For Upload a manifest file, do one of the following:
   - To use a local manifest file, choose Upload, and then choose Upload a JSON manifest file. For Open, choose a file, and then choose Open.
   - To use a manifest file from Amazon S3, choose URL, and type the URL for the manifest file. To find the URL of a pre-existing manifest file in the Amazon S3 console, navigate to the appropriate file and choose it. A properties panel displays, including the link URL. You can copy the URL and paste it into Amazon QuickSight.
9. Choose Connect.
10. To make sure that the connection is complete, choose Edit/Preview data. Otherwise, choose Visualize to create an analysis using the data as-is. If you choose Edit/Preview data, you can specify a data set name as part of preparing the data. Otherwise, the data set name matches the name of the manifest file.

To learn more about data preparation, see Preparing Data (p. 111).

Data Sets Based on Multiple Amazon S3 Files

You can use one of several methods to merge or combine files from Amazon S3 inside Amazon QuickSight:

- **Combine files by using a manifest** – In this case, the files must have the same number of fields (columns). The data types must match between fields in the same position in the file. For example, the first field must have the same data type in each file. The same goes for the second field, and the third field, and so on. Amazon QuickSight takes field names from the first file.

  The files must be listed explicitly in the manifest. However, they don't have to be inside the same S3 bucket.

  In addition, the files must follow the rules described in Supported Formats for Amazon S3 Manifest Files (p. 65).

  For more details about combining files using a manifest, see Creating a Data Set Using Amazon S3 Files (p. 59).

- **Merge files without using a manifest** – To merge multiple files into one without having to list them individually in the manifest, you can use Athena. With this method, you can simply query your text
files, like they are in a table in a database. For more information, see the post Analyzing Data in Amazon S3 Using Athena in the Big Data blog.

- Use a script to append files before importing – You can use a script designed to combine your files before uploading.

Data Sets Using S3 Files in Another AWS Account

Use this section to learn how to set up security so you can use Amazon QuickSight to access Amazon S3 files in another AWS account.

For you to access files in another account, the owner of the other account must first set Amazon S3 to grant you permissions to read the file. Then, in Amazon QuickSight, you must set up access to the buckets that were shared with you. After both of these steps are finished, you can use a manifest to create a data set.

Note
To access files that are shared with the public, you don't need to set up any special security. However, you still need a manifest file.

Topics
- Setting Up Amazon S3 to Allow Access from a Different Amazon QuickSight Account (p. 61)
- Setting Up Amazon QuickSight to Access Amazon S3 Files in Another AWS Account (p. 62)

Setting Up Amazon S3 to Allow Access from a Different Amazon QuickSight Account

Use this section to learn how to set permissions in Amazon S3 files so they can be accessed by Amazon QuickSight in another AWS account.

For information on accessing another account's Amazon S3 files from your Amazon QuickSight account, see Setting Up Amazon QuickSight to Access Amazon S3 Files in Another AWS Account (p. 62). For more information about S3 permissions, see Managing Access Permissions to Your Amazon S3 Resources and How Do I Set Permissions on an Object?

You can use the following procedure to set this access from the S3 console. Alternately, you can grant permissions by using the AWS CLI or by writing a script. If you have a lot of files to share, you can instead create an S3 bucket policy on the s3:GetObject action. To use a bucket policy, add it to the bucket permissions, not to the file permissions. For information on bucket policies, see Bucket Policy Examples in the Amazon S3 Developer Guide.

1. Get the email address of the AWS account email you want to share with. Alternately, you can get and use the canonical user ID. For more information on canonical user IDs, see AWS Account Identifiers in the AWS General Reference.
2. Sign in to the AWS Management Console and open the Amazon S3 console at https://console.aws.amazon.com/s3/.
3. Locate the Amazon S3 bucket that you want to share with Amazon QuickSight. Choose Permissions.
4. Choose Add Account, and then type in an email address, or paste in a canonical user ID, for the AWS account that you want to share with. This email address should be the primary one associated with the AWS account.
5. Choose Yes for Read bucket permissions.
   Choose Save to confirm.
6. Locate the file you want to share, and open the file's permission settings.
7. Type in an email address or canonical user ID for the AWS account you want to share with. This email address should be the primary one associated with the AWS account.
8. Enable Read object permissions for each file that Amazon QuickSight needs access to.
9. Notify the Amazon QuickSight user that the files are now available for use.

Setting Up Amazon QuickSight to Access Amazon S3 Files in Another AWS Account

Use this section to learn how to set up Amazon QuickSight so you can access Amazon S3 files in another AWS account. For information on allowing someone else to access your Amazon S3 files from their Amazon QuickSight account, see Setting Up Amazon S3 to Allow Access from a Different Amazon QuickSight Account (p. 61).

Use the following procedure to access another account’s Amazon S3 files from Amazon QuickSight. Before you can use this procedure, the users in the other AWS account must share the files in their Amazon S3 bucket with you.

1. Verify that the user or users in the other AWS account gave your account read and write permission to the S3 bucket in question.
2. Choose your profile icon, and then choose Manage QuickSight.
3. Choose Edit AWS Permissions.
Account settings

Notification email address

This will be where access requests and service communications are sent.

Enable IAM user access requests to this account

Account permissions

Set QuickSight permissions on AWS resources

Edit QuickSight read-only access to AWS resources

Edit AWS permissions

Close this QuickSight account

By unsubscribing you will be deleting all content:

- Data sources
- Data sets
- Analyses
- Published dashboards

Unsubscribe
4. Choose Choose S3 buckets.
5. On the Select Amazon S3 buckets screen, choose the S3 buckets you can access across AWS tab.

![Select Amazon S3 buckets](image)

The default tab is named S3 buckets linked to QuickSight account. It shows all the buckets your Amazon QuickSight account has access to.

6. Type the name of the Amazon S3 bucket that you want to add. It must exactly match the unique name of the Amazon S3 bucket.

   If you don't have the appropriate permissions, you see the error message "We can't connect to this S3 bucket. Make sure any S3 buckets you specify are associated with the AWS account used to create this QuickSight account." This error message appears if you don't have either account permissions or Amazon QuickSight permissions.

7. Choose Select buckets to confirm your selection.
8. Create a new data set based on Amazon S3, and upload your manifest file. For more information Amazon S3 data sets, see Creating a Data Set Using Amazon S3 Files (p. 59).
Supported Formats for Amazon S3 Manifest Files

You use JSON manifest files to specify files in Amazon S3 to import into Amazon QuickSight. These JSON manifest files can use either the Amazon QuickSight format described following or the Amazon Redshift format described in Using a Manifest to Specify Data Files.

If you use an Amazon QuickSight manifest file, it must have a .json extension, for example my_manifest.json. If you use an Amazon Redshift manifest file, it can have any extension.

If you use an Amazon Redshift manifest file, Amazon QuickSight processes the optional mandatory flag similarly to Amazon Redshift, terminating the import process and returning an error if the associated file is not found.

Files you select for import must be in delimited-text (for example, .csv or .tsv), log (.clf), or extended log (.elf) format, and all files identified in one manifest file must use the same file format. All files must have the same number and type of columns.

No file specified in the manifest can exceed 1 GB in size. The total size of the all the files specified can't exceed 10 GB, and the total number of files specified can't exceed 1000.

Any files you specify must be in Amazon S3 buckets that you have granted Amazon QuickSight access to. For information about granting Amazon QuickSight access to AWS resources, see Managing Amazon QuickSight Permissions to AWS Resources (p. 451).

Manifest File Format for Amazon QuickSight

Amazon QuickSight manifest files use the following JSON format.

```json
{
    "fileLocations": [
        {
            "URIs": [ "uri1", "uri2", "uri3" ]
        },
        {
            "URIprefixes": [ "prefix1", "prefix2", "prefix3" ]
        }
    ],
    "globalUploadSettings": {
        "format": "CSV",
        "delimiter": ",",
        "textqualifier": "'",
        "containsHeader": "true"
    }
}
```

Use the fields in the fileLocations element to specify the files to import, and the fields in the globalUploadSettings element to specify import settings for those files, such as field delimiters.

The manifest file elements are described following.

- **fileLocations** — Use this element to specify the files to import. You can use either or both of the URIs and URIprefixes arrays to do this. You must specify at least one value in one or the other of them.
- **URIs** — Use this array to list URIs for specific files to import.
Amazon QuickSight can access Amazon S3 files that are in any region, but you must use a URI format that identifies the region of the Amazon S3 bucket if it is different from that used by your Amazon QuickSight account.

URIs in the following formats are supported:

<table>
<thead>
<tr>
<th>URI Format</th>
<th>Example</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>s3://&lt;bucket name&gt;/&lt;file name&gt;</td>
<td>s3://data_bucket/data.csv</td>
<td></td>
</tr>
<tr>
<td><a href="https://s3-">https://s3-</a>&lt;region name&gt;.amazonaws.com/&lt;bucket name&gt;/&lt;file name&gt;</td>
<td><a href="https://s3-us-east-1.amazonaws.com/data_bucket/data.csv">https://s3-us-east-1.amazonaws.com/data_bucket/data.csv</a></td>
<td>This URI type identifies the region for the Amazon S3 bucket.</td>
</tr>
<tr>
<td>https://&lt;bucket name&gt;.s3-&lt;region name&gt;.amazonaws.com/&lt;file name&gt;</td>
<td><a href="https://data_bucket.s3-us-east-1.amazonaws.com/data.csv">https://data_bucket.s3-us-east-1.amazonaws.com/data.csv</a></td>
<td>This URI type identifies the region for the Amazon S3 bucket.</td>
</tr>
</tbody>
</table>

- **URIPrefixes** — Use this array to list URI prefixes for S3 buckets and folders. All files in a specified bucket or folder are imported. Amazon QuickSight does not recursively retrieve files from child folders.

Amazon QuickSight can access Amazon S3 buckets or folders that are in any region. However, you must use a URI prefix format that identifies the region of the Amazon S3 bucket if it is different from that used by your Amazon QuickSight account.

URI prefixes in the following formats are supported:

<table>
<thead>
<tr>
<th>URIPrefix Format</th>
<th>Example</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://s3.amazonaws.com/">https://s3.amazonaws.com/</a>&lt;bucket name&gt;/&lt;folder name1&gt;/(&lt;folder name2&gt;/etc.)</td>
<td><a href="https://s3.amazonaws.com/data_bucket/folder1/">https://s3.amazonaws.com/data_bucket/folder1/</a></td>
<td></td>
</tr>
<tr>
<td>s3://&lt;bucket name&gt;</td>
<td>s3://data_bucket/</td>
<td></td>
</tr>
<tr>
<td>s3://&lt;bucket name&gt;/&lt;folder name1&gt;/(&lt;folder name2&gt;/etc.)</td>
<td>s3://data_bucket/folder1/</td>
<td></td>
</tr>
</tbody>
</table>
**URI Prefix Format**

<table>
<thead>
<tr>
<th>Example</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>https://s3-&lt;region name&gt;.amazonaws.com/&lt;bucket name&gt;/</code></td>
<td>This URI Prefix type identifies the region for the Amazon S3 bucket.</td>
</tr>
<tr>
<td><code>https://s3-&lt;region name&gt;.amazonaws.com/&lt;bucket name&gt;/&lt;folder name1&gt;/(&lt;folder name2&gt;/etc.)</code></td>
<td>This URI Prefix type identifies the region for the Amazon S3 bucket.</td>
</tr>
<tr>
<td><code>https://&lt;bucket name&gt;.s3-&lt;region name&gt;.amazonaws.com</code></td>
<td>This URI Prefix type identifies the region for the Amazon S3 bucket.</td>
</tr>
</tbody>
</table>

- **globalUploadSettings** — (Optional) Use this element to specify import settings for the Amazon S3 files, such as field delimiters. If this element is not specified, Amazon QuickSight uses the default values for the fields in this section.

  **Important**
  For log (.clf) and extended log (.elf) files, only the **format** field in this section is applicable, so you can skip the other fields. If you choose to include them, their values are ignored.

- **format** — (Optional) Specify the format of the files to be imported. Valid formats are **CSV**, **TSV**, **CLF**, and **ELF**. The default value is **CSV**.
- **delimiter** — (Optional) Specify the file field delimiter. This must map to the file type specified in the **format** field. Valid formats are commas (, ) for .csv files and tabs (\t) for .tsv files. The default value is comma (, ).
- **textqualifier** — (Optional) Specify the file text qualifier. Valid formats are single quote (‘) , double quotes ("), or no value if no qualifier is used. The leading backslash is a required escape character for a double quote in JSON. The default value is double quotes (\").
- **containsHeader** — (Optional) Specify whether the file has a header row. Valid formats are true or false. The default value is true.

**Manifest File Examples for Amazon QuickSight**

The following are some examples of completed Amazon QuickSight manifest files.

**Example 1**

The following example shows a manifest file that identifies two specific .csv files for import. These files use double quotes for text qualifiers. The **format**, **delimiter**, and **containsHeader** fields are skipped because the default values are acceptable.

```json
{
  "fileLocations": [
    {
      "URIs": [
        "https://data_bucket.s3.amazonaws.com/data.csv",
        "https://data_bucket.s3.amazonaws.com/data2.csv"
      ]
    }
  ]
},
```
Example 2

The following example shows a manifest file that identifies one specific .tsv file for import, and also a bucket in another region that contains additional .tsv files for import. The `textqualifier` and `containsHeader` fields are skipped because the default values are acceptable.

```json
{
    "fileLocations": [
        {
            "URIs": [
                "https://s3.amazonaws.com/data_bucket/data.tsv"
            ],
            "URIPrefixes": [
                "https://s3-us-east-1.amazonaws.com/data_bucket/"
            ]
        }
    ],
    "globalUploadSettings": {
        "format": "TSV",
        "delimiter": "\t"
    }
}
```

Example 3

The following example identifies two buckets that contain .clf files for import, one in the same region as the Amazon QuickSight account and one in a different region. The `delimiter`, `textqualifier`, and `containsHeader` fields are skipped because they are not applicable to log files.

```json
{
    "fileLocations": [
        {
            "URIPrefixes": [
                "https://data_bucket.s3-us-east-1.amazonaws.com",
                "s3://other_data_bucket/"
            ]
        }
    ],
    "globalUploadSettings": {
        "format": "CLF"
    }
}
```

Example 4

The following example uses the Amazon Redshift format to identify a .csv file for import.

```json
"globalUploadSettings": {
    "textqualifier": "\"
}
```
Creating a Data Set Using Amazon Athena Data

You can connect to Amazon Athena data sources and use Athena data to create Amazon QuickSight data sets.

Before you try to read files from Amazon S3 buckets, make sure that you grant Amazon QuickSight access to them. For more information, see Managing Amazon QuickSight Permissions to AWS Resources (p. 451).

To create an Athena data set

1. Check Data Source Limits (p. 48) to make sure that your target table or query doesn't exceed data source limits.
2. On the Amazon QuickSight start page, choose Manage data.
3. On the Your Data Sets page, choose New data set.
4. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose the Athena icon.
5. For Data source name, type a name for the data source.
6. Choose Validate connection to validate the connection. If validation fails, make sure Amazon QuickSight has permission to access Athena resources. Then, try validating again. For more information on setting Amazon QuickSight permissions to AWS resources, see Managing User Access in Amazon QuickSight (p. 405)
7. Choose Create data source.

    Note
    Amazon QuickSight automatically secures connections to Athena instances by using Secure Sockets Layer (SSL). You don't need to do anything to enable this.
8. For Database: contain sets of tables., choose Select, and then choose your Athena database.
Choose your table

transport

Database: contain sets of tables.

Select...

Choose **Prepare data** to create a SQL query or perform other data preparation. Otherwise choose **Select table**.

**Note**

If you want to create a custom SQL query, click **Edit/Preview data** to edit a query. If you do this without selecting a table, you will see an error in the data preview area. You can safely ignore this. The error is saying that there is no data to display until your query is created.

9. Choose one of the following options:

- To prepare the data before creating an analysis, choose **Edit/Preview data** to begin data preparation. Choose to prepare data at this point if you are planning on writing a SQL query, rather than selecting data from a single table. For more information about data preparation, see **Preparing Data Sets** (p. 111).
- Otherwise, choose a table, and then choose **Select** to confirm.
Choose your table

transport

Database: contain sets of tables.

quicksighttest

Tables: contain the data you can visualize.

qs_test

10. If you did not choose to prepare the data in the previous step, you will see the following screen.
Creating Data Sets

To load your data into SPICE, choose Import to SPICE. The green indicator shows whether or not you have space available.

Alternately, you can choose to query your data without using SPICE. To do this, choose Directly query your data.

11. After choosing how to query your data, choose one of the following options:
   - To prepare the data before creating an analysis, choose Edit/Preview data to begin data preparation for the selected table. For more information about data preparation, see Preparing Data Sets (p. 111).
   - To create a data set and analyze the data using the table as-is, choose Visualize.

Creating a Data Set from Salesforce

Use the following procedure to create a data set by connecting to Salesforce and selecting a report or object to provide data.

1. Check Data Source Limits (p. 48) to make sure that your target report or object doesn't exceed data source limits.
2. On the Amazon QuickSight start page, choose Manage data.
3. On the Your Data Sets page, choose New data set.
4. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose the Salesforce icon.
5. Type a name for the data source and then choose Create data source.
6. On the Salesforce login page, enter your Salesforce credentials.

7. For **Data elements: contain your data**, choose **Select** and then choose either **REPORT** or **OBJECT**.

   **Note**
   Joined reports aren't supported as Amazon QuickSight data sources.

8. Choose one of the following options:
   - To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation. For more information about data preparation, see Preparing Data Sets (p. 111).
   - Otherwise, choose a report or object and then choose **Select**.
9. Choose one of the following options:

- To create a data set and an analysis using the data as-is, choose **Visualize**.

  **Note**
  
  If you don't have enough SPICE capacity, choose **Edit/Preview data**. In data preparation, you can remove fields from the data set to decrease its size or apply a filter that reduces the number of rows returned. For more information about data preparation, see Preparing Data Sets (p. 111).

- To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation for the selected report or object. For more information about data preparation, see Preparing Data Sets (p. 111).
Creating Data Sets from New Database Data Sources

You can use a variety of database data sources to provide data to Amazon QuickSight. This includes Amazon RDS instances and Amazon Redshift clusters, and also MariaDB, Microsoft SQL Server, MySQL, and PostgreSQL instances in your organization, in Amazon EC2, or similar environments.

When creating a new database data set, you can select one table, join several tables, or create a SQL query to retrieve the data that you want. You can also change whether the data set uses a direct query or stores data in SPICE.

When you create a data set based on an AWS resource like Amazon RDS, Amazon Redshift, or Amazon EC2, data transfer charges might apply when consuming data from that source. Those charges might also vary depending on whether that AWS resource is in the home region you chose for your Amazon QuickSight account. Refer to the pricing page for the service in question for more details on applicable pricing.

Topics
- Required Permissions for Database Credentials (p. 75)
- Network and Database Configuration Requirements (p. 76)
- Creating a Database Data Set (p. 79)

Required Permissions for Database Credentials

You must provide a user name and password for a database in order to connect to it. The user account identified by these credentials must have `SELECT` permissions on some system tables in order to allow Amazon QuickSight to do things like discover table schemas and estimate table size.

The following table identifies the tables that the user account must have `SELECT` permissions on, depending on the type of database you are connecting to. These requirements apply for all database instances you connect to, regardless of their environment (whether they are on-premise, in Amazon RDS, in Amazon EC2, etc.).

<table>
<thead>
<tr>
<th>Instance Type</th>
<th>Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon Aurora</td>
<td>• INFORMATION_SCHEMA.STATISTICS</td>
</tr>
<tr>
<td></td>
<td>• INFORMATION_SCHEMA.TABLES</td>
</tr>
<tr>
<td>Amazon Redshift</td>
<td>• pg_stats</td>
</tr>
<tr>
<td></td>
<td>• pg_class</td>
</tr>
<tr>
<td></td>
<td>• pg_namespace</td>
</tr>
<tr>
<td>MariaDB</td>
<td>• INFORMATION_SCHEMA.STATISTICS</td>
</tr>
<tr>
<td></td>
<td>• INFORMATION_SCHEMA.TABLES</td>
</tr>
<tr>
<td>Microsoft SQL Server</td>
<td>• DBCC SHOW_STATISTICS</td>
</tr>
<tr>
<td></td>
<td>• sp_statistics</td>
</tr>
<tr>
<td>MySQL</td>
<td>• INFORMATION_SCHEMA.STATISTICS</td>
</tr>
<tr>
<td></td>
<td>• INFORMATION_SCHEMA.TABLES</td>
</tr>
<tr>
<td>PostgreSQL</td>
<td>• pg_stats</td>
</tr>
<tr>
<td></td>
<td>• pg_class</td>
</tr>
<tr>
<td></td>
<td>• pg_namespace</td>
</tr>
</tbody>
</table>
Note
If you are using MySQL or PostreSQL, verify that you are connecting from an allowed host or IP address. See Database Configuration Requirements for Self-Administered Instances (p. 78) for more detail.

Network and Database Configuration Requirements

To serve as data sources, databases need to be configured so that Amazon QuickSight can access them. Use the following sections to make sure that your database is configured appropriately.

Important
Because a database instance on Amazon EC2 is administered by you rather than AWS, it must meet both the Network Configuration Requirements (p. 76) as well as the Database Configuration Requirements for Self-Administered Instances (p. 78).

Network Configuration Requirements

To be usable from Amazon QuickSight, a database server must be accessible from the internet. It must also allow inbound traffic from Amazon QuickSight servers.

If the database is on AWS and in the same region as your Amazon QuickSight account, you can auto-discover the instance to make connecting to it easier. To do this, you must grant Amazon QuickSight permissions to access it. For more information, see Managing Amazon QuickSight Permissions to AWS Resources (p. 451).

Network Configuration for an AWS Instance in a Default VPC

If your database is on an AWS cluster or instance that you created in a default VPC and is publicly accessible (that is, you did not choose to make private), it is already appropriately configured to be accessible from the internet. You still need to enable access from Amazon QuickSight servers to your AWS cluster or instance. For further details on how to do this, choose the appropriate topic following:

- Authorizing Connections from Amazon QuickSight to Amazon RDS DB Instances (p. 436)
- Authorizing Connections from Amazon QuickSight to Amazon Redshift Clusters (p. 440)
- Authorizing Connections from Amazon QuickSight to Amazon EC2 Instances (p. 447)

Network Configuration for an AWS Instance in a Non-Default VPC

If you are configuring an AWS instance in a non-default VPC, make sure that the instance is publicly accessible and that the VPC has the following:

- An internet gateway.
- A public subnet.
- A route in the route table between the internet gateway and the AWS instance.
- Network access control lists (ACLs) in your VPC that allow traffic between the cluster or instance and Amazon QuickSight servers. These ACLs must do the following:
  - Allow inbound traffic from the appropriate Amazon QuickSight IP address range and all ports to the IP address and port that the database is listening on.
  - Allow outbound traffic from the database's IP address and port to the appropriate Amazon QuickSight IP address range and all ports.

For more information about Amazon QuickSight IP address ranges, see IP Address Ranges for Amazon QuickSight (p. 78) following.

For more information about configuring VPC ACLs, see Network ACLs.
• Security group rules that allow traffic between the cluster or instance and Amazon QuickSight servers. For further details on how to create appropriate security group rules, see Authorizing Connections from Amazon QuickSight to AWS Data Stores (p. 436).

For more information about configuring an AWS VPC, see Networking in Your VPC.

Network Configuration for an AWS Instance That is Not in a VPC

If you are configuring an AWS instance that is not in a VPC, make sure that the instance is publicly accessible and that there is a security group rule that allows traffic between the cluster or instance and Amazon QuickSight servers. For further details on how to do this, choose the appropriate topic following:

• Authorizing Connections from Amazon QuickSight to Amazon RDS DB Instances (p. 436)
• Authorizing Connections from Amazon QuickSight to Amazon Redshift Clusters (p. 440)
• Authorizing Connections from Amazon QuickSight to Amazon EC2 Instances (p. 447)

Network Configuration for a Non-AWS Database Instance

If you want to use SSL to secure your connections to your database (recommended), make sure that you have a certificate signed by a recognized certificate authority (CA). Amazon QuickSight doesn't accept certificates that are self-signed or issued from a non-public CA. For more information, see Amazon QuickSight SSL and CA Certificates (p. 77)

If your database is on a non-AWS server, you must change that server's firewall configuration to accept traffic from the appropriate Amazon QuickSight IP address range. For more information about Amazon QuickSight IP address ranges, see IP Address Ranges for Amazon QuickSight (p. 78). Refer to your operating system documentation for any other steps you need to take to enable internet connectivity.

Amazon QuickSight SSL and CA Certificates

Following is a list of accepted public Certificate Authorities. If you are using a non-AWS database instance, your certificate must be on this list, or it won't work.

• AAA Certificate Services
• AddTrust Class 1 CA Root
• AddTrust External CA Root
• AddTrust Qualified CA Root
• AffirmTrust Commercial
• AffirmTrust Networking
• AffirmTrust Premium
• AffirmTrust Premium ECC
• America Online Root Certification Authority 1
• America Online Root Certification Authority 2
• Baltimore CyberTrust Code Signing Root
• Baltimore CyberTrust Root
• Buypass Class 2 Root CA
• Buypass Class 3 Root CA
• QuoVadis Root CA 2
• QuoVadis Root CA 3
• QuoVadis Root Certification Authority
• SecureTrust CA
• Sonera Class1 CA
• Sonera Class2 CA
• Starfield Root Certificate Authority - G2
• Starfield Services Root Certificate Authority - G2
• SwissSign Gold CA - G2
• SwissSign Platinum CA - G2
• SwissSign Silver CA - G2
• TC TrustCenter Class 2 CA II
• TC TrustCenter Class 4 CA II
• TC TrustCenter Universal CA I
• Thawte Personal Freemail CA
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- Certum CA
- Certum Trusted Network CA
- Chambers of Commerce Root
- Chambers of Commerce Root - 2008
- Class 2 Primary CA
- Class 3P Primary CA
- Deutsche Telekom Root CA 2
- DigiCert Assured ID Root CA
- DigiCert Global Root CA
- DigiCert High Assurance EV Root CA
- Entrust.net Certification Authority (2048)
- Entrust Root Certification Authority
- Entrust Root Certification Authority - G2
- Equifax Secure eBusiness CA-1
- Equifax Secure Global eBusiness CA-1
- GeoTrust Global CA
- GeoTrust Primary Certification Authority
- GeoTrust Primary Certification Authority - G2
- GeoTrust Primary Certification Authority - G3
- GeoTrust Universal CA
- Global Chambersign Root - 2008
- GlobalSign
- GlobalSign Root CA
- Go Daddy Root Certificate Authority - G2
- GTE CyberTrust Global Root
- KEYNECTIS ROOT CA
- Thawte Premium Server CA
- thawte Primary Root CA
- thawte Primary Root CA - G2
- thawte Primary Root CA - G3
- Thawte Server CA
- Thawte Timestamping CA
- T-TeleSec GlobalRoot Class 2
- T-TeleSec GlobalRoot Class 3
- UTN - DATAcorp SGC
- UTN-USERFirst-Client Authentication and Email
- UTN-USERFirst-Hardware
- UTN-USERFirst-Object
- Valicert
- VeriSign Class 1 Public Primary Certification Authority - G3
- VeriSign Class 2 Public Primary Certification Authority - G3
- VeriSign Class 3 Public Primary Certification Authority - G3
- VeriSign Class 3 Public Primary Certification Authority - G4
- VeriSign Class 3 Public Primary Certification Authority - G5
- VeriSign Universal Root Certification Authority
- XRamp Global Certification Authority

IP Address Ranges for Amazon QuickSight

For more information on the IP address ranges for Amazon QuickSight in supported regions, see AWS Regions and IP Address Ranges (p. 396).

Database Configuration Requirements for Self-Administered Instances

For a database to be accessible to Amazon QuickSight, it must meet the following criteria:

- It is accessible from the internet. Refer to your database management system documentation for any steps you need to take to enable internet connectivity.
- It is configured to accept connections and authenticate access using the user credentials you provide as part of creating the data set.
- If you are connecting to MySQL or PostgreSQL, it must be accessible from your host or IP range. This is an optional security limitation specified in MySQL or PostgreSQL connection settings. If this limitation is in place, any attempt to connect from nonspecified host or IP address will be rejected, even if you have the correct username and password.
Creating a Database Data Set

The following procedures walk you through connecting to database data sources and creating data sets. Use Creating a Data Set from an Autodiscovered Amazon Redshift Cluster or Amazon RDS Instance (p. 79) to create data sets from AWS data sources that your Amazon QuickSight account autodiscovered, or use Creating a Data Set Using a Database That's Not Autodiscovered (p. 82) to create data sets from any other database data sources.

Creating a Data Set from an Autodiscovered Amazon Redshift Cluster or Amazon RDS Instance

Use the following procedure to create a connection to an autodiscovered AWS data source.

1. Check Data Source Limits (p. 48) to make sure that your target table or query doesn't exceed data source limits.
2. Confirm that the database credentials you plan to use have appropriate permissions as described in Required Permissions for Database Credentials (p. 75).
3. Make sure you have configured the cluster or instance for Amazon QuickSight access by following the instructions in Network and Database Configuration Requirements (p. 76).
4. On the Amazon QuickSight start page, choose Manage data.
5. On the Your Data Sets page, choose New data set.
6. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose either the RDS or the Redshift Auto-discovered icon, depending on the AWS service you want to connect to.
7. Enter the connection information for the data source, as follows:
   - For Data source name, type a name for the data source.
   - For Instance ID, choose the name of the instance or cluster you want to connect to.
   - Database name shows the default database for the Instance ID cluster or instance. If you want to use a different database on that cluster or instance, type its name.
   - For Username, type the user name of an account that has permissions to access the target database and also to read (perform a SELECT statement on) any tables in that database that you want to use.
   - For Password, type the password associated with the user account you entered.
8. Choose Validate connection to verify your connection information is correct.
9. If the connection validates, choose Create data source. If not, correct the connection information and try validating again.
   
   Note
   Amazon QuickSight automatically secures connections to Amazon RDS instances and Amazon Redshift clusters by using Secure Sockets Layer (SSL). You don't need to do anything to enable this.

10. For Schema: contain sets of tables, choose Select and then choose a schema. In some cases where there is only a single schema in the database, that schema is automatically chosen and the schema selection option isn't displayed.
11. Choose one of the following options:

- To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation. Typically, you would choose to prepare data at this point if you are planning on writing a SQL query rather than selecting data from a single table. For more information about data preparation, see Preparing Data Sets (p. 111).

- Otherwise, choose a table and then choose **Select**.

12. Choose one of the following options:

- To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation for the selected table. For more information about data preparation, see Preparing Data Sets (p. 111).
• To create a data set and an analysis using the table data as-is, and to import the data set data into SPICE for improved performance (recommended), check the table size and the SPICE indicator to see if you have enough capacity.

![](image)

If you have enough SPICE capacity, choose the **Import to SPICE for quicker analytics** radio button and then create an analysis by choosing **Visualize**.

**Note**

If you want to use SPICE and you don't have enough space, choose **Edit/Preview data**. In data preparation, you can remove fields from the data set to decrease its size, apply a filter, or write a SQL query that reduces the number of rows or columns returned. For more information about data preparation, see Preparing Data Sets (p. 111).

![](image)

• To create a data set and an analysis using the table data as-is, and to have the data queried directly from the database, choose the **Directly query your data** radio button and then create an analysis by choosing **Visualize**.
Creating a Data Set Using a Database That's Not Autodiscovered

Use the following procedure to create a connection to any database other than an autodiscovered Amazon Redshift cluster or Amazon RDS instance. This includes Amazon Redshift clusters and Amazon RDS instances that are in a different region or are associated with a different AWS account, and MariaDB, Microsoft SQL Server, MySQL, and PostgreSQL instances that are on-premise, in Amazon EC2, or in some other accessible environment.

1. Check Data Source Limits (p. 48) to make sure that your target table or query doesn't exceed data source limits.
2. Confirm that the database credentials you plan to use have appropriate permissions as described in Required Permissions for Database Credentials (p. 75).
3. Make sure you have configured the cluster or instance for Amazon QuickSight access by following the instructions in Network and Database Configuration Requirements (p. 76).
4. On the Amazon QuickSight start page, choose Manage data.
5. On the Your Data Sets page, choose New data set.
6. In the FROM NEW DATA SOURCES section of the Create a Data Set page, choose the Redshift Manual connect icon if you want to connect to an Amazon Redshift cluster in another region or associated with a different AWS account. Or, choose the appropriate database management system icon to connect to an instance of Amazon Aurora, MariaDB, Microsoft SQL Server, MySQL, or PostgreSQL.
7. Enter the connection information for the data source, as follows:
   - For Data source name, type a name for the data source.
   - For Database server, type or paste one of the following values:
     - For an Amazon Redshift cluster or Amazon RDS instance, type the endpoint of the cluster or instance without the port number. For example, if the endpoint value is `clustername.1234abcd.us-west-2.redshift.amazonaws.com:1234`, then type `clustername.1234abcd.us-west-2.redshift.amazonaws.com`. You can get the endpoint value from the Endpoint field on the cluster or instance detail page in the AWS console.
     - For an Amazon EC2 instance of MariaDB, Microsoft SQL Server, MySQL, or PostgreSQL, type the public DNS. You can get the public DNS value from the Public DNS field on the instance detail pane in the Amazon EC2 console.
     - For a non-AWS instance of MariaDB, Microsoft SQL Server, MySQL, or PostgreSQL, type the hostname or public IP address of the database server. If you are using Secure Sockets Layer (SSL) for a secured connection (recommended), you will likely need to provide the hostname to match the information required by the SSL certificate. For a list of accepted certificates see Amazon QuickSight SSL and CA Certificates (p. 77).
• For **Port**, type the port that the cluster or instance uses for connections.
• For **Database name**, type the name of the database that you want to use.
• For **Username**, type the user name of an account that has permissions to access the target database and also to read (perform a `SELECT` statement on) any tables in that database that you want to use.
• For **Password**, type the password associated with the user account you entered.

8. (Optional) If you are connecting to anything other than an Amazon Redshift cluster and you don't want a secured connection, make sure that **Enable SSL** is clear. *We strongly recommend leaving this checked*, as an unsecured connection can be open to tampering.

For more information on how the target instance uses SSL to secure connections, see the documentation for the target database management system. Amazon QuickSight doesn't accept self-signed SSL certificates as valid. For a list of accepted certificates, see Amazon QuickSight SSL and CA Certificates (p. 77).

Amazon QuickSight automatically secures connections to Amazon Redshift clusters by using SSL. You don't need to do anything to enable this.

Some databases, such as Presto and Apache Spark, must meet additional requirements before Amazon QuickSight can connect. For more information, see Creating a Data Source Using Presto (p. 53), or Creating a Data Source Using Apache Spark (p. 53).

9. (Optional) Choose **Validate connection** to verify your connection information is correct.

10. If the connection validates, choose **Create data source**. If not, correct the connection information and try validating again.

11. For **Schema: contain sets of tables**, choose **Select** and then choose a schema. Note that in some cases where there is only a single schema in the database, that schema is automatically chosen and the schema selection option isn't displayed.

12. Choose one of the following options:

   - To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation. Typically, you would choose to prepare data at this point if you are planning on writing a SQL query rather than selecting data from a single table. For more information about data preparation, see Preparing Data Sets (p. 111).
• Otherwise, choose a table and then choose **Select**.

13. Choose one of the following options:

• To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation for the selected table. For more information about data preparation, see Preparing Data Sets (p. 111).

• To create a data set and an analysis using the table data as-is, and to import the data set data into SPICE for improved performance (recommended), check the table size and the SPICE indicator to see if you have enough space.

If you have enough SPICE capacity, choose the **Import to SPICE for quicker analytics** radio button and then create an analysis by choosing **Visualize**.

**Note**
If you want to use SPICE and you don’t have enough space, choose **Edit/Preview data**. In data preparation, you can remove fields from the data set to decrease its size, apply a filter, or write a SQL query that reduces the number of rows or columns returned. For more information about data preparation, see Preparing Data Sets (p. 111).
Creating a Data Set Using an Existing Data Source

After you make an initial connection to a Salesforce, AWS data store, or other database data source, Amazon QuickSight saves the connection information and adds the data source to the FROM EXISTING DATA SOURCES section of the Create a Data Set page. You can use these existing data sources to create new data sets without re-specifying connection information.

Creating a Data Set Using an Existing Amazon S3 Data Source

Use the following procedure to create a data set using an existing Amazon S3 data source.

1. On the Amazon QuickSight start page, choose Manage data.
2. On the Your Data Sets page, choose New data set.
3. In the FROM EXISTING DATA SOURCES section of the Create a Data Set page, choose the Amazon S3 data source to use.
4. To prepare the data before creating the data set, choose Edit/Preview data, to create an analysis using the data as-is, choose Visualize.
Creating a Data Set Using an Existing Amazon Athena Data Source

If you want to create a data set using an existing Amazon Athena data source, use the following procedure.

To create a data set using an existing Amazon Athena data source

1. On the Amazon QuickSight start page, choose Manage data.
2. On the Your Data Sets page, choose New data set.
3. In the FROM EXISTING DATA SOURCES section of the Create a Data Set page, choose the Athena data source to use.
4. Choose Create data set.
5. For Database: contain sets of tables, choose Select, and then choose your Athena database.

Choose your table

transport

Database: contain sets of tables.

Select...

Choose Prepare data to create a SQL query or perform other data preparation tasks, or otherwise choose Select table.
Note
If you want to create a custom SQL query, click Edit/Preview data to edit a query. If you do this without selecting a table, you will see an error in the data preview area. You can safely ignore this. The error is saying that there is no data to display until your query is created.

6. Choose one of the following options:

- To prepare the data before creating an analysis, choose Edit/Preview data to begin data preparation. Choose to prepare data at this point if you are planning on writing a SQL query, rather than selecting data from a single table. For more information about data preparation, see Preparing Data Sets (p. 111).

- Otherwise, choose a table, and then choose Select to confirm.

Choose your table

transport

Database: contain sets of tables.

quicksighttest

Tables: contain the data you can visualize.

qs_test

7. If you did not choose to prepare the data in the previous step, you will see the following screen.
To load your data into SPICE, choose **Import to SPICE**. The green indicator shows whether or not you have space available.

Alternately, you can choose to query your data without using SPICE. To do this, choose **Directly query your data**.

8. After choosing how to query your data, choose one of the following options:

   - To prepare the data before creating an analysis, choose **Edit/Preview data** to begin data preparation for the selected table. For more information about data preparation, see *Preparing Data Sets* (p. 111).
   - To create a data set and analyze the data using the table as-is, choose **Visualize**.

### Create a Data Set Using an Existing Salesforce Data Source

Use the following procedure to create a data set using an existing Salesforce data source.

1. On the Amazon QuickSight start page, choose **Manage data**.
2. On the **Your Data Sets** page, choose **New data set**.
3. In the **FROM EXISTING DATA SOURCES** section of the **Create a Data Set** page, choose the Salesforce data source to use.
4. Choose **Create Data Set**.
5. For **Data elements: contain your data**, choose **Select** and then choose either **REPORT** or **OBJECT**.
6. Choose one of the following options:

   - To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation. For more information about data preparation, see Preparing Data Sets (p. 111).
   - Otherwise, choose a report or object and then choose **Select**.

7. Choose one of the following options:

   - To create a data set and an analysis using the data as-is, choose **Visualize**.
Note
If you don't have enough SPICE capacity, choose Edit/Preview data. In data preparation, you can remove fields from the data set to decrease its size or apply a filter that reduces the number of rows returned. For more information about data preparation, see Preparing Data Sets (p. 111).

• To prepare the data before creating an analysis, choose Edit/Preview data to open data preparation for the selected report or object. For more information about data preparation, see Preparing Data Sets (p. 111).

Creating a Data Set Using an Existing Database Data Source

Use the following procedure to create a data set using an existing database data source.

1. On the Amazon QuickSight start page, choose Manage data.
2. On the Your Data Sets page, choose New data set.
3. In the FROM EXISTING DATA SOURCES section of the Create a Data Set page, choose the database data source to use, and then choose Create Data Set.
4. For Schema: contain sets of tables, choose Select and then choose a schema. Note that in some cases where there is only a single schema in the database, that schema will be automatically chosen and the schema selection option won't be displayed.
5. Choose one of the following options:

- To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation. Typically, you would choose to prepare data at this point if you are planning on writing a SQL query rather than selecting data from a single table. For more information about data preparation, see Preparing Data Sets (p. 111).

- Otherwise, choose a table and then choose **Select**.

6. Choose one of the following options:

- To prepare the data before creating an analysis, choose **Edit/Preview data** to open data preparation for the selected table. For more information about data preparation, see Preparing Data Sets (p. 111).
• To create a data set and an analysis using the table data as-is, and to import the data set data into SPICE for improved performance (recommended), check the SPICE indicator to see if you have enough space.

If you have enough SPICE capacity, choose the **Import to SPICE for quicker analytics** radio button and then create an analysis by choosing **Visualize**.

**Note**

If you want to use SPICE and you don't have enough space, choose **Edit/Preview data**. In data preparation, you can remove fields from the data set to decrease its size, apply a filter, or write a SQL query that reduces the number of rows or columns returned. For more information about data preparation, see *Preparing Data Sets (p. 111)*.

• To create a data set and an analysis using the table data as-is, and to have the data queried directly from the database, choose the **Directly query your data** radio button and then create an analysis by choosing **Visualize**.
Editing a Data Set

You can edit an existing data set to perform data preparation. For more information about Amazon QuickSight data preparation functionality, see Preparing Data (p. 111).

You can open a data set for editing from the Your Data Sets page, or from the analysis page. Editing a data set from either location modifies the data set for all analyses that use it.

Editing a Data Set from the Your Data Sets Page

To edit a data set from the Your Data Sets page, choose the data set, and then choose Edit Data Set. The data set opens in the data preparation page.

Editing a Data Set from the Analysis Page

Use the following procedure to edit a data set from the analysis page.

1. On the analysis page, choose the data set list at the top of the Fields list pane and then choose Edit analysis data sets.
2. In Data sets in this analysis, choose the data set you want to edit, and then choose Edit. The data set opens in the data preparation page.

![Data sets in this analysis](image-url)

**Refreshing Data**

You can refresh your SPICE data sets at any time. Refreshing imports the data into SPICE again, so the data includes any changes since the last import.

You can refresh SPICE data by taking any of the following approaches:

- You can use the options on the Your Data Sets page.
- You can refresh a data set during data preparation.
- You can schedule refreshes of the data.

In the following sections, you can find an explanation of each approach.

**Topics**

- Refreshing a Data Set from the Your Data Sets Page (p. 95)
- Refreshing a Data Set During Data Preparation (p. 96)
- Refreshing a Data Set on a Schedule (p. 97)

For data that is not stored in SPICE, you can do the following:
To refresh file-based data, you must delete and recreate the data set.
To refresh data from a database, reopen your data set or the visualization you created.

Refreshing a Data Set from the Your Data Sets Page

Use the following procedure to refresh a SPICE data set based on an Amazon S3 or database data source on the Your Data Sets page.

To refresh SPICE data from the Your Data Sets page

1. On the Your Data Sets page, choose the data set, and then choose Refresh Now.

2. Leave the refresh type as Full refresh.

3. If you are refreshing an Amazon S3 data set, choose one of the following options for S3 Manifest:
   - To use the same manifest file you last provided to Amazon QuickSight, choose Existing Manifest. If you have changed the manifest file at the file location or URL that you last provided, the data returned reflects those changes.
   - To specify a new manifest file by uploading it from your local network, choose Upload Manifest, and then choose Upload manifest file. For Open, choose a file, and then choose Open.
   - To specify a new manifest file by providing a URL, type the URL of the manifest in Input manifest URL. You can find the manifest file URL in the Amazon S3 console by opening the context (right-click) menu for the manifest file, choosing Properties, and looking at the Link box.
4. Choose **Refresh**.
5. If you are refreshing an Amazon S3 data set, choose **OK**, then **OK** again.

   If you are refreshing a database data set, choose **OK**.

### Refreshing a Data Set During Data Preparation

Use the following procedure to refresh a SPICE data set based on an Amazon S3 or database data source during data preparation.

**To refresh SPICE data during data preparation**

1. On the **Your Data Sets** page, choose the data set, and then choose **Edit Data Set**.

2. On the pane, choose **Refresh now**.
3. Leave the refresh type as **Full refresh**.
4. If you are refreshing an Amazon S3 data set, choose one of the following options for **S3 Manifest**:
   - To use the same manifest file you last provided to Amazon QuickSight, choose **Existing Manifest**. If you have changed the manifest file at the file location or URL that you last provided, the data returned will reflect those changes.
   - To specify a new manifest file by uploading it from your local network, choose **Upload Manifest**, and then choose **Upload manifest file**. For **Open**, choose a file, and then choose **Open**.
   - To specify a new manifest file by providing a URL, type the URL of the manifest in **Input manifest URL**. You can find the manifest file URL in the Amazon S3 console by opening the context (right-click) menu for the manifest file, choosing **Properties**, and looking at the **Link** box.

5. Choose **Refresh**.
6. If you are refreshing an Amazon S3 data set, choose **OK**, then **OK** again.
   If you are refreshing a database data set, choose **OK**.

**Refreshing a Data Set on a Schedule**

Use the following procedure to schedule refreshing the data.

**To refresh SPICE data on a schedule**

1. On the **Your Data Sets** page, choose the data set, and then choose **Schedule refresh**.
2. For Schedule Refresh, choose Create.

3. On the Create a Schedule screen, choose settings for your schedule.
   a. **Time zone**: Choose the time zone that applies to the data refresh.
      - **Daily**: Repeats every day
      - **Weekly**: Repeats on the same day of each week
      - **Monthly**: Repeats on the same day number of each month. To refresh data on the 29th, 30th or 31st day of the month, choose Last day of month from the list.
   c. **Starting**: Choose a date for the refresh to start.
   d. **At**: Specify the time that the refresh should start. Use HH:MM and 24-hour format, for example 13:30.
4. Choose Create.

You can create five schedules for each data set. When you have created five, the Create button is disabled.

Changing a Data Set

In two situations, changes to a data set might cause concern. One is if you deliberately edit the data set. The other is if your data source has changed so much that it affects the analyses based on it.

**Important**
Analyses that are in production usage should be protected so they continue to function correctly.

We recommend the following when you're dealing with data changes:

- Carefully document your data sources and data sets, and the visuals that rely upon them. Documentation should include screenshots, fields used, placement in field wells, filters, sorts, calculations, colors, formatting, and so on. Record everything that you need to recreate the visual.
- When you edit a data set, try not to make changes that might break existing visuals. For example, don't remove columns that are being used in a visual. If you must remove a column, create a calculated column in its place. The replacement column should have the same name and data type as the original.
- If your data source or data set changes in your source database, adapt your visual to accommodate the change, as described previously. Or you can try to adapt the source database. For example, you might create a view of the source table (document). Then if the table changes, you can adjust the view to include or exclude columns (attributes), change data types, fill null values, and so on. Or, in
another circumstance, if your data set is based on a slow SQL query, you might create a table to hold the results of the query.

If you can't sufficiently adapt the source of the data, recreate the visuals based on your documentation of the analysis.

- If you no longer have access to a data source, your analyses based on that source are empty. The visuals you created still exist, but they can't display until they have some data to show. This result can happen if permissions are changed by your administrator.

- If you remove the data set a visual is based on, you might need to recreate it from your documentation. You can edit the visual and select a new data set to use with it. If you need to consistently use a new file to replace an older one, store your data in a location that is consistently available. For example, you might store your .csv file in S3 and create an S3 data set to use for your visuals. For more information on access files stored in S3, see Creating a Data Set Using Amazon S3 Files (p. 59).

Alternatively, you can import the data into a table, and base your visual on a query. This way, the data structures don't change, even if the data contained in them changes.

**Sharing Data Sets**

You can give other Amazon QuickSight users access to a data set by sharing it with them. Any user you share the data set with can create analyses from it. If you make a user an owner when you share the data set with them, then that user can also refresh, edit, delete, or re-share the data set.

**Sharing a Data Set**

Use the following procedure to share a data set.

1. On the **Your Data Sets** page, choose the data set, and then choose **Share** (if this data set hasn't been shared with anyone) or **Shared with <X> users** (if the data set has been shared with others).

2. Choose **Invite Users**.
3. In the **Type a user name or email** box, type the user name of a person with whom you want to share this data set and then choose the add icon. You can only invite users who belong to the current Amazon QuickSight account.

Repeat this step until you have entered information for everyone you want to share the data set with.

4. For **Permission**, choose the role to assign to each person you are sharing the data set with. A role determines the permission level to grant to that user account.

Choose **User** to allow the user to create analyses from the data set. Choose **Owner** to allow the user to do that and also refresh, edit, delete, and re-share the data set.
5. Choose **Share**.

The users you have shared the data set with receive emails with a link that gives them access to the data set.

**Viewing and Editing the Permissions of Users That a Data Set Is Shared With**

If you have Owner permissions on a data set, you can use the following procedure to see which users have access to the data set, and to change the role of any user in order to modify their permissions.

1. On the **Your Data Sets** page, choose the data set, and then choose **Share** (if this data set hasn't been shared with anyone) or **Shared with <X> users** (if the data set has been shared with others).
A list of all users with access to the data set is displayed.

2. (Optional) To change a user's role and modify their permissions, choose the field in the Permission column for that user and then choose either User or Owner.
Revoking Access to a Data Set

If you have Owner permissions on a data set, you can use the following procedure to revoke user access to a data set.

1. On the Your Data Sets page, choose the data set, and then choose Share (if this data set hasn't been shared with anyone) or Shared with <X> users (if the data set has been shared with others).

A list of all users with access to the data set is displayed.
2. In the Actions column for the user, choose Revoke access.

Restricting Access to a Data Set by Using Row-Level Security

In the Enterprise edition of Amazon QuickSight, you can restrict access to a data set by configuring row-level security on it. You can do this before or after you have shared the data set. Only the users you shared with can see any of the data. By adding row-level security to all or some of these users, you can further control their access.

To do this, you create a query or file that has one column named username. Then add a column for each field you want to restrict. For each user name you add, you choose the field values that the user can see. You only need to add the user names you want to control access for. Anyone you don’t include in the data set rules still has access to all the data.
To apply the data set rules, you add the rules as a permissions data set to your data set. This approach allows each user to see only the data that matches the values listed for their user name. Any other data is permanently filtered out of their view.

You can upload data set rules from a text file or spreadsheet. Alternatively, depending on what data source your data set is coming from, you can configure a direct query to access a table of permissions. You can easily maintain the direct query maintained in the original data source. If you use file-based data set rules, you must apply any changes by overwriting the existing rules in the data set's Permissions settings.

Data sets that are restricted are marked with the word RESTRICTED in the Your Data Sets screen.

Row-level security only works for fields containing textual data (string, char, varchar, and so on). It doesn't work for dates or numeric fields.

**Creating Data Set Rules for Row-Level Security**

Use the following procedure to create a permissions files or query to use as data set rules.

1. Create a file or a query that contains the data set rules (permissions).

   The only required field name is username (not case-sensitive). It doesn't matter what order the fields are in. However, all the fields other than username are case-sensitive. They must exactly match the field names and values.

   The structure should look similar to the following.

   ```
   username  Region  Segment
   AlejandroRosalez  EMEA  Enterprise, SMB, Startup
   MarthaRivera  US  Enterprise
   NikhilJayashankar  US  SMB, Startup
   PauloSantos  US  Startup
   SaanviSarkar  APAC  Enterprise, SMB
   sales-tps@example.com
   ZhangWei  APAC  Enterprise, Startup
   ```

   Alternately, if you prefer to use a .csv file, the structure should look similar to the following.

   ```
   Username,Region,Segment
   AlejandroRosalez,EMEA,"Enterprise,SMB,Startup"
   MarthaRivera,US,Enterprise
   NikhilJayashankar,US,SMB
   PauloSantos,US,Startup
   SaanviSarkar,APAC,"SMB,Startup"
   sales-tps@example.com,"",""
   ZhangWei,APAC,"Enterprise,Startup"
   ```

   Following is a SQL example.

   ```
   select User as UserName, Region, Segment
   from tps-permissions
   ```
2. Create a data set for the data set rules. To make sure you can easily find it, give it a meaningful name, for example “Permissions-Sales-Pipeline”.

Creating Row-Level Security

Use the following procedure to apply row-level permissions by using a file or query that contains data set rules.

1. Confirm that you have added your rules as a new data set. If you added them, but don't see them under the list of data sets, refresh the screen.
2. On the Your Data Sets page, choose the data set, and then choose Permissions.

3. From the list of data sets, choose your permissions data set.
If your permissions data set doesn’t appear on this screen, return to your data sets, and refresh the page.

4. Choose the permissions policy. There are two choices:

- To use the data set rules to allow access to the data, choose Grant access to data set.
- To use the data set rules to prevent access to the data, choose Deny access to data set.

Each data set has only one active permissions data set. If you try to add a second permissions data set, it overwrites the existing one.
Important
Some restrictions apply to NULL and empty string values when working with row-level security.
If your data set has NULL values or empty strings ("") in the restricted fields, these rows are ignored when the restrictions are applied.
Inside the permissions data set, NULL values and empty strings are treated differently. For more information, see the following table.

<table>
<thead>
<tr>
<th>Rules for Username, Region, Segment</th>
<th>Result If You Grant Access</th>
<th>Result If You Deny Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>AlejandroRosalez, EMEA, &quot;Enterprise, SMB, Startup&quot;</td>
<td>Sees all EMEA Enterprise, SMB, and Startup</td>
<td>Doesn't see EMEA Enterprise, SMB, or Startup</td>
</tr>
<tr>
<td><a href="mailto:sales-tps@example.com">sales-tps@example.com</a>, &quot;&quot;, &quot;&quot;</td>
<td>Sees no rows</td>
<td>Sees all rows</td>
</tr>
</tbody>
</table>

Anyone you shared your dashboard with can see all the data in it, unless the data set is restricted by data set rules.

There are two ways to create a super user. If you use your permissions data set to grant access, list all possible values for each field for that user. Alternatively, if you use your permissions data set to deny access, leave the values blank for all restricted fields for that user. In either case, a user configured this way can see all values.

5. To save your changes, choose Apply data set. Then, on the Confirm: saving data set rules screen, choose Apply data set. Changes in permissions apply immediately to existing users.

6. (Optional) To remove permissions, first remove the data set rules from the data set. Make certain the data set rules are removed. Then, choose the permissions data set and choose Remove data set.

To overwrite permissions, choose a new permissions data set and apply it. You can reuse the same data set name, but you need to apply the new permissions in the Permissions screen to make these permissions active. SQL queries dynamically update, so these can be managed outside of Amazon QuickSight. In this case, permissions refresh when the direct query cache is automatically refreshed.

If you delete a file-based permissions data set before you remove it from the target data set, restricted users can't access the data set. While the data set is in this state, it remains marked as RESTRICTED. However, when you view Permissions for that data set, you can see that it has no selected data set rules. To fix this, you can specify new data set rules. Creating a data set with the same name is not enough to fix this. You must choose the new permissions data set in the Permissions screen. This restriction doesn't apply to direct SQL queries.

Deleting a Data Set

You can delete a data set from the Your Data Sets page. Choose the data set, and then choose Delete Data Set.
You receive a warning if you have any analyses that use the data set you have chosen for deletion. Continuing with the data set deletion does not delete the dependent analyses. The next time you open any of those analyses, you are prompted to select a new data set for any visuals that were based on the deleted data set.
Preparing Data

Data sets store any data preparation you have done on that data, so that you can reuse that prepared data in multiple analyses. Data preparation provides options such as adding calculated fields, applying filters, and changing field names or data types. If you are basing the data source on a SQL database, you can also use data preparation to join tables or enter a SQL query if you want to work with data from more than a single table.

If you want to transform the data from a data source before using it in Amazon QuickSight, you can prepare it to suit your needs and then save this preparation as part of the data set.

You can prepare a data set when you create it, or by editing it later. For more information about creating a new data set and preparing it, see Creating Data Sets (p. 57). For more information about opening an existing data set for data preparation, see Editing a Data Set (p. 93).

Use the following topics to learn more about data preparation.

Topics

- Preparing Data Sets (p. 111)
- Choosing File Upload Settings (p. 122)
- Joining Tables (p. 123)
- Using a SQL Query (p. 129)
- Selecting Fields (p. 132)
- Changing a Field Name (p. 134)
- Changing a Field Data Type (p. 135)
- Using Unsupported or Custom Dates (p. 137)
- Working with Calculated Fields (p. 139)
- Adding a Filter (p. 145)
- Adding Geospatial Data (p. 162)

Preparing Data Sets

You can prepare data in any data set to make it more suitable for analysis, for example changing a field name or adding a calculated field. For database data sets, you can also determine the data used by specifying a SQL query or joining two or more tables.

Use the following topics to learn how to prepare data sets.

Topics

- Preparing a Data Set Based on File Data (p. 111)
- Preparing a Data Set Based on Salesforce Data (p. 115)
- Preparing a Data Set Based on Database Data (p. 118)

Preparing a Data Set Based on File Data

Use the following procedure to prepare a data set based on text or Microsoft Excel files from either your local network or Amazon S3.
Preparing a Data Set Based on File Data

1. Open a file data set for data preparation by choosing one of the following options:

   • Create a new local file data set, and then choose **Edit/Preview data**. For more information about creating a new data set from a local text file, see *Creating a Data Set Using a Local Text File* (p. 57). For more information about creating a new data set from a Microsoft Excel file, see *Creating a Data Set Using a Microsoft Excel File* (p. 58).

   • Create a new Amazon S3 data set, and then choose **Edit/Preview data**. For more information about creating a new Amazon S3 data set using an Amazon S3 data source, see *Creating a Data Set Using Amazon S3 Files* (p. 59). For more information about creating a new Amazon S3 data set using an existing Amazon S3 data source, see *Creating a Data Set Using an Existing Amazon S3 Data Source* (p. 85).

   • Open an existing Amazon S3, text file, or Microsoft Excel data set for editing, from either the analysis page or the **Your Data Sets** page. For more information about opening an existing data set for data preparation, see *Editing a Data Set* (p. 93).

2. (Optional) On the data preparation page, type a new name into the data set name box on the application bar.

   This name defaults to the file name for local files. For example, it defaults to **Group 1** for Amazon S3 files.

3. Review the file upload settings and correct them if necessary. For more information about file upload settings, see *Choosing File Upload Settings* (p. 122).

   **Important**
   
   If you want to change upload settings, make this change before you make any other changes to the data set. New upload settings cause Amazon QuickSight to reimport the file. This process overwrites all of your other changes.

4. Prepare the data by doing one or more of the following:

   • **Selecting Fields** (p. 132)
   • **Changing a Field Name** (p. 134)
   • **Changing a Field Data Type** (p. 135)
   • **Adding a Calculated Field During Data Preparation** (p. 140)
   • **Adding a Filter** (p. 145)

5. Check the SPICE indicator to see if you have enough capacity to import the data set. File data sets automatically load into SPICE. The import happens when you choose either **Save & visualize** or **Save**.

   If you don't have access to enough SPICE capacity, you can make the data set smaller by using one of the following options:

   • Apply a filter to limit the number of rows.
   • Select fields to remove from the data set.
Note
The SPICE indicator doesn't update to how much space you save by removing fields or filtering the data. It continues to reflect the SPICE usage from the last import.

6. Choose **Save** to save your work, or **Cancel** to cancel it.

You might also see **Save & visualize**. This option appears based on the screen that you started from. If this option isn't there, you can create a new visualization by starting from the data set screen.

Preparing a Data Set Based on a Microsoft Excel File

Use the following procedure to prepare a Microsoft Excel data set.

1. Open a text file data set for preparation by choosing one of the following options:
   - Create a new Microsoft Excel data set, and then choose **Edit/Preview data**. For more information about creating a new Excel data set, see Creating a Data Set Using a Microsoft Excel File (p. 58).
   - Open an existing Excel data set for editing. You can do this from the analysis page or the **Your Data Sets** page. For more information about opening an existing data set for data preparation, see Editing a Data Set (p. 93).

2. (Optional) On the data preparation page, type a name into the data set name box in the application bar. If you don't rename the data set, its name defaults to the Excel file name.

3. Review the file upload settings and correct them if necessary. For more information about file upload settings, see Choosing File Upload Settings (p. 122).

   **Important**
   If it's necessary to change upload settings, make this change before you make any other changes to the data set. Changing upload settings causes Amazon QuickSight to reimport the file. This process overwrites any changes you have made so far.

4. (Optional) Change the sheet selection.
5. (Optional) Change the range selection. To do this, open **Upload Settings** from the on-data set menu beneath the login name at the top right.

6. Prepare the data by doing one or more of the following:
   - Selecting Fields (p. 132)
   - Changing a Field Name (p. 134)
   - Changing a Field Data Type (p. 135)
   - Adding a Calculated Field During Data Preparation (p. 140)
   - Adding a Filter (p. 145)

7. Check the SPICE indicator to see if you have enough space to import the data set. Amazon QuickSight must import Excel data sets into SPICE. This import happens when you choose either **Save & visualize** or **Save**.

   If you don't have enough SPICE capacity, you can choose to make the data set smaller using one of the following methods:
   - Apply a filter to limit the number of rows.
   - Select fields to remove from the data set.
   - Define a smaller range of data to import.
Preparing a Data Set Based on Salesforce Data

Use the following procedure to prepare a Salesforce data set.

1. Open a Salesforce data set for preparation by choosing one of the following options:
   - Create a new Salesforce data set and choose Edit/Preview data. For more information about creating a new Salesforce data set using a new Salesforce data source, see Creating a Data Set from Salesforce (p. 72). For more information about creating a new Salesforce data set using an existing Salesforce data source, see Create a Data Set Using an Existing Salesforce Data Source (p. 88).
   - Open an existing Salesforce data set for editing from either the analysis page or the Your Data Sets page. For more information about opening an existing data set for data preparation, see Editing a Data Set (p. 93).

2. (Optional) On the data preparation page, type a name into the data set name box in the application bar if you want to change the data set name (this defaults to the report or object name).

3. (Optional) Change the data element selection to see either reports or objects.
4. (Optional) Change the data selection to choose a different report or object.

If you have a long list in the Data pane, you can search to locate a specific item by typing a search term into the Search tables box. Any item whose name contains the search term is shown. Search is case-insensitive and wildcards are not supported. Choose the cancel icon (X) to the right of the search box to return to viewing all items.
5. Prepare the data by doing one or more of the following:
   - Selecting Fields (p. 132)
   - Changing a Field Name (p. 134)
   - Changing a Field Data Type (p. 135)
   - Adding a Calculated Field During Data Preparation (p. 140)
   - Adding a Filter (p. 145)

6. Check the SPICE indicator to see if you have enough space to import the data set. Importing data into SPICE is required for Salesforce data sets. Importing occurs when you choose either Save & visualize or Save.

   If you don't have enough SPICE capacity, you can remove fields from the data set or apply a filter to decrease its size. For more information about adding and removing fields from a data set, see Selecting Fields (p. 132).

   **Note**
   The SPICE indicator doesn't update to reflect the potential savings of removing fields or filtering the data. It continues to reflect the size of the data set as retrieved from the data source.

7. Choose **Save** to save your work, or **Cancel** to cancel it.

   You might also see **Save & visualize**. This option appears based on the screen you started from. If this option isn't there, you can create a new visualization by starting from the data set screen.
Preparing a Data Set Based on Database Data

Use the following procedure to prepare a database data set. The data for this data set can be from an AWS database data source like Amazon Athena, Amazon RDS, or Amazon Redshift, or from an external database instance.

1. Open a database data set for preparation by choosing one of the following options:
   - Create a new database data set and choose Edit/Preview data. For more information about creating a new data set using a new database data source, see Creating Data Sets from New Database Data Sources (p. 75). For more information about creating a new data set using an existing database data source, see Creating a Data Set Using an Existing Database Data Source (p. 90).
   - Open an existing database data set for editing from either the analysis page or the Your Data Sets page. For more information about opening an existing data set for data preparation, see Editing a Data Set (p. 93).

2. (Optional) On the data preparation page, type a name into the data set name box on the application bar.

   This name defaults to the table name if you selected one before data preparation. Otherwise, it's Untitled data source.

3. Decide how your data is selected by choosing one of the following:
   - To use a single table to provide data, choose a table or change the table selection.
If you have a long table list in the **Tables** pane, you can search for a specific table by typing a search term for **Search tables**.

Any table whose name contains the search term is shown. Search is case-insensitive and wildcards are not supported. Choose the cancel icon (X) to the right of the search box to return to viewing all tables.
• To use two or more joined tables to provide data, choose two tables and join them using the join pane. You must import data into SPICE if you choose to use joined tables. For more information about joining tables using the Amazon QuickSight interface, see Joining Tables (p. 123).

• To use a custom SQL query to provide data in a new data set, choose **Switch to Custom SQL tool** on the **Tables** pane. For more information, see Using a SQL Query (p. 129).

To change the SQL query in an existing data set, choose **Edit SQL** on the **Fields** pane to open the SQL pane and edit the query.
4. Prepare the data by doing one or more of the following:
   - Selecting Fields (p. 132)
   - Changing a Field Name (p. 134)
   - Changing a Field Data Type (p. 135)
   - Adding a Calculated Field During Data Preparation (p. 140)
   - Adding a Filter (p. 145)

5. If you aren't joining tables, choose whether to query the database directly or to import the data into SPICE by selecting either the Query or SPICE radio button. We recommend using SPICE for enhanced performance.

   If you want to use SPICE, check the SPICE indicator to see if you have enough space to import the data set. Importing occurs when you choose either Save & visualize or Save.

   If you don't have enough space, you can remove fields from the data set or apply a filter to decrease its size.

   Note
   The SPICE indicator doesn't update to reflect the potential savings of removing fields or filtering the data. It continues to reflect the size of the data set as retrieved from the data source.

6. Choose Save to save your work, or Cancel to cancel it.
Choosing File Upload Settings

If you are using a file data source, you should confirm the upload settings that Amazon QuickSight uses to import the file into SPICE, and correct them if necessary.

**Important**
If it's necessary to change upload settings, make these changes before you make any other changes to the data set. Changing upload settings causes Amazon QuickSight to reimport the file. This process overwrites any changes you have made so far.

**Changing Text File Upload Settings**

Text file upload settings include the file header indicator, file format, text delimiter, text qualifier, and start row. If you are working with an Amazon S3 data source, the upload settings you select are applied to all files you choose to use in this data set.

Use the following procedure to change text file upload settings.

1. On the data preparation page, open the **Upload Settings** pane by choosing the expand icon.

2. In **File format**, choose the file format type.
3. If you chose the **custom separated (CUSTOM)** format, specify the separating character in **Delimiter**.
4. If the file doesn't contain a header row, deselect the **Files include headers** check box.
5. If you want to start from a row other than the first row, specify the row number in **Start from row**. If the **Files include headers** check box is selected, the new starting row is treated as the header row. If the **Files include headers** check box is not selected, the new starting row is treated as the first data row.
6. In **Text qualifier**, choose the text qualifier, either single quotes (') or double quotes (").

**Changing Microsoft Excel File Upload Settings**

Microsoft Excel file upload settings include the range header indicator and whole sheet selector.

Use the following procedure to change Microsoft Excel file upload settings.

1. On the data preparation page, open the **Upload Settings** pane by choosing the expand icon.
Joining Tables

If you want to use fields from multiple tables in your data set, you can use Amazon QuickSight’s join interface to join two or more tables from the same data source. On the join interface, you can specify the join type and the fields to use to join the tables. The fields used in the join must be from the data source and not calculated fields. The join interface doesn't let you use any additional SQL statements to refine the data set. If you want to do this, use a custom SQL query instead. For more information about using a SQL query to create a data set, see Using a SQL Query (p. 129).

To successfully join tables, make sure that these requirements are in place:

- The target of the join is a SPICE data set.
- Both data sets are based on the same SQL database data source.

To join tables from different data sources, create the join before importing to Amazon QuickSight.

**Important**

If you chose a table and made changes to the fields (for example, changing a field name or adding a calculated field), these changes are discarded when you add tables using the join interface.

Creating a Join

Use the following procedure to join several tables to use in a data set.

1. On the data preparation page, expand the Tables pane and then choose a table. This table is on the left when you are choosing a join type and join columns. The table appears in the join interface.

   **Note**
   You can only join tables if they are members of the same SQL database data source. Others don't appear in the list.
2. In the **Tables** pane, choose another table. This table is on the right when you are choosing a join type and join columns. The table appears in the join interface and a join appears between the two tables.

3. Choose the join to open the **Configure join** pane.
4. Enter the join column information:

- In the **Data sources** section of the **Configure join** pane, choose the join column for the left table. This should be a column that has a matching column in the table to the right. For example, a Customers table usually has a customer ID column to uniquely identify the customer. An Orders table usually has a customer ID column to identify what customer that order belongs to.

- Choose the join column for the table to the right.
• (Optional) If the tables you selected join on multiple columns, choose Add a new join clause and specify the next set of join columns. Repeat this process until you have identified all of the join columns for the tables.

5. In the Configure join pane, choose a join type.
You can choose from the following join types:

- **Inner** — An inner join records only where both tables have matching values in the join columns. This join type is the most commonly used one. For example, suppose that you perform an inner join on the following Safety Ratings and Widgets tables.

<table>
<thead>
<tr>
<th>rating_id</th>
<th>safety_rating</th>
<th>widget_id</th>
<th>widget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A+</td>
<td>2</td>
<td>WidgetB</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>3</td>
<td>WidgetC</td>
</tr>
<tr>
<td>3</td>
<td>A-</td>
<td>4</td>
<td>WidgetD</td>
</tr>
<tr>
<td>4</td>
<td>B+</td>
<td>5</td>
<td>WidgetE</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the result set, widgets without safety ratings aren't shown, and safety ratings that aren't associated with any widget aren't shown.

- **Left** — A left outer join returns all records from the left table, and only records that have a value in the join column for the table to the right. For example, suppose that you perform a left outer join on the Safety Ratings (left table) and Widgets (right table) tables. In this case, all safety ratings records are returned, and only matching widget records are returned.

<table>
<thead>
<tr>
<th>rating_id</th>
<th>safety_rating</th>
<th>widget_id</th>
<th>widget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A+</td>
<td>2</td>
<td>WidgetB</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>3</td>
<td>WidgetC</td>
</tr>
<tr>
<td>3</td>
<td>A-</td>
<td>4</td>
<td>WidgetD</td>
</tr>
<tr>
<td>4</td>
<td>B+</td>
<td>5</td>
<td>WidgetE</td>
</tr>
</tbody>
</table>

- **Right** — A right outer join returns all records from the right table, and only records that have a value in the join column for the table to the left. For example, suppose that you perform a right outer join on the Safety Ratings (left table) and Widgets (right table) tables. In this case, all widget records are returned, and only matching safety ratings records are returned.

<table>
<thead>
<tr>
<th>rating_id</th>
<th>safety_rating</th>
<th>widget_id</th>
<th>widget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A+</td>
<td>2</td>
<td>WidgetB</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>3</td>
<td>WidgetC</td>
</tr>
<tr>
<td>3</td>
<td>A-</td>
<td>4</td>
<td>WidgetD</td>
</tr>
<tr>
<td>4</td>
<td>B+</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Right — A right outer join returns all records from the table to the right, and only records that have a value in the join column for the left table. For example, suppose that you perform a right outer join on the Safety Ratings (left table) and Widgets (right table) tables. In this case, all widget records are returned, and only matching safety ratings records are returned.

<table>
<thead>
<tr>
<th>rating_id</th>
<th>safety_rating</th>
<th>widget_id</th>
<th>widget</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>A-</td>
<td>1</td>
<td>WidgetA</td>
</tr>
<tr>
<td>1</td>
<td>A+</td>
<td>2</td>
<td>WidgetB</td>
</tr>
<tr>
<td>1</td>
<td>A+</td>
<td>3</td>
<td>WidgetC</td>
</tr>
<tr>
<td>2</td>
<td>A+</td>
<td>4</td>
<td>WidgetD</td>
</tr>
<tr>
<td>5</td>
<td>B+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>6</td>
<td>WidgetF</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outer — A full outer join returns all records from both tables, regardless of the values in the join columns. This type of join can return very large result sets because it includes all rows from both tables. For example, if you perform a full outer join on the Safety Ratings and Widgets tables, all records are returned.

<table>
<thead>
<tr>
<th>rating_id</th>
<th>safety_rating</th>
<th>widget_id</th>
<th>widget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A+</td>
<td>2</td>
<td>WidgetB</td>
</tr>
<tr>
<td>1</td>
<td>A+</td>
<td>3</td>
<td>WidgetC</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>4</td>
<td>WidgetD</td>
</tr>
<tr>
<td>3</td>
<td>A-</td>
<td>1</td>
<td>WidgetA</td>
</tr>
<tr>
<td>4</td>
<td>B+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>6</td>
<td>WidgetF</td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Choose Apply.

The join icon updates to indicate that the join type and columns have been selected.

The fields from the table to the right appear at the bottom of the Fields pane.
7. (Optional) Repeat steps 2–6 to add more tables. The table you selected in Step 1 is the left table and the new table is the right table for each join you add.

### Modifying Existing Joins

To modify an existing join, choose the join icon to open it in the **Configure join** pane.

To remove a table from the data set, either deselect it in the **Tables** pane, or hover over it in the relationship pane and then choose the delete icon.

### Using a SQL Query

When creating a new database data set, you can choose an existing SQL query or create a new SQL query to refine the data retrieved from a database, or to combine data from multiple tables. Using a SQL query, you can specify SQL statements in addition to any join criteria in order to refine the data set. If all you want to do is join multiple tables by specifying the join type and the fields to use to join the tables, you can use the join interface instead. For more information about using the join interface, see Joining Tables (p. 123).

You can only specify a SQL query for data sets based on SQL database data sources.

**Important**

If you chose a table and made any changes to the fields (for example, changing a field name or adding a calculated field), these changes are discarded when you switch from the table selector to the Custom SQL tool.

### Creating a Custom SQL Query

Use the following procedure to create a custom SQL query to define a data set.

1. Create a new database data set and open it for data preparation. For more information about creating a data set from a database, see Creating Data Sets from New Database Data Sources (p. 75).
2. On the data preparation page, expand the Tables pane and then choose Switch to Custom SQL tool.

Tip
In some cases, Amazon QuickSight can't change a table data source into a query. In this case, the screen doesn't display the option to switch to a custom SQL query. To use a query instead, create a new data set that is based on the query you want to use.

3. Do one of the following:

- Choose an existing query in the Custom SQL pane.

- Enter information for a new SQL query:
  - In the Custom SQL pane, choose New Custom SQL.
  - For Custom SQL name, type a query name.
  - For Custom SQL, type or paste in a SQL query. The query must conform to the SQL syntax of the target database engine in terms of capitalization, command termination, and other requirements.

  Note
  The Custom SQL box has no query editing functionality. It's significantly easier to create the query you want in your SQL editor of choice and then paste it in.

- Choose Finish. The query is processed and the query results display in the data preview pane. The saved query appears in the Custom SQL pane.
Switching Back to Using a Table

To stop using a SQL query and use regular table data instead, choose **Switch to table selector** in the **Custom SQL** pane, and then choose a table. You can only do this with new data sets. Once you have saved the data set to use a SQL query, you can edit the query, but you can't switch to using a table.

Modifying Existing Queries

To update an existing data set based on a SQL query, choose **Edit SQL** on the **Fields** pane to open the SQL pane and edit the query.
Selecting Fields

When you prepare data, only the fields you select on the data preparation page are available for subsequent use in a visual. By default, all of the fields in the table or file you are preparing are selected. You can toggle a field by either selecting or deselecting its check box in the Fields pane.

You can also toggle a field by choosing the ellipsis that appears next to each field on hover and then choosing either Exclude field or Include field.
You can select or deselect all fields at once by choosing either All or None at the top of the Fields pane.

If you edit a data set and exclude a field that is used in a visual, that visual breaks. You then need to fix it the next time you open the relevant analysis.
Searching for Fields

If you have a long field list in the Fields pane, you can search to locate a specific field by typing a search term for Search fields. Any field whose name contains the search term is shown.

Search is case-insensitive and wildcards are not supported. Choose the cancel icon (X) to the right of the search box to return to viewing all fields.

Changing a Field Name

You can change any field name from what is provided by the data source. If you change the name of a field used in a calculated field, make sure also to change it in the calculated field function. Otherwise, the function fails.

Use the following procedure to change a field name.

1. In the data preview pane, choose the edit icon on the field that you want to change.
Changing a Field Data Type

When Amazon QuickSight retrieves data, it assigns each field a data type based on the data in the field. The possible data types are as follows:

- Date — The date data type is used for date data in a supported format. For information about the date formats Amazon QuickSight supports, see Data Source Limits (p. 48).
- Decimal — The decimal data type is used for numeric data that requires one or more decimal places of precision, for example 18.23. The decimal data type supports values with up to four decimal places to the right of the decimal point. Values that have a higher scale than this are truncated to the fourth decimal place when displayed in data preparation or analyses and when imported into SPICE. For example, 13.00049 is truncated to 13.0004.
- Int — The int data type is used for numeric data that only contains integers, for example 39.
- String — The string data type is used for nondate alphanumeric data.

2. Highlight the field name and type a new name.

3. Choose Apply.
During data preparation, you can change the data type of any field from the data source but not that of any calculated field you create. Amazon QuickSight converts the field data according to the data type you choose. Rows that contain data that is incompatible with that data type are skipped. For example, suppose that you convert the following field from String to Int.

```
10020
36803
14267a
98457
78216b
```

All records containing alphabetic characters in that field are skipped, as shown following.

```
10020
36803
98457
```

If you have a database data set with fields whose data types aren't supported by Amazon QuickSight, use a SQL query during data preparation. Then use `CAST` or `CONVERT` commands (depending on what is supported by the source database) to change the field data types. For more information about adding a SQL query during data preparation, see Using a SQL Query (p. 129). For more information about how different source data types are interpreted by Amazon QuickSight, see Supported Data Types (p. 49).

If you have numeric fields that act as dimensions rather than metrics, for example ZIP codes and most ID numbers, it's helpful to give them a string data type during data preparation. Doing this lets Amazon QuickSight understand that they are not useful for performing mathematical calculations and can only be aggregated with the `Count` function. For more information about how Amazon QuickSight uses dimensions and measures, see Setting a Field as a Dimension or Measure (p. 210).

**To change a field data type**

1. In the data preview pane, choose the data type icon under the field you want to change.

2. Choose the target data type. Only data types other than the one currently in use are listed.
Using Unsupported or Custom Dates

Amazon QuickSight natively supports a limited number of date formats. However, you can't always control the format of the data provided to you. When your data contains a date in an unsupported format, you can tell Amazon QuickSight how to interpret it.

You can do this by editing the data set, and changing the format of the column from text or numeric to date. A screen appears after you make this change, so you can enter the format. For example, if you are using a relational data source, you can specify MM-dd-yyyy for a text field containing '09-19-2017', so it is interpreted as 2017-09-19T00:00:00.000Z. If you are using a nonrelational data source, you can do the same thing starting with a numeric field or a text field.

Amazon QuickSight only supports text to date for relational (SQL) sources.

For more information on supported date formats, see Supported Date Formats (p. 52).

Use this procedure to help Amazon QuickSight understand dates in different formats.

1. For a data set containing unsupported date formats, edit the data as follows. For the column containing your datetime data, change the data type from text to date. Do this by choosing the colorful data type icon beneath the column name in the data preview.
Using Unsupported or Custom Dates

Data source
SPICE

sheets RevenueData_plusintdate_QuickSi

Fields 12 fields selected

Select All | None
- Date
- Text Date
- Int Date
- Customer ID
- Customer Name
- Customer Region
- Customer Segment
- Service Line
- Revenue Goal
- Billed Amount

Calculated fields
No calculated fields.
Note
Integer dates that aren’t Unix epoch datetimes don’t work as is. For example, these formats are not supported as integers: MM/dd/yy, MM/dd/yyyy, dd/MM/yyyy, and yyMMdd. The workaround is to first change them to text format. Make sure all your rows contain six digits (not five). Then change the text data type to datetime.
For more information on Unix epoch datetimes, see epochDate Function (p. 176).

When you change the data type to date, the Edit date format screen appears.
2. Type your date format, indicating which parts are month, date, year, or time. Formats are case-sensitive.
3. Choose Validate to make sure Amazon QuickSight can now interpret your datetime data with the format you specified. Rows that don't validate are skipped and omitted from the data set.
4. When you are satisfied with the results, choose Update. Otherwise, choose Close.

Working with Calculated Fields

Create calculated fields to use operators or functions to analyze or transform field data. For details about supported functions and operators, see Amazon QuickSight Calculated Field Function and Operator Reference (p. 170).

You can use multiple functions and operators in a calculated field. For example, you might use the formatDate function to extract the year from a date field, and then the ifelse function to segment records based on the year.

ifelse(formatDate(order_date, 'yyyy') > '2000', 'this century', 'last century')

You can create a calculated field based on one or more data set fields or existing calculated fields. For example, you can use the ifelse function to create a quarter field extrapolated from a month value.

ifelse(month <=3, 1, month > 3 AND month <= 6, 2, month > 6 AND month <= 9, 3, 4)

You can then use that calculated quarter field and a sales amount field to identify high-spending customers for the first quarter.

ifelse(quarter = 1 AND sales_amount >= 10000, 'review account', 'n/a')

You can add calculated fields to a data set during data preparation or from the analysis page. When you add a calculated field to a data set during data preparation, it's available to all analyses that use that data set. When you add a calculated field to a data set in an analysis, it's available only in that analysis. For information about adding calculated fields during data preparation, see Adding a Calculated Field During Data Preparation (p. 140). For information about adding calculated fields in an analysis, see Adding a Calculated Field to an Analysis (p. 232).

Handling Decimal Values in Calculated Fields

The decimal data type supports up to four decimal places to the right of the decimal point. During data preparation, calculated fields that use decimal data with more than four decimal places use the full value
to perform the calculation. If the result is again decimal data that uses more than four decimal places, the result is then truncated when the data set is imported into SPICE or displayed in an analysis.

As an example, take decimal field FieldA with a value of 0.00006, which is displayed in the user interface as 0.0. The full value 0.00006 is still used in all calculations. The following are some examples of how you can use this value in calculations:

- FieldA > 0 = true. The calculated field value displayed in the analysis or imported into SPICE is true.
- ceil(FieldA) = 1. The calculated field value displayed in the analysis or imported into SPICE is 1.
- FieldA + 0.00009 = 0.00015. The calculated field value displayed in the analysis or imported into SPICE is 0.0001.
- FieldA * 1.5 = 0.00009. The calculated field value displayed in the analysis or imported into SPICE is 0.0.

Adding a Calculated Field During Data Preparation

Create calculated fields to use functions and operators to analyze or transform field data. For details about supported functions and operators, see Amazon QuickSight Calculated Field Function and Operator Reference (p. 170). For more information about using calculated fields, see Working with Calculated Fields (p. 139).

You can add calculated fields to a data set during data preparation or from the analysis page. When you add a calculated field to a data set during data preparation, it's available to all analyses that use that data set. When you add a calculated field to a data set in an analysis, it's available only in that analysis.

Use this topic to learn about adding calculated fields during data preparation. For information about adding calculated fields in an analysis, see Adding a Calculated Field to an Analysis (p. 232).

Adding a Calculated Field

Use the following procedure to add a calculated field.

1. Do one of the following:
   - Create a calculated field without having the formula populated by a field.

     On the data preparation page, expand the Fields pane, and then choose New Field.

     ![Image of New Field option]

   - Create a calculated field and have the formula populated with a specified field.
On the data preparation page, expand the **Fields** pane, hover over the field that you want to use as the basis for the calculated field, choose the ellipsis that appears to the right of it, and then choose **Add calculation based on <field name>**.

2. In the **Calculated field** pane, highlight the value in **Calculated field name**, and then type a name for the calculated field.
3. Add a function to the calculated field formula by doing one of the following:

- If you created the calculated field by choosing **New Field**, choose a function from **Function list** and then choose **Add**.
• If you created the calculated field by choosing a specific field to use, place your cursor in front of the field name in Formula. Then type the name of the function that you want to use and an open parenthesis, then place your cursor after the field name and type a close parenthesis.

4. In Formula, type any parameters needed by the function (help for the function displays below Formula). As needed, choose fields from Field list and then choose Add to add them to the formula. You can also choose additional functions from the Function list to complete the formula.

If you are using a field that has a space or a nonalphanumeric character other than an underscore in the name, you must enclose the field name in curly braces when referencing it, for example {customer id}. Curly braces are optional if the fieldname has no space or a nonalphanumeric character.
5. Choose **Create**.

   The new calculated field is created, and appears in the **Calculated fields** section at the top of the **Fields** pane.

**Editing a Calculated Field**

To edit a calculated field, locate the field you want to edit in the **Calculated fields** section of the **Fields** pane, hover over it, choose the ellipsis that appears to the right of it, and then choose **Edit <field name>**.
Deleting a Calculated Field

To delete a calculated field, locate the field you want to delete in the Calculated fields section of the Fields pane, hover over it, choose the ellipsis that appears to the right of it, and then choose Delete <field name>.

As with regular fields, if you delete a calculated field that is used in a visual, that visual breaks. You then need fix it the next time you open the relevant analysis.

Adding a Filter

You can use filters to refine the data in a data set. Each filter applies only to a single field. You can apply filters to both regular and calculated fields.

You can apply multiple filters to a single field. Amazon QuickSight applies the union of all the filters you specify to the field.

For example, if there is one filter of state = WA and another filter of sales >= 500, then the data set only contains records that meet both of those criteria.

If you create a filter on the sales field with the criteria sales < 400 and another filter with the criteria sales >= 200, then the data set contains records with sales amounts between $200 and $399.99.

Take care that multiple filters applied to the same field aren’t mutually exclusive. For example, if you create a filter on the sales field with the criteria sales < 400 and another filter with the criteria sales > 500, the data set contains no data. This result is because the sales amount can’t be less than $400 and greater than $500 at the same time.
Note
The data preview shows you the results of your combined filters, only as they apply to the first thousand rows. If all of the first 1000 rows are filtered out, then no rows show in the preview. This result happens even when rows after the first 1000 aren't filtered out.

Topics
- Viewing Filters (p. 146)
- Adding a Filter (p. 147)
- Editing a Filter (p. 159)
- Deleting a Filter (p. 161)

Viewing Filters
To see the filters for a data set, start on the data preparation page. Choose the Filters pane on the left side of the screen. It's located beneath the Fields pane.

If a single field has multiple filters, they are grouped together. They display in order of create date, with the oldest filter on top.

Viewing Filter Details
Choose the filter to open the Edit Filter view and see filter details.

Choose the Edit filter selector to close that view and return to the Filters view.
Adding a Filter

You can apply filters to both regular and calculated fields, which include text (string data type), numeric (int or decimal data types), and date fields. Depending on the data type of the field you choose, you are offered different filtering options as described in the following topics.

Topics

- Adding a Text Filter (p. 147)
- Adding a Numeric Filter (p. 151)
- Adding a Date Filter (p. 153)

Adding a Text Filter

You have two options for creating text field filters. You can specify multiple field values to include or exclude using the Custom filter list filter type, or specify a single value that the field value must equal or not equal using the Custom filter filter type.

Adding a Text Filter by Specifying Multiple Field Values

With the Custom filter list filter type, you specify one or more field values to filter on, and whether you want to include or exclude records that contain those values. The specified value and actual field value must match exactly for the filter to be applied to a given record.

Use the following procedure to create a text field filter by specifying multiple field values.

1. On the data preparation page, expand the Filters pane.
2. Choose New filter, and then choose a text field to filter on.

   Doing this creates a new filter with no criteria.

3. Choose the new filter to expand it.
4. Change the filter type to **Custom filter list**.

5. Type a field value in **Enter a value to add**, and then choose the add icon.

To remove a field value from the criteria, choose its delete icon.
6. (Optional) Repeat Step 5 until you have added all of the field values that you want to filter on.

7. Choose whether to include or exclude records that contain the field values you selected.

8. Choose **Apply**.
Adding a Text Filter by Specifying a Single Field Value

With the **Custom filter** filter type, you specify a single value that the field value must equal or not equal. If you choose an equal comparison, the specified value and actual field value must match exactly in order for the filter to be applied to a given record.

Use the following procedure to create a text field filter by specifying one field value.

1. On the data preparation page, expand the **Filters** pane.
2. Choose **New filter**, and then choose a text field to filter on.

   Doing this creates a new filter with no criteria.
3. Choose the new filter to expand it.

4. Change the filter type to **Custom filter**.

5. Choose a comparison type.

6. Type a field value in the **value** box.
7. Choose Apply.

Adding a Numeric Filter

Fields with decimal or int data types are considered numeric fields. You create filters on numeric fields by specifying a comparison type, for example Greater than or Between, and a comparison value or values as appropriate to the comparison type. Comparison values must be positive integers and should not contain commas.

You can use the following comparison types in numeric filters:

- Equals
- Does not equal
- Greater than
- Greater than or equal to
- Less than
- Less than or equal to
- Between

Creating a Numeric Filter

Use the following procedure to create a numeric field filter.

1. On the data preparation page, expand the Filters pane.
2. Choose New filter, and then choose a numeric field to filter on.
   
   Doing this creates a new filter with no criteria.
3. Choose the new filter to expand it.
4. Choose a comparison type.

5. If you have chosen a comparison type other than *Between* or *Not between*, type a comparison value.

If you have chosen a comparison type of *Between* or *Not between*, type the beginning of the value range in *Minimum value* and the end of the value range in *Maximum value*.
6. Choose **Apply**.

### Adding a Date Filter

You create filters on date fields by selecting the filter conditions and date values that you want to use. There are two filter types for dates:

- **Range** – A series of dates based on a time range and comparison type. You can filter records based on whether the date field value is before or after a specified date, or within a date range. You enter date values in the format MM/DD/YYYY. You can use the following comparison types:
  - **Between** – Between a start date and an end date
  - **After** – After a specified date
  - **Before** – Before a specified date

- **Relative** – A series of date/time elements based on the current date. You can filter records based on the current date and your selected unit of measure (UOM). Date filter UOMs include years, quarters, months, weeks, days, and hours. You can use the following comparison types:
  - **Previous** – The previous UOM—for example, the previous year.
  - **This** – This UOM, which includes all dates and times that fall within the select UOM, even if they occur in the future.
  - **to date or up to now** – UOM to date, or UOM up to now. The displayed phrase adapts to the UOM you choose. However, in all cases this option filters out data that is not between the beginning of the current UOM and the current moment.
  - **Last n** – The last specified number of the given UOM, which includes all of this UOM and all of the last \( n - 1 \) UOM. For example, let’s say today is May 10, 2017. You choose to use **years** as your UOM, and set Last \( n \) years to 3. The filtered data includes data for all of 2017, plus all of 2016, and all of 2015. If you have any data for the future dates of the current year (2017 in this example), these records are included in your data set.

Comparisons are applied inclusive to the date specified. For example, if you apply the filter <\text{date}> <\text{Before} 1/1/16>, the records returned include all rows with date values through 1/1/16 23:59:59.
Note
If a column or attribute has no time zone information, then the client query engine sets the default interpretation of that datetime data. For example, suppose that a column contains a timestamp, rather than a timestamptz, and you are in a different time zone than the data's origin. In this case, the engine can render the timestamp differently than you expect. Amazon QuickSight and SPICE both use Universal Coordinated Time (UTC) times.

Creating a Date Filter

Use the following procedure to create a filter for a date field.

1. Choose Filter on the tool bar.
2. On the Applied filters pane, choose Create one, and then choose a date field to filter on.

Doing this creates a new filter with no criteria.

3. If the filter does not expand to show options, choose the new filter to expand it.

4. Choose a filter type.
5. Do the following to create a date filter on a time range:

1. To create a date filter on a time range, choose a comparison type.
2. Type date values.

   If you choose a **Between** comparison, type a start and end date, or select the **Start date** or **End date** field to bring up the date picker control and select dates.
If you choose a **Before** or **After** comparison, type a date, or choose the date field to bring up the date picker control and select a date instead.

6. Do the following to create a date filter on relative dates:
1. Choose a unit of measure (UOM).

2. Choose one option. If you choose Last \( n \) UOM, specify a number for your range—for example, last 3 years, or last 2 hours.

For more information about date filter options, see Adding a Date Filter (p. 153).
7. Choose **Apply**.

**Editing a Filter**

You can edit a filter by changing the filter criteria or enabling or disabling the filter.

You can't change the field a filter applies to. To apply a filter to a different field, create a new filter instead.

**Enabling or Disabling a Filter**

You can use the filter menu to enable or disable a filter. When you create a filter, it's enabled by default.

1. On the data preparation page, expand the **Filters** pane.
2. Choose the filter you want to enable or disable, and then choose the selector to the right of the filter name.
3. On the filter menu, choose **Enable filter** or **Disable filter**.

### Changing Filter Criteria

Use the following procedure to modify a filter.

1. On the data preparation page, expand the **Filters** pane.
2. Choose the filter you want to modify to see the filter details.
3. Change the comparison type or values.
4. Choose **Apply**.
Deleting a Filter

Use the following procedures to delete a filter.

1. On the data preparation page, expand the Filters pane.
2. Choose the filter you want to enable or disable, and then choose the selector to the right of the filter name.
3. On the filter menu, choose Delete filter.
Adding Geospatial Data

You can flag geographic fields in your data, so that Amazon QuickSight can display them on a map. Amazon QuickSight can chart latitude and longitude coordinates. It also recognizes geographic components such as country, state, county, city, and zip code. You can also create geographic hierarchies that can disambiguate similar entities, for example the same city name in two states.

Use the following procedures to add geospatial data types and hierarchies to your data set.

1. On the data preparation page, label the geographic components with the correct data type. There are several ways to do this. One is to choose the field under Fields, and use the ellipses icon (…) to open the context menu.

Then, choose the correct geospatial data type.
You can also change the data type in the work area with the data sample. To do this, choose the data type listed under the field name. Then choose the data type you want to assign.

2. Verify that all geospatial fields necessary for mapping are labeled as geospatial data types. You can check this by looking for the place marker icon. This icon appears under the field names across the top of the page, and also in the Fields pane on the left.

Also check the name of the data type, for example latitude, longitude, or country.

3. (Optional) You can set up a hierarchy or grouping for geographical components (state, city), or for latitude and longitude. It isn't necessary to do this. But if you do so, you don't have to add all members of the grouping to the field wells in a map chart.

To do this, first choose one of these fields in the Fields pane. Each field can only belong to one hierarchy. It doesn't matter which one you choose first, or in what order you add fields.

Choose the ellipsis icon (...) next to the field name. Then choose Add to a hierarchy.
4. On the **Add field to hierarchy** screen, choose one of the following.

Choose **Create a new geospatial hierarchy** to create a new grouping.

Choose **Add to existing geospatial hierarchy** to add a field to a grouping that already exists. The existing hierarchies displayed include only those of matching geospatial types.

Choose **Add** to confirm your choice.

5. On the **Create hierarchy** screen, create a name for your hierarchy.

If you are creating a latitude and longitude grouping, the **Create hierarchy** screen appears as follows. Depending on whether you chose latitude or longitude in the previous steps, one of either latitude or longitude displays on this screen. Make sure your latitude field shows under **Field to use for latitude**. Also make sure your longitude shows under **Field to use for longitude**.
For geographical components, the **Create hierarchy** screen has two choices.

Choose **This hierarchy is for a single country** if your data only contains one country. Choose the specific country from the list. Your data doesn't need to contain every level of the hierarchy. You can add fields to the hierarchy in any order.

Choose **This hierarchy is for multiple countries** if your data contains more than one country. Choose the field that contains the country names. Currently, Amazon QuickSight only supports US geographical areas. Thus, you can't create a hierarchy containing other geographical types.
For either hierarchy type, choose **Update** to continue.

6. Continue by adding as many fields to the hierarchy as you need to.

Your geospatial groupings appear in the **Fields** pane.
Changing a Geospatial Grouping

You can change a geospatial hierarchy or grouping that exists in a data set.

Use the following procedure to edit or disband a geospatial hierarchy.

1. Open the data set. In the Fields pane, choose the hierarchy name.

2. Choose the ellipsis icon (...), then choose one of the following options.

   Choose Disband hierarchy to remove the hierarchy from the data set. This operation can't be undone. Disbanding the hierarchy doesn't remove any fields from the data set.
Choose **Edit hierarchy** to make changes to the hierarchy. Doing this reopens the creation screens, so you can make different choices in rebuilding your hierarchy.

**Geospatial Limits & Troubleshooting**

There are some limitations to working with geospatial data. Be aware of the following and make sure that your data follows the guidelines listed, so that it works properly in geospatial visuals:

- The map chart identifies State, City, County, and Zipcode as GeoEntity types. After it does so, it converts each to a latitude and longitude pair to display on the map. This automatic conversion is currently supported for US data only. In other regions, automatic conversion is not supported. However, you can still use the map chart with latitude and longitude pairs for locations outside the US.

- Geospatial data can't be ambiguous. For example, suppose that the data contains a city named Springfield, but no state is specified. Because multiple states have a city named Springfield, it isn't possible to geocode the location to a specific point on a map. To avoid this problem, you can add enough geographical data to make it clear exactly what point should be shown on a map chart.

- Some places aren't yet supported, and trying to use these places can cause errors. If your geography follows all the guidelines listed here, and still generates errors, contact the Amazon QuickSight team from within the Amazon QuickSight console.

- The country that you choose on the **Create hierarchy** screen becomes the default for that data set. To change it, edit or create a hierarchy, and choose a different country.

- Latitude values must fall within the range -90 to 90. Longitude values must fall within the range -180 to 180. Amazon QuickSight skips anything outside these ranges. Out-of-range points can't be mapped on a map chart.

- Latitude and longitude values must be numeric. For example, the map point indicated by 28.5383355 -81.3792365 is compatible with Amazon QuickSight. But 28° 32' 18.0096'' N 81° 22' 45.2424'' W is not. You can use a calculated field with a formula to create a numeric latitude and longitude out of character strings. The following examples show different ways that you can create calculated field formulas in Amazon QuickSight, to parse GPS latitude and longitude into numeric latitude and longitude.

The following sample converts latitude and longitude to numeric format from separate fields. For example, if you parse 51° 30' 26.4636'' N 0° 7' 39.9288'' W using space as a delimiter, you can use something like the following sample to convert the resulting fields to numeric latitude and longitude. (In this example, the seconds are followed by two single quotes; if your data has a double quote instead, then you can use `strlen(LatSec)-1) ` instead of `strlen(LatSec)-2)`.)

```c
/*Latitude*/
    ifelse(LatDir = "N",
        parseInt(split(LatDeg, "°", 1)) +
        (parseDecimal(split(LatMin, ",", 1)) / 60) +
        (parseDecimal((substring(LatSec, 1, strlen(LatSec)-2)) / 3600)),
        (parseInt(split(LatDeg, "°", 1)) +
        (parseDecimal(split(LatMin, "°", 1)) / 60) +
        (parseDecimal((substring(LatSec, 1, strlen(LatSec)-2)) / 3600)) * -1)

/*Longitude*/
    ifelse(LongDir = "E",
        parseInt(split(LongDeg, "°", 1)) +
        (parseDecimal(split(LongMin, ",", 1)) / 60) +
        (parseDecimal((substring(LongSec, 1, strlen(LongSec)-2)) / 3600)),
        (parseInt(split(LongDeg, "°", 1)) +
        (parseDecimal(split(LongMin, "°", 1)) / 60) +
        (parseDecimal((substring(LongSec, 1, strlen(LongSec)-2)) / 3600)) * -1)
```
If your data doesn’t include the symbols for degree, minute and second, the formula looks like the following.

/*Latitude*/
ifelse(
    LatDir = "N",
    (LatDeg + (LatMin / 60) + (LatSec / 3600)),
    (LatDeg + (LatMin / 60) + (LatSec / 3600)) * -1
)

/*Longitude*/
ifelse(
    LongDir = "E",
    (LongDeg + (LongMin / 60) + (LongSec / 3600)),
    (LongDeg + (LongMin / 60) + (LongSec / 3600)) * -1
)

The following sample converts 53°21’N 06°15’W to numeric format. However, without the seconds, this value doesn’t map as accurately.

/*Latitude*/
ifelse(
    right(Latitude, 1) = "N",
    parseInt(split(Latitude, "°", 1)) +
    parseDecimal(substring(Latitude, (locate(Latitude, "°",3)+1),  2) ) / 60),
    (parseInt(split(Latitude, "°", 1)) +
    parseDecimal(substring(Latitude, (locate(Latitude, "°",3)+1),  2) ) / 60) * -1
)

/*Longitude*/
ifelse(
    right(Longitude, 1) = "E",
    (parseInt(split(Longitude, "°", 1)) +
    parseDecimal(substring(Longitude, (locate(Longitude, "°",3)+1),  2) ) / 60),
    (parseInt(split(Longitude, "°", 1)) +
    parseDecimal(substring(Longitude, (locate(Longitude, "°",3)+1),  2) ) / 60) * -1
)

The formats of GPS latitude and longitude can vary, so customize your formulas to match your data. For more information, see the following links:

- Degrees Minutes Seconds to Decimal Degrees on LatLong.net
- Converting Degrees/Minutes/Seconds to Decimals using SQL on Stack Overflow
- Geographic Coordinate Conversion on Wikipedia
Amazon QuickSight Calculated Field Function and Operator Reference

You can use the following functions and operators to create calculated fields during data preparation.

For information on aggregating calculated fields, see Using Aggregate Functions in Calculated Fields (p. 233). You can only aggregate calculated fields in a visual, not in a data set.

Topics

• Arithmetic and Comparison Operators (p. 170)
• Conditional Functions (p. 171)
• Date Functions (p. 175)
• Numeric Functions (p. 180)
• String Functions (p. 184)

Arithmetic and Comparison Operators

You can use the following arithmetic and comparison operators in calculated fields:

• Addition (+)
• Subtraction (-)
• Multiplication (*)
• Division (/)
• Equal (=)
• Not equal (<>)
• Greater than (>)
• Greater than or equal to (>=)
• Less than (<)
• Less than or equal to (<=)
• AND
• OR
• NOT

Equal (=) and not equal (<>) comparisons are case-sensitive. For example, if the condition is state = 'WA' and the value in the field is wa, those values are not considered to be equivalent.

You can determine the order in which operators are applied by using parentheses. For example, in the following statement the addition statement is processed first, and then the result is multiplied by three, returning a value of 36.

\[(5 + 7) * 3\]

In the following statement, the multiplication statement is processed first, and then the result is added to five, returning a value of 26.
5 + (7 * 3)

Examples

The following example uses multiple arithmetic operators to determine a sales total after discount.

\[(\{\text{quantity}\} \times \{\text{sales amount}\}) - \{\text{discount amount}\}\]

The following example uses multiple conditional operators to identify top customers in Washington or Oregon for a promotion.

\[\text{ifelse}(((\text{State} = 'WA' \text{ OR State} = 'OR') \text{ AND } \{\text{Number of orders}\} > 10), '\text{Special offer}', 'n/a')\]

Conditional Functions

Topics
- coalesce Function (p. 171)
- ifelse Function (p. 172)
- isNotNull Function (p. 173)
- isNull Function (p. 173)
- nullIf Function (p. 174)

coalesce Function

coaelse returns the value of the first argument that is not null. When a non-null value is found, the remaining arguments in the list are not evaluated. If all arguments are null, the result is null. 0-length strings are valid values and are not considered equivalent to null.

Syntax

\[\text{coalesce}(\text{expression}, \text{expression} [, \text{expression}, ...])\]

Arguments

coaelse takes two or more expressions as arguments. All of the expressions must have the same data type or be able to be implicitly cast to the same data type.

expression

The expression must be a string. It can be a field name like \text{address1}, a literal value like \text{'Unknown'}, or another function like \text{toString(\{sales amount\})}.

Return Type

coaelse returns a value of the same data type as the input arguments.
Example

The following example retrieves a customer's mailing address if it exists, her street address if there is no mailing address, or returns "No address listed" if neither address is available.

```
coalesce(mailingAddress, streetAddress, 'No address listed')
```

ifelse Function

`ifelse` evaluates a set of `if, then` expression pairings, and returns the value of the `then` argument for the first `if` argument that evaluates to true. The remaining arguments in the list are not evaluated. If none of the `if` arguments evaluate to true, then the value of the `else` argument is returned.

Syntax

```
ifelse(if, then [, if, then ...], else)
```

Arguments

`ifelse` takes one or more `if, then` expression pairings plus an expression for the `else` argument.

`if`

The expression to be evaluated as true or not. It can be a field name like `address1`, a literal value like `Unknown`, or another function like `toString({sales amount})`.

If you use multiple AND and OR operators in the `if` argument, enclose statements in parentheses to identify processing order. For example, the following `if` argument returns records with a month of 1, 2, or 5 and a year of 2000.

```
ifelse((month = 5 OR month < 3) AND year = 2000, 'yes', 'no')
```

The next `if` argument uses the same operators, but returns records with a month of 5 and any year, or with a month of 1 or 2 and a year of 2000.

```
ifelse(month = 5 OR (month < 3 AND year = 2000), 'yes', 'no')
```

`then`

The expression to be returned if its `if` argument is evaluated as true. It can be a field name like `address1`, a literal value like `Unknown`, or a call to another function. The expression must have the same data type as the `else` argument.

`else`

The expression to be returned if none of the `if` arguments evaluate as true. It can be a field name like `address1`, a literal value like `Unknown`, or another function like `toString({sales amount})`. The expression must have the same data type as the `then` argument.

Return Type

`ifelse` returns a value of the same data type as the input arguments.
Example

The following example assigns a group to a sales record based on the sales total.

```
isNotNull(salesTotal > 0 AND salesTotal < 500, 'Group 1', salesTotal >= 500 AND salesTotal < 1000, 'Group 2', 'Group 3')
```

isNotNull Function

isNotNull evaluates an expression to see if it is not null. If the expression is not null, isNotNull returns true, and otherwise it returns false.

Syntax

```
isNotNull(expression)
```

Arguments

expression

The expression to be evaluated as null or not. It can be a field name like `address1` or a call to another function that outputs a string.

Return Type

Boolean

Example

The following example evaluates the sales_amount field for null values.

```
isNotNull(sales_amount)
```

The following are the given field values.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20.13</td>
<td>(null)</td>
</tr>
<tr>
<td>57.54</td>
<td></td>
</tr>
</tbody>
</table>

For these field values, the following values are returned.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>true</td>
</tr>
<tr>
<td>false</td>
</tr>
<tr>
<td>true</td>
</tr>
</tbody>
</table>

isNull Function

isNull evaluates an expression to see if it is null. If the expression is null, isNull returns true, and otherwise it returns false.
nullIf Function

nullIf compares two expressions. If they are equal, the function returns null. If they are not equal, the function returns the first expression.

Syntax

```
nullIf(expression, expression)
```

Arguments

nullIf takes two expressions as arguments.

expression

The expression must be a string. It can be a field name like `address1`, a literal value like `'Unknown'`, or a call to another function that outputs a string.
Return Type

String

Example

The following example returns nulls if the reason for a shipment delay is unknown.

```
nullIf({delay reason}, 'unknown')
```

The following are the given field values.

```
delay reason
=========
unknown
back ordered
weather delay
```

For these field values, the following values are returned.

```
(null)
back ordered
weather delay
```

Date Functions

Topics

- dateDiff Function (p. 175)
- epochDate Function (p. 176)
- extract Function (p. 177)
- formatDate Function (p. 178)
- now Function (p. 179)
- truncDate Function (p. 179)

dateDiff Function

dateDiff returns the difference in days between two date fields.

dateDiff is supported for use with analyses based on SPICE data sets.

Syntax

```
dateDiff(date, date)
```

Arguments

dateDiff takes two dates as arguments.
**date**

A date field or a call to another function that outputs a date.

**Return Type**

Integer

**Example**

The following example returns the difference between two dates.

```
dateDiff({order date}, {ship date})
```

The following are the given field values.

<table>
<thead>
<tr>
<th>order date</th>
<th>ship date</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/01/14</td>
<td>01/05/14</td>
</tr>
<tr>
<td>09/13/16</td>
<td>09/20/16</td>
</tr>
</tbody>
</table>

For these field values, the following values are returned.

4

7

**epochDate Function**

epochDate converts an epoch date into a standard date in the format yyyy-MM-ddTkk:mm:ss.SSSZ (using the format pattern syntax specified in Class DateTimeFormat in the Joda project documentation), for example 2015-10-15T19:11:51.003Z.

epochDate is supported for use with analyses based on SPICE data sets.

**Syntax**

```
epochDate(epochdate)
```

**Arguments**

*epochdate*

An epoch date, which is an integer representation of a date as the number of seconds since 00:00:00 UTC on January 1, 1970.

*epochdate* must be an integer. It can be the name of a field that uses the integer data type, a literal integer value, or a call to another function that outputs an integer. If the integer value is longer than 10 digits, the digits after the tenth place are discarded.

**Return Type**

Date
Example

The following example converts an epoch date to a standard date.

```
epochDate(3100768000)
```

The following value is returned:

```
2068-04-04T12:26:40.000Z
```

extract Function

`extract` returns a specified portion of a date value. Requesting a time-related portion of a date that doesn't contain time information returns 0.

`extract` is supported for use with analyses based on SPICE data sets.

Syntax

```
extrack('period', date)
```

Arguments

`period`

The period that you want extracted from the date value. Valid periods are as follows:

- YYYY: This returns the year portion of the date.
- MM: This returns the month portion of the date.
- DD: This returns the day portion of the date.
- WD: This returns the day of the week as an integer, with Sunday being 1.
- HH: This returns the hour portion of the date.
- MI: This returns the minute portion of the date.
- SS: This returns the second portion of the date. (Not supported when added inside SPICE-based analyses.)

`date`

A date field or a call to another function that outputs a date.

Return Type

Integer

Example

The following example extracts the day from a date value.

```
extrack('DD', {order date})
```
The following are the given field values.

<table>
<thead>
<tr>
<th>order date</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/01/14</td>
</tr>
<tr>
<td>09/13/16</td>
</tr>
</tbody>
</table>

For these field values, the following values are returned.

|   | 01 | 13 |

**formatDate Function**

formatDate formats a date using a pattern you specify.

**Syntax**

```javascript
formatDate(date, ['format'], ['time_zone'])
```

**Arguments**

- **date**
  - A date field or a call to another function that outputs a date.

- **format**
  - (Optional) A string containing the format pattern to apply. This argument accepts the format patterns specified in Supported Date Formats (p. 52).

  If you do not specify a format, it will default to yyyy-MM-ddTkk:mm:ss:SSS.

- **time_zone**
  - (Optional) A string representing an IANA time zone.

  If you do not specify a time zone, UTC is used.

**Return Type**

String

**Example**

The following example formats a UTC date and displays using a specific time zone.

```javascript
formatDate({order date}, 'dd MMM yyyy', 'America/Los_Angeles')
```

The following are the given field values.

<table>
<thead>
<tr>
<th>order date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
For these field values, the following values are returned.

<table>
<thead>
<tr>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 Dec 2012</td>
</tr>
<tr>
<td>28 Dec 2013</td>
</tr>
<tr>
<td>14 Nov 2012</td>
</tr>
</tbody>
</table>

**now Function**

For database data sets that directly query the database, `now` returns the current date and time using the settings and format specified by the database server. For file and Salesforce data sets, `now` returns the UTC date and time, in the format `yyyy-MM-ddTkk:mm:ss:SSSZ` (for example, `2015-10-15T19:11:51:003Z`). `now` is not supported for use with database data sets that use SPICE.

**Syntax**

```plaintext
now()
```

**Return Type**

Date

**truncDate Function**

`truncDate` returns a date value that represents a specified portion of a date. For example, requesting the year portion of the value `2012-09-02T00:00:00.000Z` returns `2012-01-01T00:00:00.000Z`. Specifying a time-related period for a date that doesn't contain time information returns the initial date value unchanged.

`truncDate` is supported for use with analyses based on SPICE data sets.

**Syntax**

```plaintext
truncDate('period', date)
```

**Arguments**

`period`

The period of the date that you want returned. Valid periods are as follows:

- **YYYY**: This returns the year portion of the date.
- **MM**: This returns the month portion of the date.
- **DD**: This returns the day portion of the date.
- **WK**: This returns the week portion of the date.
- **HH**: This returns the hour portion of the date.
- **MI**: This returns the minute portion of the date.
• SS: This returns the second portion of the date. (Not supported when added inside SPICE-based analyses.)

date

A date field or a call to another function that outputs a date.

## Return Type

Date

## Example

The following example returns a date representing the month of the order date.

```plaintext
truncDate('MM', {order date})
```

The following are the given field values.

<table>
<thead>
<tr>
<th>order date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-12-14T00:00:00.00Z</td>
</tr>
<tr>
<td>2013-12-29T00:00:00.000Z</td>
</tr>
<tr>
<td>2012-11-15T00:00:00.000Z</td>
</tr>
</tbody>
</table>

For these field values, the following values are returned.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-12-01T00:00:00.000Z</td>
</tr>
<tr>
<td>2013-12-01T00:00:00.000Z</td>
</tr>
<tr>
<td>2012-11-01T00:00:00.000Z</td>
</tr>
</tbody>
</table>

## Numeric Functions

### ceil Function

`ceil` rounds a decimal value to the next highest integer. For example, `ceil(29.02)` returns 30.

`ceil` is supported for use with analyses based on SPICE data sets.

#### Syntax

```plaintext
ceil(decimal)
```
Arguments

decimal

A field that uses the decimal data type, a literal value like 17.62, or a call to another function that outputs a decimal.

Return Type

Integer

Example

The following example rounds a decimal field to the next highest integer.

ceil(sales_amount)

The following are the given field values.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.13</td>
</tr>
<tr>
<td>892.03</td>
</tr>
<tr>
<td>57.54</td>
</tr>
</tbody>
</table>

For these field values, the following values are returned.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
</tr>
<tr>
<td>893</td>
</tr>
<tr>
<td>58</td>
</tr>
</tbody>
</table>

decimalToInt Function

decimalToInt converts a decimal value to the integer data type by stripping off the decimal point and any numbers after it. decimalToInt does not round up (for example, decimalToInt(29.99) returns 29).

decimalToInt is supported for use with analyses based on SPICE data sets.

Syntax

decimalToInt(decimal)

Arguments

decimal

A field that uses the decimal data type, a literal value like 17.62, or a call to another function that outputs a decimal.

Return Type

Integer
Example

The following example converts a decimal field to an integer.

```
decimalToInt(sales_amount)
```

The following are the given field values.

```
20.13
892.03
57.54
```

For these field values, the following values are returned.

```
20
892
58
```

floor Function

floor decrements a decimal value to the next lowest integer. For example, floor(29.08) returns 29).

floor is supported for use with analyses based on SPICE data sets.

Syntax

```
floor(decimal)
```

Arguments

`decimal`

A field that uses the decimal data type, a literal value like 17.62, or a call to another function that outputs a decimal.

Return Type

Integer

Example

The following example decrements a decimal field to the next lowest integer.

```
floor(sales_amount)
```

The following are the given field values.

```
20.13
892.03
57.54
```
The following example converts an integer field to a decimal.

`intToDecimal(transaction_count)`

The following are the given field values.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
</tr>
<tr>
<td>892</td>
</tr>
<tr>
<td>57</td>
</tr>
</tbody>
</table>

For these field values, the following values are returned.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.0</td>
</tr>
<tr>
<td>892.0</td>
</tr>
<tr>
<td>58.0</td>
</tr>
</tbody>
</table>

### round Function

`round` rounds a decimal value to the closest integer if no scale is specified, or to the closest decimal place if scale is specified.

`round` is supported for use with analyses based on SPICE data sets.
Syntax

`round(decimal, scale)`

**Arguments**

*decimal*

A field that uses the decimal data type, a literal value like `17.62`, or a call to another function that outputs a decimal.

*scale*

The number of decimal places to use for the return values.

**Return Type**

Decimal

**Example**

The following example rounds a decimal field to the closest second decimal place.

`round(sales_amount, 2)`

The following are the given field values.

```
20.1307
892.0388
57.5447
```

For these field values, the following values are returned.

```
20.13
892.04
58.54
```
concat Function

concat concatenates two or more strings.

Syntax

concat(expression, expression [, expression ...])

Arguments

concat takes two or more string expressions as arguments.

expression

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

Return Type

String

Examples

The following example concatenates three string fields and adds appropriate spacing.

concat(salutation, ' ', first_name, ' ', last_name)

The following are the given field values.

<table>
<thead>
<tr>
<th>salutation</th>
<th>first_name</th>
<th>last_name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms.</td>
<td>Jane</td>
<td>Doe</td>
</tr>
<tr>
<td>Dr.</td>
<td>Sally</td>
<td>Roe</td>
</tr>
<tr>
<td>Mr.</td>
<td>John</td>
<td>Smith</td>
</tr>
</tbody>
</table>

For these field values, the following values are returned.

Ms. Jane Doe
The following example concatenates two string literals.

```sql
concat('Hello', 'world')
```

The following value is returned.

```
Hello world
```

**left Function**

`left` returns the leftmost characters from a string. You specify the number of characters to be returned.

**Syntax**

```
left(expression, limit)
```

**Arguments**

- **expression**
  
  The expression must be a string. It can be the name of a field that uses the string data type, a literal value like `'12 Main Street'`, or a call to another function that outputs a string.

- **limit**
  
  The number of characters to be returned from `expression`, starting from the first character in the string.

**Return Type**

String

**Example**

The following example returns the first 5 characters from a string.

```sql
left('Seattle Store#14', 5)
```

The following value is returned:

```
Seatt
```

**locate Function**

`locate` locates a substring that you specify within another string, and returns the number of characters until the first character in the substring.
Syntax

\[
\text{locate}(\text{expression, substring, start})
\]

Arguments

\textit{expression}

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like ‘12 Main Street’, or a call to another function that outputs a string.

\textit{substring}

The set of characters in \textit{expression} that you want to locate. The substring can occur one or more times in \textit{expression}.

\textit{start}

(Optional) If \textit{substring} occurs more than once, use \textit{start} to identify where in the string the function should start looking for the substring. For example, if you want to find the second example of a substring and you think it will typically occur after the first 10 characters, you would specify a \textit{start} value of 10.

Return Type

Integer

Examples

The following example returns information about where the first occurrence of the substring ‘and’ appears in a string.

\[
\text{locate}(‘1 and 2 and 3 and 4’, ‘\text{and}’) \]

The following value is returned:

3

The following example returns information about where the first occurrence of the substring ‘and’ appears in a string after the fourth character.

\[
\text{locate}(‘1 and 2 and 3 and 4’, ‘\text{and}’, 4) \]

The following value is returned:

9

\texttt{ltrim} Function

\texttt{ltrim} removes preceding whitespace from a string.
Syntax

ltrim(expression)

Arguments

expression

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

Return Type

String

Example

The following example removes the preceding spaces from a string.

ltrim('   Seattle Store#14')

The following value is returned:

Seattle Store#14

parseDate Function

parseDate parses a string to determine if it contains a date value, and returns a standard date in the format yyyy-MM-ddTk:mm:ss.SSSZ (using the format pattern syntax specified in Class DateTimeFormat in the Joda project documentation), for example 2015-10-15T19:11:51.003Z. This function returns all rows that contain a date in a valid format and skips any rows that do not, including rows that contain null values.

Amazon QuickSight supports dates in the range from Jan 1, 1900 00:00:00 UTC to Dec 31, 2037 23:59:59 UTC. See also, Supported Date Formats (p. 52).

Note

parseDate is not supported for use with SPICE data sets.

Syntax

parseDate(expression, ['format'], ['time_zone'])

Arguments

expression

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '1/1/2016', or a call to another function that outputs a string.

format

(Optional) A string containing the format pattern that date_string must match. For example, if you are using a field with data like 01/03/2016, you would specify the format 'MM/dd/yyyy'. If you do
not specify a format, it defaults to `yyyy-MM-dd`. Rows whose data doesn't conform to format are skipped.

Different date formats are supported based on the type of data set used. Use the following table to see details of supported date formats.

<table>
<thead>
<tr>
<th>Date source type</th>
<th>Supported date formats</th>
</tr>
</thead>
<tbody>
<tr>
<td>File, Athena, and Salesforce data sets.</td>
<td>All date format patterns specified in <a href="#">Supported Date Formats</a> (p. 52).</td>
</tr>
<tr>
<td>Direct query of Amazon Aurora, MariaDB, and MySQL databases.</td>
<td>• MM/dd/yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd/MM/yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MM/dd</td>
</tr>
<tr>
<td></td>
<td>• MMM/dd/yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd/MMM/yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MMM/dd</td>
</tr>
<tr>
<td></td>
<td>• MM/dd/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• dd/MM/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• MMM/dd/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• dd/MMM/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MMM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• MM-dd-yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd-MM-yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd</td>
</tr>
<tr>
<td></td>
<td>• MMM-dd-yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd-MM-yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd HH:mm:ss</td>
</tr>
<tr>
<td>Direct query of Snowflake</td>
<td>• dd/MM/yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd/MM/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• dd-MM-yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• MM/dd/yyyy</td>
</tr>
<tr>
<td></td>
<td>• MM/dd/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• MM-dd-yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd HH:mm:ss</td>
</tr>
</tbody>
</table>

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### parseDate Function

<table>
<thead>
<tr>
<th>Date source type</th>
<th>Supported date formats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct query of Microsoft SQL Server databases.</td>
<td>• dd-MM-yyyy</td>
</tr>
<tr>
<td></td>
<td>• MM/dd/yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd/MM/yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MM/dd</td>
</tr>
<tr>
<td></td>
<td>• MMM/dd/yyyy</td>
</tr>
<tr>
<td></td>
<td>• dd/MMM/yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MMM/dd</td>
</tr>
<tr>
<td></td>
<td>• dd/MMMM/yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MM/MM/dd</td>
</tr>
<tr>
<td></td>
<td>• dd/MM/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• MMM/dd/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• dd/MMM/yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy/MMM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• MM-dd-yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd</td>
</tr>
<tr>
<td></td>
<td>• MMM-dd-yyyy</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd</td>
</tr>
<tr>
<td></td>
<td>• MM-dd-yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• dd-MM-yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM-dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• MMM-dd-yyyy HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• dd-MM/MM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM/MM/dd HH:mm:ss</td>
</tr>
<tr>
<td></td>
<td>• yyyy-MM/MM/MM/dd</td>
</tr>
<tr>
<td>Date source type</td>
<td>Supported date formats</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------</td>
</tr>
</tbody>
</table>
| Direct query of Amazon Redshift or PostgreSQL databases. | • MM/dd/yyyy
• dd/MM/yyyy
• yyyy/MM/dd
• MMM/dd/yyyy
• dd/MMM/yyyy
• yyyy/MMM/dd
• MM/dd/yyyy HH:mm:ss
• dd/MM/yyyy HH:mm:ss
• yyyy/MM/dd HH:mm:ss
• MMM/dd/yyyy HH:mm:ss
• dd/MMM/yyyy HH:mm:ss
• yyyy/MMM/dd HH:mm:ss
• MM-dd-yyyy
• dd-MM-yyyy
• yyyy-MM-dd
• MMM-dd-yyyy
• dd-MMM-yyyy
• yyyy-MMM-dd
• MM-dd-yyyy HH:mm:ss
• dd-MM-yyyy HH:mm:ss
• yyyy-MM-dd HH:mm:ss
• MMM-dd-yyyy HH:mm:ss
• dd-MMM-yyyy HH:mm:ss
• yyyy-MMM-dd HH:mm:ss |
| SPICE database data sets (any DBMS) | Not supported |

**time_zone**

(Optional) A string representing an IANA time zone.

If you do not specify a time zone, UTC is used.

**Return Type**

Date

**Example**

The following example evaluates Field2 to determine if it contains date values.

```sql
parseDate(Field2, 'MM/dd/yyyy')
```

The following are the given field values.

```sql
Field2
```
parseDecimal Function

`parseDecimal` parses a string to determine if it contains a decimal value. This function returns all rows that contain a decimal, integer, or null value, and skips any rows that do not. If the row contains an integer value, it is returned as a decimal. For example, a value of '2' is returned as '2.0'.

**Syntax**

```
parseDecimal(expression)
```

**Arguments**

*expression*

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '9.62', or a call to another function that outputs a string.

**Return Type**

Decimal

**Example**

The following example evaluates Field2 to determine if it contains decimal values.

```
parseDecimal(Field2)
```

The following are the given field values.

```
Field2
-------
 2
 2a
12.13
 3b
 3.9
 (null)
198.353398
```

For these field values, the following rows are returned.

```
2.0
12.13
```
parseInt Function

parseInt parses a string to determine if it contains an integer value. This function returns all rows that contain a decimal, integer, or null value, and skips any rows that do not. If the row contains a decimal value, it is returned as the nearest integer, rounded down. For example, a value of ‘2.99’ is returned as ‘2’.

Syntax

```plaintext
parseInt(expression)
```

Arguments

- `expression`

  The expression must be a string. It can be the name of a field that uses the string data type, a literal value like ‘3’, or a call to another function that outputs a string.

Return Type

Integer

Example

The following example evaluates Field2 to determine if it contains integer values.

```plaintext
parseInt(Field2)
```

The following are the given field values.

<table>
<thead>
<tr>
<th>Field2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
</tr>
<tr>
<td>2.1</td>
</tr>
<tr>
<td>2a</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>3b</td>
</tr>
<tr>
<td>(null)</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

For these field values, the following rows are returned.

| 2      |
| 2      |
| 3      |
| (null) |
| 5      |

replace Function

replace replaces part of a string with another string that you specify.
Syntax

replace(expression, substring, replacement)

Arguments

expression

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

substring

The set of characters in expression that you want to replace. The substring can occur one or more times in expression.

replacement

The string you want to have substituted for substring.

Return Type

String

Example

The following example replaces the substring 'and' with 'or'.

replace('1 and 2 and 3', 'and', 'or')

The following string is returned:

1 or 2 or 3

right Function

right returns the rightmost characters from a string, including spaces. You specify the number of characters to be returned.

Syntax

right(expression, limit)

Arguments

expression

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

limit

The number of characters to be returned from expression, starting from the last character in the string.
Return Type
String

Example
The following example returns the last 5 characters from a string.

```plaintext
right('Seattle Store#14', 12)
```
The following value is returned:

```
tle Store#14
```

rtrim Function
rtrim removes following whitespace from a string.

Syntax
```plaintext
rtrim(expression)
```

Arguments

expression
The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

Return Type
String

Example
The following example removes the following spaces from a string.

```plaintext
rtrim('Seattle Store#14   ')
```

For these field values, the following values are returned.

```
Seattle Store#14
```

split Function
split splits a string into an array of substrings, based on a delimiter that you choose, and returns the item specified by the position.

Syntax
```plaintext
split(expression, delimiter , position)
```
Arguments

expression

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street;1402 35th Ave;1818 Elm Ct;11 Janes Lane', or a call to another function that outputs a string.

delimiter

The character that delimits where the string is broken into substrings. For example, split('one|two|three', '|', 2) becomes the following.

| one   |
| two   |
| three |

If you choose position = 2, split returns 'two'.

position

(Optional) The position of the item to return from the array. The position of the first item in the array is 1.

Return Type

String array

Example

The following example splits a string into an array, using the semicolon character (;) as the delimiter, and returns the third element of the array.

split('123 Test St;1402 35th Ave;1818 Elm Ct;11 Janes Lane', ';', 3)

The following item is returned.

1818 Elm Ct

This function skips items containing null values or empty strings.

strlen Function

strlen returns the number of characters in a string, including spaces.

Syntax

(strlen(expression))

Arguments

expression

An expression can be the name of a field that uses the string data type like address1, a literal value like 'Unknown', or another function like substring(field_name, 0, 5).
Return Type

Integer

Example

The following example returns the length of the specified string.

```
strlen('1421 Main Street')
```

The following value is returned:

```
16
```

substring Function

substring returns the characters in a string, starting at the location specified by the `start` argument and proceeding for the number of characters specified by the `length` arguments.

Syntax

```
substring(expression, start, length)
```

Arguments

`expression`

An expression can be the name of a field that uses the string data type like `address1`, a literal value like `Unknown`, or another function like `substring(field_name,0,5)`.

`start`

The character location to start from. `start` is inclusive, so the character at the starting position will be the first character in the returned value.

`length`

The number of additional characters to include after `start`. `length` is inclusive of `start`, so the last character returned will be `length` - 1 after the starting character.

Return Type

String

Example

The following example returns the 13th through 19th characters in a string.

```
substring('Fantasy and Science Fiction',13,7)
```

The following value is returned:
**toLowerCase Function**

toLower formats a string in all lowercase. toLower skips rows containing null values.

**Syntax**

toLower(expression)

**Arguments**

*expression*

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

**Return Type**

String

**Example**

The following example converts a string value into lowercase.

```
toLower('Seattle Store#14')
```

The following value is returned:

```
seattle store#14
```

**toString Function**

toString formats the input expression as a string. toString skips rows containing null values.

**Syntax**

toString(expression)

**Arguments**

*expression*

An expression can be a field of any data type, a literal value like 14.62, or a call to another function that returns any data type.

**Return Type**

String
**Example**

The following example returns the values from Field2 (which uses the date data type) as strings.

```plaintext
toString(Field2)
```

The following are the given field values.

<table>
<thead>
<tr>
<th>Field2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992-11-14T00:00:00.000Z</td>
</tr>
<tr>
<td>2012-10-12T00:00:00.000Z</td>
</tr>
<tr>
<td>1973-04-08T00:00:00.000Z</td>
</tr>
</tbody>
</table>

For these field values, the following rows are returned.

| 1992-11-14T00:00:00.000Z |
| 2012-10-12T00:00:00.000Z |
| 1973-04-08T00:00:00.000Z |

**toUpper Function**

toUpper formats a string in all uppercase. toUpper skips rows containing null values.

**Syntax**

```
toUpper(expression)
```

**Arguments**

*expression*

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

**Return Type**

String

**Example**

The following example converts a string value into uppercase.

```plaintext
toUpper('Seattle Store#14')
```

The following value is returned:

```
SEATTLE STORE#14
```
Syntax

\[ \text{trim(expression)} \]

**Arguments**

**expression**

The expression must be a string. It can be the name of a field that uses the string data type, a literal value like '12 Main Street', or a call to another function that outputs a string.

**Return Type**

String

**Example**

The following example removes the following spaces from a string.

\[ \text{trim(' Seattle Store#14 ')} \]

For these field values, the following values are returned.

Seattle Store#14
Working with Analyses

You use an analysis to create and interact with visuals and stories. You can think of an analysis as a container for a set of related visuals and stories, for example ones that are all applicable to a given business goal or key performance indicator. You can use multiple data sets in an analysis, although any given visual can only use one of those data sets.

After you create an analysis and an initial visual, you can expand the analysis by adding data sets and visuals, and also by creating stories to add narrative to the analysis data.

Amazon QuickSight supports up to 20 data sets in a single analysis, and up to 20 visuals in a single analysis.

Topics

- Creating an Analysis (p. 201)
- Saving Changes to an Analysis (p. 202)
- Renaming an Analysis (p. 203)
- Adding a Title and Description to an Analysis (p. 204)
- Viewing Analysis Details (p. 206)
- Deleting an Analysis (p. 206)
- Export Data from an Analysis to a CSV File (p. 207)
- Adding a Data Set to an Analysis (p. 207)
- Modifying Data Set Fields in an Analysis (p. 210)
- Adding a Calculated Field to an Analysis (p. 232)
- SPICE Data in an Analysis (p. 241)
- Sharing Analyses (p. 242)

Creating an Analysis

Use the following procedure to create a new analysis.

1. On the All analyses tab of the Amazon QuickSight start page, choose New analysis. You are taken to the Your Data Sets page.
2. Choose a data set and then choose Create analysis.
If you don’t have any data sets, create a new one by choosing New data set. You can create an analysis as the last step in creating a new data set. For more information about creating a data set, see Creating Data Sets (p. 57).

3. Create a visual. For more information about creating visuals, see Creating an Amazon QuickSight Visual (p. 245).

After you are done creating the analysis, you can iterate on it by modifying the visual, adding additional visuals, adding scenes to the default story, or adding additional stories.

## Saving Changes to an Analysis

When working on an analysis, you can set Autosave either on (the default) or off. When Autosave is on, your changes are automatically saved every minute or so. When Autosave is off, your changes are not automatically saved, which allows you to make changes and pursue different lines of inquiry without permanently altering the analysis. If you decide that you want to save your results after all, re-enable Autosave. Your changes up to that point are then saved.

In either Autosave mode, you can undo or redo any change you make by choosing Undo or Redo on the application bar.

### Changing the Autosave Mode

To change the Autosave mode for an analysis, choose the Autosave indicator next to the analysis name and then choose Autosave ON or Autosave OFF.
When Autosave Can't Save Changes

If one of the following things occurs:

- Autosave is on and another user makes a conflicting change to the analysis
- Autosave is on and there is a service failure, such that your most recent changes can't be saved
- Autosave is off, you turn it on, and one of the backlogged changes now being saved to the server conflicts with another user's changes

Then Amazon QuickSight gives you the option to do one of two things: either let Amazon QuickSight turn Autosave off and continue working in unsaved mode, or reload the analysis from the server and then redo your most recent changes.

If your client authentication expires while you are editing an analysis, you are directed to sign in again. On successful sign in, you are directed back to the analysis where you can continue working normally.

If your permissions on the analysis are revoked while you are editing it, you can't make any further changes.

Renaming an Analysis

Use the following procedure to rename an analysis.

1. Open the analysis you want to rename.
2. In the Analysis name field in the application bar, select the current name and then type a new name.
Adding a Title and Description to an Analysis

In addition to the analysis name, you can add a title and description to an analysis. A useful title and description provides context about the information in the analysis.

Add a Title and Description

Use the following procedure to add a title and description to an analysis.

1. On the analysis page, choose Add in the application bar and then choose Add title.

2. Choose Sheet title, type a title, and press Enter.

3. Choose Add in the application bar and then choose Add description.
Delete a Title or Description

To remove a title, choose Add in the application bar and then choose Remove title. Alternately, to remove the title, you can select the title and then choose the delete icon.

To remove a description, choose Add in the application bar and then choose Remove description. Alternately, to remove the description, you can select the description and then choose the delete icon.
Viewing Analysis Details

To view analysis details, locate the analysis you want on the All analyses tab of the Amazon QuickSight start page. Then choose the details icon on the analysis.

Deleting an Analysis

You can delete an analysis by using the All analyses tab of the Amazon QuickSight start page. Deleting an analysis doesn't affect any dashboards that are based on that analysis.

Use the following procedure to delete an analysis.

1. On the All analyses tab of the Amazon QuickSight start page, choose the details icon on the analysis you want to delete.
2. Choose **Delete**.

3. Confirm the deletion by choosing **Delete** again.

**Export Data from an Analysis to a CSV File**

To export data from an analysis or dashboard to a comma-separated values (CSV) file, follow the procedure in Exporting Data from an Amazon QuickSight Visual to a CSV File (p. 249).

**Adding a Data Set to an Analysis**

After you have created an analysis using an initial data set, you can add more data sets to the analysis that you can also use to create visuals. Each visual can only use one data set.

From within the analysis, you can open any data set for editing, for example to add or remove fields, or perform other data preparation. For more information about editing a data set, see Editing a Data Set (p. 93).

The currently selected data set displays at the top of the **Fields list** pane. This is the data set that is used by the currently selected visual. Choosing a different visual changes the selected data set to the one used by that visual.

To change the selected data set manually, choose the data set list at the top of the **Fields list** pane and then choose a different data set. This deselects the currently selected visual if it doesn't use this data set; either choose a visual that uses the selected data set, or choose **Add** on the application bar and then **Add Visual** to create a new visual using the selected data set.
If you choose Suggested on the tool bar to see suggested visuals, you'll see visuals based on the currently selected data set.

Only filters for the currently selected data set are shown in the Filter pane, and you can only create filters on the currently selected data set.

**Add a Data Set to an Analysis**

Use the following procedure to add a data set to an analysis.

1. On the analysis page, choose the data set list at the top of the Fields list pane and then choose Edit analysis data sets.

2. In the Data sets in this analysis dialog box, choose Add data set.
Delete a Data Set From an Analysis

Use the following procedure to delete a data set from an analysis.

1. On the analysis page, choose the data set list at the top of the Fields list pane and then choose Edit analysis data sets.
2. In the **Data sets in this analysis** dialog box, choose the data set you want to delete, and then choose the delete icon. Note that you can't delete a data set if it is the only one in the analysis.

![Data sets in this analysis dialog box](image)

3. Choose the close icon in the upper right-hand corner of the dialog box to close it.

## Modifying Data Set Fields in an Analysis

You can modify the dimension or measure setting of a field by using the **Field list** pane. You can also change numeric field data types, and numeric or date field formats, by using the **Field list** pane, visual field wells, or on-visual editors. When you change a field data type or format, it applies to all visuals in the analysis that use that data set.

### Topics
- Setting a Field as a Dimension or Measure (p. 210)
- Changing a Field Data Type (p. 211)
- Changing a Field Format (p. 211)

### Setting a Field as a Dimension or Measure

In the **Field list** pane, dimension fields have blue icons and measure fields have green icons. Dimensions are text or date fields that may be items, like products, or attributes that are related to measures and can be used to partition them, like sales date for sales figures. Measures are numeric values that you use for measurement, comparison, and aggregation. If Amazon QuickSight interpreted a field as a measure and you would rather use it as a dimension (or the other way around), you can change the setting for that field.

Changing a field's measure or dimension setting changes it for all visuals in the analysis that use that data set, but does not change it in the data set itself.

### Change a Field's Dimension or Measure Setting

1. In the **Field list** pane, hover over the field you want to change.
2. Choose the selector icon to the right of the field name, and then choose **Convert to dimension** or **Convert to measure** as appropriate.
Changing a Field Data Type

You can use the Field list pane, visual field wells, or on-visual editors to change numeric field data types within the context of an analysis. Numeric fields default to displaying as numbers, but you can choose to have them display as currency or as a percentage instead. You can't change the data types for string or date fields.

Changing a field's data type in an analysis changes it for all visuals in the analysis that use that data set, but does not change it in the data set itself.

Note
If you are working in a pivot table visual, applying a table calculation changes the data type of the cell values if the data type doesn't make sense with the applied calculation. For example, if you apply the Rank function to a numeric field that you modified to use a currency data type, the cell values display as numbers rather than currency. Similarly, if you apply the Percent difference function instead, the cell values display as percentages rather than currency. For more information about applying calculations to a pivot table, see Working with Table Calculations (p. 357).

Change a Numeric Field's Data Type

Use the following procedure to change a field's data type.

1. Choose one of the following options:
   - In the Field list pane, hover over the numeric field you want to change and then choose the selector icon to the right of the field name.
   - On any visual that contains an on-visual editor associated with the numeric field you want to change, choose that on-visual editor.
   - Expand the Field wells pane, then choose the field well associated with the numeric field you want to change.

2. Choose Show as and then choose Number, Currency, or Percent.

Changing a Field Format

You can change the format of a numeric or date field within the context of an analysis. The formatting options available for numeric fields vary based whether you are using a number, currency, or percent data type for the field.

Use menu options in the Field list pane, visual field wells, or on-visual editors to make simple format changes, or use the Format Data pane to make more extensive formatting changes.

Topics
- Format a Date Field (p. 211)
- Format a Number Field (p. 216)
- Format a Currency Field (p. 222)
- Format a Percent Field (p. 228)
- Return a Field's Format to Default Settings (p. 232)

Format a Date Field

When you format a date field, you can either choose a format from a list of common options or you can open the Format Data pane and manually format the field. Manually formatting the field allows you to
choose from a list of common date and time formats to use, or alternatively specify custom formats for the date and time values.

Changing a field format changes it for all visuals in the analysis that use that data set, but does not change it in the data set itself.

**Format a Date Field Using List Options**

If you want to format a date field by choosing from a list of common options, you can access such a list from the Field list pane, a visual on-visual editor, or a visual field well.

Use the following procedure to change a date field's format by choosing a list option.

1. Choose one of the following options:
   - In the Field list pane, choose the selector icon to the right of the date field you want to format.
   - On any visual that contains an on-visual editor associated with the date field you want to format, choose that on-visual editor.
   - Expand the Field wells pane, then choose the field well associated with the date field you want to change.
2. Choose Format, and then choose the format you want. The following quick formatting options are offered for date fields:
   - Show the month, day, year, and time.
   - Show the month, day, and year.
   - Show the month and year.
   - Show the year.

**Format a Date Field Manually**

Manually formatting the field allows you to choose from a more extensive list of date and time formats to use, or alternatively to specify custom formats for the date and time values.

Use the following procedure to manually change a date field's format.

1. Choose one of the following options:
   - In the Field list pane, choose the selector icon to the right of the date field you want to format.
   - On any visual that contains an on-visual editor associated with the date field you want to format, choose that on-visual editor.
   - Expand the Field wells pane, then choose the field well associated with the date field you want to change.
2. Choose Format and then choose More Formatting Options....

   The Format Data pane opens.
3. Expand the **Date** section. Choose an existing date format, or choose **Custom** and specify a format pattern in the **Custom** section lower down in the **Format Data** pane. If you choose **Custom** for the **Date** section, you must also choose **Custom** for the following **Time** section, and the pattern you specify in the **Custom** section must include any date and time formatting that you want.

   The default selection is **Custom**, with a default format pattern of YYYY-MM-DDTHH:mm:ssZ, for example 2016-09-22T17:00:00-07:00.
4. Expand the **Time** section. Choose an existing time format, or choose **Custom** and specify a format pattern in the **Custom** section lower down in the **Format Data** pane. If you choose **Custom** for the **Time** section, you must also choose **Custom** for the preceding **Date** section, and the pattern you specify in the **Custom** section must include any date and time formatting that you want.

The default selection is **Custom**, with a default format pattern of **YYYY-MM-DDTHH:mm:ssZZ**, for example **2016-09-22T17:00:00-07:00**.
5. If you chose **Custom** in the **Date** and **Time** sections, expand the **Custom** section and specify the format pattern that you want, using the format pattern syntax specified in [Class DateTimeFormat](#) in the Joda project documentation.

If you chose something other than **Custom** in the **Date** and **Time** sections, **Custom** is populated with the format pattern that reflects your selections. For example, if you chose Jun 21, 2016 in the **Date** section and 17:00:00pm in the **Time** section, the **Custom** section shows the format pattern MMM DD, YYYY HH:mm:ss.
6. (Optional) Expand the **Custom** section and use **Preview** to verify your specified format.

---

**Format a Number Field**

When you format a number field, you can either choose the decimal place and thousand separator format from a list of common options or you can open the **Format Data** pane and manually format the field. Manually formatting the field allows you to choose what separators to use, the number of decimal places to show, what units to use, and how to display negative numbers.

Changing a field format changes it for all visuals in the analysis, but does not change it in the underlying data set.

**Format a Number Field Using List Options**

If you want to format a number field by choosing from a list of common options, you can access such a list from the **Field list** pane, an on-visual editor, or a visual field well.

Use the following procedure to change a number field’s format by choosing a list option.

1. Choose one of the following options:
   - In the **Field list** pane, choose the selector icon to the right of the number field you want to format.
• On any visual that contains an on-visual editor associated with the number field you want to format, choose that on-visual editor.

• Expand the Field wells pane, then choose the field well associated with the number field you want to change.

2. Choose Format, and then choose the format you want. The following quick formatting options are offered for number fields:

• Use commas to separate groups of thousands and use a decimal point to show the fractional part of the number, for example 1,234.56.

• Use a decimal point to show the fractional part of the number, for example 1234.56.

• Show the number as an integer and use commas to separate groups of thousands, for example 1,234.

• Show the number as an integer, for example 1234.

### Format a Number Field Manually

Manually formatting the field allows you to choose what separators to use, the number of decimal places to show, what units to use, and how to display negative numbers.

Use the following procedure to manually change a number field's format.

1. Choose one of the following options:

• In the Field list pane, choose the selector icon to the right of the number field you want to format.

• On any visual that contains an on-visual editor associated with the number field you want to format, choose that on-visual editor.

• Expand the Field wells pane, then choose the field well associated with the number field you want to change.

2. Choose Format and then choose More Formatting Options....

The Format Data pane opens.
3. Expand the **Separators** section and choose from the following options:

- Under **Decimal**, choose a dot or a comma for the decimal separator. A dot is the default. If you choose a comma instead, you must use a dot or a space as the thousands separator.

- Under **Thousands**, select or deselect **Enabled** to indicate whether you want to use a thousands separator. **Enabled** is selected by default.

- If you are using a thousands separator, choose whether to use a comma, dot, or space for the separator. A comma is the default. If you choose a dot instead, you must use a comma as the decimal separator.
4. Expand the **Decimal Places** section and choose from the following options:

- Choose **Auto** to have Amazon QuickSight automatically determine the appropriate number of decimal places, or choose **Custom** to specify a number of decimal places. **Auto** is the default.
- If you chose **Custom**, enter the number of decimal places to use. Field values are rounded to the decimal places specified. For example, if you specify two decimal places, the value 6.728 is rounded to 6.73.
5. Expand the **Units** section and choose from the following options:

- Choose the unit to use. Choosing a unit adds the appropriate suffix to the number value. For example, if you choose **Thousands**, a field value of 1234 displays as 1.234K.

The unit options are as follows:
- No unit suffix. This is the default.
- Thousands (K)
- Millions (M)
- Billions (B)
- Trillions (T)

- If you want to use a custom prefix or suffix, specify it in the **Prefix** or **Suffix** box. You can specify both, and you can also specify a custom prefix in addition to the suffix added by selecting a unit.
6. Expand the **Negatives** section and choose whether to display a negative value by using a minus sign or by enclosing it in parentheses. Using a minus sign is the default.
Format a Currency Field

When you format a currency field, you can either choose the currency symbol from a list of common options, or open the **Format Data** pane and manually format the field. Manually formatting the field allows you to choose what symbol to use, what separators to use, the number of decimal places to show, what units to use, and how to display negative numbers.

Changing a field format changes it for all visuals in the analysis, but does not change it in the underlying data set.

**Format a Currency Field Using List Options**

If you want to choose the symbol for a currency field from a list of common options, you can access such a list from the **Field list** pane, an on-visual editor, or a visual field well.

Use the following procedure to select a currency field's symbol by choosing a list option.

1. Choose one of the following options:
   - In the **Field list** pane, choose the selector icon to the right of the currency field you want to format.
   - On any visual that contains an on-visual editor associated with the currency field you want to format, choose that on-visual editor.
   - Expand the **Field wells** pane, then choose the field well associated with the currency field you want to change.
2. Choose **Symbol**, and then choose the symbol you want. The following symbols are offered for currency fields:

   - Display in dollars ($).
   - Display in pounds (£).
   - Display in euros (€).
   - Display in yen (¥).

**Format a Currency Field Manually**

Manually formatting the field allows you to choose what symbol to use, what separators to use, the number of decimal places to show, what units to use, and how to display negative numbers.

Use the following procedure to manually change a currency field's format.

1. Choose one of the following options:
   - In the **Field list** pane, choose the selector icon to the right of the currency field you want to format.
   - On any visual that contains an on-visual editor associated with the currency field you want to format, choose that on-visual editor.
   - Expand the **Field wells** pane, then choose the field well associated with the currency field you want to change.

2. Choose **Format** and then choose **More Formatting options**.

   The **Format Data** pane opens.

   ![Format Data Pane](image)

3. Expand the **Symbol** section and choose from the following options:

   - Display in dollars ($). This is the default.
   - Display in pounds (£).
• Display in euros (€).
• Display in yen (¥).

4. Expand the **Separators** section and choose from the following options:

   • Under **Decimal**, choose a dot or a comma for the decimal separator. A dot is the default. If you choose a comma instead, you must use a dot or a space as the thousands separator.

   • Under **Thousands**, select or deselect **Enabled** to indicate whether you want to use a thousands separator. **Enabled** is selected by default.

   • If you are using a thousands separator, choose whether to use a comma, dot, or space for the separator. A comma is the default. If you choose a dot instead, you must use a comma as the decimal separator.
5. Expand the **Decimal Places** section and choose the number of decimal places to use. The default is 2. Field values are rounded to the decimal places specified. For example, if you specify two decimal places, the value 6.728 is rounded to 6.73.
6. Expand the **Units** section and choose from the following options:

- Choose the unit to use. Choosing a unit adds the appropriate suffix to the number value. For example, if you choose **Thousands**, a field value of 1234 displays as 1.234K.

The unit options are as follows:

- No unit suffix. This is the default.
- Thousands (K)
- Millions (M)
- Billions (B)
- Trillions (T)

- If you want to use a custom prefix or suffix, specify it in the **Prefix** or **Suffix** box. Using a custom suffix is a good way to specify a currency suffix outside of those already offered by Amazon QuickSight. You can specify both, and you can also specify a custom prefix in addition to the suffix added by selecting a unit.
7. Expand the **Negatives** section and choose whether to display a negative value by using a minus sign or by enclosing it in parentheses. Using a minus sign is the default.
Format a Percent Field

When you format a percent field, you can either choose the number of decimal places from a list of common options, or open the Format Data pane and manually format the field. Manually formatting the field allows you to choose what separators to use, the number of decimal places to show, and how to display negative numbers.

Changing a field format changes it for all visuals in the analysis, but does not change it in the underlying data set.

Format a Percent Field Using List Options

If you want to choose the number of decimal places for a percent field from a list of common options, you can access such a list from the Field list pane, an on-visual editor, or a visual field well.

Use the following procedure to change a percent field's number of decimal places by choosing a list option.

1. Choose one of the following options:
   - In the Field list pane, choose the selector icon to the right of the percent field you want to format.
   - On any visual that contains an on-visual editor associated with the percent field you want to format, choose that on-visual editor.
   - Expand the Field wells pane, then choose the field well associated with the percent field you want to change.
2. Choose **Decimals**, and then choose the number of decimal places you want. The following quick formats are offered for percent fields:

- Display the value with two decimal places.
- Display the value with one decimal place.
- Display the value with no decimal places.

**Format a Percent Field Manually**

Manually formatting the field allows you to choose what separators to use, the number of decimal places to show, and how to display negative numbers.

Use the following procedure to manually change a percent field's format.

1. Choose one of the following options:

   - In the **Field list** pane, choose the selector icon to the right of the percent field you want to format.
   - On any visual that contains an on-visual editor associated with the percent field you want to format, choose that on-visual editor.
   - Expand the **Field wells** pane, then choose the field well associated with the percent field you want to change.

2. Choose **Format** and then choose **More Formatting options**....

   The **Format Data** pane opens.

   ![Format Data pane](image)

3. Expand the **Separators** section and choose from the following options:

   - Under **Decimal**, choose a dot or a comma for the decimal separator. A dot is the default. If you choose a comma instead, you must use a dot or a space as the thousands separator.
   - Under **Thousands**, select or deselect **Enabled** to indicate whether you want to use a thousands separator. **Enabled** is selected by default.
   - If you are using a thousands separator, choose whether to use a comma, dot, or space for the separator. A comma is the default. If you choose a dot instead, you must use a comma as the decimal separator.
4. Expand the **Decimal Places** section and choose from the following options:

- Choose **Auto** to have Amazon QuickSight automatically determine the appropriate number of decimal places, or choose **Custom** to specify a number of decimal places. **Auto** is the default.
- If you chose **Custom**, enter the number of decimal places to use. Field values are rounded to the decimal places specified. For example, if you specify two decimal places, the value 6.728 is rounded to 6.73.
5. Expand the **Negatives** section and choose whether to display a negative value by using a minus sign or by enclosing it in parentheses. Using a minus sign is the default.
Return a Field's Format to Default Settings

Use the following procedure to return a field's format to the default settings.

1. Choose one of the following options:
   - In the Field list pane, choose the selector icon to the right of the field you want to reset.
   - On any visual that contains an on-visual editor associated with the field you want to reset, choose that on-visual editor.
   - Expand the Field wells pane, then choose the field well associated with the field you want to change.
2. Choose Format and then choose More Formatting options....
   The Format Data pane opens.
3. Choose Reset to defaults.

Adding a Calculated Field to an Analysis

You create calculated fields to use functions and operators to analyze or transform field data. You can add calculated fields to a data set or to an analysis. You can create a calculated field and add a formula (expression) with aggregate functions only in an analysis.

When you add a calculated field to a data set during data preparation, it's available to all analyses that use that data set. Data sets support only single-row operations. When you add a calculated field to an analysis, it's available only in that analysis. Analyses support both single-row operations and aggregate operations.

Single-row operations are those that supply a (potentially) different result for every row. Aggregate operations supply results that are always the same for entire sets of rows. For example, if you use a simple string function with no conditions, it changes every row. If you use an aggregate function, it applies to all the rows in a group. If you ask for the total sales amount for the US, the same number applies to the entire set. If you ask for data on a particular state, the total sales amount changes to reflect your new grouping. It still provides one result for the entire set.
By creating the aggregated calculated field within the analysis, you can then drill down into the data. The value of that aggregated field is recalculated appropriately for each level. This type of aggregation isn't possible during data set preparation.

For example, let's say that you want to figure out the percentage of profit for each country, region, and state. You can add a calculated field to your analysis, \((\text{sum}(\{\text{sales amount}\} - \text{cost}) / \text{sum}(\{\text{sales amount}\}))\). This field is then calculated for each country, region, and state, at the time your analyst drills down into the geography.

The functions available in SPICE data include the following:

- \text{avg} (p. 234)
- \text{ceil} (p. 180)
- \text{count} (p. 234)
- \text{dateDiff} (p. 175)
- \text{decimalToInt} (p. 181)
- \text{distinct_count} (p. 235)
- \text{epochDate} (p. 176)
- \text{extract} (p. 177)
- \text{floor} (p. 182)
- \text{intToDecimal} (p. 183)
- \text{max} (p. 235)
- \text{min} (p. 235)
- \text{round} (p. 183)
- \text{sum} (p. 236)
- \text{truncDate} (p. 179)

\textbf{Note}

The date functions \text{extract} and \text{truncDate} don't support SS (second) in SPICE.

For information on calculated fields in data sets, see \text{Working with Calculated Fields (p. 139)}.

\section*{Using Aggregate Functions in Calculated Fields}

You can use the following aggregate functions on calculated fields during analysis and visualization:

- \text{Average} – Averages the set of numbers in the specified measure, grouped by the chosen dimension or dimensions.
- \text{Count} – Calculates the number of values in a dimension or measure, grouped by the chosen dimension or dimensions.
- \text{Distinct Count} – Calculates the number of distinct values in a dimension or measure, grouped by the chosen dimension or dimensions.
- \text{Max} – Returns the maximum value of the specified measure, grouped by the chosen dimension or dimensions.
- \text{Min} – Returns the minimum value of the specified measure, grouped by the chosen dimension or dimensions.
- \text{Sum} – Adds the set of numbers in the specified measure, grouped by the chosen dimension or dimensions.

When a calculated field formula contains an aggregation, it becomes a custom aggregation. To make sure your data is accurately displayed, Amazon QuickSight applies the following rules:
• Custom aggregations can’t contain nested aggregate functions. For example, this formula won’t work: \( \text{sum}(\text{avg}(x)/\text{avg}(y)) \). However, nesting nonaggregated functions inside or outside aggregate functions do work. For example, \( \text{ceil}(\text{avg}(x)) \) works. So does \( \text{avg}(\text{ceil}(x)) \).

• Custom aggregations can’t contain both aggregated and nonaggregated fields, in any combination. For example, this formula won’t work: \( \text{Sum}(\text{sales})+\text{quantity} \)

• Filter groups can’t contain both aggregated and nonaggregated fields.

• Custom aggregations can’t be converted to a dimension. They also can’t be dropped into the field well as a dimension.

• In a pivot table, custom aggregations can’t be added to table calculations.

• Scatter plots with custom aggregations need at least one dimension under **Group/Color** in the field wells.

For details about supported functions and operators, see Amazon QuickSight Calculated Field Function and Operator Reference (p. 170).

**Topics**

• **avg Function** (p. 234)
• **count Function** (p. 234)
• **distinct_count Function** (p. 235)
• **max Function** (p. 235)
• **min Function** (p. 235)
• **sum Function** (p. 236)

**avg Function**

The **avg** function averages the set of numbers in the specified measure, grouped by the chosen dimension or dimensions. For example, \( \text{avg}(\text{sales amount}) \) returns the average for that measure grouped by the (optional) chosen dimension.

**Syntax**

\[
\text{avg(decimal)}
\]

**Arguments**

\[\text{decimal}\]

The argument must be a measure. Null values are omitted from the results. Literal values don't work. The argument must be a field.

**count Function**

The **count** function calculates the number of values in a dimension or measure, grouped by the chosen dimension or dimensions. For example, \( \text{count}(\text{product type}) \) returns the total number of product types grouped by the (optional) chosen dimension, including any duplicates. The \( \text{count}(\text{sales}) \) function returns the total number of sales completed grouped by the (optional) chosen dimension, for example salesperson.

**Syntax**

\[
\text{count(dimension or measure)}
\]
Arguments

dimension or measure

The argument must be a measure or a dimension. Null values are omitted from the results. Literal values don't work. The argument must be a field.

distinct_count Function

The distinct_count function calculates the number of distinct values in a dimension or measure, grouped by the chosen dimension or dimensions. For example, distinct_count(product type) returns the total number of unique product types grouped by the (optional) chosen dimension, without any duplicates. The distinct_count(ship date) function returns the total number of dates when products were shipped grouped by the (optional) chosen dimension, for example region.

Syntax

distinct_count(dimension or measure)

Arguments

dimension or measure

The argument must be a measure or a dimension. Null values are omitted from the results. Literal values don't work. The argument must be a field.

max Function

The max function returns the maximum value of the specified measure, grouped by the chosen dimension or dimensions. For example, max(sales goal) returns the maximum sales goals grouped by the (optional) chosen dimension.

Syntax

max(measure)

Arguments

measure

The argument must be a measure. Null values are omitted from the results. Literal values don't work. The argument must be a field.

min Function

The min function returns the minimum value of the specified measure, grouped by the chosen dimension or dimensions. For example, min(return rate) returns the minimum rate of returns grouped by the (optional) chosen dimension.
Adding a Calculated Field

Use the following procedure to add a calculated field.

1. Choose Add on the application bar, and then choose Add calculated field.

2. Choose a function from Function list.
3. Choose a field from Field list. The field is entered into the formula where your cursor is.
4. In **Formula**, type any parameters needed by the function (help for the function displays below **Formula**). As needed, choose additional fields from **Field list** and **Function list** to complete your formula.

If you use a field that has a space or a nonalphanumeric character other than an underscore in the name, you must enclose the field name in curly braces when referencing it, for example `{ship charges amount}`. Curly braces are optional if the field name has no space and no nonalphanumeric character.

5. In the **Calculated field name** box, where it says **Enter a field name**, type a name for the calculated field. This name will be the field label displayed in the analysis, so it should match the existing style of field names.
6. Choose **Create**.

   If there are no errors in the formula or name, the new calculated field is created. It appears in the **Fields list** pane. It displays in the top section if it is a dimension—that is, if it returns a text string or a date. It displays in the bottom section if it is a measure—that is, if it returns a numeric value.

### Editing a Calculated Field

Use the following procedure to edit a calculated field.

1. In the **Field list** pane, hover over the calculated field you want to change.
2. Choose the selector icon to the right of the field name, and then choose **Edit calculated field**.
3. If the field is a custom aggregation, you can edit it in the field well.

Hover over the field in the field well and choose the selector icon to the right of the field name. Choose **Aggregate: custom**, and then choose **Custom**.

Then choose **Edit formula**.

**Deleting a Calculated Field**

Use the following procedure to delete a calculated field.

1. In the **Field list** pane, hover over the calculated field you want to delete.
2. Choose the selector icon to the right of the field name, and then choose **Remove calculated field**.
SPICE Data in an Analysis

When you use SPICE data to create an analysis, a data import indicator appears next to the data set list at the top of the Fields list pane. When you first open the analysis and the data set is importing, this icon appears as a spinner.

Once the SPICE import completes, the indicator displays the percentage of rows that were successfully imported. A message also appears at the top of the visualization pane to provide counts of the rows imported and skipped.

If any rows were skipped, you can choose View summary in this message bar to see details about why those rows failed to import. To edit the data set and resolve the issues that led to skipped rows, choose
Edit data set. For more information about common causes for skipped rows, see My rows were skipped during data preparation (p. 465).

If an import fails altogether, the data import indicator appears as an exclamation point icon, and an Import failed message displays.

Sharing Analyses

You can share an analysis with one or more other users by emailing them a link, making it easy to collaborate and disseminate findings. You can only share an analysis with other users in your Amazon QuickSight account.

Once you share an analysis, you can review the other users that have access to it, and also revoke access from any user.

Topics
- Share an Analysis (p. 242)
- View the Users an Analysis is Shared With (p. 243)
- Revoke Access to an Analysis (p. 244)

Share an Analysis

Use the following procedure to share an analysis:

1. On the analysis page, choose Share on the application bar and then choose Share analysis.
2. In the Type a user name or email box, type the user name of a person with whom you want to share this analysis and press Enter. You can only share analyses with users who belong to the current Amazon QuickSight account.
   
   Repeat this step until you have entered information for everyone you want to share the analysis with.
3. For Permission, choose the role to assign to each person you are sharing the analysis with. A role determines the permission level to grant to that user account.

Currently, the only available role is COOWNER. This role lets invited users view, modify, and re-share the analysis.
4. Choose **Share**.

The users you have shared the analysis with receive emails with a link that gives them access to the analysis.

**View the Users an Analysis is Shared With**

If you have shared an analysis, you can use the following procedure to see which users have access to it.

1. On the analysis page, choose **Share** on the application bar and then choose **Share analysis**.
2. Choose **Manage analysis access**.
3. Review the users this analysis has been shared with under **User accounts with access to this analysis**.

   You can search to locate a specific user account by typing a search term into **Search by username or email**. Any user account user name or email address that contains the search term is shown. Searching is case-sensitive and wildcards are not supported. Delete the search term to return to viewing all user accounts.

### Revoke Access to an Analysis

Use the following procedure to revoke user access to an analysis.

1. On the analysis page, choose **Share** on the application bar and then choose **Share analysis**.
2. Choose **Manage analysis access**.

3. Under **User accounts with access to this analysis**, locate the user account whose access you want to revoke and then choose **X**, as shown following:

4. Choose **Confirm**.
Working with Amazon QuickSight Visuals

A visual is a graphical representation of your data. You can create a wide variety of visuals in an analysis, using different data sets and visual types.

After you have created a visual, you can modify it in a range of ways to customize it to your needs. Possible customizations include changing what fields map to visual elements, changing the visual type, sorting visual data, or applying a filter.

Amazon QuickSight supports up to 20 data sets in a single analysis, and up to 20 visuals in a single analysis.

Use the following sections to learn how to create and modify visuals.

Topics
- Creating an Amazon QuickSight Visual (p. 245)
- Renaming an Amazon QuickSight Visual (p. 249)
- Deleting an Amazon QuickSight Visual (p. 249)
- Exporting Data from an Amazon QuickSight Visual to a CSV File (p. 249)
- Changing Visual Layout in Amazon QuickSight (p. 250)
- Viewing Visual Data in Amazon QuickSight (p. 254)
- Formatting a Visual in Amazon QuickSight (p. 258)
- Changing the Fields Used by a Visual in Amazon QuickSight (p. 262)
- Changing Visual Colors in Amazon QuickSight (p. 275)
- Sorting Visual Data in Amazon QuickSight (p. 282)
- Filtering Visual Data in Amazon QuickSight (p. 284)
- Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)
- Working with Visual Types in Amazon QuickSight (p. 314)

Creating an Amazon QuickSight Visual

You can create a visual in several ways. You can select the fields you want and use AutoGraph to let Amazon QuickSight determine the most appropriate visual type, or you can choose a specific visual type and choose fields to populate it. Alternatively, if you aren't sure what questions your data can answer for you, you can choose Suggested on the tool bar and choose a visual that Amazon QuickSight suggests for you. Suggested visuals are ones that we think are of interest, based on a preliminary examination of your data. For more information about AutoGraph, see Using AutoGraph (p. 318).

To create a useful visual, it helps to know what question you are trying to answer as specifically as possible, and to use the smallest data set that can answer that question. Doing so helps you create simpler visuals that are easier to analyze.

Fields as Dimensions and Measures

In the Fields list pane, dimension fields have blue icons and measure fields have green icons. Dimensions are text or date fields that can be items, like products, or attributes that are related to measures and
can be used to partition them, like sales date for sales figures. Measures are numeric values that you use for measurement, comparison, and aggregation. You typically use a combination of dimension and measure fields to produce a visual, for example sales totals (a measure) by sales date (a dimension).

For more information about the types of fields expected by the different visual types, see the specific visual type topics in the Working with Visual Types in Amazon QuickSight (p. 314) section. For more information about changing a field's measure or dimension setting, see Setting a Field as a Dimension or Measure (p. 210).

**Field Limitations**

You can only use one date field per visual. This limitation applies to all visual types.

You can't use the same field for more than one dimension field well or drop target on a visual. For more information about how expected field type is indicated by field wells and drop targets, see Using Visual Field Controls (p. 263).

**Searching for Fields**

If you have a long field list in the Fields list pane, you can search to locate a specific field by choosing the search icon at the top of the Fields list pane and then typing a search term into the search box. Any field whose name contains the search term is shown. Search is case-insensitive and wildcards are not supported. Choose the cancel icon (X) to the right of the search box to return to viewing all fields.

**Creating a Visual**

Use the following procedure to create a new visual.

1. On the Amazon QuickSight start page, choose the analysis that you want to add a visual to.
2. On the analysis page, choose the data set you want to use from the data set list at the top of the Fields list pane. For more information, see Adding a Data Set to an Analysis (p. 207).
3. Choose Add on the application bar, and then choose Add visual.
A new, blank visual is created and receives focus.

4. Choose one of the following options:

- Create a visual by choosing fields and letting Amazon QuickSight determine the most appropriate visual type.
  1. In the **Visual types** pane, choose the AutoGraph icon.

  ![AutoGraph Icon](image1.png)

  2. In the **Fields list** pane, choose the fields you want to use.

  Amazon QuickSight creates the visual, using the visual type it determines is most compatible with the data you selected.

- Create a visual by choosing a visual type and then choosing fields to populate it.
  1. In the **Visual types** pane, choose the icon of the visual type you want to use.

  ![Visual Types Pane](image2.png)

  The field wells for that visual type open at the top of the visual pane.
2. From the **Fields list** pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the color of the target field well. If you choose to use a dimension field to populate a **Value** field well, the **Count** aggregate function is automatically applied to it to create a numeric value.

Amazon QuickSight creates the visual using the visual type you selected.

- Create a visual using a suggestion.

On the tool bar, choose **Suggested**, then choose a suggested visual.
Renaming an Amazon QuickSight Visual

Use the following procedure to rename a visual.

1. On the analysis page, select the visual that you want to rename.
2. Select the visual name at the top left of the visual and type a new name.
3. Press Enter or click outside of the visual name field to save the new name.

Deleting an Amazon QuickSight Visual

Use the following procedure to delete a visual.

1. On the analysis page, select the visual you want to delete.
2. Choose the on-visual menu at the upper-right corner of the visual, and then choose Delete.

Exporting Data from an Amazon QuickSight Visual to a CSV File

Use the following procedure to export data from a visual to a file with the comma-separated value (CSV) format.

1. Choose or create an analysis or dashboard that contains one or more visuals.
2. Choose the visual you want to export.

3. Choose the on-visual menu, at the upper right of the visual. Then choose **Export to CSV**.

![Visual Options Menu](image)

4. Depending on your browser settings, one of the following happens:
   - The file automatically goes to your default **Download** location.
   - A dialog box appears so you can choose a file name and location.
   - A dialog box appears so you can choose to open the file with the default software or to save the file. If you choose to save, you can choose a file name and location.

   By default, the CSV file name is the name of your analysis or dashboard. To make the file name unique, it has a sequential timestamp (a Unix epoch data type) or a date in the format `yyyy-MM-dd_THH_mm_ss.SSSZ`. You can choose rename the downloaded file, for example to include the name of the visual.

   The CSV contains the fields and filtered data appearing in the visual.

5. To export data from additional visuals in the same analysis or dashboard, repeat this process for each visual.

*Tip*
If you have difficulty getting the download to start, try a different browser.

---

### Changing Visual Layout in Amazon QuickSight

You can change visual layout by modifying where a visual appears in the analysis, and also what size it is. You can use this functionality to rearrange visual order, place visuals side by side, and have visuals of varying sizes within the analysis.

If you change a visual to make it considerably smaller, the on-visual editors are hidden so that the chart elements have more room to display. Bar chart visuals can also display fewer data points. To see a resized visual in full pane mode so that on-visual editors and all data points are displayed, use the **Maximize** option on the on-visual menu. Choose **Minimize** to return the visual to its original size when you are done.

If you resize a visual that uses a legend so that it is taller than it is wide, the legend displays on the bottom of the chart if it had been displaying on the right-hand side.

If you reduce the size of the browser window, Amazon QuickSight resizes and if necessary reorders visuals for optimal display. For example, smaller visuals that were side by side might be displayed sequentially. The original layout is restored when the size of the browser window is increased again.
Changing Visual Location

On the analysis page, choose the move handle on the visual you want to relocate. Drag the visual to where you want it.
Changing Visual Size

To change visual size, on the analysis page choose the resize handle on the visual you want to resize. Drag to change the visual's dimensions.
Editing a Resized Visual

Use the following procedure to open a resized visual in full pane mode for editing.

1. On the analysis page, choose the visual you want to edit.
2. Choose the on-visual menu at the upper-right corner of the visual, and then choose Maximize.

The visual opens in full pane mode, displaying the on-visual editors if they were hidden.
3. Edit the visual. When you are done, choose the on-visual menu at the upper-right corner of the visual, and then choose Minimize.

Viewing Visual Data in Amazon QuickSight

Amazon QuickSight offers a variety of ways to see the details of the data being displayed in a visual. The axes or rows and columns of the visual (depending on the visual type) have labels, and hovering over any graphical element in a visual displays the data associated with that element. Some visual types use visual cues to emphasize the element you are hovering over and make it easier to differentiate, for example by changing the color of the element, or highlighting it.

Use the following sections to learn more about viewing data in visuals.

Topics

- Viewing Visual Details (p. 254)
- Scrolling Through Visual Data (p. 255)
- Focusing on Visual Elements (p. 256)
- Excluding Visual Elements (p. 257)

Viewing Visual Details

When viewing a visual, you can hover your cursor over any graphical element to get details on that element. For example, a bar on a bar chart:

Or a bubble on a scatter plot:
Scrolling Through Visual Data

For bar charts, line charts, and pivot tables, creating a visual on a large data set can result in more visual elements than can be fit into the page length or width. In these cases, scroll bars are provided so that you can page through the data. Drag the scroll bar slider to view different areas of the chart.

On bar charts and line charts, you can also adjust the length of the slider to reflect a greater or lesser proportion of the chart. To do this, choose one of the gray handles on either end of the slider and drag it to adjust the slider size.
Focusing on Visual Elements

When viewing visuals, you can choose an element on the visual (like a bar or bubble, or a row or column header in the case of a pivot table), and then choose to focus on the element.

Focusing on the element creates a filter that removes all other elements except for the one you selected:
Excluding Visual Elements

When viewing visuals, you can choose an element (like a bar or bubble, or a row or column header in the case of a pivot table), and then choose to exclude the element. The exception is that you can’t exclude elements that are mapped to date fields. You can exclude multiple elements on a single chart.

Excluding the element creates a filter that removes only that element from the visual:

To see the other elements again, either choose Undo on the application bar, or disable or delete the filter.

For more information about filters, see Filtering Visual Data in Amazon QuickSight (p. 284).
To see the excluded element again, either choose **Undo** on the application bar, or disable or delete the filter.

For more information about filters, see Filtering Visual Data in Amazon QuickSight (p. 284).

**Formatting a Visual in Amazon QuickSight**

Use visual formatting to determine if a visual displays a title or a legend. For some visual types, you can also set the range for the X or Y axis to determine the values it starts and ends at.

Use the following table to determine what types of formatting each visual type supports.

<table>
<thead>
<tr>
<th>Visual Type</th>
<th>Hide/Display Visual Title</th>
<th>Hide/Display Visual Legend</th>
<th>Specify Axis Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal bar charts (all)</td>
<td>Yes</td>
<td>Yes, except for simple bar charts (those that don't have clustering or multiple measures), which don't display a legend</td>
<td>Yes, on the X axis</td>
</tr>
<tr>
<td>Vertical bar charts (all)</td>
<td>Yes</td>
<td>Yes, except for simple bar charts (those that don't have clustering or multiple measures), which don't display a legend</td>
<td>Yes, on the Y axis</td>
</tr>
<tr>
<td>Combo charts (all)</td>
<td>Yes</td>
<td>Yes, except for simple bar charts (those that don't have clustering, stacking, or multiple measures), which don't display a legend</td>
<td>Yes, on the Bars and Lines</td>
</tr>
<tr>
<td>Line charts (all)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, on the Y axis</td>
</tr>
<tr>
<td>Pivot table</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Scatter plot</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, on both the X and Y axes</td>
</tr>
<tr>
<td>Tree map</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Pie graph</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Displaying a Visual's Title

Use the following procedure to hide or display the title for a visual. The visual title displays by default.

1. On the analysis page, select the visual you want to format.
2. Choose the on-visual menu at the upper-right corner of the visual, and then choose **Format visual**.

3. On the **Format Visual** pane, select or deselect **Show title**.

4. Close the **Format Visual** pane, either by choosing either the X icon in the upper-right corner of the pane, or by choosing the on-visual menu at the upper-right corner of the visual, and then choosing **Format visual** again.

Displaying the Visual Legend

The visual legend helps you identify what a given visual element represents by mapping the element value to a color. For example, on a line chart, line color might represent store location.

You can use the visual menu to toggle between hiding and displaying the legend. You can use the **Format Visual** pane to do so as well, and also to choose where on the visual the legend displays. The visual legend displays to the right of the visual by default.

When you move your cursor over the legend, a handle appears that you can use to adjust the width of the legend pane by dragging it wider or narrower.
Changing the Legend Format by Using the Format Visual Pane

Use the following procedure to hide or display the visual title. The visual title displays by default.

1. On the analysis page, select the visual you want to format.
2. Choose the on-visual menu at the upper-right corner of the visual, and then choose Format visual.
3. On the Format Visual pane, expand the Legend section.
4. Select or deselect Show legend.
5. For POSITION, choose Right, Bottom, or Top to determine where on the visual the legend displays.
6. Close the Format Visual pane by either choosing the X icon in the upper-right corner of the pane, or by choosing the on-visual menu at the upper-right corner of the visual, and then choosing Format visual again.

Changing the Legend Format by Using the Visual Menu

Use the following procedure to toggle between showing or hiding the legend by using the visual menu.

1. On the analysis page, select the visual you want to show or hide the legend for.
2. Choose the on-visual menu at the upper-right corner of the visual, and then choose Show legend or Hide legend as appropriate.

Changing the Axis Range

You can use the Format Visual pane to set the range for one or both axes of the visual, depending on what is supported by the visual type. By default, the axis range starts at 0 and ends around the highest value for the measure being displayed.

Use the following procedure to set the axis range for a visual.

1. On the analysis page, select the visual you want to format.
2. Choose the on-visual menu at the upper-right corner of the visual, and then choose Format visual.
3. On the **Format Visual** pane, expand the `<X-or-Y>-Axis` section. This is the **X-Axis** section for horizontal bar charts, the **Y-Axis** section for vertical bar charts and line charts, and both axes are available for scatter plots.

4. Set the range for the axis by choosing one of the following options:
   - Choose **Auto (starting at 0)** to have the range start at 0 and end around the highest value for the measure being displayed.
   - Choose **Auto (based on data range)** to have the range start at the lowest value for the measure being displayed and end around the highest value for the measure being displayed.
   - Choose **Custom range** to have the range start and end at values that you specify.

   If you choose **Custom range**, type the start and end values in the fields in that section. Typically, you use integers for the range values. For stacked 100percent bar charts, use a decimal value to indicate the percentage you want. For example, if you want the range to be 0–30 percent instead of 0–100 percent, type 0 for the start value and .3 for the end value.

5. Close the **Format Visual** pane, either by choosing the X icon in the upper-right corner of the pane, or by choosing the on-visual menu at the upper-right corner of the visual, and then choosing **Format visual** again.

### Changing the Fields Used by a Visual in Amazon QuickSight

You can add or modify fields for a visual by using the **Fields list** pane, the field wells, or the on-visual editors or drop targets on the visual.

The field wells, on-visual editors, and drop targets available for a specific visual depends on the visual type selected. Refer to the appropriate visual type topic in the *Working with Visual Types in Amazon QuickSight (p. 314)* section for details.

**Important**

You can also change the data type and format of numeric fields by using field wells and on-visual editors. If you change a field in this way, it changes it for all visuals in the analysis, not just for the selected visual. For more information about changing numeric field data types and formats, see *Modifying Data Set Fields in an Analysis (p. 210)*.

Use the following topics to learn more about adding, removing, and modifying fields on a visual.

**Topics**

- Using Visual Field Controls (p. 263)
- Adding or Removing a Field (p. 267)
- Changing the Field Associated with a Visual Element (p. 268)
- Changing Field Aggregation (p. 271)
- Changing Date Field Granularity (p. 273)
Using Visual Field Controls

You can edit the fields used by a visual by using the following user interface (UI) controls:

- The **Fields list** pane.

  ![Fields list pane](image1.png)

- The **field wells**.

  ![Field wells](image2.png)

- The **on-visual editors**.

  ![On-visual editors](image3.png)
• The drop targets on the visual.
You can use these controls as follows:

- You can create a visual and assign fields to different elements on it by selecting fields in the Fields list pane, or dragging fields to field wells or drop targets.
- You can change the field associated with a visual element by dragging a field to a drop target or field well, or selecting a different field in a field well or on-visual editor.
- You can change field aggregation or date granularity by using the field wells or the on-visual editors.

The field wells, on-visual editors, and drop targets available on a specific visual depends on the visual type selected.

**Dragging Fields to Drop Targets or Field Wells**

When you drag a field to either a drop target or field well, Amazon QuickSight provides you with information about whether the target element expects a measure or a dimension. Amazon QuickSight also provides you with information about whether that element is available for field assignment.

For example, when you drag a measure to the value drop target on a new single-measure line chart, you see the drop target color-coded green. That green color coding indicates that the drop target expects a measure. The drag label indicates that the target is available to add a field.
When you drag a dimension to the X axis or color drop target on a new line chart, you see a label color-coded blue. That blue color coding indicates that the drop target expects a dimension. The drag label indicates that the target is available to add a field.

You can also drag a measure or dimension to a drop target on a line chart where the element is already associated with a field. In this case, the drag label indicates that you are replacing the field currently associated with the drop target.
Adding or Removing a Field

You can add a field to a visual by choosing it on the Fields list pane, dragging it to a drop target on the visual, or dragging it to a field well. There is a 1:1 correspondence of drop targets to field wells for each visual type, so you can use whichever method you prefer.

To remove a field from a visual, deselect it in the Fields list pane, or choose an on-visual editor or field well that uses that field, and then choose Remove from the pop-up menu.

Adding a Field by Selecting It in the Fields List Pane

You can also let Amazon QuickSight map the field to the most appropriate visual element. To do so, simply choose the field in the Fields list pane. Amazon QuickSight adds the field to the visual by populating the first empty field well that corresponds with that field type (either measure or dimension). If all of the visual elements are already populated, Amazon QuickSight determines the most appropriate field well and replaces the field in it with the field you selected.

Adding a Field by Using a Drop Target

To add a field to a visual by using a drop target, choose a field in the Fields list pane and then drag the field to your chosen drop target on the visual, making sure the drop indicator shows that the field is being added.
Adding a Field by Using a Field Well

To add a field to a visual by using a field well, choose a field in the Fields list pane. Then drag the field to the target field well, making sure that the drop indicator shows that the field is being added.

1. Expand the Field wells pane by choosing the expand icon.

2. Drag the field you want to add from the Fields list pane to the appropriate field well.

Changing the Field Associated with a Visual Element

You can change the field assigned to an element in a visual by using the field wells, drop targets, or the on-visual editors on the visual. For pivot tables, you must use field wells or drop targets as this visual type does not provide on-visual editors.
Change a Field Mapping by Using an On-Visual Editor

Use the following procedure to modify the mapping of a field to a visual element.

1. On the visual, choose the on-visual editor for the visual element for which you want to change the field.

2. On the on-visual editor menu, choose the field you want to associate with that visual element.
Changing a Field Mapping by Using a Drop Target

To modify the mapping of a field to a visual element by using a drop target, choose a field in the **Fields list** pane. Then drag the field to a drop target on the visual, making sure that the drop indicator shows that the field is being replaced.

Changing a Field Mapping by Using a Field Well

Use the following procedure to modify the mapping of a field to a visual element.

1. Expand the **Field wells** pane by choosing the expand icon.

2. Choose the field well that represents the element you want to remap, and then choose a new field from the menu that displays.
Changing Field Aggregation

You can apply functions to fields to display aggregate information, like the sum of the sales for a given product. You can apply an aggregate function by using the options in either an on-visual editor or a field well. The following aggregate functions are available in Amazon QuickSight:

- **Average** – Calculates the average value for the selected field.
- **Count** – Provides a count of the number of records containing the selected measure for a given dimension. An example is a count of Order ID by State.
- **Distinct Count** – Provides a count of how many different values are in the selected measure, for the selected dimension or dimensions. An example is a count of Product by Region. A simple count can show how many products are sold for each region. A distinct count can show how many different products are sold for each region. You might have sold 2000 items, but only two different types of items.
- **Max** – Calculates the maximum value for the selected field.
- **Min** – Calculates the minimum value for the selected field.
- **Sum** – Totals all of the values for the selected field.

All aggregate functions can be applied to numeric fields. **Count** is automatically applied to a dimension if you choose to use it in a field well that expects a measure. If you have used a dimension in that way, you can also change the aggregate function applied to it. You can’t apply aggregate functions to fields in dimension field wells.

The visual elements that support aggregated fields varies by visual type.

**Changing or Adding Aggregation on a Field by Using an On-Visual Editor**

Use the following procedure to change or add aggregation on a field.

1. On the visual, choose the on-visual editor for the field you want to apply aggregation to.
2. On the on-visual editor menu, choose **Aggregate**, then choose the aggregate function you want to apply.

Changing or Adding Aggregation to a Field by Using a Field Well

Use the following procedure to add aggregation to a field for a pivot table visual.

1. Expand the **Field wells** pane by choosing the expand icon.
Changing Date Field Granularity

You can change the granularity for a date field on a visual to determine the intervals for which item values are shown. You can set the date field granularity to one of the following values:

- Year (this is the default).
- Month
- Week
- Day
- Hour. This is only supported when the date data includes time information.

Changing Date Field Granularity by Using an On-Visual Editor

Use the following procedure to change date field granularity by using an on-visual editor.

1. On the visual, choose the field well for the date field whose granularity you want to change.
2. On the field well menu, choose **Aggregate**, then choose the time interval you want to apply, as shown following:

**Changing Date Field Granularity by Using a Field Well**

Use the following procedure to change date field granularity by using a field well.

1. Expand the **Field wells** pane by choosing the expand icon.

2. Choose the field well containing the date field.
3. On the field well menu, choose **Aggregate**, then choose the date granularity you want to use.

Changing Visual Colors in Amazon QuickSight

You can change the color of one, some, or all elements on visuals that use scatter plot, pie chart, or any of the bar chart or line chart visual types. You can change the chart color used by all elements on
the chart, and also change the color of individual elements. When you set the color for an individual element, it overrides the chart color. For example, suppose that you set the color for the Arts bar to blue.

![Chart](image1)

Then you change the chart color to green. The Arts bar remains blue.

![Chart](image2)

When you change the color of an element that is grouped, for example a bar in a clustered bar chart, the color for that element is changed in all of the groups. For example, if you have the following visual and you modify the color for the West region from purple to red:

![Chart](image3)

It is modified in all of the clusters:
Setting New Colors for a Visual

Use the following procedure to change the colors for a visual.

1. On the analysis page, select the visual you want to modify.
2. To change the chart color, choose any element on the visual, and then choose **Chart Color**.

   To select elements, do the following:
   - On a bar chart, choose any bar.
   - On a line chart, choose the end of a line.
   - On a scatter plot, choose an element. The field must be in the **Group/Color** section of **Field wells**.

3. Choose the color you want. All elements on the visual are changed to use this color, except for any that have previously had their color individually set. In that case, the element color overrides the chart color.
4. To change the color for a single element on the visual, choose that element, choose **Color** `<fieldname>`, and then choose the color you want.
Repeat this step until you have set the color on all elements you want to modify.
Setting Visual Colors Back to Defaults

Use the following procedure to return to using the default colors on a visual.

1. On the analysis page, select the visual you want to modify.
2. To change the chart color back to the default color for that visual type, choose any element on the visual, choose Chart Color, and then choose Reset to Default. All elements on the visual are changed to the default color for the visual type, except for any that have previously had their color individually set. In that case, the element color setting overrides the chart color setting.
3. To change the color for a single element back to the default, choose that element, choose \texttt{Color <fieldname>}, and then choose \texttt{Reset to Default}. The default color for individual elements is the chart color if you have specified one, or the default color for the visual type otherwise.
Sorting Visual Data in Amazon QuickSight

Most visual types offer the ability to change data sort order. Whether sorting is supported and what visual element you can sort by depends on the visual type.

Important
Sorting by text fields (those with a string data type) isn't supported for visuals based on SPICE data sets.
Use the following table to identify the field wells/on-visual editors that support sorting for each visual type.

<table>
<thead>
<tr>
<th>Visual type</th>
<th>Field well or on-visual editor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal bar charts (all)</td>
<td>Y axis and Value</td>
</tr>
<tr>
<td>Vertical bar charts (all)</td>
<td>X axis and Value</td>
</tr>
<tr>
<td>Combo charts (all)</td>
<td>X axis, Bars, and Lines</td>
</tr>
<tr>
<td>Line charts (all)</td>
<td>X axis and Value</td>
</tr>
<tr>
<td>Pivot table</td>
<td>Column</td>
</tr>
<tr>
<td>Scatter plot</td>
<td>Sorting not supported</td>
</tr>
<tr>
<td>Tree map</td>
<td>Size, Group by, and Color</td>
</tr>
<tr>
<td>Pie graph</td>
<td>Value and Group/Color</td>
</tr>
<tr>
<td>Heat map</td>
<td>Columns and Values</td>
</tr>
</tbody>
</table>

## Sorting a Visual

For most visual types, you can use either a field well or an on-visual editor to choose the sort order. Pivot tables behave differently; you specify the sort order by using the column sort icon on the visual. For more information about sorting pivot tables, see Sorting Pivot Tables (p. 356).

Use the procedures below to sort any non-pivot table visual type by using either a field well or an on-visual editor.

### Sorting by Using an On-Visual Editor

1. On the visual, choose an on-visual editor that supports sorting.
2. On the on-visual editor menu, choose **Sort**, and then choose the ascending or descending sort order icon.
Filtering Visual Data in Amazon QuickSight

You can use filters to refine the data displayed in a visual. Filters are applied to the data before any aggregate functions that you specify.
A filter is associated with a single data set in an analysis, and can be scoped to one, several, or all visuals in the analysis that use that data set. By default, a filter applies to the visual that was selected when the filter was created. You can change the scope of a filter after you create it.

You can apply filters to both regular fields and calculated fields.

You can apply multiple filters to a single field. Amazon QuickSight applies the union of all the filters you specify to the field. For example, if you create a filter on the sales field with the criteria sales < 400 and another filter with the criteria sales >= 200, then the visual shows records with sales amounts between $200 and $399.99. You must make sure that multiple filters applied to the same field aren't mutually exclusive. For example, suppose that you create a filter on the sales field with the criteria sales < 400 and another filter with the criteria sales > 500. In this case, the visual shows no data, because the sales amount can't be both less than $400 and greater than $500 at the same time.

You can apply multiple filters to a visual. Amazon QuickSight applies the union of all the filters you specify to the visual. For example, if there is one filter of state = WA and another filter of sales >= 500, then the visual only displays records that meet both of those criteria.

Amazon QuickSight uses filters to focus on or exclude a visual element representing a particular value. For more information about focusing on a visual element, see Focusing on Visual Elements (p. 256). For more information about excluding a visual element, see Excluding Visual Elements (p. 257).

Topics

- Viewing Filters (p. 285)
- Adding a Filter (p. 287)
- Editing a Filter (p. 308)
- Deleting a Filter (p. 310)

Viewing Filters

To see the filters for a visual, choose Filter on the tool bar. Only the filters that apply to the selected visual display. They appear in the Applied filters pane in order of creation, with the oldest filter on top.

If multiple filters are specified on a single field, they are grouped together. They are shown in order of creation, with the oldest filter on top.
Understanding Filter Icons

Filters in the **Applied filters** pane display icons to indicate how they are scoped, and whether or not they are enabled.

A disabled filter displays the disabled icon to the right of the filter name.

One of several scope icons displays to the left of the filter name to indicate the scope set on that filter.

These scope icons match those displayed on the filter menu when you are choosing the scope for the filter.
Adding a Filter

You can create a filter on any field from the data set associated with the currently selected visual. If you want to create a filter for a different data set, choose a visual that uses that data set. When you create a filter, it applies by default to just the currently selected visual. You can apply the filter to additional visual that use that data set after you create it.

Once you apply a filter to a visual, a filter icon appears on the visual so you can identify at a glance that the data is filtered.
You can create filters on text (string data type), numeric (int or decimal data types) and date fields. Depending on the data type of the field you choose, you are offered different filtering options, as described in the following topics.

**Topics**
- Adding a Text Filter (p. 288)
- Adding a Numeric Filter (p. 297)
- Adding a Date Filter (p. 300)
- Adding a compound filter with And/Or operators (p. 306)

### Adding a Text Filter

You can filter text fields by either choosing field values from a list or by specifying field values.

Use the **Filter list** filter type to filter by choosing field values. Using this filter type, Amazon QuickSight retrieves a list of the field values for the selected field. You choose the values you want to filter on, and whether you want to include or exclude records with those values.

**Important**
You are only offered this option in cases where Amazon QuickSight can quickly retrieve the full set of field values. In cases where the data set is very large or there's a very high number of unique values, this is not possible, and you must filter by specifying field values instead.

You can filter by specifying field values by using either the **Custom filter list** filter type or the **Custom filter** filter type.

With the **Custom filter list** filter type, you specify one or more field values to filter on, and whether you want to include or exclude records that contain those values. The specified value and actual field value must match exactly in order for the filter to be applied to a given record.

With the **Custom filter** filter type, you specify a single value that the field value must equal or not equal. If you choose an equal comparison, the specified value and actual field value must match exactly in order for the filter to be applied to a given record.

For any type of text filter, you can refresh the list of field values by choosing the refresh icon. This is helpful when you have created a filter before Amazon QuickSight has retrieved the entire data set and so does not initially have a complete list to display.
Details on how to create each type of text field filter are provided in the following sections.

**Adding a Text Filter by Choosing Field Values**

Use the following procedure to create a text field filter for by selecting field values.

**Important**

You can only filter by choosing field values in cases where Amazon QuickSight can quickly retrieve the full set of values. In cases where you are working with very large record sets and this is not possible, you must filter by specifying field values instead. For more information about filtering with specified field values, see Adding a Text Filter by Specifying Multiple Field Values (p. 292) and Adding a Text Filter by Specifying a Single Field Value (p. 295).

1. Choose **Filter** on the tool bar.
2. On the **Applied filters** pane, choose the new filter icon, and then choose a text field to filter on. This creates a new filter with no criteria.
3. Choose the new filter to expand it.
4. Choose **Filter list** for the filter type.
5. Choose whether to include or exclude records that contain the field values you will select in the next step.

6. Select the field values you want to filter on.

Scroll through the checklist and select or clear values, or toggle the ALL check box to select or deselect all of the values at once.
Toggle the sort icon to change the sort order of the field values from ascending (the default) to descending and back.
To narrow down the values displayed, type a search term into the box above the checklist and choose **Search**. Search terms are case-insensitive and wildcards are not supported. Any field value that contains the search term is returned. For example, searching on `L` returns `al`, `AL`, `la`, and `LA`.

To return to viewing the full set of field values rather than just those that match the search term, choose **Search** again.

**Note**
The filter list can display up to 10,000 values. If you have more than 10,000 values in your list, use a custom filter. For information about custom filters, see *Adding a Text Filter by Specifying Multiple Field Values (p. 292)*.

**Adding a Text Filter by Specifying Multiple Field Values**

You can use the **Custom filter list** filter type to specify one or more field values to filter on, and choose whether you want to include or exclude records that contain those values. The specified value and actual field value must match exactly in order for the filter to be applied to a given record.

Use the following procedure to create a text field filter by specifying exact field values.
1. Choose **Filter** on the tool bar.
2. On the **Applied filters** pane, choose the new filter icon, and then choose a text field to filter on.
   
   This creates a new filter with no criteria.

3. Choose the new filter to expand it.

4. Choose **Custom filter list** for the filter type.

5. Type a field value in **Enter a value to add**, and then choose the add icon.
To remove a field value from the criteria, choose its delete icon.

6. (Optional) Repeat Step 5 until you have added all of the field values you want to filter on.
7. Choose whether to include or exclude records that contain the field values you selected.
8. Choose **Apply**.

**Adding a Text Filter by Specifying a Single Field Value**

With the **Custom filter** filter type, you specify a single value that the field value must equal or not equal. If you choose an equal comparison, the specified value and actual field value must match exactly in order for the filter to be applied to a given record.

Use the following procedure to create a text field filter by specifying one field value.

1. Choose **Filter** on the tool bar.
2. On the **Applied filters** pane, choose the new filter icon, and then choose a text field to filter on.
   
   This creates a new filter with no criteria.
3. Choose the new filter to expand it.

4. Choose **Custom filter** for the filter type.

5. Choose a comparison type.
6. Type a field value in the value field.

7. Choose Apply.

**Adding a Numeric Filter**

Fields with decimal or int data types are considered numeric fields. You create filters on numeric fields by specifying a comparison type, for example **Greater than** or **Between**, and a comparison value or values as appropriate to the comparison type. Comparison values must be positive integers and should not contain commas.

You can use the following comparison types in numeric filters:

- Equals
- Does not equal
- Greater than
- Less than
- Greater than or equal to
- Less than or equal to
- Between
For data sets based on database queries, you can also optionally apply an aggregate function to the comparison value or values, for example **Sum** or **Average**.

You can use the following aggregate functions in numeric filters:

- Average
- Count
- Max
- Min
- Sum

**Creating a Numeric Filter**

Use the following procedure to create a numeric field filter.

1. Choose **Filter** on the tool bar.
2. On the Applied filters pane, choose the new filter icon, and then choose a numeric field to filter on.

   This creates a new filter with no criteria.

3. Choose the new filter to expand it.

4. Choose a comparison type.
5. (Optional) If you are using a query-based data set, choose an aggregate function if you want to use one.

6. If you have chosen a comparison type other than **Between**, type a comparison value.
Adding a Filter

If you have chosen a comparison type of **Between**, type the beginning of the value range in **Minimum value** and the end of the value range in **Maximum value**.

7. Choose **Apply**.

**Adding a Date Filter**

You create filters on date fields by selecting the filter conditions and date values that you want to use. There are two filter types for dates:

- **Range** – A series of dates based on a time range and comparison type. You can filter records based on whether the date field value is before or after a specified date, or within a date range. You enter date values in the format MM/DD/YYYY. You can use the following comparison types:
  - **Between** – Between a start date and an end date
  - **After** – After a specified date
  - **Before** – Before a specified date
• **Relative** – A series of date/time elements based on the current date. You can filter records based on the current date and your selected unit of measure (UOM). Date filter UOMs include years, quarters, months, weeks, days, and hours. You can use the following comparison types:
  • **Previous** – The previous UOM—for example, the previous year.
  • **This** – This UOM, which includes all dates and times that fall within the select UOM, even if they occur in the future.
  • **to date or up to now** – UOM to date, or UOM up to now. The displayed phrase adapts to the UOM you choose. However, in all cases this option filters out data that is not between the beginning of the current UOM and the current moment.
  • **Last n** – The last specified number of the given UOM, which includes all of this UOM and all of the last \( n - 1 \) UOM. For example, let's say today is May 10, 2017. You choose to use years as your UOM, and set Last \( n \) years to 3. The filtered data includes data for all of 2017, plus all of 2016, and all of 2015. If you have any data for the future dates of the current year (2017 in this example), these records are included in your data set.

Comparisons are applied inclusive to the date specified. For example, if you apply the filter \(<\text{date}> \text{Before 1/1/16}\>\), the records returned include all rows with date values through 1/1/16 23:59:59.

**Note**

If a column or attribute has no time zone information, then the client query engine sets the default interpretation of that datetime data. For example, suppose that a column contains a timestamp, rather than a timestamptz, and you are in a different time zone than the data's origin. In this case, the engine can render the timestamp differently than you expect. Amazon QuickSight and SPICE both use Universal Coordinated Time (UTC) times.

**Creating a Date Filter**

Use the following procedure to create a filter for a date field.

1. Choose **Filter** on the tool bar.
2. On the **Applied filters** pane, choose **Create one**, and then choose a date field to filter on.

Doing this creates a new filter with no criteria.

3. If the filter does not expand to show options, choose the new filter to expand it.
4. Choose a filter type.

5. Do the following to create a date filter on a time range:
   1. To create a date filter on a time range, choose a comparison type.
2. Type date values.

   If you choose a **Between** comparison, type a start and end date, or select the **Start date** or **End date** field to bring up the date picker control and select dates.
If you choose a Before or After comparison, type a date, or choose the date field to bring up the date picker control and select a date instead.

6. Do the following to create a date filter on relative dates:
1. Choose a unit of measure (UOM).

   ![Filter Options Diagram]

   - **Edit filter**
   - **Date**
     - **Years - none**
   - **Filter type**
     - **Relative dates**
     - **Years**
     - **Years**
     - **Quarters**
     - **Months**
     - **Weeks**
     - **Days**
     - **Hours**
   - **Apply**

2. Choose one option. If you choose **Last n UOM**, specify a number for your range—for example, last 3 years, or last 2 hours.

   For more information about date filter options, see **Adding a Date Filter (p. 153)**.
Adding a compound filter with And/Or operators

When you add multiple filters to a visual, Amazon QuickSight uses the AND operator to combine them.

To add multiple filters using the OR operator, you must create a filter group. This lets you combine multiple conditions in a single filter with the OR operator. You can think of this as grouping filters in parentheses. Filter grouping is available for all types of filters.

When you filter on multiple measures (green fields marked with #), you can apply the filter conditions to an aggregate of that field. Filters in a group can contain either aggregated or non-aggregated fields, but not both.

To create a filter group, follow these steps.

1. Edit or create a filter.
2. Scroll to the bottom of the filter, where there is a dividing line labeled OR. Choose **Add filter condition**.
Adding a Filter

- Select the filter condition to add.
- Choose the condition type (e.g., segment).
- Select the filter values (e.g., Enterprise).
- Apply the filter.

Note: Filters in a group can be either aggregated or non-aggregated, but not both. Learn more.
3. A new blank filter appears below the first one. Choose the next field and the conditions to filter on.
4. (Optional) You can add additional filter conditions to the filter group.
5. (Optional) To remove a filter from the filter group, choose X near the field name.
6. When you are finished, choose Apply.

**Editing a Filter**

You can edit a filter by enabling or disabling the filter, changing the filter criteria, or changing the filter scope to include or exclude other visuals in the analysis that use the same data set.

You can't change the field a filter applies to. To apply a filter to a different field, create a new filter instead.

**Enabling or Disabling a Filter**

You can use the filter menu to enable or disable a filter. When you create a filter, it is enabled by default.

1. On the analysis page, choose Filter on the tool bar.
2. On the Applied filters pane, choose the selector to the right of the filter name.
3. On the filter menu, choose Enable filter or Disable filter.
Changing Filter Criteria

Use the following procedure to modify a filter.

1. On the analysis page, choose Filter on the tool bar.
2. On the Applied filters pane, choose the filter you want to modify to see the filter details.
3. Change the comparison type or values.
4. If the filter type has an Apply button, choose Apply.

Changing Filter Scope

You can use the filter menu to set the scope of a filter to one, several, or all visuals in the analysis that use the data set that filter is based on. By default, a filter applies only to the visual that was selected when the filter was created.

1. On the analysis page, choose Filter on the tool bar.
2. On the Applied filters pane, choose the selector to the right of the filter name.
3. On the filter menu, choose All visuals for this data set, Some visuals for this data set or Only this visual.
Deleting a Filter

Use the following procedures to delete a filter.

1. On the analysis page, choose Filter on the tool bar.
2. On the Applied filters pane, choose the selector to the right of the filter name.
3. (Optional) To delete one filter from a filter group, scroll to the filter you want to delete. Then choose the X near the appropriate field name. Doing this removes a single filter condition.

To delete all filters from a filter group, choose Delete all.

Adding Drill-Downs to Visual Data in Amazon QuickSight

All visual types except pivot tables offer the ability to create a hierarchy of fields for a visual element, and then to drill down to see data at different levels of the hierarchy. For example, you could associate the country, state, and city fields with the X axis on a bar chart, then drill down or up to see data at each of those levels. As you drill down each level, the data displayed is refined by the value of the element you drill down on. For example, if you drill down to city on the bar that represents California at the state level, you get data on all of the cities in California.
The field wells you can use to create drill-downs varies by visual type, so refer to the topic for a given visual type to learn more about its drill-down support.

Drill-down functionality is added automatically when you associate a date field with the drill-down field well of a visual, for example using a date in the Group/Color field well of a scatter plot. In this case, you can always drill up and down through the levels of date granularity (year, month, week, day, and hour).

**Adding a Drill-Down**

Use the following procedure to add drill-down levels to a visual.

1. On the analysis page, choose the visual you want to add drill-downs to.

   **Note**
   You can’t add drill-downs to pivot tables.

2. Expand the Field wells pane.

3. Drag a field that you want to use in the drill-down hierarchy to an appropriate field well, depending on the visual type. Position it above or below the existing field based on where you want it to be based on the hierarchy you are creating. Make sure that the label for the dragged field says **Add drill-down layer**.
4. Continue until you have added all of the levels of hierarchy you want. To remove a field from the hierarchy, choose the field, and then choose Remove.

5. To drill down or up in order to see data at a different level of the hierarchy, choose an element on the visual (like a line or bar), and then choose Drill down to <lower level> or Drill up to <higher level>. In this example, from the region level you can drill down to state or up to country to see data at those levels. If you drill down to state from the Northeast region, you see only states in that region.
After you drill down to see data at the state level, you can then drill down further to see city-level data, or go back up to region. If you drill down to city from the color block representing NJ, you see only cities in New Jersey.
Working with Visual Types in Amazon QuickSight

Amazon QuickSight offers a range of visual types that you can use to display your data. Use the topics in this section to learn more about the capabilities of each visual type.

Measures and Dimensions in Visuals

When we describe how to use the different visual types, we use the term *measure* to refer to numeric values that you use for measurement, comparison, and aggregation in visuals. A measure can be either a numeric field, like product cost, or a numeric aggregate on a field of any data type, like count of transaction IDs.

We use the term *dimension* to refer to text or date fields that can be items, like products, or attributes that are related to measures and can be used to partition them. Examples are sales date for sales figures or product manufacturer for customer satisfaction numbers. Amazon QuickSight automatically identifies a field as a measure or a dimension based on its data type.

Numeric fields can act as dimensions, for example ZIP codes and most ID numbers. It's helpful to give such fields a string data type during data preparation, so that Amazon QuickSight understands that they are to be treated as dimensions and are not useful for performing mathematical calculations.

You can change whether a field is displayed as a dimension or measure on an analysis-by-analysis basis instead. For more information, see Fields as Dimensions and Measures (p. 245).
Display Limits in Visuals

All visual types limit the number of data points they display, so that the visual elements (like lines, bars, or bubbles) are still easy to view and analyze. The visual selects the first $n$ number of rows for display up to the limit for that visual type. The selection is either according to sort order, if one has been applied, or in default order otherwise.

The number of data points supported varies by visual type. To learn more about display limits for a particular visual type, see the topic for that type.

The visual title identifies the number of data points displayed if you have reached the display limit for that visual type. If you have a large data set and want to avoid running into the visual display limit, use one or more filters to reduce the amount of data displayed. For more information about using filters with visuals, see Filtering Visual Data in Amazon QuickSight (p. 284).

Amazon QuickSight supports up to 20 data sets in a single analysis, and up to 20 visuals in a single analysis.

An other category also shows on some visuals. It contains the aggregated data for all the data beyond the cutoff limit for the visual type you are using. You can use the on-visual menu to choose whether or not to display the other category. The other category doesn’t show on scatter plots, heat maps, maps, tables (tabular reports), or KPIs. It also doesn’t show on line charts when the X axis is a date. Drilling down into the other category is not supported.

The following image shows the other category on a bar chart.
The following image shows the other category on a pivot table.
Hiding or Displaying the other Category

Use the following procedure to hide or display the other category.

1. On the analysis page, select the visual you want to modify.
2. Choose the on-visual menu at the upper-right corner of the visual, and then choose Hide "other" category or Show "other" category, as appropriate.
Using AutoGraph

AutoGraph isn't a visual type itself, but instead lets you tell Amazon QuickSight to choose the visual type for you. When you create a visual by choosing AutoGraph and then selecting fields, Amazon QuickSight uses the most appropriate visual type for the number and data types of the fields you select.

The icon for AutoGraph is as follows:

Creating a Visual Using AutoGraph

Use the following procedure to create a visual using AutoGraph.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the AutoGraph icon.
4. On the Fields list pane, choose the fields you want to use.
Using Bar Charts

Amazon QuickSight supports the following types of bar charts, with either horizontal or vertical orientation:

- Single-measure
- Multi-measure
- Clustered
- Stacked
- Stacked 100 percent

You use these as follows:

- Use the horizontal or vertical bar chart visual types to create single-measure, multi-measure, or clustered bar charts.
- Use a single-measure bar chart to show values for a single measure for a dimension.
- Use a multi-measure bar chart to show values for two or more measures for a dimension.
- Use a clustered bar chart to show values for a single measure for a dimension that is then grouped by another dimension, for example sales total by state, grouped by region.
- Use any of the stacked bar chart visual types to create stacked bar charts. A stacked bar chart is similar to a clustered bar chart in that it displays a measure for two dimensions. However, instead of clustering bars for each child dimension by the parent dimension, it displays one bar per parent dimension. It uses color blocks within the bars to show the relative values of each item in the child dimension.

Amazon QuickSight offers both regular stacked bar charts and stacked 100 percent bar charts. A regular stacked bar chart differs from a stacked 100 percent bar chart in that the color blocks reflect the value of each item in the child dimension relative to the total for the measure. In contrast, a stacked 100 percent bar chart shows them by their percentage.

For example, the following stacked bar chart shows that total sales in the southern region were $2735.51, with $1474.96 from Texas and $1260.55 from Florida.
The following stacked 100 percent bar chart shows this same data by percentage, which is 100 percent for the southern region. The color block for Florida represents the approximately 46 percent of revenue from that state. The color block for Texas represents the remaining 54 percent.
Working with Horizontal Bar Charts

You can use the horizontal bar chart visual type to create a single-measure, multi-measure, or clustered horizontal bar chart. A single-measure bar chart shows one measure for one dimension, for example average delay time by flight number. A multi-measure bar chart shows two or more measures for one dimension, for example sales total and profit total by automobile mode. A clustered bar chart shows values for a dimension grouped by a related dimension, for example sales totals by automobile model, grouped by car maker.

To create a horizontal bar chart, use a dimension for the Y axis and a measure for the value. The dimension is typically a text field that is related to the measure in some way. You can use the dimension to segment the measure to see more detailed information. You can also use a date field in this way, but we recommend using a line chart for that because they are better suited to showing changes in a measure over time. Each horizontal bar in the chart represents a measure value for an item in the dimension you chose.
Horizontal bar charts show up to 2500 data points on the Y axis for visuals that don’t use group/color. For visuals that do use group/color, they show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a horizontal bar chart is as follows:

### Horizontal Bar Chart Features

Use the following table to understand the features supported by horizontal bar charts.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
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<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes, with exceptions</td>
<td>Multi-measure horizontal bar charts and clustered horizontal bar charts display a legend, while single-measure horizontal bar charts do not.</td>
<td>Displaying the Visual Legend (p. 259)</td>
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<td>Changing the title display</td>
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<td>Changing the axis range</td>
<td>Yes</td>
<td>You can set the range for the X axis.</td>
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</tr>
<tr>
<td>Changing the visual colors</td>
<td>Yes</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude any bar on the chart, except when you are using a date field as the dimension for the Y axis. In that case, you can only focus on a bar, not exclude it.</td>
<td>Focusing on Visual Elements (p. 256) Excluding Visual Elements (p. 257)</td>
</tr>
<tr>
<td>Sorting</td>
<td>Yes</td>
<td>You can sort on the fields you choose for the Y axis and the values.</td>
<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Field aggregation</td>
<td>Yes</td>
<td>You must apply aggregation to the field or fields you choose for the value, and can’t apply aggregation to the fields you choose for the Y axis or group/color.</td>
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</table>

### Creating a Horizontal Bar Chart

Use the following procedure to create a horizontal bar chart.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the horizontal bar chart icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.
   - To create a single-measure horizontal bar chart, drag a dimension to the Y axis field well and a measure to the Value field well.
   - To create a multi-measure horizontal bar chart, drag a dimension to the Y axis field well and two or more measures to the Value field well. Leave the Group/Color field well empty.
   - To create a clustered horizontal bar chart, drag a dimension to the Y axis field well, a measure to the Value field well, and another dimension to the Group/Color field well.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the Y axis or Group/Color field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

Working with Horizontal Stacked Bar Charts

Use a horizontal stacked bar chart to show values for hierarchical data, for example sales total by car model, stacked by car maker. A horizontal stacked bar chart uses a scale based on the maximum value for the selected measure. To create a chart that uses a scale based on 100 percent instead, use the Working with a Horizontal Stacked 100 Percent Bar Chart (p. 324).

Horizontal stacked bar charts show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a horizontal stacked bar chart is as follows:

Horizontal Stacked Bar Chart Features

Use the following table to understand the features supported by horizontal stacked bar charts.

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Creating a Horizontal Stacked Bar Chart

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1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the horizontal stacked bar chart icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.

   To create a horizontal stacked bar chart, drag a dimension to the Y axis field well, one measure to the Value field well, and one dimension to the Group/Color field well.

5. (Optional) Add drill-down layers by dragging one or more additional fields to the Y axis or Group/Color field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

Working with a Horizontal Stacked 100 Percent Bar Chart

Use a horizontal stacked 100 percent bar chart to show values for hierarchical data, for example sales total by car model, stacked by car maker. A horizontal stacked 100 percent bar chart uses a scale of 100 percent. To create a chart that uses a scale based on the maximum value of the selected measure instead, use the Working with Horizontal Stacked Bar Charts (p. 323).

Horizontal stacked 100 percent bar charts show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a horizontal stacked 100 percent bar chart is as follows:
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Creating a Horizontal Stacked 100 Percent Bar Chart

Use the following procedure to create a horizontal stacked 100 percent bar chart.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the horizontal stacked 100 percent bar chart icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.

To create a horizontal stacked 100 percent bar chart, drag a dimension to the Y axis field well, one measure to the Value field well, and one dimension to the Group/Color field well.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the Y axis or Group/Color field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

**Working with Vertical Bar Charts**

You can use the vertical bar chart visual type to create a single-measure, multi-measure, or clustered vertical bar chart. A single-measure bar chart shows one measure for one dimension, for example average delay time by flight number. A multi-measure bar chart shows two or more measures for one dimension, for example sales total and profit total by automobile mode. A clustered bar chart shows values for a dimension grouped by a related dimension, for example sales totals by automobile model, grouped by car maker.

To create a vertical bar chart, use a dimension for the X axis and a measure for the value. The dimension is typically a text field that is related to the measure in some way. You can use the dimension to segment the measure to see more detailed information. You can also use a date field in this way, but we recommend using a line chart for that because they are better suited to showing changes in a measure over time. Each vertical bar in the chart represents a measure value for an item in the dimension you chose.

Vertical bar charts show up to 2500 data points on the Y axis for visuals that don’t use group/color. For visuals that do use group/color, they show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a vertical bar chart is as follows:

![Vertical Bar Chart Icon]

**Vertical Bar Chart Features**

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Creating a Vertical Bar Chart

Use the following procedure to create a vertical bar chart.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the vertical bar chart icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.
   - To create a single-measure vertical bar chart, drag a dimension to the X axis field well and one measure to the Value field well.
   - To create a multi-measure vertical bar chart, drag a dimension to the X axis field well and two or more measures to the Value field well. Leave the Group/Color field well empty.
   - To create a clustered vertical bar chart, drag a dimension to the X axis field well, one measure to the Value field well, and one dimension to the Group/Color field well.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the X axis or Group/Color field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

Working with Vertical Stacked Bar Charts

Use a vertical stacked bar chart to show values for hierarchical data, for example sales total by car model, stacked by car maker. A vertical stacked bar chart uses a scale based on the maximum value for the selected measure. To create a chart that uses a scale based on 100 percent instead, use the Working with Vertical Stacked 100 Percent Bar Charts (p. 329).

Vertical stacked bar charts show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a vertical stacked bar chart is as follows:
Vertical Stacked Bar Chart Features

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Creating a Vertical Stacked Bar Chart

Use the following procedure to create a vertical stacked bar chart.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the vertical stacked bar chart icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.

   To create a vertical stacked bar chart, drag a dimension to the X axis field well, one measure to the Value field well, and one dimension to the Group/Color field well.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the X axis or Group/Color field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

Working with Vertical Stacked 100 Percent Bar Charts

Use a vertical stacked 100 percent bar chart to show values for hierarchical data, for example sales total by car model, stacked by car maker. A vertical stacked 100 percent bar chart uses a scale of 100 percent. To create a chart that uses a scale based on the maximum value of the selected measure instead, use the Working with Vertical Stacked Bar Charts (p. 327).

Vertical stacked 100 percent bar charts show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a vertical stacked 100 percent bar chart is as follows:

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<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Field aggregation</td>
<td>Yes</td>
<td>You must apply aggregation to the fields you choose for the value and group/color, and can't apply aggregation to the field you choose for the X axis.</td>
<td>Changing Field Aggregation (p. 271)</td>
</tr>
</tbody>
</table>
Creating a Vertical Stacked 100 Percent Bar Chart

Use the following procedure to create a vertical stacked 100 percent bar chart.

1. On the analysis page, choose **Visualize** on the tool bar.
2. Choose **Add** on the application bar, and then choose **Add visual**.
3. On the **Visual types** pane, choose the vertical stacked 100 percent bar chart icon.
4. From the **Fields list** pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the **Count** aggregate function is automatically applied to it to create a numeric value.

   To create a vertical stacked 100 percent bar chart, drag a dimension to the **X axis** field well, one measure to the **Value** field well, and one dimension to the **Group/Color** field well.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the **X axis** or **Group/Color** field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

Using Combo Charts

Amazon QuickSight supports the following types of combo charts:

- Clustered bar combo chart
- Stacked bar combo chart

These are also known as line and column charts.

Use the combo chart visual types to create a single visualization that shows two different types of data. These two types are individually best suited to a line chart and a bar chart. The difference between these two types can work well for comparing two sets of data, for example trends and categorical data.

On the clustered bar combo chart, bars display for each child dimension, grouped by the parent dimension. On the stacked bar combo chart, one bar displays per parent dimension. Inside each bar, colors show the relative values of each item in the child dimension. Both types of combo chart require only one dimension on the **X axis**, but are usually more effective when also displaying at least one measure under **Lines**.
Using Combo Charts

Topics

- Working with Clustered Bar Combo Charts (p. 332)
- Working with Stacked Bar Combo Charts (p. 335)
Working with Clustered Bar Combo Charts

The combo chart is like using two different types of visualization at the same time. You should make sure the data in the bars (or columns) directly relates to the data in the line or lines. This relationship is not technically enforced by the tool, so it’s essential that you determine this relationship yourself. Without some relation between the lines and bars, the visual loses meaning.

You can use the combo chart visual type to create a single-measure or single-line chart. A single-measure combo chart shows one measure for one dimension.

To create a multi-measure chart, you can choose to add multiple lines, or multiple bars. A multi-measure bar chart shows two or more measures for one dimension. You can group the bars in clusters, or stack them.

A clustered bar chart shows values for a dimension grouped by a parent dimension.

To create a vertical bar chart, use a dimension for the X axis and a measure for the value. The dimension is typically a text field that is related to the measure in some way and can be used to segment it in order to see more detailed information. You can also use a date field in this way, but we recommend using a line chart because it’s better suited to showing changes in a measure over time. Each vertical bar in the chart represents a measure value for an item in the dimension you chose.

Vertical bar charts show up to 2500 data points on the Y axis for visuals that don’t use group/color. Visuals that do use group/color show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how Amazon QuickSight handles data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a clustered bar combo chart is as follows.

Clustered Bar Combo Chart Features

Use the following table to understand the features supported by clustered bar combo charts.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes, with exceptions</td>
<td>Multi-measure combo charts display a legend, and single-measure combo charts don’t.</td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td>Displaying a Visual’s Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Yes</td>
<td>You can set the range for the Y axis.</td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>Yes</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude any bar on the chart, except when you are using a date field</td>
<td>Focusing on Visual Elements (p. 256)</td>
</tr>
</tbody>
</table>
Creating a Clustered Bar Combo Chart

Use the following procedure to create a clustered bar combo chart.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the clustered bar combo chart icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field well. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value. You can create combo charts as follows:

   - To create a single-measure clustered bar combo chart, drag a dimension to the X axis field well. Then drag one measure to either the Bars or Lines field well.
   - To create a multi-measure clustered bar combo chart, drag a dimension or dimensions to the X axis field well. Then drag two or more measures to the Bars or Lines field well.

      Optionally, add a dimension to the Group/Color field well. If you have a field in Group/Color, you can't have more than one field under Bars.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the X axis or Group/Color field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).
Working with Stacked Bar Combo Charts

The combo chart is like using two different types of visualization at the same time. You should make sure the data in the bars (or columns) directly relates to the data in the line or lines. This relationship is not technically enforced by the tool, so it’s essential that you determine this relationship yourself. Without some relation between the lines and bars, the visual loses meaning.

You can use the combo chart visual type to create a single-measure or single-line chart. A single-measure combo chart shows one measure for one dimension.

To create a multi-measure chart, you can choose to add multiple lines, or multiple bars. A multi-measure bar chart shows two or more measures for one dimension. You can group the bars in clusters, or stack them.

Use a stacked bar combo chart to show values for hierarchical data, for example sales total by car model, stacked by car maker. A stacked bar combo chart uses a scale based on the maximum value for the selected measure.

Stacked bar combo charts show up to 50 data points on the Y axis and up to 50 data points for group/color. For more information about how Amazon QuickSight handles data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a stacked bar combo chart is as follows.

Stacked Bar Combo Chart Features

Use the following table to understand the features supported by stacked bar combo charts.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes</td>
<td></td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Yes</td>
<td>You can set the range for the Y axis.</td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>Yes</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude any bar or color block within a bar, except when you are using a date field as one of the dimensions. In that case, you can only focus on the bar or color block that uses the date dimension, not exclude it.</td>
<td>Focusing on Visual Elements (p. 256) Excluding Visual Elements (p. 257)</td>
</tr>
</tbody>
</table>
### Feature | Supported? | Comments | For More Information
--- | --- | --- | ---
Sorting | Yes | You can sort on the fields you choose for the X axis and the values. | Sorting Visual Data in Amazon QuickSight (p. 282)
Field aggregation | Yes | You must apply aggregation to the fields you choose for the value and group/color, and can't apply aggregation to the field you choose for the X axis. | Changing Field Aggregation (p. 271)
Adding drill-downs | Yes | You can add drill-down levels to the X axis and Group/Color field wells. | Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)

### Creating a Stacked Bar Combo Chart

Use the following procedure to create a stacked bar combo chart.

1. On the analysis page, choose **Visualize** on the tool bar.
2. Choose **Add** on the application bar, and then choose **Add visual**.
3. On the **Visual types** pane, choose the stacked bar combo chart icon.
4. From the **Fields list** pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the **Count** aggregate function is automatically applied to it to create a numeric value.

To create a stacked bar combo chart, drag a dimension or dimensions to the **X axis** field well, and a measure or measures to the **Bars** field well, the **Lines** field well, or both. Measures in the **Bars** field well display as stacked bars.

Optionally, add a dimension to the **Group/Color** field well. If you have a field in **Group/Color**, you can't have more than one field under **Bars**.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the **X axis** or **Group/Color** field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).
Using Geospatial Charts (Maps)

Use geospatial charts to show differences in data values across a geographical map. The map allows you to zoom in and out. As you zoom in closer, you can see more geographical features. The map retains the chosen zoom level and size.

Each circle represents a geographical location on the map chart. This can be latitude and longitude, or geographical components such as state or city. The size of the circles represent the magnitude of the field in the Size well, in relation to other values in the same field. The color of the circles represents the values in the Color well. The field in the Color well displays in the legend, if you choose to display one.

Here is a sample of a map chart. The latitude, longitude, country, state, and city are identified by a place marker icon, showing that they are a geospatial data type. State and city are inside of a hierarchy named Geo. Data types must be correctly configured in the data set before geospatial mapping can work. Hierarchies are optional. They allow QuickSight to resolve locations on the map, in the case of any ambiguities. If the data types are correct, the mapping can work for supported geographies without hierarchies.

For more information about setting up geospatial data types and hierarchies, see Adding Geospatial Data (p. 162).
Use the following table to understand the features supported by geospatial maps.
Using Heat Maps

Use heat maps to show a measure for the intersection of two dimensions, with color-coding to easily differentiate where values fall in the range. Heat maps can also be used to show the count of values for the intersection of the two dimensions.

Each rectangle on a heat map represents the value for the specified measure for the intersection of the selected dimensions. Rectangle color represents where the value falls in the range for the measure, with darker colors indicating higher values and lighter colors indicating lower ones.

Heat maps and pivot tables display data in a similar tabular fashion. Use a heat map if you want to identify trends and outliers, as the use of color makes these easier to spot. Use a pivot table if you want to further analyze data on the visual, for example by changing column sort order or applying aggregate functions across rows or columns.

To create a heat map, choose at least two fields of any data type. Amazon QuickSight populates the rectangle values with the count of the X axis value for the intersecting Y axis value. Typically, you would choose a measure and two dimensions.

For example, the following heat map shows which products are most used by the customers in these countries, measured by a simple count.
Heat maps show up to 50 data points for rows and up to 50 data points for columns. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a heat map is as follows:
Heat Map Features

Use the following table to understand the features supported by heat maps.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes</td>
<td></td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td>Displaying a Visual’s Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Not applicable</td>
<td></td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>No</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude a rectangle in a heat map, except when you are using a date field as the rows dimension. In that case, you can only focus on a rectangle, not exclude it.</td>
<td>Focusing on Visual Elements (p. 256) Excluding Visual Elements (p. 257)</td>
</tr>
<tr>
<td>Sorting</td>
<td>Yes</td>
<td>You can sort by the fields you choose for the columns and the values.</td>
<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Field aggregation</td>
<td>Yes</td>
<td>You must apply aggregation to the fields you choose for the value, and can't apply aggregation to the fields you choose for the rows or columns.</td>
<td>Changing Field Aggregation (p. 271)</td>
</tr>
<tr>
<td>Adding drill-downs</td>
<td>Yes</td>
<td>You can add drill-down levels to the Rows and Columns field wells.</td>
<td>Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)</td>
</tr>
</tbody>
</table>

Create a Heat Map

Use the following procedure to create a heat map.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the heat map icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.
To create a heat map, drag a dimension to the **Rows** field well, a dimension to the **Columns** field well, and a measure to the **Values** field well.

5. (Optional) Add drill-down layers by dragging one or more additional fields to the **Rows** or **Columns** field wells. For more information about adding drill-downs, see *Adding Drill-Downs to Visual Data in Amazon QuickSight* (p. 310).

### Using KPIs

Use a KPI to visualize a comparison between a key value and its target value.

A KPI displays a value comparison, the two values being compared, and a progress bar. For example, the following KPI shows how closely revenue is meeting its forecast.

![KPI Example](image)

The icon for a KPI is as follows:

![KPI Icon](image)
KPI Features

Use the following table to understand the features supported by the KPI visual type in Amazon QuickSight.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removing the title</td>
<td>Yes</td>
<td>You can choose not to display a title.</td>
<td></td>
</tr>
<tr>
<td>Changing comparison method</td>
<td>Yes</td>
<td>By default, Amazon QuickSight automatically chooses a method. The settings are auto, difference, percent, and difference as percent.</td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
<tr>
<td>Changing the primary value</td>
<td>Yes</td>
<td>You can choose comparison (default) or actual.</td>
<td></td>
</tr>
<tr>
<td>displayed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display or remove the progress</td>
<td>Yes</td>
<td>You can format the visual to either display (default) or not display a progress bar.</td>
<td></td>
</tr>
<tr>
<td>bar</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Creating a KPI

Use the following procedure to create a KPI.

1. Create a new analysis for your data set.
2. In the **Visual types** pane, choose the KPI icon.
3. From the **Fields list** pane, drag the fields you want to use to the appropriate field wells. You must use measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the **Count** aggregate function is automatically applied to it to create a numeric value.

   To create a KPI, drag a measure to the **Value** field well. To compare that value to a target value, drag a different measure to the **Target value** field well.

4. (Optional) Choose formatting options by selecting the on-visual menu at the upper-right corner of the visual, then choosing **Format visual**.

Using Line Charts

Use line charts to compare changes in measure values over period of time, for the following scenarios:

- One measure over a period of time, for example gross sales by month.
- Multiple measures over a period of time, for example gross sales and net sales by month.
- One measure for a dimension over a period of time, for example number of flight delays per day by airline.
Line charts show the individual values of a set of measures or dimensions against the range displayed by the Y axis. Area line charts differ from regular line charts in that each value is represented by a colored area of the chart instead of just a line, to make it easier to evaluate item values relative to each other.

For example, discount amount by year by region looks like the following in a line chart.

![Line Chart Example](image)

It looks like the following in an area line chart.

![Area Line Chart Example](image)

Each line on the chart represents a measure value across a period of time. When you have a chart with multiple lines, hover over any line to see a pop-up legend that shows the values for each line for that point in time.
Using Line Charts

Working with a Line Chart

Use line charts to compare changes in values for one or more measures or dimensions over a period of time. Line charts differ from area line charts in that each value is represented by a line instead of a colored area of the chart.

Line charts show up to 2500 data points on the X axis when no color field is selected. When color is populated, line charts show up to 200 data points on the X axis and up to 25 data points for color. For more information about how data that falls outside the display limit for this visual type, see Display Limits in Visuals (p. 315).

The icon for a line chart is as follows:

![Line Chart Icon](image)

Line Chart Features

Use the following table to understand the features supported by line charts.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes</td>
<td></td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
</tbody>
</table>
### Feature Supported? Comments For More Information

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td>You can set the range for the Y axis.</td>
<td>Displaying a Visual’s Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Yes</td>
<td>You can set the range for the Y axis.</td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>Yes</td>
<td>You can focus on or exclude any line on the chart, except in the following cases: • You create a multi-dimension line chart and use a date field as the dimension for the line color. • You create a measure or multi-measure line chart and use a date field as the dimension for the X axis. In these cases, you can only focus on a line, not exclude it.</td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude any line on the chart, except in the following cases: • You create a multi-dimension line chart and use a date field as the dimension for the line color. • You create a measure or multi-measure line chart and use a date field as the dimension for the X axis.</td>
<td>Focusing on Visual Elements (p. 256) Excluding Visual Elements (p. 257)</td>
</tr>
<tr>
<td>Sorting</td>
<td>Yes</td>
<td>You can sort on the fields you choose for the X axis and the value.</td>
<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Field aggregation</td>
<td>Yes</td>
<td>You must apply aggregation to the field you choose for the value, and can’t apply aggregation to the fields you choose for the X axis and color.</td>
<td>Changing Field Aggregation (p. 271)</td>
</tr>
<tr>
<td>Adding drill-downs</td>
<td>Yes</td>
<td>You can add drill-down levels to the X axis and Color field wells.</td>
<td>Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)</td>
</tr>
</tbody>
</table>

## Creating a Line Chart

Use the following procedure to create a line chart.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the line chart icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.
   - To create a single-measure line chart, drag a dimension to the X axis field well and one measure to the Value field well.
• To create a multi-measure line chart, drag a dimension to the X axis field well and two or more measures to the Value field well. Leave the Color field well empty.

• To create a multi-dimension line chart, drag a dimension to the X axis field well, one measure to the Value field well, and one dimension to the Color field well.

5. (Optional) Add drill-down layers by dragging one or more additional fields to the X axis or Color field wells. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

**Working with an Area Line Chart**

Use area line charts to compare changes in values for one or more measures or dimensions over a period of time. Area line charts differ from regular line charts in that each value is represented by a colored area of the chart instead of just a line. This makes it easier to evaluate item values relative to each other.

Area line charts show up to 2500 data points on the X axis when no color field is selected. When color is populated, area line charts show up to 200 data points on the X axis and up to 25 data points for color. For more information about how data that falls outside the display limit for this visual type, see Display Limits in Visuals (p. 315).

The icon for an area line chart is as follows:

![Area Line Chart Icon](image)

**Area Line Chart Features**

Use the following table to understand the features supported by area line charts.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes</td>
<td></td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Yes</td>
<td>You can set the range for the Y axis.</td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>Yes</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude any line on the chart, except in the following cases:</td>
<td>Focusing on Visual Elements (p. 256)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• You create a multi-dimension line chart and use a date field as the dimension for the line color.</td>
<td>Excluding Visual Elements (p. 257)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• You create a measure or multi-measure line chart and use a date field as the dimension for the X axis.</td>
<td></td>
</tr>
</tbody>
</table>
Amazon QuickSight User Guide
Using Pie Charts

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>In these cases, you can only focus on a line, not exclude it.</td>
<td></td>
</tr>
<tr>
<td>Sorting</td>
<td>Yes</td>
<td>You can sort on the fields you choose for the X axis and the value.</td>
<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Field aggregation</td>
<td>Yes</td>
<td>You must apply aggregation to the field you choose for the value, and can’t apply aggregation to the fields you choose for the X axis and color.</td>
<td>Changing Field Aggregation (p. 271)</td>
</tr>
<tr>
<td>Adding drill-downs</td>
<td>Yes</td>
<td>You can add drill-down levels to the X axis and Color field wells.</td>
<td>Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)</td>
</tr>
</tbody>
</table>

**Creating an Area Line Chart**

Use the following procedure to create an area line chart.

1. On the analysis page, choose **Visualize** on the tool bar.
2. Choose **Add** on the application bar, and then choose **Add visual**.
3. On the **Visual types** pane, choose the area line chart icon.
4. From the **Fields list** pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the **Count** aggregate function is automatically applied to it to create a numeric value.
   - To create a single-measure area line chart, drag a dimension to the **X axis** field well and one measure to the **Value** field well.
   - To create a multi-measure area line chart, drag a dimension to the **X axis** field well and two or more measures to the **Value** field well. Leave the **Color** field well empty.
   - To create a multi-dimension area line chart, drag a dimension to the **X axis** field well, one measure to the **Value** field well, and one dimension to the **Color** field well.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the **X axis** or **Color** field wells. For more information about adding drill-downs, see **Adding Drill-Downs to Visual Data in Amazon QuickSight** (p. 310).

**Using Pie Charts**

Use pie charts to compare values for items in a dimension.

Each wedge in a pie chart represents one item in the dimension. Wedge size represents the proportion of the value for the selected measure that the item represents compared to the whole for the dimension. Pie charts are best when precision isn’t important and there are few items in the dimension.

Pie charts show up to 20 data points for group/color. For more information about how we handle data that falls outside display limits, see **Display Limits in Visuals** (p. 315).

The icon for a pie chart is as follows:
Pie Chart Features

Use the following table to understand the features supported by pie charts.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes</td>
<td></td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Not applicable</td>
<td></td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>Yes</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude a wedge in a pie chart, except when you are using a date field as a dimension. In that case, you can only focus on a wedge, not exclude it.</td>
<td>Focusing on Visual Elements (p. 256) Excluding Visual Elements (p. 257)</td>
</tr>
<tr>
<td>Sorting</td>
<td>Yes</td>
<td>You can sort on the field you choose for the value or the group/color.</td>
<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Field aggregation</td>
<td>Yes</td>
<td>You must apply aggregation to the field you choose for the value, and can't apply aggregation to the field you choose for group/color.</td>
<td>Changing Field Aggregation (p. 271)</td>
</tr>
<tr>
<td>Adding drill-downs</td>
<td>Yes</td>
<td>You can add drill-down levels to the Group/Color field well.</td>
<td>Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)</td>
</tr>
</tbody>
</table>

Create a Pie Chart

Use the following procedure to create a pie chart.

1. On the analysis page, choose **Visualize** on the tool bar.
2. Choose **Add** on the application bar, and then choose **Add visual**.
3. On the **Visual types** pane, choose the pie chart icon.
4. From the **Fields list** pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the **Count** aggregate function is automatically applied to it to create a numeric value.

   To create a pie chart, drag a measure to the **Value** field well and a dimension to the **Group/Color** field well.
5. (Optional) Add drill-down layers by dragging one or more additional fields to the Group/Color field well. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).

Using Pivot Table

Use pivot tables to show measure values for the intersection of two dimensions.

After you populate a pivot table, you can change row sort order and also apply statistical functions for further analysis. You can cluster pivot table columns and rows to show values for subcategories grouped by related dimension. You can also specify multiple measures to populate the cell values of the table, so that you can see a range of data in a single table.

Heat maps and pivot tables display data in a similar tabular fashion. Use a heat map if you want to identify trends and outliers, as the use of color makes these easier to spot. Use a pivot table if you want to analyze data on the visual.

To create a pivot table, choose at least two fields of any data type. Amazon QuickSight creates the table and populates the cell values with the count of the column value for the intersecting row value. Typically, you would choose a measure and two dimensions measurable by that measure.

Pivot tables show up to 1000 data points for rows and up to 200 data points for columns. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

To easily transpose the fields used by the rows and columns of the pivot table, choose the orientation icon:

The icon for a pivot table is as follows:

Pivot Table Features

Pivot tables don't display a legend.

You can't hide or display the title on a pivot table visual.

Use the following table to understand the features supported by pivot tables.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>No</td>
<td></td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>No</td>
<td></td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
</tbody>
</table>
Creating a Pivot Table

Use the following procedure to create a pivot table.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the pivot table icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.
   - To create a single-measure pivot table, drag a dimension to the Rows field well, a dimension to the Columns field well, and a measure to the Values field well.
   - To create a multi-measure pivot table, drag a dimension to the Rows field well, a dimension to the Columns field well, and two or more measures to the Values field well.
To create a clustered pivot table, drag one or more dimensions to the **Rows** field well, one or more dimensions to the **Columns** field well, and a measure to the **Values** field well.

You can also select multiple fields for all of the pivot table field wells if you want to, to combine the multi-measure and clustered pivot table approaches.

### Modifying Pivot Table Visuals

When you work with a pivot table, you can modify it in a number of ways to customize the visual to your needs. As with all visual types, you can add and remove fields, change the field associated with a visual element, change field aggregation, change date field granularity, and focus on or exclude rows or columns. For more information about how to make these changes to a pivot table, see the topics under [Changing the Fields Used by a Visual in Amazon QuickSight](p. 262).

There are also some ways to modify pivot tables that are exclusive to this visual type, as follows:

- Change the pivot table format to display by rows or by columns.
- Expand or collapse clustered rows or columns to show or hide subcategories.
- Sort the rows in the pivot table by the values in a selected column.
- Add table calculations (like rank or difference) to cell values.

Use the following topics to learn more about how to make these changes to pivot table visuals.

**Topics**
- Changing the Pivot Table Format (p. 353)
- Expanding and Collapsing Pivot Table Clusters (p. 354)
- Sorting Pivot Tables (p. 356)
- Working with Table Calculations (p. 357)

### Changing the Pivot Table Format

You can choose to display a pivot table in a columnar or row-based format. Columnar is the default. When you change to a row-based format, a column with the value name is added to the right of the row header column.

Use the following procedure to change a pivot table format.

1. On the analysis page, choose the pivot table visual you want to edit.
2. Expand the **Field wells** pane by choosing the expand icon.
3. On the **Values** field well, choose one of the following options:
   - Choose **Column** for a columnar format.
Expanding and Collapsing Pivot Table Clusters

If you are using grouped columns or rows in a pivot table, you can expand or collapse a group to show or hide its data in the table.

Use the following procedure to expand or collapse a pivot table group.

1. On the analysis page, choose the pivot table visual you want to edit.
2. On the group you want to collapse, choose the collapse icon, as shown following:
The group collapses and the data for the related group is summarized in the row or column, as shown following:

To expand the group again, choose the expand icon:
In a pivot table, you can change the sort order on any column to sort all rows in the table according to the values in that column. You can only sort by one column at a time.

On the visual, choose the sort icon on the subheader of the column you want to sort by and choose either Sort ascending or Sort descending:

The rows are re-ordered based on the values in the selected column:

To remove sorting from a column, choose the sort icon on the subheader of the sorted column and choose Clear sort.
Working with Table Calculations

You can use table calculations to apply statistical functions to pivot table cells. Use the following sections to understand how to apply or remove a table calculation, the functions you can use in calculations, and the different ways you can apply a calculation to a pivot table.

Adding and Removing Table Calculations

Use the following procedures to add, modify, and remove table calculation on a pivot table.

Adding a Table Calculation

Use the following procedure to add a table calculation to a pivot table.

Note
Applying a table calculation changes the data type of the cell values if the data type doesn't make sense with the applied calculation. For example, if you apply the `Rank` function to a numeric field that you modified to use a currency data type, the cell values display as integers rather than currency. Similarly, if you apply the `Percent difference` function instead, the cell values display as percentages rather than currency. For more information about changing field data types in an analysis, see Changing a Field Data Type (p. 211).

1. Expand the `Field wells` pane by choosing the expand icon.

2. Choose the field in the `Values` well that you want to apply a table calculation to, choose `Add table calculation`, and then choose the function to apply.

Changing How a Calculation Is Applied

Use the following procedure to change the way a table calculation is applied to a pivot table.
1. Expand the **Field wells** pane by choosing the expand icon.

2. Choose the field in the **Values** well that has the table calculation you want to change, choose **Calculate as**, and then choose the way you want the calculation applied.

---

**Removing a Calculation**

Use the following procedure to remove a table calculation from a pivot table.

1. Expand the **Field wells** pane by choosing the expand icon.

2. Choose the field in the **Values** well that you want to remove the table calculation from, and then choose **Remove calculation**.
Functions for Table Calculations

You can use the following functions in pivot table calculations.

**Topics**
- Running Total (p. 359)
- Difference (p. 360)
- Percent Difference (p. 360)
- Percent of Total (p. 361)
- Rank (p. 361)
- Percentile (p. 362)

**Running Total**

The running total function calculates the sum of a given cell value and the values of all cells prior to it. This is calculated as \( \text{Cell1} = \text{Cell1}, \ \text{Cell2} = \text{Cell1} + \text{Cell2}, \ \text{Cell3} = \text{Cell1} + \text{Cell2} + \text{Cell3}, \) and so on. For example, suppose that you have the following data.

Applying the running total function across the table rows gives you the following results.
Difference

The difference function calculates the difference between a cell value and value of the cell prior to it. This is calculated as $\text{Cell}_1 = \text{Cell}_1 - \text{null}$, $\text{Cell}_2 = \text{Cell}_2 - \text{Cell}_1$, $\text{Cell}_3 = \text{Cell}_3 - \text{Cell}_2$, and so on. Because $\text{Cell}_1 - \text{null} = \text{null}$, the $\text{Cell}_1$ value is always empty. For example, suppose that you have the following data.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>BILLING</th>
<th>MARKETING</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>2012</td>
<td>67.25</td>
<td>117.15</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>316.20</td>
<td>492.25</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>250.47</td>
<td>1,054.08</td>
</tr>
</tbody>
</table>

Applying the difference function across the table rows gives you the following results.

Percent Difference

The percent difference function calculates the difference between a cell value and the value of the cell prior to it, divided by the value of the cell prior to it. This is calculated as $\text{Cell}_1 = (\text{Cell}_1 - \text{null}) / \text{null}$, $\text{Cell}_2 = (\text{Cell}_2 - \text{Cell}_1) / \text{Cell}_1$, $\text{Cell}_3 = (\text{Cell}_3 / \text{Cell}_2) / \text{Cell}_2$, and so on. Because $(\text{Cell}_1 - \text{null}) / \text{null} = \text{null}$, the $\text{Cell}_1$ value is always empty. For example, take the following rows.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>BILLING</th>
<th>MARKETING</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>2012</td>
<td>67.25</td>
<td>117.15</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>316.20</td>
<td>492.25</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>250.47</td>
<td>1,054.08</td>
</tr>
</tbody>
</table>

Applying the percent difference function across the table rows gives you the following results.
Percent of Total

The percent of total function calculates the percentage the given cell represents of the sum of all of the cells included in the calculation. This is calculated as $\text{Cell}_1 = \text{Cell}_1 / (\text{sum of all cells})$, $\text{Cell}_2 = \text{Cell}_2 / (\text{sum of all cells})$, and so on. For example, suppose that you have the following data.

![Percent of Total Example](image)

Applying the percent of total function across the table rows gives you the following results.

Rank

The rank function calculates the rank of the cell value compared to the values of the other cells included in the calculation. Rank always shows the highest value equal to 1 and lowest value equal to the count of cells included in the calculation. If there are two or more cells with equal values, they receive the same rank but are considered to take up their own spots in the ranking. Thus, the next highest value is pushed down in rank by the number of cells at the rank above it, minus one. For example, if you rank the values 5,3,3,4,3,2, their ranks would be 1,3,3,2,3,6.

Given the following data:

![Rank Example](image)

Applying the rank function across the table rows gives you the following results.
If you applied rank using table across down instead, so that the initial ranks are determined across the rows and then those ranks are in turn ranked down the columns, you get the following results. The last column has two equal values sharing the top rank of 1, so the remaining value has a rank of 3.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>BILLING</th>
<th>HR</th>
<th>MARKETING</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>EMEA</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>AP</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Percentile**

The percentile function calculates the percent of the values of the cells included in the calculation that are at or below the value for the given cell. This is calculated as the count of cell values that is less than (current cell value + (.05 * count of cell values equal to the current cell value)) / count of all cells. For example, suppose that you have the following data.

Applying the percentile function across the table rows gives you the following results.

**Ways to Apply Table Calculations**

You can apply table calculations in the ways described following. Table calculations are applied to only one field at a time, so if you have a pivot table with multiple values, calculations are only applied to the cells representing the field you applied the calculation to.

**Topics**

- Table Across (p. 363)
- Table Down (p. 363)
- Table Across Down (p. 364)
- Table Down Across (p. 365)
- Group Across (p. 366)
- Group Down (p. 367)
- Group Across Down (p. 368)
- Group Down Across (p. 369)
Table Across

Using table across applies the calculation across the rows of the pivot table, regardless of any grouping. This is the default. For example, take the following pivot table.

Applying the running total function using table across gives you the following results, with row totals in the last column.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>BILLING</th>
<th>MOBILE</th>
<th>MARKETING</th>
<th>API</th>
<th>MOBILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>2012</td>
<td>472.25</td>
<td>117.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>364.28</td>
<td>402.25</td>
<td>101.2</td>
<td>210.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>250.67</td>
<td>1,050.08</td>
<td>586.96</td>
<td>1,339.43</td>
<td></td>
</tr>
<tr>
<td>EMEA</td>
<td>2014</td>
<td>135.44</td>
<td>401.04</td>
<td>350.2</td>
<td>501.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>120.14</td>
<td>68.47</td>
<td>8.84</td>
<td>55.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>107.68</td>
<td>66.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>2013</td>
<td>490.11</td>
<td>1,240.86</td>
<td>191.24</td>
<td>1,303.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>202.04</td>
<td>371.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>905.78</td>
<td>1,315.25</td>
<td>681.59</td>
<td>1,238.47</td>
<td></td>
</tr>
</tbody>
</table>

Table Down

Using table down applies the calculation down the columns of the pivot table, regardless of any grouping. For example, take the following pivot table.

Applying the running total function using table down gives you the following results, with column totals in the last row.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>BILLING</th>
<th>MOBILE</th>
<th>MARKETING</th>
<th>API</th>
<th>MOBILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>2012</td>
<td>472.25</td>
<td>117.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>364.28</td>
<td>402.25</td>
<td>101.2</td>
<td>210.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>250.67</td>
<td>1,050.08</td>
<td>586.96</td>
<td>1,339.43</td>
<td></td>
</tr>
<tr>
<td>EMEA</td>
<td>2014</td>
<td>135.44</td>
<td>401.04</td>
<td>350.2</td>
<td>501.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>120.14</td>
<td>68.47</td>
<td>8.84</td>
<td>55.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>107.68</td>
<td>66.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>2013</td>
<td>490.11</td>
<td>1,240.86</td>
<td>191.24</td>
<td>1,303.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>202.04</td>
<td>371.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>905.78</td>
<td>1,315.25</td>
<td>681.59</td>
<td>1,238.47</td>
<td></td>
</tr>
</tbody>
</table>
Using table across down applies the calculation across the rows of the pivot table, and then takes the results and reapplies the calculation down the columns of the pivot table.

For the running total and difference functions, you get the same results whether you apply the function using table across down or table down across, because of the way those functions are calculated. For all other functions, the results are different depending on whether you apply the function using table across down or table down across.

For example, take the following pivot table.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>BILLING</th>
<th>MARKETING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>API</td>
<td>MOBILE</td>
</tr>
<tr>
<td>AP</td>
<td>2012</td>
<td>67.25</td>
<td>117.15</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>316.28</td>
<td>492.25</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>1,054.01</td>
<td>1,038.36</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>588.96</td>
<td>561.32</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>66.01</td>
<td>120.86</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>1,230.86</td>
<td>191.24</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>371.89</td>
<td>861.35</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>1,315.25</td>
<td>681.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3,123.67</td>
</tr>
</tbody>
</table>

Applying the running total function using table across down or table down across gives you the following results, where totals are summed both down and across, with the grand total in the bottom right cell.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>BILLING</th>
<th>MARKETING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>API</td>
<td>MOBILE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>67.25</td>
<td>117.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>316.28</td>
<td>492.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,054.01</td>
<td>1,038.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>588.96</td>
<td>561.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66.01</td>
<td>120.86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,230.86</td>
<td>191.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>371.89</td>
<td>861.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,315.25</td>
<td>681.35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3,123.67</td>
</tr>
</tbody>
</table>

Applying the rank function using table across down, so that the initial ranks are determined across the table rows and then those ranks are in turn ranked down the columns, gives you the following results.
While applying the rank function using table down across, so that the initial ranks are determined down the table columns and then those ranks are in turn ranked across the rows, gives you the following results instead.

Table Down Across

Using table down across applies the calculation down the columns of the pivot table, then takes the results and re-applies the calculation across the rows of the pivot table.

For the running total and difference functions, you get the same results whether you apply the function using table down across or table across down, because of the way those functions are calculated. For all other functions, the results are different depending on whether you apply the function using table down across or table across down.

For example, take the following pivot table.

Applying the running total function using table down across or table across down gives you the following results, where totals are summed both down and across, with the grand total in the bottom right cell.
Applying the rank function using table down across, so that the initial ranks are determined down the table columns and then those ranks are in turn ranked across the rows, gives you the following results.

While applying the rank function using table across down, so that the initial ranks are determined across the table rows and then those ranks are in turn ranked down the columns, gives you the following results instead.

Group Across

Using group across applies the calculation across the rows of the pivot table within group boundaries, as determined by the second level of grouping applied to the columns. For example, if you group by state and then by city, grouping is applied at the state level. If you group by region, state, and city, grouping is again applied at the state level. When there is no grouping, group across returns the same results as table across.

For example, take the following pivot table where columns are grouped by service category and then by consumption channel.
Applying the running total function using group across gives you the following results, where the function is applied across the rows, bounded by the columns for each service category group. The Mobile columns display the total for both consumption channels for the given service category, for the customer region and year represented by the given row. For example, the highlighted cell represents the total for the AP region for 2012, for all consumption channels in the Billing service category.

Group Down

Using group down applies the calculation down the columns of the pivot table within group boundaries, as determined by the second level of grouping applied to the rows. For example, if you group by state and then by city, grouping is applied at the state level. If you group by region, state, and city, grouping is again applied at the state level. When there is no grouping, group down returns the same results as table down.

For example, take the following pivot table where rows are grouped by region and then by year.

Applying the running total function using group down gives you the following results, where the function is applied down the columns, bounded by the rows for each region group. The 2014 rows
display the total for all years for the given region, for the service category and consumption channel represented by the given column. For example, the highlighted cell represents the total for the Billing service category for the Mobile consumption channel, for all years in the AP region.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>API</th>
<th>MOBILE</th>
<th>API</th>
<th>MOBILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>2012</td>
<td>67.25</td>
<td>117.15</td>
<td>103.2</td>
<td>210.88</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>303.53</td>
<td>699.4</td>
<td>680.16</td>
<td>1560.51</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>634</td>
<td>1083.48</td>
<td>1210.24</td>
<td>2620.00</td>
</tr>
<tr>
<td>EMEA</td>
<td>2014</td>
<td>129.44</td>
<td>401.04</td>
<td>390.04</td>
<td>727.52</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>493.58</td>
<td>499.91</td>
<td>359.04</td>
<td>727.52</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>317.26</td>
<td>555.52</td>
<td>359.04</td>
<td>727.52</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>400.11</td>
<td>320.86</td>
<td>191.24</td>
<td>390.04</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>662.15</td>
<td>1603.75</td>
<td>120.89</td>
<td>2620.00</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>1563.93</td>
<td>3918</td>
<td>873.43</td>
<td>3364.5</td>
</tr>
</tbody>
</table>

Group Across Down

Using group across down applies the calculation across the rows within group boundaries, as determined by the second level of grouping applied to the columns. Then the function takes the results and re-applies the calculation down the columns of the pivot table, within group boundaries as determined by the second level of grouping applied to the rows. For example, if you group a row or column by state and then by city, grouping is applied at the state level. If you group by region, state, and city, grouping is again applied at the state level. When there is no grouping, group across down returns the same results as table across down.

For the running total and difference functions, you get the same results whether you apply the function using group across down or group down across, because of the way those functions are calculated. For all other functions, the results are different depending on whether you apply the function using group across down or group down across.

For example, take the following pivot table where columns are grouped by service category and then by consumption channel, and rows are grouped by region and then by year.

<table>
<thead>
<tr>
<th>customer_region</th>
<th>timestamp</th>
<th>API</th>
<th>MOBILE</th>
<th>API</th>
<th>MOBILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP</td>
<td>2012</td>
<td>67.25</td>
<td>117.15</td>
<td>103.2</td>
<td>210.88</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>316.28</td>
<td>492.25</td>
<td>101.2</td>
<td>210.88</td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>25047</td>
<td>1054.08</td>
<td>566.96</td>
<td>1393.63</td>
</tr>
<tr>
<td>EMEA</td>
<td>2014</td>
<td>155.44</td>
<td>401.04</td>
<td>353.02</td>
<td>701.84</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>120.14</td>
<td>86.47</td>
<td>8.04</td>
<td>55.8</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>107.68</td>
<td>66.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>460.11</td>
<td>1203.86</td>
<td>191.24</td>
<td>390.04</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>202.04</td>
<td>371.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2014</td>
<td>905.78</td>
<td>1315.25</td>
<td>681.19</td>
<td>1239.67</td>
</tr>
</tbody>
</table>

Applying the running total function using group across down or group down across gives you the following results, where totals are summed both down and across within the group boundaries. In this case, these are service category for the columns and customer region for the rows. The grand total appears in the bottom right cell for the group.
Applying the rank function using group across down gives you the following results, where the function is first applied across the rows bounded by each service category group. The function is then applied again to the results of that first calculation, this time applied down the columns bounded by each region group.

Applying the rank function using group down across gives you the following results instead, where the function is first applied down the columns bounded by each region group. The function is then applied again to the results of that first calculation, this time applied across the rows bounded by each service category group.

**Group Down Across**

Using group down across applies the calculation down the columns within group boundaries, as determined by the second level of grouping applied to the rows. Then Amazon QuickSight takes the results and reapplies the calculation across the rows of the pivot table. Again, it reapplies the calculation within group boundaries as determined by the second level of grouping applied to the columns. For example, if you group a row or column by state and then by city, grouping is applied at the state level. If you group by region, state, and city, grouping is again applied at the state level. When there is no grouping, group down across returns the same results as table down across.
For the running total and difference functions, you get the same results whether you apply the function using group down across or group across down, because of the way those functions are calculated. For all other functions, the results are different depending on whether you apply the function using group down across or group across down.

For example, take the following pivot table where columns are grouped by service category and then by consumption channel, and rows are grouped by region and then by year.

Applying the running total function using group down across or group across down gives you the following results. Here, totals are summed both down and across within the group boundaries, in this case service category for the columns and customer region for the rows. The grand total is in the bottom right cell for the group.

Applying the rank function using group down across gives you the following results, where the function is first applied down the columns bounded by each region group. The function is then applied again to the results of that first calculation, this time applied across the rows bounded by each service category group.

Applying the rank function using group across down gives you the following results instead, where the function is first applied across the rows bounded by each service category group. The function is then
applied again to the results of that first calculation, this time applied down the columns bounded by each region group.

Using Scatter Plots

Use scatter plots to visualize two or three measures for a dimension.

Each bubble on the scatter plot represents one item in the dimension. The X and Y axes represent two different measures that apply to the dimension. A bubble appears on the chart at the point where the values for the two measures for an item in the dimension intersect. Optionally, you can also use bubble size to represent an additional measure.

Scatter plots show up to 50 data points for the intersection of the X and Y axis values for visuals that don't use group/color. For visuals that do use group/color, scatter plots show up to 2500 data points. For more information about how we handle data that falls outside display limits, see Display Limits in Visuals (p. 315).

The icon for a scatter plot is as follows:

Scatter Plot Features

Use the following table to understand the features supported by scatter plots.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes, with exceptions</td>
<td>Scatter plots display a legend if you have the Group/Color field well populated.</td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Yes</td>
<td>You can set the range for both the X and Y axes.</td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>Yes</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding elements</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude a bubble in a scatter plot, except when you are using a date field as a dimension. In that case,</td>
<td>Focusing on Visual Elements (p. 256)</td>
</tr>
</tbody>
</table>

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### Creating a Scatter Plot

Use the following procedure to create a scatter plot.

1. On the analysis page, choose **Visualize** on the tool bar.
2. Choose **Add** on the application bar, and then choose **Add visual**.
3. On the **Visual types** pane, choose the scatter plot icon.
4. From the **Fields list** pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the **Count** aggregate function is automatically applied to it to create a numeric value.

To create a scatter plot, drag a measure to the **X axis** field well, a measure to the **Y axis** field well, and a dimension to the **Group/Color** field well. To represent another measure with bubble size, drag that measure to the **Size** field well.

5. (Optional) Add drill-down layers by dragging one or more additional fields to the **Group/Color** field well. For more information about adding drill-downs, see **Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)**.

### Using Tabular Reports

Use tabular reports to see a customized table view of your data.

To create a table visual, choose at least one field of any data type. You can add as many columns as you need. Plus, you can add calculated columns.

The icon for a table is as follows.

![Table Icon](image)

### Tabular Report Features

Tabular reports don't display a legend. You can hide or display the title on a tabular report.
Use the following table to understand the features supported by tabular reports.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>No</td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
<tr>
<td>Sorting</td>
<td>Yes</td>
<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Calculated Fields &amp;</td>
<td>Yes</td>
<td>Changing Field Aggregation (p. 271)</td>
</tr>
<tr>
<td>Aggregations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adding drill-downs</td>
<td>No</td>
<td>Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)</td>
</tr>
</tbody>
</table>

**Creating a Tabular Report**

Use the following procedure to create a tabular report (a table visual).

1. On the analysis page, choose **Visualize** on the tool bar.
2. Choose **Add** on the application bar, and then choose **Add visual**.
3. On the **Visual types** pane, choose the table icon.
4. From the **Fields list** pane, choose the fields you want to use. If you want to add a calculated field, choose **Add** on the application bar, and then choose **Add calculated field**.
   - To create a non-aggregated view of the data, add fields only to the **Value** field well. This shows data without any aggregations.
   - To create an aggregated view of the data, choose the fields you want to aggregate by, and then add them to the **Group by** field well.

**Using Tree Maps**

Use tree maps to visualize one or two measures for a dimension.

Each rectangle on the tree map represents one item in the dimension. Rectangle size represents the proportion of the value for the selected measure that the item represents compared to the whole for the dimension. You can optionally use rectangle color to represent another measure for the item. Rectangle color represents where the value for the item falls in the range for the measure, with darker colors indicating higher values and lighter colors indicating lower ones.

Tree maps show up to 100 data points for the group by field. For more information about how we handle data that falls outside display limits, see **Display Limits in Visuals (p. 315)**.

The icon for a tree map is as follows:
<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported?</th>
<th>Comments</th>
<th>For More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the legend display</td>
<td>Yes</td>
<td></td>
<td>Displaying the Visual Legend (p. 259)</td>
</tr>
<tr>
<td>Changing the title display</td>
<td>Yes</td>
<td></td>
<td>Displaying a Visual's Title (p. 259)</td>
</tr>
<tr>
<td>Changing the axis range</td>
<td>Not applicable</td>
<td></td>
<td>Changing the Axis Range (p. 261)</td>
</tr>
<tr>
<td>Changing the visual colors</td>
<td>No</td>
<td></td>
<td>Changing Visual Colors in Amazon QuickSight (p. 275)</td>
</tr>
<tr>
<td>Focusing on or excluding</td>
<td>Yes, with exceptions</td>
<td>You can focus on or exclude a rectangle from a tree map, except when you are using a date field as the dimension. In that case, you can only focus on a rectangle, not exclude it.</td>
<td>Focusing on Visual Elements (p. 256) Excluding Visual Elements (p. 257)</td>
</tr>
<tr>
<td>elements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorting</td>
<td>Yes</td>
<td>You can sort on the fields you choose for size, color, or to group by.</td>
<td>Sorting Visual Data in Amazon QuickSight (p. 282)</td>
</tr>
<tr>
<td>Field aggregation</td>
<td>Yes</td>
<td>You must apply aggregation to the fields you choose for size and color, and can't apply aggregation to the field you choose to group by.</td>
<td>Changing Field Aggregation (p. 271)</td>
</tr>
<tr>
<td>Adding drill-downs</td>
<td>Yes</td>
<td>You can add drill-down levels to the Group by field well.</td>
<td>Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310)</td>
</tr>
</tbody>
</table>

### Create a Tree Map

Use the following procedure to create a tree map.

1. On the analysis page, choose Visualize on the tool bar.
2. Choose Add on the application bar, and then choose Add visual.
3. On the Visual types pane, choose the tree map icon.
4. From the Fields list pane, drag the fields you want to use to the appropriate field wells. Typically, you want to use dimension or measure fields as indicated by the target field well. If you choose to use a dimension field as a measure, the Count aggregate function is automatically applied to it to create a numeric value.

To create a tree map, drag a measure to the Size field well and a dimension to the Group by field well. Optionally, drag another measure to the Color field well.

5. (Optional) Add drill-down layers by dragging one or more additional fields to the Group by field well. For more information about adding drill-downs, see Adding Drill-Downs to Visual Data in Amazon QuickSight (p. 310).
Working with Stories

You can use a story to preserve multiple iterations of an analysis and then play them sequentially to provide a narrative about the analysis data. For example, you might want to see several versions of the analysis, all with the same charts but with different filters applied.

A captured iteration of an analysis is called a scene. A scene preserves the visuals that are in the analysis at the time you create it, including such things as filtering and sort order. The data in the visuals is not captured as part of the scene. When you play the story, visuals will reflect the current data in the data set.

Every analysis comes with a default story called Storyboard 1. When working in an analysis, you can add scenes to Storyboard 1 by choosing Capture on the application bar. You can rename Storyboard 1 by using the procedure in Rename a Story or Scene (p. 376).

You can create additional stories as needed. If you have added other stories to the analysis, choosing Capture adds a scene to whichever story is currently selected.

View a Story

You can view the currently selected story for an analysis by choosing Story on the tool bar. To see or select other stories, choose the expand icon next to the currently selected story.
Create a Story

Use the following procedure to create a new story.

1. On the analysis page, choose **Story** on the tool bar.

2. Choose the add icon (+) at the top of the **Story** pane.

3. Type a story name and then choose **OK**. The new story is set as the current selected story.

Choose **Visualize** on the tool bar to return to viewing visuals again. Whenever you want to capture the current state of the analysis as a scene in the story, choose **Capture** on the application bar.

Rename a Story or Scene

You can rename stories, and also scenes within stories. Use the following procedure to rename a story or a scene.

1. On the analysis page, choose **Story** on the tool bar.
2. Select and drag to highlight the story or scene name you want to change.
3. Type a new name and then press **Enter**.

**Play a Story**

Use the following procedure to play a story.

1. On the analysis page, choose **Story** on the tool bar.
2. Choose the play icon on the scene you want to start playing from. The story plays, opening on the scene you selected.
3. Choose **PREVIOUS** or **NEXT** to step through the scenes in the story.

4. To stop playing the story, choose **STOP STORY**.
Delete a Story

You can delete the currently selected story by choosing the expand icon next to the story and then choosing **Delete**.
Working with Dashboards

A dashboard is a read-only snapshot of an analysis that you can share with other Amazon QuickSight users for reporting purposes. A dashboard preserves the configuration of the analysis at the time you create it, including such things as filtering and sort order. The data used for the analysis is not captured as part of the dashboard. When you view the dashboard, it will reflect the current data in the data sets used by the analysis.

When you share a dashboard, you specify which users have access to it. These users can view and filter the dashboard data. Any filters applied to the dashboard visuals exist only while the user is viewing the dashboard, and aren't saved once it is closed.

Use the following sections to learn how to create, share, and view dashboards.

Topics
- Creating and Sharing a New Dashboard (p. 380)
- Copying a Dashboard (p. 385)
- Deleting a Dashboard (p. 386)
- Sharing Dashboards (p. 387)
- Using Dashboards in Amazon QuickSight (p. 392)

Creating and Sharing a New Dashboard

Use the following procedure to create and optionally share a dashboard.

1. On the analysis page, choose Share on the application bar, and then choose Create dashboard.

2. Do one of the following:
   - Choose Create new dashboard as, and then type a dashboard name.
   - Choose Replace an existing dashboard, and then choose the dashboard to replace.
3. Choose **Create dashboard**.

4. Do one of the following:

   - Choose **Cancel** on the **Share with users in your account** screen to create a dashboard without sharing it now. Then, on the **Dashboard sharing** screen, choose **Close**. Doing this completes creating the dashboard. You can always share the new dashboard later.

   - Type the email or user name you want to share with on the **Share with users in your account** screen to create a dashboard and share it now. Then choose the user from the list that appears. Users who haven't yet used Amazon QuickSight don't appear in the list.

     **Important**

     Users who can access to the dashboard can also access the data used in the dashboard.
To add more users, choose +. Then type each user's email or user name. You can remove users by choosing the trashcan icon near the user that you want to remove.
Repeat this step until you have entered everyone that you want to share with, and then choose Share to confirm your choices.

5. (Optional) If you shared the dashboard in the previous step, the Dashboard sharing screen appears. Choose the users that you want to allow to create analyses based on the shared dashboard.
To allow a user to create analyses, choose Can create analyses near that user’s name. To revoke this access, choose x by that user’s name.

To add more users, choose Invite user. By doing this, you can add more users before closing this screen. You can also access this screen again by choosing to share the dashboard later.

To reshare the dashboard with the user, choose the Reshare icon next to that user’s name. Doing this sends them a new notification email.

Choose Close when you’re finished on this screen. If you let other users create analyses from your dashboard, a confirmation dialog box appears, shown following.
Copying a Dashboard

To create a new analysis or dashboard from an existing dashboard, choose Save As from the top menu. Doing so creates a new analysis. To create a new dashboard, share the new analysis as a dashboard.

After you have saved the original dashboard as a new analysis, you can collaborate on it by sharing the new analysis with other users. You can use this workflow to preserve a production version of the dashboard, while also developing or testing a new version of it.

Use the following procedure to copy a dashboard to a new one.

1. Open the dashboard you want to duplicate.
2. Choose Save As, and then type a name for the new analysis. When you save an existing dashboard using the Save As option, it creates the copied dashboard as an analysis.
3. (Optional) Make changes to the new analysis.

   At this point, you can share the analysis with other users so you can collaborate on changes. Although the saved dashboard remains a new analysis, all users who have access can make changes to the same analysis.

4. (Optional) To create a new dashboard with your changes, choose Share, and then Create Dashboard.
5. (Optional) To save the new dashboard, close the Share dashboard screen, then close the Dashboard sharing screen.
If you want to share the dashboard with other users, you can type these users' names or email addresses in these screens, rather than closing the screens. Otherwise, you can share the dashboard later by choosing Share from the new saved dashboard.

For more information on sharing dashboards, see Sharing Dashboards (p. 387). For more information on sharing analyses, see Sharing Analyses (p. 242).

Deleting a Dashboard

You can only delete dashboards you have published, not dashboards that have been shared with you. Use the following procedure to delete a dashboard.

1. On the All dashboards tab of the Amazon QuickSight start page, choose the details icon (vertical ⋮) on the dashboard you want to delete.

2. Choose Delete.

3. To confirm that you want to delete it, choose Delete again.
Sharing Dashboards

After you create a dashboard, you can share it with additional users. Once you share a dashboard, you can review the other users that have access to it, and also revoke access from any user.

**Note**
In some cases, for dashboards shared before Sept 25 2017, the user setting for Can create analyses can become locked in the off setting. To fix this, enable the option, and reshare the dashboard with that user. Refresh the screen to see the most current settings.

**Topics**
- View the Users a Dashboard is Shared With (p. 387)
- Share an Existing Dashboard (p. 388)
- Reshare a Dashboard with a User (p. 390)
- Revoke Access to a Dashboard (p. 391)

**View the Users a Dashboard is Shared With**

Use the following procedure to see which users have access to the dashboard.

1. On the dashboard page, choose Share on the application bar.
2. Review the users under Username. You can also see their Role and Settings.

You can search to locate a specific user account by typing a search term into Search users. Any user account user name or email address that contains the search term is shown. Searching is case-sensitive, and wildcards are not supported. Delete the search term to return to viewing all user accounts.
Share an Existing Dashboard

Use the following procedure to share a dashboard.

1. On the dashboard page, choose **Share** on the application bar.
2. Choose **Invite user**.
3. In the **Type a user name or email** box, type the user name of a person with whom you want to share this dashboard and then press **Enter**. You can only share with users who belong to the current Amazon QuickSight account. The users must also have used Amazon QuickSight at least once, to finish creating their account.

Repeat this step until you have entered information for everyone you want to share the dashboard with.
Reshare a Dashboard with a User

Use the following procedure if you need to resend a share email to someone.

1. On the dashboard page, choose Share on the application bar.
2. Under Action, locate the user account to reshare with and then choose the Reshare icon. When you choose Reshare, Amazon QuickSight sends a new email to that user. (No confirmation message displays.)
3. Choose **Confirm**.

**Revoke Access to a Dashboard**

Use the following procedure to revoke user access to a dashboard.

1. On the dashboard page, choose **Share** on the application bar.
2. Under **Action**, locate the user account whose access you want to revoke and then choose **X**.
Using Dashboards in Amazon QuickSight

Use this section to learn more about how to view, filter, and export dashboards.

Topics

- Viewing Dashboard Data (p. 392)
- Filtering Dashboard Data (p. 392)
- Export Data from a Dashboard to a CSV file (p. 393)

Viewing Dashboard Data

You can scroll through and view the details of any visual in a dashboard, and focus on or exclude visual elements, the same way you can in an analysis. You can also update chart colors on the visuals. Any changes you make exist for your current viewing session only, and aren’t saved. For more information about viewing visual data, see Viewing Visual Data in Amazon QuickSight (p. 254). For more information about changing chart colors, see Changing Visual Colors in Amazon QuickSight (p. 275).

Filtering Dashboard Data

You can filter the data of any visual in a dashboard, the same way you can in an analysis, but filters in dashboards exist for your current viewing session only, and aren’t saved. For more information about filtering visual data, see Filtering Visual Data in Amazon QuickSight (p. 284).
Export Data from a Dashboard to a CSV file

To export data from an analysis or dashboard to a comma-separated values (CSV) file, follow the procedure in Exporting Data from an Amazon QuickSight Visual to a CSV File (p. 249).
Administration

Welcome to the administrator’s guide for Amazon QuickSight! This guide is intended to consolidate Amazon QuickSight administrative tasks into one area. The guide contains information about controlling access, managing accounts, and choosing editions and regions.

If you like what you see here, let us know. (Click one of the feedback buttons below).

Topics
- Editions (p. 394)
- AWS Regions and IP Address Ranges (p. 396)
- Signing Up for Amazon QuickSight (p. 397)
- Managing User Access in Amazon QuickSight (p. 405)
- Managing Amazon QuickSight Usage (p. 420)
- Working with AWS Services (p. 435)

Editions

Amazon QuickSight offers Standard and Enterprise editions. Use this topic to learn more about the differences in availability, user management, permissions, and security between the two versions.

Both editions offer a full set of features for creating and sharing data visualizations. Enterprise edition additionally offers encryption at rest and Microsoft Active Directory (AD) integration. In Enterprise edition, you select a Microsoft AD directory in AWS Directory Service. You use that active directory to identify and manage your Amazon QuickSight users and administrators.

For more information about the features offered by the Amazon QuickSight editions and also pricing, see Amazon QuickSight.

Availability

Currently, you must choose the US East (N. Virginia) Region as your Amazon QuickSight capacity region if you want to use Amazon QuickSight Enterprise edition. The Microsoft AD directory you select to integrate with Amazon QuickSight must reside in that region. This region is also where default SPICE capacity for your account is allocated. You can still access AWS resources in any AWS Region, and also purchase SPICE capacity in any region supported by Amazon QuickSight.

User Management

User management is different between the Amazon QuickSight Standard and Enterprise editions. Both editions support identity federation, or federated single-signon (SSO), through Security Assertion Markup Language 2.0 (SAML 2.0).

User Management for Standard Edition

In Standard edition, you can invite an AWS Identity and Access Management (IAM) user and allow that user to use their credentials to access Amazon QuickSight. Alternatively, you can invite any person with...
an email address to create an Amazon QuickSight–only user account. When you create a user account, Amazon QuickSight sends email to that user inviting them to activate their account.

When you create a user account, you also choose to assign it either an administrative or a user role. This role assignment determines the user’s permissions in Amazon QuickSight. You perform all management of users by adding, changing, and deleting user accounts in Amazon QuickSight.

For more information about managing Standard edition user accounts, see Managing User Accounts in Amazon QuickSight Standard Edition (p. 405).

User Management for Enterprise Edition

In Enterprise edition, you can select one or more Microsoft AD active directory groups in AWS Directory Service for administrative access. All users in these groups are authorized to sign in to Amazon QuickSight as administrators. You can also select one or more Microsoft AD active directory groups in AWS Directory Service for user access. All users in these groups are authorized to sign in to Amazon QuickSight as users.

**Important**
Administrators and users added in this way are not automatically notified of their access to Amazon QuickSight. You must email users with the sign-in URL, the account name, and their credentials.

You can only add or remove Enterprise edition user accounts by adding or removing a person from a Microsoft AD group that you associated with Amazon QuickSight. When you add a user account, the permissions it gets rely on whether the Microsoft AD group is an administrative group or a user group in Amazon QuickSight.

You can also bulk add or remove user accounts by integrating Microsoft AD groups with, or removing Microsoft AD groups from, Amazon QuickSight.

Deactivating a user by removing the user from a Microsoft AD group, or by removing their Microsoft AD group from integration with Amazon QuickSight, doesn't delete the associated Amazon QuickSight user account for that person.

For more information about managing Enterprise edition user accounts, see Managing User Accounts in Amazon QuickSight Enterprise Edition (p. 414).

Permissions

For Standard edition, all Amazon QuickSight administrative users have permissions to manage subscriptions and SPICE capacity. They can also add, modify, and delete user accounts.

Additional AWS permissions are required to manage Amazon QuickSight permissions to AWS resources and to unsubscribe from Amazon QuickSight. These tasks can only be performed by an IAM user who also has administrative permissions in Amazon QuickSight, or by the IAM user or AWS account that created the Amazon QuickSight account.

For Enterprise edition, all Microsoft AD users that are added as Amazon QuickSight administrative users have permissions to manage subscriptions and SPICE capacity. In Enterprise edition, you must add AD users or groups to an IAM role that has QuickSight permissions, rather than adding IAM users individually.

Additional AWS permissions are required to manage Microsoft AD groups and Amazon QuickSight permissions to AWS resources, and to unsubscribe from Amazon QuickSight. The administrative user is prompted for AWS or IAM credentials to perform these tasks.

For more information about the permissions needed for tasks that affect AWS resources, see Setting Your IAM Policy (p. 453).
Secure Transmission and Storage

In both editions of Amazon QuickSight, all transfers of data (for example, from the data source to SPICE, or from SPICE to the user interface) are encrypted. Database connections are secured using Secure Sockets Layer (SSL), and all other transfers are secured using Transport Layer Security (TLS).

In Enterprise edition, data at rest in SPICE is also encrypted using block-level encryption with AWS-managed keys.

AWS Regions and IP Address Ranges

AWS cloud computing resources are housed in highly available data center facilities in different areas of the world (for example, North America, Europe, or Asia). Each data center location is called a region. For more information about AWS regions, see Global Infrastructure.

Amazon QuickSight is currently supported in the following regions and IP address ranges.

<table>
<thead>
<tr>
<th>Region</th>
<th>IP address range</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East (Ohio) (us-east-2)</td>
<td>52.15.247.160/27</td>
</tr>
<tr>
<td>US East (N. Virginia) (us-east-1)</td>
<td>52.23.63.224/27</td>
</tr>
<tr>
<td>US West (Oregon) (us-west-2)</td>
<td>54.70.204.128/27</td>
</tr>
<tr>
<td>EU (Ireland) (eu-west-1)</td>
<td>52.210.255.224/27</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>13.229.254.0/27</td>
</tr>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>54.153.249.96/27</td>
</tr>
</tbody>
</table>

When you sign up for Amazon QuickSight, you select a home region. This is the AWS Region where you want Amazon QuickSight to allocate the SPICE capacity associated with any user accounts you create. Typically, this will be the region closest to your physical location, and the same region where you have the majority of your other AWS resources (like Amazon RDS instances). For more information about how SPICE capacity is allocated, see Managing SPICE Capacity (p. 429).

When you sign in to Amazon QuickSight using the default URL of quicksight.aws.amazon.com, the US East (N. Virginia) (us-east-1) region is selected by default. If you sign in using a URL that specifies a supported region, for example us-west-2-quicksight.aws.amazon.com, the region specified in the URL is selected. You can change to other supported regions by using the region selector on the right side of the application bar.

You can autodiscover your Amazon RDS instances and Amazon Redshift clusters that run in any of the AWS regions that Amazon QuickSight supports. If you enable autodiscovery, the autodiscovered
resources displayed reflect whatever region you currently have selected. You can still use AWS resources in other regions by manually creating connections to them. For more information about enabling autodiscovery of AWS data stores, see Authorizing Connections from Amazon QuickSight to AWS Data Stores (p. 436).

It is important to remember that each region is completely independent. Any Amazon QuickSight resources you create, like data sets and analyses, exist only in the region in which you create them, and can't be moved to other regions.

### Signing Up for Amazon QuickSight

If you are new to AWS and don't have any AWS resources that you want to make available in Amazon QuickSight, use Sign Up for Amazon QuickSight with a New AWS Account (p. 398) to create an Amazon QuickSight account.

If you have an existing AWS account and want to integrate your AWS resources with Amazon QuickSight, or if you want to use AWS Identity and Access Management (IAM) user credentials to create an Amazon QuickSight account, use Sign Up for Amazon QuickSight with an Existing AWS Account (p. 399) to create an Amazon QuickSight account.

If your organization has an existing Amazon QuickSight account and you want to request access to it, follow the procedure in Request Access to an Existing Amazon QuickSight Account (p. 402).

**Topics**
- Check Your Browser (p. 397)
- Sign Up for Amazon QuickSight with a New AWS Account (p. 398)
- Sign Up for Amazon QuickSight with an Existing AWS Account (p. 399)
- Request Access to an Existing Amazon QuickSight Account (p. 402)

### Check Your Browser

Before you start working with Amazon QuickSight, use the following table to verify that your browser is supported for Amazon QuickSight access.

<table>
<thead>
<tr>
<th>Browser</th>
<th>Version</th>
<th>Check Your Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Safari</td>
<td>7, 8, 9</td>
<td>Open Safari. On the menu, choose Safari, and then choose About Safari. The version number is shown in the dialog box that displays.</td>
</tr>
<tr>
<td>Google Chrome</td>
<td>Last 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>Microsoft Edge</td>
<td>Latest version</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Microsoft Internet Explorer</td>
<td>11</td>
<td>Open Internet Explorer, choose the Tools icon, and then choose About Internet Explorer.</td>
</tr>
</tbody>
</table>
### Sign Up for Amazon QuickSight with a New AWS Account

If you are new to AWS and don't have any AWS resources that you want to make available in Amazon QuickSight, use the following procedure to create an Amazon QuickSight Standard edition account. If you want to connect to AWS resources, or integrate user accounts from a Microsoft AD directory in AWS Directory Service, see [Sign Up for Amazon QuickSight with an Existing AWS Account](#) for more information.

When you have finished signing up, you can proceed with connecting to data and creating analyses. For more information about creating your first analysis, see [Getting Started](#). You can also invite other users to access Amazon QuickSight. For more information, see [Managing User Accounts in Amazon QuickSight Standard Edition](#).

#### To create an AWS account and an Amazon QuickSight account

1. Go to [https://quicksight.aws](https://quicksight.aws) and choose **Try for free**. For information about QuickSight pricing, including the limits for free tier and free trial usage, see [Amazon QuickSight Pricing](#).
2. On the **Sign In or Create an AWS Account** page, choose **I am a new user**, and then choose **Sign in using our secure server**. Follow the online instructions to create an AWS account. Part of the sign-up procedure involves receiving a phone call and entering a PIN using the phone keypad.
3. Choose **Standard edition**, and then choose **Continue**.
4. For **QuickSight account name**, type a unique account name for your company or team. It should be representative of your organization if possible, for example **examplecompany** or **examplecompany-finance**. Account names are unique in Amazon QuickSight, so if you expect to have multiple Amazon QuickSight accounts within your company, you should plan ahead to avoid any conflict.
   
   Your account name can only contain characters (A–Z and a–z), digits (0–9), and hyphens (-).
5. For **Notification email address**, type the email address where Amazon QuickSight should send service and usage notifications.
6. For **QuickSight capacity region**, choose the AWS Region where you want Amazon QuickSight to allocate the SPICE capacity associated with any user accounts you create. Typically, this is the region closest to your physical location. For more information about using AWS Regions with Amazon QuickSight, see [AWS Regions and IP Address Ranges](#). For more information about how SPICE capacity is allocated, see [Managing SPICE Capacity](#).
7. Leave **Enable autodiscovery of your data and users in your AWS Redshift, RDS, and IAM services** selected to allow Amazon QuickSight to autodiscover any of these types of resources associated with your AWS account. Alternatively, expand this section and deselect the individual options for the resources that you don't want to use with Amazon QuickSight.
8. If you have Amazon S3 buckets, choose **Amazon S3 (all buckets)** to allow Amazon QuickSight to access all of them, or choose **Choose S3 buckets** to select specific buckets.
9. If you have Amazon Athena databases, choose **Athena** to allow Amazon QuickSight to access them. If you choose to use Athena as a data source, make sure that in the prior step you have enabled Amazon QuickSight access to the Amazon S3 buckets in which your Athena data resides.

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<table>
<thead>
<tr>
<th>Browser</th>
<th>Version</th>
<th>Check Your Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mozilla Firefox</td>
<td>Last three versions</td>
<td>Open Firefox. On the menu, choose the Help icon, and then choose <strong>About Firefox</strong>. The version number is listed underneath the Firefox name.</td>
</tr>
</tbody>
</table>

**Note**
When you create an Amazon QuickSight account, an AWS Directory Service directory is created in the US East (N. Virginia) (us-east-1) Region, which Amazon QuickSight uses for account management. You are not charged for this directory, and it is automatically deleted if you unsubscribe from Amazon QuickSight.

11. Choose **Go to Amazon QuickSight**.

## Sign Up for Amazon QuickSight with an Existing AWS Account

Use this topic to sign up for Amazon QuickSight using an existing AWS account.

Amazon QuickSight accounts are provisioned by AWS accounts. Once set up for a specific AWS account, Amazon QuickSight can be integrated with your AWS resources such as data sources or active directories.

**Note**
Before you begin, you must have a way to connect to an existing AWS account. Then you can integrate your AWS resources (such as data sources or active directories) with Amazon QuickSight. If your company already has an AWS account, contact your administrator if you need assistance. If you don't already have an AWS account and you want to create one, see **Sign Up for Amazon QuickSight with a New AWS Account** (p. 398) for more information.

Users in your organization who use Amazon QuickSight are part of an Amazon QuickSight account. They can be IAM users. Alternatively, they can be users who only have access to Amazon QuickSight. To avoid confusion, we refer to all Amazon QuickSight users as **QuickSight users** or **QuickSight administrators**.

For details on setting up AWS users and permissions for Amazon QuickSight, see **AWS Identity and Access Management (IAM) Users, Roles, and Policies** (p. 453).

## Create an Amazon QuickSight Account

After you have completed any needed configuration of your existing AWS resources, as discussed preceding, use the following procedures to create an Amazon QuickSight account.

### To create an Amazon QuickSight account

1. Follow the instructions in **Sign In to Your AWS Root Account or an AWS Account with Administrator Access** (p. 400).

2. Do one of the following:
   a. To integrate user accounts from a Microsoft AD directory in AWS Directory Service, follow the instructions in **Create an Amazon QuickSight Enterprise Edition Account** (p. 401).
   b. If you don’t want to integrate user accounts from an active directory, follow the instructions in **Create an Amazon QuickSight Standard Edition Account** (p. 401).

When you have finished signing up, you can connect to your data and start to create analyses. For more information about creating your first analysis, see **Getting Started** (p. 5).

For more information about managing users in Amazon QuickSight Standard edition, see **Managing User Accounts in Amazon QuickSight Standard Edition** (p. 405).

For more information about managing users in Amazon QuickSight Enterprise edition, see **Managing User Accounts in Amazon QuickSight Enterprise Edition** (p. 414).
Sign In to Your AWS Root Account or an AWS Account with Administrator Access

Start the Amazon QuickSight sign-up process and sign in to your AWS account.

To sign in to your AWS root account or an account with administrator access

1. Go to https://quicksight.aws and choose Sign up for free. For information about Amazon QuickSight pricing, including the limits for free tier and free trial usage, see Amazon QuickSight Pricing.
2. On the Sign In or Create an AWS Account page, type your email address, choose I am a returning user and my password is, type your password, and then choose Sign in using our secure server.
3. Go to Create an Amazon QuickSight Standard Edition Account (p. 401) if you want to use Amazon QuickSight Standard edition or Create an Amazon QuickSight Enterprise Edition Account (p. 401) if you want to use Amazon QuickSight Enterprise edition.
4. When you are done signing in to AWS, the Amazon QuickSight sign up page displays. Here, you specify an account name, an email address for Amazon QuickSight notifications, and a home capacity region:
   - For QuickSight account name, Amazon QuickSight defaults to the IAM alias for your AWS account, if you have one. Type a unique account name for your company and team. It should be representative of your organization if possible, for example examplecompany or examplecompany-finance.
   - Your account name can only contain characters (A–Z and a–z), digits (0–9), and hyphens (-).
   - Note
     Account names are unique in Amazon QuickSight. Thus, if you expect to have multiple Amazon QuickSight accounts within your company, you should plan ahead to avoid any conflict.
   - For Notification email address, type the email address where Amazon QuickSight should send service and usage notifications.
   - For QuickSight capacity region, choose the AWS Region where you want Amazon QuickSight to allocate the SPICE capacity for all your users. Typically, this region is the same one where you have the majority of your other AWS resources (like Amazon RDS DB instances). For more information about using AWS regions with Amazon QuickSight, see AWS Regions and IP Address Ranges (p. 396). For more information about how SPICE capacity is allocated, see Managing SPICE Capacity (p. 429).
5. Choose Continue.
   - Note
     When you create an Amazon QuickSight account, an AWS Directory Service directory is created in the US East (N. Virginia) (us-east-1) Region, which Amazon QuickSight uses for account management. You are not charged for this directory, and it is automatically deleted if you unsubscribe from Amazon QuickSight.
6. On the Grant Amazon QuickSight read-only access to AWS resources page, choose to enable all the services you want to autodiscover from Amazon QuickSight.
   - Important
     You can enable any or all of these options. We recommend leaving these options selected even if you don't currently use a given service. Selecting them makes it possible for Amazon QuickSight to access AWS resources you might create in the future.
7. Choose Finish and go to Amazon QuickSight.

Create an Amazon QuickSight Standard Edition Account

Create an Amazon QuickSight Standard edition account as described following.

To create a Standard edition account

1. In Amazon QuickSight, choose Standard edition, and then choose Continue.
2. For QuickSight account name, type a unique account name for your company and team. This name should be representative of your organization if possible, for example examplecompany or examplecompany-finance.

   Note
   Account names are unique in Amazon QuickSight. Thus, if you expect to have multiple Amazon QuickSight accounts within your company, you should plan ahead to avoid any conflict.

3. For Notification email address, type the email address where Amazon QuickSight should send service and usage notifications.

4. For QuickSight capacity region, choose the AWS Region where you want Amazon QuickSight to allocate the SPICE capacity for all your users. Typically, this is the same region where you have the majority of your other AWS resources (like Amazon RDS instances). For more information about using AWS Regions with Amazon QuickSight, see AWS Regions and IP Address Ranges (p. 396). For more information about how SPICE capacity is allocated, see Managing SPICE Capacity (p. 429).

5. Leave Enable autodiscovery of your data and users in your AWS Redshift, RDS, and IAM services selected to allow Amazon QuickSight to autodiscover any of these types of resources associated with your AWS account. Alternatively, expand this section and deselect the individual options for the resources that you don’t want to use with Amazon QuickSight.

6. If you have Amazon S3 buckets, choose Amazon S3 (all buckets) to allow Amazon QuickSight to access all of them, or choose Choose S3 buckets to select specific buckets.

7. If you have Amazon Athena databases, choose Athena to allow Amazon QuickSight to access them. If you choose to use Athena as a data source, make sure that in the prior step you have enabled Amazon QuickSight access to the Amazon S3 buckets in which your Athena data resides.


   Note
   When you create an Amazon QuickSight account, an AWS Directory Service directory is created in the US East (N. Virginia) (us-east-1) Region, which Amazon QuickSight uses for account management. You are not charged for this directory, and it is automatically deleted if you unsubscribe from Amazon QuickSight.

9. Choose Go to Amazon QuickSight.

Create an Amazon QuickSight Enterprise Edition Account

Create an Amazon QuickSight Enterprise edition account as described following.

To create an Enterprise edition account

1. In Amazon QuickSight, choose Enterprise edition, and then choose Continue.
2. Under Active directory, choose Select a directory, and then choose the Microsoft AD that contains the user accounts you want to integrate with Amazon QuickSight. If you don’t see that directory, choose Refresh list. If you want to create a new directory rather than using an existing one, choose Create directory to go to the AWS Directory Service console.
Currently, Amazon QuickSight Enterprise edition is available only in the US East (N. Virginia) Region, so the Microsoft AD you select must reside in that region. The US East (N. Virginia) Region is also where default SPICE capacity for your account is allocated if you choose to use Enterprise edition.

3. Choose Authorize to grant Amazon QuickSight administrative permissions to the directory you selected. Authorization allows Amazon QuickSight to list, add, and remove users and groups from this directory.

4. If there is a default alias for the active directory you selected, it is used as your Amazon QuickSight account name. If not, type an account name in QuickSight account name. The account name should be representative of your organization if possible, for example examplecompany or examplecompany-finance.

   Note
   Account names are unique in Amazon QuickSight. Thus, if you expect to have multiple Amazon QuickSight accounts within your company, you should plan ahead to avoid any conflict.

   Your account name can only contain characters (A–Z and a–z), digits (0–9), and hyphens (-).

5. For Admin group, type the name of administrator group you want to use.

   All users in this group have Amazon QuickSight user accounts with administrative privileges created for them. You are charged for each user that activates their Amazon QuickSight account.

   If you want to add another administrator group, choose Add another admin group, and then type an administrator group into the new box that displays.

   Repeat until you have added all of the administrator groups you want to use.

6. For User group, type the name of the user group you want to use.

   All users in this group have Amazon QuickSight user accounts with user privileges created for them. You are charged for each user that activates their Amazon QuickSight account.

   If you want to add another user group, choose Add another user group, and then type a user group into the new box that displays.

   Repeat until you have added all of the user groups you want to use.

7. Leave Enable autodiscovery of your data and users in your AWS Redshift, RDS, and IAM services selected to allow Amazon QuickSight to autodiscover any of these types of resources associated with your AWS account. Alternatively, expand this section and deselect the individual options for the resources that you don't want to use with Amazon QuickSight.

8. If you have Amazon S3 buckets, choose Amazon S3 (all buckets) to allow Amazon QuickSight to access all of them, or choose Choose S3 buckets to select specific buckets.

9. If you have Amazon Athena databases, choose Athena to allow Amazon QuickSight to access them. If you choose to use Athena as a data source, make sure that in the prior step you have enabled Amazon QuickSight access to the Amazon S3 buckets in which your Athena data resides.


11. Choose Go to Amazon QuickSight.

Request Access to an Existing Amazon QuickSight Account

   Note
   If you are the AWS account administrator, you can enable self-provisioning for Amazon QuickSight by setting an IAM policy on a role with permissions for CreateUser or
Request Access to an Existing Amazon QuickSight Account

CreateAdmin. To learn more about this, see AWS Identity and Access Management (IAM) Users, Roles, and Policies (p. 452).

If your organization has already signed up for Amazon QuickSight, you can ask your Amazon QuickSight administrator to add you as a user. Your Amazon QuickSight administrator is the person whose AWS account or IAM credentials were used to create the Amazon QuickSight account.

For Standard edition accounts, your Amazon QuickSight administrator can give you access through your IAM credentials, through Single Sign-On (SSO), or through your email address. Use the Getting Access as a New Amazon QuickSight Standard Edition User section for more information about signing up as a Standard edition user.

If you have an Enterprise edition account, your Amazon QuickSight administrator must add your network user account to an active directory group that is associated with Amazon QuickSight. Use the Getting Access as a New Amazon QuickSight Enterprise Edition User section for more information about signing up as an Enterprise edition user.

After you sign in for the first time, you can connect to data and creating analyses. For more information about creating your first analysis, see Getting Started (p. 5).

Getting Access as a New Amazon QuickSight Standard Edition User

Your Amazon QuickSight administrator uses either your IAM credentials, your Single Sign-On (SSO) service, or your email address to create your Amazon QuickSight user account. Then Amazon QuickSight sends you an email inviting you to activate it. The invitation email you receive indicates what type of credentials you should use.

Note

If your company is using a Single Sign-On (SSO) service with Amazon QuickSight, your administrator provides instructions on how to sign in. For more information on how this is set up, see Enabling Single Sign-On Access to Amazon QuickSight Using SAML 2.0 (p. 410).

Signing In as a New User Using Credentials Based on Your Email Address

Use the following procedure to sign in as a new user who has an Amazon QuickSight–only account based on an email address.

To sign in as a new user who has an account based on an email address

1. In your invitation email, choose the link in the body of the email to open the Amazon QuickSight sign-up page.
2. Complete your user account by typing a password.
   - Passwords are case-sensitive, must be between 8 and 64 characters in length, and must contain at least one character from three of the following four categories:
     - Lowercase letters (a–z)
     - Uppercase letters (A–Z)
     - Numbers (0–9)
     - Nonalphanumeric characters (~!@#$%^&*_-+=`|(){}[]:;"'<>,.?/)
3. Choose Create account and sign in.
4. Choose Continue. Doing this takes you to the Amazon QuickSight start page.

Signing In as a New User Using Your IAM Credentials

Use the following procedure to sign in to Amazon QuickSight as a new user who has IAM credentials.
To sign in as a new user with IAM credentials

1. When you receive the invitation email, go to the Amazon QuickSight sign in page, https://quicksight.aws.
2. For **Account name**, type the account name in your invitation email, and then choose **Continue**.
3. Type your IAM user name in **Email address or username**.
4. Type your IAM password in **Password**.
5. Choose **Sign in**.

Self-Provisioning an Amazon QuickSight user

Use the following procedure to sign in to Amazon QuickSight as a new user who has access to Amazon QuickSight, but has not yet created a login. For this process to work, the AWS administrator must have granted permissions, using an AWS user or group policy in IAM. For more information, see AWS Identity and Access Management (IAM) Users, Roles, and Policies (p. 452).

To sign in as a new user with access but no login

1. When you are invited to do so, go to the Amazon QuickSight sign in page, https://quicksight.aws.
2. For **Account name**, type the Amazon QuickSight account name (not the AWS account number). Your administrator or manager might provide this name. Then choose **Continue**.
3. Type your new Amazon QuickSight user name in **Email address or username**.
4. Type your new Amazon QuickSight password in **Password**.
5. Choose **Sign in**.

Self-Provisioning an Amazon QuickSight administrator

Use the following procedure to set or create the administrator for Amazon QuickSight. This procedure does not require using an alias for your account or your directory.

To make a user the Amazon QuickSight administrator

1. Create the AWS user
   - Use IAM to create the user you want to be the administrator of Amazon QuickSight. Or, identify an existing user in IAM for the administrator role. If you prefer, you can put the user inside a new group, for manageability.
   - Grant the user (or group) sufficient permissions, as described in Setting Your IAM Policy (p. 453).
   - For more information on working with IAM, see AWS Identity and Access Management (IAM) Users, Roles, and Policies (p. 452).
2. Log in to your AWS console with the target user's credentials.
4. Type in your email, and choose **Continue**
5. On success, the target IAM user is now an Amazon QuickSight administrator.

Getting Access as a New Amazon QuickSight Enterprise Edition User

After your Amazon QuickSight administrator adds your network user account to an active directory group associated with Amazon QuickSight, the administrator must notify you. At that point, the administrator should provide you with the information that you need to activate your Amazon
QuickSight user account. This information must include the Amazon QuickSight account name you use to sign in.

Use the following procedure to sign in to Amazon QuickSight as a new Enterprise edition user.

**To sign in as a new Enterprise edition user**

1. When you receive notification from your administrator, go to the Amazon QuickSight sign in page, https://quicksight.aws.
2. For **Account name**, type the account name in your administrator provided to you, and then choose **Continue**.
3. Type your network user name in **Email address or username**.
4. Type the associated password in **Password**.
5. Choose **Sign in**.

**Managing User Access in Amazon QuickSight**

Use the following topics to manage user access to Amazon QuickSight, and Amazon QuickSight access to AWS resources.

**Topics**

- Managing User Accounts in Amazon QuickSight Standard Edition (p. 405)
- Enabling Single Sign-On Access to Amazon QuickSight Using SAML 2.0 (p. 410)
- Managing User Accounts in Amazon QuickSight Enterprise Edition (p. 414)
- Closing Your Amazon QuickSight Account (p. 418)

**Managing User Accounts in Amazon QuickSight Standard Edition**

Use this topic to learn more about managing user accounts in Amazon QuickSight Standard edition. For information about managing user accounts in Amazon QuickSight Enterprise edition, see Managing User Accounts in Amazon QuickSight Enterprise Edition (p. 414).

If you have administrative privileges in Amazon QuickSight, you can create and delete user accounts. You can create user accounts based on AWS Identity and Access Management (IAM) credentials, or you can create Amazon QuickSight-only user accounts using the email address of the user. You can’t create Amazon QuickSight user accounts using non-IAM AWS credentials.

Each Amazon QuickSight Standard edition account can have up to 100 user accounts, including the AWS root account or IAM account that created the Amazon QuickSight account. If you need an exception to this limit, follow the instructions at AWS Service Limits to submit a limit increase request.

Use the following procedures to add, view, and delete Amazon QuickSight Standard edition user accounts.

**Inviting Users to Access Amazon QuickSight**

You can invite any person with a valid email address to use Amazon QuickSight. When they sign up, a new Amazon QuickSight-only user account is created for them. You can also invite IAM users in your AWS account to use Amazon QuickSight. In this case, they can use their IAM credentials to sign in to Amazon QuickSight. Any IAM user you invite must have a password associated with their IAM credentials, and you must also have an email address for them.
User accounts are created in two steps. First, you invite a user to join Amazon QuickSight. This creates an inactive user account in Amazon QuickSight, and sends an invitation email to the user. When the user accepts the invitation and signs in for the first time, the user creates a password to activate the user account.

For information about signing in for the first time as an invited user, see Getting Access as a New Amazon QuickSight Standard Edition User (p. 403).

Use the following procedure to invite a user to access Amazon QuickSight.

1. Choose your user name on the application bar and then choose **Manage QuickSight**.

2. Choose **Manage Users**.

3. Choose **Invite users**.

4. In the **Type an IAM user name or email** box, type the IAM user name or the email address of a person to whom you want to grant access to Amazon QuickSight and then press **Enter**. Note that a user's IAM user name may be the same as their email address, and this is fine.

   Repeat this step until you have entered information for everyone you want to invite.

5. For **Email**, type an email address for the user account.

6. For **IAM User**, verify that it says **Yes** for accounts that are associated with IAM users, and **No** for those that are Amazon QuickSight-only.

7. For **Role**, choose the role to assign to each person you are inviting. A role determines the permission level to grant to that user account.

   - Choose **USER** if you want the user to be able to use Amazon QuickSight but not perform any administrative tasks like managing users or purchasing SPICE capacity.
   - Choose **ADMIN** if you want the user to be able to both use Amazon QuickSight and perform administrative tasks.
There are some differences in what administrative tasks IAM admin users and Amazon QuickSight admin users can perform, because some administrative tasks require permissions in AWS, which Amazon QuickSight-only users lack.

- Amazon QuickSight admin users can manage users, SPICE capacity, and subscriptions.
- IAM admin users can manage users, SPICE capacity, and subscriptions as well. They can also manage Amazon QuickSight permissions to AWS resources, and unsubscribe from Amazon QuickSight.

If you are creating an IAM admin user, check with your AWS administrator and make sure that user has the all necessary statements in their IAM permissions policy to work with Amazon QuickSight resources. For more information about what statements are required, see Setting Your IAM Policy (p. 453).

8. Choose Invite.

Resend an Invitation to a User

The sign-up URL in the invitation email expires after 24 hours. Use the following procedure if you need to resend an invitation to someone.

1. Choose your user name on the application bar and then choose Manage QuickSight.
2. Choose Manage Users.
3. Find the entry for the person you want to re-invite, and choose Resend invitation.
4. Choose Confirm.

Viewing User Account Details

After a user account is created, you can view the account on the Manage Users page. Use the following procedure to view a user account.

1. Choose your user name on the application bar and then choose Manage QuickSight.
2. Choose Manage Users.

3. Locate the user account you want view.

   You can browse, or you can search to locate a specific user account by typing a search term into Search for a user. Any user account email address that starts with the search term is shown. Search is case-insensitive and wildcards are not supported. To clear the search results and view all user accounts, delete the search term.

4. You can review the user name, email, assigned role, and status. The status field shows either ACTIVE or INACTIVE to indicate whether or not the user has responded to the invitation email and activated an account.

Deleting a User Account

Use the following procedure to delete a user account.

1. Choose your user name on the application bar and then choose Manage QuickSight.

2. Choose Manage Users.

3. Locate the user account you want to delete and then choose the delete icon.

4. Choose to either delete or transfer any resources owned by the user and then choose OK.
5. Do one of the following:

- If you chose to transfer user resources, type the user name of the account to transfer them to and then choose **Delete and transfer resources**.

- If you chose to delete user resources, choose **Delete**.
Amazon QuickSight supports identity federation through Security Assertion Markup Language 2.0 (SAML 2.0) in both Standard and Enterprise editions. You can use an identity provider that supports SAML 2.0 to provide a simple on-boarding flow for your Amazon QuickSight users. Such identity providers include Microsoft Active Directory Federation Services, Ping One Federation Server, and Okta.

With identity federation, your users get one-click access to their Amazon QuickSight applications using their existing identity credentials. You also have the security benefit of identity authentication by your identity provider. You can control which users have access to Amazon QuickSight using your existing identity provider.

Example Authentication Workflow

In the following diagram, you can see a typical authentication flow between Amazon QuickSight and a third-party identity provider. In this example, the administrator has set up a sign-in page to access Amazon QuickSight, called applications.exampleco.com. The web page uses a federation service that complies with SAML 2.0 to trigger a sign-on request. The administrator has also set up a user to allow access to Amazon QuickSight.
In this authentication flow, the following happens:

1. The user browses to https://applications.exampleco.com. The sign-on page requests authentication for the user.
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 the Amazon QuickSight service.
6. Using the authentication token from AWS, Amazon QuickSight authorizes the user and presents applications to the browser.

From the user's perspective, the process happens transparently. The user starts at your organization's internal portal and lands at an Amazon QuickSight application portal, without ever having to supply any AWS credentials.

**Setting Up SAML**

You can use an AWS Identity and Access Management (IAM) role and a relay state URL to configure an identity provider (IdP) that is compliant with SAML 2.0. The role grants users permissions to
access Amazon QuickSight. The relay state is the portal that the user is forwarded to, after successful authentication by AWS.

**Topics**
- **Prerequisites (p. 412)**
- **Step 1: Create a SAML Provider in AWS (p. 412)**
- **Step 2: Configure Permissions in AWS for Your Federated Users (p. 412)**
- **Step 3: Configure the SAML IdP (p. 413)**
- **Step 4: Create Assertions for the SAML Authentication Response (p. 414)**
- **Step 5: Configure the Relay State of Your Federation (p. 414)**

**Prerequisites**

Before configuring your SAML 2.0 connection, you need to do the following:

- Configure your IdP to establish a trust relationship with AWS:
  - Inside your organization's network, configure your identity store, such as Windows Active Directory, to work with a SAML-based IdP. SAML-based IdPs include Microsoft Windows Active Directory Federation Services, Shibboleth, and so on.
  - Using your IdP, generate a metadata document that describes your organization as an identity provider.
  - Set up SAML 2.0 authentication, using the same steps as for the AWS Management Console. When this process is complete, you can configure your relay state to match the relay state of Amazon QuickSight (See **Step 5: Configure the Relay State of Your Federation (p. 414)**).
  - Create an Amazon QuickSight account and note the name to use when you configure your IAM policy and IdP. For more information on creating an Amazon QuickSight account, see **Signing Up for Amazon QuickSight (p. 397)**.

After you have created the setup to federate to the AWS Management Console as outlined in the tutorial, you can edit the relay state provided in the tutorial with the relay state of Amazon QuickSight (Step 5 below). For more information about integrating with your IdP, see **Integrating Third-Party SAML Solution Providers with AWS in the IAM User Guide**.

**Step 1: Create a SAML Provider in AWS**

Your SAML identity provider defines your organization's IdP to AWS. It does so by using the metadata document you previously generated using your IdP.

**To create a SAML provider in AWS**

1. Sign in to the AWS Management Console and open the IAM console at https://console.aws.amazon.com/iam/.
2. Create a new SAML provider, which is an entity in IAM that holds information about your organization's identity provider. For more information, see **Creating SAML Identity Providers** in the IAM User Guide.
3. As part of this process, upload the metadata document produced by the IdP software in your organization noted in the previous section.

**Step 2: Configure Permissions in AWS for Your Federated Users**

Next, create an IAM role that establishes a trust relationship between IAM and your organization's IdP. This role identifies your IdP as a principal (trusted entity) for the purposes of federation. The role also defines which users authenticated by your organization's IdP are allowed to access Amazon
QuickSight. For more information about creating a role for a SAML IdP, review Creating a Role for SAML 2.0 Federation in the IAM User Guide.

After you have created the role, you can limit the role to have permissions only to Amazon QuickSight by attaching an inline policy to the role. The following sample policy document provides access to Amazon QuickSight. This policy allows the user access to Amazon QuickSight and allows them to create both administrator accounts and user accounts.

**Note**
In the following example, replace `<YOUR_AWS_ACCOUNT_ID>` with your 12 digit AWS account ID (with no hyphens ‘-’).

```json
{
    "Statement": [
        {
            "Action": [
                "quicksight:CreateUser",
                "quicksight:CreateAdmin"
            ],
            "Effect": "Allow",
            "Resource": [
                "arn:aws:quicksight::<YOUR_AWS_ACCOUNT_ID>:user/${aws:userid}"
            ]
        },
        {
            "Version": "2012-10-17"
        }
    ]
}
```

If you want to provide access to Amazon QuickSight and also the ability to create Amazon QuickSight users and administrators, you can use the following policy example.

```json
{
    "Statement": [
        {
            "Action": [
                "quicksight:CreateUser",
                "quicksight:CreateAdmin"
            ],
            "Effect": "Allow",
            "Resource": [
                "arn:aws:quicksight::<YOUR_AWS_ACCOUNT_ID>:user/${aws:userid}"
            ]
        },
        {
            "Version": "2012-10-17"
        }
    ]
}
```

You can view account details in the AWS Management Console.

Once you have set up SAML and the IAM policy(ies), you don't need to invite users manually. The first time users open Amazon QuickSight, they are provisioned automatically. If they have permissions for the "quicksight:CreateUser" action, they will be added as QuickSight users. If they have permissions for the "quicksight:CreateAdmin" action, they will be added as QuickSight administrators.

**Step 3: Configure the SAML IdP**

After you create the IAM role, update your SAML IdP about AWS as a service provider. To do so, install the saml-metadata.xml file found at https://signin.aws.amazon.com/static/saml-metadata.xml.
To update the IdP metadata, see the instructions provided by your IdP. Some providers give you the option to type the URL, after which the IdP gets and installs the file for you. Others require you to download the file from the URL and then provide it as a local file.

For more information, see your IdP documentation.

**Step 4: Create Assertions for the SAML Authentication Response**

Next, configure the information that the IdP passes as SAML attributes to AWS as part of the authentication response. For more information, see Configuring SAML Assertions for the Authentication Response in the [IAM User Guide](#).

**Step 5: Configure the Relay State of Your Federation**

Finally, you can configure the relay state of your federation to point to the Amazon QuickSight relay state URL. After successful authentication by AWS, the user is directed to Amazon QuickSight, defined as the relay state in the SAML authentication response.

The relay state URL for Amazon QuickSight is:

https://quicksight.aws.amazon.com

### Managing User Accounts in Amazon QuickSight Enterprise Edition

Use this topic to learn more about managing user accounts in Amazon QuickSight Enterprise edition. (For information about managing user accounts in Amazon QuickSight Standard edition, see Managing User Accounts in Amazon QuickSight Standard Edition (p. 405).)

You can add and remove Microsoft AD directory groups to create and deactivate user accounts. You can access the directory groups directly or by using the AD Connector. To do this, you must have both administrative privileges in Amazon QuickSight and also appropriate AWS permissions. The necessary AWS permissions are as follows:

- ds:DescribeTrusts
- quicksight:GetGroupMapping
- quicksight:SearchDirectoryGroups
- quicksight:SetGroupMapping

Each Amazon QuickSight Enterprise edition account can have an unlimited number of user accounts.

Use the following procedures to add, view, and deactivate Amazon QuickSight Enterprise edition user accounts.

#### Adding User Accounts

You manage users through Microsoft Active Directory (AD) groups. You can create multiple user accounts at once by choosing one or more AD groups to integrate with Amazon QuickSight. All users in the selected groups are authorized to sign in to Amazon QuickSight. You can also add user accounts individually by adding those users to AD groups that are already integrated with Amazon QuickSight. To see what groups are integrated with your Amazon QuickSight account, use the procedure in Viewing User Account Details (p. 415). For more information about adding a user to a Microsoft AD directory group, see Add Users and Groups (Simple AD and Microsoft AD). Or, you can read more about how to Connect to a Directory using AD Connector.
Your new users are not automatically notified of their access to Amazon QuickSight. You must email users with the account name and the sign-in URL (https://quicksight.aws). Let them know that they can use their active directory credentials to sign in to Amazon QuickSight.

Use the following procedure to add a Microsoft AD directory group to Amazon QuickSight.

1. Choose your user name on the application bar, and then choose Manage QuickSight.

2. Choose Manage Users.

3. Choose Manage groups.

4. On the AWS sign-in page, enter your AWS or IAM credentials.

5. To add user accounts with administrative privileges, choose Add groups under Administrator groups. Otherwise, add them under the User groups section.

6. For Search for groups to add to groups list, type the name of the group you want to use. A list of matching group names appears. Choose Enter for each to add it to the Domain/Group name list.

    Repeat until you have added all of the groups that you want to use.

7. Choose Add selected groups.

    All users in the selected groups have Amazon QuickSight user accounts created for them. You are charged for each user that activates their Amazon QuickSight account.

8. Send email or otherwise notify users of their new accounts, and provide them the account name and the sign-in URL.

Viewing User Account Details

You can view the Microsoft AD directory groups integrated with Amazon QuickSight on the Manage users page. Use the following procedure to view the Microsoft AD directory groups that are integrated with Amazon QuickSight.

1. Choose your user name on the application bar and then choose Manage QuickSight.
2. Choose **Manage Users**. On this screen you can see which users were active this month. You can also see deleted users.

3. Choose **Manage groups**. Administrator and user groups are managed from the AWS Console for QuickSight.

4. On the AWS sign-in page, enter your AWS or IAM credentials.

5. View the groups whose users have administrative privileges under **Administrator groups**, and the groups whose users have user privileges under **User groups**.

### Deactivating User Accounts

You can deactivate multiple user accounts at once by choosing one or more Microsoft AD directory groups to remove from integration with Amazon QuickSight. All users in the selected groups have their Amazon QuickSight deactivated. Resources are not lost by deactivating an account. You will get a chance to transfer their orphaned resources to another user.

To deactivate a user account individually, remove that user from any Microsoft AD directory groups that are already integrated with Amazon QuickSight. To view the groups integrated with your Amazon QuickSight account, use the procedure in **Viewing User Account Details** (p. 415).

Deactivating a user account removes that user's ability to access Amazon QuickSight resources, like analyses or data sets, but doesn't delete that account or any Amazon QuickSight resources associated with it.

If you later need to reactivate a user account, put the user into an integrated group with access to Amazon QuickSight. This restores their ability to access Amazon QuickSight and any existing resources associated with that user account.

Use the following procedure to remove a Microsoft AD directory group from Amazon QuickSight.

1. Choose your user name on the application bar and then choose **Manage QuickSight**.

   ![Manage QuickSight](image)

2. Choose **Manage Users**.

3. Choose **Manage groups**.

4. On the AWS sign-in page, enter your AWS or IAM credentials.

5. Locate the group you want remove under either the **Administrator groups** or the **User groups** section, and then choose the remove icon.
6. In the **Manage users** screen, you can view each deactivated user in the **Deleted user** section. This is located beneath the **Active users this month** section.

To transfer the user’s resources, click on the **Action “x”** button beside that user’s name.

Choose one of the following:
- Transfer ownership of all orphaned resources to a different user in this account.
- Delete all orphaned resources. (This frees the user's SPICE capacity.)
These actions apply to all resources owned solely by that user. If you transfer ownership, Amazon QuickSight will not make unnecessary duplicates of resources even if the resources are already shared with the receiving user.

**Closing Your Amazon QuickSight Account**

If you want to close your Amazon QuickSight account, you can unsubscribe from the service. In order to unsubscribe, you must be signed in using the IAM account or AWS root account that was used to create your Amazon QuickSight account.

Use the following procedure to unsubscribe from Amazon QuickSight.

1. Choose your user name on the application bar and then choose **Manage QuickSight**.

2. Choose **Account settings**.

3. Choose **Unsubscribe**.

4. (For Amazon QuickSight Enterprise edition accounts only) On the AWS sign-in page, enter your AWS or IAM credentials.

5. **Note**
   This step applies only to early adopters of Amazon QuickSight. Amazon QuickSight accounts created after the preview period won't see these options.

   (Optional) If you prefer to use the AWS console to manually delete the Simple AD directory or VPC that Amazon QuickSight used for user management, uncheck **Delete Simple AD directory** or **Delete VPC**. *We recommend leaving these checked so that these resources will be automatically removed.*
6. Choose **Unsubscribe**.
Managing Amazon QuickSight Usage

If your Amazon QuickSight user account has administrative privileges, you can manage user account subscriptions, and also the SPICE capacity used by your Amazon QuickSight account.

Use the following topics to manage subscriptions and SPICE capacity.

Topics
- Managing Subscriptions (p. 420)
- Managing SPICE Capacity (p. 429)

Managing Subscriptions

Purchase subscriptions to get discounted pricing on Amazon QuickSight. When you create an Amazon QuickSight account, you automatically get one free user account. When you invite additional users to Amazon QuickSight, you are charged for those user accounts on a month-by-month basis. When you purchase a subscription, you pay for a user account on an annual rather than monthly basis, and receive a discounted price in return for the extended time commitment. For more information about pricing, see Amazon QuickSight.

When you purchase a set of subscriptions, you choose the number of user accounts you want to cover, when it should start (any time from the month following the current month, to one year in the future), and whether or not it auto-renews. All subscriptions that you purchase together must use the values for these settings.

You can edit an existing set of subscriptions to change whether or not it auto-renews. If the set is not yet active, you can also change the number of subscriptions it covers, or delete it entirely.

View Current Subscriptions

Use the following procedure to view your current subscriptions.

1. Choose your user name on the application bar and then choose Manage QuickSight.

2. Choose Your Subscriptions.
3. Use the subscription meter to see how many user accounts you have and what sort of billing they are on. The types of user accounts shown are as follows:

- **Free users:** This is the free user you receive as a standard part of your Amazon QuickSight account.
- **Purchased annual subscriptions:** These are users covered by purchased subscriptions rather than billed month-to-month.
- **Monthly billed users:** These are users that are billed month-to-month.

In the following example, the account has 21 users total:

- 1 free user.
- 7 users with annual subscriptions. Note that only active subscriptions are shown here; subscriptions that have yet to start aren't reflected.
- 13 month-to-month users.

Hover over any section of the meter to get details on that user segment.
4. Use the information in the subscriptions table to see what current and future subscriptions you have.

**Purchase Subscriptions**

Use the following procedure to purchase subscriptions.

1. Choose your user name on the application bar and then choose Manage QuickSight.
2. Choose **Your Subscriptions**.

3. Choose **Purchase subscription**.

4. Choose or enter the number of subscriptions you want.
5. Choose the month and year when the subscriptions will start.

6. Choose whether or not the subscriptions auto-renew.
7. Choose **Purchase subscription**.

---

**Edit Subscriptions**

Use the following procedure to edit subscriptions.

1. Choose your user name on the application bar and then choose **Manage QuickSight**.

2. Choose **Your Subscriptions**.
3. Next to the set of subscriptions you want to change, choose **Edit**.

4. (Optional) If the subscriptions haven't started yet, change the number of subscriptions you want.

5. Choose whether or not the subscriptions auto-renew.
6. Choose **Save changes**.

**Delete Subscriptions**

Use the following procedure to delete subscriptions. You can only delete subscriptions that haven't started yet.

1. Choose your user name on the application bar and then choose **Manage QuickSight**.
2. Choose Your Subscriptions.

3. Next to the set of subscriptions you want to delete, choose Edit.

4. Choose Delete Subscription.
Managing SPICE Capacity

You can use the admin page to see how much SPICE capacity you have overall, and how much of that you are using. SPICE capacity is allocated by region, so the information displayed is for the currently selected region.

SPICE is Amazon QuickSight's in-memory optimized calculation engine, designed specifically for fast, ad-hoc data visualization. SPICE stores your data in a system architected for high availability, where it is saved until you choose to delete it. You can improve the performance of database data sets by importing the data into SPICE instead of using a direct query to the database. All non-database data sets must use SPICE.

Each Amazon QuickSight account receives 10 GB of SPICE capacity per paid user, which is allocated when the user signs into Amazon QuickSight for the first time. Each Amazon QuickSight account also receives one free user with 1 GB of SPICE capacity. SPICE capacity is pooled across users for the Amazon QuickSight account. For example, if you have 4 users (3 paid and 1 free), you have 31 GB of SPICE capacity available, which can be utilized by any of the users in the account. All of your default SPICE capacity is allocated to your home region, and the other regions have no SPICE capacity unless you choose to purchase some.

To free up SPICE capacity, delete any unused data sets that you have imported into SPICE. For more information about deleting a data set, see Deleting a Data Set (p. 109).

You can purchase additional SPICE capacity if you want to, up to a limit of 1TB total capacity per QuickSight account. If you need an exception to this limit, follow the instructions at AWS Service Limits to submit a limit increase request. You can also release purchased SPICE capacity that you aren't using. Purchasing or releasing SPICE capacity only affects the capacity for the currently selected region. For information about additional SPICE pricing, see Amazon QuickSight.

View SPICE Capacity and Usage

Use the following procedure to review your SPICE capacity and usage.

1. Choose your user name on the application bar and then choose Manage QuickSight.
Note
If you are low on SPICE capacity, you can also choose the Buy SPICE alert that appears on the Your Data Sets and Create a Data Set pages.

2. Choose SPICE Capacity.

3. Use the Total SPICE Capacity meter to see your SPICE capacity, broken out by type. Capacity types are as follows:

- Free tier: This is the 1 GB of capacity associated with the free user you get with every Amazon QuickSight account.
- Free bundled: This is the total default capacity associated with your paid users. You get 10 GB of default SPICE capacity per paid user.
- Purchased: This is the additional SPICE capacity you have purchased.
4. Use the **SPICE Usage** meter to see your SPICE usage, broken out by type. Usage types are as follows:

- **Used capacity:** This is used portion of the default SPICE capacity you get per user.
- **Unused capacity:** This is unused portion of the default SPICE capacity you get per user.
- **Releasable unused capacity:** This is purchased capacity that isn't in use, and so can be released to reduce costs.
Purchase SPICE Capacity

Use the following procedure to purchase additional SPICE capacity.

1. Choose your user name on the application bar and then choose **Manage QuickSight**.

   ![Manage QuickSight](image1)

   **Note**
   If you are low on SPICE capacity, you can also choose the **Buy SPICE** alert that appears on the **Your Data Sets** and **Create a Data Set** pages.

2. Choose **SPICE Capacity**.

   ![SPICE Capacity](image2)

3. Choose **Purchase more capacity**.

   ![Purchase more capacity](image3)
4. For **How much SPICE capacity do you need?**, type the number of gigabytes (GBs) you want to purchase.

![Purchase SPICE capacity](image)

5. Choose **Purchase SPICE capacity**.

![Purchase SPICE capacity](image)

**Release SPICE Capacity**

Use the following procedure to release unused purchased SPICE capacity.

1. Choose your user name on the application bar and then choose **Manage QuickSight**.

![Manage QuickSight](image)

**Note**

If you are low on SPICE capacity, you can also choose the **Buy SPICE** alert that appears on the **Your Data Sets** and **Create a Data Set** pages.

2. Choose **SPICE Capacity**.
3. Choose **Release unused purchased capacity**.

4. For **How much SPICE capacity do you need to release?**, choose **Release all** if you want to release all unused purchased capacity, or choose **Release <amount> GB** and type the number of gigabytes (GBs) that you want to release.

5. Choose **Release SPICE capacity**.
Working with AWS Services

Use this section to help you set up Amazon QuickSight to work with other AWS services, such as AWS Identity and Access Management (IAM) and AWS CloudTrail.

Topics
- Working with AWS Data Sources (p. 435)
- AWS Identity and Access Management (IAM) Users, Roles, and Policies (p. 452)
- Logging Operations with AWS CloudTrail (p. 456)

Working with AWS Data Sources

Use this section to help you configure autodiscovery, manage permissions, and authorize connections.

Topics
- Allowing Autodiscovery of AWS Resources (p. 435)
- Authorizing Connections from Amazon QuickSight to AWS Data Stores (p. 436)
- Exploring Your AWS Data in Amazon QuickSight (p. 450)
- Managing Amazon QuickSight Permissions to AWS Resources (p. 451)

Allowing Autodiscovery of AWS Resources

Configuring AWS Resources

Use the following sections to help you configure your AWS resources to work with Amazon QuickSight.

Configuring Your AWS Data Sources for Amazon QuickSight Access

You can have Amazon QuickSight autodiscover Amazon RDS DB instances or Amazon Redshift clusters that are associated with your AWS account. These resources must be located in the same AWS Region as your Amazon QuickSight account.

If you choose to enable autodiscovery, choose one of the following options to make the AWS resource accessible:
- For Amazon RDS DB instances that you created in a default VPC and didn't choose to make private, or that aren't in a VPC (are EC2-Classic instances), see Authorizing Connections from Amazon QuickSight to Amazon RDS DB Instances (p. 436). In this topic, you can find information on creating a security group to allow connections from Amazon QuickSight servers.

- For Amazon Redshift clusters that you created in a default VPC and didn't choose to make private, or that aren't in a VPC (are EC2-Classic instances), see Authorizing Connections from Amazon QuickSight to Amazon Redshift Clusters (p. 440). In this topic, you can find information on creating a security group to allow connections from Amazon QuickSight servers.

- For an Amazon RDS DB instance or Amazon Redshift cluster that is in a nondefault VPC, see Authorizing Connections from Amazon QuickSight to Amazon RDS DB Instances (p. 436) or Authorizing Connections from Amazon QuickSight to Amazon Redshift Clusters (p. 440). In these topics, you can find information on creating a security group to allow connections from Amazon QuickSight servers, and then verifying that the VPC meets the requirements described in Network Configuration for an AWS Instance in a Non-Default VPC (p. 76).

Enabling autodiscovery is the easiest way to make this data available in Amazon QuickSight. You can still manually create data connections whether or not you enable autodiscovery.

Confirming the Availability of AWS Identity and Access Management (IAM) Roles

If you choose to enable autodiscovery of AWS resources for your Amazon QuickSight account, Amazon QuickSight creates an AWS Identity and Access Management (IAM) role in your AWS account. This IAM role that grants your account permission to identify and retrieve data from your AWS data sources.

Because AWS limits you to 250 IAM roles, be sure you have at least one free role for Amazon QuickSight to use if you want Amazon QuickSight to autodiscover your AWS resources.

Authorizing Connections from Amazon QuickSight to AWS Data Stores

For Amazon QuickSight to access your AWS resources, you must create security groups for them that authorize connections from the IP address ranges used by Amazon QuickSight servers. You must have AWS credentials that permit you to access these AWS resources to modify their security groups.

Use the procedures in the following sections to enable Amazon QuickSight connections.

Topics
- Authorizing Connections from Amazon QuickSight to Amazon RDS DB Instances (p. 436)
- Authorizing Connections from Amazon QuickSight to Amazon Redshift Clusters (p. 440)
- Authorizing Connections from Amazon QuickSight to Amazon EC2 Instances (p. 447)

Authorizing Connections from Amazon QuickSight to Amazon RDS DB Instances

For Amazon QuickSight to connect to an Amazon RDS DB instance, you must create a new security group for that DB instance. This security group contains an inbound rule authorizing access from the appropriate IP address range for the Amazon QuickSight servers in that region. To learn more about authorizing Amazon QuickSight connections, see Manually Enabling Access to an Amazon RDS Instance in a VPC (p. 437) or Manually Enabling Access to an Amazon RDS Instance That Is Not in a VPC (p. 439).

To create and assign a security group for an Amazon RDS DB instance, you must have AWS credentials that permit access to that DB instance.

Enabling connection from Amazon QuickSight servers to your instance is just one of several prerequisites for creating a data set based on an AWS database data source. For more information about what is required, see Creating Data Sets from New Database Data Sources (p. 75).
Manually Enabling Access to an Amazon RDS Instance in a VPC

Use the following procedure to enable Amazon QuickSight access to an Amazon RDS DB instance in a VPC.

To enable Amazon QuickSight access to an Amazon RDS DB instance in a VPC

1. Sign in to the AWS Management Console and open the Amazon RDS console at https://console.aws.amazon.com/rds/.
2. On the Instances page, select the instance to which you want to grant access, and then choose the details page icon, as shown following.

3. Locate Port in the Cluster Database Properties section. Note the Port value.
4. Locate VPC in the Security and Network section, and note the VPC value. Choose the VPC value to open the VPC console.
5. On the Amazon VPC Management Console, choose Security Groups in the navigation pane.
6. Choose **Create Security Group**.
7. On the **Create Security Group** page, enter the security group information as follows:
   - For **Name tag** and **Group name**, type **Amazon-QuickSight-access**.
   - For **Description**, type **Amazon-QuickSight-access**.
   - For **VPC**, choose the VPC for your instance. This VPC is the one with the VPC ID that you noted.

8. Choose **Yes, Create**.
9. Your new security group should be displayed on the screen. Choose the security group, and then choose **Inbound Rules** from the tab list.

Choose **Edit** to create a new rule. Use the following values:

- For **Type**, choose **Custom TCP Rule**.
- For **Protocol**, choose **TCP (6)**.
- For **Port Range**, type the port number of the Amazon RDS cluster to which you are providing access. This port number is the one that you noted in an earlier step.
- For **Source**, type the CIDR address block for the region where you'll be using QuickSight. For example, here is the CIDR address block for EU (Ireland): 52.210.255.224/27. For more information on the IP address ranges for Amazon QuickSight in supported regions, see [AWS Regions and IP Address Ranges](#).  

**Note**

If you have activated Amazon QuickSight in multiple regions, you can create inbound rules for each Amazon QuickSight endpoint CIDR. Doing this allows Amazon QuickSight to have access to the Amazon RDS DB instance from any region defined in the inbound rules.

An Amazon QuickSight user or administrator who uses Amazon QuickSight in multiple regions is treated as a single user. In other words, even if you are using Amazon
QuickSight in every region, both your Amazon QuickSight account and your users are global.

10. Choose **Save** to save your new inbound rule.

11. Return to the **Instances** page of the Amazon RDS console.

Choose the instance that you want to enable access to.

Choose **Instance Actions**, and then choose **Modify**.

12. In the **Network & Security** section, the currently assigned security group or groups are already chosen for **Security Group**. Press CTRL and choose **Amazon-QuickSight-access** in addition to the other selected groups.

13. Choose **Continue**, and then choose **Modify DB Instance**.

**Manually Enabling Access to an Amazon RDS Instance That Is Not in a VPC**

Use the following procedure to access an Amazon RDS DB instance that is not in a VPC.
To access an Amazon RDS DB instance that is not in a VPC

1. Sign in to the Amazon RDS console.
2. Choose Security Groups in the navigation pane.
4. Type Amazon-QuickSight-access for the Name and Description values, and then choose Create.
5. The new security group is selected by default.

Select the details icon next to the security group, as shown following.

6. For Connection Type, choose CIDR/IP.
7. For CIDR/IP to Authorize, type the appropriate CIDR address block. For more information on the IP address ranges for Amazon QuickSight in supported regions, see AWS Regions and IP Address Ranges (p. 396).

8. Choose Authorize.
9. Return to the Instances page of the Amazon RDS Management Console, choose the instance that you want to enable access to, choose Instance Actions, and then choose Modify.
10. In the Network & Security section, the currently assigned security group or groups already is chosen for Security Group. Press CTRL and choose Amazon-QuickSight-access in addition to the other selected groups.
11. Choose Continue, and then choose Modify DB Instance.

Authorizing Connections from Amazon QuickSight to Amazon Redshift Clusters

For Amazon QuickSight to connect to an Amazon Redshift instance, you must create a new security group for that instance. This security group contains an inbound rule authorizing access from the appropriate IP address range for the Amazon QuickSight servers in that region. To learn more about authorizing Amazon QuickSight connections, see Manually Enabling Access to an Amazon Redshift Cluster in a VPC (p. 441) or Manually Enabling Access to an Amazon Redshift Cluster That Is Not in a VPC (p. 445).

To create and assign a security group for an Amazon Redshift cluster, you must have AWS credentials that permit access to that cluster.
Enabling connection from Amazon QuickSight servers to your cluster is just one of several prerequisites for creating a data set based on an AWS database data source. For more information about what is required, see Creating Data Sets from New Database Data Sources (p. 75).

**Manually Enabling Access to an Amazon Redshift Cluster in a VPC**

Use the following procedure to enable Amazon QuickSight access to an Amazon Redshift cluster in a VPC.

**To enable Amazon QuickSight access to an Amazon Redshift cluster in a VPC**

1. Sign in to the AWS Management Console and open the Amazon Redshift console at https://console.aws.amazon.com/redshift/.

2. Choose the details page icon next to the cluster you want to make available, as shown following.

![Redshift dashboard](image)

3. Locate **Port** in the **Cluster Database Properties** section. Note the **Port** value.

4. Locate **VPC ID** in the **Cluster Properties** section, note the **VPC ID** value. Choose **View VPCs** to open the Amazon VPC Management Console.
5. On the Amazon VPC Management Console, choose **Security Groups** in the navigation pane.
6. Choose **Create Security Group**.
7. On the **Create Security Group** page, enter the security group information as follows:
   - For Name tag and Group name, type *Amazon-QuickSight-access*.
   - For Description, type *Amazon-QuickSight-access*.
   - For VPC, choose the VPC for your instance. This is the VPC with the VPC ID that you noted.
8. Choose Yes, Create.

9. Your new security group should be displayed on the screen. Choose the security group. Then, choose Inbound Rules from the tab list.

Choose Edit to create a new rule. Use the following values:

- For **Type**, choose Custom TCP Rule.
- For **Protocol**, choose TCP (6).
- For **Port Range**, enter the port number of the Amazon Redshift cluster to which you are providing access. This is the port number you noted in an earlier step.
- For **Source**, type the CIDR address block for the region where you’ll be using QuickSight. For example, here is the CIDR address block for EU (Ireland): 52.210.255.224/27. For more information on the IP address ranges for Amazon QuickSight in supported regions, see AWS Regions and IP Address Ranges (p. 396).

**Note**

If you have activated Amazon QuickSight in multiple regions, you can create inbound rules for each Amazon QuickSight endpoint CIDR. Doing this allows Amazon QuickSight to have access to the Amazon RDS DB instance from any region defined in the inbound rules.

An Amazon QuickSight user or administrator who uses Amazon QuickSight in multiple regions is treated as a single user. In other words, even if you are using Amazon QuickSight in every region, both your Amazon QuickSight account and your users are global.
10. Choose **Save** to save your new inbound rule.

11. Return to the **Clusters** page of the Amazon Redshift Management Console, and then open the details page for the cluster that you want to enable access to.

   Choose **Cluster**, and then choose **Modify**.
12. The currently assigned security groups are already chosen for VPC Security Groups. Press CTRL and choose Amazon-QuickSight-access in addition to the other selected groups.

13. Choose Modify.

**Manually Enabling Access to an Amazon Redshift Cluster That Is Not in a VPC**

Use the following procedure to access an Amazon Redshift cluster that is not in a VPC.

**To access an Amazon Redshift cluster that is not in a VPC**

1. Sign in to the AWS Management Console and open the Amazon Redshift console at https://console.aws.amazon.com/redshift/.
2. Choose Security in the navigation pane.
4. Type Amazon-QuickSight-access for the Cluster Security Group Name and Description values, and then choose Create.
5. Select the details icon next to the security group, as shown following.
6. Choose **Add Connection Type**.

7. Enter the connection information.
   - For **Connection Type**, choose **CIDR/IP**.
   - For **CIDR/IP to Authorize**, type the appropriate CIDR address block. The supported IP address ranges for Amazon QuickSight regions, see [AWS Regions and IP Address Ranges](p. 396).

8. Choose **Authorize**.

9. Return to the **Clusters** page of the Amazon Redshift console, open the details page for the cluster that you want to enable access to, choose **Cluster**, and then choose **Modify**.

10. The currently assigned security groups are already chosen for **Cluster Security Group**. Press CTRL and choose **Amazon-QuickSight-access** in addition to the other selected groups.

11. Choose **Modify**.
Enabling Access to Amazon Redshift Spectrum

Using Amazon Redshift Spectrum, you can connect Amazon QuickSight to an external catalog with Amazon Redshift. For example, you can access the Athena catalog and query unstructured data on your Amazon S3 data lake using an Amazon Redshift cluster instead of the Athena query engine.

You can also combine data sets that include data stored in Amazon Redshift and in S3. Then you can access them using the SQL syntax in Amazon Redshift.

After you’ve registered your data catalog (for Athena) or external schema (for a Hive metastore), you can use Amazon QuickSight to select the external schema and the Amazon Redshift Spectrum tables. This process works just as for any other Amazon Redshift tables in your cluster. You don’t need to load or transform your data.

For more information on using Amazon Redshift Spectrum, see Using Amazon Redshift Spectrum to Query External Data in the Amazon Redshift Database Developer Guide.

To connect using Redshift Spectrum, you need to do the following:

• Create or identify an IAM role associated with the Amazon Redshift cluster.
• Add the IAM policies AmazonS3ReadOnlyAccess and AmazonAthenaFullAccess to the IAM role.
• Register an external schema or data catalog for the tables that you plan to use.

Redshift Spectrum lets you separate storage from compute, so you can scale them separately. You only pay for the queries that you run.

To connect to Redshift Spectrum tables, you don’t need to grant Amazon QuickSight access to Amazon S3 or Athena. Amazon QuickSight only needs access to the Amazon Redshift cluster. For full details on configuring Redshift Spectrum, see Getting Started with Amazon Redshift Spectrum in the Amazon Redshift Database Developer Guide.

Authorizing Connections from Amazon QuickSight to Amazon EC2 Instances

For Amazon QuickSight to connect to an Amazon EC2 instance, you must create a new security group for that instance. This security group contains an inbound rule authorizing access from the appropriate IP address range for the Amazon QuickSight servers in that region.

To modify the security groups for these Amazon EC2 instances, you must have AWS credentials that permit you to access to the instances.

Enabling connection from Amazon QuickSight servers to your instance is just one of several prerequisites for creating a data set based on an AWS database data source. For more information about what is required, see Creating Data Sets from New Database Data Sources (p. 75).

To enable Amazon QuickSight access to an Amazon EC2 instance

1. Sign in to the AWS Management Console and open the Amazon EC2 console at https://console.aws.amazon.com/ec2/.
2. If your EC2 instance is in a VPC, select the instance to view the instance details pane. Locate its VPC ID and make note of it for later use.
3. Choose Security Groups in the NETWORK & SECURITY section of the navigation pane on the left. Then choose Create Security Group, as shown following.
4. Enter the security group information as follows:
   - For **Security group name**, type `Amazon-QuickSight-access`.
   - For **Description**, type `Amazon-QuickSight-access`.
   - For **VPC**, choose the VPC ID that you noted in step 2 if your Amazon EC2 instance is in a VPC. Otherwise, choose **No VPC**.

5. Choose **Add Rule** on the **Inbound** tab.

6. Create a new rule with the following values:
   - For **Type**, choose **Custom TCP Rule**.
   - For **Protocol**, choose **TCP**.
   - (Optional) For **Port Range**, enter the port number used by the instance on this Amazon EC2 instance to which you are providing access.
   - For **Source**, type the CIDR address block for the region where you'll be using QuickSight. For example, here is the CIDR address block for EU (Ireland): 52.210.255.224/27. For more information on the IP address ranges for Amazon QuickSight in supported regions, see [AWS Regions and IP Address Ranges](#) (p. 396).

**Note**

If you have activated Amazon QuickSight in multiple regions, you can create inbound rules for each Amazon QuickSight endpoint CIDR. Doing this allows Amazon QuickSight to have access to the Amazon RDS DB instance from any region defined in the inbound rules.

An Amazon QuickSight user or administrator who uses Amazon QuickSight in multiple regions is treated as a single user. In other words, even if you are using Amazon
QuickSight in every region, both your Amazon QuickSight account and your users are global.

7. Choose Create.
8. Choose Instances in the INSTANCES section of the navigation pane, and then choose the instance that you want to enable access to.
9. Choose Actions, then Networking, and then Change Security Groups.
10. In Change Security Groups, select the Amazon-QuickSight-access security group.

Then choose Assign Security Groups, as shown following.
Exploring Your AWS Data in Amazon QuickSight

Use this section to learn how to explore AWS data in Amazon QuickSight using the AWS Management Console. Using the Explore in QuickSight shortcut, you can access a customizable dashboard template showing your data. Just as with any Amazon QuickSight dashboard, this dashboard can be refreshed on a schedule, published, and shared with other users in your organization.

Topics
- Exploring Amazon S3 Analytics Data (p. 450)

Exploring Amazon S3 Analytics Data

Amazon QuickSight contains a dashboard designed to provide insight into your Amazon S3 analytics data. To use this feature, you must first enable S3 analytics storage class analysis for your S3 buckets. For more on enabling storage class analysis in S3, see Amazon S3 Analytics – Storage Class Analysis in the Amazon S3 Developer Guide.

After you have enabled storage class analysis, you can use Amazon QuickSight to explore your S3 analytics data.

To explore S3 analytics data in Amazon QuickSight

1. Open the Amazon S3 console at https://console.aws.amazon.com/s3/.
2. Choose a bucket to explore. The bucket must have storage class analysis enabled, with at least one filter.
3. Choose the Management tab.
4. Then Choose Analytics.
5. Choose Explore in QuickSight.

Note
If you don’t have an Amazon QuickSight account, you’re prompted to create one before you can use the dashboard.
When you choose the option to explore in Amazon QuickSight, your S3 analytics data is automatically loaded into the dashboard template. The dashboard contains multiple visualizations to help you to understand the storage access pattern of your bucket.

Use the template as is, or customize it to suit your needs. For example, one visual on the default template helps you identify infrequently accessed data. It compares the amount of data retrieved to the amount of storage consumed, for objects of different ages.

You can also add your own visualizations to the dashboard. For example, you can break down the data access patterns, using filters for storage class analysis that you already have defined in S3 analytics.

To learn more about using S3 analytics and storage class analysis, see Amazon S3 Analytics – Storage Class Analysis in the Amazon S3 Developer Guide.

Managing Amazon QuickSight Permissions to AWS Resources

As part of signing up for Amazon QuickSight, you set Amazon QuickSight permissions to your AWS resources. You can edit those permissions to change the level of access that Amazon QuickSight has to these resources. To edit these permissions, you must be signed in using the IAM account or AWS root account used to create your Amazon QuickSight account. Alternatively, you can be signed in as an IAM user with administrative privileges and the permissions described in the Set Amazon QuickSight permissions to AWS resources row of the table shown in Setting Your IAM Policy (p. 453).

Important
You should only edit Amazon QuickSight permissions to your AWS resources from within Amazon QuickSight. If you edit these permissions directly using the IAM Management Console, you can’t edit them from Amazon QuickSight.

To edit Amazon QuickSight permissions to your AWS resources

1. Choose your user name on the application bar, and then choose Manage QuickSight.
2. Choose **Account permissions**.
3. Choose **Edit AWS Permissions**.
4. (For Amazon QuickSight Enterprise edition accounts only) On the AWS sign-in page, enter your AWS or IAM credentials.
5. On the **Edit QuickSight read-only access to AWS resources** page, select **Enable autodiscovery of your data and users in your AWS Redshift, RDS, and IAM services**. Doing this allows Amazon QuickSight to autodiscover any of these types of resources associated with your AWS account. Alternatively, expand this section and choose the individual options for the resources that you want to use with Amazon QuickSight.
6. If you have one or more Amazon S3 buckets, select the **Amazon S3 (all buckets)** check box to edit Amazon QuickSight access to them. For **Choose Amazon S3 buckets**, choose the buckets you want to make available to Amazon QuickSight, and then choose **Select buckets**.
7. If you have Amazon Athena databases, choose **Athena** to allow Amazon QuickSight to access them.

   If you choose to use Athena as a data source, make sure that in the previous step you have enabled Amazon QuickSight access to the Amazon S3 buckets in which your Athena data resides.

   **Note**
   The QuickSightAthena managed policy contains the necessary permissions for Amazon QuickSight to interact with Athena. It doesn't have permissions for input buckets. These can't be added because it is a managed policy and therefore static.
8. Choose **Apply**.

---

**AWS Identity and Access Management (IAM) Users, Roles, and Policies**

Amazon QuickSight is fully integrated with AWS Identity and Access Management (IAM). Use this section to find how to configure IAM identities and policies for use with Amazon QuickSight.

- For information on creating IAM users, groups, and roles, see [IAM Identities](#).
- For information on creating policies in IAM, see [Creating a New Policy](#).
- Sign in to the AWS Management Console and open the IAM console at [https://console.aws.amazon.com/iam/](https://console.aws.amazon.com/iam/).

**Topics**

- [IAM Actions and Permissions for Amazon QuickSight users](#)
- [Setting Your IAM Policy](#)
IAM Actions and Permissions for Amazon QuickSight users

Amazon QuickSight provides a number of AWS Identity and Access Management (IAM) actions that you can use for creating or removing an Amazon QuickSight account. All Amazon QuickSight actions are prefixed with `quicksight:`, such as `quicksight:Subscribe`. For information about using Amazon QuickSight actions in an IAM policy, see Setting Your IAM Policy (p. 453).

The following list shows the supported Amazon QuickSight actions:

- "quicksight:CreateAdmin"
  CreateAdmin lets authenticated users provision Amazon QuickSight administrator users.

- "quicksight:CreateUser"
  CreateUser lets authenticated users provision Amazon QuickSight users.

- "quicksight:GetGroupMapping"
  GetGroupMapping is used only in Amazon QuickSight Enterprise edition accounts. It lets Amazon QuickSight identify and display the Microsoft AD directory groups that are mapped to roles in Amazon QuickSight.

- "quicksight:SearchDirectoryGroups"
  SearchDirectoryGroups is used only in Amazon QuickSight Enterprise edition accounts. It lets Amazon QuickSight display your Microsoft AD directory groups so that you can choose which ones to map to roles in Amazon QuickSight.

- "quicksight:SetGroupMapping"
  SetGroupMapping is used only in Amazon QuickSight Enterprise edition accounts. It lets Amazon QuickSight map the Microsoft AD directory groups that you select to roles in Amazon QuickSight.

- "quicksight:Subscribe"
  Subscribe lets you subscribe to Amazon QuickSight.

- "quicksight:Unsubscribe"
  Unsubscribe lets you unsubscribe from Amazon QuickSight.

Setting Your IAM Policy

You can use AWS root credentials or IAM user credentials to create an Amazon QuickSight account. AWS root credentials already have all of the required permissions for managing Amazon QuickSight access to AWS resources.

We recommend that you protect your root credentials, and instead use IAM user credentials. To do this, create a policy and attach it to the IAM user and roles that you plan to use for Amazon QuickSight. The policy must include the appropriate statements for the Amazon QuickSight administrative tasks you need to perform, as described in the following table.

<table>
<thead>
<tr>
<th>Task</th>
<th>Permissions for Standard Edition</th>
<th>Permissions for Enterprise Edition</th>
</tr>
</thead>
</table>
| Sign up for Amazon QuickSight and set Amazon QuickSight permissions to AWS resources. | • ds:AuthorizeApplication  
• ds:CheckAlias  
• ds:CreateAlias  
• ds:CreateIdentityPoolDirectory | • ds:AuthorizeApplication  
• ds:CheckAlias  
• ds:CreateAlias  
• ds:DescribeDirectories |

For more information, see Managing Amazon.
<table>
<thead>
<tr>
<th>Task</th>
<th>Permissions for Standard Edition</th>
<th>Permissions for Enterprise Edition</th>
</tr>
</thead>
</table>
| QuickSight Permissions to AWS Resources (p. 451). | • ds:DeleteDirectory  
• ds:DescribeDirectories  
• ds:DescribeTrustedEntity  
• iam:AttachRolePolicy  
• iam:CreateRole  
• iam:CreatePolicy  
• iam:CreatePolicyVersion  
• iam:GetRole  
• iam:GetPolicy  
• iam:GetPolicyVersion  
• iam:ListAccountAliases  
• iam:ListAttachedRolePolicies  
• iam:ListEntitiesForPolicy  
• iam:ListPolicyVersions  
• iam:ListPolicies  
• quicksight:Subscribe  
• s3:ListAllMyBuckets | • ds:DescribeTrustedEntities  
• ds:UnauthorizeApplication  
• iam:AttachRolePolicy  
• iam:CreateRole  
• iam:CreatePolicy  
• iam:CreatePolicyVersion  
• iam:GetRole  
• iam:GetPolicy  
• iam:GetPolicyVersion  
• iam:GetRole  
• iam:ListAccountAliases  
• iam:ListAttachedRolePolicies  
• iam:ListEntitiesForPolicy  
• iam:ListPolicyVersions  
• iam:ListRoles  
• quicksight:GetGroupMapping  
• quicksight:SetGroupMapping  
• quicksight:Subscribe  
• s3:ListAllMyBuckets |
| Creating administrators and users inside of Amazon QuickSight. | • quicksight:CreateUser  
• quicksight:CreateAdmin | • quicksight:CreateUser  
• quicksight:CreateAdmin |
| For more information, see AWS Identity and Access Management (IAM) Users, Roles, and Policies (p. 452). |  |  |
| Associating active directory groups with Amazon QuickSight during sign up, and managing group association going forward. This task is only required for Enterprise edition accounts. | • N/A | • ds:DescribeTrustedEntities  
• quicksight:GetGroupMapping  
• quicksight:SearchDirectoryGroups  
• quicksight:SetGroupMapping |
Set Amazon QuickSight permissions to AWS resources.
For more information, see Managing Amazon QuickSight Permissions to AWS Resources (p. 451).

<table>
<thead>
<tr>
<th>Task</th>
<th>Permissions for Standard Edition</th>
<th>Permissions for Enterprise Edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsubscribe from Amazon</td>
<td>• ds:DeleteDirectory</td>
<td>• ds:UnauthorizeApplication</td>
</tr>
<tr>
<td>QuickSight.</td>
<td>• ds:UnauthorizeApplication</td>
<td>• quicksight:Unsubscribe</td>
</tr>
<tr>
<td></td>
<td>• quicksight:Unsubscribe</td>
<td></td>
</tr>
</tbody>
</table>

The following example shows an IAM policy that enables active directory group management for an Amazon QuickSight Enterprise edition account.

```json
{
  "Statement": [
    {
      "Action": [
        "ds:DescribeTrusts",
        "quicksight:GetGroupMapping",
        "quicksight:SearchDirectoryGroups",
        "quicksight:SetGroupMapping"
      ],
      "Effect": "Allow",
      "Resource": [
        "arn:aws:quicksight::<YOUR_AWS_ACCOUNT_ID>:user/${aws:userid}"
      ]
    },
    {
      "Version": "2012-10-17"
    }
  ]
}
```

The following example shows a policy that enables creating Amazon QuickSight users.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "quicksight:CreateGroupMapping",
        "quicksight:DeleteGroupMapping",
        "quicksight:DescribeGroupMapping",
        "quicksight:ListGroupMappings",
        "quicksight:UpdateGroupMapping"
      ],
      "Effect": "Allow",
      "Resource": 
```
{  
  "Action": [  
    "quicksight:CreateUser"
  ],  
  "Effect": "Allow",  
  "Resource": "arn:aws:quicksight::<YOUR_AWS_ACCOUNT_ID>:user/${aws:userid}"
}
}

For information about Amazon QuickSight actions like quicksight:GetGroupMapping, see IAM Actions and Permissions for Amazon QuickSight users (p. 453).

**Note**  
Avoid modifying a policy that was created by Amazon QuickSight. When you modify it yourself, Amazon QuickSight won't be able to edit it. This can cause issues with the policy. To fix the issue, delete the previously modified policy.

## Logging Operations with AWS CloudTrail

Amazon QuickSight is integrated with AWS CloudTrail. This service captures specific API calls and delivers log files to your Amazon S3 bucket. Amazon QuickSight doesn't currently have public API operations. However, you can use CloudTrail to capture non-API events made from the Amazon QuickSight console. CloudTrail logs show user request information: who made the request, the IP address the request was made from, when it happened, and more.

To learn about CloudTrail, including how to configure and enable it, see the AWS CloudTrail User Guide.

When CloudTrail logging is enabled in your AWS account, Amazon QuickSight operations are tracked in CloudTrail log files. Amazon QuickSight actions are written with other AWS service records. CloudTrail determines when to create and write to a new file based on a time period and file size.

**Note**  
AWS CloudTrail logging for Amazon QuickSight is available for both Standard and Enterprise Editions, across all supported Amazon QuickSight regions. For more information, read AWS Regions and IP Address Ranges (p. 396).

### Topics
- Working with Amazon QuickSight Log Files (p. 456)
- Understanding Amazon QuickSight Log File Contents (p. 457)
- Tracking Non-API Events by Using CloudTrail Logs (p. 457)
- Understanding Amazon QuickSight Log File Entries (p. 458)

## Working with Amazon QuickSight Log Files

You can store your log files in your Amazon S3 bucket for as long as you want. Alternatively, you can also define Amazon S3 lifecycle rules to automatically archive or delete log files. By default, your log files are encrypted with Amazon S3 server-side encryption (SSE).

If you want to be notified when log files are delivered, you can configure CloudTrail to publish Amazon SNS notifications on log file delivery. For more information, see Configuring Amazon SNS Notifications for CloudTrail.

You can also aggregate Amazon QuickSight log files from multiple AWS regions and multiple AWS accounts into a single Amazon S3 bucket. For more information, see Receiving CloudTrail Log Files from Multiple Regions and Receiving CloudTrail Log Files from Multiple Accounts.
Understanding Amazon QuickSight Log File Contents

Every log entry contains information about who generated the request. The user identity information in the log entry 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 an IAM role or federated user
- Whether the request was made by another AWS service

For more information on user identity, see the CloudTrail userIdentity Element.

By default, each Amazon QuickSight log entry contains the following information:

- userIdentity
- eventTime
- eventId
- readOnly
- awsRegion
- eventSource (quicksight)
- eventType (AwsServiceEvent)
- recipientAccountId (customer AWS account)

Note
CloudTrail displays users as unknown if they were provisioned by Amazon QuickSight. This display is because these users aren't a known IAM identity type.

Tracking Non-API Events by Using CloudTrail Logs

Following is a list of the non-API events you can track.

User Management

- CreateAccount – Create Account
- BatchCreateUser – Create User
- BatchResendUserInvite – Invite User
- UpdateGroups – Update Groups
  
  This event works with Enterprise Edition only.
- UpdateSpiceCapacity – Update SPICE Capacity
- DeleteUser – Delete User
- Unsubscribe – Unsubscribe User

Subscription

- CreateSubscription – Create Subscription
- UpdateSubscription – Update Subscription
- DeleteSubscription – Delete Subscription
Dashboard

- **GetDashboard** – Get Dashboard
- **CreateDashboard** – Create Dashboard
- **UpdateDashboard** – Update Dashboard
- **UpdateDashboardAccess** – Update Dashboard Access
- **DeleteDashboard** – Delete Dashboard

Analysis

- **GetAnalysis** – Get Analysis
- **CreateAnalysis** – Create Analysis
- **UpdateAnalysisAccess** – Update Analysis Access
- **UpdateAnalysis** – Update Analysis
  - **RenameAnalysis** – Rename Analysis
  - **CreateVisual** – Create Visual
  - **RenameVisual** – Rename Visual
  - **DeleteVisual** – Delete Visual
  - **DeleteAnalysis** – Delete Analysis

Data Source

- **CreateDataSource** – Create Data Source
  - **FlatFile** – Flat file
  - **External** – External
  - **S3** – S3
  - **ImportS3ManifestFile** – S3 Manifest File
  - **Presto** – Presto
  - **RDS** – RDS
  - **Redshift** – Redshift (manual)
- **UpdateDataSource** – Update Data Source
- **DeleteDataSource** – Delete Data Source

Data Set

- **CreateDataSet** – Create Data Set
  - **CustomSQL** – Custom SQL
  - **SQLTable** – SQL Table
  - **File** – CSV or XLSX
- **UpdateDataSet** – Update SQL Join Dataset
- **UpdateDatasetAccess** – Update Dataset Access
- **DeleteDataSet** – Delete Dataset

Understanding Amazon QuickSight Log File Entries

CloudTrail log files contain one or more log entries. Each entry lists multiple JSON-formatted events. A log entry 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. The log entries are not 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.

**BatchCreateUser**

```json
{
   "eventVersion":"1.05",
   "userIdentity":
   {
      "type":"Root",
      "principalId":"123456789012",
      "arn":"arn:aws:iam::123456789012:root",
      "accountId":"123456789012",
      "userName":"test-username"
   },
   "eventTime":"2017-04-19T03:16:13Z",
   "eventSource":"quicksight.amazonaws.com",
   "eventName":"BatchCreateUser",
   "awsRegion":"us-west-2",
   "requestParameters":null,
   "responseElements":null,
   "eventID":"e7d2382e-70a0-3fb7-9d41-a7a913422240",
   "readOnly":false,
   "eventType":"AwsServiceEvent",
   "recipientAccountId":"123456789012",
   "serviceEventDetails":
   {
      "eventRequestDetails":
      {
         "users":
         {
            "test-user-11":
            {
               "role":"USER"
            },
            "test-user-22":
            {
               "role":"ADMIN"
            }
         }
      },
      "eventResponseDetails":
      {
         "validUsers":[
        ],
         "InvalidUsers":[
        "test-user-11",
        "test-user-22"
        ]
      }
   }
}
```
Troubleshooting Amazon QuickSight

Use this information to help you diagnose and fix common issues that you can encounter when using Amazon QuickSight.

Need more help? You can visit the Amazon QuickSight User Community or the AWS forums. See also the Amazon QuickSight Resource Library.

Topics
- I can't connect to my data source. (p. 460)
- My rows were skipped during data preparation (p. 465)
- My SPICE data won't sort alphabetically (p. 465)
- I can't add a visual to my analysis (p. 465)
- I get a feedback bar across my printed docs (p. 465)

I can't connect to my data source.

This section helps you troubleshoot connections to data sources. Before you continue, verify that the database is currently available. Also, verify that you have the correct connection information and valid credentials.

Topics
- I need to validate the connection to my data source, or I need to change my data source settings. (p. 460)
- I can't connect even though my data source connection options look right (SSL) (p. 461)
- I can't connect to MySQL (SSL & Authorization) (p. 462)
- I can't connect to S3 (p. 464)
- I can't connect to RDS (p. 465)

I need to validate the connection to my data source, or I need to change my data source settings.

If you need to update your data source, or you got a connection error and need to check your settings, follow these steps and validate your connection to the data source.

1. From the QuickSight home screen, choose Manage data.
2. Choose New data set.
3. Scroll to FROM EXISTING DATA SOURCES.
4. Choose the data source you want to test or change.
5. If the option is offered, choose Edit/Preview data.
6. Choose Validate connection.
7. Make any changes you want to make, then choose Update data source.
I can't connect even though my data source connection options look right (SSL)

Problems connecting can occur when SSL is incorrectly configured. The symptoms can include the following.

- You can connect to your database in other ways or from other locations.
- You can connect to a similar database but not this one.

Rule out the following circumstances:

- Permissions issues
- Availability issues
- Expired or invalid certificate
- Self-signed certificate
- Certificate chain in the wrong order
- Ports not enabled
- Firewall blocking IP
- VPC or security group not configured correctly.

To help find issues with SSL, you can use an online SSL checker, or a tool like OpenSSL.

The following example walks through troubleshooting a connection where SSL is suspect. The administrator in this example has already installed OpenSSL.

Example

1. The user finds an issue connecting to his database. He verifies that he can connect a different database in another region. He checks other versions of the same database and he can connect easily.
2. The administrator reviews the issue and decides to verify that the certificates are working correctly. She searches online for an article on using OpenSSL to troubleshoot or debug SSL connections.
3. Using OpenSSL, the administrator verifies the SSL configuration in the terminal.

```bash
echo quit
openssl s_client -connect <host>:port
```

The result shows that the certificate is not working:

```
... ...
CONNECTED(00000003)
012345678901234:error:140770FC:SSL routines:SSL23_GET_SERVER_HELLO:unknown protocol:s23_clnt.c:782:
---
no peer certificate available
---
No client certificate CA names sent
---
SSL handshake has read 7 bytes and written 278 bytes
```
---

New, (NONE), Cipher is (NONE)
Secure Renegotiation IS NOT supported
SSL-Session:
  Protocol : TLSv1.2
  Cipher : 0000
  Session-ID:
  Session-ID-ctx:
  Master-Key:
  Key-Arg : None
  PSK identity: None
  PSK identity hint: None
  Start Time: 1497569068
  Timeout : 300 (sec)
  Verify return code: 0 (ok)
---

4. The administrator corrects the problem by installing the SSL certificate on the user's database server.

Please see the following for more detail on the solution in this example:

- Using SSL to Encrypt a Connection to a DB Instance

**I can't connect to MySQL (SSL & Authorization)**

To check on some common connection issues in MySQL, follow the steps described here. This procedure helps you find out if you have enabled SSL and granted usage rights.

1. First, check /etc/my.cnf to make sure SSL is enabled for MySQL.

Then, go into MySQL and run:

```
show status like 'Ssl%';
```

These results show that SSL is working:

```
<table>
<thead>
<tr>
<th>Variable_name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ssl_accept_renegotiates</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_accepts</td>
<td>1</td>
</tr>
<tr>
<td>Ssl_callback_cache_hits</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_cipher</td>
<td></td>
</tr>
<tr>
<td>Ssl_cipher_list</td>
<td></td>
</tr>
<tr>
<td>Ssl_client_connects</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_connect_renegotates</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_ctx_verify_depth</td>
<td>18446744073709551615</td>
</tr>
<tr>
<td>Ssl_ctx_verify_mode</td>
<td>5</td>
</tr>
<tr>
<td>Ssl_default_timeout</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_finished_accepts</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_finished_connects</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_hits</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_misses</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_mode</td>
<td>SERVER</td>
</tr>
<tr>
<td>Ssl_session_cache_overflows</td>
<td>0</td>
</tr>
</tbody>
</table>
```
If SSL is disabled, the result looks like this:

<table>
<thead>
<tr>
<th>Variable_name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ssl_accept_renegotiates</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_accepts</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_callback_cache_hits</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_cipher</td>
<td></td>
</tr>
<tr>
<td>Ssl_cipher_list</td>
<td></td>
</tr>
<tr>
<td>Ssl_client_connects</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_connect_renegotates</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_ctx_verify_depth</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_ctx_verify_mode</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_default_timeout</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_finished_accepts</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_finished_connects</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_hits</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_misses</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_mode</td>
<td>NONE</td>
</tr>
<tr>
<td>Ssl_session_cache_overflows</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_size</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_session_cache_timeouts</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_sessions_reused</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_used_session_cache_entries</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_verify_depth</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_verify_mode</td>
<td>0</td>
</tr>
<tr>
<td>Ssl_version</td>
<td></td>
</tr>
</tbody>
</table>

2. Make sure you have installed a supported SSL certificate on the database server.
3. Grant usage for the specific user to connect using SSL.

```
GRANT USAGE ON .* TO 'encrypted_user'@'%' REQUIRE SSL;
```

Please see the following for more detail on the solution in this example:

- SSL Support for MySQL DB Instances
- Using SSL to Encrypt a Connection to a DB Instance
- MySQL documentation
I can't connect to S3

To successfully connect to Amazon S3, you must configure authentication, create a valid manifest file inside the bucket you are trying to access, and make sure the file described by the manifest is available.

To verify authentication, make sure you authorized Amazon QuickSight to access the S3 account. It's not enough that you, the user, are authorized. Amazon QuickSight must be authorized separately.

Authorizing Amazon QuickSight to access your Amazon S3 bucket

1. If you have Enterprise edition, temporarily switch to the US East (N. Virginia) region (top right), while you edit your account permissions.
2. Inside of Amazon QuickSight, choose your profile name (very top right). Choose Manage QuickSight.
3. Then choose Account Settings, on the left.
4. From the Account Settings page, choose Edit AWS permissions.
5. If Amazon S3 is check-marked, you can see how many buckets are authorized.
6. To select individual buckets, choose Choose S3 buckets.
7. Select the buckets you want to access from Amazon QuickSight. Then choose Select buckets.
8. Choose Apply.
9. If you changed your region during the first step of this process, change it back to the region you want to use.

It is crucial to make sure your manifest file is valid. If Amazon QuickSight can't parse your file, it will give you an error similar to "We can't parse the manifest file as a valid JSON" or "We can't connect to the S3 bucket".

Verifying your manifest file

1. Open your manifest file. You can do this directly from the Amazon S3 console at https://console.aws.amazon.com/s3/. Navigate to your manifest file and choose Open.
2. Make sure the URI(s) provided inside the manifest file are in fact the file(s) you want connect to.
3. If you are using a link to the manifest file, rather than uploading it, make sure the link does not have any additional phrases after the word .json. You can get the proper link to an S3 file by viewing its details on Amazon S3. Look for Link.
4. To make sure the content of the manifest file is valid, you can use a JSON validator, like the one at https://jsonlint.com.
5. Verify permissions on your bucket or file. In the https://console.aws.amazon.com/s3/, navigate to your Amazon S3 bucket, select the Permissions tab, and add the appropriate permissions. Be sure the permissions are at the right level: either on the bucket or on the file(s).
6. If you are using the s3:// protocol, rather than https://, check to make sure you reference your bucket directly. For example, use s3://mybucket/myfile.csv instead of s3://s3-us-west-2.amazonaws.com/mybucket/myfile.csv. Doubly specifying Amazon S3, by using s3:// and also s3-us-west-2.amazonaws.com, will cause an error.

For more information on manifest files and connecting to Amazon S3 see: Supported Formats for Amazon S3 Manifest Files (p. 65)

Finally, verify that your Amazon S3 dataset was created according to these steps: Creating a Data Set Using Amazon S3 Files (p. 59)
I can't connect to RDS

Please see the following for more detail on troubleshooting connections to RDS: http://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/CHAP_Troubleshooting.html#CHAP_Troubleshooting.Connecting

My rows were skipped during data preparation

When you prepare data, Amazon QuickSight previews a portion of your data for you to work with. If it can't interpret a row for any reason, it will skip this row. Then it displays a message to say how many rows are skipped.

Here is a list of things to check:

- Inconsistency between the field data type and the field data, for example text data in a field with a numeric data type.
- Having a file that contains a header but having the **Contains header** upload setting deselected.
- Having the data source data violate one or more Data Source Limits (p. 48).
- Field data that is incompatible with or excluded by the function used in a calculated field. For example, if you have a calculated field that uses **parseDate Function** (p. 188), rows with data that doesn't evaluate to a valid date are skipped.

My SPICE data won't sort alphabetically

SPICE does not yet support sorting text. To work around this issue, use a direct query instead of SPICE. If you are using text files, you will need to import them through another data source.

I can't add a visual to my analysis

If you are editing an analysis for a selected data source, and the connection to the data source terminates unexpectedly, this error state can prevent further changes to the analysis. In this case, you will not be able to add more visuals to the analysis.

To fix:

- Verify that you still have access to the data source.
- If you are using a proxy server, verify that *.quicksight.amazon.com is added to the list of whitelisted (safe) domains.

I get a feedback bar across my printed docs

The browser will sometimes print the document feedback bar across the page, blocking some printed content.

To avoid this problem, use the twirl-down icon on the bottom left of the screen to minimize the feedback bar. Then print your document.

We always welcome your feedback on our documentation!
I get a feedback bar across my printed docs
AWS Glossary

For the latest AWS terminology, see the AWS Glossary in the AWS General Reference.
### Document History

**Latest documentation update:** December 21, 2017

The AWS documentation team regularly polishes and enhances this guide. We want it to be helpful. Leave feedback to say what you want us to improve!

**Note**

In a Kindle publication, you can find the last change date above the table of contents. However, on the Kindle website, the original publication date is unchanged.

The following table describes the important changes to the *Amazon QuickSight User Guide*.

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date Changed</th>
</tr>
</thead>
<tbody>
<tr>
<td>New feature</td>
<td>You can use Amazon QuickSight with Amazon S3 files that are in a different AWS account. For more information, see <a href="#">Data Sets Using S3 Files in Another AWS Account</a>.</td>
<td>November 20, 2017</td>
</tr>
<tr>
<td>New visual types</td>
<td>You can create visuals using maps. You can also view tabular data in a visual. For more information on preparing geospatial data for use in a visual, see <a href="#">Adding Geospatial Data</a>. For more information on creating a geospatial visual, see <a href="#">Using Geospatial Charts (Maps)</a>. For more information on using tabular reports, see <a href="#">Using Tabular Reports</a>.</td>
<td>November 20, 2017</td>
</tr>
<tr>
<td>New features</td>
<td>Amazon QuickSight can support 1000 columns in a data set. For more information, see <a href="#">Data Source Limits</a>. Calculated fields are supported in SPICE data sets. For more information, see <a href="#">Adding a Calculated Field to an Analysis</a>. Also, high cardinality values, which often display as a long tail on a visual, are placed into a category called other. For more information, see <a href="#">Working with Visual Types in Amazon QuickSight</a>.</td>
<td>November 20, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>In Enterprise edition, you can restrict access to a data set by adding row-level security. To learn more, see <a href="#">Restricting Access to a Data Set by Using Row-Level Security</a>.</td>
<td>October 20, 2017</td>
</tr>
<tr>
<td>New visual type</td>
<td>You can create visuals using combo charts. To learn more about combo charts, see <a href="#">Using Combo Charts</a>.</td>
<td>October 20, 2017</td>
</tr>
<tr>
<td>New features</td>
<td>Amazon QuickSight supports creating custom aggregations for calculated fields in analyses, custom date formats, and copies of dashboards. For more information on aggregating calculated fields, see <a href="#">Using Aggregate Functions in Calculated Fields</a>. For more information on using unsupported dates by creating a custom date format, see <a href="#">Using Unsupported or Custom Dates</a>. For more information on duplicating dashboards, see <a href="#">Copying a Dashboard</a>.</td>
<td>September 25, 2017</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date Changed</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>New feature</td>
<td>You can combine multiple filters using the And/Or operators. To learn more about filter groups, see Adding a compound filter with And/Or operators (p. 306).</td>
<td>August 31, 2017</td>
</tr>
<tr>
<td>New data source</td>
<td>Amazon QuickSight supports Amazon S3 Analytics.</td>
<td>August 31, 2017</td>
</tr>
<tr>
<td>New Features</td>
<td>Amazon QuickSight supports importing ZIP files from Amazon S3. There is also a new search feature, to simplify finding analyses, data sets, and dashboards. For more information on the search feature, see Navigating the User Interface (p. 38).</td>
<td>August 31, 2017</td>
</tr>
<tr>
<td>New regions</td>
<td>Amazon QuickSight is now available in Asia Pacific (Singapore) and Asia Pacific (Sydney).</td>
<td>August 8, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight supports Snowflake cloud data warehouse.</td>
<td>July 31, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight added a new aggregation: Count Distinct. To learn more, see Changing Field Aggregation (p. 271).</td>
<td>July 19, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight supports exploring Amazon S3 analytics data from an Amazon QuickSight dashboard that you reach from the AWS Management Console. To learn more, see Exploring Your AWS Data in Amazon QuickSight (p. 450).</td>
<td>July 5, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight supports Amazon Redshift Spectrum. To learn more, see Enabling Access to Amazon Redshift Spectrum (p. 447).</td>
<td>May 25, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight supports just-in-time (JIT) user provisioning through the following policy actions: quicksight:CreateUser and quicksight:CreateAdmin. To learn more, see Setting Your IAM Policy (p. 453).</td>
<td>May 25, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight supports direct connections to Teradata 14.0 and later.</td>
<td>May 25, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight added relative date filters for data sets and visuals. To learn more, see Adding a Date Filter (p. 153).</td>
<td>May 25, 2017</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date Changed</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight supports connecting to Apache Spark and Presto. To learn more, see Creating a Data Source Using Apache Spark (p. 53) and Creating a Data Source Using Presto (p. 53).</td>
<td>May 3, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight supports operational logging with AWS CloudTrail. To learn more, see Logging Operations with AWS CloudTrail (p. 456).</td>
<td>April 28, 2017</td>
</tr>
<tr>
<td>New feature</td>
<td>Amazon QuickSight is available in US East (Ohio). To learn more about regions, see AWS Regions and IP Address Ranges (p. 396).</td>
<td>April 11, 2017</td>
</tr>
</tbody>
</table>
| New feature     | • You can use the AD Connector with Amazon QuickSight. To learn more about managing Enterprise users, see Managing User Accounts in Amazon QuickSight Enterprise Edition (p. 414).  
• You can add Key Performance Indicators (KPIs) to your visualizations. To learn more, see Using KPIs (p. 343).  
• And you can import .xlsx files with headers and footers, comments, formatting, filter header, sort, frozen panel/header, hidden columns, groups, and formulas / references. You can also limit your import to a specific range. To learn more about importing ranges, see Choosing File Upload Settings (p. 122). | April 6, 2017 |
| New feature     | You can now export to a comma-separated value (CSV) format file using Amazon QuickSight. To learn more, see Exporting Data from an Amazon QuickSight Visual to a CSV File (p. 249). | March 21, 2017|
| New feature     | You can now schedule data refreshes for SPICE data sets. To learn more, see Refreshing Data (p. 94).                                           | February 14, 2017|
| New feature     | You can now connect to Amazon Athena databases and use them as data sources in Amazon QuickSight. To learn more, see Creating a Data Set Using Amazon Athena Data (p. 69). | December 22, 2016|
| New edition     | Amazon QuickSight now offers an Enterprise edition as well as a Standard edition. Both editions offer a full set of features for creating and sharing data visualizations, and Enterprise edition additionally offers encryption at rest and Active Directory integration. When you choose to use Enterprise edition, you select a Microsoft AD directory in AWS Directory Service and use that active directory to identify and manage your Amazon QuickSight users and administrators. To learn more, see Editions (p. 394). | December 15, 2016|
| New guide       | This is the first release of Amazon QuickSight User Guide.                                                                                     | November 15, 2016|
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