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What is AWS Fargate?

AWS Fargate is a technology that you can use with Amazon ECS to run containers without having to manage servers or clusters of Amazon EC2 instances. With Fargate, you no longer have to provision, configure, or scale clusters of virtual machines to run containers. This removes the need to choose server types, decide when to scale your clusters, or optimize cluster packing.

When you run your Amazon ECS tasks and services with the Fargate launch type or a Fargate capacity provider, you package your application in containers, specify the CPU and memory requirements, define networking and IAM policies, and launch the application. Each Fargate task has its own isolation boundary and does not share the underlying kernel, CPU resources, memory resources, or elastic network interface with another task.

This topic describes the different components of Fargate tasks and services, and calls out special considerations for using Fargate with Amazon ECS.

Amazon ECS on AWS Fargate is currently only available in the following Regions:

<table>
<thead>
<tr>
<th>Region Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
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<td>us-east-2</td>
</tr>
<tr>
<td>US East (N. Virginia)</td>
<td>us-east-1</td>
</tr>
<tr>
<td>US West (N. California)</td>
<td>us-west-1 (usw1-az1 &amp; usw1-az3 only)</td>
</tr>
<tr>
<td>US West (Oregon)</td>
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</tr>
<tr>
<td>Africa (Cape Town)</td>
<td>af-south-1</td>
</tr>
<tr>
<td>Asia Pacific (Hong Kong)</td>
<td>ap-east-1</td>
</tr>
<tr>
<td>Asia Pacific (Mumbai)</td>
<td>ap-south-1</td>
</tr>
<tr>
<td>Asia Pacific (Osaka)</td>
<td>ap-northeast-3</td>
</tr>
<tr>
<td>Asia Pacific (Seoul)</td>
<td>ap-northeast-2</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>ap-southeast-1</td>
</tr>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>ap-southeast-2</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>ap-northeast-1 (apne1-az1, apne1-az2, &amp; apne1-az4 only)</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>ca-central-1 (cac1-az1 &amp; cac1-az2 only)</td>
</tr>
<tr>
<td>China (Beijing)</td>
<td>cn-north-1 (cnn1-az1 &amp; cnn1-az2 only)</td>
</tr>
<tr>
<td>China (Ningxia)</td>
<td>cn-northwest-1</td>
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<tr>
<td>Europe (Frankfurt)</td>
<td>eu-central-1</td>
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<td>Europe (London)</td>
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<td>Europe (Paris)</td>
<td>eu-west-3</td>
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The following walkthroughs help you get started using Amazon ECS on Fargate.

- the section called “Getting Started with Amazon ECS on AWS Fargate” (p. 14)
- the section called “Tutorial: Creating a Cluster with a Fargate Task Using the AWS CLI” (p. 327)
- the section called “Tutorial: Creating a cluster with a Fargate task using the Amazon ECS CLI” (p. 35)

For more information about Amazon Elastic Container Service, see What is Amazon ECS?

Pricing

With Amazon ECS on AWS Fargate, you pay for the vCPU and memory resources your tasks use. For more information, see Fargate Pricing.

Fargate also offers Savings Plans which provides significant savings on your AWS usage. For more information, see the Savings Plans User Guide.

To see your bill, go to the Billing and Cost Management Dashboard in the AWS Billing and Cost Management console. Your bill contains links to usage reports that provide details about your bill. To learn more about AWS account billing, see AWS Account Billing.

If you have questions concerning AWS billing, accounts, and events, contact AWS Support.

For an overview of Trusted Advisor, a service that helps you optimize the costs, security, and performance of your AWS environment, see AWS Trusted Advisor.
Setting up with Amazon ECS

If you've already signed up for Amazon Web Services (AWS) and have been using Amazon Elastic Compute Cloud (Amazon EC2), you are close to being able to use Amazon ECS. The set-up process for the two services is similar. The following guide prepares you for launching your first Amazon ECS cluster.

Complete the following tasks to get set up for Amazon ECS.

Sign up for AWS

When you sign up for AWS, your AWS account is automatically signed up for all services, including Amazon EC2 and Amazon ECS. You are charged only for the services that you use.

If you have an AWS account already, skip to the next task. If you don't have an AWS account, use the following procedure to create one.

To create an AWS account

2. Follow the online instructions.

Part of the sign-up procedure involves receiving a phone call and entering a verification code on the phone keypad.

Note your AWS account number, because you'll need it for the next task.

Create an IAM user

Services in AWS, such as Amazon EC2 and Amazon ECS, require that you provide credentials when you access them, so that the service can determine whether you have permission to access its resources. The console requires your password. You can create access keys for your AWS account to access the command line interface or API. However, we don't recommend that you access AWS using the credentials for your AWS account; we recommend that you use AWS Identity and Access Management (IAM) instead. Create an IAM user, and then add the user to an IAM group with administrative permissions or and grant this user administrative permissions. You can then access AWS using a special URL and the credentials for the IAM user.

If you signed up for AWS but have not created an IAM user for yourself, you can create one using the IAM console.

To create an administrator user for yourself and add the user to an administrators group (console)

1. Sign in to the IAM console as the account owner by choosing Root user and entering your AWS account email address. On the next page, enter your password.

   Note
   We strongly recommend that you adhere to the best practice of using the Administrator IAM user that follows and securely lock away the root user credentials. Sign in as the root user only to perform a few account and service management tasks.
2. In the navigation pane, choose Users and then choose Add user.
3. For User name, enter Administrator.
4. Select the check box next to AWS Management Console access. Then select Custom password, and then enter your new password in the text box.
5. (Optional) By default, AWS requires the new user to create a new password when first signing in. You can clear the check box next to User must create a new password at next sign-in to allow the new user to reset their password after they sign in.
6. Choose Next: Permissions.
7. Under Set permissions, choose Add user to group.
8. Choose Create group.
9. In the Create group dialog box, for Group name enter Administrators.
10. Choose Filter policies, and then select AWS managed - job function to filter the table contents.
11. In the policy list, select the check box for AdministratorAccess. Then choose Create group.

**Note**
You must activate IAM user and role access to Billing before you can use the AdministratorAccess permissions to access the AWS Billing and Cost Management console. To do this, follow the instructions in step 1 of the tutorial about delegating access to the billing console.

12. Back in the list of groups, select the check box for your new group. Choose Refresh if necessary to see the group in the list.
13. Choose Next: Tags.
14. (Optional) Add metadata to the user by attaching tags as key-value pairs. For more information about using tags in IAM, see Tagging IAM entities in the IAM User Guide.
15. Choose Next: Review to see the list of group memberships to be added to the new user. When you are ready to proceed, choose Create user.

You can use this same process to create more groups and users and to give your users access to your AWS account resources. To learn about using policies that restrict user permissions to specific AWS resources, see Access management and Example policies.

To sign in as this new IAM user, sign out of the AWS console, then use the following URL, where your_aws_account_id is your AWS account number without the hyphens (for example, if your AWS account number is 1234-5678-9012, your AWS account ID is 123456789012):

```
https://your_aws_account_id.signin.aws.amazon.com/console/
```

Enter the IAM user name and password that you just created. When you're signed in, the navigation bar displays 'your_user_name @ your_aws_account_id'.

If you don't want the URL for your sign-in page to contain your AWS account ID, you can create an account alias. From the top of the IAM dashboard, to the right of your sign-in link, choose Customize and enter an alias, such as your company name. To sign in after you create an account alias, use the following URL:

```
https://your_account_alias.signin.aws.amazon.com/console/
```

To verify the sign-in link for IAM users for your account, open the IAM console and check under IAM users sign-in link on the dashboard.

For more information about IAM, see the AWS Identity and Access Management User Guide.
Create a virtual private cloud

Amazon Virtual Private Cloud (Amazon VPC) enables you to launch AWS resources into a virtual network that you've defined.

**Note**
The Amazon ECS console first-run experience creates a VPC for your cluster, so if you intend to use the Amazon ECS console, you can skip to the next section.

If you have a default VPC, you also can skip this section and move to the next task, Install the AWS CLI (p. 5). To determine whether you have a default VPC, see Supported Platforms in the Amazon EC2 Console in the *Amazon EC2 User Guide for Linux Instances*. Otherwise, you can create a nondefault VPC in your account using the steps below.

**Important**
If your account supports Amazon EC2 Classic in a region, then you do not have a default VPC in that region.

**To create a nondefault VPC**

1. Open the Amazon VPC console at [https://console.aws.amazon.com/vpc/](https://console.aws.amazon.com/vpc/).
2. From the navigation bar, select a region for the VPC. VPCs are specific to a region, so you should select the same region in which you created your key pair.
3. On the VPC dashboard, choose **Launch VPC Wizard**.
4. On the **Step 1: Select a VPC Configuration** page, ensure that **VPC with a Single Public Subnet** is selected, and choose **Select**.
5. On the **Step 2: VPC with a Single Public Subnet** page, enter a friendly name for your VPC in the **VPC name** field. Leave the other default configuration settings, and choose **Create VPC**. On the confirmation page, choose **OK**.

For more information about Amazon VPC, see What is Amazon VPC? in the *Amazon VPC User Guide*.

**Install the AWS CLI**

The AWS Management Console can be used to manage all operations manually with Amazon ECS. However, installing the AWS CLI on your local desktop or a developer box enables you to build scripts that can automate common management tasks in Amazon ECS.

To use the AWS CLI with Amazon ECS, install the latest AWS CLI, version. For information about installing the AWS CLI or upgrading it to the latest version, see Installing the AWS Command Line Interface in the *AWS Command Line Interface User Guide*. 
Getting started with Amazon ECS

The following guides provide an introduction to the tools available to access Amazon ECS and introductory step by step procedures to run containers. Docker basics takes you through the basic steps to create a Docker container image and upload it to an Amazon ECR private repository. The getting started guides walk you through using the AWS Copilot command line interface and the AWS Management Console to complete the common tasks to run your containers on Amazon ECS and AWS Fargate.

Contents
- Docker basics for Amazon ECS (p. 6)
- Getting started with Amazon ECS using AWS Copilot (p. 10)
- Getting Started with Amazon ECS on AWS Fargate (p. 14)

Docker basics for Amazon ECS

Docker is a technology that provides the tools for you to build, run, test, and deploy distributed applications that are based on Linux containers. Amazon ECS uses Docker images in task definitions to launch containers as part of tasks in your clusters.

AWS and Docker have collaborated to make a simplified developer experience that enables you to deploy and manage containers on Amazon ECS directly using Docker tools. You can now build and test your containers locally using Docker Desktop and Docker Compose, and then deploy them to Amazon ECS on Fargate. To get started with the Amazon ECS and Docker integration, download Docker Desktop and optionally sign up for a Docker ID. For more information, see Docker Desktop and Docker ID signup.

Docker provides a walkthrough on deploying containers on Amazon ECS. For more information, see Deploying Docker containers on Amazon ECS.

The documentation in this guide assumes that readers possess a basic understanding of what Docker is and how it works. For more information about Docker, see What is Docker? and the Docker overview.

Installing Docker

Important
If you already have Docker installed, skip to Create a Docker image (p. 7).

Docker Desktop is an easy-to-install application for your Mac or Windows environment that enables you to build and share containerized applications and microservices. Docker Desktop includes Docker Engine, the Docker CLI client, Docker Compose, and other tools that are helpful when using Docker with Amazon ECS. For more information about how to install Docker Desktop on your preferred operating system, see Docker Desktop overview.

If you don't need a local development environment and you prefer to use an Amazon EC2 instance to use Docker, we provide the following steps to launch an Amazon EC2 instance and install Docker Engine and the Docker CLI.

To install Docker on an Amazon EC2 instance

1. Launch an instance with the Amazon Linux 2 or Amazon Linux AMI. For more information, see Launching an instance in the Amazon EC2 User Guide for Linux Instances.
2. Connect to your instance. For more information, see Connect to your Linux instance in the Amazon EC2 User Guide for Linux Instances.
3. Update the installed packages and package cache on your instance.
4. Install the most recent Docker Engine package.
   Amazon Linux 2
   ```bash
   sudo yum update -y
   sudo amazon-linux-extras install docker
   ```

5. Start the Docker service.
   ```bash
   sudo service docker start
   ```

6. Add the `ec2-user` to the `docker` group so you can execute Docker commands without using `sudo`.
   ```bash
   sudo usermod -a -G docker ec2-user
   ```

7. Log out and log back in again to pick up the new `docker` group permissions. You can accomplish this by closing your current SSH terminal window and reconnecting to your instance in a new one. Your new SSH session will have the appropriate `docker` group permissions.

8. Verify that the `ec2-user` can run Docker commands without `sudo`.
   ```bash
   docker info
   ```

   **Note**
   In some cases, you may need to reboot your instance to provide permissions for the `ec2-user` to access the Docker daemon. Try rebooting your instance if you see the following error:

   ```
   Cannot connect to the Docker daemon. Is the docker daemon running on this host?
   ```

---

**Create a Docker image**

Amazon ECS task definitions use Docker images to launch containers on the container instances in your clusters. In this section, you create a Docker image of a simple web application, and test it on your local system or Amazon EC2 instance, and then push the image to a container registry (such as Amazon ECR or Docker Hub) so you can use it in an Amazon ECS task definition.

**To create a Docker image of a simple web application**

1. Create a file called `Dockerfile`. A Dockerfile is a manifest that describes the base image to use for your Docker image and what you want installed and running on it. For more information about Dockerfiles, go to the [Dockerfile Reference](#).
   ```bash
   touch Dockerfile
   ```

2. Edit the `Dockerfile` you just created and add the following content.
   ```bash
   FROM ubuntu:18.04
   ```
# Install dependencies
RUN apt-get update && \
    apt-get -y install apache2

# Install apache and write hello world message
RUN echo 'Hello World!' > /var/www/html/index.html

# Configure apache
RUN echo '. /etc/apache2/envvars' > /root/run_apache.sh && \
    echo 'mkdir -p /var/run/apache2' >> /root/run_apache.sh && \
    echo 'mkdir -p /var/lock/apache2' >> /root/run_apache.sh && \
    echo '/usr/sbin/apache2 -D FOREGROUND' >> /root/run_apache.sh && \
    chmod 755 /root/run_apache.sh

EXPOSE 80
CMD /root/run_apache.sh

This Dockerfile uses the Ubuntu 18.04 image. The RUN instructions update the package caches, install some software packages for the web server, and then write the "Hello World!" content to the web server's document root. The EXPOSE instruction exposes port 80 on the container, and the CMD instruction starts the web server.

3. Build the Docker image from your Dockerfile.

   **Note**
   Some versions of Docker may require the full path to your Dockerfile in the following command, instead of the relative path shown below.

   ```bash
docker build -t hello-world .
```

4. Run docker images to verify that the image was created correctly.

   ```bash
docker images --filter reference=hello-world
```

   **Output:**

<table>
<thead>
<tr>
<th>REPOSITORY</th>
<th>TAG</th>
<th>IMAGE ID</th>
<th>CREATED</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>hello-world</td>
<td>latest</td>
<td>e9ffedc8c286</td>
<td>4 minutes ago</td>
<td>241MB</td>
</tr>
</tbody>
</table>

5. Run the newly built image. The `-p 80:80` option maps the exposed port 80 on the container to port 80 on the host system. For more information about docker run, go to the Docker run reference.

   ```bash
docker run -t -i -p 80:80 hello-world
```

   **Note**
   Output from the Apache web server is displayed in the terminal window. You can ignore the "Could not reliably determine the server's fully qualified domain name" message.

6. Open a browser and point to the server that is running Docker and hosting your container.

   - If you are using an EC2 instance, this is the **Public DNS** value for the server, which is the same address you use to connect to the instance with SSH. Make sure that the security group for your instance allows inbound traffic on port 80.
   - If you are running Docker locally, point your browser to `http://localhost/`.
   - If you are using docker-machine on a Windows or Mac computer, find the IP address of the VirtualBox VM that is hosting Docker with the `docker-machine ip` command, substituting `machine-name` with the name of the docker machine you are using.
docker-machine ip machine-name

You should see a web page with your "Hello World!" statement.

7. Stop the Docker container by typing Ctrl + c.

Push your image to Amazon Elastic Container Registry

Amazon ECR is a managed AWS Docker registry service. You can use the Docker CLI to push, pull, and manage images in your Amazon ECR repositories. For Amazon ECR product details, featured customer case studies, and FAQs, see the Amazon Elastic Container Registry product detail pages.

This section requires the following:

- You have the AWS CLI installed and configured. If you do not have the AWS CLI installed on your system, see Installing the AWS Command Line Interface in the AWS Command Line Interface User Guide.
- Your user has the required IAM permissions to access the Amazon ECR service. For more information, see Amazon ECR managed policies.

To tag your image and push it to Amazon ECR

1. Create an Amazon ECR repository to store your hello-world image. Note the repositoryUri in the output.

   ```
   aws ecr create-repository --repository-name hello-repository --region region
   ```

   Output:

   ```
   {
     "repository": {
       "registryId": "aws_account_id",
       "repositoryName": "hello-repository",
       "repositoryArn": "arn:aws:ecr:region:aws_account_id:repository/hello-repository",
       "createdAt": 1505337806.0,
       "repositoryUri": "aws_account_id.dkr.ecr.region.amazonaws.com/hello-repository"
     }
   }
   ```

2. Tag the hello-world image with the repositoryUri value from the previous step.

   ```
   docker tag hello-world aws_account_id.dkr.ecr.region.amazonaws.com/hello-repository
   ```

3. Run the aws ecr get-login-password command. Specify the registry URI you want to authenticate to. For more information, see Registry Authentication in the Amazon Elastic Container Registry User Guide.

   ```
   aws ecr get-login-password | docker login --username AWS --password-stdin aws_account_id.dkr.ecr.region.amazonaws.com
   ```

   Output:
4. Push the image to Amazon ECR with the repositoryUri value from the earlier step.

```bash
docker push aws_account_id.dkr.ecr.region.amazonaws.com/hello-repository
```

**Clean up**

When you are done experimenting with your Amazon ECR image, you can delete the repository so you are not charged for image storage.

```bash
aws ecr delete-repository --repository-name hello-repository --region region --force
```

---

**Getting started with Amazon ECS using AWS Copilot**

Get started with Amazon ECS using AWS Copilot by deploying an Amazon ECS application.

### Prerequisites

Before you begin, make sure that you meet the following prerequisites:

- Set up an AWS account. For more information see [Setting up with Amazon ECS](#) (p. 3).
- Install the AWS Copilot CLI. Releases currently support Linux and macOS systems. For more information, see [Installing the AWS Copilot CLI](#) (p. 22).
- Install and configure the AWS CLI. For more information, see [AWS Command Line Interface](#).
- Run `aws configure` to set up a default profile that the AWS Copilot CLI will use to manage your application and services.
- Install and run Docker. For more information, see [Get started with Docker](#).

### Deploy your application using one command

Make sure that you have the AWS command line tool installed and have already run `aws configure` before you start.

Deploy the application using the following command.

```bash
git clone https://github.com/aws-samples/amazon-ecs-cli-sample-app.git demo-app && cd demo-app && copilot init --app demo --name api --type 'Load Balanced Web Service' --dockerfile './Dockerfile'
```
Deploy your application step by step

Step 1: Configure your credentials

Run `aws configure` to set up a default profile that the AWS Copilot CLI uses to manage your application and services.

```
aws configure
```

Step 2: Clone the demo app

Clone a simple Flask application and Dockerfile.

```
git clone https://github.com/aws-samples/amazon-ecs-cli-sample-app.git demo-app
```

Step 3: Set up your application

1. From within the demo-app directory, run the `init` command.

```
copilot init
```

AWS Copilot walks you through the setup of your first application and service with a series of terminal prompts, starting with next step. If you have already used AWS Copilot to deploy applications, you're prompted to choose one from a list of application names.

2. Name your application.

```
What would you like to name your application? [? for help]
```

Enter `demo`.

Step 4: Set up an ECS Service in your "demo" Application

1. You're prompted to choose a service type. You're building a simple Flask application that serves a small API.

```
Which service type best represents your service's architecture? [Use arrows to move, type to filter, ? for more help]
> Load Balanced Web Service
    Backend Service
    Scheduled Job
```

Choose `Load Balanced Web Service`.

2. Provide a name for your service.

```
What do you want to name this Load Balanced Web Service? [? for help]
```

Enter `api` for your service name.
3. Select a Dockerfile.

Which Dockerfile would you like to use for api? [Use arrows to move, type to filter, ? for more help]
> ./Dockerfile

Choose `Dockerfile`.

4. Define port.

Which port do you want customer traffic sent to? [? for help] (80)

Enter **80** or accept default.

5. You will see a log showing the application resources being created.

Creating the infrastructure to manage services under application demo.

6. After the application resources are created, deploy a test environment.

Would you like to deploy a test environment? [? for help] (y/N)

Enter **y**.

Proposing infrastructure changes for the test environment.

7. You will see a log displaying the status of your application deployment.

Note: It's best to run this command in the root of your Git repository.
Welcome to the Copilot CLI! We're going to walk you through some questions to help you get set up with an application on ECS. An application is a collection of containerized services that operate together.

Use existing application: **No**
Application name: **demo**
Workload type: **Load Balanced Web Service**
Service name: **api**
Dockerfile: **./Dockerfile**
no EXPOSE statements in Dockerfile **./Dockerfile**
Port: **80**

Ok great, we'll set up a **Load Balanced Web Service** named **api** in application **demo** listening on port **80**.

# Created the infrastructure to manage services under application **demo**.

# Wrote the manifest for service **api** at copilot/api/manifest.yml
Your manifest contains configurations like your container size and port (:80).

# Created ECR repositories for service **api**.

All right, you're all set for local development.
Deploy: **Yes**

# Created the infrastructure for the test environment.
  - Virtual private cloud on 2 availability zones to hold your services [Complete]
  - Virtual private cloud on 2 availability zones to hold your services [Complete]
  - Internet gateway to connect the network to the internet [Complete]
  - Public subnets for internet facing services [Complete]
  - Private subnets for services that can't be reached from the internet [Complete]
  - Routing tables for services to talk with each other [Complete]
Step 5: Verify your application is running

View the status of your application by using the following commands.

List all of your AWS Copilot applications.

```
$ copilot app ls
```

Show information about the environments and services in your application.

```
$ copilot app show
```
Show information about your environments.

```
copilot env ls
```

Show information about the service, including endpoints, capacity and related resources.

```
copilot svc show
```

List of all the services in an application.

```
copilot svc ls
```

Show logs of a deployed service.

```
copilot svc logs
```

Show service status.

```
copilot svc status
```

List available commands and options.

```
copilot --help
```

```
copilot init --help
```

**Step 6. Learn to create a CI/CD Pipeline**

Instructions can be found in the [ECS Workshop](#) detailing how to fully automate a CI/CD pipeline and git workflow using AWS Copilot.

**Step 7: Clean up**

Run the following command to delete and clean up all resources.

```
copilot app delete
```

---

**Getting Started with Amazon ECS on AWS Fargate**

Amazon Elastic Container Service (Amazon ECS) is a highly scalable, fast, container management service that makes it easy to run, stop, and manage your containers. You can host your containers on a serverless infrastructure that is managed by Amazon ECS by launching your services or tasks on AWS Fargate. For a broad overview on AWS Fargate, see [What is AWS Fargate?](#) (p. 1).

Get started with Amazon ECS on AWS Fargate by using the Fargate launch type for your tasks. In the Regions where Amazon ECS supports AWS Fargate, the Amazon ECS first-run wizard guides you through the process of getting started with Amazon ECS using the Fargate launch type. The wizard gives you the
option of creating a cluster and launching a sample web application. If you already have a Docker image
to launch in Amazon ECS, you can create a task definition with that image and use that for your cluster
instead.

**Important**
For more information about the Amazon ECS first-run wizard for EC2 tasks, see *Getting Started
with Amazon ECS.*

Complete the following steps to get started with Amazon ECS on AWS Fargate.

**Prerequisites**

Before you begin, be sure that you've completed the steps in *Setting up with Amazon ECS (p. 3)* and that
your AWS user has either the permissions specified in the AdministratorAccess or Amazon ECS First
Run Wizard Permissions (p. 265) IAM policy example.

The first-run wizard attempts to automatically create the task execution IAM role, which is required for
Fargate tasks. To ensure that the first-run experience is able to create this IAM role, one of the following
must be true:

- Your user has administrator access. For more information, see *Setting up with Amazon ECS (p. 3).*
- Your user has the IAM permissions to create a service role. For more information, see *Creating a Role to
  Delegate Permissions to an AWS Service.*
- A user with administrator access has manually created the task execution role so that it is available on
  the account to be used. For more information, see *Amazon ECS task execution IAM role (p. 290).*

**Step 1: Create a Task Definition**

A task definition is like a blueprint for your application. Each time you launch a task in Amazon ECS, you
specify a task definition. The service then knows which Docker image to use for containers, how many
containers to use in the task, and the resource allocation for each container.

2. From the navigation bar, select the **US East (N. Virginia)** Region.
   
   **Note**
   You can complete this first-run wizard using these steps for any Region that supports
   Amazon ECS using Fargate. For more information, see *Fargate launch type (p. 93).*
3. Configure your container definition parameters.
   
   For **Container definition**, the first-run wizard comes preloaded with the *sample-app, nginx,*
   and *tomcat-webserver* container definitions in the console. You can optionally rename the
   container or review and edit the resources used by the container (such as CPU units and memory
   limits) by choosing **Edit** and editing the values shown. For more information, see *Container
   Definitions (p. 67).*
   
   **Note**
   If you are using an Amazon ECR image in your container definition, be sure to use the
   full registry/repository:tag naming for your Amazon ECR images. For example,
   *aws_account_id.dkr.ecr.region.amazonaws.com/my-web-app:latest.*
4. For **Task definition**, the first-run wizard defines a task definition to use with the preloaded container
definitions. You can optionally rename the task definition and edit the resources used by the task
   (such as the **Task memory** and **Task CPU** values) by choosing **Edit** and editing the values shown. For
   more information, see *Task definition parameters (p. 66).*
Task definitions created in the first-run wizard are limited to a single container for simplicity. You can create multi-container task definitions later in the Amazon ECS console.

5. Choose Next.

Step 2: Configure the Service

In this section of the wizard, select how to configure the Amazon ECS service that is created from your task definition. A service launches and maintains a specified number of copies of the task definition in your cluster. The Amazon ECS sample application is a web-based Hello World–style application that is meant to run indefinitely. By running it as a service, it restarts if the task becomes unhealthy or unexpectedly stops.

The first-run wizard comes preloaded with a service definition, and you can see the sample-app-service service defined in the console. You can optionally rename the service or review and edit the details by choosing Edit and doing the following:

1. In the Service name field, select a name for your service.
2. In the Number of desired tasks field, enter the number of tasks to launch with your specified task definition.
3. In the Security group field, specify a range of IPv4 addresses to allow inbound traffic from, in CIDR block notation. For example, 203.0.113.0/24.
4. (Optional) You can choose to use an Application Load Balancer with your service. When a task is launched from a service that is configured to use a load balancer, the task is registered with the load balancer. Traffic from the load balancer is distributed across the instances in the load balancer. For more information, see Introduction to Application Load Balancers.

   Important
   Application Load Balancers do incur cost while they exist in your AWS resources. For more information, see Application Load Balancer Pricing.

   Complete the following steps to use a load balancer with your service.

   • In the Container to load balance section, choose the Load balancer listener port. The default value here is set up for the sample application, but you can configure different listener options for the load balancer. For more information, see Service load balancing (p. 197).

5. Review your service settings and click Save, Next.

Step 3: Configure the Cluster

In this section of the wizard, you name your cluster, and then Amazon ECS takes care of the networking and IAM configuration for you.

1. In the Cluster name field, choose a name for your cluster.
2. Click Next to proceed.

Step 4: Review

1. Review your task definition, task configuration, and cluster configuration and click Create to finish. You are directed to a Launch Status page that shows the status of your launch. It describes each step of the process (this can take a few minutes to complete while your Auto Scaling group is created and populated).
2. After the launch is complete, choose View service.

**Step 5: (Optional) View your Service**

If your service is a web-based application, such as the Amazon ECS sample application, you can view its containers with a web browser.

1. On the Service: *service-name* page, choose the Tasks tab.
2. Choose a task from the list of tasks in your service.
3. In the Network section, choose the ENI Id for your task. This takes you to the Amazon EC2 console where you can view the details of the network interface associated with your task, including the IPv4 Public IP address.
4. Enter the IPv4 Public IP address in your web browser and you should see a webpage that displays the Amazon ECS sample application.

![Amazon ECS Sample App](image)

**Congratulations!**

*Your application is now running on a container in Amazon ECS.*

**Step 6: Clean Up**

When you are finished using an Amazon ECS cluster, you should clean up the resources associated with it to avoid incurring charges for resources that you are not using.

Some Amazon ECS resources, such as tasks, services, clusters, and container instances, are cleaned up using the Amazon ECS console. Other resources, such as Amazon EC2 instances, Elastic Load Balancing load balancers, and Auto Scaling groups, must be cleaned up manually in the Amazon EC2 console or by deleting the AWS CloudFormation stack that created them.

1. Open the Amazon ECS console at [https://console.aws.amazon.com/ecs/](https://console.aws.amazon.com/ecs/).
2. In the navigation pane, choose Clusters.
3. On the Clusters page, select the cluster to delete.
4. Choose Delete Cluster. At the confirmation prompt, enter delete me and then choose Delete. Deleting the cluster cleans up the associated resources that were created with the cluster, including Auto Scaling groups, VPCs, or load balancers.
Amazon ECS developer tools overview

Whether you are part of a large enterprise or a startup, Amazon ECS offers a variety of tools that can help you to get your containers up and running quickly, regardless of your level of expertise. You can work with Amazon ECS in the following ways.

- Learn about, develop, manage and visualize your container applications and services using the AWS Management Console (p. 18).
- Perform specific actions to Amazon ECS resources with automated deployments through programming or scripts using the AWS Command Line Interface (p. 18), AWS SDKs (p. 21) or the ECS API.
- Define and manage all AWS resources in your environment with automated deployment using AWS CloudFormation (p. 19).
- Use the complete AWS Copilot CLI (p. 19) end-to-end developer workflow to create, release, and operate container applications that comply with AWS best practices for infrastructure.
- Using your preferred programming language, define infrastructure or architecture as code with the AWS CDK (p. 19).
- Containerize applications that are hosted on premises or on Amazon EC2 instances or both by using the AWS App2Container (p. 20) integrated portability and tooling ecosystem for containers.
- Deploy a Docker Compose application to Amazon ECS or test local containers with containers running in ECS, using the Amazon ECS CLI (p. 20).
- Launch containers from Docker Desktop integration with Amazon ECS (p. 20) using Amazon ECS in Docker Desktop.

AWS Management Console

The AWS Management Console is a browser-based interface for managing Amazon ECS resources. The console provides a visual overview of the service, making it easy to explore Amazon ECS features and functions without needing to use additional tools. Many related tutorials and walkthroughs are available that can guide you through use of the console.

For a tutorial that guides you through the console, see Getting started with Amazon ECS (p. 6).

When starting out, many customers prefer using the console because it provides instant visual feedback on whether the actions they take succeed. AWS customers that are familiar with the AWS Management Console, can easily manage related resources such as load balancers and Amazon EC2 instances.

Start with the AWS Management Console.

AWS Command Line Interface

The AWS Command Line Interface (AWS CLI) is a unified tool that you can use to manage your AWS services. With this one tool alone, you can both control multiple AWS services and automate these services through scripts. The Amazon ECS commands in the AWS CLI are a reflection of the Amazon ECS API.

AWS provides two sets of command line tools: the AWS Command Line Interface (AWS CLI) and the AWS Tools for Windows PowerShell. For more information, see the AWS Command Line Interface User Guide and the AWS Tools for Windows PowerShell User Guide.
The AWS CLI is suitable for customers who prefer and are used to scripting and interfacing with a command line tool and know exactly which actions they want to perform on their Amazon ECS resources. The AWS CLI is also helpful to customers who want to familiarize themselves with the Amazon ECS APIs. Customers can use the AWS CLI to perform a number of operations on Amazon ECS resources, including Create, Read, Update, and Delete operations, directly from the command line interface.

Use the AWS CLI if you are or want to become familiar with the Amazon ECS APIs and corresponding CLI commands and want to write automated scripts and perform specific actions on Amazon ECS resources.

**AWS CloudFormation**

AWS CloudFormation and Terraform for Amazon ECS both provide powerful ways for you to define your infrastructure as code. You can easily track which version of your template or AWS CloudFormation stack is running at any time and rollback to a previous version if needed. You can perform infrastructure and application deployments in the same automated fashion. This flexibility and automation is what makes AWS CloudFormation and Terraform two popular formats for deploying workloads to Amazon ECS from continuous delivery pipelines.

For more information about AWS CloudFormation, see Creating Amazon ECS resources with AWS CloudFormation (p. 324).

Use AWS CloudFormation or Terraform if you want to automate infrastructure deployments and applications on Amazon ECS and explicitly define and manage all of the AWS resources in your environment.

**AWS Copilot CLI**

The AWS Copilot CLI (command line interface) is a comprehensive tool that enables customers to deploy and operate applications packaged in containers and environments on Amazon ECS directly from their source code. When using AWS Copilot you can perform these operations without understanding AWS and Amazon ECS elements such as Application Load Balancers, public subnets, tasks, services, and clusters. AWS Copilot creates AWS resources on your behalf from opinionated service patterns, such as a load balanced web service or backend service, providing an immediate production environment for containerized applications. You can deploy through an AWS CodePipeline pipeline across multiple environments, accounts, or Regions, all of which can be managed within the CLI. By using AWS Copilot you can also perform operator tasks, such as viewing logs and the health of your service. AWS Copilot is an all-in-one tool that helps you more easily manage your cloud resources so that you can focus on developing and managing your applications.

For more information, see Using the AWS Copilot command line interface (p. 21).

Use the AWS Copilot complete end-to-end developer workflow to create, release, and operate container applications that comply with AWS best practices for infrastructure.

**AWS CDK**

The AWS Cloud Development Kit (AWS CDK) is an open source software development framework that enables you to model and provision your cloud application resources using familiar programming languages. AWS CDK provisions your resources in a safe, repeatable manner through AWS CloudFormation. Using the CDK, customers can generate their environment with fewer lines of code using the same language they used to build their application. Amazon ECS provides a module in the CDK that is named `ecs-patterns`, which creates common architectures. An available pattern is `ApplicationLoadBalancedFargateService()`. This pattern creates a cluster, task definition, and additional resources to run a load balanced Amazon ECS service on AWS Fargate.
For more information, see Creating an Amazon ECS on AWS Fargate service using the AWS CDK in the AWS Cloud Development Kit (AWS CDK) Developer Guide.

Use the AWS CDK if you want to define infrastructure or architecture as code in your preferred programming language. For example, you can use the same language that you use to write your applications.

**AWS App2Container**

Sometimes enterprise customers might already have applications that are hosted on premises or on EC2 instances or both. They are interested in the portability and tooling ecosystem of containers specifically on Amazon ECS, and need to containerize first. AWS App2Container enables you to do just that. App2Container (A2C) is a command line tool for modernizing .NET and Java applications into containerized applications. A2C analyzes and builds an inventory of all applications running in virtual machines, on premises or in the cloud. After you select the application you want to containerize, A2C packages the application artifact and identified dependencies into container images. It then configures the network ports and generates the Amazon ECS task. Last, it creates a CloudFormation template that you can deploy or modify if needed.

For more information, see Getting started with AWS App2Container.

Use App2Container if you have applications that are hosted on premises or on Amazon EC2 instances or both.

**Amazon ECS CLI**

The Amazon ECS CLI enables you to run your applications on Amazon ECS and AWS Fargate using the Docker Compose file format. You can quickly provision resources, push and pull images using Amazon ECR, and monitor running applications on Amazon ECS or AWS Fargate. You can also test containers running locally along with containers in the cloud within the CLI.

For more information, see Using the Amazon ECS command line interface (p. 27).

Use the ECS CLI if you have a Compose application and want to deploy it to Amazon ECS, or test local containers with containers running in Amazon ECS in the cloud.

**Docker Desktop integration with Amazon ECS**

AWS and Docker have collaborated to make a simplified developer experience that enables you to deploy and manage containers on Amazon ECS directly using Docker tools. You can now build and test your containers locally using Docker Desktop and Docker Compose, and then deploy them to Amazon ECS on Fargate. To get started with the Amazon ECS and Docker integration, download Docker Desktop and optionally sign up for a Docker ID. For more information, see Docker Desktop and Docker ID signup.

Beginners to containers often start learning about containers by using Docker tools such as the Docker CLI and Docker Compose. This makes using the Docker Compose CLI plugin for Amazon ECS a natural next step in running containers on AWS after testing locally. Docker provides a walkthrough on deploying containers on Amazon ECS. For more information, see Deploying Docker containers on Amazon ECS.

You can take advantage of additional Amazon ECS features, such as service discovery, load balancing and other AWS resources for use with their applications with Docker Desktop.

You can also download the Docker Compose CLI plugin for Amazon ECS directly from GitHub. For more information, see Docker Compose CLI plugin for Amazon ECS on GitHub.
AWS SDKs

You can also use AWS SDKs to manage Amazon ECS resources and operations from a variety of programming languages. The SDKs provide modules to help take care of tasks, including tasks in the following list.

- Cryptographically signing your service requests
- Retrying requests
- Handling error responses

For more information about the available SDKs, see Tools for Amazon Web Services.

Summary

With the many options to choose from, you can choose the options that are best suited to you. Consider the following options.

- If you are visually oriented, you can visually create and operate containers using the AWS Management Console.
- If you prefer CLIs, consider using AWS Copilot or the AWS CLI. Alternatively, if you prefer the Docker ecosystem, you can take advantage of the functionality of ECS from within the Docker CLI to deploy to AWS. After these resources are deployed, you can continue managing them through the CLI or visually through the Console.
- If you are a developer, you can use the AWS CDK to define your infrastructure in the same language as your application. You can use the CDK and AWS Copilot to export to CloudFormation templates where you can change granular settings, add other AWS resources, and automate deployments through scripting or a CI/CD pipeline such as AWS CodePipeline.

The AWS CLI, SDKs, or ECS API are useful tools for automating actions on ECS resources, making them ideal for deployment. To deploy applications using AWS CloudFormation you can use a variety of programming languages or a simple text file to model and provision all the resources needed for your applications. You can then deploy your application across multiple Regions and accounts in an automated and secure manner. For example, you can define your ECS cluster, services, task definitions, or capacity providers, as code in a file and deploy through the AWS CLI CloudFormation commands.

To perform operations tasks, you can view and manage resources programmatically using the AWS CLI, SDK, or ECS API. Commands like `describe-tasks` or `list-services` display the latest metadata or a list of all resources. Similar to deployments, customers can write an automation that includes commands such as `update-service` to provide corrective action upon the detection of a resource that has stopped unexpectedly. You can also operate your services using AWS Copilot. Commands like `copilot svc logs` or `copilot app show` provide details about each of your microservices, or about your application as a whole.

Customers can use any of the available tooling mentioned in this document and use them in variety of combinations. ECS tooling offers various paths to graduate from certain tools to use others that fit your changing needs. For example, you can opt for more granular control over resources or more automation as needed. ECS also offers a large range of tools for a wide range of needs and levels of expertise.

Using the AWS Copilot command line interface

The AWS Copilot command line interface (CLI) commands simplify building, releasing, and operating production-ready containerized applications on Amazon ECS from a local development environment.
The AWS Copilot CLI aligns with developer workflows that support modern application best practices: from using infrastructure as code to creating a CI/CD pipeline provisioned on behalf of a user. Use the AWS Copilot CLI as part of your everyday development and testing cycle as an alternative to the AWS Management Console.

AWS Copilot currently supports Linux, macOS, and Windows systems. For more information about the latest version of the AWS Copilot CLI, see Releases.

**Note**
The source code for the AWS Copilot CLI is available on GitHub. The latest CLI documentation is available on the AWS Copilot website. We recommend that you submit issues and pull requests for changes that you would like to have included. However, Amazon Web Services doesn't currently support running modified copies of AWS Copilot code. Report issues with AWS Copilot by connecting with us on Gitter or GitHub where you can open issues, provide feedback, and report bugs.

## Installing the AWS Copilot CLI

The AWS Copilot CLI can be installed on Linux or macOS systems either by using Homebrew or by manually downloading the binary. Use the following steps with your preferred installation method.

### Installing the AWS Copilot CLI using Homebrew

The following command is used to install the AWS Copilot CLI on your macOS or Linux system using Homebrew. Before installation, you should have Homebrew installed. For more information, see Homebrew.

```
brew install aws/tap/copilot-cli
```

### Manually installing the AWS Copilot CLI

As an alternative to Homebrew, you can manually install the AWS Copilot CLI on your macOS or Linux system. Use the following command for your operating system to download the binary, apply execute permissions to it, and then verify it works by listing the help menu.

**macOS**

For macOS:

```
sudo curl -Lo /usr/local/bin/copilot https://github.com/aws/copilot-cli/releases/latest/download/copilot-darwin \
&& sudo chmod +x /usr/local/bin/copilot \
&& copilot --help
```

**Linux**

For Linux x86 (64-bit) systems:

```
sudo curl -Lo /usr/local/bin/copilot https://github.com/aws/copilot-cli/releases/latest/download/copilot-linux \
&& sudo chmod +x /usr/local/bin/copilot \
&& copilot --help
```

For Linux ARM systems:

```
sudo curl -Lo /usr/local/bin/copilot https://github.com/aws/copilot-cli/releases/latest/download/copilot-linux-arm64 \
```
Installing the AWS Copilot CLI

&& sudo chmod +x /usr/local/bin/copilot \
&& copilot --help

Windows

Using Powershell, run the following command:

```
PS C:\> New-Item -Path 'C:\copilot' -ItemType directory; 
```

(Optional) Verify the AWS Copilot CLI using PGP signatures

The AWS Copilot CLI executables are cryptographically signed using PGP signatures. The PGP signatures can be used to verify the validity of the AWS Copilot CLI executable. Use the following steps to verify the signatures using the GnuPG tool.

1. Download and install GnuPG. For more information, see the GnuPG website.
   - For macOS, we recommend using Homebrew. Install Homebrew using the instructions from their website. For more information, see Homebrew. After Homebrew is installed, use the following command from your macOS terminal.

```
brew install gnupg
```

   - For Linux systems, install gpg using the package manager on your flavor of Linux.
   - For Windows systems, download and use the Windows simple installer from the GnuPG website. For more information, see GnuPG Download.

2. Retrieve the Amazon ECS PGP public key. You can use a command to do this or manually create the key and then import it.

   a. Option 1: Retrieve the key with the following command.

```
gpg --keyserver hkp://keys.gnupg.net --recv BCE9D9A42D51784F
```

   b. Option 2: Create a file with the following contents of the Amazon ECS PGP public key and then import it.

```
-----BEGIN PGP PUBLIC KEY BLOCK-----
Version: GnuPG v2

mQINBFq1SasBEADliGcT1NVJ1ydFfN8DqebYYe9ne3dt6jKFMwKowLm6LLGJe7HUjQthgCWQWwKf+qPq8dArRgDAtn2pY5fKipHgar4CPQ9Qn5RMO2f1741mavr4Vg7K/FK8VH1q2uRw32/89XLqEgbR0TMDwKuxoPctEgBq8HJ3Lgn6P6e+6xWVRkChQuB0QAhjbQ+bM0kNy0lJn8gINL3UMAG6568E3LAN1gQgGEnPaS1Uw6W1uP0GZO
N5-6pHBJrKIL/v/JT4IFXpYw22vhWNahxeNRonoYj3uyuKeliCrw4kjo+skizBGo2K7qcvX8c3j5+Zi1lH/qDLXmcUb2a2azSMM1mOoF8ExK5hA0UbUq1KfWjXqXK6NN1c0LcTR7qWd5mNh13dFanLgV/ZnIrsSaqJ0L6zRSq804LN1OBVnbDEx2K+e5kFxn51BqFgPfrj3hQ+KTHMa9Y8Z7yUc64Bj1N6F9N17FJJu5Sf9qdkvRLasQRBCqBGxX3r1ZJbHieJwVNEUKW1+EgeC6kxj5u5Nw7zu2c3hQZQRcADLV+hfVJktOz9gm6x2bq1TnWwcz4xK3wpe5B3eE5Ux08z78a3gtsEaStfQQo6XBaQbUWOur1y5Zb3i2jSTJtl7uLy8Wn2P260emeeHizicVMF6E1gEqPrJAIupgc7KyZvPt4YewfAARQABtCRebw6F6b24qJUNTDxIY3McCVjxjPlpHLAYW1hem9uLmVbT6jAswEAEACAYF
A1rjLOIYAcgQHivRXa0TaQrgiq/+JppWqHn1VFMwv7lessBBISUqZed6p6VpU8d7Ba3pCcbBP8V7B8Rbs3pL5tbv1+rkqolw+0g24q/ue/YbWtoAt4q0cEo0HgcaNAGaB817GzFZtYJGpWpWSn9Hq9j37/vYyVVZvmcaAAMcB64Humnhr0dj9Cblo9lpgCbpJeVuc02hjn23eEJsS9kC7OUHqVxkVn4d9u2ZXF4O01SF6hmqKIOB0LrAlj5Qv30hVQJ0ThYqGGrk/ENM1JZx2Sqt7twW8jkg1n3H3Y

--------BEGIN PGP PUBLIC KEY BLOCK--------
Version: GnuPG v2

mQINBFq1SasBEADliGcT1NVJ1ydFfN8DqebYYe9ne3dt6jKFMwKowLm6LLGJe7HUjQthgCWQWwKf+qPq8dArRgDAtn2pY5fKipHgar4CPQ9Qn5RMO2f1741mavr4Vg7K/FK8VH1q2uRw32/89XLqEgbR0TMDwKuxoPctEgBq8HJ3Lgn6P6e+6xWVRkChQuB0QAhjbQ+bM0kNy0lJn8gINL3UMAG6568E3LAN1gQgGEnPaS1Uw6W1uP0GZO
N5-6pHBJrKIL/v/JT4IFXpYw22vhWNahxeNRonoYj3uyuKeliCrw4kjo+skizBGo2K7qcvX8c3j5+Zi1lH/qDLXmcUb2a2azSMM1mOoF8ExK5hA0UbUq1KfWjXqXK6NN1c0LcTR7qWd5mNh13dFanLgV/ZnIrsSaqJ0L6zRSq804LN1OBVnbDEx2K+e5kFxn51BqFgPfrj3hQ+KTHMa9Y8Z7yUc64Bj1N6F9N17FJJu5Sf9qdkvRLasQRBCqBGxX3r1ZJbHieJwVNEUKW1+EgeC6kxj5u5Nw7zu2c3hQZQRcADLV+hfVJktOz9gm6x2bq1TnWwcz4xK3wpe5B3eE5Ux08z78a3gtsEaStfQQo6XBaQbUWOur1y5Zb3i2jSTJtl7uLy8Wn2P260emeeHizicVMF6E1gEqPrJAIupgc7KyZvPt4YewfAARQABtCRebw6F6b24qJUNTDxIY3McCVjxjPlpHLAYW1hem9uLmVbT6jAswEAEACAYF
A1rjLOIYAcgQHivRXa0TaQrgiq/+JppWqHn1VFMwv7lessBBISUqZed6p6VpU8d7Ba3pCcbBP8V7B8Rbs3pL5tbv1+rkqolw+0g24q/ue/YbWtoAt4q0cEo0HgcaNAGaB817GzFZtYJGpWpWSn9Hq9j37/vYyVVZvmcaAAMcB64Humnhr0dj9Cblo9lpgCbpJeVuc02hjn23eEJsS9kC7OUHqVxkVn4d9u2ZXF4O01SF6hmqKIOB0LrAlj5Qv30hVQJ0ThYqGGrk/ENM1JZx2Sqt7twW8jkg1n3H3Y
```
The details of the Amazon ECS public key for reference:

Key ID: BCE9D9A42D51784F
Type: RSA
Size: 4096
Expires: Never
User ID: Amazon ECS

Import the Amazon ECS public key with the following command.

```bash
gpg --import <public_key_filename>
```

3. Download the AWS Copilot CLI signatures. The signatures are ASCII detached PGP signatures stored in files with the extension `.asc`. The signatures file has the same name as its corresponding executable, with `.asc` appended.

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macOS

For macOS systems, run the following command.

```bash
```

Linux

For Linux x86 (64-bit) systems, run the following command.

```bash
```

For Linux ARM systems, run the following command.

```bash
sudo curl -Lo copilot.asc https://github.com/aws/copilot-cli/releases/latest/download/copilot-linux-arm64.asc
```

Windows

Using Powershell, run the following command.

```bash
```

4. Verify the signature with the following command.

- For macOS and Linux systems:

  ```bash
gpg --verify copilot.asc /usr/local/bin/copilot
  ```

Expected output:

```
gpg: Signature made Tue Apr  3 13:29:30 2018 PDT
gpg: using RSA key DE3CBD61ADAF8B8E
gpg: Good signature from "Amazon ECS <ecs-security@amazon.com>" [unknown]
gpg: WARNING: This key is not certified with a trusted signature!
gpg:         There is no indication that the signature belongs to the owner.
Primary key fingerprint: F34C 3DDA E729 26B0 79BE  AEC6 BCE9 D9A4 2D51 784F
Subkey fingerprint: EB3D F841 E2C9 212A 2BD4  2232 DE3C BD61 ADAF 8B8E
```

**Important**
The warning in the output is expected and is not problematic. It occurs because there is not a chain of trust between your personal PGP key (if you have one) and the Amazon ECS PGP key. For more information, see Web of trust.

**Next steps**

After installation, learn how to deploy an Amazon ECS application using AWS Copilot. For more information, see Getting started with Amazon ECS using AWS Copilot (p. 10).
Using the Amazon ECS command line interface

Amazon ECS has released AWS Copilot, a command line interface (CLI) tool that simplifies building, releasing, and operating production-ready containerized applications on Amazon ECS from a local development environment. For more information, see Using the AWS Copilot command line interface (p. 21).

The Amazon Elastic Container Service (Amazon ECS) command line interface (CLI) provides high-level commands to simplify creating, updating, and monitoring clusters and tasks from a local development environment. The Amazon ECS CLI supports Docker Compose files, a popular open-source specification for defining and running multi-container applications. Use the ECS CLI as part of your everyday development and testing cycle as an alternative to the AWS Management Console.

Important
At this time, the latest version of the Amazon ECS CLI only supports the major versions of Docker Compose file syntax versions 1, 2, and 3. The version specified in the compose file must be the string "1", "1.0", "2", "2.0", "3", or "3.0". Docker Compose minor versions are not supported.

The latest version of the Amazon ECS CLI is 1.17.0. For release notes, see Changelog.

Note
The source code for the Amazon ECS CLI is available on GitHub. We encourage you to submit pull requests for changes that you would like to have included. However, Amazon Web Services does not currently support running modified copies of this software.

Learn how to use high-level, application-first commands to model, create, release and manage containerized applications from a local development environment at Getting started with Amazon ECS using AWS Copilot (p. 10).

Topics
- Installing the Amazon ECS CLI (p. 27)
- Configuring the Amazon ECS CLI (p. 32)
- Migrating Configuration Files (p. 34)
- Tutorial: Creating a cluster with a Fargate task using the Amazon ECS CLI (p. 35)
- Tutorial: Creating an Amazon ECS Service That Uses Service Discovery Using the Amazon ECS CLI (p. 39)

Installing the Amazon ECS CLI

Follow these instructions to install the Amazon ECS CLI on your macOS, Linux, or Windows system.

Step 1: Download the Amazon ECS CLI

Download the Amazon ECS CLI binary.

- For macOS:
Installing the Amazon ECS CLI

For Linux systems:

```
```

For Windows systems:

```
```

Open Windows PowerShell and run the following commands:

```
PS C:\> New-Item -Path 'C:\Program Files\Amazon\ECSCLI' -ItemType Directory
PS C:\> Invoke-WebRequest -OutFile 'C:\Program Files\Amazon\ECSCLI\ecs-cli.exe' https://amazon-ecs-cli.s3.amazonaws.com/ecs-cli-windows-amd64-latest.exe
```

**Note**

If you encounter permissions issues, ensure that you are running PowerShell as an administrator.

### Step 2: Verify the Amazon ECS CLI using PGP signatures

The Amazon ECS CLI executables are cryptographically signed using PGP signatures. The PGP signatures can be used to verify the validity of the Amazon ECS CLI executable. Use the following steps to verify the signatures using the GnuPG tool.

1. Download and install GnuPG. For more information, see the GnuPG website.
   - For macOS, we recommend using Homebrew. Install Homebrew using the instructions from their website. For more information, see Homebrew. After Homebrew is installed, use the following command from your macOS terminal.
     ```
brew install gnupg
```
   - For Linux systems, install gpg using the package manager on your flavor of Linux.
   - For Windows systems, download and use the Windows simple installer from the GnuPG website. For more information, see GnuPG Download.

2. Retrieve the Amazon ECS PGP public key. You can use a command to do this or manually create the key and then import it.
   a. Option 1: Retrieve the key with the following command.
      ```
gpg --keyserver hkp://keys.gnupg.net --recv BCE9D9A42D51784F
```
   b. Option 2: Create a file with the following contents of the Amazon ECS PGP public key and then import it.
      ```
------BEGIN PGP PUBLIC KEY BLOCK------
Version: GnuPG v2
mQINBFq1SasBEADliGcT1NVJ1yd4fN8DqeWYe9ne3dt6jgKFmKowLmm6LLGJe7HUjOtjchcWvDKh+gPpHq4rRgDxZtn2pXY5fK1ghag4CD8QgRnRM0Z2fl741msvrv4Vg
7F/MBVvH4g1uWw32/B94XLzegRb6MDkUxeOjEpCt+eBaqMj3Lgn6Pe+4xVWrkChQvBoQAjBQ+bSm0KnY01jN8j1nL3UMAG6h8E3LANtgdgEnpNab1UwWLuPoG004x
N=6pHBJrKIL/1v/STU4FPxyWzwvWNahtxeMRnoYj3uycHkeliCrw4kJ0+sKizBgd
------END PGP PUBLIC KEY BLOCK------
```
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The details of the Amazon ECS PGP public key for reference:

Key ID: BCE9D9A42D51784F
Type: RSA
Size: 4096

User ID: Amazon ECS

API Version 2014-11-13
3. Download the Amazon ECS CLI signatures. The signatures are ASCII detached PGP signatures stored in files with the extension .asc. The signatures file has the same name as its corresponding executable, with .asc appended.

   - For macOS systems:
     ```
     ```
   - For Linux systems:
     ```
     ```
   - For Windows systems:
     ```
     ```

4. Verify the signature.

   - For macOS and Linux systems:
     ```
     gpg --verify ecs-cli.asc /usr/local/bin/ecs-cli
     ```
   - For Windows systems:
     ```
     PS C:\> gpg --verify ecs-cli.asc 'C:\Program Files\Amazon\ECSCLI\ecs-cli.exe'
     ```

Expected output:

```
gpg: Signature made Tue Apr  3 13:29:30 2018 PDT
      using RSA key DE3CBD61ADAF8B8E
      Good signature from "Amazon ECS <ecs-security@amazon.com>" [unknown]
      WARNING: This key is not certified with a trusted signature!
      Primary key fingerprint: F34C 3DDA E729 26B0 79BE AEC6 D9A4 2D51 784F
      Subkey fingerprint: EB3D F841 E2C9 212A 2BD4 2232 DE3C BD61 ADAP BB8E
```

**Important**
The warning in the output is expected and is not problematic. It occurs because there is not a chain of trust between your personal PGP key (if you have one) and the Amazon ECS PGP key. For more information, see Web of trust.

**Step 3: Apply Execute Permissions to the Binary**

Apply execute permissions to the binary.

- For macOS and Linux systems:
Configuring the Amazon ECS CLI

Amazon ECS User Guide for AWS Fargate

Configuring the Amazon ECS CLI

Amazon ECS has released AWS Copilot, a command line interface (CLI) tool that simplifies building, releasing, and operating production-ready containerized applications on Amazon ECS from a local development environment. For more information, see Using the AWS Copilot command line interface (p. 21).

The Amazon ECS CLI requires some basic configuration information before you can use it, such as your AWS credentials, the AWS Region in which to create your cluster, and the name of the Amazon ECS cluster to use. Configuration information is stored in the `~/.ecs` directory on macOS and Linux systems and in `C:\Users\<username>\AppData\local\ecs` on Windows systems.

To configure the Amazon ECS CLI

1. Set up a CLI profile with the following command, substituting `profile_name` with your desired profile name, `AWS_ACCESS_KEY_ID` and `AWS_SECRET_ACCESS_KEY` environment variables with your AWS credentials.

   ```bash
   ecs-cli configure profile --profile-name profile_name --access-key AWS_ACCESS_KEY_ID --secret-key AWS_SECRET_ACCESS_KEY
   ```

2. Complete the configuration with the following command, substituting `launch_type` with the task launch type you want to use by default, `region_name` with your desired AWS region, `cluster_name` with the name of an existing Amazon ECS cluster or a new cluster to use, and `configuration_name` for the name you'd like to give this configuration.

   ```bash
   ecs-cli configure launch-type launch_type region_name --cluster-name cluster_name --configuration-name configuration_name
   ```

Note

Once the PATH variable is set, the Amazon ECS CLI can be used from either Windows PowerShell or the command prompt.

Step 4: Complete the Installation

Verify that the CLI is working properly.

```bash
ecs-cli --version
```

Proceed to Configuring the Amazon ECS CLI (p. 32).

Important

You must configure the Amazon ECS CLI with your AWS credentials, an AWS region, and an Amazon ECS cluster name before you can use it.

```
sudo chmod +x /usr/local/bin/ecs-cli
```

For Windows systems:

Edit the environment variables and add `C:\Program Files\Amazon\ECSCLI` to the PATH variable field, separated from existing entries by using a semicolon. For example:

```
PS C:\> setx path "%path%;C:\Program Files\Amazon\ECSCLI"
```

Restart PowerShell (or the command prompt) so the changes go into effect.

```
Note

Once the PATH variable is set, the Amazon ECS CLI can be used from either Windows PowerShell or the command prompt.
```
After you have installed and configured the CLI, you can try the Tutorial: Creating a cluster with a Fargate task using the Amazon ECS CLI (p. 35). For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide.

Profiles

The Amazon ECS CLI supports the configuring of multiple sets of AWS credentials as named profiles using the `ecs-cli configure profile` command. A default profile can be set by using the `ecs-cli configure profile default` command. These profiles can then be referenced when you run Amazon ECS CLI commands that require credentials using the `--ecs-profile` flag otherwise the default profile is used.

For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide.

Cluster Configurations

A cluster configuration is a set of fields that describes an Amazon ECS cluster including the name of the cluster and the region. A default cluster configuration can be set by using the `ecs-cli configure default` command. The Amazon ECS CLI supports the configuring of multiple named cluster configurations using the `--config-name` option.

For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide.

Order of Precedence

There are multiple methods for passing both the credentials and the region in an Amazon ECS CLI command. The following is the order of precedence for each of these.

The order of precedence for credentials is:

1. Amazon ECS CLI profile flags:
   a. ECS profile (`--ecs-profile`)
   b. AWS profile (`--aws-profile`)
2. Environment variables:
   a. AWS_PROFILE
   b. ECS_PROFILE
   c. AWS_ACCESS_KEY_ID, AWS_SECRET_ACCESS_KEY, and AWS_SESSION_TOKEN
3. ECS config-attempts to fetch credentials from the default ECS profile.
4. Default AWS profile—Attempts to use credentials (aws_access_key_id, aws_secret_access_key) or assume_role (role_arn, source_profile) from the AWS profile name.
   a. AWS_DEFAULT_PROFILE environment variable (defaults to default).
5. EC2 instance role

The order of precedence for Region is:

1. Amazon ECS CLI flags:
   a. Region flag (`--region`)
b. Cluster config flag (--cluster-config)

2. ECS config-attempts to fetch the Region from the default ECS profile.

3. Environment variables—Attempts to fetch the region from the following environment variables:
   a. AWS_REGION
   b. AWS_DEFAULT_REGION

4. AWS profile-attempts to use the region from the AWS profile name:
   a. AWS_PROFILE environment variable
   b. AWS_DEFAULT_PROFILE environment variable (defaults to default)

Migrating Configuration Files

The process of configuring the Amazon ECS CLI has changed significantly in the latest version (v1.0.0) to allow the addition of new features. A migration command has been introduced that converts an older (v0.6.6 and older) configuration file to the current format. The old configuration files are deprecated, so we recommend converting your configuration to the newest format to take advantage of the new features. The configuration-related changes and new features introduced in v1.0.0 in the new YAML formatted configuration files include:

- Splitting up of credential and cluster-related configuration information into two separate files. Credential information is stored in ~/.ecs/credentials and cluster configuration information is stored in ~/.ecs/config.
- The configuration files are formatted in YAML.
- Support for storing multiple named configurations.
- Deprecation of the field compose-service-name-prefix (name used for creating a service <compose_service_name_prefix> + <project_name>). This field can still be configured. However, if it is not configured, there is no longer a default value assigned. For Amazon ECS CLI v0.6.6 and earlier, the default was ecscompose-service-.
- Removal of the field compose-project-name-prefix (name used for creating a task definition <compose_project_name_prefix> + <project_name>). Amazon ECS CLI v1.0.0 and later can still read old configuration files; so if this field is present then it is still read and used. However, configuring this field is not supported in v1.0.0+ with the ecs-cli configure command, and if the field is manually added to a v1.0.0+ configuration file it causes the Amazon ECS CLI to throw an error.
- The field cfn-stack-name-prefix (name used for creating CFN stacks <cfn_stack_name_prefix> + <cluster_name>) has been changed to cfn-stack-name. Instead of specifying a prefix, the exact name of a CloudFormation template can be configured.
- Amazon ECS CLI v0.6.6 and earlier allowed configuring credentials using a named AWS profile from the ~/.aws/credentials file on your system. This functionality has been removed. However, a new flag, --aws-profile, has been added which allows the referencing of an AWS profile inline in all commands that require credentials.

Note
The --project-name flag can be used to set the project name.

Migrating Older Configuration Files to the v1.0.0+ Format

While all versions of the Amazon ECS CLI support reading from the older configuration file format, upgrading to the new format is required to take advantage of some new features, for example using multiple named cluster profiles. Migrating your legacy configuration file to the new format is easy with the ecs-cli configure migrate command. The command takes the configuration information stored in the old format in ~/.ecs/config and converts it to a pair of files in the new format, overwriting your old configuration file in the process.

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When running the `ecs-cli configure migrate` command there is a warning message displayed with the old configuration file, and a preview of the new configuration files. User confirmation is required before the migration proceeds. If the `--force` flag is used, then the warning message is not displayed, and the migration proceeds without any confirmation. If `cfn-stack-name-prefix` is used in the legacy file, then `cfn-stack-name` is stored in the new file as `<cfn_stack_name_prefix> + <cluster_name>`.

For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide.

**Tutorial: Creating a cluster with a Fargate task using the Amazon ECS CLI**

This tutorial shows you how to set up a cluster and deploy a service with tasks using the Fargate launch type.

**Prerequisites**

Complete the following prerequisites:

- Set up an AWS account.
- Install the Amazon ECS CLI. For more information, see Installing the Amazon ECS CLI (p. 27).
- Install and configure the AWS CLI. For more information, see AWS Command Line Interface.

**Step 1: Create the Task Execution IAM Role**

The Amazon ECS container agent makes calls to AWS APIs on your behalf, so it requires an IAM policy and role for the service to know that the agent belongs to you. This IAM role is referred to as a task execution IAM role. If you already have a task execution role created to use, you can skip this step. For more information, see Amazon ECS task execution IAM role (p. 290).

**To create the task execution IAM role using the AWS CLI**

1. Create a file named `task-execution-assume-role.json` with the following contents:

   ```json
   {
   "Version": "2012-10-17",
   "Statement": [
   {
   "Sid": "",
   "Effect": "Allow",
   "Principal": {
   "Service": "ecs-tasks.amazonaws.com"
   },
   "Action": "sts:AssumeRole"
   }
   ]
   }
   ``

2. Create the task execution role:

   ```bash
   aws iam --region us-west-2 create-role --role-name ecsTaskExecutionRole --assume-role-policy-document file://task-execution-assume-role.json
   ``

3. Attach the task execution role policy:

   ```bash
   aws iam attach-role-policy --role-name ecsTaskExecutionRole --policy-arn arn:aws:iam::aws:policy/AmazonECSContainerInstancesPolicy
   ```
### Step 2: Configure the Amazon ECS CLI

The Amazon ECS CLI requires credentials in order to make API requests on your behalf. It can pull credentials from environment variables, an AWS profile, or an Amazon ECS profile. For more information, see Configuring the Amazon ECS CLI (p. 32).

**To create an Amazon ECS CLI configuration**

1. Create a cluster configuration, which defines the AWS region to use, resource creation prefixes, and the cluster name to use with the Amazon ECS CLI:

   ```
   ecs-cli configure --cluster tutorial --default-launch-type FARGATE --config-name tutorial --region us-west-2
   ```

2. Create a CLI profile using your access key and secret key:

   ```
   ecs-cli configure profile --access-key AWS_ACCESS_KEY_ID --secret-key AWS_SECRET_ACCESS_KEY --profile-name tutorial-profile
   ```

### Step 3: Create a Cluster and Configure the Security Group

**To create an ECS cluster and security group**

1. Create an Amazon ECS cluster with the `ecs-cli up` command. Because you specified Fargate as your default launch type in the cluster configuration, this command creates an empty cluster and a VPC configured with two public subnets.

   ```
   ecs-cli up --cluster-config tutorial --ecs-profile tutorial-profile
   ```

   This command may take a few minutes to complete as your resources are created. The output of this command contains the VPC and subnet IDs that are created. Take note of these IDs as they are used later.

2. Using the AWS CLI, retrieve the default security group ID for the VPC. Use the VPC ID from the previous output:

   ```
   aws ec2 describe-security-groups --filters Name=vpc-id,Values=VPC_ID --region us-west-2
   ```

   The output of this command contains your security group ID, which is used in the next step.

3. Using AWS CLI, add a security group rule to allow inbound access on port 80:

   ```
   aws ec2 authorize-security-group-ingress --group-id security_group_id --protocol tcp --port 80 --cidr 0.0.0.0/0 --region us-west-2
   ```
Step 4: Create a Compose File

For this step, create a simple Docker compose file that creates a simple PHP web application. At this time, the Amazon ECS CLI supports Docker compose file syntax versions 1, 2, and 3. This tutorial uses Docker compose v3.

Here is the compose file, which you can name docker-compose.yml. The web container exposes port 80 for inbound traffic to the web server. It also configures container logs to go to the CloudWatch log group created earlier. This is the recommended best practice for Fargate tasks.

```yaml
version: '3'
services:
  web:
    image: amazon/amazon-ecs-sample
    ports:
      - "80:80"
    logging:
      driver: awslogs
      options:
        awslogs-group: tutorial
        awslogs-region: us-west-2
        awslogs-stream-prefix: web

Note
If your account already contains a CloudWatch Logs log group named tutorial in the us-west-2 Region, choose a unique name so the ECS CLI creates a new log group for this tutorial.

In addition to the Docker compose information, there are some parameters specific to Amazon ECS that you must specify for the service. Using the VPC, subnet, and security group IDs from the previous step, create a file named ecs-params.yml with the following content:

```yaml
version: 1
task_definition:
  task_execution_role: ecsTaskExecutionRole
ecs_network_mode: awsvpc
task_size:
  mem_limit: 0.5GB
  cpu_limit: 256
run_params:
  network_configuration:
    awsvpc_configuration:
      subnets:
        - "subnet ID 1"
        - "subnet ID 2"
      security_groups:
        - "security group ID"
      assign_public_ip: ENABLED
```

Step 5: Deploy the Compose File to a Cluster

After you create the compose file, you can deploy it to your cluster with `ecs-cli compose service up`. By default, the command looks for files called docker-compose.yml and ecs-params.yml in the current directory; you can specify a different docker compose file with the `--file` option, and a different ECS Params file with the `--ecs-params` option. By default, the resources created by this command have the current directory in their titles, but you can override that with the `--project-name` option. The `--create-log-groups` option creates the CloudWatch log groups for the container logs.

```
ecs-cli compose --project-name tutorial service up --create-log-groups --cluster-config tutorial --ecs-profile tutorial-profile
```
Step 6: View the Running Containers on a Cluster

After you deploy the compose file, you can view the containers that are running in the service with `ecs-cli compose service ps`.

```
ecs-cli compose --project-name tutorial service ps --cluster-config tutorial --ecs-profile tutorial-profile
```

Output:

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>TaskDefinition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tutorial/0c2862e6e39e4eff92ca3e4f843c5b9a/web</td>
<td>RUNNIGN</td>
<td>34.222.202.55:80-&gt;80/tcp</td>
</tr>
<tr>
<td>tutorial:1</td>
<td>UNKNOWN</td>
<td></td>
</tr>
</tbody>
</table>

In the above example, you can see the `web` container from your compose file, and also the IP address and port of the web server. If you point your web browser at that address, you should see the PHP web application. Also in the output is the `task-id` value for the container. Copy the task ID as you use it in the next step.

Step 7: View the Container Logs

View the logs for the task:

```
ecs-cli logs --task-id 0c2862e6e39e4eff92ca3e4f843c5b9a --follow --cluster-config tutorial --ecs-profile tutorial-profile
```

**Note**
The `--follow` option tells the Amazon ECS CLI to continuously poll for logs.

Step 8: Scale the Tasks on the Cluster

You can scale up your task count to increase the number of instances of your application with `ecs-cli compose service scale`. In this example, the running count of the application is increased to two.

```
ecs-cli compose --project-name tutorial service scale 2 --cluster-config tutorial --ecs-profile tutorial-profile
```

Now you should see two more containers in your cluster:

```
ecs-cli compose --project-name tutorial service ps --cluster-config tutorial --ecs-profile tutorial-profile
```

Output:

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>TaskDefinition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tutorial/0c2862e6e39e4eff92ca3e4f843c5b9a/web</td>
<td>RUNNIGN</td>
<td>34.222.202.55:80-&gt;80/tcp</td>
</tr>
<tr>
<td>tutorial:1</td>
<td>UNKNOWN</td>
<td></td>
</tr>
<tr>
<td>tutorial/d9fbbc931d2e47ae4928f843c5b9f/web</td>
<td>RUNNIGN</td>
<td>34.220.230.191:80-&gt;80/tcp</td>
</tr>
<tr>
<td>tutorial:1</td>
<td>UNKNOWN</td>
<td></td>
</tr>
</tbody>
</table>

Step 9: View your Web Application

Enter the IP address for the task in your web browser and you should see a webpage that displays the `Simple PHP App` web application.
Step 10: Clean Up

When you are done with this tutorial, you should clean up your resources so they do not incur any more charges. First, delete the service so that it stops the existing containers and does not try to run any more tasks.

```
ecs-cli compose --project-name tutorial service down --cluster-config tutorial --ecs-profile tutorial-profile
```

Now, take down your cluster, which cleans up the resources that you created earlier with ecs-cli up.

```
ecs-cli down --force --cluster-config tutorial --ecs-profile tutorial-profile
```

Tutorial: Creating an Amazon ECS Service That Uses Service Discovery Using the Amazon ECS CLI

This tutorial shows a simple walkthrough of creating an Amazon ECS service that is configured to use service discovery. Many of the service discovery configuration values can be specified with either the ECS parameters file or flags. When flags are used, they take precedence over the ECS parameters file if both are present. When using the Amazon ECS CLI, the compose project name is used as the name for your ECS service.

**Prerequisites**

It is expected that you have completed the following prerequisites before continuing on:

- Set up an AWS account.
- Install the Amazon ECS CLI. For more information, see Installing the Amazon ECS CLI (p. 27).

**Configure the Amazon ECS CLI**

Before you can start this tutorial, you must install and configure the Amazon ECS CLI. For more information, see Installing the Amazon ECS CLI (p. 27).

The Amazon ECS CLI requires credentials in order to make API requests on your behalf. It can pull credentials from environment variables, an AWS profile, or an Amazon ECS profile. For more information, see Configuring the Amazon ECS CLI (p. 32).

**To create an Amazon ECS CLI configuration**

1. Create a cluster configuration:
2. Create a profile using your access key and secret key:

```
ecs-cli configure profile --access-key AWS_ACCESS_KEY_ID --secret-key AWS_SECRET_ACCESS_KEY --profile-name ec2-tutorial
```

**Note**
If this is the first time that you are configuring the Amazon ECS CLI, these configurations are marked as default. If this is not your first time configuring the Amazon ECS CLI, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide to set this as the default configuration and profile.

### Create an Amazon ECS Service Configured to Use Service Discovery

Use the following steps to create an Amazon ECS service that is configured to use service discovery with the Amazon ECS CLI.

**To create an Amazon ECS service configured to use service discovery**

1. Create an Amazon ECS service named `backend` and create a private DNS namespace named `tutorial` within a VPC. In this example, the task is using the `awsvpc` network mode, so the `container_name` and `container_port` values are not required.

```
ecs-cli compose --project-name backend service up --private-dns-namespace tutorial --vpc vpc-04deee8176dce7d7d --enable-service-discovery
```

**Output:**

```
INFO[0001] Using ECS task definition TaskDefinition="backend:1"
INFO[0002] Waiting for the private DNS namespace to be created...
INFO[0002] Cloudformation stack status stackStatus=CREATE_IN_PROGRESS
WARN[0033] Defaulting DNS Type to A because network mode was awsvpc
INFO[0033] Waiting for the Service Discovery Service to be created...
INFO[0034] Cloudformation stack status stackStatus=CREATE_IN_PROGRESS
INFO[0065] Created an ECS service service=backend
taskDefinition="backend:1"
INFO[0066] Updated ECS service successfully desiredCount=1
serviceName=backend
INFO[0081] (service backend) has started 1 tasks: (task 824b5a76-8f9c-4beb-a64b-6904e320630e). timestamp="2018-09-12 00:00:26 +0000 UTC"
INFO[0157] Service status desiredCount=1 runningCount=1
serviceName=backend
INFO[0157] ECS Service has reached a stable state desiredCount=1 runningCount=1
serviceName=backend
```

2. Create another service named `frontend` in the same private DNS namespace. Because the namespace already exists, the Amazon ECS CLI uses it instead of creating a new one.

```
ecs-cli compose --project-name frontend service up --private-dns-namespace tutorial --vpc vpc-04deee8176dce7d7d --enable-service-discovery
```

**Output:**

```
```
3. Verify that the two services are able to discover each other within the VPC using DNS. The DNS hostname uses the following format: `<service_discovery_service_name>.<service_discovery_namespace>`. For this example, the `frontend` service can be discovered at `frontend.tutorial` and the `backend` service can be discovered at `backend.tutorial`. Because these are private DNS namespaces, these DNS names only resolve when within the specified VPC.

4. To update the service discovery settings, update the settings for the `frontend` service. The values that can be updated are the DNS TTL and the value for the health check custom config failure threshold.

```
ecs-cli compose --project-name frontend service up --update-service-discovery --dns-type SRV --dns-ttl 120 --healthcheck-custom-config-failure-threshold 2
```

Output:

```
INFO[0001] Using ECS task definition TaskDefinition="frontend:1"
INFO[0001] Updated ECS service successfully desiredCount=1
desiredCount=1
serviceName=frontend
INFO[0001] Service status desiredCount=1 runningCount=1
serviceName=frontend
serviceName=frontend
INFO[0001] ECS Service has reached a stable state desiredCount=1 runningCount=1
serviceName=frontend
INFO[0001] Cloudformation stack status stackStatus=UPDATE_IN_PROGRESS
```

5. To clean up, delete the Amazon ECS service and the service discovery resources. When the `frontend` service is deleted, the Amazon ECS CLI automatically removes the associated service discovery service.

```
ecs-cli compose --project-name frontend service rm
```

Output:

```
INFO[0000] Updated ECS service successfully desiredCount=0
serviceName=frontend
INFO[0001] Service status desiredCount=0 runningCount=1
serviceName=frontend
INFO[0016] Service status desiredCount=0 runningCount=0
serviceName=frontend
INFO[0016] (service frontend) has stopped 1 running tasks: (task 824b5a7e-8f9c-4beb-a64b-6904e320630e). timestamp="2018-09-12 00:37:25 +0000 UTC"
INFO[0016] ECS Service has reached a stable state desiredCount=0 runningCount=0
serviceName=frontend
INFO[0016] Deleted ECS service service=frontend
```
INFO[0016] ECS Service has reached a stable state  
  desiredCount=0 runningCount=0  
  serviceName=frontend
INFO[0027] Waiting for your Service Discovery Service resource to be deleted...
INFO[0027] Cloudformation stack status  
  stackStatus=DELETE_IN_PROGRESS

6. To complete the cleanup, delete the `backend` service along with the private DNS namespace that was created with it. The Amazon ECS CLI associates the AWS CloudFormation stack for the private DNS namespace with the Amazon ECS service for which it was created. When the service is deleted, the namespace is also deleted.

    `ecs-cli compose --project-name backend service rm --delete-namespace`
AWS Fargate platform versions

AWS Fargate platform versions are used to refer to a specific runtime environment for Fargate task infrastructure. It is a combination of the kernel and container runtime versions.

New platform versions are released as the runtime environment evolves, for example, if there are kernel or operating system updates, new features, bug fixes, or security updates. Security updates and patches are deployed automatically for your Fargate tasks. If a security issue is found that affects a platform version, AWS patches the platform version. In some cases, you may be notified that your Fargate tasks have been scheduled for retirement. For more information, see Task retirement (p. 154).

Topics
- Platform version considerations (p. 43)
- Available AWS Fargate platform versions (p. 43)
- Migrating to platform version 1.4.0 (p. 46)
- AWS Fargate platform version deprecation (p. 46)

Platform version considerations

The following should be considered when specifying a platform version:

- When specifying a platform version, you can use either a specific version number, for example 1.4.0, or LATEST (which uses the 1.4.0 platform version).
- In the China (Beijing) and China (Ningxia) Regions, the only supported platform versions are 1.4.0 and 1.3.0. The AWS Management Console displays older platform versions but an error will be returned if they are chosen. The LATEST platform version is supported because it uses the 1.4.0 platform version.
- If you have a service with running tasks and want to update their platform version, you can update your service, specify a new platform version, and choose Force new deployment. Your tasks are redeployed with the latest platform version. For more information, see Updating a service (p. 182).
- If your service is scaled up without updating the platform version, those tasks receive the platform version that was specified on the service's current deployment.

Available AWS Fargate platform versions

The following are the available platform versions. For information about platform version deprecation, see AWS Fargate platform version deprecation (p. 46).

1.4.0

The following is the changelog for platform version 1.4.0.

- Beginning on November 5, 2020, any new Amazon ECS task launched on Fargate using platform version 1.4.0 will be able to use the following features:
  - When using Secrets Manager to store sensitive data, you can inject a specific JSON key or a specific version of a secret as an environment variable or in a log configuration. For more information, see Specifying sensitive data using Secrets Manager (p. 126).
  - Specify environment variables in bulk using the environmentFiles container definition parameter. For more information, see Specifying environment variables (p. 136).
• Tasks run in a VPC and subnet enabled for IPv6 will be assigned both a private IPv4 address and an IPv6 address. For more information, see Fargate task networking in the Amazon Elastic Container Service User Guide for AWS Fargate.

• The task metadata endpoint version 4 provides additional metadata about your task and container including the task launch type, the Amazon Resource Name (ARN) of the container, and the log driver and log driver options used. When querying the /stats endpoint you also receive network rate stats for your containers. For more information, see Task metadata endpoint version 4 in the Amazon Elastic Container Service User Guide for AWS Fargate.

• Beginning on July 30, 2020, any new Amazon ECS task launched on Fargate using platform version 1.4.0 will be able to route UDP traffic using a Network Load Balancer to their Amazon ECS on Fargate tasks. For more information, see Service load balancing (p. 197).

• Beginning on May 28, 2020, any new Amazon ECS task launched on Fargate using platform version 1.4.0 will have its ephemeral storage encrypted with an AES-256 encryption algorithm using an AWS Fargate-managed encryption key. For more information, see Using data volumes in tasks (p. 95).

• Added support for using Amazon EFS file system volumes for persistent task storage. For more information, see Amazon EFS volumes (p. 96).

• The ephemeral task storage has been increased to a minimum of 20 GB for each task. For more information, see Using data volumes in tasks (p. 95).

• The network traffic behavior to and from tasks has been updated. Starting with platform version 1.4.0, all Fargate tasks receive a single elastic network interface (referred to as the task ENI) and all network traffic flows through that ENI within your VPC and will be visible to you through your VPC flow logs. For more information, see Fargate task networking (p. 104).

• Task ENIs add support for jumbo frames. Network interfaces are configured with a maximum transmission unit (MTU), which is the size of the largest payload that fits within a single frame. The larger the MTU, the more application payload can fit within a single frame, which reduces per-frame overhead and increases efficiency. Supporting jumbo frames will reduce overhead when the network path between your task and the destination supports jumbo frames, such as all traffic that remains within your VPC.

• CloudWatch Container Insights will include network performance metrics for Fargate tasks. For more information, see Amazon ECS CloudWatch Container Insights (p. 249).

• Added support for the task metadata endpoint version 4 which provides additional information for your Fargate tasks, including network stats for the task and which Availability Zone the task is running in. For more information, see Task metadata endpoint version 4 (p. 310).

• Added support for the SYS_PTRACE Linux parameter in container definitions. For more information, see Linux Parameters (p. 82).

• The Fargate container agent replaces the use of the Amazon ECS container agent for all Fargate tasks. This change should not have an effect on how your tasks run.

• The container runtime is now using Containerd instead of Docker. This change should not have an effect on how your tasks run. You will notice that some error messages that originate with the container runtime will change from mentioning Docker to more general errors. For more information, see Stopped tasks error codes in the Amazon Elastic Container Service User Guide for AWS Fargate.

• Based on Amazon Linux 2.

1.3.0

The following is the changelog for platform version 1.3.0.

• Beginning on Sept 30, 2019, any new Fargate task that is launched supports the awsfirelens log driver. FireLens for Amazon ECS enables you to use task definition parameters to route logs to an AWS service or AWS Partner Network (APN) destination for log storage and analytics. For more information, see Custom log routing (p. 112).
• Added task recycling for Fargate tasks, which is the process of refreshing tasks that are a part of an Amazon ECS service. For more information, see Fargate task recycling (p. 156).

• Beginning on March 27, 2019, any new Fargate task that is launched can use additional task definition parameters that enable you to define a proxy configuration, dependencies for container startup and shutdown as well as a per-container start and stop timeout value. For more information, see Proxy configuration (p. 90), Container dependency (p. 83), and Container timeouts (p. 84).

• Beginning on April 2, 2019, any new Fargate task that is launched supports injecting sensitive data into your containers by storing your sensitive data in either AWS Secrets Manager secrets or AWS Systems Manager Parameter Store parameters and then referencing them in your container definition. For more information, see Specifying sensitive data (p. 125).

• Beginning on May 1, 2019, any new Fargate task that is launched supports referencing sensitive data in the log configuration of a container using the secretOptions container definition parameter. For more information, see Specifying sensitive data (p. 125).

• Beginning on May 1, 2019, any new Fargate task that is launched supports the splunk log driver in addition to the awslogs log driver. For more information, see Storage and Logging (p. 76).

• Beginning on July 9, 2019, any new Fargate tasks that is launched supports CloudWatch Container Insights. For more information, see Amazon ECS CloudWatch Container Insights (p. 249).

• Beginning on December 3, 2019, the Fargate Spot capacity provider is supported. For more information, see AWS Fargate capacity providers (p. 51).

• Based on Amazon Linux 2.

1.2.0

The following is the changelog for platform version 1.2.0.

Note
Platform version 1.2.0 is deprecated. We recommend migrating to the latest platform version. For information about platform version deprecation, see AWS Fargate platform version deprecation (p. 46).

• Added support for private registry authentication using AWS Secrets Manager. For more information, see Private registry authentication for tasks (p. 123).

1.1.0

The following is the changelog for platform version 1.1.0.

Note
Platform version 1.1.0 is deprecated. We recommend migrating to the latest platform version. For information about platform version deprecation, see AWS Fargate platform version deprecation (p. 46).

• Added support for the Amazon ECS task metadata endpoint. For more information, see Amazon ECS task metadata endpoint (p. 310).

• Added support for Docker health checks in container definitions. For more information, see Health Check (p. 71).

• Added support for Amazon ECS service discovery. For more information, see Service Discovery (p. 217).

1.0.0

The following is the changelog for platform version 1.0.0.
Note
Platform version 1.0.0 is deprecated. We recommend migrating to the latest platform version. For information about platform version deprecation, see AWS Fargate platform version deprecation (p. 46).

- Based on Amazon Linux 2017.09.
- Initial release.

Migrating to platform version 1.4.0

The following should be considered when migrating your Amazon ECS on Fargate tasks from platform version 1.0.0, 1.1.0, 1.2.0, or 1.3.0 to platform version 1.4.0. It is considered best practice to confirm your task works properly on platform version 1.4.0 prior to migrating your tasks.

- The network traffic behavior to and from tasks has been updated. Starting with platform version 1.4.0, all Amazon ECS on Fargate tasks receive a single elastic network interface (referred to as the task ENI) and all network traffic flows through that ENI within your VPC and will be visible to you through your VPC flow logs. For more information, see Fargate task networking (p. 104).
- If you are using interface VPC endpoints, the following should be considered.
  - When using container images hosted with Amazon ECR, both the com.amazonaws.region.ecr.dkr and com.amazonaws.region.ecr.api Amazon ECR VPC endpoints as well as the Amazon S3 gateway endpoint are required. For more information, see Amazon ECR interface VPC endpoints (AWS PrivateLink) in the Amazon Elastic Container Registry User Guide.
  - When using a task definition that references Secrets Manager secrets to retrieve sensitive data for your containers, you must create the interface VPC endpoints for Secrets Manager. For more information, see Using Secrets Manager with VPC Endpoints in the AWS Secrets Manager User Guide.
  - When using a task definition that references Systems Manager Parameter Store parameters to retrieve sensitive data for your containers, you must create the interface VPC endpoints for Systems Manager. For more information, see Using Systems Manager with VPC endpoints in the AWS Systems Manager User Guide.
  - Ensure that the security group in the Elastic Network Interface (ENI) associated with your task has the security group rules created to allow traffic between the task and the VPC endpoints you are using.

AWS Fargate platform version deprecation

This page lists platform versions that AWS Fargate has deprecated or have been scheduled for deprecation. These platform versions remain available until the published deprecation date.

A force update date is provided for each platform version scheduled for deprecation. On the force update date, any service using the LATEST platform version that is pointed to a platform version that is scheduled for deprecation will be updated using the force new deployment option. When the service is updated using the force new deployment option, all tasks running on a platform version scheduled for deprecation are stopped and new tasks are launched using the platform version that the LATEST tag points to at that time. Standalone tasks or services with an explicit platform version set are not affected by the force update date.

We recommend updating your services standalone tasks to use the most recent platform version. For more information on migrating to the most recent platform version, see Migrating to platform version 1.4.0 (p. 46).

Once a platform version reaches the deprecation date, the platform version will no longer be available for new tasks or services. Any standalone tasks or services which explicitly use a deprecated platform version will not be able to start.
version will continue using that platform version until the tasks are stopped. After the deprecation date, a deprecated platform version will no longer receive any security updates or bug fixes.

<table>
<thead>
<tr>
<th>Platform version</th>
<th>Force update date</th>
<th>Deprecation date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0.0</td>
<td>October 26, 2020</td>
<td>December 14, 2020</td>
</tr>
<tr>
<td>1.1.0</td>
<td>October 26, 2020</td>
<td>December 14, 2020</td>
</tr>
<tr>
<td>1.2.0</td>
<td>October 26, 2020</td>
<td>December 14, 2020</td>
</tr>
</tbody>
</table>

For information about current platform versions, see AWS Fargate platform versions (p. 43).
Amazon ECS clusters

An Amazon ECS cluster is a logical grouping of tasks or services. If you are using capacity providers, a cluster is also a logical grouping of capacity providers. When you first use Amazon ECS, a default cluster is created for you, but you can create multiple clusters in an account to keep your resources separate.

Topics
- Cluster concepts (p. 48)
- Creating a cluster (p. 49)
- Amazon ECS capacity providers (p. 49)
- Updating cluster settings (p. 54)
- Deleting a cluster (p. 55)

Cluster concepts

The following are general concepts about Amazon ECS clusters.

- Clusters are Region-specific.
- The following are the possible states that a cluster can be in.
  - ACTIVE
    The cluster is ready to accept tasks and, if applicable, you can register container instances with the cluster.
  - PROVISIONING
    The cluster has capacity providers associated with it and the resources needed for the capacity provider are being created.
  - DEPROVISIONING
    The cluster has capacity providers associated with it and the resources needed for the capacity provider are being deleted.
  - FAILED
    The cluster has capacity providers associated with it and the resources needed for the capacity provider have failed to create.
  - INACTIVE
    The cluster has been deleted. Clusters with an INACTIVE status may remain discoverable in your account for a period of time. However, this behavior is subject to change in the future, so you should not rely on INACTIVE clusters persisting.
- A cluster may contain a mix of tasks using either the Fargate or EC2 launch types. For more information about launch types, see Amazon ECS launch types (p. 93).
- A cluster may contain a mix of both Auto Scaling group capacity providers and Fargate capacity providers, however when specifying a capacity provider strategy they may only contain one or the other but not both. For more information, see Amazon ECS capacity providers (p. 49).
- Custom IAM policies may be created to allow or restrict user access to specific clusters. For more information, see the Cluster Examples (p. 268) section in Amazon Elastic Container Service Identity-Based Policy Examples (p. 263).
- Clusters with Fargate tasks can be scaled using Service Auto Scaling. For more information, see Service Auto Scaling (p. 209).
Creating a cluster

You can create an Amazon ECS cluster using the AWS Management Console, as described in this topic. Before you begin, be sure that you’ve completed the steps in Setting up with Amazon ECS (p. 3).

The console cluster creation wizard provides a simple way to create the resources that are needed by an Amazon ECS cluster by creating a AWS CloudFormation stack. It also lets you customize several common cluster configuration options. However, the wizard does not allow you to customize every resource option. If your requirements extend beyond what is supported in this wizard, consider using our reference architecture at https://github.com/awslabs/ecs-refarch-cloudformation.

If you add or modify the underlying cluster resources directly after they are created by the wizard you may receive an error when attempting to delete the cluster. AWS CloudFormation refers to this as stack drift. For more information on detecting drift on an existing AWS CloudFormation stack, see Detect Drift on an Entire CloudFormation Stack in the AWS CloudFormation User Guide.

To create a cluster

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. From the navigation bar, select the Region to use.
3. In the navigation pane, choose Clusters.
4. On the Clusters page, choose Create Cluster.
5. For Select cluster compatibility, choose Networking only, then choose Next Step.
   
   Important
   
The FARGATE and FARGATE_SPOT capacity providers will be automatically associated with the cluster. For more information, see AWS Fargate capacity providers (p. 51).

6. On the Configure cluster page, enter a Cluster name. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.
7. In the Networking section, configure the VPC for your cluster. You can keep the default settings, or you can modify these settings with the following steps.
   a. (Optional) If you choose to create a new VPC, for CIDR Block, select a CIDR block for your VPC. For more information, see Your VPC and Subnets in the Amazon VPC User Guide.
   b. For Subnets, select the subnets to use for your VPC. You can keep the default settings or you can modify them to meet your needs.
8. In the CloudWatch Container Insights section, choose whether to enable Container Insights for the cluster. For more information, see Amazon ECS CloudWatch Container Insights (p. 249).
9. Choose Create.

Amazon ECS capacity providers

Amazon ECS capacity providers are used to manage the infrastructure the tasks in your clusters use. Each cluster can have one or more capacity providers and an optional default capacity provider strategy. The capacity provider strategy determines how the tasks are spread across the cluster’s capacity providers. When you run a standalone task or create a service, you may either use the cluster’s default capacity provider strategy or specify a capacity provider strategy that overrides the cluster’s default strategy.

Capacity provider concepts

Capacity providers consist of the following components.

API Version 2014-11-13
49
Capacity provider

A capacity provider is associated with a cluster and is used in a capacity provider strategy to determine the infrastructure that a task runs on.

For Amazon ECS on AWS Fargate users, there is a FARGATE and a FARGATE_SPOT capacity provider. The AWS Fargate capacity providers are reserved and don't need to be created nor can they be deleted. After you associate them with your cluster, you may add them to a capacity provider strategy. For more information, see AWS Fargate capacity providers (p. 51).

Default capacity provider strategy

A default capacity provider strategy is associated with an Amazon ECS cluster. This determines the capacity provider strategy used creating a service or running a standalone task in the cluster when there isn't a custom capacity provider strategy or launch type specified. It is considered best practice to define a default capacity provider strategy for each cluster.

Capacity provider strategy

A capacity provider strategy is specified when creating a service or running a standalone task when the default capacity provider strategy for a cluster does not meet your needs.

Only capacity providers that are already associated with a cluster and have an ACTIVE or UPDATING status can be used in a capacity provider strategy. A capacity provider can be associated with a cluster either during cluster creation or by using the PutClusterCapacityProviders API after a cluster has been created.

A capacity provider strategy consists of one or more capacity providers. An optional base and weight value may be specified for finer control of a capacity provider.

The base value designates how many tasks, at a minimum, to run on the specified capacity provider. Only one capacity provider in a capacity provider strategy can have a base defined.

The weight value designates the relative percentage of the total number of launched tasks that should use the specified capacity provider. For example, if you have a strategy that contains two capacity providers, and both have a weight of 1, then when the base is satisfied, the tasks will be split evenly across the two capacity providers. Using that same logic, if you specify a weight of 1 for capacityProviderA and a weight of 4 for capacityProviderB, then for every one task that is run using capacityProviderA, four tasks would use capacityProviderB.

Capacity provider considerations

The following should be considered when using capacity providers:

- A capacity provider must be associated with a cluster prior to being specified in a capacity provider strategy.
- When you specify a capacity provider strategy, the number of capacity providers that can be specified is limited to six.
- A service using an Auto Scaling group capacity provider can't be updated to use a Fargate capacity provider and vice versa.
- In a capacity provider strategy, if no weight value is specified for a capacity provider in the console then the default value of 1 is used. If using the API or AWS CLI, the default value of 0 is used.
- When multiple capacity providers are specified within a capacity provider strategy, at least one of the capacity providers must have a weight value greater than zero and any capacity providers with a weight of 0 will not be used to place tasks. If you specify multiple capacity providers in a strategy that all have a weight of 0, any RunTask or CreateService actions using the capacity provider strategy will fail.
- In a capacity provider strategy, only one capacity provider can have a base value defined. If no base value is specified, the default value of 0 is used.
• A cluster may contain a mix of both Auto Scaling group capacity providers and Fargate capacity providers, however a capacity provider strategy may only contain one or the other but not both.

• A cluster may contain a mix of services and standalone tasks using both capacity providers and launch types. A service may be updated to use a capacity provider strategy rather than a launch type, however you must force a new deployment when doing so.

• When managed termination protection is enabled, managed scaling must also be enabled otherwise managed termination protection won't work.

• Using capacity providers is not supported when using Classic Load Balancers for your services.

AWS Fargate capacity providers

Amazon ECS on AWS Fargate capacity providers enable you to use both Fargate and Fargate Spot capacity with your Amazon ECS tasks. For more information about capacity providers, see Amazon ECS capacity providers (p. 49).

With Fargate Spot you can run interruption tolerant Amazon ECS tasks at a discounted rate compared to the Fargate price. Fargate Spot runs tasks on spare compute capacity. When AWS needs the capacity back, your tasks will be interrupted with a two-minute warning. This is described in further detail below.

Fargate capacity provider considerations

The following should be considered when using Fargate capacity providers.

• The Fargate and Fargate Spot capacity providers don't need to be created. They are available to all accounts and only need to be associated with a cluster to be available for use.

• To associate Fargate and Fargate Spot capacity providers to an existing cluster, you must use the Amazon ECS API or AWS CLI. For more information, see Adding Fargate capacity providers to an existing cluster (p. 53).

• The Fargate and Fargate Spot capacity providers are reserved and cannot be deleted. You can disassociate them from a cluster using the PutClusterCapacityProviders API.

• When a new cluster is created using the Amazon ECS console along with the Networking only cluster template, the FARGATE and FARGATE_SPOT capacity providers are associated with the new cluster automatically.

• Using Fargate Spot requires that your task use platform version 1.3.0 or later. For more information, see AWS Fargate platform versions (p. 43).

• When tasks using the Fargate and Fargate Spot capacity providers are stopped, a task state change event is sent to Amazon EventBridge. The stopped reason describes the cause. For more information, see Task state change events (p. 240).

• A cluster may contain a mix of Fargate and Auto Scaling group capacity providers, however a capacity provider strategy may only contain either Fargate or Auto Scaling group capacity providers, but not both. For more information, see Auto Scaling Group Capacity Providers in the Amazon Elastic Container Service Developer Guide.

Handling Fargate Spot termination notices

When tasks using Fargate Spot capacity are stopped due to a Spot interruption, a two-minute warning is sent before a task is stopped. The warning is sent as a task state change event to Amazon EventBridge and a SIGTERM signal to the running task. When using Fargate Spot as part of a service, the service scheduler will receive the interruption signal and attempt to launch additional tasks on Fargate Spot if capacity is available. A service with only one task will be interrupted until capacity is available.

To ensure that your containers exit gracefully before the task stops, the following can be configured:
AWS Fargate capacity providers

- A `stopTimeout` value of 120 seconds or less can be specified in the container definition that the task is using. Specifying a `stopTimeout` value gives you time between the moment the task state change event is received and the point at which the container is forcefully stopped. If you don't specify a `stopTimeout` value, the default value of 30 seconds is used. For more information, see Container timeouts (p. 84).

- The SIGTERM signal must be received from within the container to perform any cleanup actions. Failure to process this signal will result in the task receiving a SIGKILL signal after the configured `stopTimeout` and may result in data loss or corruption.

The following is a snippet of a task state change event displaying the stopped reason and stop code for a Fargate Spot interruption.

```json
{
  "version": "0",
  "id": "9bcdac79-b31f-4d3d-9410-fbd727c29fab",
  "detail-type": "ECS Task State Change",
  "source": "aws.ecs",
  "account": "111122223333",
  "resources": [
    "arn:aws:ecs:us-east-1:111122223333:task/b99d40b3-5176-4f71-9a52-9dbd6f1cebef"
  ],
  "detail": {
    "createdAt": "2016-12-06T16:41:05.702Z",
    "desiredStatus": "STOPPED",
    "lastStatus": "RUNNING",
    "stoppedReason": "Your Spot Task was interrupted.",
    "stopCode": "TerminationNotice",
    "taskArn": "arn:aws:ecs:us-east-1:111122223333:task/b99d40b3-5176-4f71-9a52-9dbd6fEXAMPLE",
    ...
  }
}
```

The following is an event pattern that is used to create an EventBridge rule for Amazon ECS task state change events. You can optionally specify a cluster in the `detail` field to receive task state change events for. For more information, see Creating an EventBridge Rule in the Amazon EventBridge User Guide.

```json
{
  "source": [
    "aws.ecs"
  ],
  "detail-type": [
    "ECS Task State Change"
  ],
  "detail": {
    "clusterArn": [
    ]
  }
}
```

Creating a new cluster that uses Fargate capacity providers

When a new Amazon ECS cluster is created, you can specify one or more capacity providers to associate with the cluster. The capacity providers are used to define a capacity provider strategy which determine the infrastructure your tasks run on.

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When using the AWS Management Console, the FARGATE and FARGATE_SPOT capacity providers are associated with the cluster automatically when using the Networking only cluster template. For more information, see Creating a cluster (p. 49).

**To create an Amazon ECS cluster using Fargate capacity providers (AWS CLI)**

Use the following command to create a new cluster and associate both the Fargate and Fargate Spot capacity providers with it.

- **create-cluster (AWS CLI)**

```
aws ecs create-cluster \
  --cluster-name FargateCluster \
  --capacity-providers FARGATE FARGATE_SPOT \ 
  --region us-west-2
```

**Adding Fargate capacity providers to an existing cluster**

You can update the pool of available capacity providers for an existing Amazon ECS cluster by using the PutClusterCapacityProviders API.

Adding either the Fargate or Fargate Spot capacity providers to an existing cluster is not supported in the AWS Management Console. You must either create a new Fargate cluster in the console or add the Fargate or Fargate Spot capacity providers to the existing cluster using the Amazon ECS API or AWS CLI.

**To add the Fargate capacity providers to an existing cluster (AWS CLI)**

Use the following command to add the Fargate and Fargate Spot capacity providers to an existing cluster. If the specified cluster has existing capacity providers associated with it, you must specify all existing capacity providers in addition to any new ones you want to add. Any existing capacity providers associated with a cluster that are omitted from a PutClusterCapacityProviders API call will be disassociated from the cluster. You can only disassociate an existing capacity provider from a cluster if it's not being used by any existing tasks. These same rules apply to the cluster's default capacity provider strategy. If the cluster has an existing default capacity provider strategy defined, it must be included in the PutClusterCapacityProviders API call. Otherwise, it will be overwritten.

- **put-cluster-capacity-providers (AWS CLI)**

```
aws ecs put-cluster-capacity-providers \
  --cluster FargateCluster \
  --capacity-providers FARGATE FARGATE_SPOT existing_capacity_provider1 existing_capacity_provider2 \
  --default-capacity-provider-strategy existing_default_capacity_provider_strategy \ 
  --region us-west-2
```

**Running tasks using a Fargate capacity provider**

You can run a task or create a service using either the Fargate or Fargate Spot capacity providers by specifying a capacity provider strategy. If no capacity provider strategy is provided, the cluster's default capacity provider strategy is used.

Running a task using the Fargate or Fargate Spot capacity providers is supported in the AWS Management Console. You must add the Fargate or Fargate Spot capacity providers to cluster's default capacity provider strategy if using the AWS Management Console. When using the Amazon ECS API or AWS CLI you can specify either a capacity provider strategy or use the cluster's default capacity provider strategy.
To run a task using a Fargate capacity provider (AWS CLI)

Use the following command to run a task using the Fargate and Fargate Spot capacity providers.

- `run-task` (AWS CLI)

```
aws ecs run-task \
  --capacity-provider-strategy capacityProvider=FARGATE,weight=1 \n  capacityProvider=FARGATE_SPOT,weight=1 \n  --cluster FargateCluster \n  --task-definition task-def-family:revision \n  --network-configuration \
  "awsvpcConfiguration={subnets=[string,string],securityGroups=[string,string],assignPublicIp=string}"
  --count integer \n  --region us-west-2
```

**Note**

When running standalone tasks using Fargate Spot it is important to note that the task may be interrupted before it is able to complete and exit. It is therefore important that you code your application to gracefully exit within 2 minutes when it receives a SIGTERM signal and be able to be resumed. For more information, see Handling Fargate Spot termination notices (p. 51).

Create a service using a Fargate capacity provider (AWS CLI)

Use the following command to create a service using the Fargate and Fargate Spot capacity providers.

- `create-service` (AWS CLI)

```
aws ecs create-service \
  --capacity-provider-strategy capacityProvider=FARGATE,weight=1 \n  capacityProvider=FARGATE_SPOT,weight=1 \n  --cluster FargateCluster \n  --service-name FargateService \n  --task-definition task-def-family:revision \n  --network-configuration \
  "awsvpcConfiguration={subnets=[string,string],securityGroups=[string,string],assignPublicIp=string}"
  --desired-count integer \n  --region us-west-2
```

Updating cluster settings

Cluster settings enable you to configure parameters for your existing Amazon ECS clusters. You can update cluster settings using the Amazon ECS API, AWS CLI or SDKs. Currently, the only supported cluster setting is `containerInsights`, which allows you to enable or disable CloudWatch Container Insights for an existing cluster. To enable CloudWatch Container Insights for a new cluster, that can be done in the AWS Management Console during cluster creation. For more information, see Creating a cluster (p. 49).

**Important**

Currently, if you delete an existing cluster that does not have Container Insights enabled and then create a new cluster with the same name with Container Insights enabled, Container Insights will not actually be enabled. If you want to preserve the same name for your existing cluster and enable Container Insights, you must wait 7 days before you can re-create it.
Deleting a cluster

If you are finished using a cluster, you can delete it. Once deleted, the cluster will transition to the INACTIVE state. Clusters with an INACTIVE status may remain discoverable in your account for a period of time. However, this behavior is subject to change in the future, so you should not rely on INACTIVE clusters persisting.

When you delete a cluster in the Amazon ECS console, the associated resources that are deleted with it vary depending on how the cluster was created. Step 5 (p. 55) of the following procedure changes based on that condition.

If your cluster was created with the AWS Management Console then the AWS CloudFormation stack that was created for your cluster is also deleted when you delete your cluster. If you have added or modified the underlying cluster resources you may receive an error when attempting to delete the cluster. AWS CloudFormation refers to this as stack drift. For more information on detecting drift on an existing AWS CloudFormation stack, see Detect Drift on an Entire CloudFormation Stack in the AWS CloudFormation User Guide.

To delete a cluster (AWS Management Console)

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. From the navigation bar, select the Region to use.
3. In the navigation pane, choose Clusters.
   
   Important
   In the navigation pane, ensure that the New ECS Experience toggle is disabled. The delete cluster workflow is not supported yet in the new Amazon ECS console.
4. On the Clusters page, select the cluster to delete.
5. Choose Delete Cluster. You see a confirmation prompt.
Amazon ECS task definitions

A task definition is required to run Docker containers in Amazon ECS. The following are some of the parameters you can specify in a task definition:

- The Docker image to use with each container in your task
- How much CPU and memory to use with each task
- The launch type to use, which determines the infrastructure on which your tasks are hosted
- The Docker networking mode to use for the containers in your task
- The logging configuration to use for your tasks
- Whether the task should continue to run if the container finishes or fails
- The command the container should run when it is started
- Any data volumes that should be used with the containers in the task
- The IAM role that your tasks should use

Your entire application stack does not need to be on a single task definition, and in most cases it should not. Your application can span multiple task definitions. You can do this by combining related containers into their own task definitions, each representing a single component. For more information, see Application architecture (p. 61).

Topics

- Task definition considerations (p. 56)
- Application architecture (p. 61)
- Creating a task definition (p. 61)
- Task definition parameters (p. 66)
- Amazon ECS launch types (p. 93)
- Using data volumes in tasks (p. 95)
- Fargate task networking (p. 104)
- Using the awslogs log driver (p. 106)
- Custom log routing (p. 112)
- Private registry authentication for tasks (p. 123)
- Specifying sensitive data (p. 125)
- Specifying environment variables (p. 136)
- Example task definitions (p. 138)
- Updating a task definition (p. 141)
- Deregistering task definition revisions (p. 142)

Task definition considerations

Tasks that use the Fargate launch type don't support all of the Amazon ECS task definition parameters that are available. Some parameters aren't supported at all, and others behave differently for Fargate tasks.
The following task definition parameters aren't valid in Fargate tasks:

- devices
- disableNetworking
- dnsSearchDomains
- dnsServers
- dockerSecurityOptions
- dockerVolumeConfiguration
- extraHosts
- host
- hostname
- links
- placementConstraints — By default, Fargate tasks are spread across Availability Zones.
- privileged
- sharedMemorySize
- tmpfs

**Important**

When any one of the task definition parameters isn't supported, it is assumed that any subflags for that parameter aren't supported either.

The following task definition parameters behave differently for Fargate tasks:

- When using `logConfiguration`, the supported log drivers for Fargate tasks are the `awslogs`, `splunk`, and `awsfirelens` log drivers.
- When using `linuxParameters` for capabilities, the `drop` parameter can be used, but the `add` parameter isn't supported.
- The `healthCheck` parameter is only supported for Fargate tasks that use the platform version 1.1.0 or later.
- If you use the `portMappings` parameter, you should only specify the `containerPort`. The `hostPort` can either be left blank or be set to the same value as the `containerPort`.

To ensure that your task definition validates for use with the Fargate launch type, you can specify the following when you register the task definition:

- In the AWS Management Console, for the `Requires Compatibilities` field, specify `FARGATE`.
- In the AWS CLI, for the `--requires-compatibilities` option, specify `FARGATE`.
- In the API, specify the `requiresCompatibilities` flag.

**Network mode**

Fargate task definitions require that the network mode is set to `awsvpc`. The `awsvpc` network mode provides each task with its own elastic network interface. A network configuration is also required when creating a service or manually running tasks. For more information, see Fargate Task Networking in the *Amazon Elastic Container Service User Guide for AWS Fargate*.

**Task CPU and memory**

Fargate task definitions require that you specify CPU and memory at the task level. Even though you can also specify CPU and memory at the container level for Fargate tasks, this is optional. Most use cases
Logging

Fargate task definitions only support the awslogs, splunk and awsfirelens log drivers for the log configuration. The following code shows a snippet of a task definition where the awslogs log driver is configured:

```json
"logConfiguration": {
    "logDriver": "awslogs",
    "options": {
        "awslogs-group": "/ecs/fargate-task-definition",
        "awslogs-region": "us-east-1",
        "awslogs-stream-prefix": "ecs"
    }
}
```

For more information about how you can use the awslogs log driver in task definitions to send your container logs to CloudWatch Logs, see Using the awslogs log driver (p. 106).

For more information about using the awsfirelens log driver in a task definition, see Custom log routing (p. 112).

Amazon ECS Task execution IAM role

There is an optional task execution IAM role that you can specify with Fargate to allow your Fargate tasks to make API calls to Amazon ECR. The API calls pull container images as well as call CloudWatch to store container application logs. For more information, see Amazon ECS task execution IAM role (p. 290).

Example task definition

The following is an example task definition that uses the Fargate launch type to set up a web server:

```json
{
    "containerDefinitions": [
        {
            "command": ["/bin/sh -c "echo '<html> <head> <title>Amazon ECS Sample App</title> <style>body {margin-top: 40px; background-color: #333;} </style> </head><body> <div style=color:white;text-align:center> <h1>Amazon ECS Sample App</h1> <h2>Congratulations! Your application is now running on a container in Amazon ECS.</h2> </div></body>
" > /usr/local/apache2/htdocs/index.html && httpd-foreground"
        }
    ],
```
For Amazon ECS tasks on Fargate, the following storage types are supported:

- Amazon EFS volumes for persistent storage. For more information, see Amazon EFS volumes (p. 96).
- Ephemeral storage for nonpersistent storage.

When provisioned, each Amazon ECS task hosted on Fargate receives the following ephemeral storage. The ephemeral storage configuration depends on which platform version the task is using. After a Fargate task stops, the ephemeral storage is deleted. For more information about Amazon ECS default service limits, see Amazon ECS service quotas (p. 226).

**Note**
The host and sourcePath parameters are not supported for Fargate tasks.

**Fargate tasks using platform version 1.4.0 or later**

All Amazon ECS on Fargate tasks using platform version 1.4.0 or later receive a minimum of 20 GiB of ephemeral storage. Both the pulled, compressed, and the uncompressed container image for the task is stored on the ephemeral storage. To determine the total amount of ephemeral storage your task has to use, you must subtract the amount of storage your container image uses from the total amount.

For tasks using platform version 1.4.0 or later that are launched on May 28, 2020 or later, the ephemeral storage is encrypted with an AES-256 encryption algorithm using an AWS Fargate-managed encryption key.
Fargate tasks using platform version 1.3.0 or earlier

For Amazon ECS on Fargate tasks using platform version 1.3.0 or earlier, each task receives the following ephemeral storage.

- 10 GB of Docker layer storage

  **Note**
  
  This amount includes both compressed and uncompressed container image artifacts.

- An additional 4 GB for volume mounts. This can be mounted and shared among containers using the volumes, mountPoints and volumesFrom parameters in the task definition.

Example task definition

In this example, you have two application containers that need to access the same scratch file storage location.

**To provide nonpersistent empty storage for containers in a Fargate task**

1. In the task definition volumes section, define a volume with the name application_scratch.

   ```json
   "volumes": [ 
   { 
     "name": "application_scratch",
     "host": {}
   } 
   ]
   ``

2. In the containerDefinitions section, create the application container definitions so they mount the nonpersistent storage.

   ```json
   "containerDefinitions": [ 
   { 
     "name": "application1",
     "image": "my-repo/application",
     "cpu": 100,
     "memory": 100,
     "essential": true,
     "mountPoints": [ 
     { 
       "sourceVolume": "application_scratch",
       "containerPath": "/var/scratch"
     } 
     ]
   },
   { 
     "name": "application2",
     "image": "my-repo/application",
     "cpu": 100,
     "memory": 100,
     "essential": true,
     "mountPoints": [ 
     { 
       "sourceVolume": "application_scratch",
       "containerPath": "/var/scratch"
     } 
     ]
   }
   ]
   ```
Application architecture

How you architect your application on Amazon ECS depends on several factors, with the launch type you are using being a key differentiator. We give the following guidance which should assist in the process.

Using the Fargate launch type

When architecting your application to run on Amazon ECS using AWS Fargate, the main question is when should you put multiple containers into the same task definition versus deploying containers separately in multiple task definitions.

When the following conditions are required, we recommend that you deploy your containers in a single task definition:

- Your containers share a common lifecycle (that is, they are launched and terminated together).
- Your containers must run on the same underlying host (that is, one container references the other on a localhost port).
- You require that your containers share resources.
- Your containers share data volumes.

Otherwise, you should define your containers in separate tasks definitions so that you can scale, provision, and deprovision them separately.

Creating a task definition

Before you can run Docker containers on Amazon ECS, you must create a task definition. You can define multiple containers and data volumes in a single task definition. For more information about the parameters available in a task definition, see Task definition parameters (p. 66).

To create a new task definition

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation pane, choose task definitions, Create new task definition.
3. On the Select launch type compatibilities page, choose FARGATE and then Next step.

   Note
   The Fargate launch type isn't compatible with Windows containers.

4. (Optional) If you have a JSON representation of your task definition, complete the following steps:
   a. On the Configure task and container definitions page, scroll to the bottom of the page and choose Configure via JSON.
   b. Paste your task definition JSON into the text area and choose Save.
   c. Verify your information and choose Create.

5. For Task Definition Name, type a name for your task definition. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.
6. For Task execution IAM role, either select your task execution role or choose Create new role so that the console can create one for you. For more information, see Amazon ECS task execution IAM role (p. 290).
7. For Task size, choose a value for Task memory (GB) and Task CPU (vCPU). The table below shows the valid combinations.
Creating a task definition

### CPU value vs. Memory value

<table>
<thead>
<tr>
<th>CPU value</th>
<th>Memory value</th>
</tr>
</thead>
<tbody>
<tr>
<td>256 (.25 vCPU)</td>
<td>512 MB, 1 GB, 2 GB</td>
</tr>
<tr>
<td>512 (.5 vCPU)</td>
<td>1 GB, 2 GB, 3 GB, 4 GB</td>
</tr>
<tr>
<td>1024 (1 vCPU)</td>
<td>2 GB, 3 GB, 4 GB, 5 GB, 6 GB, 7 GB, 8 GB</td>
</tr>
<tr>
<td>2048 (2 vCPU)</td>
<td>Between 4 GB and 16 GB in 1 GB increments</td>
</tr>
<tr>
<td>4096 (4 vCPU)</td>
<td>Between 8 GB and 30 GB in 1 GB increments</td>
</tr>
</tbody>
</table>

8. For each container in your task definition, complete the following steps:
   a. Choose **Add container**.
   b. Fill out each required field and any optional fields to use in your container definitions. More container definition parameters are available in the **Advanced container configuration** menu. For more information, see Task definition parameters (p. 66).
   c. Choose **Add** to add your container to the task definition.

9. (Optional) For **Service Integration**, to configure the parameters for App Mesh integration, choose **Enable App Mesh integration** and then do the following:
   a. For **Mesh name**, choose the existing App Mesh service mesh to use. If you don't see any meshes listed, then you need to create one first. For more information, see Service meshes in the AWS App Mesh User Guide.
   b. For **App Mesh endpoints**, select one of the following options.
      - **Virtual node** – Enter or select the following information.
        - For **Application container name**, choose the container name to use for the App Mesh integration. This container must already be defined within the task definition.
        - For **Virtual node name**, choose the existing App Mesh virtual node to use. If you don't see any virtual nodes listed, then you need to create one first. For more information, see Virtual nodes in the AWS App Mesh User Guide.
        - For **Virtual node port** – Pre-populated with the listener port set on the virtual node in App Mesh.
      - **Virtual gateway** – Enter or select the following information.
        - For **Virtual gateway name**, choose the existing App Mesh virtual gateway to use. If you don't see any virtual gateways listed, then you need to create one first. For more information, see Virtual gateways in the AWS App Mesh User Guide.
        - For **Virtual gateway port** – Pre-populated with the listener port set on the virtual gateway in App Mesh.
   c. For **Envoy image**, enter `840364872350.dkr.ecr.us-west-2.amazonaws.com/aws-appmesh-envoy:v1.15.1.0-prod` for all regions except `me-south-1` and `ap-east-1`. You can replace `us-west-2` with any Region except `me-south-1` and `ap-east-1`. If your application is in one of these regions, then you also need to replace `840364872350` with the appropriate value for your Region. For more information, see Envoy image in the AWS App Mesh User Guide.
   d. Choose **Apply** and then choose **Confirm**. This will add an Envoy proxy container to the task definition, as well as the settings to support it. If you selected **Virtual node**, it will also auto-populate the App Mesh **Proxy Configuration** settings for the next step. If you selected **Virtual gateway**, then the **Proxy Configuration** is disabled, because it's not used for a virtual gateway.

10. (Optional) If you selected **Virtual node** in Service Integration, then for **Proxy Configuration**, verify all of the pre-populated values. For more information about these fields, see the JSON tab in **Update services**.
11. (Optional) For **Log Router Integration**, you can add a custom log routing configuration. Choose **Enable FireLens integration** and then do the following:

   a. For **Type**, choose the log router type to use.
   
   b. For **Image**, type the image URI for your log router container. If you chose the fluentbit log router type, the **Image** field prepopulates with the AWS for Fluent Bit image. For more information, see Using the AWS for Fluent Bit image (p. 114).
   
   c. Choose **Apply**. This creates a new log router container to the task definition named `log_router`, and applies the settings to support it. If you make changes to the log router integration fields, choose **Apply** again to update the FireLens container.

12. (Optional) To define data volumes for your task, choose **Add volume**. For more information, see Using data volumes in tasks (p. 95).

   - For **Name**, type a name for your volume. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.

13. In the **Tags** section, specify the key and value for each tag to associate with the task definition. For more information, see Tagging Your Amazon ECS Resources.

14. Choose **Create**.

**Task definition template**

An empty task definition template is shown as follows. You can use this template to create your task definition, which can then be pasted into the console JSON input area or saved to a file and used with the AWS CLI `--cli-input-json` option. For more information, see Task definition parameters (p. 66).

```
{
    "family": "",
    "taskRoleArn": "",
    "executionRoleArn": "",
    "networkMode": "awsvpc",
    "containerDefinitions": [
        {
            "name": "",
            "image": "",
            "repositoryCredentials": {"credentialsParameter": ""},
            "cpu": 0,
            "memory": 0,
            "memoryReservation": 0,
            "links": [""],
            "portMappings": [
                {
                    "containerPort": 0,
                    "hostPort": 0,
                    "protocol": "tcp"
                }
            ],
            "essential": true,
            "entryPoint": [""],
            "command": [""],
            "environment": [
                {"name": "",
                 "value": ""
            }
        ],
        "environmentFiles": [
            {"value": ""
```

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"type": "s3"
],
"mountPoints": [
{
"sourceVolume": "",
"containerPath": "",
"readOnly": true
}
],
"volumesFrom": [
{
"sourceContainer": "",
"readOnly": true
}
],
"linuxParameters": {
"capabilities": {
"add": [""],
"drop": [""
},
"devices": [
{
"hostPath": "",
"containerPath": "",
"permissions": ["read"]
}
],
"initProcessEnabled": true,
"sharedMemorySize": 0,
"tmpfs": [
{
"containerPath": "",
"size": 0,
"mountOptions": ["
}
],
"maxSwap": 0,
"swappiness": 0
},
"secrets": [
{
"name": "",
"valueFrom": ""
}
],
"dependsOn": [
{
"containerName": "",
"condition": "HEALTHY"
}
],
"startTimeout": 0,
"stopTimeout": 0,
"hostname": "",
"user": "",
"workingDirectory": "",
"disableNetworking": true,
"privileged": true,
"readonlyRootFilesystem": true,
"dnsServers": [""],
"dnsSearchDomains": [""],
"extraHosts": [
{
"hostname": "",
"ipAddress": ""
]
Task definition template

```json
{
  "dockerSecurityOptions": [],
  "interactive": true,
  "pseudoTerminal": true,
  "dockerLabels": {
    "KeyName": ""
  },
  "ulimits": [
    {
      "name": "msgqueue",
      "softLimit": 0,
      "hardLimit": 0
    }
  ],
  "logConfiguration": {
    "logDriver": "awslogs",
    "options": {
      "KeyName": ""
    },
    "secretOptions": []
  },
  "healthCheck": {
    "command": [],
    "interval": 0,
    "timeout": 0,
    "retries": 0,
    "startPeriod": 0
  },
  "systemControls": [],
  "resourceRequirements": [],
  "firelensConfiguration": {
    "type": "fluentd",
    "options": {
      "KeyName": ""
    }
  }
},
"volumes": [
  {
    "name": "",
    "host": {
      "sourcePath": ""
    },
    "dockerVolumeConfiguration": {
      "scope": "task",
      "autoprovion": true,
      "driver": "",
      "driveropts": {
        "KeyName": ""
      },
      "labels": {
        "KeyName": ""
      }
    },
    "efsVolumeConfiguration": {
      "fileSystemId": "",
      "rootDirectory": "",
      "transitEncryption": "ENABLED",
      "transitEncryptionPort": 0,
      "authorizationConfig": {
        "accessPointId": ""
      }
    }
  }
}
```
Task definition parameters

Task definitions are split into separate parts: the task family, the IAM task role, the network mode, container definitions, volumes, task placement constraints, and launch types. The family and container definitions are required in a task definition, while task role, network mode, volumes, task placement constraints, and launch type are optional.

The following are more detailed descriptions for each task definition parameter.
Family

family

Type: string

Required: yes

When you register a task definition, you give it a family, which is similar to a name for multiple versions of the task definition, specified with a revision number. The first task definition that is registered into a particular family is given a revision of 1, and any task definitions registered after that are given a sequential revision number.

Task execution role

executionRoleArn

Type: string

Required: no

The Amazon Resource Name (ARN) of the task execution role that grants the Amazon ECS container agent permission to make AWS API calls on your behalf. The task execution IAM role is required depending on the requirements of your task. For more information, see Amazon ECS task execution IAM role (p. 290).

Network mode

networkMode

Type: string

Required: no

The Docker networking mode to use for the containers in the task. For Amazon ECS tasks hosted on Fargate, the awsvpc network mode is required.

When the network mode is awsvpc, the task is allocated an elastic network interface, and you must specify a NetworkConfiguration when you create a service or run a task with the task definition. For more information, see Fargate Task Networking in the Amazon Elastic Container Service User Guide for AWS Fargate.

The awsvpc network mode offers the highest networking performance for containers because they use the Amazon EC2 network stack. Exposed container ports are mapped directly to the attached elastic network interface port, so you cannot take advantage of dynamic host port mappings.

Container Definitions

When you register a task definition, you must specify a list of container definitions that are passed to the Docker daemon on a container instance. The following parameters are allowed in a container definition.

Topics

- Standard Container Definition Parameters (p. 68)
• Advanced Container Definition Parameters (p. 71)
• Other Container Definition Parameters (p. 82)

Standard Container Definition Parameters

The following task definition parameters are either required or used in most container definitions.

Topics
• Name (p. 68)
• Image (p. 68)
• Memory (p. 69)
• Port Mappings (p. 69)

Name

name

Type: string
Required: yes

The name of a container. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed. If you are linking multiple containers together in a task definition, the name of one container can be entered in the links of another container to connect the containers.

Image

image

Type: string
Required: yes

The image used to start a container. This string is passed directly to the Docker daemon. Images in the Docker Hub registry are available by default. You can also specify other repositories with either repository-url/image:tag or repository-url/image.digest. Up to 255 letters (uppercase and lowercase), numbers, hyphens, underscores, colons, periods, forward slashes, and number signs are allowed. This parameter maps to Image in the Create a container section of the Docker Remote API and the IMAGE parameter of docker run.

• When a new task starts, the Amazon ECS container agent pulls the latest version of the specified image and tag for the container to use. However, subsequent updates to a repository image are not propagated to already running tasks.

• Images in private registries are supported. For more information, see Private registry authentication for tasks (p. 123).

• Images in Amazon ECR repositories can be specified by using either the full registry/repository:tag or registry/repository@digest naming convention. For example, aws_account_id.dkr.ecr.region.amazonaws.com/my-web-app:latest or aws_account_id.dkr.ecr.region.amazonaws.com/my-web-app@sha256:94afdf1f2e64d908bc90dbca0035d5b567EXAMPLE

• Images in official repositories on Docker Hub use a single name (for example, ubuntu or mongo).

• Images in other repositories on Docker Hub are qualified with an organization name (for example, amazon/amazon-ecs-agent).
Images in other online repositories are qualified further by a domain name (for example, quay.io/assemblyline/ubuntu).

**Memory**

memory

Type: integer

Required: no

The amount (in MiB) of memory to present to the container. If your container attempts to exceed the memory specified here, the container is killed. The total amount of memory reserved for all containers within a task must be lower than the task memory value, if one is specified. This parameter maps to Memory in the Create a container section of the Docker Remote API and the --memory option to `docker run`.

If using the Fargate launch type, this parameter is optional.

The Docker daemon reserves a minimum of 4 MiB of memory for a container, so you should not specify fewer than 4 MiB of memory for your containers.

memoryReservation

Type: integer

Required: no

The soft limit (in MiB) of memory to reserve for the container. When system memory is under contention, Docker attempts to keep the container memory to this soft limit; however, your container can consume more memory when needed, up to either the hard limit specified with the memory parameter (if applicable), or all of the available memory on the container instance, whichever comes first. This parameter maps to MemoryReservation in the Create a container section of the Docker Remote API and the --memory-reservation option to `docker run`.

If a task-level memory value is not specified, you must specify a non-zero integer for one or both of memory or memoryReservation in a container definition. If you specify both, memory must be greater than memoryReservation. If you specify memoryReservation, then that value is subtracted from the available memory resources for the container instance on which the container is placed. Otherwise, the value of memory is used.

For example, if your container normally uses 128 MiB of memory, but occasionally bursts to 256 MiB of memory for short periods of time, you can set a memoryReservation of 128 MiB, and a memory hard limit of 300 MiB. This configuration would allow the container to only reserve 128 MiB of memory from the remaining resources on the container instance, but also allow the container to consume more memory resources when needed.

The Docker daemon reserves a minimum of 4 MiB of memory for a container, so you should not specify fewer than 4 MiB of memory for your containers.

**Port Mappings**

portMappings

Type: object array

Required: no

Port mappings allow containers to access ports on the host container instance to send or receive traffic.
For task definitions that use the awsvpc network mode, you should only specify the containerPort. The hostPort can be left blank or it must be the same value as the containerPort.

This parameter maps to PortBindings in the Create a container section of the Docker Remote API and the --publish option to docker run. If the network mode of a task definition is set to host, then host ports must either be undefined or they must match the container port in the port mapping.

**Note**

After a task reaches the running status, manual and automatic host and container port assignments are visible in the following locations:

- Console: The Network Bindings section of a container description for a selected task.
- AWS CLI: The networkBindings section of the describe-tasks command output.
- API: The DescribeTasks response.

**containerPort**

Type: integer

Required: yes, when portMappings are used

The port number on the container that is bound to the user-specified or automatically assigned host port.

If using containers in a task with the Fargate launch type, exposed ports should be specified using containerPort.

If using containers in a task with the EC2 launch type and you specify a container port and not a host port, your container automatically receives a host port in the ephemeral port range. For more information, see hostPort. Port mappings that are automatically assigned in this way do not count toward the 100 reserved ports limit of a container instance.

**hostPort**

Type: integer

Required: no

The port number on the container instance to reserve for your container.

If using containers in a task with the Fargate launch type, the hostPort can either be left blank or be the same value as containerPort.

If using containers in a task with the EC2 launch type, you can specify a non-reserved host port for your container port mapping (this is referred to as static host port mapping), or you can omit the hostPort (or set it to 0) while specifying a containerPort and your container automatically receives a port (this is referred to as dynamic host port mapping) in the ephemeral port range for your container instance operating system and Docker version.

The default ephemeral port range Docker version 1.6.0 and later is listed on the instance under /proc/sys/net/ipv4/ip_local_port_range. If this kernel parameter is unavailable, the default ephemeral port range from 49153-65535 is used. Do not attempt to specify a host port in the ephemeral port range, as these are reserved for automatic assignment. In general, ports below 32768 are outside of the ephemeral port range.

The default reserved ports are 22 for SSH, the Docker ports 2375 and 2376, and the Amazon ECS container agent ports 51678-51680. Any host port that was previously user-specified for a running task is also reserved while the task is running (after a task stops, the host port is released). The current reserved ports are displayed in the remainingResources of describe-
**container-instances** output, and a container instance may have up to 100 reserved ports at a time, including the default reserved ports. Automatically assigned ports do not count toward the 100 reserved ports limit.

**protocol**

Type: string

Required: no

The protocol used for the port mapping. Valid values are `tcp` and `udp`. The default is `tcp`.

If you are specifying a host port, use the following syntax:

```
"portMappings": [
    {
        "containerPort": integer,
        "hostPort": integer
    },
    ...
]
```

If you want an automatically assigned host port, use the following syntax:

```
"portMappings": [
    {
        "containerPort": integer
    },
    ...
]
```

### Advanced Container Definition Parameters

The following advanced container definition parameters provide extended capabilities to the `docker run` command that is used to launch containers on your Amazon ECS container instances.

**Topics**

- Health Check (p. 71)
- Environment (p. 73)
- Network Settings (p. 76)
- Storage and Logging (p. 76)
- Security (p. 80)
- Resource limits (p. 80)
- Docker Labels (p. 81)

### Health Check

**healthCheck**

The container health check command and associated configuration parameters for the container. This parameter maps to `HealthCheck` in the Create a container section of the Docker Remote API and the `HEALTHCHECK` parameter of `docker run`.

**Note**

The Amazon ECS container agent only monitors and reports on the health checks specified in the task definition. Amazon ECS does not monitor Docker health checks that are
embedded in a container image and not specified in the container definition. Health check parameters that are specified in a container definition override any Docker health checks that exist in the container image.

You can view the health status of both individual containers and a task with the DescribeTasks API operation or when viewing the task details in the console.

The following describes the possible healthStatus values for a container:

- **HEALTHY**—The container health check has passed successfully.
- **UNHEALTHY**—The container health check has failed.
- **UNKNOWN**—The container health check is being evaluated or there is no container health check defined.

The following describes the possible healthStatus values for a task. The container health check status of nonessential containers do not have an effect on the health status of a task.

- **HEALTHY**—All essential containers within the task have passed their health checks.
- **UNHEALTHY**—One or more essential containers have failed their health check.
- **UNKNOWN**—The essential containers within the task are still having their health checks evaluated or there are no container health checks defined.

If a task is run manually, and not as part of a service, the task will continue its lifecycle regardless of its health status. For tasks that are part of a service, if the task reports as unhealthy then the task will be stopped and the service scheduler will replace it.

The following are notes about container health check support:

- Container health checks are supported for Fargate tasks if you are using platform version 1.1.0 or later. For more information, see AWS Fargate platform versions (p. 43).
- Container health checks are not supported for tasks that are part of a service that is configured to use a Classic Load Balancer.

**command**

A string array representing the command that the container runs to determine if it is healthy. The string array can start with CMD to execute the command arguments directly, or CMD-SHELL to run the command with the container's default shell. If neither is specified, CMD is used by default.

When registering a task definition in the AWS Management Console, use a comma separated list of commands which will automatically converted to a string after the task definition is created. An example input for a health check could be:

```
CMD-SHELL, curl -f http://localhost/ || exit 1
```

When registering a task definition using the AWS Management Console JSON panel, the AWS CLI, or the APIs, you should enclose the list of commands in brackets. An example input for a health check could be:

```
[ "CMD-SHELL", "curl -f http://localhost/ || exit 1" ]
```

An exit code of 0 indicates success, and a non-zero exit code indicates failure. For more information, see HealthCheck in the Create a container section of the Docker Remote API.

**interval**

The time period in seconds between each health check execution. You may specify between 5 and 300 seconds. The default value is 30 seconds.
**timeout**

The time period in seconds to wait for a health check to succeed before it is considered a failure. You may specify between 2 and 60 seconds. The default value is 5 seconds.

**retries**

The number of times to retry a failed health check before the container is considered unhealthy. You may specify between 1 and 10 retries. The default value is three retries.

**startPeriod**

The optional grace period within which to provide containers time to bootstrap before failed health checks count towards the maximum number of retries. You may specify between 0 and 300 seconds. The `startPeriod` is disabled by default.

### Environment

**cpu**

Type: integer

Required: no

The number of `cpu` units the Amazon ECS container agent will reserve for the container. This parameter maps to `CpuShares` in the Create a container section of the Docker Remote API and the `--cpu-shares` option to `docker run`.

This field is optional for tasks using the Fargate launch type, and the only requirement is that the total amount of CPU reserved for all containers within a task be lower than the task-level `cpu` value.

**Note**

You can determine the number of CPU units that are available per Amazon EC2 instance type by multiplying the number of vCPUs listed for that instance type on the Amazon EC2 Instances detail page by 1,024.

Linux containers share unallocated CPU units with other containers on the container instance with the same ratio as their allocated amount. For example, if you run a single-container task on a single-core instance type with 512 CPU units specified for that container, and that is the only task running on the container instance, that container could use the full 1,024 CPU unit share at any given time. However, if you launched another copy of the same task on that container instance, each task would be guaranteed a minimum of 512 CPU units when needed, and each container could float to higher CPU usage if the other container was not using it, but if both tasks were 100% active all of the time, they would be limited to 512 CPU units.

On Linux container instances, the Docker daemon on the container instance uses the CPU value to calculate the relative CPU share ratios for running containers. For more information, see CPU share constraint in the Docker documentation. The minimum valid CPU share value that the Linux kernel allows is 2. However, the CPU parameter is not required, and you can use CPU values below 2 in your container definitions. For CPU values below 2 (including null), the behavior varies based on your Amazon ECS container agent version:

- **Agent versions <= 1.1.0**: Null and zero CPU values are passed to Docker as 0, which Docker then converts to 1,024 CPU shares. CPU values of 1 are passed to Docker as 1, which the Linux kernel converts to two CPU shares.

- **Agent versions >= 1.2.0**: Null, zero, and CPU values of 1 are passed to Docker as two CPU shares.

On Windows container instances, the CPU limit is enforced as an absolute limit, or a quota. Windows containers only have access to the specified amount of CPU that is defined in the task definition. A null or zero CPU value is passed to Docker as 0, which Windows interprets as 1% of one CPU.
essential

Type: Boolean
Required: no

If the essential parameter of a container is marked as true, and that container fails or stops for any reason, all other containers that are part of the task are stopped. If the essential parameter of a container is marked as false, then its failure does not affect the rest of the containers in a task. If this parameter is omitted, a container is assumed to be essential.

All tasks must have at least one essential container. If you have an application that is composed of multiple containers, you should group containers that are used for a common purpose into components, and separate the different components into multiple task definitions. For more information, see Application architecture (p. 61).

"essential": true|false

entryPoint

Important
Early versions of the Amazon ECS container agent do not properly handle entryPoint parameters. If you have problems using entryPoint, update your container agent or enter your commands and arguments as command array items instead.

Type: string array
Required: no

The entry point that is passed to the container. This parameter maps to Entrypoint in the Create a container section of the Docker Remote API and the --entrypoint option to docker run. For more information about the Docker ENTRYPOINT parameter, go to https://docs.docker.com/engine/reference/builder/#entrypoint.

"entryPoint": ["string", ...]

command

Type: string array
Required: no

The command that is passed to the container. This parameter maps to Cmd in the Create a container section of the Docker Remote API and the COMMAND parameter to docker run. For more information about the Docker CMD parameter, go to https://docs.docker.com/engine/reference/builder/#cmd. If there are multiple arguments, each argument should be a separated string in the array.

"command": ["string", ...]

workingDirectory

Type: string
Required: no

The working directory in which to run commands inside the container. This parameter maps to WorkingDir in the Create a container section of the Docker Remote API and the --workdir option to docker run.
"workingDirectory": "string"

environment

Type: object array

Required: no

The environment variables to pass to a container. This parameter maps to `Env` in the Create a container section of the Docker Remote API and the `--env` option to `docker run`.

**Important**

We do not recommend using plaintext environment variables for sensitive information, such as credential data.

name

Type: String

Required: Yes, when environment is used

The name of the environment variable.

value

Type: String

Required: Yes, when environment is used

The value of the environment variable.

"environment" : [  
  { "name" : "string", "value" : "string" },  
  { "name" : "string", "value" : "string" }  
]

secrets

Type: Object array

Required: No

An object representing the secret to expose to your container. For more information, see Specifying sensitive data (p. 125).

name

Type: String

Required: Yes

The value to set as the environment variable on the container.

valueFrom

Type: String

Required: Yes

The secret to expose to the container. The supported values are either the full ARN of the AWS Secrets Manager secret or the full ARN of the parameter in the AWS Systems Manager Parameter Store.
Note
If the Systems Manager Parameter Store parameter exists in the same Region as the task you are launching then you can use either the full ARN or name of the secret. If the parameter exists in a different Region then the full ARN must be specified.

```
"secrets": [
    {
      "name": "environment_variable_name",
      "valueFrom": "arn:aws:ssm:region:aws_account_id:parameter/parameter_name"
    }
]
```

Network Settings
dnsServers
Type: string array
Required: no
A list of DNS servers that are presented to the container. This parameter maps to Dns in the Create a container section of the Docker Remote API and the --dns option to docker run.

Note
This parameter is not supported for Windows containers or tasks using the awsvpc network mode.

```
"dnsServers": ["string", ...]
```

Storage and Logging
readonlyRootFilesystem
Type: Boolean
Required: no
When this parameter is true, the container is given read-only access to its root file system. This parameter maps to ReadonlyRootfs in the Create a container section of the Docker Remote API and the --read-only option to docker run.

Note
This parameter is not supported for Windows containers.

```
"readonlyRootFilesystem": true|false
```

mountPoints
Type: Object Array
Required: No
The mount points for data volumes in your container.
This parameter maps to Volumes in the Create a container section of the Docker Remote API and the --volume option to docker run.
Windows containers can mount whole directories on the same drive as $env:ProgramData. Windows containers cannot mount directories on a different drive, and mount point cannot be across drives.

**sourceVolume**

Type: String

Required: Yes, when `mountPoints` are used

The name of the volume to mount.

**containerPath**

Type: String

Required: Yes, when `mountPoints` are used

The path on the container to mount the volume at.

**readOnly**

Type: Boolean

Required: No

If this value is `true`, the container has read-only access to the volume. If this value is `false`, then the container can write to the volume. The default value is `false`.

**volumesFrom**

Type: Object Array

Required: No

Data volumes to mount from another container. This parameter maps to `VolumesFrom` in the Create a container section of the Docker Remote API and the `--volumes-from` option to `docker run`.

**sourceContainer**

Type: string

Required: yes, when `volumesFrom` is used

The name of the container to mount volumes from.

**readOnly**

Type: Boolean

Required: no

If this value is `true`, the container has read-only access to the volume. If this value is `false`, then the container can write to the volume. The default value is `false`.

```json
"volumesFrom": [
  {
    "sourceContainer": "string",
    "readOnly": true|false
  }
]
```

**logConfiguration**

Type: `LogConfiguration` Object
The log configuration specification for the container.

For example task definitions using a log configuration, see Example task definitions (p. 138).

This parameter maps to LogConfig in the Create a container section of the Docker Remote API and the --log-driver option to docker run. By default, containers use the same logging driver that the Docker daemon uses; however the container may use a different logging driver than the Docker daemon by specifying a log driver with this parameter in the container definition. To use a different logging driver for a container, the log system must be configured properly on the container instance (or on a different log server for remote logging options). For more information on the options for different supported log drivers, see Configure logging drivers in the Docker documentation.

The following should be noted when specifying a log configuration for your containers:

- Amazon ECS currently supports a subset of the logging drivers available to the Docker daemon (shown in the valid values below). Additional log drivers may be available in future releases of the Amazon ECS container agent.
- This parameter requires version 1.18 of the Docker Remote API or greater on your container instance.
- For tasks using the Fargate launch type, because you do not have access to the underlying infrastructure your tasks are hosted on, any additional software needed will have to be installed outside of the task. For example, the Fluentd output aggregators or a remote host running Logstash to send Gelf logs to.

```json
"logConfiguration": {
   "logDriver": "awslogs","fluentd","gelf","json-file","journald","logentries","splunk","syslog","awsfirelens",
   "options": {"string": "string"
   ...
   },
   "secretOptions": [{
      "name": "string",
      "valueFrom": "string"
   }]
}
```

**logDriver**

Type: string

Valid values: "awslogs", "fluentd", "gelf", "json-file", "journald", "logentries", "splunk", "syslog", "awsfirelens"

Required: yes, when logConfiguration is used

The log driver to use for the container. The valid values listed earlier are log drivers that the Amazon ECS container agent can communicate with by default.

For tasks using the Fargate launch type, the supported log drivers are awslogs, splunk, and awsfirelens.

For more information on using the awslogs log driver in task definitions to send your container logs to CloudWatch Logs, see Using the awslogs log driver (p. 106).

For more information about using the awsfirelens log driver, see Custom Log Routing.

This parameter requires version 1.18 of the Docker Remote API or greater on your container instance.
options
Type: string to string map
Required: no

The configuration options to send to the log driver.
This parameter requires version 1.19 of the Docker Remote API or greater on your container instance.

secretOptions
Type: object array
Required: no

An object representing the secret to pass to the log configuration. For more information, see Specifying sensitive data (p. 125).

name
Type: String
Required: Yes

The value to set as the environment variable on the container.

valueFrom
Type: String
Required: Yes

The secret to expose to the log configuration of the container.

```
"logConfiguration": {
  "logDriver": "splunk",
  "options": {
    "splunk-url": "https://cloud.splunk.com:8080",
    "splunk-token": "...",
    "tag": "...",
    ...
  },
  "secretOptions": [{
    "name": "splunk-token",
    "valueFrom": "/ecs/logconfig/splunkcred"
  }]
}
```

firelensConfiguration
Type: FirelensConfiguration Object
Required: No

The FireLens configuration for the container. This is used to specify and configure a log router for container logs. For more information, see Custom log routing (p. 112).

```
{
  "firelensConfiguration": {
    "type": "fluentd",
    "options": {
```
Container Definitions

options
Type: String to string map
Required: No

The options to use when configuring the log router. This field is optional and can be used to specify a custom configuration file or to add additional metadata, such as the task, task definition, cluster, and container instance details to the log event. If specified, the syntax to use is "options":{"enable-ecs-log-metadata":"true|false","config-file-type":"s3|file","config-file-value":"arn:aws:s3:::mybucket/fluent.conf|filepath"}. For more information, see Creating a task definition that uses a FireLens configuration (p. 115).

type
Type: String
Required: Yes

The log router to use. The valid values are fluentd or fluentbit.

Security

user
Type: string
Required: no

The user to use inside the container. This parameter maps to User in the Create a container section of the Docker Remote API and the --user option to docker run.

You can specify the user using the following formats. If specifying a UID or GID, you must specify it as a positive integer.
- user
- user:group
- uid
- uid:gid
- user:gid
- uid:group

Note
This parameter is not supported for Windows containers.

"user": "string"

Resource limits

ulimits
Type: object array
Required: no

A list of ulimit values to define for a container. This value would overwrite the default resource limit setting for the operating system. This parameter maps to Ulimits in the Create a container section of the Docker Remote API and the --ulimit option to docker run.

Amazon ECS tasks hosted on Fargate use the default resource limit values set by the operating system with the exception of the nofile resource limit parameter which Fargate overrides. The nofile resource limit sets a restriction on the number of open files that a container can use. The default nofile soft limit is 1024 and hard limit is 4096.

This parameter requires version 1.18 of the Docker Remote API or greater on your container instance.

**Note**
This parameter is not supported for Windows containers.

```json
"ulimits": [
  {
    "name": "core"|"cpu"|"data"|"fsize"|"locks"|"memlock"|"msgqueue"|"nice"|"nofile"|"nproc"|"rss"|"rtt prio"|"rtprio"|"rttime"|"sigpending"|"stack",
    "softLimit": integer,
    "hardLimit": integer
  }
  ...
]
```

**name**

Type: string

Valid values: "core" | "cpu" | "data" | "fsize" | "locks" | "memlock" | "msgqueue" | "nice" | "nofile" | "nproc" | "rss" | "rtt prio" | "rtprio" | "rttime" | "sigpending" | "stack"

Required: yes, when ulimits are used

The type of the ulimit.

**hardLimit**

Type: integer

Required: yes, when ulimits are used

The hard limit for the ulimit type.

**softLimit**

Type: integer

Required: yes, when ulimits are used

The soft limit for the ulimit type.

**Docker Labels**

dockerLabels

Type: string to string map
Required: no

A key/value map of labels to add to the container. This parameter maps to Labels in the Create a container section of the Docker Remote API and the --label option to docker run.

This parameter requires version 1.18 of the Docker Remote API or greater on your container instance.

```
"dockerLabels": {"string": "string"
...}
```

Other Container Definition Parameters

The following container definition parameters are able to be used when registering task definitions in the Amazon ECS console by using the Configure via JSON option. For more information, see Creating a task definition (p. 61).

Topics
- Linux Parameters (p. 82)
- Container dependency (p. 83)
- Container timeouts (p. 84)
- System Controls (p. 85)
- Interactive (p. 86)
- Pseudo Terminal (p. 86)

Linux Parameters

linuxParameters

Type: LinuxParameters object

Required: no

Linux-specific options that are applied to the container, such as KernelCapabilities.

Note
This parameter is not supported for Windows containers.

```
"linuxParameters": {
  "capabilities": {
    "add": ["string", ...],
    "drop": ["string", ...]
  }
}
```

capabilities

Type: KernelCapabilities object

Required: no

The Linux capabilities for the container that are dropped from the default configuration provided by Docker. For more information about the default capabilities and the non-default available capabilities, see Runtime privilege and Linux capabilities in the Docker run reference.
For more detailed information about these Linux capabilities, see the capabilities(7) Linux manual page.

**add**

**Type:** string array

**Valid values:** "SYS_PTRACE"

**Required:** no

The Linux capabilities for the container to add to the default configuration provided by Docker. This parameter maps to CapAdd in the Create a container section of the Docker Remote API and the --cap-add option to docker run.

**drop**

**Type:** string array

**Valid values:** "ALL" | "AUDIT_CONTROL" | "AUDIT_WRITE" | "BLOCK_SUSPEND" | "CHOWN" | "DAC_OVERRIDE" | "DAC_READ_SEARCH" | "FOWNER" | "FSETID" | "IPC_LOCK" | "IPC_OWNER" | "KILL" | "LEASE" | "Linux_IMMUTABLE" | "MAC_ADMIN" | "MAC_OVERRIDE" | "MKNOD" | "NET_ADMIN" | "NET_BIND_SERVICE" | "NET_BROADCAST" | "NET_RAW" | "SETFCAP" | "SETGID" | "SETPCAP" | "SETPUID" | "SYS_ADMIN" | "SYS_BOOT" | "SYS_CHROOT" | "SYS_MODULE" | "SYS_NICE" | "SYS_PACCT" | "SYS_PTRACE" | "SYS_RAWIO" | "SYS_RESOURCE" | "SYS_TIME" | "SYS_TTY_CONFIG" | "SYSLOG" | "WAKE_ALARM"

**Required:** no

The Linux capabilities for the container to remove from the default configuration provided by Docker. This parameter maps to CapDrop in the Create a container section of the Docker Remote API and the --cap-drop option to docker run.

**initProcessEnabled**

Run an init process inside the container that forwards signals and reaps processes. This parameter maps to the --init option to docker run.

This parameter requires version 1.25 of the Docker Remote API or greater on your container instance.

**Container dependency**

**dependsOn**

**Type:** Array of ContainerDependency objects

**Required:** no

The dependencies defined for container startup and shutdown. A container can contain multiple dependencies. When a dependency is defined for container startup, for container shutdown it is reversed. For an example, see Example: Container dependency (p. 140).

**Note**

If a container does not meet a dependency constraint or times out before meeting the constraint, Amazon ECS doesn't progress dependent containers to their next state.

For Amazon ECS tasks hosted on Fargate, this parameter requires that the task or service uses platform version 1.3.0 or later.
"dependsOn": [
  {
    "containerName": "string",
    "condition": "string"
  }
]

containerName
Type: String
Required: Yes
The container name that must meet the specified condition.

condition
Type: String
Required: Yes
The dependency condition of the container. The following are the available conditions and their behavior:

- **START** – This condition emulates the behavior of links and volumes today. It validates that a dependent container is started before permitting other containers to start.

- **COMPLETE** – This condition validates that a dependent container runs to completion (exits) before permitting other containers to start. This can be useful for nonessential containers that run a script and then exit. This condition cannot be set on an essential container.

- **SUCCESS** – This condition is the same as COMPLETE, but it also requires that the container exits with a zero status. This condition cannot be set on an essential container.

- **HEALTHY** – This condition validates that the dependent container passes its Docker healthcheck before permitting other containers to start. This requires that the dependent container has health checks configured. This condition is confirmed only at task startup.

### Container timeouts

startTimeout
Type: Integer
Required: no
Example values: 120
Time duration (in seconds) to wait before giving up on resolving dependencies for a container.

For example, you specify two containers in a task definition with `containerA` having a dependency on `containerB` reaching a COMPLETE, SUCCESS, or HEALTHY status. If a `startTimeout` value is specified for `containerB` and it doesn’t reach the desired status within that time then `containerA` will give up and not start.

**Note**
If a container does not meet a dependency constraint or times out before meeting the constraint, Amazon ECS doesn’t progress dependent containers to their next state.

For Amazon ECS tasks hosted on Fargate, this parameter requires that the task or service uses platform version 1.3.0 or later. When using platform version 1.4.0, if this parameter is not specified, the default value of 60 seconds is used.
stopTimeout

Type: Integer

Required: no

Example values: 120

Time duration (in seconds) to wait before the container is forcefully killed if it doesn't exit normally on its own.

For tasks using the Fargate launch type, the task or service requires platform version 1.3.0 or later. The max stop timeout value is 120 seconds and if the parameter is not specified, the default value of 30 seconds is used.

**System Controls**

systemControls

Type: SystemControl object

Required: no

A list of namespaced kernel parameters to set in the container. This parameter maps to Sysctls in the Create a container section of the Docker Remote API and the --sysctl option to docker run.

It is not recommended that you specify network-related systemControls parameters for multiple containers in a single task that also uses either the awsvpc or host network mode for the following reasons:

- For tasks that use the awsvpc network mode, if you set systemControls for any container it will apply to all containers in the task. If you set different systemControls for multiple containers in a single task, the container that is started last will determine which systemControls take effect.
- For tasks that use the host network mode, the network namespace systemControls are not supported.

If you are setting an IPC resource namespace to use for the containers in the task, the following will apply to your system controls. For more information, see IPC mode (p. 92).

- For tasks that use the host IPC mode, IPC namespace systemControls are not supported.
- For tasks that use the task IPC mode, IPC namespace systemControls values will apply to all containers within a task.

**Note**

This parameter is not supported for Windows containers or tasks using the Fargate launch type.

```json
"systemControls": [
  {
    "namespace":"string",
    "value":"string"
  }
]
```

namespace

Type: String

Required: no
Volumes

When you register a task definition, you can optionally specify a list of volumes to be passed to the Docker daemon on a container instance, which then becomes available for access by other containers on the same container instance.

For more information, see Using data volumes in tasks (p. 95).

The following parameters are allowed in a container definition:

name

Type: String

Required: No

The name of the volume. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed. This name is referenced in the sourceVolume parameter of container definition mountPoints object.
**Amazon ECS User Guide for AWS Fargate**

**Volumes**

`efsVolumeConfiguration`

Type: Object  
Required: No  
This parameter is specified when using Amazon EFS volumes.

`fileSystemId`

Type: String  
Required: Yes  
The Amazon EFS file system ID to use.

`rootDirectory`

Type: String  
Required: No  
The directory within the Amazon EFS file system to mount as the root directory inside the host. If this parameter is omitted, the root of the Amazon EFS volume will be used. Specifying `/` will have the same effect as omitting this parameter.

**Important**

If an EFS access point is specified in the `authorizationConfig`, the root directory parameter must either be omitted or set to `/` which will enforce the path set on the EFS access point.

`transitEncryption`

Type: String  
Valid values: `ENABLED` | `DISABLED`  
Required: No  
Whether or not to enable encryption for Amazon EFS data in transit between the Amazon ECS host and the Amazon EFS server. Transit encryption must be enabled if Amazon EFS IAM authorization is used. If this parameter is omitted, the default value of `DISABLED` is used. For more information, see Encrypting Data in Transit in the Amazon Elastic File System User Guide.

`transitEncryptionPort`

Type: Integer  
Required: No  
The port to use when sending encrypted data between the Amazon ECS host and the Amazon EFS server. If you do not specify a transit encryption port, it will use the port selection strategy that the Amazon EFS mount helper uses. For more information, see EFS Mount Helper in the Amazon Elastic File System User Guide.

`authorizationConfig`

Type: Object  
Required: No  
The authorization configuration details for the Amazon EFS file system.
accessPointId

Type: String
Required: No

The access point ID to use. If an access point is specified, the root directory value in the efsVolumeConfiguration must either be omitted or set to / which will enforce the path set on the EFS access point. If an access point is used, transit encryption must be enabled in the EFSVolumeConfiguration. For more information, see Working with Amazon EFS Access Points in the Amazon Elastic File System User Guide.

iam

Type: String
Valid values: ENABLED | DISABLED
Required: No

Whether or not to use the Amazon ECS task IAM role defined in a task definition when mounting the Amazon EFS file system. If enabled, transit encryption must be enabled in the EFSVolumeConfiguration. If this parameter is omitted, the default value of DISABLED is used. For more information, see IAM Roles for Tasks.

Launch types

When you register a task definition, you specify the launch type to use for your task. For more information, see Amazon ECS launch types (p. 93).

The following parameter is allowed in a task definition:

requiresCompatibilities

Type: string array
Required: no

Valid Values: EC2 | FARGATE

The launch type the task is using. This enables a check to ensure that all of the parameters used in the task definition meet the requirements of the launch type.

Valid values are FARGATE and EC2. For more information about launch types, see Amazon ECS launch types (p. 93).

Task size

When you register a task definition, you can specify the total cpu and memory used for the task. This is separate from the cpu and memory values at the container definition level. For tasks hosted on Amazon EC2 instances, these fields are optional. For tasks hosted on Fargate, these fields are required and there are specific values for both cpu and memory that are supported.

Note
Task-level CPU and memory parameters are ignored for Windows containers. We recommend specifying container-level resources for Windows containers.

The following parameter is allowed in a task definition:
CPU

Type: string

Required: conditional

**Note**

This parameter is not supported for Windows containers.

The hard limit of CPU units to present for the task. It can be expressed as an integer using CPU units, for example 1024, or as a string using vCPUs, for example 1 vCPU or 1 vcpu, in a task definition. When the task definition is registered, a vCPU value is converted to an integer indicating the CPU units.

For tasks hosted on Fargate, this field is required and you must use one of the following values, which determines your range of supported values for the memory parameter:

<table>
<thead>
<tr>
<th>CPU value</th>
<th>Memory value (MiB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>256 (.25 vCPU)</td>
<td>512 (0.5 GB), 1024 (1 GB), 2048 (2 GB)</td>
</tr>
<tr>
<td>512 (.5 vCPU)</td>
<td>1024 (1 GB), 2048 (2 GB), 3072 (3 GB), 4096 (4 GB)</td>
</tr>
<tr>
<td>1024 (1 vCPU)</td>
<td>2048 (2 GB), 3072 (3 GB), 4096 (4 GB), 5120 (5 GB), 6144 (6 GB), 7168 (7 GB), 8192 (8 GB)</td>
</tr>
<tr>
<td>2048 (2 vCPU)</td>
<td>Between 4096 (4 GB) and 16384 (16 GB) in increments of 1024 (1 GB)</td>
</tr>
<tr>
<td>4096 (4 vCPU)</td>
<td>Between 8192 (8 GB) and 30720 (30 GB) in increments of 1024 (1 GB)</td>
</tr>
</tbody>
</table>

Memory

Type: string

Required: conditional

**Note**

This parameter is not supported for Windows containers.

The hard limit of memory (in MiB) to present to the task. It can be expressed as an integer using MiB, for example 1024, or as a string using GB, for example 1GB or 1 GB, in a task definition. When the task definition is registered, a GB value is converted to an integer indicating the MiB.

For tasks hosted on Fargate, this field is required and you must use one of the following values, which determines your range of supported values for the CPU parameter:

<table>
<thead>
<tr>
<th>Memory value (MiB)</th>
<th>CPU value</th>
</tr>
</thead>
<tbody>
<tr>
<td>512 (0.5 GB), 1024 (1 GB), 2048 (2 GB)</td>
<td>256 (.25 vCPU)</td>
</tr>
<tr>
<td>1024 (1 GB), 2048 (2 GB), 3072 (3 GB), 4096 (4 GB)</td>
<td>512 (.5 vCPU)</td>
</tr>
<tr>
<td>2048 (2 GB), 3072 (3 GB), 4096 (4GB), 5120 (5 GB), 6144 (6 GB), 7168 (7 GB), 8192 (8 GB)</td>
<td>1024 (1 vCPU)</td>
</tr>
</tbody>
</table>
Proxy configuration

proxyConfiguration

Type: ProxyConfiguration object

Required: no

The configuration details for the App Mesh proxy.

For tasks using the Fargate launch type, this feature requires that the task or service uses platform version 1.3.0 or later.

**Note**

This parameter is not supported for Windows containers.

"proxyConfiguration": {
    "type": "APPMESH",
    "containerName": "string",
    "properties": [
        {
            "name": "string",
            "value": "string"
        }
    ]
}

type

Type: String

Value values: APPMESH

Required: No

The proxy type. The only supported value is APPMESH.

countainerName

Type: String

Required: Yes

The name of the container that will serve as the App Mesh proxy.

properties

Type: Array of KeyValuePair objects

Required: No

The set of network configuration parameters to provide the Container Network Interface (CNI) plugin, specified as key-value pairs.
• **IgnoredUID** – (Required) The user ID (UID) of the proxy container as defined by the `user` parameter in a container definition. This is used to ensure the proxy ignores its own traffic. If **IgnoredGID** is specified, this field can be empty.

• **IgnoredGID** – (Required) The group ID (GID) of the proxy container as defined by the `user` parameter in a container definition. This is used to ensure the proxy ignores its own traffic. If **IgnoredUID** is specified, this field can be empty.

• **AppPorts** – (Required) The list of ports that the application uses. Network traffic to these ports is forwarded to the **ProxyIngressPort** and **ProxyEgressPort**.

• **ProxyIngressPort** – (Required) Specifies the port that incoming traffic to the **AppPorts** is directed to.

• **ProxyEgressPort** – (Required) Specifies the port that outgoing traffic from the **AppPorts** is directed to.

• **EgressIgnoredPorts** – (Required) The egress traffic going to these specified ports is ignored and not redirected to the **ProxyEgressPort**. It can be an empty list.

• **EgressIgnoredIPs** – (Required) The egress traffic going to these specified IP addresses is ignored and not redirected to the **ProxyEgressPort**. It can be an empty list.

**name**

  Type: String

  Required: No

  The name of the key-value pair.

**value**

  Type: String

  Required: No

  The value of the key-value pair.

### Other task definition parameters

The following task definition parameters are able to be used when registering task definitions in the Amazon ECS console by using the **Configure via JSON** option. For more information, see **Creating a task definition** (p. 61).

**Topics**

- Ephemeral storage (p. 91)
- IPC mode (p. 92)
- PID mode (p. 92)

### Ephemeral storage

**ephemeralStorage**

  Type: Object

  Required: No

  The amount of ephemeral storage to allocate for the task. This parameter is used to expand the total amount of ephemeral storage available, beyond the default amount, for tasks hosted on AWS Fargate. For more information, see **Fargate task storage** (p. 96).
Note
This parameter is only supported for tasks hosted on AWS Fargate using platform version 1.4.0 or later.

**IPC mode**

ipcMode

Type: String
Required: No

The IPC resource namespace to use for the containers in the task. The valid values are `host`, `task`, or `none`. If `host` is specified, then all containers within the tasks that specified the `host` IPC mode on the same container instance share the same IPC resources with the host Amazon EC2 instance. If `task` is specified, all containers within the specified task share the same IPC resources. If `none` is specified, then IPC resources within the containers of a task are private and not shared with other containers in a task or on the container instance. If no value is specified, then the IPC resource namespace sharing depends on the Docker daemon setting on the container instance. For more information, see IPC settings in the Docker run reference.

If the `host` IPC mode is used, be aware that there is a heightened risk of undesired IPC namespace exposure. For more information, see Docker security.

If you are setting namespaced kernel parameters using `systemControls` for the containers in the task, the following will apply to your IPC resource namespace. For more information, see System Controls (p. 85).

- For tasks that use the `host` IPC mode, IPC namespace related `systemControls` are not supported.
- For tasks that use the `task` IPC mode, IPC namespace related `systemControls` will apply to all containers within a task.

Note
This parameter is not supported for Windows containers or tasks using the Fargate launch type.

**PID mode**

pidMode

Type: String
Required: No

The process namespace to use for the containers in the task. The valid values are `host` or `task`. If `host` is specified, then all containers within the tasks that specified the `host` PID mode on the same container instance share the same process namespace with the host Amazon EC2 instance. If `task` is specified, all containers within the specified task share the same process namespace. If no value is specified, the default is a private namespace. For more information, see PID settings in the Docker run reference.

If the `host` PID mode is used, be aware that there is a heightened risk of undesired process namespace exposure. For more information, see Docker security.

Note
This parameter is not supported for Windows containers or tasks using the Fargate launch type.
Amazon ECS launch types

An Amazon ECS launch type determines the type of infrastructure on which your tasks and services are hosted.

Fargate launch type

Using the Fargate launch type, you can run your containerized applications without the need to provision and manage the backend infrastructure. After you register your task definition, Fargate launches the container for you.

The AWS Fargate launch type is currently available in the following Regions:

<table>
<thead>
<tr>
<th>Region Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East (Ohio)</td>
<td>us-east-2</td>
</tr>
<tr>
<td>US East (N. Virginia)</td>
<td>us-east-1</td>
</tr>
<tr>
<td>US West (N. California)</td>
<td>us-west-1 (usw1-az1 &amp; usw1-az3 only)</td>
</tr>
<tr>
<td>US West (Oregon)</td>
<td>us-west-2</td>
</tr>
<tr>
<td>Africa (Cape Town)</td>
<td>af-south-1</td>
</tr>
<tr>
<td>Asia Pacific (Hong Kong)</td>
<td>ap-east-1</td>
</tr>
<tr>
<td>Asia Pacific (Mumbai)</td>
<td>ap-south-1</td>
</tr>
<tr>
<td>Asia Pacific (Osaka)</td>
<td>ap-northeast-3</td>
</tr>
<tr>
<td>Asia Pacific (Seoul)</td>
<td>ap-northeast-2</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>ap-southeast-1</td>
</tr>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>ap-southeast-2</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>ap-northeast-1 (apne1-az1, apne1-az2, &amp; apne1-az4 only)</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>ca-central-1 (cac1-az1 &amp; cac1-az2 only)</td>
</tr>
<tr>
<td>China (Beijing)</td>
<td>cn-north-1 (cnn1-az1 &amp; cnn1-az2 only)</td>
</tr>
<tr>
<td>China (Ningxia)</td>
<td>cn-northwest-1</td>
</tr>
<tr>
<td>Europe (Frankfurt)</td>
<td>eu-central-1</td>
</tr>
<tr>
<td>Europe (Ireland)</td>
<td>eu-west-1</td>
</tr>
<tr>
<td>Europe (London)</td>
<td>eu-west-2</td>
</tr>
<tr>
<td>Europe (Paris)</td>
<td>eu-west-3</td>
</tr>
<tr>
<td>Europe (Milan)</td>
<td>eu-south-1</td>
</tr>
<tr>
<td>Europe (Stockholm)</td>
<td>eu-north-1</td>
</tr>
<tr>
<td>South America (São Paulo)</td>
<td>sa-east-1</td>
</tr>
</tbody>
</table>

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93
<table>
<thead>
<tr>
<th>Region Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East (Bahrain)</td>
<td>me-south-1</td>
</tr>
<tr>
<td>AWS GovCloud (US-East)</td>
<td>us-gov-east-1</td>
</tr>
<tr>
<td>AWS GovCloud (US-West)</td>
<td>us-gov-west-1</td>
</tr>
</tbody>
</table>

The following diagram shows the general architecture:
EC2 launch type

With the EC2 launch type, you can run your containerized applications on a cluster of Amazon EC2 instances that you manage.

The following diagram shows the general architecture:

Using data volumes in tasks

Amazon ECS on Fargate supports the following data volume options for containers.
Fargate task storage

When provisioned, each Amazon ECS task hosted on AWS Fargate receives the following ephemeral storage for bind mounts. This can be mounted and shared among containers using the volumes, mountPoints and volumesFrom parameters in the task definition.

Fargate tasks using platform version 1.4.0 or later

By default, Amazon ECS tasks hosted on Fargate using platform version 1.4.0 or later receive a minimum of 20 GiB of ephemeral storage. The total amount of ephemeral storage can be increased, up to a maximum of 200 GiB, by specifying the ephemeralStorage parameter in your task definition.

The pulled, compressed, and the uncompressed container image for the task is stored on the ephemeral storage. To determine the total amount of ephemeral storage your task has to use, you must subtract the amount of storage your container image uses from the total amount of ephemeral storage your task is allocated.

For tasks using platform version 1.4.0 or later that are launched on May 28, 2020 or later, the ephemeral storage is encrypted with an AES-256 encryption algorithm using an AWS Fargate-managed encryption key.

Fargate tasks using platform version 1.3.0 or earlier

For Amazon ECS on Fargate tasks using platform version 1.3.0 or earlier, each task receives the following ephemeral storage.

- 10 GB of Docker layer storage
  
  **Note**
  This amount includes both compressed and uncompressed container image artifacts.

- An additional 4 GB for volume mounts. This can be mounted and shared among containers using the volumes, mountPoints and volumesFrom parameters in the task definition.

Topics

- Amazon EFS volumes (p. 96)
- Bind mounts (p. 99)

Amazon EFS volumes

Amazon Elastic File System (Amazon EFS) provides simple, scalable file storage for use with your Amazon ECS tasks. With Amazon EFS, storage capacity is elastic, growing and shrinking automatically as you add and remove files. Your applications can have the storage they need, when they need it.

You can use Amazon EFS file systems with Amazon ECS to export file system data across your fleet of container instances. That way, your tasks have access to the same persistent storage, no matter the
instance on which they land. However, you must configure your container instance AMI to mount the Amazon EFS file system before the Docker daemon starts. Also, your task definitions must reference volume mounts on the container instance to use the file system. The following sections help you get started using Amazon EFS with Amazon ECS.

**Amazon EFS volume considerations**

The following should be considered when using Amazon EFS volumes:

- For tasks hosted on Fargate, Amazon EFS file systems are supported on platform version 1.4.0 or later. For more information, see AWS Fargate platform versions (p. 43).
- When using Amazon EFS volumes for tasks hosted on Fargate, Fargate creates a supervisor container that is responsible for managing the Amazon EFS volume. The supervisor container uses a small amount of the task’s memory. The supervisor container is visible when querying the task metadata version 4 endpoint, but isn't visible in CloudWatch Container Insights. For more information, see Task metadata endpoint version 4 (p. 310).

**Using Amazon EFS access points**

Amazon EFS access points are application-specific entry points into an EFS file system that make it easier to manage application access to shared datasets. For more information on Amazon EFS access points and how to control access to them, see Working with Amazon EFS Access Points in the Amazon Elastic File System User Guide.

Access points can enforce a user identity, including the user's POSIX groups, for all file system requests that are made through the access point. Access points can also enforce a different root directory for the file system so that clients can only access data in the specified directory or its subdirectories.

**Note**

When creating an EFS access point, you specify a path on the file system to serve as the root directory. When referencing the EFS file system with an access point ID in your Amazon ECS task definition, the root directory must either be omitted or set to / which will enforce the path set on the EFS access point.

You can use an Amazon ECS task IAM role to enforce that specific applications use a specific access point. By combining IAM policies with access points, you can easily provide secure access to specific datasets for your applications. For more information on using task IAM roles, see IAM Roles for Tasks (p. 294).

**Specifying an Amazon EFS file system in your task definition**

To use Amazon EFS file system volumes for your containers, you must specify the volume and mount point configurations in your task definition. The following task definition JSON snippet shows the syntax for the volumes and mountPoints objects for a container:

```json
{
   "containerDefinitions": [
      {
         "name": "container-using-efs",
         "image": "amazonlinux:2",
         "entryPoint": ["sh"],
         "command": ["ls -la /mount/efs"
                        ],
         "mountPoints": [
```
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Amazon EFS volumes

```json
{
    "sourceVolume": "myEfsVolume",
    "containerPath": "\mount\efs",
    "readOnly": true
}
]
"
}
"volumes": [
{
    "name": "myEfsVolume",
    "efsVolumeConfiguration": {
        "fileSystemId": "fs-1234",
        "rootDirectory": "\path\to\my\data",
        "transitEncryption": "ENABLED",
        "transitEncryptionPort": integer,
        "authorizationConfig": {
            "accessPointId": "fsap-1234",
            "iam": "ENABLED"
        }
    }
}]
}

**efsVolumeConfiguration**

**Type:** Object

**Required:** No

This parameter is specified when using Amazon EFS volumes.

**fileSystemId**

**Type:** String

**Required:** Yes

The Amazon EFS file system ID to use.

**rootDirectory**

**Type:** String

**Required:** No

The directory within the Amazon EFS file system to mount as the root directory inside the host. If this parameter is omitted, the root of the Amazon EFS volume will be used. Specifying / has the same effect as omitting this parameter.

**Important**

If an EFS access point is specified in the authorizationConfig, the root directory parameter must either be omitted or set to /, which enforces the path set on the EFS access point.

**transitEncryption**

**Type:** String

**Valid values:** ENABLED | DISABLED

**Required:** No
Whether or not to enable encryption for Amazon EFS data in transit between the Amazon ECS host and the Amazon EFS server. Transit encryption must be enabled if Amazon EFS IAM authorization is used. If this parameter is omitted, the default value of DISABLED is used. For more information, see Encrypting Data in Transit in the Amazon Elastic File System User Guide.

transitEncryptionPort

Type: Integer

Required: No

The port to use when sending encrypted data between the Amazon ECS host and the Amazon EFS server. If you don't specify a transit encryption port, it uses the port selection strategy that the Amazon EFS mount helper uses. For more information, see EFS Mount Helper in the Amazon Elastic File System User Guide.

authorizationConfig

Type: Object

Required: No

The authorization configuration details for the Amazon EFS file system.

accessPointId

Type: String

Required: No

The access point ID to use. If an access point is specified, the root directory value in the efsVolumeConfiguration must either be omitted or set to / which will enforce the path set on the EFS access point. If an access point is used, transit encryption must be enabled in the EFSVolumeConfiguration. For more information, see Working with Amazon EFS Access Points in the Amazon Elastic File System User Guide.

iam

Type: String

Valid values: ENABLED | DISABLED

Required: No

Whether or not to use the Amazon ECS task IAM role defined in a task definition when mounting the Amazon EFS file system. If enabled, transit encryption must be enabled in the EFSVolumeConfiguration. If this parameter is omitted, the default value of DISABLED is used. For more information, see IAM Roles for Tasks.

Bind mounts

With bind mounts, a file or directory on a host, such as AWS Fargate, is mounted into a container. Bind mounts are tied to the lifecycle of the container using them. Once all containers using a bind mount are stopped, for example when a task is stopped, the data is removed. For more information, see Using bind mounts in the Docker documentation.

The following are common use cases for bind mounts.

• To provide an empty data volume to mount in one or more containers.
• To expose a path and its contents from a Dockerfile to one or more containers.

Considerations when using bind mounts

When using bind mounts, the following should be considered.

• For tasks hosted on AWS Fargate using platform version 1.4.0 or later, by default they receive a minimum of 20 GiB of ephemeral storage for bind mounts. The total amount of ephemeral storage can be increased to a maximum of 200 GiB by specifying the ephemeralStorage object in your task definition.

• To expose files from a Dockerfile to a data volume when a task is run, the Amazon ECS data plane looks for a VOLUME directive. If the absolute path specified in the VOLUME directive is the same as the containerPath specified in the task definition, the data in the VOLUME directive path is copied to the data volume. In the following Dockerfile example, a file named examplefile in the /var/log/exported directory is written to the host and then mounted inside the container.

```bash
FROM public.ecr.aws/amazonlinux/amazonlinux:latest
RUN mkdir -p /var/log/exported
RUN touch /var/log/exported/examplefile
VOLUME ["/var/log/exported"]
```

By default, the volume permissions are set to 0755 and the owner as root. These permissions can be customized in the Dockerfile. The following example defines the owner of the directory as node.

```bash
FROM public.ecr.aws/amazonlinux/amazonlinux:latest
RUN yum install -y shadow-utils && yum clean all
RUN useradd node
RUN mkdir -p /var/log/exported && chown node:node /var/log/exported
RUN touch /var/log/exported/examplefile
USER node
VOLUME ["/var/log/exported"]
```

Specifying a bind mount in your task definition

For Amazon ECS tasks hosted on Fargate, the following task definition JSON snippet shows the syntax for the volumes, mountPoints, and ephemeralStorage objects for a task definition.

```json
{
  "family": "",
  ...
  "containerDefinitions": [
    {
      "mountPoints": [
        {
          "containerPath": "/path/to/mount_volume",
          "sourceVolume": "string"
        }
      ],
      "name": "string"
    },
    ...
  "volumes": [
    {
      "name": "string"
    }
  ],
  ...
}
```
"ephemeralStorage": {
  "sizeInGiB": integer
}

The following describes each task definition parameter in more detail.

name

  Type: String
  Required: No

  The name of the volume. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed. This name is referenced in the sourceVolume parameter of container definition mountPoints.

mountPoints

  Type: Object Array
  Required: No

  The mount points for data volumes in your container.

This parameter maps to Volumes in the Create a container section of the Docker Remote API and the --volume option to docker run.

Windows containers can mount whole directories on the same drive as $env:ProgramData. Windows containers cannot mount directories on a different drive, and mount point cannot be across drives.

sourceVolume

  Type: String
  Required: Yes, when mountPoints are used

  The name of the volume to mount.

containerPath

  Type: String
  Required: Yes, when mountPoints are used

  The path on the container to mount the volume at.

readOnly

  Type: Boolean
  Required: No

  If this value is true, the container has read-only access to the volume. If this value is false, then the container can write to the volume. The default value is false.

ephemeralStorage

  Type: Object
  Required: No
The amount of ephemeral storage to allocate for the task. This parameter is used to expand the total amount of ephemeral storage available, beyond the default amount, for tasks hosted on AWS Fargate using platform version 1.4.0 or later.

**Bind mount examples**

The following examples cover the most common use cases for using a bind mount for your containers.

**To allocate an increased amount of ephemeral storage space for a Fargate task**

For Amazon ECS tasks hosted on Fargate using platform version 1.4.0 or later, you can allocate more than the default amount of ephemeral storage for the containers in your task to use. This example can be incorporated into the other examples to allocate more ephemeral storage for your Fargate tasks.

- In the task definition, define an `ephemeralStorage` object. The `sizeInGiB` must be an integer between the values of 21 and 200 and is expressed in GiB.

```json
"ephemeralStorage": {
    "sizeInGiB": integer
}
```

**To provide an empty data volume for one or more containers**

In some cases, you want to provide the containers in a task some scratch space. For example, you may have two database containers that need to access the same scratch file storage location during a task. This can be achieved using a bind mount.

1. In the task definition `volumes` section, define a bind mount with the name `database_scratch`.

```json
"volumes": [
    {
        "name": "database_scratch",
    }
]
```

2. In the `containerDefinitions` section, create the database container definitions so that they mount the volume.

```json
"containerDefinitions": [
    {
        "name": "database1",
        "image": "my-repo/database",
        "cpu": 100,
        "memory": 100,
        "essential": true,
        "mountPoints": [
            {
                "sourceVolume": "database_scratch",
                "containerPath": "/var/scratch"
            }
        ]
    },
    {
        "name": "database2",
        "image": "my-repo/database",
        "cpu": 100,
        "memory": 100,
        "essential": true,
```
Bind mounts

"mountPoints": [
    {
        "sourceVolume": "database_scratch",
        "containerPath": "/var/scratch"
    }
]

To expose a path and its contents in a Dockerfile to a container

In this example, you have a Dockerfile that writes data that you want to mount inside a container.

1. Create a Dockerfile. The following example uses the public Amazon Linux 2 container image and creates a file named examplefile in the /var/log/exported directory that we want to mount inside the container. The VOLUME directive should specify an absolute path.

```d lang=d
FROM public.ecr.aws/amazonlinux/amazonlinux:latest
RUN mkdir -p /var/log/exported
RUN touch /var/log/exported/examplefile
VOLUME ["/var/log/exported"]
```

By default, the volume permissions are set to 0755 and the owner as root. These permissions can be changed in the Dockerfile. In the following example, the owner of the /var/log/exported directory is set to node.

```d lang=d
FROM public.ecr.aws/amazonlinux/amazonlinux:latest
RUN yum install -y shadow-utils && yum clean all
RUN useradd node
RUN mkdir -p /var/log/exported && chown node:node /var/log/exported
RUN touch /var/log/exported/examplefile
USER node
VOLUME ["/var/log/exported"]
```

2. In the task definition volumes section, define a volume with the name application_logs.

```d lang=d
"volumes": [
    {
        "name": "application_logs",
    }
]
```

3. In the containerDefinitions section, create the application container definitions so they mount the storage. The containerPath value must match the absolute path specified in the VOLUME directive from the Dockerfile.

```d lang=d
"containerDefinitions": [
    {
        "name": "application1",
        "image": "my-repo/application",
        "cpu": 100,
        "memory": 100,
        "essential": true,
        "mountPoints": [
            {
                "sourceVolume": "application_logs",
                "containerPath": "/var/log/exported"
            }
        ]
    }
],
```

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Fargate task networking

**Important**
If you are using Amazon ECS tasks hosted on Amazon EC2 instances, see Task networking in the *Amazon Elastic Container Service Developer Guide*.

By default, every Amazon ECS task on Fargate is provided an elastic network interface (ENI) with a primary private IP address. When using a public subnet, you may optionally assign a public IP address to the task's ENI. If your VPC is enabled for dual-stack mode and you use a subnet with an IPv6 CIDR block, your task's ENI will also receive an IPv6 address. A task can only have one ENI associated with it at a time. For more information about VPCs and subnets, see VPCs and subnets in the *Amazon VPC User Guide*.

For a task on Fargate to be able to pull a container image, the task must have a route to the internet. The following describes how to ensure your task has a route to the internet.

- When using a public subnet, you can assign a public IP address to the task ENI.
- When using a private subnet, the subnet can have a NAT gateway attached.
- When using container images hosted in Amazon ECR, you can configure Amazon ECR to use an interface VPC endpoint and the image pull will occur over the task's private IPv4 address. For more information, see Amazon ECR interface VPC endpoints (AWS PrivateLink) in the *Amazon Elastic Container Registry User Guide*.

Because each task gets its own ENI, you can also take advantage of networking features like VPC Flow Logs so that you can monitor traffic to and from your tasks. Additionally, containers that belong to the same task can communicate over the localhost interface. For more information, see VPC Flow Logs in the *Amazon VPC User Guide*.

The ENIs that are created are fully managed by AWS Fargate and there is an associated IAM policy that is used to grant permissions for Fargate. For tasks using Fargate platform version 1.4.0 or later, the task receives a single ENI (referred to as the task ENI) and all network traffic flows through that ENI within your VPC and will be visible to you through your VPC flow logs. For tasks that use Fargate platform version 1.3.0 and earlier, in addition to the task ENI, the task also receives a separate Fargate-owned ENI which is used for some network traffic which is not visible in the VPC flow logs. The following describes the network traffic behavior as well as the required IAM policy for each platform version.

<table>
<thead>
<tr>
<th>Action</th>
<th>Traffic flow with platform version 1.3.0 and earlier</th>
<th>Traffic flow with platform version 1.4.0</th>
<th>IAM permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrieving Amazon ECR login credentials</td>
<td>Fargate-owned ENI</td>
<td>Task ENI</td>
<td>Task execution IAM role</td>
</tr>
</tbody>
</table>


Fargate task networking considerations

There are several things to consider when using task networking.

- The Amazon ECS service-linked role is required to provide Amazon ECS with the permissions to make calls to other AWS services on your behalf. This role is created for you automatically when you create a cluster, or if you create or update a service in the AWS Management Console. For more information, see Service-Linked Role for Amazon ECS (p. 282). You can also create the service-linked role with the following AWS CLI command:

  `aws iam create-service-linked-role --aws-service-name ecs.amazonaws.com`

- Amazon ECS populates the hostname of the task with an Amazon-provided (internal) DNS hostname when both the `enableDnsHostnames` and `enableDnsSupport` options are enabled on your VPC. If these options are not enabled, the DNS hostname of the task will be a random hostname. For more information on the DNS settings for a VPC, see Using DNS with Your VPC in the Amazon VPC User Guide.

- There is a limit of 16 subnets and 5 security groups that can be specified in the `awsVpcConfiguration`. For more information, see `AwsVpcConfiguration` in the Amazon Elastic Container Service API Reference.

- The ENIs that are created and attached by Fargate cannot be detached manually or modified by your account. This is to prevent the accidental deletion of an ENI that is associated with a running task. To release the ENIs for a task, stop the task.

- If a VPC is updated, for example to change the DHCP options set it uses, and you want tasks using the VPC to pick up the changes, those tasks must be stopped and new tasks started.

- Tasks launched in subnets with IPv6 CIDR blocks only receive an IPv6 address when using platform version 1.4.0 or later.

- For tasks using platform version 1.4.0 or later, the task ENIs support jumbo frames. Network interfaces are configured with a maximum transmission unit (MTU), which is the size of the largest payload that fits within a single frame. The larger the MTU, the more application payload can fit within a single frame, which reduces per-frame overhead and increases efficiency. Supporting jumbo frames will reduce overhead when the network path between your task and the destination supports jumbo frames, such as all traffic that remains within your VPC.
Using a VPC in dual-stack mode

When using a VPC in dual-stack mode, your tasks can communicate over IPv4 or IPv6, or both. IPv4 and IPv6 addresses are independent of each other and you must configure routing and security in your VPC separately for IPv4 and IPv6. For more information about configuring your VPC for dual-stack mode, see Migrating to IPv6 in the Amazon VPC User Guide.

Amazon ECS tasks on Fargate are assigned an IPv6 address if the following conditions are met:

- Your VPC and subnet are enabled for IPv6. For more information about configuring your VPC for dual-stack mode, see Migrating to IPv6 in the Amazon VPC User Guide.
- The task or service is using platform version 1.4.0 or later.
- The dualStackIPv6 account setting is enabled. For more information, see Account settings (p. 143).

Amazon ECS tasks on Fargate assigned an IPv6 address can access the internet as long as the VPC is configured with either an internet gateway or an egress-only internet gateway. NAT gateways are not needed. For more information, see Internet gateways and Egress-only internet gateways in the Amazon VPC User Guide.

Using the awslogs log driver

You can configure the containers in your tasks to send log information to CloudWatch Logs. This allows you to view the logs from the containers in your Fargate tasks. This topic helps you get started using the awslogs log driver in your task definitions.

Note

The type of information that is logged by the containers in your task depends mostly on their ENTRYPOINT command. By default, the logs that are captured show the command output that you would normally see in an interactive terminal if you ran the container locally, which are the STDOUT and STDERR I/O streams. The awslogs log driver simply passes these logs from Docker to CloudWatch Logs. For more information on how Docker logs are processed, including alternative ways to capture different file data or streams, see View logs for a container or service in the Docker documentation.

Enabling the awslogs log driver for your containers

If you are using the Fargate launch type for your tasks, all you need to do to enable the awslogs log driver is add the required logConfiguration parameters to your task definition. For more information, see Specifying a log configuration in your task definition (p. 109).

Creating a log group

The awslogs log driver can send log streams to an existing log group in CloudWatch Logs or it can create a new log group on your behalf. The AWS Management Console provides an auto-configure option which creates a log group on your behalf using the task definition family name with ecs as the prefix. Alternatively, you can manually specify your log configuration options and specify the awslogs-create-group option with a value of true which will create the log groups on your behalf.
Note
To use the `awslogs-create-group` option to have your log group created, your IAM policy must include the `logs:CreateLogGroup` permission.

Using the auto-configuration feature to create a log group

When registering a task definition in the Amazon ECS console, you have the option to allow Amazon ECS to auto-configure your CloudWatch logs. This option creates a log group on your behalf using the task definition family name with `ecs` as the prefix.

To use log group auto-configuration option in the Amazon ECS console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the left navigation pane, choose Task Definitions, Create new Task Definition.
3. Select your compatibility option and choose Next Step.
4. Choose Add container.
5. In the Storage and Logging section, for Log configuration, choose Auto-configure CloudWatch Logs.
6. Enter your awslogs log driver options. For more information, see Specifying a log configuration in your task definition (p. 109).
7. Complete the rest of the task definition wizard.

Available awslogs log driver options

The `awslogs` log driver supports the following options in Amazon ECS task definitions. For more information, see CloudWatch Logs logging driver.

`awslogs-create-group`

Required: No

Specify whether you want the log group automatically created. If this option is not specified, it defaults to `false`.

Note
Your IAM policy must include the `logs:CreateLogGroup` permission before you attempt to use `awslogs-create-group`.

`awslogs-region`

Required: Yes

Specify the region to which the `awslogs` log driver should send your Docker logs. You can choose to send all of your logs from clusters in different regions to a single region in CloudWatch Logs so that they are all visible in one location, or you can separate them by region for more granularity. Be sure that the specified log group exists in the region that you specify with this option.

`awslogs-endpoint`

Required: No

By default, Docker uses either the `awslogs-region` log option or the detected Region to construct the remote CloudWatch Logs API endpoint. Use the `awslogs-endpoint` log option to override the default endpoint with the provided endpoint.

`awslogs-group`

Required: Yes
You must specify a log group to which the `awslogs` log driver sends its log streams. For more information, see Creating a log group (p. 106).

`awslogs-stream-prefix`

Required: Yes, when using the Fargate launch type.

The `awslogs-stream-prefix` option allows you to associate a log stream with the specified prefix, the container name, and the ID of the Amazon ECS task to which the container belongs. If you specify a prefix with this option, then the log stream takes the following format:

```
prefix-name/container-name/ecs-task-id
```

For Amazon ECS services, you could use the service name as the prefix, which would allow you to trace log streams to the service that the container belongs to, the name of the container that sent them, and the ID of the task to which the container belongs.

`awslogs-datetime-format`

Required: No

This option defines a multiline start pattern in Python `strftime` format. A log message consists of a line that matches the pattern and any following lines that don't match the pattern. Thus the matched line is the delimiter between log messages.

One example of a use case for using this format is for parsing output such as a stack dump, which might otherwise be logged in multiple entries. The correct pattern allows it to be captured in a single entry.

For more information, see `awslogs-datetime-format`.

This option always takes precedence if both `awslogs-datetime-format` and `awslogs-multiline-pattern` are configured.

**Note**

Multiline logging performs regular expression parsing and matching of all log messages, which may have a negative impact on logging performance.

`awslogs-multiline-pattern`

Required: No

This option defines a multiline start pattern using a regular expression. A log message consists of a line that matches the pattern and any following lines that don't match the pattern. Thus the matched line is the delimiter between log messages.

For more information, see `awslogs-multiline-pattern`.

This option is ignored if `awslogs-datetime-format` is also configured.

**Note**

Multiline logging performs regular expression parsing and matching of all log messages. This may have a negative impact on logging performance.

`mode`

Required: No

Valid values: `non-blocking` | `blocking`

Default value: `blocking`
The delivery mode of log messages from the container to `awslogs`. For more information, see Configure logging drivers.

**max-buffer-size**

Required: No

Default value: 1m

When non-blocking mode is used, the `max-buffer-size` log option controls the size of the ring buffer used for intermediate message storage.

## Specifying a log configuration in your task definition

Before your containers can send logs to CloudWatch, you must specify the `awslogs` log driver for containers in your task definition. This section describes the log configuration for a container to use the `awslogs` log driver. For more information, see Creating a task definition (p. 61).

The task definition JSON shown below has a `logConfiguration` object specified for each container; one for the WordPress container that sends logs to a log group called `awslogs-wordpress`, and one for a MySQL container that sends logs to a log group called `awslogs-mysql`. Both containers use the `awslogs-example` log stream prefix.

```json
{
  "containerDefinitions": [
    {
      "name": "wordpress",
      "links": [
        "mysql"
      ],
      "image": "wordpress",
      "essential": true,
      "portMappings": [
        {
          "containerPort": 80,
          "hostPort": 80
        }
      ],
      "logConfiguration": {
        "logDriver": "awslogs",
        "options": {
          "awslogs-group": "awslogs-wordpress",
          "awslogs-region": "us-west-2",
          "awslogs-stream-prefix": "awslogs-example"
        }
      },
      "memory": 500,
      "cpu": 10
    },
    {
      "environment": [
        {
          "name": "MYSQL_ROOT_PASSWORD",
          "value": "password"
        }
      ],
      "name": "mysql",
      "image": "mysql",
      "cpu": 10,
      "memory": 500,
      "essential": true,
      "portMappings": [
        {
          "containerPort": 3306,
          "hostPort": 3306
        }
      ]
    }
  ]
}
```
Viewing awslogs container logs in CloudWatch Logs

After your Fargate tasks that use the awslogs log driver have launched, your configured containers should be sending their log data to CloudWatch Logs. You can view and search these logs in the console.

To view your CloudWatch Logs data for a container from the Amazon ECS console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. On the Clusters page, select the cluster that contains the task to view.
3. On the Cluster: cluster_name page, choose Tasks and select the task to view.
4. On the Task: task_id page, expand the container view by choosing the arrow to the left of the container name.
5. In the Log Configuration section, choose View logs in CloudWatch, which opens the associated log stream in the CloudWatch console.
To view your CloudWatch Logs data in the CloudWatch console

2. In the left navigation pane, choose Logs.
3. Select a log group to view. You should see the log groups that you created in Creating a log group (p. 106).
4. Choose a log stream to view.
Custom log routing

FireLens for Amazon ECS enables you to use task definition parameters to route logs to an AWS service or AWS Partner Network (APN) destination for log storage and analytics. FireLens works with Fluentd and Fluent Bit. We provide the AWS for Fluent Bit image or you can use your own Fluentd or Fluent Bit image.

Creating Amazon ECS task definitions with a FireLens configuration is supported using the AWS SDKs, AWS CLI, and AWS Management Console.

Considerations

The following should be considered when using FireLens for Amazon ECS:

- FireLens for Amazon ECS is supported for tasks hosted on both AWS Fargate and Amazon EC2.
- FireLens for Amazon ECS is supported in AWS CloudFormation templates. For more information, see `AWS::ECS::TaskDefinition FirelensConfiguration` in the `AWS CloudFormation User Guide`.
- For tasks that use the bridge network mode, the container with the FireLens configuration must start before any application containers that rely on it start. To control the start order of your containers, use dependency conditions in your task definition. For more information, see `Container dependency (p. 83)`.
Note
If you use dependency condition parameters in container definitions with a FireLens configuration, ensure that each container has a START or HEALTHY condition requirement.

Required IAM permissions

To use this feature, you must create an IAM role for your tasks that provides the permissions necessary to use any AWS services that the tasks require. For example, if a container is routing logs to Kinesis Data Firehose, then the task would require permission to call the firehose:PutRecordBatch API. For more information, see Adding and Removing IAM Identity Permissions in the IAM User Guide.

The following example IAM policy adds the required permissions for routing logs to Kinesis Data Firehose.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "firehose:PutRecordBatch"
            ],
            "Resource": ["*"],
        }
    ]
}
```

Your task may also require the Amazon ECS task execution role under the following conditions. For more information, see Amazon ECS task execution IAM role (p. 290).

- If your task is hosted on Fargate and you are pulling container images from Amazon ECR or referencing sensitive data from AWS Secrets Manager in your log configuration, then you must include the task execution IAM role.
- If you are specifying a custom configuration file that is hosted in Amazon S3, your task execution IAM role must include the s3:GetObject permission for the configuration file and the s3:GetBucketLocation permission on the Amazon S3 bucket that the file is in. For more information, see Specifying Permissions in a Policy in the Amazon Simple Storage Service Console User Guide.

The following example IAM policy adds the required permissions for retrieving a file from Amazon S3. Specify the name of your Amazon S3 bucket and configuration file name.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:GetObject"
            ],
            "Resource": ["arn:aws:s3:::examplebucket/folder_name/config_file_name"
            ],
            "Effect": "Allow",
        }
    ]
}
```
Using Fluent logger libraries

When the `awsfirelens` log driver is specified in a task definition, the ECS agent injects the following environment variables into the container:

**FLUENT_HOST**

The IP address assigned to the FireLens container.

**FLUENT_PORT**

The port that the Fluent Forward protocol is listening on.

The `FLUENT_HOST` and `FLUENT_PORT` environment variables enable you to log directly to the log router from code instead of going through `stdout`. For more information, see [fluuent-logger-golang on GitHub](https://github.com/fluent/fluuent-logger-golang).

Using the AWS for Fluent Bit image

AWS provides a Fluent Bit image with plugins for both CloudWatch Logs and Kinesis Data Firehose. We recommend using Fluent Bit as your log router because it has a lower resource utilization rate than Fluentd. For more information, see [CloudWatch Logs for Fluent Bit](https://aws.amazon.com/documentation/elasticcontainerregistry/benchmark-fluent-bit-cloudwatch-logs/) and [Amazon Kinesis Firehose for Fluent Bit](https://aws.amazon.com/documentation/elasticcontainerregistry/benchmark-fluent-bit-kinesis-firehose/).

The **AWS for Fluent Bit** image is available on Amazon ECR on both the Amazon ECR Public Gallery and in an Amazon ECR repository in most Regions for high availability, and on Docker Hub.

Amazon ECR Public Gallery

The AWS for Fluent Bit image is available on the Amazon ECR Public Gallery. This is the recommended location to download the AWS for Fluent Bit image as it is a public repository and available to be used from all AWS Regions. For more details, see [aws-for-fluent-bit](https://github.com/aws/aws-for-fluent-bit) on the Amazon ECR Public Gallery.

You can pull the AWS for Fluent Bit image from the Amazon ECR Public Gallery by specifying the repository URL with the desired image tag. The available image tags can be found on the **Image tags** tab on the Amazon ECR Public Gallery.

The following shows the syntax to use for the Docker CLI.

```
docker pull public.ecr.aws/aws-observability/aws-for-fluent-bit:tag
```

For example, you can pull the latest AWS for Fluent Bit image using this Docker CLI command:

```
docker pull public.ecr.aws/aws-observability/aws-for-fluent-bit:latest
```

**Note**

Unauthenticated pulls are allowed, but have a lower rate limit than authenticated pulls. To authenticate using your AWS account before pulling, use the following command:
Creating a task definition that uses a FireLens configuration

To use custom log routing with FireLens you must specify the following in your task definition:

- A log router container containing a FireLens configuration. We recommend that the container be marked as essential.
- One or more application containers that contain a log configuration specifying the `awsfirelens` log driver.
- A task IAM role ARN containing the permissions needed for the task to route the logs.

When creating a new task definition using the AWS Management Console, there is a FireLens integration section that makes it easy to add a log router container. For more information, see Creating a task definition (p. 61).

Amazon ECS converts the log configuration and generates the Fluentd or Fluent Bit output configuration. The output configuration is mounted in the log routing container at `/fluent-bit/etc/fluent-bit.conf` for Fluent Bit and `/fluentd/etc/fluent.conf` for Fluentd.
The following task definition example defines a log router container that uses Fluent Bit to route its logs to CloudWatch Logs. It also defines an application container that uses a log configuration to route logs to Amazon Kinesis Data Firehose.

```json
{
  "family": "firelens-example-firehose",
  "taskRoleArn": "arn:aws:iam::123456789012:role/ecs_task_iam_role",
  "containerDefinitions": [
    {
      "essential": true,
      "image": "906394416424.dkr.ecr.us-west-2.amazonaws.com/aws-for-fluent-bit:latest",
      "name": "log_router",
      "firelensConfiguration": {
        "type": "fluentbit"
      },
      "logConfiguration": {
        "logDriver": "awslogs",
        "options": {
          "awslogs-group": "firelens-container",
          "awslogs-region": "us-west-2",
          "awslogs-create-group": "true",
          "awslogs-stream-prefix": "firelens"
        }
      },
      "memoryReservation": 50,
    },
    {
      "essential": true,
      "image": "httpd",
      "name": "app",
      "logConfiguration": {
        "logDriver": "awsfirelens",
        "options": {
          "Name": "firehose",
          "region": "us-west-2",
          "delivery_stream": "my-stream"
        }
      },
      "memoryReservation": 100
    }
  ]
}
```

The key-value pairs specified as options in the `logConfiguration` object are used to generate the Fluentd or Fluent Bit output configuration. The following is a code example from a Fluent Bit output definition.

```
[OUTPUT]
  Name       firehose
  Match      app-firelens*
  region     us-west-2
  delivery_stream my-stream
```

**Note**
FireLens manages the `match` configuration. This configuration is not specified in your task definition.

### Using Amazon ECS metadata

When specifying a FireLens configuration in a task definition, you can optionally toggle the value for `enable-ecs-log-metadata`. By default, Amazon ECS adds additional fields in your log entries that
help identify the source of the logs. You can disable this action by setting `enable-ecs-log-metadata` to `false`.

- `ecs_cluster` – The name of the cluster that the task is part of.
- `ecs_task_arn` – The full ARN of the task that the container is part of.
- `ecs_task_definition` – The task definition name and revision that the task is using.

The following shows the syntax required when specifying an Amazon ECS log metadata setting value:

```json
{
    "containerDefinitions": [
        {
            "essential": true,
            "image": "906394416424.dkr.ecr.us-west-2.amazonaws.com/aws-for-fluent-bit:latest",
            "name": "log_router",
            "firelensConfiguration": {
                "type": "fluentbit",
                "options": {
                    "enable-ecs-log-metadata": "true | false"
                }
            }
        }
    ]
}
```

### Specifying a custom configuration file

In addition to the auto-generated configuration file that FireLens creates on your behalf, you can also specify a custom configuration file. The configuration file format is the native format for the log router you're using. For more information, see Fluentd Config File Syntax and Fluent Bit Configuration Schema.

In your custom configuration file, for tasks using the bridge or awsvpc network mode, you should not set a Fluentd or Fluent Bit forward input over TCP because FireLens will add it to the input configuration.

Your FireLens configuration must contain the following options to specify a custom configuration file:

- **config-file-type**
  
  The source location of the custom configuration file. The available options are `s3` or `file`.

  **Note**
  
  Tasks hosted on AWS Fargate only support the `file` configuration file type.

- **config-file-value**
  
  The source for the custom configuration file. If the `s3` config file type is used, the config file value is the full ARN of the Amazon S3 bucket and file. If the `file` config file type is used, the config file value is the full path of the configuration file that exists either in the container image or on a volume that is mounted in the container.

  **Important**
  
  When using a custom configuration file, you must specify a different path than the one FireLens uses. Amazon ECS reserves the `/fluent-bit/etc/fluent-bit.conf` file path for Fluent Bit and `/fluentd/etc/fluent.conf` for Fluentd.

The following example shows the syntax required when specifying a custom configuration.

**Important**

To specify a custom configuration file that is hosted in Amazon S3, ensure you have created a task execution IAM role with the proper permissions. For more information, see Required IAM permissions (p. 113).
The following shows the syntax required when specifying a custom configuration:

```json
{
    "containerDefinitions": [
        {
            "essential": true,
            "image": "906394416424.dkr.ecr.us-west-2.amazonaws.com/aws-for-fluent-bit:latest",
            "name": "log_router",
            "firelensConfiguration": {
                "type": "fluentbit",
                "options": {
                    "config-file-type": "s3 | file",
                    "config-file-value": "arn:aws:s3:::mybucket/fluent.conf | filepath"
                }
            }
        }
    ]
}
```

**Note**
Tasks hosted on AWS Fargate only support the `file` configuration file type.

### Filtering logs using regular expressions

Fluentd and Fluent Bit both support filtering of logs based on their content. FireLens provides a simple method for enabling this filtering. In the log configuration options in a container definition, you can specify the special keys `exclude-pattern` and `include-pattern` that take regular expressions as their values. The `exclude-pattern` key causes all logs that match its regular expression to be dropped. With `include-pattern`, only logs that match its regular expression are sent. These keys can be used together.

The following example demonstrates how to use this filter.

```json
{
    "containerDefinitions": [
        {
            "logConfiguration": {
                "logDriver": "awsfirelens",
                "options": {
                    "@type": "cloudwatch_logs",
                    "log_group_name": "firelens-testing",
                    "auto_create_stream": "true",
                    "use_tag_as_stream": "true",
                    "region": "us-west-2",
                    "exclude-pattern": "^[a-z][aeiou].*$",
                    "include-pattern": "^.*[aeiou]*$"
                }
            }
        }
    ]
}
```

### Example task definitions

The following are some example task definitions demonstrating common custom log routing options. For more examples, see Amazon ECS FireLens examples on GitHub.

**Topics**
- Forwarding logs to CloudWatch Logs (p. 119)
Example task definitions

- Forwarding logs to an Amazon Kinesis Data Firehose delivery stream (p. 120)
- Forwarding logs to an Amazon Elasticsearch Service domain (p. 120)
- Parsing container logs that are serialized JSON (p. 121)
- Forwarding to an external Fluentd or Fluent Bit (p. 122)

### Forwarding logs to CloudWatch Logs

**Note**

For more examples, see Amazon ECS FireLens examples on GitHub.

The following task definition example demonstrates how to specify a log configuration that forwards logs to a CloudWatch Logs log group. For more information, see What Is Amazon CloudWatch Logs? in the Amazon CloudWatch Logs User Guide.

In the log configuration options, specify the log group name and the Region it exists in. To have Fluent Bit create the log group on your behalf, specify "auto_create_group": "true". You can also specify the task ID as the log stream prefix, which assists in filtering. For more information, see Fluent Bit Plugin for CloudWatch Logs.

```json
{
  "family": "firelens-example-cloudwatch",
  "taskRoleArn": "arn:aws:iam::123456789012:role/ecs_task_iam_role",
  "containerDefinitions": [
    {
      "essential": true,
      "image": "906394416424.dkr.ecr.us-west-2.amazonaws.com/aws-for-fluent-bit:latest",
      "name": "log_router",
      "firelensConfiguration": {
        "type": "fluentbit",
      },
      "logConfiguration": {
        "logDriver": "awslogs",
        "options": {
          "awslogs-group": "firelens-container",
          "awslogs-region": "us-west-2",
          "awslogs-create-group": "true",
          "awslogs-stream-prefix": "firelens"
        }
      },
      "memoryReservation": 50
    },
    {
      "essential": true,
      "image": "nginx",
      "name": "app",
      "logConfiguration": {
        "logDriver": "awsfirelens",
        "options": {
          "Name": "cloudwatch",
          "region": "us-west-2",
          "log_key": "log",
          "log_group_name": "/aws/ecs/containerinsights/$(ecs_cluster)/application",
          "auto_create_group": "true",
          "log_stream_prefix": "log_stream_name"
        }
      },
      "memoryReservation": 100
    }
  ]
}
```

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Forwarding logs to an Amazon Kinesis Data Firehose delivery stream

**Note**
For more examples, see Amazon ECS FireLens examples on GitHub.

The following task definition example demonstrates how to specify a log configuration that forwards logs to an Amazon Kinesis Data Firehose delivery stream. The Kinesis Data Firehose delivery stream must already exist. For more information, see Creating an Amazon Kinesis Data Firehose Delivery Stream in the Amazon Kinesis Data Firehose Developer Guide.

In the log configuration options, specify the delivery stream name and the Region it exists in. For more information, see Fluent Bit Plugin for Amazon Kinesis Firehose.

```json
{
  "family": "firelens-example-firehose",
  "taskRoleArn": "arn:aws:iam::123456789012:role/ecs_task_iam_role",
  "containerDefinitions": [
    {
      "essential": true,
      "image": "906394416424.dkr.ecr.us-west-2.amazonaws.com/aws-for-fluent-bit:latest",
      "name": "log_router",
      "firelensConfiguration": {
        "type": "fluentbit"
      },
      "logConfiguration": {
        "logDriver": "awslogs",
        "options": {
          "awslogs-group": "firelens-container",
          "awslogs-region": "us-west-2",
          "awslogs-create-group": "true",
          "awslogs-stream-prefix": "firelens"
        }
      },
      "memoryReservation": 50
    },
    {
      "essential": true,
      "image": "httpd",
      "name": "app",
      "logConfiguration": {
        "logDriver": "awsfirelens",
        "options": {
          "Name": "firehose",
          "region": "us-west-2",
          "delivery_stream": "my-stream"
        }
      },
      "memoryReservation": 100
    }
  ]
}
```

Forwarding logs to an Amazon Elasticsearch Service domain

**Note**
For more examples, see Amazon ECS FireLens examples on GitHub.

The following task definition example demonstrates how to specify a log configuration that forwards logs to an Amazon Elasticsearch Service domain. The Amazon Elasticsearch Service domain must already exist. For more information, see What is Amazon Elasticsearch Service in the Amazon Elasticsearch Service Developer Guide.
In the log configuration options, specify the log options required for Elasticsearch integration. For more information, see Fluent Bit for Amazon Elasticsearch Service.

```json
{
  "family": "firelens-example-elasticsearch",
  "taskRoleArn": "arn:aws:iam::123456789012:role/ecs_task_iam_role",
  "containerDefinitions": [
    {
      "essential": true,
      "image": "906394416424.dkr.ecr.us-west-2.amazonaws.com/aws-for-fluent-bit:latest",
      "name": "log_router",
      "firelensConfiguration": {
        "type": "fluentbit"
      },
      "logConfiguration": {
        "logDriver": "awslogs",
        "options": {
          "awslogs-group": "firelens-container",
          "awslogs-region": "us-west-2",
          "awslogs-create-group": "true",
          "awslogs-stream-prefix": "firelens"
        }
      },
      "memoryReservation": 50
    },
    {
      "essential": true,
      "image": "httpd",
      "name": "app",
      "logConfiguration": {
        "logDriver": "awsfirelens",
        "options": {
          "Name": "es",
          "Host": "vpc-fake-domain-ke7thzo07jawrhzm26mb7ite7y.us-west-2.es.amazonaws.com",
          "Port": "443",
          "Index": "my_index",
          "Type": "my_type",
          "AWS_Auth": "On",
          "AWS_Region": "us-west-2",
          "tls": "On"
        }
      },
      "memoryReservation": 100
    }
  ]
}
```

### Parsing container logs that are serialized JSON

**Note**

For more examples, see Amazon ECS FireLens examples on GitHub.

Beginning with AWS for Fluent Bit version 1.3, there is a JSON parser included in the AWS for Fluent Bit image. The following example shows how to reference the JSON parser in the FireLens configuration of your task definition.

```json
"firelensConfiguration": {
  "type": "fluentbit",
  "options": {
    "config-file-type": "file",
    "config-file-value": "/fluent-bit/configs/parse-json.conf"
  }
}
```
The Fluent Bit config file will parse any logs that are in JSON. For example, if the logs at your destination looked like the following without JSON parsing:

```json
{
  "source": "stdout",
  "log": "{"requestID": "b5d716fca19a4252ad90e7b8ec7cc8d2", "requestInfo": {
  "ipAddress": "204.16.5.19", "path": "/activate", "user": "TheDoctor"}}",
  "container_id": "e54cccac2b87417f71877907f6787906842004282067ae0867e60a63529d35",
  "container_name": "/ecs-demo-6-container2-a4eafbb3d4c7f1e16e00",
  "ecs_cluster": "mycluster",
  "ecs_task_arn": "arn:aws:ecs:us-east-2:01234567891011:task/mycluster/3de392df-6bfa-470b-97ed-aa6f482cd7a6",
  "ecs_task_definition": "demo:7"
}
```

With the JSON parsing, the log will look like the following:

```json
{
  "source": "stdout",
  "container_id": "e54cccac2b87417f71877907f6787906842004282067ae0867e60a63529d35",
  "container_name": "/ecs-demo-6-container2-a4eafbb3d4c7f1e16e00",
  "ecs_cluster": "mycluster",
  "ecs_task_arn": "arn:aws:ecs:us-east-2:01234567891011:task/mycluster/3de392df-6bfa-470b-97ed-aa6f482cd7a6",
  "ecs_task_definition": "demo:7"
}
```

The serialized JSON is expanded into top level fields in the final JSON output. For more information on JSON parsing, see Parser in the Fluent Bit documentation.

### Forwarding to an external Fluentd or Fluent Bit

**Note**
For more examples, see Amazon ECS FireLens examples on GitHub.

The following task definition example demonstrates how to specify a log configuration that forwards logs to an external Fluentd or Fluent Bit host. Specify the `host` and `port` for your environment.

```json
{
  "family": "firelens-example-forward",
  "taskRoleArn": "arn:aws:iam::123456789012:role/ecs_task_iam_role",
  "containerDefinitions": [
  {
    "essential": true,
    "image": "90639416424.dkr.ecr.us-west-2.amazonaws.com/aws-for-fluent-bit:latest",
    "name": "log_router",
    "firelensConfiguration": {
      "type": "fluentbit"
    },
    "logConfiguration": {
```
Private registry authentication for tasks

Private registry authentication for tasks using AWS Secrets Manager enables you to store your credentials securely and then reference them in your container definition. This allows your tasks to use images from private repositories. This feature is supported by tasks using both the Fargate or EC2 launch types.

Important
If your task definition references an image stored in Amazon ECR, this topic does not apply. For more information, see Using Amazon ECR Images with Amazon ECS in the Amazon Elastic Container Registry User Guide.

For tasks using the Fargate launch type, this feature requires platform version 1.2.0 or later. For information, see AWS Fargate platform versions (p. 43).

Within your container definition, specify repositoryCredentials with the full ARN of the secret that you created. The secret you reference can be from a different Region than the task using it, but must be from within the same account.

Note
When using the Amazon ECS API, AWS CLI, or AWS SDK, if the secret exists in the same Region as the task you are launching then you can use either the full ARN or name of the secret. When using the AWS Management Console, the full ARN of the secret must be specified.

The following is a snippet of a task definition showing the required parameters:

```
"containerDefinitions": [
  {
    "image": "private-repo/private-image",
    "repositoryCredentials": {
      "credentialsParameter": "arn:aws:secretsmanager:region:aws_account_id:secret:secret_name"
    }
  }
]
```
Required IAM permissions for private registry authentication

The Amazon ECS task execution role is required to use this feature. This allows the container agent to pull the container image. For more information, see Amazon ECS task execution IAM role (p. 290).

To provide access to the secrets that you create, manually add the following permissions as an inline policy to the task execution role. For more information, see Adding and Removing IAM Policies.

- secretsmanager:GetSecretValue
- kms:Decrypt—Required only if your key uses a custom KMS key and not the default key. The ARN for your custom key should be added as a resource.

An example inline policy adding the permissions is shown below.

```json
{
   "Version": "2012-10-17",
   "Statement": [
   {
      "Effect": "Allow",
      "Action": [
      "kms:Decrypt",
      "secretsmanager:GetSecretValue"
      ],
      "Resource": [
      "arn:aws:kms:<region>:<aws_account_id>:key/key_id"
      ]
   }
   ]
}
```

Enabling private registry authentication

To create a basic secret

Use AWS Secrets Manager to create a secret for your private registry credentials.

1. Open the AWS Secrets Manager console at https://console.aws.amazon.com/secretsmanager/.
2. Choose Store a new secret.
3. For Select secret type, choose Other type of secrets.
4. Select Plaintext and enter your private registry credentials using the following format:

```json
{
   "username": "privateRegistryUsername",
   "password": "privateRegistryPassword"
}
```
5. Choose Next.
6. For Secret name, type an optional path and name, such as production/MyAwesomeAppSecret or development/TestSecret, and choose Next. You can optionally add a description to help you remember the purpose of this secret later.
Specifying sensitive data

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Specifying sensitive data

The secret name must be ASCII letters, digits, or any of the following characters: /_+=.@-

7. (Optional) At this point, you can configure rotation for your secret. For this procedure, leave it at Disable automatic rotation and choose Next.

For information about how to configure rotation on new or existing secrets, see Rotating Your AWS Secrets Manager Secrets.

8. Review your settings, and then choose Store secret to save everything you entered as a new secret in Secrets Manager.

To create a task definition that uses private registry authentication

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation pane, choose Task Definitions.
3. On the task definitions page, choose Create new task definition.
4. On the Select launch type compatibility page, choose the launch type for your tasks and then Next step.
5. For task definition Name, type a name for your task definition. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.
6. For Task execution role, either select your existing task execution role or choose Create new role to have one created for you. This role authorizes Amazon ECS to pull private images for your task. For more information, see Required IAM permissions for private registry authentication (p. 124).

Important
If the Task execution role field does not appear, choose Configure via JSON and manually add the executionRoleArn field to specify your task execution role. The following shows the syntax:

"executionRoleArn": "arn:aws:iam::aws_account_id:role/ecsTaskExecutionRole"

7. For each container to create in your task definition, complete the following steps:

a. In the Container Definitions section, choose Add container.

b. For Container name, type a name for your container. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.

c. For Image, type the image name or path to your private image. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.

d. Select the Private repository authentication option.

e. For Secrets manager ARN, enter the full Amazon Resource Name (ARN) of the secret that you created earlier. The value must be between 20 and 2048 characters.

f. Fill out the remaining required fields and any optional fields to use in your container definitions. More container definition parameters are available in the Advanced container configuration menu. For more information, see Task definition parameters (p. 66).

g. Choose Add.

8. When your containers are added, choose Create.

Specifying sensitive data

Amazon ECS enables you to inject sensitive data into your containers by storing your sensitive data in either AWS Secrets Manager secrets or AWS Systems Manager Parameter Store parameters and then referencing them in your container definition.
Secrets can be exposed to a container in the following ways:

- To inject sensitive data into your containers as environment variables, use the `secrets` container definition parameter.
- To reference sensitive information in the log configuration of a container, use the `secretOptions` container definition parameter.

**Topics**

- Specifying sensitive data using Secrets Manager (p. 126)
- Specifying sensitive data using Systems Manager Parameter Store (p. 132)

**Specifying sensitive data using Secrets Manager**

Amazon ECS enables you to inject sensitive data into your containers by storing your sensitive data in AWS Secrets Manager secrets and then referencing them in your container definition. Sensitive data stored in Secrets Manager secrets can be exposed to a container as environment variables or as part of the log configuration.

When you inject a secret as an environment variable, you can specify the full contents of a secret, a specific JSON key within a secret, or a specific version of a secret to inject. This helps you control the sensitive data exposed to your container. For more information about secret versioning, see Key Terms and Concepts for AWS Secrets Manager in the AWS Secrets Manager User Guide.

**Considerations for specifying sensitive data using Secrets Manager**

The following should be considered when using Secrets Manager to specify sensitive data for containers.

- For Amazon ECS tasks on AWS Fargate, the following should be considered:
  - To inject the full content of a secret as an environment variable or in a log configuration, you must use platform version 1.3.0 or later. For information, see AWS Fargate platform versions (p. 43).
  - To inject a specific JSON key or version of a secret as an environment variable or in a log configuration, you must use platform version 1.4.0 or later. For information, see AWS Fargate platform versions (p. 43).
- Only secrets that store text data, which are secrets created with the `SecretString` parameter of the `CreateSecret` API, are supported. Secrets that store binary data, which are secrets created with the `SecretBinary` parameter of the `CreateSecret` API are not supported.
- When using a task definition that references Secrets Manager secrets to retrieve sensitive data for your containers, if you are also using interface VPC endpoints, you must create the interface VPC endpoints for Secrets Manager. For more information, see Using Secrets Manager with VPC Endpoints in the AWS Secrets Manager User Guide.
- Sensitive data is injected into your container when the container is initially started. If the secret is subsequently updated or rotated, the container will not receive the updated value automatically. You must either launch a new task or if your task is part of a service you can update the service and use the `Force new deployment` option to force the service to launch a fresh task.
- The VPC your task uses must have DNS resolution enabled.

**Required IAM permissions for Amazon ECS secrets**

To use this feature, you must have the Amazon ECS task execution role and reference it in your task definition. This allows the container agent to pull the necessary Secrets Manager resources. For more information, see Amazon ECS task execution IAM role (p. 290).
To provide access to the Secrets Manager secrets that you create, manually add the following permissions as an inline policy to the task execution role. For more information, see Adding and Removing IAM Policies.

- `secretsmanager:GetSecretValue`–Required if you are referencing a Secrets Manager secret.
- `kms:Decrypt`–Required only if your secret uses a custom KMS key and not the default key. The ARN for your custom key should be added as a resource.

The following example inline policy adds the required permissions.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "secretsmanager:GetSecretValue",
            "kms:Decrypt"
         ],
         "Resource": [
            "arn:aws:kms:<region>:<aws_account_id>:key/<key_id>"
         ]
      }
   ]
}
```

### Injecting sensitive data as an environment variable

Within your container definition, you can specify the following:

- The `secrets` object containing the name of the environment variable to set in the container
- The Amazon Resource Name (ARN) of the Secrets Manager secret
- Additional parameters that contain the sensitive data to present to the container

The following example shows the full syntax that must be specified for the Secrets Manager secret.

```
arn:aws:secretsmanager:<region>:<aws_account_id>:secret:<secret-name>
```

The following section describes the additional parameters. These parameters are optional, but if you do not use them, you must include the colons `:` to use the default values. Examples are provided below for more context.

**json-key**

Specifies the name of the key in a key-value pair with the value that you want to set as the environment variable value. Only values in JSON format are supported. If you do not specify a JSON key, then the full contents of the secret is used.

**version-stage**

Specifies the staging label of the version of a secret that you want to use. If a version staging label is specified, you cannot specify a version ID. If no version stage is specified, the default behavior is to retrieve the secret with the `AWSCURRENT` staging label.

Staging labels are used to keep track of different versions of a secret when they are either updated or rotated. Each version of a secret has one or more staging labels and an ID. For more information, see Key Terms and Concepts for AWS Secrets Manager in the AWS Secrets Manager User Guide.
version-id

Specifies the unique identifier of the version of a secret that you want to use. If a version ID is specified, you cannot specify a version staging label. If no version ID is specified, the default behavior is to retrieve the secret with the AWSCURRENT staging label.

Version IDs are used to keep track of different versions of a secret when they are either updated or rotated. Each version of a secret has an ID. For more information, see Key Terms and Concepts for AWS Secrets Manager in the AWS Secrets Manager User Guide.

For a full tutorial on creating a Secrets Manager secret and injecting it into a container as an environment variable, see Tutorial: Specifying sensitive data using Secrets Manager secrets (p. 332).

Example container definitions

The following examples show ways in which you can reference Secrets Manager secrets in your container definitions.

Example referencing a full secret

The following is a snippet of a task definition showing the format when referencing the full text of a Secrets Manager secret.

```json
{
  "containerDefinitions": [{
    "secrets": [{
      "name": "environment_variable_name",
      "valueFrom": "arn:aws:secretsmanager:region:aws_account_id:secret:secret_name-AbCdEf"
    }]
  }
}
```

Example referencing a specific key within a secret

The following shows an example output from a get-secret-value command that displays the contents of a secret along with the version staging label and version ID associated with it.

```json
{
  "Name": "appauthexample",
  "VersionId": "871d9eca-18aa-46a9-8785-981ddEXAMPLE",
  "SecretString": "{\"username1\":\"password1\",\"username2\":\"password2\",\"username3\":\"password3\"}",
  "VersionStages": [
    "AWSCURRENT"
  ],
  "CreatedDate": 1581968848.921
}
```

Reference a specific key from the previous output in a container definition by specifying the key name at the end of the ARN.

```json
{
  "containerDefinitions": [{
    "secrets": [{
      "name": "environment_variable_name",
    }]
  }
}
```
Example referencing a specific secret version

The following shows an example output from a `describe-secret` command that displays the unencrypted contents of a secret along with the metadata for all versions of the secret.

```json
{
    "Name": "appauthexample",
    "Description": "Example of a secret containing application authorization data.",
    "RotationEnabled": false,
    "LastChangedDate": 1581968848.926,
    "LastAccessedDate": 1581897600.0,
    "Tags": [],
    "VersionIdsToStages": {
        "871d9eca-18aa-46a9-8785-981ddEXAMPLE": [
            "AWSCURRENT"
        ],
        "9d4cb84b-ad69-40c0-a0ab-cead3EXAMPLE": [
            "AWSPREVIOUS"
        ]
    }
}
```

Reference a specific version staging label from the previous output in a container definition by specifying the key name at the end of the ARN.

```json
{
    "containerDefinitions": [
        {
            "secrets": [
                {
                    "name": "environment_variable_name",
                    "valueFrom": "arn:aws:secretsmanager:region:aws_account_id:secret:appauthexample-AbCdEf::AWSPREVIOUS:"
                }
            ]
        }
    ]
}
```

Reference a specific version ID from the previous output in a container definition by specifying the key name at the end of the ARN.

```json
{
    "containerDefinitions": [
        {
            "secrets": [
                {
                    "name": "environment_variable_name",
                    "valueFrom": "arn:aws:secretsmanager:region:aws_account_id:secret:appauthexample-AbCdEf:::9d4cb84b-ad69-40c0-a0ab-cead3EXAMPLE"
                }
            ]
        }
    ]
}
```

Injecting sensitive data in a log configuration

Within your container definition, when specifying a `logConfiguration` you can specify `secretOptions` with the name of the log driver option to set in the container and the full ARN of the Secrets Manager secret containing the sensitive data to present to the container.
The following is a snippet of a task definition showing the format when referencing an Secrets Manager secret.

```json
{
    "containerDefinitions": [{
        "logConfiguration": [{
            "logDriver": "splunk",
            "options": {
                "splunk-url": "https://cloud.splunk.com:8080"
            },
            "secretOptions": [{
                "name": "splunk-token",
                "valueFrom": "arn:aws:secretsmanager:region:aws_account_id:secret:secret_name-AbCdEf"
            }]
        }]
    }
}
```

## Creating an AWS Secrets Manager secret

You can use the Secrets Manager console to create a secret for your sensitive data. For more information, see Creating a Basic Secret in the AWS Secrets Manager User Guide.

### To create a basic secret

Use Secrets Manager to create a secret for your sensitive data.

2. Choose Store a new secret.
3. For Select secret type, choose Other type of secrets.
4. Specify the details of your custom secret as Key and Value pairs. For example, you can specify a key of UserName, and then supply the appropriate user name as its value. Add a second key with the name of Password and the password text as its value. You could also add entries for a database name, server address, TCP port, and so on. You can add as many pairs as you need to store the information you require.

   Alternatively, you can choose the Plaintext tab and enter the secret value in any way you like.

5. Choose the AWS KMS encryption key that you want to use to encrypt the protected text in the secret. If you don't choose one, Secrets Manager checks to see if there's a default key for the account, and uses it if it exists. If a default key doesn't exist, Secrets Manager creates one for you automatically. You can also choose Add new key to create a custom CMK specifically for this secret. To create your own AWS KMS CMK, you must have permissions to create CMKs in your account.

6. Choose Next.

7. For Secret name, type an optional path and name, such as `production/MyAwesomeAppSecret` or `development/TestSecret`, and choose Next. You can optionally add a description to help you remember the purpose of this secret later.

   The secret name must be ASCII letters, digits, or any of the following characters: /_+=.@-

8. (Optional) At this point, you can configure rotation for your secret. For this procedure, leave it at Disable automatic rotation and choose Next.

   For information about how to configure rotation on new or existing secrets, see Rotating Your AWS Secrets Manager Secrets.

9. Review your settings, and then choose Store secret to save everything you entered as a new secret in Secrets Manager.
Creating a task definition that references sensitive data

You can use the Amazon ECS console to create a task definition that references a Secrets Manager secret.

To create a task definition that specifies a secret

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation pane, choose task definitions, Create new task definition.
3. On the Select launch type compatibility page, choose the launch type for your tasks and choose Next step.
4. For task definition Name, type a name for your task definition. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.
5. For Task execution role, either select your existing task execution role or choose Create new role to have one created for you. This role authorizes Amazon ECS to pull private images for your task. For more information, see Required IAM permissions for private registry authentication (p. 124).

   Important
   If the Task execution role field does not appear, choose Configure via JSON and manually add the executionRoleArn field to specify your task execution role. The following code shows the syntax:

   "executionRoleArn": "arn:aws:iam::aws_account_id:role/ecsTaskExecutionRole"

6. For each container to create in your task definition, complete the following steps:
   a. Under Container Definitions, choose Add container.
   b. For Container name, type a name for your container. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.
   c. For Image, type the image name or path to your private image. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.
   d. Expand Advanced container configuration.
   e. For sensitive data to inject as environment variables, under Environment, for Environment variables, complete the following fields:
      i. For Key, enter the name of the environment variable to set in the container. This corresponds to the name field in the secrets section of a container definition.
      ii. For Value, choose ValueFrom. For Add value, enter the ARN of the Secrets Manager secret that contains the data to present to your container as an environment variable.
   f. For sensitive data referenced in the log configuration for a container, under Storage and Logging, for Log configuration, complete the following fields:
      i. Clear the Auto-configure CloudWatch Logs option.
      ii. Under Log options, for Key, enter the name of the log configuration option to set.
      iii. For Value, choose ValueFrom. For Add value, enter the full ARN of the Secrets Manager secret that contains the data to present to your log configuration as a log option.
   g. Fill out the remaining required fields and any optional fields to use in your container definitions. More container definition parameters are available in the Advanced container configuration menu. For more information, see Task definition parameters (p. 66).
   h. Choose Add.
7. When your containers are added, choose Create.
Specifying sensitive data using Systems Manager Parameter Store

Amazon ECS enables you to inject sensitive data into your containers by storing your sensitive data in AWS Systems Manager Parameter Store parameters and then referencing them in your container definition.

**Topics**

- Considerations for specifying sensitive data using Systems Manager Parameter Store (p. 132)
- Required IAM permissions for Amazon ECS secrets (p. 132)
- Injecting sensitive data as an environment variable (p. 133)
- Injecting sensitive data in a log configuration (p. 133)
- Creating an AWS Systems Manager Parameter Store parameter (p. 134)
- Creating a Task Definition that References sensitive data (p. 134)

Considerations for specifying sensitive data using Systems Manager Parameter Store

The following should be considered when specifying sensitive data for containers using Systems Manager Parameter Store parameters.

- For tasks that use the Fargate launch type, this feature requires that your task use platform version 1.3.0 or later. For information, see AWS Fargate platform versions (p. 43).
- Sensitive data is injected into your container when the container is initially started. If the secret or Parameter Store parameter is subsequently updated or rotated, the container will not receive the updated value automatically. You must either launch a new task or if your task is part of a service you can update the service and use the **Force new deployment** option to force the service to launch a fresh task.

Required IAM permissions for Amazon ECS secrets

To use this feature, you must have the Amazon ECS task execution role and reference it in your task definition. This allows the container agent to pull the necessary AWS Systems Manager resources. For more information, see Amazon ECS task execution IAM role (p. 290).

To provide access to the AWS Systems Manager Parameter Store parameters that you create, manually add the following permissions as an inline policy to the task execution role. For more information, see Adding and Removing IAM Policies.

- `ssm:GetParameters`—Required if you are referencing a Systems Manager Parameter Store parameter in a task definition.
- `secretsmanager:GetSecretValue`—Required if you are referencing a Secrets Manager secret either directly or if your Systems Manager Parameter Store parameter is referencing a Secrets Manager secret in a task definition.
- `kms:Decrypt`—Required only if your secret uses a custom KMS key and not the default key. The ARN for your custom key should be added as a resource.

The following example inline policy adds the required permissions:

```json
{}
```
Injecting sensitive data as an environment variable

Within your container definition, specify `secrets` with the name of the environment variable to set in the container and the full ARN of the Systems Manager Parameter Store parameter containing the sensitive data to present to the container.

The following is a snippet of a task definition showing the format when referencing a Systems Manager Parameter Store parameter. If the Systems Manager Parameter Store parameter exists in the same Region as the task you are launching, then you can use either the full ARN or name of the parameter. If the parameter exists in a different Region, then the full ARN must be specified.

```json
{
  "containerDefinitions": [
    {
      "secrets": [
        {
          "name": "environment_variable_name",
          "valueFrom": "arn:aws:ssm:region:aws_account_id:parameter/parameter_name"
        }
      ]
    }
  ]
}
```

Injecting sensitive data in a log configuration

Within your container definition, when specifying a `logConfiguration` you can specify `secretOptions` with the name of the log driver option to set in the container and the full ARN of the Systems Manager Parameter Store parameter containing the sensitive data to present to the container.

**Important**

If the Systems Manager Parameter Store parameter exists in the same Region as the task you are launching, then you can use either the full ARN or name of the parameter. If the parameter exists in a different Region, then the full ARN must be specified.

The following is a snippet of a task definition showing the format when referencing a Systems Manager Parameter Store parameter.

```json
{
  "containerDefinitions": [
    {
      "logConfiguration": [
        {
          "logDriver": "fluentd",
          "options": {
            "tag": "fluentd-demo"
          },
          "secretOptions": [
            {
              "name": "fluentd-address",
              "valueFrom": "arn:aws:ssm:region:aws_account_id:parameter/parameter_name"
            }
          ]
        }
      ]
    }
  ]
}
```
Creating an AWS Systems Manager Parameter Store parameter

You can use the AWS Systems Manager console to create a Systems Manager Parameter Store parameter for your sensitive data. For more information, see Walkthrough: Create and Use a Parameter in a Command (Console) in the AWS Systems Manager User Guide.

To create a Parameter Store parameter

2. In the navigation pane, choose Parameter Store, Create parameter.
3. For Name, type a hierarchy and a parameter name. For example, type test/database_password.
4. For Description, type an optional description.
5. For Type, choose String, StringList, or SecureString.

Note

- If you choose SecureString, the KMS Key ID field appears. If you don't provide a KMS CMK ID, a KMS CMK ARN, an alias name, or an alias ARN, then the system uses alias/aws/ssm, which is the default KMS CMK for Systems Manager. To avoid using this key, choose a custom key. For more information, see Use Secure String Parameters in the AWS Systems Manager User Guide.
- When you create a secure string parameter in the console by using the key-id parameter with either a custom KMS CMK alias name or an alias ARN, you must specify the prefix alias/ before the alias. The following is an ARN example:

```
arn:aws:kms:us-east-2:123456789012:alias/MyAliasName
```

The following is an alias name example:

```
alias/MyAliasName
```

6. For Value, type a value. For example, MyFirstParameter. If you chose SecureString, the value is masked as you type.
7. Choose Create parameter.

Creating a Task Definition that References sensitive data

You can use the Amazon ECS console to create a task definition that references a Systems Manager Parameter Store parameter.

To create a task definition that specifies a secret

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation pane, choose task definitions, Create new task definition.
3. On the Select launch type compatibility page, choose the launch type for your tasks and choose Next step.
4. For task definition Name, type a name for your task definition. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.
5. For **Task execution role**, either select your existing task execution role or choose **Create new role** to have one created for you. This role authorizes Amazon ECS to pull private images for your task. For more information, see [Required IAM permissions for private registry authentication](#) (p. 124).

   **Important**
   If the **Task execution role** field does not appear, choose **Configure via JSON** and manually add the **executionRoleArn** field to specify your task execution role. The following code shows the syntax:

   
   ```text
   "executionRoleArn": "arn:aws:iam::aws_account_id:role/ecsTaskExecutionRole"
   ```

6. For each container to create in your task definition, complete the following steps:

   a. Under **Container Definitions**, choose **Add container**.

   b. For **Container name**, type a name for your container. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.

   c. For **Image**, type the image name or path to your private image. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed.

   d. Expand **Advanced container configuration**.

   e. For sensitive data to inject as environment variables, under **Environment**, for **Environment variables**, complete the following fields:

      i. For **Key**, enter the name of the environment variable to set in the container. This corresponds to the **name** field in the **secrets** section of a container definition.

      ii. For **Value**, choose **ValueFrom**. For **Add value**, enter the full ARN of the AWS Systems Manager Parameter Store parameter that contains the data to present to your container as an environment variable.

         **Note**
         If the Systems Manager Parameter Store parameter exists in the same Region as the task you are launching, then you can use either the full ARN or name of the secret. If the parameter exists in a different Region, then the full ARN must be specified.

   f. For secrets referenced in the log configuration for a container, under **Storage and Logging**, for **Log configuration**, complete the following fields:

      i. Clear the **Auto-configure CloudWatch Logs** option.

      ii. Under **Log options**, for **Key**, enter the name of the log configuration option to set.

      iii. For **Value**, choose **ValueFrom**. For **Add value**, enter the name or full ARN of the AWS Systems Manager Parameter Store parameter that contains the data to present to your log configuration as a log option.

         **Note**
         If the Systems Manager Parameter Store parameter exists in the same Region as the task you are launching, then you can use either the full ARN or the name of the secret. If the parameter exists in a different Region, then the full ARN must be specified.

   g. Fill out the remaining required fields and any optional fields to use in your container definitions. More container definition parameters are available in the **Advanced container configuration** menu. For more information, see [Task definition parameters](#) (p. 66).

   h. Choose **Add**.

7. When your containers are added, choose **Create**.
Specifying environment variables

Environment variables can be passed to your containers in the following ways:

- Individually using the `environment` container definition parameter. This maps to the `--env` option to `docker run`.
- In bulk, using the `environmentFiles` container definition parameter to list one or more files containing the environment variables. The file must be hosted in Amazon S3. This maps to the `--env-file` option to `docker run`.

Specifying environment variables in a file enables you to bulk inject environment variables as opposed to specifying them individually. Within your container definition, specify the `environmentFiles` object with a list of Amazon S3 buckets containing your environment variable files. The files must use an `.env` file extension and there is a limit of ten files per task definition.

The following is a snippet of a task definition showing how to specify individual environment variables.

```
{
    "family": "",
    "containerDefinitions": [
        {
            "name": "",
            "image": "",
            ...
            "environment": [
                {
                    "name": "variable",
                    "value": "value"
                }
            ],
            ...
        },
        ...
    ],
    ...
}
```

The following is a snippet of a task definition showing how to specify an environment variable file.

```
{
    "family": "",
    "containerDefinitions": [
        {
            "name": "",
            "image": "",
            ...
            "environmentFiles": [
                {
                    "value": "arn:aws:s3:::s3_bucket_name/envfile_object_name.env",
                    "type": "s3"
                }
            ],
            ...
        },
        ...
    ],
    ...
}
```
Considerations for specifying environment variable files

The following should be considered when specifying an environment variable file in a container definition.

- For Amazon ECS tasks on AWS Fargate, your tasks must use platform version 1.4.0 or later to use this feature. For more information, see AWS Fargate platform versions (p. 43).
- The file must use the .env file extension and UTF-8 encoding.
- Each line in an environment file should contain an environment variable in VARIABLE=VALUE format. Spaces or quotation marks are included as part of the values. Lines beginning with # are treated as comments and are ignored. For more information on the environment variable file syntax, see Declare default environment variables in file.

The following is an example showing the syntax that must be used.

```plaintext
# This is a comment and will be ignored
VARIABLE=VALUE
ENVIRONMENT=PRODUCTION
```

- If there are environment variables specified using the environment parameter in a container definition, they take precedence over the variables contained within an environment file.
- If multiple environment files are specified that contain the same variable, they are processed from the top down. We recommend that you use unique variable names.
- If an environment file is specified as a container override, it is used, and any other environment files specified in a container definition is ignored.

Required IAM permissions

The Amazon ECS task execution role is required to use this feature. This allows the container agent to pull the environment variable file from Amazon S3. For more information, see Amazon ECS task execution IAM role (p. 290).

To provide access to the Amazon S3 objects that you create, manually add the following permissions as an inline policy to the task execution role. Use the Resource parameter to scope the permission to the Amazon S3 buckets that contain the environment variable files. For more information, see Adding and Removing IAM Policies.

- s3:GetObject
- s3:GetBucketLocation

An example inline policy adding the permissions is shown.

```json
{
   "Version": "2012-10-17",
   "Statement": [
       {
           "Effect": "Allow",
           "Action": ["s3:GetObject"],
           "Resource": ["arn:aws:s3:::examplebucket/folder_name/env_file_name"]
       }
   ]
}
```
Example task definitions

This section provides some task definition examples that you can use to start creating your own task definitions. For more information, see Task definition parameters (p. 66) and Creating a task definition (p. 61).

For additional task definition examples, see AWS Sample Task Definitions on GitHub.

Topics

• Example: Webserver (p. 138)
• Example: splunk log driver (p. 139)
• Example: fluentd log driver (p. 139)
• Example: gelf log driver (p. 140)
• Example: Container dependency (p. 140)

Example: Webserver

The following is an example task definition using the Fargate launch type that sets up a web server:

```json
{
    "containerDefinitions": [
        {
            "command": ["/bin/sh -c "echo '<html> <head> <title>Amazon ECS Sample App</title><style>body {margin-top: 40px; background-color: #333;} </style> </head><body> <div style=color:white;text-align:center> <h1>Amazon ECS Sample App</h1> <h2>Congratulations!</h2> <p>Your application is now running on a container in Amazon ECS.</p> </div></body>' > /usr/local/apache2/htdocs/index.html && httpd-foreground"
        ],
        "entryPoint": ["sh", "-c"],
        "essential": true,
        "image": "httpd:2.4",
        "logConfiguration": {
            "logDriver": "awslogs",
            "options": {
                "awslogs-group": "/ecs/fargate-task-definition",
                "awslogs-region": "us-east-1",
                "awslogs-stream-prefix": "ecs"
            }
        },
        "name": "sample-fargate-app"
    }
}
```
Example: splunk log driver

The following example demonstrates how to use the splunk log driver in a task definition that sends the logs to a remote service. The Splunk token parameter is specified as a secret option because it can be treated as sensitive data. For more information, see Specifying sensitive data (p. 125).

```
"containerDefinitions": [{
  "logConfiguration": {
    "logDriver": "splunk",
    "options": {
      "splunk-url": "https://cloud.splunk.com:8080",
      "tag": "tag_name",
    },
    "secretOptions": [{
      "name": "splunk-token",
      "valueFrom": "arn:aws:secretsmanager:region:aws_account_id:secret:splunk-token-KnrBkD"
    }],
  },
  "entryPoint": [],
  "portMappings": [{
    "hostPort": 80,
    "protocol": "tcp",
    "containerPort": 80
  }]
}
```

Example: fluentd log driver

The following example demonstrates how to use the fluentd log driver in a task definition that sends the logs to a remote service. The fluentd-address value is specified as a secret option as it may be treated as sensitive data. For more information, see Specifying sensitive data (p. 125).

```
"containerDefinitions": [{
  "logConfiguration": {
    "logDriver": "fluentd",
    "options": {
      "tag": "fluentd demo"
    },
    "secretOptions": [{
      "name": "fluentd-address",
      "valueFrom": "arn:aws:secretsmanager:region:aws_account_id:secret:fluentd-address-KnrBkD"
    }],
  },
  "entryPoint": [],
  "portMappings": [{
    "hostPort": 80,
    "protocol": "tcp",
    "containerPort": 80
  }]
}
```
Example: *gelf* log driver

The following example demonstrates how to use the *gelf* log driver in a task definition that sends logs to a remote host running Logstash that takes Gelf logs as an input. For more information, see `logConfiguration` (p. 77).

```json
{
  "containerDefinitions": [{
    "logConfiguration": {
      "logDriver": "gelf",
      "options": {
        "gelf-address": "udp://logstash-service-address:5000",
        "tag": "gelf task demo"
      }
    },
    "entryPoint": [],
    "portMappings": [{
      "hostPort": 5000,
      "protocol": "udp",
      "containerPort": 5000
    },
    { "hostPort": 5000,
      "protocol": "tcp",
      "containerPort": 5000
  }
  ]
}
}
```

Example: Container dependency

This example demonstrates the syntax for a task definition with multiple containers where container dependency is specified. In the following task definition, the *envoy* container must reach a healthy status, determined by the required container healthcheck parameters, before the *app* container will start. For more information, see `Container dependency` (p. 83).

```json
{
  "family": "appmesh-gateway",
  "proxyConfiguration": {
    "type": "APPMESH",
    "containerName": "envoy",
    "properties": [{
      "name": "IgnoredUID",
      "value": "1337"
    },
    { "name": "ProxyIngressPort",
      "value": "15000"
    },
    { "name": "ProxyEgressPort",
      "value": "15001"
  }
  }
}
```
Updating a task definition

To update a task definition, create a task definition revision. If the task definition is used in a service, you must update that service to use the updated task definition.
To create a task definition revision

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. From the navigation bar, choose the Region that contains your task definition.
3. In the navigation pane, choose task definitions.
4. On the task definitions page, select the box to the left of the task definition to revise and choose Create new revision.
5. On the Create new revision of task definition page, make changes. For example, to change the existing container definitions (such as the container image, memory limits, or port mappings), select the container, make the changes, and then choose Update.
6. Verify the information and choose Create.
7. If your task definition is used in a service, update your service with the updated task definition. For more information, see Updating a service (p. 182).

Deregistering task definition revisions

If you decide that you no longer need a specific task definition revision in Amazon ECS, you can deregister the task definition revision so that it no longer displays in your ListTaskDefinition API calls or in the console when you want to run a task or update a service.

When you deregister a task definition revision, it is immediately marked as INACTIVE. Existing tasks and services that reference an INACTIVE task definition revision continue to run without disruption. Existing services that reference an INACTIVE task definition revision can still scale up or down by modifying the service's desired count.

You can't use an INACTIVE task definition revision to run new tasks or create new services. You also can't update an existing service to reference an INACTIVE task definition revision (even though there may be up to a 10-minute window following deregistration where these restrictions have not yet taken effect).

**Note**
At this time, INACTIVE task definition revisions remain discoverable in your account indefinitely. However, this behavior is subject to change in the future. Therefore, you should not rely on INACTIVE task definition revisions persisting beyond the lifecycle of any associated tasks and services.

Use the following procedure to deregister a task definition revision.

To deregister a task definition revision

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. From the navigation bar, choose the region that contains your task definition.
3. In the navigation pane, choose task definitions.
4. On the task definitions page, choose the task definition family that contains one or more revisions that you want to deregister.
5. On the task definition Name page, select the box to the left of each task definition revision you want to deregister.
6. Choose Actions, Deregister.
7. Verify the information in the Deregister task definition window, and choose Deregister to finish.
Account settings

Amazon ECS provides account settings, which provide a way to opt in or out of specific features. For each Region, you can opt in to or opt out of each account setting at the account level or for a specific IAM user or role.

The following are supported scenarios:

- An IAM user or role can opt in or opt out for their individual user account.
- An IAM user or role can set the default opt in or opt out setting for all users on the account.
- The root user can opt in to or opt out of any specific IAM role or user on the account. If the account setting for the root user is changed, it sets the default for all the IAM users and roles for which no individual account setting has been selected.

**Note**
Federated users assume the account setting of the root user and can't have explicit account settings set for them.

The following account settings are available. The opt in and opt out option must be selected for each account setting separately.

**Amazon Resource Names (ARNs) and IDs**

Resource names: serviceLongArnFormat, taskLongArnFormat, and containerInstanceLongArnFormat

Amazon ECS is introducing a new format for Amazon Resource Names (ARNs) and resource IDs for Amazon ECS services, tasks, and container instances. The opt-in status for each resource type determines the ARN format the resource uses. You must opt-in to the new ARN format to use features such as resource tagging for that resource type. For more information, see Amazon Resource Names (ARNs) and IDs (p. 144).

Only resources launched after opting in receive the new ARN and resource ID format. All existing resources are not affected. In order for Amazon ECS services and tasks to transition to the new ARN and resource ID formats, the service or task must be re-created. To transition a container instance to the new ARN and resource ID format, the container instance must be drained and a new container instance registered to the cluster.

**Note**
Tasks launched by an Amazon ECS service can only receive the new ARN and resource ID format if the service was created on or after November 16, 2018, and the IAM user who created the service has opted in to the new format for tasks.

**CloudWatch Container Insights**

Resource name: containerInsights

CloudWatch Container Insights collects, aggregates, and summarizes metrics and logs from your containerized applications and microservices. The metrics include utilization for resources such as CPU, memory, disk, and network. Container Insights also provides diagnostic information, such as container restart failures, to help you isolate issues and resolve them quickly. You can also set CloudWatch alarms on metrics that Container Insights collects. For more information, see Amazon ECS CloudWatch Container Insights (p. 249).
When you opt in to the containerInsights account setting, all new clusters have Container Insights enabled by default. You can disable this setting for specific clusters when you create them. You can also change this setting by using the UpdateClusterSettings API.

**Dual-stack VPC IPv6**

Resource name: dualStackIPv6

Amazon ECS supports providing tasks with an IPv6 address in addition to the primary private IPv4 address.

For tasks to receive an IPv6 address, the task must use the awsvpc network mode, must be launched in a VPC configured for dual-stack mode, and the dualStackIPv6 account setting must be enabled. For more information on other requirements, see Using a VPC in dual-stack mode (p. 106).

**Important**
The dualStackIPv6 account setting can only be changed using either the Amazon ECS API or the AWS CLI. For more information, see Modifying account settings (p. 146).

If you had a running task using the awsvpc network mode in an IPv6 enabled subnet between the dates of October 1, 2020 and November 2, 2020, the default dualStackIPv6 account setting in the Region the task was running in is disabled. If that condition is not met, the default dualStackIPv6 setting in the Region is enabled.

**Topics**
- Amazon Resource Names (ARNs) and IDs (p. 144)
- ARN and resource ID format timeline (p. 145)
- Viewing account settings (p. 145)
- Modifying account settings (p. 146)

**Amazon Resource Names (ARNs) and IDs**

When Amazon ECS resources are created, each resource is assigned a unique Amazon Resource Name (ARN) and resource identifier (ID). If you are using a command line tool or the Amazon ECS API to work with Amazon ECS, resource ARNs or IDs are required for certain commands. For example, if you are using the stop-task AWS CLI command to stop a task, you must specify the task ARN or ID in the command.

The ability to opt in to and opt out of the new Amazon Resource Name (ARN) and resource ID format is provided on a per-Region basis. Currently, any new account created is opted in by default.

You can opt in or opt out of the new Amazon Resource Name (ARN) and resource ID format at any time. After you have opted in, any new resources that you create use the new format.

**Note**
A resource ID does not change after it's created. Therefore, opting in or out of the new format does not affect your existing resource IDs.

The following sections describe how ARN and resource ID formats are changing. For more information on the transition to the new formats, see Amazon Elastic Container Service FAQ.

**Amazon Resource Name (ARN) format**

Some resources have a user-friendly name, such as a service named production. In other cases, you must specify a resource using the Amazon Resource Name (ARN) format. The new ARN format for Amazon ECS tasks, services, and container instances includes the cluster name. For information about opting in to the new ARN format, see Modifying account settings (p. 146).
The following table shows both the current (old) format and the new format for each resource type.

<table>
<thead>
<tr>
<th>Resource type</th>
<th>ARN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>container-instance-id</td>
</tr>
<tr>
<td></td>
<td>New: arn:aws:ecs:region:aws_account_id:container-instance/cluster-</td>
</tr>
<tr>
<td></td>
<td>name/container-instance-id</td>
</tr>
<tr>
<td>Amazon ECS service</td>
<td>Old: arn:aws:ecs:region:aws_account_id:service/service-name</td>
</tr>
<tr>
<td></td>
<td>New: arn:aws:ecs:region:aws_account_id:service/cluster-name/service-</td>
</tr>
<tr>
<td></td>
<td>name/service-name</td>
</tr>
<tr>
<td>Amazon ECS task</td>
<td>Old: arn:aws:ecs:region:aws_account_id:task/task-id</td>
</tr>
<tr>
<td></td>
<td>New: arn:aws:ecs:region:aws_account_id:task/cluster-name/task-id</td>
</tr>
</tbody>
</table>

**Resource ID length**

A resource ID takes the form of a unique combination of letters and numbers. New resource ID formats include shorter IDs for Amazon ECS tasks and container instances. The old resource ID format was 36 characters long. The new IDs are in a 32-character format that does not include any hyphens. For information about opting in to the new resource ID format, see Modifying account settings (p. 146).

**ARN and resource ID format timeline**

There is a timeline for the opt-in and opt-out periods for the new Amazon Resource Name (ARN) and resource ID format for Amazon ECS resources. The ARN and resource ID is set at the time of creation and does not change after that. Therefore, opting in or out of the new format does not affect the ARN or resource ID of your existing resources.

The following are the important dates related to this change.

- From now until September 30, 2020 – The ability to opt in to and opt out of the new Amazon Resource Name (ARN) and resource IDs is provided on a per-Region basis. Any new accounts created are opted out by default.
- October 1, 2020 - March 31, 2021 – All new accounts are opted in to the new format by default. Any existing accounts that have not explicitly opted out of the new format are also opted in. The ability to opt in and opt out continues to be available on a per-Region basis.
- April 1, 2021 – All accounts will be opted in by default. All new resources created will receive the new format. The ability to opt out will no longer be available.

You can modify your opt-in setting for the new Amazon Resource Name (ARN) and resource ID format at any time between now and April 1, 2021. After you have opted in, any new resources that you create use the new format.

**Viewing account settings**

You can use the AWS Management Console and AWS CLI tools to view your account settings.
Modifying account settings

You can use the AWS Management Console and AWS CLI tools to modify your account settings.

To modify account settings (Console)
1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation bar at the top of the screen, select the Region for which to modify your account settings.
3. From the dashboard, choose Account Settings.
4. On the Amazon ECS ARN and resource ID settings and CloudWatch Container Insights sections, you can select or deselect the check boxes for each account setting for the authenticated IAM user and role. Choose Save once finished.

Important
IAM users and IAM roles need the ecs:PutAccountSetting permission to perform this action.
5. On the confirmation screen, choose Confirm to save the selection.
To modify the default account settings for all IAM users or roles on your account (AWS CLI)

Use one of the following commands to modify the default account setting for all IAM users or roles on your account. These changes apply to the entire AWS account unless an IAM user or role explicitly overrides these settings for themselves.

- **put-account-setting-default** (AWS CLI)

  ```bash
  aws ecs put-account-setting-default --name serviceLongArnFormat --value enabled --region us-east-2
  ```

  You can also use this command to modify other account settings. To do this, replace the `name` parameter with the corresponding account setting.

- **Write-ECSAccountSetting** (AWS Tools for Windows PowerShell)

  ```powershell
  Write-ECSAccountSettingDefault -Name serviceLongArnFormat -Value enabled -Region us-east-1 -Force
  ```

To modify the account settings for your IAM user account (AWS CLI)

Use one of the following commands to modify the account settings for your IAM user. If you’re using these commands as the root user, changes apply to the entire AWS account unless an IAM user or role explicitly overrides these settings for themselves.

- **put-account-setting** (AWS CLI)

  ```bash
  aws ecs put-account-setting --name serviceLongArnFormat --value enabled --region us-east-1
  ```

  You can also use this command to modify other account settings. To do this, replace the `name` parameter with the corresponding account setting.

- **Write-ECSAccountSetting** (AWS Tools for Windows PowerShell)

  ```powershell
  Write-ECSAccountSetting -Name serviceLongArnFormat -Value enabled -Force
  ```

To modify the account settings for a specific IAM user or IAM role (AWS CLI)

Use one of the following commands and specify the ARN of an IAM user, IAM role, or root user in the request to modify the account settings for a specific IAM user or IAM role.

- **put-account-setting** (AWS CLI)

  ```bash
  aws ecs put-account-setting --name serviceLongArnFormat --value enabled --principal-arn arn:aws:iam::aws_account_id:user/principalName --region us-east-1
  ```

  You can also use this command to modify other account settings. To do this, replace the `name` parameter with the corresponding account setting.

- **Write-ECSAccountSetting** (AWS Tools for Windows PowerShell)

  ```powershell
  Write-ECSAccountSetting -Name serviceLongArnFormat -Value enabled -PrincipalArn arn:aws:iam::aws_account_id:user/principalName -Region us-east-1 -Force
  ```
Scheduling Amazon ECS tasks

Amazon Elastic Container Service (Amazon ECS) is a shared state, optimistic concurrency system that provides flexible scheduling capabilities for your tasks and containers. The Amazon ECS schedulers leverage the same cluster state information provided by the Amazon ECS API to make appropriate placement decisions.

Each task that uses the Fargate launch type has its own isolation boundary and does not share the underlying kernel, CPU resources, memory resources, or elastic network interface with another task.

Amazon ECS provides a service scheduler (for long-running tasks and applications), the ability to run tasks manually (for batch jobs or single run tasks), with Amazon ECS placing tasks on your cluster for you. You can specify task placement strategies and constraints that allow you to run tasks in the configuration you choose, such as spread out across Availability Zones. It is also possible to integrate with custom or third-party schedulers.

Service scheduler

The service scheduler is ideally suited for long running stateless services and applications. The service scheduler ensures that the scheduling strategy you specify is followed and reschedules tasks when a task fails (for example, if the underlying infrastructure fails for some reason).

There are two service scheduler strategies available:

- **REPLICA**—The replica scheduling strategy places and maintains the desired number of tasks across your cluster. By default, the service scheduler spreads tasks across Availability Zones. You can use task placement strategies and constraints to customize task placement decisions. For more information, see Replica (p. 158).

- **DAEMON**—The daemon scheduling strategy deploys exactly one task on each active container instance that meets all of the task placement constraints that you specify in your cluster. The service scheduler evaluates the task placement constraints for running tasks and will stop tasks that do not meet the placement constraints. When using this strategy, there is no need to specify a desired number of tasks, a task placement strategy, or use Service Auto Scaling policies. For more information, see Daemon in the Amazon Elastic Container Service Developer Guide.

  **Note**

  Fargate tasks do not support the DAEMON scheduling strategy.

The service scheduler optionally also makes sure that tasks are registered against an Elastic Load Balancing load balancer. You can update your services that are maintained by the service scheduler, such as deploying a new task definition, or changing the running number of desired tasks. By default, the service scheduler spreads tasks across Availability Zones, but you can use task placement strategies and constraints to customize task placement decisions. For more information, see Amazon ECS services (p. 157).

Manually running tasks

The RunTask action is ideally suited for processes such as batch jobs that perform work and then stop. For example, you could have a process call RunTask when work comes into a queue. The task pulls work from the queue, performs the work, and then exits. Using RunTask, you can allow the default task placement strategy to distribute tasks randomly across your cluster, which minimizes the chances that a single instance gets a disproportionate number of tasks. Alternatively, you can use RunTask to customize how the scheduler places tasks using task placement strategies and constraints. For more information, see Run a standalone task (p. 149) and RunTask in the Amazon Elastic Container Service API Reference.

Running tasks on a cron-like schedule
If you have tasks to run at set intervals in your cluster, such as a backup operation or a log scan, you can use the Amazon ECS console to create a CloudWatch Events rule that runs one or more tasks in your cluster at specified times. Your scheduled event rule can be set to either a specific interval (run every $N$ minutes, hours, or days), or for more complicated scheduling, you can use a `cron` expression. For more information, see Scheduled tasks (cron) (p. 152).

**Contents**
- Run a standalone task (p. 149)
- Scheduled tasks (cron) (p. 152)
- Task retirement (p. 154)
- Fargate task recycling (p. 156)

## Run a standalone task

Deploying your application as a standalone task is ideal in certain situations. For example, suppose that you are developing an application but you are not ready to deploy it with the service scheduler. Perhaps your application is a one-time or periodic batch job that does not make sense to keep running or restart when it finishes.

To deploy your application so that it is running continually or to place it behind a load balancer, create an Amazon ECS service. For more information, see Amazon ECS services (p. 157).

To run a standalone task use one of the following procedures.

### New console

To create a standalone task using the new console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/v2.
2. In the navigation pane, choose **Clusters**.
3. On the **Clusters** page, select the cluster to run the standalone task in.
4. From the **Tasks** tab, choose **Deploy**.
5. The **Compute configuration** section can be expanded to change the compute option for your service to use. By default, the console will select a compute option for you so in most cases you can go to the next step. The following describes the order that the console uses to select a default:

   - If your cluster has a default capacity provider strategy defined, it will be selected.
   - If your cluster doesn’t have a default capacity provider strategy defined but you do have the Fargate capacity providers added to the cluster, a custom capacity provider strategy using the FARGATE capacity provider will be selected.
   - If your cluster doesn’t have a default capacity provider strategy defined but you do have one or more Auto Scaling group capacity providers added to the cluster, the **Use custom (Advanced)** option is selected and you will need to manually define the strategy.
   - If your cluster doesn’t have a default capacity provider strategy defined and no capacity providers added to the cluster, the Fargate launch type is selected.

6. For **Application type**, select **Task**.
7. For **Task definition**, choose the task definition family and revision to use.

   **Important**
   The console validates that the selected task definition family and revision is compatible with the defined compute configuration. If you receive a warning, verify both your task definition compatibility and the compute configuration selected.

8. For **Desired tasks**, specify the number of tasks to launch.
Run a standalone task

9. The **Networking** section can be expanded to define the network configuration for the tasks. By default, the console selects the default Amazon VPC along with all subnets and the default security group within the default Amazon VPC. Use the following steps to specify a custom configuration.
   
   a. For **VPC**, select the VPC to use.
   
   b. For **Subnets**, select one or more subnets in the VPC that the task scheduler should consider when placing your tasks.
   
   c. For **Security group**, you can either select an existing security group or create a new one. To use an existing security group, select the security group and move to the next step. To create a new security group, choose **Create a new security group**. You must specify a security group name, description, and then add one or more inbound rules for the security group.
   
   d. For **Public IP**, choose whether to auto-assign a public IP address to the elastic network interface (ENI) of the task. Tasks that are launched on AWS Fargate can be assigned a public IP address when run using a public subnet so they have a route to the internet. For more information, see Fargate task networking in the *Amazon Elastic Container Service User Guide for AWS Fargate*.
   
10. (Optional) The **Tags** section can be expanded to add tags, in the form of key-value pairs, to the service.

Old console

To create a standalone task using the old console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation pane, choose **Task Definitions** and select the task definition to run.
   
   • To run the latest revision of a task definition shown here, select the box to the left of the task definition to run.
   
   • To run an earlier revision of a task definition shown here, select the task definition to view all active revisions, then select the revision to run.
3. Choose **Actions**, Run Task.
4. On the Run Task page, complete the following steps.
   
   a. Choose either a capacity provider strategy or a launch type.
      
      • To use a **Capacity provider strategy**, choose Switch to capacity provider strategy and then choose whether your task should use the default capacity provider strategy defined for the cluster or a custom capacity provider strategy. A capacity provider must already be associated with the cluster in order to be used in a custom capacity provider strategy. For more information, see Amazon ECS capacity providers (p. 49).
      
      • To use a **Launch type**, choose Switch to launch type and select FARGATE. For more information about launch types, see Amazon ECS launch types (p. 93).
   
   b. For **Platform version**, choose the platform version to run your task on. For more information about platform versions, see AWS Fargate platform versions (p. 43).
   
   c. For **Cluster**, choose the cluster to use.
   
   d. For **Number of tasks**, type the number of tasks to launch with this task definition.
   
   e. For **Task group**, type the name of the task group.
5. In the **VPC and security groups** section, complete the following steps:
   
   a. For **Cluster VPC**, choose the VPC for your tasks to use. Ensure that the VPC that you choose is not configured to require dedicated hardware tenancy, as that is not supported by Fargate tasks.
b. For **Subnets**, choose the available subnets for your task.

c. For **Security groups**, a security group has been created for your task that allows HTTP traffic from the internet (0.0.0.0/0). To edit the name or the rules of this security group, or to choose an existing security group, choose **Edit** and then modify your security group settings.

d. For **Auto-assign public IP**, choose **ENABLED** if you want the elastic network interface attached to the Fargate task to be assigned a public IP address. This is required if your task needs outbound network access, for example to pull an image. If outbound network access is not required, then you can choose **DISABLED**.

6. In the **Advanced Options** section, complete the following steps:

   • (Optional) To send command, environment variable, task IAM role, or task execution role overrides to one or more containers in your task definition, choose **Advanced Options** and complete the following steps:

     **Note**
     If you will be using the parameter values from your task definition there is no need to specify overrides. These fields are only used to override the values specified in the task definition.

     i. For **Task Role Override**, choose an IAM role for this task to override the task IAM role specified in the task definition. For more information, see **IAM Roles for Tasks (p. 294)**.

     Only roles with the `ecs-tasks.amazonaws.com` trust relationship are shown here. For more information about creating an IAM role for your tasks, see **Creating an IAM Role and Policy for your Tasks (p. 295)**.

     ii. For **Task Execution Role Override**, choose a task execution role to override the task execution role specified in the task definition. For more information, see **Amazon ECS task execution IAM role (p. 290)**.

     iii. For **Container Overrides**, choose a container to which to send a command or environment variable override.

       • For a **command override**: For **Command override**, type the command override to send. If your container definition does not specify an **ENTRYPOINT**, the format should be a comma-separated list of non-quoted strings. For example:

         ```bash
         /bin/sh,-c,echo,$DATE
         ```

         If your container definition does specify an **ENTRYPOINT** (such as `sh,-c`), the format should be an unquoted string, which is surrounded with double quotes and passed as an argument to the **ENTRYPOINT** command. For example:

         ```bash
         while true; do echo $DATE > /var/www/html/index.html; sleep 1; done
         ```

       • For **environment variable overrides**: Choose **Add Environment Variable**. For **Key**, type the name of your environment variable. For **Value**, type a string value for your environment value (without surrounding quotes).

         ![Add Environment Variable](image)
This environment variable override is sent to the container as:

```
MY_ENV_VAR="This variable contains a string."
```

7. In the **Task tagging configuration** section, complete the following steps:
   a. Select **Enable ECS managed tags** if you want Amazon ECS to automatically tag each task with the Amazon ECS managed tags. For more information, see Tagging Your Amazon ECS Resources.
   b. For **Propagate tags from**, select one of the following:
      - **Do not propagate** – This option will not propagate any tags.
      - **Task Definitions** – This option will propagate the tags specified in the task definition to the task.

      **Note**
      If you specify a tag with the same key in the Tags section, it will override the tag propagated from the task definition.

8. In the **Tags** section, specify the key and value for each tag to associate with the task. For more information, see Tagging Your Amazon ECS Resources.

9. Review your task information and choose **Run Task**.

   **Note**
   If your task moves from **PENDING** to **STOPPED**, or if it displays a **PENDING** status and then disappears from the listed tasks, your task may be stopping due to an error. For more information, see Checking stopped tasks for errors (p. 369) in the troubleshooting section.

---

**Scheduled tasks (cron)**

Amazon ECS supports the ability to schedule tasks on either a **cron**-like schedule or in a response to CloudWatch Events. This is supported for Amazon ECS tasks using both the Fargate and EC2 launch types.

If you have tasks to run at set intervals in your cluster, such as a backup operation or a log scan, you can use the Amazon ECS console to create a CloudWatch Events rule that runs one or more tasks in your cluster at the specified times. Your scheduled event rule can be set to either a specific interval (run every \( N \) minutes, hours, or days), or for more complicated scheduling, you can use a **cron** expression. For more information, see Schedule Expressions for Rules in the Amazon CloudWatch Events User Guide.

You can also now set your Fargate tasks as a task target in CloudWatch Events, allowing you to launch tasks in response to changes that happen. Additionally, you can modify the network configuration when using the **awsvpc** network mode via the CloudWatch Events console and AWS CLI, giving Fargate tasks triggered by CloudWatch Events the same networking properties as Amazon EC2 instances. For more information, see Tutorial: Run an Amazon ECS Task When a File is Uploaded to an Amazon S3 Bucket in the Amazon CloudWatch Events User Guide.

**Note**
This feature is not yet available for Fargate tasks in the following Regions:

<table>
<thead>
<tr>
<th>Region Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>China (Beijing)</td>
<td>cn-north-1</td>
</tr>
</tbody>
</table>
Creating a scheduled task

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. Choose the cluster in which to create your scheduled task. If you do not have any clusters, see Creating a cluster (p. 49) for steps on creating a new cluster.
4. For Schedule rule name, enter a unique name for your schedule rule. Up to 64 letters, numbers, periods, hyphens, and underscores are allowed.
5. (Optional) For Schedule rule description, enter a description for your rule. Up to 512 characters are allowed.
6. For Schedule rule type, choose whether to use a fixed interval schedule or a cron expression for your schedule rule. For more information, see Schedule Expressions for Rules in the Amazon CloudWatch Events User Guide.
   - For Run at fixed interval, enter the interval and unit for your schedule.
   - For Cron expression, enter the cron expression for your task schedule. These expressions have six required fields, and fields are separated by white space. For more information, and examples of cron expressions, see Cron Expressions in the Amazon CloudWatch Events User Guide.
7. Create a target for your schedule rule.
   a. For Target id, enter a unique identifier for your target. Up to 64 letters, numbers, periods, hyphens, and underscores are allowed.
   b. For Launch type, choose the launch type for the tasks in your service. For more information, see Amazon ECS launch types (p. 93).
   c. For Task definition, choose the family and revision (family:revision) of the task definition to run for this target.
   d. For Platform version, choose the platform version to use for this target. For more information, see AWS Fargate platform versions (p. 43).

   **Note**
   Platform versions are only applicable to tasks that use the Fargate launch type.
   e. For Number of tasks, enter the number of instantiations of the specified task definition to run on your cluster when the rule executes.
   f. (Optional) For Task role override, choose the IAM role to use for the task in your target, instead of the task definition default. For more information, see IAM Roles for Tasks (p. 294). Only roles with the Amazon EC2 Container Service Task Role trust relationship are shown here. For more information about creating an IAM role for your tasks, see Creating an IAM Role and Policy for your Tasks (p. 295). You must add iam:PassRole permissions for any task role and task role overrides to the CloudWatch IAM role. For more information, see Amazon ECS CloudWatch Events IAM Role (p. 301).
   g. If your scheduled task's task definition uses the awsvpc network mode, you must configure a VPC, subnet, and security group settings for your scheduled task. For more information, see Fargate Task Networking in the Amazon Elastic Container Service User Guide for AWS Fargate.
      i. For Cluster VPC, if you selected the EC2 launch type, choose the VPC in which your container instances reside. If you selected the Fargate launch type, select the VPC that
the Fargate tasks should use. Ensure that the VPC you choose is not configured to require dedicated hardware tenancy as that is not supported by Fargate tasks.

ii. For **Subnets**, choose the available subnets for your scheduled task placement.

**Important**
Only private subnets are supported for the `awsvpc` network mode. Because tasks do not receive public IP addresses, a NAT gateway is required for outbound internet access, and inbound internet traffic should be routed through a load balancer.

iii. For **Security groups**, a security group has been created for your scheduled tasks, which allows HTTP traffic from the internet (0.0.0.0/0). To edit the name or the rules of this security group, or to choose an existing security group, choose **Edit** and then modify your security group settings.

iv. For **Auto-assign Public IP**, choose whether to have your tasks receive a public IP address. If you are using Fargate tasks, a public IP address must be assigned to the task's elastic network interface, with a route to the internet, or a NAT gateway that can route requests to the internet. This allows the task to pull container images.

h. For **CloudWatch Events IAM role for this target**, choose an existing CloudWatch Events service role (`ecsEventsRole`) that you may have already created. Or, choose **Create new role** to create the required IAM role that allows CloudWatch Events to make calls to Amazon ECS to run tasks on your behalf. For more information, see Amazon ECS CloudWatch Events IAM Role (p. 301).

**Important**
If your scheduled tasks require the use of the task execution role, a task role, or if they use a task role override, then you must add `iam:PassRole` permissions for your task execution role, task role, or task role override to the CloudWatch IAM role. For more information, see Amazon ECS CloudWatch Events IAM Role (p. 301).

i. (Optional) In the **Container overrides** section, you can expand individual containers and override the command and/or environment variables for that container that are defined in the task definition.

8. (Optional) To add additional targets (other tasks to run when this rule is executed), choose **Add targets** and repeat the previous substeps for each additional target.

9. Choose **Create**.

**To edit a scheduled task**

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. Choose the cluster in which to edit your scheduled task.
3. On the **Cluster: cluster-name** page, choose **Scheduled Tasks**.
4. Select the box to the left of the schedule rule to edit, and choose **Edit**.
5. Edit the fields to update and choose **Update**.

---

**Task retirement**

Amazon ECS task retirement affects tasks of both Fargate and EC2 launch types and you will be notified by email of the pending retirement.

A task can be scheduled for retirement in the following scenarios:

- AWS detects the irreparable failure of the underlying hardware hosting the task.
- Your task uses the Fargate launch type and is running on a platform version that has a security vulnerability that requires you to replace the tasks by launching new tasks using a patched platform version.
If your task is scheduled for retirement, you receive an email before the event with the task ID and retirement date. This email is sent to the address that's associated with your account, the same email address that you use to log in to the AWS Management Console. If you use an email account that you do not check regularly, then you can use the AWS Personal Health Dashboard to determine if any of your tasks are scheduled for retirement. To update the contact information for your account, go to the Account Settings page.

When a task reaches its scheduled retirement date, it is stopped or terminated by AWS. If the task is part of a service, then the task is automatically stopped and the service scheduler launches a new one to replace it. If you are using standalone tasks, then you receive notification of the task retirement and must launch new tasks to replace them.

Working with tasks scheduled for retirement

If the task is part of a service, then the task is automatically stopped. The service scheduler starts a new one to replace it after it reaches its scheduled retirement date. If you would like to update your service tasks before the retirement date, you can use the following steps. For more information, see Updating a service (p. 182).

To update a running service (AWS Management Console)

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. On the navigation bar, select the Region that your cluster is in.
3. In the navigation pane, choose Clusters.
4. On the Clusters page, select the name of the cluster in which your service resides.
6. Check the box to the left of the service to update and choose Update.
7. On the Configure service page, your service information is pre-populated. Select Force new deployment and choose Next step.
   
   **Note**
   For tasks using the Fargate launch type, forcing a new deployment launches new tasks using the patched platform version. Your tasks do not require you select a different platform version. For more information, see AWS Fargate platform versions (p. 43).

9. Choose Update Service to finish and update your service.

To update a running service (AWS CLI)

1. Obtain the ARN for the service.

   ```
   aws ecs list-services --cluster cluster_name --region region
   ```

   Output:

   ```
   {
   "serviceArns": [
   "arn:aws:ecs:region:aws_account_id:service/MyService"
   ]
   }
   ```

2. Update your service, forcing a new deployment that deploys new tasks.
Fargate task recycling

When AWS determines that a security or infrastructure update is needed for an Amazon ECS task hosted on AWS Fargate, it will apply the necessary patches for the task. Most of these patches will be transparent and the task won't need to be stopped, but on occasion it is necessary for the task to be recycled. Beginning with Fargate platform version 1.3.0, any Fargate tasks launched as part of a service may be stopped and a new one started by the Amazon ECS service scheduler in order to provide the best possible security and availability for the task. The service scheduler will ensure that the desired task count for your service will be maintained.

To prepare for this process, we recommending testing your application behavior by simulating this scenario. You can do this by stopping an individual task in your service to test for resiliency.

**Note**

Amazon ECS doesn't send a notification prior to the recycling event.
Amazon ECS services

An Amazon ECS service allows you to run and maintain a specified number of instances of a task definition simultaneously in an Amazon ECS cluster. If any of your tasks should fail or stop for any reason, the Amazon ECS service scheduler launches another instance of your task definition to replace it in order to maintain the desired number of tasks in the service.

In addition to maintaining the desired number of tasks in your service, you can optionally run your service behind a load balancer. The load balancer distributes traffic across the tasks that are associated with the service.

Topics
• Service scheduler concepts (p. 157)
• Additional service concepts (p. 158)
• Service definition parameters (p. 158)
• Creating a service (p. 170)
• Updating a service (p. 182)
• Deleting a service (p. 185)
• Amazon ECS Deployment types (p. 186)
• Service load balancing (p. 197)
• Service Auto Scaling (p. 209)
• Service Discovery (p. 217)
• Service throttle logic (p. 220)

Service scheduler concepts

The service scheduler is ideally suited for long running stateless services and applications. The service scheduler ensures that the scheduling strategy you specify is followed and reschedules tasks when a task fails (for example, if the underlying infrastructure fails for some reason). Task placement strategies and constraints can be used to customize how the scheduler places and terminates tasks. If a task in a service stops, the scheduler launches a new task to replace it. This process continues until your service reaches the number of desired running tasks based on the scheduling strategy (also referred to as the service type) that the service uses.

The service scheduler includes logic that throttles how often tasks are restarted if they repeatedly fail to start. If a task is stopped without having entered a RUNNING state, determined by the task having a startedAt time stamp, the service scheduler starts to incrementally slow down the launch attempts and emits a service event message. This behavior prevents unnecessary resources from being used for failed tasks, giving you a chance to resolve the issue. After the service is updated, the service scheduler resumes normal behavior. For more information, see Service throttle logic (p. 220) and Service event messages (p. 374).

There are two service scheduler strategies available:

• REPLICA—The replica scheduling strategy places and maintains the desired number of tasks across your cluster. By default, the service scheduler spreads tasks across Availability Zones. You can use task placement strategies and constraints to customize task placement decisions. For more information, see Replica (p. 158).
• DAEMON—The daemon scheduling strategy deploys exactly one task on each active container instance that meets all of the task placement constraints that you specify in your cluster. The service scheduler
evaluates the task placement constraints for running tasks and will stop tasks that do not meet the placement constraints. When using this strategy, there is no need to specify a desired number of tasks, a task placement strategy, or use Service Auto Scaling policies. For more information, see Daemon in the Amazon Elastic Container Service Developer Guide.

Note
Fargate tasks do not support the DAEMON scheduling strategy.

Replica

The replica scheduling strategy places and maintains the desired number of tasks in your cluster.

When creating a service that runs tasks on Fargate, when the service scheduler launches new tasks or stops running tasks, it attempts to maintain balance across Availability Zones. There is no need to specify task placement strategies or restraints.

Additional service concepts

- You can optionally run your service behind a load balancer. For more information, see Service load balancing (p. 197).
- You can optionally specify a deployment configuration for your service. A deployment is triggered by updating the task definition or desired count of a service. During a deployment, the service scheduler uses the minimum healthy percent and maximum percent parameters to determine the deployment strategy. For more information, see Service definition parameters (p. 158).
- You can optionally configure your service to use Amazon ECS service discovery. Service discovery uses Amazon Route 53 auto naming APIs to manage DNS entries for your service's tasks, making them discoverable within your VPC. For more information, see Service Discovery (p. 217).
- When you delete a service, if there are still running tasks that require cleanup, the service status moves from ACTIVE to DRAINING, and the service is no longer visible in the console or in the ListServices API operation. After all tasks have transitioned to either STOPPING or STOPPED status, the service status moves from DRAINING to INACTIVE. Services in the DRAINING or INACTIVE status can still be viewed with the DescribeServices API operation. However, in the future, INACTIVE services may be cleaned up and purged from Amazon ECS record keeping, and DescribeServices calls on those services return a ServiceNotFoundException error.

Service definition parameters

A service definition defines how to run your Amazon ECS service. The following parameters can be specified in a service definition.

Launch type

launchType

Type: String

Valid values: EC2 | FARGATE

Required: No

The launch type on which to run your service. If a launch type is not specified, EC2 is used by default. For more information, see Amazon ECS launch types (p. 93).
If a `launchType` is specified, the `capacityProviderStrategy` parameter must be omitted.

## Capacity provider strategy

**capacityProviderStrategy**

- **Type**: Array of objects
- **Required**: No

The capacity provider strategy consists of one or more capacity providers along with the `base` and `weight` to assign to them. A capacity provider must be associated with the cluster to be used in a capacity provider strategy. The `PutClusterCapacityProviders` API is used to associate a capacity provider with a cluster. Only capacity providers with an `ACTIVE` or `UPDATING` status can be used.

If a `capacityProviderStrategy` is specified, the `launchType` parameter must be omitted. If no `capacityProviderStrategy` or `launchType` is specified, the `defaultCapacityProviderStrategy` for the cluster is used.

If specifying a capacity provider that uses an Auto Scaling group, the capacity provider must already be created. New capacity providers can be created with the `CreateCapacityProvider` API operation.

To use a AWS Fargate capacity provider, specify either the `FARGATE` or `FARGATE_SPOT` capacity providers. The AWS Fargate capacity providers are available to all accounts and only need to be associated with a cluster to be used.

The `PutClusterCapacityProviders` API operation is used to update the list of available capacity providers for a cluster after the cluster is created.

- **capacityProvider**
  - **Type**: String
  - **Required**: Yes

  The short name or full ARN of the capacity provider.

- **weight**
  - **Type**: Integer
  - **Valid range**: Integers between 0 and 1,000.
  - **Required**: No

  The weight value designates the relative percentage of the total number of tasks launched that should use the specified capacity provider.

  For example, if you have a strategy that contains two capacity providers and both have a weight of 1, then when the base is satisfied, the tasks will be split evenly across the two capacity providers. Using that same logic, if you specify a weight of 1 for `capacityProviderA` and a weight of 4 for `capacityProviderB`, then for every one task that is run using `capacityProviderA`, four tasks would use `capacityProviderB`.

- **base**
  - **Type**: Integer
  - **Valid range**: Integers between 0 and 100,000.
Required: No

The base value designates how many tasks, at a minimum, to run on the specified capacity provider. Only one capacity provider in a capacity provider strategy can have a base defined.

Task definition

taskDefinition

Type: String
Required: No

The family and revision (family:revision) or full Amazon Resource Name (ARN) of the task definition to run in your service. If a revision is not specified, the latest ACTIVE revision of the specified family is used.

A task definition must be specified when using the rolling update (ECS) deployment controller.

Platform version

platformVersion

Type: String
Required: No

The platform version on which your tasks in the service are running. A platform version is only specified for tasks using the Fargate launch type. If one is not specified, the latest version (LATEST) is used by default.

AWS Fargate platform versions are used to refer to a specific runtime environment for the Fargate task infrastructure. When specifying the LATEST platform version when running a task or creating a service, you get the most current platform version available for your tasks. When you scale up your service, those tasks receive the platform version that was specified on the service's current deployment. For more information, see AWS Fargate platform versions (p. 43).

Cluster

cluster

Type: String
Required: No

The short name or full Amazon Resource Name (ARN) of the cluster on which to run your service. If you do not specify a cluster, the default cluster is assumed.

Service name

serviceName

Type: String
Required: Yes

The name of your service. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed. Service names must be unique within a cluster, but you can have similarly named services in multiple clusters within a Region or across multiple Regions.

**Scheduling strategy**

`schedulingStrategy`

Type: String

Valid values: REPLICA

Required: No

The scheduling strategy to use. If no scheduling strategy is specified, the REPLICA strategy is used. For more information, see [Service scheduler concepts](p. 157).

There are two service scheduler strategies available:

- **REPLICA**—The replica scheduling strategy places and maintains the desired number of tasks across your cluster. By default, the service scheduler spreads tasks across Availability Zones. You can use task placement strategies and constraints to customize task placement decisions. For more information, see [Replica](p. 158).

- **DAEMON**—The daemon scheduling strategy deploys exactly one task on each active container instance that meets all of the task placement constraints that you specify in your cluster. The service scheduler evaluates the task placement constraints for running tasks and will stop tasks that do not meet the placement constraints. When using this strategy, there is no need to specify a desired number of tasks, a task placement strategy, or use Service Auto Scaling policies. For more information, see [Daemon](p. 157) in the Amazon Elastic Container Service Developer Guide.

**Note**

Fargate tasks do not support the DAEMON scheduling strategy.

**Desired count**

`desiredCount`

Type: Integer

Required: No

The number of instantiations of the specified task definition to place and keep running on your cluster.

This parameter is required if the REPLICA scheduling strategy is used. If the service uses the DAEMON scheduling strategy, this parameter is optional.

**Deployment configuration**

`deploymentConfiguration`

Type: Object

Required: No
Optional deployment parameters that control how many tasks run during the deployment and the ordering of stopping and starting tasks.

**maximumPercent**

Type: Integer

Required: No

If a service is using the rolling update (ECS) deployment type, the `maximumPercent` parameter represents an upper limit on the number of your service's tasks that are allowed in the `RUNNING` or `PENDING` state during a deployment, as a percentage of the `desiredCount` (rounded down to the nearest integer). This parameter enables you to define the deployment batch size. For example, if your service is using the `REPLICA` service scheduler and has a `desiredCount` of four tasks and a `maximumPercent` value of 200%, the scheduler may start four new tasks before stopping the four older tasks (provided that the cluster resources required to do this are available). The default `maximumPercent` value for a service using the `REPLICA` service scheduler is 200%.

If your service is using the `DAEMON` service scheduler type, the `maximumPercent` should remain at 100%, which is the default value.

The maximum number of tasks during a deployment is the `desiredCount` multiplied by the `maximumPercent`/100, rounded down to the nearest integer value.

If a service is using either the blue/green (CODE_DEPLOY) or EXTERNAL deployment types and tasks that use the EC2 launch type, the `maximum percent` value is set to the default value and is used to define the upper limit on the number of the tasks in the service that remain in the `RUNNING` state while the container instances are in the `DRAINING` state. If the tasks in the service use the Fargate launch type, the maximum percent value is not used, although it is returned when describing your service.

**minimumHealthyPercent**

Type: Integer

Required: No

If a service is using the rolling update (ECS) deployment type, the `minimumHealthyPercent` represents a lower limit on the number of your service's tasks that must remain in the `RUNNING` state during a deployment, as a percentage of the `desiredCount` (rounded up to the nearest integer). This parameter enables you to deploy without using additional cluster capacity. For example, if your service has a `desiredCount` of four tasks and a `minimumHealthyPercent` of 50%, the service scheduler may stop two existing tasks to free up cluster capacity before starting two new tasks.

For services that do not use a load balancer, the following should be noted:

- A service is considered healthy if all essential containers within the tasks in the service pass their health checks.
- If a task has no essential containers with a health check defined, the service scheduler will wait for 40 seconds after a task reaches a `RUNNING` state before the task is counted towards the minimum healthy percent total.
- If a task has one or more essential containers with a health check defined, the service scheduler will wait for the task to reach a healthy status before counting it towards the minimum healthy percent total. A task is considered healthy when all essential containers within the task have passed their health checks. The amount of time the service scheduler can wait for is determined by the container health check settings. For more information, see Health Check (p. 71).

For services that do use a load balancer, the following should be noted:
• If a task has no essential containers with a health check defined, the service scheduler will wait for the load balancer target group health check to return a healthy status before counting the task towards the minimum healthy percent total.
• If a task has an essential container with a health check defined, the service scheduler will wait for both the task to reach a healthy status and the load balancer target group health check to return a healthy status before counting the task towards the minimum healthy percent total.

The default value for a replica service for `minimumHealthyPercent` is 100%. The default `minimumHealthyPercent` value for a service using the `DAEMON` service schedule is 0% for the AWS CLI, the AWS SDKs, and the APIs and 50% for the AWS Management Console.

The minimum number of healthy tasks during a deployment is the desiredCount multiplied by the `minimumHealthyPercent`/100, rounded up to the nearest integer value.

If a service is using either the blue/green (CODE_DEPLOY) or EXTERNAL deployment types and is running tasks that use the EC2 launch type, the minimum healthy percent value is set to the default value and is used to define the lower limit on the number of the tasks in the service that remain in the RUNNING state while the container instances are in the DRAINING state. If a service is using either the blue/green (CODE_DEPLOY) or EXTERNAL deployment types and is running tasks that use the Fargate launch type, the minimum healthy percent value is not used, although it is returned when describing your service.

---

**Deployment controller**

**deploymentController**

Type: Object

Required: No

The deployment controller to use for the service. If no deployment controller is specified, the ECS controller is used. For more information, see Amazon ECS Deployment types (p. 186).

**type**

Type: String

Valid values: ECS | CODE_DEPLOY | EXTERNAL

Required: yes

The deployment controller type to use. There are three deployment controller types available:

ECS

The rolling update (ECS) deployment type involves replacing the current running version of the container with the latest version. The number of containers Amazon ECS adds or removes from the service during a rolling update is controlled by adjusting the minimum and maximum number of healthy tasks allowed during a service deployment, as specified in the deploymentConfiguration.

CODE_DEPLOY

The blue/green (CODE_DEPLOY) deployment type uses the blue/green deployment model powered by CodeDeploy, which allows you to verify a new deployment of a service before sending production traffic to it.

EXTERNAL

The external deployment type enables you to use any third party deployment controller for full control over the deployment process for an Amazon ECS service.
Task placement

placementStrategy

Type: Array of objects

Required: No

The placement strategy objects to use for tasks in your service. You can specify a maximum of four strategy rules per service.

type

Type: String

Valid values: random | spread | binpack

Required: No

The type of placement strategy. The random placement strategy randomly places tasks on available candidates. The spread placement strategy spreads placement across available candidates evenly based on the field parameter. The binpack strategy places tasks on available candidates that have the least available amount of the resource that is specified with the field parameter. For example, if you binpack on memory, a task is placed on the instance with the least amount of remaining memory (but still enough to run the task).

field

Type: String

Required: No

The field to apply the placement strategy against. For the spread placement strategy, valid values are instanceId (or host, which has the same effect), or any platform or custom attribute that is applied to a container instance, such as attribute:ecs.availability-zone. For the binpack placement strategy, valid values are cpu and memory. For the random placement strategy, this field is not used.

Tags

tags

Type: Array of objects

Required: No

The metadata that you apply to the service to help you categorize and organize them. Each tag consists of a key and an optional value, both of which you define. When a service is deleted, the tags are deleted as well. A maximum of 50 tags can be applied to the service. For more information, see Tagging your Amazon ECS resources (p. 222).

key

Type: String


Required: No

One part of a key-value pair that make up a tag. A key is a general label that acts like a category for more specific tag values.
value
Type: String
Length Constraints: Minimum length of 0. Maximum length of 256.
Required: No
The optional part of a key-value pair that make up a tag. A value acts as a descriptor within a tag category (key).

enableECSManagedTags
Type: Boolean
Valid values: true | false
Required: No
Specifies whether to enable Amazon ECS managed tags for the tasks in the service. If no value is specified, the default value is false. For more information, see Tagging your resources for billing (p. 224).

propagateTags
Type: String
Valid values: TASK_DEFINITION | SERVICE
Required: No
Specifies whether to copy the tags from the task definition or the service to the tasks in the service. If no value is specified, the tags are not copied. Tags can only be copied to the tasks within the service during service creation. To add tags to a task after service creation, use the TagResource API action.

Network configuration

networkConfiguration
Type: Object
Required: No
The network configuration for the service. This parameter is required for task definitions that use the awsvpc network mode to receive their own Elastic Network Interface, and it is not supported for other network modes. If using the Fargate launch type, the awsvpc network mode is required. For more information, see Fargate Task Networking in the Amazon Elastic Container Service User Guide for AWS Fargate.

awsvpcConfiguration
Type: Object
Required: No
An object representing the subnets and security groups for a task or service.

subnets
Type: Array of strings
Required: Yes
Network configuration

The subnets associated with the task or service. There is a limit of 16 subnets that can be specified per awsvpcConfiguration.

securityGroups

Type: Array of strings

Required: No

The security groups associated with the task or service. If you do not specify a security group, the default security group for the VPC is used. There is a limit of 5 security groups that can be specified per awsvpcConfiguration.

assignPublicIP

Type: String

Valid values: ENABLED | DISABLED

Required: No

Whether the task's elastic network interface receives a public IP address. If no value is specified, the default value of DISABLED is used.

healthCheckGracePeriodSeconds

Type: Integer

Required: No

The period of time, in seconds, that the Amazon ECS service scheduler should ignore unhealthy Elastic Load Balancing target health checks, container health checks, and Route 53 health checks after a task enters a RUNNING state. This is only valid if your service is configured to use a load balancer. If your service has a load balancer defined and you do not specify a health check grace period value, the default value of 0 is used.

If your service's tasks take a while to start and respond to health checks, you can specify a health check grace period of up to 2,147,483,647 seconds during which the ECS service scheduler ignores the health check status. This grace period can prevent the ECS service scheduler from marking tasks as unhealthy and stopping them before they have time to come up.

loadBalancers

Type: Array of objects

Required: No

A load balancer object representing the load balancers to use with your service. For services that use an Application Load Balancer or Network Load Balancer, there is a limit of five target groups you can attach to a service.

After you create a service, the load balancer name or target group ARN, container name, and container port specified in the service definition are immutable.

For Classic Load Balancers, this object must contain the load balancer name, the container name (as it appears in a container definition), and the container port to access from the load balancer. When a task from this service is placed on a container instance, the container instance is registered with the load balancer specified here.

For Application Load Balancers and Network Load Balancers, this object must contain the load balancer target group ARN, the container name (as it appears in a container definition), and the container port to access from the load balancer. When a task from this service is placed on a container instance, the container instance and port combination is registered as a target in the target group specified here.
Network configuration

targetGroupArn
Type: String
Required: No

The full ARN of the Elastic Load Balancing target group associated with a service.

A target group ARN is only specified when using an Application Load Balancer or Network Load Balancer. If you are using a Classic Load Balancer the target group ARN should be omitted.

loadBalancerName
Type: String
Required: No

The name of the load balancer to associate with the service.

A load balancer name is only specified when using a Classic Load Balancer. If you are using an Application Load Balancer or a Network Load Balancer the load balancer name parameter should be omitted.

containerName
Type: String
Required: No

The name of the container (as it appears in a container definition) to associate with the load balancer.

containerPort
Type: Integer
Required: No

The port on the container to associate with the load balancer. This port must correspond to a containerPort in the task definition used by tasks in the service. For tasks that use the EC2 launch type, the container instance must allow ingress traffic on the hostPort of the port mapping.

role
Type: String
Required: No

The short name or full ARN of the IAM role that allows Amazon ECS to make calls to your load balancer on your behalf. This parameter is only permitted if you are using a load balancer with a single target group for your service, and your task definition does not use the awsvpc network mode. If you specify the role parameter, you must also specify a load balancer object with the loadBalancers parameter.

If your specified role has a path other than /, then you must either specify the full role ARN (this is recommended) or prefix the role name with the path. For example, if a role with the name bar has a path of /foo/ then you would specify /foo/bar as the role name. For more information, see Friendly Names and Paths in the IAM User Guide.

Important
If your account has already created the Amazon ECS service-linked role, that role is used by default for your service unless you specify a role here. The service-linked role is required if your task definition uses the awsvpc network mode, in which case you should not specify a role here. For more information, see Service-Linked Role for Amazon ECS (p. 282).
**serviceRegistries**

Type: Array of objects

Required: No

The details of the service discovery configuration for your service. For more information, see Service Discovery (p. 217).

**registryArn**

Type: String

Required: No

The ARN of the service registry. The currently supported service registry is AWS Cloud Map. For more information, see Working with Services in the AWS Cloud Map Developer Guide.

**port**

Type: Integer

Required: No

The port value used if your service discovery service specified an SRV record. This field is required if both the awsvpc network mode and SRV records are used.

**containerName**

Type: String

Required: No

The container name value, already specified in the task definition, to be used for your service discovery service. If the task definition that your service task specifies uses the bridge or host network mode, you must specify a containerName and containerPort combination from the task definition. If the task definition that your service task specifies uses the awsvpc network mode and a type SRV DNS record is used, you must specify either a containerName and containerPort combination or a port value, but not both.

**containerPort**

Type: Integer

Required: No

The port value, already specified in the task definition, to be used for your service discovery service. If the task definition your service task specifies uses the bridge or host network mode, you must specify a containerName and containerPort combination from the task definition. If the task definition your service task specifies uses the awsvpc network mode and a type SRV DNS record is used, you must specify either a containerName and containerPort combination or a port value, but not both.

**Client token**

**clientToken**

Type: String

Required: No

Unique, case-sensitive identifier you provide to ensure the idempotency of the request. Up to 32 ASCII characters are allowed.
Service definition template

The following shows the JSON representation of an Amazon ECS service definition.

```
{
   "cluster": "",
   "serviceName": "",
   "taskDefinition": "",
   "loadBalancers": [
      {
         "targetGroupArn": "",
         "loadBalancerName": "",
         "containerName": "",
         "containerPort": 0
      }
   ],
   "serviceRegistries": [
      {
         "registryArn": "",
         "port": 0,
         "containerName": "",
         "containerPort": 0
      }
   ],
   "desiredCount": 0,
   "clientToken": "",
   "launchType": "FARGATE",
   "capacityProviderStrategy": [
      {
         "capacityProvider": "",
         "weight": 0,
         "base": 0
      }
   ],
   "platformVersion": "",
   "role": "",
   "deploymentConfiguration": {
      "maximumPercent": 0,
      "minimumHealthyPercent": 0
   },
   "placementStrategy": [
      {
         "type": "spread",
         "field": ""
      }
   ],
   "networkConfiguration": {
      "awsvpcConfiguration": {
         "subnets": [""],
         "securityGroups": [""],
         "assignPublicIp": "ENABLED"
      }
   },
   "healthCheckGracePeriodSeconds": 0,
   "schedulingStrategy": "REPLICA",
   "deploymentController": {
      "type": "CODE_DEPLOY"
   },
   "tags": [
      {
      }
   ]
}
```
Creating a service

When you create an Amazon ECS service, you specify the basic parameters that define what makes up your service and how it should behave. These parameters create a service definition.

You can optionally configure additional features, such as an Elastic Load Balancing load balancer to distribute traffic across the containers in your service. For more information, see Service load balancing (p. 197). You must verify that your container instances can receive traffic from your load balancers. You can allow traffic to all ports on your container instances from your load balancer's security group to ensure that traffic can reach any containers that use dynamically assigned ports.

The following documents take you through each step of the create service wizard in the AWS Management Console.

Topics

- Creating a service using the new console (p. 170)
- Creating a service using the old console (p. 172)

Creating a service using the new console

You can create an Amazon ECS service using the new Amazon ECS console. To make the service creation process as easy as possible, the console has default selections for many choices which we describe below. There are also help panels available for most of the sections in the console which provide further context.

To create a service using the new console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/v2.
2. On the Clusters page, select the cluster to create the service in.
3. From the Services tab, choose Deploy.
4. The Compute configuration section can be expanded to change the compute option for your service to use. By default, the console will select a compute option for you so in most cases you can go to the next step. The following describes the order that the console uses to select a default:

   - If your cluster has a default capacity provider strategy defined, it will be selected.
   - If your cluster doesn't have a default capacity provider strategy defined but you do have the Fargate capacity providers added to the cluster, a custom capacity provider strategy using the FARGATE capacity provider will be selected.
   - If your cluster doesn't have a default capacity provider strategy defined but you do have one or more Auto Scaling group capacity providers added to the cluster, the Use custom (Advanced) option is selected and you will need to manually define the strategy.
• If your cluster doesn’t have a default capacity provider strategy defined and no capacity providers added to the cluster, the Fargate launch type is selected.

5. For Application type, select Service.

6. For Task definition, select the task definition family and revision to use.

   Important
   The console validates that the selected task definition family and revision is compatible with the defined compute configuration. If you receive a warning, verify both your task definition compatibility and the compute configuration selected.

7. For Service name, specify a name for your service.

8. For Desired tasks, specify the number of tasks to launch and maintain in the service.

9. The Deployment options section can be expanded to change the minimum healthy percent and maximum percent of running tasks allowed during a service deployment. The console has default values for the most common use case selected.

   Note
   Currently, only the Rolling update (ECS) deployment type is supported. To use any other deployment type, switch to the old console.

10. (Optional) The Load balancing section can be expanded to configure a load balancer for your service. Use the following steps to configure your service to use an Application Load Balancer.

   a. For Load balancer type, select Application Load Balancer.

   b. Choose Create a new load balancer to create a new Application Load Balancer or Use an existing load balancer to select an existing Application Load Balancer.

   c. When creating a new load balancer, for Load balancer name, specify a unique name for your load balancer. When using an existing load balancer, for Load balancer, select your existing load balancer.

   d. For Listener, specify a port and protocol for the Application Load Balancer to listen for connection requests on. By default, the load balancer will be configured to use port 80 and HTTP.

   e. For Target group name, specify a name and a protocol for the target group that the Application Load Balancer will route requests to. By default, the target group will route requests to the first container defined in your task definition.

   f. For Health check path, specify a path that exists within your container where the Application Load Balancer should periodically send requests to verify the connection health between the Application Load Balancer and the container. By default, a path of / is used which is the root directory.

   g. For Health check grace period, specify the amount of time (in seconds) that the service scheduler should ignore unhealthy Elastic Load Balancing target health checks for.

11. The Networking section can be expanded to define the network configuration for the service. Task definitions that use the awsvpc network mode or services configured to use a load balancer must have a networking configuration. By default, the console selects the default Amazon VPC along with all subnets and the default security group within the default Amazon VPC. Use the following steps to specify a custom configuration.

   a. For VPC, select the VPC to use.

   b. For Subnets, select one or more subnets in the VPC that the task scheduler should consider when placing your tasks.

   c. For Security group, you can either select an existing security group or create a new one. To use an existing security group, select the security group and move to the next step. To create a new security group, choose Create a new security group. You must specify a security group name, description, and then add one or more inbound rules for the security group.

   d. For Public IP, choose whether to auto-assign a public IP address to the elastic network interface (ENI) of the task. Tasks that are launched on AWS Fargate can be assigned a public IP address
Creating a service using the old console

**Important**
Amazon ECS has provided a new console experience for creating a service. For more information, see Creating a service using the new console (p. 170).

The following documents take you through each step of the create service wizard in the old console.

**Topics**
- Step 1: Configuring Basic Service Parameters (p. 172)
- Step 2: Configure a Network (p. 174)
- Step 3: Configuring Your Service to Use a Load Balancer (p. 175)
- Step 4: Configuring Your Service to Use Service Discovery (p. 179)
- Step 5: Configuring your service to use Service Auto Scaling (p. 180)
- Step 6: Review and create your service (p. 182)

**Step 1: Configuring Basic Service Parameters**

**Important**
Amazon ECS has provided a new console experience for creating a service. For more information, see Creating a service using the new console (p. 170).

All services require some basic configuration parameters that define the service, such as the task definition to use, which cluster the service should run on, how many tasks should be placed for the service, and so on. This is called the service definition. For more information about the parameters defined in a service definition, see Service definition parameters (p. 158).

This procedure covers creating a service with the basic service definition parameters that are required. After you have configured these parameters, you can create your service or move on to the procedures for optional service definition configuration, such as configuring your service to use a load balancer.

**Note**
If your cluster is configured with a default capacity provider strategy, you will only be able to create a service using the default capacity provider strategy when using the console. Likewise, if no default capacity provider is defined, you will only be able to use a launch type when creating a service using the console. It is not currently possible to have a mixed strategy using both capacity providers and launch types in the console.

**To configure the basic service definition parameters**

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. On the navigation bar, select the Region that your cluster is in.
3. In the navigation pane, choose Task Definitions and select the task definition from which to create your service.
4. On the Task Definition name page, select the revision of the task definition from which to create your service.
5. Review the task definition, and choose Actions, Create Service.
6. On the Configure service page, complete the following steps.
Creating a service using the old console

a. Choose either a capacity provider strategy or a launch type.

- To use a **Capacity provider strategy**, choose **Switch to capacity provider strategy** and then choose whether your service should use the default capacity provider strategy defined for the cluster or a custom capacity provider strategy. A capacity provider must already be associated with the cluster in order to be used in a custom capacity provider strategy. For more information, see Amazon ECS capacity providers (p. 49).

- To use a **Launch type**, choose **Switch to launch type** and select **FARGATE** or **EC2**. For more information about launch types, see Amazon ECS launch types (p. 93).

b. For **Platform version**, if you chose a Fargate capacity provider or the Fargate launch type, then select the platform version to use.

  **Note**
  When the **LATEST** platform version is selected, the **1.4.0** platform version is used.

c. **Cluster**: Select the cluster in which to create your service.

d. **Service name**: Type a unique name for your service.

e. **Service type**: Select a scheduling strategy for your service. For more information, see Service scheduler concepts (p. 157).

f. **Number of tasks**: If you chose the REPLICA service type, type the number of tasks to launch and maintain on your cluster.

  **Note**
  If your launch type is **EC2**, and your task definition uses static host port mappings on your container instances, then you need at least one container instance with the specified port available in your cluster for each task in your service. This restriction does not apply if your task definition uses dynamic host port mappings with the bridge network mode. For more information, see portMappings (p. 69).

g. If you are using the **Rolling update** deployment type, fill out the following deployment configuration parameters. For more information on how these parameters are used, see Deployment configuration (p. 161).

  - **Minimum healthy percent**: Specify a lower limit on the number of your service's tasks that must remain in the **RUNNING** state during a deployment, as a percentage of the service's desired number of tasks (rounded up to the nearest integer).
  
  - **Maximum percent**: Specify an upper limit on the number of your service's tasks that are allowed in the **RUNNING** or **PENDING** state during a deployment, as a percentage of the service's desired number of tasks (rounded down to the nearest integer).

7. On the **Deployments** page, complete the following steps.

a. For **Deployment type**, choose whether your service should use a rolling update deployment or a blue/green deployment using AWS CodeDeploy. For more information, see Amazon ECS Deployment types (p. 186).

b. If you selected the blue/green deployment type, complete the following steps:

  i. For **Deployment configuration** choose the deployment configuration to use for the service. This determines how traffic is shifted when your task set is updated. For more information, see Blue/Green deployment with CodeDeploy (p. 188)

  ii. For **Service role for CodeDeploy** choose the IAM service role for AWS CodeDeploy. For more information, see Amazon ECS CodeDeploy IAM Role (p. 297)

8. In the **Task tagging configuration** section, complete the following steps:

a. Select **Enable ECS managed tags** if you want Amazon ECS to automatically tag the tasks in the service with the Amazon ECS managed tags. For more information, see Tagging Your Amazon ECS Resources.

b. For **Propagate tags from**, select one of the following:
Creating a service using the old console

- **Do not propagate** – This option will not propagate any tags to the tasks in the service.
- **Service** – This option will propagate the tags specified on your service to each of the tasks in the service.
- **Task Definitions** – This option will propagate the tags specified in the task definition of a task to the tasks in the service.

**Note**

If you specify a tag with the same key in the Tags section, it will override the tag propagated from either the service or the task definition.

9. In the Tags section, specify the key and value for each tag to associate with the task. For more information, see Tagging Your Amazon ECS Resources.

10. Choose **Next step** and navigate to Step 2: Configure a Network (p. 174).

**Step 2: Configure a Network**

**Important**

Amazon ECS has provided a new console experience for creating a service. For more information, see Creating a service using the new console (p. 170).

If your service's task definition uses the awsvpc network mode, you must configure a VPC, subnet, and security group for your service.

If your service's task definition does not use the awsvpc network mode, you can move on to the next step, Step 3: Configuring Your Service to Use a Load Balancer (p. 175).

The awsvpc network mode does not provide task ENIs with public IP addresses for tasks that use the EC2 launch type. To access the internet, tasks that use the EC2 launch type must be launched in a private subnet that is configured to use a NAT gateway. For more information, see NAT Gateways in the Amazon VPC User Guide. Inbound network access must be from within the VPC using the private IP address or DNS hostname, or routed through a load balancer from within the VPC. Tasks launched within public subnets do not have internet access.

**Note**

The above limitation does not apply to tasks that use the Fargate launch type. You can configure these tasks to receive public IP addresses.

To configure VPC and security group settings for your service

1. If you have not done so already, follow the basic service configuration procedures in Step 1: Configuring Basic Service Parameters (p. 172).
2. For **Cluster VPC**, if you selected the EC2 launch type, choose the VPC in which your container instances reside. If you selected the Fargate launch type, select the VPC that the Fargate tasks should use. Ensure that the VPC you choose is not configured to require dedicated hardware tenancy, as that is not supported by Fargate tasks.
3. For **Subnets**, choose the available subnets for your service task placement.
4. For **Security groups**, a security group has been created for your service's tasks, which allows HTTP traffic from the internet (0.0.0.0/0). To edit the name or the rules of this security group, or to choose an existing security group, choose **Edit** and then modify your security group settings.
5. For **Auto-assign Public IP**, choose whether to have your tasks receive a public IP address. If you are using Fargate tasks, in order for the task to pull the container image it must either use a public subnet and be assigned a public IP address or a private subnet that has a route to the internet or a NAT gateway that can route requests to the internet.
6. If you are configuring your service to use a load balancer or if you are using the green/blue deployment type, continue to Step 3: Configuring Your Service to Use a Load Balancer (p. 175).
Important
Amazon ECS has provided a new console experience for creating a service. For more information, see Creating a service using the new console (p. 170).

Services can be configured to use a load balancer to distribute incoming traffic to the tasks in your service. If your service is using the rolling update deployment type, this is optional. If your service is using the blue/green deployment type, then it is required to use either an Application Load Balancer or Network Load Balancer.

If you are not configuring your service to use a load balancer, you can choose None as the load balancer type and move on to the next section, Step 4: Configuring Your Service to Use Service Discovery (p. 179).

If you have an available Elastic Load Balancing load balancer configured, you can attach it to your service with the following procedures, or you can configure a new load balancer. For more information, see Creating a load balancer (p. 201).

Important
Before following these procedures, you must create your Elastic Load Balancing load balancer resources.

Topics
- Configuring a Load Balancer for the Rolling Update Deployment Type (p. 175)
- Configuring a Load Balancer for the Blue/Green Deployment Type (p. 177)

Configuring a Load Balancer for the Rolling Update Deployment Type

If your service's tasks take a while to start and respond to Elastic Load Balancing health checks, you can specify a health check grace period of up to 2,147,483,647 seconds. During that time, the service scheduler ignores health check status. This grace period can prevent the service scheduler from marking tasks as unhealthy and stopping them before they have time to come up. This is only valid if your service is configured to use a load balancer.

To configure a health check grace period

1. If you have not done so already, follow the basic service configuration procedures in Step 1: Configuring Basic Service Parameters (p. 172).
2. For Health check grace period: Enter the period of time, in seconds, that the Amazon ECS service scheduler should ignore unhealthy Elastic Load Balancing target health checks after a task has first started.

To configure your service to use a load balancer, you must choose the load balancer type to use with your service.

To choose a load balancer type

1. If you have not done so already, follow the basic service creation procedures in Step 1: Configuring Basic Service Parameters (p. 172).
2. For Load balancer type, choose the load balancer type to use with your service:
Application Load Balancer

Allows containers to use dynamic host port mapping, which enables you to place multiple tasks using the same port on a single container instance. Multiple services can use the same listener port on a single load balancer with rule-based routing and paths.

Network Load Balancer

Allows containers to use dynamic host port mapping, which enables you to place multiple tasks using the same port on a single container instance. Multiple services can use the same listener port on a single load balancer with rule-based routing.

Classic Load Balancer

Requires static host port mappings (only one task allowed per container instance); rule-based routing and paths are not supported.

We recommend that you use Application Load Balancers for your Amazon ECS services so that you can take advantage of the advanced features available to them.

3. For **Select IAM role for service**, choose **Create new role** to create a new role for your service, or select an existing IAM role to use for your service (by default, this is `ecsServiceRole`).

   **Important**
   
   If you choose to use an existing `ecsServiceRole` IAM role, you must verify that the role has the proper permissions to use Application Load Balancers and Classic Load Balancers. For more information, see Service Scheduler IAM Role (p. 288).

4. For **ELB Name**, choose the name of the load balancer to use with your service. Only load balancers that correspond to the load balancer type you selected earlier are visible here.

5. The next step depends on the load balancer type for your service. If you've chosen an Application Load Balancer, follow the steps in To configure an Application Load Balancer (p. 176). If you've chosen a Network Load Balancer, follow the steps in To configure a Network Load Balancer (p. 177).

To configure an Application Load Balancer

1. For **Container to load balance**, choose the container and port combination from your task definition that your load balancer should distribute traffic to, and choose **Add to load balancer**.

2. For **Listener port**, choose the listener port and protocol of the listener that you created in Creating an Application Load Balancer (p. 202) (if applicable), or choose **create new** to create a new listener and then enter a port number and choose a port protocol for **Listener protocol**.

3. For **Target group name**, choose the target group that you created in Creating an Application Load Balancer (p. 202) (if applicable), or choose **create new** to create a new target group.

   **Important**
   
   If your service's task definition uses the `awsvpc` network mode (which is required for the Fargate launch type), your target group must use `ip` as the target type, not `instance`. This is because tasks that use the `awsvpc` network mode are associated with an elastic network interface, not an Amazon EC2 instance.

4. (Optional) If you chose to create a new target group, complete the following fields as follows:
   
   - For **Target group name**, a default name is provided for you.
   - For **Target group protocol**, enter the protocol to use for routing traffic to your tasks.
   - For **Path pattern**, if your listener does not have any existing rules, the default path pattern (/) is used. If your listener already has a default rule, then you must enter a path pattern that matches traffic that you want to have sent to your service's target group. For example, if your service is a web application called `web-app`, and you want traffic that matches `http://my-elb-url/web-`
app to route to your service, then you would enter /web-app* as your path pattern. For more information, see ListenerRules in the User Guide for Application Load Balancers.

- For Health check path, enter the path to which the load balancer should send health check pings.

5. When you are finished configuring your Application Load Balancer, choose Next step.

To configure a Network Load Balancer

1. For Container to load balance, choose the container and port combination from your task definition that your load balancer should distribute traffic to, and choose Add to load balancer.

2. For Listener port, choose the listener port and protocol of the listener that you created in Creating a Network Load Balancer (p. 206) (if applicable), or choose create new to create a new listener and then enter a port number and choose a port protocol for Listener protocol.

3. For Target group name, choose the target group that you created in Creating a Network Load Balancer (p. 206) (if applicable), or choose create new to create a new target group.

   Important

   If your service's task definition uses the awsvpc network mode (which is required for the Fargate launch type), your target group must use ip as the target type, not instance. This is because tasks that use the awsvpc network mode are associated with an elastic network interface, not an Amazon EC2 instance.

4. (Optional) If you chose to create a new target group, complete the following fields as follows:

   - For Target group name, a default name is provided for you.
   - For Target group protocol, enter the protocol to use for routing traffic to your tasks.
   - For Health check path, enter the path to which the load balancer should send health check pings.

5. When you are finished configuring your Network Load Balancer, choose Next Step.

Configuring a Load Balancer for the Blue/Green Deployment Type

To configure your service that uses the blue/green deployment type to use a load balancer, you must use either an Application Load Balancer or a Network Load Balancer.

To choose a load balancer type

1. If you have not done so already, follow the basic service creation procedures in Step 1: Configuring Basic Service Parameters (p. 172).

2. For Load balancer type, choose the load balancer type to use with your service:

   Application Load Balancer

   Allows containers to use dynamic host port mapping, which enables you to place multiple tasks using the same port on a single container instance. Multiple services can use the same listener port on a single load balancer with rule-based routing and paths.

   Network Load Balancer

   Allows containers to use dynamic host port mapping, which enables you to place multiple tasks using the same port on a single container instance. Multiple services can use the same listener port on a single load balancer with rule-based routing.

   We recommend that you use Application Load Balancers for your Amazon ECS services so that you can take advantage of the advanced features available to them.

3. For Load balancer name, choose the name of the load balancer to use with your service. Only load balancers that correspond to the load balancer type you selected earlier are visible here.
4. The next step depends on the load balancer type for your service. If you’ve chosen an Application Load Balancer, follow the steps in To configure an Application Load Balancer (p. 176). If you’ve chosen a Network Load Balancer, follow the steps in To configure a Network Load Balancer (p. 177).

To configure an Application Load Balancer for the blue/green deployment type

1. For **Container to load balance**, choose the container and port combination from your task definition that your load balancer should distribute traffic to, and choose **Add to load balancer**.

2. For **Production listener port**, choose the listener port and protocol of the listener that you created in Creating an Application Load Balancer (p. 202) (if applicable), or choose **create new** to create a new listener and then enter a port number and choose a port protocol for **Production listener protocol**.

3. (Optional) Select **Test listener** if you want to configure a listener port and protocol on your load balancer to test updates to your service before routing traffic to your new taskset. Complete the following step:
   - For **Test listener port**, choose the listener port and protocol of the listener that you want to test traffic over, or choose **create new** to create a new test listener and then enter a port number and choose a port protocol in **Test listener protocol**.

4. For blue/green deployments, two target groups are required. Each target group binds to a separate taskset in the deployment. Complete the following steps:
   a. For **Target group 1 name**, choose the target group that you created in Creating an Application Load Balancer (p. 202) (if applicable), or choose **create new** to create a new target group.
      
      **Important**
      If your service's task definition uses the `awsvpc` network mode (which is required for the Fargate launch type), your target group must use `ip` as the target type, not `instance`. This is because tasks that use the `awsvpc` network mode are associated with an elastic network interface, not an Amazon EC2 instance.
   b. (Optional) If you chose to create a new target group, complete the following fields as follows:
      - For **Target group name**, enter a name for your target group.
      - For **Target group protocol**, enter the protocol to use for routing traffic to your tasks.
      - For **Path pattern**, if your listener does not have any existing rules, the default path pattern (`/`) is used. If your listener already has a default rule, then you must enter a path pattern that matches traffic that you want to have sent to your service's target group. For example, if your service is a web application called `web-app`, and you want traffic that matches `http://my-elb-url/web-app` to route to your service, then you would enter `/web-app/*` as your path pattern. For more information, see **ListenerRules** in the User Guide for Application Load Balancers.
      - For **Health check path**, enter the path to which the load balancer should send health check pings.
   c. Repeat the steps for target group 2.
   d. When you are finished configuring your Application Load Balancer, choose **Next step**. Navigate to Step 4: Configuring Your Service to Use Service Discovery (p. 179).

To configure a Network Load Balancer for the blue/green deployment type

1. For **Container to load balance**, choose the container and port combination from your task definition that your load balancer should distribute traffic to, and choose **Add to load balancer**.
1. **For** **Listener port**, choose the listener port and protocol of the listener that you created in *Creating a Network Load Balancer (p. 206)* (if applicable), or choose **create new** to create a new listener and then enter a port number and choose a port protocol for **Listener protocol**.

2. **For** **Target group name**, choose the target group that you created in *Creating a Network Load Balancer (p. 206)* (if applicable), or choose **create new** to create a new target group.

   **Important**
   If your service's task definition uses the `awsvpc` network mode (which is required for the Fargate launch type), your target group must use `ip` as the target type, not `instance`. This is because tasks that use the `awsvpc` network mode are associated with an elastic network interface, not an Amazon EC2 instance.

3. **(Optional)** If you chose to create a new target group, complete the following fields as follows:
   - For **Target group name**, enter a name for your target group.
   - For **Target group protocol**, enter the protocol to use for routing traffic to your tasks.
   - For **Health check path**, enter the path to which the load balancer should send health check pings.

4. When you are finished configuring your Network Load Balancer, choose **Next Step**. Navigate to *Step 4: Configuring Your Service to Use Service Discovery (p. 179)*.

### Step 4: Configuring Your Service to Use Service Discovery

Your Amazon ECS service can optionally enable service discovery integration, which allows your service to be discoverable via DNS. For more information, see *Service Discovery (p. 217)*.

If you are not configuring your service to use a service discovery, you can move on to the next section, *Step 5: Configuring your service to use Service Auto Scaling (p. 180)*.

**To configure service discovery**

1. If you have not done so already, follow the basic service configuration procedures in *Step 1: Configuring Basic Service Parameters (p. 172)*.

2. On the **Configure network** page, select **Enable service discovery integration**.

3. For **Namespace**, select an existing Amazon Route 53 namespace, if you have one, otherwise select **create new private namespace**.

4. If creating a new namespace, for **Namespace name** enter a descriptive name for your namespace. This is the name used for the Amazon Route 53 hosted zone.

5. For **Configure service discovery service**, select to either create a new service discovery service or select an existing one.

6. If creating a new service discovery service, for **Service discovery name** enter a descriptive name for your service discovery service. This is used as the prefix for the DNS records to be created.

7. Select **Enable ECS task health propagation** if you want health checks enabled for your service discovery service.

8. For **DNS record type**, select the DNS record type to create for your service. Amazon ECS service discovery only supports A and SRV records, depending on the network mode that your task definition specifies. For more information about these record types, see *Supported DNS Record Types* in the *Amazon Route 53 Developer Guide*.

   - If the task definition that your service task specifies uses the `bridge` or `host` network mode, only type SRV records are supported. Choose a container name and port combination to associate with the record.

   - If the task definition that your service task specifies uses the `awsvpc` network mode, select either the A or SRV record type. If the type A DNS record is selected, skip to the next step. If the type SRV is selected, specify either the port that the service can be found on or a container name and port combination to associate with the record.
9. For TTL, enter the resource record cache time to live (TTL), in seconds. This value determines how long a record set is cached by DNS resolvers and by web browsers.
10. Choose Next step to proceed and navigate to Step 5: Configuring your service to use Service Auto Scaling (p. 180).

**Step 5: Configuring your service to use Service Auto Scaling**

Your Amazon ECS service can optionally be configured to use Auto Scaling to adjust its desired count of tasks in your Amazon ECS service up or down in response to CloudWatch alarms.

Amazon ECS Service AutoScaling supports the following types of scaling policies:

- **Target Tracking Scaling Policies (p. 211) (Recommended)**—Increase or decrease the number of tasks that your service runs based on a target value for a specific metric. This is similar to the way that your thermostat maintains the temperature of your home. You select temperature and the thermostat does the rest.
- **Step Scaling Policies (p. 216)**—Increase or decrease the number of tasks that your service runs based on a set of scaling adjustments, known as step adjustments, which vary based on the size of the alarm breach.

For more information, see Service Auto Scaling (p. 209).

**To configure basic Service Auto Scaling parameters**

1. If you have not done so already, follow the basic service configuration procedures in Step 1: Configuring Basic Service Parameters (p. 172).
2. On the Set Auto Scaling page, select Configure Service Auto Scaling to adjust your service’s desired count.
3. For Minimum number of tasks, enter the lower limit of the number of tasks for Service Auto Scaling to use. Your service’s desired count is not automatically adjusted below this amount.
4. For Desired number of tasks, this field is pre-populated with the value that you entered earlier. You can change your service’s desired count at this time, but this value must be between the minimum and maximum number of tasks specified on this page.
5. For Maximum number of tasks, enter the upper limit of the number of tasks for Service Auto Scaling to use. Your service’s desired count is not automatically adjusted above this amount.
6. For IAM role for Service Auto Scaling, choose the ecsAutoscaleRole. If this role does not exist, choose Create new role to have the console create it for you.
7. The following procedures provide steps for creating either target tracking or step scaling policies for your service. Choose your desired scaling policy type.

These steps help you create target tracking scaling policies and CloudWatch alarms that can be used to trigger scaling activities for your service.

**To configure target tracking scaling policies for your service**

1. For Scaling policy type, choose Target tracking.
2. For Policy name, enter a descriptive name for your policy.
3. For ECS service metric, choose the metric to track. The following metrics are available:
   - ECSServiceAverageCPUUtilization—Average CPU utilization of the service.
   - ECSServiceAverageMemoryUtilization—Average memory utilization of the service.
   - ALBRequestCountPerTarget—Number of requests completed per target in an Application Load Balancer target group.
4. For **Target value**, enter the metric value that the policy should maintain. For example, use a target value of 1000 for `ALBRequestCountPerTarget`, or a target value of 75(%) for `ECSServiceAverageCPUUtilization`.

5. For **Scale-out cooldown period**, enter the amount of time, in seconds, after a scale-out activity completes before another scale-out activity can start. While the scale-out cooldown period is in effect, the capacity that has been added by the previous scale-out activity that initiated the cooldown is calculated as part of the desired capacity for the next scale out. The intention is to continuously (but not excessively) scale out.

6. For **Scale-in cooldown period**, enter the amount of time, in seconds, after a scale-in activity completes before another scale-in activity can start. The scale-in cooldown period is used to block subsequent scale-in requests until it has expired. The intention is to scale in conservatively to protect your application's availability. However, if another alarm triggers a scale out activity during the cooldown period after a scale-in, Service Auto Scaling scales out your scalable target immediately.

7. (Optional) To disable the scale-in actions for this policy, choose **Disable scale-in**. This allows you to create a separate scaling policy for scale-in later.

8. Choose **Next step**.

These steps help you create step scaling policies and CloudWatch alarms that can be used to trigger scaling activities for your service. You can create a **Scale out** alarm to increase the desired count of your service, and a **Scale in** alarm to decrease the desired count of your service.

**To configure step scaling policies for your service**

1. For **Scaling policy type**, choose **Step scaling**.
2. For **Policy name**, enter a descriptive name for your policy.
3. For **Execute policy when**, select the CloudWatch alarm to use to scale your service up or down.

   ```
   You can use an existing CloudWatch alarm that you have previously created, or you can choose to create a new alarm. The **Create new alarm** workflow allows you to create CloudWatch alarms that are based on the `CPUUtilization` and `MemoryUtilization` of the service that you are creating. To use other metrics, you can create your alarm in the CloudWatch console and then return to this wizard to choose that alarm.
   ```

4. (Optional) If you've chosen to create a new alarm, complete the following steps.
   a. For **Alarm name**, enter a descriptive name for your alarm. For example, if your alarm should trigger when your service CPU utilization exceeds 75%, you could call the alarm `service_name-cpu-gt-75`
   b. For **ECS service metric**, choose the service metric to use for your alarm. For more information, see **Service Auto Scaling** (p. 209).
   c. For **Alarm threshold**, enter the following information to configure your alarm:
      - Choose the CloudWatch statistic for your alarm (the default value of **Average** works in many cases). For more information, see **Statistics** in the **Amazon CloudWatch User Guide**.
      - Choose the comparison operator for your alarm and enter the value that the comparison operator checks against (for example, > and 75).
      - Enter the number of consecutive periods before the alarm is triggered and the period length. For example, two consecutive periods of 5 minutes would take 10 minutes before the alarm triggered. Because your Amazon ECS tasks can scale up and down quickly, consider using a low number of consecutive periods and a short period duration to react to alarms as soon as possible.

5. For **Scaling action**, enter the following information to configure how your service responds to the alarm:
Updating a service

You can update an existing service to change some of the service configuration parameters, such as the number of tasks that are maintained by a service, which task definition is used by the tasks, or if your tasks are using the Fargate launch type, you can change the platform version your service uses. If you have an application that needs more capacity, you can scale up your service. If you have unused capacity to scale down, you can reduce the number of desired tasks in your service and free up resources.

If you want to use an updated container image for your tasks, you can create a new task definition revision with that image and deploy it to your service by using the `force new deployment` option in the console.

The service scheduler uses the minimum healthy percent and maximum percent parameters (in the deployment configuration for the service) to determine the deployment strategy.
If a service is using the rolling update (ECS) deployment type, the **minimum healthy percent** represents a lower limit on the number of tasks in a service that must remain in the **RUNNING** state during a deployment, as a percentage of the desired number of tasks (rounded up to the nearest integer). The parameter also applies while any container instances are in the **DRAINING** state if the service contains tasks using the EC2 launch type. This parameter enables you to deploy without using additional cluster capacity. For example, if your service has a desired number of four tasks and a minimum healthy percent of 50%, the scheduler may stop two existing tasks to free up cluster capacity before starting two new tasks. Tasks for services that do not use a load balancer are considered healthy if they are in the **RUNNING** state. Tasks for services that do use a load balancer are considered healthy if they are in the **RUNNING** state and they are reported as healthy by the load balancer. The default value for minimum healthy percent is 100%.

If a service is using the rolling update (ECS) deployment type, the **maximum percent** parameter represents an upper limit on the number of tasks in a service that are allowed in the **RUNNING** or **PENDING** state during a deployment, as a percentage of the desired number of tasks (rounded down to the nearest integer). The parameter also applies while any container instances are in the **DRAINING** state if the service contains tasks using the EC2 launch type. This parameter enables you to define the deployment batch size. For example, if your service has a desired number of four tasks and a maximum percent value of 200%, the scheduler may start four new tasks before stopping the four older tasks. That's provided that the cluster resources required to do this are available. The default value for the maximum percent is 200%.

If a service is using the blue/green (**CODE_DEPLOY**) deployment type and tasks that use the EC2 launch type, the **minimum healthy percent** and **maximum percent** values are set to the default values. They are only used to define the lower and upper limit on the number of the tasks in the service that remain in the **RUNNING** state while the container instances are in the **DRAINING** state. If the tasks in the service use the Fargate launch type, the minimum healthy percent and maximum percent values are not used. They are currently visible when describing your service.

When the service scheduler replaces a task during an update, the service first removes the task from the load balancer (if used) and waits for the connections to drain. Then, the equivalent of `docker stop` is issued to the containers running in the task. This results in a **SIGTERM** signal and a 30-second timeout, after which **SIGKILL** is sent and the containers are forcibly stopped. If the container handles the **SIGTERM** signal gracefully and exits within 30 seconds from receiving it, no **SIGKILL** signal is sent. The service scheduler starts and stops tasks as defined by your minimum healthy percent and maximum percent settings.

**Important**

If you are changing the ports used by containers in a task definition, you may need to update the security groups for the container instances to work with the updated ports.

If your service uses a load balancer, the load balancer configuration defined for your service when it was created cannot be changed. If you update the task definition for the service, the container name and container port that were specified when the service was created must remain in the task definition.

To change the load balancer name, the container name, or the container port associated with a service load balancer configuration, you must create a new service.

Amazon ECS does not automatically update the security groups associated with Elastic Load Balancing load balancers or Amazon ECS container instances.

**Topics**

- Updating a service using the new console (p. 183)
- Updating a service using the old console (p. 184)

**Updating a service using the new console**

You can update an Amazon ECS service using the new Amazon ECS console. When updating a service using the AWS Management Console, the current service configuration is pre-populated. You are able...
Updating a service using the old console

Amazon ECS User Guide for AWS Fargate

To update the task definition, desired task count, capacity provider strategy, platform version, and deployment configuration; or any combination of these.

**Note**
Currently, only services using the Rolling update (ECS) deployment type should be updated using the new console. To update a service using any other deployment type, switch to the old console.

To create a service using the new console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/v2.
2. On the **Clusters** page, select the cluster to create the service in.
3. On the **Cluster overview** page, check the box next to the service to update and choose **Edit**.
4. For **Task definition**, choose the task definition family and revision to use.

**Important**
The console validates that the selected task definition family and revision is compatible with the defined compute configuration. If you receive a warning, verify both your task definition compatibility and the compute configuration selected.

5. Expand the **Deployment options** section and use the following steps to change the deployment configuration for your service.
   a. For services on AWS Fargate the platform version can be updated.
   b. For services using a capacity provider strategy, the capacity provider strategy can be updated.

**Note**
A service using an Auto Scaling group capacity provider can't be updated to use a Fargate capacity provider and vice versa.

   c. Select the **Force new deployment** option to have your service start a new deployment, which will stop all currently running tasks and launch new tasks using the updated configuration.
   d. For **Min running tasks**, specify the lower limit on the number of tasks in the service that must remain in the **RUNNING** state during a deployment, as a percentage of the desired number of tasks (rounded up to the nearest integer).
   e. For **Max running tasks**, specify the upper limit on the number of tasks in the service that are allowed in the **RUNNING** or **PENDING** state during a deployment, as a percentage of the desired number of tasks (rounded down to the nearest integer).

6. Expand the **Tags** section to update the tags associated with the service.
7. Choose **Update**.

Updating a service using the old console

**Important**
Amazon ECS has provided a new console experience for updating a service. For more information, see **Updating a service using the new console** (p. 183).

To update a running service

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. On the navigation bar, select the Region that your cluster is in.
3. In the navigation pane, choose **Clusters**.
4. On the **Clusters** page, select the name of the cluster in which your service resides.
5. On the **Cluster: name** page, choose **Services**.
6. Check the box to the left of the service to update and choose **Update**.
7. On the **Configure service** page, your service information is pre-populated. Change the task definition, capacity provider strategy, platform version, deployment configuration, or number of desired tasks (or any combination of these). To have your service start a new deployment, which will stop and relaunch all tasks using the new configuration, select **Force new deployment**. Choose **Next step** when finished changing the service configuration.

   **Note**
   A service using an Auto Scaling group capacity provider can’t be updated to use a Fargate capacity provider and vice versa.

8. On the **Configure deployments** page, if your service is using the blue/green deployment type, the components of your service deployment is pre-populated. Confirm the following settings.

   a. For **Application name**, choose the CodeDeploy application of which your service is a part.
   
   b. For **Deployment group name**, choose the CodeDeploy deployment group of which your service is a part.
   
   c. Select the deployment lifecycle event hooks and the associated Lambda functions to execute as part of the new revision of the service deployment. The available lifecycle hooks are:

   - **BeforeInstall** – Use this deployment lifecycle event hook to invoke a Lambda function before the replacement task set is created. The result of the Lambda function at this lifecycle event does not trigger a rollback.
   
   - **AfterInstall** – Use this deployment lifecycle event hook to invoke a Lambda function after the replacement task set is created. The result of the Lambda function at this lifecycle event can trigger a rollback.
   
   - **BeforeAllowTraffic** – Use this deployment lifecycle event hook to invoke a Lambda function before the production traffic has been rerouted to the replacement task set. The result of the Lambda function at this lifecycle event can trigger a rollback.
   
   - **AfterAllowTraffic** – Use this deployment lifecycle event hook to invoke a Lambda function after the production traffic has been rerouted to the replacement task set. The result of the Lambda function at this lifecycle event can trigger a rollback.

   For more information about lifecycle hooks, see **AppSpec 'hooks' Section in the AWS CodeDeploy User Guide**.

9. Choose **Next step**.

10. On the **Configure network** page, your network information is pre-populated. In the **Load balancing** section, if your service is using the blue/green deployment type, select the listeners to associate with the target groups. Change the health check grace period (if desired) and choose **Next step**.

11. (Optional) You can use Service Auto Scaling to scale your service up and down automatically in response to CloudWatch alarms.

   a. Under **Optional configurations**, choose **Configure Service Auto Scaling**.
   
   b. Proceed to **Step 5: Configuring your service to use Service Auto Scaling** (p. 180).
   
   c. Complete the steps in that section and then return.

12. Choose **Update Service** to finish and update your service.

## Deleting a service

You can delete an Amazon ECS service using the console. Before deletion, the service is automatically scaled down to zero. If you have a load balancer or service discovery resources associated with the service, they are not affected by the service deletion. To delete your Elastic Load Balancing resources, see one of the following topics, depending on your load balancer type: **Delete an Application Load Balancer** or **Delete a Network Load Balancer**. To delete your service discovery resources, follow the procedure below.
To delete an Amazon ECS service

Use the following procedure to delete an Amazon ECS service.

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. On the navigation bar, select the Region that your cluster is in.
3. In the navigation pane, choose Clusters and select the name of the cluster in which your service resides.
5. Check the box to the left of the service to update and choose Delete.
6. Confirm the service deletion by entering the text phrase and choose Delete.

To delete the service discovery resources (AWS CLI)

To delete the remaining service discovery resources, you can use the AWS CLI to delete the service discovery service and service discovery namespace.

1. Ensure that the latest version of the AWS CLI is installed and configured. For more information about installing or upgrading your AWS CLI, see Installing the AWS Command Line Interface.
2. Retrieve the ID of the service discovery service to delete.

   ```bash
   aws servicediscovery list-services --region <region_name>
   ```

   **Note**
   If no service discovery service is returned, continue to step 4.
3. Using the service discovery service ID from the previous output, delete the service.

   ```bash
   aws servicediscovery delete-service --id <service_discovery_service_id> --region <region_name>
   ```

4. Retrieve the ID of the service discovery namespace to delete.

   ```bash
   aws servicediscovery list-namespaces --region <region_name>
   ```

5. Using the service discovery namespace ID from the previous output, delete the namespace.

   ```bash
   aws servicediscovery delete-namespace --id <service_discovery_namespace_id> --region <region_name>
   ```

Amazon ECS Deployment types

An Amazon ECS deployment type determines the deployment strategy that your service uses. There are three deployment types: rolling update, blue/green, and external.

Topics
- Rolling update (p. 187)
- Blue/Green deployment with CodeDeploy (p. 188)
- External Deployment (p. 192)
Rolling update

When the rolling update (ECS) deployment type is used for your service, when a new service deployment is started the Amazon ECS service scheduler replaces the currently running tasks with new tasks. The number of tasks that Amazon ECS adds or removes from the service during a rolling update is controlled by the deployment configuration. The deployment configuration consists of the minimumHealthyPercent and maximumPercent values which are defined when the service is created, but can also be updated on an existing service.

The minimumHealthyPercent represents the lower limit on the number of tasks that should be running for a service during a deployment or when a container instance is draining, as a percent of the desired number of tasks for the service. This value is rounded up. For example if the minimum healthy percent is 50 and the desired task count is four, then the scheduler can stop two existing tasks before starting two new tasks. Likewise, if the minimum healthy percent is 75% and the desired task count is two, then the scheduler can't stop any tasks due to the resulting value also being two.

The maximumPercent represents the upper limit on the number of tasks that should be running for a service during a deployment or when a container instance is draining, as a percent of the desired number of tasks for a service. This value is rounded down. For example if the maximum percent is 200 and the desired task is four then scheduler can start four new tasks before stopping four existing tasks. Likewise, if the maximum percent is 125 and the desired task count is three, the scheduler can't start any tasks due to the resulting value also being three.

Important

When setting a minimum healthy percent or a maximum percent, you should ensure that the scheduler can stop or start at least one task when a deployment is triggered. If your service has a deployment that is stuck due to an invalid deployment configuration, a service event message will be sent. For more information, see service(service-name) was unable to stop or start tasks during a deployment because of the service deployment configuration. Update the minimumHealthyPercent or maximumPercent value and try again. (p. 376).

When a new service deployment is started or when a deployment is completed, Amazon ECS sends a service deployment state change event to EventBridge. This provides a programmatic way to monitor the status of your service deployments. For more information, see Service deployment state change events (p. 245).

To create a new Amazon ECS service that uses the rolling update deployment type, see Creating a service (p. 170).

Using the deployment circuit breaker

By default, when a service using the rolling update deployment type starts a new deployment, the service scheduler will launch new tasks until the desired count is reached. You can optionally enable deployment circuit breaker logic on the service, which will cause the deployment to transition to a failed state if it can't reach a steady state. The deployment circuit breaker logic can also trigger Amazon ECS to roll back to the last completed deployment upon a deployment failure.

The deployment circuit breaker can only be configured for a service using the Amazon ECS API, AWS CLI, or SDK. The following create-service AWS CLI example shows how to create a service when the deployment circuit breaker enabled with rollback.

```
aws ecs create-service \
  --service-name MyService \
  --deployment-controller type=ECS \
  --desired-count 2 \
  --deployment-configuration "deploymentCircuitBreaker={enable=true,rollback=true}" \
  --task-definition sample-fargate:1 \
  --launch-type FARGATE \
  --platform-version 1.4.0 \
```
The following should be considered when enabling the deployment circuit breaker logic on a service.

- The deployment circuit breaker is only supported for Amazon ECS services that use the rolling update (ECS) deployment controller and don't use a Classic Load Balancer.
- If a service deployment has at least one successfully running task, the circuit breaker logic will not trigger regardless of the deployment having any previous or future failed tasks.
- There are two new parameters added to the response of a DescribeServices API action that provide insight into the state of a deployment, the rolloutState and rolloutStateReason. When a new deployment is started, the rollout state begins in an IN_PROGRESS state. When the service reaches a steady state, the rollout state transitions to COMPLETED. If the service fails to reach a steady state and circuit breaker is enabled, the deployment will transition to a FAILED state. A deployment in a FAILED state won't launch any new tasks.
- In addition to the service deployment state change events Amazon ECS sends for deployments that have started and have completed, Amazon ECS also sends an event when a deployment with circuit breaker enabled fails. These events provide details about why a deployment failed or if a deployment was started because of a rollback. For more information, see Service deployment state change events (p. 245).
- If a new deployment is started because a previous deployment failed and rollback was enabled, the reason field of the service deployment state change event will indicate the deployment was started because of a rollback.

Blue/Green deployment with CodeDeploy

The blue/green deployment type uses the blue/green deployment model controlled by CodeDeploy. This deployment type enables you to verify a new deployment of a service before sending production traffic to it. For more information, see What Is CodeDeploy? in the AWS CodeDeploy User Guide.

There are three ways traffic can shift during a blue/green deployment:

- **Canary** — Traffic is shifted in two increments. You can choose from predefined canary options that specify the percentage of traffic shifted to your updated task set in the first increment and the interval, in minutes, before the remaining traffic is shifted in the second increment.
- **Linear** — Traffic is shifted in equal increments with an equal number of minutes between each increment. You can choose from predefined linear options that specify the percentage of traffic shifted in each increment and the number of minutes between each increment.
- **All-at-once** — All traffic is shifted from the original task set to the updated task set all at once.

The following are components of CodeDeploy that Amazon ECS uses when a service uses the blue/green deployment type:

**CodeDeploy application**

A collection of CodeDeploy resources. This consists of one or more deployment groups.

**CodeDeploy deployment group**

The deployment settings. This consists of the following:

- Amazon ECS cluster and service
- Load balancer target group and listener information
- Deployment roll back strategy
- Traffic rerouting settings
• Original revision termination settings
• Deployment configuration
• CloudWatch alarms configuration that can be set up to stop deployments
• SNS or CloudWatch Events settings for notifications

For more information, see Working with Deployment Groups in the AWS CodeDeploy User Guide.

CodeDeploy deployment configuration

Specifies how CodeDeploy routes production traffic to your replacement task set during a deployment. The following pre-defined linear and canary deployment configuration are available. You can also create custom defined linear and canary deployments as well. For more information, see Working with Deployment Configurations in the AWS CodeDeploy User Guide.

<table>
<thead>
<tr>
<th>Deployment configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CodeDeployDefault.ECSLinear10PercentEvery1Minutes</td>
<td>Shifts 10 percent of traffic every minute until all traffic is shifted.</td>
</tr>
<tr>
<td>CodeDeployDefault.ECSLinear10PercentEvery3Minutes</td>
<td>Shifts 10 percent of traffic every three minutes until all traffic is shifted.</td>
</tr>
<tr>
<td>CodeDeployDefault.ECSCanary10percent5Minutes</td>
<td>Shifts 10 percent of traffic in the first increment. The remaining 90 percent is deployed five minutes later.</td>
</tr>
<tr>
<td>CodeDeployDefault.ECSCanary10percent15Minutes</td>
<td>Shifts 10 percent of traffic in the first increment. The remaining 90 percent is deployed 15 minutes later.</td>
</tr>
<tr>
<td>CodeDeployDefault.ECSAllAtOnce</td>
<td>Shifts all traffic to the updated Amazon ECS container at once.</td>
</tr>
</tbody>
</table>

Revision

A revision is the CodeDeploy application specification file (AppSpec file). In the AppSpec file, you specify the full ARN of the task definition and the container and port of your replacement task set where traffic is to be routed when a new deployment is created. The container name must be one of the container names referenced in your task definition. If the network configuration or platform version has been updated in the service definition, you must also specify those details in the AppSpec file. You can also specify the Lambda functions to run during the deployment lifecycle events. The Lambda functions allow you to run tests and return metrics during the deployment. For more information, see AppSpec File Reference in the AWS CodeDeploy User Guide.

Blue/Green Deployment Considerations

Consider the following when using the blue/green deployment type:

• When an Amazon ECS service using the blue/green deployment type is initially created, an Amazon ECS task set is created.
• You must configure the service to use either an Application Load Balancer or Network Load Balancer. Classic Load Balancers aren't supported. The following are the load balancer requirements:
  • You must add a production listener to the load balancer, which is used to route production traffic.
  • An optional test listener can be added to the load balancer, which is used to route test traffic. If you specify a test listener, CodeDeploy routes your test traffic to the replacement task set during a deployment.
• Both the production and test listeners must belong to the same load balancer.
• You must define a target group for the load balancer. The target group routes traffic to the original task set in a service through the production listener.
• When a Network Load Balancer is used, only the CodeDeployDefault.ECSAllAtOnce deployment configuration is supported.
• For services configured to use service auto scaling and the blue/green deployment type, auto scaling is not blocked during a deployment but the deployment may fail under some circumstances. The following describes this behavior in more detail.
  • If a service is scaling and a deployment starts, the green task set is created and CodeDeploy will wait up to an hour for the green task set to reach steady state and won’t shift any traffic until it does.
  • If a service is in the process of a blue/green deployment and a scaling event occurs, traffic will continue to shift for 5 minutes. If the service doesn't reach steady state within 5 minutes, CodeDeploy will stop the deployment and mark it as failed.
• Tasks using the Fargate launch type or the CODE_DEPLOY deployment controller types don't support the DAEMON scheduling strategy.
• When you initially create a CodeDeploy application and deployment group, you must specify the following:
  • You must define two target groups for the load balancer. One target group should be the initial target group defined for the load balancer when the Amazon ECS service was created. The second target group's only requirement is that it can't be associated with a different load balancer than the one the service uses.
  • When you create a CodeDeploy deployment for an Amazon ECS service, CodeDeploy creates a replacement task set (or green task set) in the deployment. If you added a test listener to the load balancer, CodeDeploy routes your test traffic to the replacement task set. This is when you can run any validation tests. Then CodeDeploy reroutes the production traffic from the original task set to the replacement task set according to the traffic rerouting settings for the deployment group.

Amazon ECS Console Experience

The service create and service update workflows in the Amazon ECS console supports blue/green deployments.

To create an Amazon ECS service that uses the blue/green deployment type, see Creating a service (p. 170).

To update an existing Amazon ECS service that is using the blue/green deployment type, see Updating a service (p. 182).

When you use the Amazon ECS console to create an Amazon ECS service using the blue/green deployment type, an Amazon ECS task set and the following CodeDeploy resources are created automatically with the following default settings.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application name</td>
<td>AppECS-&lt;cluster[:47]&gt;-&lt;service[:47]&gt;</td>
</tr>
<tr>
<td>Deployment group name</td>
<td>DgpECS-&lt;cluster[:47]&gt;-&lt;service[:47]&gt;</td>
</tr>
<tr>
<td>Deployment group load balancer info</td>
<td>The load balancer production listener, optional test listener, and target groups specified are added to the deployment group configuration.</td>
</tr>
<tr>
<td>Traffic rerouting settings</td>
<td>Traffic rerouting – The default setting is <strong>Reroute traffic immediately</strong>. You can change it on</td>
</tr>
</tbody>
</table>
Blue/Green deployment with CodeDeploy

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original revision termination settings</td>
<td>The original revision termination settings are configured to wait 1 hour after traffic has been rerouted before terminating the blue task set.</td>
</tr>
<tr>
<td>Deployment configuration</td>
<td>The deployment configuration is set to CodeDeployDefault.ECSAllAtOnce by default, which routes all traffic at one time from the blue task set to the green task set. The deployment configuration can be changed using the AWS CodeDeploy console after the service is created.</td>
</tr>
</tbody>
</table>

**To view details of an Amazon ECS service using the blue/green deployment type, use the **Deployments** tab on the Amazon ECS console.**

**To view the details of a CodeDeploy deployment group in the CodeDeploy console, see View Deployment Group Details with CodeDeploy in the AWS CodeDeploy User Guide.**

**To modify the settings for a CodeDeploy deployment group in the CodeDeploy console, see Change Deployment Group Settings with CodeDeploy in the AWS CodeDeploy User Guide.**

A tutorial walking through the steps needed to create a service using the blue/green deployment type is provided. For more information, see Tutorial: Creating a service using a blue/green deployment (p. 347).

Support for performing a blue/green deployment has been added for AWS CloudFormation. For more information, see Perform Amazon ECS blue/green deployments through CodeDeploy using AWS CloudFormation in the AWS CloudFormation User Guide.

**Blue/Green Deployment Required IAM Permissions**

Amazon ECS blue/green deployments are made possible by a combination of the Amazon ECS and CodeDeploy APIs. IAM users must have the appropriate permissions for these services before they can use Amazon ECS blue/green deployments in the AWS Management Console or with the AWS CLI or SDKs.

In addition to the standard IAM permissions for creating and updating services, Amazon ECS requires the following permissions. These permissions have been added to the AmazonECS_FullAccess IAM policy. For more information, see AmazonECS_FullAccess (p. 274).

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "codedeploy:CreateApplication",
        "codedeploy:CreateDeployment",
        "codedeploy:CreateDeploymentGroup",
        "codedeploy:GetApplication",
        "codedeploy:GetDeployment"
      ]
    }
  ]
}
```
"codedeploy:GetDeploymentGroup",
"codedeploy:ListApplications",
"codedeploy:ListDeploymentGroups",
"codedeploy:ListDeployments",
"codedeploy:StopDeployment",
"codedeploy:GetDeploymentTarget",
"codedeploy:ListDeploymentTargets",
"codedeploy:GetDeploymentConfig",
"codedeploy:GetApplicationRevision",
"codedeploy:RegisterApplicationRevision",
"codedeploy:BatchGetApplicationRevisions",
"codedeploy:BatchGetDeploymentGroups",
"codedeploy:BatchGetDeployments",
"codedeploy:BatchGetApplications",
"codedeploy:ListApplicationRevisions",
"codedeploy:ListDeploymentConfigs",
"codedeploy:ContinueDeployment",
"sns:ListTopics",
"cloudwatch:DescribeAlarms",
"lambda:ListFunctions"
],
"Resource": [
"*
]
}

Note
In addition to the standard Amazon ECS permissions required to run tasks and services, IAM users also require `iam:PassRole` permissions to use IAM roles for tasks.

CodeDeploy needs permissions to call Amazon ECS APIs, modify your Elastic Load Balancing, invoke Lambda functions, and describe CloudWatch alarms, as well as permissions to modify your service's desired count on your behalf. Before creating an Amazon ECS service that uses the blue/green deployment type, you must create an IAM role (`ecsCodeDeployRole`). For more information, see Amazon ECS CodeDeploy IAM Role (p. 297).

The Create Service Example (p. 270) and Update Service Example (p. 271) IAM policy examples show the permissions that are required for IAM users to use Amazon ECS blue/green deployments on the AWS Management Console.

External Deployment

The external deployment type enables you to use any third-party deployment controller for full control over the deployment process for an Amazon ECS service. The details for your service are managed by either the service management API actions (CreateService, UpdateService, and DeleteService) or the task set management API actions (CreateTaskSet, UpdateTaskSet, UpdateServicePrimaryTaskSet, and DeleteTask). Each API action has a subset of the service definition parameters that it can manage.

The UpdateService API action updates the desired count and health check grace period parameters for a service. If the launch type, platform version, load balancer details, network configuration, or task definition need to be updated, you must create a new task set.

The UpdateTaskSet API action updates only the scale parameter for a task set.

The UpdateServicePrimaryTaskSet API action modifies which task set in a service is the primary task set. When you call the DescribeServices API action, it returns all fields specified for a primary task set. If the primary task set for a service is updated, any task set parameter values that exist on the new primary task set that differ from the old primary task set in a service are updated to the new value.
when a new primary task set is defined. If no primary task set is defined for a service, when describing the service, the task set fields are null.

**External Deployment Considerations**

Consider the following when using the external deployment type:

- Service auto scaling is not supported when using an external deployment controller.
- If using a load balancer for the task, the supported load balancer types are either an Application Load Balancer or a Network Load Balancer.
- Tasks using the Fargate launch type or EXTERNAL deployment controller types don't support the DAEMON scheduling strategy.

**External Deployment Workflow**

The following is the basic workflow to managing an external deployment on Amazon ECS.

**To manage an Amazon ECS service using an external deployment controller**

1. Create an Amazon ECS service. The only required parameter is the service name. You can specify the following parameters when creating a service using an external deployment controller. All other service parameters are specified when creating a task set within the service.

   - **serviceName**
     - Type: String
     - Required: Yes
     - The name of your service. Up to 255 letters (uppercase and lowercase), numbers, hyphens, and underscores are allowed. Service names must be unique within a cluster, but you can have similarly named services in multiple clusters within a Region or across multiple Regions.

   - **desiredCount**
     - The number of instantiations of the specified task set task definition to place and keep running within the service.

   - **deploymentConfiguration**
     - Optional deployment parameters that control how many tasks run during a deployment and the ordering of stopping and starting tasks. For more information, see deploymentConfiguration.

   - **tags**
     - Type: Array of objects
     - Required: No
     - The metadata that you apply to the service to help you categorize and organize them. Each tag consists of a key and an optional value, both of which you define. When a service is deleted, the tags are deleted as well. A maximum of 50 tags can be applied to the service. For more information, see Tagging your Amazon ECS resources (p. 222).

     - **key**
       - Type: String
       - Required: No
One part of a key-value pair that make up a tag. A key is a general label that acts like a category for more specific tag values.

**value**

Type: String

Length Constraints: Minimum length of 0. Maximum length of 256.

Required: No

The optional part of a key-value pair that make up a tag. A value acts as a descriptor within a tag category (key).

**enableECSManagedTags**

Specifies whether to enable Amazon ECS managed tags for the tasks within the service. For more information, see Tagging your resources for billing (p. 224).

**propagateTags**

Type: String

Valid values: TASK_DEFINITION | SERVICE

Required: No

Specifies whether to copy the tags from the task definition or the service to the tasks in the service. If no value is specified, the tags are not copied. Tags can only be copied to the tasks within the service during service creation. To add tags to a task after service creation, use the TagResource API action.

**healthCheckGracePeriodSeconds**

Type: Integer

Required: No

The period of time, in seconds, that the Amazon ECS service scheduler should ignore unhealthy Elastic Load Balancing target health checks, container health checks, and Route 53 health checks after a task enters a RUNNING state. This is only valid if your service is configured to use a load balancer. If your service has a load balancer defined and you do not specify a health check grace period value, the default value of 0 is used.

If your service's tasks take a while to start and respond to health checks, you can specify a health check grace period of up to 2,147,483,647 seconds during which the ECS service scheduler ignores the health check status. This grace period can prevent the ECS service scheduler from marking tasks as unhealthy and stopping them before they have time to come up.

**schedulingStrategy**

The scheduling strategy to use. Services using an external deployment controller support only the REPLICA scheduling strategy. For more information, see Service scheduler concepts (p. 157).

**placementConstraints**

An array of placement constraint objects to use for tasks in your service. You can specify a maximum of 10 constraints per task (this limit includes constraints in the task definition and those specified at run time). If you are using the Fargate launch type, task placement constraints aren't supported.
placementStrategy

The placement strategy objects to use for tasks in your service. You can specify a maximum of four strategy rules per service.

The following is an example service definition for creating a service using an external deployment controller.

```json
{
  "cluster": "",
  "serviceName": "",
  "desiredCount": 0,
  "role": "",
  "deploymentConfiguration": {
    "maximumPercent": 0,
    "minimumHealthyPercent": 0
  },
  "placementConstraints": [
    {
      "type": "distinctInstance",
      "expression": ""
    }
  ],
  "placementStrategy": [
    {
      "type": "binpack",
      "field": ""
    }
  ],
  "healthCheckGracePeriodSeconds": 0,
  "schedulingStrategy": "REPLICA",
  "deploymentController": {
    "type": "EXTERNAL"
  },
  "tags": [
    {
      "key": "",
      "value": ""
    }
  ],
  "enableECSManagedTags": true,
  "propagateTags": "TASK_DEFINITION"
}
```

2. Create an initial task set. The task set contains the following details about your service:

   taskDefinition

   The task definition for the tasks in the task set to use.

   launchType

   Type: String

   Valid values: EC2 | FARGATE

   Required: No

   The launch type on which to run your service. If a launch type is not specified, EC2 is used by default. For more information, see Amazon ECS launch types (p. 93).

   If a launchType is specified, the capacityProviderStrategy parameter must be omitted.
platformVersion

Type: String
Required: No

The platform version on which your tasks in the service are running. A platform version is only specified for tasks using the Fargate launch type. If one is not specified, the latest version (LATEST) is used by default.

AWS Fargate platform versions are used to refer to a specific runtime environment for the Fargate task infrastructure. When specifying the LATEST platform version when running a task or creating a service, you get the most current platform version available for your tasks. When you scale up your service, those tasks receive the platform version that was specified on the service's current deployment. For more information, see AWS Fargate platform versions (p. 43).

loadBalancers

A load balancer object representing the load balancer to use with your service. When using an external deployment controller, only Application Load Balancers and Network Load Balancers are supported. If you're using an Application Load Balancer, only one Application Load Balancer target group is allowed per task set.

The following snippet shows an example loadBalancer object to use.

```json
"loadBalancers": [
  {
    "targetGroupArn": "",
    "containerName": "",
    "containerPort": 0
  }
]
```

**Note**
When specifying a loadBalancer object, you must specify a targetGroupArn and omit the loadBalancerName parameters.

networkConfiguration

The network configuration for the service. This parameter is required for task definitions that use the awsvpc network mode to receive their own elastic network interface, and it's not supported for other network modes. For more information, see Fargate Task Networking in the Amazon Elastic Container Service User Guide for AWS Fargate.

serviceRegistries

The details of the service discovery registries to assign to this service. For more information, see Service Discovery (p. 217).

scale

A floating-point percentage of the desired number of tasks to place and keep running in the task set. The value is specified as a percent total of a service's desiredCount. Accepted values are numbers between 0 and 100.

The following is a JSON example for creating a task set for an external deployment controller.

```json
{
  "service": "",
  "cluster": "",
  "externalId": "",
  "scale": 0.5
}
```
3. When service changes are needed, use the UpdateService, UpdateTaskSet, or CreateTaskSet API action depending on which parameters you're updating. If you created a task set, use the scale parameter for each task set in a service to determine how many tasks to keep running in the service. For example, if you have a service that contains tasksetA and you create a tasksetB, you might test the validity of tasksetB before wanting to transition production traffic to it. You could set the scale for both task sets to 100, and when you were ready to transition all production traffic to tasksetB, you could update the scale for tasksetA to 0 to scale it down.

Service load balancing

Your Amazon ECS service can optionally be configured to use Elastic Load Balancing to distribute traffic evenly across the tasks in your service.

Amazon ECS services hosted on AWS Fargate support the Application Load Balancer and Network Load Balancer load balancer types. Application Load Balancers are used to route HTTP/HTTPS (or layer 7) traffic. Network Load Balancers are used to route TCP or UDP (or layer 4) traffic. For more information, see Load balancer types (p. 200).
Application Load Balancers offer several features that make them attractive for use with Amazon ECS services:

- Each service can serve traffic from multiple load balancers and expose multiple load balanced ports by specifying multiple target groups.
- Application Load Balancers allow containers to use dynamic host port mapping (so that multiple tasks from the same service are allowed per container instance).
- Application Load Balancers support path-based routing and priority rules (so that multiple services can use the same listener port on a single Application Load Balancer).

Topics
- Service load balancing considerations (p. 198)
- Load balancer types (p. 200)
- Creating a load balancer (p. 201)
- Registering multiple target groups with a service (p. 207)

Service load balancing considerations

Consider the following when you use service load balancing.

Application Load Balancer and Network Load Balancer considerations

The following considerations are specific to Amazon ECS services using Application Load Balancers or Network Load Balancers:

- Amazon ECS requires the service-linked IAM role which provides the permissions needed to register and deregister targets with your load balancer when tasks are created and stopped. For more information, see Service-Linked Role for Amazon ECS (p. 282).
- For services that use an Application Load Balancer or Network Load Balancer, you cannot attach more than five target groups to a service.
- When you create a target group for your service, you must choose ip as the target type, not instance.
- If your service uses an Application Load Balancer and requires access to multiple load balanced ports, such as port 80 and port 443 for an HTTP/HTTPS service, you can configure two listeners. One listener is responsible for HTTPS that forwards the request to the service, and another listener that is responsible for redirecting HTTP requests to the appropriate HTTPS port. For more information, see Create a listener to your Application Load Balancer in the User Guide for Application Load Balancers.
- After you create a service, the target group ARN or load balancer name, container name, and container port specified in the service definition are immutable. You cannot add, remove, or change the load balancer configuration of an existing service. If you update the task definition for the service, the container name and container port that were specified when the service was created must remain in the task definition.
- If a service's task fails the load balancer health check criteria, the task is stopped and restarted. This process continues until your service reaches the number of desired running tasks.
- The Application Load Balancer slow start mode is supported. For more information, see Application Load Balancer slow start mode considerations (p. 199).
- When using Network Load Balancers configured with IP addresses as targets, requests are seen as coming from the Network Load Balancers private IP address. This means that services behind an Network Load Balancer are effectively open to the world as soon as you allow incoming requests and health checks in the target's security group.
• Using a Network Load Balancer to route UDP traffic to your Amazon ECS tasks on Fargate require the task to use platform version 1.4.0.

• If you are experiencing problems with your load balancer-enabled services, see Troubleshooting service load balancers (p. 377).

### Application Load Balancer slow start mode considerations

Application Load Balancers enabled for slow start mode are supported for Amazon ECS services. For more information about slow start mode, see Target groups for your Application Load Balancers.

To ensure that the service scheduler ignores unhealthy container health checks until your tasks have warmed up and are ready to receive traffic, the following configurations are required:

- You must configure your container health check to return an *UNHEALTHY* status until the slow start period has ended.
- You must configure the health check grace period value for your Amazon ECS service for the same duration as the slow start mode duration.

Consider the following when you use different task network modes with Application Load Balancer slow start mode:

- **When using** `awsvpc` **network mode**, each task is assigned its own elastic network interface (ENI) and IP address which allows the Application Load Balancer to register each task as a target in the target group. This enables each newly registered target to have slow start mode enabled.

- **When using** `host` **network mode**, the task bypasses the Docker networking constructs and maps container ports directly to the Amazon EC2 instance's network interface or interfaces. You register the container instance as the Application Load Balancer target as opposed to the IP address of the task. This means you can only run one task per instance if you want slow start mode to work effectively. If you were to update an existing task or service, or restart the container instance, this does not re-register the container instance as an Application Load Balancer target, which would not cause the slow start duration to begin.

- **When using** `bridge` **network mode**, similarly to using `host` network mode, you register the container instance as the Application Load Balancer target as opposed to the Amazon ECS task so the same considerations described above apply.

Additionally, the following considerations are specific for using Application Load Balancer slow start mode and adding Amazon ECS tasks as targets:

- When you enable slow start for a target group, the targets already registered with the target group do not enter slow start mode.

- When you enable slow start for an empty target group and then register one or more targets using a single registration operation, these targets do not enter slow start mode. Newly registered targets enter slow start mode only when there is at least one registered target that is not in slow start mode.

- If you deregister a target in slow start mode, the target exits slow start mode. If you register the same target again, it enters slow start mode again.

- If a target in slow start mode becomes unhealthy and then healthy again before the duration period elapses, the target remains in slow start mode until the duration period elapses and then exits slow start mode. If a target that is not in slow start mode changes from unhealthy to healthy, it does not enter slow start mode.
Load balancer types

Elastic Load Balancing supports the following types of load balancers: Application Load Balancers, Network Load Balancers, and Classic Load Balancers. Amazon ECS services can use either type of load balancer. Application Load Balancers are used to route HTTP/HTTPS (or Layer 7) traffic. Network Load Balancers and Classic Load Balancers are used to route TCP (or Layer 4) traffic.

Topics
- Application Load Balancer (p. 200)
- Network Load Balancer (p. 200)

Application Load Balancer

An Application Load Balancer makes routing decisions at the application layer (HTTP/HTTPS), supports path-based routing, and can route requests to one or more ports on each container instance in your cluster. Application Load Balancers support dynamic host port mapping. For example, if your task's container definition specifies port 80 for an NGINX container port, and port 0 for the host port, then the host port is dynamically chosen from the ephemeral port range of the container instance (such as 32768 to 61000 on the latest Amazon ECS-optimized AMI). When the task is launched, the NGINX container is registered with the Application Load Balancer as an instance ID and port combination, and traffic is distributed to the instance ID and port corresponding to that container. This dynamic mapping allows you to have multiple tasks from a single service on the same container instance. For more information, see the User Guide for Application Load Balancers.

Network Load Balancer

A Network Load Balancer makes routing decisions at the transport layer (TCP/SSL). It can handle millions of requests per second. After the load balancer receives a connection, it selects a target from the target
Creating a load balancer

This section provides a hands-on introduction to using Elastic Load Balancing through the AWS Management Console to use with your Amazon ECS services. In this section, you create an external load balancer that receives public network traffic and routes it to your Amazon ECS container instances.

Elastic Load Balancing supports the following types of load balancers: Application Load Balancers, Network Load Balancers, and Classic Load Balancers, and Amazon ECS services can use either type of load balancer. Application Load Balancers are used to route HTTP/HTTPS traffic. Network Load Balancers and Classic Load Balancers are used to route TCP or Layer 4 traffic.

Application Load Balancers offer several features that make them attractive for use with Amazon ECS services:

- Application Load Balancers allow containers to use dynamic host port mapping (so that multiple tasks from the same service are allowed per container instance).
- Application Load Balancers support path-based routing and priority rules (so that multiple services can use the same listener port on a single Application Load Balancer).
We recommend that you use Application Load Balancers for your Amazon ECS services so that you can take advantage of these latest features. For more information about Elastic Load Balancing and the differences between the load balancer types, see the Elastic Load Balancing User Guide.

Prior to using a load balancer with your Amazon ECS service, your account must already have the Amazon ECS service-linked role created. For more information, see Service-Linked Role for Amazon ECS (p. 282).

**Topics**
- Creating an Application Load Balancer (p. 202)
- Creating a Network Load Balancer (p. 206)

## Creating an Application Load Balancer

This section walks you through the process of creating an Application Load Balancer in the AWS Management Console.

### Define your load balancer

First, provide some basic configuration information for your load balancer, such as a name, a network, and a listener.

A **listener** is a process that checks for connection requests. It is configured with a protocol and a port for the frontend (client to load balancer) connections, and protocol and a port for the backend (load balancer to backend instance) connections. In this example, you configure a listener that accepts HTTP requests on port 80 and sends them to the containers in your tasks on port 80 using HTTP.

**To define your load balancer**

1. Open the Amazon EC2 console at [https://console.aws.amazon.com/ec2/](https://console.aws.amazon.com/ec2/).
2. From the navigation bar, select a Region for your load balancer. Be sure to select the same Region that you selected for your Amazon ECS container instances.
3. In the navigation pane, under **LOAD BALANCING**, choose **Load Balancers**.
4. Choose **Create Load Balancer**.
5. On the **Select load balancer type** page, choose **Application Load Balancer** and then choose **Continue**.
6. Complete the **Configure Load Balancer** page as follows:
   a. For **Name**, type a name for your load balancer.
   b. For **Scheme**, an internet-facing load balancer routes requests from clients over the internet to targets. An internal load balancer routes requests to targets using private IP addresses.
   c. For **IP address type**, choose **ipv4** to support IPv4 addresses only or **dualstack** to support both IPv4 and IPv6 addresses.
   d. For **Listeners**, the default is a listener that accepts HTTP traffic on port 80. You can keep the default listener settings, modify the protocol or port of the listener, or choose **Add** to add another listener.
      
      **Note**
      If you plan on routing traffic to more than one target group, see **ListenerRules** for details on how to add host or path-based rules.
   e. For **VPC**, select the same VPC that you used for the container instances on which you intend to run your service.
   f. For **Availability Zones**, select the check box for the Availability Zones to enable for your load balancer. If there is one subnet for that Availability Zone, it is selected. If there is more than one
subnet for that Availability Zone, select one of the subnets. You can select only one subnet per Availability Zone. Your load balancer subnet configuration must include all Availability Zones that your container instances reside in.

g. Choose Next: Configure Security Settings.

Configure security settings

If you created a secure listener in the previous step, complete the Configure Security Settings page as follows; otherwise, choose Next: Configure Security Groups.

To configure security settings

1. If you have a certificate from AWS Certificate Manager, choose Choose an existing certificate from AWS Certificate Manager (ACM), and then choose the certificate from Certificate name.
2. If you have already uploaded a certificate using IAM, choose Choose an existing certificate from AWS Identity and Access Management (IAM), and then choose your certificate from Certificate name.
3. If you have a certificate ready to upload, choose Upload a new SSL Certificate to AWS Identity and Access Management (IAM). For Certificate name, type a name for the certificate. For Private Key, copy and paste the contents of the private key file (PEM-encoded). In Public Key Certificate, copy and paste the contents of the public key certificate file (PEM-encoded). In Certificate Chain, copy and paste the contents of the certificate chain file (PEM-encoded), unless you are using a self-signed certificate and it's not important that browsers implicitly accept the certificate.
4. For Select policy, choose a predefined security policy. For details on the security policies, see Security Policies in the User Guide for Application Load Balancers.

Configure security groups

You must assign a security group to your load balancer that allows inbound traffic to the ports that you specified for your listeners. Amazon ECS does not automatically update the security groups associated with Elastic Load Balancing load balancers or Amazon ECS container instances.

To assign a security group to your load balancer

1. On the Assign Security Groups page, choose Create a new security group.
2. Enter a name and description for your security group, or leave the default name and description. This new security group contains a rule that allows traffic to the port that you configured your listener to use.

   Note
   Later in this topic, you create a security group rule for your container instances that allows traffic on all ports coming from the security group created here, so that the Application Load Balancer can route traffic to dynamically assigned host ports on your container instances.
Creating a load balancer

3. Choose **Next: Configure Routing** to go to the next page in the wizard.

**Configure routing**

In this section, you create a target group for your load balancer and the health check criteria for targets that are registered within that group.

**To create a target group and configure health checks**

1. For **Target group**, keep the default, **New target group**.
2. For **Name**, type a name for the new target group.
3. Set **Protocol** and **Port** as needed.
4. For **Target type**, choose whether to register your targets with an instance ID or an IP address.
   
   **Important**
   
   If your service's task definition uses the `awsvpc` network mode (which is required for the Fargate launch type), you must choose `ip` as the target type, not `instance`. This is because tasks that use the `awsvpc` network mode are associated with an elastic network interface, not an Amazon EC2 instance.

5. For **Health checks**, keep the default health check settings.
6. Choose **Next: Register Targets**.

**Register targets**

Your load balancer distributes traffic between the targets that are registered to its target groups. When you associate a target group to an Amazon ECS service, Amazon ECS automatically registers and deregisters containers with your target group. Because Amazon ECS handles target registration, you do not add targets to your target group at this time.
To skip target registration

1. In the Registered instances section, ensure that no instances are selected for registration.
2. Choose Next: Review to go to the next page in the wizard.

Review and create

Review your load balancer and target group configuration and choose Create to create your load balancer.

Create a security group rule for your container instances

After your Application Load Balancer has been created, you must add an inbound rule to your container instance security group that allows traffic from your load balancer to reach the containers.

To allow inbound traffic from your load balancer to your container instances

1. Open the Amazon EC2 console at https://console.aws.amazon.com/ec2/.
2. In the left navigation, choose Security Groups.
3. Choose the security group that your container instances use. If you created your container instances by using the Amazon ECS first run wizard, this security group may have the description, ECS Allowed Ports.
4. Choose the Inbound tab, and then choose Edit.
5. For Type, choose All traffic.
6. For Source, choose Custom, and then type the name of your Application Load Balancer security group that you created in Configure security groups (p. 203). This rule allows all traffic from your Application Load Balancer to reach the containers in your tasks that are registered with your load balancer.
7. Choose Save to finish.
Create an Amazon ECS service

After your load balancer and target group are created, you can specify the target group in a service definition when you create a service. When each task for your service is started, the container and port combination specified in the service definition is registered with your target group and traffic is routed from the load balancer to that container. For more information, see Creating a service (p. 170).

Creating a Network Load Balancer

This section walks you through the process of creating a Network Load Balancer in the AWS Management Console.

Define your load balancer

First, provide some basic configuration information for your load balancer, such as a name, a network, and a listener.

A **listener** is a process that checks for connection requests. It is configured with a protocol and port for the frontend (client to load balancer) connections, and a protocol and port for the backend (load balancer to backend instance) connections. In this example, you configure an Internet-facing load balancer in the selected network with a listener that receives TCP traffic on port 80.

To define your load balancer

1. Open the Amazon EC2 console at [https://console.aws.amazon.com/ec2/](https://console.aws.amazon.com/ec2/).
2. From the navigation bar, select a region for your load balancer. Be sure to select the same region that you selected for your Amazon ECS container instances.
3. In the navigation pane, under **LOAD BALANCING**, choose **Load Balancers**.
4. Choose **Create Load Balancer**.
5. On the **Select load balancer type** page, choose **Create** under **Network Load Balancer**.
6. Complete the **Configure Load Balancer** page as follows:
   a. For **Name**, type a name for your load balancer.
   b. For **Scheme**, choose either **internet-facing** or **internal**. An internet-facing load balancer routes requests from clients over the internet to targets. An internal load balancer routes requests to targets using private IP addresses.
   c. For **Listeners**, the default is a listener that accepts TCP traffic on port 80. You can keep the default listener settings, modify the protocol or port of the listener, or choose **Add listener** to add another listener.
   d. For **Availability Zones**, select the VPC that you used for your Amazon EC2 instances. For each Availability Zone that you used to launch your Amazon EC2 instances, select an Availability Zone and then select the public subnet for that Availability Zone. To associate an Elastic IP address with the subnet, select it from **Elastic IP**.
   e. Choose **Next: Configure Routing**.

Configure routing

You register targets, such as Amazon EC2 instances, with a target group. The target group that you configure in this step is used as the target group in the listener rule, which forwards requests to the target group. For more information, see Target Groups for Your Network Load Balancers in the User Guide for Network Load Balancers.

To configure your target group

1. For **Target group**, keep the default, **New target group**.
2. For **Name**, type a name for the target group.
3. Set **Protocol** and **Port** as needed.
4. For **Target type**, choose whether to register your targets with an instance ID or an IP address.

   **Important**
   If your service's task definition uses the `awsvpc` network mode (which is required for the Fargate launch type), you must choose `ip` as the target type, not `instance`. This is because tasks that use the `awsvpc` network mode are associated with an elastic network interface, not an Amazon EC2 instance.
   You cannot register instances by instance ID if they have the following instance types: C1, CC1, CC2, CG1, CG2, CR1, G1, G2, HI1, HS1, M1, M2, M3, and T1. You can register instances of these types by IP address.

5. For **Health checks**, keep the default health check settings.
6. Choose **Next: Register Targets**.

---

**Register targets with the target group**

Your load balancer distributes traffic between the targets that are registered to its target groups.

When you associate a target group to an Amazon ECS service, Amazon ECS automatically registers and deregisters containers with your target group. Because Amazon ECS handles target registration, you do not add targets to your target group at this time.

**To skip target registration**

1. In the **Registered instances** section, ensure that no instances are selected for registration.
2. Choose **Next: Review** to go to the next page in the wizard.

---

**Review and create**

Review your load balancer and target group configuration and choose **Create** to create your load balancer.

**Create an Amazon ECS service**

After your load balancer and target group are created, you can specify the target group in a service definition when you create a service. When each task for your service is started, the container and port combination specified in the service definition is registered with your target group and traffic is routed from the load balancer to that container. For more information, see Creating a service (p. 170).

---

**Registering multiple target groups with a service**

Your Amazon ECS service can serve traffic from multiple load balancers and expose multiple load balanced ports when you specify multiple target groups in a service definition.

To create a service specifying multiple target groups, you must create the service using the Amazon ECS API, SDK, AWS CLI, or an AWS CloudFormation template. After the service is created, you can view the service and the target groups registered to it with the AWS Management Console. It is not possible to update the load balancing configuration of an existing service.

Multiple target groups can be specified in a service definition using the following format. For the full syntax of a service definition, see Service definition template (p. 169).

```
"loadBalancers": [
   
]```
Registering multiple target groups with a service

```
"targetGroupArn":"arn:aws:elasticloadbalancing:region:123456789012:targetgroup/
  target_group_name_1/1234567890123456",
  "containerName":"container_name",
  "containerPort":container_port
 },

"targetGroupArn":"arn:aws:elasticloadbalancing:region:123456789012:targetgroup/
  target_group_name_2/6543210987654321",
  "containerName":"container_name",
  "containerPort":container_port
 }
]
```

Multiple target group considerations

The following should be considered when you specify multiple target groups in a service definition.

- For services that use an Application Load Balancer or Network Load Balancer, you cannot attach more than five target groups to a service.
- Specifying multiple target groups in a service definition is only supported under the following conditions:
  - The service must use either an Application Load Balancer or Network Load Balancer.
  - The service must use the rolling update (ECS) deployment controller type.
- Specifying multiple target groups is supported for services containing tasks using both the Fargate and EC2 launch types.
- When creating a service that specifies multiple target groups, the Amazon ECS service-linked role must be created. The role is created by omitting the `role` parameter in API requests, or the `Role` property in AWS CloudFormation. For more information, see Service-Linked Role for Amazon ECS (p. 282).

Example service definitions

Following are a few example use cases for specifying multiple target groups in a service definition. For the full syntax of a service definition, see Service definition template (p. 169).

**Example: Having separate load balancers for internal and external traffic**

In the following use case, a service uses two separate load balancers, one for internal traffic and a second for internet-facing traffic, for the same container and port.

```
"loadBalancers":[
  //Internal ELB
  {
    "targetGroupArn":"arn:aws:elasticloadbalancing:region:123456789012:targetgroup/
      target_group_name_1/1234567890123456",
    "containerName":"nginx",
    "containerPort":8080
  },
  //Internet-facing ELB
  {
    "targetGroupArn":"arn:aws:elasticloadbalancing:region:123456789012:targetgroup/
      target_group_name_2/6543210987654321",
    "containerName":"nginx",
    "containerPort":8080
  }
]
```
Example: Exposing multiple ports from the same container

In the following use case, a service uses one load balancer but exposes multiple ports from the same container. For example, a Jenkins container might expose port 8080 for the Jenkins web interface and port 50000 for the API.

```
"loadBalancers": [  
    {  
        "targetGroupArn": "arn:aws:elasticloadbalancing:region:123456789012:targetgroup/target_group_name_1/1234567890123456",  
        "containerName": "jenkins",  
        "containerPort": 8080  
    },  
    {  
        "targetGroupArn": "arn:aws:elasticloadbalancing:region:123456789012:targetgroup/target_group_name_2/6543210987654321",  
        "containerName": "jenkins",  
        "containerPort": 50000  
    }  
]  
```

Example: Exposing ports from multiple containers

In the following use case, a service uses one load balancer and two target groups to expose ports from separate containers.

```
"loadBalancers": [  
    {  
        "targetGroupArn": "arn:aws:elasticloadbalancing:region:123456789012:targetgroup/target_group_name_1/1234567890123456",  
        "containerName": "webserver",  
        "containerPort": 80  
    },  
    {  
        "targetGroupArn": "arn:aws:elasticloadbalancing:region:123456789012:targetgroup/target_group_name_2/6543210987654321",  
        "containerName": "database",  
        "containerPort": 3306  
    }  
]  
```

Service Auto Scaling

*Automatic scaling* is the ability to increase or decrease the desired count of tasks in your Amazon ECS service automatically. Amazon ECS leverages the Application Auto Scaling service to provide this functionality. For more information, see the Application Auto Scaling User Guide.

Amazon ECS publishes CloudWatch metrics with your service's average CPU and memory usage. For more information, see Service utilization (p. 235). You can use these and other CloudWatch metrics to scale out your service (add more tasks) to deal with high demand at peak times, and to scale in your service (run fewer tasks) to reduce costs during periods of low utilization.
Amazon ECS Service Auto Scaling supports the following types of automatic scaling:

- **Target Tracking Scaling Policies (p. 211)**—Increase or decrease the number of tasks that your service runs based on a target value for a specific metric. This is similar to the way that your thermostat maintains the temperature of your home. You select temperature and the thermostat does the rest.

- **Step Scaling Policies (p. 216)**—Increase or decrease the number of tasks that your service runs based on a set of scaling adjustments, known as step adjustments, that vary based on the size of the alarm breach.

- **Scheduled Scaling**—Increase or decrease the number of tasks that your service runs based on the date and time.

### Service Auto Scaling and Deployments

As a best practice to prevent scale-in processes from behaving like scale-out processes, suspend dynamic scaling during deployments. This will prevent alarms from triggering scale-in and scale-out processes that depend on the running task count. Take the following steps to avoid this issue.

1. Call the `describe-scalable-targets` command, specifying the resource ID of the ECS service associated with the scalable target in Application Auto Scaling (Example: `service/default/sample-webapp`). Record the output. You will need it when you call the next command.

2. Call the `register-scalable-target` command, specifying the resource ID, namespace, and scalable dimension. Specify `true` for both `DynamicScalingInSuspended` and `DynamicScalingOutSuspended`.

3. After deployment is complete, you can call the `register-scalable-target` command to resume scaling.

For more information, see [Suspending and resuming scaling for Application Auto Scaling](#).

### IAM Permissions Required for Service Auto Scaling

Service Auto Scaling is made possible by a combination of the Amazon ECS, CloudWatch, and Application Auto Scaling APIs. Services are created and updated with Amazon ECS, alarms are created with CloudWatch, and scaling policies are created with Application Auto Scaling.

In addition to the standard IAM permissions for creating and updating services, the IAM user that accesses Service Auto Scaling settings must have the appropriate permissions for the services that support dynamic scaling. IAM users must have permissions to use the actions shown in the following example policy.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "application-autoscaling:*",
                "ecs:DescribeServices",
                "ecs:UpdateService",
                "cloudwatch:DescribeAlarms",
                "cloudwatch:PutMetricAlarm",
                "cloudwatch:DeleteAlarms",
                "cloudwatch:DescribeAlarmHistory",
                "cloudwatch:DescribeAlarmsForMetric",
                "cloudwatch:GetMetricStatistics",
                "cloudwatch:ListMetrics"
            ]
        }
    ]
}
``
Target Tracking Scaling Policies

With target tracking scaling policies, you select a metric and set a target value. Amazon ECS Service Auto Scaling creates and manages the CloudWatch alarms that trigger the scaling policy and calculates the scaling adjustment based on the metric and the target value. The scaling policy adds or removes service tasks as required to keep the metric at, or close to, the specified target value. In addition to keeping the metric close to the target value, a target tracking scaling policy also adjusts to the fluctuations in the metric due to a fluctuating load pattern and minimizes rapid fluctuations in the number of tasks running in your service.

Considerations

Keep the following considerations in mind:

- A target tracking scaling policy assumes that it should perform scale out when the specified metric is above the target value. You cannot use a target tracking scaling policy to scale out when the specified metric is below the target value.
- A target tracking scaling policy does not perform scaling when the specified metric has insufficient data. It does not perform scale in because it does not interpret insufficient data as low utilization.
- You may see gaps between the target value and the actual metric data points. This is because Service Auto Scaling always acts conservatively by rounding up or down when it determines how much capacity to add or remove. This prevents it from adding insufficient capacity or removing too much capacity.
- To ensure application availability, the service scales out proportionally to the metric as fast as it can, but scales in more gradually.
- You can have multiple target tracking scaling policies for an Amazon ECS service, provided that each of them uses a different metric. The intention of Service Auto Scaling is to always prioritize availability, so

The Create Service Example (p. 270) and Update Service Example (p. 271) IAM policy examples show the permissions that are required for IAM users to use Service Auto Scaling in the AWS Management Console.

The Application Auto Scaling service also needs permission to describe your Amazon ECS services and CloudWatch alarms, and permissions to modify your service's desired count on your behalf. If you enable automatic scaling for your ECS services, it creates a service-linked role named AWSServiceRoleForApplicationAutoScaling_ECSService. This service-linked role grants Application Auto Scaling permission to describe the alarms for your policies, to monitor the current running task count of the service, and to modify the desired count of the service. The original managed Amazon ECS role for Application Auto Scaling was ecsAutoScaleRole, but it is no longer required. The service-linked role is the default role for Application Auto Scaling. For more information, see Service-Linked Roles in the Application Auto Scaling User Guide.
its behavior differs depending on whether the target tracking policies are ready for scale out or scale in. It will scale out the service if any of the target tracking policies are ready for scale out, but will scale in only if all of the target tracking policies (with the scale-in portion enabled) are ready to scale in.

- Do not edit or delete the CloudWatch alarms that Service Auto Scaling manages for a target tracking scaling policy. Service Auto Scaling deletes the alarms automatically when you delete the scaling policy.

**Tutorial: Service Auto Scaling with Target Tracking**

The following procedures help you to create an Amazon ECS cluster and a service that uses target tracking to scale out (and in) automatically based on demand.

In this tutorial, you use the Amazon ECS first-run wizard to create a cluster and a service that runs behind an Elastic Load Balancing load balancer. Then you configure a target tracking scaling policy that scales your service automatically based on the current application load as measured by the service's CPU utilization (from the `ECS, ClusterName, ServiceName` category in CloudWatch).

When the average CPU utilization of your service rises above 75% (meaning that more than 75% of the CPU that is reserved for the service is being used), a scale-out alarm triggers Service Auto Scaling to add another task to your service to help out with the increased load. Conversely, when the average CPU utilization of your service drops below the target utilization for a sustained period of time, a scale-in alarm triggers a decrease in the service's desired count to free up those cluster resources for other tasks and services.

**Prerequisites**

This tutorial assumes that you are using administrator credentials, and that you have an Amazon EC2 key pair in the current region. If you do not have these resources, or your are not sure, you can create them by following the steps in Setting up with Amazon ECS (p. 3).

**Step 1: Create a Cluster and a Service**

Start by creating a cluster and service using the Amazon ECS first-run wizard. The first-run wizard takes care of creating the necessary IAM roles for this tutorial, an Auto Scaling group for your container instances, and a service that runs behind a load balancer. The wizard also makes the clean-up process much easier, because you can delete the entire AWS CloudFormation stack in one step.

For this tutorial, you create a cluster called `service-autoscaling` and a service called `sample-webapp`.

**To create your cluster and service**

1. Open the Amazon ECS console first run wizard at https://console.aws.amazon.com/ecs/home#/firstRun.
2. From the navigation bar, choose the US East (N. Virginia) region.
3. On **Step 1: Container and Task**, for Container definition, select sample-app.
4. For Task definition, leave all of the default options and choose Next.
5. On **Step 2: Service**, for Load balancer type, choose Application Load Balancer, Next.
   - **Important**: Application Load Balancers do incur costs while they exist in your AWS resources. For more information, see Elastic Load Balancing Pricing.
6. On **Step 3: Cluster**, for Cluster name, enter service-autoscaling and choose Next.
7. Review your choices and then choose Create.
You are directed to a Launch Status page that shows the status of your launch and describes each step of the process (this can take a few minutes to complete while your cluster resources are created and populated).

8. When your cluster and service are created, choose View service.

**Step 2: Configure Service Auto Scaling**

Now that you have launched a cluster and created a service in that cluster that is running behind a load balancer, you can enable Service Auto Scaling by creating a target tracking scaling policy.

**To configure basic Service Auto Scaling parameters**

1. On the Service: sample-app-service page, your service configuration should look similar to the image below, although the task definition revision and load balancer name are likely to be different. Choose Update to update your new service.

2. On the Update service page, choose Next step until you get to Step 3: Set Auto Scaling (optional).
3. For **Service Auto Scaling**, choose **Configure Service Auto Scaling** to adjust your service's desired count.

4. For **Minimum number of tasks**, enter 1 for the lower limit of the number of tasks for Service Auto Scaling to use. Your service's desired count is not automatically adjusted below this amount.

5. For **Desired number of tasks**, this field is pre-populated with the value that you entered earlier. This value must be between the minimum and maximum number of tasks specified on this page. Leave this value at 1.

6. For **Maximum number of tasks**, enter 2 for the upper limit of the number of tasks for Service Auto Scaling to use. Your service's desired count is not automatically adjusted above this amount.

7. For **IAM role for Service Auto Scaling**, choose the `ecsAutoscaleRole`. If this role does not exist, choose **Create new role** to have the console create it for you.

**To configure a target tracking scaling policy for your service**

1. Choose **Add scaling policy** to configure your scaling policy.

2. On the **Add policy** page, update the following fields:
   
   a. For **Scaling policy type**, choose **Target tracking**.
   
   b. For **Policy name**, enter **TargetTrackingPolicy**.
   
   c. For **ECS service metric**, choose **ECSServiceAverageCPUUtilization**.
   
   d. For **Target value**, enter 75.
   
   e. For **Scale-out cooldown period**, enter 60 seconds. A scale-out activity increases the number of your service's tasks. While the scale-out cooldown period is in effect, the capacity that has been added by the previous scale-out activity that initiated the cooldown is calculated as part of the desired capacity for the next scale out. The intention is to continuously (but not excessively) scale out.
   
   f. For **Scale-in cooldown period**, enter 60 seconds. A scale-in activity reduces the number of your service's tasks. The scale-in cooldown period is used to block subsequent scale-in requests until it has expired. The intention is to scale in conservatively to protect your application's availability. However, if another alarm triggers a scale out activity during the cooldown period after a scale-in, Service Auto Scaling scales out your scalable target immediately.
   
   g. Choose **Save**.

3. Choose **Next step**.

4. Review all of your choices and then choose **Update Service**.

5. When your service status is finished updating, choose **View Service**.

**Step 3: Trigger a Scaling Activity**

After your service is configured with Service Auto Scaling, you can trigger a scaling activity by pushing your service's CPU utilization into the **ALARM** state. Because the example in this tutorial is a web application that is running behind a load balancer, you can send thousands of HTTP requests to your service (using the ApacheBench utility) to spike the service CPU utilization above the threshold amount. This spike should trigger the alarm, which in turn triggers a scaling activity to add one task to your service.

After the ApacheBench utility finishes the requests, the service CPU utilization should drop below your 75% threshold, triggering a scale-in activity that returns the service's desired count to 1.

**To trigger a scaling activity for your service**

1. From your service's main view page in the console, choose the load balancer name to view its details in the Amazon EC2 console. You need the load balancer's DNS name, which should look something like **EC2Contai-EcsElast-SMAKV74U23PH-96652279.us-east-1.elb.amazonaws.com**.
2. Use the ApacheBench (ab) utility to make thousands of HTTP requests to your load balancer in a short period of time.

Note
This command is installed by default on macOS, and it is available for many Linux distributions, as well. For example, you can install ab on Amazon Linux with the following command:

```bash
$ sudo yum install -y httpd24-tools
```

Run the following command, substituting your load balancer's DNS name.

```bash
$ ab -n 100000 -c 1000 http://EC2Contai-EcsElast-SMAKV74U23PH-96652279.us-east-1.elb.amazonaws.com/
```


4. In the left navigation pane, choose Alarms.

5. Wait for your ab HTTP requests to trigger the scale-out alarm in the CloudWatch console. You should see your Amazon ECS service scale out and add one task to your service's desired count.

6. Shortly after your ab HTTP requests complete (between 1 and 2 minutes), your scale in alarm should trigger and the scale in policy reduces your service's desired count back to 1.

**Step 4: Next Steps**

Go to the next step if you would like to delete the basic infrastructure that you just created for this tutorial. Otherwise, you can use this infrastructure as your base and try one or more of the following:

- To view these scaling activities from the Amazon ECS console, choose the Events tab of the service. When scaling events occur, you see informational messages here. For example:

  Message: Successfully set desired count to 1. Change successfully fulfilled by ecs.
  Cause: monitor alarm TargetTracking-service/service-autoscaling/sample-webapp-AlarmLow-fcd80aef-5161-4890-aeb4-35dd11ff42c in state ALARM triggered policy TargetTrackingPolicy

- If you have CloudWatch Container Insights set up and it's collecting Amazon ECS metrics, you can view metric data on the CloudWatch automatic dashboards. For more information, see Introducing Amazon CloudWatch Container Insights for Amazon ECS in the AWS Compute Blog.

- Learn how to set up CloudWatch Container Insights. Additional charges apply. For more information, see Amazon ECS CloudWatch Container Insights (p. 249) and Updating cluster settings (p. 54).

**Step 5: Cleaning Up**

When you have completed this tutorial, you may choose to keep your cluster, Auto Scaling group, load balancer, target tracking scaling policy, and CloudWatch alarms. However, if you are not actively using these resources, you should consider cleaning them up so that your account does not incur unnecessary charges.

**To delete your cluster**

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the left navigation pane, choose Clusters.
3. On the Clusters page, choose the service-autoscaling cluster.
4. Choose Delete Cluster, Delete. It may take a few minutes for the cluster AWS CloudFormation stack to finish cleaning up.
Step Scaling Policies

Although Amazon ECS Service Auto Scaling supports using Application Auto Scaling step scaling policies, we recommend using target tracking scaling policies instead. For example, if you want to scale your service when CPU utilization falls below or rises above a certain level, create a target tracking scaling policy based on the CPU utilization metric provided by Amazon ECS. For more information, see Target Tracking Scaling Policies (p. 211).

With step scaling policies, you create and manage the CloudWatch alarms that trigger the scaling process. If the target tracking alarms don't work for your use case, you can use step scaling. You can also use target tracking scaling with step scaling for an advanced scaling policy configuration. For example, you can configure a more aggressive response when utilization reaches a certain level.

Service Auto Scaling Considerations

When using scaling policies, note the following considerations:

- Amazon ECS sends metrics in 1-minute intervals to CloudWatch. Metrics are not available until the clusters and services send the metrics to CloudWatch, and you cannot create CloudWatch alarms for metrics that do not exist yet.
- The scaling policies support a cooldown period. This is the number of seconds to wait for a previous scaling activity to take effect.
  - For scale-out events, the intention is to continuously (but not excessively) scale out. After Service Auto Scaling successfully scales out using a scaling policy, it starts to calculate the cooldown time. The scaling policy won’t increase the desired capacity again unless either a larger scale out is triggered or the cooldown period ends. While the scale-out cooldown period is in effect, the capacity added by the initiating scale-out activity is calculated as part of the desired capacity for the next scale-out activity.
  - For scale-in events, the intention is to scale in conservatively to protect your application’s availability, so scale-in activities are blocked until the cooldown period has expired. However, if another alarm triggers a scale-out activity during the scale-in cooldown period, Service Auto Scaling scales out the target immediately. In this case, the scale-in cooldown period stops and doesn’t complete.
- The ECS service scheduler respects the desired count at all times, but as long as you have active scaling policies and alarms on a service, Service Auto Scaling could change a desired count that was manually set by you.
- If a service’s desired count is set below its minimum capacity value, and an alarm triggers a scale-out activity, Service Auto Scaling scales the desired count up to the minimum capacity value and then continues to scale out as required, based on the scaling policy associated with the alarm. However, a scale-in activity does not adjust the desired count, because it is already below the minimum capacity value.
- If a service’s desired count is set above its maximum capacity value, and an alarm triggers a scale-in activity, Service Auto Scaling scales the desired count out to the maximum capacity value and then continues to scale in as required, based on the scaling policy associated with the alarm. However, a scale-out activity does not adjust the desired count, because it is already above the maximum capacity value.
- During scaling activities, the actual running task count in a service is the value that Service Auto Scaling uses as its starting point, as opposed to the desired count, which is what processing capacity is supposed to be. This prevents excessive (runaway) scaling that could not be satisfied, for example, if there are not enough container instance resources to place the additional tasks. If the container instance capacity is available later, the pending scaling activity may succeed, and then further scaling activities can continue after the cooldown period.
- If you want your task count to scale to zero when there is no work to be done, set a minimum capacity of 0. With target tracking scaling policies, when actual capacity is 0 and the metric indicates that there
is workload demand, Service Auto Scaling waits for one data point to be sent before scaling out. In this case, it scales out by the minimum possible amount as a starting point and then resumes scaling based on the actual running task count.

Amazon ECS Console Experience

Service Auto Scaling is disabled by default. You can enable it by configuring scaling policies from the Auto Scaling tab of your services in the AWS Management Console for Amazon ECS.

For step-by-step guidance for working with scaling policies from the console, see Creating a service (p. 170) and Updating a service (p. 182). For more information about step scaling and a walkthrough, see Automatic Scaling with Amazon ECS in the AWS Compute Blog. For a target tracking walkthrough, see Target Tracking Scaling Policies (p. 211).

When you configure scaling policies for a service in the Amazon ECS console, your service is automatically registered as a scalable target with Application Auto Scaling, and your scaling policies are automatically in force as soon as they’re successfully created.

AWS CLI and SDK Experience

Service Auto Scaling is made possible by a combination of the Amazon ECS, CloudWatch, and Application Auto Scaling APIs. Services are created and updated with Amazon ECS, alarms are created with CloudWatch, and scaling policies are created with Application Auto Scaling.

For more information about these specific API operations, see the Amazon Elastic Container Service API Reference, the Amazon CloudWatch API Reference, and the Application Auto Scaling API Reference. For more information about the AWS CLI commands for these services, see the ecs, cloudwatch, and application-autoscaling sections of the AWS CLI Command Reference.

To configure scaling policies for your ECS service using the AWS CLI

1. Register your ECS service as a scalable target using the register-scalable-target command.
2. Create a scaling policy using the put-scaling-policy command.
3. [Step scaling] Create an alarm that triggers the scaling policy using the put-metric-alarm command.

For more information about configuring scaling policies using the AWS CLI, see the Application Auto Scaling User Guide.

Service Discovery

Your Amazon ECS service can optionally be configured to use Amazon ECS Service Discovery. Service discovery uses AWS Cloud Map API actions to manage HTTP and DNS namespaces for your Amazon ECS services. For more information, see What Is AWS Cloud Map? in the AWS Cloud Map Developer Guide.

Service discovery is available in the following AWS Regions:

<table>
<thead>
<tr>
<th>Region Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East (N. Virginia)</td>
<td>us-east-1</td>
</tr>
<tr>
<td>US East (Ohio)</td>
<td>us-east-2</td>
</tr>
<tr>
<td>US West (N. California)</td>
<td>us-west-1</td>
</tr>
</tbody>
</table>
Service Discovery concepts

Service discovery consists of the following components:

- **Service discovery namespace**: A logical group of service discovery services that share the same domain name, such as example.com.
- **Service discovery service**: Exists within the service discovery namespace and consists of the service name and DNS configuration for the namespace. It provides the following core component:
  - **Service registry**: Allows you to look up a service via DNS or AWS Cloud Map API actions and get back one or more available endpoints that can be used to connect to the service.
- **Service discovery instance**: Exists within the service discovery service and consists of the attributes associated with each Amazon ECS service in the service directory.
- **Instance attributes**: The following metadata is added as custom attributes for each Amazon ECS service that is configured to use service discovery:
  - **AWS_INSTANCE_IPV4** – For an A record, the IPv4 address that Route 53 returns in response to DNS queries and AWS Cloud Map returns when discovering instance details, for example, 192.0.2.44.
  - **AWS_INSTANCE_PORT** – The port value associated with the service discovery service.
• **AVAILABILITY_ZONE** – The Availability Zone into which the task was launched. For tasks using the EC2 launch type, this is the Availability Zone in which the container instance exists. For tasks using the Fargate launch type, this is the Availability Zone in which the elastic network interface exists.

• **REGION** – The Region in which the task exists.

• **ECS_SERVICE_NAME** – The name of the Amazon ECS service to which the task belongs.

• **ECS_CLUSTER_NAME** – The name of the Amazon ECS cluster to which the task belongs.

• **EC2_INSTANCE_ID** – The ID of the container instance the task was placed on. This custom attribute is not added if the task is using the Fargate launch type.

• **ECS_TASK_DEFINITION_FAMILY** – The task definition family that the task is using.

• **ECS_TASK_SET_EXTERNAL_ID** – If a task set is created for an external deployment and is associated with a service discovery registry, then the **ECS_TASK_SET_EXTERNAL_ID** attribute will contain the external ID of the task set.

• **Amazon ECS health checks**: Amazon ECS performs periodic container-level health checks. If an endpoint does not pass the health check, it is removed from DNS routing and marked as unhealthy.

## Service discovery considerations

The following should be considered when using service discovery:

• Service discovery is supported for tasks on Fargate that use platform version 1.1.0 or later. For more information, see **AWS Fargate platform versions (p. 43)**.

• Services configured to use service discovery have a limit of 1,000 tasks per service. This is due to a Route 53 service quota.

• The Create Service workflow in the Amazon ECS console only supports registering services into private DNS namespaces. When an AWS Cloud Map private DNS namespace is created, a Route 53 private hosted zone will be created automatically.

• The DNS records created for a service discovery service always register with the private IP address for the task, rather than the public IP address, even when public namespaces are used.

• Service discovery requires that tasks specify either the **awsvpc**, **bridge**, or **host** network mode (**none** is not supported).

• If the task definition your service task specifies uses the **awsvpc** network mode, you can create any combination of A or SRV records for each service task. If you use SRV records, a port is required.

• If the task definition that your service task specifies uses the **bridge** or **host** network mode, an SRV record is the only supported DNS record type. Create an SRV record for each service task. The SRV record must specify a container name and container port combination from the task definition.

• DNS records for a service discovery service can be queried within your VPC. They use the following format: `<service discovery service name>.<service discovery namespace>`. For more information, see **Step 3: Verify Service Discovery (p. 343)**.

• When doing a DNS query on the service name, A records return a set of IP addresses that correspond to your tasks. SRV records return a set of IP addresses and ports per task.

• If you have eight or fewer healthy records, Route 53 responds to all DNS queries with all of the healthy records.

• When all records are unhealthy, Route 53 responds to DNS queries with up to eight unhealthy records.

• You can configure service discovery for an ECS service that is behind a load balancer, but service discovery traffic is always routed to the task and not the load balancer.

• Service discovery does not support the use of Classic Load Balancers.

• It is recommended to use container-level health checks managed by Amazon ECS for your service discovery service.
• **HealthCheckCustomConfig**—Amazon ECS manages health checks on your behalf. Amazon ECS uses information from container and health checks, as well as your task state, to update the health with AWS Cloud Map. This is specified using the `--health-check-custom-config` parameter when creating your service discovery service. For more information, see `HealthCheckCustomConfig` in the *AWS Cloud Map API Reference*.

• If you are using the Amazon ECS console, the workflow creates one service discovery service per ECS service. It maps all of the task IP addresses as A records, or task IP addresses and port as SRV records.

• Service discovery can only be configured when first creating a service. Updating existing services to configure service discovery for the first time or change the current configuration is not supported.

• The AWS Cloud Map resources created when service discovery is used must be cleaned up manually. For more information, see Step 4: Clean up (p. 345) in the Tutorial: Creating a service using Service Discovery (p. 337) topic.

## Amazon ECS console experience

The service creation workflow in the Amazon ECS console supports service discovery. Service discovery can only be configured when first creating a service. Updating existing services to configure service discovery for the first time or change the current configuration is not supported.

To create a new Amazon ECS service that uses service discovery, see Creating a service (p. 170).

## Service discovery pricing

Customers using Amazon ECS service discovery are charged for Route 53 resources and AWS Cloud Map discovery API operations. This involves costs for creating the Route 53 hosted zones and queries to the service registry. For more information, see AWS Cloud Map Pricing in the *AWS Cloud Map Developer Guide*.

Amazon ECS performs container level health checks and exposes them to AWS Cloud Map custom health check API operations. This is currently made available to customers at no extra cost. If you configure additional network health checks for publicly exposed tasks, you are charged for those health checks.

## Service throttle logic

The Amazon ECS service scheduler includes logic that throttles how often service tasks are launched if they repeatedly fail to start.

If tasks for an ECS service repeatedly fail to enter the `RUNNING` state (progressing directly from `PENDING` to `STOPPED`), then the time between subsequent restart attempts is incrementally increased up to a maximum of 15 minutes. This maximum period is subject to change in the future and should not be considered permanent. This behavior reduces the effect that unstartable tasks have on your Amazon ECS cluster resources or Fargate infrastructure costs. If your service triggers the throttle logic, you receive the following service event message (p. 376):

```
(service service-name) is unable to consistently start tasks successfully.
```

Amazon ECS does not ever stop a failing service from retrying, nor does it attempt to modify it in any way other than increasing the time between restarts. The service throttle logic does not provide any user-tunable parameters.

If you update your service to use a new task definition, your service returns to a normal, non-throttled state immediately. For more information, see Updating a service (p. 182).
The following are some common causes that trigger this logic:

- The Amazon ECS container agent is unable to pull your task Docker image. This could be due to a bad container image name, image, or tag, or a lack of private registry authentication or permissions. In this case, you also see CannotPullContainerError in your stopped task errors (p. 369).

**Important**

Tasks that are stopped after they reach the **RUNNING** state do not trigger the throttle logic or the associated service event message. For example, if failed Elastic Load Balancing health checks for a service cause a task to be flagged as unhealthy, and Amazon ECS deregisters it and kills the task, this does not trigger the throttle. Even if a task’s container command immediately exits with a non-zero exit code, the task has already moved to the **RUNNING** state. Tasks that fail immediately due to command errors do not trigger the throttle or the service event message.
Resources and tags

Amazon ECS resources, including task definitions, clusters, tasks, services, and container instances, are assigned an Amazon Resource Name (ARN) and a unique resource identifier (ID). These resources can be tagged with values that you define, to help you organize and identify them.

The following topics provide an overview on these resources and tags and show how you can use them.

Contents
• Tagging your Amazon ECS resources (p. 222)
• Amazon ECS service quotas (p. 226)
• Amazon ECS usage reports (p. 230)

Tagging your Amazon ECS resources

To help you manage your Amazon ECS resources, you can optionally assign your own metadata to each resource using tags. This topic provides an overview of tags in Amazon ECS and how you can create them.

Important
To use this feature, you must opt in to the new Amazon Resource Name (ARN) and resource identifier (ID) formats. For more information, see Amazon Resource Names (ARNs) and IDs (p. 144).

Tag basics

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value, both of which you define.

Tags enable you to categorize your AWS resources in different ways, for example, by purpose, owner, or environment. This is useful when you have many resources of the same type. You can quickly identify a specific resource based on the tags you've assigned to it. For example, you can define a set of tags for your account's Amazon ECS container instances to help you track each instance's owner and stack level.

We recommend that you devise a set of tag keys that meets your needs for each resource type. Using a consistent set of tag keys makes it easier for you to manage your resources. You can search and filter the resources based on the tags you add.

Tags don't have any semantic meaning to Amazon ECS and are interpreted strictly as a string of characters. Also, tags are not automatically assigned to your resources. You can edit tag keys and values, and you can remove tags from a resource at any time. You can set the value of a tag to an empty string, but you can't set the value of a tag to null. If you add a tag that has the same key as an existing tag on that resource, the new value overwrites the earlier value. If you delete a resource, any tags for the resource are also deleted.

You can work with tags using the AWS Management Console, the AWS CLI, and the Amazon ECS API.

If you use AWS Identity and Access Management (IAM), you can control which users in your AWS account have permission to manage tags.

Tagging your resources

You can tag new or existing Amazon ECS tasks, services, task definitions, and clusters.
Tag restrictions

If you’re using the Amazon ECS console, you can apply tags to new or existing resources by using the Tags tab on the relevant resource page at any time. The Propagate tags from option can be used to copy tags from the task definition or service to a task. This can be done when you’re running a task or creating a service.

If you’re using the Amazon ECS API, the AWS CLI, or an AWS SDK, you can apply tags to new resources using the tags parameter on the relevant API action. Or, alternatively, you can use the TagResource API action to apply tags to existing resources. For more information, see TagResource. The propagateTags parameter can be used to copy tags from the task definition or service to the task. This can be done when you’re running a task or creating a service. For more information, see RunTask and CreateService.

Additionally, some resource-creating actions enable you to specify tags for a resource when the resource is created. If tags can’t be applied while resources are being created, we roll back the process of creating resources. This ensures that resources are either created with tags or not created at all, and that no resources are left untagged at any time. By tagging resources while they’re being created, you can eliminate the need to run custom tagging scripts after resource creation.

The following table describes the Amazon ECS resources that can be tagged, and the resources that can be tagged when created.

### Tagging support for Amazon ECS resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Supports tags</th>
<th>Supports tag propagation</th>
<th>Supports tagging on creation (Amazon ECS API, AWS CLI, AWS SDK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon ECS tasks</td>
<td>Yes</td>
<td>Yes, from the task definition.</td>
<td>Yes</td>
</tr>
<tr>
<td>Amazon ECS services</td>
<td>Yes</td>
<td>Yes, from either the task definition or the service to the tasks in the service.</td>
<td>Yes</td>
</tr>
<tr>
<td>Amazon ECS task sets</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Amazon ECS task definitions</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Amazon ECS clusters</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Tag restrictions**

The following basic restrictions apply to tags:

- Maximum number of tags per resource – 50
- For each resource, each tag key must be unique, and each tag key can have only one value.
- Maximum key length – 128 Unicode characters in UTF-8
- Maximum value length – 256 Unicode characters in UTF-8
- If your tagging schema is used across multiple services and resources, remember that other services may have restrictions on allowed characters. Generally allowed characters are: letters, numbers, and spaces representable in UTF-8, and the following characters: + - = . _ : / @.
- Tag keys and values are case-sensitive.
Tagging your resources for billing

When you enable Amazon ECS-managed tags, Amazon ECS automatically tags all newly launched tasks with the cluster name. For tasks that belong to a service, they are also tagged with the service name. These managed tags are helpful when reviewing cost allocation after enabling them in your Cost and Usage Report. For more information, see Amazon ECS usage reports (p. 230).

To see the cost of your combined resources, you can organize your billing information based on resources that have the same tag key values. For example, you can tag several resources with a specific application name, and then organize your billing information to see the total cost of that application across several services. For more information about setting up a cost allocation report with tags, see The Monthly Cost Allocation Report in the AWS Billing and Cost Management User Guide.

Important
To use this feature, you must opt in to the new Amazon Resource Name (ARN) and resource identifier (ID) formats. For more information, see Amazon Resource Names (ARNs) and IDs (p. 144).

Note
If you’ve enabled reporting, data for the current month is available for viewing after 24 hours.

Working with tags using the console

Using the Amazon ECS console, you can manage the tags associated with new or existing tasks, services, task definitions, clusters, or container instances.

When you select a resource-specific page in the Amazon ECS console, it displays a list of those resources. For example, if you select Clusters from the navigation pane, the console displays a list of Amazon ECS clusters. When you select a resource from one of these lists (for example, a specific cluster) that supports tags, you can view and manage its tags on the Tags tab.

Contents
- Adding tags on an individual resource during launch (p. 224)
- Adding and deleting tags on an individual resource (p. 225)

Adding tags on an individual resource during launch

The following resources enable you to specify tags when you create the resource.

<table>
<thead>
<tr>
<th>Task</th>
<th>Console</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run one or more tasks.</td>
<td>Run a standalone task (p. 149)</td>
</tr>
<tr>
<td>Create a service.</td>
<td>Creating a service (p. 170)</td>
</tr>
<tr>
<td>Create a task set.</td>
<td>External Deployment (p. 192)</td>
</tr>
<tr>
<td>Register a task definition.</td>
<td>Creating a task definition (p. 61)</td>
</tr>
<tr>
<td>Create a cluster.</td>
<td>Creating a cluster (p. 49)</td>
</tr>
</tbody>
</table>
Adding and deleting tags on an individual resource

Amazon ECS enables you to add or delete tags associated with your clusters, services, tasks, and task definitions directly from the resource's page.

To add a tag to an individual resource

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. From the navigation bar, select the Region to use.
3. In the navigation pane, select a resource type (for example, Clusters).
4. Select the resource from the resource list and choose Tags, Edit.
5. In the Edit Tags dialog box, specify the key and value for each tag, and then choose Save.

To delete a tag from an individual resource

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. From the navigation bar, select the Region to use.
3. In the navigation pane, choose a resource type (for example, Clusters).
4. Select the resource from the resource list and choose Tags, Edit.
5. On the Edit Tags page, select the Delete icon for each tag you want to delete, and choose Save.

Working with tags using the CLI or API

Use the following to add, update, list, and delete the tags for your resources. The corresponding documentation provides examples.

Tagging support for Amazon ECS resources

<table>
<thead>
<tr>
<th>Task</th>
<th>AWS CLI</th>
<th>API action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add or overwrite one or more tags.</td>
<td>tag-resource</td>
<td>TagResource</td>
</tr>
<tr>
<td>Delete one or more tags.</td>
<td>untag-resource</td>
<td>UntagResource</td>
</tr>
</tbody>
</table>

The following examples show how to tag or untag resources using the AWS CLI.

Example 1: Tag an existing cluster

The following command tags an existing cluster.

```
aws ecs tag-resource --resource-arn resource_ARN --tags key=stack,value=dev
```

Example 2: Untag an existing cluster

The following command deletes a tag from an existing cluster.

```
aws ecs untag-resource --resource-arn resource_ARN --tag-keys tag_key
```

Example 3: List tags for a resource
The following command lists the tags associated with an existing resource.

```bash
aws ecs list-tags-for-resource --resource-arn resource_ARN
```

Some resource-creating actions enable you to specify tags when you create the resource. The following actions support tagging on creation.

<table>
<thead>
<tr>
<th>Task</th>
<th>AWS CLI</th>
<th>AWS Tools for Windows PowerShell</th>
<th>API Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run one or more tasks.</td>
<td>run-task</td>
<td>Start-ECSTask</td>
<td>RunTask</td>
</tr>
<tr>
<td>Create a service.</td>
<td>create-service</td>
<td>New-ECSService</td>
<td>CreateService</td>
</tr>
<tr>
<td>Create a task set.</td>
<td>create-task-set</td>
<td>New-ECSTaskSet</td>
<td>CreateTaskSet</td>
</tr>
<tr>
<td>Register a task definition.</td>
<td>register-task-definition</td>
<td>Register-ECSTaskDefinition</td>
<td>RegisterTaskDefinition</td>
</tr>
<tr>
<td>Create a cluster.</td>
<td>create-cluster</td>
<td>New-ECSCluster</td>
<td>CreateCluster</td>
</tr>
</tbody>
</table>

The following examples demonstrate how to apply tags when you create resources.

**Example 1: Create a cluster and apply a tag**

The following command creates a cluster named `devcluster` and adds a tag with key `team` and value `devs`.

```bash
aws ecs create-cluster --cluster-name devcluster --tags key=team,value=devs
```

**Example 2: Create a service and apply a tag**

The following command creates a service named `application` and adds a tag with key `stack` and value `dev`.

```bash
aws ecs create-service --service-name application --task-definition task-def-app --tags key=stack,value=dev
```

**Example 3: Create a service with tags and propagate the tags**

The `--propagateTags` parameter can be used to copy the tags from either a task definition or a service to the tasks in a service. The following command creates a service with tags and propagates them to the tasks in that service.

```bash
aws ecs create-service --service-name application --task-definition task-def-app --tags key=stack,value=dev --propagateTags Service
```

**Amazon ECS service quotas**

The following tables provide the default service quotas, also referred to as limits, for Amazon ECS for an AWS account. For more information on the service quotas for other AWS services that you can use with
Amazon ECS, such as Elastic Load Balancing and Auto Scaling, see AWS service quotas in the Amazon Web Services General Reference.

Amazon ECS service quotas

The following are Amazon ECS service quotas.

Most of these service quotas, but not all, are listed under the Amazon Elastic Container Service (Amazon ECS) namespace in the Service Quotas console. To request a quota increase, see Requesting a quota increase in the Service Quotas User Guide.

<table>
<thead>
<tr>
<th>Service quota</th>
<th>Description</th>
<th>Default quota value</th>
<th>Adjustable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clusters</td>
<td>The maximum number of clusters in this account in the current Region.</td>
<td>10,000</td>
<td>Yes</td>
</tr>
<tr>
<td>Services per cluster</td>
<td>The maximum number of services per cluster.</td>
<td>5,000</td>
<td>Yes</td>
</tr>
<tr>
<td>Tasks per service</td>
<td>The maximum number of tasks per service (the desired count).</td>
<td>5,000</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Note</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Services configured to use service discovery have a limit of 1,000 tasks per service. This is due to a Route 53 service quota.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECS Exec sessions</td>
<td>The maximum number of ECS Exec sessions per container.</td>
<td>2</td>
<td>Yes</td>
</tr>
<tr>
<td>Tasks launched (count) per run-task</td>
<td>The maximum number of tasks that can be launched per RunTask API action.</td>
<td>10</td>
<td>No</td>
</tr>
<tr>
<td>Revisions per task definition family</td>
<td>The maximum number of revisions per task definition family. Deregistering a task definition revision does not exclude it from being included in this limit.</td>
<td>1,000,000</td>
<td>No</td>
</tr>
<tr>
<td>Task definition size limit</td>
<td>The maximum size, in KiB, of a task definition.</td>
<td>64</td>
<td>No</td>
</tr>
</tbody>
</table>
### AWS Fargate service quotas

The following are Amazon ECS on AWS Fargate service quotas.

These service quotas are listed under the AWS Fargate namespace in the Service Quotas console. To request a quota increase, see Requesting a quota increase in the Service Quotas User Guide.

<table>
<thead>
<tr>
<th>Service quota</th>
<th>Description</th>
<th>Default quota value</th>
<th>Adjustable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task definition max containers</td>
<td>The maximum number of containers definitions within a task definition.</td>
<td>10</td>
<td>No</td>
</tr>
<tr>
<td>Subnets specified in an awsVpcConfiguration</td>
<td>The maximum number of subnets specified within an awsVpcConfiguration.</td>
<td>16</td>
<td>No</td>
</tr>
<tr>
<td>Security groups specified in an awsVpcConfiguration</td>
<td>The maximum number of security groups specified within an awsVpcConfiguration.</td>
<td>5</td>
<td>No</td>
</tr>
<tr>
<td>Target groups per service</td>
<td>The maximum number of target groups per service, if using an Application Load Balancer or a Network Load Balancer.</td>
<td>5</td>
<td>No</td>
</tr>
<tr>
<td>Classic Load Balancers per service</td>
<td>The maximum number of Classic Load Balancers per service.</td>
<td>1</td>
<td>No</td>
</tr>
<tr>
<td>Tags per resource</td>
<td>The maximum number of tags per resource. This applies to task definitions, clusters, tasks, and services.</td>
<td>50</td>
<td>No</td>
</tr>
</tbody>
</table>

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Managing your Amazon ECS and AWS Fargate service quotas in the AWS Management Console

Amazon ECS has integrated with Service Quotas, an AWS service that enables you to view and manage your quotas from a central location. For more information, see What Is Service Quotas? in the Service Quotas User Guide.

Service Quotas makes it easy to look up the value of your Amazon ECS service quotas.

**AWS Management Console**

To view Amazon ECS and Fargate service quotas using the AWS Management Console

2. In the navigation pane, choose AWS services.
3. From the AWS services list, search for and select Amazon Elastic Container Service (Amazon ECS) or AWS Fargate.

   In the Service quotas list, you can see the service quota name, applied value (if it is available), AWS default quota, and whether the quota value is adjustable.
4. To view additional information about a service quota, such as the description, choose the quota name.
5. (Optional) To request a quota increase, select the quota that you want to increase, select Request quota increase, enter or select the required information, and select Request.

To work more with service quotas using the AWS Management Console see the Service Quotas User Guide. To request a quota increase, see Requesting a quota increase in the Service Quotas User Guide.

**AWS CLI**

To view Amazon ECS and Fargate service quotas using the AWS CLI

Run the following command to view the default Amazon ECS quotas.

```
aws service-quotas list-aws-default-service-quotas
   --query 'Quotas[*].
   {Adjustable:Adjustable,Name:QuotaName,Value:Value,Code:QuotaCode}'
   --service-code ecs
   --output table
```

Run the following command to view the default Fargate quotas.

```
aws service-quotas list-aws-default-service-quotas
   --query 'Quotas[*].
   {Adjustable:Adjustable,Name:QuotaName,Value:Value,Code:QuotaCode}'
   --service-code fargate
   --output table
```

Run the following command to view your applied Fargate quotas.

```
aws service-quotas list-service-quotas
   --service-code fargate
```

**Note**

Amazon ECS does not support applied quotas.
To work more with service quotas using the AWS CLI, see the Service Quotas AWS CLI Command Reference. To request a quota increase, see the request-service-quota-increase command in the AWS CLI Command Reference.

Amazon ECS usage reports

AWS provides a free reporting tool called Cost Explorer that enables you to analyze the cost and usage of your Amazon ECS resources.

Cost Explorer is a free tool that you can use to view charts of your usage and costs. You can view data from the last 13 months, and forecast how much you are likely to spend for the next three months. You can use Cost Explorer to see patterns in how much you spend on AWS resources over time. For example, you can use it to identify areas that need further inquiry and see trends that you can use to understand your costs. You also can specify time ranges for the data, and view time data by day or by month.

The metering data in your Cost and Usage Report shows usage across all of your Amazon ECS tasks. The metering data includes CPU usage as vCPU-Hours and memory usage as GB-Hours for each task that was run. How that data is presented depends on the launch type of the task.

For tasks using the Fargate launch type, the lineItem/Operation column shows FargateTask and you will see the cost associated with each task.

You can also use the Amazon ECS-managed tags to identify the service or cluster that each task belongs to. For more information, see Tagging your resources for billing (p. 224).

Important
The metering data is only viewable for tasks launched on or after November 16, 2018. Tasks launched before this date don't show metering data.

Here's an example of some of the fields you can sort cost allocation data by using Cost Explorer.

- Cluster name
- Service name
- Resource tags
- Launch type
- Region
- Usage type

Monitoring Amazon ECS

You can monitor your Amazon ECS resources using Amazon CloudWatch, which collects and processes raw data from Amazon ECS into readable, near real-time metrics. These statistics are recorded for a period of two weeks, so that you can access historical information and gain a better perspective on how your clusters or services are performing. Amazon ECS metric data is automatically sent to CloudWatch in 1-minute periods. For more information about CloudWatch, see the Amazon CloudWatch User Guide.

Monitoring tools

Monitoring Amazon ECS is an important part of maintaining the reliability, availability, and performance of Amazon ECS and your AWS solutions. You should collect monitoring data from all of the parts of your AWS solution so that you can more easily debug a multi-point failure if one occurs. Before you start monitoring Amazon ECS; however, you should create a monitoring plan that includes answers to the following questions:

- What are your monitoring goals?
- What resources will you monitor?
- How often will you monitor these resources?
- What monitoring tools will you use?
- Who will perform the monitoring tasks?
- Who should be notified when something goes wrong?

When you are using the Fargate launch type, you get CPU and memory utilization metrics for each of your services to assist in the monitoring of your environment.

The next step is to establish a baseline for normal Amazon ECS performance in your environment, by measuring performance at various times and under different load conditions. As you monitor Amazon ECS, store historical monitoring data so that you can compare it with current performance data, identify normal performance patterns and performance anomalies, and devise methods to address issues.

Topics

- Monitoring tools (p. 231)
- Amazon ECS CloudWatch metrics (p. 232)
- AWS Fargate usage metrics (p. 237)
- Amazon ECS events and EventBridge (p. 238)
- Amazon ECS CloudWatch Container Insights (p. 249)
- Logging Amazon ECS API calls with AWS CloudTrail (p. 251)

Monitoring tools

AWS provides various tools that you can use to monitor Amazon ECS. You can configure some of these tools to do the monitoring for you, while some of the tools require manual intervention. We recommend that you automate monitoring tasks as much as possible.

Automated monitoring tools

You can use the following automated monitoring tools to watch Amazon ECS and report when something is wrong:

- Amazon CloudWatch alarms – Watch a single metric over a time period that you specify, and perform one or more actions based on the value of the metric relative to a given threshold over a number of time periods. The action is a notification sent to an Amazon Simple Notification Service (Amazon SNS)
topic or Amazon EC2 Auto Scaling policy. CloudWatch alarms do not invoke actions simply because they are in a particular state; the state must have changed and been maintained for a specified number of periods. For more information, see Amazon ECS CloudWatch metrics (p. 232).

For services with tasks that use the Fargate launch type, you can use CloudWatch alarms to scale in and scale out the tasks in your service based on CloudWatch metrics, such as CPU and memory utilization. For more information, see Service Auto Scaling (p. 209).

- Amazon CloudWatch Logs – Monitor, store, and access the log files from the containers in your Amazon ECS tasks by specifying the awslogs log driver in your task definitions. For more information, see Using the awslogs log driver (p. 106).
- Amazon CloudWatch Events – Match events and route them to one or more target functions or streams to make changes, capture state information, and take corrective action. For more information, see Amazon ECS events and EventBridge (p. 238) in this guide and What Is Amazon CloudWatch Events? in the Amazon CloudWatch Events User Guide.
- AWS CloudTrail log monitoring – Share log files between accounts, monitor CloudTrail log files in real time by sending them to CloudWatch Logs, write log processing applications in Java, and validate that your log files have not changed after delivery by CloudTrail. For more information, see Logging Amazon ECS API calls with AWS CloudTrail (p. 251) in this guide, and Working with CloudTrail Log Files in the AWS CloudTrail User Guide.

Manual monitoring tools

Another important part of monitoring Amazon ECS involves manually monitoring those items that the CloudWatch alarms don’t cover. The CloudWatch, Trusted Advisor, and other AWS console dashboards provide an at-a-glance view of the state of your AWS environment. We recommend that you also check the log files on your container instances and the containers in your tasks.

- CloudWatch home page:
  - Current alarms and status
  - Graphs of alarms and resources
  - Service health status

In addition, you can use CloudWatch to do the following:
- Create customized dashboards to monitor the services you care about.
- Graph metric data to troubleshoot issues and discover trends.
- Search and browse all your AWS resource metrics.
- Create and edit alarms to be notified of problems.
- AWS Trusted Advisor can help you monitor your AWS resources to improve performance, reliability, security, and cost effectiveness. Four Trusted Advisor checks are available to all users; more than 50 checks are available to users with a Business or Enterprise support plan. For more information, see AWS Trusted Advisor.

Amazon ECS CloudWatch metrics

You can monitor your Amazon ECS resources using Amazon CloudWatch, which collects and processes raw data from Amazon ECS into readable, near real-time metrics. These statistics are recorded for a period of two weeks so that you can access historical information and gain a better perspective on how your clusters or services are performing. Amazon ECS metric data is automatically sent to CloudWatch in 1-minute periods. For more information about CloudWatch, see the Amazon CloudWatch User Guide.

Topics
- Enabling CloudWatch metrics (p. 233)
Enabling CloudWatch metrics

Any Amazon ECS service using the Fargate launch type is enabled for CloudWatch CPU and memory utilization metrics automatically, so you don't need to take any manual steps.

Available metrics and dimensions

The following sections list the metrics and dimensions that Amazon ECS sends to Amazon CloudWatch.

Amazon ECS metrics

Amazon ECS provides metrics for you to monitor your resources. You can measure the CPU and memory reservation and utilization across your cluster as a whole, and the CPU and memory utilization on the services in your clusters. For your GPU workloads, you can measure your GPU reservation across your cluster.

The metrics made available will depend on the launch type of the tasks and services in your clusters. If you're using the Fargate launch type for your services, CPU and memory utilization metrics are provided to assist in the monitoring of your services. For the EC2 launch type, you will own and need to monitor the Amazon EC2 instances that make your underlying infrastructure. Accordingly, additional CPU, memory, and GPU reservation and CPU and memory utilization metrics are made available at the cluster, service, and task level.

Amazon ECS sends the following metrics to CloudWatch every minute. When Amazon ECS collects metrics, it collects multiple data points every minute. It then aggregates them to one data point before sending the data to CloudWatch. So in CloudWatch, one sample count is actually the aggregate of multiple data points during one minute.

The AWS/ECS namespace includes the following metrics.

**CPUReservation**

The percentage of CPU units that are reserved by running tasks in the cluster.

Cluster CPU reservation (this metric can only be filtered by `ClusterName`) is measured as the total CPU units that are reserved by Amazon ECS tasks on the cluster, divided by the total CPU units that were registered for all of the container instances in the cluster. Only container instances in `ACTIVE` or `DRAINING` status will affect CPU reservation metrics. This metric is only used for tasks using the EC2 launch type.

Valid dimensions: `ClusterName`.

Valid statistics: Average, Minimum, Maximum, Sum, Sample Count. The most useful statistic is Average.

Unit: Percent.

**CPUUtilization**

The percentage of CPU units that are used in the cluster or service.

Cluster CPU utilization (metrics that are filtered by `ClusterName` without `ServiceName`) is measured as the total CPU units in use by Amazon ECS tasks on the cluster, divided by the total CPU units.
units that were registered for all of the container instances in the cluster. Only container instances in \textit{ACTIVE} or \textit{DRAINING} status will affect CPU utilization metrics. Cluster CPU utilization metrics are only used for tasks using the EC2 launch type.

Service CPU utilization (metrics that are filtered by \texttt{ClusterName} and \texttt{ServiceName}) is measured as the total CPU units in use by the tasks that belong to the service, divided by the total number of CPU units that are reserved for the tasks that belong to the service. Service CPU utilization metrics are used for tasks using both the Fargate and the EC2 launch type.

Valid dimensions: \texttt{ClusterName}, \texttt{ServiceName}.

Valid statistics: Average, Minimum, Maximum, Sum, Sample Count. The most useful statistic is Average.

Unit: Percent.

\textbf{MemoryReservation}

The percentage of memory that is reserved by running tasks in the cluster.

Cluster memory reservation (this metric can only be filtered by \texttt{ClusterName}) is measured as the total memory that is reserved by Amazon ECS tasks on the cluster, divided by the total amount of memory that was registered for all of the container instances in the cluster. Only container instances in \textit{ACTIVE} or \textit{DRAINING} status will affect memory reservation metrics. This metric is only used for tasks using the EC2 launch type.

Valid dimensions: \texttt{ClusterName}.

Valid statistics: Average, Minimum, Maximum, Sum, Sample Count. The most useful statistic is Average.

Unit: Percent.

\textbf{MemoryUtilization}

The percentage of memory that is used in the cluster or service.

Cluster memory utilization (metrics that are filtered by \texttt{ClusterName} without \texttt{ServiceName}) is measured as the total memory in use by Amazon ECS tasks on the cluster, divided by the total amount of memory that was registered for all of the container instances in the cluster. Only container instances in \textit{ACTIVE} or \textit{DRAINING} status will affect memory utilization metrics. Cluster memory utilization metrics are only used for tasks using the EC2 launch type.

Service memory utilization (metrics that are filtered by \texttt{ClusterName} and \texttt{ServiceName}) is measured as the total memory in use by the tasks that belong to the service, divided by the total memory that is reserved for the tasks that belong to the service. Service memory utilization metrics are used for tasks using both the Fargate and EC2 launch types.

Valid dimensions: \texttt{ClusterName}, \texttt{ServiceName}.

Valid statistics: Average, Minimum, Maximum, Sum, Sample Count. The most useful statistic is Average.

Unit: Percent.

\textbf{GPUReservation}

The percentage of total available GPUs that are reserved by running tasks in the cluster.

Cluster GPU reservation is measured as the number of GPUs reserved by Amazon ECS tasks on the cluster, divided by the total number of GPUs that was available on all of the GPU-enabled container instances in the cluster. Only container instances in \textit{ACTIVE} or \textit{DRAINING} status will affect GPU reservation metrics.
Valid dimensions: ClusterName.

Valid statistics: Average, Minimum, Maximum, Sum, Sample Count. The most useful statistic is Average.

Unit: Percent.

Note
If you're using tasks with the EC2 launch type and have Linux container instances, the Amazon ECS container agent relies on Docker stats metrics to gather CPU and memory data for each container running on the instance. For burstable performance instances (T3, T3a, and T2 instances), the CPU utilization metric may reflect different data compared to instance-level CPU metrics.

Dimensions for Amazon ECS metrics

Amazon ECS metrics use the $AWS/ECS$ namespace and provide metrics for the following dimensions. Metrics for a dimension only reflect the resources with running tasks during a period. For example, if you have a cluster with one service in it but that service has no tasks in a RUNNING state, there will be no metrics sent to CloudWatch. If you have two services and one of them has running tasks and the other doesn't, only the metrics for the service with running tasks would be sent.

ClusterName
This dimension filters the data that you request for all resources in a specified cluster. All Amazon ECS metrics are filtered by ClusterName.

ServiceName
This dimension filters the data that you request for all resources in a specified service within a specified cluster.

Service utilization

Service utilization is measured as the percentage of CPU and memory that is used by the Amazon ECS tasks that belong to a service on a cluster when compared to the CPU and memory that is specified in the service's task definition. This metric is supported for services with tasks using the Fargate launch type.

\[
\text{Service CPU utilization} = \frac{(\text{Total CPU units used by tasks in service}) \times 100}{(\text{Total CPU units specified in task definition}) \times (\text{number of tasks in service})}
\]

\[
\text{Service memory utilization} = \frac{(\text{Total MiB of memory used by tasks in service}) \times 100}{(\text{Total MiB of memory specified in task definition}) \times (\text{number of tasks in service})}
\]

Each minute, the Amazon ECS container agent associated with each task calculates the number of CPU units and MiB of memory that are currently being used for each task owned by the service, and this information is reported back to Amazon ECS. The total amount of CPU and memory used for all tasks owned by the service that are running on the cluster is calculated, and those numbers are reported to CloudWatch as a percentage of the total resources that are specified for the service in the service's
task definition. If you specify a soft limit (memoryReservation), it's used to calculate the amount of reserved memory. Otherwise, the hard limit (memory) is used. For more information about hard and soft limits, see Task Definition Parameters.

**Service RUNNING task count**

You can use CloudWatch metrics to view the number of tasks in your services that are in the RUNNING state. For example, you can set a CloudWatch alarm for this metric to alert you if the number of running tasks in your service falls below a specified value.

**To view the number of running tasks in a service**

2. On the navigation pane, choose Metrics.
3. On the All metrics tab, choose ECS.
4. Choose ClusterName, ServiceName and then choose any metric (either CPUUtilization or MemoryUtilization) that corresponds to the service to view running tasks in.
5. On the Graphed metrics tab, change Period to 1 Minute and Statistic to Sample Count.

The value displayed in the graph indicates the number of RUNNING tasks in the service.

---

**Viewing Amazon ECS metrics**

After you have enabled CloudWatch metrics for Amazon ECS, you can view those metrics on the Amazon ECS and CloudWatch consoles. The Amazon ECS console provides a 24-hour maximum, minimum, and average view of your service metrics. The CloudWatch console provides a fine-grained and customizable display of your resources, as well as the number of running tasks in a service.

**Topics**

- Viewing service metrics using the Amazon ECS console (p. 236)
- Viewing Amazon ECS metrics using the CloudWatch console (p. 237)

**Viewing service metrics using the Amazon ECS console**

Amazon ECS service CPU and memory utilization metrics are available on the Amazon ECS console. The view provided for service metrics shows the average, minimum, and maximum values for the previous 24-hour period, with data points available in 5-minute intervals. For more information, see Service utilization (p. 235).
To view service metrics in the console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. Select the cluster that contains the service that you want to view metrics for.
4. Choose the service that you want to view metrics for.

Viewing Amazon ECS metrics using the CloudWatch console

Amazon ECS service metrics can also be viewed on the CloudWatch console. The console provides the most detailed view of Amazon ECS metrics, and you can tailor the views to suit your needs. You can view Service utilization (p. 235) and the Service RUNNING task count (p. 236). For more information about CloudWatch, see the Amazon CloudWatch User Guide.

To view metrics in the CloudWatch console

2. In the Metrics section in the navigation pane, choose ECS.
3. Choose the metrics to view. Cluster metrics are scoped as ECS > ClusterName and service utilization metrics are scoped as ECS > ClusterName, ServiceName. The following example shows cluster CPU and memory utilization.

AWS Fargate usage metrics

You can use CloudWatch usage metrics to provide visibility into your accounts usage of resources. Use these metrics to visualize your current service usage on CloudWatch graphs and dashboards.

AWS Fargate usage metrics correspond to AWS service quotas. You can configure alarms that alert you when your usage approaches a service quota. For more information about Fargate service quotas, see AWS Fargate service quotas (p. 228).

AWS Fargate publishes the following metrics in the AWS/Usage namespace.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ResourceCount</td>
<td>The total number of the specified resource running on your account. The resource is defined by the dimensions associated with the metric.</td>
</tr>
</tbody>
</table>
Creating a CloudWatch alarm to monitor Fargate resource usage metrics

AWS Fargate provides CloudWatch usage metrics that correspond to the AWS service quotas for Fargate On-Demand and Fargate Spot resource usage. In the Service Quotas console, you can visualize your usage on a graph and configure alarms that alert you when your usage approaches a service quota. For more information, see AWS Fargate usage metrics (p. 237).

Use the following steps to create a CloudWatch alarm based on one of the Fargate resource usage metrics.

**To create an alarm based on your Fargate usage quotas (AWS Management Console)**

2. In the navigation pane, choose **AWS services**.
3. From the **AWS services** list, search for and select **AWS Fargate**.
4. In the **Service quotas** list, select the Fargate usage quota you want to create an alarm for.
5. In the Amazon CloudWatch Events alarms section, choose **Create**.
6. For **Alarm threshold**, choose the percentage of your applied quota value that you want to set as the alarm value.
7. For **Alarm name**, enter a name for the alarm and then choose **Create**.

Amazon ECS events and EventBridge

Amazon EventBridge enables you to automate your AWS services and respond automatically to system events such as application availability issues or resource changes. Events from AWS services are delivered to EventBridge in near real time. You can write simple rules to indicate which events are of interest.
to you and what automated actions to take when an event matches a rule. The actions that can be automatically triggered include the following:

- Adding events to log groups in CloudWatch Logs
- Invoking an AWS Lambda function
- Invoking Amazon EC2 Run Command
- Relaying the event to Amazon Kinesis Data Streams
- Activating an AWS Step Functions state machine
- Notifying an Amazon SNS topic or an Amazon Simple Queue Service (Amazon SQS) queue

For more information, see Getting Started with Amazon EventBridge in the Amazon EventBridge User Guide.

You can use Amazon ECS events for EventBridge to receive near real-time notifications regarding the current state of your Amazon ECS clusters. When using the Fargate launch type, you can see the state of your tasks. For services, you can see events related to the health of your service.

Using EventBridge, you can build custom schedulers on top of Amazon ECS that are responsible for orchestrating tasks across clusters and monitoring the state of clusters in near real time. You can eliminate scheduling and monitoring code that continuously polls the Amazon ECS service for status changes and instead handle Amazon ECS state changes asynchronously using any EventBridge target. Targets might include AWS Lambda, Amazon Simple Queue Service, Amazon Simple Notification Service, or Amazon Kinesis Data Streams.

An Amazon ECS event stream ensures that every event is delivered at least one time. If duplicate events are sent, the event provides enough information to identify duplicates. For more information, see Handling events (p. 247).

Events are relatively ordered, so that you can easily tell when an event occurred in relation to other events.

**Topics**
- Amazon ECS events (p. 239)
- Handling events (p. 247)

## Amazon ECS events

Amazon ECS tracks the state of each of your tasks and services. If the state of a task or service changes, an event is triggered and is sent to Amazon EventBridge. These events are classified as task state change events and service action events. These events and their possible causes are described in greater detail in the following sections.

**Note**
Amazon ECS may add other event types, sources, and details in the future. If you are programmatically deserializing event JSON data, make sure that your application is prepared to handle unknown properties to avoid issues if and when these additional properties are added.

Container state change and task state change events contain two `version` fields: one in the main body of the event, and one in the `detail` object of the event. The following describes the differences between these two fields:

- The `version` field in the main body of the event is set to 0 on all events. For more information about EventBridge parameters, see Events and Event Patterns in the Amazon EventBridge User Guide.
- The `version` field in the `detail` object of the event describes the version of the associated resource. Each time a resource changes state, this version is incremented. Because events can be sent multiple
times, this field allows you to identify duplicate events. Duplicate events have the same version in the detail object. If you are replicating your task state with EventBridge, you can compare the version of a resource reported by the Amazon ECS APIs with the version reported in EventBridge for the resource (inside the detail object) to verify that the version in your event stream is current.

Service action events only contain the version field in the main body.

**Task state change events**

The following scenarios trigger task state change events:

You call the StartTask, RunTask, or StopTask API operations, either directly or with the AWS Management Console, AWS CLI, or SDKs.

Starting or stopping tasks creates new task resources or modifies the state of existing task resources. The Amazon ECS service scheduler starts or stops a task.

Starting or stopping tasks creates new task resources or modifies the state of existing task resources. The Amazon ECS container agent calls the SubmitTaskStateChange API operation.

The Amazon ECS container agent monitors the state of your tasks and it reports any state changes. State changes might include changes from PENDING to RUNNING or from RUNNING to STOPPED.

A container in the task changes state.

The Amazon ECS container agent monitors the state of containers within tasks. For example, if a container that is running within a task stops, this container state change triggers an event.

A task using the Fargate Spot capacity provider receives a termination notice.

When a task is using the FARGATE_SPOT capacity provider and is stopped due to a Spot interruption, a task state change event is triggered.

**Example Task state change event**

Task state change events are delivered in the following format. The detail section below resembles the Task object that is returned from a DescribeTasks API operation in the Amazon Elastic Container Service API Reference. If your containers are using an image hosted with Amazon ECR, the imageDigest field is returned.

**Note**

The values for the createdAt, connectivityAt, pullStartedAt, startedAt, pullStoppedAt, and updatedAt fields are UNIX timestamps in the response of a DescribeTasks action whereas in the task state change event they are ISO string timestamps.

For more information about CloudWatch Events parameters, see Events and Event Patterns in the Amazon EventBridge User Guide.

```json
{
  "version": "0",
  "id": "3317b2af-7005-947d-b652-f55e762e571a",
  "detail-type": "ECS Task State Change",
  "source": "aws.ecs",
  "account": "111122223333",
  "time": "2020-01-23T17:57:58Z",
  "region": "us-west-2",
  "resources": [
```
"arn:aws:ecs:us-west-2:111122222333:task/FargateCluster/c13b4cb40f1f4fe4a2971f76ae5a47ad",
"detail": {
  "attachments": [
    {"id": "1789bcae-ddfb-4d10-8ebe-8ac87d0b5b8", "type": "eni", "status": "ATTACHED", "details": [
      {
        "name": "subnetId", "value": "subnet-abcd1234"
      },
      {
        "name": "networkInterfaceId", "value": "eni-abcd1234"
      },
      {
        "name": "macAddress", "value": "0a:98:eb:a7:29:ba"
      },
      {
        "name": "privateIPv4Address", "value": "10.0.0.139"
      }
    ]
  },
  "availabilityZone": "us-west-2c",
  "containers": [
    {"containerArn": "arn:aws:ecs:us-west-2:111122222333:container/cf159fd6-3e3f-4a9e-84f9-66cbe726af01", "lastStatus": "RUNNING", "name": "FargateApp", "image": "111122223333.dkr.ecr.us-west-2.amazonaws.com/hello-repository:latest", "imageDigest": "sha256:74b2c688c700ec95a93e478cb959737c148df3fbf5ea70a031a726e856", "runtimeId": "ad64c6c775f83c5507ec249c87f7947137b03d2b08d99611115cf24f3b7307e1", "taskArn": "arn:aws:ecs:us-west-2:111122222333:task/FargateCluster/c13b4cb40f1f4fe4a2971f76ae5a47ad", "networkInterfaces": [
      {"attachmentId": "1789bcae-ddfb-4d10-8ebe-8ac87d0b5b8", "privateIPv4Address": "10.0.0.139"
    ]
  ],
  "cpu": "0"
},
"createdAt": "2020-01-23T17:57:34.402Z",
"launchType": "FARGATE",
"cpu": "256",
"memory": "512",
"desiredStatus": "RUNNING",
"group": "family:sample-fargate",
"lastStatus": "RUNNING",
"overrides": {
  "containerOverrides": [
    {"name": "FargateApp"}
  ]
},
"apiVersion": "2014-11-13"
For a tutorial walkthrough of setting up a simple AWS Lambda function that listens for Amazon ECS task events and writes them out to a CloudWatch Logs log stream, see Tutorial: Listening for Amazon ECS CloudWatch Events (p. 356).

For a tutorial walkthrough of creating an SNS topic to email you when a task state change event occurs, see Tutorial: Sending Amazon Simple Notification Service alerts for task stopped events (p. 357).

**Service action events**

Amazon ECS sends service action events with the detail type **ECS Service Action**. Unlike the container instance and task state change events, the service action events do not include a version number in the details response field. The following is an event pattern that is used to create an EventBridge rule for Amazon ECS service action events. For more information, see Creating an EventBridge Rule in the Amazon EventBridge User Guide.

```
{
   "source": [
      "aws.ecs"
   ],
   "detail-type": [
      "ECS Service Action"
   ]
}
```

Amazon ECS sends events with **INFO**, **WARN**, and **ERROR** event types. The following are the service action events.

**Service action events with INFO event type**

**SERVICE_STEADY_STATE**

The service is healthy and at the desired number of tasks, thus reaching a steady state.

**TASKSET_STEADY_STATE**

The task set is healthy and at the desired number of tasks, thus reaching a steady state.

**CAPACITY_PROVIDER_STEADY_STATE**

A capacity provider associated with a service reaches a steady state.

**SERVICE_DESIRED_COUNT_UPDATED**

When the service scheduler updates the computed desired count for a service or task set. This event is not sent when the desired count is manually updated by a user.
Service action events with **WARN** event type

**SERVICE_TASK_START_IMPAIRED**

The service is unable to consistently start tasks successfully.

**SERVICE_DISCOVERY_INSTANCE_UNHEALTHY**

A service using service discovery contains an unhealthy task. The service scheduler detects that a task within a service registry is unhealthy.

Service action events with **ERROR** event type

**SERVICE_DAEMON_PLACEMENT_CONSTRAINT_VIOLATED**

A task in a service using the **DAEMON** service scheduler strategy no longer meets the placement constraint strategy for the service.

**ECS_OPERATION_THROTTLED**

The service scheduler has been throttled due to the Amazon ECS API throttle limits.

**SERVICE_DISCOVERY_OPERATION_THROTTLED**

The service scheduler has been throttled due to the AWS Cloud Map API throttle limits. This can occur on services configured to use service discovery.

**SERVICE_TASK_PLACEMENT_FAILURE**

The service scheduler is unable to place a task. The cause will be described in the `reason` field.

A common cause for this service event being triggered is because of a lack of resources in the cluster to place the task. For example, not enough CPU or memory capacity on the available container instances or no container instances being available. Another common cause is when the Amazon ECS container agent is disconnected on the container instance, causing the scheduler to be unable to place the task.

**SERVICE_TASK_CONFIGURATION_FAILURE**

The service scheduler is unable to place a task due to a configuration error. The cause will be described in the `reason` field.

A common cause of this service event being triggered is because tags were being applied to the service but the user or role had not opted in to the new Amazon Resource Name (ARN) format in the Region. For more information, see Amazon Resource Names (ARNs) and IDs (p. 144). Another common cause is that Amazon ECS was unable to assume the task IAM role provided.

### Example Service steady state event

Service steady state events are delivered in the following format. For more information about EventBridge parameters, see Events and Event Patterns in the *Amazon EventBridge User Guide*.

For a tutorial walkthrough of setting up a simple AWS Lambda function that listens for Amazon ECS service action events and writes them out to a CloudWatch Logs log stream, see Tutorial: Listening for Amazon ECS CloudWatch Events (p. 356).

For a tutorial walkthrough of creating an SNS topic to email you when a service event event occurs, see Tutorial: Sending Amazon Simple Notification Service alerts for task stopped events (p. 357).
Example Capacity provider steady state event

Capacity provider steady state events are delivered in the following format.

```json
{
  "version": "0",
  "id": "b9baa007-2f33-0eb1-5760-0d02a572d81f",
  "detail-type": "ECS Service Action",
  "source": "aws.ecs",
  "account": "111122223333",
  "time": "2019-11-19T19:37:00Z",
  "region": "us-west-2",
  "resources": [
  ],
  "detail": {
    "eventType": "INFO",
    "eventName": "CAPACITY_PROVIDER_STEADY_STATE",
    "capacityProviderArns": [
    ],
    "createdAt": "2019-11-19T19:37:00.807Z"
  }
}
```

Example Service task start impaired event

Service task start impaired events are delivered in the following format.

```json
{
  "version": "0",
  "id": "57c9506e-9d21-294c-d2fe-e8738da7e67d",
  "detail-type": "ECS Service Action",
  "source": "aws.ecs",
  "account": "111122223333",
  "time": "2019-11-19T19:37:00Z",
  "region": "us-west-2",
  "resources": [
  ],
  "detail": {
    "eventType": "WARN",
    "eventName": "SERVICE_TASK_START_IMPAIRED",
    "createdAt": "2019-11-19T19:37:00.807Z"
  }
}
```
Example Service task placement failure event

Service task placement failure events are delivered in the following format. For more information about EventBridge parameters, see Events and Event Patterns in the Amazon EventBridge User Guide.

In the following example, the task was attempting to use the FARGATE_SPOT capacity provider but the service scheduler was unable to acquire any Fargate Spot capacity.

```
{
  "version": "0",
  "id": "ddca6449-b258-46c0-8653-e0e3a6d0468b",
  "detail-type": "ECS Service Action",
  "source": "aws.ecs",
  "account": "111122223333",
  "region": "us-west-2",
  "resources": [
  ],
  "detail": {
    "eventType": "ERROR",
    "eventName": "SERVICE_TASK_PLACEMENT_FAILURE",
    "capacityProviderArns": [
    ],
    "reason": "RESOURCE:FARGATE",
    "createdAt": "2019-11-06T19:09:33.087Z"
  }
}
```

Service deployment state change events

Amazon ECS sends service deployment change state events with the detail type ECS Deployment State Change. The following is an event pattern that is used to create an EventBridge rule for Amazon ECS service deployment state change events. For more information, see Creating an EventBridge Rule in the Amazon EventBridge User Guide.

```
{
  "source": ["aws.ecs"],
  "detail-type": ["ECS Deployment State Change"
]
}
```

Amazon ECS sends events with INFO and ERROR event types. The following are the service deployment state change events.

SERVICE_DEPLOYMENT_IN_PROGRESS

The service deployment is in progress. This event is sent for both initial deployments and rollback deployments.
SERVICE_DEPLOYMENT_COMPLETED

The service deployment has completed. This event is sent once a service reaches a steady state after a deployment.

SERVICE_DEPLOYMENT_FAILED

The service deployment has failed. This event is sent for services with deployment circuit breaker logic enabled.

Example service deployment in progress event

Service deployment in progress events are delivered when both an initial and a rollback deployment is started. The difference between the two is in the reason field. For more information about EventBridge parameters, see Events and Event Patterns in the Amazon EventBridge User Guide.

The following shows an example output for an initial deployment starting.

```json
{
    "version": "0",
    "id": "ddca6449-b258-46c0-8653-e0e3a6EXAMPLE",
    "detail-type": "ECS Deployment State Change",
    "source": "aws.ecs",
    "account": "111122223333",
    "time": "2020-05-23T12:31:14Z",
    "region": "us-west-2",
    "resources": [
    ],
    "detail": {
        "eventType": "INFO",
        "eventName": "SERVICE_DEPLOYMENT_IN_PROGRESS",
        "deploymentId": "ecs-svc/123",
        "updatedAt": "2020-05-23T11:11:11Z",
        "reason": "ECS deployment deploymentId in progress."
    }
}
```

The following shows an example output for a rollback deployment starting. The reason field provides the ID of the deployment the service is rolling back to.

```json
{
    "version": "0",
    "id": "ddca6449-b258-46c0-8653-e0e3aEXAMPLE",
    "detail-type": "ECS Deployment State Change",
    "source": "aws.ecs",
    "account": "111122223333",
    "time": "2020-05-23T12:31:14Z",
    "region": "us-west-2",
    "resources": [
    ],
    "detail": {
        "eventType": "INFO",
        "eventName": "SERVICE_DEPLOYMENT_IN_PROGRESS",
        "deploymentId": "ecs-svc/123",
        "updatedAt": "2020-05-23T11:11:11Z",
        "reason": "ECS deployment circuit breaker: rolling back to deploymentId deploymentID."
    }
}
```
Handling events

Amazon ECS sends events on an at least once basis. This means you may receive multiple copies of a given event. Additionally, events may not be delivered to your event listeners in the order in which the events occurred.

To enable proper ordering of events, the detail section of each event contains a version property. Each time a resource changes state, this version is incremented. Duplicate events have the same version in the detail object. If you are replicating your task state with EventBridge, you can compare

Example service deployment completed event

Service deployment completed state events are delivered in the following format. For more information, see Rolling update (p. 187).

```
{
    "version": "0",
    "id": "ddca6449-b258-46c0-8653-e0e3aEXAMPLE",
    "detail-type": "ECS Deployment State Change",
    "source": "aws.ecs",
    "account": "111122223333",
    "time": "2020-05-23T12:31:14Z",
    "region": "us-west-2",
    "resources": [
    ],
    "detail": {
        "eventType": "INFO",
        "eventName": "SERVICE_DEPLOYMENT_COMPLETED",
        "deploymentId": "ecs-svc/123",
        "updatedAt": "2020-05-23T11:11:11Z",
        "reason": "ECS deployment deploymentID completed."
    }
}
```

Example service deployment failed event

Service deployment failed state events are delivered in the following format. A service deployment failed state event will only be sent for services that have deployment circuit breaker logic enabled. For more information, see Rolling update (p. 187).

```
{
    "version": "0",
    "id": "ddca6449-b258-46c0-8653-e0e3aEXAMPLE",
    "detail-type": "ECS Deployment State Change",
    "source": "aws.ecs",
    "account": "111122223333",
    "time": "2020-05-23T12:31:14Z",
    "region": "us-west-2",
    "resources": [
    ],
    "detail": {
        "eventType": "ERROR",
        "eventName": "SERVICE_DEPLOYMENT_FAILED",
        "deploymentId": "ecs-svc/123",
        "updatedAt": "2020-05-23T11:11:11Z",
        "reason": "ECS deployment circuit breaker: task failed to start."
    }
}
```
the version of a resource reported by the Amazon ECS APIs with the version reported in EventBridge for the resource to verify that the version in your event stream is current. Events with a higher version property number should be treated as occurring later than events with lower version numbers.

Example: Handling events in an AWS Lambda function

The following example shows a Lambda function written in Python 2.7 that captures task state change events and saves them to the following Amazon DynamoDB table:

- **ECSTaskState** – Stores the latest state for a task. The table ID is the taskArn value of the task.

```python
import json
import boto3

def lambda_handler(event, context):
    id_name = ""
    new_record = {}

    # For debugging so you can see raw event format.
    print('Here is the event:')
    print(json.dumps(event))

    if event["source"] != "aws.ecs":
        raise ValueError("Function only supports input from events with a source type of: aws.ecs")

    # Switch on task/container events.
    table_name = ""
    if event["detail-type"] == "ECS Task State Change":
        table_name = "ECSTaskState"
        id_name = "taskArn"
        event_id = event["detail"]["taskArn"]
    else:
        raise ValueError("detail-type for event is not a supported type. Exiting without saving event.")

    new_record["cw_version"] = event["version"]
    new_record.update(event["detail"])

    # "status" is a reserved word in DDB, but it appears in containerPort state change messages.
    if "status" in event:
        new_record["current_status"] = event["status"]
        new_record.pop("status")

    # Look first to see if you have received a newer version of an event ID.
    # If the version is OLDER than what you have on file, do not process it.
    # Otherwise, update the associated record with this latest information.
    print("Looking for recent event with same ID...")
    dynamodb = boto3.resource("dynamodb", region_name="us-east-1")
    table = dynamodb.Table(table_name)
    saved_event = table.get_item(
        Key={
            id_name : event_id
        }
    )
    if "Item" in saved_event:
        # Compare events and reconcile.
        print("EXISTING EVENT DETECTED: Id " + event_id + " - reconciling")
        if saved_event["Item"]["version"] < event["detail"]["version"]:  
            print("Received event is a more recent version than the stored event - updating")
```

API Version 2014-11-13

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CloudWatch Container Insights collects, aggregates, and summarizes metrics and logs from your containerized applications and microservices. The metrics include utilization for resources such as CPU, memory, disk, and network. The metrics are available in CloudWatch automatic dashboards. For a full list of Amazon ECS Container Insights metrics, see Amazon ECS Container Insights Metrics in the Amazon CloudWatch User Guide.

Operational data is collected as performance log events. These are entries that use a structured JSON schema that enables high-cardinality data to be ingested and stored at scale. From this data, CloudWatch creates higher-level aggregated metrics at the cluster and service level as CloudWatch metrics. For more information, see Container Insights Structured Logs for Amazon ECS in the Amazon CloudWatch User Guide.

**Important**

Metrics collected by CloudWatch Container Insights are charged as custom metrics. For more information about CloudWatch pricing, see CloudWatch Pricing. Amazon ECS also provides monitoring metrics that are provided at no additional cost. For more information, see Amazon ECS CloudWatch metrics (p. 232).

### Container Insights considerations

The following should be considered when using CloudWatch Container Insights.

- CloudWatch Container Insights metrics only reflect the resources with running tasks during the specified time range. For example, if you have a cluster with one service in it but that service has no tasks in a running state, there will be no metrics sent to CloudWatch. If you have two services and one of them has running tasks and the other doesn't, only the metrics for the service with running tasks will be sent.
- Network metrics are available for tasks using the Fargate or EC2 launch type with the bridge or awsvpc network mode.

### Working with Container Insights-enabled clusters

Container Insights can be enabled for all new clusters created by opting in to the containerInsights account setting, on individual clusters by enabling it using the cluster settings during cluster creation, or on existing clusters by using the UpdateClusterSettings API.

Opting in to the containerInsights account setting can be done with both the Amazon ECS console and the AWS CLI. You must be running version 1.16.200 or later of the AWS CLI to use this feature. For more information on creating Amazon ECS clusters, see Creating a cluster (p. 49).

**Important**
To opt in all IAM users or roles on your account to Container Insights-enabled clusters using the console

1. As the root user of the account, open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation bar at the top of the screen, select the Region for which to opt in to Container Insights-enabled clusters.
3. From the dashboard, choose Account Settings.
4. For IAM user or role, ensure your root user or container instance IAM role is selected.
5. For Container Insights, select the check box. Choose Save once finished.

   Important
   IAM users and IAM roles need the ecs:PutAccountSetting permission to perform this action.
6. On the confirmation screen, choose Confirm to save the selection.

To opt in all IAM users or roles on your account to Container Insights-enabled clusters using the command line

Any user on an account can use one of the following commands to modify the default account setting for all IAM users or roles on your account. These changes apply to the entire AWS account unless an IAM user or role explicitly overrides these settings for themselves.

- put-account-setting-default (AWS CLI)

```bash
aws ecs put-account-setting-default --name containerInsights --value enabled --region us-east-1
```

- Write-ECSAccountSettingDefault (AWS Tools for Windows PowerShell)

```powershell
Write-ECSAccountSettingDefault -Name containerInsights -Value enabled -Region us-east-1 -Force
```

To opt in an IAM user or container instance IAM role to Container Insights-enabled clusters as the root user using the command line

The root user on an account can use one of the following commands and specify the ARN of the principal IAM user or container instance IAM role in the request to modify the account settings.

- put-account-setting (AWS CLI)

```bash
aws ecs put-account-setting --name containerInsights --value enabled --principal-arn arn:aws:iam::aws_account_id:user/userName --region us-east-1
```

- Write-ECSAccountSetting (AWS Tools for Windows PowerShell)

```powershell
Write-ECSAccountSetting -Name containerInsights -Value enabled -PrincipalArn arn:aws:iam::aws_account_id:user/userName -Region us-east-1 -Force
```
To update the settings for an existing cluster using the command line

Use one of the following commands to update the setting for a cluster.

- **update-cluster-settings** (AWS CLI)

```
aws ecs update-cluster-settings --cluster cluster_name_or_arn --settings 
name=containerInsights,value=enabled|disabled --region us-east-1
```

Logging Amazon ECS API calls with AWS CloudTrail

Amazon ECS is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or an AWS service in Amazon ECS. CloudTrail captures all API calls for Amazon ECS as events, including calls from the Amazon ECS console and from code calls to the Amazon ECS API operations.

If you create a trail, you can enable continuous delivery of CloudTrail events to an Amazon S3 bucket, including events for Amazon ECS. If you don’t configure a trail, you can still view the most recent events in the CloudTrail console in **Event history**. Using the information collected by CloudTrail, you can determine the request that was made to Amazon ECS, the IP address from which the request was made, who made the request, when it was made, and additional details.

For more information, see the [AWS CloudTrail User Guide](https://docs.aws.amazon.com/cloudtrail/latest/userguide/).

Amazon ECS information in CloudTrail

CloudTrail is enabled on your AWS account when you create the account. When activity occurs in Amazon ECS, that activity is recorded in a CloudTrail event along with other AWS service events in **Event history**. You can view, search, and download recent events in your AWS account. For more information, see [Viewing Events with CloudTrail Event History](https://docs.aws.amazon.com/cloudtrail/latest/userguide/).

For an ongoing record of events in your AWS account, including events for Amazon ECS, create a trail. A trail enables CloudTrail to deliver log files to an Amazon S3 bucket. By default, when you create a trail in the console, the trail applies to all regions. The trail logs events from all Regions in the AWS partition and delivers the log files to the Amazon S3 bucket that you specify. Additionally, you can configure other AWS services to further analyze and act upon the event data collected in CloudTrail logs. For more information, see:

- Overview for Creating a Trail
- CloudTrail Supported Services and Integrations
- Configuring Amazon SNS Notifications for CloudTrail
- Receiving CloudTrail Log Files from Multiple Regions and [Receiving CloudTrail Log Files from Multiple Accounts](https://docs.aws.amazon.com/cloudtrail/latest/userguide/)

All Amazon ECS actions are logged by CloudTrail and are documented in the [Amazon Elastic Container Service API Reference](https://docs.aws.amazon.com/AmazonECS/latest/developerguide/amazon-ecs-api.html). For example, calls to the `CreateService`, `RunTask` and `DeleteCluster` sections generate entries in the CloudTrail log files.

Every event or log entry contains information about who generated the request. The identity information helps you determine the following:

- Whether the request was made with root or IAM user credentials.
- Whether the request was made with temporary security credentials for a role or federated user.
- Whether the request was made by another AWS service.
For more information, see the CloudTrail userIdentity Element.

Understanding Amazon ECS log file entries

A trail is a configuration that enables delivery of events as log files to an Amazon S3 bucket that you specify. CloudTrail log files contain one or more log entries. An event represents a single request from any source and includes information about the requested action, the date and time of the action, request parameters, and so on. CloudTrail log files are not an ordered stack trace of the public API calls, so they do not appear in any specific order.

**Note**

These examples have been formatted for improved readability. In a CloudTrail log file, all entries and events are concatenated into a single line. In addition, this example has been limited to a single Amazon ECS entry. In a real CloudTrail log file, you see entries and events from multiple AWS services.

The following example shows a CloudTrail log entry that demonstrates the `CreateCluster` action:

```json
{
    "eventVersion": "1.04",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "AIDACKCEVSQ6C2EXAMPLE:account_name",
        "arn": "arn:aws:sts::123456789012:user/Mary_Major",
        "accountId": "123456789012",
        "accessKeyId": "AKIAIOSFODNN7EXAMPLE",
        "sessionContext": {
            "attributes": {
                "mfaAuthenticated": "false",
                "creationDate": "2018-06-20T18:32:25Z"
            },
            "sessionIssuer": {
                "type": "Role",
                "principalId": "AIDACKCEVSQ6C2EXAMPLE",
                "arn": "arn:aws:iam::123456789012:role/Admin",
                "accountId": "123456789012",
                "userName": "Mary_Major"
            }
        }
    },
    "eventTime": "2018-06-20T19:04:36Z",
    "eventSource": "ecs.amazonaws.com",
    "eventName": "CreateCluster",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "203.0.113.12",
    "userAgent": "console.amazonaws.com",
    "requestParameters": {
        "clusterName": "default"
    },
    "responseElements": {
        "cluster": {
            "clusterArn": "arn:aws:ecs:us-east-1:123456789012:cluster/default",
            "pendingTasksCount": 0,
            "registeredContainerInstancesCount": 0,
            "status": "ACTIVE",
            "runningTasksCount": 0,
            "statistics": [],
            "clusterName": "default",
            "activeServicesCount": 0
        }
    },
    "requestID": "cb8c167e-EXAMPLE",
    "eventID": "e3c6f4ce-EXAMPLE"
}
```
"eventType": "AwsApiCall",
"recipientAccountId": "123456789012"
}
Security in Amazon Elastic Container Service

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from a data center and network architecture that is built to meet the requirements of the most security-sensitive organizations.

Security is a shared responsibility between AWS and you. The shared responsibility model describes this as security of the cloud and security in the cloud:

- **Security of the cloud** – AWS is responsible for protecting the infrastructure that runs AWS services in the AWS Cloud. AWS also provides you with services that you can use securely. Third-party auditors regularly test and verify the effectiveness of our security as part of the AWS compliance programs. To learn about the compliance programs that apply to Amazon Elastic Container Service, see AWS Services in Scope by Compliance Program.
- **Security in the cloud** – Your responsibility is determined by the AWS service that you use. You are also responsible for other factors including the sensitivity of your data, your company’s requirements, and applicable laws and regulations.

This documentation helps you understand how to apply the shared responsibility model when using Amazon ECS. The following topics show you how to configure Amazon ECS to meet your security and compliance objectives. You also learn how to use other AWS services that help you to monitor and secure your Amazon ECS resources.

**Topics**

- Identity and access management for Amazon Elastic Container Service (p. 254)
- Logging and Monitoring in Amazon Elastic Container Service (p. 306)
- Compliance Validation for Amazon Elastic Container Service (p. 307)
- Infrastructure Security in Amazon Elastic Container Service (p. 307)

Identity and access management for Amazon Elastic Container Service

AWS Identity and Access Management (IAM) is an AWS service that helps an administrator securely control access to AWS resources. IAM administrators control who can be authenticated (signed in) and authorized (have permissions) to use Amazon ECS resources. IAM is an AWS service that you can use with no additional charge.

**Topics**

- Audience (p. 255)
- Authenticating With Identities (p. 255)
- Managing Access Using Policies (p. 257)
- How Amazon Elastic Container Service Works with IAM (p. 258)
- Amazon Elastic Container Service Identity-Based Policy Examples (p. 263)
- Supported Resource-Level Permissions for Amazon ECS API Actions (p. 272)
- Managed Policies and Trust Relationships (p. 273)
- Service-Linked Role for Amazon ECS (p. 282)
- Amazon ECS task execution IAM role (p. 290)
• IAM Roles for Tasks (p. 294)
• Amazon ECS CodeDeploy IAM Role (p. 297)
• Amazon ECS CloudWatch Events IAM Role (p. 301)
• Troubleshooting Amazon Elastic Container Service Identity and Access (p. 304)

Audience

How you use AWS Identity and Access Management (IAM) differs, depending on the work that you do in Amazon ECS.

Service user – If you use the Amazon ECS service to do your job, then your administrator provides you with the credentials and permissions that you need. As you use more Amazon ECS features to do your work, you might need additional permissions. Understanding how access is managed can help you request the right permissions from your administrator. If you cannot access a feature in Amazon ECS, see Troubleshooting Amazon Elastic Container Service Identity and Access (p. 304).

Service administrator – If you're in charge of Amazon ECS resources at your company, you probably have full access to Amazon ECS. It's your job to determine which Amazon ECS features and resources your employees should access. You must then submit requests to your IAM administrator to change the permissions of your service users. Review the information on this page to understand the basic concepts of IAM. To learn more about how your company can use IAM with Amazon ECS, see How Amazon Elastic Container Service Works with IAM (p. 258).

IAM administrator – If you're an IAM administrator, you might want to learn details about how you can write policies to manage access to Amazon ECS. To view example Amazon ECS identity-based policies that you can use in IAM, see Amazon Elastic Container Service Identity-Based Policy Examples (p. 263).

Authenticating With Identities

Authentication is how you sign in to AWS using your identity credentials. For more information about signing in using the AWS Management Console, see Signing in to the AWS Management Console as an IAM user or root user in the IAM User Guide.

You must be authenticated (signed in to AWS) as the AWS account root user, an IAM user, or by assuming an IAM role. You can also use your company's single sign-on authentication or even sign in using Google or Facebook. In these cases, your administrator previously set up identity federation using IAM roles.

When you access AWS using credentials from another company, you are assuming a role indirectly. To sign in directly to the AWS Management Console, use your password with your root user email address or your IAM user name. You can access AWS programmatically using your root user or IAM users access keys. AWS provides SDK and command line tools to cryptographically sign your request using your credentials. If you don't use AWS tools, you must sign the request yourself. Do this using Signature Version 4, a protocol for authenticating inbound API requests. For more information about authenticating requests, see Signature Version 4 signing process in the AWS General Reference.

Regardless of the authentication method that you use, you might also be required to provide additional security information. For example, AWS recommends that you use multi-factor authentication (MFA) to increase the security of your account. To learn more, see Using multi-factor authentication (MFA) in AWS in the IAM User Guide.

AWS account root user

When you first create an AWS account, you begin with a single sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account root user and is accessed by signing in with the email address and password that you used to create the account. We strongly recommend that you do not use the root user for your everyday tasks, even the administrative ones. Instead, adhere to the best practice of using the root user only to create your first IAM user. Then
securely lock away the root user credentials and use them to perform only a few account and service management tasks.

**IAM Users and Groups**

An **IAM user** is an identity within your AWS account that has specific permissions for a single person or application. An IAM user can have long-term credentials such as a user name and password or a set of access keys. To learn how to generate access keys, see [Managing access keys for IAM users](#) in the IAM User Guide. When you generate access keys for an IAM user, make sure you view and securely save the key pair. You cannot recover the secret access key in the future. Instead, you must generate a new access key pair.

An **IAM group** is an identity that specifies a collection of IAM users. You can't sign in as a group. You can use groups to specify permissions for multiple users at a time. Groups make permissions easier to manage for large sets of users. For example, you could have a group named `IAMAdmins` and give that group permissions to administer IAM resources.

Users are different from roles. A user is uniquely associated with one person or application, but a role is intended to be assumable by anyone who needs it. Users have permanent long-term credentials, but roles provide temporary credentials. To learn more, see [When to create an IAM user (instead of a role)](#) in the IAM User Guide.

**IAM Roles**

An **IAM role** is an identity within your AWS account that has specific permissions. It is similar to an IAM user, but is not associated with a specific person. You can temporarily assume an IAM role in the AWS Management Console by switching roles. You can assume a role by calling an AWS CLI or AWS API operation or by using a custom URL. For more information about methods for using roles, see [Using IAM roles](#) in the IAM User Guide.

IAM roles with temporary credentials are useful in the following situations:

- **Temporary IAM user permissions** – An IAM user can assume an IAM role to temporarily take on different permissions for a specific task.

- **Federated user access** – Instead of creating an IAM user, you can use existing identities from AWS Directory Service, your enterprise user directory, or a web identity provider. These are known as federated users. AWS assigns a role to a federated user when access is requested through an identity provider. For more information about federated users, see [Federated users and roles](#) in the IAM User Guide.

- **Cross-account access** – You can use an IAM role to allow someone (a trusted principal) in a different account to access resources in your account. Roles are the primary way to grant cross-account access. However, with some AWS services, you can attach a policy directly to a resource (instead of using a role as a proxy). To learn the difference between roles and resource-based policies for cross-account access, see [How IAM roles differ from resource-based policies](#) in the IAM User Guide.

- **Cross-service access** – Some AWS services use features in other AWS services. For example, when you make a call in a service, it's common for that service to run applications in Amazon EC2 or store objects in Amazon S3. A service might do this using the calling principal's permissions, using a service role, or using a service-linked role.

- **Principal permissions** – When you use an IAM user or role to perform actions in AWS, you are considered a principal. Policies grant permissions to a principal. When you use some services, you might perform an action that then triggers another action in a different service. In this case, you must have permissions to perform both actions. To see whether an action requires additional dependent actions in a policy, see [Actions, Resources, and Condition Keys for Amazon Elastic Container Service](#) in the Service Authorization Reference.

- **Service role** – A service role is an IAM role that a service assumes to perform actions on your behalf. Service roles provide access only within your account and cannot be used to grant access to services in other accounts. An IAM administrator can create, modify, and delete a service role from within
IAM. For more information, see Creating a role to delegate permissions to an AWS service in the IAM User Guide.

- **Service-linked role** – A service-linked role is a type of service role that is linked to an AWS service. The service can assume the role to perform an action on your behalf. Service-linked roles appear in your IAM account and are owned by the service. An IAM administrator can view, but not edit the permissions for service-linked roles.

- **Applications running on Amazon EC2** – You can use an IAM role to manage temporary credentials for applications that are running on an EC2 instance and making AWS CLI or AWS API requests. This is preferable to storing access keys within the EC2 instance. To assign an AWS role to an EC2 instance and make it available to all of its applications, you create an instance profile that is attached to the instance. An instance profile contains the role and enables programs that are running on the EC2 instance to get temporary credentials. For more information, see Using an IAM role to grant permissions to applications running on Amazon EC2 instances in the IAM User Guide.

To learn whether to use IAM roles or IAM users, see When to create an IAM role (instead of a user) in the IAM User Guide.

**Managing Access Using Policies**

You control access in AWS by creating policies and attaching them to IAM identities or AWS resources. A policy is an object in AWS that, when associated with an identity or resource, defines their permissions. You can sign in as the root user or an IAM user, or you can assume an IAM role. When you then make a request, AWS evaluates the related identity-based or resource-based policies. Permissions in the policies determine whether the request is allowed or denied. Most policies are stored in AWS as JSON documents. For more information about the structure and contents of JSON policy documents, see Overview of JSON policies in the IAM User Guide.

Administrators can use AWS JSON policies to specify who has access to what. That is, which principal can perform actions on what resources, and under what conditions.

Every IAM entity (user or role) starts with no permissions. In other words, by default, users can do nothing, not even change their own password. To give a user permission to do something, an administrator must attach a permissions policy to a user. Or the administrator can add the user to a group that has the intended permissions. When an administrator gives permissions to a group, all users in that group are granted those permissions.

IAM policies define permissions for an action regardless of the method that you use to perform the operation. For example, suppose that you have a policy that allows the iam:GetRole action. A user with that policy can get role information from the AWS Management Console, the AWS CLI, or the AWS API.

**Identity-Based Policies**

Identity-based policies are JSON permissions policy documents that you can attach to an identity, such as an IAM user, group of users, or role. These policies control what actions users and roles can perform, on which resources, and under what conditions. To learn how to create an identity-based policy, see Creating IAM policies in the IAM User Guide.

Identity-based policies can be further categorized as inline policies or managed policies. Inline policies are embedded directly into a single user, group, or role. Managed policies are standalone policies that you can attach to multiple users, groups, and roles in your AWS account. Managed policies include AWS managed policies and customer managed policies. To learn how to choose between a managed policy or an inline policy, see Choosing between managed policies and inline policies in the IAM User Guide.

**Resource-Based Policies**

Resource-based policies are JSON policy documents that you attach to a resource. Examples of resource-based policies are IAM role trust policies and Amazon S3 bucket policies. In services that support resource-
based policies, service administrators can use them to control access to a specific resource. For the resource where the policy is attached, the policy defines what actions a specified principal can perform on that resource and under what conditions. You must specify a principal in a resource-based policy. Principals can include accounts, users, roles, federated users, or AWS services.

Resource-based policies are inline policies that are located in that service. You can't use AWS managed policies from IAM in a resource-based policy.

**Access Control Lists (ACLs)**

Access control lists (ACLs) control which principals (account members, users, or roles) have permissions to access a resource. ACLs are similar to resource-based policies, although they do not use the JSON policy document format.

Amazon S3, AWS WAF, and Amazon VPC are examples of services that support ACLs. To learn more about ACLs, see Access control list (ACL) overview in the Amazon Simple Storage Service Developer Guide.

**Other Policy Types**

AWS supports additional, less-common policy types. These policy types can set the maximum permissions granted to you by the more common policy types.

- **Permissions boundaries** – A permissions boundary is an advanced feature in which you set the maximum permissions that an identity-based policy can grant to an IAM entity (IAM user or role). You can set a permissions boundary for an entity. The resulting permissions are the intersection of entity's identity-based policies and its permissions boundaries. Resource-based policies that specify the user or role in the *Principal* field are not limited by the permissions boundary. An explicit deny in any of these policies overrides the allow. For more information about permissions boundaries, see Permissions boundaries for IAM entities in the *IAM User Guide*.

- **Service control policies (SCPs)** – SCPs are JSON policies that specify the maximum permissions for an organization or organizational unit (OU) in AWS Organizations. AWS Organizations is a service for grouping and centrally managing multiple AWS accounts that your business owns. If you enable all features in an organization, then you can apply service control policies (SCPs) to any or all of your accounts. The SCP limits permissions for entities in member accounts, including each AWS account root user. For more information about Organizations and SCPs, see How SCPs work in the *AWS Organizations User Guide*.

- **Session policies** – Session policies are advanced policies that you pass as a parameter when you programmatically create a temporary session for a role or federated user. The resulting session's permissions are the intersection of the user or role's identity-based policies and the session policies. Permissions can also come from a resource-based policy. An explicit deny in any of these policies overrides the allow. For more information, see Session policies in the *IAM User Guide*.

**Multiple Policy Types**

When multiple types of policies apply to a request, the resulting permissions are more complicated to understand. To learn how AWS determines whether to allow a request when multiple policy types are involved, see Policy evaluation logic in the *IAM User Guide*.

**How Amazon Elastic Container Service Works with IAM**

Before you use IAM to manage access to Amazon ECS, you should understand what IAM features are available to use with Amazon ECS. To get a high-level view of how Amazon ECS and other AWS services work with IAM, see AWS Services That Work with IAM in the *IAM User Guide*.
Amazon ECS Identity-Based Policies

With IAM identity-based policies, you can specify allowed or denied actions and resources as well as the conditions under which actions are allowed or denied. Amazon ECS supports specific actions, resources, and condition keys. To learn about all of the elements that you use in a JSON policy, see IAM JSON Policy Elements Reference in the IAM User Guide.

Actions

Administrators can use AWS JSON policies to specify who has access to what. That is, which principal can perform actions on what resources, and under what conditions.

The Action element of a JSON policy describes the actions that you can use to allow or deny access in a policy. Policy actions usually have the same name as the associated AWS API operation. There are some exceptions, such as permission-only actions that don't have a matching API operation. There are also some operations that require multiple actions in a policy. These additional actions are called dependent actions.

Include actions in a policy to grant permissions to perform the associated operation.

Policy actions in Amazon ECS use the following prefix before the action: ecs:. For example, to grant someone permission to create an Amazon ECS cluster with the Amazon ECS CreateCluster API operation, you include the ecs:CreateCluster action in their policy. Policy statements must include either an Action or NotAction element. Amazon ECS defines its own set of actions that describe tasks that you can perform with this service.

To specify multiple actions in a single statement, separate them with commas as follows:

```
"Action": [  
    "ecs:action1",  
    "ecs:action2"
]
```

You can specify multiple actions using wildcards (*). For example, to specify all actions that begin with the word Describe, include the following action:

```
"Action": "ecs:Describe*"
```

To see a list of Amazon ECS actions, see Actions, Resources, and Condition Keys for Amazon Elastic Container Service in the IAM User Guide

Resources

Administrators can use AWS JSON policies to specify who has access to what. That is, which principal can perform actions on what resources, and under what conditions.

The Resource JSON policy element specifies the object or objects to which the action applies. Statements must include either a Resource or a NotResource element. As a best practice, specify
a resource using its Amazon Resource Name (ARN). You can do this for actions that support a specific resource type, known as resource-level permissions.

For actions that don't support resource-level permissions, such as listing operations, use a wildcard (*) to indicate that the statement applies to all resources.

"Resource": "*

The Amazon ECS cluster resource has the following ARN:

arn:${Partition}:ecs:${Region}:${Account}:cluster/${clusterName}

For more information about the format of ARNs, see Amazon Resource Names (ARNs) and AWS Service Namespaces.

For example, to specify the my-cluster cluster in your statement, use the following ARN:

"Resource": "arn:aws:ecs:us-east-1:123456789012:cluster/my-cluster"

To specify all clusters that belong to a specific account, use the wildcard (*):

"Resource": "arn:aws:ecs:us-east-1:123456789012:cluster/*"

Some Amazon ECS actions, such as those for creating resources, cannot be performed on a specific resource. In those cases, you must use the wildcard (*).

"Resource": "*

Some Amazon ECS API actions can be performed on multiple resources. For example, multiple clusters can be referenced when calling the DescribeClusters API action. To specify multiple resources in a single statement, separate the ARNs with commas.

"Resource": [
  "resource1",
  "resource2"
]

The following table describes the ARNs for each resource type used by the Amazon ECS API actions.

Important

The following table uses the new longer ARN format for Amazon ECS tasks, services, and container instances. If you have not opted in to the long ARN format, the ARNs will not include the cluster name. For more information, see Amazon Resource Names (ARNs) and IDs (p. 144).

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>ARN</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Amazon ECS resources</td>
<td>arn:aws:ecs:*</td>
</tr>
<tr>
<td>All Amazon ECS resources owned by the specified account in the specified region</td>
<td>arn:aws:ecs:region:account:*</td>
</tr>
<tr>
<td>Cluster</td>
<td>arn:aws:ecs:region:account:cluster/cluster-name</td>
</tr>
</tbody>
</table>
### Resource Type and ARN

<table>
<thead>
<tr>
<th>Resource Type</th>
<th>ARN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task definition</td>
<td>arn:aws:ecs:region:account:task-definition/task-definition-family-name:task-definition-revision-number</td>
</tr>
<tr>
<td>Service</td>
<td>arn:aws:ecs:region:account:service/cluster-name/service-name</td>
</tr>
<tr>
<td>Task</td>
<td>arn:aws:ecs:region:account:task/cluster-name/task-id</td>
</tr>
<tr>
<td>Container</td>
<td>arn:aws:ecs:region:account:container/container-id</td>
</tr>
</tbody>
</table>

To learn with which actions you can specify the ARN of each resource, see **Supported Resource-Level Permissions for Amazon ECS API Actions (p. 272).**

### Condition Keys

Administrators can use AWS JSON policies to specify who has access to what. That is, which **principal** can perform **actions** on what **resources**, and under what **conditions**.

The **Condition** element (or **Condition block**) lets you specify conditions in which a statement is in effect. The Condition element is optional. You can create conditional expressions that use **condition operators**, such as equals or less than, to match the condition in the policy with values in the request.

If you specify multiple **Condition** elements in a statement, or multiple keys in a single **Condition** element, AWS evaluates them using a logical **AND** operation. If you specify multiple values for a single condition key, AWS evaluates the condition using a logical **OR** operation. All of the conditions must be met before the statement's permissions are granted.

You can also use placeholder variables when you specify conditions. For example, you can grant an IAM user permission to access a resource only if it is tagged with their IAM user name. For more information, see **IAM policy elements: variables and tags** in the **IAM User Guide**.

AWS supports global condition keys and service-specific condition keys. To see all AWS global condition keys, see **AWS global condition context keys** in the **IAM User Guide**.

Amazon ECS defines its own set of condition keys and also supports using some global condition keys. To see all AWS global condition keys, see **AWS Global Condition Context Keys** in the **IAM User Guide**.

Amazon ECS implements the following service-specific condition keys.

<table>
<thead>
<tr>
<th>Condition Key</th>
<th>Description</th>
<th>Evaluation Types</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>aws:RequestTag/ $ {TagKey}</strong></td>
<td>The context key is formatted &quot;aws:RequestTag/tag-key&quot;: &quot;tag-value&quot; where tag-key and tag-value are a tag key and value pair. Checks that the tag key–value pair is present in an AWS request. For example, you could check to see that the request includes the tag key &quot;Dept&quot; and that it has the value &quot;Accounting&quot;.</td>
<td>String</td>
</tr>
<tr>
<td><strong>aws:ResourceTag/ $ {TagKey}</strong></td>
<td>The context key is formatted &quot;aws:ResourceTag/tag-key&quot;: &quot;tag-value&quot; where tag-key and tag-value are a tag key and value pair.</td>
<td>String</td>
</tr>
<tr>
<td>Condition Key</td>
<td>Description</td>
<td>Evaluation Types</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Checks that the tag attached to the identity resource (user or role) matches the specified key name and value.</td>
<td></td>
</tr>
<tr>
<td>aws:TagKeys</td>
<td>This context key is formatted “aws:TagKeys”:“tag-key” where tag-key is a list of tag keys without values (for example, [&quot;Dept&quot;,&quot;Cost-Center&quot;]).</td>
<td>String</td>
</tr>
<tr>
<td></td>
<td>Checks the tag keys that are present in an AWS request.</td>
<td></td>
</tr>
<tr>
<td>ecs:ResourceTag/[$TagKey]</td>
<td>The context key is formatted &quot;ecs:ResourceTag/tag-key&quot;:&quot;tag-value&quot; where tag-key and tag-value are a tag key and value pair.</td>
<td>String</td>
</tr>
<tr>
<td></td>
<td>Checks that the tag attached to the identity resource (user or role) matches the specified key name and value.</td>
<td></td>
</tr>
<tr>
<td>ecs:cluster</td>
<td>The context key is formatted “ecs:cluster”:“cluster-arn” where cluster-arn is the ARN for the Amazon ECS cluster.</td>
<td>ARN, Null</td>
</tr>
<tr>
<td>ecs:container-instances</td>
<td>The context key is formatted “ecs:container-instances”:“container-instance-arns” where container-instance-arns is one or more container instance ARNs.</td>
<td>ARN, Null</td>
</tr>
<tr>
<td>ecs:task-definition</td>
<td>The context key is formatted “ecs:task-definition”:“task-definition-arn” where task-definition-arn is the ARN for the Amazon ECS task definition.</td>
<td>ARN, Null</td>
</tr>
<tr>
<td>ecs:service</td>
<td>The context key is formatted “ecs:service”:“service-arn” where service-arn is the ARN for the Amazon ECS service.</td>
<td>ARN, Null</td>
</tr>
</tbody>
</table>

To learn with which actions and resources you can use a condition key, see Supported Resource-Level Permissions for Amazon ECS API Actions (p. 272).

Examples

To view examples of Amazon ECS identity-based policies, see Amazon Elastic Container Service Identity-Based Policy Examples (p. 263).

Amazon ECS Resource-Based Policies

Amazon ECS does not support resource-based policies.

Authorization Based on Amazon ECS Tags

You can attach tags to Amazon ECS resources or pass tags in a request to Amazon ECS. To control access based on tags, you provide tag information in the condition element of a policy using the aws:RequestTag/key-name or aws:TagKeys condition keys. For more information, see Controlling Access Using Tags in the IAM User Guide.

For more information about tagging Amazon ECS resources, see Resources and tags (p. 222).
To view an example identity-based policy for limiting access to a resource based on the tags on that resource, see Describing Amazon ECS Services Based on Tags (p. 272).

Amazon ECS IAM Roles

An IAM role is an entity within your AWS account that has specific permissions.

Using Temporary Credentials with Amazon ECS

You can use temporary credentials to sign in with federation, assume an IAM role, or to assume a cross-account role. You obtain temporary security credentials by calling AWS STS API operations such as AssumeRole or GetFederationToken.

Amazon ECS supports using temporary credentials.

Service-Linked Roles

Service-linked roles allow AWS services to access resources in other services to complete an action on your behalf. Service-linked roles appear in your IAM account and are owned by the service. An IAM administrator can view but not edit the permissions for service-linked roles.

Amazon ECS supports service-linked roles. For details about creating or managing Amazon ECS service-linked roles, see Service-Linked Role for Amazon ECS (p. 282).

Service Roles

This feature allows a service to assume a service role on your behalf. This role allows the service to access resources in other services to complete an action on your behalf. Service roles appear in your IAM account and are owned by the account. This means that an IAM administrator can change the permissions for this role. However, doing so might break the functionality of the service.

Amazon ECS supports service roles.

Amazon Elastic Container Service Identity-Based Policy Examples

By default, IAM users and roles don't have permission to create or modify Amazon ECS resources. They also can't perform tasks using the AWS Management Console, AWS CLI, or AWS API. An IAM administrator must create IAM policies that grant users and roles permission to perform specific API operations on the specified resources they need. The administrator must then attach those policies to the IAM users or groups that require those permissions.

To learn how to create an IAM identity-based policy using these example JSON policy documents, see Creating Policies on the JSON Tab in the IAM User Guide.

Topics

- Policy Best Practices (p. 264)
- Allow Users to View Their Own Permissions (p. 264)
- Amazon ECS First Run Wizard Permissions (p. 265)
- Cluster Examples (p. 268)
- List and Describe Task Examples (p. 270)
- Create Service Example (p. 270)
Identity-Based Policy Examples

- Update Service Example (p. 271)
- Describing Amazon ECS Services Based on Tags (p. 272)

Policy Best Practices

Identity-based policies are very powerful. They determine whether someone can create, access, or delete Amazon ECS resources in your account. These actions can incur costs for your AWS account. When you create or edit identity-based policies, follow these guidelines and recommendations:

- **Get started using AWS managed policies** – To start using Amazon ECS quickly, use AWS managed policies to give your employees the permissions they need. These policies are already available in your account and are maintained and updated by AWS. For more information, see Get started using permissions with AWS managed policies in the IAM User Guide.

- **Grant least privilege** – When you create custom policies, grant only the permissions required to perform a task. Start with a minimum set of permissions and grant additional permissions as necessary. Doing so is more secure than starting with permissions that are too lenient and then trying to tighten them later. For more information, see Grant least privilege in the IAM User Guide.

- **Enable MFA for sensitive operations** – For extra security, require IAM users to use multi-factor authentication (MFA) to access sensitive resources or API operations. For more information, see Using multi-factor authentication (MFA) in AWS in the IAM User Guide.

- **Use policy conditions for extra security** – To the extent that it's practical, define the conditions under which your identity-based policies allow access to a resource. For example, you can write conditions to specify a range of allowable IP addresses that a request must come from. You can also write conditions to allow requests only within a specified date or time range, or to require the use of SSL or MFA. For more information, see IAM JSON policy elements: Condition in the IAM User Guide.

Allow Users to View Their Own Permissions

This example shows how you might create a policy that allows IAM users to view the inline and managed policies that are attached to their user identity. This policy includes permissions to complete this action on the console or programmatically using the AWS CLI or AWS API.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "ViewOwnUserInfo",
            "Effect": "Allow",
            "Action": [
                "iam:GetUserPolicy",
                "iam:ListGroupsForUser",
                "iam:ListAttachedUserPolicies",
                "iam:ListUserPolicies",
                "iam:GetUser"
            ],
            "Resource": ["arn:aws:iam::*:user/${aws:username}"]
        },
        {
            "Sid": "NavigateInConsole",
            "Effect": "Allow",
            "Action": [
                "iam:GetGroupPolicy",
                "iam:GetPolicyVersion",
                "iam:GetPolicy",
                "iam:ListAttachedGroupPolicies",
                "iam:ListGroupPolicies",
                "iam:ListPolicyVersions",
```
Amazon ECS User Guide for AWS Fargate
Identity-Based Policy Examples

Amazon ECS First Run Wizard Permissions

The Amazon ECS first-run wizard simplifies the process of creating a cluster and running your tasks and services. However, users require permissions to many API operations from multiple AWS services to complete the wizard. The `AmazonECS_FullAccess` managed policy below shows the required permissions to complete the Amazon ECS first-run wizard.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "application-autoscaling:DeleteScalingPolicy",
                "application-autoscaling:DeregisterScalableTarget",
                "application-autoscaling:DescribeScalableTargets",
                "application-autoscaling:DescribeScalingActivities",
                "application-autoscaling:DescribeScalingPolicies",
                "application-autoscaling:RegisterScalableTarget",
                "appmesh:ListMeshes",
                "appmesh:ListVirtualNodes",
                "appmesh:DescribeVirtualNode",
                "autoscaling:UpdateAutoScalingGroup",
                "autoscaling:CreateAutoScalingGroup",
                "autoscaling:CreateLaunchConfiguration",
                "autoscaling:DeleteAutoScalingGroup",
                "autoscaling:DeleteLaunchConfiguration",
                "autoscaling:Describe*",
                "cloudformation:CreateStack",
                "cloudformation:DeleteStack",
                "cloudformation:CreateStack",
                "cloudformation:DescribeStack*",
                "cloudformation:UpdateStack",
                "cloudwatch:DescribeAlarms",
                "cloudwatch:DeleteAlarms",
                "cloudwatch:GetMetricStatistics",
                "cloudwatch:PutMetricAlarm",
                "codedeploy:CreateApplication",
                "codedeploy:CreateDeployment",
                "codedeploy:CreateDeploymentGroup",
                "codedeploy:GetApplication",
                "codedeploy:GetDeployment",
                "codedeploy:GetDeploymentGroup",
                "codedeploy:ListApplications",
                "codedeploy:ListDeploymentGroups",
                "codedeploy:ListDeployments",
                "codedeploy:StopDeployment",
                "codedeploy:GetDeploymentTarget",
                "codedeploy:GetDeploymentTargets",
                "codedeploy:GetDeploymentConfig",
                "codedeploy:GetApplicationRevision",
                "codedeploy:RegisterApplicationRevision",
                "codedeploy:BatchGetApplicationRevisions",
                "codedeploy:BatchGetDeploymentGroups",
                "codedeploy:BatchGetDeployments",
            ]
        }
    ]
}
```
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Identity-Based Policy Examples

"codedeploy:BatchGetApplications",
"codedeploy:ListApplicationRevisions",
"codedeploy:ListDeploymentConfigs",
"codedeploy:ContinueDeployment",
"sns:ListTopics",
"lambda:ListFunctions",
"ec2:AssociateRouteTable",
"ec2:AttachInternetGateway",
"ec2:AuthorizeSecurityGroupIngress",
"ec2:CancelSpotFleetRequests",
"ec2:CreateInternetGateway",
"ec2:CreateLaunchTemplate",
"ec2:CreateRoute",
"ec2:CreateRouteTable",
"ec2:CreateSecurityGroup",
"ec2:CreateSubnet",
"ec2:CreateVpc",
"ec2:DeleteLaunchTemplate",
"ec2:DeleteSubnet",
"ec2:DeleteVpc",
"ec2:Describe**",
"ec2:DetachInternetGateway",
"ec2:DisassociateRouteTable",
"ec2:ModifySubnetAttribute",
"ec2:ModifyVpcAttribute",
"ec2:RunInstances",
"ec2:RequestSpotFleet",
"elasticloadbalancing:CreateListener",
"elasticloadbalancing:CreateLoadBalancer",
"elasticloadbalancing:CreateRule",
"elasticloadbalancing:CreateTargetGroup",
"elasticloadbalancing:DeleteListener",
"elasticloadbalancing:DeleteLoadBalancer",
"elasticloadbalancing:DeleteRule",
"elasticloadbalancing:DeleteTargetGroup",
"elasticloadbalancing:DescribeListeners",
"elasticloadbalancing:DescribeLoadBalancers",
"elasticloadbalancing:DescribeRules",
"elasticloadbalancing:DescribeTargetGroups",
"ecs:*",
"events:DescribeRule",
"events:DeleteRule",
"events:ListRuleNamesByTarget",
"events:ListTargetsByRule",
"events:PutRule",
"events:PutTargets",
"events:RemoveTargets",
"iam:ListAttachedRolePolicies",
"iam:ListAttachedRolePolicies",
"logs:CreateLogGroup",
"logs:DescribeLogGroups",
"logs:FilterLogEvents",
"route53:GetHostedZone",
"route53:ListHostedZonesByName",
"route53:CreateHostedZone",
"route53:DeleteHostedZone",
"route53:GetHealthCheck",
"servicediscovery:CreatePrivateDnsNamespace",
"servicediscovery:CreateService",
"servicediscovery:GetNamespace",
"servicediscovery:GetOperation",
"servicediscovery:GetService",
"servicediscovery:ListNamespaces",
"servicediscovery:ListServices",
"servicediscovery:UpdateService",

API Version 2014-11-13
266
"servicediscovery:DeleteService"
],
"Resource": [  
  "*"
]
},
{
"Effect": "Allow",
"Action": [
  "ssm:GetParametersByPath",
  "ssm:GetParameters",
  "ssm:GetParameter"
],
"Resource": "arn:aws:ssm:*:*:parameter/aws/service/ecs*"
},
{
"Effect": "Allow",
"Action": [
  "ec2:DeleteInternetGateway",
  "ec2:DeleteRoute",
  "ec2:DeleteRouteTable",
  "ec2:DeleteSecurityGroup"
],
"Resource": [  
  "*"
]
},
"Condition": {
  "StringLike": {
    "ec2:ResourceTag/aws:cloudformation:stack-name": "EC2ContainerService-"
  }
}
},
{
"Action": "iam:PassRole",
"Effect": "Allow",
"Resource": [  
  "*"
]
},
"Condition": {
  "StringLike": {
    "iam:PassedToService": "ecs-tasks.amazonaws.com"
  }
}
},
{
"Action": "iam:PassRole",
"Effect": "Allow",
"Resource": [  
  "arn:aws:iam::*:role/ecsInstanceRole*"
],
"Condition": {
  "StringLike": {
    "iam:PassedToService": [  
      "ec2.amazonaws.com",
      "ec2.amazonaws.com.cn"
    ]
  }
}
},
{
"Action": "iam:PassRole",
"Effect": "Allow",
"Resource": [  
  "arn:aws:iam::*:role/ecsAutoscaleRole*"
],
"Condition": {
  "StringLike": {
    "iam:PassedToService": [  
      "ec2.amazonaws.com",
      "ec2.amazonaws.com.cn"
    ]
  }
}
},
{
"Action": "iam:PassRole",
"Effect": "Allow",
"Resource": [  
  "arn:aws:iam::*:role/ecsInstanceRole*"
]
}
The first run wizard also attempts to automatically create different IAM roles depending on the launch type of the tasks used. Examples are the Amazon ECS service role, container instance IAM role, and the task execution IAM role. To ensure that the first-run experience is able to create these IAM roles, one of the following must be true:

- Your user has administrator access. For more information, see Setting up with Amazon ECS (p. 3).
- Your user has the IAM permissions to create a service role. For more information, see Creating a Role to Delegate Permissions to an AWS Service.
- You have a user with administrator access manually create the required IAM role so it is available on the account to be used. For more information, see the following:
  - Service Scheduler IAM Role (p. 288)
  - Amazon ECS task execution IAM role (p. 290)

**Cluster Examples**

The following IAM policy allows permission to create and list clusters. The CreateCluster and ListClusters actions do not accept any resources, so the resource definition is set to * for all resources.
The following IAM policy allows permission to describe and delete a specific cluster. The DescribeClusters and DeleteCluster actions accept cluster ARNs as resources.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ecs:DescribeClusters",
        "ecs:DeleteCluster"
      ],
      "Resource": [
        "arn:aws:ecs:us-east-1:<aws_account_id>:cluster/<cluster_name>"
      ]
    }
  ]
}
```

The following IAM policy can be attached to a user or group that would only allow that user or group to perform operations on a specific cluster.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "ecs:Describe*",
        "ecs:List*"
      ],
      "Effect": "Allow",
      "Resource": "*"
    },
    {
      "Action": [
        "ecs:DeleteCluster",
        "ecs:DeregisterContainerInstance",
        "ecs:ListContainerInstances",
        "ecs:RegisterContainerInstance",
        "ecs:SubmitContainerStateChange",
        "ecs:SubmitTaskStateChange"
      ],
      "Effect": "Allow",
      "Resource": "arn:aws:ecs:us-east-1:<aws_account_id>:cluster/default"
    },
    {
      "Action": [
        "ecs:DescribeContainerInstances",
        "ecs:DescribeTasks",
        "ecs:ListTasks",
        "ecs:UpdateContainerAgent",
        "ecs:StartTask",
        "ecs:StopTask",
        "ecs:RunTask"
      ],
      "Effect": "Allow",
      "Resource": "*",
      "Condition": {
        "ArnEquals": {
          "ecs:cluster": "arn:aws:ecs:us-east-1:<aws_account_id>:cluster/default"
        }
      }
    }
  ]
}
```
List and Describe Task Examples

The following IAM policy allows a user to list tasks for a specified cluster:

```
{
    "Version": "2012-10-17",
    "Statement": [
    {
        "Effect": "Allow",
        "Action": [ "ecs:ListTasks" ],
        "Condition": {
            "ArnEquals": {
                "ecs:cluster": "arn:aws:ecs:<region>:<aws_account_id>:cluster/<cluster_name>"
            },
            "Resource": [ "*" ]
        }
    }
    ]
}
```

The following IAM policy allows a user to describe a specified task in a specified cluster:

```
{
    "Version": "2012-10-17",
    "Statement": [
    {
        "Effect": "Allow",
        "Action": [ "ecs:DescribeTasks" ],
        "Condition": {
            "ArnEquals": {
                "ecs:cluster": "arn:aws:ecs:<region>:<aws_account_id>:cluster/<cluster_name>"
            },
            "Resource": [ "arn:aws:ecs:<region>:<aws_account_id>:task/<task_UUID>" ]
        }
    }
    ]
}
```

Create Service Example

The following IAM policy allows a user to create Amazon ECS services in the AWS Management Console:

```
{
    "Version": "2012-10-17",
    "Statement": [
    {
        "Effect": "Allow",
        "Action": [ "ecs:CreateService" ],
        "Condition": {
            "ArnEquals": {
                "ecs:cluster": "arn:aws:ecs:<region>:<aws_account_id>:cluster/<cluster_name>"
            },
            "Resource": [ "arn:aws:ecs:<region>:<aws_account_id>:service/<service_name>" ]
        }
    }
    ]
}
```
Identity-Based Policy Examples

Update Service Example

The following IAM policy allows a user to update Amazon ECS services in the AWS Management Console:

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "application-autoscaling:Describe*",
        "application-autoscaling:PutScalingPolicy",
        "application-autoscaling:DeleteScalingPolicy",
        "application-autoscaling:RegisterScalableTarget",
        "cloudwatch:DescribeAlarms",
        "cloudwatch:PutMetricAlarm",
        "ecs:List*",
        "ecs:Describe*",
        "ecs:CreateService",
        "elasticloadbalancing:Describe*",
        "iam:AttachRolePolicy",
        "iam:CreateRole",
        "iam:GetPolicy",
        "iam:GetPolicyVersion",
        "iam:GetRole",
        "iam:ListAttachedRolePolicies",
        "iam:ListRoles",
        "iam:ListGroup",
        "iam:ListUsers"
      ],
      "Resource": [
        "*
      ]
    }
  ]
}
```
Describing Amazon ECS Services Based on Tags

You can use conditions in your identity-based policy to control access to Amazon ECS resources based on tags. This example shows how you might create a policy that allows describing your services. However, permission is granted only if the service tag owner has the value of that user's user name. This policy also grants the permissions necessary to complete this action on the console.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "DescribeServices",
      "Effect": "Allow",
      "Action": "ecs:DescribeServices",
      "Resource": "*"
    },
    {
      "Sid": "ViewServiceIfOwner",
      "Effect": "Allow",
      "Action": "ecs:DescribeServices",
      "Resource": "arn:aws:ecs:*:*:service/*",
      "Condition": {
        "StringEquals": {"ecs:ResourceTag/Owner": "${aws:username}"}
      }
    }
  ]
}
```

You can attach this policy to the IAM users in your account. If a user named richard-roe attempts to describe an Amazon ECS service, the service must be tagged owner=richard-roe or owner=richard-roe. Otherwise he is denied access. The condition tag key owner matches both owner and owner because condition key names are not case-sensitive. For more information, see IAM JSON Policy Elements: Condition in the IAM User Guide.

Supported Resource-Level Permissions for Amazon ECS API Actions

The term resource-level permissions refers to the ability to specify which resources users are allowed to perform actions on. Amazon ECS has partial support for resource-level permissions. This means that for certain Amazon ECS actions, you can control when users are allowed to use those actions based on conditions that have to be fulfilled, or specific resources that users are allowed to use. For example, you can grant users permission to launch instances, but only of a specific type, and only using a specific AMI.

For more information about the resources that are created or modified by the Amazon ECS actions, and the ARNs and Amazon ECS condition keys that you can use in an IAM policy statement, see Actions, Resources, and Condition Keys for Amazon Elastic Container Service in the IAM User Guide.

Considerations for Resource-Level Permissions

When controlling access to Amazon ECS API actions by specifying the Amazon Resource Name (ARN) of a resource in an IAM policy, be mindful that ECS has introduced an account setting that affects the ARN format for container instances, services, and tasks. To use resource-level permissions, we recommend that you opt-in to the new, longer ARN format. For more information, see Amazon Resource Names (ARNs) and IDs (p. 144).

When an IAM policy is evaluated, the specified resources are evaluated based on their use of the new, longer ARN format. The following are examples of how access is controlled.
Specifying a Service with a Cluster Only with a Wildcard

Example: `arn:aws:ecs:region:aws_account_id:service/cluster_name*`

In this example, access will be controlled to the following services:

- All services using the new ARN format that are in the `cluster_name*` cluster.
- All services using the old ARN format that are in the `cluster_name*` cluster.

Important

This will NOT control access to services using the old ARN format that have a service name with the `cluster_name` prefix that are not in the `cluster_name*` cluster.

Specifying a Service with both a Cluster and Service Name with a Wildcard

Example: `arn:aws:ecs:region:aws_account_id:service/cluster_name/service_name*`

In this example, access will be controlled to the following services:

- All services using the new ARN format that are in the `cluster_name` cluster with the `service_name` prefix.
- All services using the old ARN format that are in the `cluster_name` cluster with the `service_name` prefix, even though the actual ARN of the service will still have the `arn:aws:ecs:region:aws_account_id:service/service_name*` ARN format.

Specifying a Service with a full ARN

Example: `arn:aws:ecs:region:aws_account_id:service/cluster_name/service_name`

In this example, access will be controlled to the following services:

- All services using the new ARN format that are in the `cluster_name` cluster with the `service_name` service name.
- All services using the old ARN format that are in the `cluster_name` cluster with the `service_name` service name, even though the actual ARN of the service will still have the `arn:aws:ecs:region:aws_account_id:service/service_name` ARN format.

Managed Policies and Trust Relationships

Amazon ECS and Amazon ECR provide several managed policies and trust relationships that you can attach to IAM users, EC2 instances, and Amazon ECS tasks that allow differing levels of control over Amazon ECS resources and API operations. You can apply these policies directly, or you can use them as starting points for creating your own policies.

Topics

- Amazon ECS Managed Policies and Trust Relationships (p. 273)
- Amazon ECR Managed Policies (p. 279)
- Migrating to the AmazonECS_FullAccess managed policy (p. 280)

Amazon ECS Managed Policies and Trust Relationships

Amazon ECS provides several managed policies and trust relationships that you can attach to IAM users, EC2 instances, or Amazon ECS tasks that allow differing levels of control over Amazon ECS resources.
and API operations. You can apply these policies directly, or you can use them as starting points for creating your own policies. For more information about each API operation mentioned in these policies, see Actions in the Amazon Elastic Container Service API Reference.

Topics

- AmazonECS_FullAccess (p. 274)
- AmazonEC2ContainerServiceFullAccess (p. 277)
- AmazonEC2ContainerServiceRole (p. 278)
- AmazonEC2ContainerServiceAutoscaleRole (p. 278)

AmazonECS_FullAccess

This managed policy provides administrative access to Amazon ECS resources and enables ECS features through access to other AWS service resources, including VPCs, Auto Scaling groups, and AWS CloudFormation stacks.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "application-autoscaling:DeleteScalingPolicy",
                "application-autoscaling:DeregisterScalableTarget",
                "application-autoscaling:DescribeScalableTargets",
                "application-autoscaling:DescribeScalingActivities",
                "application-autoscaling:DescribeScalingPolicies",
                "application-autoscaling:PutScalingPolicy",
                "application-autoscaling:RegisterScalableTarget",
                "appmesh:ListMeshes",
                "appmesh:ListVirtualNodes",
                "appmesh:DescribeVirtualNode",
                "autoscaling:UpdateAutoScalingGroup",
                "autoscaling:CreateAutoScalingGroup",
                "autoscaling:CreateLaunchConfiguration",
                "autoscaling:DeleteAutoScalingGroup",
                "autoscaling:DeleteLaunchConfiguration",
                "autoscaling:Describe*",
                "cloudformation:CreateStack",
                "cloudformation:DeleteStack",
                "cloudformation:DescribeStacks",
                "cloudformation:UpdateStack",
                "cloudwatch:DescribeAlarms",
                "cloudwatch:DeleteAlarms",
                "cloudwatch:GetMetricStatistics",
                "cloudwatch:PutMetricAlarm",
                "codedeploy:CreateApplication",
                "codedeploy:CreateDeployment",
                "codedeploy:CreateDeploymentGroup",
                "codedeploy:GetApplication",
                "codedeploy:GetDeployment",
                "codedeploy:GetDeploymentGroup",
                "codedeploy:GetDeploymentConfig",
                "codedeploy:GetApplicationRevision",
                "codedeploy:RegisterApplicationRevision",
            ]
        }
    ]
}
```

"codedeploy:BatchGetApplicationRevisions",
"codedeploy:BatchGetDeploymentGroups",
"codedeploy:BatchGetDeployments",
"codedeploy:BatchGetApplications",
"codedeploy:ListApplicationRevisions",
"codedeploy:ListDeploymentConfigs",
"codedeploy:ContinueDeployment",
"sns:ListTopics",
"lambda:ListFunctions",
"ec2:AssociateRouteTable",
"ec2:AttachInternetGateway",
"ec2:AuthorizeSecurityGroupIngress",
"ec2:CancelSpotFleetRequests",
"ec2:CreateInternetGateway",
"ec2:CreateLaunchTemplate",
"ec2:CreateRoute",
"ec2:CreateRouteTable",
"ec2:CreateSecurityGroup",
"ec2:CreateSubnet",
"ec2:CreateVpc",
"ec2:DeleteLaunchTemplate",
"ec2:DeleteSubnet",
"ec2:DeleteVpc",
"ec2:Describe**",
"ec2:DeregisterHealthCheck",
"ec2:Describe*",
"ec2:DeletePrivateDnsNamespace",
"ec2:DeletePrivateLink",
"ec2:DeletePrivateLinkClientVpcAssociation",
"ec2:DeletePrivateLinkVpcAssociation",
"ec2:DescribePrivateDnsNamespaces",
"ec2:DescribePrivateLinkEndpoints",
"ec2:DescribePrivateLinkVpcEndpoints",
"elasticloadbalancing:CreateListener",
"elasticloadbalancing:CreateLoadBalancer",
"elasticloadbalancing:CreateRule",
"elasticloadbalancing:CreateTargetGroup",
"elasticloadbalancing:DeleteListener",
"elasticloadbalancing:DeleteLoadBalancer",
"elasticloadbalancing:DeleteRule",
"elasticloadbalancing:DeleteTargetGroup",
"elasticloadbalancing:DescribeListeners",
"elasticloadbalancing:DescribeLoadBalancers",
"elasticloadbalancing:DescribeRules",
"elasticloadbalancing:DescribeTargetGroups",
"ecs:**",
"events:DescribeRule",
"events:DeleteRule",
"events:ListRuleNamesByTarget",
"events:ListTargetsByRule",
"events:PutRule",
"events:PutTargets",
"events:RemoveTargets",
"iam:ListAttachedRolePolicies",
"iam:ListInstanceProfiles",
"iam:ListRoles",
"logs:CreateLogGroup",
"logs:DescribeLogGroups",
"logs:FilterLogEvents",
"route53:GetHostedZone",
"route53:ListHostedZonesByName",
"route53:CreateHostedZone",
"route53:DeleteHostedZone",
"route53:GetHealthCheck",
"servicediscovery:CreatePrivateDnsNamespace",
"servicediscovery:CreateService",
"servicediscovery:GetNamespace",
"servicediscovery:GetOperation",
"servicediscovery:GetService"
Managed Policies and Trust Relationships

```
  
  
  "servicediscovery:ListNamespaces",
  "servicediscovery:ListServices",
  "servicediscovery:UpdateService",
  "servicediscovery:DeleteService"
  ],
  "Resource": [
    "*"
  ]
},

  
  
  "Effect": "Allow",
  "Action": [
    "ssm:GetParametersByPath",
    "ssm:GetParameters",
    "ssm:GetParameter"
  ],
  "Resource": "arn:aws:ssm::*:*:parameter/aws/service/ecs"
},

  
  
  "Effect": "Allow",
  "Action": [
    "ec2:DeleteInternetGateway",
    "ec2:DeleteRoute",
    "ec2:DeleteRouteTable",
    "ec2:DeleteSecurityGroup"
  ],
  "Resource": [
    "*"
  ],
  "Condition": {
    "StringLike": {
      "ec2:ResourceTag/aws:cloudformation:stack-name": "EC2ContainerService-*"
    }
  }
},

  
  
  "Action": "iam:PassRole",
  "Effect": "Allow",
  "Resource": [
    "*"
  ],
  "Condition": {
    "StringLike": {
      "iam:PassedToService": "ecs-tasks.amazonaws.com"
    }
  }
},

  
  
  "Action": "iam:PassRole",
  "Effect": "Allow",
  "Resource": ["arn:aws:iam::*:role/ecsInstanceRole*"]
],
  "Condition": {
    "StringLike": {
      "iam:PassedToService": ["ec2.amazonaws.com", "ec2.amazonaws.com.cn"
    }
  }
},

  
  
  "Action": "iam:PassRole",
  "Effect": "Allow",
  "Resource": 
```
Managed Policies and Trust Relationships

AmazonEC2ContainerServiceFullAccess

**Important**
The AmazonEC2ContainerServiceFullAccess managed IAM policy is deprecated as of January 29, 2021 in response to a security finding with the `iam:passRole` permission which grants access to all resources including credentials to roles in the account. Once the policy is deprecated, you won’t be able to attach the policy to any new IAM users or roles. Any existing users or roles that have the policy attached will be able to continue using it, however we recommend updating your IAM users or roles to use the AmazonECS_FullAccess managed policy instead.

This managed policy allows full administrator access to Amazon ECS.
Managed Policies and Trust Relationships

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"events:ListTargetsByRule",
"events:PutRule",
"events:PutTargets",
"events:RemoveTargets",
"iam:ListInstanceProfiles",
"iam:ListRoles",
"iam:PassRole"
],
"Resource": "*

AmazonEC2ContainerServiceRole

This managed policy allows Elastic Load Balancing load balancers to register and deregister Amazon ECS container instances on your behalf. For more information, see Service Scheduler IAM Role (p. 288).

{  "Version": "2012-10-17",
   "Statement": [
      {  "Effect": "Allow",
         "Action": [
            "ec2:AuthorizeSecurityGroupIngress",
            "ec2:Describe*",
            "elasticloadbalancing:DeregisterInstancesFromLoadBalancer",
            "elasticloadbalancing:DeregisterTargets",
            "elasticloadbalancing:Describe*",
            "elasticloadbalancing:RegisterInstancesWithLoadBalancer",
            "elasticloadbalancing:RegisterTargets"
         ],
         "Resource": "*
      }
   ]
}

AmazonEC2ContainerServiceAutoscaleRole

This managed policy allows Application Auto Scaling to scale your Amazon ECS service's desired count up and down in response to CloudWatch alarms on your behalf. For more information, see Service Auto Scaling IAM Role (p. 289).

{  "Version": "2012-10-17",
   "Statement": [
      {  "Effect": "Allow",
         "Action": [
            "ecs:DescribeServices",
            "ecs:UpdateService"
         ],
         "Resource": [
            "*
         ]
      },
      {  "Effect": "Allow",
         "Action": [
            "cloudwatch:DescribeAlarms",
            "cloudwatch:PutMetricAlarm"
         ]
      }
   ]
}
Amazon ECR Managed Policies

Amazon ECR provides several managed policies that you can attach to IAM users or EC2 instances that allow differing levels of control over Amazon ECR resources and API operations. You can apply these policies directly, or you can use them as starting points for creating your own policies. For more information about each API operation mentioned in these policies, see Actions in the Amazon Elastic Container Registry API Reference.

Topics

- AmazonEC2ContainerRegistryFullAccess (p. 279)
- AmazonEC2ContainerRegistryPowerUser (p. 279)
- AmazonEC2ContainerRegistryReadOnly (p. 280)

AmazonEC2ContainerRegistryFullAccess

This managed policy is a starting point for customers who are looking to provide an IAM user or role with full administrator access to manage their use of Amazon ECR. The Amazon ECR Lifecycle Policies feature enables customers to specify the lifecycle management of images in a repository. Lifecycle policy events are reported as CloudTrail events, and Amazon ECR is integrated with AWS CloudTrail to display a customer’s lifecycle policy events directly in the Amazon ECR console. The AmazonEC2ContainerRegistryFullAccess managed IAM policy includes the cloudtrail:LookupEvents permission to facilitate this behavior.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "ecr:*",
            "cloudtrail:LookupEvents"
         ],
         "Resource": "*"
      }
   ]
}
```

AmazonEC2ContainerRegistryPowerUser

This managed policy allows power user access to Amazon ECR, which allows read and write access to repositories, but does not allow users to delete repositories or change the policy documents applied to them.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "ecr:GetAuthorizationToken",
            "ecr:BatchCheckLayerAvailability",
            "ecr:BatchGetImage",
            "ecr:GetDownloadUrlForImage",
            "ecr:InitiateMultipartUpload",
            "ecr:ListImages",
            "ecr:PutImage",
            "ecr:UploadLayerVersion",
            "s3:ListBucket",
            "s3:GetObject",
            "cloudtrail:LookupEvents"
         ],
         "Resource": "*"
      }
   ]
}
```
Managed Policies and Trust Relationships

Amazon EC2 Container Registry Read-Only

This managed policy allows read-only access to Amazon ECR, such as the ability to list repositories and the images within the repositories, and also to pull images from Amazon ECR with the Docker CLI.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "ecr:GetAuthorizationToken",
                "ecr:BatchCheckLayerAvailability",
                "ecr:GetDownloadUrlForLayer",
                "ecr:GetRepositoryPolicy",
                "ecr:DescribeRepositories",
                "ecr:ListImages",
                "ecr:DescribeImages",
                "ecr:BatchGetImage",
                "ecr:GetLifecyclePolicy",
                "ecr:GetLifecyclePolicyPreview",
                "ecr:ListTagsForResource",
                "ecr:DescribeImageScanFindings",
                "ecr:InitiateLayerUpload",
                "ecr:UploadLayerPart",
                "ecr:CompleteLayerUpload",
                "ecr:PutImage"
            ],
            "Resource": "*"
        }
    ],
    "Resource": "*"
}
```

Migrating to the AmazonECS_FullAccess managed policy

The AmazonEC2ContainerServiceFullAccess managed IAM policy is being deprecated on January 29, 2021 in response to a security finding with the `iam:passRole` permission which grants access to all resources including credentials to roles in the account. Once the policy is deprecated, you won't be able to attach the policy to any new IAM groups, users, or roles. Any existing groups, users, or roles that have the policy attached will be able to continue using it, however we recommend updating your IAM groups, users, or roles to use the AmazonECS_FullAccess managed policy instead.

The permissions granted by the AmazonECS_FullAccess policy have finer detail than the AmazonEC2ContainerServiceFullAccess policy. If you are currently using permissions granted by the AmazonEC2ContainerServiceFullAccess policy that are not present in the
Amazon ECS User Guide for AWS Fargate
Managed Policies and Trust Relationships

AmazonECS_FullAccess policy you can add additional permissions to an IAM group, user, or role by adding an in-line policy statement. For more information about each of these policies, see Amazon ECS Managed Policies and Trust Relationships (p. 273).

Use the following steps to determine if you have any IAM groups, users, or roles that are currently using the AmazonEC2ContainerServiceFullAccess managed IAM policy and then update them to detach the deprecated policy and attach the AmazonECS_FullAccess policy.

To update an IAM group, user, or role to use the AmazonECS_FullAccess policy (AWS Management Console)

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Policies and search for and select the AmazonEC2ContainerServiceFullAccess policy.
3. Choose the Policy usage tab which will display any IAM role currently using this policy.
4. For each IAM role currently using the AmazonEC2ContainerServiceFullAccess policy, select the role and use the following steps to detach the deprecated policy and attach the AmazonECS_FullAccess policy.
   a. On the Permissions tab, choose the X next to the AmazonEC2ContainerServiceFullAccess policy.
   b. Choose Add permissions.
   c. Choose Attach existing policies directly, search for and select the AmazonECS_FullAccess policy, and then choose Next: Review.
   d. Review the changes and then choose Add permissions.
   e. Repeat these steps for each IAM group, user, or role that is using the AmazonEC2ContainerServiceFullAccess policy.

To update an IAM group, user, or role to use the AmazonECS_FullAccess policy (AWS CLI)

1. Use the generate-service-last-accessed-details command to generate a report that includes details about when the deprecated policy was last used.

   ```
   aws iam generate-service-last-accessed-details \
   --arn arn:aws:iam::aws:policy/AmazonEC2ContainerServiceFullAccess
   ```

   Example output:

   ```
   {
   "JobId": "32bb1fb0-1ee0-b08e-3626-ae83EXAMPLE"
   }
   ```

2. Use the job ID from the previous output with the get-service-last-accessed-details command to retrieve the service last accessed report. This report will display the Amazon Resource Name (ARN) of the IAM entities that last used the deprecated policy.

   ```
   aws iam get-service-last-accessed-details \
   --job-id 32bb1fb0-1ee0-b08e-3626-ae83EXAMPLE
   ```

3. Use one of the following commands to detach the AmazonEC2ContainerServiceFullAccess policy from an IAM group, user, or role.

   - detach-group-policy
   - detach-role-policy
   - detach-user-policy
4. Use one of the following commands to attach the AmazonECS_FullAccess policy to an IAM group, user, or role.
   - attach-group-policy
   - attach-role-policy
   - attach-user-policy

**Service-Linked Role for Amazon ECS**

Amazon Elastic Container Service uses a service-linked role for the permissions it requires to call other AWS services on your behalf. For more information, see Using Service-Linked Roles in the IAM User Guide.

Prior to the introduction of a service-linked role for Amazon ECS, you were required to create an IAM role for your Amazon ECS services which granted Amazon ECS the permission it needed. This role is no longer required, however it is available if needed. For more information, see Legacy IAM Roles for Amazon ECS (p. 287).

**Permissions Granted by the Service-Linked Role**

Amazon ECS uses the service-linked role named **AWSServiceRoleForECS** to enable Amazon ECS to call AWS APIs on your behalf.

The **AWSServiceRoleForECS** service-linked role trusts the ecs.amazonaws.com service principal to assume the role.

The role permissions policy allows Amazon ECS to complete the following actions on resources.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Sid": "ECSTaskManagement",
         "Effect": "Allow",
         "Action": [
            "ec2:AttachNetworkInterface",
            "ec2:CreateNetworkInterface",
            "ec2:CreateNetworkInterfacePermission",
            "ec2:DeleteNetworkInterface",
            "ec2:DeleteNetworkInterfacePermission",
            "ec2:Describe*",
            "ec2:DetachNetworkInterface",
            "elasticloadbalancing:DeregisterInstancesFromLoadBalancer",
            "elasticloadbalancing:DeregisterTargets",
            "elasticloadbalancing:Describe*",
            "elasticloadbalancing:RegisterInstancesWithLoadBalancer",
            "elasticloadbalancing:RegisterTargets",
            "route53:ChangeResourceRecordSets",
            "route53:CreateHealthCheck",
            "route53:DeleteHealthCheck",
            "route53:Get*",
            "route53:List*",
            "route53:UpdateHealthCheck",
            "servicediscovery:DeregisterInstance",
            "servicediscovery:Get*",
            "servicediscovery:List*",
            "servicediscovery:RegisterInstance",
            "servicediscovery:RegisterInstanceCustomHealthStatus"
         ],
         "Resource": "*"
      }
   ],
}```
{
    "Sid": "AutoScaling",
    "Effect": "Allow",
    "Action": [
        "autoscaling:Describe*"
    ],
    "Resource": "*
    },
{
    "Sid": "AutoScalingManagement",
    "Effect": "Allow",
    "Action": [
        "autoscaling:DeletePolicy",
        "autoscaling:PutScalingPolicy",
        "autoscaling:SetInstanceProtection",
        "autoscaling:UpdateAutoScalingGroup"
    ],
    "Resource": "*
    },
    "Condition": {
        "Null": {
            "autoscaling:ResourceTag/AmazonECSManaged": "false"
        }
    }
},
{
    "Sid": "AutoScalingPlanManagement",
    "Effect": "Allow",
    "Action": [
        "autoscaling-plans:CreateScalingPlan",
        "autoscaling-plans:DeleteScalingPlan",
        "autoscaling-plans:DescribeScalingPlans"
    ],
    "Resource": "*
    },
{
    "Sid": "CWAlarmManagement",
    "Effect": "Allow",
    "Action": [
        "cloudwatch:DeleteAlarms",
        "cloudwatch:DescribeAlarms",
        "cloudwatch:PutMetricAlarm"
    ],
    "Resource": "arn:aws:cloudwatch:*:*:alarm:*"
},
{
    "Sid": "ECSTagging",
    "Effect": "Allow",
    "Action": [
        "ec2:CreateTags"
    ],
    "Resource": "arn:aws:ec2:*:*:network-interface/*"
},
{
    "Sid": "CWLogGroupManagement",
    "Effect": "Allow",
    "Action": [
        "logs:CreateLogGroup",
        "logs:DescribeLogGroups",
        "logs:PutRetentionPolicy"
    ],
    "Resource": "arn:aws:logs:*:*:log-group:/aws/ecs/*"
},
{
    "Sid": "CWLogStreamManagement",
    "Effect": "Allow",
    "Action": [
Create the Service-Linked Role

Under most circumstances, you don't need to manually create the service-linked role. For example, when you create a new cluster (for example, with the Amazon ECS first-run experience, the cluster creation wizard, or the AWS CLI or SDKs), or create or update a service in the AWS Management Console, Amazon ECS creates the service-linked role for you, if it does not already exist.

You must configure permissions to allow an IAM entity (such as a user, group, or role) to create, edit, or delete a service-linked role.

To allow an IAM entity to create the AWSServiceRoleForECS service-linked role

Add the following statement to the permissions policy for the IAM entity that needs to create the service-linked role:

```
{
    "Effect": "Allow",
    "Action": [
        "iam:CreateServiceLinkedRole"
    ],
    "Resource": "arn:aws:iam::*:role/aws-service-role/ecs.amazonaws.com/AWSServiceRoleForECS*",
    "Condition": {"StringLike": {"iam:AWSServiceName": "ecs.amazonaws.com"}}
}
```

Creating a Service-Linked Role in IAM (AWS CLI)

You can use IAM commands from the AWS Command Line Interface to create a service-linked role with the trust policy and inline policies that the service needs to assume the role.

To create a service-linked role (CLI)

Use the following command:

```
$ aws iam create-service-linked-role --aws-service-name ecs.amazonaws.com
```

Edit the Service-Linked Role

Amazon ECS does not allow you to edit the AWSServiceRoleForECS service-linked role. After you create a service-linked role, you cannot change the name of the role because various entities might reference the role. You can, however, edit the description of the role. For more information, see Modifying a Role in the IAM User Guide.

To allow an IAM entity to edit the description of the AWSServiceRoleForECS service-linked role

Add the following statement to the permissions policy for the IAM entity that needs to edit the description of a service-linked role:

```
{
    "Effect": "Allow",
    "Action": [
```
Service-Linked Role

Delete the Service-Linked Role

If you no longer use Amazon ECS, we recommend that you delete the service-linked role. That way you don't have an unused entity that is not actively monitored or maintained. However, you must delete all Amazon ECS clusters in all regions before you can delete the service-linked role.

To allow an IAM entity to delete the AWSServiceRoleForECS service-linked role

Add the following statement to the permissions policy for the IAM entity that needs to delete a service-linked role:

```json
{
    "Effect": "Allow",
    "Action": [
        "iam:DeleteServiceLinkedRole",
        "iam:GetServiceLinkedRoleDeletionStatus"
    ],
    "Resource": "arn:aws:iam::*:role/aws-service-role/ecs.amazonaws.com/AWSServiceRoleForECS*",
    "Condition": {"StringLike": {"iam:AWSServiceName": "ecs.amazonaws.com"}}
}
```

Cleaning up a Service-Linked Role

Before you can use IAM to delete a service-linked role, you must first confirm that the role has no active sessions and delete all Amazon ECS clusters in all AWS Regions.

To check whether the service-linked role has an active session

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles and choose the AWSServiceRoleForECS name (not the check box).
3. On the Summary page, choose Access Advisor and review recent activity for the service-linked role.

   **Note**
   
   If you are unsure whether Amazon ECS is using the AWSServiceRoleForECS role, you can try to delete the role. If the service is using the role, then the deletion fails and you can view the regions where the role is being used. If the role is being used, then you must wait for the session to end before you can delete the role. You cannot revoke the session for a service-linked role.

To remove Amazon ECS resources used by the AWSServiceRoleForECS service-linked role

You must delete all Amazon ECS clusters in all AWS Regions before you can delete the AWSServiceRoleForECS role.

- Delete all Amazon ECS clusters in all regions. For more information, see Deleting a cluster (p. 55).

Deleting a Service-Linked Role in IAM (Console)

You can use the IAM console to delete a service-linked role.
To delete a service-linked role (console)

1. Sign in to the AWS Management Console and open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane of the IAM console, choose Roles. Then select the check box next to AWSServiceRoleForECS, not the name or row itself.
3. Choose Delete role.
4. In the confirmation dialog box, review the service last accessed data, which shows when each of the selected roles last accessed an AWS service. This helps you to confirm whether the role is currently active. If you want to proceed, choose Yes, Delete to submit the service-linked role for deletion.
5. Watch the IAM console notifications to monitor the progress of the service-linked role deletion. Because the IAM service-linked role deletion is asynchronous, after you submit the role for deletion, the deletion task can succeed or fail.
   - If the task succeeds, then the role is removed from the list and a notification of success appears at the top of the page.
   - If the task fails, you can choose View details or View Resources from the notifications to learn why the deletion failed. If the deletion fails because the role is using the service's resources, then the notification includes a list of resources, if the service returns that information. You can then clean up the resources and submit the deletion again.

   **Note**
   You might have to repeat this process several times, depending on the information that the service returns. For example, your service-linked role might use six resources and your service might return information about five of them. If you clean up the five resources and submit the role for deletion again, the deletion fails and the service reports the one remaining resource. A service might return all of the resources, a few of them, or it might not report any resources.
   - If the task fails and the notification does not include a list of resources, then the service might not return that information. To learn how to clean up the resources for that service, see AWS services that work with IAM. Find your service in the table, and choose the Yes link to view the service-linked role documentation for that service.

Deleting a Service-Linked Role in IAM (AWS CLI)

You can use IAM commands from the AWS Command Line Interface to delete a service-linked role.

To delete a service-linked role (CLI)

1. Because a service-linked role cannot be deleted if it is being used or has associated resources, you must submit a deletion request. That request can be denied if these conditions are not met. You must capture the deletion-task-id from the response to check the status of the deletion task. Enter the following command to submit a service-linked role deletion request:

   ```bash
   $ aws iam delete-service-linked-role --role-name AWSServiceRoleForECS+OPTIONAL-SUFFIX
   ```

2. Use the following command to check the status of the deletion task:

   ```bash
   $ aws iam get-service-linked-role-deletion-status --deletion-task-id deletion-task-id
   ```

   The status of the deletion task can be NOT_STARTED, IN_PROGRESS, SUCCEEDED, or FAILED. If the deletion fails, the call returns the reason that it failed so that you can troubleshoot. If the deletion fails because the role is using the service's resources, then the notification includes a list of resources, if the service returns that information. You can then clean up the resources and submit the deletion again.
Note
You might have to repeat this process several times, depending on the information that the service returns. For example, your service-linked role might use six resources and your service might return information about five of them. If you clean up the five resources and submit the role for deletion again, the deletion fails and the service reports the one remaining resource. A service might return all of the resources, a few of them, or it might not report any resources. To learn how to clean up the resources for a service that does not report any resources, see AWS services that work with IAM. Find your service in the table, and choose the Yes link to view the service-linked role documentation for that service.

Deleting a Service-Linked Role in IAM (AWSAPI)

You can use the IAM API to delete a service-linked role.

To delete a service-linked role (API)

1. To submit a deletion request for a service-linked role, call DeleteServiceLinkedRole. In the request, specify the AWSServiceRoleForECS role name.

   Because a service-linked role cannot be deleted if it is being used or has associated resources, you must submit a deletion request. That request can be denied if these conditions are not met. You must capture the DeletionTaskId from the response to check the status of the deletion task.

2. To check the status of the deletion, call GetServiceLinkedRoleDeletionStatus. In the request, specify the DeletionTaskId.

   The status of the deletion task can be NOT_STARTED, IN_PROGRESS, SUCCEEDED, or FAILED. If the deletion fails, the call returns the reason that it failed so that you can troubleshoot. If the deletion fails because the role is using the service's resources, then the notification includes a list of resources, if the service returns that information. You can then clean up the resources and submit the deletion again.

   Note
You might have to repeat this process several times, depending on the information that the service returns. For example, your service-linked role might use six resources and your service might return information about five of them. If you clean up the five resources and submit the role for deletion again, the deletion fails and the service reports the one remaining resource. A service might return all of the resources, a few of them, or it might not report any resources. To learn how to clean up the resources for a service that does not report any resources, see AWS services that work with IAM. Find your service in the table, and choose the Yes link to view the service-linked role documentation for that service.

 Legacy IAM Roles for Amazon ECS

Prior to the introduction of the AWSServiceRoleForECS IAM role, you were required to create separate IAM roles to enable Amazon ECS permissions to call Elastic Load Balancing and Application Auto Scaling APIs on your behalf.

The Amazon ECS service scheduler IAM role grants the Amazon ECS service scheduler permissions that it needs to register and deregister container instances with your load balancers. You can optionally create the service scheduler IAM role and specify it when creating a service, or preferably you can allow Amazon ECS to use the service-linked role.

The Amazon ECS Service Auto Scaling IAM role grants Amazon ECS permission to describe your CloudWatch alarms and registered services, as well as permission to update your Amazon ECS service's desired count on your behalf.
These legacy IAM roles are described in more detail below, but have effectively been replaced by the Amazon ECS service-linked role.

**Service Scheduler IAM Role**

Amazon ECS provides a managed IAM policy named AmazonEC2ContainerServiceRole to use for the service scheduler IAM role. The AmazonEC2ContainerServiceRole policy is shown below.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Resource": "*
    }
  ]
}
```

**Note**
The ec2:AuthorizeSecurityGroupIngress rule is reserved for future use. Amazon ECS does not automatically update the security groups associated with Elastic Load Balancing load balancers or Amazon ECS container instances.

**To check for the ecsServiceRole in the IAM console**

2. In the navigation pane, choose Roles.
3. Search the list of roles for ecsServiceRole. If the role does not exist, use the procedure below to create the role. If the role does exist, select the role to view the attached policies.
4. Choose the Permissions tab.
5. In the Managed Policies section, ensure that the AmazonEC2ContainerServiceRole managed policy is attached to the role. If the policy is attached, your Amazon ECS service role is properly configured. If not, follow the substeps below to attach the policy.
   a. Choose Attach Policy.
   b. To narrow the available policies to attach, for Filter, type AmazonEC2ContainerServiceRole.
   c. Check the box to the left of the AmazonEC2ContainerServiceRole policy and choose Attach Policy.
7. Verify that the trust relationship contains the following policy. If the trust relationship matches the policy below, choose Cancel. If the trust relationship does not match, copy the policy into the Policy Document window and choose Update Trust Policy.

```json
{
  "Version": "2008-10-17",
  "Statement": [
    {
      "Sid": "",
      "Effect": "allow",
    ],
    "Resource": "*
  ]
}
```
To create an IAM role for your service scheduler load balancers

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles, Create role.
3. For Select type of trusted entity section, choose AWS service.
4. For Choose the service that will use this role, choose Elastic Container Service.
5. For Select your use case, choose Elastic Container Service and choose Next: Permissions.
6. In the Attached permissions policy section, select the AmazonEC2ContainerServiceRole policy and choose Next: Review.
7. For Role Name, type ecsServiceRole, enter a Role description and then choose Create role.

Service Auto Scaling IAM Role

Amazon ECS provides a managed IAM policy named AmazonEC2ContainerServiceAutoscaleRole to use for the Service Auto Scaling IAM role. The AmazonEC2ContainerServiceAutoscaleRole policy is shown below.

```
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "ecs:DescribeServices",
            "ecs:UpdateService"
         ],
         "Resource": ["*"]
      },
      {
         "Effect": "Allow",
         "Action": [
            "cloudwatch:DescribeAlarms",
            "cloudwatch:PutMetricAlarm"
         ],
         "Resource": ["*"]
      }
   ]
}
```

To check for the Service Auto Scaling role in the IAM console

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles.
3. Search the list of roles for `ecsAutoscaleRole`. If the role does not exist, use the procedure below to create the role. If the role does exist, select the role to view the attached policies.

4. Choose the **Permissions** tab.

5. In the **Permissions policies** section, ensure that the `AmazonEC2ContainerServiceAutoscaleRole` managed policy is attached to the role. If the policy is attached, your Amazon ECS service role is properly configured. If not, follow the substeps below to attach the policy.

   a. Choose **Attach policies**.

   b. To narrow the available policies to attach, for **Filter**, type `AmazonEC2ContainerServiceAutoscaleRole`.

   c. Select the box to the left of the `AmazonEC2ContainerAutoscaleRole` policy and choose **Attach policy**.

6. Choose **Trust relationships**, **Edit trust relationship**.

7. Verify that the trust relationship contains the following policy. If the trust relationship matches the policy below, choose **Cancel**. If the trust relationship does not match, copy the policy into the **Policy Document** window and choose **Update Trust Policy**.

   ```json
   {
     "Version": "2012-10-17",
     "Statement": [  
       {  
         "Effect": "Allow",
         "Principal": {  
           "Service": "application-autoscaling.amazonaws.com"
         },
         "Action": "sts:AssumeRole"
       }
     ]
   }
   ```

---

**To create an IAM role for Service Auto Scaling**


2. In the navigation pane, choose **Roles** and then choose **Create role**.

3. In the **Choose the service that will use this role** section, choose **Elastic Container Service**.

4. In the **Select your use case** section, choose **Elastic Container Service Autoscale**, **Next**: **Permissions**.

5. For **Add tags (optional)**, enter any key value tags you wish to add to the IAM role. Choose **Next**: **Review** when finished.

6. In the **Role name** field, type `ecsAutoscaleRole` to name the role, and then choose **Create Role** to finish.

---

**Amazon ECS task execution IAM role**

The task execution role grants the Amazon ECS container and Fargate agents permission to make AWS API calls on your behalf. The task execution IAM role is required depending on the requirements of your task. You can have multiple task execution roles for different purposes and services associated with your account.

The following are common use cases for a task execution IAM role:

- Your task uses the Fargate launch type and...
  - is pulling a container image from Amazon ECR.
  - uses the `awslogs` log driver. For more information, see [Using the awslogs log driver (p. 106)](https://docs.aws.amazon.com/eks/latest/userguide/using-awslogs.html).
• Your tasks uses either the Fargate or EC2 launch type and...
  • is using private registry authentication. For more information, see Required IAM permissions for private registry authentication (p. 292).
  • the task definition is referencing sensitive data using Secrets Manager secrets or AWS Systems Manager Parameter Store parameters. For more information, see Required IAM permissions for Amazon ECS secrets (p. 293).

**Note**
The task execution role is supported by Amazon ECS container agent version 1.16.0 and later.

Amazon ECS provides the managed policy named `AmazonECSTaskExecutionRolePolicy` which contains the permissions the common use cases described above require. It may be necessary to add inline policies to your task execution role for special use cases which are outlined below.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ecr:GetAuthorizationToken",
        "ecr:BatchCheckLayerAvailability",
        "ecr:GetDownloadUrlForLayer",
        "ecr:BatchGetImage",
        "logs:CreateLogStream",
        "logs:PutLogEvents"
      ],
      "Resource": "*"
    }
  ]
}
```

An Amazon ECS task execution role is automatically created for you in the Amazon ECS console first-run experience; however, you should manually attach the managed IAM policy for tasks to allow Amazon ECS to add permissions for future features and enhancements as they are introduced. You can use the following procedure to check and see if your account already has the Amazon ECS task execution role and to attach the managed IAM policy if needed.

**To check for the `ecsTaskExecutionRole` in the IAM console**

2. In the navigation pane, choose **Roles**.
3. Search the list of roles for `ecsTaskExecutionRole`. If the role does not exist, see Creating the task execution IAM role (p. 292). If the role does exist, select the role to view the attached policies.
4. On the **Permissions** tab, ensure that the `AmazonECSTaskExecutionRolePolicy` managed policy is attached to the role. If the policy is attached, your Amazon ECS task execution role is properly configured. If not, follow the substeps below to attach the policy.
   a. Choose **Attach policies**.
   b. To narrow the available policies to attach, for **Filter**, type `AmazonECSTaskExecutionRolePolicy`.
   c. Check the box to the left of the `AmazonECSTaskExecutionRolePolicy` policy and choose **Attach policy**.
5. Choose **Trust relationships**, **Edit trust relationship**.
6. Verify that the trust relationship contains the following policy. If the trust relationship matches the policy below, choose **Cancel**. If the trust relationship does not match, copy the policy into the **Policy Document** window and choose **Update Trust Policy**.

---

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Creating the task execution IAM role

If your account does not already have a task execution role, use the following steps to create the role.

To create the `ecsTaskExecutionRole` IAM role

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles, Create role.
3. In the Select type of trusted entity section, choose Elastic Container Service.
4. For Select your use case, choose Elastic Container Service Task, then choose Next: Permissions.
5. In the Attach permissions policy section, search for AmazonECSTaskExecutionRolePolicy, select the policy, and then choose Next: Review.
6. For Role Name, type `ecsTaskExecutionRole` and choose Create role.

Required IAM permissions for private registry authentication

The Amazon ECS task execution role is required to use the private registry authentication feature. This allows the container agent to pull the container image. For more information, see Private registry authentication for tasks (p. 123).

To provide access to the secrets that you create, manually add the following permissions as an inline policy to the task execution role. For more information, see Adding and Removing IAM Policies.

- `secretsmanager:GetSecretValue`
- `kms:Decrypt`—Required only if your key uses a custom KMS key and not the default key. The ARN for your custom key should be added as a resource.

An example inline policy adding the permissions is shown below.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "kms:Decrypt",
        "secretsmanager:GetSecretValue"
      ],
      "Resource": [
        "arn:aws:kms:
```
Required IAM permissions for Amazon ECS secrets

To use the Amazon ECS secrets feature, you must have the Amazon ECS task execution role and reference it in your task definition. This allows the container agent to pull the necessary AWS Systems Manager or Secrets Manager resources. For more information, see Specifying sensitive data (p. 125).

To provide access to the AWS Systems Manager Parameter Store parameters that you create, manually add the following permissions as an inline policy to the task execution role. For more information, see Adding and Removing IAM Policies.

- `ssm:GetParameters`—Required if you are referencing a Systems Manager Parameter Store parameter in a task definition.
- `secretsmanager:GetSecretValue`—Required if you are referencing a Secrets Manager secret either directly or if your Systems Manager Parameter Store parameter is referencing a Secrets Manager secret in a task definition.
- `kms:Decrypt`—Required only if your secret uses a custom KMS key and not the default key. The ARN for your custom key should be added as a resource.

The following example inline policy adds the required permissions:

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "secretsmanager:GetSecretValue",
                "kms:Decrypt"
            ],
            "Resource": [
                "arn:aws:kms:<region>:<aws_account_id>:key/<key_id>"
            ]
        }
    ]
}
```

Optional IAM permissions for Fargate tasks pulling Amazon ECR images over interface endpoints

When launching tasks that use the Fargate launch type that pull images from Amazon ECR when Amazon ECR is configured to use an interface VPC endpoint, you can restrict the tasks access to a specific VPC or VPC endpoint. Do this by creating a task execution role for the tasks to use that use IAM condition keys.

Use the following IAM global condition keys to restrict access to a specific VPC or VPC endpoint. For more information, see AWS Global Condition Context Keys.

- `aws:SourceVpc`—Restricts access to a specific VPC.
• `aws:SourceVpce`—Restricts access to a specific VPC endpoint.

The following task execution role policy provides an example for adding condition keys:

**Important**

The `ecr:GetAuthorizationToken` API action cannot have the `aws:sourceVpc` or `aws:sourceVpce` condition keys applied to it because the GetAuthorizationToken API call goes through the elastic network interface owned by AWS Fargate rather than the elastic network interface of the task.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ecr:GetAuthorizationToken",
        "logs:CreateLogStream",
        "logs:PutLogEvents"
      ],
      "Resource": "*"
    },
    {
      "Effect": "Allow",
      "Action": [
        "ecr:BatchCheckLayerAvailability",
        "ecr:GetDownloadUrlForLayer",
        "ecr:BatchGetImage"
      ],
      "Resource": "*",
      "Condition": {
        "StringEquals": {
          "aws:sourceVpce": "vpce-xxxxxx",
          "aws:sourceVpc": "vpc-xxxxx"
        }
      }
    }
  ]
}
```

**IAM Roles for Tasks**

With IAM roles for Amazon ECS tasks, you can specify an IAM role that can be used by the containers in a task. Applications must sign their AWS API requests with AWS credentials, and this feature provides a strategy for managing credentials for your applications to use, similar to the way that Amazon EC2 instance profiles provide credentials to EC2 instances. Instead of creating and distributing your AWS credentials to the containers or using the EC2 instance's role, you can associate an IAM role with an ECS task definition or the `RunTask` API operation. The applications in the task's containers can then use the AWS SDK or CLI to make API requests to authorized AWS services.

You define the IAM role to use in your task definitions, or you can use a `taskRoleArn` override when running a task manually with the `RunTask` API operation. The Amazon ECS agent receives a payload message for starting the task with additional fields that contain the role credentials. The Amazon ECS agent sets a unique task credential ID as an identification token and updates its internal credential cache so that the identification token for the task points to the role credentials that are received in the payload. The Amazon ECS agent populates the `AWS_CONTAINER_CREDENTIALS_RELATIVE_URI` environment variable in the `Env` object (available with the `docker inspect container_id` command) for all containers that belong to this task with the following relative URI: `/credential_provider_version/credentials?id=task_credential_id`.
Note
When you specify an IAM role for a task, the AWS CLI or other SDKs in the containers for that task use the AWS credentials provided by the task role exclusively and they no longer inherit any IAM permissions from the container instance.

From inside the container, you can query the credentials with the following command:

curl 169.254.170.2$AWS_CONTAINER_CREDENTIALS_RELATIVE_URI

Output:

```json
{
  "AccessKeyId": "ACCESS_KEY_ID",
  "Expiration": "EXPIRATION_DATE",
  "RoleArn": "TASK_ROLE_ARN",
  "SecretAccessKey": "SECRET_ACCESS_KEY",
  "Token": "SECURITY_TOKEN_STRING"
}
```

Note
The default expiration time for the generated IAM role credentials is 6 hours.

Topics
- Benefits of Using IAM Roles for Tasks (p. 295)
- Creating an IAM Role and Policy for your Tasks (p. 295)
- Using a Supported AWS SDK (p. 297)
-Specifying an IAM Role for your Tasks (p. 297)

Benefits of Using IAM Roles for Tasks

- **Credential Isolation:** A container can only retrieve credentials for the IAM role that is defined in the task definition to which it belongs; a container never has access to credentials that are intended for another container that belongs to another task.

- **Authorization:** Unauthorized containers cannot access IAM role credentials defined for other tasks.

- **Auditability:** Access and event logging is available through CloudTrail to ensure retrospective auditing. Task credentials have a context of `taskArn` that is attached to the session, so CloudTrail logs show which task is using which role.

Creating an IAM Role and Policy for your Tasks

You must create an IAM policy for your tasks to use that specifies the permissions that you would like the containers in your tasks to have. You have several ways to create a new IAM permission policy. You can copy a complete AWS managed policy that already does some of what you’re looking for and then customize it to your specific requirements. For more information, see [Creating a New Policy in the IAM User Guide](#).

You must also create a role for your tasks to use before you can specify it in your task definitions. You can create the role using the **Amazon Elastic Container Service Task Role** service role in the IAM console. Then you can attach your specific IAM policy to the role that gives the containers in your task the permissions you desire. The procedures below describe how to do this.

If you have multiple task definitions or services that require IAM permissions, you should consider creating a role for each specific task definition or service with the minimum required permissions for the tasks to operate so that you can minimize the access that you provide for each task.
The Amazon ECS Task Role trust relationship is shown below.

```
{  
  "Version": "2012-10-17",  
  "Statement": [  
    {  
      "Sid": "",  
      "Effect": "Allow",  
      "Principal": {  
        "Service": "ecs-tasks.amazonaws.com"  
      },  
      "Action": "sts:AssumeRole"  
    }  
  ]
}
```

**To create an IAM policy for your tasks**

In this example, we create a policy to allow read-only access to an Amazon S3 bucket. You could store database credentials or other secrets in this bucket, and the containers in your task can read the credentials from the bucket and load them into your application.

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose **Policies** and then choose **Create policy**.
3. Follow the steps under one of the following tabs, which shows you how to use the visual or JSON editors.

Using the visual editor

1. For **Service**, choose **S3**.
2. For **Actions**, expand the **Read** option and select **GetObject**.
3. For **Resources**, select **Add ARN** and enter the full Amazon Resource Name (ARN) of your Amazon S3 bucket, and then choose **Review policy**.
4. On the **Review policy** page, for **Name** type your own unique name, such as AmazonECSTaskS3BucketPolicy.
5. Choose **Create policy** to finish.

Using the JSON editor

1. In the **Policy Document** field, paste the policy to apply to your tasks. The example below allows permission to the **my-task-secrets-bucket** Amazon S3 bucket. You can modify the policy document to suit your specific needs.

```
{  
  "Version": "2012-10-17",  
  "Statement": [  
    {  
      "Effect": "Allow",  
      "Action": [  
        "s3:GetObject"  
      ],  
      "Resource": [  
        "arn:aws:s3:::my-task-secrets-bucket/*"  
      ]  
    }  
  ]
}
```
To create an IAM role for your tasks

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles, Create role.
3. For Select type of trusted entity section, choose AWS service.
4. For Choose the service that will use this role, choose Elastic Container Service.
5. For Select your use case, choose Elastic Container Service Task and choose Next: Permissions.
6. For Attach permissions policy, select the policy to use for your tasks (in this example AmazonECSTaskS3BucketPolicy, and then choose Next: Tags.
7. For Add tags (optional), enter any metadata tags you want to associate with the IAM role, and then choose Next: Review.
8. For Role name, enter a name for your role. For this example, type AmazonECSTaskS3BucketRole to name the role, and then choose Create role to finish.

Using a Supported AWS SDK

Support for IAM roles for tasks was added to the AWS SDKs on July 13th, 2016. The containers in your tasks must use an AWS SDK version that was created on or after that date. AWS SDKs that are included in Linux distribution package managers may not be new enough to support this feature.

To ensure that you are using a supported SDK, follow the installation instructions for your preferred SDK at Tools for Amazon Web Services when you are building your containers to get the latest version.

Specifying an IAM Role for your Tasks

After you have created a role and attached a policy to that role, you can run tasks that assume the role. You have several options to do this:

- Specify an IAM role for your tasks in the task definition. You can create a new task definition or a new revision of an existing task definition and specify the role you created previously. If you use the console to create your task definition, choose your IAM role in the Task Role field. If you use the AWS CLI or SDKs, specify your task role ARN using the taskRoleArn parameter. For more information, see Creating a task definition (p. 61).

  **Note**
  This option is required if you want to use IAM task roles in an Amazon ECS service.

- Specify an IAM task role override when running a task. You can specify an IAM task role override when running a task. If you use the console to run your task, choose Advanced Options and then choose your IAM role in the Task Role field. If you use the AWS CLI or SDKs, specify your task role ARN using the taskRoleArn parameter in the overrides JSON object. For more information, see Run a standalone task (p. 149).

  **Note**
  In addition to the standard Amazon ECS permissions required to run tasks and services, IAM users also require iam:PassRole permissions to use IAM roles for tasks.

Amazon ECS CodeDeploy IAM Role

Before you can use the CodeDeploy blue/green deployment type with Amazon ECS, the CodeDeploy service needs permissions to update your Amazon ECS service on your behalf. These permissions are provided by the CodeDeploy IAM role (ecsCodeDeployRole).
Note
IAM users also require permissions to use CodeDeploy; these permissions are described in Blue/Green Deployment Required IAM Permissions (p. 191).

There are two managed policies provided. The AWSCodeDeployRoleForECS policy, shown below, gives CodeDeploy permission to update any resource using the associated action.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Action": [
                "ecs:DescribeServices",
                "ecs:CreateTaskSet",
                "ecs:UpdateServicePrimaryTaskSet",
                "ecs:DeleteTaskSet",
                "elasticloadbalancing:DescribeTargetGroups",
                "elasticloadbalancing:DescribeListeners",
                "elasticloadbalancing:ModifyListener",
                "elasticloadbalancing:DescribeRules",
                "elasticloadbalancing:ModifyRule",
                "lambda:InvokeFunction",
                "cloudwatch:DescribeAlarms",
                "sns:Publish",
                "s3:GetObject",
                "s3:GetObjectVersion"
            ],
            "Resource": "*",
            "Effect": "Allow"
        },
        {
            "Action": ["iam:PassRole"],
            "Effect": "Allow",
            "Resource": "*",
            "Condition": {
                "StringLike": {
                    "iam:PassedToService": [
                        "ecs-tasks.amazonaws.com"
                    ]
                }
            }
        }
    ]
}
```

The AWSCodeDeployRoleForECSLimited policy, shown below, gives CodeDeploy more limited permissions.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Action": [
                "ecs:DescribeServices",
                "ecs:CreateTaskSet",
                "ecs:UpdateServicePrimaryTaskSet",
                "ecs:DeleteTaskSet",
                "cloudwatch:DescribeAlarms"
            ],
            "Resource": "*",
            "Effect": "Allow"
        }
    ]
}
```
To create an IAM role for CodeDeploy

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles, Create role.
3. For Select type of trusted entity section, choose AWS service.
4. For **Choose the service that will use this role**, choose **CodeDeploy**.
5. For **Select your use case**, choose **CodeDeploy - ECS, Next: Permissions**.
6. Choose **Next: Tags**.
7. For **Add tags (optional)**, you can add optional IAM tags to the role. Choose **Next:Review** when finished.
8. For **Role name**, type `ecsCodeDeployRole`, enter an optional description, and then choose **Create role**.

**To add the required permissions to the Amazon ECS CodeDeploy IAM role**

2. Search the list of roles for `ecsCodeDeployRole`. If the role does not exist, use the procedure above to create the role. If the role does exist, select the role to view the attached policies.
3. In the **Permissions policies** section, ensure that either the `AWSCodeDeployRoleForECS` or `AWSCodeDeployRoleForECSLimited` managed policy is attached to the role. If the policy is attached, your Amazon ECS CodeDeploy service role is properly configured. If not, follow the substeps below to attach the policy.

   a. Choose **Attach policies**.
   b. To narrow the available policies to attach, for **Filter**, type `AWSCodeDeployRoleForECS` or `AWSCodeDeployRoleForECSLimited`.
   c. Check the box to the left of the AWS managed policy and choose **Attach policy**.
4. Choose **Trust Relationships, Edit trust relationship**.
5. Verify that the trust relationship contains the following policy. If the trust relationship matches the policy below, choose **Cancel**. If the trust relationship does not match, copy the policy into the **Policy Document** window and choose **Update Trust Policy**.

   ```json
   {
   "Version": "2012-10-17",
   "Statement": [
   {
   "Sid": "",
   "Effect": "Allow",
   "Principal": {
   "Service": ["codedeploy.amazonaws.com"]
   },
   "Action": "sts:AssumeRole"
   }
   ]
   }
   ```

6. If the tasks in your Amazon ECS service using the blue/green deployment type require the use of the task execution role or a task role override, then you must add the `iam:PassRole` permission for each task execution role or task role override to the CodeDeploy IAM role as an inline policy. For more information, see Amazon ECS task execution IAM role (p. 290) and IAM Roles for Tasks (p. 294).

   Follow the substeps below to create an inline policy.
   b. Search the list of roles for `ecsCodeDeployRole`. If the role does not exist, use the procedure above to create the role. If the role does exist, select the role to view the attached policies.
   c. In the **Permissions policies** section, choose **Add inline policy**.
d. Choose the **JSON** tab and add the following policy text.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": "iam:PassRole",
         "Resource": [
            "arn:aws:iam::<aws_account_id>:role/<ecsTaskExecutionRole_or_TaskRole_name>"
         ]
      }
   ]
}
```

**Note**

Specify the full ARN of your task execution role or task role override.

e. Choose **Review policy**

f. For **Name**, type a name for the added policy and then choose **Create policy**.

---

**Amazon ECS CloudWatch Events IAM Role**

Before you can use Amazon ECS scheduled tasks with CloudWatch Events rules and targets, the CloudWatch Events service needs permissions to run Amazon ECS tasks on your behalf. These permissions are provided by the CloudWatch Events IAM role (**ecsEventsRole**).

The CloudWatch Events role is automatically created for you in the AWS Management Console when you configure a scheduled task. For more information, see **Scheduled tasks (cron)** (p. 152).

The **AmazonEC2ContainerServiceEventsRole** policy is shown below.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": "ecs:RunTask",
         "Resource": ["*"]
      },
      {
         "Effect": "Allow",
         "Action": "iam:PassRole",
         "Resource": ["*"],
         "Condition": {
            "StringLike": {
               "iam:PassedToService": "ecs-tasks.amazonaws.com"
            }
         }
      }
   ]
}
```
If your scheduled tasks require the use of the task execution role, a task role, or a task role override, then you must add `iam:PassRole` permissions for each task execution role, task role, or task role override to the CloudWatch Events IAM role. For more information about the task execution role, see Amazon ECS task execution IAM role (p. 290).

**Note**
Specify the full ARN of your task execution role or task role override.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:PassRole",
            "Resource": ["arn:aws:iam::<aws_account_id>:role/<ecsTaskExecutionRole_or_TaskRole_name>"
        }
    ]
}
```

You can use the following procedure to check that your account already has the CloudWatch Events IAM role, and manually create it if needed.

**To check for the CloudWatch Events IAM role in the IAM console**

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles.
3. Search the list of roles for `ecsEventsRole`. If the role does not exist, use the next procedure to create the role. If the role does exist, select the role to view the attached policies.
4. Choose Permissions.
5. In the Permissions policies section, ensure that the `AmazonEC2ContainerServiceEventsRole` managed policy is attached to the role. If the policy is attached, your Amazon ECS service role is properly configured. If not, follow the substeps below to attach the policy.
   a. Choose Attach policies.
   b. To narrow the available policies to attach, for Filter, type `AmazonEC2ContainerServiceEventsRole`.
   c. Select the box to the left of the `AmazonEC2ContainerServiceEventsRole` policy and choose Attach policy.
7. Verify that the trust relationship contains the following policy. If the trust relationship matches the policy below, choose Cancel. If the trust relationship does not match, copy the policy into the Policy Document window and choose Update Trust Policy.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "",
            "Effect": "Allow",
            "Principal": {
                "Service": "events.amazonaws.com"
            },
            "Action": "sts:AssumeRole"
        }
    ]
}
```
To create an IAM role for CloudWatch Events

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles and then choose Create role.
4. In the Attach permissions policy section, select the AmazonEC2ContainerServiceEventsRole policy and choose Next: Tags.
5. In the Add tags (optional) section, enter any tags you would like to associate with the role and choose Next: Review.
6. For Role name, type ecsEventsRole to name the role, optionally enter a description, and then choose Create role.
7. Review your role information and choose Create Role.
8. Search the list of roles for ecsEventsRole and select the role you just created.
10. Replace the existing trust relationship with the following text in the Policy Document window and choose Update Trust Policy.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "",
            "Effect": "Allow",
            "Principal": {
                "Service": "events.amazonaws.com"
            },
            "Action": "sts:AssumeRole"
        }
    ]
}
```

To add permissions for the task execution role to the CloudWatch Events IAM role

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Policies, Create policy.
3. Choose JSON, paste the following policy, and then choose Review policy:

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "iam:PassRole",
            "Resource": [
                "arn:aws:iam::<aws_account_id>:role/<ecsTaskExecutionRole_or_TaskRole_name>"
            ]
        }
    ]
}
```
4. For Name, type AmazonECSEventsTaskExecutionRole, optionally enter a description, and then choose Create policy.
5. In the navigation pane, choose Roles.
6. Search the list of roles for ecsEventsRole and select the role to view the attached policies.
7. Choose Attach policy.
8. In the Attach policy section, select the AmazonECSEventsTaskExecutionRole policy and choose Attach policy.

Troubleshooting Amazon Elastic Container Service Identity and Access

Use the following information to help you diagnose and fix common issues that you might encounter when working with Amazon ECS and IAM.

Topics
- I Am Not Authorized to Perform an Action in Amazon ECS (p. 304)
- I Am Not Authorized to Perform iam:PassRole (p. 304)
- I Want to View My Access Keys (p. 305)
- I'm an Administrator and Want to Allow Others to Access Amazon ECS (p. 305)
- I Want to Allow People Outside of My AWS Account to Access My Amazon ECS Resources (p. 305)

I Am Not Authorized to Perform an Action in Amazon ECS

If the AWS Management Console tells you that you're not authorized to perform an action, then you must contact your administrator for assistance. Your administrator is the person that provided you with your user name and password.

The following example error occurs when the mateojackson IAM user tries to use the console to view details about a widget but does not have ecs:GetWidget permissions.

User: arn:aws:iam::123456789012:user/mateojackson is not authorized to perform: ecs:GetWidget on resource: my-example-widget

In this case, Mateo asks his administrator to update his policies to allow him to access the my-example-widget resource using the ecs:GetWidget action.

I Am Not Authorized to Perform iam:PassRole

If you receive an error that you're not authorized to perform the iam:PassRole action, then you must contact your administrator for assistance. Your administrator is the person that provided you with your user name and password. Ask that person to update your policies to allow you to pass a role to Amazon ECS.

Some AWS services allow you to pass an existing role to that service, instead of creating a new service role or service-linked role. To do this, you must have permissions to pass the role to the service.

The following example error occurs when an IAM user named marymajor tries to use the console to perform an action in Amazon ECS. However, the action requires the service to have permissions granted by a service role. Mary does not have permissions to pass the role to the service.
User: arn:aws:iam::123456789012:user/marymajor is not authorized to perform: iam:PassRole

In this case, Mary asks her administrator to update her policies to allow her to perform the iam:PassRole action.

I Want to View My Access Keys

After you create your IAM user access keys, you can view your access key ID at any time. However, you can't view your secret access key again. If you lose your secret key, you must create a new access key pair.

Access keys consist of two parts: an access key ID (for example, AKIAIOSFODNN7EXAMPLE) and a secret access key (for example, wJalrXUtznFEMI/K7MDENG/bPxRfipFYEXAMPLEKEY). Like a user name and password, you must use both the access key ID and secret access key together to authenticate your requests. Manage your access keys as securely as you do your user name and password.

Important
Do not provide your access keys to a third party, even to help find your canonical user ID. By doing this, you might give someone permanent access to your account.

When you create an access key pair, you are prompted to save the access key ID and secret access key in a secure location. The secret access key is available only at the time you create it. If you lose your secret access key, you must add new access keys to your IAM user. You can have a maximum of two access keys. If you already have two, you must delete one key pair before creating a new one. To view instructions, see Managing access keys in the IAM User Guide.

I'm an Administrator and Want to Allow Others to Access Amazon ECS

To allow others to access Amazon ECS, you must create an IAM entity (user or role) for the person or application that needs access. They will use the credentials for that entity to access AWS. You must then attach a policy to the entity that grants them the correct permissions in Amazon ECS.

To get started right away, see Creating your first IAM delegated user and group in the IAM User Guide.

I Want to Allow People Outside of My AWS Account to Access My Amazon ECS Resources

You can create a role that users in other accounts or people outside of your organization can use to access your resources. You can specify who is trusted to assume the role. For services that support resource-based policies or access control lists (ACLs), you can use those policies to grant people access to your resources.

To learn more, consult the following:

- To learn whether Amazon ECS supports these features, see How Amazon Elastic Container Service Works with IAM (p. 258).
- To learn how to provide access to your resources across AWS accounts that you own, see Providing access to an IAM user in another AWS account that you own in the IAM User Guide.
- To learn how to provide access to your resources to third-party AWS accounts, see Providing access to AWS accounts owned by third parties in the IAM User Guide.
- To learn how to provide access through identity federation, see Providing access to externally authenticated users (identity federation) in the IAM User Guide.
- To learn the difference between using roles and resource-based policies for cross-account access, see How IAM roles differ from resource-based policies in the IAM User Guide.
Logging and Monitoring in Amazon Elastic Container Service

Monitoring is an important part of maintaining the reliability, availability, and performance of Amazon Elastic Container Service and your AWS solutions. You should collect monitoring data from all of the parts of your AWS solution so that you can more easily debug a multi-point failure if one occurs. AWS provides several tools for monitoring your Amazon ECS resources and responding to potential incidents:

**Amazon CloudWatch Alarms**

Watch a single metric over a time period that you specify, and perform one or more actions based on the value of the metric relative to a given threshold over a number of time periods. The action is a notification sent to an Amazon Simple Notification Service (Amazon SNS) topic or Amazon EC2 Auto Scaling policy. CloudWatch alarms do not invoke actions simply because they are in a particular state; the state must have changed and been maintained for a specified number of periods. For more information, see Amazon ECS CloudWatch metrics (p. 232).

For services with tasks that use the Fargate launch type, you can use CloudWatch alarms to scale in and scale out the tasks in your service based on CloudWatch metrics, such as CPU and memory utilization. For more information, see Service Auto Scaling (p. 209).

**Amazon CloudWatch Logs**

Monitor, store, and access the log files from the containers in your Amazon ECS tasks by specifying the *awslogs* log driver in your task definitions. This is the only supported method for accessing logs for tasks using the Fargate launch type. For more information, see Using the *awslogs* log driver (p. 106).

**Amazon CloudWatch Events**

Match events and route them to one or more target functions or streams to make changes, capture state information, and take corrective action. For more information, see Amazon ECS events and EventBridge (p. 238) in this guide and What Is Amazon CloudWatch Events? in the Amazon CloudWatch Events User Guide.

**AWS CloudTrail Logs**

CloudTrail provides a record of actions taken by a user, role, or an AWS service in Amazon ECS. Using the information collected by CloudTrail, you can determine the request that was made to Amazon ECS, the IP address from which the request was made, who made the request, when it was made, and additional details. For more information, see Logging Amazon ECS API calls with AWS CloudTrail (p. 251).

**AWS Trusted Advisor**

Trusted Advisor draws upon best practices learned from serving hundreds of thousands of AWS customers. Trusted Advisor inspects your AWS environment and then makes recommendations when opportunities exist to save money, improve system availability and performance, or help close security gaps. All AWS customers have access to five Trusted Advisor checks. Customers with a Business or Enterprise support plan can view all Trusted Advisor checks.

For more information, see AWS Trusted Advisor in the AWS Support User Guide.

Another important part of monitoring Amazon ECS involves manually monitoring those items that the CloudWatch alarms don’t cover. The CloudWatch, Trusted Advisor, and other AWS console dashboards provide an at-a-glance view of the state of your AWS environment. We recommend that you also check the log files on your container instances and the containers in your tasks.
Compliance Validation for Amazon Elastic Container Service

Third-party auditors assess the security and compliance of Amazon Elastic Container Service as part of multiple AWS compliance programs. These include SOC, PCI, FedRAMP, HIPAA, and others.

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

You can download third-party audit reports using AWS Artifact. For more information, see Downloading reports in AWS Artifact.

Your compliance responsibility when using Amazon ECS is determined by the sensitivity of your data, your company's compliance objectives, and applicable laws and regulations. AWS provides the following resources to help with compliance:

- **Security and Compliance Quick Start Guides** – These deployment guides discuss architectural considerations and provide steps for deploying security- and compliance-focused baseline environments on AWS.
- **Architecting for HIPAA Security and Compliance Whitepaper** – This whitepaper describes how companies can use AWS to create HIPAA-compliant applications.
- **AWS Compliance Resources** – This collection of workbooks and guides might apply to your industry and location.
- **AWS Config** – This AWS service assesses how well your resource configurations comply with internal practices, industry guidelines, and regulations.
- **AWS Security Hub** – This AWS service provides a comprehensive view of your security state within AWS that helps you check your compliance with security industry standards and best practices.

Infrastructure Security in Amazon Elastic Container Service

As a managed service, Amazon Elastic Container Service is protected by the AWS global network security procedures that are described in the Amazon Web Services: Overview of Security Processes whitepaper.

You use AWS published API calls to access Amazon ECS through the network. Clients must support Transport Layer Security (TLS) 1.0 or later. We recommend TLS 1.2 or later. Clients must also support cipher suites with perfect forward secrecy (PFS) such as Ephemeral Diffie-Hellman (DHE) or Elliptic Curve Ephemeral Diffie-Hellman (ECDHE). Most modern systems such as Java 7 and later support these modes.

Additionally, requests must be signed by using an access key ID and a secret access key that is associated with an IAM principal. Or you can use the AWS Security Token Service (AWS STS) to generate temporary security credentials to sign requests.

You can call these API operations from any network location, but Amazon ECS does support resource-based access policies, which can include restrictions based on the source IP address. You can also use Amazon ECS policies to control access from specific Amazon Virtual Private Cloud endpoints or specific VPCs. Effectively, this isolates network access to a given Amazon ECS resource from only the specific VPC within the AWS network. For more information, see Amazon ECS interface VPC endpoints (AWS PrivateLink) (p. 308).

**Topics**
- Amazon ECS interface VPC endpoints (AWS PrivateLink) (p. 308)
Amazon ECS interface VPC endpoints (AWS PrivateLink)

You can improve the security posture of your VPC by configuring Amazon ECS to use an interface VPC endpoint. Interface endpoints are powered by AWS PrivateLink, a technology that enables you to privately access Amazon ECS APIs by using private IP addresses. AWS PrivateLink restricts all network traffic between your VPC and Amazon ECS to the Amazon network. You don't need an internet gateway, a NAT device, or a virtual private gateway.

For more information about AWS PrivateLink and VPC endpoints, see VPC Endpoints in the Amazon VPC User Guide.

Considerations for Amazon ECS VPC endpoints

Before you set up interface VPC endpoints for Amazon ECS, be aware of the following considerations:

• Tasks using the Fargate launch type don't require the interface VPC endpoints for Amazon ECS, but you might need interface VPC endpoints for Amazon ECR, Secrets Manager, or Amazon CloudWatch Logs described in the following points.

• To allow your tasks to pull private images from Amazon ECR, you must create the interface VPC endpoints for Amazon ECR. For more information, see Interface VPC Endpoints (AWS PrivateLink) in the Amazon Elastic Container Registry User Guide.

  Important
  If you configure Amazon ECR to use an interface VPC endpoint, you can create a task execution role that includes condition keys to restrict access to a specific VPC or VPC endpoint. For more information, see Optional IAM permissions for Fargate tasks pulling Amazon ECR images over interface endpoints (p. 293).

• To allow your tasks to pull sensitive data from Secrets Manager, you must create the interface VPC endpoints for Secrets Manager. For more information, see Using Secrets Manager with VPC Endpoints in the AWS Secrets Manager User Guide.

• If your VPC doesn't have an internet gateway and your tasks use the awslogs log driver to send log information to CloudWatch Logs, you must create an interface VPC endpoint for CloudWatch Logs. For more information, see Using CloudWatch Logs with Interface VPC Endpoints in the Amazon CloudWatch Logs User Guide.

• VPC endpoints currently don't support cross-Region requests. Ensure that you create your endpoint in the same Region where you plan to issue your API calls to Amazon ECS.

• VPC endpoints only support Amazon-provided DNS through Amazon Route 53. If you want to use your own DNS, you can use conditional DNS forwarding. For more information, see DHCP Options Sets in the Amazon VPC User Guide.

• The security group attached to the VPC endpoint must allow incoming connections on port 443 from the private subnet of the VPC.

Creating the VPC Endpoints for Amazon ECS

To create the VPC endpoint for the Amazon ECS service, use the Creating an Interface Endpoint procedure in the Amazon VPC User Guide to create the following endpoints. If you have existing container instances within your VPC, you should create the endpoints in the order that they're listed. If you plan on creating your container instances after your VPC endpoint is created, the order doesn't matter.

• com.amazonaws.region.ecs-agent
• com.amazonaws.region.ecs-telemetry
• com.amazonaws.region.ecs
Note

`region` represents the Region identifier for an AWS Region supported by Amazon ECS, such as `us-east-2` for the US East (Ohio) Region.

Create the Secrets Manager and Systems Manager endpoints

If you are referencing either Secrets Manager secrets or Systems Manager Parameter Store parameters in your task definitions to inject sensitive data into your containers, you need to create the interface VPC endpoints for Secrets Manager or Systems Manager so those tasks can reach those services. You only need to create the endpoints from the specific service your sensitive data is hosted in. For more information, see Specifying sensitive data (p. 125).

For more information about Secrets Manager VPC endpoints, see Using Secrets Manager with VPC endpoints in the AWS Secrets Manager User Guide.

For more information about Systems Manager VPC endpoints, see Using Systems Manager with VPC endpoints in the AWS Systems Manager User Guide.

Create the Systems Manager endpoints

If you use the ECS Exec feature, you need to create the interface VPC endpoints for Systems Manager Session Manager. For more information, see Using Amazon ECS Exec for debugging (p. 360).

For more information about Systems Manager Session Manager VPC endpoints, see Use AWS PrivateLink to set up a VPC endpoint for Session Manager in the AWS Systems Manager User Guide.

Creating a VPC endpoint policy for Amazon ECS

You can attach an endpoint policy to your VPC endpoint that controls access to Amazon ECS. The policy specifies the following information:

- The principal that can perform actions.
- The actions that can be performed.
- The resources on which actions can be performed.

For more information, see Controlling access to services with VPC endpoints in the Amazon VPC User Guide.

Example: VPC endpoint policy for Amazon ECS actions

The following is an example of an endpoint policy for Amazon ECS. When attached to an endpoint, this policy grants access to the listed Amazon ECS actions for all principals on all resources.

```json
{
  "Statement": [
    {
      "Principal": "*",
      "Effect": "Allow",
      "Resource": "*"
    }
  ]
}
```
Amazon ECS task metadata endpoint

**Important**
If you are using Amazon ECS tasks hosted on Amazon EC2 instances, see Amazon ECS task metadata endpoint in the Amazon Elastic Container Service Developer Guide.

Amazon ECS on Fargate provides a method to retrieve various metadata, network metrics, and Docker stats about your containers and the tasks they are a part of. This is referred to as the task metadata endpoint. The following task metadata endpoint versions are available for Amazon ECS on Fargate tasks:

- Task metadata endpoint version 4 – Available for tasks that use platform version 1.4.0 or later.
- Task metadata endpoint version 3 – Available for tasks that use platform version 1.1.0 or later.

All containers belonging to tasks that are launched with the awsvpc network mode receive a local IPv4 address within a predefined link-local address range. When a container queries the metadata endpoint, the container agent can determine which task the container belongs to based on its unique IP address, and metadata and stats for that task are returned.

**Topics**
- Task metadata endpoint version 4 (p. 310)
- Task metadata endpoint version 3 (p. 318)

Task metadata endpoint version 4

**Important**
If you are using Amazon ECS tasks hosted on Amazon EC2 instances, see Amazon ECS task metadata endpoint in the Amazon Elastic Container Service Developer Guide.

Beginning with Fargate platform version 1.4.0, an environment variable named ECS_CONTAINER_METADATA_URI_V4 is injected into each container in a task. When you query the task metadata endpoint version 4, various task metadata and Docker stats are available to tasks.

The task metadata endpoint version 4 functions like the version 3 endpoint but provides additional network metadata for your containers and tasks. Additional network metrics are available when querying the /stats endpoints as well.

**Note**
To avoid the need to create new task metadata endpoint versions in the future, additional metadata may be added to the version 4 output. We will not remove any existing metadata or change the metadata field names.

Enabling the task metadata endpoint

The task metadata endpoint is enabled by default for all Amazon ECS tasks run on AWS Fargate that use platform version 1.4.0 or later.

Task metadata endpoint version 4 paths

The following task metadata endpoints are available to containers:

`${ECS_CONTAINER_METADATA_URI_V4}`

This path returns metadata for the container.
This path returns metadata for the task, including a list of the container IDs and names for all of the containers associated with the task. For more information about the response for this endpoint, see Task metadata JSON response (p. 311).

This path returns Docker stats for the Docker container. For more information about each of the returned stats, see ContainerStats in the Docker API documentation.

Note
Amazon ECS tasks on AWS Fargate require that the container run for ~1 second prior to returning the container stats.

This path returns Docker stats for all of the containers associated with the task. For more information about each of the returned stats, see ContainerStats in the Docker API documentation.

Note
Amazon ECS tasks on AWS Fargate require that the container run for ~1 second prior to returning the container stats.

**Task metadata JSON response**

The following metadata is returned in the task metadata endpoint ($\{ECS_CONTAINER_METADATA_URI_V4\}/task) JSON response.

Cluster
The Amazon Resource Name (ARN) or short name of the Amazon ECS cluster to which the task belongs.

TaskARN
The full Amazon Resource Name (ARN) of the task to which the container belongs.

Family
The family of the Amazon ECS task definition for the task.

Revision
The revision of the Amazon ECS task definition for the task.

DesiredStatus
The desired status for the task from Amazon ECS.

KnownStatus
The known status for the task from Amazon ECS.

Limits
The resource limits specified at the task level (such as CPU and memory). This parameter is omitted if no resource limits are defined.

PullStartedAt
The timestamp for when the first container image pull began.

PullStoppedAt
The timestamp for when the last container image pull finished.
**AvailabilityZone**

The Availability Zone the task is in.

*Note*

The Availability Zone metadata is only available for Fargate tasks using platform version 1.4 or later.

**Containers**

A list of container metadata for each container associated with the task.

**DockerId**

The Docker ID for the container.

**Name**

The name of the container as specified in the task definition.

**DockerName**

The name of the container supplied to Docker. The Amazon ECS container agent generates a unique name for the container to avoid name collisions when multiple copies of the same task definition are run on a single instance.

**Image**

The image for the container.

**ImageID**

The SHA-256 digest for the image.

**Ports**

Any ports exposed for the container. This parameter is omitted if there are no exposed ports.

**Labels**

Any labels applied to the container. This parameter is omitted if there are no labels applied.

**DesiredStatus**

The desired status for the container from Amazon ECS.

**KnownStatus**

The known status for the container from Amazon ECS.

**ExitCode**

The exit code for the container. This parameter is omitted if the container has not exited.

**Limits**

The resource limits specified at the container level (such as CPU and memory). This parameter is omitted if no resource limits are defined.

**CreatedAt**

The time stamp for when the container was created. This parameter is omitted if the container has not been created yet.

**StartedAt**

The time stamp for when the container started. This parameter is omitted if the container has not started yet.

**FinishedAt**

The time stamp for when the container stopped. This parameter is omitted if the container has not stopped yet.
Examples

The following examples show sample outputs from the task metadata endpoints for Amazon ECS tasks run on AWS Fargate.

Example container metadata response

When querying the `$ {ECS_CONTAINER_METADATA_URI_V4}` endpoint you are returned only metadata about the container itself. The following is an example output.

```json
{
  "DockerId": "cd189a93e5849daa93386466019ab50-2495160603",
  "Name": "curl",
  "DockerName": "curl",
  "Image": "111122223333.dkr.ecr.us-west-2.amazonaws.com/curltest:latest",
  "ImageID": "sha256:25f3695bedfb494a50f12d127839a68ad3caaf91e451c1da073db34c542c4d2cb",
  "Labels": {
    "com.amazonaws.ecs.container-name": "curl",
    "com.amazonaws.ecs.task-definition-family": "curltest",
    "com.amazonaws.ecs.task-definition-version": "2"
  },
  "DesiredStatus": "RUNNING",
  "KnownStatus": "RUNNING",
  "Limits": {
    "CPU": 10,
    "Memory": 128
  },
  "CreatedAt": "2020-10-08T20:09:11.44527186Z",
  "StartedAt": "2020-10-08T20:09:11.44527186Z",
  "Type": "NORMAL",
  "Networks": [
    {
      "NetworkMode": "awsvpc",
      "IPv4Addresses": [
        "192.0.2.3"
      ],
      "AttachmentIndex": 0,
      "MACAddress": "0a:de:f6:10:51:e5",
      "IPv4SubnetCIDRBlock": "192.0.2.0/24",
      "DomainNameServers": [
        "192.0.2.2"
      ],
      "DomainNameSearchList": [
```
Example task metadata response

When querying the `${ECS_CONTAINER_METADATA_URI_V4}/task` endpoint you are returned metadata about the task the container is part of. The following is an example output.

```
{
  "TaskARN": "arn:aws:ecs:us-west-2:111122223333:task/default/e9028f8d5d8e4f258373e7b93ce9a3c3",
  "Family": "curltest",
  "Revision": "3",
  "DesiredStatus": "RUNNING",
  "KnownStatus": "RUNNING",
  "Limits": {
    "CPU": 0.25,
    "Memory": 512
  },
  "PullStartedAt": "2020-10-08T20:47:16.053330955Z",
  "PullStoppedAt": "2020-10-08T20:47:19.592684631Z",
  "AvailabilityZone": "us-west-2a",
  "Containers": [
    {
      "DockerId": "e9028f8d5d8e4f258373e7b93ce9a3c3-2495160603",
      "Name": "curl",
      "DockerName": "curl",
      "Image": "111122223333.dkr.ecr.us-west-2.amazonaws.com/curltest:latest",
      "ImageID": "sha256:25f3f8a5e45554a50f12d127839a68ad3ca9f1e451c1da073db34c542c4d2cb",
      "Labels": {
        "com.amazonaws.ecs.container-name": "curl",
        "com.amazonaws.ecs.task-arn": "arn:aws:ecs:us-west-2:111122223333:task/default/e9028f8d5d8e4f258373e7b93ce9a3c3",
        "com.amazonaws.ecs.task-definition-family": "curltest",
        "com.amazonaws.ecs.task-definition-version": "3"
      },
      "DesiredStatus": "RUNNING",
      "KnownStatus": "RUNNING",
      "Limits": {
        "CPU": 10,
        "Memory": 128
      },
      "CreatedAt": "2020-10-08T20:47:20.567813946Z",
      "StartedAt": "2020-10-08T20:47:20.567813946Z",
      "Type": "NORMAL",
      "Networks": [
```

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Example task stats response

When querying the `${ECS_CONTAINER_METADATA_URI_V4}/task/stats` endpoint you are returned network metrics about the task the container is part of. The following is an example output.

```
{
    "read": "2020-10-08T21:24:44.938937019Z",
    "preread": "2020-10-08T21:24:34.938937019Z",
    "pids_stats": {},
    "blkio_stats": {
        "io_service_bytes_recursive": [
            { "major": 202, "minor": 26368, "op": "Read", "value": 638976 },
            { "major": 202, "minor": 26368, "op": "Write", "value": 0 },
            { "major": 202, "minor": 26368, "op": "Sync", "value": 0 }
        ]
    }
}
```

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"value": 638976

},
{

"major": 202,
"minor": 26368,
"op": "Async",
"value": 0

},
{

"major": 202,
"minor": 26368,
"op": "Total",
"value": 638976

}
],
"io_serviced_recursive": [
{
"major": 202,
"minor": 26368,
"op": "Read",
"value": 12
},
{
"major": 202,
"minor": 26368,
"op": "Write",
"value": 0
},
{
"major": 202,
"minor": 26368,
"op": "Sync",
"value": 12
},
{
"major": 202,
"minor": 26368,
"op": "Async",
"value": 0
},
{
"major": 202,
"minor": 26368,
"op": "Total",
"value": 12
}
],
"io_queue_recursive": [],
"io_service_time_recursive": [],
"io_wait_time_recursive": [],
"io_merged_recursive": [],
"io_time_recursive": [],
"sectors_recursive": []

},
"num_procs": 0,
"storage_stats": {},
"cpu_stats": {
"cpu_usage": {
"total_usage": 1137691504,
"percpu_usage": [
696479228,
441212276,
0,
0,
0,
0,

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0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
  "usage_in_kernelmode": 80000000,
  "usage_in_usermode": 810000000,
},
"system_cpu_usage": 9393210000000,
"online_cpus": 2,
"throttling_data": {
  "periods": 0,
  "throttled_periods": 0,
  "throttled_time": 0
}
},
"precpu_stats": {
  "cpu_usage": {
    "total_usage": 1136624601,
    "percpu_usage": [695639662, 440984939, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],
    "usage_in_kernelmode": 80000000,
    "usage_in_usermode": 810000000,
  },
  "system_cpu_usage": 9373330000000,
  "online_cpus": 2,
  "throttling_data": {
    "periods": 0,
    "throttled_periods": 0,
    "throttled_time": 0
  }
},
"memory_stats": {
  "usage": 6504448,
  "max_usage": 8458240,
  "stats": {
    "active_anon": 1675264,
    "active_file": 557056,
    "cache": 651264,
    "dirty": 0,
    "hierarchical_memory_limit": 536870912,
    "hierarchical_memsw_limit": 9223372036854772000,
    "inactive_anon": 0,
    "inactive_file": 3088384,
    "mapped_file": 430080,
    "pgfault": 11034,
"pgmajfault": 5,
"pgpgin": 8436,
"pgpgout": 7137,
"rss": 4669440,
"rss_huge": 0,
"total_active_anon": 1675264,
"total_active_file": 557056,
"total_cache": 651264,
"total_dirty": 0,
"total_inactive_anon": 0,
"total_inactive_file": 3088384,
"total_mapped_file": 430080,
"total_majfault": 11034,
"total_pgmajfault": 5,
"total_pgpgin": 8436,
"total_pgpgout": 7137,
"total_rss": 4669440,
"total_rss_huge": 0,
"total_unevictable": 0,
"total_writeback": 0,
"unevictable": 0,
"writeback": 0
},
"limit": 9223372036854772000,
"name": "curltest",
"id": "3d1f891ced94dc795608466c8ddcf-464223573",
"networks": {
  "eth1": {
    "rx_bytes": 2398415937,
    "rx_packets": 1898631,
    "rx_errors": 0,
    "rx_dropped": 0,
    "tx_bytes": 1259037719,
    "tx_packets": 428002,
    "tx_errors": 0,
    "tx_dropped": 0
  }
},
"network_rate_stats": {
  "rx_bytes_per_sec": 43.298687872232854,
  "tx_bytes_per_sec": 215.39347269466413
}
}  

Task metadata endpoint version 3

Important
If you are using Amazon ECS tasks hosted on Amazon EC2 instances, see Amazon ECS task metadata endpoint in the Amazon Elastic Container Service Developer Guide.

Beginning with Fargate platform version 1.1.0, an environment variable named ECS_CONTAINER_METADATA_URI is injected into each container in a task. When you query the task metadata version 3 endpoint, various task metadata and Docker stats are available to tasks.

Enabling Task Metadata

The task metadata endpoint feature is enabled by default for Amazon ECS tasks hosted on Fargate that use platform version 1.1.0 or later. For more information, see AWS Fargate platform versions (p. 43).
Task Metadata Endpoint Paths

The following API endpoints are available to containers:

${ECS_CONTAINER_METADATA_URI}

This path returns metadata JSON for the container.

${ECS_CONTAINER_METADATA_URI}/task

This path returns metadata JSON for the task, including a list of the container IDs and names for all of the containers associated with the task. For more information about the response for this endpoint, see Task Metadata JSON Response (p. 319).

${ECS_CONTAINER_METADATA_URI}/stats

This path returns Docker stats JSON for the specific Docker container. For more information about each of the returned stats, see ContainerStats in the Docker API documentation.

${ECS_CONTAINER_METADATA_URI}/task/stats

This path returns Docker stats JSON for all of the containers associated with the task. For more information about each of the returned stats, see ContainerStats in the Docker API documentation.

Task Metadata JSON Response

The following information is returned from the task metadata endpoint (${ECS_CONTAINER_METADATA_URI}/task) JSON response.

Cluster

The Amazon Resource Name (ARN) or short name of the Amazon ECS cluster to which the task belongs.

TaskARN

The full Amazon Resource Name (ARN) of the task to which the container belongs.

Family

The family of the Amazon ECS task definition for the task.

Revision

The revision of the Amazon ECS task definition for the task.

DesiredStatus

The desired status for the task from Amazon ECS.

KnownStatus

The known status for the task from Amazon ECS.

Limits

The resource limits specified at the task level (such as CPU and memory). This parameter is omitted if no resource limits are defined.

PullStartedAt

The timestamp for when the first container image pull began.

PullStoppedAt

The timestamp for when the last container image pull finished.
AvailabilityZone

The Availability Zone the task is in.

**Note**

The Availability Zone metadata is only available for Fargate tasks using platform version 1.4 or later.

Containers

A list of container metadata for each container associated with the task.

DockerId

The Docker ID for the container.

Name

The name of the container as specified in the task definition.

DockerName

The name of the container supplied to Docker. The Amazon ECS container agent generates a unique name for the container to avoid name collisions when multiple copies of the same task definition are run on a single instance.

Image

The image for the container.

ImageID

The SHA-256 digest for the image.

Ports

Any ports exposed for the container. This parameter is omitted if there are no exposed ports.

Labels

Any labels applied to the container. This parameter is omitted if there are no labels applied.

DesiredStatus

The desired status for the container from Amazon ECS.

KnownStatus

The known status for the container from Amazon ECS.

ExitCode

The exit code for the container. This parameter is omitted if the container has not exited.

Limits

The resource limits specified at the container level (such as CPU and memory). This parameter is omitted if no resource limits are defined.

CreatedAt

The time stamp for when the container was created. This parameter is omitted if the container has not been created yet.

StartedAt

The time stamp for when the container started. This parameter is omitted if the container has not started yet.

FinishedAt

The time stamp for when the container stopped. This parameter is omitted if the container has not stopped yet.
Type

The type of the container. Containers that are specified in your task definition are of type NORMAL. You can ignore other container types, which are used for internal task resource provisioning by the Amazon ECS container agent.

Networks

The network information for the container, such as the network mode and IP address. This parameter is omitted if no network information is defined.

ExecutionStoppedAt

The time stamp for when the tasks DesiredStatus moved to STOPPED. This occurs when an essential container moves to STOPPED.

Example Task Metadata Response

The following JSON response is for a single-container task.

```json
{
    "Cluster": "default",
    "Family": "nginx",
    "Revision": "5",
    "DesiredStatus": "RUNNING",
    "KnownStatus": "RUNNING",
    "Containers": [
        {
            "DockerId": "731a0d6a3b4210e2448339bc7015aaaa79bfe4fa256384f4102db86ef94cbbbc4c",
            "Name": "~internal~ecs~pause",
            "DockerName": "ecs-nginx-5-internalecspause-acc99c0cbf2d6d11700",
            "Image": "amazon/amazon-ecs-pause:0.1.0",
            "ImageID": "",
            "Labels": {
                "com.amazonaws.ecs.container-name": "~internal~ecs~pause",
                "com.amazonaws.ecs.task-definition-family": "nginx",
                "com.amazonaws.ecs.task-definition-version": "5"
            },
            "DesiredStatus": "RESOURCES_PROVISIONED",
            "KnownStatus": "RESOURCES_PROVISIONED",
            "Limits": {
                "CPU": 0,
                "Memory": 0
            },
            "CreatedAt": "2018-02-01T20:55:08.366329616Z",
            "StartedAt": "2018-02-01T20:55:09.058354915Z",
            "Type": "CNI_PAUSE",
            "Networks": [
                {
                    "NetworkMode": "awsvpc",
                    "IPv4Addresses": [
                        "10.0.2.106"
                    ]
                }
            ]
        },
        {
            "DockerId": "43481a6ce4842eece8fe72fc28500c6b52edcc0917f105b83379f88cac1ff3946",
```
"Name": "nginx-curl",
"DockerName": "ecs-nginx-5-nginx-curl-ccccc9f49db0dfe0d901",
"Image": "nrdlngr/nginx-curl",
"ImageID": "sha256:2e00ae64383cfc865ba0a2ba37f61b50a120d2d9378559dcd458dc0de47bc165",
"Labels": {
    "com.amazonaws.ecs.cluster": "default",
    "com.amazonaws.ecs.container-name": "nginx-curl",
    "com.amazonaws.ecs.task-definition-family": "nginx",
    "com.amazonaws.ecs.task-definition-version": "5"
},
"DesiredStatus": "RUNNING",
"KnownStatus": "RUNNING",
"Limits": {
    "CPU": 512,
    "Memory": 512
},
"CreatedAt": "2018-02-01T20:55:10.554941919Z",
"StartedAt": "2018-02-01T20:55:11.064236631Z",
"Type": "NORMAL",
"Networks": [
    {
        "NetworkMode": "awsvpc",
        "IPv4Addresses": ["10.0.2.106"
    ]
},
"PullStartedAt": "2018-02-01T20:55:09.372495529Z",
"PullStoppedAt": "2018-02-01T20:55:10.552018345Z",
"AvailabilityZone": "us-east-2b"}
AWS services integrated with Amazon ECS

Amazon ECS works with other AWS services to provide additional solutions for your business challenges. This topic identifies services that either use Amazon ECS to add functionality, or services that Amazon ECS uses to perform tasks.

Contents

• Using Amazon ECR with Amazon ECS (p. 323)
• Creating Amazon ECS resources with AWS CloudFormation (p. 324)
• Use App Mesh with Amazon ECS (p. 324)

Using Amazon ECR with Amazon ECS

Amazon ECR is a managed AWS Docker registry service. Customers can use the familiar Docker CLI to push, pull, and manage images. Amazon ECR provides a secure, scalable, and reliable registry. Amazon ECR supports private Docker repositories with resource-based permissions using AWS IAM so that specific users or Amazon EC2 instances can access repositories and images. Developers can use the Docker CLI to author and manage images.

For more information on how to create repositories, push and pull images from Amazon ECR, and set access controls on your repositories, see the Amazon Elastic Container Registry User Guide.

Using Amazon ECR Images with Amazon ECS

You can use your ECR images with Amazon ECS, but you need to satisfy the following prerequisites.

• Your container instances must be using at least version 1.7.0 of the Amazon ECS container agent. The latest version of the Amazon ECS–optimized AMI supports ECR images in task definitions. For more information, including the latest Amazon ECS–optimized AMI IDs, see Amazon ECS Container Agent Versions in the Amazon Elastic Container Service Developer Guide.

• The Amazon ECS container instance role (ecsInstanceRole) that you use with your container instances must possess the following IAM policy permissions for Amazon ECR.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "ecr:BatchCheckLayerAvailability",
                "ecr:BatchGetImage",
                "ecr:GetDownloadUrlForLayer",
                "ecr:GetAuthorizationToken"
            ],
            "Resource": "*"
        }
    ]
}
```
If you use the `AmazonEC2ContainerServiceforEC2Role` managed policy for your container instances, then your role has the proper permissions. To check that your role supports Amazon ECR, see Amazon ECS Container Instance IAM Role in the Amazon Elastic Container Service Developer Guide.

- In your ECS task definitions, make sure that you are using the full registry/repository:tag naming for your ECR images. For example, 
  `aws_account_id.dkr.ecr.region.amazonaws.com/my-web-app:latest`.

Creating Amazon ECS resources with AWS CloudFormation

Amazon ECS is integrated with AWS CloudFormation, a service that helps you model and set up your AWS resources so that you can spend less time creating and managing your resources and infrastructure. You create a template that describes all the AWS resources that you want, for example an Amazon ECS cluster, and AWS CloudFormation takes care of provisioning and configuring those resources for you.

When you use AWS CloudFormation, you can reuse your template to set up your Amazon ECS resources consistently and repeatedly. Just describe your resources once, and then provision the same resources over and over in multiple AWS accounts and Regions.

Amazon ECS and AWS CloudFormation templates

To provision and configure resources for Amazon ECS and related services, you must understand AWS CloudFormation templates. Templates are formatted text files in JSON or YAML. These templates describe the resources that you want to provision in your AWS CloudFormation stacks. If you’re unfamiliar with JSON or YAML, you can use AWS CloudFormation Designer to help you get started with AWS CloudFormation templates. For more information, see What is AWS CloudFormation Designer? in the AWS CloudFormation User Guide.

Amazon ECS supports creating clusters, task definitions, services, and task sets in AWS CloudFormation. For more information, including examples of JSON and YAML templates for your Amazon ECS resources, see Amazon ECS resource type reference in the AWS CloudFormation User Guide.

Learn more about AWS CloudFormation

To learn more about AWS CloudFormation, see the following resources:

- AWS CloudFormation
- AWS CloudFormation User Guide
- AWS CloudFormation Command Line Interface User Guide

Use App Mesh with Amazon ECS

App Mesh is a service mesh that makes it easy to monitor and control services. App Mesh standardizes how your services communicate, giving you end-to-end visibility and helping to ensure high availability for your applications. App Mesh gives you consistent visibility and network traffic controls for every service in an application. You can get started using App Mesh with Amazon ECS by completing the Getting started with AWS App Mesh and Amazon ECS tutorial in the AWS App Mesh User Guide. The tutorial recommends that you have existing services deployed to Amazon ECS that you want to use App Mesh with.
Tutorials for Amazon ECS

The following tutorials show you how to perform common tasks when using Amazon ECS.

Topics
- Tutorial: Creating a VPC with Public and Private Subnets for Your Clusters (p. 325)
- Tutorial: Creating a Cluster with a Fargate Task Using the AWS CLI (p. 327)
- Tutorial: Specifying sensitive data using Secrets Manager secrets (p. 332)
- Tutorial: Creating a service using Service Discovery (p. 337)
- Tutorial: Creating a service using a blue/green deployment (p. 347)
- Tutorial: Listening for Amazon ECS CloudWatch Events (p. 356)
- Tutorial: Sending Amazon Simple Notification Service alerts for task stopped events (p. 357)

Tutorial: Creating a VPC with Public and Private Subnets for Your Clusters

Container instances in your clusters need external network access to communicate with the Amazon ECS service endpoint. However, you might have tasks and services that you would like to run in private subnets. Creating a VPC with both public and private subnets provides you the flexibility to launch tasks and services in either a public or private subnet. Tasks and services in the private subnets can access the internet through a NAT gateway. Services in both the public and private subnets can be configured to use a load balancer so that they can still be reached from the public internet.

This tutorial guides you through creating a VPC with two public subnets and two private subnets, which are provided with internet access through a NAT gateway.

Step 1: Create an Elastic IP Address for Your NAT Gateway

A NAT gateway requires an Elastic IP address in your public subnet, but the VPC wizard does not create one for you. Create the Elastic IP address before running the VPC wizard.

To create an Elastic IP address
1. Open the Amazon VPC console at https://console.aws.amazon.com/vpc/.
2. In the left navigation pane, choose Elastic IPs.
3. Choose Allocate new address, Allocate, Close.
4. Note the Allocation ID for your newly created Elastic IP address; you enter this later in the VPC wizard.

Step 2: Run the VPC Wizard

The VPC wizard automatically creates and configures most of your VPC resources for you.
Step 3: Create Additional Subnets

To run the VPC wizard
1. In the left navigation pane, choose VPC Dashboard.
2. Choose Launch VPC Wizard, VPC with Public and Private Subnets, Select.
3. For VPC name, give your VPC a unique name.
4. For Elastic IP Allocation ID, choose the ID of the Elastic IP address that you created earlier.
5. Choose Create VPC.
6. When the wizard is finished, choose OK. Note the Availability Zone in which your VPC subnets were created. Your additional subnets should be created in a different Availability Zone.

Non-default subnets, such as those created by the VPC wizard, are not auto-assigned public IPv4 addresses. Instances launched in the public subnet must be assigned a public IPv4 address to communicate with the Amazon ECS service endpoint.

To modify your public subnet’s IPv4 addressing behavior
1. In the left navigation pane, choose Subnets.
2. Select the public subnet for your VPC. By default, the name created by the VPC wizard is Public subnet.
3. Choose Actions, Modify auto-assign IP settings.
4. Select the Enable auto-assign public IPv4 address check box, and then choose Save.

Step 3: Create Additional Subnets

The wizard creates a VPC with a single public and a single private subnet in a single Availability Zone. For greater availability, you should create at least one more of each subnet type in a different Availability Zone so that your VPC has both public and private subnets across two Availability Zones.

To create an additional private subnet
1. In the left navigation pane, choose Subnets.
2. Choose Create Subnet.
3. For Name tag, enter a name for your subnet, such as Private subnet.
4. For VPC, choose the VPC that you created earlier.
5. For Availability Zone, choose a different Availability Zone than your original subnets in the VPC.
6. For IPv4 CIDR block, enter a valid CIDR block. For example, the wizard creates CIDR blocks in 10.0.0.0/24 and 10.0.1.0/24 by default. You could use 10.0.3.0/24 for your second private subnet.
7. Choose Yes, Create.

To create an additional public subnet
1. In the left navigation pane, choose Subnets and then Create Subnet.
2. For Name tag, enter a name for your subnet, such as Public subnet.
3. For VPC, choose the VPC that you created earlier.
4. For Availability Zone, choose the same Availability Zone as the additional private subnet that you created in the previous procedure.
5. For IPv4 CIDR block, enter a valid CIDR block. For example, the wizard creates CIDR blocks in 10.0.0.0/24 and 10.0.1.0/24 by default. You could use 10.0.2.0/24 for your second public subnet.
6. Choose Yes, Create.
7. Select the public subnet that you just created and choose Route Table, Edit.
8. By default, the main route table is selected. Choose the other available route table so that the 0.0.0.0/0 destination is routed to the internet gateway (igw-xxxxxxxx) and choose Save.
10. Select Enable auto-assign public IPv4 address and choose Save, Close.

Next Steps

After you have created your VPC, you should consider the following next steps:

- Create security groups for your public and private resources if they require inbound network access. For more information, see Working with Security Groups in the Amazon VPC User Guide.
- Create Amazon ECS clusters in your private or public subnets. For more information, see Creating a cluster (p. 49). If you use the cluster creation wizard in the Amazon ECS console, you can specify the VPC that you just created and the public or private subnets in which to launch your instances, depending on your use case.
- To make your containers directly accessible from the internet, launch instances into your public subnets. Be sure to configure your container instance security groups appropriately.
- To avoid making containers directly accessible from the internet, launch instances into your private subnets.
- Create a load balancer in your public subnets that can route traffic to services in your public or private subnets. For more information, see Service load balancing (p. 197).

Tutorial: Creating a Cluster with a Fargate Task Using the AWS CLI

The following steps help you set up a cluster, register a task definition, run a task, and perform other common scenarios in Amazon ECS with the AWS CLI. Ensure that you are using the latest version of the AWS CLI. For more information on how to upgrade to the latest version, see Installing the AWS Command Line Interface.

Topics

- Prerequisites (p. 327)
- Step 1: Create a Cluster (p. 328)
- Step 2: Register a Task Definition (p. 328)
- Step 3: List Task Definitions (p. 329)
- Step 4: Create a Service (p. 330)
- Step 5: List Services (p. 330)
- Step 6: Describe the Running Service (p. 330)
- Step 7: Clean Up (p. 332)

Prerequisites

This tutorial assumes that the following prerequisites have been completed.
Step 1: Create a Cluster

By default, your account receives a default cluster.

**Note**

The benefit of using the default cluster that is provided for you is that you don't have to specify the `--cluster cluster_name` option in the subsequent commands. If you do create your own, non-default, cluster, you must specify `--cluster cluster_name` for each command that you intend to use with that cluster.

Create your own cluster with a unique name with the following command:

```bash
aws ecs create-cluster --cluster-name fargate-cluster
```

**Output:**

```json
{
   "cluster": {
      "status": "ACTIVE",
      "statistics": [],
      "clusterName": "fargate-cluster",
      "registeredContainerInstancesCount": 0,
      "pendingTasksCount": 0,
      "runningTasksCount": 0,
      "activeServicesCount": 0,
      "clusterArn": "arn:aws:ecs:region:aws_account_id:cluster/fargate-cluster"
   }
}
```

Step 2: Register a Task Definition

Before you can run a task on your ECS cluster, you must register a task definition. Task definitions are lists of containers grouped together. The following example is a simple task definition that creates a PHP web app using the httpd container image hosted on Docker Hub. For more information about the available task definition parameters, see Amazon ECS task definitions (p. 56).

```json
{
   "family": "sample-fargate",
   "networkMode": "awsvpc",
   "containerDefinitions": [
      {
         "name": "fargate-app",
      }
   ]
}
```
The above example JSON can be passed to the AWS CLI in two ways: You can save the task definition JSON as a file and pass it with the `--cli-input-json file://path_to_file.json` option. Or, you can escape the quotation marks in the JSON and pass the JSON container definitions on the command line as in the below example. If you choose to pass the container definitions on the command line, your command additionally requires a `--family` parameter that is used to keep multiple versions of your task definition associated with each other.

To use a JSON file for container definitions:

```
aws ecs register-task-definition --cli-input-json file://$HOME/tasks/fargate-task.json
```

The `register-task-definition` command returns a description of the task definition after it completes its registration.

**Step 3: List Task Definitions**

You can list the task definitions for your account at any time with the `list-task-definitions` command. The output of this command shows the family and revision values that you can use together when calling `run-task` or `start-task`.

```
aws ecs list-task-definitions
```

Output:

```
{
  "taskDefinitionArns": [
    "arn:aws:ecs:region:aws_account_id:task-definition/sample-fargate:1"
  ]
}
```
**Step 4: Create a Service**

After you have registered a task for your account, you can create a service for the registered task in your cluster. For this example, you create a service with one instance of the `sample-fargate:1` task definition running in your cluster. The task requires a route to the internet, so there are two ways you can achieve this. One way is to use a private subnet configured with a NAT gateway with an elastic IP address in a public subnet. Another way is to use a public subnet and assign a public IP address to your task. We provide both examples below.

Example using a private subnet.

```bash
aws ecs create-service --cluster fargate-cluster --service-name fargate-service --task-definition sample-fargate:1 --desired-count 1 --launch-type "FARGATE" --network-configuration "awsvpcConfiguration={subnets=[subnet-abcd1234],securityGroups=[sg-abcd1234]}"
```

Example using a public subnet.

```bash
aws ecs create-service --cluster fargate-cluster --service-name fargate-service --task-definition sample-fargate:1 --desired-count 1 --launch-type "FARGATE" --network-configuration "awsvpcConfiguration={subnets=[subnet-abcd1234],securityGroups=[sg-abcd1234],assignPublicIp=ENABLED}"
```

The `create-service` command returns a description of the task definition after it completes its registration.

**Step 5: List Services**

List the services for your cluster. You should see the service that you created in the previous section. You can take the service name or the full ARN that is returned from this command and use it to describe the service later.

```bash
aws ecs list-services --cluster fargate-cluster
```

Output:

```
{
  "serviceArns": [
    "arn:aws:ecs:region:aws_account_id:service/fargate-service"
  ]
}
```

**Step 6: Describe the Running Service**

Describe the service using the service name retrieved earlier to get more information about the task.

```bash
aws ecs describe-services --cluster fargate-cluster --services fargate-service
```

If successful, this will return a description of the service failures and services. For example, in services section, you will find information on deployments, such as the status of the tasks as running or pending. You may also find information on the task definition, the network configuration and time-stamped events. In the failures section, you will find information on failures, if any, associated with the call. For troubleshooting, see Service Event Messages. For more information about the service description,
see Describe Services. If your instance was launched in a public subnet, you can view the service task from the internet by using the AWS CLI command `list-tasks` to retrieve the task ID needed for the command `describe-tasks` to retrieve the public IP address of the website.

```json
{
  "services": [
    {
      "status": "ACTIVE",
      "taskDefinition": "arn:aws:ecs:region:aws_account_id:task-definition/sample-fargate:1",
      "pendingCount": 2,
      "launchType": "FARGATE",
      "loadBalancers": [],
      "roleArn": "arn:aws:iam::aws_account_id:role/aws-service-role/ecs.amazonaws.com/AWSServiceRoleForECS",
      "placementConstraints": [],
      "createdAt": 1510811361.128,
      "desiredCount": 2,
      "networkConfiguration": {
        "awsvpcConfiguration": {
          "subnets": [
            "subnet-abcd1234"
          ],
          "securityGroups": [
            "sg-abcd1234"
          ],
          "assignPublicIp": "DISABLED"
        }
      },
      "platformVersion": "LATEST",
      "serviceName": "fargate-service",
      "serviceArn": "arn:aws:ecs:region:aws_account_id:service/fargate-service",
      "deploymentConfiguration": {
        "maximumPercent": 200,
        "minimumHealthyPercent": 100
      },
      "deployments": [
        {
          "status": "PRIMARY",
          "networkConfiguration": {
            "awsvpcConfiguration": {
              "subnets": [
                "subnet-abcd1234"
              ],
              "securityGroups": [
                "sg-abcd1234"
              ],
              "assignPublicIp": "DISABLED"
            }
          },
          "pendingCount": 2,
          "launchType": "FARGATE",
          "createdAt": 1510811361.128,
          "desiredCount": 2,
          "taskDefinition": "arn:aws:ecs:region:aws_account_id:task-definition/sample-fargate:1",
          "updatedAt": 1510811361.128,
          "platformVersion": "0.0.1",
          "id": "ecs-svc/9223370526043414679",
          "runningCount": 0
        }
      ],
      "events": [
        "API Version 2014-11-13"
      ]
    }
  ]
}
```
Step 7: Clean Up

When you are finished with this tutorial, you should clean up the associated resources to avoid incurring charges for unused resources.

Delete the service.

```
aws ecs delete-service --cluster fargate-cluster --service fargate-service --force
```

Delete the cluster.

```
aws ecs delete-cluster --cluster fargate-cluster
```

Tutorial: Specifying sensitive data using Secrets Manager secrets

Amazon ECS enables you to inject sensitive data into your containers by storing your sensitive data in AWS Secrets Manager secrets and then referencing them in your container definition. For more information, see Specifying sensitive data (p. 125).

The following tutorial shows how to create an Secrets Manager secret, reference the secret in an Amazon ECS task definition, and then verify it worked by querying the environment variable inside a container showing the contents of the secret.

Prerequisites

This tutorial assumes that the following prerequisites have been completed:

- The steps in Setting up with Amazon ECS (p. 3) have been completed.
- Your AWS user has the required IAM permissions to create the Secrets Manager and Amazon ECS resources described.
Step 1: Create an Secrets Manager secret

You can use the Secrets Manager console to create a secret for your sensitive data. In this tutorial we will be creating a basic secret for storing a username and password to reference later in a container. For more information, see Creating a Basic Secret in the AWS Secrets Manager User Guide.

To create a basic secret

Use Secrets Manager to create a secret for your sensitive data.

1. Open the Secrets Manager console at https://console.aws.amazon.com/secretsmanager/.
2. Choose Store a new secret.
3. For Select secret type, choose Other type of secrets.
4. For Specify the key/value pairs to be stored in this secret, choose the Plaintext tab and replace the existing text with the following text. The text value you specify here will be the environment variable value in your container at the end of the tutorial.

```
password_value
```
5. Choose Next.
6. For Secret name, type username_value and choose Next. The secret name value you specify here will be the environment variable name in your container at the end of the tutorial.
7. For Configure automatic rotation, leave Disable automatic rotation selected and choose Next.
8. Review these settings, and then choose Store to save everything you entered as a new secret in Secrets Manager.
9. Select the secret you just created and save the Secret ARN to reference in your task execution IAM policy and task definition in later steps.

Step 2: Update your task execution IAM role

In order for Amazon ECS to retrieve the sensitive data from your Secrets Manager secret, you must have the Amazon ECS task execution role and reference it in your task definition. This allows the container agent to pull the necessary Secrets Manager resources. If you have not already created your task execution IAM role, see Amazon ECS task execution IAM role (p. 290).

The following steps assume you already have the task execution IAM role created and properly configured.

To update your task execution IAM role

Use the IAM console to update your task execution role with the required permissions.

1. Open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose Roles.
3. Search the list of roles for ecsTaskExecutionRole and select it.
4. Choose Permissions, Add inline policy.
5. Choose the JSON tab and specify the following JSON text, ensuring that you specify the full ARN of the Secrets Manager secret you created in step 1.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
```
Step 3: Create an Amazon ECS task definition

You can use the Amazon ECS console to create a task definition that references a Secrets Manager secret.

To create a task definition that specifies a secret

Use the IAM console to update your task execution role with the required permissions.

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation pane, choose Task Definitions, Create new Task Definition.
3. On the Select launch type compatibility page, choose EC2 and choose Next step.
4. Choose Configure via JSON and enter the following task definition JSON text, ensuring that you specify the full ARN of the Secrets Manager secret you created in step 1 and the task execution IAM role you updated in step 2. Choose Save.

Important
The value for the secret name in the task definition must match the name you specified for the secret name when the secret was created.

```json
{
   "executionRoleArn": "arn:aws:iam::aws_account_id:role/ecsTaskExecutionRole",
   "containerDefinitions": [
   
   { "entryPoint": [ "sh", "-c" ], "portMappings": [ 
      "hostPort": 80,
      "protocol": "tcp",
      "containerPort": 80
   ] }]

   , "command": [ 
      "/bin/sh -c "echo '<html> <head> <title>Amazon ECS Sample App</title> <style>body {margin-top: 40px; background-color: #333;} </style> </head><body class="html" style="color:white;text-align:center"> <h1>Amazon ECS Sample App</h1>

Congratulations! You're application is now running on a container in Amazon ECS. p>
</div></body></html>" > /usr/local/apache2/htdocs/index.html & & httpd-foreground"
   
   , "cpu": 10,
   "secrets": [ 
      
      "name": "username_value"
```

6. Choose Review policy. For Name specify ECSSecretsTutorial, then choose Create policy.
Step 4: Create an Amazon ECS cluster

You can use the Amazon ECS console to create a cluster containing a container instance to run the task on. If you have an existing cluster with at least one container instance registered to it with the available resources to run one instance of the task definition created for this tutorial you can skip to the next step.

For this tutorial we will be creating a cluster with one t2.micro container instance using the Amazon ECS-optimized Amazon Linux 2 AMI.

To create a cluster

Use the Amazon ECS console to create a cluster and register one container instance to it.

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. From the navigation bar, select the Region that contains both the Secrets Manager secret and the Amazon ECS task definition you created.
3. In the navigation pane, choose Clusters.
4. On the Clusters page, choose Create Cluster.
5. For Select cluster compatibility, choose EC2 Linux + Networking, then choose Next step.
6. On the Configure cluster page, for Cluster name enter ecs-secrets-tutorial.
7. For EC2 instance type, choose t2.micro.
8. For Key pair, choose a key pair to add to the container instance.
   
   **Important**
   
   A key pair is required to complete the tutorial, so if you do not already have a key pair created follow the link to the EC2 console to create one.

9. In the Networking section, configure the VPC for your cluster. Select an existing VPC or you can choose Create a new VPC to use for the tutorial.
   a. (Optional) If you choose to create a new VPC, for CIDR Block, select a CIDR block for your VPC. For more information, see Your VPC and Subnets in the Amazon VPC User Guide.
   b. For Subnets, select the subnets to use for your VPC. You can keep the default settings or you can modify them to meet your needs.
10. For Container instance IAM role, choose your existing container instance IAM role or select Create new role to have one created for you.
11. Leave all other fields at their default values and choose Create.

Step 5: Run an Amazon ECS task

You can use the Amazon ECS console to run a task using the task definition you created. For this tutorial we will be running a task using the EC2 launch type, using the cluster we created in the previous step.
To run a task
1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. In the navigation pane, choose Task Definitions and select the ecs-secrets-tutorial task definition we created.
3. Select the latest revision of the task definition and then choose Actions, Run Task.
4. For Launch Type, choose EC2.
5. For Cluster, choose the ecs-secrets-tutorial cluster we created in the previous step.
6. For Task tagging configuration, deselect Enable ECS managed tags. They are unnecessary for the purposes of this tutorial.
7. Review your task information and choose Run Task.

Note
If your task moves from PENDING to STOPPED, or if it displays a PENDING status and then disappears from the listed tasks, your task may be stopping due to an error. For more information, see Checking stopped tasks for errors (p. 369) in the troubleshooting section.

Step 6: Verify

You can verify all of the steps were completed successfully and the environment variable was created properly in your container using the following steps.

To verify that the environment variable was created
1. Find the public IP or DNS address for your container instance.
   a. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
   b. Select the ecs-secrets-tutorial cluster that hosts your container instance.
   c. On the Cluster page, choose ECS Instances.
   d. On the Container Instance column, select the container instance to connect to.
   e. On the Container Instance page, record the Public IP or Public DNS for your instance.
2. If you are using a macOS or Linux computer, connect to your instance with the following command, substituting the path to your private key and the public address for your instance:
   $ ssh -i /path/to/my-key-pair.pem ec2-user@ec2-198-51-100-1.compute-1.amazonaws.com

   For more information about using a Windows computer, see Connecting to Your Linux Instance from Windows Using PuTTY in the Amazon EC2 User Guide for Linux Instances.

   Important
   For more information about any issues while connecting to your instance, see Troubleshooting Connecting to Your Instance in the Amazon EC2 User Guide for Linux Instances.
3. List the containers running on the instance. Note the container ID for ecs-secrets-tutorial container.

   docker ps

4. Connect to the ecs-secrets-tutorial container using the container ID from the output of the previous step.

   docker exec -it container_ID /bin/bash
5. Use the `echo` command to print the value of the environment variable.

   ```bash
   echo $username_value
   ```

   If the tutorial was successful, you should see the following output:

   ```bash
   password_value
   ```

   **Note**
   Alternatively, you can list all environment variables in your container using the `env` (or `printenv`) command.

**Step 7: Clean up**

When you are finished with this tutorial, you should clean up the associated resources to avoid incurring charges for unused resources.

**To clean up the resources**

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. Select the `ecs-secrets-tutorial` cluster you created.
3. On the `Cluster` page, choose **Delete Cluster**.
4. Enter the delete cluster confirmation phrase and choose **Delete**. This will take several minutes but will clean up all of the Amazon ECS cluster resources.
5. Open the IAM console at https://console.aws.amazon.com/iam/.
6. In the navigation pane, choose **Roles**.
7. Search the list of roles for `ecsTaskExecutionRole` and select it.
8. Choose **Permissions**, then choose the X next to `ECSSecretsTutorial`. Choose **Remove** to confirm the removal of the inline policy.
10. Select the `username_value` secret you created and choose **Actions, Delete secret**.

**Tutorial: Creating a service using Service Discovery**

Service discovery has been integrated into the Create Service wizard in the Amazon ECS console. For more information, see [Creating a service](p. 170).

The following tutorial shows how to create an ECS service containing a Fargate task that uses service discovery with the AWS CLI.

**For a list of Regions that support service discovery, see [Service Discovery](p. 217).**

Fargate tasks are only supported in the following Regions:

<table>
<thead>
<tr>
<th>Region Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East (Ohio)</td>
<td>us-east-2</td>
</tr>
</tbody>
</table>
Amazon ECS User Guide for AWS Fargate

Prerequisites

<table>
<thead>
<tr>
<th>Region Name</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>US East (N. Virginia)</td>
<td>us-east-1</td>
</tr>
<tr>
<td>US West (N. California)</td>
<td>us-west-1 (usw1-az1 &amp; usw1-az3 only)</td>
</tr>
<tr>
<td>US West (Oregon)</td>
<td>us-west-2</td>
</tr>
<tr>
<td>Africa (Cape Town)</td>
<td>af-south-1</td>
</tr>
<tr>
<td>Asia Pacific (Hong Kong)</td>
<td>ap-east-1</td>
</tr>
<tr>
<td>Asia Pacific (Mumbai)</td>
<td>ap-south-1</td>
</tr>
<tr>
<td>Asia Pacific (Osaka)</td>
<td>ap-northeast-3</td>
</tr>
<tr>
<td>Asia Pacific (Seoul)</td>
<td>ap-northeast-2</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>ap-southeast-1</td>
</tr>
<tr>
<td>Asia Pacific (Sydney)</td>
<td>ap-southeast-2</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>ap-northeast-1 (apne1-az1, apne1-az2, &amp; apne1-az4 only)</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>ca-central-1 (cac1-az1 &amp; cac1-az2 only)</td>
</tr>
<tr>
<td>China (Beijing)</td>
<td>cn-north-1 (cnn1-az1 &amp; cnn1-az2 only)</td>
</tr>
<tr>
<td>China (Ningxia)</td>
<td>cn-northwest-1</td>
</tr>
<tr>
<td>Europe (Frankfurt)</td>
<td>eu-central-1</td>
</tr>
<tr>
<td>Europe (Ireland)</td>
<td>eu-west-1</td>
</tr>
<tr>
<td>Europe (London)</td>
<td>eu-west-2</td>
</tr>
<tr>
<td>Europe (Paris)</td>
<td>eu-west-3</td>
</tr>
<tr>
<td>Europe (Milan)</td>
<td>eu-south-1</td>
</tr>
<tr>
<td>Europe (Stockholm)</td>
<td>eu-north-1</td>
</tr>
<tr>
<td>South America (São Paulo)</td>
<td>sa-east-1</td>
</tr>
<tr>
<td>Middle East (Bahrain)</td>
<td>me-south-1</td>
</tr>
<tr>
<td>AWS GovCloud (US-East)</td>
<td>us-gov-east-1</td>
</tr>
<tr>
<td>AWS GovCloud (US-West)</td>
<td>us-gov-west-1</td>
</tr>
</tbody>
</table>

Prerequisites

This tutorial assumes that the following prerequisites have been completed:

- The latest version of the AWS CLI is installed and configured. For more information, see Installing the AWS Command Line Interface.
- The steps in Setting up with Amazon ECS (p. 3) have been completed.
- Your AWS user has the required permissions specified in the Amazon ECS First Run Wizard Permissions (p. 265) IAM policy example.
Step 1: Create the Service Discovery resources

Use the following steps to create your service discovery namespace and service discovery service.

To create the Service Discovery resources

1. Create a private service discovery namespace named tutorial within one of your existing VPCs:

   ```bash
   aws servicediscovery create-private-dns-namespace --name tutorial --vpc vpc-abcd1234 --region us-east-1
   ```

   Output:

   ```json
   {
     "OperationId": "h2qe3s6dxftvvt7riu6lfy2f6c3jlhf4-je6chs2e"
   }
   ```

2. Using the OperationId from the previous output, verify that the private namespace was created successfully. Copy the namespace ID as it is used in subsequent commands.

   ```bash
   aws servicediscovery get-operation --operation-id h2qe3s6dxftvvt7riu6lfy2f6c3jlhf4-je6chs2e
   ```

   Output:

   ```json
   {
     "Operation": {
       "Id": "h2qe3s6dxftvvt7riu6lfy2f6c3jlhf4-je6chs2e",
       "Type": "CREATE_NAMESPACE",
       "Status": "SUCCESS",
       "CreateDate": 1519777852.502,
       "UpdateDate": 1519777856.086,
       "Targets": {
         "NAMESPACE": "ns-uejictsjen2i4eeg"
       }
     }
   }
   ```

3. Using the NAMESPACE ID from the previous output, create a service discovery service named myapplication. Copy the service discovery service ID as it is used in subsequent commands:

   ```bash
   aws servicediscovery create-service --name myapplication --dns-config 'NamespaceId="ns-uejictsjen2i4eeg",DnsRecords=[{Type="A",TTL="300"}]' --health-check-custom-config FailureThreshold=1 --region us-east-1
   ```

   Output:

   ```json
   {
     "Service": {
       "Id": "srv-utcrh6wavdkgqt",
       "Name": "myapplication",
       "DnsConfig": {
       
   ```
Step 2: Create the Amazon ECS resources

Use the following steps to create your Amazon ECS cluster, task definition, and service.

To create Amazon ECS resources

1. Create an Amazon ECS cluster named tutorial to use:

   ```bash
   aws ecs create-cluster --cluster-name tutorial --region us-east-1
   ```

   Output:

   ```json
   {
     "cluster": {
       "clusterArn": "arn:aws:ecs:region:aws_account_id:cluster/tutorial",
       "clusterName": "tutorial",
       "status": "ACTIVE",
       "registeredContainerInstancesCount": 0,
       "runningTasksCount": 0,
       "pendingTasksCount": 0,
       "activeServicesCount": 0,
       "statistics": []
     }
   }
   ```

2. Register a task definition that is compatible with Fargate. It requires the use of the awsvpc network mode. The following is the example task definition used for this tutorial.

   First, create a file named `fargate-task.json` with the contents of the following task definition:

   ```json
   {
     "family": "tutorial-task-def",
     "networkMode": "awsvpc",
     "containerDefinitions": [
       {
         "name": "sample-app",
         "image": "httpd:2.4",
         "portMappings": [
           {
             "containerPort": 80,
             "hostPort": 80,
             "protocol": "tcp"
           }
         ],
         "essential": true,
       }
     ]
   }
   ```
Then, register the task definition using the `fargate-task.json` file that you created:

```bash
aws ecs register-task-definition --cli-input-json file://fargate-task.json --region us-east-1
```

3. Create a file named `ecs-service-discovery.json` with the contents of the ECS service that you are going to create. This example uses the task definition created in the previous step. An `awsvpcConfiguration` is required because the example task definition uses the `awsvpc` network mode.

```json
{
    "cluster": "tutorial",
    "serviceName": "ecs-service-discovery",
    "taskDefinition": "tutorial-task-def",
    "serviceRegistries": [
        {
        }
    ],
    "launchType": "FARGATE",
    "platformVersion": "LATEST",
    "networkConfiguration": {
        "awsvpcConfiguration": {
            "assignPublicIp": "ENABLED",
            "securityGroups": [ "sg-abcd1234" ],
            "subnets": [ "subnet-abcd1234" ]
        }
    },
    "desiredCount": 1
}
```

Create your ECS service, specifying the Fargate launch type and the LATEST platform version, which supports service discovery:

```bash
aws ecs create-service --cli-input-json file://ecs-service-discovery.json --region us-east-1
```

Output:
Step 2: Create the Amazon ECS resources

```json
{
  "service": {
    "serviceName": "ecs-service-discovery",
    "clusterArn": "arn:aws:ecs:<region>:<aws_account_id>:cluster/tutorial",
    "loadBalancers": [],
    "serviceRegistries": [
      {
        "registryArn": "arn:aws:servicediscovery:<region>:<aws_account_id>:service/srv-utcrh6wavdkggqtk"
      }
    ],
    "status": "ACTIVE",
    "desiredCount": 1,
    "runningCount": 0,
    "pendingCount": 0,
    "launchType": "FARGATE",
    "platformVersion": "LATEST",
    "taskDefinition": "arn:aws:ecs:<region>:<aws_account_id>:task-definition/tutorial-task-def:1",
    "deploymentConfiguration": {
      "maximumPercent": 200,
      "minimumHealthyPercent": 100
    },
    "deployments": [
      {
        "id": "ecs-svc/9223370516993140842",
        "status": "PRIMARY",
        "taskDefinition": "arn:aws:ecs:<region>:<aws_account_id>:task-definition/tutorial-task-def:1",
        "desiredCount": 1,
        "pendingCount": 0,
        "runningCount": 0,
        "createdAt": 1519861634.965,
        "updatedAt": 1519861634.965,
        "launchType": "FARGATE",
        "platformVersion": "1.1.0",
        "networkConfiguration": {
          "awsvpcConfiguration": {
            "subnets": ["subnet-abcd1234"],
            "securityGroups": ["sg-abcd1234"],
            "assignPublicIp": "ENABLED"
          }
        }
      }
    ],
    "roleArn": "arn:aws:iam::<aws_account_id>:role/ECSServiceLinkedRole",
    "events": [],
    "createdAt": 1519861634.965,
    "placeConstraints": [],
    "placementStrategy": [],
    "networkConfiguration": {
      "awsvpcConfiguration": {
        "subnets": ["subnet-abcd1234"],
        "securityGroups": ["sg-abcd1234"
      ]
    }
  }
}
```

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Step 3: Verify Service Discovery

You can verify that everything has been created properly by querying your service discovery information. After service discovery is configured, you can query it using either the AWS Cloud Map API operations or by using dig from within your VPC, as described below.

To verify service discovery configuration

1. Using the service discovery service ID, list the service discovery instances:

   ```
   aws servicediscovery list-instances --service-id srv-utcrh6wavdkgggk --region us-east-1
   ```

   Output:

   ```
   {
   "Instances": [
   {
   "Id": "16becc26-8558-4af1-9fbd-f81be062a266",
   "Attributes": {
   "AWS_INSTANCE_IPV4": "172.31.87.2",
   "AWS_INSTANCE_PORT": "80",
   "AVAILABILITY_ZONE": "us-east-1a",
   "REGION": "us-east-1",
   "ECS_SERVICE_NAME": "ecs-service-discovery",
   "ECS_CLUSTER_NAME": "tutorial",
   "ECS_TASK_DEFINITION_FAMILY": "tutorial-task-def"
   }
   }
   ]
   }
   ```

2. Using the service discovery namespace and service, use additional parameters to query the details about the service discovery instances:

   ```
   aws servicediscovery discover-instances --namespace-name tutorial --service-name myapplication --query-parameters ECS_CLUSTER_NAME=tutorial --region us-east-1
   ```

   Output:

   ```
   {
   "Instances": [
   {
   "InstanceId": "16becc26-8558-4af1-9fbd-f81be062a266",
   "NamespaceName": "tutorial",
   "ServiceName": "ecs-service-discovery",
   "HealthStatus": "HEALTHY",
   "Attributes": {
   "AWS_INSTANCE_IPV4": "172.31.87.2",
   "AWS_INSTANCE_PORT": "80",
   "AVAILABILITY_ZONE": "us-east-1a",
   "REGION": "us-east-1",
   }
   }
   ]
   ```
Step 3: Verify Service Discovery

3. The DNS records created in the Route 53 hosted zone for the service discovery service can be queried with the following AWS CLI commands.

Using the namespace ID, get information about the namespace, which includes the Route 53 hosted zone ID:

```
aws servicediscovery get-namespace --id ns-uejictsjen2i4eeg --region us-east-1
```

Output:

```
{
   "Namespace": {
      "Id": "ns-uejictsjen2i4eeg",
      "Name": "tutorial",
      "Type": "DNS_PRIVATE",
      "Properties": {
         "DnsProperties": {
            "HostedZoneId": "Z35JQ4ZFDRYPLV"
         }
      },
      "CreateDate": 1519777852.502,
      "CreatorRequestId": "9049a1d5-25e4-4115-8625-96dbda9a6093"
   }
}
```

4. Using the Route 53 hosted zone ID, get the resource record set for the hosted zone:

```
aws route53 list-resource-record-sets --hosted-zone-id Z35JQ4ZFDRYPLV --region us-east-1
```

Output:

```
{
   "ResourceRecordSets": [
      {
         "Name": "tutorial.",
         "Type": "NS",
         "TTL": 172800,
         "ResourceRecords": [
            {
               "Value": "ns-1536.awsdns-00.co.uk."
            },
            {
               "Value": "ns-0.awsdns-00.com."
            },
            {
               "Value": "ns-1024.awsdns-00.org."
            },
            {
               "Value": "ns-512.awsdns-00.net."
            }
      }
   }
}
Step 4: Clean up

When you are finished with this tutorial, you should clean up the associated resources to avoid incurring charges for unused resources.

To clean up the service discovery instances and Amazon ECS resources

1. Deregister the service discovery service instances:

```
aws servicediscovery deregister-instance --service-id srv-uctrh5mvdkqgqtk --instance-id 16becc26-8558-4af1-9fbd-f81be062a266 --region us-east-1
```

Output:

```
{
  "OperationId": "xhu73bsertyffhtf3faq17kummmx274n-jh0zimzv"
}
```

2. Using the OperationId from the previous output, verify that the service discovery service instances were deregistered successfully:
aws servicediscovery get-operation --operation-id xhu73bsertlyffhm3faoi7kumsmx274n-jh0zimzv --region us-east-1

Output:

```json
{
    "Operation": {
        "Id": "xhu73bsertlyffhm3faoi7kumsmx274n-jh0zimzv",
        "Type": "DEREGISTER_INSTANCE",
        "Status": "SUCCESS",
        "CreateDate": 1525984073.707,
        "UpdateDate": 1525984076.426,
        "Targets": {
            "INSTANCE": "16becc26-8558-4af1-9fbd-f81be062a266",
            "ROUTE_53_CHANGE_ID": "C5NSRG1J411FH",
            "SERVICE": "srv-utcrh6wavedkgqtk"
        }
    }
}
```

3. Delete the service discovery service:

```
aws servicediscovery delete-service --id srv-utcrh6wavedkgqtk --region us-east-1
```

4. Delete the service discovery namespace:

```
aws servicediscovery delete-namespace --id ns-uejictsjen2i4eeg --region us-east-1
```

Output:

```json
{
    "OperationId": "c3ncqglftesw4ibgj5baz6ktaoh6cg4t-jh0ztysj"
}
```

5. Using the OperationId from the previous output, verify that the service discovery namespace was deleted successfully:

```
aws servicediscovery get-operation --operation-id c3ncqglftesw4ibgj5baz6ktaoh6cg4t-jh0ztysj --region us-east-1
```

Output:

```json
{
    "Operation": {
        "Id": "c3ncqglftesw4ibgj5baz6ktaoh6cg4t-jh0ztysj",
        "Type": "DELETE_NAMESPACE",
        "Status": "SUCCESS",
        "CreateDate": 1525984602.211,
        "UpdateDate": 1525984602.558,
        "Targets": {
            "NAMESPACE": "ns-rymlehshst7hhukh",
            "ROUTE_53_CHANGE_ID": "CJP2A2M86XW3O"
        }
    }
}
```

6. Update the Amazon ECS service so that the desired count is 0, which allows you to delete it:
Amazon ECS User Guide for AWS Fargate

Tutorial: Creating a service using a blue/green deployment

Amazon ECS has integrated blue/green deployments into the Create Service wizard on the Amazon ECS console. For more information, see Creating a service (p. 170).

The following tutorial shows how to create an Amazon ECS service containing a Fargate task that uses the blue/green deployment type with the AWS CLI.

Note
Support for performing a blue/green deployment has been added for AWS CloudFormation. For more information, see Perform Amazon ECS blue/green deployments through CodeDeploy using AWS CloudFormation in the AWS CloudFormation User Guide.

Prerequisites

This tutorial assumes that you have completed the following prerequisites:

- The latest version of the AWS CLI is installed and configured. For more information about installing or upgrading the AWS CLI, see Installing the AWS Command Line Interface.
- The steps in Setting up with Amazon ECS (p. 3) have been completed.
- Your AWS user has the required permissions specified in the Amazon ECS First Run Wizard Permissions (p. 265) IAM policy example.
- You have a VPC and security group created to use. For more information, see Tutorial: Creating a VPC with Public and Private Subnets for Your Clusters.
- The Amazon ECS CodeDeploy IAM role is created. For more information, see Amazon ECS CodeDeploy IAM Role (p. 297).

Step 1: Create an Application Load Balancer

Amazon ECS services using the blue/green deployment type require the use of either an Application Load Balancer or a Network Load Balancer. This tutorial uses an Application Load Balancer.

To create an Application Load Balancer

1. Use the create-load-balancer command to create an Application Load Balancer. Specify two subnets that aren't from the same Availability Zone as well as a security group.
Step 2: Create an Amazon ECS cluster

Use the `create-cluster` command to create a cluster named `tutorial-bluegreen-cluster` to use.

```
aws ecs create-cluster \
  --cluster-name tutorial-bluegreen-cluster \
  --region us-east-1
```
The output includes the ARN of the cluster, with the following format:

```
```

## Step 3: Register a task definition

Use the `register-task-definition` command to register a task definition that is compatible with Fargate. It requires the use of the `awsvpc` network mode. The following is the example task definition used for this tutorial.

First, create a file named `fargate-task.json` with the following contents. Ensure that you use the ARN for your task execution role. For more information, see Amazon ECS task execution IAM role (p. 290).

```json
{
  "family": "tutorial-task-def",
  "networkMode": "awsvpc",
  "containerDefinitions": [
    {
      "name": "sample-app",
      "image": "httpd:2.4",
      "portMappings": [
        {
          "containerPort": 80,
          "hostPort": 80,
          "protocol": "tcp"
        }
      ],
      "essential": true,
      "entryPoint": [
        "sh",
        "-c"
      ],
      "command": [
        "/bin/sh -c \"echo '<html> <head> <title>Amazon ECS Sample App</title> <style>body {margin-top: 40px; background-color: #333;} </style> </head><body> <div style=color:white;text-align:center> <h1>Amazon ECS Sample App</h1> <h2>Congratulations!</h2> <p>Your application is now running on a container in Amazon ECS.</p> </div></html>' > /usr/local/apache2/htdocs/index.html && httpd-foreground\"
      ]
    }
  ],
  "requiresCompatibilities": [
    "FARGATE"
  ],
  "cpu": "256",
  "memory": "512",
  "executionRoleArn": "arn:aws:iam::aws_account_id:role/ecsTaskExecutionRole"
}
```

Then register the task definition using the `fargate-task.json` file that you created.

```
aws ecs register-task-definition
  --cli-input-json file://fargate-task.json
  --region us-east-1
```

## Step 4: Create an Amazon ECS service

Use the `create-service` command to create a service.

```
```
Step 5: Create the AWS CodeDeploy resources

Use the following steps to create your CodeDeploy application, the Application Load Balancer target group for the CodeDeploy deployment group, and the CodeDeploy deployment group.

To create CodeDeploy resources

1. Use the create-application command to create a CodeDeploy application. Specify the ECS compute platform.

```
aws deploy create-application \
  --application-name tutorial-bluegreen-app \n  --compute-platform ECS \n  --region us-east-1
```

The output includes the application ID, with the following format:

```
{
```

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2. Use the `create-target-group` command to create a second Application Load Balancer target group, which will be used when creating your CodeDeploy deployment group.

```bash
aws elbv2 create-target-group \
  --name bluegreentarget2 \
  --protocol HTTP \
  --port 80 \
  --target-type ip \
  --vpc-id "vpc-0b6dd82c67d8012a1" \
  --region us-east-1
```

The output includes the ARN for the target group, with the following format:

```
arn:aws:elasticloadbalancing:region:aws_account_id:targetgroup/bluegreentarget2/708d384187a3cfdc
```

3. Use the `create-deployment-group` command to create a CodeDeploy deployment group.

First, create a file named `tutorial-deployment-group.json` with the following contents. This example uses the resource that you created. For the `serviceRoleArn`, specify the ARN of your Amazon ECS CodeDeploy IAM role. For more information, see Amazon ECS CodeDeploy IAM Role (p. 297).

```json
{
  "applicationName": "tutorial-bluegreen-app",
  "autoRollbackConfiguration": {
    "enabled": true,
    "events": [ "DEPLOYMENT_FAILURE" ]
  },
  "blueGreenDeploymentConfiguration": {
    "deploymentReadyOption": {
      "actionOnTimeout": "CONTINUE_DEPLOYMENT",
      "waitTimeInMinutes": 0
    },
    "terminateBlueInstancesOnDeploymentSuccess": {
      "action": "TERMINATE",
      "terminationWaitTimeInMinutes": 5
    }
  },
  "deploymentGroupName": "tutorial-bluegreen-dg",
  "deploymentStyle": {
    "deploymentOption": "WITH_TRAFFIC_CONTROL",
    "deploymentType": "BLUE_GREEN"
  },
  "loadBalancerInfo": {
    "targetGroupPairInfoList": [
      {
        "targetGroups": [
          {
            "name": "bluegreentarget1"
          },
          {
            "name": "bluegreentarget2"
          }
        ],
        "prodTrafficRoute": {
          "listenerArns": [
            "arn:aws:elasticloadbalancing:region:aws_account_id:listener/app/bluegreen-alb/e5ba62739c166e642/665750bec1b03bd4"
          ]
        }
      }
    ]
}
```

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Step 6: Create and monitor an CodeDeploy deployment

Use the following steps to create and upload an application specification file (AppSpec file) and an CodeDeploy deployment.

To create and monitor an CodeDeploy deployment

1. Create and upload an AppSpec file using the following steps.

   a. Create a file named appspec.yaml with the contents of the CodeDeploy deployment group. This example uses the resources that you created earlier in the tutorial.

      ```yaml
      version: 0.0
      Resources:
        - TargetService:
            Type: AWS::ECS::Service
            Properties:
              LoadBalancerInfo:
                ContainerName: "sample-app"
                ContainerPort: 80
                PlatformVersion: "LATEST"
      
      b. Use the s3 mb command to create an Amazon S3 bucket for the AppSpec file.

      ```

      ```bash
      aws s3 mb s3://tutorial-bluegreen-bucket
      
      c. Use the s3 cp command to upload the AppSpec file to the Amazon S3 bucket.

      ```bash
      aws s3 cp appspec.yaml s3://tutorial-bluegreen-bucket
      
      Then create the CodeDeploy deployment group.

      ```bash
      aws deploy create-deployment-group \
      --cli-input-json file://tutorial-deployment-group.json \
      --region us-east-1
      
      The output includes the deployment group ID, with the following format:

      ```json
      {
        "deploymentGroupId": "6fd9bdc6-dc51-4af5-ba5a-0a4a72431c88"
      }
      
Step 6: Create and monitor an CodeDeploy deployment

Use the following steps to create and upload an application specification file (AppSpec file) and an CodeDeploy deployment.

To create and monitor an CodeDeploy deployment

1. Create and upload an AppSpec file using the following steps.

   a. Create a file named appspec.yaml with the contents of the CodeDeploy deployment group. This example uses the resources that you created earlier in the tutorial.

      ```yaml
      version: 0.0
      Resources:
        - TargetService:
            Type: AWS::ECS::Service
            Properties:
              LoadBalancerInfo:
                ContainerName: "sample-app"
                ContainerPort: 80
                PlatformVersion: "LATEST"
      
      b. Use the s3 mb command to create an Amazon S3 bucket for the AppSpec file.

      ```

      ```bash
      aws s3 mb s3://tutorial-bluegreen-bucket
      
      c. Use the s3 cp command to upload the AppSpec file to the Amazon S3 bucket.

      ```bash
      aws s3 cp appspec.yaml s3://tutorial-bluegreen-bucket
      
      Then create the CodeDeploy deployment group.

      ```bash
      aws deploy create-deployment-group \
      --cli-input-json file://tutorial-deployment-group.json \
      --region us-east-1
      
      The output includes the deployment group ID, with the following format:

      ```json
      {
        "deploymentGroupId": "6fd9bdc6-dc51-4af5-ba5a-0a4a72431c88"
      }
      
Step 6: Create and monitor an CodeDeploy deployment

Use the following steps to create and upload an application specification file (AppSpec file) and an CodeDeploy deployment.

To create and monitor an CodeDeploy deployment

1. Create and upload an AppSpec file using the following steps.

   a. Create a file named appspec.yaml with the contents of the CodeDeploy deployment group. This example uses the resources that you created earlier in the tutorial.

      ```yaml
      version: 0.0
      Resources:
        - TargetService:
            Type: AWS::ECS::Service
            Properties:
              LoadBalancerInfo:
                ContainerName: "sample-app"
                ContainerPort: 80
                PlatformVersion: "LATEST"
      
      b. Use the s3 mb command to create an Amazon S3 bucket for the AppSpec file.

      ```

      ```bash
      aws s3 mb s3://tutorial-bluegreen-bucket
      
      c. Use the s3 cp command to upload the AppSpec file to the Amazon S3 bucket.

      ```bash
      aws s3 cp appspec.yaml s3://tutorial-bluegreen-bucket
      
      Then create the CodeDeploy deployment group.

      ```bash
      aws deploy create-deployment-group \
      --cli-input-json file://tutorial-deployment-group.json \
      --region us-east-1
      
      The output includes the deployment group ID, with the following format:

      ```json
      {
        "deploymentGroupId": "6fd9bdc6-dc51-4af5-ba5a-0a4a72431c88"
      }
      
Step 6: Create and monitor an CodeDeploy deployment

Use the following steps to create and upload an application specification file (AppSpec file) and an CodeDeploy deployment.

To create and monitor an CodeDeploy deployment

1. Create and upload an AppSpec file using the following steps.

   a. Create a file named appspec.yaml with the contents of the CodeDeploy deployment group. This example uses the resources that you created earlier in the tutorial.

      ```yaml
      version: 0.0
      Resources:
        - TargetService:
            Type: AWS::ECS::Service
            Properties:
              LoadBalancerInfo:
                ContainerName: "sample-app"
                ContainerPort: 80
                PlatformVersion: "LATEST"
      
      b. Use the s3 mb command to create an Amazon S3 bucket for the AppSpec file.

      ```

      ```bash
      aws s3 mb s3://tutorial-bluegreen-bucket
      
      c. Use the s3 cp command to upload the AppSpec file to the Amazon S3 bucket.

      ```bash
      aws s3 cp appspec.yaml s3://tutorial-bluegreen-bucket
      
      Then create the CodeDeploy deployment group.

      ```bash
      aws deploy create-deployment-group \
      --cli-input-json file://tutorial-deployment-group.json \
      --region us-east-1
      
      The output includes the deployment group ID, with the following format:

      ```json
      {
        "deploymentGroupId": "6fd9bdc6-dc51-4af5-ba5a-0a4a72431c88"
      }
      
Step 6: Create and monitor an CodeDeploy deployment

Use the following steps to create and upload an application specification file (AppSpec file) and an CodeDeploy deployment.

To create and monitor an CodeDeploy deployment

1. Create and upload an AppSpec file using the following steps.

   a. Create a file named appspec.yaml with the contents of the CodeDeploy deployment group. This example uses the resources that you created earlier in the tutorial.

      ```yaml
      version: 0.0
      Resources:
        - TargetService:
            Type: AWS::ECS::Service
            Properties:
              LoadBalancerInfo:
                ContainerName: "sample-app"
                ContainerPort: 80
                PlatformVersion: "LATEST"
      
      b. Use the s3 mb command to create an Amazon S3 bucket for the AppSpec file.

      ```

      ```bash
      aws s3 mb s3://tutorial-bluegreen-bucket
      
      c. Use the s3 cp command to upload the AppSpec file to the Amazon S3 bucket.
Step 6: Create and monitor an CodeDeploy deployment

2. Create the CodeDeploy deployment using the following steps.

a. Create a file named `create-deployment.json` with the contents of the CodeDeploy deployment. This example uses the resources that you created earlier in the tutorial.

```json
{
  "applicationName": "tutorial-bluegreen-app",
  "deploymentGroupName": "tutorial-bluegreen-dg",
  "revision": {
    "revisionType": "S3",
    "S3Location": {
      "bucket": "tutorial-bluegreen-bucket",
      "key": "appspec.yaml",
      "bundleType": "YAML"
    }
  }
}
```

b. Use the `create-deployment` command to create the deployment.

```bash
aws deploy create-deployment \
  --cli-input-json file://create-deployment.json \
  --region us-east-1
```

The output includes the deployment ID, with the following format:

```json
{
  "deploymentId": "d-RPCR1U3TW"
}
```

c. Use the `get-deployment-target` command to get the details of the deployment, specifying the deploymentID from the previous output.

```bash
aws deploy get-deployment-target \
  --deployment-id "d-IMJU3A8TW" \
  --target-id tutorial-bluegreen-cluster:service-bluegreen \
  --region us-east-1
```

Continue to retrieve the deployment details until the status is `Succeeded`, as shown in the following output.

```json
{
  "deploymentTarget": {
    "deploymentTargetType": "ECSTarget",
    "ecsTarget": {
      "deploymentId": "d-RPCR1U3TW",
      "targetId": "tutorial-bluegreen-cluster:service-bluegreen",
      "targetArn": "arn:aws:ecs:region:aws_account_id:service/service-bluegreen",
      "lastUpdatedAt": 1543431490.226,
      "lifecycleEvents": [
        {
          "lifecycleEventName": "BeforeInstall",
          "startTime": 1543431361.022,
          "endTime": 1543431361.433,
          "status": "Succeeded"
        }
      ]
    }
  }
}
```
Step 6: Create and monitor an CodeDeploy deployment

```json
{
  "lifecycleEventName": "Install",
  "startTime": 1543431361.678,
  "endTime": 1543431485.275,
  "status": "Succeeded"
},
{
  "lifecycleEventName": "AfterInstall",
  "startTime": 1543431485.52,
  "endTime": 1543431486.033,
  "status": "Succeeded"
},
{
  "lifecycleEventName": "BeforeAllowTraffic",
  "startTime": 1543431486.838,
  "endTime": 1543431487.483,
  "status": "Succeeded"
},
{
  "lifecycleEventName": "AllowTraffic",
  "startTime": 1543431487.748,
  "endTime": 1543431488.488,
  "status": "Succeeded"
},
{
  "lifecycleEventName": "AfterAllowTraffic",
  "startTime": 1543431489.152,
  "endTime": 1543431489.885,
  "status": "Succeeded"
}
},
"status": "Succeeded",
"taskSetsInfo": [
  {
    "identifier": "ecs-svc/9223370493425779968",
    "desiredCount": 1,
    "pendingCount": 0,
    "runningCount": 1,
    "status": "ACTIVE",
    "trafficWeight": 0.0,
    "targetGroup": {
      "name": "bluegreentarget1"
    }
  },
  {
    "identifier": "ecs-svc/9223370493423413672",
    "desiredCount": 1,
    "pendingCount": 0,
    "runningCount": 1,
    "status": "PRIMARY",
    "trafficWeight": 100.0,
    "targetGroup": {
      "name": "bluegreentarget2"
    }
  }
]
}```
Step 7: Clean up

When you have finished this tutorial, clean up the resources associated with it to avoid incurring charges for resources that you aren’t using.

Cleaning up the tutorial resources

1. Use the `delete-deployment-group` command to delete the CodeDeploy deployment group.

```
aws deploy delete-deployment-group \
  --application-name tutorial-bluegreen-app \
  --deployment-group-name tutorial-bluegreen-dg \
  --region us-east-1
```

2. Use the `delete-application` command to delete the CodeDeploy application.

```
aws deploy delete-application \
  --application-name tutorial-bluegreen-app \
  --region us-east-1
```

3. Use the `delete-service` command to delete the Amazon ECS service. Using the `--force` flag allows you to delete a service even if it has not been scaled down to zero tasks.

```
aws ecs delete-service \
  --service arn:aws:ecs:region:aws_account_id:service/service-bluegreen \
  --force \
  --region us-east-1
```

4. Use the `delete-cluster` command to delete the Amazon ECS cluster.

```
aws ecs delete-cluster \
  --cluster tutorial-bluegreen-cluster \
  --region us-east-1
```

5. Use the `s3 rm` command to delete the AppSpec file from the Amazon S3 bucket.

```
aws s3 rm s3://tutorial-bluegreen-bucket/appspec.yaml
```

6. Use the `s3 rb` command to delete the Amazon S3 bucket.

```
aws s3 rb s3://tutorial-bluegreen-bucket
```

7. Use the `delete-load-balancer` command to delete the Application Load Balancer.

```
aws elbv2 delete-load-balancer \
  --load-balancer-arn arn:aws:elasticloadbalancing:region:aws_account_id:loadbalancer/app/bluegreen-alb/e5ba62739c16e642 \
  --region us-east-1
```

8. Use the `delete-target-group` command to delete the two Application Load Balancer target groups.

```
aws elbv2 delete-target-group \
  --target-group-arn arn:aws:elasticloadbalancing:region:aws_account_id:targetgroup/bluegreen-target1/209a8d10d325ad4 \
  --region us-east-1
```
Tutorial: Listening for Amazon ECS CloudWatch Events

In this tutorial, you set up a simple AWS Lambda function that listens for Amazon ECS task events and writes them out to a CloudWatch Logs log stream.

Prerequisite: Set up a test cluster

If you do not have a running cluster to capture events from, follow the steps in Creating a cluster (p. 49) to create one. At the end of this tutorial, you run a task on this cluster to test that you have configured your Lambda function correctly.

Step 1: Create the Lambda function

In this procedure, you create a simple Lambda function to serve as a target for Amazon ECS event stream messages.

1. Open the AWS Lambda console at https://console.aws.amazon.com/lambda/.
2. Choose Create function.
3. On the Author from scratch screen, do the following:
   a. For Name, enter a value.
   b. For Runtime, choose Python 2.7.
   c. For Role, choose Create a new role with basic Lambda permissions.
4. Choose Create function.
5. In the Function code section, edit the sample code to match the following example:

```python
import json

def lambda_handler(event, context):
    if event['source'] != "aws.ecs":
        raise ValueError("Function only supports input from events with a source type of: aws.ecs")

    print('Here is the event: ')
    print(json.dumps(event))
```

This is a simple Python 2.7 function that prints the event sent by Amazon ECS. If everything is configured correctly, at the end of this tutorial, you see that the event details appear in the CloudWatch Logs log stream associated with this Lambda function.

6. Choose Save.
Step 2: Register an event rule

Next, you create a CloudWatch Events event rule that captures task events coming from your Amazon ECS clusters. This rule captures all events coming from all clusters within the account where it is defined. The task messages themselves contain information about the event source, including the cluster on which it resides, that you can use to filter and sort events programmatically.

**Note**

When you use the AWS Management Console to create an event rule, the console automatically adds the IAM permissions necessary to grant CloudWatch Events permission to call your Lambda function. If you are creating an event rule using the AWS CLI, you need to grant this permission explicitly. For more information, see Events and Event Patterns in the Amazon CloudWatch Events User Guide.

**To route events to your Lambda function**

2. On the navigation pane, choose **Events, Rules, Create rule**.
3. For **Event Source**, choose ECS as the event source. By default, the rule applies to all Amazon ECS events for all of your Amazon ECS groups. Alternatively, you can select specific events or a specific Amazon ECS group.
4. For **Targets**, choose **Add target**, for **Target type**, choose **Lambda function**, and then select your Lambda function.
5. Choose **Configure details**.
6. For **Rule definition**, type a name and description for your rule and choose **Create rule**.

Step 3: Test your rule

Finally, you create a CloudWatch Events event rule that captures task events coming from your Amazon ECS clusters. This rule captures all events coming from all clusters within the account where it is defined. The task messages themselves contain information about the event source, including the cluster on which it resides, that you can use to filter and sort events programmatically.

**To test your rule**

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. Choose **Clusters, default**.
3. On the Cluster : default screen, choose **Tasks, Run new Task**.
4. For **Task Definition**, select the latest version of console-sample-app-static and choose **Run Task**.
5. Open the CloudWatch console at https://console.aws.amazon.com/cloudwatch/.
6. On the navigation pane, choose **Logs** and select the log group for your Lambda function (for example, /aws/lambda/my-function).
7. Select a log stream to view the event data.

Tutorial: Sending Amazon Simple Notification Service alerts for task stopped events

In this tutorial, you configure a CloudWatch Events event rule that only captures task events where the task has stopped running because one of its essential containers has terminated. The event sends only task events with a specific stoppedReason property to the designated Amazon SNS topic.
Prerequisite: Set up a test cluster

If you do not have a running cluster to capture events from, follow the steps in Creating a cluster (p. 49) to create one. At the end of this tutorial, you run a task on this cluster to test that you have configured your Amazon SNS topic and CloudWatch Events event rule correctly.

Step 1: Create and subscribe to an Amazon SNS topic

For this tutorial, you configure an Amazon SNS topic to serve as an event target for your new event rule.

To create an Amazon SNS topic

2. Choose Topics, Create topic.
3. On the Create topic screen, for Name, enter TaskStoppedAlert and choose Create topic.
4. On the TaskStoppedAlert details screen, choose Create subscription.
5. On the Create subscription screen, for Protocol, choose Email. For Endpoint, enter an email address to which you currently have access and choose Create subscription.
6. Check your email account, and wait to receive a subscription confirmation email message. When you receive it, choose Confirm subscription.

Step 2: Register an event rule

Next, you register an event rule that captures only task-stopped events for tasks with stopped containers.

To create an event rule

1. Open the CloudWatch console at https://console.aws.amazon.com/cloudwatch/
2. On the navigation pane, choose Events, Rules, Create rule.
3. For Event Source, choose Event Pattern, select Custom event pattern and then replace the existing text with the following text:

```
{
  "source": ["aws.ecs"],
  "detail-type": ["ECS Task State Change"],
  "detail": {
    "lastStatus": ["STOPPED"],
    "stoppedReason": ["Essential container in task exited"]
  }
}
```

This code defines a CloudWatch Events event rule that matches any event where the lastStatus and stoppedReason fields match the indicated values. For more information about event patterns, see Events and Event Patterns in the Amazon CloudWatch User Guide.
4. For **Targets**, choose **Add target**. For **Target type**, choose **SNS topic**, and then choose **TaskStoppedAlert**.
5. Choose **Configure details**.
6. For **Rule definition**, type a name and description for your rule and then choose **Create rule**.

### Step 3: Test your rule

Verify that the rule is working by running a task that exits shortly after it starts. If your event rule is configured correctly, you receive an email message within a few minutes with the event text. If you have an existing task definition that can satisfy the rule requirements, run a task using it. If you do not, the following steps will walk you through registering a Fargate task definition and running it that will.

**To test the rule**

1. Open the Amazon ECS console at [https://console.aws.amazon.com/ecs/](https://console.aws.amazon.com/ecs/).
2. Choose **Task Definitions, Create new Task Definition**.
3. For Select launch type compatibility, choose **FARGATE**, Next step.
4. Choose **Configure via JSON**, copy and paste the following task definition JSON into the field and choose **Save**.

```
{
  "containerDefinitions": [
    {
      "command": [
        "sh",
        "+c",
        "sleep 5"
      ],
      "essential": true,
      "image": "amazonlinux:2",
      "name": "test-sleep"
    }
  ],
  "cpu": "256",
  "executionRoleArn": "arn:aws:iam::012345678910:role/ecsTaskExecutionRole",
  "family": "fargate-task-definition",
  "memory": "512",
  "networkMode": "awsvpc",
  "requiresCompatibilities": [
    "FARGATE"
  ]
}
```

5. Choose **Create, View task definition**.
6. For **Actions**, choose **Run Task**.
7. For Launch type, choose **FARGATE**. For **VPC and security groups**, choose a VPC and Subnets for the task to use and then choose **Run Task**.
8. For **Container name**, type **Wordpress**, for **Image**, type **wordpress**, and for **Maximum memory (MB)**, type **128**.
9. On the **Tasks** tab for your cluster, periodically choose the refresh icon until you no longer see your task running. To verify that your task has stopped, for **Desired task status**, choose **Stopped**.
10. Check your email to confirm that you have received an email alert for the stopped notification.
Amazon ECS troubleshooting

You may need to troubleshoot issues with your load balancers, tasks, services, or container instances. This chapter helps you find diagnostic information from the Amazon ECS container agent, the Docker daemon on the container instance, and the service event log in the Amazon ECS console.

Topics
- Using Amazon ECS Exec for debugging (p. 360)
- Checking stopped tasks for errors (p. 369)
- Stopped tasks error codes (p. 370)
- CannotPullContainer task errors (p. 373)
- Service event messages (p. 374)
- Invalid CPU or memory value specified (p. 376)
- Troubleshooting service load balancers (p. 377)
- Troubleshooting service auto scaling (p. 378)
- AWS Fargate throttling limits (p. 379)
- API failure reasons (p. 379)

Using Amazon ECS Exec for debugging

With Amazon ECS Exec, you can directly interact with containers without needing to first interact with the host container operating system, open inbound ports, or manage SSH keys. You can use ECS Exec to run commands in or get a shell to a container running on an Amazon EC2 instance or on AWS Fargate. This makes it easier to collect diagnostic information and quickly troubleshoot errors. For example, in a development context, you can use ECS Exec to easily interact with various process in your containers and troubleshoot your applications. And, in production scenarios, you can use it to gain break-glass access to your containers to debug issues.

You can run commands in a running Linux container using ECS Exec from the Amazon ECS API, AWS Command Line Interface (AWS CLI), AWS SDKs, or the AWS Copilot CLI. For details on using ECS Exec, as well as a video walkthrough, using the AWS Copilot CLI, see the Copilot Github documentation.

You can also use ECS Exec to maintain stricter access control policies and audit container access. By selectively turning on this feature, you can control who can run commands and on which tasks they can run those commands. With a log of each command and their output, you can use ECS Exec to audit which tasks were run and you can use CloudTrail to audit who accessed a container.

Architecture

ECS Exec makes use of AWS Systems Manager (SSM) Session Manager to establish a connection with the running container and uses AWS Identity and Access Management (IAM) policies to control access to running commands in a running container. This is made possible by bind-mounting the necessary SSM agent binaries into the container. The Amazon ECS or AWS Fargate agent is responsible for starting the SSM core agent inside the container alongside your application code. For more information, see AWS Systems Manager Session Manager.

You can audit which user accessed the container using AWS CloudTrail and log each command (and their output) to Amazon S3 or Amazon CloudWatch Logs. To encrypt data between the local client and container with your own encryption key, you must provide the AWS Key Management Service (AWS KMS) key.
Considerations for using ECS Exec

For this topic, you should be familiar with the following aspects involved with using ECS Exec:

- ECS Exec is only supported on Linux containers.
- ECS Exec is not currently supported using the AWS Management Console.
- ECS Exec is not currently supported in the Asia Pacific (Osaka) Region.
- If you are using interface Amazon VPC endpoints with Amazon ECS, you must create the interface Amazon VPC endpoints for Systems Manager Session Manager. For more information, see Create the Systems Manager endpoints (p. 309).
- You can't enable ECS Exec for existing tasks. It can only be enabled for new tasks.
- When a user runs commands on a container using ECS Exec, these commands are run as the root user. The SSM agent and its child processes run as root even when you specify a user ID for the container.
- The SSM agent requires that the container file system is able to be written to in order to create the required directories and files. Therefore, making the root file system read-only using the readonlyRootFilesystem task definition parameter, or any other method, isn't supported.
- Users can run all of the commands that are available within the container context. The following actions might result in orphaned and zombie processes: terminating the main process of the container, terminating the command agent, and deleting dependencies. To cleanup zombie processes, we recommend adding the initProcessEnabled flag to your task definition.
- While starting SSM sessions outside of the execute-command action is possible, this results in the sessions not being logged and being counted against the session limit. We recommend limiting this access by denying the ssm:start-session action using an IAM policy. For more information, see Limiting access to the Start Session action (p. 367).
- ECS Exec will use some CPU and memory. You'll want to accommodation for that when specifying the CPU and memory resource allocations in your task definition.

Prerequisites for using ECS Exec

Before you start using ECS Exec, make sure you that you have completed these actions:

- Install and configure the AWS CLI. For more information, see AWS Command Line Interface.
- Install Session Manager plugin for the AWS CLI. For more information, see Install the Session Manager plugin for the AWS CLI.
- ECS Exec has version requirements depending on whether your tasks are hosted on Amazon EC2 or AWS Fargate:
  - If you're using Amazon EC2, you must use an Amazon ECS optimized AMI that was released after January 20th, 2021, with an agent version of 1.50.2 or greater. For more information, see Amazon ECS optimized AMIs.
  - If you're using AWS Fargate, you must use platform version 1.4.0 or higher. For more information, see FARGATE: platform versions.

Enabling and using ECS Exec

IAM permissions required for ECS Exec

The ECS Exec feature requires a task IAM role to grant containers the permissions needed for communication between the managed SSM agent (execute-command agent) and the SSM service. For
more information, see Amazon ECS task IAM role. You should add the following permissions to a task IAM role and include the task IAM role in your task definition. For more information, see Adding and Removing IAM Policies.

Use the following policy for your task IAM role to add the required SSM permissions.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ssmmessages:CreateControlChannel",
        "ssmmessages:CreateDataChannel",
        "ssmmessages:OpenControlChannel",
        "ssmmessages:OpenDataChannel"
      ],
      "Resource": "*"
    }
  ]
}
```

Optional task definition changes

If you set the task definition parameter `initProcessEnabled` to `true`, this starts the init process inside the container, which removes any zombie SSM agent child processes found. The following provides an example.

```
{
  "taskRoleArn": "ecsTaskRole",
  "networkMode": "awsvpc",
  "requiresCompatibilities": ["EC2", "FARGATE"],
  "executionRoleArn": "ecsTaskExecutionRole",
  "memory": ".5 gb",
  "cpu": ".25 vcpu",
  "containerDefinitions": [
    {
      "name": "amazon-linux",
      "image": "amazonlinux:latest",
      "essential": true,
      "command": ["sleep","3600"],
      "linuxParameters": {
        "initProcessEnabled": true
      }
    }
  ],
  "family": "ecs-exec-task"
}
```

Enabling ECS Exec for your tasks and services

You can enable the ECS Exec feature for your services and standalone tasks by specifying the `--enable-execute-command` flag when using one of the following AWS CLI commands: `create-service`, `update-service`, `start-task`, or `run-task`.

For example, if you run the following command, the ECS Exec feature is enabled for a newly created service. For more information about creating services, see `create-service`.

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After you have enabled ECS Exec for a task, you can run the following command to confirm the task is ready to be used. If the `lastStatus` property of the `ExecuteCommandAgent` is listed as `RUNNING` and the `enableExecuteCommand` property is set to `true`, then your task is ready.

```bash
aws ecs describe-tasks
  --cluster cluster-name
  --tasks task-id
```

The following output snippet is an example of what you might see.

```json
{
  "tasks": [
    {
      ...
      "containers": [
        {
          ...
          "managedAgents": [
            {
              "lastStartedAt": "2021-03-01T14:49:44.574000-06:00",
              "name": "ExecuteCommandAgent",
              "lastStatus": "RUNNING"
            }
          ]
        }
      ],
      ...
      "enableExecuteCommand": true,
      ...
    }
  ]
}
```

### Running commands using ECS Exec

After you have confirmed the `ExecuteCommandAgent` is running, you can open an interactive shell on your container using the following command. If your task contains multiple containers, you must specify the container name using the `--container` flag. Amazon ECS only supports initiating interactive sessions, so you must use the `--interactive` flag.

The following command will run an interactive `/bin/sh` command against a container named `container-name` for a task with an id of `task-id`.

```bash
aws ecs execute-command
  --cluster cluster-name
  --task task-id
  --container container-name
  --interactive
  --command "/bin/sh"
```
Logging and Auditing using ECS Exec

Enabling logging and auditing in your tasks and services

Amazon ECS provides a default configuration for logging commands run using ECS Exec by sending logs to CloudWatch Logs using the `awslogs` log driver that's configured in your task definition. If you want to provide a custom configuration, the AWS CLI supports a `--configuration` flag for both the `create-cluster` and `update-cluster` commands. It's also important to know that the container image requires `script` and `cat` to be installed in order to have command logs uploaded correctly to Amazon S3 or CloudWatch Logs. For more information about creating clusters, see `create-cluster`.

**Note**
This configuration only handles the logging of the `execute-command` session. It doesn't affect logging of your application.

The following example creates a service and then logs the output to your CloudWatch Logs LogGroup named `cloudwatch-log-group-name` and your Amazon S3 bucket named `s3-bucket-name`.

```bash
aws ecs create-cluster
   --cluster-name cluster-name
   --configuration executeCommandConfiguration="{
      kmsKeyId=string, 
      logging=OVERRIDE, 
      logConfiguration={
         cloudWatchLogGroupName=cloudwatch-log-group-name, 
         cloudWatchEncryptionEnabled=true, 
         s3BucketName=s3-bucket-name, 
         s3EncryptionEnabled=true, 
         s3KeyPrefix=demo 
      }
   }
```

The `logging` property determines the behavior of the logging capability of ECS Exec:

- **NONE**: logging is disabled
- **DEFAULT**: logs are sent to the configured `awslogs` driver (If the driver isn't configured, then no log is saved.)
- **OVERRIDE**: logs are sent to the provided Amazon CloudWatch Logs LogGroup, Amazon S3 bucket, or both

**IAM permissions required for Amazon CloudWatch Logs or Amazon S3 Logging**

To enable logging, the Amazon ECS task role that's referenced in your task definition needs to have additional permissions. These additional permissions can be added as an inline policy to the task role. They are different depending on if you direct your logs to Amazon CloudWatch Logs or Amazon S3.

**Amazon CloudWatch Logs**

The following example inline policy adds the required Amazon CloudWatch Logs permissions.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": 
```
"logs:DescribeLogGroups"
],
"Resource": "*

},
{
   "Effect": "Allow",
   "Action": [
   "logs:CreateLogStream",
   "logs:DescribeLogStreams",
   "logs:PutLogEvents"
],
}
}

Amazon S3

The following example inline policy adds the required Amazon S3 permissions.

{
   "Version": "2012-10-17",
   "Statement": [
   {
      "Effect": "Allow",
      "Action": [
      "s3:GetBucketLocation"
      ],
      "Resource": "*
   },
   {
      "Effect": "Allow",
      "Action": [
      "s3:GetEncryptionConfiguration"
      ],
      "Resource": "arn:aws:s3:::s3-bucket-name"
   },
   {
      "Effect": "Allow",
      "Action": [
      "s3:PutObject"
      ],
      "Resource": "arn:aws:s3:::s3-bucket-name/*"
   }
   ]
}

IAM permissions required for encryption using your own KMS customer master key (CMK)

By default, the data transferred between your local client and the container uses TLS 1.2 encryption that AWS provides. To further encrypt data using your own CMK, you must create a CMK and add the kms:Decrypt permission to your task IAM role. This permission is used by your container to decrypt the data. For more information about creating a CMK, see Creating keys.

You would add the following inlining policy to your task IAM role which requires the AWS KMS permissions. For more information, see IAM permissions required for ECS Exec (p. 361).

{
   "Version": "2012-10-17",
   "Statement": [
   {
      "Effect": "Allow",
      "Action": [
      "kms:Decrypt"
      ],
   }
   ]
}
Using IAM policies to limit access to ECS Exec

You can limit user access to the execute-command API action by using one or more of the following IAM policy condition keys:

- aws:ResourceTag/\texttt{clusterTagKey}
- ecs:ResourceTag/\texttt{clusterTagKey}
- aws:ResourceTag/\texttt{taskTagKey}
- ecs:ResourceTag/\texttt{taskTagKey}
- ecs:container-name
- ecs:cluster
- ecs:task
- ecs:enable-execute-command

With the following example IAM policy, users can run commands in containers that are running within tasks with a tag that has an environment key and development value and in a cluster that's named cluster-name.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "ecs:ExecuteCommand",
            "Resource": "arn:aws:ecs:region:aws-account-id:task/cluster-name/*",
            "Condition": {
                "StringEquals": {
                    "ecs:ResourceTag/environment": "development"
                }
            }
        }
    ]
}
```
With the following IAM policy example, users can’t use the `execute-command` API when the container name is `production-app`.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Deny",
         "Action": [ "ecs:ExecuteCommand" ],
         "Resource": "*",
         "Condition": {
            "StringEquals": {
               "ecs:container-name": "production-app"
            }
         }
      }
   ]
}
```

With the following IAM policy, users can only launch tasks when ECS Exec is disabled.

```json
{
   "Version": "2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [ "ecs:RunTask", "ecs:StartTask", "ecs:CreateService", "ecs:UpdateService" ],
         "Resource": "*",
         "Condition": {
            "StringEquals": {
               "ecs:enable-execute-command": "false"
            }
         }
      }
   ]
}
```

**Note**
Because the `execute-command` API action contains only task and cluster resources in a request, only cluster and task tags are evaluated.

### Limiting access to the Start Session action

While starting SSM sessions on your container outside of ECS Exec is possible, this could potentially result in the sessions not being logged. Sessions started outside of ECS Exec also count against the session quota. We recommend limiting this access by denying the `ssm:start-session` action directly for your Amazon ECS tasks using an IAM policy. You can deny access to all Amazon ECS tasks or to specific tasks based on the tags used.
The following is an example IAM policy that denies access to the `ssm:start-session` action for tasks in all Regions with a specified cluster name. You can optionally include a wildcard with the `cluster-name`.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Deny",
      "Action": "ssm:StartSession",
      "Resource": "arn:aws:ecs:*:111122223333:task/cluster-name/*"
    }
  ]
}
```

The following is an example IAM policy that denies access to the `ssm:start-session` action on resources in all Regions tagged with tag key `Task-Tag-Key` and tag value `Exec-Task`.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Deny",
      "Action": "ssm:StartSession",
      "Resource": "*",
      "Condition": {
        "StringEquals": {
          "aws:ResourceTag/Task-Tag-Key": "Exec-Task"
        }
      }
    }
  ]
}
```

## Troubleshooting issues with ECS Exec

The following are troubleshooting notes to help diagnose why you may be getting an error when using ECS Exec.

### Verify using the Amazon ECS Exec Checker

The Amazon ECS Exec Checker script provides a way to verify and validate that your Amazon ECS cluster and task have met the prerequisites for using the ECS Exec feature. The tool requires the latest version of the AWS CLI and that the `jq` is available. For more information, see [Amazon ECS Exec Checker on GitHub](#).

### Error when calling `execute-command`

If a `The execute command failed` error occurs, the following are possible causes.

- The task does not have the required permissions. Verify that the task definition used to launch your task has a task IAM role defined and that the role has the required permissions. For more information, see [IAM permissions required for ECS Exec (p. 361)](#).
- The SSM Agent is not connected due to slowness or network latency. Wait and try the `execute-command` action again.
Checking stopped tasks for errors

If you have trouble starting a task, your task might be stopping because of an error. For example, you run the task and the task displays a PENDING status and then disappears. You can view stopped task errors like this in the Amazon ECS console by viewing the stopped task and inspecting it for error messages.

**Important**

Amazon ECS also sends task state change events to EventBridge which you can view if your stopped task has expired from view in the Amazon ECS console. For more information, see Task state change events (p. 240).

**To check stopped tasks for errors (AWS Management Console)**

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. On the **Clusters** page, select the cluster in which your stopped task resides.
3. On the **Cluster : clusternam**e page, choose **Tasks**.
4. In the **Desired task status** table header, choose **Stopped**, and then select the stopped task to inspect. The most recent stopped tasks are listed first.
5. In the **Details** section, inspect the **Stopped reason** field to see the reason that the task was stopped.

6. If you have a container that has stopped, expand the container and inspect the **Status reason** row to see what caused the task state to change.
In the previous example, the container image name cannot be found. This can happen if you misspell the image name.

If this inspection does not provide enough information, see Stopped tasks error codes (p. 370) for more information.

**To check stopped tasks for errors (AWS CLI)**

1. List the stopped tasks in a cluster. The output will contain the Amazon Resource Name (ARN) of the task, which you need to describe the task.

   ```
   aws ecs list-tasks \
   --cluster cluster_name \
   --desired-status STOPPED \
   --region us-west-2
   ```

2. Describe the stopped task to retrieve the stoppedReason in the response.

   ```
   aws ecs describe-tasks \
   --cluster cluster_name \
   --tasks arn:aws:ecs:us-west-2:account_id:task/cluster_name/task_ID \
   --region us-west-2
   ```

### Stopped tasks error codes

The following are the possible error messages you may receive when your Fargate task is stopped unexpectedly. The error messages are returned by the container agent and the prefix is dependent on the platform version the task is using.

To check your stopped tasks for an error message using the AWS Management Console, see Checking stopped tasks for errors (p. 369).

<table>
<thead>
<tr>
<th>Error message prefix in platform version 1.3 and prior</th>
<th>Error message prefix in platform version 1.4 and later</th>
<th>Details</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>DockerTimeoutError</td>
<td>ContainerRuntimeTimeoutError</td>
<td>This error occurs when a container was unable to transition to either a RUNNING or STOPPED</td>
<td>ContainerRuntimeTimeoutError: Could not transition to running; timed out</td>
</tr>
</tbody>
</table>

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### Stopped tasks error codes

<table>
<thead>
<tr>
<th>Error message prefix in platform version 1.3 and prior</th>
<th>Error message prefix in platform version 1.4 and later</th>
<th>Details</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>CannotStartContainerError</td>
<td>CannotStartContainerError</td>
<td>state within the timeout period. The reason and timeout value is provided in the error message.</td>
<td>after waiting 1m: <code>&lt;reason&gt;</code></td>
</tr>
<tr>
<td>CannotStopContainerError</td>
<td>CannotStopContainerError</td>
<td>This error occurs when a container is unable to be stopped.</td>
<td>CannotStopContainerError: failed to get container status: <code>&lt;reason&gt;</code></td>
</tr>
<tr>
<td>CannotInspectContainerError</td>
<td>CannotInspectContainerError</td>
<td>This error occurs when the container agent is unable to describe the container via the container runtime.</td>
<td>CannotInspectContainerError: <code>&lt;reason&gt;</code></td>
</tr>
<tr>
<td>ResourceInitializationError</td>
<td>ResourceInitializationError</td>
<td>This error occurs when the container agent for your Fargate task fails to create or bootstrap the resources required to start the container or the task is belongs to.</td>
<td>ResourceInitializationError: failed to initialize logging driver: <code>&lt;reason&gt;</code></td>
</tr>
</tbody>
</table>

*When using platform version 1.3 or prior, the ECS agent will return the reason from Docker.*

*When using platform version 1.4 or later, the Fargate agent will return the reason from containerd.*

*This error only occurs if using platform version 1.4.0 or later.*

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<table>
<thead>
<tr>
<th>Error message prefix in platform version 1.3 and prior</th>
<th>Error message prefix in platform version 1.4 and later</th>
<th>Details</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>CannotPullContainerError</td>
<td>CannotPullContainerError</td>
<td>This error occurs when the agent is unable to pull the container image specified in the task definition. For more information, see CannotPullContainer task errors (p. 373).</td>
<td>CannotPullContainerError: &lt;reason&gt;</td>
</tr>
<tr>
<td>CannotCreateVolumeError</td>
<td>CannotCreateVolumeError</td>
<td>This error occurs when the agent is unable to create the volume mount specified in the task definition. This error only occurs if using platform version 1.4 or later.</td>
<td>CannotCreateVolumeError: &lt;reason&gt;</td>
</tr>
<tr>
<td>ContainerRuntimeError</td>
<td>ContainerRuntimeError</td>
<td>This error occurs when the agent receives an unexpected error from containerd for a runtime-specific operation. This error is usually caused by an internal failure in the agent or the containerd runtime. This error only occurs if using platform version 1.4 or later.</td>
<td>ContainerRuntimeError: failed to create container IO set: &lt;reason&gt;</td>
</tr>
<tr>
<td>OutOfMemoryError</td>
<td>OutOfMemoryError</td>
<td>This error occurs when a container exits due to processes in the container consuming more memory than was allocated in the task definition.</td>
<td>OutOfMemoryError: container killed due to memory usage</td>
</tr>
<tr>
<td>InternalError</td>
<td>InternalError</td>
<td>This error occurs when the agent encounters an unexpected, non-runtime related internal error. This error only occurs if using platform version 1.4 or later.</td>
<td>InternalError: &lt;reason&gt;</td>
</tr>
</tbody>
</table>
CannotPullContainer task errors

The following errors indicate that when creating a task, the container image specified could not be retrieved.

Connection timed out

When a Fargate task is launched, its elastic network interface requires a route to the internet to pull container images. If you receive an error similar to the following when launching a task, it is because a route to the internet does not exist:

```
```

To resolve this issue, you can:
- For tasks in public subnets, specify ENABLED for Auto-assign public IP when launching the task. For more information, see Run a standalone task (p. 149).
- For tasks in private subnets, specify DISABLED for Auto-assign public IP when launching the task, and configure a NAT gateway in your VPC to route requests to the internet. For more information, see NAT Gateways in the Amazon VPC User Guide. For more information about creating a VPC with public and private subnets, including a NAT gateway for the private subnets, see Tutorial: Creating a VPC with Public and Private Subnets for Your Clusters (p. 525).

Context canceled

The common cause for this error is because the VPC your task is using does not have a route to pull the container image from Amazon ECR.

Image not found

When you specify an Amazon ECR image in your container definition, you must use the full URI of your ECR repository along with the image name in that repository. If the repository or image cannot be found, you receive the following error:

```
CannotPullContainerError: API error (404): repository 111122223333.dkr.ecr.us-east-1.amazonaws.com/<repo>/<image> not found
```

To resolve this issue, verify the repository URI and the image name. Also ensure that you have set up the proper access using the task execution IAM role. For more information about the task execution role, see Amazon ECS task execution IAM role (p. 290).

Insufficient disk space

If the root volume of your container instance has insufficient disk space when pulling the container image, you see an error similar to the following:

```
CannotPullContainerError: write /var/lib/docker/tmp/GetImageBlob1111111111: no space left on device
```

To resolve this issue, free up disk space.

If you are using the Amazon ECS-optimized AMI, you can use the following command to retrieve the 20 largest files on your filesystem:

```
du -Sh / | sort -hr | head -20
```

Example output:
In some cases, like this example above, the root volume may be filled out by a running container. If the container is using the default `json-file` log driver without a `max-size` limit, it may be that the log file is responsible for most of that space used. You can use the `docker ps` command to verify which container is using the space by mapping the directory name from the output above to the container ID. For example:

<table>
<thead>
<tr>
<th>CONTAINER ID</th>
<th>IMAGE</th>
<th>COMMAND</th>
<th>CREATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>50501b5f4cbf</td>
<td>amazon/amazon-ecs-agent:latest</td>
<td>&quot;/agent&quot;</td>
<td>4 days ago</td>
</tr>
<tr>
<td></td>
<td>Up 4 days</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By default, when using the `json-file` log driver, Docker captures the standard output (and standard error) of all of your containers and writes them in files using the JSON format. You are able to set the `max-size` as a log driver option, which prevents the log file from taking up too much space. For more information, see Configure logging drivers in the Docker documentation.

The following is a container definition snippet showing how to use this option:

```json
{
    "log-driver": "json-file",
    "log-opt": {
        "max-size": "256m"
    }
}
```

An alternative if your container logs are taking up too much disk space is to use the `awslogs` log driver. The `awslogs` log driver sends the logs to CloudWatch, which frees up the disk space that would otherwise be used for your container logs on the container instance. For more information, see Using the `awslogs` log driver (p. 106).

Docker Hub rate limiting

If you receive one of the following errors, you are likely hitting the Docker Hub rate limits:

**ERROR: too many requests: Too Many Requests.**

You have reached your pull rate limit. You may increase the limit by authenticating and upgrading: https://www.docker.com/increase-rate-limits.

For more information on the Docker Hub rate limits, see Understanding Docker Hub rate limiting.

## Service event messages

When troubleshooting a problem with a service, the first place you should check for diagnostic information is the service event log. You can view service events using the DescribeServices API, the AWS CLI, or by using the AWS Management Console.

When viewing service event messages using the Amazon ECS API, only the events from the service scheduler are returned. These include the most recent task placement and instance health events. However, the Amazon ECS console displays service events from the following sources.
Service event messages

- Task placement and instance health events from the Amazon ECS service scheduler. These events will have a prefix of `service (service-name)`. To ensure that this event view is helpful, we only show the 100 most recent events and duplicate event messages are omitted until either the cause is resolved or six hours passes. If the cause is not resolved within six hours, you will receive another service event message for that cause.

- Service Auto Scaling events. These events will have a prefix of `Message`. The 10 most recent scaling events are shown. These events only occur when a service is configured with an Application Auto Scaling scaling policy.

Use the following steps to view your current service event messages.

**Viewing service event messages (AWS Management Console)**

To view the service event log in the Amazon ECS console

1. Open the Amazon ECS console at https://console.aws.amazon.com/ecs/.
2. On the Clusters page, select the cluster in which your service resides.
3. On the Cluster: clustername page, select the service to inspect.

5. Examine the Message column for errors or other helpful information.

**Viewing service event messages (AWS CLI)**

Use the describe-services command to view the service event messages for a specified service.

The following AWS CLI example describes the `service-name` service in the `default` cluster, which will provide the latest service event messages.

```
aws ecs describe-services \
  --cluster default \
  --services service-name \
  --region us-west-2
```
Service event messages

The following are examples of service event messages you may see in the Amazon ECS console.

**service (service-name) is unable to consistently start tasks successfully.**

This service contains tasks that have failed to start after consecutive attempts. At this point, the service scheduler begins to incrementally increase the time between retries. You should troubleshoot why your tasks are failing to launch. For more information, see Service throttle logic (p. 220).

After the service is updated, for example with an updated task definition, the service scheduler resumes normal behavior.

**service (service-name) operations are being throttled. Will try again later.**

This service is unable to launch more tasks due to API throttling limits. Once the service scheduler is able to launch more tasks, it will resume.

To request an API rate limit quota increase, open the AWS Support Center page, sign in if necessary, and choose Create case. Choose Service limit increase. Complete and submit the form.

**service (service-name) was unable to stop or start tasks during a deployment because of the service deployment configuration. Update the minimumHealthyPercent or maximumPercent value and try again.**

This service is unable to stop or start tasks during a service deployment due to the deployment configuration. The deployment configuration consists of the minimumHealthyPercent and maximumPercent values which are defined when the service is created, but can also be updated on an existing service.

The minimumHealthyPercent represents the lower limit on the number of tasks that should be running for a service during a deployment or when a container instance is draining, as a percent of the desired number of tasks for the service. This value is rounded up. For example if the minimum healthy percent is 50 and the desired task count is four, then the scheduler can stop two existing tasks before starting two new tasks. Likewise, if the minimum healthy percent is 75% and the desired task count is two, then the scheduler can't stop any tasks due to the resulting value also being two.

The maximumPercent represents the upper limit on the number of tasks that should be running for a service during a deployment or when a container instance is draining, as a percent of the desired number of tasks for a service. This value is rounded down. For example if the maximum percent is 200 and the desired task is four then scheduler can start four new tasks before stopping four existing tasks. Likewise, if the maximum percent is 125 and the desired task count is three, the scheduler can't start any tasks due to the resulting value also being three.

When setting a minimum healthy percent or a maximum percent, you should ensure that the scheduler can stop or start at least one task when a deployment is triggered.

Invalid CPU or memory value specified

When registering a task definition using the Amazon ECS API or AWS CLI, if you specify an invalid cpu or memory value, the following error is returned.

```
An error occurred (ClientException) when calling the RegisterTaskDefinition operation: 
Invalid 'cpu' setting for task. For more information, see the Troubleshooting section of the Amazon ECS Developer Guide.
```

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Note
When using Terraform, the following error may be returned.

**Error: ClientException: No Fargate configuration exists for given values.**

To resolve this issue, you must specify a supported value for the task CPU and memory in your task definition. The `cpu` value can be expressed in CPU units or vCPUs in a task definition but is converted to an integer indicating the CPU units when the task definition is registered. The `memory` value can be expressed in MiB or GB in a task definition but is converted to an integer indicating the MiB when the task definition is registered.

For task definitions that only specify EC2 for the `requiresCompatibilities` parameter, the supported CPU values are between 128 CPU units (0.125 vCPUs) and 1024 CPU units (10 vCPUs). The memory value must be an integer and the limit is dependent upon the amount of available memory on the underlying Amazon EC2 instance you use.

For task definitions that specify FARGATE for the `requiresCompatibilities` parameter (even if EC2 is also specified), you must use one of the values in the following table, which determines your range of supported values for the CPU and memory parameter.

Supported task CPU and memory values for tasks hosted on Fargate are as follows.

<table>
<thead>
<tr>
<th>CPU value</th>
<th>Memory value (MiB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>256 (.25 vCPU)</td>
<td>512 (0.5GB), 1024 (1GB), 2048 (2GB)</td>
</tr>
<tr>
<td>512 (.5 vCPU)</td>
<td>1024 (1GB), 2048 (2GB), 3072 (3GB), 4096 (4GB)</td>
</tr>
<tr>
<td>1024 (1 vCPU)</td>
<td>2048 (2GB), 3072 (3GB), 4096 (4GB), 5120 (5GB), 6144 (6GB), 7168 (7GB), 8192 (8GB)</td>
</tr>
<tr>
<td>2048 (2 vCPU)</td>
<td>Between 4096 (4GB) and 16384 (16GB) in increments of 1024 (1GB)</td>
</tr>
<tr>
<td>4096 (4 vCPU)</td>
<td>Between 8192 (8GB) and 30720 (30GB) in increments of 1024 (1GB)</td>
</tr>
</tbody>
</table>

**Troubleshooting service load balancers**

Amazon ECS services can register tasks with an Elastic Load Balancing load balancer. Load balancer configuration errors are common causes for stopped tasks. If your stopped tasks were started by services that use a load balancer, consider the following possible causes.

**Important**

Container health checks are not supported for tasks that are part of a service that is configured to use a Classic Load Balancer. The Amazon ECS service scheduler ignores tasks in an **UNHEALTHY** state that are behind a Classic Load Balancer.

**Container instance security group**

If your container is mapped to port 80 on your container instance, your container instance security group must allow inbound traffic on port 80 for the load balancer health checks to pass.

**Elastic Load Balancing load balancer not configured for all Availability Zones**

Your load balancer should be configured to use all of the Availability Zones in a region, or at least all of the Availability Zones in which your container instances reside. If a service uses a load balancer
and starts a task on a container instance that resides in an Availability Zone that the load balancer is not configured to use, the task never passes the health check and it is killed.

Elastic Load Balancing load balancer health check misconfigured

The load balancer health check parameters can be overly restrictive or point to resources that do not exist. If a container instance is determined to be unhealthy, it is removed from the load balancer. Be sure to verify that the following parameters are configured correctly for your service load balancer.

Ping Port

The *Ping Port* value for a load balancer health check is the port on the container instances that the load balancer checks to determine if it is healthy. If this port is misconfigured, the load balancer likely deregisters your container instance from itself. This port should be configured to use the *hostPort* value for the container in your service’s task definition that you are using with the health check.

Ping Path

This value is often set to *index.html*, but if your service does not respond to that request, then the health check fails. If your container does not have an *index.html* file, you can set this to / to target the base URL for the container instance.

Response Timeout

This is the amount of time that your container has to return a response to the health check ping. If this value is lower than the amount of time required for a response, the health check fails.

Health Check Interval

This is the amount of time between health check pings. The shorter your health check intervals are, the faster your container instance can reach the *Unhealthy Threshold*.

Unhealthy Threshold

This is the number of times your health check can fail before your container instance is considered unhealthy. If you have an unhealthy threshold of 2, and a health check interval of 30 seconds, then your task has 60 seconds to respond to the health check ping before it is assumed unhealthy. You can raise the unhealthy threshold or the health check interval to give your tasks more time to respond.

Unable to update the service *servicename*: Load balancer container name or port changed in task definition

If your service uses a load balancer, the load balancer configuration defined for your service when it was created cannot be changed. If you update the task definition for the service, the container name and container port that were specified when the service was created must remain in the task definition.

To change the load balancer name, the container name, or the container port associated with a service load balancer configuration, you must create a new service.

Troubleshooting service auto scaling

Service auto scaling and deployments

As a best practice to prevent scale in processes from behaving like scale out processes, suspend dynamic scaling during deployments. This will prevent alarms from triggering scale in and scale out processes that depend on the running task count. Take the following steps to avoid this issue.

1. Call the `describe-scalable-targets` command, specifying the resource ID of the ECS service associated with the scalable target in Application Auto Scaling (Example: `service/default/sample-webapp`). Record the output. You will need it when you call the next command.
2. Call the `register-scalable-target` command, specifying the resource ID, namespace, and scalable dimension. Specify `true` for both `DynamicScalingInSuspended` and `DynamicScalingOutSuspended`.

3. After deployment is complete, you can call the `register-scalable-target` command to resume scaling.

For more information, see [Suspending and Resuming Scaling for Application Auto Scaling](#).

### AWS Fargate throttling limits

AWS Fargate throttles Amazon ECS `RunTask` API requests for each AWS account on a per-Region basis. We do this to help the performance of the service, and to ensure fair usage for all Fargate customers. Throttling ensures that calls to the launch tasks do not exceed the maximum allowed API request limits. API calls are subject to the request limits whether they originate from the Amazon ECS console, a command line tool, or a third-party application.

When the `RunTask` API throttling limit is reached, you will get the following exception:

```
An error occurred (ThrottlingException) when calling the RunTask operation (reached max retries: 4): Rate exceeded.
```

To request an API rate limit quota increase, complete the following steps.

**To request a rate limit increase**

1. Open the [AWS Support Center](#).
2. Choose [Create case](#), [Service limit increase](#).
3. For **Limit type**, select [Fargate](#).
4. For **Region**, select the region you want to submit the rate limit increase for.
5. For **Limit**, choose [Concurrent Task Limit](#).
6. For **Use case description**, describe your use case concerning the `RunTask` API throttle limit so support can assist you further.

### API failure reasons

When an API action that you have triggered through the Amazon ECS API, console, or the AWS CLI exits with a `failures` error message, the following may assist in troubleshooting the cause. The failure will return a reason and the Amazon Resource Name (ARN) of the resource associated with the failure.

Many resources are Region-specific, so when using the console ensure that you set the correct Region for your resources. When using the AWS CLI, make sure that your AWS CLI commands are being sent to the correct region with the `--region` parameter.

For more information about the structure of the `Failure` data type, see [Failure](#) in the [Amazon Elastic Container Service API Reference](#).

<table>
<thead>
<tr>
<th>API action</th>
<th>Failure reason</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>DescribeClusters</td>
<td>MISSING</td>
<td>The specified cluster was not found. Verify the spelling of the cluster name.</td>
</tr>
<tr>
<td>API action</td>
<td>Failure reason</td>
<td>Cause</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>DescribeServices</td>
<td>MISSING</td>
<td>The specified service was not found. Verify the correct cluster or region has been specified and that the service ARN or name is valid.</td>
</tr>
<tr>
<td>DescribeTasks</td>
<td>MISSING</td>
<td>The specified task was not found. Verify the correct cluster or region has been specified and that the task ARN or ID is valid.</td>
</tr>
</tbody>
</table>
## Document history

The following table describes the major updates and new features for the *Amazon ECS User Guide for AWS Fargate*. We also update the documentation frequently to address the feedback that you send us.

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon ECS Exec</td>
<td>Amazon ECS has released a new debugging tool called ECS Exec. For more information, see <em>Using Amazon ECS Exec for debugging</em> (p. 360).</td>
<td>15 March 2021</td>
</tr>
<tr>
<td>New console experience</td>
<td>Amazon ECS has released a new console experience which supports creating or updating a service or running a standalone task. For more information, see <em>Creating a service using the new console</em> (p. 170) and <em>Run a standalone task</em> (p. 149).</td>
<td>28 December 2020</td>
</tr>
<tr>
<td>AWS Fargate platform version 1.4.0 update</td>
<td>Beginning on November 5, 2020, any new Fargate task that is launched using platform version 1.4.0 will have access to the following features. For more information, see <em>1.4.0</em> (p. 43).&lt;br&gt;• When using Secrets Manager to store sensitive data, you can inject a specific JSON key or a specific version of a secret as an environment variable or in a log configuration. For more information, see <em>Specifying sensitive data using Secrets Manager</em> (p. 126).&lt;br&gt;• Specify environment variables in bulk using the environmentFiles container definition parameter. For more information, see <em>Specifying environment variables</em> (p. 136).&lt;br&gt;• Tasks run in a VPC and subnet enabled for IPv6 will be assigned both a private IPv4 address and an IPv6 address. For more information, see <em>Fargate task networking</em> in the <em>Amazon Elastic Container Service User Guide for AWS Fargate</em>.&lt;br&gt;• The task metadata endpoint version 4 provides additional metadata about your task and container including the task launch type, the Amazon Resource Name (ARN) of the container, and the log driver and log driver options used. When querying the /stats endpoint you also receive network rate stats for your containers. For more information, see <em>Task metadata endpoint version 4</em> in the <em>Amazon Elastic Container Service User Guide for AWS Fargate</em>.</td>
<td>5 November 2020</td>
</tr>
<tr>
<td>Fargate usage metrics</td>
<td>AWS Fargate provides CloudWatch usage metrics which provide visibility into your accounts usage of Fargate On-Demand and Fargate Spot resources. For more information, see <em>AWS Fargate usage metrics</em> (p. 237).</td>
<td>3 August 2020</td>
</tr>
<tr>
<td>AWS Copilot version 0.1.0</td>
<td>The new AWS Copilot CLI launched, providing high-level commands to simplify modeling, creating, releasing, and managing containerized applications on Amazon.</td>
<td>9 July 2020</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date</td>
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<tr>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>ECS from a local development environment. For more information, see Using the AWS Copilot command line interface (p. 21).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWS Fargate platform versions deprecation schedule</td>
<td>The Fargate platform version deprecation schedule has been added. For more information, see AWS Fargate platform version deprecation (p. 46).</td>
<td>8 July 2020</td>
</tr>
<tr>
<td>AWS Fargate Region expansion</td>
<td>Amazon ECS on AWS Fargate has expanded to the Europe (Milan) Region.</td>
<td>25 June 2020</td>
</tr>
<tr>
<td>AWS Fargate platform version 1.4.0 update</td>
<td>Beginning on May 28, 2020, any new Fargate task that is launched using platform version 1.4.0 will have its 20 GB ephemeral storage encrypted with an AES-256 encryption algorithm using an AWS Fargate-managed encryption key. For more information, see Using data volumes in tasks (p. 95).</td>
<td>28 May 2020</td>
</tr>
<tr>
<td>AWS Fargate Region expansion</td>
<td>AWS Fargate with Amazon ECS has expanded to the Africa (Cape Town) Region.</td>
<td>11 May 2020</td>
</tr>
<tr>
<td>Service quota updated</td>
<td>The following service quota was updated:</td>
<td>17 April 2020</td>
</tr>
<tr>
<td></td>
<td>- Clusters per account was raised from 2,000 to 10,000.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see Amazon ECS service quotas (p. 226).</td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>AWS Fargate platform version 1.4.0</td>
<td>AWS Fargate platform version 1.4.0 is released, which contains the following features:</td>
<td>8 April 2020</td>
</tr>
<tr>
<td></td>
<td>• Added support for using Amazon EFS file system volumes for persistent task storage. For more information, see Amazon EFS volumes (p. 96).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The ephemeral task storage has been increased to 20 GB. For more information, see Using data volumes in tasks (p. 95).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The network traffic behavior to and from tasks has been updated. Starting with platform version 1.4.0, all Fargate tasks receive a single elastic network interface, referred to as the task ENI. All network traffic flows through that ENI within your VPC and will be visible to you through your VPC flow logs. For more information, see Fargate task networking (p. 104).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Task ENIs add support for jumbo frames. Network interfaces are configured with a maximum transmission unit (MTU), which is the size of the largest payload that fits within a single frame. The larger the MTU, the larger the application payload that can fit within a single frame, which reduces per-frame overhead and increases efficiency. Supporting jumbo frames reduces overhead when the network path between your task and the destination supports jumbo frames, such as all traffic that remains within your VPC.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CloudWatch Container Insights will include network performance metrics for Fargate tasks. For more information, see Amazon ECS CloudWatch Container Insights (p. 249).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Added support for the task metadata endpoint v4, which provides additional information for your Fargate tasks, including network stats for the task and which Availability Zone the task is running in. For more information, see Task metadata endpoint version 4 (p. 310).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Added support for the SYS_PTRACE Linux parameter in container definitions. For more information, see Linux Parameters (p. 82).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Fargate container agent replaces the use of the Amazon ECS container agent for all Fargate tasks. This change should not affect how your tasks run.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The container runtime is now using Containerd instead of Docker. This change should not affect how your tasks run. You may notice that some error messages that originate with the container runtime are more general and do not mention Docker.</td>
<td></td>
</tr>
</tbody>
</table>

For more information, see AWS Fargate platform versions (p. 43).
<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon EFS file system support for task volumes</td>
<td>Amazon EFS file systems can be used as data volumes for your Fargate tasks. For more information, see Amazon EFS volumes (p. 96).</td>
<td>8 April 2020</td>
</tr>
<tr>
<td>Amazon ECS Task Metadata Endpoint version 4</td>
<td>Beginning with Fargate platform version 1.4.0, an environment variable named ECS_CONTAINER_METADATA_URI_V4 is injected into each container in a task. When you query the task metadata version 4 endpoint, various task metadata and Docker stats are available to tasks. For more information, see Task metadata endpoint version 4 (p. 310).</td>
<td>8 April 2020</td>
</tr>
<tr>
<td>Fargate Spot</td>
<td>Amazon ECS added support for running tasks using Fargate Spot. For more information, see AWS Fargate capacity providers (p. 51).</td>
<td>3 Dec 2019</td>
</tr>
<tr>
<td>Service Action Events</td>
<td>Amazon ECS now sends events to Amazon EventBridge when certain service actions occur. For more information, see Service action events (p. 242).</td>
<td>25 Nov 2019</td>
</tr>
<tr>
<td>FireLens for Amazon ECS</td>
<td>FireLens for Amazon ECS is in general availability. FireLens for Amazon ECS enables you to use task definition parameters to route logs to an AWS service or partner destination for log storage and analytics. For more information, see Custom log routing (p. 112).</td>
<td>30 Sept 2019</td>
</tr>
<tr>
<td>AWS Fargate Region expansion</td>
<td>AWS Fargate with Amazon ECS has expanded to the Europe (Paris), Europe (Stockholm), and Middle East (Bahrain) Regions.</td>
<td>30 Sept 2019</td>
</tr>
<tr>
<td>FireLens for Amazon ECS</td>
<td>FireLens for Amazon ECS is in public preview. FireLens for Amazon ECS enables you to use task definition parameters to route logs to an AWS service or partner destination for log storage and analytics. For more information, see Custom log routing (p. 112).</td>
<td>30 Aug 2019</td>
</tr>
<tr>
<td>CloudWatch Container Insights</td>
<td>CloudWatch Container Insights is now generally available. It enables you to collect, aggregate, and summarize metrics and logs from your containerized applications and microservices. For more information, see Amazon ECS CloudWatch Container Insights (p. 249).</td>
<td>30 Aug 2019</td>
</tr>
<tr>
<td>AWS Fargate Region expansion</td>
<td>AWS Fargate with Amazon ECS has expanded to the Asia Pacific (Hong Kong) Region.</td>
<td>06 Aug 2019</td>
</tr>
<tr>
<td>Registering Multiple Target Groups with a Service</td>
<td>Added support for specifying multiple target groups in a service definition. For more information, see Registering multiple target groups with a service (p. 207).</td>
<td>30 July 2019</td>
</tr>
<tr>
<td>CloudWatch Container Insights</td>
<td>Amazon ECS has added support for CloudWatch Container Insights. For more information, see Amazon ECS CloudWatch Container Insights (p. 249).</td>
<td>9 July 2019</td>
</tr>
<tr>
<td>Resource-level permissions for Amazon ECS services and tasksets</td>
<td>Amazon ECS has expanded resource-level permissions support for Amazon ECS services and tasks. For more information, see How Amazon Elastic Container Service Works with IAM (p. 258).</td>
<td>27 June 2019</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date</td>
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<td>--------</td>
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</tr>
<tr>
<td><strong>AWS Fargate platform version 1.3.0 update</strong></td>
<td>Beginning on May 1, 2019, any new Fargate task that is launched supports the splunk log driver in addition to the awlogs log driver. For more information, see Storage and Logging (p. 76).</td>
<td>1 May 2019</td>
</tr>
<tr>
<td><strong>AWS Fargate platform version 1.3.0 update</strong></td>
<td>Beginning on May 1, 2019, any new Fargate task that is launched supports referencing sensitive data in the log configuration of a container using the secretOptions container definition parameter. For more information, see Specifying sensitive data (p. 125).</td>
<td>1 May 2019</td>
</tr>
<tr>
<td><strong>AWS Fargate platform version 1.3.0 update</strong></td>
<td>Beginning on April 2, 2019, any new Fargate task that is launched supports injecting sensitive data into your containers by storing your sensitive data in either AWS Secrets Manager secrets or AWS Systems Manager Parameter Store parameters and then referencing them in your container definition. For more information, see Specifying sensitive data (p. 125).</td>
<td>2 Apr 2019</td>
</tr>
<tr>
<td><strong>AWS Fargate platform version 1.3.0 update</strong></td>
<td>Beginning on March 27, 2019, any new Fargate task can use additional task definition parameters that enable you to define a proxy configuration, dependencies for container startup and shutdown as well as a per-container start and stop timeout value. For more information, see Proxy configuration (p. 90), Container dependency (p. 83), and Container timeouts (p. 84).</td>
<td>27 Mar 2019</td>
</tr>
<tr>
<td><strong>Amazon ECS introduces the external deployment type</strong></td>
<td>The external deployment type enables you to use any third-party deployment controller for full control over the deployment process for an Amazon ECS service. For more information, see External Deployment (p. 192).</td>
<td>27 Mar 2019</td>
</tr>
<tr>
<td><strong>Amazon ECS introduces the PutAccountSettingDefault API</strong></td>
<td>Amazon ECS introduces the PutAccountSettingDefault API that allows a user to set the default ARN/ID format opt in status for all the IAM users and roles on the account. Previously, setting the account's default opt in status required the use of the root user. For more information, see Amazon Resource Names (ARNs) and IDs (p. 144).</td>
<td>8 Feb 2019</td>
</tr>
<tr>
<td><strong>Interface VPC Endpoints (AWS PrivateLink)</strong></td>
<td>Added support for configuring interface VPC endpoints powered by AWS PrivateLink. This allows you to create a private connection between your VPC and Amazon ECS without requiring access over the Internet, through a NAT instance, a VPN connection, or AWS Direct Connect. For more information, see Interface VPC Endpoints (AWS PrivateLink).</td>
<td>26 Dec 2018</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date</td>
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</tbody>
</table>
| AWS Fargate platform version 1.3.0 | New AWS Fargate platform version released, which contains:  
  • Added support for using AWS Systems Manager Parameter Store parameters to inject sensitive data into your containers.  
  For more information, see Specifying sensitive data (p. 125).  
  • Added task recycling for Fargate tasks, which is the process of refreshing tasks that are a part of an Amazon ECS service.  
  For more information, see Fargate task recycling (p. 156).  
  For more information, see AWS Fargate platform versions (p. 43). | 17 Dec 2018 |
| AWS Fargate Region expansion | AWS Fargate with Amazon ECS has expanded to the Asia Pacific (Mumbai) and Canada (Central) Regions. | 07 Dec 2018 |
| Amazon ECS blue/green deployments | Amazon ECS added support for blue/green deployments using CodeDeploy. This deployment type allows you to verify a new deployment of a service before sending production traffic to it.  
  For more information, see Blue/Green deployment with CodeDeploy (p. 188). | 27 Nov 2018 |
| Resource tagging | Amazon ECS added support for adding metadata tags to your services, task definitions, tasks, clusters, and container instances.  
  For more information, see Resources and tags (p. 222). | 15 Nov 2018 |
| AWS Fargate Region expansion | AWS Fargate with Amazon ECS has expanded to the US West (N. California) and Asia Pacific (Seoul) Regions.  
  For more information, see AWS Fargate platform versions (p. 43). | 07 Nov 2018 |
| Service limits updated | The following service limits were updated:  
  • Number of tasks using the Fargate launch type, per Region, per account was raised from 20 to 50.  
  • Number of public IP addresses for tasks using the Fargate launch type was raised from 20 to 50.  
  For more information, see Amazon ECS service quotas (p. 226). | 31 Oct 2018 |
<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS Fargate Region expansion</td>
<td>AWS Fargate with Amazon ECS has expanded to the Europe (London) Region. For more information, see AWS Fargate platform versions (p. 43).</td>
<td>26 Oct 2018</td>
</tr>
<tr>
<td>Private registry authentication support for Amazon ECS using AWS Fargate tasks</td>
<td>Amazon ECS introduced support for Fargate tasks using private registry authentication using AWS Secrets Manager. This feature enables you to store your credentials securely and then reference them in your container definition, which allows your tasks to use private images. For more information, see Private registry authentication for tasks (p. 123).</td>
<td>10 Sept 2018</td>
</tr>
</tbody>
</table>
| Amazon ECS CLI v1.8.0                       | New version of the Amazon ECS CLI released, which added the following functionality:  
  • Added support for Docker volumes in Docker compose files.  
  • Added support for task placement constraints and strategies in Docker compose files.  
  • Added support for private registry authentication in Docker compose files.  
  • Added support for --force-update on compose up to force relaunching of tasks.  
  For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide.                           | 7 Sept 2018   |
| Amazon ECS service discovery Region expansion | Amazon ECS service discovery has expanded support to the Asia Pacific (Singapore), Asia Pacific (Sydney), Asia Pacific (Tokyo), EU (Frankfurt), and Europe (London) Regions.  
  For more information, see Service Discovery (p. 217).                                                                                     | 30 August 2018|
<p>| Scheduled tasks with Fargate tasks support  | Amazon ECS introduced support for scheduled tasks for the Fargate launch type. For more information, see Scheduled tasks (cron) (p. 152).                                                              | 28 August 2018|
| AWS Fargate Region expansion                | AWS Fargate with Amazon ECS has expanded to the Europe (Frankfurt), Asia Pacific (Singapore), and Asia Pacific (Sydney) Regions. For more information, see AWS Fargate platform versions (p. 43). | 19 July 2018  |</p>
<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
</table>
| Amazon ECS CLI v1.7.0 | New version of the Amazon ECS CLI released, which added the following functionality:  
  - Added support for container healthcheck and devices in Docker compose files. For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide. | 18 July 2018 |
| Amazon ECS service scheduler strategies added | Amazon ECS introduced the concept of service scheduler strategies.  
  There are two service scheduler strategies available:  
  - REPLICA—The replica scheduling strategy places and maintains the desired number of tasks across your cluster. By default, the service scheduler spreads tasks across Availability Zones. You can use task placement strategies and constraints to customize task placement decisions. For more information, see Replica (p. 158).  
  - DAEMON—The daemon scheduling strategy deploys exactly one task on each active container instance that meets all of the task placement constraints that you specify in your cluster. The service scheduler evaluates the task placement constraints for running tasks and will stop tasks that do not meet the placement constraints. When using this strategy, there is no need to specify a desired number of tasks, a task placement strategy, or use Service Auto Scaling policies. For more information, see Daemon in the Amazon Elastic Container Service Developer Guide.  
  **Note**  
  Fargate tasks do not support the DAEMON scheduling strategy. For more information, see Service scheduler concepts (p. 157). | 12 June 2018 |
| Amazon ECS CLI v1.6.0 | New version of the Amazon ECS CLI released, which added the following functionality:  
  - Added support for Docker compose file syntax version 3. For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide. | 5 June 2018 |
<p>| AWS Fargate Region expansion | AWS Fargate with Amazon ECS has expanded to the US East (Ohio), US West (Oregon), and EU West (Ireland) Regions. For more information, see AWS Fargate platform versions (p. 43). | 26 April 2018 |</p>
<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
</table>
| Amazon ECS CLI v1.5.0           | New version of the Amazon ECS CLI released, which added the following functionality:  
  • Added support for the ECS CLI to automatically retrieve the latest stable Amazon ECS-optimized AMI by querying the Systems Manager Parameter Store API during the cluster resource creation process. This requires the user account that you are using to have the required Systems Manager permissions.  
  • Added support for the `shm_size` and `tmpfs` parameters in compose files.  
  For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide.                                                                 | 19 April 2018 |
| Amazon ECS CLI download verification | Added new PGP signature method for verifying the Amazon ECS CLI installation file. For more information, see Installing the Amazon ECS CLI (p. 27).                                                                                                                                   | 5 April 2018  |
| AWS Fargate Platform Version    | New AWS Fargate platform version released, which contains:  
  • Added support for Amazon ECS task metadata endpoint (p. 310).  
  • Added support for Health Check (p. 71).  
  • Added support for Service Discovery (p. 217)  
  For more information, see AWS Fargate platform versions (p. 43).                                                                                                                                                               | 26 March 2018 |
| Amazon ECS Service Discovery     | Added integration with Route 53 to support Amazon ECS service discovery. For more information, see Service Discovery (p. 217).                                                                                                                                                        | 22 March 2018 |
| Amazon ECS CLI v1.4.2            | New version of the Amazon ECS CLI released, which added the following functionality:  
  • Updated the AMI to `amzn-ami-2017.09.k-amazon-ecs-optimized`.  
  For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide.                                                                                                 | 20 March 2018 |
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| Amazon ECS CLI v1.4.0 | New version of the Amazon ECS CLI released, which added the following functionality:  
• Added support for the us-gov-west-1 Region.  
• Added --force-deployment flag for the compose service command.  
• Added support for aws_session_token in ECS profiles.  
• Updated the AMI to amzn-ami-2017.09.j-amazon-ecs-optimized.  
For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide. | 09 March 2018 |
| Container Health Checks | Added support for Docker health checks in container definitions. For more information, see Health Check (p. 71). | 08 March 2018 |
| Amazon ECS Task Metadata Endpoint | Beginning with version 1.17.0 of the Amazon ECS container agent, various task metadata and Docker stats are available to tasks that use the awsvpc network mode at an HTTP endpoint that is provided by the Amazon ECS container agent. For more information, see Amazon ECS task metadata endpoint (p. 310). | 8 February 2018 |
| Amazon ECS Service Auto Scaling using target tracking policies | Added support for ECS Service Auto Scaling using target tracking policies in the Amazon ECS console. For more information, see Target Tracking Scaling Policies (p. 211).  
Removed the previous tutorial for step scaling in the ECS first run wizard. This was replaced with the new tutorial for target tracking. | 8 February 2018 |
| Amazon ECS CLI v1.3.0 | New version of the Amazon ECS CLI released, which added the following functionality:  
• Ability to create empty clusters with the up command.  
• Added --health-check-grace-period flag for the compose service up command.  
• Updated the AMI to amzn-ami-2017.09.g-amazon-ecs-optimized.  
For more information, see the Amazon ECS Command Line Reference in the Amazon Elastic Container Service Developer Guide. | 19 January 2018 |
<p>| New service scheduler behavior | Updated information about the behavior for service tasks that fail to launch. Documented new service event message that triggers when a service task has consecutive failures. For more information about this updated behavior, see Additional service concepts (p. 158). | 11 January 2018 |</p>
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<td>Task-level CPU and memory</td>
<td>Added support for specifying CPU and memory at the task-level in task definitions. For more information, see <code>TaskDefinition</code>.</td>
<td>12 December 2017</td>
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| Task execution role                       | The Amazon ECS container agent makes calls to the Amazon ECS API actions on your behalf, so it requires an IAM policy and role for the service to know that the agent belongs to you. The following actions are covered by the task execution role:  
  - Calls to Amazon ECR to pull the container image  
  - Calls to CloudWatch to store container application logs  
For more information, see `Amazon ECS task execution IAM role (p. 290)`. | 7 December 2017  |
| Amazon ECS CLI v1.1.0 with Fargate support | New version of the Amazon ECS CLI released, which added the following features:  
  - Support for task networking  
  - Support for AWS Fargate  
  - Support for viewing CloudWatch Logs data from a task  
For more information, see `ECS CLI changelog`.                                                                 | 29 November 2017|
| AWS Fargate GA                            | Added support for launching Amazon ECS services using the Fargate launch type. For more information, see `Amazon ECS launch types (p. 93)`.                                                                  | 29 November 2017|
AWS glossary

For the latest AWS terminology, see the AWS glossary in the AWS General Reference.