Hands-on tutorials

Deploy Docker Containers on Amazon ECS

Deploy Docker Containers on Amazon ECS: Hands-on tutorials

Table of Contents

Deploy Docker Containers on Amazon ECS

AWS experience	Beginner
Time to complete	10 minutes
Cost to complete	Cost will vary by region, and will be around $0.004 / hour of running the container
Services used	Amazon ECS AWS Fargate Elastic Load Balancing
Last updated	August 11, 2022

Overview

Amazon Elastic Container Service (Amazon ECS) is the AWS service you use to run Docker applications on a scalable cluster. In this how-to guide, you will learn how to run a Docker-enabled sample application on an Amazon ECS cluster behind a load balancer, test the sample application, and delete your resources to avoid charges. This guide uses AWS Fargate, which has a ~$0.004 (less than half of a US cent) cost per hour when using the 0.25 vCPU / 0.5 GB configuration.

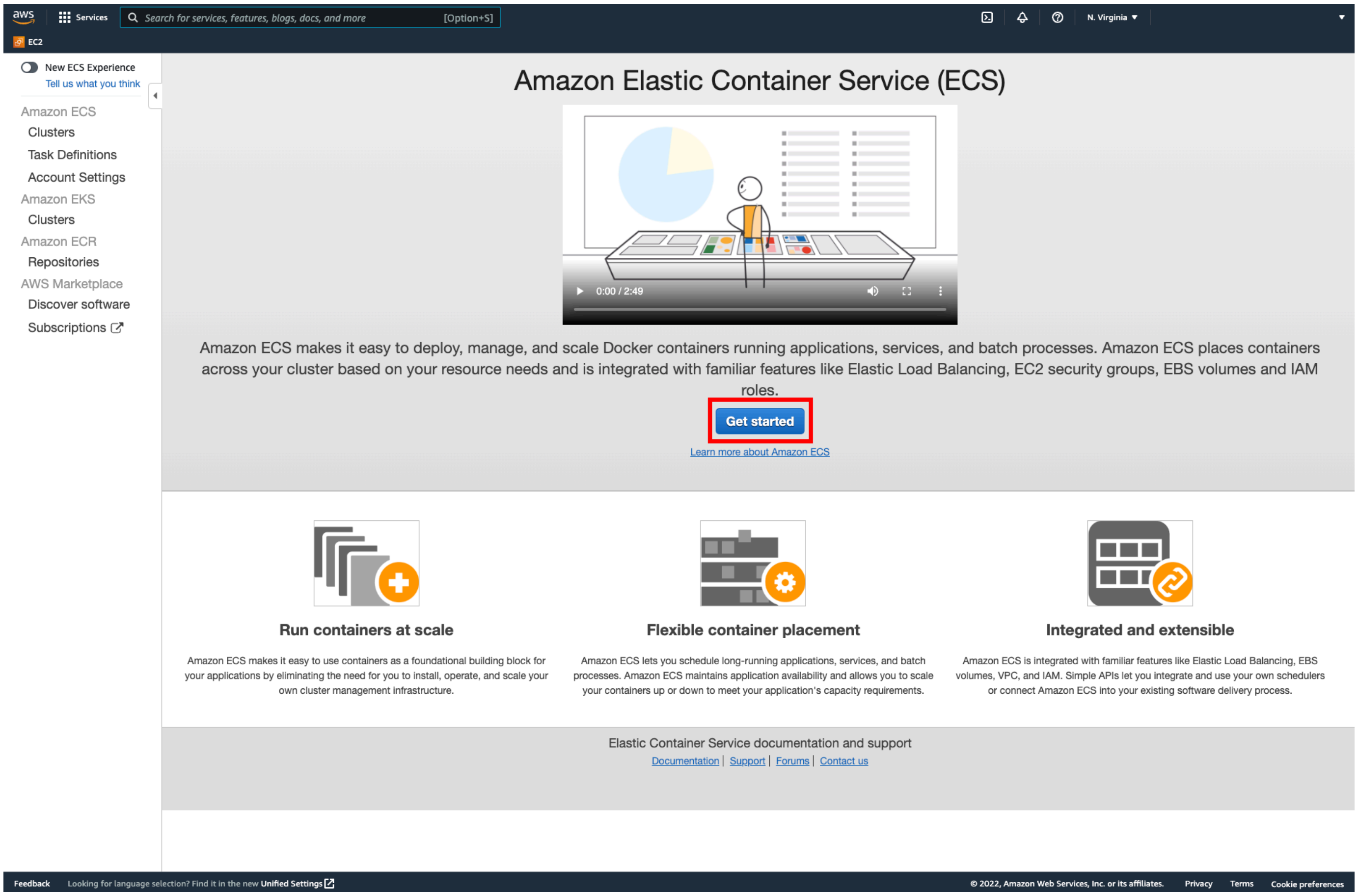
Implementation

Step 1: Set up your first run with Amazon ECS

The Amazon ECS first-run wizard will guide you through creating a cluster and launching a sample web application. In this step, you will enter the Amazon ECS console and launch the wizard.

- Launch the first-run wizard

  To launch the Amazon ECS first-run wizard, choose the **Get started** button. (If your layout looks different, disable the **New ECS Experience** toggle button at the top left of the console).



Amazon Elastic Container Service (ECS)

Amazon ECS makes it easy to deploy, manage, and scale Docker containers running applications, services, and batch processes. Amazon ECS places containers across your cluster based on your resource needs and is integrated with familiar features like Elastic Load Balancing, EC2 security groups, EBS volumes and IAM roles.

Run containers at scale

Amazon ECS makes it easy to use containers as a foundational building block for your applications by eliminating the need for you to install, operate, and scale your own cluster management infrastructure.

Flexible container placement

Amazon ECS lets you schedule long-running applications, services, and batch processes. Amazon ECS maintains application availability and allows you to scale your containers up or down to meet your application's capacity requirements.

Integrated and extensible

Amazon ECS is integrated with familiar features like Elastic Load Balancing, EBS volumes, VPC, and IAM. Simple APIs let you integrate and use your own schedulers or connect Amazon ECS into your existing software delivery process.

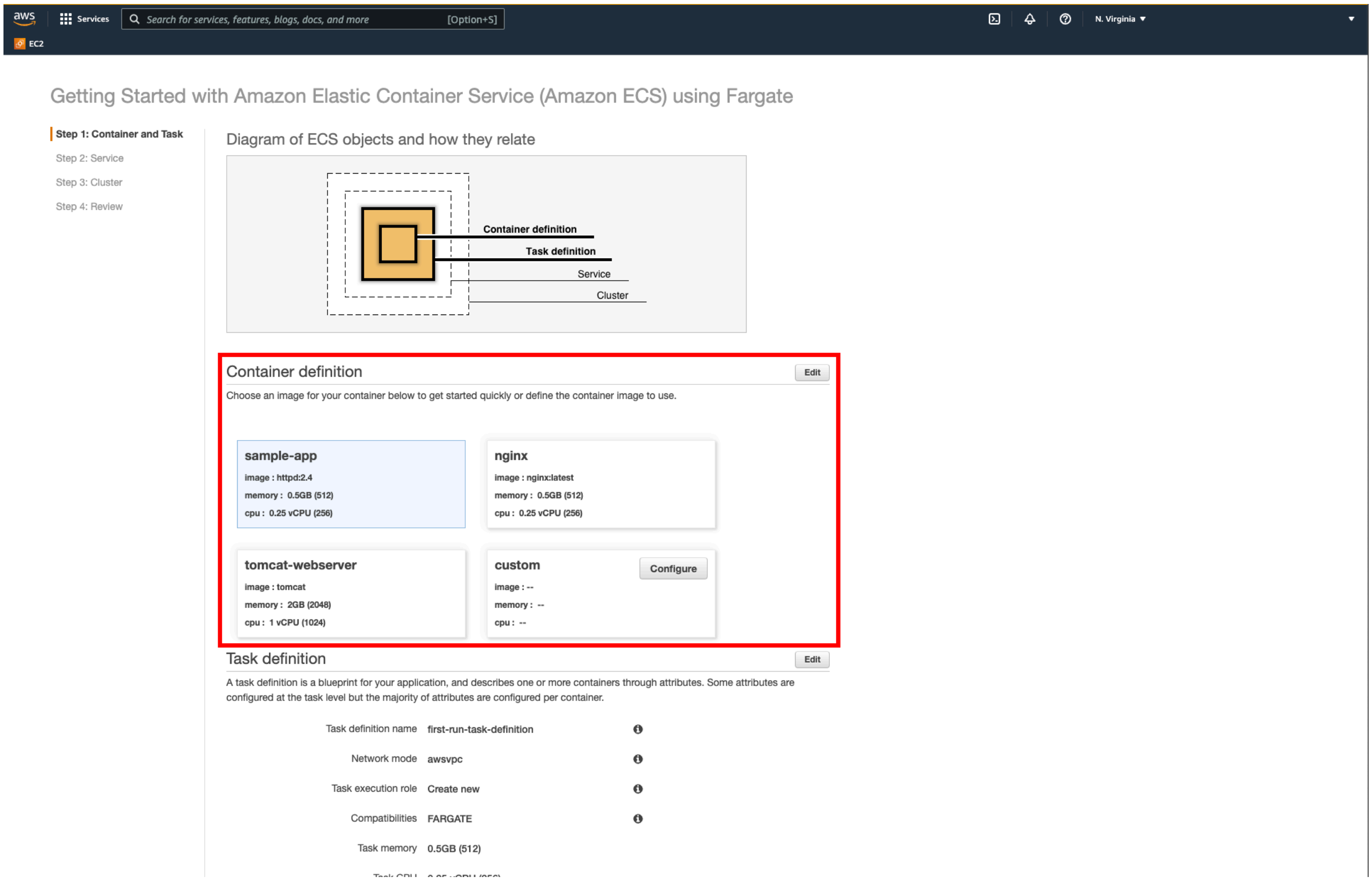
Elastic Container Service documentation and support

Step 2: Create container and task definition

A task definition is like a blueprint for your application. In this step, you will specify a task definition so Amazon ECS knows which Docker image to use for containers, how many containers to use in the task, and the resource allocation for each container.

1. Select a task definition

   In the **Container definition** field, select **sample-app**.



Getting Started with Amazon Elastic Container Service (Amazon ECS) using Fargate

Diagram of ECS objects and how they relate

Container definition

Choose an image for your container below to get started quickly or define the container image to use.

sample-app
image : httpd:2.4
memory : 0.5GB (512)
cpu : 0.25 vCPU (256)

nginx
image : nginx:latest
memory : 0.5GB (512)
cpu : 0.25 vCPU (256)

tomcat-webserver
image : tomcat
memory : 2GB (2048)
cpu : 1 vCPU (1024)

custom
image : --
memory : --
cpu : --

Task definition

A task definition is a blueprint for your application, and describes one or more containers through attributes. Some attributes are configured at the task level but the majority of attributes are configured per container.

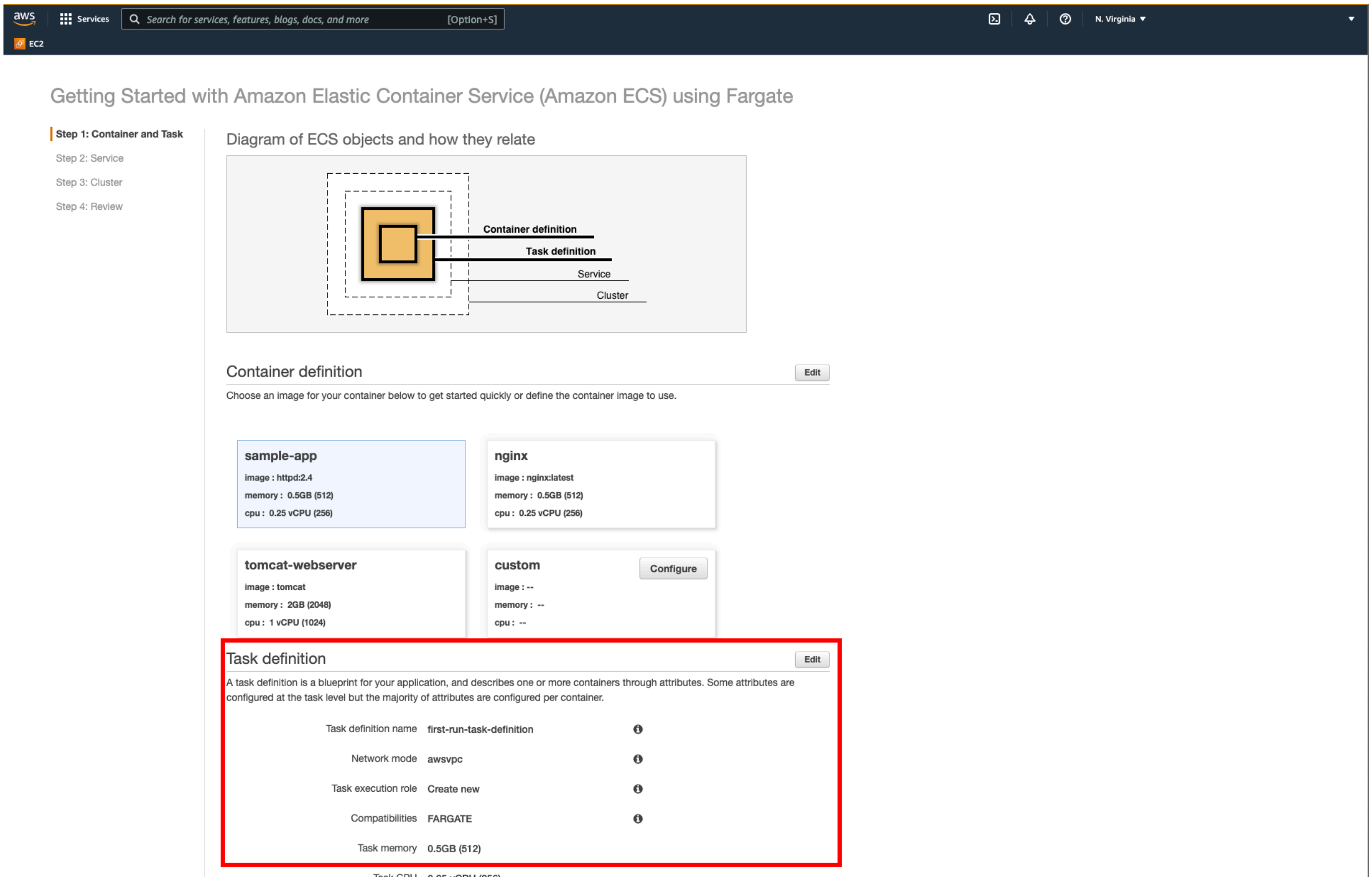
Task definition name	first-run-task-definition
Network mode	awsvpc
Task execution role	Create new
Compatibilities	FARGATE
Task memory	0.5GB (512)
Task CPU	0.25 vCPU (256)

2. Review the default values

   The task definition comes preloaded with default configuration values.

   Review the default values and choose **Next.**

   If you prefer to modify the configurations or would like to learn more, see Task definition parameters.



Getting Started with Amazon Elastic Container Service (Amazon ECS) using Fargate

Step 1: Container and Task
Step 2: Service
Step 3: Cluster
Step 4: Review

Diagram of ECS objects and how they relate

Container definition

Choose an image for your container below to get started quickly or define the container image to use.

sample-app
image : httpd:2.4
memory : 0.5GB (512)
cpu : 0.25 vCPU (256)

nginx
image : nginx:latest
memory : 0.5GB (512)
cpu : 0.25 vCPU (256)

tomcat-webserver
image : tomcat
memory : 2GB (2048)
cpu : 1 vCPU (1024)

custom
image : --
memory : --
cpu : --

Task definition

A task definition is a blueprint for your application, and describes one or more containers through attributes. Some attributes are configured at the task level but the majority of attributes are configured per container.

Task definition name	first-run-task-definition
Network mode	awsvpc
Task execution role	Create new
Compatibilities	FARGATE
Task memory	0.5GB (512)
Task CPU	0.25 vCPU (256)

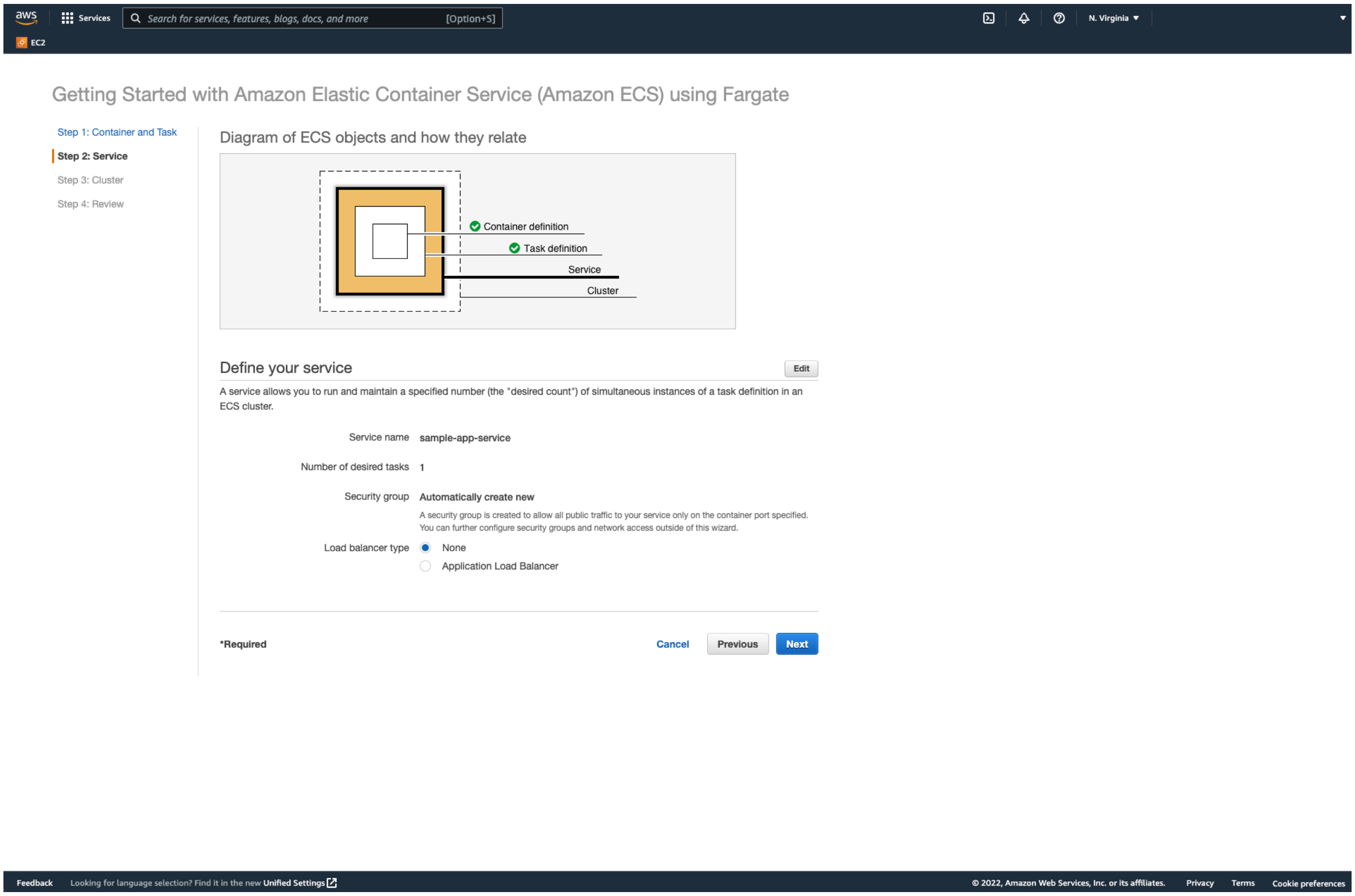
Step 3: Define your service

Now that you have created a task definition, you will configure the Amazon ECS service. A service launches and maintains copies of the task definition in your cluster. For example, by running an application as a service, Amazon ECS will auto-recover any stopped tasks and maintain the number of copies you specify.

1. Review service options

   Service options come preloaded with default configuration values.

   - **Service name**: The default **sample-app-service** is a web-based "Hello World" application provided by AWS. It is meant to run indefinitely; because it is running as a service, it will restart if the task becomes unhealthy or unexpectedly stops.
   - **Number of desired tasks**: Leave the default value of 1. This will create one copy of your task.


aws
Services
Search for services, features, blogs, docs, and more [Option+S]
N. Virginia
EC2
Step 1: Container and Task
Step 2: Service
Step 3: Cluster
Step 4: Review
Container definition
Task definition
Service
Cluster
Edit
Cancel
Previous
Next
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Getting Started with Amazon Elastic Container Service (Amazon ECS) using Fargate

Diagram of ECS objects and how they relate

Define your service

A service allows you to run and maintain a specified number (the "desired count") of simultaneous instances of a task definition in an ECS cluster.

Service name: sample-app-service

Number of desired tasks: 1

Security group: Automatically create new

A security group is created to allow all public traffic to your service only on the container port specified. You can further configure security groups and network access outside of this wizard.

Load balancer type: ● None ○ Application Load Balancer

*Required

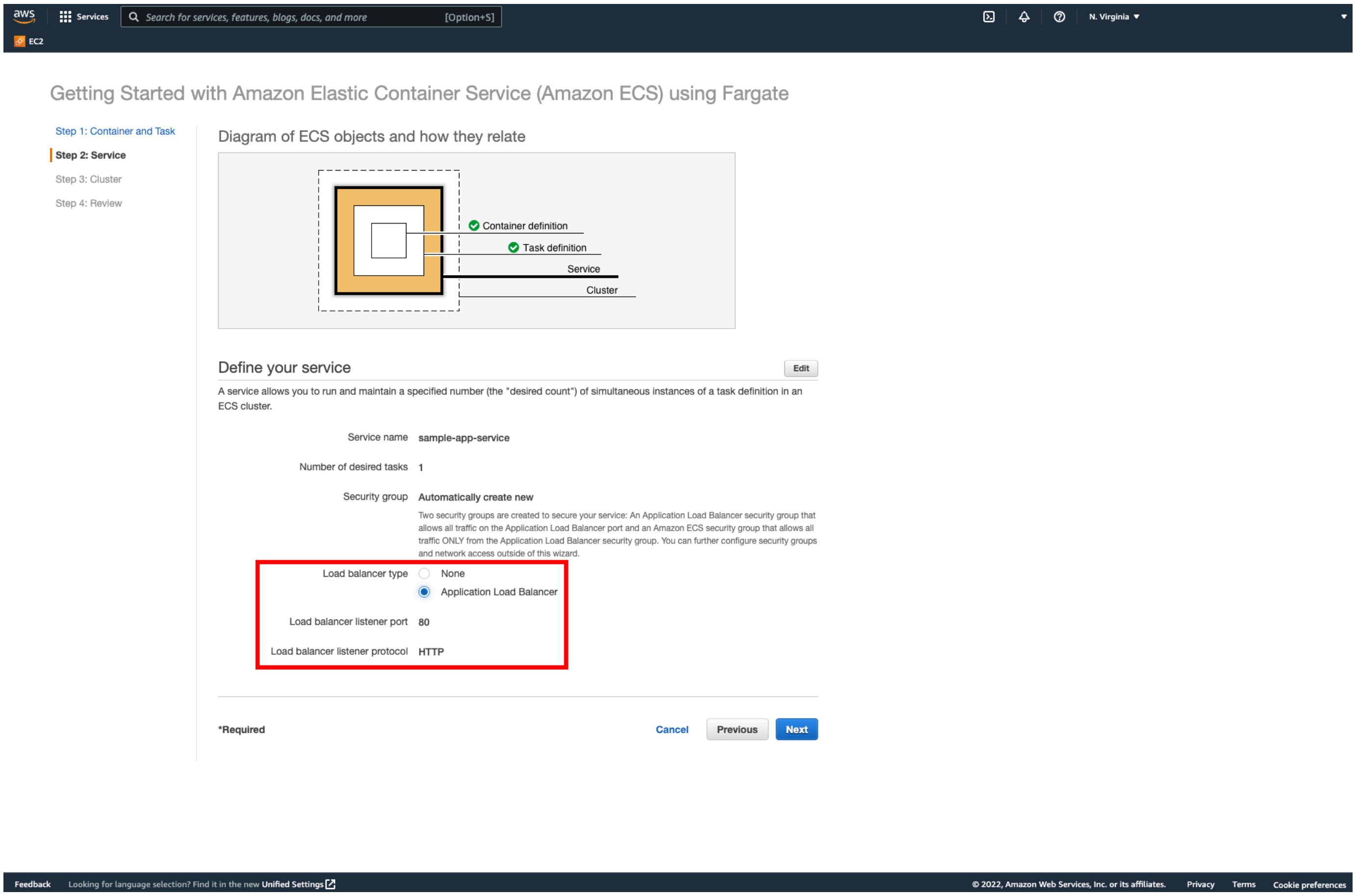
2. Review load balancing settings

Load balancing: You have the option to use a load balancer with your service. Amazon ECS can create an Elastic Load Balancing (ELB) load balancer to distribute the traffic across the container instances your task is launched on.

Select the **Application Load Balancer** option**.**

The default values for **Load balancer listener port** and **Load balancer listener protocol** are set up for the sample application. For more information on load balancing configuration, see Service load balancing.

Review your settings and choose **Next.**


aws
Services
Search for services, features, blogs, docs, and more [Option+S]
N. Virginia
EC2
Step 1: Container and Task
Step 2: Service
Step 3: Cluster
Step 4: Review
Container definition
Task definition
Service
Cluster
Edit
Cancel
Previous
Next
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Getting Started with Amazon Elastic Container Service (Amazon ECS) using Fargate

Diagram of ECS objects and how they relate

Define your service

A service allows you to run and maintain a specified number (the "desired count") of simultaneous instances of a task definition in an ECS cluster.

Service name	sample-app-service
Number of desired tasks	1
Security group	Automatically create new Two security groups are created to secure your service: An Application Load Balancer security group that allows all traffic on the Application Load Balancer port and an Amazon ECS security group that allows all traffic ONLY from the Application Load Balancer security group. You can further configure security groups and network access outside of this wizard.
Load balancer type	○ None ● Application Load Balancer
Load balancer listener port	80
Load balancer listener protocol	HTTP

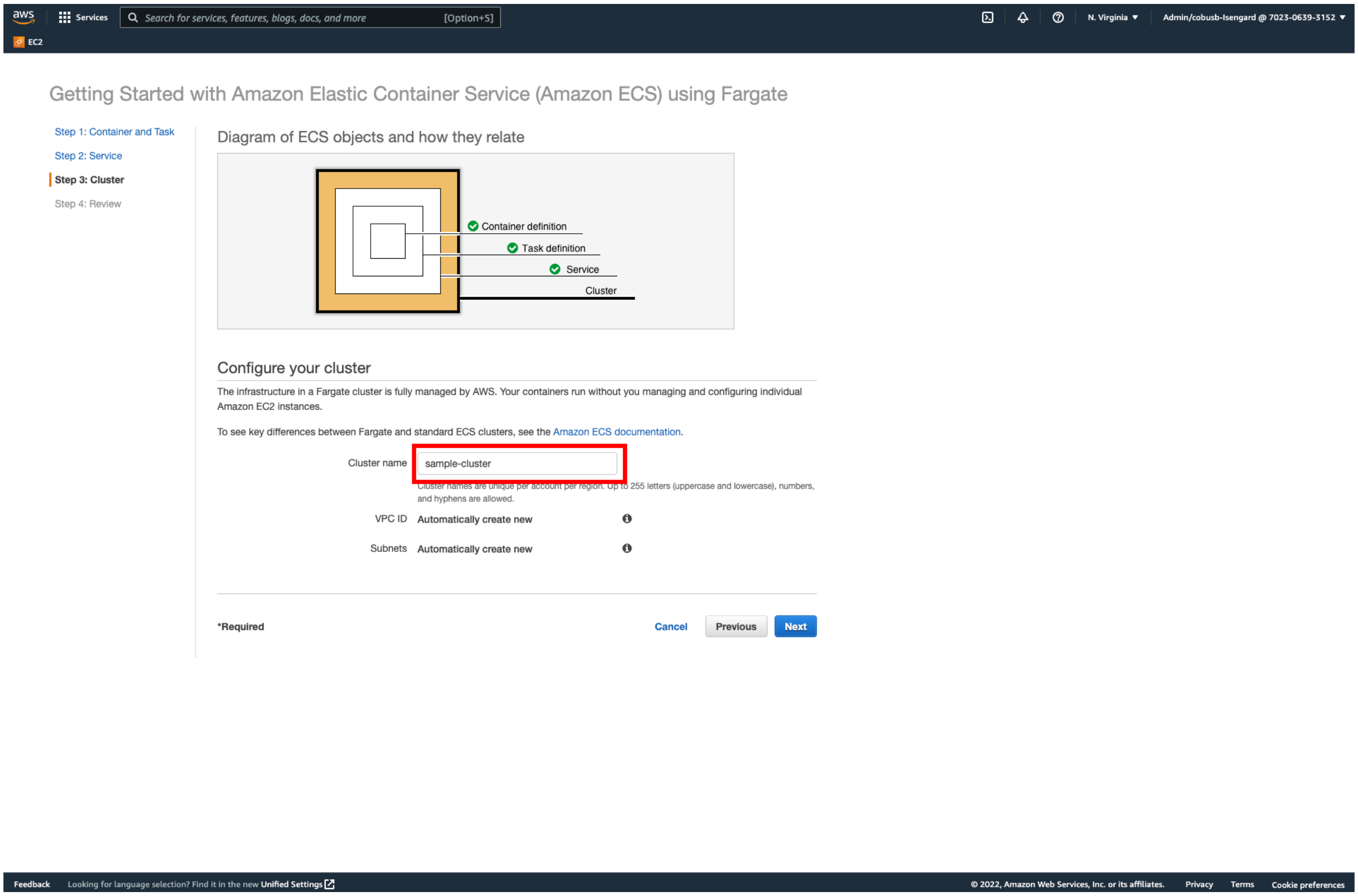
*Required

Step 4: Configure your cluster

Your Amazon ECS tasks run on a cluster, which uses AWS Fargate to provide the compute engine so that you do not need to manage servers. In this step, you will configure the cluster.

- Set cluster name

  In the **Cluster name** field, enter **sample-cluster** and choose **Next**.


aws
Services
Search for services, features, blogs, docs, and more [Option+S]
N. Virginia ▼
Admin/cobusb-Isengard @ 7023-0639-3152 ▼
EC2
Step 1: Container and Task
Step 2: Service
Step 3: Cluster
Step 4: Review
Container definition
Task definition
Service
Cluster
Cancel
Previous
Next
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Getting Started with Amazon Elastic Container Service (Amazon ECS) using Fargate

Diagram of ECS objects and how they relate

Configure your cluster

The infrastructure in a Fargate cluster is fully managed by AWS. Your containers run without you managing and configuring individual Amazon EC2 instances.

To see key differences between Fargate and standard ECS clusters, see the Amazon ECS documentation.

Cluster name: sample-cluster

Cluster names are unique per account per region. Up to 255 letters (uppercase and lowercase), numbers, and hyphens are allowed.

VPC ID: Automatically create new

Subnets: Automatically create new

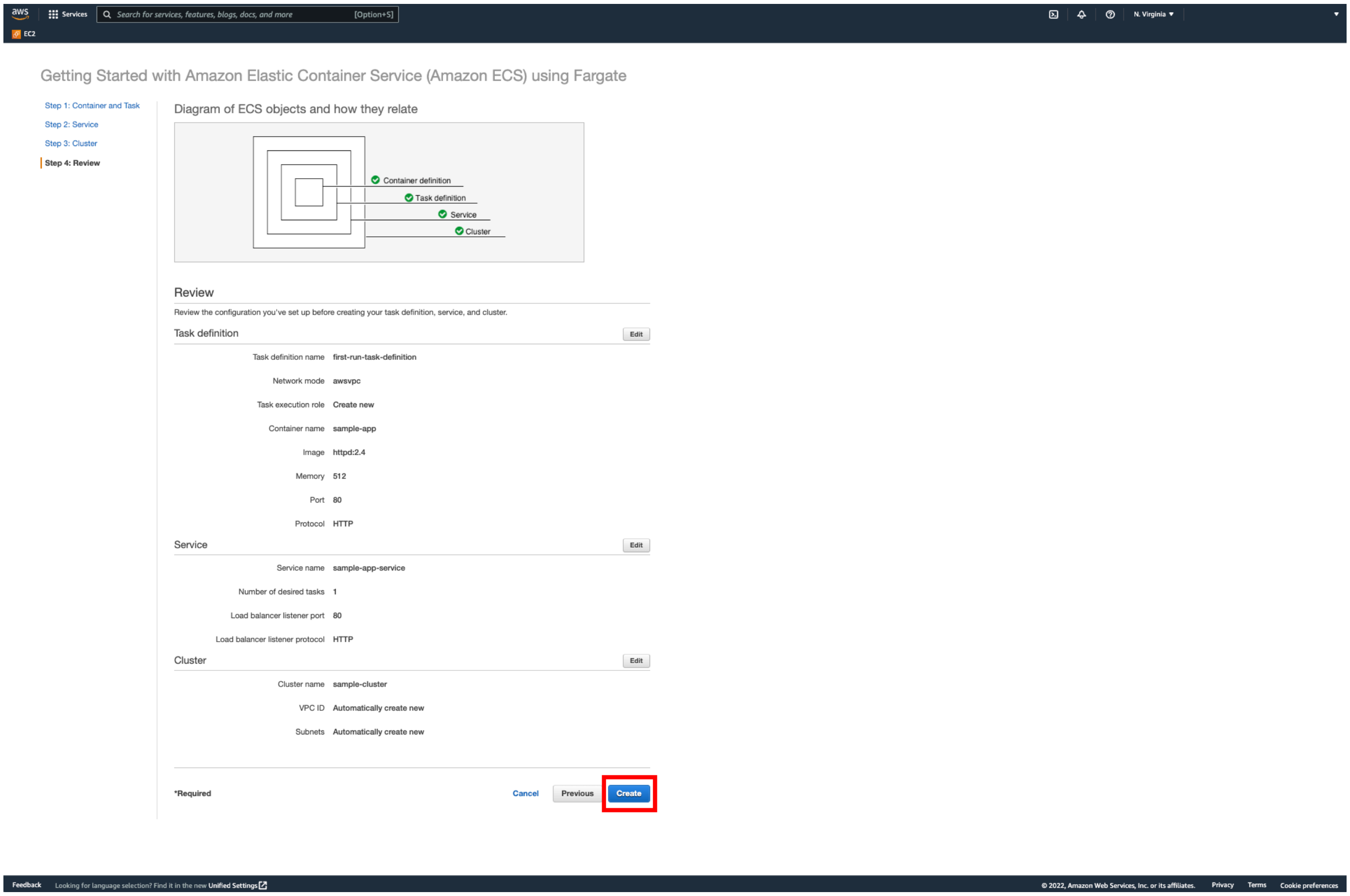
*Required

Step 5: Launch and view your resources

In the previous steps, you configured your task definition (which is like an application blueprint), the Amazon ECS service (which launches and maintains copies of your task definitions), and your cluster. In this step, you will review, launch, and view the resources you create.

1. Review task definition

   You have a final chance to review your task definition, task configuration, and cluster configuration before launching. Choose **Create.**


Services
Search for services, features, blogs, docs, and more [Option+S]
EC2
N. Virginia
Step 1: Container and Task
Step 2: Service
Step 3: Cluster
Step 4: Review
Container definition
Task definition
Service
Cluster
Edit
Cancel
Previous
Create
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Getting Started with Amazon Elastic Container Service (Amazon ECS) using Fargate

Diagram of ECS objects and how they relate

Review

Review the configuration you've set up before creating your task definition, service, and cluster.

Task definition

Task definition name	first-run-task-definition
Network mode	awsvpc
Task execution role	Create new
Container name	sample-app
Image	httpd:2.4
Memory	512
Port	80
Protocol	HTTP

Service

Service name	sample-app-service
Number of desired tasks	1
Load balancer listener port	80
Load balancer listener protocol	HTTP

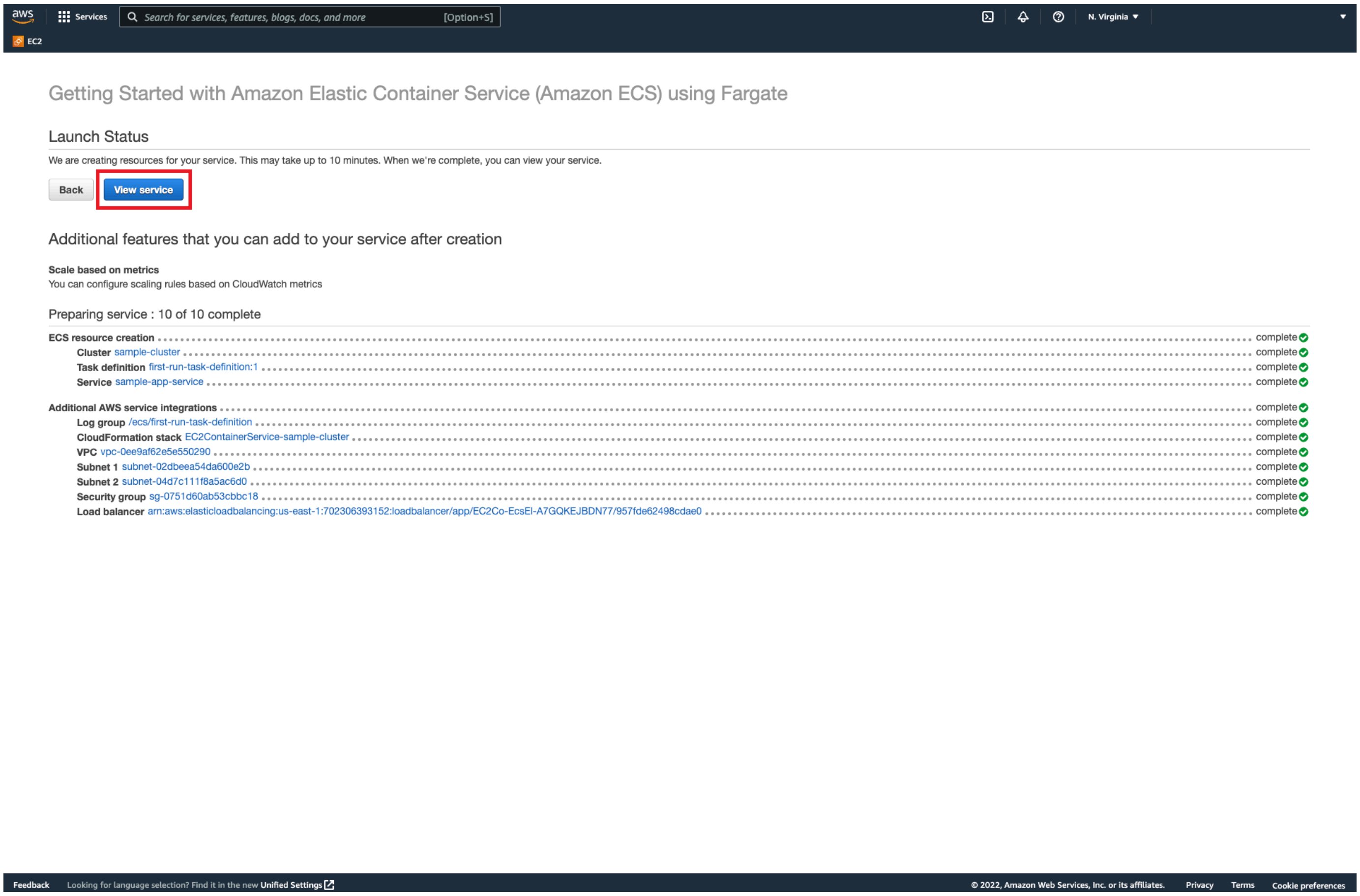
Cluster

Cluster name	sample-cluster
VPC ID	Automatically create new
Subnets	Automatically create new

*Required

2. View service status

   You are on a **Launch Status** page that shows the status of your launch and describes each step of the process. After the launch is complete, choose **View service.**


aws
Services
Search for services, features, blogs, docs, and more [Option+S]
N. Virginia ▾
EC2

Getting Started with Amazon Elastic Container Service (Amazon ECS) using Fargate

Launch Status

We are creating resources for your service. This may take up to 10 minutes. When we're complete, you can view your service.

Additional features that you can add to your service after creation

Scale based on metrics
You can configure scaling rules based on CloudWatch metrics

Preparing service : 10 of 10 complete

```
ECS resource creation ........................................ complete ✓
    Cluster sample-cluster ................................... complete ✓
    Task definition first-run-task-definition:1 .............. complete ✓
    Service sample-app-service ............................... complete ✓

Additional AWS service integrations .......................... complete ✓
    Log group /ecs/first-run-task-definition ................. complete ✓
    CloudFormation stack EC2ContainerService-sample-cluster .. complete ✓
    VPC vpc-0ee9af62e5e550290 ................................ complete ✓
    Subnet 1 subnet-02dbeea54da600e2b ........................ complete ✓
    Subnet 2 subnet-04d7c111f8a5ac6d0 ........................ complete ✓
    Security group sg-0751d60ab53cbbc18 ...................... complete ✓
    Load balancer arn:aws:elasticloadbalancing:us-east-1:702306393152:loadbalancer/app/EC2Co-EcsEl-A7GQKEJBDN77/957fde62498cdae0 ... complete ✓
```

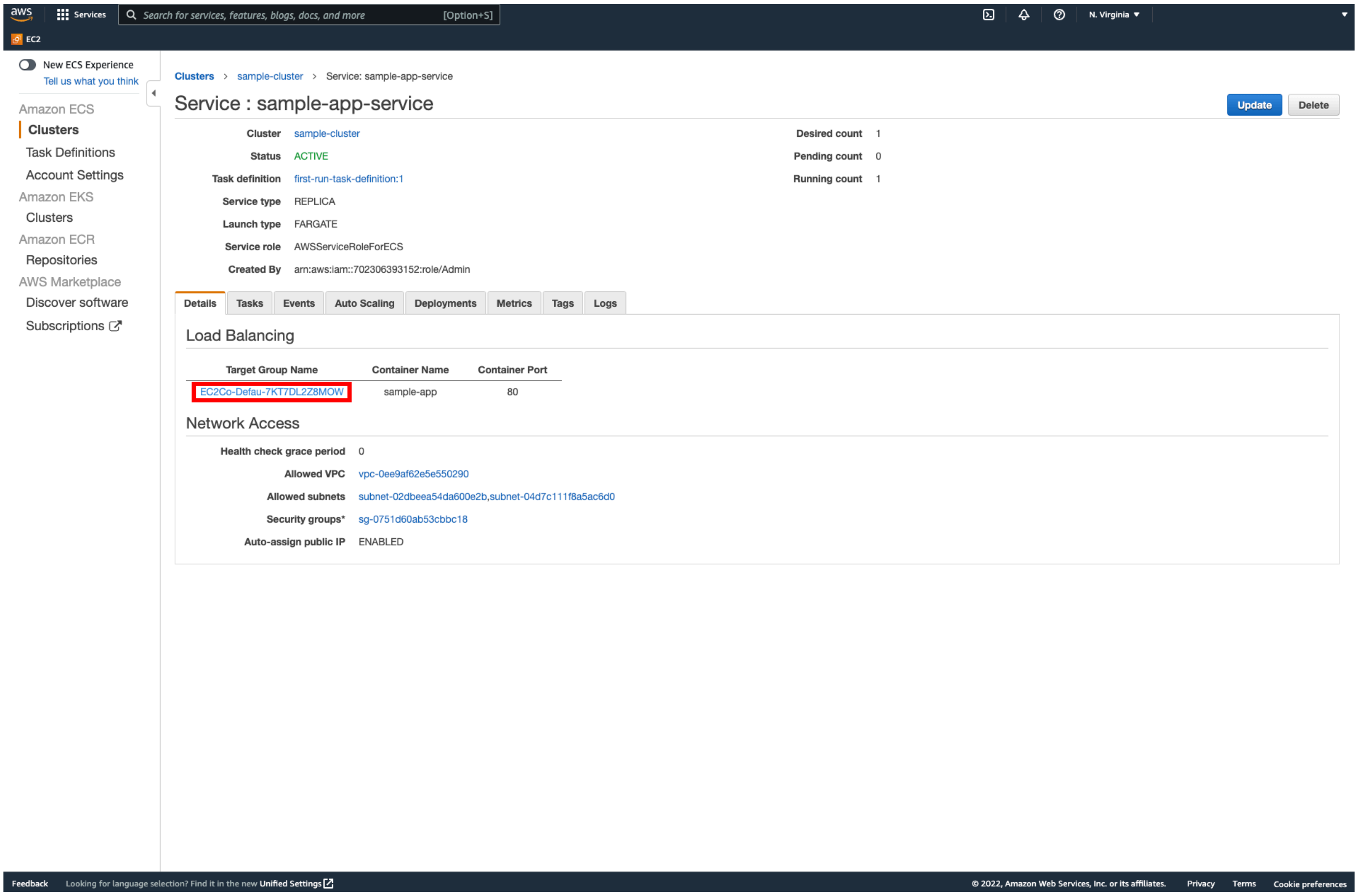
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences

Step 6: Open the sample application

In this step, you will verify that the sample application is up and running by pointing your browser to the load balancer DNS name.

1. View details about the application

   On the sample-app-service page, select the **Details** tab and select the entry under **Target Group Name.**



Clusters > sample-cluster > Service: sample-app-service

Service : sample-app-service

Cluster	sample-cluster	Desired count	1
Status	ACTIVE	Pending count	0
Task definition	first-run-task-definition:1	Running count	1
Service type	REPLICA		
Launch type	FARGATE		
Service role	AWSServiceRoleForECS		
Created By	arn:aws:iam::702306393152:role/Admin		

Load Balancing

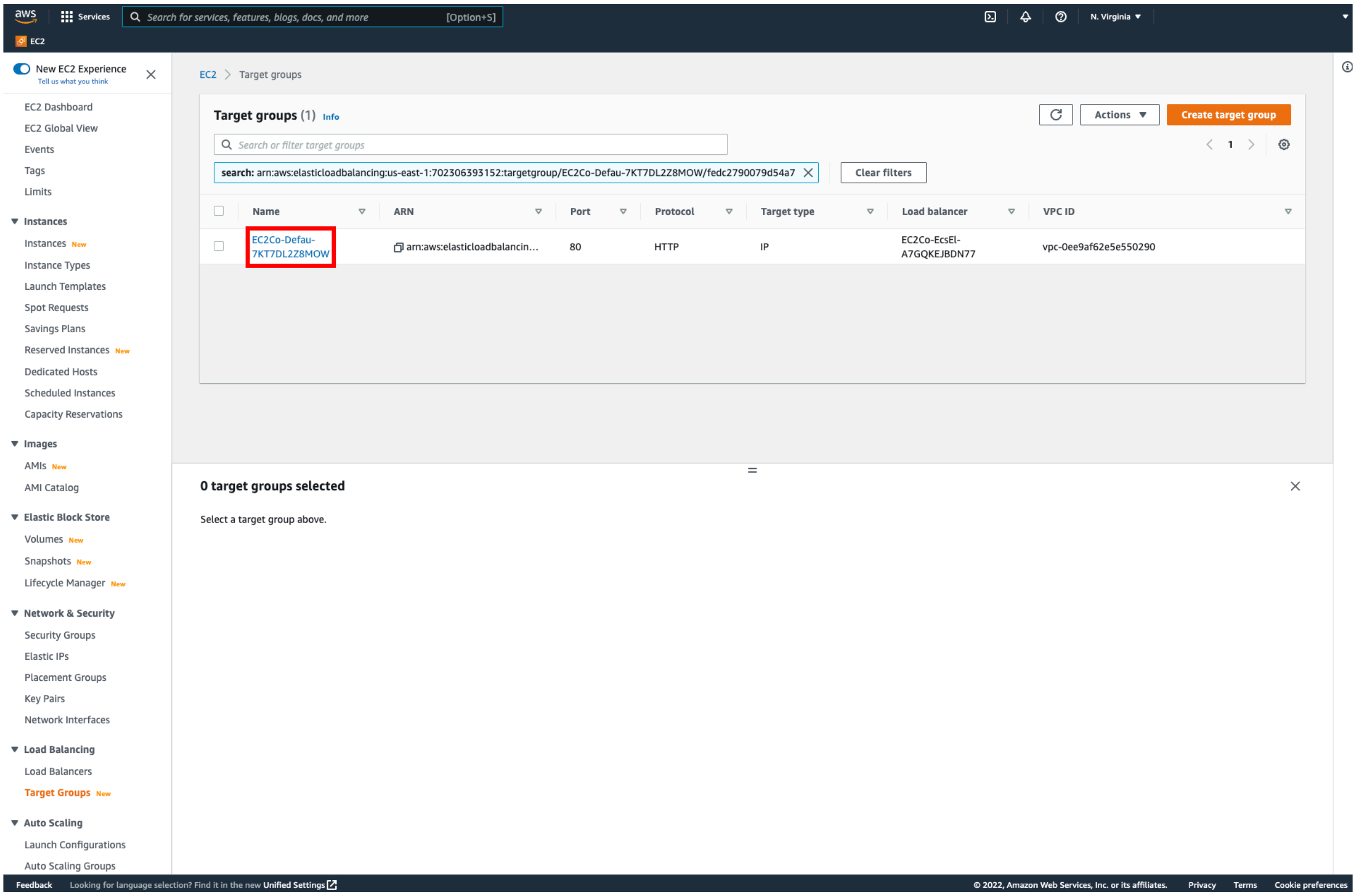
Target Group Name	Container Name	Container Port
EC2Co-Defau-7KT7DL2Z8MOW	sample-app	80

Network Access

Health check grace period	0
Allowed VPC	vpc-0ee9af62e5e550290
Allowed subnets	subnet-02dbeea54da600e2b,subnet-04d7c111f8a5ac6d0
Security groups*	sg-0751d60ab53cbbc18
Auto-assign public IP	ENABLED

2. View target group details

On the **Target groups** page, select the target group name.



search: arn:aws:elasticloadbalancing:us-east-1:702306393152:targetgroup/EC2Co-Defau-7KT7DL2Z8MOW/fedc2790079d54a7

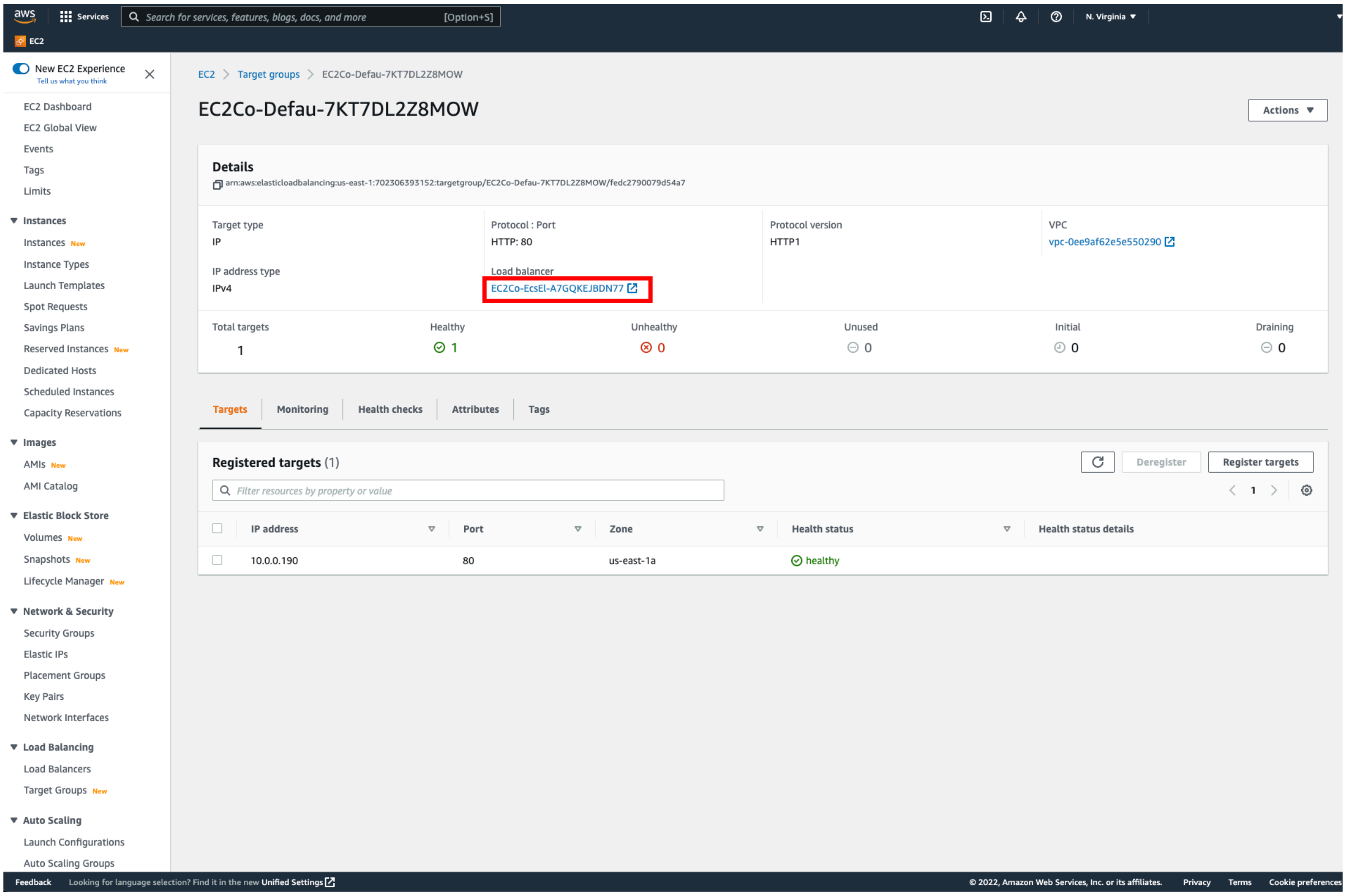
Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
EC2Co-Defau-7KT7DL2Z8MOW	arn:aws:elasticloadbalancin…	80	HTTP	IP	EC2Co-EcsEl-A7GQKEJBDN77	vpc-0ee9af62e5e550290

0 target groups selected

Select a target group above.

3. Select the load balancer

In the **Details** section, choose the **Load balancer** link.



EC2Co-Defau-7KT7DL2Z8MOW

Details

arn:aws:elasticloadbalancing:us-east-1:702306393152:targetgroup/EC2Co-Defau-7KT7DL2Z8MOW/fedc2790079d54a7

Target type: IP

IP address type: IPv4

Protocol : Port: HTTP: 80

Load balancer: EC2Co-EcsEl-A7GQKEJBDN77

Protocol version: HTTP1

VPC: vpc-0ee9af62e5e550290

Total targets	Healthy	Unhealthy	Unused	Initial	Draining
1	1	0	0	0	0

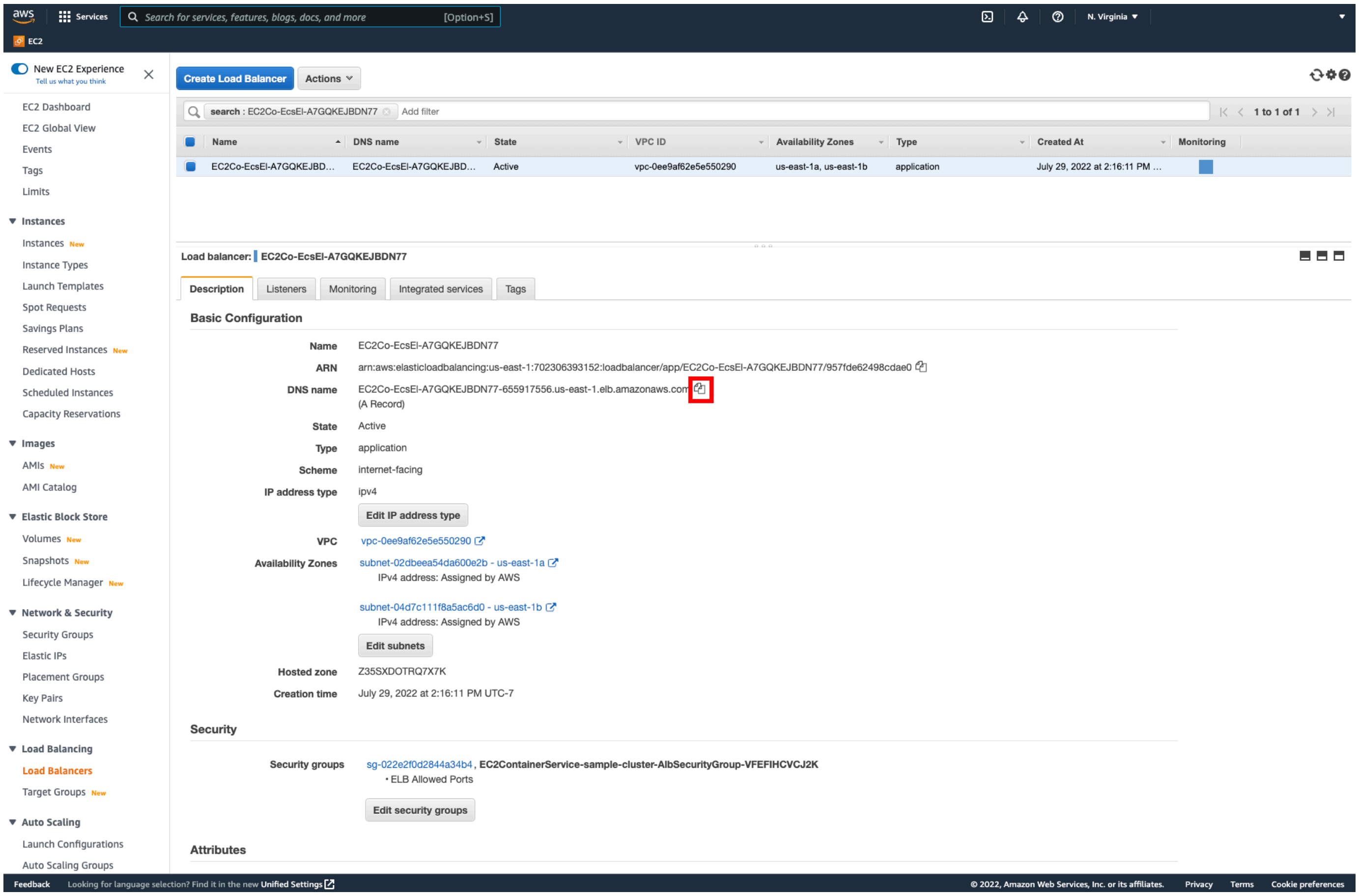
Registered targets (1)

Filter resources by property or value

	IP address	Port	Zone	Health status	Health status details
□	10.0.0.190	80	us-east-1a	healthy	

4. Copy the DNS name of the application

In the **Description** tab, select the two page icon next to the load balancer DNS to copy the DNS name to your clipboard.



search : EC2Co-EcsEI-A7GQKEJBDN77

Name	DNS name	State	VPC ID	Availability Zones	Type	Created At	Monitoring
EC2Co-EcsEI-A7GQKEJBD...	EC2Co-EcsEI-A7GQKEJBD...	Active	vpc-0ee9af62e5e550290	us-east-1a, us-east-1b	application	July 29, 2022 at 2:16:11 PM ...	

Load balancer: EC2Co-EcsEI-A7GQKEJBDN77

Basic Configuration

Name: EC2Co-EcsEI-A7GQKEJBDN77
ARN: arn:aws:elasticloadbalancing:us-east-1:702306393152:loadbalancer/app/EC2Co-EcsEI-A7GQKEJBDN77/957fde62498cdae0
DNS name: EC2Co-EcsEI-A7GQKEJBDN77-655917556.us-east-1.elb.amazonaws.com (A Record)
State: Active
Type: application
Scheme: internet-facing
IP address type: ipv4
VPC: vpc-0ee9af62e5e550290
Availability Zones: subnet-02dbeea54da600e2b - us-east-1a
IPv4 address: Assigned by AWS
subnet-04d7c111f8a5ac6d0 - us-east-1b
IPv4 address: Assigned by AWS
Hosted zone: Z35SXDOTRQ7X7K
Creation time: July 29, 2022 at 2:16:11 PM UTC-7

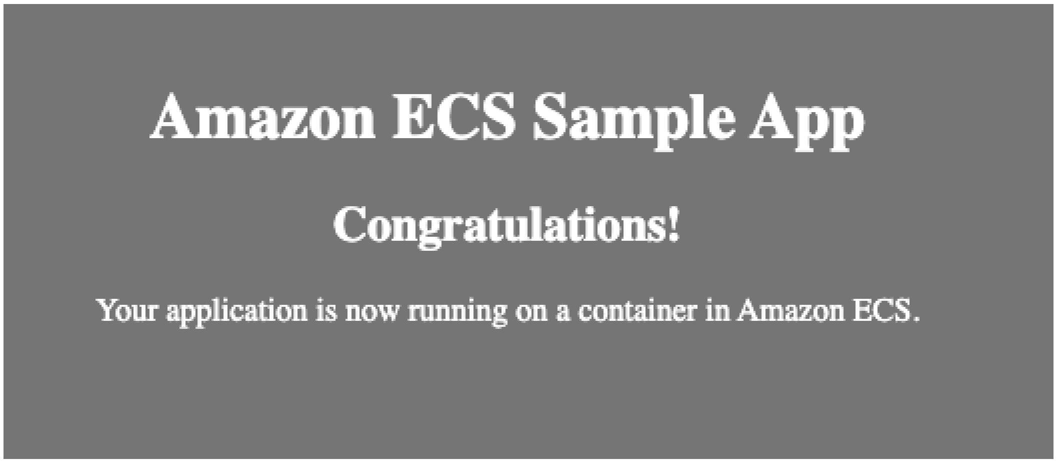
Security

Security groups: sg-022e2f0d2844a34b4, EC2ContainerService-sample-cluster-AlbSecurityGroup-VFEFIHCVCJ2K
- ELB Allowed Ports

Attributes

5. View the sample application

Paste the name into a new browser window, and press Enter to view the sample application (in this case, a static webpage).



Amazon ECS Sample App

Congratulations!

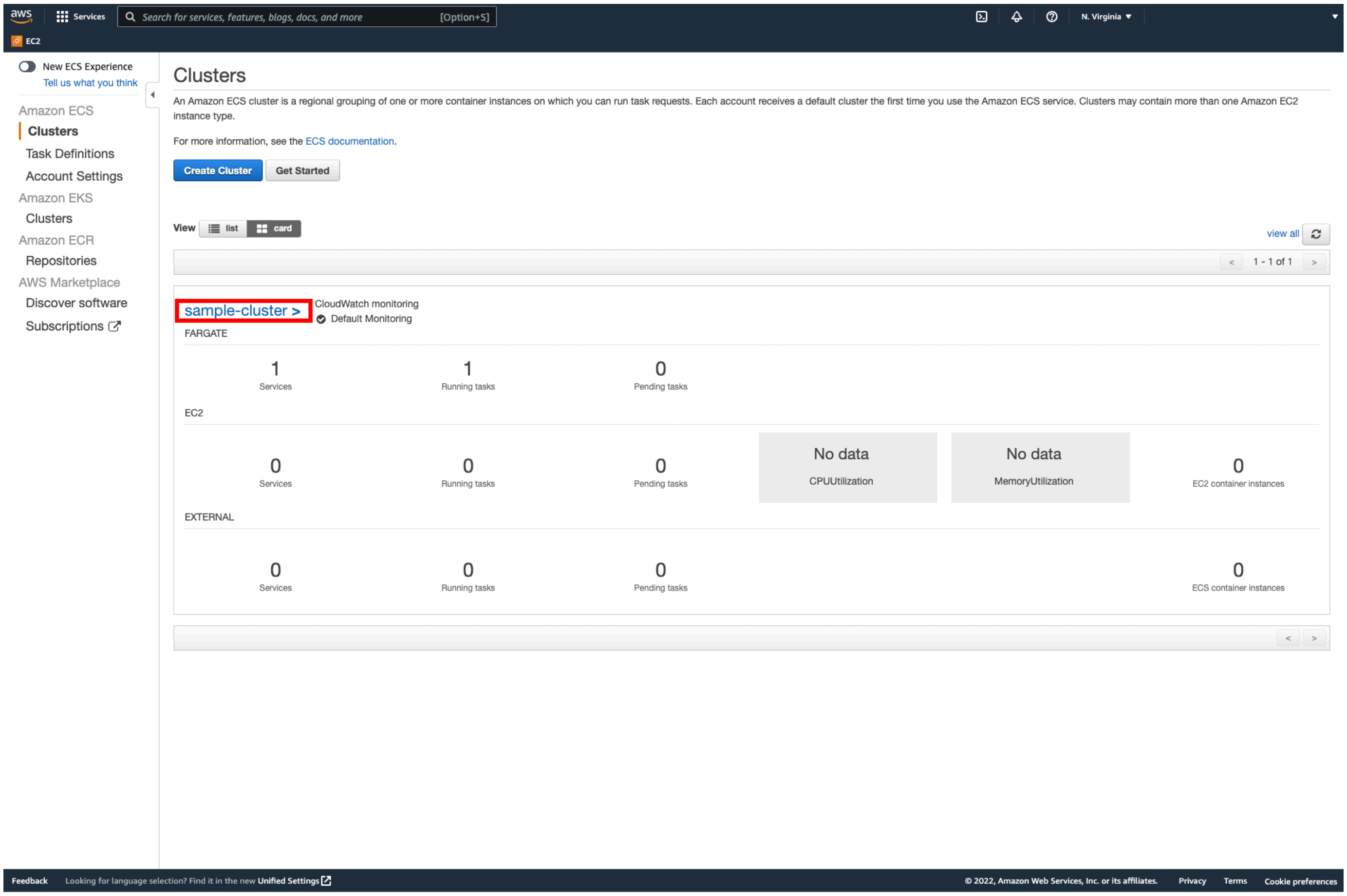
Your application is now running on a container in Amazon ECS.

(Optional) Clean up resources

Throughout this guide, you've launched three resources: an Amazon ECS cluster, AWS Fargate to run your container, and a load balancer. In this step, you can clean up all your resources to avoid unwanted charges.

1. Select the cluster

   Navigate back to the Amazon ECS console page and select the cluster name (sample-cluster).



Clusters

An Amazon ECS cluster is a regional grouping of one or more container instances on which you can run task requests. Each account receives a default cluster the first time you use the Amazon ECS service. Clusters may contain more than one Amazon EC2 instance type.

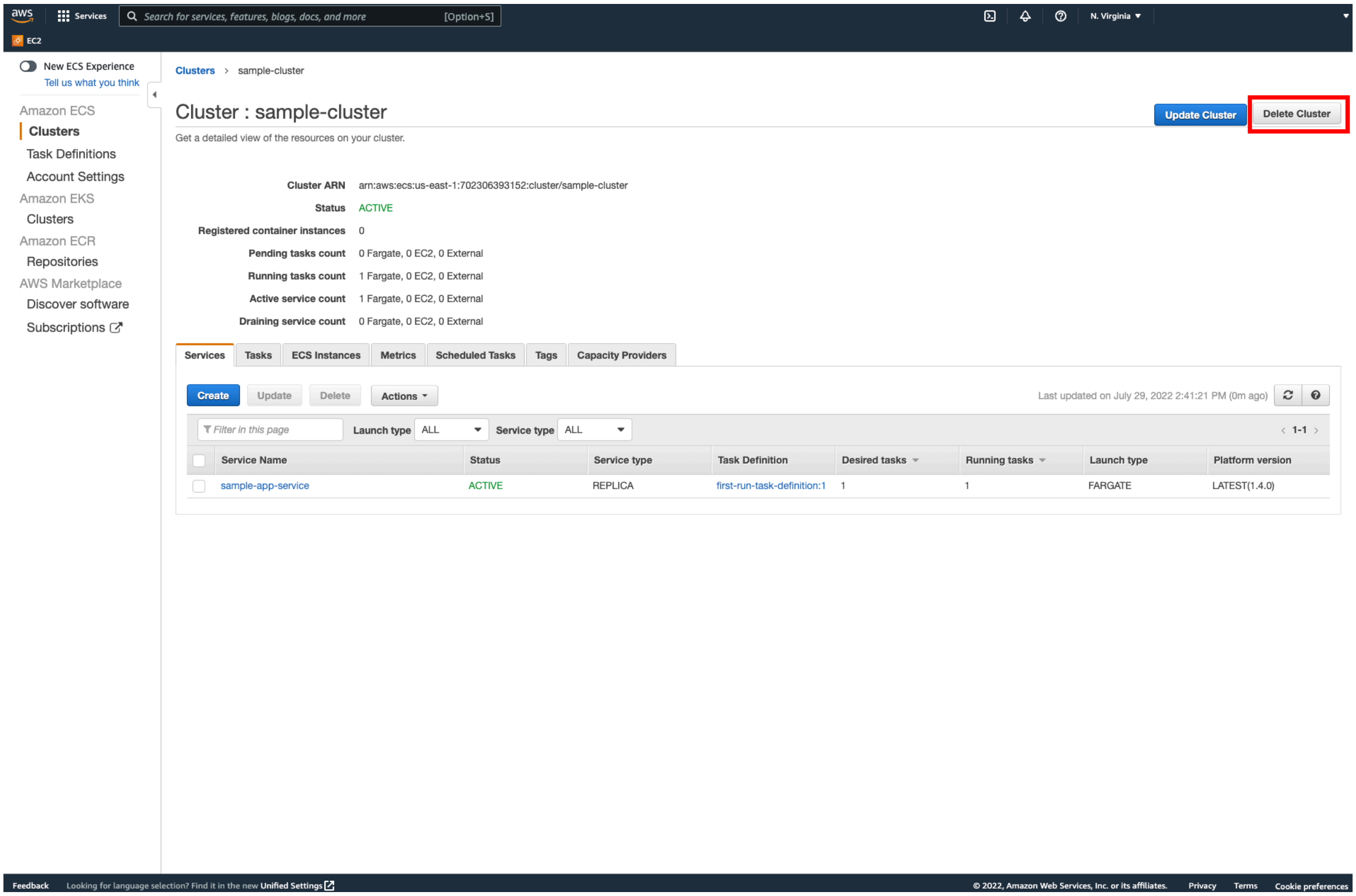
For more information, see the ECS documentation.

sample-cluster > CloudWatch monitoring ✓ Default Monitoring

FARGATE					
1 Services	1 Running tasks	0 Pending tasks			
EC2					
0 Services	0 Running tasks	0 Pending tasks	No data CPUUtilization	No data MemoryUtilization	0 EC2 container instances
EXTERNAL					
0 Services	0 Running tasks	0 Pending tasks			0 ECS container instances

2. Choose Delete Cluster

   Choose **Delete Cluster** to delete the cluster.



Cluster : sample-cluster

Get a detailed view of the resources on your cluster.

Cluster ARN	arn:aws:ecs:us-east-1:702306393152:cluster/sample-cluster
Status	ACTIVE
Registered container instances	0
Pending tasks count	0 Fargate, 0 EC2, 0 External
Running tasks count	1 Fargate, 0 EC2, 0 External
Active service count	1 Fargate, 0 EC2, 0 External
Draining service count	0 Fargate, 0 EC2, 0 External

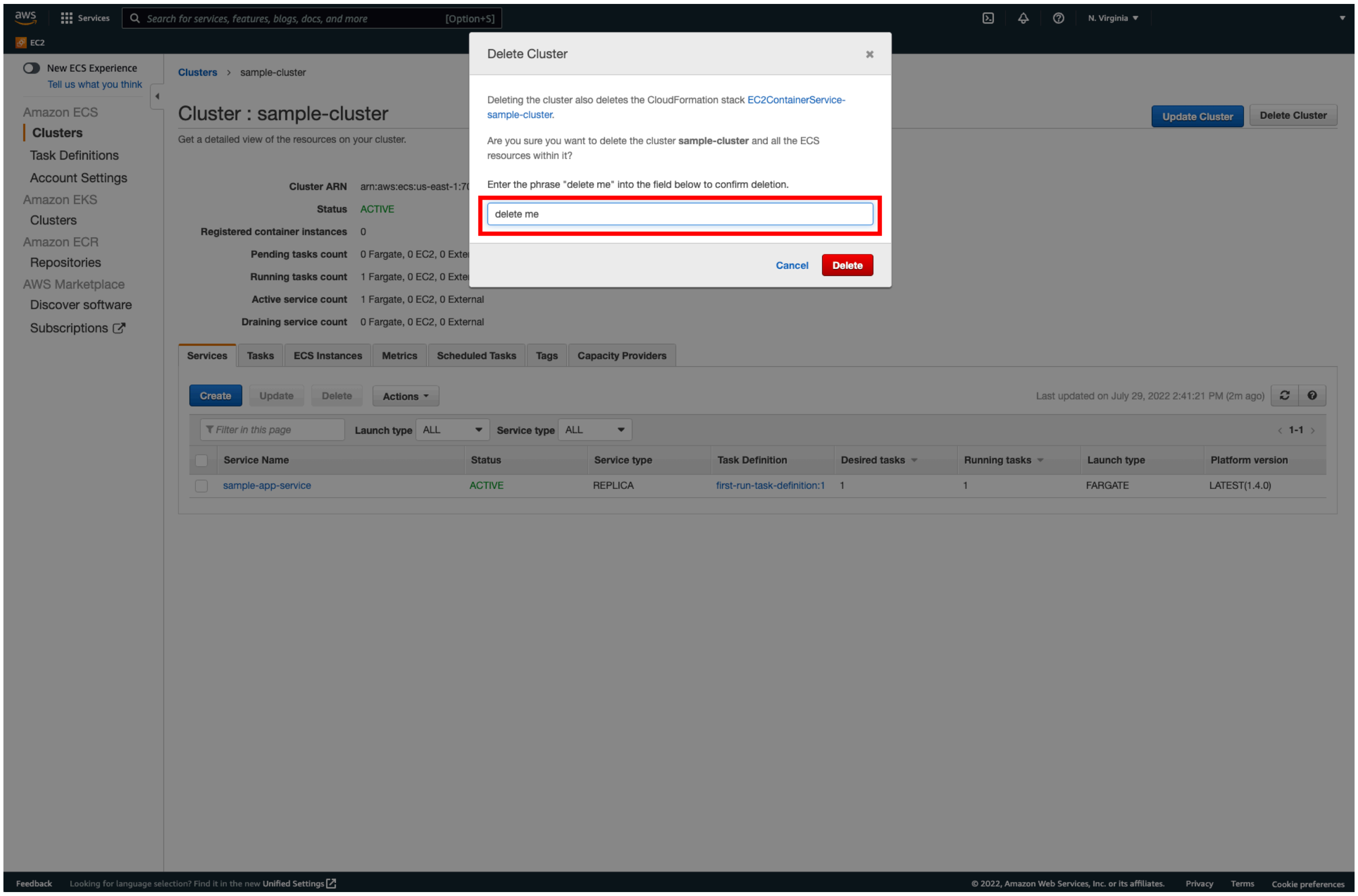
Last updated on July 29, 2022 2:41:21 PM (0m ago)

Launch type ALL Service type ALL 1-1

Service Name	Status	Service type	Task Definition	Desired tasks	Running tasks	Launch type	Platform version
sample-app-service	ACTIVE	REPLICA	first-run-task-definition:1	1	1	FARGATE	LATEST(1.4.0)

3. Confirm cluster deletion

Enter **delete me** in the dialog box and choose **Delete**.



Cluster : sample-cluster

Get a detailed view of the resources on your cluster.

Cluster ARN	arn:aws:ecs:us-east-1:7(
Status	ACTIVE
Registered container instances	0
Pending tasks count	0 Fargate, 0 EC2, 0 Exte
Running tasks count	1 Fargate, 0 EC2, 0 Exte
Active service count	1 Fargate, 0 EC2, 0 External
Draining service count	0 Fargate, 0 EC2, 0 External

Last updated on July 29, 2022 2:41:21 PM (2m ago)

Launch type ALL Service type ALL 1-1

	Service Name	Status	Service type	Task Definition	Desired tasks	Running tasks	Launch type	Platform version
□	sample-app-service	ACTIVE	REPLICA	first-run-task-definition:1	1	1	FARGATE	LATEST(1.4.0)

Delete Cluster

Deleting the cluster also deletes the CloudFormation stack EC2ContainerService-sample-cluster.

Are you sure you want to delete the cluster **sample-cluster** and all the ECS resources within it?

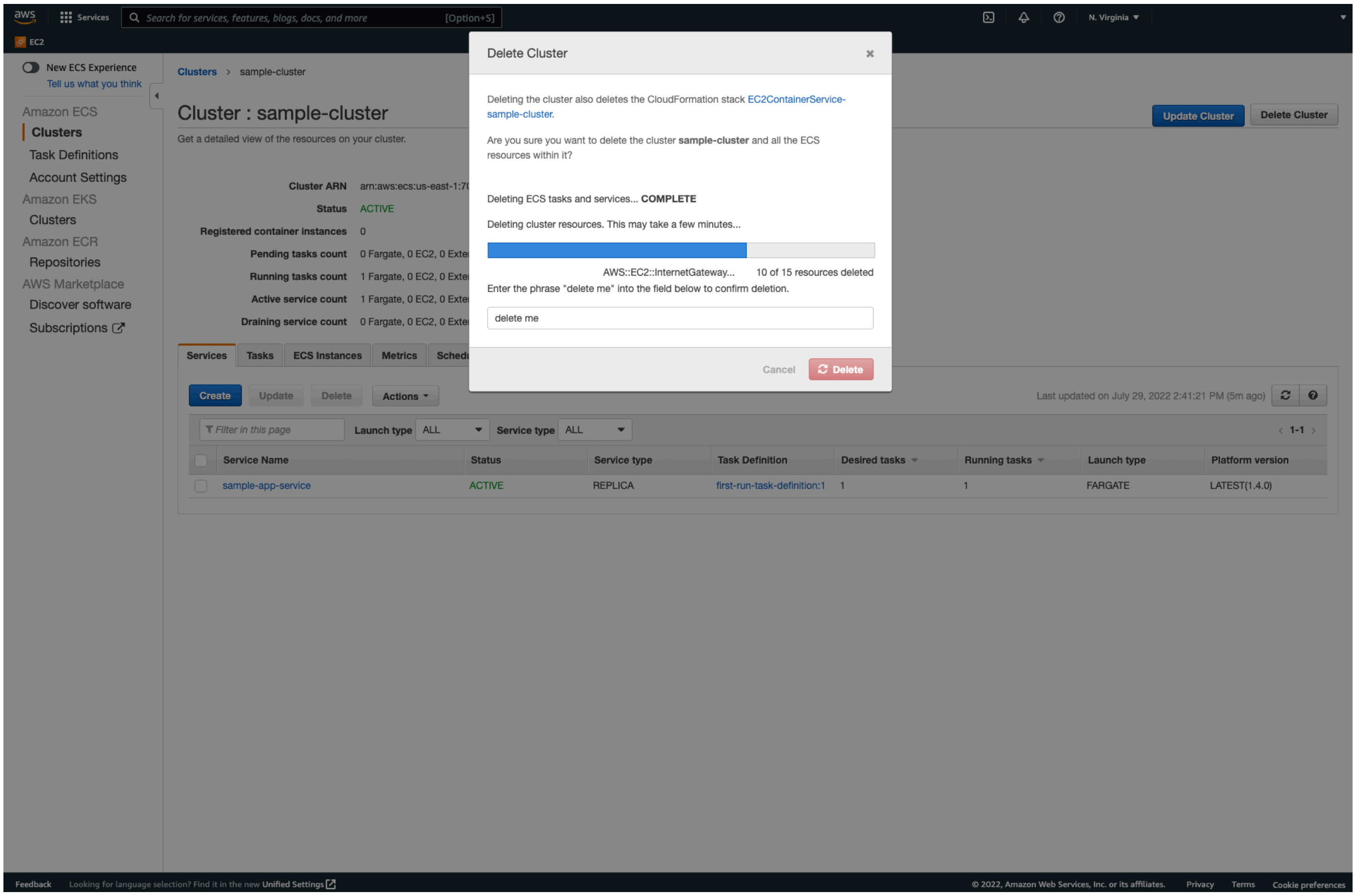
Enter the phrase "delete me" into the field below to confirm deletion.

delete me

Cancel Delete

4. Monitor cluster deletion

You will now see the progress as all the resources created are deleted.



Delete Cluster

Deleting the cluster also deletes the CloudFormation stack EC2ContainerService-sample-cluster.

Are you sure you want to delete the cluster **sample-cluster** and all the ECS resources within it?

Deleting ECS tasks and services... **COMPLETE**

Deleting cluster resources. This may take a few minutes...

AWS::EC2::InternetGateway... 10 of 15 resources deleted

Enter the phrase "delete me" into the field below to confirm deletion.

delete me

Cluster : sample-cluster

Get a detailed view of the resources on your cluster.

Cluster ARN	arn:aws:ecs:us-east-1:7(
Status	ACTIVE
Registered container instances	0
Pending tasks count	0 Fargate, 0 EC2, 0 Exte
Running tasks count	1 Fargate, 0 EC2, 0 Exte
Active service count	1 Fargate, 0 EC2, 0 Exte
Draining service count	0 Fargate, 0 EC2, 0 Exte

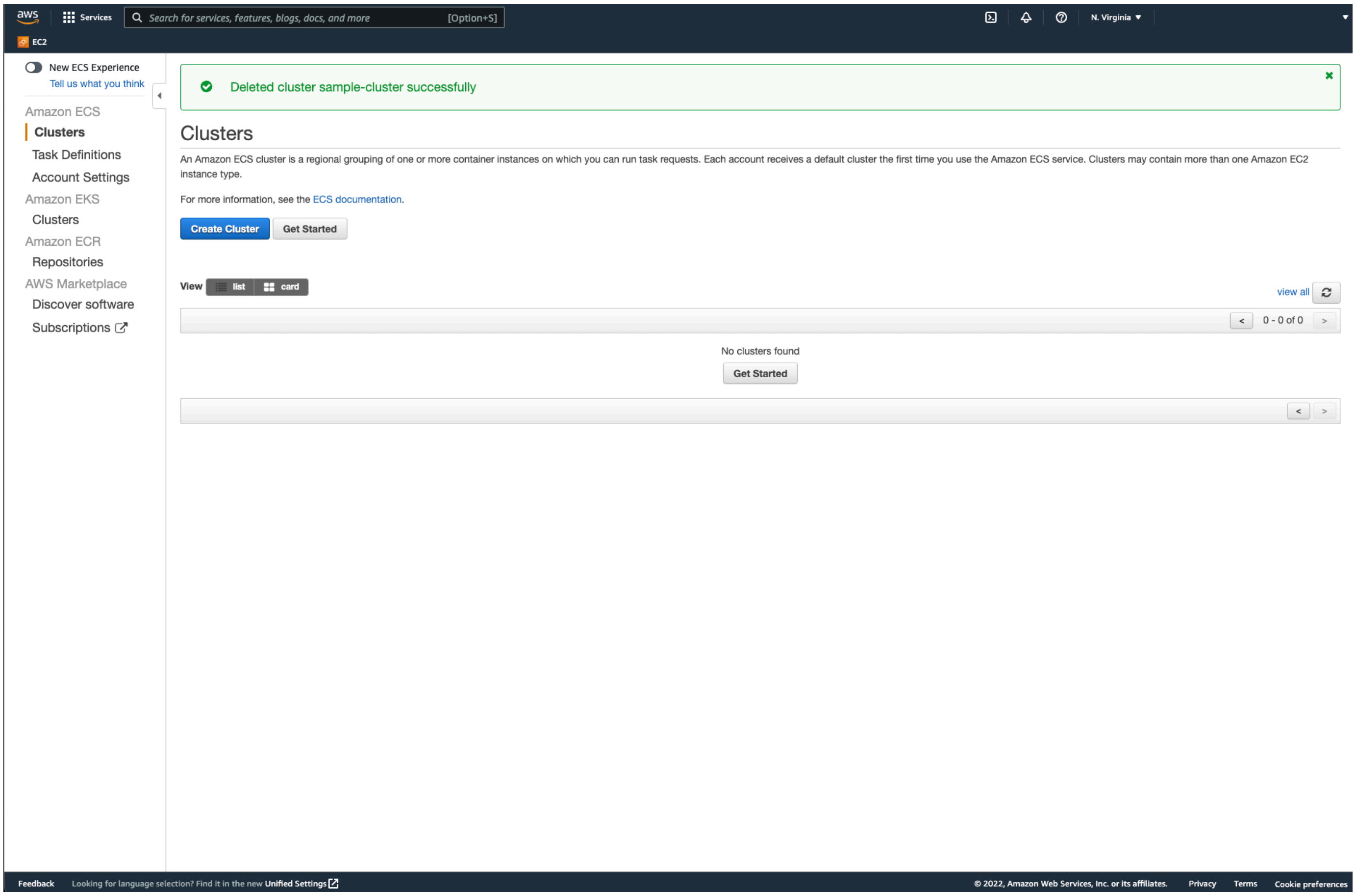
Last updated on July 29, 2022 2:41:21 PM (5m ago)

Launch type ALL Service type ALL

Service Name	Status	Service type	Task Definition	Desired tasks	Running tasks	Launch type	Platform version
sample-app-service	ACTIVE	REPLICA	first-run-task-definition:1	1	1	FARGATE	LATEST(1.4.0)

5. Cluster deletion complete

Once everything has been deleted, you will see the **Deleted cluster sample-cluster successfully** message in green. You have now completed this guide.



Deleted cluster sample-cluster successfully

Clusters

An Amazon ECS cluster is a regional grouping of one or more container instances on which you can run task requests. Each account receives a default cluster the first time you use the Amazon ECS service. Clusters may contain more than one Amazon EC2 instance type.

For more information, see the ECS documentation.

No clusters found

Congratulations

Congratulations! You have learned how to configure and deploy your Docker-enabled application to Amazon ECS, and how to delete resources that are no longer needed. Amazon ECS is a highly scalable, high performance container management service that supports Docker containers and allows you to easily run applications on a managed cluster of Amazon EC2 instances.