

LAB: EC2 ECS Cluster with Load Balancer

You need:

- An AWS Account

Duration of the Lab: 30 Minutes.

Difficulty: medium

Create an EC2 ECS Cluster

Create a new EC2 Launch Type Cluster:

Select cluster template

The following cluster templates are available to simplify cluster creation. Additional configuration and integrations can be added later.

Networking only

Resources to be created:

- Cluster
- VPC (optional)
- Subnets (optional)

Powered by AWS Fargate

EC2 Linux + Networking

Resources to be created:

- Cluster
- VPC
- Subnets
- Auto Scaling group with Linux AMI

EC2 Windows + Networking

Resources to be created:

- Cluster
- VPC
- Subnets
- Auto Scaling group with Windows AMI

*Required

Cancel

Next step

Give the cluster a name and provision 3 t2.micro instances into the cluster:

Instance configuration

Provisioning Model

☒ On-Demand Instance

With On-Demand Instances, you pay for compute capacity by the hour, with no long-term commitments or upfront payments.

☐ Spot

Amazon EC2 Spot Instances let you take advantage of unused EC2 capacity in the AWS cloud. Spot Instances are available at up to a 90% discount compared to On-Demand prices. [Learn more](#)

EC2 instance type*

t2.micro

☐ Manually enter desired instance type

Enable T2 unlimited

☐

Number of instances*

3

EC2 Ami Id*

Amazon Linux 2 AMI [ami-0e934...

EBS storage (GiB)*

22

Key pair

None - unable to SSH

You will not be able to SSH into your EC2 instances without a key pair. You can create a new key pair in the [EC2 console](#).

Select the existing VPC and all three subnets. Select “create a new Security Group” where Port 80 is open to accept connection from 0.0.0.0/0:

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Networking

Configure the VPC for your container instances to use. A VPC is an isolated portion of the AWS cloud populated by AWS objects, such as Amazon EC2 instances. You can choose an existing VPC, or create a new one with this wizard.

VPC vpc-6570b40f (172.31.0/20)

[Check the structure for vpc-6570b40f in the Amazon EC2 console.](#)

Subnets

subnet-cfd47ba5 (172.31.16.0/20) - eu-central-1a
assign ipv6 on creation: Disabled

Security group

sg-0123456789abcdef0 (172.31.16.0/20) - eu-central-1a
assign ipv6 on creation: Disabled

Security group inbound rules

Protocol tcp

Create a new Container Instance IAM role and hit Create:

Container instance IAM role

The Amazon ECS container agent makes calls to the Amazon ECS API actions on your behalf, so container instances that run the agent require the `ecsInstanceRole` IAM policy and role for the service to know that the agent belongs to you. If you do not have the `ecsInstanceRole` already, we can create one for you.

Container instance IAM role Create new role

Tags

Key	Value
<input type="text" value="Add key"/>	<input type="text" value="Add value"/>

CloudWatch Container Insights

CloudWatch Container Insights is a monitoring and troubleshooting solution for containerized applications and microservices. It collects, aggregates, and summarizes compute utilization such as CPU, memory, disk, and network; and diagnostic information such as container restart failures to help you isolate issues with your clusters and resolve them quickly. [Learn more](#)

CloudWatch Container Insights ☐ Enable Container Insights

*Required

[Cancel](#)

[Previous](#)

[Create](#)

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Observe the Instances coming up in the EC2 Dashboard:

The screenshot shows the AWS Management Console's EC2 Dashboard. The left sidebar contains navigation links for 'New EC2 Experience', 'Events', 'Tags', 'Reports', 'Limits', 'INSTANCES', 'IMAGES', 'ELASTIC BLOCK STORE', and 'NETWORK & SECURITY'. The main content area displays a table of EC2 instances. The first instance, 'ECS Instance - EC2ContainerService-myec2cluster', is highlighted with a yellow circle and has a 'running' status. Below the table, the details for this instance are shown, including its ID, type, availability zone, and various DNS and IP addresses.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public IP
ECS Instance - EC2ContainerService-myec2cluster	i-0b41c97e113e07bd3	t2.micro	eu-central-1c	running	Initializing	None	ec2-35-157-225-150.eu-central-1.compute.amazonaws.com
ECS Instance - EC2ContainerService-myec2cluster	i-0bbe2b2b8ab47d4	t2.micro	eu-central-1a	running	Initializing	None	ec2-54-157-225-150.eu-central-1.compute.amazonaws.com
ECS Instance - EC2ContainerService-myec2cluster	i-0e0f5e7dea8cfeeb	t2.micro	eu-central-1b	running	Initializing	None	ec2-3-157-225-150.eu-central-1.compute.amazonaws.com

Instance: i-0b41c97e113e07bd3 (ECS Instance - EC2ContainerService-myec2cluster) Public DNS: ec2-35-157-225-150.eu-central-1.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-0b41c97e113e07bd3	Public DNS (IPv4)	ec2-35-157-225-150.eu-central-1.compute.amazonaws.com
Instance state	running	IPv4 Public IP	35.157.225.150
Instance type	t2.micro	IPv6 IPs	-
Finding	Opt-in to AWS Compute Optimizer for recommendations. Learn more	Elastic IPs	-
Private DNS	ip-172-31-8-72.eu-central-1.compute.internal	Availability zone	eu-central-1c
Private IPs	172.31.8.72	Security groups	EC2ContainerService-myec2cluster-Ecs rules, view outbound rules
Secondary private IPs	-	Scheduled events	No scheduled events
VPC ID	vpc-6570b40f	AMI ID	amzn2-ami-ecs-hvm-2.0.20200402.x86_64
Subnet ID	subnet-bc21c8f0	Platform details	-

Before creating a service, update the Task Definition for EC2 Launch Types.

Update Task Definition for EC2 Launch Types

Open the Task Definition with the Apache container:

The screenshot shows the AWS Management Console's 'Task Definition' page. The 'Status' filter is set to 'ACTIVE'. A list of task definitions is displayed, with 'simple-apache-server' highlighted by a yellow circle and a mouse cursor. The task definition is in a 'running' state.

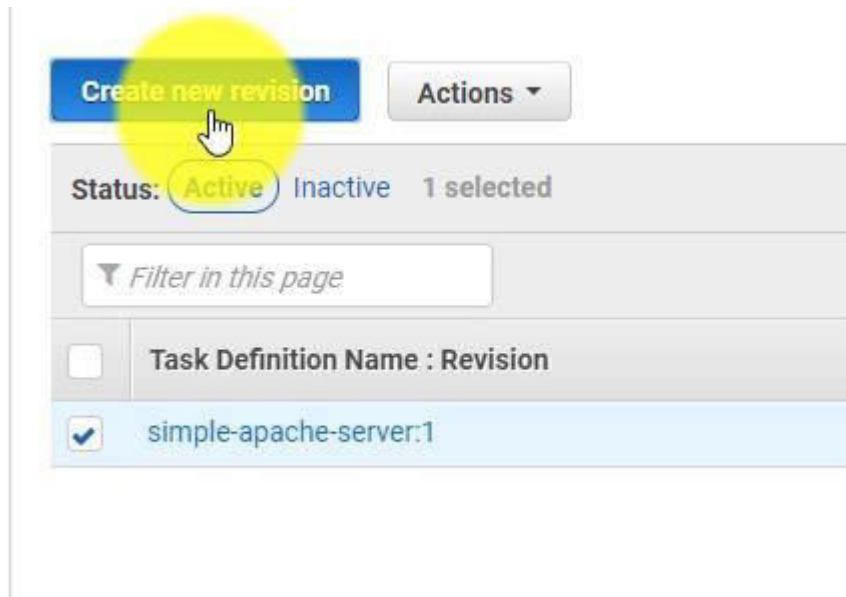
Create new Task Definition Create new revision Actions

Status: ACTIVE INACTIVE

Filter in this page

Task Definition
awscli3create
simple-apache-server

Create a new Revision:



Select

1. Network-Mode: <default> which is Bridge Mode and
2. EC2 Capabilities:

Task Definition Name* ⓘ

Task Role ⓘ

Optional IAM role that tasks can use to make API requests to authorized AWS services. Create an Amazon Elastic Container Service Task Role in the [IAM Console](#).

Network Mode ⓘ

If you choose <default>, ECS will start your container using Docker's default networking mode, which is Bridge on Linux and NAT on Windows. <default> is the only supported mode on Windows.

Requires compatibilities ☒ EC2 ☐ FARGATE

Edit the container to map port 8080 to port 80:

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The screenshot shows the AWS ECS console interface. On the left, there's a sidebar with sections like 'Task memory maximum allocation for container memory reservation', 'Task CPU maximum allocation for containers', 'Container Definitions', 'Constraint', 'Type', and 'Service Integration'. The 'Container Definitions' section is active, showing a table with columns 'Container Name' and 'Image'. A container named 'apachecontainer' is listed with image 'httpd:latest'. A red arrow points from this container to the 'Port mappings' section on the right. The 'Port mappings' section shows a table with columns 'Host port', 'Container port', and 'Protocol'. A port mapping is defined for host port 8080, container port 80, and protocol tcp. A yellow circle highlights the 'Add port mapping' button. Below the port mappings, there's an 'Advanced container configuration' section with a 'HEALTHCHECK' button.

Update the Container and Create the new Task Definition Revision.

Create a Service

Now let's create a Service:

The screenshot shows the AWS ECS console page for a cluster named 'myec2cluster'. The page title is 'Cluster : myec2cluster'. Below the title, it says 'Get a detailed view of the resources on your cluster.' The main content area shows cluster details: 'Cluster ARN' is 'arn:aws:ecs:eu-central-1:161952721022:cluster/myec2cluster', 'Status' is 'ACTIVE', 'Registered container instances' is '3', 'Pending tasks count' is '0 Fargate, 0 EC2', 'Running tasks count' is '0 Fargate, 0 EC2', 'Active service count' is '0 Fargate, 0 EC2', and 'Draining service count' is '0 Fargate, 0 EC2'. Below the details, there's a tabbed interface with tabs for 'Services', 'Tasks', 'ECS Instances', 'Metrics', 'Scheduled Tasks', 'Tags', and 'Capacity Providers'. The 'Services' tab is selected. In the 'Services' tab, there's a 'Create' button highlighted with a yellow circle, along with 'Update', 'Delete', and 'Actions' buttons. Below the buttons, there's a filter section with a 'Filter in this page' dropdown, 'Launch type' set to 'ALL', and 'Service type' set to 'ALL'. At the bottom, there's a table with columns 'Service Name', 'Status', 'Service type', and 'Task Definition'. The table is currently empty, showing 'No results'.

Select the EC2 Launch Type (1), your latest revision of the Task Definition (2) and (3), give the service a name (4) and start 2 tasks (5):

Configure service

A service lets you specify how many copies of your task definition to run and maintain in a cluster. You can optionally use a Load Balancing load balancer to distribute incoming traffic to containers in your service. Amazon ECS maintains that number and coordinates task scheduling with the load balancer. You can also optionally use Service Auto Scaling to adjust the number of tasks in your service.

The screenshot shows the 'Configure service' form in the AWS Management Console. Red circles with numbers 1 through 5 highlight specific fields: 1 points to the 'Launch type' section where 'EC2' is selected; 2 points to the 'Task Definition' dropdown menu showing 'simple-apache-server'; 3 points to the 'Revision' dropdown menu showing '2 (latest)'; 4 points to the 'Service name' text input field containing 'apacheservice'; and 5 points to the 'Number of tasks' text input field containing '2'. Other visible fields include 'Cluster' (myec2cluster), 'Service type*' (REPLICA selected), 'Minimum healthy percent' (100), and 'Maximum percent' (200). Information icons (i) are present next to several fields.

Next step, select “application load balancer”. Open the EC2 Dashboard in a new Tab to create a load balancer first:

1. Application Load Balancer
2. Place it in the three subnets of your default VPC
3. Create a new Security Group
4. Create a new Target Group, type “Instance”
5. Create the load balancer without registering any targets

Go back to the other tab with the creation of the ECS Service, select your load balancer:

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Load balancer name

Container to load balance

apachecontainer : 80 [Remove](#)

Production listener port*

Production listener protocol* HTTP

Target group name

Target group protocol HTTP

Target type instance

Path pattern Evaluation order

Health check path

Additional health check options can be configured in the ELB console after you create your service.

Remove the Service Discovery, Do not Adjust the Service's desired count and Create the Service.

Wait until the Tasks are running:

Clusters > myec2cluster

Cluster : myec2cluster [Update Cluster](#) [Delete Cluster](#)

Get a detailed view of the resources on your cluster.

Cluster ARN arn:aws:ecs:eu-central-1:161952721022:cluster/myec2cluster

Status **ACTIVE**

Registered container instances 3

Pending tasks count 0 Fargate, 2 EC2

Running tasks count 0 Fargate, 0 EC2

Active service count 0 Fargate, 1 EC2

Draining service count 0 Fargate, 0 EC2

Services Tasks **ECS Instances** Metrics Scheduled Tasks Tags Capacity Providers

[Run new Task](#) [Stop](#) [Stop All](#) [Actions](#)

Last updated on April 7, 2020 1:01:03 PM (0m ago)

Desired task status: **Running** Stopped

Launch type ALL < 1-2 > Page size 50

<input type="checkbox"/>	Task	Task definition	Container instance	Last status	Desired status	Started By	Group	Launch type	Platform version
<input type="checkbox"/>	d10b4f71-1f25-4267-98...	simple-apache-server:2	34a97847-3d7b-4104-a...	RUNNING	RUNNING	ecs-svc/751931372723...	service.apacheservice	EC2	--
<input type="checkbox"/>	f83e8ccb-e22b-4d2e-bd...	simple-apache-server:2	254558e0-427e-4ff9-a0...	RUNNING	RUNNING	ecs-svc/751931372723...	service.apacheservice	EC2	--

Open the Service and have a look at the logs:

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Service : apacheservice Update Delete

Cluster: myec2cluster Desired count: 2

Status: **ACTIVE** Pending count: 0

Task definition: simple-apache-server:2 Running count: 2

Service type: REPLICAS

Launch type: EC2

Service role: ecsServiceRole

Details Tasks Events Auto Scaling Deployments Metrics Tags **Logs**

Task status: **RUNNING** STOPPED

Last updated on April 7, 2020 1:01:10 PM (0m ago)

Filter logs

Timestamp (UTC+00:00)	Message	Task
2020-04-07 13:01:04	[Tue Apr 07 11:01:04.244156 2020] [mpm_event:notice] [pid 1:tid 140037212394624] AH00489: Apache/2...	d10b4f71-1f25-4267-98fc-8017d34cbf9a
2020-04-07 13:01:04	[Tue Apr 07 11:01:04.244376 2020] [core:notice] [pid 1:tid 140037212394624] AH00094: Command line: h...	d10b4f71-1f25-4267-98fc-8017d34cbf9a
2020-04-07 13:01:04	AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. S...	d10b4f71-1f25-4267-98fc-8017d34cbf9a
2020-04-07 13:01:04	AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. S...	d10b4f71-1f25-4267-98fc-8017d34cbf9a
2020-04-07 13:01:03	[Tue Apr 07 11:01:03.715445 2020] [mpm_event:notice] [pid 1:tid 140184193873024] AH00489: Apache/2...	f83e8ccb-e22b-4d2e-bd86-517e3ae91d19
2020-04-07 13:01:03	[Tue Apr 07 11:01:03.715643 2020] [core:notice] [pid 1:tid 140184193873024] AH00094: Command line: h...	f83e8ccb-e22b-4d2e-bd86-517e3ae91d19
2020-04-07 13:01:03	AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. S...	f83e8ccb-e22b-4d2e-bd86-517e3ae91d19
2020-04-07 13:01:03	AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 172.17.0.2. S...	f83e8ccb-e22b-4d2e-bd86-517e3ae91d19

Test the Service

Open the load balancer URL when it switched from “provisioning” to “active”:

aws Services Resource Groups

New EC2 Experience

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts **New**

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

Lifecycle Manager

NETWORK & SECURITY

Security Groups **New**

Create Load Balancer

Filter by tags and attributes or search by keyword

Name	DNS name	State	VPC ID	Availability Zones
ec2-lb	ec2-lb-1314026108.eu-central-1...	provisioning	vpc-6570b40f	eu-central-1c, eu-cer

Load balancer: ec2-lb

Description Listeners Monitoring Integrated services Tags

Basic Configuration

Name	ARN	DNS name
ec2-lb	arn:aws:elasticloadbalancing:eu-central-1:161952721022:loadbalancer/app/ec2-lb/13a40dd51dcff279	ec2-lb-1314026108.eu-central-1.elb.amazonaws.com

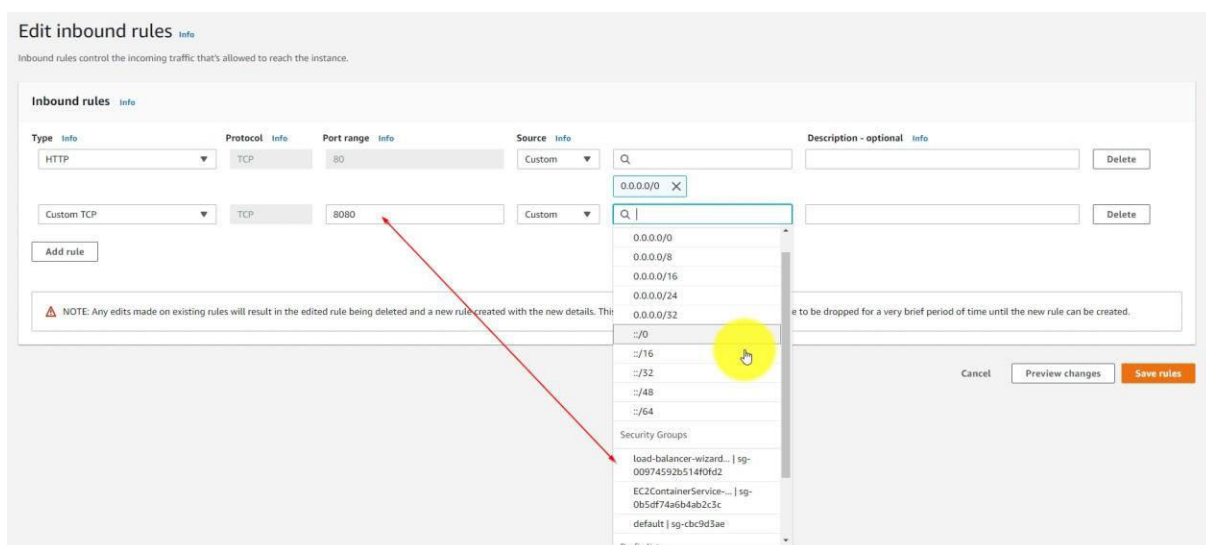
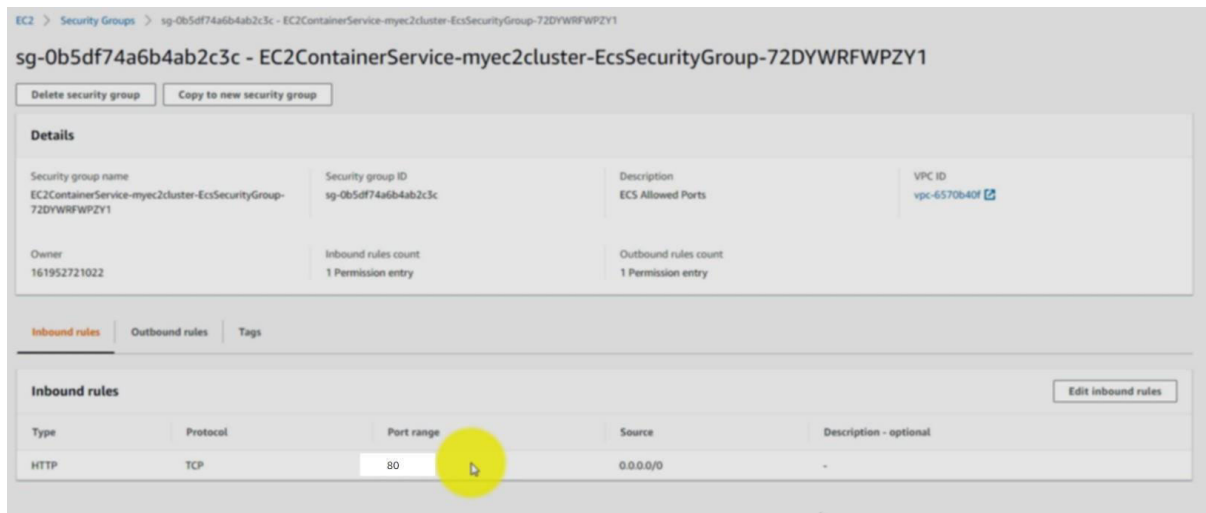
Why does it time-out? Is it because the targets are all unhealthy? No!

Checkout the Security group for the EC2 Containers.

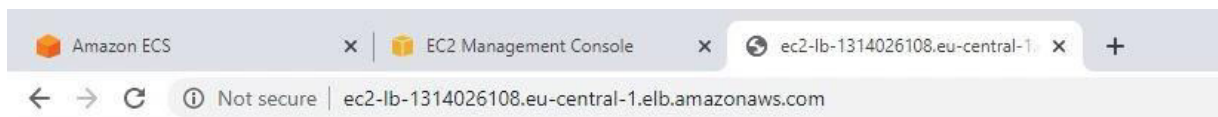
Fix the Security Group Settings

The security group for the Containers should allow incoming traffic from the load balancer on port 8080, because we mapped the apache container to port 8080 on the ECS EC2 Instances, so we have to fix this:

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If you reload your load balancer then it should work:



It works!

Cleanup

To cleanup delete

1. The service
 - a. And stop the tasks if that takes too long
2. The cluster with the EC2 Instances
3. The load balancer
4. The security groups

Lab End
