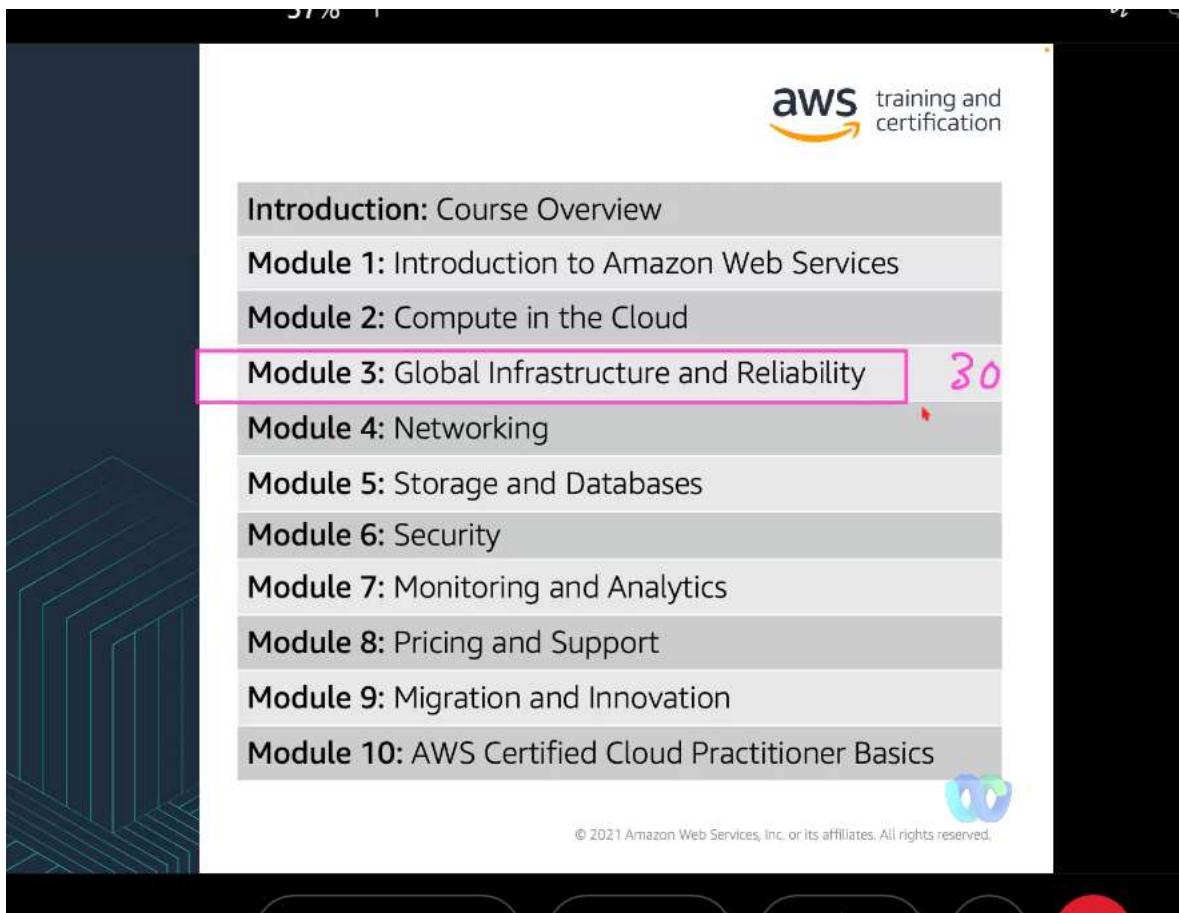


=====Aws Cloud Practitioner==



Learning Objectives

For each assignment, you will receive an automated account to build a new solution on the AWS console.

Assignment Title	Business Request	Learning Objectives
Cloud Computing Essentials	The city's web portal needs to migrate the beach wave size prediction page to AWS to improve reliability.	Articulate the characteristics of the AWS cloud computing platform. Describe the core benefits of using AWS products and services. Compare and contrast AWS cloud services to On-Premises infrastructure. Implement hosting a static web page using Amazon S3.

Cloud First Steps	<p>The island's stabilization system is failing and needs increased reliability and availability for its computational modules.</p>	<p>Summarize AWS Infrastructure benefits. Describe AWS Regions and Availability Zones. Deploy Amazon EC2 instances into multiple Availability Zones.</p>
Computing Solutions	<p>The school server that runs the scheduling solution needs more memory. Assist with vertically scaling their Amazon EC2 instance.</p>	<p>Describe Amazon EC2 instance families and instance types. Describe horizontal and vertical scaling. Recognize options for connecting to Amazon EC2 instances.</p>
Networking Concepts	<p>Help the bank setup a secure networking environment which allows communication between resources and the internet.</p>	<p>Define key features of VPCs, subnets, internet gateways and route tables. Describe the benefits of using Amazon VPCs. State the basics of CIDR block notation and IP addressing. Explain how VPC traffic is routed and secured using gateways, network access control lists, and security groups.</p>
Databases in Practice	<p>Improve the insurance company's relational database operations, performance, and availability.</p>	<p>Review the features, benefits and database types available with Amazon RDS. Describe vertical and horizontal scaling on Amazon RDS. Use Amazon RDS read replicas to increase database performance. Implement multi-AZ deployments of Amazon RDS to increase availability.</p>
Connecting VPCs	<p>The city's marketing team wants separate Amazon VPCs for each department that allows</p>	<p>Summarize how VPC peering works with Amazon VPC. Explain the steps for establishing a VPC peering</p>

	<p>communication between Amazon VPCs.</p>	<p>connection.</p> <p>Create a peering connection between two Amazon VPCs.</p> <p>Establish a peering connection between Amazon VPCs using a specific subnet.</p>
First NoSQL Database	<p>Help the island's streaming entertainment service implement a NoSQL database to develop new features.</p>	<p>Summarize the different uses of common purpose-built databases.</p> <p>Describe the features and benefits of Amazon DynamoDB.</p> <p>Interact with the elements and attributes of an Amazon DynamoDB database.</p> <p>Set Up a NoSQL database with Amazon DynamoDB.</p>
File Systems in the Cloud	<p>Help the city's pet modeling agency share file data without provisioning or managing storage.</p>	<p>Summarize the different storage options available on AWS.</p> <p>Summarize the key features and benefits of Amazon EFS.</p> <p>Identify business use cases for Amazon EFS.</p> <p>Configure Amazon EFS endpoints to access centralized storage.</p>
Auto-healing and Scaling Applications	<p>Assist the city's gaming cafe with implementing auto healing servers while restricting patrons to a specific provisioning capacity.</p>	<p>Describe the auto healing and scaling capabilities offered by Auto Scaling groups.</p> <p>Create an Auto Scaling group with strict resource boundaries.</p> <p>Configure an Auto Scaling group to respond to a time-based event.</p>
Highly Available Web Applications	<p>Help the travel agency create a highly available web application architecture.</p>	<p>Describe the principles for architecting highly available applications.</p> <p>Summarize the benefits of using an AWS Application Load Balancer (ALB).</p>

Core Security Concepts

Help improve security at the city's stock exchange by ensuring that support engineers can only perform authorized actions.

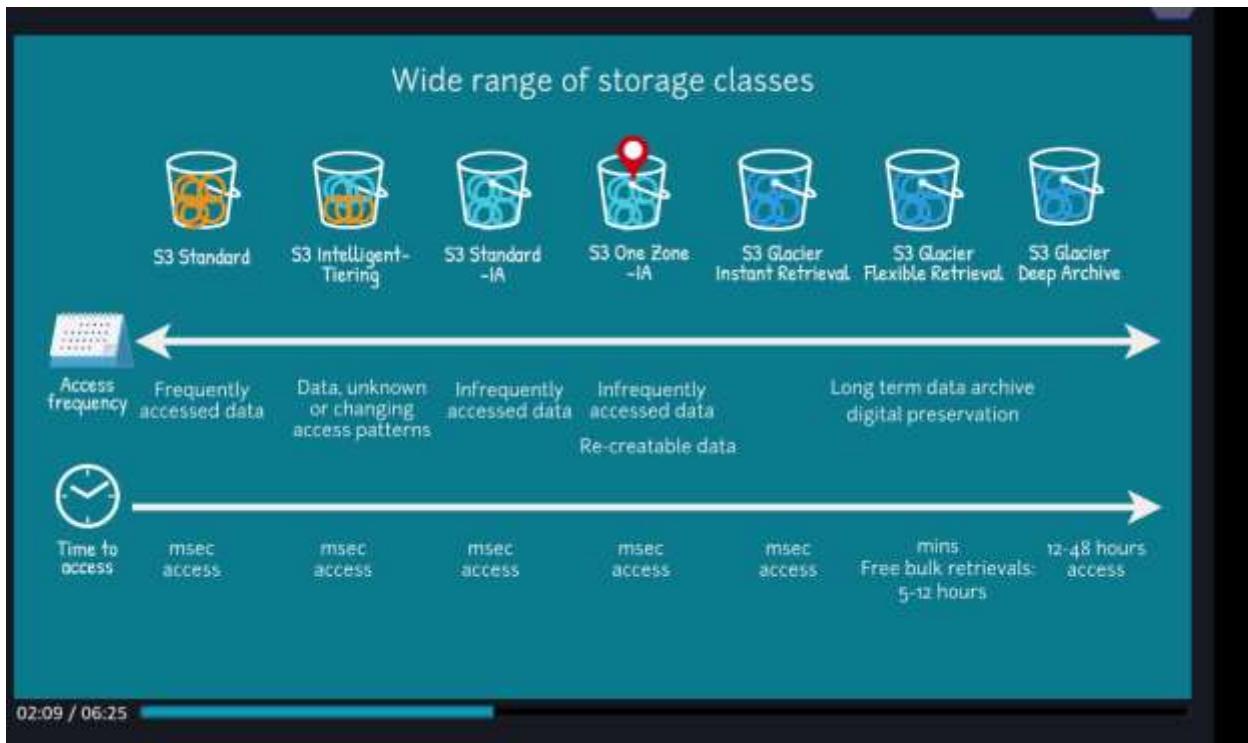
Use Auto Scaling groups with load balancing and health monitoring.

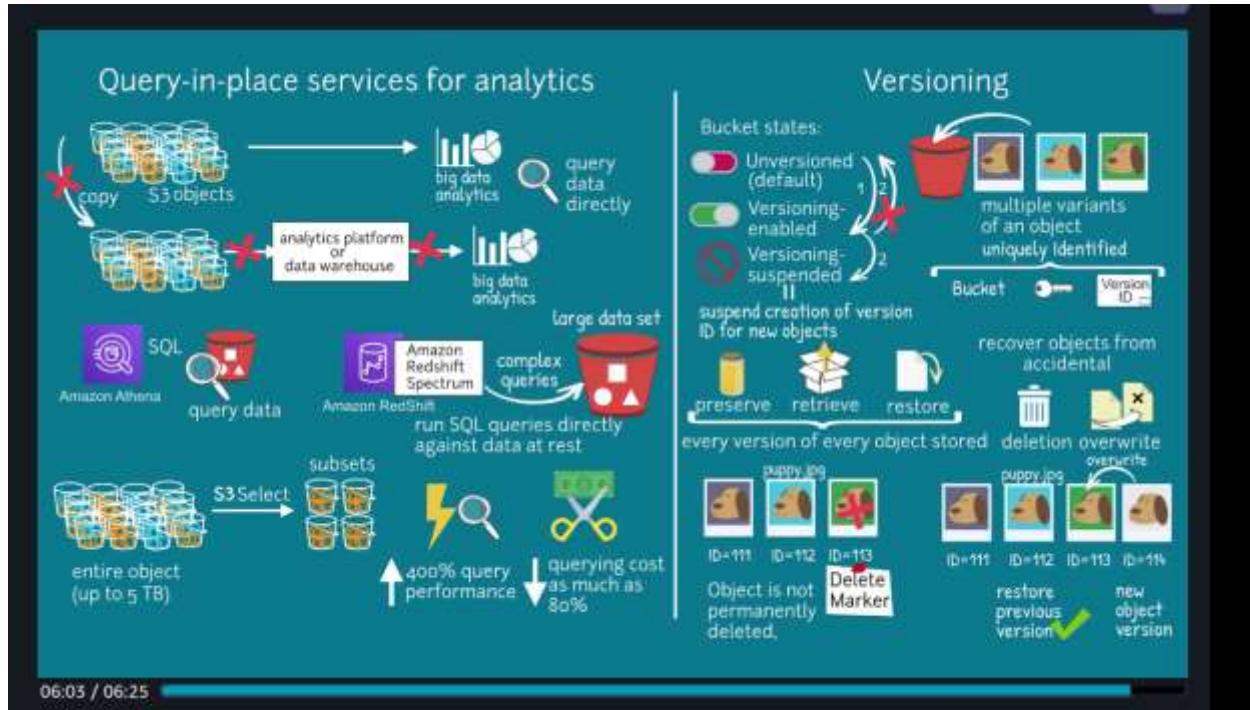
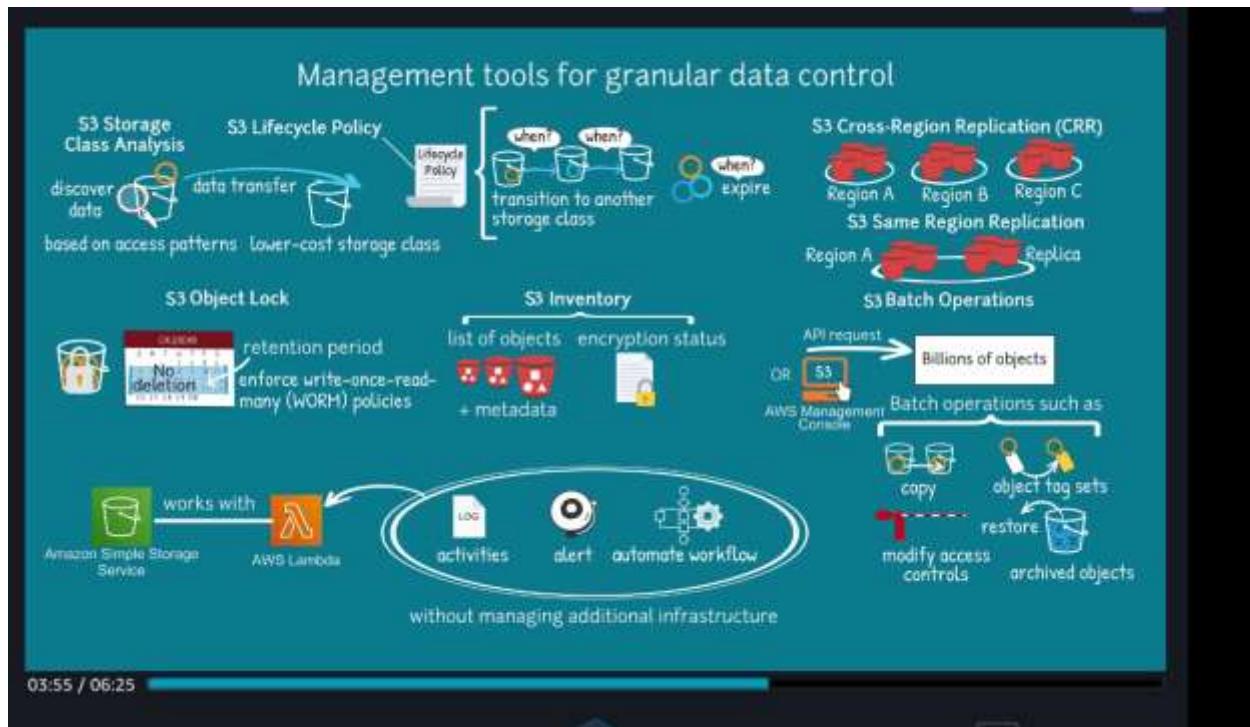
Cloud Economics

The city's surf board shop needs a cost estimation of an architecture with variable resource usage.

Describe the creation process and differences between AWS IAM users, roles, and groups. Review the structure and components of AWS IAM Policies. Summarize the AWS Shared Responsibility Model and compliance programs.

AWS S3 more Features:





Amazon S3 More Features

Amazon Simple Storage Service

Wide range of storage classes

Storage Class	Access Frequency	Access Patterns	Retention	Cost
S3 Standard	Frequently accessed data	Daily/unknown	1000+ objects	Low
S3 Intelligent-Tiering	Frequently accessed data	Changing	1000+ objects	Moderate
S3 Standard-IA	Infrequently accessed data	Months	1000+ objects	Moderate
S3 One Zone - IA	Infrequently accessed data	Years	1000+ objects	Moderate
S3 Glacier Instant Retrieval	Infrequently accessed data	Years	1000+ objects	Very Low
S3 Glacier Deep Archive	Infrequently accessed data	Decades	< 100 objects	Very Low

Time to access: From seconds to 16+ hours

Management tools for granular data control

- S3 Storage Class Analysis
- S3 Lifecycle Policy
- Amazon KMS
- S3 Object Lock
- S3 Batch Operations
- S3 Inventory
- S3 Object Tagging
- Amazon VPC Endpoint Services

Virtual managing additional architecture

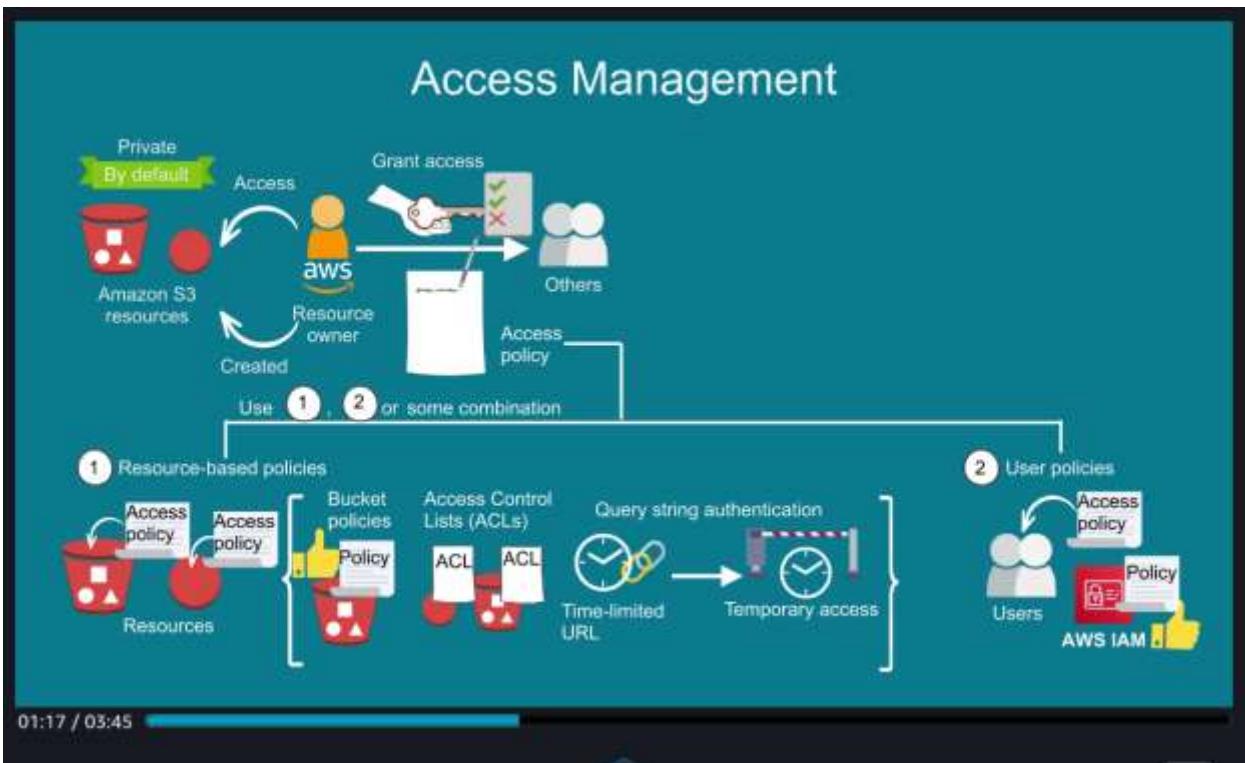
Query-in-place services for analytics

- S3 Cross-Region Replication (CRN)
- S3 Same Region Replication
- Amazon Redshift
- Amazon Athena
- Amazon Lambda
- Amazon CloudWatch Metrics
- Amazon Kinesis
- Amazon S3 Data API
- Amazon S3 Data Pipeline
- Amazon S3 Batch Operations
- Amazon S3 Batch Transform
- Amazon S3 Transfer Acceleration
- Amazon S3 Batch Store

Versioning

- Bucket status: Unversioned (off), Versioning enabled (on), Versioning suspended (grey).
- Multiple versions of an object: multiple versions of an object identified.
- Object: Version, Creation date, Last modified, Last modified date.
- Bucket: Bucket creation date, Last modified date, Objects, Version count, Version count by last modified, Last modified date, Version retention rule.
- Actions: Get, Put, Delete, Delete marker.

06:10 / 06:25



Resource-based Policies

The diagram illustrates the differences between Access Control Lists (ACLs) and Bucket Policies.

Access control lists:

- ACL:** Represented by a red bucket icon. It uses XML or JSON format.
- Type of access:** AWS accounts and Groups.
- Default ACL:** A screenshot shows a UI for creating an ACL with "Full control" permissions.
- ACL permissions:** Read / Write permissions can be granted to Other AWS accounts.

Bucket Policies:

- Bucket policy (JSON):** Represented by a red bucket icon with a policy document icon.
- Permissions:** All objects in an S3 bucket.

Example Bucket Policy (JSON):

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": [
        "arn:aws:iam::111122223333:user/Alice",
        "arn:aws:iam::111122223333:root"
      ],
      "Action": "s3:*",
      "Resource": [
        "arn:aws:s3:::my_bucket",
        "arn:aws:s3:::my_bucket/*"
      ]
    }
  ]
}
```

Annotations explain the policy elements:

- Root account:** Points to the "arn:aws:iam::111122223333:root" principal.
- IAM user:** Points to the "arn:aws:iam::111122223333:user/Alice" principal.
- Any S3 operation:** Points to the "Action: s3:*".
- S3 bucket named "my_bucket"** and **all objects in the bucket:** Points to the "Resource" section.

User Policies

The diagram shows how User Policies work in AWS IAM.

AWS Identity and Access Management (IAM):

- User policies (JSON):** Represented by a blue person icon with a policy document icon.
- Who has access?** A question mark icon.
- Entity:** A blue person icon.
- Principal:** A blue person icon with a checkmark icon.
- Example:** A screenshot of a policy document.
- By default:** A green arrow points to the policy document.

Example User Policy (JSON):

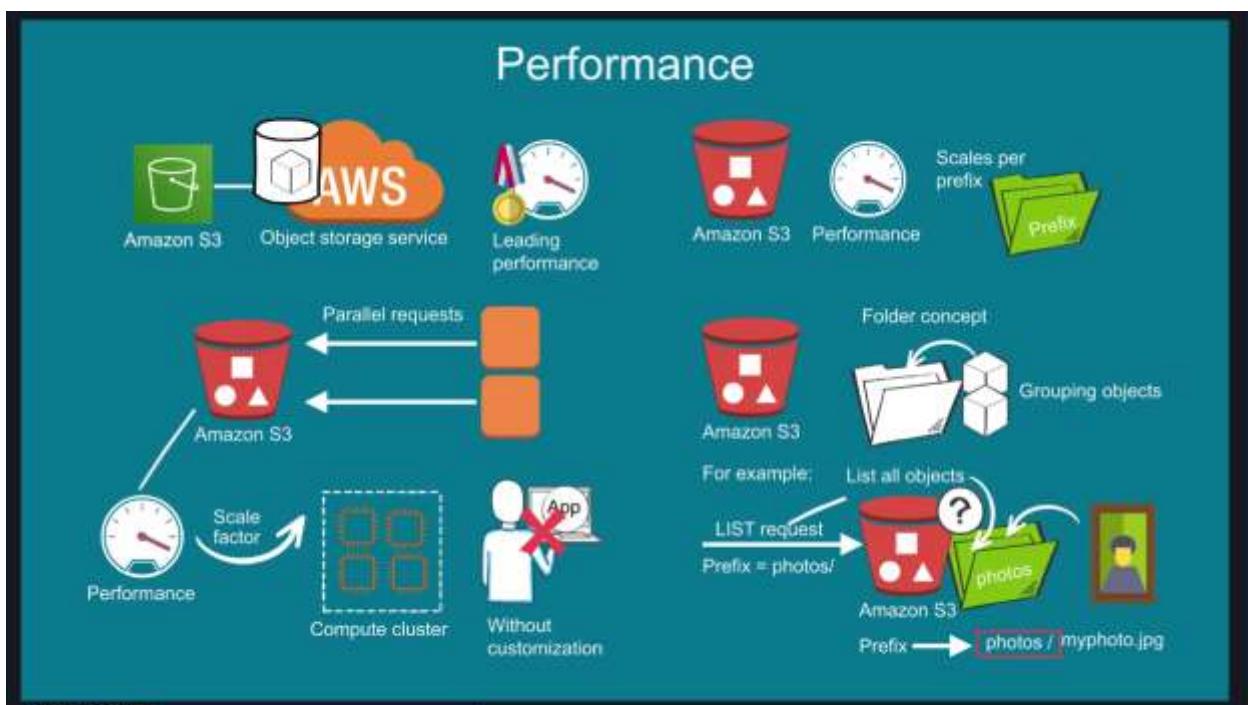
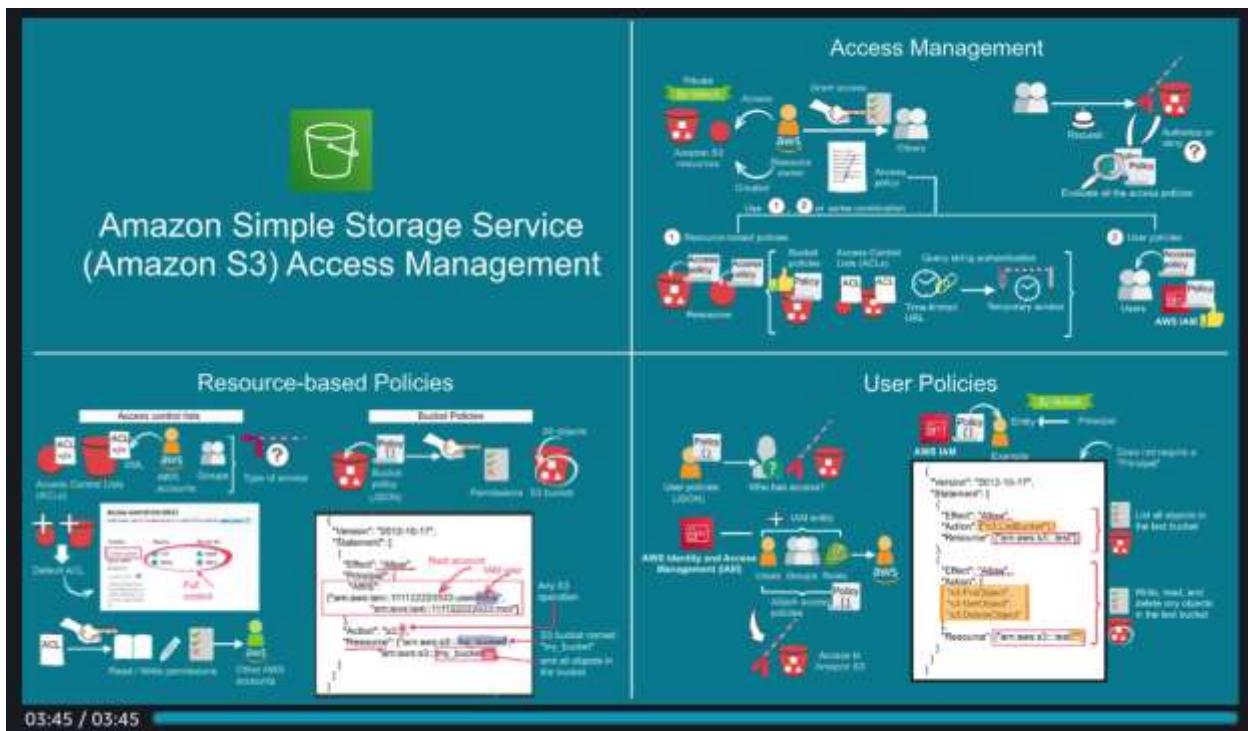
```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "s3>ListBucket",
      "Resource": "arn:aws:s3:::test"
    },
    {
      "Effect": "Allow",
      "Action": [
        "s3:PutObject",
        "s3:GetObject",
        "s3>DeleteObject"
      ],
      "Resource": "arn:aws:s3:::test/*"
    }
  ]
}
```

Annotations explain the policy elements:

- List all objects in the test bucket:** Points to the "s3>ListBucket" action.
- Write, read, and delete any objects in the test bucket:** Points to the "s3:PutObject", "s3:GetObject", and "s3>DeleteObject" actions.

Attach access policies: A blue arrow points from the policy document to the IAM entity.

Access to Amazon S3: A blue bucket icon with a checkmark icon.



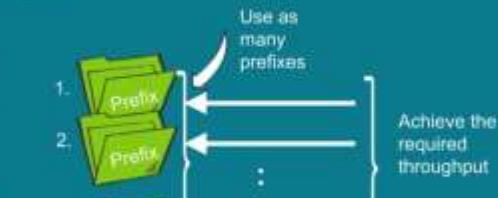
Performance



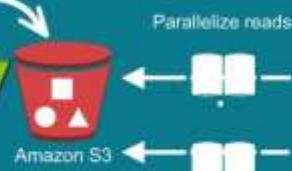
Amazon S3 Performance



- Put / Copy / Post / Delete 3,500 requests per second
- Get / Head 5,500 requests per second



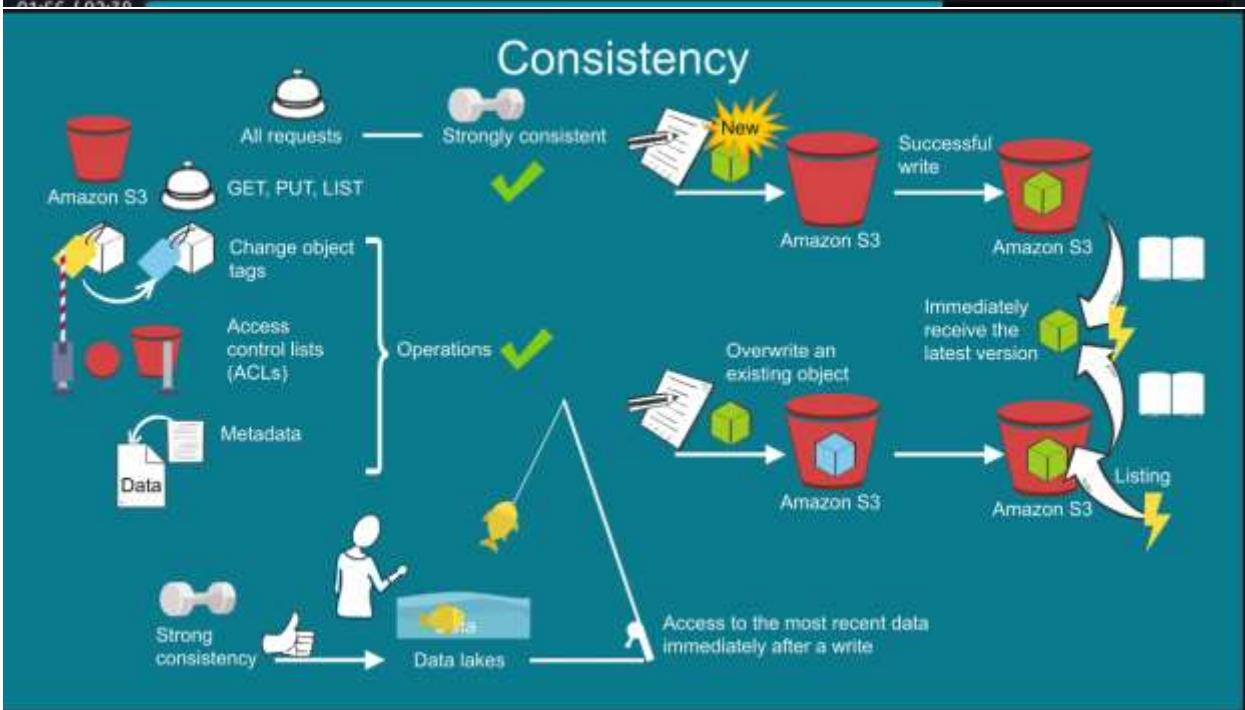
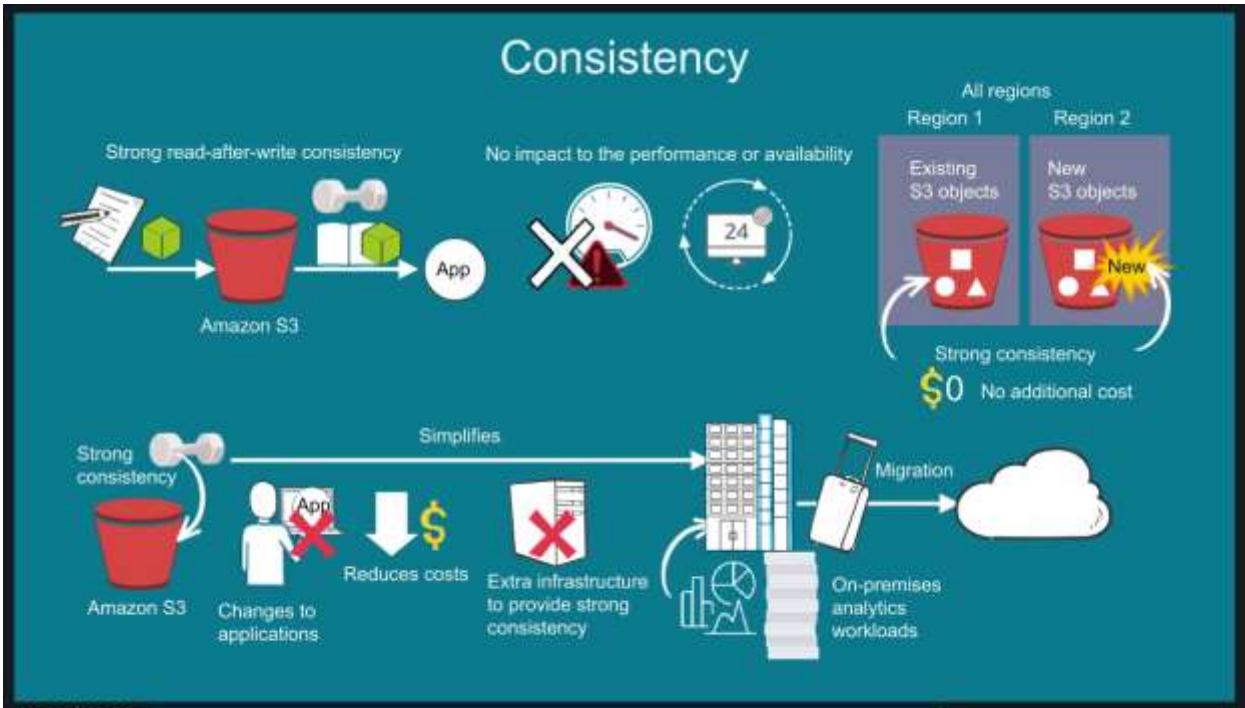
+ 10 prefixes

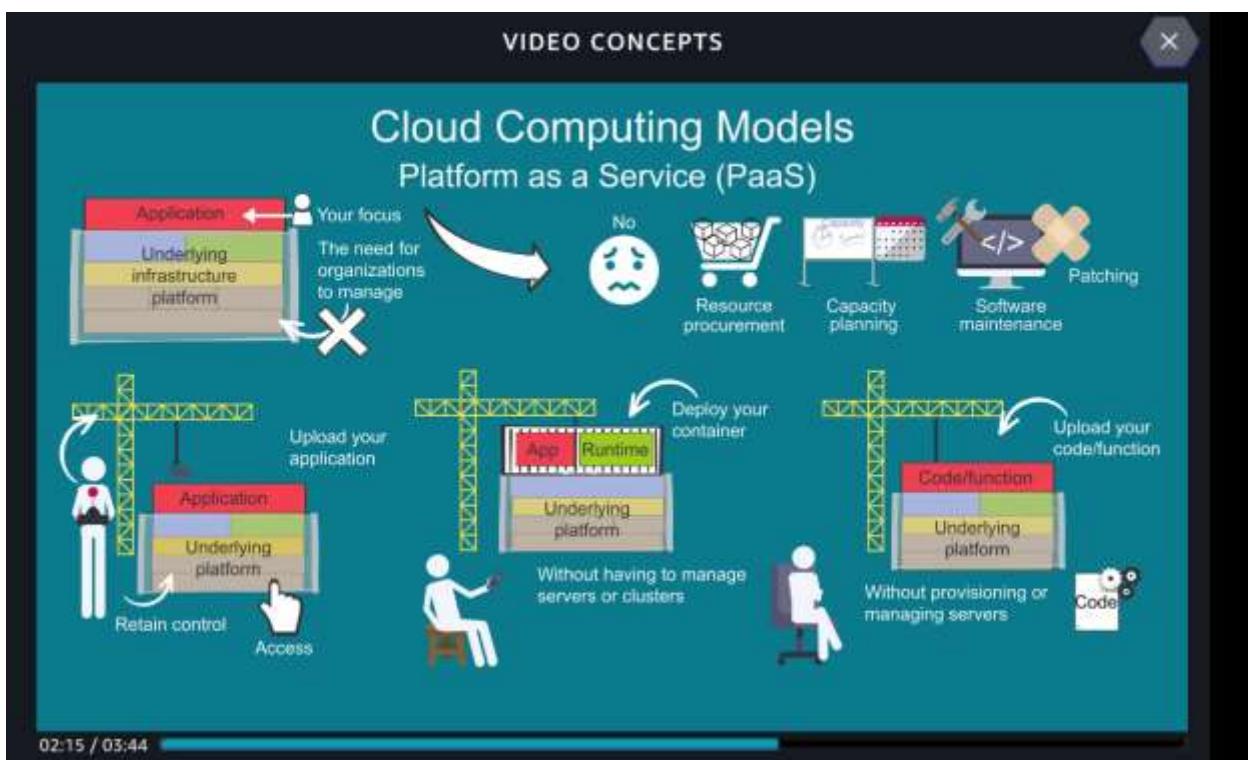
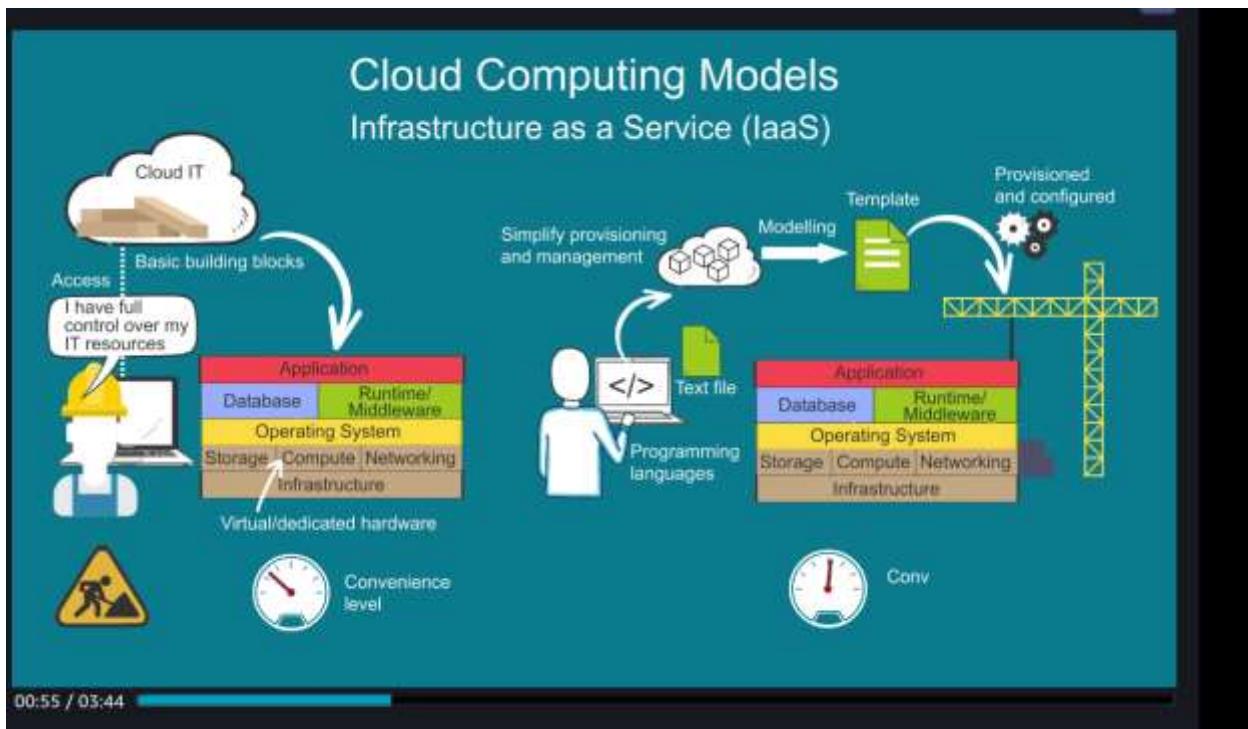


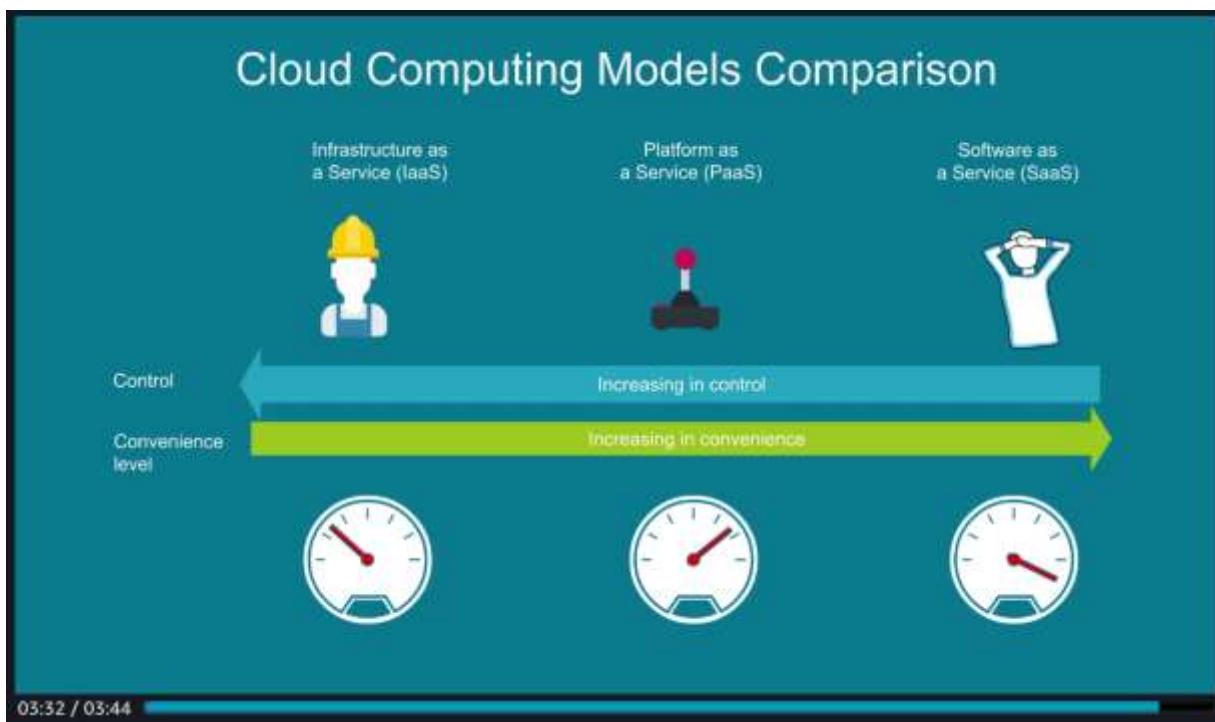
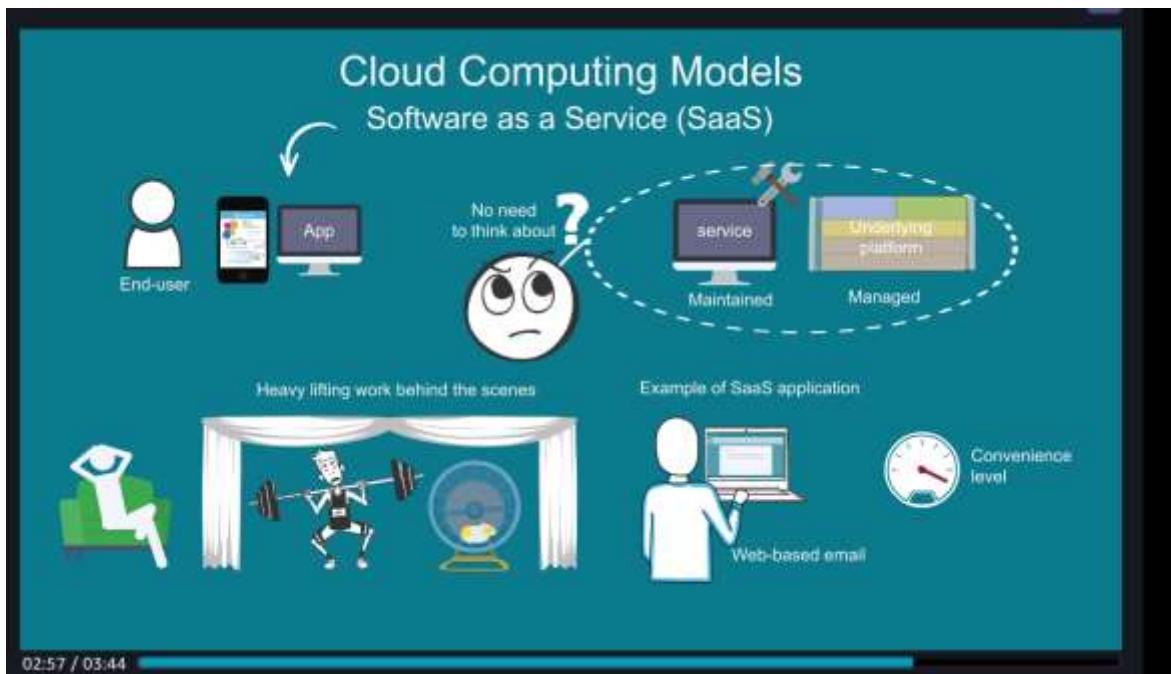
10 x
55,000 requests per second

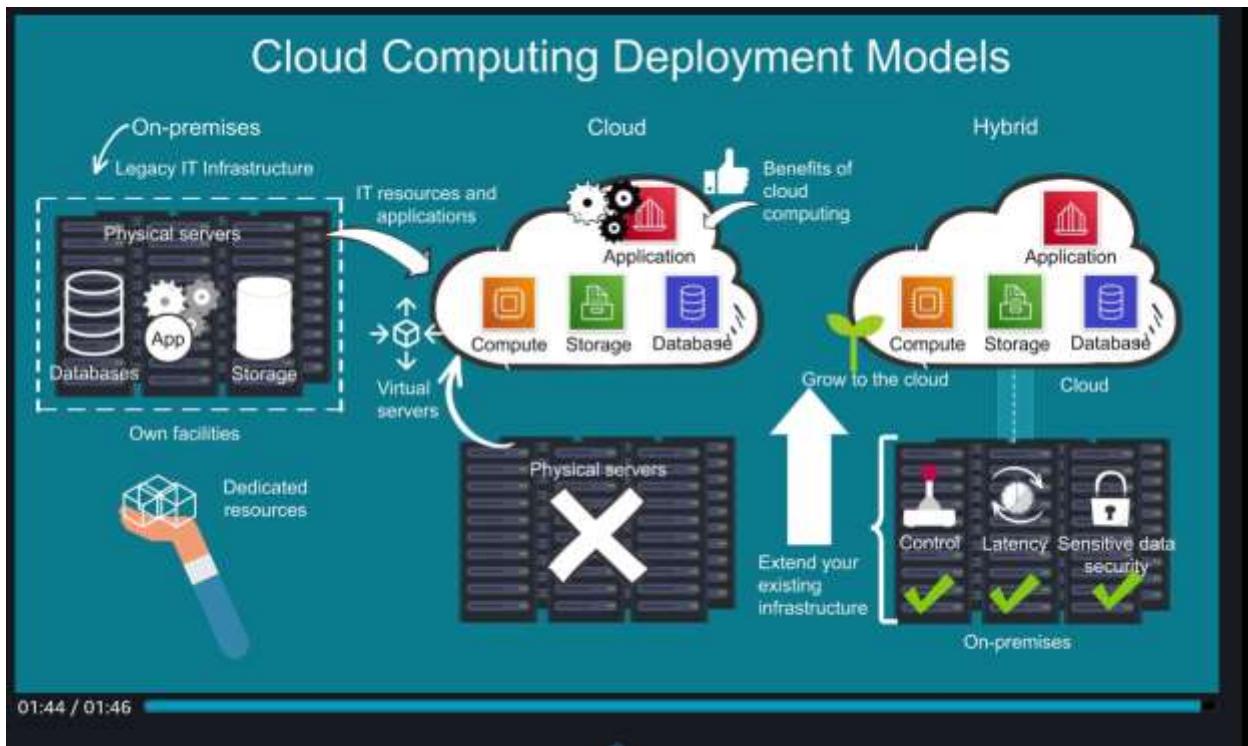
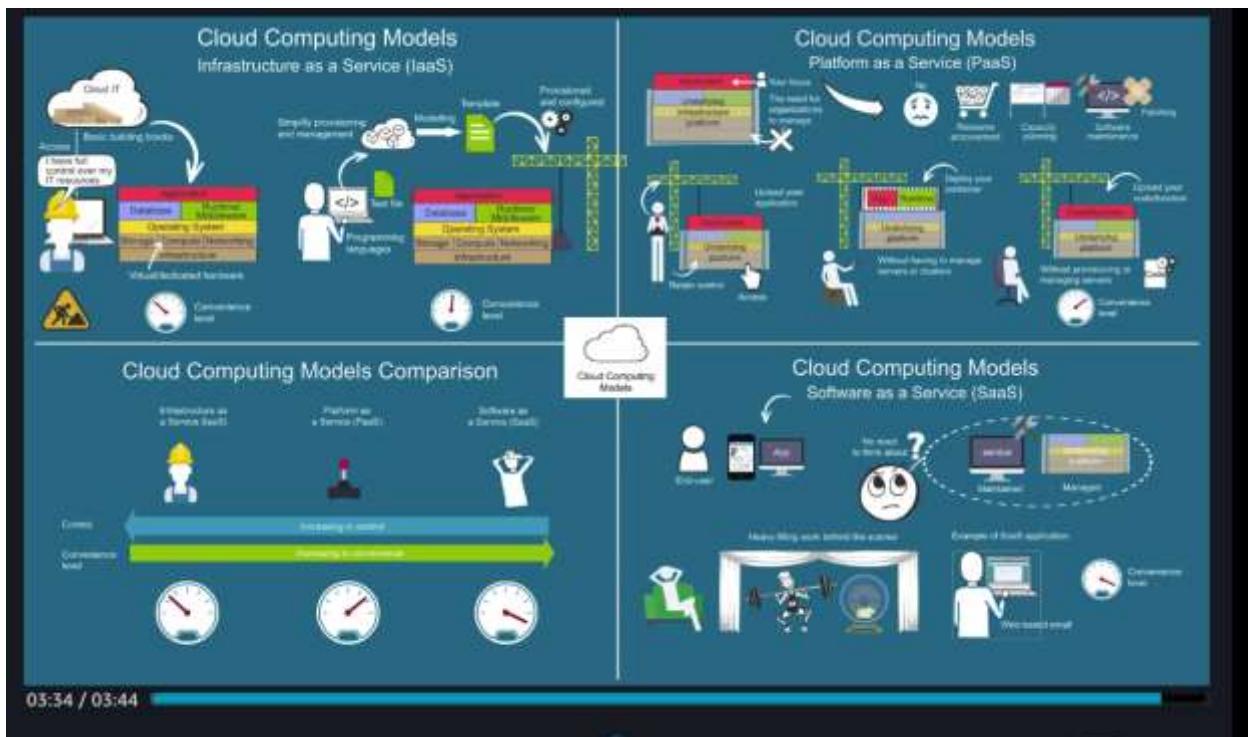
Read performance

01:21 / 02:38









2 Plan

This is the Plan section. It details the building activities that are required for the solution. Here you will review the tasks you must complete in the Practice and DIY sections.

Practice Lab Goals

- Create an S3 bucket.
- Configure S3 bucket web hosting.
- Upload lab files to S3 bucket.

DIY Goals

Based on what you have learned:

- Rename index.html to www.html

The diagram illustrates the architecture for hosting a static website. An 'Instant Web Portal' (laptop icon) is connected via an arrow to an 'Amazon S3' bucket (cloud icon). The S3 bucket contains an 'index.html' file. A separate arrow points from the S3 bucket to a server icon labeled 'Amazon EC2'. Another arrow points from the EC2 instance to a monitor icon labeled 'Amazon CloudFront'. Finally, an arrow points from CloudFront to a smartphone icon labeled 'Mobile Device'.

Next

Learn | Practice | EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete your assignments.

Lab File Steps

Cloud Computing Essentials

STEP 1:

- Review the lab objectives in the concepts field.
- Click Start Lab to provision your environment, then click Open AWS Console to begin.
- Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Create an Amazon S3 bucket.
- Enable static web site hosting.
- Secure an Amazon S3 bucket using a bucket policy.

Step 1/27

Practice Lab

This is the Practice section. Here you will build the first part of the solution using an AWS account that has been prepared for you.

Next

Hosting a Static Website on Amazon S3

2 Plan | 4 DIY | EXIT

3 Practice

Lab is Ready! (01:59:02)

Open AWS Console

Custom: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your account to be reviewed.

Lab Files Step 1

Cloud Computing Essentials

STEP 1:

- Review the lab objectives in the concepts field.
- Click Start Lab to provision your environment, then click Open AWS Console to begin.
- Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT:

In this lab you will:

- Create an Amazon S3 bucket.
- Enable static website hosting.
- Secure an Amazon S3 bucket using a certificate.

Step 1/27

Let's move on to the DIY section. Click DIY.

4 DIY EXIT

4 DIY

Lab is Ready! (01:59:02)

Open AWS Console

Custom: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your account to be reviewed.

Lab File DIY Activity

Cloud Computing Essentials

DIY ACTIVITIES:

- Rename index.html to www.html

SOLUTION VALIDATION METHOD:

Validation Process:

Our test servers will send an HTTP GET request to the default page in your Amazon S3 bucket. You must rename index.html to www.html.

If www.html exists within your Amazon S3 bucket, validation will succeed.

Hint: Use the Actions menu to rename index.html to www.html, then type your bucket name into the validation field.

VALIDATION FORM

Please type the validation criteria below.

Bucket Name

VALIDATE

SKIP

VALIDATION MESSAGE

This is the DIY section. It details what you must do to complete the remaining portion of the solution.

NEXT

3 Practice EXIT

3 Practice

Cloud Computing Essentials

STEP 1

1. Review the lab objectives in the concepts field.
2. Click Start Lab to provision your environment, then click Open AWS Console to begin.
3. Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Create an Amazon S3 bucket.
- Enable static web site hosting.
- Secure an Amazon S3 bucket using a

Lab Files Steps

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Step 1/27

2 Plan 4 DIY EXIT

Hosting a Static Website on Amazon S3

3 Practice

Cloud Computing Essentials

STEP 3

1. Double-click the zipped folder to extract the content, then review the files downloaded.
 - You will see the five files listed below.
2. Go to the next step.

index.html
main.js
style.css
target-file.csv
policy.txt

Name

- index.html
- main.js
- policy.txt
- style.css
- target-file.csv

1. Review

Lab Files Steps

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Step 3/27

2 Plan 4 DIY EXIT

3 Practice

Lab is Ready [01:48:34]

Open AWS Console

Cloud Computing Essentials

STEP 4

1. Go to the AWS Console page tab, then in the Services search field, type:

S3

2. Click S3 in the search results.

3. Go to the next step.

CONCEPT

The AWS Management Console is a web interface to access and manage the broad collection of services provided by Amazon Web Services.

Step 4/27

◀ ▶

AWS Services

Search results for S3

Services (1)

Features (0)

Documentation (196,017)

Marketplace (618)

S3 Click Scalable Storage in the Cloud

S3 Glacier Archive Storage in the Cloud

Athena Query Data in S3 using SQL

AWS Snow Family Large Scale Data Transport

Features

See all 10 results

Amazon S3 File Gateway Storage Gateway feature

Datasets IoT Analytics feature

WS resources

Next supports download the AWS mobile app for iOS or Android

Dashboard with metrics covering storage

SQL GraphQL service for developers

◀ ▶

2 Plan 4 DIY > EXIT

This screenshot shows the AWS Management Console search interface. The search term 'S3' has been entered into the search bar. Below the search bar, there are two sections: 'Services' and 'Features'. Under 'Services', 'S3' is listed with a 'Click' button. Other services like 'S3 Glacier' and 'Athena' are also listed. Under 'Features', 'Amazon S3 File Gateway' and 'Datasets' are listed. To the right, there's a sidebar titled 'WS resources' with links for the AWS mobile app and a dashboard. At the bottom, there are navigation buttons for 'Plan', 'DIY', and 'EXIT'.

3 Practice

Lab is Ready [01:47:41]

Open AWS Console

Cloud Computing Essentials

STEP 5

1. Click Create Bucket.

Note: If you see a note about temporarily re-enabling the previous Amazon S3 console, click Switch to the new console.

2. Go to the next step.

CONCEPT

A bucket is a container for objects stored in Amazon S3. Every object is contained in a bucket. You can configure buckets so that they are created in a specific AWS Region.

Step 5/27

◀ ▶

Amazon S3

Amazon S3

Regions

Access Points

Object Lambda Access Points

Access Conditions

Access analysis for S3

Block Public Access settings for this account

Storage Lens

Dashboard

AWS Organizations settings

Feature spotlight

AWS Marketplace for S3

Account ID

Account snapshot

Total storage: 25.20B Objects count: 1 Avg. object size: 21.2 kB

View Storage Lens dashboard

Buckets (1)

Buckets are containers for data stored in S3. Learn more

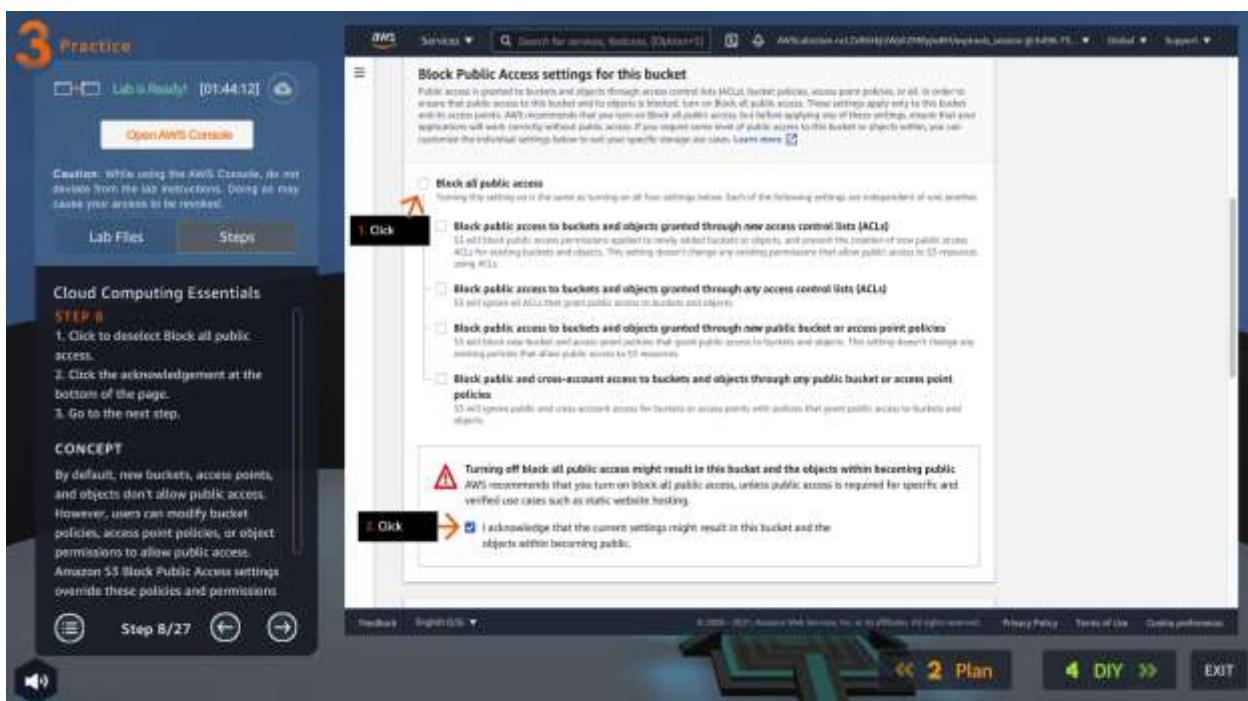
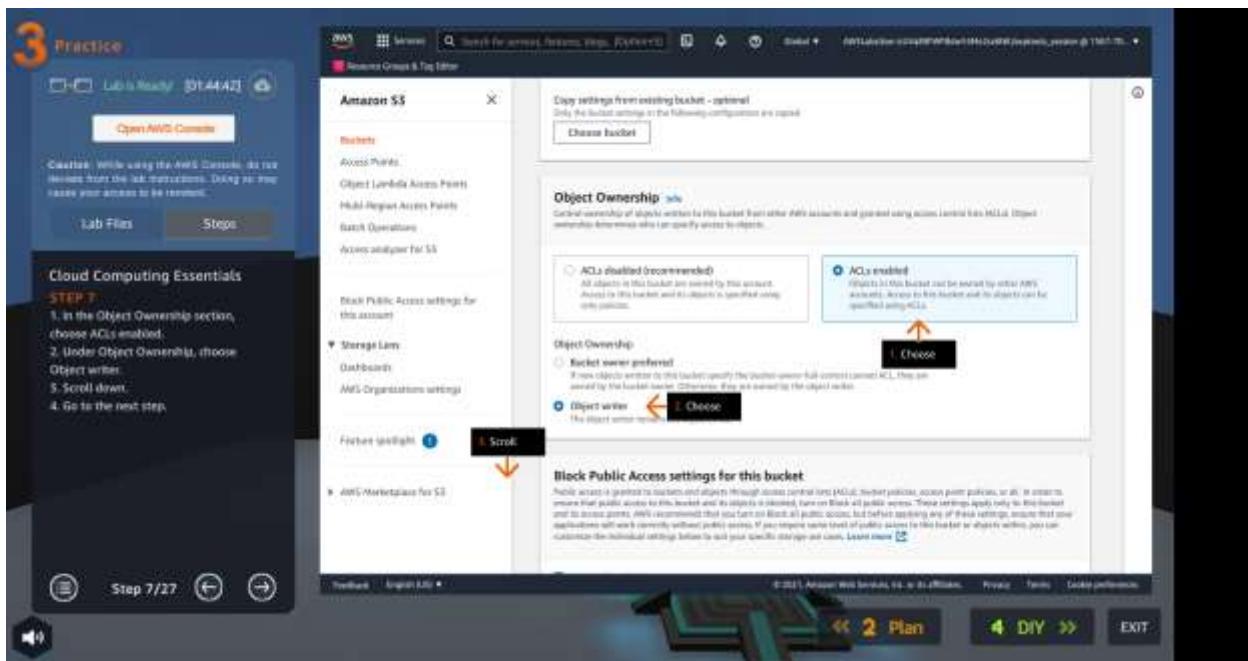
Create Bucket

Name	Region	Access	Created date
available-region-AvgpaU7Bucket-us-east-1-1443673252002	US East (N. Virginia) us-east-1	Free	January 2, 2016 2015-01-02T00:00:00Z

◀ ▶

2 Plan 4 DIY > EXIT

This screenshot shows the AWS Management Console for the Amazon S3 service. On the left, there's a sidebar with various options like 'Regions', 'Access Points', and 'Storage Lens'. The main area is titled 'Account ID' and shows an 'Account snapshot' with statistics: Total storage: 25.20B, Objects count: 1, and Avg. object size: 21.2 kB. Below this is a section for 'Buckets' with a table showing one bucket named 'available-region-AvgpaU7Bucket-us-east-1-1443673252002'. At the bottom, there are navigation buttons for 'Plan', 'DIY', and 'EXIT'.



3 Practice

Lab is Ready! [01:43:51]

Open AWS Console

Cloud Computing Essentials

STEP 9

1. Scroll down to the Default encryption section.
2. Under Server-side encryption, choose Enable.
3. Accept default for Encryption key type.
4. Click Create bucket.
5. Go to the next step.

CONCEPT

By default, data is not encrypted in your Amazon S3 bucket. It is a best practice to encrypt your data either on the client side or through the Amazon S3 server.

Step 9/27

Tags (0) – optional

No tags associated with this bucket.

Add tag | Scroll

Default encryption

Automatically encrypt new objects stored in this bucket using server-side encryption.

Server-side encryption:

- Disable
- Enable** Choose

Encryption key type:

- To encrypt a object with a customer-provided key, choose **Amazon S3-managed keys (SSE-S3)** Accept default
- AWS Key Management Service key (SSSE-KMS) An encryption key provided by AWS Key Management Service (AWS KMS). Learn more

Advanced settings

After creating the bucket you can upload files and folders to the bucket, and configure additional bucket settings.

Cancel | **Create bucket** Click

2 Plan | **4 DIY** | EXIT

3 Practice

Lab is Ready! [01:41:45]

Open AWS Console

Cloud Computing Essentials

STEP 10

1. Click View details.
2. Go to the next step.

CONCEPT

You can access your bucket using the Amazon S3 console. Using the console UI, you can perform almost all bucket operations without having to write any code.

Step 10/27

Amazon S3

Buckets

Access Points

Object Lambda Access Points

Batch Operations

Access analyzer for S3

Block Public Access settings for this account.

Storage Lens

Dashboard

AWS Organizations settings

Features spotlight

AWS Marketplace for S3

Success! You created bucket "sample-bucket-name-123133"

To upload files and folders, or to configure additional bucket settings choose **View details**.

View details | Click | View details

Amazon S3

Account snapshot

Last updated: Jun 21, 2021 by Storage Lens. Metrics are generated every 24 hours. Learn more

View Storage Lens dashboard

Total storage	Object count	Avg. Object size	You can enable advanced metrics in the "Default account dashboard" configuration.
2.3 EB	4	344.0 KB	

Buckets (2)

Buckets are containers for data stored in S3. Learn more

Create new | **Copy ARN** | **Empty** | **Delete** | **Create bucket**

Name	Region	Access	Creation date
sample-bucket-name-123133	US East (N. Virginia) us-east-1	Owner	January 2, 2020, 20:15:28 (UTC-05:00)
sample-bucket-name-123133	US East (N. Virginia) us-east-1	Objects can be public	June 28, 2021, 12:28:52 (UTC+04:00)

2 Plan | **4 DIY** | EXIT

3 Practice

Lab is Ready! [01:40:24]

Cloud Computing Essentials

STEP 11:

1. Click Upload.
2. Go to the next step in this guide.

CONCEPT

Your data stored in Amazon S3 is referred to as an object. An object is a file and any metadata that describes that file. Amazon S3 stores files in a manner that the contents of your files are served by Amazon S3. The metadata is a set of key-value pairs that describe the object.

Step 11/27

Amazon S3

unique-bucket-name-121135

Objects (0)

Objects are the fundamental entities stored in Amazon S3. You can use **Search for objects** to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more

Actions: Copy (S3) Copy (S3) Copy (S3) Download Open Revert **Upload**

Properties **Permissions** **Metrics** **Management** **Access Points**

Upload

No objects
You don't have any objects in this bucket.

Upload

Feedback **Upcoming**

3 Practice

Lab is Ready! [01:40:00]

Cloud Computing Essentials

STEP 12:

1. Click Add file.
- On Windows, you may see a blinking notification on the menu bar. Press [alt + tab] to select the open dialog window to upload the files.
2. Choose the four files listed below that you previously downloaded.
- index.html
- main.js
- style.css
- target-file.csv
3. Click Upload.

Step 12/27

Files and folders (4 Total, 4.5 KB)

All files and folders in this batch will be uploaded.

Add file **Upload**

Name	Folder	Type	Size
index.html	-	text/html	1.4 KB
main.js	-	text/javascript	3.1 KB
style.css	-	text/css	1.6 KB
target-file.csv	-	text/csv	352.0 B

Destination

Destination: s3://unique-bucket-name-121135

Destination details: Bucket settings that impact new objects created in the specified destination.

Permissions: Grant public access and access to other AWS accounts.

Properties: Identify storage class, encryption settings, tags, and more.

Cancel **Upload**

Feedback **Upcoming**

3 Practice

Lab is Ready! [01:38:51] Open AWS Console

Cloud Computing Essentials

STEP 15

1. Review to verify that all files have been uploaded.
2. Click Close.
3. Go to the next step.

CONCEPT

Amazon S3 supports an unlimited number of objects of any file type such as images, text and audio files.

Step 15/27 ← →

Upload: status

The information below will no longer be available after you navigate away from this page.

Summary

Estimator	Succeeded	Failed
0.0/0 unique-bucket-123	0/0 (0.0%)	0/0 (0.0%)

File and folder Configuration

Files and folders (4 Total, 4.5 KB)

Name	Type	Size	Status
index.html	Static website	1.4 KB	Succeeded
main.js	Text/javascript	1.1 KB	Succeeded
style.css	Text/css	1.6 KB	Succeeded
target.docx	Microsoft Word	0.0 KB	Succeeded

Step 15/27 ← →

2 Plan 4 DIY > EXIT

3 Practice

Lab is Ready! [01:37:44] Open AWS Console

Cloud Computing Essentials

STEP 16

1. In the Objects section, choose index.html.
2. Click the Actions drop down menu.
3. Review the available options.
- You will see different options to manage your objects such as rename, copy or download.
4. Go to the next step.

Step 14/27 ← →

lab-unique-bucket-123321 —

Objects (4)

Review the following actions taken in dimension 2D. You can use AWS Lambda to copy a lot of objects in parallel.

Actions

Copy to URL, Edit URL, Unzip, Open, Delete, Details, Create folder, All Actions

Name	Type	Last modified
index.html	File	March 18, 2022, 09:21:58 UTC/04:00
main.js	File	March 18, 2022, 09:22:00 UTC/04:00
style.css	File	March 18, 2022, 09:22:02 UTC/04:00
target.docx	File	March 18, 2022, 09:22:03 UTC/04:00

Actions

Download as, Share with a personal URL, Calculate total size, Copy, Move, Rename object, Copy with S3 select, EBS pricing, Remove object, Edit storage class, Edit server-side encryption, Edit metadata, Edit tags, Share public access (V2).

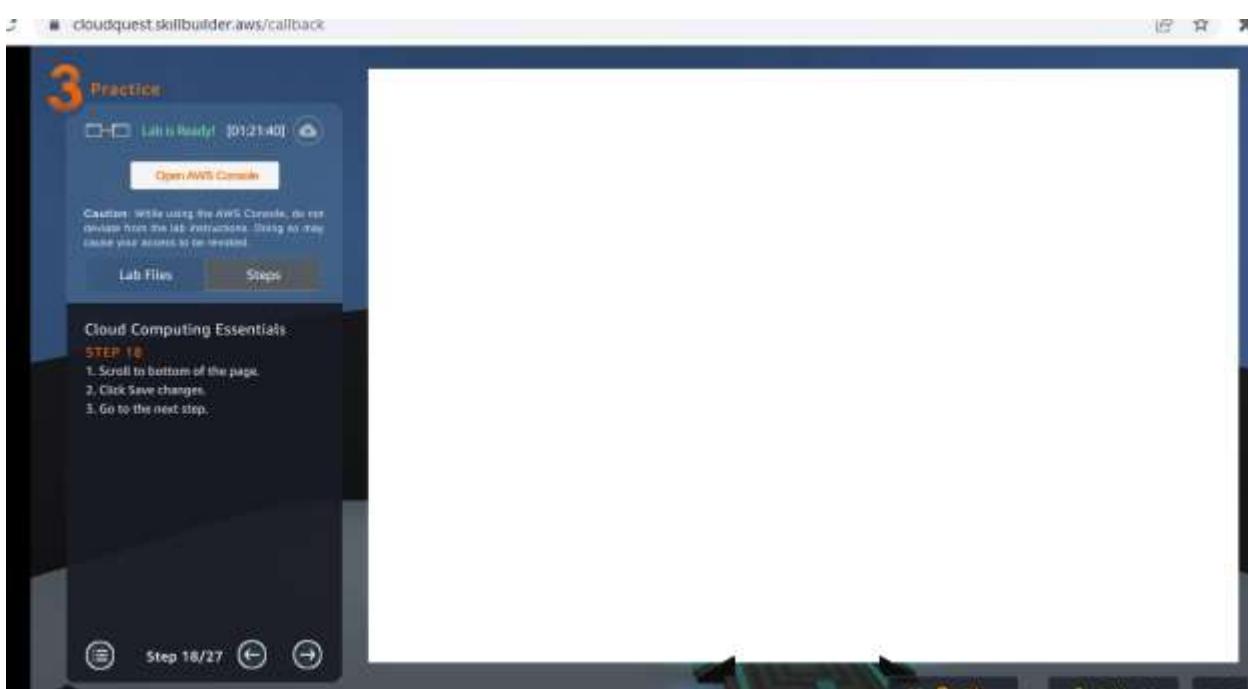
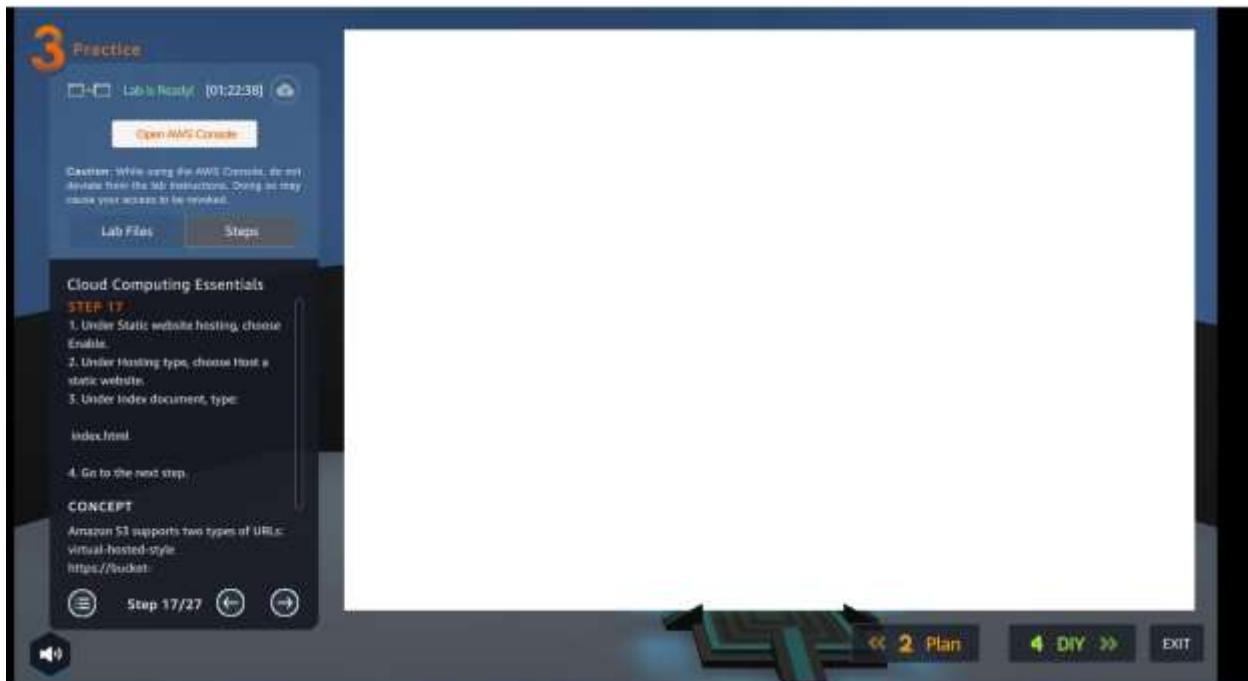
Step 14/27 ← →

2 Plan 4 DIY > EXIT

The screenshot shows the AWS Lambda Practice interface on the left and the AWS S3 console on the right. The Lambda Practice interface displays a progress bar at Step 15/27. The S3 console shows a bucket named 'unique-bucket-name-121135' with four objects listed:

Name	Type	Last modified	Size	Storage class
index.html	html	June 25, 2021, 15:06:46 (UTC-04:00)	1.4 KB	Standard
main.js	js	June 25, 2021, 15:06:47 (UTC-04:00)	1.1 KB	Standard
styles.css	css	June 25, 2021, 15:06:46 (UTC-04:00)	1.0 KB	Standard
target.html	html	June 25, 2021, 15:06:46 (UTC-04:00)	152.0 KB	Standard

The screenshot shows the AWS Lambda Practice interface on the left and the AWS Lambda function configuration page on the right. The Lambda Practice interface displays a progress bar at Step 16/27. The Lambda function configuration page shows the 'Edit' tab selected. At the bottom of the Lambda Practice interface, there are navigation buttons: '1', '2 Plan', '4 DIY >', and 'EXIT'.



3 Practice

Lab is Ready! [01:20:24]

[Open AWS Console](#)

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Cloud Computing Essentials

STEP 19

1. Click the Permissions tab.
2. Review the Block public access (bucket settings) to verify that Block all public access is Off.
3. In the Bucket policy section, click Edit.
4. Go to the next step.

CONCEPT

By default, all Amazon S3 resources (buckets, objects, and related subresources) are private and only the resource owner can access it. The resource owner can optionally grant

(≡) Step 19/27 ← →

3 Practice

Lab is Ready! [01:18:14]

[Open AWS Console](#)

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Cloud Computing Essentials

STEP 20

1. Click the icon to copy your bucket's ARN.
2. Delete the content in the Policy editor section.

Note: You may see an AccessDenied error under the Edit statement panel. Please ignore.

3. Go to the next step.

CONCEPT

Bucket policy and user policy are two of the access policy options available for

(≡) Step 20/27 ← →

3 Practice

Lab is Ready! [01:17:11]

[Open AWS Console](#)

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Cloud Computing Essentials

STEP 21

1. Open the policy.txt file in your local computer, then review the content.
 - This is the policy.txt file that you downloaded in the previous step.
 - The policy grants the s3:GetObject permission to any public anonymous users.
2. Replace the Your_BucketARN placeholder with the Bucket ARN you copied earlier.
3. Review to ensure that the ARN ends with /"

(≡) Step 21/27 ← →

3 Practice

Lab is Ready! [01:15:47]

[Open AWS Console](#)

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

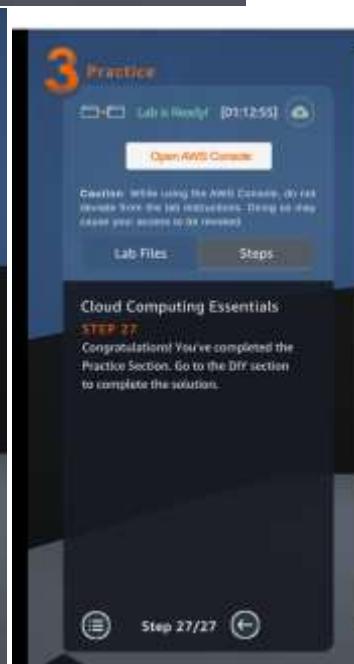
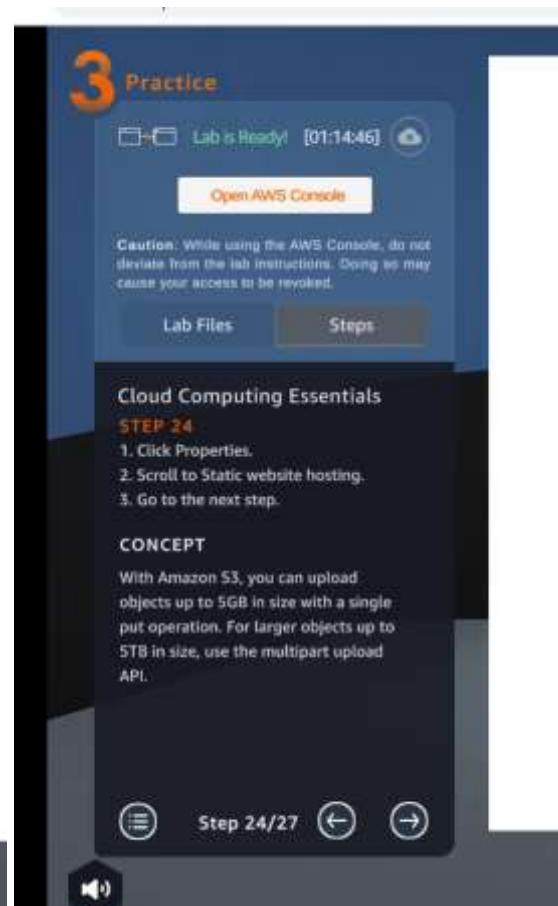
Cloud Computing Essentials

STEP 22

1. Copy all the updated content of the policy.txt file and paste in the Policy editor section.
2. Review to ensure that the ARN ends with /"
3. Scroll to the bottom of the page.
4. Go to the next step.

Note: Error messages may appear under the Edit statement panel due to limited lab permissions. Please ignore them and continue to the next step.

(≡) Step 22/27 ← →

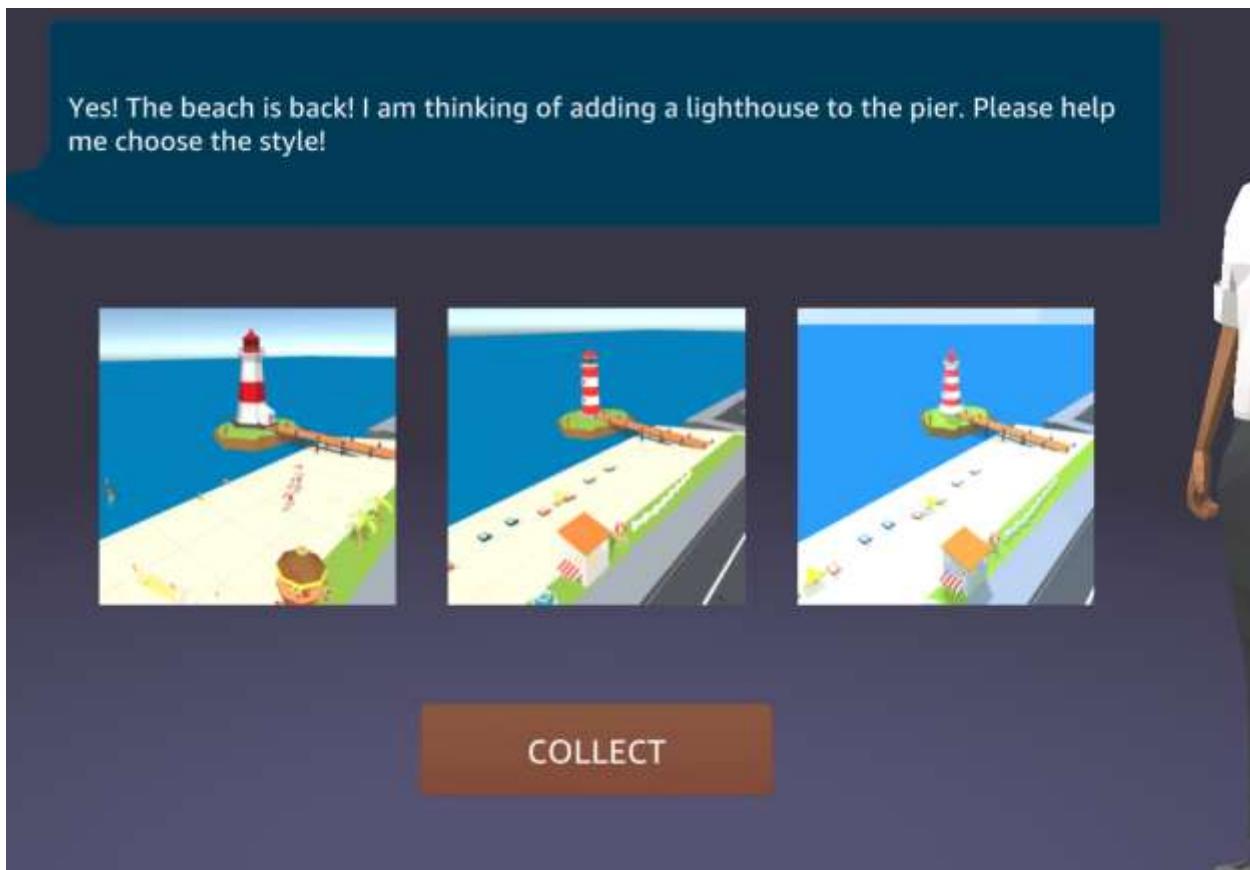


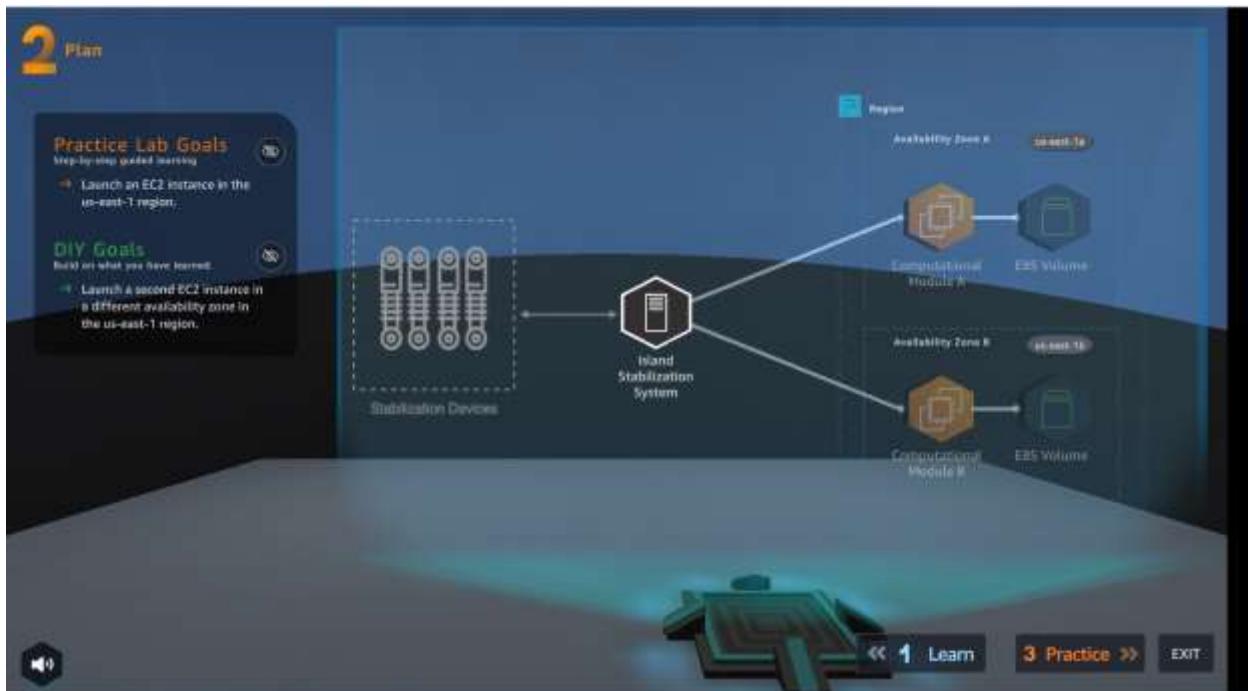
island-waves-bucket

arn:aws:s3:::island-waves-bucket

<http://island-waves-bucket.s3-website-us-east-1.amazonaws.com>

Level 2 : EC2





3 Practice

Practice Lab

Cloud First Steps

STEP 1

- Review the lab objectives in the concepts field.
- Click Start Lab to provision your environment, then click Open AWS Console to begin.
- Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Launch an Amazon EC2 instance.
- Configure a user data script to display the instance details in a browser.

Step 1/18

Launch an Amazon EC2 Instance

<< 2 Plan 4 DIY >> EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Cloud First Steps

STEP 3

1. Click the Lab Files tab.
2. Click the download icon to download the user-data file to your computer.
 - You will use this file in an upcoming step.
3. Click the Steps tab to return to the Practice Lab steps.
4. Go to the next step.

CONCEPT

All the files required for this lab are provided to you.

Step 2/18

3 Practice

Open AWS Console

1. Click The AWS Console, do not use the navigation bar. Using the navigation bar will prevent the lab from working correctly.

2. Click

Lab Files **Steps**

LAB FILES (1) Downloadable content:
user-data

2. Click

Launch an Amazon EC2 Instance

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Cloud First Steps

STEP 3

1. To switch to the new AWS Console, choose **Switch now**.
 - The lab instructions are based on the new AWS Console.
2. Go to the next step.

If you are already using the new AWS Console, you can skip this step.

CONCEPT

The new AWS Console Home will replace your existing experience soon.

Step 3/18

AWS Management Console

AWS services

- Recently visited services
 - S3
 - SS
 - Lambda
 - Amazon SageMaker
 - VPC
 - IAM
 - RDS
- All services

New AWS Console Home

See valuable insights for your account and services with the new customizable Console Home experience. [Learn more](#)

Switch now

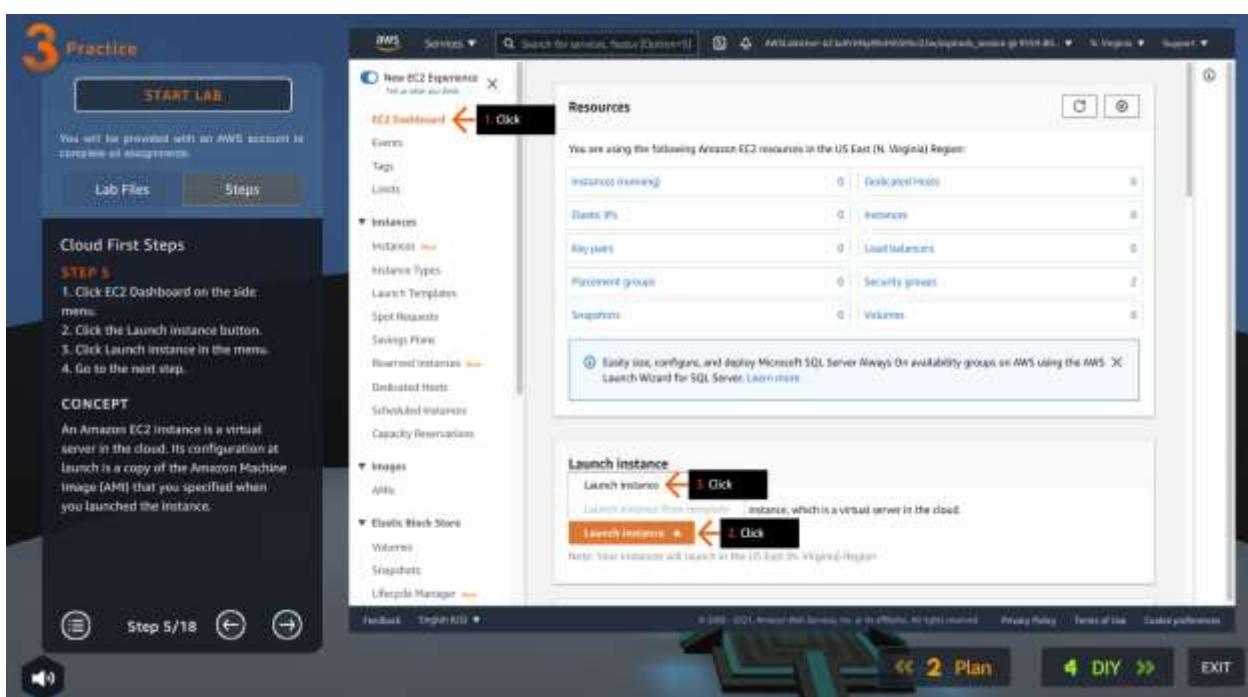
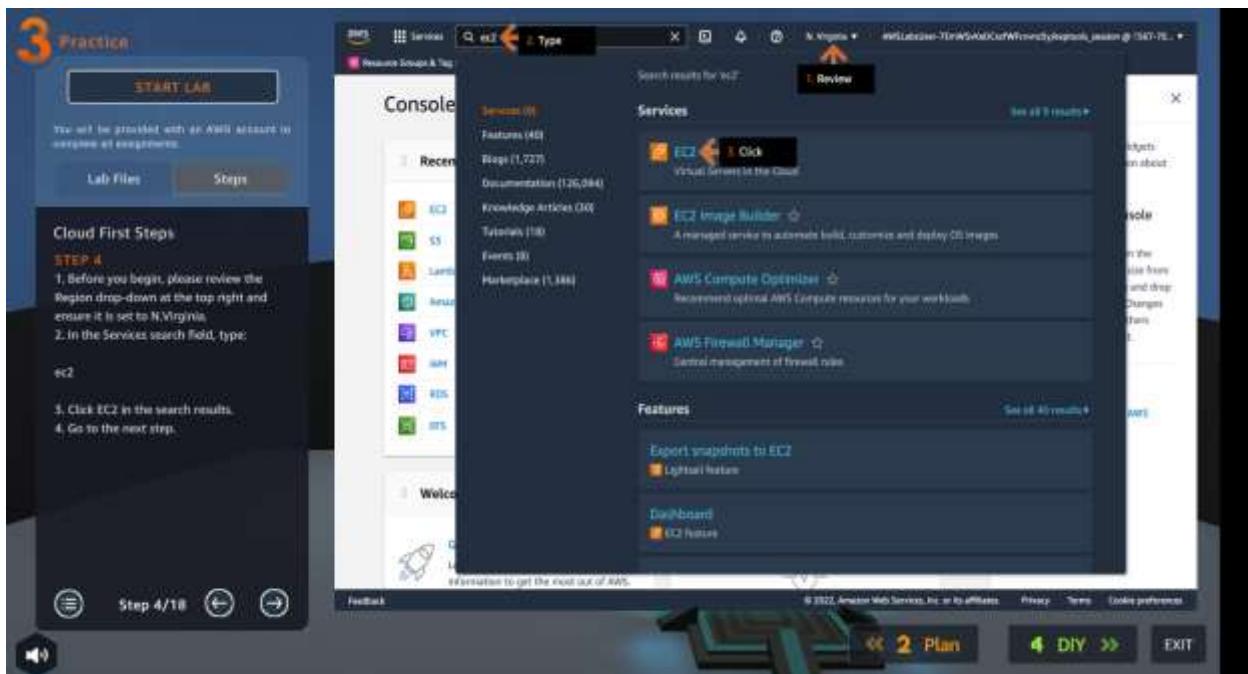
Stay connected to your AWS resources on-the-go

AWS Console Mobile App now supports four additional regions. Download the AWS Console Mobile App to your iOS or Android mobile device. [Learn more](#)

Feedback

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2 Plan **DIY** **EXIT**



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Cloud First Steps

STEP 6

1. In the Name and tags section, under Name, type a name.
Such as: webserver01
2. In Application and OS Images section, under Quick Start, choose Amazon Linux.
3. Scroll down.
4. Go to the next step.

CONCEPT

An Amazon Machine Image (AMI) provides the information required to launch an instance. You must specify an AMI when you launch an instance. You

Name and tags

Name: **webserver01** **Choose** **Type**

Application and OS Images (Amazon Machine Image) [info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or browse for AMIs if you don't know what you are looking for below.

Search for AMIs including 1000s of application and OS images.

Quick Start

Amazon Linux Ubuntu Windows Red Hat SUSE Linux **Choose** Image (AMI)

Search for AMIs including AMIs from AWS Marketplace and the Community.

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Cloud First Steps

STEP 7

1. Choose Amazon Linux 2 AMI.
2. Under Instance type, choose t2.micro.
3. Scroll down.
4. Go to the next step.

CONCEPT

When you launch an instance, the instance type that you specify determines the hardware of the host computer used for your instance. Each instance type offers different compute, memory, and storage capabilities and are grouped in instance families based on these capabilities.

Amazon Machine Image (AMI) **Choose**

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type
ami-09fb25a3159c5fb (64-bit x86) / ami-4f8d8fe5 (x86_64 HVM)
Virtualization: none CPU credits: true Root device type: ebs

Description: Amazon Linux 2 Kernel 5.10 AMI 2.0.20200419.0 x86_64 HVM (p2)

Architecture: **64-bit (x86)** **AMI ID**: ami-09fb25a3159c5fb

Instance type **Choose**

t2.micro **Choose**

Family: t2 **AMI ID**: ami-09fb25a3159c5fb (64-bit x86) / ami-4f8d8fe5 (x86_64 HVM)
On-Demand Linux pricing: \$0.0179 USD per Hour
On-Demand Windows pricing: \$0.162 USD per Hour

Priority eligible

Compare instance types

Key pair (login) [info](#)

This can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps

STEP #

- In the Key pair/login section, choose Proceed without a key pair.
- In the Network settings section, click Edit.
- Go to the next step.

CONCEPT

Amazon EC2 uses public key cryptography to encrypt and decrypt login information. Public key cryptography uses a public key to encrypt a piece of data, and then the recipient uses their private key to decrypt the data. The public and private keys are known as a key pair.

Step 8/18

Key pair (login) info
You can use a key pair for security instead of your instance. Ensure that you have access to the selected key pair before you launch the instance.
Key pair name - required **Choose**
Proceed without a key pair (Not recommended)
Default value:

Network **vpc-tutorial585** **Edit** **Click**
Subnet No preference (Default subnet in any availability zone)
Auto-assign public IP: Enable
Security groups (Firewall) info
Will create a new security group called 'Launch-wizard-1' with the following rules:
 Allow SSH traffic from Anywhere Helps you connect to your instance
 Allow HTTPS traffic from the internet To run an endpoint, for example when creating a web service
 Allow HTTP traffic from the internet To run an endpoint, for example when creating a web service

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2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps

STEP #

- Under VPC, choose cloud-first-step/LabVPC.
- Ensure that you have selected the LabVPC or your solution will fail.
- Under Subnet, choose subnet in us-east-1a availability zone.
- Go to the next step.

CONCEPT

Amazon EC2 is hosted in multiple locations world-wide. These locations are composed of Regions, Availability Zones, and Local Zones. Each Region is a separate geographic area that has

Step 9/18

VPC - required **Choose**
vpc-0c770808423f4c8a4 (cloud-first-step/LabVPC) **Choose**
Subnet info
subnet-05210005c1381c919 cloud-first-step/LabVPC/Public-SubnetSubnet1
VPC: vpc-0c770808423f4c8a4 Owner: 140718833447 Availability Zone: us-east-1a
IP addresses available: 18
subnet-05210005c1381c919 cloud-first-step/LabVPC/Public-SubnetSubnet2
VPC: vpc-0c770808423f4c8a4 Owner: 140718833447 Availability Zone: us-east-1a
IP addresses available: 18
Create security group **Select existing security group**

Security group name - required **Launch-wizard-1**
This security group will be added to all network interfaces. The name can't be edited after the security group is created; the length is 255 characters. Valid characters are a-z, A-Z, 0-9, spaces, and _-./@#\$%^&*()

Description - required **Launch-wizard created 2022-04-22T20:41:51.156Z**

Inbound security group rules:

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2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps

STEP 10

1. In the Security group name field type:
2. In the Description field type:
3. Choose HTTP under Type.
4. Scroll down.
5. Go to the next step.

CONCEPT

A security group acts as a virtual firewall that controls the traffic for one or more instances. When you launch an instance, it automatically receives a security group.

Step 10/18

Firewall (security group)

A security group is a set of rules that define traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group 

Select existing security group 

Security group name - required 

This security group will be applied to all network interfaces. The name can't be edited after the security group is created. Max length is 256 characters. Valid characters: a-zA-Z, 0-9, periods, and _ (US-ASCII).

Description - required info 

Type 

Inbound security groups rules

* Security group rule 1 (TCP) 80, 0.0.0.0/0 

Type   Port range 

Source type info   Description - optional info 

Anywhere  

⚠ Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only. 

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2 Plan  EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps

STEP 11

1. In the Configure storage section, review the default storage settings.
2. Click to expand Advanced details.
3. Go to the next step.

CONCEPT

When you launch an instance, the root device volume contains the image used to boot the instance.

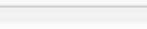
Step 11/18

Configure storage

To: 8 GB gp2 Root volume 

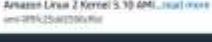
Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage 

Add new volume 

0 x File systems 


Summary

Number of instances 

Software image (AMI) 

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2 Plan  EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps:

STEP 12:

1. Open the user-data file you downloaded earlier on your local computer, then review the content.
 - This user data script launches a web server using port 80 to display internal information about the instance.
2. Go to the next step.

Note: The code block in your file is longer than what is displayed here.

```
#!/bin/bash
sudo yum update -y
sudo yum install -y httpd
sudo yum install -y git
export META_INST_ID=$(curl http://169.254.169.254/latest/meta-data/instance-id)
export META_INST_TYPE=$(curl http://169.254.169.254/latest/meta-data/instance-type)
export META_INST_AZ=$(curl http://169.254.169.254/latest/meta-data/placement/availability-zone)
cd /var/www/html

echo "    </div>" >> index.html
echo "        <div class="instance-card-inf-item">" >> index.html
echo "            <div class="instance-card-inf-txt">Availability zone</div>" >> index.html
echo "            <div class="instance-card-inf-title">"$META_INST_AZ"</div>" >> index.html
echo "        </div>" >> index.html
echo "    </div>" >> index.html
echo "    </div>" >> index.html
echo "    </body>" >> index.html
echo "</html>" >> index.html
sudo service httpd start
```

Review

Step 12/18

2 Plan **4 DIY** **EXIT**

Note: The code block in your file is longer than what is displayed here.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps:

STEP 13:

1. Scroll down to User data section.
2. Copy the entire contents of the user-data file and paste it into the User data editor section.
3. Scroll down.
4. Go to the next step.

CONCEPT

When you launch an instance in Amazon EC2, you have the option of passing user data to the instance that can be used to perform common automated configuration tasks and even run scripts after the instance starts.

```
#!/bin/bash
sudo yum update -y
sudo yum install -y httpd
sudo yum install -y git
export META_INST_ID=$(curl http://169.254.169.254/latest/meta-data/instance-id)
export META_INST_TYPE=$(curl http://169.254.169.254/latest/meta-data/instance-type)
export META_INST_AZ=$(curl http://169.254.169.254/latest/meta-data/placement/availability-zone)
cd /var/www/html
echo "    <!DOCTYPE html>" >> index.html
echo "    <html lang="en">" >> index.html
echo "        <head>" >> index.html
echo "            <meta charset="UTF-8"/>" >> index.html
echo "            <meta name="viewport" content="width=device-width, initial-scale=1.0"/>" >> index.html
```

User data has already been base64 encoded

Summary

Number of instances (1)

Software Image (AMI): Amazon Linux 2 Kernel 5.10 AMI... and more

ami-0f9b13a0275026164

Feedback

2 Plan **4 DIY** **EXIT**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps

STEP 14

1. Review the Summary section.
2. Click Launch.
3. Go to the next step.

CONCEPT

It's always a good idea to review the instance launch details you have configured before the deployment.

Summary

Number of instances (1)

Software Image (AMI)
Amazon Linux 2 Kernel 5.10 AMI... (more)

Virtual server type (Instance type)
t2.micro

Firewall (Security group)
New security group

Storage (Volumes)
1 volume(s) - 8 GiB

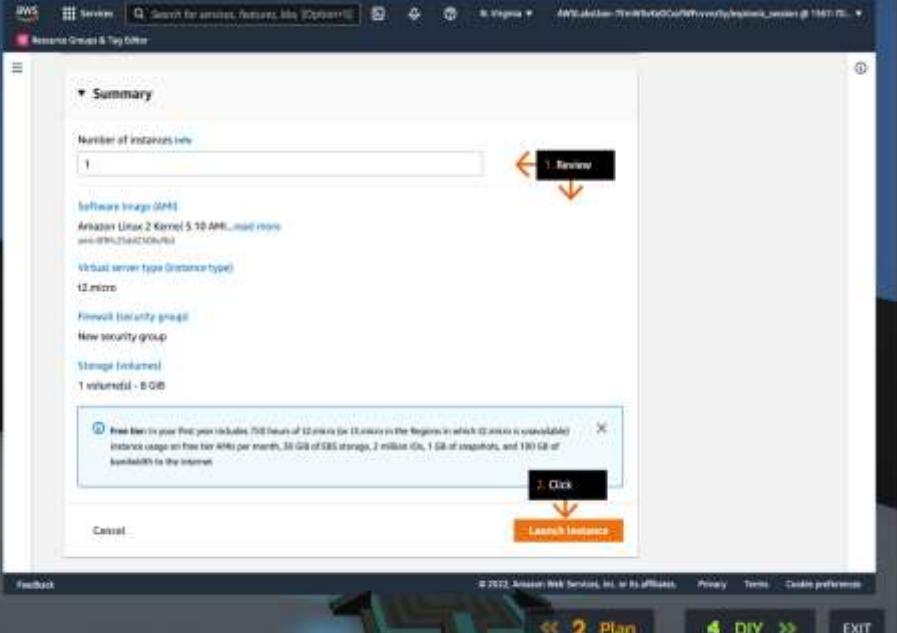
Free tier in your first year includes 700 hours of t2.micro (or t3.micro) in the Regions in which it's available. Instance usage on Free tier AMIs per month: 36 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the Internet.

1. Review

2. Click

Launch Instances

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps

STEP 15

1. Review the success message.
2. Click View all instances.
3. Go to the next step.

Success

Successfully initiated launch of instance i-075d43044ea44fb0

1. Review

Next Steps:

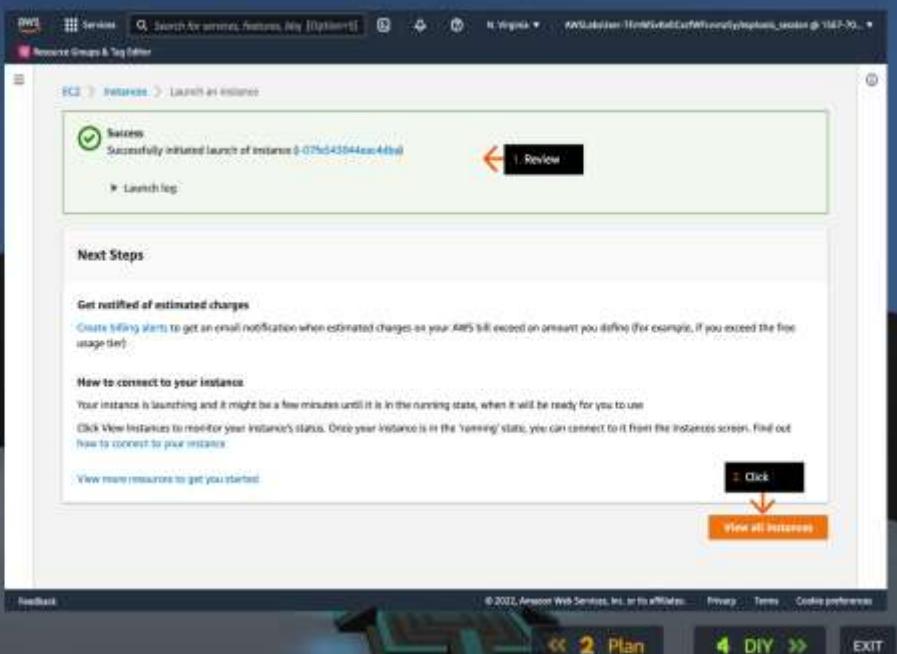
Get notified of estimated charges
[Create billing alerts](#) to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instance
Your instance is launching and it might be a few minutes until it is in the running state, when it will be ready for you to use.
[Click View Instances](#) to monitor your instance's status. Once your instance is in the 'running' state, you can connect to it from the Instances screen. Find out how to connect to your instance.

2. Click

View all instances

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps:

STEP 18:

1. Choose your Amazon EC2 instance.
2. Once the instance state is listed as Running, click the icon to copy the Public (IPv4) DNS name.
- Do not use the open address link.
3. Go to the next step.

CONCEPT

An instance enters the pending state when it launches for the first time and changes to a running state when it is ready for use.

Step 16/18

Instances (1/1) **i-07fe543944eac4dba (webserver01)**

EC2 Dashboard EC2 Global View Events Tags Limits

1. Choose

Name Instance ID Instance state Instance type Status check Alarms status

webserver01 i-07fe543944eac4dba Running t2.micro 2/2 checks passed No alarms

Instance: i-07fe543944eac4dba (webserver01)

Select an instance above

Details Security Networking Storage Status checks Monitoring Tags

Instance summary

Instance ID: i-07fe543944eac4dba (webserver01) Public IPv4 address: 54.145.62.173 [open address] Private IPv4 address: 10.0.0.31

IPv6 address: Instance state: Running

Instance type: t2.micro Public IPv4 DNS name (IPv4 only): ec2-54-145-62-173.compute.amazonaws.com [open address]

IP name: ip-10-0-0-21.ec2.internal Private IP address: 10.0.0.21 Auto-assigned IP address: 54.145.62.173

Auto-assigned IP address: 54.145.62.173

Amazon private instance DNS name: IPv4 (A)

Details Security Networking Storage Status checks Monitoring Tags

Feedback

2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Cloud First Steps:

STEP 17:

1. Paste the public DNS address into a browser, then press Enter.
2. Review the details about your instance.
3. Go to the next step.

Note:

1. You may need to refresh your browser to see the Amazon EC2 Status update to Running.
2. The user data script generates a web page to display the Amazon EC2 instance details.
3. If you see a connection timeout message when opening the web page, please ensure the address begins with `http://`.

Step 17/18

Amazon EC2 Status

ec2-54-145-62-173.compute-1.amazonaws.com ↵ 1 Paste

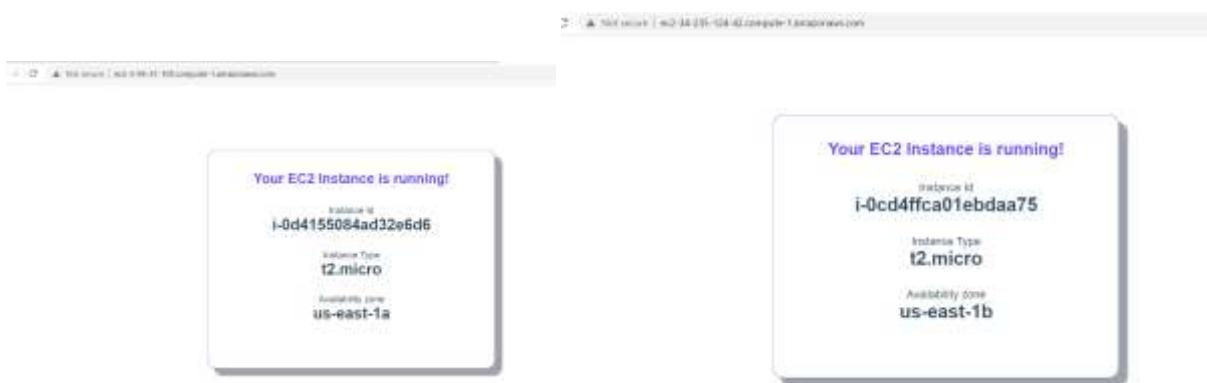
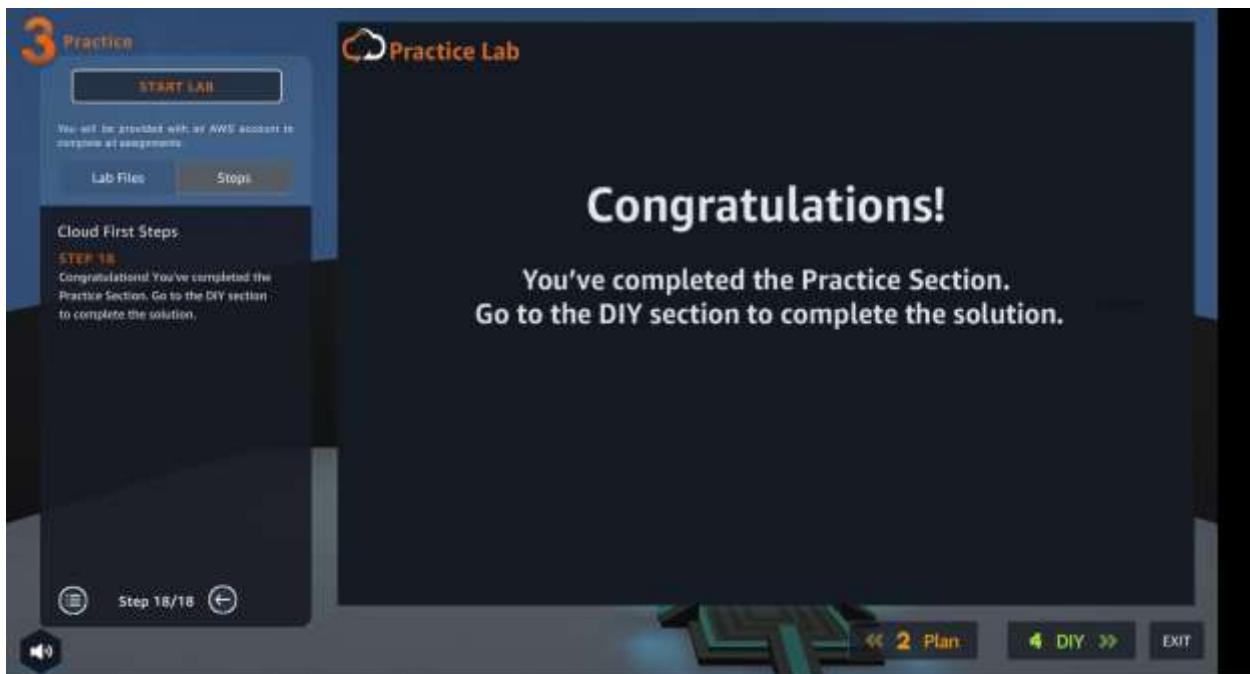
Your EC2 Instance is running!

Instance Id: i-07fe543944eac4dba

Instance Type: t2.micro

Availability zone: us-east-1a

2 Plan 4 DIY EXIT



webserver01

DNS: EC2 instance run check

ec2-3-95-31-105.compute-1.amazonaws.com

instance id:- i-0d4155084ad32e6d6

[i-0d4155084ad32e6d6](#)

webserver02

DNS2: EC2 instance run check

ec2-34-235-124-42.compute-1.amazonaws.com

instance id:- i-0cd4ffca01ebdaa75

[i-0cd4ffca01ebdaa75](#)

Question:
Which statement about the Amazon S3 data consistency model is correct?

Amazon S3 provides read-after-write consistency for PUTS of new objects in your S3 bucket in all Regions.

Amazon S3 provides strong read-after-write consistency for PUT and DELETE operations in all AWS Regions.

Amazon S3 offers eventual consistency for overwrite PUTS and Deletes in all Regions.

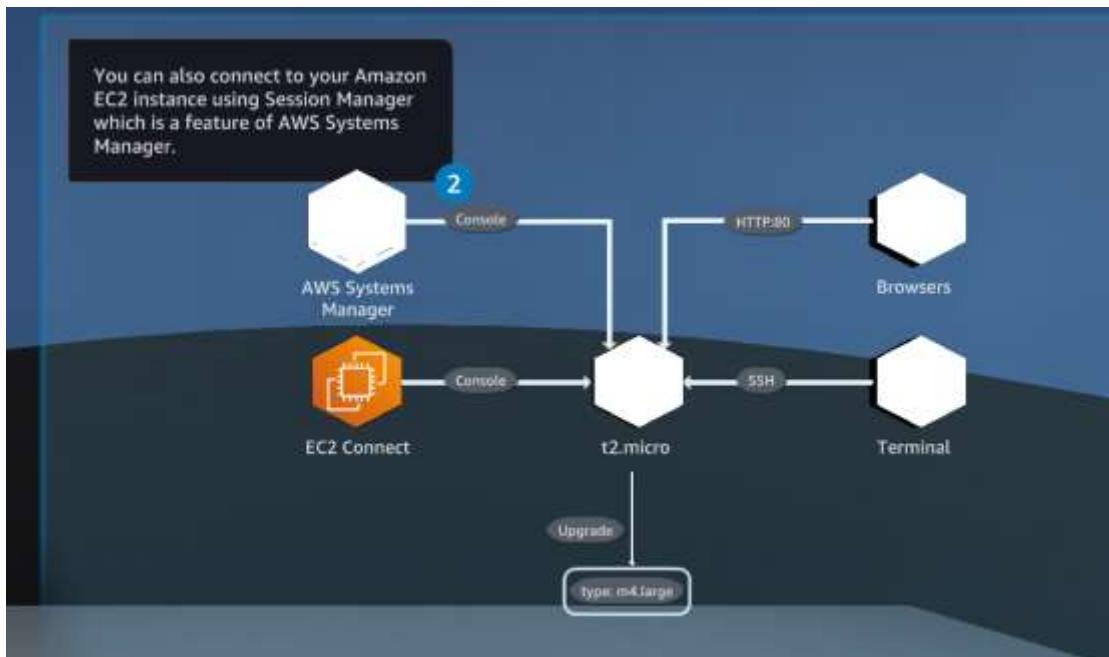
ANSWER

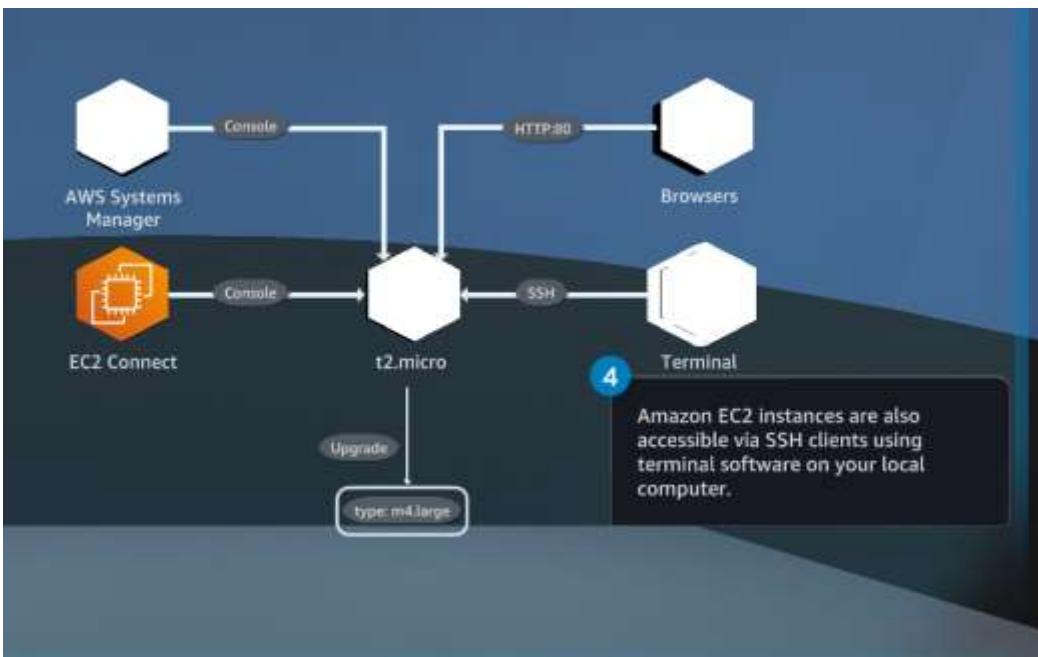
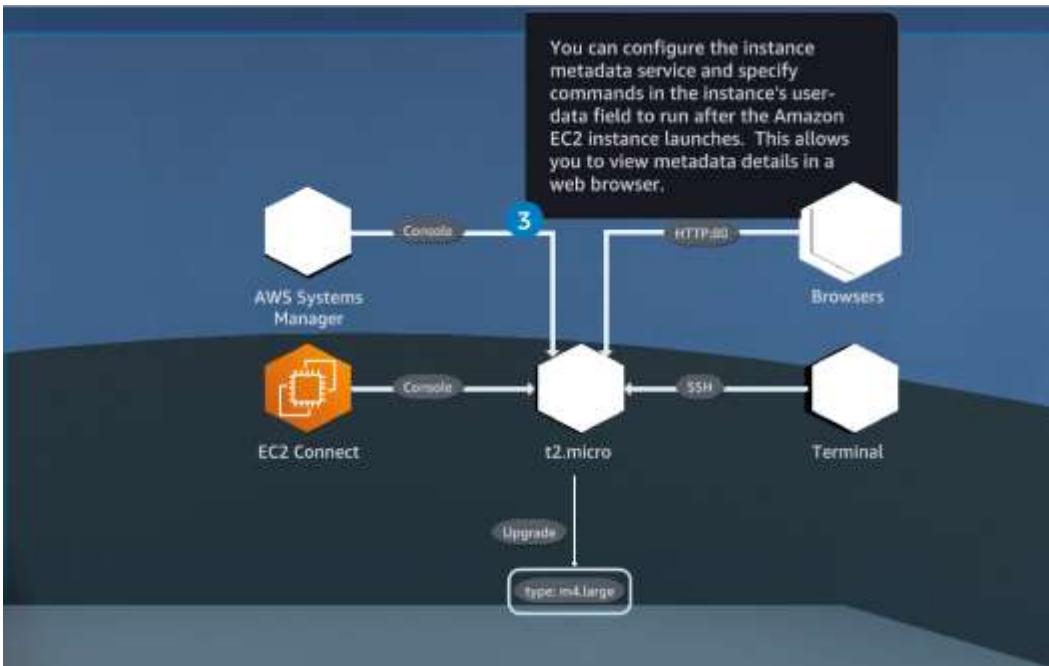
Need a hint? Click the question mark for help.

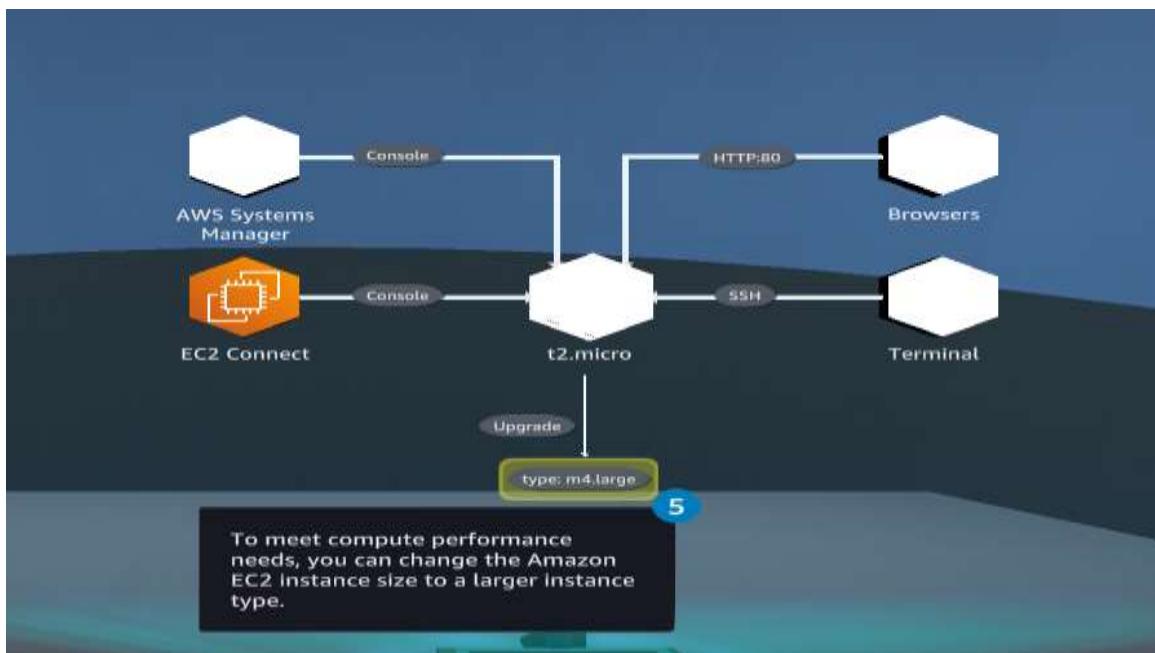




CHANGE EC2 INSTANCE TO A GENERAL PURPOSE LARGE INSTANCE (M4.LARGE)







2 Plan

Practice Lab Goals

Step-by-step guided learning

- Browse instance attributes.
- Learn about instance families.
- Connect to an instance and check logs.
- Stop and start an instance.

DIY Goals

Build on what you have learned.

- Change the EC2 instance type to a general purpose larger instance (m4.large).

The diagram shows the same network topology as the first one, but with the following changes:

- The central node is now labeled "t2.micro" with a yellow box containing "type: m4.large".
- The "Upgrade" arrow is now labeled "Upgrade" and points from the original "t2.micro" node to the new "type: m4.large" node.
- The "type: m4.large" node is connected to the "SSH" and "HTTP:80" ports of the central "t2.micro" node.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 1

1. Review the lab objectives in the concepts field.
2. Click Start Lab to provision your environment, then click Open AWS Console to begin.
3. Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Explore Amazon EC2 instance types.
- Filter Amazon EC2 instances based on their attributes.
- Connect to an Amazon EC2 instance using EC2 Connect.

Step 1/24

→ ←

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 2

1. Before you begin, please review the Region drop-down at the top right and ensure it is set to N.Virginia.
2. In the Services search field, type ec2.
3. Click EC2 from the search results.
4. Go to the next step.

CONCEPT

Amazon EC2 offers the broadest and deepest compute platform with choice of processor, storage, networking, operating system, and purchase model.

Step 2/24

→ ←

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 3

1. Click Instances.
2. Go to the next step.

CONCEPT

Amazon EC2 instances provide virtual compute capacity in the cloud.

Step 3/24

→ ←

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 4

1. Choose the instance named AWS Computing Solutions.
2. Click the Details tab.
3. Review the details.
4. Go to the next step.

CONCEPT

Information about the instance such as its public IP, private IP, and public DNS is displayed in the instance summary panel by selecting the Amazon EC2 instance.

Step 4/24

→ ←

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions.

STEP 5

1. Click Instance Types.
2. Go to the next step.

CONCEPT

Amazon EC2 provides a wide selection of instance types that belong to instance families that are optimized to fit different use cases.

Step 5/24  

EC2 Dashboard       

EC2 > Instance types

Instance types (396)

Instance type	VCPUs	Architecture	Memory (GiB)	Storage (GB)	Storage type
r5.4xlarge	32	a86_64	128	1200	SSD
t4.2xlarge	1	a39g_60_64	0.612	-	-
t2.2xlarge	1	a39g_60_64	0.3	-	-
t2.3xlarge	1	a39g_60_64	2	-	-
o2.2xlarge	8	a86_64	12	-	-
t2.4xlarge	4	a86_64	16	-	-
t2.6xlarge	2	a39g_60_64	4	-	-
t2.8xlarge	2	a86_64	8	-	-
t3.2xlarge	2	a86_64	0.3	-	-
t3.4xlarge	2	a86_64	2	-	-

Select an instance type above

Details      

2 Plan **4 DIY** 

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions.

STEP 6

1. In the Filter instance types field type:
t5.2xlarge [Enter]
c5.2xlarge [Enter]
r5.2xlarge [Enter]
2. Click the selection box next to each result.
3. Go to the next step.

CONCEPT

Each instance type includes one or more instance sizes, allowing you to scale your resources to the requirements of your target workload.

Step 6/24  

EC2 Dashboard       

EC2 > Instance types > t5.2xlarge

Instance types (3/3)

Instance type	VCPUs	Architecture	Memory (GiB)	Storage (GB)	Storage type
t5.2xlarge	2	a86_64	8	-	-
c5.2xlarge	2	a86_64	4	-	-
r5.2xlarge	2	a86_64	16	-	-

Selected instance types:

t5.2xlarge  c5.2xlarge  r5.2xlarge 

Details      

2 Plan **4 DIY** 

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 7

1. Review the instance details for each instance type.
2. Scroll down to compare compute, networking, storage, accelerator and pricing information about each instance type.
3. Click Instances.
4. Go to the next step.

CONCEPT

The Amazon EC2 console allows you to filter instance attributes such as instance type, instance family and instance size. You can search using keywords, attribute names or expressions.

Step 7/24 **◀** **▶** **EXIT**

EC2 > Instances > t3 Large

Instance types (3/3)

Clear Filters

Instance type	vCPUs	Architecture	Memory (GiB)	Storage (GiB)	Storage type
t3 large	2	x86_64	8	-	-
c5 Large	2	x86_64	4	-	-
r5 Large	2	x86_64	16	-	-

Details **Review**

	t3 large	c5 large	r5 large
Instance family	t3	c5	r5
Instance size	large	large	large
Hypervisor	ntttx	ntttx	ntttx
Auto Recovery support	true	true	true

Feedback **Next Step** **Privacy Policy** **Terms of Use** **Cookie preferences**

2 Plan **4 DIY** **EXIT**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 8

1. Click the AWS Computing Solutions instance.
2. Under the details tab, click the copy icon to copy the Public IPv4 address of the instance (do not use the open address link).
3. Go to the next step.

CONCEPT

Instance metadata is data about your instance that you can use to configure or manage the running instance. Instance metadata is divided into categories, for example, host name, events, and security groups.

Step 8/24 **◀** **▶** **EXIT**

Instances (1/1) info

Filter instances

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
AWS Compute...	i-0662cd9255800c74	Running	t3.2xlarge	2/2 checks p...	No alarms

Instance: i-0662cd9255800c74 (AWS Computing Solutions)

Details **Security** **Networking** **Storage** **Status Checks** **Monitoring** **Tags**

Instance summary

Public IPv4 address: copied

Private IPv4 address: 10.0.41.59

Public IP/IPv6 DNS: ec2-18-232-111-109.compute-1.amazonaws.com | open address

Private IP/IPv6 DNS: ip-10-0-41-59.ec2.internal

Instance ID: i-0662cd9255800c74

Instance state: Running

Instance type: t3.2xlarge

VPC ID:

Feedback **Next Step** **Privacy Policy** **Terms of Use** **Cookie preferences**

2 Plan **4 DIY** **EXIT**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 9

1. Open a browser and paste the IP address you copied into your browser's address bar then press Enter.
2. Review the instance details then return to the Instance page.
3. Go to the next step.

CONCEPT

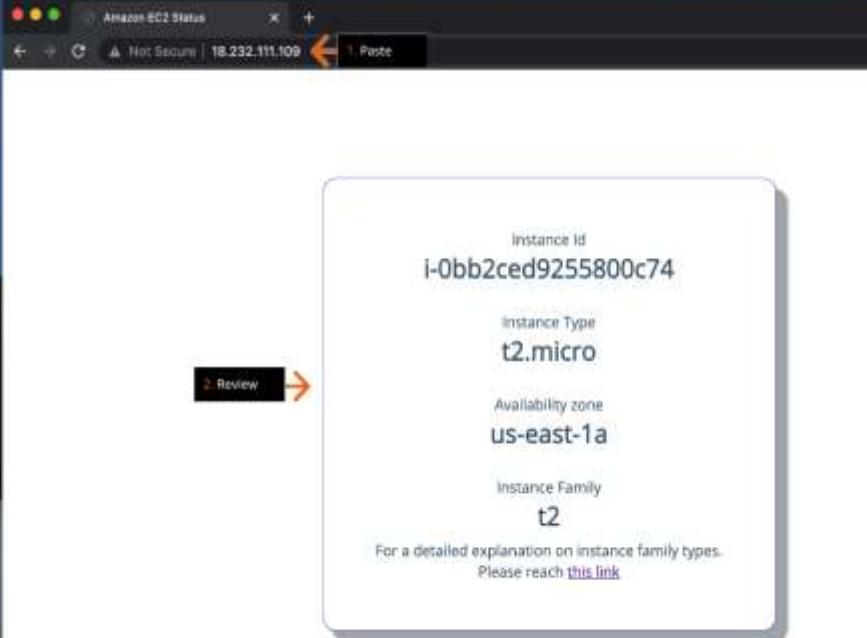
When creating a new instance, you can enable the Instance Metadata Service (IMDS) using the Advanced Details section. This will allow you to display attribute details using the instance's public IP.

Step 9/24 ← →

Amazon EC2 Status Not Secure | 18.232.111.109 1. Paste

Instance Id: i-0bb2ced9255800c74
Instance Type: t2.micro
Availability zone: us-east-1a
Instance Family: t2

For a detailed explanation on instance family types. Please reach [this link](#).



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 10

1. Click Connect.
2. Go to the next step.

CONCEPT

You have the flexibility to connect to an Amazon EC2 instance using EC2 Instance Connect, Session Manager, or an SSH Client.

Step 10/24 ← →

Amazon EC2 Services Search for services, regions (Optional) https://aws.amazon.com/virtualization/ec2/instance-connect/ N. Virginia Support

New EC2 Instances (1 of what you have) Instances (1/1) i-0bb2ced9255800c74 Connect Instance state Actions Launch instances

EC2 Dashboard Events Tags Limits

Instances Instances (1)
Name: i-0bb2ced9255800c74 Instance ID: i-0bb2ced9255800c74 Instance State: Running Instance Type: t2.micro Status Checks: 2/2 checks pass No alarms

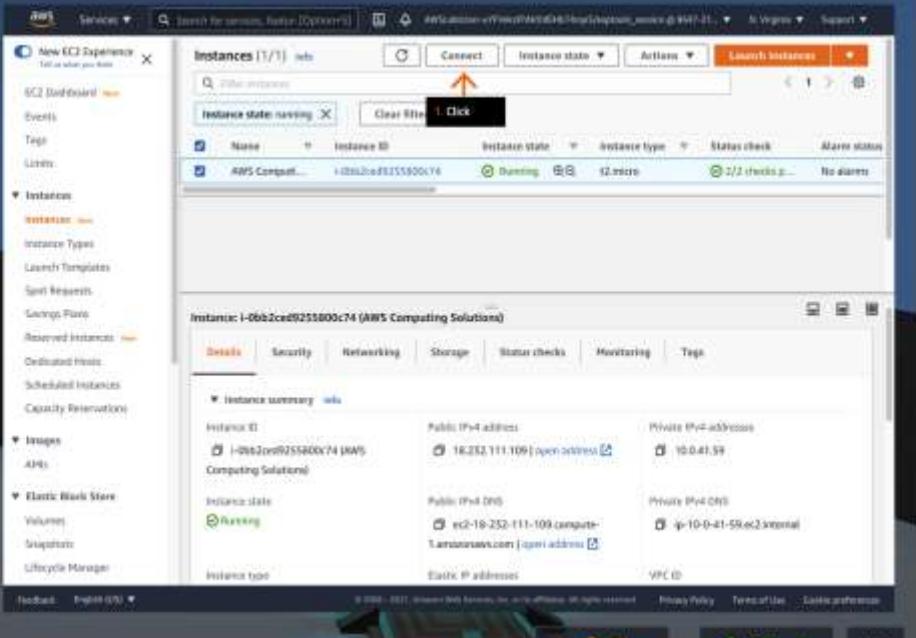
Instance: i-0bb2ced9255800c74 (AWS Computing Solutions)

Details Security Networking Storage Status Checks Monitoring Tags

Instance summary

Attribute	Value	Attribute	Value
Instance ID	i-0bb2ced9255800c74 (AWS Computing Solutions)	Public IPv4 address	18.232.111.109 [open address]
		Private IPv4 address	10.0.41.59
Instance state	Running	Public IPv6 DNS	ec2-18-232-111-109.compute-1.amazonaws.com [open address]
		Private IPv6 DNS	ip-10-0-41-59.ec2.internal
Instance type		Elastic IP addresses	
		VPC ID	

Feedback English (US) Help Privacy Policy Terms of Use Cookies preferences << 2 Plan 4 DIY >> EXIT



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 11

1. Review the connection settings under the EC2 instance Connect tab.
2. Click the Session Manager tab.
3. Go to the next step.

CONCEPT

Amazon EC2 instance Connect provides a simple and secure way to connect to your Linux instances. EC2 Instance Connect uses IAM policies and principals to control SSH access to your instances, removing the need to share and manage SSH keys.

Step 11/24

The screenshot shows the AWS Practice interface on the left with the title '3 Practice' and a 'START LAB' button. Below it is a list of steps for 'STEP 11'. To the right is the AWS Management Console showing the 'EC2 > Instances' page. A specific instance is selected, and a 'Connect to instance' dialog box is open. The 'Session Manager' tab is highlighted. The dialog box contains fields for 'Instance ID' (i-0b623ed925580074), 'Public IP address' (18.232.111.109), and 'User name' (ec2-user). A note at the bottom states: 'Note: In most cases, the provided user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.' At the bottom of the dialog are 'Cancel' and 'Connect' buttons.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 12

1. Review the Session Manager usage details.
2. Click the SSH client tab.
3. Go to the next step.

CONCEPT

Session Manager lets you manage your Amazon EC2 instances through an interactive one-click browser-based shell or through the AWS CLI. Once the session begins, you can run bash commands as you would through any other connection type.

Step 12/24

The screenshot shows the AWS Practice interface on the left with the title '3 Practice' and a 'START LAB' button. Below it is a list of steps for 'STEP 12'. To the right is the AWS Management Console showing the 'EC2 > Instances' page. A specific instance is selected, and a 'Connect to instance' dialog box is open. The 'Session Manager' tab is highlighted. The dialog box contains a section titled 'Session Manager usage' with the following points:

- Connect to your instance without SSH keys or a bastion host.
- Sessions are secured using an AWS Key Management Service key.
- You can log session commands and details in an Amazon S3 bucket or CloudWatch Logs log group.
- Configure sessions on the Session Manager Preferences page.

At the bottom of the dialog are 'Cancel' and 'Connect' buttons.

3 Practice

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 13

1. Review the requirements for connecting via SSH.
 - You will notice that a key pair is required.
2. Click the EC2 Instance Connect tab.
3. Go to the next step.

CONCEPT

You can connect to your instance using an SSH client on your local computer using your instance key pair. Your computer may have an SSH client installed or you may need to install an SSH client.

Step 13/24

3 Practice

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

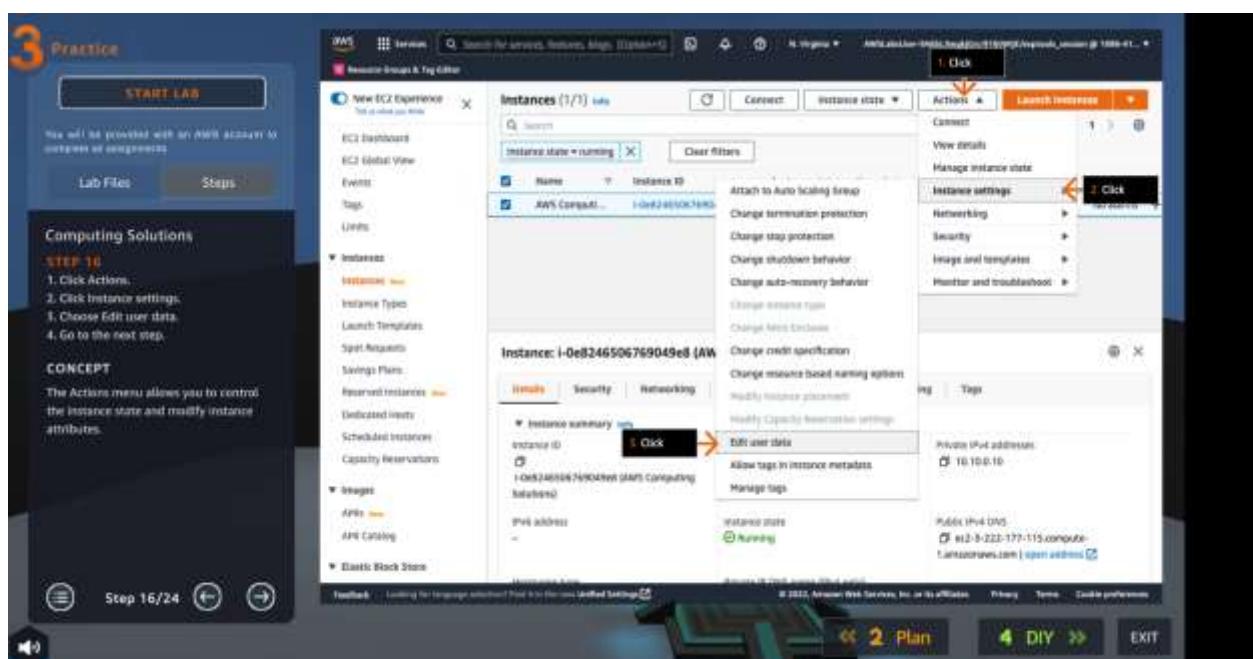
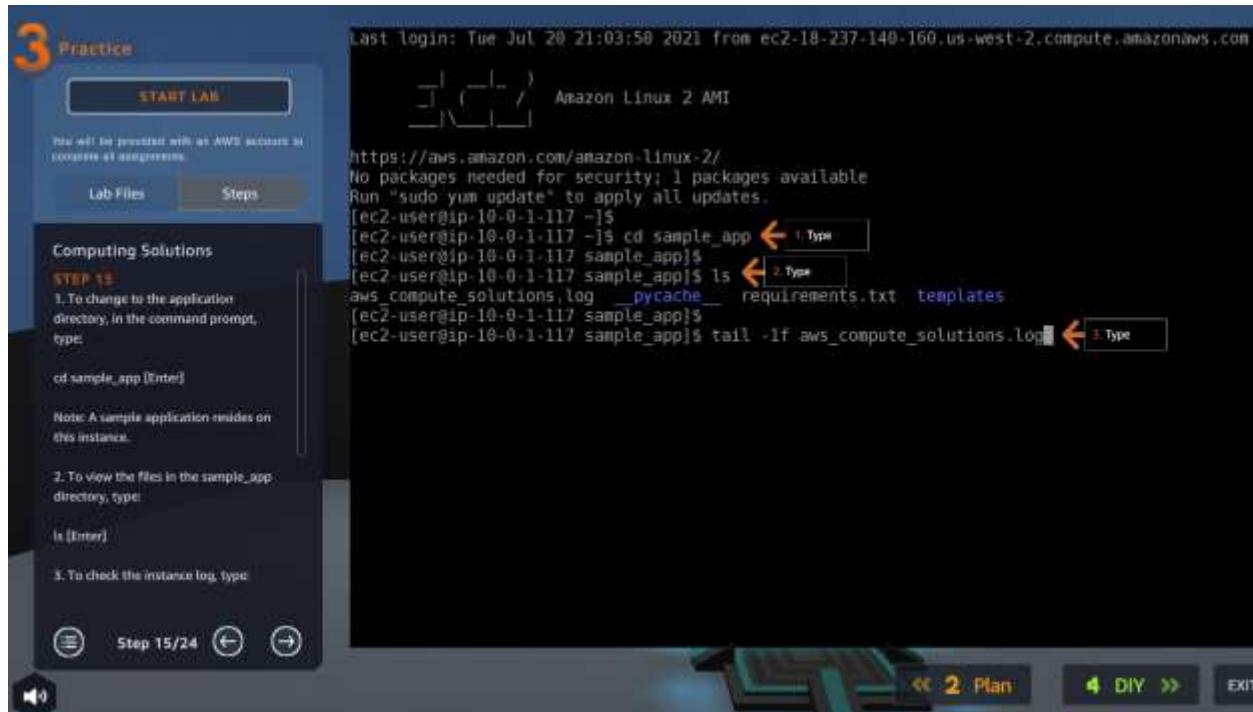
STEP 14

1. Click Connect.
2. Once the terminal window opens, go to the next step.

CONCEPT

The EC2 Instance Connect API pushes a one-time-use SSH public key to the instance metadata for 60 seconds. An IAM policy authorizes your IAM user to push the public key to the instance metadata. The SSH daemon on the instance uses the AuthorizedKeyCommand and AuthorizedKeyCommandUser to access the public key from the metadata to authenticate and connect you to the instance.

Step 14/24



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 17

1. Review the commands in the Current user data field.
2. Click Cancel.
3. Go to the next step.

CONCEPT

You can also use instance metadata to access user data that you specified when launching your instance.

Step 17 / 24

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 18

1. Return to Amazon EC2 Instances dashboard and click Instances.
2. Click Instance state.
3. Click Stop instance.
4. Go to the next step.

CONCEPT

The Instance state menu allows you to place an instance into different states of activity. You can start and stop an instance if it has an Amazon EBS volume as its root device.

Step 18 / 24

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Computing Solutions

STEP 19:

1. Click Stop when prompted with the confirmation window.
2. Go to the next step.

CONCEPT:

Once an instance is stopped, CPU usage and data transfer charges cease, but storage charges for any attached Amazon EBS volumes continue.

Step 19/24

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Computing Solutions

STEP 20:

1. Once your instance state changes to Stopped, review the Public IP and DNS fields. They will be empty.
2. Go to the next step.

CONCEPT:

Each time you start a stopped instance, AWS charges a minimum of one minute for usage of per-second billing instances. After one minute, AWS charges only for the seconds you use.

Step 20/24

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 21

1. Click the Actions drop down menu.
2. Choose the Instance settings and review the available options.
- You will see different options to change your instance such as type, termination protection or shutdown behavior.
3. Go to the next step.

CONCEPT

You must stop your Amazon EBS-backed instance before you can change its instance type. Ensure that you plan for downtime while your instance is stopped. Stopping the instance and

Step 21/24

The screenshot shows the AWS EC2 Instances page. An instance named 'AWS Compute' is selected. The 'Actions' dropdown menu is open, and the 'Instance settings' option is highlighted with an orange arrow. Other options in the dropdown include 'View details', 'Manage instance state', 'Networking', 'Security', 'Image and templates', and 'Master and troubleshoot'.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Computing Solutions

STEP 22

1. Click instance state.
2. Choose Start instance.
3. Go to the next step.

Step 22/24

The screenshot shows the AWS EC2 Instances page for the same instance. The 'Actions' dropdown menu is open, and the 'Start instance' option is highlighted with an orange arrow. Other options in the dropdown include 'Stop instance', 'Reboot instance', and 'Terminate instance'.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Computing Solutions

STEP 23

1. Once the instance reaches the Running state, review the instance details. You will notice that the IP and DNS data is now populated.
2. Go to the next step.

EC2 Dashboard

Instances (1/1) **AWS Compute...** (i-0b173d96ebd6b7be2) Running t2.micro 2/2 check passes No alarms +

Details Security Networking Storage Status checks Monitoring Tags

Instance ID: i-0b173d96ebd6b7be2 (AWS Computing Solutions)
Private IPv4 address: 10.10.0.10
Public IPv4 address: 42.54.196.247-118.compute-1.amazonaws.com | open address
Private IPv4 DNS: ec2-54-196-247-118.compute-1.amazonaws.com | open address
Instance state: Running
Instance type: t2.micro
Private IP DNS name (IPv4 only): ip-10-10-0-10.ec2.internal
Private IP address: 10.10.0.10
Public IP address: 42.54.196.247-118.compute-1.amazonaws.com | open address
Elastic IP address: N/A

Feedback Deploy 600 ▾

Step 23/24 ← →

Review

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Computing Solutions

STEP 24

Congratulations! You've completed the Practice Section. Go to the DIY section to complete the solution.

Practice Lab

Congratulations!

You've completed the Practice Section.
Go to the DIY section to complete the solution.

Step 24/24 ←

The screenshot shows the AWS AMI Lounge interface. On the left, a sidebar displays instance details: Instance ID i-0e0082999135d2f3a, Instance Type t2.micro, Availability Zone us-east-1a, and Instance Family t2. Below this is a note about the AMI's compatibility with Lambda functions.

The main area shows a terminal session with the following output:

```

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-10-0-10 ~]$ CD SAMPLE_APP
-bash: CD: command not found
[ec2-user@ip-10-10-0-10 ~]$ cd sample_app
[ec2-user@ip-10-10-0-10 sample_app]$ ls
app.py aws_compute_solutions.log __pycache__ requirements.txt templates
[ec2-user@ip-10-10-0-10 sample_app]$ tail aws_compute_solutions.log
INFO:root:Instance Family is t2
INFO:root:Instance Type is t2.micro
INFO:root:Instance Id is i-0e0082999135d2f3a
INFO:root:Availability Zone is us-east-1a
INFO:werkzeug:205.210.31.132 - - [29/Sep/2022 07:07:14] "GET / HTTP/1.0" 200 -
INFO:root:Instance Family is t2
INFO:root:Instance Type is t2.micro
INFO:root:Instance Id is i-0e0082999135d2f3a
INFO:root:Availability Zone is us-east-1a
INFO:werkzeug:168.149.184.241 - - [29/Sep/2022 07:12:45] "GET / HTTP/1.1" 200 -
[ec2-user@ip-10-10-0-10 sample_app]$

```

Below the terminal, the instance summary is displayed again:

i-0e0082999135d2f3a (AWS Computing Solutions)
 PublicIPs: 18.207.222.180 PrivateIPs: 10.10.0.10

Change instance type to m4.large and start the server.

Ex. userData file :

```

#!/bin/bash

# Update and install python3
sudo yum update -y
sudo yum install -y python3

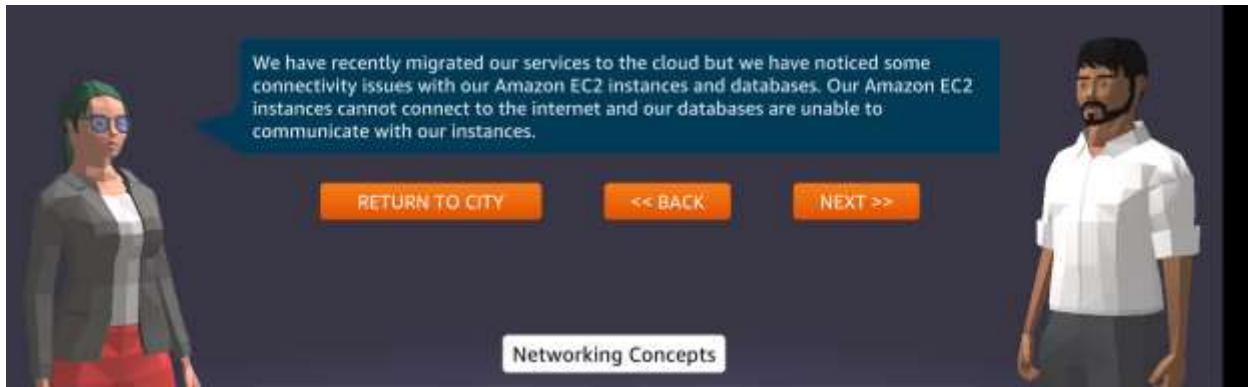
```

```
#Export environment variables
export APP_NAME=sample_app
export LAB_ID=399068fe-9ca4-42de-a351-3d0048824a10
export PROVISION_BUCKET_NAME=pu-base-buckets-v1-provision-lab

#Declare files and create directory
EC2_FILES="lab app.py requirements.txt templates/index.html"
mkdir /home/ec2-user/$APP_NAME
mkdir /home/ec2-user/$APP_NAME/templates

#Copy files from S3
for file_ in $EC2_FILES
do
aws s3 cp s3://$PROVISION_BUCKET_NAME/$LAB_ID/$APP_NAME/$file_ /home/ec2-user/$APP_NAME/$file_
done

# Install and start app
mv /home/ec2-user/$APP_NAME/lab /etc/rc.d/init.d/
chmod +x /etc/rc.d/init.d/lab
chkconfig lab on
sudo chown -R ec2-user:ec2-user /home/ec2-user/$APP_NAME
sudo pip3 install -r /home/ec2-user/$APP_NAME/requirements.txt
service lab start
```



That's great. However, I'm confused. How did my engineers create a VPC without internet access? I thought this was supposed to be included.

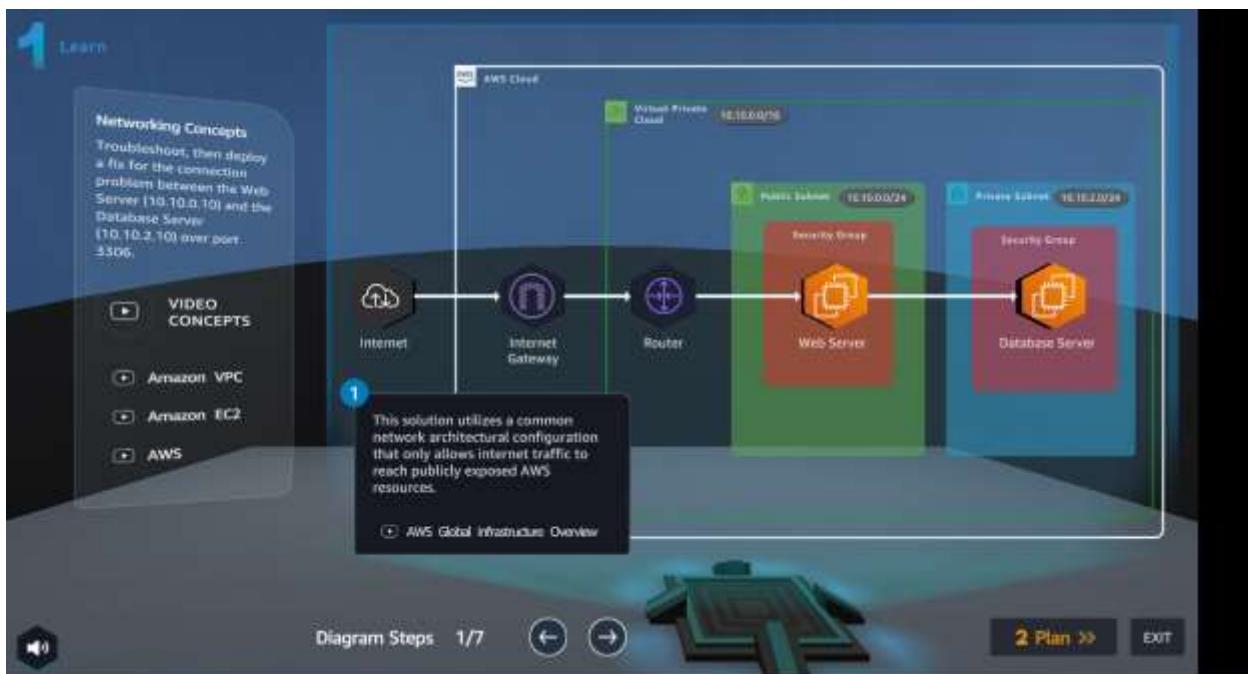
RETURN TO CITY << BACK NEXT >>

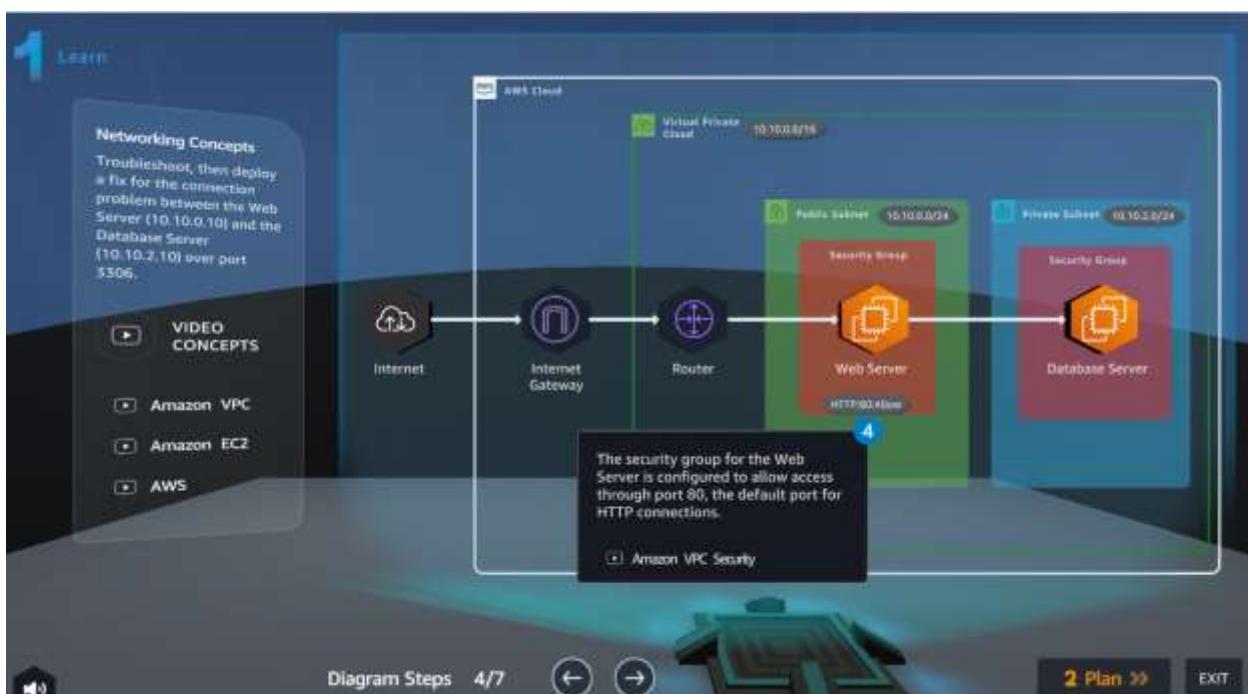
Networking Concepts

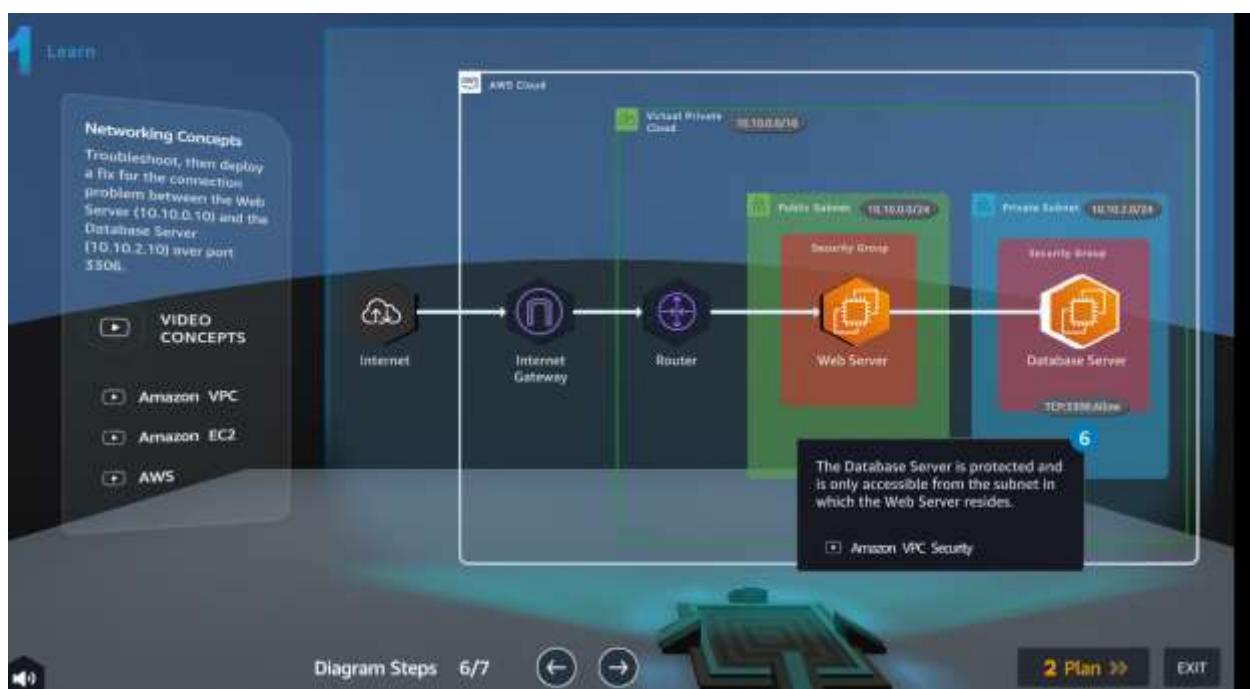
Rewards + Amazon Web Services	Solution Annotations
+50 Gems	Configure routing table and attach internet gateway
+3 Customization Items	Configure a security group
+10 Amazon EC2	

The AWS default VPCs are configured with internet gateways and routing to the internet by default. When you create new VPCs, you choose whether all or part of the VPC should be exposed to the internet. This allows you to customize your own network security configuration to meet your requirements.

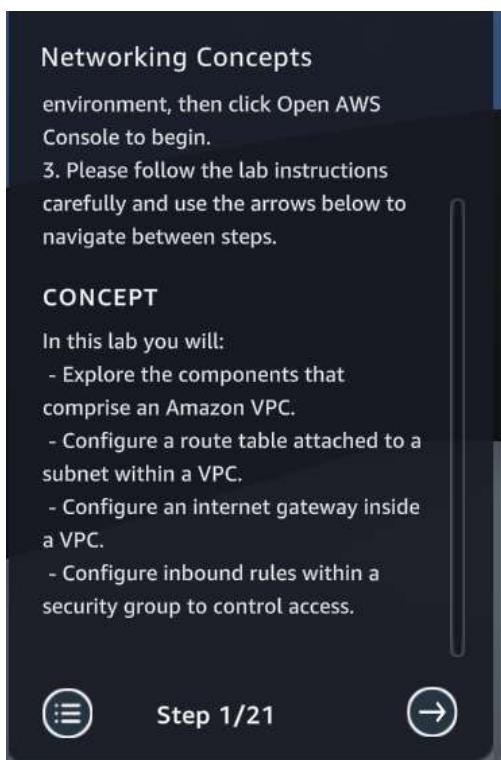
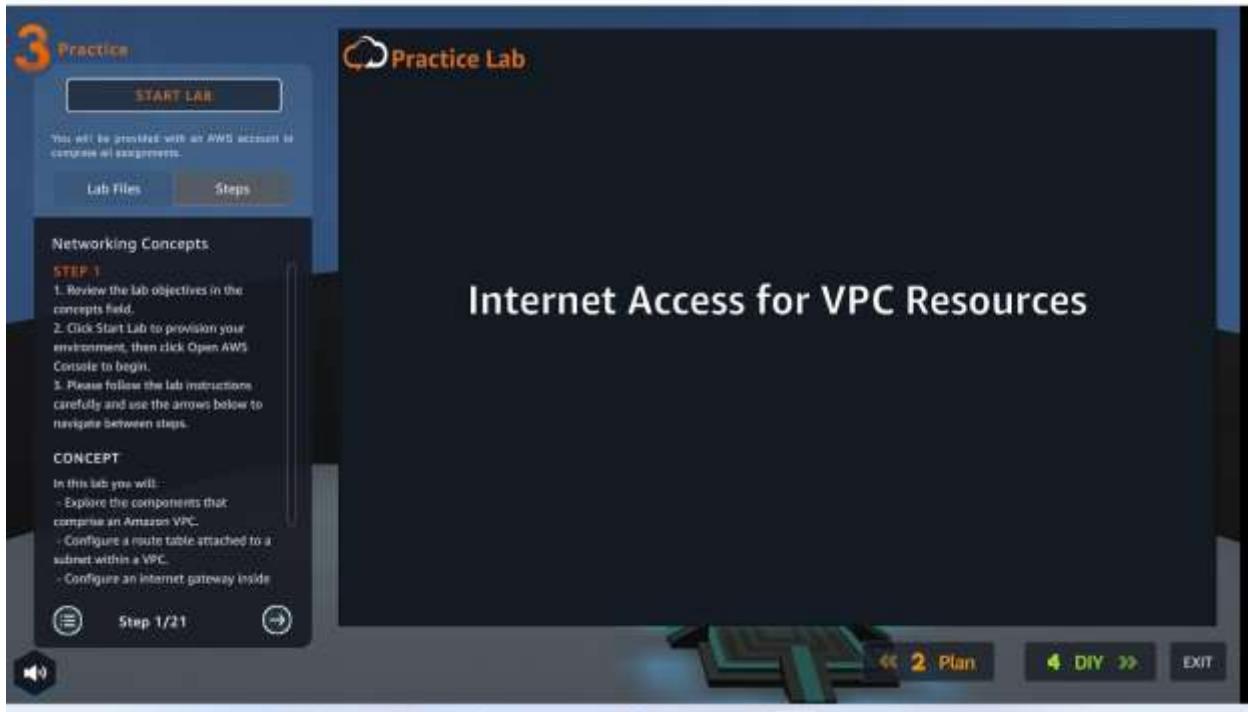
RETURN TO CITY << BACK NEXT >>











The screenshot shows the AWS Practice interface. On the left, a sidebar displays 'Networking Concepts' with 'STEP 3' instructions: 1. Before you begin, please review the Region drop-down at the top right and ensure it is set to N. Virginia. 2. In the Services search field, type ec2. 3. Click EC2 from the search results. 4. Go to the next step. Below this is a 'CONCEPT' section stating: 'AWS launched its very first Amazon EC2 instance in August, 2006.' At the bottom of the sidebar are navigation icons for Step 2/21, back, forward, and exit.

The main content area shows the AWS Services search results for 'ec2'. The top result is 'EC2' with a 'Click' button. Other results include 'EC2 Image Builder', 'AWS Compute Optimizer', 'GuardDuty', 'Export snapshots to EC2', and 'Dashboard'. A sidebar on the right titled 'AWS resources' contains a note about the AWS mobile app and tips for saving money in EC2.

This screenshot shows the AWS Practice interface on Step 3/21. The sidebar now lists 'STEP 3' instructions: 1. Click Instances. 2. Go to the next step. The main content area is the 'EC2 Instances' page under the 'EC2 Instances' tab. It shows a table of resources: Instances (Running) 1, Dedicated Hosts 0, Elastic IPs 3, Instances 2, Key pairs 0, Load balancers 0, Placement groups 0, Security groups 6, Snapshots 0, and Volumes 2. Below the table is a 'Launch instance' section with a 'Launch instance' button and a note: 'To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.' At the bottom of the page are navigation icons for Step 3/21, back, forward, and exit.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Networking Concepts

STEP 4

1. Click to select the Web Server instance.
2. Click the icon to copy the instance Public IPv4 address.
3. Go to the next step.

EC2 Dashboard

Forms
Tags
Limits

Instances

Instance Type:
Launch Templates
Spot Requests
Settings Plans
Reserved Instances
Dedicated Hosts
Scheduled Instances
Capacity Reservations

Images

AMIs

Elastic Block Store

Volumes
Snapshots
Lifecycle Manager

Instances (1/1) Info Connect Instance state Actions Launch instances

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
Web Server	i-03949fb1946ac9a17	Running	t2.micro	2/2 checks p...	No alarms
DB Server	i-079ef00d2a30822e	Running	t2.micro	2/2 checks p...	No alarms

Instance: i-03949fb1946ac9a17 | Web Server

Details Security Networking Storage Status checks Monitoring Tags

Instance summary Public IPv4 address copied

INSTANCE ID: i-03949fb1946ac9a17 Click → 54.173.76.245 [open address] → 10.10.0.10

Step 4/21 ← →

2 Plan **DIY** → E07

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Networking Concepts

STEP 5

1. Paste the IP address into your browser then press Enter.
2. After a few minutes, a site timeout message will appear.
3. To solve this issue, return to the EC2 instance page then go to the next step.

54.173.76.245

Paste

This site can't be reached

54.173.76.245 took too long to respond.

Try:

- Checking the connection
- Checking the proxy and the firewall

ERR_CONNECTION_TIMED_OUT

Details Refresh

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP 6

1. Click the Web Server instance.
2. Click the Networking tab.
3. Review and take note of the Public IPv4 address and Private IPv4 address.
4. Go to the next step.

CONCEPT

Amazon VPC enables you to launch AWS resources into a virtual network that you've defined. This virtual network closely resembles a traditional network that you'd operate in your own data center, with the benefits of using the scalable infrastructure of AWS.

Step 6/21

Instance: i-0aef993651fb8c36a (Web Server)

Details Security Networking Storage Status checks Monitoring Tags

Networking details

Public IPv4 address	Private IPv4 addresses	VPC ID
34.235.252.32 [open address]	10.10.0.10	vpc-0052e6a101495a7b0 [network-connections/VPC/web-server-mitigation1]
Public IPv4 DNS	Private IPv4 DNS	Subnet ID
m2-34-235-252-32.compute-1.amazonaws.com [open address]	ip-10-10-0-10.ec2.internal	subnet-0d27f3b7 [network-connections/VPC/web-server-mitigation1]
IPv4 address	Secondary private IPv4 addresses	Availability zone

Feedback English (US) 2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP 7

1. Click the Subnet ID of the Web Server instance.
2. Go to the next step.

CONCEPT

A subnet is a range of IP addresses in your VPC. You can launch AWS resources into a specified subnet. Each subnet must reside entirely within one Availability Zone and cannot span zones.

Step 7/21

Instance: i-0aef993651fb8c36a (Web Server)

Details Security Networking Storage Status checks Monitoring Tags

Networking details

Public IPv4 address	Private IPv4 addresses	VPC ID
34.235.252.32 [open address]	10.10.0.10	vpc-0052e6a101495a7b0 [network-connections/VPC/web-server-mitigation1]
Public IPv4 DNS	Private IPv4 DNS	Subnet ID
m2-34-235-252-32.compute-1.amazonaws.com [open address]	ip-10-10-0-10.ec2.internal	subnet-0d27f3b7 [network-connections/VPC/web-server-mitigation1]
IPv4 address	Secondary private IPv4 addresses	Availability zone

Feedback English (US) 2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP #1

1. Choose the network-concepts subnet.
2. Click the Route table tab.
3. Click the Route table link named web-server-netSubnet1.
4. Go to the next step.

CONCEPT

A route table contains a set of rules, called routes, that are used to determine where network traffic from your subnet or gateway is directed. Use a public subnet for internet-connected resources and a private subnet for non-internet-connected resources.

Step 8/21

Route table: rtb-065277fb4b33622 / network-concepts/VPC/web-server-netSubnet1

Destination	Target
10.10.0.0/16	local
0.0.0.0/0	nat-0d41084cf11b1f0

2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP #1

1. Select the network-concepts route table.
2. Click the Routes tab.
3. Review the two route table entries:
 - One route sends local traffic to the local network only and the other route sends all other traffic to the internet via a NAT gateway.
4. Click Edit routes.
5. Go to the next step.

CONCEPT

The CIDR naming convention 0.0.0.0/0, represents all IPv4 addresses (-/0 for IPv6).

Step 9/21

Destination	Target	Status	Propagated
10.10.0.0/16	local	Active	No
0.0.0.0/0	nat-0d41084cf11b1f0	Active	No

2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Networking Concepts

STEP 10

1. Click Remove to delete the NAT gateway from the route table.
2. Go to the next step.

CONCEPT

A NAT gateway is a Network Address Translation (NAT) service. You can use a NAT gateway so that instances in a private subnet can connect to services outside your VPC but external services cannot initiate a connection with those instances.

Step 10/21

Edit routes

Destination: 10.10.0.0/16 Target: local Status: Active

Propagated: No

Edit routes

Destination: 0.0.0.0 Target: net-0541b564cf11dc1d Status: Active

Propagated: No

Remove **i Click**

Add route

Cancel **Preview** **Save changes**

The screenshot shows the AWS VPC console with the 'Edit routes' page open. It displays two existing routes: one for destination 10.10.0.0/16 targeting 'local' (Status: Active) and another for 0.0.0.0 targeting a specific NAT gateway (Status: Active). A new route is being added for 0.0.0.0/0, with the target set to 'net-0541b564cf11dc1d'. A 'Choose' button is highlighted with a red arrow, indicating the user needs to select the correct target. The 'Save changes' button at the bottom right is also highlighted with a red arrow.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Networking Concepts

STEP 11

1. Click Add route.
2. In the Destination field, type:

0.0.0.0/0

3. In the Target field, choose Internet Gateway, then type:

igw-

4. Under Target choose igw-xxxxxx/network-concepts/VPC
5. Click Save changes.
6. Go to the next step.

CONCEPT

Step 11/21

Edit routes

Destination: 10.10.0.0/16 Target: local Status: Active

Propagated: No

Edit routes

Destination: 0.0.0.0 Target: **Choose**

Propagated: No

Add route **i Click** **Save changes**

Cancel **Preview**

The screenshot shows the AWS VPC console with the 'Edit routes' page open. A new route is being added for 0.0.0.0/0. The 'Target' field has a dropdown menu open, showing 'net-0541b564cf11dc1d (network-concepts/VPC)' with a 'Choose' button next to it, which is highlighted with a red arrow. The 'Save changes' button at the bottom right is also highlighted with a red arrow.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Networking Concepts

STEP 12

1. Review the new Internet gateway association.
- The subnet is now reachable from the Internet.
2. Click the Services menu to return to the EC2 instance page.
3. Go to the next step.

CONCEPT

An Internet gateway supports IPv4 and IPv6 traffic. It does not cause availability risks or bandwidth constraints on your network traffic. There's no additional charge for having an internet gateway in your account.

Step 12/21

Updated routes for rtb-065277fb84539622 / network-concepts/VPC/web-server-rtb/rtb successfully

Details

Route table ID	Hair	Split subnet associations	Edge associations
rtb-065277fb84539622	No	Subnet: 00000000000000000000000000000000	
VPC	Owner ID: 849673252055	Network: network-concepts/VPC	Interface: VPC/web-server-rtb/rtb

Routes (2)

Destination	Target	Status	Propagated
10.10.0.0/16	local	Active	No
0.0.0.0/0	ipr-00f5a2c020e8020a	Active	No

1 Review

Both

1. Review

2 Plan

4 DIY

EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Networking Concepts

STEP 13

1. From the EC2 instances page choose the Web Server instance.
2. Click the Security tab.
3. Under Security groups, click the WebServerSecurityGroup.
4. Go to the next step.

Step 13/21

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Networking Concepts

STEP 14

1. Click Edit inbound rules.
2. Go to the next step.

CONCEPT

For each security group, you add rules that control the traffic based on protocols and port numbers. There are separate sets of rules for inbound traffic and outbound traffic.

Step 14/21

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP 15

1. Click Add rule.
2. Go to the next step.

CONCEPT

When you create a VPC, it comes with a default security group. You can create additional security groups for each VPC.

Step 15/21

Networking Concepts

protocol for MySQL/Aurora.

4. Choose HTTP from the options.
5. Go to the next step.

CONCEPT

You can create a security group and add rules that reflect the role of the instance that's associated with the security group. For example, an instance that's configured as a web server needs security group rules that allow inbound HTTP and HTTPS access. Likewise, a database instance needs rules that allow access for the type of database, such as access over port 3306 for MySQL.

Step 16/21

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP 17

- Under Source choose Anywhere-IPv4.
- Click Save rules.
- Go to the next step.

CONCEPT

Security groups are stateful. For example, if you send a request from an instance, the response traffic for that request is allowed to reach the instance regardless of the inbound security group rules. Responses to allowed inbound traffic are allowed to leave the instance, regardless of the outbound rules.

Step 17/21

Edit inbound rules

Inbound rules

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
-	HTTP	TCP	80	Anyc... <input type="button" value="Choose"/> Custom: 33.33.0.0/16	

Add rule

Choose

Cancel Preview changes Save rules

Anywhere-IPv4
Anywhere-IPv6
My IP

1 Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP 18

- Click Instances.
- Go to the next step.

Instances

Instance Type

Launch Templates

Spot Reserves

Saving Plans

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

Images

AMIs

Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

Network & Security

Security Groups

Details

Inbound security group rules successfully modified on security group sg-0371c7c5a91c2a882 | WebServerSecurityGroup

sg-0371c7c5a91c2a882 - WebServerSecurityGroup

Owner: 649673252033 Inbound rules count: 2 Permission entries Outbound rules count: 1 Permission entry

Inbound rules Outbound rules Tag

Inbound rules (2)

Type	Protocol	Port range	Source	Description - optional
HTTP	TCP	80	0.0.0.0/0	-
HTTP	TCP	80	-/0	-

Edit inbound rules

Step 18/21

Actions

Privacy Policy Terms of Use Cookie preferences

1 Plan 2 DIY 3 EXIT

3 Practice

START LAB

You will be provided with an AWS account to practice all assignments.

Lab Files Steps

Networking Concepts

STEP 19

1. Choose the Web Server instance.
- This will test connectivity using a Java application.
2. Click the Networking tab.
3. Click the icon to copy the Public IP address.
4. Go to the next step.

EC2 Dashboard

Instances

Instance: i-02e09236c1fb8c5fa (Web Server)

Networking

Public IPv4 address: **i-02e09236c1fb8c5fa** (copy)

Private IPv4 address: 10.10.0.10

VPC ID: vpc-032d9ec31495a160 (network-concepts-VPC)

Subnet ID: subnet-01221dd533ecf044e (network-concepts-VPC/web-server-subnet)

IPv6 address: Secondary private IPv6 address: Availability zone: azr-001

3 Practice

START LAB

You will be provided with an AWS account to practice all assignments.

Lab Files Steps

Networking Concepts

STEP 20

1. Paste the instance IP address into a browser address bar then press Enter.
2. Review the application that loads from the public IP address.
3. Review the connection from the Internet to the Web server.
- A connection should be established.
4. Review the connection from the Web Server to the Database Server.
- A connection from the Web server to the DB server should display as failed.
5. Go to the next step.

CONCEPT

To deploy a working internet gateway the following must be completed:

Internet

Review

Review

Review

Review

Amazon CloudFront

Router

Web Server MySQL server on '10.10.2.10:3306' (3306)

Database

HTTP 200 OK

HTTP 500 Internal Server Error

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

- A connection from the Web server to the DB server should display as failed.
- 5. Go to the next step.

CONCEPT

To deploy a working Internet gateway the following must be completed:

- Attach the Internet gateway to a VPC.
- Route tables associated with your public subnet must have a route to your internet gateway.
- Security groups associated with your VPC must allow traffic in/from the Internet.
- Any instances in the VPC must have a public IP or Elastic IP address assigned.

Step 20/21

Internet

VPC: 10.10.1.0/16

Subnet: 10.10.1.0/24

Router

Web Server: 10.10.1.10:8080

MySQL Server: 10.10.2.10:3306

DB Server: 10.10.2.10:3306

HTTP: 8080

TCP: 3306

Review

Review

Review

Review

2 Plan

4 DIY

EXIT

```
graph LR; Internet --> IG[Internet Gateway]; IG --> Router[Router]; Router --> S1[Subnet 10.10.1.0/24]; Router --> S2[Subnet 10.10.2.0/24]; S1 --> WebServer[Web Server: 10.10.1.10:8080]; S2 --> MySQLServer[MySQL Server: 10.10.2.10:3306];
```

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Networking Concepts

STEP 21

Congratulations! You've completed the Practice Section. Go to the DIY section to complete the solution.

Congratulations!

You've completed the Practice Section.
Go to the DIY section to complete the solution.

The screenshot shows a cloud-based lab interface. On the left, there's a sidebar with a 'DIY' logo, a 'START LAB' button, and tabs for 'Lab Files' and 'DIY Activity'. Below these are sections for 'Networking Concepts', 'DIY ACTIVITIES' (with a note about changing security group rules), and 'SOLUTION VALIDATION METHOD' (describing the validation process). A large central area contains a 'VALIDATION FORM' with a text input field containing 'DbServerSecurityGroup', a 'VALIDATE' button, and a 'SKIP' button. To the right is a 'VALIDATION MESSAGE' box which is currently empty. At the bottom right of the main area are navigation buttons: '<< 3 Practice' and 'EXIT'.

This screenshot displays a detailed networking concepts page. It features a title 'Networking Concepts' with a subtitle 'allow traffic over port 3306 into the Database Server.' Below this is a 'SOLUTION VALIDATION METHOD' section. It includes a 'Validation Process' description and a note about updating security group rules to allow traffic on port 3306. A large text block at the bottom explains the connection setup between a Web Server and a Database Server using specific security groups and TCP ports.

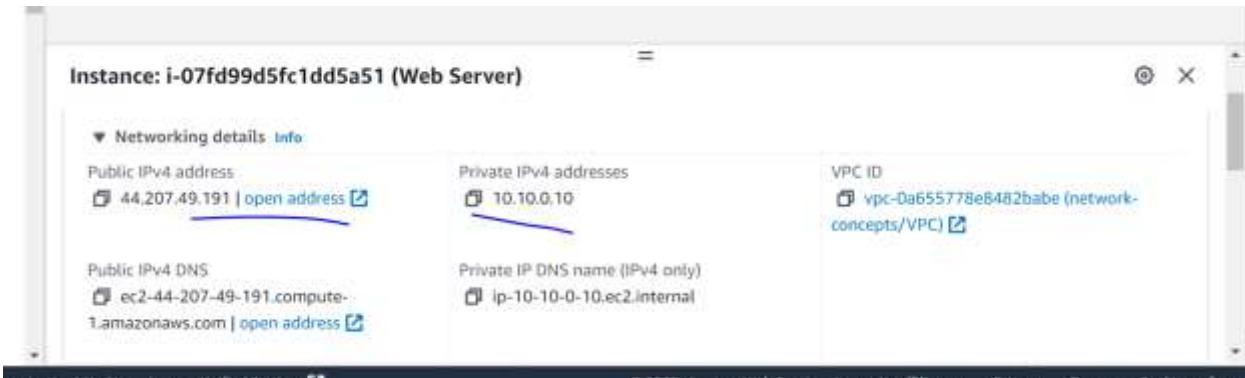
Networking Concepts
allow traffic over port 3306 into the Database Server.

SOLUTION VALIDATION METHOD

Validation Process:
Our servers will determine if the Web Server can connect to the Database Server on port 3306 with Custom Source subnet 10.10.0.0/24.

Update the security group rules, then review the Java application for a visual confirmation of an established connection. The status should change to Connected.

The Web Server using security group WebServerSecurityGroup needs to connect to the Database Server using security group DbServerSecurityGroup over a TCP connection on port 3306.



[subnet-0c8f848d620f136e5 \(network-concepts/VPC/web-server-netSubnet1\)](#)

Route table: [rtb-03929b088afdb6688 / network-concepts/VPC/web-server-netSubnet1](#)

Security group: sg-06e47990ab261dfc4

My main issue is cost. So far I get much more web store traffic during the day than I do at night. I think I can cut the amount of servers from 4 to 2 during the evening.

[RETURN TO CITY](#)

[<< BACK](#)

[NEXT >>](#)

Yes, that's one of the many advantages of cloud computing. You pay for what you use. Don't need something? Just shut it down and you won't pay for it.

[RETURN TO CITY](#)

[<< BACK](#)

[NEXT >>](#)

When building your systems, on-premise customers often over-purchase to account for growth. Since you can get these resources on-demand, you don't have to worry about paying upfront for resources you might need later.

If you need more resources, you can scale your systems horizontally, which means add more servers when you need them. If your current resources are too weak to run your application, you can scale vertically, which means increase the computing power on one or more instances.

[RETURN TO CITY](#)

[**<< BACK**](#)

[**NEXT >>**](#)

Yes! I'm going to prepare a price estimate using the AWS Pricing Calculator. I will send you a URL when it's ready.

Keep in mind that there are different possible architectures for the same solution, so there's potential to save even more in the future. However, architectural improvements can be a conversation for another time.

Learn

Cloud Economics
Configure a price estimate for an architecture that uses a variable amount of Amazon EC2 instances based on peak usage time.

VIDEO CONCEPTS

Cloud Economics

Diagram Steps 1/9

1

This solution uses the AWS Pricing Calculator to create estimates for your AWS use cases. You can model your solutions before building them, explore the AWS service price points, and review the calculations behind your estimates.

AWS Cloud
Customer Demand
Unused capacity
Unused customers
WebServer WebServer

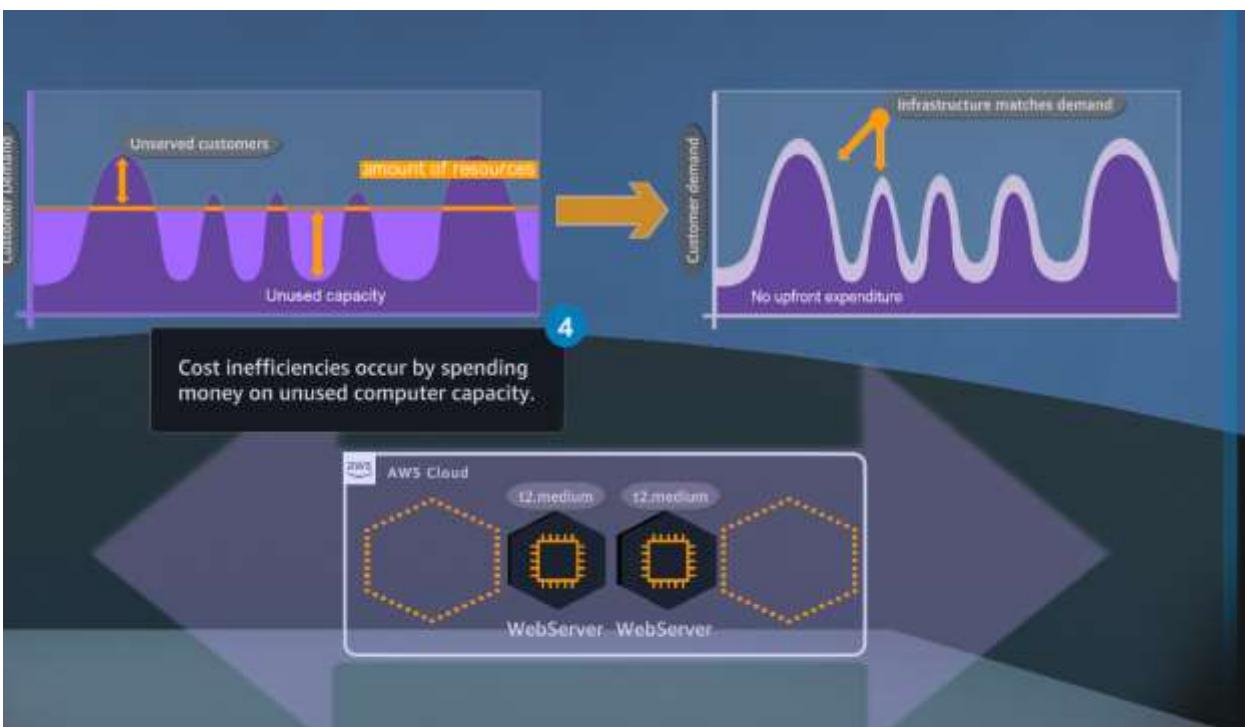
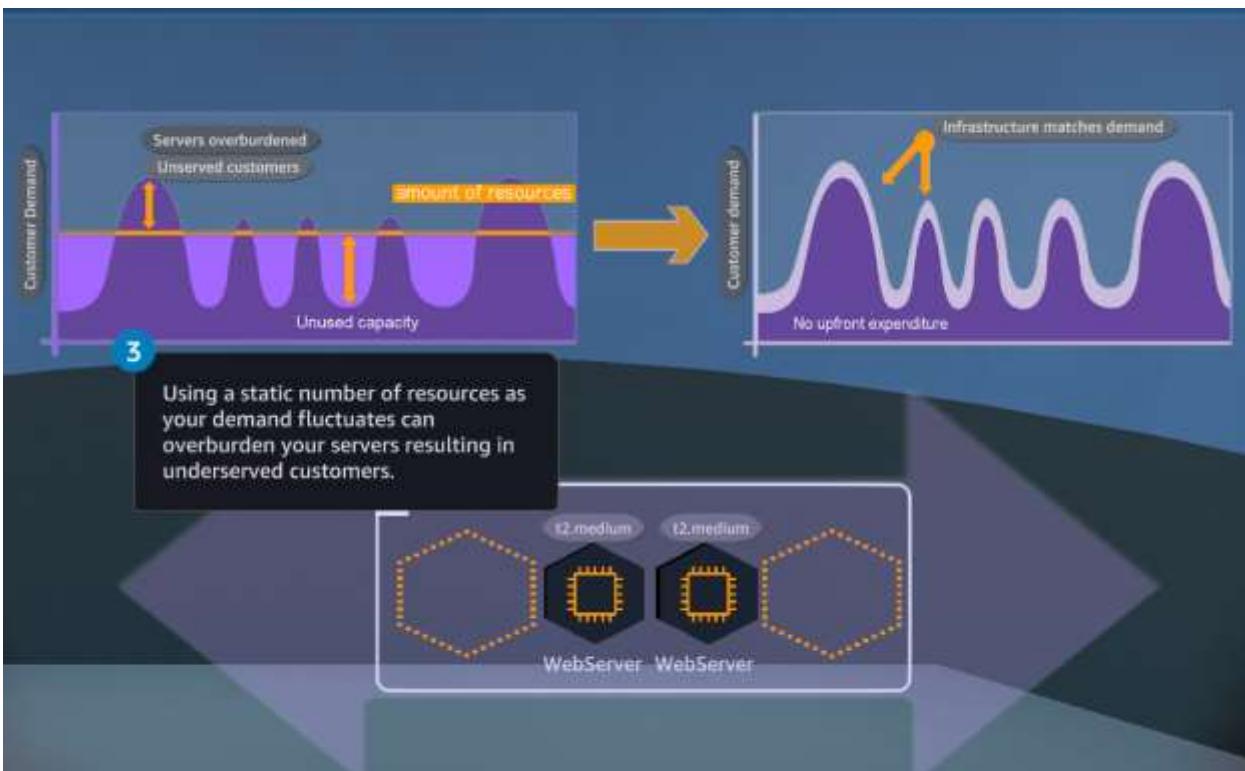
2 Plan >> **EXIT**

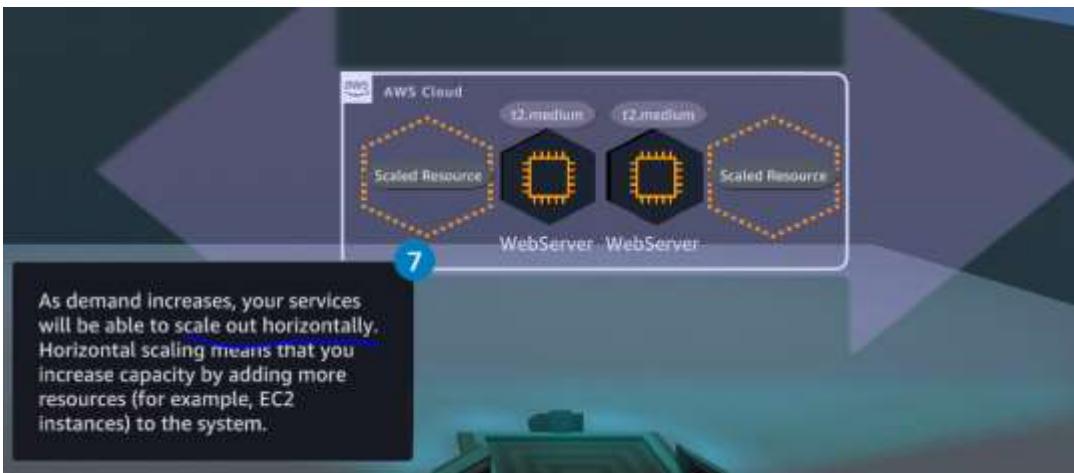
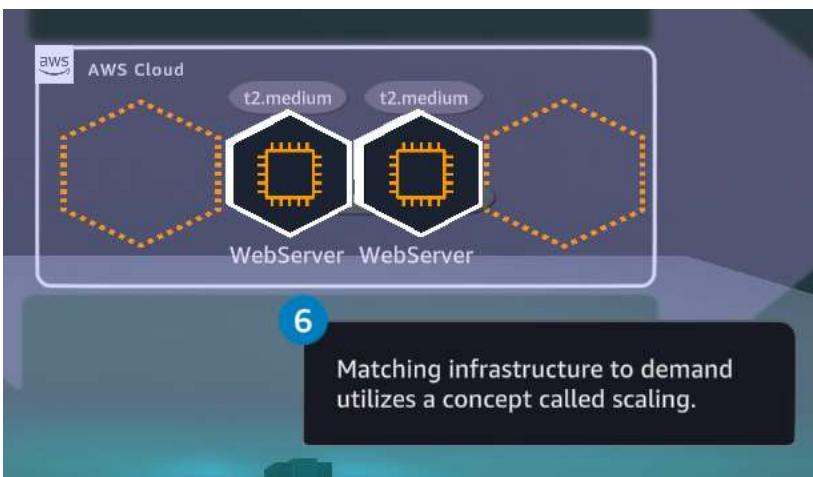
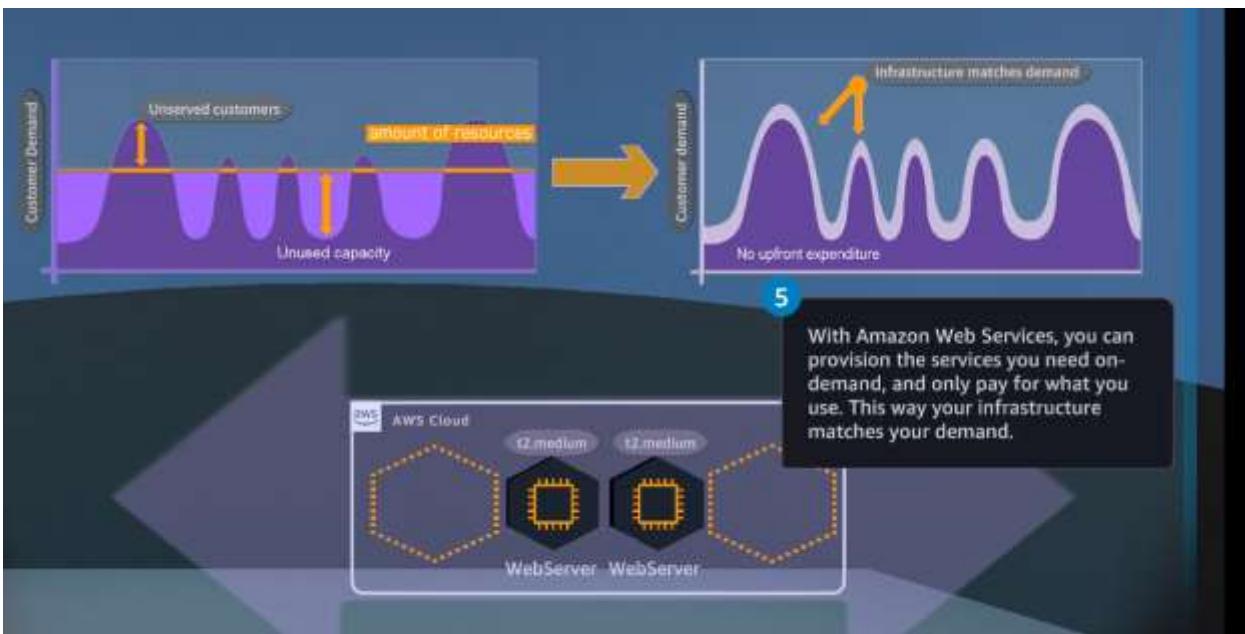
Customer Demand
Unused capacity
Unused customers
amount of resources

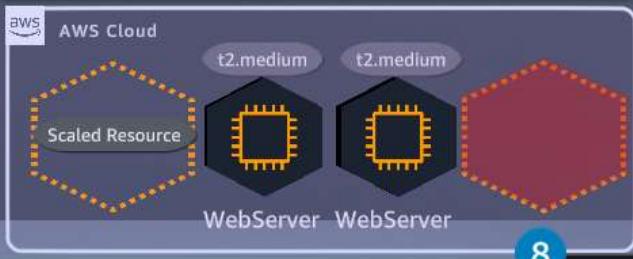
2

AWS enables you to take control of costs and continuously optimize your spend, so you only pay for the resources you actually need.

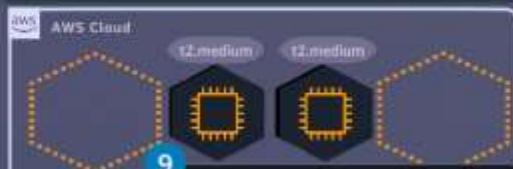
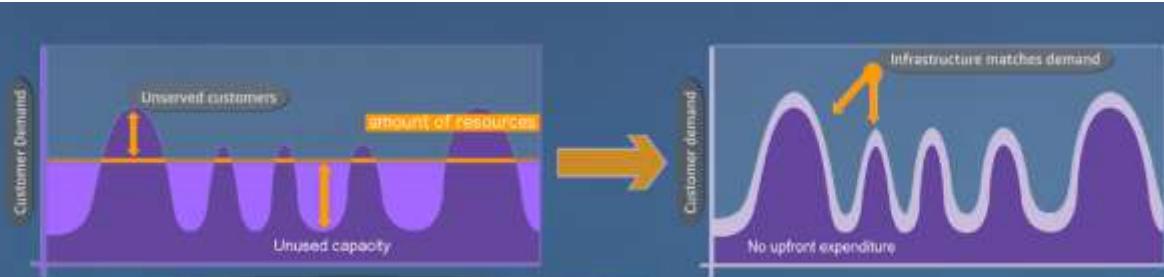
AWS Cloud
t2.medium t2.medium
WebServer WebServer







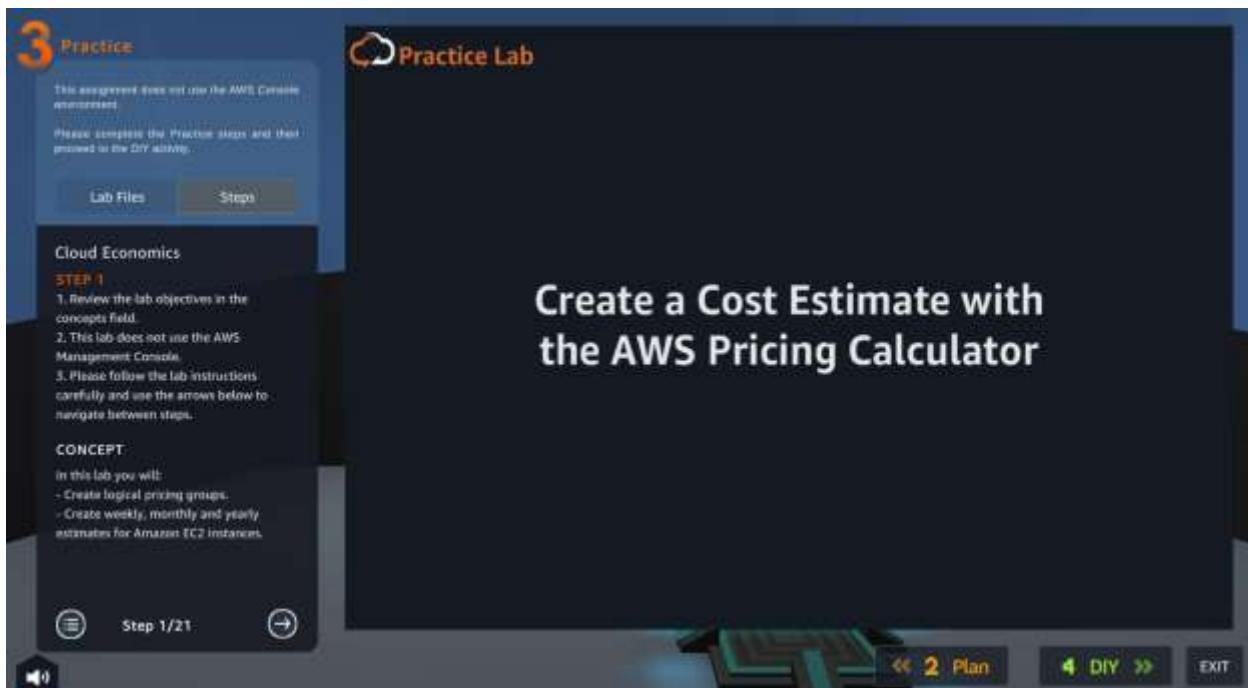
As your demand begins to decrease, your systems will scale horizontally, which means the number of instances or other resources reserved for use will also decrease.



With the AWS Pricing Calculator you can get an estimate with no commitment and explore AWS services and pricing for your architecture needs. You can use it to help you plan how you spend, find cost saving opportunities, and make informed decisions when using Amazon Web Services.

Estimate different configurations
t2.medium → t2.micro





3 Practice

This assignment does not use the AWS Cloud environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

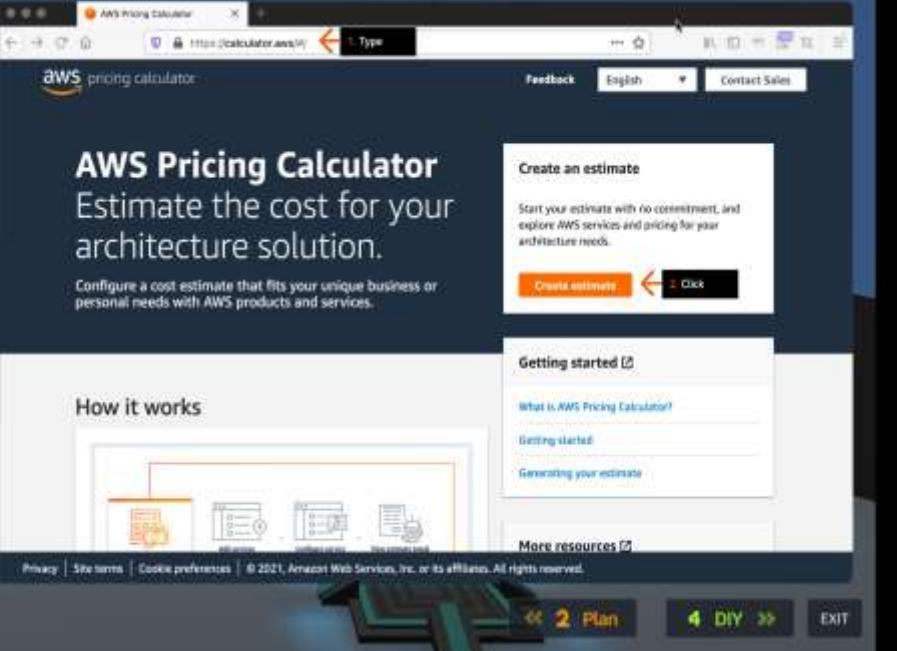
STEP 2

1. Open a new window in your preferred web browser then type:
<https://calculator.aws>
2. Click Create estimate.
3. Go to the next step.

CONCEPT

AWS Pricing Calculator is an easy way to estimate your cloud costs.

Step 2/21



3 Practice

This assignment does not use the AWS Cloud environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

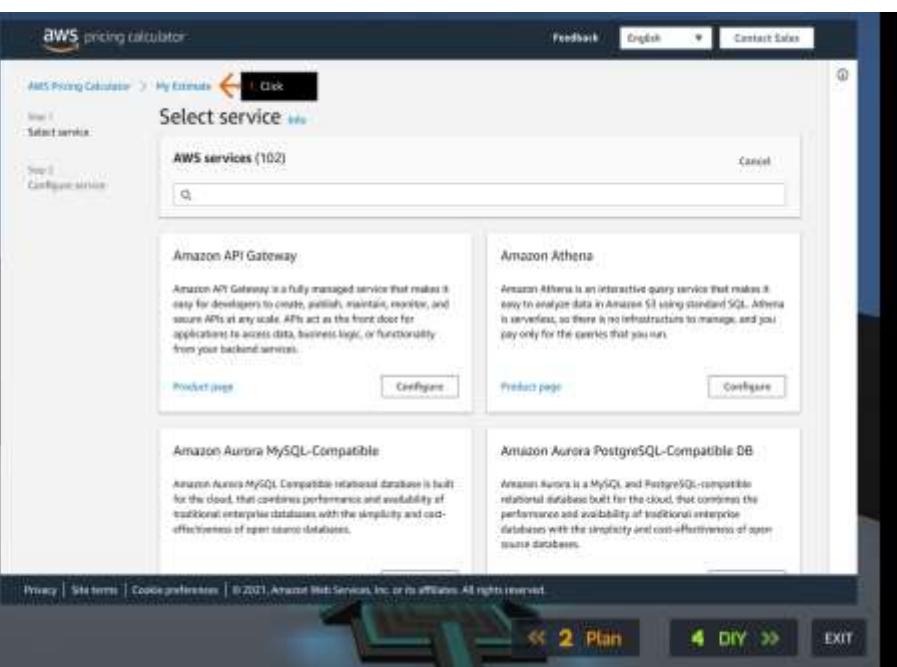
STEP 3

1. Click My Estimate.
2. Go to the next step.

CONCEPT

Before creating an estimate, consider creating a logical grouping of your services. A useful logical grouping could be Web Servers.

Step 3/21



3 Practice

This assignment does not use the AWS Console environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

STEP 4

1. Click Create group.
2. Go to the next step.

CONCEPT

Adding multiple groups to an estimate gives you more insight into your data.

Step 4/21

3 Practice

This assignment does not use the AWS Console environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

STEP 5

1. In the Group name field, type:
Web Servers
2. Click Create group.
3. Go to the next step.

3 Practice

This assignment does not use the AWS Console environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

STEP 6

1. Click Add service.
2. Go to the next step.

CONCEPT

You can see the breakdown of your services under the Organization tab.

Step 6/21

aws pricing calculator

Successfully added Web Servers group.

My Estimate

Estimate summary

Upfront cost: 0.00 USD	Monthly cost: 0.00 USD
Total 12-month cost: 0.00 USD	
Includes up-front cost	

Groups

My Estimate

Web Servers

Getting Started with AWS

Contact Us

Sign in to the Console

Add service

Empty Estimate

You don't have any estimates to display.

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2 Plan

4 DIY

EXIT

3 Practice

This assignment does not use the AWS Cloud environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files **Steps**

Cloud Economics

STEP 7

1. In the AWS services search field, type: ec2
2. Under Amazon EC2, click Configure.
3. Go to the next step.

CONCEPT

Each card allows you to configure details about your service, and also get direct links to the product pages.

Step 7/21

AWS pricing calculator

Feedback English Contact Sales

Step 1 Select service Step 2 Configure service

Select service

AWS services (102)

Q: ec2 Type

Amazon EC2

Amazon EC2 offers the broadest and deepest compute platform with choice of processor, storage, networking, operating system, and purchase model.

Amazon EC2 Dedicated Hosts

Amazon EC2 Dedicated Hosts allow you to use your eligible software licenses on Amazon EC2, so that you get the flexibility and cost effectiveness of using your own licenses, but with the residency, simplicity and elasticity of AWS. Includes support for EC2 High Memory and EC2 Mac instances.

Product page **Click** **Configure**

Windows Server and SQL Server on Amazon EC2

The Windows Server and SQL Server on Amazon EC2 calculator provides a pricing estimate for specific workloads. It recommends suitable cloud deployment options and cost-saving pricing models based on licensing and infrastructure inputs.

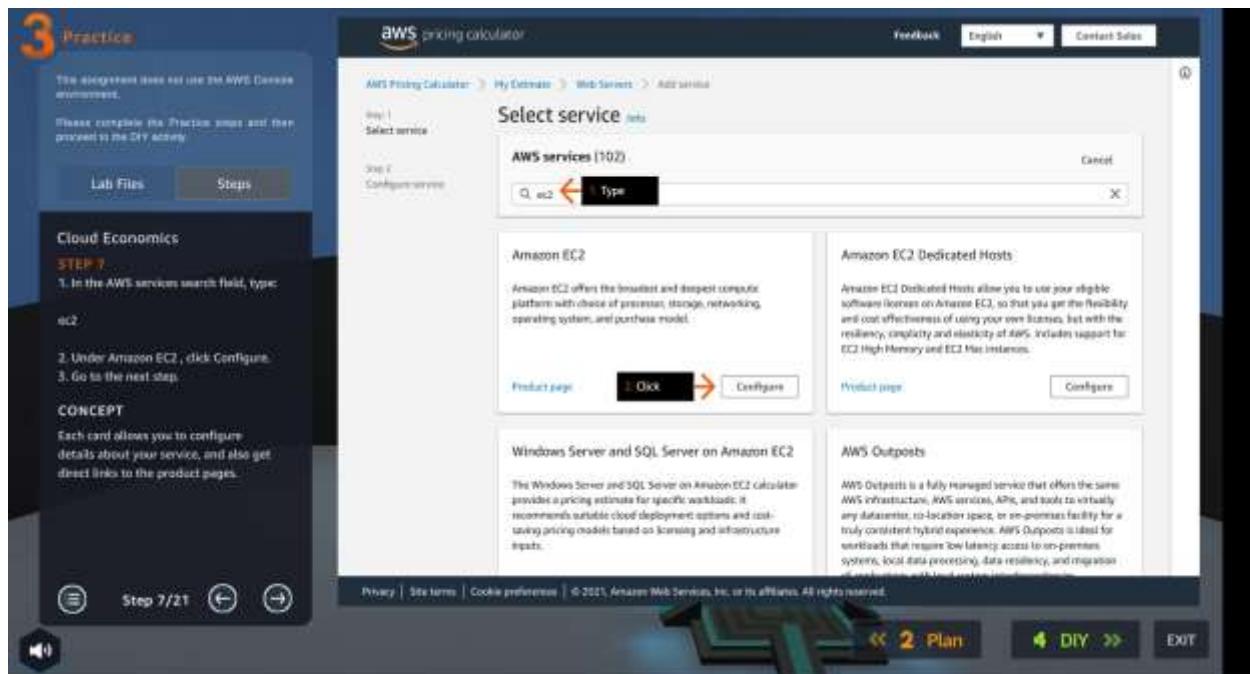
AWS Outposts

AWS Outposts is a fully managed service that offers the same AWS infrastructure, AWS services, APIs, and tools to virtually any datacenter, co-location space, or on-premises facility for a truly consistent hybrid experience. AWS Outposts is ideal for workloads that require low latency access to on-premises systems, local data processing, data residency, and migration workloads such as backup and disaster recovery.

Product page **Configure**

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◀ 2 Plan ▶ 4 DIY ▶ EXIT



3 Practice

This assignment does not use the AWS Cloud environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files **Steps**

Cloud Economics

STEP 8

1. Under Description, type:

Web Server Estimate

2. Confirm Region is chosen for location type.
3. Choose US East (N. Virginia) as your region.
4. Choose Advanced estimate.
5. Go to the next step.

CONCEPT

Different regions may have different prices. In the event that a customer has spiky traffic throughout the day you should use Advanced estimate. Click

Step 8/21

AWS pricing calculator

Feedback English Contact Sales

Step 1 Select service Step 2 Configure service

Select service

AWS services (102)

Q: ec2 Type

Amazon EC2

Amazon EC2 offers the broadest and deepest compute platform with choice of processor, storage, networking, operating system, and purchase model.

Amazon EC2 Dedicated Hosts

Amazon EC2 Dedicated Hosts allow you to use your eligible software licenses on Amazon EC2, so that you get the flexibility and cost effectiveness of using your own licenses, but with the residency, simplicity and elasticity of AWS. Includes support for EC2 High Memory and EC2 Mac instances.

Product page **Click** **Configure**

Windows Server and SQL Server on Amazon EC2

The Windows Server and SQL Server on Amazon EC2 calculator provides a pricing estimate for specific workloads. It recommends suitable cloud deployment options and cost-saving pricing models based on licensing and infrastructure inputs.

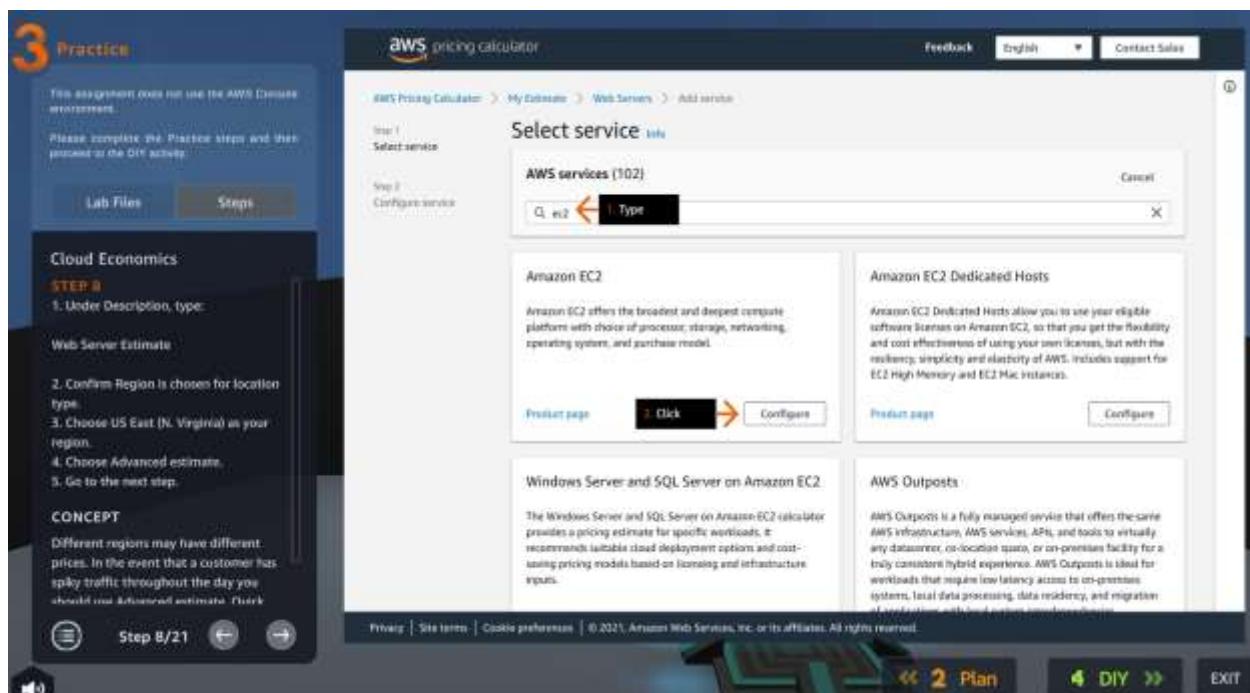
AWS Outposts

AWS Outposts is a fully managed service that offers the same AWS infrastructure, AWS services, APIs, and tools to virtually any datacenter, co-location space, or on-premises facility for a truly consistent hybrid experience. AWS Outposts is ideal for workloads that require low latency access to on-premises systems, local data processing, data residency, and migration workloads such as backup and disaster recovery.

Product page **Configure**

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◀ 2 Plan ▶ 4 DIY ▶ EXIT



CONCEPT

Different regions may have different prices. In the event that a customer has spiky traffic throughout the day you should use Advanced estimate. Quick estimate assumes consistent utilization.

The screenshot shows the AWS Pricing Calculator interface. On the left, there's a sidebar with a '3 Practice' section containing steps for a lab exercise. The main area is titled 'aws pricing calculator' and shows two configuration sections:

- EC2 instance specifications:** Under 'Operating system', 'Linux' is selected. There are 'Choose' and 'Next Step' buttons.
- Workload:** It asks to select a graph that best represents recent usage. The 'Daily spike traffic' option is selected, shown with a blue waveform graph. Other options include 'Constant usage' (flat line), 'Weekly spike traffic' (blue wave), and 'Hourly spike traffic' (blue bell curve). A 'Choose' button is next to the selected option.

At the bottom, under 'Workload days', all days from Sunday to Saturday are checked. Navigation buttons like 'Step 9/21' and arrows are at the bottom left, and 'Plan', 'DIY', and 'EXIT' buttons are at the bottom right.

The screenshot shows two overlapping web pages. On the left is a dark-themed 'Practice' interface for 'Cloud Economics'. It displays a step-by-step guide for 'STEP 10' with the following steps:

- Under Baseline, type: 2
- Under Peak, type: 4
- Under Duration of peak, in the hours and minutes fields, type: 8 and 0
- Go to the next step.

Below this is a 'CONCEPT' section with the heading 'The Baseline usage refers to the minimum amount of servers during non-peak time. Conversely, Peak usage represents the amount of servers required at peak periods.' At the bottom of the practice interface are navigation icons: a menu icon, 'Step 10/21', a back arrow, and a forward arrow.

On the right is the 'aws pricing calculator' interface. It has a 'Daily cycle pattern' section where 'Sunday' is selected. Below it are fields for 'Baseline' (value 2), 'Peak' (value 4), and 'Duration of peak (hours, minutes)' (value 8:00). A sidebar titled 'EC2 Instances (366)' shows a list with one item: 'Selected instance: t4g.nano'. The calculator interface includes standard navigation buttons like 'Feedback', 'English', and 'Contact Sales'.

4. Go to the next step.

CONCEPT

The Baseline usage refers to the minimum amount of servers during non-peak time. Conversely, Peak usage represents the amount of servers required at peak periods.



Step 10/21



The screenshot shows the AWS Pricing Calculator interface. At the top, there are buttons for 'Feedback', 'English', and 'Contact Sales'. Below that, the title 'EC2 Instances (344)' and 'Selected instance: t2.medium' are displayed. There are three dropdown menus with 'Choose' buttons: '1 Choose' (vCPU), '2' (Memory), and '3 Choose' (Network Performance). Arrows point from the '2' and '3' dropdowns to their respective 'Choose' buttons. A checkbox 'Show only current generation instances.' is checked. The table below lists the instances:

Instance name	Memory	vCPUs	Network Performance	Storage	On-Demand Price
t2.medium	4 GB	2	Up to 2 Gbps	IOPS only	\$0.031
t1.medium	4 GB	2	Up to 1 Gbps	IOPS only	\$0.031
i2.medium	8 GB	2	Up to 2 Gbps	IOPS only	\$0.041
a1.large	4 GB	2	Up to 10 Gbps	IOPS only	\$0.051
t1g.large	8 GB	2	Up to 1 Gbps	IOPS only	\$0.067
cg1.large	4 GB	2	Up to 10 Gbps	IOPS only	\$0.068
cl1.large	8 GB	2	Up to 5 Gbps	IOPS only	\$0.071
d2gd.large	4 GB	2	Up to 10 Gbps	T-1 NVMe SSD	\$0.0781
mt1.large	8 GB	7	Up to 10 Gbps	IOPS only	\$0.077

CONCEPT

When creating estimates, users often do one-to-one mappings of their on-premise hardware to the cloud. For example, don't assume 4GB is necessary because that is used on-premise. One-to-one mapping of hardware specifications often prevents users from effectively making use of all cloud benefits. It's important to right-size your instances.

3 Practice

This assignment does not use the AWS DevOps environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

STEP 12:

- Under Pricing strategy, choose On-Demand as the pricing model.
- Click Show calculations.
- Click estimated workload hours.
- Go to the next step.

CONCEPT

For new cloud customers, it is often recommended to use On-Demand instances. Once a customer has established enough usage data and are certain of their commitment, they can acquire significant savings in the future by using other plans.

Step 12/21

Pricing strategy [Info](#)

Pricing model:

- EC2 Instance Savings Plans: EC2 Instance Savings Plans provides a significant discount when you commit to an hourly spend on an instance family for a particular region. Estimates could be as low as 60% off EC2 instance savings plans and the discounted pricing for the base usage and performance.
- Compute Savings Plans: Compute Savings Plans provide a discount on up to 100 metrics when you commit to an hourly spend. Estimates could be as low as 60% off Compute Savings Plans and the discounted pricing for the base usage and performance.
- On-Demand and Reserved: A mix of Reserved and On-Demand pricing for the base usage and performance.
- All Reserved: Reserved Instances provide a significant discount (up to 75%) compared to On-Demand instance pricing.
- Spot: Amazon EC2 Spot Instances allow you to request spare Amazon EC2 computing capacity for up to 60% off the on-demand price.

1. Choose

2. Click Show calculations

Utilization summary: View a complete calculation of your estimated workload hours. 1. Click

On-Demand instance hours: 1845.8668
1845.8668 On-Demand instance hours * 0.0044 USD = 80.32533 USD
On-Demand instances (monthly): 80.32533 USD

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2 Plan 4 DIY EXIT 10:31 AM

3 Practice

This assignment does not use the AWS DevOps environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

STEP 13:

- Scroll down within the Estimated workload hours pop-up to Workload hours per month.
- Review how your workload hours are broken down per day.
- Review that instances 3 and 4 are only being charged 8 hours per day while instances 1 and 2 are charged at 24 hours per day.
- Under Utilization summary, review the Total On-Demand instance hours per month.
- Click close.
- Go to the next step in this guide.

CONCEPT

Step 13/21

Pricing strategy

Estimated workload hours

1. Scroll

Workload hours per month

This table measures the total instance utilization hours per month for your estimated daily workload.

	Sunday Hours	Monday Hours	Tuesday Hours	Wednesday Hours	Thursday Hours	Friday Hours	Saturday Hours
1	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24
3	8	8	8	8	8	8	8
4	8	8	8	8	8	8	8

Utilization summary

Total On-Demand instance hours: 1845.8668 2. Review

3. Click

2 Plan 4 DIY EXIT

CONCEPT

Amazon instance pricing is very granular, offering per-second billing for many instances.



Step 13/21



The screenshot shows a 'Practice' step in a cloud economics lab. The left sidebar lists steps 1 through 5. Step 1 is completed (green), steps 2 and 3 are in progress (yellow), and steps 4 and 5 are pending (gray). The main area displays an 'Estimated workload hours' table and an 'Utilization summary' section.

Estimated workload hours

	Sunday Hours	Monday Hours	Tuesday Hours	Wednesday Hours	Thursday Hours	Friday Hours	Saturday Hours
1	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24
3	8	8	8	8	8	8	8
4	8	8	8	8	8	8	8

Utilization summary

Total On-Demand Instance hours: 1946.0000

Actions:

- 1. Scroll (arrow pointing down)
- 2. Review (button)
- 3. Review (button)
- 4. Review (button)
- 5. Click (button with arrow)

CONCEPT

Amazon Elastic Block Storage offers various storage types based on your workloads. For basic web servers, General Purpose SSDs might suffice. However, for more specialized workloads involving large data transfer or high input-output operations, other storage types might be appropriate.



Step 14/21



3 Practice

This assignment item will use the AWS CloudFormation environment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

STEP 15

- Under Inbound Data Transfer choose Internet (free) and for Enter amount, type:
- Choose TB per month.
- Under Outbound Data Transfer choose Internet.
- In Enter amount, type:
- 100
- Choose GB per month.
- Click Show calculations.
- Go to the next step.

Step 15/21

aws pricing calculator

Feedback English Contact Sales

Data Transfer

Inbound Data Transfer
Enter the data you expect to transfer into US East (N. Virginia)

1. Choose → Internet (free) 1. Type TB per month 2. Choose

Add inbound data transfer

Intra-Region Data Transfer
Enter the data you expect to transfer between Availability Zones or VPC Peering connections in US East (N. Virginia)

Enter account TB per month

Outbound Data Transfer
Enter the data you expect to transfer out of US East (N. Virginia)

1. Click → Internet (1.00 USD - 0.08 USD per GB) 1. Type 100 2. Choose

Add outbound data transfer

2. Click → Show calculations

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< 2 Plan 4 DIY > EXIT

100

5. Choose GB per month.
6. Click Show calculations.
7. Go to the next step.

CONCEPT

Part of AWS pricing includes Data Transfer rates. All data coming into AWS from the internet is free, however there may be charges for inter-region and outbound data. If you're unsure about how much data you use, there are tools to help you measure this on your current systems.



The screenshot shows a modal window titled "Configure Amazon EC2: Step 15/21". The window displays data transfer calculations:

- Inbound:** Internet: $1 \text{ TB per month} \times 1024 \text{ GB in a TB} = 1024 \text{ GB per month}$
- Outbound:** Internet: $1024 \text{ GB} \times \$0.01 \text{ USD per GB outbound} + (0 \text{ GB} \times \$0.01 \text{ USD per GB inbound}) = \0.00 USD
- Total Monthly cost:** $\$0.00 \text{ USD}$

Below the calculations, there are "Review" and "Next Step" buttons. The "Next Step" button is highlighted with an orange arrow pointing to it. The overall interface is dark-themed with orange highlights for steps and buttons.

3 Practice

This assignment does not use the AWS Cloud9 environment.

Please complete the Practice steps and then proceed to the DTF activity.

Lab Files Steps

Cloud Economics

STEP 17

1. Click View summary.
2. Go to next step.

Configure Amazon EC2 info

Add outbound data transfer

Show calculations

Inbound: Internet: 1 TB per month = 1024 GB in a TB = 1024 GB per month

Pricing calculations:

Inbound: Internet: 1024 GB x 0 USD per GB = 0.00 USD

Intra-region: (0 GB x 0.01 USD per GB outbound) + (0 GB x 0.01 USD per GB inbound) = 0.00 USD

Outbound: Internet: 100 GB x 0.01 USD per GB = 1.00 USD

Data Transfer cost (monthly)

Review

2. Review

Total Upfront cost: [redacted] Show Details ▾

Total Monthly cost: [redacted]

Save and view summary **Save and add service**

workloads that require low latency access to on-premises servers, local data processing, data residency, and analytics

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Step 17/21

3 Practice

This assignment does not use the AWS Cloud9 environment.

Please complete the Practice steps and then proceed to the DTF activity.

Lab Files Steps

Cloud Economics

STEP 18

1. Click Share.
2. Go to the next step.

aWS pricing calculator

Successfully added Amazon EC2 estimate.

AWS Pricing Calculator > My Estimate > Web Servers

My Estimate See 0

Estimate summary

Upfront cost: 0.00 USD

Monthly cost: [redacted]

Total 12 months cost: [redacted] **USD**

Includes upfront cost

Getting Started with AWS

Contact us Sign in to the Console

Groups Info

My Estimate

Web Servers X

My Estimate

Service Name: **Amazon EC2**

Upfront cost: 0.00 USD

Monthly cost: 111.35 USD

Description: -

Region: US East (N. Virginia)

Operating System: -

Add service

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Step 18/21

The screenshot shows two overlapping windows. The background window is titled '3 Practice' and contains instructions for a lab exercise. The foreground window is the 'aws pricing calculator'.

aws pricing calculator

Feedback English Contact Sales

Succesfully added Amazon EC2 estimate.

AWS Pricing Calculator > My Estimate > Web Servers

My Estimate Edit

Estimate summary Info

Upfront cost: 0.00 USD Weekly cost: Total 12 month cost: 111.15 USD USD

Includes upfront cost

Groups Info My Estimate Delete Move up Create group Add service Duplicate

My Estimate

Find resources

Web Servers

Service Name	Upfront cost	Weekly cost	Description	Region	Config
Amazon EC2	0.00 USD	111.15 USD		US East (N. Virginia)	Operating

Getting Started with AWS

Contact Us Sign in to the Console

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Step 19/21 Plan DIY EXIT

Detailed description: The screenshot displays the AWS Pricing Calculator interface. At the top, a success message indicates that an estimate for Amazon EC2 has been successfully added. The main area shows an estimate summary with upfront and weekly costs, both listed as 0.00 USD, resulting in a total 12-month cost of 111.15 USD. Below this, a table lists the service name (Amazon EC2) with its corresponding costs and configuration details. To the right, a sidebar titled 'Getting Started with AWS' provides links to contact support and sign in to the console. The overall layout is clean and professional, typical of AWS's user interface design.

3 Practice

This assignment does not use the AWS Cloud Economics assignment.

Please complete the Practice steps and then proceed to the DIY activity.

Lab Files Steps

Cloud Economics

STEP 19:

1. Click Agree and continue.
2. Go to the next step.

Step 19/21

Save estimate

Public server acknowledgement:

Your data will be stored on AWS public servers. This calculator will generate an obscure, but publicly accessible URL. Anyone with this public share link will be able to access your estimate.

Don't show me this again.

Acknowledgement:

AWS Pricing Calculator provides only an estimate of your AWS fees and doesn't include any taxes that might apply. Your actual fees depend on a variety of factors, including your actual usage of AWS services. [Learn more](#)

Cancel Agree and continue

4 DIY

Save estimate

Your calculations have been saved:

Copy and save or bookmark this link for your records. You may use the link below to retrieve your estimate. Public share links expire after 3 years.

Public share link:

This is your obscure, public link to the saved estimate.

<https://calculator.aws/c/estimate?id=725092fb64d1fb> Copy public link

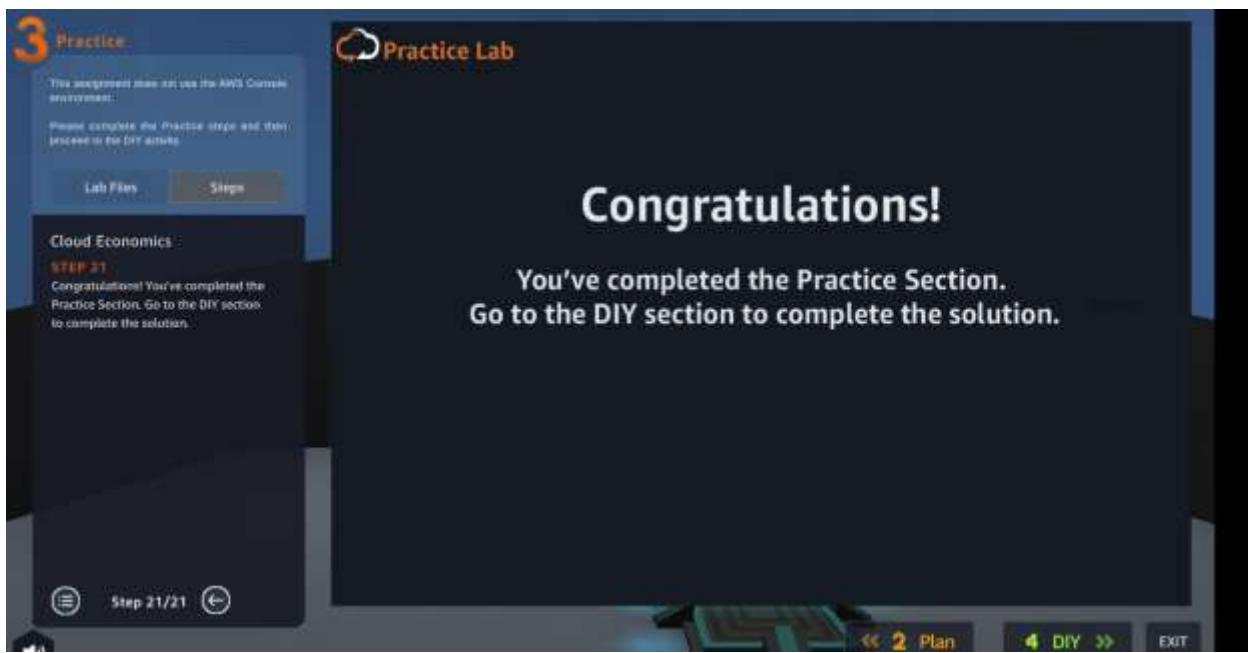
Acknowledgement:

AWS Pricing Calculator provides only an estimate of your AWS fees and doesn't include any taxes that might apply. Your actual fees depend on a variety of factors, including your actual usage of AWS services. [Learn more](#)

Cancel

Step 20/21

2 Plan 4 DIY EXIT



<https://calculator.aws/#/estimate?id=8e37dc3d813673d4e31ed3b2b5f2c27d4a865543>

Recently, our database administrators have been complaining that they are spending too much time with operational tasks like patching and managing database infrastructure, instead of innovating. We heard AWS might be able to help.

That's a common pain point. AWS has a managed relational database service called Amazon RDS which removes the operational burden of patching and managing underlying infrastructure.

That seems like what we need. I can have our database admins experiment with Amazon RDS in our Dev/Test environments. Will RDS also protect us from data loss?

Yes, it does! Amazon RDS can perform routine backups on your database. You can choose how long you'd like to store those backups which is known as the retention period.

Okay, but how else do we ensure our systems are resilient in case of a disaster?

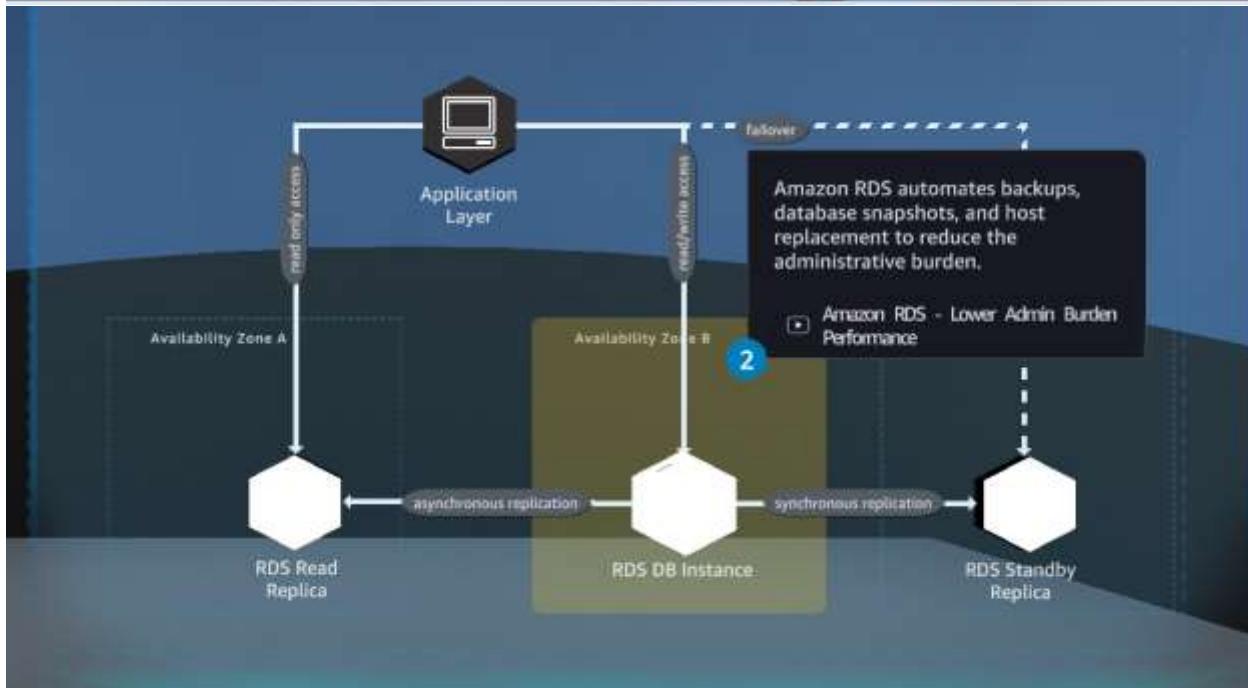
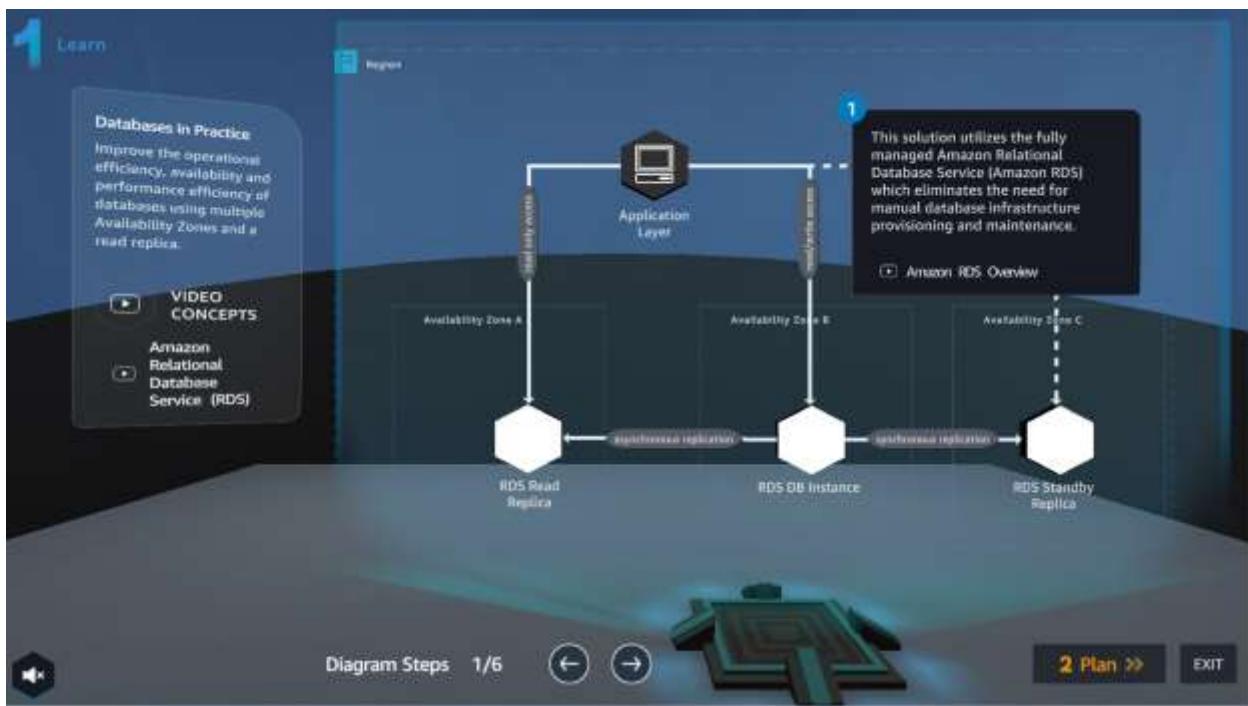
Using Amazon RDS, you can deploy your database instances in multiple Availability Zones, or AZs. Should a disaster impact one AZ, an automatic failover to the other AZ will occur. Your data is replicated synchronously, so your customers won't see any down time.

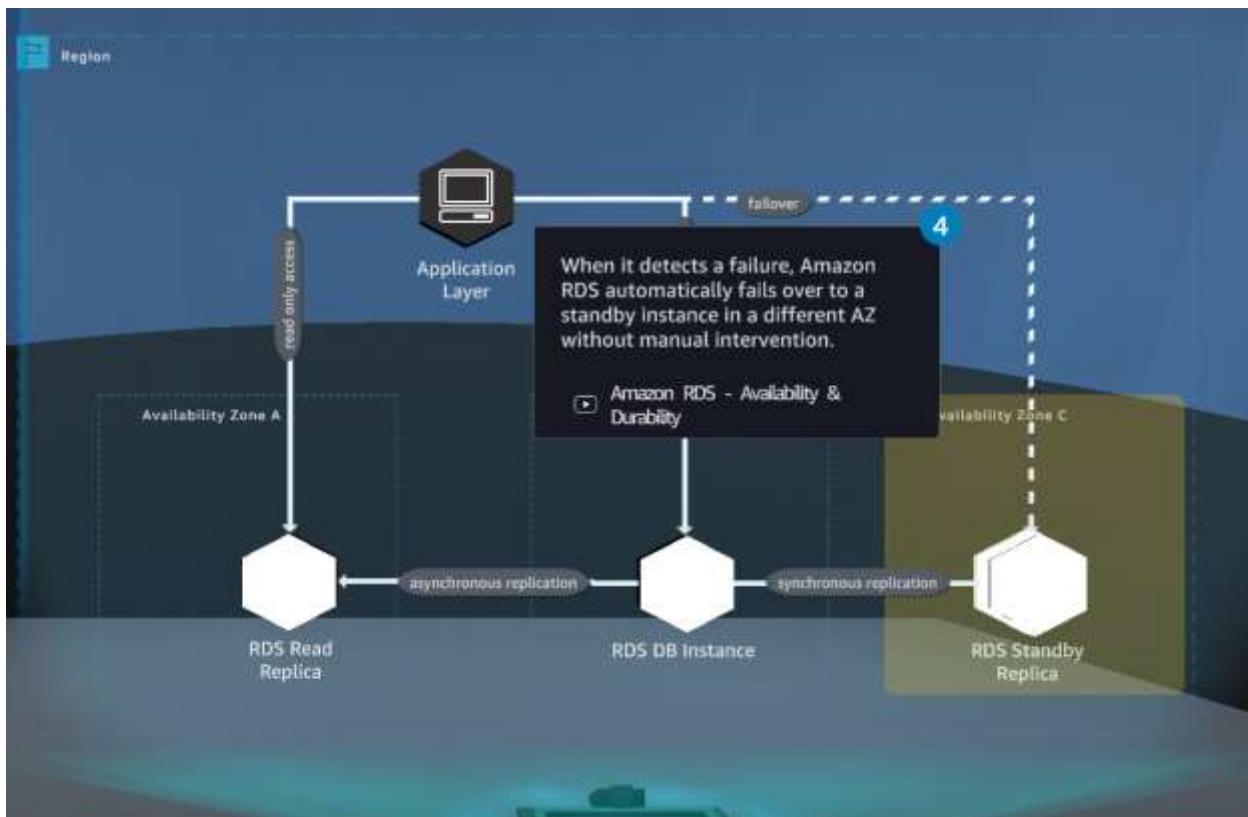
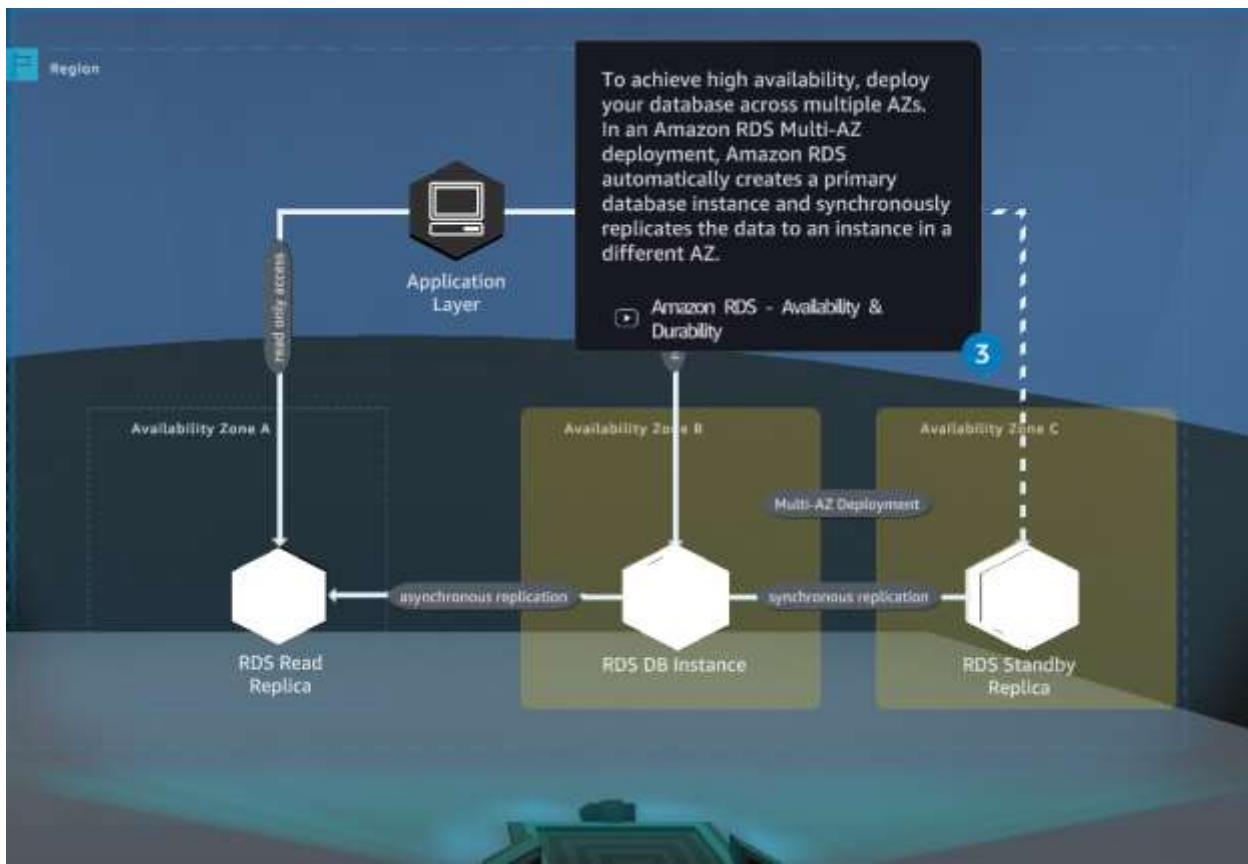
This is exactly what we need. Will deploying our database in multiple Availability Zones mean that we will have twice the database performance?

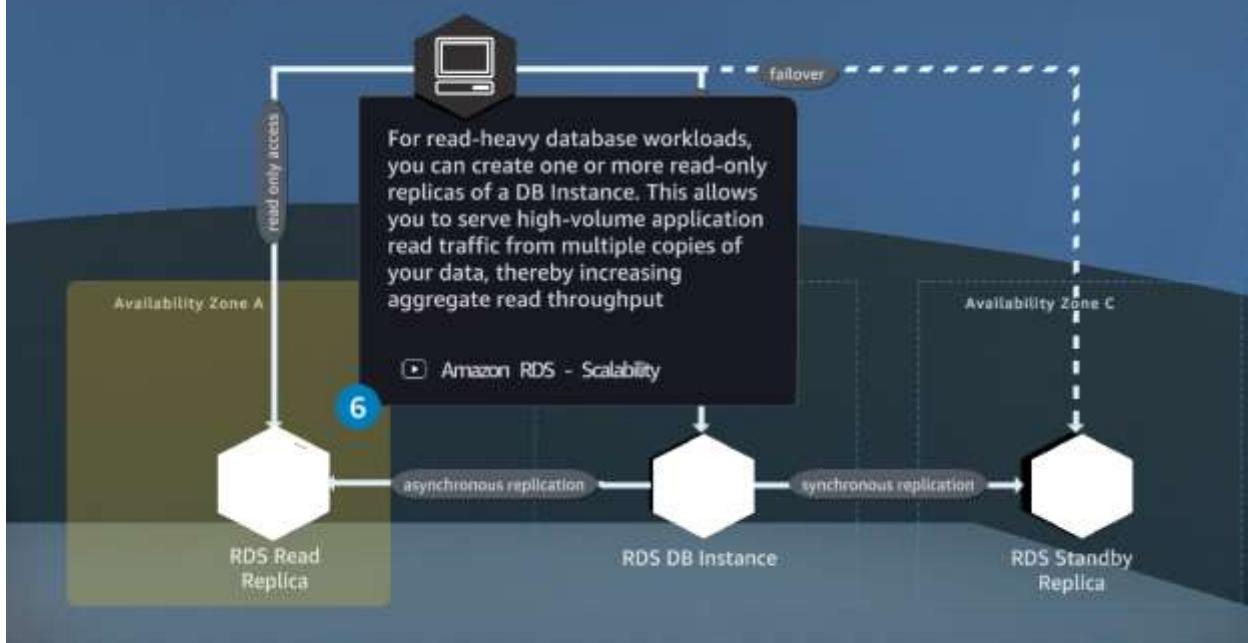
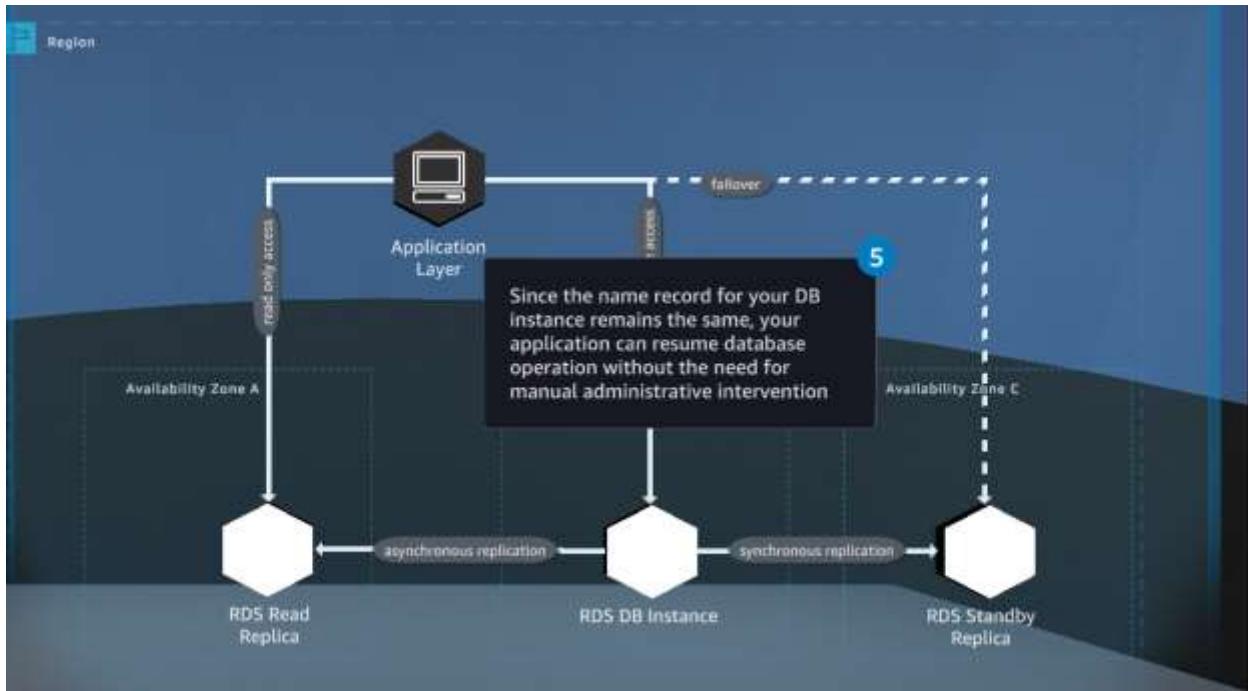
Well, not quite. Using multiple AZs is intended for high availability and disaster recovery, not increased performance.

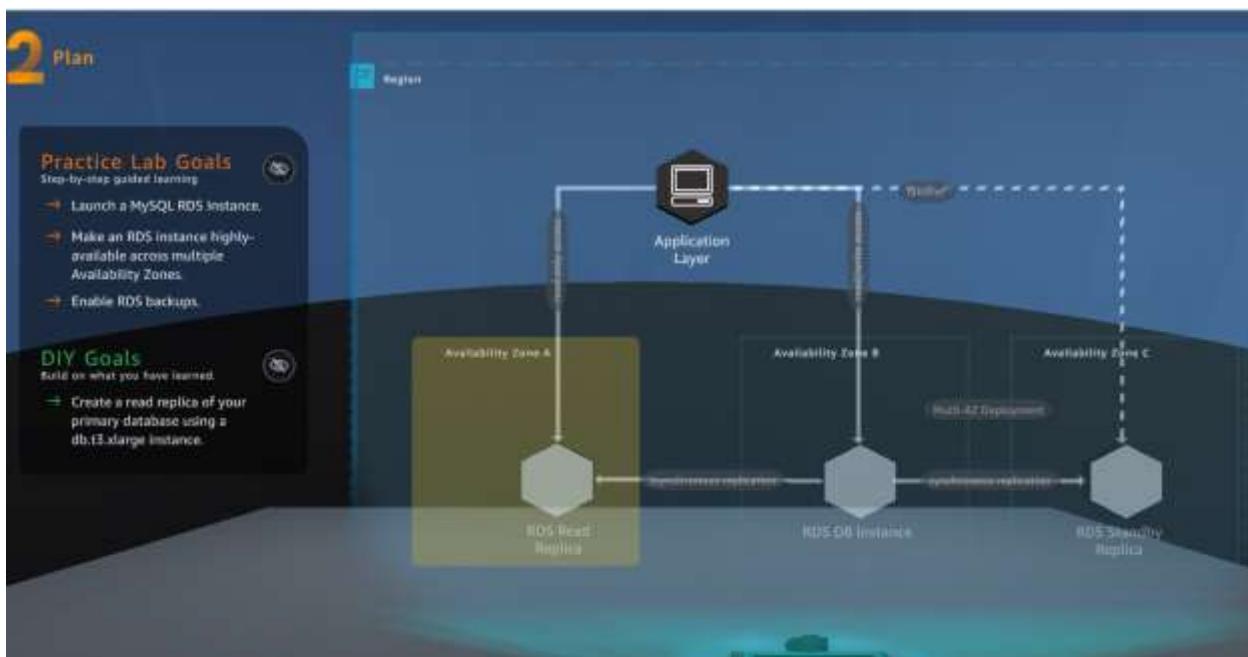
Okay, so what can I do to improve performance? Our data analytics team is constantly running real time queries and big data analytics. With each large read load, data performance is impacted.

If you're doing read intensive workloads, you can deploy something called a read replica. Read replicas have the same data as your primary database but only allow read operations. You can direct queries to the read replica, therefore, your primary database is free to do more write operations.









3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Databases in Practice

STEP 1

- Review the lab objectives in the concepts field.
- Click Start Lab to provision your environment, then click Open AWS Console to begin.
- Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will learn how to:

- Launch an RDS instance.
- Configure a multi-AZ deployment.
- Configure RDS backups.

Step 1/15

Databases in Practice

STEP 2

- In the Services search field, type: rds
- Click RDS under Services in the search results.
- Go to the next step.

CONCEPT

Amazon RDS is a managed service. This means your database administrator can focus on innovating instead of patching and updating their database and infrastructure.

Step 2/15

Databases in Practice

STEP 3

- Select Databases from the sidebar.
- Click Create database.
- Go to the next step.

CONCEPT

Amazon RDS is optimized for memory, performance and I/O. With Amazon RDS you only pay for what resources you actually consume.

Step 3/15

Create database

Choose a database creation method [info](#)

Standard create This is the default. It uses most of the configuration options, including ones for availability, security, backups, and performance.

Easy create Use recommended best-practices configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type: [info](#)

Amazon Aurora 

MySQL 

MariaDB 

PostgreSQL 

Oracle 

Microsoft SQL Server 

Feedback English (US) ▾ [Privacy Policy](#) [Terms of Use](#) [Cookie preferences](#)

Step 4 / 15 [◀](#) [▶](#) [2 Plan](#) [4 DIY](#) [EXIT](#)

Version

MariaDB 10.4.13 [info](#) [Accept default](#)

Templates

Choose a sample template to meet your use case. [info](#)

Production Use defaults for high availability, durability, and fast, consistent performance.

Dev/Test This template is intended for development and test environments. It uses MariaDB 10.4.13. This template is intended for development and test environments. It uses MariaDB 10.4.13.

Free tier Use RDS Free Tier to develop new applications, host existing applications, or gain hands-on experience with Amazon RDS.

Settings

DB instance identifier [info](#)

Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

Master username [info](#)

Type a login ID for the master user of your DB instance.

Feedback English (US) ▾ [Privacy Policy](#) [Terms of Use](#) [Cookie preferences](#)

Step 5 / 15 [◀](#) [▶](#) [2 Plan](#) [4 DIY](#) [EXIT](#)

The screenshot shows two side-by-side interfaces. On the left is the '3 Practice' interface, which includes a 'START LAB' button, a note about providing an AWS account, and tabs for 'Lab Files' and 'Steps'. It also displays 'Databases in Practice' with steps 1 through 5. Step 1 is highlighted with a yellow background and contains instructions for creating a DB instance identifier. Step 2 through 5 are listed below it. Step 5 ends with a 'CONCEPT' section. On the right is the 'AWS' interface showing the 'Settings' page for an RDS instance. The 'DB instance identifier' field is set to 'my-database'. Below it, the 'Master username' is 'admin' and the 'Master password' is 'ILoveLearning!123'. Both fields have a 'Type' button next to them. The bottom of the screen shows navigation icons for the practice lab.

4. Re-type to confirm the password

5. Go to the next step.

CONCEPT

Your database identifier is the name you will see when you are searching for your instance in the console. You will be able to connect this database with the credentials you provide here.



Step 6/15



The screenshot shows the AWS RDS setup wizard at Step 7. On the left, a sidebar lists steps 1 through 6. Step 7 is highlighted with a yellow background and contains the following instructions:

- Under DB Instance class choose Burstable classes.
- Choose option db.t3.xlarge.
 - Only t3 db classes are supported in this lab.
- Under Storage type choose General Purpose SSD (gp2).
- Under Allocated storage type:
 - 20
- Go to the next step.

CONCEPT

Amazon RDS supports the most demanding database applications. You can choose between two SSD-backed storage options: one optimized for high-performance OLTP applications, and the other for cost-effective general-purpose use.

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5. Go to the next step.

CONCEPT

Amazon RDS supports the most demanding database applications. You can choose between two SSD-backed storage options: one optimized for high-performance OLTP applications, and the other for cost-effective general-purpose use.



Step 7/15



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Databases in Practice

STEP 8

- Under Storage autoscaling review the default option - Enable storage autoscaling.
- Under Maximum storage threshold review the default of 1000.
- Under Multi-AZ deployment choose Create a standby instance.
- Go to the next step.

CONCEPT

The MySQL, MariaDB, Oracle, and PostgreSQL engines allow you to scale up to 64 TB of storage and SQL Server supports up to 16 TB. Storage scaling is on-the-fly with zero downtime.

Step 8/15

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Databases in Practice

STEP 9

- Under Virtual private cloud (VPC), accept the default settings.
- Under Subnet group, accept the default settings.
- Under Public access, accept the default settings.
- Under VPC security group, accept the default settings.
- Go to the next step.

CONCEPT

Amazon RDS makes it easy to control network access to your database. Amazon RDS also lets you run your database instances in a VPC, which enables you to isolate your database.

Step 9/15

5. Go to the next step.

CONCEPT

Amazon RDS makes it easy to control network access to your database.

Amazon RDS also lets you run your database instances in a VPC, which enables you to isolate your database instances and to connect to your existing IT infrastructure through an industry-standard encrypted IPsec VPN.



Step 9/15



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Databases in Practice

STEP 10:

1. Click Additional configuration to expand the panel.
2. Under initial database name, type: **my_database**.
3. Under DB parameter group and Option group accept the default options.
4. Under Backup review all default options.
5. Go to the next step.

CONCEPT

In order for AWS to successfully provision a RDS database instance for

Additional configuration

Database options

Initial database name: **my_database**

DB parameter group: **default.mariadb10.4**

Option group: **default:mariadb-10-4**

Backup

Enable automated backups: **✓**

Backup retention period: **7 days**

Backup window: **Select window**

Copy tags to snapshots: **✓**

1. Click 2. Type 3. Review 4. Review

Step 10/15

CONCEPT

In order for AWS to successfully provision a RDS database instance for you, you must first specify an initial database name. If you fail to specify an initial database your instance may still be provisioned but it may not work properly.



Step 10/15



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Databases in Practice

STEP 11:

- Under Encryption review the default selection **Enable encryption**.
- Under Performance Insights make sure to un-check **Enable Performance Insights**.
- Under Monitoring make sure to un-check **Enable Enhanced monitoring**.
- Go to the next step.

Note: Confirm you have not enabled Performance Insights or Enhanced Monitoring as it will produce a permissions error when trying to create the database.

Step 11/15

Encryption

Enable encryption 1. Review
Choose to encrypt the data at rest and always appear in the log after they have been created using the AWS Key Management Service console. [Info](#)

AWS KMS Key [Info](#)
(default) aws/rds

Account
835519343664

KMS key ID
alias/aws/rds

Performance Insights [Info](#)
 Enable Performance insights 2. Un-check

Monitoring
 Enable Enhanced monitoring 3. Un-check

Log exports
Select the log types to publish to Amazon CloudWatch Logs.
 Audit log
 Error log
 General log
 Slow query log

IAM role
The following service-linked role is used for publishing logs to CloudWatch Logs.
RDS service linked role

[Feedback](#) English (US)

2 P

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Databases in Practice

STEP 12:

- Under Maintenance make sure to uncheck Enable auto minor version upgrade.
- Under Maintenance window review the default selection of No preference.
- Review the estimated costs.
- Click Create database.
- Go to the next step.

Step 12/15

1. Deselect

Enable auto minor version upgrade

2. Review

No preference

3. Review

4. Click

Deletion protection

Enable deletion protection

Estimated monthly costs

DB Instance	198.56 USD
Multi-AZ standby instance	198.56 USD
Storage	4.60 USD
Total	401.72 USD

This billing estimate is based on on-demand usage as described in Amazon RDS Pricing. Estimate does not include costs for backup storage, I/Os (if applicable), or data transfer.

Estimate your monthly costs for the DB instance using the AWS Simple Monthly Calculator.

5. You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

Cancel **Create database** **4. Click**

2 Plan

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Databases in Practice

STEP 13:

- It will take approximately 15-20 minutes to create your RDS DB instance. Go get a cup of coffee or a snack! Click the refresh icon when you return and ensure DB status is Available.
- Under DB Identifier, click my-database.
- Go to the next step.

Step 13/15

1 Click

2 Click

3 Review

4. Click

Creating database my-database

Your database might take a few minutes to launch.

View credential details

RDS - Databases

1 Click

2 Click

3 Review

4. Click

2 Plan

4 DIY

EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Databases in Practice

STEP 14

1. Click the Actions drop down menu.
2. Review the different available options.
- You will see different options to manage your existing database instance such as create read replica.
3. Go to the next step.

Step 14/15

my-database

Summary

DB Identifier	CPU	Status
my-database	1.11%	Available
Role	Current activity	Engine
Instance	0 Connectors	MariaDB

Connectivity & security

Endpoint & port	Networking	Security
Endpoint: my-database.c2u5jyvzvau-m1.1.rds.amazonaws.com Port: 3306	Availability Zone: us-east-1b VPC: vpc-00e549f13996a1414 Subnet group:	VPC security groups: default (sg-0111c0ff03187f0ff) (Active)

Actions

- 1. Review
- Modify
- Stop
- Restart
- Delete
- Create read replica
- Take snapshot
- Restore to point in time

Feedback: Helpful (0) •

2 Plan 4 DIY EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Databases in Practice

STEP 15

Congratulations! You've completed the Practice Section. Go to the DIY section to complete the solution.

Congratulations!

You've completed the Practice Section.
Go to the DIY section to complete the solution.

4 DIY

START LAB

You will be provided with an AWS account to complete all assignments.

Databases in Practice

DIY ACTIVITIES

- 1. Create a read replica of your primary database using a db.t3.large instance.

SOLUTION VALIDATION METHOD

Validation Process:
Our servers will verify that you have created a read replica called my-database-read-replica using my-database as your primary reference database.

VALIDATION FORM
Please type the validation criteria below:

Your RDS DB Identifier:

Your read replica DB Identifier:

VALIDATION MESSAGE

VALIDATE

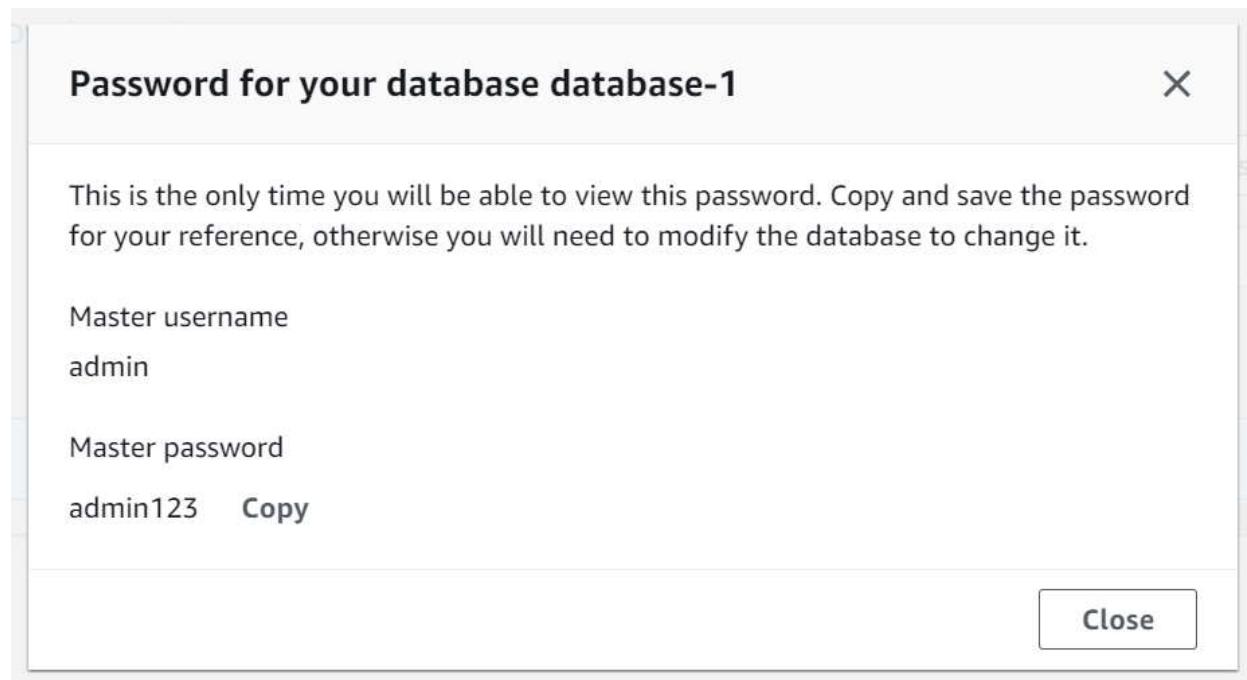
SKIP

Feedback: Helpful (0) •

3 Practice EXIT

DB identifier : [database-1](#)

Replica DB identifier: [database-1-read-replica](#)



We want to add more features to our streaming services and we need a highly scalable database with lightning fast performance.

One idea is to add a digital bookmark that allows users to continue watching shows where they left off. Can we accomplish this without having a well defined schema?

That would be a nice feature to add! Based on what you described, I think Amazon DynamoDB is the best option.

Amazon DynamoDB is a NoSQL database, so you don't have to worry about a schema. It automatically scales, and has single-digit millisecond latency!

Ok, that might work, but what about gathering metadata on viewing habits from user devices? Can a NoSQL database organize and also support storing a large amount of metadata?

It sure can! Amazon DynamoDB supports petabytes of data, and you can add records with unique IDs that have varying attributes to support your metadata needs.

Nice! This seems like it will greatly enhance our streamers' experiences.

First NoSQL Database

eb Services

tems

noDB

oDB

Solution Annotations

- Create an Amazon DynamoDB table.
- Create an Amazon DynamoDB record with metadata attributes.

1 Learn

First NoSQL Database
Create a database to help our video streaming team track customer movie viewing behaviors from metadata such as movies watched and device type.

VIDEO CONCEPTS

Amazon DynamoDB

This solution uses Amazon DynamoDB, which has a flexible schema, so each row can have any number of attributes at any point in time.

Table: UserVideoHistory

Primary key

Primary key	Sort key	Attributes
user_id	lastDateWatched	videoid, prefLang, deviceType, lastStopTime, rating
1234-5678-9012	2023-01-01	videoid, prefLang, deviceType, lastStopTime, rating
5678-4321-0987	2023-02-01	videoid, prefLang, deviceType, lastStopTime, rating
3456-7890-1234	2023-03-01	videoid, prefLang, deviceType, lastStopTime, rating
7890-5432-1234	2023-04-01	videoid, prefLang, deviceType, lastStopTime, rating

Items

Diagram Steps: 1/6 ← → **2 Plan** ➞ EXIT

2 Plan

AWS Cloud

Amazon DynamoDB is a key-value and document database that delivers single-digit millisecond performance at any scale. This level of performance addresses the low response time required by the solution.

Table: UserVideoHistory

Primary key

Primary key	Attributes
Sort Key	Schema is defined per item
lastDateWatched	videoid, prefLang, deviceType, lastStopTime, rating
2023-01-01	videoid, prefLang, deviceType, lastStopTime, rating

Difference Between SQL and NoSQL

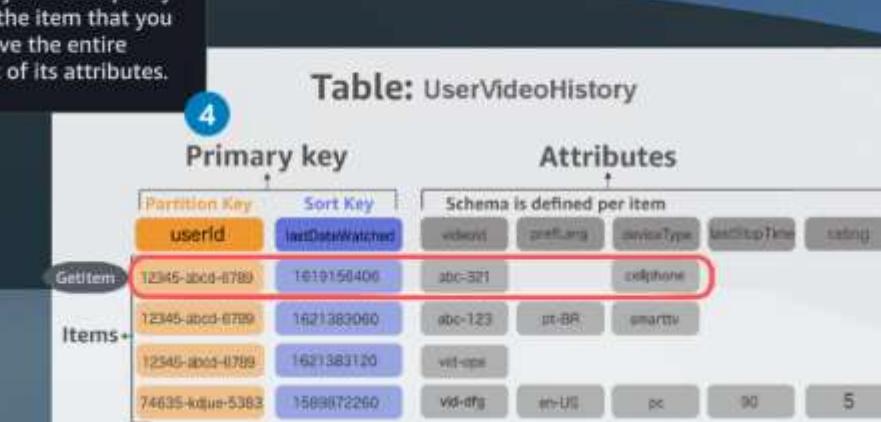
1 

Amazon DynamoDB tables support two types of primary keys: partition key only or partition key and a sort key. For this solution there is a partition key (userId) and a sort key (lastDateWatched).

How To Create A NoSQL Table

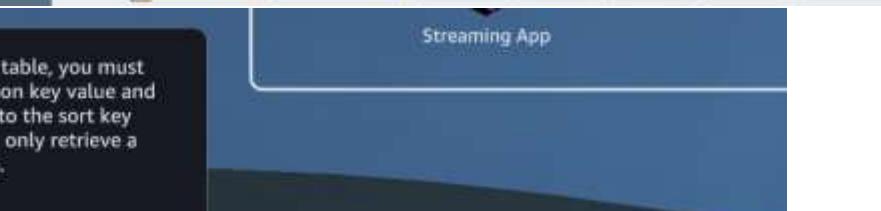
2 

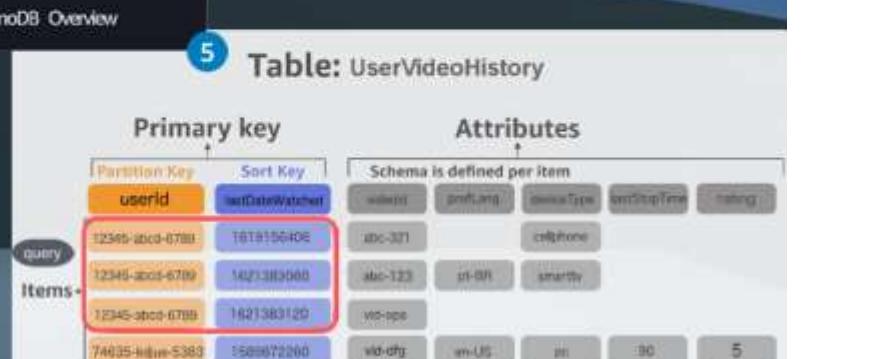
When getting a specific item (GetItem operation) you must specify the primary key for the item that you want. You can retrieve the entire item or just a subset of its attributes.

3 

In a query for this table, you must provide the partition key value and apply a condition to the sort key values so that you only retrieve a subset of the data.

Amazon DynamoDB Overview

4 

5 

Streaming App

With a flexible schema, you can add a new attribute (such as 'rating') to a specific record even after it has been created.

le: [Amazon DynamoDB Queries Overview](#)

Attributes

Schema is defined per item

6

new attribute

rating

5

2 Plan

Practice Lab Goals

- Create an Amazon DynamoDB table.
- Enter a new record and search for the record by partition ID.

D.I.Y. Goals

Build on what you have learned.

- Create a new user item with a unique id.
- Add a new attribute named rating (Number).

Table: User/VideoHistory

Primary key

Attributes

rating

70

Items

1 Learn 3 Practice > EXIT

The screenshot shows a user interface for a cloud practitioner challenge. At the top, there's a note about the flexibility of the DynamoDB schema. Below it, a link to 'Amazon DynamoDB Queries Overview'. The main area is titled 'Attributes' and shows a table schema with a primary key 'partitionId' and several attributes: 'rating' is highlighted with a red box and a circled '6' above it, while other attributes like 'vidId', 'prefLang', 'deviceType', 'lastBrowsingTime', 'abc-321', 'iphone', 'abc-723', 'af-BR', 'smarttv', 'vid-cpa', 'en-US', 'pc', and '90' are listed below. A 'new attribute' button is visible. On the left, there's a 'Plan' section with 'Practice Lab Goals' and 'D.I.Y. Goals'. In the center, a diagram shows 'AWS Cloud' connected to a 'Streaming App' which then connects to 'DynamoDB'. At the bottom, there's a table titled 'Table: User/VideoHistory' with columns for 'Primary key' and 'Attributes', showing items like 'partitionId' and 'rating'. The 'rating' column is also highlighted with a red box and a circled '70'. Navigation buttons at the bottom include '1 Learn', '3 Practice >', and 'EXIT'.

3 Practice

Practice Lab

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 1

1. Review the lab objectives in the concepts field.
2. Click Start Lab to provision your environment, then click Open AWS Console to begin.
3. Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Create a NoSQL database as an Amazon DynamoDB table.
- Add records using dynamic schema to Amazon DynamoDB.
- Query an Amazon DynamoDB table.

Step 1/26

The screenshot shows the initial step of a NoSQL database lab. It includes a sidebar with navigation links and a main content area with instructions, concepts, and a search bar.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 2

1. In the Services search bar, type: dynamodb
2. Under Services, click DynamoDB.
3. Go to the next step.

CONCEPT

Amazon DynamoDB is serverless with no servers to provision, patch, or manage and no software to install, maintain, or operate. Amazon DynamoDB automatically scales tables up and down to adjust for capacity and maintain performance.

Step 2/26

The screenshot shows the AWS Services console with the search bar set to 'dynamodb'. The search results page displays the 'DynamoDB' service as the top result, along with other features like Tables, Backups, Preferences, and Reserved capacity.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 3

1. Click Create table.
2. Go to the next step.

CONCEPT

Amazon DynamoDB supports both key-value and document data models. This enables Amazon DynamoDB to have a flexible schema, so each row can have any number of columns at any point in time. This allows you to easily adapt the tables as your business requirements change, without having to redefine the table schema as you would in relational databases.

DynamoDB is a fully managed, key-value, and document database that delivers single-digit-millisecond performance at any scale.

DynamoDB

Dashboard Tables Update settings Explore items PartQL editor New Backups Exports to S3 Imports from S3 Reserved capacity Settings New

DAK Clusters Subnet groups Parameter groups Events

Amazon DynamoDB
A fast and flexible NoSQL database service for any scale

Get started Create a new table to start exploring DynamoDB. **Create table** 1. Click

Pricing

DynamoDB charges for reading, writing, and storing data in your DynamoDB tables, along with any optional features you choose to enable. DynamoDB has on-demand capacity mode and provisioned capacity mode, and these modes have pricing for processing reads and writes on your tables.

Learn more about pricing

How it works

What is Amazon DynamoDB? **YouTube**

DynamoDB is a fast and flexible NoSQL database service. © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookies preferences

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 4

1. Under Table name type:

UserVideoHistory

2. Under Partition key type:

userId

Note: You must type the partition key exactly as shown. It is userId with an uppercase L.

3. Choose String data type from the dropdown list.
4. Under Sort key type:

lastDowWatched

Sort key - optional

You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.

lastDowWatched Type Number Choose

Table details Table

DynamoDB is a NoSQL database that requires only a table name and a primary key when you create this table.

Table name This will be used to identify your table.

userId **Type**

Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.)

Partition key The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.

lastDowWatched **Type** String **Choose**

1 to 255 characters and case sensitive

Sort key - optional You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.

lastDowWatched **Type** Number **Choose**

1 to 255 characters and case sensitive

Settings

Scroll

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First NoSQL Database

4. Under Sort key type:

lastDateWatched

5. Choose Number data type from the dropdown list.

6. Scroll down to the end of the page.

7. Go to the next step.

CONCEPT

When you create a table, in addition to the table name, you must specify the primary key of the table. The primary key uniquely identifies each item in the table, so that no two items can have the same key.

Step 4/26

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

First NoSQL Database

STEP 5

1. Accept the default settings.
2. Click Create table.
3. Go to the next step.

DynamoDB Services Search for services, hosts, comments

Default settings Accept default
The easiest way to create your table. You can't edit these settings now or after your table has been created.

Customize settings
Use these advanced features to make DynamoDB work better for your needs.

Default settings

Read/write capacity [Info](#)
Using provisioned capacity mode. Read and write capacity are set to 5 units each with auto scaling enabled.

Secondary indexes [Info](#)
No secondary indexes have been created. Queries will be run by using the table's partition key and sort key only.

Key management for encryption at rest [Info](#)
Using the AWS owned customer master key. This key is managed by DynamoDB at no extra cost.

Tags
Tags are pairs of keys and optional values that you can assign to AWS resources. You can use tags to control access to your resources or track your AWS spending.

No tags are associated with this resource.

Add new tag

You can add 50 more tags.

CANCEL **Create table** > Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 6:

1. Review the Status of the table.
2. After Status changed to Active, click the table name.
3. Go to the next step.

CONCEPT

A composite key uses both a partition key and a sort key. In a table that has a partition key and a sort key, it's possible for two items to have the same partition key value. However, those two items must have different sort key values.

Step 6/26

DynamoDB > Tables

Tables (1) info

Name Status

UserVideoHistory Active

Actions Delete Create table

Any table tag

Review

Sort key user (S) lastDateWatched (N)

Index Read capacity 0 Provisioned 0

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 7:

1. In the left navigation pane, click **Update settings**.
2. Under **Tables**, choose the radio button to select the created table.
3. Click **Actions** to expand the dropdown list.
4. Choose **Create item**.
5. Go to the next step.

Step 7/26

DynamoDB > Tables > UserVideoHistory

Tables (1) Any table tag

UserVideoHistory

Actions Actions Edit capacity Update table data Delete table Create item

Partition key user (S) Sort key lastDateWatched (Number)

Capacity provisioned Create replica Export to S3 Enable TTL Manage tags Create access-control policy

Item status Active No active alarms

Additional info

Items summary

DynamoDB updates the following information approximately every six hours.

Get live item count

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3 Practice

START LAB

We will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 8

1. Under Attributes, for the userId Attribute name, type:
12345-abcd-6789
2. For the lastDateWatched attribute, type:
1619156406
- This is a UNIX timestamp.
3. Go to the next step.

CONCEPT

With Amazon DynamoDB you create:

Step 8/26 Next

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userId - Partition key	12345-abcd-6789	String
lastDateWatched - Sort key	1619156406	Number

Cancel Create item

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CONCEPT

With Amazon DynamoDB you create items, which are records with attributes that store data. You can store data like a customer's video viewing history. Amazon DynamoDB supports a number of different data types.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 8

1. Click Add new attribute to expand the dropdown list.
2. Choose String.
3. Go to the next step.

CONCEPT

With Amazon DynamoDB you create:

Step 8/26 Next

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userId - Partition key	12345-abcd-6789	String
lastDateWatched - Sort key	1619156406	Number

Cancel Create item

1. Click Add new attribute

2. Choose String

Type: Number
Boolean
String
Binary

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 10

1. For the Attribute name, type: **videoid**
2. For the value, type: **9875-djac-1859**
3. Go to the next step.

PRACTICE

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 11

1. To add another attribute, click to expand the Add new attribute dropdown list.
2. Choose String.
3. Go to the next step.

3 PRACTICE

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 12

1. For the Attribute name, type: **preferredLanguage**
2. For the value, type: **English**
3. Go to the next step.

Resource Groups & Tag Editor

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userId - Partition key	12345-abcd-6789	String
lastDateWatched - Sort key	1619156406	Number
videoid	9875-djac-1859	String

1. Type **2. Type** **Add new attribute** **Cancel** **Create item**

Resource Groups & Tag Editor

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userId - Partition key	12345-abcd-6789	String
lastDateWatched - Sort key	1619156406	Number
videoid	9875-djac-1859	String

1. Click **2. Choose** **Add new attribute** **String** **Boolean** **Binary** **Null** **Remove** **Cancel** **Create item**

Resource Groups & Tag Editor

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userId - Partition key	12345-abcd-6789	String
lastDateWatched - Sort key	1619156406	Number
videoid	9875-djac-1859	String
preferredLanguage	English	String

1. Type **2. Type** **Add new attribute** **Cancel** **Create item**

Step 12/25

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 13

1. Click Add new attribute to expand the dropdown list again to add another attribute.
2. Choose List.
3. Go to the next step.

CONCEPT

Amazon DynamoDB can also store attributes that are more complex such as a list.

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userid - Partition key	12345-abcd-6789	String
lastDateWatched - Sort key	1619156406	Number
videoid	8825-dac-389	String
preferredLanguage	English	String

Add new attribute **▼** **binary** Null String set Number set Binary set List **Choose** Map Remove

Cancel **Create Item**

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 14

1. For the Attribute name, type: supportedDeviceTypes
2. Go to the next step.

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userid - Partition key	12345-abcd-6789	String
lastDateWatched - Sort key	1619156406	Number
videoid	8825-dac-389	String
preferredLanguage	English	String
supportedDeviceTypes	Insert a field ▼	List

Type Remove Remove Remove

Cancel **Create Item**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 15

1. Click Insert a field to expand the dropdown list.
2. Choose String.
3. Go to the next step.

DynamoDB > Items: UserVideoHistory > Item editor

Create item

Attributes

Attribute name	Value	Type
userid - Partition key	String ▼ Choose	String
lastDateWatched - Sort key	Number	Number
videoid	Boolean	Boolean
preferredLanguage	Binary	String
Null	Null	String
supportedDeviceTypes	Insert a field ▼	List

1. Click

The screenshot shows a split-screen interface. On the left, a dark-themed 'Practice' window displays a step-by-step guide for creating a DynamoDB item. On the right, the actual AWS console interface for 'Create item'.

Left Panel (Practice Window):

- Header:** Step 16/26
- Section:** First NoSQL Database
- Step 16:**
 - Click + beside the supportedDeviceTypes Attribute.
 - In the Value field, type: Amazon Fire TV
 - Go to the next step.

Right Panel (AWS Console):

- Header:** Resource Groups & Tag Editor > DynamoDB > Items: UserVideoHistory > Item editor
- Section:** Create item
- Attributes Table:**

Attribute name	Value	Type
userId - partition key	12345-abcd-6789	String
lastDateWatched - sort key	1619156406	Number
videoid	9876-d9c-1000	String
preferredLanguage	English	String
supportedDeviceTypes	Insert a field Amazon Fire TV	List
- Buttons:** Cancel, Create item

Annotations: The 'supportedDeviceTypes' row has a red box around it. A red arrow points from the '1 Click' button in the practice window to the 'supportedDeviceTypes' row. Another red arrow points from the '2 Type' button in the practice window to the 'Amazon Fire TV' input field in the AWS console.

The screenshot shows the AWS Lambda console. On the left, a sidebar titled "3 Practice" has a "START LAB" button. Below it, under "First NoSQL Database", there is a "STEP 18" section with instructions: "1. In the Value field, type: Amazon Fire Tablet". To the right, the main pane shows the AWS Management Console with the URL [https://console.aws.amazon.com/dynamodb/home?region=us-east-1#table/UserVideoHistory/items](#). A modal window titled "Create item" is open, showing the "Attributes" table. The table has two rows:

Attribute name	Value	Type
userId - Person Key	12345-abcd-6789	String
lastDateWatched - Date	1619156406	Number
videoId	9875-dpx1839	String
preferredLanguage	English	String
supportedDeviceTypes	Amazon Fire TV Amazon Fire Tablet	List

At the bottom right of the modal is a "Create item" button with a red arrow pointing to it.

The screenshot shows the AWS Lambda console. The left sidebar now includes a "Tables" section with a "Explore items" button, which has a red arrow pointing to it. The main pane shows the AWS Management Console with the URL [https://console.aws.amazon.com/dynamodb/home?region=us-east-1#table/UserVideoHistory](#). The "UserVideoHistory" table details page is displayed, showing the "Tables (1)" section and the "Scan/Query Items" results. The results table shows one item:

userId	lastDateWatched	preferredLanguage
12345-abcd-6789	1619156406	English

At the bottom right of the results table is a "Next" button with a red arrow pointing to it.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 20:

1. Click Add new attribute to expand the dropdown list to add another attribute.
2. Choose Number.
3. Go to the next step.

CONCEPT

Amazon DynamoDB is schemaless, so you can add attributes to the table for any record. You can add a `lastStopTime` attribute with a `Number` data-type that stores the total time in seconds for video viewing. This data could be leveraged for a resume feature in your application.

Step 20/26  

DynamoDB > Home > UserVideoHistory > item editor

item editor

Attributes

Attribute name	Value	Type
userId - Partition key	12345-abcd-6789	New String
lastDateWatched - Sort key	1819156408	New Number
videoId	9875-djac-1859	New String
preferredLanguage	English	New String
supportedDeviceTypes	Insert a field ▾	List

Add new attribute  

String
Number
Boolean
Binary
Null
String set
Number set
Binary set

Cancel **Save changes**

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 21:

1. In the attribute name field, type: `lastStopTime`
2. In the value field, type: `90`
3. Click Save changes.
4. Go to the next step.

Step 21/26  

DynamoDB > Home > UserVideoHistory > item editor

item editor

Attributes

Attribute name	Value	Type
userId - Partition key	12345-abcd-6789	New String
lastDateWatched - Sort key	1819156408	New Number
videoId	9875-djac-1859	New String
preferredLanguage	English	New String
supportedDeviceTypes	Insert a field ▾	List
lastStopTime	90	Type 

1. Type 

Cancel **Save changes**  **3 Click**

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 23

1. Click to expand Scan/Query Items.
2. Click the Query tab.
3. Under userId (Partition key), type: 12345-abcd-6789
4. Under lastDateWatched (Sort Key), choose Greater than.
5. In the value field type: 1609477200
6. Click Run.
7. Go to the next step.

CONCEPT

Step 22/26

UserVideoHistory

Autopreview View table details

Tables (1)

Any table tag

Q Find tables by table name

UserVideoHistory

Scan/Query Items

Scan Query

userId (Partition key) 12345-abcd-6789

lastDateWatched (Sort key) Greater than 1609477200 Sort descending

Filters

Run Reset

Completed Read capacity units consumed: 0.0

Feedback Updating permission selected. Find it in the new Unified Settings

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

First NoSQL Database

STEP 23

1. Under items returned, review the record returned.
2. Go to the next step.

Step 23/26

UserVideoHistory

Scan Query

Table or index UserVideoHistory

userId (Partition key) 12345-abcd-6789

lastDateWatched (Sort key) Greater than 1609477200 Sort descending

Filters

Run Reset

Completed Read capacity units consumed: 0.0

Items returned (1)

1. Review

userId	lastDateWatched	lastStep	preferredLanguage	supports...
12345-abcd-6789	1619156406	30	English	[{"language": "En..."}]

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The screenshot shows the AWS Lambda Practice interface. On the left, a sidebar displays a 'First NoSQL Database' section with 'STEP 2A' instructions: '1. To change the query criteria in the userId field, type: abcd-zxcv-12345'. Below this is a 'CONCEPT' section explaining that the table looks for an exact match for the partition key and uses the sort key if provided. At the bottom of the sidebar are navigation buttons for 'Step 24/26' and arrows. On the right, the main window shows the AWS Lambda console with the 'UserVideoHistory' table selected. The 'Query' tab is active, showing a query configuration with 'partition key' set to 'abcd-zxcv-12345' and 'sort key' set to 'lastDateWatched > 1609477200'. The results pane indicates 'Items returned | 0|' and notes 'The query did not return any results.'.

CONCEPT

When running a Query operation the table looks for an exact match for the partition key and uses the sort key (if provided) as way to further limit the results.

The screenshot shows the AWS Lambda Practice interface. The sidebar now displays 'STEP 2B' instructions: '1. Click the Scan tab. 2. Click Run. 3. Review the results.' Below this is a 'CONCEPT' section explaining that the Scan operation returns one or more items and item attributes by accessing every item in a table or a secondary index. At the bottom of the sidebar are navigation buttons for 'Step 25/26' and arrows. On the right, the main window shows the AWS Lambda console with the 'UserVideoHistory' table selected. The 'Scan' tab is active, showing a scan configuration with 'Scan query a table or index' set to 'Scan' and 'UserVideoHistory'. The results pane shows 'Items returned | 1|' with two items listed: 'userId' and '12345-abcd-1234'. The 'Review' button is highlighted.

CONCEPT

The Scan operation returns one or more items and item attributes by accessing every item in a table or a secondary index. If the total number of scanned items exceeds the maximum dataset size limit of 1 MB, the scan stops and results are returned to the user as a LastEvaluatedKey value, to continue the scan in a subsequent operation. The results also include the number of items exceeding the limit. A scan can result in no table data meeting the filter criteria.

3 Practice

Practice Lab

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

First NoSQL Database

STEP 30
Congratulations! You've completed the Practice Section. Go to the DIY section to complete the solution.

Congratulations!

You've completed the Practice Section.
Go to the DIY section to complete the solution.

4 DIY

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files DIY Activity

First NoSQL Database

DIY ACTIVITIES

- Create a new user item with a unique id.
- Add a new attribute named rating (Number).

SOLUTION VALIDATION METHOD

Validation Process:
Our servers will verify that you have created an item with an attribute called rating that is of the integer type.

VALIDATION FORM
Paste or type the validation criteria below:

DynamoDB table name: dynamodb-table-name

Item User Id: f.e. abcdef-1234-efgh

VALIDATE

SKIP

Amazon Elastic file system:

Great! Let me explain. In the past year we have established three new company branches in the city and each branch has its own pet image server that connects to a local client management application.

Each server stores images of all of our pet clients along with informational metadata. We are using a custom application to sync the client data across all three branches, but it takes too much time to access the images and it's not always consistent.

I see. Is the storage capacity on each branch server the same?

No. And that is another problem. Our syncing solution fails sometimes because one branch server might run out of storage space. We need a solution that centralizes our image storage and scales automatically.

Okay, one more question. Does your team update the same files and also restrict certain files with permissions?

Yes, all branches access and update the same pet client files and there are certain folders for our VIP clients that only our concierge team has access to.

Thanks! Based on your answers, I would recommend Amazon EFS. Amazon EFS is a serverless, set-and-forget, elastic file system that lets you share file data without provisioning or managing storage.

With Amazon EFS, you can create shared network drives that will allow your branches to access your pet client photos from a central location and restrict access with file level permissions.

That sounds good, but what about the storage capacity?

Amazon EFS provides petabyte scale storage that grows and shrinks automatically as you add and remove files.

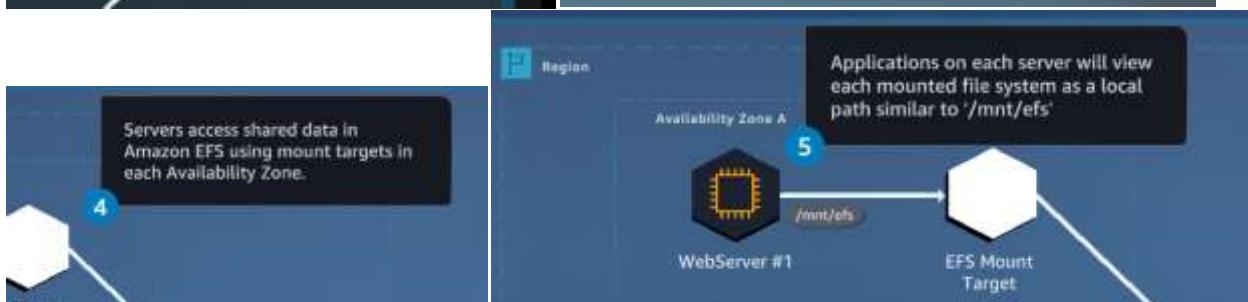
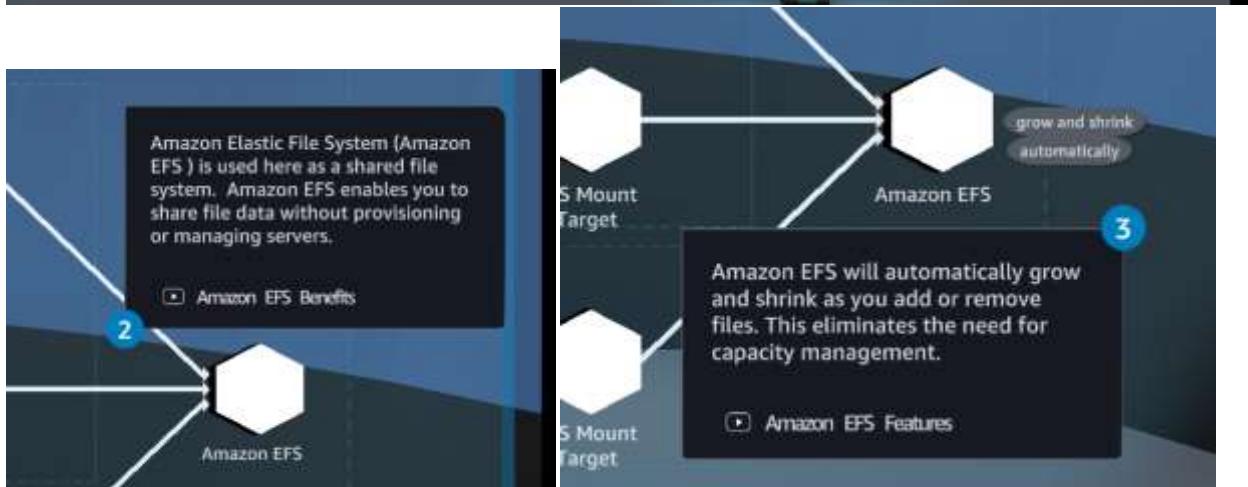
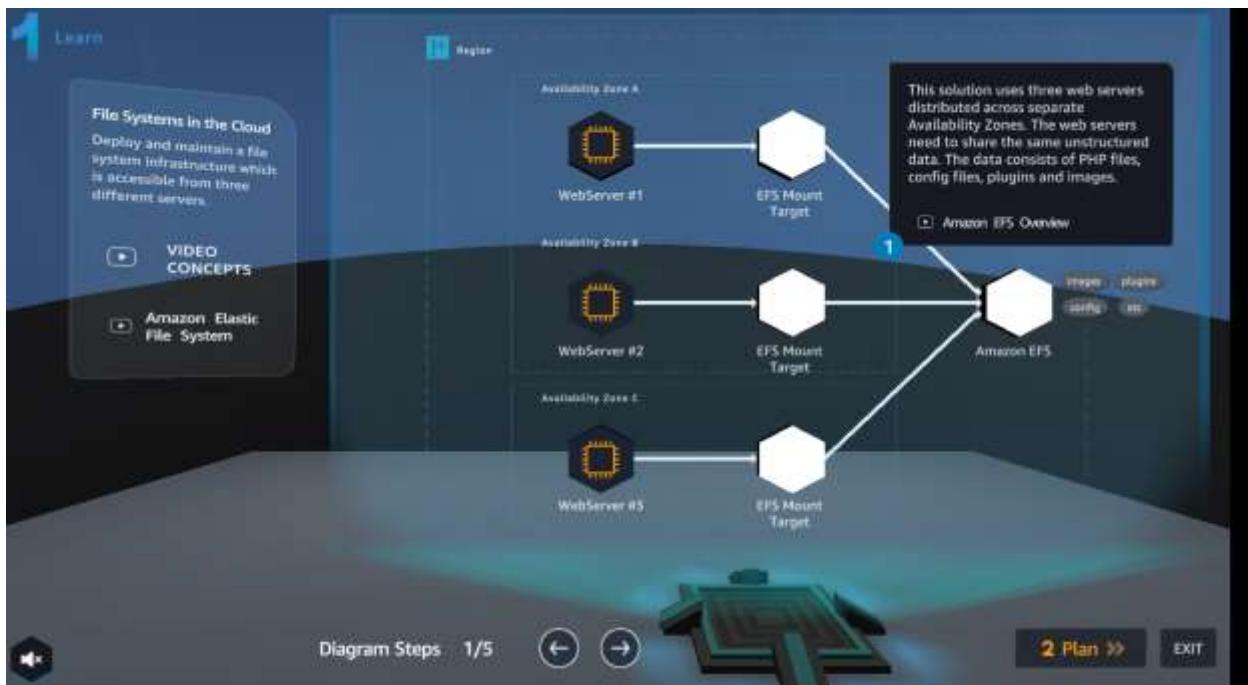
Nice! We want centralized storage, but what happens if Amazon EFS fails? Will we lose all of our client data?

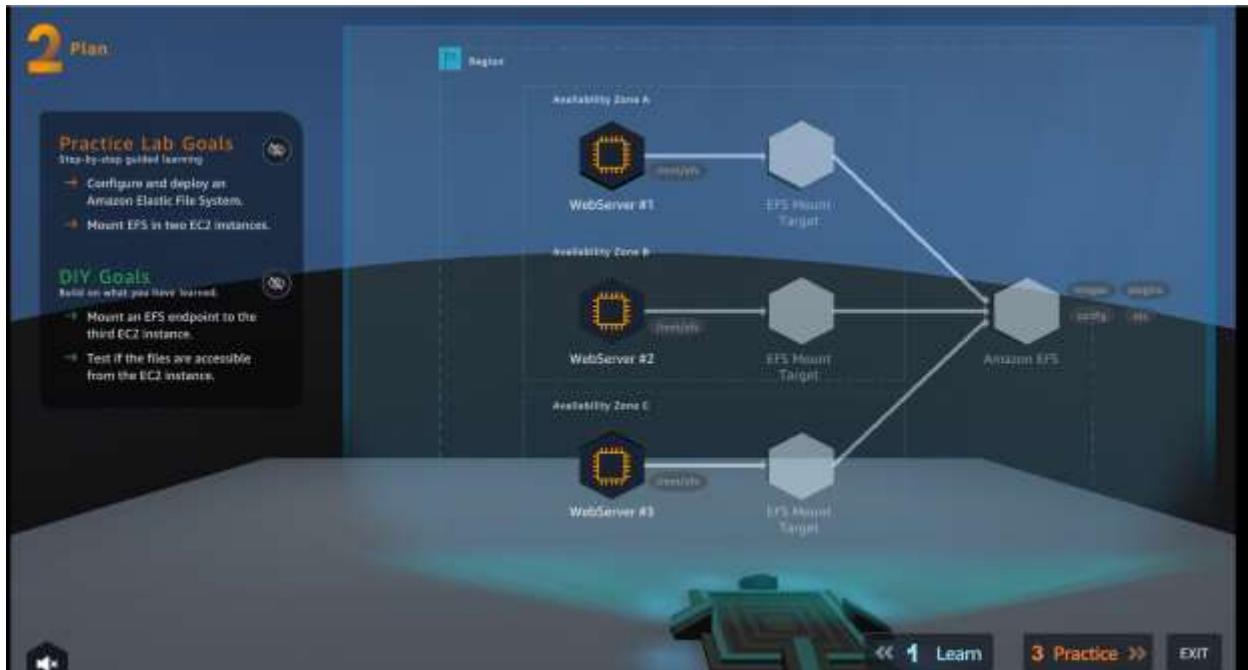
That is highly unlikely. Amazon EFS is designed to be highly available and is designed for 99.99999999% durability.

Also, by default, every Amazon EFS object is redundantly stored across multiple Availability Zones for file systems using standard storage classes. Amazon EFS is even designed to sustain concurrent device failures by quickly detecting and repairing any lost redundancy.

Wow, that is amazing! I think moving to Amazon EFS might work. Can you create an Amazon EFS file system that allows all of our branches to access pet client photos from a single location?

Will you help us create an Amazon Elastic File System?





3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud
environment, then click Open AWS Console to begin.
3. Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT
In this lab you will:

- Launch and configure an Amazon EFS file system.
- Mount the file system to an Amazon EC2 instance.
- Connect a second Amazon EC2 instance to the same file system.
- Share files between the two Amazon EC2 instances.

Step 1/42

File Systems in the Cloud

STEP 2
1. In the Services search bar, type: ec2
2. Click EC2.
3. Go to the next step.

CONCEPT
Amazon EFS provides a simple, serverless, set-and-forget, elastic file system that lets you share file data without provisioning or managing storage.

Step 2/42

File Systems in the Cloud

STEP 3
1. On the left menu, click Instances.
2. Go to the next step.

CONCEPT
With Amazon EFS, you can grow and shrink your file systems automatically as you add and remove files, eliminating the need to provision and manage capacity to accommodate growth.

Step 3/42

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 4

1. Review the names of the three existing instances.
2. Scroll to the right.
3. Go to the next step.

CONCEPT

Amazon EFS creates a shared storage file system available concurrently to multiple instances.

Step 4/42

Instances [3] Info Actions

Name	Instance ID	Instance State	Instance Type	Status Check
PerfModel-C	i-0d955558bacc5a5d	Running	t2.nano	Initializing
PerfModel-A	i-0ff57ea30e05a47	Running	t2.nano	Initializing
PerfModel-B	i-0ac7551112242a7	Running	t2.nano	Initializing

Select an instance above

⋮ Back ⌋ Forward ⌈ Privacy Policy Terms of Use Cookies preferences

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 5

1. Under Availability Zone, review the Availability Zone for each instance.
2. On the left menu, click Security Groups.
3. Go to the next step.

CONCEPT

After creating the Amazon EFS file system, you create mount targets on each subnet. The mount target enables communication from instances on the subnet. Amazon EFS uses the Network File System (NFSv4) protocol. Instances that connect to the file system are NFS clients.

Step 5/42

Instances [3] Info Actions

Instance Type	Status Check	Alarm Status	Availability Zone	Public IPv4 DNS	Public IPv4
t2.nano	2/2 checks p...	No alarms	us-east-1a	ec2-18-229-161.us...	18.229.161.141
t2.nano	2/2 checks p...	No alarms	us-east-1a	ec2-34-227-28-84.com...	34.227.28.84
t2.nano	2/2 checks p...	No alarms	us-east-1b	ec2-52-30-51-146.us...	52.30.51.146

Select an instance above

⋮ Back ⌋ Forward ⌈ Privacy Policy Terms of Use Cookies preferences

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 6

1. Review the webserver security group which is already linked to the web servers.
2. Click Create security group.
3. Go to the next step.

CONCEPT

When you create an Amazon EFS mount target, you must attach a security group. The security group determines which instances can access the file system as NFS clients.

Review **Create security group** **Click**

Security Groups [3]

Name	Security group ID	Security group name	VPC ID
ip-02e656a4691d3c81	default	ip-02e656a4691d3c81	defa
ip-04e5110c259e0228	webservice	ip-04e5110c259e0228	Secu
ip-05887950001e5b57	default	ip-05887950001e5b57	defa

Feedback **English (US)** **© 2023, Amazon Web Services, Inc. or its affiliates.** **Privacy** **Terms** **Cookie preferences**

1. Review → 2. Create security group → 3. Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 7

1. Under Security group name, type: PetModels-EFS-1-SG
2. Under Description, type: Restrict access to webservers only
3. Under VPC, choose PetModels.
- You may need to remove the existing VPC by clicking X.
4. Under inbound rules, click Add rule.
5. Go to the next step.

EC2 > Security Groups > Create security group

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name **Type** **1. Type** PetModels-EFS-1-SG
Name cannot be edited after creation.

Description **Type** **2. Type** Restrict access to webservers only

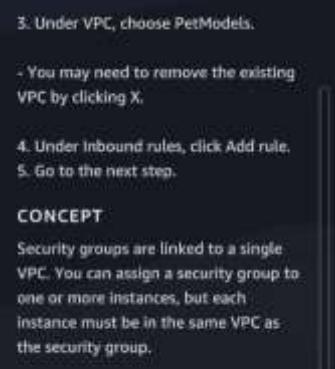
VPC **Type** **3. Choose** vpc-018425f2254591188 (PetModels) 10.10.0.0/16 vpc-1edaa563 173.31.0.0/16 (default)

This security group has no inbound rules.

Add rule **4. Click**

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1. Type → 2. Type → 3. Choose → 4. Click



CONCEPT

Security groups are linked to a single VPC. You can assign a security group to one or more instances, but each instance must be in the same VPC as the security group.



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 8

- Under Type, choose NFS.
- Under source, choose the webserver security group.
- Go to the next step.

CONCEPT

Amazon EFS file systems require an inbound NFS rule. By selecting a security group as the incoming source, any instances linked to the security group you select will have NFS client access to the file system.

Inbound rules

Type	Protocol	Port range	Source	Description (optional)
NFS	TCP	2049	Custom	Choose

Outbound rules

Type	Protocol	Port range	Destination	Description (optional)
All traffic	Custom	Custom	Security Groups	Choose

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value.

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 9

1. Scroll down.
2. Click Create security group.
3. Go to the next step.

Feedback English (US) ▾

AWS Services Search for services, features, [Optimize] AWS Lambda [Lambda] 17bd8d

Outbound rules Info

Type: **Info** Protocol: **Info** Port range: **Info** Destination: **Info** Description - optional: **Info**

All traffic **Custom** **0.0.0.0/0** **0.0.0.0/0** **Add rule**

Add rule **Save**

Tags - optional
A tag is a label that you associate with an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

No tags associated with the resource.

Add new tag You can add up to 100 tags. **Click** **Create security group**

Feedback English (US) ▾

AWS Services Search for services, features, [Optimize] AWS Lambda [Lambda] 17bd8d

New EC2 Experience Info **What's this?**

EC2 Dashboard

Events Tags Limits

Instances

Instances **Review** **571462772231**

Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

Images

AMIs

Elastic Block Store

Volumes Snapshots Lifecycle Manager

Feedback English (US) ▾

Security group (sg-0ef580cea5dc3c3c) | PetModels-EFS-1-SG was created successfully

Details

sg-0ef580cea5dc3c3c - PetModels-EFS-1-SG

Details

Security group name: PetModels-EFS-1-SG	Security group ID: sg-0ef580cea5dc3c3c	Description: Restrict access to instances only	VPC ID: vpc-04e5bb7d53ab545
Inbound rules count: 1 Permit	Outbound rules count: 0 Permit		

Inbound rules (1/1) **Run Reachability Analyzer**

Filter security group rules **Message tags** **Edit inbound rules**

Feedback English (US) ▾

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 10

1. Review the security group name.
2. Go to the next step.

CONCEPT

After the Amazon EFS security group has been created, you are prepared to create the file system.

Feedback English (US) ▾

AWS Services Search for services, features, [Optimize] AWS Lambda [Lambda] 17bd8d

New EC2 Experience Info **What's this?**

EC2 Dashboard

Events Tags Limits

Instances

Instances **Review** **571462772231**

Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

Images

AMIs

Elastic Block Store

Volumes Snapshots Lifecycle Manager

Feedback English (US) ▾

Security group (sg-0ef580cea5dc3c3c) | PetModels-EFS-1-SG was created successfully

Details

sg-0ef580cea5dc3c3c - PetModels-EFS-1-SG

Details

Security group name: PetModels-EFS-1-SG	Security group ID: sg-0ef580cea5dc3c3c	Description: Restrict access to instances only	VPC ID: vpc-04e5bb7d53ab545
Inbound rules count: 1 Permit	Outbound rules count: 0 Permit		

Inbound rules (1/1) **Run Reachability Analyzer**

Filter security group rules **Message tags** **Edit inbound rules**

Feedback English (US) ▾

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 11:

1. In the Service search bar, type: **efs**.
2. Click **EFS**.
3. Go to the next step.

CONCEPT

Amazon EFS is built to scale on demand up to petabytes of storage capacity without disrupting applications.

Services (9) **Features (3)** **Documentation (32,275)** **Knowledge Articles (34)** **Marketplace (64)**

EFS **2 Click**
Managed File Storage for EC2

DataSync **Utilities simplifies, automates, and accelerates moving data**

Features

- Access points** **EFS feature**
- File systems** **EFS feature**
- Backup plans** **AWS Backup feature**

Documentation **See all 32,275 results in documentation**

Overview - EFS-to-EFS Backup Solution

Feedback English (US) Services Search for services, regions [Optional] © 2020-2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookies preferences

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 12:

1. Click **Create file system**.
2. Go to the next step.

CONCEPT

To create Amazon EFS resources such as a file system and access points, a user must have AWS Identity and Access Management (IAM) permissions for the corresponding API action and resource.

Elastic File System

Create file system
Create an EFS file system with service-recommended settings.

1 Click

Amazon Elastic File System
Scalable, elastic, cloud-native NFS file system

Amazon Elastic File System (Amazon EFS) provides a simple, reliable, elastic file system for general journal workloads for use with AWS Glue services and other compute resources.

What is Amazon Elastic File System?

Pricing

Standard storage	\$0.02 per GB
Standard - Infrequent Access	\$0.022 per GB
One Zone storage	\$0.332 per GB
One Zone - Infrequent Access	\$0.013 per GB
Infrequent Access requests	\$0.010 per GB transferred
Provisioned Throughput	\$0.00 per HRU

Feedback English (US) Services Search for services, regions [Optional] © 2020-2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookies preferences

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 13

- Under Name, type: PetModels-EFS-1
- Under VPC, choose the PetModels VPC.
- Click Customize.
- Go to the next step.

CONCEPT

Amazon EFS offers you the choice of creating file systems using Standard or One Zone storage classes. Standard storage classes store data within and across multiple Availability Zones (AZ). One Zone storage classes store data

Step 13/42

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 14

- Deselect Enable automatic backups.
- Under Lifecycle management, for Transition into IA, choose None.
- Go to the next step.

CONCEPT

You can disable automatic backups and lifecycle management to reduce costs until you are in production.

Step 14/42

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 15:

1. Scroll down.
2. Click Next.
3. Go to the next step.

Step 15/42

Amazon VPC Configuration

Search for service: Systems Manager (Step 15/42)

Throughput mode: Auto scaling (throughput per second)

Throughput mode: Bursting (throughput bursts with file system reads)

Throughput mode: Provisioned (throughput fixed at specified amount)

Encryption: Enable to enable encryption of user-managed data at rest. Use the AWS VPC encryption default if you don't want to manage your own keys.

Enable encryption of data at rest

Current encryption settings

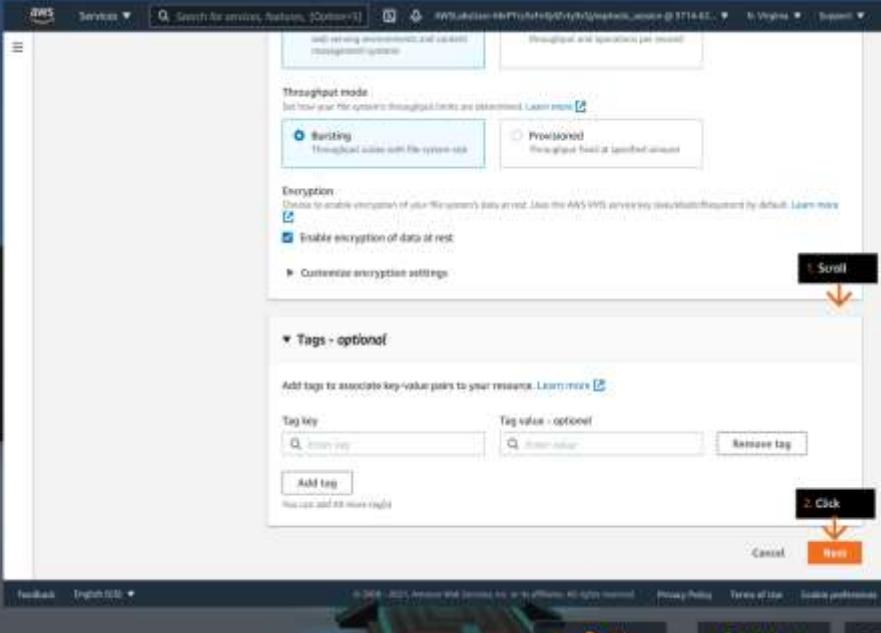
Tags - optional

Add tags to associate key-value pairs to your resource. Learn more

Tag key: Tag value - optional: Remove tag

Add tag

Cancel **Next**



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 16:

1. Under Mount targets, click Remove for subnet us-east-1a.
2. Under Mount targets click Remove for subnet us-east-1b.
3. Under Security groups for the remaining mount target, click the X to remove the existing security group.
4. Go to the next step.

CONCEPT:

For simplicity during testing, you can start with a single mount target in a single availability zone.

Step 16/42

Amazon VPC Configuration

Search for service: Systems Manager (Step 16/42)

Virtual Private Cloud (VPC): Choose the VPC where you work (EC2 instances in private IP ranges). Learn more

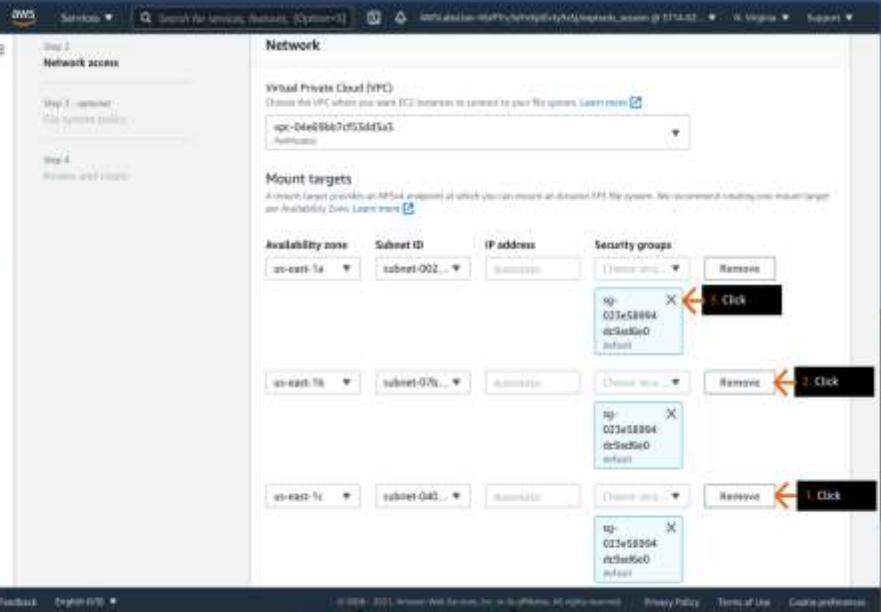
ip-04e8bb070f534d5a3

Network

Mount targets

A mount target provides an IP endpoint at which you can mount an Amazon FSx file system. We recommend creating one mount target per Availability Zone. Learn more

Availability zone	Subnet ID	IP Address	Security groups
us-east-1a	subnet-002...	172.31.1.2	(Choose new...) Remove
us-east-1b	subnet-078...	172.31.1.3	(Choose new...) Remove
us-east-1c	subnet-040...	172.31.1.4	(Choose new...) Remove



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 17

- Under Security group, choose the PetModels-EFS-1-SG.
- Click Next.
- Go to the next step.

CONCEPT

By attaching your custom security group to the mount target, you control where the source of incoming traffic to the file system can originate.

Step 17/42

Amazon EFS > File systems > Create

Step 1: File system settings

Step 2: Network access

Step 3: optional: File system policy

Step 4: Review and create

Network

Virtual Private Cloud (VPC)

Choose the VPC where your new EFS instance is connected to your file system. [Learn more](#)

vpc-04e60b7cB54d45a5

PrivateSubnet

Mount targets

A mount target provides an NFSv4 endpoint of which you can request an Amazon EBS volume. Learn more

Availability zone Subnet ID IP address

us-east-1a subnet-002... 10.0.0.10

Add mount target

Cancel Previous Next

jq-025e04994dc9a6e0

jq-0520d1a113f7bd4

jq-0ef500ea560c33c

jq-0fca0a611-1a

jq-0f500ea560c33c

jq-0fca0a611-1a

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 18

- Click Next.
- Go to the next step.

Step 18/42

Amazon EFS > File systems > Create

Step 1: File system settings

Step 2: Network access

Step 3: optional: File system policy

Step 4: Review and create

File system policy - optional

Select one or more of these common policy options, or create a custom policy using the editor. [Learn more](#)

Prevent root access by default*

Enforce read-only access by default*

Prevent anonymous access

Enforce in-transit encryption for all clients

* Identity-based policies can override these default permissions

Grant additional permissions

Manual changes will prevent the use of this policy option on the left sidebar (if closed)

Cancel Previous Next

The screenshot shows two side-by-side browser windows. The left window is a practice lab titled 'File Systems in the Cloud' (Step 19/42). It contains instructions: '1. Scroll down to the bottom of the page, then click Create. 2. Go to the next step.' The right window is the AWS Management Console showing the 'File system policy' configuration for a new EFS file system. A large orange arrow points from the 'Create' button in the practice lab to the 'Create' button in the AWS console. The AWS console also has a callout '1 Click' pointing to the 'Create' button.

File Systems in the Cloud

STEP 19

1. Scroll down to the bottom of the page, then click Create.
2. Go to the next step.

Elastic File System

File systems

Success
File system (f1-efs2ad0) is available

Review

Amazon EFS > File systems

① Reduce your storage price to \$0.043/GB-month* with EFS Lifecycle Management and One Zone storage classes. [Learn more](#)

* pricing in US East (N. Virginia) region assumes 60% of your storage in EFS One Zone IA

[What's new](#) | [Documentation](#) | [AWS Storage Blog](#)

File systems (1)

Name	ID	Encrypted	Total size	Size in Standard / One Zone	Size in Standard-IA / One Zone-IA
f1-efs2ad0	f1-efs2ad0	Encrypted	6.00 KB	6.00 KB	0 Bytes

2 Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 21

1. Click Attach.
2. Go to the next step.

Step 21/42

Elastic File System

PetModels-EFS-1 (fs-bfe2ad0b)

General

Performance mode: General Purpose
Throughput mode: Bursting
Lifecycle policy: None
Availability zone: Regional

Automatic backups: Disabled
Encrypted: Yes
File system state: Available

Metered size: Total size: 6.00 KB

Attached to: i-00000000000000000000000000000000

Actions: Delete | Attach

Metric Data

Monitoring

Tags

File system policy

Access points

Retries

Documentation

AWS Backup

AWS DataSync

AWS Transfer

File systems

Access points

Settings

File Systems in the Cloud

STEP 22

1. Under Using the EFS mount helper, click to copy the mount command and paste in your text editor.
 - You will use this command in the later steps.
2. Click Close.
3. Go to the next step.

CONCEPT

The Amazon EFS client (`amazon-efs-utils`) is an open-source collection of Amazon EFS tools. This package is available in the Amazon Linux package repositories, and you can build and install the package on other Linux distributions.

Step 22/42

Attach

Mount your Amazon EFS file system on a Linux instance. Learn more

Mount via DNS: `sudo mount -t efs -o tls fs-bfe2ad0b:/ /efs`

Mount via IP: `sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,nrreconnect=2,addr=efs-fs-01.us-east-1.amazonaws.com:/ /efs`

Using the EFS mount helper:
`sudo mount -t efs -o tls fs-bfe2ad0b:/ /efs`

Using the NFS client:
`sudo mount -t nfs4 -o nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,nrreconnect=2,addr=efs-fs-01.us-east-1.amazonaws.com:/ /efs`

See our user guide for more information. [User guide](#)

i Click **Close**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 23

1. In the Services search bar, type:

ec2

2. Click EC2.
3. Go to the next step.

CONCEPT

Once you have copied the mount command, you can connect to your Amazon EC2 Instance and mount the file system.

Step 23/42

Feedback English (US) ▾

Search results for ec2:

Services (0) Features (0) Documentation (229,963) Knowledge Articles (29) Marketplace (1,284)

EC2 Virtual Servers in the Cloud

EC2 Image Builder A managed service to automate build, customize and deploy OS images.

AWS Compute Optimizer Recommend optimal AWS Compute resources for your workloads.

AWS Firewall Manager Central management of firewall rules.

See all 6 results ▾

Network

Export snapshots to EC2 Lightweight feature

Dashboard EC2 feature

Feedback English (US) ▾

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 24

1. On the left menu, click Instances.
2. Go to the next step.

EC2 Dashboard

Events

Tags

Limits

Instances Instances **Click**

Instance Types

Launch Templates

Spot Requests

Scaling Plans

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

Images AMIs

Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

Feedback English (US) ▾

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) Region:

Instances (running)	0	Dedicated Hosts	0
Elastic IPs	0	Instances	5
Key pairs	0	Load balancers	0 API Error
Placement groups	0	Security groups	4
Snapshots	0	Values	3

Launch instance

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

Launch instance

Note: Your instance will launch in the US East (N. Virginia) Region

Scheduled events

US East (N. Virginia)

Feedback English (US) ▾

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3 Practice

START LAB

You will be provided with an AWS account to complete the assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 25

- Under Instances, choose PetModels-A.
- Click Connect.
- Go to the next step.

CONCEPT

Amazon EC2 supports SSH, Systems Manager Session Manager, or Amazon EC2 Connect to connect to an instance. Amazon EC2 Instance Connect provides a simple and secure way to connect to your Linux instances using Secure Shell (SSH). With EC2 Instance Connect, you use AWS Identity and Access Management (IAM) policies and principals to control SSH access to your instances, removing the need to share and manage SSH keys. All connection requests using Amazon EC2 Instance Connect are logged to AWS CloudTrail so that you can audit connection requests.

Step 25/42 ← →

Instances (1/3)

1 Choose

Name	Instance ID	InstanceState	InstanceType	StatusCheck
PetModels-C	i-05e096f70d567081	Running	t2.micro	2/2 checks p...
PetModels-A	i-01cf84928f775ddb3	Running	t2.micro	2/2 checks p...
PetModels-B	i-06132d5c322413ca	Running	t2.micro	2/2 checks p...

Instance: i-01cf84928f775ddb3 (PetModels-A)

Details Security Networking Storage Status check Monitoring Tags

Instance summary

Instance ID:	Public IPv4 address:	Private IPv4 address:
i-01cf84928f775ddb3 (PetModels-A)	34.227.26.84 open address	10.0.0.252
IPv4 address:	InstanceState:	Public IPv4 DNS:
-	Running	ec2-34-227-26-84.compute-1.amazonaws.com open address
Private IPv6 DNS:	Instance type:	Private IP address:
-	t2.micro	-

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The screenshot shows the AWS Practice interface on the left and the AWS Management Console on the right.

AWS Practice (Left):

- Step 26:**
 1. Click Connect.
 2. Go to the next step.
- CONCEPT:** Amazon EC2 Connect requires that the EC2 instance security group allows incoming SSH traffic over port 22.

AWS Management Console (Right):

EC2 > Instances > i-01cf84928f775ddb3 > Connect to instance

Connect to instance info

Connect to your instance—i-01cf84928f775ddb3 (PetModels-A) using any of these options

EC2 Instance Connect Session Manager SSH client EC2 Serial Console

Instance ID: i-01cf84928f775ddb3 (PetModels-A)

Public IP address: 34.227.26.84

User name: ec2-user

Connect using a custom user name, or use the default user name ec2-user for the AMI used to launch the instance.

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Buttons: Cancel, Connect, **1 Click**

Bottom Navigation: Step 26/42, Back, Forward

Browser View (Bottom):

Connect to instance | EC2 home | i-01cf84928f775ddb3 (PetModels-A) | https://console.aws.amazon.com/ec2/v2/connect/ec2-user/i-01cf84928f775ddb3 | +

Amazon Linux 2 AMI

```
https://aws.amazon.com/amazon-linux-2/
16 package(s) needed for security, out of 18 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-0-0-252 ~]$ [ec2-user@ip-10-0-0-252 ~]$ sudo yum install -y amazon-efs-utils
```

← Type

i-01cf84928f775ddb3 (PetModels-A)

Public IP: 34.227.26.84 Private IP: 10.0.0.252

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 2B

- Type: `mkdir data` [Press Enter Key]
- Type: `ls` [Press Enter Key]
- Paste the `sudo mount` command you copied earlier from the EFS console. Replace the folder name `efs` at the end of the command with `data`, before pressing [Enter].
- Type: `cd data` [Press Enter Key]
- To create a log file, type: `sudo bash -c "cat >> efs-1-setup.log"` [Press Enter Key]
- Type: `cat efs-1-setup.log` [Press Enter Key]
- Type Control+C to end the cat session.
- To view the log file contents:

i-01cf84928f775ddb3 (PetModels-A)
Public IPs: 34.227.26.84 Private IPs: 10.0.0.252

The terminal history shows the following commands:

```
[ec2-user@ip-10-0-0-252 ~]$ mkdir data
[ec2-user@ip-10-0-0-252 ~]$ ls
[ec2-user@ip-10-0-0-252 ~]$ sudo mount -t efs -o tls fs-bfe2ad0b:/ data
[ec2-user@ip-10-0-0-252 ~]$ cd data
[ec2-user@ip-10-0-0-252 data]$ sudo bash -c "cat >> efs-1-setup.log"
[ec2-user@ip-10-0-0-252 data]$ cat efs-1-setup.log
[ec2-user@ip-10-0-0-252 data]$
```

Annotations with orange arrows and numbers indicate the steps:

- 1 Type: `mkdir data`
- 2 Type: `ls`
- 3 Paste: `sudo mount -t efs -o tls fs-bfe2ad0b:/ data`
- 4 Type: `cd data`
- 5 Type: `sudo bash -c "cat >> efs-1-setup.log"`
- 6 Type: `cat efs-1-setup.log`
- 7 Type: `Ctrl+C`
- 8 Type: `cat efs-1-setup.log`

5. To create a log file, type:
`sudo bash -c "cat >> efs-1-setup.log"` [Press Enter Key]

6. Type:
`cat efs-1-setup.log` [Press Enter Key]

7. Type Control+C to end the cat session.

8. To view the log file contents:
`cat efs-1-setup.log` [Press Enter Key]

B. To view the log file contents:
`cat efs-1-setup.log` [Press Enter Key]

9. Go to the next step.

Note: In this step you used Linux commands to create a data directory, then mounted the newly created Amazon EFS file system to that directory. You created a log file and appended information to it. The log file and its contents will be visible from other instances that have the same file-system mounted.

Step 28/42

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 29

1. Return to the AWS Console tab and in the Services search field type:

efs

2. Click EFS.
3. Go to the next step.

CONCEPT

After successfully mounting the new file system, you are ready to add more mount points for other subnets in other availability zones within the same VPC.

Step 29/42

Services ▾

Search results for "efs"

1. Click

2. Click

EFS

Managed File Storage for EC2

DataSync

DataSync simplifies, automates, and accelerates moving data

Features

Access points

File systems

Backup plans

Documentation

See all 32,275 results in Documentation

Overview - EFS-to-EFS Backup Solution

Feedback English (US) ▾

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 30

1. Under Name, click PetModels-EFS-1.
2. Go to the next step.

CONCEPT

You can mount a file system on compute instances, including Amazon EC2, Amazon ECS, and AWS Lambda in your Virtual Private Cloud (VPC).

Step 30/42

Elastic File System

File systems

Access points

Settings

AWS Backup

AWS DataSync

AWS Transfer

Documentation

File systems (1)

1. Click

Name	File system ID	Encrypted	Total size	Size in Standard / One Zone	Size in Standard / One Zone-IA
PetModels-EFS-1	fs-2e2599	Encrypted	4.00 KB	4.00 KB	0 bytes

3 Practice

START LAB

You will be provisioned with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 31

1. Click Network.
2. Click Manage.
3. Go to the next step.

CONCEPT

The Network tab allows you to display and manage your mount targets.

Step 31/42

3 Practice

START LAB

You will be provisioned with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 32

1. Under Mount targets, click Add mount target.
2. Go to the next step.

CONCEPT

For Amazon EFS file systems that use Standard storage classes, you can create a mount target in each Availability Zone in an AWS Region.

Step 32/42

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 33:

1. Choose us-east-1b for the Availability Zone.
2. Choose the PetModels-Subnet2 subnet.
3. Go to the next step.

CONCEPT

You can create mount targets for a file system using the AWS Management Console, AWS CLI, or programmatically using the AWS SDKs. When using the console, you can create mount targets when you first create a file system or after the file system is created.

Availability zone

Virtual Private Cloud (VPC)

Choose the VPC where your EC2 instances to connect to your file system. Learn more ↗

vpc-026540138105c4972
PetModels

Mount targets

A mount target provides an IP endpoint at which you can mount an Amazon EFS file system. We recommend creating one mount target per Availability Zone. Learn more ↗

Availability zone	Subnet ID	IP address	Security group
us-east-1a	subnet-06ed... 7d8	10.0.1.166	sg-020ef5537 PetModels PetModels 09-1-50
us-east-1b	subnet-0541c05e6b6... 7d8	10.0.1.170	sg-020ef5537 PetModels PetModels 09-1-50

1. Choose → **2. Choose**

Add mount target

Cancel **Save**

Step 33/42

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

File Systems in the Cloud

STEP 34:

1. Under Security group, choose PetModels-EFS-1-SG.
2. Click Save.
- ignore the policy error banner that may appear.
3. Go to the next step.

CONCEPT

In most cases, you will assign the same security group to each mount target.

Availability zone

Virtual Private Cloud (VPC)

Choose the VPC where your EC2 instances to connect to your file system. Learn more ↗

vpc-026540138105c4972
PetModels

Mount targets

A mount target provides an IP endpoint at which you can mount an Amazon EFS file system. We recommend creating one mount target per Availability Zone. Learn more ↗

Availability zone	Subnet ID	IP address	Security group
us-east-1a	subnet-04d91b4d	10.0.0.17	sg-020ef5534 PetModels-1-SG PetModels-1-SG 09-1-50
us-east-1b	subnet-049c8759	10.0.1.54	sg-020ef5534 PetModels-1-SG PetModels-1-SG 09-1-50

1. Choose → **2. Click**

Add mount target

Cancel **Save**

Step 34/42

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps:**

File Systems in the Cloud

STEP 35

1. After a few minutes, click to refresh the screen under Network.
2. Wait until the mount target state is Available for the new mount target.
3. Go to the next step.

CONCEPT

Each mount target installs an elastic network interface (ENI) into the chosen subnet. An elastic network interface is a logical networking component in a VPC that represents a virtual network card. The ENI automatically receives an IP address from the VPC.

Elastic File System

File system: None
Access points: None
File system policy: None
File system state: Available
Region: us-east-1

Network

Availability zone	Mount target ID	Subnet ID	Mount target state	IP address	Network interface ID	Security groups
us-east-1a	mtnt-32701087	subnet-06385ec2b0d2370da	Available	10.0.0.186	eni-04963721aa5c7e57	ip-0ef580cea5dc033c [PetNodes-EFS-1-SQ]
us-east-1b	mtnt-00761088	subnet-07bc2875ca470553	Available	10.0.1.181	eni-083f0630ed526fb21	ip-0ef580cea5dc033c [PetNodes-EFS-1-SQ]

Step 35/42 **◀** **▶**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps:**

File Systems in the Cloud

STEP 36

1. In the Service search bar type: **ec2**
2. Click **EC2**.
3. Go to the next step.

CONCEPT

After adding an additional mount target, you can mount the file system on instances in the specified subnet.

Services (6)

Features (34)
Documentation (229,965)
Knowledge Articles (29)
Marketplace (1,264)

1. Type

2. Click

EC2 Virtual Servers in the Cloud

EC2 Image Builder A managed service to automate build, customize and deploy OS images

AWS Compute Optimizer Recommend optimal AWS Compute resources for your workloads

AWS Firewall Manager Central management of firewall rules

Features

See all 34 results ▾

Export snapshots to EC2
Lightail feature

Dashboard
EC2 feature

Step 36/42 **◀** **▶**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 57

1. On the left menu, click Instances.
2. Go to the next step.

EC2 Dashboard

Instances **1 Click**

- Instances
- Instance Types
- Launch Templates
- Spot Requests
- Saving Plans
- Reserved Instances
- Dedicated Hosts
- Scheduled Instances
- Capacity Reservations

Images AMIs

Elastic Block Store Volumes Snapshots Lifecycle Manager

Feedback Support AWS Step Functions Privacy Policy Terms of Use Cookies preferences

Step 37/42

The screenshot shows the AWS Practice interface. On the left, there's a sidebar with 'File Systems in the Cloud' and a 'START LAB' button. Below it, under 'STEP 57', are two steps: '1. On the left menu, click Instances.' and '2. Go to the next step.'. The main content area is titled 'EC2 Dashboard' and shows the 'Instances' section. A large orange arrow points to the 'Instances' link in the sidebar. Another orange arrow points to the '1 Click' button in the 'Instances' section of the dashboard.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 58

1. Under Instances, choose PetModels-B.
2. Click Connect.
3. Go to the next step.

EC2 Dashboard

Instances **1 Click**

Instance Types Launch Templates Spot Requests Saving Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

Images AMIs

Elastic Block Store Volumes Snapshots Lifecycle Manager

Feedback Support AWS Step Functions Privacy Policy Terms of Use Cookies preferences

Step 38/42

The screenshot shows the AWS Practice interface. The 'Instances' section is highlighted with an orange arrow. Inside the 'Instances' section, the 'PetModels-B' instance is selected, indicated by a blue border and a checkmark. An orange arrow points to the 'PetModels-B' row in the list. To the right, a detailed view of the 'PetModels-B' instance is shown in a modal window.

Name	Instance ID	Instance state	Instance type	Status check
PetModels-C	i-0095555aaab9a3	Running	t2.micro	2/2 checks p...
PetModels-A	i-0095555aaab9a7	Running	t2.micro	2/2 checks p...
PetModels-B	i-0ac7f39c1722426a7	Running	t2.micro	2/2 checks p...

Instance: i-0ac7f39c1722426a7 (PetModels-B)

Details Security Networking Storage Status checks Monitoring Tags

Instance summary Info:

Instance ID	Public IPv4 address	Private IPv4 address
i-0ac7f39c1722426a7 (PetModels-B)	54.158.20.182 open address	192.1.1.108
Pub. address	Instance state	Public IPv4 DNS
-	Running	ec2-54-158-20-182.compute-1.amazonaws.com open address
Private IPv4 DNS	Instance IP	Private IP addresses
-	-	-

The screenshot shows two side-by-side browser windows. The left window displays Step 39 of a lab titled 'File Systems in the Cloud'. It instructs the user to click 'Connect' and then go to the next step. The right window shows the 'Connect to instance' dialog for an EC2 instance with ID i-0a2ff9c1722426a7. The dialog includes fields for Instance ID, Public IP address (34.158.20.182), and User name (ec2-user). A note states: 'In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.' The 'Connect' button is highlighted with a red arrow. The bottom of the screen shows the AWS navigation bar.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 39

1. Click Connect.
2. Go to the next step.

Step 39/42

EC2 instances > i-0a2ff9c1722426a7 > Connect to instance

Connect to instance: i-0a2ff9c1722426a7

Connect to your instance i-0a2ff9c1722426a7 (PetModels-B) using any of these options:

EC2 Instance Connect Session Manager SSH client EC2 Serial Console

Instance ID: i-0a2ff9c1722426a7 (PetModels-B)

Public IP address: 34.158.20.182

User name: ec2-user

Connect using a custom username, or use the default user name ec2-user for the SSH client to launch the session.

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Cancel Connect

4 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 40

1. Type:
sudo yum install -y amazon-efs-utils
2. Go to the next step.

Step 40/42

Amazon Linux 2 AMI

http://aws.amazon.com/amazon-linux-2/
No packages needed for security; 5 packages available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-10-1-79 ~]\$ sudo yum install -y amazon-efs-utils

1. Type

i-07c14b56e190b7ae0 (PetModels-B)
Public IP: 52.81.42.92 Private IP: 10.10.1.79

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

File Systems in the Cloud

STEP 41

- Type: `mkdir data [Press Enter Key]`
- Type: `ls [Press Enter Key]`
- Paste the mount command you copied earlier from the EFS console. Replace the folder name `efs` at the end of the command with `data`, before pressing [Enter].
- Type: `cd data [Press Enter Key]`

```

ec2-user@ip-10-10-1-79 ~$ 
ec2-user@ip-10-10-1-79 ~$ mkdir data < 1. Type
ec2-user@ip-10-10-1-79 ~$ ls < 2. Type
ec2-user@ip-10-10-1-79 ~$ sudo mount -t efs -o tls fs-057dbe6fc061b109e:/ data < 3. Replace
ec2-user@ip-10-10-1-79 ~$ cd data < 4. Type
ec2-user@ip-10-10-1-79 data$ 
ec2-user@ip-10-10-1-79 data$ cat efs-1-setup.log < 5. Type
efs-1 mounted in site A
ec2-user@ip-10-10-1-79 data$ 
ec2-user@ip-10-10-1-79 data$ sudo bash -c "cat >> efs-1-setup.log" < 6. Type
efs-1 mounted in site B < 7. Type
ec2-user@ip-10-10-1-79 data$ 
ec2-user@ip-10-10-1-79 data$ cat efs-1-setup.log < 8. Type
efs-1 mounted in site A
efs-1 mounted in site B
ec2-user@ip-10-10-1-79 data$ 
ec2-user@ip-10-10-1-79 data$ 

```

i-07c14b56e190b7ae0 (PetModels-B)
Public IP: 52.91.42.92 Private IP: 10.10.1.79

Step 41/42 ← →

5. Type: `cat efs-1-setup.log [Press Enter Key]`

6. Type: `sudo bash -c "cat >> efs-1-setup.log" [Press Enter Key]`

7. Type: `efs-1 mounted in site B [Press Enter Key]`

8. To end the cat session, type: `Control+C`

9. To view the log file contents, type: `cat efs-1-setup.log [Press Enter Key]`

Notes:

- You have successfully mounted an EFS file system to two EC2 instances in separate AZs.
- In this step, you created a data directory, mounted your Amazon EFS file system to the data directory, added entries to the existing log file and then viewed them.

10. Go to the next step.

CONCEPT
You can use Amazon EC2 user data to bootstrap file systems to new instances when they launch.

Step 41/42 ← →

The screenshot shows the Practice Lab interface. On the left, there's a sidebar for 'File Systems in the Cloud' under 'STEP 42'. It says 'Congratulations! You've completed the Practice Section. Go to the DIY section to complete the solution.' Below it, there's a 'VALIDATION FORM' section with a text input field containing 'fs-0f52efe8f27ba7d69' and two buttons: 'VALIDATE' and 'SKIP'. To the right, a large 'CONGRATULATIONS!' message is displayed with the text: 'You've completed the Practice Section. Go to the DIY section to complete the solution.' At the bottom, there's a 'DIY' section with a 'VALIDATION MESSAGE' placeholder and a 'SOLUTION VALIDATION METHOD' section describing the validation process.

PetModels-EFS-1-SG

[PetModels-EFS-1-SG](#)

```
sudo mount -t efs -o tls fs-0f52efe8f27ba7d69:/ efs
```

```
sudo mount -t efs -o tls fs-0f52efe8f27ba7d69:/ data
```

```
sudo mount -t nfs4 -o  
nfsvers=4.1,rsize=1048576,wsize=1048576,hard,timeo=600,retrans=2,noresvport fs-  
0f52efe8f27ba7d69.efs.us-east-1.amazonaws.com:/ efs
```

ID : [fs-0f52efe8f27ba7d69](#)

Core Security Concepts:

We recently decided to create a Support Engineering team. However, as this team grows we want to be able to manage users efficiently. We want all support engineers to have the same set of permissions. Can AWS help with this?

Hello, and welcome to the city stock exchange! Thanks for answering our call.

Yes! AWS has a service called Identity and Access Management (IAM), that enables you to create policies that manage AWS users and groups, and use permissions to allow and deny access to AWS resources. With AWS IAM, you can manage your security requirements at scale.

So with policies, do I have to learn every type of permission for all of the AWS services? I just want my support staff to have read-only access to Amazon EC2 and Amazon RDS.

No, you do not. AWS IAM delivers pre-built AWS managed policies to help you get started quickly. Two of the policies it comes with are read-only access to Amazon EC2 and Amazon RDS.

Great! But what if I don't want to use those predefined policies? Can I create my own?

Yes! You can create your own custom policy and apply it to your resources. AWS also has tools that can help you create policy files!

Wow. Sounds like there are lot of options. How about the actual creation of a user? I would like my support engineers to have access to the AWS console, and to developer tools. I also want to assign these users to the support team right away.

When you create a user, you can assign them permissions to access resources via the AWS Console, AWS CLI or developer tools. You can also place users in groups and assign permissions.

Thanks so much. Our security team will sleep well knowing that permissions are locked down.

[RETURN TO CITY](#)

[GO TO SOLUTION CENTER](#)

Core Security Concepts

Rewards + Amazon Web Services



+55 Gems



+3 Customization Items

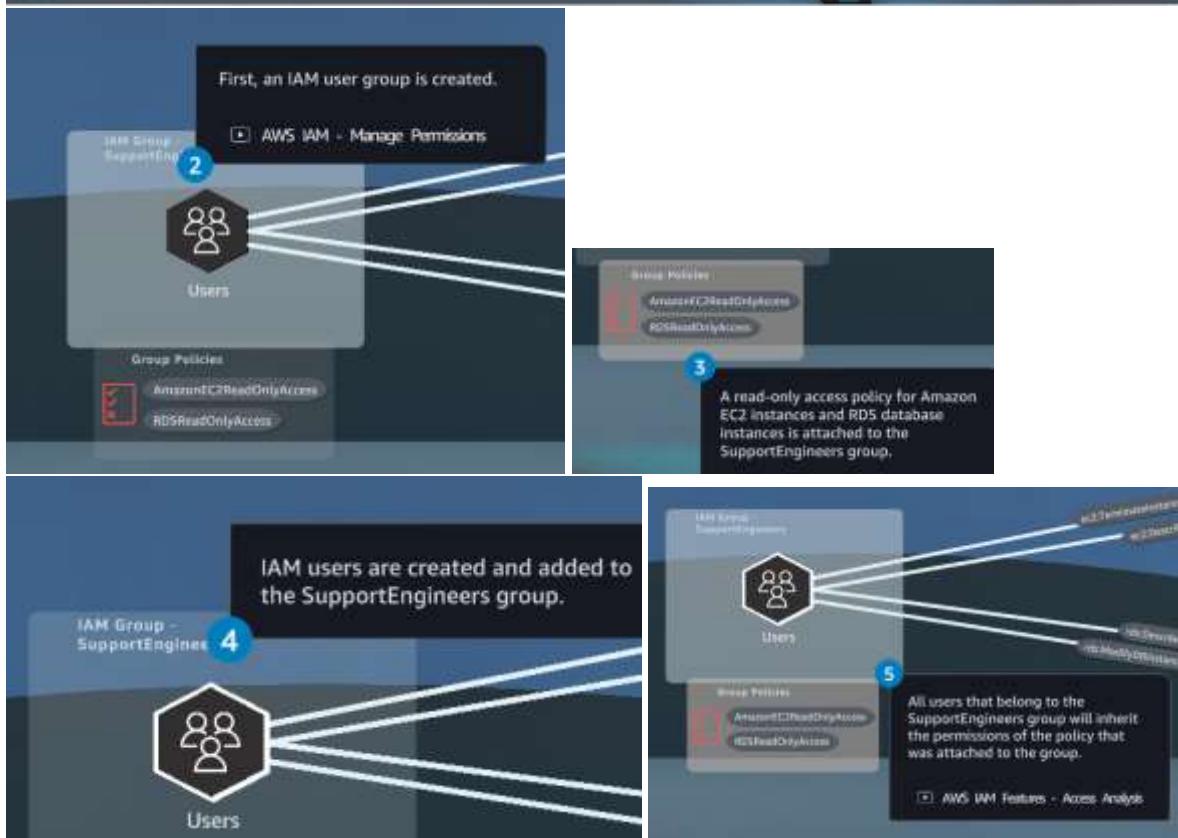
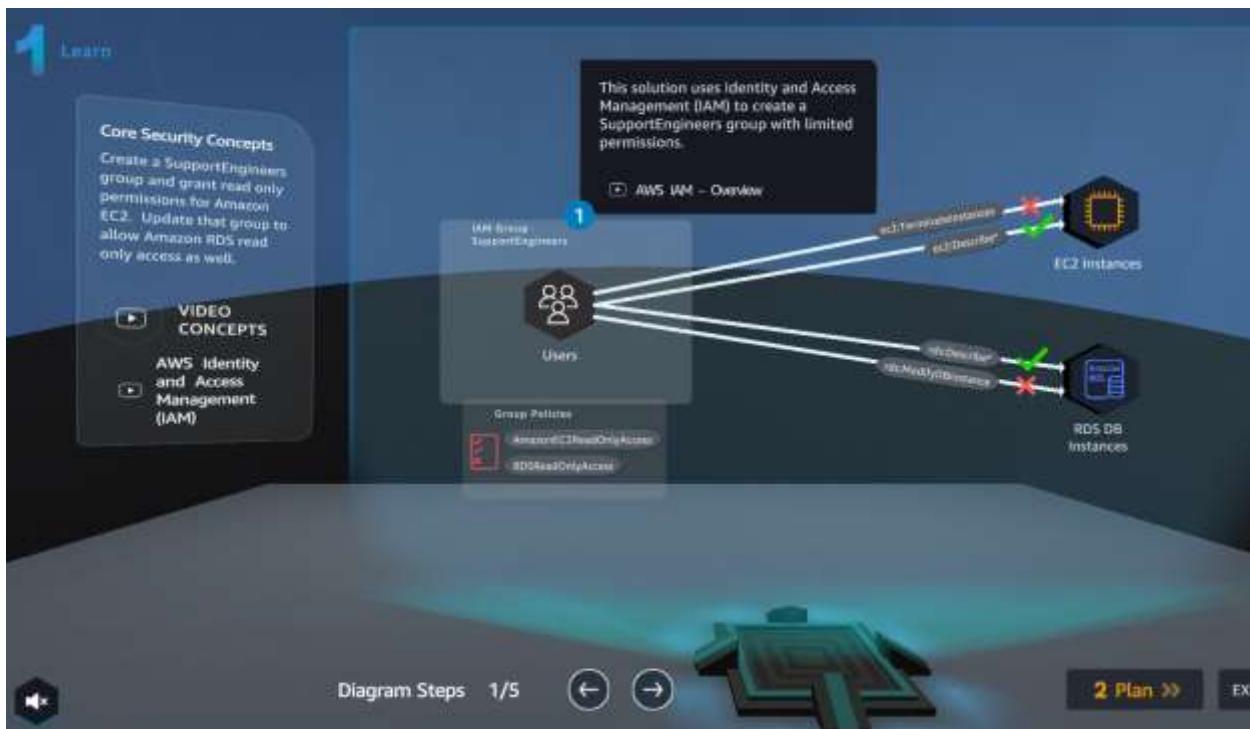


+10 Amazon Relational Database Service (RDS)

Services: Amazon Relational Database Service (RDS)

Solution Annotations

- Create an IAM group for Support Engineers.
- Attach a managed EC2 read-only access policy to your IAM group.
- Create a user, then attach to the group membership.



2 Plan

Practice Lab Goals

Step-by-step guided learning

- >Create a SupportEngineers group.
- Attach a policy that allows group members read only access to EC2.
- Verify that group members have read only EC2 access.

DIY Goals:

Build on what you have learned.

- Grant the SupportEngineers group read only access to RDS.

The diagram illustrates the IAM group 'SupportEngineers' which contains users. Two arrows originate from the 'SupportEngineers' group icon and point to two separate resources: 'EC2 Instances' and 'RDS DB Instances'. Each resource has its own icon: a hexagon with a square inside for EC2 and a hexagon with a database icon for RDS.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Core Security Concepts

STEP 1:

- Review the lab objectives in the concepts field.
- Click Start Lab to provision your environment, then click Open AWS Console to begin.
- Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Create an IAM group and users.
- Attach an AWS managed policy to a group of users.

Defining User and Group Permissions using IAM Policies

3 Practice

STARTING...

Your AWS environment is being provisioned. Time: 00:04

Lab Files Steps

Core Security Concepts

STEP 2

1. In the Search for services box type: **Iam**
2. Under Services, click **IAM**.
3. Go to the next step.

CONCEPT

AWS Identity and Access Management (AWS IAM) enables you to manage access to AWS services and resources securely. AWS IAM is a feature of your AWS account offered at no additional charge. You will be charged only for use of other AWS services by your users.

Step 2 / 19

Services

The new AWS Core Starting June 2023, or [let us know what you think](#)

Search results for **Iam**

Services (96)

- Features (15)
- Blogs (1,340)
- Documentation (102,611)
- Knowledge Articles (30)
- Events (0)
- Marketplace (103)

IAM **Click**

Manage access to AWS resources

Resource Access Manager

Share AWS resources with other accounts or AWS Organizations

Amazon VPC IP Address Manager

Manage IP address management service

Serverless Application Repository

Assemble, deploy, and share serverless applications within teams or publicly

Features

Groups

- IAM Groups

Roles

- IAM Roles

Policies

- IAM Policies

See all 11 results

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3 Practice

STARTING...

Your AWS environment is being provisioned. Time: 00:04

Lab Files Steps

Core Security Concepts

STEP 3

1. In the left panel, click User groups.
2. On the User groups screen that opens, click Create group.
3. Go to the next step.

CONCEPT

Often a collection of users will require a similar set of permissions. In order to define permissions for multiple users, an AWS IAM group can be used. AWS IAM users can be added to a group and they inherit all the permissions that have been attached to the group.

Step 3 / 19

Identity and Access Management (IAM)

Identity and Access Management (IAM) provides secure, programmable access to AWS services and resources. It also provides fine-grained control over who has access to specific AWS services and resources, and how those services and resources are used.

New group **Click**

Access management

- User groups
- Users
- Roles
- Policy
- Identity providers
- Account settings

User groups (0) **Click**

A user group is a collection of IAM users. User groups simplify permissioning for a collection of users.

Filter user groups by **Group name** and **Group type**

Create group **Click**

Group name

Users

Permissions

Created

No resources to display

Feedback: [Let us know what you think](#) | [View my practice progress](#)

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3 Practice

STARTING...

Your AWS environment is being provisioned. Time: 01:29

Lab Files Steps

Core Security Concepts

STEP 4

1. Under User group name type:
2. Scroll to the Attach permissions policies section.
3. Go to the next step.

CONCEPT

A user group can contain many users, and a user can belong to multiple user groups. User groups can't be nested; they can contain only users, not other user groups. There is no default user group that automatically includes all users in the AWS account. If you want to have a user group like that, you must create it and assign each new user to it.

Step 4/19

Name the group

User group name
Type: SupportEngineers

Add users to the group - Optional

Attach permissions policies - Optional

AmazonEC2ReadOnlyAccess

CONCEPT

A user group can contain many users, and a user can belong to multiple user groups. User groups can't be nested; they can contain only users, not other user groups. There is no default user group that automatically includes all users in the AWS account. If you want to have a user group like that, you must create it and assign each new user to it.

Step 5/19

3 Practice

STARTING...

Your AWS environment is being provisioned. Time: 02:18

Lab Files Steps

Core Security Concepts

STEP 5

1. In the Attach permissions policies search bar, type the below:
2. Choose the policy named:
3. Click Create group.
4. Go to the next step.

CONCEPT

A policy is an object in AWS that, when associated with an identity or resource, defines their permissions. AWS evaluates policies every time an AWS IAM principal (user or role) makes a request.

Step 5/19

Identity and Access Management [IAM]

Add users to the group - Optional

Attach permissions policies - Optional

AmazonEC2ReadOnlyAccess

Create group

3 Practice

STARTING...

Your AWS account needs to be configured. Time: 0:38

Lab Files Steps

Core Security Concepts

STEP 6

1. In the left panel, click Users.
2. On the Users screen that opens, click Add user.
3. Go to the next step.

CONCEPT

An AWS Identity and Access Management user is an entity that you create in AWS to represent the person or application that uses it to interact with AWS. A user in AWS consists of a name and credentials. An AWS IAM user with administrative permissions is not the same thing as the AWS account root user.

Feedback: Learning the new AWS User Experience

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The screenshot shows the AWS IAM 'Users' page. At the top right, there is a blue button labeled 'Add user'. An orange arrow points to this button, indicating the next step. The page also includes sections for 'User name', 'Groups', 'User activity', 'MFA', and 'Password age'.

3 Practice

Tables Ready (02:24:12)

Open AWS Console

Caption: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 7

1. In the User name textbox type support-engineer-1
2. In Select AWS credential type, click the Access key - Programmatic access checkbox.
3. Click the Password AWS Management Console access checkbox.
4. In Create Password Console password choose Custom password.
5. In the password textbox type: supportPassword123

supportPassword123

Feedback: Creating the support-engineer-1 user in the new AWS User Experience

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The screenshot shows the 'Add user' wizard. Under 'Select AWS access type', the 'Access key - Programmatic access' checkbox is checked. Below it, the 'Console password' dropdown is open, showing 'supportPassword123' which is also highlighted with an orange arrow. At the bottom right, there is a 'Next Step' button with an orange arrow pointing to it.

Core Security Concepts

NOTE: All passwords must contain at least 8 characters with a mix of characters that are upper case, lower case, numbers and symbols. Your IAM user will not be able to logon if these requirements are not met.

6. In Require password reset, click the User must create... to un-check the check box.
7. Click Next: Permissions.
8. Go to the next step.

CONCEPT

Disabling the AWS Management Console access password for a user prevents them from signing in to the AWS Management Console using their user name and password. It does not change their permissions or prevent them from accessing the console using an assumed role.

Step 7/19

3 Practice

Lab is Ready! (02:23:15)

Core Security Concepts

1. Under Set permissions choose Add user to group.
2. Choose the SupportEngineers group.
3. Review to ensure that your SupportEngineers group has AmazonEC2ReadOnlyAccess policy attached to it.
4. Click Next: Tags.
5. Go to the next step.

CONCEPT

A user can belong to more than one group. In the event that groups have conflicting policies AWS has a policy evaluation logic.

Step 8/19

3 Practice

Lab is Ready! [02:22:27] [Open AWS Console](#)

Core Security Concepts

- Under Key, type: job-title
- Under Value on the same row, type: Support Engineer
- Click Next: Review.
- Go to the next step.

CONCEPT

Users can have tags associated with them. This can help you manage a large amount of users in the future.

Step 9/19  

Add user

Add tags (optional)

AMF tags are key-value pairs you can add to your user. Tags can include user information, such as an email address, or can be descriptive, such as a job title. You can use the tags to organize, track, or control access for this user. [Learn more](#)

Key	Value (optional)	Remove
job-title	Support Engineer	

Add new tag 

You can add 40 more tags.

[Cancel](#) [Previous](#) [Next: Review](#)

3 Practice

Lab is Ready! [02:22:11] [Open AWS Console](#)

Core Security Concepts

STEP 10

- Review your User details.
- Review to ensure that your user belongs to the Group named SupportEngineers.
- Review to ensure the tag is added to your user.
- Click Create user.
- Go to the next step.

CONCEPT

For extra security, enable multi-factor authentication (MFA) for all users in your account. With MFA, users have a device that generates a response to an authentication challenge. If a user's password or access keys are compromised, your account resources are still secure because of the additional authentication requirement.

Step 10/19  

Add user

Review

Review your choices. After you create the user, you can view and download the autogenerated password and access key.

User details

User name	support-engineer-1
AWS access type	Programmatic access and AWS Management Console access
Console password type	Custom
Require password reset	No
Permissions boundary	Permissions boundary is not set

Permissions summary

The user above will be added to the following groups

Type	Name
Group	SupportEngineers



Tags

The new user will receive the following tag

Key	Value
job-title	Support Engineer



[Cancel](#) [Previous](#) [Create user](#)

CONCEPT

For extra security, enable multi-factor authentication (MFA) for all users in your account. With MFA, users have a device that generates a response to an authentication challenge. If a user's password or access keys are compromised, your account resources are still secure because of the additional authentication requirement.

CONCEPT

The secret access key is available for download only when you create it. If you don't download your secret access key or if you lose it, you must create a new one. Remember to keep it secret and keep it safe.

Step 11/19  

3 Practice

Lab is Ready [02:21:22]

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 11

1. Copy the AWS Management Console access link to a text editor.

- You can also download the .csv that contains the Console logon link and credentials.

2. Click Close.

3. Go to the next step.

CONCEPT

The secret access key is available for download only when you create it. If you don't download your secret access

Step 11/19

3 Practice

Lab is Ready [02:20:09]

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 12

1. Open a new browser tab or window from any web browser then paste the Console logon link you copied previously into the address bar and press Enter.

- To stay logged on with your original credentials, use an incognito or private browsing window.

2. Under IAM user name type:

support-engineer-1

Step 12/19

Core Security Concepts

3. Under Password type:

supportPassword123

4. Click Sign In.

5. Go to the next step.

CONCEPT

As an administrator, you can sign in as your newly created user to review their access level. Change your own passwords and access keys regularly, and make sure that all AWS IAM users in your account do so as well. If you allow users to change their own passwords, create a custom password policy that requires them to create strong passwords.

Step 12/19

3 Practice

Lab is Ready! [02:18:46]

Open AWS Console

Caution: While using the AWS Console, do not leave from this lab environment. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 13

1. In the Services search bar, type:

EC2

2. Under Services click EC2.

3. Go to the next step.

CONCEPT

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers.

Step 13/19

AWS Services Search bar: ec2

Services

- EC2
- EC2 Image Builder
- AWS Compute Optimizer
- AWS Firewall Manager

Features

- Export snapshots to EC2
- Launch instances
- Dashboard
- EC2 Metrics

AWS resources

New supports four based the AWS flour iOS or Android

Read Practice additional course

Helpful links courses covering this topic

AWS Certified Developer Associate Exam from AWS

3 Practice

Lab is Ready! [02:18:26]

Open AWS Console

Caution: While using the AWS Console, do not leave from this lab environment. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 14

1. Click the Region selection drop-down.

2. Choose US East (N. Virginia) if it is not selected.

3. Go to the next step.

EC2 Dashboard

Events

Tags

Limits

Instances

Instance Types

Launch Templates

Spot Requests

Saving Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

Welcome to the new EC2 console!

We're reimagining the EC2 console to make it easier for you to implement periodically. We encourage you to try them and let us know what you think! The old console and the new console use the New EC2 Experience toggle.

Choose US East (N. Virginia) as your default region.

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) region:

Resource Type	Count	Description
Instances (running)	0	Redshift
Elasti IPs	0	Instances
Key pairs	0	Layer 1
Maintenance groups	0	Security Groups
Snapshots	0	Volumes

Launch instance

3 Practice

Lab is Ready [02:17:59]

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 15

1. Click Instances (running).
2. Go to the next step.

CONCEPT

The Amazon EC2 Dashboard displays metrics on the number of resources by type.

Step 15/19

Welcome to the new EC2 console!

We're refactoring the EC2 console to make it easier to use and improve performance. New release notes periodically. We encourage you to try them and let us know where we can make improvements. To switch between the old console and the new console, use the New EC2 Experience toggle.

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) Region

Instances (running)	Dedicated IPs
1	0

Elastic IPs	Local balances
1	0

Key pairs	PlACEMENT groups
1	0

Placement groups	Security groups
0	4

Snapshots	Volumes
0	1

Launch Instance

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

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3 Practice

Lab is Ready [02:17:34]

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 16

1. Choose the Web Server instance.
2. At the top of the page, click the Instance state dropdown.
3. In the dropdown list, click Terminate instance.
4. Go to the next step.

CONCEPT

All updates to user and group permissions are instantaneous.

Step 16/19

Instances (1/1)	Actions	Launch instance
<input checked="" type="checkbox"/> Nurse Web Server: i-0ab1143fb5b50b65d3	<input checked="" type="checkbox"/> Stop instance <input checked="" type="checkbox"/> Reboot instance <input checked="" type="checkbox"/> Terminate instance	

Instance: i-0ab1143fb5b50b65d3 (Web Server)

Details	Security	Networking	Storage	Status checks	Monitoring	Tags
Instance summary						
Instance ID: i-0ab1143fb5b50b65d3 (Web Server)	Public IPv4 address:	Private IPv4 address:				
	-	10.10.0.10				
Instance state: Running	Public IP v4 DNS:	Private IPv4 DNS:				
	-	ip-15-10-0-10.ec2.internal				
Instance type: t2.micro	Elastic IP addresses:	VPC ID:				
	-	vpc-00000000				

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3 Practice

Lab is Ready [02:17:16]

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 17

1. In the Terminate instance? window, click **Terminate**.
2. Go to the next step.

AWS Services Search for services, features, marketplace items [Version 5] support-engineer-1@1023-4099 N. Virginia

New EC2 Experience Tell us what you think

EC2 Dashboard Events Tags Limits

Instances Instances Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

Images AMIs

Elastic Block Store Volumes Snapshots Lifecycle Manager

Feedback English (US) Step 17/19 ← →

Terminate instance?

Instance ID i-0ab1143f5b50265d3 (Web Server)

To confirm that you want to terminate the instance, choose the **Terminate** button below. Terminating the instance cannot be undone.

Cancel **Terminate** Close

3 Practice

Lab is Ready [02:17:05]

Open AWS Console

Caution: While using the AWS Console, do not deviate from the lab instructions. Doing so may cause your access to be revoked.

Lab Files Steps

Core Security Concepts

STEP 18

1. Review the Failed to terminate banner stating that you cannot delete an instance due to user permissions.
2. Go to the next step.

CONCEPT

Users can only perform actions that are allowed by the assigned AWS IAM policies.

AWS Services Search for services, features, marketplace items [Version 5] support-engineer-1@1023-4099 N. Virginia Support

New EC2 Experience Tell us what you think

EC2 Dashboard Events Tags **Review** Limits

Instances Instances Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

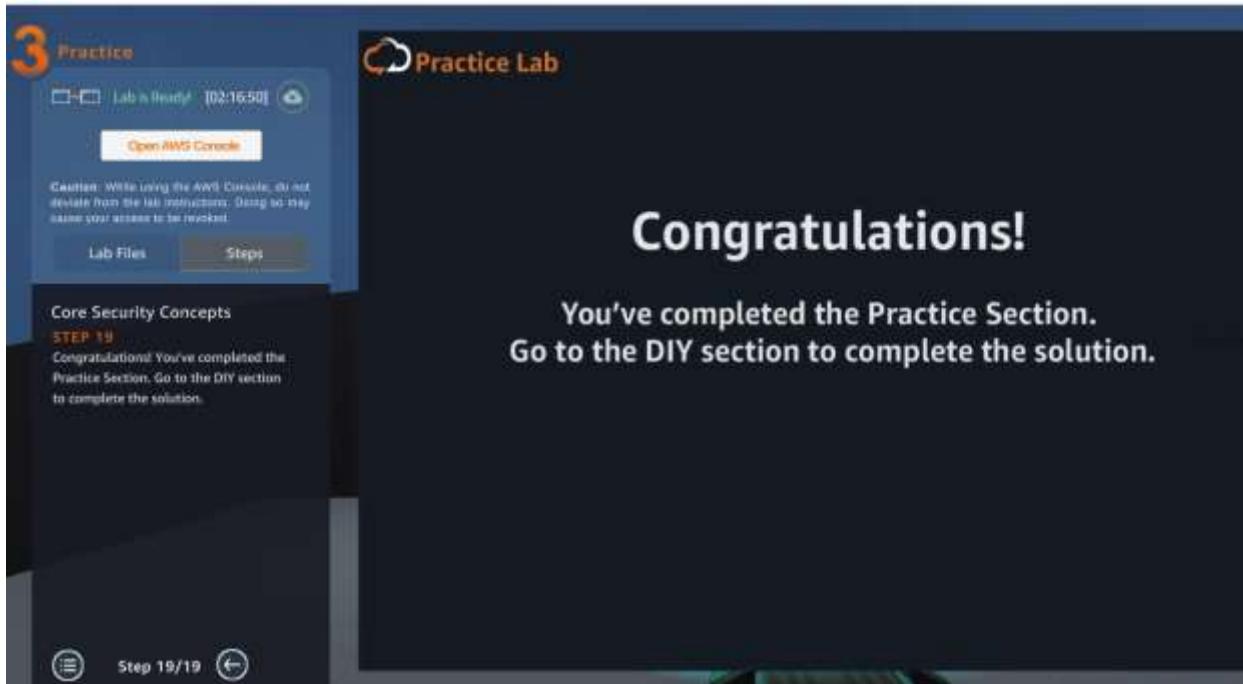
Images AMIs

Elastic Block Store Volumes Snapshots

Instances (1) Info Connect Instance state Actions Launch instance

Instance ID i-05c74437b05811e48 (Web Server)

Public IP address 10.10.0.10 Private IPv4 addresses 10.10.0.10

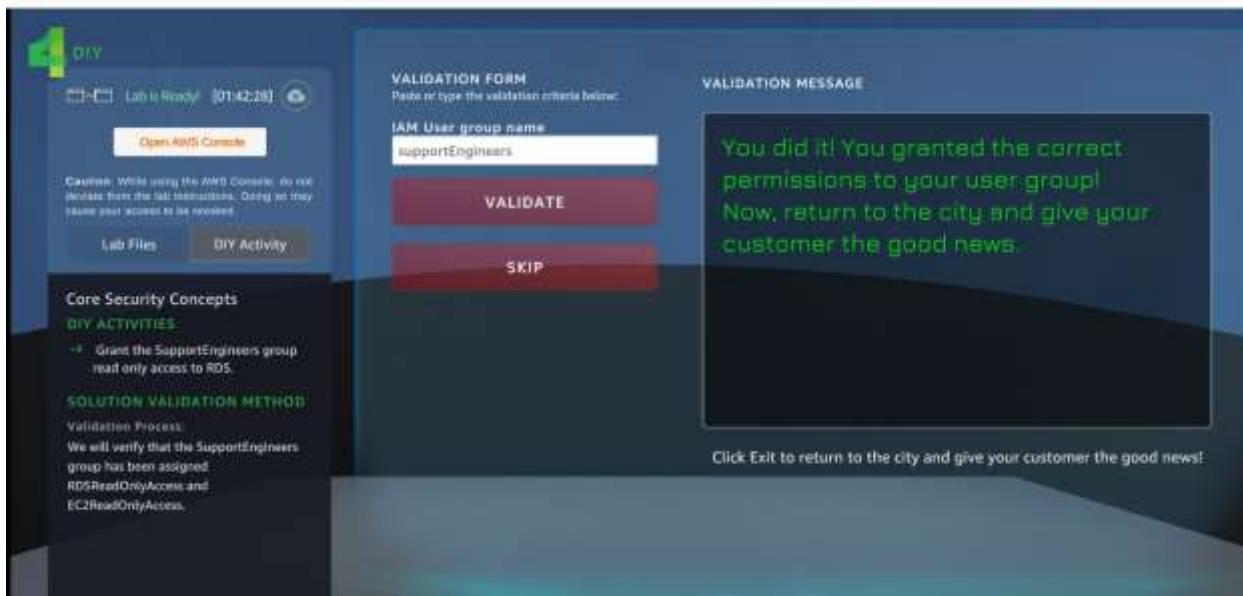


SupportEngineers

support-engineer-1

supportPassword!123

Users with AWS Management Console access can sign-in at: <https://287907322556.signin.aws.amazon.com/console>



Auto healing and scaling application:

Hi! I own the city's best gaming cafe. Thanks for answering my call for help!

Gaming parties are hot right now, and we're allowing our users to host their own servers for various games in our cafe.

Our customers are only allowed to provision a maximum amount of Amazon EC2 instances each day, but we do not have controls to enforce this rule.

Sadly, we're running into some problems. First, if an Amazon EC2 instance crashes, we need automatic replacement for the failed instance.

Secondly, we want patrons to stay within their server creation limit.

This sounds like a perfect opportunity for Auto Scaling groups.

You can setup launch templates for their game web servers and have the number of Amazon EC2 instances automatically scale up or down based on demand.

You can also set hard limits on the number of instances they can use.

Oh, that sounds excellent! However, we have another problem.

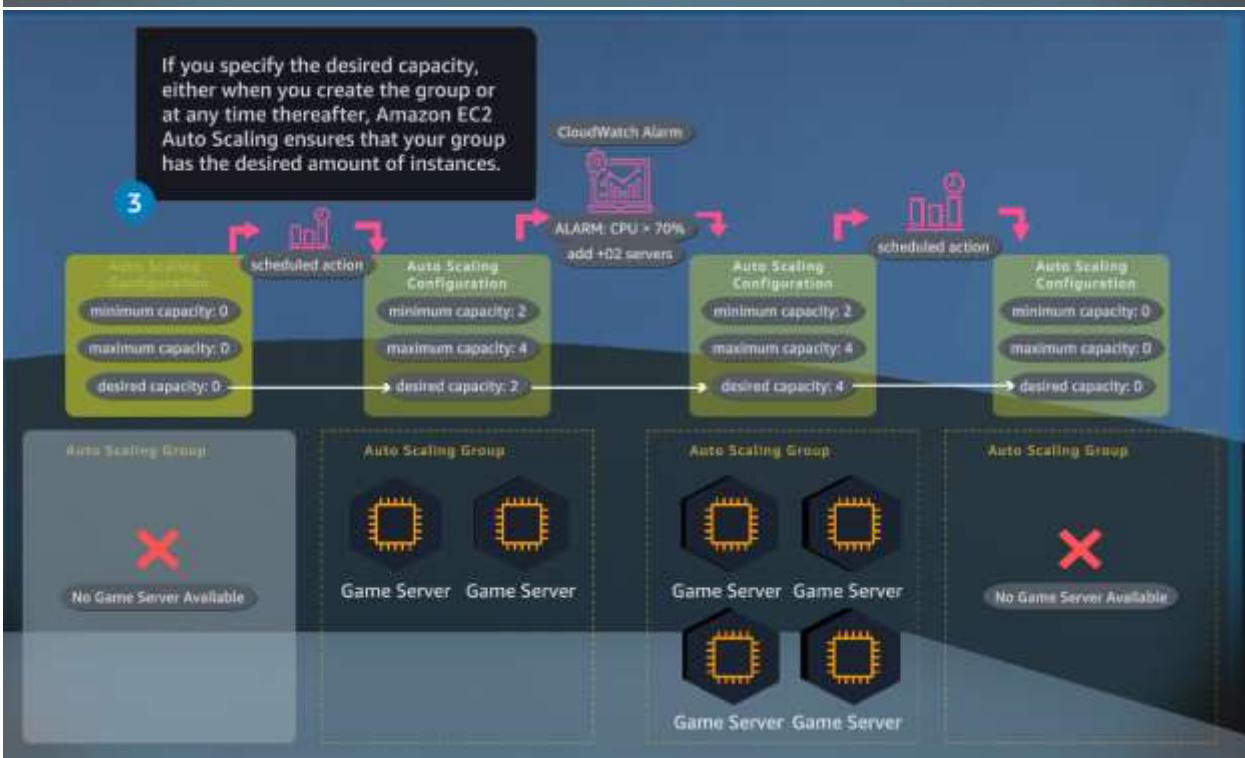
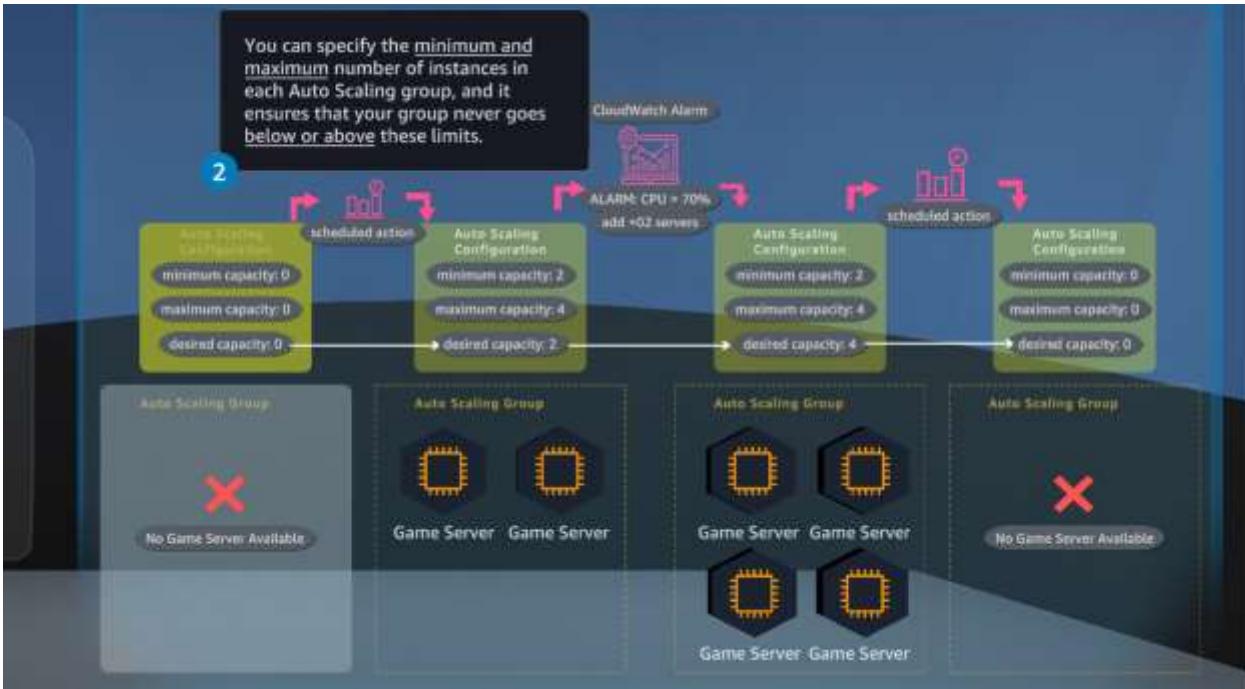
Every Tuesday we have a large party booked from 8:00PM to 1:00AM. We want to ensure that their servers are up and ready the second they walk in at 8:00PM and their servers shutdown exactly at 1:00 AM.

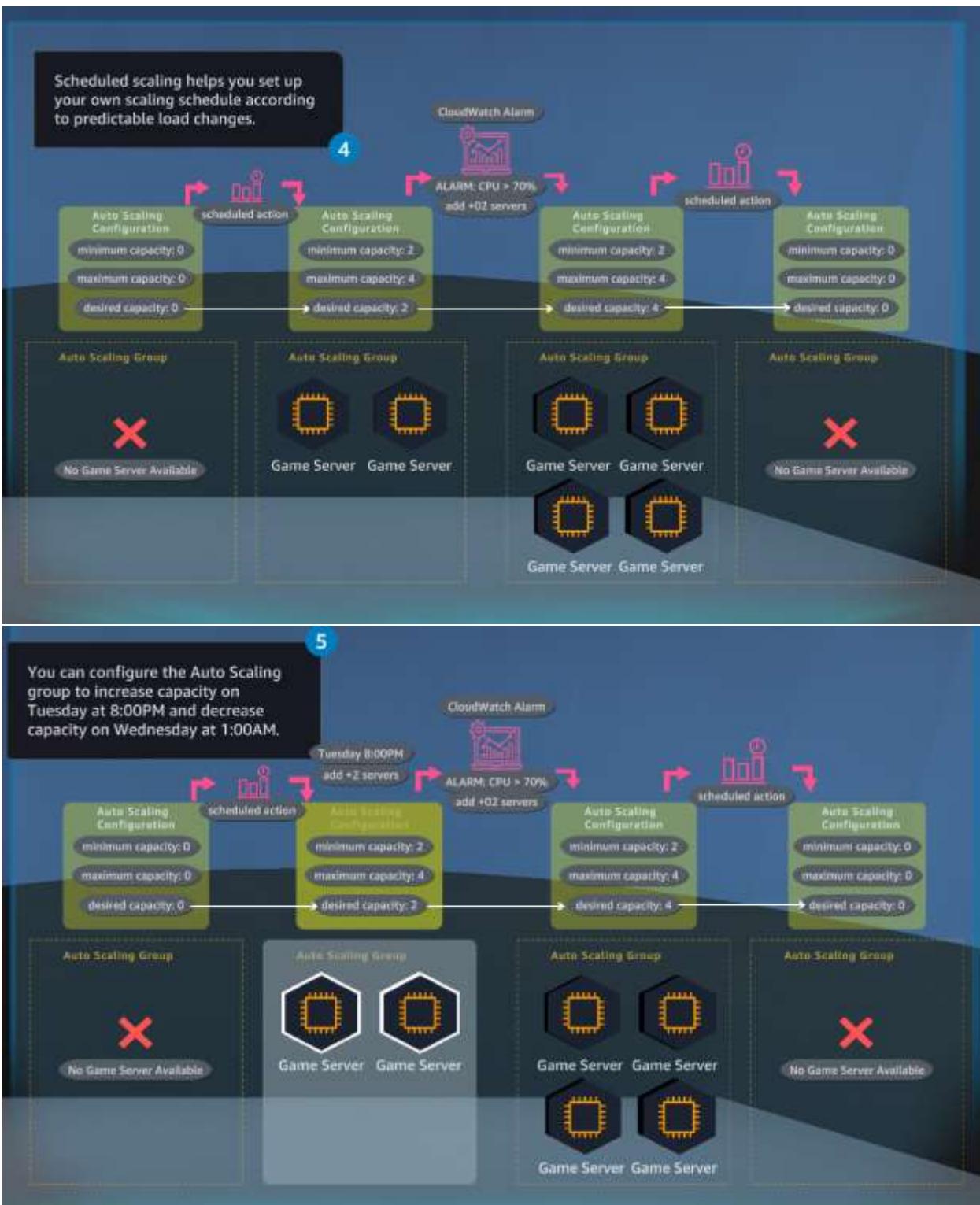
How can we ensure that their game servers start up and shut down at specific times?

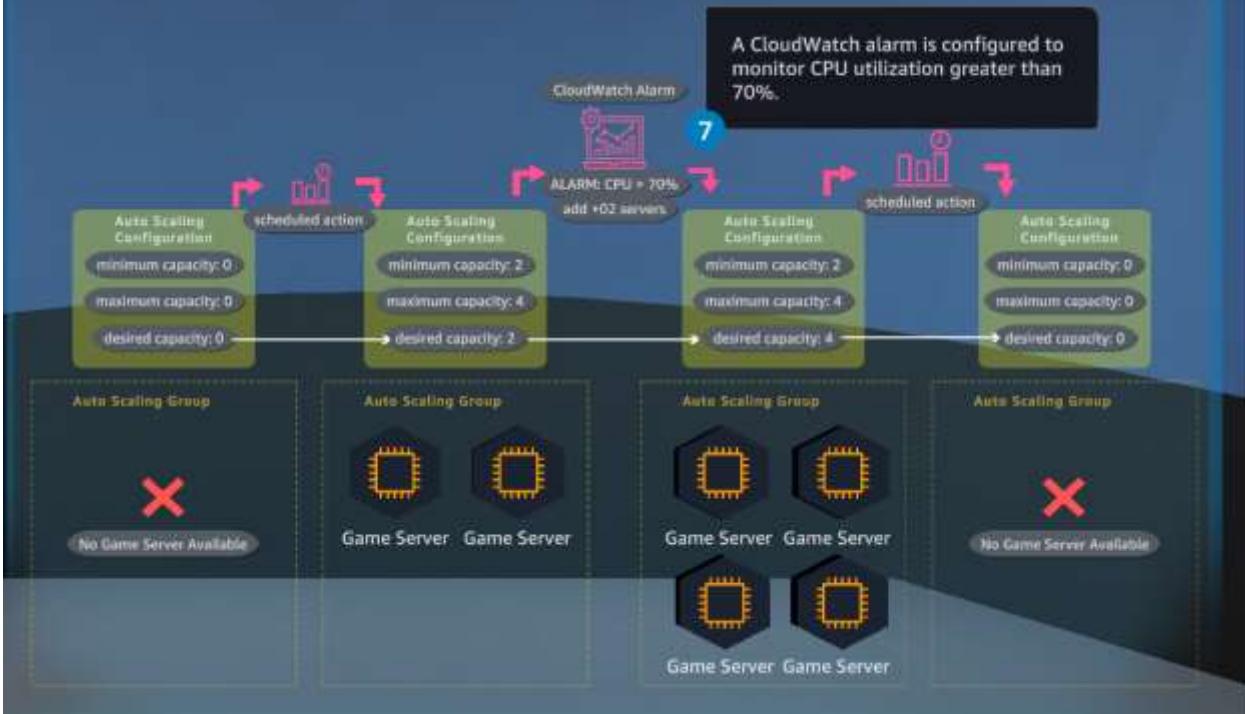
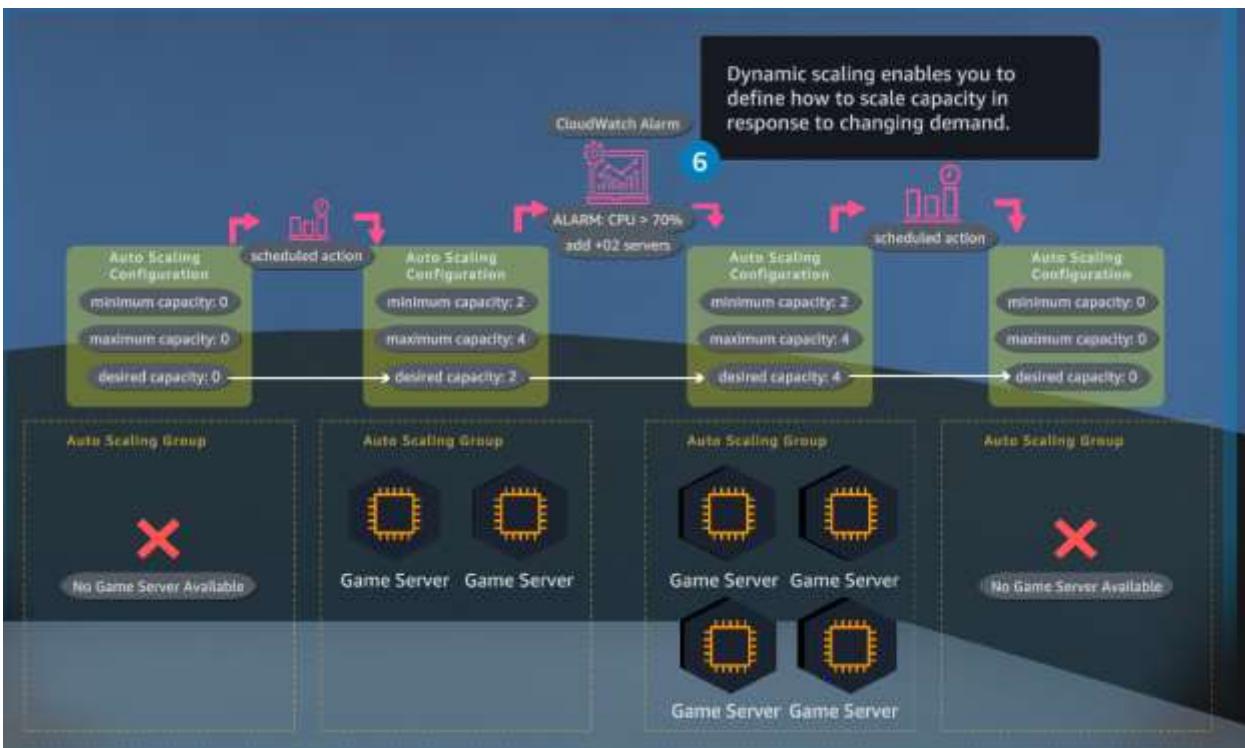
That's not a problem. With Auto Scaling groups you can configure scheduled scaling that launches and terminates instances according to a predefined schedule.

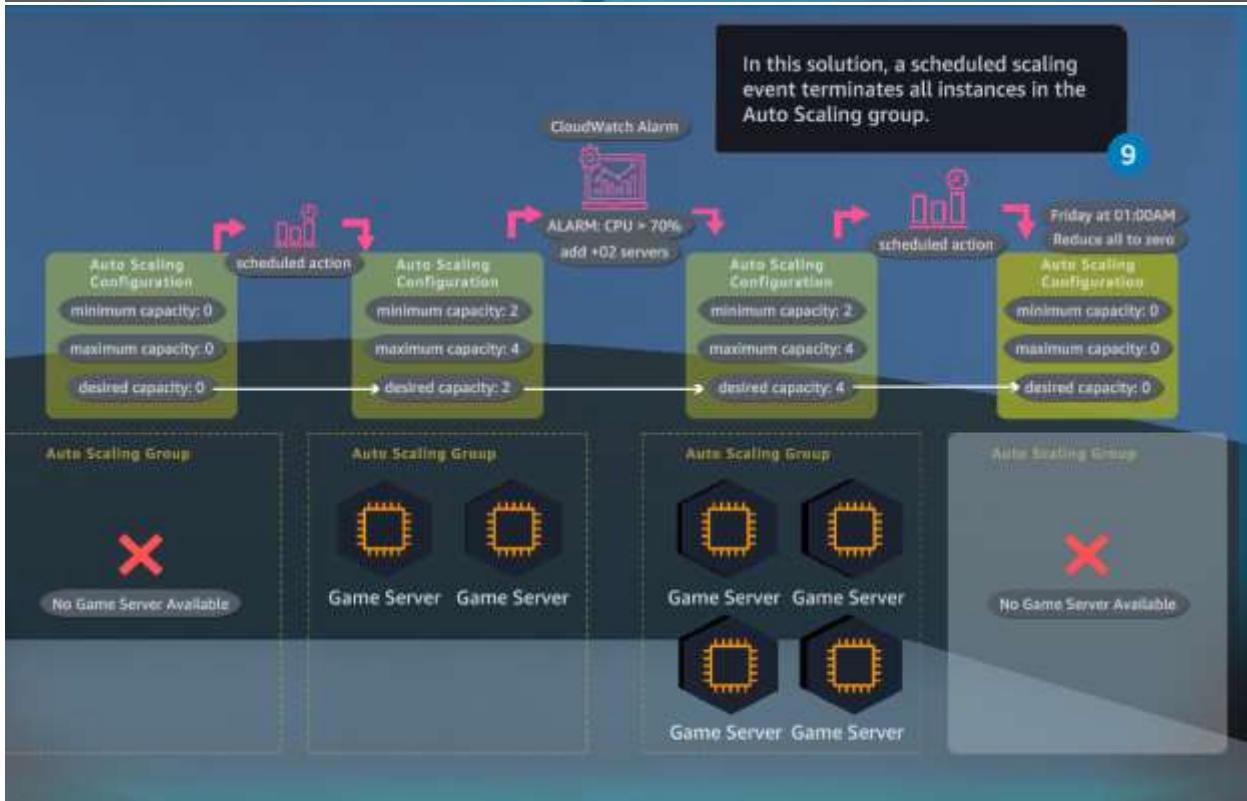
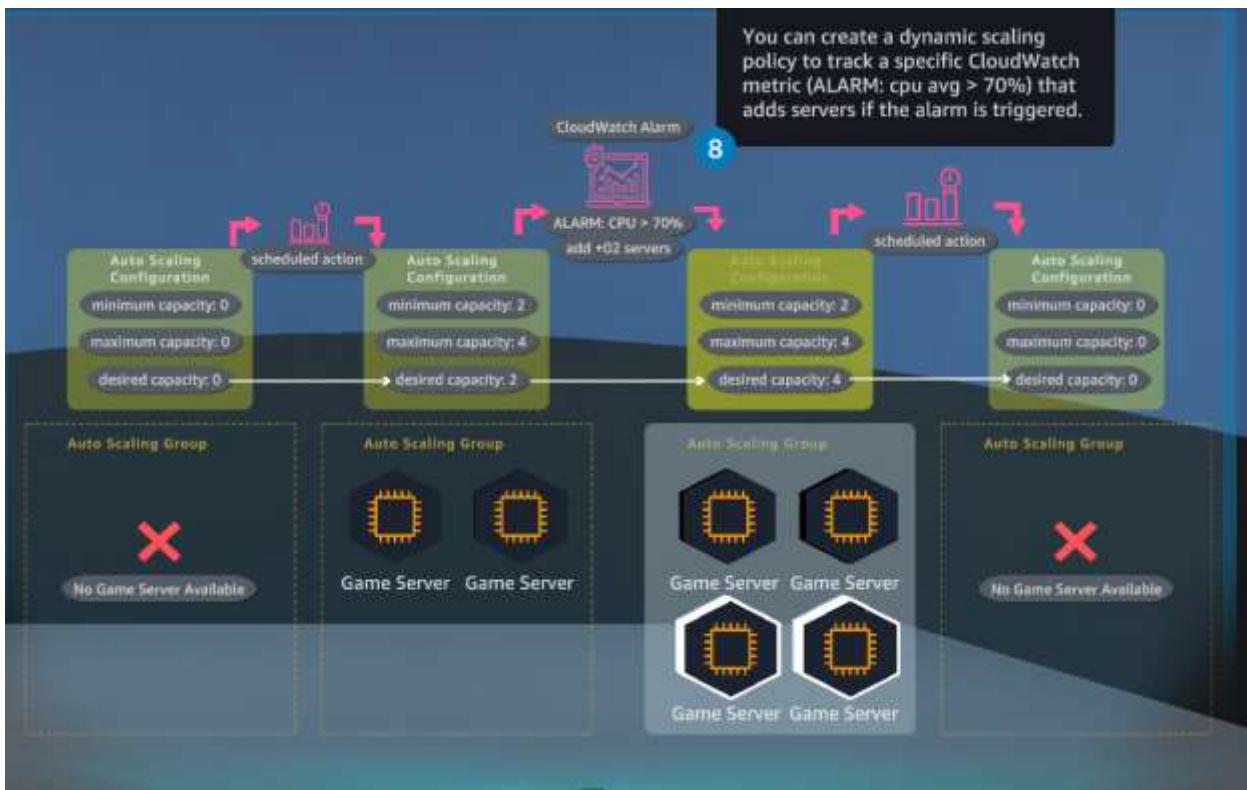
I think Auto Scaling groups can work for us!

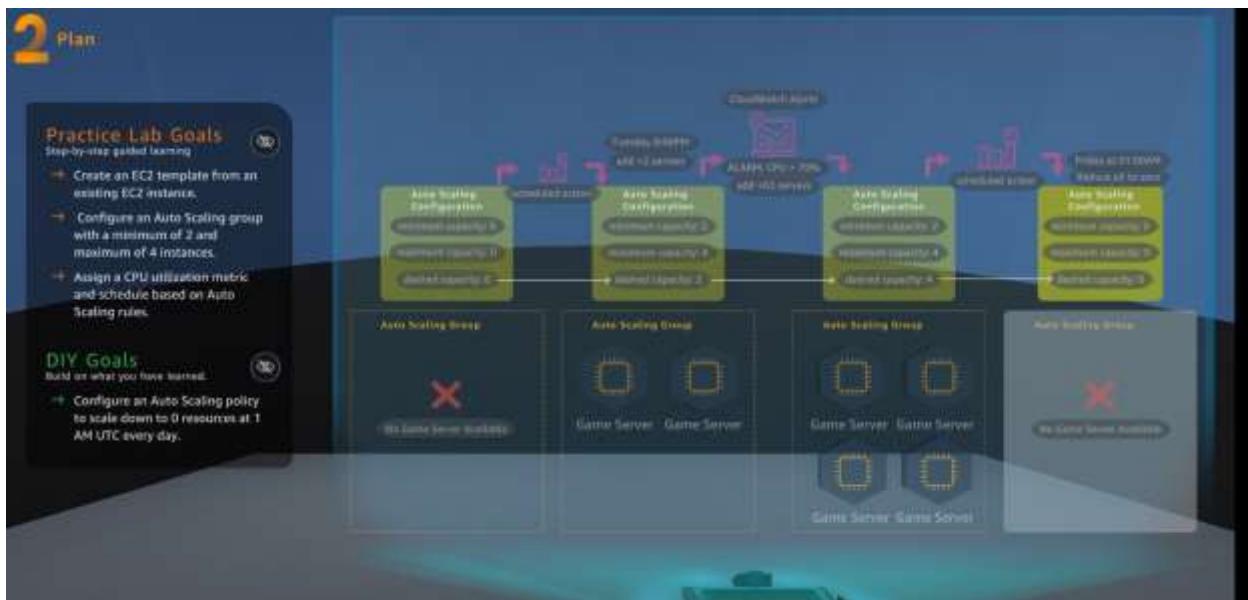












3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 1

- Review the lab objectives in the concepts field.
- Click Start Lab to provision your environment, then click Open AWS Console to begin.
- Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Create an Amazon EC2 Auto Scaling group.
- Assign Amazon EC2 Instances to an Auto Scaling group.

Step 1/35

Auto-healing and Scaling Applications

STEP 2

- In the services search field, type: ec2
- Click EC2 from the search results.
- Go to the next step.

CONCEPT

AWS Auto Scaling monitors your applications and automatically adjusts capacity to maintain steady, predictable performance at the lowest possible cost.

Step 2/35

Auto-healing and Scaling Applications

STEP 3

- Click Instances.
- Go to the next step.

CONCEPT

AWS Auto Scaling is free to use, and allows you to optimize the costs of your AWS environment.

Step 3/35

Auto-healing and Scaling Applications

STEP 4

1. Click the Instance ID of your Game Server.
2. Go to the next step.

CONCEPT

AWS Auto Scaling can help you optimize your utilization and cost efficiencies when consuming AWS services so you only pay for the resources you actually need. When demand drops, AWS Auto Scaling will automatically remove any excess resource capacity so you avoid overspending.

(≡) Step 4/35 (←) (→)

Auto-healing and Scaling Applications

STEP 5

1. Click the icon to copy the Public IPv4 address.
2. Go to the next step.

CONCEPT

AWS Auto Scaling continually monitors your applications to make sure that they are operating at your desired performance levels. Using AWS Auto Scaling, you maintain optimal application performance and availability, even when workloads are periodic, unpredictable, or continuously changing.

(≡) Step 5/35 (←) (→)

Auto-healing and Scaling Applications

STEP 6

1. In a new browser tab or window, type:
`http://`
- Do not press [Enter] yet.
2. Paste the web server public IP address after `http://` then press [Enter].
3. Go to the next step.

CONCEPT

It's important to test your build steps whenever possible. Identify potential issues as soon as possible during your build.

(≡) Step 6/35 (←) (→)

Auto-healing and Scaling Applications

STEP 7

1. Return to the EC2 Console page and click Instances from the left menu.
2. Choose Game Server.
3. Click Actions.
4. Choose Image and templates.
5. Choose Create image.
6. Go to the next step.

CONCEPT

You can capture the contents of an instance and its volume into an Amazon Machine Image (AMI). An AMI is a template used for launching new instances with identical configurations.

(≡) Step 7/35 (←) (→)

Auto-healing and Scaling Applications

1. Under Image name type:
`GameServer`
2. Under Image description type:
`Regular customer game server`

CONCEPT

By default, Amazon EC2 shuts down the instance, takes snapshots of any attached volumes, creates and registers the AMI, and then reboots the instance. You can enable the No reboot option, if you don't want your instance to be shut.

(≡) Step 8/35 (←) (→)

Auto-healing and Scaling Applications

STEP 9

1. Scroll down to the Tags - optional section.
2. Choose Tag image and snapshots together.
3. Click Create image.
4. Go to the next step.

CONCEPT

After you create an AMI, it is only available, by default, within the region of creation. To use the same AMI in another region, you must copy the AMI to the other region.

(≡) Step 9/35 (←) (→)

3 Practice

START LAB

We will be provided with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 10

1. Click AMIs
2. Review that the GameServer AMI was created.
3. Periodically click refresh icon
4. Review that the status of your AMI shows available.
5. Click Launch Templates.
6. Go to the next step.

- It may take up to 5 minutes for the AMI to be created.

Step 10/35

The screenshot shows the AWS EC2 Image Builder interface. On the left, there's a sidebar with navigation links like 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances', 'Launch Templates', 'Spot Requests', 'Savings Plans', 'Reserved Instances', 'Dedicated Hosts', 'Scheduled Instances', and 'Capacity Reservations'. Under 'Images', there's a section for 'AMIs'. A new AMI named 'GameServer' has just been created, indicated by a blue status bar at the top. The 'Launch' tab is selected. The 'Details' tab shows the AMI details: AMI ID: ami-05067802a6ca5a878, Owner: 10254505000000, Status: available, and Name: GameServer. There are also tabs for 'Permissions' and 'Tags'.

3 Practice

START LAB

You will be provisioned with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 11

1. Click Create launch template.
2. Go to the next step.

CONCEPT

Launch templates enable you to store launch parameters so that you do not have to specify them every time you launch an instance. For example, a launch template can contain the AMI ID, instance type, and network settings that you typically use to launch instances.

Step 11/35

The screenshot shows the AWS EC2 Launch Templates page. The left sidebar includes 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances', 'Launch Templates' (which is highlighted), 'Spot Requests', 'Savings Plans', 'Reserved Instances', 'Dedicated Hosts', 'Scheduled Instances', and 'Capacity Reservations'. Under 'Images', there's a section for 'AMIs'. The main content area is titled 'EC2 launch templates' with the sub-section 'Streamline, simplify and standardize instance launches'. It explains how to use launch templates to automate instance launches, simplify permission policies, and reinforce best practices across your organization. It includes a 'New launch template' button. Below this, there are sections for 'Benefits and features' (Streamline provisioning, Simplify permissions, Governance) and a 'Create a launch template' wizard.

The screenshot shows two overlapping windows. On the left is the 'Lambda Practice' interface, Step 12 of a 35-step lab. It displays a 'START LAB' button and a sidebar with 'Auto-healing and Scaling Applications' and 'STEP 12'. Step 12 details are as follows:

- Under Launch template name type: GameServerTemplate
- Under Template version description, type: Regular customer game server template
- Under Auto Scaling guidance click: Provide guidance to help me set up a template that I can use with EC2 Auto Scaling.
- Go to the next step.

The right window is the 'Create launch template' wizard in the AWS CloudFormation console. It shows the 'Launch template name and description' section with 'GameServerTemplate' entered. Below it is the 'Template version description' section with 'Regular customer game server templates' entered. A checkbox for 'Provide guidance to help me set up a template that I can use with EC2 Auto Scaling' is checked. At the bottom, there's a note about AMI requirements.

CONCEPT

You are limited to creating 5,000 launch templates per Region and 10,000 versions per launch template.



Step 12/35



3 Practice

START LAB

You will be provided with an AWS account to complete an assignment.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 13

1. Scroll down to the Application and OS Images (Amazon machine image) - required section.
2. Choose My AMIs.
3. Choose Owned by me.
4. Under Amazon Machine Image (AMI), choose GameServer.
5. Go to the next step.

Launch template contents

Specify the details of your launch template below. Leaving a field blank will result in the field not being included in the launch template.

Application and OS Images (Amazon machine image) - required

An AMI is a template that contains the software configuration (operating system, application server, and application) required to launch your instance. Search or browse for AMIs if you don't see what you are looking for below.

Choose

Results Quick Start

Owned by me Shared with me

3. Choose **Create Instance Image (AMI)**

GameServer
ami-0f723059e0c04000
2023-08-17T21:10:00Z
Virtualization type: HVM enabled: Yes
Root device type: ebs

Description **Choose**
Regular customer game server

Feedback English (US) ▾

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Step 13/35 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete an assignment.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 14

1. Scroll down to the the Instance type section.
2. Under Instance type, choose c2.medium.
3. Click Create a new key pair.
4. Go to the next step.

CONCEPT

For each launch template, you can create one or more numbered launch template versions. The first version specifies the instance type, AMI ID, subnet, and key pair to use to launch the instance.

Instance type

Compare instance types

c2.medium
Family: c2 Family: 1 vCPU | 8 GiB Memory
On-Demand Linux pricing: \$0.008 USD per Hour
On-Demand Windows pricing: \$0.008 USD per Hour

c2.large
Family: c2 Family: 4 vCPUs | 16 GiB Memory
On-Demand Linux pricing: \$0.016 USD per Hour
On-Demand Windows pricing: \$0.016 USD per Hour

c2.xlarge
Family: c2 Family: 8 vCPUs | 32 GiB Memory
On-Demand Linux pricing: \$0.032 USD per Hour
On-Demand Windows pricing: \$0.032 USD per Hour

c3.medium
Family: c3 Family: 2 vCPUs | 4 GiB Memory
On-Demand Linux pricing: \$0.004 USD per Hour
On-Demand Windows pricing: \$0.004 USD per Hour

c3.large
Family: c3 Family: 4 vCPUs | 8 GiB Memory
On-Demand Linux pricing: \$0.016 USD per Hour
On-Demand Windows pricing: \$0.016 USD per Hour

c3.xlarge
Family: c3 Family: 8 vCPUs | 16 GiB Memory
On-Demand Linux pricing: \$0.032 USD per Hour
On-Demand Windows pricing: \$0.032 USD per Hour

c3.2xlarge
Family: c3 Family: 16 vCPUs | 32 GiB Memory
On-Demand Linux pricing: \$0.064 USD per Hour
On-Demand Windows pricing: \$0.064 USD per Hour

Security groups

Feedback English (US) ▾

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Step 14/35 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 15

- Under Key pair name, type: GameServerKeyPair
- Under Key pair type choose RSA.
- Under Private key file format choose .pem
- Click Create key pair.
- Save the GameServerKeyPair file after you are prompted to download.
- Go to the next step.

CONCEPT

If you plan to access your Amazon EC2 instance through Windows or the PuTTY program then you will use a .ppk file. If you are using a unix-based (e.g. Linux, MacOS) shell with OpenSSH then select the .pem format.

Step 15/35

AWS Services Search for services, features, APIs [Option+Shift] N. Virginia AWSLambdaUser-mjMspfByUro0GPHgY1ZJXoPte

Create key pair

Key pairs allow you to connect to your instance securely.

Enter the name of the key pair below. When prompted, store the private key in a secure and accessible location on your computer. You will need it later to connect to your instance. [Learn more](#).

Key pair name: GameServerKeyPair

Type: RSA

Key pair type: RSA encrypted private and public key pair

Private key file format: .pem

Choose

Choose

Choose

Choose

Click

Create key pair

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 16

- Click to expand Network settings.
- Choose Select existing security group.
- Under Security groups choose WebServerSecurityGroup.
- Go to the next step.

Step 15/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 16

- Click to expand Network settings.
- Choose Select existing security group.
- Under Security groups choose WebServerSecurityGroup.
- Go to the next step.

Network settings

Subnet info: Don't include in launch template **Create new subnet**

Firewall (security groups): Choose **Select existing security group**

Security groups info: Select security group: WebServerSecurityGroup sg-0ab8fa2efeb247332 X **Choose**

Advanced network configuration

Configure storage info

Advanced

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 17

1. Scroll down to the bottom of page.
2. Review the Summary section.
3. Click Create launch template.
4. Go to the next step.

CONCEPT

For Resource tags, specify tags by providing key and value combinations. You can tag the instance, the volumes, Spot instance requests, or all three. For Network interfaces, you can specify up to two network interfaces for the instance.

Step 17/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 18

1. Scroll to the bottom of the page.
2. Click View launch templates.
3. Go to the next step.

CONCEPT

This launch template can be used to configure Auto Scaling and healing properties of your system. When a server goes down this will be the information that is used to create a new instance.

Step 18/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 19

1. On the left menu, click Auto Scaling Groups.
2. Click Create Auto Scaling group.
3. Go to the next step.

CONCEPT

AWS Auto Scaling lets you build scaling plans that automate how groups of different resources respond to changes in demand. You can optimize for balance between availability and costs. AWS Auto Scaling automatically creates all of the scaling policies and sets targets for you based on your preference.

Step 19/35 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 20

1. Under Auto Scaling group name, type: RegularCustomerGameServer
2. Under Launch template choose GameServerTemplate.
3. Go to the next step.

CONCEPT

Notice the properties that were previously specified in the launch template default for the Auto Scaling group. Information such as Instance Type has already been selected for you.

Step 20/35 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 21

1. Scroll down to the bottom of the page.
2. Click Next.
3. Go to the next step.

CONCEPT

If you host an application on multiple Amazon EC2 instances, you can launch instances across multiple instance types and purchase options (Spot and On-Demand instances) by choosing Combine purchase options and instance types. This is an advanced feature in which your team can optimize costs using different deployment strategies.

Step 21/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 22

1. Under VPC choose the Amazon VPC named: auto-healing-and-scaling/GameServerVPC.
2. Under Availability Zones and subnets choose both game-server-subnet subnets.
3. Go to the next step.

Feedback English (US)

Search for services, systems, logs, data, and more

Capacity Reservations

Add step

Map T

Launch

GameServerTemplate

Create a launch template

1.5GB

Description: Regular customer server game template

AMI ID: ami-055e7602a5ce1a878

Security group: -

Key pair name: GameServerKeyPair

Launch template: GameServerTemplate

Instance type: t2.nano

Request Spot Instances: No

Security group ID: sg-00465449d1f1eb0f

Additional details

Date created: Sun Jul 18 2021 22:48:31 GMT-0700 (Pacific Daylight Time)

Storage (volumes): -

Next

EC2 **Create launch template or configuration**

Step 1 Choose instance launch options

Choose the VPC network environment that your instances are launched into, and customize the instance types and purchase options.

Network

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC

Select the VPC that defines the virtual network for your Auto Scaling group.

vpc-090c549fb0cb3683 (auto-healing-and-scaling-game-server-subnet1) 10.10.0.0/16

Choose

Availability Zones and subnets

Select the Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

auto-healing-and-scaling-game-server-subnet1 (auto-healing-and-scaling-game-server-subnet1) 10.10.0.0/16

auto-healing-and-scaling-game-server-subnet2 (auto-healing-and-scaling-game-server-subnet2) 10.10.1.0/24

Choose

Feedback English (US)

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 23

1. Scroll to bottom of page.
2. Click Next.
3. Go to the next step.

EC2 Dashboard

- Events
- Tags
- Launch Templates
- Spot Requests
- Saving Plans
- Reserved Instances
- Dedicated Hosts
- Scheduled Instances
- Capacity Reservations

IMAGES

- AMIs

ELASTIC BLOCK STORE

- Volumes
- Snapshots
- Lifecycle Manager

NETWORK & SECURITY

- Security Groups

Feedback **English (US)**

Step 23/35

New EC2 Experience

Step 1: Choose launch template or configuration

Create a VPC

Availability Zones and subnets

Choose which availability zones and subnets your Auto Scaling group can use in this chosen VPC.

Subnet availability: **None used**

Subnets

- us-east-1a [subnet-01edc14d95f76129] **ECSGameServerVPC/game-server-netSubnet1** (10.0.1.0/24)
- us-east-1b [subnet-01edc14d95f76129] **ECSGameServerVPC/game-server-netSubnet2** (10.0.1.0/24)

Create a subnet

Instance type requirements

Override launch template

Launch template

Version

Description

GameServerTemplate Default Regular customer game server template

Instance type

t2.micro

Click

Cancel **Preview** **Skip to review** **Next**

Step 23/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 24

1. Under Load balancing - optional. select No load balancer.
2. Under health check grace period, type:

240

3. Click Next.
4. Go to the next step.

CONCEPT

Amazon EC2 Auto Scaling can determine the health status of an instance using one or more of the following. First is the status checks provided by Amazon EC2 to identify hardware and software issues that may impair an instance. The second is health checks provided by a load balancer. These can include custom health checks.

Configure advanced options

Load balancing - optional

Use the options below to attach your Auto Scaling group to an existing load balancer, or to a new load balancer that you define.

No load balancer Optimize for Auto Scaling groups and not be limited by a fixed load balancer.

Attach to an existing load balancer Choose from pre-existing load balancers.

Attach to a new load balancer Optimize for creating a new load balancer to attach to your Auto Scaling groups.

1 Choose

Health checks - optional

Health check type

EC2 Auto Scaling automatically monitors the full health status of your selected load balancer. If you enabled load balancing, you can enable EC2 health checks in addition to the EC2 health checks that are already enabled.

EC2 ELB TPL

Health check grace period

The amount of time until EC2 Auto Scaling performs the first health check on new instances after they join the service.

240 seconds

Additional settings - optional

Monitoring

Enable group metrics collection within CloudWatch Metrics

Click

Cancel **Preview** **Skip to review** **Next**

Step 24/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 25

1. Under Desired capacity, type: **2**
2. Under Minimum capacity, type: **2**
3. Under Maximum capacity, type: **4**
4. Choose Target tracking scaling policy.
5. Go to the next step.

CONCEPT

With target tracking scaling policies, you select a scaling metric (e.g., CPU Utilization) and set a target value. Amazon EC2 Auto Scaling creates and manages the Amazon CloudWatch alarms that trigger the scaling policy and calculates the scaling adjustment based on the metric and the target value.

Step 25/35

New EC2 Experience

EC2 -> Auto Scaling groups > Create Auto Scaling group

Configure group size and scaling policies

Set the desired, minimum, and maximum capacity of your Auto Scaling group. You can optionally add a scaling policy to automatically scale the number of instances in the group.

Group size - optional

Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum capacity limits. Your desired capacity must be within the limit range.

Desired capacity: **2** **Type**

Minimum capacity: **2** **Type**

Maximum capacity: **4** **Type**

Scaling policies - optional

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. [Info](#)

Target tracking scaling policy (Choose a defined outcome and data to use the scaling policy to add and remove capacity as needed to achieve that outcome.)

None

Step 25/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 26

1. Scroll down in the Scaling policies section.
2. Under Scaling policy name, type:

CPU Utilization

3. Under Metric type, choose Average CPU utilization.
4. Under Target value, type:

70

5. Click Next.
6. Go to the next step.

Step 26/35

New EC2 Experience

EC2 Dashboard Events Tags Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

INSTANCES

Instances Instance Type Launch Template Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

IMAGES

AMI

ELASTIC BLOCK STORE

Volumes Snapshots Lifecycle Manager

NETWORK & SECURITY

Security Groups

Metrics **CloudWatch Metrics**

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. [Info](#)

1. Scroll 

Target tracking scaling policy Scaling is triggered when the metric value in the target tracking scaling policy reaches the target value.

Step scaling policy Scaling is triggered when the metric value reaches one of the step scaling policy's target values.

Scaling policy name: CPU Utilization 

Metric type: Average CPU utilization 

Target value: 70 

Instances need: 200 Instances warm up before including in metric

Disable scale-in to create only a scale-out policy

Instance scale-in protection - optional

Instance scale-in protection: If instance scale-in is enabled, newly launched instances will be protected from scale-in by default.

Enable instance scale-in protection 

Next **Preview** **Skip to review** **Cancel**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 27

1. Click Skip to review.
2. Go to the next step.

CONCEPT

You can be notified when Amazon EC2 Auto Scaling is launching or terminating the Amazon EC2 instances in your Auto Scaling group. You manage notifications using Amazon Simple Notification Service (Amazon SNS).

Step 27/35

New EC2 Experience

EC2 Dashboard Events Tags Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

INSTANCES

Instances Instance Type Launch Template Spot Requests Savings Plans Reserved Instances Dedicated Hosts Scheduled Instances Capacity Reservations

IMAGES

AMI

ELASTIC BLOCK STORE

Volumes Snapshots Lifecycle Manager

NETWORK & SECURITY

Security Groups

EC2 > Auto Scaling groups > Create Auto Scaling group

Add notifications [Info](#)

Send notifications to SNS topics whenever Amazon EC2 Auto Scaling launches or terminates the EC2 instances in your Auto Scaling group.

Step 1: Choose launch template or configuration

Step 2: Choose instance launch options

Step 3: Configure advanced options

Step 4: Configure group size and scaling policies

Step 5: Review

Add notifications 

Map 1 (current) **Configure advanced options**

Map 2 (current) **Configure group size and scaling policies**

Map 3 (current) **Add notifications**

Map 4 (current) **Add tags**

Map 5 (current) **Review**

1. Click 

Next **Preview** **Skip to review** **Cancel**

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

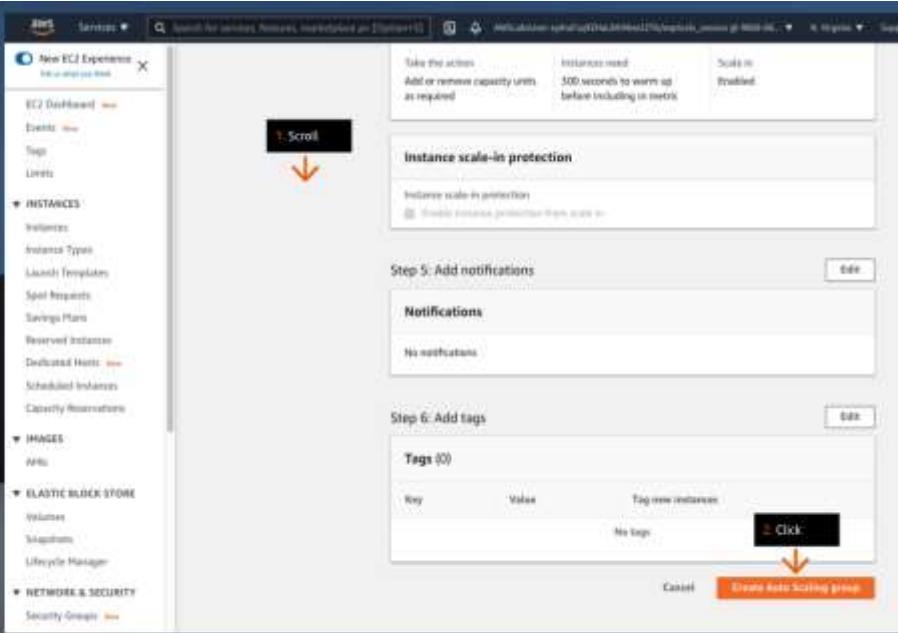
Auto-healing and Scaling Applications

STEP 28

1. Scroll down and review your configuration settings.
2. Click Create Auto Scaling group.
3. Go to the next step.

1. Scroll 

Step 28/35



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 29

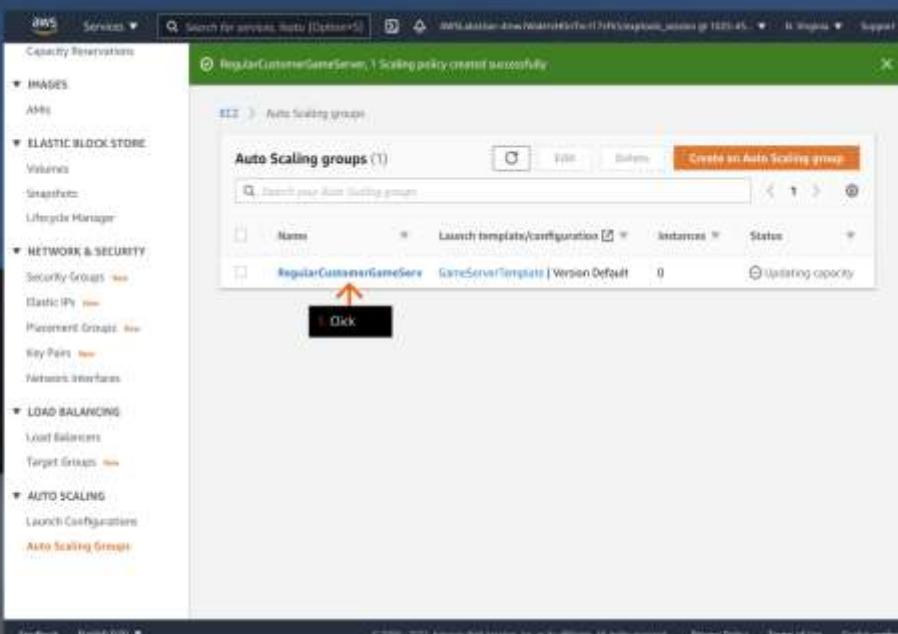
1. Click RegularCustomerGameServer.
2. Go to the next step.

CONCEPT

After you create a scaling policy, Amazon EC2 Auto Scaling starts evaluating the policy against the metrics you selected.

 Ok 

Step 29/35



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files: Steps

Auto-healing and Scaling Applications

STEP 30

1. Click Activity.
2. Under Activity history, review that two instances were created to meet the "desired" and actual capacity".
3. Go to the next step.

CONCEPT

You can see the history of your scaling group. If additional conditions are added to your scaling group you can view which condition has caused the system to scale.

Activity notifications (0)

Activity history (2)

Activity notifications (0)

No notifications are currently specified.

Create notification

Activity history (2)

No activity history

Status Description Cause

Launching a new EC2 instance - i-0c5b3706094963ba At 2021-07-19T06:01:01Z a user request created an AutoScalingGroup change from 0 to 2. An 2021-07-19T06:01:25Z an instance was started in response to a desired and actual capacity, increasing the capacity from 0 to 2.

Launching a new EC2 instance - i-0d313ca34ed591e At 2021-07-19T06:01:01Z a user request created an AutoScalingGroup change from 0 to 2. An 2021-07-19T06:01:25Z an instance was started in response to a desired and actual capacity, increasing the capacity from 0 to 2.

Feedback: Finish 0/35 Step 30/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files: Steps

Auto-healing and Scaling Applications

STEP 31

1. Click the Automatic scaling tab.
2. Scroll down to Scheduled actions.
3. Go to the next step.

CONCEPT

Scheduled scaling helps you to set up your own scaling schedule according to predictable load changes. For example, let's say that every week the traffic to your web application starts to increase based on a predictable factor, you can configure your system to preempt this event.

RegularCustomer@aws.amazon.com: 1 scaling policy created successfully

Auto Scaling groups > RegularCustomer@aws.amazon.com

Details Activity Automatic scaling Instance management Monitoring Instance refresh

Dynamic scaling policies (1) Info Actions Create dynamic scaling policy

CPU Utilization

Policy type: Target tracking scaling

Enabled or disabled? Enabled

Execute policy when: As required to maintain Average CPU utilization at 70

Take the action: Add or remove capacity units as required

Instances need: 500 seconds to warm up before including in metric

Scale in Enabled

Feedback: Finish 0/35 Step 31/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 32:

- Under Scheduled actions, click Create scheduled action.
- Go to the next step.

CLOUDWATCH METRICS

Capacity Reservations

Images

Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

Network & Security

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

Load Balancing

Load Balancers

Target Groups

AUTO SCALING

Launch Configurations

Auto Scaling Groups

Add or remove capacity units as required

Instances need: 300 seconds to warm up before including in metric

Scalar metrics: Enabled

Predictive scaling policies (0) [Actions](#) [Create predictive scaling policy](#)

No predictive scaling policies have been created.

Predictive scaling policies use historical data to scale out your group ahead of forecasted hourly load.

[Create predictive scaling policy](#) **1 Click**

Scheduled actions (0) [Actions](#) [Create scheduled action](#)

No scheduled actions are currently specified

[Creates scheduled action](#)

Feedback Digital IDU Step 32/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Auto-healing and Scaling Applications

STEP 33:

- Under Name, type: **SecondWaveOfRegulars**
- Under Desired capacity, type: **5**
- Under Minimum capacity, type: **3**
- Under Maximum capacity, type: **4**

Create scheduled action

Name: **SecondWaveOfRegulars**

Type: **at least [Desired capacity] and, at most [Maximum capacity]**

Desired capacity: **5**

Min: **3**

Max: **4**

Choose: **Every week** | Cron: **0 20 * * Mon**

Time zone: **Etc/UTC**

Specific start time: **2021/11/01 20:00**

Time zone: **Etc/UTC**

7 Click **6 Type** **5 Choose** **4 Choose** **3 Choose** **2 Type** **1 Click**

Cancel **Create**

Feedback Digital IDU Step 33/35

Auto-healing and Scaling Applications

5. Under Recurrence choose: Every week
6. Under Specific start time, choose a future date, then type 20:00 in the time field.
7. Click Create.
8. Go to the next step.

CONCEPT

By default, the times that you set are in Coordinated Universal Time (UTC). When specifying a recurring schedule with a cron expression using the AWS CLI or an SDK, you can change the time zone to correspond to your local time zone or a time zone from another part of your network.

Step 33/35

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 34

1. Review your newly created Scheduled actions.
2. Go to the next step.

AWS Services Search for services, AWS (US West (Oregon)) Help Support

Capacity Reservations Add or remove capacity units as required

Instances need 300 seconds to warm up before including in metrics

Scaling In Enabled

Predictive scaling policies (0) [Info](#) [Actions](#) [Create predictive scaling policy](#) [1 >](#)

No predictive scaling policies have been created.

Predictive scaling policies use historical data to scale out your group ahead of forecasted hourly load.

Create predictive scaling policy

Scheduled action created or edited successfully

Scheduled actions (1) [Info](#) [Actions](#) [Create scheduled action](#)

Name	Start time	End time	Recurrence	Time zone	Desired capacity
Second	2021-Nov-01 00:00:00	2021-Nov-01 00:30:00	Every 30 minutes	UTC	1

Review [Next](#) [Finalize](#)

Feedback Help Help

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Auto-healing and Scaling Applications

STEP 35

Congratulations! You've completed the Practice Section. Go to the DIY section to complete the solution.

Practice Lab

Congratulations!

You've completed the Practice Section.
Go to the DIY section to complete the solution.

The screenshot shows the AWS DIY Lab interface. On the left, there's a sidebar with a green '4 DIY' logo, 'START LAB' button, 'Lab Files' tab, and 'DIY Activity' tab. Below these are sections for 'Auto-healing and Scaling Applications' and 'DIY ACTIVITIES'. One activity is listed: 'Configure an Auto Scaling policy to scale down to 0 resources at 1 AM UTC every day.' To the right, there's a 'VALIDATION FORM' section with fields for 'Your Auto Scaling group name' (set to 'auto-scaling-group-name') and 'scheduled-action-name' (set to 'The name of your Auto Scaling group is'). There are two red buttons: 'VALIDATE' and 'SKIP'. A large dark blue box on the right is labeled 'VALIDATION MESSAGE'.

RegularCustomerGameServer , SecondWaveOfRegulars, ShutDownOfRegulars

This screenshot shows the validation message after clicking 'VALIDATE'. It displays an error message: 'We found the scheduled action "SecondWaveOfRegulars" but it has some problems: - The scheduled start time is not 01:00 AM UTC - This scheduled action is not running daily - This scheduled action is not scaling down the number of instances to 0. Check that you created a scheduled action to scale down all hosts to 0 every day at 01:00 AM UTC. Then try again.'

This screenshot shows the validation message after fixing the scheduled action name to 'ShutDownOfRegulars'. The message now says: 'You did it! You have an auto scaling action scheduled to scale down the instances to 0 at 01:00 AM UTC! Now, return to the city and give your customer the good news.' At the bottom, it says 'Click Exit to return to the city and give your customer the good news!'.

High Availability web app:

Hi! Thank you for answering our request for help! Our travel agency just had a disastrous promotional event.

The promotional event we held last week increased our web traffic and overloaded our website. All requests were being timed out.

What is worse is that our EC2 instances were also hosted in an Availability Zone which was affected by severe storms. We were offline for hours.

I am so sorry this happened. Let's talk about how you can prevent this from happening again.

First, use AWS to create an Auto Scaling group across multiple Availability Zones to ensure that your resources aren't isolated.

Second, create an Elastic Load Balancer to ensure that your network traffic is distributed equally across your servers.

Okay, so if I spread them out over multiple Availability Zones, does that mean we will be 100% safe from any failures?

No system is 100% failure proof, but Availability Zones reside in geographically distinct locations so a singular event is unlikely to affect multiple Availability Zones simultaneously.

Got it. But how do we verify if our site is down in a different Availability Zone?

Once you spread your EC2 instances over multiple Availability Zones, you can attach an Elastic Load Balancer to your Auto Scaling group to ensure high availability and elasticity as well.

You can monitor EC2 instance health by setting up a health check on your Elastic Load Balancer.

This sounds promising! Can you build this system for us? Our site needs to handle the increased demand.

Will you help us make our travel booking site highly available?

[RETURN TO CITY](#)

[<< BACK](#)

[ACCEPT](#)

Thanks for helping!

[RETURN TO CITY](#)

[GO TO SOLUTION CENTER](#)

Highly Available Web Applications

Rewards + Amazon Web Services

 +80 Gems

 +3 Customization Items

 +10 Elastic Load Balancing (ELB)

Services: Elastic Load Balancing (ELB)

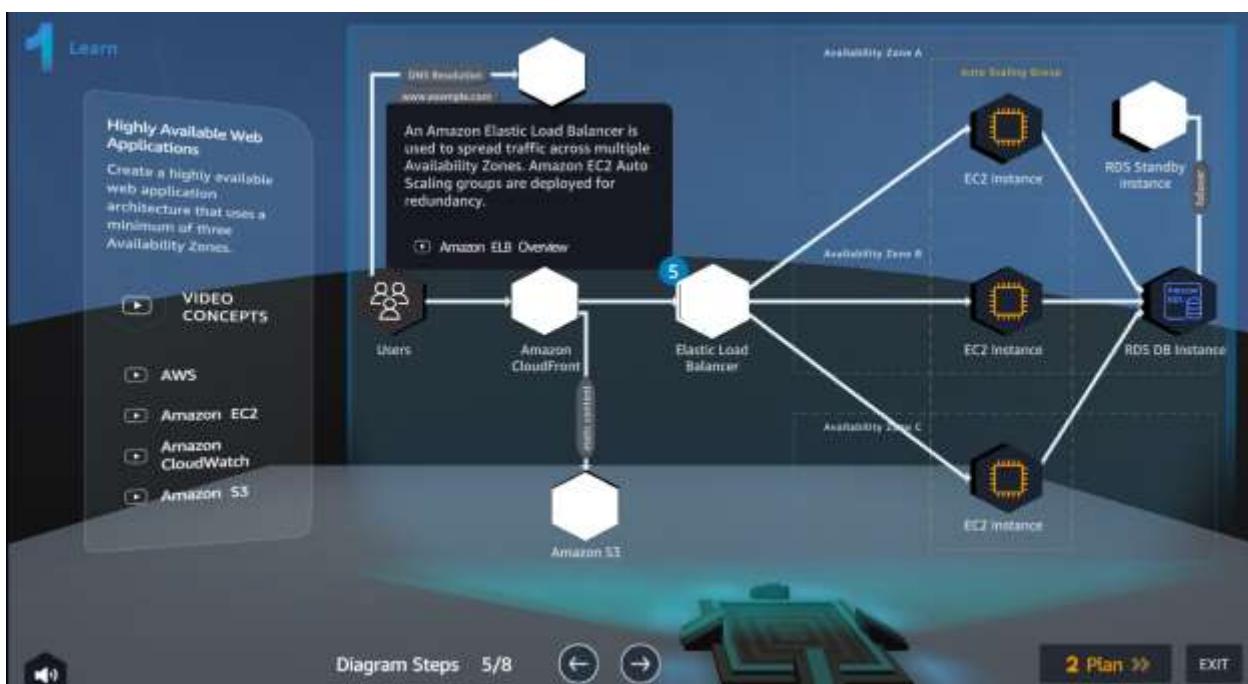
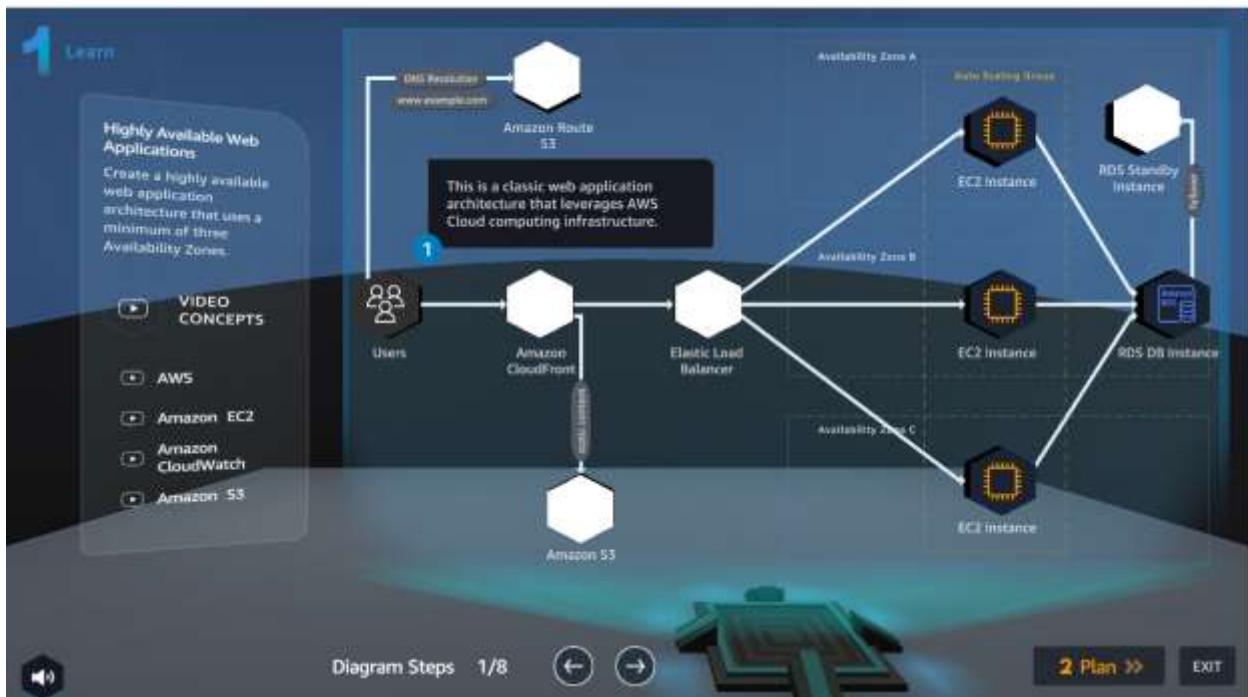
Solution Annotations

→ Create an Auto Scaling group across multiple Availability Zones.

→ Create an Elastic Load Balancer (ELB).

→ Attach an Auto Scaling group to an ELB.

→ Create an ELB health check for EC2 instances.



1 Learn

Highly Available Web Applications

Create a highly available web application architecture that uses a minimum of three Availability Zones.

VIDEO CONCEPTS

- ▶ AWS
- ▶ Amazon EC2
- ▶ Amazon CloudWatch
- ▶ Amazon S3

The Auto Scaling service creates groups of servers that grow or shrink in capacity depending on demand.

6

7

8

Auto Scaling also works directly with Amazon CloudWatch for metrics data and with Elastic Load Balancing to add and remove hosts for load distribution.

▶ Amazon CloudWatch Overview

7

For example, if the web servers are reporting greater than 80 percent CPU utilization over a period of time, an additional web server could be quickly deployed and then automatically added to the load balancer.

8

2 Plan

Practice Lab Goals

Step-by-step guided learning

- ▶ Create an Application Load Balancer (ALB)
- ▶ Configure an Auto Scaling group and connect it to the ALB
- ▶ Configure a health check endpoint

DIY Goals

Build on what you have learned

- ▶ Configure an Auto Scaling group to include a new EC2 instance in a third Availability Zone

Highly Available Web Applications

2. Click Start Lab to provision your environment, then click Open AWS Console to begin.
3. Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will:

- Migrate an Auto Scaling group behind an AWS Application Load Balancer (ALB) in one Availability Zone (AZ).
- Set up ALB health monitoring for an Amazon EC2 Auto Scaling group.
- Add a second Availability Zone to an Amazon EC2 Auto Scaling group.

Step 1/41  

STEP 2

1. In the Services search field, type: ec2
2. Under Services, click EC2.
3. Go to the next step.

CONCEPT

By placing your web servers in an Amazon EC2 Auto Scaling group behind a load balancer, you can achieve high availability for your application.

Step 2/41  

Highly Available Web Applications

1. On the left menu, click Auto Scaling Groups.
2. Choose the TravelAgencyWebServers Auto Scaling group.
3. On the Details tab, review the current capacity details.
4. Go to the next step.

CONCEPT

Minimum and maximum capacity define boundaries for the number of instances allowed in the Auto Scaling group. The desired capacity is the initial capacity of the Auto Scaling group and the capacity it attempts to maintain. This auto scaling group can currently contain only one instance.

Step 3/41  

STEP 4

1. Click the Instance management tab.
2. Review that there is currently one instance in the Auto Scaling group.
3. Go to the next step.

CONCEPT

An Auto Scaling group starts by launching enough instances to meet its desired capacity. It maintains this number of instances by performing periodic health checks on the instances in the group.

Step 4/41  

STEP 5

1. Click the Details tab.
2. Scroll down to the Network section.
3. Go to the next step.

CONCEPT

You must specify at least one Availability Zone when you are creating your Auto Scaling group. An Auto Scaling group can be configured across multiple Availability Zones for increased availability.

Step 5/41  

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 6

1. Review that the Auto Scaling group is configured with a single subnet from one Availability Zone.
2. Click the Edit button in the Load balancing section to create an AWS Application Load Balancer (ALB).
3. Go to the next step.

CONCEPT

You define which subnets, from one or more Availability Zones, are linked to the Auto Scaling group. This defines where your Amazon EC2 resources linked to the Auto Scaling group can reside.

Step 6/41 ← →

EC2 Dashboard Events Tags Instances Images AMIs Elastic Block Store

New EC2 Experience Tell us what you think

Auto Scaling groups (1/1) Edit Delete Create an Auto Scaling group

Name Launch template/configuration Instances Status Desired

TravelAgencyWeb: Lambda@edge configuration (0/0)

Network Review Availability Zone: us-east-1a Subnet ID: subnet-0d08f701d200fba7

Load balancing Load balancer target groups Classic Load Balancers

Health checks

Feedback English (US) Privacy Policy Terms of Use Customer Support

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 7

1. Click Add a new load balancer.
2. Go to the next step.

CONCEPT

Attaching a load balancer to your Auto Scaling group registers the group with the load balancer, which acts as a single point of contact for all incoming web traffic to your Auto Scaling group.

Step 7/41 ← →

EC2 Dashboard Events Tags Instances Images AMIs Elastic Block Store

New EC2 Experience Tell us what you think

Resource Groups & Tag Editor

Edit TravelAgencyWebServers

Network

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

Availability Zones and subnets Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

Select Availability Zones and subnets

us-east-1a | subnet-06aac5f0d554311d (Subnet PublicSubnet1) 10.0.0.19

Create a subnet

Load balancing - optional

Load balancers

Application, Network or Gateway Load Balancer target groups

Classic Load Balancers

Create and attach new load balancers

Add a new load balancer 1. Click

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 8

- Under Load balancer type, choose Application Load Balancer.
- Under Load balancer scheme, choose Internet-facing.
- Go to the next step.

CONCEPT

For managing web-based applications requiring HTTPS connectivity, choose the Application Load Balancer. If the web applications are for public access, the load balancer must be internet-facing.

Step 8/41

Edit TravelAgencyWebServers

Network

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling use the zones. The default VPC and default subnets are suitable for getting started quickly.

Availability Zones and subnets

Select Availability Zones and subnets

us-east-1a | subnet-06aac5f0db554311d (Lab/TravelAgencyVpc/PublicSubnet1) 10.0.0.0/16

Create a subnet

Load balancing - optional

Load balancers

- Application, Network or Gateway Load Balancer target groups
- Classic Load Balancers

Create and attach new load balancers

Add a new load balancer **1 Click**

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 9

- Under Availability Zones and subnets, choose all three availability zones.
- Under each drop-down choose the available Public subnet.
- For Default routing (forward to), choose Create a target group and accept the defaults.
- Click Update to create the Application Load Balancer (ALB).
- Go to the next step.

CONCEPT

A load balancer takes requests from clients and distributes them across targets in a target group. After you enable an Availability Zone, the load balancer starts routing requests to the registered targets in that Availability Zone.

Step 9/41

Load balancing - optional

Load balancers

- Application, Network or Gateway Load Balancer target groups
- Classic Load Balancers

Create and attach new load balancers

Add a new load balancer **1 Click**

Capacity Reservations

Images

Elastic Block Store

Volume

Snapshots

Amazon Machine Image Manager

Network & Security

Security Groups

Classic IP

Placement Groups

VPC Peering

Network Interfaces

Load Balancing

Load Balancers

Target Groups

Auto Scaling

Launch Configurations

Auto Scaling Groups

Availability Zones and subnets

Choose

us-east-1a

us-east-1b

us-east-1c

Choose

subnet-0fb5ed794805d769

subnet-01042153291ca59c2

subnet-079c163a0c61037e2

subnet-020dd8e6557427c4b

subnet-079c163a0c61037e2

Protocol: HTTP Port: 80 Default routing (forward to): Choose

New target group name: TravelAgencyWebServers-1

Tags - optional

Add tag

1 Click

Update

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CONCEPT

A load balancer takes requests from clients and distributes them across targets in a target group. After you enable an Availability Zone, the load balancer starts routing requests to the registered targets in that Availability Zone.

Step 9/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 10

1. In the left menu, click Security Groups.
2. Click Create security group.
3. Go to the next step.

CONCEPT

To customize the traffic flow between the ALB and the web servers you can create new security groups that define what traffic is allowed to the load balancer and what traffic is allowed to the web servers behind the load balancer.

Step 10/41 ← →

Name	Security group ID	Security group name	VPC ID
sg-02ef98520387e1839	TravelAgencyWebServer	vpc-0d904ae7537411a9	default
sg-0938f5fe930a0fb4	default	vpc-0d904ae7537411a9	default
sg-a795a70c	default	vpc-16581d45	default

Feedback Help/Info ▾ Step 10/41 ▶ Privacy Policy Terms of Use Cookies preferences

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 11

1. For the security group name type: TravelAgencyLoadBalancer
2. Type a description such as: Allow access to the Travel Agency Load Balancer from the Internet
3. For VPC, choose the lab/TravelAgencyVpc.
→ You may have to click X to remove the existing VPC entry.
4. Under inbound rules, click Add rule.
5. Go to the next step.

Step 11/41 ← →

EC2 > Security Groups > Create security group

Create security group info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name info

TravelAgencyLoadBalancer 1. Type

Items cannot be edited after creation.

Description info

Allow access to the Travel Agency Load Balancer from the Internet. 2. Type

VPC info

vpc-0d904ae7537411a9 (lab/TravelAgencyVpc) 3. Choose

Inbound rules info

This security group has no inbound rules.

Add rule 4. Click

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3. For VPC, choose the lab/TravelAgencyVpc.
 - You may have to click X to remove the existing VPC entry.
 4. Under Inbound rules, click Add rule.
 5. Go to the next step.

CONCEPT

Security groups are assigned to a VPC. This means the security group can only be assigned to resources within the VPC.

Step 11/41

TransitGatewayTransitVirtualInterfaceAttachment security group.
 3. Go to the next step.

CONCEPT

For a public-facing load balancer, you specify 0.0.0.0/0 as a source to accept traffic from any address. By specifying a security group as an outbound destination, you can restrict traffic to only be sent to instances associated with the specified security group.

Step 12/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 12

- Set the new inbound rule as follows:
 - Type: HTTP
 - Source: Custom
 - Click in the search field next to Source, and choose 0.0.0.0/0 to allow all traffic.
- Change the default Outbound rule as follows:
 - Type: HTTP
 - Destination: Custom
 - Remove the 0.0.0.0/0 destination.
 - Click in the search field next to Destination, and select the TravelAgencyWebServer security group.
 - Go to the next step.

Step 12/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 13

- Scroll down to the bottom of the page.
- Click Create security group.
- Go to the next step.

CONCEPT

Security groups are not active unless they are assigned to a resource.

Step 13/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 14

1. In the left menu, click Security Groups.
2. Choose the TravelAgencyWebServer security group.
3. On the Actions drop-down, choose Edit inbound rules.
4. Go to the next step.

CONCEPT

To increase security, you can edit the security group in use by Amazon EC2 instances behind the load balancer to only allow inbound traffic from the Application Load Balancer (ALB).

Step 14/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 15

1. To remove the existing rule, click Delete.
- You will need to delete the existing rule to modify rule type.
2. To add a new rule, click Add rule.
3. Go to the next step.

CONCEPT

By removing the 0.0.0.0/0 source and replacing it with a security group, you can easily control which resources are allowed to send traffic to instances without having to input address ranges. Only traffic from the instances associated with the security group is allowed.

Step 15/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 16

1. Choose HTTP as Type from the drop-down list.
2. Choose the TravelAgencyLoadBalancer security group as the new inbound source from the drop-down list.
3. Go to the next step.

Feedback English (US) +

AWS Services Search for services, features, or [Open in new tab] N. Virginia AWS Lambda User (4 Virtual Private IP) 7777

Edit inbound rules

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
-	HTTP	TCP	80	Custom	Choose

Add rule

Security Groups

- TravelAgencyWeb Server - sg-02b7a2ec0c1f6d9a
- default sg-0b654c294842d6cfa

Choose Preview changes Save rules

Step 16/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 17

1. To save the changes, click Save rules.
2. Go to the next step.

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AWS Services Search for services, features, or [Open in new tab] N. Virginia AWS Lambda User (4 Virtual Private IP) 7777

Edit inbound rules

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
-	HTTP	TCP	80	Custom	IP: 00017752:40 978481

Add rule

Cancel Preview changes Save rules

Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 18

1. In the left menu, click Load Balancers.
2. Choose the TravelAgencyWebServers-1 ALB.
3. Click the Description tab.
4. Scroll down to the Security section.
5. Go to the next step.

CONCEPT

Custom security groups are only active after you assign them to an instance. You can assign multiple security groups to an instance.

Step 18/41

Load Balancer: TravelAgencyWebServers-1

Description

Basic Configuration

Name: TravelAgencyWebServers-1
ARN: arn:aws:elasticloadbalancing:us-east-1:137146272231:loadbalancer/app/TravelAgencyWebServers-1/59d0fbad64760e
DNS name: TravelAgencyWebServers-1-e25238485.us-east-1.amazonaws.com
IP address type: IPv4
Type: application
Scheme: internet-facing
VPC: vpc-04d7134a3c77ea00

1 Click

1 Scroll

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 19

1. Click the Edit security groups button.
2. In the Edit security groups window, choose the TravelAgencyLoadBalancer security group.
3. Click the TravelAgencyWebServer security group to deselect it.
4. Click Save.
5. Go to the next step.

CONCEPT

The security groups you associate with your load balancer determine your rules for controlling where traffic can come from and where it is allowed to be sent.

Step 19/41

Edit security groups

Select security groups to associate with your load balancer.

Security group ID	Name	Description
sg-02a052260007b...	TravelAgencyLoadBalancer	Allow access to the Travel Agency Load Balancer from the Internet
sg-02a0f1986ba9...	TravelAgencyWebServer	Security Group used by the Travel Agency Web Servers
sg-04907a6dd5...	default	default VPC security group

1 Click

Cancel Save

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 20

- In the left menu, click Load Balances.
- Choose the TravelAgencyWebServers-1 ALB.
- Under the Description tab, click the icon to copy the ALB's DNS name.
- Go to the next step.

CONCEPT

To test access to your application through the load balancer, you can copy the DNS name into a browser window.

Actions

Load Balancers

Load balancer: TravelAgencyWebServers-1

Basic Configuration

Name	TravelAgencyWebServers-1
ARN	arn:aws:elasticloadbalancing:us-east-1:102054555650:loadbalancer/app/TravelAgencyWebServers-1/252fe8d0a3c0
DNS name	travelagencywebservers-1-3276541981.us-east-1.elb.amazonaws.com
Status	Active
Type	application
Scheme	internal-facing
IP address type	IPv4
VPC	vpc-0f0b044e7027411a
Availability Zones	subnet-016d4c2023cde00 - us-east-1D [✓] subnet-016d4c2023cde00 - us-east-1C [✓] Public IP Address Assigned by AWS

Step 20/41 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 21

- Paste this ALB's DNS name in a new web browser tab.
- The website is only hosted with HTTP. Prefix the DNS name with "http://" when you paste it into your browser (for example, http://WebServers-1.us-east-1.elb.amazonaws.com).
- Congratulations, you have moved the Travel Agency web site behind an ALB.
- Go to the next step.

CONCEPT

Use the DNS name to get quick feedback and view your application. If you don't see your application, be sure to check the rules in the security group.

Sign In

About

UNICORN TRAVEL AGENCY

Step 21/41 ← →

CONCEPT

Use the DNS name to get quick feedback and view your application. If you don't see your application, be sure to check the rules in the security group that you associated to the load balancer.

Step 21/41 ← →

CONCEPT

The default ALB health check only validates the root path of an HTTP server. Applications will generally implement a much more robust application health check to validate server configuration and external access. You can manually verify that health checks are active on your load balancer.

Step 22/41 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 22

- In your same browser tab, on to the end of the ALB URL, type and then press enter:

/health

- Review the simple message that loads stating Instance i-XXXX is healthy.
- Keep this tab open for additional checks later in this lab.
- Go to the next step.

CONCEPT

The default ALB health check only validates the root path of an HTTP server. Applications will generally

Step 22/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 23

- In the left menu, click Target Groups.
- Choose the TravelAgencyWebServers-1 target group.
- Click the Health checks tab.
- Click Edit.
- Go to the next step.

CONCEPT

You can modify load balancer health check settings to match your performance requirements.

Step 23/41

Protocol	Path	Port	Healthy threshold
HTTP	/	80	5 consecutive health check successes

Unhealthy threshold	Timeout	Interval	Success codes
3 consecutive health check failures	5 seconds	10 seconds	200

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

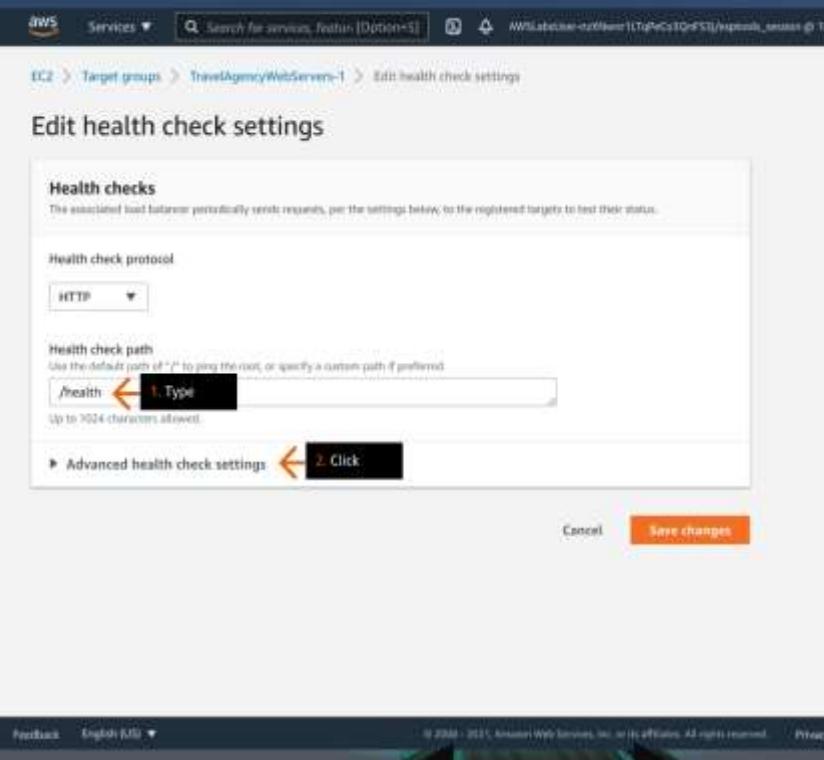
STEP 24

1. In the Health check path field type:
`/health`
2. Click the Advanced health check settings drop-down.
3. Go to the next step.

CONCEPT

After your target is registered, it must pass one health check to be considered healthy. After each health check is completed, the load balancer node closes the connection that was established for the health check.

Step 24/41



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

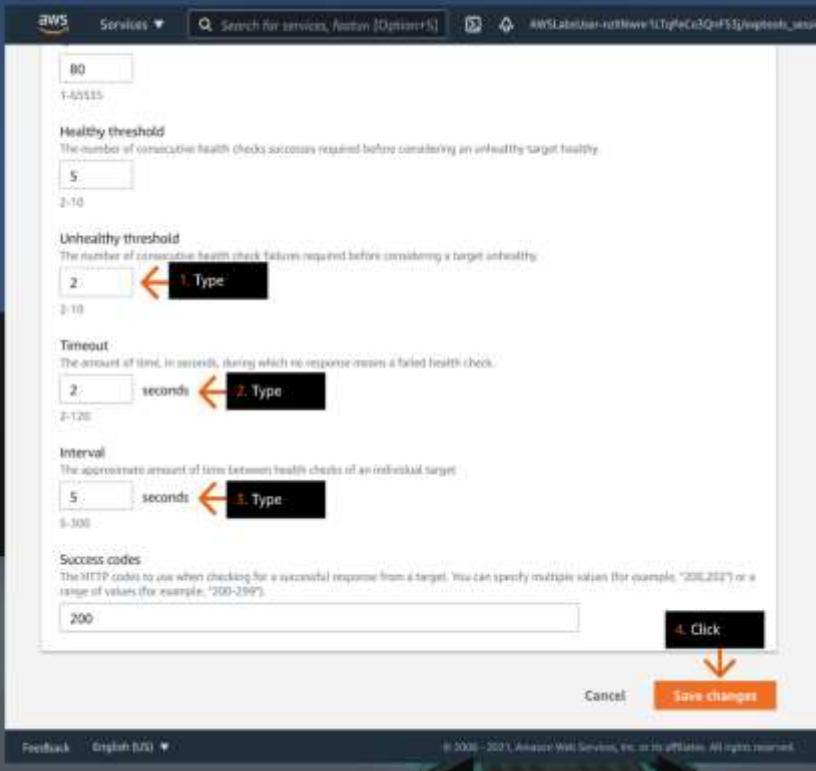
Highly Available Web Applications

STEP 25

1. Under Unhealthy threshold type:
2
2. Under Timeout type:
2
3. Under Interval type:
5
4. Click Save changes.
5. Go to the next step.

CONCEPT

Step 25/41





3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 26

1. In the menu on the left, click Auto Scaling Groups.
2. Choose the TravelAgencyWebServers Auto Scaling group.
3. Scroll down to the Network section.
4. Click Edit.
5. Go to the next step.

CONCEPT

After you have created an internet-facing load balancer, you can now run your applications in a private subnet. You can add or remove subnets associated with the Auto Scaling group.

Step 26/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 27

1. In the Subnets drop-down, choose the `us-east-1a | subnet-00f944ac7527411a0 [Sub/TravelAgencyVpc]` subnet.
 - This should be the only subnet selected.
2. Click to deselect any other subnet that may be selected.
3. Click Update.
4. Go to the next step.

CONCEPT

If you add or remove a subnet you are defining where the Auto Scaling group resources can reside.

Step 27/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 28

1. On the left menu, click Instances.
2. Choose the Lab/TravelAgencyWebServers instance.
3. Click the Networking tab.
4. Review that the old instance is in the Lab/TravelAgencyVpc/PublicSubnet1 subnet.
5. Choose the Instance state drop down menu.
6. Choose Terminate instance.
7. In the Terminate instance pop up windows, click Terminate.
8. Go to the next step.

CONCEPT

Changing the subnet will not automatically cause instances to rebuild in the Auto Scaling group. Terminating the instance reduces the number of instances below the minimum for the Auto Scaling group and triggers a new instance launch in the private subnet.

Step 28/41 ← →

Instances (1/1) | **Choose** | Instance state | Actions | Launch instance

Name: lab/TravelAgencyWebServers | Instance ID: i-03bdccb429464feff

Actions: Stop instance, Start instance, Reboot instance, Relaunch instance, Terminate instance

Networking: Details, Security, **Networking**, Storage, Status checks, Monitoring, Tags

Networking details:

- Public IPv4 address: 54.235.63.177 | [Open address](#)
- Private IPv4 address: 10.0.2.106
- VPC ID: vpc-02b044e757741149 (Lab/TravelAgencyVpc)
- Subnet ID: subnet-02d4f701b2bd1f1a7 (Lab/TravelAgencyVpc/PublicSubnet1)
- Availability zone: us-east-1a

Review

Details, Security, **Networking**, Storage, Status checks, Monitoring, Tags

Networking details:

- Public IPv4 DNS: ec2-54-235-62-177.compute-1.amazonaws.com | [Open address](#)
- Private IPv4 DNS: ip-10-0-2-106.ec2.internal
- PVLAN addresses: -
- Secondary private IPv4 addresses: -
- Current IP address: [Instrument](#)
- Output: 0

CONCEPT

Changing the subnet will not automatically cause instances to rebuild in the Auto Scaling group. Terminating the instance reduces the number of instances below the minimum for the Auto Scaling group and triggers a new instance launch in the private subnet.

Step 28/41 ← →

CONCEPT

If you terminate an instance within an Auto Scaling group which results in lowering the number of running instances below the Auto Scaling minimum requirement, then a new instance will be launched automatically.

Step 29/41 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 29

1. After a few minutes, click to refresh the Instances table and observe that a new instance was created.
2. Choose the new instance.
3. Click the Networking tab.
4. Review that the new instance is in the lab/TravelAgencyVpc/PrivateSubnet1 subnet.
5. Review the unique instance ID.
6. Go to the next step.

CONCEPT

If you terminate an instance within an Auto Scaling group which results in lowering the number of running instances below the Auto Scaling

Step 29/41

Instances (1/2) 1. Click Connect Instance state Actions Launch instance

Name	Instance ID	Instance state	Instance type	Status check
Lab/TravelAgencyWebServer	i-056664294d48ff	Terminated	t2.micro	-
Lab/TravelAgencyWebServer	i-0f5725538db2c058	Running	t2.micro	-

Instance: i-0f5725538db2c058 (lab/TravelAgencyWebServers)

Networking

Public IPv4 address	Private IPv4 address	VPC ID
-	192.0.126.37	vpc-d944ac7527411ab (lab/TravelAgencyVpc)

Public IPv4 DNS Private IPv4 DNS Subnet ID

IPv4 addresses	Secondary private IPv4 addresses	Availability zone
-	-	us-east-1a (lab/TravelAgencyVpc/PrivateSubnet1)

Carrier IP address (ephemeral) Outpost ID

Review

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3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 30

1. In the menu on the left, click Auto Scaling Groups.
2. Choose the TravelAgencyWebServers Auto Scaling group.
3. Click on the Activity tab.
4. Scroll to Activity history.
5. Go to the next step.

CONCEPT

You can review Auto Scaling group operations in Activity history.

Step 30/41

Auto Scaling groups (1/1) Create an Auto Scaling group

Name	Launch template/configuration	Instances	Status
TransAgencyWebServers	LabStack-redis-pymysqlMicro (2tgbs...)	2	-

Activity 1. Click

Details Activity Automatic scaling Instance management Monitoring Instance reflect

Activity history (4) 4. Scroll

Send to On instance action Create notification

No notifications are currently specified

Create notification

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The screenshot shows the AWS Practice interface on the left and the AWS Management Console on the right. The Practice interface displays Step 31/41, a 'START LAB' button, and instructions for Step 31. The main content area is titled 'Highly Available Web Applications' and contains 'STEP 31' with the following steps:

- Under Activity history, review that the old instance was terminated.
- Review that Auto Scaling responded by creating a new instance.
- Go to the next step.

CONCEPT
Each item in Activity history lists an Auto Scaling action and the cause of the actions.

The AWS Management Console shows the EC2 > Auto Scaling groups page. It lists one Auto Scaling group named 'TravelAgencyWebServers'. Below it is the 'Activity history' section, which shows four entries:

Status	Description	Cause
Successful	Launching a new EC2 instance: i-0f572555a8c2e080	At 2021-07-06T21:54:27Z an instance was started in response to a difference below actual capacity, increasing the capacity from 0 to 1.
Terminating EC2 instance: i-036dcb4216ed0eff	Waiting for ELB Connection Draining	At 2021-07-06T21:54:07Z an instance was taken out of service in response to an ELB indicating it has been terminated or stopped.
Updating load balancers/target groups: Successful Status		
Successful	Terminating EC2 instance: i-036dcb4216ed0eff	At 2021-07-06T21:54:07Z an instance was taken out of service in response to an ELB indicating it has been terminated or stopped.

The screenshot shows the AWS Practice interface on the left and a browser window on the right. The Practice interface displays Step 32/41, a 'START LAB' button, and instructions for Step 32. The main content area is titled 'Highly Available Web Applications' and contains 'STEP 32' with the following steps:

- In health check browser tab, click to refresh the health check page.
- Review the message such as Instance i-XXXXXX is healthy.
- The Instance ID value should be the value of the new instance.
- Go to the next step.

CONCEPT
Make sure to get verification that your new instances are running and considered healthy by the load balancer.

The browser window shows a webpage at <http://travelagencywebservers-1-494380056.us-east-1.elb.amazonaws.com/health>. The page displays the message: 'Instance i-00ddff2ff00b23d33 is healthy'. An arrow points from the 'Review' button in the Practice interface to this message in the browser.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 33

1. In the menu on the left, click Auto Scaling Groups.
2. Choose the TravelAgencyWebServers Auto Scaling group.
3. Under Network click Edit.
4. Go to the next step.

CONCEPT

To take advantage of the safety and reliability of geographic redundancy, span your Auto Scaling group across multiple Availability Zones within a Region. Attach a load balancer to distribute incoming traffic across those Availability Zones.

Step 33/41

EC2 > Auto Scaling groups

Auto Scaling groups (1/1)

Name	Launch template/configuration	Instances	Status
TravelAgencyWebServers	LaunchStack-ndy.com-nw0then1U3qP...	1	-

Settings not available unless you use a launch template.

Network

Availability Zones: us-east-1a Subnet ID: subnet-0f0567f7dab912de

Load balancing

Auto Scaling Groups: TravelAgencyWebServers-1 Click

1 Click

1 Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 34

1. In the Subnets drop-down, choose the lab/TravelAgencyVpc/PrivateSubnet2 subnet so both lab/TravelAgencyVpc/PrivateSubnet1 and lab/TravelAgencyVpc/PrivateSubnet2 are selected.
2. Click Update.
3. Go to the next step.

CONCEPT

When one Availability Zone becomes unhealthy or unavailable, Amazon EC2 Auto Scaling launches new instances in an unaffected Availability Zone. Auto Scaling attempts to launch new instances in the Availability Zone with the fewest instances.

Step 34/41

EC2 > Auto Scaling groups > TravelAgencyWebServers

Edit TravelAgencyWebServers

Network

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

Subnets:

- lab/TravelAgencyVpc/PrivateSubnet1
- lab/TravelAgencyVpc/PrivateSubnet2
- lab/TravelAgencyVpc/PublicSubnet1
- lab/TravelAgencyVpc/PublicSubnet2
- us-east-1a | subnet-0f0567f7dab912de (lab/TravelAgencyVpc/PrivateSubnet1) (0.0.0.0/16)
- us-east-1a | subnet-0f0567f7dab912de (lab/TravelAgencyVpc/PrivateSubnet2) (0.0.0.0/16)
- us-east-1b | subnet-0f0567f7dab912de (lab/TravelAgencyVpc/PrivateSubnet1) (0.0.0.0/16)
- us-east-1b | subnet-0f0567f7dab912de (lab/TravelAgencyVpc/PrivateSubnet2) (0.0.0.0/16)
- us-east-1c | subnet-0f0567f7dab912de (lab/TravelAgencyVpc/PublicSubnet1) (0.0.0.0/16)
- us-east-1c | subnet-0f0567f7dab912de (lab/TravelAgencyVpc/PublicSubnet2) (0.0.0.0/16)

1 Choose

2 Click

CONCEPT

When one Availability Zone becomes unhealthy or unavailable, Amazon EC2 Auto Scaling launches new instances in an unaffected Availability Zone. Auto Scaling attempts to launch new instances in the Availability Zone with the fewest instances.

Step 34/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 35

1. On the left menu, click Auto Scaling Groups.
2. Choose the TravelAgencyWebServers Auto Scaling group.
3. Under Group details, click Edit.
4. Go to the next step.

CONCEPT

The desired capacity is the initial capacity of the Auto Scaling group after this operation completes and the capacity it attempts to maintain. Desired capacity is what Auto Scaling changes based on instance performance or other alarm-based actions that you configure.

Step 35/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

2. Under Maximum capacity type:
- 2
3. Click Update.
4. Go to the next step.

CONCEPT

By changing desired capacity manually, you can test your Auto Scaling group behavior. Increasing the desired capacity, while not exceeding the maximum capacity, will launch new instances to meet the desired capacity value.

Step 36/41

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 37

1. In the menu on the left, click Auto Scaling Groups.
2. Choose the TravelAgencyWebServers Auto Scaling group.
3. Click the Activity tab.
4. Scroll down to Activity history.
5. Go to the next step.

CONCEPT

You can review Activity history to verify your expected results.

Step 37/41

The screenshot shows the AWS CloudFormation console with the 'Auto Scaling groups' section open. The 'Activity' tab is selected in the navigation bar. A callout points to the 'Activity' tab with the instruction '3. Click'. Another callout points to the 'Auto Scaling' section in the left sidebar with the instruction '4. Scroll'.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Highly Available Web Applications

STEP 38

1. Under Activity history, review that a new instance is launching.
2. Review the ID of the new instance.
3. Go to the next step.

CONCEPT

Connection draining enables the load balancer to complete in-flight requests made to instances that are deregistering or unhealthy before stopping traffic flow from the load balancer.

Step 38/41

The screenshot shows the AWS CloudFormation console with the 'Activity history' section open. A callout points to the 'Review' button in the activity history table with the instruction '2. Review the ID of the new instance'. Another callout points to the 'Activity history' table with the instruction '1. Under Activity history, review that a new instance is launching'.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 39

- In the menu on the left, click Instances.
- Choose the instance that corresponds with the new instance ID.
- Click the Networking tab.
- Review that the new instance is in the lab/TravelAgencyVpc/PrivateSubnet2 subnet.
- Go to the next step.

CONCEPT

When Auto Scaling launches a new instance, you can verify the subnet ID to ensure that your instance was deployed to the correct subnet.

Step 39/41 ← →

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Highly Available Web Applications

STEP 40

- In the health check browser tab, click to refresh the health check page.
- Review the message.
- The page should load with Instance i-XXXX is healthy. The instance ID value should be the value of the new instance.
- Congratulations! You have successfully migrated the Travel Agency website to a highly available architecture.
- Go to the next step.

CONCEPT

After an instance has been deployed to a new subnet, you can check on the

Step 40/41 ← →

The screenshot shows two main sections of the AWS Practice Lab interface:

Left Panel (Step 3: Practice):

- Section Header:** 3 Practice
- Buttons:** START LAB, Lab Files, Steps
- Text:** You will be provided with an AWS account to complete all assignments.
- Section Header:** Highly Available Web Applications
- Text:** STEP 41: Congratulations! You've completed the Practice Section. Go to the DIY section to complete the solution.
- Status Bar:** Step 41/41

Right Panel (Step 4: DIY):

- Section Header:** 4 DIY
- Buttons:** START LAB, Lab Files, DIY Activity
- Text:** You will be provided with an AWS account to complete all assignments.
- Section Header:** Highly Available Web Applications
- Section Header:** DIY ACTIVITIES
- Text:** + Configure an Auto Scaling group to include a new EC2 instance in a third Availability Zone.
- Section Header:** SOLUTION VALIDATION METHODS
- Text:** Validation Process: We will verify that you have deployed an AWS Application Load Balancer (ALB) with a minimum of three Amazon EC2 instances across three Availability Zones.
- Form:** VALIDATION FORM
Put or type the validation criteria below:
 - Your ALB name:
 - Your Auto Scaling group name:
- Buttons:** VALIDATE, SKIP
- Text:** VALIDATION MESSAGE (Empty box)

Connecting VPCs:

Hi! I am the city's Chief Marketing Officer. Thanks so much for coming as soon as you did.

We needed logical isolation of our applications, so we set up separate Amazon Virtual Private Clouds for our Marketing, Development and Finance departments. The problem is that all departments depend on getting reports from Finance.

Due to the isolated Amazon VPCs, Marketing and Development team members have to raise tickets to gain access to Finance reports, which is reducing our productivity. Any ideas on how we can improve this?

Amazon VPC has a feature called VPC peering. After you create a VPC peering connection between two Amazon VPCs, you can then route traffic between the VPCs using private IP addresses.

This sounds great. Can I peer one Amazon VPC to multiple Amazon VPCs?

Yes, you can. However, peering connections are not transitive. This means that if you create peering connections from Marketing to Finance and Development to Finance, no traffic is allowed between Marketing and Development unless you create another peering connection between them.

You can also peer with Amazon VPCs in different accounts. Are you using different accounts for your Amazon VPCs?

No. At this point in time, we aren't using different accounts.

Okay, that's good to know. VPC peering supports peering between multiple accounts in case we add new accounts later.

Thanks! I can't wait to get the financial data we need.

[RETURN TO CITY](#)

[GO TO SOLUTION CENTER](#)

Connecting VPCs

Rewards + Amazon Web Services



+50 Gems



Customization House

Solution Annotations

Configure Amazon VPC peering between the Marketing and Finance networks.

1 Learn

Connecting VPCs
Allow communication between applications hosted in different Amazon VPCs using VPC peering. The Marketing and Developer EC2 instances need to access the Financial Services Server in the Finance VPC.

VIDEO CONCEPTS

Amazon VPC

This solution uses multiple Amazon VPCs for each department (Marketing, Finance and Developer). The VPCs will be connected using VPC peering, allowing the resources in each VPC to communicate with one another.

Amazon VPC Overview

Marketing VPC
Virtual Private Cloud
Marketing Server
CIDR: 10.10.0.0/16

Route table	Destination	Target
	10.10.0.0/16	Local
	172.31.0.0/16	peering

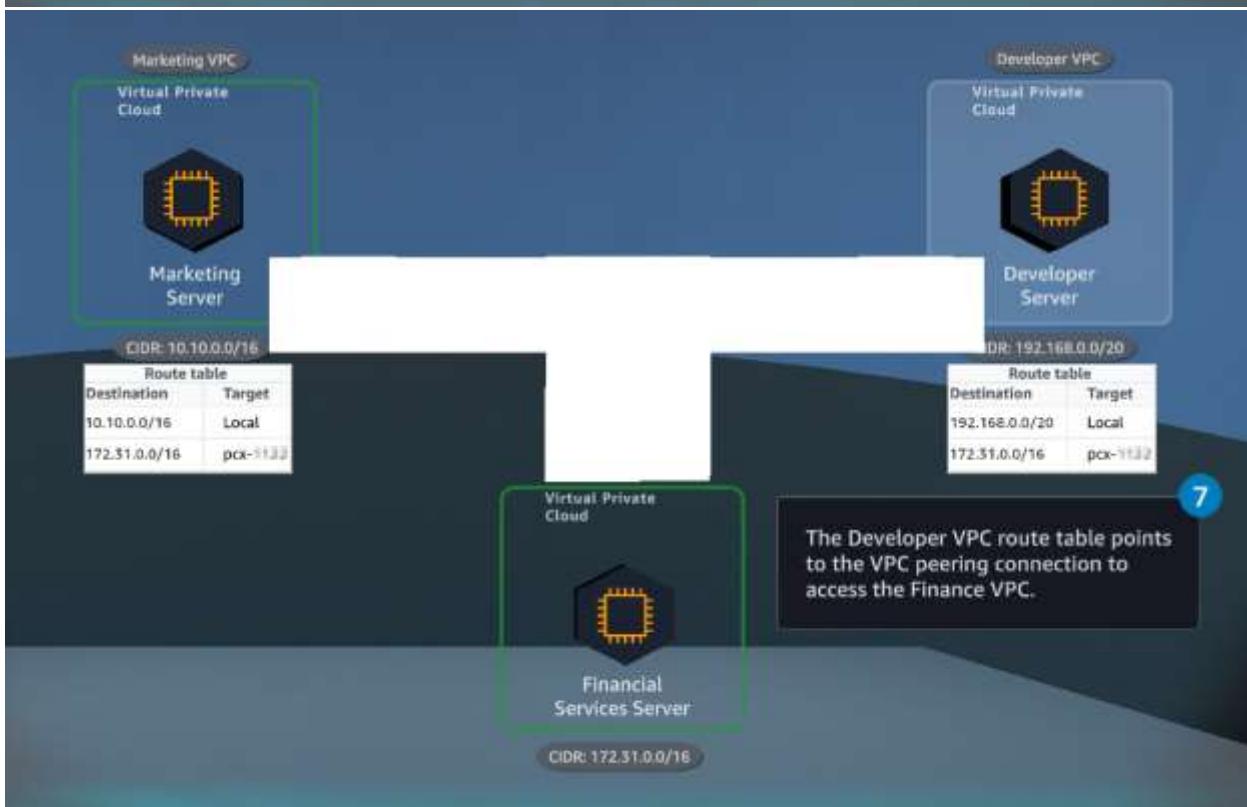
Developer VPC
Virtual Private Cloud
Developer Server
CIDR: 10.10.0.0/16

Route table	Destination	Target
	10.10.0.0/16	Local
	172.31.0.0/16	peering

Financial Services VPC
Virtual Private Cloud
Financial Services Server
CIDR: 172.31.0.0/16

Diagram Steps 1/9 ← → **2 Plan ➞** EXIT









3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files | Steps

Connecting VPCs

STEP 1

1. Review the lab objectives in the concepts field.
2. Click Start Lab to provision your environment, then click Open AWS Console to begin.
3. Please follow the lab instructions carefully and use the arrows below to navigate between steps.

CONCEPT

In this lab you will learn how to:

- Set up an Amazon VPC peering connection.
- Ensure traffic is internally routed within the peering connection.

Step 1/32 | 2 Plan | DIY | EXIT

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 2

1. In the Services search bar, type: **vpc**
2. Under Services, click **VPC**
3. Go to the next step.

CONCEPT

Amazon VPC is a service that lets you launch AWS resources in a logically isolated virtual network that you define. You have complete control over your virtual networking environment.

Step 2/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 3

1. In the left navigation pane, click **Your VPCs**.
2. Review the Marketing, Finance and Developer VPCs.
3. Go to the next step.

CONCEPT

By default, Amazon VPCs are isolated from each other. A VPC peering connection is a networking connection between two Amazon VPCs that enables you to route traffic between them using private IP addresses.

Step 3/52

Name	VPC ID	State	IPv4 CIDR
-	vpc-1effaa563	Available	172.31.0.0/16
connecting-vpc/Finance VPC	vpc-95uffa45905926f9f	Available	172.31.0.0/16
connecting-vpc/Marketing VPC	vpc-0c356090344e120f62	Available	10.10.0.0/16
connecting-vpc/Developer VPC	vpc-08ca5f613ab64fa5	Available	192.168.0.0/20

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 4

1. In the services search bar, type: ec2
2. Under Services, click EC2.
3. Go to the next step.

Search results for 'EC2'

Services (7) Features (35)

Documentation (233,520) Knowledge Articles (28) Marketplace (1,138)

EC2 Virtual Servers in the Cloud

EC2 Image Builder A managed service to automate build, customize and deploy OS images.

EC2 Global View EC2 Global View provides a global dashboard and search functionality that lets you...

AWS Compute Optimizer Recommend optimal AWS Compute resources for your workloads

See all 7 results

Features

Export snapshots to EC2

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 5

1. Click Instances (running).
2. Go to the next step.

New EC2 Experience

EC2 Dashboard

Events Tags Limits

Instances

Instances Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances

Resources

Instances (running) Elastic IPs Key pairs Placement groups Snapshots

Easily size, configure, and deploy Micro...

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 6

1. Under Instances, click to select the Financial Services Server.
2. In the Details tab, review the details of the Financial Services Server.
3. There is no Public IPv4 address, only a Private IPv4 address. Your Financial Services instance does not have access to the internet, so you will need to communicate with it through its private IP 172.31.0.10.
4. Review the Subnet ID of ResourceNotFoundException. Note that it is a private subnet.
5. Go to the next step.

Step 6/32

Name	Instance ID	Instance State	Instance Type	Status check	Alarm status	Availability Zone
Marketing Server	i-000000000000000000	Running	g.0	Pass	No alarms	us-east-1a
Financial Services Server	i-000000000000000001	Running	g.0	Pass	No alarms	us-east-1a
Debugger Server	i-000000000000000002	Running	g.0	Pass	No alarms	us-east-1a

Instance: i-000000000000000001 (Financial Services Server)

Details Security Networking Storage Network interface Monitoring Help

Public IPv4 address: 172.31.0.10

Private IPv4 address: 172.31.0.10 (Financial Services Server)

Subnet ID: subnet-000000000000000000

Review

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 7

- Under Instances, click to select the Marketing Server.
- Under the Details tab, review the Amazon VPC the Marketing Server belongs to.
- Click Connect.
- Go to the next step.

CONCEPT

There are four ways to connect into an Amazon EC2 instance: EC2 instance Connect, Session Manager, an SSH client, and EC2 Serial Console.

EC2 Dashboard

Instances (1/3) **3 Click**

Name	Instance ID	Instance Type	Status Check	Alarm Status
Developer Server	i-02f077a7f177e8bb	t2.micro	initializing	No alarms +
Financial Services Server	i-025aa00000000000d	t2.micro	initializing	No alarms +
Marketing Server	i-022a08f026c453ee1	t2.micro	running	No alarms +

Details **3 Review**

Instance: i-022a08f026c453ee1 (Marketing Server)

Details Security Networking Storage Status Checks Monitoring Tags

Instance summary Info

Instance ID: i-022a08f026c453ee1 (Marketing Server) Public IPv4 address: 3.211.255.21 (open address) Private IPv4 address: 10.10.10.10 Public IPv4 DNS: ec2-3-215-255-21.compute-1.amazonaws.com (open address) Instance status: running Private IP DNS name (IPv4 only): ip-10-10-0-10.us-east-1.vpc.ec2.internal Instance type: t2.micro Public IP address: 3.211.255.21 (Public IP) Instance private resource DNS name: VPC ID: vpc-0308023e050746347 (Subnet: 162e1b0) (Marketing VPC)

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 8

- Click the EC2 Instance Connect tab.
- Click Connect.
- Go to the next step.

CONCEPT

Amazon EC2 Instance Connect provides a secure way to connect to your Linux instances using Secure Shell (SSH). With EC2 Instance Connect, you use AWS Identity and Access Management policies and principals to control SSH access to your instances, removing the need to share and manage SSH keys. All connection requests using EC2 Instance Connect are logged to AWS CloudTrail so you can audit connection requests.

EC2 Instances > i-0764fe30da20c85k7 > Connect to instance

Connect to instance **3 Click**

EC2 Instance Connect Session Manager SSH client EC2 Serial Console

Instance ID: i-0764fe30da20c85k7 (Marketing Server) Public IP address: 3.214.91.245 User name: ec2-user

Connecting using a custom user name, or use the default user name ec2-user for the AMI used to launch the instance.

Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Cancel **3 Click** Connect

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 9

- Type the following command into the terminal, then press [Enter]:

```
ping 172.31.0.10
```

- 172.31.0.10 is the private IPv4 address of the Financial Services Server.
- Review that your command hangs and there is no connection.

- Press Ctrl+C on your keyboard while in the terminal to terminate the command.
- Go to next the step.

2 Review

3 Go to next the step.

CONCEPT

By default, Amazon VPCs cannot communicate with resources in other Amazon VPCs using private IPv4 addresses or IPv6 addresses. In this case the Financial Services Server doesn't have a public IP, therefore your Amazon VPCs are unaware how to route data to private IP destinations outside of their own private range.

Step 9/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 10

- Return to the Amazon EC2 Instances page. Under instance ID, click the Marketing Server instance ID.
- Go to the next step.

1 Click

Step 9/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 11

1. Click the Subnet ID with the name: MarketingPublicSubnet1.
2. Go to the next step.

CONCEPT

Amazon EC2 instances reside within a subnet. A subnet is a range of IP addresses in your Amazon VPC.

Step 11/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 12

1. Under Subnets, click the checkbox to choose the subnet named MarketingPublicSubnet1.
2. In the Details tab, click the Route table named MarketingPublicSubnet1.
3. Go to the next step.

CONCEPT

One important property of a subnet is its route table. A route table contains a set of rules called routes. Routes are used to determine where network traffic from your subnet or gateway is directed.

Step 12/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

1. Click the Routes tab.
2. Review the routing rules.

- There are two routes: one for the local traffic and one for the internet traffic through the internet gateway.

3. Go to the next step.

CONCEPT

Route tables will have rules for local traffic and public IP ranges if a gateway is attached. Note that AWS recommends that you specify a CIDR block from the private IPv4 address ranges as specified in RFC 1918.

Step 13/32

Destination	Target	Status	Propagated
0.0.0.0/16	local	Active	No
0.0.0.0/0	igw-Dev01.us-east-2.vpc.0000000000000000	Active	No

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 14

1. In the left navigation pane, click Peering Connections.
2. Click Create peering connection.
3. Go to the next step.

CONCEPT

Instances in either Amazon VPC can communicate with each other as if they are within the same network.

Step 14/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 15

1. In the Peering connection settings, under Name, type: Marketing <-> Finance
2. Under VPC ID (Requester), choose the Marketing VPC.
3. Review that the Marketing VPC has 10.10.0.0/16 as its CIDR range.
4. Under VPC ID (Accepter), choose the Finance VPC.
5. Review that Finance VPC has 172.31.0.0/16 as its CIDR range.
6. Scroll down to the bottom of the page.
7. Go to the next step.

Step 15/32

Peering connection settings

Name - optional
Marketing <-> Finance **[Type]**

Select a local VPC to peer with
VPC ID Requester:
vpc-0f833baa0f0e70ff [Subnet-162e1bdc/Marketing VPC] **[Choose]**

VPC CIDRs for vpc-0f833baa0f0e70ff [Subnet-162e1bdc/Marketing VPC]

CIDR	Status	Status reason
10.10.0.0/16	Review	Associated

Select another VPC to peer with
Account:
 My account
 Another account

Region:
 This Region (us-east-1)
 Another Region

VPC ID Accepter:
vpc-0e5372f2d275cbca2 [Subnet-162e1bdc/Finance VPC] **[Choose]**

VPC CIDRs for vpc-0e5372f2d275cbca2 [Subnet-162e1bdc/Finance VPC]

CIDR	Status	Status reason
172.31.0.0/16	Review	Associated

CONCEPT

Your Amazon VPC will request that another Amazon VPC allow access to its resources. The Amazon VPC making the request is called the Requester. You can request access to Amazon VPCs from other AWS accounts.

Step 15/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 16

1. Click Create peering connection.
2. Go to the next step.

Step 16/32

Create peering connection

My account
 Another account

Region:
 This Region (us-east-1)
 Another Region

VPC ID (Accepter):
vpc-0e5372f2d275cbca2 [Subnet-162e1bdc/Finance VPC]

VPC CIDRs for vpc-0e5372f2d275cbca2 [Subnet-162e1bdc/Finance VPC]

CIDR	Status	Status reason
172.31.0.0/16	Associated	-

Tags

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional
<input type="text"/> Name	<input type="text"/> Marketing <-> Finance X [Remove]

Add new tag

You can add 48 more tags.

Create peering connection **[Click]**

Connecting VPCs

STEP 17

1. Return to the Peering connections page. Click to select the peering connection with the name Marketing <> Finance.
2. Review that the Status shows Pending acceptance.
3. Click to expand Actions.
4. In the Actions dropdown menu, choose Accept request.
5. Go to the next step.

CONCEPT

To request a VPC peering connection with an Amazon VPC in your account, ensure that you have the IDs of the Amazon VPCs with which you are creating the peering connection. You must both create and accept the VPC peering connection request yourself to activate it. If the peering connection is across accounts, both accounts must accept the connection to activate it.

Step 17/32

3 Practice

START LAB

You will be provided with an AWS account to complete all requirements.

Lab Files **Steps**

Connecting VPCs

4. In the Actions dropdown menu, choose Accept request.
5. Go to the next step.

CONCEPT

To request a VPC peering connection with an Amazon VPC in your account, ensure that you have the IDs of the Amazon VPCs with which you are creating the VPC peering connection. You must both create and accept the VPC peering connection request yourself to activate it. If the peering connection is across accounts, both accounts must accept the connection to activate it.

Step 17/32

The screenshot shows the AWS VPC Peering Connections page with one entry listed:

Name	Peering connection ID	Status	Request
Marketing <> Finance	pea-000094a7a82c355323	Pending acceptance	Accept request

A large orange arrow points from the "Accept request" button to a callout box titled "Pending acceptance". The callout box contains the text: "You can accept or reject this peering connection request using the Actions menu. You have until Monday, September 20, 2021, 13:18:38 EDT. To accept or reject the request, otherwise it expires." Below the callout box are tabs for Details, Classification, DNS, Route tables, and Tags, with "Details" selected.

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 18:

1. Click Accept request.
2. Go to the next step.

Accept VPC peering connection request

Are you sure you want to accept this VPC peering connection request? (qa-0b115/Marketing / Marketing -> Finance)

Requester VPC	Accepter VPC	Requester CIDR	Accepter Region
qa-0b115/Marketing / Marketing VPC	qa-0b115/172.27.0.0/24 / qa-0b115/Finance VPC	172.0.0.0/16	N. Virginia (us-east-1)
Requester owner ID	Accepter owner ID	Requester owner ID	Accepter owner ID
447948861661 (This account)	847848851983 (This account)	447948861661 (This account)	847848851983 (This account)

Cancel **Accept request** Click

Step 18/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 19:

1. In the left navigation pane, click Route tables.
2. Under Route tables, to search the route table by name, type the following and then press (Enter).

MarketingPublicSubnet1

3. Go to the next step.

Route tables (1/8) Click

MarketingPublicSubnet1

Name	aws:cloudformation:logical-id	Edge associations	Main
connecting-vpc/MarketingVPC/MarketingPublicSubnet1RouteTable04478826			No
connecting-vpc/Fin...	rtb-03a5732cafb88267b8	subnet-08fc523c5d764...	No
connecting-vpc/Fin...	rtb-0845e7f55495266d	subnet-0d0123e81d1d...	No
connecting-vpc/Ma...	rtb-0ac21377196e7a23	subnet-0f89113826e8...	No
	rtb-0c18185d528e9940	-	No
	rtb-0d23994825fb8880	-	Yes
connecting-vpc/Fin...	rtb-083347014923f114	subnet-0161239819e6...	No

rtb-0ac21377196e7a23 / connecting-vpc/Marketing VPC/MarketingPublicSubnet1

Details **Routes** **Subnet associations** **Edge associations** **Route propagation** **Tags**

Routes (0)

Destinations **Target** **Status** **Propagated**

Step 19/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 20

- Under Route tables, review that the route table MarketingPublicSubnet1 is found.
- Click the Routes tab.
- Click Edit routes.
- Go to the next step.

CONCEPT

After you establish a peering connection, you must modify the route table associated with each Amazon VPC. You must add a route into each route table to allow traffic to be routed to the peered Amazon VPC.

Step 20/32

Route tables (1/1) Info Actions Create route table

Name: connecting-vpc/Marketing VPC/MarketingPublicSubnet1 Clear filters

Name	Route table ID	Explicit subnet associat...	Tags associations	Main
connecting-vpc/Ma...	rta-0ae2fb3771b4e7a2	subnet-088113c3ea...	-	No

rtb-0ae2fb3771b4e7a2 connecting-vpc/Marketing VPC/MarketingPublicSubnet1

Details Routes (1)

Destination Target Status Propagated

172.31.0.0/16 0.0.0.0/0 local Active No

3. Click 5. Click Edit routes

Feedback Learning for language assignment! Find it in the new Unified Settings. © 2021 Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookies preferences

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 21

- Click Add route.
- Under Destination, type: 172.31.0.0/16
- In the Target search field, type: pcx
- Choose the peering connection with the name Marketing <-> Finance.
- Click Save changes.
- Go to the next step.

CONCEPT

Route tables have a target: The gateway, network interface, or connection through which to send the destination traffic. Peering connections are one type of connection that can be used as a target.

Step 21/32

VPC > Route tables > rtb-0ae2fb3771b4e7a2 > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.10.0.0/16	local	Active	No
0.0.0.0/0	Type	Active	No
172.31.0.0/16	pcx	Active	No

Add route 1. Click 4. Choose 6. Click Save changes



Step 21/32



3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 22:

1. In the left navigation pane, click Route tables.
2. To search the route table by name, type the following and then press [Enter]: **FinancePrivateSubnet1**.
3. Go to the next step.

Name	Route table ID	Target	Status	Propagated
connecting-vpc/FIn...	rtb-0e000000000000000000000000000000	subnet-00000000000000000000000000000000	Yes	No
connecting-vpc/FIn...	rtb-09210e52040920f	subnet-07307903500000000000000000000000	No	No
connecting-vpc/FIn...	rtb-00000000000000000000000000000000	subnet-00000000000000000000000000000000	No	No
connecting-vpc/FIn...	rtb-00000000000000000000000000000000	subnet-00000000000000000000000000000000	No	No

Select a route table

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files Steps

Connecting VPCs

STEP 23:

1. Under Route tables, review that the route table **FinancePrivateSubnet1** is found.
2. Click the Routes tab.
3. Click Edit routes.
4. Go to the next step.

CONCEPT

The route tables for each Amazon VPC must be modified to allow traffic across the peering connection.

Name	Route table ID	Target	Status	Propagated
connecting-vpc/FIn...	rtb-0e000000000000000000000000000000	subnet-00000000000000000000000000000000	No	No

rtb-0c0b62a 2. Click **connecting-vpc/finance VPC/FinancePrivateSubnet1**

Details **Routes** Subnet associations Edge associations Route propagation Tags

Routes (2)

Destination Target Status Propagated

172.31.0.0/16 local Yes No

1 Click Edit routes

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 24

1. Click Add route.
2. Under Destination, type: 10.10.0.0/16
3. In the Target search field, type: pcx-
4. Choose the peering connection named Marketing > Finance.
5. Click Save changes.
6. Go to next the step.

1 Click 1 Type 1 Choose 1 Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 25

1. Return to the Amazon EC2 Instances page, click to select the Marketing Server.
2. Click Connect.
3. Go to the next step.

1 Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 26

1. Under Connect to instance, in the EC2 Instance Connect tab, click Connect.
2. Go to the next step.

1 Click

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 27

- Type the command below, then press [Enter].

```
ping 172.31.0.10
```

- Review that the ping command is still not working.
- Press Ctrl+C to terminate the command.
- Go to the next step.

CONCEPT

Just because Amazon VPCs are peered doesn't mean that all data is accepted. Security features such as network access control lists and security groups will still apply. Be sure to update them accordingly.

Step 27/32

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Step 27/32

3 Practice

START LAB

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Lab Files **Steps**

Connecting VPCs

STEP 28

- Return to the Amazon EC2 Instances page, then click to select the Financial Services Server.
- Click the Security tab.
- Click the security group with the name `FinanceServerSecurityGroup`.
- Go to the next step.

CONCEPT

Security groups do not automatically accept data from peered Amazon VPCs. You must update security groups to allow your peered Amazon VPC as an incoming source.

Step 28/32

Connecting VPCs

STEP 29

1. Click the Inbound rules tab.
2. Review your inbound rules.

- There are two inbound rules: one allowing the HTTP traffic through port 80 and the other allowing SSH traffic through port 22.

3. Click Edit inbound rules.
4. Go to the next step.

CONCEPT

Security groups are stateful—if you send a request from your instance, the response traffic for that request is allowed to flow in regardless of the inbound rules. This also means that responses to allowed inbound traffic are allowed to flow out, regardless of the outbound rules.

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START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

1. Click Add rule.
2. Click to expand Type and then in the dropdown menu, choose All ICMP - IPv4.
3. In the Source textbox, type: 10.10.0.0/16
4. Click Save rules.
5. Go to the next step.

CONCEPT

Security group rules are always permissive; you can't create rules that deny access. Security group rules enable you to filter traffic based on protocols and port numbers.

Step 29/32

Step 30/32

3 Practice

START LAB

You will be provided with an AWS account to complete all assignments.

Lab Files **Steps**

Connecting VPCs

STEP 31

1. Return to the Amazon EC2 instance page, then connect to the Marketing Server using EC2 Connect.
2. In the terminal, type the following command and press [Enter]:

```
ping 172.31.0.10.
```

3. Review the data showing the Marketing Server is able to communicate with the Financial Services Server.
4. To terminate the ping command, press:

Ctrl+C

Step 31/32 **←** **→**

4 Type

```
ping: statistics ...
0 packets transmitted, 0 received, 0% packet loss, time 1741ms
rtt min/avg/max/mdev = 0.337/0.443/0.629/0.357 ms
[ec2-user@ip-10-10-0-10 ~]$
```

3 Review

i-0615b19d82e8213da (Marketing Server)

Public IP: 3.225.214.21 Private IP: 10.10.0.10

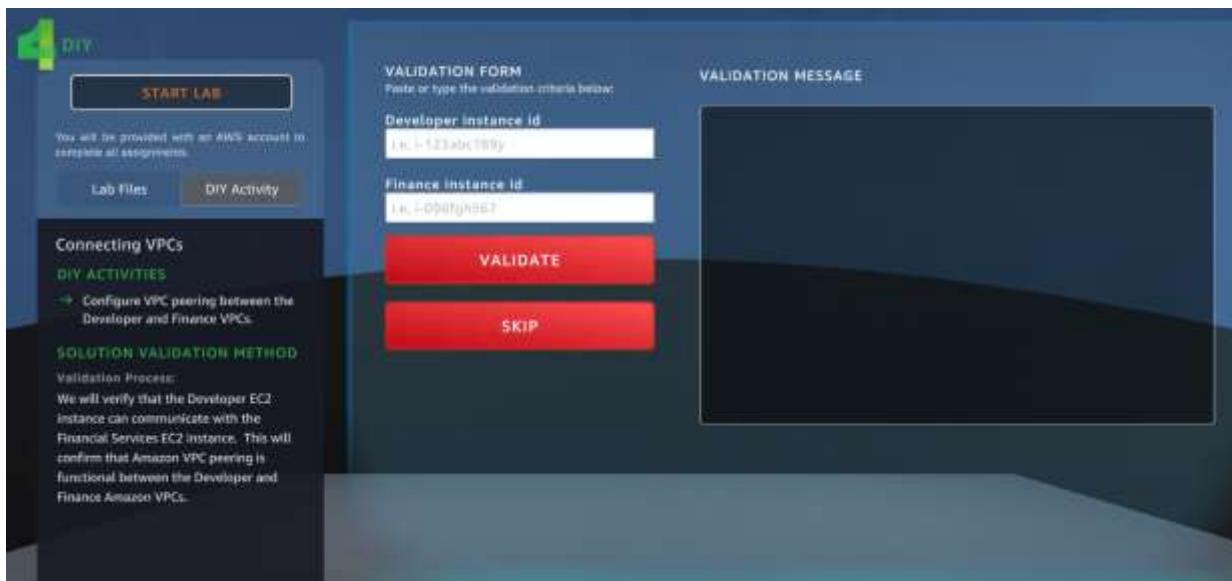
CONCEPT

Your services can communicate once your Amazon VPCs are peered, and security groups allow the correct traffic. Remember, if you need to add different traffic types, you will have to change the inbound rules of your security groups.

5. Go to the next step.

Congratulations!

You've completed the Practice Section. Go to the DIY section to complete the solution.



Financial EC2:

subnet id: subnet-0976b6512b9c44f26

[subnet-0976b6512b9c44f26 \(connecting-vpc/Finance VPC/FinancePrivateSubnet1\)](#)

ping 172.31.0.10

[subnet-015e7bbcb34dc4e0 \(connecting-vpc/Marketing VPC/MarketingPublicSubnet1\)](#)

Route table

[rtb-0404e19af77950d58 | connecting-vpc/Marketing VPC/MarketingPublicSubnet1](#)

- [sg-0449f52f1c951ab9f \(FinanceServerSecurityGroup\)](#)



credly.com/earner/earned/badge/5749ee15-75b0-4e6e-bd53-142b3a631369

A screenshot of the Credly platform showing the same "Cloud Practitioner" badge. It includes the Credly logo, a user profile icon, and a search bar. Below the badge, it says "This badge was issued to Shyam Patidar on October 28, 2022" and "Accepting a badge adds it to your profile. You can edit your privacy settings after accepting." There is a "Accept Badge" button.

AWS Cloud Quest: Cloud Practitioner

Issued by [Amazon Web Services Training and Certification](#)

Earners of this badge have demonstrated basic solution building knowledge using AWS services and have a fundamental understanding of AWS Cloud concepts. Badge earners have acquired hands-on experience with compute, networking, database and security services.

[Learn more](#)

This section shows the detailed view of the badge on the Credly platform, including the badge name, issuer, description, and a link to learn more.

Progress
Badges
Pets
Challenges
Service Cards
Knowledge Library

X

Skill Path Progress

12/13
Cloud Practitioner
100%

12 RP to Level 20

11/14
Solutions Architect
49%

Total Reputation Points (RP) 20

8/22
Serverless Developer
38%

Total Reputation Points (RP) 20

7/21
Machine Learning
33%

Total Reputation Points (RP) 20

[Open Roles Map](#)

AWS Reputation Level

Level 19

12 RP to Level 20
Total Reputation Points (RP) 20

Reputation Points by Service:	
Amazon EC2: 90	Amazon S3: 51
Amazon VPC: 20	Amazon Relational Database Service (RDS): 20
Amazon DynamoDB: 10	Amazon Elastic File Systems: 10
Amazon Identity and Access Management (IAM): 10	Elastic Load Balancing (ELB): 10
VPC: 10	

Builder Level

Transition to Level 8
Builder Level 8

Total Solutions Built: 12

Solutions Built:

- Highly Available Web Applications: Improve the user experience by implementing a highly available web application architecture.
- High-Speed Database: Optimize the query processing speed of your database by using a distributed database system.
- Relational Database: Implement a reliable and efficient relational database system.
- Cloud Economics: The cloud cost calculator provides a detailed analysis of your costs.
- File Systems in the Cloud: How to use Amazon S3 and Amazon EBS for managing storage.
- Databases in Practice: Improve the performance and reliability of your databases.
- Data Security Concepts: Understand the concepts of data security.
- Auto-healing and Scaling: Implement auto-scaling and self-healing capabilities.

Builder Level



1 solution to Level 9

Builder Level 8

Total Solutions Built: 12

Solutions Built:

Highly Available Web Applications

Help the travel agency create a highly available web application architecture.

First NoSQL Database

Help the island's streaming entertainment service implement a NoSQL database to develop new features.

Networking Concepts

Help the bank setup a secure networking environment which allows communication between resources and the internet.

Cloud Economics

The city's surf board shop needs a cost estimation of an architecture with variable resource usage.

File Systems in the Cloud

Help the city's pet modeling agency share file data without provisioning or managing storage.

Databases in Practice

Improve the insurance company's relational database operations, performance, and availability.

Core Security Concepts

Auto-healing and Scaling Applications

Help the city's pet modeling agency share file data without provisioning or managing storage.

Builder Level



1 solution to Level 9

Builder Level 8

Total Solutions Built: 12

Solutions Built:

Core Security Concepts

Help improve security at the city's stock exchange by ensuring that support engineers can only perform authorized actions.

Auto-healing and Scaling Applications

Assist the city's gaming cafe with implementing auto healing servers while restricting patrons to a specific provisioning capacity.

Cloud Computing Essentials

The city's web portal needs to migrate the beach wave size prediction page to AWS to improve reliability.

Computing Solutions

The school server that runs the scheduling solution needs more memory. Assist with vertically scaling their Amazon EC2 instance.

Connecting VPCs

The city's marketing team wants separate Amazon VPCs for each department that also allows communication between the Amazon VPCs.

Cloud First Steps

The island's stabilization system is failing and needs increased reliability and availability for its computational modules.

Knowledge Library

Role: Cloud Practitioner

Cloud Computing Essentials



The city's web portal needs to migrate the beach wave size prediction page to AWS to improve reliability.

[WATCH VIDEOS](#)

[REPLAY LAB](#)

Cloud First Steps



The island's stabilization system is failing and needs increased reliability and availability for its computational modules.

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Computing Solutions



The school server that runs the scheduling solution needs more memory. Assist with vertically scaling their Amazon EC2 instances.

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Networking Concepts



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Connecting VPCs



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Databases in Practice

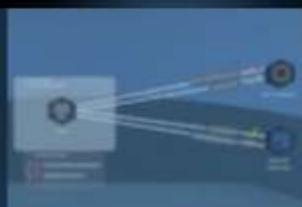


Improve the insurance company's relational database operations, performance, and availability.

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[REPLAY LAB](#)

Core Security Concepts



Help improve security at the city's stock exchange by ensuring that support engineers can only perform authorized actions.

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File Systems in the Cloud

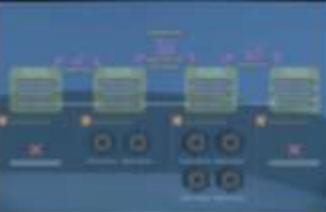


Help the city's pet modeling agency share file data without provisioning or managing storage.

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[REPLAY LAB](#)

Auto-healing and Scaling Appl

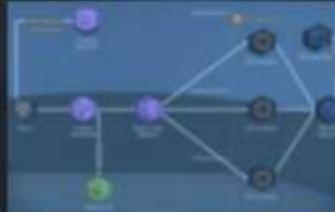


Assist the city's gaming cafe with implementing auto healing servers while restricting patrons to a specific provisioning capacity.

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Highly Available Web Application



Help the travel agency create a highly available web application architecture.

[WATCH VIDEOS](#)

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