

## Assignment 1

ACCEPTANCE CRITERIA – Include the followings in the PDF:

- Web page that shows your name. The web app in EC2.
- Lambda that returns your friends names.
- S3 bucket URL.

You will submit screenshots of the core steps in one PDF for all assignments.

I recommend you **delete resources once you are done**. Otherwise, it will continue to incur charges.

### Task 1 – IaaS (EC2) – Launch a simple web app on EC2

- Spin up an EC2 instance.
  - a. Allow HTTP:80 port from the world (0.0.0.0/0) in the Network Setting panel.
- Connect to the instance. There are 4 ways to connect to your server, SSH, EC2 connect, IAM.  
Refer: [Connect to your Linux instance](#)
- Configure a web server on EC2.

```
sudo -s => Logging as a root user so you can execute any command
yum install httpd -y => Installing an Apache web server package
service httpd start => Starting the server
cd /var/www/html => Changing the directory to customize the default page.
nano index.html => Create the index.html and write your name here as HTML.
```

If the web app is not responding:

- Make sure you are making <http://<your ip>>, not **https** in your browser.
- Check Security Group if it allows port 80.

### Task 2 – FaaS (Lambda) – Simple API with Lambda function URL

Create a lambda function that returns an array of strings. Make it an API by enabling the public URL.

Refer: [Creating and managing Lambda function URLs](#)

- a. Enable URL and enable **CORS**

### Task 3 – Deploying a static website in S3

Call the API in Lambda from the React app and deploy the app in S3. Refer: [Hosting a static website using Amazon S3](#)

- b. Install NodeJS on your laptop
- c. `npx create-react-app appname`
- d. `npm install axios`
- e. `npm start` – to start your front-end app
- f. `npm run build` – after testing, build the app
- g. create a bucket and deselect “Block public access”
- h. drop all files inside the build folder into the bucket.
- i. Write a policy that makes all objects in the bucket public. Refer to the next section.
- j. Enable “static website hosting” and define the index.html as the index and error page.

If you google, you will find examples of these 3 tasks all over the internet.

### Task 4 – Take a screen shot of tasks and TERMINATE the EC2 instance and clean up.

## Snippets

The bucket policy that makes all objects inside it public:

```
{
  "Id": "Policy1650912821527",
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "Stmt1650912820312",
      "Action": [
        "s3:GetObject"
      ],
      "Effect": "Allow",
      "Resource": "arn:aws:s3:::<yourbucket>/*",
      "Principal": "*"
    }
  ]
}
```

The React web app:

```
import axios from "axios";
import { useEffect, useState } from "react";

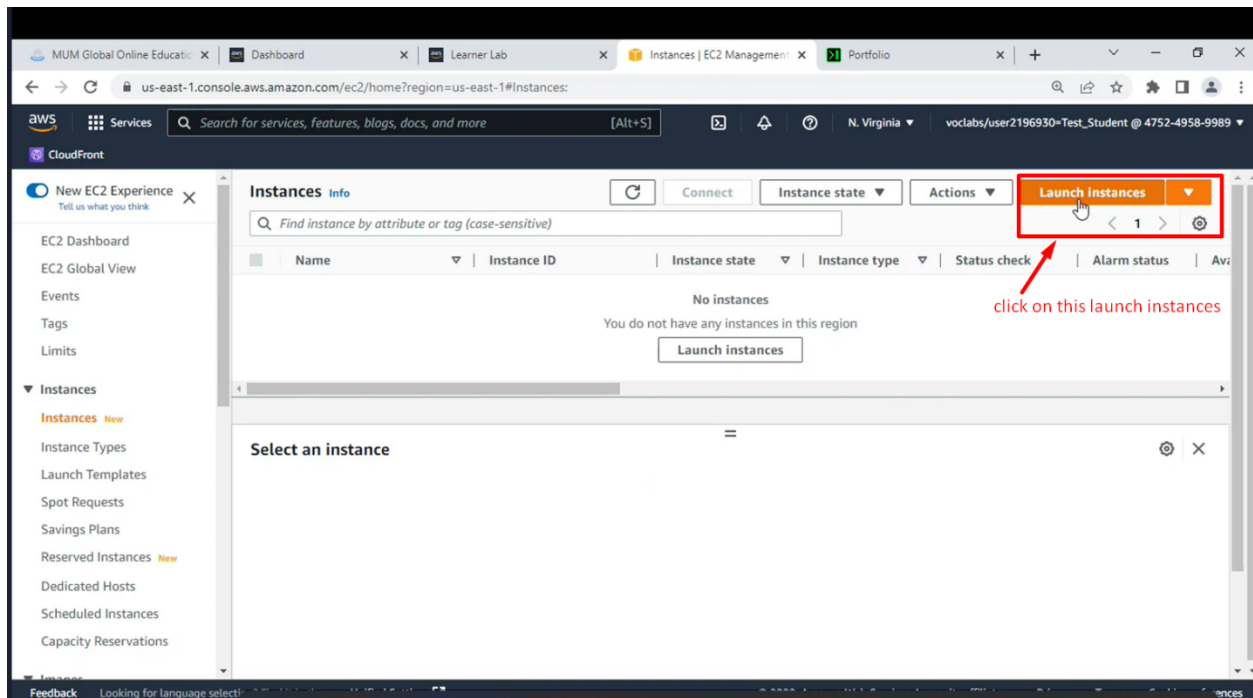
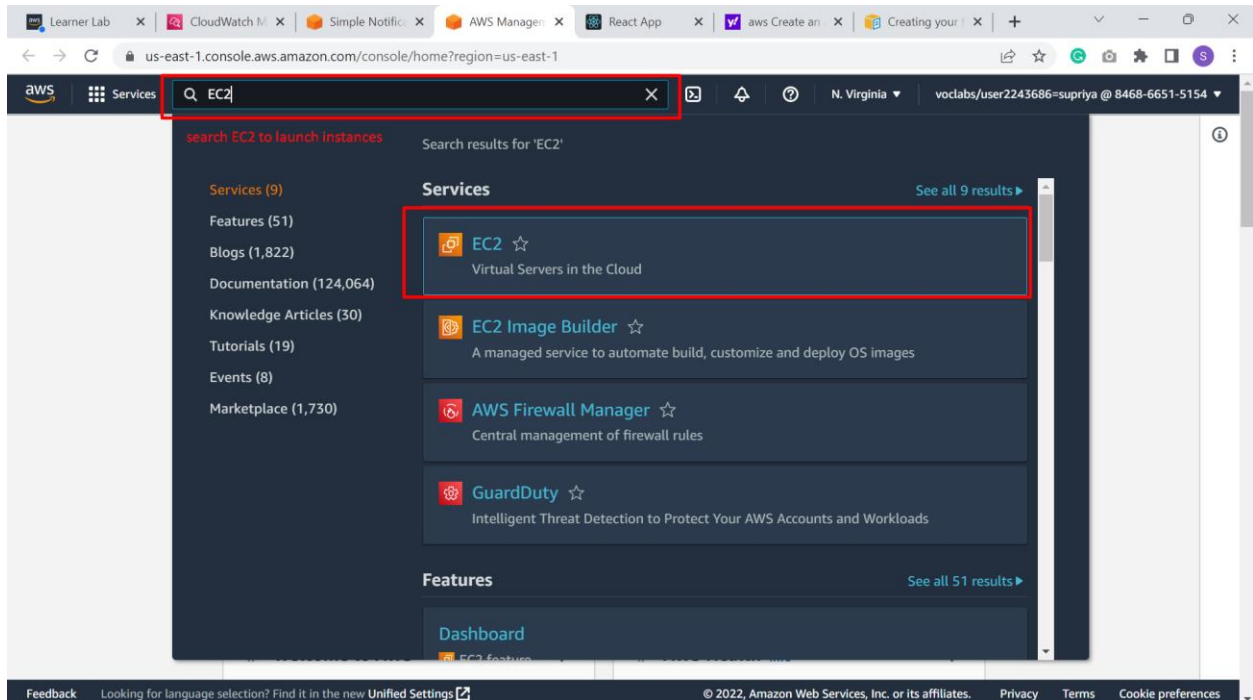
export default function App() {
  const [students, setstudents] = useState([]);

  useEffect(() => {
    async function fetchStudents() {
      const studentsFromLambda = (
        await axios.get(
          "<your lambda URL>"
        )
      ).data;
      setstudents(studentsFromLambda);
      console.log(studentsFromLambda);
    }

    fetchStudents();
  }, []);
  return (
    <div>
      Cloud Computing course
      <ol>
        {students.map((student) => (
          <li>{student}</li>
        ))}
      </ol>
    </div>
  );
}
```

## Setting up a web server on EC2

Step-by-step instructions for you to refer. There are many ways to achieve the same result. You don't have to follow it. It will waste a lot of time. Instead, you can do it on your own without following it step by step since you paid careful attention in class and understood the idea.



MUM Global Online Education | Dashboard | Learner Lab | EC2 Management Console | Portfolio

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Search for services, features, blogs, docs, and more [Alt+S]

N. Virginia | voclabs/user2196930-Test\_Student @ 4752-4958-9989

CloudFront

Search our full catalog including 1000s of application and OS images

**Quick Start** for developer select default Amazon Linux

Amazon Linux macOS Ubuntu Windows Red Hat

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type  
ami-09d3b3274b6c5d4aa (64-bit (x86)) / ami-081dc0707789c2daf (64-bit (Arm))  
Virtualization: hvm ENA enabled: true Root device type: ebs

Free tier eligible

Description  
Amazon Linux 2 Kernel 5.10 AMI 2.0.20221004.0 x86\_64 HVM gp2

Architecture AMI ID  
64-bit (x86) ami-09d3b3274b6c5d4aa Verified provider

**Summary**

Number of instances Info  
1

Software Image (AMI)  
Amazon Linux 2 Kernel 5.10 AMI...read more  
ami-09d3b3274b6c5d4aa

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
New security group

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

MUM Global Online Education | Dashboard | Learner Lab | EC2 Management Console

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Search for services, features, blogs, docs, and more [Alt+S]

CloudFront

Amazon Linux 2 Kernel 5.10 AMI 2.0.20221004.0 x86\_64 HVM gp2

Architecture AMI ID  
64-bit (x86) ami-09d3b3274b6c5d4aa Verified provider

**▼ Instance type Info**

Instance type

t2.micro Free tier eligible  
Family: t2 1 vCPU 1 GiB Memory  
On-Demand Linux pricing: 0.0116 USD per Hour  
On-Demand Windows pricing: 0.0162 USD per Hour

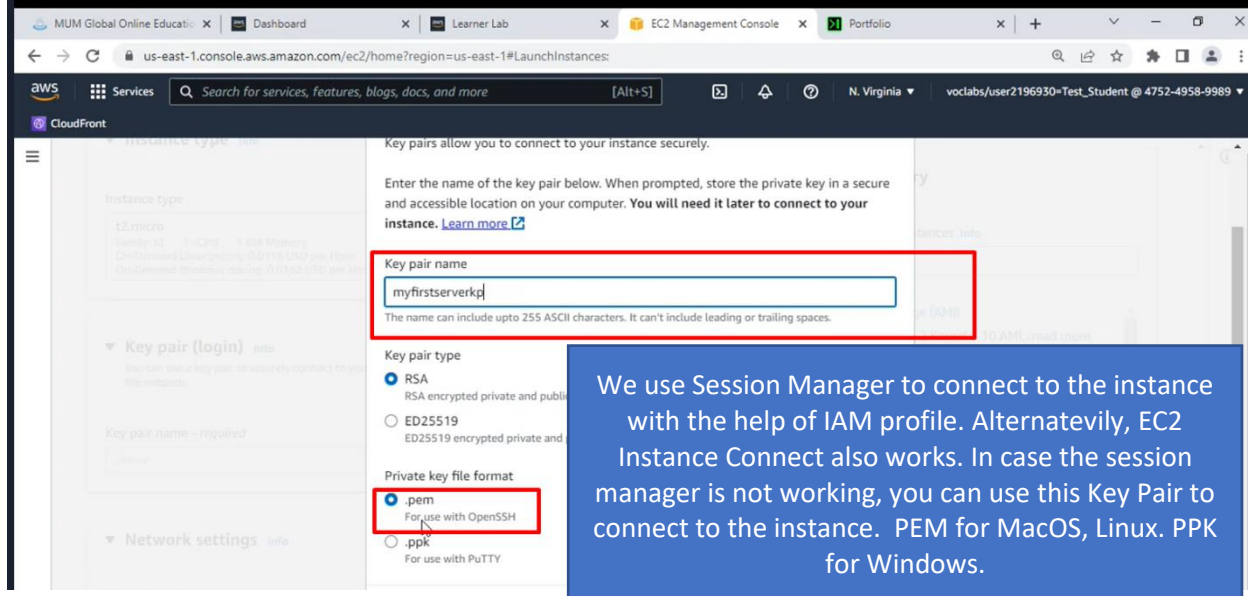
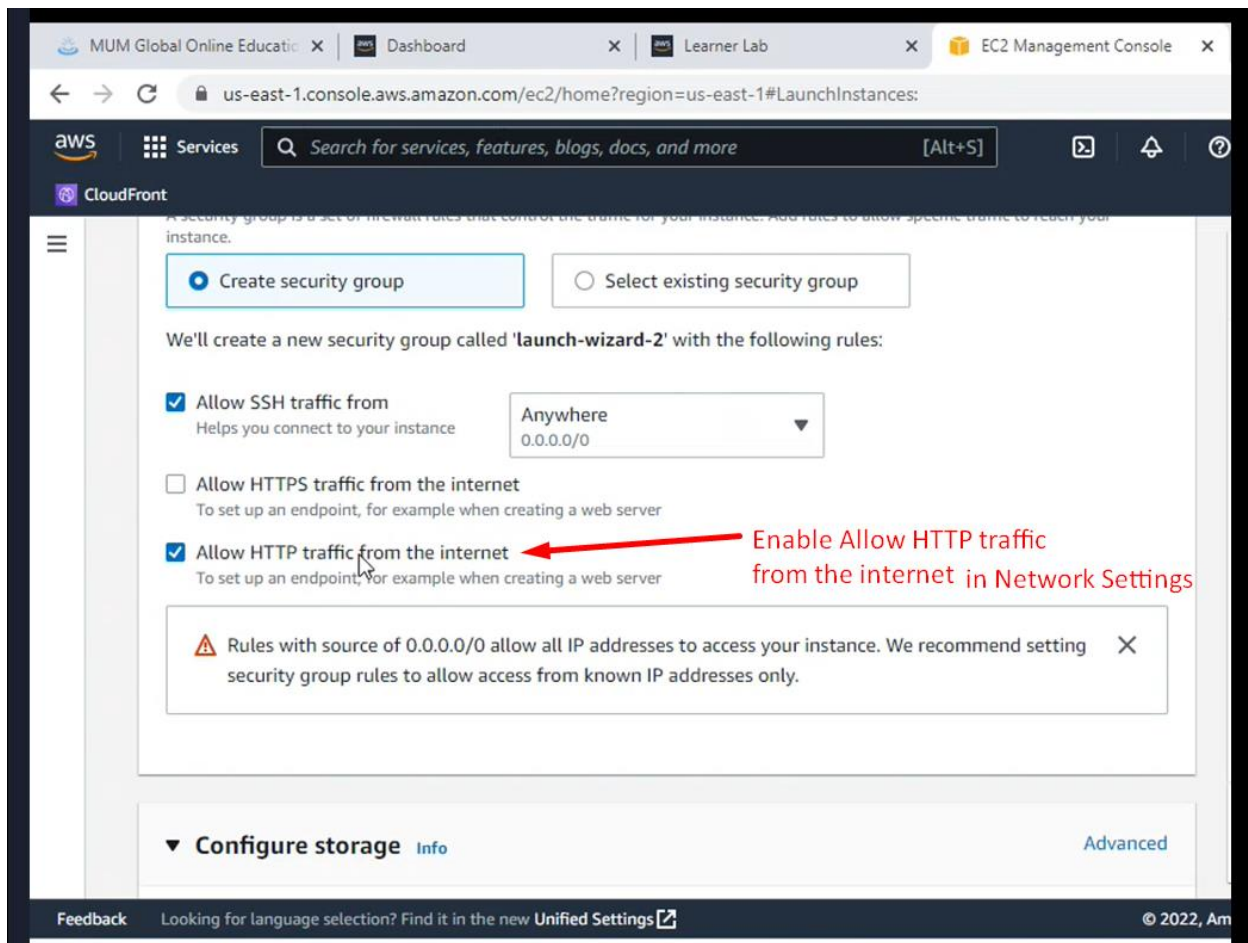
Compare instance types

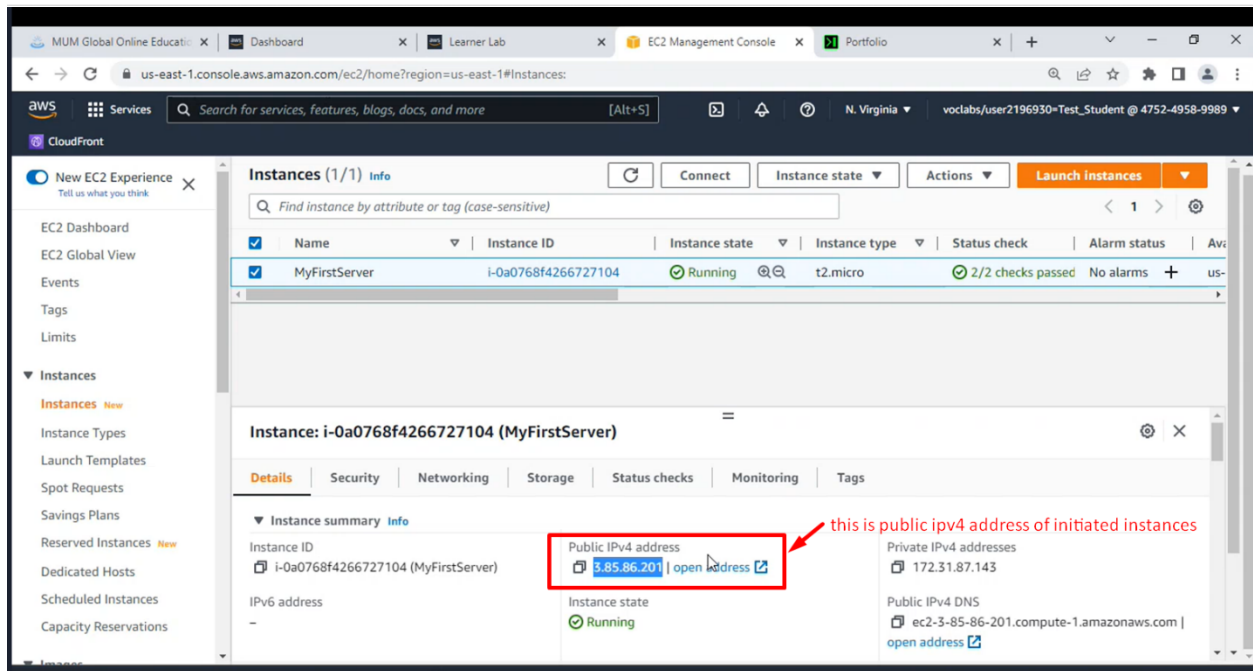
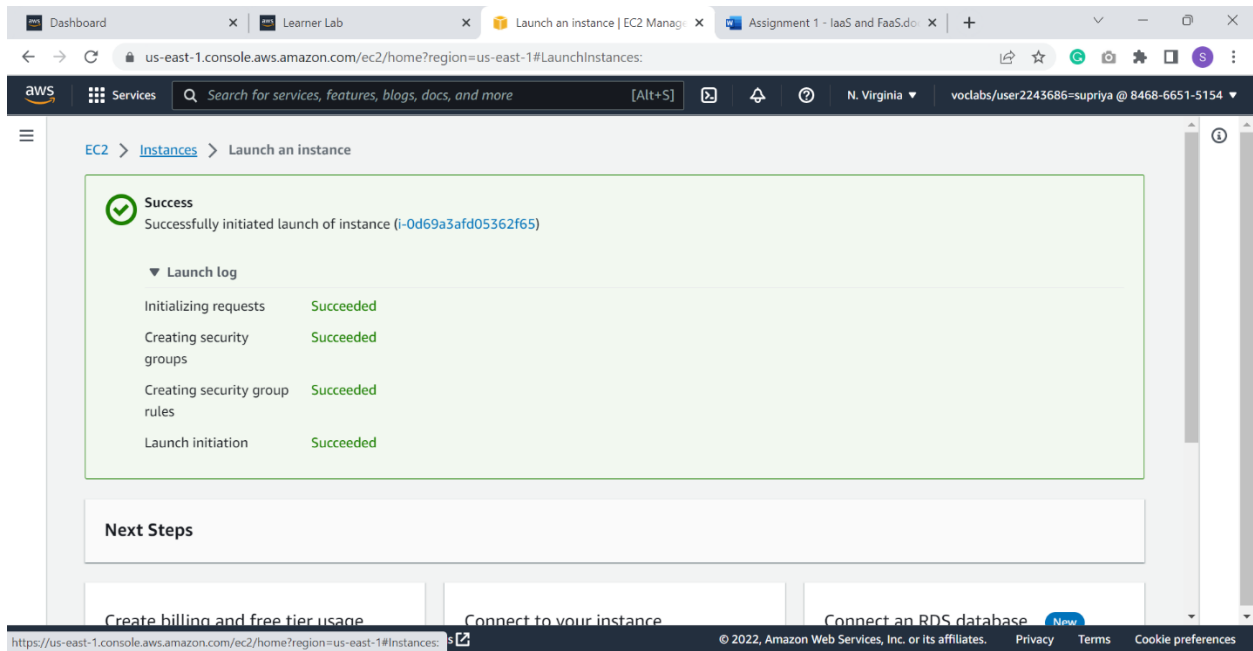
**▼ Key pair (login) Info**

You 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.

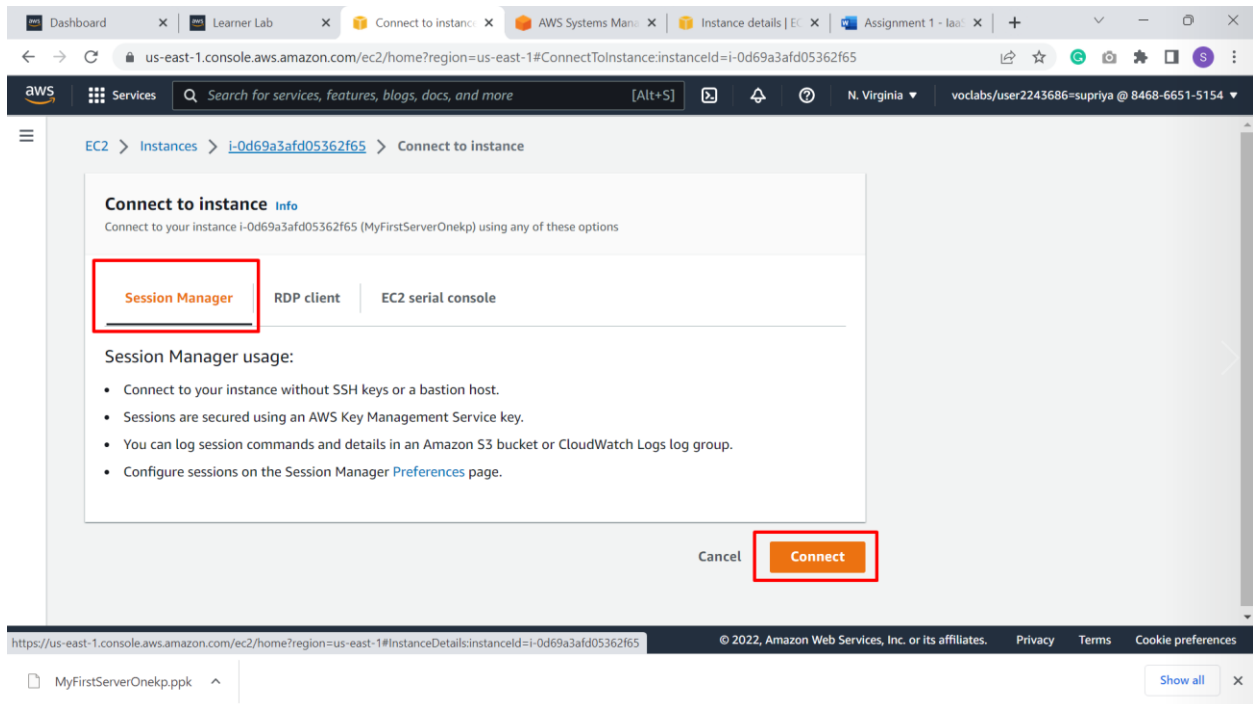
Key pair name - required  
Select

Create new key pair

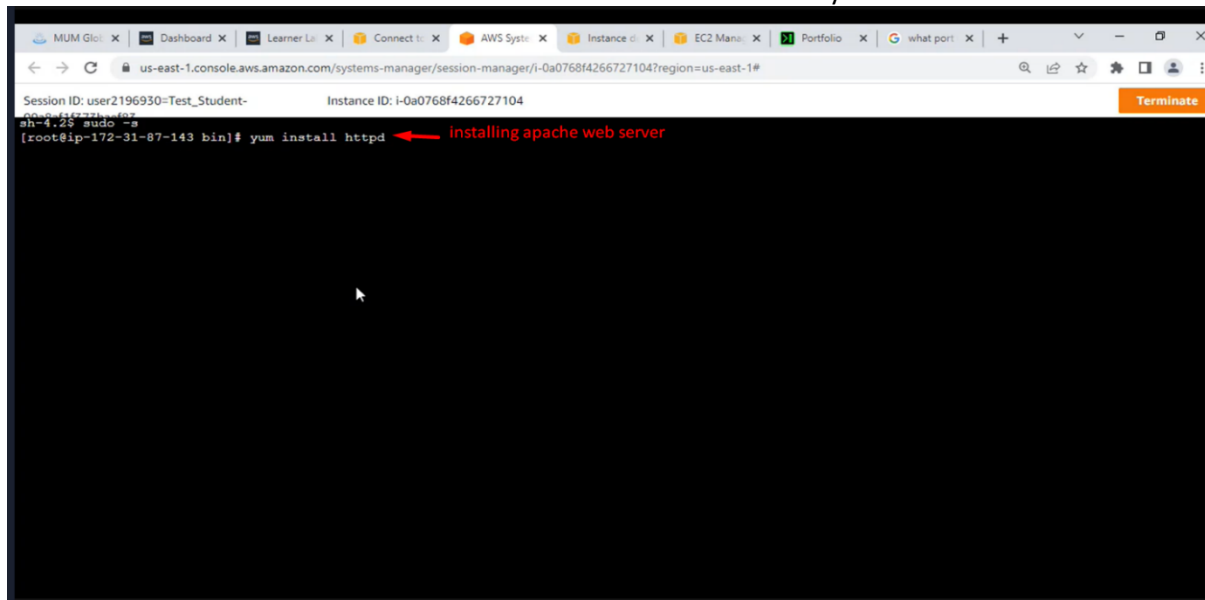




1. Configure a web server on EC2.
  - a. Select the instance
  - b. Hit Connect
  - c. Select the "Session Manager" tab and hit Connect.



- d. To install and customize a web server:
- sudo -s** => Logging as a root user so you can start the HTTPD service
  - yum install httpd -y** => Installing a web server
  - service httpd start** => Starting the server
  - cd /var/www/html** => Changing the directory to customize the default Apache page.
  - nano index.html** => Create the index.html and write your name here as HTML.





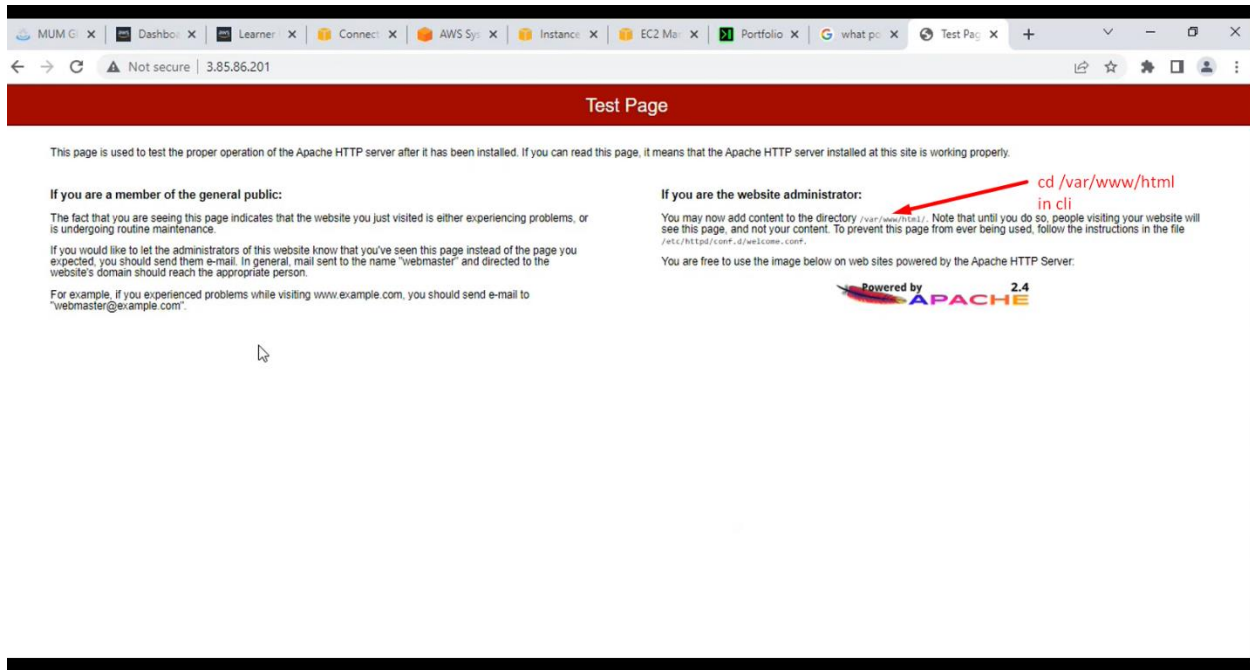
```
root@ip-172-31-5-164:/home/ec2-user

Verifying : httpd-filesystem-2.4.52-1.amzn2.noarch 4/9
Verifying : httpd-2.4.52-1.amzn2.x86_64 5/9
Verifying : mailcap-2.1.41-2.amzn2.noarch 6/9
Verifying : generic-logos-httpd-18.0.0-4.amzn2.noarch 7/9
Verifying : mod_http2-1.15.19-1.amzn2.0.1.x86_64 8/9
Verifying : apr-1.7.0-9.amzn2.x86_64 9/9

Installed:
  httpd.x86_64 0:2.4.52-1.amzn2

Dependency Installed:
  apr.x86_64 0:1.7.0-9.amzn2
  apr-util.x86_64 0:1.6.1-5.amzn2.0.2
  apr-util-bdb.x86_64 0:1.6.1-5.amzn2.0.2
  generic-logos-httpd.noarch 0:18.0.0-4.amzn2
  httpd-filesystem.noarch 0:2.4.52-1.amzn2
  httpd-tools.x86_64 0:2.4.52-1.amzn2
  mailcap.noarch 0:2.1.41-2.amzn2
  mod_http2.x86_64 0:1.15.19-1.amzn2.0.1

Complete!
[root@ip-172-31-5-164 ec2-user]# service httpd start
Redirecting to /bin/systemctl start httpd.service
[root@ip-172-31-5-164 ec2-user]#
```





```
root@ip-172-31-5-164:/var/www/html
Verifying : mod_http2-1.15.19-1.amzn2.0.1.x86_64 8/9
Verifying : apr-1.7.0-9.amzn2.x86_64 9/9

Installed:
  httpd.x86_64 0:2.4.52-1.amzn2

Dependency Installed:
  apr.x86_64 0:1.7.0-9.amzn2
  apr-util.x86_64 0:1.6.1-5.amzn2.0.2
  apr-util-bdb.x86_64 0:1.6.1-5.amzn2.0.2
  generic-logos-httpd.noarch 0:18.0.0-4.amzn2
  httpd-filesystem.noarch 0:2.4.52-1.amzn2
  httpd-tools.x86_64 0:2.4.52-1.amzn2
  mailcap.noarch 0:2.1.41-2.amzn2
  mod_http2.x86_64 0:1.15.19-1.amzn2.0.1

Complete!
root@ip-172-31-5-164 ec2-user]# service httpd start
Redirecting to /bin/systemctl start httpd.service
root@ip-172-31-5-164 ec2-user]# cd /var/www/html/
root@ip-172-31-5-164 html]# touch index.html
root@ip-172-31-5-164 html]# ls
index.html
root@ip-172-31-5-164 html]# nano index.html
```

```
root@ip-172-31-5-164:/var/www/html
GNU nano 2.9.8 index.html Modified
<p>Welcome to the cloud computing course, MIU <p>

File Name to Write: index.html
^G Get Help      M-D DOS Format  M-A Append      M-B Backup File
^C Cancel        M-M Mac Format  M-P Prepend     ^T To Files
```

Go to the website and reload

```
Learner Lab - Foundational Ser X Instances | EC2 Management Co X 3.80.161.145/
Welcome to the cloud computing course, MIU
```

## Creating a public Lambda endpoint

▼ Advanced settings

☐ Enable Code signing [Info](#)  
Use code signing configurations to ensure that the code has been signed by an approved source and has not been altered since signing.

☒ Enable function URL [Info](#) ← Enable function URL  
Use function URLs to assign HTTPS endpoints to your Lambda function.

Auth type  
Choose the auth type for your function URL. [Learn more](#)

☐ AWS\_IAM  
Only authenticated IAM users and roles can make requests to your function URL.

☒ NONE  
Lambda won't perform IAM authentication on requests to your function URL. The URL endpoint will be public unless you implement your own authorization logic in your function.

Function URL permissions

When you choose auth type **NONE**, Lambda automatically creates the following resource-based policy and attaches it to your function. This policy makes your function public to anyone with the function URL. You can edit the policy later. To limit access to authenticated IAM users and roles, choose auth type **AWS\_IAM**.

► View policy statement

☒ Configure cross-origin resource sharing (CORS) ← enable cors  
Use CORS to allow access to your function URL from any origin. You can also use CORS to control access for specific HTTP headers and methods in requests to your function URL. By default, all origins are allowed. You can edit this after creating the function. [Learn more](#)

☐ Enable tags [Info](#)  
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, track your AWS costs, and enforce attribute-based access control.

☐ Enable VPC [Info](#)  
Connect your function to a VPC to access private resources during invocation.

Cancel Create function

Lambda > Functions > MyFirstLambdaFunc

### MyFirstLambdaFunc

Throttle Copy ARN Actions

▼ Function overview [Info](#)

MyFirstLambdaFunc  
Layers (0)

+ Add trigger + Add destination

Description  
-  
Last modified yesterday  
Function ARN  
arn:aws:lambda:us-east-1:846866515154:function:MyFirstLambdaFunc

Function URL [Info](#)  
<https://wj3u5pe7eatdrsmkfj22iipga0lezam.lambda-url.us-east-1.on.aws/> ← clicking this link displays result 3

Code Test Monitor Configuration Aliases Versions

Code source [Info](#)

File Edit Find View Go Tools Window Test Deploy Upload from

Go to Anything (Ctrl-P)

MyFirstLambdaFunc  
index.js

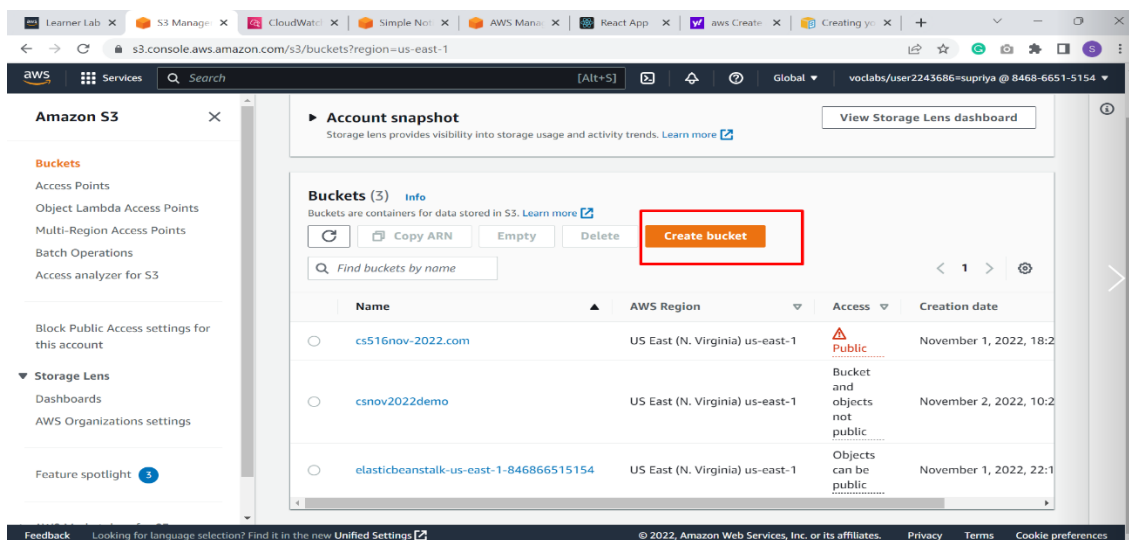
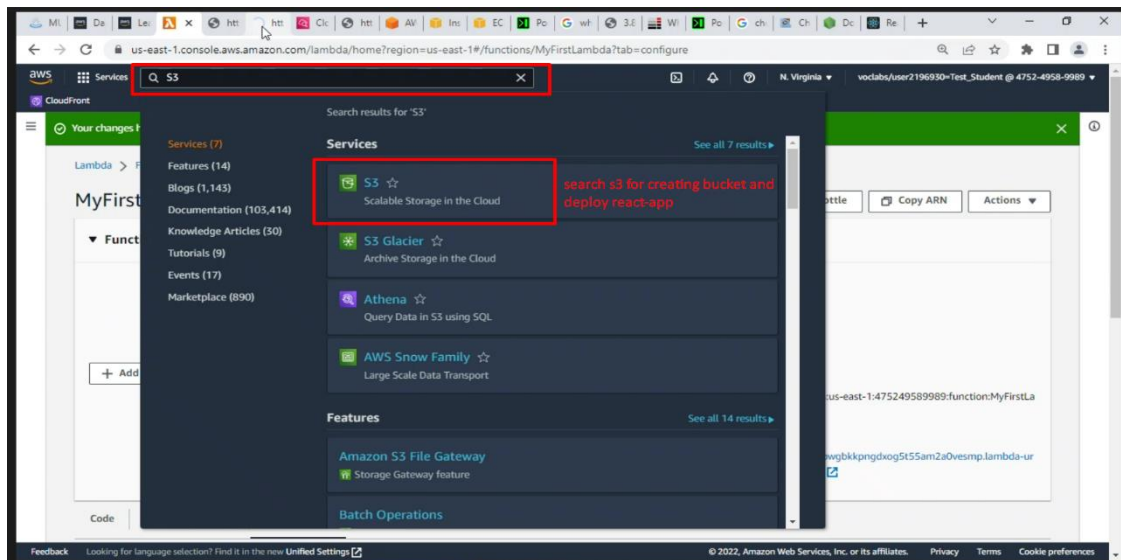
```
1 exports.handler = async (event) => {  
2   // TODO implement  
3  
4   console.log("Hello from my lambda!");  
5   console.log(JSON.stringify(event));  
6   const response = {  
7     statusCode: 200,  
8     body: JSON.stringify(["Supriya Ghising", "Anna", "Simran"]),  
9   };  
10  return response;  
11 }  
12
```

1

2

["Supriya Ghising", "Anna", "Simran"]

## Deploying a React app to S3



Amazon S3 > Buckets > Create bucket

Create bucket

Buckets are containers for data stored in S3. [Learn more](#)

General configuration

Bucket name

unique-bucketName.com

Bucket name must be globally unique and must not contain spaces or uppercase letters. See rules for bucket naming

AWS Region

US East (N. Virginia) us-east-1

Copy settings from existing bucket - optional

Only the bucket settings in the following configuration are copied.

Choose bucket

Object Ownership

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

ACLs disabled (recommended)

All objects in this bucket are owned by this account. Access to this bucket and its objects is specified using only policies.

ACLs enabled

Objects in this bucket can be owned by other AWS accounts. Access to this bucket and its objects can be specified using ACLs.

Object Ownership

Bucket owner enforced

Block Public Access settings for this bucket

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to this bucket and its objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to this bucket or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

☐ Block all public access

Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.

☐ Block public access to buckets and objects granted through new access control lists (ACLs)

S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.

☐ Block public access to buckets and objects granted through any access control lists (ACLs)

S3 will ignore all ACLs that grant public access to buckets and objects.

☐ Block public access to buckets and objects granted through new public bucket or access point policies

S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.

☐ Block public and cross-account access to buckets and objects through any public bucket or access point policies

S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

Turning off block all public access might result in this bucket and the objects within becoming public

AWS recommends that you turn on Block all public access, unless public access is required for specific and verified use cases such as static website hosting.

☒ I acknowledge that the current settings might result in this bucket and the objects within becoming public.

Bucket Versioning

Versioning is a means of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your Amazon S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. [Learn more](#)

Bucket Versioning

☒ Disable

☐ Enable

Tags (0) - optional

Track storage cost or other criteria by tagging your bucket. [Learn more](#)

No tags associated with this bucket.

Add tag

Default encryption

Automatically encrypts new objects stored in this bucket. [Learn more](#)

Server-side encryption

☒ Disable

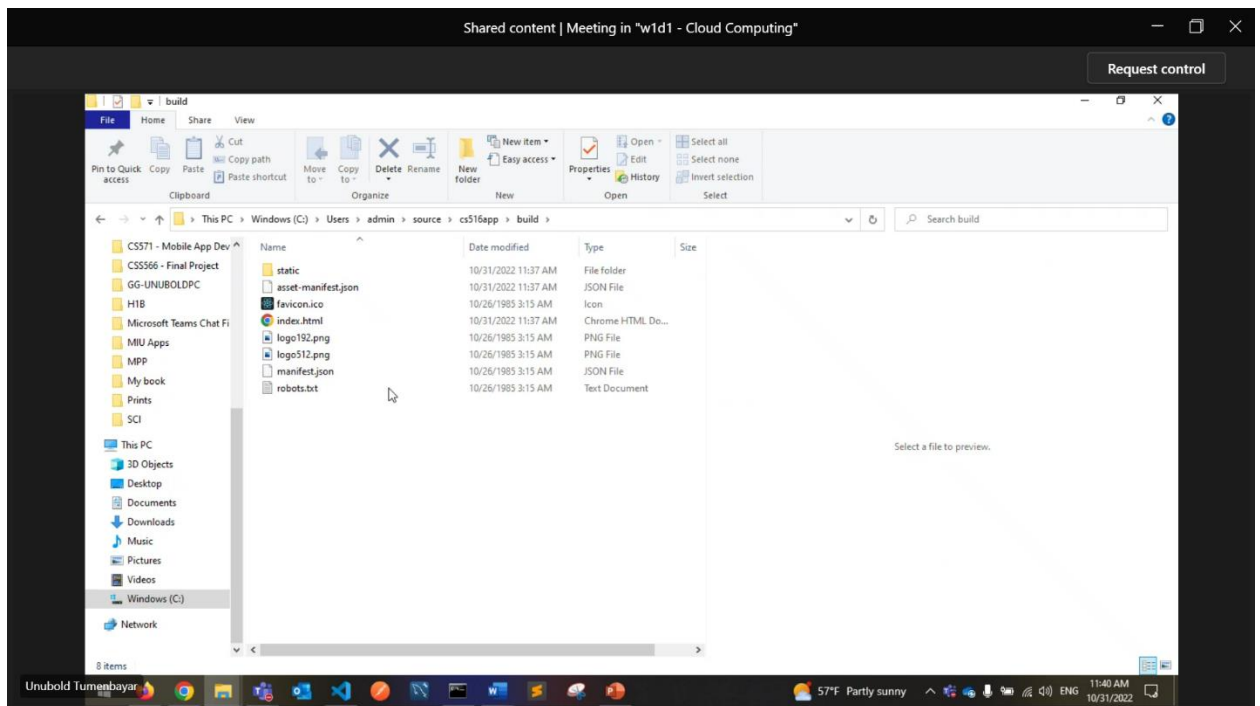
☐ Enable

Advanced settings

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

Cancel

Create bucket



**Buckets (2)** Info Refresh Copy ARN Empty Delete Create bucket

Buckets are containers for data stored in S3. [Learn more](#)

Find buckets by name

	Name	AWS Region	Access	Creation date
<input type="radio"/>	<b>cloudbucketlesson</b>	US East (N. Virginia) us-east-1	Objects can be public	April 26, 2022, 23:01:12 (UTC-05:00)
<input type="radio"/>	elasticbeanstalk-us-east-1-068007615521	US East (N. Virginia) us-east-1	Objects can be public	April 25, 2022, 23:04:58 (UTC-05:00)

Go to the **cloudbucketlesson** bucket to upload build folders files of project.

click to the created bucket and upload files or folders of project, you can upload images, videos

Amazon S3 > Buckets > cloudbucketlesson > Upload

## Upload [Info](#)

Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. [Learn more](#)

Drag and drop files and folders you want to upload here, or choose **Add files**, or **Add folders**.

**Files and folders (14 Total, 760.8 KB)** [Remove](#) [Add files](#) [Add folder](#)

All files and folders in this table will be uploaded.

<input type="checkbox"/>	Name ▲	Folder ▼	Type ▼	Size ▼
<input type="checkbox"/>	787.4637bb57.chunk.js	static/js/	-	4.5 KB
<input type="checkbox"/>	787.4637bb57.chunk.js.map	static/js/	-	10.0 KB
<input type="checkbox"/>	asset-manifest.json	-	application/json	517.0 B
<input type="checkbox"/>	favicon.ico	-	image/x-icon	3.8 KB
<input type="checkbox"/>	index.html	-	text/html	644.0 B
<input type="checkbox"/>	logo192.png	-	image/png	5.2 KB
<input type="checkbox"/>	logo512.png	-	image/png	9.4 KB

After uploading complete go to the properties tab of bucket.

Amazon S3 > Buckets > cloudbucketlesson

### cloudbucketlesson [Info](#)

[Objects](#) [Properties](#) [Permissions](#) [Metrics](#) [Management](#) [Access Points](#)

#### Static website hosting

☐ Disable

☒ Enable

#### Index document

Specify the home or default page of the website.

#### Error document - optional

This is returned when an error occurs.

Then save changes.

aws

Services

Search

[Alt+S]

Global

voclabs/user2243686=supriya @ 8468-6651-5154

Amazon S3

Buckets

Access Points

Object Lambda Access Points

Multi-Region Access Points

Batch Operations

Access analyzer for S3

Block Public Access settings for this account

Storage Lens

Dashboards

AWS Organizations settings

Feature spotlight

AWS Marketplace for S3

Amazon S3 > Buckets > cs516nov-2022-frontend.com > Edit bucket policy

Info

Bucket policy

The bucket policy, written in JSON, provides access to the objects stored in the bucket. Bucket policies don't apply to objects owned by other accounts.

[Learn more](#)

Policy examples

Policy generator

Bucket ARN

arn:aws:s3:::cs516nov-2022-frontend.com

Policy

```
1 {
2   "Version": "2012-10-17",
3   "Id": "Policy1650912821527",
4   "Statement": [
5     {
6       "Sid": "Stmt1650912820312",
7       "Effect": "Allow",
8       "Principal": "*",
9       "Action": "s3:GetObject",
10      "Resource": "arn:aws:s3:::cs516nov-2022-frontend.com/*"
11    }
12  ]
13 }
```

Edit statement

Select a statement

Select an existing statement in the policy or add a new statement.

+ Add new statement

+ Add new statement

JSON Ln 13, Col 1

Security: 0 Errors: 0 Warnings: 0 Suggestions: 0

Preview external access

Cancel

Save changes

Edit bucket policy to getObject

Feedback

Looking for language selection? Find it in the new Unified Settings

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Privacy

Terms

Cookie preferences



aws

Services

Search

[Alt+S]

Global

voclabs/user2243686=supriya @ 8468-6651-5154

Amazon S3

Buckets

cs516nov-2022-frontend.com

Upload

Upload

Info

Add the files and folders you want to upload to S3. To upload a file larger than 160GB, use the AWS CLI, AWS SDK or Amazon S3 REST API. [Learn more](#)

Drag and drop files and folders you want to upload here, or choose **Add files**, or **Add folders**.

Files and folders (14 Total, 727.7 KB)

Remove

Add files

Add folder

All files and folders in this table will be uploaded.

Find by name

< 1 2 >

<input type="checkbox"/>	Name	Folder	Type	Size
<input type="checkbox"/>	787.36db6797.chunk.js	static/js/	text/javascript	4.5 KB
<input type="checkbox"/>	787.36db6797.chunk.js.map	static/js/	-	10.3 KB
<input type="checkbox"/>	asset-manifest.json	-	application/json	517.0 B
<input type="checkbox"/>	favicon.ico	-	image/x-icon	3.8 KB
<input type="checkbox"/>	index.html	-	text/html	644.0 B
<input type="checkbox"/>	logo192.png	-	image/png	5.2 KB
<input type="checkbox"/>	logo512.png	-	image/png	9.4 KB
<input type="checkbox"/>	main.2dbd410b.js	static/js/	text/javascript	174.8 KB
<input type="checkbox"/>	main.2dbd410b.js.LICENSE.txt	static/js/	text/plain	1.1 KB
<input type="checkbox"/>	main.2dbd410b.js.map	static/js/	-	515.9 KB

Destination

Destination

s3://cs516nov-2022-frontend.com

► Destination details

Bucket settings that impact new objects stored in the specified destination.

► Permissions

Grant public access and access to other AWS accounts.

► Properties

Specify storage class, encryption settings, tags, and more.

Cancel

Upload

Feedback

Looking for language selection? Find it in the new [Unified Settings](#)

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Privacy

Terms

Cookie preferences

aws

Services

Search

[Alt+S]

Global

voclabs/user2243686=supriya @ 8468-6651-5154

Uploading

26%

Total remaining: 11 files: 538.0 KB(73.94%)  
Estimated time remaining: a few seconds  
Transfer rate: 13.9 KB/s

Cancel

Upload: status

Close

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

Summary

Destination

s3://cs516nov-2022-frontend.com

Succeeded

3 files, 189.6 KB (26.06%)

Failed

0 files, 0 B (0%)

Files and folders

Configuration

Files and folders (14 Total, 727.7 KB)

Find by name

< 1 2 >

Name	Folder	Type	Size	Status	Error
787.36db6797.chunk.js	static/js/	text/javascript	4.5 KB	Succeeded	-
787.36db6797.chunk.js.map	static/js/	-	10.3 KB	Succeeded	-
asset-manifest.json	-	application/json	517.0 B	Pending	-
favicon.ico	-	image/x-icon	3.8 KB	Pending	-
index.html	-	text/html	644.0 B	Pending	-
logo192.png	-	image/png	5.2 KB	Pending	-
logo512.png	-	image/png	9.4 KB	Pending	-
main.2dbd410b.js	static/js/	text/javascript	174.8 KB	Succeeded	-
main.2dbd410b.js.LICENSE.txt	static/js/	text/plain	1.1 KB	In Progress (100%)	-
main.2dbd410b.js.map	static/js/	-	515.9 KB	Pending	-

Amazon S3

Buckets

Access Points

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Dashboards

AWS Organizations settings

Feature spotlight

Feature spotlight

AWS Marketplace for S3

Amazon S3 > Buckets > cs516nov-2022-frontend.com > Edit static website hosting

### Edit static website hosting

Static website hosting

Use this bucket to host a website or redirect requests. [Learn more](#)

Static website hosting

☐ Disable

☒ Enable

Hosting type

☒ Host a static website

Use the bucket endpoint as the web address. [Learn more](#)

☐ Redirect requests for an object

Redirect requests to another bucket or domain. [Learn more](#)

For your customers to access content at the website endpoint, you must make all your content publicly readable. To do so, you can edit the S3 Block Public Access settings for the bucket. For more information, see [Using Amazon S3 Block Public Access](#)

Index document

Specify the home or default page of the website.

index.html

Error document - optional

This is returned when an error occurs.

index.html

Redirection rules - optional

Redirection rules, written in JSON, automatically redirect webpage requests for specific content. [Learn more](#)

### Static website hosting

Use this bucket to host a website or redirect requests. [Learn more](#)

Static website hosting

Enabled

Hosting type

Bucket hosting

Bucket website endpoint

When you configure your bucket as a static website, the website is available at the AWS Region-specific website endpoint of the bucket. [Learn more](#)

<http://cs516nov-2022-frontend.com.s3-website-us-east-1.amazonaws.com>

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Cloud Computing course

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