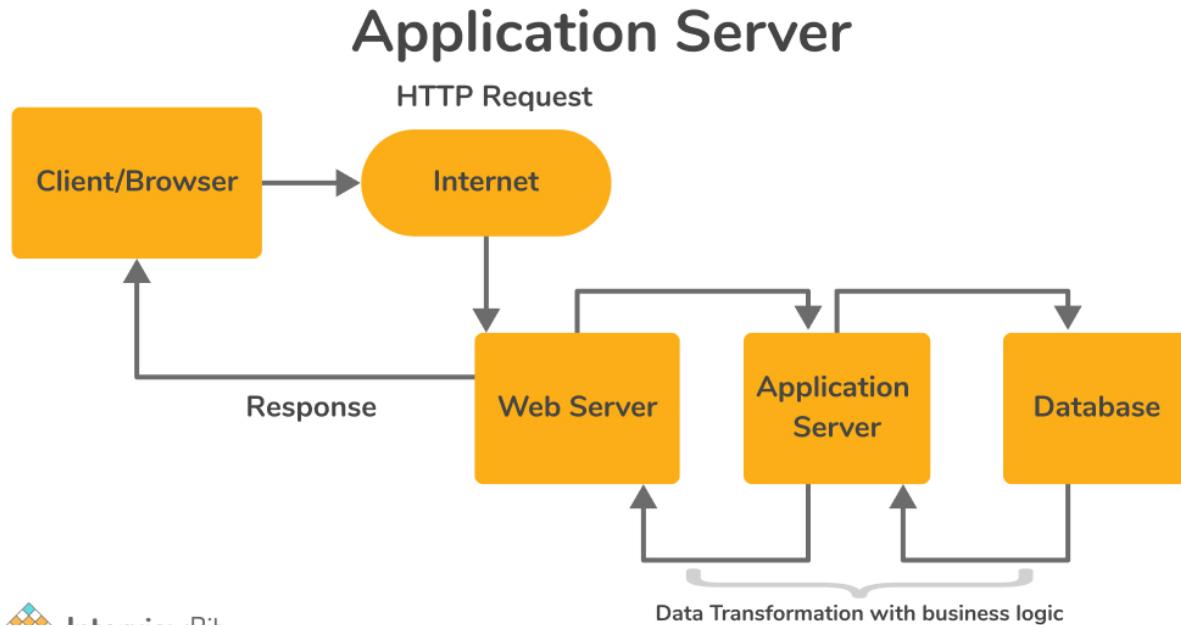


## 1. What is an Application Server and a Web server?



S.NO	Web Server	Application Server
1.	Web server encompasses web container only.	While application server encompasses Web container as well as EJB container.
2.	Web server is useful or fitted for static content.	Whereas application server is fitted for dynamic content.
3.	Web server consumes or utilizes less resources.	While application server utilize more resources.
4.	Web servers arrange the run environment for web applications.	While application servers arrange the run environment for enterprises applications.
5.	In web servers, multithreading is supported.	While in application server, multithreading is not supported.
6.	Web server's capacity is lower than application server.	While application server's capacity is higher than web server.
7.	In web server, HTML and HTTP protocols are used.	While in this, GUI as well as HTTP and RPC/RMI protocols are used.

8.	Processes that are not resource-intensive are supported.	Processes that are resource-intensive are supported.
9.	Transactions and connection pooling is not supported.	Transactions and connection pooling is supported.
10.	The capacity of fault tolerance is low as compared to application servers.	It has high fault tolerance.
11.	Web Server examples are Apache HTTP Server , Nginx.	Application Servers example are JBoss , Glassfish.
12.	Subset of the application server.	Superset of a web server.
13.	Reduces longer running processes that are resource-intensive.	Reduces web traffic, which is not resource-intensive.

#### **Features of Web Server:**

- 1) Handles HTTP Protocol (static contents)
- 2) No Server-side Programming.
- 3) Support web-Based Applications (JSP, Servlets, PHP, HTML, etc.)
- 4) Not support Database Connection Pooling.
- 5) Not provide EJB support.

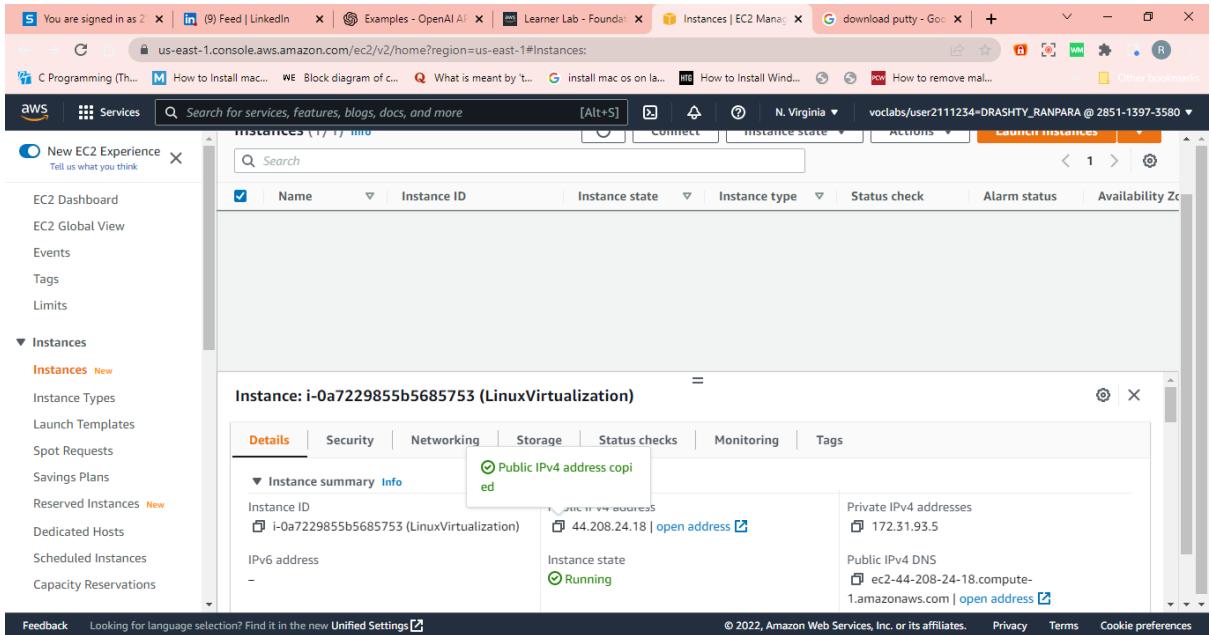
#### **Features of Application Server:**

- 1) Serves dynamic business logic.
- 2) It helps you to manage backend logic like calculations, database, processing, etc.
- 3) It helps you to deploy applications, dependency injection, security, etc. database pooling, and EJB.
- 4) The superior server of Web Server.

**2. Host a Static Web Application in a Linux based EC2 instance. Decide whether you need a web server or an application server to host the static web application. Comment on which category of storage does this application use.**

#### **For LINUX**

1. Login to AWS Portal. Go to the Learner Lab program and click on the start lab button. It should show a green signal beside the AWS link.

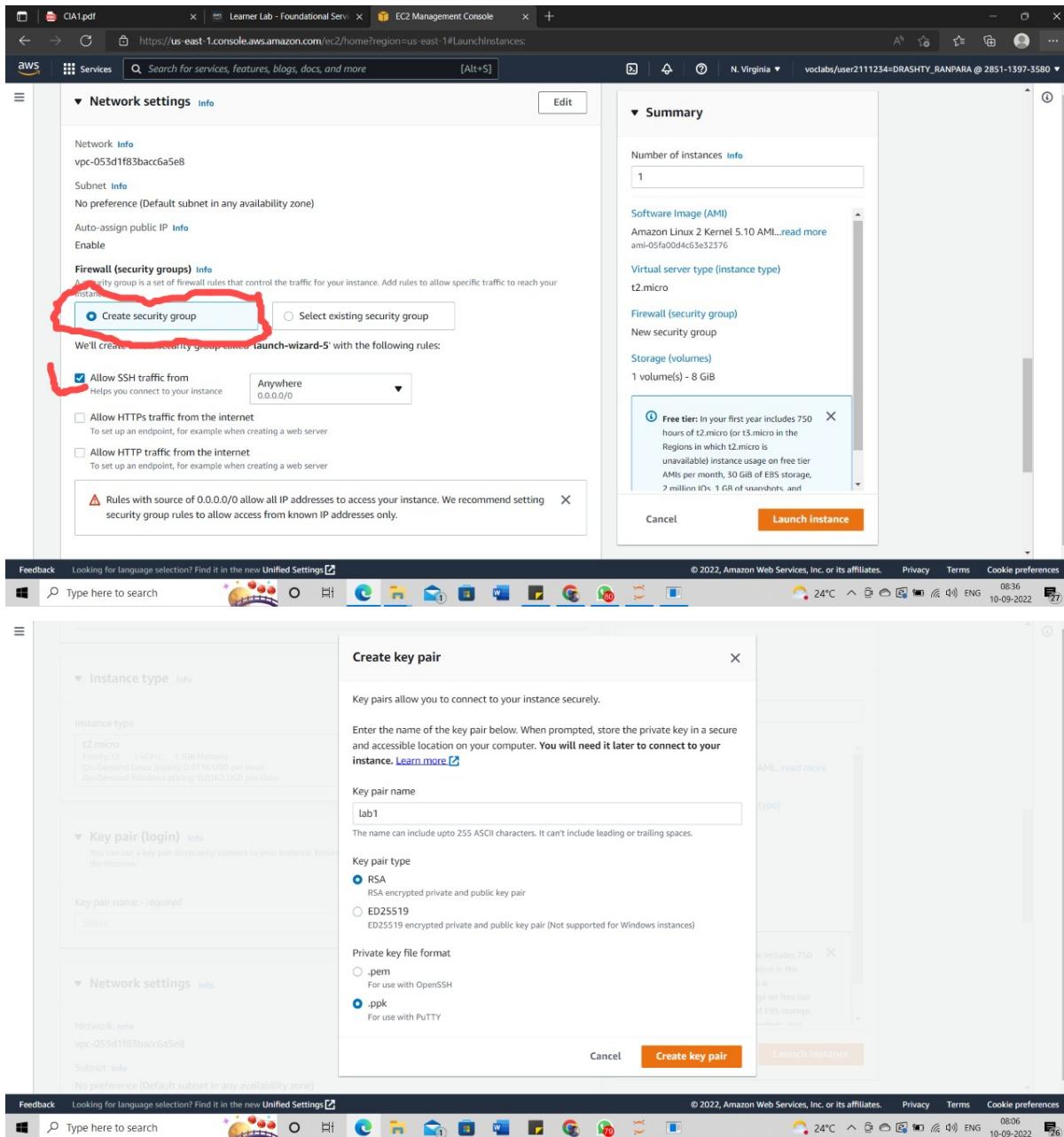


2. Navigate to EC2 Dashboard and click on Launch Instance.
3. Provide with Name and tags - for instance, lab1. Furthermore, select the necessary operating system based on your requirement. In our case, we go for **Amazon Linux** and opt for **free tier eligibility**.

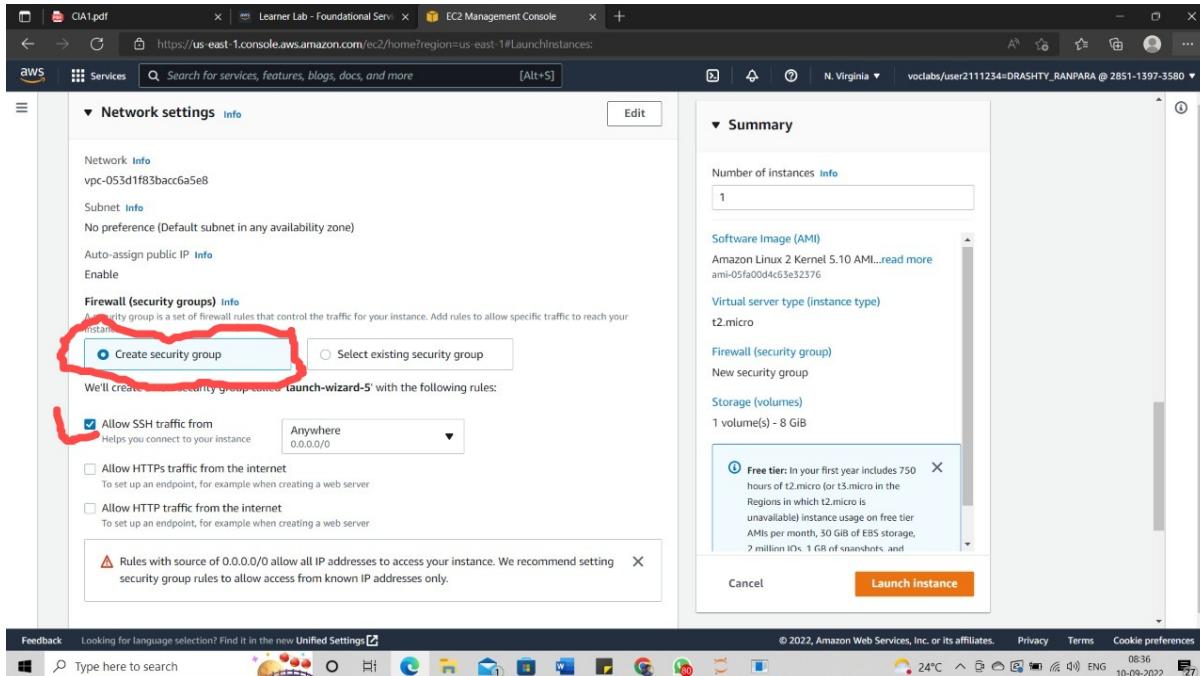
The screenshot shows the AWS EC2 Management Console Home page. On the left, there's a navigation sidebar with sections like EC2 Dashboard, Events, Tags, Limits, Instances, Images, and Elastic Block Store. The main area has a 'Launch instance' section with a large orange 'Launch instance' button and a 'Migrate a server' link. Below it is a 'Scheduled events' section showing 'US East (N. Virginia)' with 'No scheduled events'. To the right, there's a 'Service health' section indicating the service is operating normally, and an 'Explore AWS' sidebar with promotional links for spot instances and price performance.

The screenshot shows the AWS EC2 Management Console Launch Instances page. It features a search bar at the top and a grid of AMI icons for Amazon Linux, macOS, Ubuntu, Windows, and Red Hat. On the right, there's a 'Summary' panel where the user can set the number of instances (set to 1), choose a software image (Amazon Linux 2 Kernel 5.10 AMI), select an instance type (t2.micro), and configure a security group (New security group). A 'Free tier' information box is also present. At the bottom, there's a 'Launch' button and a 'Cancel' button. A screenshot of the 'Screenshot saved' message is overlaid on the bottom right.

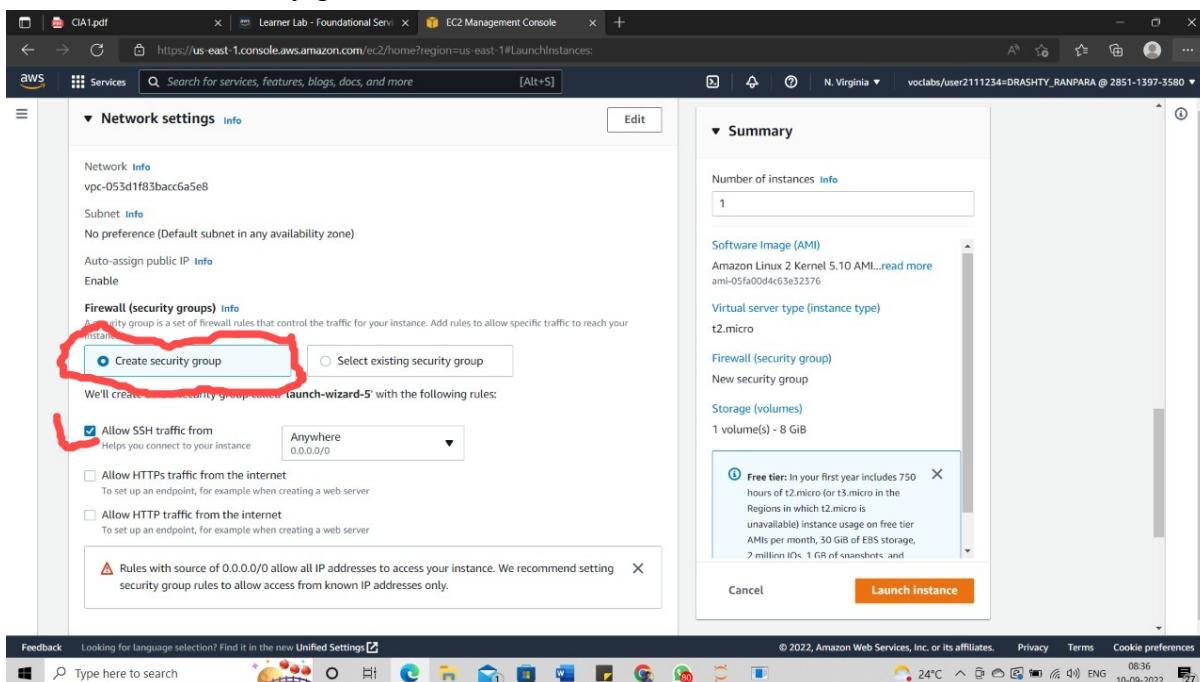
Select the necessary **instance type** and click on **Create new key pair**. From the dialogue box that appeared, give the **Key pair name** and under the **Key pair type** select **RSA** furthermore, under the **Private key file format** select **.ppk**(for Linux). Finally, click on **Create key pair** button.



- After creating the key pair under Network Settings select the radio button and **Create security group**. If you already have an **existing security group** kindly go for that option. Next, select the checkbox **Allow SSH traffic from the internet**.



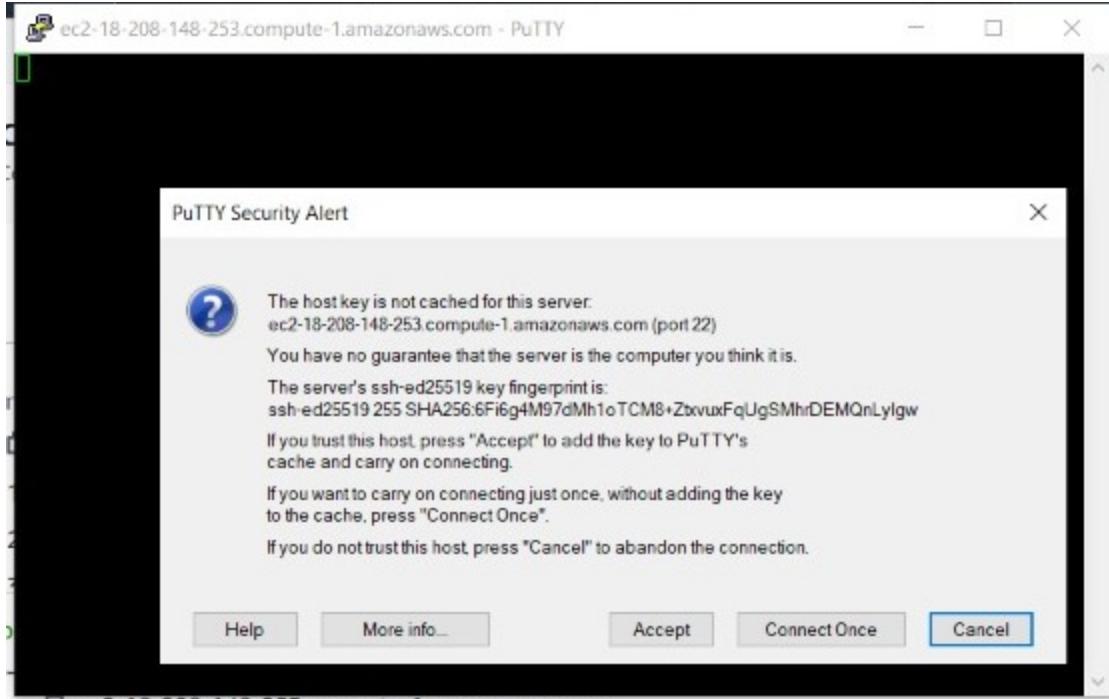
5. According to your requirements go for **Configure storage**. Here I opt for default storage which is already given. After that, click on the **Launch instance** button.



6. A **Success** message will be popped once you launch instance.

The image consists of three vertically stacked screenshots of the AWS EC2 Instances Launch an instance page. Each screenshot shows a success message: "Successfully initiated launch of instance (i-06b1d2c18a4e7b777)" and "Successfully initiated launch of instance (i-00b84cf906175974a)". Below each message is a "Launch log" link. A "Next Steps" section follows, containing links for "Get notified of estimated charges", "How to connect to your instance", and "View more resources to get you started". At the bottom right of each screenshot is an orange "View all instances" button. The top of each screenshot shows the AWS navigation bar and search bar.

7. Meanwhile, download PuTTY from the browser and click for installation. You'll see the **PuTTY Configuration** window will be seen.
8. From AWS portal copy the **public ip address** under **SSH Client** menu. Paste the DNS in **Host Name**. From left pane clic on **SSH -> Auth** and browse the **.ppk** file which is downloaded in your local system. Next, click on **open**.
  
9. **Accept it.**



The first two chapters of the book are available online at [www.mathematicalmodeling.com](http://www.mathematicalmodeling.com).

10. Copy login username from the AWS portal after connecting it and paste it in terminal.

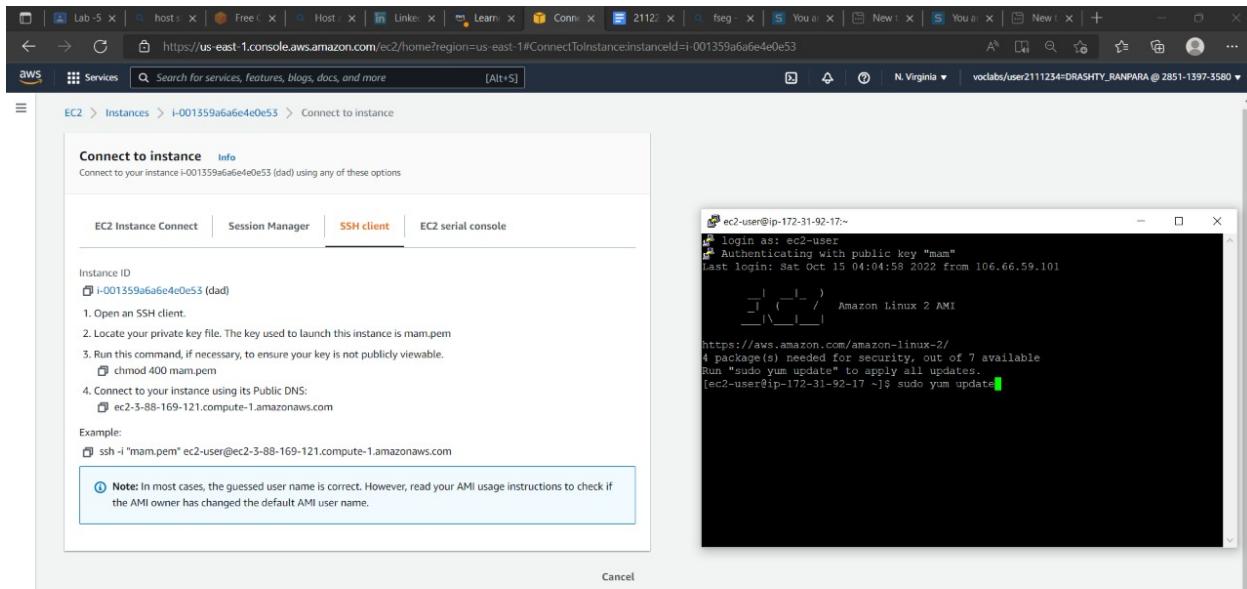
The screenshot shows the AWS Management Console with the URL [https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#ConnectToInstance instanceId=i-001359a6a6e4e0e53](https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#ConnectToInstance	instanceId=i-001359a6a6e4e0e53). The page title is "Connect to instance". The top navigation bar includes links for Services, Search for services, features, blogs, docs, and more, and a user profile for vclabs/user2111234@DRASHTY\_RANPARA @ 2851-1397-3580.

The main content area shows the "Connect to instance" section for instance i-001359a6a6e4e0e53. It provides options to "Open an SSH client", "Locate your private key file", "Run this command", "Connect to your instance using its Public DNS", and "Example" commands. A note states: "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."

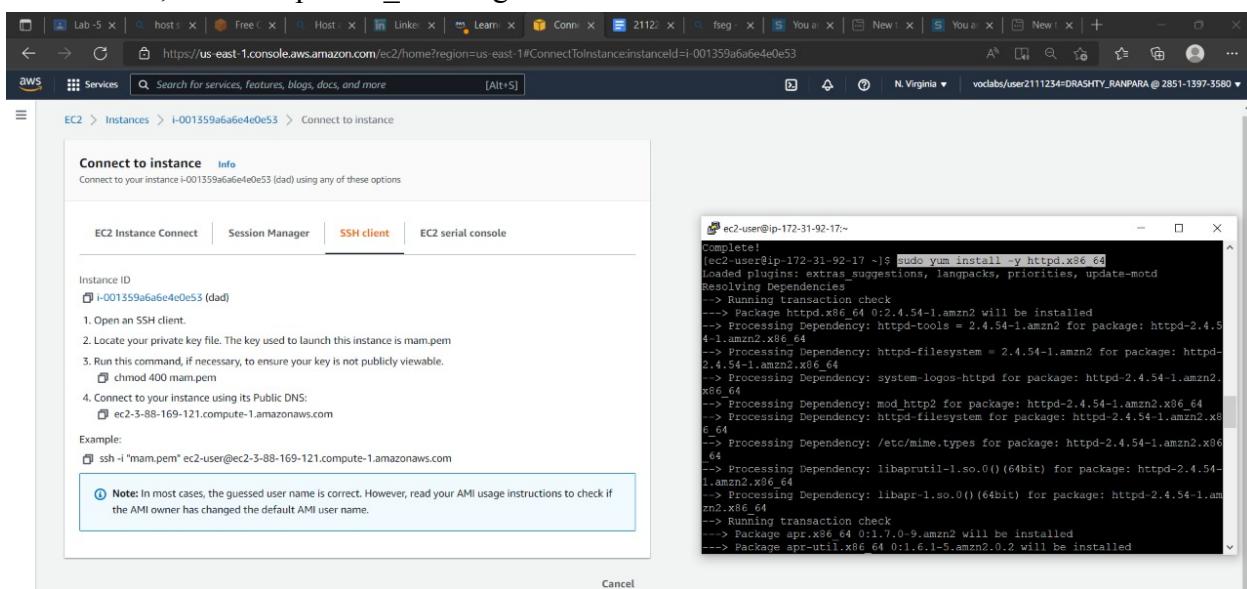
A terminal window on the right shows the output of an SSH session:

```
ec2-user@ip-172-31-92-17:~  
login as: ec2-user  
Authenticating with public key "mam"  
Last login: Sat Oct 15 04:04:58 2022 from 106.66.59.101  
[ec2-user@ip-172-31-92-17 ~]$  
https://aws.amazon.com/amazon-linux-2/  
4 package(s) needed for Security, out of 7 available  
Run "sudo yum update" to apply all updates.  
[ec2-user@ip-172-31-92-17 ~]$
```

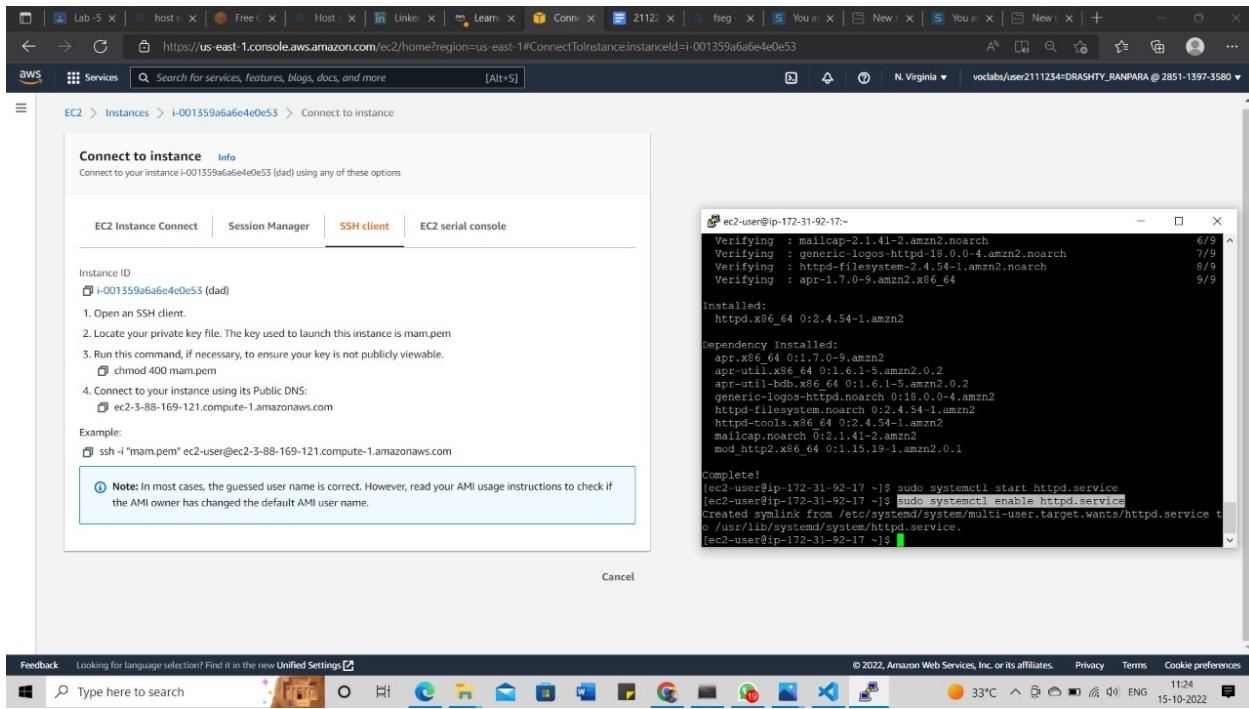
11. Update the yum package using command - sudo yum update



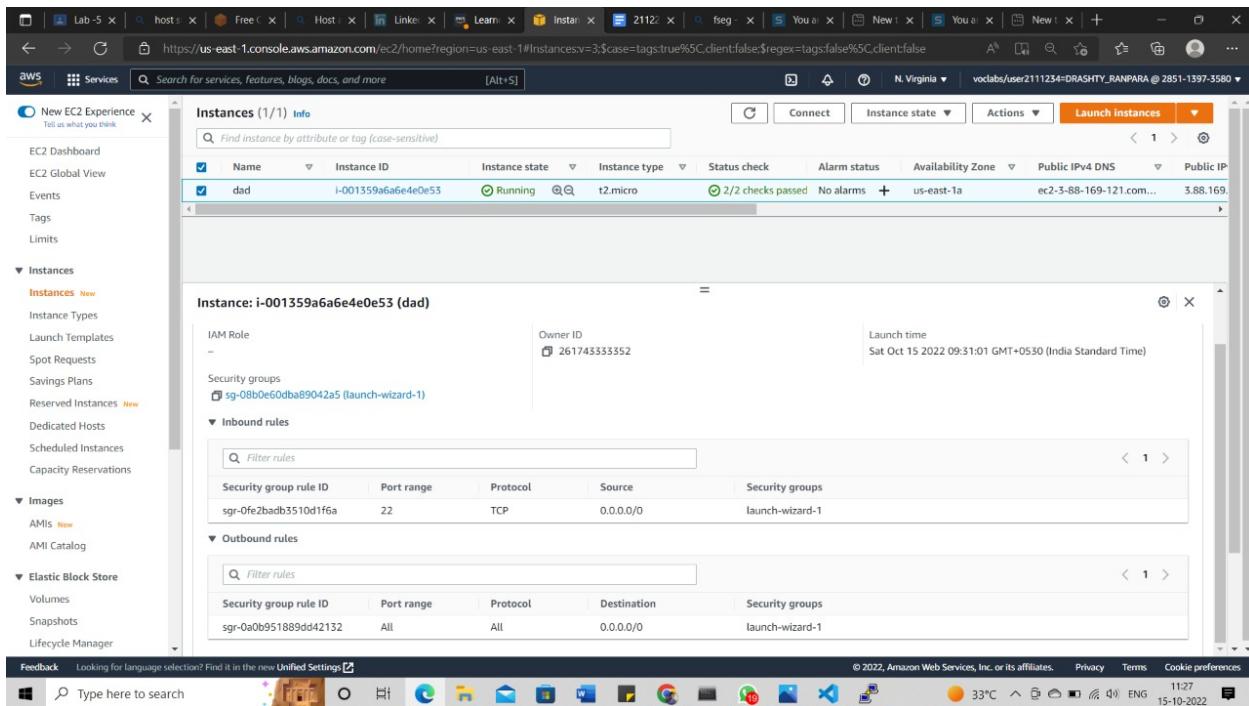
## 12. Next, install httpd.x86\_64 using sudo command.



## 13. Start and enable the installed service using sudo systemctl start httpd.service and sudo systemctl enable httpd.service



#### 14. Go to the security group of your instance and click on the Security groups name.



#### 15. You see the inbound rule and click on the Edit inbound rule.

The screenshot shows the AWS EC2 Security Groups page. On the left, a sidebar lists various services like EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances, Images, Elastic Block Store, and Feedback. The main content area displays the details for the security group 'sg-08b0e60dba89042a5 - launch-wizard-1'. It shows the security group name, owner (26174333352), security group ID (sg-08b0e60dba89042a5), description (created 2022-10-15T04:00:38.219Z), and VPC ID (vpc-081a44db08b8ba08c). Below this, there are tabs for Inbound rules, Outbound rules, and Tags. A message indicates you can check network connectivity with the Reachability Analyzer. The Inbound rules section shows one rule: Name: -, Security group rule ID: sgr-0fe2badb3510d1f6a, IP version: IPv4, Type: SSH, Protocol: TCP, Port range: 22, Source: 0.0.0.0/0. The bottom of the screen shows the Windows taskbar with various pinned icons.

16. You will see the rules section and click on the Add rules.

The screenshot shows the 'Edit inbound rules' section of the AWS EC2 ModifyInboundSecurityGroupRules page. It displays an 'Inbound rules' table with one existing rule: sgr-0fe2badb3510d1f6a (SSH, TCP, port 22, source 0.0.0.0/0). Below the table is an 'Add rule' button. At the bottom, there are 'Cancel', 'Preview changes', and a prominent orange 'Save rules' button. The bottom of the screen shows the Windows taskbar with various pinned icons.

17. Add Http and Https rules and click on the save rules.

**Inbound rules**

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-0669b5faafad58474	HTTP	TCP	80	Custom	Q 0.0.0.0/0
sgr-0e47c588c45d26ff2	HTTPS	TCP	443	Custom	Q 0.0.0.0/0
sgr-0fe2badb3510d1f6a	SSH	TCP	22	Custom	Q 0.0.0.0/0

**Add rule**

Cancel | Preview changes | **Save rules**

**sg-08b0e60dba89042a5 - launch-wizard-1**

**Details**

Security group name	sg-08b0e60dba89042a5	Description	launch-wizard-1 created 2022-10-15T04:00:58.219Z
Owner	261743333552	Inbound rules count	3 Permission entries
		Outbound rules count	1 Permission entry

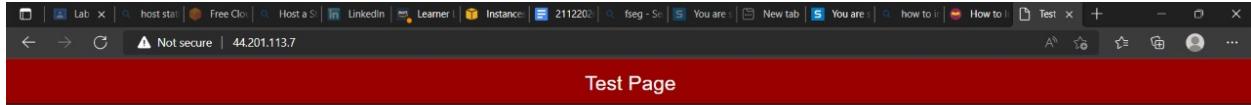
**Inbound rules** | Outbound rules | Tags

You can now check network connectivity with Reachability Analyzer

**Inbound rules (3)**

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source
-	sgr-0669b5faafad58474	IPv4	HTTP	TCP	80	0.0.0.0/0
-	sgr-0e47c588c45d26ff2	IPv4	HTTPS	TCP	443	0.0.0.0/0
-	sgr-0fe2badb3510d1f6a	IPv4	SSH	TCP	22	0.0.0.0/0

18. After saving the rule restart the instance and copy public ip address and paste it in browser



This page is used to test the proper operation of the Apache HTTP server after it has been installed. If you can read this page, it means that the Apache HTTP server installed at this site is working properly.

If you are a member of the general public:

The fact that you are seeing this page indicates that the website you just visited is either experiencing problems, or is undergoing routine maintenance.

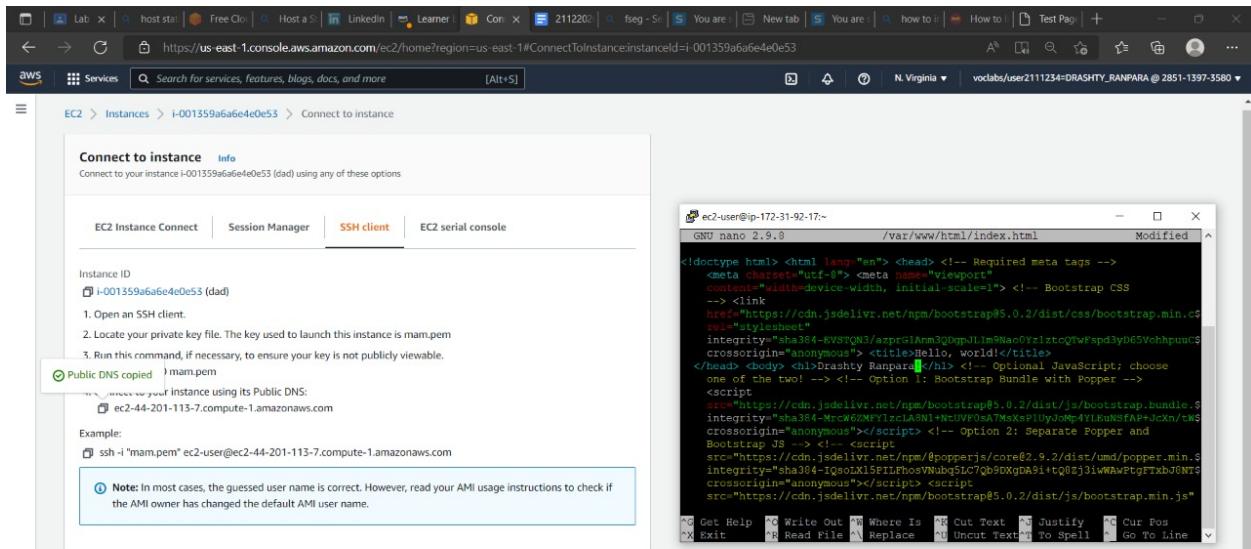
If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

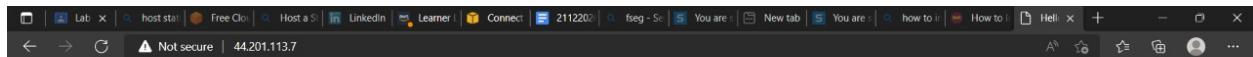
For example, if you experienced problems while visiting [www.example.com](http://www.example.com), you should send e-mail to "webmaster@example.com".

If you are the website administrator:

You may now add content to the directory `/var/www/html/`. Note that until you do so, people visiting your website will see this page, and not your content. To prevent this page from ever being used, follow the instructions in the file `/etc/httpd/conf.d/welcome.conf`.

You are free to use the image below on web sites powered by the Apache HTTP Server:





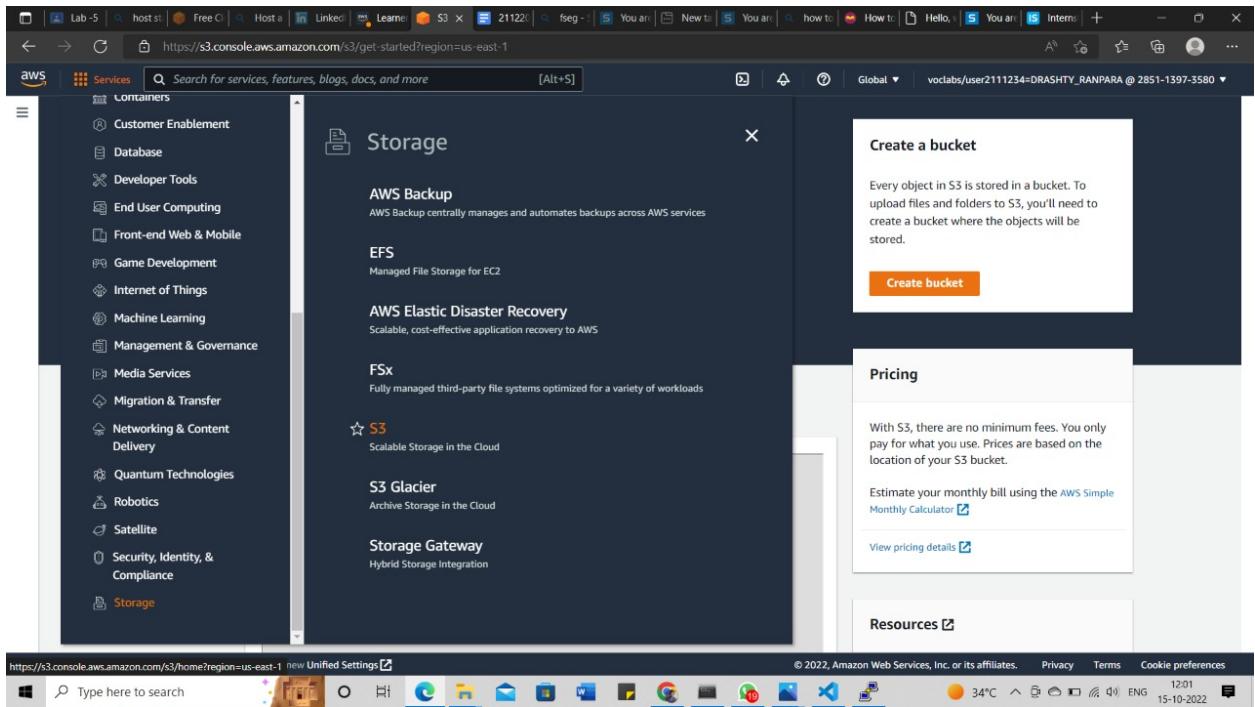
Drashty Ranpara!



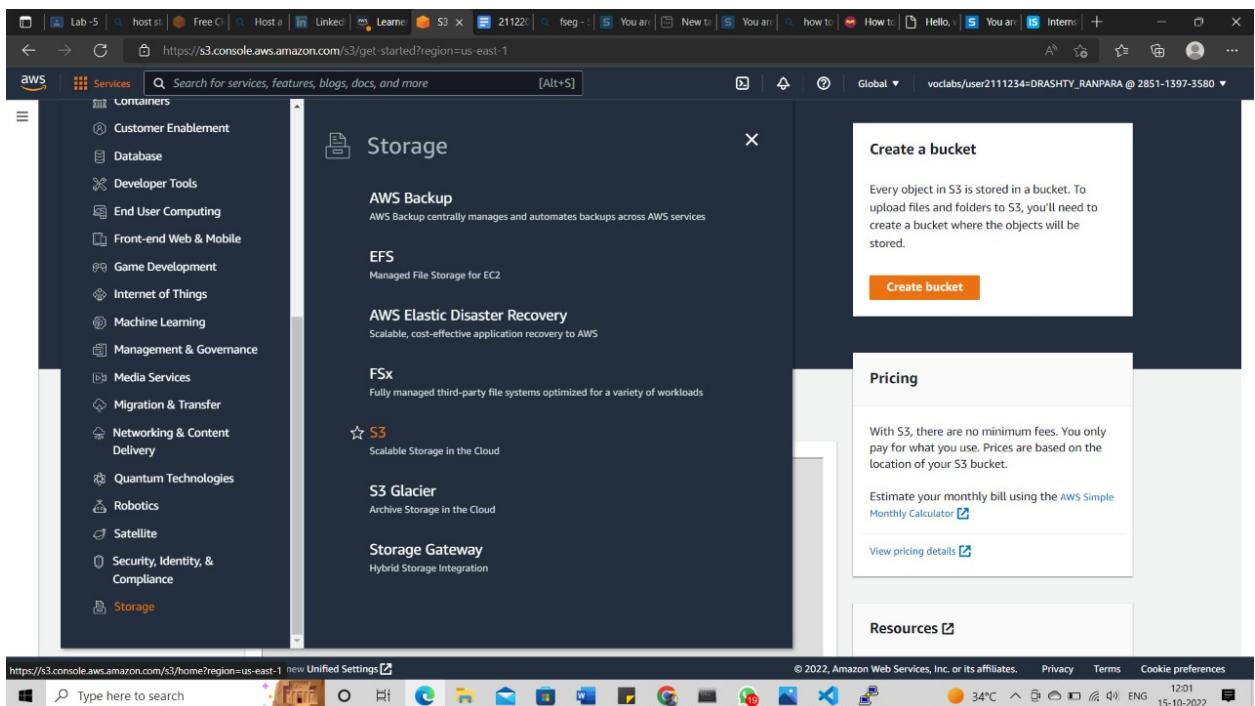
**3. Host a static Web Application using S3 bucket and provide public access to the website. Ensure to have more than 1 files in your application.**



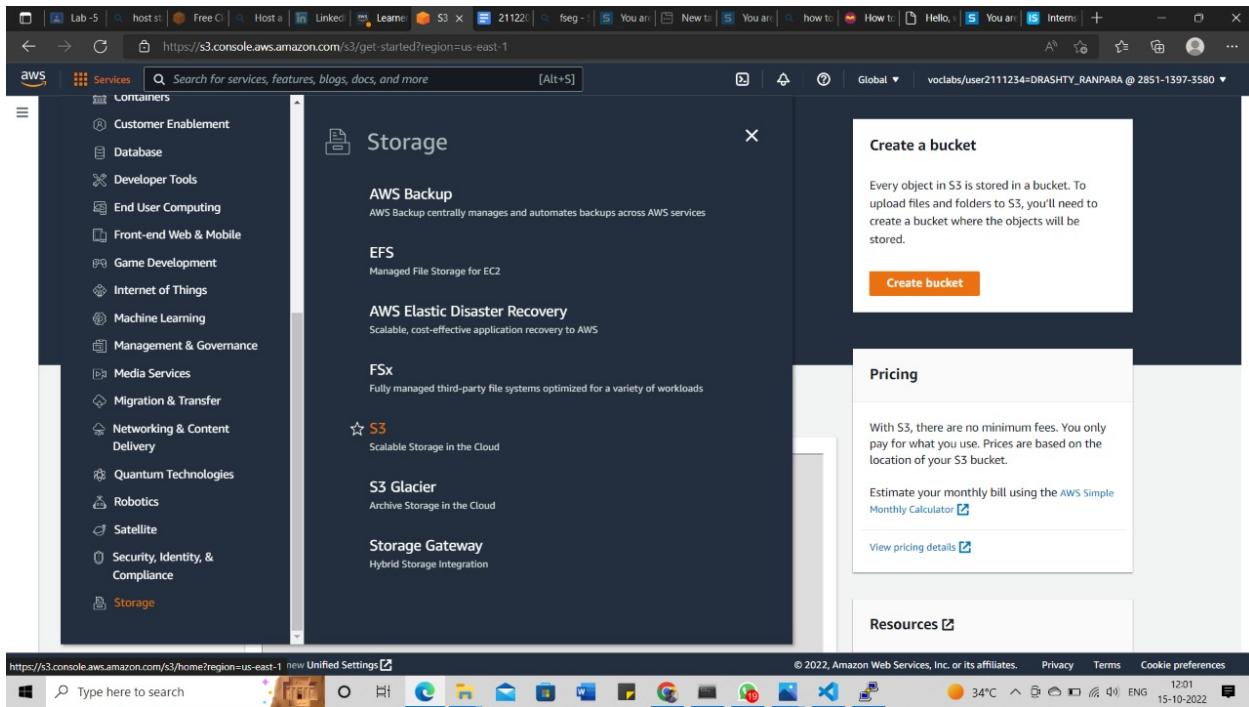
1. From Services, find S3 and click on the Amazon S3 service.



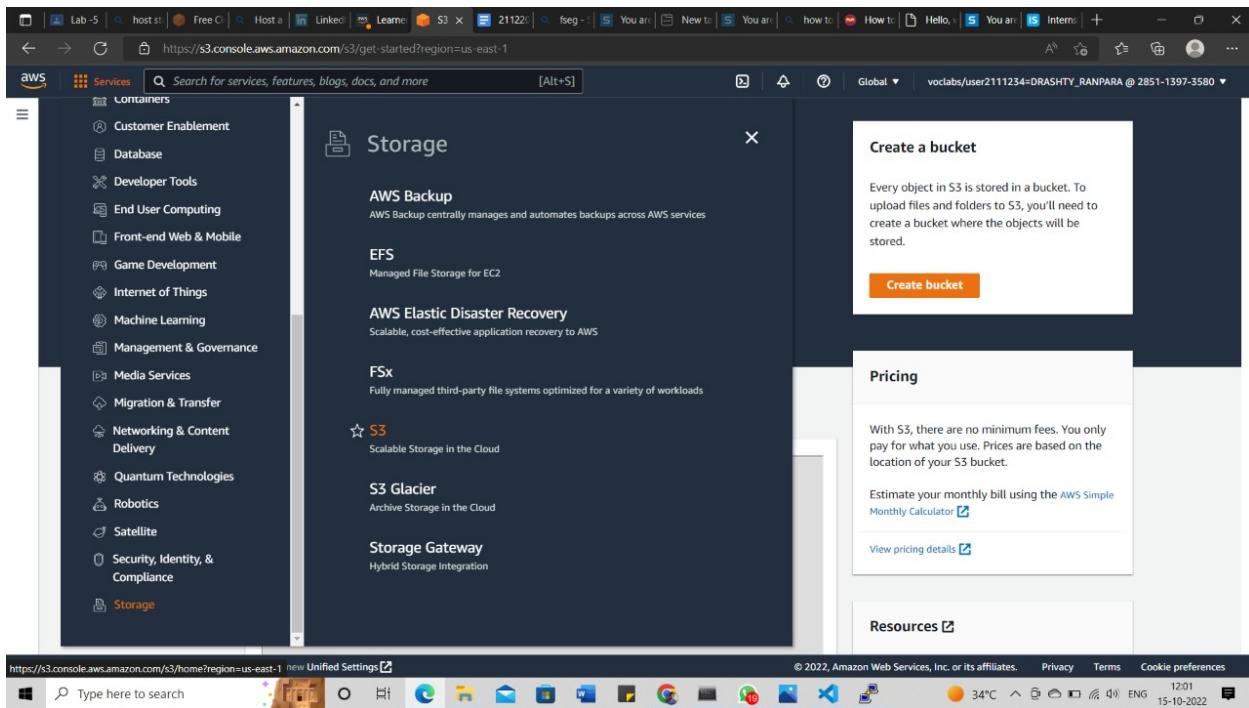
2. Next, click on the Create bucket button to create a S3 storage bucket.



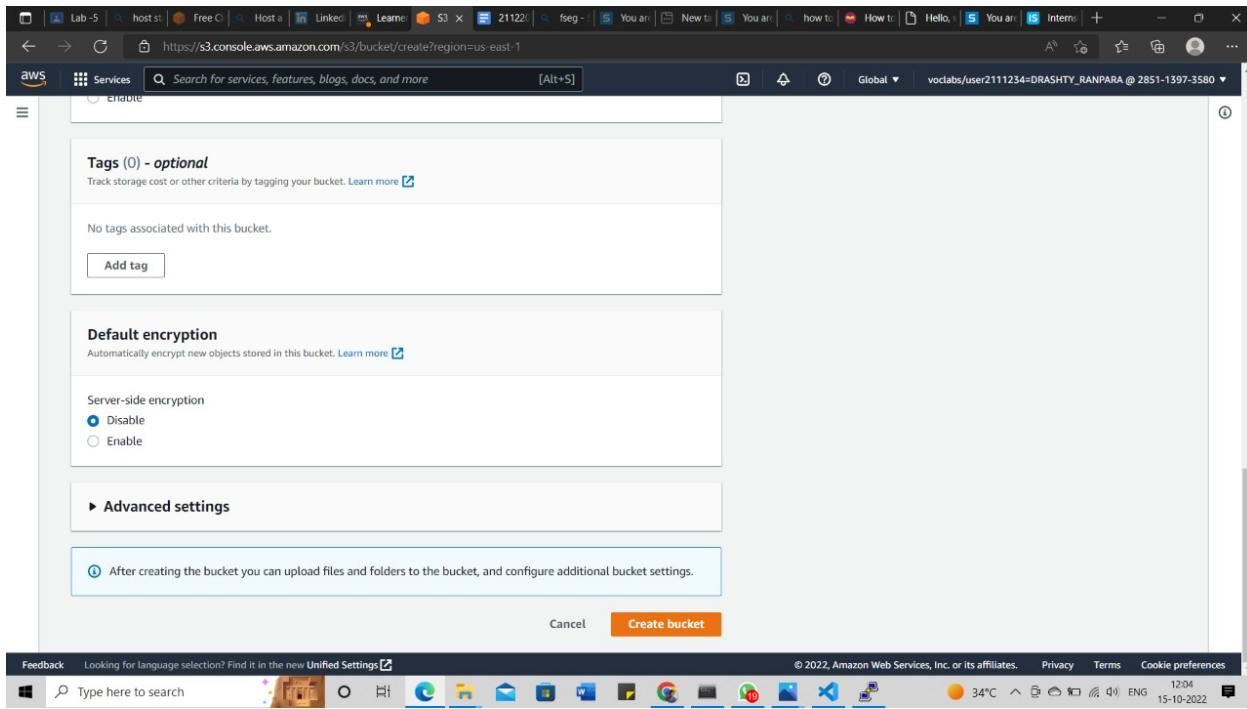
3. Give the appropriate and unique Bucket name as per the naming convention mentioned below the textbox and also select the AWS Region of your choice.



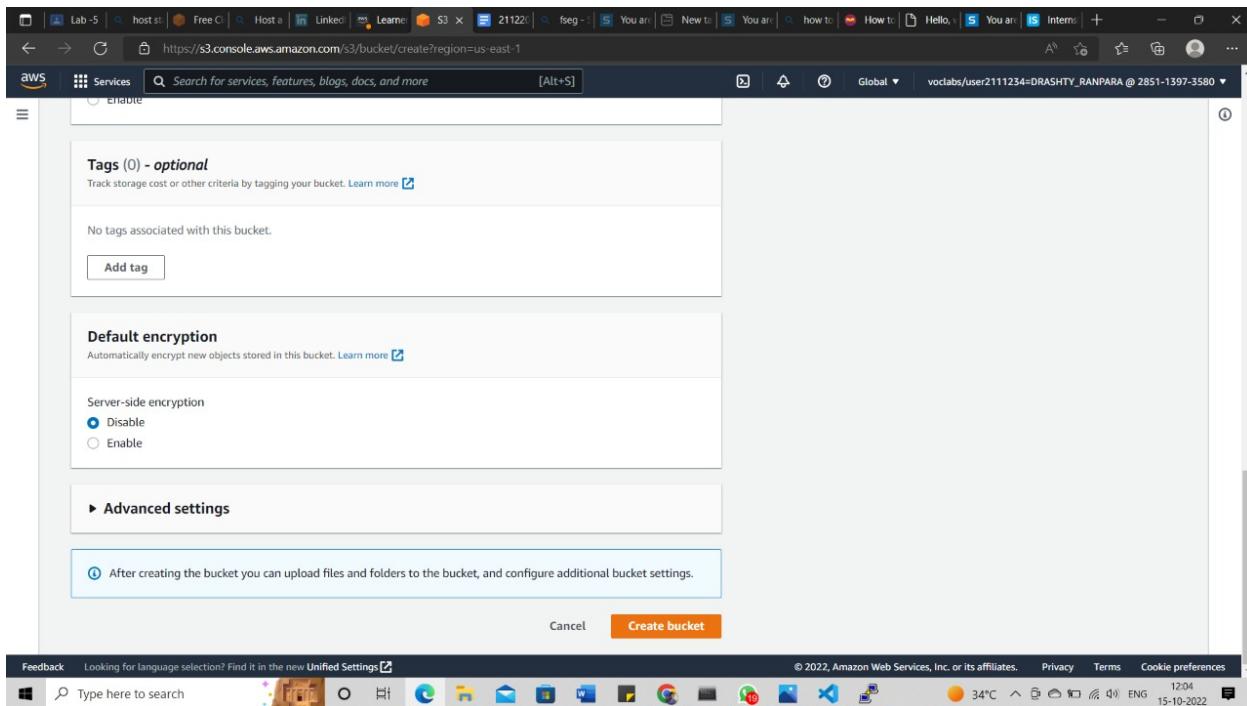
4. Keep the Object ownership as (recommended) and tick on the  Block all public access



- Add Tags according to your need and keep the Default encryption as  Disable and click on Create bucket button.



6. Now since the bucket is successfully created, under the **Buckets** you can see your newly created bucket.



7. Click on the bucket name link i.e. hostmysitedd wherein you need to upload the static website files and folders. Hence, click on **Upload** button to upload necessary files.

The screenshot shows the AWS S3 console interface. On the left, a sidebar menu includes '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', and 'AWS Marketplace for S3'. The main content area displays the 'hostmysitedd' bucket. The 'Objects' tab is selected, showing 0 objects. A search bar at the top of the object list allows searching by prefix. Below the search bar is a toolbar with actions like Copy S3 URI, Copy URL, Download, Open, Delete, Actions, Create folder, and Upload. A message states 'No objects' and 'You don't have any objects in this bucket.' An 'Upload' button is located at the bottom of the object list.

8. Further, click on the Add files and add all the .html/.htm files.

The screenshot shows the AWS S3 upload interface for the 'hostmysitedd' bucket. A large dashed box at the top allows dragging and dropping files or folders. Below this, a table titled 'Files and folders (10 Total, 38.8 KB)' lists the files to be uploaded. The table has columns for Name, Folder, Type, and Size. The files listed are: index.html, landing-page.css, outline-button.css, outline-button.html, package.json, place-card.css, place-card.html, solid-button.css, solid-button.html, and style.css. Each file's size is listed in the 'Size' column. At the bottom, a 'Destination' section shows the URL 's3://hostmysitedd'.

9. After uploading the files click on the **Upload** button given at the end in order to upload it.

The screenshot shows the AWS S3 console with a progress bar indicating 0% completion for an upload. Below the progress bar, a message says "Total remaining: 10 files: 38.8 KB(100.00%)". The "Upload: status" section shows a summary table with one row: "Destination s3://hostmysitedd" with "Succeeded" status and "0 files, 0 B (0%)". The "Files and folders" tab is selected, showing a list of 10 files: index.html, landing-page.css, package.json, style.css, components/, index.html, landing-page.css, package.json, style.css, and components/. The file sizes range from 2.0 KB to 168.0 B.

10. You can clearly see that all the .htm/.html files are uploaded successfully.

The screenshot shows the AWS S3 console for the "hostmysitedd" bucket. The "Objects" tab is selected, displaying a list of 5 objects: index.html, landing-page.css, package.json, style.css, and components/. The objects are listed with their names, types (html, css, json), last modified dates (October 15, 2022), sizes (2.0 KB to 168.0 B), and storage classes (Standard). The "Actions" dropdown menu includes options like Copy S3 URI, Copy URL, Download, Open, Delete, Create folder, and Upload.

11. Now, moving further navigate to **properties** tab → **Static Website Hosting** → click on **Edit**

The screenshot shows the AWS S3 console with the URL <https://s3.console.aws.amazon.com/s3/buckets/hostmysitedd?region=us-east-1&tab=properties>. The page title is "How to optimize your costs on S3." The top navigation bar includes tabs for Objects, Properties (selected), Permissions, Metrics, Management, and Access Points. A "Learn more" button is in the top right. The main content area has a "Bucket overview" section with fields: AWS Region (US East (N. Virginia) us-east-1), Amazon Resource Name (ARN) (arn:aws:s3:::hostmysitedd), and Creation date (October 15, 2022, 12:05:07 (UTC+05:30)). Below this is a "Bucket Versioning" section with a note about keeping multiple variants of objects. It shows "Bucket Versioning" status as "Disabled". There is also a note about Multi-factor authentication (MFA) delete. The "Tags (0)" section indicates no tags are present. The bottom of the page includes a feedback link, copyright information (© 2022, Amazon Web Services, Inc. or its affiliates.), and a toolbar with various icons.

The screenshot shows the same AWS S3 console page. The "Object Lock" section is highlighted, showing a note that Amazon S3 currently does not support enabling Object Lock after a bucket has been created. The "Object Lock" status is "Disabled". The "Requester pays" section is also visible, noting that requester pays mode is disabled. The "Static website hosting" section is shown but not enabled. The bottom of the page includes a feedback link, copyright information (© 2022, Amazon Web Services, Inc. or its affiliates.), and a toolbar with various icons.

12. Now,  Enable the static website hosting and keep hosting type as  Host a Static Website. Give the Index document as according to your project's main file which may be either index.html/ home.html . In this case we have given index.html. The Error document is optional but you can give a common error page 404.html if you have uploaded this page while uploading files. Lastly, save the changes..

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](#)

**Note:** 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.

`error.html`

Redirection rules - *optional*

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

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

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12:09 34°C ENG 15-10-2022

13. Leading ahead, go to **Permissions** tab → **Block public access (bucket settings)** → click on **Edit** → uncheck all checkboxes to give public access.

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](#)

**Note:** 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

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

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12:09 34°C ENG 15-10-2022

The screenshot shows the AWS S3 console with the URL <https://s3.console.aws.amazon.com/s3/bucket/hostmysitedb/property/bpa/edit?region=us-east-1>. The page title is "Edit Block public access (bucket settings)". The main content area describes the "Block public access (bucket settings)" feature and lists several options under "Block public access to buckets and objects". The "Block all public access" checkbox is checked. A modal dialog box is overlaid on the page, containing a warning message: "Updating the Block Public Access settings for this bucket will affect this bucket and all objects within. This may result in some objects becoming public." Below the message is a text input field with the placeholder "To confirm the settings, enter confirm in the field." and a "confirm" button.

14. Type **confirm** in the textbox and hit **Confirm** button.

The screenshot shows the same AWS S3 console page as before, but the modal dialog has been closed. The "confirm" button is now highlighted in orange, indicating it is the next step to complete the process.

15. Under the same **Permissions** tab only → **Bucket policy** → **Edit** and add the following text by just editing the Resource json name and place your bucket name instead.

{

```

    "Version": "2012-10-17",
    "Id": "Policy1640958696038",
    "Statement": [
        {
            "Sid": "Stmt1640958688822",
            "Effect": "Allow",
            "Principal": "*",
            "Action": "s3:GetObject",
            "Resource": "arn:aws:s3:::<bucketname>/*"
        }
    ]
}

```

The screenshot shows the AWS S3 console interface for managing bucket permissions. At the top, a green success message states: "Successfully edited Block Public Access settings for this bucket." Below this, there's a section titled "How to optimize your costs on S3." It includes a "Block all public access" setting, which is currently "Off". A link "Individual Block Public Access settings for this bucket" is also present.

Under the "Bucket policy" section, it says "No policy to display." There are "Edit" and "Delete" buttons available for managing policies. The browser's address bar shows the URL: `https://s3.console.aws.amazon.com/s3/buckets/hostmysitedd?region=us-east-1&tab=permissions`.

The system tray at the bottom right of the screen displays the date and time as "15-10-2022 12:11", the temperature as "34°C", and the language as "ENG".

The screenshot shows the AWS S3 console with the URL <https://s3.console.aws.amazon.com/s3/buckets/hostmysitedd?region=us-east-1&tab=permissions>. A green success message at the top says "Successfully edited Block Public Access settings for this bucket." Below it, a blue bar says "How to optimize your costs on S3." It shows "Block all public access" is Off. Under "Bucket policy", it says "No policy to display." There are "Edit" and "Delete" buttons.

16. Save the changes after modifying the above necessary conditions.

The screenshot shows the AWS S3 console with the same URL as the previous screenshot. A green success message at the top says "Successfully edited bucket policy." Below it, a blue bar says "How to optimize your costs on S3." It shows "Block all public access" is Off. Under "Bucket policy", it displays a JSON policy document:

```
{
  "Version": "2012-10-17",
  "Id": "Policy1640958696038",
  "Statement": [
    {
      "Sid": "Stmt164095868822",
      "Effect": "Allow",
      "Principal": "*",
      "Action": "s3:GetObject",
      "Resource": "arn:aws:s3:::hostmysitedd/*"
    }
  ]
}
```

There are "Edit" and "Delete" buttons.

17. Now navigate to the end where you'll find the URL for your hosted site. Click on the URL link. In this case it is: <http://hostedmysitedd.s3...>

**Requester pays**  
When enabled, the requester pays for requests and data transfer costs, and anonymous access to this bucket is disabled. [Learn more](#)

Requester pays  
Disabled

**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://hostmysitedd.s3-website-us-east-1.amazonaws.com>

18. Hooray! The site is hosted. Play around different tabs to know the depth content in the site.

**Requester pays**  
When enabled, the requester pays for requests and data transfer costs, and anonymous access to this bucket is disabled. [Learn more](#)

Requester pays  
Disabled

**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://hostmysitedd.s3-website-us-east-1.amazonaws.com>

How to optimize your costs on S3.

Amazon S3 currently does not support enabling Object Lock after a bucket has been created. To enable Object Lock for this bucket, contact Customer Support.

**Requester pays**

When enabled, the requester pays for requests and data transfer costs, and anonymous access to this bucket is disabled. Learn more.

Requester pays  
Disabled

**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://hostmysitedd.s3-website-us-east-1.amazonaws.com>



19. Cloud is fun! The tutorial ends up here. 😊