

# SHAHID SMARAK COLLEGE

(Affiliated to Tribhuvan University)



*Lab Report Of*  
**CLOUD COMPUTING**  
**SUBJECT CODE: CACS 402**

*Program: BCA*

*Faculty: Faculty of Humanities and Social Science*

**Submitted by:**

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**Semester:** Seven

**Level:** Bachelor

**Roll No:** -----

**Submitted to:**

**Instructor:** Hari Lal Chalise

**Date of Submission:**

**Lab Number: 1**

**Date: 26 March, 2024**

**Title:** Write down step by instruction to install Virtual Box with different flavors of Linux or windows OS.

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**Step 1:** Visit the official site, <https://www.virtualbox.org/wiki/Downloads>, for virtual box and download the required virtual box.

**Download VirtualBox**

Here you will find links to VirtualBox binaries and its source code.

**VirtualBox binaries**

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 6.1 packages, see [VirtualBox 6.1 builds](#). Version 6.1 will remain supported until December 2023.

**VirtualBox 7.0.8 platform packages**

- [Windows hosts](#)
- [macOS / Intel hosts](#)
- [Developer preview for macOS / Arm64 \(M1/M2\) hosts](#)
- [Linux distributions](#)
- [Solaris hosts](#)
- [Solaris 11 IPS hosts](#)

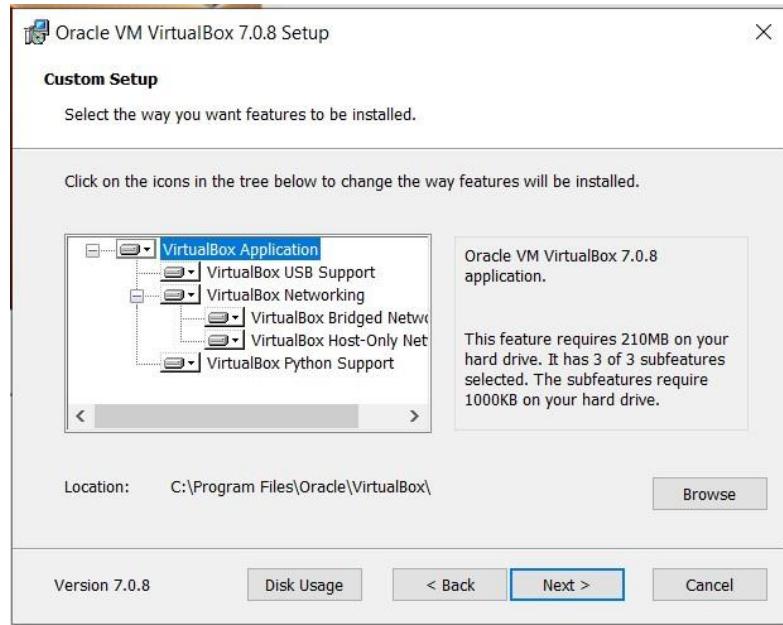
**Step 2:** Run the downloaded .exe file to install virtual box on your system.

 VirtualBox-7.0.8-156879-Win.exe	6/17/2023 5:56 PM	Application	108,037 KB
 flow_chart.drawio (1).png	6/17/2023 3:45 PM	PNG File	69 KB
 flow_chart.drawio.png	6/17/2023 3:45 PM	PNG File	70 KB
 nginx-1.24.0.zip	6/16/2023 10:34 AM	WinRAR ZIP archive	1,719 KB
 staging.sql	6/15/2023 2:57 PM	Microsoft SQL Ser...	85,024 KB

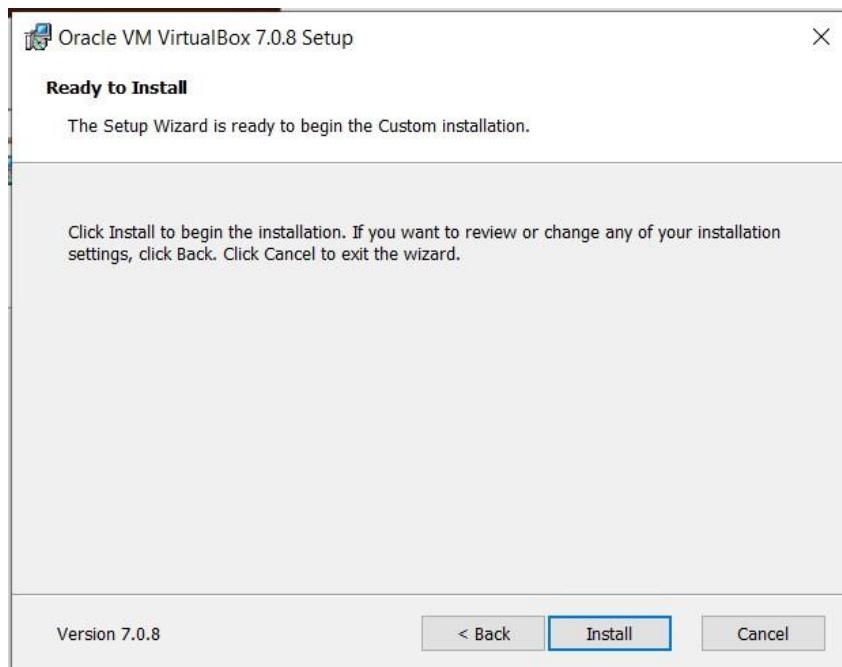
**Step 3:** On running the .exe file, a setup wizard box will appear. Click on “Next” button.



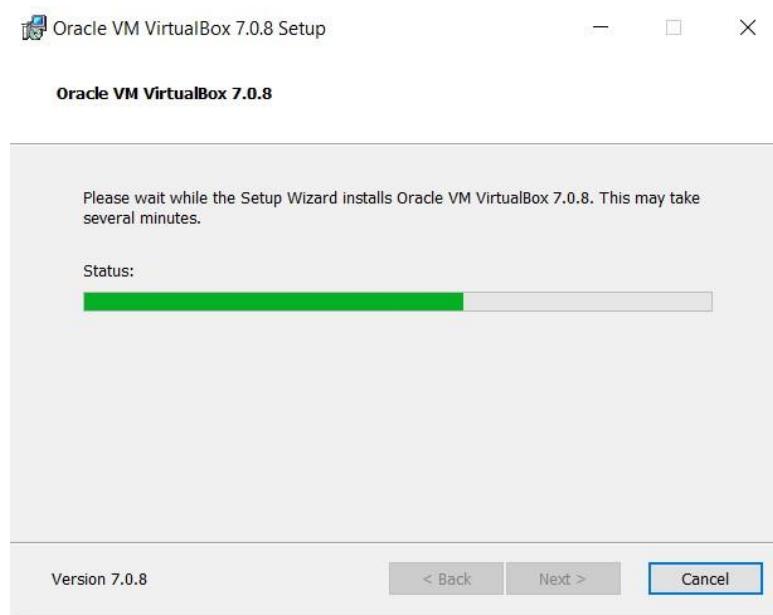
**3.1** Choose the location where you want to install the virutal box and click on “Next” button.



**3.2** Then, click on “Install” button.



**3.3** Wait for the installation to complete.



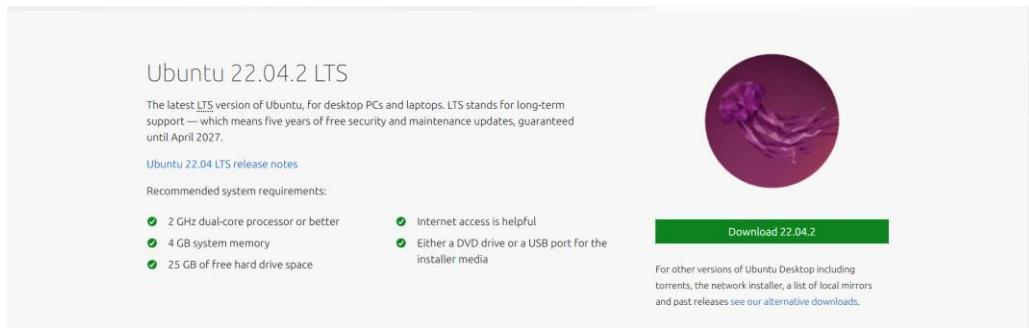
**3.4** Finally, check the “Start Oracle VM VirtualBox after installation” and click on “Finish” button.



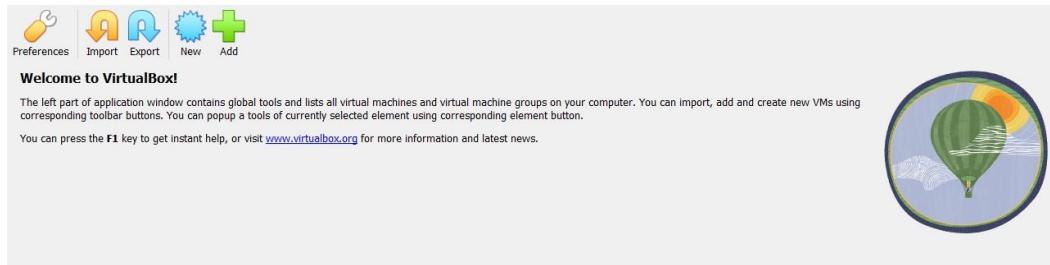
**3.5** You will now see the welcome message.



**Step 4:** Visit the official site, <https://ubuntu.com/download/desktop>, to download the Ubuntu .iso image file.



## Step 5: Open the Virtual Box application.



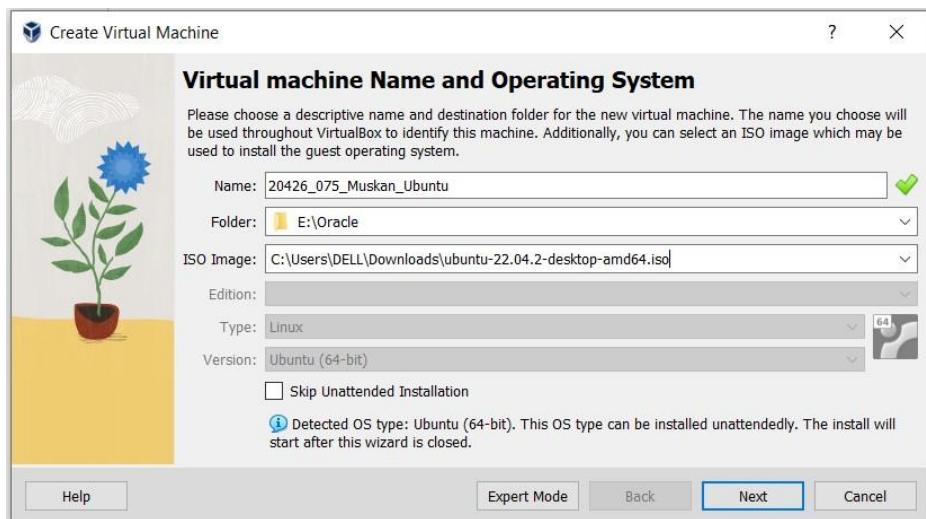
**5.1** Click in the “New” button. A “Create Virtual Machine” dialog box will appear on the screen.

**5.1.1** Provide a name for your machine.

**5.1.2** Choose a location on your drive.

**5.1.3** Choose the *iso* image downloaded in **Step 4**

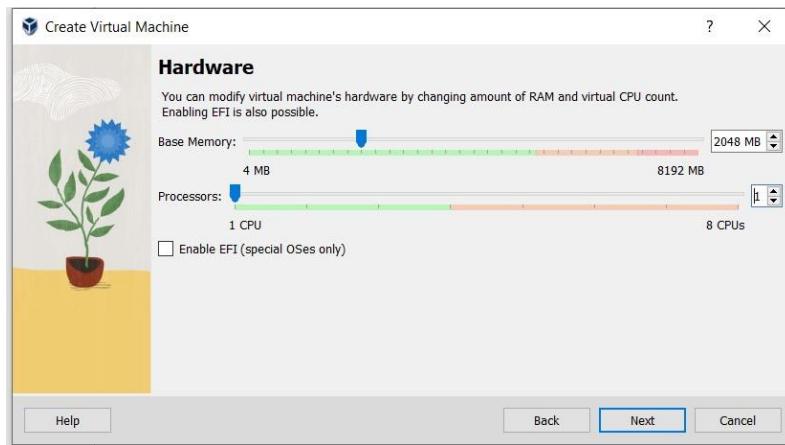
**5.1.4** Click on “Next” button.



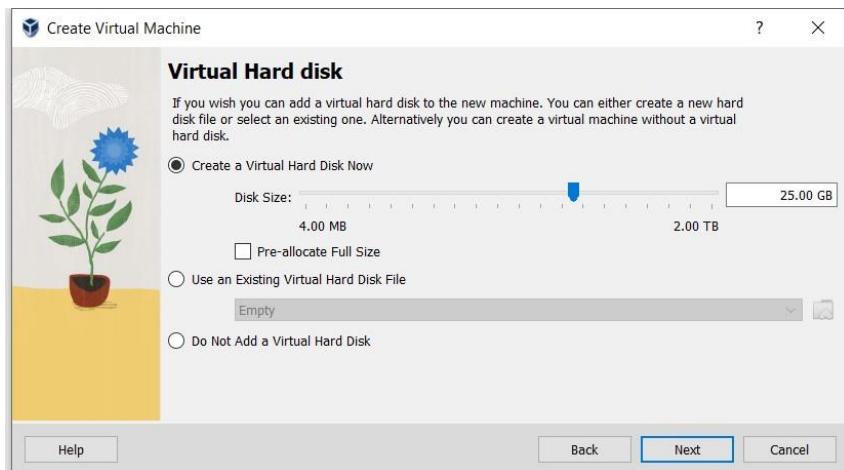
**Step 6:** Another dialog box will appear where you can provide the password for the new OS. After providing the password, click on the “Next” button.



### Step 7: Choose hardware size and number of processors.



### Step 8: Then, create a virtual hard disk.



### Step 9: A summary of all the configuration files will now appear. Finally, click on the "Finish" button.

**Create Virtual Machine**

### Summary

The following table summarizes the configuration you have chosen for the new virtual machine. When you are happy with the configuration press Finish to create the virtual machine. Alternatively you can go back and modify the configuration.

Machine Name and OS Type	
Machine Name	20426_075_Muskan_Ubuntu
Machine Folder	E:/Oracle/20426_075_Muskan_Ubuntu
ISO Image	C:/Users/DELL/Downloads/ubuntu-22.04.2-desktop-amd64.iso
Guest OS Type	Ubuntu (64-bit)
Skip Unattended Install	true
<b>Hardware</b>	
Base Memory	2048
Processor(s)	1
EFI Enable	false
<b>Disk</b>	
Disk Size	4.88 GB
Pre-allocate Full Size	false

Help Back Finish Cancel

**General**  
Name: 20426\_075\_Muskan\_Ubuntu  
Operating System: Ubuntu (64-bit)

**System**  
Base Memory: 2048 MB  
Boot Order: Floppy, Optical, Hard Disk  
Acceleration: Nested Paging, KVM Paravirtualization

**Display**  
Video Memory: 16 MB  
Graphics Controller: VMSSVGA  
Remote Desktop Server: Disabled  
Recording: Disabled

**Storage**  
Controller: IDE  
IDE Secondary Device 0: [Optical Drive] ubuntu-22.04.2-desktop-amd64.iso (4.59 GB)  
Controller: SATA  
SATA Port 0: 20426\_075\_Muskan\_Ubuntu.vdi (Normal, 4.88 GB)

**Audio**  
Host Driver: Default  
Controller: ICH AC97

**Network**  
Adapter 1: Intel PRO/1000 MT Desktop (NAT)

**USB**  
USB Controller: OHCI, EHCI  
Device Filters: 0 (0 active)

**Shared folders**  
None

**Description**  
None

**Preview**  
20426\_075\_Muskan\_Ubuntu

**Lab Number:** 2

**Date:** \_\_\_\_\_

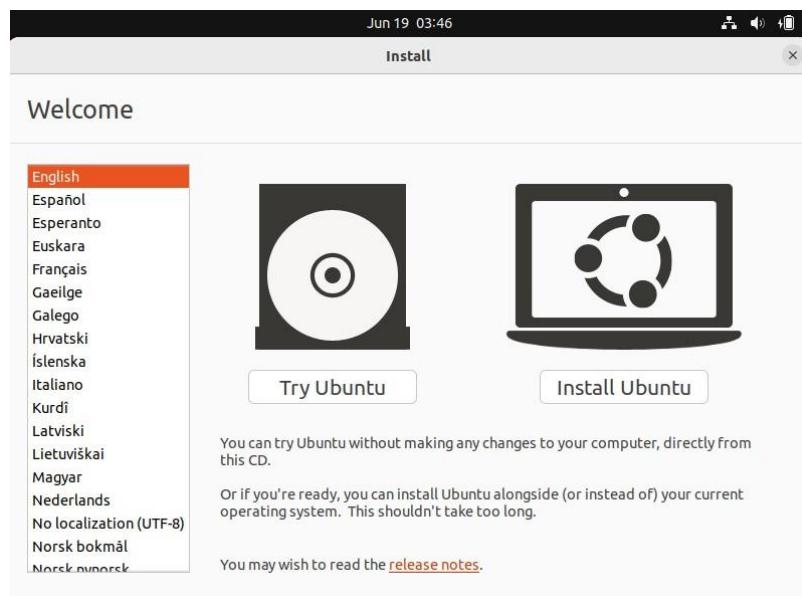
**Title:** Take Snapshot of each VM OS and restore it.

**Step 1:** Open your virtual box.

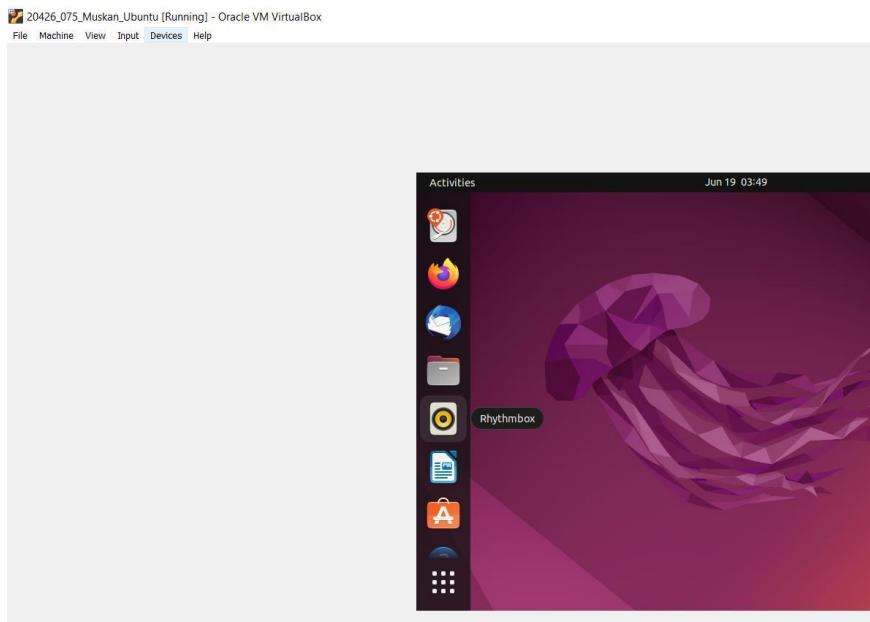
**Step 2:** Click on “Start” button to run your new OS on the virtual machine. Wait for the OS to power up and click on “try and install” Ubuntu.



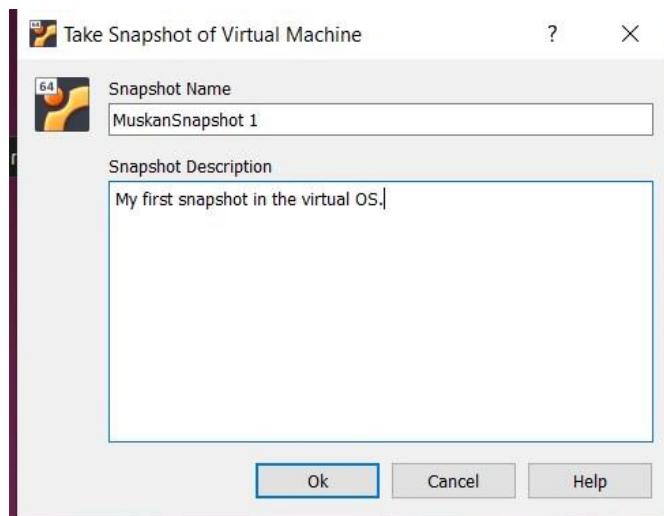
**Step 3:** Choose “Install Ubuntu” option.



**Step 4:** On the menu bar click on the “Machine” menu and choose “Take snapshot” option.

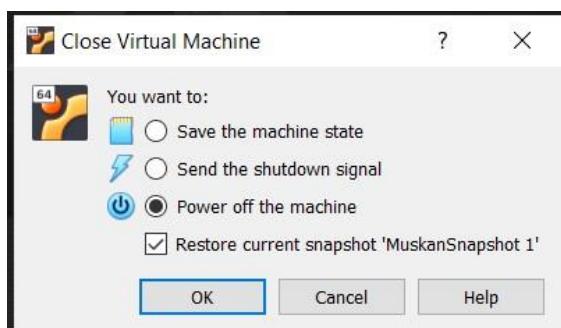


**4.1** Fill in the snapshot name and snapshot description and click on “Ok” button.



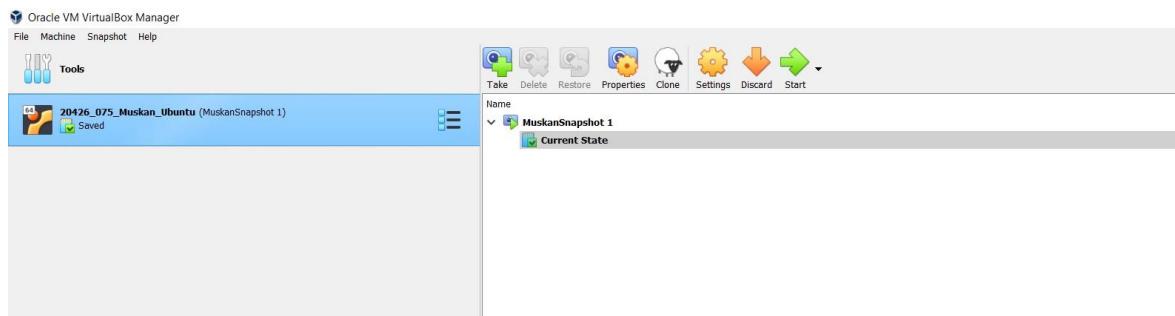
#### 4.2 Wait for the snapshot to finish.

**Step 5:** Try to close the OS where you will see the “Restore” option.



**Step 6:** Click on “Ok” button.

Now you can see the snapshot in the Virtual Box Manager.



**Lab Number:** 3

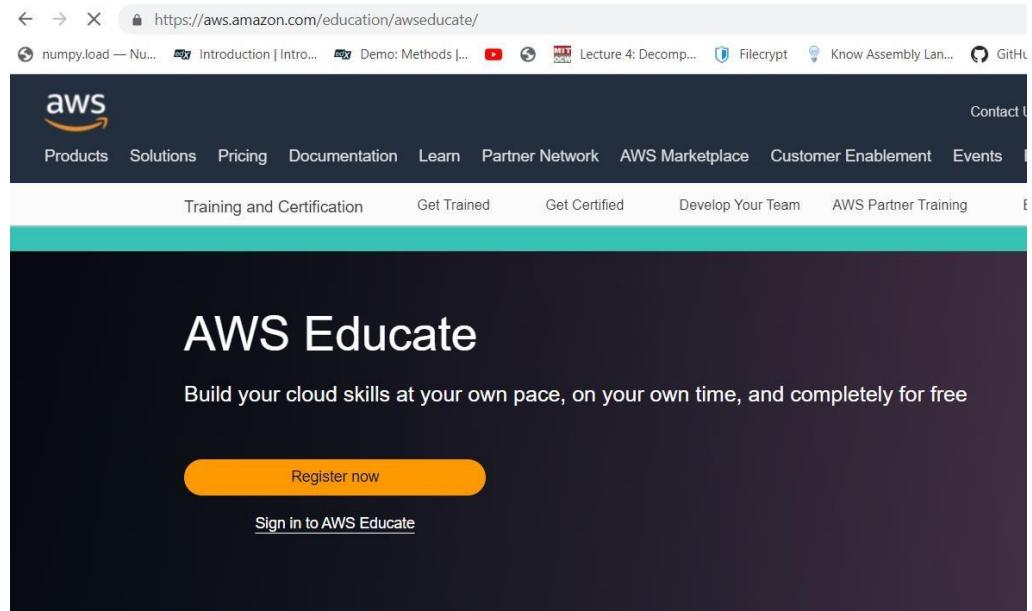
**Date:** \_\_\_\_\_

**Title:** Register an "amazon educate" account with college email address.

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Step 1: Visit official site, <https://aws.amazon.com/education/awseducate/>.

Step 2: Click on "register now" button.



Step 3: On clicking the button, you will be redirected to a registration form. Fill up the form and submit the form. You will be redirected to email verification page.

### Create your account

First name

Muskan

Last name

Bhandari

Country

Nepal

Birth month

July

Birth year

2001

Email

CSIT75.Muskan@newsummit..edu.np

Registration code (optional)

EducateLP

protected by reCAPTCHA

[Privacy](#) · [Terms](#)



Step 5: Open your email inbox and verify the email. You will then be redirected to a verified email page.

Thank you for applying to AWS Educate!

Please verify your email address to complete your registration by selecting the button below.

[Verify my email](#)

Thank you,  
AWS Educate

Need help? [Contact us here.](#)

Step 6: You will then be asked to set password.

Welcome to [AWS Educate!](#)

You can now access hundreds of hours of free, self-paced online training resources, as well as hands-on practice on the AWS Console with course labs. Follow content recommendations by category, or discover courses at your pace. Earn learner badges that demonstrate your skill mastery, and also check out other helpful AWS resources.

Begin by setting your password below.

[Click here to set a password](#)

Don't forget to bookmark the AWS Educate homepage for easy access, or [click here](#) to sign in directly.

We hope you enjoy the program,  
AWS Educate

Need help? Contact us here.

### Set your password

Enter a password that contains at least:

- ✓ 8 characters
- ✓ 1 letter
- ✓ 1 number
- ✓ 1 special character ⓘ

Enter a password

Confirm password

[Continue](#)

Step 7: You can now see the homepage of amazon aws educate.

The screenshot shows the AWS Educate homepage. At the top, there's a navigation bar with the AWS logo, a search bar, and links for 'Courses & Labs', 'Jobs', and a user profile for 'Muskan Bhandari'. Below the header, a large blue banner says 'Your cloud journey starts here' and 'No matter your goal, we've gathered the most useful content to build your cloud skills.' On the left, there are filters for 'Course Features' (Badge, Lab) and 'Topic' (Analytics, Cloud Computing, Development). The main content area is titled 'Most popular courses and labs' and shows four cards: 'Getting Started with Serverless (Lab)' (Foundational | 2 hour(s)), 'Getting Started with Security (Lab)' (Foundational | 2 hour(s)), 'Getting Started with Cloud Operations (Lab)' (Foundational | 2 hour(s)), and 'Getting Started with Databases (Lab)' (Foundational | 2 hour(s)). To the right, there's a sidebar titled 'Explore' with sections for user feedback ('We want to hear from you! Tell us about your AWS Educate experience so we can improve'), a did-you-know fact about digital badges, and a link to 'Activate Windows'. At the bottom, there are links for 'FAQ', 'Contact us', 'Privacy', 'Site terms', 'Cookie preferences', and copyright information.

**Lab Number:** 4

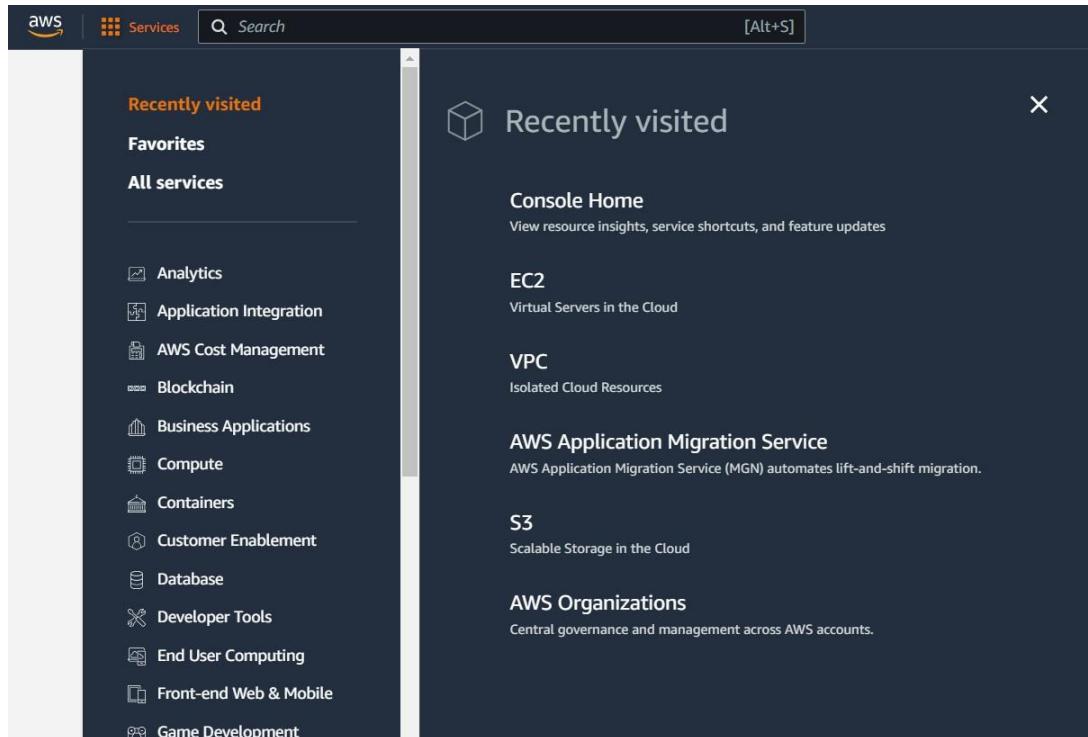
**Date:** \_\_\_\_\_

**Title:** Upload any file to amazon s3.

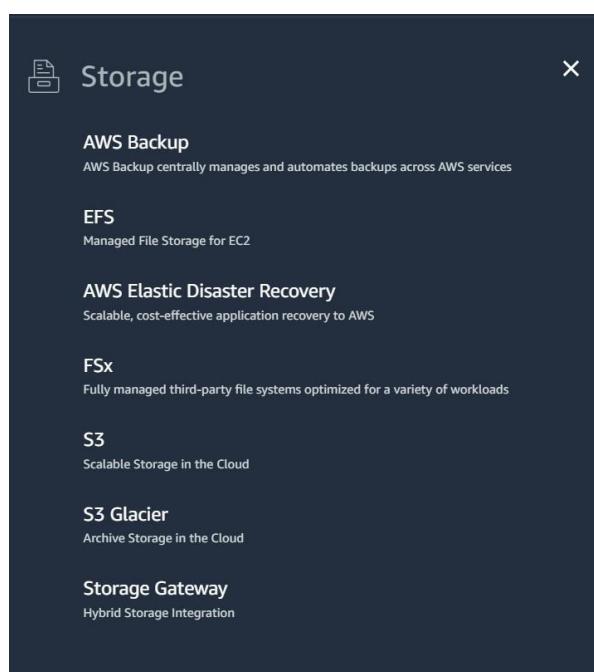
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Step 1: Open the amazon console, <http://console.aws.amazon.com/>,

Step 2: Click on “Services” tab on the top left corner of the console.



Step 3: You will now see different choices. Click on “S3 (scalable storage in the cloud)” option.



Step 4: Click on “Create bucket” button located on the right corner.

Buckets (7) [Info](#)  
Buckets are containers for data stored in S3. [Learn more](#)

[View Storage Lens dashboard](#)

[C](#) [Copy ARN](#) [Empty](#) [Delete](#) [Create bucket](#)

Find buckets by name

Step 5: You can now see the configuration form. Provide an appropriate bucket name, choose aws region from the dropdown menu and then save the configuration details.

Amazon S3 > Buckets > Create bucket

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

**General configuration**

Bucket name  
  
Bucket name must be unique within the global namespace and follow the bucket naming rules. See rules for bucket naming

AWS Region

Copy settings from existing bucket - *optional*  
Only the bucket settings in the following configuration are copied.  
[Choose bucket](#)

Step 6: On successfully creating the bucket, you can see the following message.

⌚ Successfully created bucket "bhandarimuskanbucket13"  
To upload files and folders, or to configure additional bucket settings choose [View details](#).

[View details](#)

Buckets (8) [Info](#)  
Buckets are containers for data stored in S3. [Learn more](#)

[C](#) [Copy ARN](#) [Empty](#) [Delete](#) [Create bucket](#)

Find buckets by name

Name	AWS Region	Access	Creation date
bhandarimuskanbucket13	Asia Pacific (Mumbai) ap-south-1	Bucket and objects not public	June 20, 2023, 06:38:40 (UTC+05:45)

Step 7: Click on the bucket name. Here, the bucket name is “bhandarimuskanbucket13”.

Step 8: You can now see the different tabs. Click on “Objects” tab.

The screenshot shows the AWS S3 console interface for a bucket named "bhandarimuskanbucket13". The top navigation bar includes tabs for Objects, Properties, Permissions, Metrics, Management, and Access Points. The "Objects" tab is selected. Below the tabs, there's a toolbar with actions like Copy S3 URI, Copy URL, Download, Open, Delete, Actions, Create folder, and Upload. A search bar labeled "Find objects by prefix" is present. The main content area is titled "Objects (0)" and displays a message: "No objects. You don't have any objects in this bucket." At the bottom right of this area is a prominent orange "Upload" button.

Step 9: Click on “upload” button.

This screenshot is identical to the one above, showing the AWS S3 console for the same bucket. The "Upload" button is again highlighted in orange at the bottom right of the "No objects" section.

Step 10: You can now see the option to upload files or folders.

The screenshot shows the "Upload" page of the AWS S3 console. At the top, it says "Upload" and provides instructions: "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." Below this is a large dashed rectangular area with the text "Drag and drop files and folders you want to upload here, or choose Add files or Add folder." To the right of this area is a table titled "Files and folders (0)". The table has columns for Name, Folder, Type, and Size. A "Remove" button is at the top of the table, and "Add files" and "Add folder" buttons are located to its right. A search bar labeled "Find by name" is also present. The message "All files and folders in this table will be uploaded." is displayed above the table. The table itself shows "No files or folders" and "You have not chosen any files or folders to upload."

Step 11: Click on “Add Files” option to upload a file. Choose any file from your local machine and click on upload button.

**Files and folders (1 Total, 116.4 KB)**

All files and folders in this table will be uploaded.

	Name	Folder	Type	Size
<input type="checkbox"/>	Rusty_Blackbird_0001_6548.jpg	-	image/jpeg	116.4 KB

**▶ Permissions**  
Grant public access and access to other AWS accounts.

**▶ Properties**  
Specify storage class, encryption settings, tags, and more.

[Cancel](#) [Upload](#)

Step 12: You will now be redirected to a success page.

**Upload succeeded**  
View details below.

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

**Summary**

Destination	Succeeded	Failed
s3://bhandarimuskhanbucket13	<span style="color: green;">1 file, 116.4 KB (100.00%)</span>	<span style="color: grey;">0 files, 0 B (0%)</span>

[Files and folders](#) [Configuration](#)

**Files and folders (1 Total, 116.4 KB)**

Name	Folder	Type	Size	Status	Error
Rusty_Blackbird_0001_6548.jpg	-	image/jpeg	116.4 KB	<span style="color: green;">Succeeded</span>	-

[Activate Windows](#)  
Go to Settings to activate Windows.

Step 13: Click on the “Object URL” provided in the “Properties” tab. You can now see your uploaded file.

Amazon S3 > Buckets > bhandarimuskhanbucket13 > Rusty\_Bird\_0001\_6548.jpg

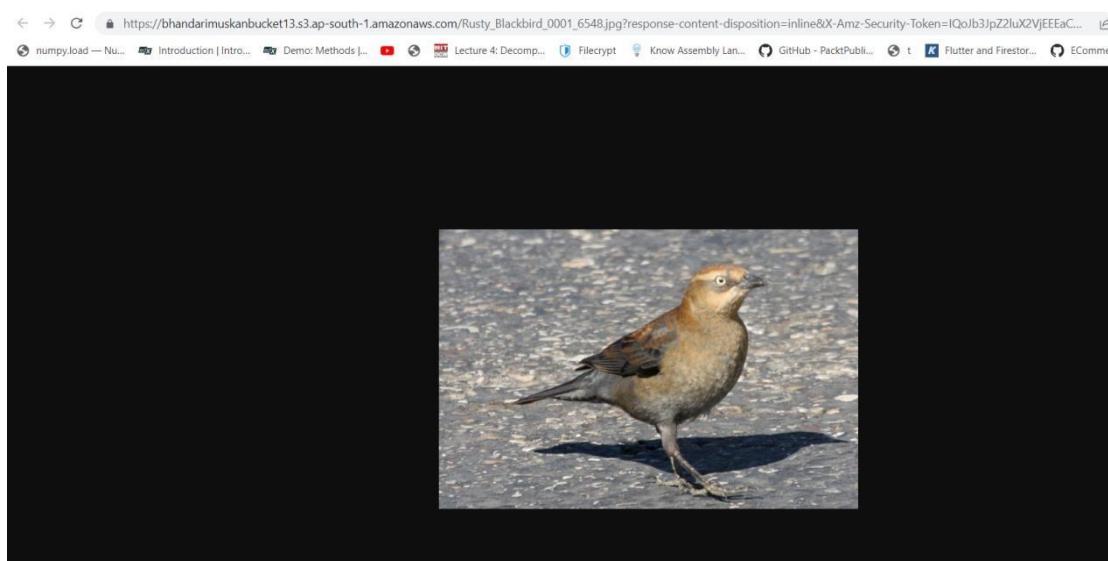
Rusty\_Bird\_0001\_6548.jpg [Info](#)

[Copy S3 URI](#) [Download](#) [Open](#) [Object actions](#)

[Properties](#) [Permissions](#) [Versions](#)

**Object overview**

Owner	s3://bhandarimuskhanbucket13/Rusty_Bird_0001_6548.jpg
AWS Region	Amazon Resource Name (ARN)
Asia Pacific (Mumbai) ap-south-1	arn:aws:s3:::bhandarimuskhanbucket13/Rusty_Bird_0001_6548.jpg
Last modified	Entity tag (Etag)
June 20, 2023, 06:41:50 (UTC+05:45)	d0926ae263727c1286c248d0f73da1d4
Size	Object URL
116.4 KB	<a href="https://bhandarimuskhanbucket13.s3.ap-south-1.amazonaws.com/Rusty_Bird_0001_6548.jpg">https://bhandarimuskhanbucket13.s3.ap-south-1.amazonaws.com/Rusty_Bird_0001_6548.jpg</a>
Type	Activate Windows
jpg	Go to Settings to activate Windows.
Key	
<a href="#">Rusty_Bird_0001_6548.jpg</a>	



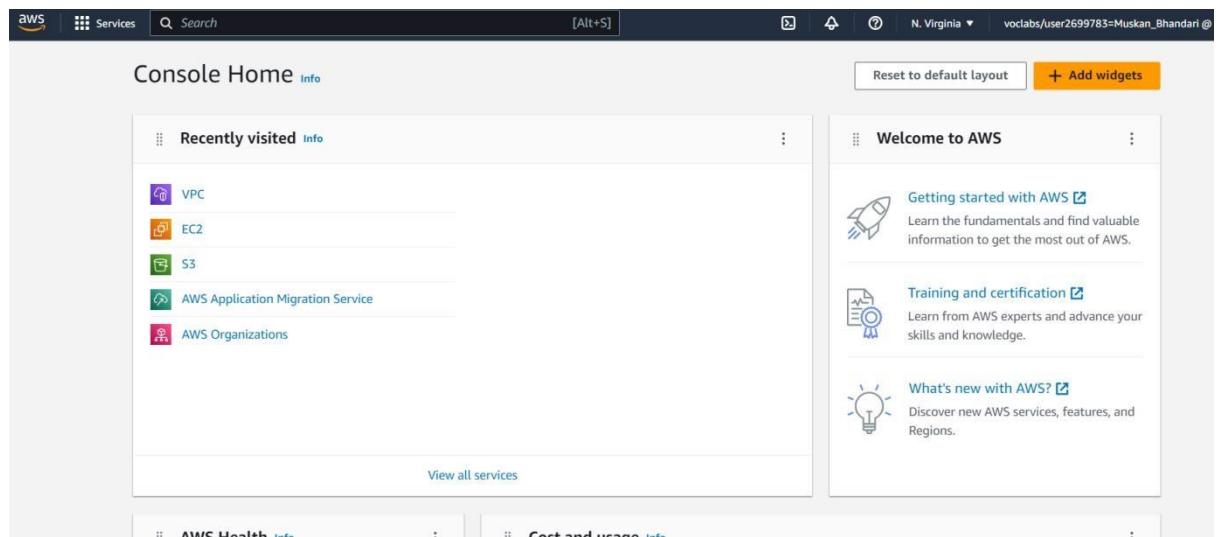
**Lab Number:** 5

**Date:** \_\_\_\_\_

**Title:** Amazon Instance EC2

## Task 1: Launching an EC2 Instance

1. In the AWS Management Console on the **Services** menu, enter **EC2**. From the search results, choose **EC2**.



2. In the left navigation pane, choose **EC2 Dashboard** to ensure that you are on the dashboard page.
3. In the **Launch instance** section, choose the **Launch instance** dropdown list, and then choose **Launch instance**.

A screenshot showing two side-by-side pages from the AWS Management Console. On the left is the 'Launch instance' page under the EC2 service. It features a large orange 'Launch instance' button with a dropdown arrow, a 'Migrate a server' button, and a note stating 'Note: Your instances will launch in the US East (N. Virginia) Region'. On the right is the 'Service health' page, which includes a 'AWS Health Dashboard' link, region information ('Region: US East (N. Virginia)', 'Status: This service is operating'), and a 'Zones' section.

### Step 1: Naming the EC2 instance

4. Using tags, we can categorize your AWS resources in different. This categorization is useful when you have many resources of the same type. We can quickly identify a specific resource based on the tags that you have assigned to it. Each tag consists of a key and a value, both of which you define.
5. When we name your instance, AWS creates a key-value pair. The key for this pair is **Name**, and the value is the name that you enter for your EC2 instance.
6. In the **Name and tags** pane, in the **Name** text box, enter **Web-Server**

The screenshot shows the 'Name and tags' pane with one tag defined:

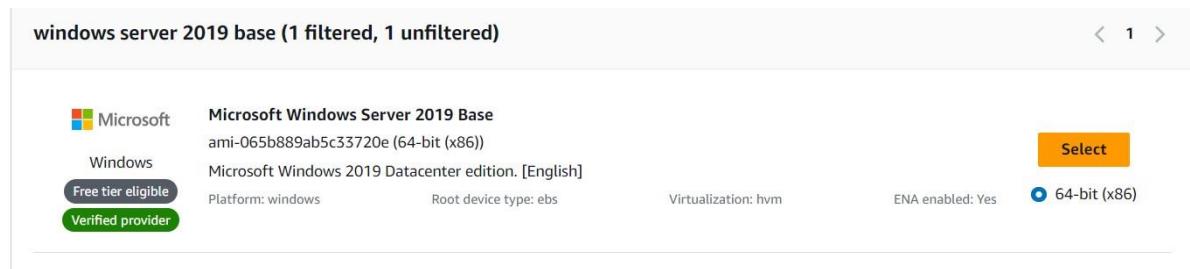
Key <small>Info</small>	Value <small>Info</small>	Resource types <small>Info</small>
<input type="text" value="Name"/> <span>X</span>	<input type="text" value="Web-server"/> <span>X</span>	<input type="button" value="Select resource ty..."/> <span>▼</span>

Below the table, there are two buttons: 'Instances X' and 'Volumes X'. At the bottom left is a button labeled 'Add new tag'. A note at the bottom says 'You can add up to 49 more tags.'

- 
7. Choose the **Add additional tags** link.
  8. From the **Resource types** dropdown list, select **Instances** and **Volumes**.

### Step 2: Choosing an AMI

9. An Amazon Machine Image (AMI) provides the information required to launch an instance, which is a virtual server in the cloud. An AMI includes the following:
10. A template for the root volume for the instance.
11. Launch permissions that control which AWS accounts can use the AMI to launch instances
12. A block device mapping that specifies the volumes to attach to the instance when it is launched
13. The **Quick Start** list contains the most commonly used AMIs.
14. Locate the **Application and OS Images (Amazon Machine Image)** section. It is just below the **Name and tags** section.
15. In the search box, enter Windows Server 2019 Base and press Enter.
16. Next to **Microsoft Windows Server 2019 Base**, choose **Select**.
17. Choose **Confirm Changes**.



### Step 3: Choosing an instance type

18. In the **Instance type** section, keep the default instance type, **t2.micro**.

The screenshot shows the 'Instance type' section. It displays the 't2.micro' instance type, which is described as Family: t2, 1 vCPU, 1 GiB Memory, Current generation: true. It also lists On-Demand Windows pricing, On-Demand SUSE pricing, On-Demand RHEL pricing, and On-Demand Linux pricing. To the right, there are buttons for 'Free tier eligible', 'All generations', and 'Compare instance types'.

### Step 4: Configuring a key pair

19. In the **Key pair (login)** section, from the **Key pair name - required** dropdown list, choose **Proceed without a key pair (not recommended)**.

The screenshot shows the 'Key pair (login)' section. It includes a note about using a key pair for secure connection and a dropdown menu for 'Key pair name - required'. The dropdown shows 'Proceed without a key pair (Not recommended)' as the selected value. There is also a 'Default value' dropdown and a 'Create new key pair' button. A note at the bottom explains that for Windows instances, a key pair is used to decrypt the administrator password.

### Step 5: Configuring the network settings

20. We use this pane to configure networking settings.

21. The virtual private cloud (VPC) indicates which VPC we want to launch the instance into. We can have multiple VPCs, including different ones for development, testing, and production.

**Network settings** [Info](#)

VPC - *required* [Info](#)

vpc-0ce1b4513dfdc40c0 (Lab VPC)  
10.0.0.0/16

Subnet [Info](#)

subnet-0bf9bb25c098a3590      Public Subnet 1  
VPC: vpc-0ce1b4513dfdc40c0    Owner: 291683965211    Availability Zone: us-east-1a  
IP addresses available: 251    CIDR: 10.0.1.0/24

Auto-assign public IP [Info](#)

Enable

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the 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*

Muskan Web Server security group

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and .\_-:/()#,@[]+=;&;!\$\*

Description - *required* [Info](#)

launch-wizard-1 created 2023-08-16T14:46:53.370Z

22. In the **Network settings** section, choose **Edit**.
23. From the **VPC - required** dropdown list, choose **Lab VPC..**
24. For **Security group name - required**, enter **Muskan Web Server security group**.

### Step 6: Configuring advanced details

25. Expand the **Advanced details** section.
26. For **IAM instance profile**, choose the role that has **LabInstanceProfile** in the name.

## ▼ Advanced details [Info](#)

Purchasing option [Info](#)

Request Spot Instances

Domain join directory [Info](#)

Select



Create new directory



IAM instance profile [Info](#)

c57966a1007920l4587048t1w291683965211-LabInstanceProfile-xHNudb785Pr1

arn:aws:iam::291683965211:instance-profile/c57966a1007920l4587048t1w291683965211-LabInstanceProfile-xHNudb785Pr1



Hostname type [Info](#)

IP name



27. DNS Hostname [Info](#)

28. From the **Termination protection** dropdown list, choose **Enable**.

29. Copy the following commands, and paste them into the **User data** text box.

User data - *optional* [Info](#)

Upload a file with your user data or enter it in the field.

Choose file

```
<powershell>
# Installing web server
Install-WindowsFeature -name Web-Server -IncludeManagementTools
# Getting website code
wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-100-
EDCOMP-1-DEV/lab-01-ec2/code.zip -outfile
"C:\Users\Administrator\Downloads\code.zip"
# Unzipping website code
Add-Type -AssemblyName System.IO.Compression.FileSystem
function Unzip {
{
    param([string]$zipfile, [string]$outpath)
    [System.IO.Compression.ZipFile]::ExtractToDirectory($zipfile, $outpath)
}
Unzip "C:\Users\Administrator\Downloads\code.zip" "C:\inetpub\"
```

30. The script does the following:

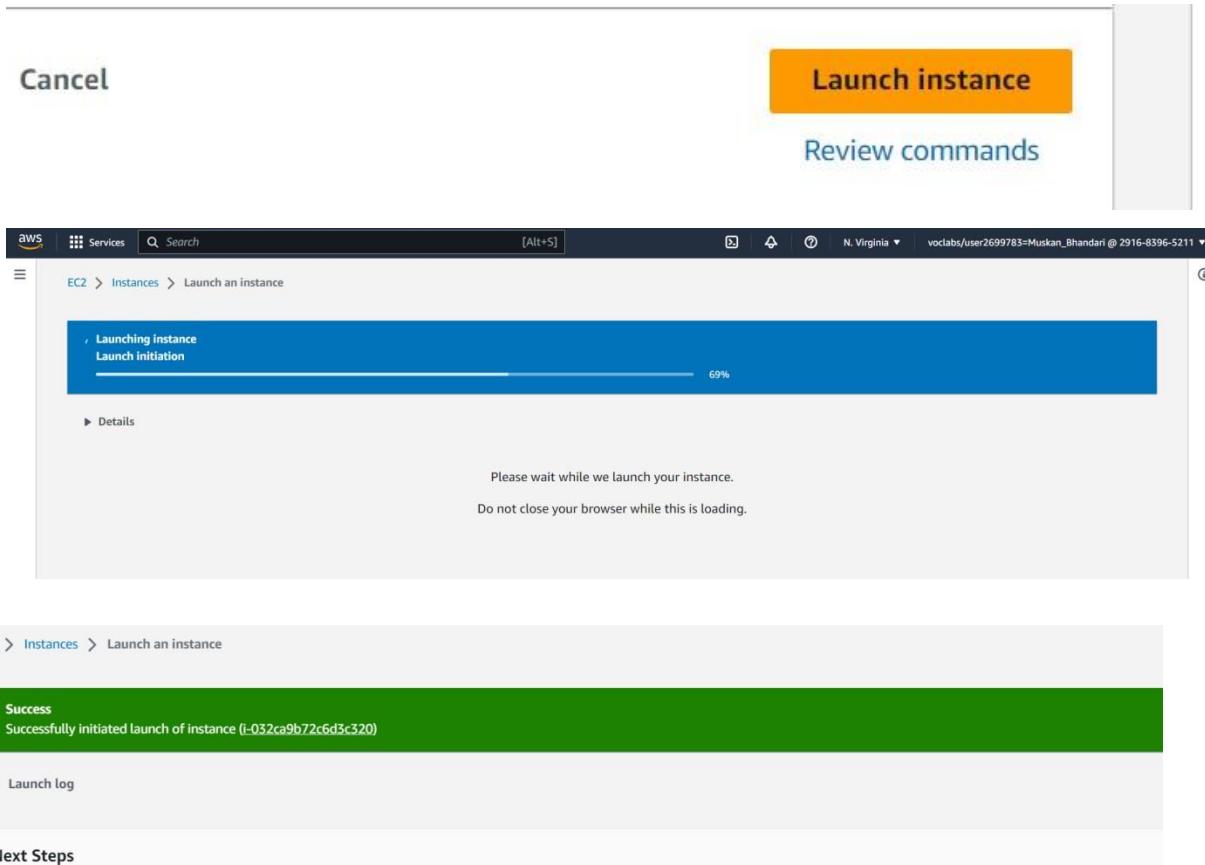
- a. Installs a Microsoft Internet Information Services (IIS) web server
- b. Creates a simple web site
- c. Sets the password for the Administrator user

## Step 8: Launch an EC2 instance

31. Now that you have configured your EC2 instance settings, it is time to launch your instance.

32. In the **Summary** section, choose **Launch instance**.

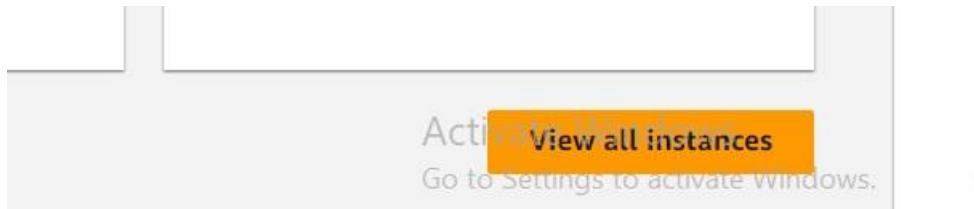
33. A message indicates that you have successfully initiated the launch of your instance.



34. Choose **View all instances**

35. The instance appears in a **Pending** state, which means that it is being launched. It then changes to **Running**, which indicates that the instance has started booting. There will be a short time before we can access the instance.

36. The instance receives a public Domain Name System (DNS) name that we can use to contact the instance from the Internet.



37. Next to your **Web-Server**, select the check box. The **Details** tab displays detailed information about your instance.
38. To view more information in the **Details** tab, drag the window divider upward.
39. Review the information displayed in the **Details**, **Security** and **Networking** tabs.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Web-server	i-032ca9b72c6d3c320	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	ec2-44-201-222-

40. Wait for your instance to display the following:
  - a. **Instance State:** Running
  - b. **Status Checks:** 2/2 checks passed

## Task 2: Monitor your instance

41. Choose the **Status checks** tab.
42. Notice that both the **System reachability** and **Instance reachability** checks have passed.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Web-server	i-032ca9b72c6d3c320	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	ec2-44-201-222-

**Instance: i-032ca9b72c6d3c320 (Web-server)**

Details | Security | Networking | Storage | **Status checks** | Monitoring | Tags

**Status checks** Info

Status checks detect problems that may impair i-032ca9b72c6d3c320 (Web-server) from running your applications.

System status checks	Instance status checks
System reachability check passed	Instance reachability check passed

Report the instance status if our checks do not reflect your experience with this instance or if they do not detect issues you are having.

[Report instance status](#)

Activate Windows  
Go to Settings to activate Windows.

43. Choose the **Monitoring** tab.
44. Scroll through the log and review the messages in the output.
45. To return to the Amazon EC2 dashboard, choose **Cancel**.
46. With our **Web-Server** selected, choose the **Actions** dropdown menu, and select **Monitor and troubleshoot Get instance screenshot**.

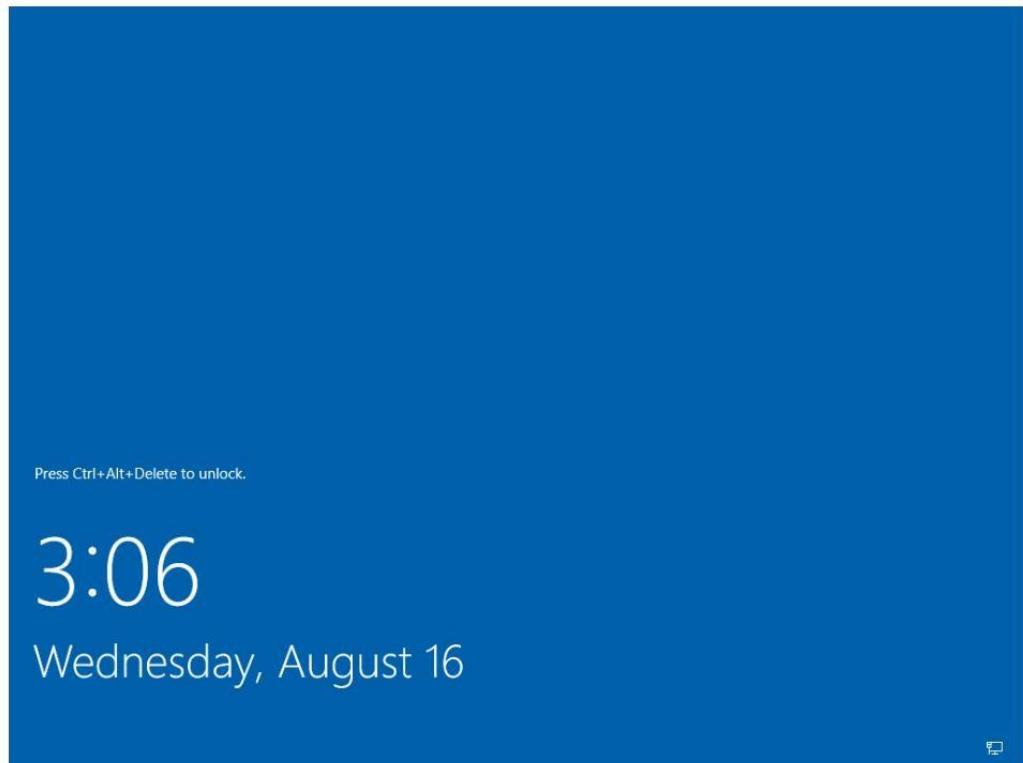
The screenshot shows the AWS EC2 Instances page. A context menu is open over a selected t2.micro instance. The menu items include:

- Connect
- View details
- Manage instance state
- Instance settings
- Networking
- Security
- Image and templates
- Monitor and troubleshoot** (highlighted in blue)

### Get system log Info

When you experience issues with your EC2 instance, reviewing system logs can help you pinpoint the cause.

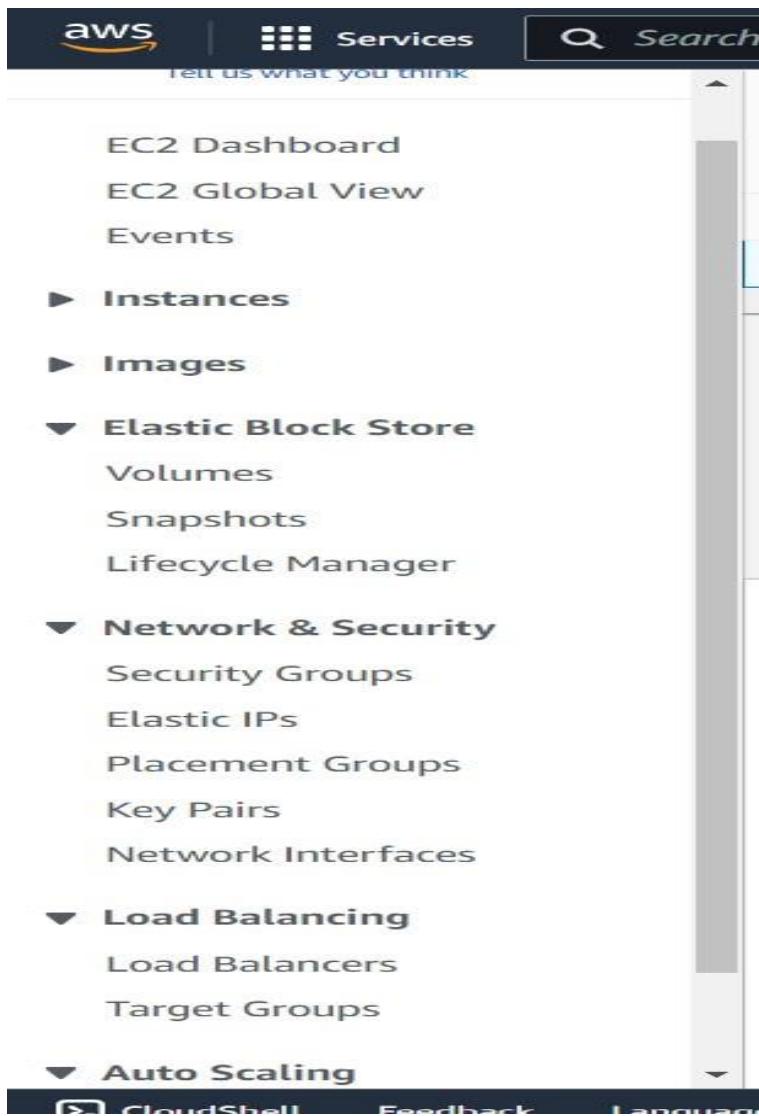
System log	
Review system log for instance i-032ca9b72c6d3c320 as of Wed Aug 16 2023 20:50:37 GMT+0545 (Nepal Time)	<a href="#">Copy log</a> <a href="#">Download</a>
<pre> 2023/08/16 14:58:48Z: OsCurrentBuild: 1776 2023/08/16 14:58:48Z: OsReleaseId: 1809 2023/08/16 14:58:48Z: Language: en-US 2023/08/16 14:58:48Z: TimeZone: Coordinated Universal Time 2023/08/16 14:58:48Z: Offset: UTC 00:00:00 2023/08/16 14:58:48Z: AMI-ID: ami-065b889ab5c33720e 2023/08/16 14:58:48Z: Instance-ID: i-032ca9b72c6d3c320 2023/08/16 14:58:48Z: Instance-Type: t2.micro 2023/08/16 14:58:52Z: Driver: AWS PV Driver Package v8.4.3 2023/08/16 14:58:53Z: Launch: EC2 Launch v1.3.2004256 2023/08/16 14:58:53Z: SSM: Amazon SSM Agent v3.1.2282.0 2023/08/16 14:58:53Z: RDPCERTIFICATE-SUBJECTNAME: EC2AMAZ-EA2A12B 2023/08/16 14:58:53Z: RDPCERTIFICATE-THUMPRINT: 666A6BC2E42B1B053DB51408AAE831CD3FD985F4 2023/08/16 14:59:29Z: HibernationEnabled: False 2023/08/16 14:59:34Z: Message: Windows is Ready to use 2023/08/16 14:59:38Z: EC2LaunchTelemetry: IsTelemetryEnabled=true 2023/08/16 14:59:38Z: EC2LaunchTelemetry: AgentOsArch=windows_amd64 </pre>	



47. At the bottom of the page, choose **Cancel**.

### **Task 3: Updating the security group and accessing the web server**

48. Select the check box next to the Amazon EC2 **Web-Server** that we created, and then choose the **Details** tab.



49.

50. Copy the **Public IPv4 address** of your instance to your clipboard.
51. In your web browser, open a new tab, paste the IP address you just copied, and then press Enter.
52. Keep the browser tab open, but return to the **EC2 Management Console** tab.
53. In the left navigation pane, choose **Security Groups**.
54. Next to **Web Server security group**, select the check box.
55. Choose the **Inbound rules** tab.
56. Choose **Edit inbound rules**, and then choose **Add rule**, and configure the following options:
  - a. **Type:** Choose **HTTP**.
  - b. **Source:** Choose **Anywhere-IPv4**.

Security Groups (3) <a href="#">Info</a>							<a href="#">Actions</a> ▾	<a href="#">Export security groups to CSV</a>	<a href="#">Create security group</a>	<a href="#">?</a>
<input type="checkbox"/>	Name	Security group ID	Security group name	VPC ID	Description	Owner				
<input type="checkbox"/>	-	sg-048a285ca348a4685	default	vpc-0ce1b4513dfdc40c0 <a href="#">Edit</a>	default VPC security gr...	291683965211				
<input type="checkbox"/>	-	sg-3cb80e3e	default	vpc-48189435 <a href="#">Edit</a>	default VPC security gr...	291683965211				
<input type="checkbox"/>	-	sg-0950003ff69281e78	Muskan Web Server se...	vpc-0ce1b4513dfdc40c0 <a href="#">Edit</a>	launch-wizard-1 create...	291683965211				

Inbound rules [Info](#)

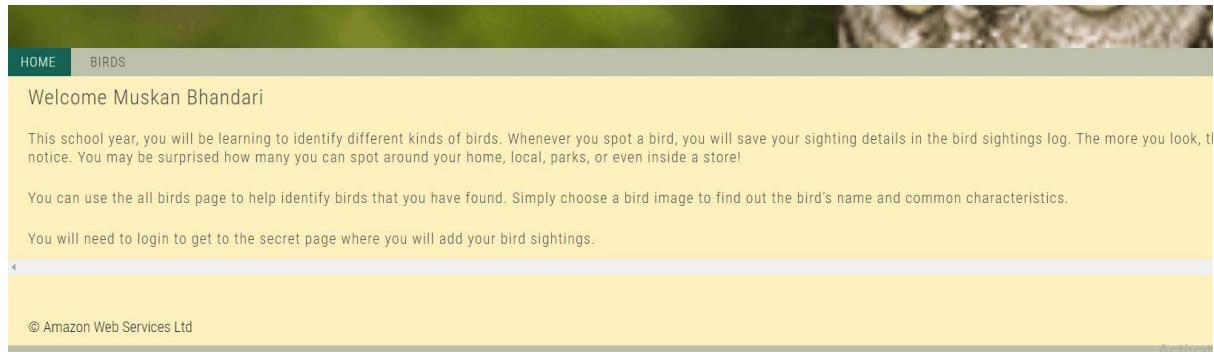
Security group rule ID	Type <a href="#">Info</a>	Protocol <a href="#">Info</a>	Port range <a href="#">Info</a>	Source <a href="#">Info</a>	Description - optional <a href="#">Info</a>
-	HTTP	TCP	80	Anywhere <a href="#">▼</a>	<input type="text"/> 0.0.0.0/0 <a href="#">X</a>

[Add rule](#)

[Cancel](#) [Preview changes](#) [Save rules](#)

## 57. Choose Save rules

58. Return to the web server browser tab with the public IPv4 address that you previously opened, and choose to refresh the page.



We should now find a web website with the message **Welcome Muskan Bhandari!**

**Lab Number:** 6

**Date:** \_\_\_\_\_

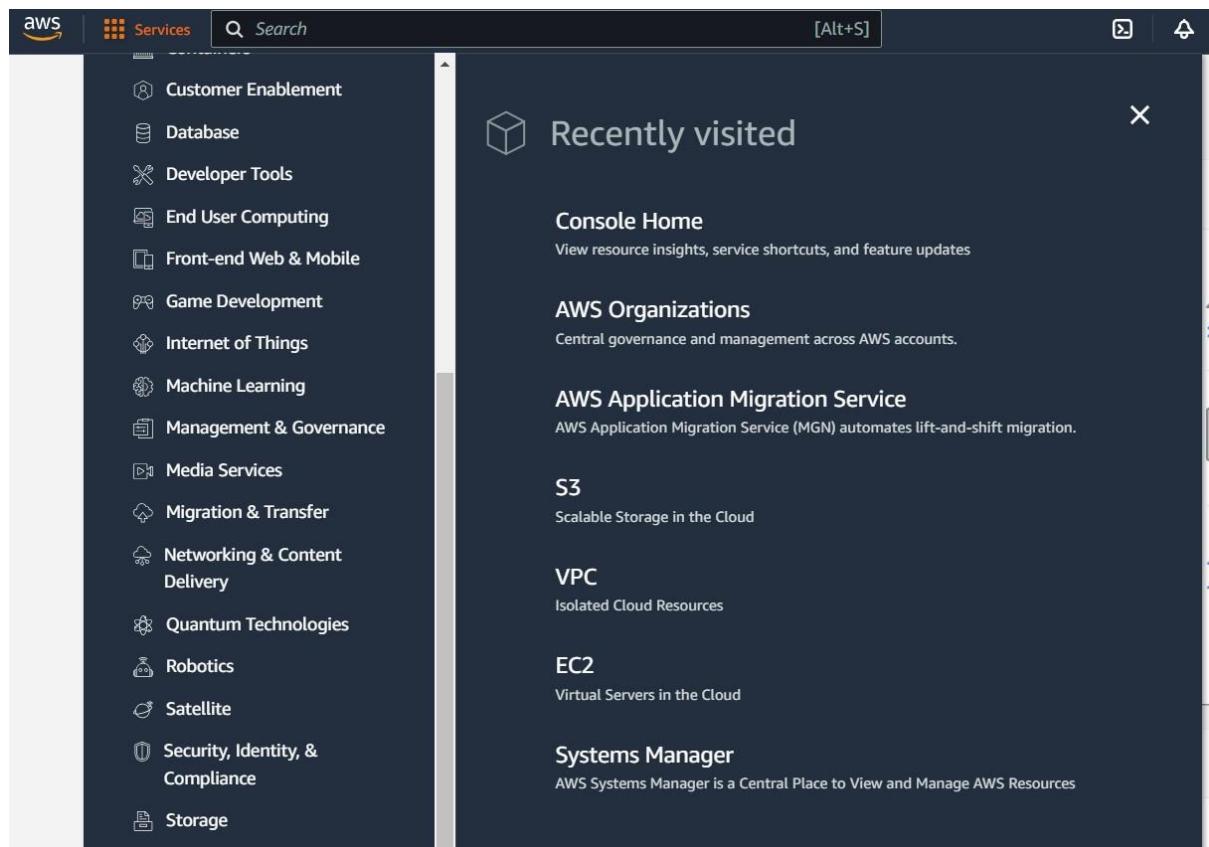
**Title:** *Creating a Virtual Private Cloud (VPC)*

---

## Task 1: Explore the default VPC configuration

A VPC is a virtual network that is dedicated to your AWS account. It is logically isolated from other virtual networks in the AWS Cloud. We can launch AWS resources, such as Amazon Elastic Compute Cloud (Amazon EC2) instances, into the VPC.

1. In the AWS Management Console on the **Services** menu, enter **VPC**. From the search results, choose **VPC**.



2. In the left navigation pane, choose **Your VPCs**.

The screenshot shows the AWS VPC dashboard. At the top, there's a search bar and a dropdown menu for selecting a VPC. Below that, there are sections for 'Virtual private cloud' and 'Security'. Under 'Virtual private cloud', there are links for 'Your VPCs' (with a 'New' indicator), 'Subnets', 'Route tables', 'Internet gateways', 'Egress-only internet gateways', 'Carrier gateways', 'DHCP option sets', 'Elastic IPs', 'Managed prefix lists', 'Endpoints', 'Endpoint services', 'NAT gateways', and 'Peering connections'. Under 'Security', there's a link for 'Network ACLs'.

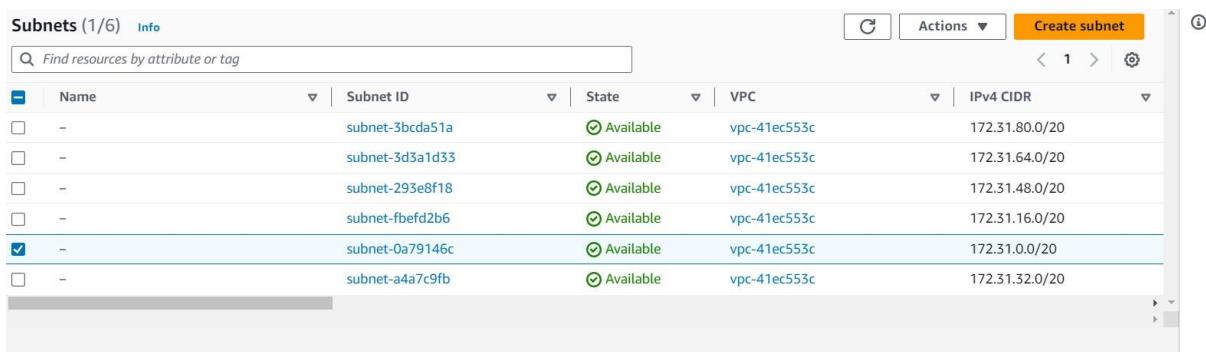
3. There is a default VPC that is provided so that, we can launch resources as soon as we start using AWS.
4. Notice that the default VPC is configured with the CIDR range of **172.31.0.0/16**.

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCI
-	vpc-41ec553c	Available	172.31.0.0/16	-	dopt-

- This CIDR range includes all addresses from 172.31.0.0 through 172.31.255.255, which is a total of 65,536 addresses.

## Task 2: Explore a default Subnet

- In the left navigation pane, choose **Subnets**.
- Notice that all of the default subnets are associated with the same VPC, the default VPC. Also notice that each subnet has an **IPv4 CIDR** range. Each subnet CIDR range is a distinct subset of the addresses available in the VPC. When designing your subnets, you must ensure that the CIDR ranges do not overlap with address ranges used in other subnets.
- From the list of subnets, choose the subnet with the **IPv4 CIDR** range **172.31.0.0/20**.

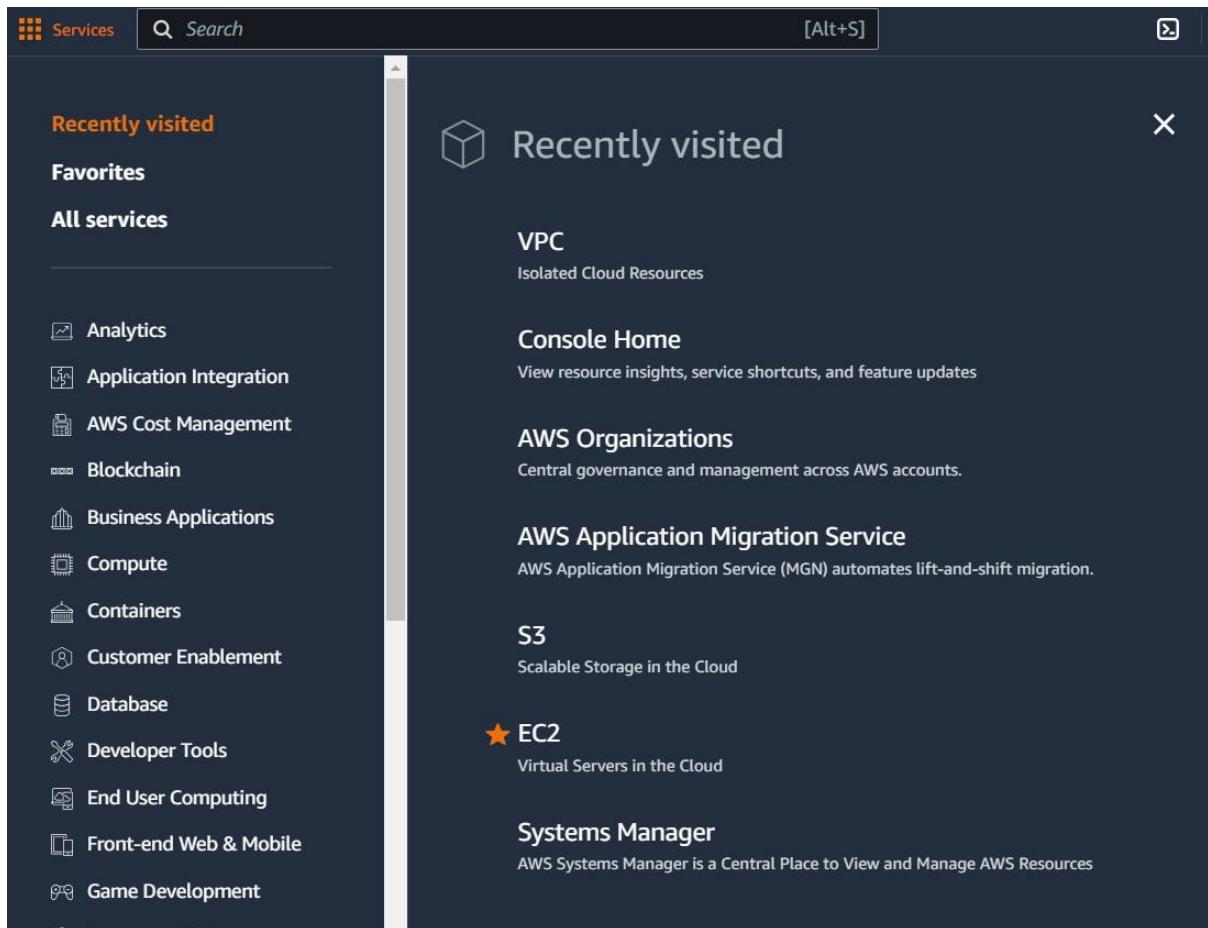


Subnets (1/6) <a href="#">Info</a>					
<input type="button" value="Actions ▾"/> <input type="button" value="Create subnet"/> <a href="#">?</a>					
Name	Subnet ID	State	VPC	IPv4 CIDR	
-	subnet-3bcda51a	<span>Available</span>	vpc-41ec553c	172.31.80.0/20	
-	subnet-3d3a1d33	<span>Available</span>	vpc-41ec553c	172.31.64.0/20	
-	subnet-293e8f18	<span>Available</span>	vpc-41ec553c	172.31.48.0/20	
-	subnet-fbefd2b6	<span>Available</span>	vpc-41ec553c	172.31.16.0/20	
<input checked="" type="checkbox"/>	subnet-0a79146c	<span>Available</span>	vpc-41ec553c	172.31.0.0/20	
-	subnet-a4a7c9fb	<span>Available</span>	vpc-41ec553c	172.31.32.0/20	

- The VPC has a CIDR block of **172.31.0.0/16**, which includes all 172.31.x.x IP addresses. This subnet has a CIDR block of **172.31.0.0/20**, which includes addresses 172.31.0.0 through 172.31.15.255. These CIDR ranges might look similar, but the subnet is smaller than the VPC because of the **/20** in the CIDR range. This subnet uses the first 4,096 addresses available in the VPC. The console shows that only 4,091 addresses are available to use. This is because AWS always reserves five addresses in each subnet for IP networking purposes.
- The value for **Auto-assign public IPv4 address** is **Yes**, which means that it is turned on.
- This means that the subnet automatically assigns a public IP address for all instances that are launched into it.

## Task 3: Deploy an EC2 instance

12. On the **Services** menu, choose **EC2**.



13. Choose **Launch instance**, and then choose **Launch instance** from the dropdown list.

Configure the following options:

- In the **Name and tags** pane, in the **Name** text box, enter **MuskanWebServer**.
- Choose an Amazon Machine Image (AMI).
  - In the **Application and OS Images (Amazon Machine Image)** section, choose **Amazon Linux**.
  - From the list of Amazon Machine Images, select **Amazon Linux 2 AMI**.

## ▼ 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 see what you are looking for below

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

### Quick Start



Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

### Amazon Machine Image (AMI)

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type  
ami-0453898e98046c639 (64-bit (x86)) / ami-0a27863587713655c (64-bit (Arm))  
Virtualization: hvm ENA enabled: true Root device type: ebs

Free tier eligible

### Description

Amazon Linux 2 Kernel 5.10 AMI 2.0.20230808.0 x86\_64 HVM gp2

## ▼ Network settings [Info](#)

### VPC - required [Info](#)

vpc-41ec553c (default) ▾ 

### Subnet [Info](#)

No preference ▾  Create new subnet 

### Auto-assign public IP [Info](#)

Enable ▾

### Firewall (security groups) [Info](#)

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

Create security group

Select existing security group

### Common security groups [Info](#)

Select security groups ▾

default sg-ddcfdad3 X  
VPC: vpc-41ec553c

 Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

## 14. Instance Type

a. Choose an instance type:

i. Select **t2.micro**.

- b. In the **Key pair (login)** section, from the **Key pair name - required** dropdown list, choose **Proceed without a key pair (Not recommended)**.
- c. In the **Network settings** section, choose **Edit**.
- d. For **Firewall (security groups)**, choose **Select an existing security group**.
- e. In the **Common security groups** dropdown list, choose the security group named **Web-Server-SG**.
- f. In the **Advanced Details** section, for **IAM instance profile**, choose **WorkRole**.
- g. In the **Advanced Details** section, copy the following commands, and paste them into the **User data** text box:
- h. In the **Summary** section, choose **Launch instance**.

**User data - optional** [Info](#)

Upload a file with your user data or enter it in the field.

 [Choose file](#)

```
#!/bin/bash
# Install Apache Web Server and PHP
yum install -y httpd mysql
amazon-linux-extras install -y php7.2
# Download Lab files
wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-100-
EDNETW-1-60961/1-lab-getting-started-vpc/s3/inventory-app.zip
unzip inventory-app.zip -d /var/www/html/
# Download and install the AWS SDK for PHP
wget https://github.com/aws/aws-sdk-php/releases/download/3.62.3/aws.zip
unzip aws -d /var/www/html
# Turn on web server
chkconfig httpd on
service httpd start
```

User data has already been base64 encoded

15. A message indicates that you successfully initiated the launch of your instance.

**Success**

Successfully initiated launch of instance ([i-06c533f4b33355dce](#))

▼ Launch log

Initializing requests	Succeeded
Launch initiation	Succeeded

16. Choose **View all instances**.

17. Wait for the application server to fully launch. It should display the following status:

**Instance State: Running**

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
MuskanWebSe...	i-06c533f4b33355dce	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a	ec2-34-228-217-

18. Select **Web-Server**.

19. From the **Details** tab, copy the **Public IPv4 address** address.

20. Open a new browser tab, paste the IP address that you just copied, and then press Enter.

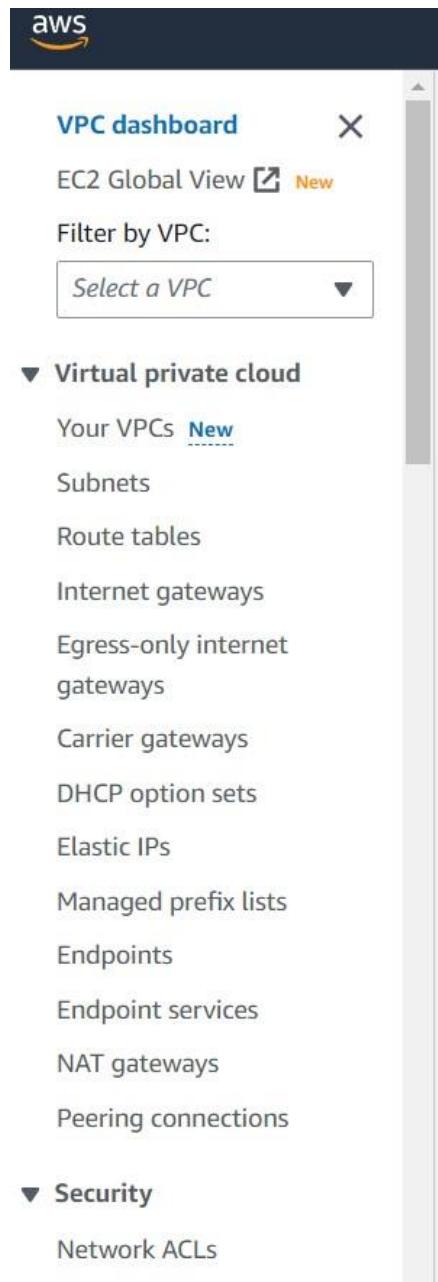
21. If you configured the VPC correctly, the Inventory application and this message should appear: **Please configure Settings to connect to database**. You have not configured any database settings yet, but the appearance of the Inventory application demonstrates that the public subnet was correctly configured.

## Task 4: Create a custom VPC

22. Return to the browser tab with the AWS console.



23. In the left navigation pane, choose **Your VPCs**.



Your VPCs (1)		Info	Actions	Create VPC
<input type="text"/> Find resources by attribute or tag				
	Name	VPC ID		
<input type="checkbox"/>	-	vpc-41ec553c		

24. Choose **Create VPC** and configure the following settings:

- a. For **Resources to create**, choose **VPC and more**

- b. For **Name tag auto-generation**, enter muskan\_lab.

**VPC settings**

Resources to create [Info](#)  
Create only the VPC resource or the VPC and other networking resources.

VPC only  VPC and more

Name tag auto-generation [Info](#)  
Enter a value for the Name tag. This value will be used to auto-generate Name tags for all resources in the VPC.

Auto-generate  
muskan\_lab

IPv4 CIDR block [Info](#)  
Determine the starting IP and the size of your VPC using CIDR notation.

10.0.0.0/16 65,536 IPs

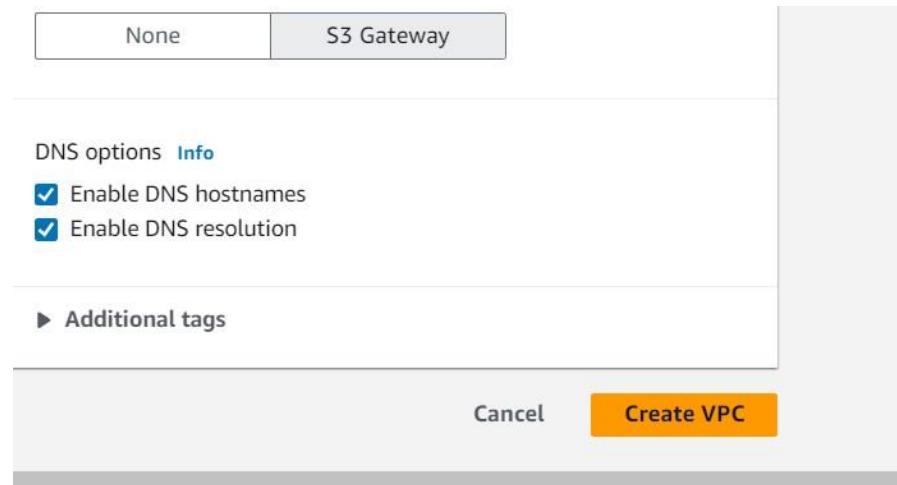
IPv6 CIDR block [Info](#)  
 No IPv6 CIDR block  
 Amazon-provided IPv6 CIDR block

- c. For **IPv4 CIDR block**, ensure that the value is 10.0.0.0/16
- d. For **Availability Zones (AZs)**, choose 2.
- e. For **Number of public subnets**, choose 2.
- f. For **Number of private subnets**, choose 2.
- g. Expand **Customize subnets CIDR blocks**.
- h. Update the subnet CIDR block values using the certain ranges provided

25. Take a moment to review the **Preview** diagram provided in the wizard.



26. Choose **Create VPC**.



### Create VPC workflow

✔ Success

▼ Details

- ✔ Create VPC: [vpc-02a599699abd3df79](#)
- ✔ Enable DNS hostnames
- ✔ Enable DNS resolution
- ✔ Verifying VPC creation: [vpc-02a599699abd3df79](#)
- ✔ Create S3 endpoint: [vpce-0253f1b58e5c103e6](#)
- ✔ Create subnet: [subnet-087a24fc05ecd48fe](#)
- ✔ Create subnet: [subnet-0c1f3aa7e9317bc09](#)
- ✔ Create subnet: [subnet-0148fc09b3b542f8d](#)
- ✔ Create subnet: [subnet-0976deb55eb6877aa](#)
- ✔ Create internet gateway: [igw-0a6b35f7b5da100f5](#)
- ✔ Attach internet gateway to the VPC
- ✔ Create route table: [rtb-0cb82f92a2a416853](#)
- ✔ Create route
- ✔ Associate route table
- ✔ Associate route table
- ✔ Create route table: [rtb-060749350996d32a7](#)
- ✔ Associate route table
- ✔ Create route table: [rtb-0d896a1f3ef01356c](#)

27. The wizard immediately starts creating your VPC. After it finishes, we will have a VPC that has all of the components that you explored earlier: subnets, route tables, an internet gateway, and a default security group. The VPC wizard also automatically configures the routes in the route tables for both the public subnets and the private subnets.
28. Like the default security group you explored earlier, the default security group created by the wizard blocks incoming traffic from the internet. To reach a web server in the new VPC, you need to add a rule to this default security group.
29. Choose **View VPC**.

VPC > Your VPCs > vpc-02a599699abd3df79

vpc-02a599699abd3df79 / muskan\_lab-vpc

**Details** [Info](#)

VPC ID vpc-02a599699abd3df79	State <span style="color: green;">Available</span>	DNS hostnames Enabled	DNS resolution Enabled
Tenancy Default	DHCP option set dopt-cce4fbfb6	Main route table rtb-0402b1ce2838bd5b4	Main network ACL acl-05ff01dbf7a5c3a7c
Default VPC No	IPv4 CIDR 10.0.0.0/16	IPv6 pool -	IPv6 CIDR (Network border group) -
Network Address Usage metrics Disabled	Route 53 Resolver DNS Firewall rule groups -	Owner ID 749642533014	

[Resource map](#) [New](#) | [CIDRs](#) | [Flow logs](#) | [Tags](#)

30. In the left navigation pane, choose **Security Groups**.

**Security Groups (2)** [Info](#)

[Actions](#) [Export security groups to CSV](#) [Create security group](#)

<input type="checkbox"/>	Name	Security group ID	Security group name	VPC ID	Description	Owner
<input type="checkbox"/>	-	sg-ddcfad3	default	vpc-41ec553c	default VPC security gr...	749642533014
<input type="checkbox"/>	-	sg-05785cce9080b724f	default	vpc-02a599699abd3df79	default VPC security gr...	749642533014

31. Choose **Create security group**.

**Tags - optional**

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.

No tags associated with the resource.

[Add new tag](#)

You can add up to 50 more tags

**Security group name**  
MuskanServer2-SG

[Cancel](#) [Create security group](#)

32. For **Security group name**, enter MuskanServer2-SG.

⌚ Security group (sg-0e0c8841198090f23 | MuskanServer2-SG) X  
was created successfully  
► Details

## sg-0e0c8841198090f23 - MuskanServer2-SG

Actions ▾

Details	
Security group name	▣ MuskanServer2-SG
Security group ID	▣ sg-0e0c8841198090f23
Description	

### Inbound rules Info

Inbound rule 1		Delete
Type <small>Info</small>	Protocol <small>Info</small>	
HTTP	TCP	
Port range <small>Info</small>	Source type <small>Info</small>	
80	Anywhere-IPv4	
Source <small>Info</small>	Description - optional <small>Info</small>	
<input type="text"/> 0.0.0.0/0 X	Allow web access	
<button>Add rule</button>		

33. For **Description**, enter Allow HTTP Access.
34. For **VPC**, clear the selection and then choose **Lab-vpc**.

35. In the **Inbound rules** section, choose **Add rule**, and then configure the following settings:

- a. For **Type**, choose **HTTP**.
- b. From the **Source type** dropdown list, choose **Anywhere IPv4**.
- c. For **Description**, enter Allow Web Access.

36. Choose **Create security group**.

### Task 3: Deploy an EC2 instance into your custom VPC

37. On the **Services** menu, choose **EC2**.

38. Choose **Launch instance**, and then choose **Launch instance** from the dropdown list.

Configure the following options:

- a. In the **Name and tags** pane, in the **Name** text box, enter Muskan-WebServe2.
- b. Choose an Amazon Machine Image (AMI).
  - i. In the **Application and OS Images (Amazon Machine Image)** section, choose **Amazon Linux**.

The screenshot shows the AWS Lambda console with the 'Create Function' wizard. Step 2 is titled 'Set runtime and add triggers'. The 'Runtime' dropdown is set to 'Node.js 14.x'. The 'Add trigger' dropdown is set to 'AWS Lambda triggers'. Below these, there are sections for 'Handler' (set to 'index.handler') and 'Role' (set to 'Lambda execution role'). At the bottom, there are 'Next Step' and 'Create Function' buttons.

- c. Choose an Instance Type:

- i. Select **t2.micro**.

- d. In the **Key pair (login)** section, from the **Key pair name - required** dropdown list, choose **Proceed without a key pair (not recommended)**.
- e. In the **Network settings** section, choose **Edit**.
- f. For **VPC - required**, choose **Muskan\_Lab\_vpc**.

**▼ Network settings** [Info](#)

**VPC - required** [Info](#)

vpc-02a599699abd3df79 (muskan\_lab-vpc)  
10.0.0.0/16

**Subnet** [Info](#)

subnet-087a24fc05ecd48fe      muskan\_lab-subnet-public1-us-east-1a  
VPC: vpc-02a599699abd3df79    Owner: 749642533014  
Availability Zone: us-east-1a    IP addresses available: 4091    CIDR: 10.0.0.0/20

**Create new subnet** [Create new subnet](#)

**Auto-assign public IP** [Info](#)

Enable

**Firewall (security groups)** [Info](#)

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

Create security group       Select existing security group

**Common security groups** [Info](#)

Select security groups

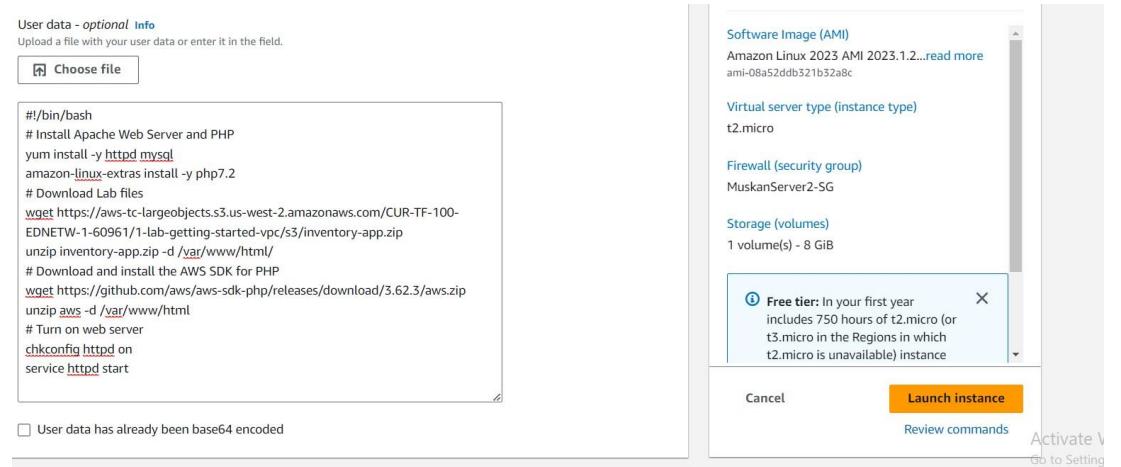
MuskanServer2-SG sg-0e0c8841198090f23 X  
VPC: vpc-02a599699abd3df79

**Compare security group rules**

Security groups that you add or remove here will be added to or removed from all your network interfaces.

► Advanced network configuration

- g. For **Subnet**, choose the subnet with **public1** in the name.
- h. For **Auto-assign public IP**, choose **Enable**.
- i. For **Firewall (security groups)**, choose **Select an existing security group**.
- j. From the **Common security groups** dropdown list, choose the **Web-Server2SG** security group.
- k. In the **Advanced Details** section, for **IAM instance profile**, choose **WorkRole**.
- l. In the **Advanced Details** section, copy the given commands, and paste them into the **User data** text box:



m. In the **Summary** section, choose **Launch instance**.

39. A message indicates that you successfully initiated the launch of your instance.

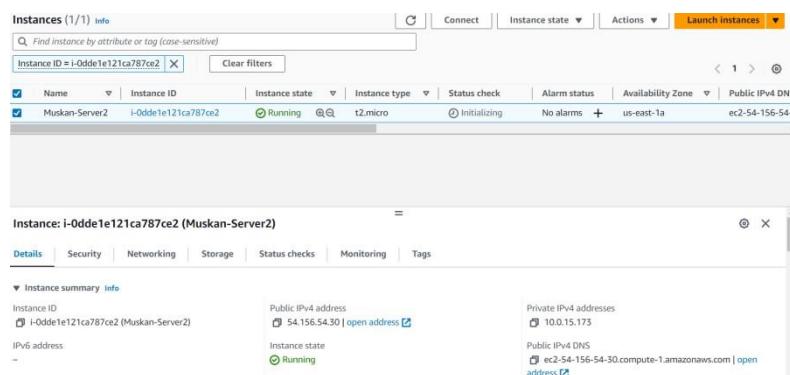


40. Choose **View all instances**.

41. Wait for the application server to fully launch. It should display the following status:

**Instance State:** Running

42. Select **Muskan-Web-Server2**.



43. From the **Details** tab, copy the **Public IPv4 address** address.

44. Open a new browser tab, paste the IP address that you just copied, and then press Enter.

45. If you configured the VPC correctly, the Inventory application and this message should appear: **Please configure Settings to connect to database**. You have not configured any database settings yet, but the appearance of the Inventory application demonstrates that the public subnet was correctly configured.