

# Experiment 02

## Aim:

Create and deploy virtual servers on AWS

## Theory:

This simulation provides you with a basic overview of launching, resizing, managing, and monitoring an Amazon Elastic Compute Cloud (Amazon EC2) instance.

Amazon EC2 is a web service that provides resizable compute capacity in the cloud.

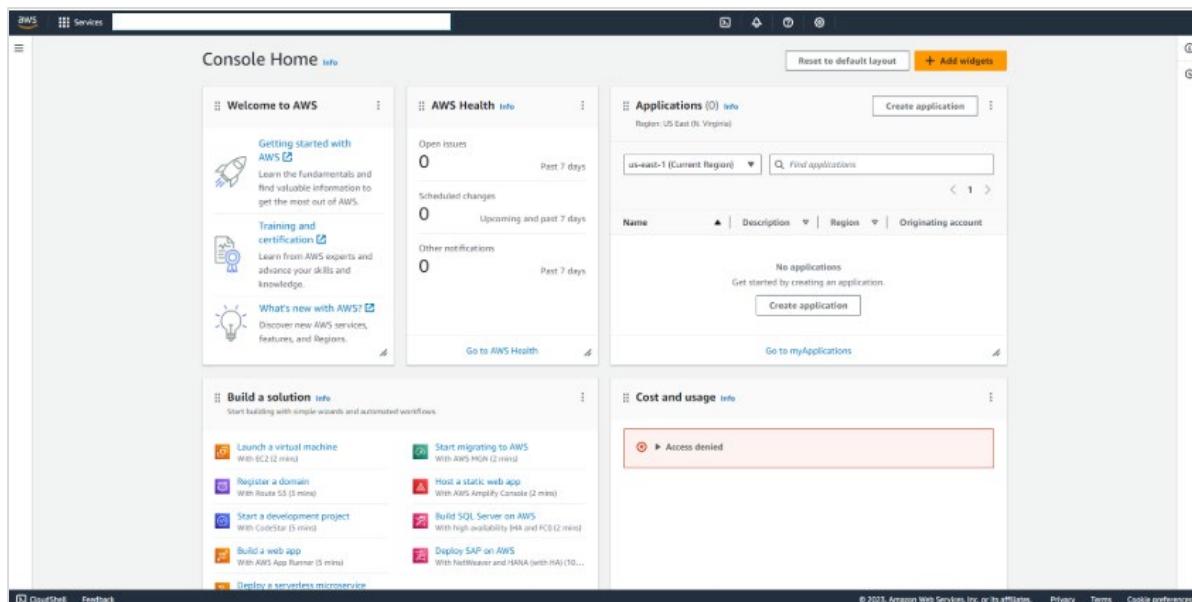
It's designed to make web-scale cloud computing intuitive and straight forward to use.

Amazon EC2 gives you fast access to new server instances, and you can quickly scale capacity both up and down as your computing requirements change.

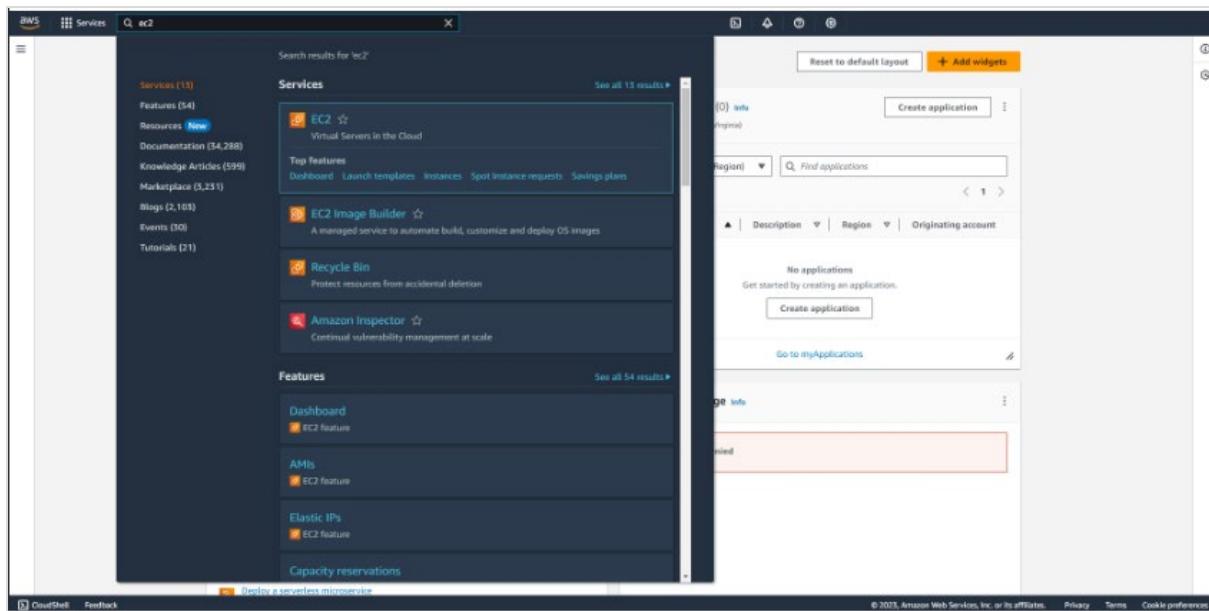
## Task 1: Launching your EC2 instance

In this task, you launch an EC2 instance with termination protection. Termination protection prevents you from accidentally terminating an EC2 instance. You also deploy your instance with a user data script to deploy a simple web server.

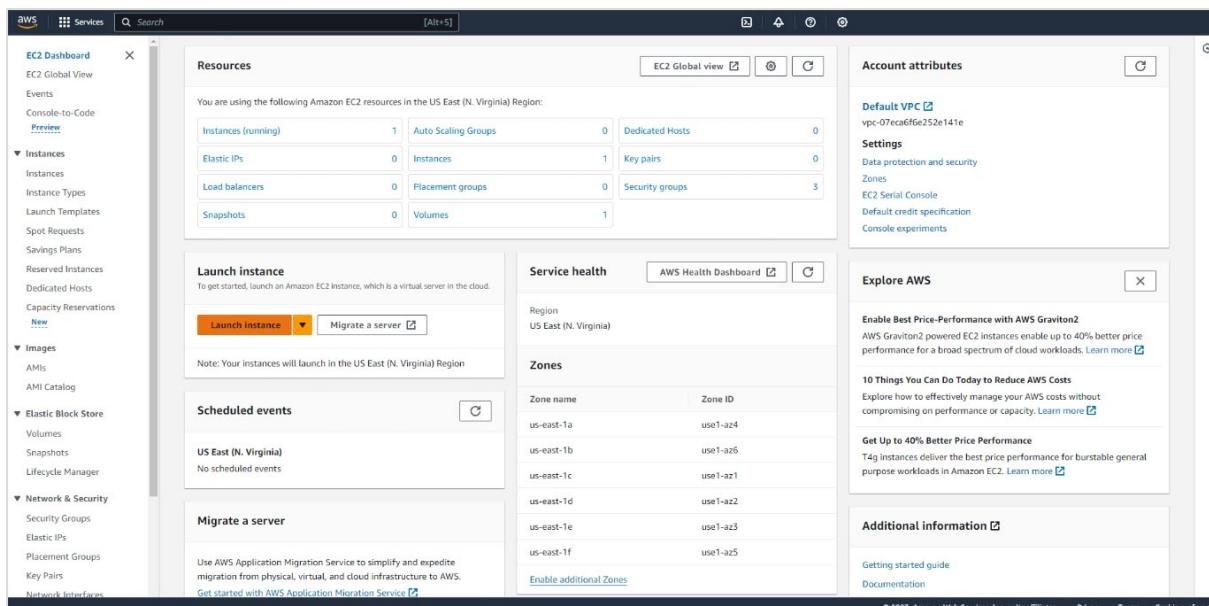
1. In the AWS Management Console in the **Search**, enter **EC2** and choose **Enter**.



2. From the search results, choose **EC2**.



### 3. In the **Launch instance** section, choose **Launch instance**.



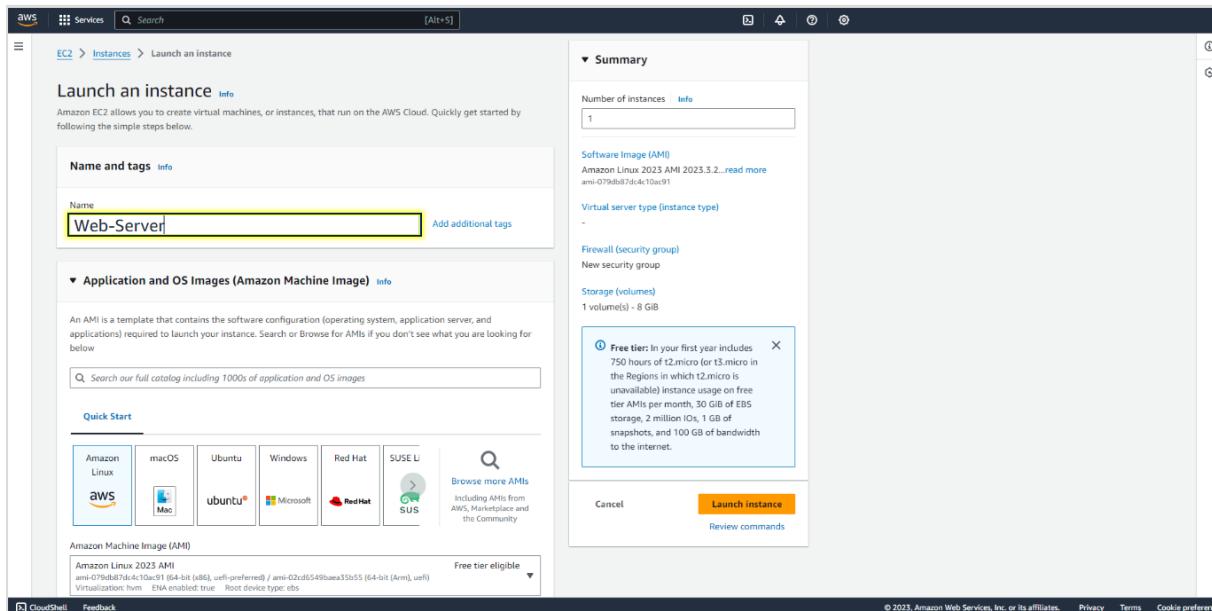
## STEP 1: NAME YOUR EC2 INSTANCE

Using tags, you can categorize your AWS resources in different ways (for example, by purpose, owner, or environment). This categorization is useful when you have many resources of the same type. You 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.

When you 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.

### 4. In the **Name and tags** pane, in the **Name** text box, enter Web-Server then choose **Enter**.

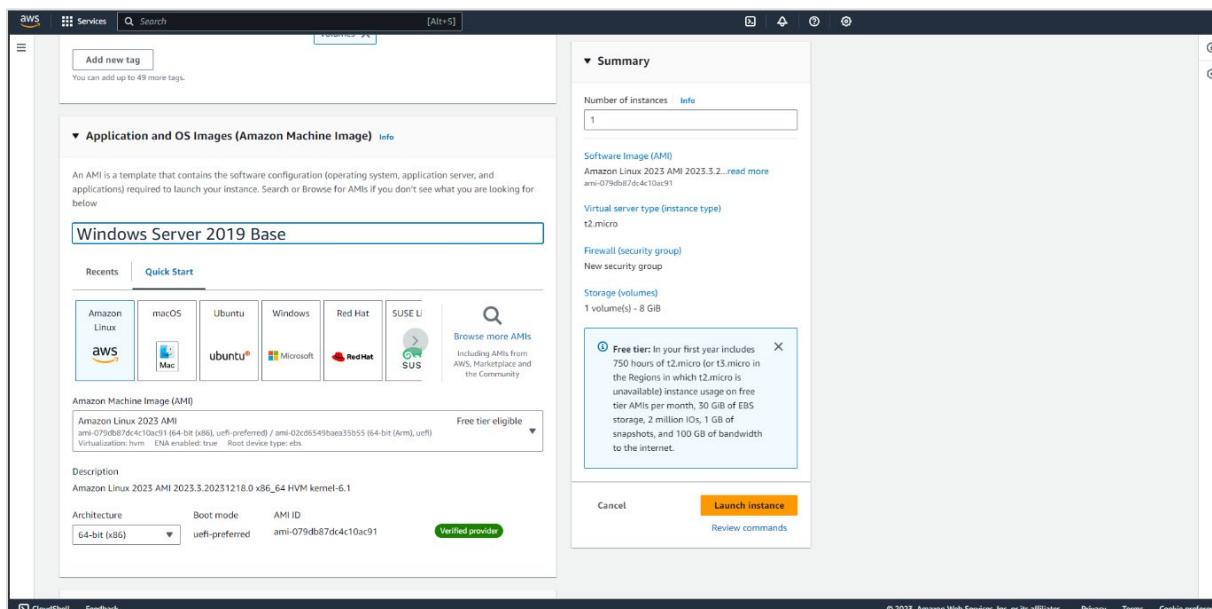
5. Choose the **Add additional tags** link.
6. From the **Resource types** dropdown list, **Instances** is selected by default. Leave Instances selected and select **Volumes**.



## STEP 2: CHOOSE AN AMI

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:

- Launch permissions that control which AWS accounts can use the AMI to launch instances
- 7. Locate the **Application and OS Images (Amazon Machine Image)** section. It's below the **Name and tags** section. In the search box, enter **Windows Server 2019 Base** and choose **Enter**.



**7. Next to Microsoft Windows Server 2019 Base, choose Select.**

### STEP 3: CHOOSE AN INSTANCE TYPE

In this step, you choose a **t2.micro** instance. This instance type has one virtual CPU and 1 GiB of memory.

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

### STEP 4: CONFIGURE A KEY PAIR

In this simulation, you don't connect to your instance using an SSH key, so you don't need to configure a key pair.

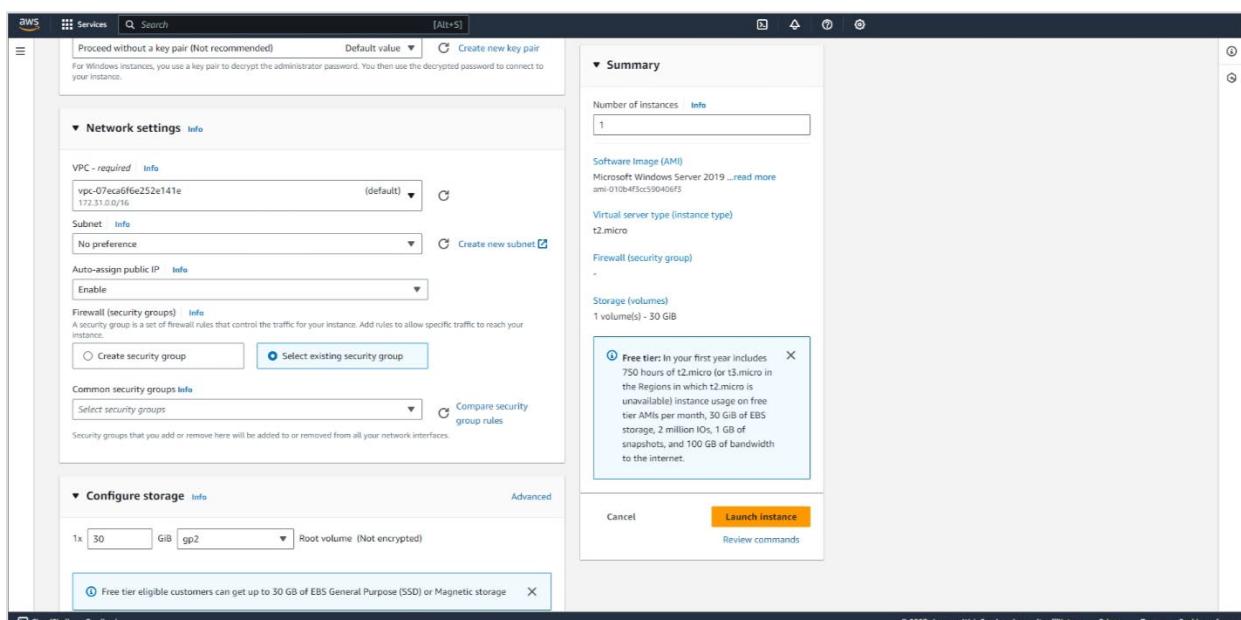
**10. In the Key pair (login) section, from the Key pair name - required dropdown list, choose Proceed without a key pair (not recommended).**

## STEP 5: CONFIGURE THE NETWORK SETTINGS

You use this pane to configure networking settings.

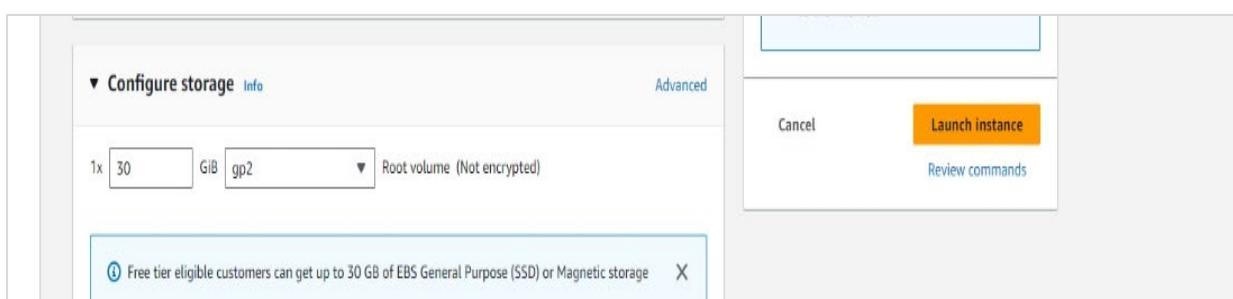
The virtual private cloud (VPC) indicates which VPC you want to launch the instance into. You can have multiple VPCs, including different ones for development, testing, and production.

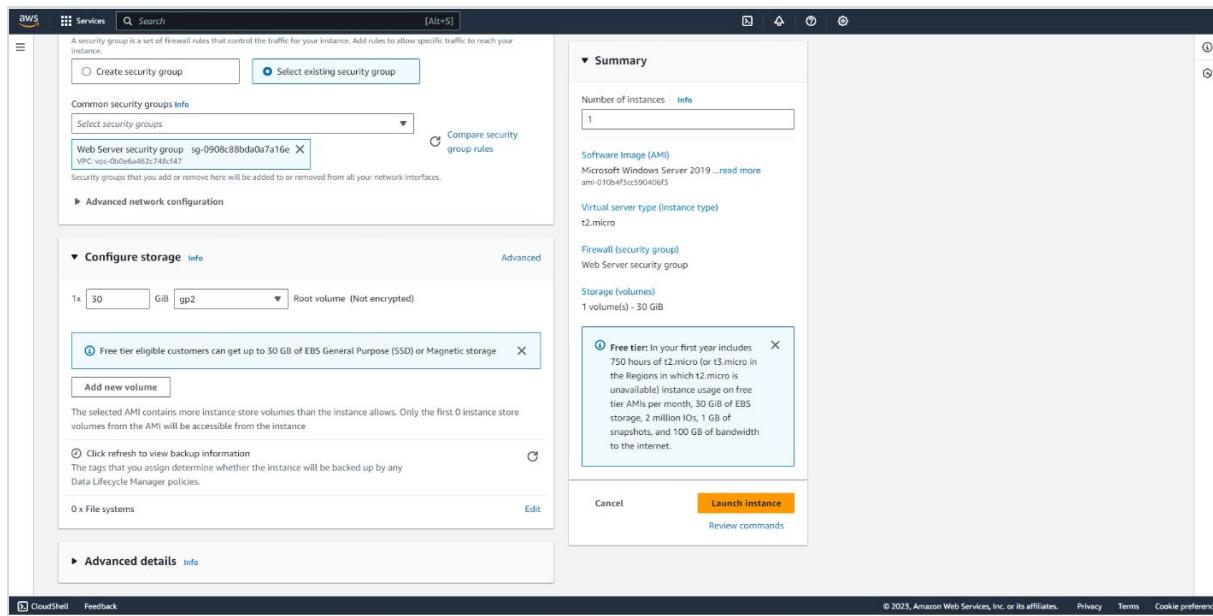
11. In the **Network settings** section, choose **Edit**.
12. From the **VPC - required** dropdown list, choose **Lab VPC**.
13. For **Firewall (security groups)**, choose **Select existing security group**.
14. From **Common security groups**, choose **Web Server security group**.



## STEP 6: ADD STORAGE

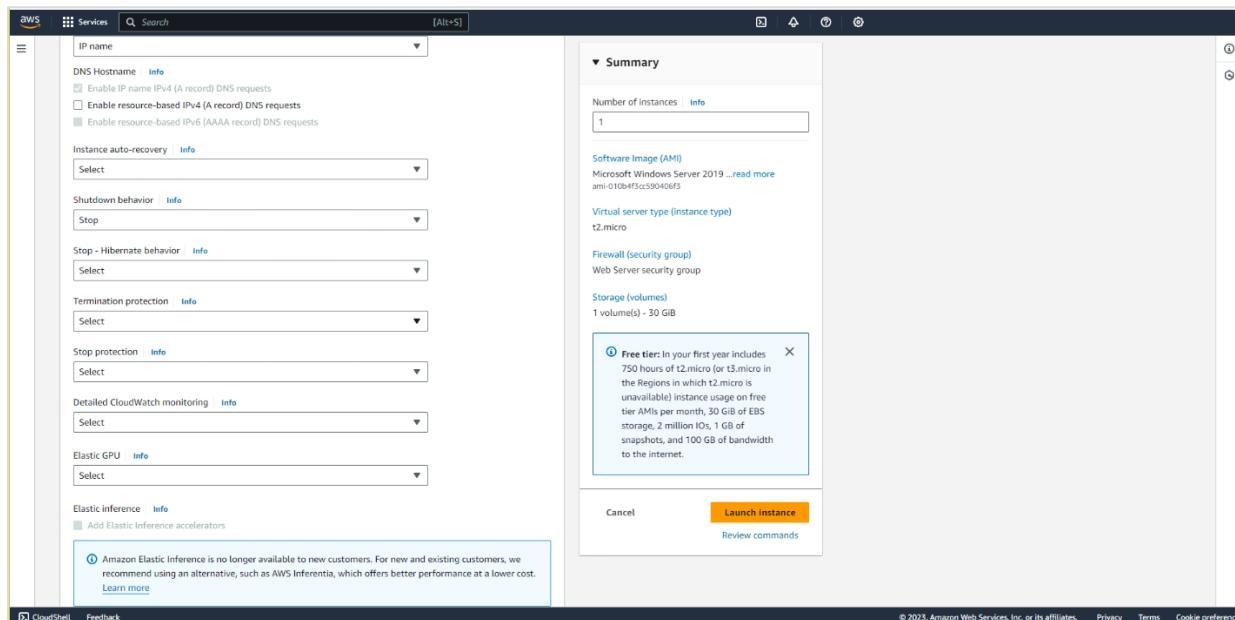
Amazon EC2 stores data on a network-attached virtual disk called Amazon Elastic Block Store (Amazon EBS). You launch the EC2 instance using a default 30 GiB disk volume. This is your root volume (also known as a boot volume).





## STEP 7: CONFIGURE ADVANCED DETAILS

15. Expand the **Advanced details** section.
16. For **IAM instance profile**, choose the role that begins with **LabStack** in the name.
17. From the **Termination protection** dropdown list, choose **Enable**.



18. Copy the following commands, and choose the User data text box. Then, choose Paste.

```
<powershell>
# Installing web server
Install-WindowsFeature -name Web-Server -IncludeManagementTools
```

```

# Getting website code
wget https://us-east-1-tcprod.s3.amazonaws.com/courses/CUR-TF-
100-
EDCOMP/v1.0.4.prod-ef70397c/01-Lab-ec2/scripts/code.zip -outfile
"C:\Users\Administrator\Downloads\code.zip"

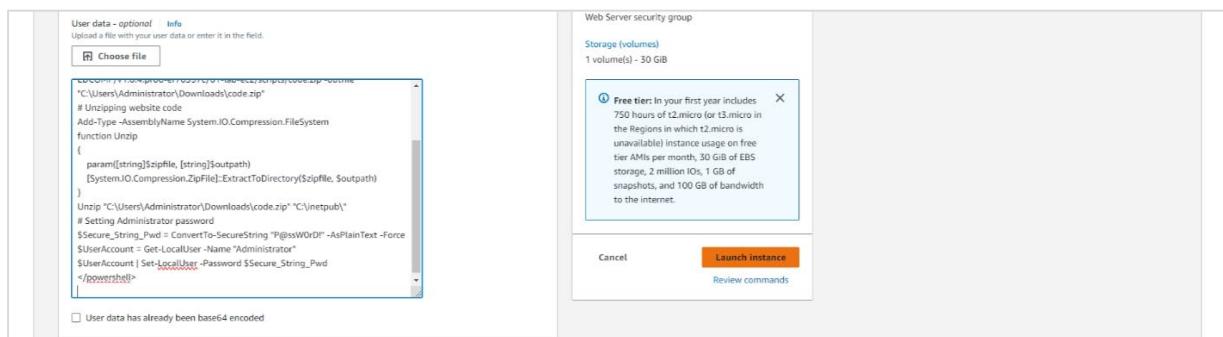
# Unzipping website code
Add-Type -AssemblyName System.IO.Compression.FileSystem
function Unzip
{
    param([string]$zipfile, [string]$outpath)

[System.IO.Compression.ZipFile]::ExtractToDirectory($zipfile,
$outpath)
}

Unzip "C:\Users\Administrator\Downloads\code.zip" "C:\inetpub\  

# Setting Administrator password
$Secure_String_Pwd = ConvertTo-SecureString "P@ssW0rD!" -
AsPlainText -Force
$UserAccount = Get-LocalUser -Name "Administrator"
$UserAccount | Set-LocalUser -Password $Secure_String_Pwd
</powershell>

```



## STEP 8: LAUNCH AN EC2 INSTANCE

Now that you configured your EC2 instance settings, it's time to launch your instance.

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

## 20. Choose **View all instances**.

The screenshot shows the AWS CloudWatch Launch successful page. At the top, a green banner displays a success message: "Successfully initiated launch of instance i-0a378ecc0300074da". Below the banner, there's a "Next Steps" section with a search bar and a navigation menu (1-6). The steps are arranged in a grid:

- Create billing and free tier usage alerts**: To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds. Includes a "Create billing alerts" button.
- Connect to your instance**: Once your instance is running, log into it from your local computer. Includes a "Connect to instance" button and a "Learn more" link.
- Connect an RDS database**: Configure the connection between an EC2 instance and a database to allow traffic flow between them. Includes a "Connect an RDS database" button and a "Learn more" link.
- Create EBS snapshot policy**: Create a policy that automates the creation, retention, and deletion of EBS snapshots. Includes a "Create EBS snapshot policy" button.
- Manage detailed monitoring**: Enable or disable detailed monitoring for the instance. If you enable detailed monitoring, the Amazon EC2 console displays monitoring graphs with a 1-minute period. Includes a "Manage detailed monitoring" button.
- Create Load Balancer**: Create a application, network gateway or classic Elastic Load Balancer. Includes a "Create Load Balancer" button.
- Create AWS budget**: AWS Budgets allows you to create budgets, forecast spend, and take action on your costs and usage from a single location. Includes a "Create AWS budget" button.
- Manage CloudWatch alarms**: Create or update Amazon CloudWatch alarms for the instance. Includes a "Manage CloudWatch alarms" button.

At the bottom right, there's a "View all instances" button.

## 21. Next to your **Web-Server**, select the check box. This will show the **Details** tab. Review the **Details** tab which displays information about your instance.

The screenshot shows the AWS EC2 Instances page. On the left, a sidebar lists various EC2-related services and features. The main area shows a table of instances with one row selected for "Web-Server" (instance ID: i-0a378ecc0300074da). The "Details" tab is selected in the navigation bar below the table. The details pane displays the following information for the selected instance:

| Attribute                       | Value   |
|---------------------------------|---|
| Instance ID                     | i-0a378ecc0300074da   |
| Name                            | Web-Server  |
| Instance state                  | Running   |
| Instance type                   | t2.micro  |
| Status check                    | 2/2 checks passed   |
| Alarm status                    | View alarms   |
| Availability Zone               | us-east-1a  |
| Public IPv4 DNS                 | ec2-54-89-233-131.compute-1.amazonaws.com                         |
| Public IPv4 IP                  | 54.89.233.131   |
| Elastic IP                      | -   |
| Private IPv4 address            | 54.89.233.131   |
| Instance state                  | Running   |
| Private IP DNS name (IPv4 only) | ip-10-0-1-12.ec2.internal   |
| Instance type                   | t2.micro  |
| VPC ID                          | vpc-0edae4b2556a74f3 (Lab VPC)                                    |
| Subnet ID                       | subnet-0b1da32ede8847dc5 (Public Subnet 1)                        |
| Private IPv4 addresses          | 10.0.1.12   |
| Public IPv4 DNS                 | ec2-54-89-233-131.compute-1.amazonaws.com                         |
| Elastic IP addresses            | -   |
| AWS Compute Optimizer finding   | Opt-in to AWS Compute Optimizer for recommendations.   Learn more |
| Auto Scaling Group name         | -   |

## 22. Choose the **Security** tab and review the information that's available to you.

The screenshot shows the AWS EC2 Instances page. On the left, there's a navigation sidebar with various services like EC2 Dashboard, Events, Instances, Images, Elastic Block Store, Network & Security, and more. The main area displays a table titled 'Instances (1/1) Info' with one row for 'Web-Server' (instance ID: i-0a378ecc0300074da). The instance is listed as 'Running' with a t2.micro instance type. It has 2/2 checks passed and is located in us-east-1a. The Public IPv4 DNS is ec2-54-89-233-131.co... and the Public IPv4 IP is 54.89.233.131. Below the table, there's a detailed view for the 'Web-Server' instance under the 'Security' tab, showing its IAM Role (Lab-SSM-Role), Owner ID (929952451040), and Launch time (Wed Dec 27 2023 10:16:09 GMT-0500 (Eastern Standard Time)). The Networking tab is also visible.

**23. Choose the Networking tab and review the information that's available to you. Next, choose Continue.**

This screenshot is similar to the previous one but with the 'Networking' tab selected for the 'Web-Server' instance. Under the 'Networking details' section, it shows the Public IPv4 address (54.89.233.131), Private IPv4 address (10.0.1.12), and VPC ID (vpc-0cedae4b2556a74f3 (Lab VPC)). It also lists the Public IPv4 DNS (ec2-54-89-233-131.compute-1.amazonaws.com), Private IP DNS name (ip-10-0-1-12.ec2.internal), and Subnet ID (subnet-0b1da32ede8847dc5 (Public Subnet 1)). The Availability zone is us-east-1a, and the Use RDN as guest OS hostname is set to Disabled. The 'Network Interfaces (1)' section shows one interface (eni-0e1a9e1e685077184) with a Public IPv4 address of 54.89.233.131, a Private IPv4 address of 10.0.1.12, and a Primary IP of ip-10-0-1-12.ec2.internal.

Your instance should display the following:

- **Instance State:** Running
- **Status Checks:** 2/2 checks passed

## Task 2: Monitor your instance

24. Choose the **Status and alarms** tab. Review the information that's available to you.

The screenshot shows the AWS EC2 Instances page. On the left, there's a navigation sidebar with links like EC2 Dashboard, EC2 Global View, Events, Console-to-Code, Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations, Images, AMIs, AMI Catalog, Elastic Block Store, Volumes, Snapshots, Lifecycle Manager, Network & Security, Security Groups, Elastic IPs, Placement Groups, Key Pairs, and Network Interfaces. The main content area has a title 'Instances (1/1) Info' and a search bar. Below it is a table with one row for a 'Web-Server' instance (ID: i-0a378ecc0300074da). The table columns include Name, Instance ID, Instance state (Running), Instance type (t2.micro), Status check (2/2 checks passed), Alarm status, Availability Zone (us-east-1a), Public IPv4 DNS (ec2-54-89-233-131.co...), Public IPv4 IP (54.89.233.131), and Elastic IP. Below the table is a section titled 'Instance: i-0a378ecc0300074da (Web-Server)' with tabs for Details, Status and alarms (selected), Monitoring, Security, Networking, Storage, and Tags. The 'Status and alarms' tab shows 'Status checks' (System status checks: System reachability check passed) and 'Alarms' (empty). At the bottom right of the main content area, there's a link to 'Actions'.

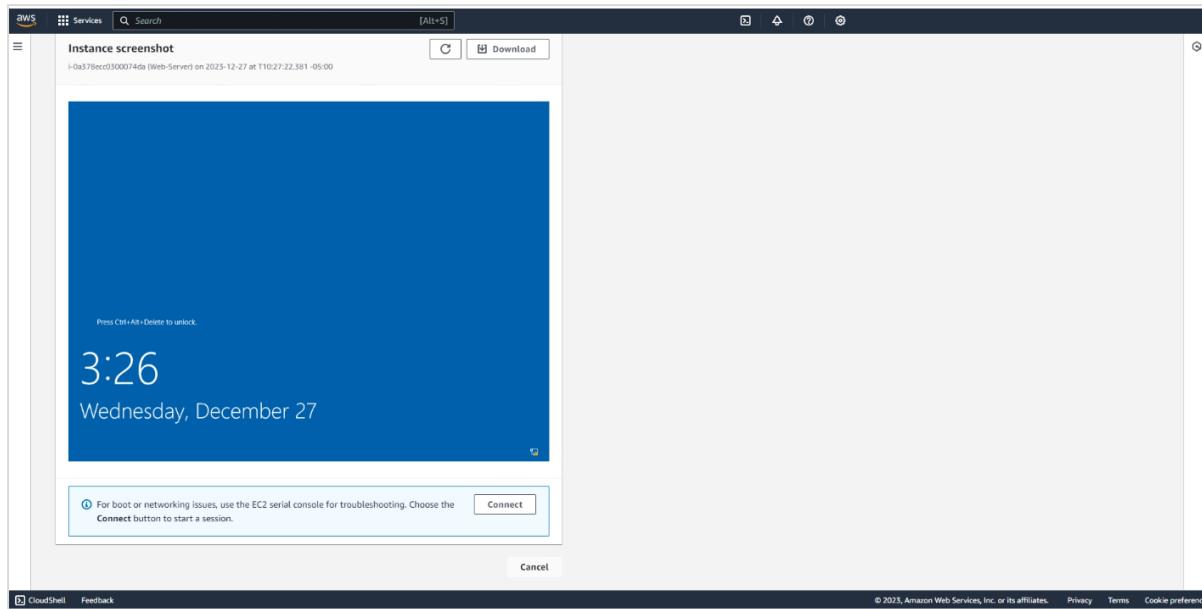
25. Choose the **Monitoring** tab.

This screenshot is similar to the previous one but shows the 'Monitoring' tab selected in the 'Status and alarms' section. It displays various performance metrics for the 'Web-Server' instance over a 1-hour period. The metrics include CPU utilization (%), Network in (bytes), Network out (bytes), Network packets in (count), Network packets out (count), Disk reads (bytes), Disk read operations (operations), Disk writes (bytes), Disk write operations (operations), CPU credit usage (count), and CPU credit balance (count). Each metric is represented by a line chart with data points at 14:30, 14:45, 15:00, and 15:15. There are also buttons for 'Manage detailed monitoring' and 'Add to dashboard'.

26. At the top of the page, choose the **Actions** dropdown list. Choose **Monitor and troubleshoot < Get system log**.

## 27. In the **System log**, review the messages in the output.

## 28. To return to the Amazon EC2 dashboard, choose **Cancel**.



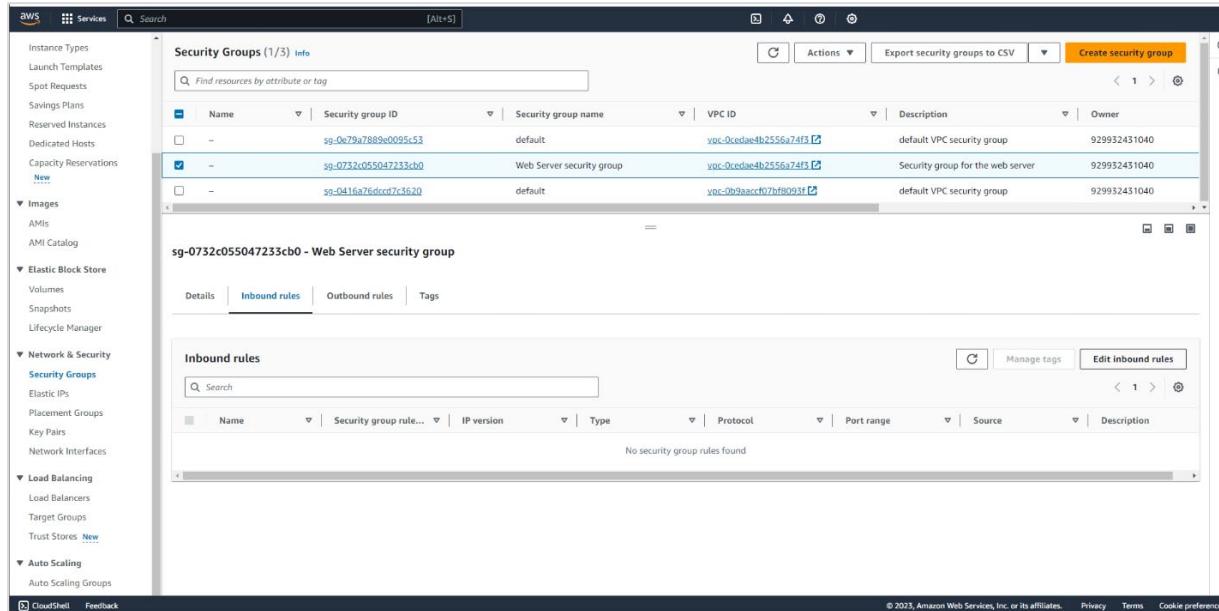
29. With your **Web-Server** selected, choose the **Actions** dropdown list, and choose **Monitor and troubleshoot < Get instance screenshot**.

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

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

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

32. Next to **Web Server security group**, select the check box.



33. Choose the **Inbound rules** tab.

The security group currently has no rules.

34. Choose **Edit inbound rules**, and then choose **Add rule**, and configure the following options:

- Type: Choose **HTTP**.
- Source: Choose **Anywhere-IPv4**.

In this simulation, you can only add a new ingress rule. You cannot change a rule after it's created. Double check the configuration before choosing Save rules.

35. Choose **Save rules**.

In a live environment, you would be able to copy the public IPv4 address and paste it into a browser to ensure that the SG and user data script deployed.

## Task 4: Connecting to your instance using AWS Systems Manager Fleet Manager

36. Search for **Systems Manager** and choose **Enter**.

37. Choose **Systems Manager**.

38. In the left navigation pane, choose **Fleet Manager**.

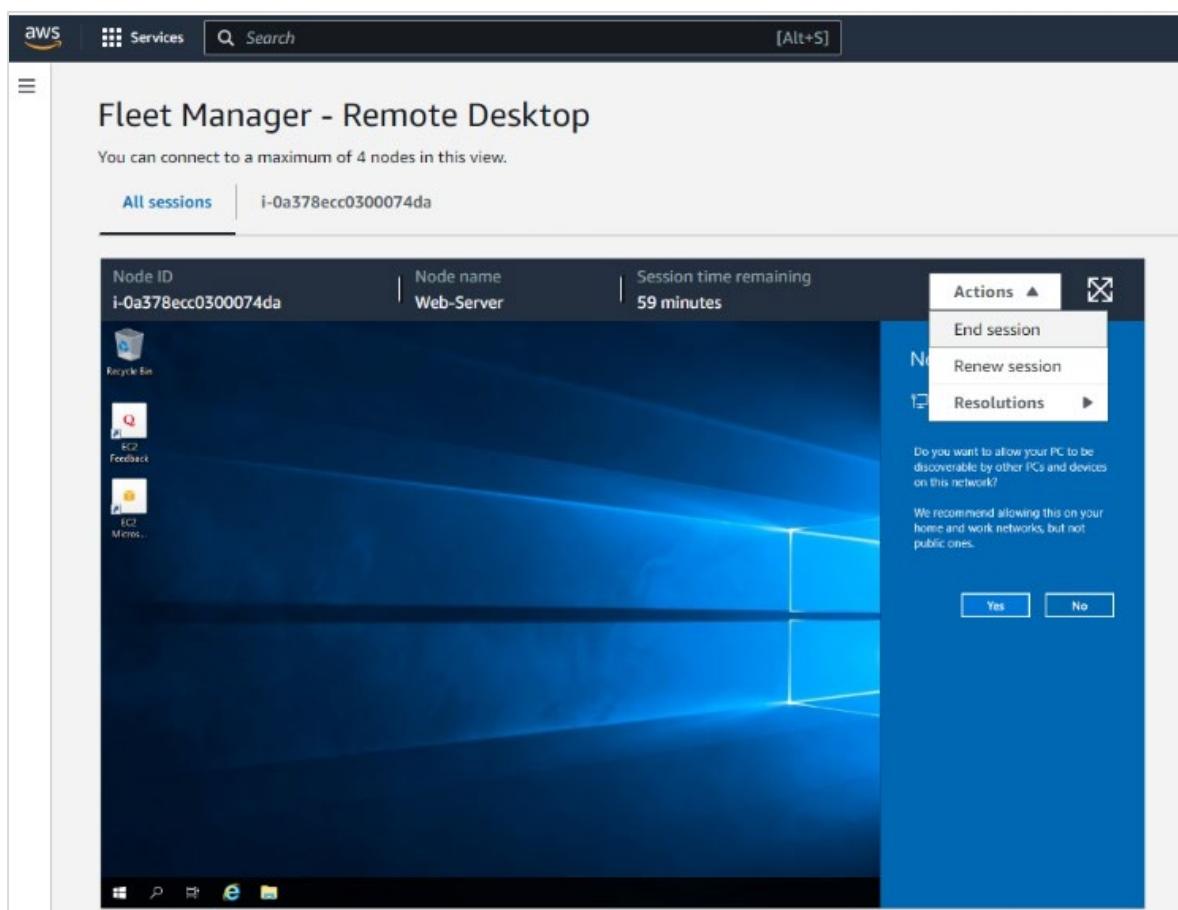
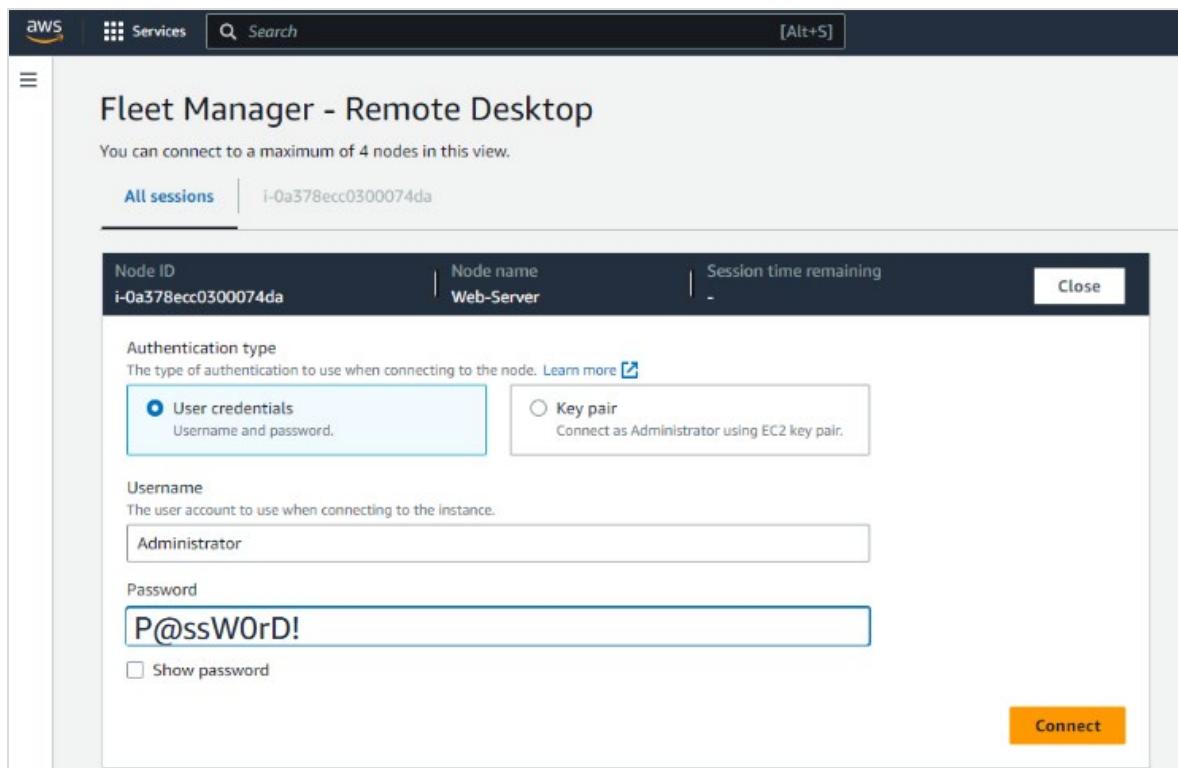
39. Under **Managed nodes**, select your **Web-Server** EC2 instance.

40. From the Node actions dropdown list, choose **Connect**, then **Connect with Remote Desktop**.

41. Enter the **Username**: Administrator

42. Enter the **Password**: P@ssW0rD!

43. Choose **Connect**.



44. To disconnect from your **Web-Server** instance, choose **Action** and then choose **End session**.

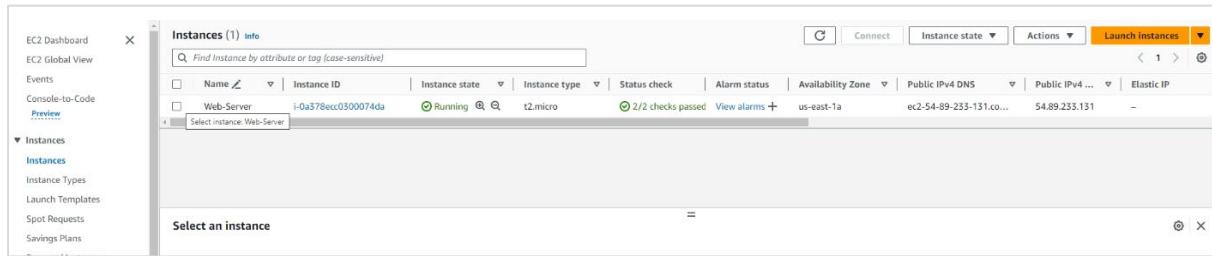
45. In the pop-up window, choose **End session** again.

### Task 5: Resizing your instance

46. In the AWS Management Console, search for **EC2** and choose **Enter**. Then, choose **EC2**.

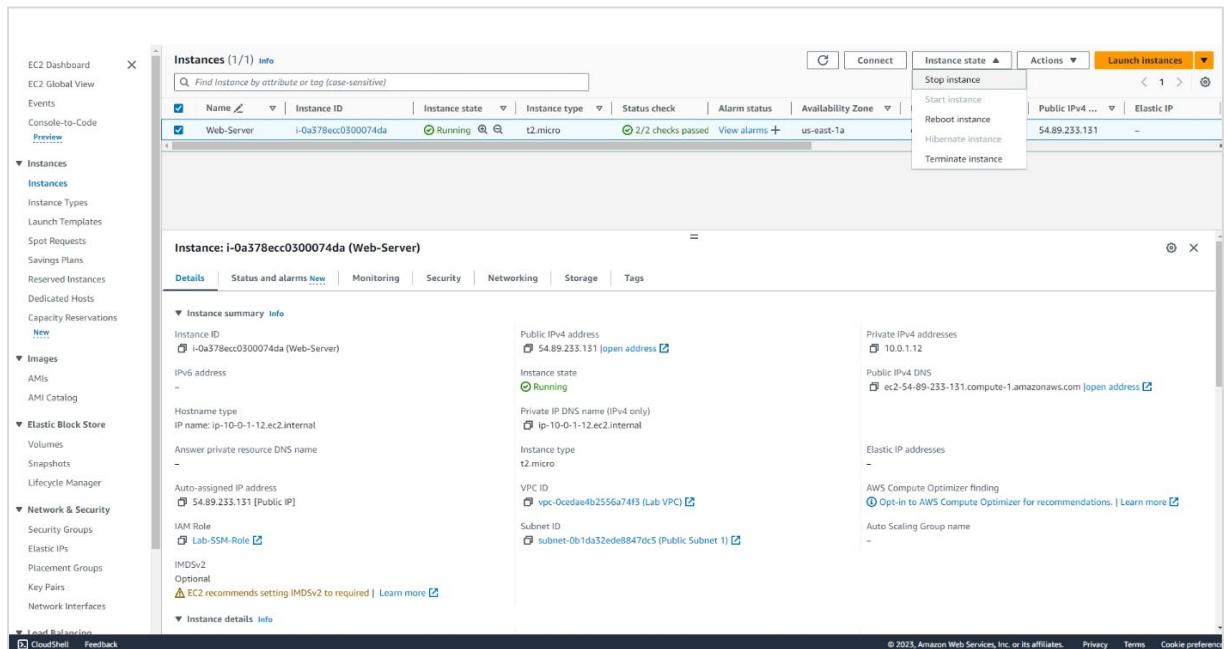
47. On the **EC2 Management Console**, in the left navigation pane, choose **Instances**.

48. Select the check box next to your **Web-Server** instance. At the top of the page, choose the **Instance state** dropdown list, and choose **Stop instance**.



49. In the **Stop instance?** pop-up window, choose **Stop**.

Your instance performs a normal shutdown and then stops running.



50. Wait for the **Instance state** to display **Stopped**.

The screenshot shows the AWS EC2 Instances page. A green banner at the top indicates 'Successfully stopped i-0a378ecc0300074da'. The main table lists one instance: 'Web-Server' (Instance ID: i-0a378ecc0300074da, Instance state: Stopped, Instance type: t2.micro). The Actions dropdown menu is open, with 'Change instance type' selected. Other options in the dropdown include 'Connect', 'View details', 'Manage instance state', 'Networking', 'Security', 'Image and templates', and 'Monitor and troubleshoot'.

## CHANGE THE INSTANCE TYPE

51. Select the check box next to your **Web-Server**. From the **Actions** dropdown list, select **Instance settings < Change instance type**, and then configure the following option:
  - **Instance type:** Select **t2.nano**.
52. Choose **Apply**.

The screenshot shows the 'Change instance type' dialog box. It displays the current instance ID (i-0a378ecc0300074da) and current instance type (t2.micro). The new instance type is set to t2.nano. A note states 'EBS-optimized is not supported for this instance type'. At the bottom are 'Cancel' and 'Apply' buttons.

## START THE RESIZED INSTANCE

When the instance is started again, it is a t2.nano instance. You now start the instance again, which has less memory but more disk space.

53. Next to your **Web-Server**, select the check box.

54. From the **Instance state** dropdown list, choose **Start instance**.

The screenshot shows the AWS EC2 Instances page. In the main table, there is one instance named 'Web-Server' with the ID 'i-0a378ecc0300074da'. The 'Instance state' for this instance is currently 'Stopped'. To the right of the table, there is a dropdown menu under the 'Actions' button. The 'Start instance' option is highlighted. A green success message at the top left of the page says 'Instance type changed successfully'.

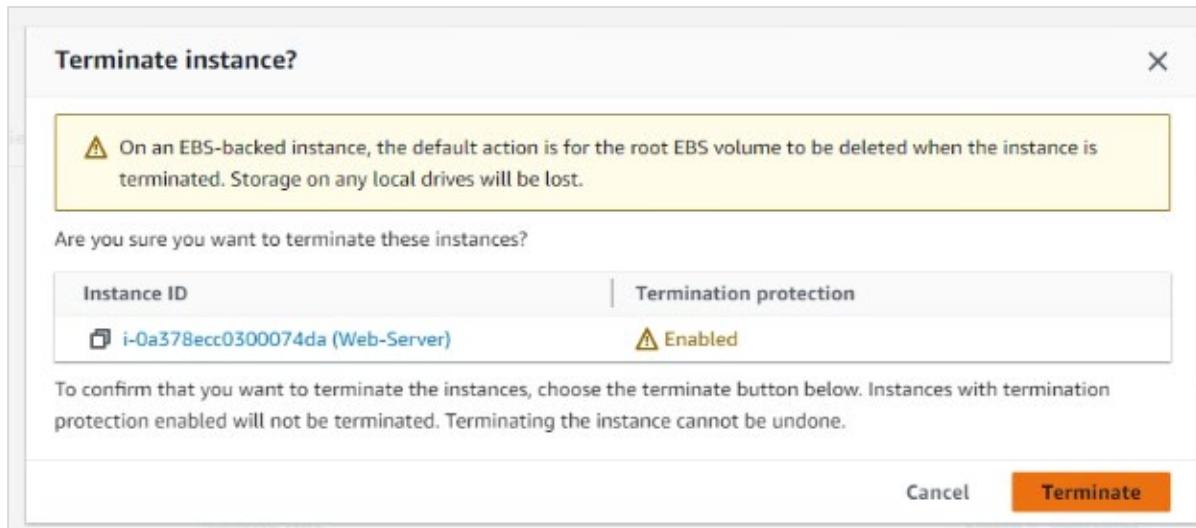
After the instance is restarted, the Instance state displays Running. Choose Continue.

### Task 6: Testing termination protection

55. Select the check box next to your **Web-Server** instance. From the **Instance state** dropdown list, choose **Terminate instance**.

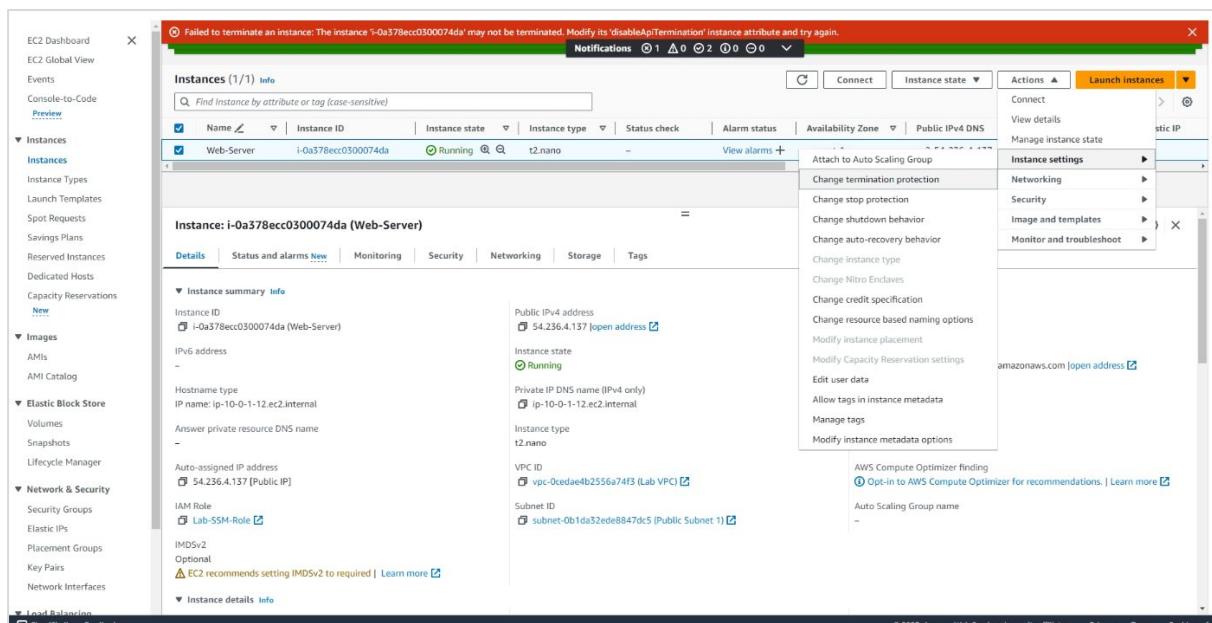
56. Choose **Terminate** to see what will happen if you try to terminate the instance.

The screenshot shows the AWS EC2 Instances page again. The same 'Web-Server' instance is selected. This time, the 'Actions' dropdown menu has the 'Terminate instance' option selected. A green success message at the top left of the page says 'Successfully started i-0a378ecc0300074da'. The instance state is now shown as 'Running'.



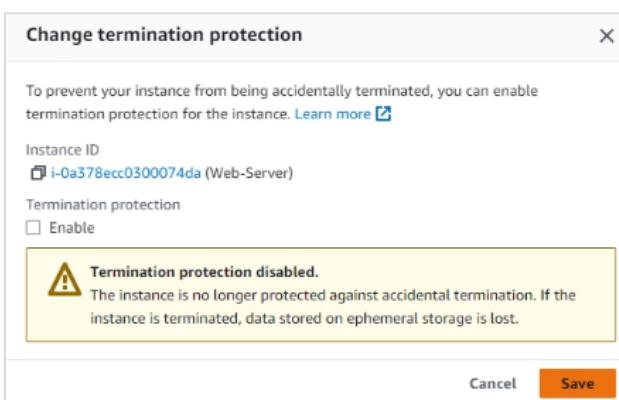
If you really want to terminate the instance, you need to turn off termination protection.

## 57. From the **Actions** dropdown list, choose **Instance settings**, and then choose **Change termination protection**.



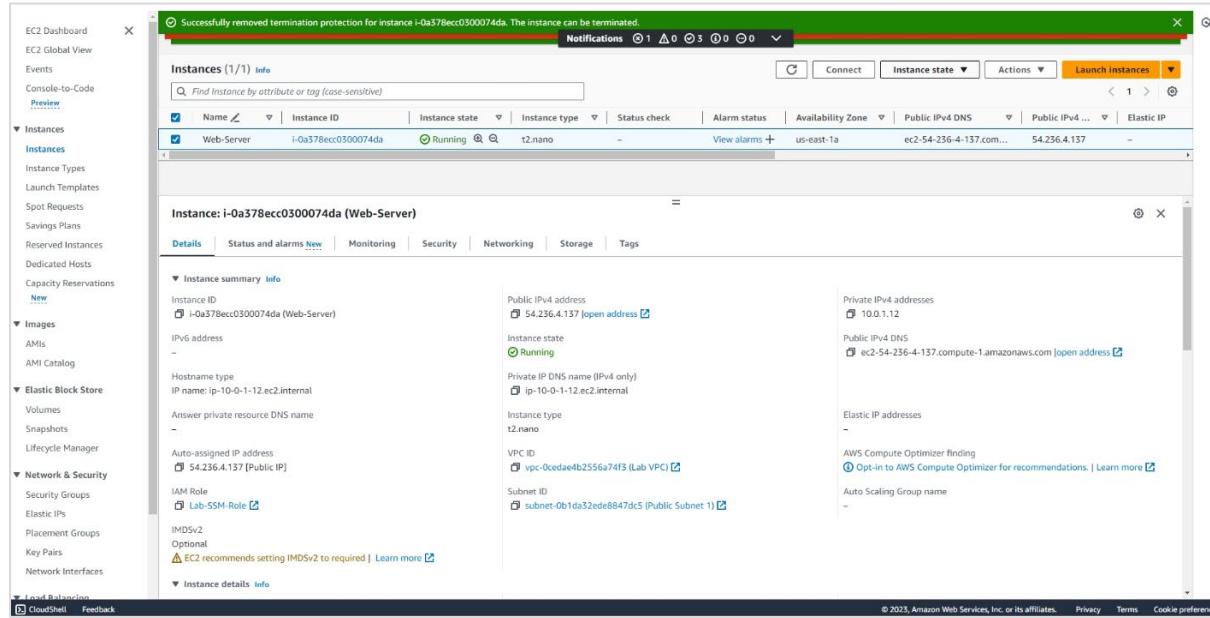
## 58. The check box for **Enable** will be selected. Clear the checkbox to disable.

## 59. Choose **Save**.



60. Now, try to terminate the instance again. From the **Instance state** dropdown list, choose **Terminate instance**.

61. The instance state will now successfully be terminated. Choose **Terminate**.



**Conclusion-** In this simulation, we created an EC2 instance and learned to manage instance properties such as the instance type. We modified security group settings to make the website reachable, and you learned how to use termination protection to prevent instance deletion. We learned how to stop, start, and terminate an EC2 instance. Finally, we learned how to find the EC2 limits for our AWS account.