



Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2023-24

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|--------------|--|--------------|--|
| Class: | | Semester: | |
| Course Code: | | Course Name: | |

| | |
|---------------------------------|---|
| Name of Student: | |
| Roll No. : | |
| Experiment No.: | 1 |
| Title of the Experiment: | To study and implement Infrastructure as a Service using AWS EC2 by creating Ubuntu Virtual Machine through PUTTY open Source terminal emulator |
| Date of Performance: | |
| Date of Submission: | |

Evaluation

| Performance Indicator | Max. Marks | Marks Obtained |
|------------------------------------|------------|----------------|
| Performance | 5 | |
| Understanding | 5 | |
| Journal work and timely submission | 10 | |
| Total | 20 | |

| Performance Indicator | Exceed Expectations (EE) | Meet Expectations (ME) | Below Expectations (BE) |
|---|--------------------------|------------------------|-------------------------|
| Performance | 4-5 | 2-3 | 1 |
| Understanding | 4-5 | 2-3 | 1 |
| Journal work and timely submission | 8-10 | 5-8 | 1-4 |

Checked by

Name of Faculty :

Signature :

Date :



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Experiment No. 1

Aim: To study and implement Infrastructure as a Service using AWS

Objective: To demonstrate the steps to create and run virtual machines inside Amazon EC2

Theory:

IAAS: Infrastructure as a service (IaaS) is a type of cloud computing service that offers essential compute, storage, and networking resources on demand, on a pay-as-you-go basis. IaaS is one of the four types of cloud services, along with software as a service ([SaaS](#)), platform as a service ([PaaS](#)), and [serverless](#).

In an IaaS service model, a [cloud provider](#) hosts the infrastructure components that are traditionally present in an on-premises data center. This includes servers, storage and networking hardware, as well as the virtualization or [hypervisor](#) layer.

IaaS providers also supply a range of services to accompany those infrastructure components. IaaS customers access resources and services through a wide area network ([WAN](#)), such as the internet, and can use the cloud provider's services to install the remaining elements of an application stack. For example, the user can log in to the IaaS platform to create [virtual machines](#) (VMs); install operating systems in each VM; deploy middleware, such as databases; create storage buckets for workloads and backups; and install the enterprise workload into that VM. Customers can then use the provider's services to track costs, monitor performance, balance network traffic, troubleshoot application issues and manage disaster recovery.

AWS: AWS enables you to select the operating system, programming language, web application platform, database, and other services you need. With AWS, you receive a virtual environment that lets you load the software and services your application requires. This eases the migration process for existing applications while preserving options for building new solutions.

You pay only for the compute power, storage, and other resources you use, with no long-term contracts or up-front commitments.

AWS is designed to allow application providers, ISVs, and vendors to quickly and securely host your applications – whether an existing application or a new SaaS-based application.

EC2: Amazon Elastic Compute Cloud (Amazon EC2) provides on-demand, scalable computing capacity in the Amazon Web Services (AWS) Cloud. Using Amazon EC2 reduces hardware costs so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. You can add capacity (scale up) to handle compute-heavy tasks, such as monthly or yearly processes, or spikes in website traffic. When usage decreases, you can reduce capacity (scale down) again.



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Steps:

- We will start by creating an EC2 instance. Go to EC2 ☐
Console <https://console.aws.amazon.com/ec2/v2/home> and Click on Launch instance.
Where you will find multiple AMIs, Scroll down and select Ubuntu Server
- Once you select the server, follow further steps, and launch. Make sure while launching download the PEM file as it will need in the future. ☐
- Now go to the EC2 dashboard and look for a public IP address and Copy that as we will need for PUTTY configuration, Though you can use Public DNS as well. ☐
- We are done with AWS configuration, now open PUTTY and follow a few steps: ☐
- Add copied IP address in the Host Name field and name the Saved session and save it. Will keep port as it is i.e., 22 as we have only opened the 22 port as we want everything should go through the SSH tunnel; though you can open other ports as well there will be less security. ☐
- Add SSH (PPK) key by browsing SSH -> Auth -> Private Key file for authentication -> Browse and again go to Session and Save it. ☐
Note: By default, AWS only provide a PEM file. We need to convert PEM to PPK. You can find multiple online tools for converting this
- Click on Open, and it will prompt a security alert just choose Yes, and you will able to see the command prompt. ☐
On the command prompt, just log in as Ubuntu, as we have added PPK so it won't ask for Password.
- Once you get logged into the server, you need to follow the below. ☐
 - `sudo apt update`
&& `sudo apt upgrade`
 - `sudo sed -i 's/^PasswordAuthentication no/PasswordAuthentication yes/' /etc/ssh/sshd_config` – To set login credentials
 - `sudo /etc/init.d/ssh restart`
 - `sudo passwd ubuntu` – This will be your login password to ubuntu machine ◦
`sudo apt install xrdp xfce4 xfce4-goodies tightvncserver` ◦ `echo xfce4-session > /home/ubuntu/.xsession` ◦ `sudo cp /home/ubuntu/.xsession /etc/skel` ◦ `sudo sed -i '0,-1/s//ask-1/' /etc/xrdp/xrdp.ini` ◦ `sudo service xrdp restart`
- Note: In between, if this process asks for some kind of choice, then select the local version installed option. ☐



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- Now, we need to configure the tunnel on PUTTY to the route of the request. □
- Open PUTTY again and go to the Connection – > SSH -> Tunnels -> □
 1. Add Source Port (This could be any in my case I have added 8888).
 2. Add Destination Port – This will be your instance private IP address following with 3389.
 3. Click on Add
- Once done, now click on the open button and you will see a Command prompt where login Id will be Ubuntu. □

Now you can check either we are listening on the same port or not using the following command: netstat -antp
- Now we are done with the setup. □
- Open Remote Desktop Connection □
- Add localhost:8888 or 127.0.0.1:8888 and Connect □
- You will be asked for a username and password; So username could be Ubuntu and Password will be added by you while installing the command. And Yeah, there you go, We have successfully logged into the Remote

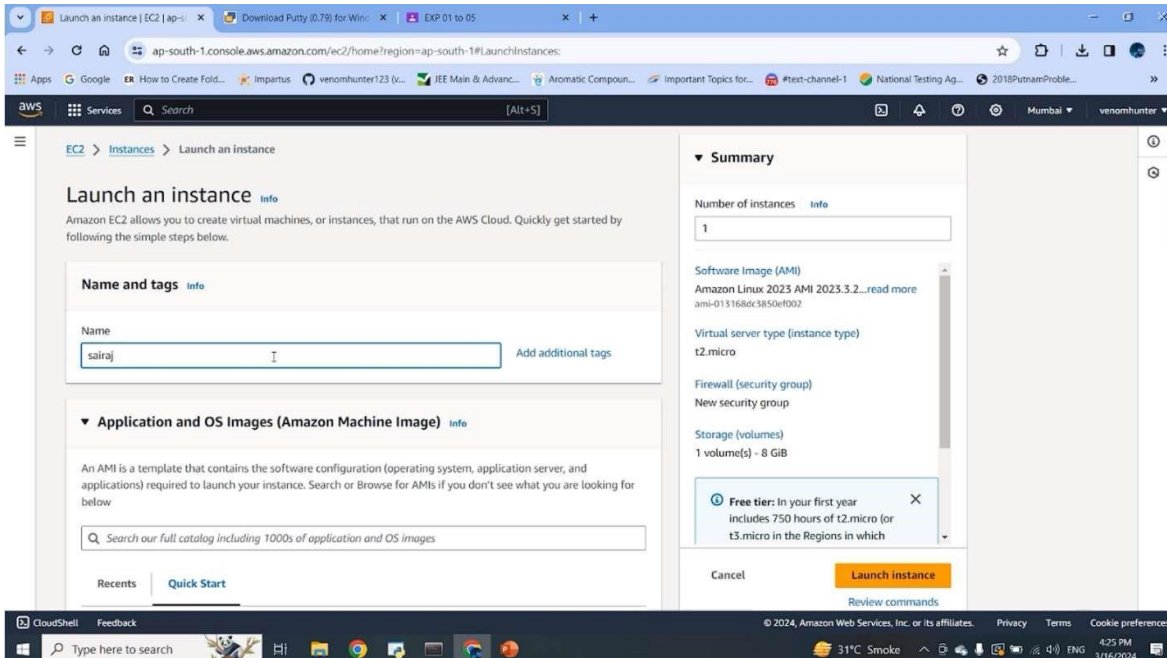
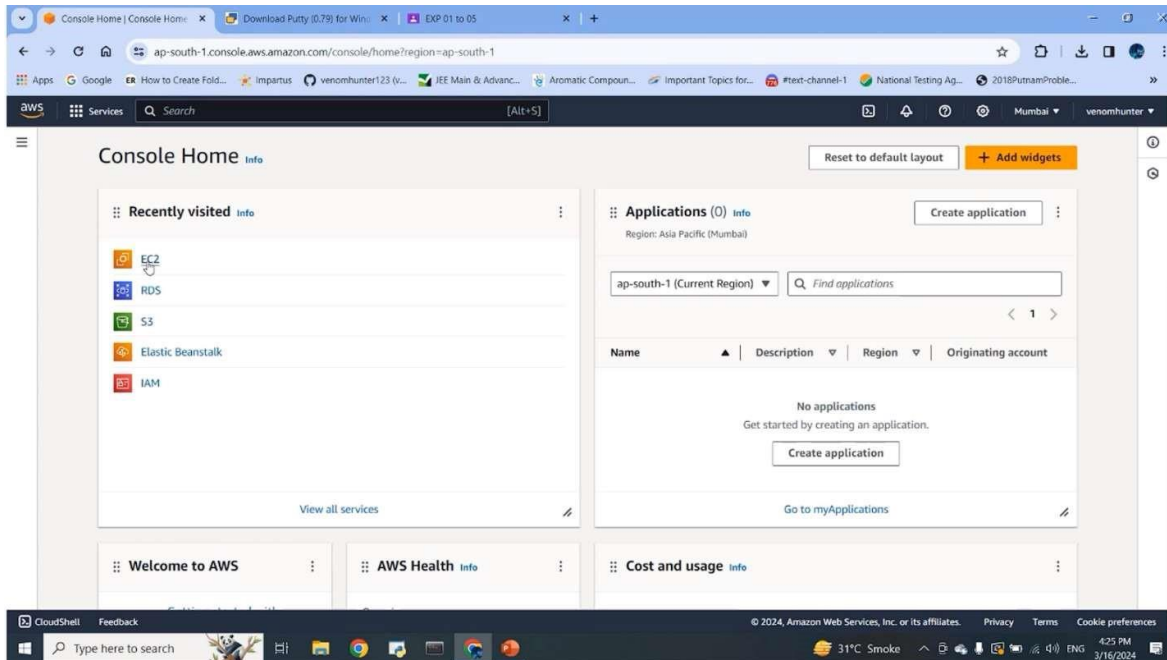
server.



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Output and Observation:





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Launch an instance | EC2 | ap-south-1

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

Success
Successfully initiated launch of instance (i-097b6a79a8da51fd9)

Launch log

Next Steps

What would you like to do next with this instance, for example "create alarm" or "create backup"

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.
[Create billing alerts](#)

Connect to your instance
Once your instance is running, log into it from your local computer.
[Connect to instance](#)
[Learn more](#)

Connect an RDS database
Configure the connection between an EC2 instance and a database to allow traffic flow between them.
[Connect an RDS database](#)
[Create a new RDS database](#)
[Learn more](#)

Create EBS snapshot policy
Create a policy that automates the creation, retention, and deletion of EBS snapshots
[Create EBS snapshot policy](#)

CloudShell Feedback

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Instances | EC2 | ap-south-1

ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#Instances:

EC2 Dashboard
EC2 Global View
Events

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

Find Instance by attribute or tag (case sensitive)

| Name | Instance ID |
|----------------|----------------|
| BEANSTALKDE... | i-0ab1cd933... |
| BEANSTALKDE... | i-0cf905857... |
| sairaj | i-01ce09f76... |
| sairaj | i-097b6a79a... |

Instance: i-097b6a79a8da51fd9

Details Status and alarms New

Instance summary info

Instance ID
i-097b6a79a8da51fd9 (sairaj)

IPv6 address
-

Hostname type
IP name: ip-172-31-45-251.ap-south-1.compute.internal

Answer private resource DNS name
IPv4 (A)

Private IP DNS name (IPv4 only)
ip-172-31-45-251.ap-south-1.compute.internal

Instance type
t2.micro

Putty Configuration

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address)
Port
22

Connection type
☒ SSH ☐ Serial ☐ Other: Telnet

Load, save or delete a stored session

Saved Sessions

Default Settings

Load Save Delete

Close window on exit
☐ Always ☐ Never ☒ Only on clean exit

Open Cancel

Check Alarm status Availability Zone Public IPv4 DNS

| Check | Alarm status | Availability Zone | Public IPv4 DNS |
|---------------|-----------------------------|-------------------|-----------------|
| checks passed | View alarms | ap-south-1c | ec2-13-201-175- |
| | View alarms | ap-south-1b | - |
| | View alarms | ap-south-1b | - |
| | View alarms | ap-south-1a | ec2-35-154-83-1 |

Private IPv4 addresses
172.31.45.251

Public IPv4 DNS
ec2-35-154-83-16.ap-south-1.compute.amazonaws.com
[Open address](#)

Elastic IP addresses
-

CloudShell Feedback

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The screenshot displays the AWS Management Console for the 'ap-south-1' region. A terminal window is open, showing the command 'sudo apt update' and its output, which includes information about available updates and the Ubuntu system's warranty. The terminal also shows the command 'sudo apt install apache2' and its output, indicating that the installation is successful. The terminal window is titled 'ubuntu@ip-172-31-45-251:~\$'.

The main console view shows a list of EC2 instances. The table below summarizes the instances shown in the screenshot:

| Instance type | Status check | Alarm status | Availability Zone | Public IPv4 DNS |
|---------------|-------------------|---------------|-------------------|-----------------|
| t3.micro | 2/2 checks passed | View alarms + | ap-south-1c | ec2-13-201-175- |
| t3.micro | - | View alarms + | ap-south-1b | - |
| t2.micro | - | View alarms + | ap-south-1b | - |
| t2.micro | - | View alarms + | ap-south-1a | ec2-35-154-83-1 |

The 'Instance Summary' for the selected instance (i-097b6a79a8da51fd9) is shown below:

- Instance ID: i-097b6a79a8da51fd9 (sairaj)
- IPv6 address: -
- Instance state: Running
- Private IP address: 35.154.83.16 (open address)
- Private IP DNS name (IPv4 only): ip-172-31-45-251.ap-south-1.compute.internal
- Instance type: t2.micro
- Private IP DNS name (IPv4 only): ip-172-31-45-251.ap-south-1.compute.internal
- Answer private resource DNS name: IPv4 (A)

The console also shows the 'Launch instances' button and the 'Connect' button. The 'Tags' tab is selected, showing no tags for this instance.



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Conclusion:

Amazon Elastic Compute Cloud (EC2) offers numerous advantages as an Infrastructure as a Service (IaaS) solution. Firstly, EC2 provides scalable computing capacity, allowing users to easily adjust their resources based on demand fluctuations, thus optimizing costs and performance. Secondly, it offers a wide selection of instance types tailored to various workloads, ensuring flexibility and efficiency in resource allocation. Additionally, EC2's integration with other AWS services facilitates seamless deployment and management of complex applications, enabling rapid development cycles and improved operational efficiency. Overall, EC2's robust infrastructure, scalability, and integration capabilities make it a preferred choice for organizations seeking reliable and scalable cloud computing solutions.