1. Describe IaaS

IaaS
Infrastructure as a service (IaaS) is a service delivery method for cloud computing. An organization can outsource various resources from the cloud computing platform for its clients.

Alongside IaaS, other cloud computing methods are PaaS (Platform as a Service) and SaaS (Software as a Service). More businesses have turned to the use of Iaas as one of the cloud computing methods spearheading its rapid growth.

The IT resources available in the cloud computing platform include virtual machines, servers, and networking, storage which an organization can access online and share with its clients.

1. Let's now understand what IaaS is in-depth
2. How IAAS works
3. User cases of IaaS
4. IaaS Providers
5. IaaS vs. SaaS

Let's now understand what IaaS is in-depth

IaaS offers a virtual infrastructure to interested organizations through the cloud from its database. Originally known as Hardware as a Service, it also provides computing infrastructure which delivers to users networking connections, virtual servers, IP addresses, and storage services depending on the customer's need.

The payment of services is dependent on the nature of the resources a customer needs. IaaS payment schedules range from hourly, weekly, or even on a monthly basis which is purely the decision of the customer.

IaaS has distinguished its services into three models that are guided by the customer's privacy needs.

1. Public cloud

Public cloud stores its infrastructure in a cloud computing platform. It is a commonly used method of cloud computing. Some of the examples of public clouds are Google Cloud, AWS, and Microsoft Azure. From these clouds, third-party clients, who are the owners of the hardware, software, and other infrastructure, can operate services like servers and storage which they then deploy via the internet.

Advantages of Public clouds

- It is cost-effective for the user since the organization only pays for the services used.
- The organization does not need to install any physical hardware thus no or minimal maintenance cost.
- It is highly reliable

2. Private Cloud

A private cloud stores its infrastructure in the organization's place. Just like the name suggests, it is purely to be accessed and used by a single organization.

Private clouds are mostly purchased by organizations that require advanced security and privacy of their data such as government institutions. It is installed at the institution's place. Third-party cloud service owners can also host private clouds.

Some of the benefits of the private cloud model offer include:

- Ultra-scalable
- Highly flexible
- Advanced security especially when dealing with sensitive data

3. Hybrid cloud

This is a combination of both public and private cloud models. The organization is free to switch between the two models depending on the nature of the data. When the data or information in question is not highly sensitive, the public cloud is opted for.

Private cloud is, however, the best option when dealing with data that is considered highly sensitive, hence the need for beefed security. Some of the critical business dealings also opt for private cloud models for privacy reasons.

- A hybrid cloud model is best when the organization needs;
- Top-notch performing infrastructure
- Cost-effective infrastructure

Other than managing infrastructure, IaaS also provides other services like billing management, load balancers, backup, IP address, and access management.

How IAAS works

IaaS works in a way that it identifies a virtual or physical infrastructure available at a cloud provider. It links the customer to the cloud provider and offers several services such as virtualization, network.

The organization identifies its need and requests the appropriate service. The user then pays for the resource and IaaS also offers billing management services.

Why would you then choose IaaS?

One benefit that IaaS offers to its clients is cost-effectiveness in IT infrastructure. An organization has access to IT infrastructure without installing or developing its own data center. Furthermore, there is no maintenance cost for the infrastructure which is the sole role of the cloud provider.

Other IAAS benefits

- Time-saving– Infrastructure as a Service is tasked with the role of setting physical and virtual hardware. It is also responsible for maintaining the infrastructure thus time-saving to the organization.
- Pay as you go– users are free to use the product which they have paid for any time. They also pay only for what they need to use in their organization.
- Data security– IaaS is one of the most secure cloud computing methods. Users are therefore assured of data security.
- High Scalability– IaaS ensures that its products are always accessible by the users when needed. They can also be remodeled as per need.
- Highly flexible and redundant– even in the event hardware fails, the organization's service paid for is not affected. Normalcy is achieved soonest.

- Constant availability– IaaS cloud computing platform is ever available to its users. Its products are available to users at any given time throughout the year.
- IaaS however still has its shortcomings.
- Infrastructure failure means a delay in work and other programs. Network failure can be frustrating especially when you can't monitor the connectivity since you have to depend on the cloud computing technical team.
- Having technical personnel that is well versed with the IaaS infrastructure is required to handle technical hitches.

User cases of IaaS

IaaS is applicable in many circumstances. IaaS can be used in business organizations and large institutions.

Businesses can use IaaS providers to scale their IT infrastructure. From a third-party provider, they can have a pool of virtual resources that they can use to host websites.

Furthermore, they can also benefit from interconnected servers from the host's virtual network.

In an organization, IaaS can be used to create and test new workloads. Before the organization develops s new application, they can always test it using the IaaS platform.

Iaas will determine if it's viable and then the organization can decide to install it on their premise.

Popular IaaS Providers

IaaS providers include Amazon Web Service (AWS), Google Cloud, and Microsoft Azure.

Amazon Web Service (AWS)

AWS offers a virtual working environment for its users and they pay for the product they are using, thus reducing cost. It is among the leading providers of IaaS.

Its IaaS provides the basic building blocks an organization would need to run its IT services. AWS provides scalable access to networking features, data storage space, and computers. The computer can be virtual or on a dedicated server.

It promises that its IaaS will offer its customers the highest level of flexibility, and control over its IT resources. In that regard, many IT departments will have the same experience and control, which they would have by installing the same IT infrastructure on their premises.

AWS offers a pay-as-you-go (on-demand-capacity) billing for its IaaS, which allows you to scale your consumption when needed. But for those that want to reserve additional capacity, AWS offers reserved capacity billing.

That also allows you to get discounts of up to 75% of the on-demand capacity. Moreover, you can lower your IaaS further on AWS, by opting for volume-based discounts for some of its IaaS such as S3 storage.

That's what makes AWS's IaaS, one of the popular options for small, medium, and large enterprises.

Google Cloud

Google Cloud also offers IaaS, which you can for on-demand, or prepay for on a monthly basis. It offers up to 57% discounts on its Compute Engine resources if you opt for a prepaid package. Furthermore, it offers you up to $300 in free trial discounts, which you can use to test their IaaS product.

The $300 discount covers over 20 of their IaaS, which include Compute Engine, Cloud Storage, Google Kubernetes Engine, Operations, Cloud CDN, and Cloud SQL. The discount applies to the cost of using the IaaS.

Depending on how resource-intensive your IT operations are, you can end up using it within a few hours or days, or even weeks. But it does give your IT team sufficient time and resources to sample Google Cloud.

Microsoft Azure IaaS

Just like other IaaS, Microsoft Azure promises an instant computing infrastructure, which customers can provision and manage over the internet. With it, you can avoid spending your capital on costly physical servers and data center infrastructure.

Furthermore, they don't bundle their IaaS resources, which allows you to pay for what you use only. In that regard, you can choose to rent only those IaaS components you need, for whatever period you need them.

IaaS vs. SaaS

With IaaS, the IaaS providers manage the infrastructure for you. You can then opt to buy, install, configure, and manage your software. With SaaS, you pay for the software but opt to access it using your IT infrastructure or run it on PaaS or IaaS.

Whichever option you choose, you get to start and run your IT operations with a lean budget.

Conclusion

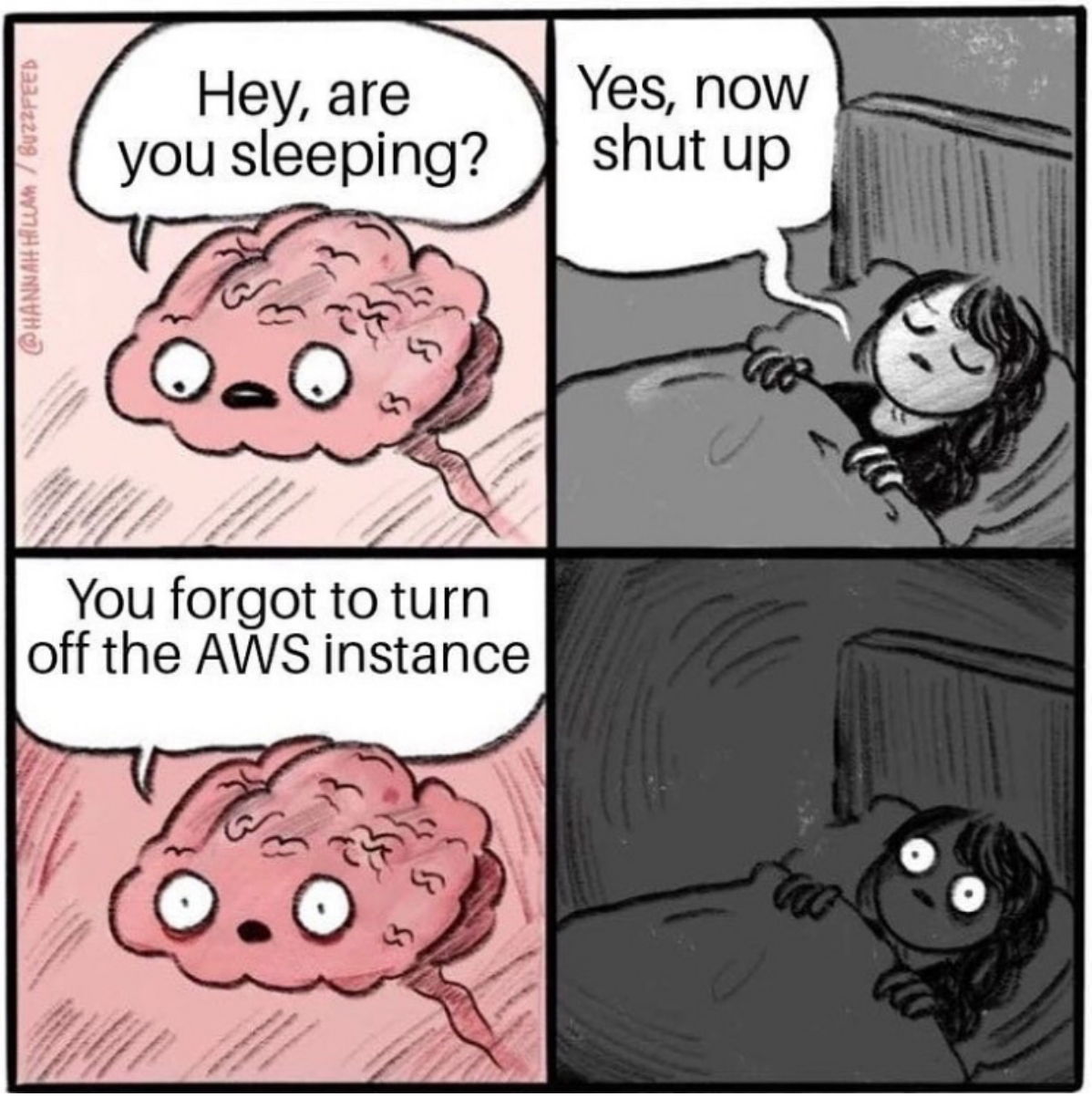
IaaS is the real data solution for large and small organizations. It provides cloud data connectivity and storage which means organizations can access their information from anywhere. IaaS is a highly flexible and scalable cloud model making it the best developer for web applications.

2. List the Compute Services available in AWS.

CATEGORY	AWS SERVICE
Instances (Virtual Machines)	1. **Amazon Elastic Compute Cloud (Amazon EC2) -** Secure and resizeable compute capacity (virtual servers) in the cloud. 2. **Amazon EC2 Spot Instances -** Run fault-tolerant workloads for up to 90% off. 3. **Amazon EC2 Auto Scaling -** Automatically add or remove compute capacity to meet changes in demand. 4. **Amazon Lightsail -** Easy-to-use cloud platform that offers you everything you need to build an application or website. 5. **AWS Batch -** Fully managed batch processing at any scale.
Containers	1. **Amazon Elastic Container Service (Amazon ECS) -** Highly secure, reliable, and scalable way to run containers. 2. **Amazon ECS Anywhere -** Run containers on customer-managed infrastructure. 3. **Amazon Elastic Kubernetes Service (Amazon EKS) -** Fully managed Kubernetes service. 4. **Amazon Fargate -** Serverless compute for containers. 5. **AWS App Runner -** Build and run containerized applications on a fully managed service.
Serverless	1. **AWS Lamda -** Run code without thinking about servers. Pay only for the compute time you consume.

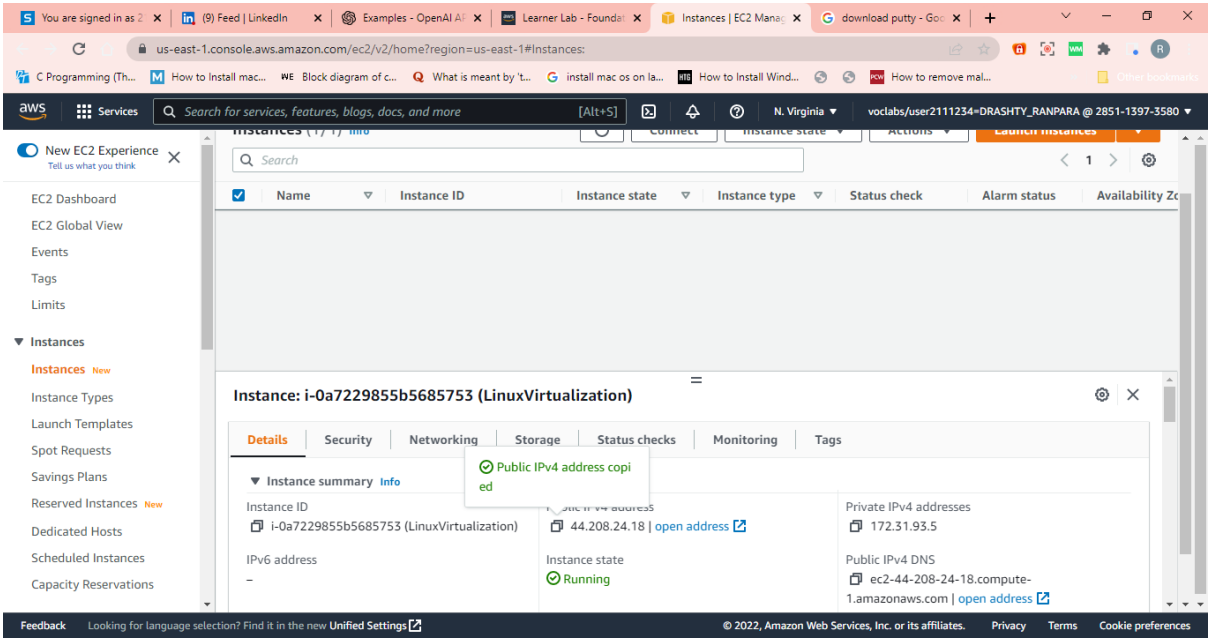
Edge and Hybrid	1. **AWS Outposts -** Run AWS infrastructure and services on premises for a truly consistent hybrid experience. 2. **AWS Snow Family -** Collect and process data in rugged or disconnected edge environments. 3. **AWS Wavelength -** Deliver ultra-low latency application for 5G devices. 4. **VMware Cloud on AWS -** Preferred service for all vSphere workloads to rapidly extend and migrate to the cloud. 5. **AWS Local Zones -** Run latency sensitive applications closer to end-users.
Cost & Capacity Management	1. **AWS Savings Plan -** Flexible pricing model that provides savings of up to 72% on AWS compute usage. 2. **AWS Compute Optimizer -** Recommends optimal AWS compute resources for your workloads to reduce costs and improve performance. 3. **AWS Elastic Beanstalk -** Easy-to-use service for deploying and scaling web applications and services. 4. **EC2 Image Builder -** Build and maintain secure Linux or Windows Server images. 5. **Elastic Load Balancing (ELB) -** Automatically distribute incoming application traffic across multiple targets.

3. Create an AWS EC2 Instance (Linux & Windows) and install the necessary packages to execute a program of your choice in it.



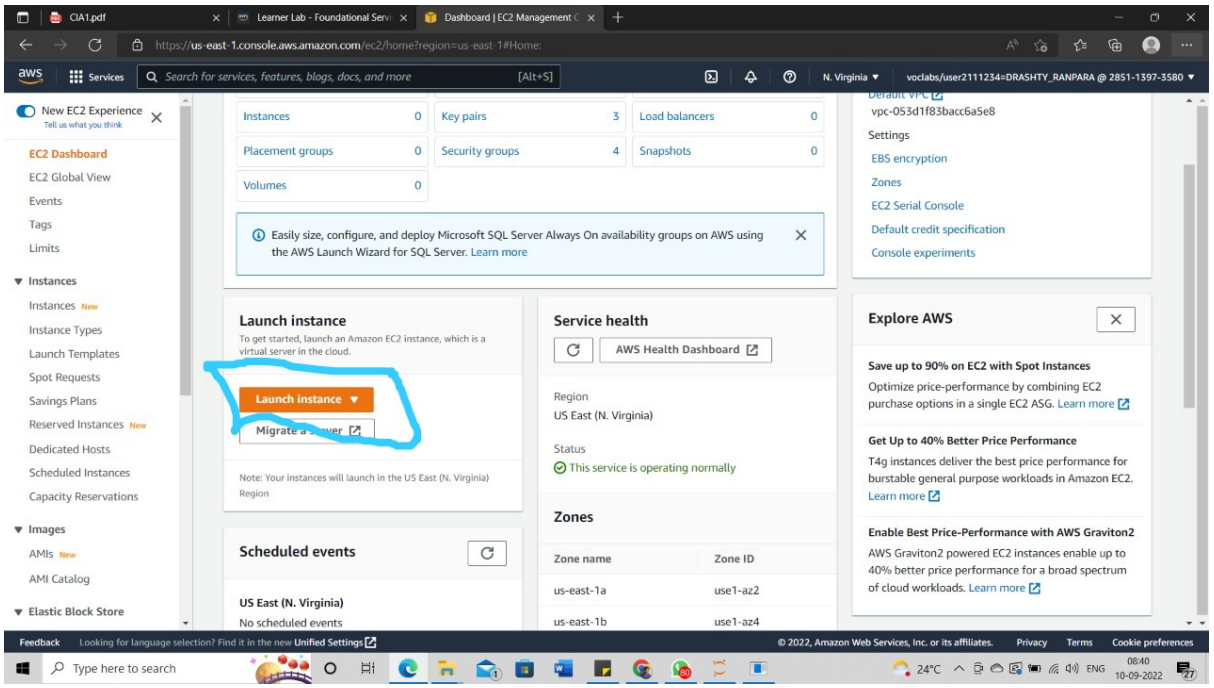
For LINUX

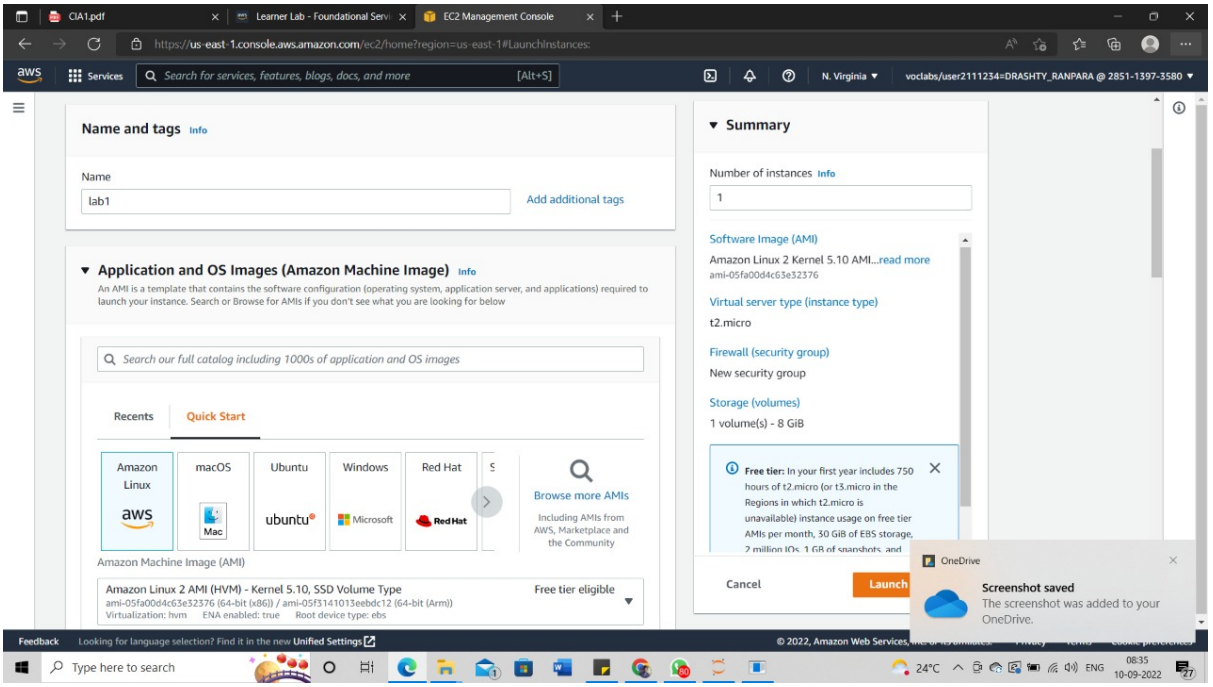
1. Login to AWS Portal. Go to the Learner Lab program and click on the start lab button. It should show a green signal beside the AWS link.



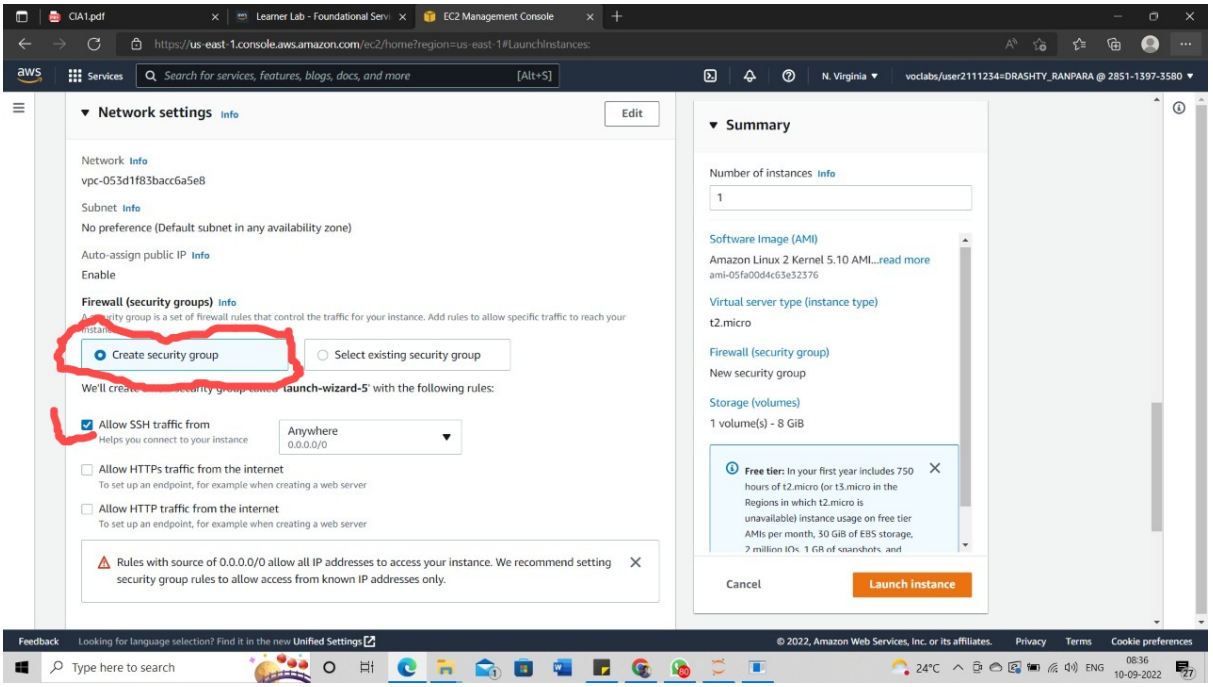
2. Navigate to **EC2 Dashboard** and click on **Launch Instance.**

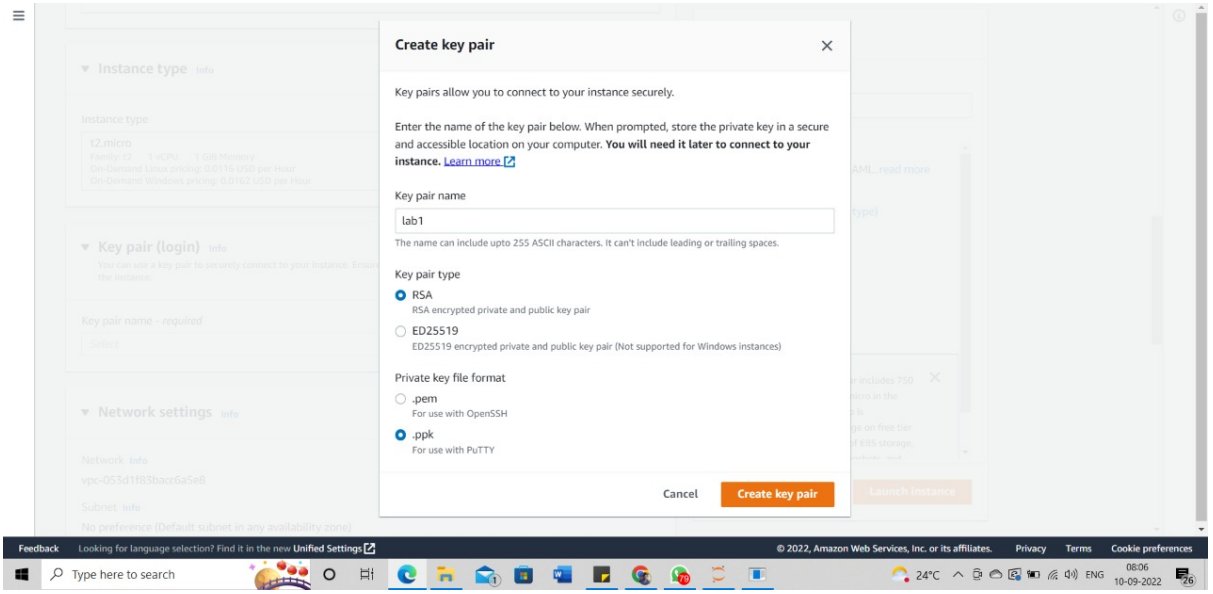
3. Provide with Name and tags - for instance, lab1. Furthermore, select the necessary operating system based on your requirement. In our case, we go for **Amazon Linux** and opt for **free tier eligibility.**



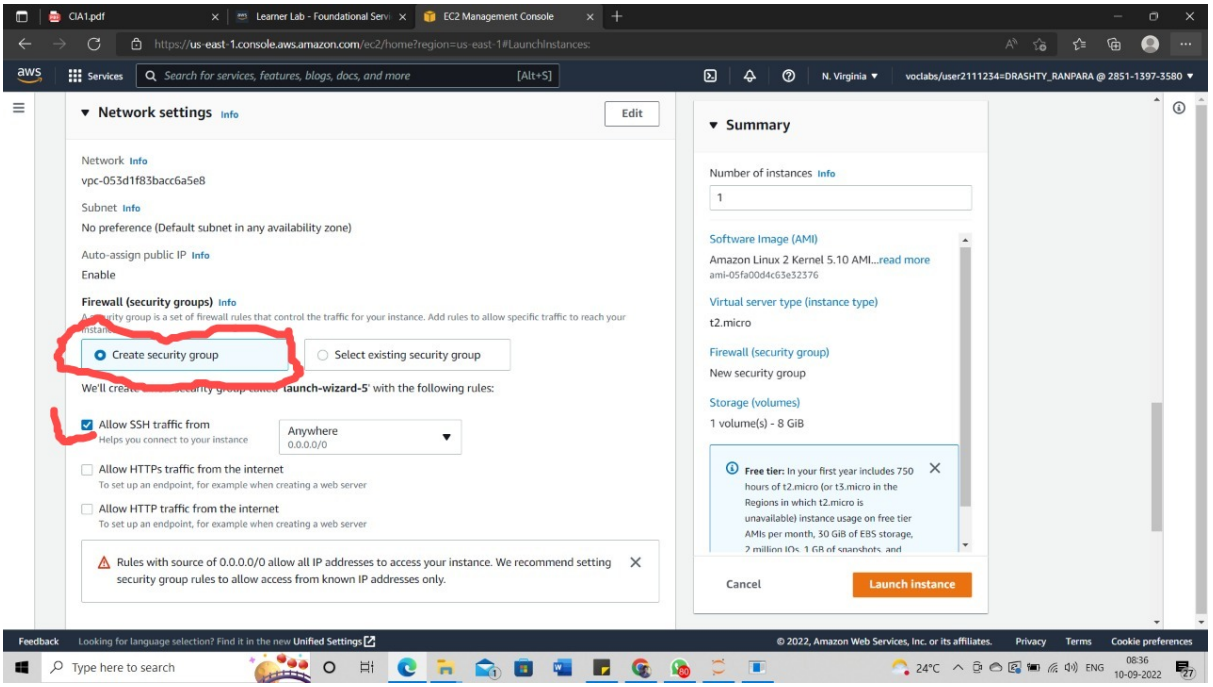


Select the necessary **instance type** and click on **Create new key pair.** From the dialogue box that appeared, give the Key pair name and under the Key pair type select **RSA** furthermore, under the Private key file format select **.ppk**(for Linux). Finally, click on **Create key pair** button.

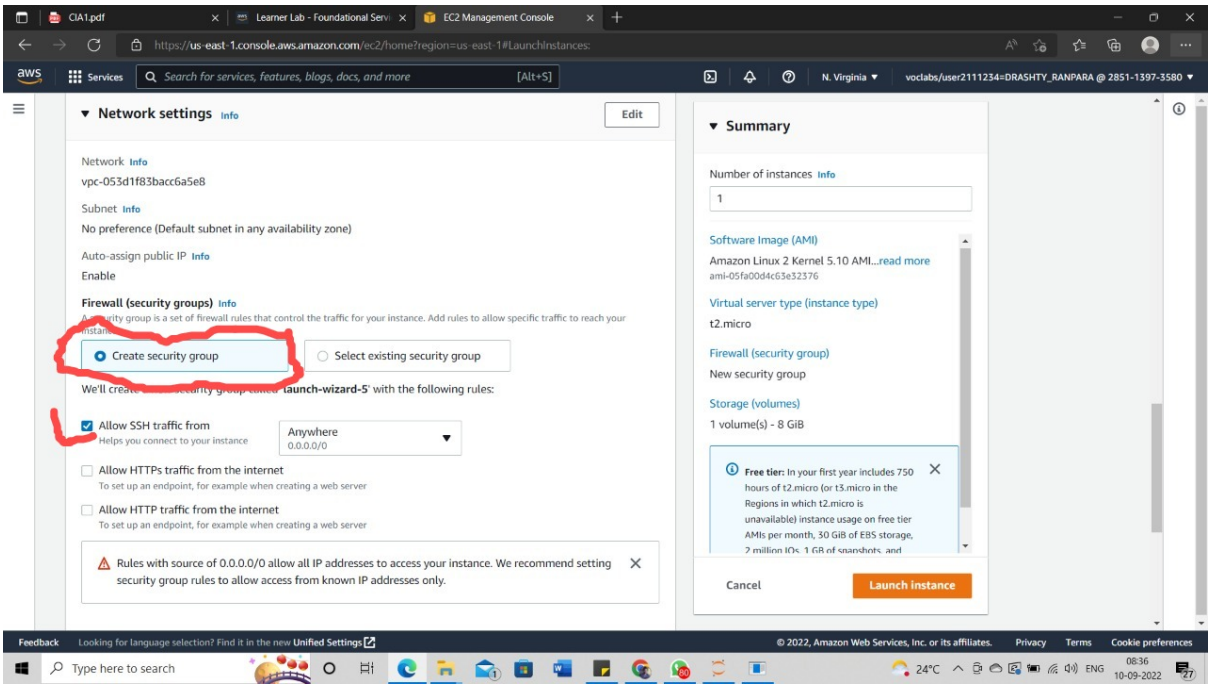




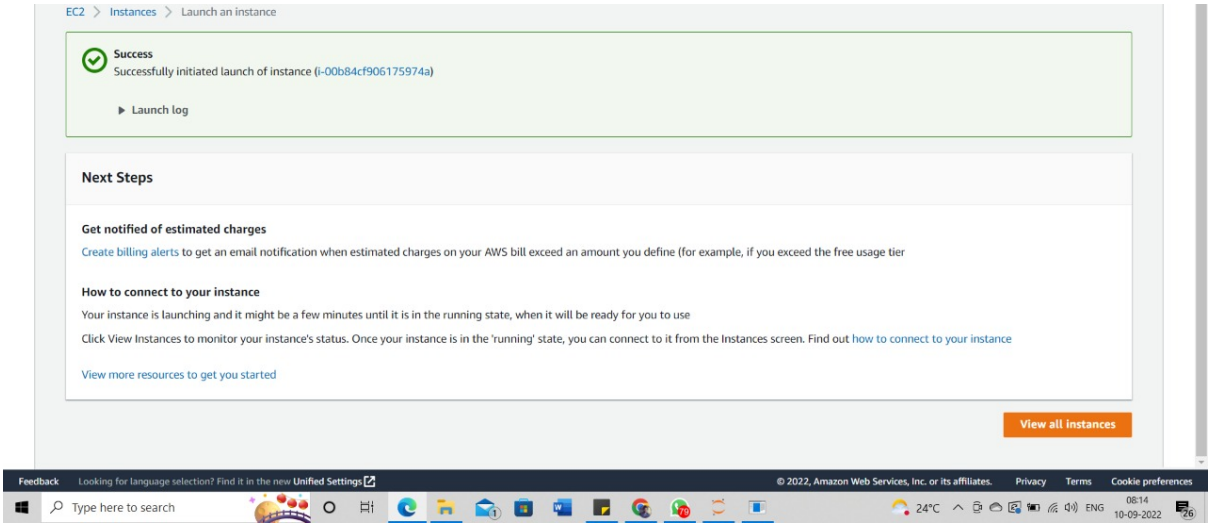
4. After creating key pair under Network Settings select the radio button and **Create security group**. If you already have an **existing security group** kindly go for that option. Next, select the checkbox **Allow SSH traffic from the internet**.



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.

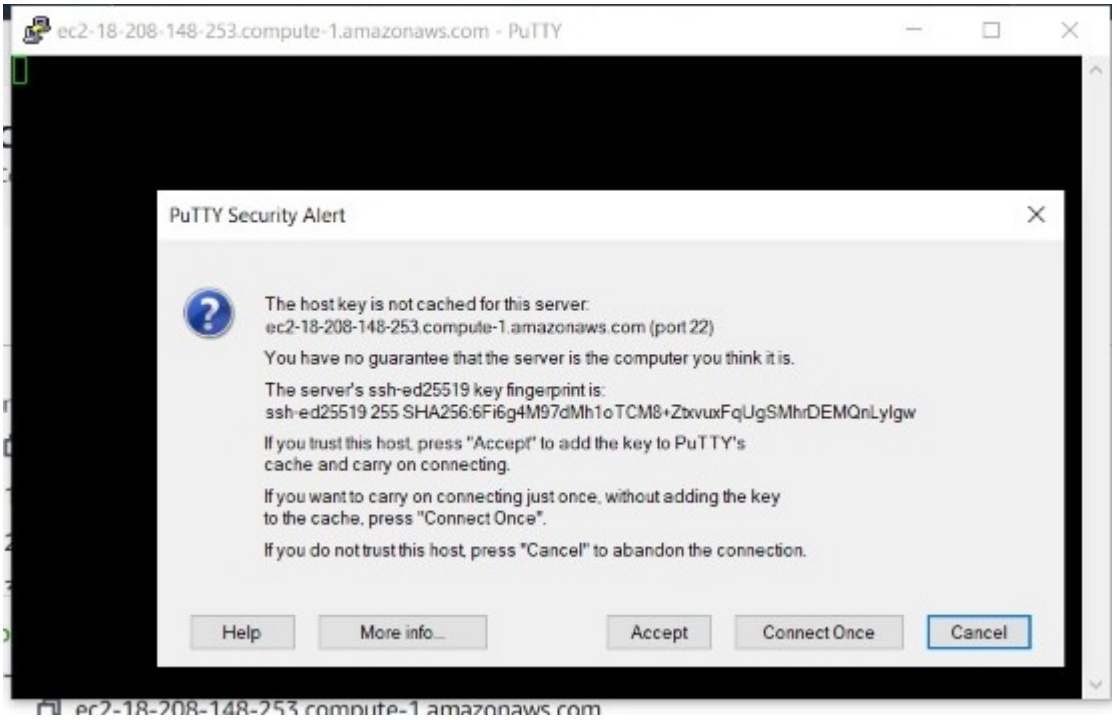


6. A **Success** message will be popped once you launch instance.

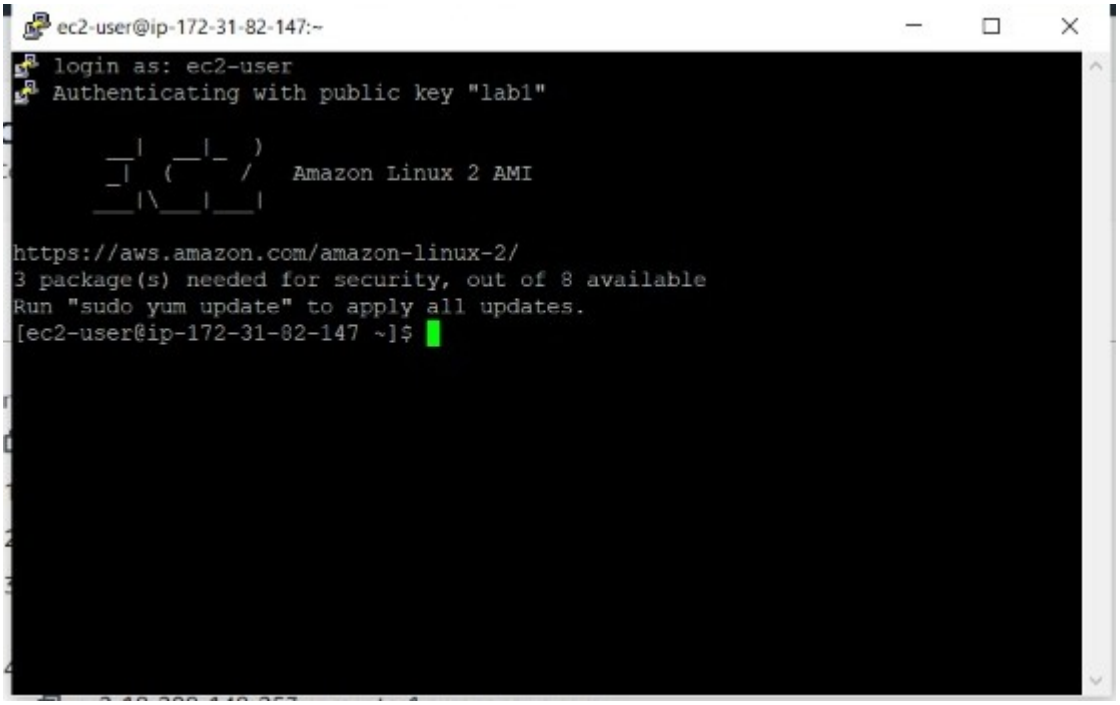


7. Meanwhile, download **PuTTY** from the browser and click for installation. You'll see the **PuTTY Configuration** window will be seen.
8. From AWS portal copy the **public ip address** under SSH Client menu. Paste the DNS in Host Name. From left pane clic on SSH -> Auth and browse the **.ppk** file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

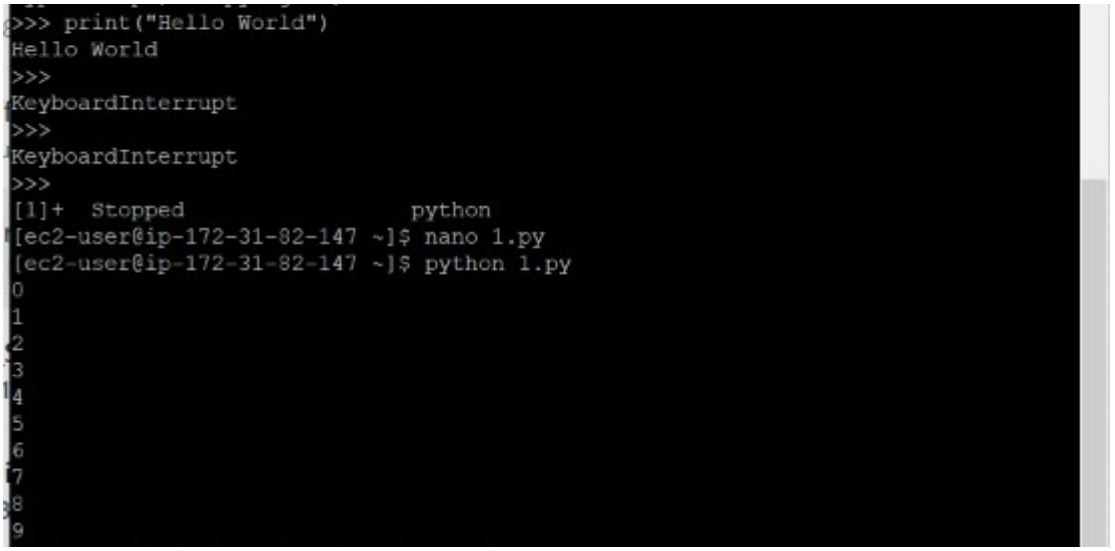
9. **Accept it.**



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

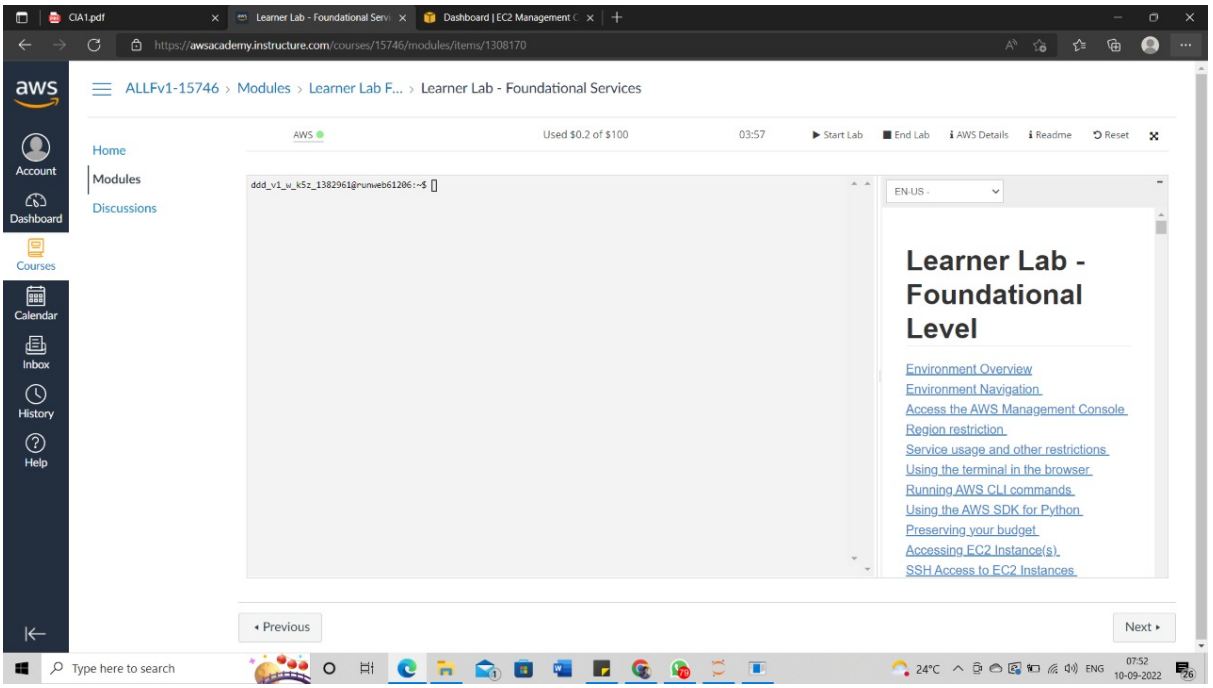


11. There you go 🙂. Here I've run the basic python program to check the connection.

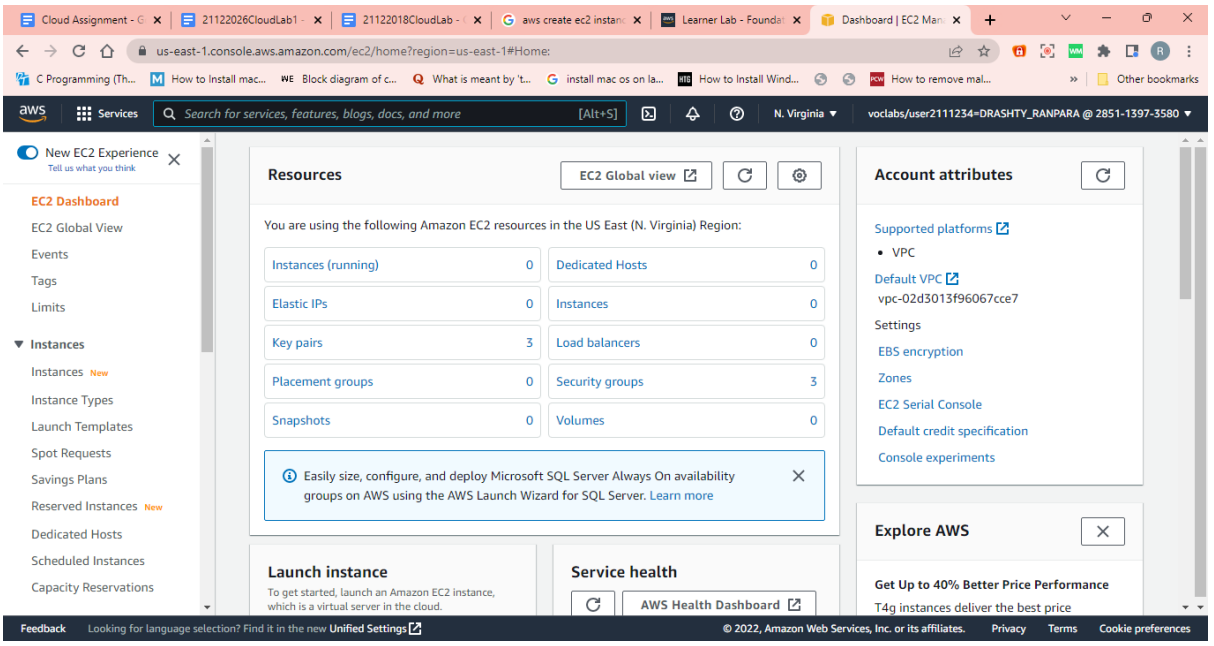


For WINDOWS

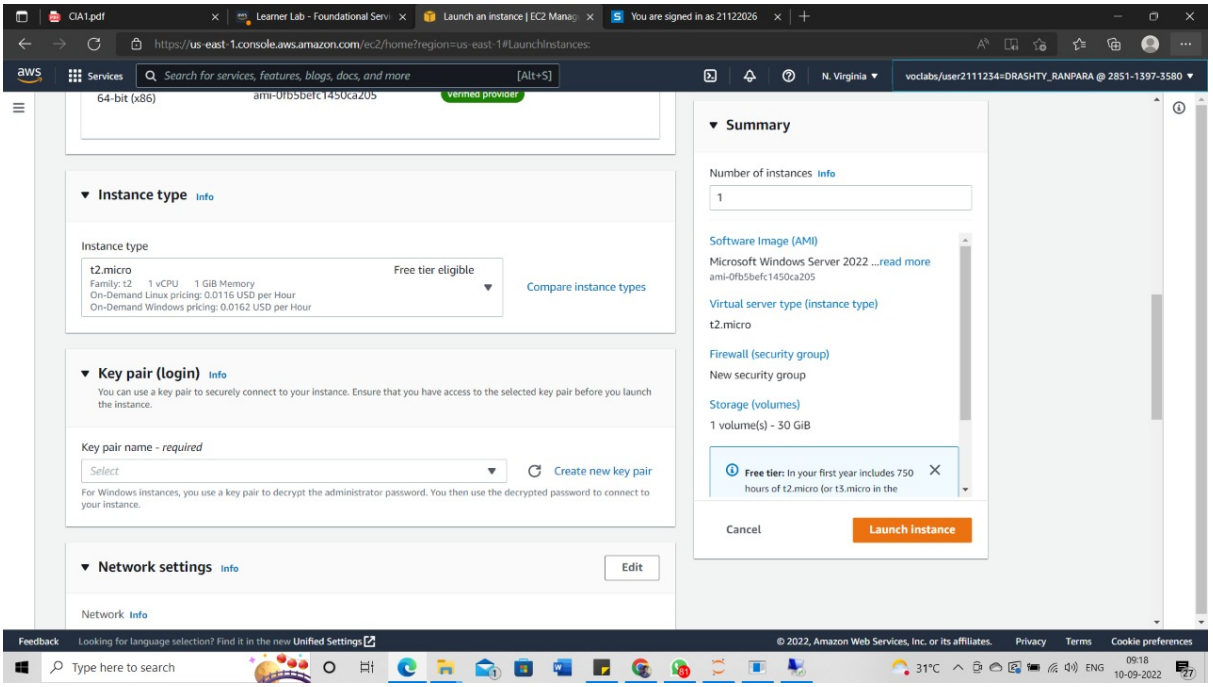
1. Login to AWS Portal. Go to the Learner Lab program and click on the **start lab** button. It should show a green signal beside the AWS link.



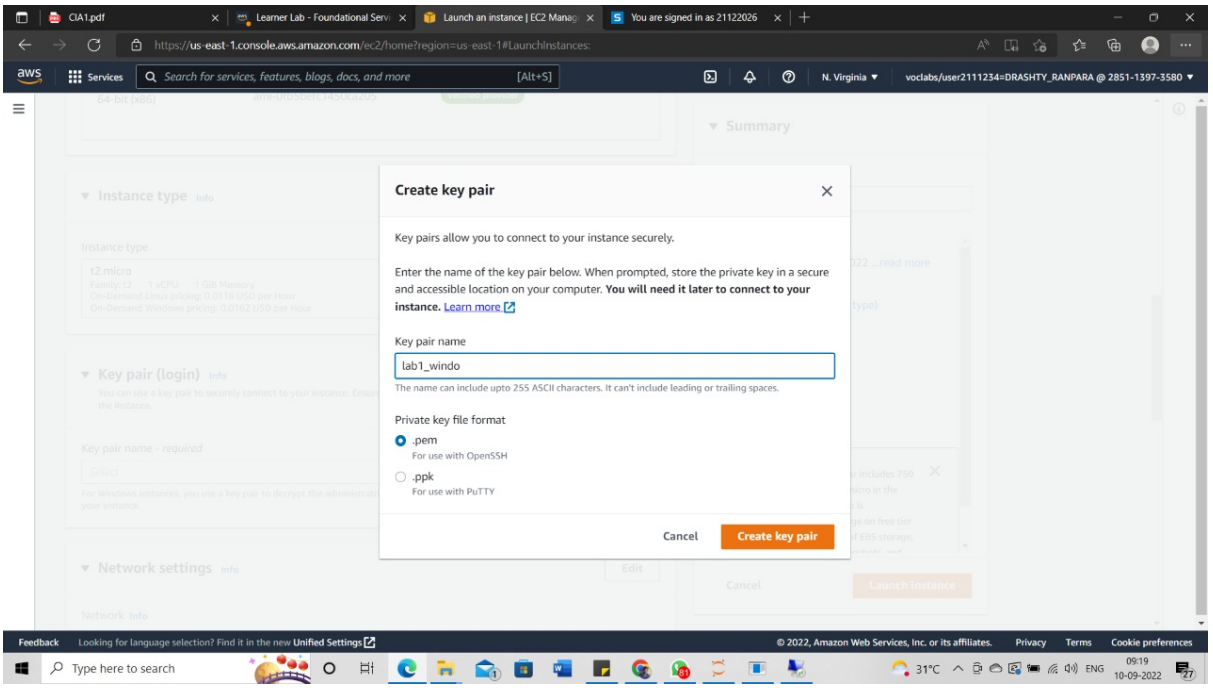
2. Navigate to **EC2 Dashboard** and click on **Launch Instance.**



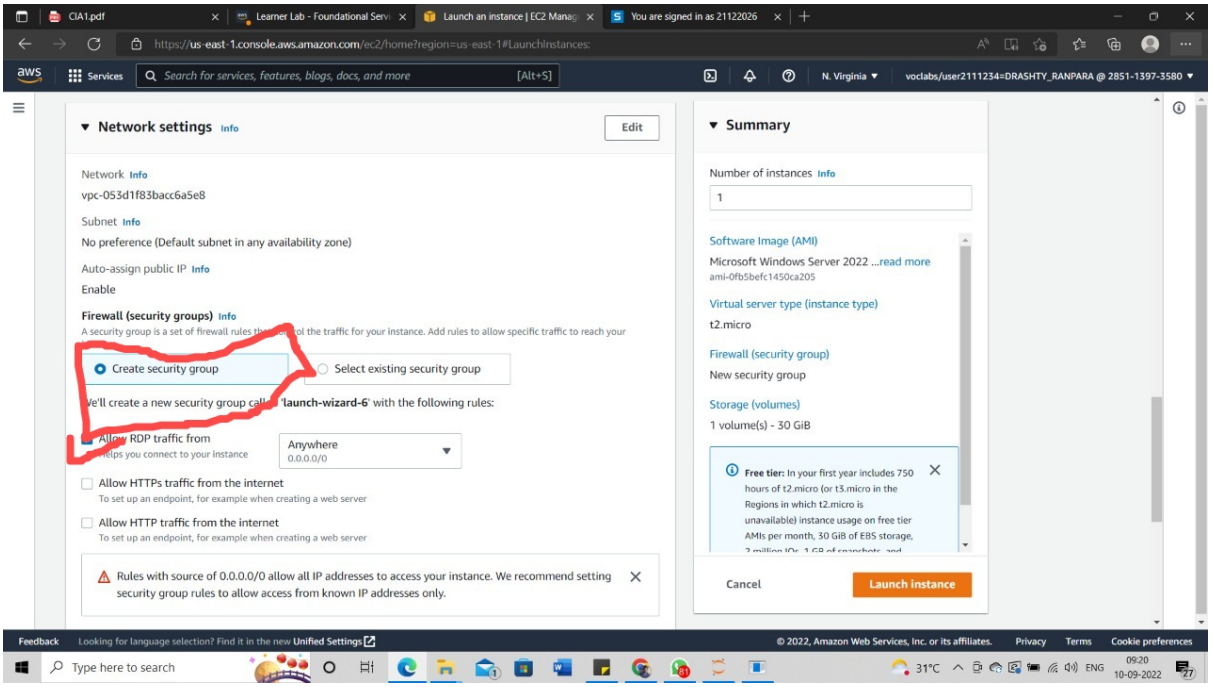
3. Provide with Name and tags - for instance, lab1. Furthermore, select the necessary operating system based on your requirement. In our case, we go for **Windows** and opt for **free tier eligibility.**



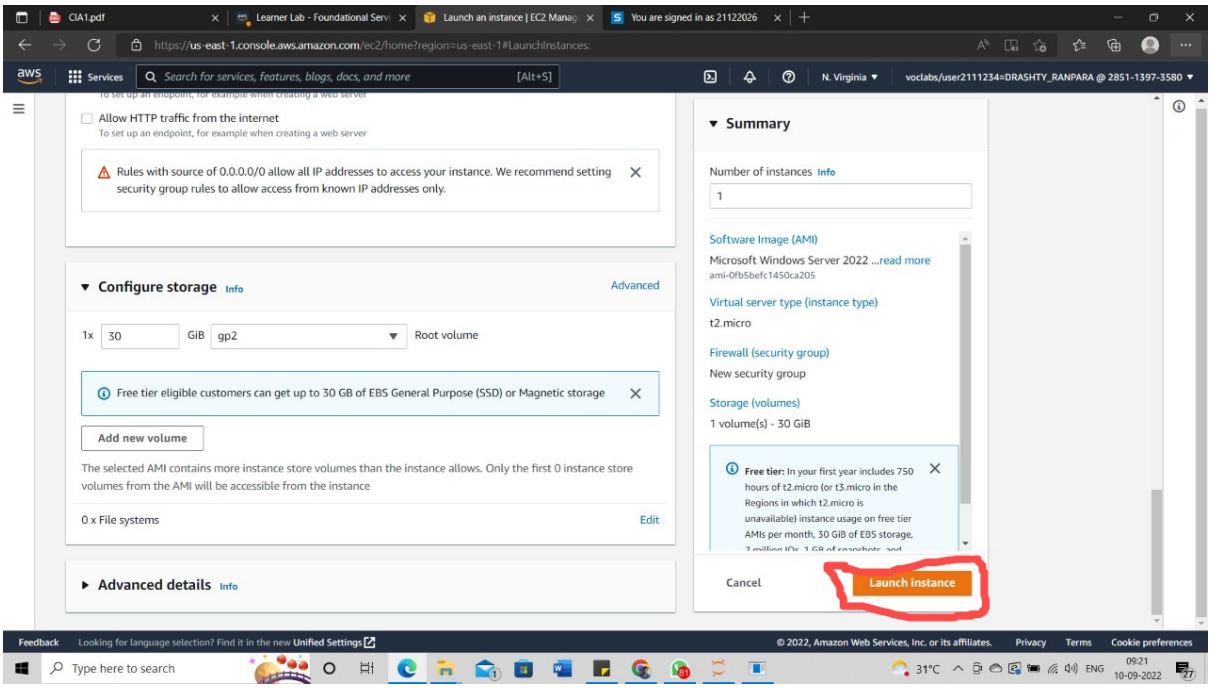
4. Select the necessary **instance type** and click on **Create new key pair.** From the dialogue box that appeared, give the Key pair name and under the Key pair type select **RSA** furthermore, under the Private key file format select **.ppk**(for Linux). Finally, click on **Create key pair** button.



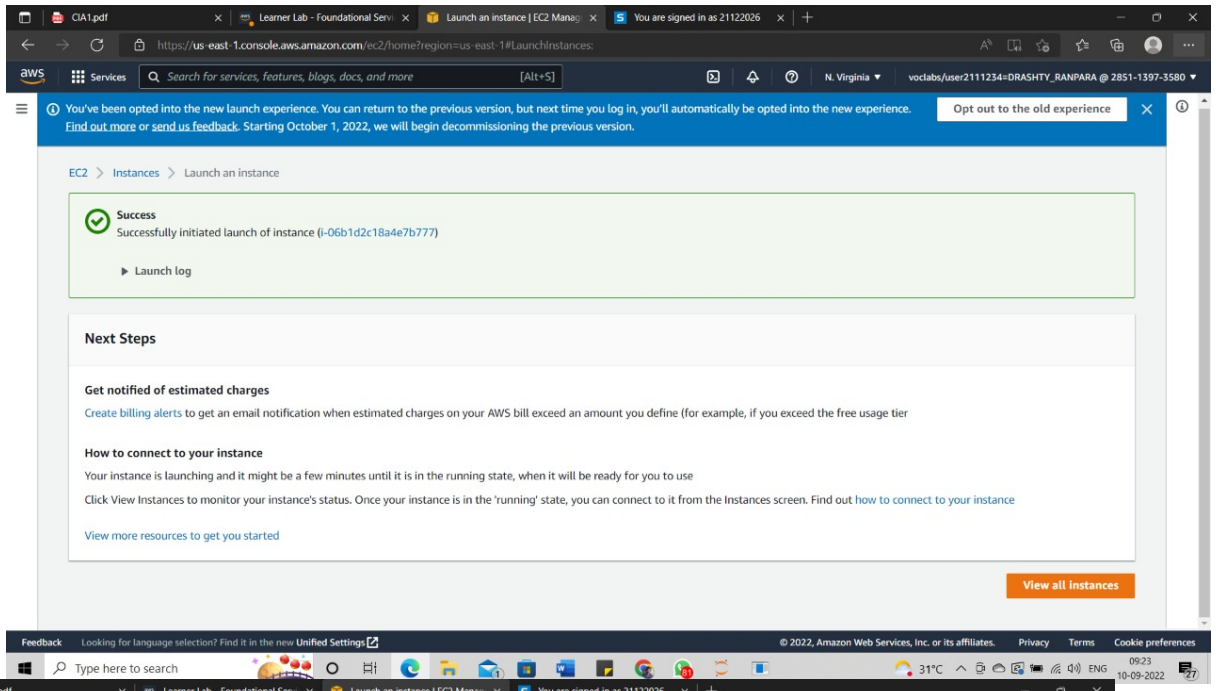
5. After creating key pair under Network Settings select the radio button and **Create security group**. If you already have an **existing security group** kindly go for that option. Next, select the checkbox **Allow RDP traffic from**.

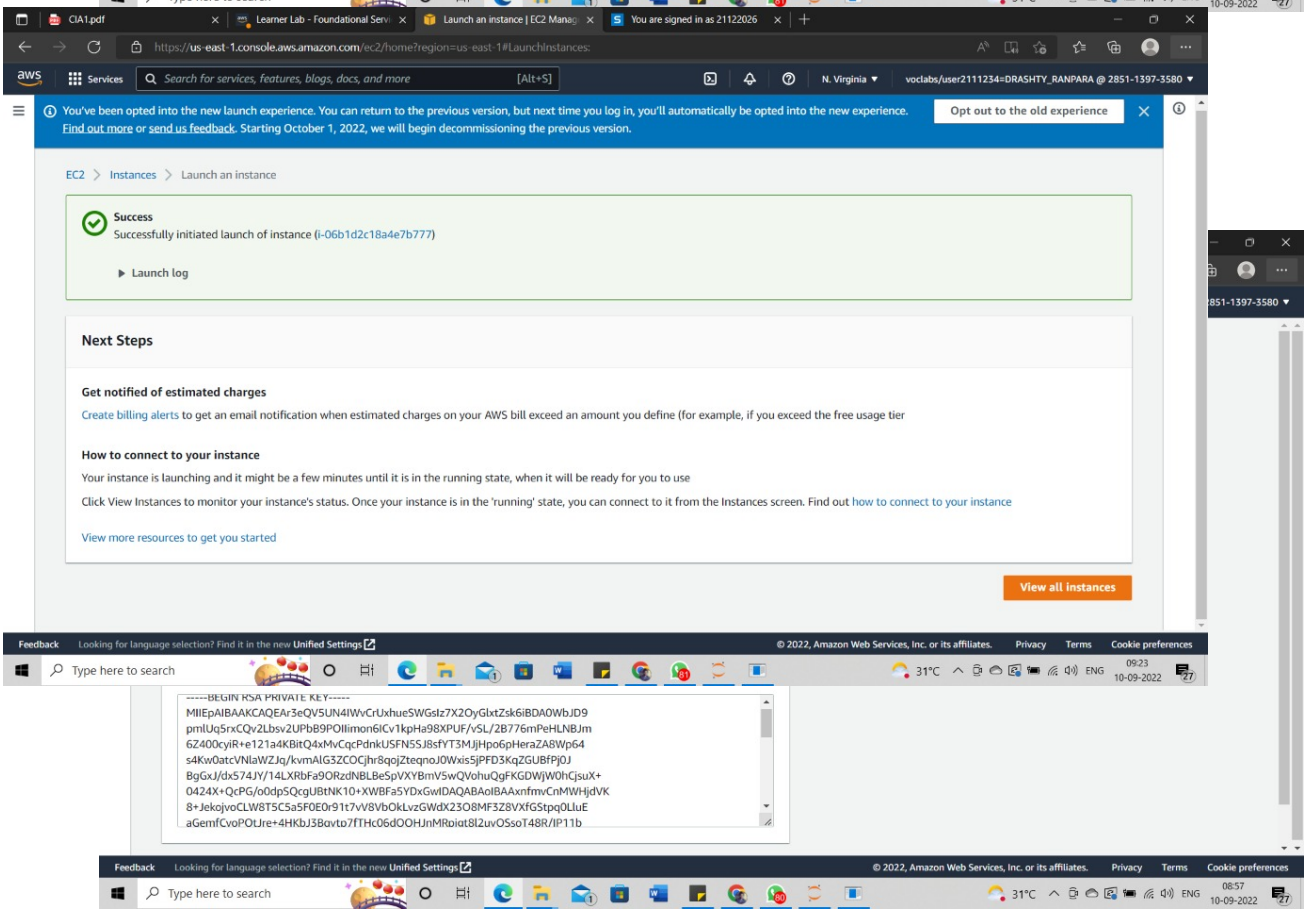


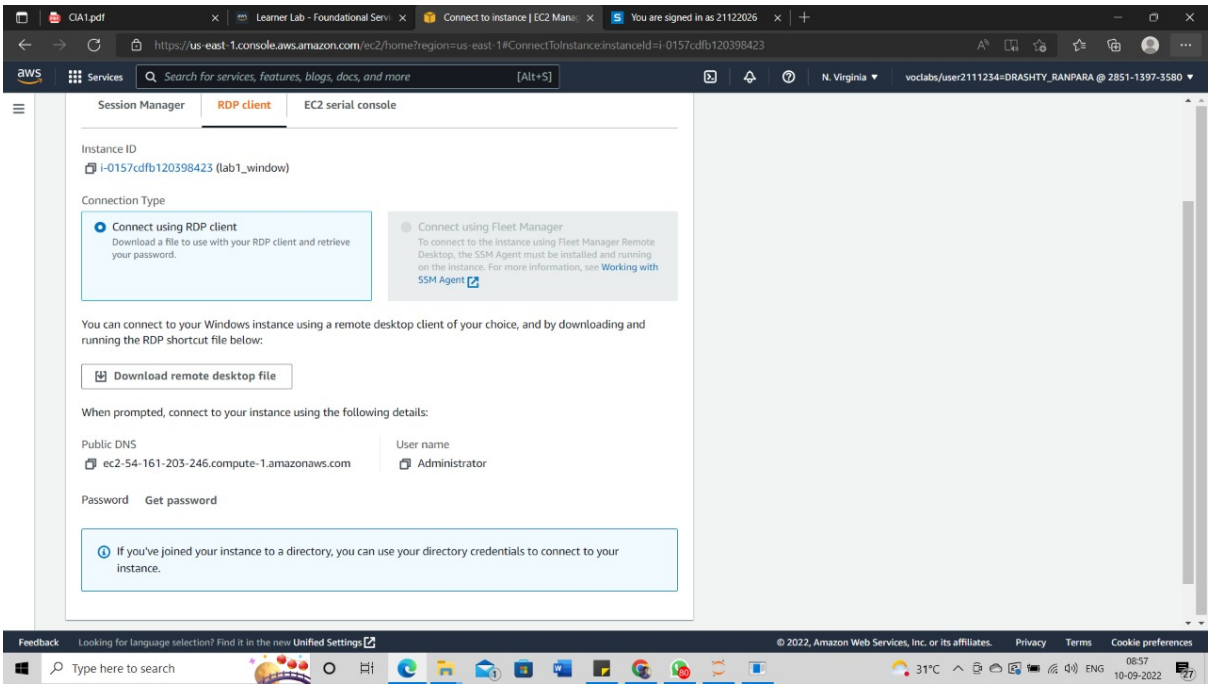
6. According to your requirements go for Configure storage. Here I opt for default storage which is already given. After that, click on the **Launch instance** button.



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

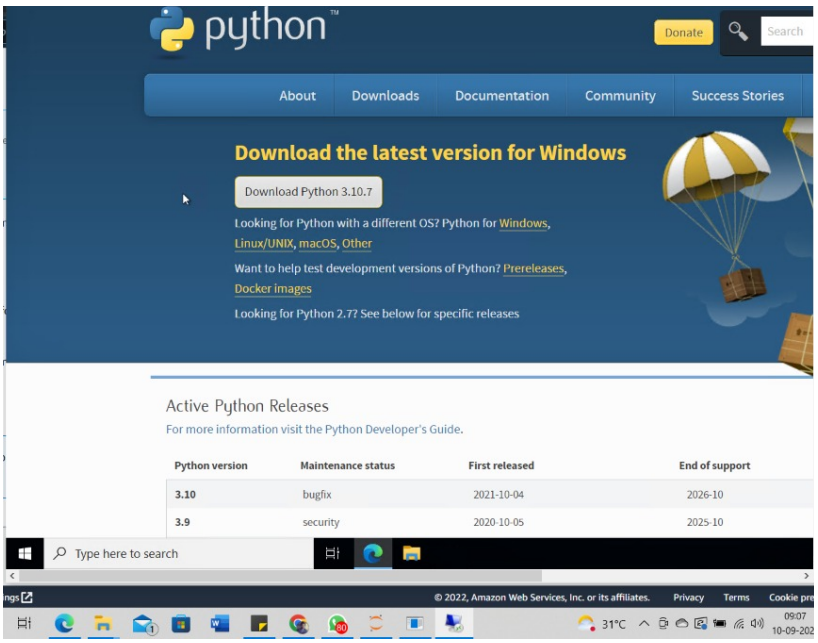

CIA1.pdf
Learner Lab - Foundational Servi
Launch an instance | EC2 Manag
You are signed in as 21122026
https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:
aws
Services
Search for services, features, blogs, docs, and more [Alt+S]
N. Virginia
voclabs/user2111234=DRASHTY_RANPARA @ 2851-1397-3580
You've been opted into the new launch experience. You can return to the previous version, but next time you log in, you'll automatically be opted into the new experience.
Find out more or send us feedback. Starting October 1, 2022, we will begin decommissioning the previous version.
Opt out to the old experience
EC2 > Instances > Launch an instance
Success
Successfully initiated launch of instance (i-06b1d2c18a4e7b777)
Launch log
Next Steps
Get notified of estimated charges
Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier
How to connect to your instance
Your instance is launching and it might be a few minutes until it is in the running state, when it will be ready for you to use
Click View Instances to monitor your instance's status. Once your instance is in the 'running' state, you can connect to it from the Instances screen. Find out how to connect to your instance
View more resources to get you started
View all instances
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
Type here to search
31°C
ENG
09:23
10-09-2022


CIA1.pdf
Learner Lab - Foundational Servi
Launch an instance | EC2 Manag
You are signed in as 21122026
https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:
aws
Services
Search for services, features, blogs, docs, and more [Alt+S]
N. Virginia
voclabs/user2111234=DRASHTY_RANPARA @ 2851-1397-3580
You've been opted into the new launch experience. You can return to the previous version, but next time you log in, you'll automatically be opted into the new experience.
Find out more or send us feedback. Starting October 1, 2022, we will begin decommissioning the previous version.
Opt out to the old experience
EC2 > Instances > Launch an instance
Success
Successfully initiated launch of instance (i-06b1d2c18a4e7b777)
Launch log
Next Steps
Get notified of estimated charges
Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier
How to connect to your instance
Your instance is launching and it might be a few minutes until it is in the running state, when it will be ready for you to use
Click View Instances to monitor your instance's status. Once your instance is in the 'running' state, you can connect to it from the Instances screen. Find out how to connect to your instance
View more resources to get you started
View all instances
Feedback
Looking for language selection? Find it in the new Unified Settings
© 2022, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
Type here to search
31°C
ENG
09:23
10-09-2022
-----BEGIN RSA PRIVATE KEY-----
MIIEpAIBAAKCAQEAr3eQV5UN4IWvCrUxhueSWGsIz7X2OyGlxtZsk6iBDA0WbJD9
pmlUq5rxCQv2Lbsv2UPbB9POIIimon6ICv1kpHa98XPUF/vSL/2B776mPeHLNBJm
6Z400cyiR+e121a4KBitQ4xMvCqcPdnkUSFN5SJ8sfYT3MJjHpo6pHeraZA8Wp64
s4Kw0atcVNlaWZJq/kvmAlG3ZCOCjhr8qojZteqnoJ0Wxis5jPFD3KqZGUBfPjOJ
BgGxJ/dx574JY/14LXRbFa9ORzdNBLBeSpVXYBmV5wQVohuQgFKGDWjW0hCjsuX+
0424X+QcPG/o0dpSQcgUBtNK10+XWBFa5YDxGwIDAQABAoIBAAxnfmvCnMWHjdVK
8+JekojvoCLW8T5C5a5F0E0r91t7vV8VbOkLvzGWdX23O8MF3Z8VXfGStpq0LluE
aGemfCvoPOtJre+4HKbJ3Bavtp7fTHc06dOOHJnMRpiat8l2uvOSsoT48R/IP11b

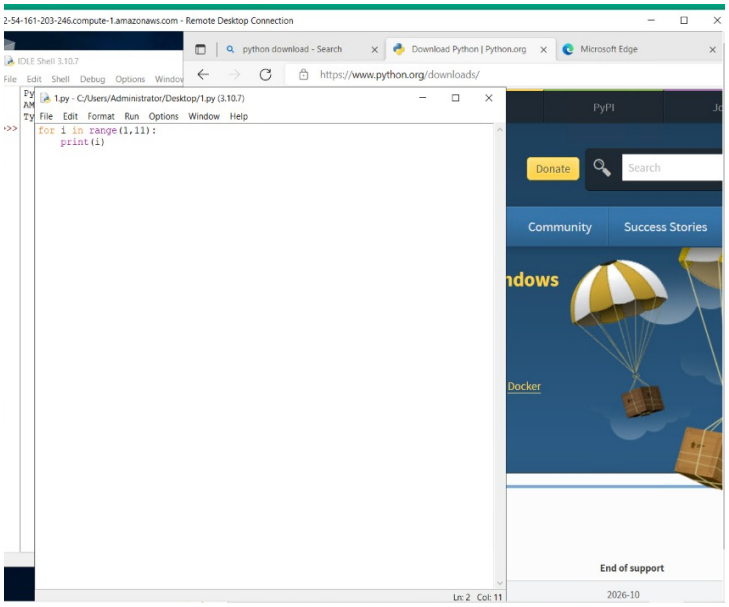


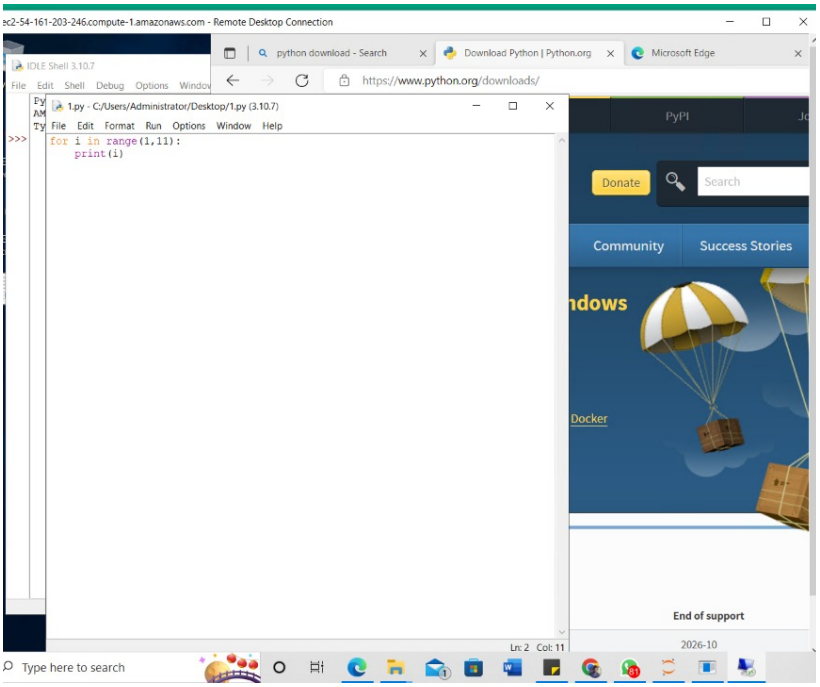
9. Meanwhile, open **RDP Client** from your system.

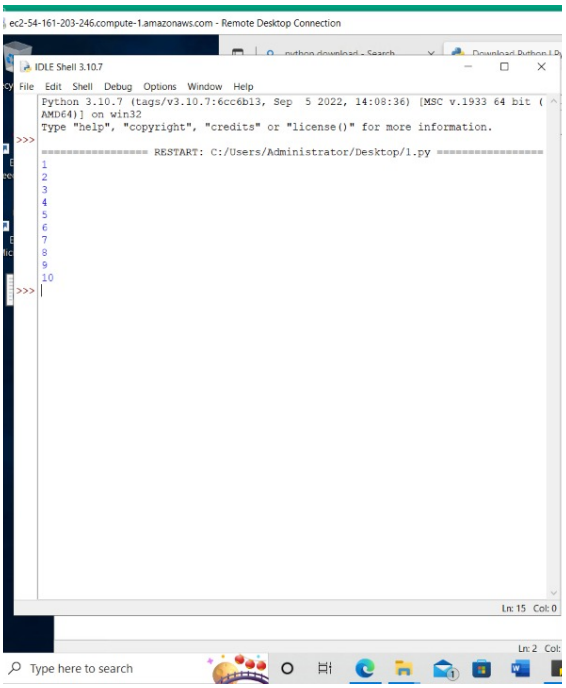
10. Enter your ID and Password from the browser in the dialogue box and click on connect.
11. Download python in RDP for testing.



12. There you go 🙂. Here I've run the basic python program to check the connection.




ec2-54-161-203-246.compute-1.amazonaws.com - Remote Desktop Connection
IDLE Shell 3.10.7
File Edit Shell Debug Options Window
python download - Search
Download Python | Python.org
Microsoft Edge
https://www.python.org/downloads/
1.py - C:/Users/Administrator/Desktop/1.py (3.10.7)
File Edit Format Run Options Window Help
for i in range(1,11):
print(i)
Ln: 2 Col: 11
PyPI
Donate
Search
Community
Success Stories
Docker
End of support
2026-10
Type here to search


ec2-54-161-203-246.compute-1.amazonaws.com - Remote Desktop Connection
IDLE Shell 3.10.7
File Edit Shell Debug Options Window Help
Python 3.10.7 (tags/v3.10.7:6cc6b13, Sep 5 2022, 14:08:36) [MSC v.1933 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Users/Administrator/Desktop/1.py ==========
1
2
3
4
5
6
7
8
9
10
>>>
Ln: 15 Col: 0
Type here to search