Tech Dev-Ops (B) 2.2

TASK - 3

Submitted by:

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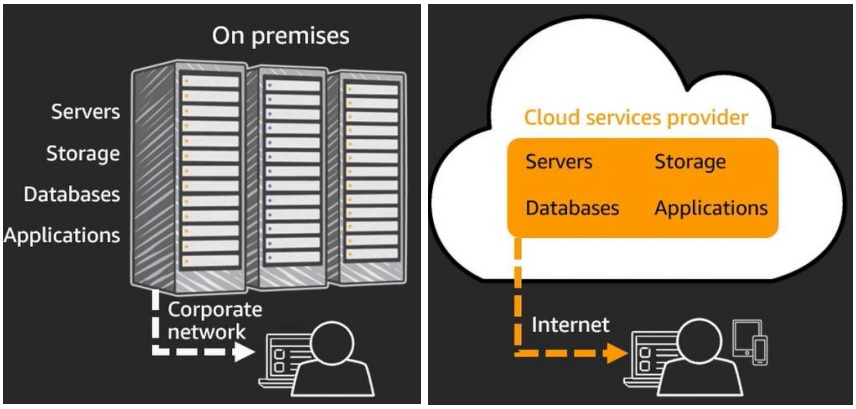
You all have to prepare a document on "Creation of ec2-instance", based on your understanding on the same.

CLOUD COMPUTING

Cloud computing enables you to stop thinking of your infrastructure as hardware and instead think of it (and use it) as software. Getting the resources from internet. It is nothing but cloud computing.



Features of cloud:

1. Scalability
2. Pay as you use – Postpaid payment

Cloud providers:

1. AWS
2. Azzure
3. Google cloud
4. IBM soft layer
5. Rackspace

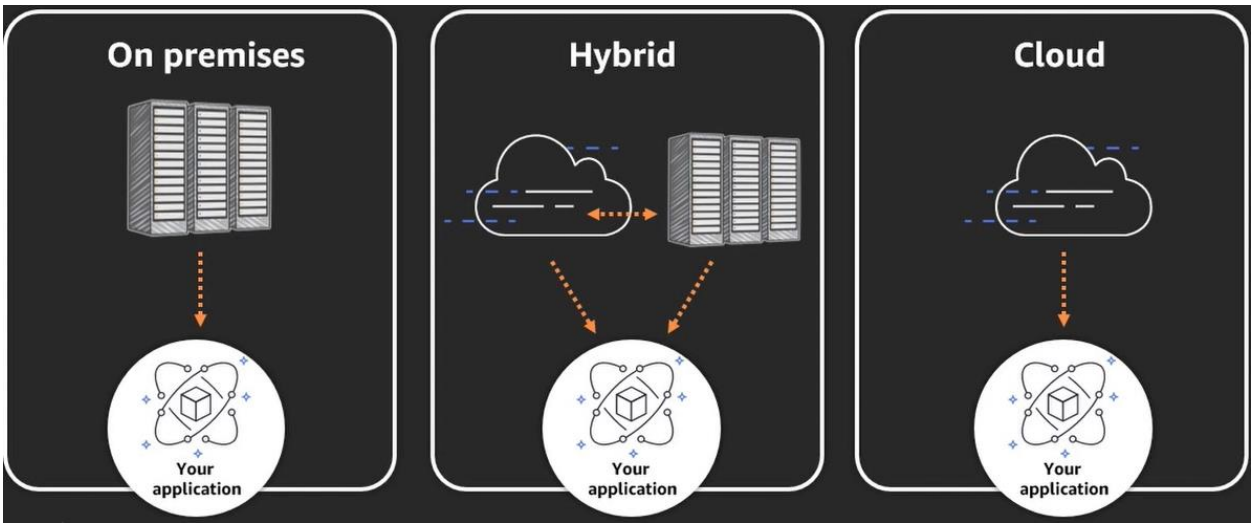
Cloud models:

1. Public cloud:
   Anybody can request a VM anybody can request service.
   Eg: AWS / AZZURE
2. Private cloud:
   On premise data center. ie., we have a lab inside the organization and they are maintaining their own lab but they want to have a private cloud. So that anybody can request a VM and get it, anybody can request a service and they can work on it. So for that they create private cloud. ie, the hardware, the network switches, the storage everything is inside the organization. Thus using the software they manages the lab. So internal to organization ie, only people from that organization can use it.
   Eg: Cisco quiker, openstack
3. Hybrid cloud:
   Which is the combination of both public and private cloud.
   Eg:
   Company use

AWS => for testing/development
On premise => for production

4. Community cloud:
   A community using a services of cloud.
   Eg:
   Setup for the college people/student for their lab practices. Anybody with access ID, Password can login to that cloud and can use it.

Cloud deployment models:



Cloud services:

1. IaaS – Infrastructure as a service
2. PaaS – platform as a service
3. SaaS – Software as a service

IaaS: They provide the virtual machines. They provide the IP address, the username and the password. And we can login to the machine and we can maintain the software, you can built it, we can create our own website in the VM. So that is IaaS.
Like, AWS ec2 => They provides VMs. So, we can login to the VMs, we can develop the software over there and then we can run a website inside the virtual machine.
Note: Based on the cloud provider, or based on the end client this definitions may change.

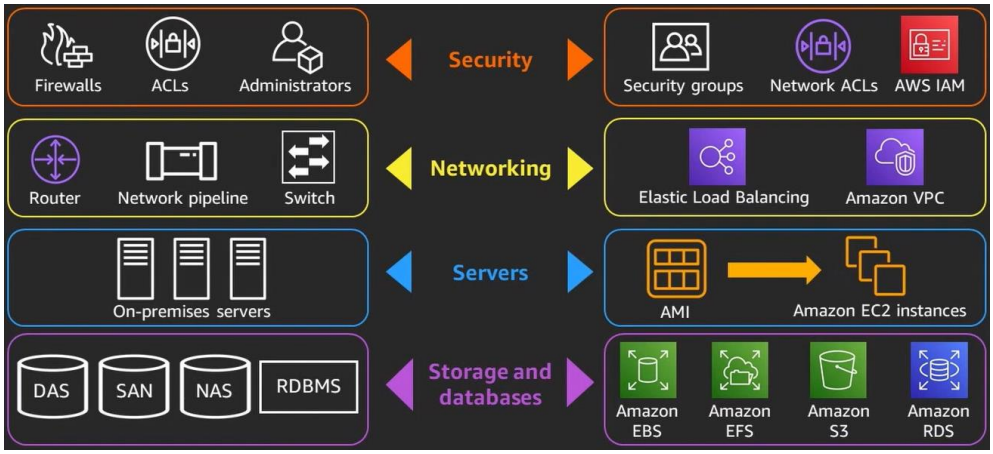
Advantages:

AWS CLOUD

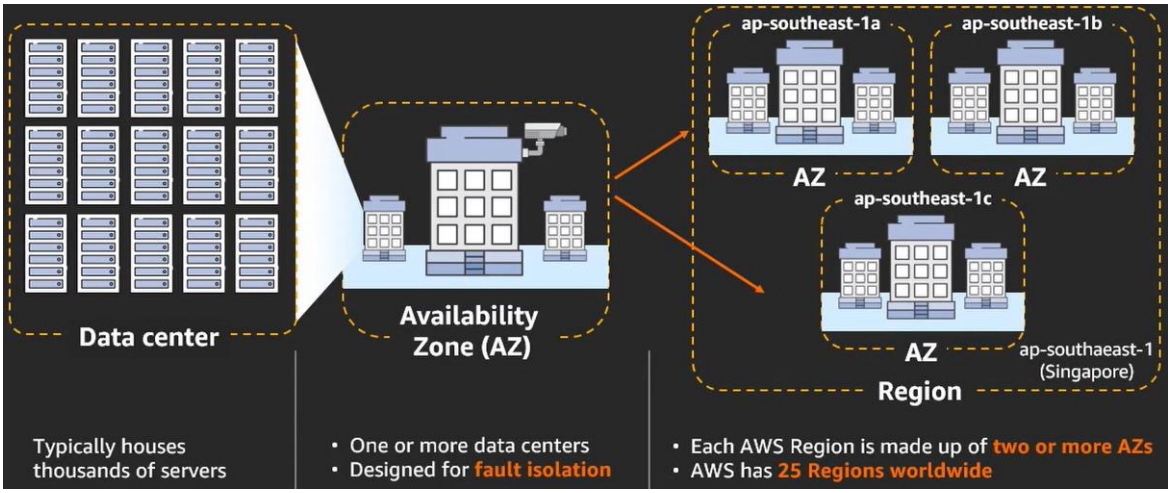
Essentially, it is a set of programmable resources. The use of IT assets as programmatic resources allows you to quickly tear down and setup infrastructure in the way that just isn't possible with a traditional approach.

The AWS cloud gives you access to many higher-level services and features, which lets you design and build applications in a completely new way. You can increase database throughput, or may be compute power, one of the biggest benefits of cloud computing is the ability to pay-as-you-go, letting you test and leverage the system without being fully committed. You can stop using these services at any time and change tactics to fit your needs.

AWS core infrastructure and services:



AWS global infrastructure:



AWS edge infrastructure:

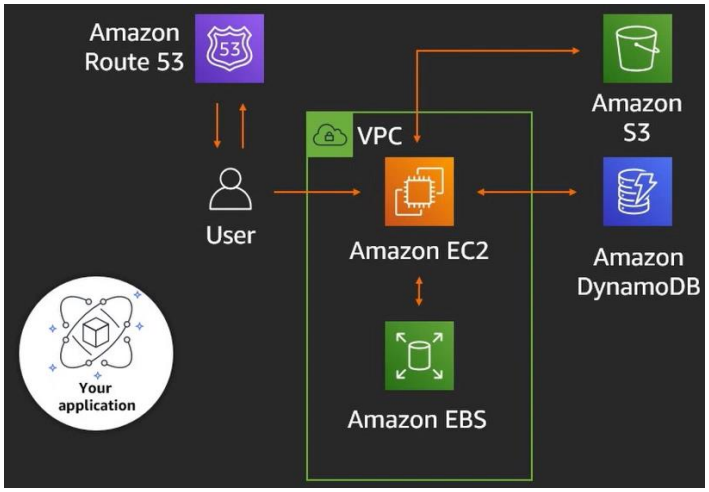
	AWS Outposts	AWS Local Zones	AWS Wavelength
Overview	AWS infrastructure and services on premises	AWS infrastructure and services in large metro centers	AWS infrastructure and services in CSP 5G networks
Use cases	Migration, local critical applications, data residency	Migration, low latency, local data processing	Ultra-low latency, local data processing
Service model	Expandable capacity in customer's data center, colocation, on-premises location	Scalable capacity in AWS-managed & operated facility	Scalable capacity in CSP data center managed and supported by AWS

Key service areas:

- Compute
- Storage
- Databases
- Networking
- Security

Example:

Let's say you have a web application which sits on a server that is accessed via the internet. The web application also need access to some external data sources.



As you can see from above architecture diagram, we have different services connected together to create an environment. In the middle we have EC2, which being a virtual server hosts the actual web application.

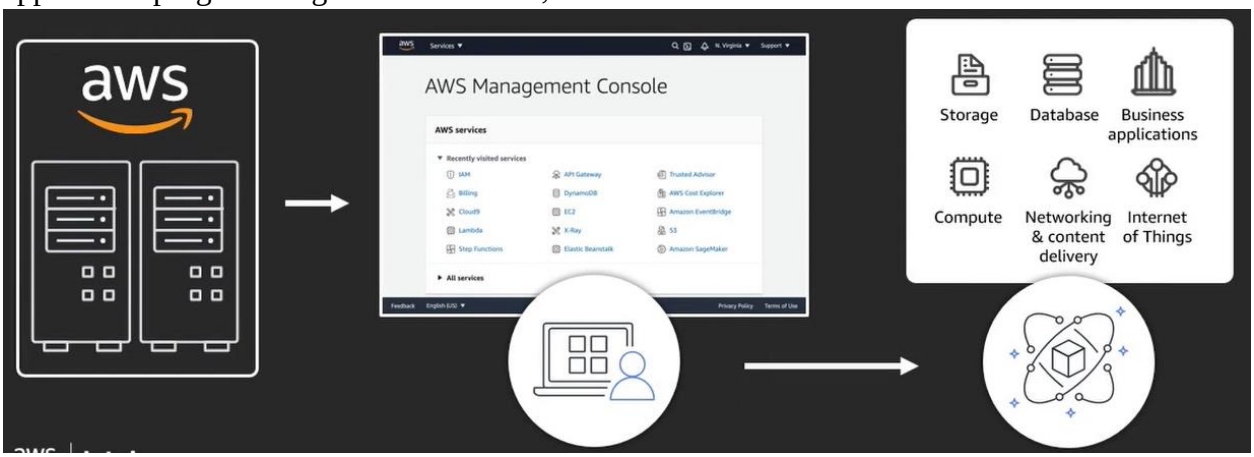
The application is stored onto an EBS volume, which provides block storage to the EC2 instance. The EC2 instance is deployed into a VPC, which provides networking access. As for as data sources go, the EC2 instance can access data in S3, which is object storage or Dynamo DB,

Which is non-relational database. External users can access this web application via route 53, which provides DNS resolution.

Note: you can see how by connecting different services together, you can come up with a huge variety of different solutions depending on what your requirements are.

How does it work?

AWS cloud is a set of programmable resources. There are ways to connect into AWS that allow direct connection between your environment and your AWS environment, enabling secure communications that bypass the internet. AWS achieves this by deploying robust physical resources around the globe. These resources are housed in data center, hat are physically connected by AWS owned network hardware. You then access the services you need via the services application programming interface or API, which allows different methods of interaction.



Three ways to interact with AWS:

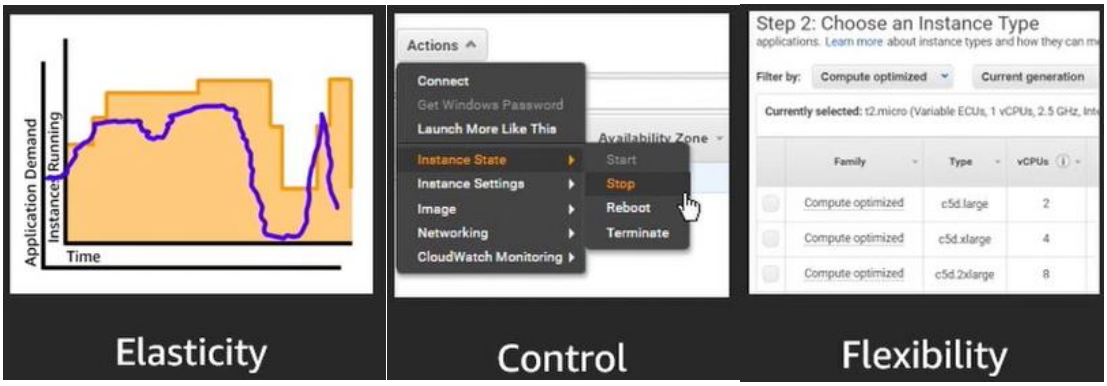
Basic services of AWS

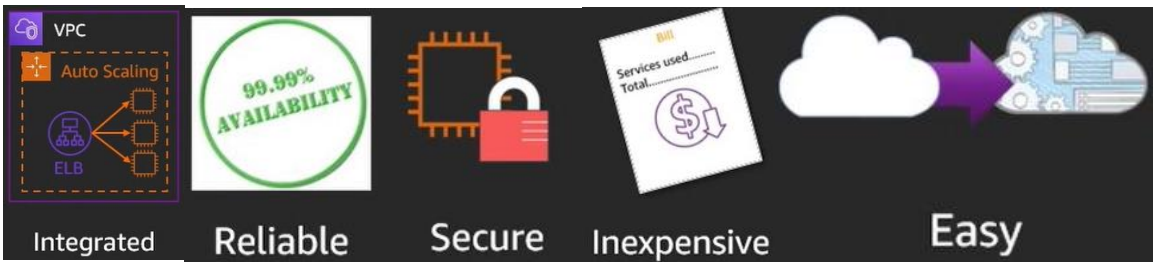
Compute:
EC2
Lambda etc
So, these are the services from amazon wherein we can request the virtual machines, they are called instances, using the amazon website (aws.amazon.com).
[*How to create an AWS account:* https://github.com/Neema345/Dev-Ops_Internship_Tasks.git]
Once it is done. Then we can create VMs.

EC2:

EC2 is a virtual server which allows you to deploy or migrate workloads directly from your on premises infrastructure into cloud.
AWS support Linux, Windows and MacOS in select regions.
It is an extremely flexible service that gives you complete control over your servers.
"EC2 is a virtual server", what this means is that, when you deploy an instance of EC2, you can deploy only the size you need and change it when you need it.
The key feature of EC2 is known as the Amazon machine image or AMI. This allows us to select the operating system of choice and even have customer applications pre-installed to speed up deployment time. Once the EC2 instance is deploys you can then run your application or workloads on them in a similar way to your existing environment.
Using EC2, we have the ability to add, remove, pause, resume, change, scale or manipulate your instances as you will.

Benefits of Amazon EC2:





Amazon EC2 instance families and its usecases:

Instance family	Use cases
General purpose *e.g., A1, T3, T3a, T2, M6g, M5*	• Low-traffic websites and web applications • Small databases and midsize databases
Compute optimized *e.g., C5, C5n, C4*	• High-performance web servers • Video encoding
Memory optimized *e.g., R5, R5n, X1e, X1, z1d*	• High-performance databases • Distributed memory caches
Storage optimized *e.g., I3, I3en, D2, H1*	• Data warehousing • Log or data processing applications
Accelerated computing *e.g., P3, P2, Inf1, G4, G3, F1*	• 3D visualizations • Machine learning

Choosing the correct type is very important for efficient use of your instances and cost reduction.

Amazon EC2 pricing:

On demand instances can be considered the list price. With on demand you have the greatest flexibility and control over when and how you configure and deploy your instances.
This is great for immediate scalability, workload changes, temporary workload or workloads that cannot be interrupted but only run for a short amount of time.

Reserved instance give a significant price reduction for workloads that run permanently.

Saving plans are similar concept, you can commit to a certain amount of capacity that you are going to utilize overtime.

Spot instances, which gives you up to 90% on the on demand price with one caveat. Spot instances are not guaranteed to permanently run.

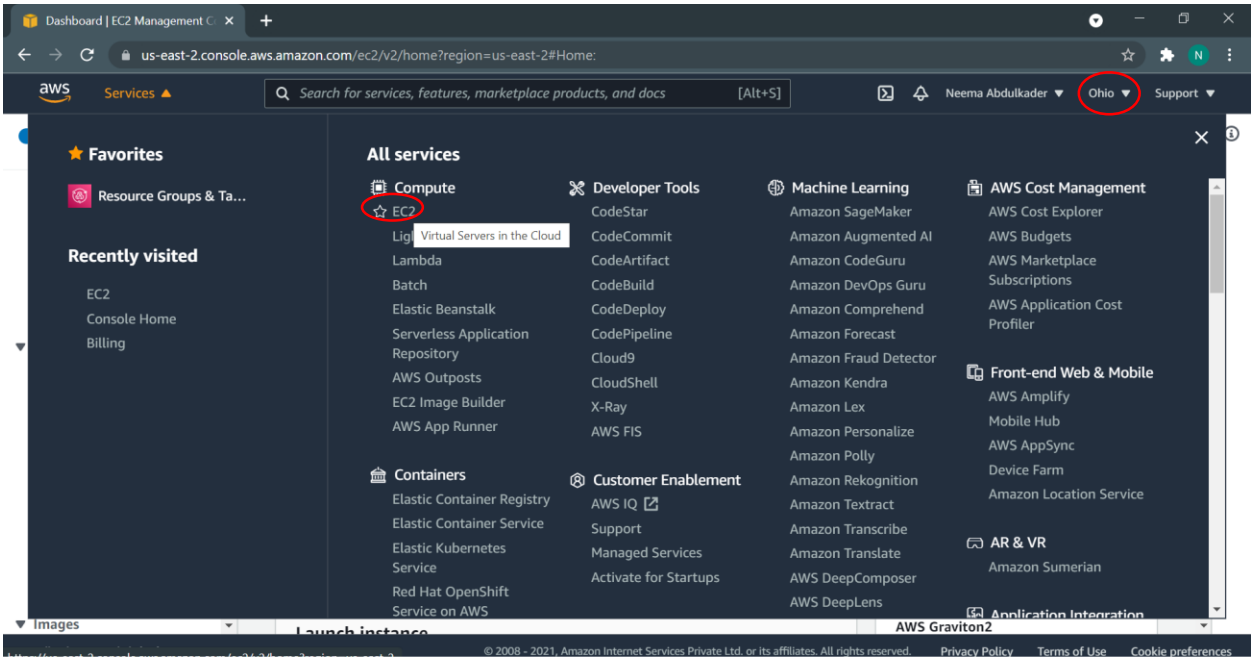
*Per second billing => Amazon Linux and Ubuntu only

**Per hour billing => all other OS

How to create EC2 instance from windows:

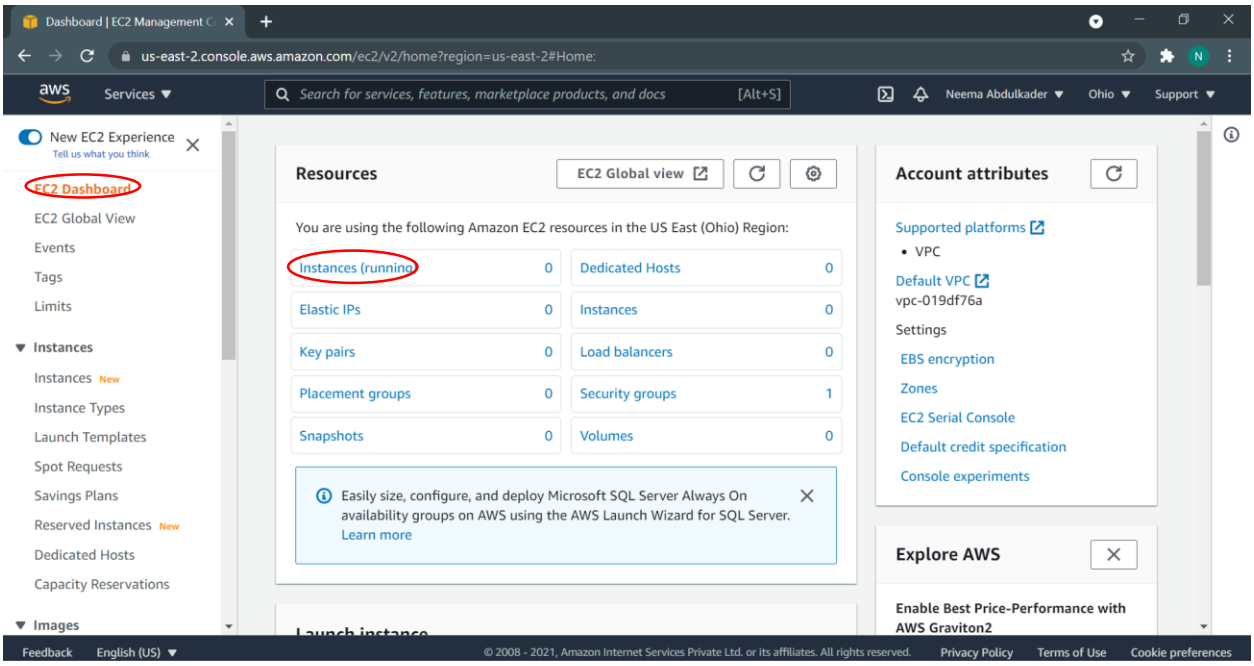
Step by step procedure:

Step 1:
In aws.amazon.com → Sign in to the console.
Step 2:
Click services
Step 3:
After login you have to select the region.
Then select EC2



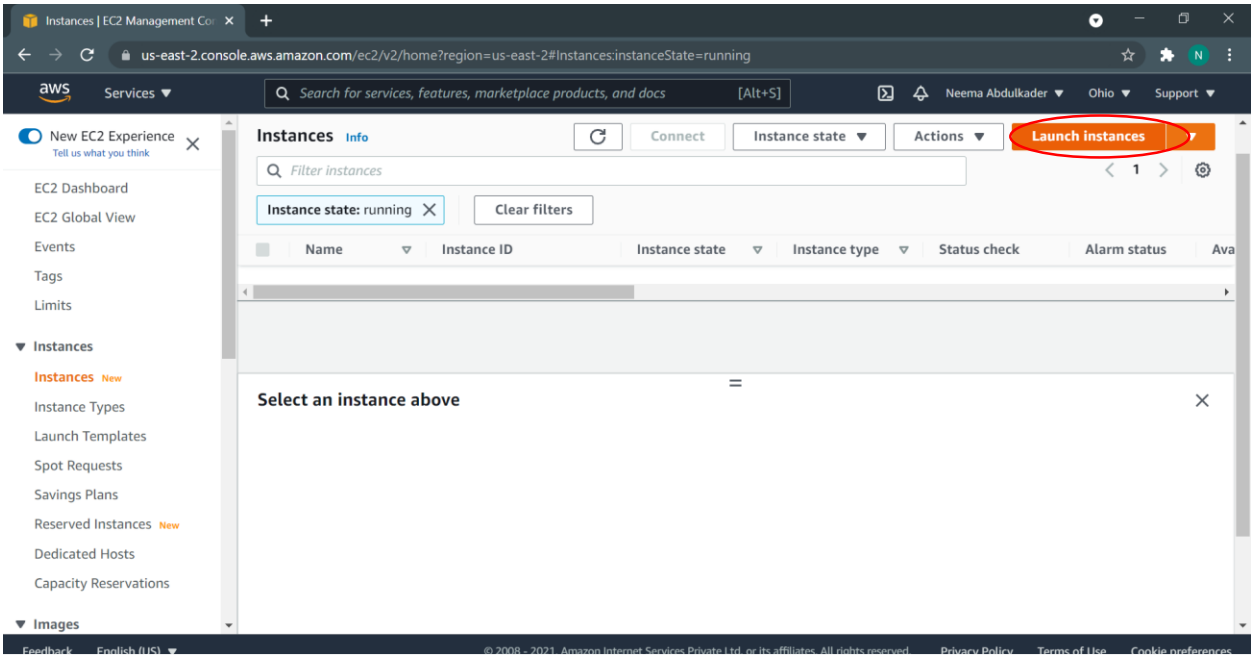
Step 4:

1. Select EC2 dashboard
2. Click inst0ances (running)

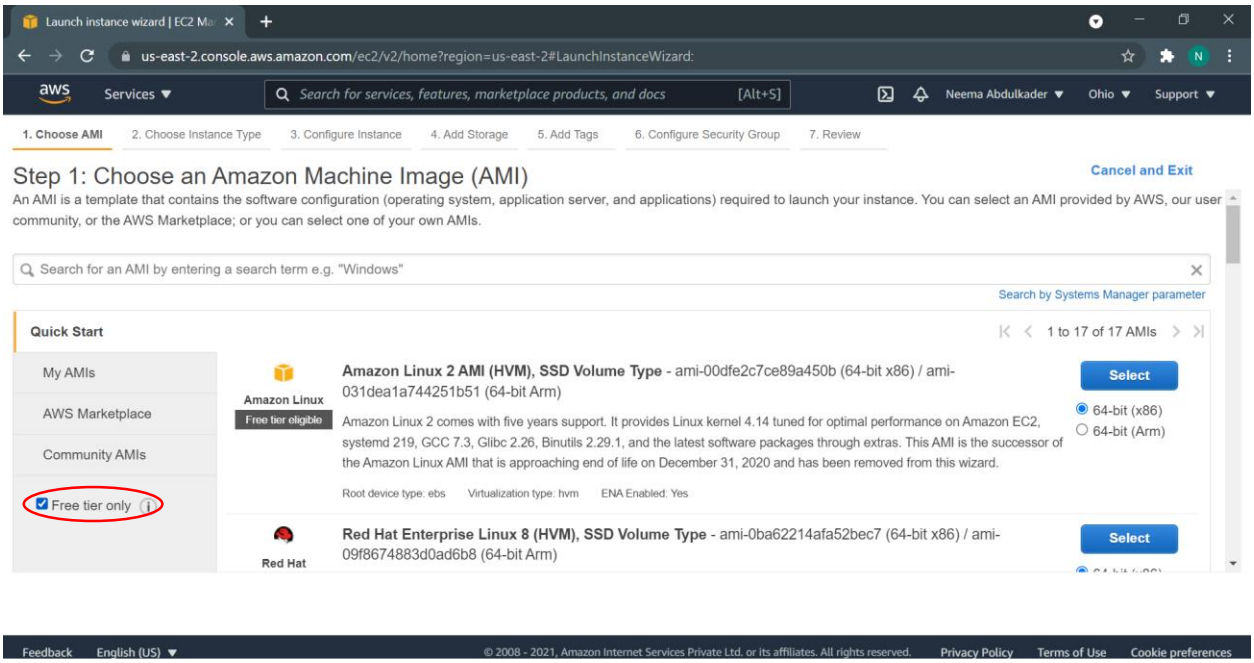


Step 5:

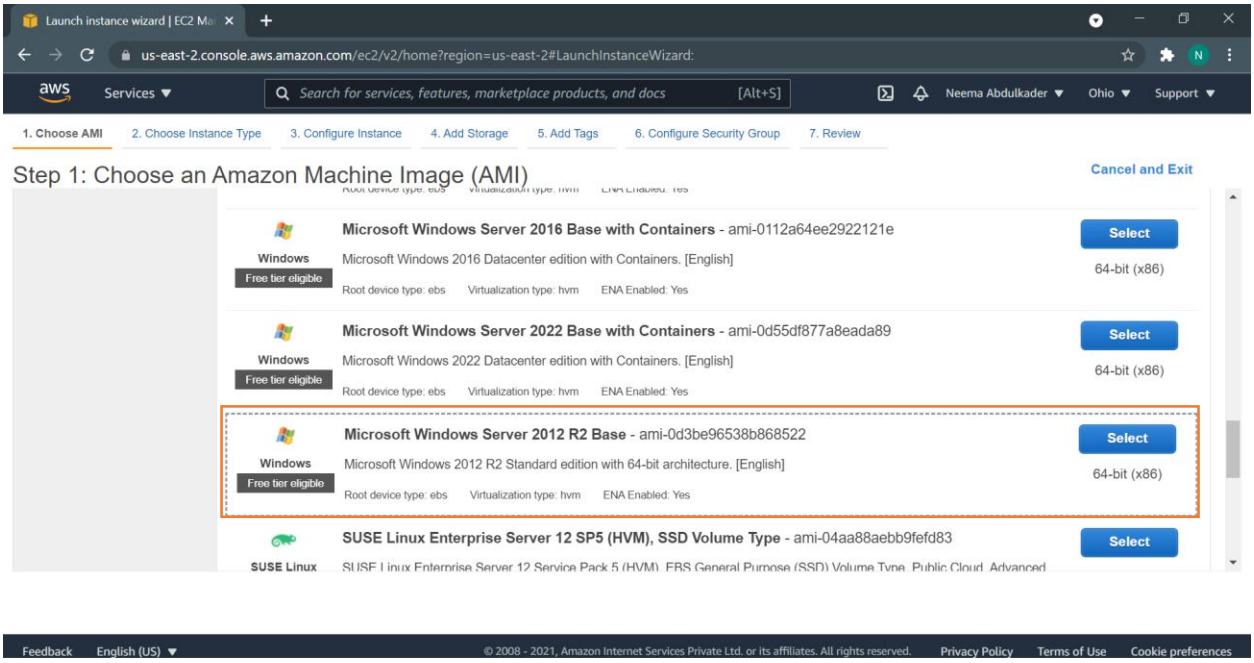
Select launch instances.



Step 6:
Select free tier option

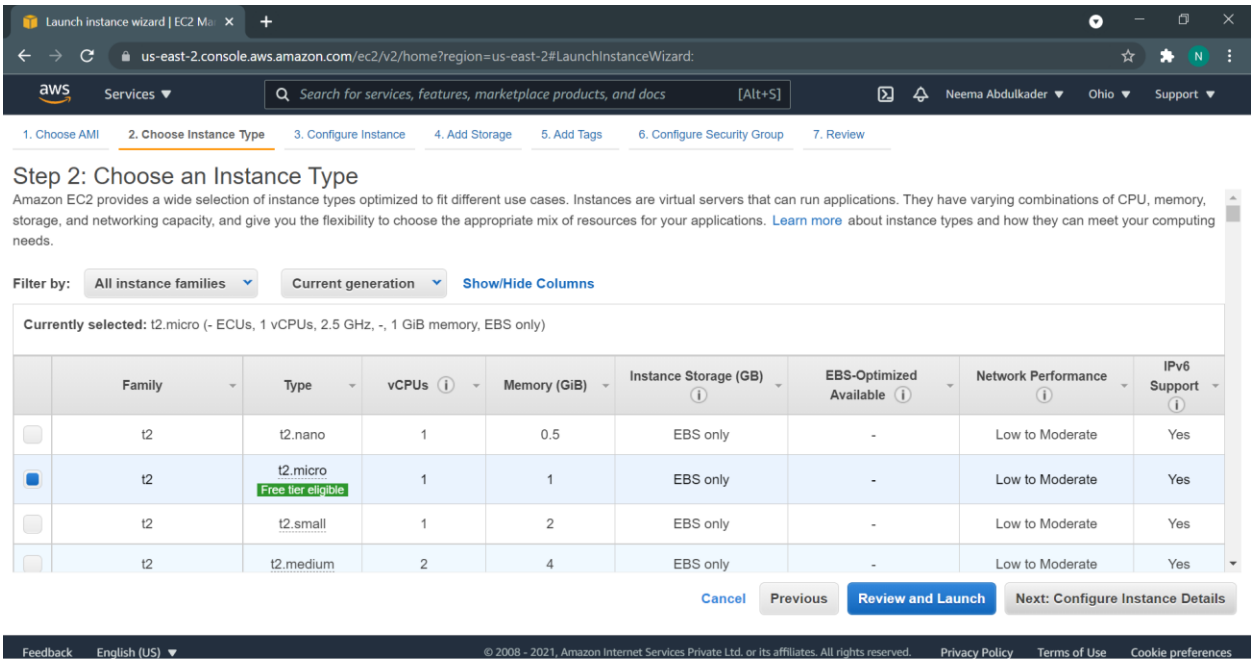


Step 7:
Choose Microsoft Windows Server 2012 R2 Base



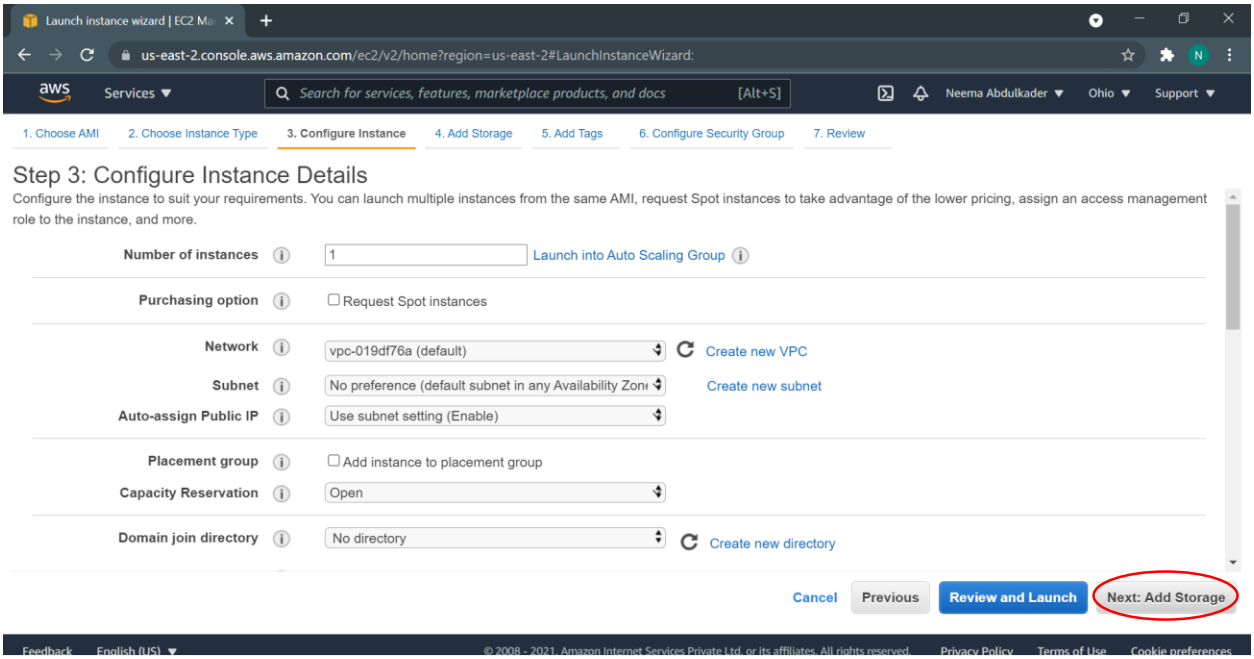
Step 8:

1. Select free tier eligible
2. Next: Configure Instance Details

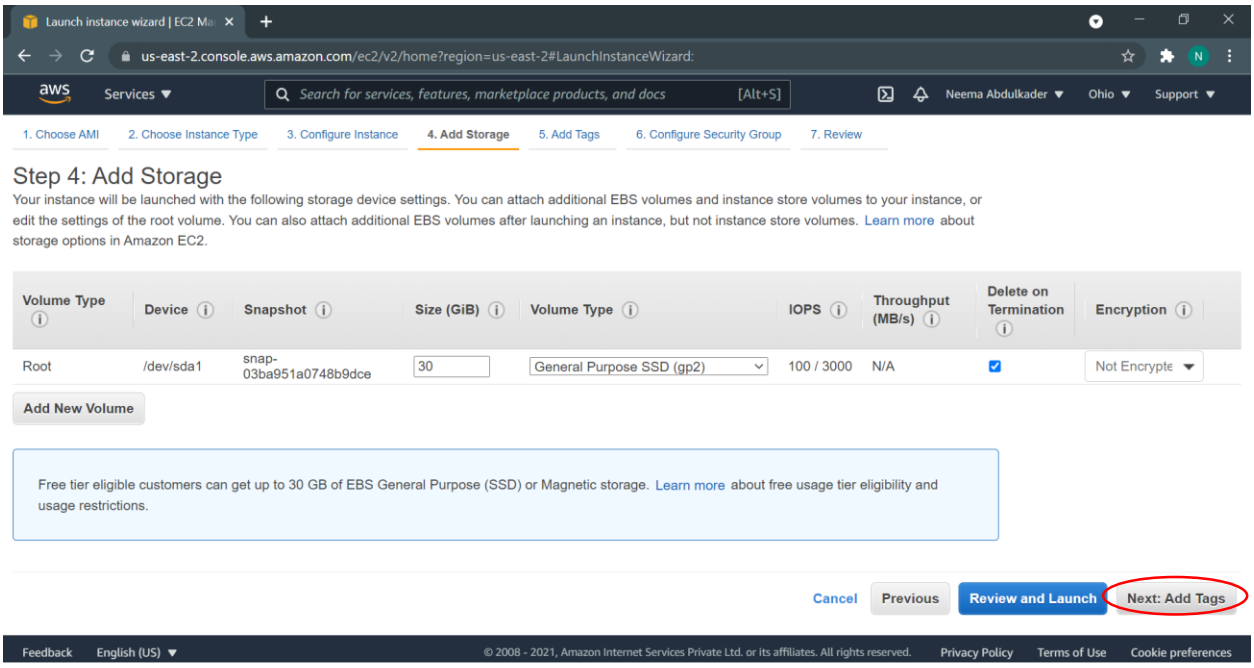


Step 9:

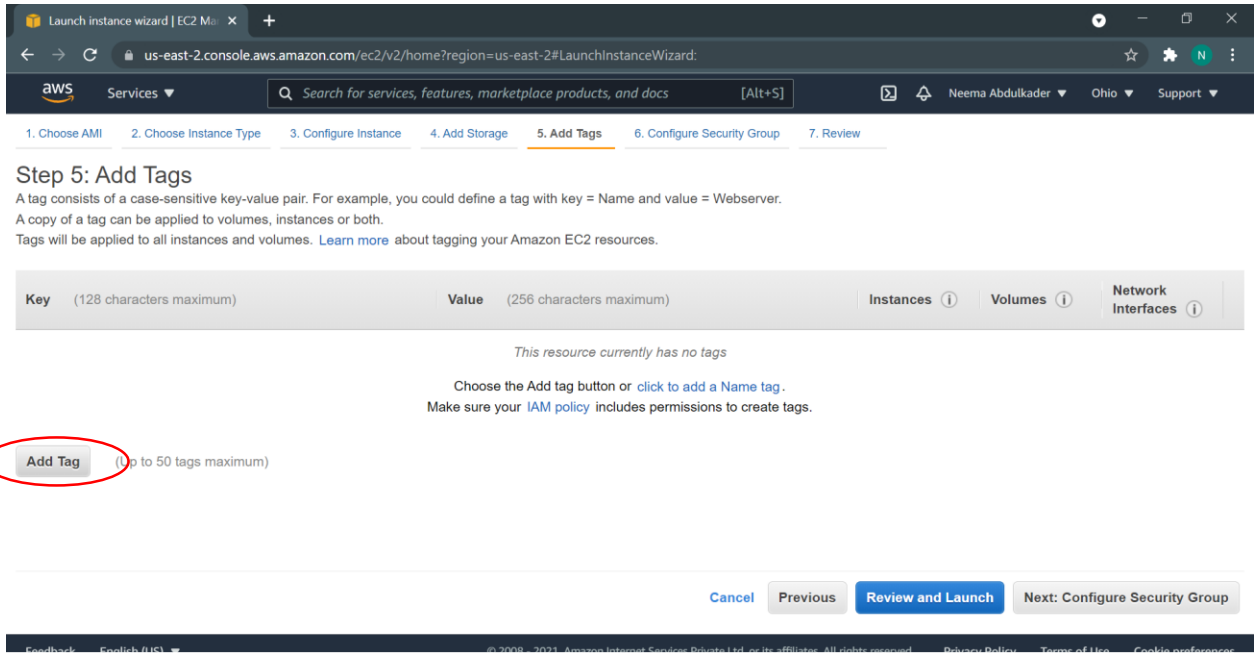
1. Give the details
2. Next: Add Storage



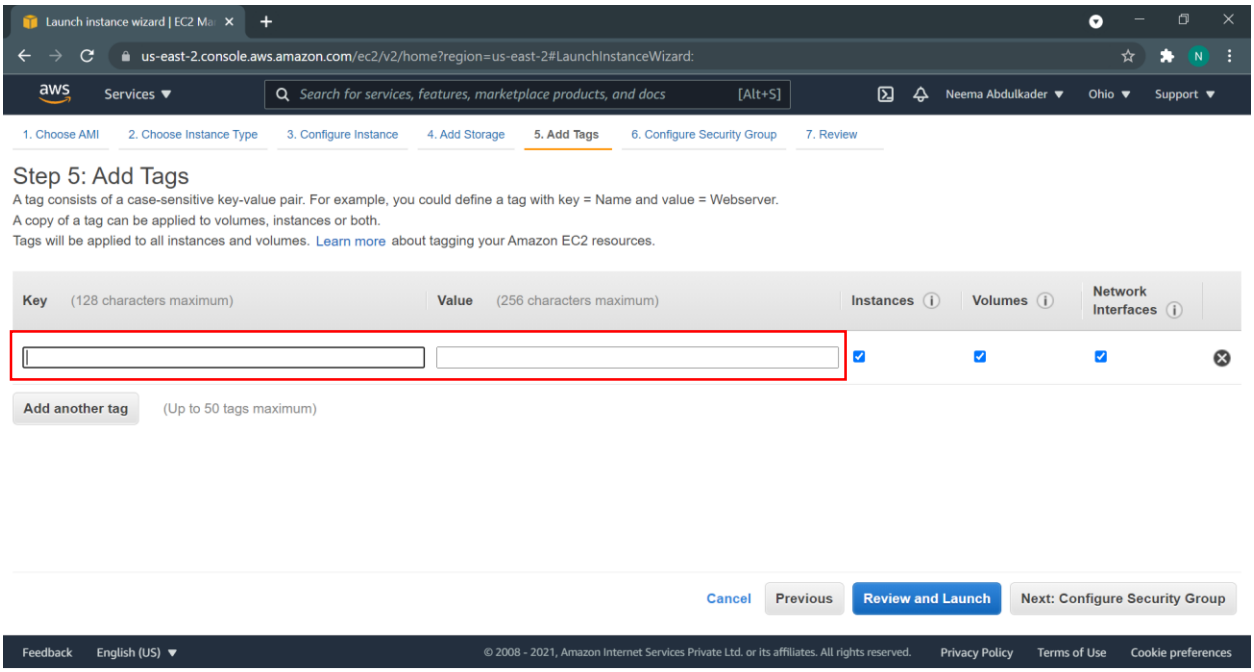
Step 10:
Next: Add Tags



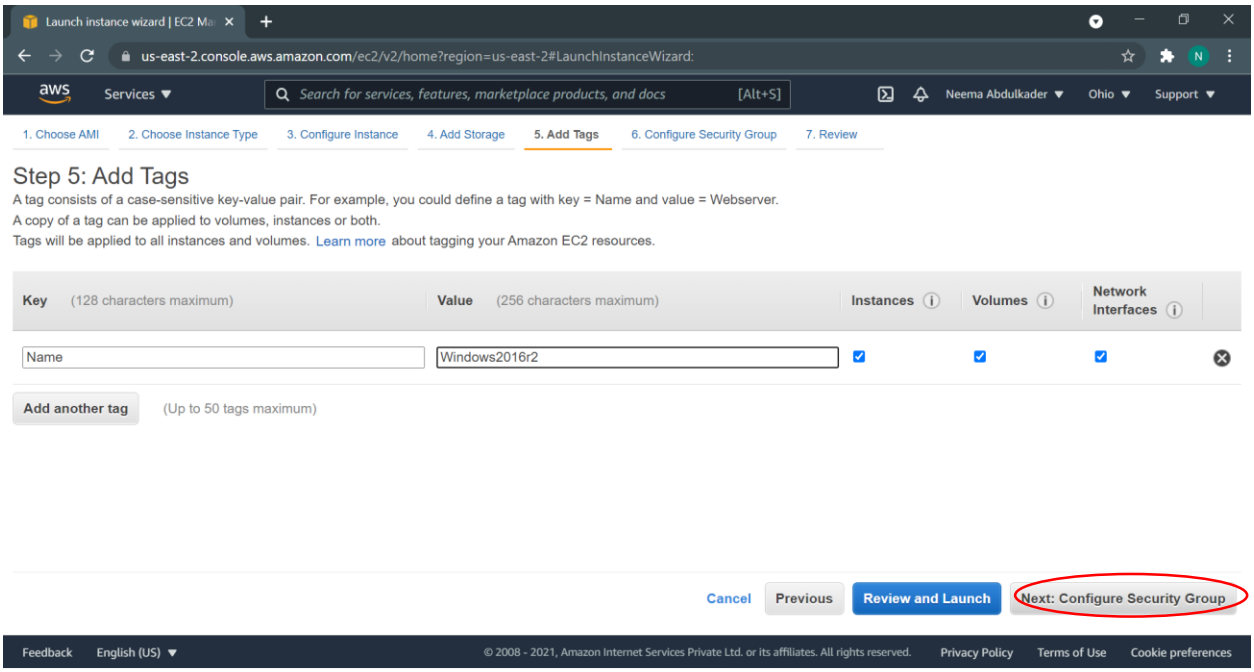
Step 11:
Add tag



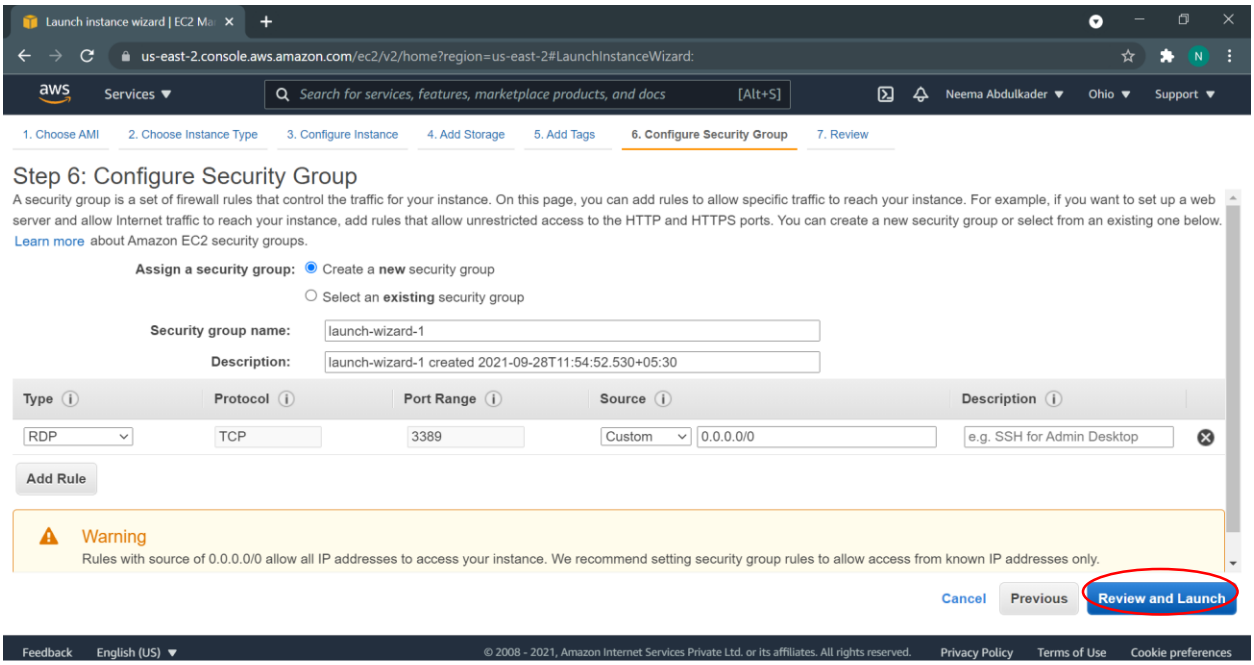
Step 12:



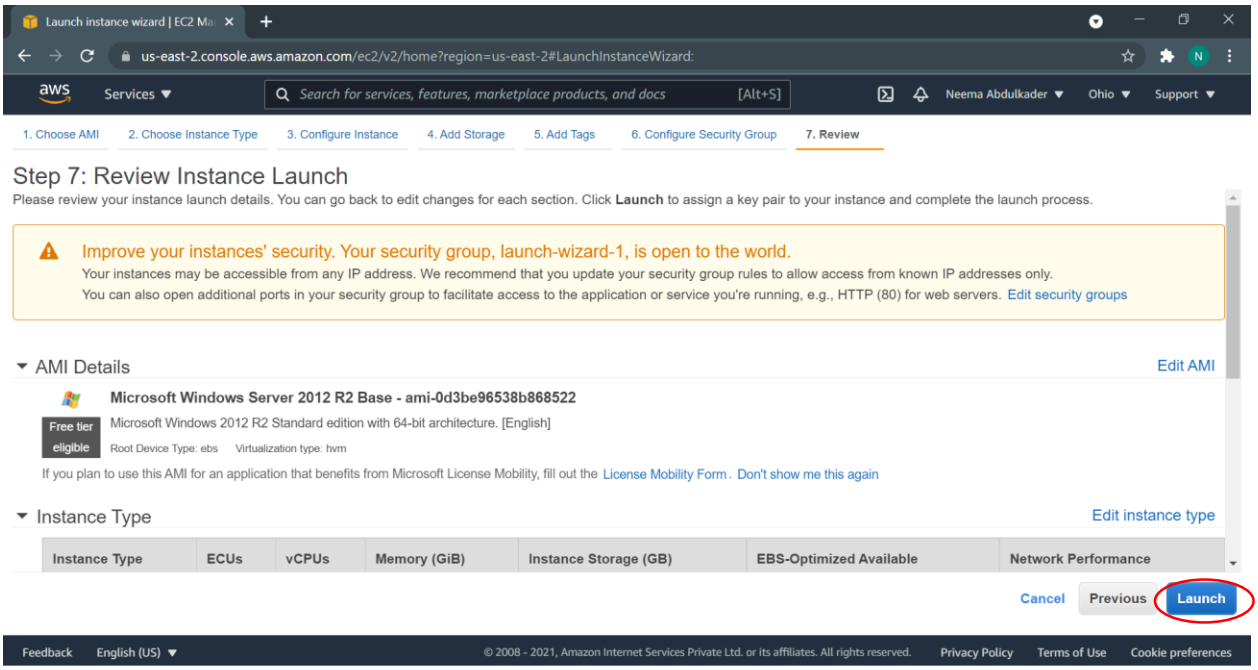
1. Add – Name
2. Next: configure security group



Step 13:
Click review and launch

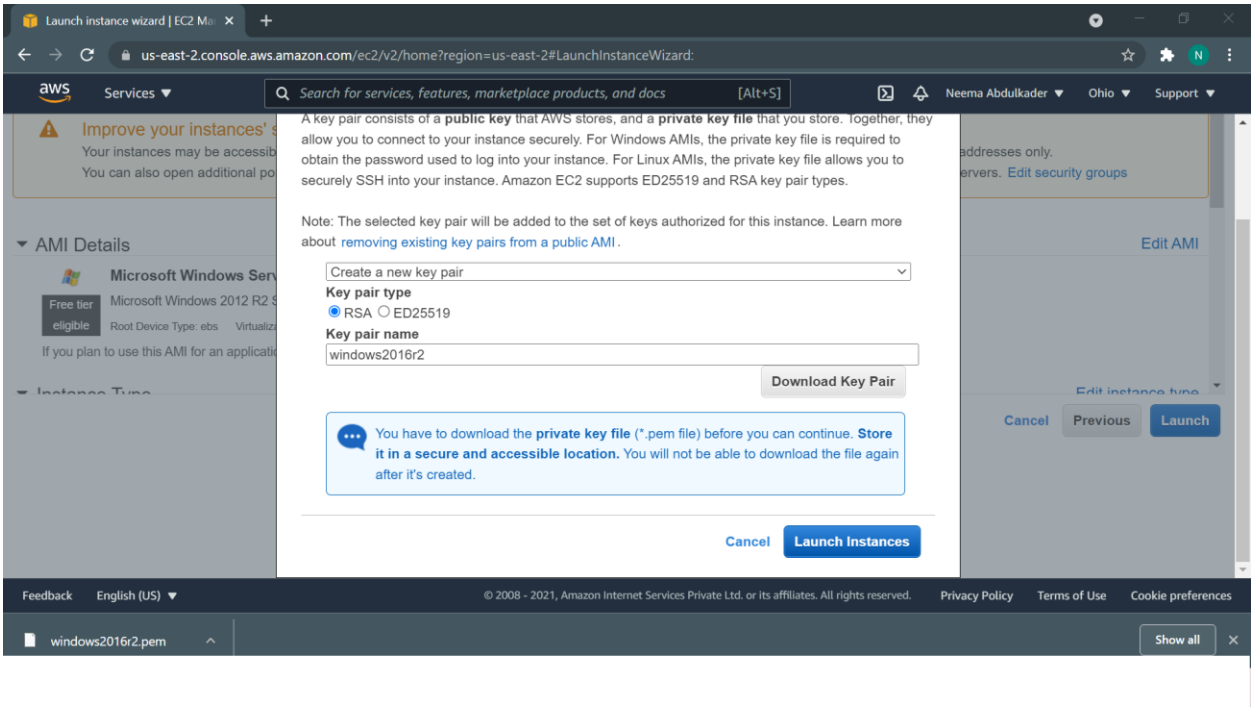


Step 14:
Review it and then launch

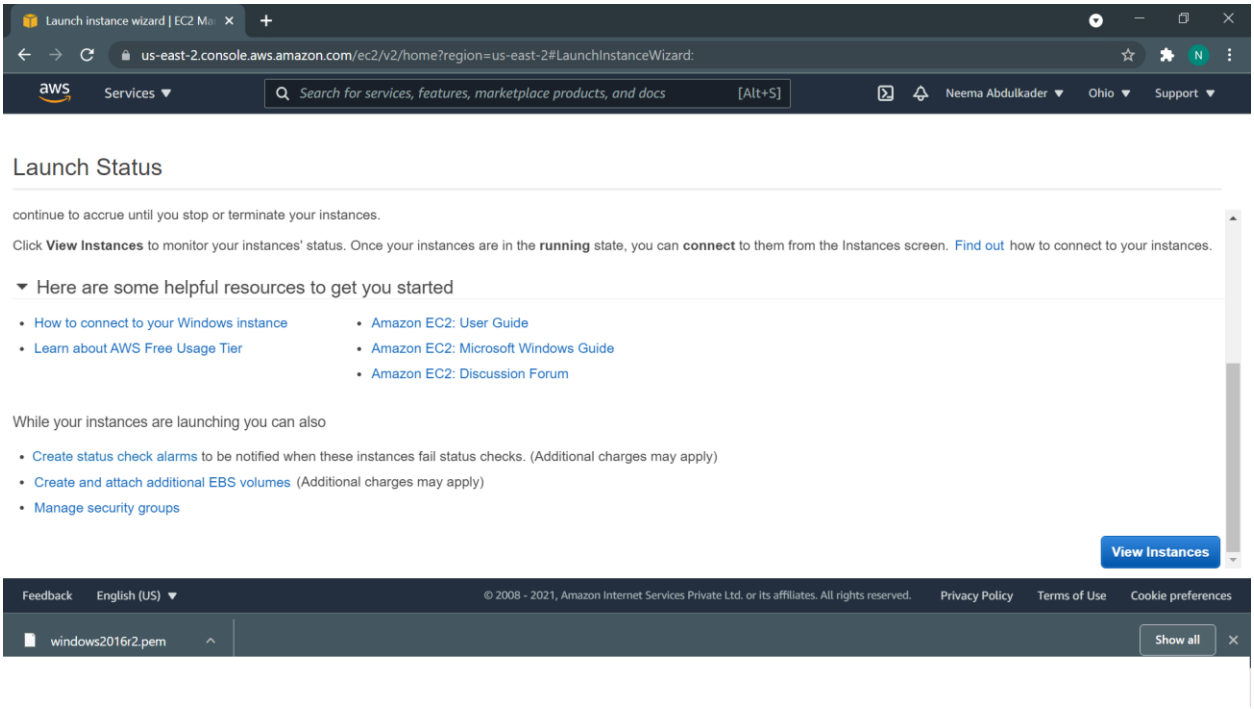


Step 15:

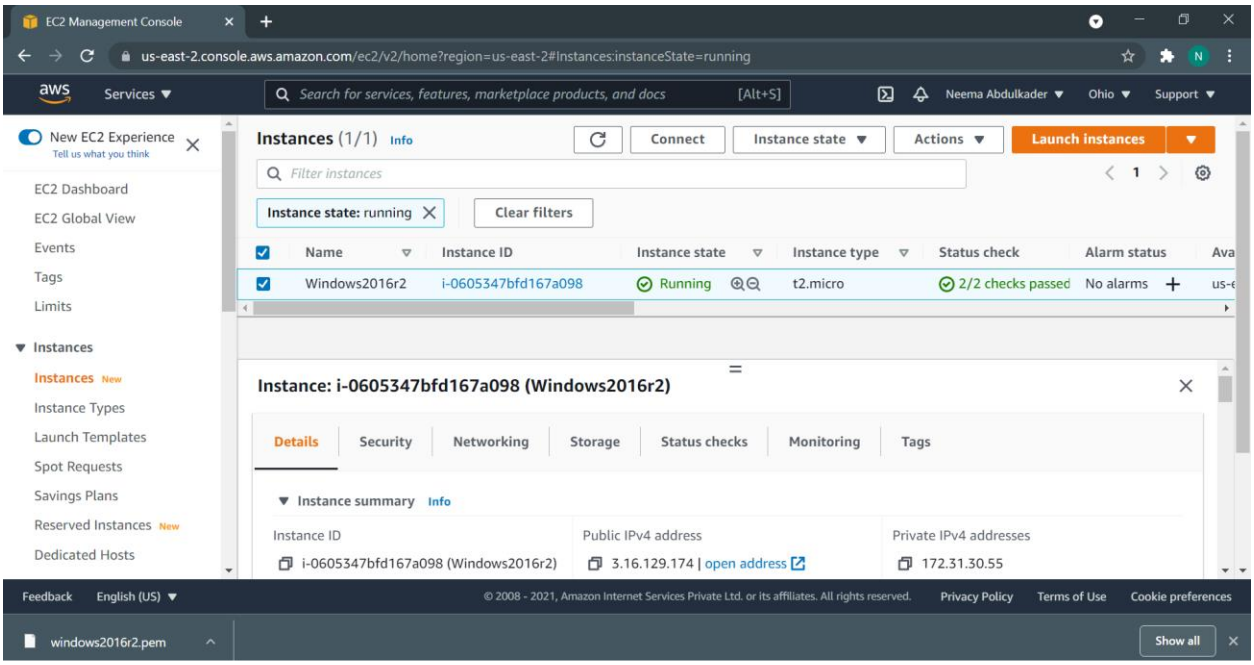
1. If you want to launch you need a password and that password is been created through this key pair=> create a new key pair.
2. Give key pair name
3. Then we have to download key pair
4. Launch instance



Step 16:
View instances



Step 17:
Instance running



Step 18:

1. Click EC2 Dashboard
   There you can see
   - Number of instance running
   - The volumes
   - Key pair given etc