

REPORT

On

Cisco Packet Tracer Lab Work & AWS Cloud Services Hands-On

Department of Computer Engineering & Applications
Institute of Engineering & Technology



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1. Cisco Packet Tracer Introduction

Cisco Packet Tracer is a powerful network simulation and visualization tool developed by Cisco Systems that allows users to create, design, configure, and troubleshoot networks in a virtual environment. It provides a comprehensive suite of features that enable users to:

Design and Build Networks: Packet Tracer offers a wide range of networking devices, including routers, switches, servers, and end-user devices, allowing users to create simple to complex network topologies.

Visualize Network Operation: Packet Tracer allows users to visualize the flow of data packets through the network, providing real-time insights into network performance and troubleshooting issues.

Configure Network Devices: Packet Tracer provides a realistic simulation of Cisco IOS commands, enabling users to practice configuring and managing network devices.

Troubleshoot Network Issues: Packet Tracer allows users to introduce faults and errors into the simulated network, providing a safe environment to practice troubleshooting techniques.

Explore IoT and Cybersecurity Concepts: Packet Tracer integrates with IoT devices and enables users to explore cybersecurity concepts and practices.

Learn and Practice Networking Skills: Packet Tracer is widely used in educational settings to help students learn networking concepts and develop hands-on experience.

Cisco Packet Tracer is a valuable tool for anyone interested in learning networking concepts, developing hands-on experience, and practicing network design, configuration, and troubleshooting. It is widely used by network professionals, students, and educators.

2. Cisco Lab Practicals

2.1 Network Devices

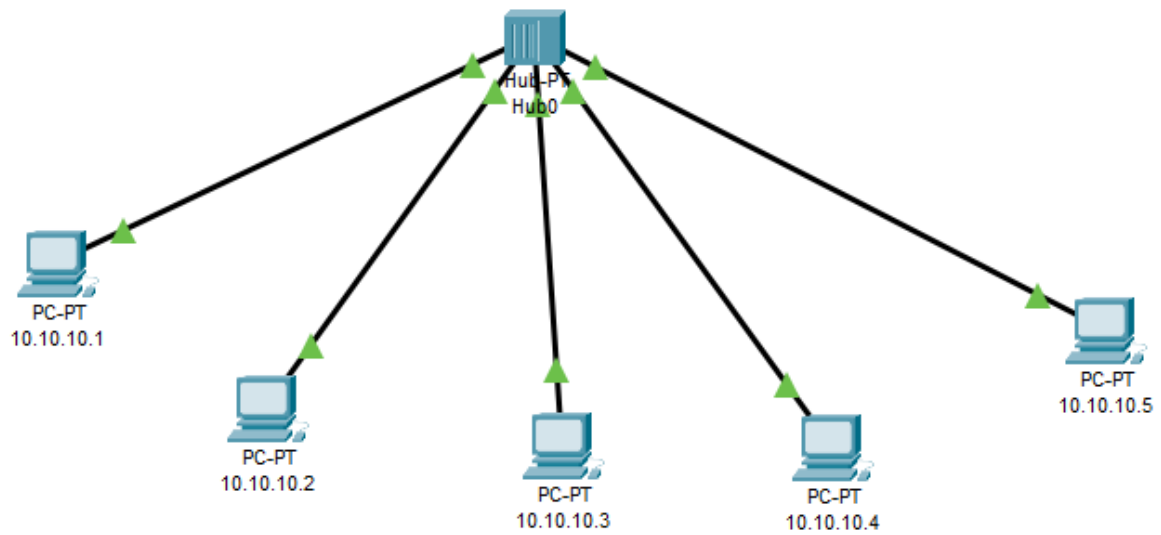


Figure 1 : Hub

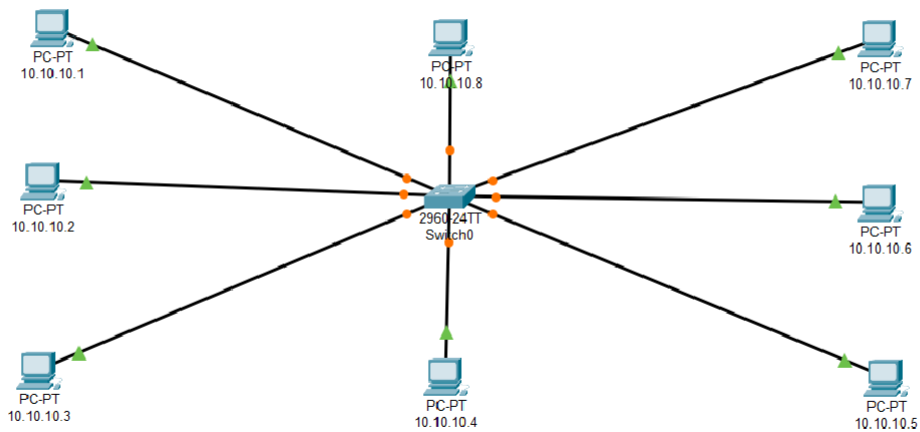


Figure 2 : Switch

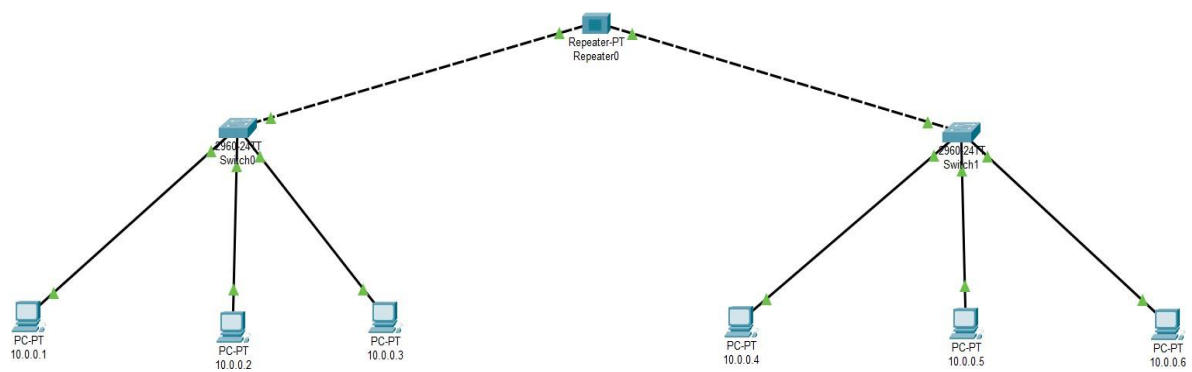


Figure 3 : Repeater

2.2 Topologies

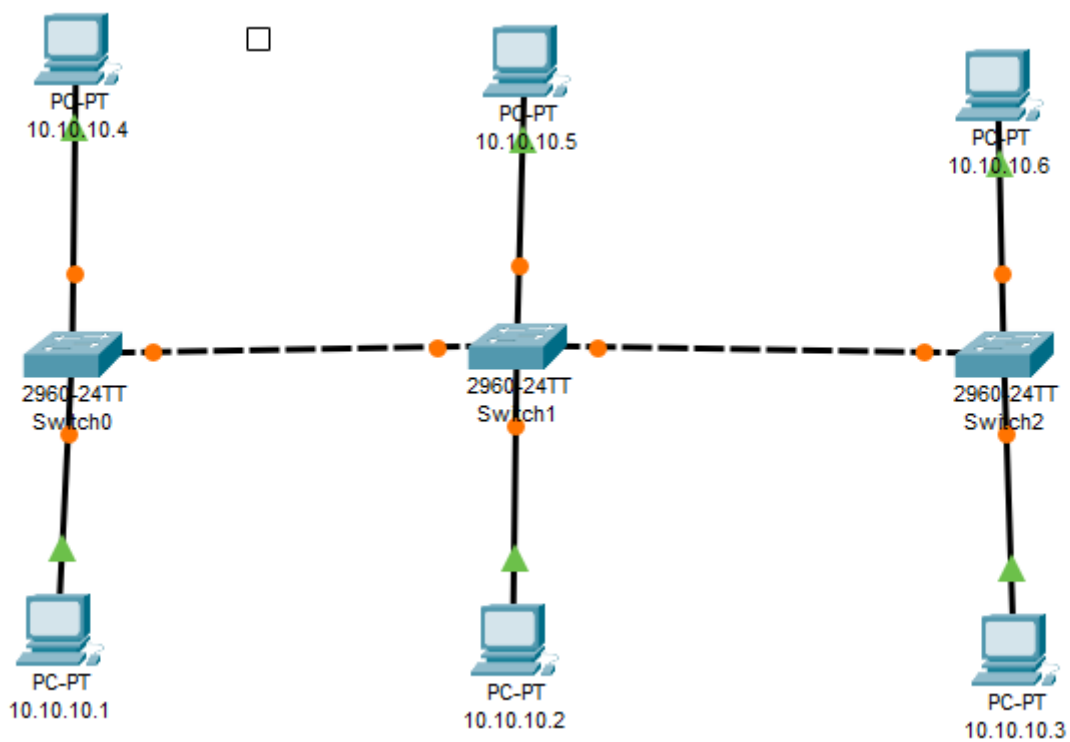


Figure 4 : Bus Topology

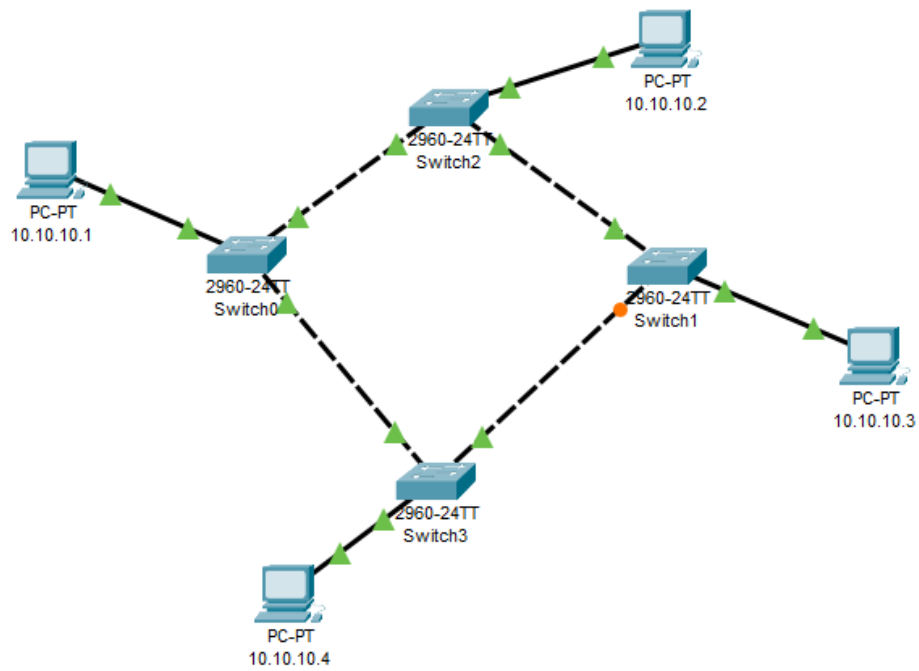


Figure 5 : Ring Topology

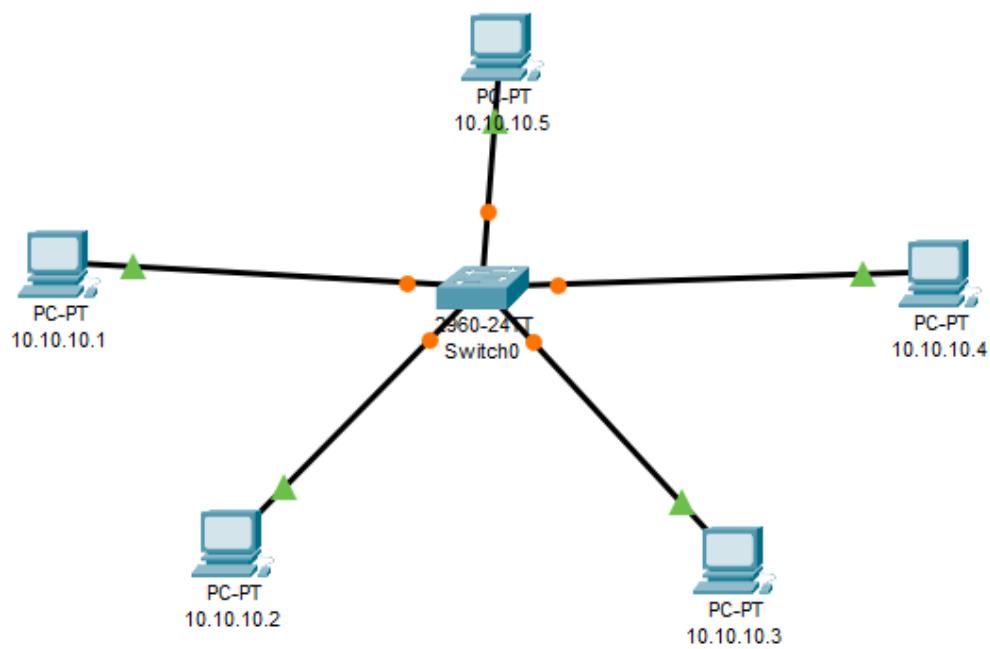


Figure 6 : Star Topology

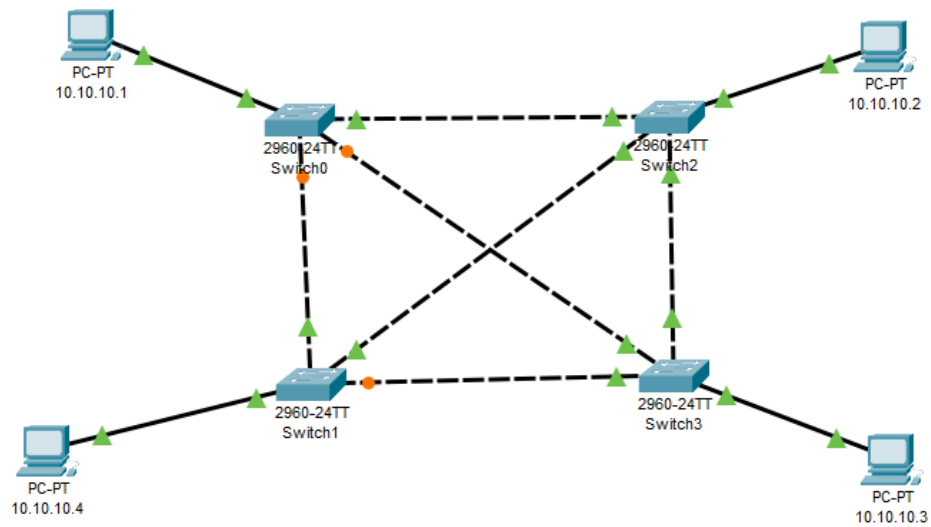


Figure 7 : Mesh Topology

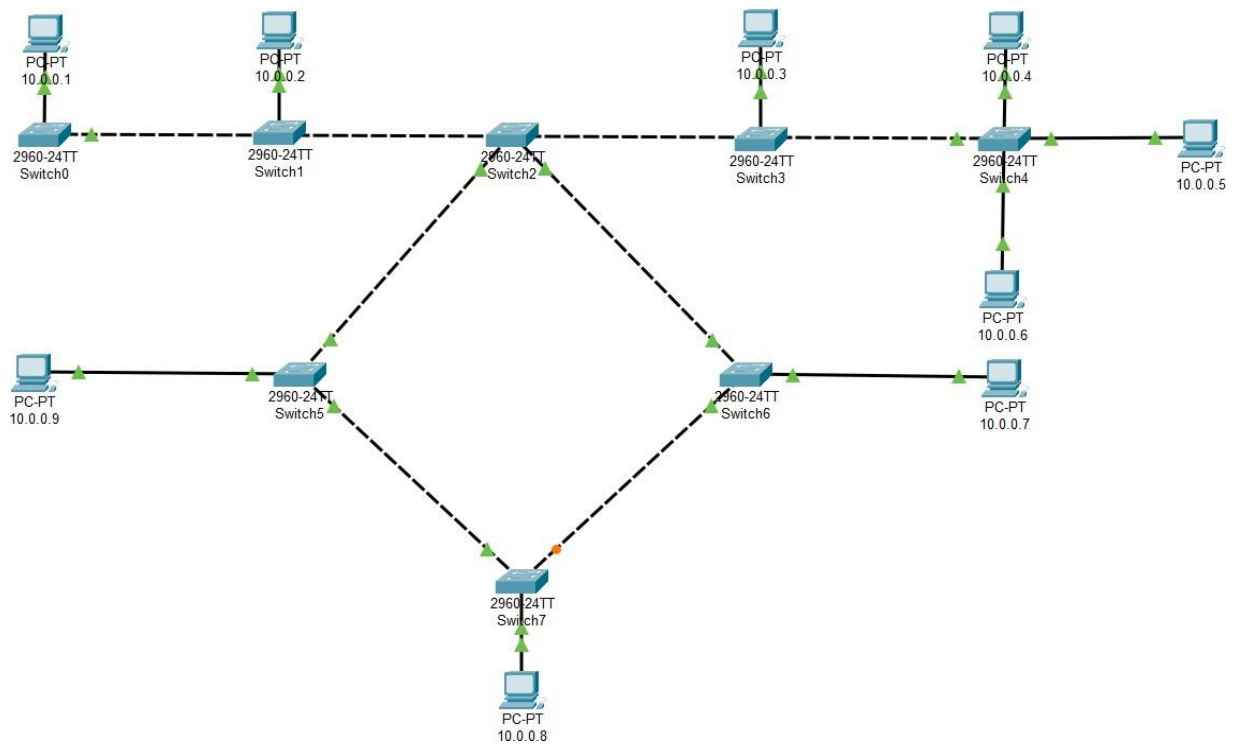


Figure 8 : Hybrid Topology

2.3 Making Same Networks

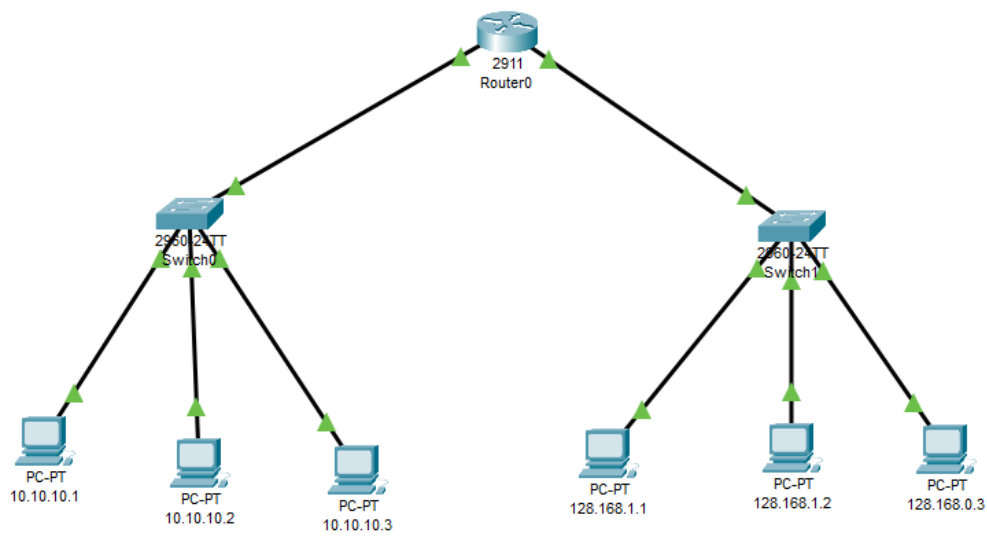


Figure 9 : Inter-LAN

2.4 Wireless Network picture in the simulation mode.

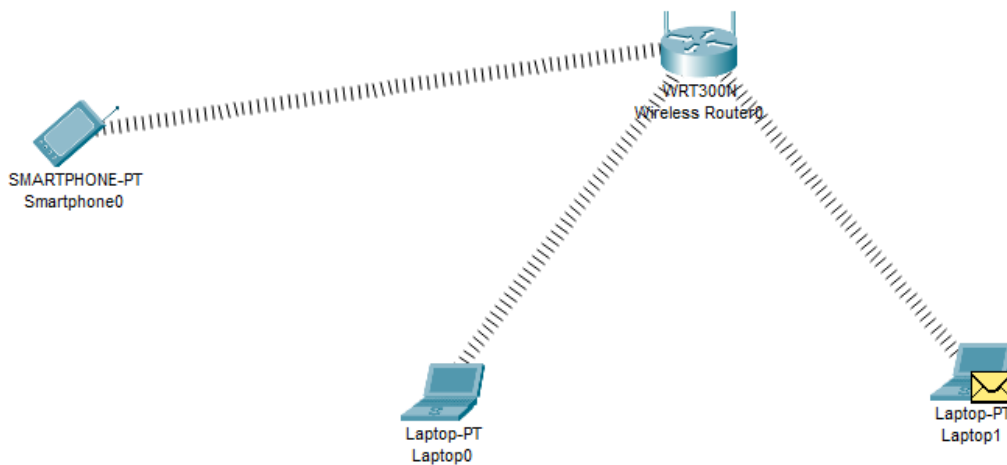


Figure 10 : Wireless Network

2.5 Router To Router Connection

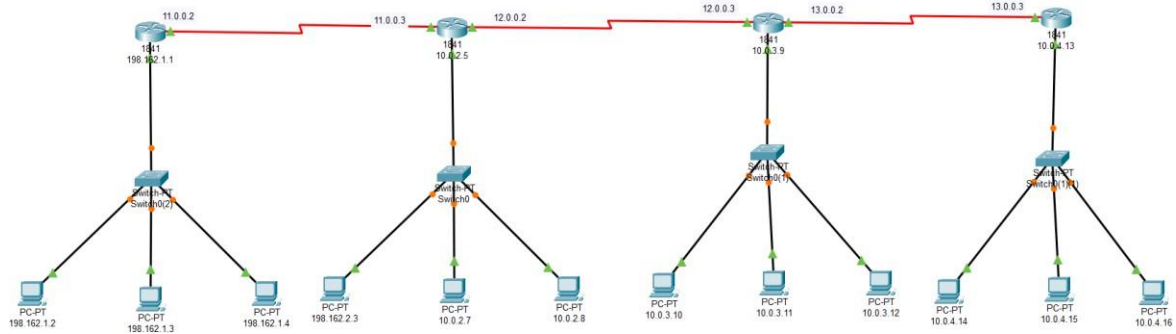


Figure 11 : Router to Router connection

2.6 Static Router Connection

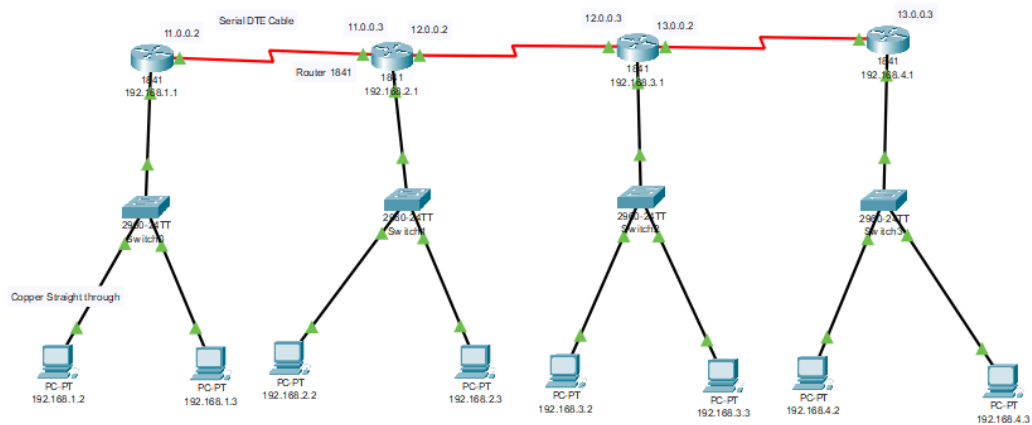


Figure 12 : Static Router Connection

2.7 Protocols

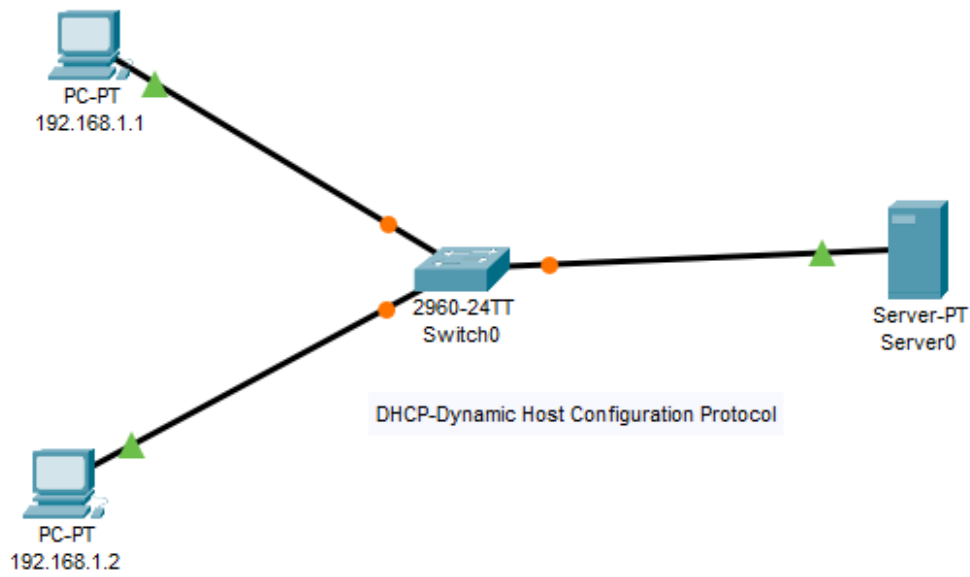


Figure 13 : File Transfer Protocol (FTP)

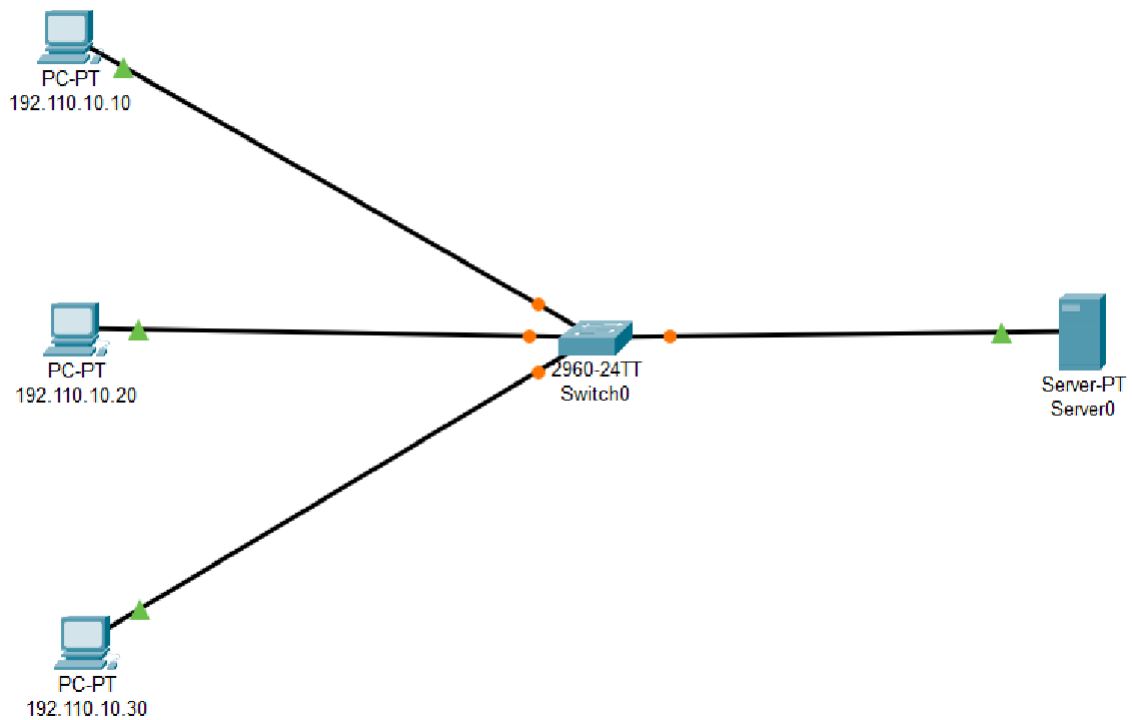


Figure 14 : Simple Mail Transfer Protocol (SMTP)

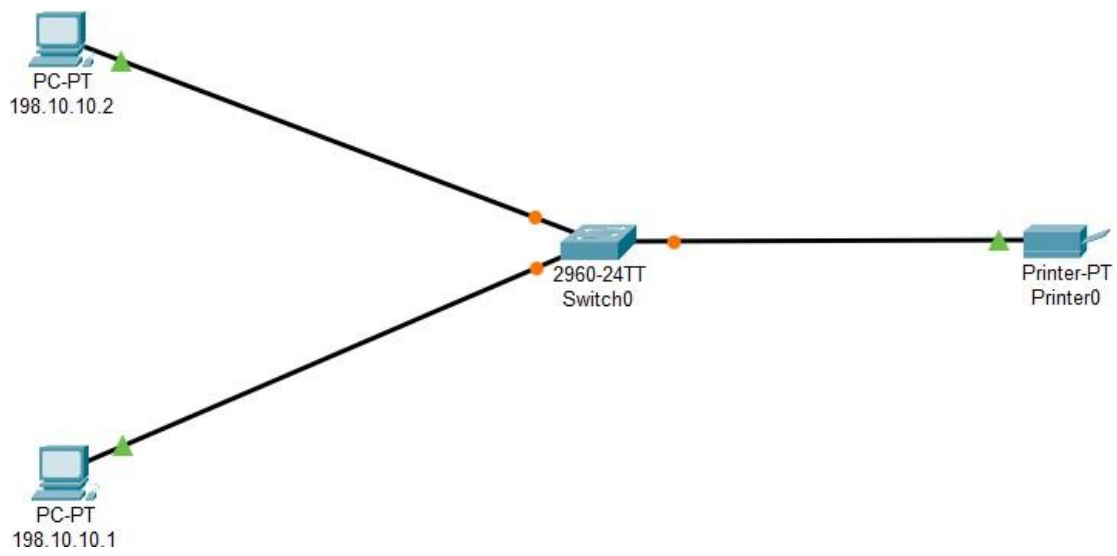


Figure 15 : Internet Control Message Protocol (ICMP)

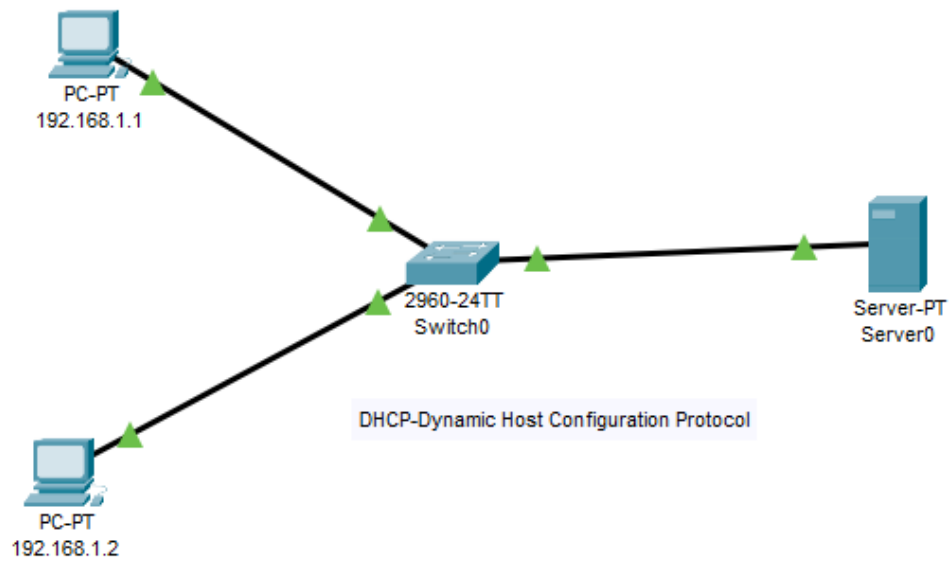


Figure 16 : Dynamic Host Configuration Protocol (DHCP)

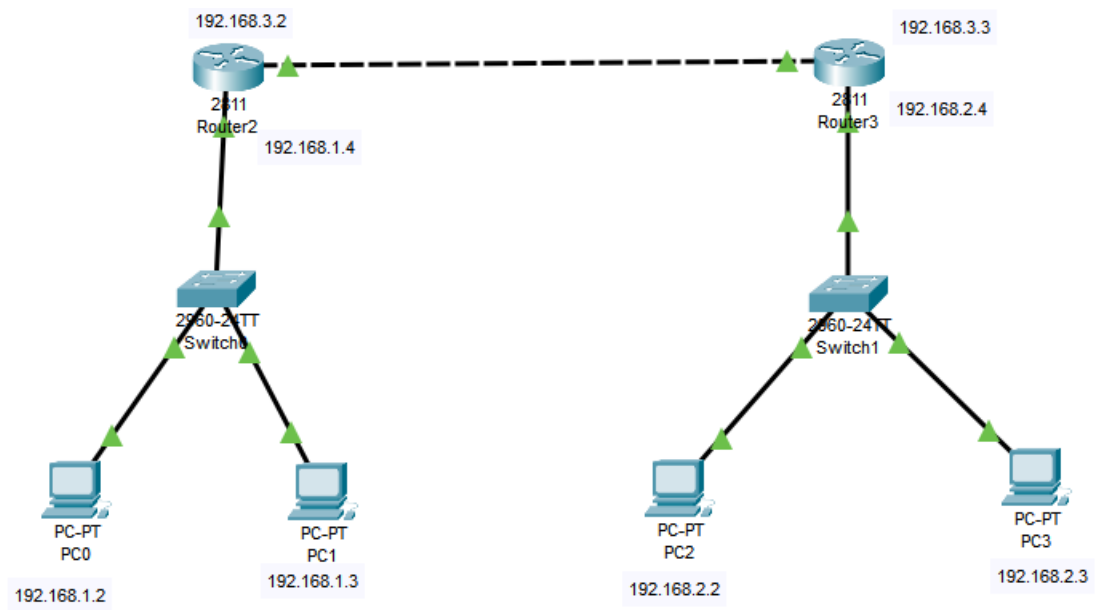


Figure 17 : Routing Information Protocol (RIP)

2.8 Bluetooth Speaker

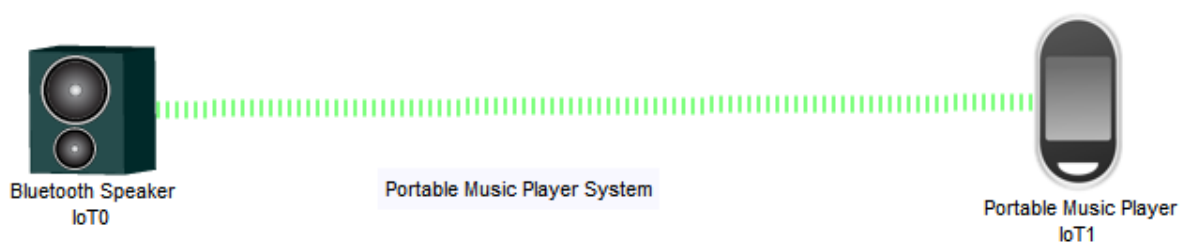


Figure 18 : Bluetooth Speaker

3.Virtual Machine

A virtual machine (VM) is a software program that emulates a physical computer system. It can run its own operating system and applications, just like a physical computer. VMs are created on top of a physical host computer, which provides them with the resources they need to run, such as CPU, memory, storage, and network access.

3.1 Create Virtual Machine

We can create a virtual machine (VM) in the VMware Cloud Console either by using an existing template or by specifying all the required configuration for your VM. By default, the virtual disks on the VM are configured with thick provisioning. If you want to use thin provisioning, use the vSphere Client to create VMs.

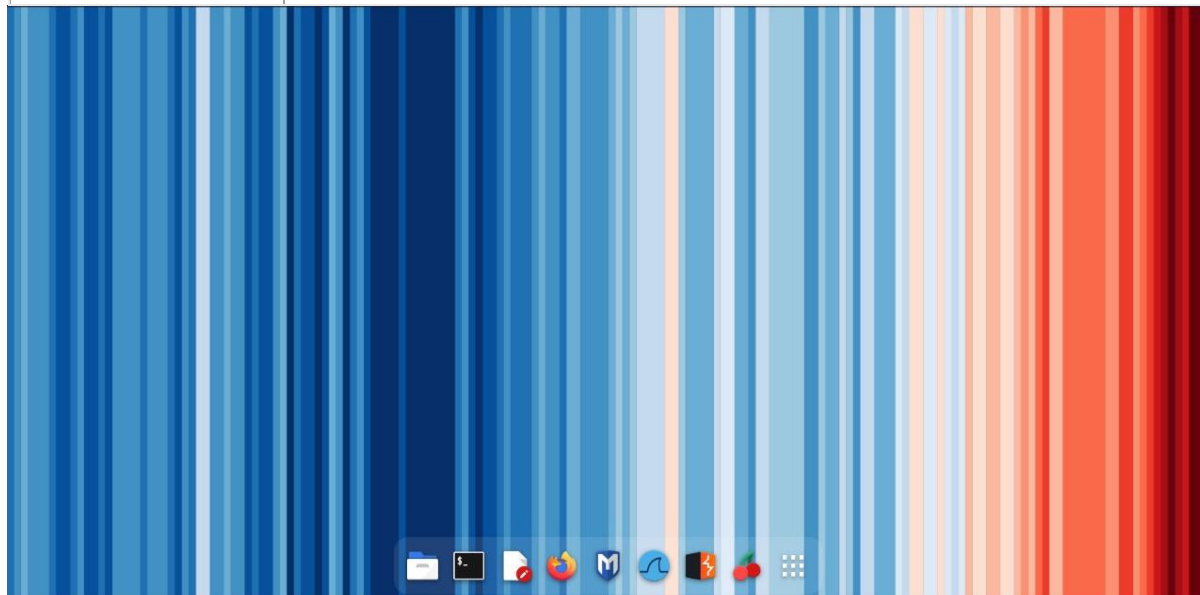
3.2 Prerequisites

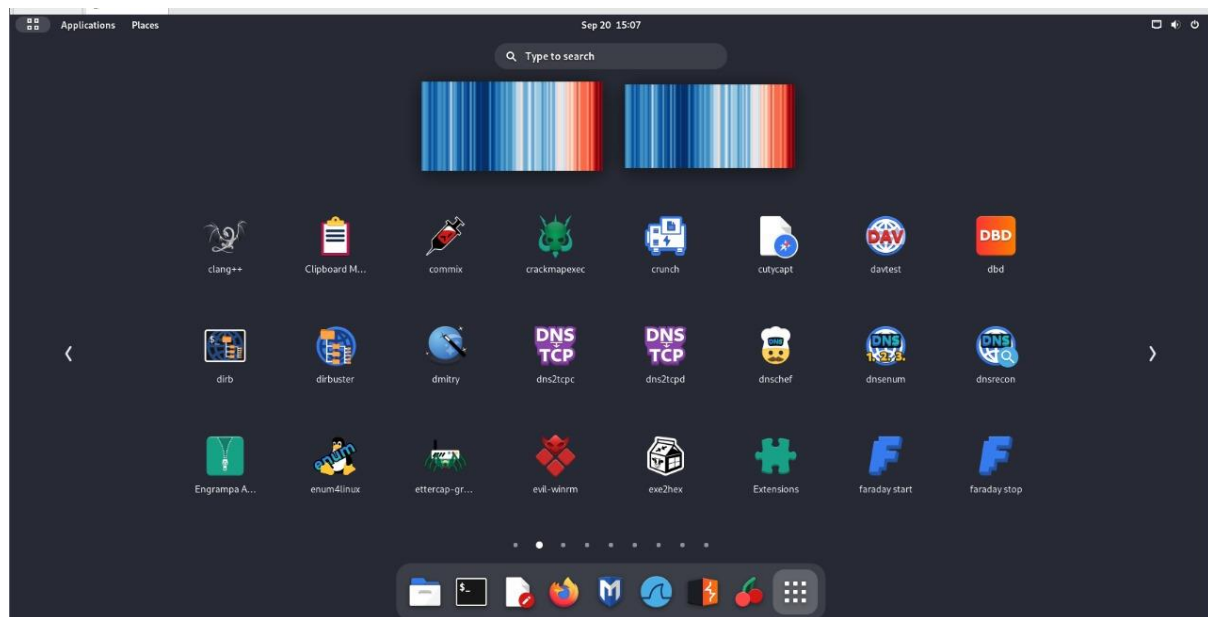
- Ensure that you have set up the necessary authentication mechanism between the vCenter and VMware Cloud..
- Ensure that you have the necessary permissions on the vCenter to create and manage VMs..
- Ensure that you have permissions on the vCenter to view all the VMs, including the VMs for which you may have the **No Access** role

3.3 Procedure

- 1.Log in to the VMware Cloud Console at <https://vmc.vmware.com>.
- 2.Click **Workloads > Create VM**.
- 3.Enter the VM configuration details.
- 4.Click **Review and Create**.

Option	Action
VM Location	Enter all the required information such as the name, vCenter, data center, and cluster where you want to create the VM.
Operating System and Hardware	<p>For the Template Source you select, enter the required information for the VM.</p> <ul style="list-style-type: none"> ▪ No Template. Enter the required operating system and the necessary hardware configuration for the VM. ▪ Local. Select an existing template. The hardware, operating system, and other configurations on the new VM are taken from the template you select.
Storage	<p>Select the datastore or cluster on which you want the VM to be created.</p> <p>Note:The vSAN default policy is applied when you select a vSAN datastore. To create a vSAN datastore with a custom policy, use the vSphere Client.</p>
Networking	You can either select a network or proceed with the default selection.





1. Introduction to AWS

1.1 Origin of AWS

AWS (Amazon Web Services) was launched by Amazon in 2006. Initially, it began as a collection of services that provided computing power, storage, and various other functionalities over the internet. Over time, it has expanded to include a vast array of cloud computing services, offering solutions for computing power, storage, content delivery, machine learning, analytics, and more.

1.2 Why we use AWS ?

There are several reasons why AWS is widely used:

Scalability: AWS allows businesses to scale their resources up or down based on demand, providing flexibility and cost-effectiveness.

Reliability: Its infrastructure is designed to be highly reliable and available, minimizing downtime and ensuring consistent performance.

Cost-Effectiveness: With pay-as-you-go pricing models, users only pay for the resources they consume without upfront costs, making it financially feasible for businesses of all sizes.

Global Reach: AWS has data centers strategically located worldwide, enabling businesses to deploy applications and services closer to their customers, reducing latency and improving user experience.

Security: AWS provides a secure platform with a range of security tools and features, ensuring data protection and compliance with various industry standards.

Flexibility and Innovation: It offers a wide range of services and tools, allowing businesses to innovate and experiment with new technologies without significant upfront investments.

1.3 Mostly used and famous services offered by AWS

Here are some of the most used and famous services offered by Amazon Web Services (AWS):

Compute: Amazon Elastic Compute Cloud (EC2) is a service that provides virtual machines in the cloud. Businesses can use EC2 to run a variety of applications, including web servers, databases, and customer relationship management (CRM) systems.



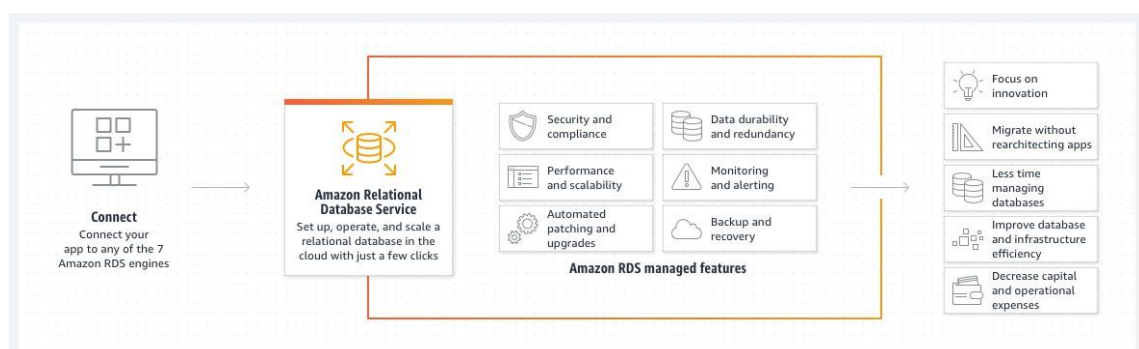
Storage: Amazon Simple Storage Service (S3) is a service that provides object storage. Businesses can use S3 to store a variety of data, including files, images, and videos.



Networking: Amazon Virtual Private Cloud (VPC) is a service that allows businesses to create a private network in the cloud. Businesses can use VPC to connect their on-premises network to the AWS cloud.



Databases: Amazon Relational Database Service (RDS) is a service that provides managed relational databases. Businesses can use RDS to run a variety of relational databases, including MySQL, PostgreSQL, and Oracle Database.

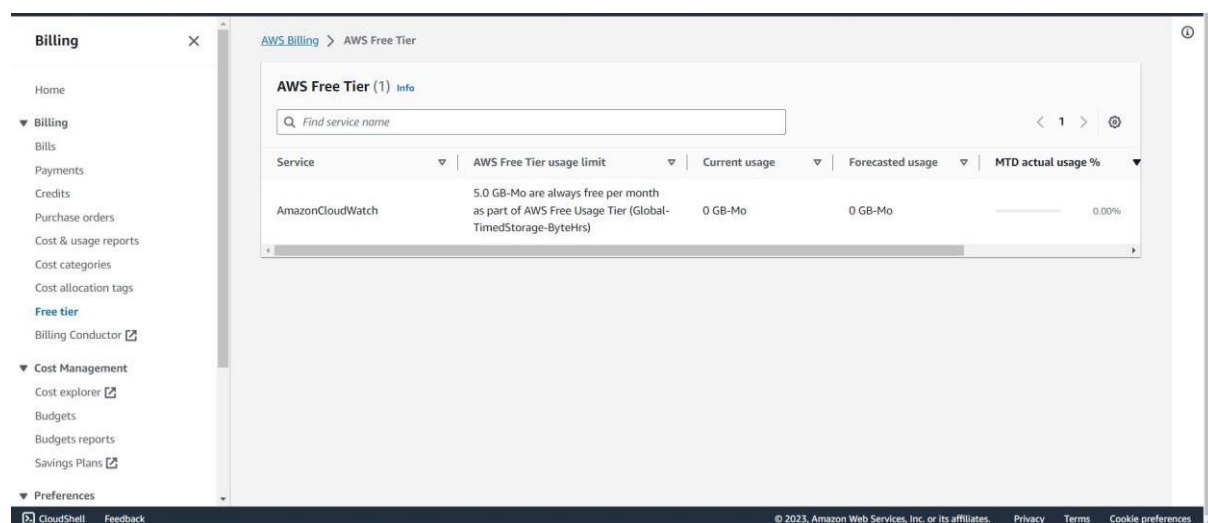


2. AWS Billing Area

The AWS Billing console allows you to easily understand your AWS spending, view and pay invoices, manage billing preferences and tax settings, and access additional Cloud Financial Management services. Quickly evaluate whether your monthly spend is in line with prior periods, forecast, or budget, and investigate and take corrective actions in a timely manner.

Benefits of using AWS Billing Areas:

- ❖ **Consolidated billing:** You can view and pay for all of your AWS resources in a single invoice, which can simplify your billing process and make it easier to manage your costs.
- ❖ **Cost allocation:** You can allocate costs across your organization based on your business needs, such as by department, project, or team. This can help you to track the costs of each of your business units and identify areas where you can save money.
- ❖ **Budgeting:** You can set budgets for your AWS accounts and receive alerts when you are approaching or exceeding your budget. This can help you to control your AWS spending and avoid unexpected costs.
- ❖ **Cost and usage reporting:** You can access detailed reports on your AWS usage and costs, which can help you to understand how your AWS resources are being used and identify opportunities to optimize your spending.



3. AWS EC2 Instance Creation

Amazon Elastic Compute Cloud (Amazon EC2) offers the broadest and deepest compute platform, with over 700 instances and choice of the latest processor, storage, networking, operating system, and purchase model to help you best match the needs of your workload. We are the first major cloud provider that supports Intel, AMD, and Arm processors, the only cloud with on-demand EC2 Mac instances, and the only cloud with 400 Gbps Ethernet networking. We offer the best price performance for machine learning training, as well as the lowest cost per inference instances in the cloud. More SAP, high performance computing (HPC), ML, and Windows workloads run on AWS than any other cloud.

Customers



[Learn how the The Financial Industry Regulatory Authority uses Amazon EC2 »](#)



[Find out why Cathay Pacific chose AWS »](#)



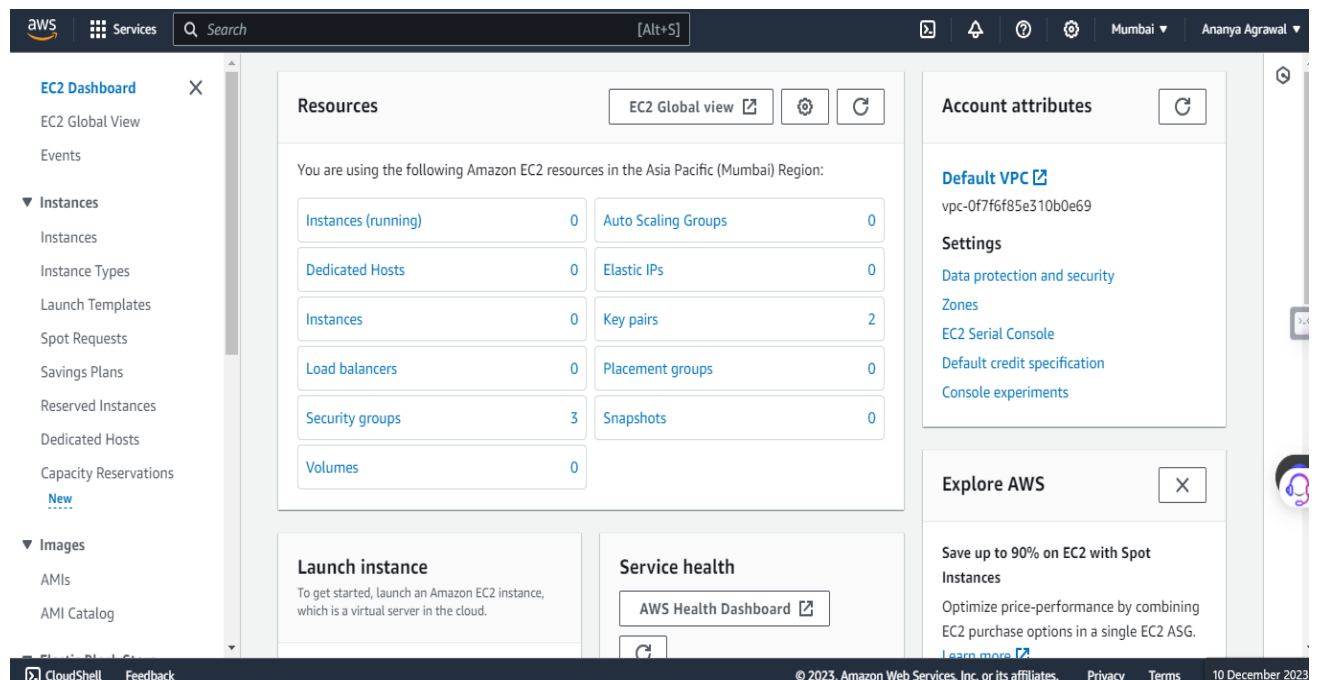
[Learn how Snap uses Graviton2-based instances »](#)



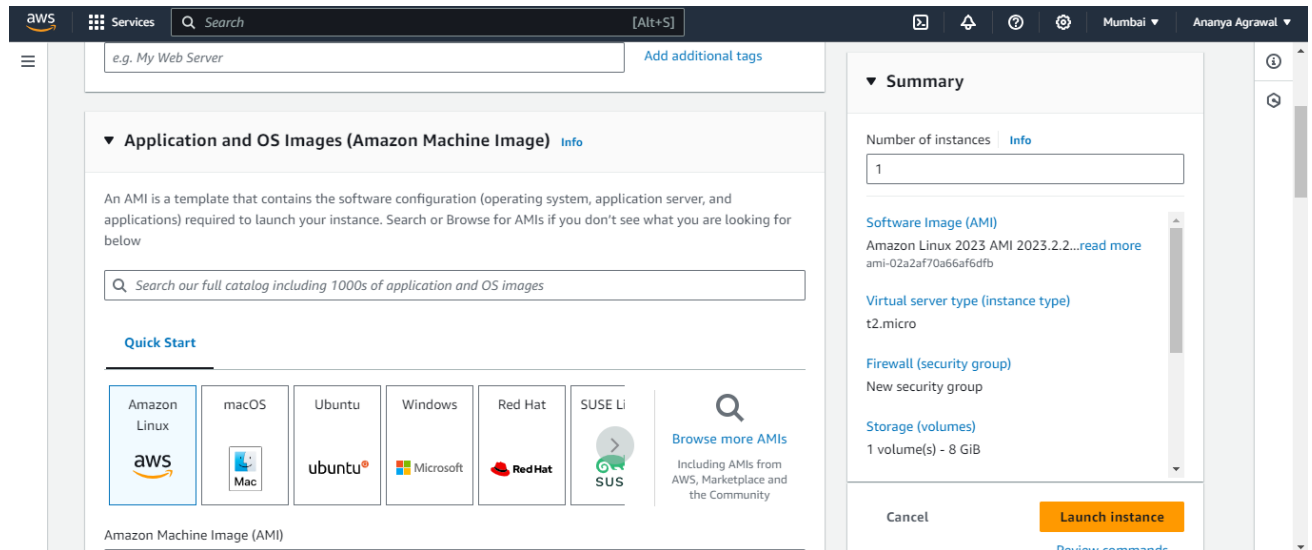
[Explore how Volkswagen innovates using Amazon EC2 »](#)

Image src : <https://aws.amazon.com/ec2/>

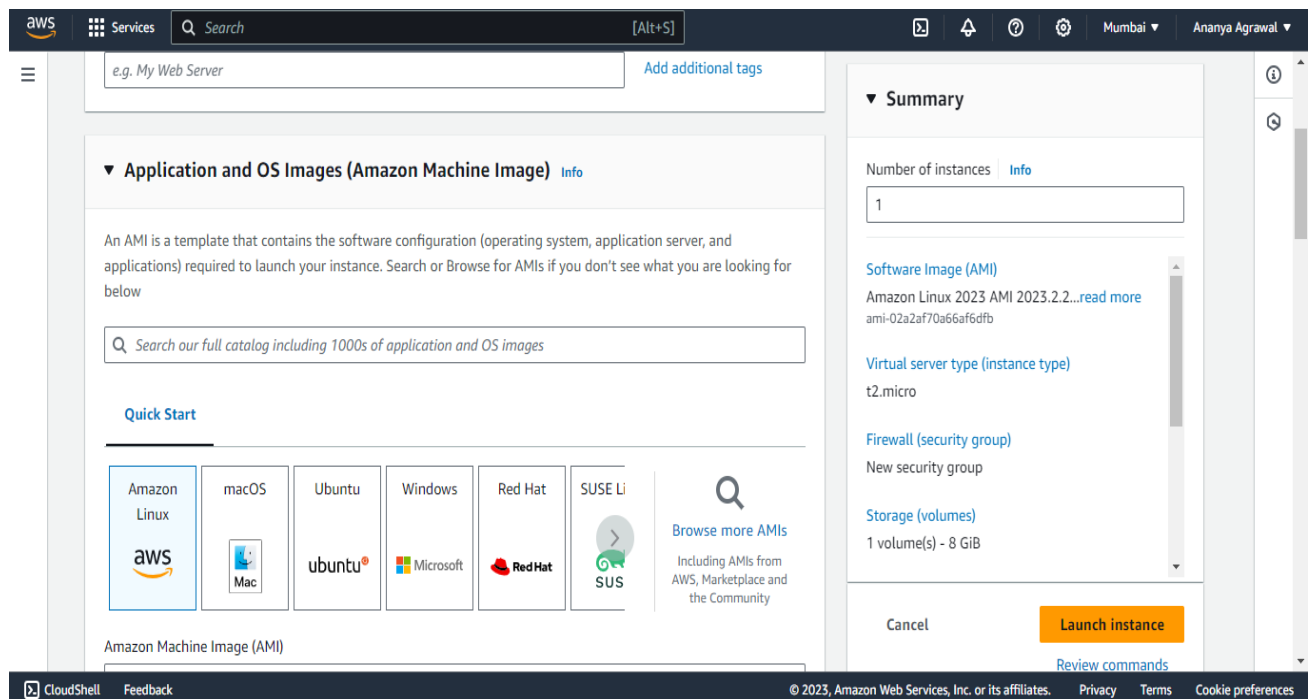
Step-1 : Go to the EC2 Dashboard



Step-2 : Click on the yellow colored “Launch instance” button.



Step-3 : After typing the name of the instance select the OS images



Quickstart AMIs (47)
Commonly used AMIs

My AMIs (0)
Created by me

AWS Marketplace AMIs (8884)
AWS & trusted third-party AMIs

Community AMIs (500)
Published by anyone

ubuntu

Ubuntu

Free tier eligible

Verified provider

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type

ami-0287a05f0ef0e9d9a (64-bit (x86)) / ami-0b6581fde9e6e7779 (64-bit (Arm))

Select

64-bit (x86)

64-bit (Arm)

Ubuntu Server 22.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Platform: ubuntu Root device type: ebs Virtualization: hvm ENA enabled: Yes

Microsoft

Windows

Free tier eligible

Verified provider

Microsoft Windows Server 2022 Base

ami-0fb974a4772b174a5 (64-bit (x86))

Select

64-bit (x86)

Microsoft Windows 2022 Datacenter edition. [English]

Platform: windows Root device type: ebs Virtualization: hvm ENA enabled: Yes

Microsoft

Windows

Microsoft Windows Server 2022 Core Base

ami-0202ccb85aa1c5073 (64-bit (x86))

Select

Microsoft Windows 2022 Datacenter Core edition. [English]

Step-4 : Configure Hardware of 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

AMI from catalog

Quick Start

Amazon Machine Image (AMI)

Windows_Server-2022-English-Full-Base-2023.10.11

ami-0fb974a4772b174a5

Verified provider

Free tier eligible

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Catalog	Published	Architecture	Virtualization	Root device type	ENA Enabled
Quickstart AMIs	2023-10-11T06:18:58.000Z	x86_64	hvm	ebs	Yes

Step-5 : Create a Key-pair

The key is used to enable Secure Shell (SSH) access into the EC2 instance.

With Windows instances, the private EC2 key helps generate an admin password to access the instance. AWS stores a copy of the public key inside the EC2 instance. Users keep the private key.

It's the developer's responsibility to [store the generated key file in a secure location](#), given that this file enables someone to access the EC2 instance and run commands in it.


Once this step is completed, the EC2 instance goes into a pending state, which typically lasts less than one minute. The instance then transitions into a running state, and it's ready to be used.

▼ Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

▼

 [Create new key pair](#)

For Windows instances, you use a key pair to decrypt the administrator password. You then use the decrypted password to connect to your instance.

Step-6 : After Creating the key-pair select all the options in the Network Settings.

▼ Network settings Info

Edit

Network Info

vpc-0f7f6f85e310b0e69

Subnet Info

No preference (Default subnet in any availability zone)

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

We'll create a new security group called 'launch-wizard-2' with the following rules:

☒ Allow RDP traffic from

Helps you connect to your instance

Anywhere

0.0.0.0/0 ▼

☒ Allow HTTPS traffic from the internet

To set up an endpoint, for example when creating a web server

☒ Allow HTTP traffic from the internet

Step-7 Now configure the storage

Now we will give configurations 1x '30' and GiB 'gp2' Root volumes'

▼ **Configure storage** [Info](#) Advanced

1x GiB ▼ Root volume (Not encrypted)

❗

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

✕

Add new volume

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

0 x File systems Edit

By selecting the no of instances we have to click on the create instance

▼ **Summary**

Number of instances [Info](#)

Software Image (AMI)

Microsoft Windows Server 2022 ...[read more](#)
ami-0fb974a4772b174a5

Virtual server type (instance type)

t2.micro

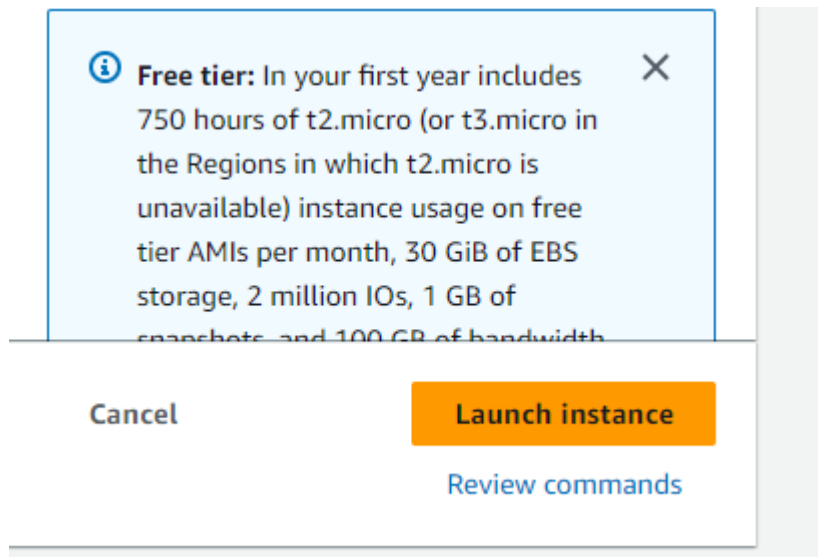
Firewall (security group)

New security group

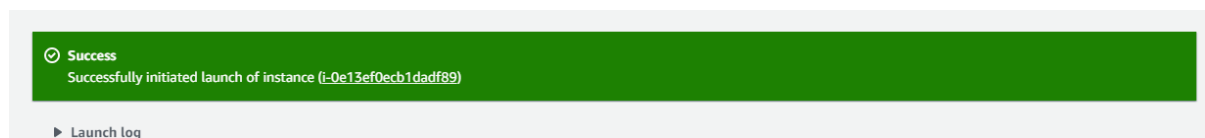
Storage (volumes)

1 volume(s) - 30 GiB

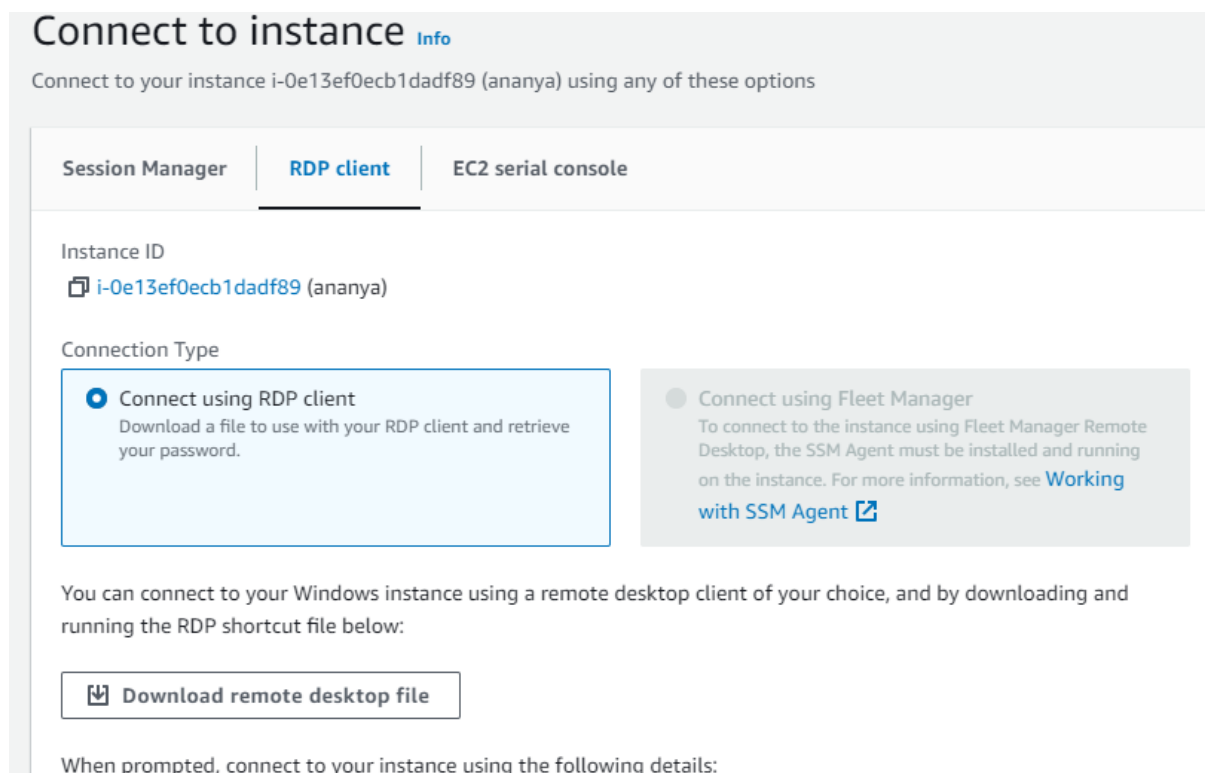
Now , click on the yellow button of Launch Instance on the bottom right of the screen.



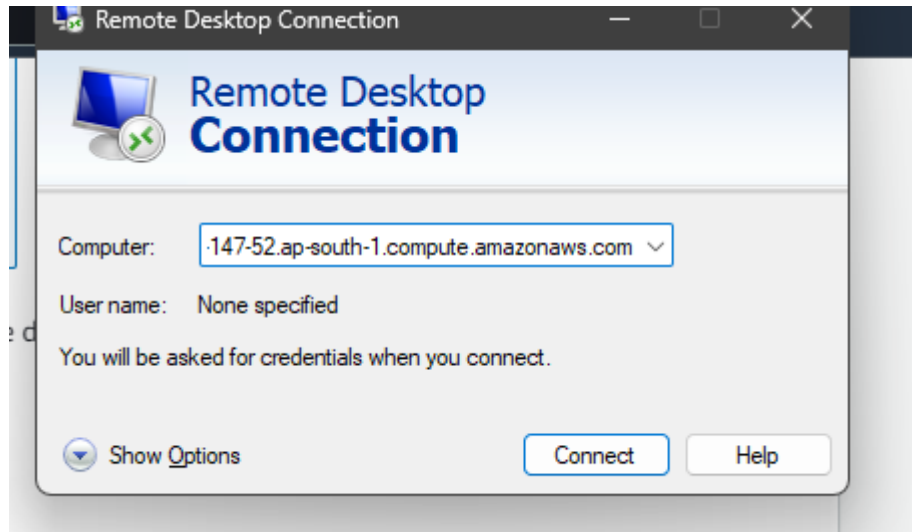
Instance creates Successfully



Step-8 : Connecting to the Instance



Step-9 : Open the Remote Desktop Connection and fill the required details.



To terminate the Instance

For closing or terminating the instance go to 'instance state' a pop up menu will appear which will have options for stopping instance , terminating instance and many more
Then select on terminate instance and a green line will appear which says " Instance successfully terminated .

Instances (1/1) Info								Refresh	Connect	Instance state ▼	Actions ▼	Launch instances ▼
Find Instance by attribute or tag (case-sensitive)												
✓	Name ↗	Instance ID	Instance state ▼	Instance type ▼	Status check	Alarm status	Availability Zone					
✓	ananya	i-0e13ef0ecb1dadf89	Running	t2.micro	Initializing	No alarms +	ap-south-1b					

4. AWS S3 Bucket Creation

Amazon Simple Storage Service (Amazon S3) is an object storage service offering industry-leading scalability, data availability, security, and performance. Customers of all sizes and industries can store and protect any amount of data for virtually any use case, such as data lakes, cloud-native applications, and mobile apps. With cost-effective storage classes and easy-to-use management features, you can optimize costs, organize data, and configure fine-tuned access controls to meet specific business, organizational, and compliance requirements.



Customers



[NASCAR modernizes multi-PB media archive at speed with Amazon S3 »](#)



[Snap optimizes cost savings while storing 2 exabytes - over 1.5 trillion photos and videos - on Amazon S3 Glacier Instant Retrieval »](#)



[Shutterstock transforms IT and saves 60% on storage costs with Amazon S3 »](#)



[Runtastic saves €300,000, stays on track for growth using Amazon S3 »](#)

Above Images src : <https://aws.amazon.com/s3/>

Step-1 : Click on the create bucket

Storage

Amazon S3

Store and retrieve any amount of data from anywhere

Amazon S3 is an object storage service that offers industry-leading scalability, data availability, security, and performance.

Create a bucket

Every object in S3 is stored in a bucket. To upload files and folders to S3, you'll need to create a bucket where the objects will be stored.

[Create bucket](#)

How it works

[Introduction to Amazon S3](#) [Copy link](#)

Pricing

With S3, there are no minimum fees. You only pay for what you use. Prices are based on the location of your S3 bucket.

Estimate your monthly bill using the [AWS Simple Monthly Calculator](#)

Or, you can also create the bucket by clicking on the hamburger icon and then click on the Buckets.

The screenshot shows the Amazon S3 console interface. On the left is a navigation sidebar with options like Buckets, Access Points, Object Lambda Access Points, Multi-Region Access Points, Batch Operations, IAM Access Analyzer for S3, Storage Lens, Dashboards, Storage Lens groups, AWS Organizations settings, Feature spotlight, and AWS Marketplace for S3. The main content area is titled 'Amazon S3 > Buckets'. It includes an 'Account snapshot' section with a 'View Storage Lens dashboard' button. Below that is the 'Buckets' section, which has a search bar, a table with columns for Name, AWS Region, Access, and Creation date, and a 'Create bucket' button. A message states 'No buckets. You don't have any buckets.' with a 'Create bucket' button. The footer contains 'CloudShell', 'Feedback', and copyright information for Amazon Web Services, Inc. or its affiliates, along with links for Privacy, Terms, and Cookie preferences.

Step-2 : Type the Bucket name

[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

Asia Pacific (Mumbai) ap-south-1

Copy settings from existing bucket - *optional*
Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

Step-3 : Since bucket name should be globally unique and as test has been created by someone else i.e. write some another name.

We're continuing to improve the S3 console to make it faster and easier to use. If you have feedback on the updated experience, choose [Provide feedback](#).

[Amazon S3](#) > [Buckets](#) > Create bucket

Create bucket [Info](#)

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

General configuration

Bucket name

⚠ Bucket with the same name already exists
Bucket name must be unique and must not contain spaces or uppercase letters. See rules for bucket naming

AWS Region

Asia Pacific (Mumbai) ap-south-1

Copy settings from existing bucket - *optional*
Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

Object Ownership [Info](#)

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership

[Feedback](#) Looking for language selection? Find it in the new [Unified Settings](#)

© 2022, Amazon Internet Services Private Ltd. or its affiliates. [Privacy](#) [Terms](#) [Cookie preferences](#)

Correct Bucket name :-

[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

Asia Pacific (Mumbai) ap-south-1 ▼

Copy settings from existing bucket - *optional*
Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

Step-4 : So, after creating the bucket now , we need to upload some files or data into it.

Bucket Key
Using an S3 Bucket Key for SSE-KMS reduces encryption costs by lowering calls to AWS KMS. S3 Bucket Keys aren't supported for DSSE-KMS. [Learn more](#)

☐ Disable

☒ Enable

► **Advanced settings**

ⓘ After creating the bucket, you can upload files and folders to the bucket, and configure additional bucket settings.

Cancel [Create bucket](#)

After this we have to click on the create Bucket

After bucket creation

Successfully created bucket "myananya1234"

View details

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

Amazon S3

>

Buckets

Account snapshot

View Storage Lens dashboard

Storage lens provides visibility into storage usage and activity trends. [Learn more](#)

Buckets (1) Info

Copy ARN

Empty

Delete

Create bucket

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

Find buckets by name

<

1

>

Name	AWS Region	Access	Creation date
<input type="radio"/> myananya1234	Asia Pacific (Mumbai) ap-south-1	Bucket and objects not public	November 7, 2023, 12:17:00 (UTC+05:30)

For deleting the bucket

Buckets (1) Info

Copy ARN

Empty

Delete

Create bucket

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

Find buckets by name

<

1

>

Name	AWS Region	Access
<input checked="" type="radio"/> myananya1234	Asia Pacific (Mumbai) ap-south-1	Bucket and objects not public

Amazon S3

>

Buckets

>

myananya1234

>

Delete bucket

Delete bucket Info

- Deleting a bucket cannot be undone.
- Bucket names are unique. If you delete a bucket, another AWS user can use the name.
- If this bucket is used with a Multi-Region Access Point in an external account, initiate failover before deleting the bucket.
- If this bucket is used with an access point in an external account, the requests made through those access points will fail after you delete this bucket.

[Learn more](#)

Delete bucket "myananya1234"?

To confirm deletion, enter the name of the bucket in the text input field.

Cancel

Delete bucket

5. References

1. <https://aws.amazon.com/rds/>
2. <https://aws.amazon.com/ec2/>
3. <https://aws.amazon.com/s3/>
4. <https://aws.amazon.com/vpc/>