Cloud Computing

Course Code: MEAD-658

Lab Practical File

Submitted by

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of

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Center for Development of Advanced Computing, Noida

Affiliated to Guru Gobind Singh Indraprastha University

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Lab-1

Objective: Explore the following networking commands:

- ipconfig
- ping
- tracert
- whois
- netstat
- etc…

Results:

- *ipconfig*

```
PS C:\Users\shant> ipconfig /all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : MSI
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Ethernet:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek USB GbE Family Controller
   Physical Address. . . . . . . . . : 00-E0-4C-68-75-85
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
```

- *ping*

```
PS C:\Users\shant> ping www.google.com

Pinging www.google.com [2404:6800:4009:82b::2004] with 32 bytes of data:
Reply from 2404:6800:4009:82b::2004: time=28ms
Reply from 2404:6800:4009:82b::2004: time=28ms
Reply from 2404:6800:4009:82b::2004: time=31ms
Reply from 2404:6800:4009:82b::2004: time=32ms

Ping statistics for 2404:6800:4009:82b::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 28ms, Maximum = 32ms, Average = 29ms
```

- *tracert*

```
PS C:\Users\shant> tracert -h 5 www.google.com

Tracing route to www.google.com [2404:6800:4002:813::2004]
over a maximum of 5 hops:

  1     5 ms     4 ms     5 ms  2405:201:4033:e0b3:aa88:1fff:fe61:5e93
  2     *        *        *     Request timed out.
  3     7 ms     7 ms     6 ms  2405:203:400:100:172:31:5:137
  4     *        *        *     Request timed out.
  5     8 ms     7 ms     7 ms  2405:200:804:3168:61::5

Trace complete.
```

- *whois*

```
PS C:\Users\shant\Downloads\WhoIs> .\whois.exe google.com

Whois v1.21 - Domain information lookup
Copyright (C) 2005-2019 Mark Russinovich
Sysinternals - www.sysinternals.com

Connecting to COM.whois-servers.net...

WHOIS Server: whois.markmonitor.com
   Registrar URL: http://www.markmonitor.com
   Updated Date: 2019-09-09T15:39:04Z
   Creation Date: 1997-09-15T04:00:00Z
   Registry Expiry Date: 2028-09-14T04:00:00Z
   Registrar: MarkMonitor Inc.
   Registrar IANA ID: 292
   Registrar Abuse Contact Email: abusecomplaints@markmonitor.com
   Registrar Abuse Contact Phone: +1.2086851750
   Domain Status: clientDeleteProhibited https://icann.org/epp#clientDeleteProhibited
   Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited
   Domain Status: clientUpdateProhibited https://icann.org/epp#clientUpdateProhibited
   Domain Status: serverDeleteProhibited https://icann.org/epp#serverDeleteProhibited
   Domain Status: serverTransferProhibited https://icann.org/epp#serverTransferProhibited
   Domain Status: serverUpdateProhibited https://icann.org/epp#serverUpdateProhibited
   Name Server: NS1.GOOGLE.COM
   Name Server: NS2.GOOGLE.COM
   Name Server: NS3.GOOGLE.COM
   Name Server: NS4.GOOGLE.COM
   DNSSEC: unsigned
   URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2025-05-17T08:05:45Z <<<
```

- *netstat*

```
PS C:\Users\shant> netstat -e
Interface Statistics

                           Received            Sent

Bytes                     952049671      1506050845
Unicast packets            73492691        12413970
Non-unicast packets          175610           57950
Discards                          0               0
Errors                            0               0
Unknown protocols                 0
```

- *hostname*

```
PS C:\Users\shant> hostname
MSI
PS C:\Users\shant>
```

- *arp*

```
PS C:\Users\shant> arp -a

Interface: 192.168.29.120 --- 0x2
  Internet Address      Physical Address      Type
  192.168.29.1          a8-88-1f-61-5e-93     dynamic
  192.168.29.186        68-b9-c2-4a-72-b4     dynamic
  192.168.29.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.56.1 --- 0x13
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static

Interface: 172.21.48.1 --- 0x39
  Internet Address      Physical Address      Type
  172.21.63.255         ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
```

- *nslookup*

```
PS C:\Users\shant> nslookup www.google.com
Server:  reliance.reliance
Address:  2405:201:4033:e0b3::c0a8:1d01

Non-authoritative answer:
Name:    www.google.com
Addresses:  2404:6800:4002:817::2004
          142.250.71.100
```

- *net*

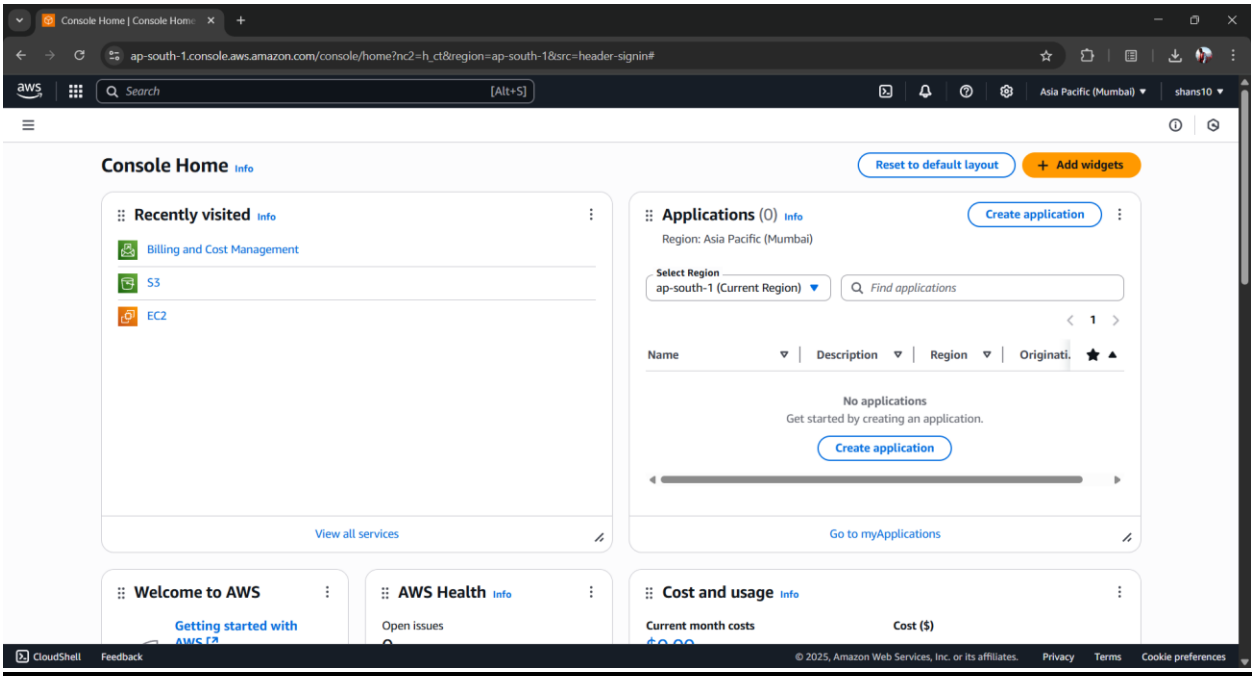
```
PS C:\Users\shant> net accounts
Force user logoff how long after time expires?:       Never
Minimum password age (days):                          0
Maximum password age (days):                          42
Minimum password length:                              0
Length of password history maintained:                None
Lockout threshold:                                    10
Lockout duration (minutes):                           10
Lockout observation window (minutes):                 10
Computer role:                                        WORKSTATION
The command completed successfully.
```

Lab-2

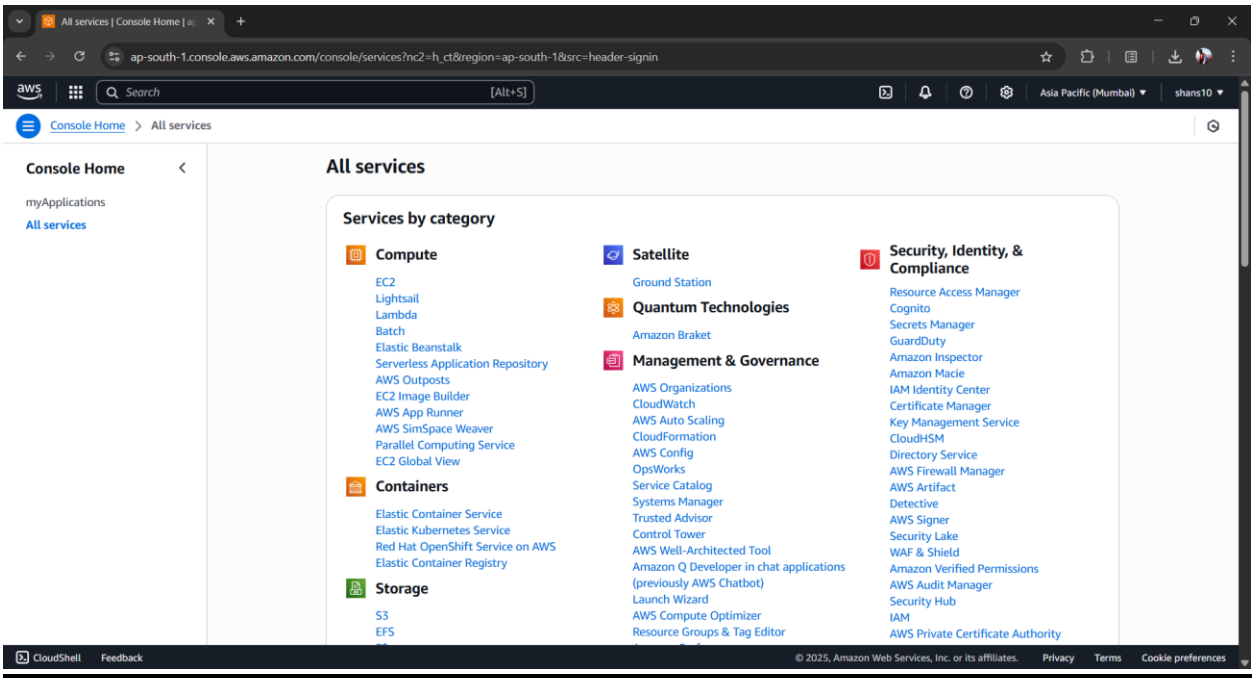
Objective: Create AWS free account and explore the services offered by AWS.

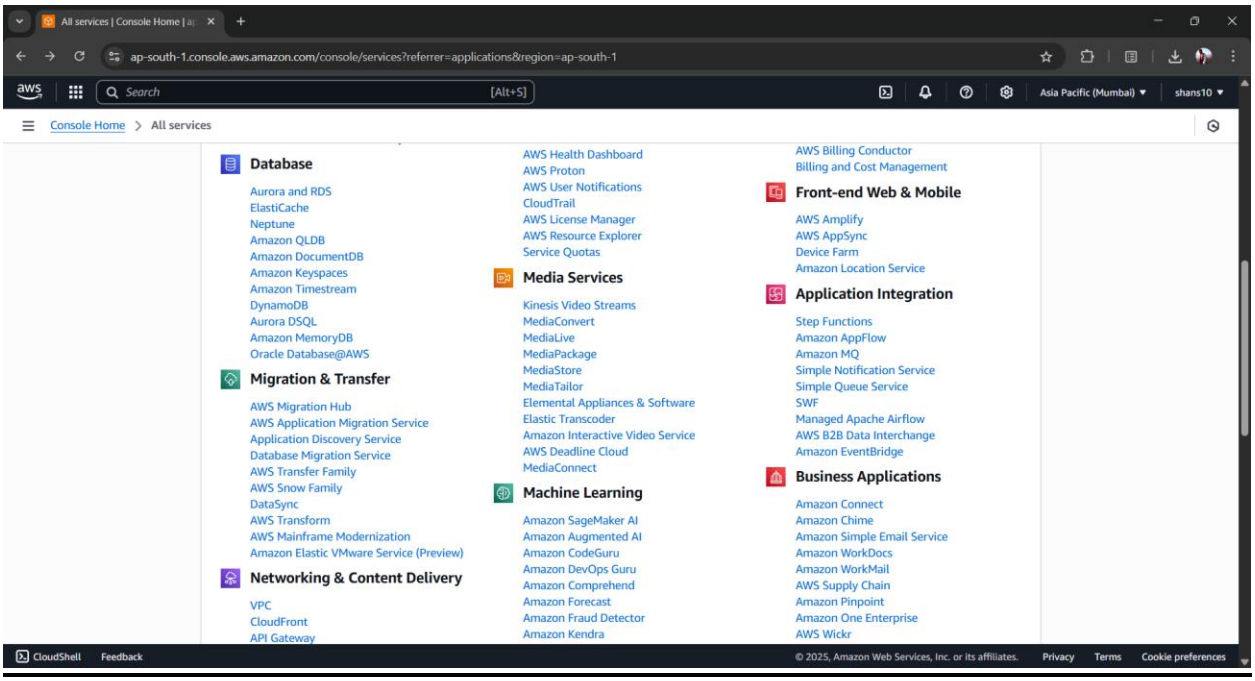
Results:

- *Account Dashboard*



- *AWS Services*




All services | Console Home
ap-south-1.console.aws.amazon.com/console/services?referrer=applications&region=ap-south-1
Search [Alt+S]
Asia Pacific (Mumbai)
shans10
Console Home > All services
Database
Aurora and RDS
ElastiCache
Neptune
Amazon QLDB
Amazon DocumentDB
Amazon Keyspaces
Amazon Timestream
DynamoDB
Aurora DSQL
Amazon MemoryDB
Oracle Database@AWS
Migration & Transfer
AWS Migration Hub
AWS Application Migration Service
Application Discovery Service
Database Migration Service
AWS Transfer Family
AWS Snow Family
DataSync
AWS Transform
AWS Mainframe Modernization
Amazon Elastic VMware Service (Preview)
Networking & Content Delivery
VPC
CloudFront
API Gateway
AWS Health Dashboard
AWS Proton
AWS User Notifications
CloudTrail
AWS License Manager
AWS Resource Explorer
Service Quotas
Media Services
Kinesis Video Streams
MediaConvert
MediaLive
MediaPackage
MediaStore
MediaTailor
Elemental Appliances & Software
Elastic Transcoder
Amazon Interactive Video Service
AWS Deadline Cloud
MediaConnect
Machine Learning
Amazon SageMaker AI
Amazon Augmented AI
Amazon CodeGuru
Amazon DevOps Guru
Amazon Comprehend
Amazon Forecast
Amazon Fraud Detector
Amazon Kendra
AWS Billing Conductor
Billing and Cost Management
Front-end Web & Mobile
AWS Amplify
AWS AppSync
Device Farm
Amazon Location Service
Application Integration
Step Functions
Amazon AppFlow
Amazon MQ
Simple Notification Service
Simple Queue Service
SWF
Managed Apache Airflow
AWS B2B Data Interchange
Amazon EventBridge
Business Applications
Amazon Connect
Amazon Chime
Amazon Simple Email Service
Amazon WorkDocs
Amazon WorkMail
AWS Supply Chain
Amazon Pinpoint
Amazon One Enterprise
AWS Wickr
CloudShell
Feedback
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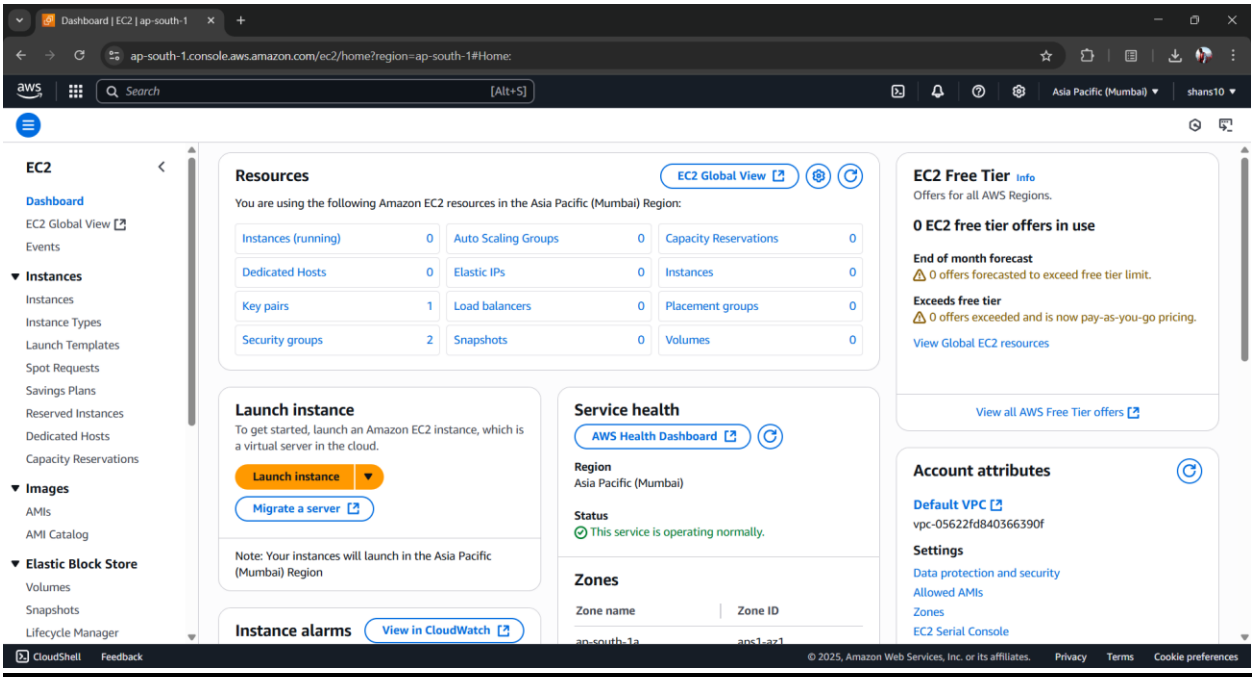
- *EC2*


Dashboard | EC2 | ap-south-1
ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#Home:
Search [Alt+S]
Asia Pacific (Mumbai)
shans10
EC2
Dashboard
EC2 Global View
Events
Instances
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
Resources
EC2 Global View
You are using the following Amazon EC2 resources in the Asia Pacific (Mumbai) Region:
Instances (running) 0
Auto Scaling Groups 0
Capacity Reservations 0
Dedicated Hosts 0
Elastic IPs 0
Instances 0
Key pairs 1
Load balancers 0
Placement groups 0
Security groups 2
Snapshots 0
Volumes 0
Launch instance
To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.
Launch instance
Migrate a server
Note: Your instances will launch in the Asia Pacific (Mumbai) Region
Instance alarms
View in CloudWatch
Service health
AWS Health Dashboard
Region
Asia Pacific (Mumbai)
Status
This service is operating normally.
Zones
Zone name
Zone ID
EC2 Free Tier Info
Offers for all AWS Regions.
0 EC2 free tier offers in use
End of month forecast
0 offers forecasted to exceed free tier limit.
Exceeds free tier
0 offers exceeded and is now pay-as-you-go pricing.
View Global EC2 resources
View all AWS Free Tier offers
Account attributes
Default VPC
vpc-05622fd840366390f
Settings
Data protection and security
Allowed AMIs
Zones
EC2 Serial Console
CloudShell
Feedback
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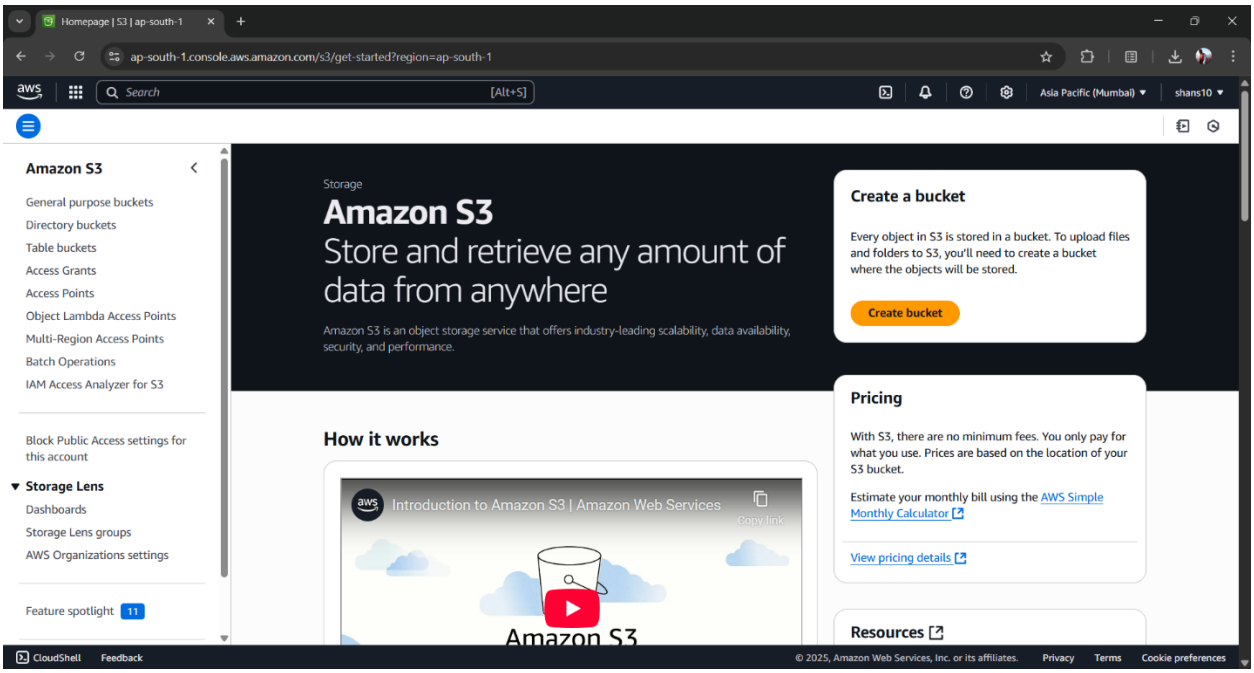
- *S3*


Homepage | S3 | ap-south-1
ap-south-1.console.aws.amazon.com/s3/get-started?region=ap-south-1
Search
[Alt+S]
Asia Pacific (Mumbai)
shans10
Amazon S3
General purpose buckets
Directory buckets
Table buckets
Access Grants
Access Points
Object Lambda Access Points
Multi-Region Access Points
Batch Operations
IAM Access Analyzer for S3
Block Public Access settings for this account
Storage Lens
Dashboards
Storage Lens groups
AWS Organizations settings
Feature spotlight 11
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 | Amazon Web Services
Copy link
Amazon S3
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
View pricing details
Resources
CloudShell
Feedback
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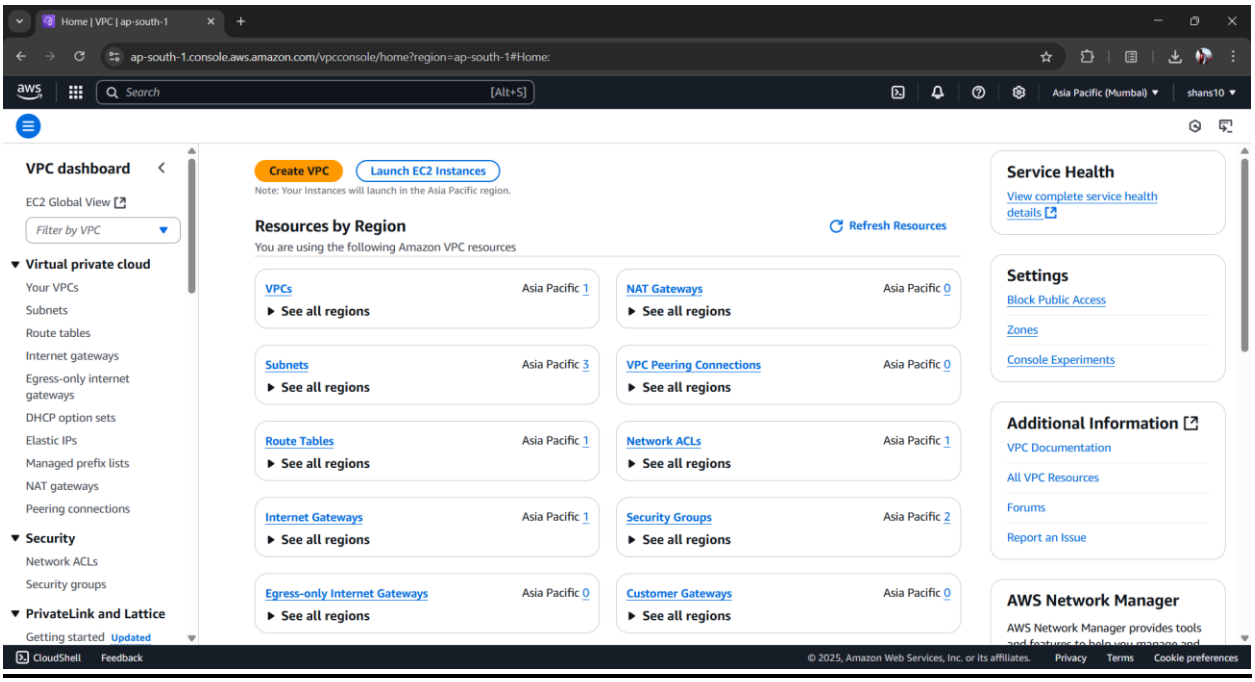
- *VPC*


Home | VPC | ap-south-1
ap-south-1.console.aws.amazon.com/vpcconsole/home?region=ap-south-1#Home:
Search
[Alt+S]
Asia Pacific (Mumbai)
shans10
VPC dashboard
EC2 Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Security
Network ACLs
Security groups
PrivateLink and Lattice
Getting started Updated
Create VPC
Launch EC2 Instances
Note: Your Instances will launch in the Asia Pacific region.
Resources by Region
Refresh Resources
You are using the following Amazon VPC resources
VPCs Asia Pacific 1
NAT Gateways Asia Pacific 0
Subnets Asia Pacific 3
VPC Peering Connections Asia Pacific 0
Route Tables Asia Pacific 1
Network ACLs Asia Pacific 1
Internet Gateways Asia Pacific 1
Security Groups Asia Pacific 2
Egress-only Internet Gateways Asia Pacific 0
Customer Gateways Asia Pacific 0
See all regions
Service Health
View complete service health details
Settings
Block Public Access
Zones
Console Experiments
Additional Information
VPC Documentation
All VPC Resources
Forums
Report an Issue
AWS Network Manager
AWS Network Manager provides tools
CloudShell
Feedback
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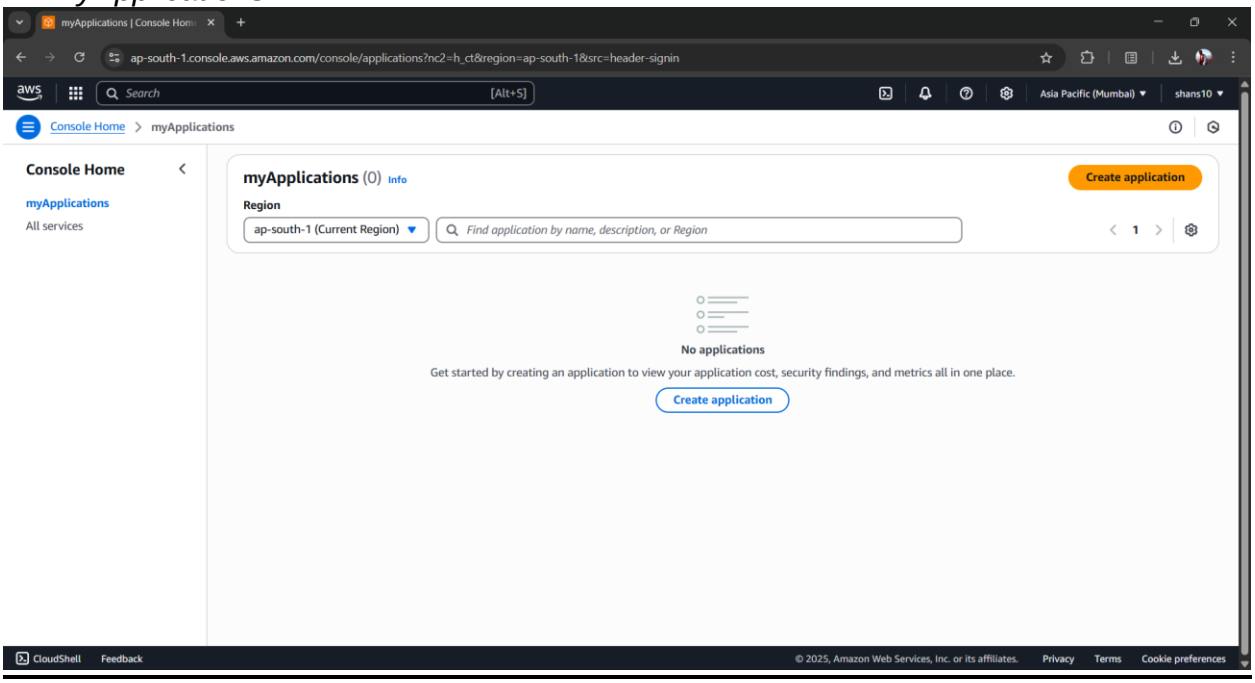
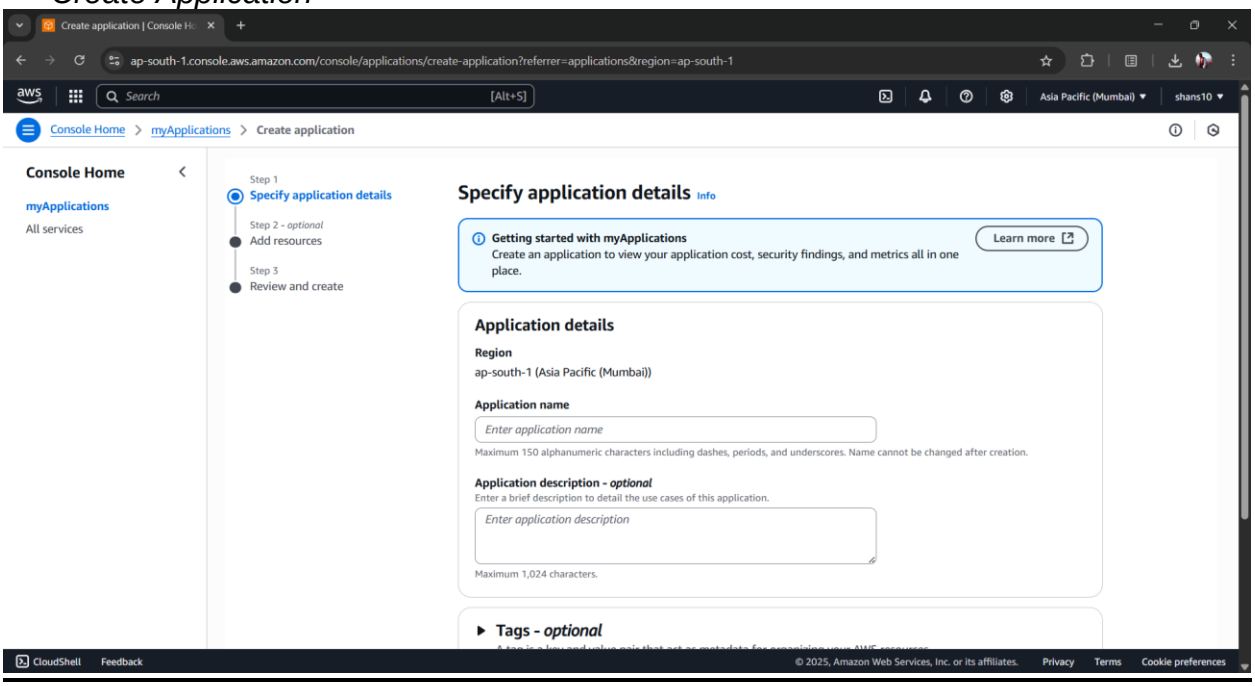
- *MyApplications*



- *Create Application*

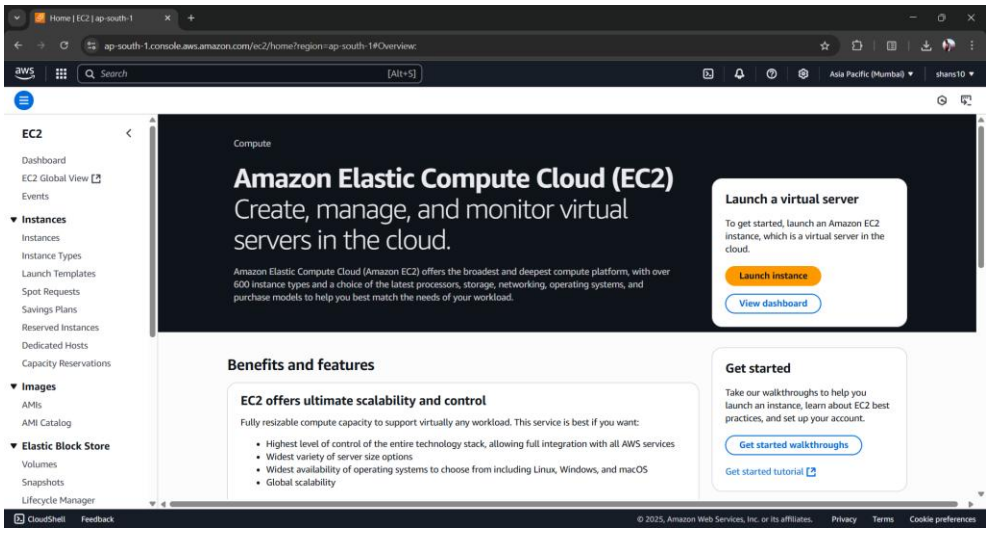


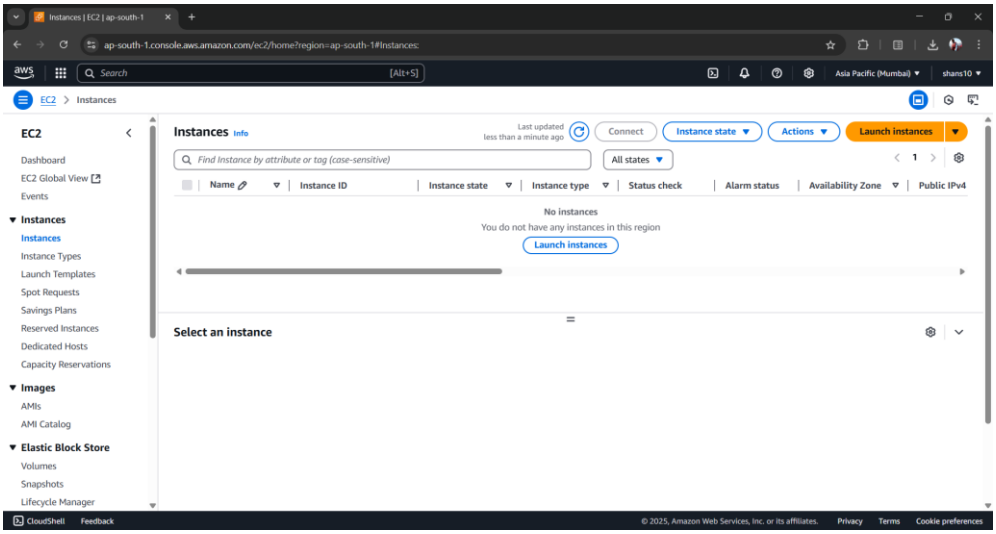
Lab-3

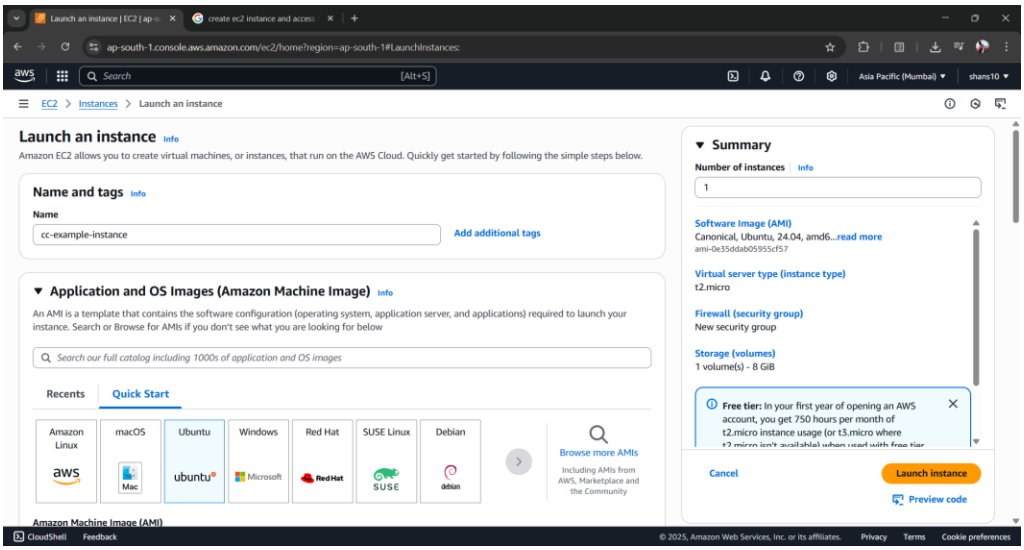
Objective: Create an EC2 instance in AWS and access it from your host machine.

Results:

- *Creating EC2 instance*






Launch an instance
EC2 > Instances > Launch an instance
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.
Name and tags Info
Name
cc-example-instance
Add additional tags
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
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Amazon Machine Image (AMI)
Summary
Number of instances Info
1
Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6...read more
ami-0e35ddab05955cf57
Virtual server type (instance type)
t2.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where
Cancel
Launch instance
Preview code
CloudShell
Feedback
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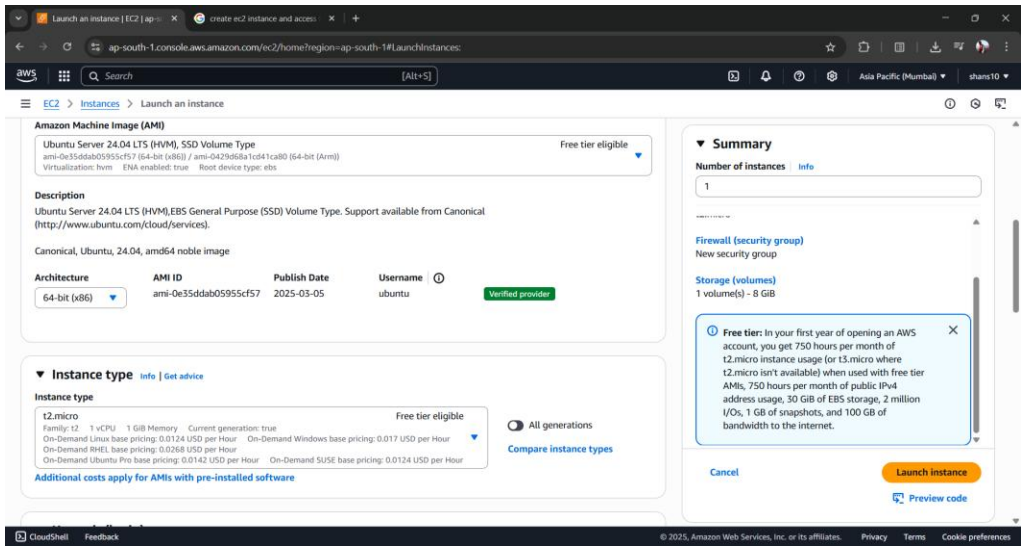
Launch an instance
EC2 > Instances > Launch an instance
Amazon Machine Image (AMI)
Ubuntu Server 24.04 LTS (HVM), SSD Volume Type
Free tier eligible
ami-0e35ddab05955cf57 (64-bit (x86)) / ami-0429d68a1cd41ca80 (64-bit (Arm))
Virtualization: hvm ENA enabled: true Root device type: ebs
Description
Ubuntu Server 24.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).
Canonical, Ubuntu, 24.04, amd64 noble image
Architecture
AMI ID
Publish Date
Username
64-bit (x86)
ami-0e35ddab05955cf57
2025-03-05
ubuntu
Verified provider
Instance type Info | Get advice
Instance type
t2.micro
Free tier eligible
Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Linux base pricing: 0.0124 USD per Hour On-Demand Windows base pricing: 0.017 USD per Hour
On-Demand RHEL base pricing: 0.0268 USD per Hour
On-Demand Ubuntu Pro base pricing: 0.0142 USD per Hour On-Demand SUSE base pricing: 0.0124 USD per Hour
All generations
Compare instance types
Additional costs apply for AMIs with pre-installed software
Summary
Number of instances Info
1
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
Cancel
Launch instance
Preview code
CloudShell
Feedback
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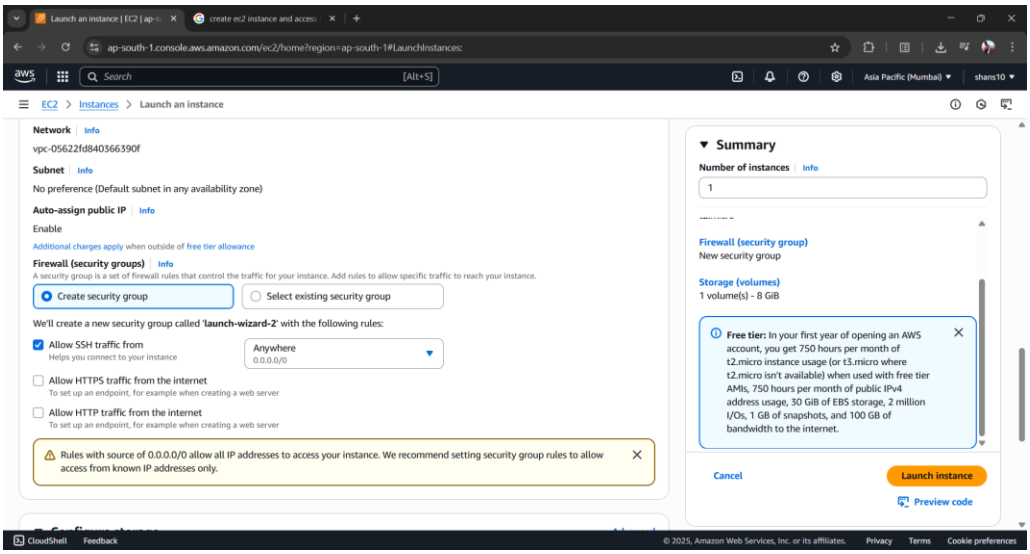
Launch an instance
EC2 > Instances > Launch an instance
Network Info
vpc-05622fd840366390f
Subnet Info
No preference (Default subnet in any availability zone)
Auto-assign public IP Info
Enable
Additional charges apply when outside of free tier allowance
Firewall (security groups) Info
A security group 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 SSH 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
To set up an endpoint, for example when creating a web server
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.
Summary
Number of instances Info
1
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.
Cancel
Launch instance
Preview code
CloudShell
Feedback
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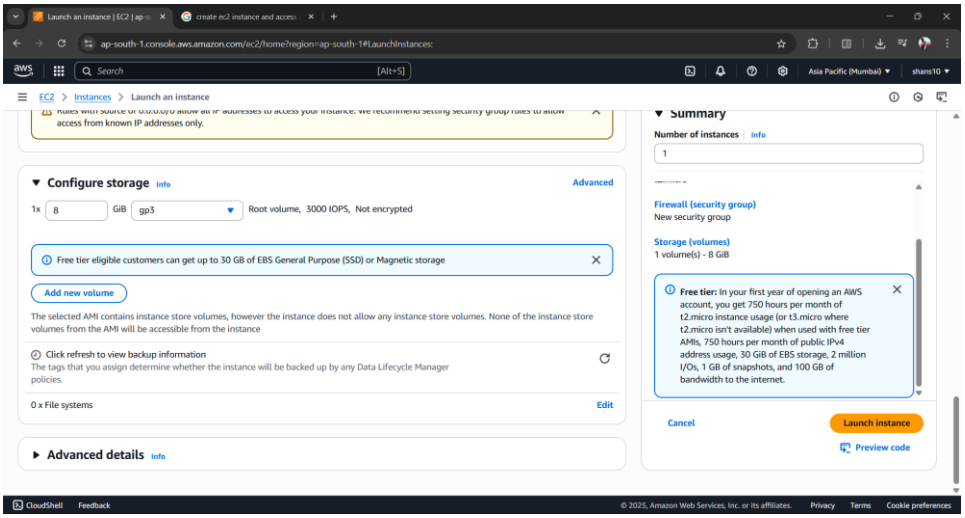
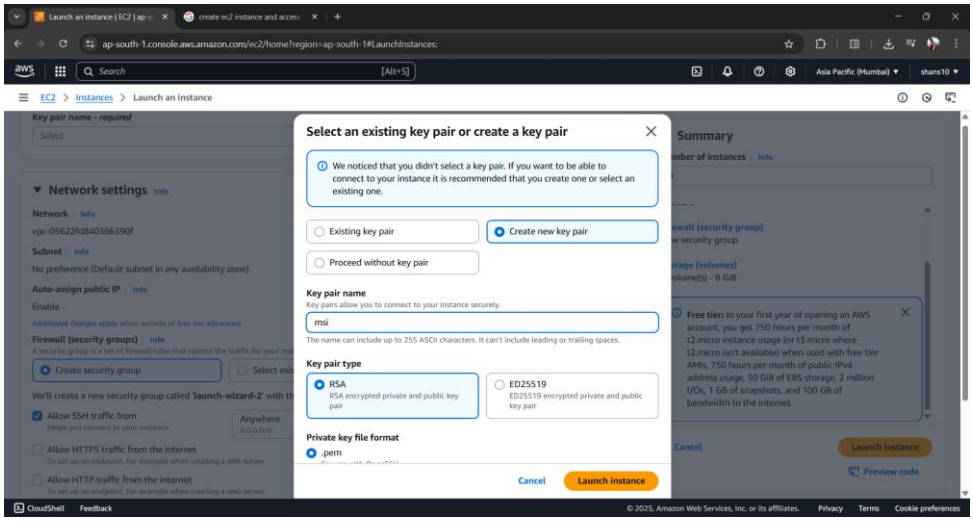
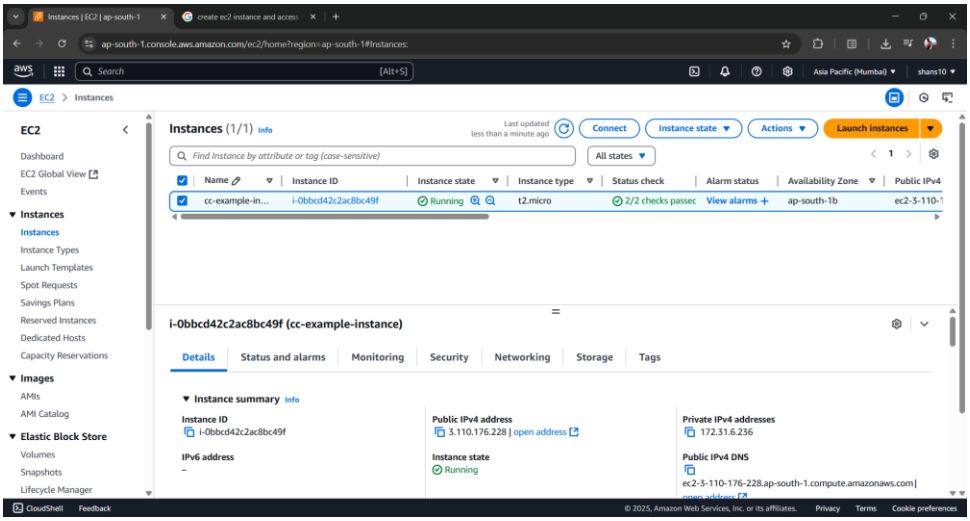
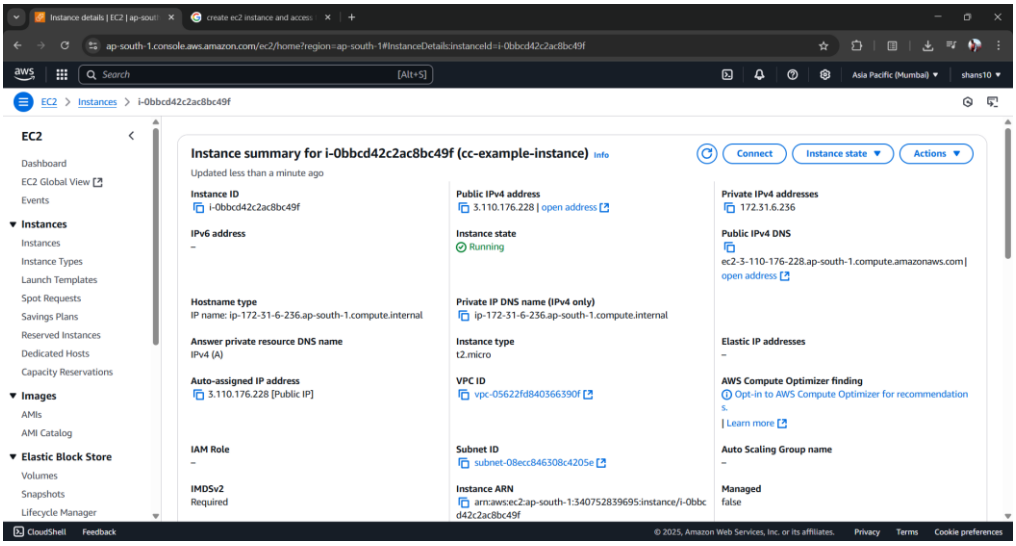




- *Accessing EC2 instance from host machine*




Instance details | EC2 | ap-south
create ec2 instance and access
ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#InstanceDetails:instanceId=i-0bbcd42c2ac8bc49f
Search
[Alt+S]
Asia Pacific (Mumbai)
shans10
EC2 > Instances > i-0bbcd42c2ac8bc49f
EC2
Dashboard
EC2 Global View
Events
Instances
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
Instance summary for i-0bbcd42c2ac8bc49f (cc-example-instance) Info
Updated less than a minute ago
Connect
Instance state
Actions
Instance ID
i-0bbcd42c2ac8bc49f
Public IPv4 address
3.110.176.228 | open address
Private IPv4 addresses
172.31.6.236
IPv6 address
–
Instance state
Running
Public IPv4 DNS
ec2-3-110-176-228.ap-south-1.compute.amazonaws.com | open address
Hostname type
IP name: ip-172-31-6-236.ap-south-1.compute.internal
Private IP DNS name (IPv4 only)
ip-172-31-6-236.ap-south-1.compute.internal
Answer private resource DNS name
IPv4 (A)
Instance type
t2.micro
Elastic IP addresses
–
Auto-assigned IP address
3.110.176.228 [Public IP]
VPC ID
vpc-05622fd840366390f
AWS Compute Optimizer finding
Opt-in to AWS Compute Optimizer for recommendations. | Learn more
IAM Role
–
Subnet ID
subnet-08ecc846308c4205e
Auto Scaling Group name
–
IMDSv2
Required
Instance ARN
arn:aws:ec2:ap-south-1:340752839695:instance/i-0bbcd42c2ac8bc49f
Managed
false
CloudShell
Feedback
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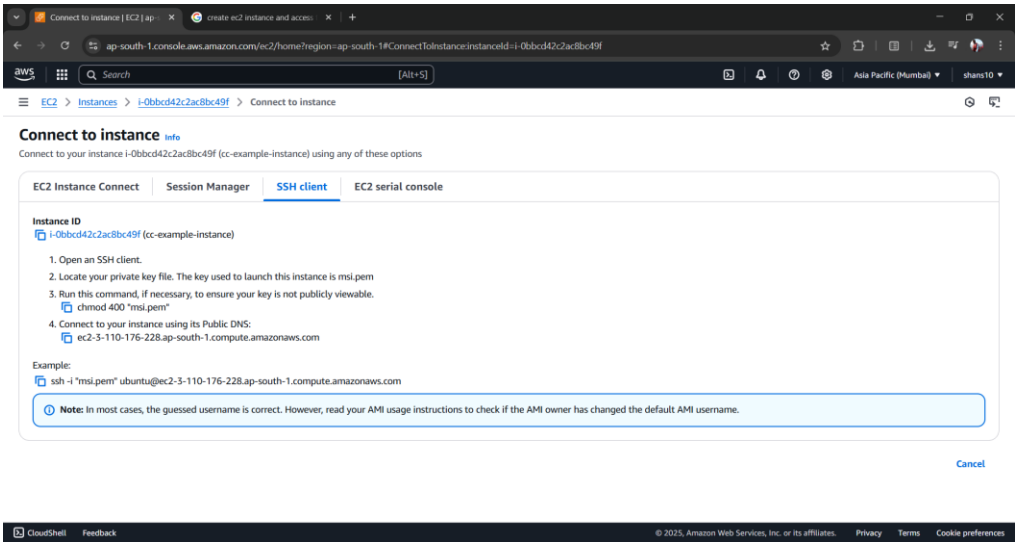
Privacy
Terms
Cookie preferences


Connect to instance | EC2 | ap
create ec2 instance and access
ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#ConnectToInstance:instanceId=i-0bbcd42c2ac8bc49f
Search
[Alt+S]
Asia Pacific (Mumbai)
shans10
EC2 > Instances > i-0bbcd42c2ac8bc49f > Connect to instance
Connect to instance Info
Connect to your instance i-0bbcd42c2ac8bc49f (cc-example-instance) using any of these options
EC2 Instance Connect
Session Manager
SSH client
EC2 serial console
Instance ID
i-0bbcd42c2ac8bc49f (cc-example-instance)
1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is msi.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
chmod 400 "msi.pem"
4. Connect to your instance using its Public DNS:
ec2-3-110-176-228.ap-south-1.compute.amazonaws.com
Example:
ssh -i "msi.pem" ubuntu@ec2-3-110-176-228.ap-south-1.compute.amazonaws.com
Note: In most cases, the guessed username is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.
Cancel
CloudShell
Feedback
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Privacy
Terms
Cookie preferences

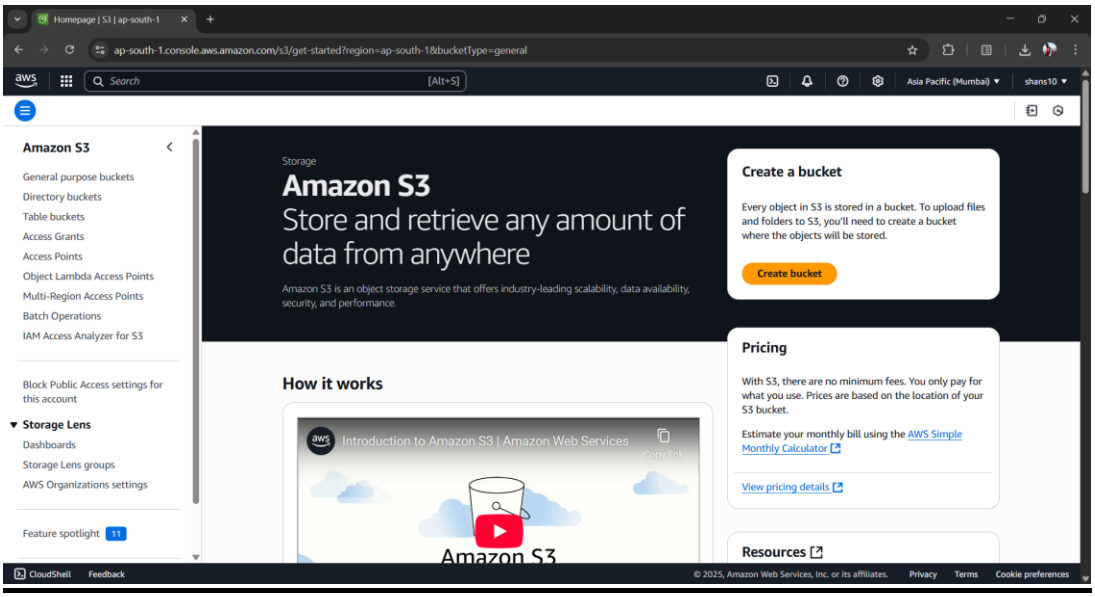

ubuntu@ip-172-31-6-236: ~
PS C:\Users\shant\Downloads> ssh -i "msi.pem" ubuntu@ec2-3-110-176-228.ap-south-1.compute.amazonaws.com
The authenticity of host 'ec2-3-110-176-228.ap-south-1.compute.amazonaws.com (3.110.176.228)' can't be established.
ED25519 key fingerprint is SHA256:lnixqMlE6F8+Yji2AfQduAqcBS97wuJ2x5BEhS74RU4.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-110-176-228.ap-south-1.compute.amazonaws.com' (ED25519) to the list of known hosts.
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-1024-aws x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro
System information as of Sat May 17 08:41:35 UTC 2025
System load: 0.03
Usage of /: 25.0% of 6.71GB
Memory usage: 20%
Swap usage: 0%
Processes: 106
Users logged in: 0
IPv4 address for enX0: 172.31.6.236
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.
Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status
The list of available updates is more than a week old.
To check for new updates run: sudo apt update
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
ubuntu@ip-172-31-6-236:~$

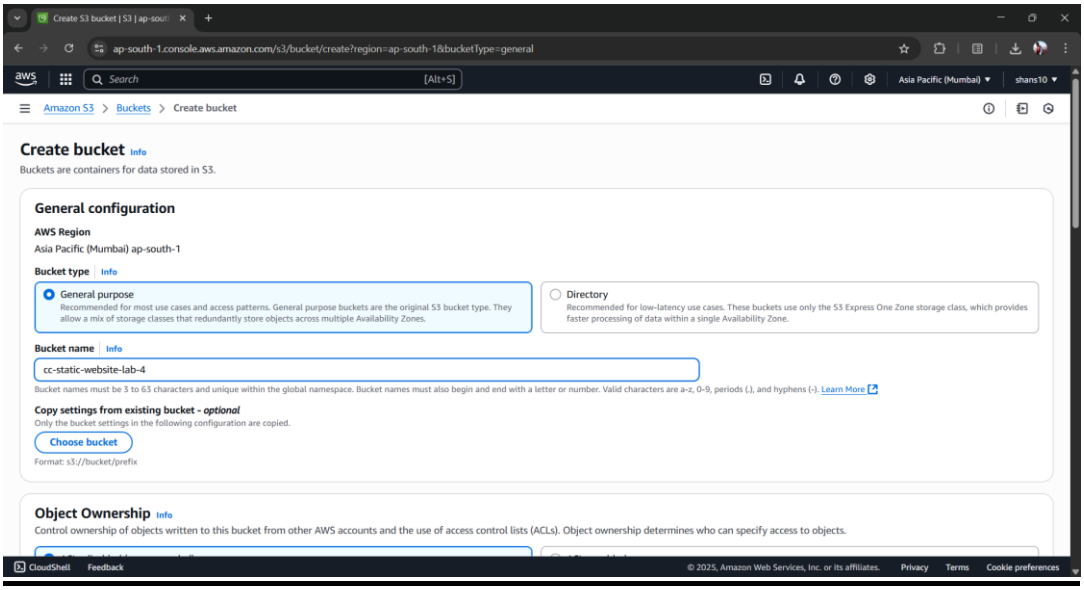
Lab-4

Objective: Host a static website using S3 in AWS.

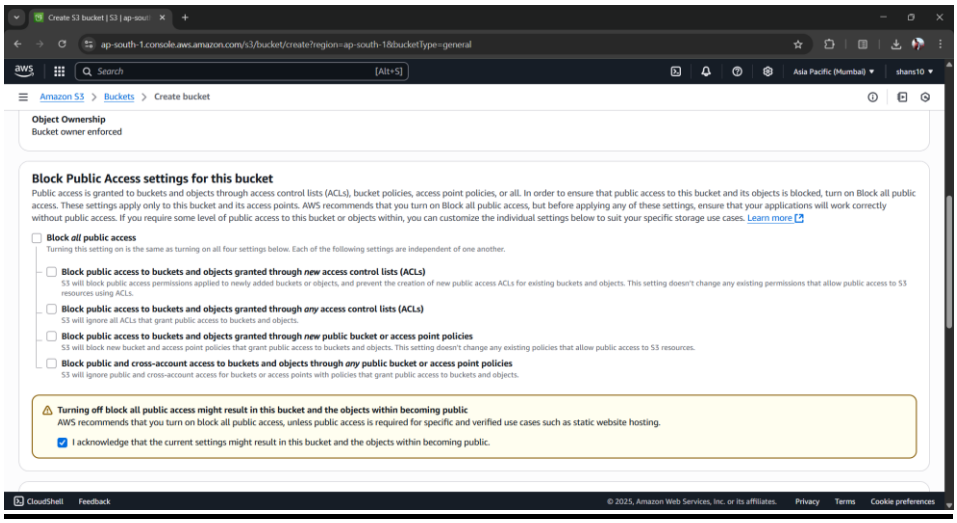
Results:

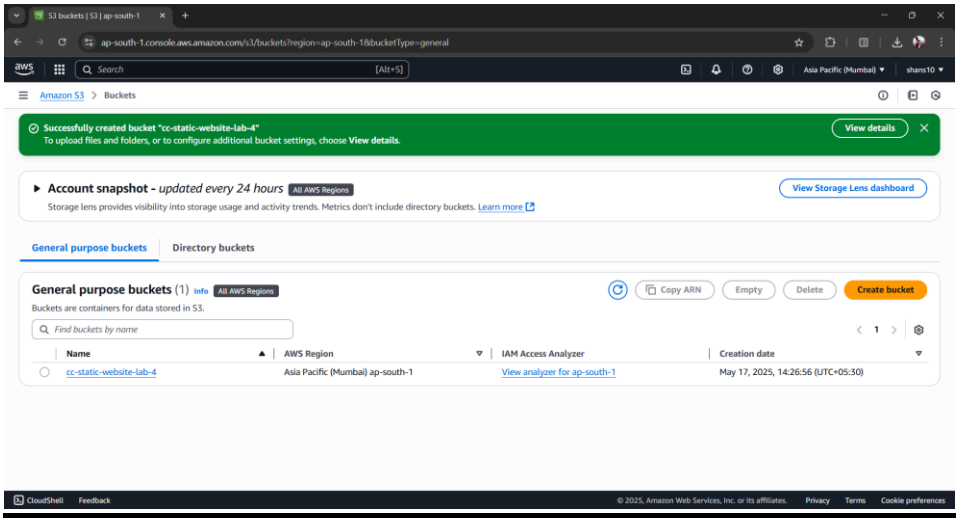
1. *Create an S3 bucket -*



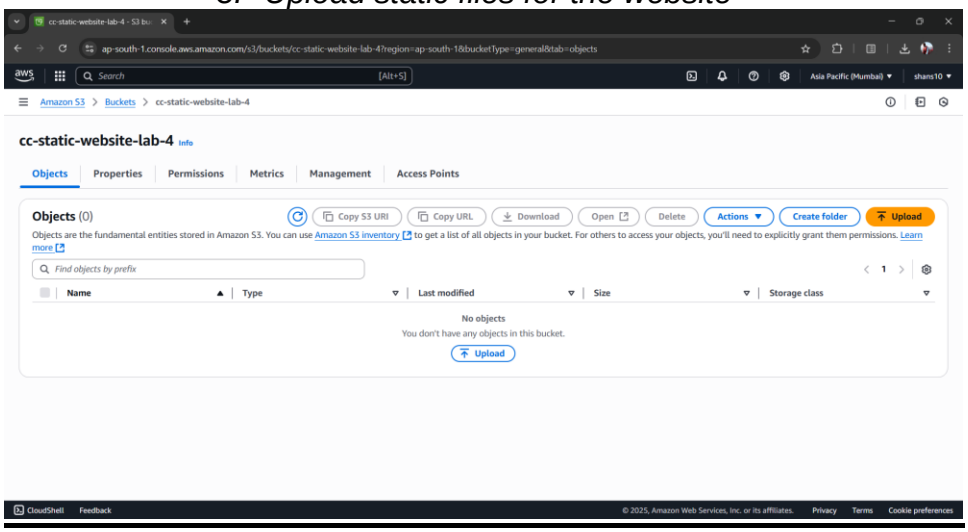


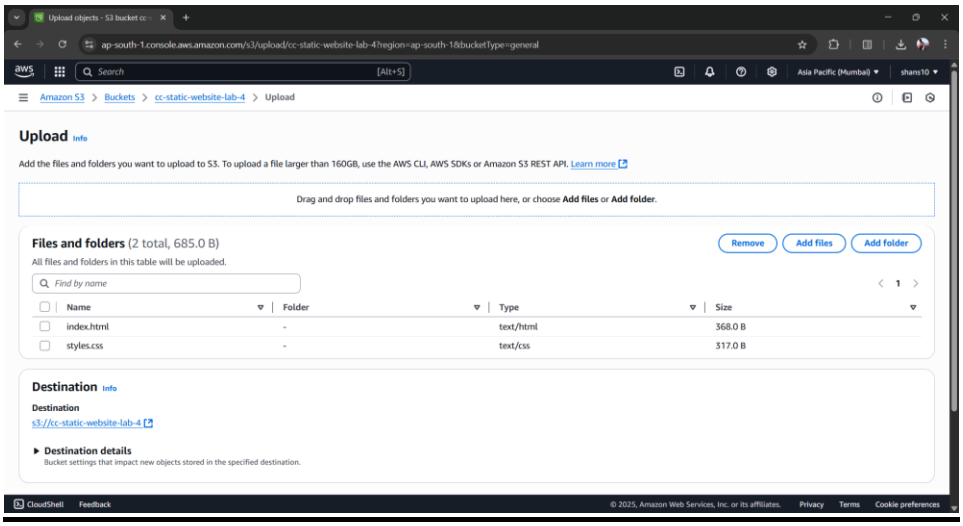
2. *Enable Public Access for the bucket -*

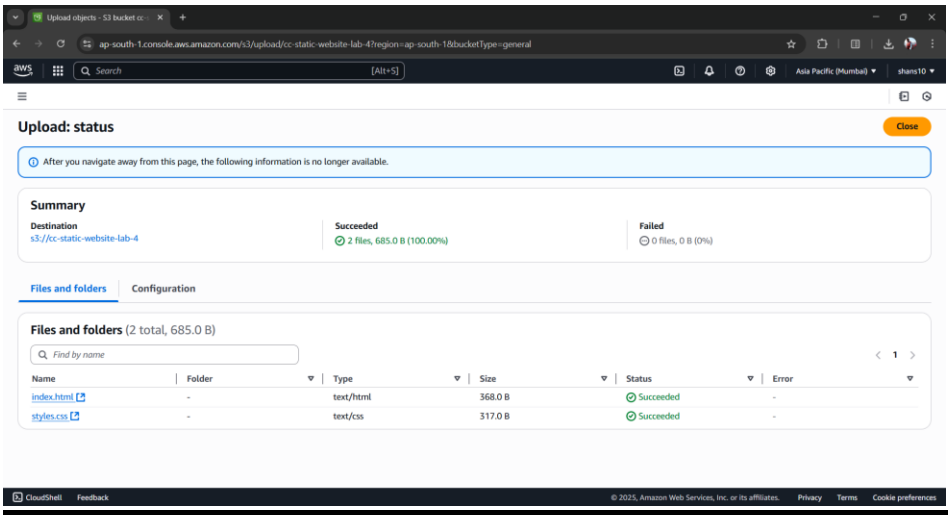




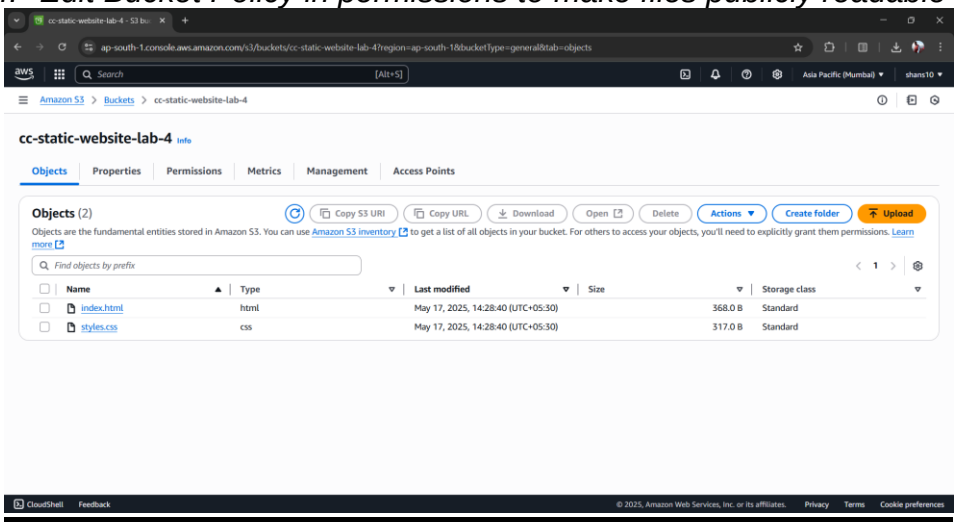
3. *Upload static files for the website -*

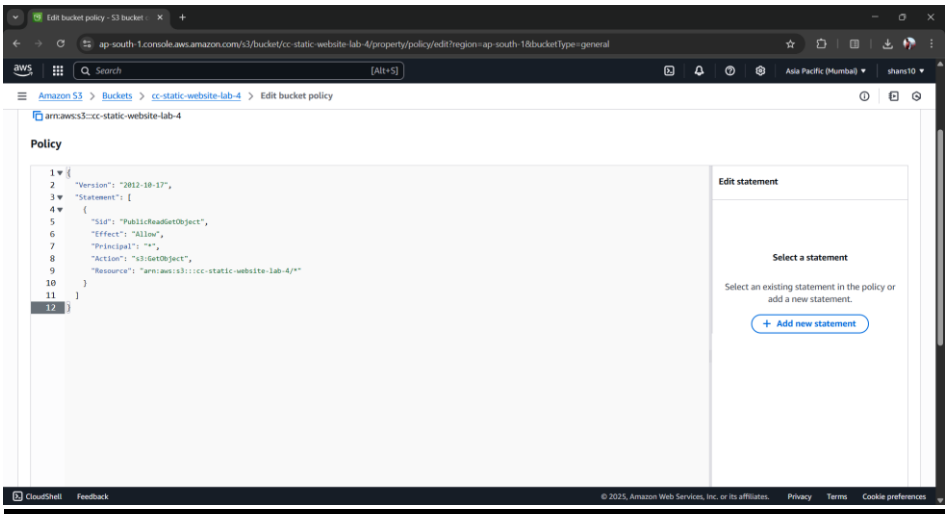




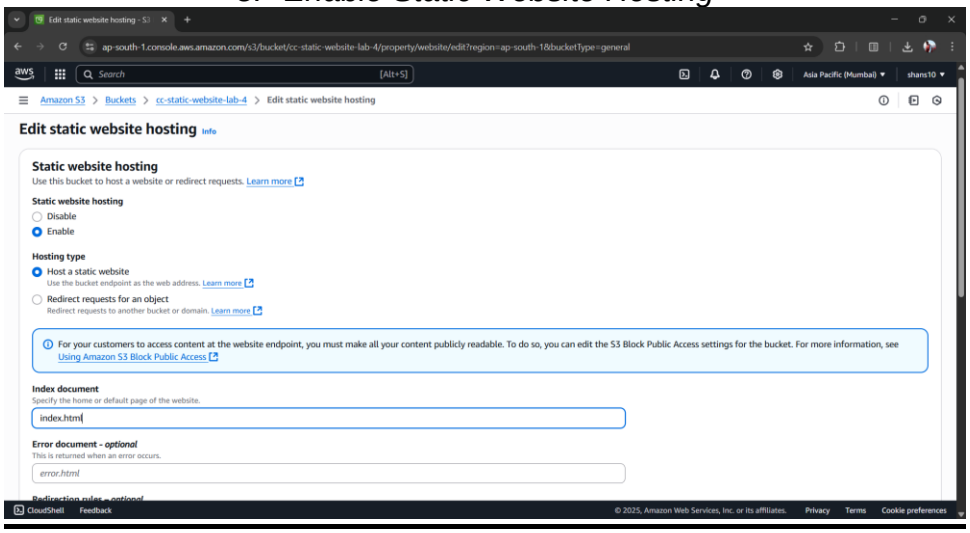


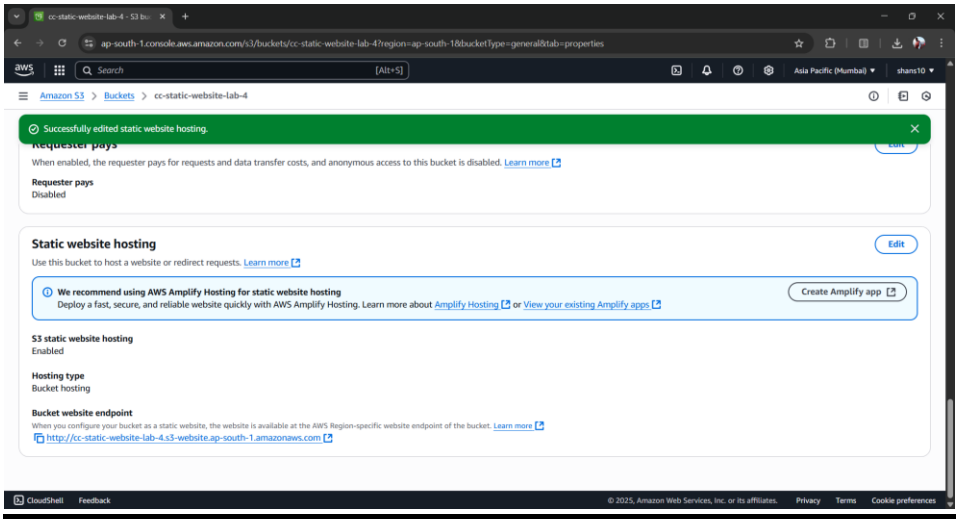
4. *Edit Bucket Policy in permissions to make files publicly readable -*



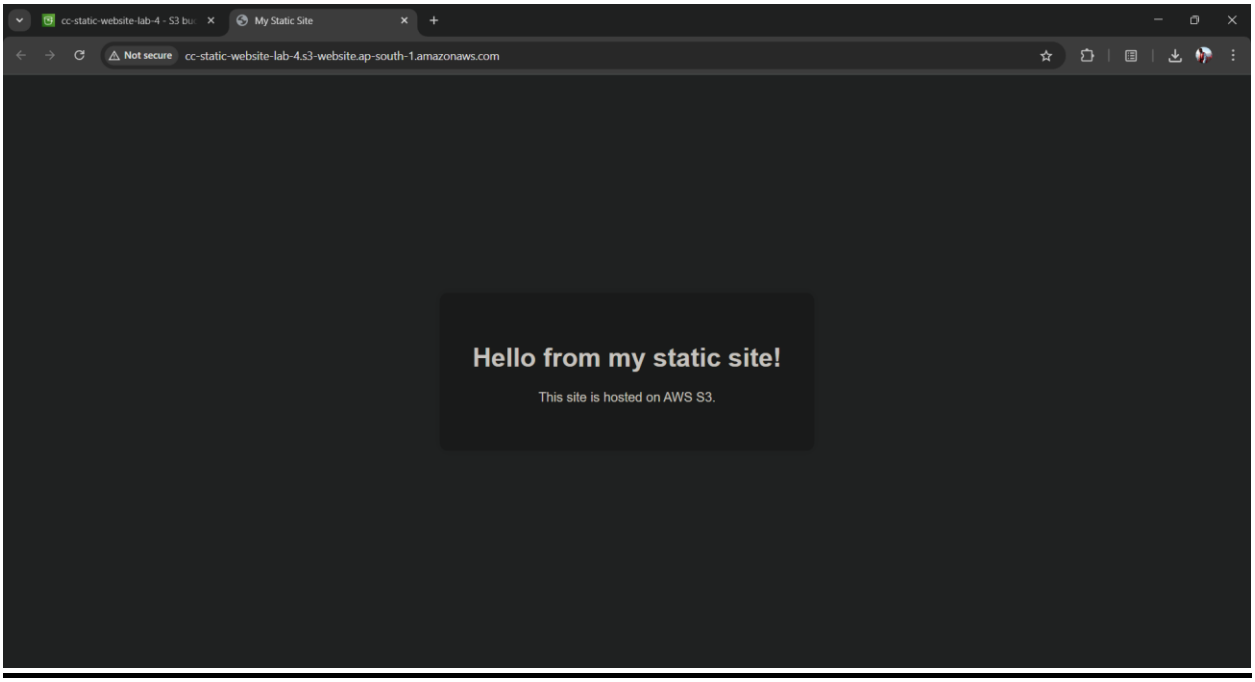


5. *Enable Static Website Hosting -*





6. *Access the website on the public ip address -*



Lab-5

Objective: Perform a comparative analysis of the services offered by Google, AWS and Microsoft clouds.

Results:

1. Compute Services:

Feature	*AWS*	*Microsoft Azure*	*GCP*
Virtual Machines	EC2	Azure Virtual Machines	Compute Engine
Serverless	AWS Lambda	Azure Functions	Cloud Functions
Containers	ECS, EKS, Fargate	AKS, Azure Container Instances	GKE, Cloud Run
App Hosting (PaaS)	Elastic Beanstalk	Azure App Services	App Engine
Auto Scaling	Auto Scaling Groups	Virtual Machine Scale Sets	Instance Groups

2. Networking

Feature	*AWS*	*Microsoft Azure*	*GCP*
VPC / Networking	VPC	Virtual Network	VPC
Load Balancing	Elastic Load Balancing	Azure Load Balancer / Application Gateway	Cloud Load Balancing
CDN	CloudFront	Azure CDN	Cloud CDN
DNS	Route 53	Azure DNS	Cloud DNS

3. Storage and Databases:

Feature	AWS	Microsoft Azure	GCP
Object Storage	S3	Azure Blob Storage	Cloud Storage
Block Storage	EBS	Azure Disk Storage	Persistent Disks
File Storage	EFS, FSx	Azure Files	Filestore
Relational DB (SQL)	RDS (PostgreSQL, MySQL, etc.)	Azure SQL, PostgreSQL, MySQL	Cloud SQL, AlloyDB
NoSQL	DynamoDB	Cosmos DB	Firestore, Bigtable
Data Warehousing	Redshift	Synapse Analytics	BigQuery

4. AI/ML Services:

Feature	AWS	Microsoft Azure	GCP
Pre-built AI APIs	Rekognition, Polly, Comprehend	Azure Cognitive Services	Vision AI, Speech-to-Text, etc.
ML Platform	SageMaker	Azure Machine Learning	Vertex AI
TPU Support	No	No	Yes (Tensor Processing Units)

5. Developer & DevOps Tools:

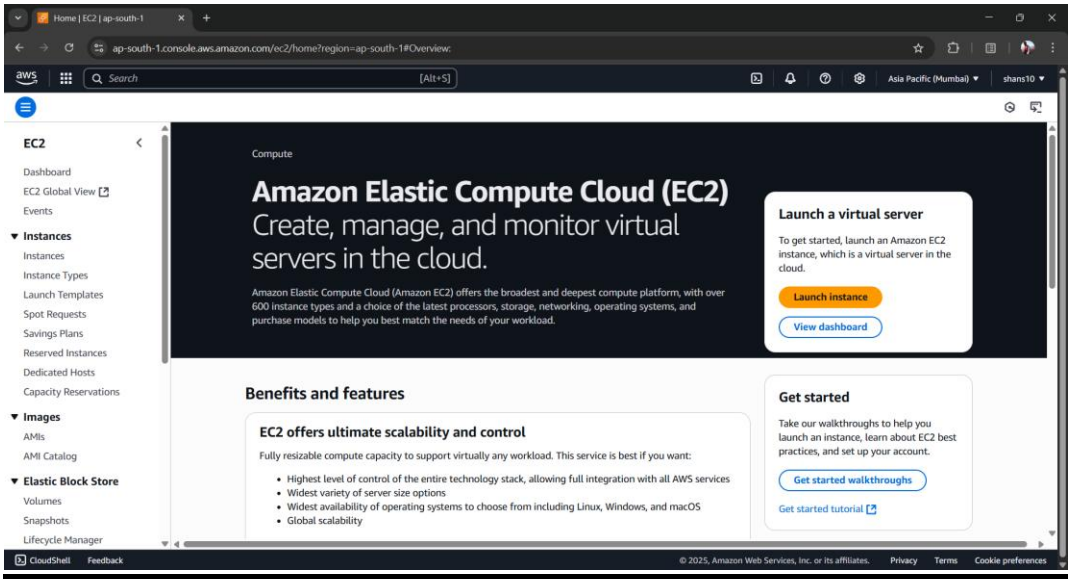
Feature	AWS	Microsoft Azure	GCP
CI/CD	CodePipeline, CodeBuild	Azure DevOps, GitHub Actions	Cloud Build
IaC (Infrastructure as Code)	CloudFormation	ARM Templates, Bicep	Deployment Manager, Terraform support
Monitoring	CloudWatch	Azure Monitor	Cloud Monitoring (Stackdriver)

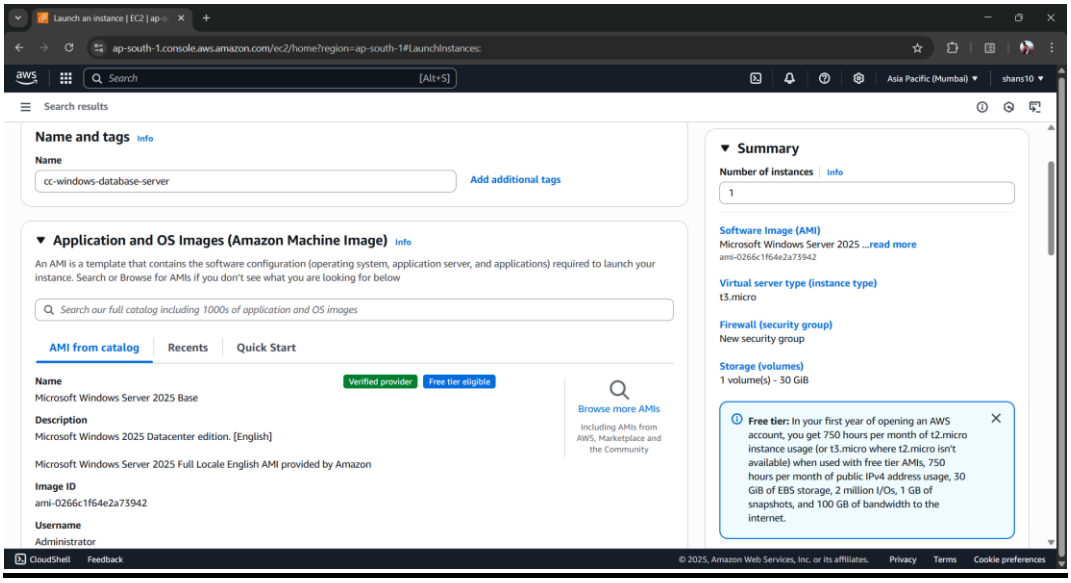
Lab-6

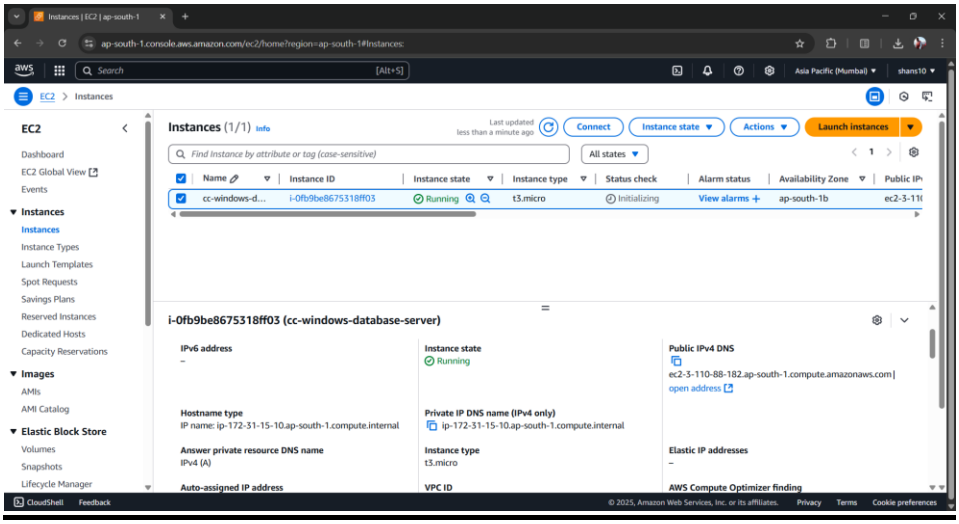
Objective: Create a windows EC2 instance and prepare a database server to be accessed by a web application.

Results:

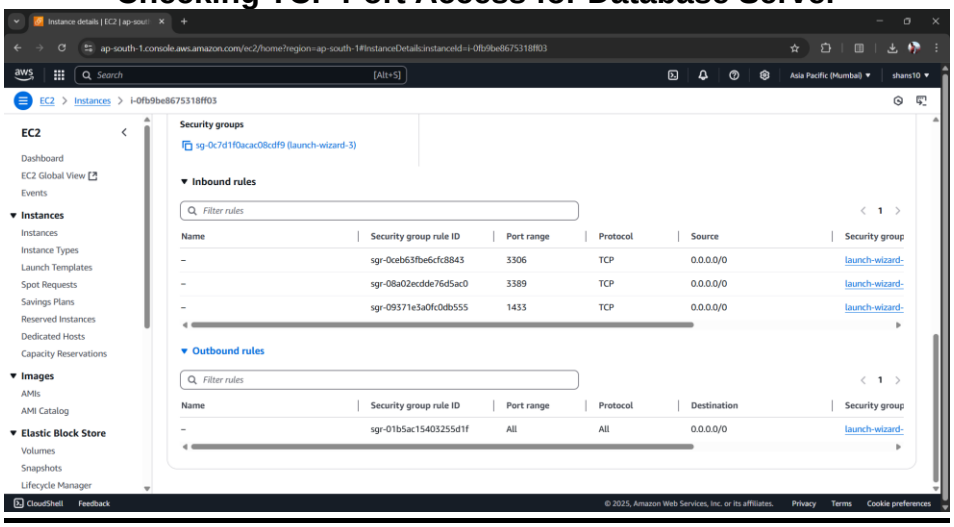
- *Step 1: Launch a Windows EC2 Instance*



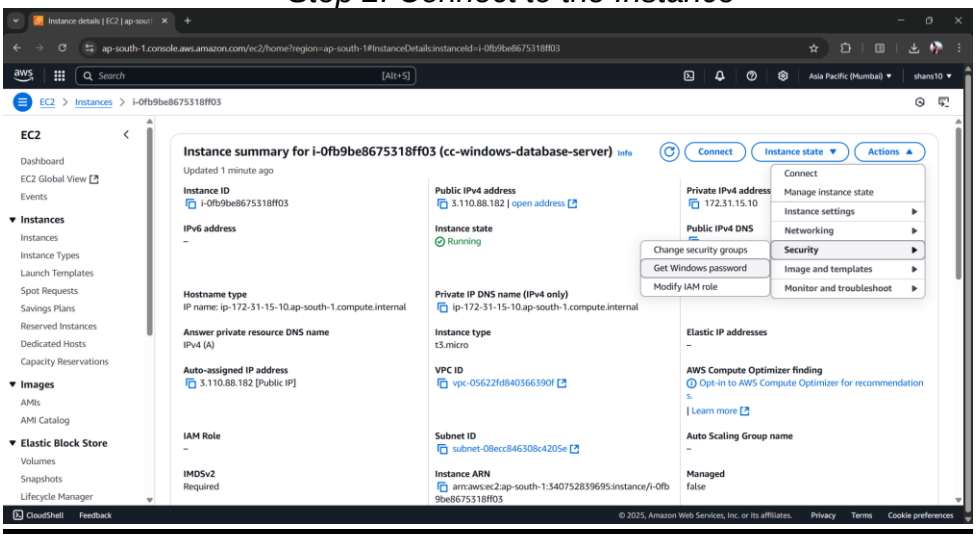


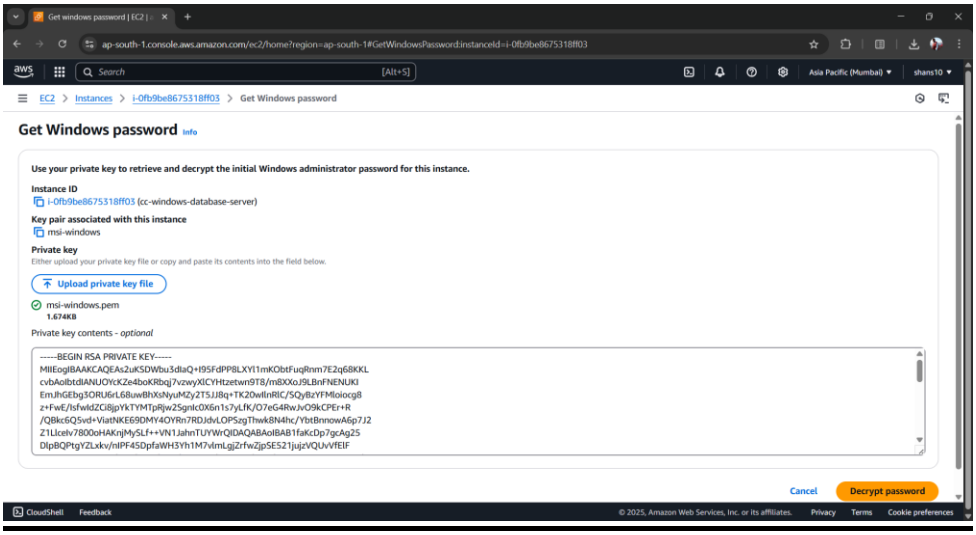


Checking TCP Port Access for Database Server



- *Step 2: Connect to the Instance*




Get windows password | EC2
ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#GetWindowsPassword:instanceId=i-0fb9be8675318ff03
Search
[Alt+S]
Asia Pacific (Mumbai)
shans10
EC2 > Instances > i-0fb9be8675318ff03 > Get Windows password
Get Windows password Info
Use your private key to retrieve and decrypt the initial Windows administrator password for this instance.
Instance ID
i-0fb9be8675318ff03 (cc-windows-database-server)
Key pair associated with this instance
msi-windows
Private key
Either upload your private key file or copy and paste its contents into the field below.
Upload private key file
msi-windows.pem
1.674KB
Private key contents - optional
-----BEGIN RSA PRIVATE KEY-----
MIIEogIBAAKCAQEAs2uKSDWbu3dlaQ+f95FdPP8LXYl1mKObtFuqRnm7E2q68KKL
cvbAoIbtdlANUOYcKZe4boKRbqj7vzwyXlCYHtzetwn9T8/m8XXoJ9LBnFNENUKI
EmJhGEbg3ORU6rL68uwBhXsNyuMZy2T5JJ8q+TK20wIlnRIC/SQyBzYFMloiocg8
z+FwE/IsfwkdZCi8jpYkTYMTpRjw2Sgnlc0X6n1s7yLfK/O7eG4RwJvO9kCPEr+R
/QBkc6Q5vd+ViatNKE69DMY4OYRn7RDJdvLOPSzgThwk8N4hc/YbtBnnowA6p7J2
Z1LIcelv7800oHAKnjMy5Lf++VN1JahnTUYWrQIDAQABAoIBAB1faKcDp7gcAg25
DIpBQPtgYZLxkv/nIPF45DpfaWH3Yh1M7vlmLgjZrfwZjpSE521jujzVQUvVfElF
Cancel
Decrypt password
CloudShell
Feedback
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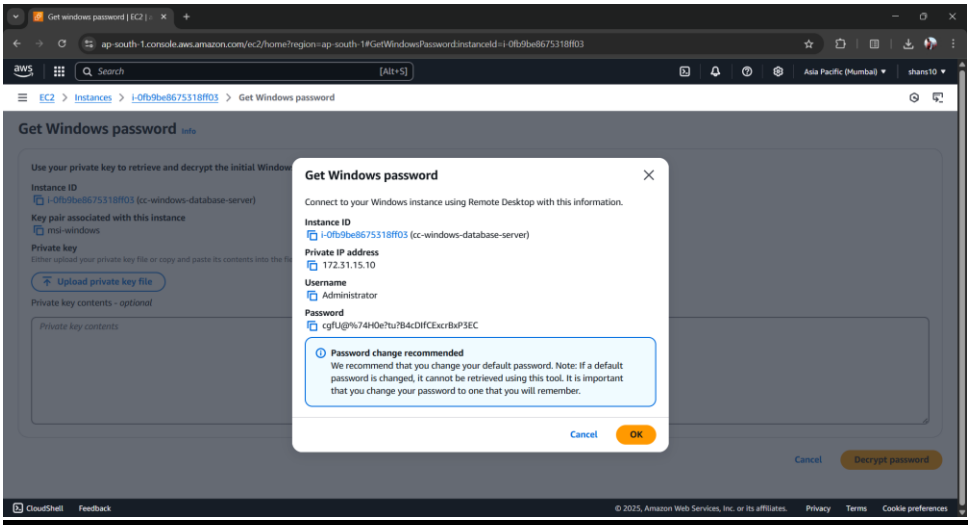
Get windows password | EC2
ap-south-1.console.aws.amazon.com/ec2/home?region=ap-south-1#GetWindowsPassword:instanceId=i-0fb9be8675318ff03
Search
[Alt+S]
Asia Pacific (Mumbai)
shans10
EC2 > Instances > i-0fb9be8675318ff03 > Get Windows password
Get Windows password Info
Use your private key to retrieve and decrypt the initial Windows
Instance ID
i-0fb9be8675318ff03 (cc-windows-database-server)
Key pair associated with this instance
msi-windows
Private key
Upload private key file
Private key contents - optional
Private key contents
Get Windows password
Connect to your Windows instance using Remote Desktop with this information.
Instance ID
i-0fb9be8675318ff03 (cc-windows-database-server)
Private IP address
172.31.15.10
Username
Administrator
Password
cgfU@%74HOe?tu?B4cDIfCExcrBxP3EC
Password change recommended
We recommend that you change your default password. Note: If a default password is changed, it cannot be retrieved using this tool. It is important that you change your password to one that you will remember.
Cancel
OK
Cancel
Decrypt password
CloudShell
Feedback
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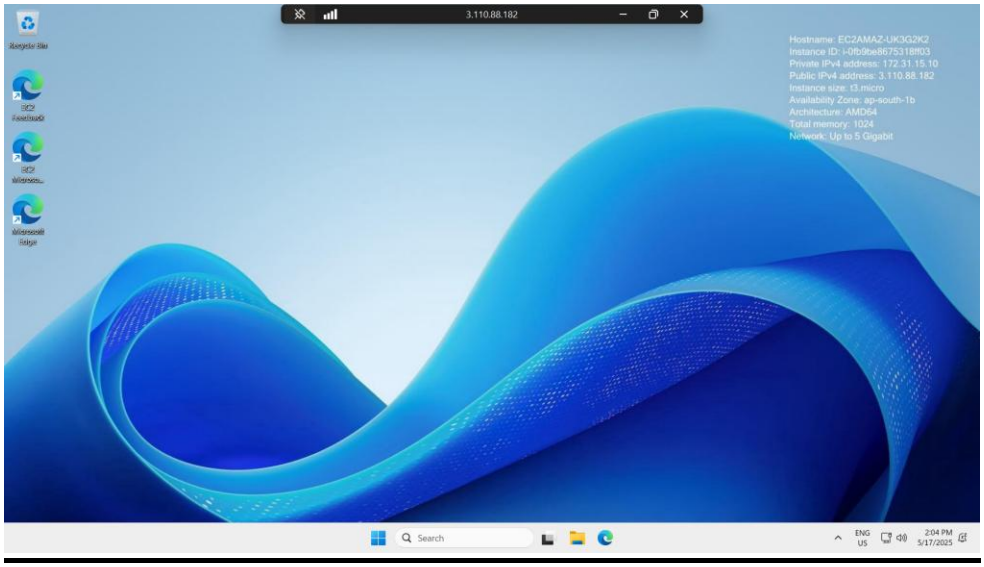
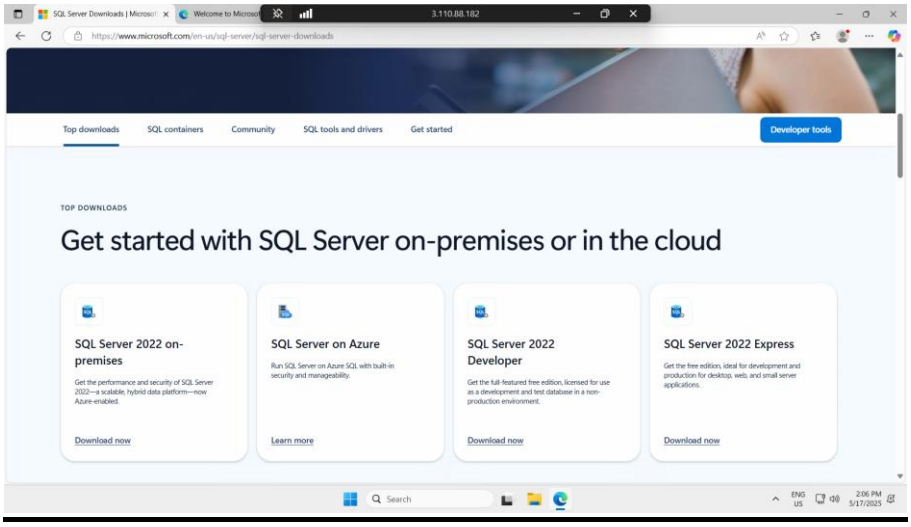
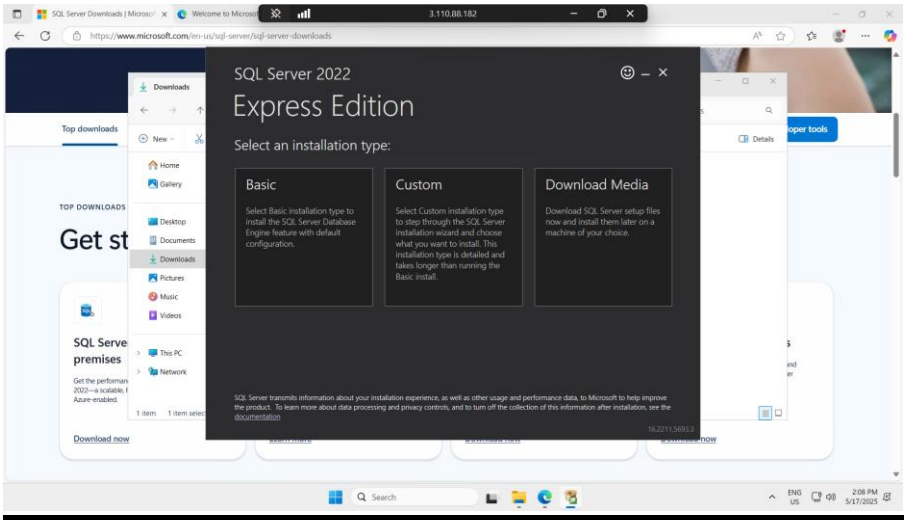
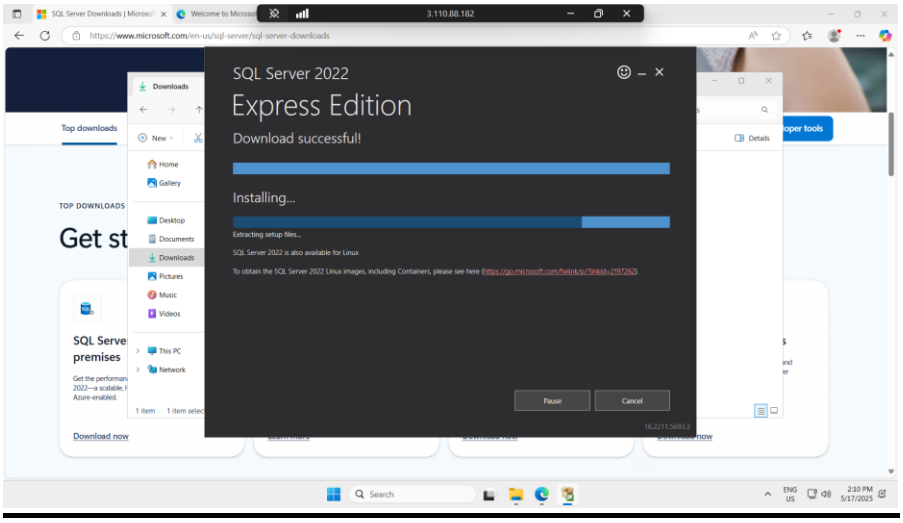
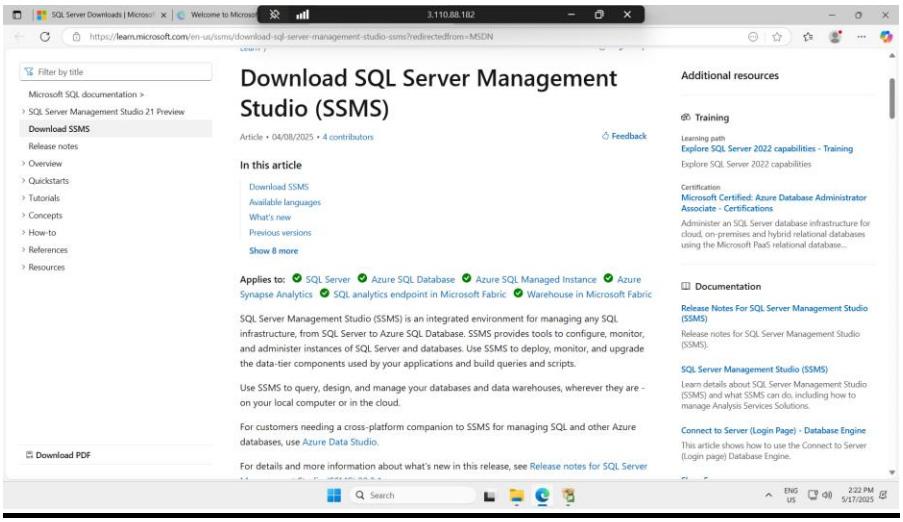

3.110.88.182
Hostname: EC2AMAZ-UK3G2K2
Instance ID: i-0fb9be8675318ff03
Private IPv4 address: 172.31.15.10
Public IPv4 address: 3.110.88.182
Instance size: t3.micro
Availability Zone: ap-south-1b
Architecture: AMD64
Total memory: 1024
Network: Up to 5 Gigabit
Search
ENG
US
2:04 PM
5/17/2025

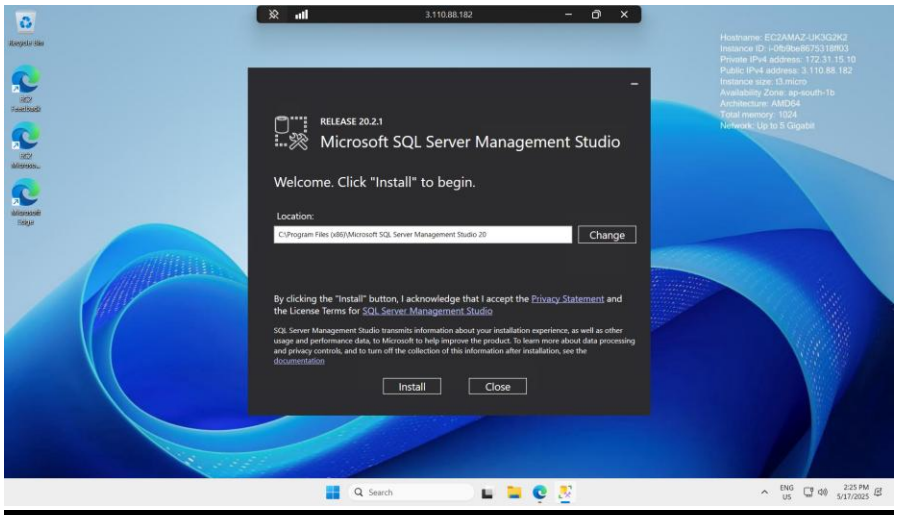
- *Step 3: Install a Database Server*



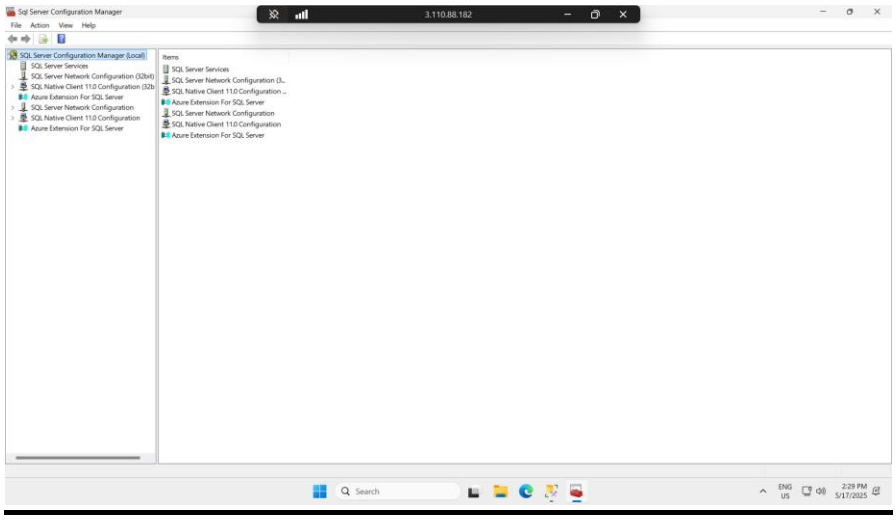


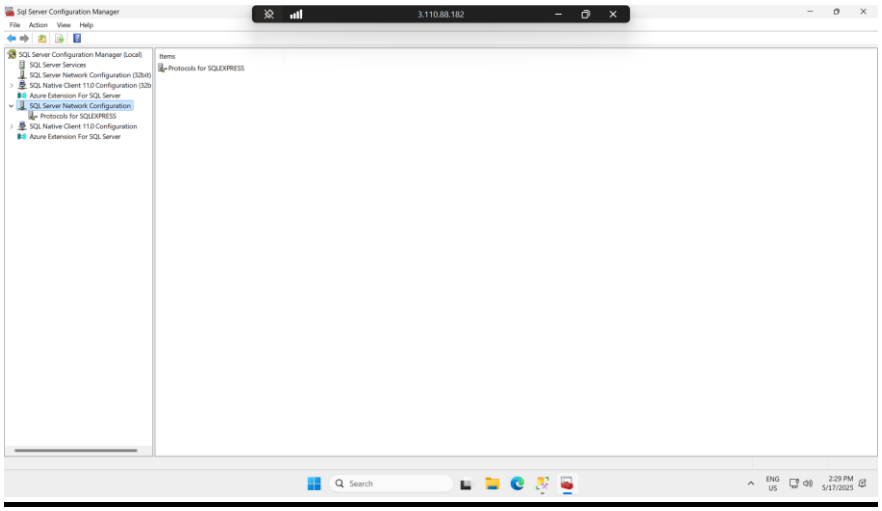


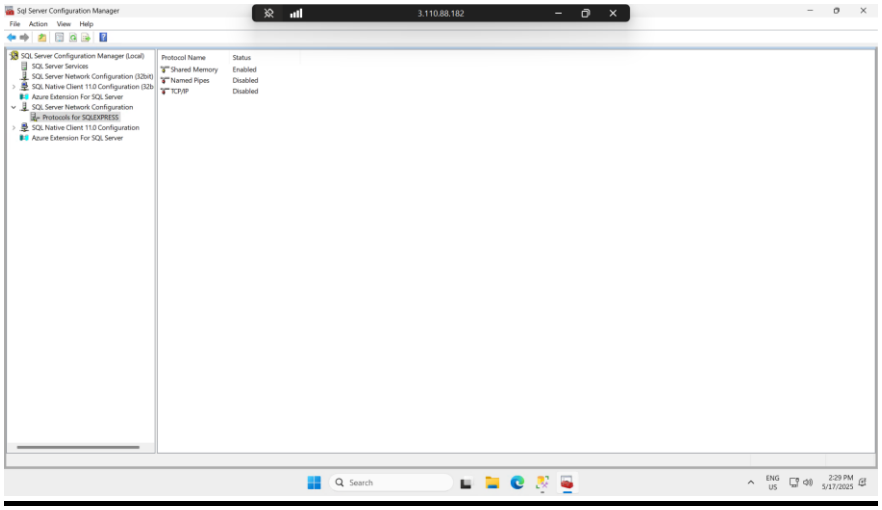


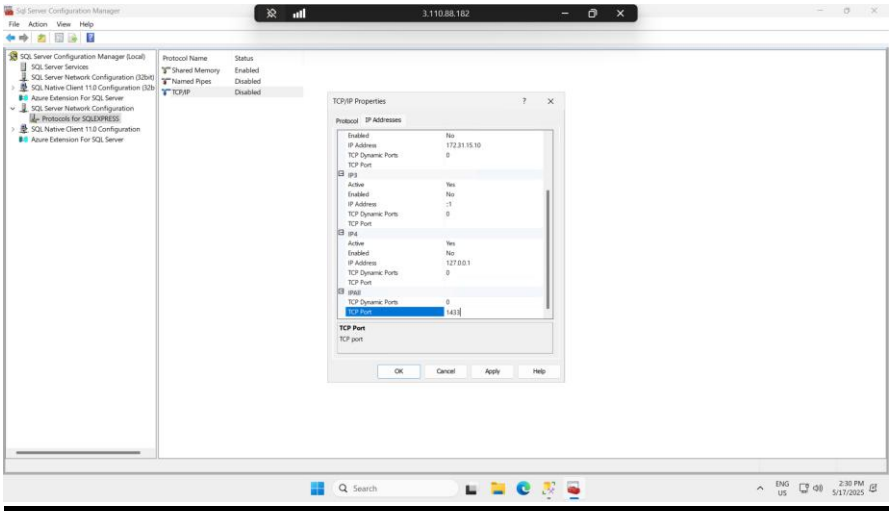


- *Step 4: Configure Database Access*

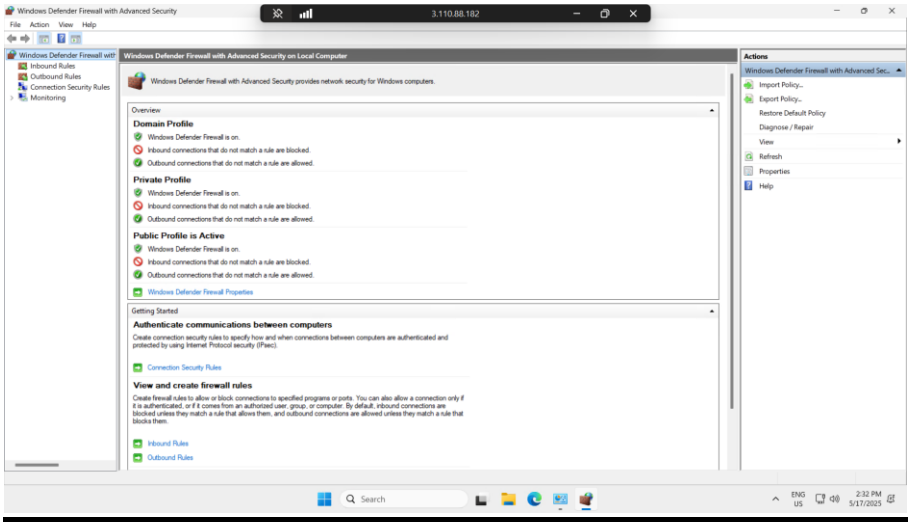


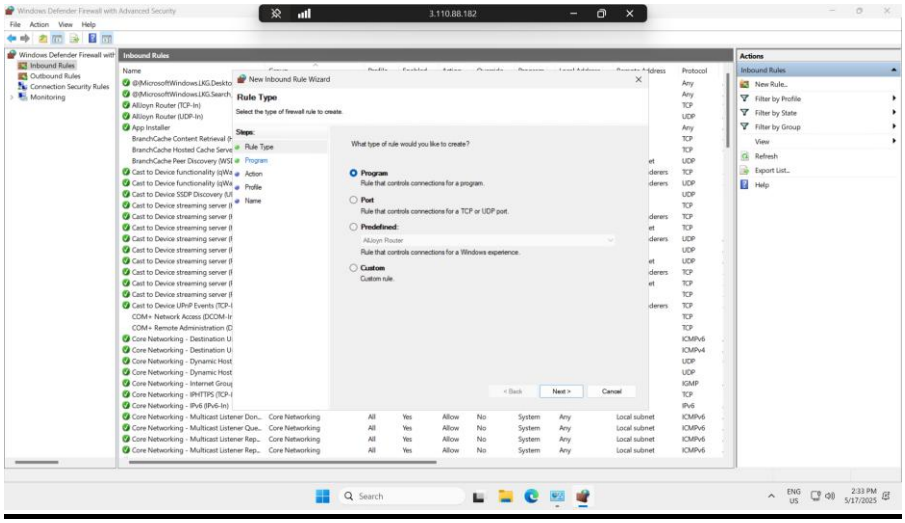

3.110.88.182
Sql Server Configuration Manager
File Action View Help
SQL Server Configuration Manager (Local)
SQL Server Services
SQL Server Network Configuration (32bit)
SQL Native Client 11.0 Configuration (32b
Azure Extension For SQL Server
SQL Server Network Configuration
Protocols for SQLEXPRESS
SQL Native Client 11.0 Configuration
Azure Extension For SQL Server
Items
Protocols for SQLEXPRESS
Search
ENG
US
2:29 PM
5/17/2025

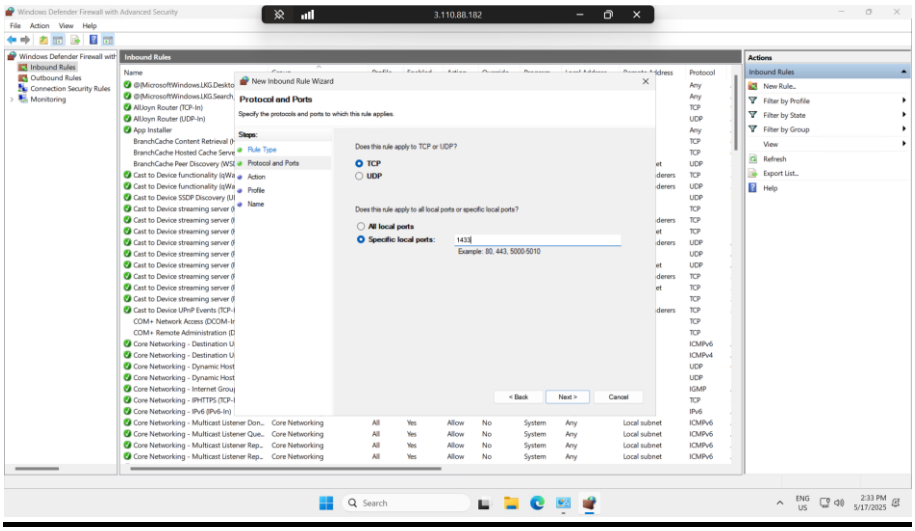

3.110.88.182
Sql Server Configuration Manager
File Action View Help
SQL Server Configuration Manager (Local)
SQL Server Services
SQL Server Network Configuration (32bit)
SQL Native Client 11.0 Configuration (32b
Azure Extension For SQL Server
SQL Server Network Configuration
Protocols for SQLEXPRESS
SQL Native Client 11.0 Configuration
Azure Extension For SQL Server
Protocol Name
Status
Shared Memory
Enabled
Named Pipes
Disabled
TCP/IP
Disabled
Search
ENG
US
2:29 PM
5/17/2025

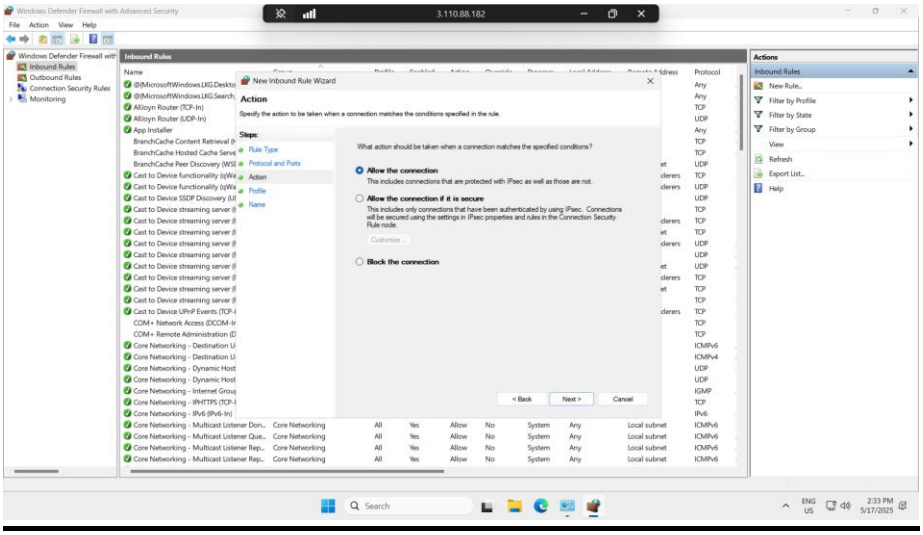

3.110.88.182
Sql Server Configuration Manager
File Action View Help
SQL Server Configuration Manager (Local)
SQL Server Services
SQL Server Network Configuration (32bit)
SQL Native Client 11.0 Configuration (32b
Azure Extension For SQL Server
SQL Server Network Configuration
Protocols for SQLEXPRESS
SQL Native Client 11.0 Configuration
Azure Extension For SQL Server
Protocol Name
Status
Shared Memory
Enabled
Named Pipes
Disabled
TCP/IP
Disabled
TCP/IP Properties
Protocol
IP Addresses
Enabled
No
IP Address
172.31.15.10
TCP Dynamic Ports
0
TCP Port
IP3
Active
Yes
Enabled
No
IP Address
::1
TCP Dynamic Ports
0
TCP Port
IP4
Active
Yes
Enabled
No
IP Address
127.0.0.1
TCP Dynamic Ports
0
TCP Port
IPAll
TCP Dynamic Ports
0
TCP Port
1433
TCP Port
TCP port
OK
Cancel
Apply
Help
Search
ENG
US
2:30 PM
5/17/2025

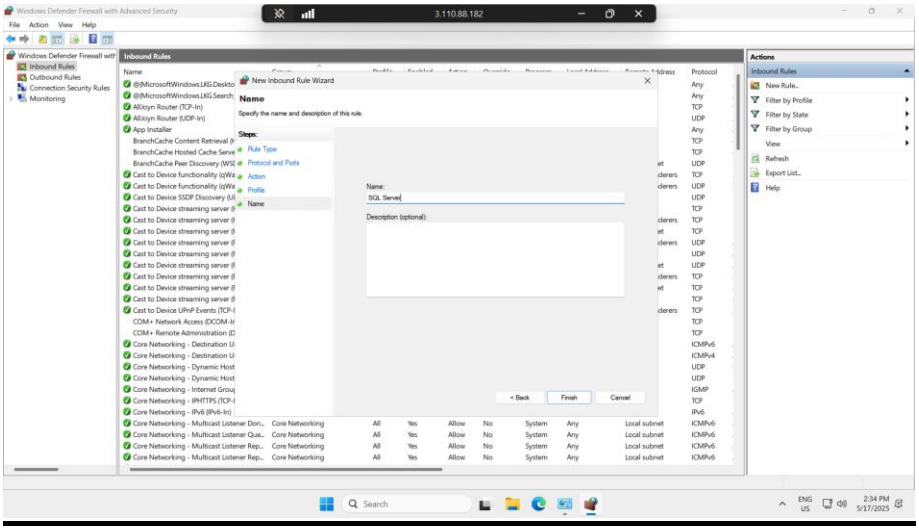
- *Step 5: Allow MSQL Port Through Firewall*

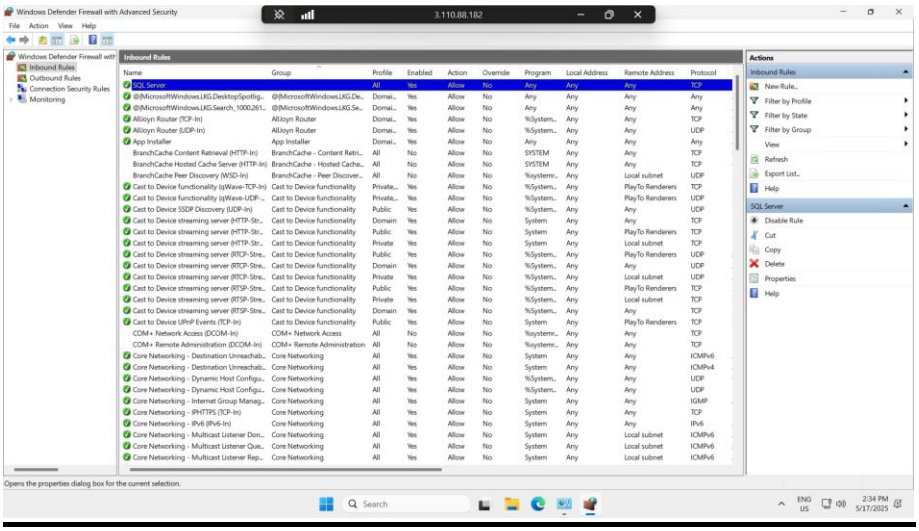







3.110.88.182
Windows Defender Firewall with Advanced Security
File Action View Help
Inbound Rules
Outbound Rules
Connection Security Rules
Monitoring
New Inbound Rule Wizard
Action
Specify the action to be taken when a connection matches the conditions specified in the rule.
Steps:
Rule Type
Protocol and Ports
Action
Profile
Name
What action should be taken when a connection matches the specified conditions?
Allow the connection
This includes connections that are protected with IPsec as well as those are not.
Allow the connection if it is secure
This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.
Customize...
Block the connection
< Back
Next >
Cancel
Actions
New Rule...
Filter by Profile
Filter by State
Filter by Group
View
Refresh
Export List...
Help
Search
ENG US
2:33 PM
5/17/2025


3.110.88.182
Windows Defender Firewall with Advanced Security
File Action View Help
Inbound Rules
Outbound Rules
Connection Security Rules
Monitoring
New Inbound Rule Wizard
Name
Specify the name and description of this rule.
Steps:
Rule Type
Protocol and Ports
Action
Profile
Name
Name:
SQL Server
Description (optional):
< Back
Finish
Cancel
Actions
New Rule...
Filter by Profile
Filter by State
Filter by Group
View
Refresh
Export List...
Help
Search
ENG US
2:34 PM
5/17/2025


3.110.88.182
Windows Defender Firewall with Advanced Security
File Action View Help
Inbound Rules
Outbound Rules
Connection Security Rules
Monitoring
Opens the properties dialog box for the current selection.
Actions
New Rule...
Filter by Profile
Filter by State
Filter by Group
View
Refresh
Export List...
Help
SQL Server
Disable Rule
Cut
Copy
Delete
Properties
Help
Search
ENG US
2:34 PM
5/17/2025