

Index Page

Sr. No	Description	Page No	Date	Faculty Signature
1	Study of Cloud Computing & Architecture(Theory)	3	12/12/23	
2	Study and implementation of Infrastructure as a Service(FOSS Cloud)	5	19/12/23	
3	Study and implementation of Storage as a Service (Own Cloud)	13	09/1/24	
4	Google cloud Linux VM creation	19	23/1/24	
5	Google cloud Windows VM creation	24	23/1/24	
6	Perform the following in google cloud: a. A “Hello world “ website on IIS- Create an IIS web server VM using Compute Engine in b. A “Hello World” website on Apache. Create an Apache web server on a Linux VM c. Transfer files to Windows VMs d. Transfer files to Linux VMs e. Back up a VM's persistent disk f. Configure periodic backups with a snapshot schedule g. Restore a boot disk from a snapshot h. Restore a persistent disk from a snapshot i. Register a domain and configure VM access j. Secure access to your website or application	28	30/2/24	
7	Write a program for web feed.	70	13/2/24	
8	Case study on Amazon EC2/Microsoft Azure/Google Cloud Platform (Research paper analysis)	74	05/2/24	

Practical 1

Aim: Study of Cloud Computing & Architecture(Theory)

Introduction: Cloud computing has revolutionized the way businesses and individuals use and manage computing resources. Instead of owning and maintaining physical servers and infrastructure, cloud computing allows users to access computing resources such as storage, processing power, and applications over the internet on a pay-as-you-go basis. This practical session aims to introduce the basic concepts of cloud computing and its architecture.

Theory:

1. Definition of Cloud Computing:

- Cloud computing refers to the delivery of computing services over the internet, including storage, databases, servers, networking, software, and more.
- Users can access these resources on-demand, without the need for direct management of the underlying infrastructure.

2. Characteristics of Cloud Computing:

- On-demand self-service: Users can provision computing resources as needed without human intervention from the service provider.
- Broad network access: Services are available over the network and can be accessed through standard mechanisms (e.g., smartphones, laptops, tablets).
- Resource pooling: Computing resources are pooled to serve multiple users, with different physical and virtual resources dynamically assigned and reassigned according to demand.
- Rapid elasticity: Computing resources can be rapidly scaled up or down to accommodate changing workload demands.
- Measured service: Cloud systems automatically control and optimize resource usage, providing transparency for both the provider and consumer through metering capabilities.

3. Cloud Service Models:

- Infrastructure as a Service (IaaS): Provides virtualized computing resources over the internet, allowing users to deploy and manage virtual machines, storage, and networking.
- Platform as a Service (PaaS): Offers a platform allowing customers to develop, run, and manage applications without the complexity of infrastructure management.

- Software as a Service (SaaS): Delivers software applications over the internet on a subscription basis, eliminating the need for installation and maintenance.

4. Cloud Deployment Models:

- Public Cloud: Services are provided over the internet and available to anyone who wants to purchase them. Infrastructure is owned and operated by a third-party cloud service provider.
- Private Cloud: Computing resources are dedicated to a single organization, offering greater control and privacy but requiring more upfront investment in infrastructure.
- Hybrid Cloud: Combines public and private cloud services, allowing data and applications to be shared between them.

5. Cloud Architecture:

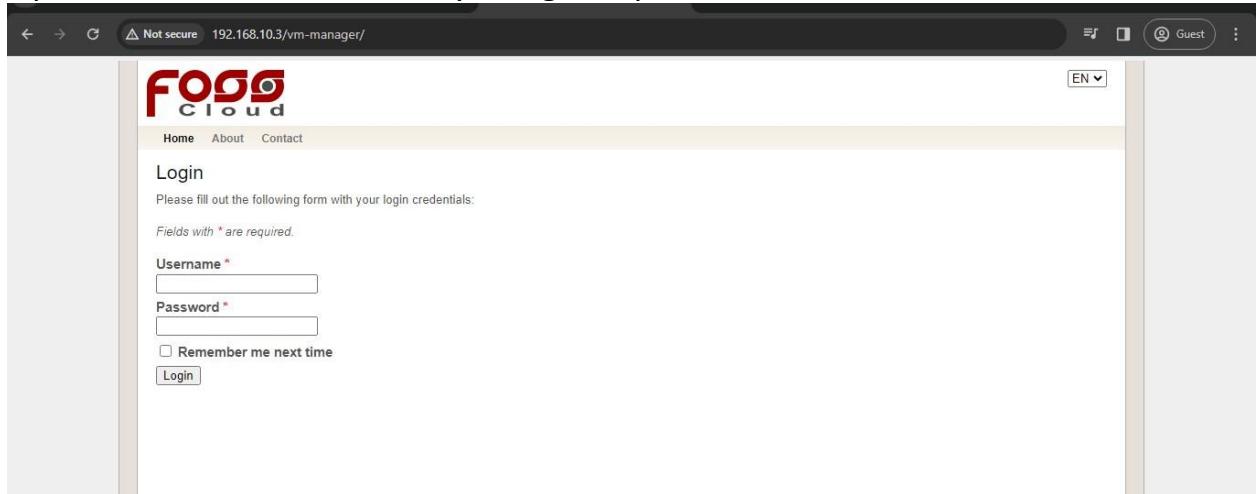
- Frontend: The user interface and client-side applications that interact with the cloud services.
- Backend: The cloud infrastructure, including servers, storage, and networking components, managed by the cloud service provider.
- Middleware: Software that connects the frontend and backend, enabling communication and data processing.
- Cloud Services: The actual services provided by the cloud, such as storage, computation, databases, etc.
- Virtualization: The abstraction of physical resources into virtual resources, allowing for better resource utilization and scalability.

Conclusion: Cloud computing offers a flexible, scalable, and cost-effective way to access computing resources. Understanding its basic concepts and architecture is essential for businesses and individuals looking to leverage the benefits of cloud technology.

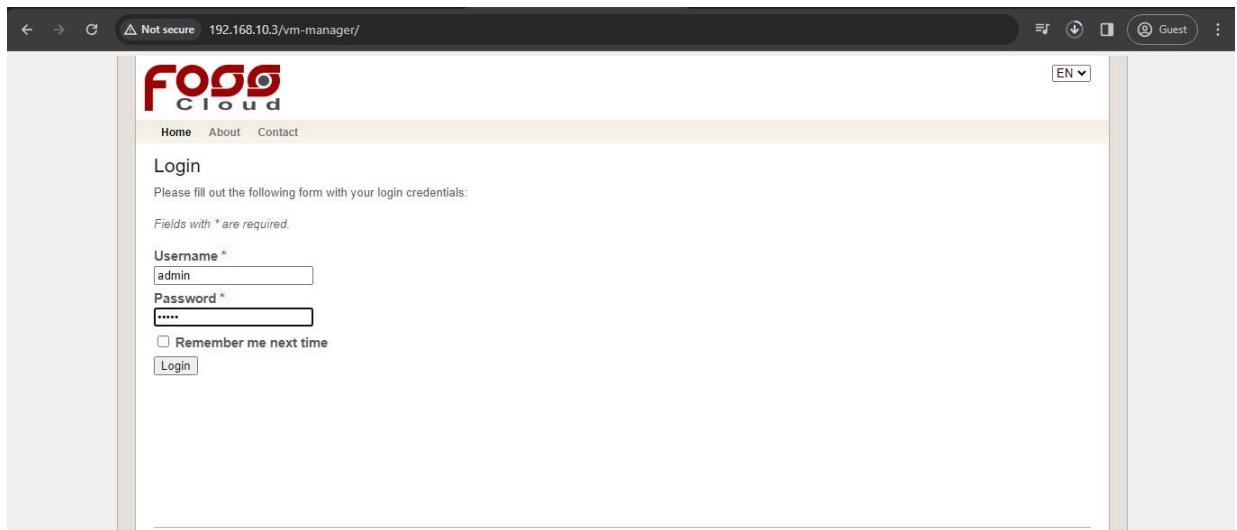
Practical 2

Aim: Study and implementation of Infrastructure as a Service(FOSS Cloud)

Open FOSS Cloud in Mozilla by using the ip address 192.168.10.3

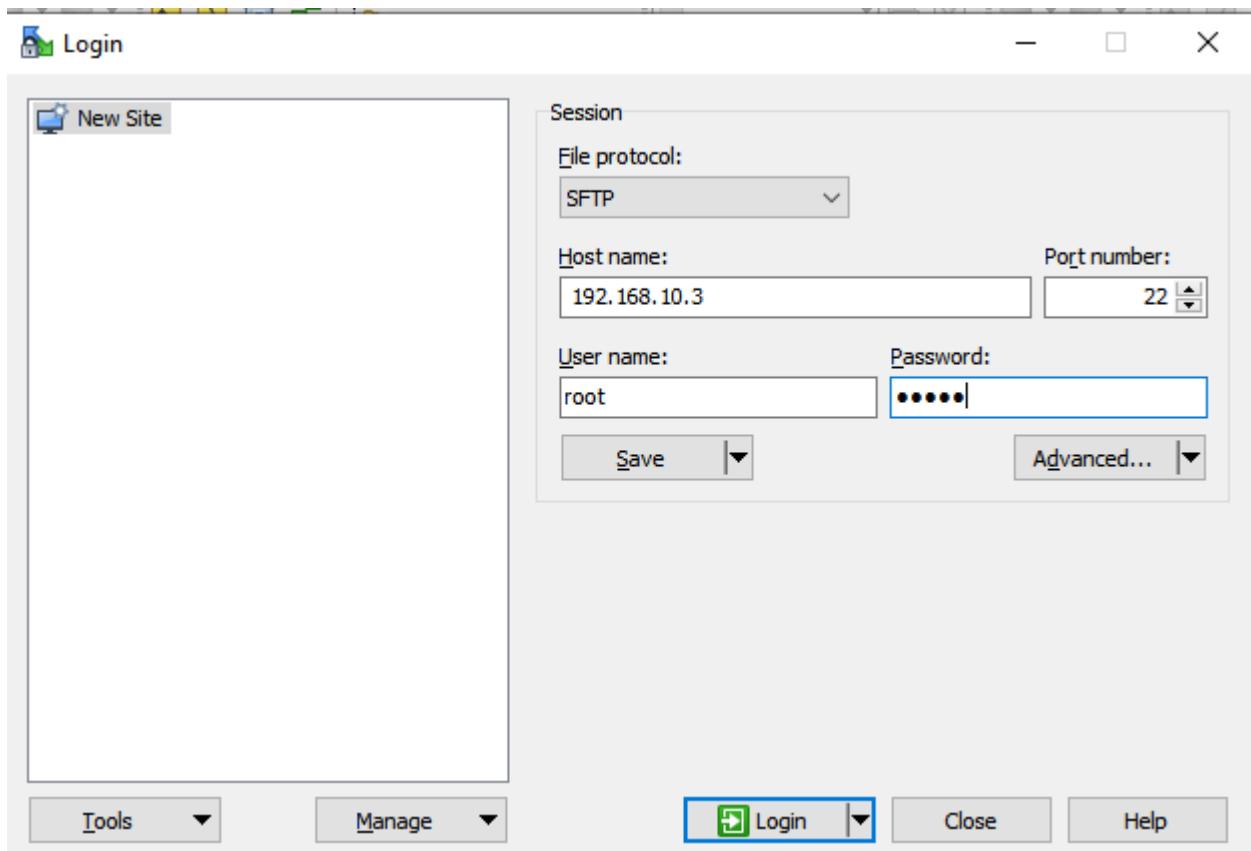


Then input username and password in admin and login as admin

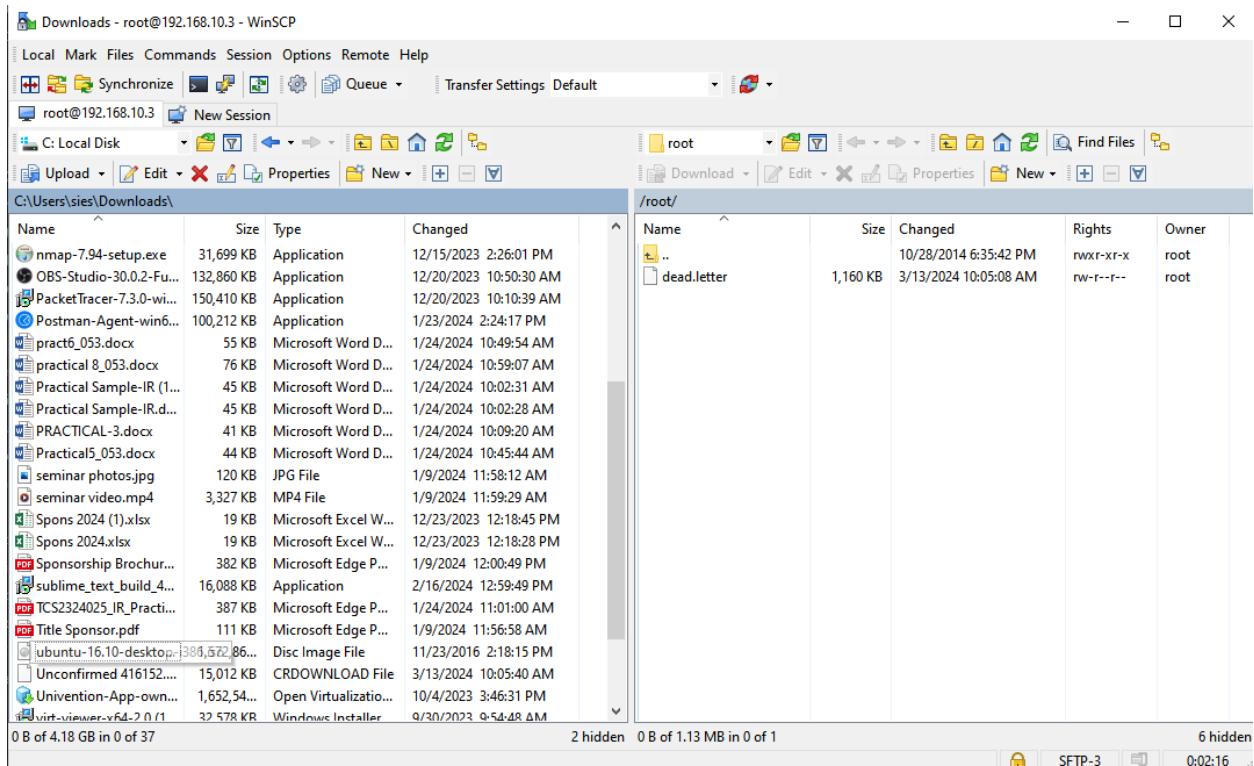


The screenshot shows the FOSS-Cloud website at 192.168.10.3/vm-manager/site. The page has a header with a logo, language selection (EN), and user status (Guest). A sidebar on the left lists navigation options: Home, About, Contact, Virtual Machine, VM Pool, Storage Pool, Node, Network, User, Configuration, Diagnostics, and Assigned VMs. The main content area features a welcome message, a note about the project's open source nature, a 'Donate' button, and links to documentation and Spice-Client download. At the bottom, there is a footer with version information and copyright details.

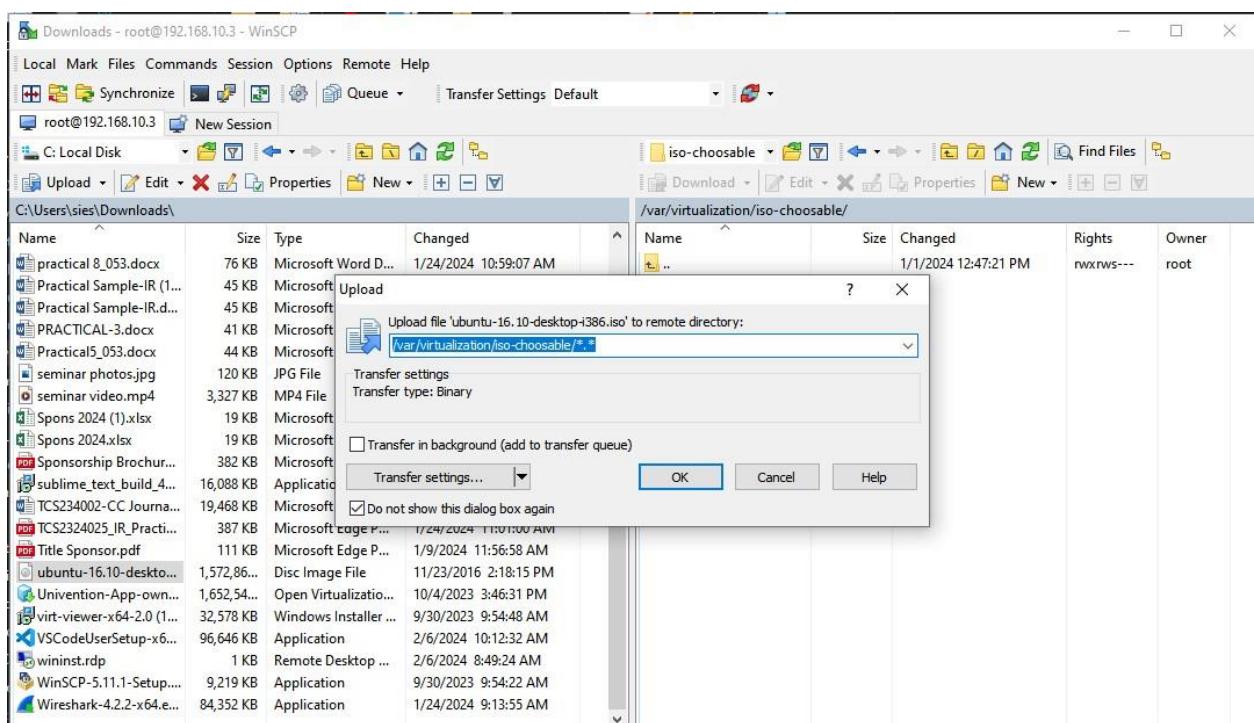
Then open WinSCP and put credential host name: 192.168.10.3, user name: root and password: admin

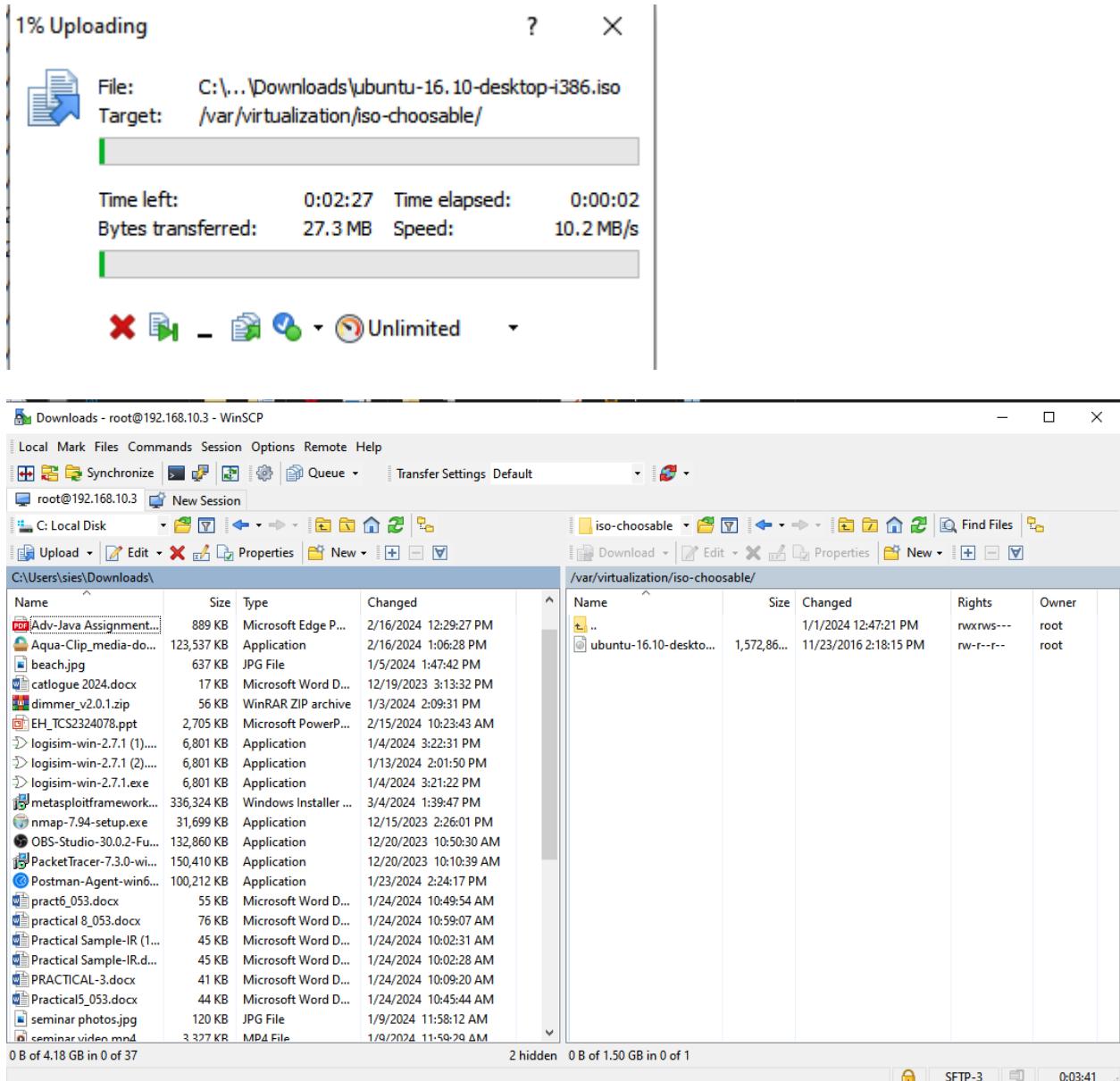


After in left hand side, try to navigate to the folder path where you kept your Ubuntu iso file.



Then in the right hand side, navigate to var>virtualization>iso-choosable. After that drag and drop the iso file from left to right.





After copying the file, go to the foss cloud and navigate to virtual machine>profile>create. Then create a Linux profile.

VIRTUAL MACHINE

- Persistent VMs
- Dynamic VMs
- VM Templates
 - Create
 - Profiles
 - Create**
 - Upload ISO File
- VM Pool**
- Storage Pool
- Node
- Network
- User
- Configuration
- Diagnostics
- Assigned VMs

Fields with * are required.

Step I
Please select a profile first!

Step II
Overwrite the default values if necessary!

BaseProfile

linux	ubuntu-16.10-desktop-i386.iso
default	
Ubuntu1	
UbuntuVM	
ubuntu123	
Ubuntu 1	
UbuntuM	
Ubuntu2	
Ubuntu7537	
Ubuntu7	
Ubuntu2324	
Ubuntu555	
UbuntuByRam	
Ubuntu_AkShree	
Ubuntu	
MyUbuntu	
Ubuntu19	
Ubuntu7616	
Ubuntu89	
soniya	
UbuntuBySangi	
Linux1	
i686	
<input checked="" type="radio"/> multi	
linux123	
windows	

Isofile

ubuntu-16.10-desktop-i386.iso

Name *
Linux2

Description *
linux OS

Memory *
128 MB 3.13 GB

Volume Capacity *
10 GB 2048 GB 31 GB

CPU *
1

Clock Offset *
utc

Create

Foss Cloud

EN ▾

Logout (admin)

Home About Contact

Virtual Machine

- Persistent VMs
- Dynamic VMs
- VM Templates
 - Create
 - Profiles
 - Create**
 - Upload ISO File
- VM Pool**
- Storage Pool
- Node
- Network
- User
- Configuration
- Diagnostics
- Assigned VMs

Manage VMProfiles

No.	Name	Architecture	Language	Description	Action
21	linux123	linux / i686	multi	cloudcomputing	
22	Linux2	linux / i686	multi	linux OS	

Page 3 of 3 | 10

Version 1.3.1
on server foss-cloud
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After creating that, go to the vm templates>create and you will see your linux file select that. Then set no. of display as 1 and create vm template.

Please select a profile first!

Please choose a node and overwrite the default values if necessary!

Profile

- linux
 - + Ubuntu1
 - + UbuntuVM
 - + ubuntu123
 - + Ubuntu 1
 - + UbuntuM
 - + Ubuntu2
 - + ubuntu7537
 - + Ubuntu7
 - + Ubuntu2324
 - + Ubuntu555
 - + UbuntuByRam
 - + Ubuntu_AkShree
 - + Ubuntu
 - + MyUbuntu
 - + Ubuntu19
 - + Ubuntu7616
 - + Ubuntu89
 - + soniya
 - + UbuntuBySangi
 - + Linux1
 - + linux123
 - + Linux2
 - + i686
 - + multi
 - + windows

Vmpool *

Node *
foss-cloud.foss-cloud.org ^

Name *

Description *

Memory * 128 MB 128 GB

Volume Capacity * 10 GB 2048 GB

CPU * **Clock Offset ***

Number of displays

Foss Cloud EN ▾

Logout (admin)

Manage VMTemplates

Vm Pool

No.	DisplayName	Status	Run Action	Memory	Node	Action
11	Ubuntu89	stopped	→ ↓ ✘ ↻	---	foss-cloud.foss-cloud.org	
12	soniya	stopped	→ ↓ ✘ ↻	---	foss-cloud.foss-cloud.org	
13	UbuntuBySangi	stopped	→ ↓ ✘ ↻	---	foss-cloud.foss-cloud.org	
14	Linux1	running	→ ↓ ✘ ↻	3.13 GB / 3.13 GE	foss-cloud.foss-cloud.org	
15	linux123	stopped	→ ↓ ✘ ↻	---	foss-cloud.foss-cloud.org	
16	linux1234	stopped	→ ↓ ✘ ↻	---	foss-cloud.foss-cloud.org	
17	Linux2	stopped	→ ↓ ✘ ↻	---	foss-cloud.foss-cloud.org	

Page 2 of 2 Refresh 10

Version 1.3.1

Then start the Linux vm by clicking on -> button. After that click vm box button.

Cloud

- Home
- About
- Contact
- Logout (admin)

Virtual Machine

- Persistent VMs
- Dynamic VMs
- VM Templates
 - Create
 - Profiles
 - Create
 - Upload ISO File

VM Pool

Storage Pool

Node

Network

User

Configuration

Diagnostics

Assigned VMs

Links

Download Spice Client

Manage VMTemplates

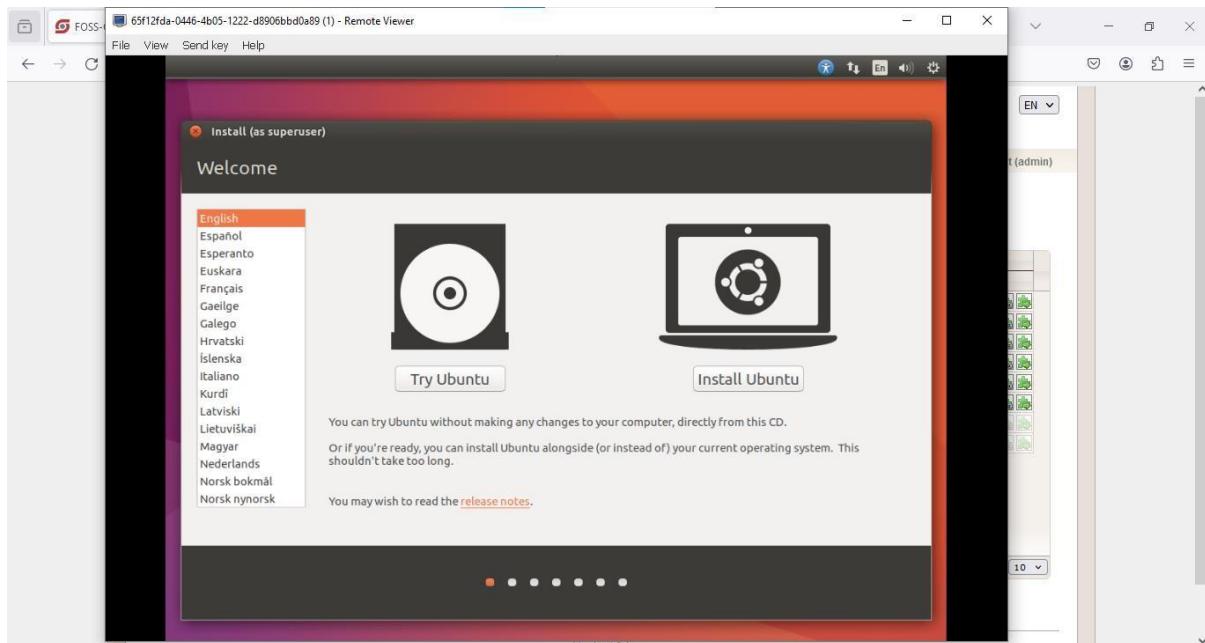
Vm Pool **vm-template-virtual-machine-pool-01**

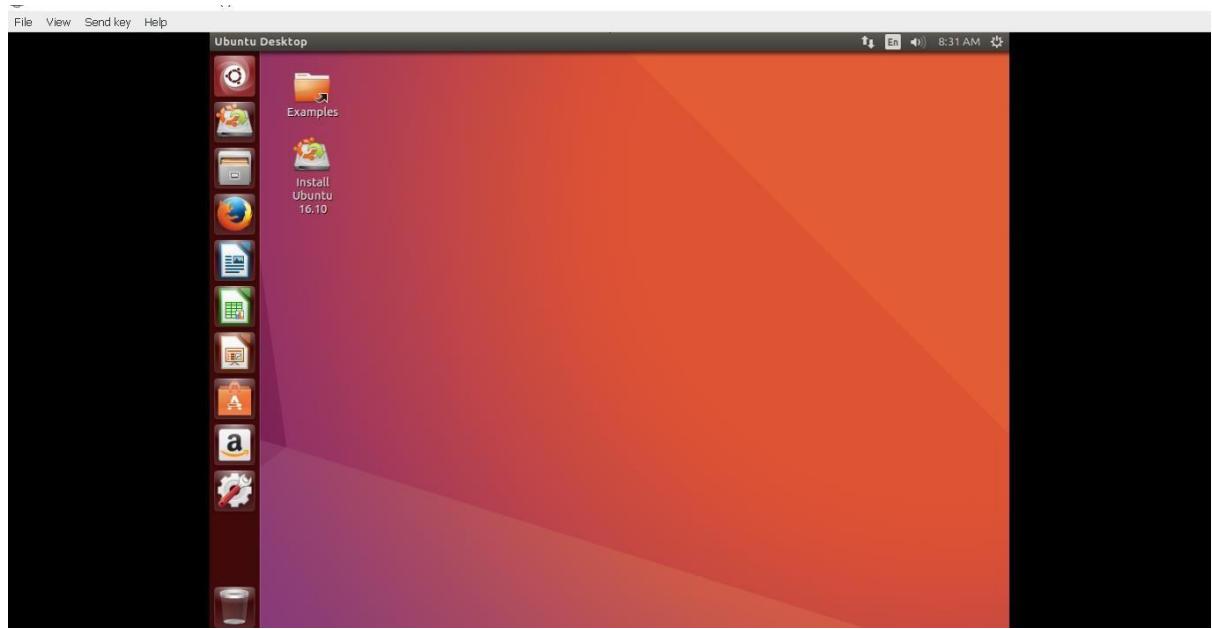
No.	DisplayName	Status	Run Action	Memory	Node	Action
11	Ubuntu89	stopped	➔ ⏪ ✖️ ↻	---	foss-cloud.foss-cloud.org	
12	soniva	stopped	➔ ⏪ ✖️ ↻	---	foss-cloud.foss-cloud.org	
13	UbuntuBySang	stopped	➔ ⏪ ✖️ ↻	---	foss-cloud.foss-cloud.org	
14	Linux1	running	➔ ⏪ ✖️ ↻	3.13 GB / 3.13 GE	foss-cloud.foss-cloud.org	
15	linux123	stopped	➔ ⏪ ✖️ ↻	---	foss-cloud.foss-cloud.org	
16	linux1234	stopped	➔ ⏪ ✖️ ↻	---	foss-cloud.foss-cloud.org	
17	Linux2	running	➔ ⏪ ✖️ ↻	3.13 GB / 3.13 GE	foss-cloud.foss-cloud.org	

Page 2 of 2 Refresh 10

Version 1.3.1
on server foss-cloud
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The Ubuntu vm will be opened





Then set the iso file to hardware by clicking on cd button.



Practical 3

Aim: Study and implementation of Storage as a Service (Own Cloud)

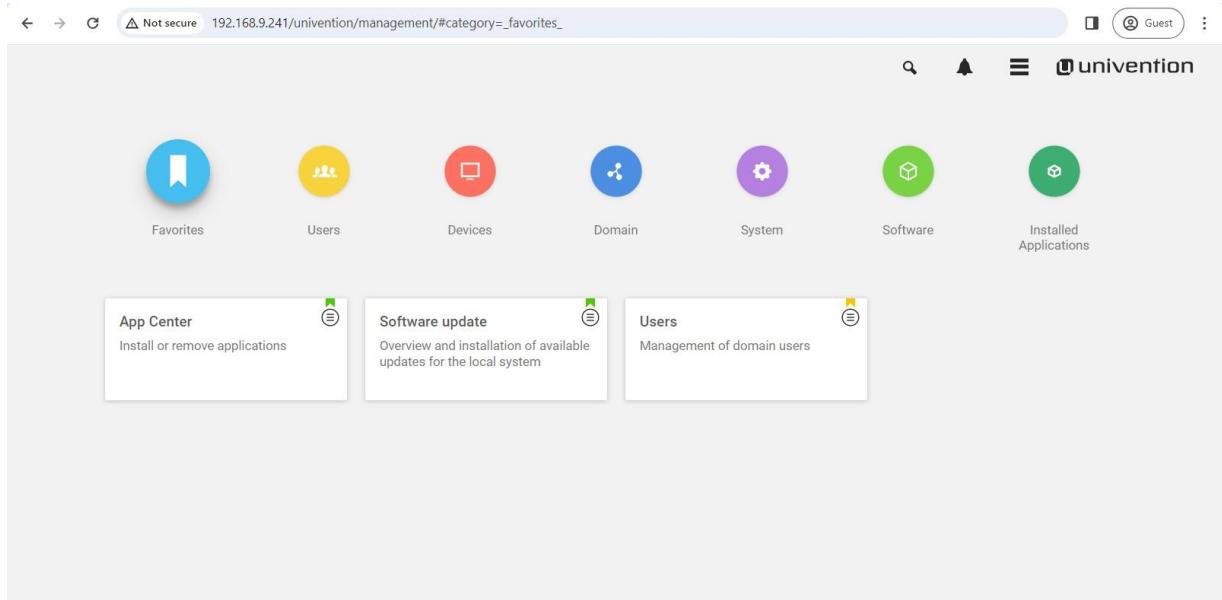
Open owncloud by inputting the ip address 192.168.9.241. Click on the System and domain settings in admin section.

The screenshot shows the Univention Portal interface. In the Applications section, there is a card for 'ownCloud' with the URL 'ucs-2657.sies.intranet'. In the Administration section, there are four links: 'System and domain settings' (ucs-2657.sies.intranet), 'Univention Management Console for administering the UCS domain and the local system', 'Admin Manual' (doc.owncloud.com), 'User Manual' (doc.owncloud.com), and 'Univention Blog' (www.univention.com). The 'System and domain settings' link is highlighted with a blue border.

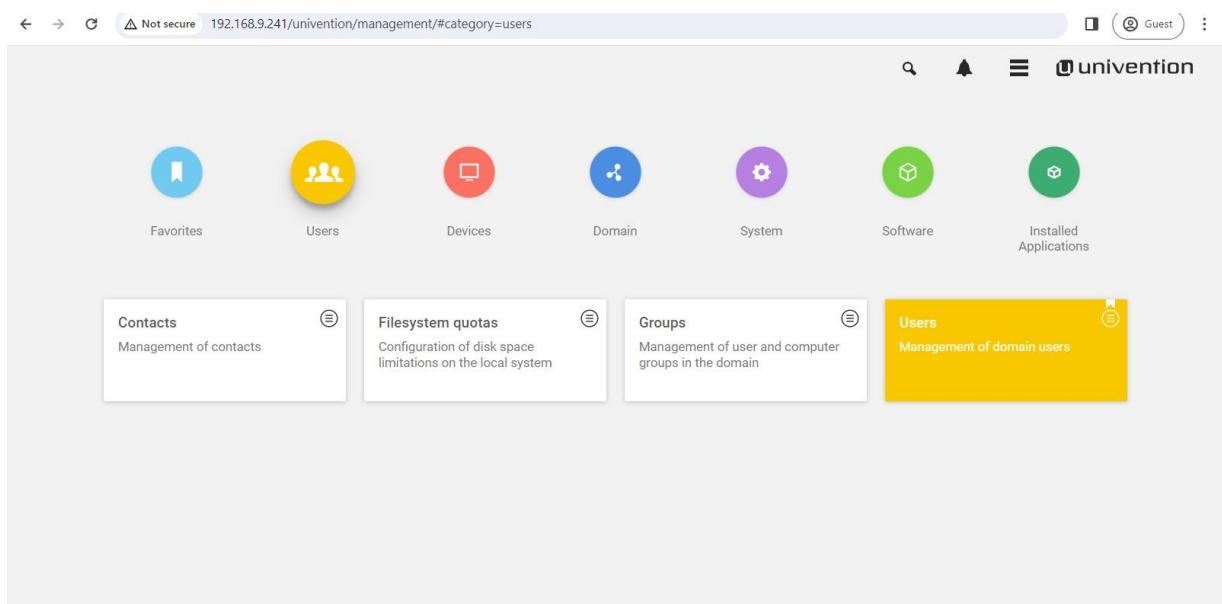
Login as admin by using credential, username: Administrator and password: admin@123

The screenshot shows the Univention login page. It features a large green 'UCS' logo at the top. Below it is a form with fields for 'Administrator' (containing the text 'Administrator') and a password field containing '.....'. A 'LOGIN' button is located at the bottom right of the form. At the bottom of the page, a red warning message reads: 'This network connection is not encrypted. Click here for an HTTPS connection.'

Click on users option



Then click user in below box



Click on add option in table.

The screenshot shows the Univention Management interface with the URL 192.168.9.241/univention/management/#module=udm:users/user:0. The title bar includes a 'Guest' button. The main header is 'USERS' with a 'CLOSE' button. Below it is a search bar with placeholder 'Search users...' and a magnifying glass icon. A navigation menu with three horizontal bars is on the right. The main content area displays a table titled 'ADD' with a heading 'Add a new user.' It lists several existing users with checkboxes and their paths: abc (intranet.sies:/users), Administrator (intranet.sies:/users), ak_nadar (intranet.sies:/users), Bhola (intranet.sies:/users), and Blessingraj (intranet.sies:/users). A status message at the top right says '0 users of 19 selected.'

Then add a user, by inputting your personalized name, username and password.

The screenshot shows the 'Add a new user' dialog box overlaid on the previous 'Users' list. The dialog has fields for Title (Mr), First name (User), Last name (12345), and User name (user7616). At the bottom are 'CANCEL', 'ADVANCED', and 'NEXT' buttons. The background 'Users' list shows the same five users as before. A status message at the top right of the dialog says '0 users of 19 selected.'

Not secure 192.168.9.241/univention/management/#module=udm:users/user:1 Guest

Users

Add a new user.

..... Password * Password (retype) *

User has to change password on next login ⓘ

Override password check ⓘ

Account disabled

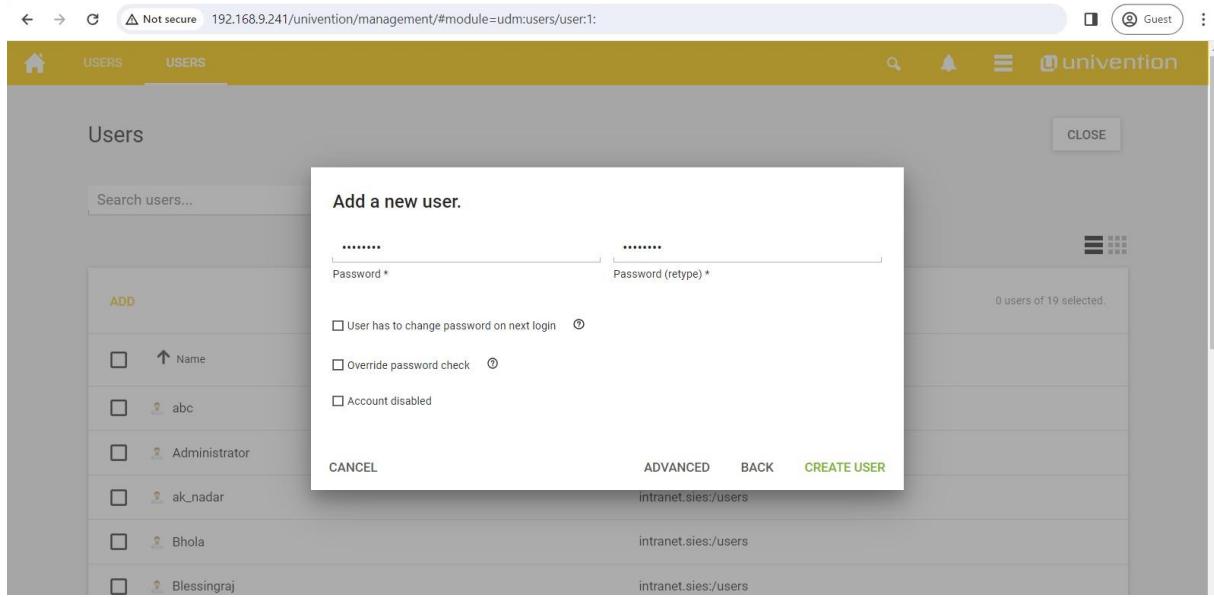
CANCEL ADVANCED BACK CREATE USER

0 users of 19 selected.

ADD

Name abc Administrator ak_nadar Bhola Blessingraj

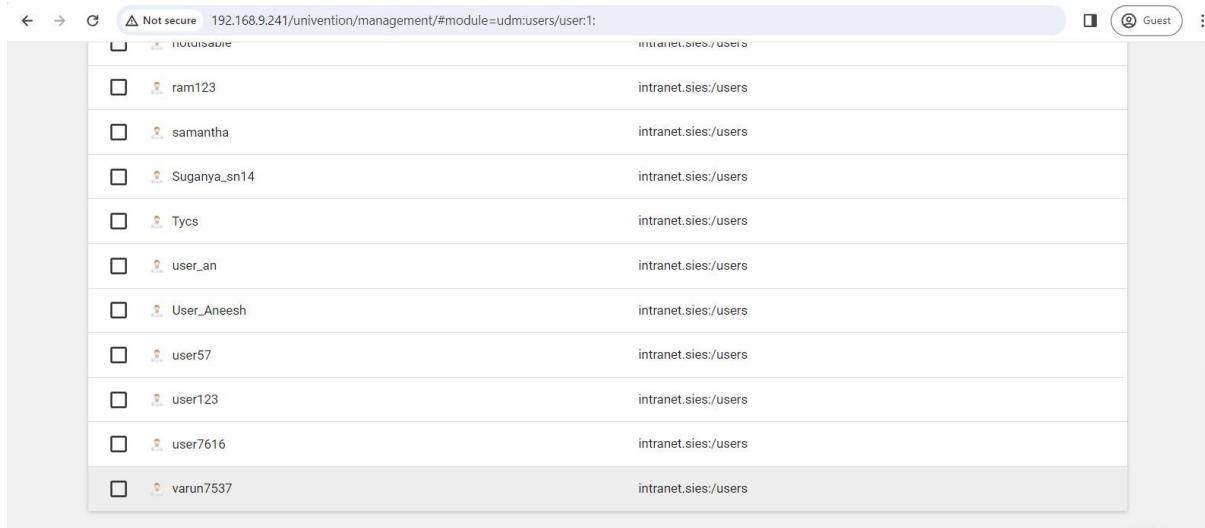
intranet.sies:/users intranet.sies:/users intranet.sies:/users



Not secure 192.168.9.241/univention/management/#module=udm:users/user:1 Guest

intranet.sies:/users

<input type="checkbox"/> ram123	intranet.sies:/users
<input type="checkbox"/> samantha	intranet.sies:/users
<input type="checkbox"/> Suganya_sn14	intranet.sies:/users
<input type="checkbox"/> Tycs	intranet.sies:/users
<input type="checkbox"/> user_an	intranet.sies:/users
<input type="checkbox"/> User_Aneesh	intranet.sies:/users
<input type="checkbox"/> user57	intranet.sies:/users
<input type="checkbox"/> user123	intranet.sies:/users
<input type="checkbox"/> user7616	intranet.sies:/users
<input type="checkbox"/> varun7537	intranet.sies:/users



After that logout as admin, and click on owncloud in applications section

Univention Portal

Applications

ownCloud
ucs-2657.sies.intranet
Cloud solution for data and file sync and share

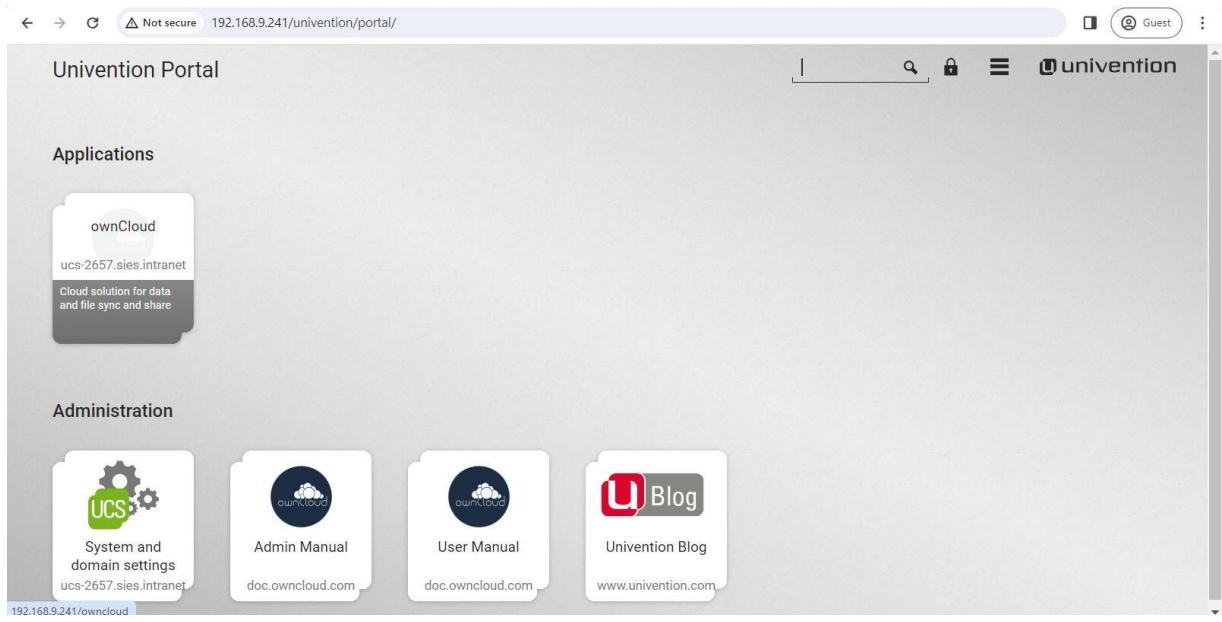
Administration

System and domain settings
ucs-2657.sies.intranet

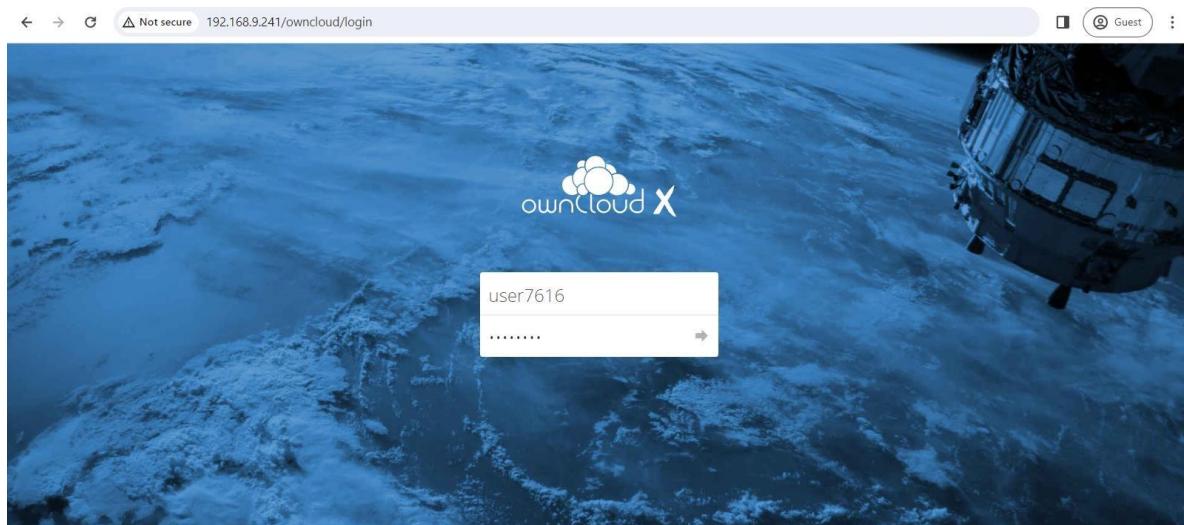
Admin Manual
doc.owncloud.com

User Manual
doc.owncloud.com

Univention Blog
www.univention.com



Then input username and password that you have created and login



Not secure 192.168.9.241/owncloud/apps/files/?dir=/&fileid=672

Guest User 12345

All files Favorites Shared with you Shared with others Shared by link Tags Deleted files Settings

ownCloud

Name Size Modified

	Name	Size	Modified
	Documents	35 KB	seconds ago
	Photos	663 KB	seconds ago
	ownCloud Manual.pdf	4.7 MB	seconds ago

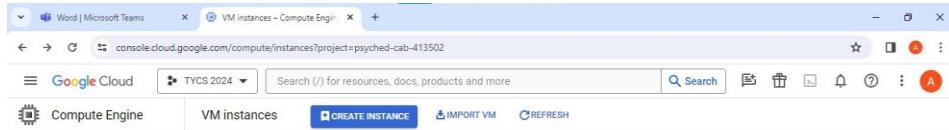
2 folders and 1 file 5.4 MB

Practical 4

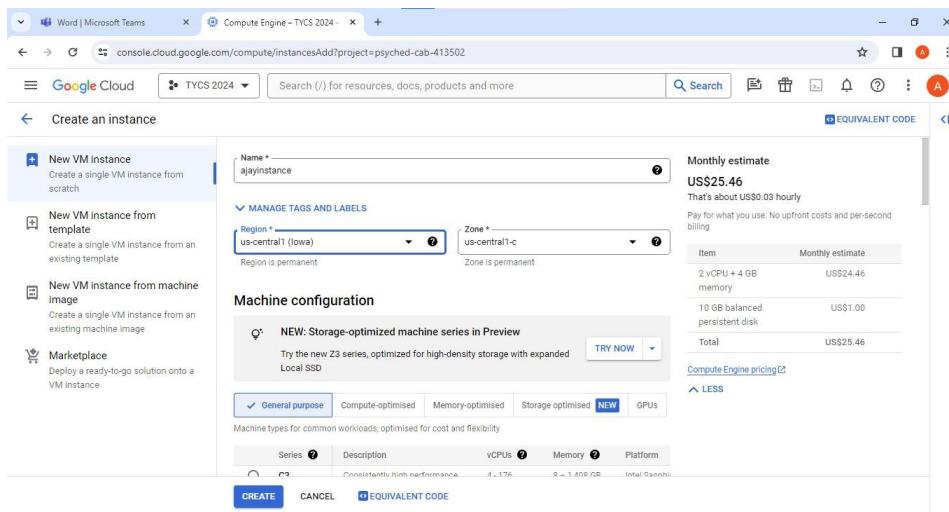
Aim: Google cloud Linux VM creation

Create a Linux Machine

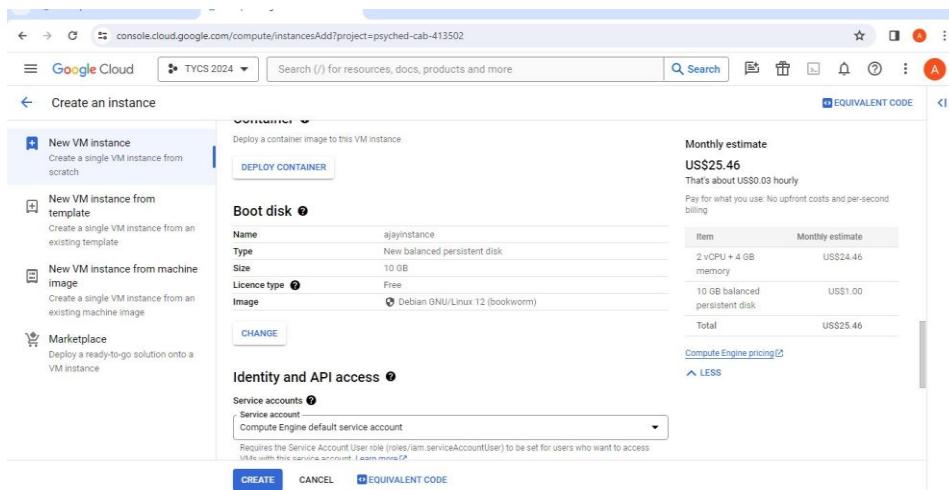
Click on create instance button



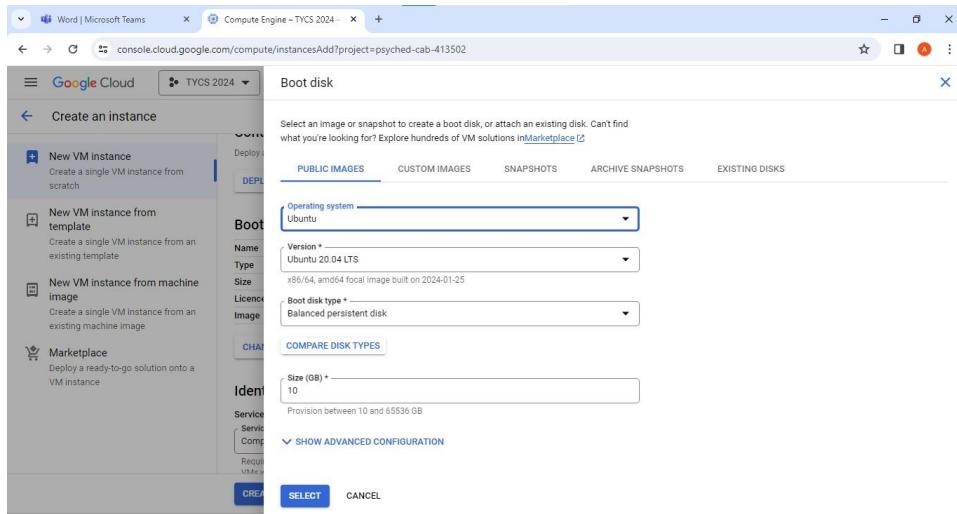
Change the instanc name according to you



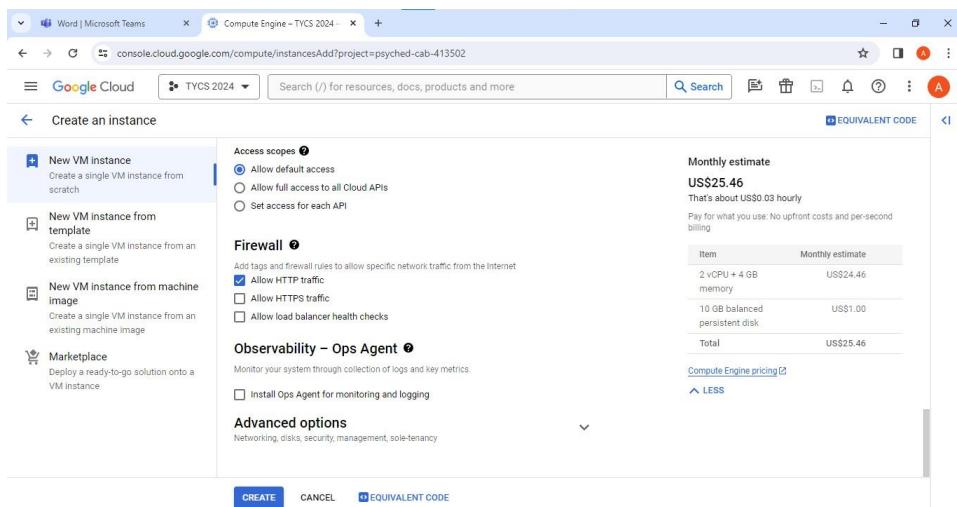
Click on the change option in bootdisk



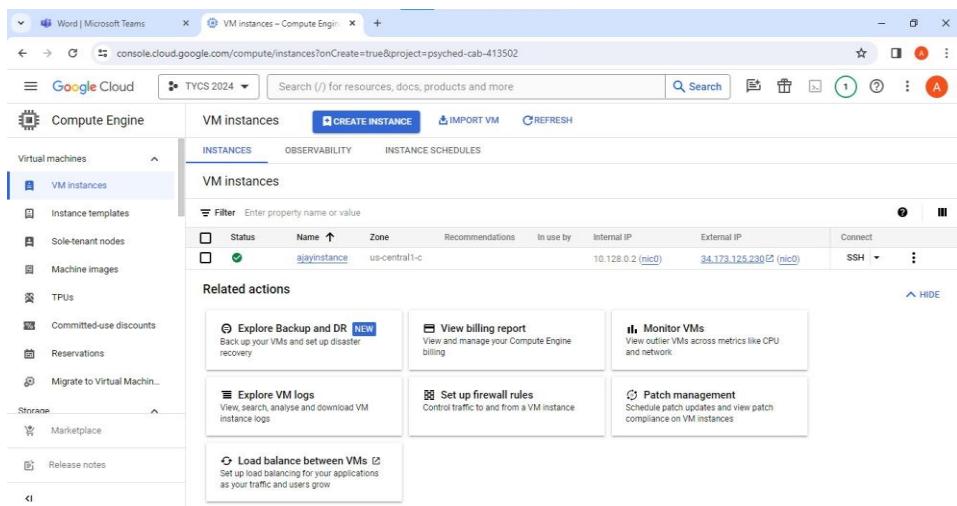
Change from debian to ubuntu in os and click on select



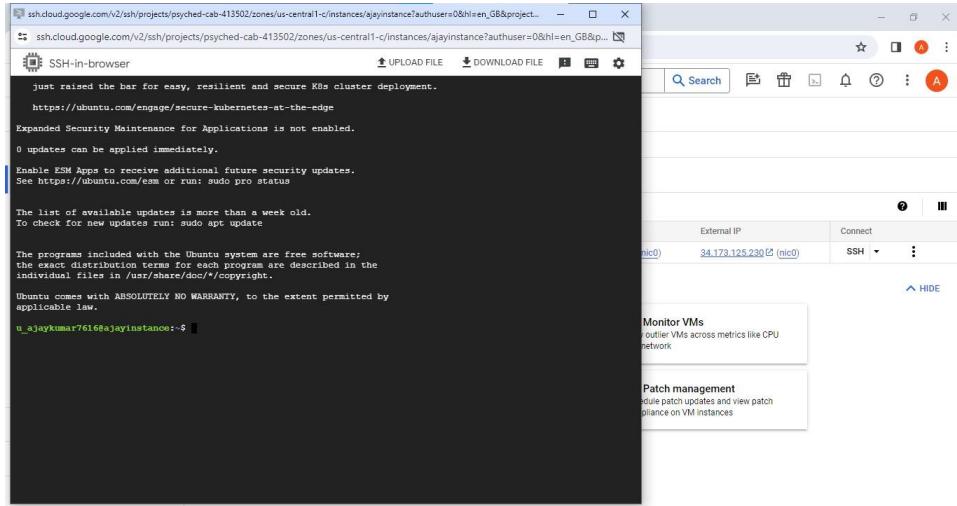
In the firewall traffic, click on allow http traffic option



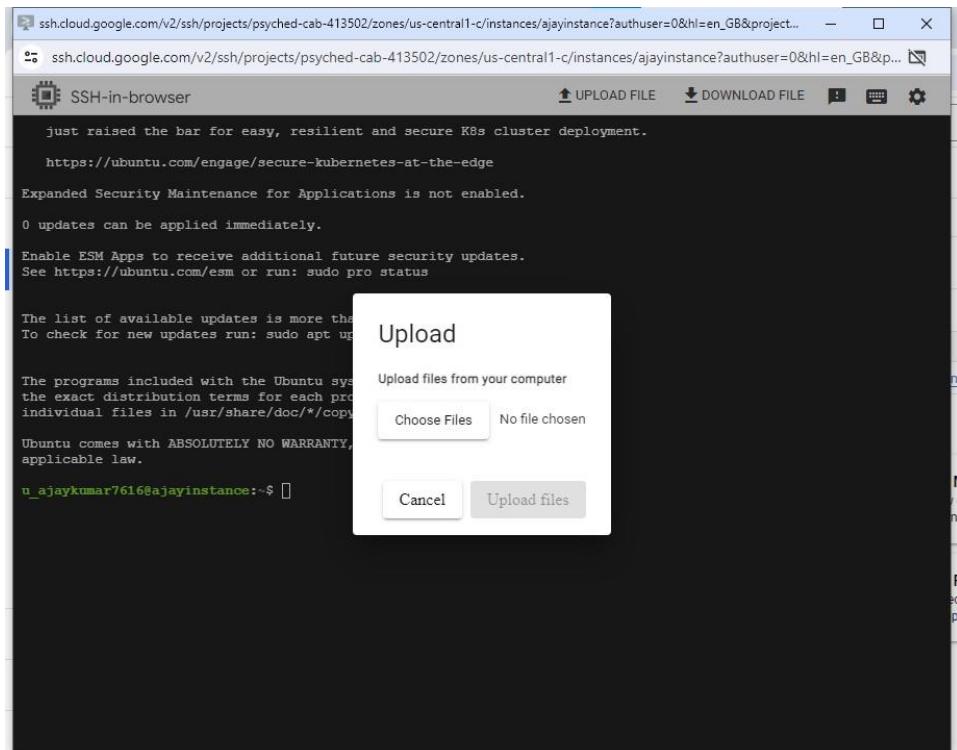
And then click on the create option



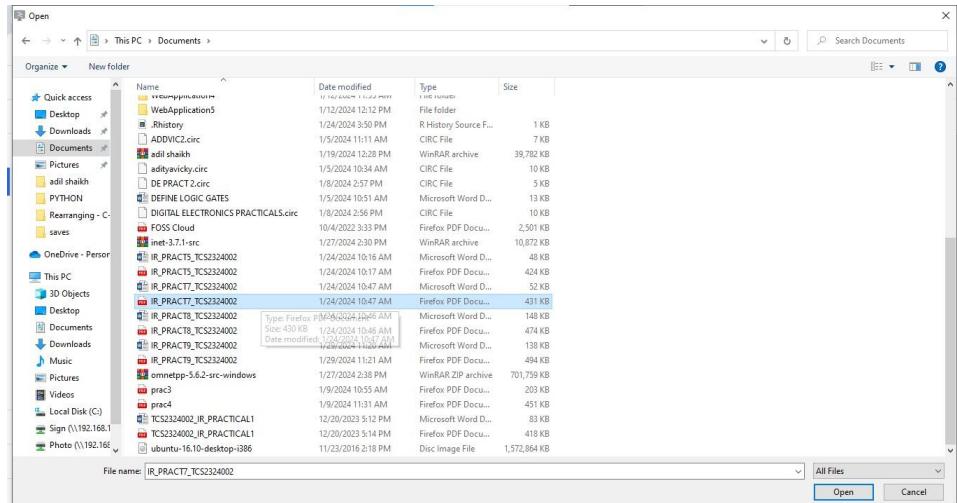
Click on SSH option and it will create new window where it will ask you to authorization. Click on authorize option



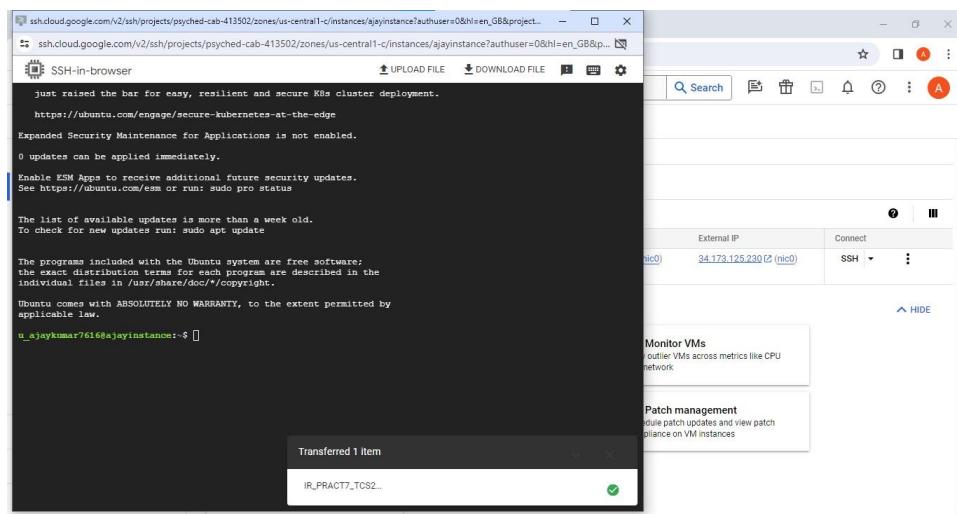
Click on Upload file option



Select one file



Click on upload file option



The screenshot shows a web-based SSH terminal window titled "SSH-in-browser". The URL in the address bar is `ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-c/instances/ajayinstance?authuser=0&hl=en_GB&project...`. The terminal window displays the following content:

```
https://ubuntu.com/engage/secure-kubernetes-at-the-edge
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.

u ajaykumar7616@ajayinstance:~$ ls -a
. .bash_logout .bashrc .cache .profile .ssh IR_PRACT7_TCS2324002.pdf
u ajaykumar7616@ajayinstance:~$
```

A message at the bottom of the terminal window says "Transferred 1 item".

Practical 5

Aim: Google cloud Windows VM creation

Create instance for windows

Name: wininstance

Region: us-central1 (Iowa)

Zone: us-central1-a

Monthly estimate: US\$25.46

Item	Monthly estimate
2 vCPU + 4 GB memory	US\$24.46
10 GB balanced persistent disk	US\$1.00
Total	US\$25.46

Operating system: Windows Server

Version: Windows Server 2022 Datacenter

Size: 50

Access scopes:

- Allow default access (selected)
- Allow full access to all Cloud APIs
- Set access for each API

Firewall:

- Add tags and firewall rules to allow specific network traffic from the Internet
- Allow HTTP traffic (checked)
- Allow HTTPS traffic
- Allow load balancer health checks

Observability - Ops Agent:

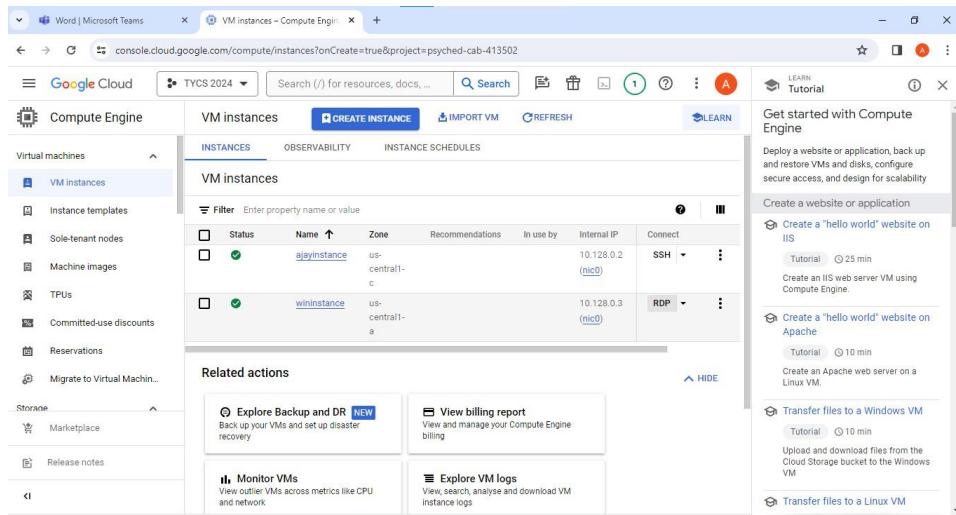
- Monitor your system through collection of logs and key metrics
- Install Ops Agent for monitoring and logging

Advanced options:

Networking, disks, security, management, sole-tenancy

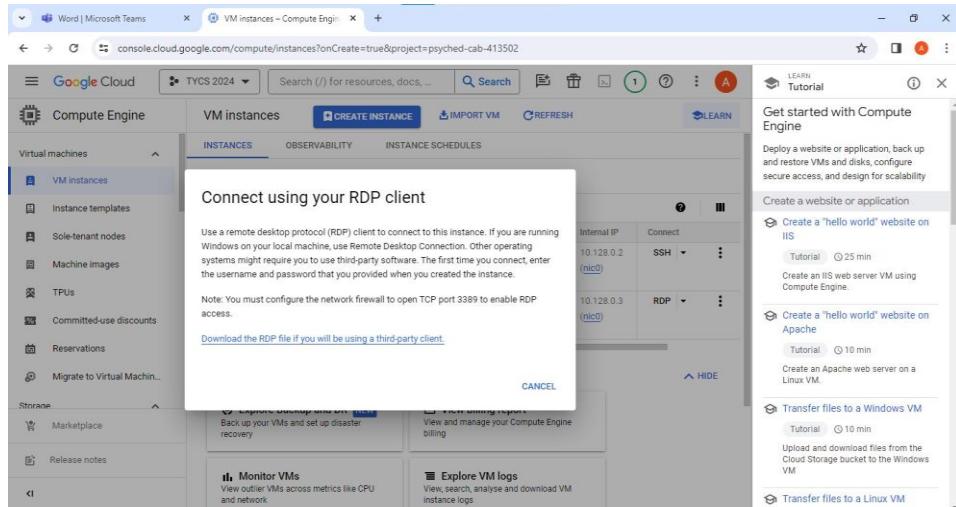
Monthly estimate: US\$63.04

Click on RDP option for remote desktop connection



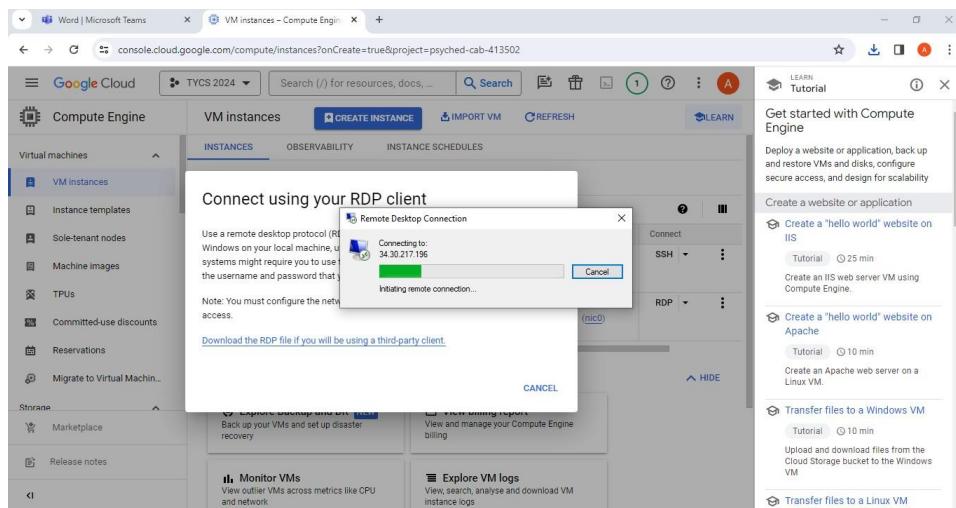
The screenshot shows the Google Cloud Compute Engine interface. On the left, there's a sidebar with 'Compute Engine' selected. Under 'Virtual machines', 'VM instances' is expanded, showing two entries: 'ajayinstance' and 'wininstance'. In the main area, there's a table with columns: Status, Name, Zone, Recommendations, In use by, Internal IP, and Connect. For 'ajayinstance', 'SSH' is selected in the 'Connect' dropdown. For 'wininstance', 'RDP' is selected. To the right of the table, there's a 'Related actions' section with links like 'Explore Backup and DR', 'View billing report', 'Monitor VMs', and 'Explore VM logs'. A sidebar on the right titled 'Get started with Compute Engine' provides links to various tutorials and guides.

Download the RDP file



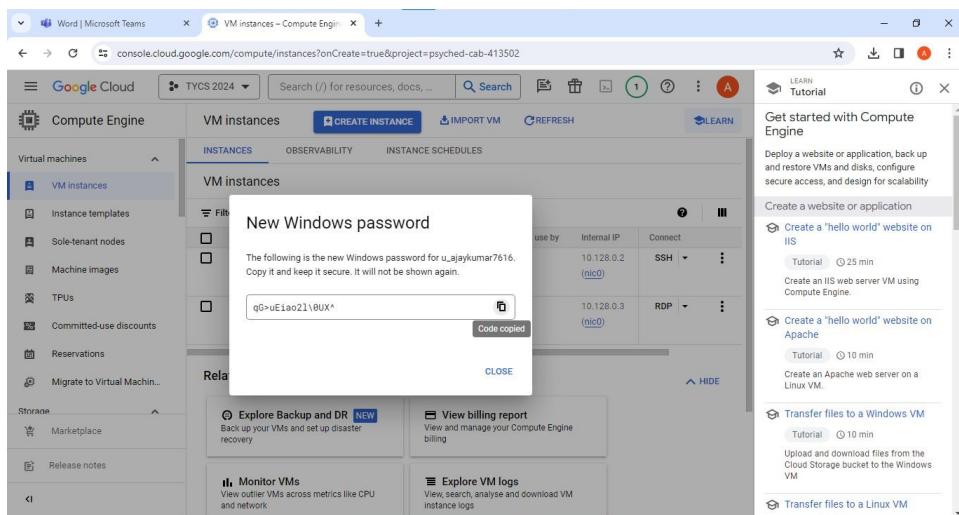
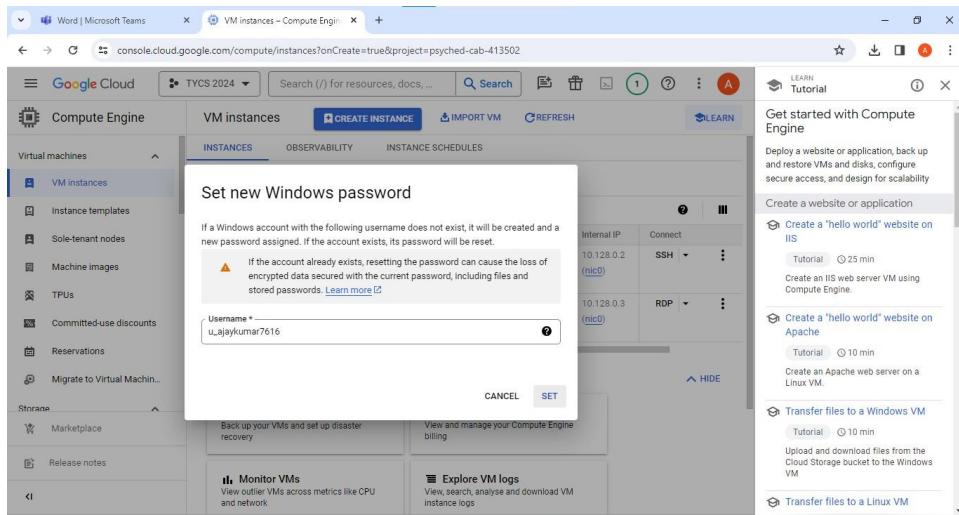
This screenshot shows the same Google Cloud Compute Engine interface as the previous one, but with a modal dialog in the foreground. The dialog is titled 'Connect using your RDP client' and contains the following text:
Use a remote desktop protocol (RDP) client to connect to this instance. If you are running Windows on your local machine, use Remote Desktop Connection. Other operating systems might require you to use third-party software. The first time you connect, enter the username and password that you provided when you created the instance.
Note: You must configure the network firewall to open TCP port 3389 to enable RDP access.
[Download the RDP file if you will be using a third-party client.](#)
The background shows the same list of VM instances and the 'RDP' connection status for 'wininstance'.

Open the download file and connect to that winnstance



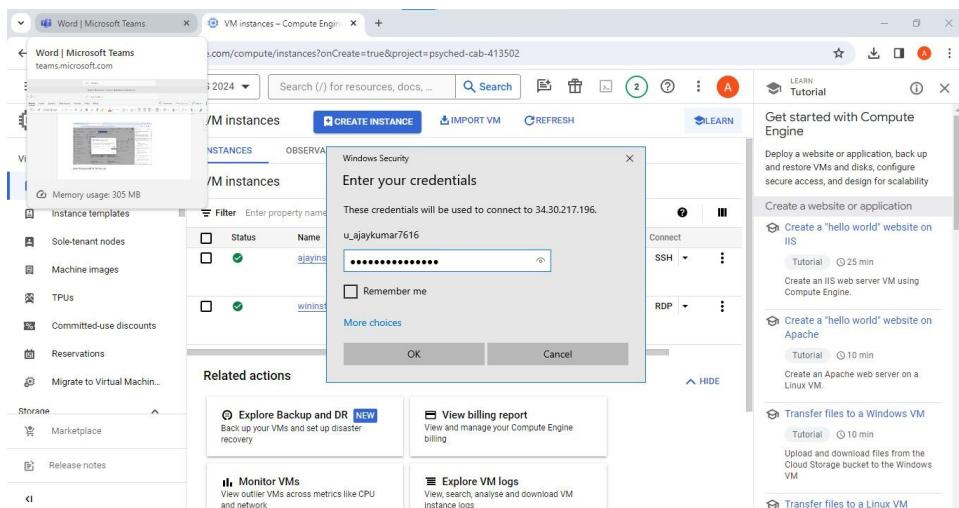
This screenshot shows the modal dialog from the previous step. The 'Remote Desktop Connection' window is open, showing the progress of the connection: 'Connecting to: 34.30.217.196' and 'Initiating remote connection...'. The background shows the same Google Cloud Compute Engine interface with the 'wininstance' VM listed.

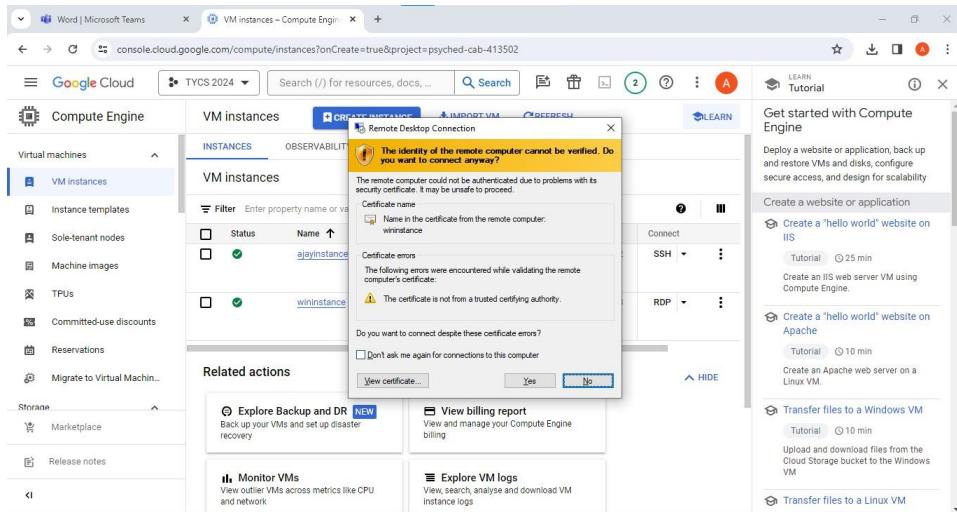
Click on RDP and set window password



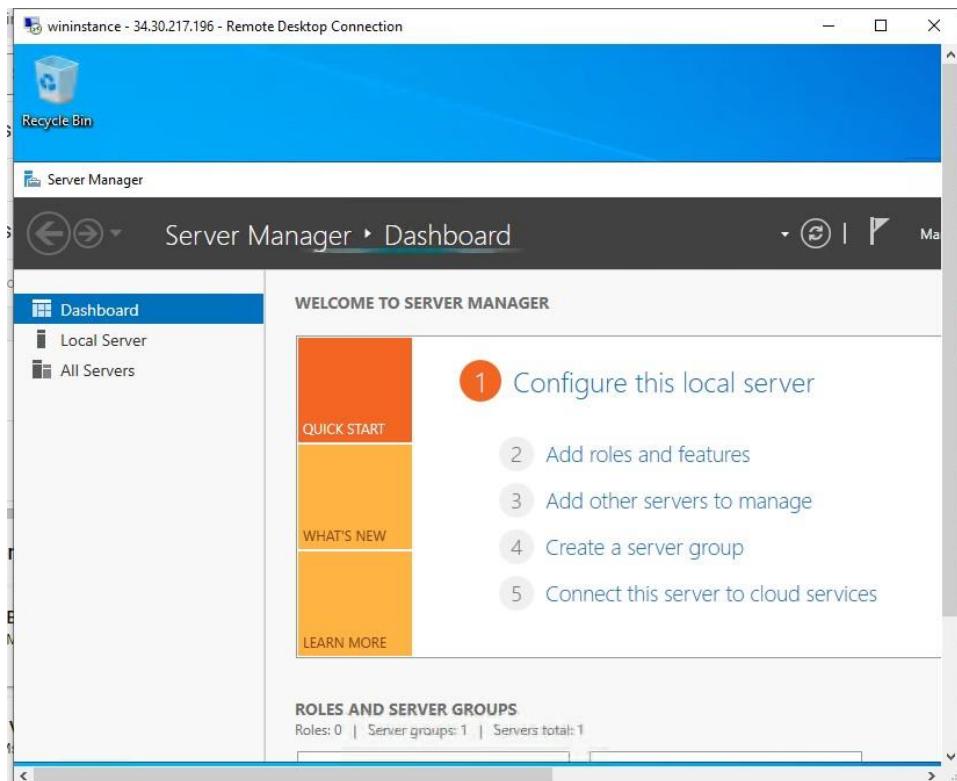
Save the password for further use

Paste the password for connecting





Click on yes



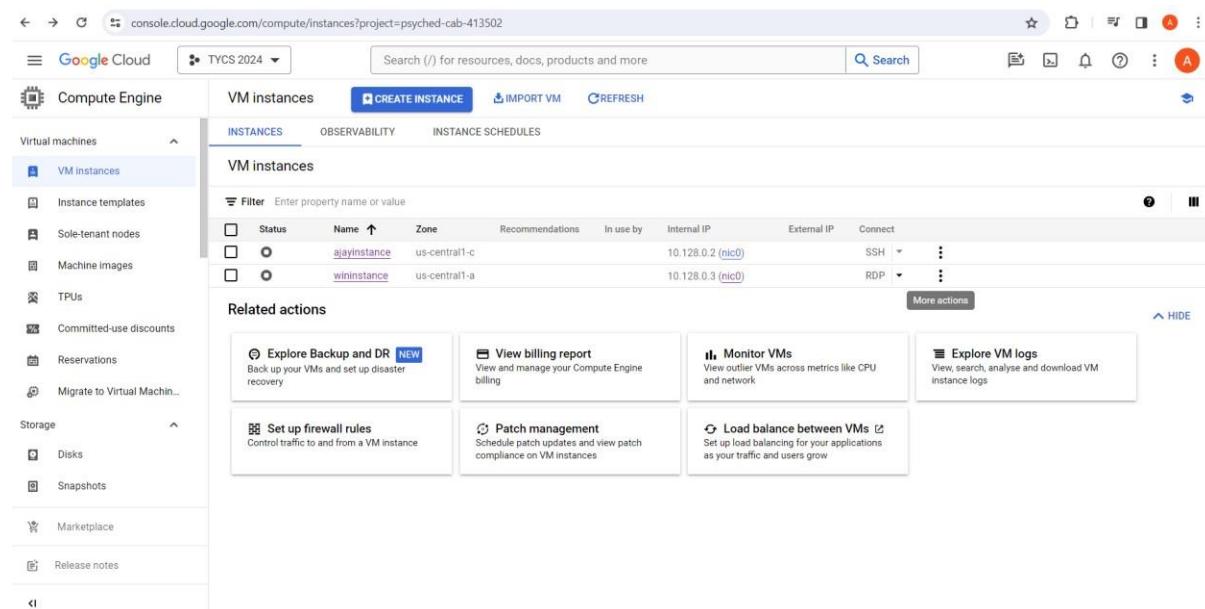
Your Window server is opened and ready to work

Practical 6

Aim: Perform the following in google cloud:

- A “Hello world” website on IIS-Create an IIS web server VM using Compute Engine in

Create a new Instance with Window Server



The screenshot shows the Google Cloud Compute Engine Instances page. The left sidebar navigation includes 'Compute Engine' (selected), 'Virtual machines' (selected), 'VM instances', 'Instance templates', 'Sole-tenant nodes', 'Machine images', 'TPUs', 'Committed-use discounts', 'Reservations', and 'Migrate to Virtual Machine'. Under 'Storage', there are 'Disks' and 'Snapshots'. The main content area displays 'VM instances' with two entries:

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
Up	ajayinstance	us-central1-c			10.128.0.2 (nic0)		SSH
Up	wininstance	us-central1-a			10.128.0.3 (nic0)		RDP

Below the table, 'Related actions' include: 'Explore Backup and DR' (NEW), 'View billing report', 'Monitor VMs', 'Explore VM logs', 'Set up firewall rules', 'Patch management', and 'Load balance between VMs'.

Create an instance (Left sidebar)

New VM instance (Selected): Create a single VM instance from scratch.

New VM instance from template: Create a single VM instance from an existing template.

New VM instance from machine image: Create a single VM instance from an existing machine image.

Marketplace: Deploy a ready-to-go solution onto a VM instance.

Boot disk (Settings):

- Name: ccassignment
- Type: New balanced persistent disk
- Size: 50 GB
- Licence type: PAYG (Pay as you go)
- Image: Windows Server 2022 Datacenter

If you are using Windows and intend to run additional Microsoft software, please fill in the [Licence verification form](#).

[Learn more](#) about Microsoft licence mobility requirements.

Identity and API access (Settings):

Service accounts:

- Service account: Compute Engine default service account

Requires the Service Account User role (roles/iam.serviceAccountUser) to be set for users who want to access VMs with this service account. [Learn more](#)

CREATE **CANCEL** **EQUIVALENT CODE**

Google Cloud TYCS 2024 Search (/) for resources, docs, products and more **Search**

Compute Engine **VM instances** **CREATE INSTANCE** **IMPORT VM** **REFRESH** **LEARN**

VM instances								
INSTANCES			OBSERVABILITY			INSTANCE SCHEDULES		
VM instances <input type="checkbox"/> Status Name ↑ Zone Recommendations In use by Internal IP External IP Connect <input type="checkbox"/> ajayinstance us-central1-c 10.128.0.2 (nic0) SSH <input type="button" value="⋮"/> <input type="checkbox"/> ccasignment us-central1-a 10.128.0.4 (nic0) 34.16.75.112 (nic0) RDP <input type="button" value="⋮"/> <input type="checkbox"/> wininstance us-central1-a 10.128.0.3 (nic0) RDP <input type="button" value="⋮"/>								
Related actions <ul style="list-style-type: none"> Explore Backup and DR <small>NEW</small> Back up your VMs and set up disaster recovery View billing report View and manage your Compute Engine billing Monitor VMs View outlier VMs across metrics like CPU and network Explore VM logs View, search, analyse and download VM instance logs Set up firewall rules Control traffic to and from a VM instance Patch management Schedule patch updates and view patch compliance on VM instances Load balance between VMs Set up load balancing for your applications as your traffic and users grow 								

Set Window Password by clicking on RDP

Google Cloud TYCS 2024 Search (/) for resources, docs, products and more **Search**

Compute Engine **VM instances** **CREATE INSTANCE** **IMPORT VM** **REFRESH**

VM instances								
INSTANCES			OBSERVABILITY			INSTANCE SCHEDULES		
X 1 START/RESUME STOP SUSPEND RESET DELETE LABELS PERMISSIONS <input type="checkbox"/> Status Name ↑ Zone Recommendations In use by Internal IP External IP Connect <input checked="" type="checkbox"/> ccasignment us-central1-a 10.128.0.4 (nic0) 34.16.75.112 (nic0) RDP <input type="button" value="⋮"/> <input type="checkbox"/> ajayinstance us-central1-c 10.128.0.2 (nic0) SSH <input type="button" value="⋮"/> <input type="checkbox"/> wininstance us-central1-a 10.128.0.3 (nic0) RDP <input type="button" value="⋮"/>								
Related actions <ul style="list-style-type: none"> Explore Backup and DR <small>NEW</small> Back up your VMs and set up disaster recovery View billing report View and manage your Compute Engine billing Monitor VMs View outlier VMs across metrics like CPU and network Explore VM logs View, search, analyse and download VM instance logs Set up firewall rules Control traffic to and from a VM instance Patch management Schedule patch updates and view patch compliance on VM instances Load balance between VMs Set up load balancing for your applications as your traffic and users grow 								

Set Windows password
 View gcloud command to reset password
 Download the RDP file
 Learn about Windows auth

Download the RDP file

The screenshot shows the Google Cloud Compute Engine interface. In the center, a modal window titled "Connect using your RDP client" is displayed. It contains instructions for connecting via RDP and notes about configuring the network firewall. Below the modal, there are several related actions: "Explore VM logs", "Set up firewall rules", "Monitor VMs", and "Load balance between VMs". On the right side of the screen, a table lists VM instances with columns for External IP, Connect method (SSH or RDP), and a more options menu.

Click on the download RDP file to start window instance

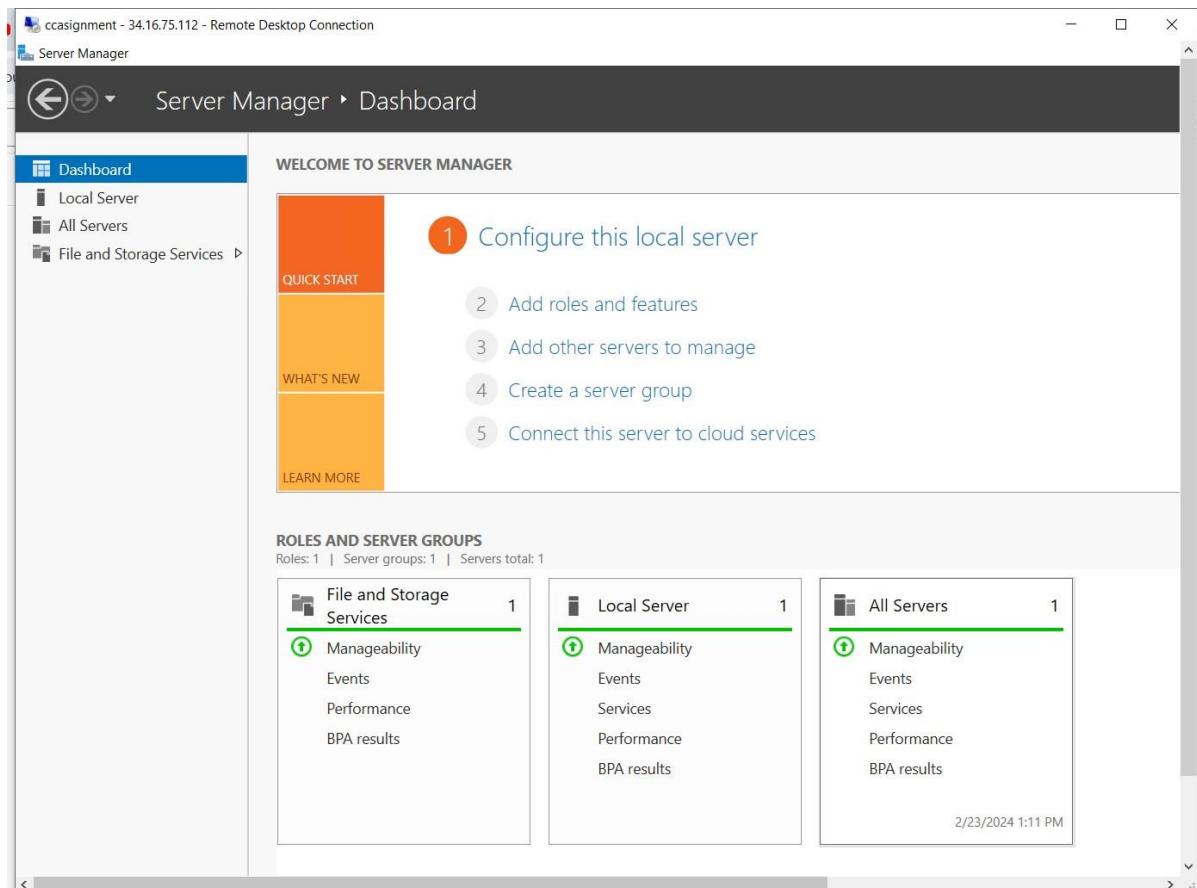
The screenshot shows the same Google Cloud Compute Engine interface as the previous one. A different modal window is now open, titled "Remote Desktop Connection". It displays a warning message: "The publisher of this remote connection can't be identified. Do you want to connect anyway?". Below the message, it shows the publisher is "Unknown publisher", the type is "Remote Desktop Connection", and the remote computer is "34.16.75.112". There are checkboxes for "Don't ask me again for connections to this computer" and "Show Details". At the bottom of the dialog are "Connect" and "Cancel" buttons. The background of the interface remains the same, showing the list of VM instances and related actions.

Input username and password which has been set

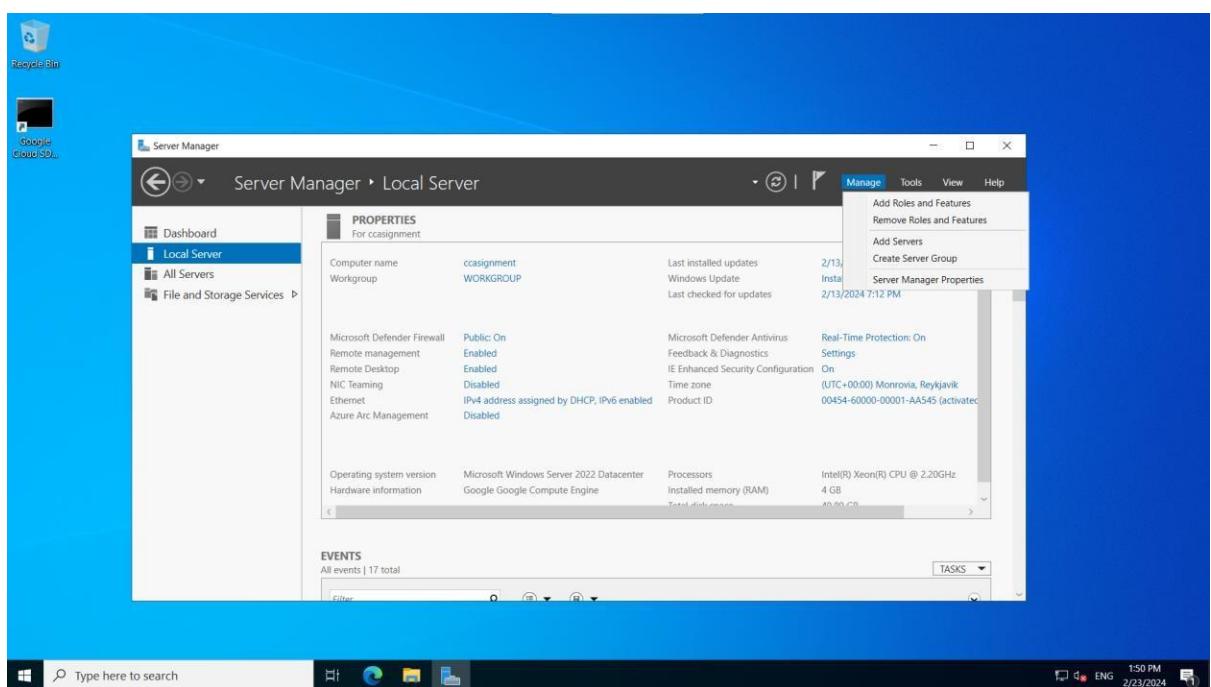
This screenshot shows the Google Cloud Compute Engine interface. On the left, there's a sidebar with 'Virtual machines' expanded, showing 'VM instances' selected. The main area is titled 'VM instances' with tabs for 'INSTANCES', 'OBSERVABILITY', and 'INSTANCE SCHEDULES'. Under 'INSTANCES', a list of VM instances is shown: 'ajayinstance' (Status: Off, Name: ajayinstance, Zone: us-central1-a), 'ccassignment' (Status: On, Name: ccassignment, Zone: us-central1-a), and 'wininstance' (Status: Off, Name: wininstance, Zone: us-central1-a). A modal window titled 'Windows Security' is open, prompting for credentials to connect to the IP 34.16.75.112. It shows the user 'u_ajaykumar7616' and a masked password field. There are 'OK' and 'Cancel' buttons. To the right of the modal, a list of connection options is visible: 'Connect' (SSH, RDP), 'View outlier VMs across metrics like CPU and network', 'Explore Backup and DR', 'Explore VM logs', 'Set up firewall rules', and 'Load balance between VMs'. A 'Related actions' section also includes 'View and manage your Compute Engine billing'.

This screenshot shows the same Google Cloud Compute Engine interface as the previous one, but with a different modal window. The modal is titled 'Remote Desktop Connection' and displays a warning: 'The identity of the remote computer cannot be verified. Do you want to connect anyway?'. It explains that the remote computer could not be authenticated due to problems with its security certificate. It lists 'Certificate name' (Name in the certificate from the remote computer: 128.0.2.2 (0000)) and 'Certificate errors' (The following errors were encountered while validating the remote computer's certificate: The certificate is not from a trusted certifying authority.). It asks if the user wants to connect despite these errors, with 'Yes' and 'No' buttons. Below the modal, the same list of connection options and related actions are visible.

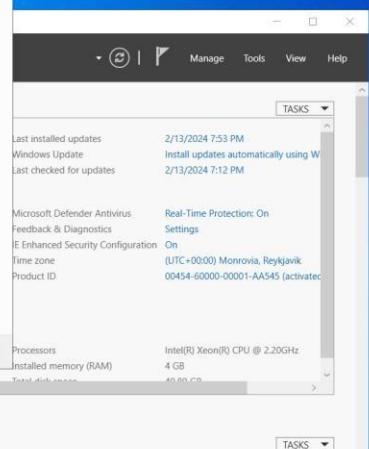
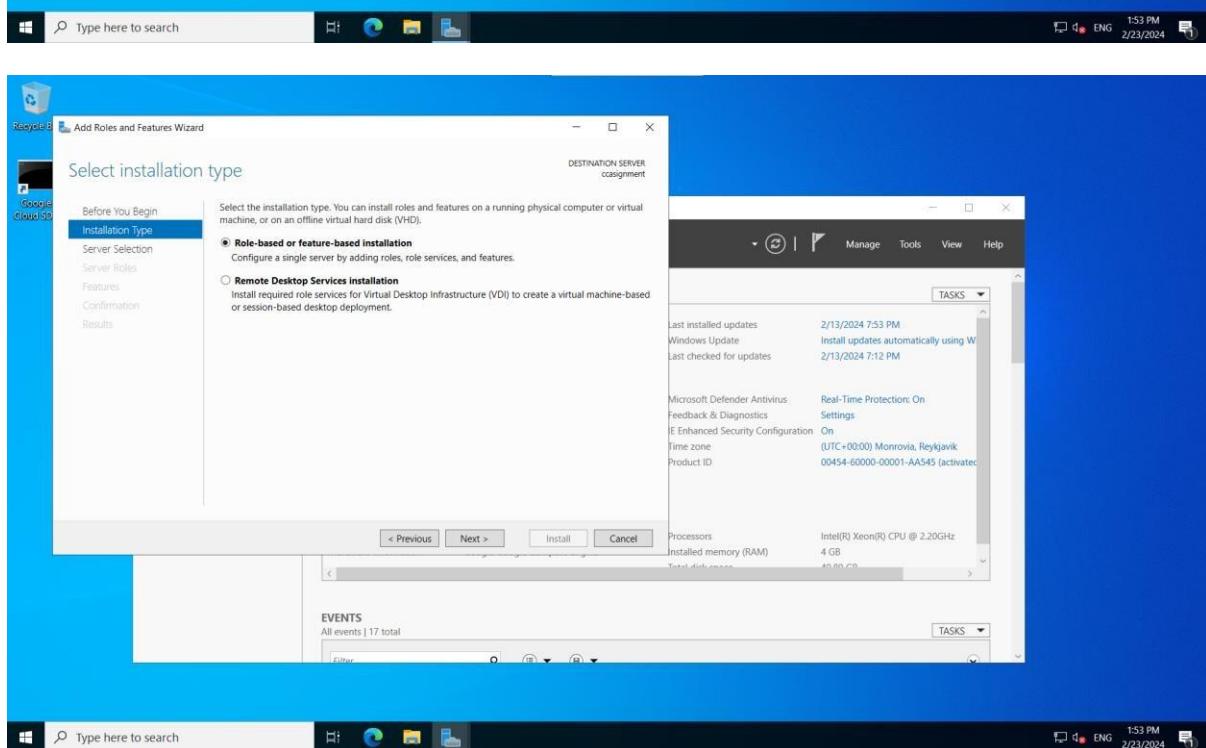
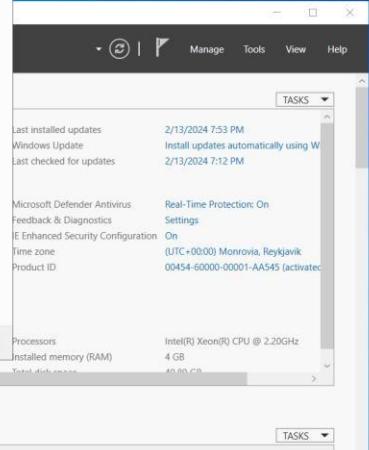
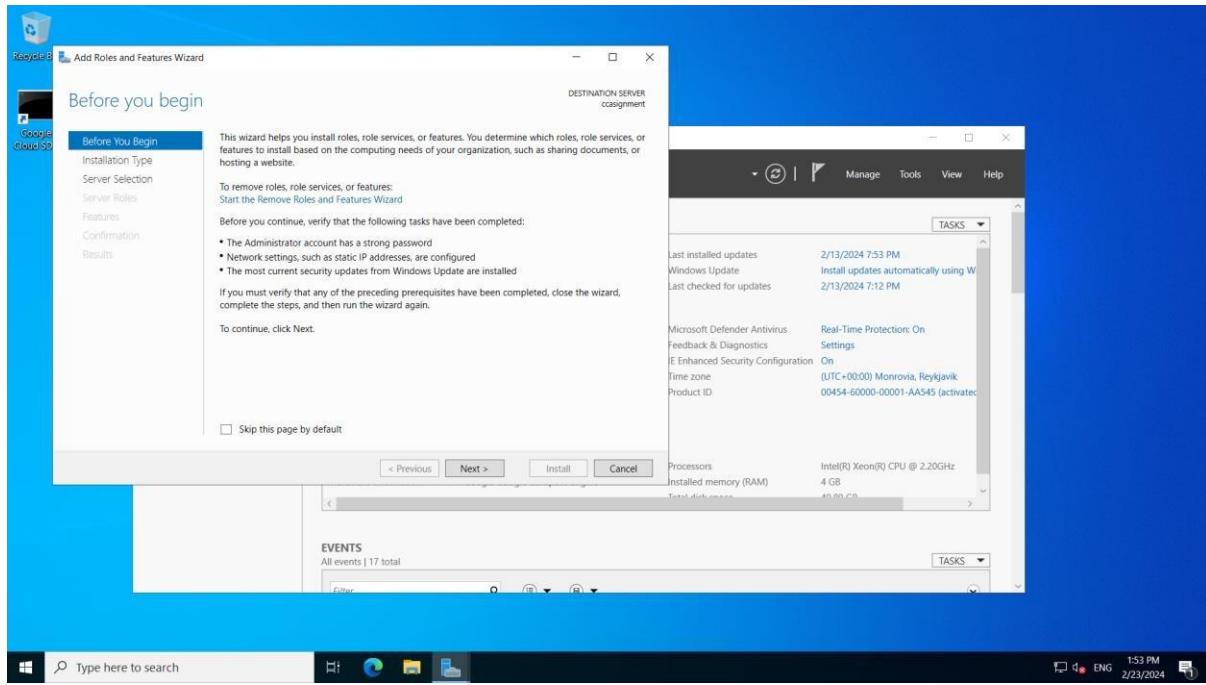
When the window instance you will get a Server manager application

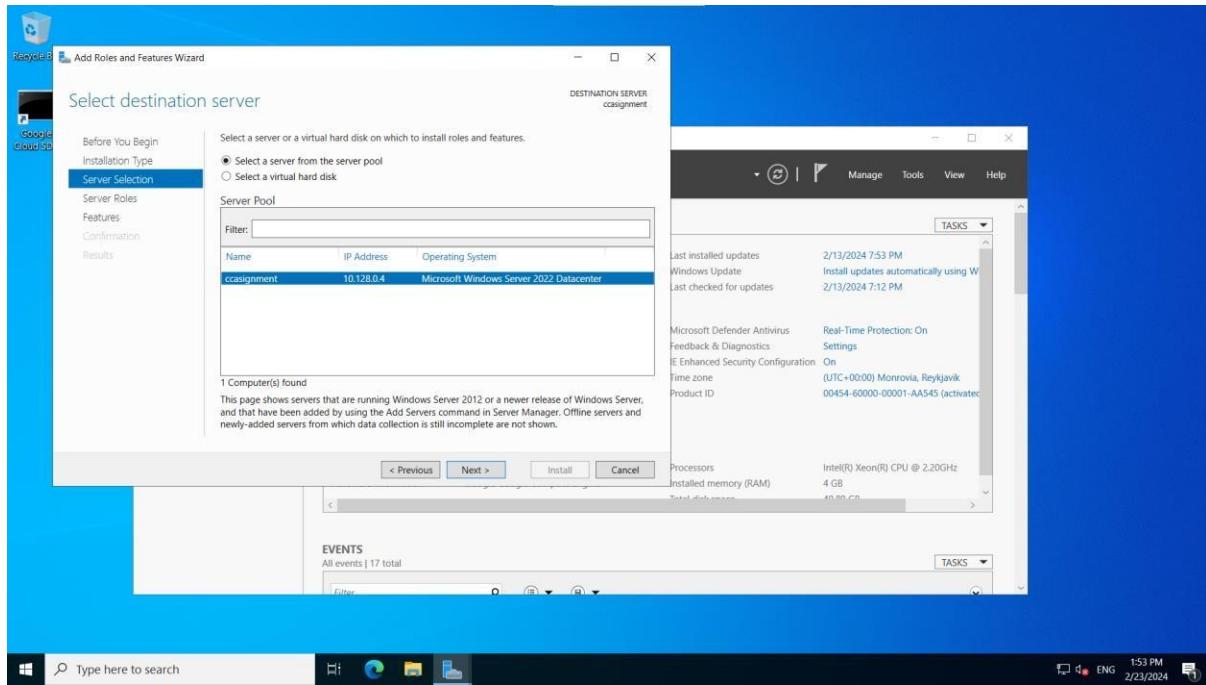


Select Add Roles and Features from the manage

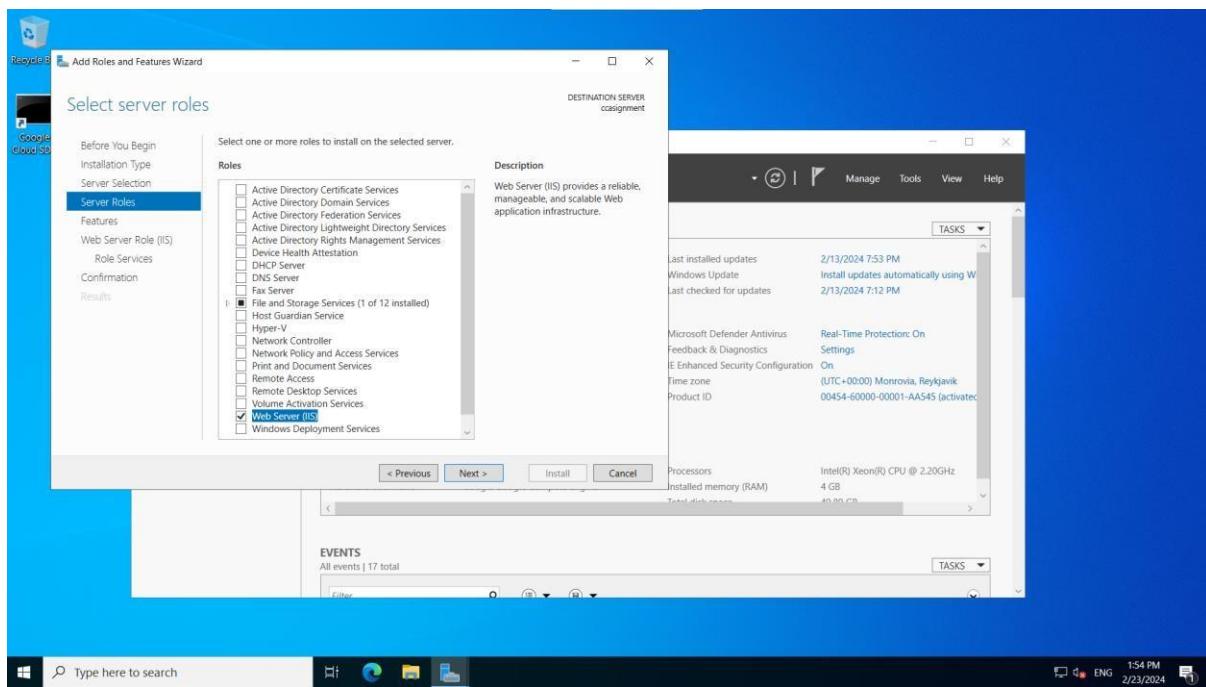


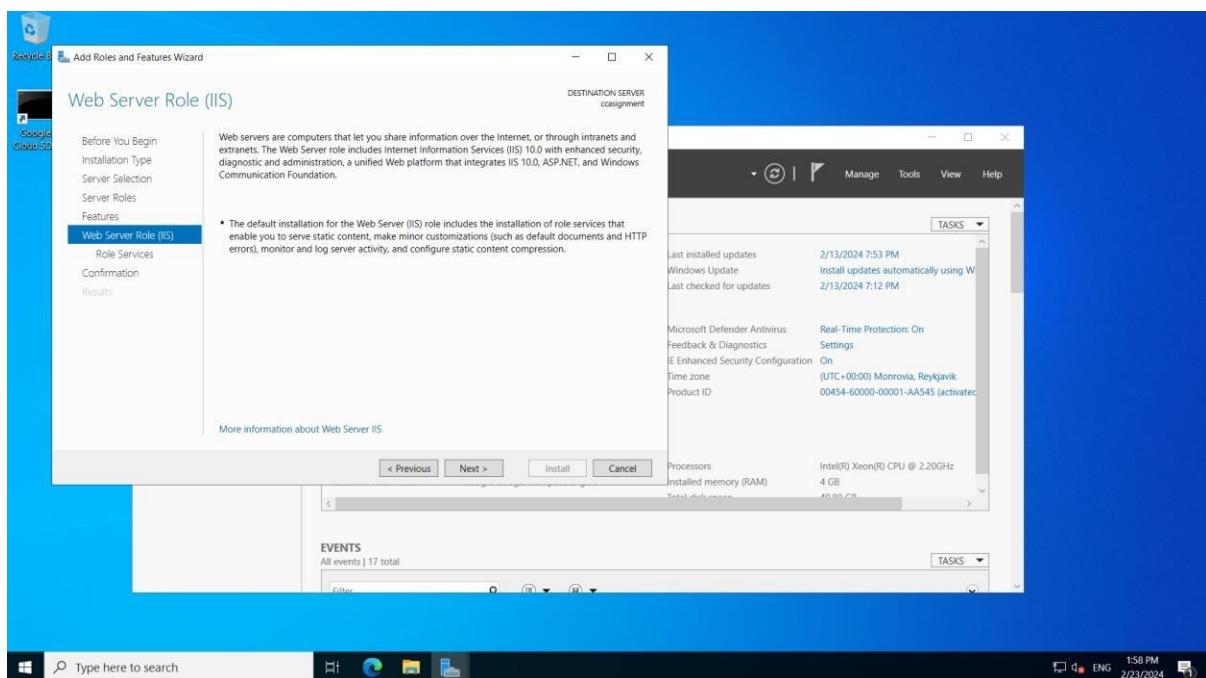
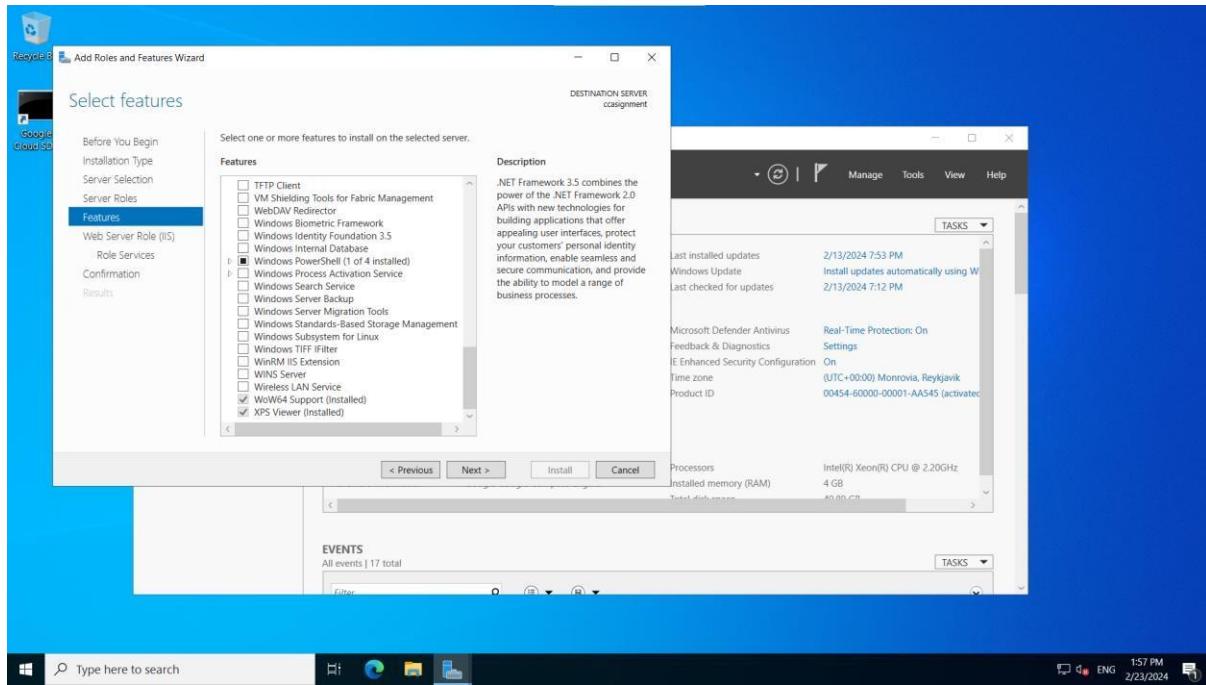
Follow the installation procedure as followed in the below snapshot

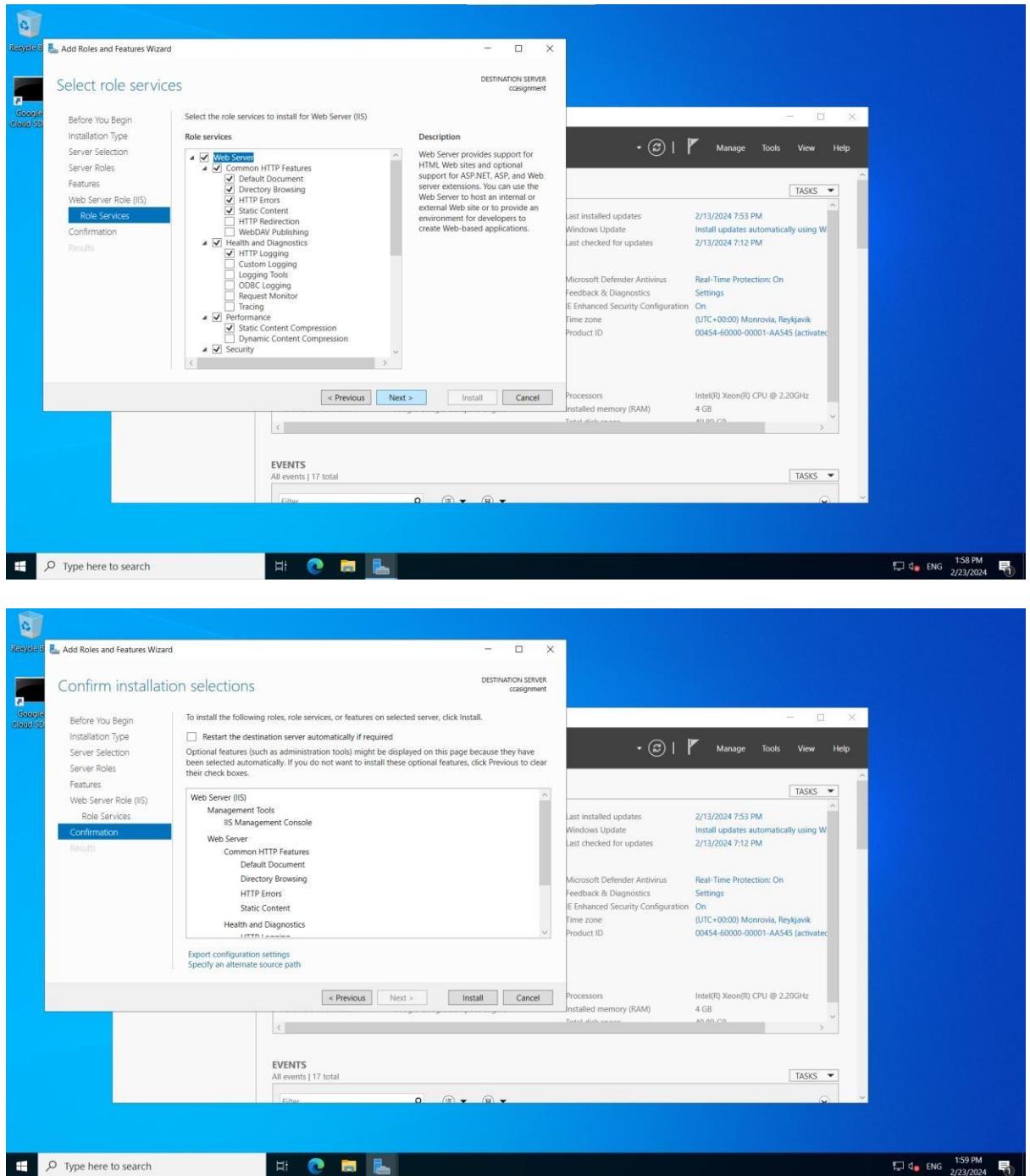




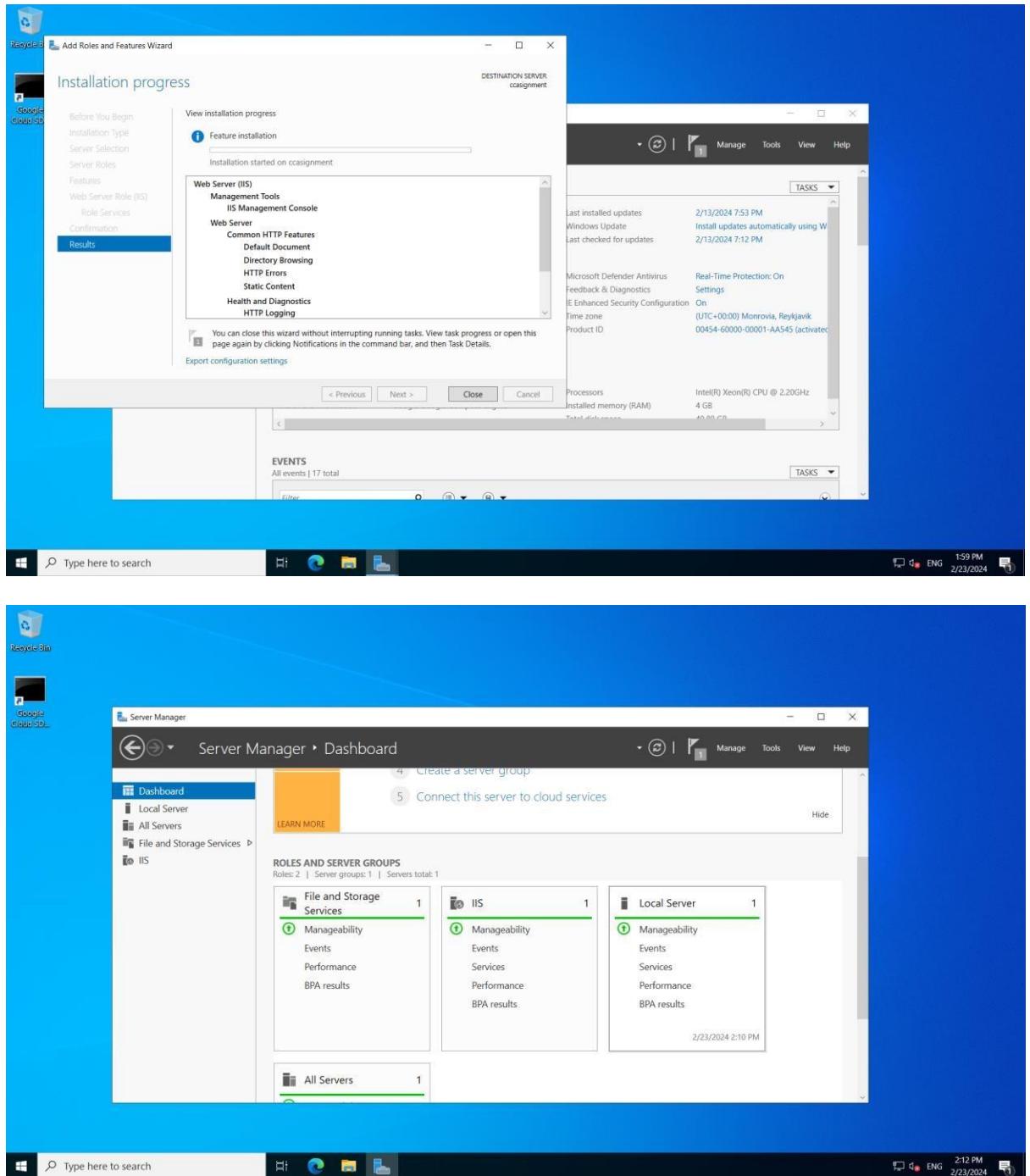
Tick mark the Web Server(IIS) which was uncheck.







You have successfully installed IIS server

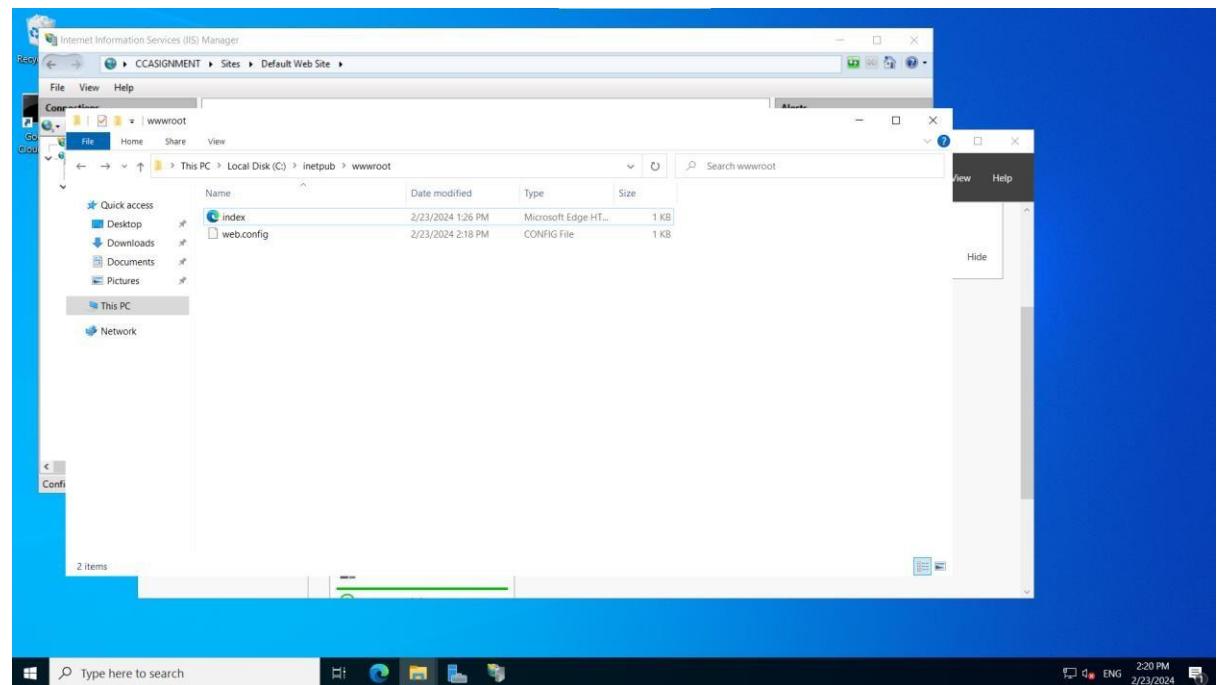


Create a Hello World in HTML format and save it has index file

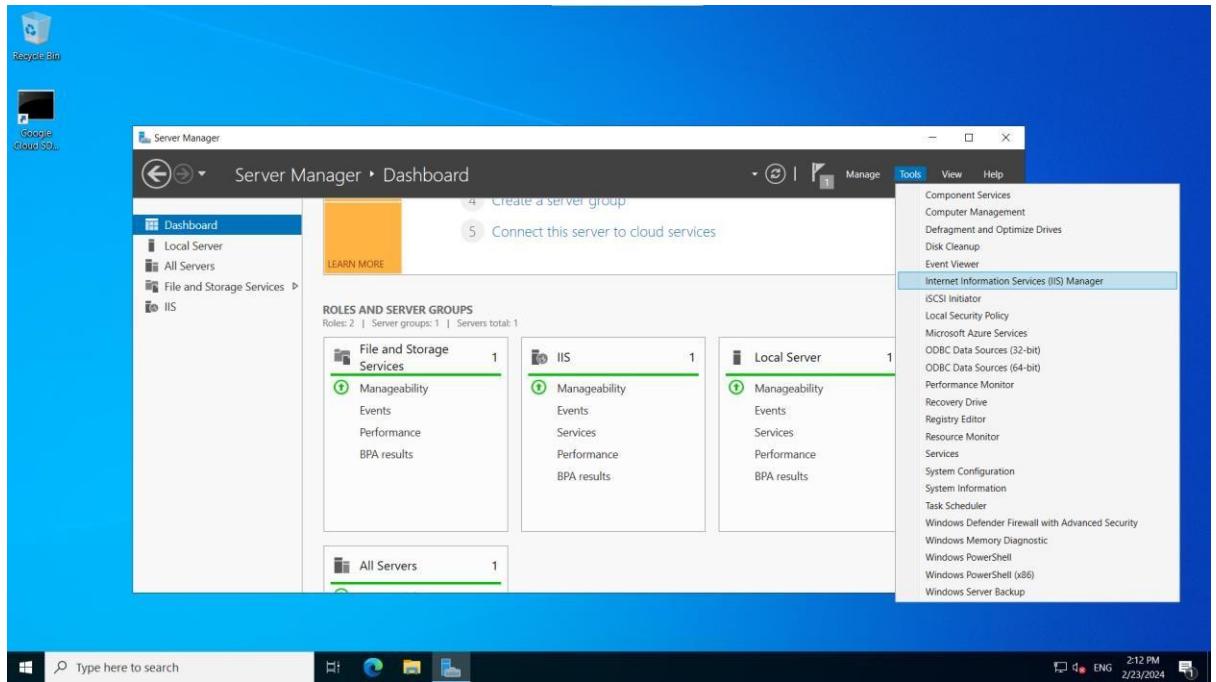
```
<!DOCTYPE html>
<html>
<head>
</head>
<body>
    <h1>Hello World!</h1>
</body>
</html>
```

Windows (CRLF) Ln 7, Col 8 100%

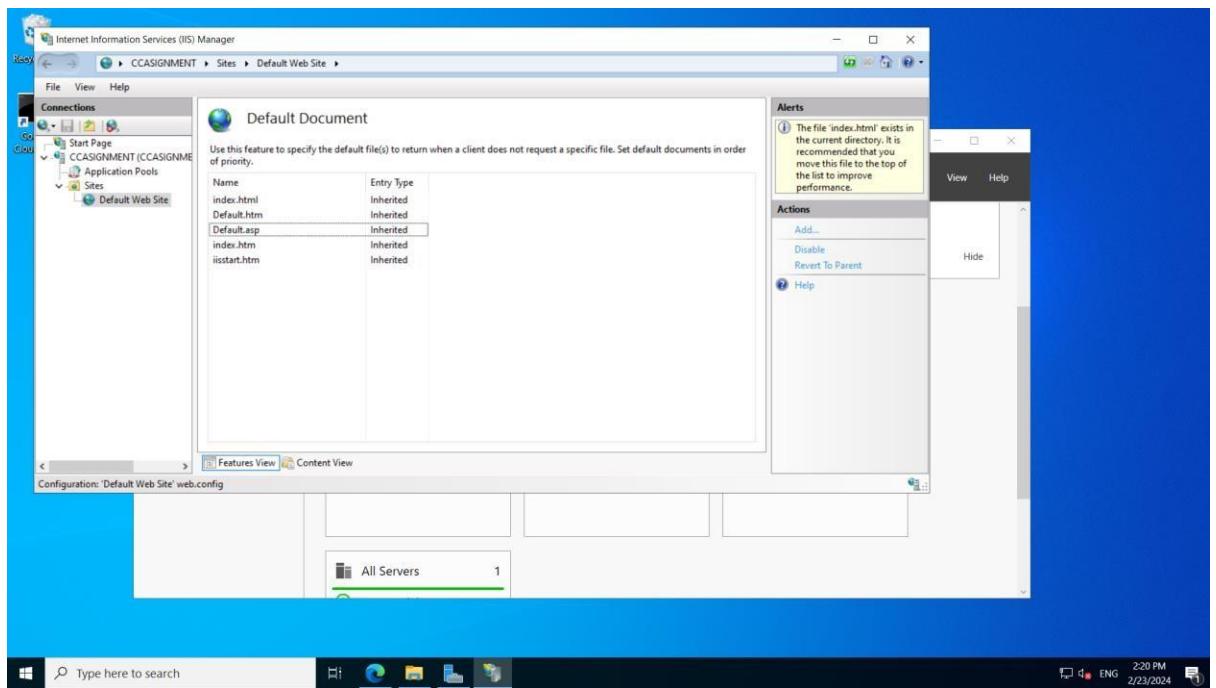
Move the index file to C:/inetpub/wwwroot/ folder



Now select the Internet Information Service Manager from the tools



Click on Sites and select Default web site where you get option of Default Document. Click on the option and where you get a list of file. In that move the index.html to top.



Then outside the window instance call the window instance using it's external IP. Then you will receive Hello World webpage.



Hello World

- b. A “Hello World” website on Apache. Create an Apache web server on a Linux VM

Create a Debian Instance

The screenshot shows the 'Create an instance' wizard in the Google Cloud Platform. The left sidebar lists options: 'New VM instance', 'New VM instance from template', 'New VM instance from machine image', and 'Marketplace'. The main form is for creating a 'New VM instance'. It includes fields for 'Name' (ccassignment2), 'Region' (us-central1 (Iowa)), 'Zone' (us-central1-a), and 'Machine configuration'. Under 'Machine configuration', the 'General purpose' tab is selected, showing the 'E2' series as the chosen option. The 'Compute Engine pricing' section shows a monthly estimate of US\$25.46. At the bottom, there are 'CREATE' and 'CANCEL' buttons.

Select the Allow HTTP traffic and create the instance

Service accounts

Service account: Compute Engine default service account

Requires the Service Account User role (roles/iam.serviceAccountUser) to be set for users who want to access VMs with this service account. [Learn more](#)

Access scopes

- Allow default access
- Allow full access to all Cloud APIs
- Set access for each API

Firewall

Add tags and firewall rules to allow specific network traffic from the Internet

- Allow HTTP traffic
- Allow HTTPS traffic
- Allow load balancer health checks

Observability – Ops Agent

Monitor your system through collection of logs and key metrics.

- Install Ops Agent for monitoring and logging

Advanced options

Networking, disks, security, management, sole-tenancy

Monthly estimate

US\$25.46

That's about US\$0.03 hourly.

Pay for what you use: No upfront costs and per-second billing

Item	Monthly estimate
2 vCPU + 4 GB memory	US\$24.46
10 GB balanced persistent disk	US\$1.00
Total	US\$25.46

[Compute Engine pricing](#)

[LESS](#)

CREATE **CANCEL** [EQUIVALENT CODE](#)

VM instances

INSTANCES **OBSERVABILITY** **INSTANCE SCHEDULES**

VM instances

Filter Enter property name or value

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	ajayinstance	us-central1-c			10.128.0.2 (nic0)		SSH
<input type="checkbox"/>	ccassignment	us-central1-a			10.128.0.4 (nic0)	34.16.75.112 (nic0)	RDP
<input type="checkbox"/>	ccassignment2	us-central1-a			10.128.0.5 (nic0)	35.226.167.25 (nic0)	SSH
<input type="checkbox"/>	wininstance	us-central1-a			10.128.0.3 (nic0)		RDP

Related actions

- Explore Backup and DR** NEW
- View billing report**
- Monitor VMs**
- Explore VM logs**
- Set up firewall rules**
- Patch management**
- Load balance between VMs**

Click on Open in browser window from the ccassignment2 instance

You will get a SSH terminal mode

```

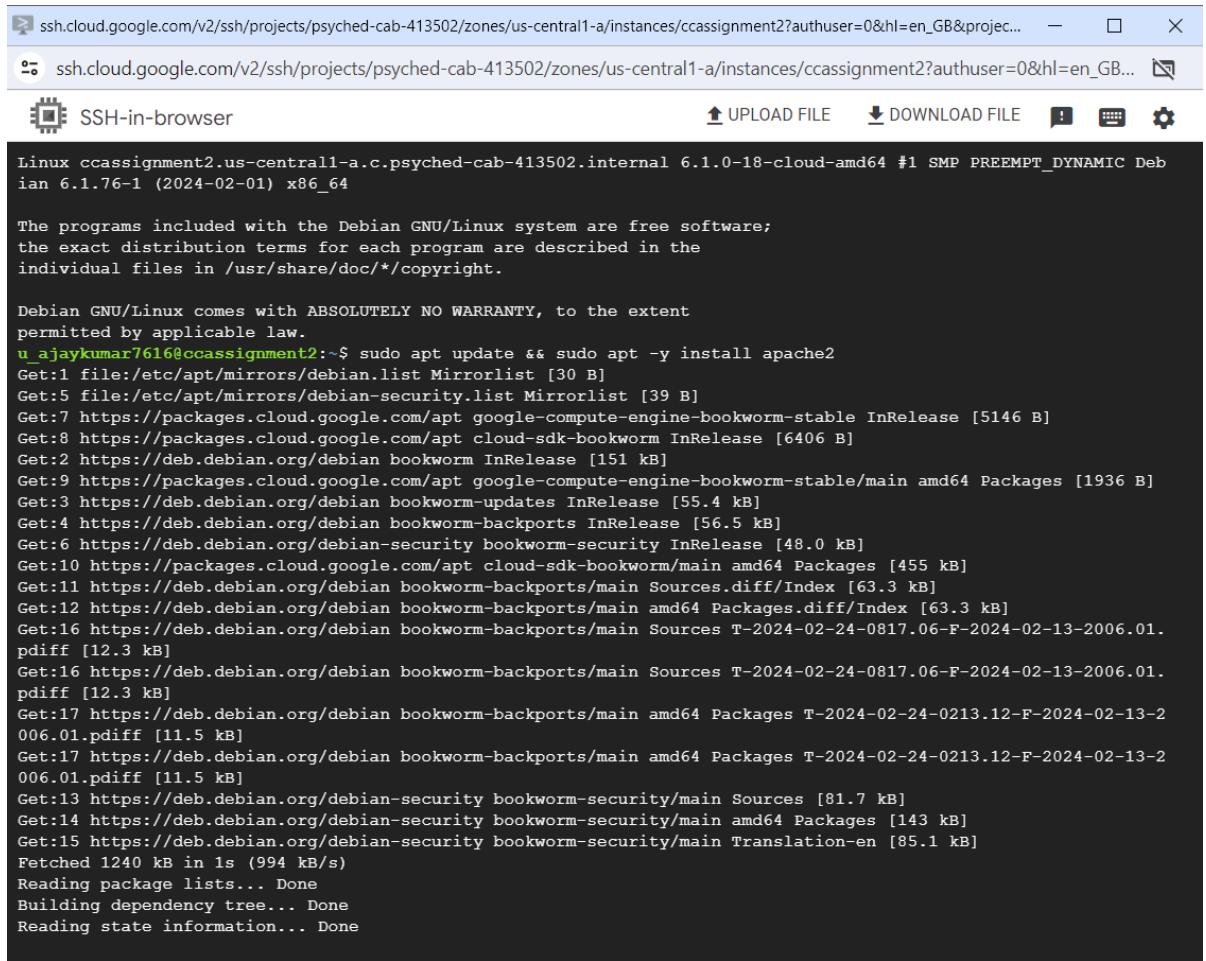
ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-a/instances/ccassignment2?authuser=0&hl=en_GB&projec...
ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-a/instances/ccassignment2?authuser=0&hl=en_GB...
SSH-in-browser
Linux ccassignment2.us-central1-a.c.psyched-cab-413502.internal 6.1.0-18-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Deb
ian 6.1.76-1 (2024-02-01) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
u_ajaykumar7616@ccassignment2:~$ 

```

Type the command `sudo apt update && sudo apt -y install apache2`. To install apache



The screenshot shows an SSH-in-browser interface. At the top, there are two tabs: the active tab is "ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-a/instances/ccassignment2?authuser=0&hl=en_GB&projec..." and the other tab is "ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-a/instances/ccassignment2?authuser=0&hl=en_GB...". Below the tabs, there are icons for "SSH-in-browser", "UPLOAD FILE", "DOWNLOAD FILE", a message bubble, a keyboard, and a gear. The main area displays the output of an "apt update" command on a Debian system:

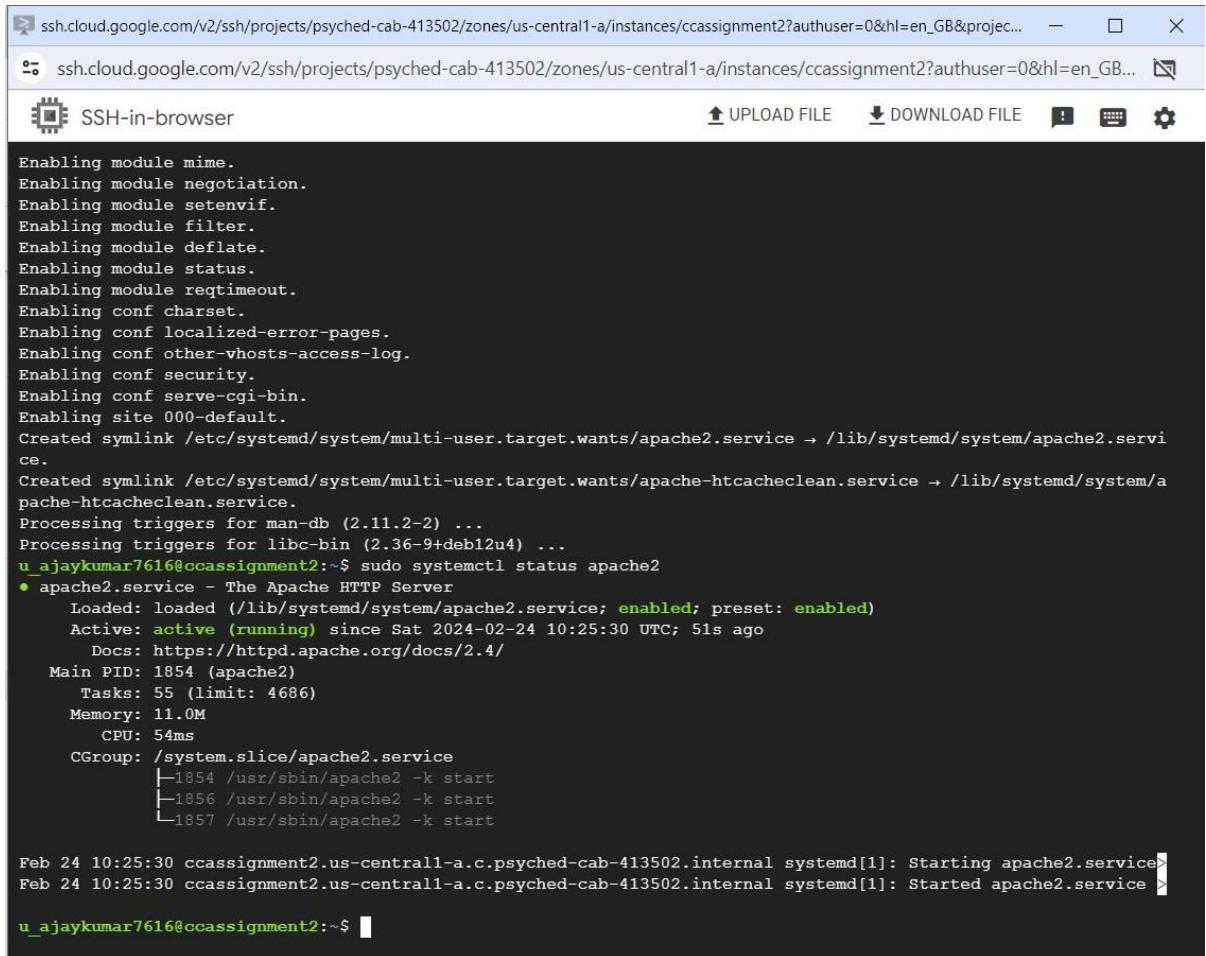
```
Linux ccassignment2.us-central1-a.c.psyched-cab-413502.internal 6.1.0-18-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Deb
ian 6.1.76-1 (2024-02-01) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

u ajaykumar7616@ccassignment2:~$ sudo apt update && sudo apt -y install apache2
Get:1 file:/etc/apt/mirrors/debian.list Mirrorlist [30 B]
Get:5 file:/etc/apt/mirrors/debian-security.list Mirrorlist [39 B]
Get:7 https://packages.cloud.google.com/apt google-compute-engine-bookworm-stable InRelease [5146 B]
Get:8 https://packages.cloud.google.com/apt cloud-sdk-bookworm InRelease [6406 B]
Get:2 https://deb.debian.org/debian bookworm InRelease [151 kB]
Get:9 https://packages.cloud.google.com/apt google-compute-engine-bookworm-stable/main amd64 Packages [1936 B]
Get:3 https://deb.debian.org/debian bookworm-updates InRelease [55.4 kB]
Get:4 https://deb.debian.org/debian bookworm-backports InRelease [56.5 kB]
Get:6 https://deb.debian.org/debian-security bookworm-security InRelease [48.0 kB]
Get:10 https://packages.cloud.google.com/apt cloud-sdk-bookworm/main amd64 Packages [455 kB]
Get:11 https://deb.debian.org/debian bookworm-backports/main Sources.diff/Index [63.3 kB]
Get:12 https://deb.debian.org/debian bookworm-backports/main amd64 Packages.diff/Index [63.3 kB]
Get:16 https://deb.debian.org/debian bookworm-backports/main Sources T-2024-02-24-0817.06-F-2024-02-13-2006.01.
pdiff [12.3 kB]
Get:16 https://deb.debian.org/debian bookworm-backports/main Sources T-2024-02-24-0817.06-F-2024-02-13-2006.01.
pdiff [12.3 kB]
Get:17 https://deb.debian.org/debian bookworm-backports/main amd64 Packages T-2024-02-24-0213.12-F-2024-02-13-2
006.01.pdiff [11.5 kB]
Get:17 https://deb.debian.org/debian bookworm-backports/main amd64 Packages T-2024-02-24-0213.12-F-2024-02-13-2
006.01.pdiff [11.5 kB]
Get:13 https://deb.debian.org/debian-security bookworm-security/main Sources [81.7 kB]
Get:14 https://deb.debian.org/debian-security bookworm-security/main amd64 Packages [143 kB]
Get:15 https://deb.debian.org/debian-security bookworm-security/main Translation-en [85.1 kB]
Fetched 1240 kB in 1s (994 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

Then start the apache using command, `sudo systemctl status apache2`

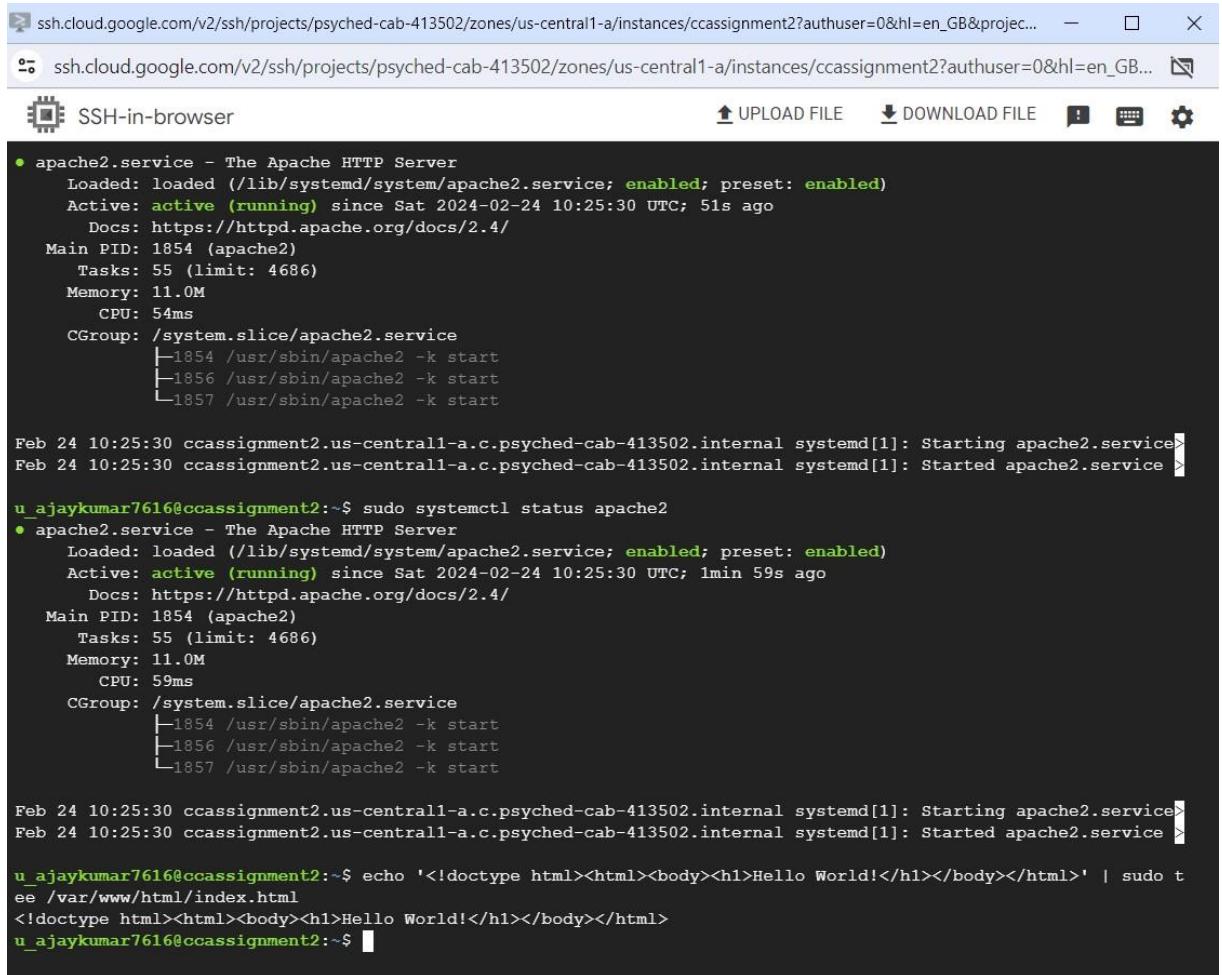


The screenshot shows an SSH session in a browser window titled "SSH-in-browser". The terminal output displays the Apache configuration process and its status:

```
Enabling module mime.
Enabling module negotiation.
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for man-db (2.11.2-2) ...
Processing triggers for libc-bin (2.36-9+deb12u4) ...
u_ajaykumar7616@ccassignment2:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Sat 2024-02-24 10:25:30 UTC; 51s ago
     Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 1854 (apache2)
    Tasks: 55 (limit: 4686)
   Memory: 11.0M
      CPU: 54ms
     CGroup: /system.slice/apache2.service
             ├─1854 /usr/sbin/apache2 -k start
             ├─1856 /usr/sbin/apache2 -k start
             └─1857 /usr/sbin/apache2 -k start
Feb 24 10:25:30 ccassignment2.us-central1-a.c.psyched-cab-413502.internal systemd[1]: Starting apache2.service>
Feb 24 10:25:30 ccassignment2.us-central1-a.c.psyched-cab-413502.internal systemd[1]: Started apache2.service >
u_ajaykumar7616@ccassignment2:~$
```

After starting the apache, replace the index.html with Hello World. Using this command,

```
echo '<!doctype html><html><body><h1>Hello
World!</h1></body></html>' | sudo tee /var/www/html/index.html
```



```

SSH-in-browser
SSH-in-browser
SSH-in-browser

apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; preset: enabled)
  Active: active (running) since Sat 2024-02-24 10:25:30 UTC; 51s ago
    Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 1854 (apache2)
   Tasks: 55 (limit: 4686)
  Memory: 11.0M
     CPU: 54ms
    CGroup: /system.slice/apache2.service
            ├─1854 /usr/sbin/apache2 -k start
            ├─1856 /usr/sbin/apache2 -k start
            └─1857 /usr/sbin/apache2 -k start

Feb 24 10:25:30 ccassignment2.us-central1-a.c.psyched-cab-413502.internal systemd[1]: Starting apache2.service>
Feb 24 10:25:30 ccassignment2.us-central1-a.c.psyched-cab-413502.internal systemd[1]: Started apache2.service >

u_ajaykumar7616@ccassignment2:~$ sudo systemctl status apache2
apache2.service - The Apache HTTP Server
  Loaded: loaded (/lib/systemd/system/apache2.service; enabled; preset: enabled)
  Active: active (running) since Sat 2024-02-24 10:25:30 UTC; 1min 59s ago
    Docs: https://httpd.apache.org/docs/2.4/
 Main PID: 1854 (apache2)
   Tasks: 55 (limit: 4686)
  Memory: 11.0M
     CPU: 59ms
    CGroup: /system.slice/apache2.service
            ├─1854 /usr/sbin/apache2 -k start
            ├─1856 /usr/sbin/apache2 -k start
            └─1857 /usr/sbin/apache2 -k start

Feb 24 10:25:30 ccassignment2.us-central1-a.c.psyched-cab-413502.internal systemd[1]: Starting apache2.service>
Feb 24 10:25:30 ccassignment2.us-central1-a.c.psyched-cab-413502.internal systemd[1]: Started apache2.service >

u_ajaykumar7616@ccassignment2:~$ echo '<!doctype html><html><body><h1>Hello World!</h1></body></html>' | sudo tee /var/www/html/index.html
<!doctype html><html><body><h1>Hello World!</h1></body></html>
u_ajaykumar7616@ccassignment2:~$ 

```

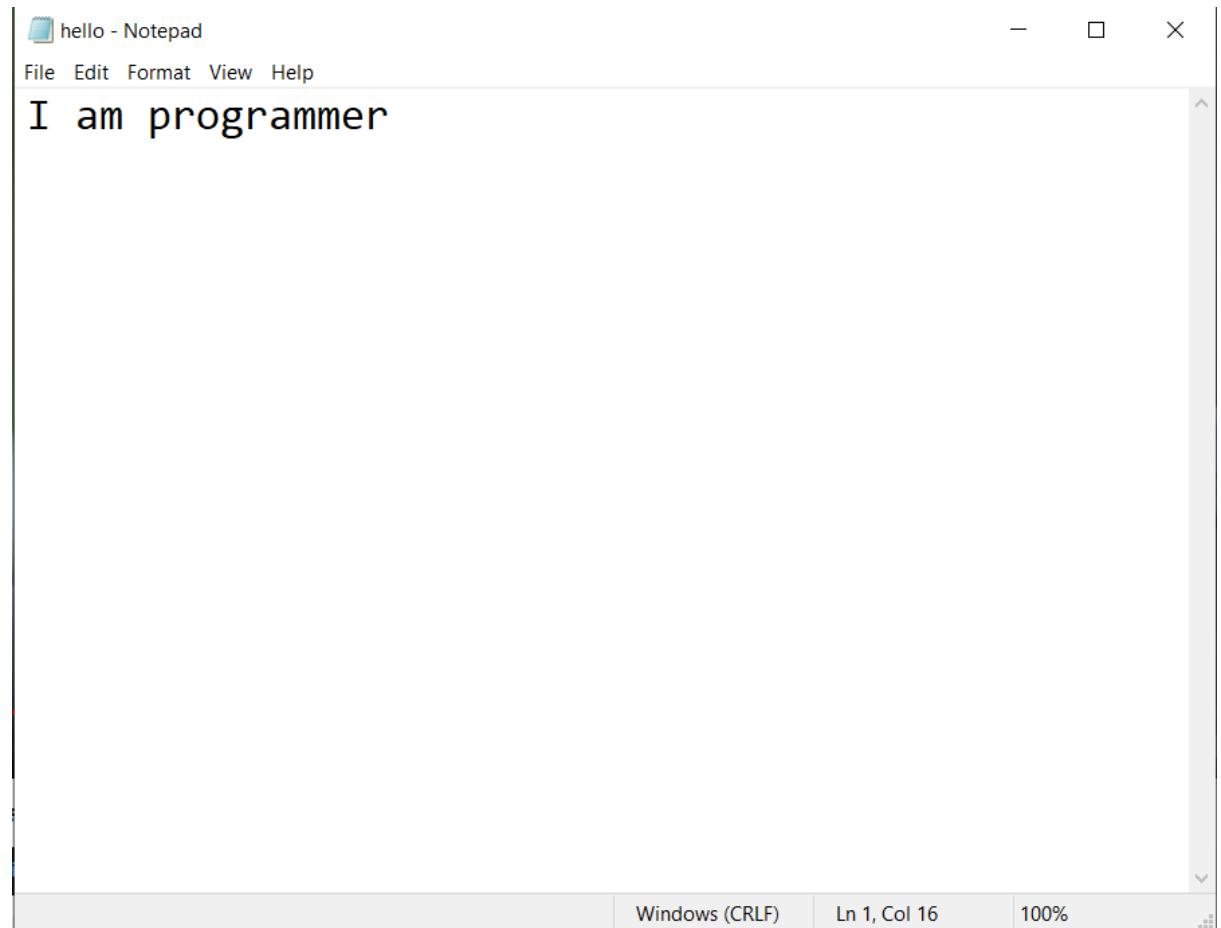
Now call the external ip outside the debian instance.



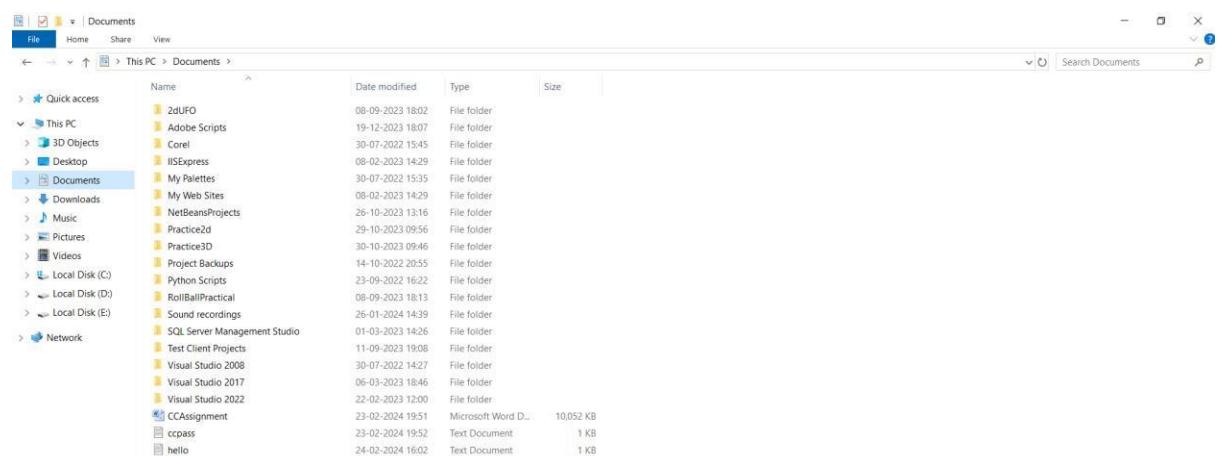
Hello World!

c. Transfer files to Windows VMs

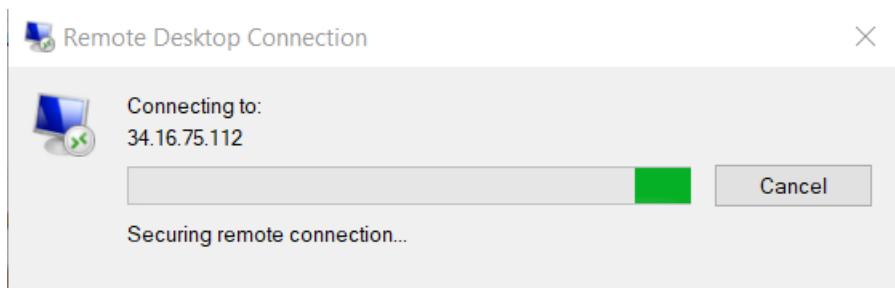
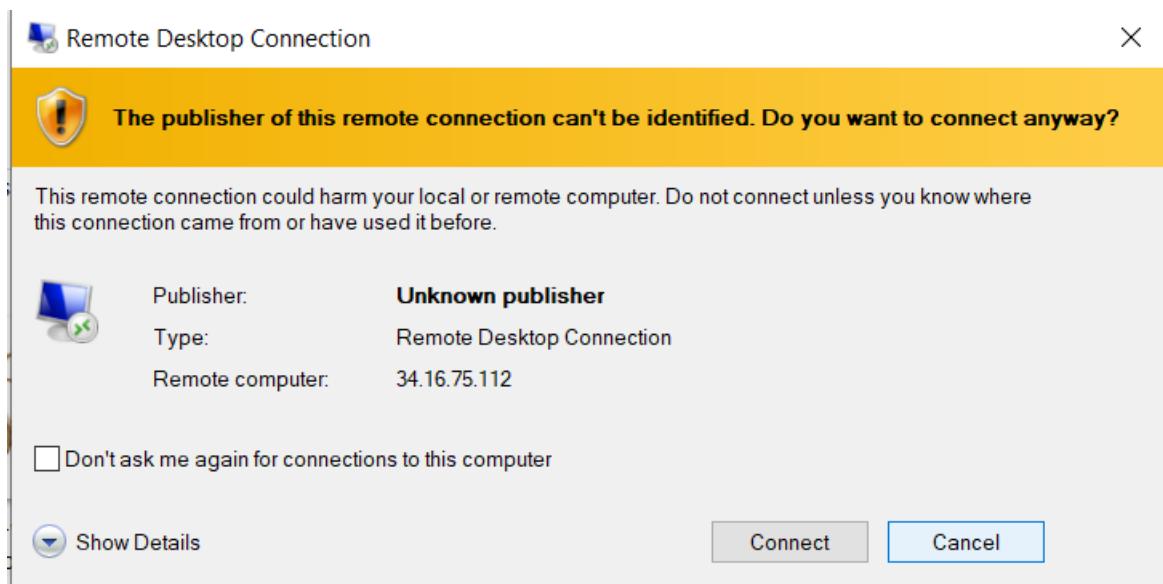
Create a hello text file.



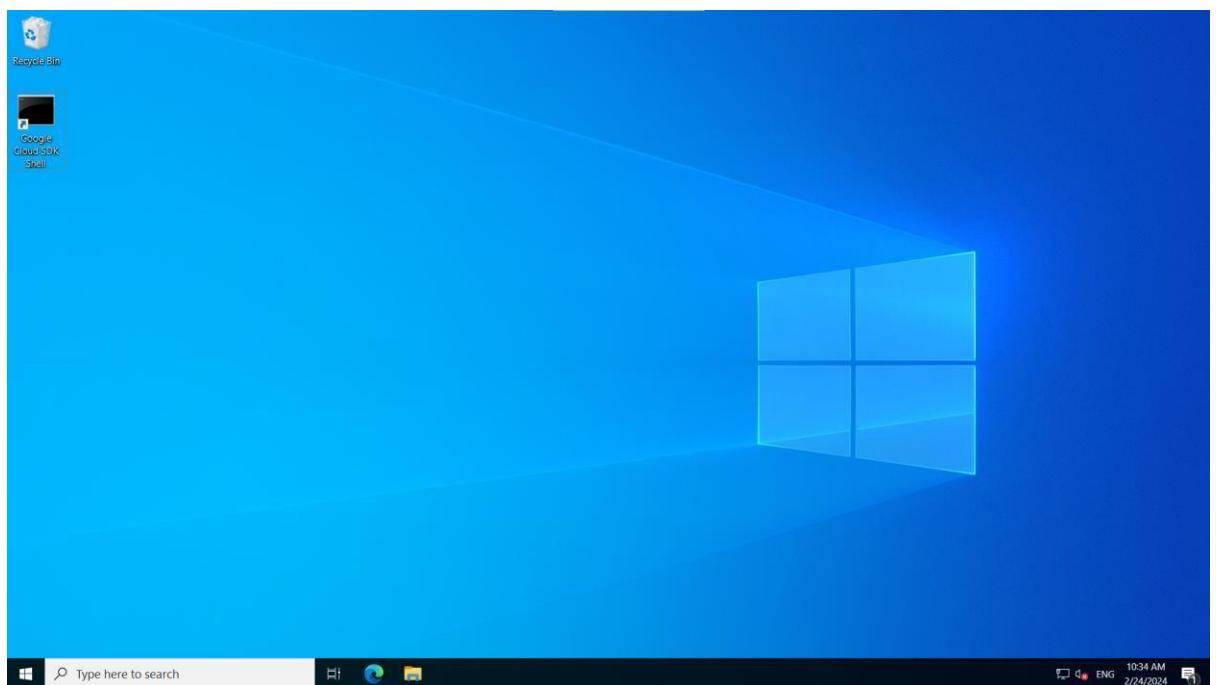
Save it in your Personal pc

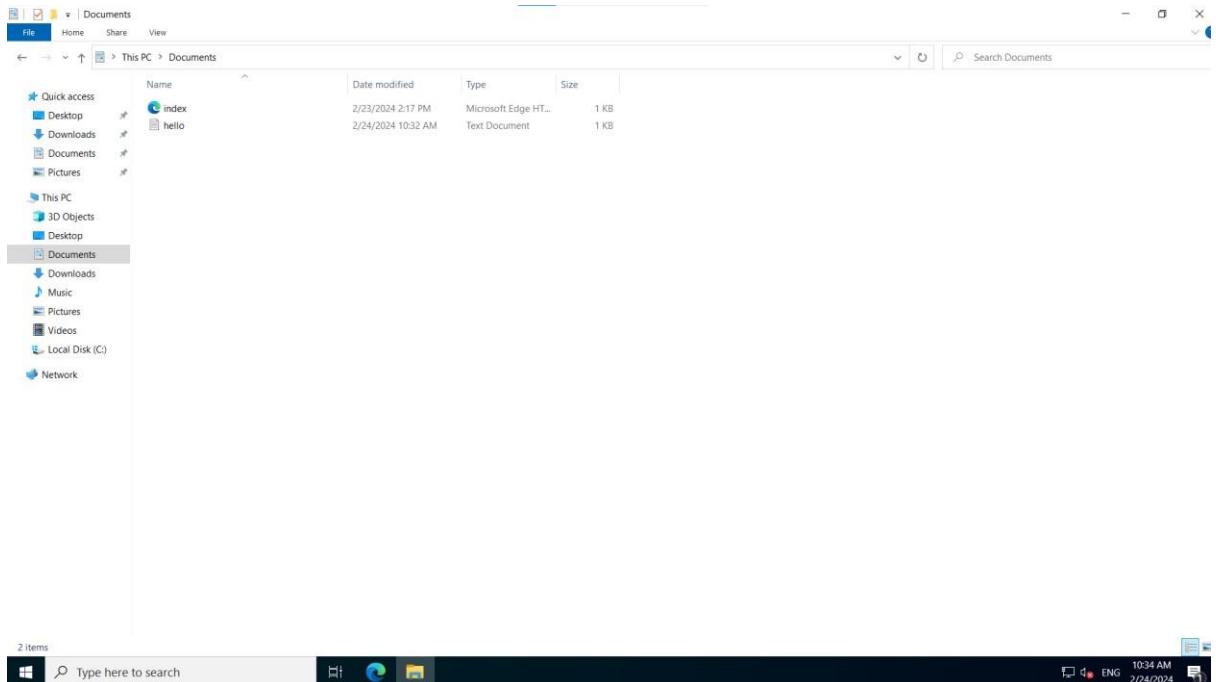


Now using RDP file launch the window instance



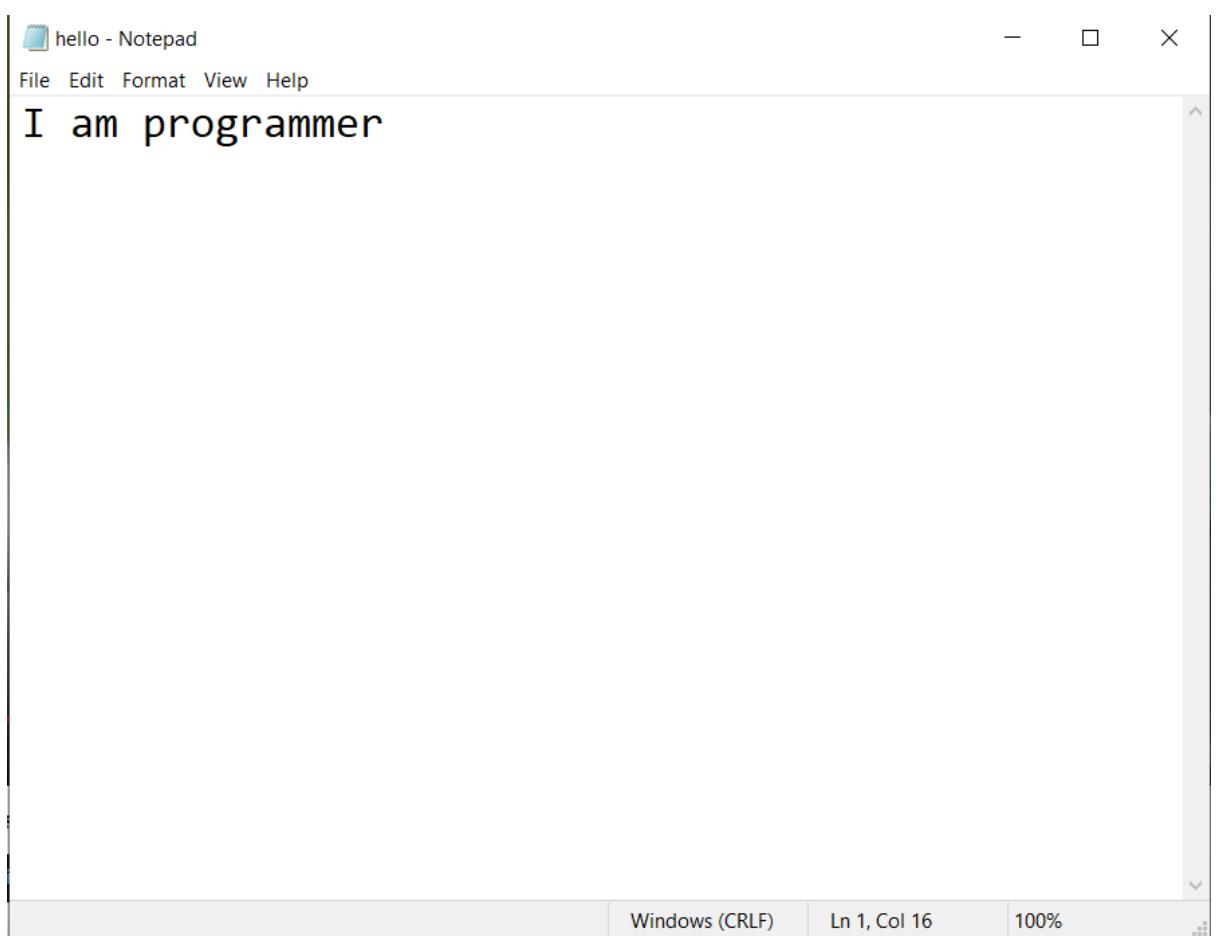
Copy the Hello text file from your Personal PC and paste the Hello.txt in the Documents folder.



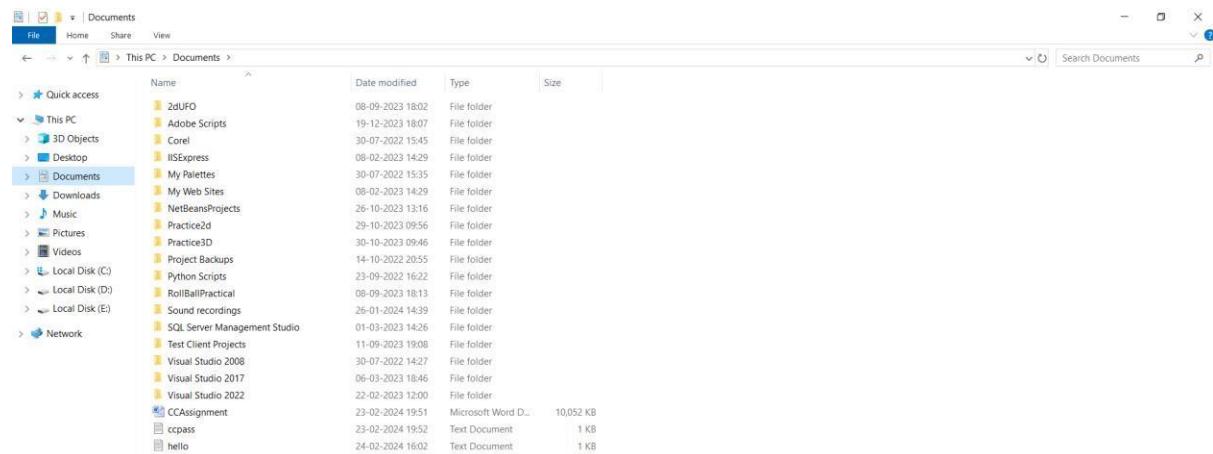


d. Transfer files to Linux VMs

Create a hello.txt file.



Save it in your Personal pc

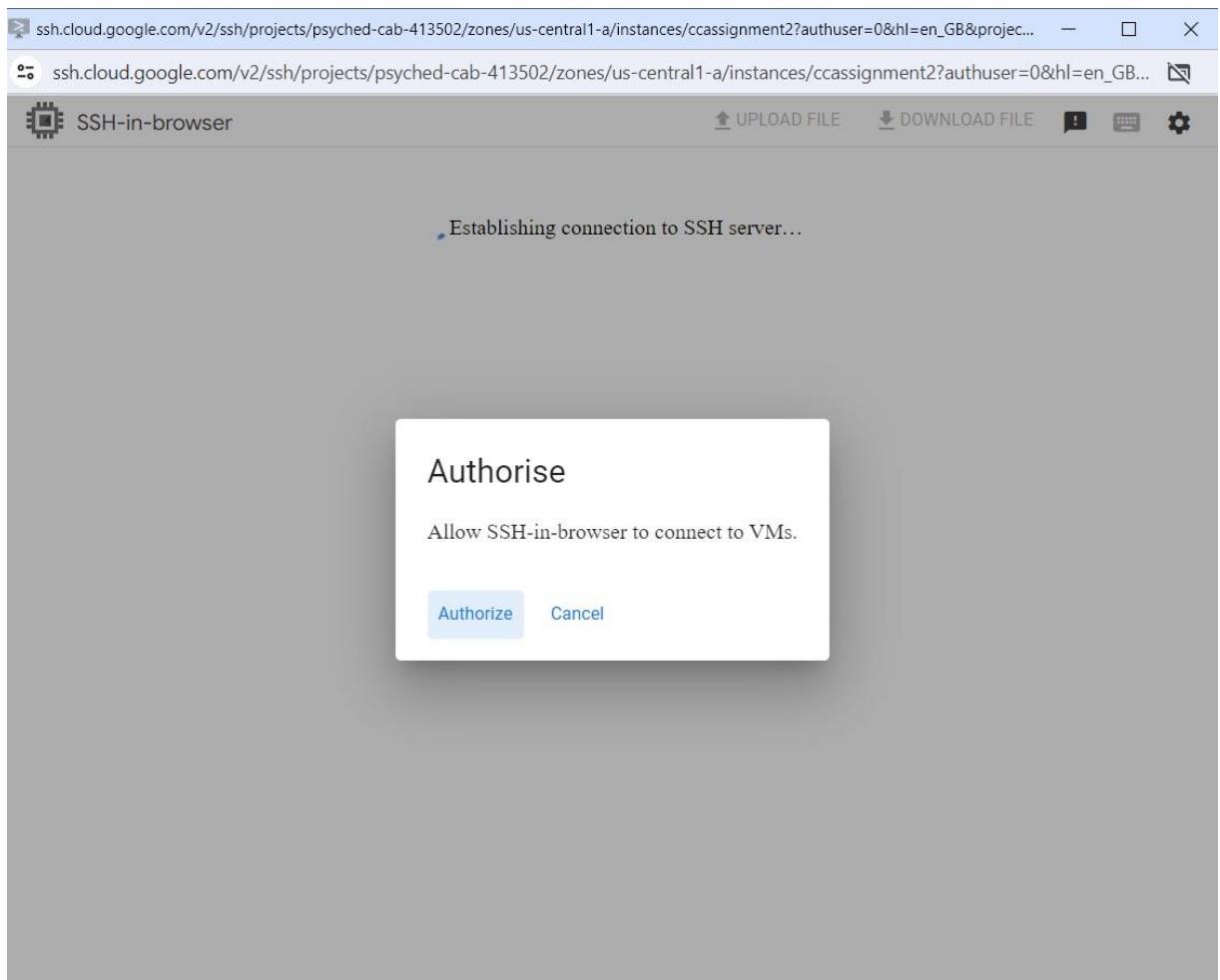


Launch the Linux instance.

A screenshot of the Google Cloud Compute Engine VM instances page. The URL is 'console.cloud.google.com/compute/instances?onCreate=true&project=psyched-cab-413502'. The left sidebar shows 'Compute Engine' with sections for 'Virtual machines' (selected), 'Instance templates', 'Sole-tenant nodes', 'Machine images', 'TPUs', 'Committed-use discounts', 'Reservations', 'Migrate to Virtual Machine...', 'Storage' (with 'Disks' and 'Snapshots'), 'Marketplace', and 'Release notes'. The main area shows 'VM instances' with tabs for 'INSTANCES' (selected), 'OBSERVABILITY', and 'INSTANCE SCHEDULES'. Under 'INSTANCES', there is a table of VM instances:

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
Running	ajayinstance	us-central1-c			10.128.0.2 (nic0)		SSH
Running	ccassignment	us-central1-a			10.128.0.4 (nic0)	34.16.75.112 (nic0)	RDP
Running	ccassignment2	us-central1-a			10.128.0.5 (nic0)	35.226.167.25 (nic0)	SSH
Running	wininstance	us-central1-a					

Below the table, there are 'Related actions' such as 'Explore Backup and DR', 'View billing report', 'Set up firewall rules', 'Patch management', and 'Load balance between VMs'. A 'Logs' button is also present. The bottom of the screen shows a taskbar with icons for File Explorer, Task View, File Manager, PowerShell, Google Chrome, and Word.



Click on the upload file option and select the hello.txt file from your personal pc.

The screenshot shows a terminal window titled "SSH-in-browser" running on a Linux system. The terminal displays the following information:

```
Linux ccassignment2.us-central1-a.c.psyched-cab-413502.internal 6.1.0-18-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.76-1 (2024-02-01) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sat Feb 24 10:24:57 2024 from 35.235.245.130
u_ajaykumar7616@ccassignment2:~$
```

ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-a/instances/ccassignment2?authuser=0&hl=en_GB&projec... — X

ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-a/instances/ccassignment2?authuser=0&hl=en_GB... 🖌

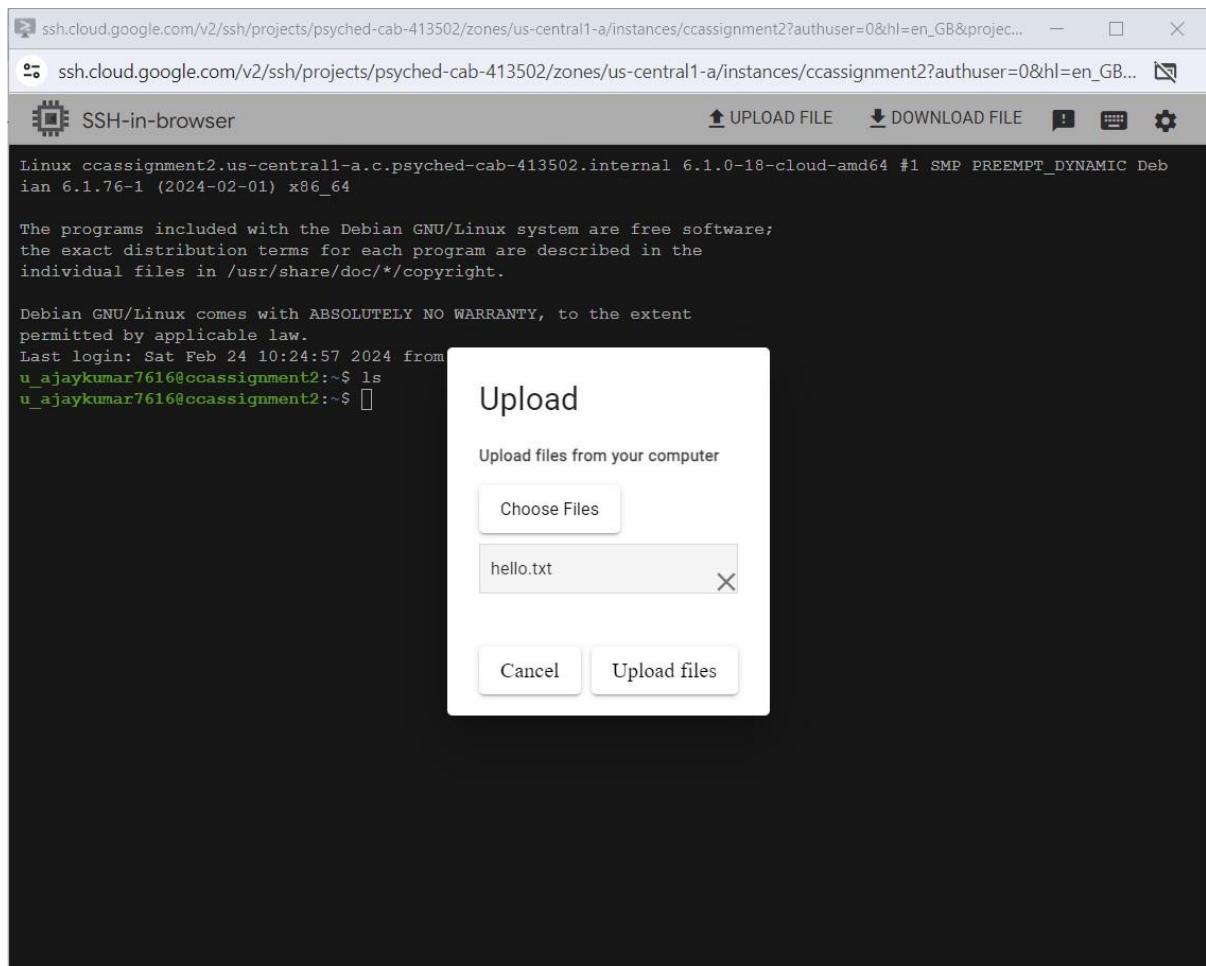
 SSH-in-browser  UPLOAD FILE  DOWNLOAD FILE   

```
Linux ccassignment2.us-central1-a.c.psyched-cab-413502.internal 6.1.0-18-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Deb  
ian 6.1.76-1 (2024-02-01) x86_64  
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.  
Last login: Sat Feb 24 10:24:57 2024 from 35.235.245.130  
u_ajaykumar7616@ccassignment2:~$ ls  
u_ajaykumar7616@ccassignment2:~$
```

Upload

Upload files from your computer

No file chosen



Give the command ls, you will see your file

The screenshot shows an SSH session in a browser window titled "SSH-in-browser". The terminal output shows a Debian system boot message and a command-line session where a file named "hello.txt" is listed. Below the terminal is a modal dialog box titled "Transferred 1 item" containing the text "hello.txt" and a green checkmark icon.

```

Linux ccassignment2.us-central1-a.c.psyched-cab-413502.internal 6.1.0-18-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Deb
ian 6.1.76-1 (2024-02-01) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sat Feb 24 10:41:55 2024 from 35.235.245.128
u_ajaykumar7616@ccassignment2:~$ ls
u_ajaykumar7616@ccassignment2:~$ ls
hello.txt
u_ajaykumar7616@ccassignment2:~$ 
```

e. Back up a VM's persistent disk

Create a VM instance

The screenshot shows the "Create an instance" wizard in the Google Cloud Platform console. The left sidebar lists options like "New VM instance", "Marketplace", etc. The main form is filled with the following details:

- Name:** ccassignment3
- Region:** us-central1 (Iowa)
- Zone:** us-central1-a
- Machine configuration:**
 - Series:** E2 (selected)
 - Description:** NEW: General-purpose machine series in Preview
 - Sign Up** button
- Monthly estimate:** US\$25.46
- Pricing:** That's about US\$0.03 hourly. Pay for what you use: No upfront costs and per-second billing.
- Compute Engine pricing** and **LESS** buttons

At the bottom, there are "CREATE" and "CANCEL" buttons, and an "EQUIVALENT CODE" link.

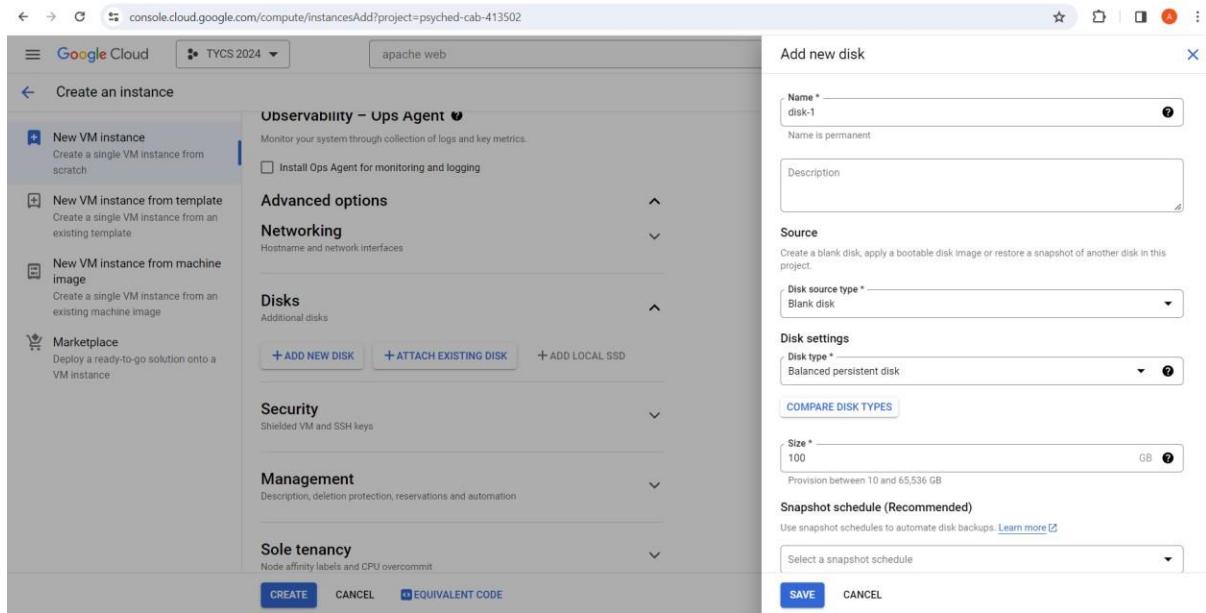
Select a different region

The screenshot shows the Google Cloud Compute Instances Add screen. On the left, there's a sidebar with options like 'New VM instance', 'New VM instance from template', 'New VM instance from machine image', and 'Marketplace'. The main area is titled 'Machine configuration' and shows a preview of the 'N series' (General-purpose machine series). It includes fields for 'Name' (ccassignment3), 'Region' (northamerica-northeast1 (Montréal)), 'Zone' (northamerica-northeast1-a), and 'Machine type' (E2). To the right, there's a 'Monthly estimate' table and a 'Compute Engine pricing' section.

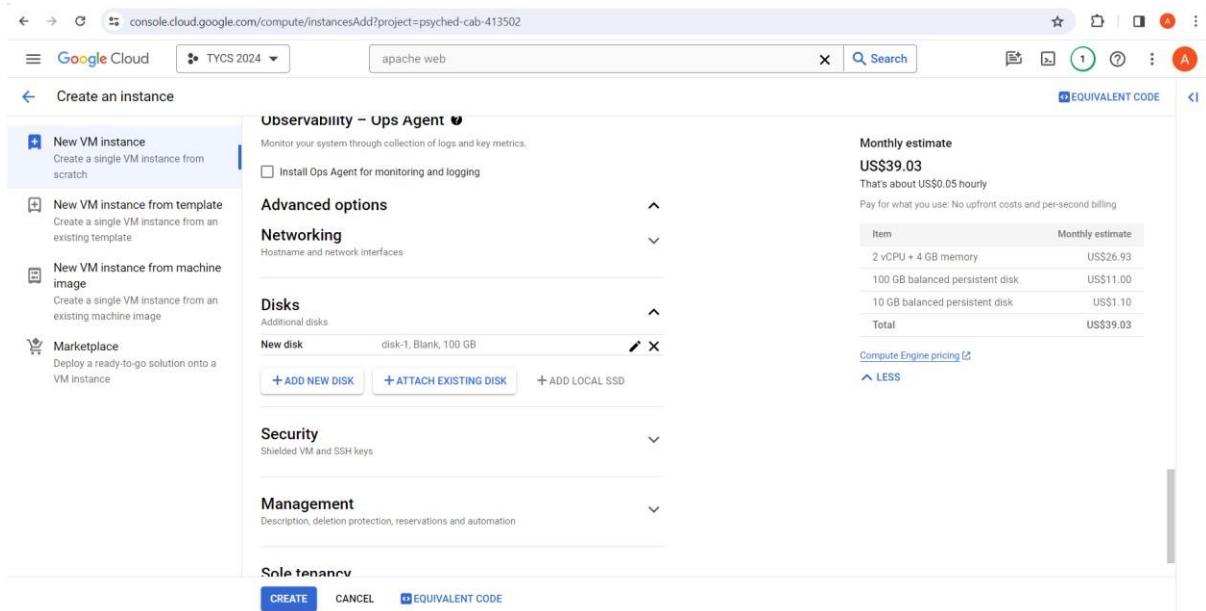
Click on Advanced option, we get option called Disks

The screenshot shows the same Google Cloud Compute Instances Add screen, but the 'Advanced options' section is now expanded. This section includes categories like 'Networking', 'Disks', 'Security', 'Management', and 'Sole tenancy'. Each category has a brief description and a 'View details' link. The 'Disks' section is currently active, showing the 'Additional disks' sub-section.

From that select Add New Disk option, and create a new disk.



Now create option, you have created Backup with persistent disk.



- f. Configure periodic backups with a snapshot schedule
- Select a instance and click on the bootdisk storage.

The screenshot shows the Google Cloud Compute Engine interface for a VM named 'ccassignment3'. The left sidebar is under 'Compute Engine' > 'Virtual machines' > 'VM instances'. The main content area shows the VM's configuration with tabs for 'DETAILS', 'OBSERVABILITY', 'OS INFO', and 'SCREENSHOT'. Under 'Storage', the 'Boot disk' section lists a disk named 'ccassignment3' with a size of 10 GB, using SCSI interface type, and is a 'Balanced persistent disk'. It is bootable and uses Google-managed encryption. Below it, there is a 'Local disks' section with 'None' listed. An 'Additional disks' section shows a disk named 'disk-1' with a size of 100 GB, using SCSI interface type, and is a 'Balanced persistent disk'. It is read/write and uses Google-managed encryption. A 'Security and access' section is also present.

The click on the create snapshot option.

The screenshot shows the Google Cloud Compute Engine interface for managing a disk named 'ccassignment3'. The left sidebar is under 'Compute Engine' > 'Storage' > 'Disks'. The main content area shows the disk's properties with tabs for 'DETAILS' and 'MONITORING'. Under 'Properties', the disk is identified as a 'Balanced persistent disk' with 10 GB size, x86/64 architecture, and no labels. It is in use by 'ccassignment3'. The 'Source image' is 'debian-12-bookworm-v20240213' and it uses Google-managed encryption. A 'Snapshot schedule' is set to 'None'. At the top of the page, there are buttons for 'CREATE INSTANCE', 'CREATE SNAPSHOT', 'CREATE IMAGE', 'CLONE DISK', and 'CREATE SECONDARY DISK'. The 'CREATE SNAPSHOT' button is highlighted.

Then create a snapshot.

The screenshot shows two consecutive pages from the Google Cloud Compute Engine interface.

Page 1: Create a snapshot

- Sidebar:** Shows 'Compute Engine' selected under 'Storage' > 'Schemas'.
- Form Fields:**
 - Name:** snapshot-1
 - Description:** (Empty)
 - Snapshot source type:** Disk
 - Source disk:** ccassignment3
- Type:** Snapshot (radio button selected)
- Location:** (Empty)
- Buttons:** CREATE, CANCEL, EQUIVALENT CODE

Page 2: Snapshot list

- Sidebar:** Shows 'Compute Engine' selected under 'Storage' > 'Schemas'.
- Table Headers:** Status, Name, Location, Snapshot size, Creation time, Creation type, Source disk.
- Table Data:**

Status	Name	Location	Snapshot size	Creation time	Creation type	Source disk
<input checked="" type="checkbox"/>	snapshot-1	us	641.62 MB	Feb 24, 2024, 4:46:29 pm	Manual	ccassignment3

Now click on the create snapshot schedule option and schedule your snapshot.

← → ⌂ console.cloud.google.com/compute/snapshotSchedulePolicies/add?project=psyched-cab-413502

Google Cloud TYCS 2024 Search (/) for resources, docs, products and more ⌂ EQUIVALENT CODE

Compute Engine Create a snapshot schedule

Create a snapshot schedule to regularly and automatically back up your persistent disks. First create a schedule, then attach it to the disks that you wish to back up. [Learn more](#)

Name * schedule-1 Lowercase letters, numbers, hyphens allowed

Description

Schedule location Choose where to use this schedule. You can only attach a snapshot schedule to a persistent disk in this region.

Region us-central1

Snapshot storage location Choose where to store snapshots generated by this schedule. Location can affect availability and networking costs. [Learn more](#)

Multi-regional Regional

Select location us (multiple regions in United States)

CREATE CANCEL EQUIVALENT CODE

← → ⌂ console.cloud.google.com/compute/snapshotSchedulePolicies/add?project=psyched-cab-413502

Google Cloud TYCS 2024 Search (/) for resources, docs, products and more ⌂ EQUIVALENT CODE

Compute Engine Create a snapshot schedule

Multi-regional Regional

Select location us (multiple regions in United States)

Schedule options Schedule frequency Daily

Start time (UTC) 22:00–23:00

Auto-delete snapshots after * 14 days

Deletion rule After you delete the disk that uses this schedule:

Keep snapshots Delete snapshots older than 14 days

Application consistency If the source disk is in use when a snapshot is taken, pending writes may not be included. Application consistency uses guest flush or VSS to ensure that pending writes have been completed before a snapshot is taken. Please ensure that disks backed up by this schedule are attached to guests that support guest flush or VSS. [Learn more](#)

CREATE CANCEL EQUIVALENT CODE

You successfully created a schedule snapshot.

The screenshot shows the Google Cloud Compute Engine Snapshots page. The sidebar on the left is titled 'Compute Engine' and includes sections for Virtual machines, Storage, and Marketplace. Under Storage, 'Schemas' is selected. The main content area is titled 'Snapshots' and contains a table of snapshots. A message at the top right says 'Successfully created snapshot schedule schedule-1.' A modal window on the right side says 'Select a snapshot' and has tabs for 'PERMISSIONS' and 'LABELS'. A message in the modal says 'Please select at least one resource.'

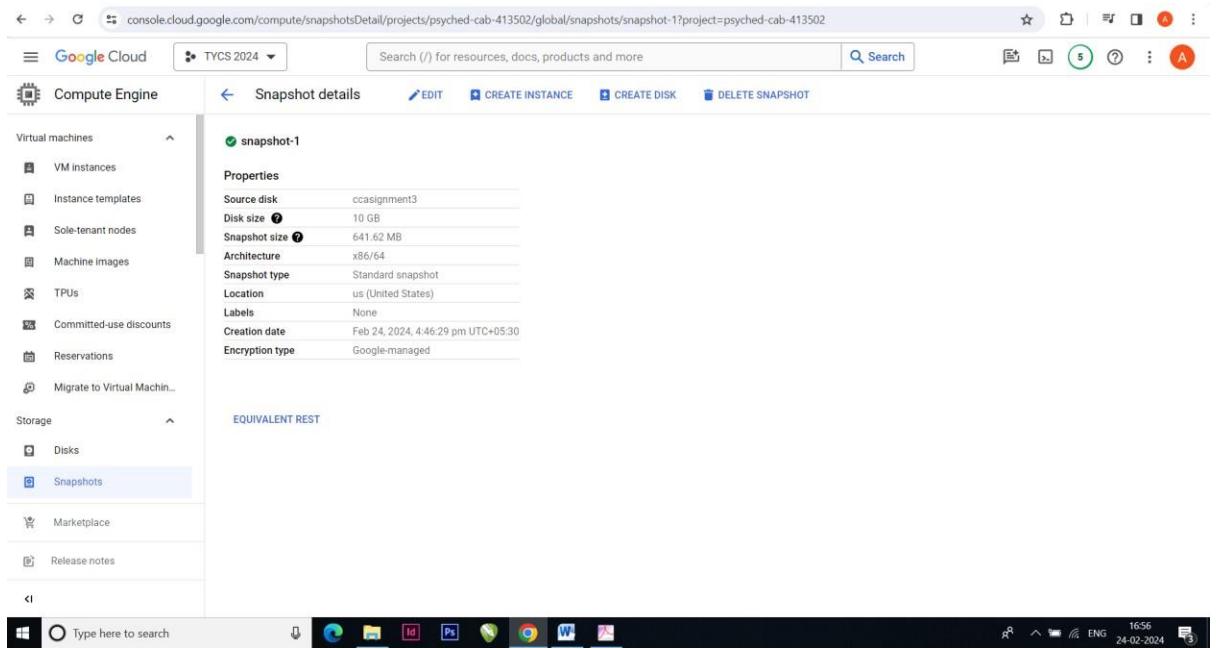
Status	Name	Location	Snapshot size	Creation time	Creation type	Source disk
Green checkmark	snapshot-1	us	641.62 MB	Feb 24, 2024, 4:46:29 pm UTC+05:30	Manual	ccassignment3

g. Restore a boot disk from a snapshot

Click on Snapshot option from the sidebar and select a snapshot from it.

This screenshot is identical to the one above, showing the Google Cloud Compute Engine Snapshots page. It displays a table of snapshots with one entry: 'snapshot-1' (Status: Green checkmark, Location: us, Size: 641.62 MB, Creation time: Feb 24, 2024, 4:46:29 pm UTC+05:30, Creation type: Manual, Source disk: ccassignment3). A success message 'Successfully created snapshot schedule schedule-1.' is visible at the top right. A 'Select a snapshot' modal is open on the right, with tabs for 'PERMISSIONS' and 'LABELS', and a message 'Please select at least one resource.'

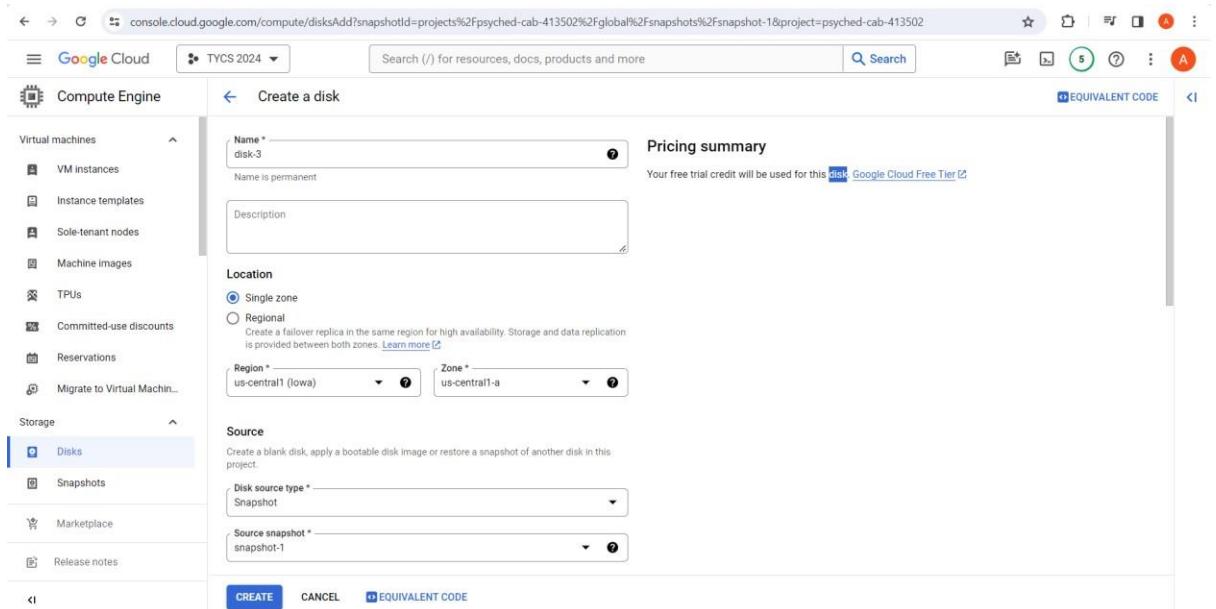
Then select the option create a disk and create a disk.



The screenshot shows the Google Cloud Compute Engine interface. On the left, a sidebar menu includes options like Virtual machines, Storage, and Compute Engine. Under Compute Engine, the 'Disks' and 'Snapshots' sections are visible. The main content area displays 'Snapshot details' for 'snapshot-1'. The properties listed are:

Source disk	ccassignment3
Disk size	10 GB
Snapshot size	641.62 MB
Architecture	x86/64
Snapshot type	Standard snapshot
Location	us (United States)
Labels	None
Creation date	Feb 24, 2024, 4:46:29 pm UTC+05:30
Encryption type	Google-managed

Below the properties, there is a section titled 'EQUIVALENT REST'.



The screenshot shows the 'Create a disk' page in the Google Cloud Compute Engine interface. The sidebar menu is identical to the previous screenshot. The main form is filled with the following values:

- Name: disk-3
- Description: (empty)
- Location:
 - Single zone (selected)
 - Regional (radio button)
- Region: us-central1 (Iowa)
- Zone: us-central1-a
- Source:
 - Disk source type: Snapshot (selected)
 - Source snapshot: snapshot-1

At the bottom, there are 'CREATE' and 'CANCEL' buttons, along with a 'EQUIVALENT CODE' link.

Now create a instance

The screenshot shows the Google Cloud Compute Instances Add screen. On the left, there's a sidebar with options like 'New VM instance', 'New VM instance from template', 'New VM instance from machine image', and 'Marketplace'. The main area has fields for 'Name' (ccassignment4), 'Region' (us-central1), 'Zone' (us-central1-a), and a 'Machine configuration' section. Under 'Machine configuration', it says 'NEW: General-purpose machine series in Preview' and lists 'E2' as selected. It also shows a table of machine types with columns for Series, Description, vCPUs, Memory, and Platform. At the bottom are 'CREATE' and 'CANCEL' buttons.

In Disks option, select attach existing disk and select the disk you have created.

The screenshot shows the Google Cloud Compute Instances Add screen with the 'Disks' section expanded. It includes options for '+ ADD NEW DISK', '+ ATTACH EXISTING DISK', and '+ ADD LOCAL SSD'. To the right, there's a 'Monthly estimate' table and a 'Compute Engine pricing' link.

The screenshot shows the 'Create an instance' screen in the Google Cloud Compute Instances Add interface. In the 'Disks' section, there is a table with one row:

Existing disk
Disk * disk-3

Below the table are 'Attachment settings' options: Mode (Read/write selected), Deletion rule (Keep disk selected), and a Device name field (disk-3). At the bottom right are 'SAVE' and 'CANCEL' buttons.

The screenshot shows the same 'Create an instance' screen as above, but with a sidebar on the right displaying 'Monthly estimate' information:

Monthly estimate
US\$25.46
That's about US\$0.03 hourly
Pay for what you use: No upfront costs and per-second billing

Item	Monthly estimate
2 vCPU + 4 GB memory	US\$24.46
10 GB balanced persistent disk	US\$1.00
Total	US\$25.46

Below the table are links for 'Compute Engine pricing' and 'LESS'.

After creating it, start the VM instance, your session is restored here.

The screenshot shows the Google Cloud Compute Engine interface. The left sidebar is collapsed. The main area displays a table of VM instances. One instance, 'ccassignment4', is highlighted in blue and has a status of 'In use by' 'ccassignment4'. Other instances listed include 'ajayinstance', 'ccassignment', 'ccassignment3', 'ccassignment2', and 'wininstance'. The table columns include Status, Name, Zone, Recommendations, In use by, Internal IP, External IP, and Connect (SSH/RDP). Below the table, there are several related actions cards: 'Explore Backup and DR', 'View billing report', 'Monitor VMs', 'Explore VM logs', 'Set up firewall rules', 'Patch management', and 'Load balance between VMs'.

h. Restore a persistent disk from a snapshot

Select the Disk option from the sidebar and select the ccassignment4 disk

The screenshot shows the Google Cloud Compute Engine interface. The left sidebar is collapsed. The main area displays a table of disks. One disk, 'ccassignment4', is highlighted in blue and has a status of 'In use by' 'ccassignment4'. Other disks listed include 'ajayinstance', 'ccassignment', 'ccassignment3', 'ccassignment2', 'disk-1', 'disk-3', and 'wininstance'. The table columns include Status, Name, Type, Size, Architecture, Zone(s), In use by, Snapshot schedule, and Actions. Below the table, there are several related actions cards: 'CREATE DISK', 'REFRESH', 'DELETE', 'OPERATIONS', 'LEARN', and 'SHOW INFO PANEL'.

You will see that the disk is in use by ccassignment4

The screenshot shows the Google Cloud Storage interface. On the left, a sidebar menu includes options like VM instances, Instance templates, Sole-tenant nodes, Machine images, TPUs, Committed-use discounts, Reservations, Migrate to Virtual Machin..., Storage (with Disk selected), Snapshots, Marketplace, and Release notes. The main area is titled 'DETAILS' and shows 'Properties' for a disk named 'ccassignment4'. The properties listed are:

Type	Balanced persistent disk
Size	10 GB
Architecture	x86/64
Zone	us-central1-a
Labels	None
In use by	ccassignment4
Snapshot schedule	schedule-1
Source snapshot	snapshot-1
Encryption type	Google-managed
Consistency group	None

Below the properties, there is a section titled 'EQUIVALENT REST'.

Now go to that ccassignment4 instance you will see there is Boot disk ccassignment4

The screenshot shows the Google Cloud Compute Engine instance details page for 'ccassignment4'. The left sidebar is identical to the previous screenshot. The main area shows the instance name 'ccassignment4' and its status as 'Running'. It includes tabs for DETAILS, OBSERVABILITY, OS INFO, and SCREENSHOT. Under the DETAILS tab, the 'Storage' section is expanded, showing the 'Boot disk' and 'Local disks' sections. The 'Boot disk' table has one row:

Name	Image	Interface type	Size (GB)	Device name	Type	Architecture	Encryption	Mode
ccassignment4	debian-12-bookworm-v20240213	SCSI	10	ccassignment4	Balanced persistent disk	x86/64	Google-managed	Boot, read/write

The 'Local disks' section shows 'None'. The 'Additional disks' section also shows 'None'.

Delete the ccassignment4 instance.

How to #delete Persistent Disk: | VM Instances - Compute Engine | Back up VMs | Google Distrib... | Running a basic Apache web se... | +

console.cloud.google.com/compute/instances?project=psyched-cab-413502

Google Cloud TYCS 2024 restore a Search

Compute Engine VM instances CREATE INSTANCE IMPORT VM REFRESH

Virtual machines VM instances Instance templates Sole-tenant nodes Machine images TPUs Committed-use discounts Reservations Migrate to Virtual Machin... Storage Disks Snapshots Marketplace Release notes

INSTANCES OBSERVABILITY INSTANCE SCHEDULES

VM instances

Filter Enter property name or value

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
OK	ajayinstance	us-central1-c			10.128.0.2 (nic0)		SSH
OK	ccassignment	us-central1-a			10.128.0.4 (nic0)		RDP
OK	ccassignment3	northamerica-northeast1-a			10.162.0.2 (nic0)	34.95.22.184 (nic0)	SSH
OK	ccassignment2	us-central1-a			10.128.0.5 (nic0)	35.226.167.25 (nic0)	SSH
OK	ccassignment4	us-central1-a			10.128.0.6 (nic0)	34.68.197.56 (nic0)	SSH
OK	winstance	us-central1-a			10.128.0.3 (nic0)		SSH

Related actions

- Explore Backup and DR NEW
- View billing report
- Monitor VMs
- Set up firewall rules
- Patch management
- Load balance between VMs

Start/Resume Stop Suspend Reset View in Delete View network details Create new machine image View logs View monitoring

console.cloud.google.com/compute/instances?project=psyched-cab-413502

Google Cloud TYCS 2024 restore a Search

Compute Engine VM instances CREATE INSTANCE IMPORT VM REFRESH

Virtual machines VM instances Instance templates Sole-tenant nodes Machine images TPUs Committed-use discounts Reservations Migrate to Virtual Machin... Storage Disks Snapshots Marketplace Release notes

INSTANCES OBSERVABILITY INSTANCE SCHEDULES

VM instances

Filter Enter property name or value

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
OK	ajayinstance	us-central1-c			1 (nic0)		SSH
OK	ccassignment	us-central1-a			2 (nic0)		RDP
OK	ccassignment3	northamerica-northeast1-a			3 (nic0)	34.95.22.184 (nic0)	SSH
OK	ccassignment2	us-central1-a			4 (nic0)	35.226.167.25 (nic0)	SSH
OK	ccassignment4	us-central1-a			5 (nic0)	34.68.197.56 (nic0)	SSH
OK	winstance	us-central1-a			6 (nic0)		RDP

Delete ccassignment4?

Are you sure that you want to delete instance ccassignment4? (This will also delete boot disk 'ccassignment4')

CANCEL DELETE

Related actions

- Explore Backup and DR NEW
- View billing report
- Monitor VMs
- Set up firewall rules
- Patch management
- Load balance between VMs

Explore VM logs

Compute Engine Disks										
CREATE DISK REFRESH DELETE OPERATIONS LEARN SHOW INFO PANEL										
Filter Enter property name or value										
Status	Name	Type	Size	Architecture	Zone(s)	In use by	Snapshot schedule	Actions		
<input type="checkbox"/>	ajayinstance	Balanced persistent disk	10 GB	x86/64	us-central1-c	ajayinstance	None	⋮		
<input type="checkbox"/>	ccassignment	Balanced persistent disk	50 GB	x86/64	us-central1-a	ccassignment	None	⋮		
<input type="checkbox"/>	ccassignment3	Balanced persistent disk	10 GB	x86/64	northamerica-northeast1-a	ccassignment3	None	⋮		
<input type="checkbox"/>	ccassignment2	Balanced persistent disk	10 GB	x86/64	us-central1-a	ccassignment2	None	⋮		
<input type="checkbox"/>	disk-1	Balanced persistent disk	100 GB	—	northamerica-northeast1-a	ccassignment3	None	⋮		
<input type="checkbox"/>	disk-3	Balanced persistent disk	10 GB	x86/64	us-central1-a	schedule-1	None	⋮		
<input type="checkbox"/>	wininstance	Balanced persistent disk	50 GB	x86/64	us-central1-a	wininstance	None	⋮		

Ccassignment4 is successfully deleted. Now create a disk to restore the session of ccassignment4

Create a disk										
EQUIVALENT CODE										
Name * <input type="text" value="disk-restore"/>										
Name is permanent										
Pricing summary										
Your free trial credit will be used for this disk. Google Cloud Free Tier										
Description										
Location										
<input checked="" type="radio"/> Single zone										
<input type="radio"/> Regional										
Create a failover replica in the same region for high availability. Storage and data replication is provided between both zones. Learn more										
Region * <input type="text" value="us-central1 (Iowa)"/>										
Zone * <input type="text" value="us-central1-a"/>										
Source										
Create a blank disk, apply a bootable disk image or restore a snapshot of another disk in this project.										
Disk source type * <input type="text" value="Blank disk"/>										
Disk settings										
Disk type * <input type="text" value="Balanced persistent disk"/>										
CREATE CANCEL EQUIVALENT CODE										

Select the Disk source type as Snapshot, and select the snapshot1.

console.cloud.google.com/compute/disksAdd?project=psyched-cab-413502

Google Cloud TYCS 2024 Search (/) for resources, docs, products and more **Search**

Compute Engine **Create a disk** **EQUIVALENT CODE**

Location

Single zone **Pricing summary**
Your free trial credit will be used for this disk. [Google Cloud Free Tier](#)

Regional Create a failover replica in the same region for high availability. Storage and data replication is provided between both zones. [Learn more](#)

Region * us-central1 (Iowa) **Zone *** us-central1-a

Source
Create a blank disk, apply a bootable disk image or restore a snapshot of another disk in this project.

Disk source type * Snapshot

Source snapshot * snapshot-1

Disk settings

Disk type * Balanced persistent disk

Size * 10 GB Provision between 10 and 65,536 GB

CREATE **CANCEL** **EQUIVALENT CODE**

You have successfully restored a disk from the snapshot.

console.cloud.google.com/compute/disks?onCreateDisk=true&project=psyched-cab-413502

Google Cloud TYCS 2024 Search (/) for resources, docs, products and more **Search**

Compute Engine **Disks** **CREATE DISK** **REFRESH** **DELETE** **OPERATIONS** **LEARN** **SHOW INFO PANEL**

Virtual machines

- VM instances
- Instance templates
- Sole-tenant nodes
- Machine images
- TPUs
- Committed-use discounts
- Reservations
- Migrate to Virtual Machin...

Storage

- Disks
- Snapshots
- Marketplace
- Release notes

Disks

<input type="checkbox"/>	Status	Name ▲	Type	Size	Architecture	Zone(s)	In use by	Snapshot schedule	Actions
<input type="checkbox"/>	Green	ajayinstance	Balanced persistent disk	10 GB	x86/64	us-central1-c	ajayinstance	None	⋮
<input type="checkbox"/>	Green	ccassignment	Balanced persistent disk	50 GB	x86/64	us-central1-a	ccassignment	None	⋮
<input type="checkbox"/>	Green	ccassignment3	Balanced persistent disk	10 GB	x86/64	northamerica-northeast1-a	ccassignment3	None	⋮
<input type="checkbox"/>	Green	ccassignment2	Balanced persistent disk	10 GB	x86/64	us-central1-a	ccassignment2	None	⋮
<input type="checkbox"/>	Green	disk-1	Balanced persistent disk	100 GB	—	northamerica-northeast1-a	ccassignment3	None	⋮
<input type="checkbox"/>	Green	disk-3	Balanced persistent disk	10 GB	x86/64	us-central1-a	schedule-1	⋮	
<input type="checkbox"/>	Green	disk-restore	Balanced persistent disk	10 GB	x86/64	us-central1-a	schedule-1	⋮	
<input type="checkbox"/>	Green	wininstance	Balanced persistent disk	50 GB	x86/64	us-central1-a	wininstance	None	⋮

Successfully created disk disk-restore. **X**

← → ⌂ https://console.cloud.google.com/compute/disksDetail/zones/us-central1-a/disks/disk-restore?project=psyched-cab-413502

Google Cloud TYCS 2024 Search (/) for resources, docs, products and more Search

Compute Engine Manage disk CREATE INSTANCE CREATE SNAPSHOT CREATE IMAGE CLONE DISK CREATE SECONDARY DISK OPERATIONS

disk-restore

DETAILS MONITORING

Properties

Type	Balanced persistent disk
Size <small>?</small>	10 GB
Architecture	x86/64
Zone	us-central1-a
Labels	None
In use by	None
Snapshot schedule	schedule-1
Source snapshot	snapshot-1
Encryption type	Google-managed
Consistency group	None

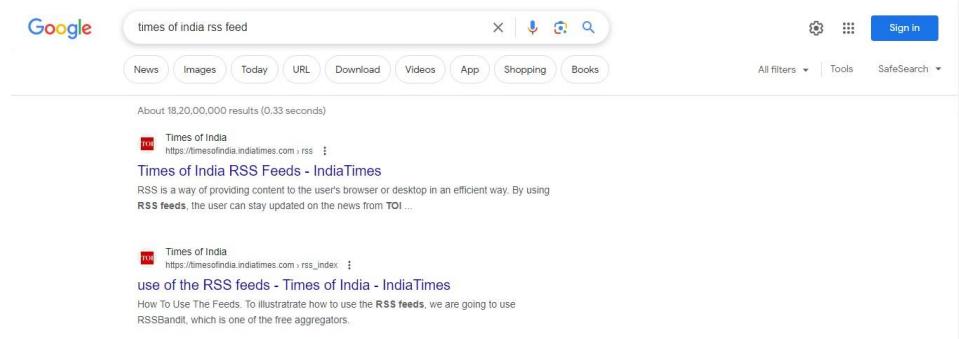
EQUIVALENT REST

Disks Snapshots

Practical 7

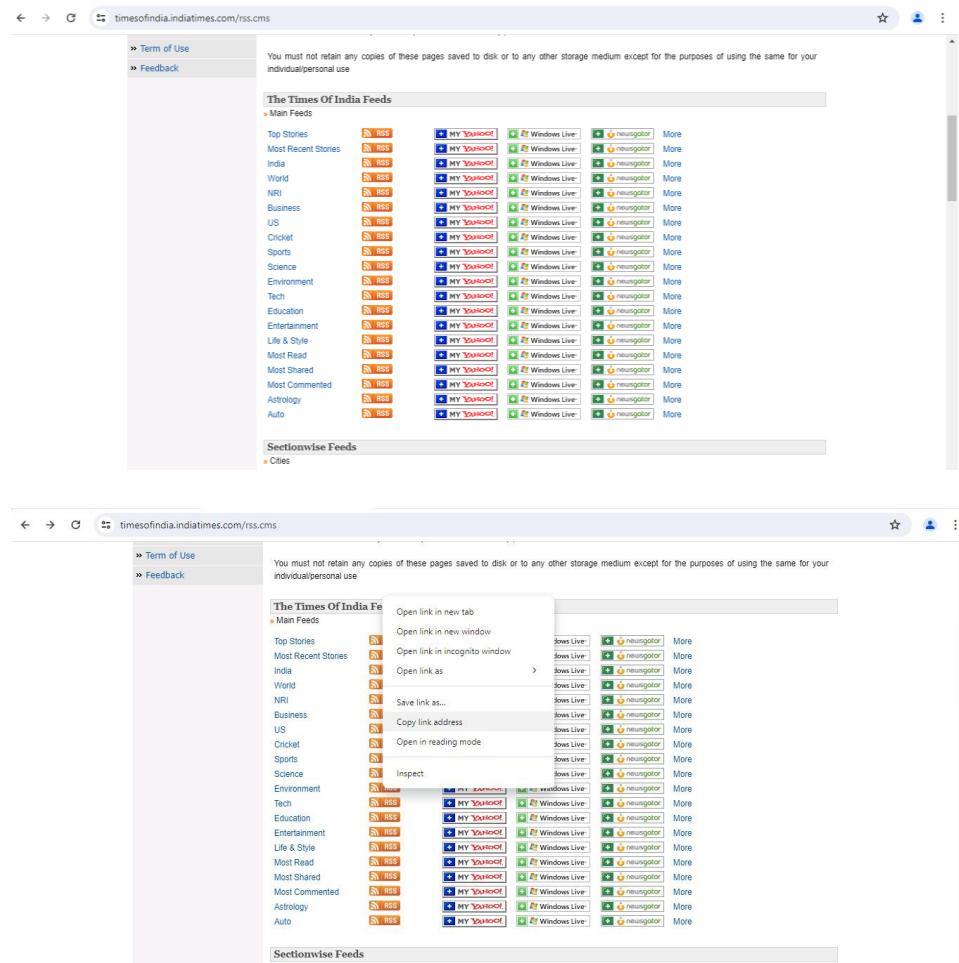
Aim: Write a program for web feed.

Search for times of india rss feeds



Google search results for "times of india rss feed". The first result is "Times of India RSS Feeds - IndiaTimes" with the URL https://timesofindia.indiatimes.com/rss_index.xml. The second result is "use of the RSS feeds - Times of India - IndiaTimes" with the URL https://timesofindia.indiatimes.com/rss_index.xml.

Copy the link from rss



The screenshots show the Times of India RSS feeds page. The top screenshot displays the "Main Feeds" section with links for Top Stories, Most Recent Stories, India, World, NRI, Business, US, Cricket, Sports, Science, Environment, Tech, Education, Entertainment, Life & Style, Most Read, Most Shared, Most Commented, Astrology, and Auto. Each link has an RSS icon and a "More" link. The bottom screenshot shows a context menu open over one of the feeds, with options like "Open link in new tab", "Open link in new window", "Open link in incognito window", "Save link as...", "Copy link address", "Open in reading mode", and "Inspect".

*Untitled - Notepad
File Edit Format View Help
Environment: - http://timesofindia.indiatimes.com/rssfeeds/2647163.cms
Cricket: - http://timesofindia.indiatimes.com/rssfeeds/54829575.cms
Entertainment: - http://timesofindia.indiatimes.com/rssfeeds/1081479906.cms

rssx.php

```
<p><b>Choose category:</b>
<form method="post" id="myform">
<select required name="rssurl">
<option value="">Select</option>
<option
value="http://timesofindia.indiatimes.com/rssfeeds/2647163.cms">Environment</option>
<option
value="http://timesofindia.indiatimes.com/rssfeeds/54829575.cms">Cricket</option>
<option
value="http://timesofindia.indiatimes.com/rssfeeds/1081479906.cms">Entertainment</option>
</select>
<input type="submit" value="Load" />
</form>
</p>
<?php
if (isset($_POST["rssurl"])) {
```

```

echo '<h1>Search Result for RSS url: ' . $_POST['rssurl'] . '</h1>';

$rssurl=$_POST['rssurl'];

$rss = new DOMDocument();

$rss->load($_POST['rssurl']);

$feed = array();

foreach ($rss->getElementsByTagName('item') as $node) {

    $item = array(
        'title' => $node->getElementsByTagName('title')->item(0)->nodeValue,
        'desc' => $node->getElementsByTagName('description')->item(0)->nodeValue,
        'link' => $node->getElementsByTagName('link')->item(0)->nodeValue,
        'date' => $node->getElementsByTagName('pubDate')->item(0)->nodeValue
    );

    array_push($feed, $item);
}

$limit = 5;

for ($x = 0; $x < $limit; $x++) {

    $title = str_replace('&', '&', $feed[$x]['title']);

    $link = $feed[$x]['link']; // Corrected assignment

    $description = $feed[$x]['desc'];

    $date = date('l F d, Y', strtotime($feed[$x]['date'])); // Corrected date
format

```

```
echo '<p><strong><a href="" . $link . "" title="" . $title . "">' . $title .  
'</a></strong><br>';  
  
echo '<p>' . $description . '</p>';  
  
echo '<small><em>Posted on ' . $date . '</em></small>';  
  
}  
  
}  
  
?>
```

Output:



Practical 8

Aim: Case study on Amazon EC2/Microsoft Azure/Google Cloud Platform
(Research paper analysis)

Introduction: Amazon EC2, Microsoft Azure, and Google Cloud Platform (GCP) are among the leading providers of cloud computing services, offering a wide range of infrastructure and platform services to businesses and individuals.

This case study aims to analyze and compare these three cloud service providers based on research papers and industry reports, focusing on key factors such as performance, pricing, features, and customer satisfaction.

Research Paper Analysis:

1. Performance:

- Evaluate the performance benchmarks of virtual machines (VMs) offered by each provider, including CPU performance, memory, disk I/O, and network speed.
- Examine research papers that compare the performance of applications deployed on Amazon EC2, Microsoft Azure, and Google Cloud Platform under various workloads.

2. Pricing:

- Analyze research papers that compare the pricing models of Amazon EC2, Microsoft Azure, and Google Cloud Platform for different types of services such as VMs, storage, and networking.
- Consider factors such as pricing transparency, discounts, and billing options offered by each provider.

3. Features and Services:

- Identify and compare the range of services and features offered by Amazon EC2, Microsoft Azure, and Google Cloud Platform, including compute, storage, database, networking, machine learning, and analytics services.
- Evaluate research papers that highlight the unique features and capabilities of each cloud provider, such as integration with other services and developer tools.

4. Customer Satisfaction:

- Examine research papers and industry reports that measure customer satisfaction and user feedback for Amazon EC2, Microsoft Azure, and Google Cloud Platform.
- Consider factors such as reliability, performance, support, and overall user experience reported by customers and industry experts.

Conclusion: Through the analysis of research papers and industry reports, this case study provides insights into the comparative strengths and weaknesses of Amazon EC2, Microsoft Azure, and Google Cloud Platform. By evaluating parameters such as performance, pricing, features, and customer satisfaction, businesses and individuals can make informed decisions when choosing a cloud service provider for their specific requirements.