

**S.I.E.S College of Arts, Science and Commerce(Autonomous)**  
**Sion(W), Mumbai – 400 022.**

**CERTIFICATE**

This is to certify that Miss/Mr. **AJAY KUMAR UTHAYA KUMAR**, Roll No. TCS2324002 has successfully completed the necessary course of experiments in the subject of **Cloud Computing** during the academic year **2023 – 2024** complying with the requirements of **University of Mumbai**, for the course of **TYBSc Computer Science [Semester-VI]**.

Prof. In-Charge  
**Maya Nair**

Examination date:

Examiner's Signature & Date:

Head of the Department  
**Prof. Manoj Singh**

College Seal

## 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:**

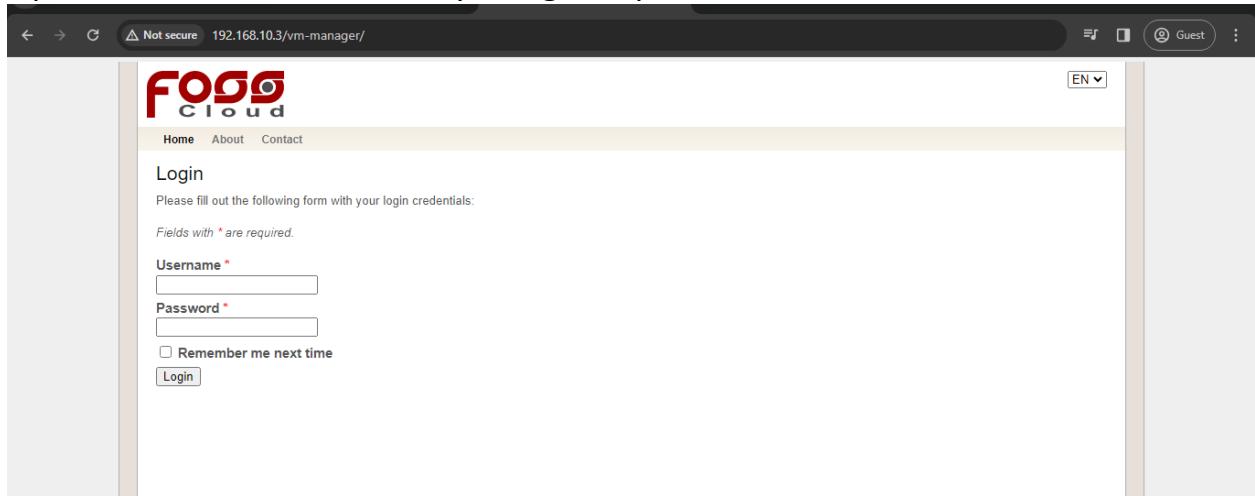
- Frontend: The user interface and client-side applications that interact with the cloud services.
- Backend: The cloud infrastructure, including servers, storage, and networking components, managed by the cloud service provider.
- Middleware: Software that connects the frontend and backend, enabling 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.

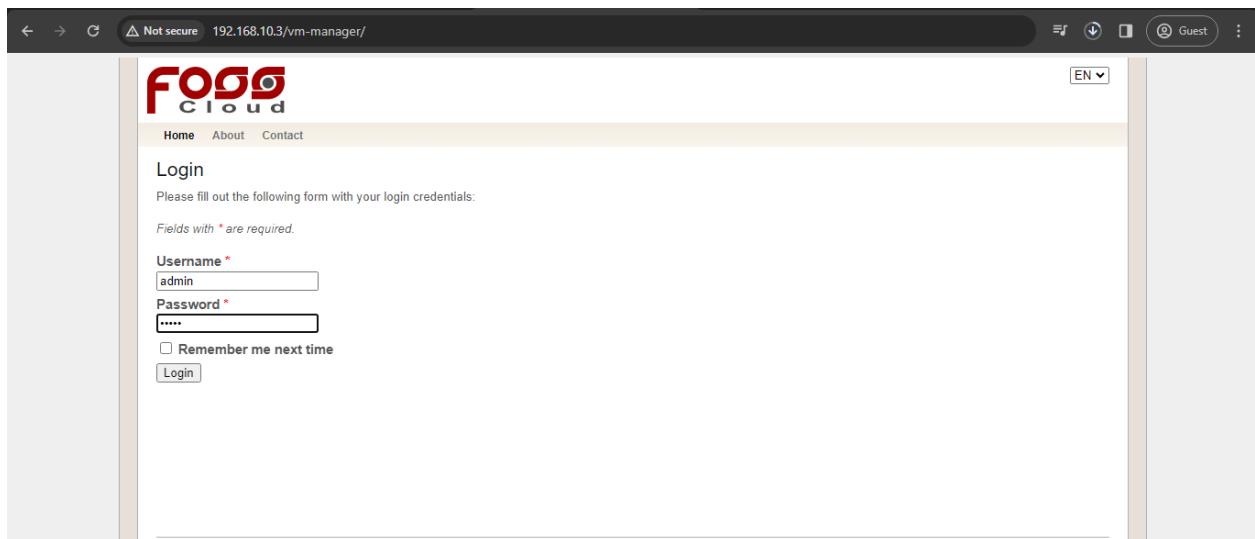
## Practical 2

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

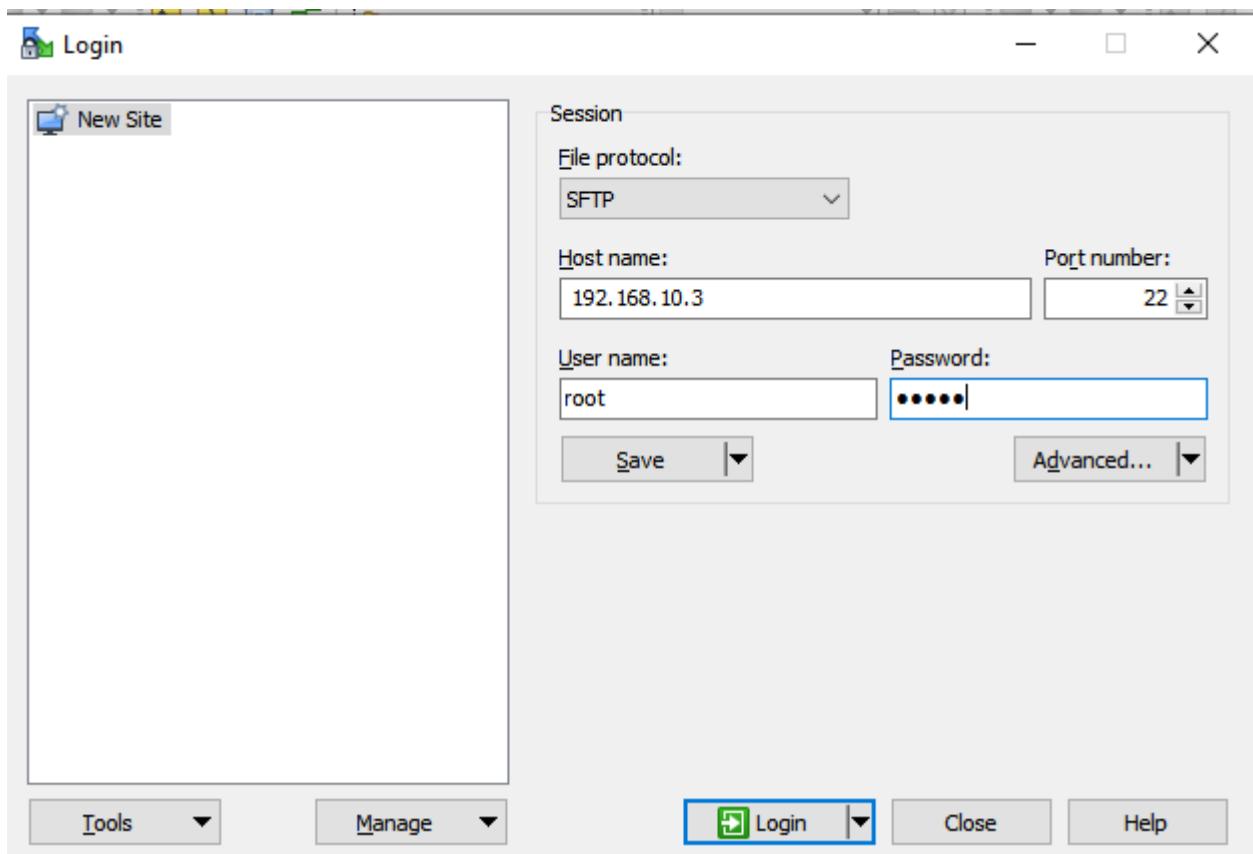


Then input username and password in admin and login as admin

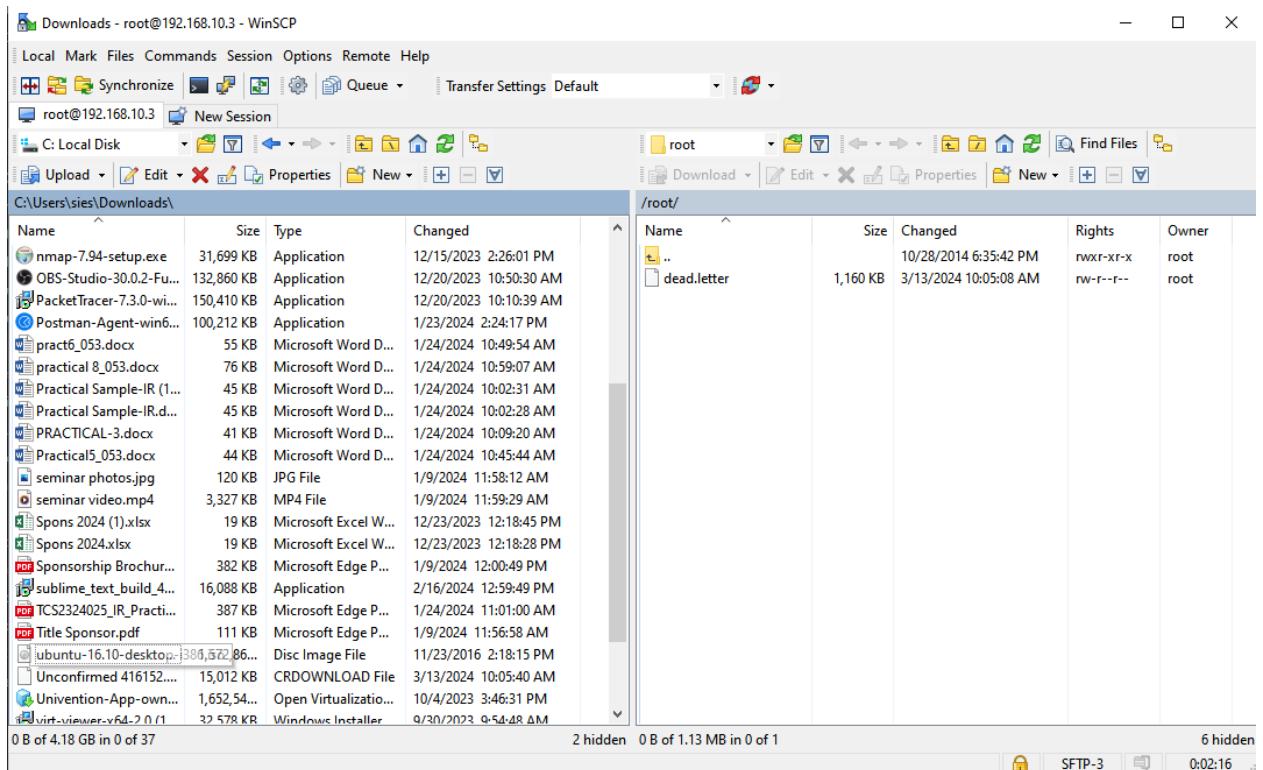


The screenshot shows the FOSS-Cloud web interface. At the top, there's a header bar with a back arrow, forward arrow, refresh button, and a URL field showing "Not secure 192.168.10.3/vm-manager/site". To the right of the URL are icons for a guest user and a dropdown menu. Below the header is the FOSS-Cloud logo and a navigation menu on the left with items like "Virtual Machine", "VM Pool", "Storage Pool", "Node", "Network", "User", "Configuration", "Diagnostics", and "Assigned VMs". The main content area has a heading "Welcome to the FOSS-Cloud" and a paragraph about the project. It includes a "Donate" button and links for "Documentation" and "Spice-Client (with protocol handler) download". At the bottom, there's a footer with copyright information: "Version 1.3.1 on server foss-cloud Copyright © 2024 by FOSS-Group. All Rights Reserved."

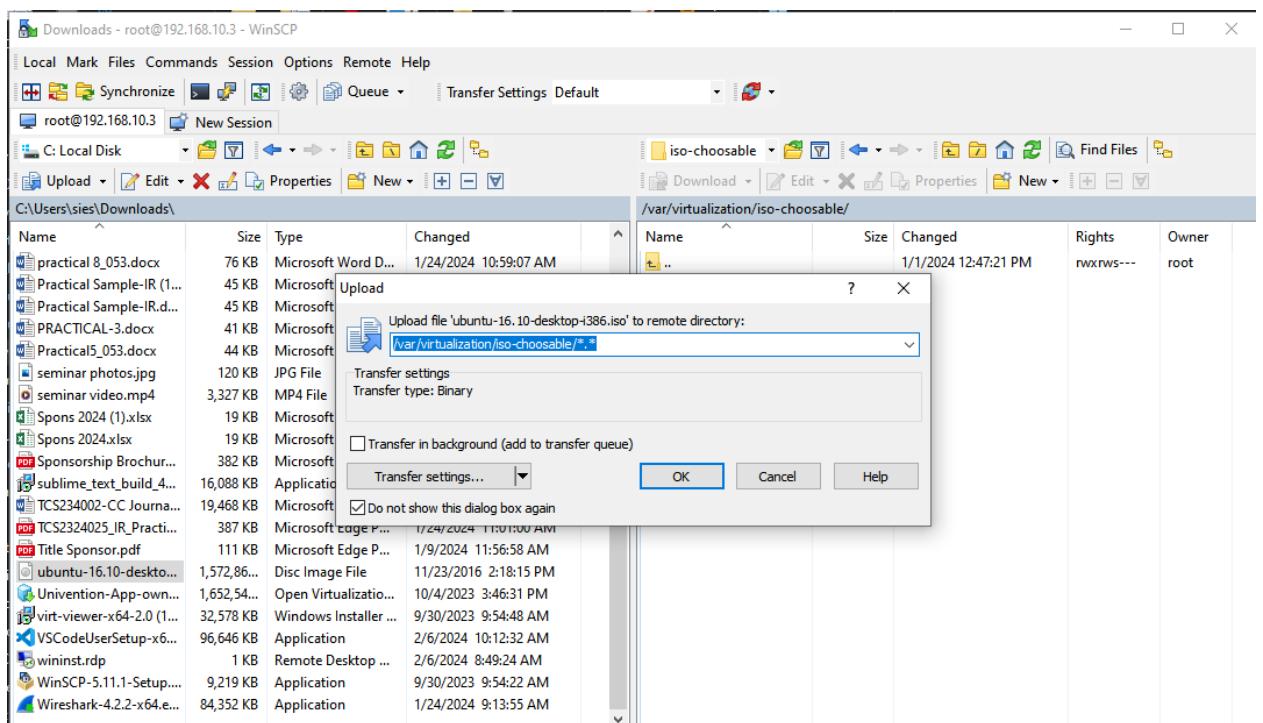
Then open WinSCP and put credential host name: 192.168.10.3, user name: root and password: admin

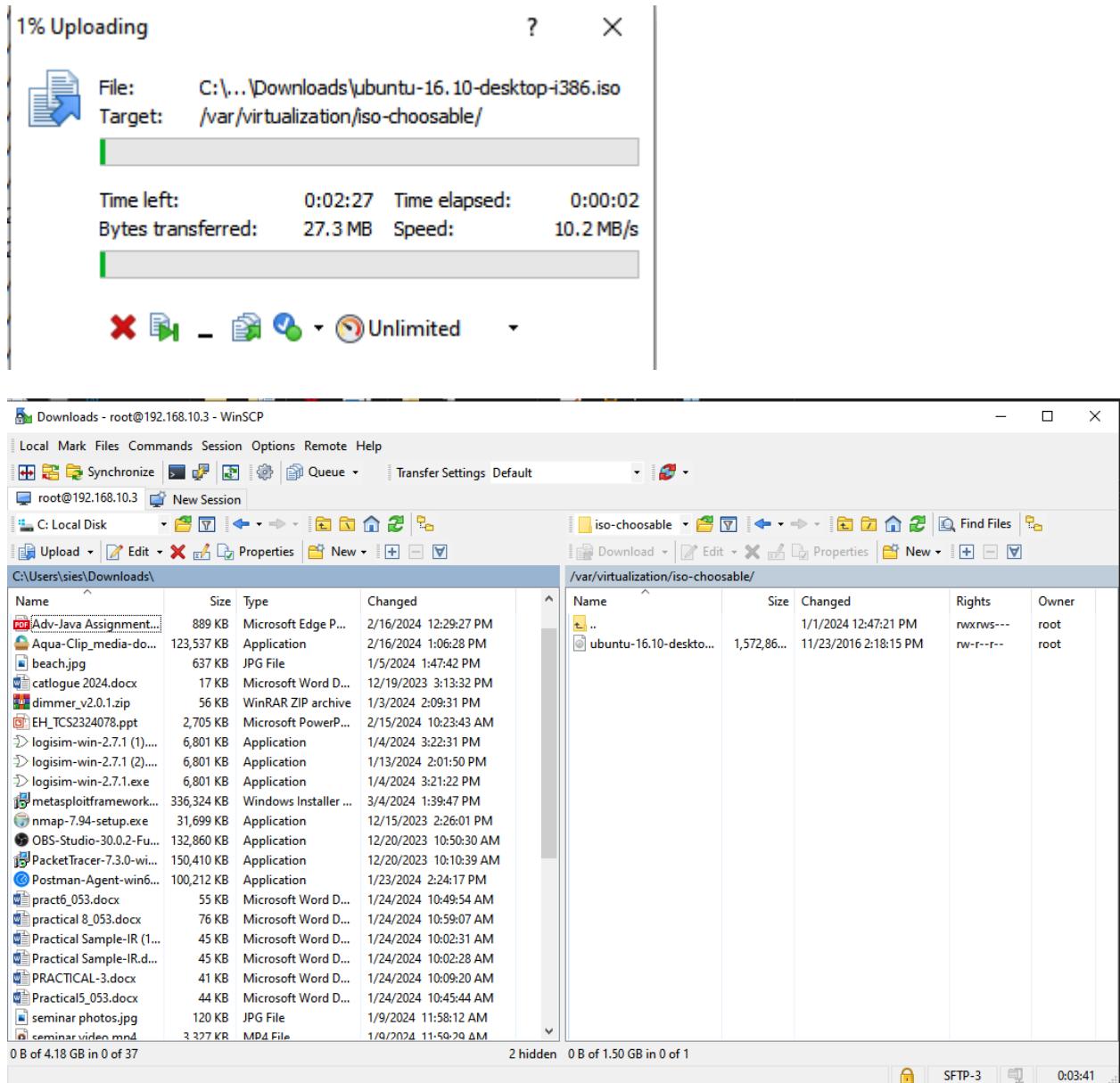


After in left hand side, try to navigate to the folder path where you kept your Ubuntu iso file.



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.

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!

**BaseProfile**

- linux
  - + default
  - + Ubuntu1
  - + UbuntuVM
  - + ubuntu123
  - + Ubuntu 1
  - + UbuntuM
  - + Ubuntu2
  - + Ubuntu7537
  - + Ubuntu7
  - + Ubuntu2324
  - + Ubuntu555
  - + UbuntuByRam
  - + Ubuntu\_AkShree
  - + Ubuntu
  - + MyUbuntu
  - + Ubuntu19
  - + Ubuntu7616
  - + Ubuntu89
  - + soniya
  - + UbuntuBySangi
  - + Linux1
    - + i686
    - + multi
  - + linux123
  - + windows

Step II  
Overwrite the default values if necessary!

**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 ▾  
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**

**Manage VM Profiles**

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  
Copyright © 2024 by FOSS-Group.  
All Rights Reserved.

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.

VM Templates

Please select a profile first!

**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

Vmpool \*

vm-template-virtual-machine-pool-01

**Node \***

foss-cloud.foss-cloud.org

**Name \***

Linux2

**Description \***

linux OS

**Memory \***

3.13 GB

128 MB      128 GB

**Volume Capacity \***

31 GB

10 GB      2048 GB

**CPU \***

1

**Clock Offset \***

utc

**Number of displays**

1

**Foss Cloud**

EN

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	soniya	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	stopped	→ ↓ ✎	---	foss-cloud.foss-cloud.org	

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

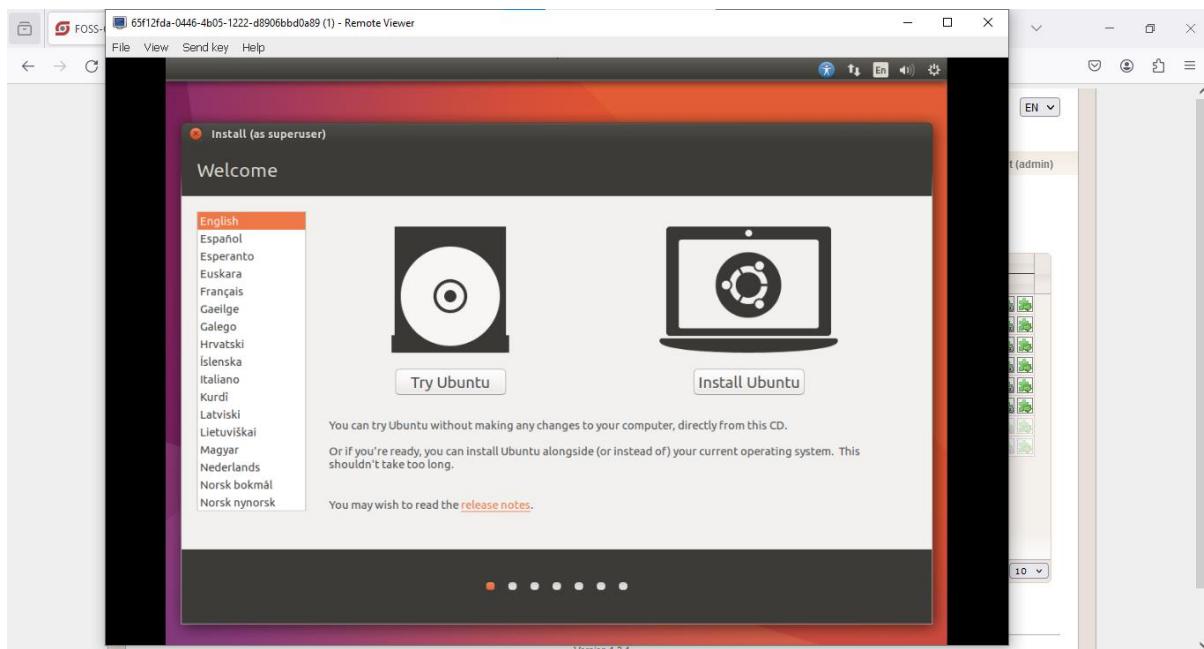
**Manage VMTemplates**

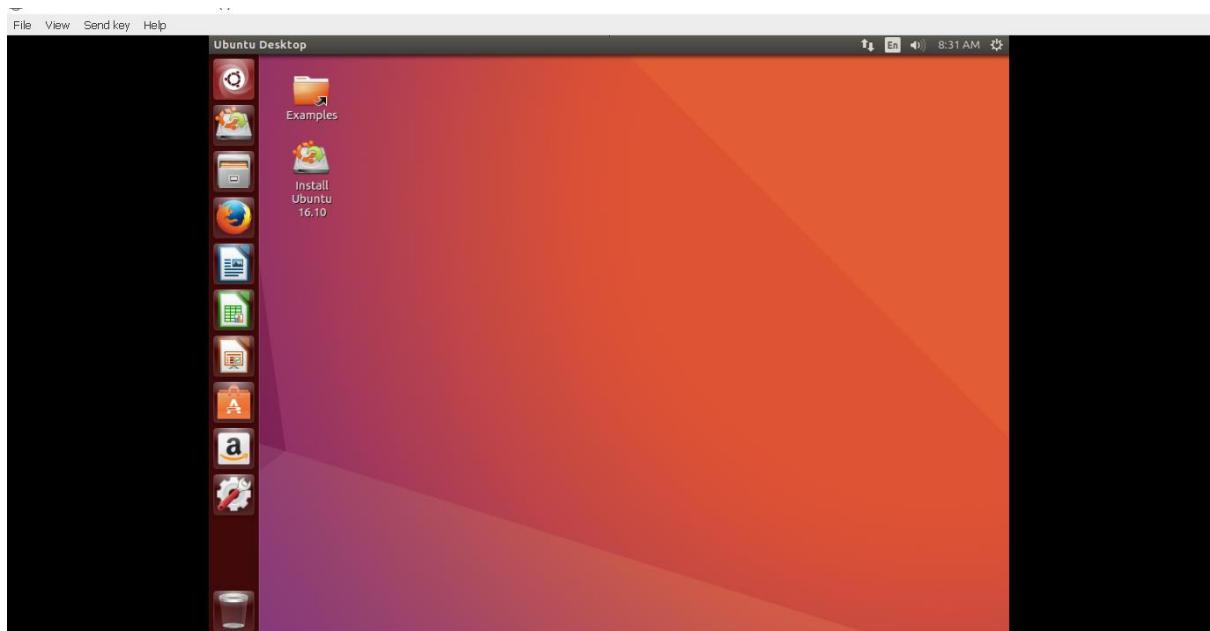
Vm Pool **vm-template-virtual-machine-pool-01**

No.	DisplayName	Status	Run Action	Memory	Node	Action
11	Ubuntu89	stopped	⟳ ⏪ ⏴ ⏵	---	foss-cloud.foss-cloud.org	
12	soniya	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	

Version 1.3.1  
on server *foss-cloud*  
Copyright © 2024 by FOSS-Group.  
All Rights Reserved.

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)

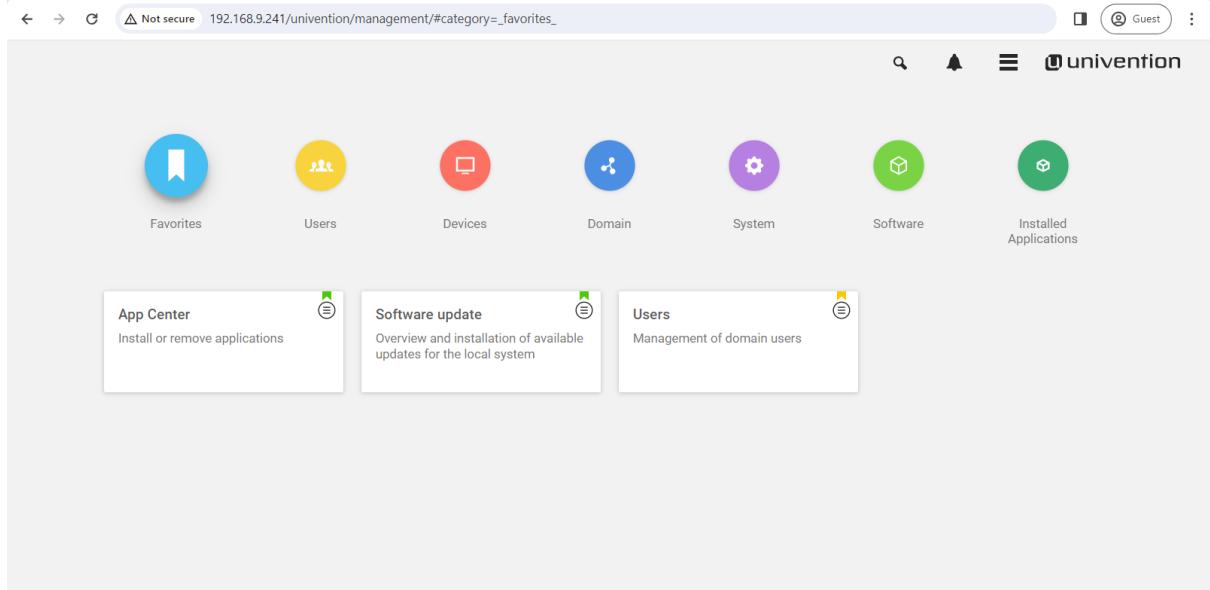
Open owncloud by inputting the ip address 192.168.9.241. Click on the System and domain settings in admin section.

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 cards: 'System and domain settings' (selected, with the URL 'ucs-2657.sies.intranet' and a note about the Univention Management Console), 'Admin Manual' (with the URL 'doc.owncloud.com'), 'User Manual' (with the URL 'doc.owncloud.com'), and 'Univention Blog' (with the URL 'www.univention.com').

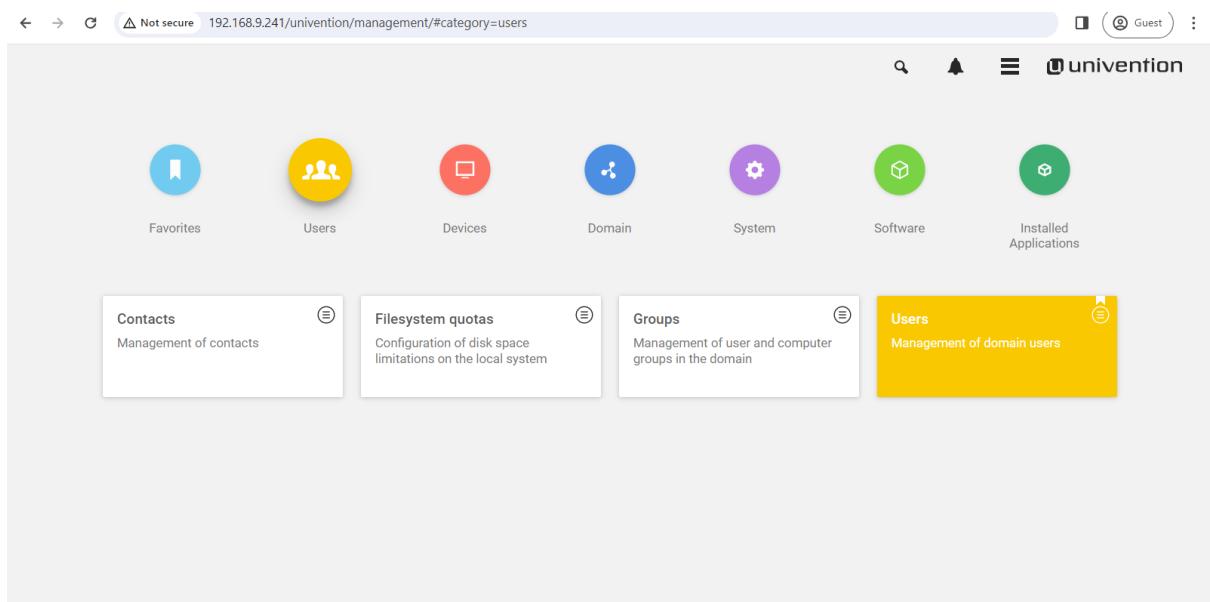
Login as admin by using credential, username: Administrator and password: admin@123

The screenshot shows the Univention login page titled 'Login at sies.intranet'. It features a large green 'UCS' logo. Below it is a form with fields for 'Administrator' (containing 'Administrator') and a password field (containing '.....'). A 'LOGIN' button is at the bottom right. 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 at the URL [192.168.9.241/univention/management/#module=udm:users/user:0](http://192.168.9.241/univention/management/#module=udm:users/user:0). The main title bar says "Not secure". The top navigation bar has icons for back, forward, search, notifications, and user "Guest". The main menu on the left has "HOME" and "USERS" selected. The main content area is titled "Users" with a "CLOSE" button. A search bar with placeholder "Search users..." and a magnifying glass icon is at the top. Below it is a table header with "ADD" and "Path". The table lists six users: abc, Administrator, ak\_nadar, Bhola, and Blessingraj, each with a checkbox and their respective paths.

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

The screenshot shows the "Add a new user" dialog box over the "Users" list. The dialog has fields for Title (Mr), First name (User), Last name (12345), and User name (user7616). It includes "CANCEL", "ADVANCED", and "NEXT" buttons. The background shows the same list of users as the previous screenshot.

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

Users

Add a new user.

.....	.....
Password *	Password (retype) *
<input type="checkbox"/> User has to change password on next login ⓘ	
<input type="checkbox"/> Override password check ⓘ	
<input type="checkbox"/> Account disabled	
CANCEL	ADVANCED BACK CREATE USER

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

0 users of 19 selected.

ADD

Name

abc

Administrator

ak\_nadar

Bhola

Blessingraj

CLOSE

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

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

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

← → ⌛ Not secure 192.168.9.241/univention/portal/ Guest ⋮

# Univention Portal

Applications

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

Administration

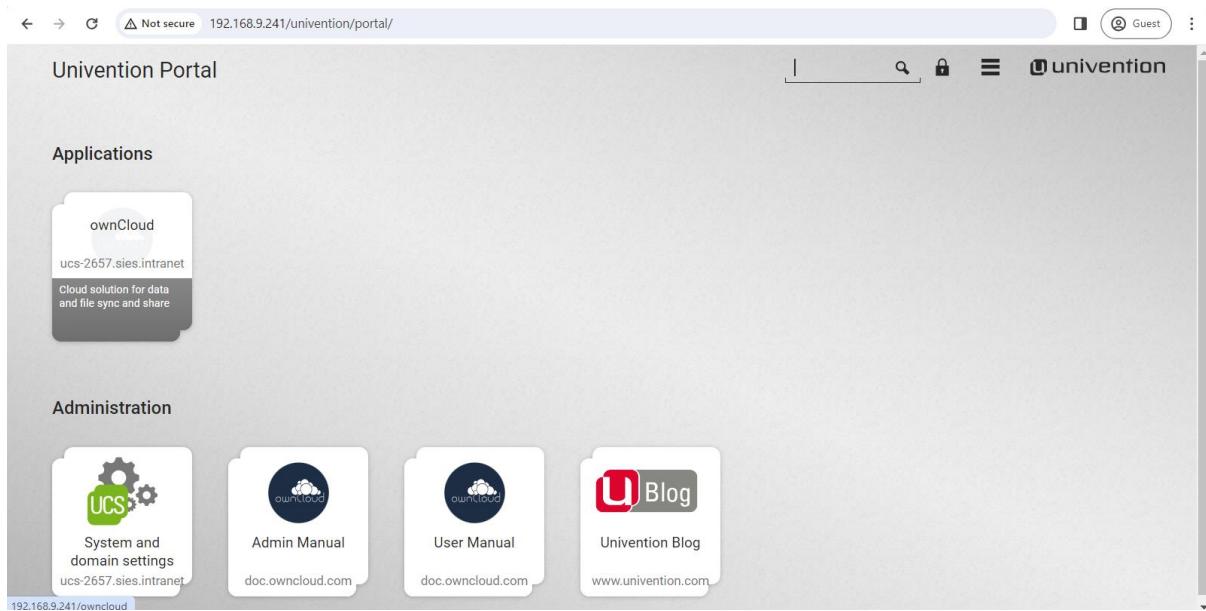
System and domain settings  
ucs-2657.sies.intranet

Admin Manual  
doc.owncloud.com

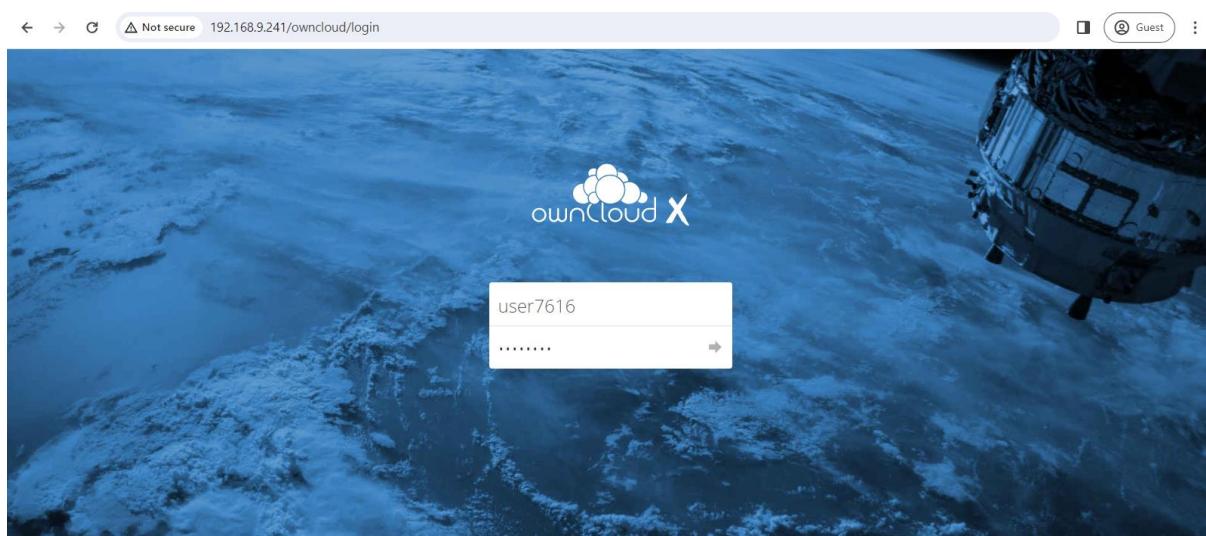
User Manual  
doc.owncloud.com

Univention Blog  
www.univention.com

192.168.9.241/owncloud



Then input username and password that you have created and login



← → ⌛ Not secure 192.168.9.241/owncloud/apps/files/?dir=/&fileId=672

User 12345 ▾ Guest ⋮

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

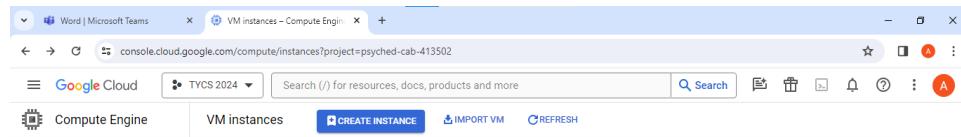
The screenshot shows the ownCloud web interface. At the top, there's a header bar with a back/forward button, a 'Not secure' warning, the URL '192.168.9.241/owncloud/apps/files/?dir=/&fileId=672', a guest user indicator, and a user dropdown for 'User 12345'. Below the header is a dark sidebar on the left containing links for 'All files', 'Favorites', 'Shared with you', 'Shared with others', 'Shared by link', 'Tags', 'Deleted files', and 'Settings'. The main area is titled 'ownCloud' and displays a file list. The list has columns for 'Name', 'Size', and 'Modified'. It contains three entries: 'Documents' (35 KB, modified 'seconds ago'), 'Photos' (663 KB, modified 'seconds ago'), and 'ownCloud Manual.pdf' (4.7 MB, modified 'seconds ago'). A summary at the bottom indicates '2 folders and 1 file' with a total size of '5.4 MB'.

## Practical 4

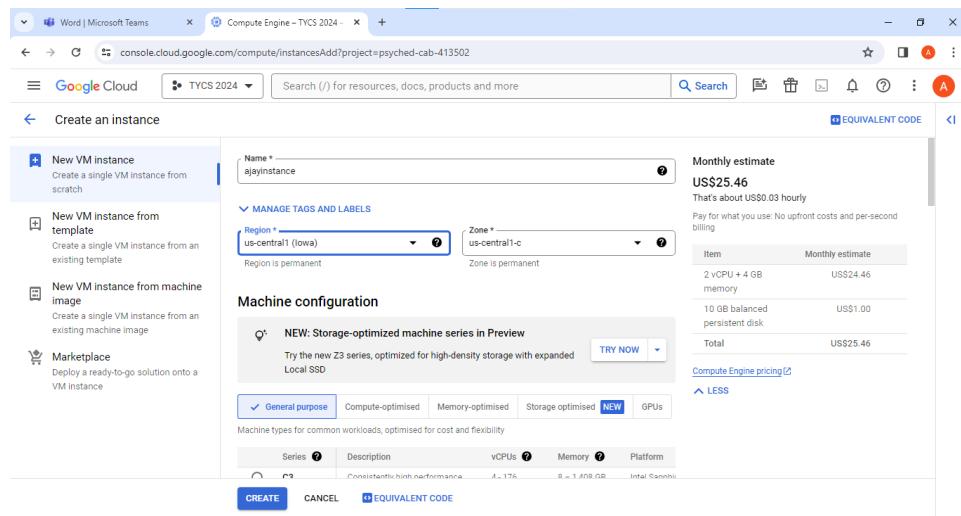
### Aim: Google cloud Linux VM creation

#### Create a Linux Machine

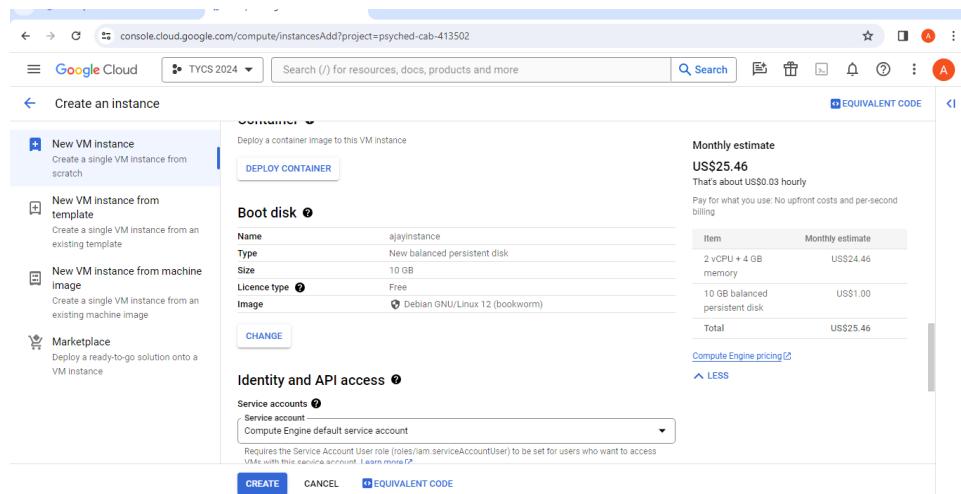
Click on create instance button



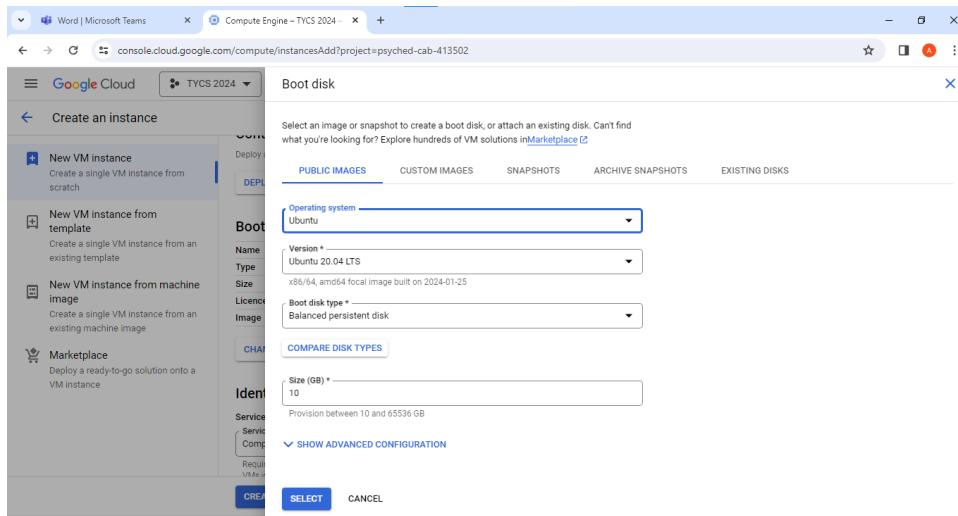
Change the instance name according to you



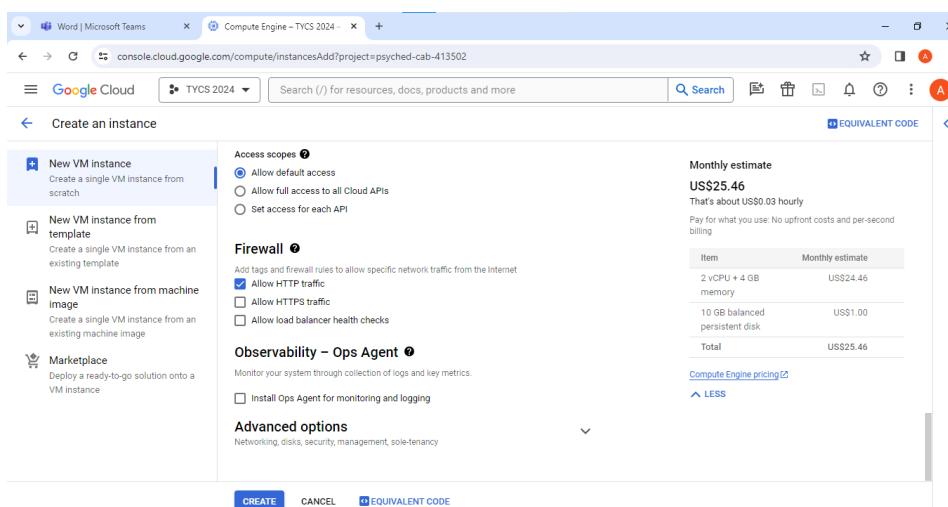
Click on the change option in bootdisk



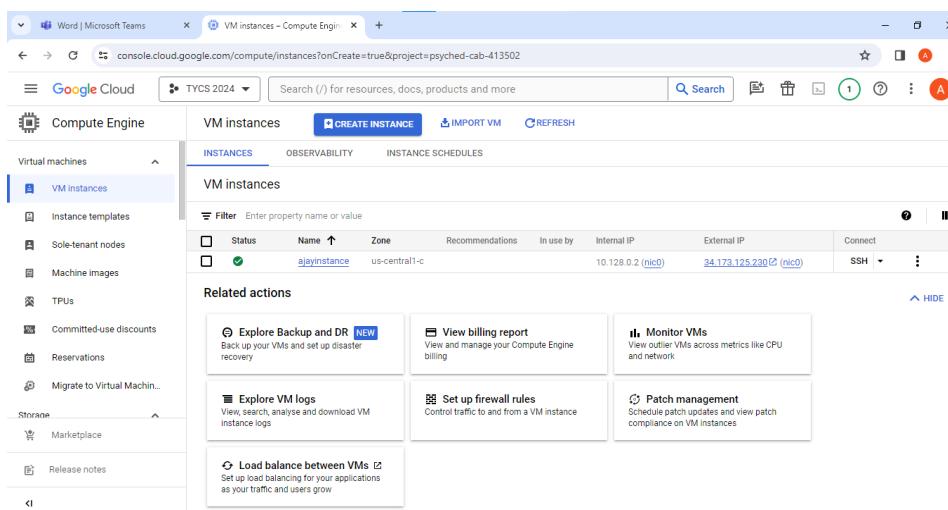
Change from debian to ubuntu in os and click on select



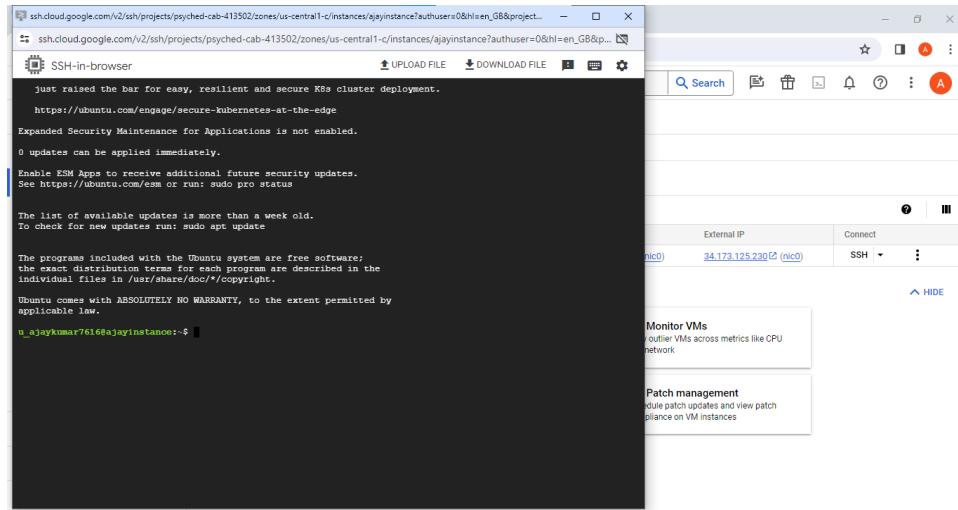
In the firewall traffic, click on allow http traffic option



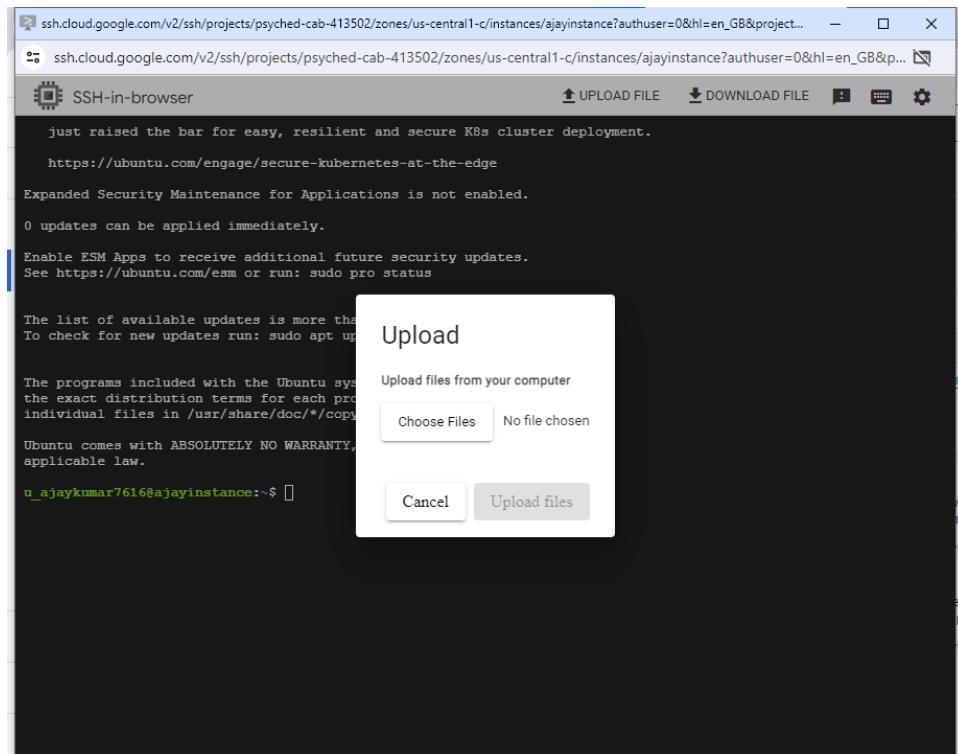
And then click on the create option



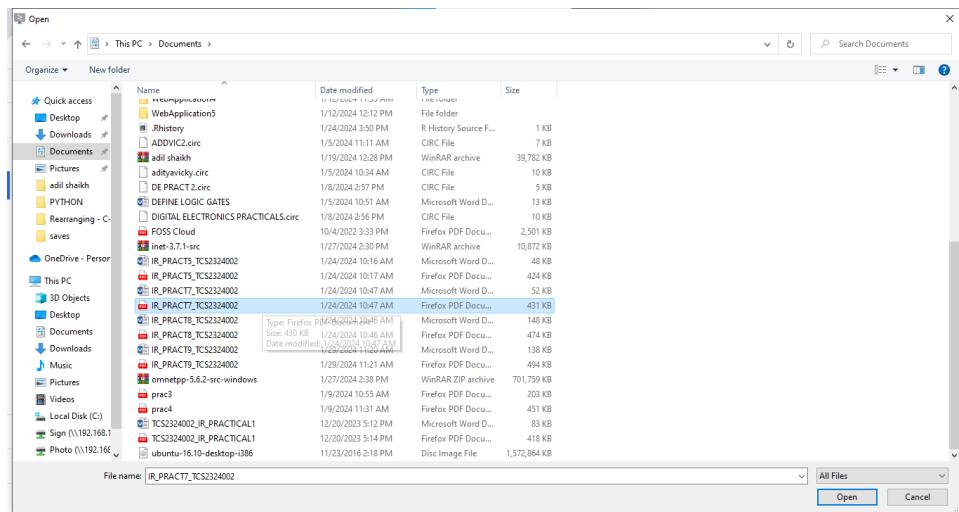
Click on SSH option and it will create new window where it will ask you to authorization. Click on authorize option



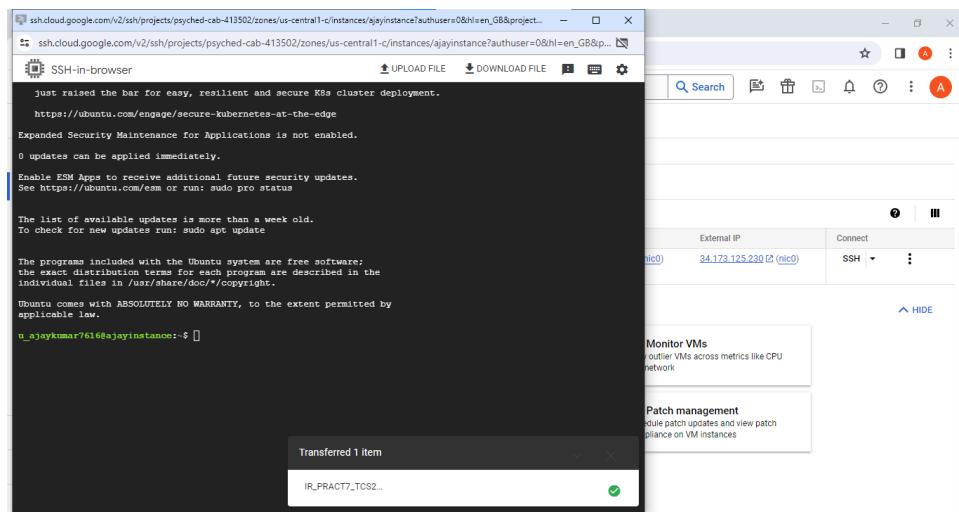
Click on Upload file option



Select one file



Click on upload file option



The screenshot shows an SSH session running in a browser window titled "SSH-in-browser". The terminal window displays a series of system messages and a command-line interface:

```
ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-c/instances/ajayinstance?authuser=0&hl=en_GB&project...  
ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-c/instances/ajayinstance?authuser=0&hl=en_GB&p...  
SSH-in-browser  
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 progress bar at the bottom of the terminal window indicates "Transferred 1 item".

# Practical 5

## Aim: Google cloud Windows VM creation

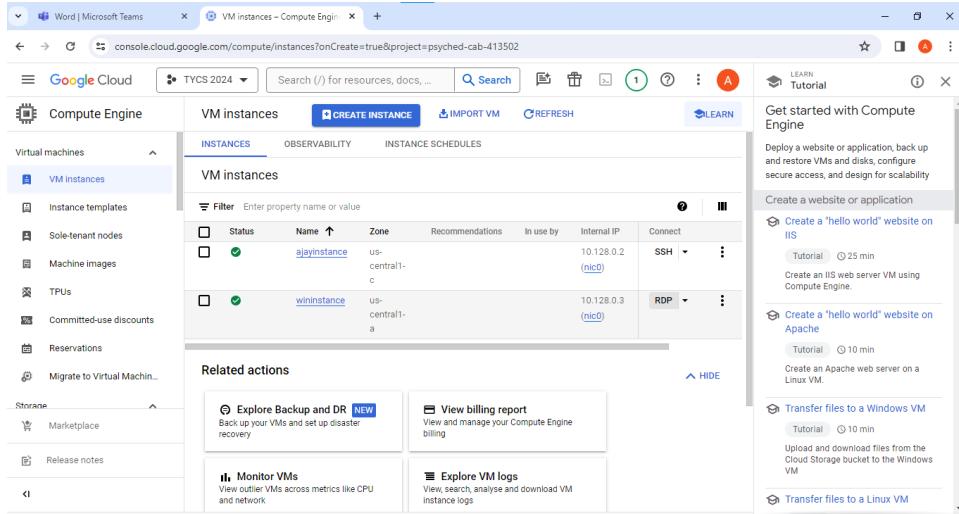
### Create instance for windows

The screenshot shows the 'Create an instance' wizard in the Google Cloud Compute Engine interface. The 'New VM instance' option is selected. In the 'Name' field, 'wininstance' is entered. Under 'MANAGE TAGS AND LABELS', 'Region' is set to 'us-central1 (Iowa)' and 'Zone' is set to 'us-central1-a'. The 'Machine configuration' section shows a 'NEW: Storage-optimized machine series in Preview' message for the 'z3' series. A 'TRY NOW' button is available. The 'General purpose' tab is selected. On the right, a 'Monthly estimate' table shows costs for 2 vCPU + 4 GB memory and 10 GB balanced persistent disk, totaling US\$25.46. A 'Compute Engine pricing' link is also present.

The screenshot shows the 'Boot disk' configuration step in the 'Create an instance' wizard. Under the 'PUBLIC IMAGES' tab, 'Operating system' is set to 'Windows Server' and 'Version' is 'Windows Server 2022 Datacenter'. 'Boot disk type' is set to 'Balanced persistent disk'. The 'Size (GB)' is set to '50'. A 'SELECT' button is at the bottom.

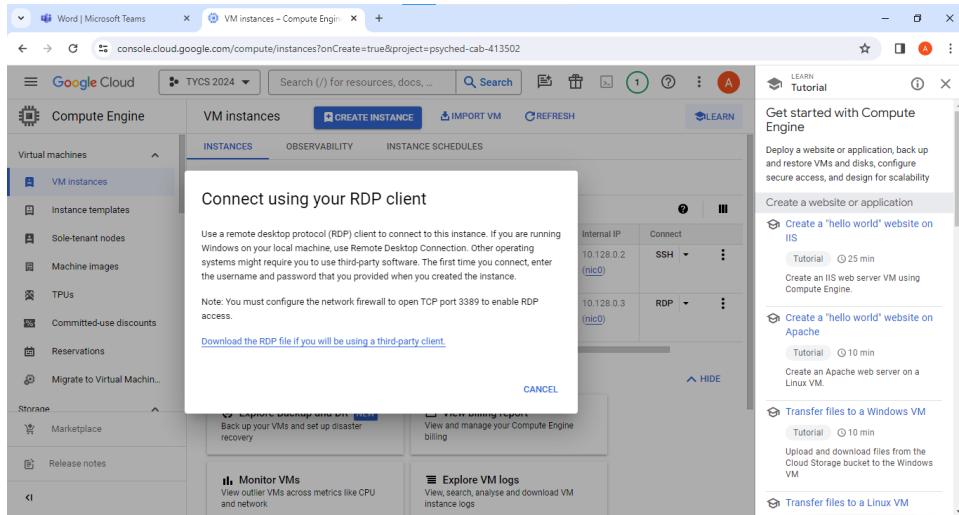
The screenshot shows the final configuration summary in the 'Create an instance' wizard. It includes sections for 'Access scopes', 'Firewall' (allowing HTTP traffic), 'Observability – Ops Agent' (monitoring logs and metrics), and 'Advanced options' (networking, security, management). The 'Monthly estimate' table on the right shows a total cost of US\$63.04 for the selected configuration.

## Click on RDP option for remote desktop connection



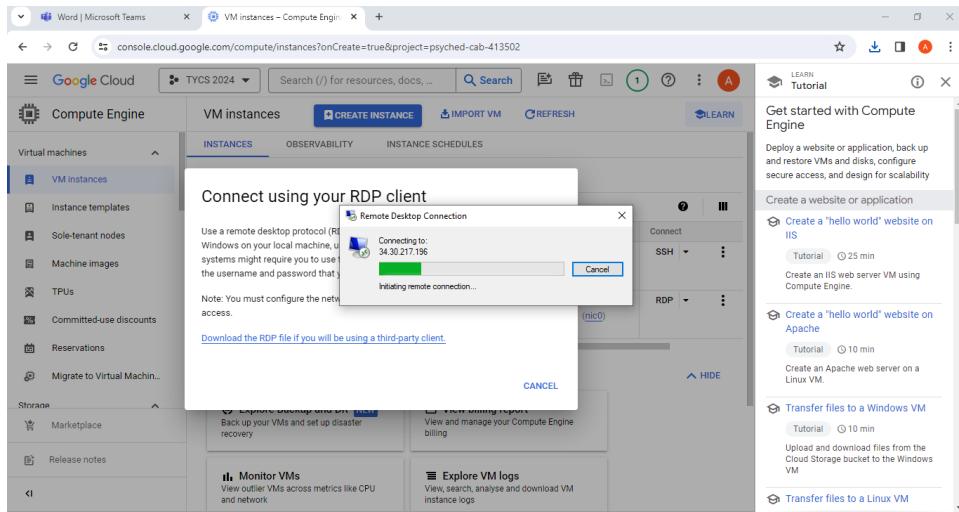
The screenshot shows the Google Cloud Compute Engine interface. On the left, there's a sidebar with 'Compute Engine' selected under 'Virtual machines'. The main area displays 'VM instances' with two entries: 'ajayinstance' and 'wininstance'. For each instance, there are columns for Status, Name, Zone, Recommendations, In use by, Internal IP, and Connect. The 'Connect' dropdown for 'wininstance' is set to 'RDP'. Below the table, there's a section titled 'Related actions' with links like 'Explore Backup and DR', 'View billing report', 'Monitor VMs', and 'Explore VM logs'.

## Download the RDP file



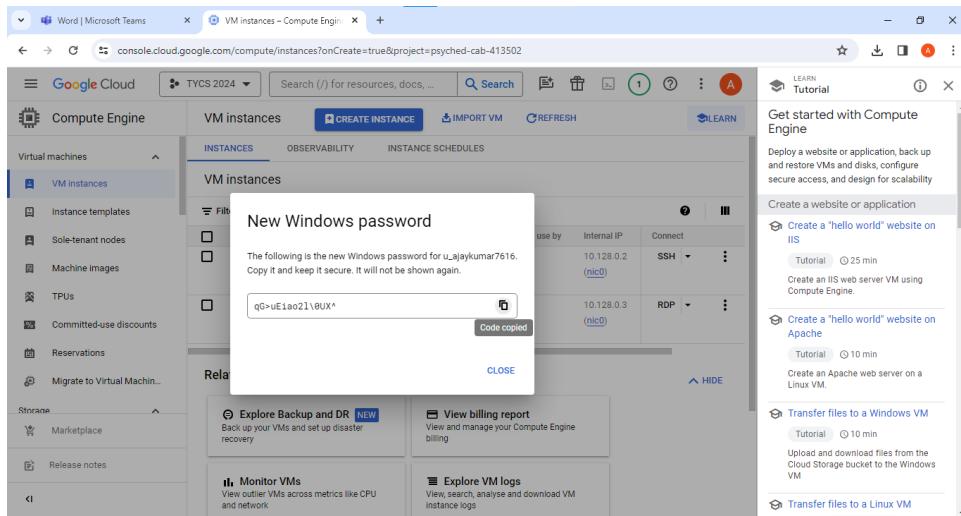
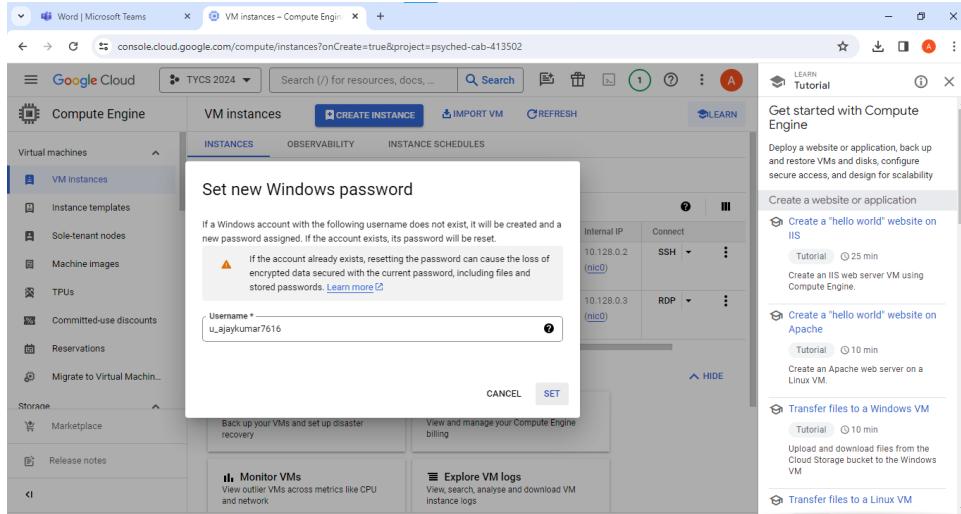
This screenshot shows the same Google Cloud Compute Engine interface as above, but with a modal dialog overlaid. The dialog is titled 'Connect using your RDP client' and contains the following text:  
Use a remote desktop protocol (RDP) client to connect to this instance. If you are running Windows on 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.](#)

## Open the download file and connect to that winnstance



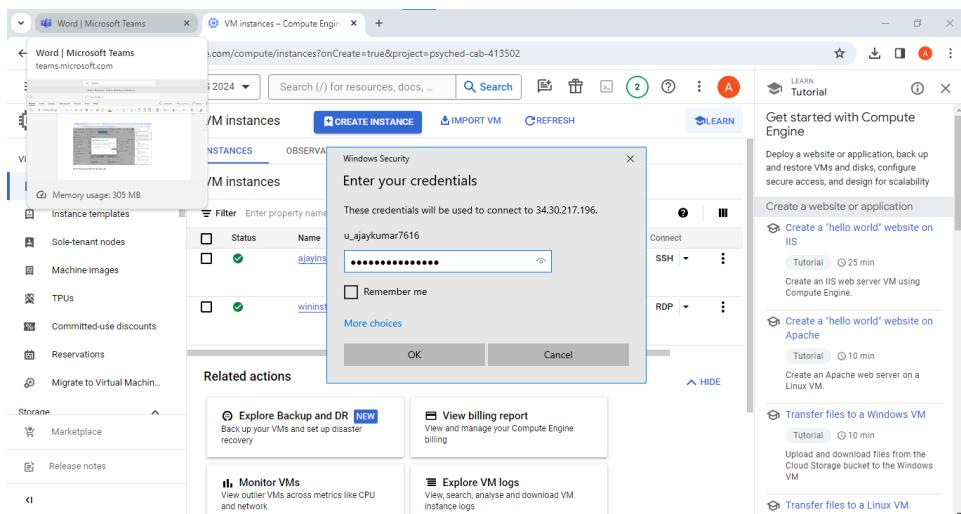
This screenshot shows the Google Cloud Compute Engine interface again, with a modal dialog from the previous step still open. The sub-dialog is titled 'Remote Desktop Connection' and displays the message 'Connecting to: 34.30.217.196' with a progress bar. Below it, it says 'Initiating remote connection...' and includes a 'Cancel' button.

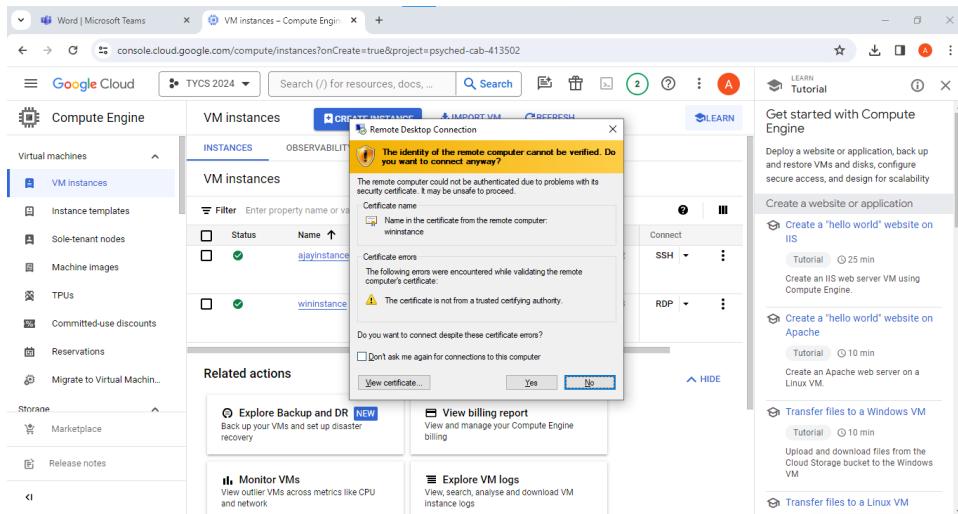
## Click on RDP and set window password



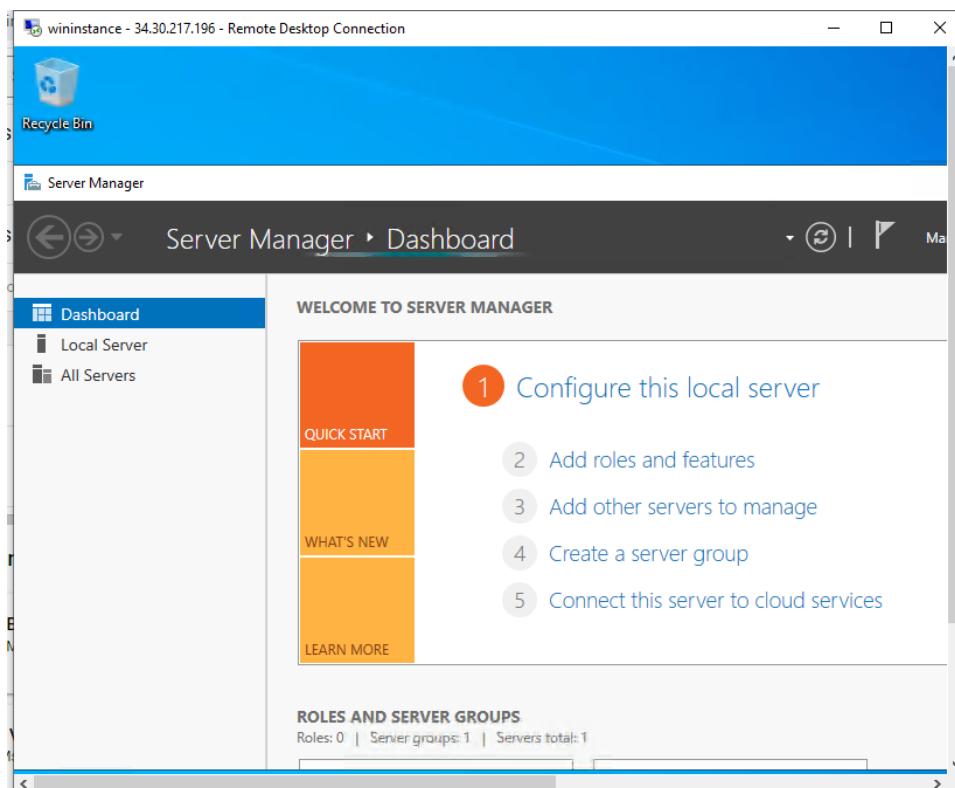
Save the password for further use

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 two pages from the Google Cloud Platform interface.

**Instances Page:** This page lists existing VM instances. Two instances are visible: "ajayinstance" (Status: Running, Zone: us-central1-c, Internal IP: 10.128.0.2, External IP: 10.128.0.2 (nic0), SSH access) and "wininstance" (Status: Running, Zone: us-central1-a, Internal IP: 10.128.0.3, External IP: 10.128.0.3 (nic0), RDP access). The left sidebar shows navigation for Compute Engine, Virtual machines, Storage, and Marketplace.

**Create an instance Dialog:** This dialog is used to set up a new VM instance. It includes sections for:

- New VM instance:** A selected option to "Create a single VM instance from scratch".
- Deploy container:** An option to "Deploy a container image to this VM instance".
- Boot disk:** Configuration for a new persistent disk (Name: ccassignment, Type: New balanced persistent disk, Size: 50 GB, Licence type: PAYG, Image: Windows Server 2022 Datacenter).
- Identity and API access:** Configuration for service accounts, currently set to "Compute Engine default service account". A note states: "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](#)".
- Buttons:** CREATE, CANCEL, EQUIVALENT CODE.

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

**VM instances**

**CREATE INSTANCE** **IMPORT VM** **REFRESH** **LEARN**

VM instances																																												
INSTANCES		OBSERVABILITY		INSTANCE SCHEDULES																																								
<b>VM instances</b>																																												
<b>Filter</b> Enter property name or value																																												
<table border="1"> <thead> <tr> <th>Status</th> <th>Name</th> <th>Zone</th> <th>Recommendations</th> <th>In use by</th> <th>Internal IP</th> <th>External IP</th> <th>Connect</th> <th>⋮</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><a href="#">ajayinstance</a></td> <td>us-central1-c</td> <td></td> <td></td> <td>10.128.0.2 (nic0)</td> <td>SSH</td> <td>⋮</td> <td>⋮</td> </tr> <tr> <td><input type="checkbox"/></td> <td><a href="#">ccassignment</a></td> <td>us-central1-a</td> <td></td> <td></td> <td>10.128.0.4 (nic0)</td> <td>34.16.75.112 (nic0)</td> <td>RDP</td> <td>⋮</td> </tr> <tr> <td><input type="checkbox"/></td> <td><a href="#">wininstance</a></td> <td>us-central1-a</td> <td></td> <td></td> <td>10.128.0.3 (nic0)</td> <td></td> <td>RDP</td> <td>⋮</td> </tr> </tbody> </table>									Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect	⋮	<input type="checkbox"/>	<a href="#">ajayinstance</a>	us-central1-c			10.128.0.2 (nic0)	SSH	⋮	⋮	<input type="checkbox"/>	<a href="#">ccassignment</a>	us-central1-a			10.128.0.4 (nic0)	34.16.75.112 (nic0)	RDP	⋮	<input type="checkbox"/>	<a href="#">wininstance</a>	us-central1-a			10.128.0.3 (nic0)		RDP	⋮
Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect	⋮																																				
<input type="checkbox"/>	<a href="#">ajayinstance</a>	us-central1-c			10.128.0.2 (nic0)	SSH	⋮	⋮																																				
<input type="checkbox"/>	<a href="#">ccassignment</a>	us-central1-a			10.128.0.4 (nic0)	34.16.75.112 (nic0)	RDP	⋮																																				
<input type="checkbox"/>	<a href="#">wininstance</a>	us-central1-a			10.128.0.3 (nic0)		RDP	⋮																																				
<b>Related actions</b>																																												
<a href="#"><b>Explore Backup and DR</b> NEW</a> Back up your VMs and set up disaster recovery																																												
<a href="#"><b>View billing report</b></a> View and manage your Compute Engine billing																																												
<a href="#"><b>Monitor VMs</b></a> View outlier VMs across metrics like CPU and network																																												
<a href="#"><b>Explore VM logs</b></a> View, search, analyse and download VM instance logs																																												
<a href="#"><b>Set up firewall rules</b></a> Control traffic to and from a VM instance																																												
<a href="#"><b>Patch management</b></a> Schedule patch updates and view patch compliance on VM instances																																												
<a href="#"><b>Load balance between VMs</b></a> Set up load balancing for your applications as your traffic and users grow																																												

## Set Window Password by clicking on RDP

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

**VM instances**

**CREATE INSTANCE** **IMPORT VM** **REFRESH** **LEARN**

VM instances																																												
INSTANCES		OBSERVABILITY		INSTANCE SCHEDULES																																								
<b>X 1</b> <b>START/RESUME</b> <b>STOP</b> <b>SUSPEND</b> <b>RESET</b> <b>DELETE</b> <b>LABELS</b> <b>PERMISSIONS</b>																																												
<b>Filter</b> Enter property name or value																																												
<table border="1"> <thead> <tr> <th>Status</th> <th>Name</th> <th>Zone</th> <th>Recommendations</th> <th>In use by</th> <th>Internal IP</th> <th>External IP</th> <th>Connect</th> <th>⋮</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><a href="#">ajayinstance</a></td> <td>us-central1-c</td> <td></td> <td></td> <td>10.128.0.2 (nic0)</td> <td>SSH</td> <td>⋮</td> <td>⋮</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><a href="#">ccassignment</a></td> <td>us-central1-a</td> <td></td> <td></td> <td>10.128.0.4 (nic0)</td> <td>34.16.75.112 (nic0)</td> <td>RDP</td> <td>⋮</td> </tr> <tr> <td><input type="checkbox"/></td> <td><a href="#">wininstance</a></td> <td>us-central1-a</td> <td></td> <td></td> <td>10.128.0.3 (nic0)</td> <td></td> <td>RDP</td> <td>⋮</td> </tr> </tbody> </table>									Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect	⋮	<input type="checkbox"/>	<a href="#">ajayinstance</a>	us-central1-c			10.128.0.2 (nic0)	SSH	⋮	⋮	<input checked="" type="checkbox"/>	<a href="#">ccassignment</a>	us-central1-a			10.128.0.4 (nic0)	34.16.75.112 (nic0)	RDP	⋮	<input type="checkbox"/>	<a href="#">wininstance</a>	us-central1-a			10.128.0.3 (nic0)		RDP	⋮
Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect	⋮																																				
<input type="checkbox"/>	<a href="#">ajayinstance</a>	us-central1-c			10.128.0.2 (nic0)	SSH	⋮	⋮																																				
<input checked="" type="checkbox"/>	<a href="#">ccassignment</a>	us-central1-a			10.128.0.4 (nic0)	34.16.75.112 (nic0)	RDP	⋮																																				
<input type="checkbox"/>	<a href="#">wininstance</a>	us-central1-a			10.128.0.3 (nic0)		RDP	⋮																																				
<b>Related actions</b>																																												
<a href="#"><b>Explore Backup and DR</b> NEW</a> Back up your VMs and set up disaster recovery																																												
<a href="#"><b>View billing report</b></a> View and manage your Compute Engine billing																																												
<a href="#"><b>Monitor VMs</b></a> View outlier VMs across metrics like CPU and network																																												
<a href="#"><b>Explore VM logs</b></a> View, search, analyse and download VM instance logs																																												
<a href="#"><b>Set up firewall rules</b></a> Control traffic to and from a VM instance																																												
<a href="#"><b>Patch management</b></a> Schedule patch updates and view patch compliance on VM instances																																												
<a href="#"><b>Load balance between VMs</b></a> Set up load balancing for your applications as your traffic and users grow																																												

## Download the RDP file

The screenshot shows the Google Cloud Compute Engine interface. On the left, there's a sidebar with sections for Virtual machines (VM instances, Instance templates, Sole-tenant nodes, Machine images, TPUs, Committed-use discounts, Reservations, Migrate to Virtual Machines), Storage (Disks, Snapshots, Marketplace), and Release notes. The main area is titled 'VM instances' and has tabs for INSTANCES, OBSERVABILITY, and INSTANCE SCHEDULES. Under INSTANCES, there's a table of VM instances with columns for External IP, Connect, and three dots for more options. One instance, '34.16.75.112', has 'RDP' selected under 'Connect'. A modal window titled 'Connect using your RDP client' is open over the table. It contains instructions about using RDP, a note about configuring the network firewall, and a link to 'Download the RDP file if you will be using a third-party client.' There are 'CANCEL' and 'HIDE' buttons at the bottom right of the modal.

Click on the download RDP file to start window instance

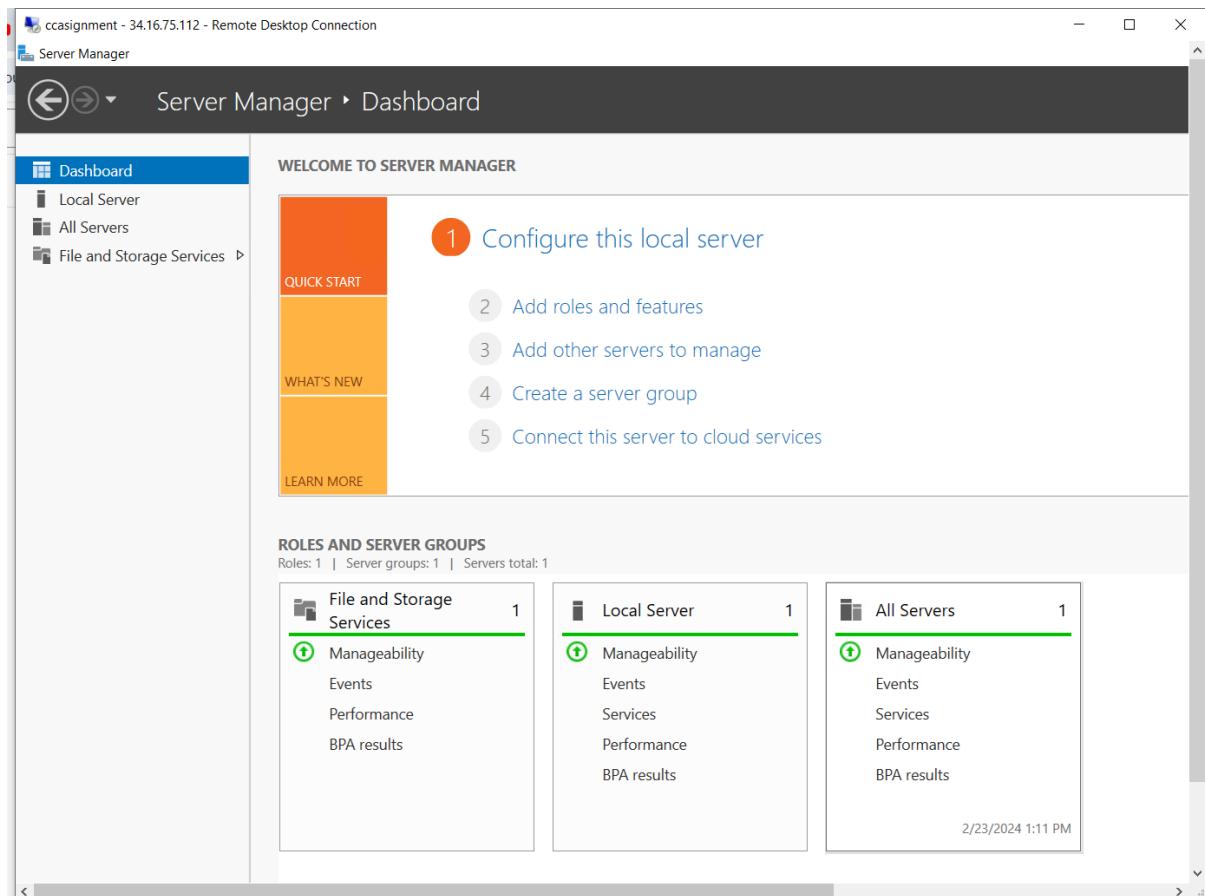
This screenshot is similar to the previous one but shows a different state. The modal window now displays a warning message: 'The publisher of this remote connection can't be identified. Do you want to connect anyway?'. Below the message, it says 'This remote connection could harm your local or remote computer. Do not connect unless you know where this connection came from or have used it before.' It shows details: Publisher: Unknown publisher, Type: Remote Desktop Connection, Remote computer: 34.16.75.112. There's a checkbox for 'Don't ask me again for connections to this computer' and buttons for 'Show Details', 'Connect', and 'Cancel'. The rest of the interface is identical to the first screenshot, showing the list of VM instances and related actions.

Input username and password which has been set

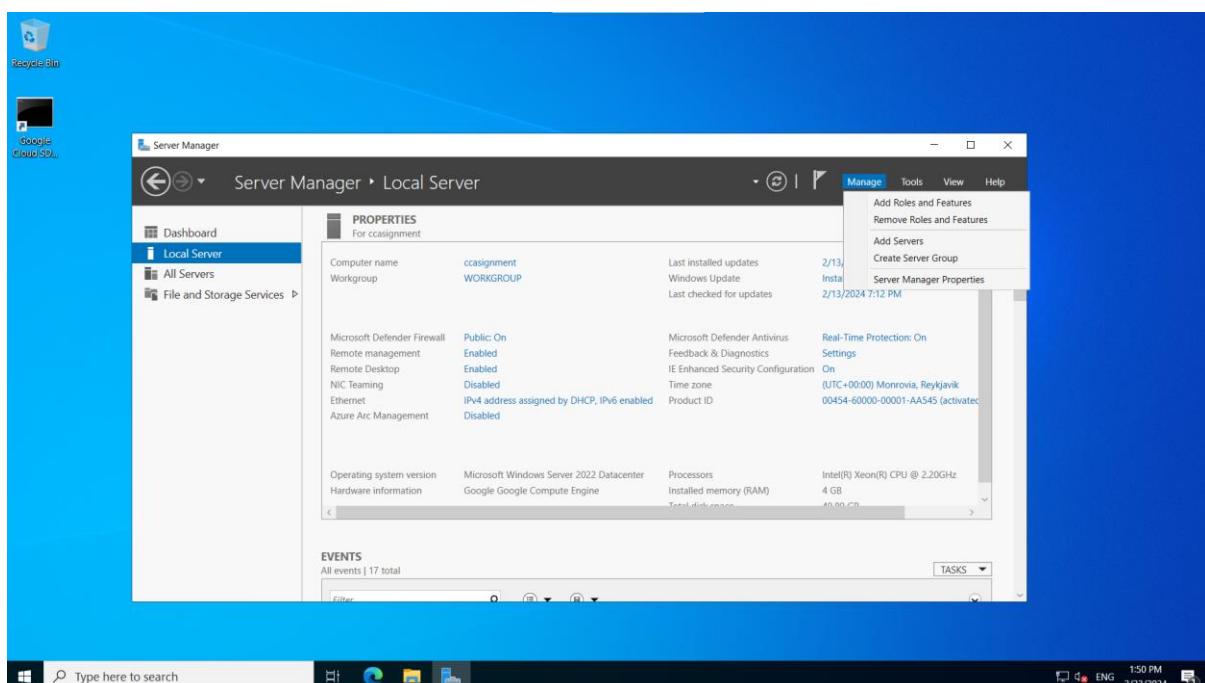
This screenshot shows the Google Cloud Compute Engine interface. On the left, there's a sidebar with 'Virtual machines' and 'Storage' sections. The main area shows 'VM instances' with three entries: 'ajayinstance' (Status: Off), 'ccassignment' (Status: On), and 'wininstance' (Status: Off). A modal window titled 'Windows Security' is open, prompting for credentials to connect to the IP 34.16.75.112. It displays the username 'u\_ajaykumar7616' and a masked password field. There are 'OK' and 'Cancel' buttons at the bottom. To the right of the modal, a list of connection options is visible, including 'Connect' (SSH/RDP), 'View metrics', and 'Patch management'.

This screenshot is similar to the previous one, showing the Google Cloud Compute Engine interface. The 'VM instances' section lists the same three VMs. A modal window titled 'Remote Desktop Connection' is open, displaying a warning message: 'The identity of the remote computer cannot be verified. Do you want to connect anyway?'. It provides details about certificate errors, including the certificate name 'ccassignment' and errors related to the certificate being from a trusted authority. It asks if the user wants to connect despite these errors, with 'Yes' and 'No' buttons. Like the first screenshot, it includes a sidebar with 'Virtual machines' and 'Storage' sections, and a list of related actions on the right.

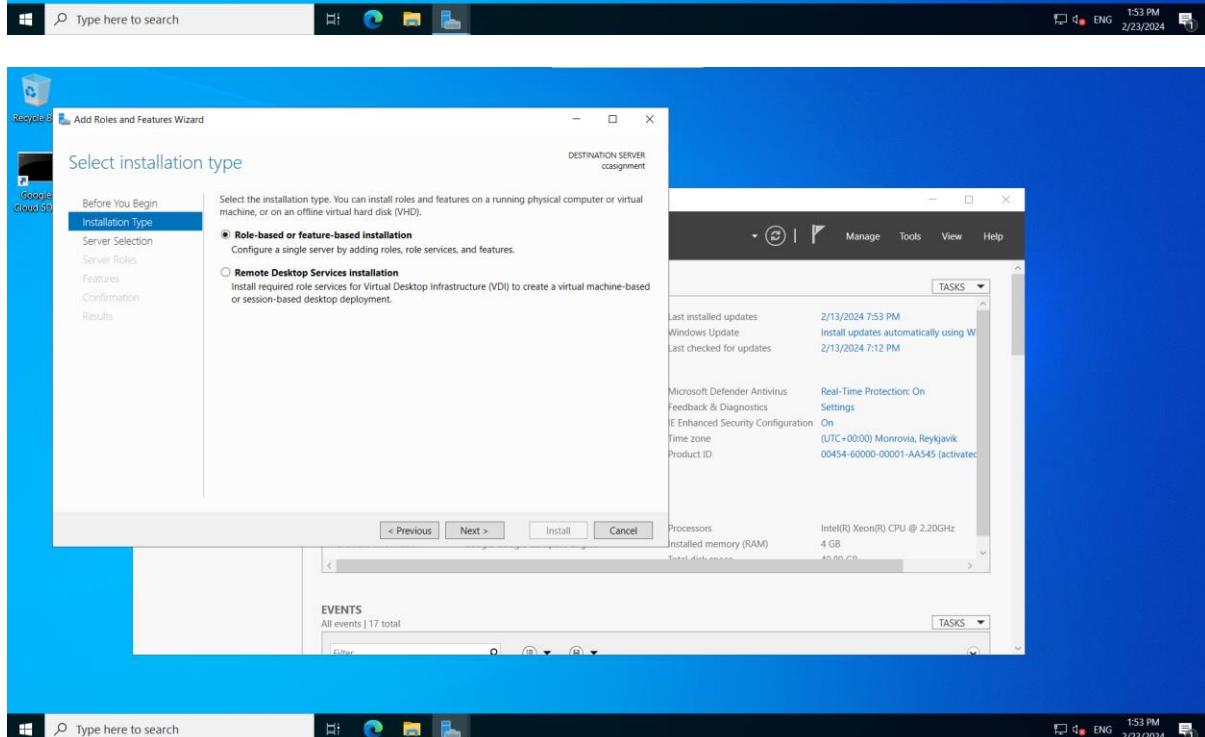
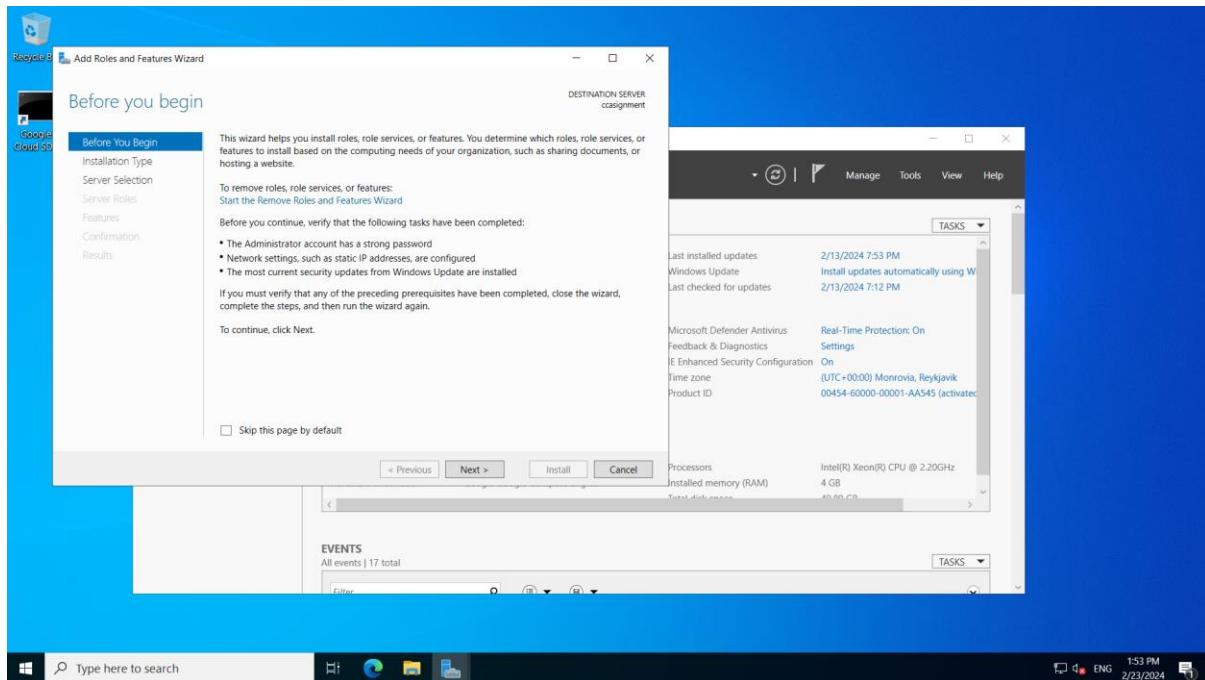
When the window instance you will get a Server manager application

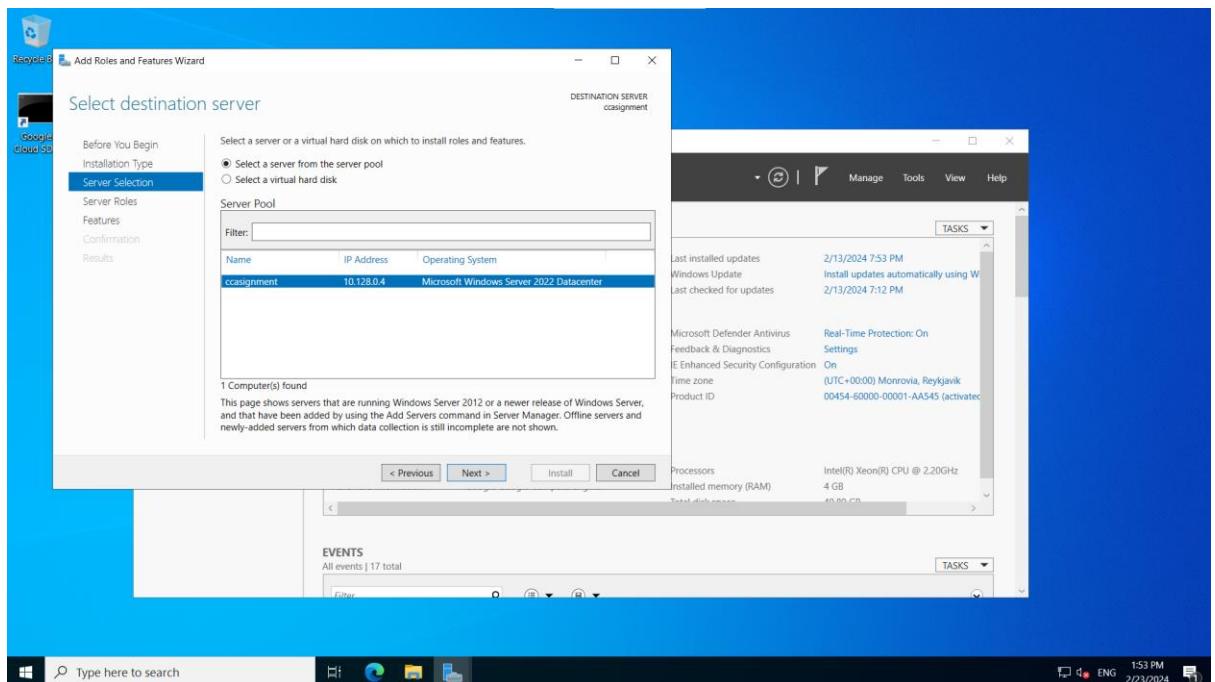


Select Add Roles and Features from the manage

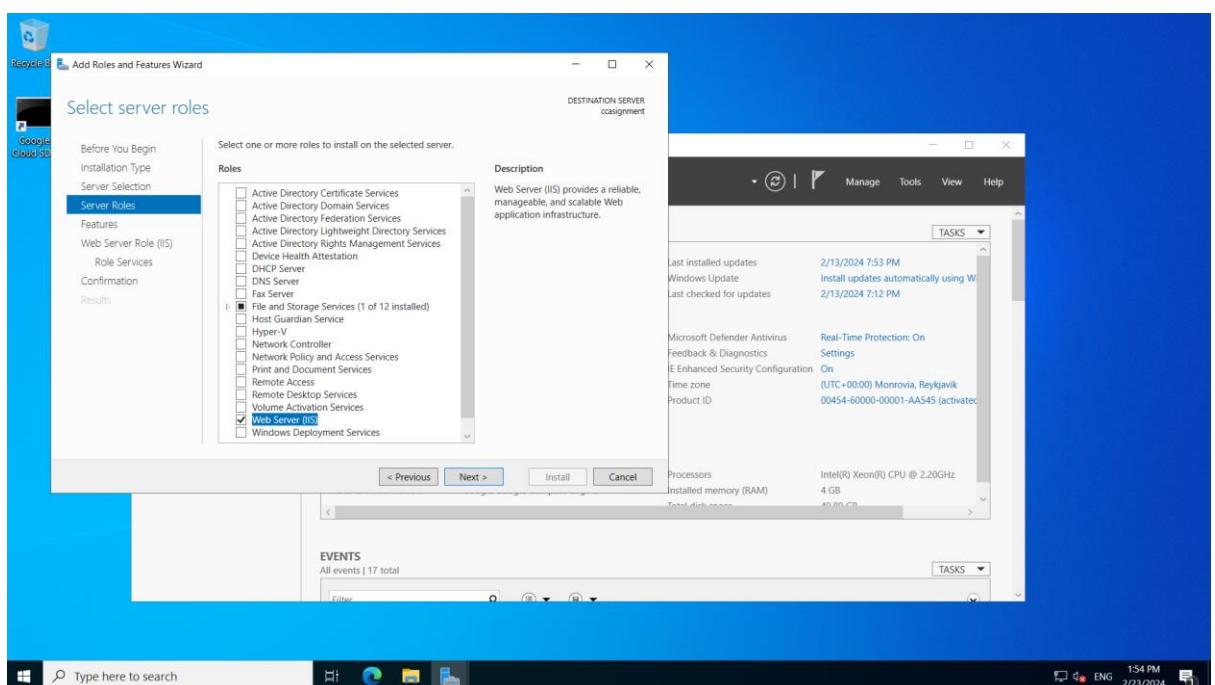


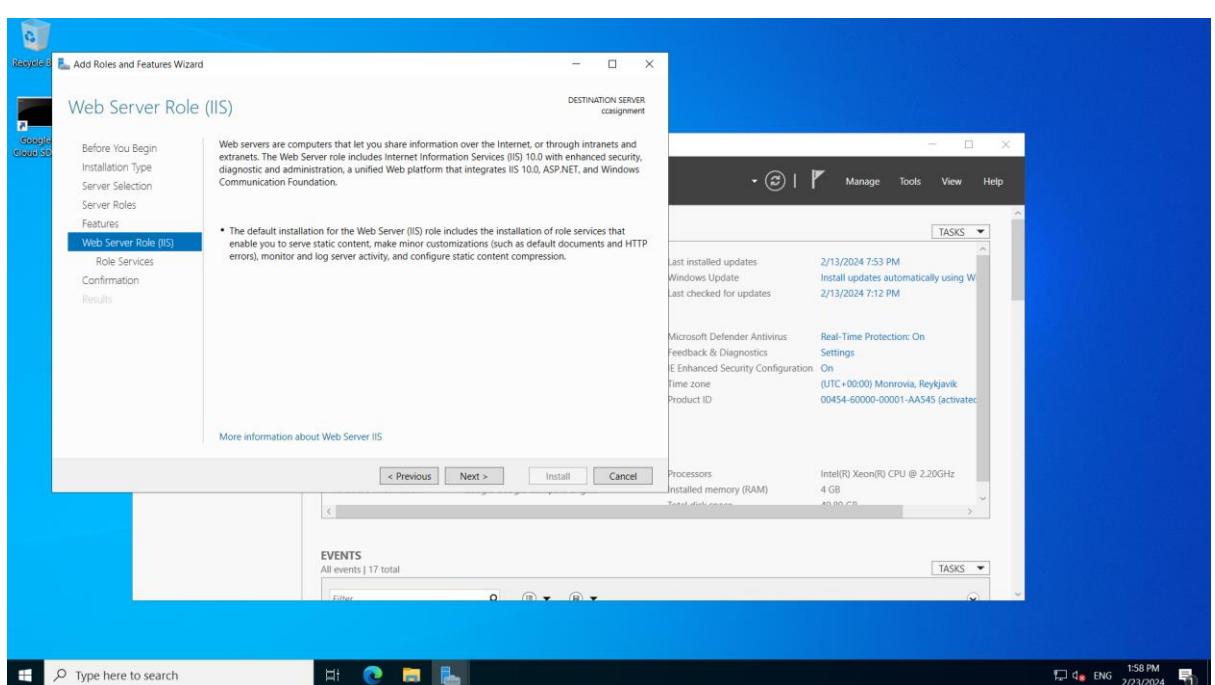
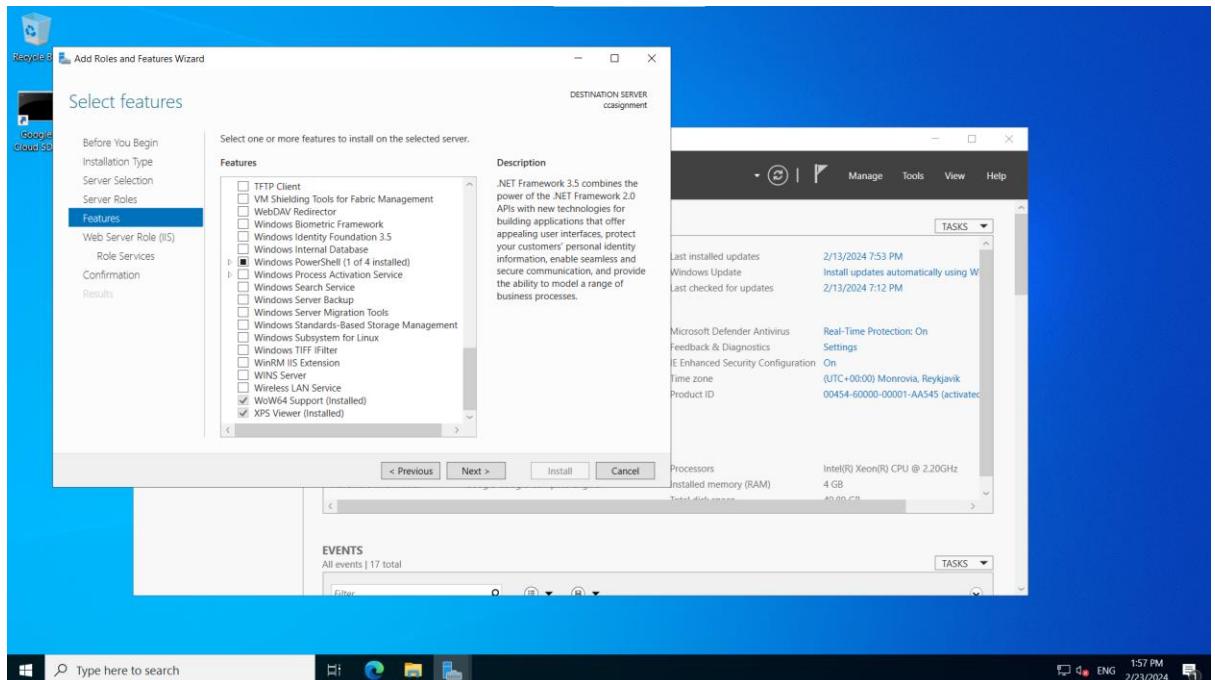
Follow the installation procedure as followed in the below snapshot

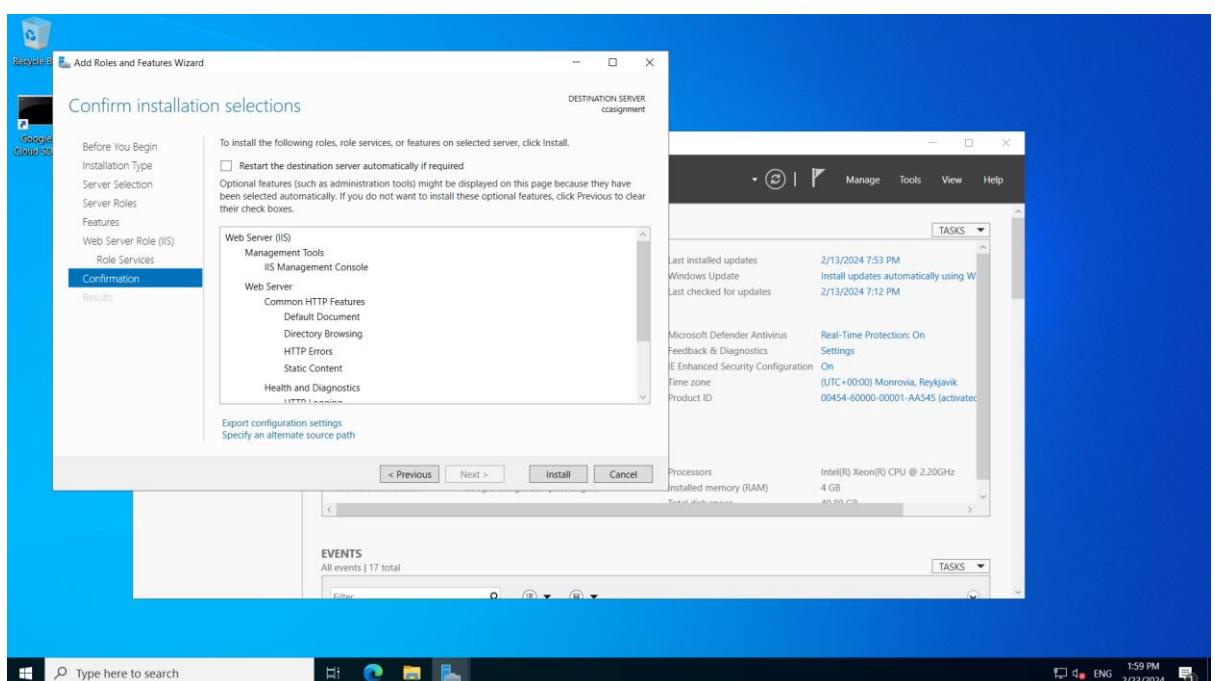
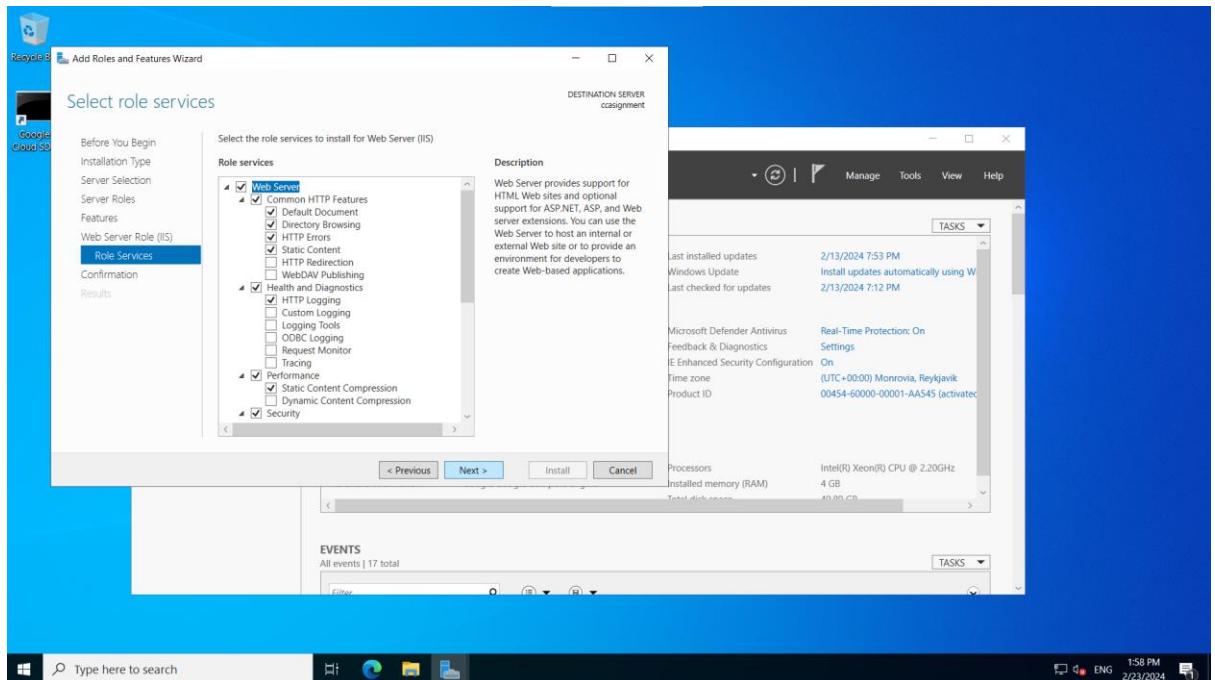




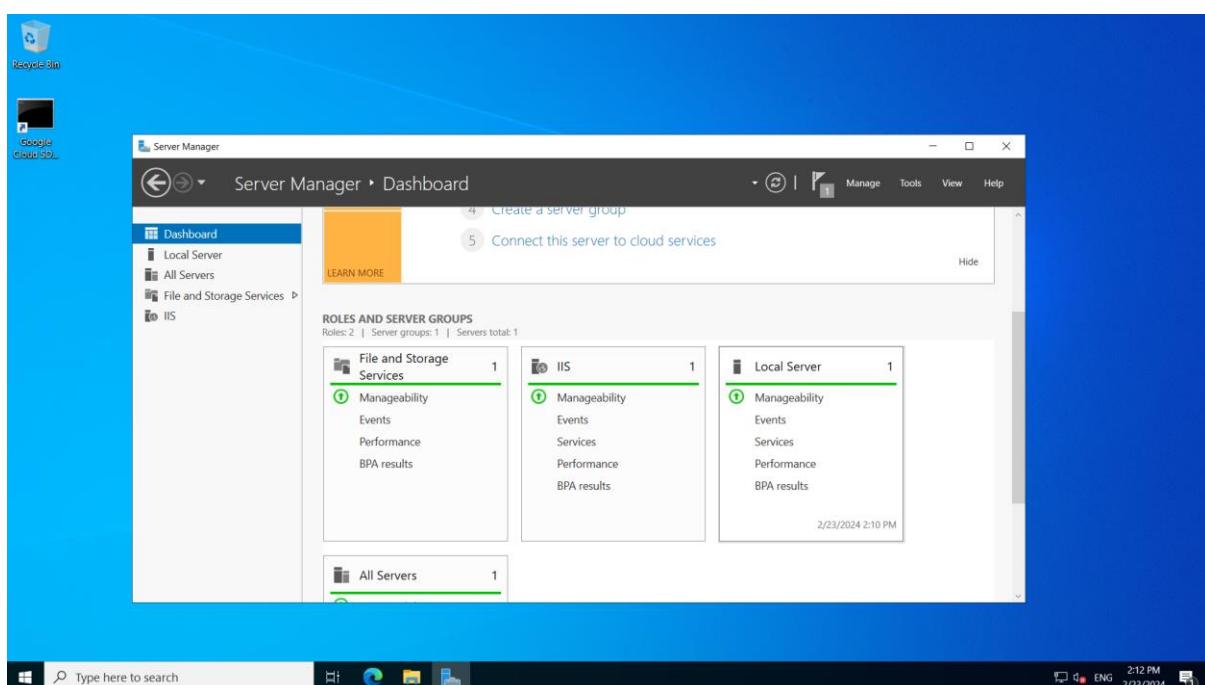
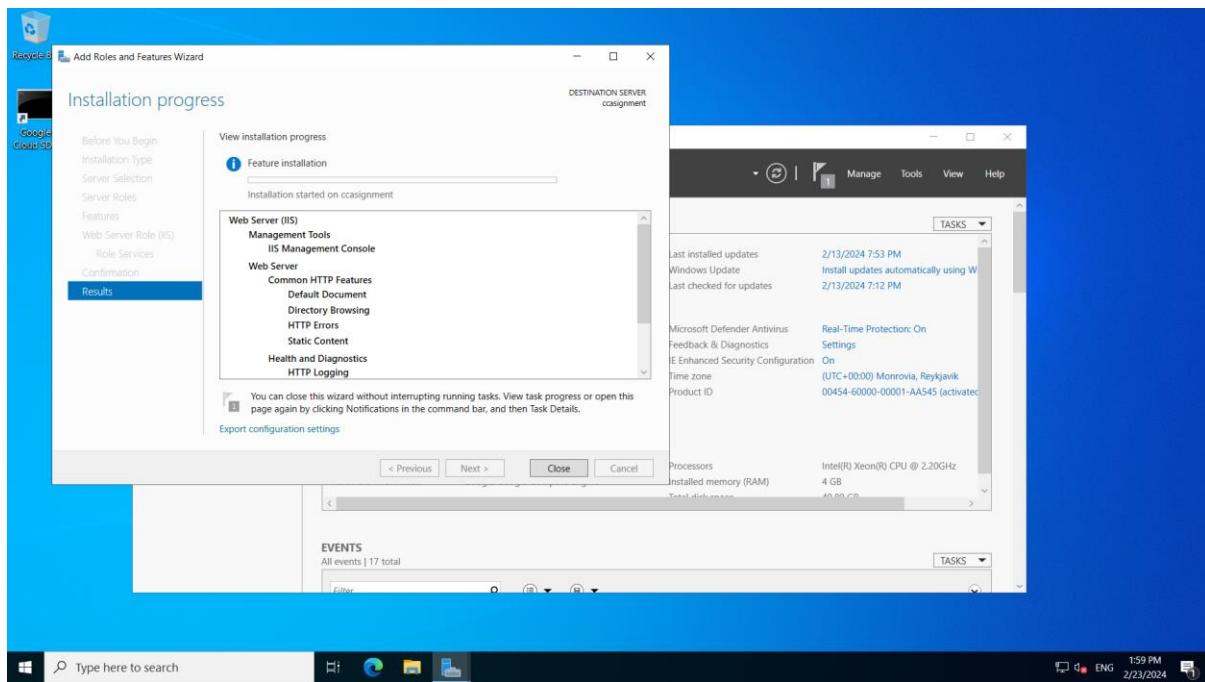
Tick mark the Web Server(IIS) which was uncheck.







You have successfully installed IIS server

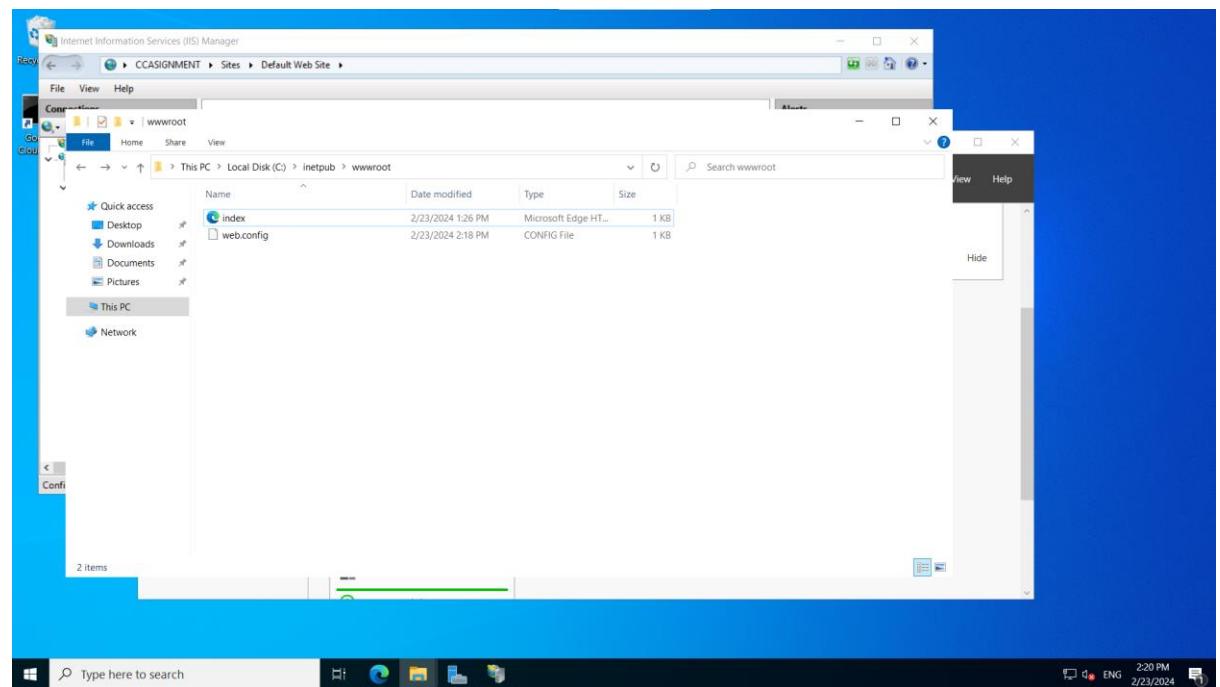


Create a Hello World in HTML format and save it has index file

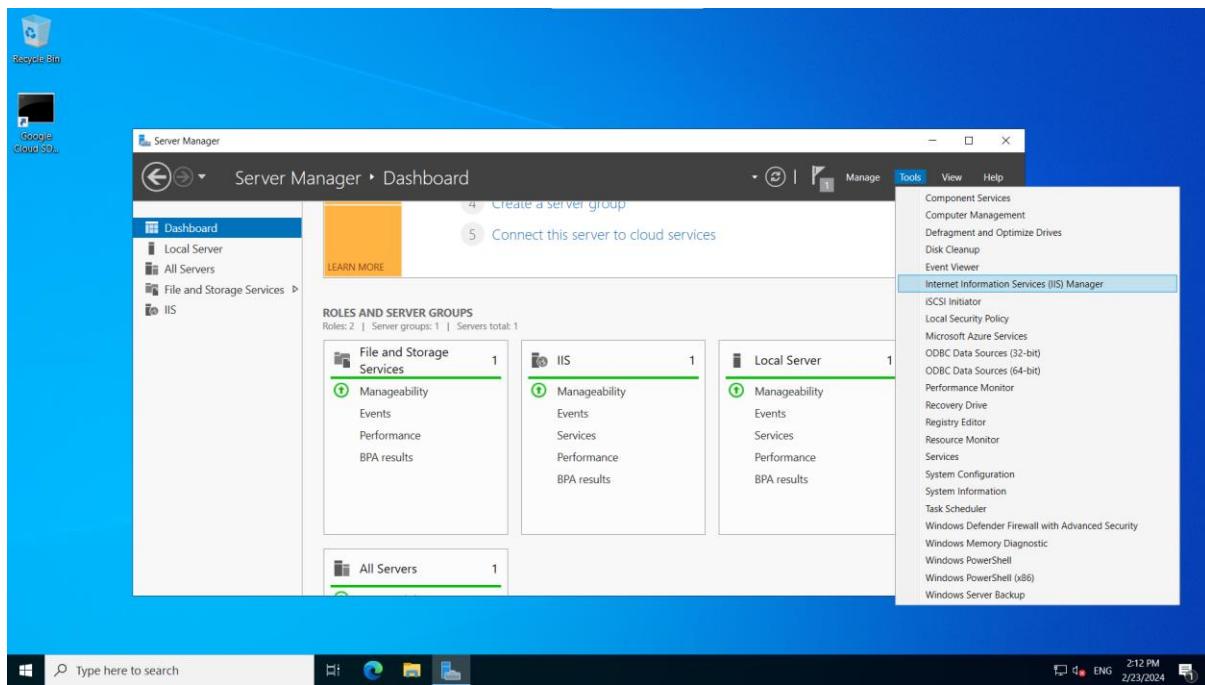
```
<!DOCTYPE html>
<html>
<head>
</head>
<body>
    <h1>Hello World!</h1>
</body>
</html>
```

Windows (CRLF) Ln 7, Col 8 100%

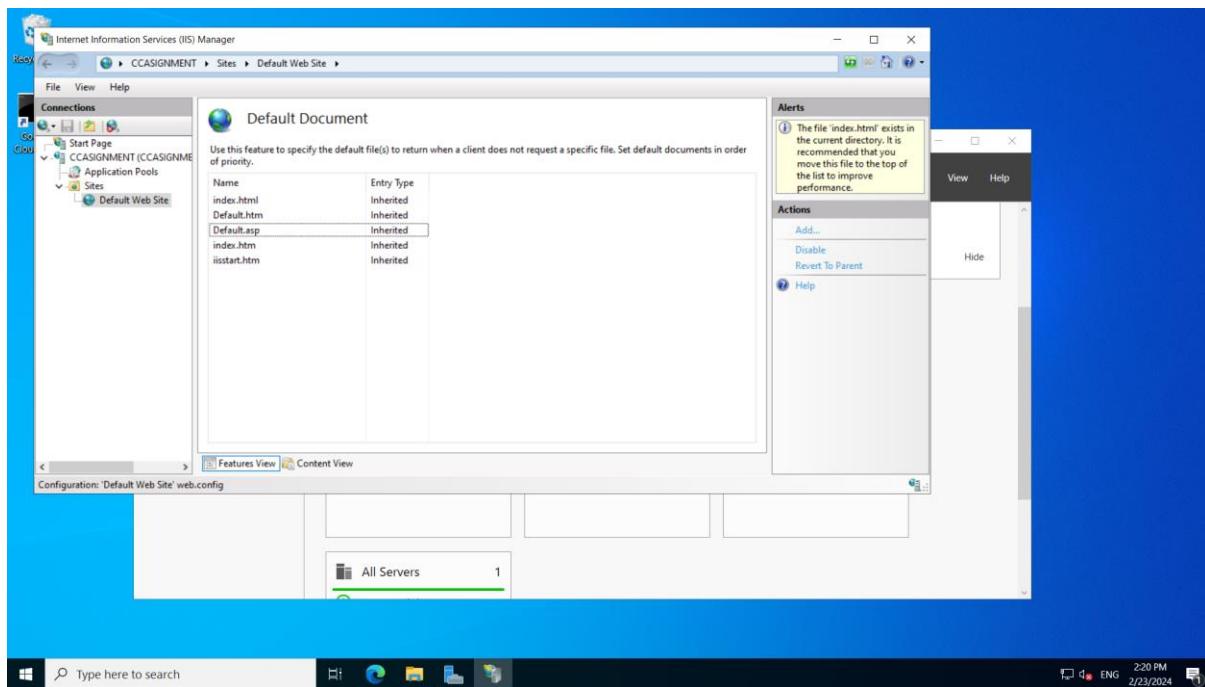
Move the index file to C:/inetpub/wwwroot/ folder



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' (selected), '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 monthly estimate is listed as US\$25.46. At the bottom, there are 'CREATE' and 'CANCEL' buttons.

Select the Allow HTTP traffic and create the instance

**New VM instance**  
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

**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](#)

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

**Compute Engine**

**VM instances** [CREATE INSTANCE](#) [IMPORT VM](#) [REFRESH](#)

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

**VM instances**

**Filter** Enter property name or value

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

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					

**Related actions**

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

## You will get a SSH terminal mode

```
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.
u_ajaykumar7616@ccassignment2:~$
```

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

The screenshot shows an SSH session running in a web browser 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-a/instances/ccassignment2?authuser=0&hl=en\_GB&projec...". The session content displays the output of a terminal command:

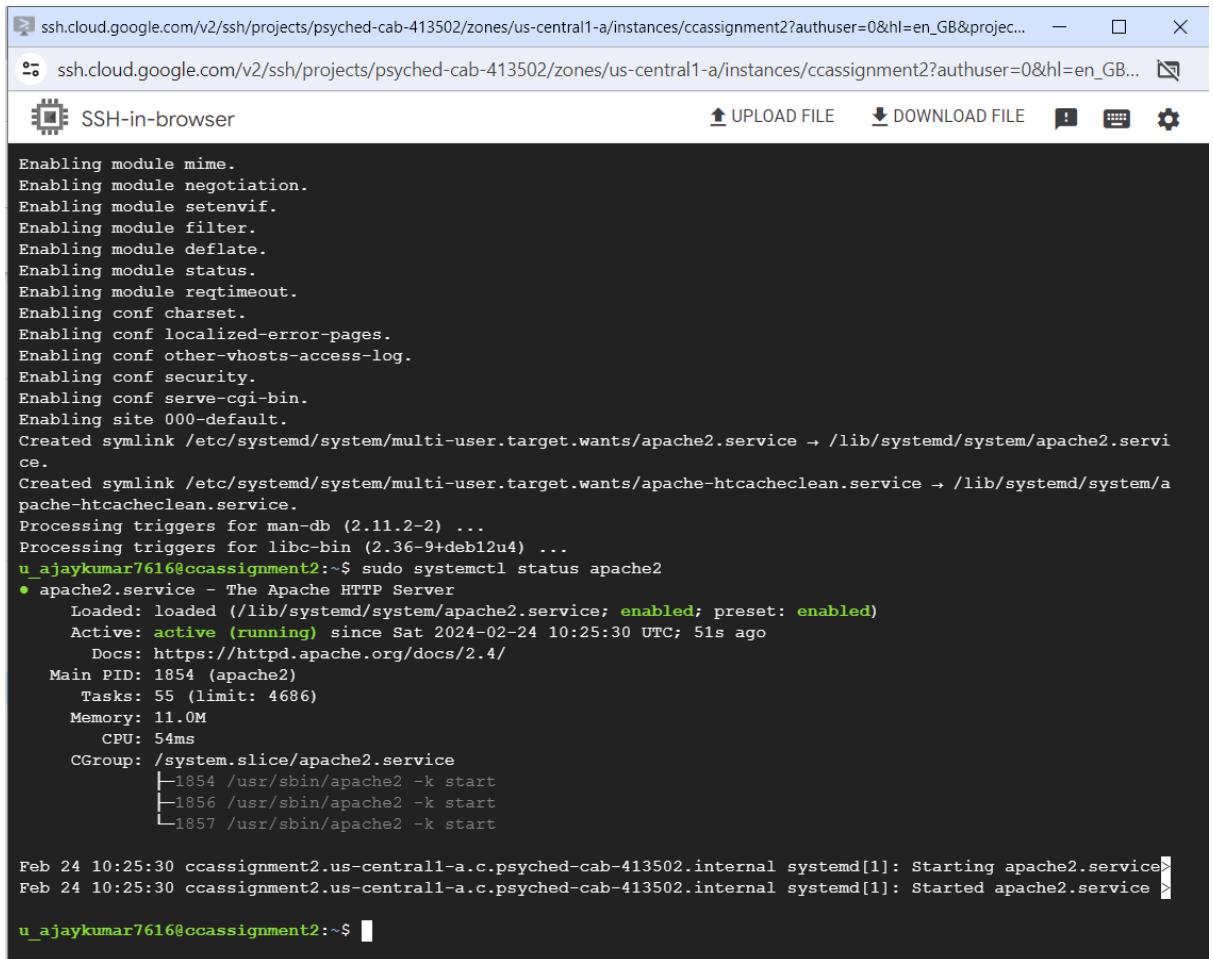
```
Linux ccassignment2.us-central1-a.c.psyched-cab-413502.internal 6.1.0-18-cloud-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.76-1 (2024-02-01) x86_64

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.

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 a terminal window titled "SSH-in-browser" connected to a Google Cloud project. The terminal displays the Apache configuration file (httpd.conf) with various modules being enabled. It then shows the output of the command "sudo systemctl status apache2", which indicates the Apache service is active and running. The terminal also shows log entries from the system log (syslog) at the bottom.

```
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
```

The screenshot shows an SSH-in-browser interface. At the top, there are tabs for 'ssh.cloud.google.com/v2/ssh/projects/psyched-cab-413502/zones/us-central1-a/instances/ccassignment2?authuser=0&hl=en\_GB&projec...' and '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', and settings. The main area displays terminal output:

```
● 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:~$
```

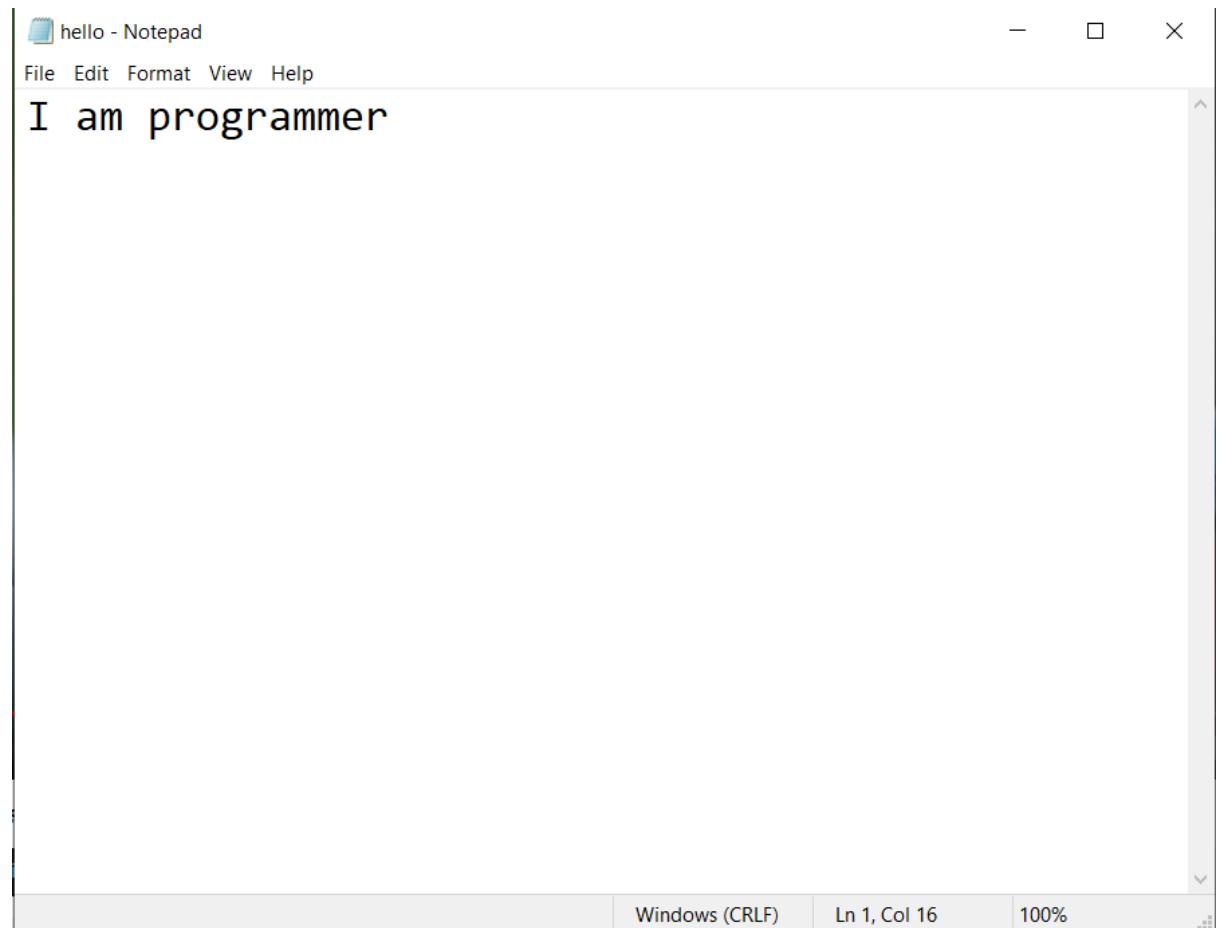
Now call the external ip outside the debian instance.



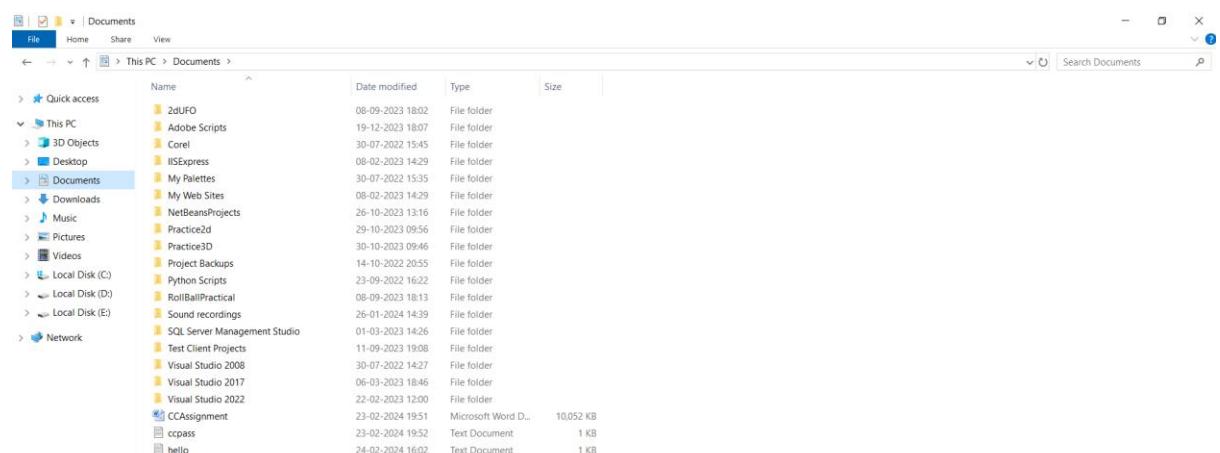
**Hello World!**

### c. Transfer files to Windows VMs

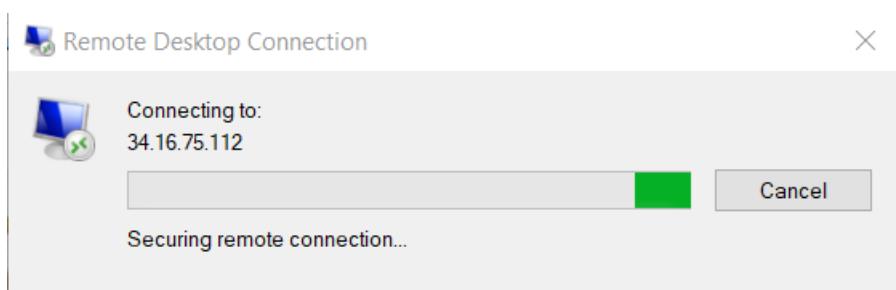
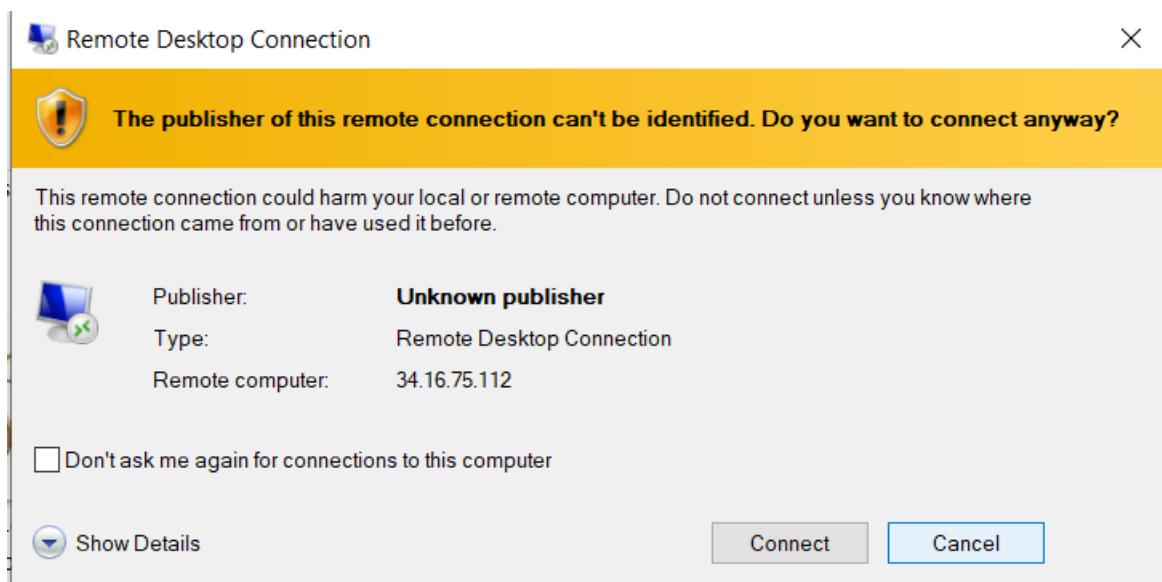
Create a hello text file.



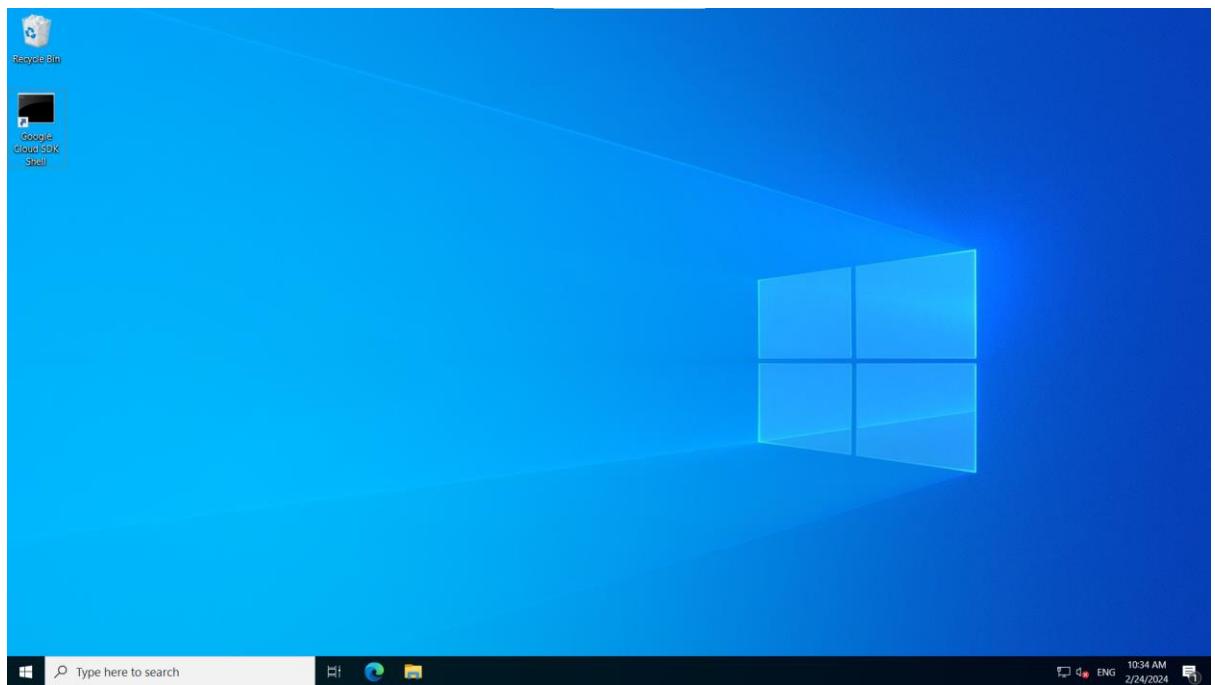
Save it in your Personal pc

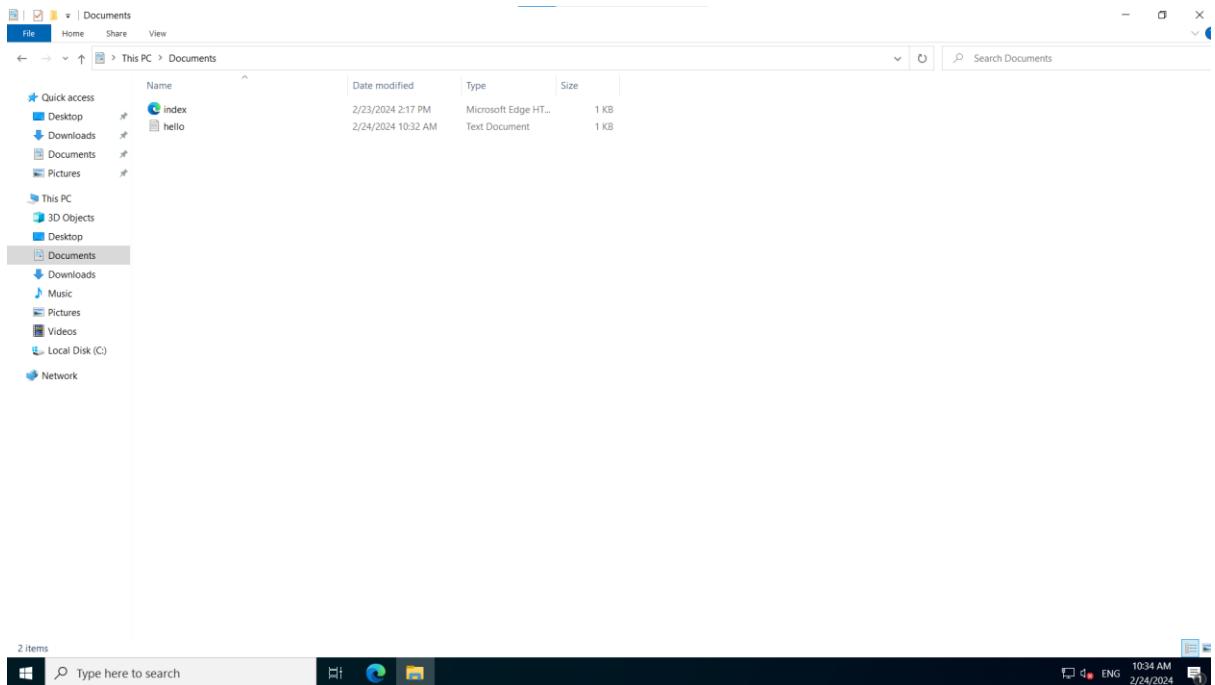


Now using RDP file launch the window instance



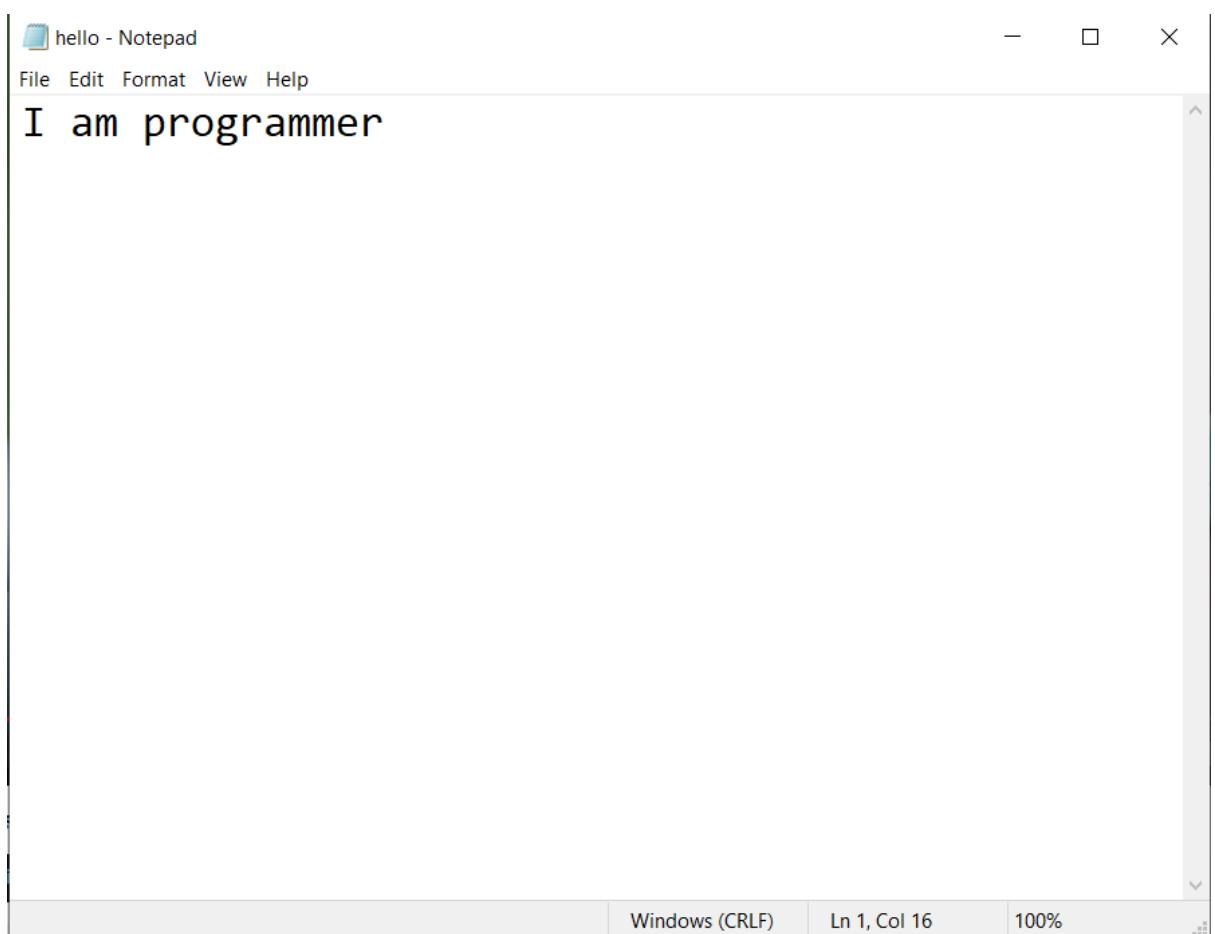
Copy the Hello text file from your Personal PC and paste the Hello.txt in the Documents folder.



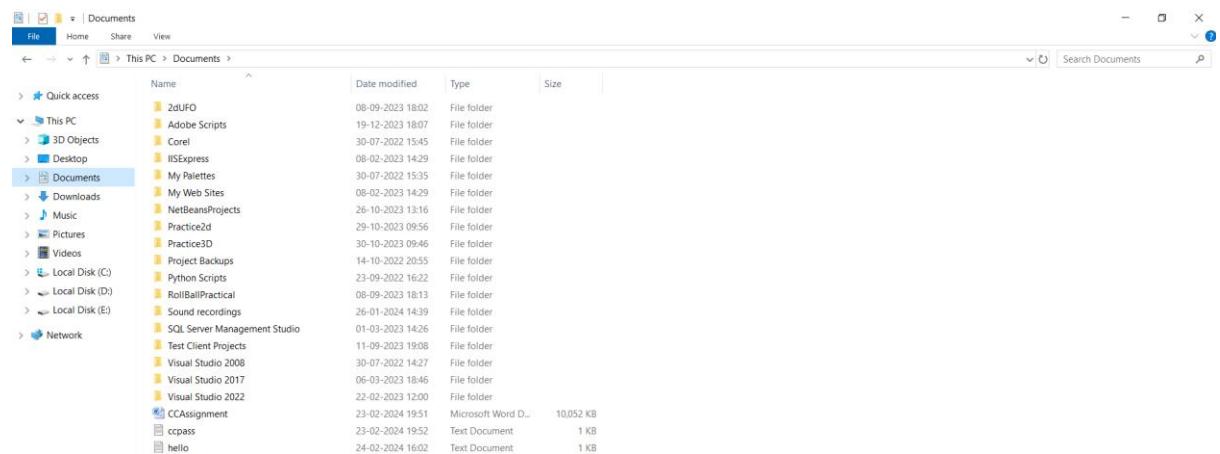


d. Transfer files to Linux VMs

Create a hello.txt file.



## Save it in your Personal pc



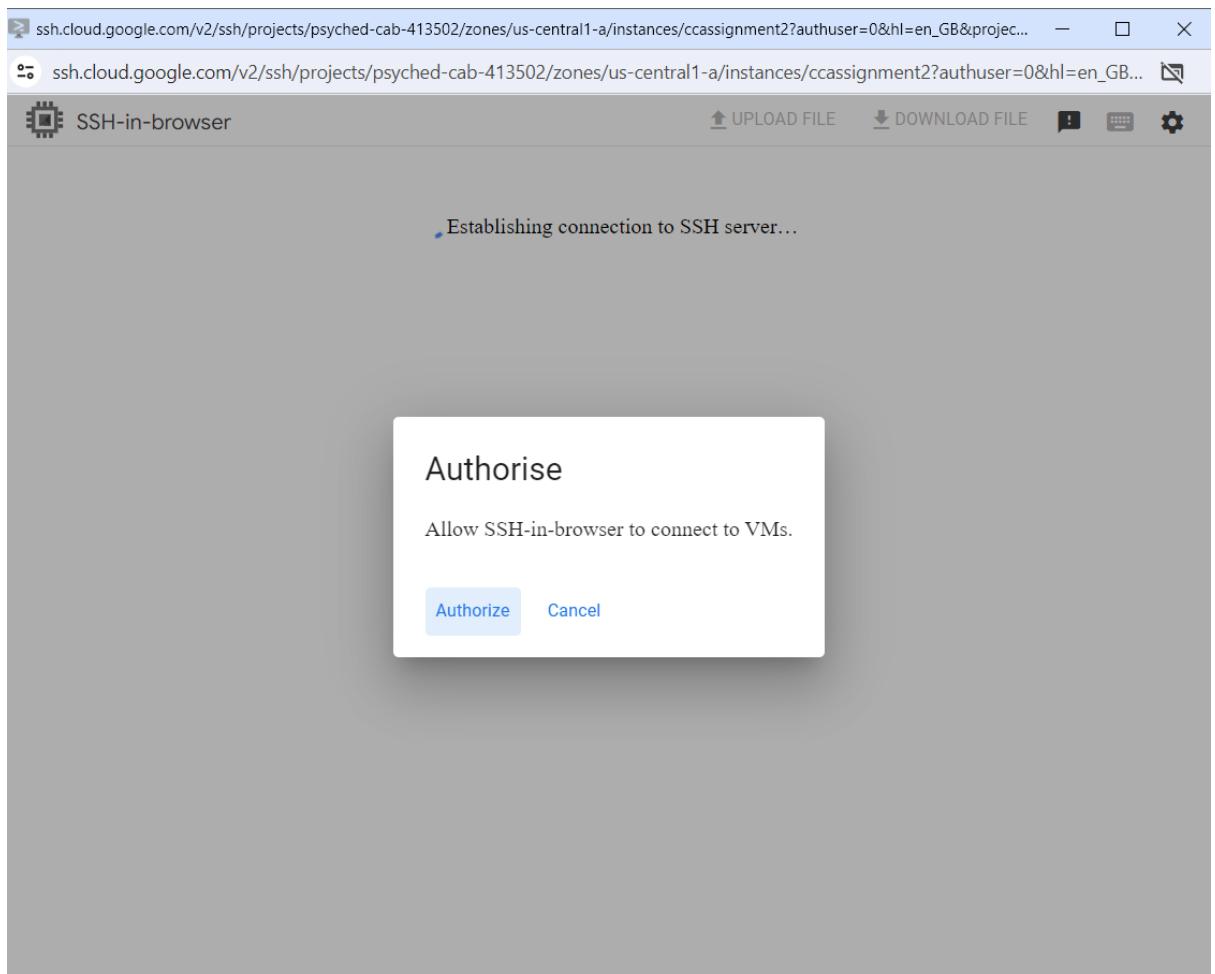
## Launch the Linux instance.

A screenshot of the Google Cloud Compute Engine VM instances page. The search bar shows 'apache web'. The table lists four 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	cassignment2	us-central1-a			10.128.0.5 (nic0)	35.226.167.25 (nic0)	SSH
Running	winstance	us-central1-a					

Related actions include:

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



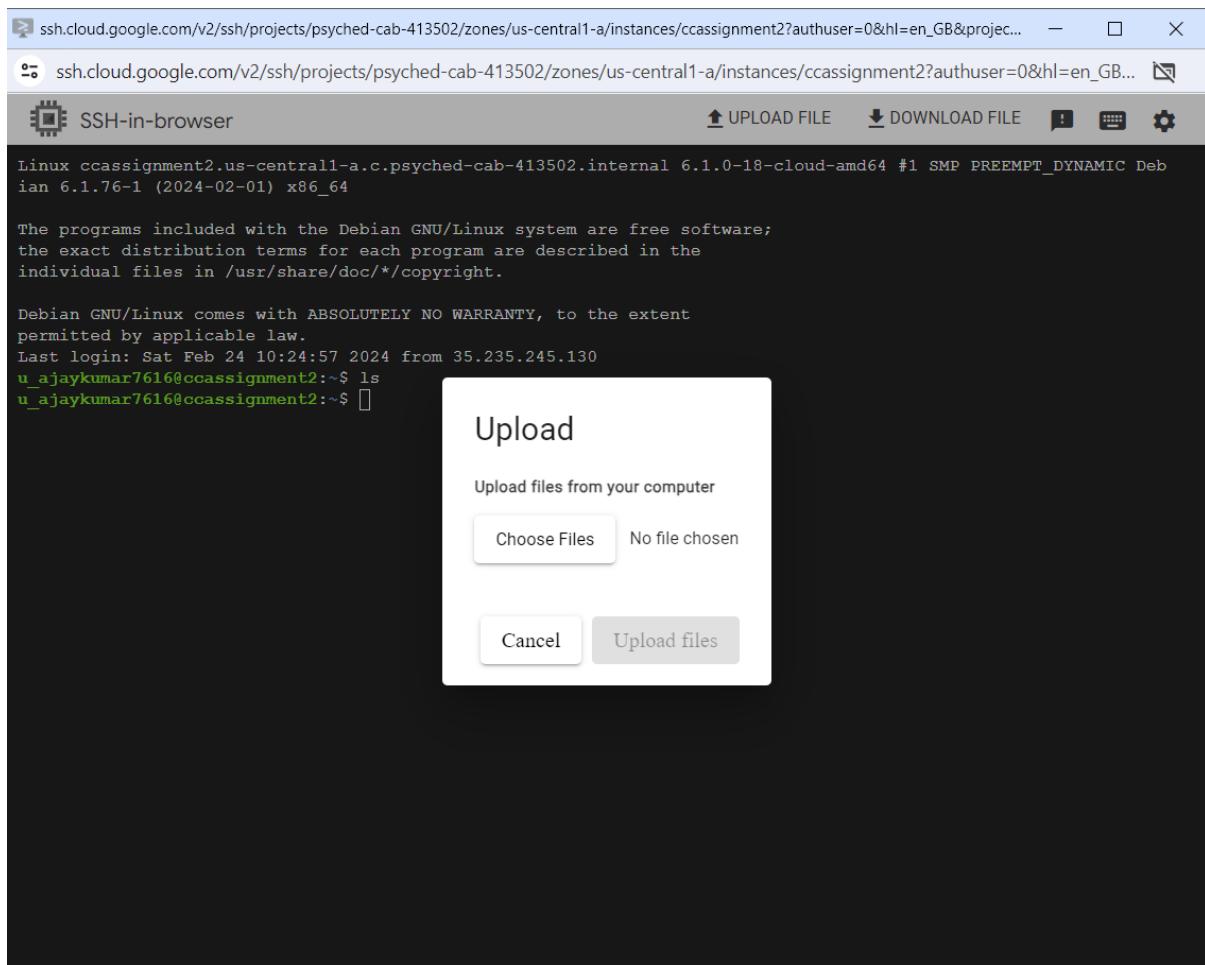
Click on the upload file option and select the hello.txt file from your personal pc.

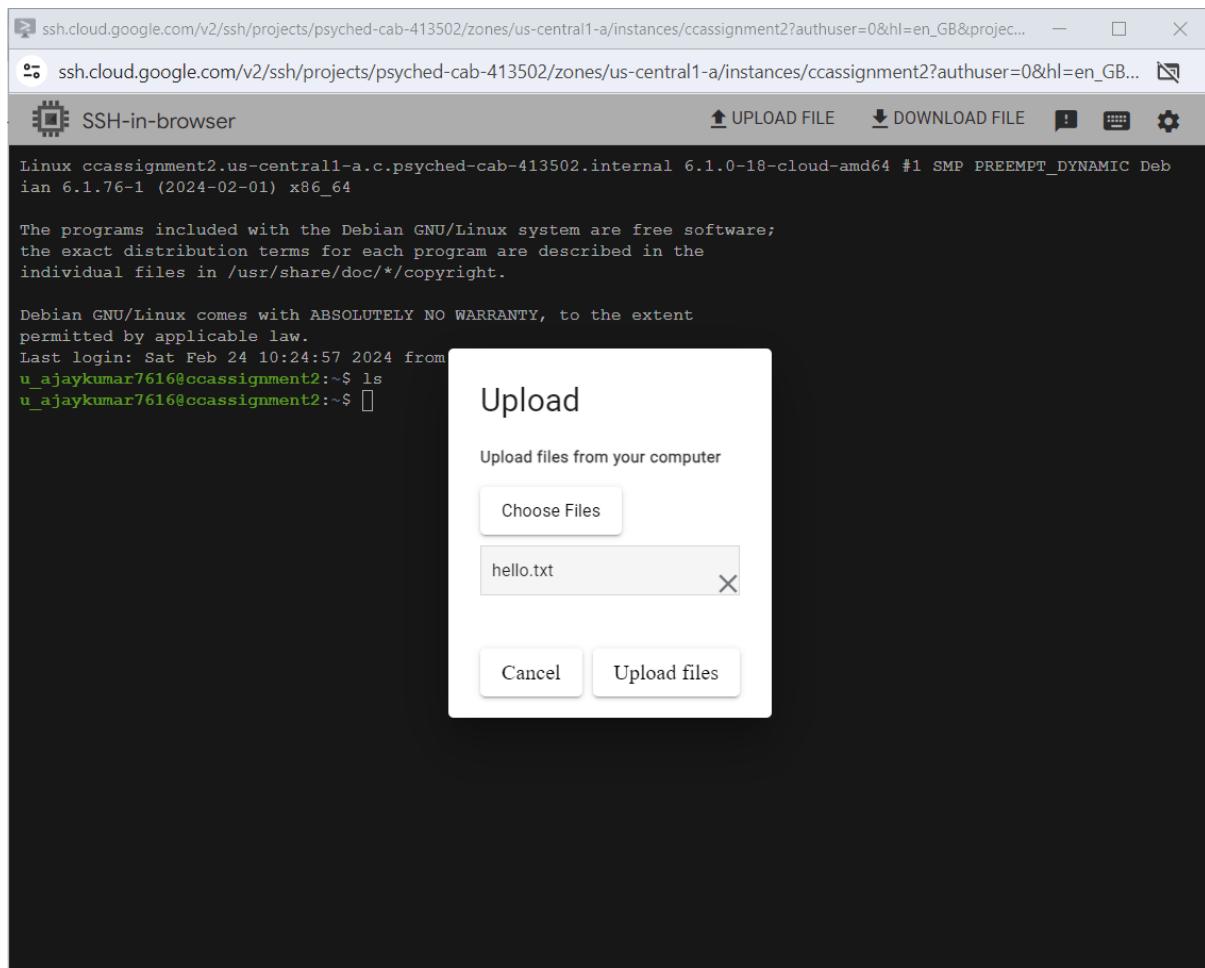
The screenshot shows a terminal window titled "SSH-in-browser" running on a Debian system. The terminal displays the following information:

```
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:~$
```





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 prompt, followed by a copyright notice, and a command history showing the creation of a file named "hello.txt". Below the terminal is a dark gray modal dialog box with a white header that says "Transferred 1 item". Inside the dialog, the file name "hello.txt" is listed next to 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 Compute Engine interface. The left sidebar lists options like "New VM instance", "New VM instance from template", "New VM instance from machine image", and "Marketplace". The main form is filled out with the following details:

- Name:** ccassignment3
- Region:** us-central1 (Iowa)
- Zone:** us-central1-a
- Machine configuration:**
  - Series:** NEW: General-purpose machine series in Preview (selected)
  - Storage:** Storage optimised (selected)
  - GPU:** GPU
- Monthly estimate:** US\$25.46
- Pricing note:** That's about US\$0.03 hourly
- Compute Engine pricing:** A table showing costs for 2 vCPU + 4 GB memory, 10 GB balanced persistent disk, and a total monthly estimate of US\$25.46.

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

## Select a different region

The screenshot shows the 'Create an instance' page in the Google Cloud console. The 'Machine configuration' section is visible, specifically the 'General purpose' tab. It lists several machine types: C3, C3D, E2, N2, and N2D. The E2 type is selected. The 'Monthly estimate' is shown as US\$28.03. A sidebar on the right provides a breakdown of costs for memory, disk, and total.

Click on Advanced option, we get option called Disks

The screenshot shows the 'Create an instance' page with the 'Advanced options' section expanded. Under 'Disks', there is an option for 'Additional disks'. The 'Monthly estimate' remains at US\$28.03.

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

Add new disk

Name \* disk-1  
Name is permanent

Description

Source

Disk source type \* Blank disk

Disk settings

Disk type \* Balanced persistent disk

Size \* 100 GB

Snapshot schedule (Recommended)

Select a snapshot schedule

SAVE CANCEL

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

Item	Monthly estimate
2 vCPU + 4 GB memory	US\$26.93
100 GB balanced persistent disk	US\$11.00
10 GB balanced persistent disk	US\$1.10
Total	US\$39.03

Compute Engine pricing ↗  
▲ LESS

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 collapsed. The main area displays the VM's configuration under the 'DETAILS' tab. Under the 'Storage' section, the 'Boot disk' table shows one entry:

Name	Image	Interface type	Size (GB)	Device name	Type	Architecture	Encryption	Mode
ccassignment3	debian-12-bookworm-v20240213	SCSI	10	ccassignment3	Balanced persistent disk	x86/64	Google-managed	Boot, read/write

Below the boot disk, there is a 'Local disks' section indicating 'None'. Under 'Additional disks', there is another table:

Name	Image	Interface type	Size (GB)	Device name	Type	Architecture	Encryption	Mode	Wk
disk-1	-	SCSI	100	disk-1	Balanced persistent disk	-	Google-managed	Read/write	Kei

At the bottom, the 'Security and access' section is visible.

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 collapsed. The main area displays the disk's properties under the 'DETAILS' tab. At the top of the page, there are several navigation links: CREATE INSTANCE, CREATE SNAPSHOT, CREATE IMAGE, CLONE DISK, and CREATE SECONDARY DISK. The 'CREATE SNAPSHOT' link is highlighted.

Properties of the disk:

Type	Balanced persistent disk
Size	10 GB
Architecture	x86/64
Zone	northamerica-northeast1-a
Labels	None
In use by	ccassignment3
Snapshot schedule	None
Source image	debian-12-bookworm-v20240213
Encryption type	Google-managed
Consistency group	None

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

Then create a snapshot.

Snapshots are backups of persistent disks. They're commonly used to recover, transfer or make data accessible to other resources in your project. [Learn more](#)

**Name \***  
snapshot-1  
Name is permanent

**Description**

**Snapshot source type \***  
Disk

**Source disk \***  
ccassignment3

**Type \***

- Snapshot**  
Standard backup and disaster recovery; stored in a separate location to your disk
- Instant snapshot**  
Rapid restoration; stored in the same location as your disk
- Archive snapshot**  
Long-term storage for infrequently accessed data; stored in a separate location to your disk

**Location**

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

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

**Select a snapshot**

**PERMISSIONS**   **LABELS**

Please select at least one resource.

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

Compute Engine Create a snapshot schedule EQUIVALENT CODE

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

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

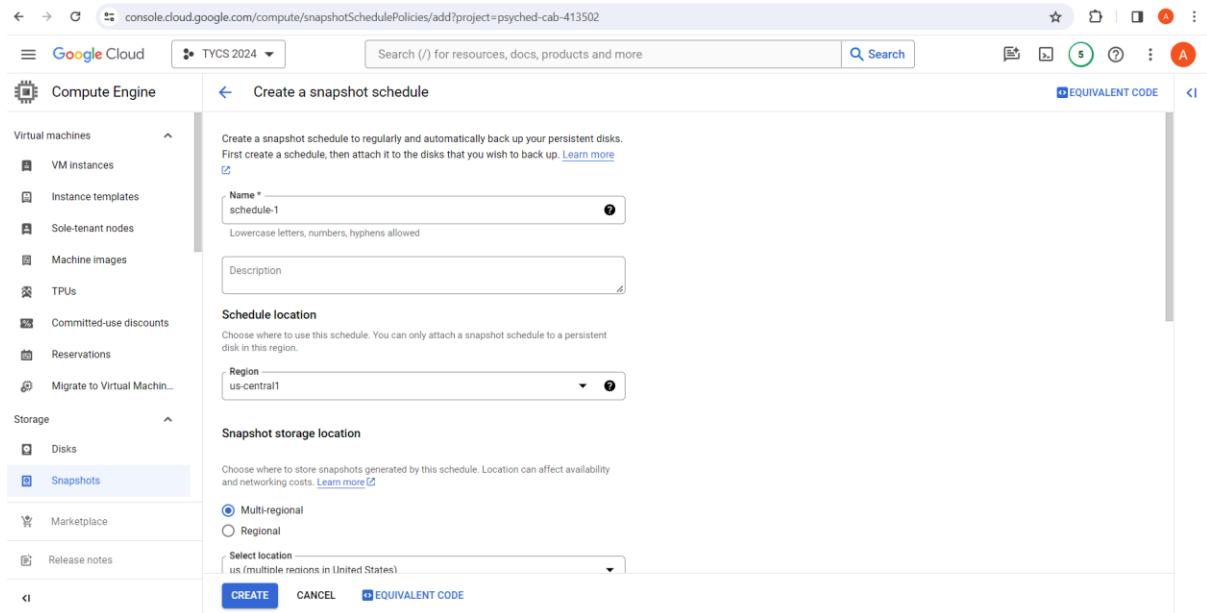
Schedule location Choose where to use this schedule. You can only attach a snapshot schedule to a persistent disk in this region.

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 (selected) 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

Compute Engine Create a snapshot schedule EQUIVALENT CODE

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

Multi-regional (selected) Regional Select location us (multiple regions in United States)

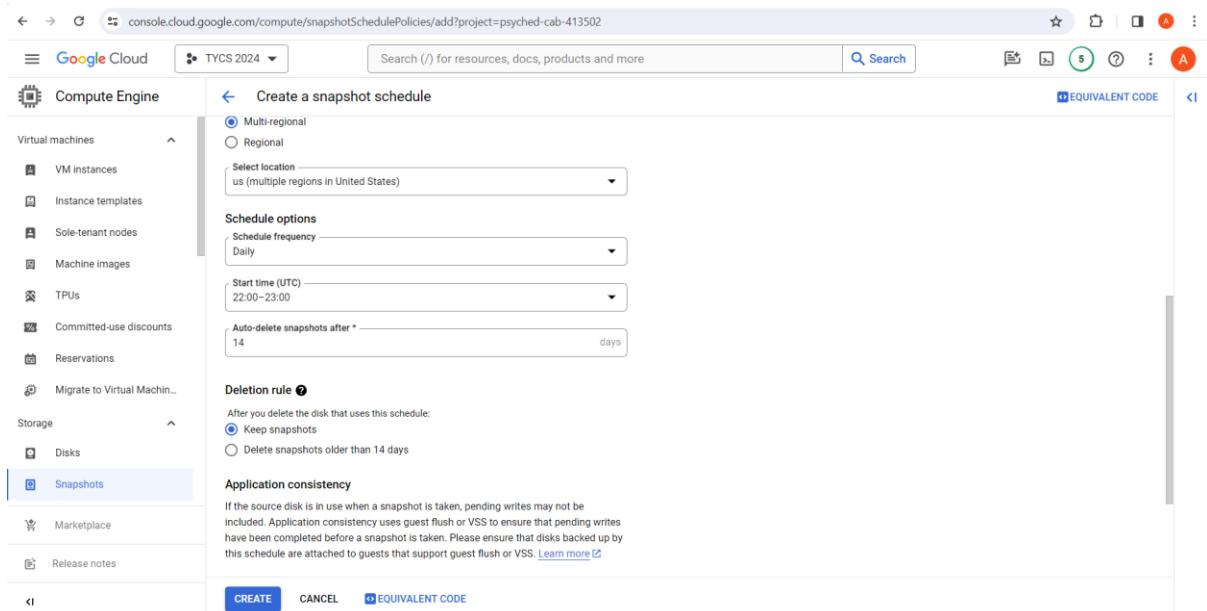
Schedule options Schedule frequency Daily Start time (UTC) 22:00–23:00 Auto-delete snapshots after 14 days

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

Keep snapshots (selected) 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 expanded to show 'Compute Engine' and 'Storage'. Under 'Storage', 'Disks' is selected, and 'Snapshots' is also listed under it. The main content area displays a table of snapshots. One row is selected, showing details: Status (Manual), Name (snapshot-1), Location (us), Snapshot size (641.62 MB), Creation time (Feb 24, 2024, 4:46:29 pm UTC+05:30), and Source disk (ccassignment3). A success message at the bottom right says 'Successfully created snapshot schedule schedule-1.' On the right side, there's a panel titled 'Select a snapshot' with tabs for 'PERMISSIONS' and 'LABELS', and a note saying 'Please select at least one resource.'

## 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. The sidebar and main content area are the same, displaying the snapshot table and the success message. The 'snapshot-1' row is still selected, and the 'Select a snapshot' panel on the right is still present.

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

console.cloud.google.com/compute/snapshotsDetail/projects/psyched-cab-413502/global/snapshots/snapshot-1?project=psyched-cab-413502

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

Snapshot details EDIT CREATE INSTANCE CREATE DISK DELETE SNAPSHOT

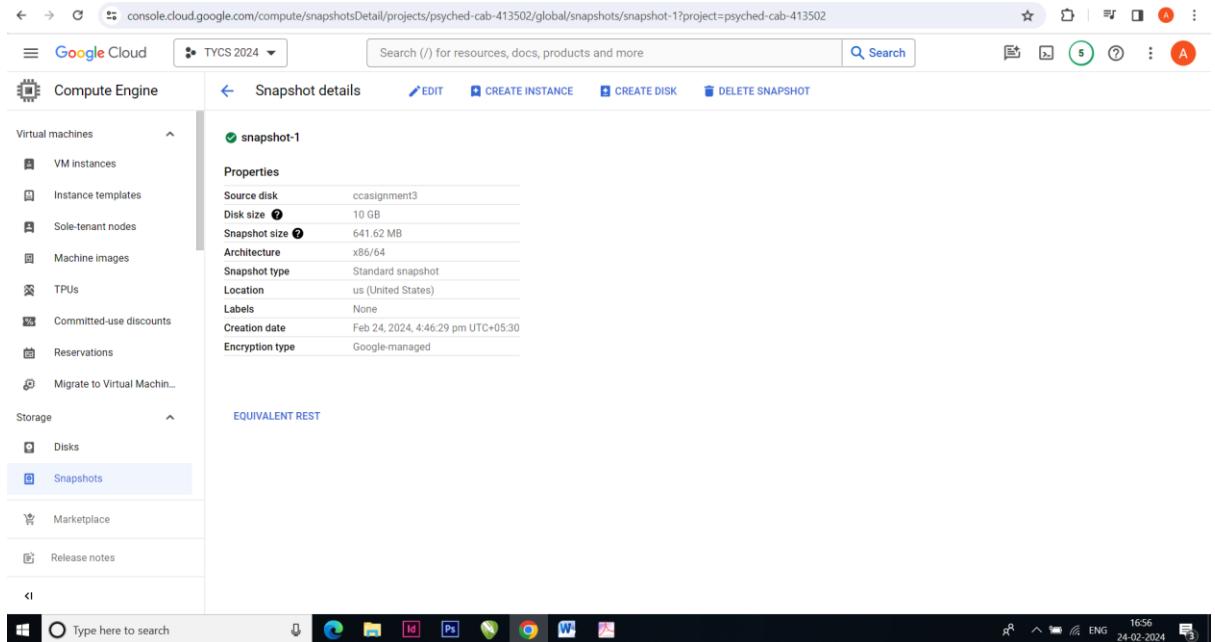
snapshot-1

**Properties**

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

EQUIVALENT REST

Type here to search 1656 24-02-2024



console.cloud.google.com/compute/disksAdd?snapshotId=projects%2Fpsyched-cab-413502%2Fglobal%2Fsnapshots%2Fsnapshot-1&project=psyched-cab-413502

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

Create a disk EQUIVALENT CODE

Name \* disk-3 Name is permanent Pricing summary

Your free trial credit will be used for this disk. Google Cloud Free Tier

Description

Location

Single zone

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

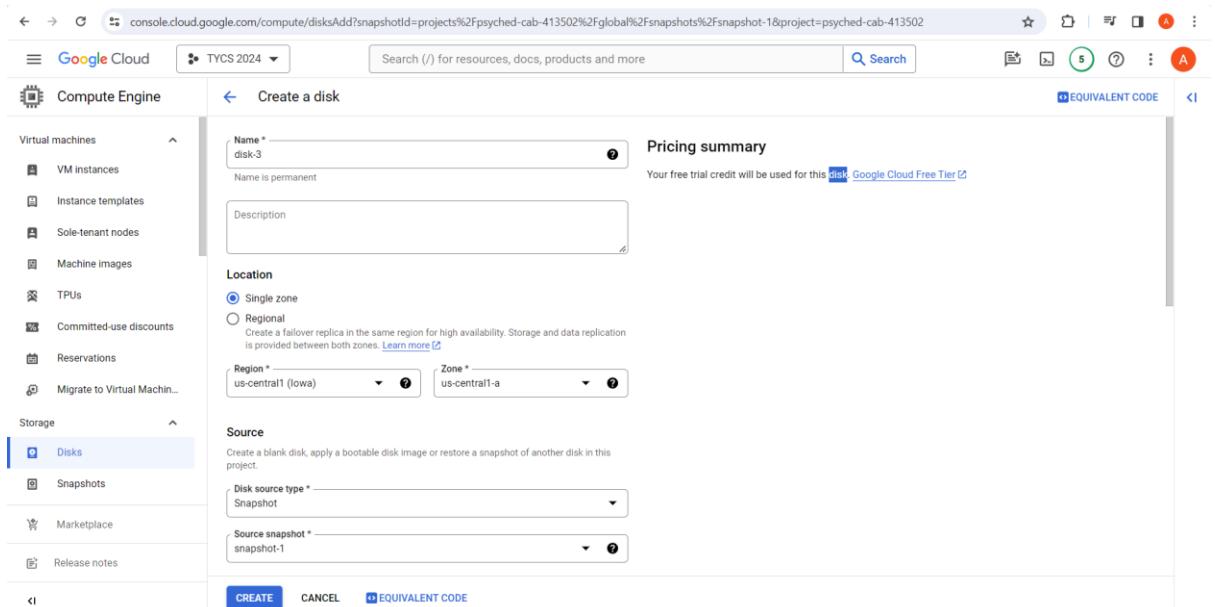
Source

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

CREATE CANCEL EQUIVALENT CODE



Now create a instance

The screenshot shows the Google Cloud Compute Instances Add screen. On the left sidebar, there are several creation options: New VM instance, New VM instance from template, New VM instance from machine image, and Marketplace. The main area is titled "Machine configuration" and displays the "General purpose" machine series in preview. It shows the N4 series as ideal for workloads prioritizing flexibility and cost-optimization. The configuration includes a Region (us-central1) and Zone (us-central1-a). A "Manage Tags and Labels" section is also present. To the right, a "Monthly estimate" table shows costs for 2 vCPU + 4 GB memory, 10 GB balanced persistent disk, and a total of US\$25.46. A "Compute Engine pricing" link is available for more details.

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. Under "Disks", there are three buttons: "+ ADD NEW DISK", "+ ATTACH EXISTING DISK", and "+ ADD LOCAL SSD". The "+ ATTACH EXISTING DISK" button is highlighted. The "Advanced options" section is also visible, containing "Networking" and "Security" subsections. The "Management" section is partially visible below. The right side of the screen shows the same monthly estimate table and Compute Engine pricing information as the previous screenshot.

The screenshot shows the Google Cloud Compute Instances Add screen. In the 'Disks' section, the 'ATTACH EXISTING DISK' button is highlighted. A modal window titled 'Existing disk' is open, showing a dropdown menu with 'disk-3' selected. Other options include 'disk-1' and 'disk-2'. The modal also contains sections for 'Attachment settings' (Mode: Read/write selected), 'Deletion rule' (Keep disk selected), and 'Device name' (disk-3 selected). Buttons for 'SAVE' and 'CANCEL' are at the bottom.

The screenshot shows the Google Cloud Compute Instances Add screen. In the 'Disks' section, the 'ATTACH EXISTING DISK' button is highlighted. A sidebar on the right provides monthly pricing details for a configuration of 2 vCPU + 4 GB memory and 10 GB balanced persistent disk, totaling US\$25.46. The sidebar includes a 'Compute Engine pricing' link and a 'LESS' link. The main form fields remain the same as in the previous screenshot.

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 green and listed under the 'In use by' column. Below the table, there's a section titled 'Related actions' with several cards.

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	winiinstance	us-central1-a			10.128.0.3 (nic0)		RDP

## 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 green and listed under the 'In use by' column. Below the table, there's a search bar with the text 'restore a'.

Status	Name	Type	Size	Architecture	Zone(s)	In use by	Snapshot schedule	Actions
OK	ajayinstance	Balanced persistent disk	10 GB	x86/64	us-central1-c	ajayinstance	None	⋮
OK	ccassignment	Balanced persistent disk	50 GB	x86/64	us-central1-a	ccassignment	None	⋮
OK	ccassignment3	Balanced persistent disk	10 GB	x86/64	northamerica-northeast1-a	ccassignment3	None	⋮
OK	ccassignment2	Balanced persistent disk	10 GB	x86/64	us-central1-a	ccassignment2	None	⋮
OK	ccassignment4	Balanced persistent disk	10 GB	x86/64	us-central1-a	ccassignment4	None	⋮
OK	disk-1	Balanced persistent disk	100 GB	—	northamerica-northeast1-a	ccassignment3	None	⋮
OK	disk-3	Balanced persistent disk	10 GB	x86/64	us-central1-a	ccassignment4	schedule-1	⋮
OK	winiinstance	Balanced persistent disk	50 GB	x86/64	us-central1-a	winiinstance	None	⋮

You will see that the disk is in use by ccassignment4

The screenshot shows the Google Cloud Compute Engine interface. On the left, a sidebar menu under 'Storage' has 'Disks' selected. The main content area displays the properties of a disk named 'ccassignment4'. The 'Properties' table includes columns for 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), and Consistency group (None). Below the properties table 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 Instances page. The instance 'ccassignment4' is selected. The 'Storage' section is expanded, showing the 'Boot disk' and 'Local disks' tables. The 'Boot disk' table has one entry: 'ccassignment4' (Image: debian-12-bookworm-v20240213, Interface type: SCSI, Size (GB): 10, Device name: ccassignment4, Type: Balanced persistent disk, Architecture: x86/64, Encryption: Google-managed, Mode: Boot, read/write). The 'Local disks' section shows 'None'. The 'Additional disks' table has one entry: 'disk-3' (Image: -, Interface type: SCSI, Size (GB): 10, Device name: disk-3, Type: Balanced persistent disk, Architecture: x86/64, Encryption: Google-managed, Mode: Read/write, Wk).

Delete the ccassignment4 instance.

The screenshot shows the Google Cloud Compute Engine VM Instances page. On the left, there's a sidebar with sections for Virtual machines (VM instances selected), Instance templates, Sole-tenant nodes, Machine images, TPUs, Committed-use discounts, Reservations, and Migrate to Virtual Machines. Under Storage, there are Disks and Snapshots. Below these are Marketplace and Release notes. The main area has tabs for INSTANCES, OBSERVABILITY, and INSTANCE SCHEDULES. The INSTANCES tab is active, displaying a table of VM instances. The table columns include Status, Name, Zone, Recommendations, In use by, Internal IP, External IP, and Connect (SSH/RDP). The instances listed are: ajayinstance (us-central1-c), ccassignment (us-central1-a), ccassignment3 (northamerica-northeast1-a), ccassignment2 (us-central1-a), ccassignment4 (us-central1-a), and wininstance (us-central1-a). To the right of the table is a context menu with options like Start/Resume, Stop, Suspend, Reset, View details, Delete, View network details, Create new machine image, View logs, and View monitoring. A 'HIDE' button is also present.

This screenshot is similar to the one above, showing the Compute Engine VM Instances page. However, a modal dialog box is overlaid on the table, asking "Delete ccassignment4?". It includes a message: "Are you sure that you want to delete instance ccassignment4? (This will also delete boot disk "ccassignment4")". At the bottom of the dialog are "CANCEL" and "DELETE" buttons. The rest of the interface and sidebar are identical to the first screenshot.

Disks																																																																																																		
<span style="color: #0070C0;">CREATE DISK</span> <span style="color: #0070C0;">REFRESH</span> <span style="color: #0070C0;">DELETE</span>																																																																																																		
<span style="color: #0070C0;">OPERATIONS</span> <span style="color: #0070C0;">LEARN</span> SHOW INFO PANEL																																																																																																		
<b>Filter</b> Enter property name or value																																																																																																		
<table border="1"> <thead> <tr> <th>Status</th><th>Name</th><th>Type</th><th>Size</th><th>Architecture</th><th>Zone(s)</th><th>In use by</th><th>Snapshot schedule</th><th>Actions</th><th> </th><th> </th></tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td><td><a href="#">ajayinstance</a></td><td>Balanced persistent disk</td><td>10 GB</td><td>x86/64</td><td>us-central1-c</td><td><a href="#">ajayinstance</a></td><td>None</td><td><span style="color: #0070C0;">⋮</span></td><td> </td><td> </td></tr> <tr> <td><input type="checkbox"/></td><td><a href="#">ccassignment</a></td><td>Balanced persistent disk</td><td>50 GB</td><td>x86/64</td><td>us-central1-a</td><td><a href="#">ccassignment</a></td><td>None</td><td><span style="color: #0070C0;">⋮</span></td><td> </td><td> </td></tr> <tr> <td><input type="checkbox"/></td><td><a href="#">ccassignment3</a></td><td>Balanced persistent disk</td><td>10 GB</td><td>x86/64</td><td>northamerica-northeast1-a</td><td><a href="#">ccassignment3</a></td><td>None</td><td><span style="color: #0070C0;">⋮</span></td><td> </td><td> </td></tr> <tr> <td><input type="checkbox"/></td><td><a href="#">ccassignment2</a></td><td>Balanced persistent disk</td><td>10 GB</td><td>x86/64</td><td>us-central1-a</td><td><a href="#">ccassignment2</a></td><td>None</td><td><span style="color: #0070C0;">⋮</span></td><td> </td><td> </td></tr> <tr> <td><input type="checkbox"/></td><td><a href="#">disk-1</a></td><td>Balanced persistent disk</td><td>100 GB</td><td>—</td><td>northamerica-northeast1-a</td><td><a href="#">ccassignment3</a></td><td>None</td><td><span style="color: #0070C0;">⋮</span></td><td> </td><td> </td></tr> <tr> <td><input type="checkbox"/></td><td><a href="#">disk-3</a></td><td>Balanced persistent disk</td><td>10 GB</td><td>x86/64</td><td>us-central1-a</td><td><a href="#">schedule-1</a></td><td>None</td><td><span style="color: #0070C0;">⋮</span></td><td> </td><td> </td></tr> <tr> <td><input type="checkbox"/></td><td><a href="#">wininstance</a></td><td>Balanced persistent disk</td><td>50 GB</td><td>x86/64</td><td>us-central1-a</td><td><a href="#">wininstance</a></td><td>None</td><td><span style="color: #0070C0;">⋮</span></td><td> </td><td> </td></tr> </tbody> </table>											Status	Name	Type	Size	Architecture	Zone(s)	In use by	Snapshot schedule	Actions			<input type="checkbox"/>	<a href="#">ajayinstance</a>	Balanced persistent disk	10 GB	x86/64	us-central1-c	<a href="#">ajayinstance</a>	None	<span style="color: #0070C0;">⋮</span>			<input type="checkbox"/>	<a href="#">ccassignment</a>	Balanced persistent disk	50 GB	x86/64	us-central1-a	<a href="#">ccassignment</a>	None	<span style="color: #0070C0;">⋮</span>			<input type="checkbox"/>	<a href="#">ccassignment3</a>	Balanced persistent disk	10 GB	x86/64	northamerica-northeast1-a	<a href="#">ccassignment3</a>	None	<span style="color: #0070C0;">⋮</span>			<input type="checkbox"/>	<a href="#">ccassignment2</a>	Balanced persistent disk	10 GB	x86/64	us-central1-a	<a href="#">ccassignment2</a>	None	<span style="color: #0070C0;">⋮</span>			<input type="checkbox"/>	<a href="#">disk-1</a>	Balanced persistent disk	100 GB	—	northamerica-northeast1-a	<a href="#">ccassignment3</a>	None	<span style="color: #0070C0;">⋮</span>			<input type="checkbox"/>	<a href="#">disk-3</a>	Balanced persistent disk	10 GB	x86/64	us-central1-a	<a href="#">schedule-1</a>	None	<span style="color: #0070C0;">⋮</span>			<input type="checkbox"/>	<a href="#">wininstance</a>	Balanced persistent disk	50 GB	x86/64	us-central1-a	<a href="#">wininstance</a>	None	<span style="color: #0070C0;">⋮</span>		
Status	Name	Type	Size	Architecture	Zone(s)	In use by	Snapshot schedule	Actions																																																																																										
<input type="checkbox"/>	<a href="#">ajayinstance</a>	Balanced persistent disk	10 GB	x86/64	us-central1-c	<a href="#">ajayinstance</a>	None	<span style="color: #0070C0;">⋮</span>																																																																																										
<input type="checkbox"/>	<a href="#">ccassignment</a>	Balanced persistent disk	50 GB	x86/64	us-central1-a	<a href="#">ccassignment</a>	None	<span style="color: #0070C0;">⋮</span>																																																																																										
<input type="checkbox"/>	<a href="#">ccassignment3</a>	Balanced persistent disk	10 GB	x86/64	northamerica-northeast1-a	<a href="#">ccassignment3</a>	None	<span style="color: #0070C0;">⋮</span>																																																																																										
<input type="checkbox"/>	<a href="#">ccassignment2</a>	Balanced persistent disk	10 GB	x86/64	us-central1-a	<a href="#">ccassignment2</a>	None	<span style="color: #0070C0;">⋮</span>																																																																																										
<input type="checkbox"/>	<a href="#">disk-1</a>	Balanced persistent disk	100 GB	—	northamerica-northeast1-a	<a href="#">ccassignment3</a>	None	<span style="color: #0070C0;">⋮</span>																																																																																										
<input type="checkbox"/>	<a href="#">disk-3</a>	Balanced persistent disk	10 GB	x86/64	us-central1-a	<a href="#">schedule-1</a>	None	<span style="color: #0070C0;">⋮</span>																																																																																										
<input type="checkbox"/>	<a href="#">wininstance</a>	Balanced persistent disk	50 GB	x86/64	us-central1-a	<a href="#">wininstance</a>	None	<span style="color: #0070C0;">⋮</span>																																																																																										

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

Create a disk										
<div style="display: flex; justify-content: space-between;"> <div style="flex: 1;"> <div> <b>Name *</b> <input type="text" value="disk-restore"/> <small>Name is permanent</small> </div> <div> <b>Description</b> <input type="text"/> </div> <div> <b>Location</b> <input checked="" type="radio"/> Single zone           <input type="radio"/> Regional           <small>Create a failover replica in the same region for high availability. Storage and data replication is provided between both zones. <a href="#">Learn more</a></small> </div> <div> <b>Region *</b> <input type="text" value="us-central1 (Iowa)"/> <b>Zone *</b> <input type="text" value="us-central1-a"/> </div> </div> <div style="flex: 1;"> <b>Pricing summary</b> <p>Your free trial credit will be used for this disk. <a href="#">Google Cloud Free Tier</a></p> </div> </div>										
<div> <b>Source</b> <p>Create a blank disk, apply a bootable disk image or restore a snapshot of another disk in this project.</p> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;"><input type="radio"/> Disk source type *</span> <input type="text" value="Blank disk"/> </div> </div>										
<div> <b>Disk settings</b> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;"><input type="radio"/> Disk type *</span> <input type="text" value="Balanced persistent disk"/> </div> </div>										
<span style="background-color: #0070C0; color: white; padding: 5px 10px; border-radius: 5px; text-decoration: none; font-weight: bold;">CREATE</span> <span style="margin: 0 10px;">CANCEL</span> <span style="color: #0070C0; text-decoration: underline;">EQUIVALENT CODE</span>										

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

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

**Create a disk**

**Location**

Single zone

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

**Pricing summary**

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

**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

COMPARE DISK TYPES

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

**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 checked="" type="checkbox"/>	ajayinstance	Balanced persistent disk	10 GB	x86/64	us-central1-c	ajayinstance	None	⋮
<input checked="" type="checkbox"/>	ccassignment	Balanced persistent disk	50 GB	x86/64	us-central1-a	ccassignment	None	⋮
<input checked="" type="checkbox"/>	ccassignment3	Balanced persistent disk	10 GB	x86/64	northamerica-northeast1-a	ccassignment3	None	⋮
<input checked="" type="checkbox"/>	ccassignment2	Balanced persistent disk	10 GB	x86/64	us-central1-a	ccassignment2	None	⋮
<input checked="" type="checkbox"/>	disk-1	Balanced persistent disk	100 GB	—	northamerica-northeast1-a	ccassignment3	None	⋮
<input checked="" type="checkbox"/>	disk-3	Balanced persistent disk	10 GB	x86/64	us-central1-a	schedule-1	⋮	
<input checked="" type="checkbox"/>	disk-restore	Balanced persistent disk	10 GB	x86/64	us-central1-a	schedule-1	⋮	
<input checked="" type="checkbox"/>	wininstance	Balanced persistent disk	50 GB	x86/64	us-central1-a	wininstance	None	⋮

Successfully created disk disk-restore. X

← → ⌂ 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 ⚡ 1 ⓘ ⓘ A

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

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

Storage Disks Snapshots

disk-restore

DETAILS MONITORING

Properties

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

EQUIVALENT REST

## 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" and the second is "use of the RSS feeds - Times of India - IndiaTimes". Both links are from <https://timesofindia.indiatimes.com>.

### Copy the link from rss

The screenshots show the Times of India RSS feeds page. The top screenshot displays the main feeds section with categories like 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. The bottom screenshot shows a context menu over a feed item, with options such as 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.