

--	--	--

INTERDISCIPLINARY PROJECT REPORT
at
Sathyabama Institute of Science and Technology
(Deemed to be University)

Submitted in partial fulfillment of the requirements for the
award of Bachelor of Technology in Information Technology

By

BEZAWADA LAKSHMI VIGNESH
REG. NO. 39120059



DEPARTMENT OF INFORMATION TECHNOLOGY

SCHOOL OF COMPUTING

**SATHYABAMA INSTITUTE OF SCIENCE AND
TECHNOLOGY**

**JEPPIAAR NAGAR, RAJIV GANDHI SALAI,
CHENNAI – 600119, TAMILNADU**

APRIL 2022

--	--	--

--	--	--



SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC
(Established under Section 3 of UGC Act, 1956)
JEPPIAAR NAGAR, RAJIV GANDHI SALAI
CHENNAI- 600119
www.sathyabama.ac.in

DEPARTMENT OF INFORMATION TECHNOLOGY

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **BEZAWADA LAKSHMI VIGNESH (Reg. No: 39120059)** who carried out the project entitled **"INSTANCE BACKUP AND RECOVERY IN GCP"** under my supervision from Jan 2022 to April 2022.

Internal Guide

Dr. V. Maria Anu M.E., Ph.D.,

Head of the Department

Dr. R. Subhashini, M.E., Ph.D.,

Submitted for Viva voce Examination held on _____

Internal Examiner

External Examiner

--	--	--

--	--	--

DECLARATION

I, **BEZAWADA LAKSHMI VIGNESH** hereby declare that the project report entitled "**INSTANCE BACKUP AND RECOVERY IN GCP**" done by me under the guidance of **Dr. V. Maria Anu**, is submitted in partial fulfillment of the requirements for the award of Bachelor of Technology Degree in Information Technology.

DATE : 21-04-2022

B.L.VIGNESH

PLACE: CHENNAI

SIGNATURE OF THE CANDIDATE

--	--	--

--	--	--

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management** of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. Sasikala M.E., Ph.D., Dean**, School of Computing, , **Dr. R. Subhashini, M.E., Ph.D., Head of the Department of Information Technology** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr.G.Mathivanan. for** his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Information Technology** who were helpful in many ways for the completion of the project.

--	--	--

--	--	--

TRAINING CERTIFICATE



--	--	--

--	--	--

ABSTRACT

Instance recovery and Backup in GCP : Google Cloud (also known as Google Cloud Platform or GCP) is a provider of computing resources for developing, deploying, and operating applications on the Web. All Google Cloud customers can use select Google Cloud products—like Compute Engine, Cloud Storage, and Big Query—free of charge, within specified monthly usage limits. The purpose of the backup is to create a copy of data that can be recovered in the event of a primary data failure. Primary data failures can be the result of hardware or software failure, data corruption, or a human-caused event, such as a malicious attack (virus or malware), or accidental deletion of data. In lack of disaster recovery strategy, unprecedented downtimes can cause significant losses for your business. It has been a major challenge for businesses big and small. In such scenarios, Disaster Recovery as a Service can best guarantee the safety and security of data. Cloud4C, a world-leading application-focused Cloud MSP and a trusted Google Cloud Platform consulting partner offer lack of disaster recovery strategy, unprecedented downtimes can cause significant losses for your business. It has been a major challenge for businesses big and small. In such scenarios, Disaster Recovery as a Service can best guarantee the safety and security of data Snapshots are a central part of the Google Cloud Backup architecture—they allow you to create a point-in-time backup of a persistent disk attached to a virtual machine instance, and save it to Google Cloud Storage. You can also rapidly restore a snapshot to a persistent disk.

TABLE OF CONTENTS

--	--	--

--	--	--

CHAPTER No.	TITLE	PAGE No
1.	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	OBJECTIVE	
2.1	AIM	2
2.2	SCOPE	2
2.3	OBJECTIVE	2
2.4	HARDWARE REQUIREMENTS	2
2.5	SOFTWARE REQUIREMENTS	3
3	TECHNOLOGIES LEARNT	3
3.1	GOOGLE CLOUD PLATFORM	3
3.2	ADVANTAGES OF GCP	3
3.3	DISADVANTAGES OF GCP	4
4	ABOUT THE PROJECT	
4.1	LOGIN	4
4.2	START	4
4.3	CREATE AN INSTANCE	4
4.4	CHECK THE INSTANCE USING SSH KEY	5
4.5	CREATE 2 ND SSH KEY	5
4.6	CREATE SNAPSHOT	6
4.7	DELETE INSTANCE	6
4.8	RECOVER	6
5	RESULT AND CONCLUSION	7

--	--	--

--	--	--

--	--	--

INSTANCE BACKUP AND RECOVERY IN GCP

CHAPTER 1

GCP

Introduction

Cloud computing today allows hardware and software products to co-exist remotely (in data centers) and at-scale. Together these products work to deliver specific services. Users typically can access, manage, and use the tools they require via a web-interface – and that's true for Google Cloud Platform services as well. This Project is related to cloud computing. It mainly deals about the instance backup and recovery in Google Cloud Platform (GCP). We have to create an instance and delete it and recover it in the original condition. The project main theme is to Create Backup, delete instance, deploy recovery using recovery option in Google Cloud Platform

1.1 Back Ground

Google Cloud Platform (GCP), offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search, Gmail, Google Drive, and YouTube. Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning. Registration requires a credit card or bank account details.

Google Cloud Platform provides infrastructure as a service, platform as a service, and serverless computing environments. In April 2008, Google announced App Engine, a platform for developing and hosting web applications in Google-managed data centers, which was the first cloud computing service from the company. The service became generally available in November 2011. Since the announcement of App Engine, Google added multiple cloud services to the platform.

Google Cloud Platform is a part of Google Cloud, which includes the Google Cloud Platform public cloud infrastructure, as well as Google Workspace (G Suite), enterprise versions of Android and Chrome OS, and application programming interfaces (APIs) for machine learning and enterprise mapping services.

--	--	--

CHAPTER 2

AIM, SCOPE, OBJECTIVE

2.1 Aim

The main aim of the project is To Instance recovery and Backup using GCP platform. Take a backup of instance, delete it and restore it in original condition

2.2 Scope

The purpose of this project mainly is to get the Create Backup, delete instance, deploy recovery using recovery option in Google Cloud Platform

2.3 Objective

- The Backup and Recovery in Google Cloud Platform
- Getting maximum knowledge on Cloud Computing
- Learning to increase accuracy of the Google cloud platform
- To gain complete Knowledge on GCP
- To be able to use GCP
- Able to Decrease Time Consumption

2.4 Hardware requirements

- **Processor:** intel core i5
- **Speed:** 1.19GHz
- **RAM:** 8.0GB
- **Memory usage:** 7.2kb
- **Keyboard:** Standard Keyboard
- **Monitor:** 15VGA color

2.5 Software Requirements

- **Operating System:** Windows
- **Online Services:** Google Cloud Platform

--	--	--

CHAPTER 3

TECHONOLOGIES LEARNT

3.1 GOOGLE CLOUD PLATFORM

Google Cloud (also known as Google Cloud Platform or GCP) is a provider of computing resources for developing, deploying, and operating applications on the Web. All Google Cloud customers can use select Google Cloud products—like Compute Engine, Cloud Storage, and Big Query—free of charge, within specified monthly usage limits. Cloud computing today allows hardware and software products to co-exist remotely (in data centers) and at-scale. Together these products work to deliver specific services. Users typically can access, manage, and use the tools they require via a web-interface – and that’s true for Google Cloud Platform services as well. In addition to service accessibility, users also gain flexibility and choice when working with Google Cloud Platform: Each service is available ‘a la carte’ so that users can leverage different resources to develop the infrastructure they need.

3.1.1 ADVANTAGES OF GCP

- High Productivity with Innovation.
- Easy to Adopt Latest Functionalities.
- Remote Access.
- Smooth Collaboration.
- Unmatched Security.
- Reduced Breaches.
- High Reliability.
- Offers Flexibility and Control.

3.1.2 DISADVANTAGES OF GCP

- Expensive
- Google Cloud DNS is slower than cloudflare
- No Free support

--	--	--

CHAPTER 4

ABOUT THE PROJECT

4.1 LOGIN

Firstly, we have to login into Google cloud platform with our email id

4.2 START

Start the project using free trail option given by Google

4.3 CREATE AN INSTANCE

Open the VM Instances option in GCP and click on the create instance

- Give a name to the instance
- Set Region as us-west(oregon) and zone as us-west 1 (b)
- Series : E2 and Machine type : e2-small (2 vCPU, 4GB memory)
- Change the system to Ubuntu
- Allow full access to all cloud Api's
- On the Firewall
- And Click on Create

4.4 CHECK THE INSTANCE USING SSH KEY

Click on SSH and open the terminal of the instance and use the following codes

1. `sudo su`
2. `cd`
3. `apt update`
4. `apt install apache2`
5. `cd /var/www/html/`
6. `systemctl start apache2`
7. Go to chrome and copy ip address of the instance and check using <http://>
8. `ll`
9. `cp -rf index.html /home/`

--	--	--

10. `rm -rf index.html`
11. `vim index.html`
12. Enter the code what you want to display `<html> <h1> Hello Guys, Welcome to our new project </h1> </html>` and close using `:wq!`
13. `systemctl restart apache2`
14. And now you can see new display in chrome

4.5 CREATE A 2ND SSH KEY

Open the created instance and follow the steps

- Click on edit and go to SSH key option
- There will be already a key and we have to create 2nd ssh key
- Open puttygen software and generate a new key
- Copy that key in the 2nd ssh key column
- Save the ssh key in the file manager with any name
- Click on save and save the instance

4.6 CREATE A SNAPSHOT

Open snapshot option and follow the steps below

- Click on Create snapshot
- Name the snapshot and set description as snapshot of ubuntu
- Select Source disk as instance
- Location as Regional and then create

4.7 DELETE INSTANCE

Open the instance and click on delete

4.8 RECOVER

Go to the snapshot option and follow the steps below steps

- Open snapshot click on create a new instance
- Set the name as same as the previous instance
- And set all the options as same as the previous one and click on create
- Open putty copy the ip address and click on ssh and open
- And then you can see the both the instances created

--	--	--

5. RESULT AND CONCLUSION

The instance we require is recovered. We have created the instance using GoogleCloud Platform. Check the instance using SSH key option by doing some changes. Restart the instance. Add the 2nd SSH key using PuttyGen. Create the snapshot using snapshot option. Delete the instance and create new instance with same name in snapshot. Check weather the instance is recovered or not using Putty. The Instance is successfully Recovered

REFERENCES

- Google cloud platform
- Wikipedia
- Console developers
- Tech republic

--	--	--

SCREENSHOTS

Creating an Instance

Google Cloud Platform

qwiklabs-gcp-03-d3ea6ff5dc7d

Search Products, resources, docs (/)

Create an instance

HELP ASSISTANT

To create a VM instance, select one of the options:

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

Name *

instance-11

Labels ?

+ ADD LABELS

Region *

us-west1 (Oregon)

Region is permanent

Zone *

us-west1-b

Zone is permanent

Machine configuration

Machine family

GENERAL-PURPOSE COMPUTE-OPTIMIZED MEMORY-OPTIMIZED GPU

Machine types for common workloads, optimized for cost and flexibility

Series

E2

CPU platform selection based on availability

Machine type

e2-small (2 vCPU, 2 GB memory)

vCPU

1 shared core

Memory

2 GB

✓ CPU PLATFORM AND GPU

Monthly estimate

\$13.23

That's about \$0.02 hourly

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

Item	Monthly estimate
2 vCPU + 2 GB memory	\$12.23
10 GB balanced persistent disk	\$1.00
Sustained use discount	-\$0.00
Total	\$13.23

[Compute Engine pricing](#)

[LESS](#)

Check the Instance using the SSH option

--	--	--

```
root@instance-11: ~ - Google Chrome
ssh.cloud.google.com/projects/qwiklabs-gcp-03-d3ea6ff5dc7d/zones/us-west1-b/instances/instance-11?authuser=2&hl=en_US&projectNumber=838125749&nonAdminProxySessionReason=1&troubleshoot4005Enabled=true&troublesho...

0 updates can be applied immediately.

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.

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.

Creating directory '/home/student-03-7fd14a29fc4a'.
student-03-7fd14a29fc4a@instance-11:~$ sudo su
root@instance-11:/home/student-03-7fd14a29fc4a# cd
root@instance-11:~#
root@instance-11:~#
root@instance-11:~#
root@instance-11:~# apt update
Hit:1 http://us-west1.gce.archive.ubuntu.com/ubuntu bionic InRelease
Get:2 http://us-west1.gce.archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:3 http://us-west1.gce.archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:5 http://us-west1.gce.archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [8570 kB]
```

38°C Sunny

14:46 20-04-2022

Check the Instance using the SSH option

--	--	--

The screenshot shows a web browser window with the address bar displaying "Not secure | 34.145.1.193". The browser's tab bar includes links for Gmail, Internships, Dashboard, Helpdesk: The Affo..., Orders: The Afford..., Buy Organic Seeds..., Track Shipment Stat..., Track Consignment, CloudAgent Lite, and The Affordable Org... The main content area displays the "Apache2 Ubuntu Default Page". At the top, there is a red Ubuntu logo and the text "ubuntu". Below this, a red banner reads "It works!". The page contains the following text:

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|   |-- ports.conf
|-- mods-enabled
|   |-- *.load
|   |-- *.conf
|-- conf-enabled
|   |-- *.conf
|-- sites-enabled
|   |-- *.conf
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.

Change the information and check

--	--	--

```

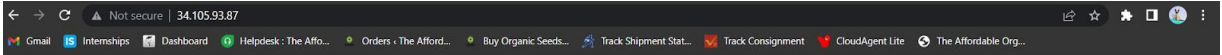
root@instance-11: /var/www/html - Google Chrome
ssh.cloud.google.com/projects/qwiklabs-gcp-03-d3ea6ff5dc7d/zones/us-west1-b/instances/instance-11?authuser=2&hl=en_US&projectNumber=838125749&nonAdminProxySessionReason=1&troubleshoot4005Enabled=true&troublesho...

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 libc-bin (2.27-3ubuntu1.5) ...
Processing triggers for systemd (237-3ubuntu10.53) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for ufw (0.36-0ubuntu0.18.04.2) ...
Processing triggers for ureadahead (0.100.0-21) ...
root@instance-11:~# cd /var/www/html/
root@instance-11:/var/www/html# systemctl start apache2
root@instance-11:/var/www/html# ll
total 20
drwxr-xr-x 2 root root 4096 Apr 20 09:17 ./
drwxr-xr-x 3 root root 4096 Apr 20 09:17 ../
-rw-r--r-- 1 root root 10918 Apr 20 09:17 index.html
root@instance-11:/var/www/html# cp -rf index.html /home/
root@instance-11:/var/www/html# rm -rf index.html
root@instance-11:/var/www/html# vim index.htm;
root@instance-11:/var/www/html# systemctl restart apache2

```

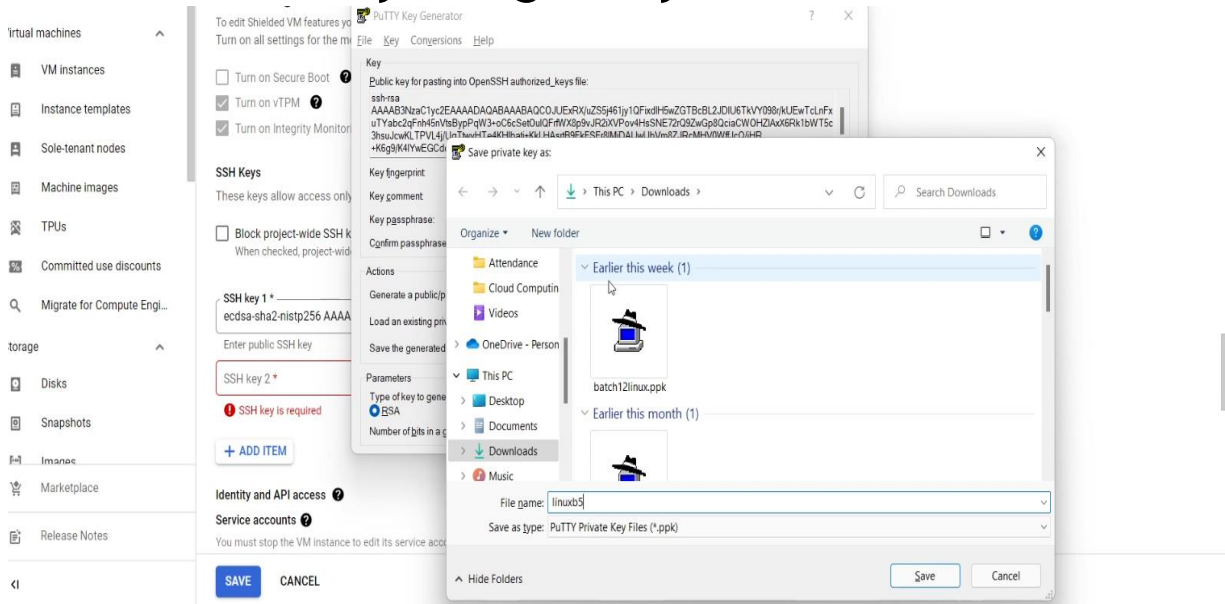
Check the change in the browser

--	--	--



Hello Guys, Welcome to our new project

Add SSH 2dn key using PuttyGen



Add SSH 2dn key using PuttyGen

14

--	--	--

Create Snapshot

Google Cloud Platform

qwiklabs-gcp-03-d3ea6ff5dc7d

Search Products, resources, docs (/)

Compute Engine

Create a snapshot

Virtual machines

VM instances

Instance templates

Sole-tenant nodes

Machine images

TPUs

Committed use discounts

Migrate for Compute Engi...

Storage

Disks

Snapshots

Images

Marketplace

Release Notes

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 *

ubantuss

Name is permanent

Description

snapshot of [ubuntu](#)

Source disk *

instance-11

Location ?

There may be a network transfer fee if you choose to store this snapshot in a location different than the source disk. [Learn more](#)

☐ Multi-regional

☒ Regional

Select location

us-west1 (Oregon)

Labels ?

CREATE

CANCEL

EQUIVALENT COMMAND LINE

--	--	--

Delete Instance

Google Cloud Platform

qwiklabs-gcp-03-d3ea6ff5dc7d

Search Products, resources, docs (/)

Compute Engine

VM instances

CREATE INSTANCE

IMPORT VM

REFRESH

OPERATIONS

HELP ASSISTANT

LEARN

HIDE INFO PANEL

Virtual machines

VM Instances

Instance templates

Sole-tenant nodes

Machine images

TPUs

Committed use discounts

Migrate for Compute Engi...

Storage

Disks

Snapshots

Images

Marketplace

Release Notes

INSTANCES

INSTANCE SCHEDULE

VM instances are highly configurable virtual machines for running workloads on Google Infrastructure. [Learn more](#)

Filter Enter property name or value

	Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect	
☐		instance-11	us-west1-b			10.138.0.2 (nic0)	34.1...	SSH	Start / Resume Stop Suspend Reset Delete View network details Create new machine image View logs View monitoring

Select an instance

PERMISSIONS

LABELS

MONITORING

Please select at least one resource.

Create new instance with same name in

snapshot

Google Cloud Platform

qwiklabs-gcp-03-d3ea6ff5dc7d

Search Products, resources, docs (/)

Create an instance

HELP ASSISTANT

To create a VM instance, select one of the options:

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

Name *

instance-11

Labels

+ ADD LABELS

Region *

us-west1 (Oregon)

Zone *

us-west1-b

Machine configuration

Machine family

GENERAL-PURPOSE COMPUTE-OPTIMIZED MEMORY-OPTIMIZED GPU

Machine types for common workloads, optimized for cost and flexibility

Series

E2

CPU platform selection based on availability

Machine type

e2-small (2 vCPU, 2 GB memory)

vCPU

1 shared core

Memory

2 GB

Monthly estimate

\$13.23

That's about \$0.02 hourly

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

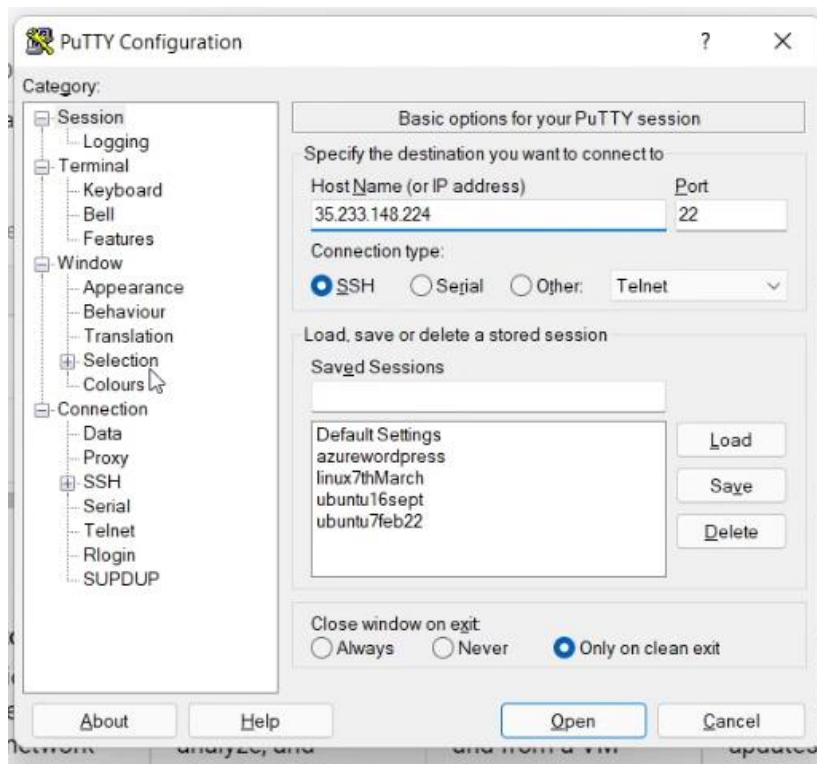
Item	Monthly estimate
2 vCPU + 2 GB memory	\$12.23
10 GB balanced persistent disk	\$1.00
Sustained use discount	-\$0.00
Total	\$13.23

[Compute Engine pricing](#)

[LESS](#)

Check the recovery using Putty

--	--	--



The instance is recovered

```
root@linux31march: ~  
root@linux31march:/home/linux# ll  
total 32  
drwxr-xr-x 5 linux linux 4096 Mar 31 12:34 ./  
drwxr-xr-x 5 root root 4096 Mar 31 12:33 ../  
-rw-r--r-- 1 linux linux 220 Apr 4 2018 .bash_logout  
-rw-r--r-- 1 linux linux 3771 Apr 4 2018 .bashrc  
drwx----- 2 linux linux 4096 Mar 31 12:34 .cache/  
drwx----- 3 linux linux 4096 Mar 31 12:34 .gnupg/  
-rw-r--r-- 1 linux linux 807 Apr 4 2018 .profile  
drwx----- 2 linux linux 4096 Mar 31 12:33 .ssh/  
root@linux31march:/home/linux# cdd  
  
Command 'cdd' not found, but can be installed with:  
  
apt install cdd  
  
root@linux31march:/home/linux#  
root@linux31march:/home/linux# cd  
root@linux31march:~#  
root@linux31march:~#  
root@linux31march:~#  
root@linux31march:~# ll  
total 48  
drwx----- 6 root root 4096 Mar 31 13:11 ./  
drwxr-xr-x 23 root root 4096 Mar 31 13:22 ../  
-rw----- 1 root root 241 Mar 31 12:31 .bash_history  
-rw-r--r-- 1 root root 3106 Apr 9 2018 .bashrc  
drwx----- 3 root root 4096 Mar 31 13:09 .config/  
drwxr-xr-x 3 root root 4096 Mar 31 13:09 .gsutil/  
-rw-r--r-- 1 root root 148 Aug 17 2015 .profile  
drwx----- 2 root root 4096 Mar 31 12:24 .ssh/  
-rw----- 1 root root 1192 Mar 31 13:11 .viminfo  
drwx----- 3 root root 4096 Mar 31 13:09 .snap/  
-rw-r--r-- 1 root root 40 Mar 31 13:09 testb5.txt  
-rw-r--r-- 1 root root 37 Mar 31 13:11 testingfromec2.txt  
root@linux31march:~#
```