**Assignment No 1:**

Title: Study the Google Cloud Platform.

Theory:link(https://cloud.google.com/docs)
(https://www.youtube.com/playlist?list=PLIivdWyY5sqIUkH9XhgMkAOyIwCN4H0As)

**What Is Cloud Computing?**

Cloud computing, in simple words, is accessing and storing data over the Internet instead of doing it on your personal hard drive.
It offers services like storage, database, networking, and more over the Internet to provide faster, innovative, and flexible resources to its customers. The customers get to pay only for the resources they use, hence helping them lower their operating costs and run their business infrastructure more efficiently.

Now, among various cloud providers like AWS, Microsoft, VMWare, IBM, etc., Google Cloud has been the talk of the town in recent years and there are enough reasons behind it. Let's begin with starters and understand what Google Cloud is.

***Here is a blog on 'What is cloud computing'.***

**What Is Google Cloud Platform?**

Google Cloud is a suite of Cloud Computing services offered by Google. The platform provides various services like compute, storage, networking, Big Data, and many more that run on the same infrastructure that Google uses internally for its end users like Google Search and YouTube.

Google server hasn't gone down in years. So, if you are planning to run your application on the Google Cloud infrastructure, then you can be assured of your applications being safe and secure.
About Google Cloud services (**https://cloud.google.com/docs/overview/cloud-platform-services)**

This overview introduces some of the commonly used Google Cloud services. For the full list of services, see the Products and services page.

This overview covers the following types of services:

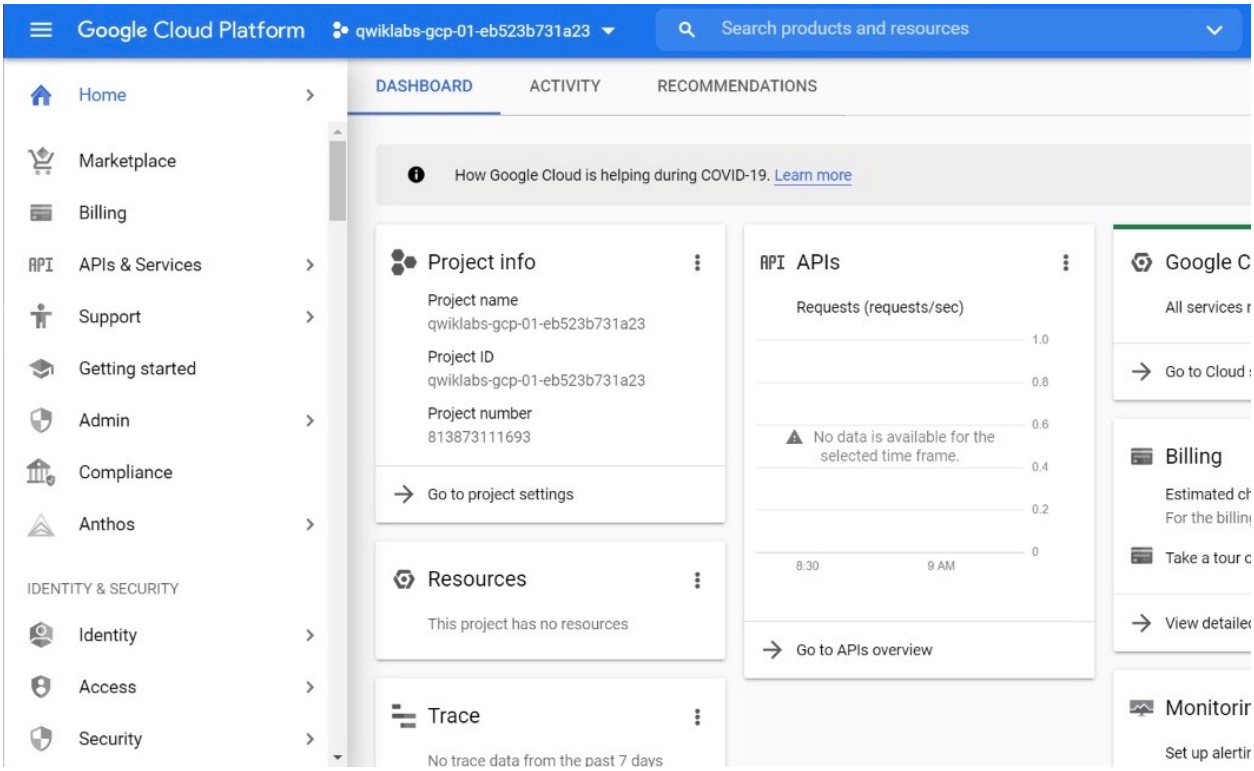
1) Computing and hosting
2) Storage
3) Databases
4) Networking
5) Big data
6) Machine learning

OUT of Google Product you have to study 3 services in detail:

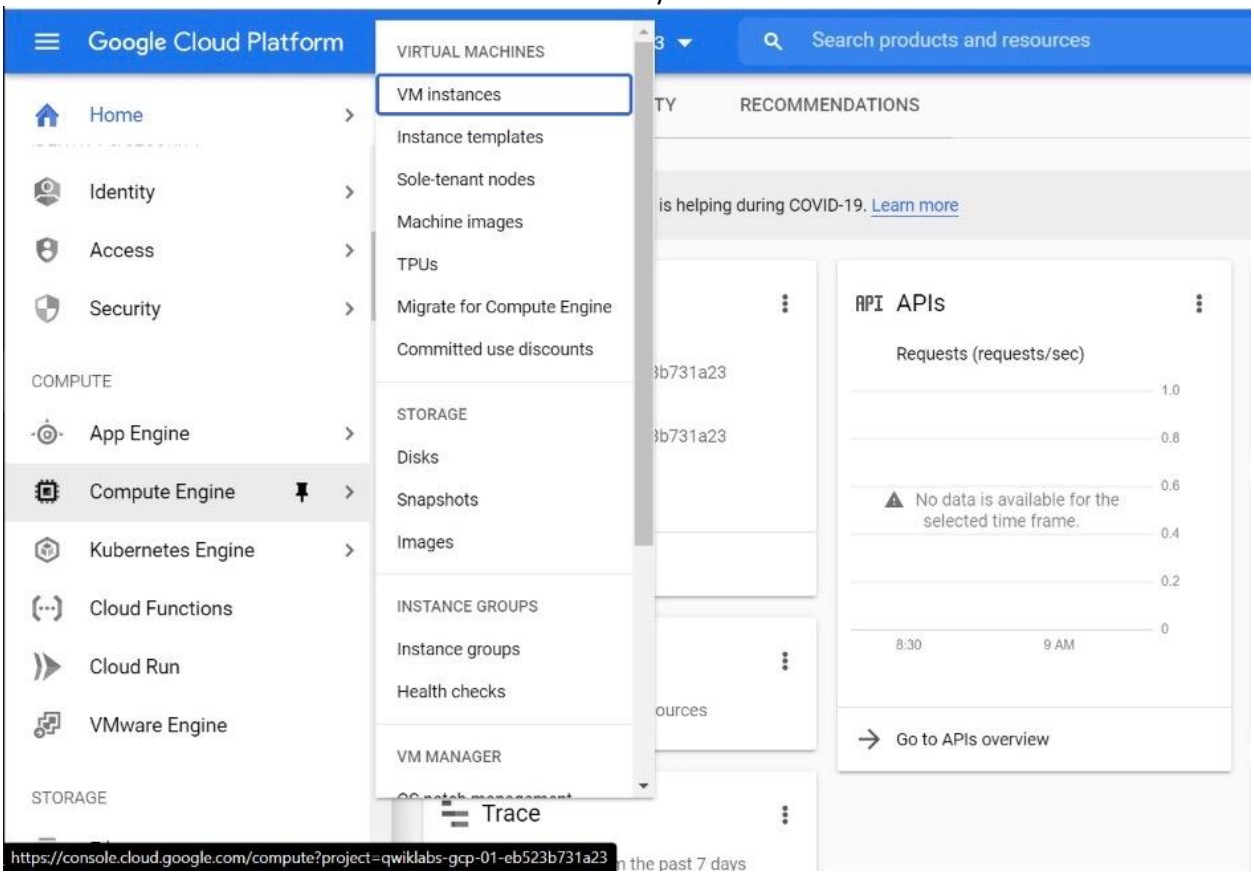
1) Compute (https://cloud.google.com/docs#section-7)
    a) In compute write detail steps of how to create a Linux virtual machine instance in Compute Engine using the Google Cloud Console. ( Reference: https://cloud.google.com/compute/docs/quickstart-linux )

## Stepwise Procedure:

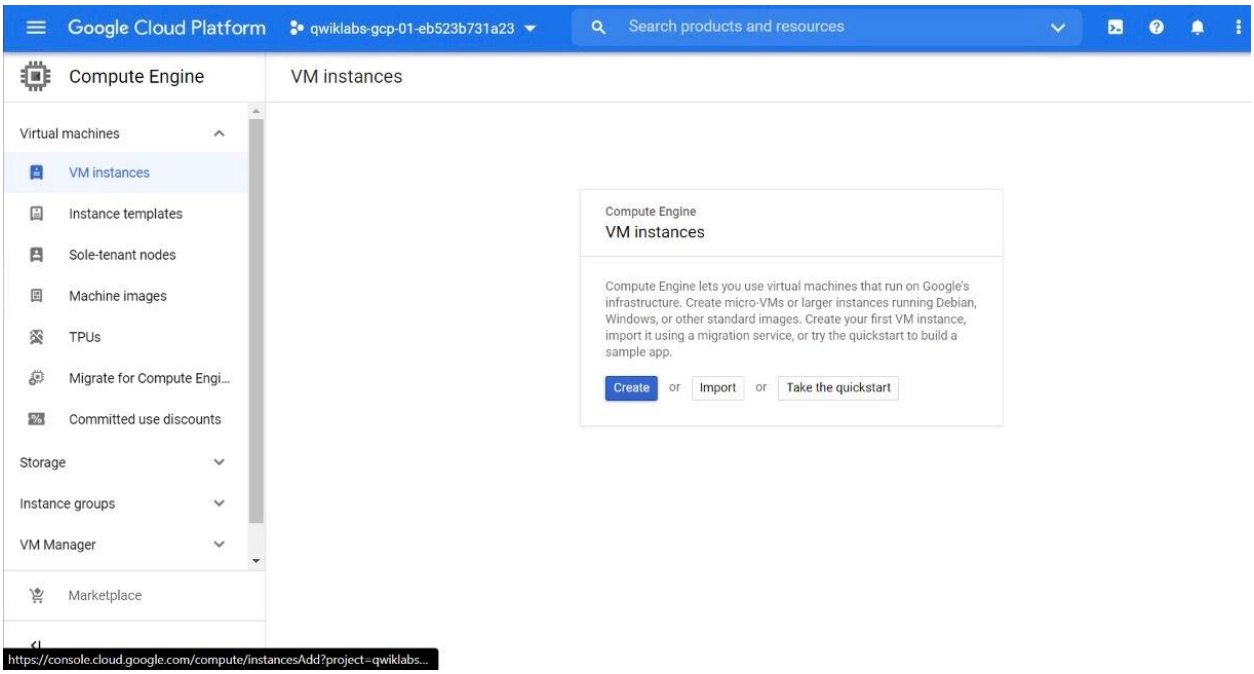
1) Visit (https://cloud.google.com/) and Sign In to your Google account.
2) A cloud console will look like this



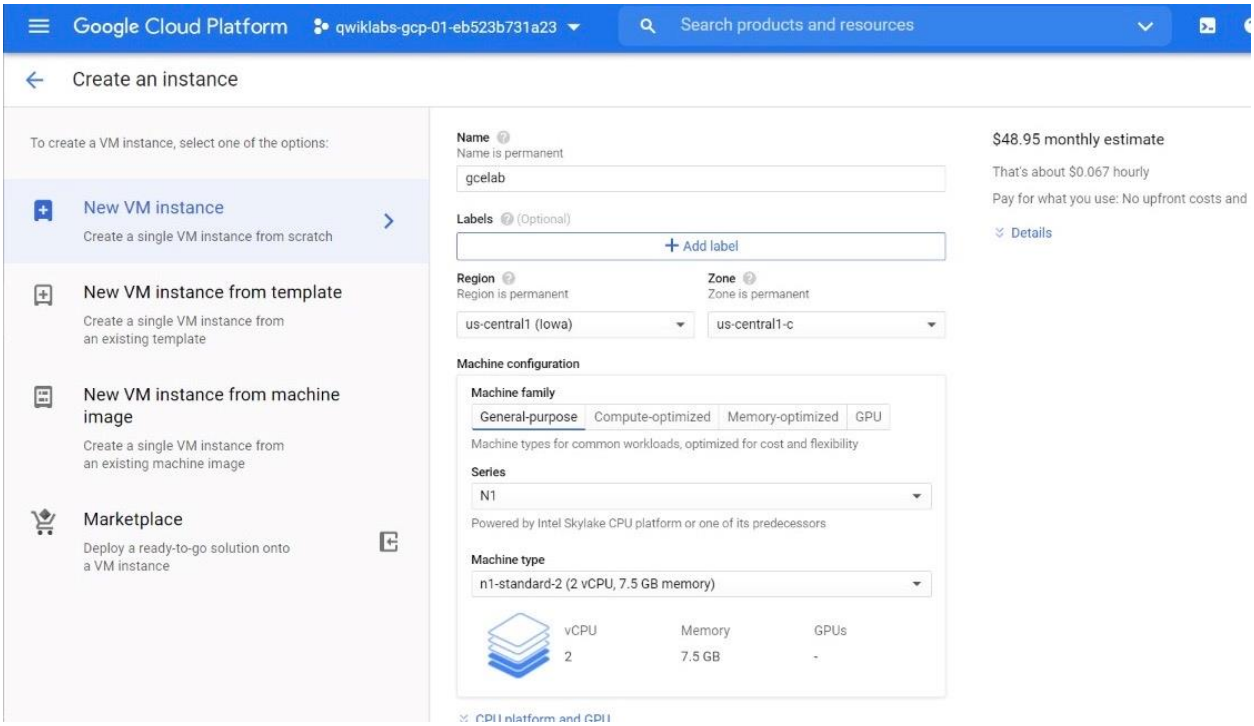
3) In the cloud console in Navigation menu click on Compute Engine and then click on the VM instances to create a new VM machine. It may take some time load the console.



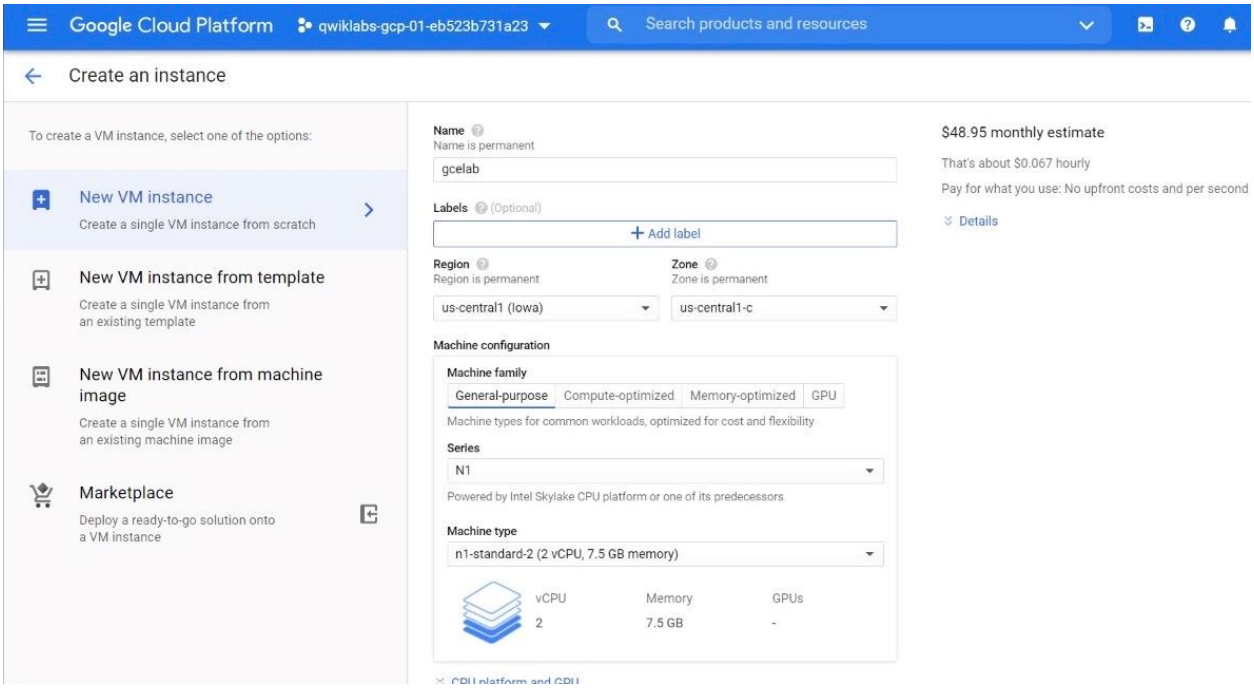

4) To create a new Virtual Machine, click on create button.



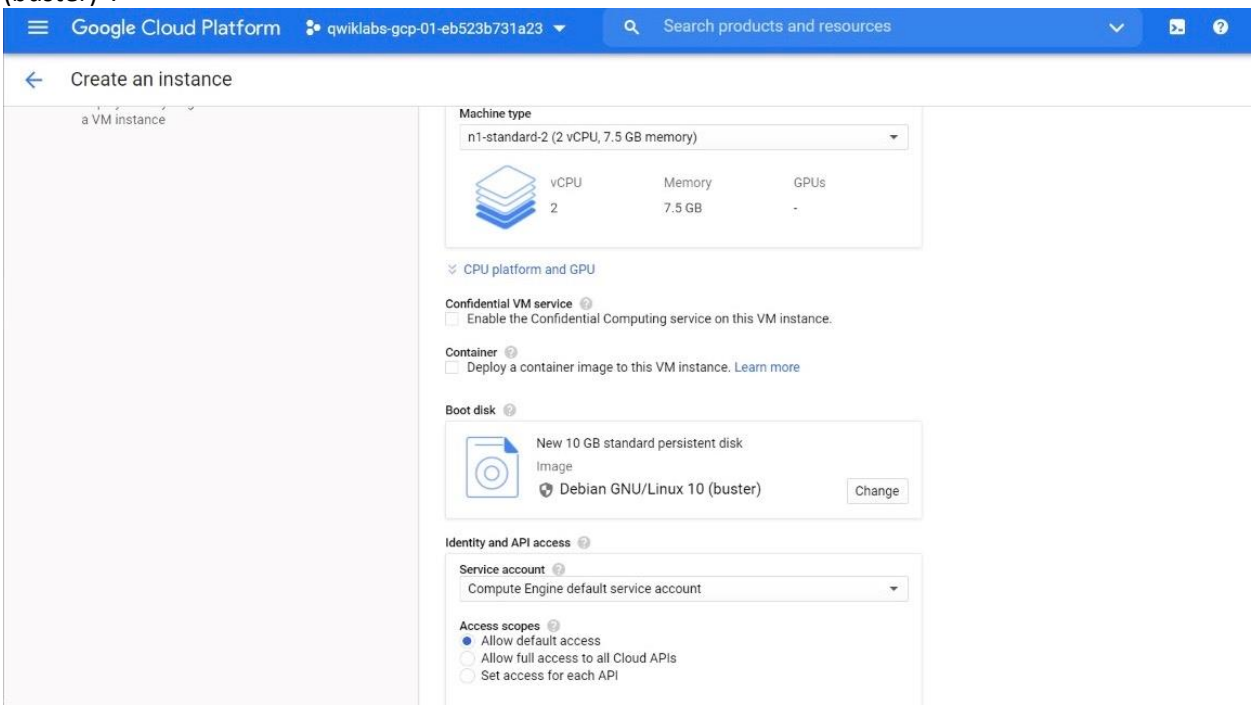
5) A new form will be in front of you where you can configure many parameters for your virtual machine. For e.g., Name, Region, Zone etc.
6) In this case we will create a VM by name “gcelab” which is a permanent name given to the VM.

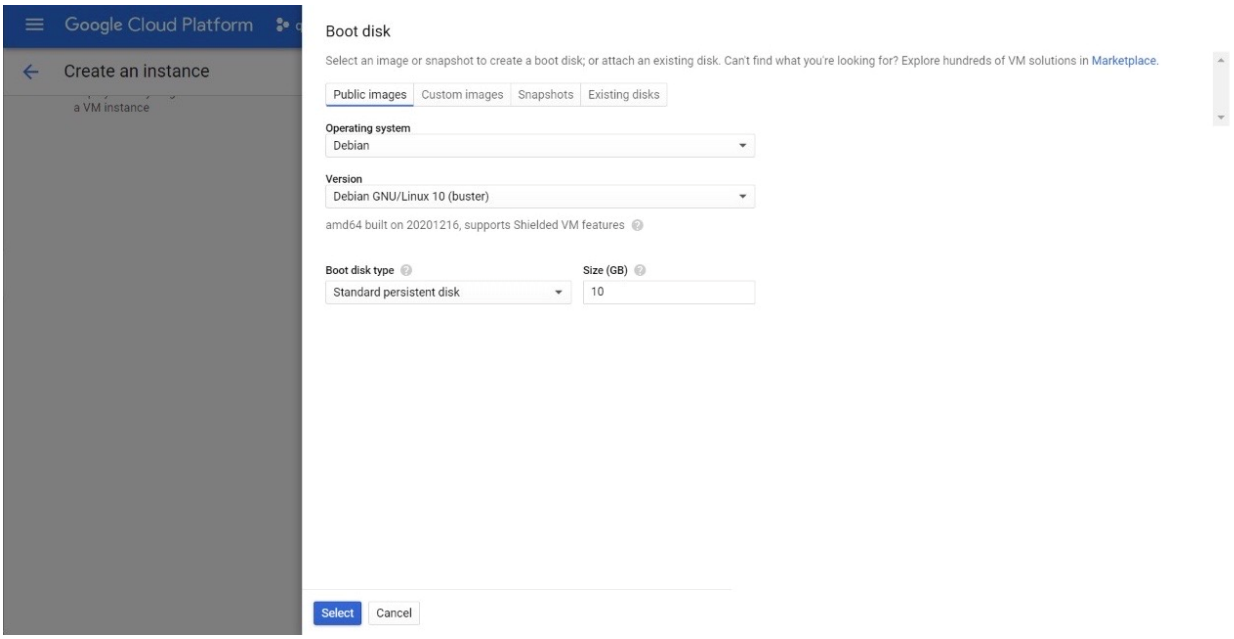



7) Now select the Region, Zone and then configure your machine configuration such as Series, Machine type.

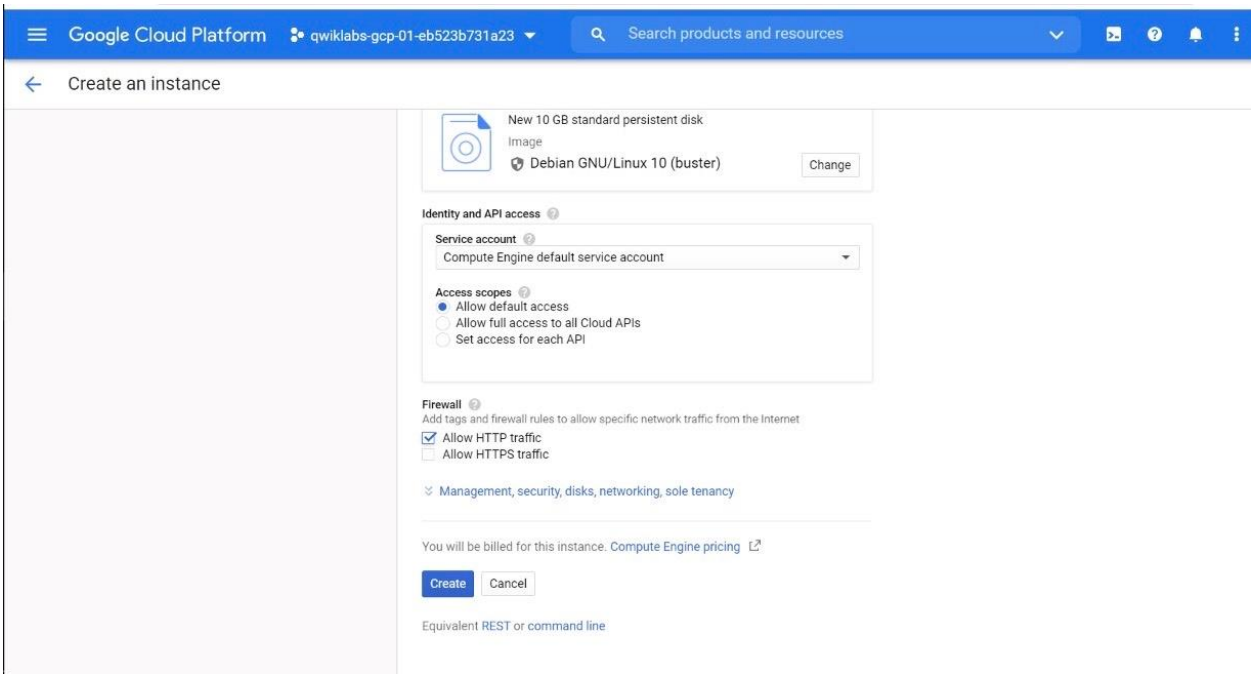


8) After completing above steps select the Boot Disk for your machine as “Debian GNU/Linux 10 (buster)”.

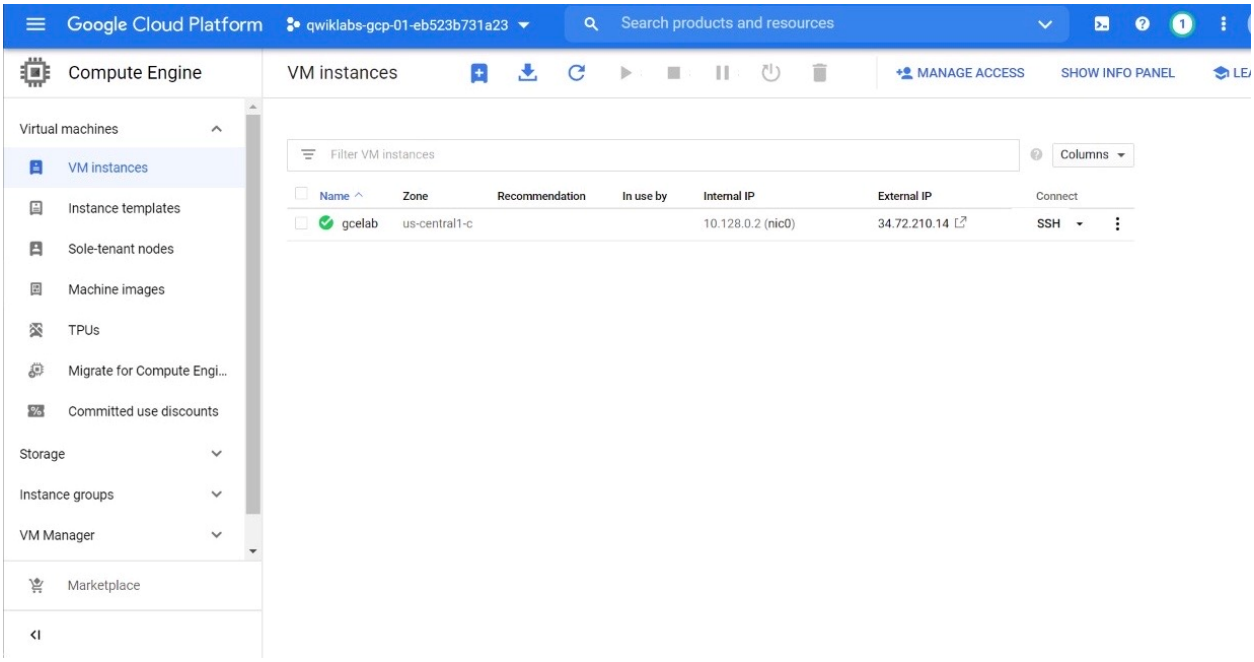


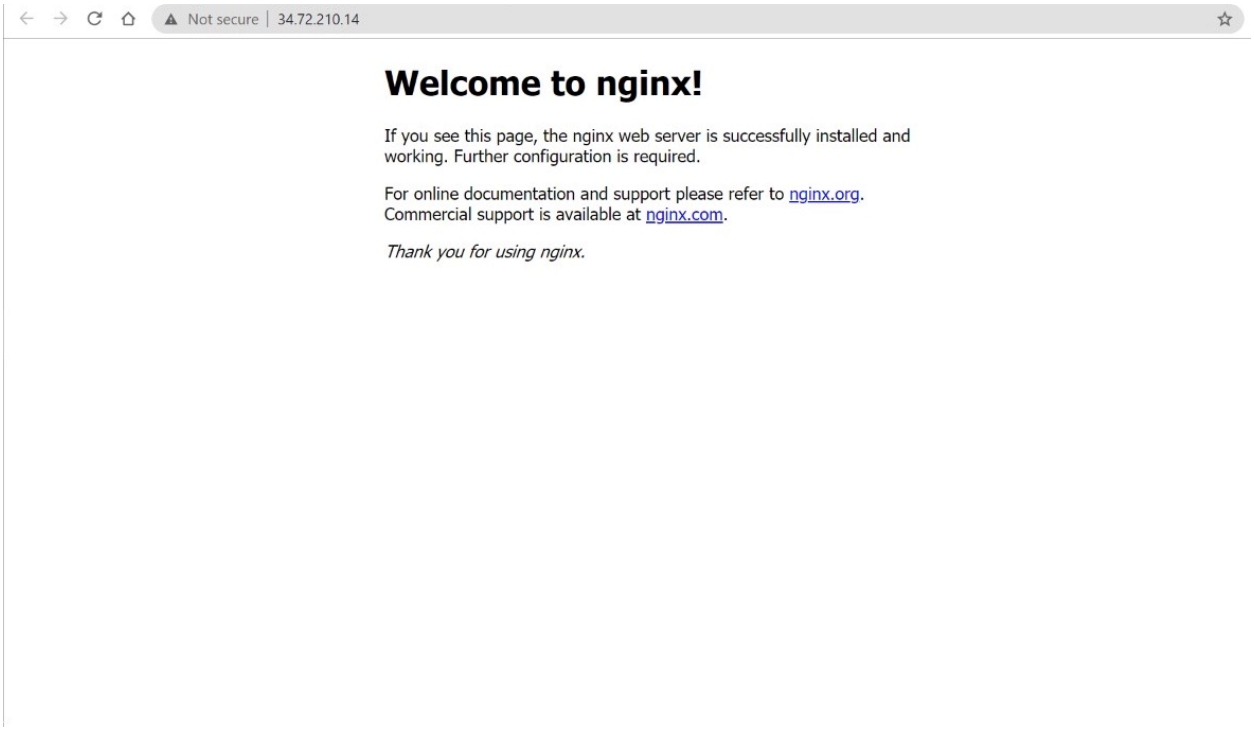
9) Now check the Allow HTTP traffic checkbox and click the create button to create a VM.




10) As you can see our new VM is now created and we can access after installing the nginx web server with the External IP address given to us.
To install nginx web server open command shell and type the following command.
Command to Install nginx – "sudo apt install nginx"



11) As we can see our VM is now created and we can use it.



b) Write detail steps for Deploy a simple Apache web server to learn the basics of running a server on a virtual machine instance. (Reference: https://cloud.google.com/compute/docs/tutorials/basic-webserver-apache)

## Stepwise Procedure:

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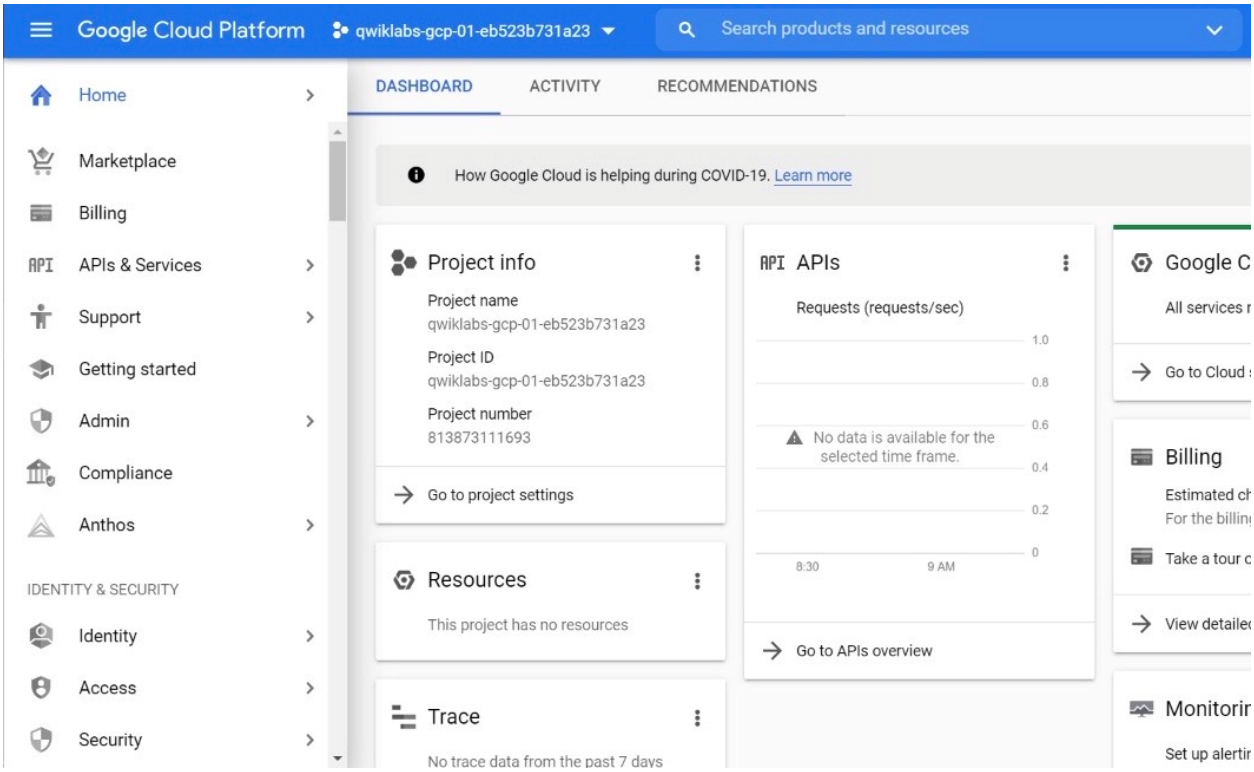
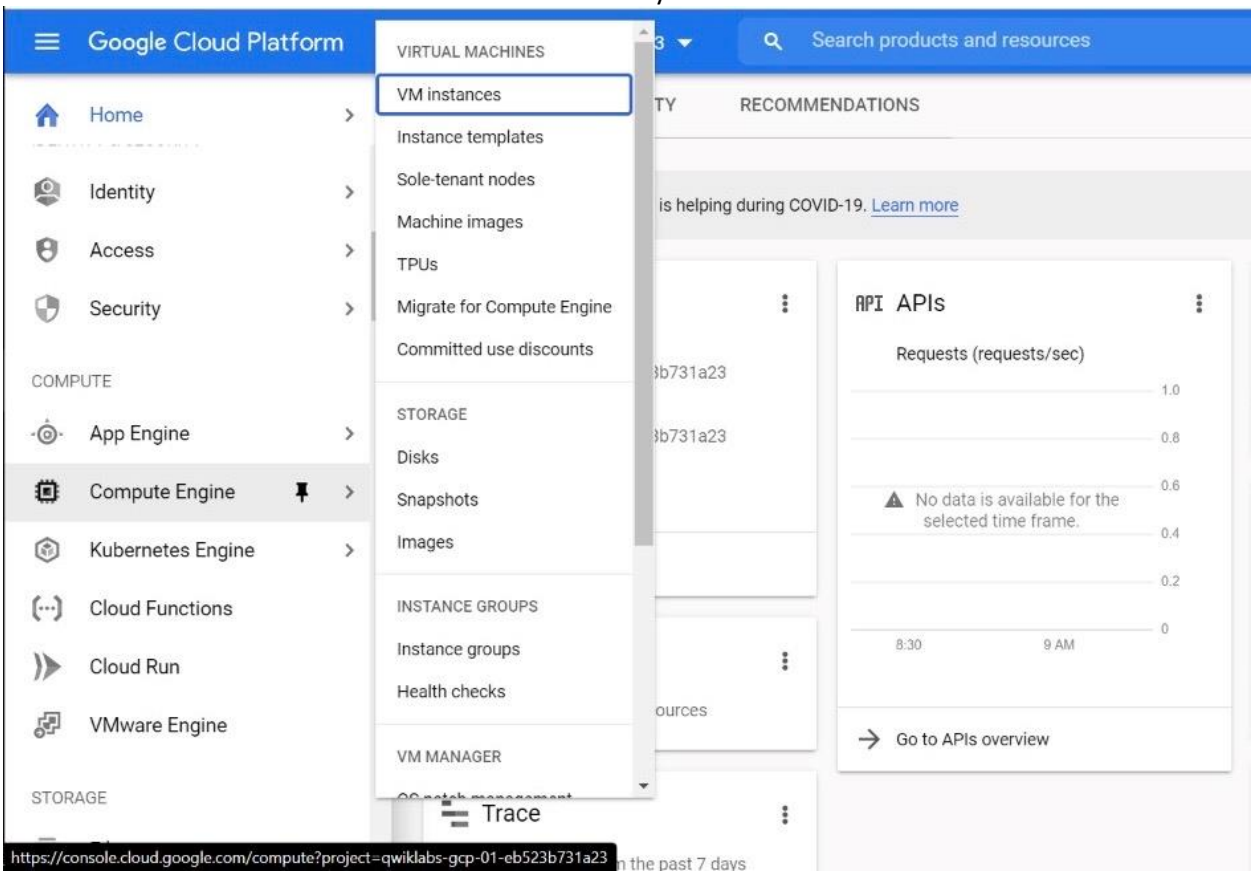


3) In the cloud console in Navigation menu click on Compute Engine and then click on the VM instances to create a new VM machine. It may take some time load the console.

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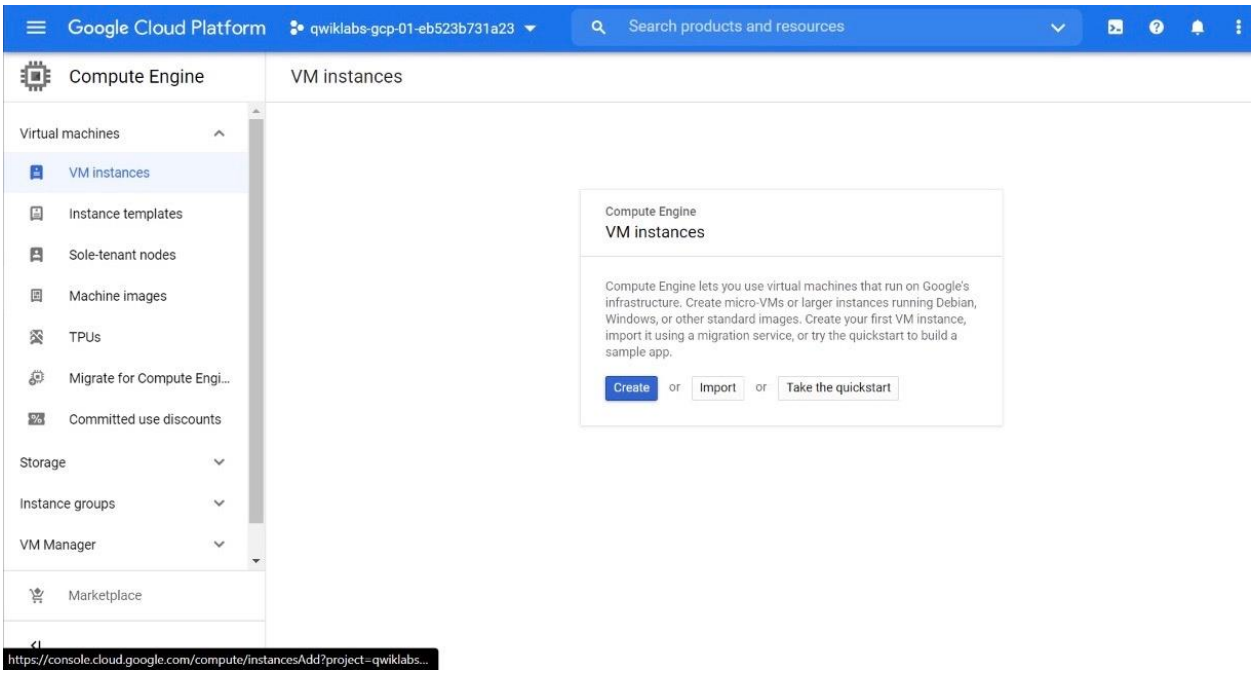

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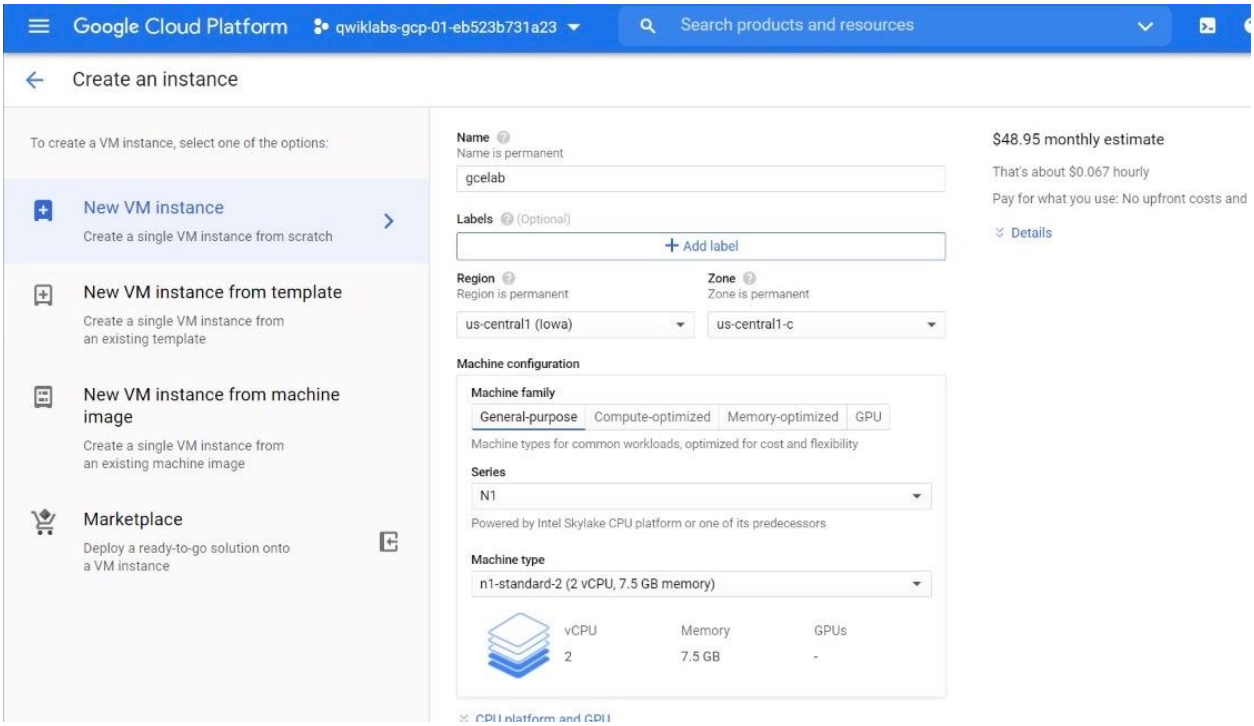
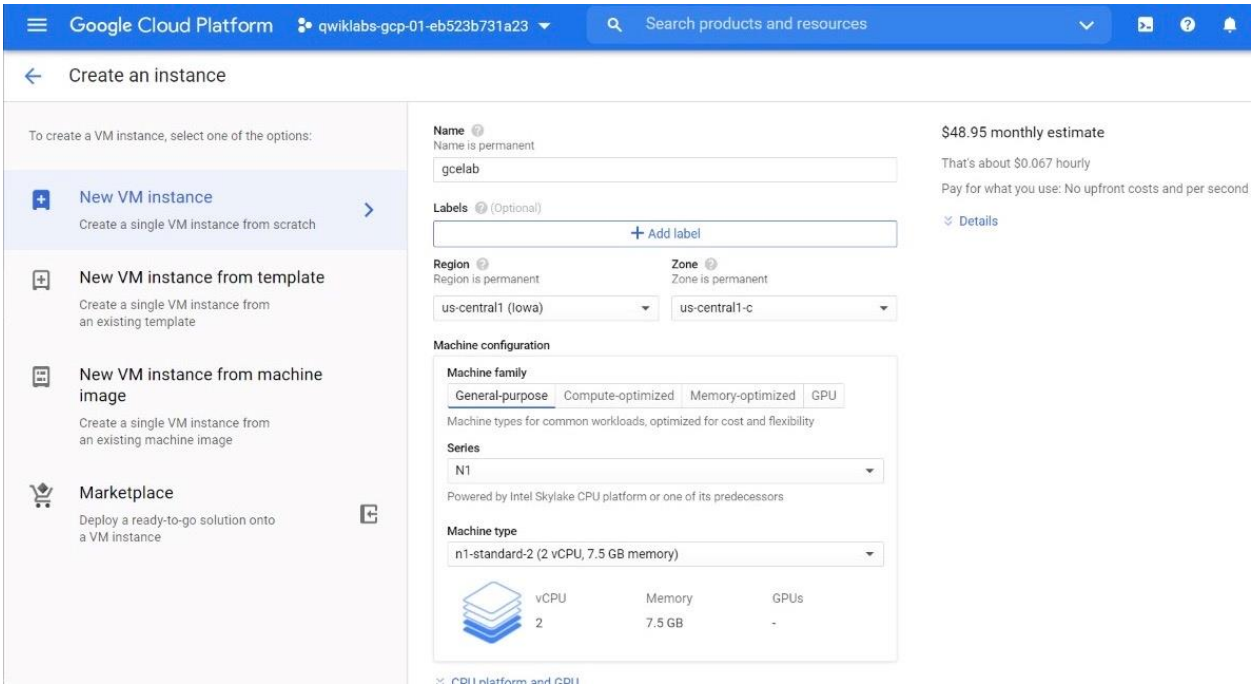



7) Now select the Region, Zone and then configure your machine configuration such as Series, Machine type.



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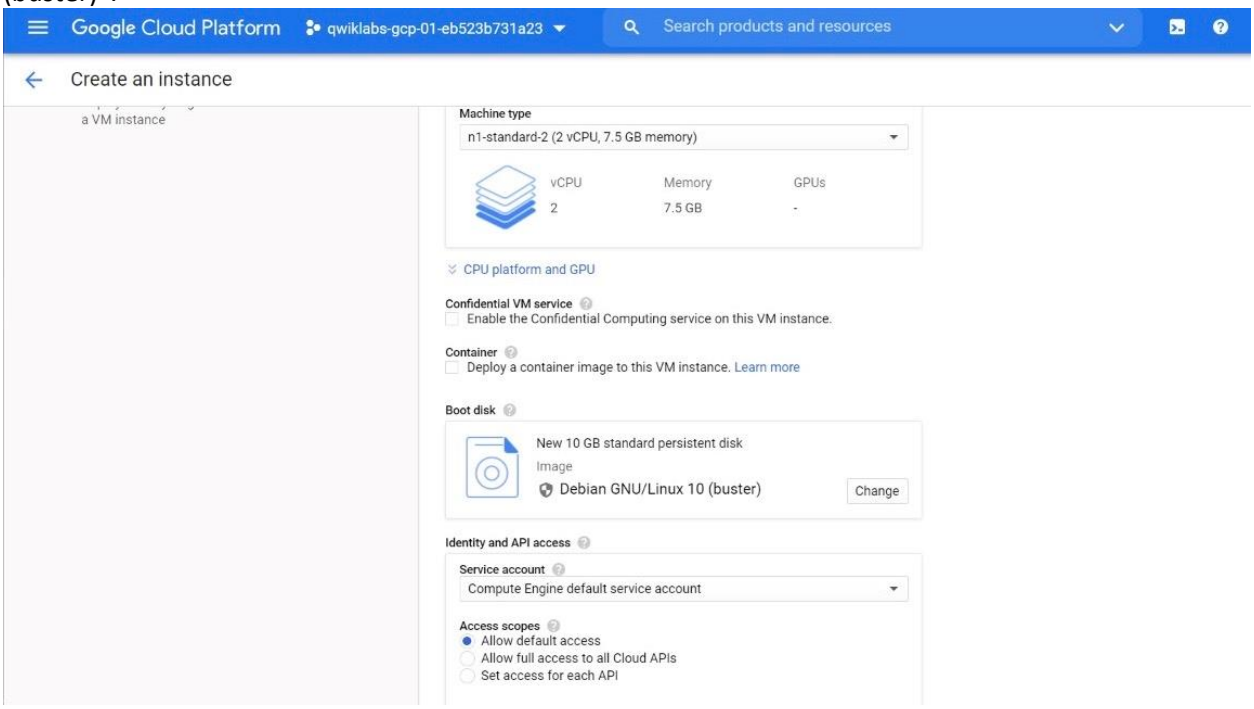


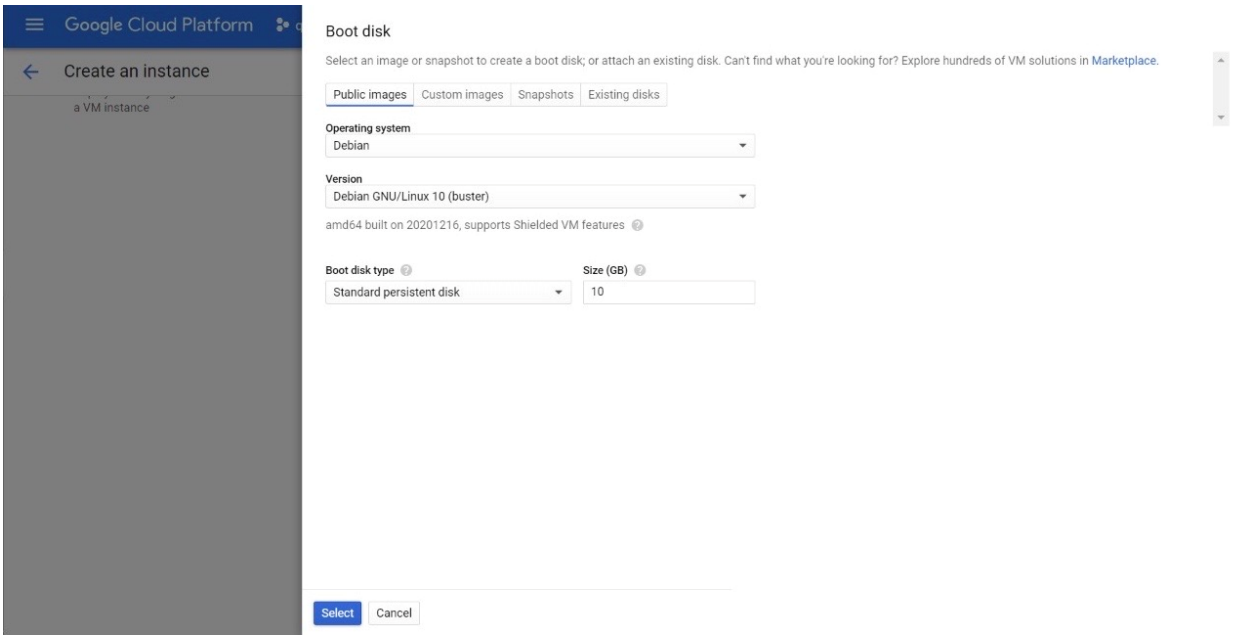

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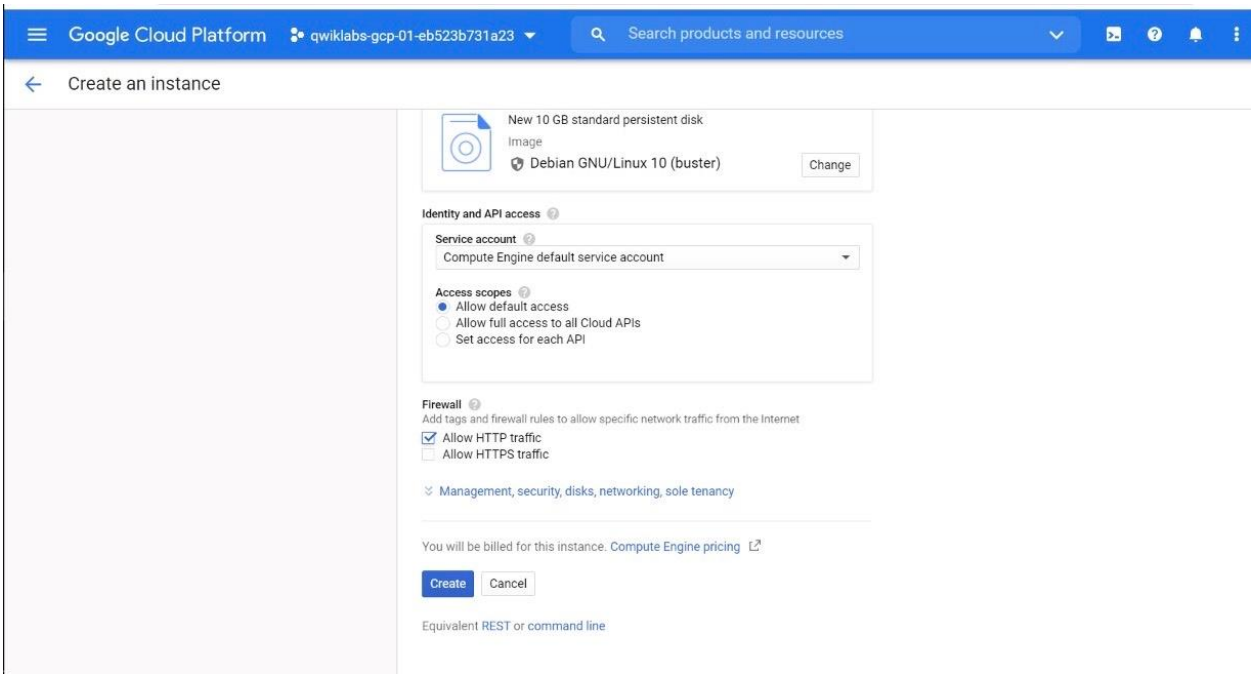


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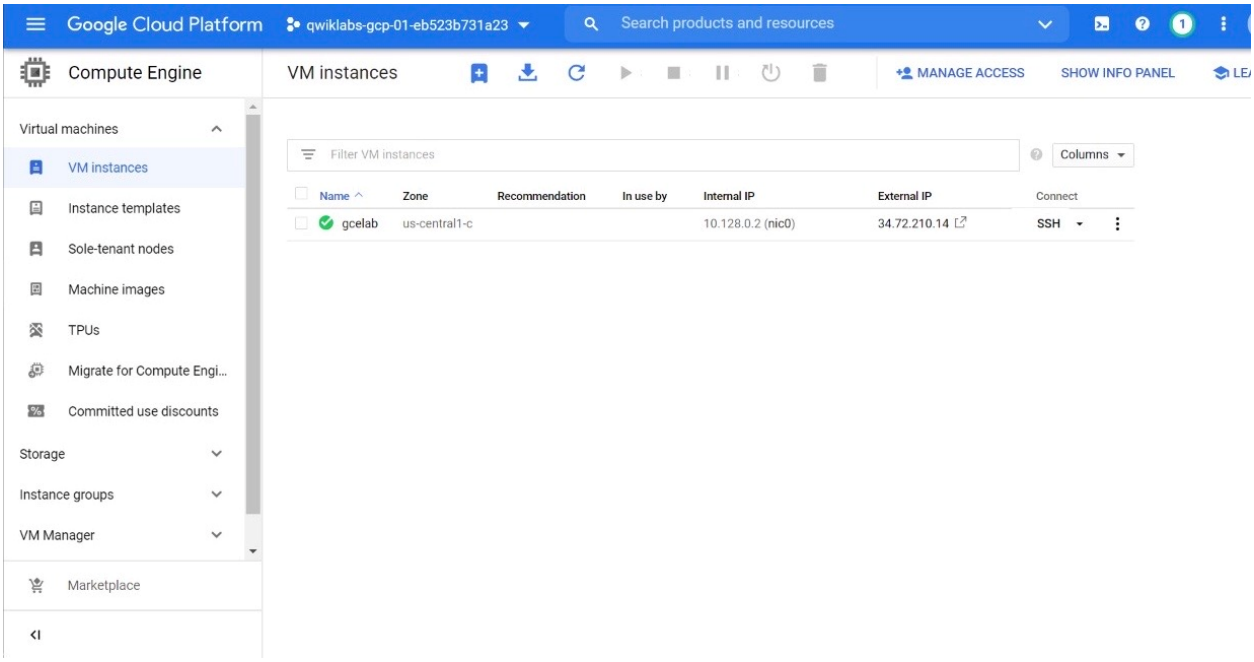
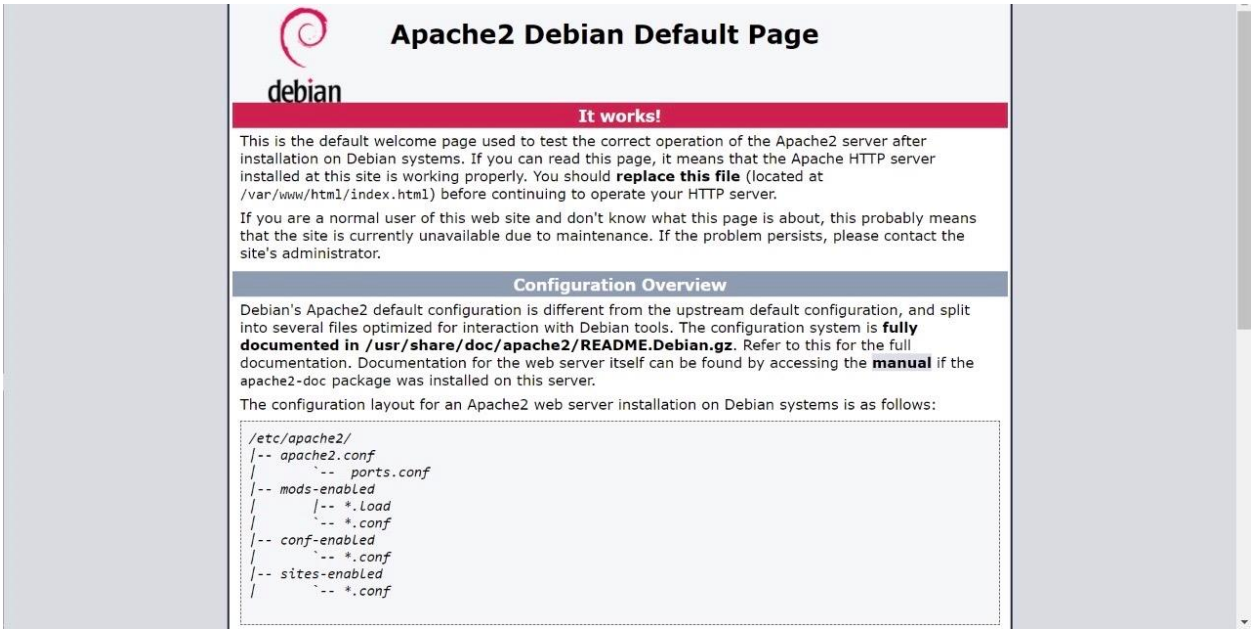


11) Now click on the “SSH” option to connect to the recently created machine. A command shell will be opened.

12) In the console use this command to deploy a simple Apache web server
“sudo apt update && sudo apt -y install apache2”

13) Now come back to the console and click on the “External IP” address to visit the VM.



a. Google App Engine (Ref: **https://cloud.google.com/appengine/docs)**

- **Google Cloud: Creating a Virtual Machine**

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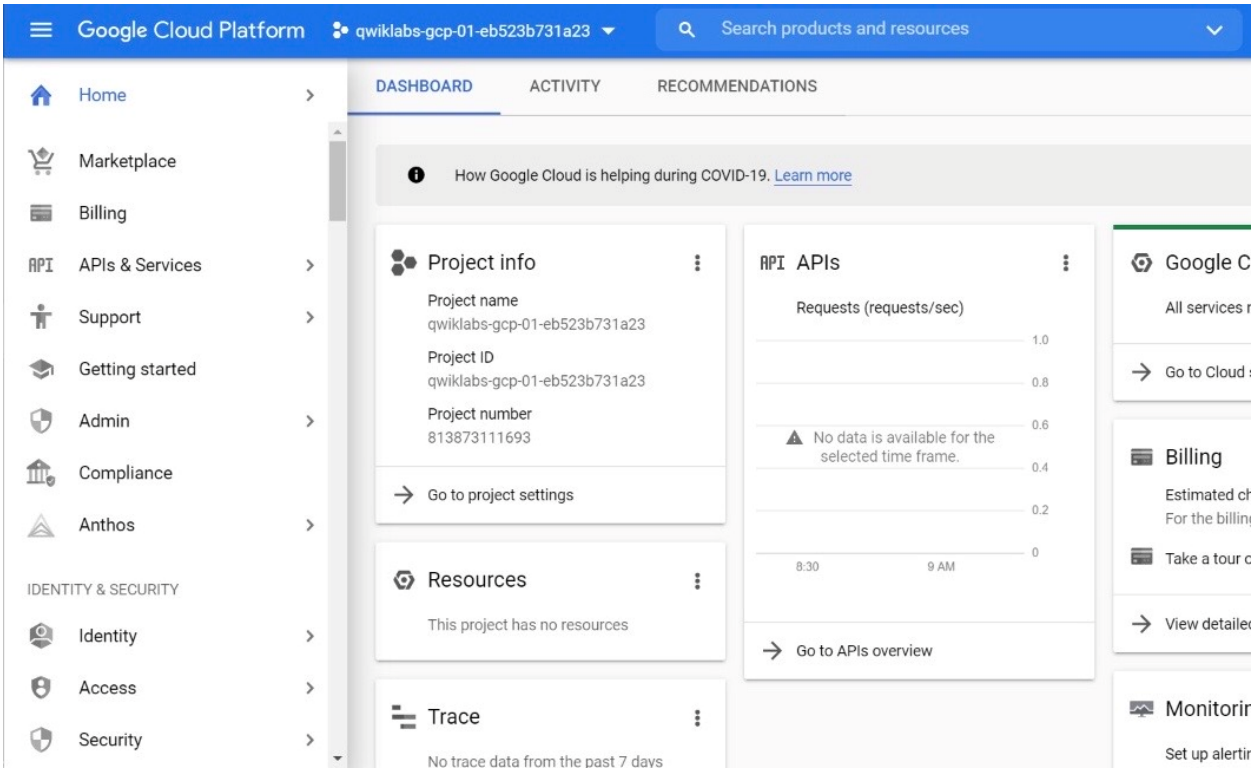

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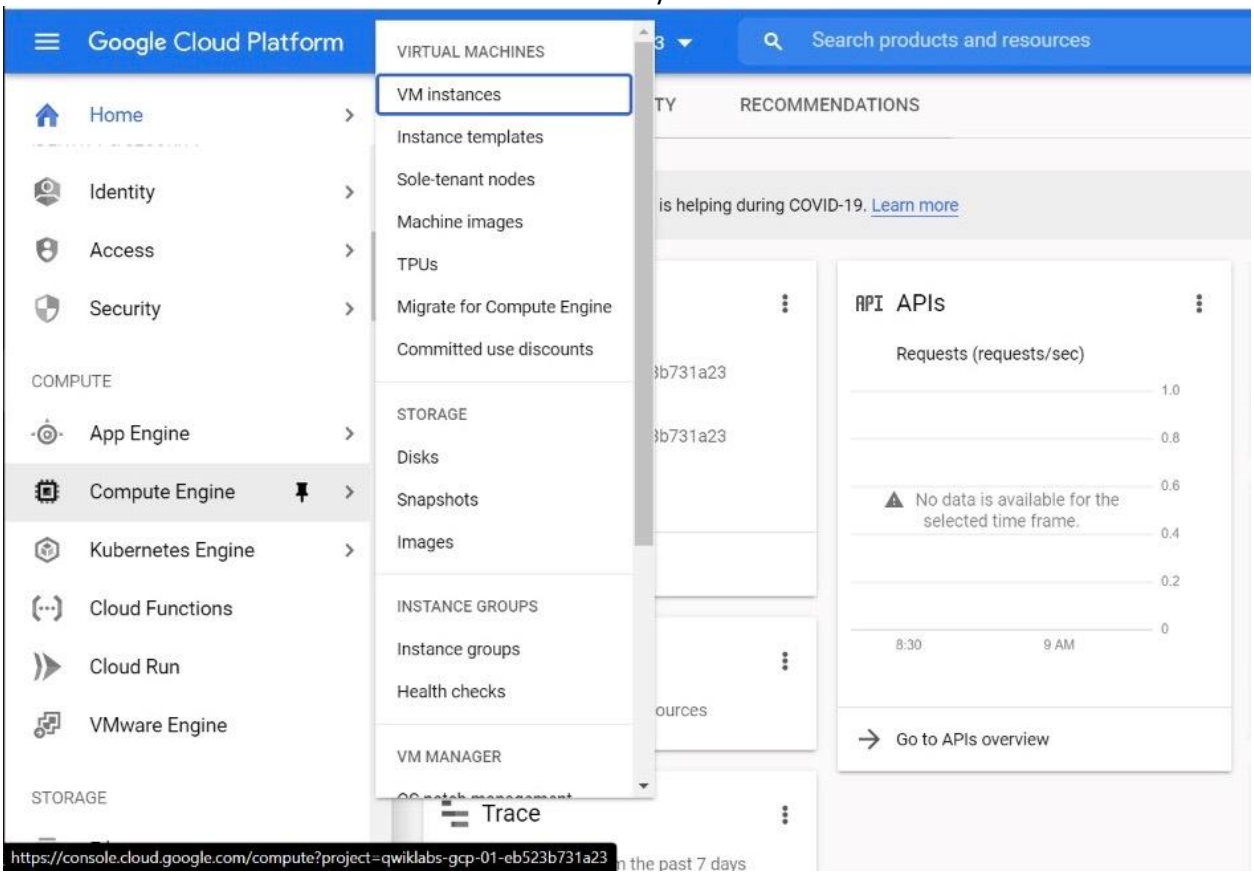


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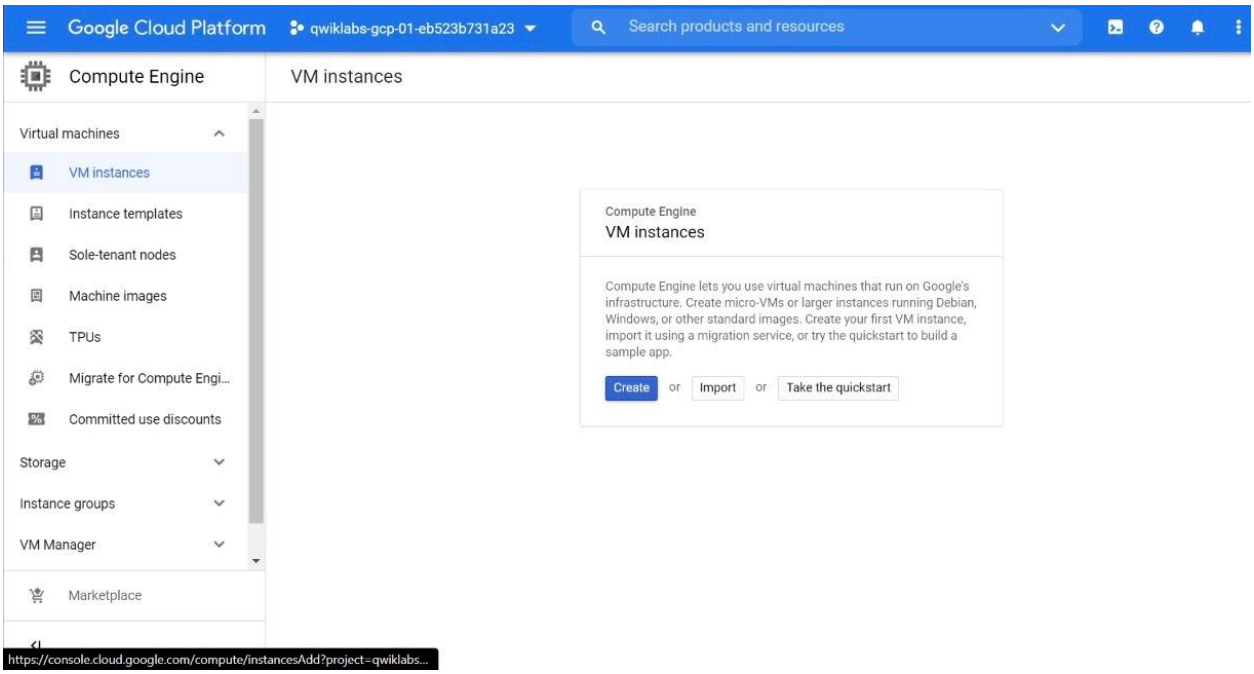

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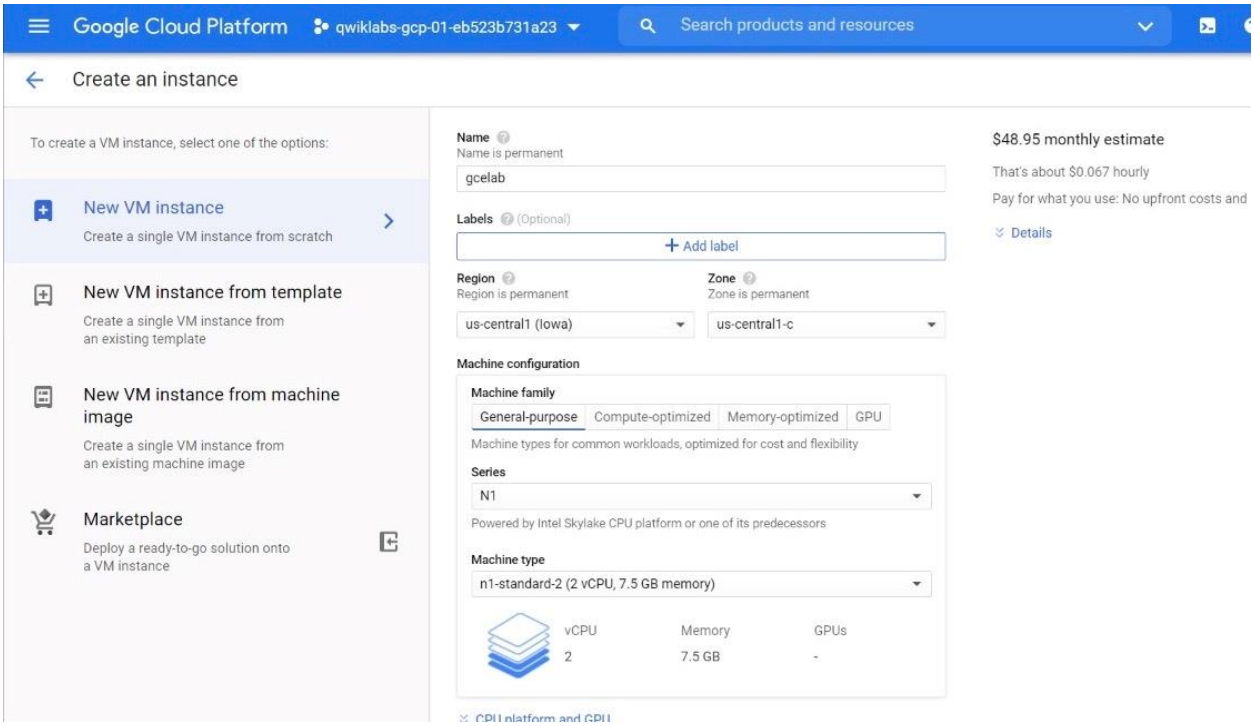


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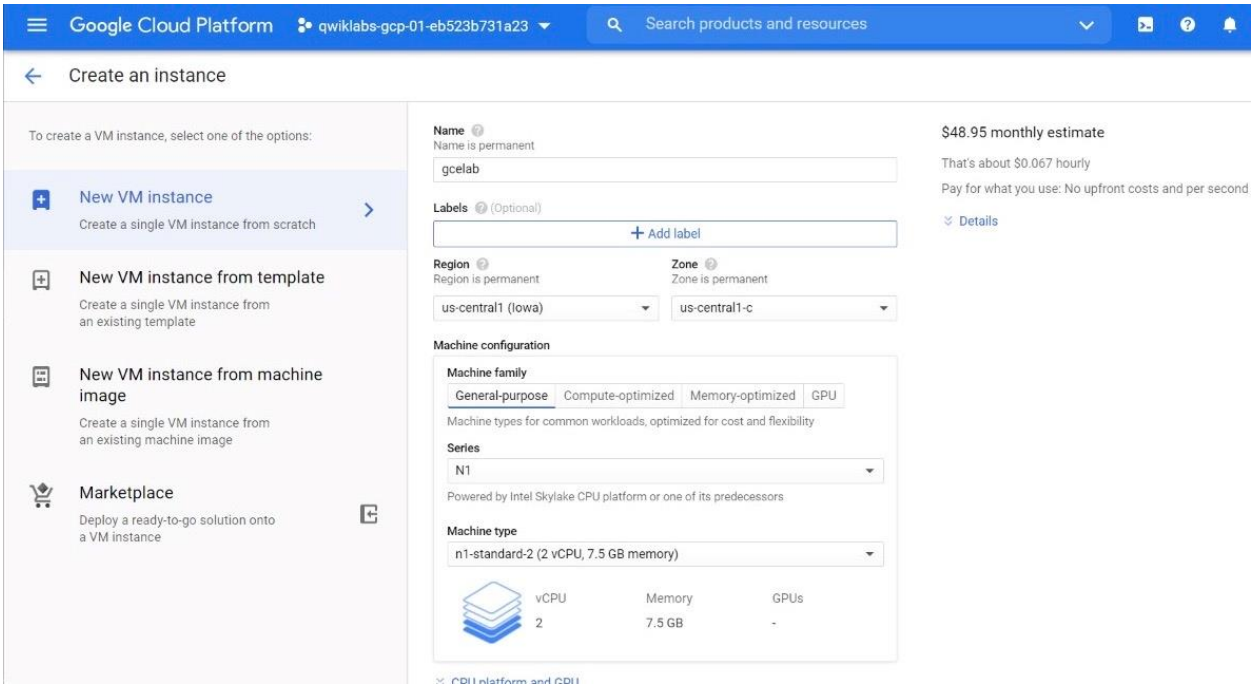

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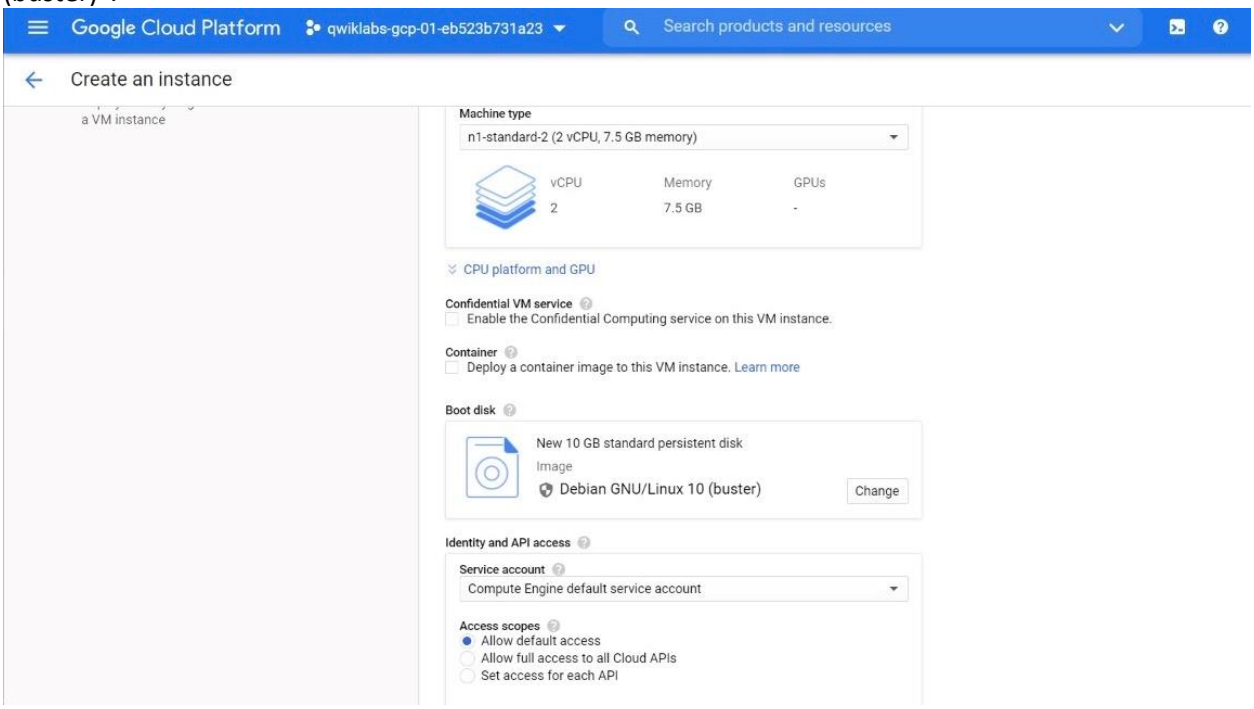


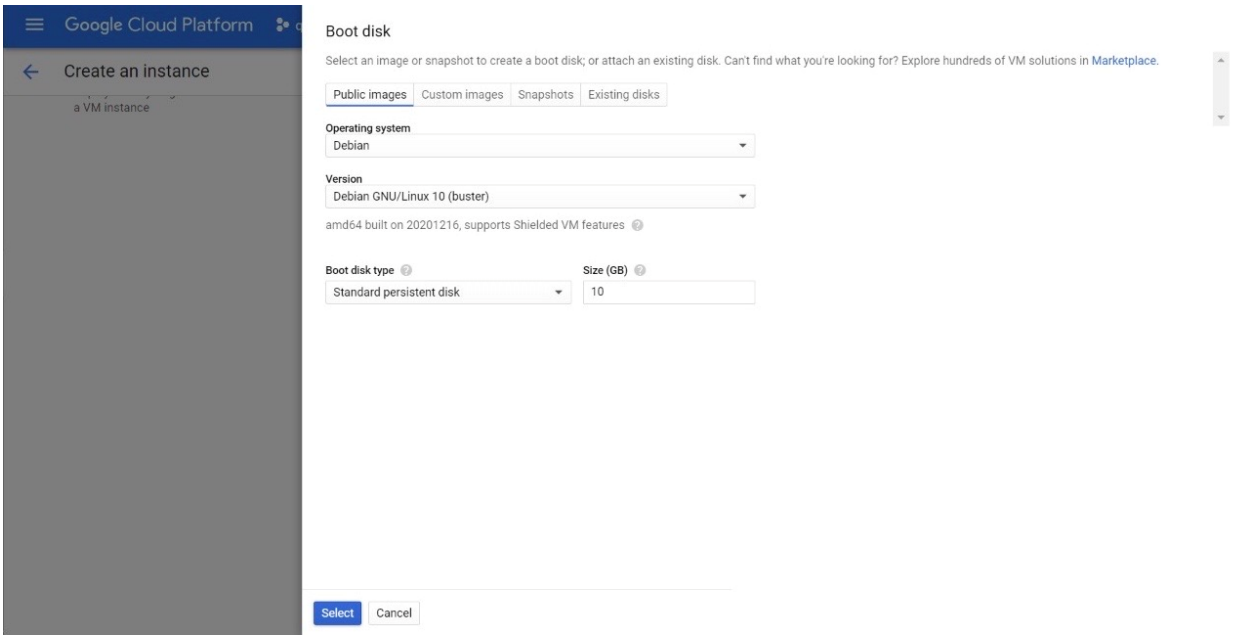

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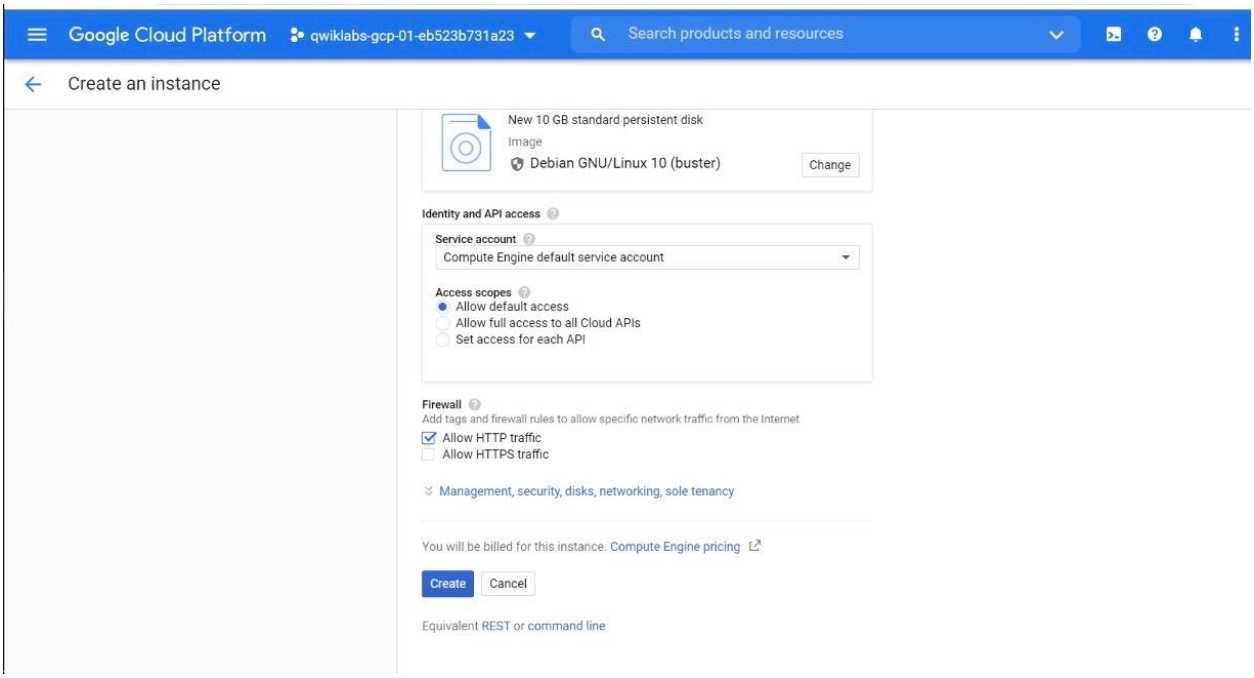


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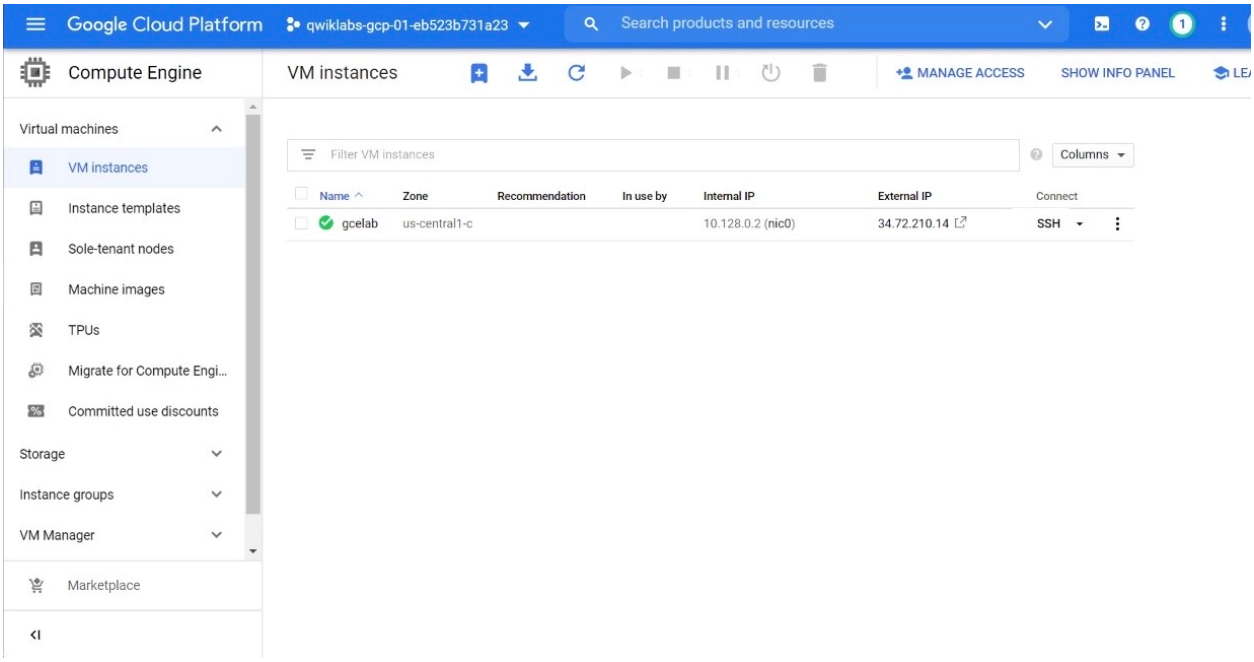

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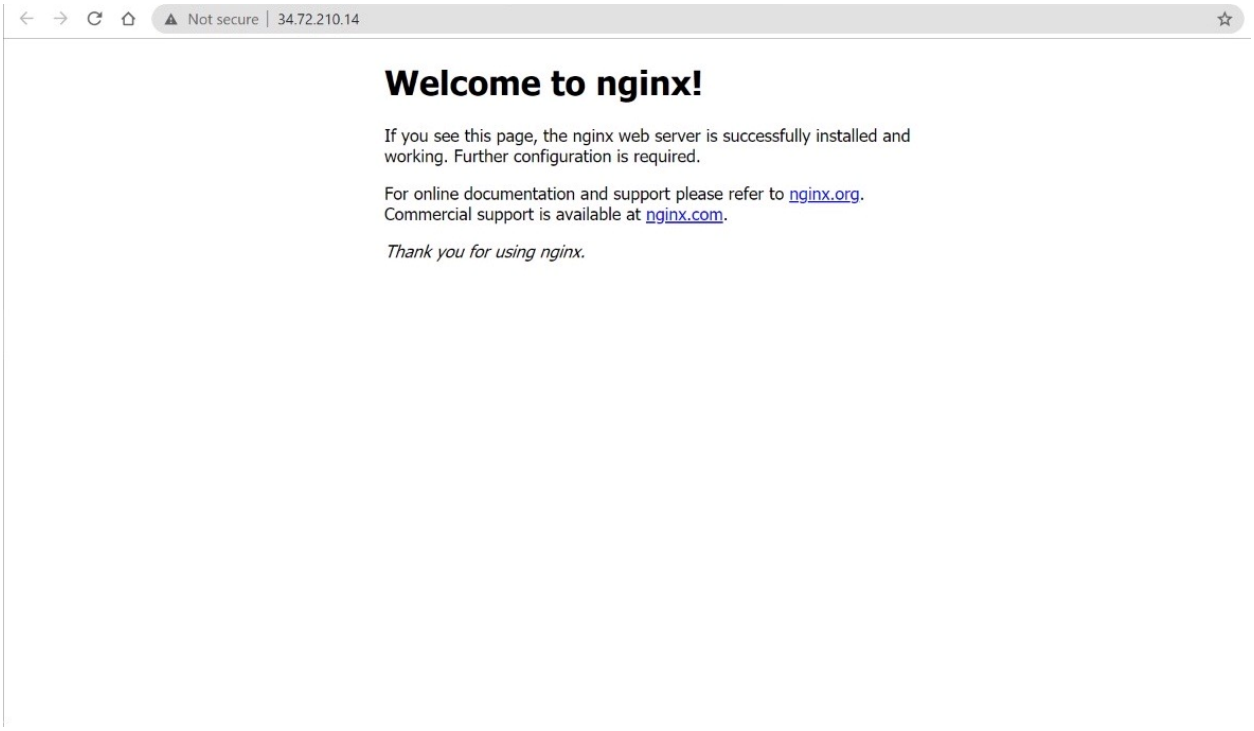
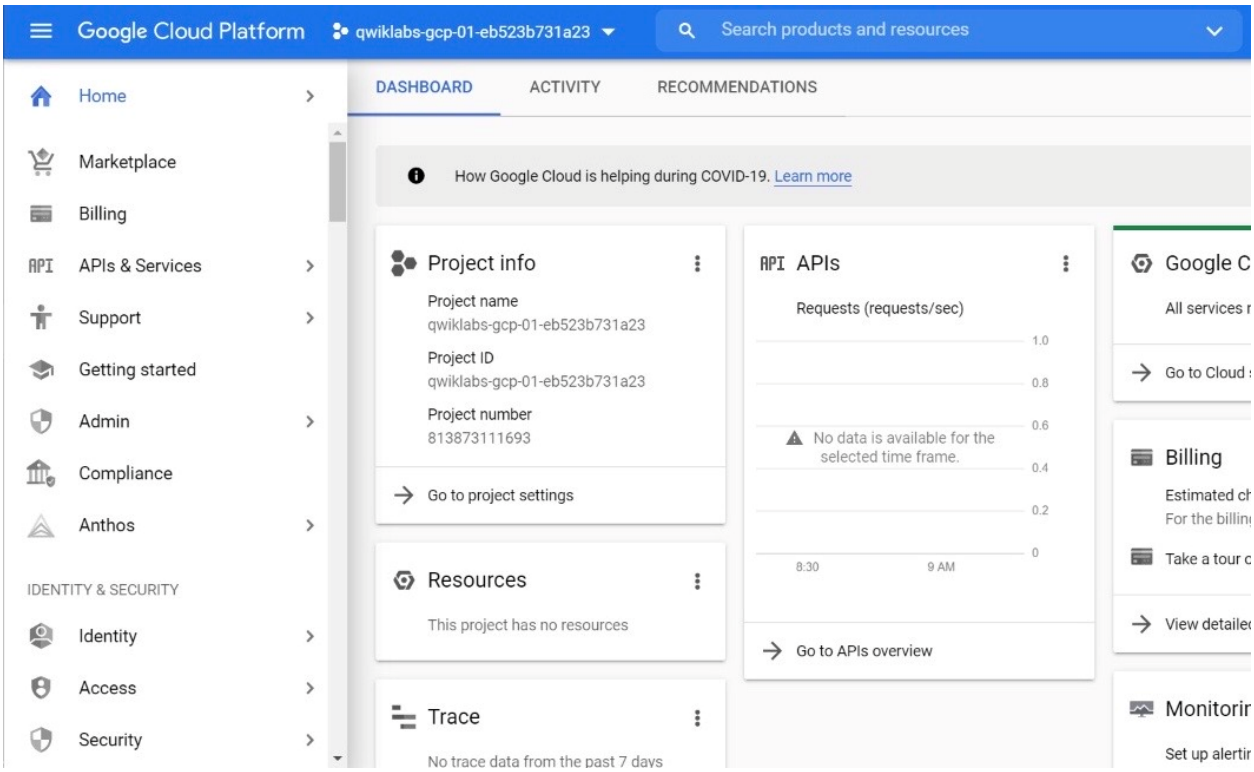


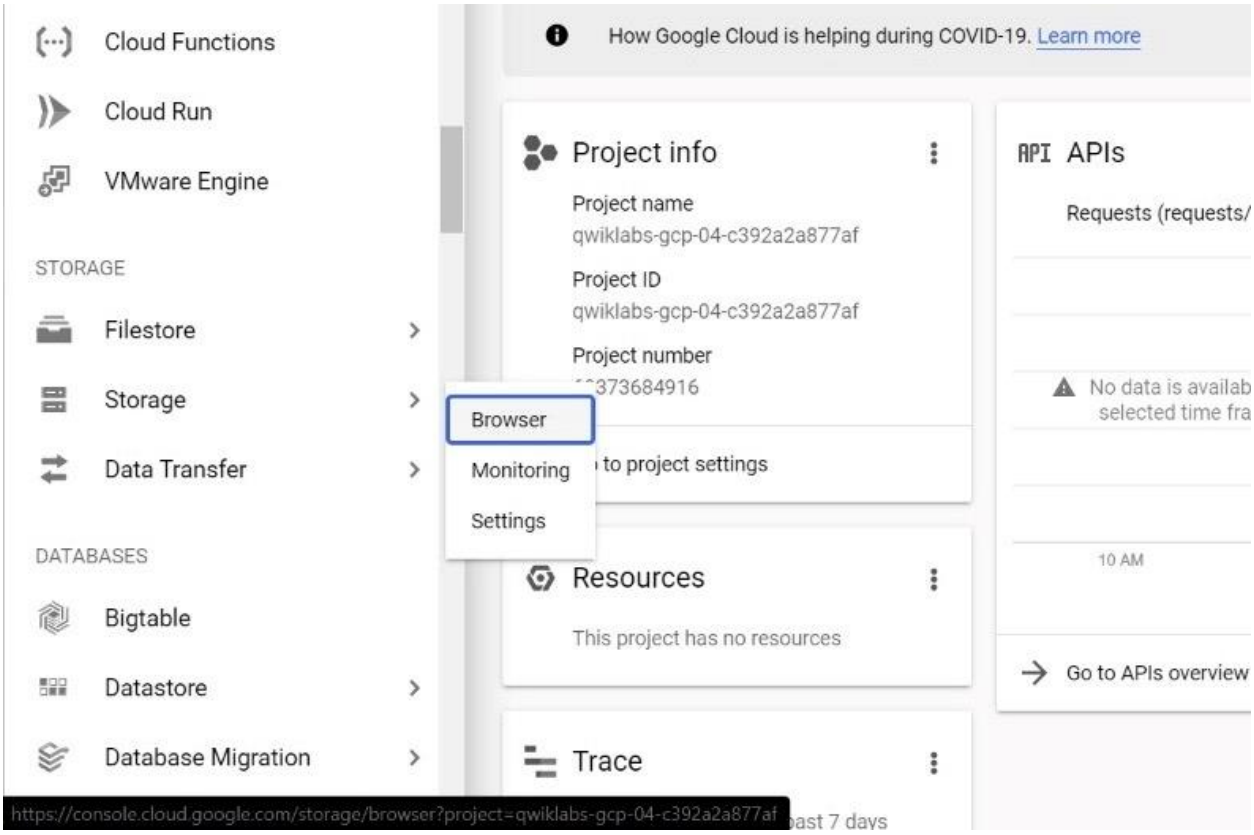
- **Google Cloud Storage: Creating a Bucket**

  **Stepwise Procedure:**

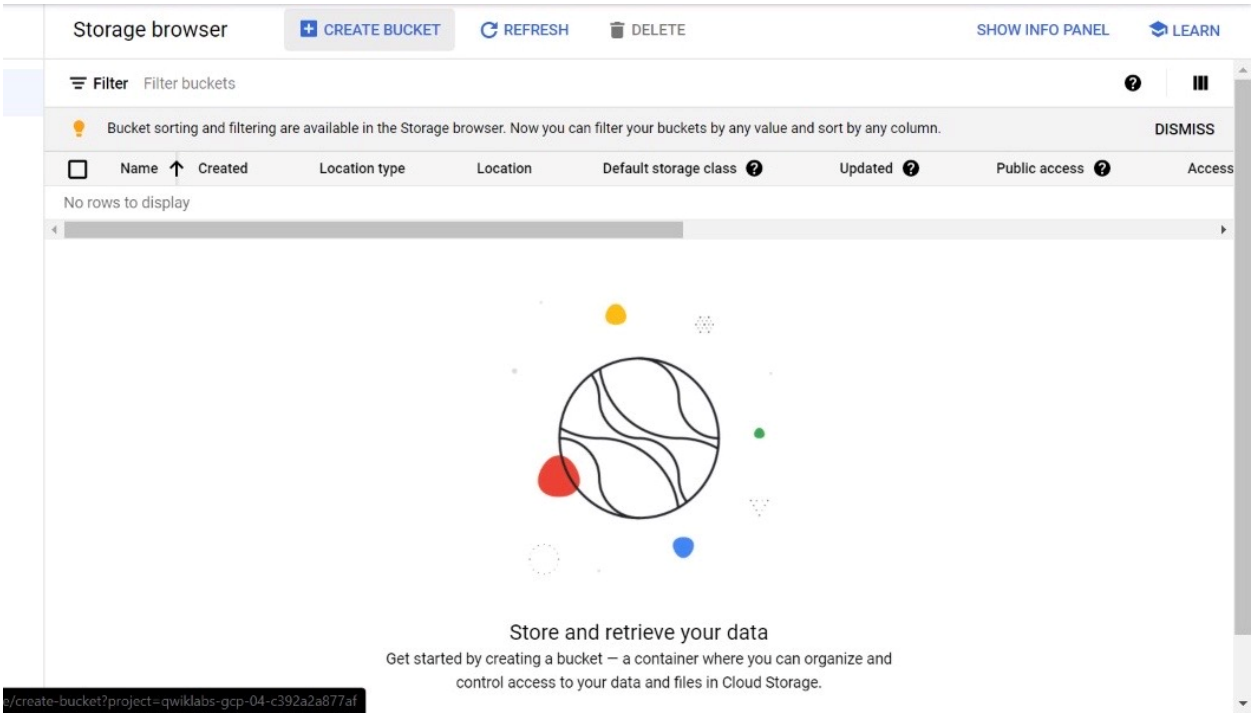
1) Visit (https://cloud.google.com/) and Sign In to your Google account.
2) A Google Cloud console will look like as shown in the picture.



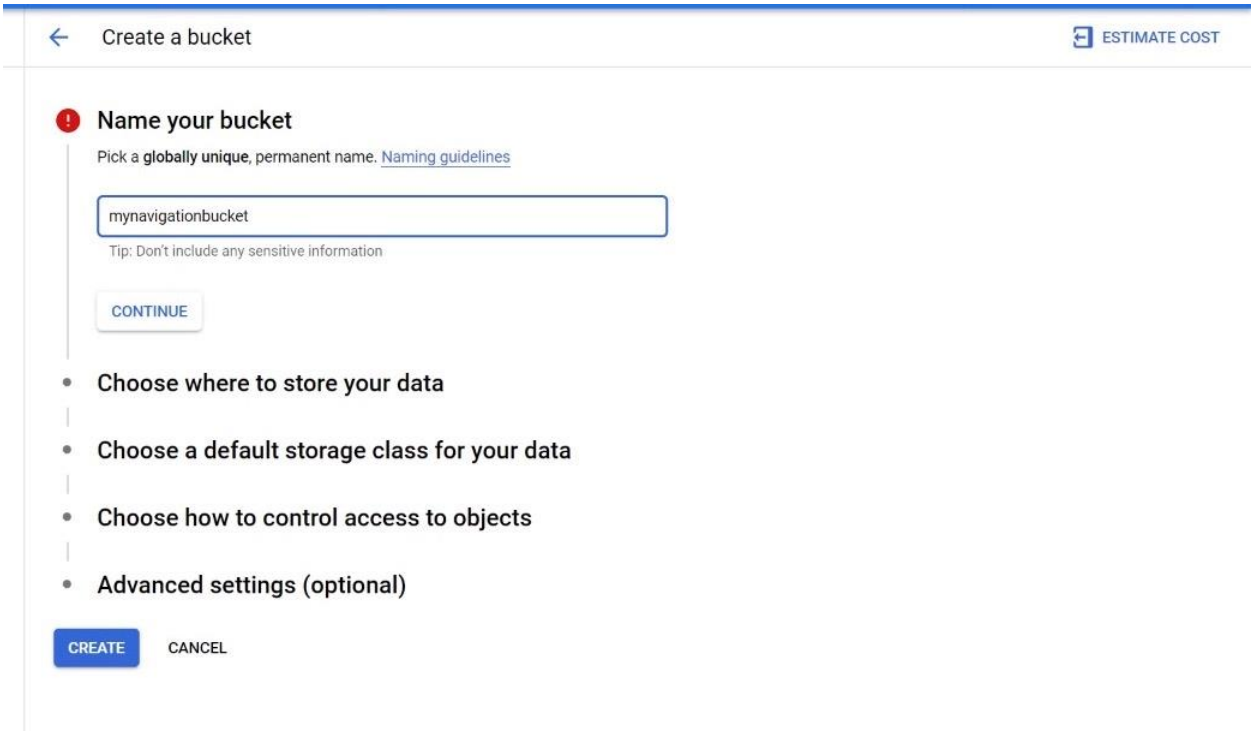
3) Now click on the Navigation menu and search for Storage and then click on the Browser.



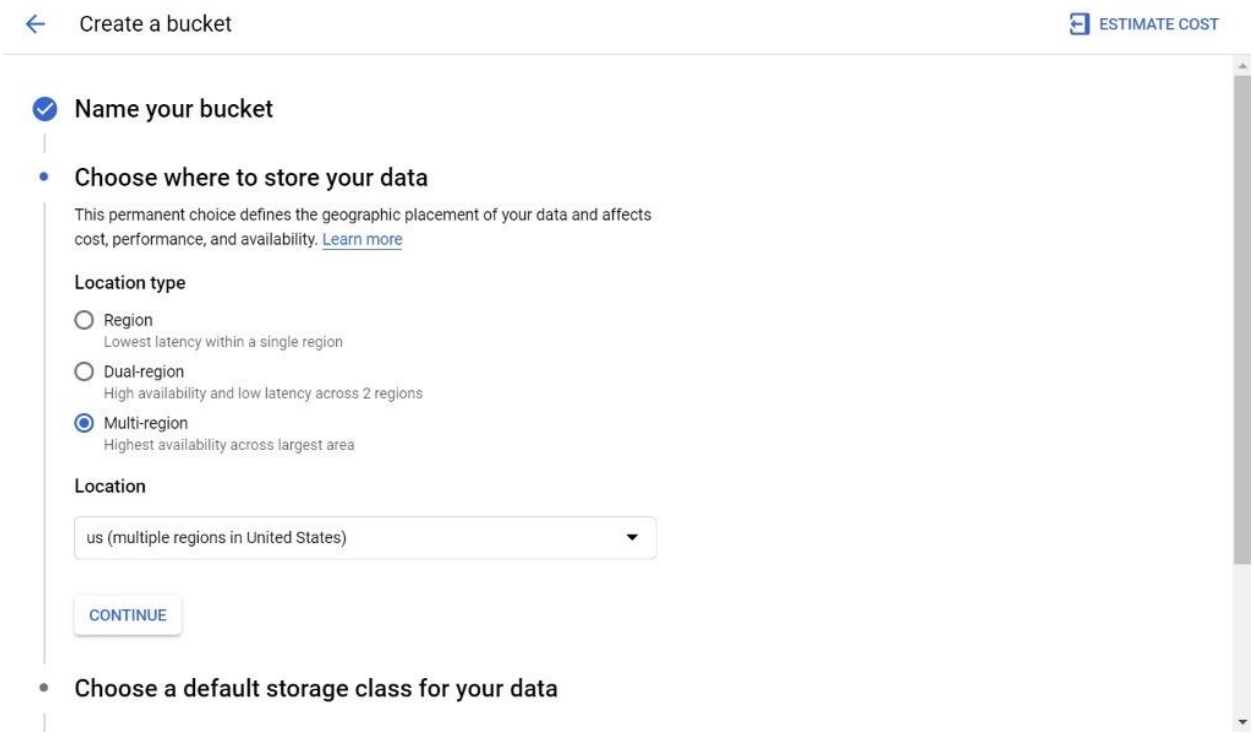

4) A storage browser page will be opened. Now click on the CREATE BUCKET button to create a new Bucket.



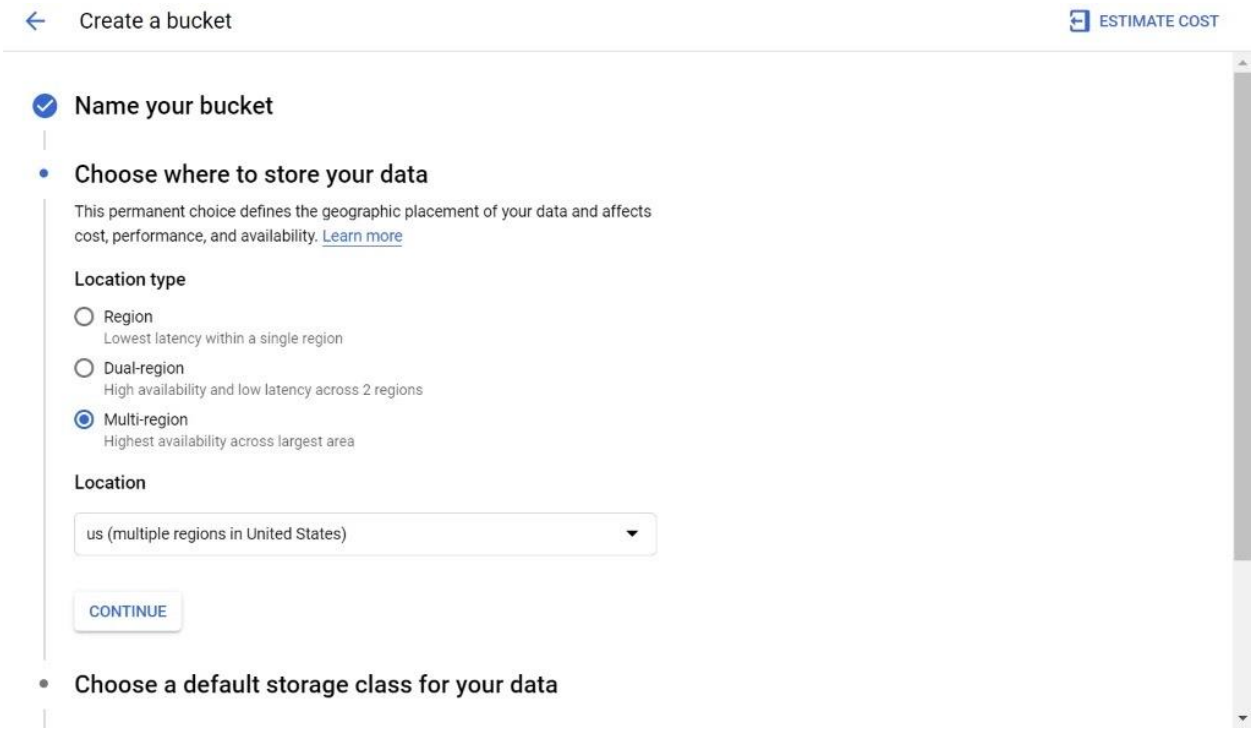

5) A new form will open which will ask for some details for your bucket.
For e.g., Name, Location Type etc.



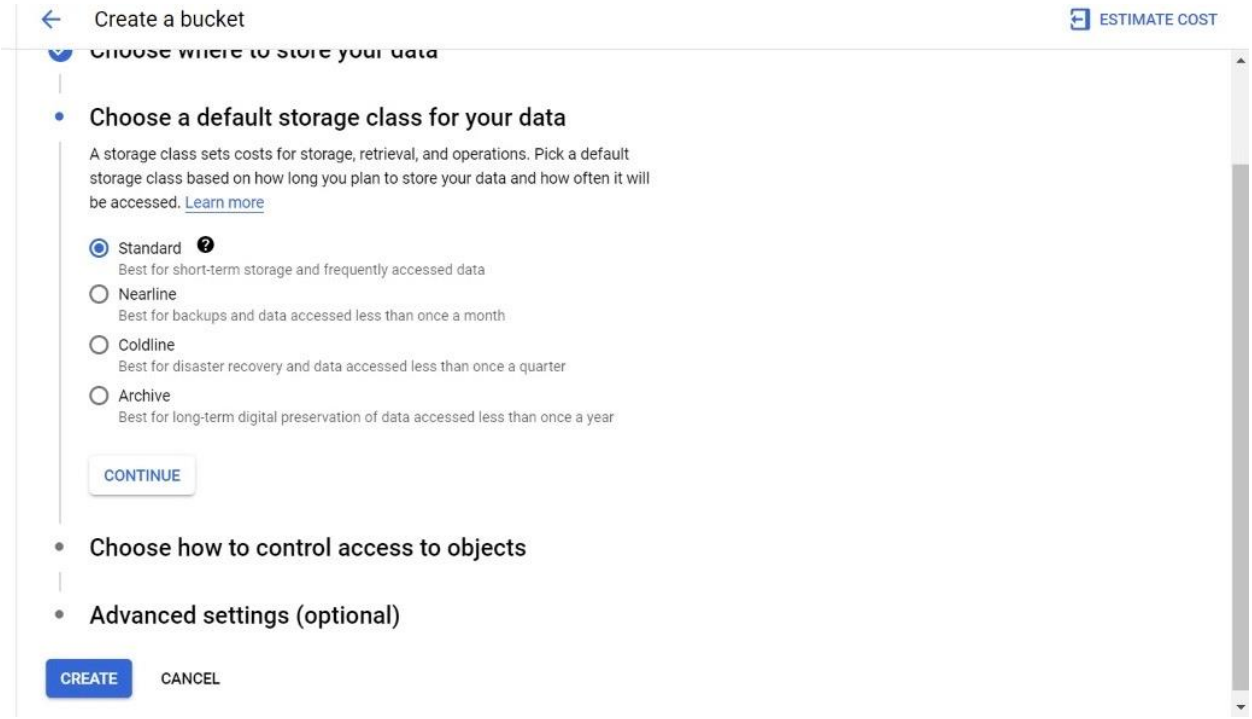

6) Give your bucket a name which is globally unique. If you want to know more about naming guidelines click on the "Naming guidelines" link.



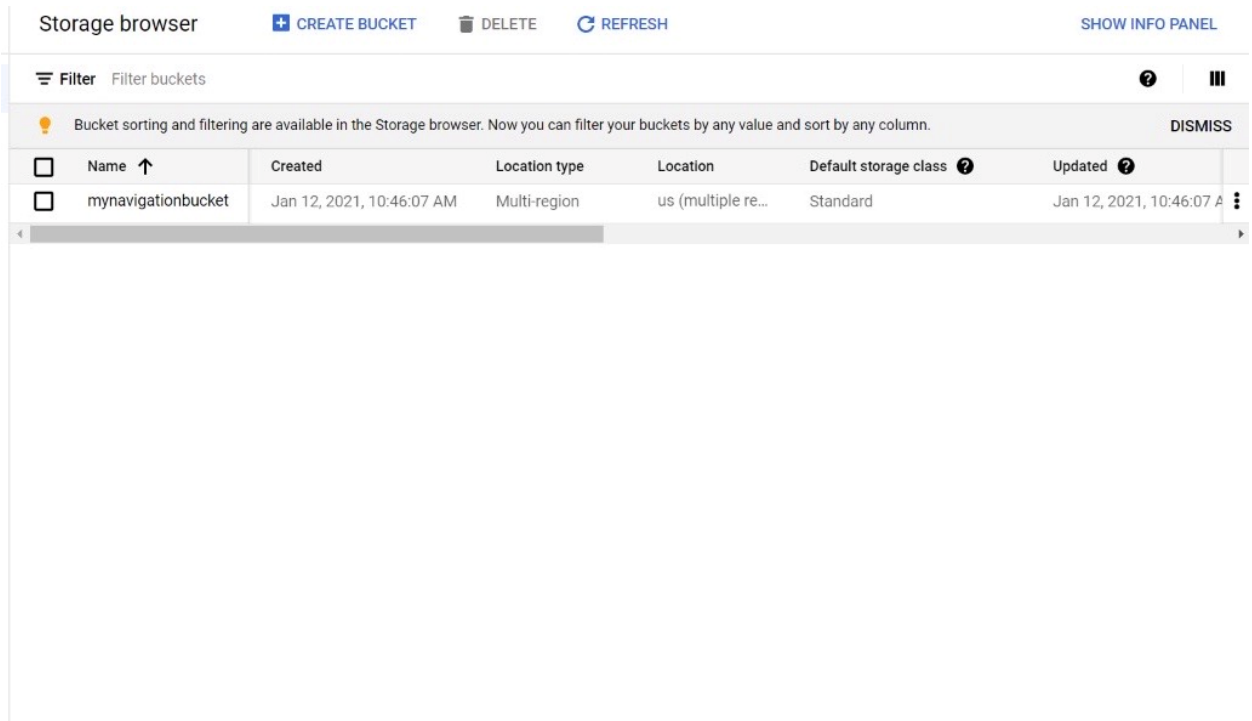

7) Now select the “Location Type” for your bucket in my case I am selecting “Multi-region” bucket and then click on Continue button.



8) Keep rest of the settings as default settings and click on Create button to create a new Bucket.




9) As you can see our bucket “mynavigationbucket” is now created and we can use it to store our data on the Google Cloud.



- **Google Cloud Storage: Creating a Folder**

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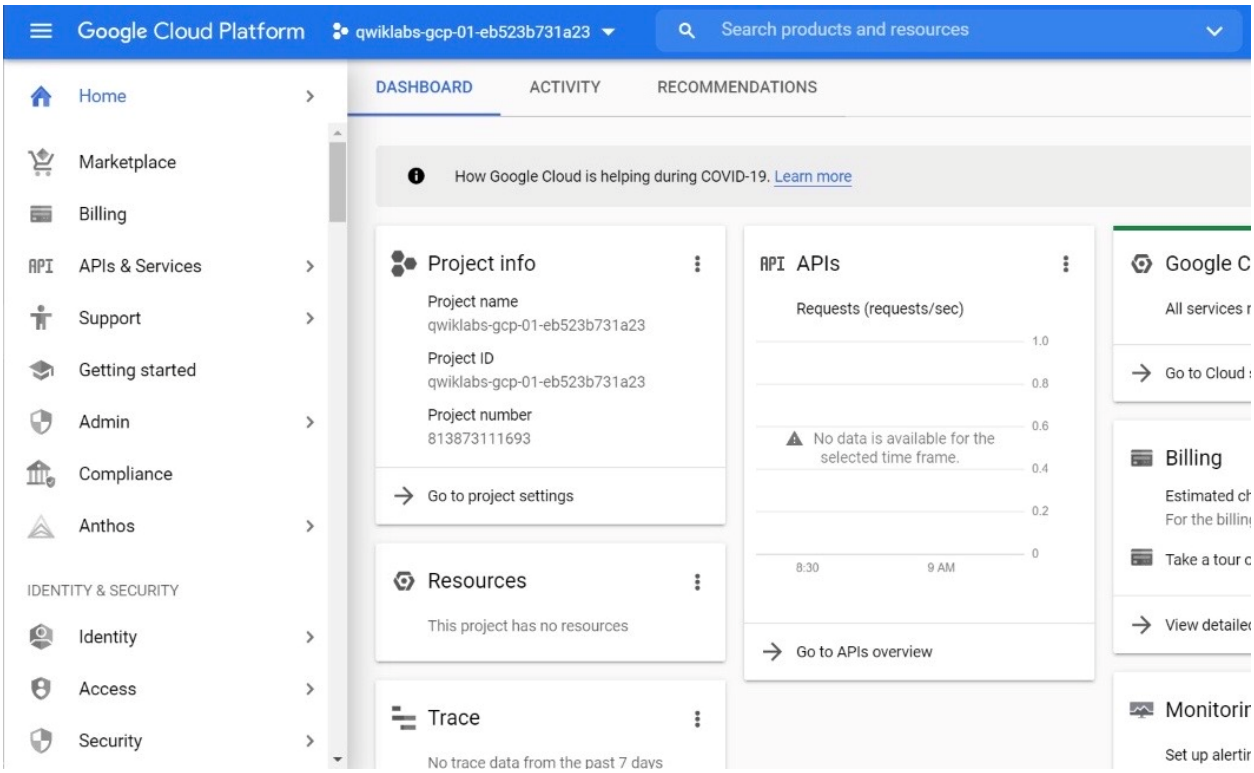


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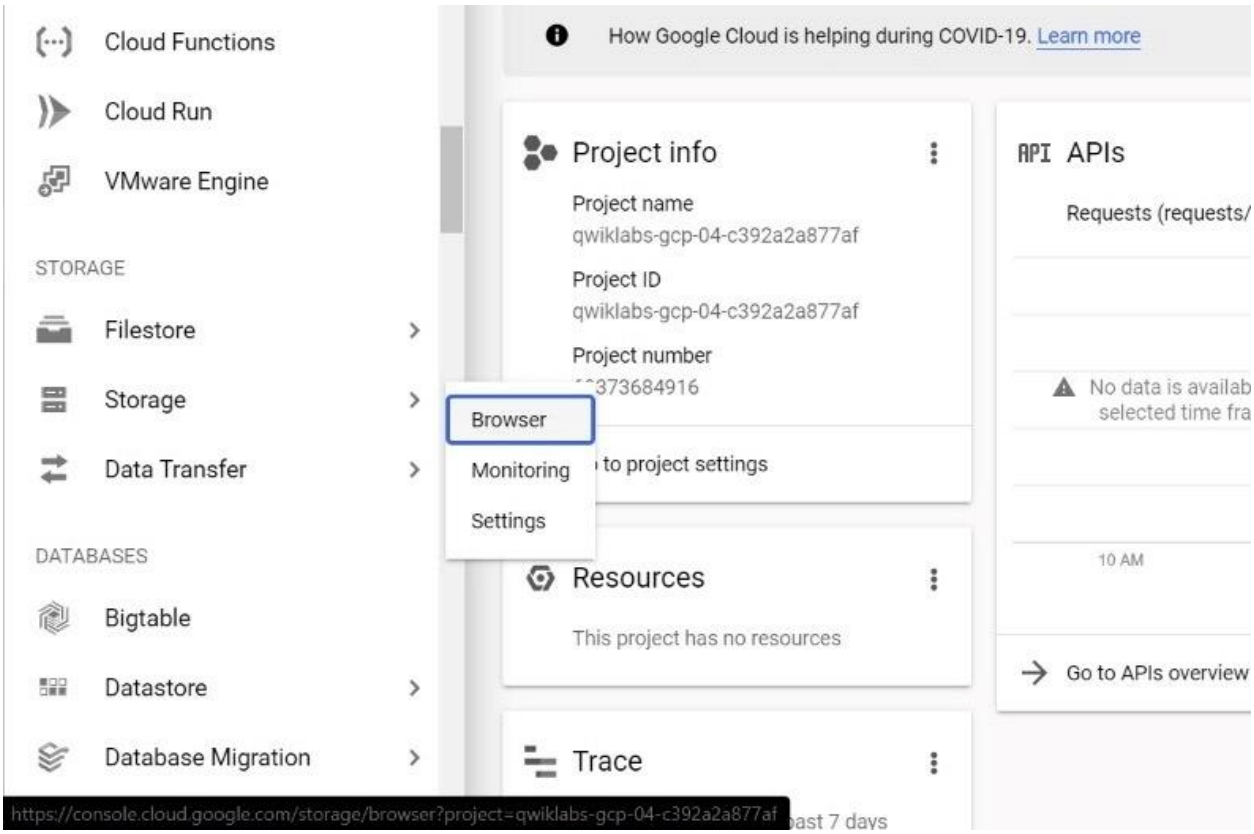


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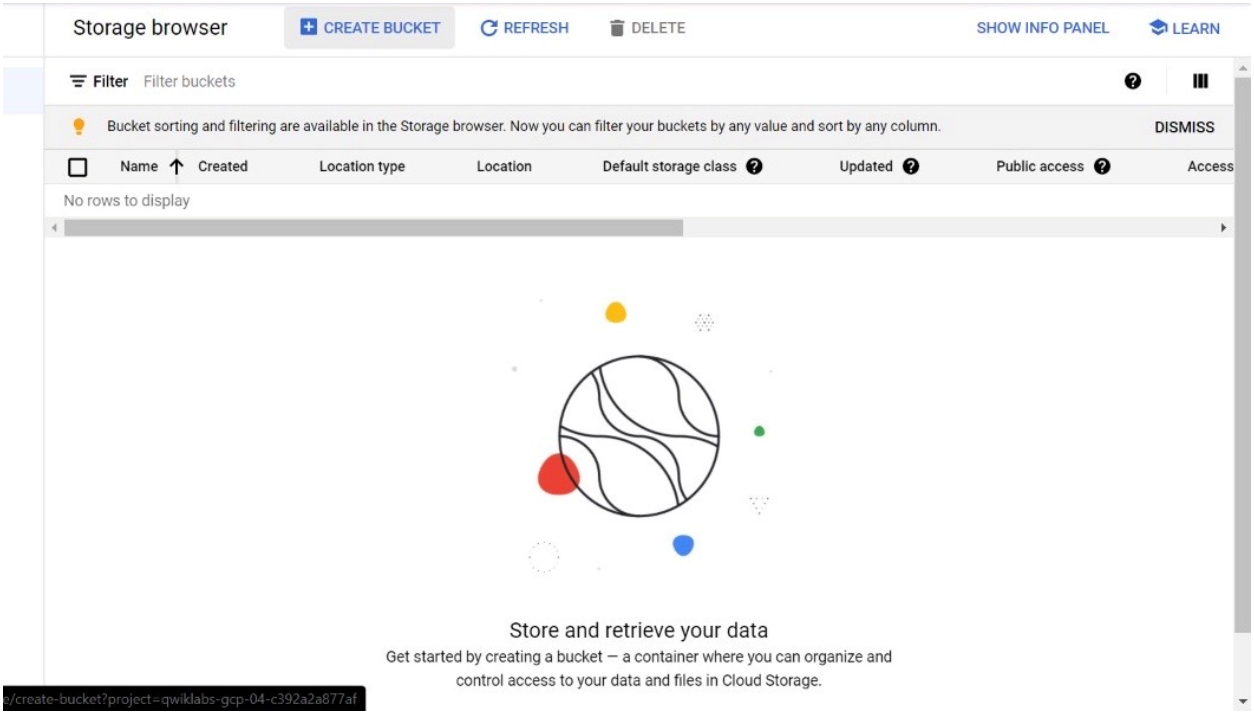

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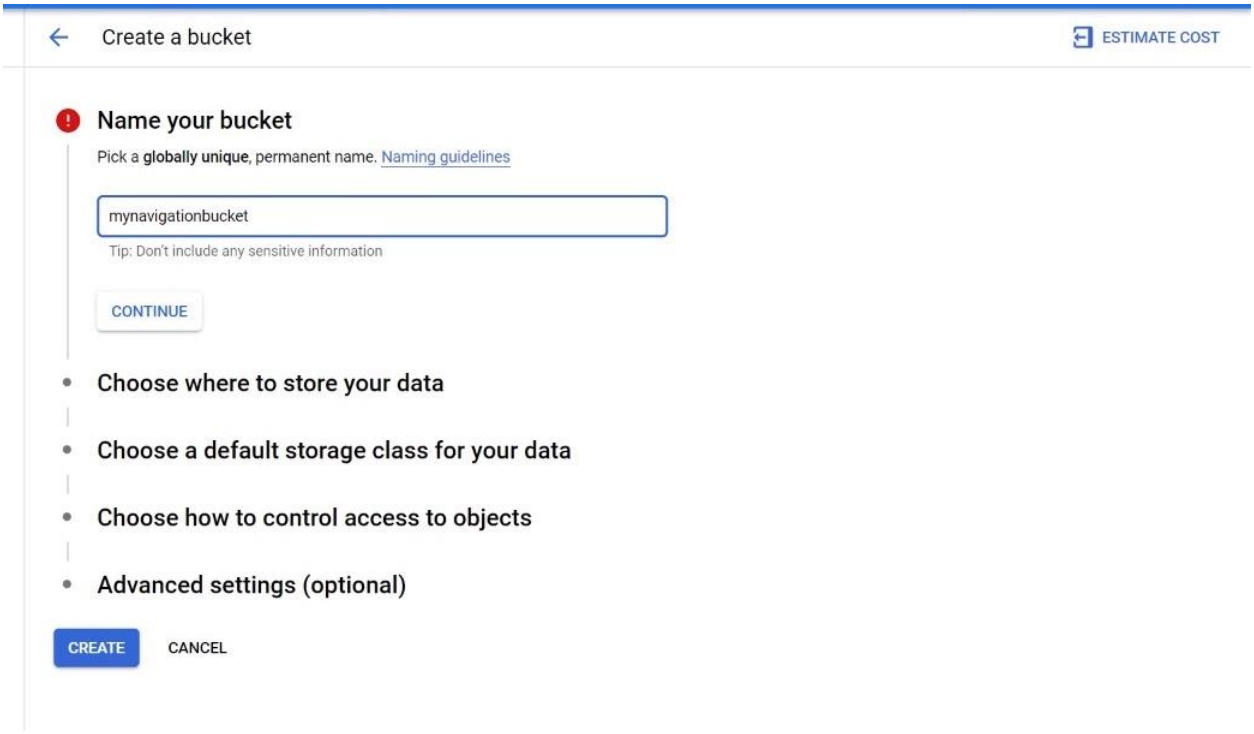


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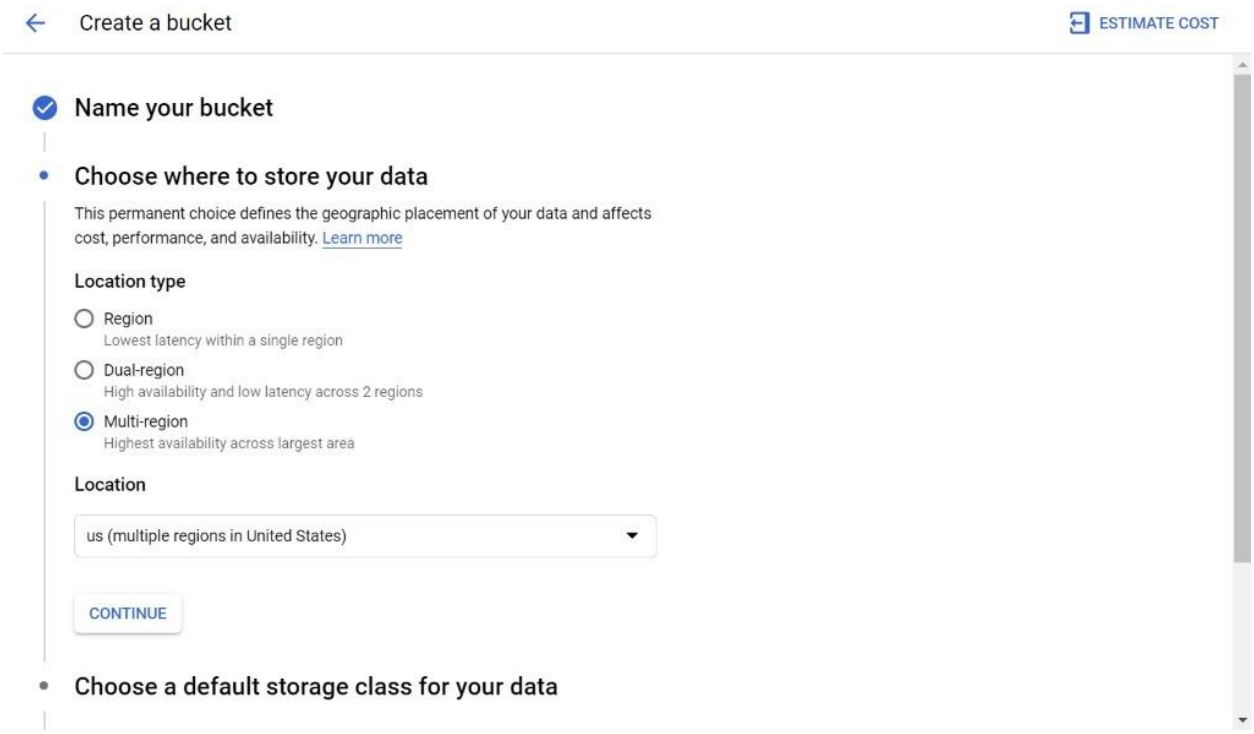

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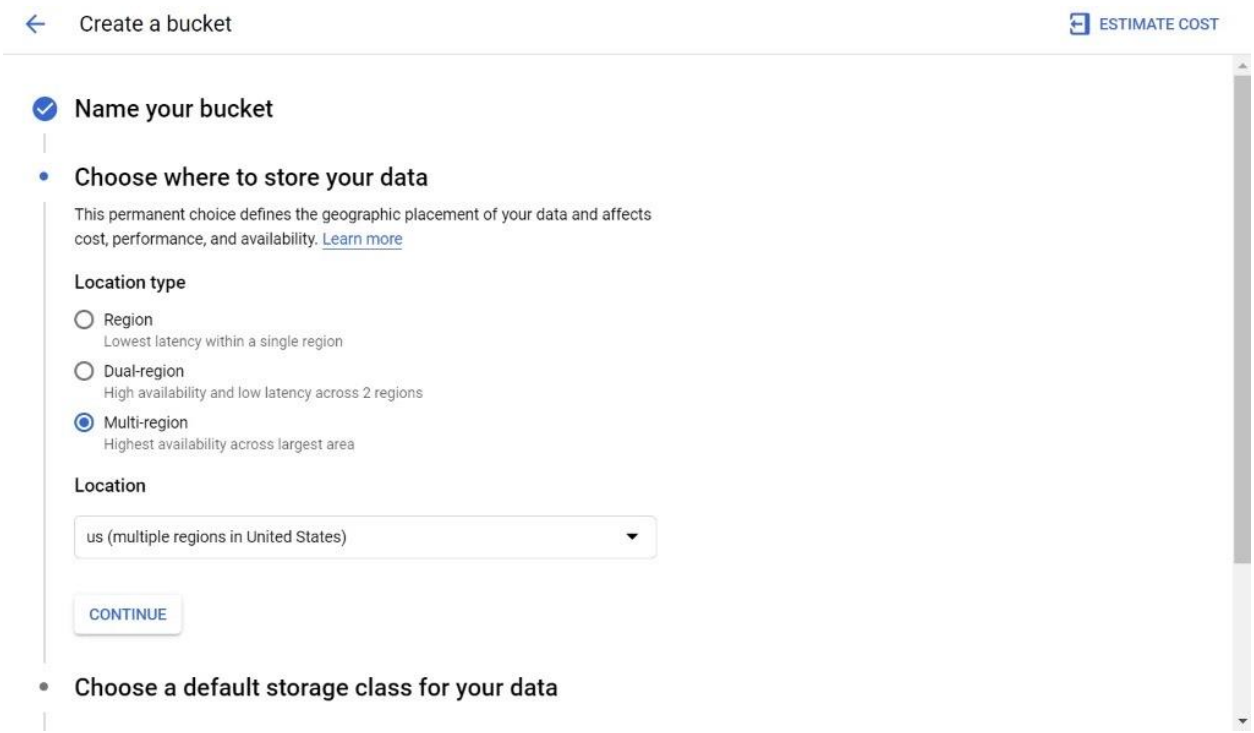
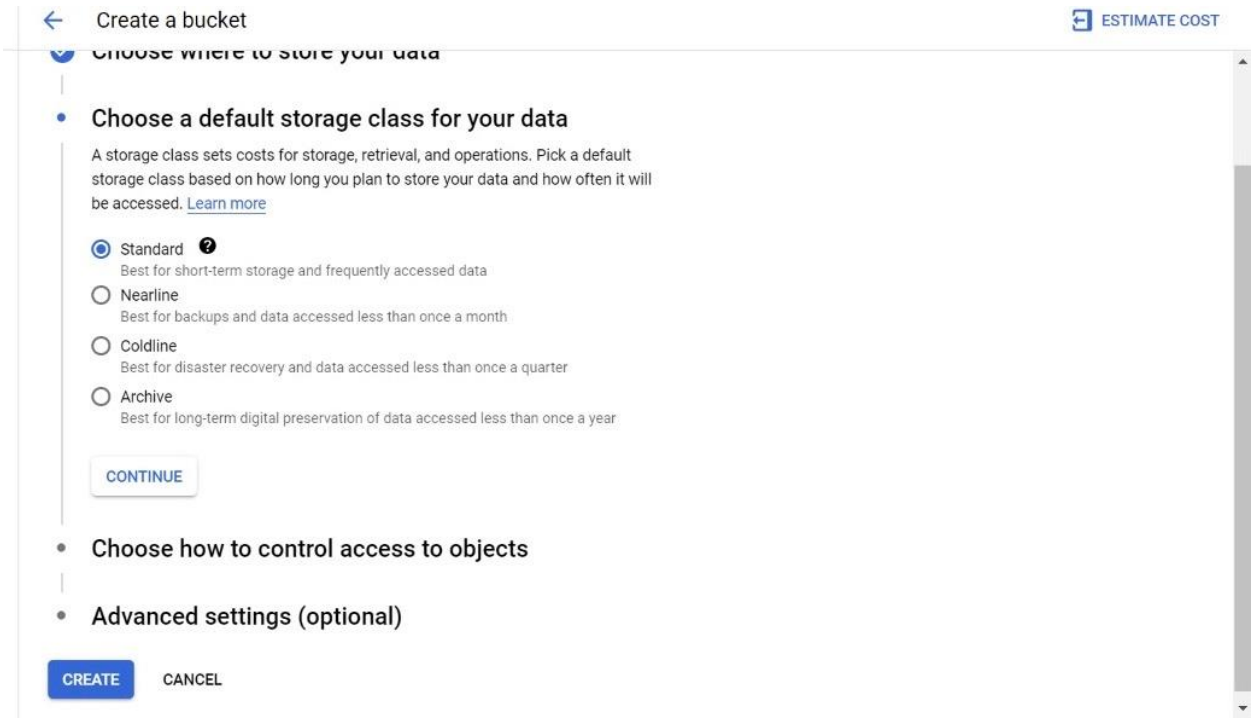



8) Keep rest of the settings as default settings and click on Create button to create a new Bucket.



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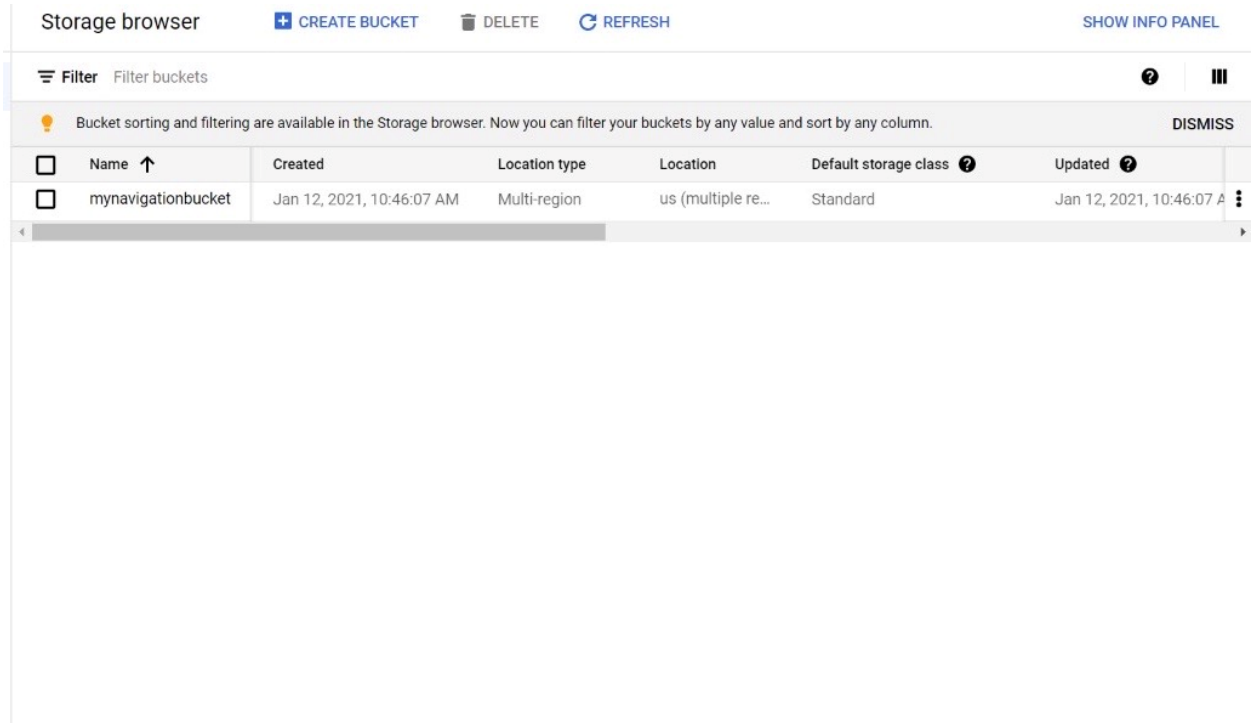
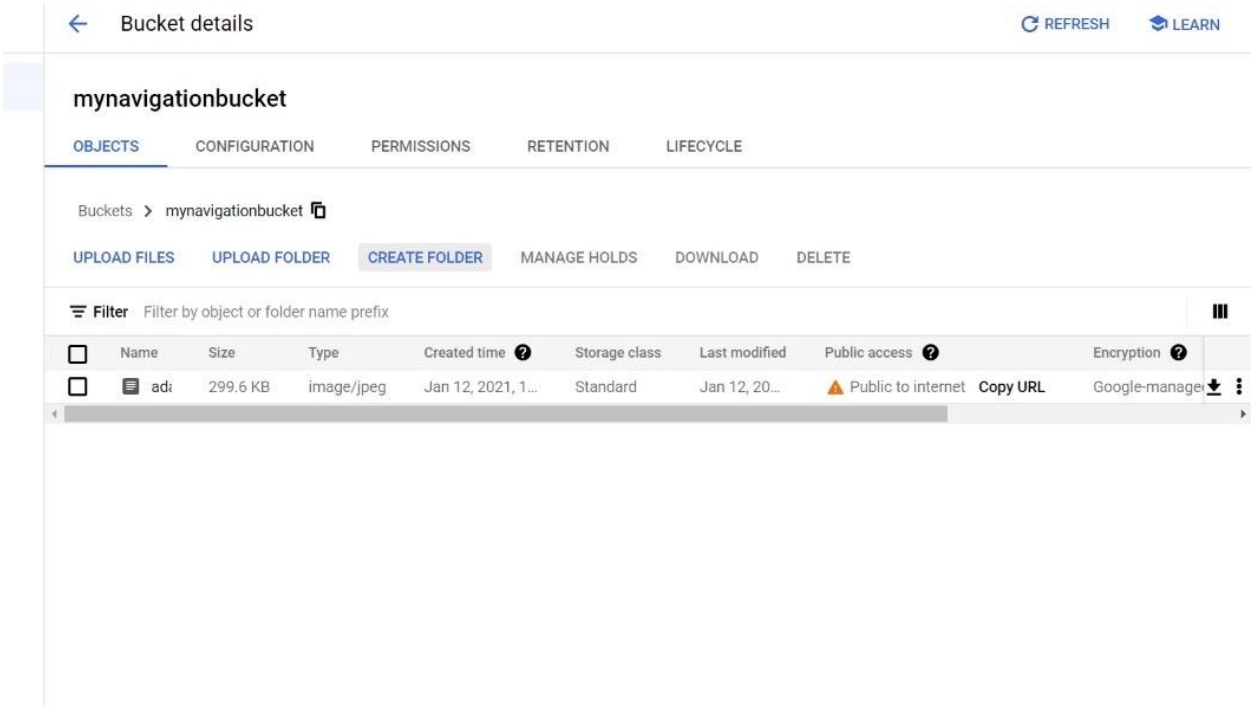
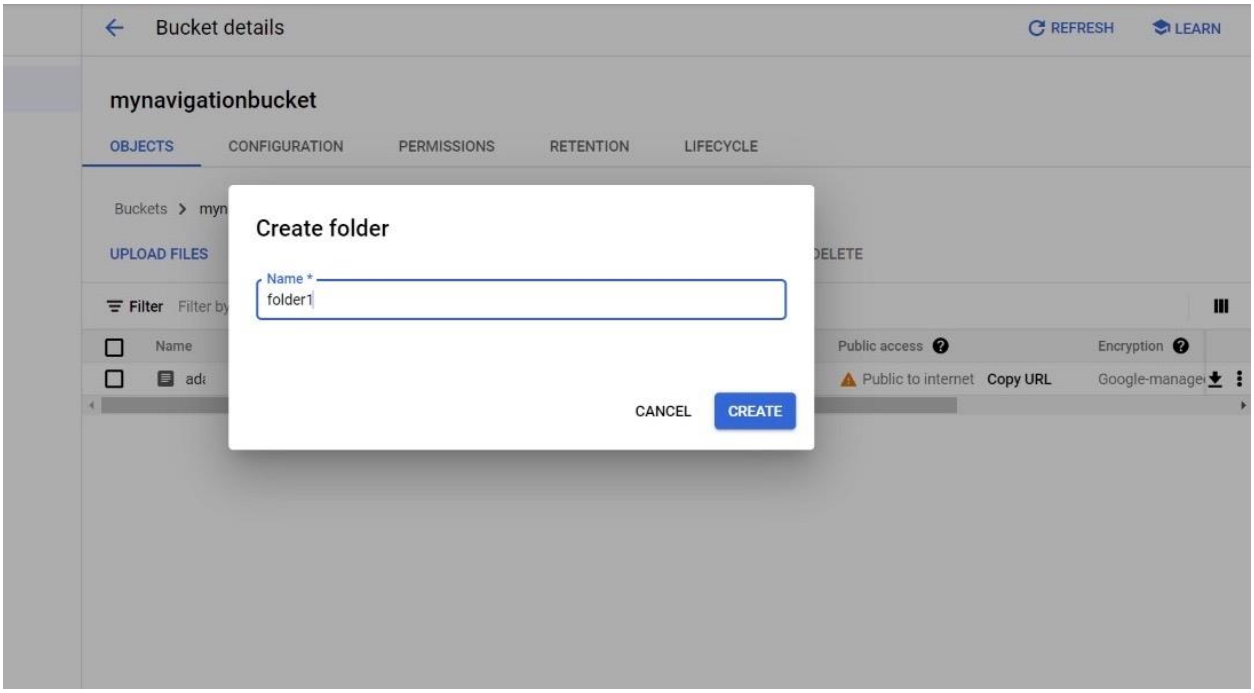


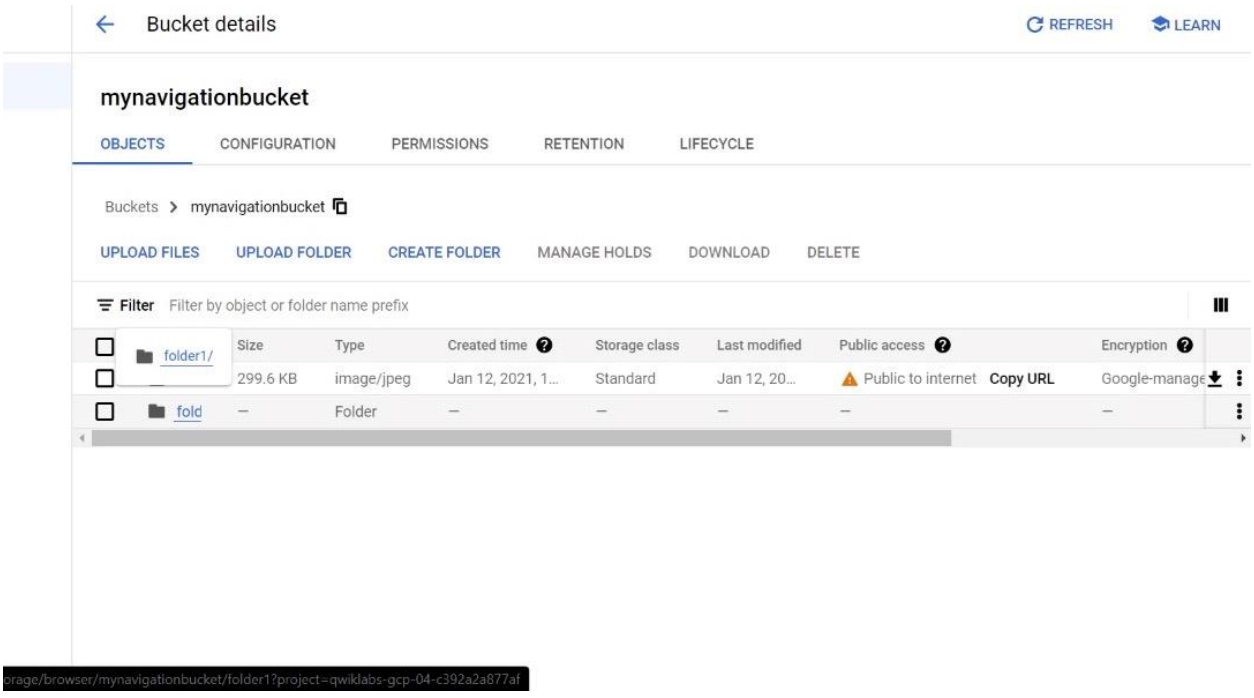

10) Now open your bucket and click on the Create Folder button to create a new Folder in your bucket.



11) You can give any name to your folder in my case I am giving it name as “folder1”.



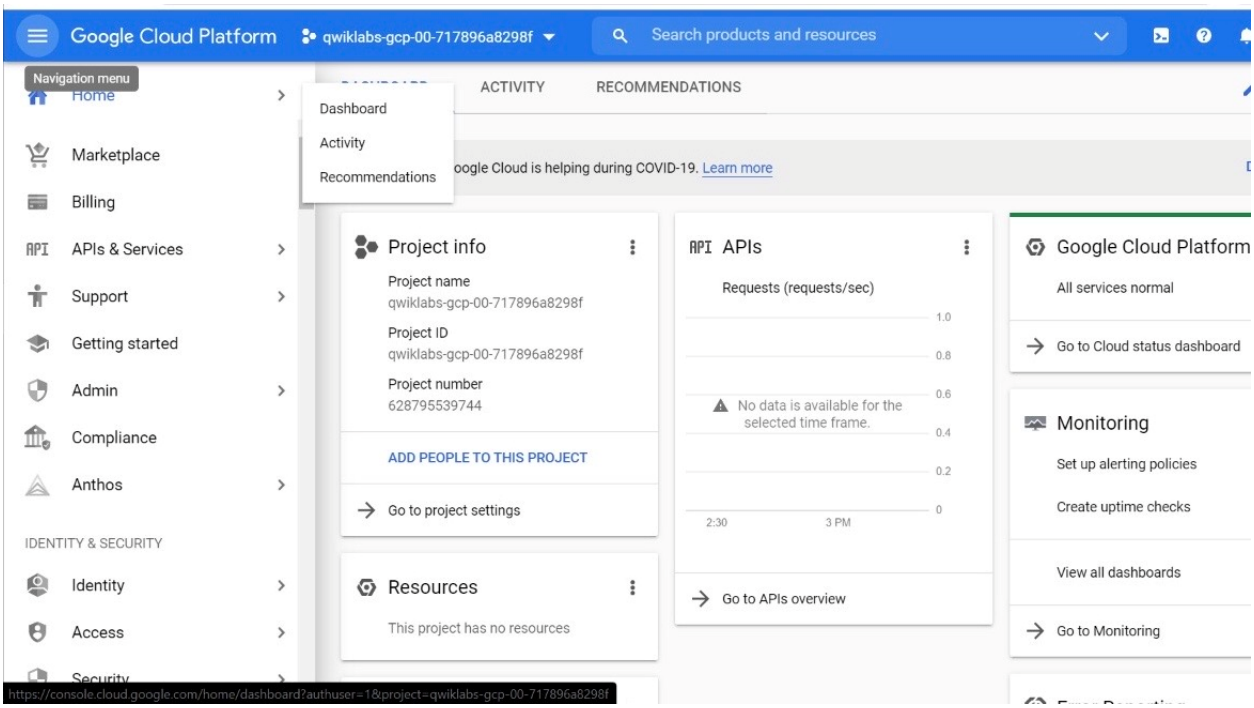

12) Now click on the CREATE button to create a new folder in your bucket.
13) As you can see our folder named as “folder1” is now created and we can store data in that folder.



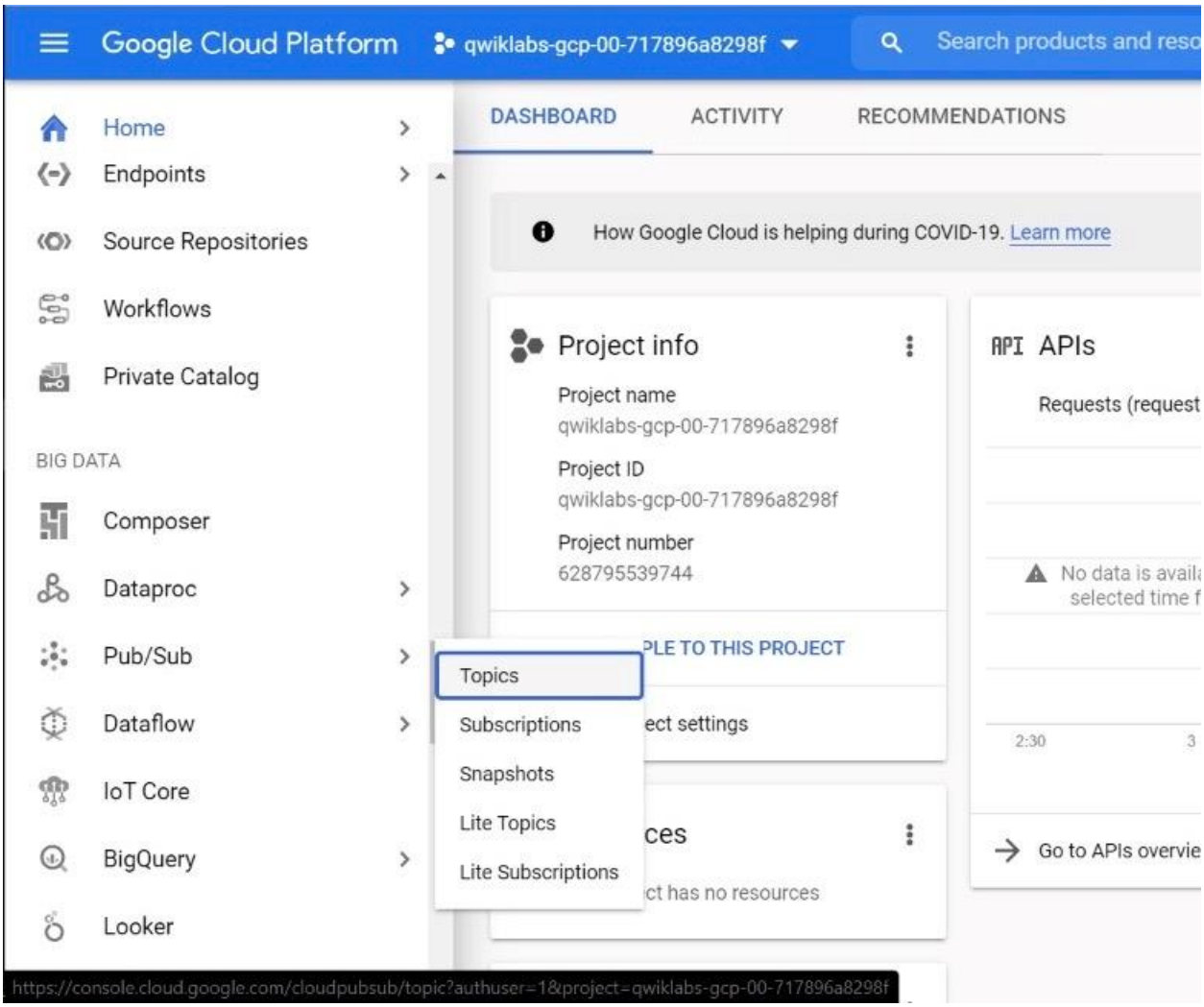
- **Google Cloud Pub/Sub:**

  **Stepwise Procedure:**

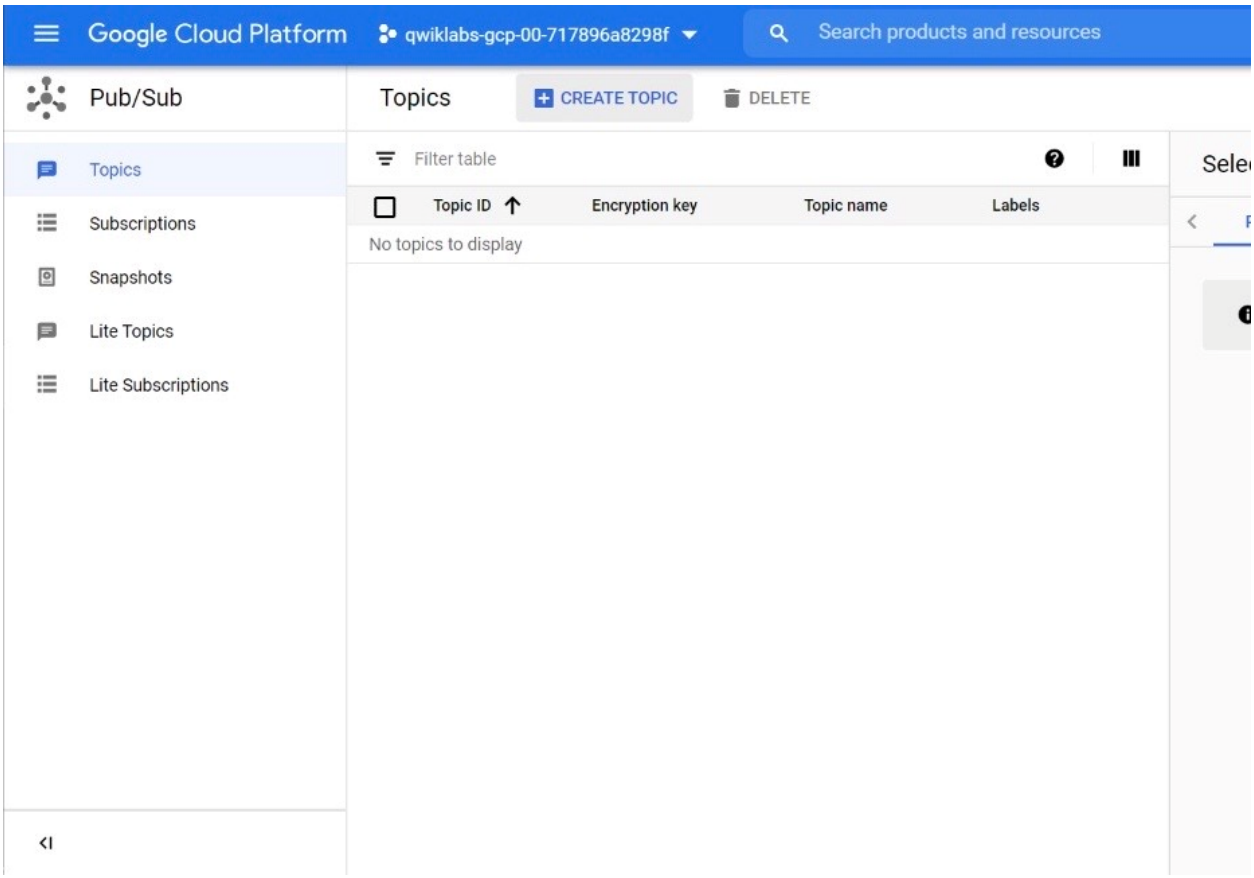
1) Visit (https://cloud.google.com/) and Sign In to your Google account.
2) A Google Cloud console will look like as shown in the picture.



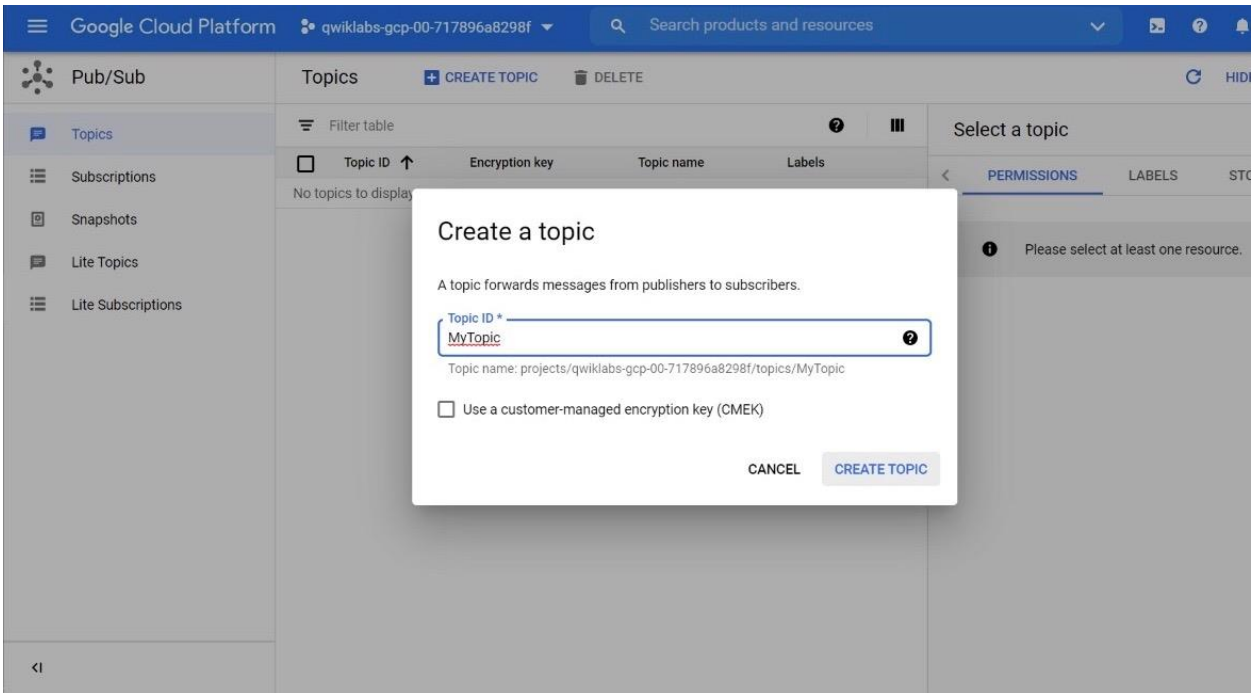

3) Now click on the Navigation menu as shown in the above picture and search for Pub/Sub and then click on Topics.



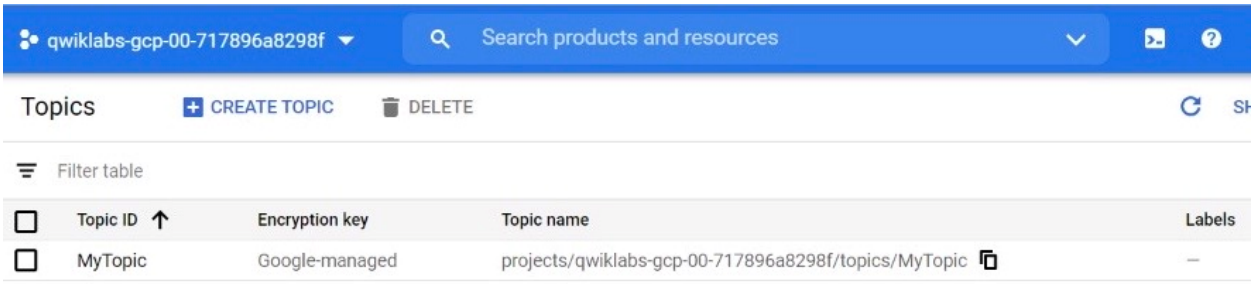

4) To create a new Topic, click on Create Topic button a new Dialog box will be opened.



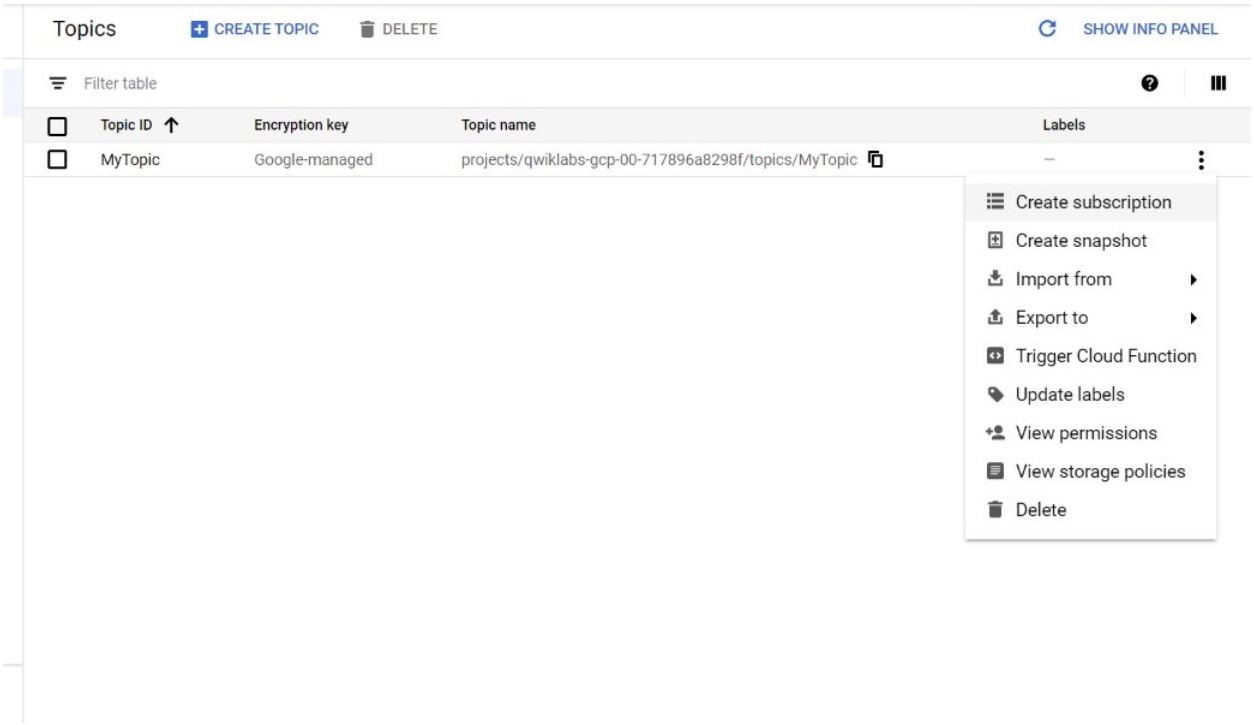

5) Give a unique ID to your Topic and click on Create Topic button.



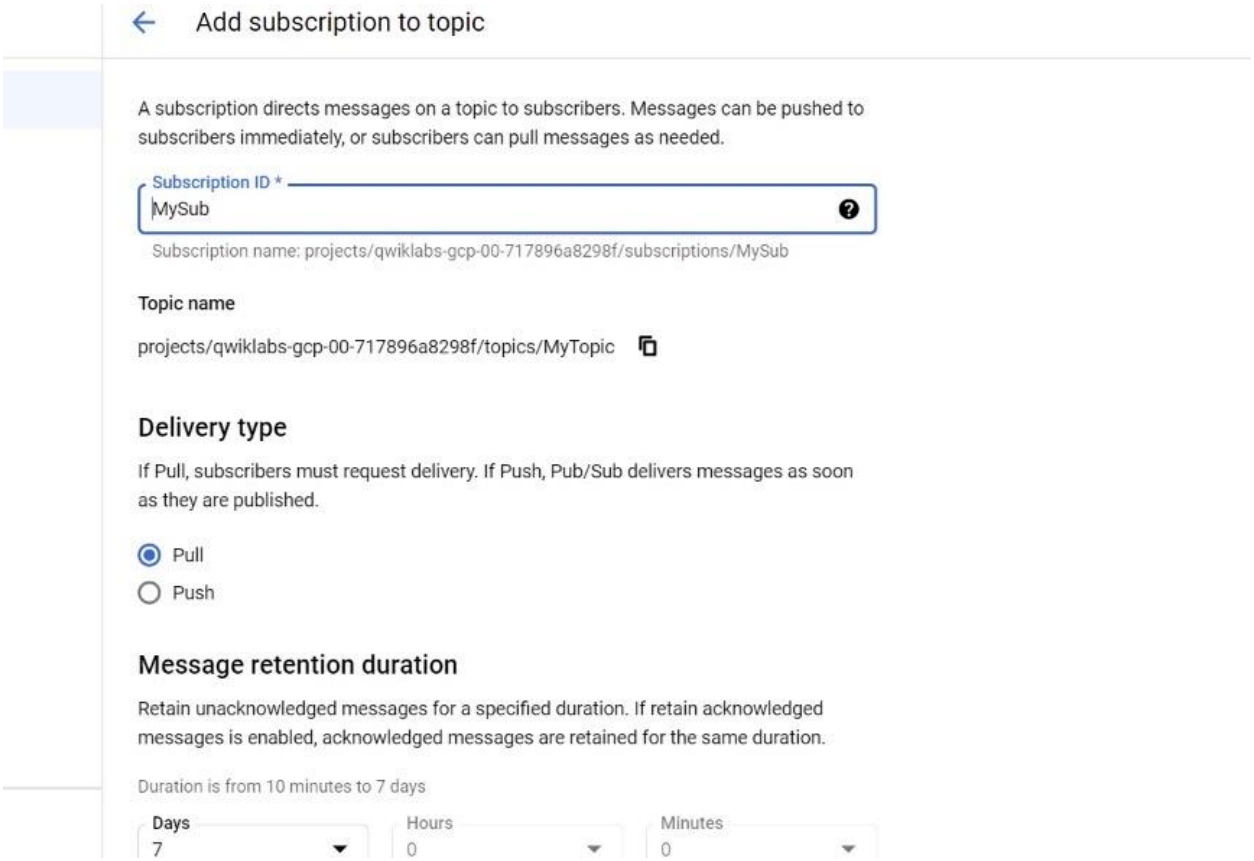
6) As you can see our Topic named as “My Topic” is now created.



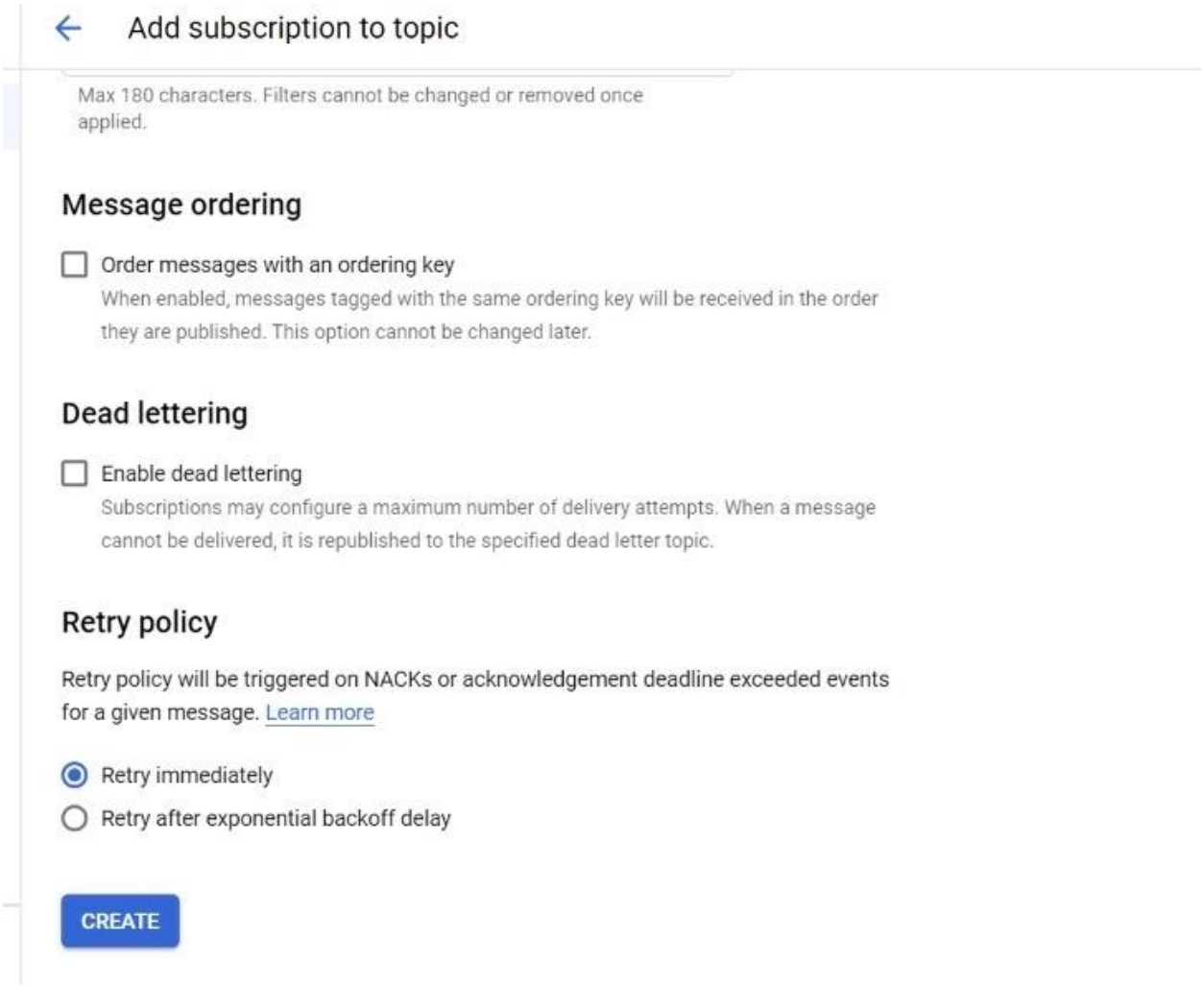
7) Now to create a Subscription Click on the “Create Subscription” as shown in the image.



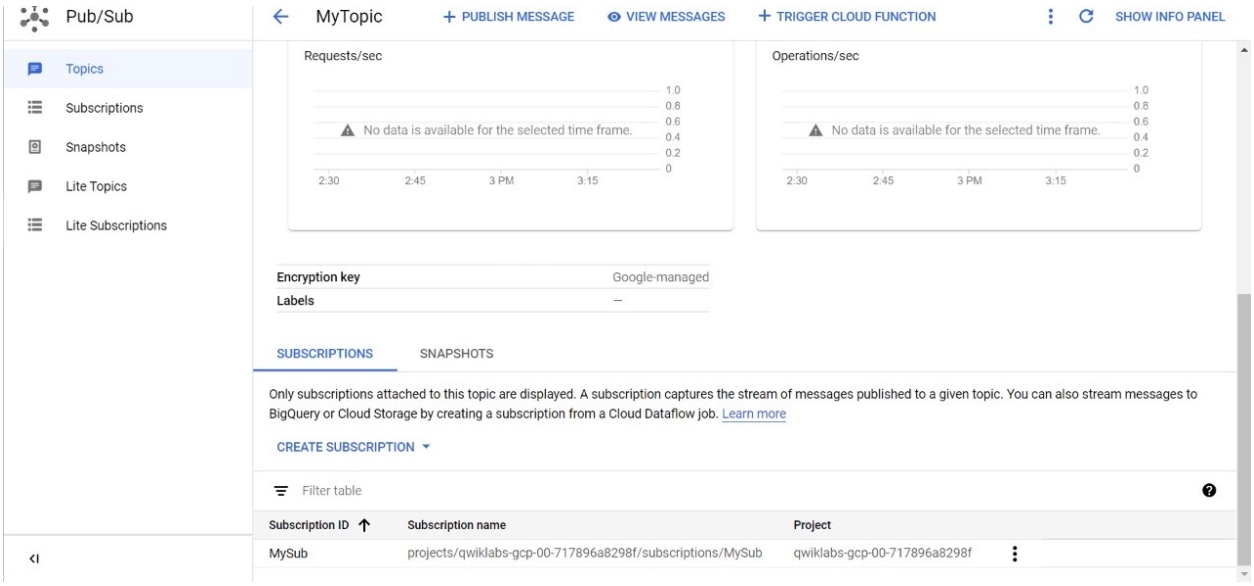

8) Give an ID to your subscription and select the delivery type as Pull.




9) Now keeping the other settings as default click on the Create button to create a subscription.




10)To check the subscription go back to “MyTopic” again and scroll down you can see “MySub” as subscription that we just created.

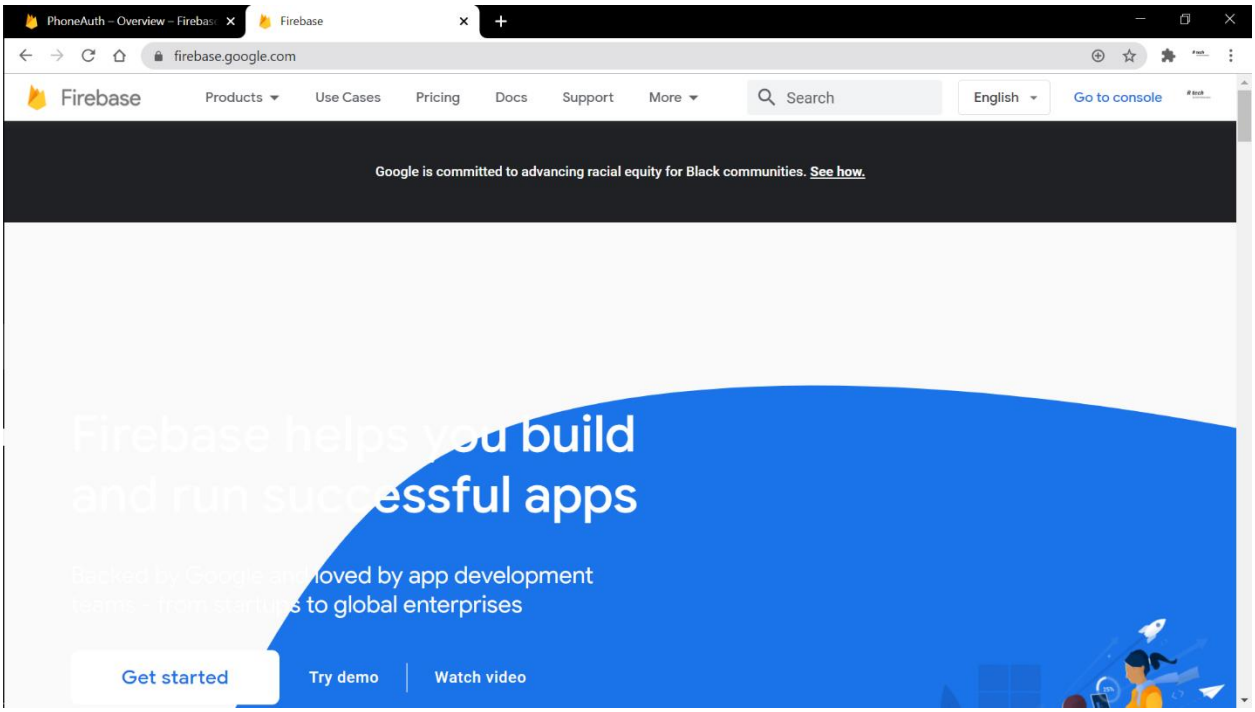

Pub/Sub
Topics
Subscriptions
Snapshots
Lite Topics
Lite Subscriptions
MyTopic
+ PUBLISH MESSAGE
VIEW MESSAGES
+ TRIGGER CLOUD FUNCTION
SHOW INFO PANEL
Requests/sec
No data is available for the selected time frame.
1.0
0.8
0.6
0.4
0.2
0
2:30
2:45
3 PM
3:15
Operations/sec
No data is available for the selected time frame.
Encryption key
Google-managed
Labels
–
SUBSCRIPTIONS
SNAPSHOTS
Only subscriptions attached to this topic are displayed. A subscription captures the stream of messages published to a given topic. You can also stream messages to BigQuery or Cloud Storage by creating a subscription from a Cloud Dataflow job. Learn more
CREATE SUBSCRIPTION
Filter table
Subscription ID
Subscription name
Project
MySub
projects/qwiklabs-gcp-00-717896a8298f/subscriptions/MySub
qwiklabs-gcp-00-717896a8298f

a. Firebase database service (https://firebase.google.com/docs/database/)

- **Firebase Realtime Database:**

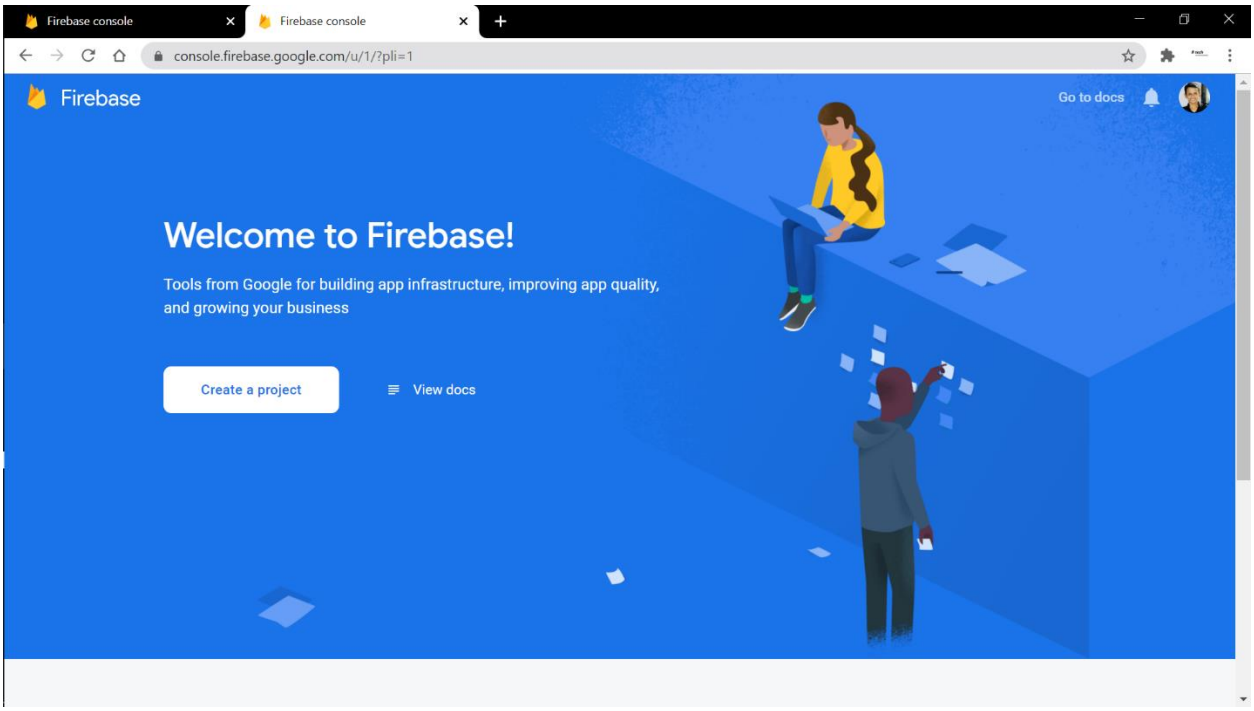
**Stepwise Procedure:**

1) Firstly visit (https://firebase.google.com/) and Sign In to your account.



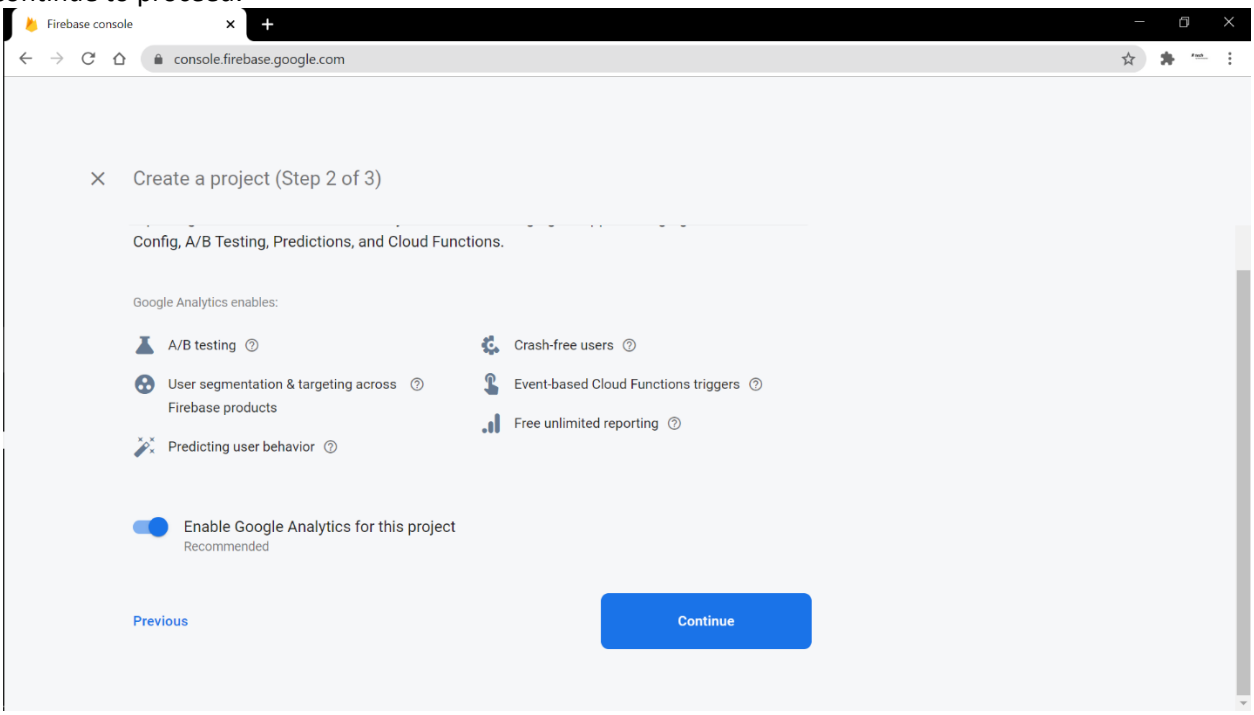

2) Sign In to your account to continue you can use your existing Google account to Sign In or you can create a new account.

3) After signing in click on the Create a project button two create a new project or you can use the existing project if you have any.

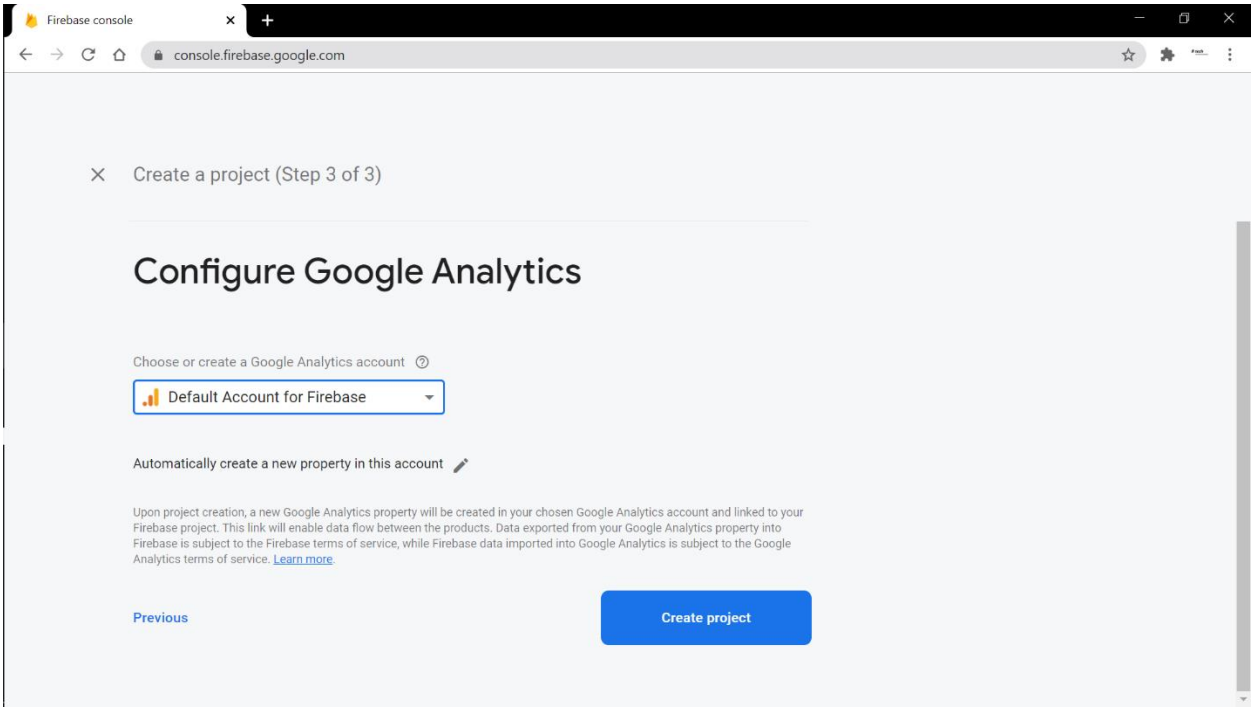



4) After clicking Create a new Project give a name to your new project in this case, I am giving name as “Firebase Realtime Database”. You can give any name to the project. After giving name to your project click on the next Button.

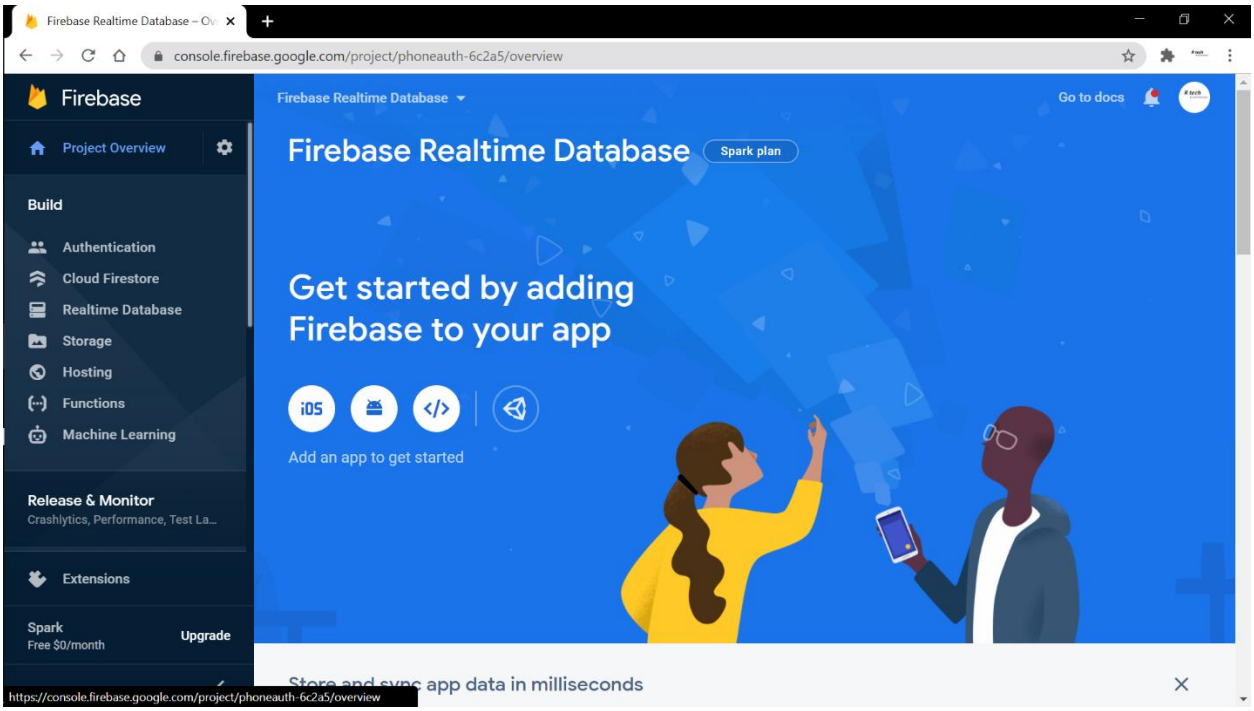
5) After this Firebase will ask for enabling Google Analytics to your project. Google Analytics is a web analytics service offered by Google that tracks and reports website traffic. Click continue to proceed.



6) Configure the Google Analytics with your default Firebase account or you can provide another account. After selecting your account press the Create Project button to finish the configuration of our new project.

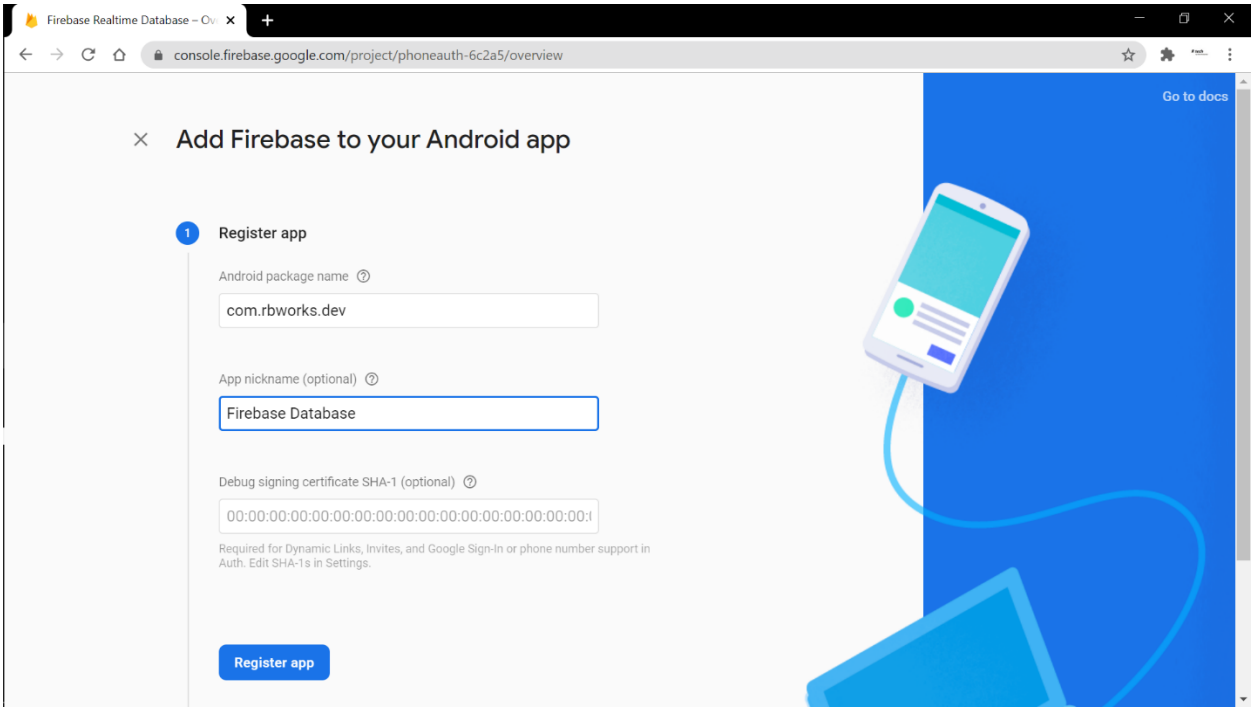



7) Now the project is created with name “Firebase Realtime Database” and a dashboard page for the project will open as shown in the screenshot.

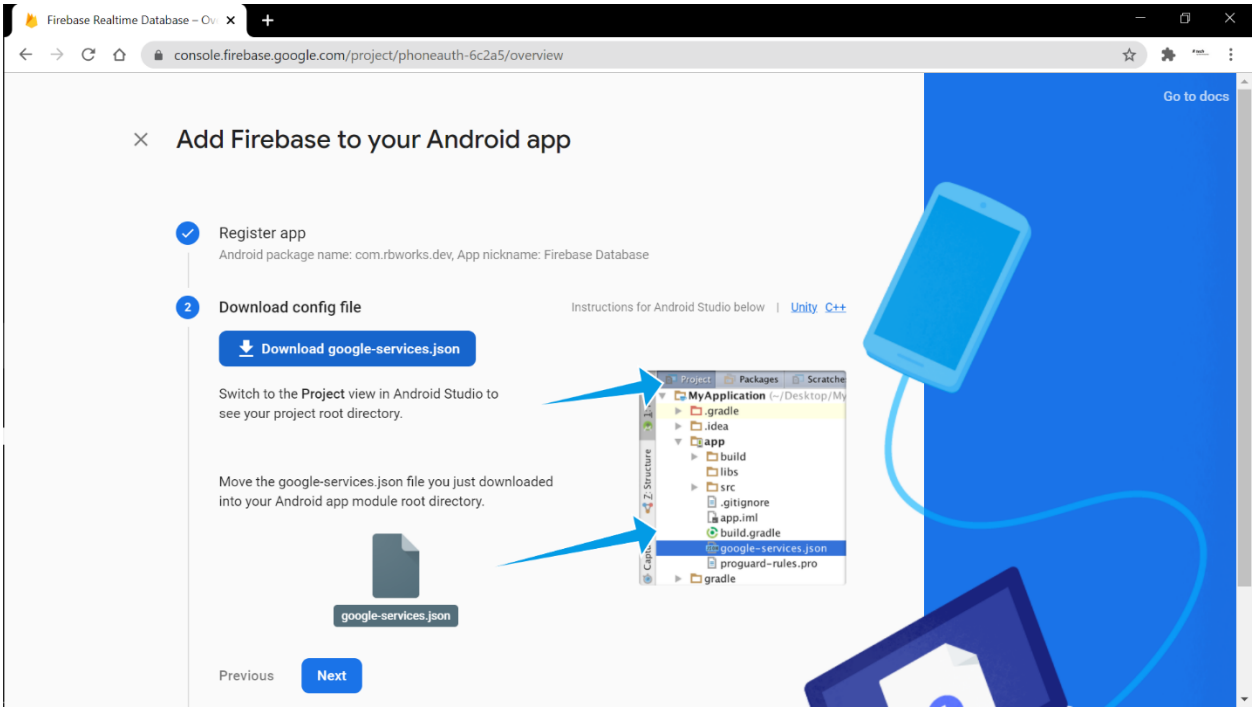



8) Now select the app platform to get started in my case I have developed Android application which will use the Firebase Realtime database to store its data so I will select the Android icon.

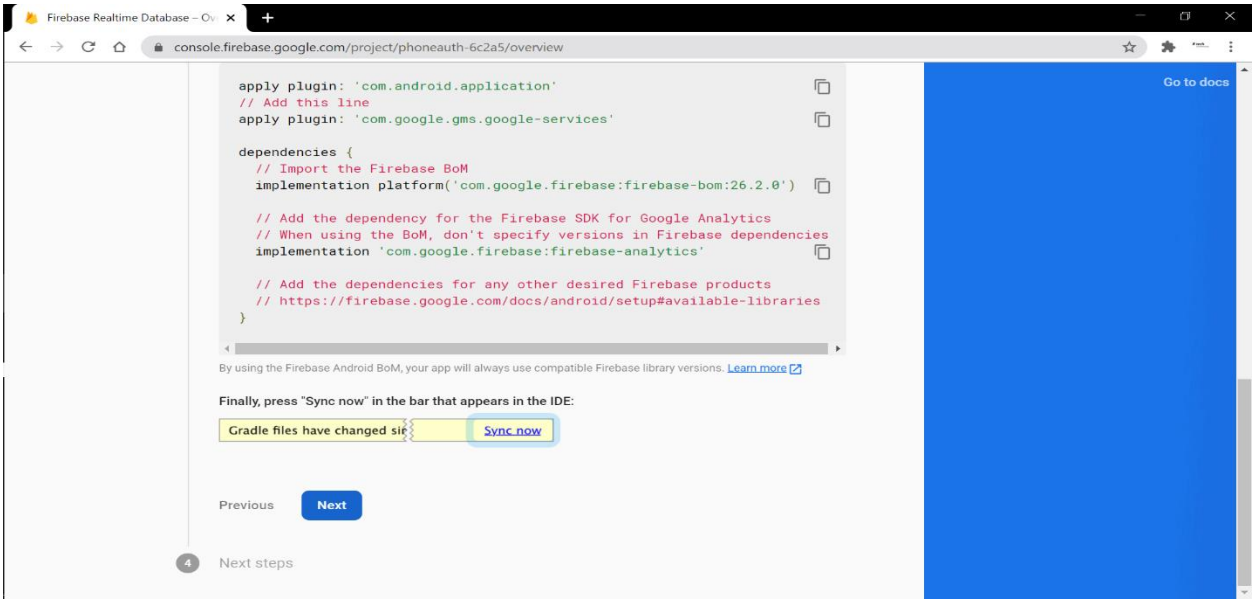
9) Now for Android, Register your application with Firebase by giving Android package name in my case it is “com.rbworks.dev” then give a nickname to your application and click on the Register app button.



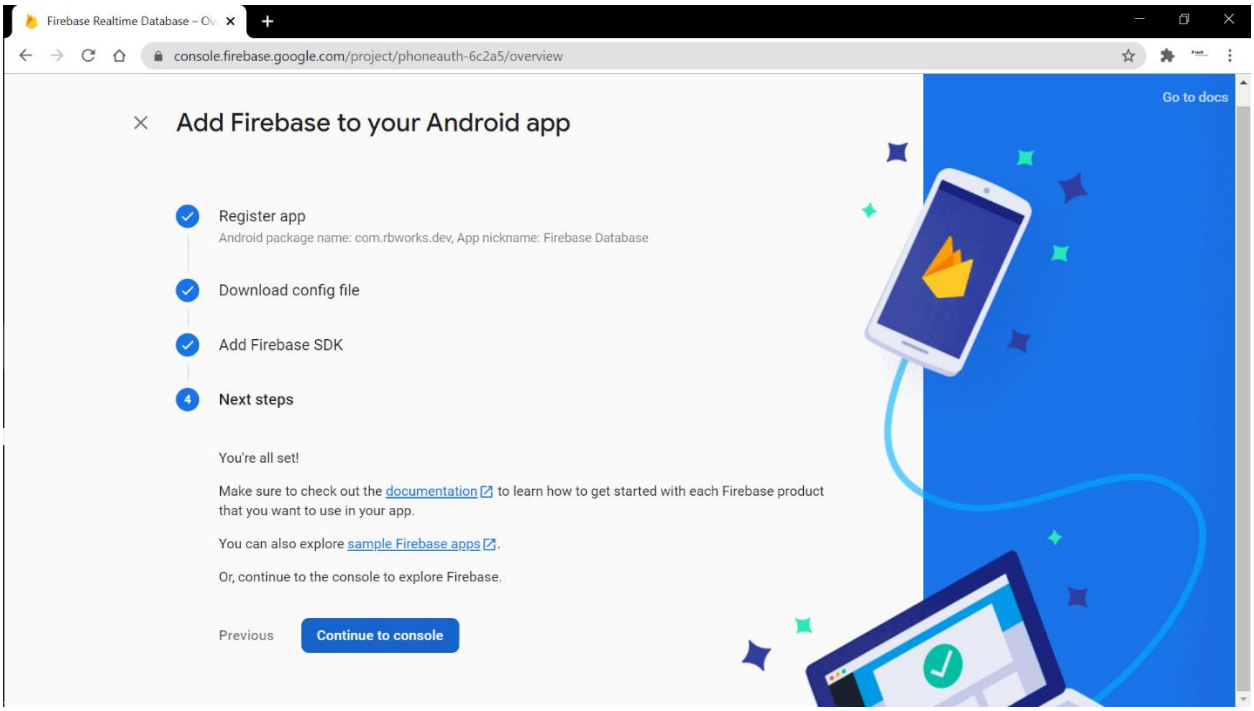
10) Now download the “google-services.json” file which is a configuration file of our project and add it to the Android application project in Android Studio and click Next.



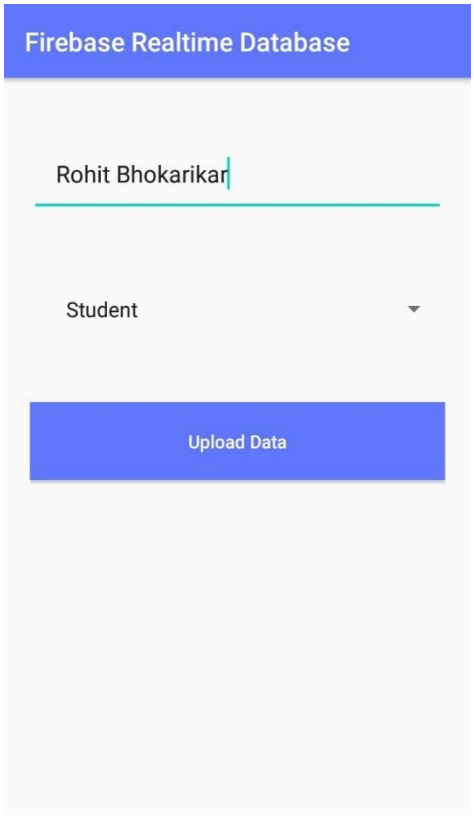

11) Now add these Android specific dependencies and to your Android project and click Next Button.




12) Now click the Continue to Console button here the Android application is successfully registered with our Firebase Realtime Database Project.




13) Now from our Android application we will send some data to our Firebase Realtime database such as Name and Role of a person and click the Upload Data button.


Firebase Realtime Database
Rohit Bhokarikar
Student
Upload Data

14) As you can see the data, we entered in our Android application is now stored in our Firebase Realtime Database.

Data –

Name – Rohit Bhokarikar
Role – Student