Create a Virtual Machine

Summary:

Google Compute Engine allows you to create virtual machines that run various operating systems, including several Linux variants (Debian, Ubuntu, Suse, Red Hat, CoreOS) and Windows Server, on Google's infrastructure. You can run thousands of virtual CPUs on a system that has been designed to run fast and to offer very consistent performance.
In this practical lab, you will learn how to instantiate virtual machines from various types of machines using the Google Cloud Platform (GCP) Console and use the command line `gcloud`. You will also learn how to connect the NGINX web server to your virtual machine.
You can easily copy and paste commands from the lab to the appropriate place, but you should type the commands yourself to strengthen understanding of the core concepts.

What you will do

- Create virtual machines with GCP Console
- Create a virtual machine with the command line `gcloud`
- Implement a web server and connect it to a virtual machine

Precondition

- An understanding of the standard Linux text editor such `vim`, `emacs` or `nano`would be beneficial

Setup

Before clicking on the Start Lab button

Read these instructions. Lab has a timer and you can't pause it. The timer, which starts when you click Start Lab, displays the amount of time the Cloud resource will be available to you.
This practical Qwiklabs lab allows you to do your own lab activities in a real cloud environment, not in a demo or simulation environment. That is by giving you new temporary credentials that are used to log in and access the Google Cloud Platform for the duration of the lab.

Required

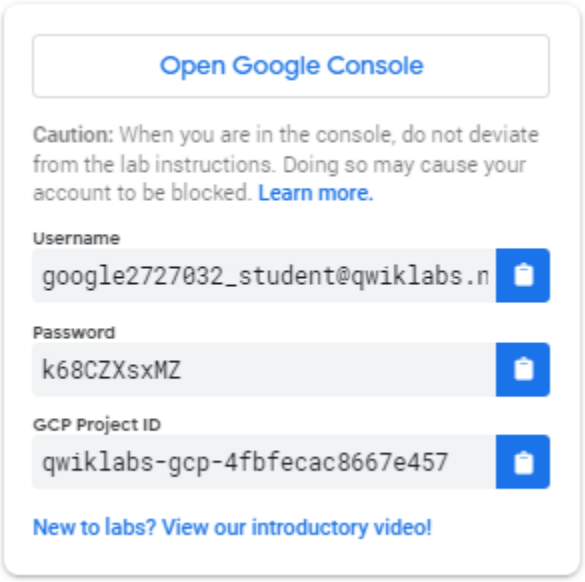
To complete this lab, you need:

- Access to a standard internet browser (recommended Chrome browser).
- Time to complete the lab.

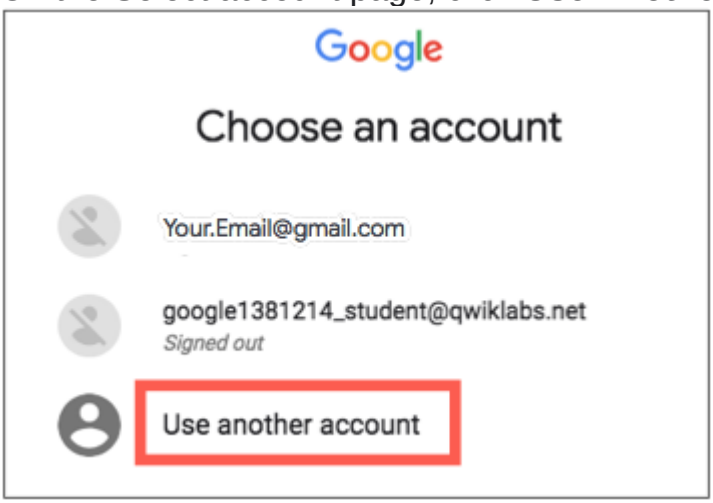
Note: If you already have a personal GCP project or account, do not use the project or account for this lab.

How to start a lab and log in to Console

1. Click the **Start Lab** button . If you have to pay a lab, a pop-up window will open to choose a payment method. On the left is a panel containing temporary credentials that you must use for this lab.



2. Copy the username, then click **Open Google Console** . The lab will run the resource, then open another tab that displays the **Select account** page .
   Tip: Open tabs in separate windows side by side.
3. On the Select account page, click **Use Another Account** .

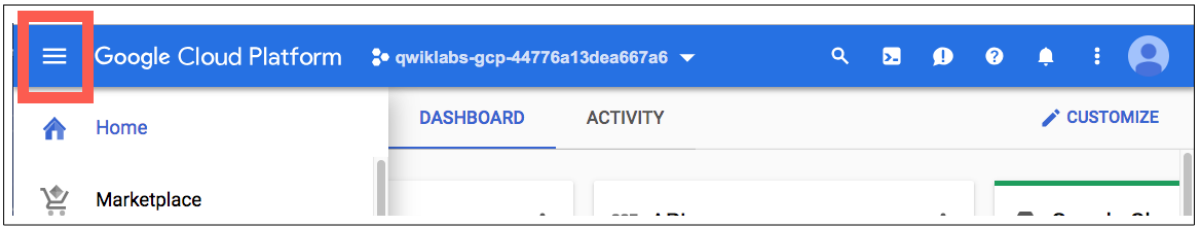


4. The Login page will open. Paste the username you have copied from the Connection Details panel. Then, copy and paste the password.
   Important: You must use credentials from the Connection Details panel. Don't use your Qwiklabs credentials. If you have a personal GCP account, don't use that account for this lab (to avoid fees).
5. Click next page:
   - Agree to terms and conditions.

- Don't add recovery or 2-step authentication options (because this is a temporary account).
- Don't register for a free trial.

The GCP Console will open in this tab after a while.

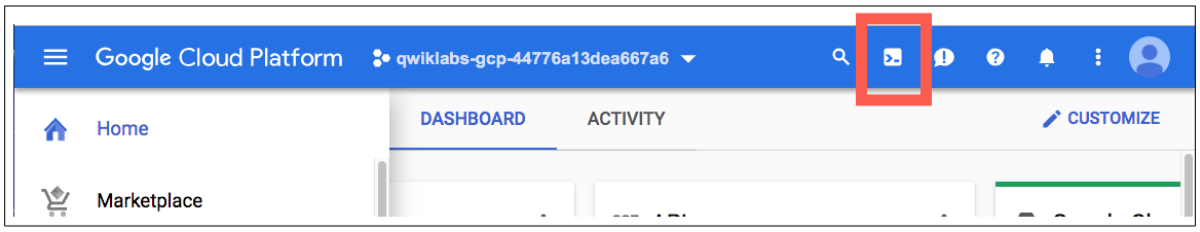
Note: You can see a menu containing a list of GCP Products and Services by clicking on the **Navigation menu** at the top left, next to "Google Cloud Platform".



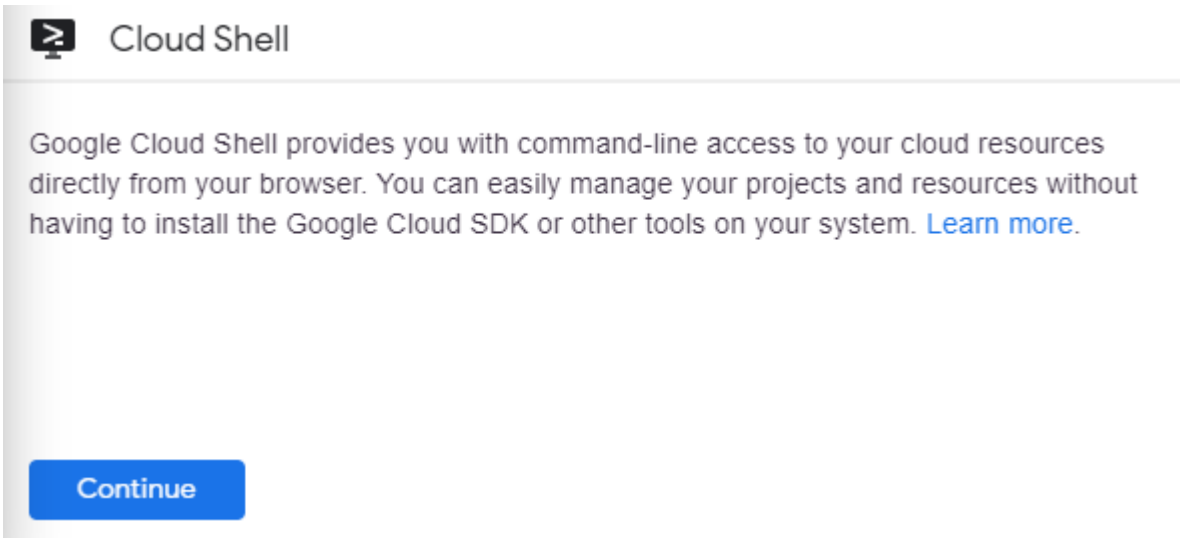
Activating Google Cloud Shell

Google Cloud Shell is a virtual machine that is loaded with development features. This virtual machine offers a 5 GB persistent homepage directory and runs on Google Cloud. Google Cloud Shell provides command - line access to GCP resources .

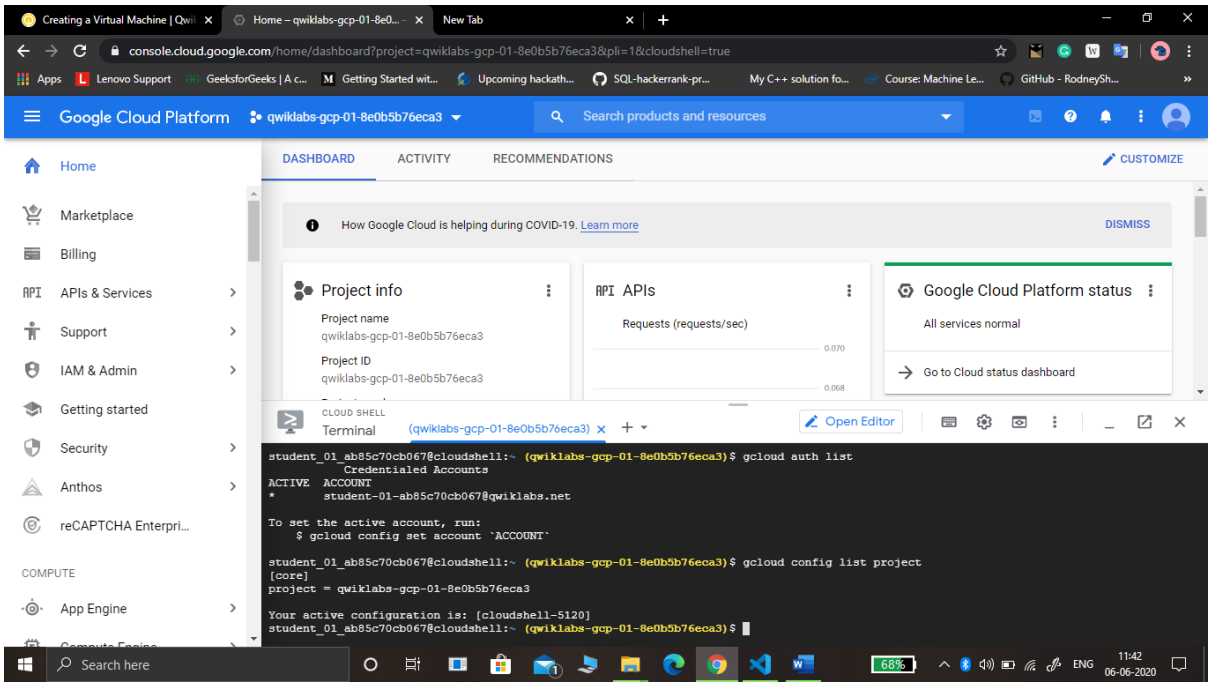
1. On the GCP console, on the top right toolbar, click **the Open Cloud Shell button** .



2. Click **Continue** :



It takes a while to supply and connect to the environment. When you are connected, you are already authenticated, and the project is set to your **PROJECT_ID** . As an example:



`gcloud` is the command-line tool for Google Cloud. It comes pre-installed on Cloud Shell and supports tab-completion.
You can list the active account name with this command:

```
gcloud auth list
```

(Output)

```
Credentialed accounts:
 - <myaccount>@<mydomain>.com (active)
```

(Example output)

```
Credentialed accounts:
 - google1623327_student@qwiklabs.net
```

You can list the project ID with this command:

```
gcloud config list project
```

(Output)

```
[core]
project = <project_ID>
```

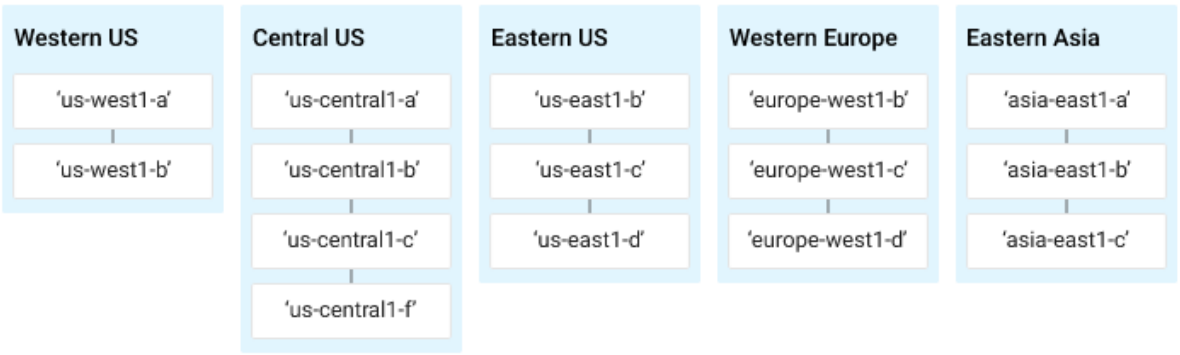
(Example output)

```
[core]
project = qwiklabs-gcp-44776a13dea667a6
```

For full documentation of `gcloud` see the gcloud command-line tool overview.

Understanding Regions and Zones

Certain Compute Engine resources live in regions or zones. A region is a specific geographical location where you can run your resources. Each region has one or more zones. For example, the us-central1 region denotes a region in the Central United States that has zones `us-central1-a`, `us-central1-b`, `us-central1-c`, and `us-central1-f`.



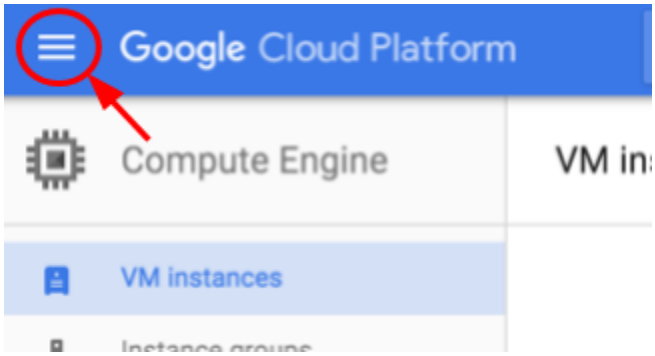
Resources that live in a zone are referred to as zonal resources. Virtual machine Instances and persistent disks live in a zone. To attach a persistent disk to a virtual machine instance, both resources must be in the same zone. Similarly, if you want to assign a static IP address to an instance, the instance must be in the same region as the static IP.

Learn more about regions and zones and see a complete list in Regions & Zones documentation.

Create a new instance from the Cloud Console

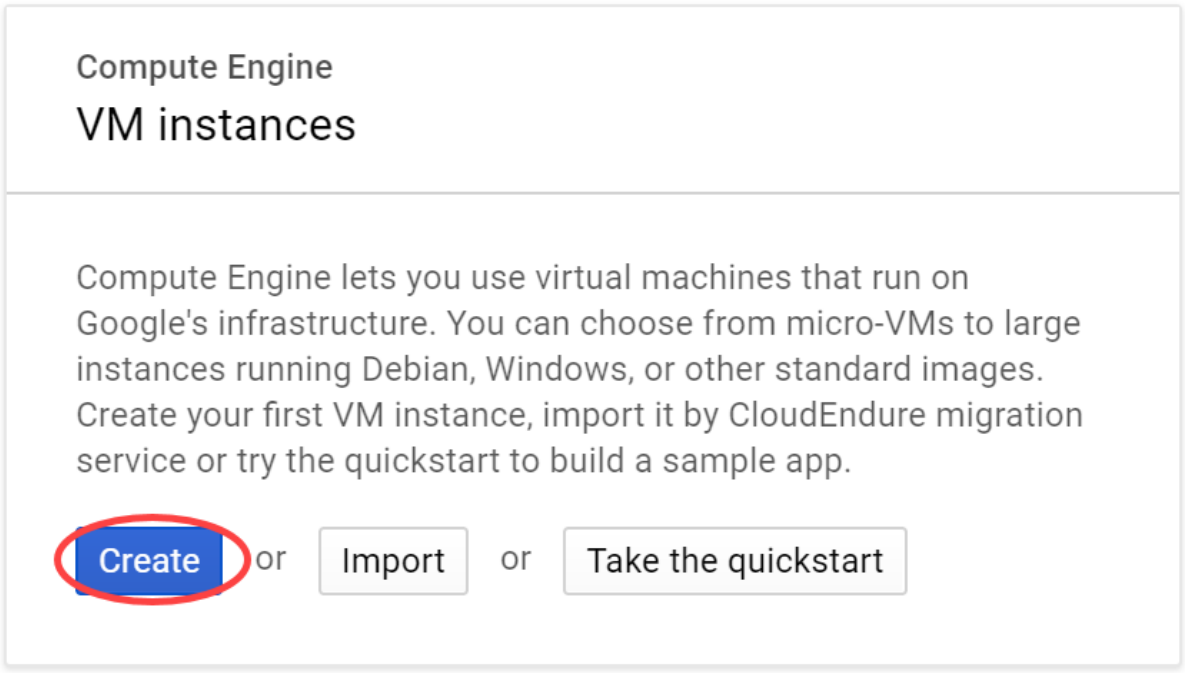
In this section, you'll learn how to create new pre-defined machine types with Google Compute Engine from the Cloud Console.

In the GCP Console, on the top left of the screen, select **Navigation menu** > **Compute Engine** > **VM Instances**:



This may take a minute to initialize for the first time.

To create a new instance, click **Create**.



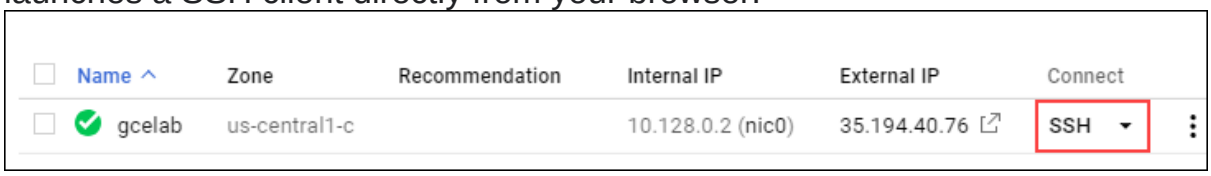
There are many parameters you can configure when creating a new instance. Use the following for this lab:

Field	Value	Additional Information
Name	`gcelab`	Name for the VM instance
Region	`us-central1 (Iowa)`	Learn more about regions in Regions & Zones documentation.
Zone	`us-central1-c` **Note:** remember the zone that you selected, you'll need it later.	Learn more about zones in Regions & Zones documentation.

Machine Type	`2 vCPUs` This is a (n1-standard-2), 2-CPU, 7.5GB RAM instance. There are a number of machine types, ranging from micro instance types to 32-core/208GB RAM instance types. Learn more in the Machine Types documentation.	**Note**: A new project has a default resource quota, which may limit the number of CPU cores. You can request more when you work on projects outside of this lab.
Boot Disk	`New 10 GB standard persistent disk` `OS Image: Debian GNU/Linux 9 (stretch)`	There are a number of images to choose from, including: Debian, Ubuntu, CoreOS as well as premium images such as Red Hat Enterprise Linux and Windows Server. See Operating System documentation for more detail.
Firewall	Check `Allow HTTP traffic` Check this option so to access a webserver that you'll install later.	**Note:** This will automatically create firewall rule to allow HTTP traffic on port 80.

Click **Create**.
Wait for it to finish - it shouldn't take more than a minute.

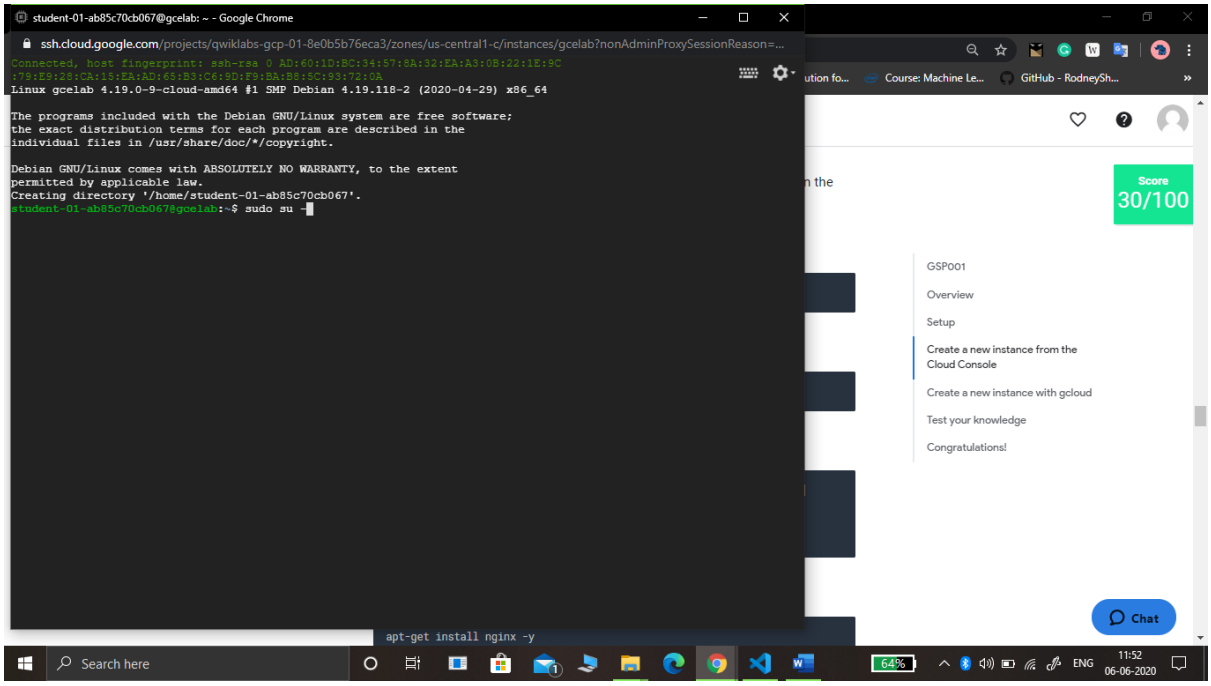
Once finished, you should see the new virtual machine in the **VM Instances** page.
To SSH into the virtual machine, click on **SSH** on the right hand side. This launches a SSH client directly from your browser.



Note: For more information, see the Connect to an instance using ssh documentation.

Install a NGINX web server

Now you'll install NGINX web server, one of the most popular web servers in the world, to connect your virtual machine to something.



Once SSH'ed, get `root` access using `sudo`:

```
sudo su -
```

As the `root` user, update your OS:

```
apt-get update
```

(Output)

```
Get:1 http://security.debian.org stretch/updates InRelease [94.3 kB]
Ign http://deb.debian.org strech InRelease
Get:2 http://deb.debian.org strech-updates InRelease [91.0 kB]
...
```

Install NGINX:

```
apt-get install nginx -y
```

(Output)

```
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
...
```

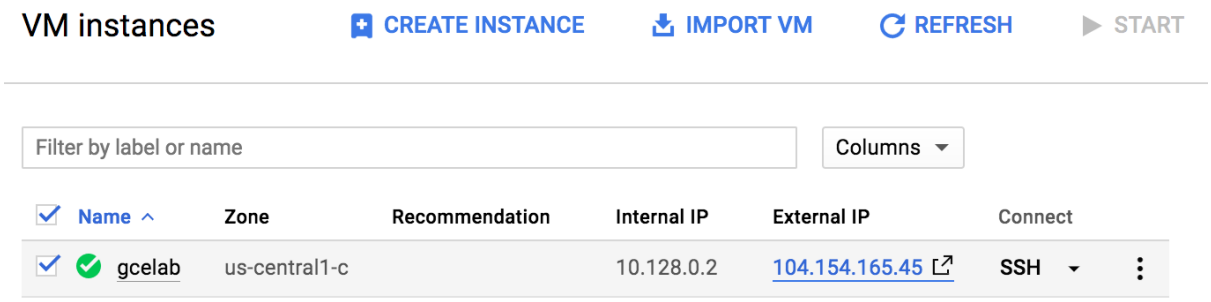
Check that NGINX is running:

```
ps auwx | grep nginx
```

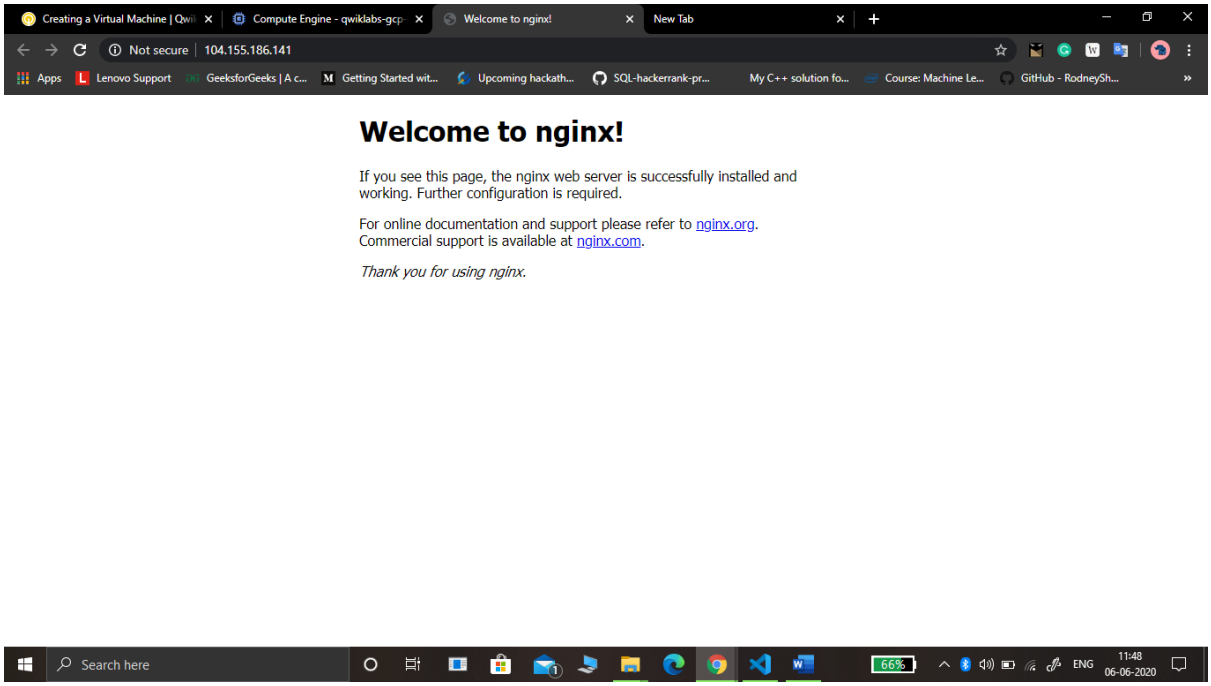
(Output)

```
root      2330  0.0  0.0 159532  1628 ?        Ss   14:06   0:00 nginx:
master process /usr/sbin/nginx -g daemon on; master_process on;
www-data  2331  0.0  0.0 159864  3204 ?        S    14:06   0:00 nginx:
worker process
www-data  2332  0.0  0.0 159864  3204 ?        S    14:06   0:00 nginx:
worker process
root      2342  0.0  0.0  12780   988 pts/0    S+   14:07   0:00 grep nginx
```

Awesome! To see the web page, go to the Cloud Console and click the `External IP` link of the virtual machine instance. You can also see the web page by adding the `External IP` to `http://EXTERNAL_IP/` in a new browser window or tab.



You should see this default web page:



To check your progress in this lab, click **Check my progress** below. A checkmark means you're on track.

Create a Compute Engine instance and add Nginx Server to your instance with necessary firewall rules.

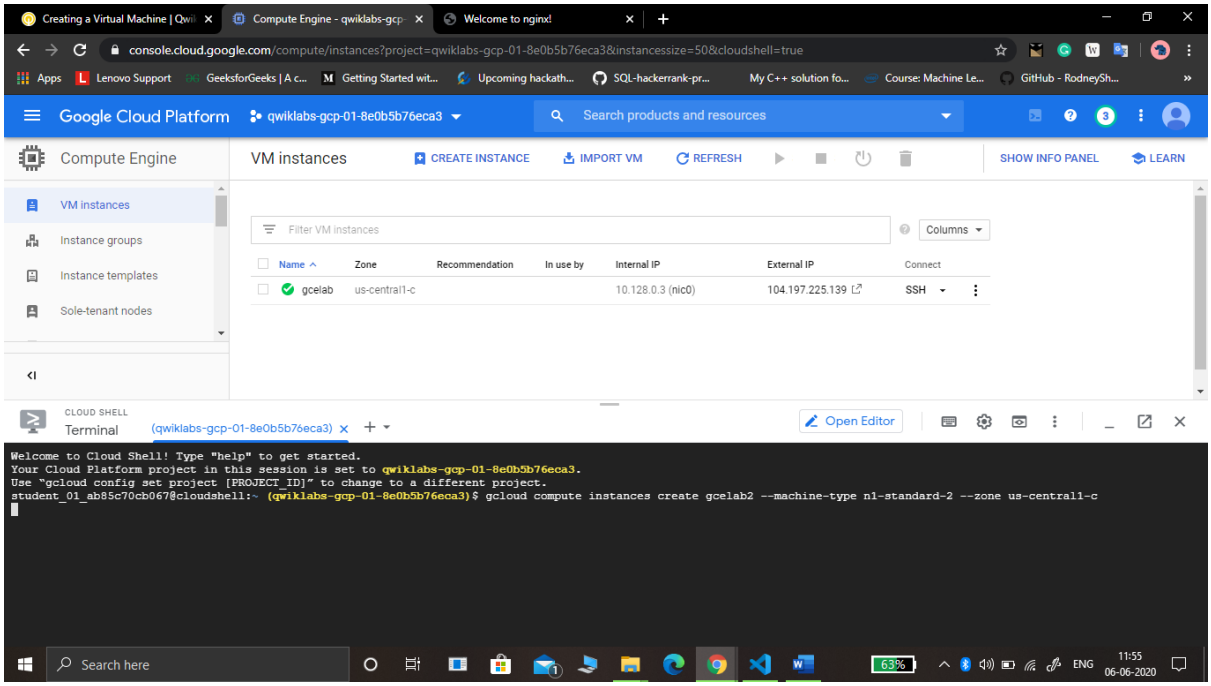
Check my progress

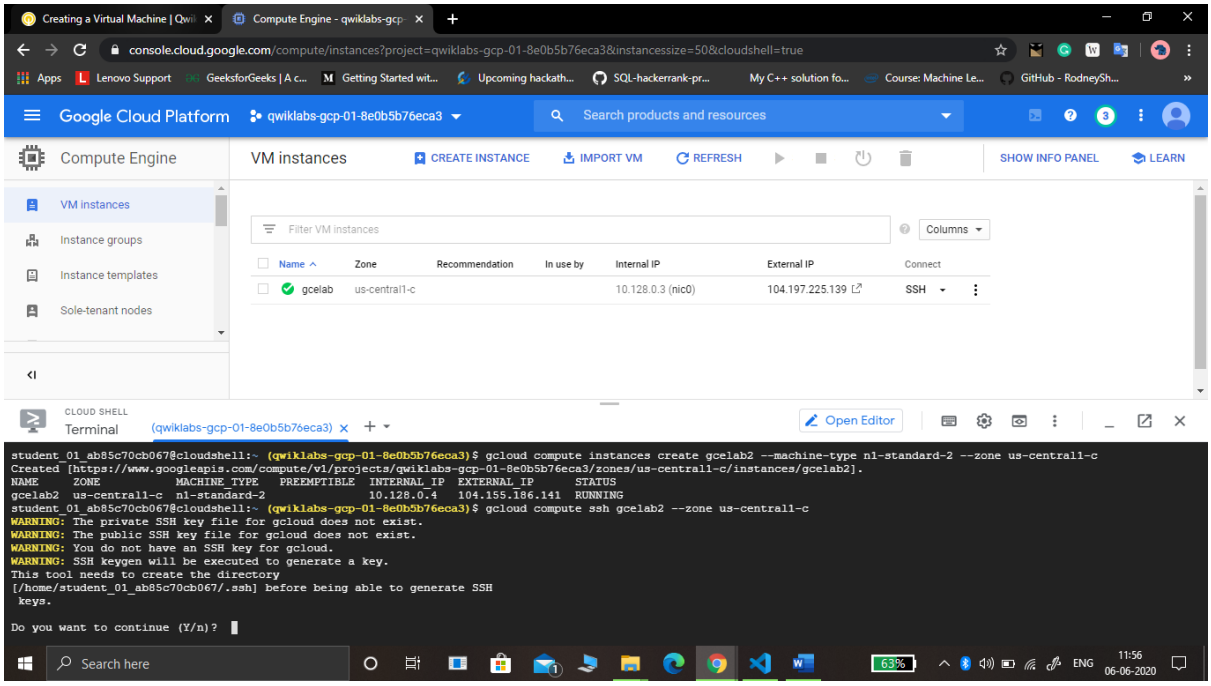
Create a new instance with gcloud

Rather than using the GCP Console to create a virtual machine instance, you can use the command line tool `gcloud`, which is pre-installed in Google Cloud Shell. Cloud Shell is a Debian-based virtual machine loaded with all the development tools you'll need (`gcloud`, `git`, and others) and offers a persistent 5GB home directory.
If you want to try this on your own machine in the future, read the gcloud command line tool guide.
In the Cloud Shell, create a new virtual machine instance from the command line using `gcloud`:

```
gcloud compute instances create gcelab2 --machine-type n1-standard-2 --zone us-central1-c
```

(Output)






```
Created [...gcelab2].
NAME      ZONE           MACHINE_TYPE   ...    STATUS
gcelab2   us-central1-c  n1-standard-2  ...    RUNNING
```

Click **Check my progress** below to verify you're on track in this lab.

Create a new instance with gcloud.

Check my progress

The instance created has these default values:

- The latest Debian 9 (stretch) image.
- The `n1-standard-2` machine type. In this lab you can select one of these other machine types if you'd like: `n1-highmem-4` or `n1-highcpu-4`. When you're working on a project outside of Qwiklabs, you can also specify a custom machine type.
- A root persistent disk with the same name as the instance; the disk is automatically attached to the instance.

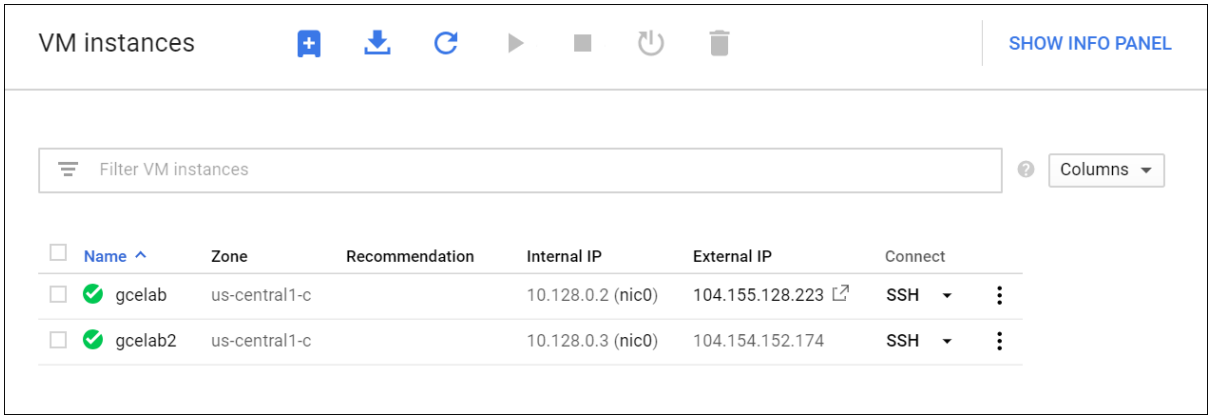
Run `gcloud compute instances create --help` to see all the defaults.

Note: You can set the default region and zones that `gcloud` uses if you are always working within one region/zone and you don't want to append the `--zone` flag every time. Do this by running these commands :

```
gcloud config set compute/zone ...
gcloud config set compute/region ...
```

To exit `help`, press **Ctrl+c**.

Check out your instances. Select **Navigation menu** > **Compute Engine** > **VM instances**. You should see the 2 instances you created in this lab.



Finally, you can SSH into your instance using `gcloud` as well. Make sure you add your zone, or omit the `--zone` flag if you've set the option globally:

```
gcloud compute ssh gcelab2 --zone us-central1-c
```

(Output)

```
WARNING: The public SSH key file for gcloud does not exist.
WARNING: The private SSH key file for gcloud does not exist.
WARNING: You do not have an SSH key for gcloud.
WARNING: [/usr/bin/ssh-keygen] will be executed to generate a key.
This tool needs to create the directory
[/home/gcpstaging306_student/.ssh] before being able to generate SSH
Keys.
```

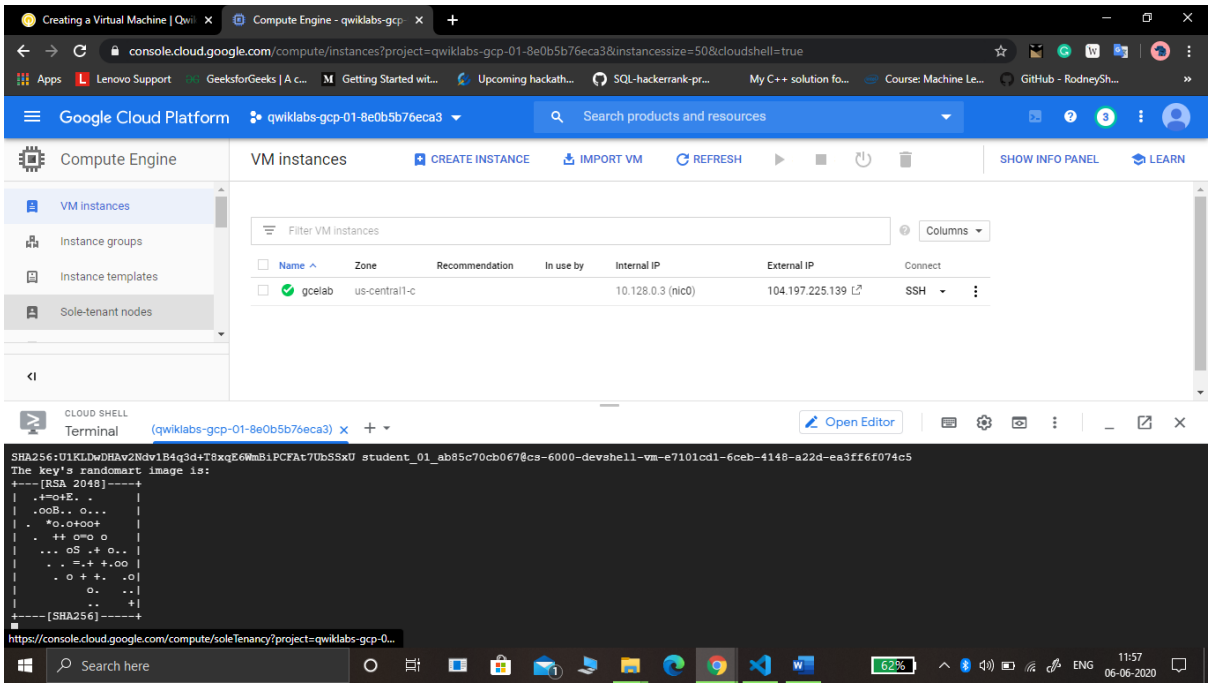
Now you'll type **Y** to continue.

```
Do you want to continue? (Y/n)
```

Enter through the passphrase section to leave the passphrase empty.

```
Generating public/private rsa key pair.
Enter passphrase (empty for no passphrase)
```

After connecting, you disconnect from SSH by exiting from the remote shell:



```
exit
```

Test your knowledge

Test your knowledge about GCP by taking our quiz. (Please select multiple correct options if necessary.)

Through which of the following ways you can create a VM instance in Google Compute Engine(GCE)?

checkThrough web console.

checkThe gcloud command line tool.

Submit

Congratulations!

Google Compute Engine is the foundation to GCP's Infrastructure-as-a-Service. You created a virtual machine with Compute Engine and can now map your existing server infrastructure, load balancers, and network topology to GCP.