

C4 M3 L6 Qwiklab: Managing Cloud Resources

1 hour 1 Credit

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Introduction

As a modern day system administrator, you will almost certainly need to set up the use of some cloud resources. Even companies that host most of their infrastructure on-site may want to host some specific services in the cloud. It's important for you to have an idea of how to manage these resources.

In this lab, you will create and use cloud instances, connect resources to them and get a general idea of the meaning of the many available parameters that you can set.

Head's up: Make sure to click the "**Start Lab**" button at the top of the screen. It may take a while for the lab to load. Please wait until the lab is running. To mark this lab as completed, make sure to click "**End Lab**" when you're done!

You'll have 60 minutes to complete this lab.

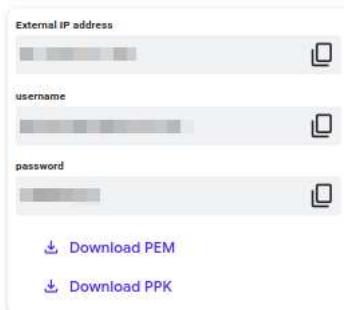
Start the lab

You'll need to start the lab before you can access the materials in the virtual machine OS. To do this, click the green "Start Lab" button at the top of the screen.

Note: For this lab, you are going to access **Linux and Windows VM** through your **local SSH and RDP Client**, and not use the **Google Console (Open GCP Console** button is not available for this lab).

[Start Lab](#)

After you click the "Start Lab" button, you will see all the connection details on the left-hand side of your screen. You should have a screen that looks like this:



Note: Working with Qwiklabs may be similar to the work you'd perform as an IT Support Specialist; you'll be interfacing with a cutting-edge technology that requires multiple steps to access, and perhaps healthy doses of patience and persistence(!). You'll also be using **RDP** and **SSH** to enter the labs -- critical skills in IT Support that you'll be able to practice through the labs.

Accessing the linux virtual machine

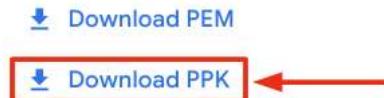
Please find one of the three relevant options below based on your device's operating system.

Option 1: Windows Users: Connecting to your VM

In this section, you will use the PuTTY Secure Shell (SSH) client and your VM's External IP address to connect.

Download your PPK key file

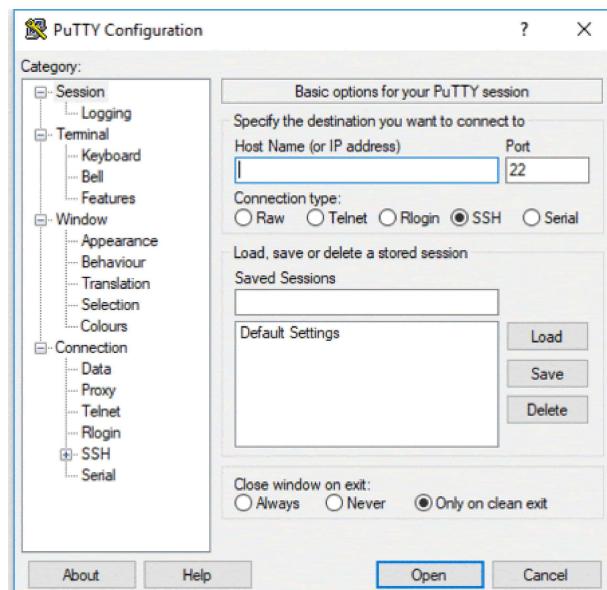
You can download the VM's private key file in the PuTTY-compatible **PPK** format from the Qwiklabs Start Lab page. Click on **Download PPK**.



Connect to your VM using SSH and PuTTY

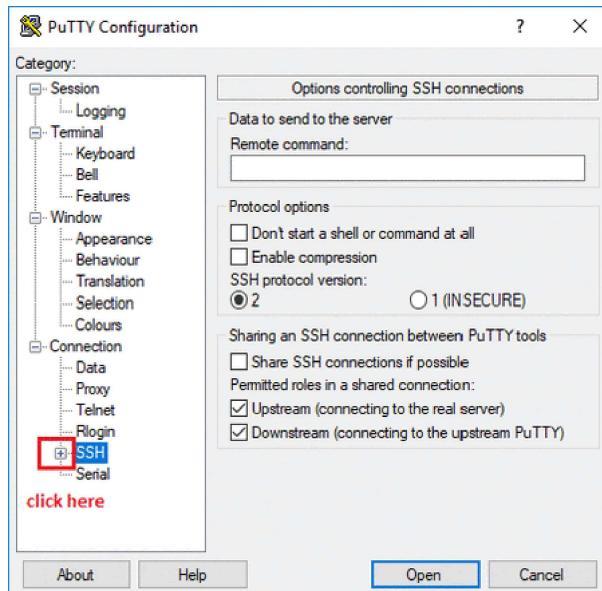
1. You can download Putty from [here](#)
2. In the **Host Name (or IP address)** box, enter
username@external_ip_address.

Note: Replace **username** and **external_ip_address** with values provided in the lab.



3. In the **Category** list, expand **SSH**.
4. Click **Auth** (don't expand it).
5. In the **Private key file for authentication** box, browse to the PPK file that you downloaded and double-click it.
6. Click on the **Open** button.

Note: PPK file is to be imported into PuTTY tool using the Browse option available in it. It should not be opened directly but only to be used in PuTTY.



7. Click **Yes** when prompted to allow a first connection to this remote SSH server. Because you are using a key pair for authentication, you will not be prompted for a password.

Common issues

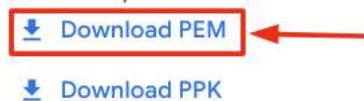
If PuTTY fails to connect to your Linux VM, verify that:

- You entered <username>@<external ip address> in PuTTY.
- You downloaded the fresh new PPK file for this lab from Qwiklabs.
- You are using the downloaded PPK file in PuTTY.

Option 2: OSX and Linux users: Connecting to your VM via SSH

Download your VM's private key file.

You can download the private key file in PEM format from the Qwiklabs Start Lab page. Click on **Download PEM**.



Connect to the VM using the local Terminal application

A **terminal** is a program which provides a **text-based interface for typing commands**. Here you will use your terminal as an SSH client to connect with lab provided Linux VM.

1. Open the Terminal application.
 - To open the terminal in Linux use the shortcut key **Ctrl+Alt+t**.
 - To open terminal in Mac (OSX) enter **cmd + space** and search for **terminal**.
2. Enter the following commands.

Note: Substitute the **path/filename for the PEM** file you downloaded, **username** and **External IP Address**.

You will most likely find the PEM file in **Downloads**. If you have not changed the download settings of your system, then the path of the PEM key will be
`~/Downloads/qwikLABS-XXXXX.pem`

```

chmod 600 ~/Downloads/qwikLABS-XXXXX.pem
ssh -i ~/Downloads/qwikLABS-XXXXX.pem username@External Ip Address
    . $ ssh -i ~/Downloads/qwikLABS-XXXXX.pem gcpstagedingedit1370_student@35.239.106.192
The authenticity of host '35.239.106.192 (35.239.106.192)' can't be established.
ECDSA key fingerprint is SHA256:vrZB04YUtruFh0a0wzno0zy1oqqPf9h9j0lxK1m8.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '35.239.106.192' (EDDSA) to the list of known hosts.
Linux linux-instance 4.9.8-9-and64 #1 SMP Debian 4.9.106-1+deb9u2 (2019-05-13) 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.
gcpstagedingedit1370_student@linux-instance:~$ 

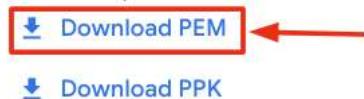
```

Option 3: Chrome OS users: Connecting to your VM via SSH

Note: Make sure you are not in **Incognito/Private mode** while launching the application.

Download your VM's private key file.

You can download the private key file in PEM format from the Qwiklabs Start Lab page. Click on **Download PEM**.

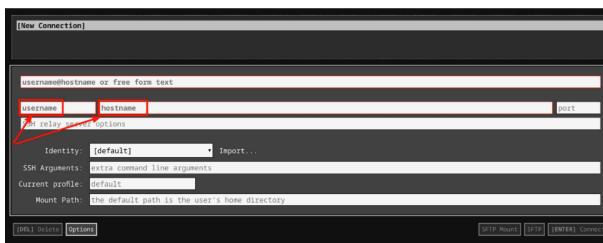


Connect to your VM

1. Add Secure Shell from [here](#) to your Chrome browser.
2. Open the Secure Shell app and click on [**New Connection**].



3. In the **username** section, enter the username given in the Connection Details Panel of the lab. And for the **hostname** section, enter the external IP of your VM instance that is mentioned in the Connection Details Panel of the lab.



4. In the **Identity** section, import the downloaded PEM key by clicking on the **Import...** button beside the field. Choose your PEM key and click on the **OPEN** button.

Note: If the key is still not available after importing it, refresh the application, and select it from the **Identity** drop-down menu.

5. Once your key is uploaded, click on the **[ENTER] Connect** button below.



6. For any prompts, type **yes** to continue.

7. You have now successfully connected to your Linux VM.

You're now ready to continue with the lab!

Creating cloud instances

Once the lab is started, connect to **master-instance** by following the instructions in the section **Accessing the linux virtual machine**. Click on **Accessing the linux virtual machine** from the navigation pane on the right side.

To create your first cloud instance, there are a number of parameters that you need to set. We will explain the most important parameters here:

1. Name

This is the name that will be used to identify this instance from other instances. For this instance, name it **linux-instance**.

2. Regions and Zones

The resources that you create will be deployed to physical devices located in datacenters around the world. A **region** is a geographical location containing a number of data centers. Each of these data centers is called a **zone**, and each zone is independent of the others. If one of them fails for some reason, the others are still available and services can be migrated without visibly affecting users.

When deploying an actual service, you should choose the region that is closest to your users, to provide the best performance. For this lab, you can have a look at the list of available regions and zones. You can just let the **default region (us-central1)** and **zone (us-central1-f)** be selected.

3. Machine Type

Cloud providers allow users to configure the characteristics of the virtual machines that they will use to fit their needs. This means selecting how many processing units (virtual CPUs) and how much memory the virtual machine will be allocated.

Keep in mind that, the more powerful the VM, the more money that it costs to have it running. As a system administrator, you may need to decide between costs and processing power to fit the needs of your organization. When setting instances like these up, it's a good idea to start small and scale as needed. As this is a lab, you won't actually be charged for creating these instances, but if you were a paying customer, you would be expected to pay for monthly use of the machine.

For all instances in this lab, select the **1 vCPU (n1-standard-1)** machine type.

4. Boot disk

Each virtual machine running in the cloud has an associated disk that contains the operating system to use, as well as some extra disk space. When you create the VM you select both how much space you want to allocate for the virtual disk and what operating system you want the machine to run.

Select the **Ubuntu 16.04 LTS** image, with the default of **10 GB of space**.

5. Firewall

Firewall rules allow you to select whether or not you want certain incoming traffic to be allowed. You may want to enable many more ports, which can be done after the instance is created. The ports shown in the VM creation page are the most common ones.

For this instance, add a firewall rule to **allow HTTP traffic**.

There are many more settings that can be configured but we won't cover them here. Leave them at their default values.

To create an instance with the above mentioned configurations, enter the following commands into the terminal:

```
gcloud compute instances create linux-instance --zone=us-central1-f --machine-type=n1-standard-1 --subnet=default  
gcloud compute firewall-rules create default-allow-http --direction=INGRESS --priority=1000 --network=default --  
Next, we'll create the Windows instance. This instance should have the name  
windows-instance, it should also be of machine type n1-standard-1, and it  
should run Windows Server 2016 Datacenter, with the default size of 50 GB.
```

To create an Windows instance, enter the following command into the terminal:

```
gcloud compute instances create windows-instance --zone=us-central1-f --machine-type=n1-standard-1 --subnet=default  
To list all the instances, use the following command:
```

```
gcloud compute instances list
```

Note down the external IP addresses for both **linux-instance** and **windows-instance**. You will be using them later in the lab.

```
gcostagededit$1_student@master-instance:~$ gcloud compute instances list  
NAME ZONE MACHINE_TYPE PREEMPTIBLE INTERNAL_IP EXTERNAL_IP STATUS  
linux-instance us-central1-f n1-standard-1 10.128.0.3 34.68.16.225 RUNNING  
master-instance us-central1-f n1-standard-1 10.128.0.1 34.66.58.269 RUNNING  
windows-instance us-central1-f n1-standard-1 10.128.0.4 34.68.8.242 RUNNING  
gcostagededit$1_student@master-instance:~$
```

Using your newly created instances

Once your instances are created, they are ready to be used.

Connect to your **linux-instance** using the following command:

```
gcloud compute ssh linux-instance --zone us-central1-f
```

For any prompts, continue by clicking **Enter** button.

Note: You can also **connect to linux-instance** by following the instructions in "Accessing the linux virtual machine" section and **using the external IP address of linux-instance** noted down earlier during the lab, instead of external IP address of master-instance in Connection Details Panel.

Once the session is open, we will install a web server on this **linux-instance**.

In a previous lab, we worked with Apache2, a widely used web server software. In this lab, we'll install nginx, another widely used web server software.

To update the list of available packages in your operating system, run this command:

```
sudo apt update
```

Once the command completes, run the following command to install the nginx software:

```
sudo apt install nginx
```

For any prompts, continue by clicking **Y**.

After that command is done installing the software, you should have a web server available on the external IP of your virtual machine. Enter the external IP address of **linux-instance** noted down earlier in a new separate browser tab.

You should see the default nginx webpage:

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org. Commercial support is available at nginx.com.

Thank you for using nginx.

Exit from `linux-instance` to go back to `master-instance` by entering the following command:

```
exit
```

Click *Check my progress* to verify the objective. Create a Linux instance and use it as a web server

Creating an additional disk

The boot disk that was created together with the instances is usually deleted when the instances go away. There are many reasons for an instance to be deleted: it could have been moved to a different zone, the operating system could have changed, the load could have decreased and thus the instance was not needed, etc.

The boot disk is generally small, since its purpose is to hold the operating system and not a lot of additional data. If you want to have a disk that doesn't get deleted when the instance goes away or gets updated, you can create an additional disk and attach that disk to your instance.

In this option, you will see a list of the disks that are associated with your account. There are already two disks there; the ones you created for each of the instances in the previous step.

To create an additional persistent disk, there are a number of parameters that you need to set. We will explain the most important parameters here:

1. Name

This will be the identifier used to select the disk when attaching it to a machine. For this lab, name the disk **additional-disk**.

2. Type

There are two types of disks: the standard and the SSD one. The SSD option uses faster disks (and costs more).

For this lab, use **Standard persistent disk**.

3. Source Type

This is where the information that will be available on the disk (when it's created) will come from.

- An **Image** is a disk that comes preloaded with an installation of a specific operating system. This is the type of disk that we used when creating the instances.
- A **Snapshot** is the exact contents of a disk at the point in time when the snapshot was taken. This can be used for backups as well as for creating custom images.
- A **Blank Disk** is a disk that is completely blank. It's up to the user to decide how to make use of it.

Blank Disk is set by default. We will be using **Blank Disk** for this lab.

4. Size

The size of the disk is how much space will be allocated to it. When using cloud infrastructure, you are not limited by the specific sizes of actual physical disks.

As with other resources, this will impact how much you end up paying. Smart system administrators will only pay for what they need!

For this lab, use a size of **500GB**.

To create a disk with the above mentioned configurations, enter the following command into the terminal:

```
gcloud compute disks create additional-disk --type=pd-standard --size=500GB --zone=us-central1-f
```

Attaching a disk to an instance

Once the disk has been created, we can attach it to one of the virtual machines that are running. In this case, we will attach it to the Windows virtual machine.

To do this, enter the following command:

```
gcloud compute instances attach-disk windows-instance --disk additional-disk  
For any prompts, continue by clicking Y.
```

Click *Check my progress* to verify the objective. Create a Windows instance and attach an additional disk to it

The disk that we attached is blank, it doesn't even have a file-system. In order for us to use it, we first need to format it. This is explained in detail in the [Partition and format disk drive in Windows](#) lab. We'll cover it briefly here.

Enter the following command to create a new user to access windows-instance and reset its password.

```
gcloud compute reset-windows-password windows-instance --user=student --zone=us-central1-f  
For any prompts, continue by clicking Y.
```

Note down the username, password and external IP address (external IP address is similar to the one noted down earlier for windows-instance). Refer the image below:



This terminal screenshot shows the execution of the `gcloud compute reset-windows-password` command. The command creates a new account and sets an initial password for the user [student]. It includes a warning about the loss of encrypted data if the account already exists. The user is prompted to set or reset the password for [student] (Y/n). The password is then reset, and the user is prompted to log in again. The password entered is "Bzsg1c1kshZ". The command also provides a link for more information: <https://cloud.google.com/compute/docs/operating-systems/windows#reset>.

Connect to windows-instance by following the instructions given in the next section Accessing the windows virtual machine.

Accessing the windows virtual machine

Please find one of the four relevant options below based on your device's operating system.

Option 1: Windows Users: Connecting to your VM via RDP

In this section, you will use Remote Desktop Connection to connect to your windows instance using its external IP address.

1. Open Remote Desktop Connection by clicking the **Start** button. In the search box, type Remote Desktop Connection, and then, in the list of results, click Remote Desktop Connection.
2. Enter the external IP address of the instance you want to connect to in the **Computer** field. Use the external IP address of your windows-instance noted down during the lab. Click on **connect**.



3. Change the username to **student**. And use the password for windows-instance noted down during the lab. Click **OK**.

4. Click **Yes** to accept the certificate.

You should now see a visual interface that looks exactly like the Windows 10 OS!

If you see any error message, close the window and wait a minute or so.

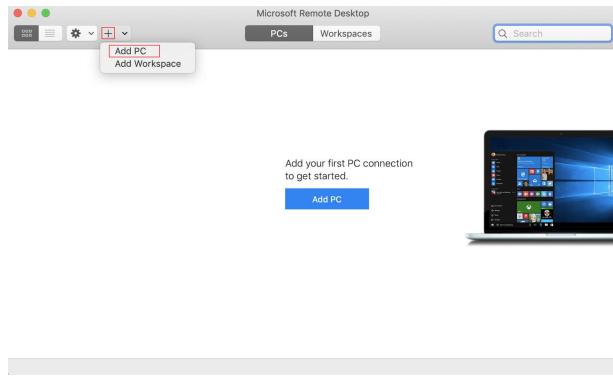
Sometimes the VM-creation process takes a few minutes, and you won't be able to access the VM until it's finished. This also applies to any errors that say your credentials (username and password) are incorrect.

Option 2: OS X users: Connecting to your VM via RDP

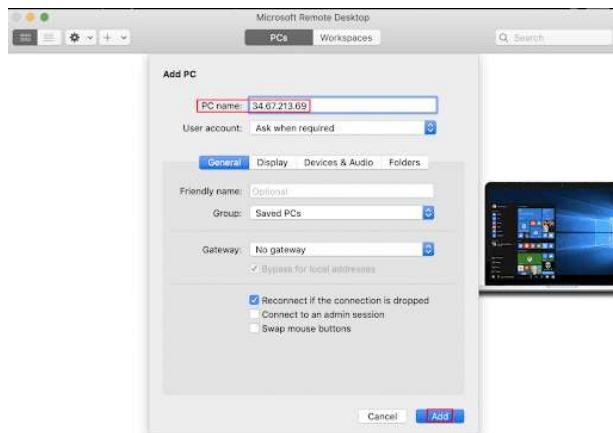
In this section, you will use Microsoft Remote Desktop 10 to connect to your windows instance using its external IP address. OSX users can [download Microsoft Remote Desktop from the Mac App Store](#). If you are using Microsoft Remote Desktop 8, note that the interface will vary slightly than what's listed below.

1. Open Microsoft Remote Desktop 10 application.

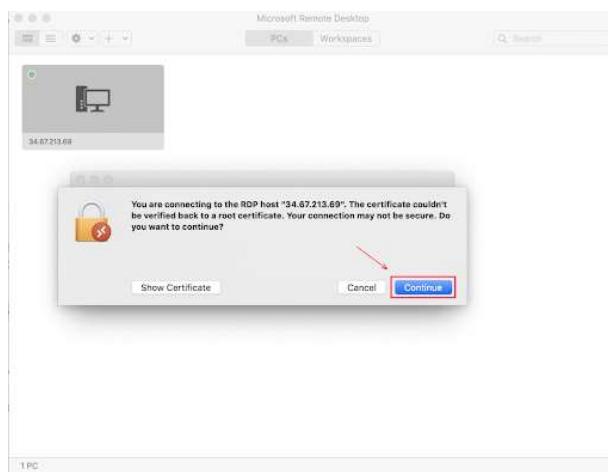
2. Click on + sign above, followed by **Add PC**.



3. Enter the external IP address of the instance you want to connect to in the **PC name** field. Find the external IP address for your instance from the Connection Details Panel on the left side. Click on the **Add** button.



4. You should now be able to see your desktop represented by the external IP address of your VM instance under **PCs**. Double click on your VM's external IP address.
5. The application will now prompt you for username and password. Change the username to **student**. And use the password mentioned in the Connection Details Panel on the left side. Once you have entered the details click **Continue**.
6. For any prompt regarding 'Certificate verification', click **continue**.



You should now see a visual interface that looks exactly like the Windows 10 OS!

If you see any error message, close the window and wait a minute or so. Sometimes the VM-creation process takes a few minutes, and you won't be able to access the VM until it's finished. This also applies to any errors that say your credentials (username and password) are incorrect.

Option 3: Chrome OS users: Connecting to your VM via RDP

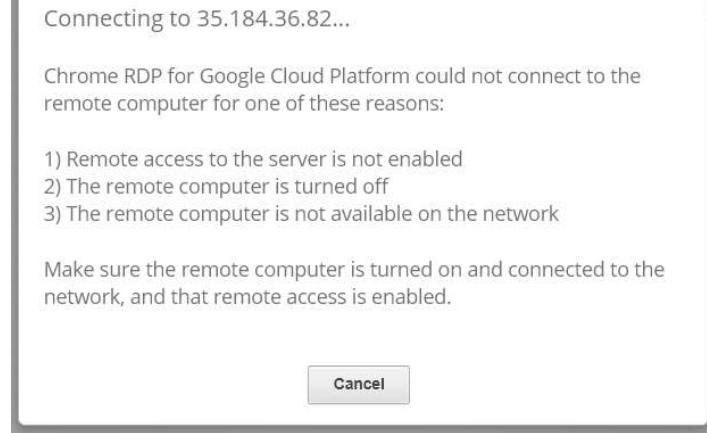
In this section, you will use Chrome RDP to connect to your windows instance using its external IP address.

Chrome OS users can [download Chrome RDP from Chrome Web Store](#). Once you navigate to the download page, click on the **Add to Chrome** button. Click on **Add app** in case of any pop-ups. Then, click on **Launch app** to start the application.

1. Open the Chrome RDP application.
2. Enter the external IP address of the instance you want to connect to in the **Enter the computer name or address to connect to** field. Use the external IP address of your windows-instance noted down during the lab. Click on **connect**.
3. Leave the domain field blank. Change the username to **student**. And use the password for windows-instance noted down during the lab. Click **OK**.
4. Click **Continue** for any window related to certificate verification.

You should now see a visual interface that looks exactly like the Windows 10 OS!

If you see any error message (an example of one is shown below), close RDP and wait a minute or so. Sometimes the VM-creation process takes a few minutes, and you won't be able to access the VM until it's finished. This also applies to any errors that say your credentials (username and password) are incorrect.

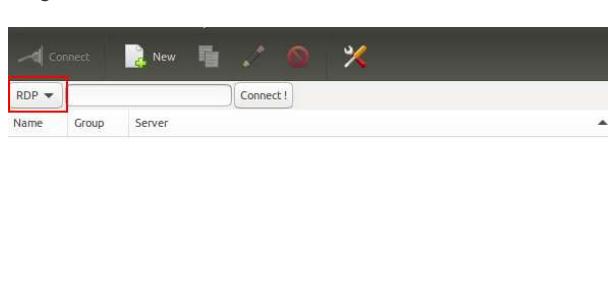


Option 4: Linux users: Connecting to your VM via RDP

In this section, you will use **Remmina** to connect to your windows instance using its external IP address. Open Remmina in your Linux machine. Linux users can [install Remmina](#) if it is not pre-installed.

1. Open Remmina.
2. Enter the external IP address of the instance you want to connect to.
Use the external IP address of your windows-instance noted down during the lab. Click on **Connect**.

Make sure the connection protocol is set to **RDP**, as shown in the image below:



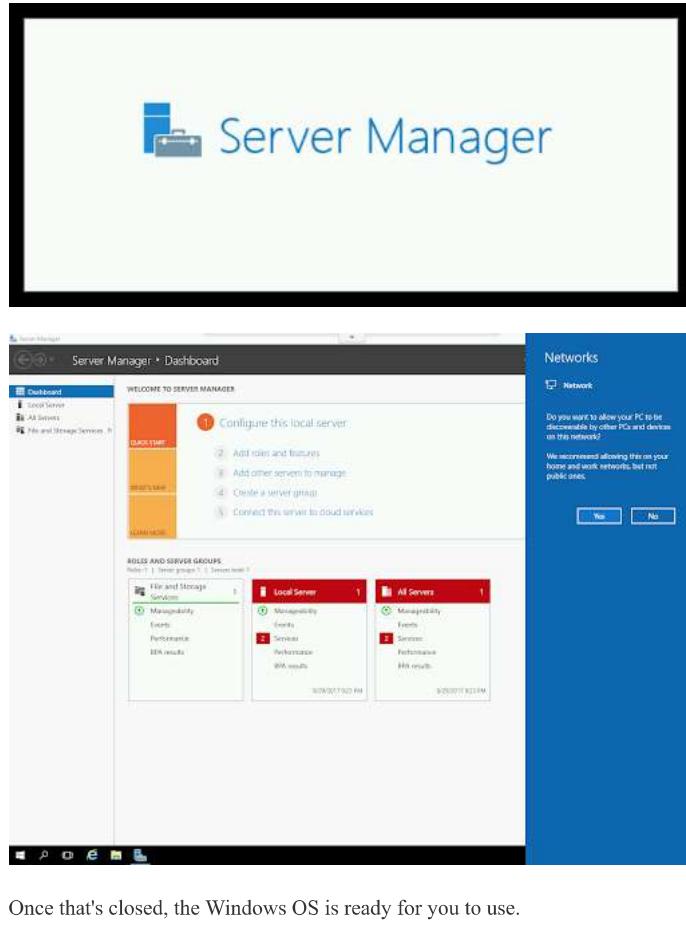
3. A window appears asking you accept the certificate, click **Ok** to continue.
4. Leave the domain field blank. Change the username to **student**. And use the password for windows-instance noted down earlier in the lab.

You should now see a visual interface that looks exactly like the Windows 10 OS!

If you see any error message, close the window and wait a minute or so. Sometimes the VM-creation process takes a few minutes, and you won't be able to access the VM until it's finished. This also applies to any errors that say your credentials (username and password) are incorrect.

Using the Windows instance

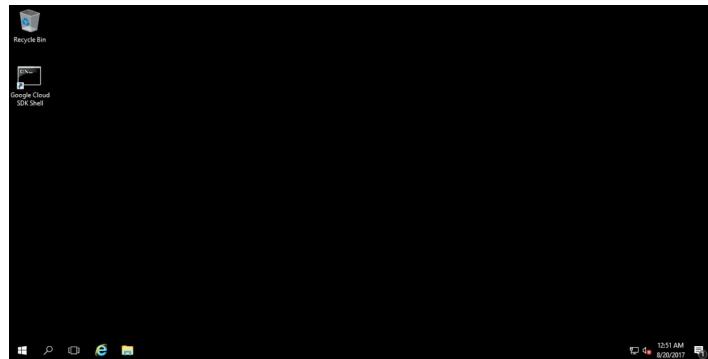
Now you have access to the Windows instance, you're ready to start using it! This version of Windows is intended to be used on a Server, and auto-starts a server-management program. We don't need this for this lab, so wait for it to finish starting and then close it. You may see the desktop appear for a few seconds before the program launches.



Once that's closed, the Windows OS is ready for you to use.

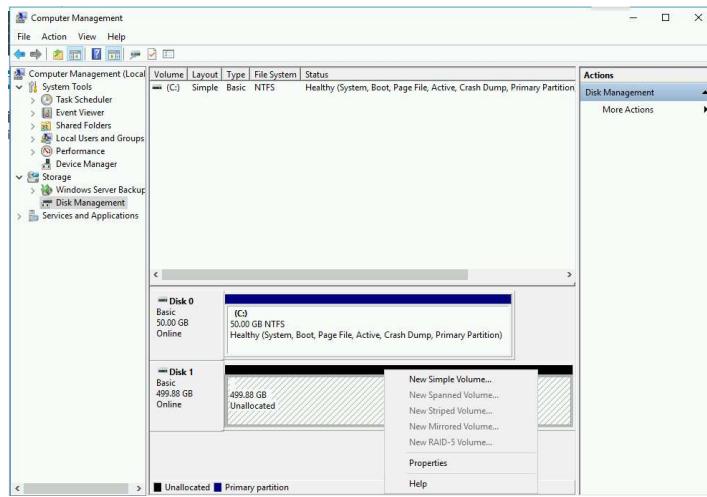
Finishing the login process

Now you'll see a Windows desktop background that looks like this:



After logging in, click on the Windows Icon. Then look for the **Computer Management** application (under **Windows Administrative Tools**) which is used for partitioning disks. Tip: you can avoid going through the Control Panel and having to click on the different sub-items by typing 'Computer' in the Windows menu. In the **Storage** menu there's **Disk Management** entry that can be used to manage disks.

When you click on this entry, a window will pop-up, prompting you to format the new disk. Select GPT as the partitioning table type. Then, you will have a volume available, but it will not be formatted with any specific file system. In order to format it, right click on the volume, select "New Simple Volume" and follow the wizard to format it using the NTFS file-system.



The operating system will then format the disk and leave it ready to be used.

Conclusion

Congratulations! You've now learned how to create different VM instances in Google Compute Engine and gained an understanding of the main options available to you. You've connected to the instances you created. You've also created and attached an additional resource to your instances.

There's a lot more to learn about the resources available to you from cloud providers, but these fundamentals will help you understand the rest of them.

End your lab

When you have completed your lab, click **End Lab**. Qwiklabs removes the resources you've used and cleans the account for you.

You will be given an opportunity to rate the lab experience. Select the applicable number of stars, type a comment, and then click **Submit**.

The number of stars indicates the following:

- 1 star = Very dissatisfied
- 2 stars = Dissatisfied
- 3 stars = Neutral
- 4 stars = Satisfied
- 5 stars = Very satisfied

You can close the dialog box if you don't want to provide feedback.

For feedback, suggestions, or corrections, please use the **Support** tab.