Lab 2 – GCP VM Installs

Bowers, Winter 2021
Due 01/31/2021 at 11:59pm

For this lab we are going to work with Google Cloud to set up a micro-instance of a virtual machine. **Please read this guide carefully and follow along**. There will be homework questions. seeded throughout this document asking you to take a screenshot here or there, report information, etc. and you won't be able to go back to it without starting over.

You can create as many VMs as you want, but keep in mind that your account will be charged for each moment a VM is online. **NOTE that you should never put your personal credit card information into the site. This is 100% free for you.**

The reason we're using a micro-instance is that it is free to your account, as long as you don't send/receive too much data.

Account Setup

You should have received an email forwarded from myself containing information for signing up for Google Cloud. Your OU email is required for the first form, as that will send you the coupon. This is what that first email should look like:

Dear Students,

Here is the URL you will need to access in order to request a Google Cloud Platform coupon. You will be asked to provide your school email address and name. An email will be sent to you to confirm these details before a coupon is sent to you.

Student Coupon Retrieval Link

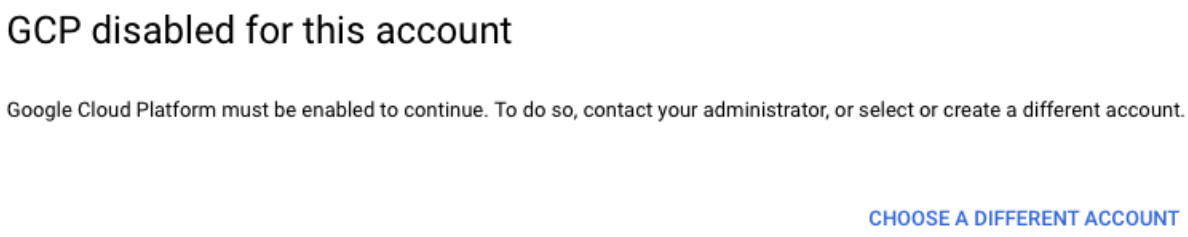
- You will be asked for a name and email address, which needs to match the domain. A confirmation email will be sent to you with a coupon code.
- You can request a coupon from the URL and redeem it until: 5/7/2021
- Coupon valid through: 1/7/2022
- You can only request ONE code per unique email address.

Please contact me if you have any questions or issues.

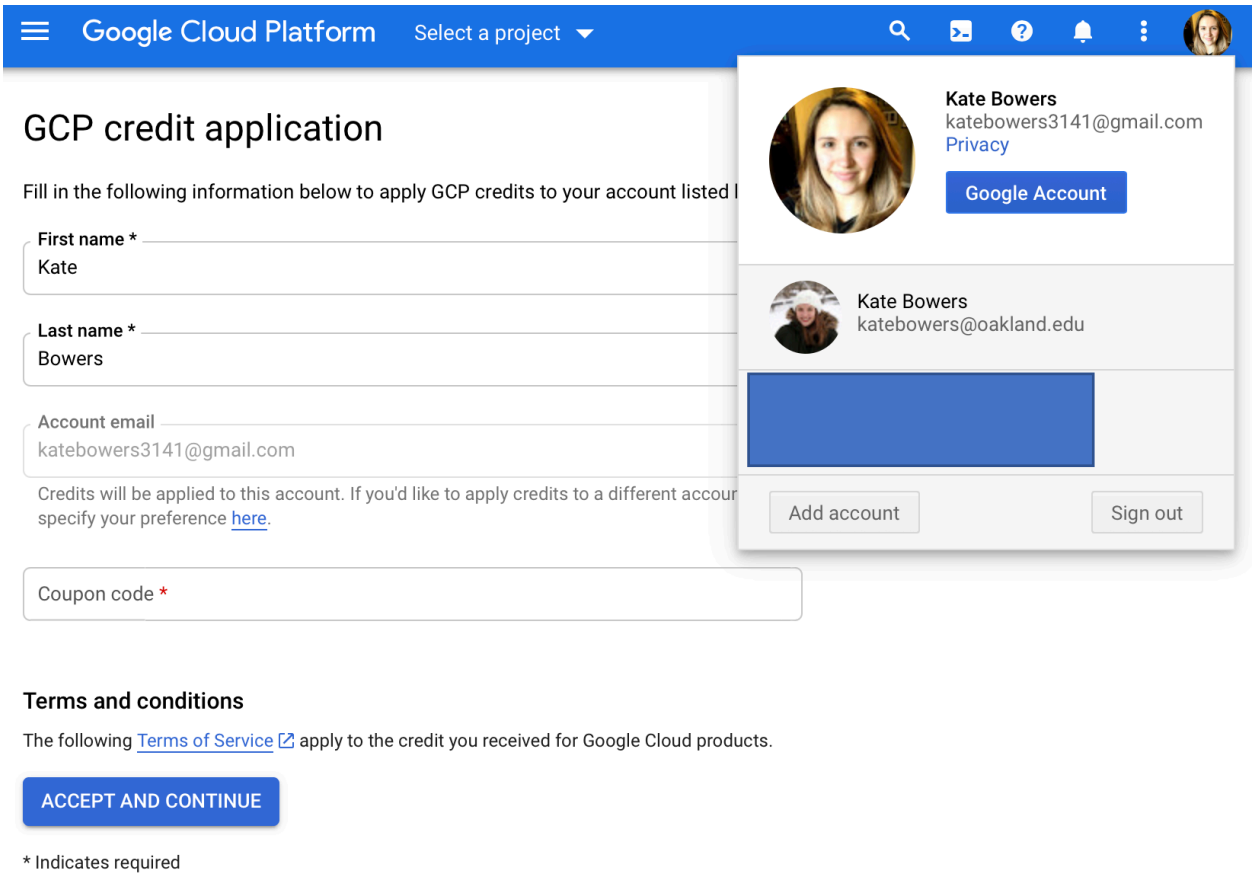
Thanks,
Kate Bowers

From your OU email, click on the “Student Coupon Retrieval Link.” Go through the steps and you should receive a second email in your OU email.

In your second email, click on the link to redeem the coupon. You should **hopefully** see this dialog message:



If you don’t get this dialog message, that’s fine. Either way, **make sure that you switch your account at the coupon redemption page to be your personal account, NOT YOUR OU ACCOUNT.**



Make sure your personal Gmail account is active, NOT YOUR OU account. Then fill out the GCP credit application. Make sure to copy over the coupon code included in the second email.

Google Cloud Platform

Welcome Kate!

Create and manage your Google Cloud Platform instances, disks, networks, and other resources in one place.

Country

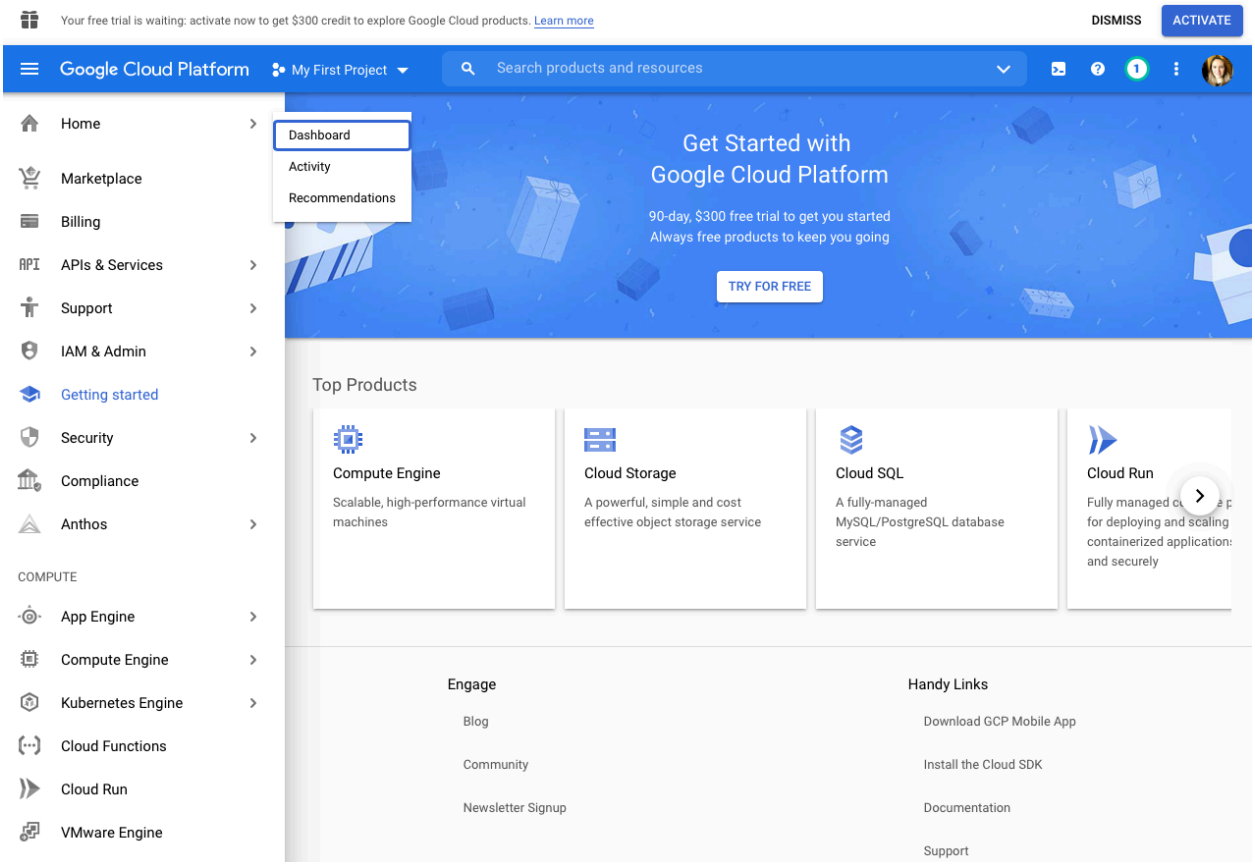
United States

Terms of Service

☐ I agree to the Google Cloud Platform Terms of Service, and the terms of service of any applicable services and APIs.

AGREE AND CONTINUE

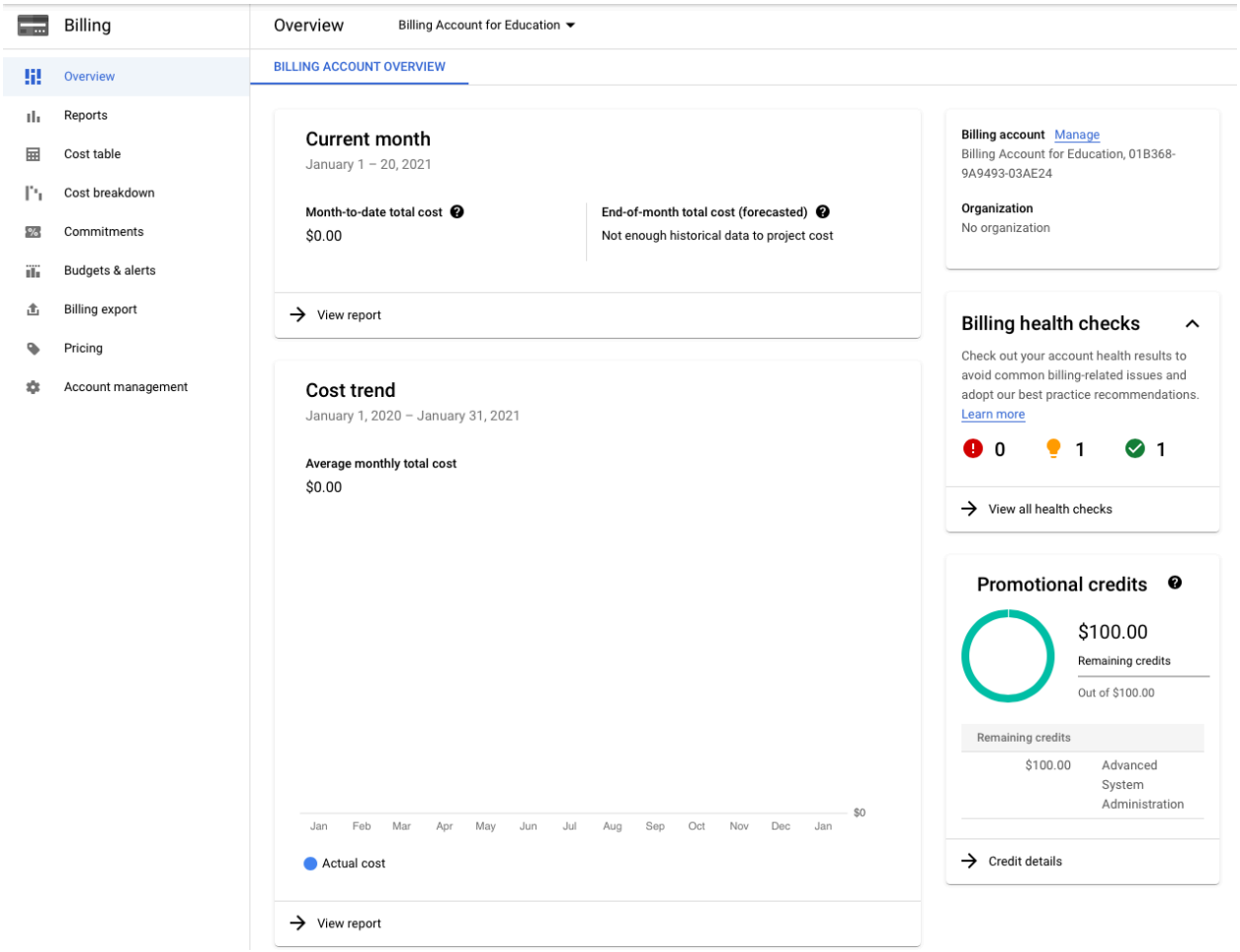
You might see a dialog message like this if you've never used GCP before. Agree to the terms of service and click Continue. It might take a minute, but now you should see the dashboard:



If you see the dialog message at the top saying you have a free trial for $300 of credits, click Dismiss. If you click this, you may become ineligible for the $50 in educational credits that I've already received for you. If you run out of money, I can request more for you, however it may take time for Google to process the request.

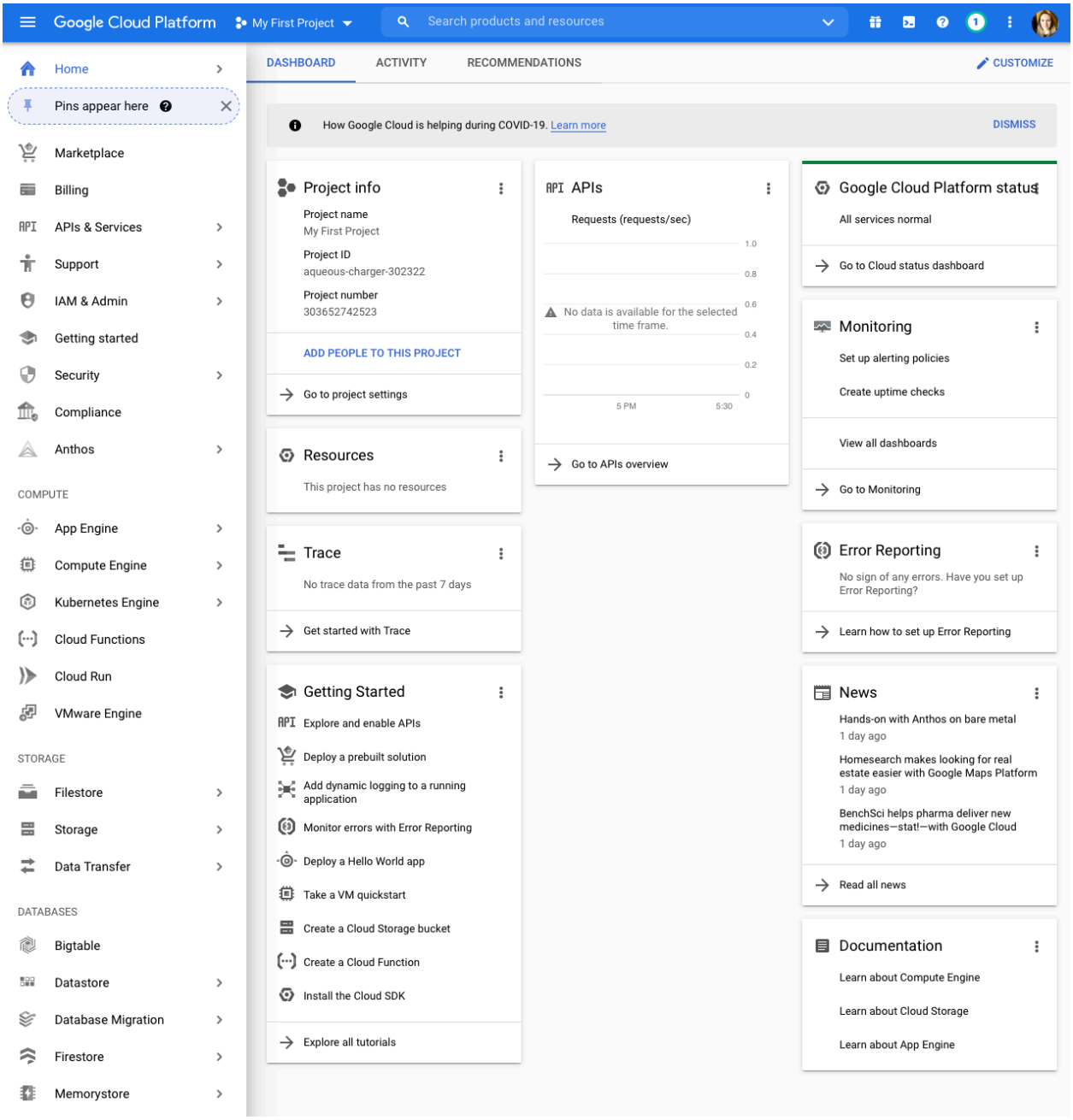
Okay, now you should have a billing account. You can access this at http://cloud.google.com now whenever you want to see how many credits you have left. You can also click the "Billing" link in the left pane from the screenshot above. Google Cloud itself is really outside the scope of this lab, however I'd recommend reading up on its capabilities (there are a LOT of really cool things you can do with it).

Your billing account page should look like this, except you'll see $50 instead of $100:

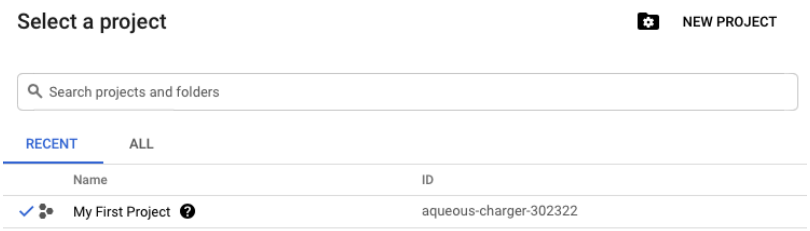


All of your Projects in GCP will be linked to this billing account. This is how cloud computing works.

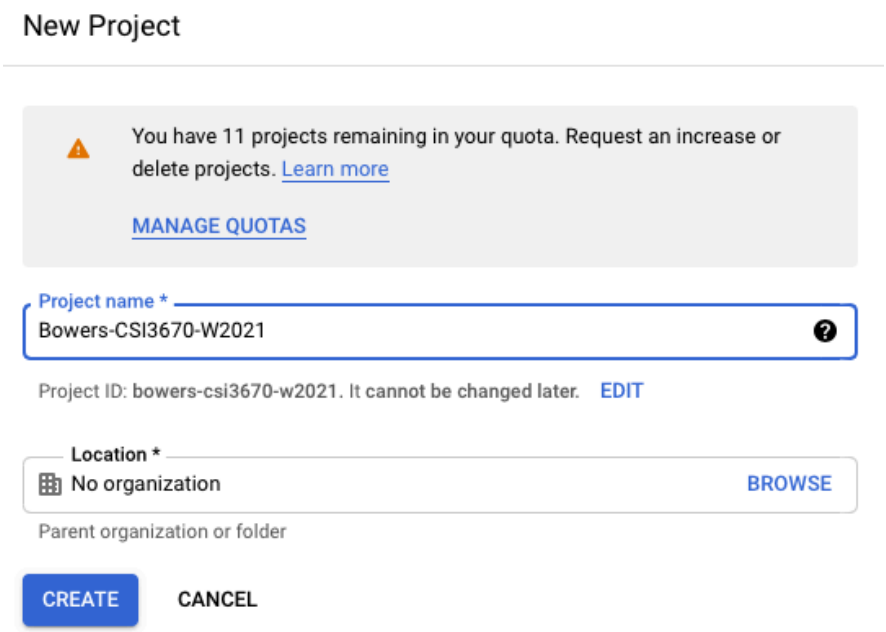
Now we need to create a Project for the class. The project will contain all VMs related to the class (so, one Project will contain both the Windows and Ubuntu VMs). Click the GCP logo on the top left to bring you to the home page, or navigate to https://console.cloud.google.com.



You should see a “My First Project” dropdown menu at the top, in the blue bar. Click on it.

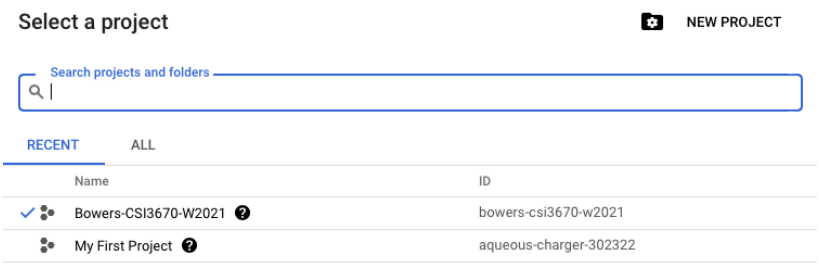


Click on the “NEW PROJECT” in the top right corner of the dialog box.



For the Project name, name your project **<LastName>-CSI3670-W2021**, where <LastName> is your last name without the angle brackets. Leave the organization alone. If prompted to enter a billing account, you should hopefully see a “Billing Account for Education” option. Choose that one. If you don’t see it, you may not have redeemed the credits correctly. Click “Create.”

You’ll be navigated back to your home page. In the top blue bar, choose your newly created project.

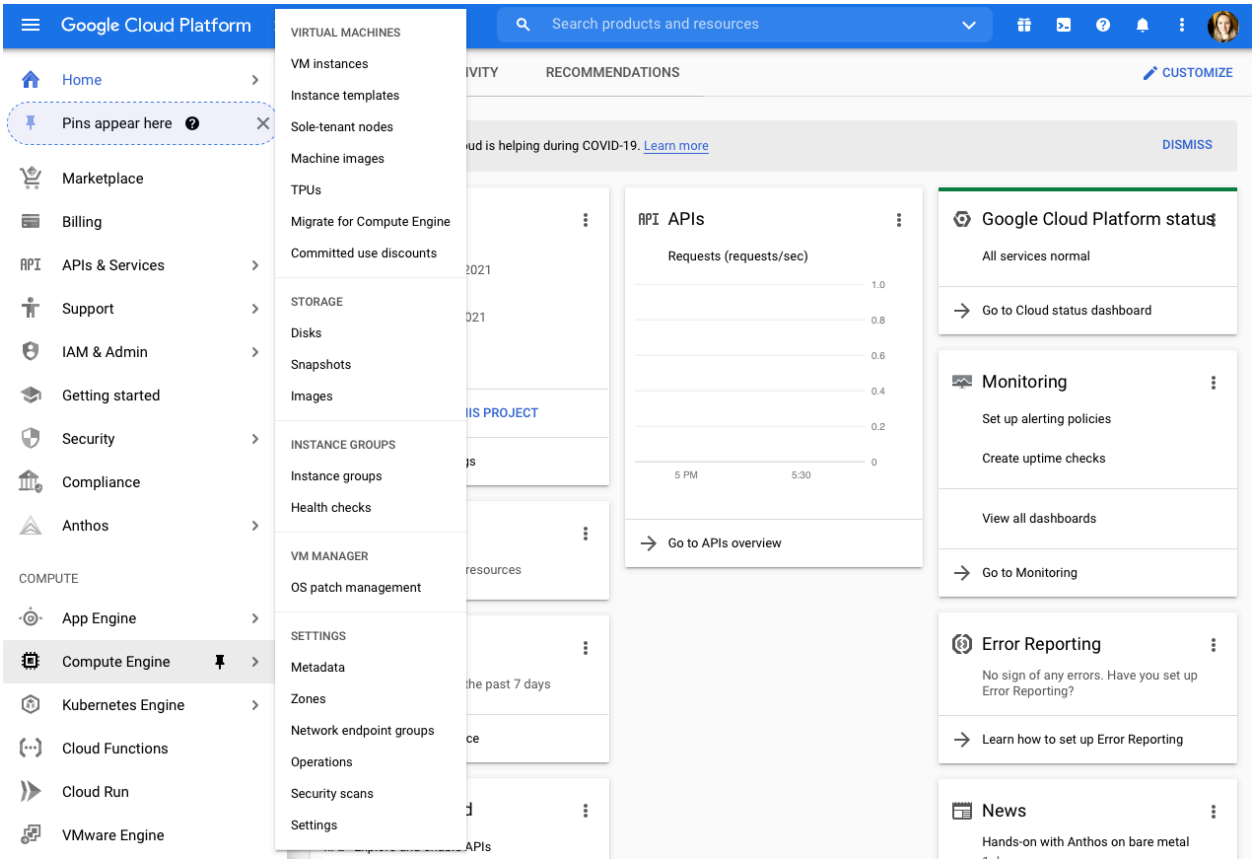


VM Setup

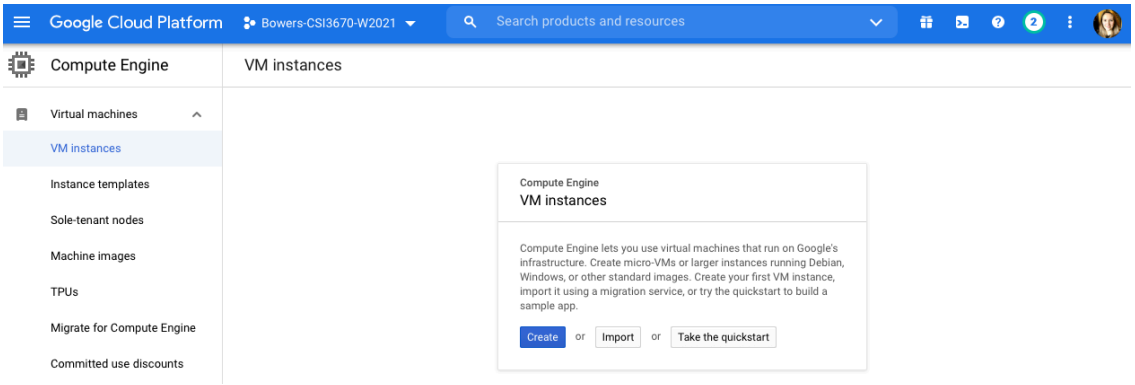
Now, you will create **two** VMs. The first will be a microinstance (similar to last semester if you had me for CSI 3660). The second will be Windows Server, to play with as a dev/test environment.

Ubuntu VM Creation

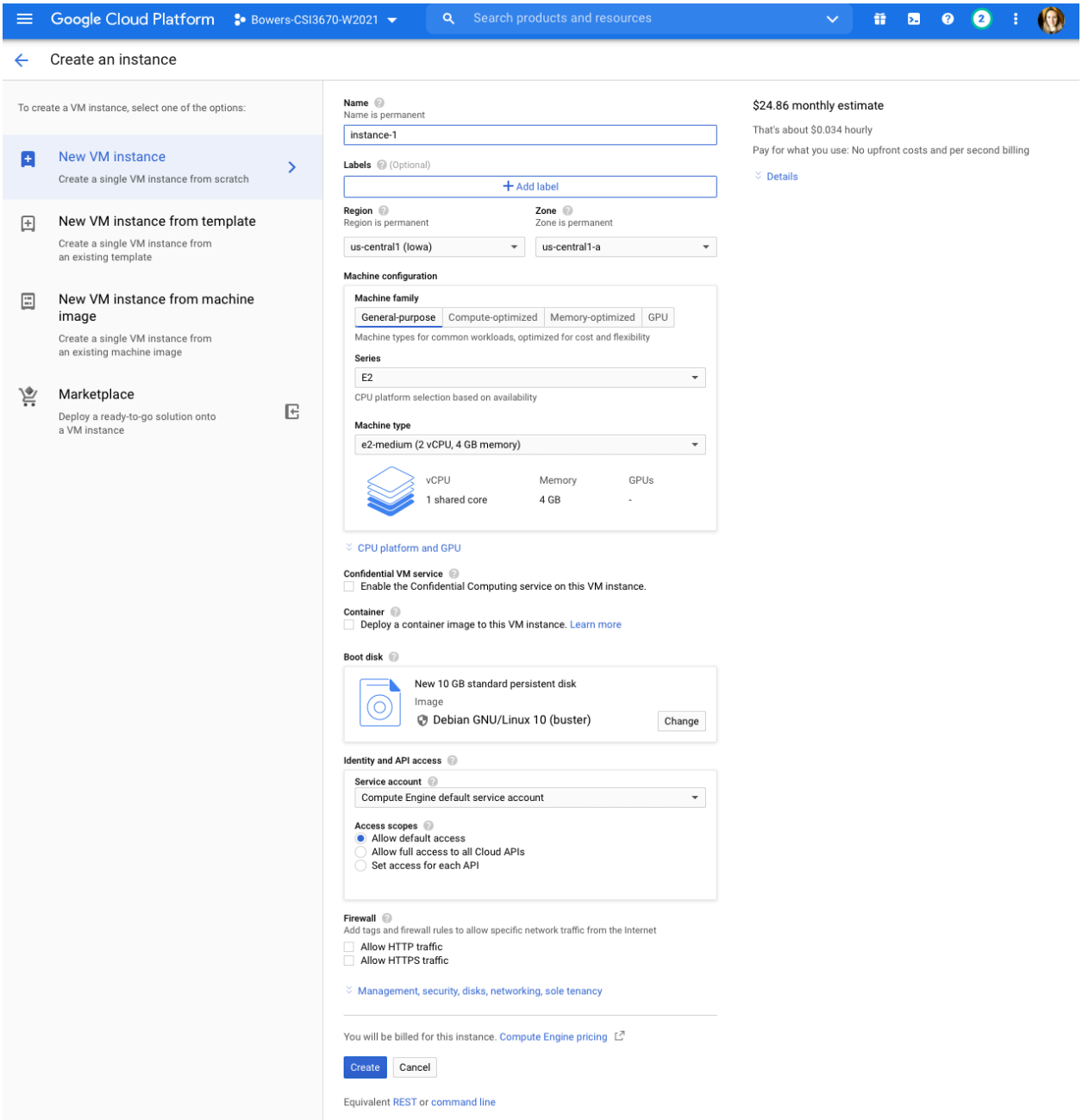
In the menu on the left of your homepage, click on Compute Engine.



It may take a few moments for the Compute Engine to initialize. Once it is done, click the Create button.



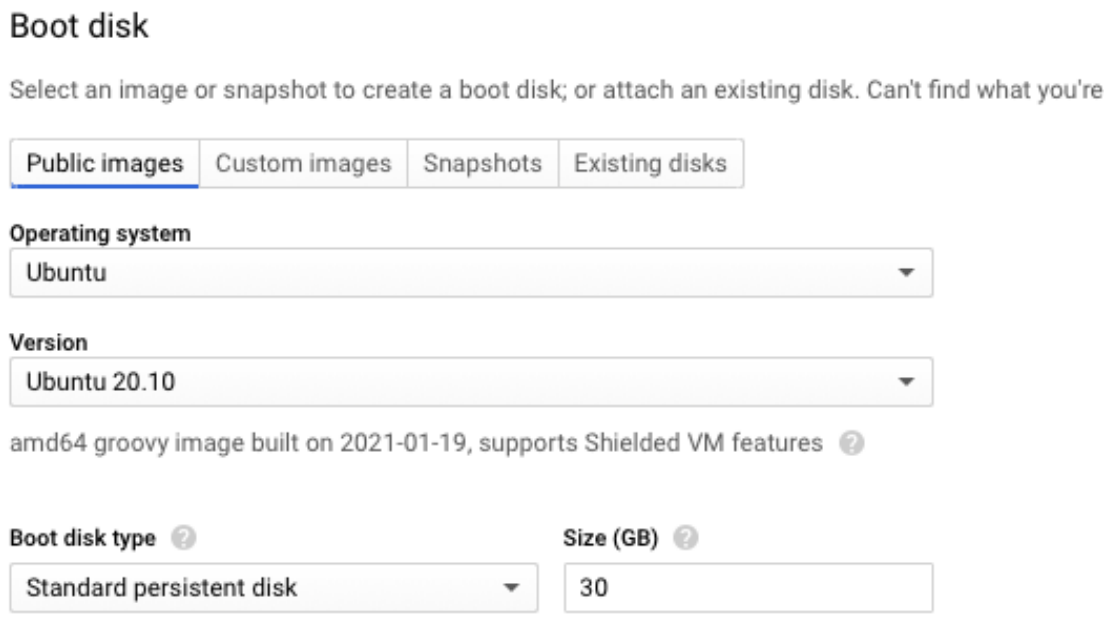
You'll be taken to the VM creation page. By default it looks like this:



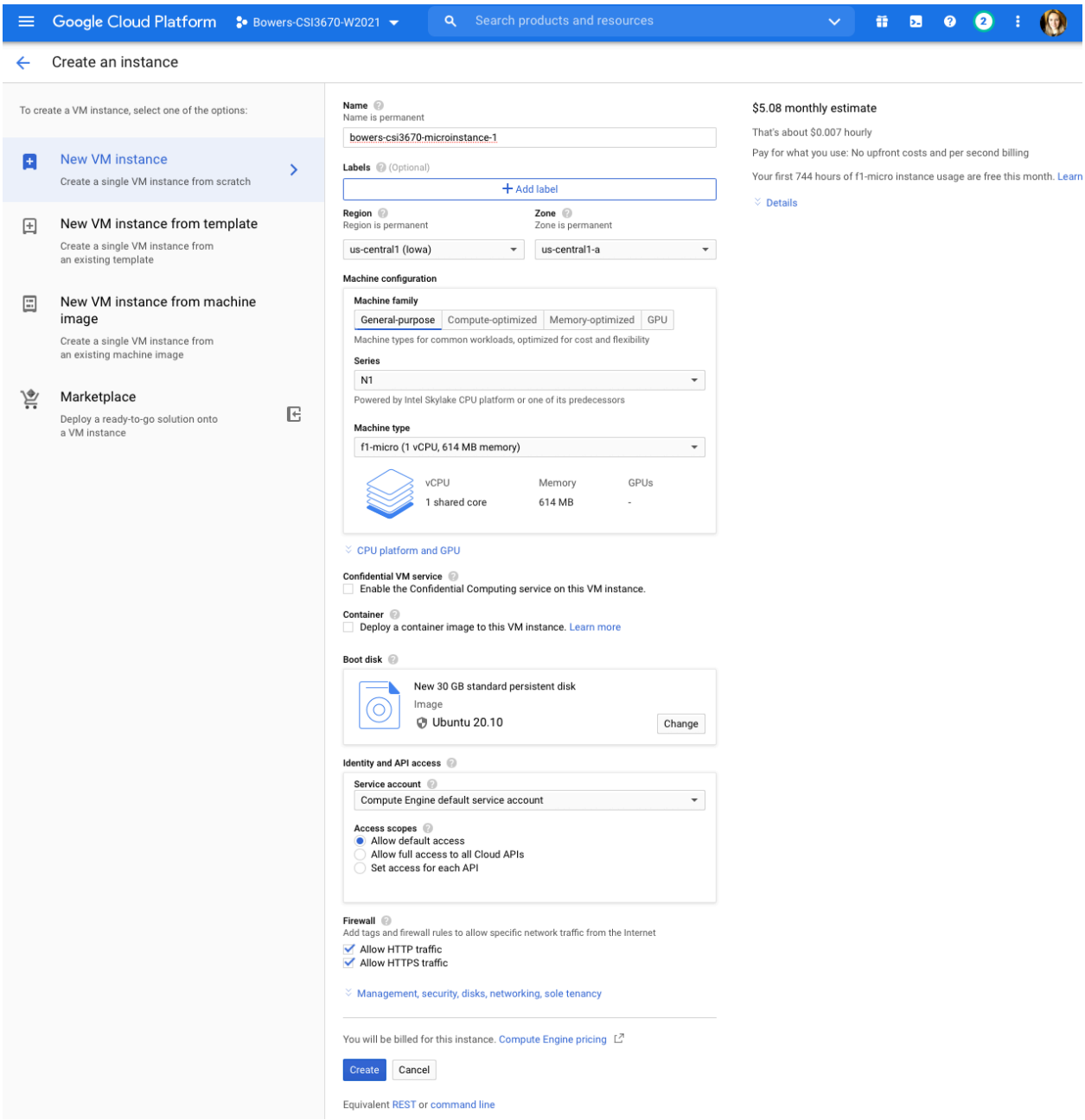
Name your VM **<lastname>-csi3670-ubuntu** (I did a different naming convention, however you want to structure it is fine). The region and zone should be us-central as shown, as this will affect the billing. You can play around with the machine type, location, etc. and see how it affects the cost changes on the right (but don't click Create yet). The beefier the machine, the more expensive. We're going to use a smaller model and keep things free.

Choose **N1** for the Series option and **f1-micro** for the Machine type. Note that now, to the right, you should see a dialog message that says “Your first 744 hours of f1-micro instance usage are free this month.” **If you do not use these options, you will be billed extra.**

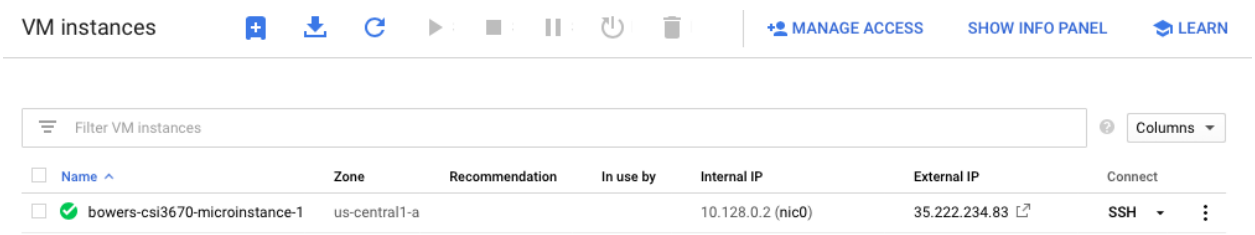
Leave the Confidential VM service and Container options unchecked. For the Boot disk option, click Change. Under the Public images tab, choose Ubuntu for the Operating system and Ubuntu 20.10 for the Version. Change the Size to be 30GB and leave the Boot disk type as Standard persistent disk.



Once you have the same configurations, click Select at the bottom. Check the Allow HTTP and HTTPS traffic options. Your microinstance should look like the screenshot below (obviously with a different name):

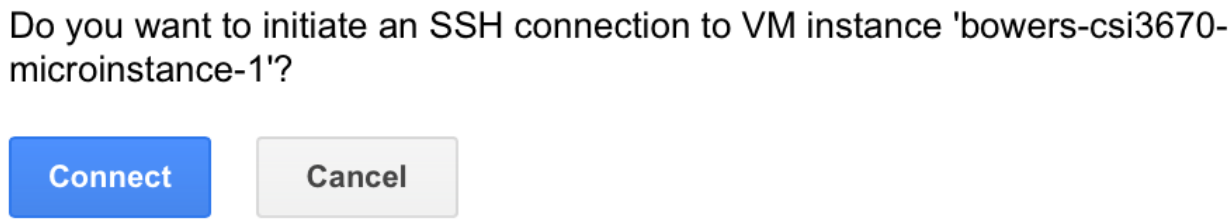


Click Create at the bottom. The VM instance creation will take a few minutes. Once it's done, you'll see a green checkmark.



Once it's ready and you see a green checkmark, you can open the instance by clicking its name and looking at the details and monitoring tabs.

Go back to the VM instances screen (like the screenshot above) and click on the SSH at the right. Google Cloud makes SSH ridiculously easy to do in the browser. This will pop open an SSH window. Depending on your browser settings, it may see it as a popup window and try to block it. Once you allow the window to be opened, you might see something similar to this:



Click Connect. This may take some time, but once the connection is established, you should see a screen similar to this:

```
 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Wed Jan 20 23:09:38 UTC 2021

  System load:  0.32               Processes:             97
  Usage of /:   4.8% of 28.90GB    Users logged in:       0
  Memory usage: 33%                IPv4 address for ens4: 10.128.0.2
  Swap usage:   0%

0 updates can be installed immediately.
0 of these updates are security updates.



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.

katebowers3141@bowers-csi3670-microinstance-1:~$
```

Yay! You are now in your Linux virtual machine. Now we should make sure our machine is up to date and install Apache. This is something that should be done fairly regularly to make sure things like security updates are applied to your software.

In the terminal run (without the dollar sign, I use the dollar sign to indicate that you should type a command into the shell):

```
$ sudo apt update && sudo apt upgrade
```

When prompted, type **y** and hit enter to accept. Once it's complete, type:

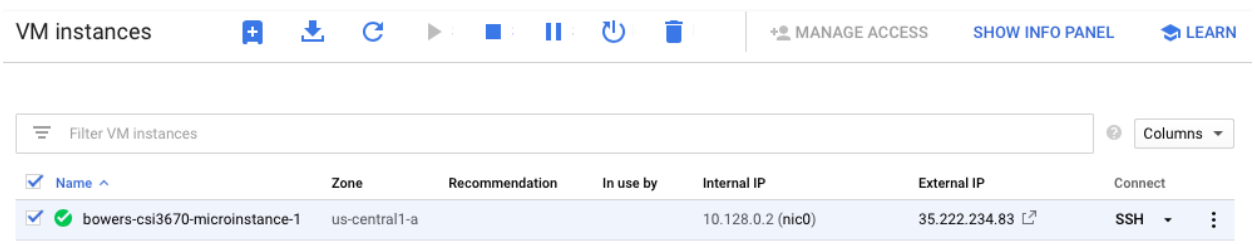
```
$ sudo apt-get install apache2
```

Again, type **y** and hit enter to accept.

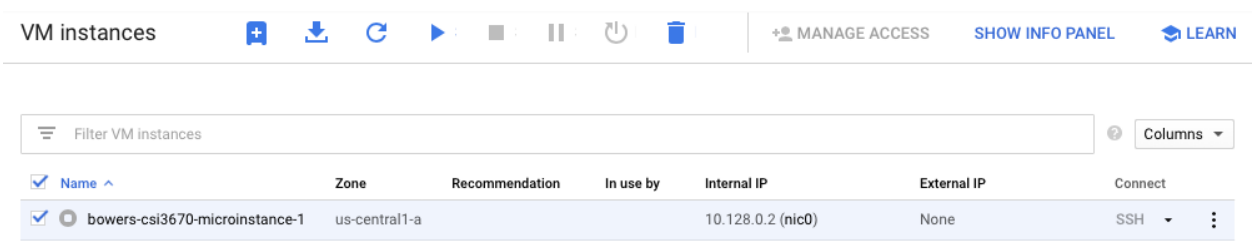
Now it's time to put together the actual lab assignment. Create a Word document (Word is free for students, see the syllabus on Moodle if you don't have it installed yet) and type your name at the top.

In a browser, type http:// followed by the external IP address of your GCP microinstance. You should see the Apache default page. Take a screenshot of this page, **including the IP address in your browser**, and paste the screenshot in the Word document beneath your name. See the screenshot on the next page for something similar.

That's it! You're done with your Ubuntu VM for now. Now, navigate back to the VM instances page in GCP Compute Engine. Check the box next to your VM instance and click the Stop (square) button at the top.



This step is important, since you will be billed while your VM is on or suspended. Make sure that when you click stop, your VM is in a safe state to be shut down (otherwise, use Suspend). If prompted with a dialog box to Stop VM instance, click Stop. Once the VM successfully shuts down, you should see it grayed out. You'll need to power it back on when you want to use it next.



Not Secure — 35.222.234.83

loud Platform | katebowers3141@bowers-csi3670-microinstance-1: ~ | 3 Apache2 Ubuntu D

Apache2 Ubuntu Default Page

ubuntu

It works!

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.
- `ports.conf` is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the `mods-enabled/`, `conf-enabled/` and `sites-enabled/` directories contain particular configuration snippets which manage modules, global configuration fragments, or virtual host configurations, respectively.
- They are activated by symlinking available configuration files from their respective *-available/ counterparts. These should be managed by using our helpers `a2enmod`, `a2dismod`, `a2ensite`, `a2dissite`, and `a2enconf`, `a2disconf` . See their respective man pages for detailed information.
- The binary is called apache2. Due to the use of environment variables, in the default configuration, apache2 needs to be started/stopped with `/etc/init.d/apache2` or `apache2ctl`. **Calling `/usr/bin/apache2` directly will not work** with the default configuration.

Document Roots

By default, Ubuntu does not allow access through the web browser to *any* file apart of those located in `/var/www`, **public_html** directories (when enabled) and `/usr/share` (for web applications). If your site is using a web document root located elsewhere (such as in `/srv`) you may need to whitelist your document root directory in `/etc/apache2/apache2.conf`.

The default Ubuntu document root is `/var/www/html`. You can make your own virtual hosts under /var/www. This is different to previous releases which provides better security out of the box.

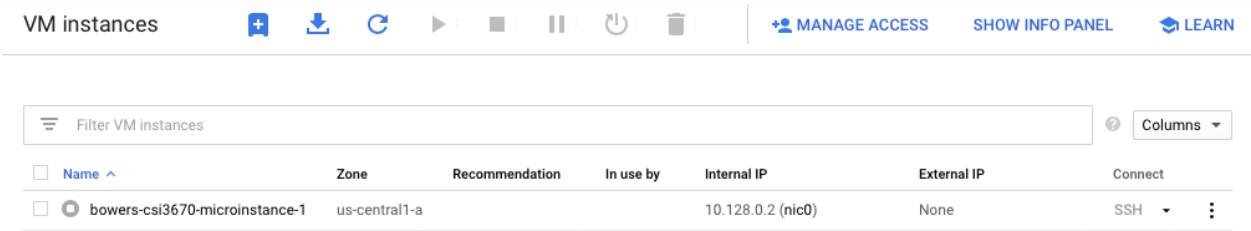
Reporting Problems

Please use the `ubuntu-bug` tool to report bugs in the Apache2 package with Ubuntu. However, check **existing bug reports** before reporting a new bug.

Please report bugs specific to modules (such as PHP and others) to respective packages, not to the web server itself.

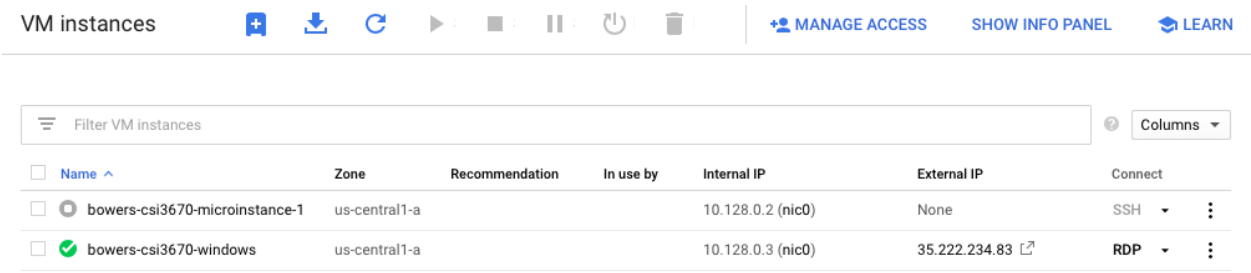
Windows GCP VM Creation

Click on the Create instance icon (the blue icon at the left with the + sign).

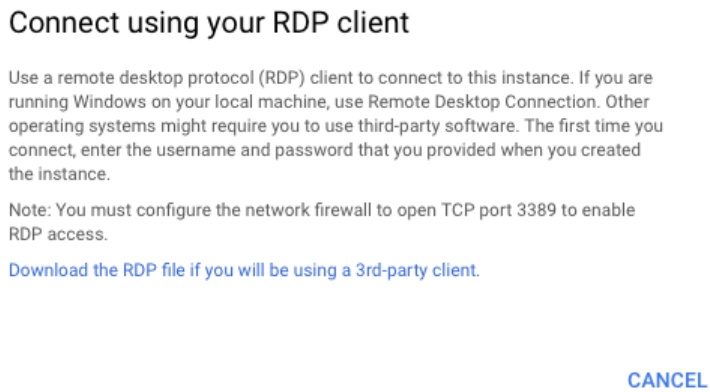


Go through the same process as your Ubuntu VM. Change the name to be <lastname>-csi3670-windows or something similar to distinguish between your Ubuntu VM. Choose the same region and zone. Give it an **n1-standard-1 (1vCPU, 3.75GB memory)**. If we used the same machine configuration as we did for Ubuntu, we don't meet the Microsoft suggestion for performance and would probably run into issues. For the Operating System, choose Windows Server (scroll to the very bottom of the dropdown list). For the Version, choose Windows Server 2019 Datacenter (**NOT DATACENTER CORE**). For the size, you can stick with 50GB. Allow the HTTP and HTTPS traffic and click Create.

BECAUSE THIS IS NOT THE FREE TYPE OF VM LIKE YOUR UBUNTU MICROINSTANCE, MAKE SURE YOU ALWAYS ALWAYS ALWAYS TURN OFF YOUR WINDOWS VM WHEN YOU ARE DONE. Otherwise your billing will be crazy. Once your VM is created, click the RDP icon to launch a Remote Desktop session.



You may get a dialog box like this:



Either download the RDP file or install the Chrome extension (https://chrome.google.com/webstore/detail/chrome-remote-desktop/inomeogfingihgjfjlpeplalcfajhgai?hl=en). If you're on Mac or Linux, look up how to connect via Remote Desktop.

Personally, I use a MacBook. I downloaded Microsoft Remote Desktop from the App Store and installed it. Then, in GCP, I downloaded the RDP file. When I opened Microsoft Remote Desktop, I navigated to the Settings dropdown menu, chose the option to Import from RDP file, and navigated to where the RDP file from my GCP microinstance downloaded. From there, I was able to open it. I also needed to go into System Preferences to enable remote connections for Microsoft Remote Desktop through my firewall settings. I also had to click the down-arrow next to RDP in the VM instances page to set my default password for my account.

Once you have access to the remote desktop, open up Windows Server. **Take a screenshot to demonstrate that you installed Windows Server correctly and are able to access the Desktop interface.** Paste this screenshot underneath the Ubuntu screenshot in your Word document.

Upload your Word or PDF document with the screenshots to Moodle.