Google Cloud Instance Configuration

CS 3113, Spring 2019

This tutorial goes through how to set up your own Google Compute Engine (GCE) instance to work on the assignments. Each student will have \$50 in credit for use during the semester. Please try to use the resources judiciously. Adding additional credits is a bit difficult. When you sign up for GCP the first time, you also receive \$300 credits from Google that you can use for the course.

You will connect to the Google cloud through a terminal or shell. This is the standard way of interacting with *nix family systems. This tutorial will also help you set up your own terminal access.

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SSH

The Secure SHell (SSH) provides a range of secure access tools to remote machines. For this class, we will be using it to establish a terminal (command-line) connection to your virtual machine instance.

We are using key-based authentication to your compute instances. This means that access will be linked to specific computers and accounts that you will be accessing your instance from. Also, you will not use a password for access (unless your local private key is encrypted).

Configuring SSH on your Laptop: Unix (OSX, Linux)

Installation: ssh is typically installed by default under these OSes.

Configuration: If you already have a ~/.**ssh/id_rsa.pub** in your home (user) directory, then you are done. You can check for this file by typing:

ls ~/.ssh/id_rsa.pub

Otherwise, generate a public/private key pair on your local machine. At the command line, type: ssh-keygen

It is okay to use an empty passphrase, but doing so means that your private key is unencrypted (this is often okay, since it is stored on your local machine only, but is a problem if your laptop is compromised).

Configuring SSH on your Laptop: Windows

Installation:

• Install PuTTY: https://www.ssh.com/ssh/putty/windows/

Configuration:

- Use the puttygen to generate a public/private key pair
 - See https://www.ssh.com/ssh/putty/windows/puttygen
 - Save both the public and private keys to a file. It is important that you safeguard the private key (do not share it!)
- Use putty to connect to your instance. To take this step, you will first need to set up and configure your instance (described below).

In the PuTTY Configuration WIndow:

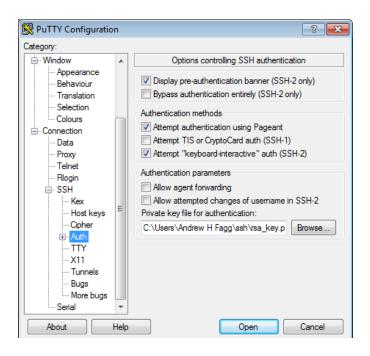
• Insert the **static IP address** of your instance. You will not have this until setting up your instance.

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- Select Connection > Data from the left-hand menu.
- Add your instance user name to the Auto-login username field.

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- Select Connection > SSH > Auth from the left-hand menu.
- Browse to and select the private ssh key file



• Save your session so you can recall these settings quickly.

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Google Cloud Account

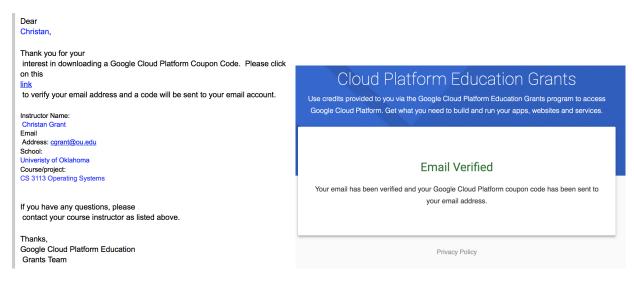
Create a Gmail account if you haven't already at https://gmail.google.com

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Course/Project Information Instructor Name: Christian Grant					
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Accept and continue. At this point you will receive the \$50 in coupons for the google cloud.

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Compute Console

The compute console is where you will be creating and manipulating your virtual machine instance(s). This can be reached at <u>https://console.cloud.google.com</u>

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۲	Compute Engine	>	_		→ Go to APIs overview	\rightarrow	Set up Error Reporting
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	Storage	>	×	View source and logs on the Debug page		→	Read all news
*	Spanner		(i)	Monitor errors with Error Reporting Deploy a Hello World app			
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STA	CKDRIVER			Create a Cloud Storage bucket			Learn about Compute Engine
	Monitoring		0	Install the Cloud SDK			Learn about Cloud Storage
Æ	Debug						Learn about App Engine
-	Trace	>	→	Explore all tutorials			
10	Logging	>					
6)	Error Reporting						
69	Enor Reporting						

The main console/dashboard looks like the following:

The console lists your active projects to which virtual machines are attached. Initially, you have one project with a default name (*My Project*). To change the name of your project, click on Manage project settings on the Project info button and save your changes.

Creating/Configuring Your Virtual Machine Instance

Create Your Instance

From the left-hand side of your Google cloud console, select Compute Engine

From Compute Engine / VM Instances, in the pop-up select CREATE

• (For those returning to the Google cloud console select: CREATE INSTANCE)

You will mostly use the defaults, but change:

- Machine type: micro (this is changeable later)
- Boot disk: select "Ubuntu 18.10"
- Firewall: Allow HTTP and HTTPS traffic
- Region: us-central1-c
- All full access to all Cloud APIs

Note that the f1-mico (0.6 GB 1 shared vCPU) instance will be free ---- it will not cost more than the free tier. There are several <u>zone options</u>, so you can choose the one where you would like your virtual instance to live. The closest zone is us-central1, this zone is located in <u>Council Bluffs, Iowa</u>. Set your zone to **us-central1-c** they will have the configurations we need.

Then click CREATE

۲	Compute Engine	← Create an instance	
A	VM instances	Name 🔞	
ala Ala	Instance groups	os-fagg-1 An instance with this name already exists	
	Instance templates	Region	\$4.28 per month estimated
8	Sole tenant nodes	us-central1 (lowa) v us-central1-c v	Effective hourly rate \$0.006 (730 hours per month)
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[22]	Images	Container 💿	
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\$	Settings	Set access for each API	
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)));;;	Marketplace	You will be billed for this instance. Learn more	
<١		Create Cancel	

After the instance is created: Select the instance from the "VM instances" list. You can view your instances here: <u>https://console.cloud.google.com/compute/instances</u>

≡	Google Cloud Platform	🖇 My First Project 👻				۹	
۲	Compute Engine	VM instances	CREATE INSTANCE	👻 📩 імрог	RT VM	C REFRESH	► START
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0	Disks						
0	Snapshots						
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X	TPUs						

Reserving an External, Static IP

If the instance is currently running, click on "STOP"

Click on "EDIT"

≡	Google Cloud Platform	💲 My First Project 👻
۲	Compute Engine	← VM instance details 🧪 EDIT 🖑 RESET 🖺 CLONE 🔳 STOP 🝵 DELETE
A	VM instances	Details Monitoring
RR HR	Instance groups	🖉 os-fagg-1
Ē	Instance templates	Remote access
8	Sole tenant nodes	SSH Connect to serial console Connecting to serial ports
0	Disks	Logs
0	Snapshots	Stackdriver Logging Serial port 1 (console)
[10] [1]	Images	३ More
XX	TPUs	Machine type f1-micro (1 vCPU, 0.6 GB memory)
,%,	Committed use discounts	CPU platform

Reserve a static IP address:

https://console.cloud.google.com/networking/addresses/add

- Network service tier: Premium
- Region: select us-central1
- Attach to: select your new instance
- Click "Reserve"

≡	Google Cloud Platform	🕽 My First Project 👻	
11	VPC network	← Reserve a static address	
8	VPC networks	Name 😨	
C ²	External IP addresses	os-fagg-1	
	Fire wall rules	Description (Optional)	
×	Routes		11.
Ŷ	VPC network peering	Network Service Tier • Premium (Current project-level tier, change)	
Χ	Shared VPC	Standard Fy version Fy4 Fy4 Fy6 Ype Regional Global (to be used with Global forwarding rules Learn more) Region Attached to Katached to Katached to Cancel Equivalent REST or command line	•

Configure ssh keys

Go back to your VM Instance Dashboard

- Select your instance
- Click "Edit"
- Under "SSH keys", click Add Item
- Copy your laptop public key (e.g. id_rsa.pub) onto your clipboard.
- Paste the key into the SSH Key text box. NOTE: your user ID at the end of the ssh key
 must match your google ID name. (i.e., <u>myprofessionalgmailaccount@gmail.com</u>).
 Also, make sure that your key does not include newlines when you are pasting it in.
- Click "Save" at the bottom of the page
- Add a second key. Paste the contents of the following file into the text box: <u>https://oudalab.github.io/cs3113sp19/instance/id_rsa_cs3113.pub</u>
- Note that you can add additional keys, for example, to support other local computers that you may be using

	Quotas	SSH Keys				
0	Security scans	Block project-wide SSH keys When checked, project-wide SSH keys cannot access this instance Learn more				
\$	Settings	You have 0 SSH keys				
		+ Add item				
		☆ Hide				
Service account 👔						
		Compute Engine default service account 👻				
` ∲ * *	Marketplace	Access scopes				

Start your instance:

• Click "Start" at the top of the page

Admin Access to your Instance

From the google cloud VM Instance page:

- Connect column: SSH: select connect in browser window.
- Wait for connection to be established (you will ultimately see a terminal window)
- You are now logged into the shell under your user ID.
- You can execute any command as the administrator (root) by prefacing the command with the *sudo* command. Doing this should be used only when necessary and with some degree of caution. However, at any time, you can delete your Instance (contents of the disk drive and all) and start again (of course, you will lose you prior work).

Configuring your Instance for the First Time

- Connect to your instance as the administrator.
- Update the current version of the OS and other software:

sudo apt update
sudo apt dist-upgrade -y

Generally, it is safe to answer 'Y' to the installation question. You should expect to do this from time to time. You can find the full script containing the installations we need on the course website: <u>https://oudalab.github.io/cs3113sp19/instance/startup.sh</u>

Install additional software

```
sudo apt install -y emacs vim htop tmux tree ranger glances
sudo apt install -y gcc gdb make
sudo apt install -y valgrind strace
sudo apt install -y linux-tools-common linux-tools-generic
sudo apt install -y linux-tools-`uname -r`
sudo apt install -y libcap-dev
sudo apt install -y libcap-dev
```

• Reboot your instance

sudo shutdown -r now

This is sometimes a necessary step after software installation (especially if your linux kernel version or other supporting libraries have been upgraded).

 Register your instance with the class: fill out the following form (this is homework zero!): https://goo.gl/forms/lurM8ZU4hf4iX2gV2

In response to your VM registration, we will verify that we are able to access your instance. Note that if we cannot access your instance, we cannot help you in configuring it and we cannot grade your assignments

Connecting to your Instance

SSH to you Instance: Browser

The simplest method to connect to an instance to use the browser. The does not require any additional key configuration.

	Name ^	Zone	Recommendation	Internal IP	External IP	Connect	
	S myosinstance	us-central1-c	🌻 Increase perf.	10.128.0.2 (nic0)	35.202.208.64 L ⁷	SSH 🖵 🚦	
				Open in	browser window		
				Open in browser window on custor			
				View gcl	oud command		
				Use ano	ther SSH client		
Secure	fter i ten devid googe con protectui gi lapopresi historieste en		 Welcome to Ubuntu 18.04.1 LTS Documentation: https://lan Support: https://lan Support: https://lan Support: https://lan System information as of Mon 	A Secure https://ssh.cloud.google.com/projects/digitalpophealth/zones/us-central-c/instances/myosinstance?authuser=0&hi=en_U Connected, how functoring and the constraint interval of a sensitivity of a se			

SSH to your Instance: Unix

In the terminal window on your local machine, type:

ssh <External Static IP address> -1 <google account username>
Where:

Where:

- <External Static IP address> is the external static IP address of your VM instance
- <google account username> is your username on your instance

If everything is configured properly, you will now have a terminal connection to your instance.

SSH to your Instance: Windows

- Open putty
- Select your saved session
- Click Open

Putty will open up a new window. If everything is configured properly, you will now have a terminal connection to your instance.

