# Getting Started with Cloud Shell and gcloud

## Overview

Cloud Shell provides you with command-line access to computing resources hosted on Google Cloud. Cloud Shell is a Debian-based virtual machine with a persistent 5-GB home directory, which makes it easy for you to manage your Google Cloud projects and resources. The `gcloud` command-line tool and other utilities you need are pre-installed in Cloud Shell, which allows you to get up and running quickly.

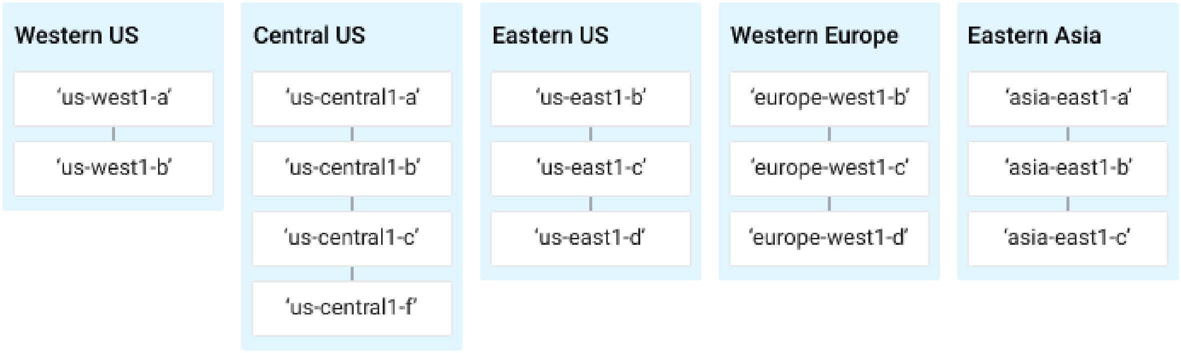
In this hands-on lab, you learn how to connect to computing resources hosted on Google Cloud via Cloud Shell with the `gcloud` tool.

### Task 1: Configure your environment

In this section, you'll learn about aspects of the development environment that you can adjust.

#### Understanding regions and zones

Certain Google 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`. The following image shows zones in their respective regions:



| Western US | Central US | Eastern US | Western Europe | Eastern Asia |
|---|---|---|---|---|
| 'us-west1-a' | 'us-central1-a' | 'us-east1-b' | 'europe-west1-b' | 'asia-east1-a' |
| 'us-west1-b' | 'us-central1-b' | 'us-east1-c' | 'europe-west1-c' | 'asia-east1-b' |
|  | 'us-central1-c' | 'us-east1-d' | 'europe-west1-d' | 'asia-east1-c' |
|  | '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. If you want 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 address.

To see what your default region and zone settings are, run the following commands:

```
gcloud config get-value compute/zone
gcloud config get-value compute/region
```

## Identify your default region and zone

1. Copy your project ID to your clipboard or text editor. The project ID is listed in 2 places:

- In the Google Cloud Console, on the Dashboard, under **Project info**. (Click **Navigation menu** (≡), and then click **Home > Dashboard**.)

2. In Cloud Shell, run the following `gcloud` command, replacing `<your_project_ID>` with the project ID you copied:

   ```
   gcloud compute project-info describe --project <your_project_ID>
   ```

   Find the default zone and region metadata values in the output. You'll use the zone (`google-compute-default-zone`) from the output later in this lab.

## Set environment variables

Environment variables define your environment and help save time when you write scripts that contain APIs or executables.

1. Create an environment variable to store your Project ID, replacing `<your_project_ID>` with the value for *name* from the `gcloud compute project-info describe` command you ran earlier:

```
export PROJECT_ID=<your_project_ID>
```

2. Create an environment variable to store your Zone, replacing `<your_zone>` with the value for *zone* from the `gcloud compute project-info describe` command you ran earlier:

```
export ZONE=<your_zone>
```

3. To verify that your variables were set properly, run the following commands:

```
echo $PROJECT_ID
echo $ZONE
```

If the variables were set correctly, the echo commands will output your Project ID and Zone.

## Create a virtual machine with the gcloud tool

Use the `gcloud` tool to create a new virtual machine (VM) instance.

1. To create your VM, run the following command:

```
gcloud compute instances create gcelab2 --machine-type n1-standard-2 --zone $ZONE
```

### Command details

- `gcloud compute` allows you to manage your Compute Engine resources in a format that's simpler than the Compute Engine API.
- `instances create` creates a new instance.
- `gcelab2` is the name of the VM.
- The `--machine-type` flag specifies the machine type as *n1-standard-2*.

- The `--zone` flag specifies where the VM is created.
- If you omit the `--zone` flag, the `gcloud` tool can infer your desired zone based on your default properties. Other required instance settings, such as `machine type` and `image`, are set to default values if not specified in the `create` command.

To open help for the `create` command, run the following command:

```
gcloud compute instances create --help
```

## Explore gcloud commands

The `gcloud` tool offers simple usage guidelines that are available by adding the `-h` flag (for help) onto the end of any `gcloud` command.

1. Run the following command: `gcloud -h`

You can access more verbose help by appending the `--help` flag onto a command or running the `gcloud help` command.

2. Run the following command: `gcloud config --help`
3. Run the following command: `gcloud help config`
4. View the list of configurations in your environment: `gcloud config list`
5. To see all properties and their settings: `gcloud config list --all`
6. List your components: `gcloud components list`

# Task 2: Install a new component

Next, you'll install a gcloud component that makes working in the `gcloud` tool easier.

**Auto-complete mode**

`gcloud interactive` has auto prompting for commands and flags and displays inline help snippets in the lower section of the pane as the command is typed.

You can use dropdown menus to auto-complete static information, such as command and sub-command names, flag names, and enumerated flag values.

1. Install the beta components:

```
sudo apt-get install google-cloud-sdk
```

2. Enable the `gcloud interactive` mode:

```
gcloud beta interactive
```

When using the interactive mode, press TAB to complete file path and resource arguments. If a dropdown menu appears, press TAB to move through the list, and press the spacebar to select your choice.

3. To try this feature, start typing the following command, and use auto-complete to replace <your_vm> with an existing VM in your project:

```
gcloud compute instances describe <your_vm>
```

A list of commands is displayed below the Cloud Shell pane. Pressing F2 toggles the active help section to ON or OFF.

4. To exit from the interactive mode, run the following command:`exit`

## Task 3: Connect to your VM instance with SSH

`gcloud compute` makes connecting to your instances easy. The `gcloud compute ssh` command provides a wrapper around SSH, which takes care of authentication and the mapping of instance names to IP addresses.

1. To connect to your VM with SSH, run the following command:

```
gcloud compute ssh gcelab2 --zone $ZONE
```

**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.
```

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

2. To continue, type **Y**
   ```
   Generating public/private rsa key pair.
   Enter passphrase (empty for no passphrase)
   ```
3. To leave the passphrase empty, press **ENTER**.
4. You don't need to do anything here, so to disconnect from SSH and exit the remote shell, run the following command: `exit`

You should be back at your project's command prompt.

## Task 4: Use the Home directory

Now try out your Home directory. The contents of your Cloud Shell Home directory persist across projects between all Cloud Shell sessions, even after the virtual machine is terminated and restarted.

1. Change your current working directory: `cd $HOME`
2. Open your `.bashrc` configuration file by using the `vi` text editor: `vi ./.bashrc`
3. The editor opens and displays the contents of the file.

   To exit the editor, press **ESC**, `:wq`, and then press **Enter**.