GCloud MPI Cluster Setup

1 Create a New GCloud MPI Cluster

- Create a new project in the GCP console [Figure 1]
- Choose where you will run the scripts
  - Option 1 - Cloud Shell [Figure 2]
  - Option 2 - Command line
    - Install and initialize the gcloud SDK on your machine (https://cloud.google.com/sdk/docs/)[1]

Run `git clone https://github.com/maxnz/gcloud-mpi-setup.git`
Run `cd gcloud-mpi-setup`

1.1 `setup.bash`

Run `./setup.bash`.

- Enter the number of virtual machines (default maximum is 16, due to the 32 processor limit for regular projects)
- Enter the full project ID if necessary
- Choose if the image should be saved after setup is complete[2]

The script will now create the cluster. Setting up 8 VMs takes about 15 minutes if it needs to create the MPI image or about 5 minutes if the image exists already

1.1.1 `setup.bash` Command Line Options

```
-h,   --help          show this help message
-p,   --project ID    set the project to use (ID = full project id)

-q,   --quiet         run the script with default options (unless
                      specified otherwise):
                          current project, 8 VMs, delete image
-n  N                 set the number of nodes (N) in the cluster
-d,   --delete-image  delete the MPI image after creating VMs (Default)
-s,   --save-image    save the MPI image after creating VMs
                      (this will incur costs)
```

[1] Note: Scripts will not work with Windows Command Prompt (WSL is OK)
[2] Saving will incur costs, but is good for rapid testing as creating a new image takes about 10 minutes

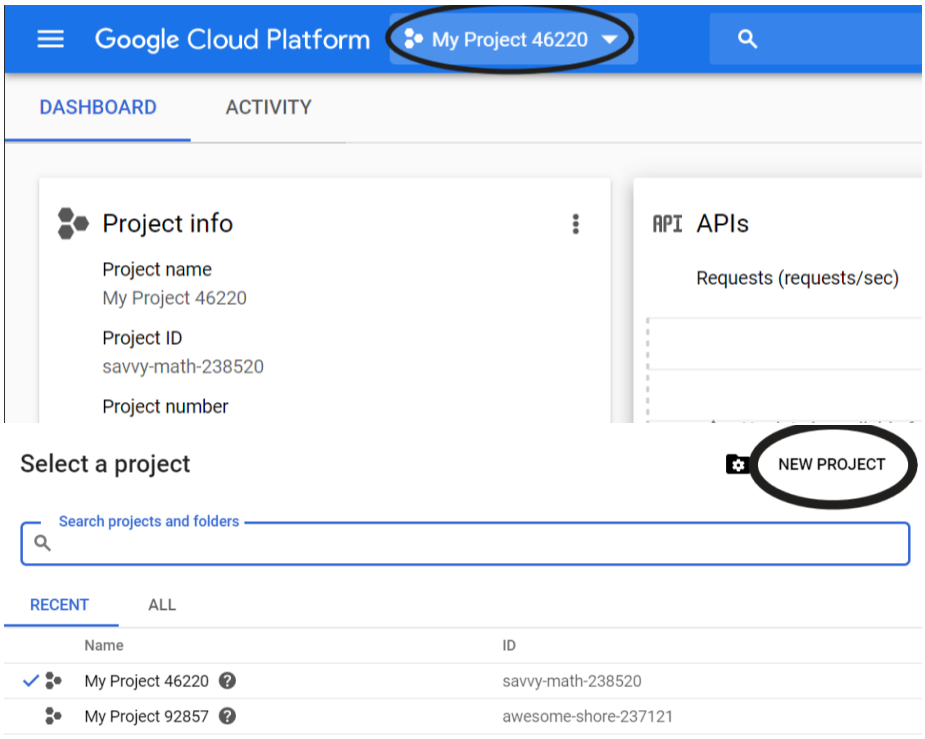

Figure 1: Create a new Project

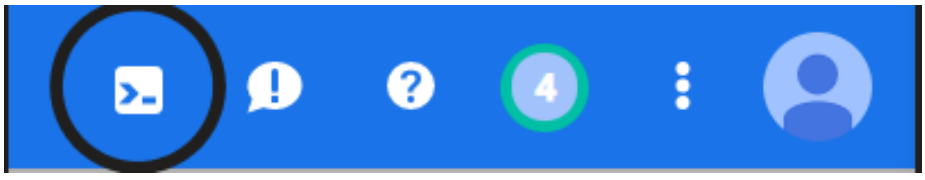

Figure 2: Cloud Shell

2 Adding Users to Your Cluster

Run `./create_users.bash`.
At the end of the script, the IP address of the head node will be printed.

If the same username is entered multiple times, the script will check if the ssh key given is already associated with that account and will add it if necessary.

This script can be run as many times as necessary as long as the cluster is running.

2.1 Manual Entry

- Enter the full project ID if necessary
- For each user:
  - Enter their preferred username
  - Enter their SSH key

2.2 Automatic Entry

Use the `-f` flag along with the name of a .csv file containing the usernames and keys

- Enter the full project ID if necessary
- Specify the column in the file containing the usernames
- Specify the column in the file containing the ssh keys

2.2.1 `create_users.bash` Command Line Options

```
-h,   --help          show this help message
-p,   --project ID    set the project to use (ID = full project id)

-f FILE               specify the .csv file (FILE) to use
-k N                  specify the column number (N) with the ssh keys
-u N                  specify the column number (N) with the usernames
```

3 Connecting to the Cluster

Each user can connect to the cluster using `ssh` *username*`@`*ip*, where ip is the IP address of the head node.

4 Stopping the Cluster

In order to save your credits, you will likely want to stop the cluster from time to time.

1. Select your project [Figure 3]
2. Select Compute Engine under Resources [Figure 4]
3. Select all VMs [Figure 5]
4. Click Stop [Figure 6]
5. Click Stop [Figure 7]

After a few minutes, all your VMs should have a stop icon [Figure 8] next to them. If there are multiple pages listing your VMs, be sure to check all of them. To restart your VMs later, follow the same steps but click Start at the end.

Figure 3: Select Project

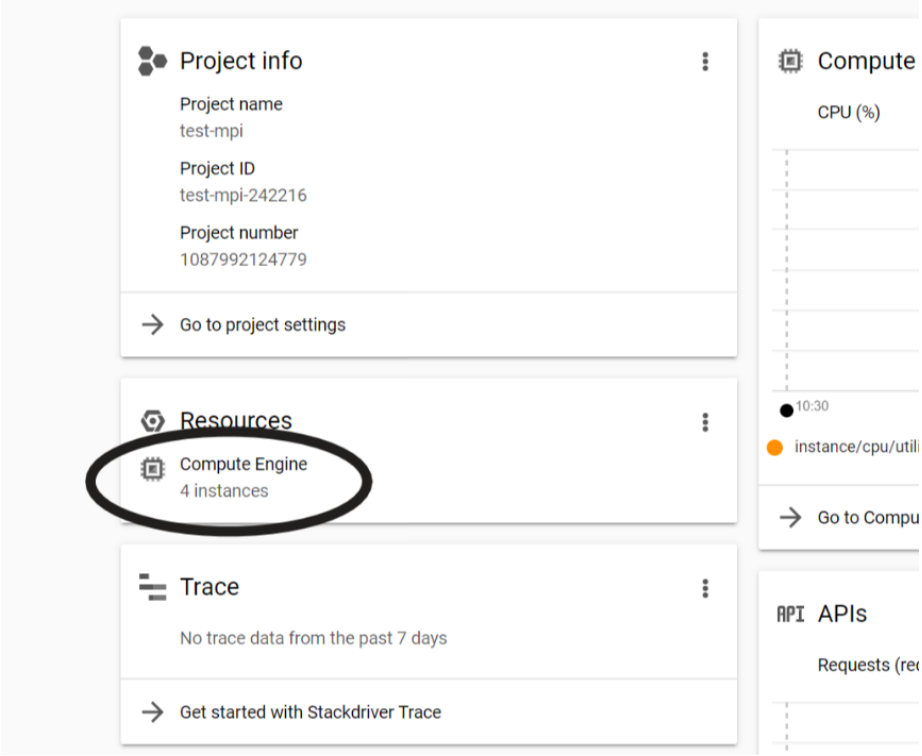

Figure 4: Select Compute Engine

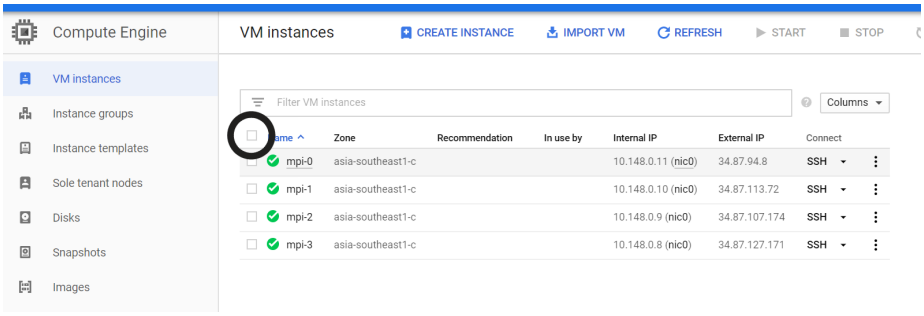

Figure 5: Select All VMs

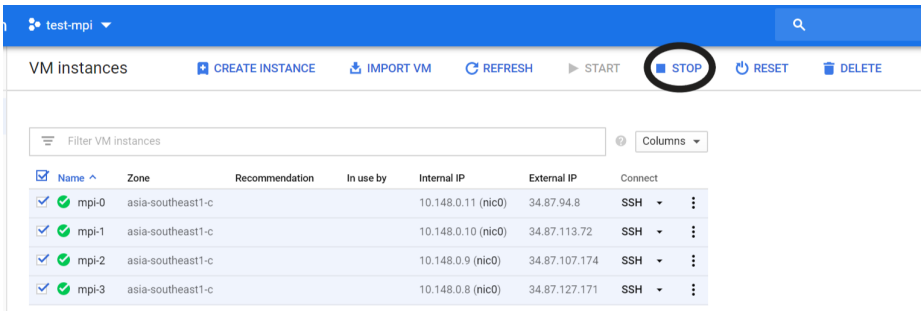

Figure 6: Click Stop

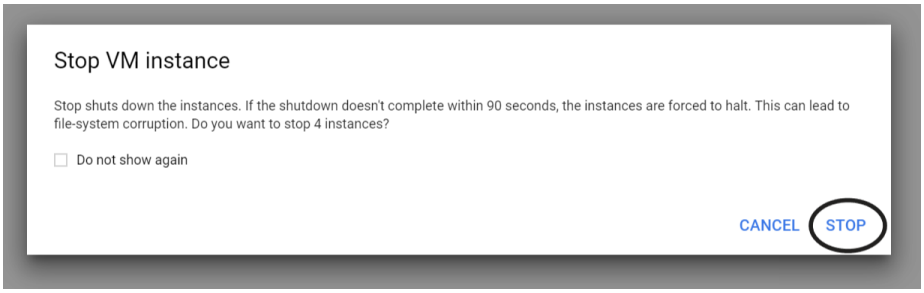

Figure 7: Click Stop

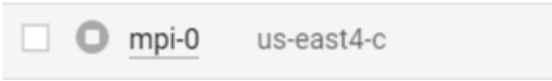

Figure 8: A Stopped VM