

COMP 2406 OpenStack Instructions

For project check-in #3 and the final project submission, you will be expected to deploy your server on an OpenStack instance. If you are unfamiliar with OpenStack, you can read about it on the OpenStack support page at <https://carleton.ca/scs/tech-support/scs-open-stack/>. The support page also provides tutorials for creating an instance, connecting to an instance, and transferring files to your instance (similar to this document). A video demonstration of the steps outlined in this document is available at: https://mediaspace.carleton.ca/media/t/1_vmpckdch. If you are comfortable working with OpenStack, SSH, and the command line, you could consider hosting a workshop on OpenStack for participation credit following reading week.

Before the deadline for check-in #3, you should have your project server installed and initialized on your OpenStack instance. To prevent any possible issues (e.g., recovering from a server crash during grading), you should also include instructions for initializing and running your server in the README file you submit with your project code on cuLearn. After the final project deadline, the plan is to have all of the OpenStack instances go 'live' and be accessible to the general public for some time so you can show off your work if you desire.

The remainder of this document outlines the steps to connect to OpenStack, create an instance for the course, run a server on the instance, and test the server from your own computer.

Creating an instance:

1. Connect to the Carleton VPN (<https://carleton.ca/its/help-centre/remote-access/>). Access to OpenStack is limited to campus IP addresses.
2. Update your SCS account if you have not already done so this term (https://newacct.scs.carleton.ca/scs_authentication/newacct-policy-form.php). The account update process will look at your current courses and add you to the course OpenStack project.
3. Login to the OpenStack dashboard at <https://openstack.scs.carleton.ca/> using your SCS account information
4. Ensure you have the COMP2406-F20 project selected in the header.
5. Click the "Images" tab on the left menu bar, find the COMP2406-F20-nodejs image, click Launch, and use the steps below to set up the instance:
 - a. Under 'Details', enter an instance name that has no spaces or special characters. Use a name that makes it easy to find your own instance. FirstnameLastname would be a good choice.
 - b. Under 'Flavour', add the only option (comp2406-f20.2gram.8gdisk.1cpu) by clicking the up arrow.
 - c. Under 'Security Groups', add the 'ping-ssh-egress' group by clicking the up arrow. Leave the 'default' group where it is.
 - d. Click "Launch Instance"
6. Go back to the "Instances" tab in the left menu. You should be able to see your instance. It may take a few minutes to initialize and enter the "Running" state.

Connecting to an instance:

1. Under the "Actions" drop down for your instance, select "Associate Floating IP".
2. Select an available IP address from the drop down. Do not change the "Port to be associated" drop down.
3. You should now see the public IP you selected (134.117.x.y) listed underneath the private IP (192.168.x.y) for your instance. The public IP is the one you will use to connect to the instance via SSH.
4. Each instance will have a default account named "student" with the password "student". The first thing you should do is update this password:
 - a. Open Powershell/Terminal and connect to your instance using SSH (substitute x/y values to match your associated public IP): `ssh student@134.117.x.y`
 - b. Once logged in to your instance through SSH, use the *passwd* command and change the password of the student account to something secure.

Running and testing a server on OpenStack:

1. Open a Powershell/Terminal window on your computer and connect to your instance via SSH using the same steps used above.
2. Once you are logged in to your instance, run your Node.js server. There is a basic server provided in the student user's home directory called `server.js` that you can use to test.
3. With the server running on your OpenStack instance, open a second Powershell/Terminal window on your own computer. Enter the command below, where 3000 is the port that your server is listening to and x/y are the values of your instance's public IP. This command will create an '[SSH tunnel](#)' that will allow you to connect and test your server from home while preventing others from accessing it.

```
ssh -L 9999:localhost:3000 student@134.117.x.y
```
4. Once you execute the command above and successfully log in, it will take you to the basic shell you would see when you log in using SSH. The SSH tunnel that has been established, though, will map port 9999 on your local machine (the one you are physically using) to port 3000 on your OpenStack instance.
5. Open the browser on your computer and enter the URL <http://localhost:9999>
6. If the SSH tunnel was set up correctly you should get a response from the server running on your OpenStack instance. If you are running the provided test server, you will simply see "Hello World".
7. Once you are finished testing the server, you can log out of both SSH sessions.

Some options for transferring files to your OpenStack instance:

1. `scp` or `rsync` - command line tools for transferring files via SSH (used in video demo)
2. Git/GitHub - you can clone your GitHub repository after connecting to your instance via SSH
3. There are also alternative methods for viewing a visual console of your instance. You can get more information from the SCS OpenStack reference linked at the start of this document.