**Lab 1: Install Your OpenStack Lab**



# Objectives:

One’s understanding of OpenStack components/ projects can be greatly deepened by installing a brand new OpenStack system on its on machine and observing the whole installation process. You can deploy an OpenStack lab on your own machine or VirtualBox virtual machine for testing OpenStack operations, even making software development.

In this first OpenStack lab, you will complete the installation in one hour using DevStack, and check the running status of the different OpenStack services.

# Prerequisites:

Before the formal installation, you need to prepare your operating systems and make some configuration.

## Hardware or Virtual Machine

In order to run OpenStack smoothly, we recommend that you reserve 4 GB memory, and 20 GB storage. At least 2 GB is required. The OpenStack lab installation should support a proof-of-concept environment with core services and suitable for our course lab.

You can use your own laptop or desktops. Or you can create a new virtual machine in VirtualBox or VMware software.



Download VirtualBox: go to <https://www.virtualbox.org/wiki/Downloads>and download the VirtualBox package based on your platform (Windows, OSX, linux and etc.)

## Install Linux

Please start with a clean and minimal install of a Linux system. If you do not have a preference, Ubuntu

16.04 is the most tested and will probably go the smoothest. Besides, you can choose Ubuntu 17.04, Fedora 24/25, CentOS/RHEL 7, as well as Debain and OpenSUSE.

Download Ubuntu: <https://www.ubuntu.com/download/desktop>

## Available Internet Connection

The installation needs stable and relative high speed (>= 10 Mbps) Internet connection since the OpenStack core services will be downloaded and installed in order. As for the network options, you can connect your machine with a cable or WiFi.

# OpenStack Installation:

We introduce a distributed OpenStack deployment in the lecture, which is suitable for real production with high scalability. For our lab, you only need an all-in-one testing environment for study. Therefore, DevStack is a good choice for the OpenStack learner and easily handled.

DevStack is a series of extensible scripts used to quickly bring up a complete OpenStack environment based on the latest versions of everything from git master. It is used interactively as a development environment and as the basis for much of the OpenStack project’s function testing. DevStack will help you boot a OpenStack automatically and you can observe the whole installation process without input any command.

## Git version control system

First, we need to install “git” to grasp the scripts from the DevStack official code repository. Open a terminal and enter the following command.

$ sudo apt­get install git

Please type ‘y’ or “yes” to continue. Git may takes you about 20M storage space. After the installation finishes, verify completion by typing:

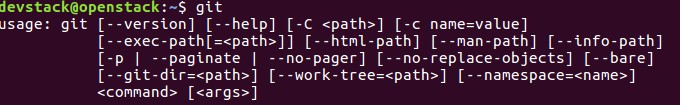
$ git

You will get result like:

usage: git [­­version] [­­help] [­C <path>] [­c name=value] [­­exec­path[=<path>]] [­­html­path] [­­man­path] [­­info­path]

[­p | ­­paginate | ­­no­pager] [­­no­replace­objects] [­­bare] [­­git­dir=<path>] [­­work­tree=<path>] [­­namespace=<name>]

<command> [<args>]



## Create stack user

DevStack should be run as a non-root with sudo enabled because the installation will modify many system configuration for setting up OpenStack environment.

You can quickly create a “stack” user to run DevStack with:

$ sudo useradd ­s /bin/bash ­d /opt/stack ­m stack

Since this user will be making changes to your system, it should have sudo privileges:

$ echo "stack ALL=(ALL) NOPASSWD: ALL" | sudo tee /etc/sudoers.d/stack

$ sudo su ­ stack

## Download scripts

$ git clone https://git.openstack.org/openstack-dev/devstack

Then enter the directory of devstack

$ cd devstack

## Create a local.conf

The “local.conf” is a user-maintained setting file that will be automatically loaded by the DevStack scripts during the installation. You can set up password for core services, host ip, network interface and etc. Please place the file in the root directory of devstack, otherwise it will not be effective.

Here, we only need a minimum required configuration to get started.

[[local|localrc]] ADMIN\_PASSWORD= YourPassword

DATABASE\_PASSWORD=$ADMIN\_PASSWORD RABBIT\_PASSWORD=$ADMIN\_PASSWORD SERVICE\_PASSWORD=$ADMIN\_PASSWORD

Replace “YourPassword” with your preference. Please remember it since you will use it to login OpenStack.

## Start the install

Under the root directory of devstack, enter:

./stack.sh

The whole installation will take about 40 minutes, largely depending on the speed of your internet connection. Many package and dependency will be installed during this process. You can observe the printout information in the terminal window, and make a record for which core service you find installed.

## Verify the installation

Once the installation completes, you will see the information in the terminal like:

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DevStack Component Timing (times are in seconds)

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|  |  |
| --- | --- |
| run\_process | 11 |
| test\_with\_retry | 2 |
| apt-get-update | 9 |
| pip\_install | 283 |
| osc | 89 |
| wait\_for\_service | 10 |
| git\_timed | 196 |
| dbsync | 380 |
| apt-get | 637 |

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Unaccounted time 771

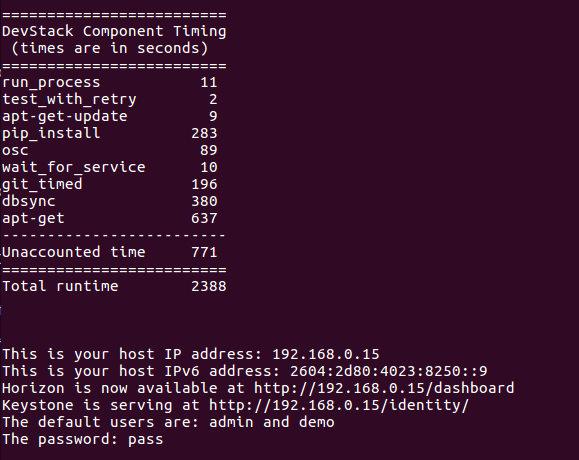
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Total runtime 2388

This is your host IP address: 192.168.0.15

This is your host IPv6 address: 2604:2d80:4023:8250::9 Horizon is now available a[t http://192.168.0.15/dashboard](http://192.168.0.15/dashboard) Keystone is serving at <http://192.168.0.15/identity/>

The default users are: admin and demo The password: pass

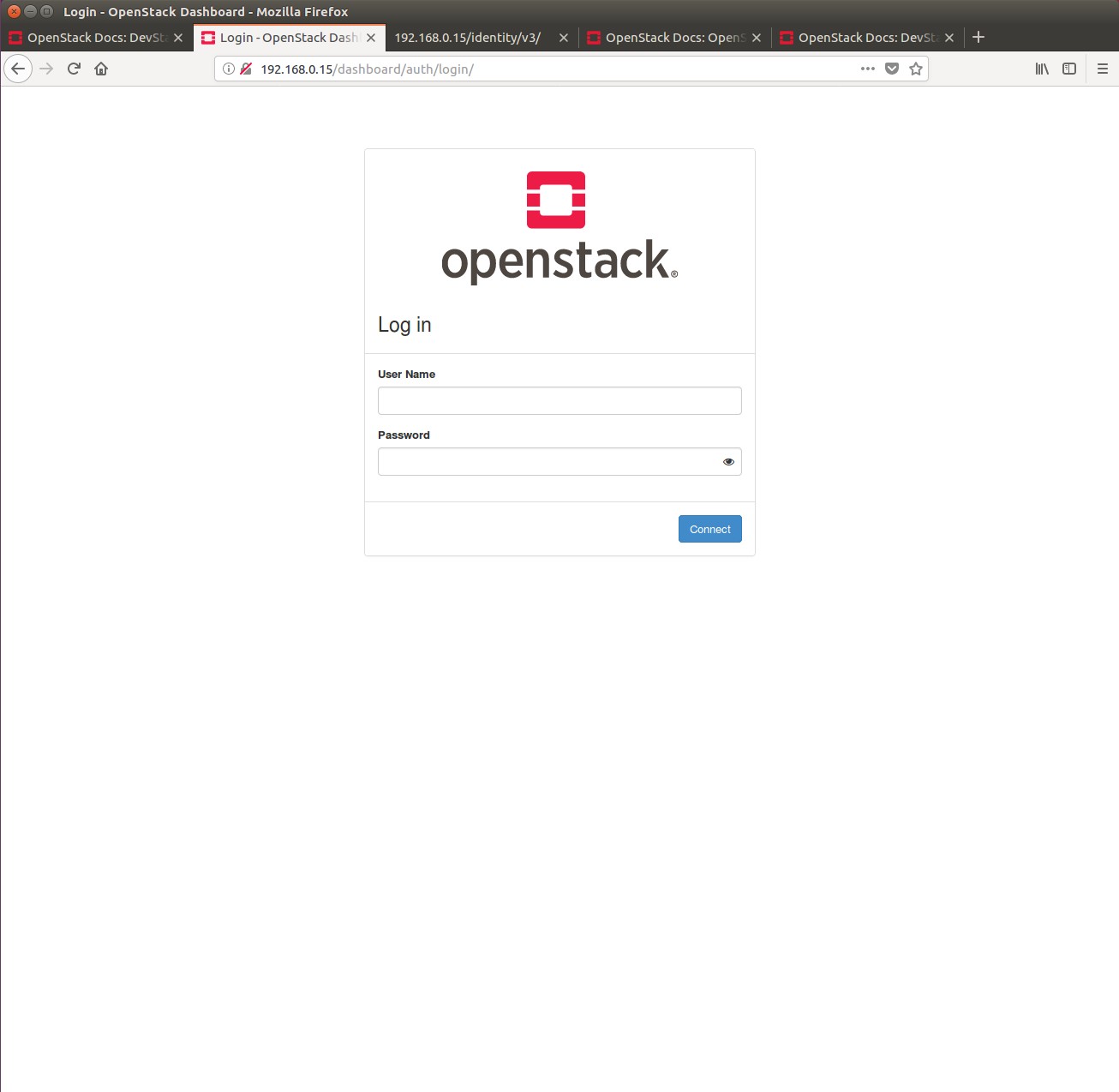


You now have a working OpenStack! Congrats!

Your OpenStack have installed **keystone, glance, nova, cinder, neutron,** and **horizon** services.

## Login to Dashboard

You can access to the Dashboard provided by Horizon service to experience the web interface to OpenStack.



The User Name and Password are same as the printout in the Step 5. Try it.

# Check Status of Core Project

## OpenStack command-line interface.

OpenStack command-line interface is the function of OpenStackClient, which is a command-line client for OpenStack including the command set for *Compute, Identity, Image, Object Storage and Block Storage APIs* together. The operations that can be performed with Dashboard can also be completed using command line.

For your reference, all of the commands can be found: <https://docs.openstack.org/python-openstackclient/pike/cli/command-list.html>

DevStack already prepared the OpenStackClient for you. You only need to create client environment scripts the admin and demo projects and users.

First, create and edit “admin\_access.sh” file and add the following content:

export OS\_USERNAME=admin export OS\_PASSWORD=pass export OS\_PROJECT\_NAME=admin

export OS\_PROJECT\_DOMAIN\_ID=default export OS\_USER\_DOMAIN\_ID=default export OS\_IDENTITY\_API\_VERSION=3

export OS\_AUTH\_URL=<http://192.168.0.15/identity/v3/>

Remember to replace the IP address with your real IP.

Second, create and edit “demo\_access.sh” file and add the following content:

export OS\_USERNAME=demo export OS\_PASSWORD=pass export OS\_PROJECT\_NAME=demo

export OS\_PROJECT\_DOMAIN\_ID=default export OS\_USER\_DOMAIN\_ID=default export OS\_IDENTITY\_API\_VERSION=3

export OS\_AUTH\_URL=<http://192.168.0.15/identity/v3/>

Then you should change the file mode for “admin\_access.sh” and “demo\_access.sh”.

$ chmod u+x admin\_access.sh

$ chmod u+x demo\_access.sh

Finally, you are ready to use the OpenStack command line. Here we use the admin user for higher access right to services.

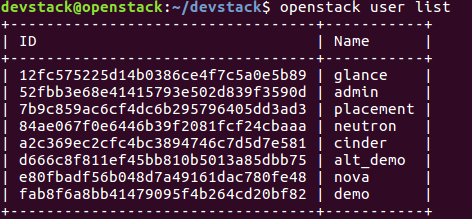
Load the “admin\_access.sh” file to populate environment variables:

$ source admin\_access.sh

## Identity (Keystone)

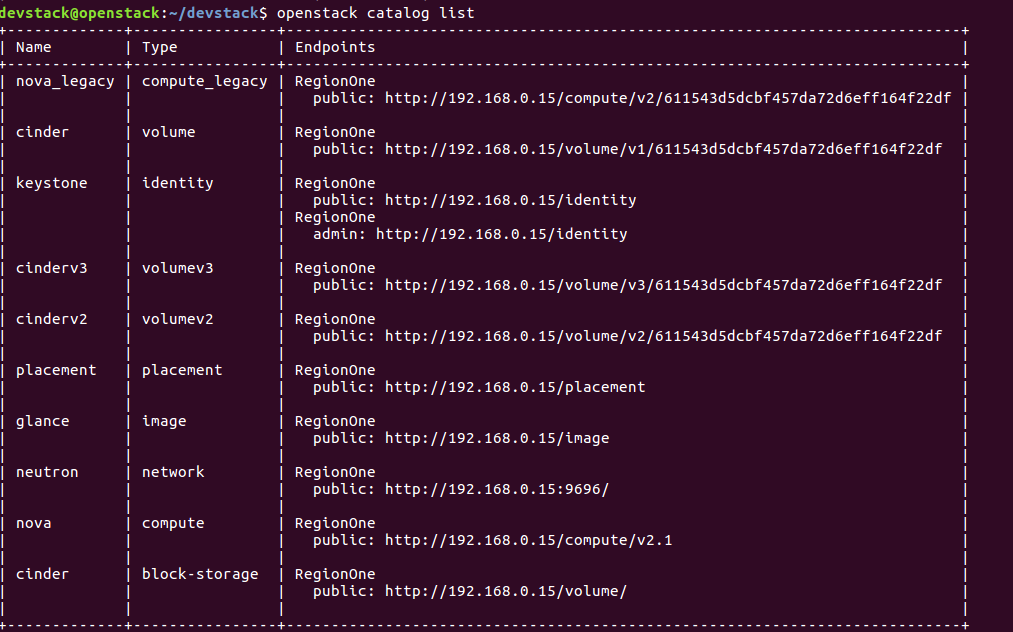
List all users. The result shows all the user registered in the Keystone.

$ openstack user list



List identity service catalog

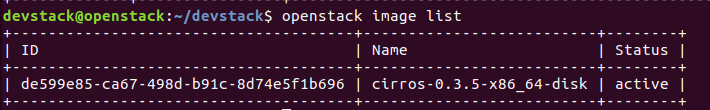
$ openstack catalog list



## Images (Glance)

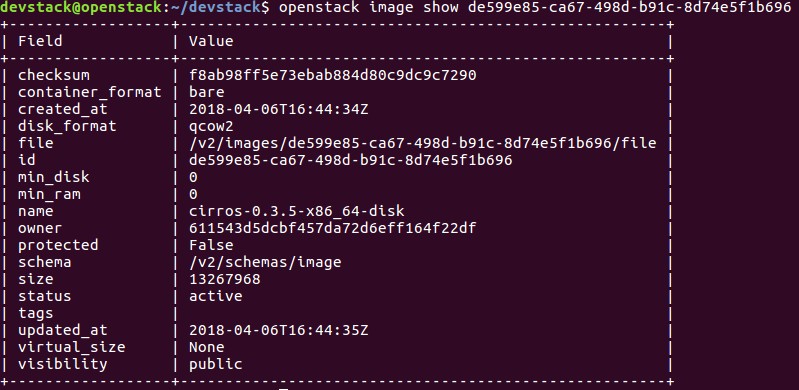
List images you can access

$ openstack image list



Show the details of a specific image. Here the Image is the image ID.

$ openstack image show Image



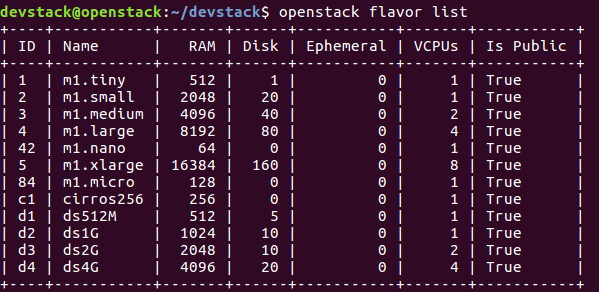
## Compute (Nova)

List instances, check status of instance. You will get an empty result because you don’t launch a instance now.

$ openstack server list

List flavor. A flavor is a type of resource configurations for launching instances, such as RAM, storage and VCPU.

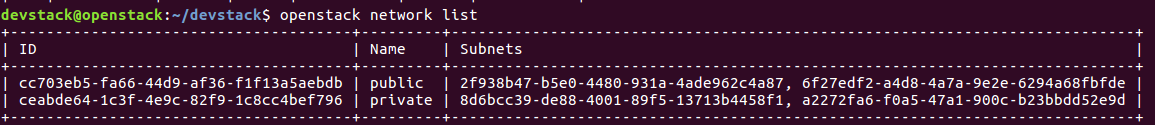
$ openstack flavor list



## Networking (Neutron)

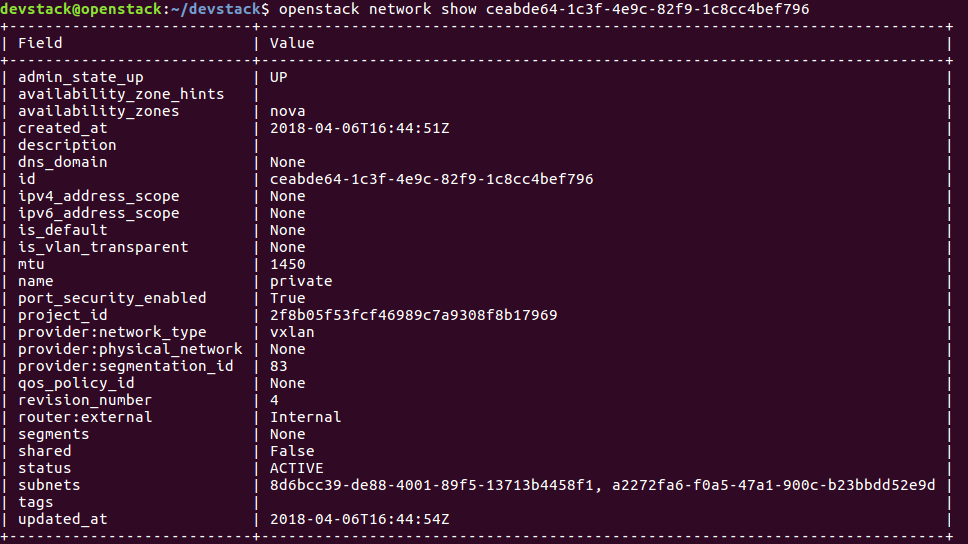
List current networks.

$ openstack network list



Show the details of a specific networks

$ openstack network show NetworkID



# What to hand in

Congratulation! You already have your OpenStack lab now. Please answer the following question, based on your installation experiments.

1. What is your observation during installation of DevStack? List all the core service you notices or any other important packages you think. (The execution of the devstack scripts may run very fast, observe it carefully)
2. If your experience some error happened during the installation of DevStack. What are them? How you solved them? (Please contact TA if you are really stuck at some errors. We are willing to help.)
3. Try to login your OpenStack dashboard and save a screen shot.
4. Record all your observations during the experiments to check the service status. Since the system environment is different for the different person, you have some special information in your observation.
5. Please describe your prerequisites of the hardware, software and network configuration of your machines.