

**Lab No: 07**

**Lab Report Name : Software Defined Network ( SDN  
Mininet with Ryu Controller)**

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**Theory :** In this lab we will learn about installation process of Software Defined Network (Mininet with Ryu Controller). First we will install python pip3. Using pip3 we install Ryu controller then we install Mininet. We will apply some code in this platform too.

## Install Ryu Controller

1. To install Ryu Controller Firstly, We need to install Python in our system

\$ sudo apt install python3-pip

```
binodon@binodon-HP-EliteBook-8470p:~$ sudo apt install python3-pip
[sudo] password for binodon:
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-pip is already the newest version (9.0.1-2.3~ubuntu1.18.04.2).
The following packages were automatically installed and are no longer required:
  efibootmgr fonts-font-awesome gir1.2-geocodeglib-1.0 libfwup1 libllvm9
  libpython-all-dev libpython-dev libpython2.7-dev
  linux-headers-5.4.0-42-generic linux-hwe-5.4-headers-5.4.0-42
  linux-image-5.4.0-42-generic linux-modules-5.4.0-42-generic
  linux-modules-extra-5.4.0-42-generic python2.7-dev ubuntu-web-launchers
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
1 not fully installed or removed.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n]
```

2. Now we may install Ryu Controller by following instruction

\$ sudo pip3 install ryu

```
binodon@binodon-HP-EliteBook-8470p:~$ sudo pip install ryu
[sudo] password for binodon:
sudo: pip: command not found
binodon@binodon-HP-EliteBook-8470p:~$ sudo pip3 install ryu
WARNING: pip is being invoked by an old script wrapper. This will fail in a future
version of pip.
Please see https://github.com/pypa/pip/issues/5599 for advice on fixing the unde
rlying issue.
To avoid this problem you can invoke Python with '-m pip' instead of running pip
directly.
WARNING: The directory '/home/binodon/.cache/pip' or its parent directory is not
owned or is not writable by the current user. The cache has been disabled. Chec
k the permissions and owner of that directory. If executing pip with sudo, you m
ay want sudo's -H flag.
Collecting ryu
  Downloading ryu-4.34.tar.gz (1.1 MB)
    | 1.1 MB 708 kB/s
Collecting eventlet!=0.18.3,!=0.20.1,!=0.21.0,!=0.23.0,>=0.18.2
  Downloading eventlet-0.27.0-py2.py3-none-any.whl (223 kB)
    | 223 kB 1.1 MB/s
Collecting msgpack>=0.3.0
  Downloading msgpack-1.0.0-cp36-cp36m-manylinux1_x86_64.whl (274 kB)
    | 274 kB 6.3 MB/s
Collecting netaddr
```

3. After Completing installation Now We can check the version:

\$ ryu-manager --version

```
binodon@binodon-HP-EliteBook-8470p:~$ ryu-manager --version
ryu-manager 4.34
```

### Install Mininet:

1. \$ git clone git://github.com/mininet/mininet

```
binodon@binodon-HP-EliteBook-8470p:~$ git clone git://github.com/mininet/mininet
fatal: destination path 'mininet' already exists and is not an empty directory.
binodon@binodon-HP-EliteBook-8470p:~$ cd mininet
```

Mininet Already exists in my system

2. \$ git tag

```
binodon@binodon-HP-EliteBook-8470p:~/mininet$ git tag
1.0.0
2.0.0
2.1.0
2.1.0p1
2.1.0p2
2.2.0
2.2.1
2.2.2
2.3.0d3
2.3.0d4
2.3.0d5
2.3.0d6
cs244-spring-2012-final
```

3. \$ git checkout -b 2.2.2 2.2.2

```
binodon@binodon-HP-EliteBook-8470p:~/mininet$ git checkout -b 2.2.2 2.2.2
Switched to a new branch '2.2.2'
binodon@binodon-HP-EliteBook-8470p:~/mininet$ mkdir my_mininet
```

### Run Ryu Controller

\$ ryu-manager ryu.app.simple\_switch

```
binodon@binodon-HP-EliteBook-8470p:~/mininet$ ryu-manager ryu.app.simple_switch
loading app ryu.app.simple_switch
loading app ryu.controller.ofp_handler
instantiating app ryu.app.simple_switch of SimpleSwitch
instantiating app ryu.controller.ofp_handler of OFPHandler
```

## Run Mininet topology

\$ sudo mn --topo single,3 --mac --switch ovsk --controller remote

```
binodon@binodon-HP-EliteBook-8470p:~/mininet$ sudo mn --topo single,3 --mac --sw
itch ovsk --controller remote
*** Creating network
*** Adding controller
Unable to contact the remote controller at 127.0.0.1:6653
Unable to contact the remote controller at 127.0.0.1:6633
Setting remote controller to 127.0.0.1:6653
*** Adding hosts:
h1 h2 h3
*** Adding switches:
s1
*** Adding links:
(h1, s1) (h2, s1) (h3, s1)
*** Configuring hosts
h1 h2 h3
*** Starting controller
c0
*** Starting 1 switches
s1 ...
*** Starting CLI:
mininet>
```

## Application:

mininet> pingall

```
mininet> pingall
*** Ping: testing ping reachability
h1 -> X X
h2 -> X X
h3 -> X X
*** Results: 100% dropped (0/6 received)
mininet>
```

**Conclusion:** We did the installation of both Ryu controller and Mininet successfully and apply some instruction too. To do this lab we did not face any problem.