EECE.7290 Selected Topics on Software Defined Networking

Lab 2: Programming OpenDayLight.

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Purpose:

To learn the development of controller applications on OpenDayLight.

Procedure:

- Download and run the Virtual Machine and add SDN_tutorial.vm to Virtual Machine. I have used VM Ware Workstation player.

- Open SDN Tutorial OS in VM and update the tutorial code. By opening terminal in SDNHub_Opendaylight_Tutorial directory. And use "Pull" command to get updated version of code from github repository.
  $ git pull –rebase
  Also run
  $ wget -q -O - https://raw.githubusercontent.com/opendaylight/odlparent/master/settings.xml > ~/.m2/settings.xml

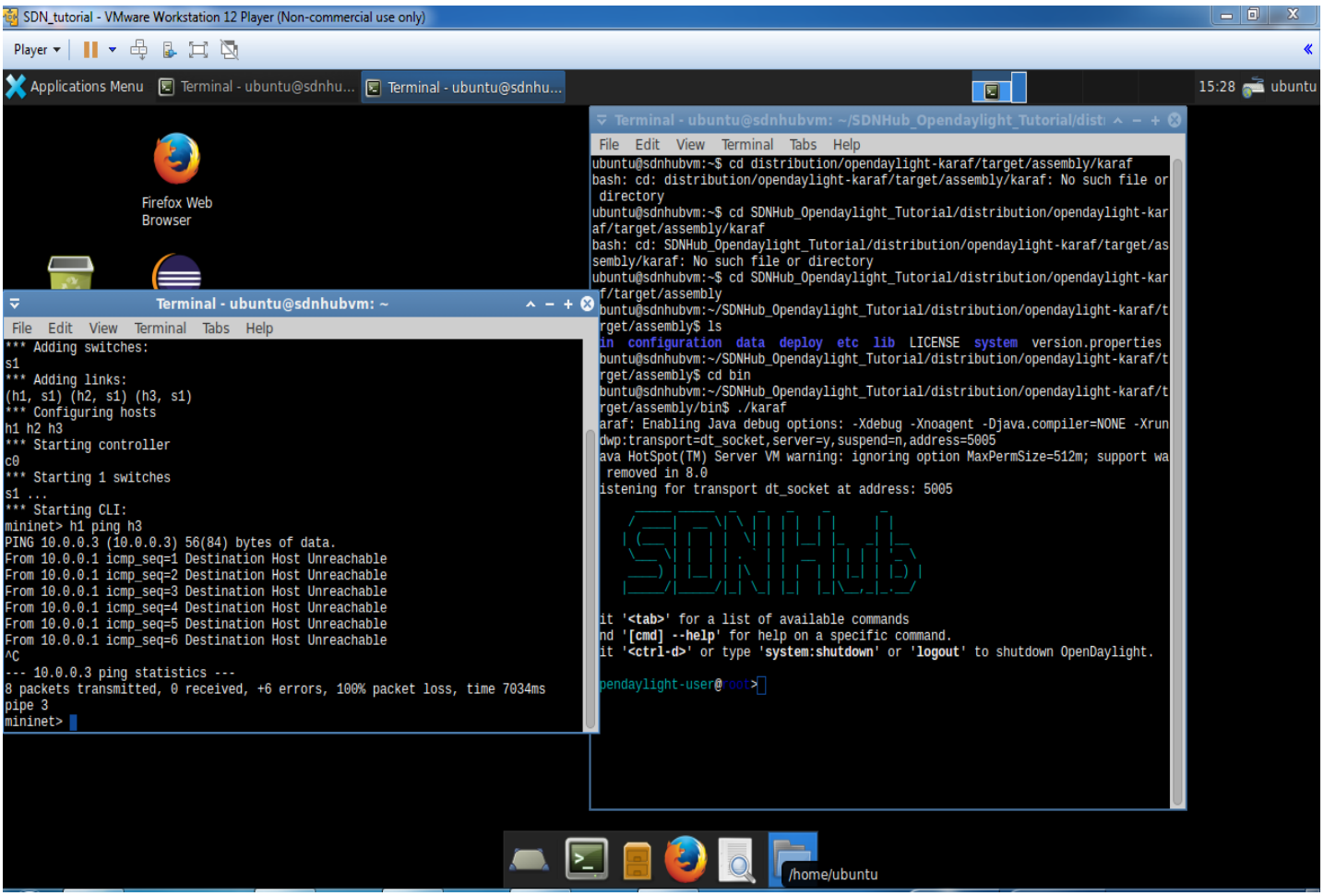
- Now that you update code you can use "**mvn**" command to build the tutorial code. It compiles code based on the pom.xml file in that directory. "install" is essential for compilation. It also accepts an optional argument "clean" if you wish to clean the temporary build files.
  - Go to the same directory and run the following command in terminal in that directory
    $ sudo mvn install -nsu

  - It will take so much time depending your computer and it will show **"BUILD SUCCESS".** If it gets build error and build is failed that means some files are corrupted get files from github again update and build mvn again.

- Now to run our controller go to the following directory.
  $ SDNHub_Opendaylight_Tutorial/distribution/opendaylight-karaf/target/assembly/bin
  - Now run karaf by
    ./karaf
    - Running karaf starts all the Java bundles installed as jar files in the OSGi environment.
    - Karaf is main portal for managing all applications and the Java bundles.
    - "feature:list" and "bundle:list -s" are commands used to find active features and bundles in the Karaf runtime environment.(<feature:list -j> for only installed features, <bundle:list -s> to see loaded bundle,)
    - To install new feature in karaf
      - Feature:install <feature name>
        - You need to know the feature name which can be find using "feature:list".
        - Once you install a feature it always stays in controller. So to remove the features go to the "**SDNHub_Opendaylight_Tutorial/distribution"** directory and delete data,snapshots and journal folder and start the controller again.

- Now you need to install some features.
  - "**odl-dlux-all**". This command will install all the dlux features that are required for GUI like **core** for topology application, **node** for node inventory applications, **YangUI** for browsing Yang RESTCONF interface, Yangvisualizer to browsing Yand models.
  - GUI can be open at http://localhost:8181/
  - User ID/Password : admin/admin
  - You can see all the features install and any topology running and Yang model and so many other things.

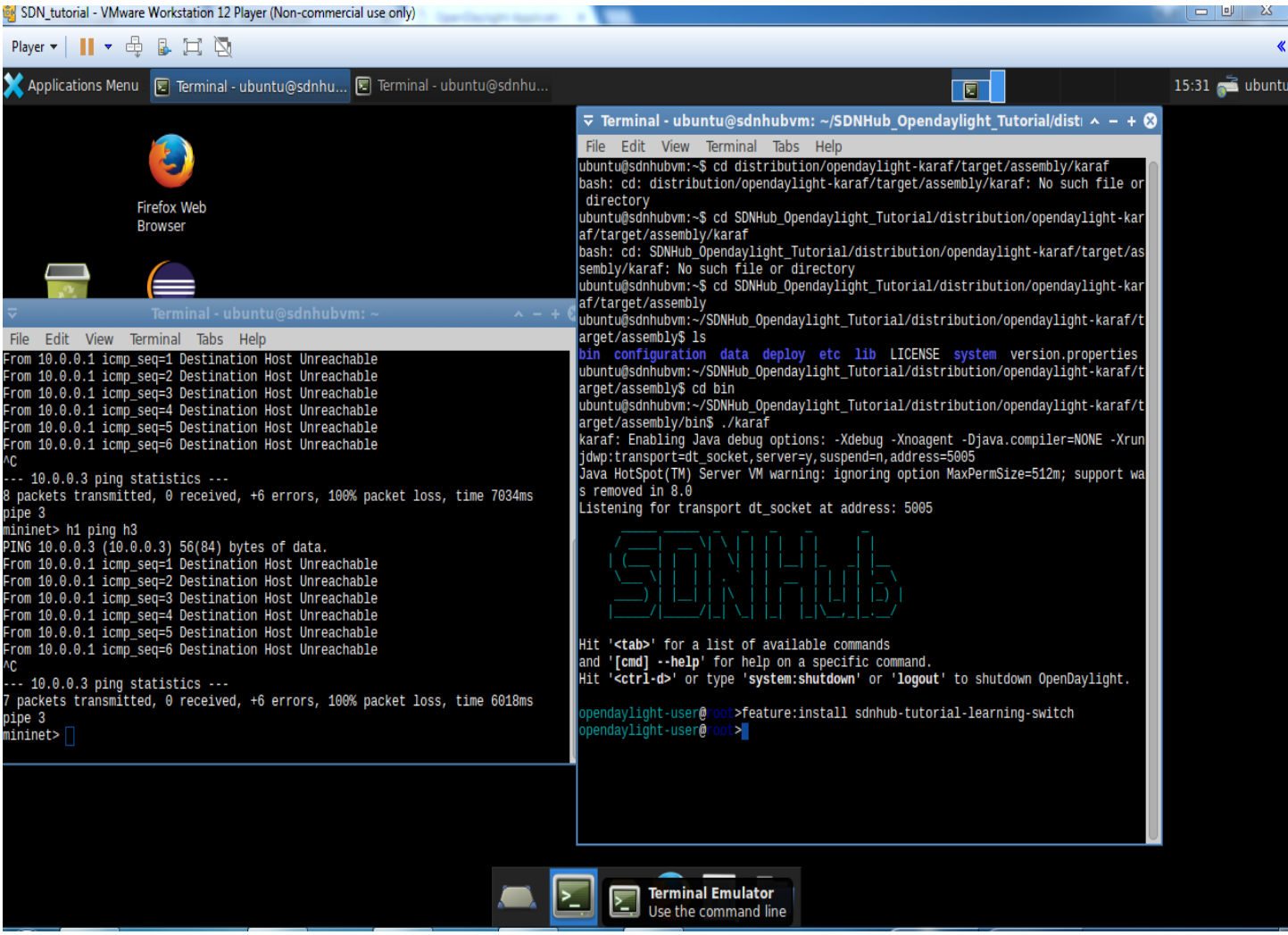
- Now keep controller running and start another terminal and start mininet
  - $ **sudo mn --topo single,3 --mac --switch ovsk,protocols=OpenFlow13 --controller remote**
- Now try to ping in mininet



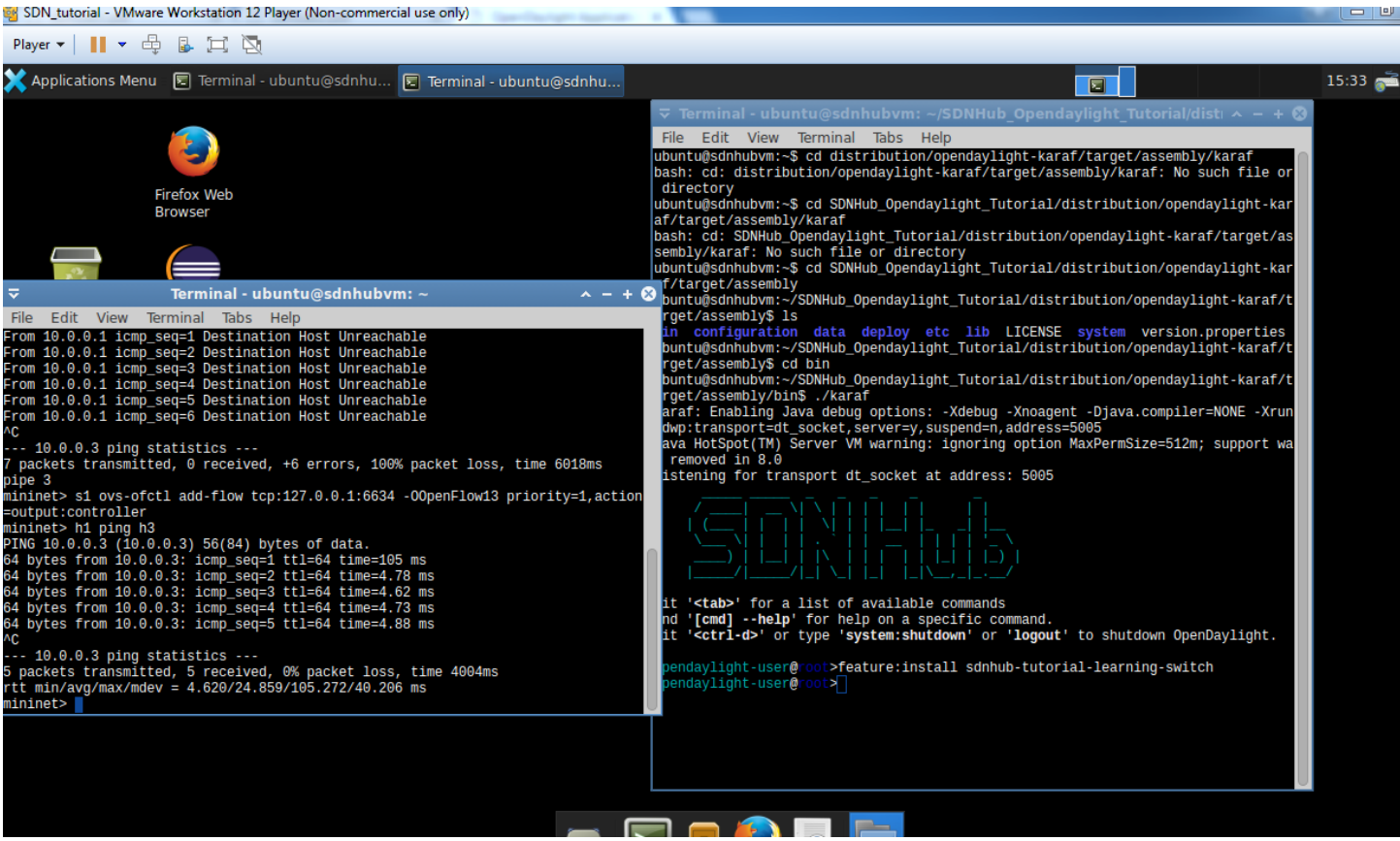
Since there is no controller ping won't reach other hosts.

- Now install learing_switch using following command in karaf.

  Root> feature:install sdnhub-tutorial-learning-switch

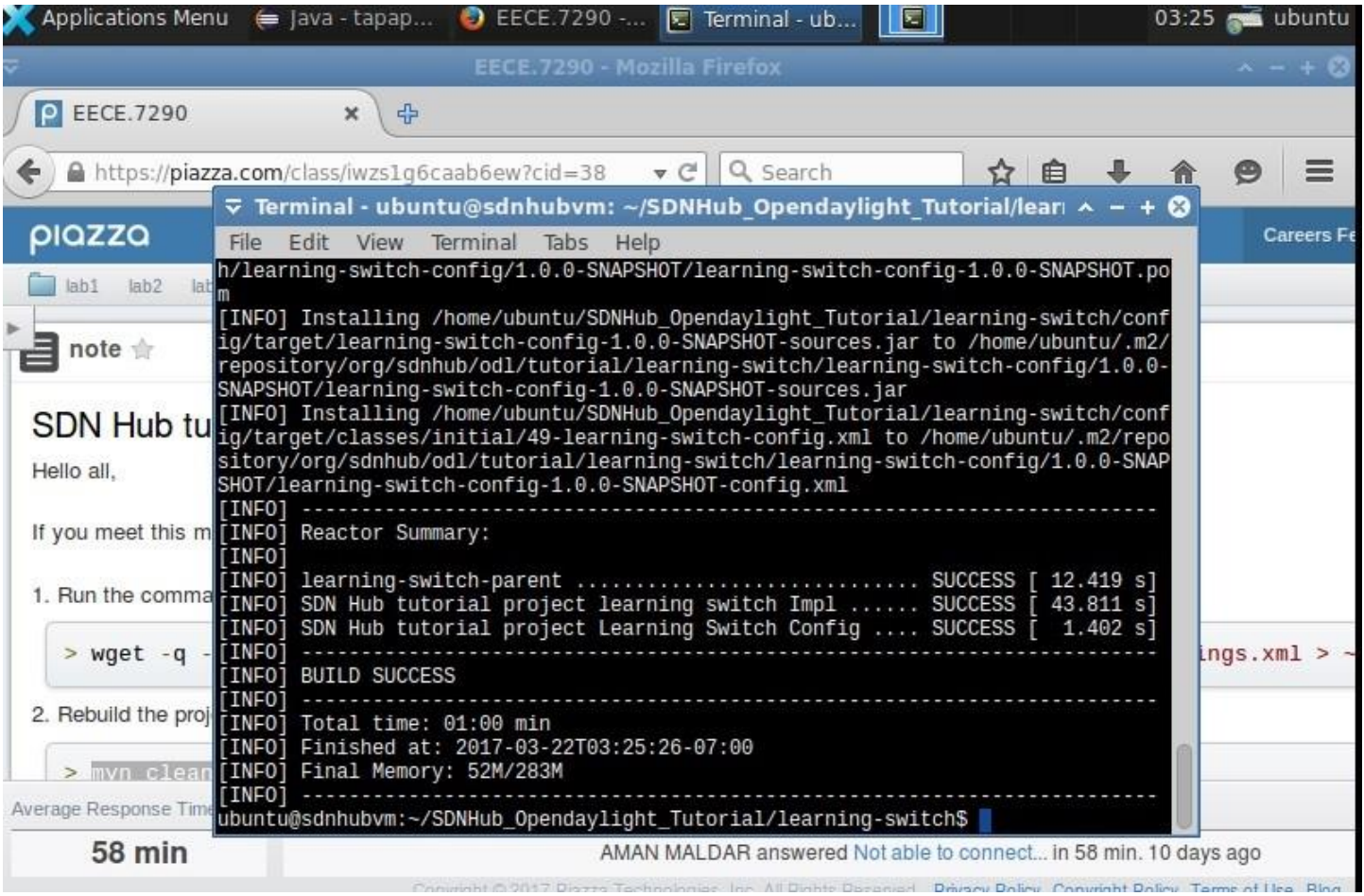


- Now try to ping again. It won't work.
  So, use following command in mininet.
  mininet>s1 ovs-ofctl add-flow tcp:127.0.0.1:6634 -OOpenFlow13 priority=1,action=output:controller
  This will add rule in the switch to send packet-in messages to the controller. And ping will go through.



- Now to install the feature you modified in "**TutorialL2Forwarding.java**" for creating L2 learning switch.
  - To modify this file open eclipse that is already installed in SDNHub_tutorial.vm.
  - In "file" menu chose "Import" then select "Existing Maven project" and "Next" then go to the directory "**SDNHub_Opendaylight_Tutorial/learning-switch/implementation/src/main/java/org/sdnhub/odl/tutorial/learningswitch/impl/**" and enter.
    Or you could go to that directory and open terminal and enter
    $ nano TutorialL2Forwarding.java

- Now build Maven.



- Start controller using following command. Go to the following directory.
  $ SDNHub_Opendaylight_Tutorial/distribution/opendaylight-karaf/target/assembly/bin
  - Now run karaf by
    ./karaf

- Now install the feature we modified. And run the mininet in other terminal and start observing on wireshark for open flow messages.