**SDN Faucet Controller and Mininet**

TUTU

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1. **Introduction**

The goal of this tutorial is to get hand on experience with SDN controller (i.e. Faucet) and with Mininet a virtual test bed environment for SDN.

You will build a small network (single topology with one switch and some hosts and use faucet controller to enforce packet filtering ACLs and mirror or unmirror traffic to a monitor host.

1. **Faucet**

Faucet (<http://faucet.nz/>) is an open source SDN OpenFlow controller. It is used control multiple data plane (e.g. switches) by installing OpenFlow rules. It is configured through a yaml file (/etc/faucet/faucet.yaml).

1. **Mininet**

Mininet (<http://mininet.org/>) is an open source network virtualization environment. It used to create different network topologies with switches and hosts and test hosts connections and network traffic.

1. **Run faucetVM virtualbox**

In this task, we will connect to the faucetUbuntu virtualbox which is resides in **rubia** computer on CO256. Faucet and mininet have already installed and ready to go in faucetUbuntu virtualbox image. To login into rubia run:

**$ ssh –X rubia**

Then to run virtualbox, just type:

$ **virtualbox**

If you didn’t find *faucetUbuntu* in the virtual box manager then go to Machine>Add then add the file */local/scratch/faucetVM/faucetUbuntu/faucetUbuntu.vbox*

Run faucetUbuntu virtual machine and user the following user name and password to login:

Username: moh, password: faucet.sdn.vm

1. **Create virtual network using mininet**

Mininet is already installed so we will just create a single topology with one switch and foure hosts. We also going to use faucet as the controller for the switch, hence we will use remote controller parameter for mininet.

**$ sudo mn –topo single,4 –controller=remote,ip=127.0.0.1,port=6653 –mac**

You should see mininet> prompt. If you try to ping between h1 and h4 it should not work, because faucet is not running yet.

**Mininet> h1 ping h4**

1. **Run faucet controller service**

To run faucet open new terminal tab (ctl+alt+t) and type.

**$ sudo service faucet start**

To check that faucet is running on port 6653 (same port that we pass to mininet above), type.

**$ sudo netstat –lp | grep 6653**

**Or use**

**$ sudo service faucet status**

Now if you try to ping between h1 and h4 it should ping. Go back to mininet terminal tab and type:

mininet> **h1 ping h4**

1. **Block host traffic**

Now let’s assume that host h4 is infected and we want to block all its traffic. What we have to do is to use faucet configuration file to add new rule to the access control list to block h1 traffic (let’s assume we will use its mac address to identify its traffic) .

Open faucet.yaml file using nano editor

**$ sudo nano /etc/faucet/faucet.yaml**

Go to acls: > office: > first and second rule and change dl\_src and dl\_dst to be 00:00:00:00:00:0**4**

Close and save (**Ctl+x** then **yes**, then **Enter**).

We need to restart faucet service to reload this new configuration.

**$ sudo service faucet restart**

Now if you go back to mininet terminal tab and try to ping between h1 and h4 it should not ping. While h1 and h2 and h3 should work fine.

**mininet> h1 ping h4 (no pinging)**

**mininet> h1 ping h2 (pinging)**

**mininet> h1 ping h3 (pinging)**

1. **Mirror host traffic to another host**

Now let’s assume that we have bro running in one host (e.g h3) and we want to mirror h1 traffic to h3.

Again we only need to configure faucet.yaml file and restart faucet service to reload the configuration file. So let’s do that.

Open faucet.yaml file using nano editor

**$ sudo nano /etc/faucet/faucet.yaml**