



Mawlana Bhashani Science and Technology University

Lab-Report

Report No: 06

Course Code: ICT-4202

Course Title: Wireless and Mobile Communication Lab

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Experiment No: 06

Experiment Name: Switching an interface to move a host around a network using mininet.

Objectives:

Mininet enables us to create, interact with, customize and share a software defined network prototype quickly and easily. It also provides a smooth path to run on hardware. From this lab we will learn:

- How to install mininet and use it properly
- How to prototype a large network on a single machine by mininet

Source Code:

```
from mininet.net import Mininet
from mininet.node import OVSSwitch
from mininet.topo import LinearTopo
from mininet.log import info, output, warn,
setLogLevel

from random import randint

class MobilitySwitch( OVSSwitch ):
    "Switch that can reattach and rename
    interfaces"

    def delIntf( self, intf ):
        "Remove (and detach) an interface"
        port = self.ports[ intf ]
        del self.ports[ intf ]
        del self.intfs[ port ]
        else:
            self.cmd( 'ovs-vsctl add-port', self, intf,
                '-- set Interface', intf,
                'ofport_request=%s' % port )

    self.validatePort( intf )

    def validatePort( self, intf ):
        "Validate intf's OF port number"

        del self.nameToIntf[ intf.name ]

        def addIntf( self, intf, rename=False,
            **kwargs ):
            "Add (and reparent) an interface"
            OVSSwitch.addIntf( self, intf,
            **kwargs )
            intf.node = self
            if rename:
                self.renameIntf( intf )

        def attach( self, intf ):
            "Attach an interface and set its port"
            port = self.ports[ intf ]
            if port:
                if self.isOldOVS():
                    self.cmd( 'ovs-vsctl add-port', self,
                    intf )

            ofport = int( self.cmd( 'ovs-vsctl get
            Interface', intf,
                'ofport' ) )
            if ofport != self.ports[ intf ]:
```

```

        warn( 'WARNING: ofport for', intf,
'is actually', ofport,
        '\n' )

def renameIntf( self, intf, newname=" ):
    "Rename an interface (to its canonical
name)"
    intf.ifconfig( 'down' )
    if not newname:
        newname = '%s-eth%d' %
( self.name, self.ports[ intf ] )
    intf.cmd( 'ip link set', intf, 'name',
newname )
    del self.nameToIntf[ intf.name ]
    intf.name = newname
    self.nameToIntf[ intf.name ] = intf
    intf.ifconfig( 'up' )

def moveIntf( self, intf, switch,
port=None, rename=True ):
    "Move one of our interfaces to another
switch"
    self.detach( intf )
    self.delIntf( intf )
    switch.addIntf( intf, port=port,
rename=rename )
    switch.attach( intf )

def printConnections( switches ):
    "Compactly print connected nodes to each
switch"
    for sw in switches:
        output( '%s: ' % sw )
        for intf in sw.intfList():
            link = intf.link
            if link:
                intf1, intf2 = link.intf1, link.intf2
                remote = intf1 if intf1.node != sw
            else intf2
            output( '%s(%s) ' % ( remote.node,
sw.ports[ intf ] ) )
        output( '\n' )

```

```

def moveHost( host, oldSwitch, newSwitch,
newPort=None ):
    "Move a host from old switch to new
switch"
    hintf, sintf =
host.connectionsTo( oldSwitch )[ 0 ]
    oldSwitch.moveIntf( sintf, newSwitch,
port=newPort )
    return hintf, sintf

def mobilityTest():
    "A simple test of mobility"
    info( '* Simple mobility test\n' )
    net = Mininet( topo=LinearTopo( 3 ),
switch=MobilitySwitch )
    info( '* Starting network:\n' )
    net.start()
    printConnections( net.switches )
    info( '* Testing network\n' )
    net.pingAll()
    info( '* Identifying switch interface for
h1\n' )
    h1, old = net.get( 'h1', 's1' )
    for s in 2, 3, 1:
        new = net[ 's%d' % s ]
        port = randint( 10, 20 )
        info( '* Moving', h1, 'from', old, 'to',
new, 'port', port, '\n' )
        hintf, sintf = moveHost( h1, old, new,
newPort=port )
        info( '*', hintf, 'is now connected to',
sintf, '\n' )
        info( '* Clearing out old flows\n' )
        for sw in net.switches:
            sw.dpctl( 'del-flows' )
        info( '* New network:\n' )
        printConnections( net.switches )
        info( '* Testing connectivity:\n' )
        net.pingAll()
        old = new
    net.stop()

if __name__ == '__main__':
    setLogLevel( 'info' )
    mobilityTest()

```

Output:

```
Activities  Terminal  Wed 10:47 PM  92.0B/s  en  [network icons]
tanvir@tanvirs-hp-pavillion-notebook: ~/mininet/examples

File Edit View Search Terminal Help
tanvir@tanvirs-hp-pavillion-notebook:~/mininet/examples$ sudo ./mobility.py
[sudo] password for tanvir:
* Simple mobility test
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3
*** Adding switches:
s1 s2 s3
*** Adding links:
(h1, s1) (h2, s2) (h3, s3) (s2, s1) (s3, s2)
*** Configuring hosts
h1 h2 h3
* Starting network:
*** Starting controller
c0
*** Starting 3 switches
s1 s2 s3 ...
s1: h1(1) s2(2)
s2: h2(1) s1(2) s3(3)
s3: h3(1) s2(2)
* Testing network
*** Ping: testing ping reachability
h1 -> h2 h3
h2 -> h1 h3
h3 -> h1 h2
*** Results: 0% dropped (6/6 received)
* Identifying switch interface for h1
* Moving h1 from s1 to s2 port 20
* h1-eth0 is now connected to s2-eth20
* Clearing out old flows
* New network:
s1: s2(2)
s2: h2(1) s1(2) s3(3) h1(20)
s3: h3(1) s2(2)
* Testing connectivity:
*** Ping: testing ping reachability
h1 -> h2 h3
```

```
Activities  Terminal  Wed 10:47 PM  11.56K/s  en  [network icons]
tanvir@tanvirs-hp-pavillion-notebook: ~/mininet/examples

File Edit View Search Terminal Help
* Moving h1 from s2 to s3 port 19
* h1-eth0 is now connected to s3-eth19
* Clearing out old flows
* New network:
s1: s2(2)
s2: h2(1) s1(2) s3(3)
s3: h3(1) s2(2) h1(19)
* Testing connectivity:
*** Ping: testing ping reachability
h1 -> h2 h3
h2 -> h1 h3
h3 -> h1 h2
*** Results: 0% dropped (6/6 received)
* Moving h1 from s3 to s1 port 13
* h1-eth0 is now connected to s1-eth13
* Clearing out old flows
* New network:
s1: s2(2) h1(13)
s2: h2(1) s1(2) s3(3)
s3: h3(1) s2(2)
* Testing connectivity:
*** Ping: testing ping reachability
h1 -> h2 h3
h2 -> h1 h3
h3 -> h1 h2
*** Results: 0% dropped (6/6 received)
*** Stopping 1 controllers
c0
*** Stopping 5 links
.....
*** Stopping 3 switches
s1 s2 s3
*** Stopping 3 hosts
h1 h2 h3
*** Done
tanvir@tanvirs-hp-pavillion-notebook:~/mininet/examples$
tanvir@tanvirs-hp-pavillion-notebook:~/mininet/examples$
tanvir@tanvirs-hp-pavillion-notebook:~/mininet/examples$
```

Discussion:

In this lab experiment, simple mobility test by mininet in Linux (Ubuntu) platform was performed. Here, h1 h2 h3 were hosts and s1 s2 s3 were switches. We moved a host from s1 to s2, s2 to s3, and then back to s1. Thus simple mobility test among the hosts was checked successfully.