Topology Code:

```
from mininet.net import Mininet
from mininet.node import Controller, OVSController
from mininet.cli import CLI
from mininet.link import TCLink
from mininet.log import setLogLevel, info

net = Mininet()

h1 = net.addHost( 'h1' )
h2 = net.addHost( 'h2' )
h3 = net.addHost( 'h3' )
h4 = net.addHost( 'h4' )
h5 = net.addHost( 'h5' )
h6 = net.addHost( 'h6' )
s1 = net.addSwitch( 's1' )
s2 = net.addSwitch( 's2' )
s3 = net.addSwitch( 's3' )

net.addLink( h1, s1, bw=20, delay='10ms' )
net.addLink( h2, s1, bw=20, delay='10ms' )
net.addLink( h3, s2, bw=20, delay='10ms' )
net.addLink( h4, s2, bw=20, delay='10ms' )
net.addLink( h5, s3, bw=20, delay='10ms' )
net.addLink( h6, s3, bw=20, delay='10ms' )
net.addLink( s1, s2, bw=50, delay='10ms' )
net.addLink( s2, s3, bw=50, delay='10ms' )

net.start()
CLI( net )
net.stop()
```

Output & Screenshots:

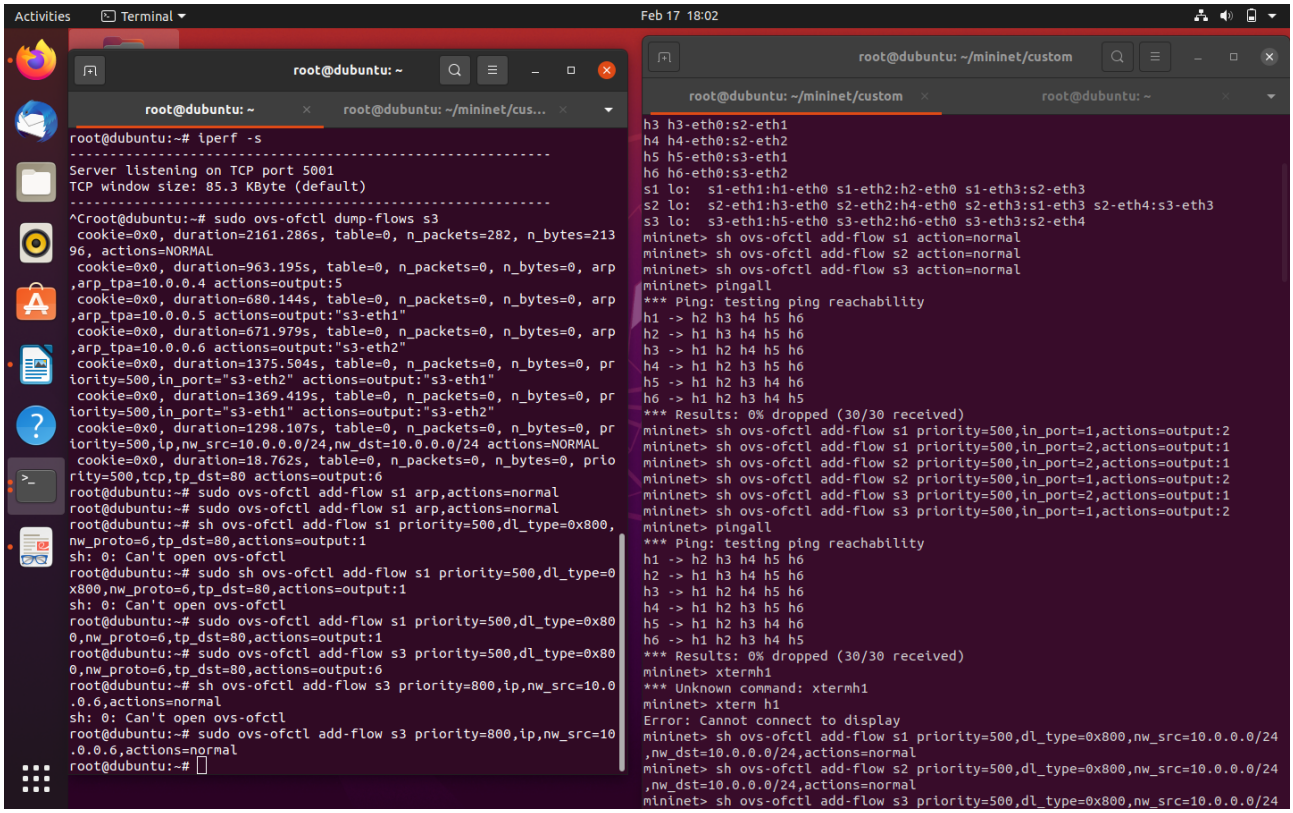
```
root@dubuntu:~/mininet/custom# python2.7 lab6.py
mininet> nodes
available nodes are:
h1 h2 h3 h4 h5 h6 s1 s2 s3
mininet> links
h1-eth0<->s1-eth1 (OK OK)
h2-eth0<->s1-eth2 (OK OK)
h3-eth0<->s2-eth1 (OK OK)
h4-eth0<->s2-eth2 (OK OK)
h5-eth0<->s3-eth1 (OK OK)
h6-eth0<->s3-eth2 (OK OK)
s1-eth3<->s2-eth3 (OK OK)
```

```
s2-eth4<->s3-eth3 (OK OK)
mininet> net
h1 h1-eth0:s1-eth1
h2 h2-eth0:s1-eth2
h3 h3-eth0:s2-eth1
h4 h4-eth0:s2-eth2
h5 h5-eth0:s3-eth1
h6 h6-eth0:s3-eth2
s1 lo:  s1-eth1:h1-eth0 s1-eth2:h2-eth0 s1-eth3:s2-eth3
s2 lo:  s2-eth1:h3-eth0 s2-eth2:h4-eth0 s2-eth3:s1-eth3 s2-eth4:s3-eth3
s3 lo:  s3-eth1:h5-eth0 s3-eth2:h6-eth0 s3-eth3:s2-eth4
mininet> pingall
*** Ping: testing ping reachability
h1 -> X X X X X
h2 -> X X X X X
h3 -> X X X X X
h4 -> X X X X X
h5 -> X X X X X
h6 -> X X X X X
*** Results: 100% dropped (0/30 received)
mininet> sh ovs-ofctl add-flow s1 action=normal
mininet> sh ovs-ofctl add-flow s2 action=normal
mininet> sh ovs-ofctl add-flow s3 action=normal
mininet> sh ovs-ofctl add-flow s1 priority=500,in_port=1,actions=output:2
mininet> sh ovs-ofctl add-flow s1 priority=500,in_port=2,actions=output:1
mininet> sh ovs-ofctl add-flow s2 priority=500,in_port=1,actions=output:2
mininet> sh ovs-ofctl add-flow s2 priority=500,in_port=2,actions=output:1
mininet> sh ovs-ofctl add-flow s3 priority=500,in_port=1,actions=output:2
mininet> sh ovs-ofctl add-flow s3 priority=500,in_port=2,actions=output:1
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4 h5 h6
h2 -> h1 h3 h4 h5 h6
h3 -> h1 h2 h4 h5 h6
h4 -> h1 h2 h3 h5 h6
h5 -> h1 h2 h3 h4 h6
h6 -> h1 h2 h3 h4 h5
*** Results: 0% dropped (30/30 received)

mininet> sh ovs-ofctl add-flow s1
priority=500,dl_type=0x800,nw_src=10.0.0.0/24,nw_dst=10.0.0.0/24,actions=normal
mininet> sh ovs-ofctl add-flow s2
priority=500,dl_type=0x800,nw_src=10.0.0.0/24,nw_dst=10.0.0.0/24,actions=normal
mininet> sh ovs-ofctl add-flow s3
priority=500,dl_type=0x800,nw_src=10.0.0.0/24,nw_dst=10.0.0.0/24,actions=normal

mininet> sh ovs-ofctl add-flow s1 arp,nw_dst=10.0.0.1,actions=output:1
mininet> sh ovs-ofctl add-flow s1 arp,nw_dst=10.0.0.2,actions=output:2
mininet> sh ovs-ofctl add-flow s2 arp,nw_dst=10.0.0.3,actions=output:1
mininet> sh ovs-ofctl add-flow s2 arp,nw_dst=10.0.0.4,actions=output:2
mininet> sh ovs-ofctl add-flow s3 arp,nw_dst=10.0.0.5,actions=output:1
mininet> sh ovs-ofctl add-flow s3 arp,nw_dst=10.0.0.6,actions=output:2
```

mininet> h6 python2 -m SimpleHTTPServer 80 &
Serving HTTP on 0.0.0.0 port 80 ...
mininet> h1 xterm
Warning: This program is an suid-root program or is being run by the root user.
The full text of the error or warning message cannot be safely formatted
in this environment. You may get a more descriptive message by running the
program as a non-root user or by removing the suid bit on the executable.
xterm: Xt error: Can't open display: %s
xterm: DISPLAY is not set
mininet> h1 ping h6
PING 10.0.0.6 (10.0.0.6) 56(84) bytes of data.
64 bytes from 10.0.0.6: icmp_seq=1 ttl=64 time=0.336 ms
64 bytes from 10.0.0.6: icmp_seq=2 ttl=64 time=0.090 ms
64 bytes from 10.0.0.6: icmp_seq=3 ttl=64 time=0.072 ms
64 bytes from 10.0.0.6: icmp_seq=4 ttl=64 time=0.060 ms
64 bytes from 10.0.0.6: icmp_seq=5 ttl=64 time=0.088 ms
^C
--- 10.0.0.6 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4100ms
rtt min/avg/max/mdev = 0.060/0.129/0.336/0.103 ms
mininet> sh ovs-ofctl add-flow s1
priority=500,dl_type=0x800,nw_proto=6,tp_dst=80,actions=output:1
mininet> sh ovs-ofctl add-flow s3 priority=800,ip,nw_src=10.0.0.6,actions=normal



```
root@dubuntu:~# sudo ovs-ofctl show s1
OFPT_FEATURES_REPLY (xid=0x2): dpid:0000000000000001
n_tables:254, n_buffers:0
capabilities: FLOW_STATS TABLE_STATS PORT_STATS QUEUE_STATS ARP_MATCH_IP
actions: output enqueue set_vlan_vid set_vlan_pcp strip_vlan mod_dl_src mod_dl_dst mod_nw_src
mod_nw_dst mod_nw_tos mod_tp_src mod_tp_dst
 1(s1-eth1): addr:42:35:28:30:6c:ff
     config:     0
     state:      0
     current:    10GB-FD COPPER
     speed: 10000 Mbps now, 0 Mbps max
 2(s1-eth2): addr:c2:14:37:bb:a5:55
     config:     0
     state:      0
     current:    10GB-FD COPPER
     speed: 10000 Mbps now, 0 Mbps max
 3(s1-eth3): addr:72:cd:22:fa:7f:07
     config:     0
     state:      0
     current:    10GB-FD COPPER
     speed: 10000 Mbps now, 0 Mbps max
 LOCAL(s1): addr:ce:73:86:4a:4c:4d
     config:     PORT_DOWN
     state:      LINK_DOWN
     speed: 0 Mbps now, 0 Mbps max
OFPT_GET_CONFIG_REPLY (xid=0x4): frags=normal miss_send_len=0
```