

Assignment-7

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Use Mininet to create the topology as shown in the figure, where hosts h1 and h2 are connected to routers r1 and r2 respectively.



There are two subnets, 10.0.1.0/24 and 10.0.2.0/24. These are subnets that are connected by two routers, i.e. r1,r2, In each subnet, there is one open vswitch. We want that h1 can talk to h2.

We can see the static configuration of host and router in output host h1 is connected to h2 via r1 and r2 router (r1, h1), (r1, r2), (r2, h2)

Command line to show the configuration of IP address in the given network:

Config of the host(h1) :

h1 ip addr show

Config of the host(r1) :

r1 ip addr show

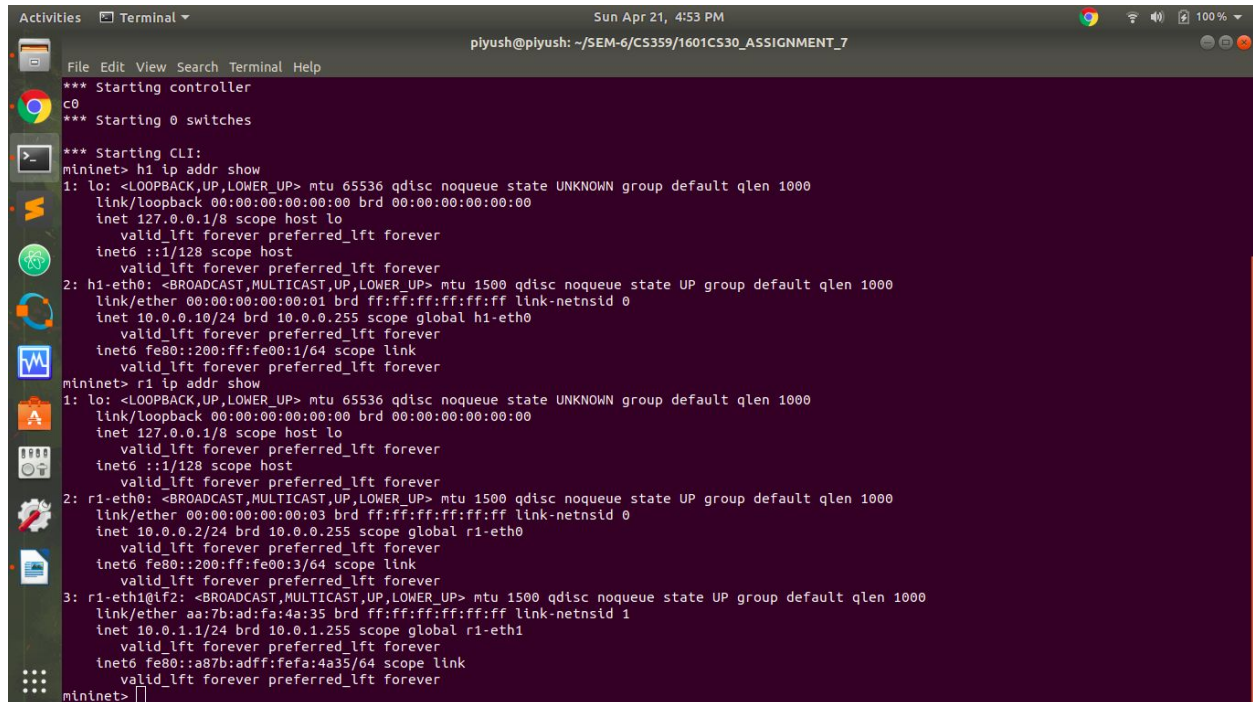
```
Activities Terminal
Sun Apr 21, 4:52 PM
piyush@piyush: ~/SEM-6/CS359/1601CS30_ASSIGNMENT_7
File Edit View Search Terminal Help
piyush@piyush:~/SEM-6/CS359/1601CS30_ASSIGNMENT_7$ workon dl4cv
(dl4cv) piyush@piyush:~/SEM-6/CS359/1601CS30_ASSIGNMENT_7$ python2 lab7.py
*** Mininet must run as root.
(dl4cv) piyush@piyush:~/SEM-6/CS359/1601CS30_ASSIGNMENT_7$ sudo python2 lab7.py
[sudo] password for piyush:
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 r1 r2
*** Adding switches:
c0
*** Adding links:
(r1, h1) (r1, r2) (r2, h2)
*** Configuring hosts
h1 h2 r1 r2
*** Starting controller
c0
*** Starting 0 switches
*** Starting CLI:
mininet> h1 ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: h1-eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 00:00:00:00:00:01 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.0.10/24 brd 10.0.0.255 scope global h1-eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::200:ff:fe00:1/64 scope link
        valid_lft forever preferred_lft forever
mininet>
```

Command Ping router and host :

h1 ping -c1 h2

And,

r1 ping -c1 r2



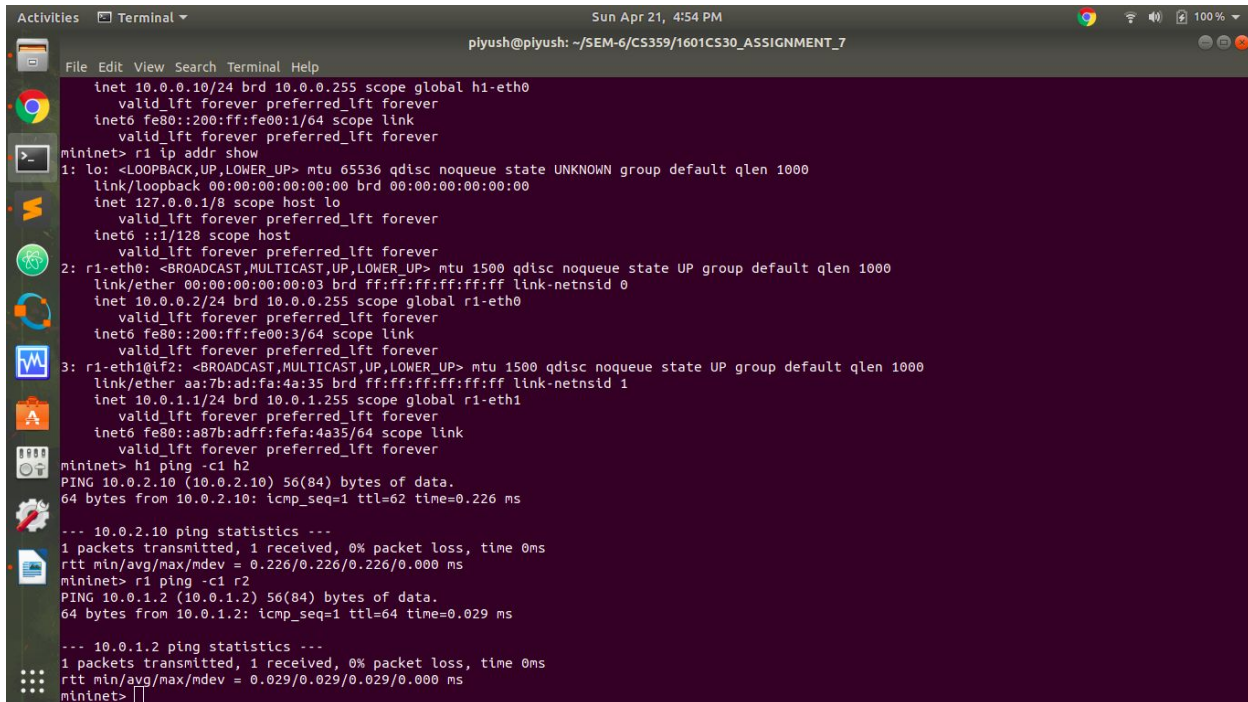
```
Activities  Terminal  Sun Apr 21, 4:53 PM
plyush@plyush: ~/SEM-6/CS359/1601CS30_ASSIGNMENT_7

*** Starting controller
c0
*** Starting 0 switches

*** Starting CLI:
mininet> h1 ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: h1-eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 00:00:00:00:00:01 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.0.10/24 brd 10.0.0.255 scope global h1-eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::200:ff:fe00:1/64 scope link
        valid_lft forever preferred_lft forever
mininet> r1 ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: r1-eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 00:00:00:00:00:03 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.0.2/24 brd 10.0.0.255 scope global r1-eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::200:ff:fe00:3/64 scope link
        valid_lft forever preferred_lft forever
3: r1-eth1@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether aa:7b:ad:fa:4a:35 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 10.0.1.1/24 brd 10.0.1.255 scope global r1-eth1
        valid_lft forever preferred_lft forever
    inet6 fe80::a87b:adff:fefa:4a35/64 scope link
        valid_lft forever preferred_lft forever
mininet> 
```

Internet Control Message Protocol sequence number (icmp_seq = 1)
and time to live = 62

We can see that after sending data of 64 bytes from subnet from h1 to h2 host with IP address configuration 10.0.2.10 it will take 0.226 ms to reach at destination h2 with 0% packet loss.

A screenshot of a Linux terminal window. The title bar shows 'Sun Apr 21, 4:54 PM' and the user is 'piyush@piyush: ~/SEM-6/CS359/1601CS30_ASSIGNMENT_7'. The terminal displays the following commands and output:

```
mininet> r1 ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: r1-eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 00:00:00:00:00:03 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 10.0.0.2/24 brd 10.0.0.255 scope global r1-eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::200:ff:fe00:3/64 scope link
        valid_lft forever preferred_lft forever
3: r1-eth1@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether aa:7b:ad:fa:4a:35 brd ff:ff:ff:ff:ff:ff link-netnsid 1
    inet 10.0.1.1/24 brd 10.0.1.255 scope global r1-eth1
        valid_lft forever preferred_lft forever
    inet6 fe80::a87b:adff:fefa:4a35/64 scope link
        valid_lft forever preferred_lft forever
mininet> h1 ping -c1 h2
PING 10.0.2.10 (10.0.2.10) 56(84) bytes of data.
64 bytes from 10.0.2.10: icmp_seq=1 ttl=62 time=0.226 ms

--- 10.0.2.10 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 0.226/0.226/0.226/0.000 ms
mininet> r1 ping -c1 r2
PING 10.0.1.2 (10.0.1.2) 56(84) bytes of data.
64 bytes from 10.0.1.2: icmp_seq=1 ttl=64 time=0.029 ms

--- 10.0.1.2 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 0.029/0.029/0.029/0.000 ms
mininet>
```

icmp sequence number = 1 & time to live = 64

We can see that after sending data of 64 bytes from subnet from r1 to r2 host with IP address configuration 10.0.1.2 it will take 0.029 ms to reach at destination h2 with 0% packet loss.