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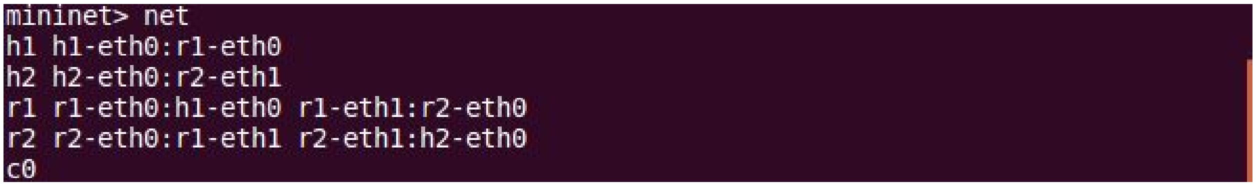
The network structure for this assignment was as follows -

h1 (.0 subnet)<--> r1(.1 subnet) <--> r2 (.2 subnet) <--> h2

Here h1,h2 are two hosts and r1,r2 are two routers. We divide the whole structure in three subnets. “h1” belongs to (10.0.0)subnet , routers belongs to(10.0.1) subnet and “h2” belongs to (10.0.2)subnet.



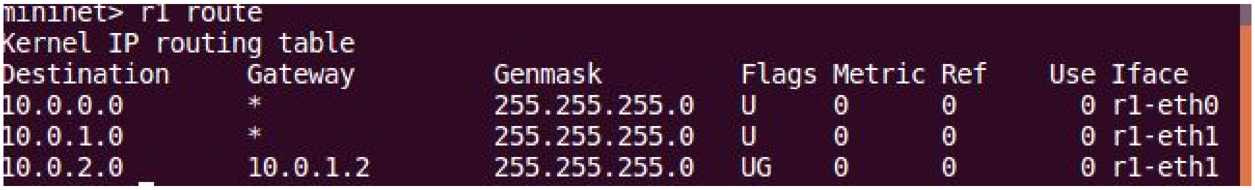
```
mininet> net
h1 h1-eth0:r1-eth0
h2 h2-eth0:r2-eth1
r1 r1-eth0:h1-eth0 r1-eth1:r2-eth0
r2 r2-eth0:r1-eth1 r2-eth1:h2-eth0
c0
```

Router r1 has two interfaces r1-eth0 and r1-eth1. r1-eth0 has a IP of (10.0.0.2/24) to cater packets in (.0)subnet. r1-eth1 has an IP of (10.0.1.1/24) to cater packets in (.1). Similarly, router r2 has two interfaces r2-eth0 to cater packets in subnet(.1) and r2-eth1 to cater packets in (.2) subnet.

We are using the following command in “r1” to update the forwarding table. As in if any packet with destination to(.2) subnet arrives at router then route it via r1-eth1 interface.

```
ip route add to 10.0.2.0/24 via 10.0.1.2 dev r1-eth1
```

Below is the forwarding table of “r1” we can see that packet with Destination 10.0.2.0 has an interface of r1-eth1 and gateway of 10.0.1.2 (.1) subnet

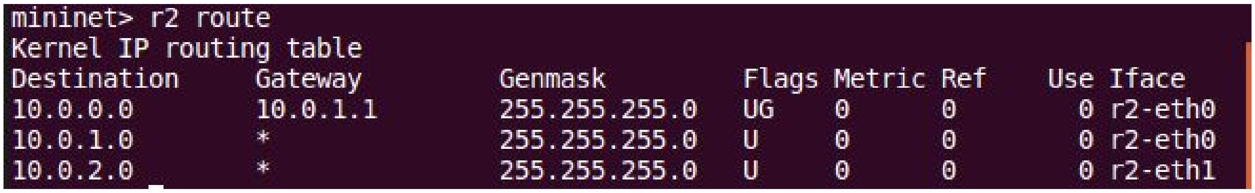


```
mininet> r1 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.0.0        *               255.255.255.0   U     0      0        0 r1-eth0
10.0.1.0        *               255.255.255.0   U     0      0        0 r1-eth1
10.0.2.0        10.0.1.2        255.255.255.0   UG    0      0        0 r1-eth1
```

Similar is with router “r2”.If any packet is destined to (.0) subnet then route it via r2-eth0

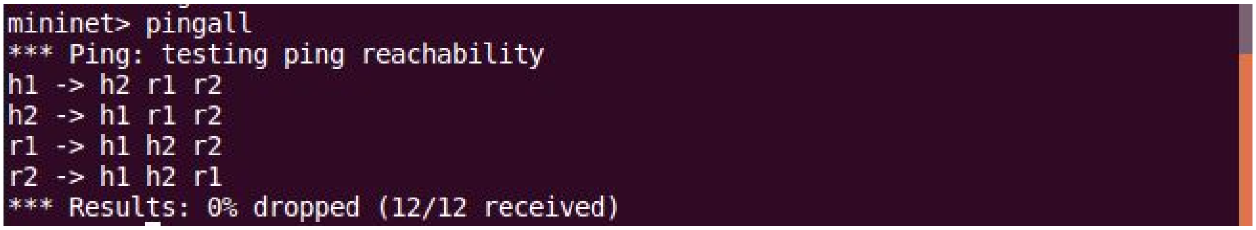
```
ip route add to 10.0.0.0/24 via 10.0.1.1 dev r2-eth0
```

Below is the forwarding table of “r2” we can see that packet with Destination 10.0.0.0 has an interface of r2-eth0 and gateway of 10.0.1.1 (.1) subnet



```
mininet> r2 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.0.0        10.0.1.1        255.255.255.0   UG    0      0        0 r2-eth0
10.0.1.0        *               255.255.255.0   U     0      0        0 r2-eth0
10.0.2.0        *               255.255.255.0   U     0      0        0 r2-eth1
```

Following was the output of the overall setup. We can see that h2 is pingable from h1. Hence the setup was correct.



```
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 r1 r2
h2 -> h1 r1 r2
r1 -> h1 h2 r2
r2 -> h1 h2 r1
*** Results: 0% dropped (12/12 received)
```

Important commands -

```
h1 = self.addHost('h1', ip="10.0.0.10/24", mac="00:00:00:00:00:01",
defaultRoute = 'via 10.0.0.2')
```

- Use ‘`ip`’ to assign ip address to host
- Use ‘`mac`’ to assign mac address to host
- To use deafult route use `defaultRoute`

```
r1.setIP('10.0.0.2/24',intf = 'r1-eth0')
```

- For interfacing of ip use `intf`
- To set the ip of a router use setIP command
- To start the net with controller use the following command

```
 net = Mininet(topo = ctopo,
            switch = OVSKernelSwitch,
            controller = DefaultController,
            link = TCLink,
               autoSetMacs = True)
```