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## CSE 534: FCN - Assignment 3, Part B

## Tasks:

**1. RIP Daemon and Traceroute at each node** BIRD config file(With RIP protocol):

```
Mininet_assignment > host_2 > ♥ bird.conf
      router id 157.0.1.1;
      log stderr all;
      log "bird.log" all;
      protocol kernel {
           ipv4 {
             import all;
              export all;
          persist;
      protocol device{
      }
      protocol direct {
           ipv4;
           ipv6;
          interface "-arc*", "*";
      protocol rip {
           ipv4 {
               import all;
               export all;
           interface "*" {
              mode broadcast;
              port 1520;
              update time 5;
              timeout time 60;
 34
```

## The routing table is as follows:

3							
*** Routing Table on host_1							
Kernel IP routing table							
Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
152.0.0.0	0.0.0.0	255.255.0.0	U	0	0	0	host_1-eth0
152.0.0.0	0.0.0.0	255.255.0.0	U	32	0	0	host_1-eth0
153.0.0.0	152.0.1.2	255.255.0.0	UG	32	0	0	host_1-eth0
154.0.0.0	152.0.1.2	255.255.0.0	UG	32	0	0	host_1-eth0
*** Routing Table on router_1							
Kernel IP routing table							
Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
152.0.0.0	0.0.0.0	255.255.0.0	U	0	0	0	router_1-eth0
152.0.0.0	0.0.0.0	255.255.0.0	U	32	0	0	router_1-eth0
153.0.0.0	0.0.0.0	255.255.0.0	U	0	0	0	router_1-eth1
153.0.0.0	0.0.0.0	255.255.0.0	U	32	0	0	router_1-eth1
154.0.0.0	0.0.0.0	255.255.0.0	U	0	0	0	router_1-eth2
154.0.0.0	0.0.0.0	255.255.0.0	U	32	0	0	router_1-eth2
*** Routing Table on router_2							
Kernel IP rout							
Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
152.0.0.0	153.0.1.1	255.255.0.0	UG	32	0	0	router_2-eth0
153.0.0.0	0.0.0.0	255.255.0.0	U	0	0	0	router_2-eth0
153.0.0.0	0.0.0.0	255.255.0.0	U	32	0	0	router_2-eth0
155.0.0.0	0.0.0.0	255.255.0.0	U	0	0	0	router_2-eth1
155.0.0.0	0.0.0.0	255.255.0.0	U	32	0	0	router_2-eth1
157.0.0.0	155.0.1.2	255.255.0.0	UG	32	0	0	router_2-eth1
*** Routing Table on router_3							
Kernel IP routing table							
Destination	Gateway	Genmask	Flags	Metric	Ref		Iface
152.0.0.0	$154.0.\overline{1}.1$	255.255.0.0	UG	32	0	0	router_3-eth0
153.0.0.0	154.0.1.1	255.255.0.0	UG	32	0		router_3-eth0
154.0.0.0	0.0.0.0	255.255.0.0	U	0	0	0	router_3-eth0
154.0.0.0	0.0.0.0	255.255.0.0	U	32	0	0	router_3-eth0
155.0.0.0	156.0.1.2	255.255.0.0	UG	32	0	0	router_3-eth1
	*						

```
*** Routing Table on router_4
Kernel IP routing table
Destination
                   Gateway
                                                           Flags Metric Ref
                                                                                   Use Iface
                                       Genmask
                                       255.255.0.0
152.0.0.0
                    155.0.1.1
                                                           UG
                                                                   32
                                                                           0
                                                                                      0 router_4-eth1
                                                                                      0 router_4-eth1
0 router_4-eth2
0 router_4-eth1
                    155.0.1.1
                                                           UG
                                                                  32
153.0.0.0
                                       255.255.0.0
                                                                           0
                                                           UG
                                                                  32
154.0.0.0
                    156.0.1.1
                                       255.255.0.0
                                                                           0
155.0.0.0
                   0.0.0.0
                                       255.255.0.0
                                                                  0
                                                                           0
                                                           Ш
                                                           U
                                                                                      0 router_4-eth1
155.0.0.0
                   0.0.0.0
                                       255.255.0.0
                                                                  32
                                                                           0
                                                                                      0 router_4-eth2
0 router_4-eth2
0 router_4-eth0
156.0.0.0
                                       255.255.0.0
                                                           U
                                                                  0
                                                                           0
                   0.0.0.0
156.0.0.0
                                       255.255.0.0
                                                           U
                                                                  32
                                                                           0
                   0.0.0.0
157.0.0.0
                                       255.255.0.0
                                                                  0
                   0.0.0.0
                                                           Ш
                                                                           0
157.0.0.0
                                       255.255.0.0
                                                           U
                                                                  32
                                                                                      0 router_4-eth0
                   0.0.0.0
*** Routing Table on host_2
Kernel IP routing table
Destination
                                                           Flags Metric Ref
                    Gateway
                                       Genmask
                                                                                   Use Iface
152.0.0.0
                    157.0.1.2
                                       255.255.0.0
                                                           UG
                                                                  32
                                                                                      0 host 2-eth0
153.0.0.0
                    157.0.1.2
                                       255.255.0.0
                                                           UG
                                                                  32
                                                                           0
                                                                                      0 host_2-eth0
                                                                                      0 host_Z-eth0
0 host_Z-eth0
0 host_Z-eth0
                                                           UG
                                                                  32
                                                                           0
154.0.0.0
                    157.0.1.2
                                       255.255.0.0
155.0.0.0
                                                           UG
                                                                  32
                    157.0.1.2
                                       255.255.0.0
                                                                           0
                    157.0.1.2
156.0.0.0
                                       255.255.0.0
                                                           UG
                                                                  32
                                                                           0
157.0.0.0
                   0.0.0.0
                                       255.255.0.0
                                                           U
                                                                  0
                                                                           0
                                                                                      0 host_2-eth0
                                                           U
                                                                  32
                                                                           0
                                       255.255.0.0
157.0.0.0
                   0.0.0.0
                                                                                      0 host_2-eth0

Standby for 6 seconds for routing table update...

*** Ping: testing ping reachability
host_1 -> host_2 router_1 router_2 router_3 router_4
host_2 -> host_1 router_1 router_2 router_3 router_4
router_1 -> host_1 host_2 router_2 router_3 router_4
router_2 -> host_1 host_2 router_1 router_3 router_4
router_3 -> host_1 host_2 router_1 router_2 router_4
router_3 -> host_1 host_2 router_1 router_2 router_4
router_4 -> host_1 host_2 router_1 router_2 router_3
 *** Results: 0% dropped (30/30 received)
 *** Starting CLI:
```

## 2. Bringing down links between router\_1 and router\_2:

The initial traceroutes between host 1 and host 2 and vice versa are shown below:

```
mininet> host_1 traceroute host_2
traceroute to 157.0.1.1 (157.0.1.1), 30 hops max, 60 byte packets
    152.0.1.2 (152.0.1.2) 0.019 ms 0.005 ms
                                                             0.004 \, \text{ms}
                                                             0.005 \, \text{ms}
    153.0.1.2 (153.0.1.2)
                                               0.005 \, \text{ms}
                                  0.010 \text{ ms}
                                                             0.007 ms
    155.0.1.2 (155.0.1.2)
                                  0.012 \, \text{ms}
                                                0.007 \, \text{ms}
    157.0.1.1 (157.0.1.1)
                                  0.011 ms 0.008 ms
                                                             0.009 \, \text{ms}
mininet> host_2 traceroute host_1
traceroute to 152.0.1.1 (152.0.1.1), 30 hops max, 60 byte packets
    157.0.1.2 (157.0.1.2)
                                  0.020 \, \text{ms}
                                                0.005 \, \text{ms}
                                                             0.004 \, \text{ms}
    155.0.1.1 (155.0.1.1)
                                  0.010 \text{ ms}
                                                0.005 \, \text{ms}
                                                             0.005 \, \text{ms}
    153.0.1.1 (153.0.1.1)
                                  0.010 \, \text{ms}
                                                0.007 \, \text{ms}
                                                             0.006 \, \text{ms}
    152.0.1.1 (152.0.1.1)
                                  0.011 \text{ ms}
                                               0.008 \, \text{ms}
                                                             0.007 \, \text{ms}
```

The route from host\_1 to host\_2 is: host\_1 -> router\_1 -> router\_2 -> router\_4 -> host\_2
The route from host\_2 to host\_1 is: host\_2 -> router\_4 -> router\_2 -> router\_1 -> host\_1

In CLI, on typing the command: "link router\_1 router\_2 down" the new traceroutes are:

```
mininet> link router_1 router_2 down
mininet> host_1 traceroute host_2
traceroute to 157.0.1.1 (157.0.1.1), 30 hops max, 60 byte packets
1 152.0.1.2 (152.0.1.2) 0.020 ms 0.004 ms
                                                         0.004 \, \text{ms}
2 154.0.1.2 (154.0.1.2) 0.011 ms
                                             0.006 \, \text{ms}
                                                         0.005 \, \text{ms}
3 156.0.1.2 (156.0.1.2)
                                0.012 \, \text{ms}
                                             0.007 \, \text{ms}
                                                         0.007 \text{ ms}
4 157.0.1.1 (157.0.1.1)
                                0.012 \text{ ms}
                                             0.008 ms
                                                         0.008 \text{ ms}
mininet> host_2 traceroute host_1
traceroute to 152.0.1.1 (152.0.1.1), 30 hops max, 60 byte packets
   157.0.1.2 (157.0.1.2)
                                0.018 \text{ ms}
                                             0.004 \text{ ms}
                                                         0.003 \, \text{ms}
   156.0.1.1 (156.0.1.1)
                                             0.005 \, \text{ms}
                                0.010 \, \text{ms}
                                                         0.005 \, \text{ms}
3 154.0.1.1 (154.0.1.1) 0.013 ms
                                             0.007 \, \text{ms}
                                                         0.007 \text{ ms}
4 152.0.1.1 (152.0.1.1) 0.011 ms
                                             0.009 \, \text{ms}
                                                         0.008 \text{ ms}
mininet>
```

Route between host\_1 to host\_2 : host\_1 -> router\_1 -> router\_3 -> router\_4 -> host\_2

Route between host\_2 to host\_1 : host\_1 -> router\_4 -> router\_3 -> router\_1 -> host\_1