

Lab Manual for Computer Communication and Networking

Lab No. 13

Enhanced Interior Gateway Routing Protocol (EIGRP)

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COMPUTER COMMUNICATION & NETWORKING

LAB EXPERIMENT # 13

EIGRP (Enhanced Interior Gateway Routing Protocol)

OBJECTIVE: -

- To observe the behavior of the EIGRP.

THEORY: -

EIGRP Properties:

- Supports CIDR and VLSM.
- Key capabilities that distinguish Enhanced IGRP (EIGRP) from other routing protocols include,
 - i. fast convergence,
 - ii. support for variable-length subnet mask,
 - iii. support for partial updates, and
 - iv. support for multiple network layer protocols.
- A router running EIGRP stores all its neighbors' routing tables so that it can quickly adapt to alternate routes. If no appropriate route exists, EIGRP queries its neighbors to discover an alternate route. These queries propagate until an alternate route is found.
- The support of EIGRP for variable-length subnet masks permits routes to be automatically summarized on a network number boundary.
- In most cases, EIGRP only uses Delay and Bandwidth as Metrics with Bandwidth taking precedence.

EIGRP TABLES:

1. Neighbor Table

Each router keeps state information about adjacent neighbors. When newly discovered neighbors are learned, the address and interface of the neighbor is recorded. This information is stored in the neighbor Computer structure. The neighbor table holds these entries.

2. Topology Table

It contains all destinations advertised by neighboring routers. Associated with each entry is the destination address and a list of neighbors that have advertised the

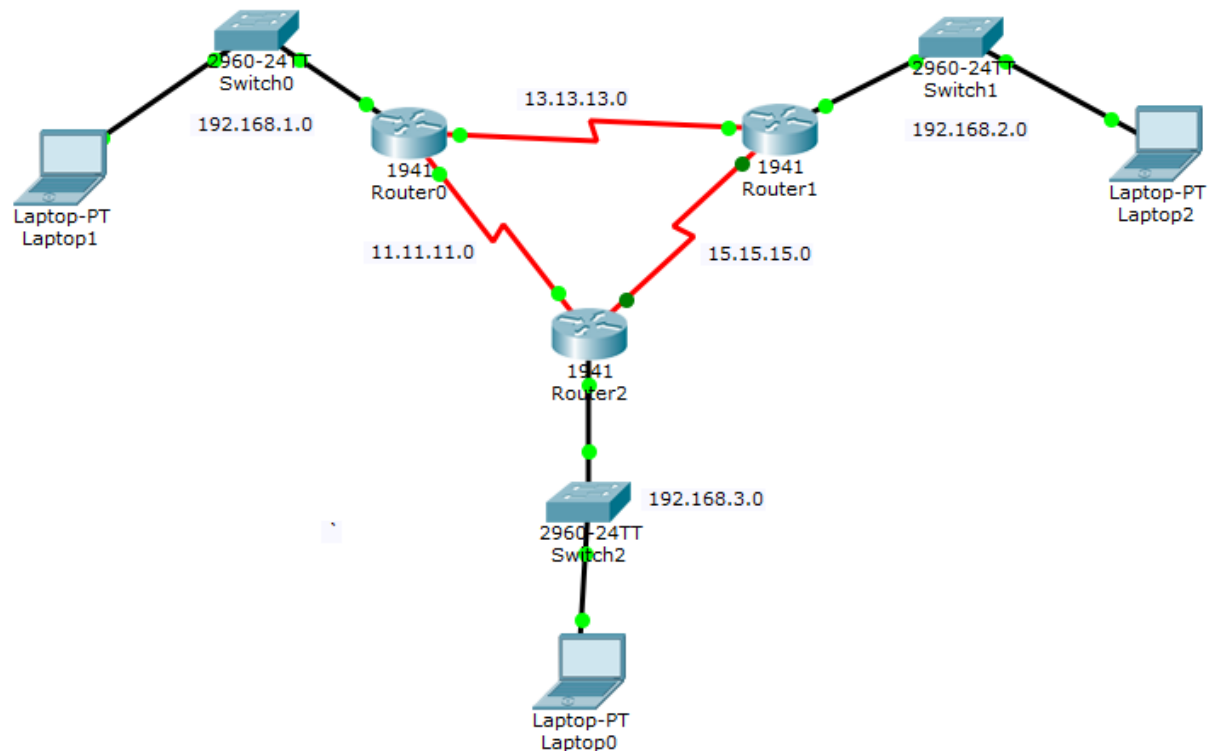
destination. For each neighbor, the advertised metric is recorded. This is the metric that the neighbor stores in its routing table. If the neighbor is advertising this destination, it must be using the route to forward packets. This is an important rule that distance vector protocols must follow.

3. Feasible Successors

A destination entry is moved from the topology table to the routing table when there is a feasible successor. All minimum cost paths to the destination form a set. From this set, the neighbors that have an advertised metric less than the current routing table metric are considered feasible successors.



NETWORK TOPOLOGY: -



PROCEDURE AND OBSERVATION: -

Router0 IP Configuration:

```
Router0(config)# interface serial 2/0
Router0(config-if)# clock rate 64000
Router0(config-if)# no shutdown
Router0(config-if)# ip address 11.11.11.1 255.0.0.0
```

```
Router0(config)# interface serial 2/1
Router0(config-if)# clock rate 64000
Router0(config-if)# no shutdown
Router0(config-if)# ip address 13.13.13.1 255.0.0.0
```

```
Router0(config)# interface fastEthernet 0/0
Router0(config-if)# ip address 192.168.1.1 255.255.255.0
Router0(config-if)# no shutdown
Router1(config)# router eigrp 10
Router1(config-router)# no auto-summary
Router1(config-router)# network 13.13.13.0
Router1(config-router)# network 11.11.11.0
Router1(config-router)# network 192.168.1.0
```

Router1 IP Configuration:

```
Router1(config)# interface serial 2/0
Router1(config-if)# clock rate 64000
Router1(config-if)# no shutdown
Router1(config-if)# ip address 13.13.13.2 255.0.0.0
```

```
Router1(config)# interface serial 2/1
Router1(config-if)# clock rate 64000
Router1(config-if)# no shutdown
Router1(config-if)# ip address 15.15.15.2 255.0.0.0
```

```
Router1(config)# interface fastEthernet 0/0
Router1(config-if)# ip address 192.168.2.1 255.255.255.0
Router1(config-if)# no shutdown
```

```
Router1(config)# router eigrp 10
Router1(config-router)#no auto-summary
Router1(config-router)# network 13.13.13.0
Router1(config-router)# network 15.15.15.0
Router1(config-router)# network 192.168.2.0
```

Router2 IP Configuration:

```
Router2(config)# interface serial 2/0
Router2(config-if)# clock rate 64000
Router2(config-if)# no shutdown
Router2(config-if)# ip address 11.11.11.2 255.0.0.0
```

```
Router2(config)# interface serial 2/1
Router2(config-if)# clock rate 64000
Router2(config-if)# no shutdown
Router2(config-if)# ip address 15.15.15.1 255.0.0.0
```

```
Router2(config)# interface fastEthernet 0/0
Router2(config-if)# ip address 192.168.3.1 255.255.255.0
Router2(config-if)# no shutdown
```

```
Router2(config)# router eigrp 10
Router2(config-router)#no auto-summary
Router2(config-router)# network 11.11.11.0
Router2(config-router)# network 15.15.15.0
Router2(config-router)# network 192.168.3.0
```

Verify the EIGRP using Neighbor Table & Topology Table

```
Router1#show ip eigrp neighbors
```



IP-EIGRP neighbors for process 10

H	Address	Interface (sec)	Hold Uptime (ms)	SRTT Cnt	RTO	Q	Seq
0	15.15.15.2	Se0/1/1	10 00:00:38	40	1000	0	8
1	13.13.13.1	Se0/1/0	14 00:00:37	40	1000	0	14

Router1# **show ip eigrp topology**

IP-EIGRP Topology Table for AS 10/ID(192.168.2.1)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - Reply status

P 11.0.0.0/8, 2 successors, FD is 2681856
 via 15.15.15.2 (2681856/2169856), Serial0/1/1
 via 13.13.13.1 (2681856/2169856), Serial0/1/0
 P 13.0.0.0/8, 1 successors, FD is 2169856
 via Connected, Serial0/1/0
 P 15.0.0.0/8, 1 successors, FD is 2169856
 via Connected, Serial0/1/1
 P 192.168.1.0/24, 1 successors, FD is 2172416
 via 13.13.13.1 (2172416/5120), Serial0/1/0
 P 192.168.2.0/24, 1 successors, FD is 5120
 via Connected, GigabitEthernet0/0
 P 192.168.3.0/24, 1 successors, FD is 2172416
 via 15.15.15.2 (2172416/5120), Serial0/1/1

‘P’ stands for Passive and indicates that route calculation has finished for this network.



QUESTIONS: -

1. Discuss routing, neighbors and topology tables.
2. What is successor and feasible successor?

3. Configure the example network using different IPs for each network and then configure EIGRP on it. Attach all coding and screenshots.

TIME BOXING:

Activity Name	Activity Time	Total Time
Instruments Allocation + Setting up Lab	10 mints	10 mints
Walk through Theory & Tasks (Lecture)	60 mints	60 mints
Implementation & Practice time	90 mints	80 mints
Evaluation Time	20 mints	20 mints
	Total Duration	180 mints

Teacher Signature: _____

Student Registration No: _____