

EIGRP Observation Lab – Feasibility Condition

Objective

The purpose of this lab is to observe the basic **behavior and requirements** in the selection of a **Feasible Successor**. This is an **observation-focused lab**. The learner should focus on what changes in the **EIGRP topology** and **routing tables**.

Topology Overview

There are 4 routers in the topology. EIGRP autonomous system (AS) 10 has been configured on all routers and enabled on all connected interfaces.

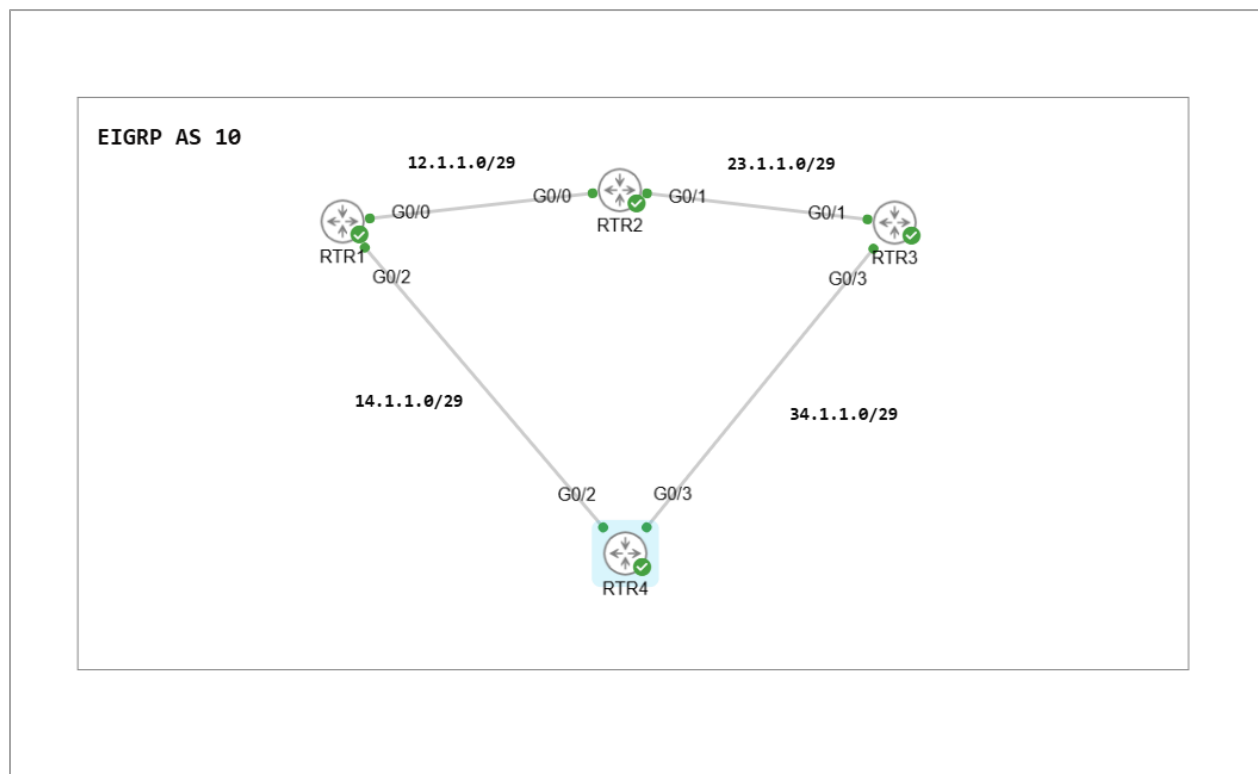


Figure 1 – Lab topology

Task 1 – View EIGRP Topology Table

On RTR2, view the available routes for prefix 34.1.1.0/29.

Questions

- How many routes are known for prefix 34.1.1.0/29?
- How many Successors for 34.1.1.0/29?

```
P 14.1.1.0/29, 1 successors, FD is 3072
    via 12.1.1.1 (3072/2816), GigabitEthernet0/0
P 23.1.1.0/29, 1 successors, FD is 256256
    via Connected, GigabitEthernet0/1
    via 12.1.1.1 (3584/3328), GigabitEthernet0/0
P 34.1.1.0/29, 1 successors, FD is 3328
    via 12.1.1.1 (3328/3072), GigabitEthernet0/0
    via 23.1.1.3 (256512/2816), GigabitEthernet0/1, serno 40
P 12.1.1.0/29, 1 successors, FD is 2816
    via Connected, GigabitEthernet0/0
RTR2#
```

Figure 2 – RTR2 show ip eigrp topology

Engineer Insight

EIGRP can select backup paths called **Feasible Successors** (FS); however, to be eligible for selection, a path must pass the **Feasibility Condition (FC)**. The FC is an essential test for ensuring a backup path does not result in a loop.

The FC answers one question. Is the Received Distance (RD) of the FS candidate lower than the FD for the destination? If the RD is lower than the FD, the path is considered loop free and becomes eligible to be used as a FS. If not, the path is not selected as a FS.

Task 2 – Manipulate Interface Metrics

On RTR3, lower the bandwidth to 1000 and increase delay to 100 on interface GigabitEthernet 0/3.

Expected Behavior

- The path to 34.1.1.0/29 via RTR3 does not appear in the default output of *show ip eigrp topology*.

Verification

Figure 3 shows there is now a single path to 34.1.1.0/29. The output of the command ***shows ip eigrp topology*** displays Successors and Feasible Successors. The Successor is the path with the lowest metric, which becomes the FD, and FS are backups that passed the FC.

```
P 14.1.1.0/29, 1 successors, FD is 3072
    via 12.1.1.1 (3072/2816), GigabitEthernet0/0
P 23.1.1.0/29, 1 successors, FD is 256256
    via Connected, GigabitEthernet0/1
    via 12.1.1.1 (3584/3328), GigabitEthernet0/0
P 34.1.1.0/29, 1 successors, FD is 3328
    via 12.1.1.1 (3328/3072), GigabitEthernet0/0
P 12.1.1.0/29, 1 successors, FD is 2816
    via Connected, GigabitEthernet0/0
RTR2#
```

Figure 3 – RTR2 show ip eigrp topology output

Question

- Does the path via RTR3 pass the Feasibility Condition?

Engineer Insight

Look at RTR3's topology table and locate the FD for 34.1.1.0/29. RTR2 receives this value as the RD. Network 34.1.1.0/29 is directly connected to RTR3 explaining the path with the higher metric being selected as the Successor. Do not concern yourself with this. What we are looking for is the FD which is **2585600**. RTR2's FD is **3328**.

```

P 14.1.1.0/29, 1 successors, FD is 3328
    via 23.1.1.2 (3328/3072), GigabitEthernet0/1
    via 34.1.1.4 (2585856/2816), GigabitEthernet0/3
P 23.1.1.0/29, 1 successors, FD is 2816
    via Connected, GigabitEthernet0/1
P 34.1.1.0/29, 1 successors, FD is 2585600
    via Connected, GigabitEthernet0/3
    via 23.1.1.2 (3584/3328), GigabitEthernet0/1
P 12.1.1.0/29, 1 successors, FD is 3072
    via 23.1.1.2 (3072/2816), GigabitEthernet0/1

RTR3#

```

Figure 4 – RTR2 show ip eigrp topology output

Is **2585600** lower than **3328**? No.

The RD (2585856) is not lower than the FD (3328) resulting in the path through RTR3 being ineligible to be designated as a FS. It will not be included in the default output of show ip eigrp topology; however, it will be displayed with the command **show ip eigrp topology all-links**. The EIGRP topology table contains all known routes, even the least favorable.

```

P 14.1.1.0/29, 1 successors, FD is 3072, serno 6
    via 12.1.1.1 (3072/2816), GigabitEthernet0/0
P 23.1.1.0/29, 1 successors, FD is 256256, serno 32
    via Connected, GigabitEthernet0/1
    via 12.1.1.1 (3584/3328), GigabitEthernet0/0
P 34.1.1.0/29, 1 successors, FD is 3328, serno 33
    via 12.1.1.1 (3328/3072), GigabitEthernet0/0
    via 23.1.1.3 (2585856/2585600), GigabitEthernet0/1, serno 44
P 12.1.1.0/29, 1 successors, FD is 2816, serno 1
    via Connected, GigabitEthernet0/0

RTR2#

```

Figure 5 – RTR2 show ip topology all-links output