

## EIGRP Observation Lab – Peering Basics

### Objective

The purpose of this lab is to observe the basic **behavior and requirements** for EIGRP speaking routers to form an adjacency. This is an **observation-focused lab**. The learner should focus on what changes in the **EIGRP neighbor** table.

### Topology Overview

There are 3 routers in the topology. **RTR1** and **RTR2** will be the focus of this lab.

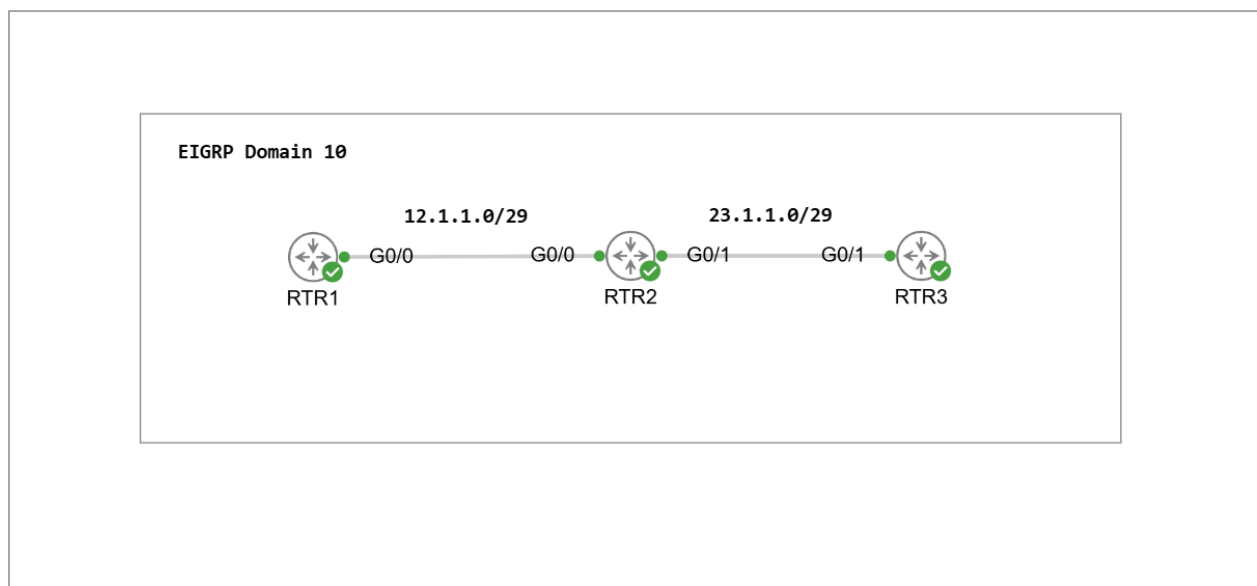


Figure 1 – Lab topology

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## Task 1 – Enable EIGRP

On RTR2, configure EIGRP AS 1 and enable interface GigabitEthernet0/0 for EIGRP AS 1. If you are continuing from the fundamental operations lab, ensure K-values are returned to their defaults before proceeding.

```
router eigrp 1
 network 12.1.1.2 0.0.0.0
```

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### Expected Behavior

- RTR1 and RTR2 do not form an adjacency.

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### Verification

Figure 2 shows interface Gi0/0 has been enabled for EIGRP AS 1. There are no peers.

```
RTR2#sh ip eigrp interfaces
EIGRP-IPv4 Interfaces for AS(1)

```

Interface	Peers	Xmit Queue Un/Reliable	PeerQ Un/Reliable	Mean SRTT	Pacing Time Un/Reliable	Multicast Flow Timer	Pending Routes
Gi0/0	0	0/0	0/0	0	0/0	0	0

```
RTR2#
```

Figure 2 – RTR2 show ip eigrp interfaces output

Figure 3 shows RTR2 does not have a neighbor adjacency with RTR1.

```
RTR2#sh ip eigrp neighbors
EIGRP-IPv4 Neighbors for AS(1)
RTR2#
```

Figure 3 – show ip eigrp neighbors output

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### Engineer Insight

A requirement for routers to form an EIGRP adjacency is for their interfaces to be on the **same subnet** with unique IPs. This requirement is met. Another requirement is for the EIGRP **AS on both routers to be identical**. Unlike OSPF, **EIGRP neighbors must use the same AS number**.

The EIGRP AS on RTR1 is 10 while the AS on RTR2 is 1. Correct RTR2 to be in AS 10 and view the neighbor table. *Figure 4* shows RTR1 and RTR2 have formed an adjacency.

```
RTR2#sh ip eigrp neighbors
EIGRP-IPv4 Neighbors for AS(10)
H   Address                Interface      Hold Uptime    SRTT   RT0  Q   Seq
                               (sec)          (ms)        RT0  Cnt Num
0   12.1.1.1                Gi0/0         12 00:00:04 1998 5000 1   2
RTR2#
```

*Figure 4 – show ip eigrp neighbors output*

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## Task 2 – Modify K-values

On RTR2, modify K3 so Minimum bandwidth is the only metric used to calculate the Composite metric (CM).

```
router eigrp 10
 metric weight 0 1 0 0 0 0
```

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### Expected Behavior

- The adjacency between RTR1 and RTR2 drops.

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### Verification

There is no longer an adjacency between RTR1 and RTR2. A requirement for an EIGRP adjacency to form is for the **K-values between the neighbors to match**.

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### Engineer Insight

When the K-values between potential EIGRP neighbors do not match, this is known as **K-value mismatch**. This error can be found in the logs with the show logging command as seen in *Figure 5*. Return K-values to default.

```
RTR1#sh logging | i K-value
*May 19 16:18:38.059: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 12.1.1.2 (GigabitEthernet0/0) is down: K-value mismatch
*May 19 16:18:47.057: %DUAL-5-NBRCHANGE: EIGRP-IPv4 10: Neighbor 12.1.1.2 (GigabitEthernet0/0) is down: K-value mismatch
```

*Figure 5 – RTR show logging output*

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## Task 3 – Modify Router-Id

On RTR2, change the router-id to 12.1.1.1.

```
router eigrp 10
 router-id 12.1.1.1
```

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## Expected Behavior

- The adjacency between RTR1 and RTR2 remains established.

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## Verification

The adjacency between RTR1 and RTR2 remains. **EIGRP neighbors are not required to have different router-ids to form an adjacency**, but it is best to ensure the IDs are unique. The EIGRP router id is determined in the following order:

1. Statically configured router-id.
2. Highest IP of up/up Loopback interface.
3. Highest IP of other up/up interfaces.