



Chapter 7: EIGRP Tuning and Troubleshooting



Scaling Networks

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Chapter 7 - Sections & Objectives

- 7.1 Tune EIGRP
- Configure EIGRP to improve network performance.
- 7.2 Troubleshoot EIGRP
- Troubleshoot common EIGRP configuration issues in a small to medium-sized business network.



7.1 Tune EIGRP



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Tune EIGRP

Automatic Summarization

EIGRP Automatic Summarization

- Summarization limits the number of routing advertisements and the size of the routing table
- EIGRP performs automatic summarization at classful boundaries.

Configuring EIGRP Automatic Summarization

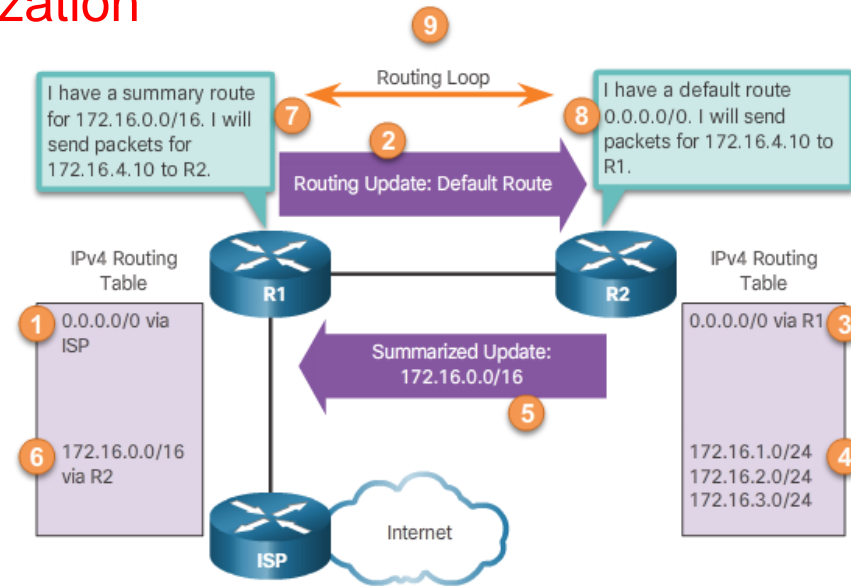
- R1(config)# router eigrp as-number
- R1(config-router)# auto-summary

Verifying Auto-Summary

- show ip protocols
- show ip eigrp topology all-links
- show ip route

Null0 summary route exists when:

- Automatic summarization is enabled.
- There is at least one subnet that was learned via EIGRP.
- There are two or more network EIGRP router configuration mode commands.
- Automatic summarization could cause routing loops





Tune EIGRP

Default Route Propagation

- Propagating a Default Static Route
 - The default static route (0.0.0.0 / 0) is usually configured on the router that has a connection to a network outside the EIGRP routing domain; for example, to an ISP.
- One way to propagate the default static route
 - The *redistribute static* command
- Verifying the Propagated Default Route

```
R1# show ip route | include 0.0.0.0
Gateway of last resort is 192.168.10.6 to network 0.0.0.0
D*EX 0.0.0.0/0 [170/3651840] via 192.168.10.6, 00:25:23,
Serial0/0/1
```

- **D** - This route was learned from an EIGRP routing update.
- ***** - The route is a candidate for a default route.
- **EX** - The route is an external EIGRP route, in this case a static route outside of the EIGRP routing domain.
 - 170 - **This is the administrative distance of an external EIGRP route.**
- EIGRP for IPv6: Default Route
 - To configure a IPv6 static default route: `ipv6 route ::/0 exit-interface`
 - To propagate a IPv6 static default route: `redistribute static`
 - To verify the propagation of IPv6 static default route: `show ipv6 route`



Tune EIGRP

Fine-tuning EIGRP Interfaces

- EIGRP Bandwidth Utilization
 - By default, EIGRP uses only up to 50 percent of an interface's bandwidth for EIGRP information. This prevents the EIGRP process from over-utilizing a link and not allowing enough bandwidth for the routing of normal traffic.
- Commands to configure the bandwidth percentage used by EIGRP on an interface:
 - IPv4: `ip bandwidth-percent eigrp as-number percent`
 - IPv6: `ipv6 bandwidth-percent eigrp as-number percent`
- **Hello and Hold Timers – Do not have to match with other EIGRP routers**
- Hello packets are used to establish and monitor the connection status of neighbors
- Commands to configure the hello intervals per interface:
 - **`ip hello-interval eigrp as-number seconds`**
 - **`ipv6 hello-interval eigrp as-number seconds`**
- **Hold time tells the router the maximum time that the router should wait to receive the next Hello before declaring that neighbor as unreachable.**
- Commands to configure the hold time intervals per interface:
 - **`ip hold-time eigrp as-number seconds`**
 - **`ipv6 hold-time eigrp as-number seconds`**



Tune EIGRP

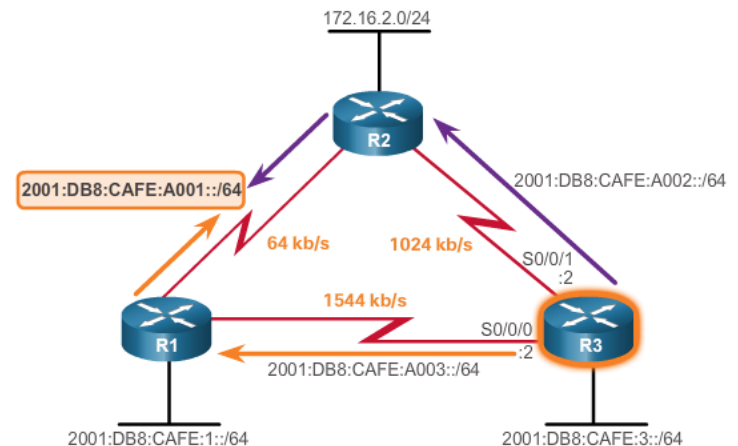
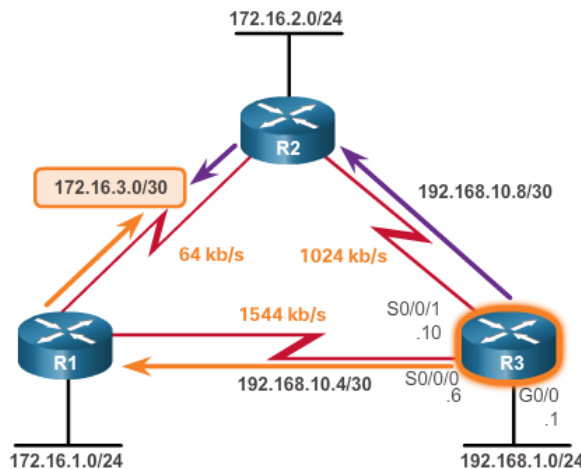
Fine-tuning EIGRP Interfaces (Cont.)

■ Load Balancing

- Equal-cost load balancing
- The ability of a router to distribute outbound traffic using all interfaces that have the same metric from the destination address
- IPv4 and IPv6: The maximum-paths value determines the maximum number of routes

■ Unequal-cost load balancing

- The ability to balance traffic across multiple routes that have different metrics
- IPv4 and IPv6: **The variance command** is used to install multiple loop-free routes with unequal cost in a local routing table





7.2 Troubleshoot EIGRP



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Troubleshoot EIGRP

Troubleshoot EIGRP Neighbor Issues

Layer 3 Connectivity

- Verify the connection
- show ip interface brief or show ipv6 interface brief
- ping ip address

EIGRP Parameters

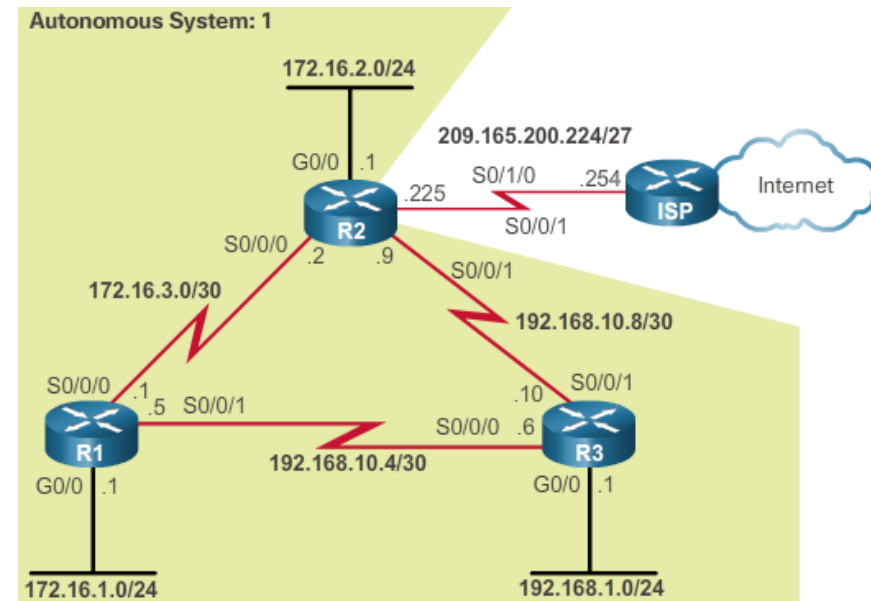
- Verify that the routers are in the same EIGRP domain with the same AS number
- show ip protocols or show ipv6 protocols

Configure AS number

- IPv4: router eigrp as-number
- IPv6: ipv6 router eigrp as-number

EIGRP Interfaces

- Verify that the router interfaces
- are participating in the EIGRP network
- show ip eigrp interfaces or show ipv6 eigrp interfaces
- show ip protocols or show ipv6 protocols
- show running-config | section eigrp





Troubleshoot EIGRP

Troubleshoot EIGRP Routing Table Issues

Passive Interface

- Prevent routers from becoming neighbors
- show ip eigrp neighbors or show ipv6 eigrp neighbors
- The show ip protocols or show ipv6 protocols command is used to verify whether the interface has been configured as passive
- Passive interface is configured if neighbor adjacency is not desirable

Missing Network Statement

- Verify the advertised networks
- show ip protocols or show ipv6 protocols
- show ip route or show ipv6 route

Configure network statements

- IPv4: network ip-address [mask]
- IPv6: ipv6 eigrp autonomous-system command in interface configuration mode

Autosummarization

- IPv4: Could cause inconsistent routing
- Disable autosummarization: no auto-summary
- IPv6: All summarization can only be accomplished using EIGRP manual summary routes.

