EIGRP Capstone Project

(Instructor Version)

**Instructor Note**: Red font color or Gray highlights indicate text that appears in the instructor copy only.

Objectives

In this Capstone Project activity, you will demonstrate your ability to:

* Design, configure, verify, and secure EIGRP, IPv4 or IPv6 on a network
* Design a VLSM addressing scheme for the devices connected to the LANs
* Present your design using network documentation from your Capstone Project network

Instructor Note: This activity is best completed in groups of 2-3 students.

Scenario

You are a network engineer for your small- to medium-sized business. You and your team have been asked to design an IPv4 or IPv6 network that uses the EIGRP routing protocol.

The network consists of four branches that is connected to a headquarters router. The headquarters then connects to an ISP router.

Your job is to create an EIGRP-based, VLSM addressed network scheme using IPv4 or IPv6 to accommodate the number of hosts requested for this Capstone Project.

Required Resources

* Packet Tracer software
* Word processing or presentation software
	1. Design the network topology.
		1. Network equipment:
			1. Six routers
				1. Four branch routers
				2. One headquarters router
				3. One ISP router
			2. Switches to support the LANS
		2. LANs:
			1. Two LANs per branch router
				1. Two LANs with 500 hosts
				2. One LAN serving 120 hosts
				3. One LAN with 200 hosts
				4. Two LANS with 80 hosts
				5. One LAN with 60 hosts
				6. One LAN with 30 hosts
			2. One, three-host LAN assigned to the ISP router for server connectivity (DNS, Web, and TFTP).
	2. Devise the network addressing scheme.
		1. Use any RFC 1918 Class B address that will accommodate the specifications listed in Step 1.
		2. ISPs LAN connection will use a different IPv4 network number to indicate Internet or telecommunications connectivity to the servers.
		3. Use VLSM efficiently to conserve addresses and allow for scalability.
		4. Apply the network address scheme to hosts and LAN and WAN interfaces.
	3. Implement the EIGRP routing protocol on your network
		1. Requirements:
			1. Advertise directly connected networks using the wildcard mask.
			2. Disable automatic summarization.
			3. Disable routing updates from being sent across the LAN interfaces.
			4. Implement one, named extended ACL on the network.
		2. Recommendations (choose two):
			1. Selectively implement EIGRP summary routes.
			2. Modify the EIGRP hello-timers.
			3. Modify the bandwidth of the interfaces.
	4. Configure basic security
		1. Restrict access to the console connection.
		2. Configure encrypted passwords.
		3. Restrict access to the VTY connections.
		4. Configure a banner warning.
	5. Backup the configurations of each router to the TFTP server.
	6. Verify the network.
		1. Validate connectivity by pinging all devices.
		2. Use five **show** commands to verify EIGRP configuration.
	7. Present your Capstone Project to the class and be able to answer questions from your peers and Instructor.

**Instructor notes**: This Modeling Activity is suggested to be a graded assignment after completing Chapters 1-11. Students should be able to show how small networks are designed, configured, verified and secured. Documentation is a large factor of this project and students must be able to explain their network design and verification through the use of **show** commands.

Instructor-Sample Solutions

*Topology (this example topology can be used with IPv4 or IPv6 addressing)*



Instructor Rubric Example

|  |  |
| --- | --- |
| Requirement | Points |
| Network Topology * Six routers
* Nine LANs
* Network switches, as necessary
 | 10 |
| Network Addressing* Class B, IPv4 with VLSM applied correctly to networks
* IPv6 applied correctly to networks
 | 20 |
| EIGRP Configuration* Wildcard masks used
* Auto-summary disabled
* LAN EIGRP routing updates disabled
* One extended, named ACL configured and operational
 | 10 |
| Network Security* Encrypted passwords
* Console access secured
* VTY lines secured
* Warning banner present
 | 10 |
| Router configurations backed up to the TFTP server | 5 |
| Full network connectivity is present and verified | 15 |
| Capstone Project presentation | 30 |

Sample Outputs (IPv4)

Show IP Route

HQ# **show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

 \* - candidate default, U - per-user static route, o - ODR

 P - periodic downloaded static route

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

 172.31.0.0/16 is variably subnetted, 15 subnets, 7 masks

D 172.31.0.0/21 is a summary, 00:15:26, Null0

D 172.31.0.0/23 [90/2170112] via 172.31.7.2, 00:15:26, Serial0/0/0

D 172.31.2.0/23 [90/2170112] via 172.31.7.2, 00:15:26, Serial0/0/0

D 172.31.4.0/23 [90/2170112] via 172.31.7.10, 00:15:28, Serial0/1/0

 [90/2170112] via 172.31.7.6, 00:15:24, Serial0/0/1

D 172.31.6.0/25 [90/2170112] via 172.31.7.10, 00:15:28, Serial0/1/0

D 172.31.6.128/26 [90/2170112] via 172.31.7.14, 00:15:25, Serial0/1/1

D 172.31.6.192/27 [90/2170112] via 172.31.7.14, 00:15:25, Serial0/1/1

C 172.31.7.0/30 is directly connected, Serial0/0/0

L 172.31.7.1/32 is directly connected, Serial0/0/0

C 172.31.7.4/30 is directly connected, Serial0/0/1

L 172.31.7.5/32 is directly connected, Serial0/0/1

C 172.31.7.8/30 is directly connected, Serial0/1/0

L 172.31.7.9/32 is directly connected, Serial0/1/0

C 172.31.7.12/30 is directly connected, Serial0/1/1

L 172.31.7.13/32 is directly connected, Serial0/1/1

 209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks

C 209.165.200.0/27 is directly connected, Serial0/2/1

L 209.165.200.2/32 is directly connected, Serial0/2/1

S\* 0.0.0.0/0 is directly connected, Serial0/2/1

HQ#

ISP# **show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

 \* - candidate default, U - per-user static route, o - ODR

 P - periodic downloaded static route

Gateway of last resort is 209.165.200.2 to network 0.0.0.0

 172.31.0.0/21 is subnetted, 1 subnets

D 172.31.0.0/21 [90/2681856] via 209.165.200.2, 00:00:25, Serial0/0/0

 192.0.2.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.0.2.0/24 is directly connected, GigabitEthernet0/0

L 192.0.2.254/32 is directly connected, GigabitEthernet0/0

 209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks

C 209.165.200.0/27 is directly connected, Serial0/0/0

L 209.165.200.1/32 is directly connected, Serial0/0/0

D\*EX 0.0.0.0/0 [170/7289856] via 209.165.200.2, 00:00:25, Serial0/0/0

ISP#

Branch1# **show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

 \* - candidate default, U - per-user static route, o - ODR

 P - periodic downloaded static route

Gateway of last resort is 172.31.7.1 to network 0.0.0.0

 172.31.0.0/16 is variably subnetted, 13 subnets, 6 masks

C 172.31.0.0/23 is directly connected, GigabitEthernet0/0

L 172.31.1.254/32 is directly connected, GigabitEthernet0/0

C 172.31.2.0/23 is directly connected, GigabitEthernet0/1

L 172.31.3.254/32 is directly connected, GigabitEthernet0/1

D 172.31.4.0/23 [90/2682112] via 172.31.7.1, 00:20:57, Serial0/0/0

D 172.31.6.0/25 [90/2682112] via 172.31.7.1, 00:20:57, Serial0/0/0

D 172.31.6.128/26 [90/2682112] via 172.31.7.1, 00:20:57, Serial0/0/0

D 172.31.6.192/27 [90/2682112] via 172.31.7.1, 00:20:57, Serial0/0/0

C 172.31.7.0/30 is directly connected, Serial0/0/0

L 172.31.7.2/32 is directly connected, Serial0/0/0

D 172.31.7.4/30 [90/2681856] via 172.31.7.1, 00:20:57, Serial0/0/0

D 172.31.7.8/30 [90/2681856] via 172.31.7.1, 00:20:57, Serial0/0/0

D 172.31.7.12/30 [90/2681856] via 172.31.7.1, 00:20:57, Serial0/0/0

D 192.0.2.0/24 [90/2682112] via 172.31.7.1, 00:01:37, Serial0/0/0

 209.165.200.0/27 is subnetted, 1 subnets

D 209.165.200.0/27 [90/2681856] via 172.31.7.1, 00:20:57, Serial0/0/0

D\*EX 0.0.0.0/0 [170/7289856] via 172.31.7.1, 00:20:57, Serial0/0/0

Show Access Lists

HQ# **show access-lists**

Extended IP access list WEB\_ACCESS

 10 permit tcp host 172.31.0.1 host 192.0.2.3 eq www

 20 permit tcp host 172.31.0.1 host 192.0.2.3 eq 443

 30 permit tcp host 172.31.4.1 host 192.0.2.3 eq www

 40 permit tcp host 172.31.4.1 host 192.0.2.3 eq 443

 50 deny tcp any host 192.0.2.3 eq www

 60 deny tcp any host 192.0.2.3 eq 443

 70 permit ip any any

Branch1# **show access-lists**

Standard IP access list NO\_ACCESS

 10 permit host 172.31.0.1

 20 permit host 172.31.2.1

Show IP Protocol

HQ# **show ip protocol**

Routing Protocol is "eigrp 100"

 Outgoing update filter list for all interfaces is not set

 Incoming update filter list for all interfaces is not set

 Default networks flagged in outgoing updates

 Default networks accepted from incoming updates

 EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

 EIGRP maximum hopcount 100

 EIGRP maximum metric variance 1

Redistributing: eigrp 100, static

 Automatic network summarization is not in effect

 Maximum path: 4

 Routing for Networks:

 172.31.7.0/30

 172.31.7.4/30

 172.31.7.8/30

 172.31.7.12/30

 209.165.200.0/27

 Routing Information Sources:

 Gateway Distance Last Update

 172.31.7.14 90 5099

 172.31.7.10 90 6890

 172.31.7.2 90 8081

 172.31.7.6 90 9139

 Distance: internal 90 external 170

Branch1# **show ip protocol**

Routing Protocol is "eigrp 100"

 Outgoing update filter list for all interfaces is not set

 Incoming update filter list for all interfaces is not set

 Default networks flagged in outgoing updates

 Default networks accepted from incoming updates

 EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

 EIGRP maximum hopcount 100

 EIGRP maximum metric variance 1

Redistributing: eigrp 100

 Automatic network summarization is not in effect

 Maximum path: 4

 Routing for Networks:

 172.31.0.0/23

 172.31.2.0/23

 172.31.7.0/30

 Passive Interface(s):

 GigabitEthernet0/0

 GigabitEthernet0/1

 Routing Information Sources:

 Gateway Distance Last Update

 172.31.7.1 90 8082

 Distance: internal 90 external 170

Show ip eigrp topology

HQ# **show ip eigrp topology**

IP-EIGRP Topology Table for AS 100

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

 r - Reply status

P 172.31.7.12/30, 1 successors, FD is 2169856

 via Connected, Serial0/1/1

P 172.31.7.8/30, 1 successors, FD is 2169856

 via Connected, Serial0/1/0

P 172.31.7.0/30, 1 successors, FD is 2169856

 via Connected, Serial0/0/0

P 172.31.7.4/30, 1 successors, FD is 2169856

 via Connected, Serial0/0/1

P 172.31.6.128/26, 1 successors, FD is 2170112

 via 172.31.7.14 (2170112/2816), Serial0/1/1

P 172.31.6.192/27, 1 successors, FD is 2170112

 via 172.31.7.14 (2170112/2816), Serial0/1/1

P 172.31.6.0/25, 1 successors, FD is 2170112

 via 172.31.7.10 (2170112/2816), Serial0/1/0

P 172.31.4.0/23, 2 successors, FD is 2170112

 via 172.31.7.10 (2170112/2816), Serial0/1/0

 via 172.31.7.6 (2170112/2816), Serial0/0/1

P 172.31.0.0/23, 1 successors, FD is 2170112

 via 172.31.7.2 (2170112/2816), Serial0/0/0

P 172.31.2.0/23, 1 successors, FD is 2170112

 via 172.31.7.2 (2170112/2816), Serial0/0/0

P 0.0.0.0/0, 1 successors, FD is 6777856

 via Rstatic (6777856/0)

P 209.165.200.0/27, 1 successors, FD is 2169856

 via Connected, Serial0/2/1

P 172.31.0.0/21, 1 successors, FD is 2169856

 via Summary (2169856/0), Null0

Branch1# **show ip eigrp topology**

IP-EIGRP Topology Table for AS 100

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

 r - Reply status

P 172.31.0.0/23, 1 successors, FD is 2816

 via Connected, GigabitEthernet0/0

P 172.31.2.0/23, 1 successors, FD is 2816

 via Connected, GigabitEthernet0/1

P 172.31.7.0/30, 1 successors, FD is 1340928

 via Connected, Serial0/0/0

P 172.31.7.12/30, 1 successors, FD is 2681856

 via 172.31.7.1 (2681856/2169856), Serial0/0/0

P 172.31.7.8/30, 1 successors, FD is 2681856

 via 172.31.7.1 (2681856/2169856), Serial0/0/0

P 172.31.7.4/30, 1 successors, FD is 2681856

 via 172.31.7.1 (2681856/2169856), Serial0/0/0

P 172.31.6.128/26, 1 successors, FD is 2682112

 via 172.31.7.1 (2682112/2170112), Serial0/0/0

P 172.31.6.192/27, 1 successors, FD is 2682112

 via 172.31.7.1 (2682112/2170112), Serial0/0/0

P 172.31.6.0/25, 1 successors, FD is 2682112

 via 172.31.7.1 (2682112/2170112), Serial0/0/0

P 172.31.4.0/23, 1 successors, FD is 2682112

 via 172.31.7.1 (2682112/2170112), Serial0/0/0

P 0.0.0.0/0, 1 successors, FD is 7289856

 via 172.31.7.1 (7289856/6777856), Serial0/0/0

P 209.165.200.0/27, 1 successors, FD is 2681856

 via 172.31.7.1 (2681856/2169856), Serial0/0/0

TFTP Configuration (may be used with IPv4 and IPv6 projects)



Sample Outputs (IPv6)

Show IPv6 Interface

HQ# **show ipv6 interface**

Serial0/0/0 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::260:3EFF:FE77:E701

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ACAD:9::, subnet is 2001:DB8:ACAD:9::/127

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF00:0

 FF02::1:FF77:E701

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 Hosts use stateless autoconfig for addresses.

Serial0/0/1 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::260:3EFF:FE77:E702

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ACAD:9::2, subnet is 2001:DB8:ACAD:9::2/127

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF00:2

 FF02::1:FF77:E702

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 Hosts use stateless autoconfig for addresses.

Serial0/1/0 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::2D0:BCFF:FE0E:5201

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ACAD:9::4, subnet is 2001:DB8:ACAD:9::4/127

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF00:4

 FF02::1:FF0E:5201

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 Hosts use stateless autoconfig for addresses.

Serial0/1/1 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::2D0:BCFF:FE0E:5202

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ACAD:9::6, subnet is 2001:DB8:ACAD:9::6/127

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF00:6

 FF02::1:FF0E:5202

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 Hosts use stateless autoconfig for addresses.

Serial0/2/1 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::202:4AFF:FE35:602

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ABCD::, subnet is 2001:DB8:ABCD::/127

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF00:0

 FF02::1:FF35:602

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 Hosts use stateless autoconfig for addresses.

Vlan1 is administratively down, line protocol is down

 Internet protocol processing disabled

ISP# **show ipv6 interface**

GigabitEthernet0/0 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::260:2FFF:FE66:401

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:CAFE:1::, subnet is 2001:DB8:CAFE:1::/64

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::1:FF00:0

 FF02::1:FF66:401

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 ND advertised reachable time is 0 milliseconds

 ND advertised retransmit interval is 0 milliseconds

 ND router advertisements are sent every 200 seconds

 ND router advertisements live for 1800 seconds

 ND advertised default router preference is Medium

 Hosts use stateless autoconfig for addresses.

Serial0/0/0 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::260:3EFF:FE10:B901

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ABCD::1, subnet is 2001:DB8:ABCD::/127

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::1:FF00:1

 FF02::1:FF10:B901

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 Hosts use stateless autoconfig for addresses.

Vlan1 is administratively down, line protocol is down

 Internet protocol processing disabled

Branch1# **show ipv6 interface**

GigabitEthernet0/0 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::201:C9FF:FE85:3A01

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ACAD:1:FFFF:FFFF:FFFF:FFFF, subnet is 2001:DB8:ACAD:1::/64

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF85:3A01

 FF02::1:FFFF:FFFF

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 ND advertised reachable time is 0 milliseconds

 ND advertised retransmit interval is 0 milliseconds

 ND router advertisements are sent every 200 seconds

 ND router advertisements live for 1800 seconds

 ND advertised default router preference is Medium

 Hosts use stateless autoconfig for addresses.

GigabitEthernet0/1 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::201:C9FF:FE85:3A02

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ACAD:2:FFFF:FFFF:FFFF:FFFF, subnet is 2001:DB8:ACAD:2::/64

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF85:3A02

 FF02::1:FFFF:FFFF

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 ND advertised reachable time is 0 milliseconds

 ND advertised retransmit interval is 0 milliseconds

 ND router advertisements are sent every 200 seconds

 ND router advertisements live for 1800 seconds

 ND advertised default router preference is Medium

 Hosts use stateless autoconfig for addresses.

Serial0/0/0 is up, line protocol is up

 IPv6 is enabled, link-local address is FE80::202:17FF:FEE2:A401

 No Virtual link-local address(es):

 Global unicast address(es):

 2001:DB8:ACAD:9::1, subnet is 2001:DB8:ACAD:9::/127

 Joined group address(es):

 FF02::1

 FF02::2

 FF02::A

 FF02::1:FF00:1

 FF02::1:FFE2:A401

 MTU is 1500 bytes

 ICMP error messages limited to one every 100 milliseconds

 ICMP redirects are enabled

 ICMP unreachables are sent

 ND DAD is enabled, number of DAD attempts: 1

 ND reachable time is 30000 milliseconds

 Hosts use stateless autoconfig for addresses.

Vlan1 is administratively down, line protocol is down

 Internet protocol processing disabled

Show IPv6 Route

HQ# **show ipv6 route**

IPv6 Routing Table - 17 entries

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

 U - Per-user Static route, M - MIPv6

 I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

 O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

 ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

 D - EIGRP, EX - EIGRP external

S ::/0 [1/0]

 via ::, Serial0/2/1

C 2001:DB8:ABCD::/127 [0/0]

 via ::, Serial0/2/1

L 2001:DB8:ABCD::/128 [0/0]

 via ::, Serial0/2/1

D 2001:DB8:ACAD::/60 [5/2169856]

 via ::, Null0

D 2001:DB8:ACAD::/61 [90/2170112]

 via FE80::2D0:FFFF:FE73:E101, Serial0/0/1

D 2001:DB8:ACAD::/62 [90/2170112]

 via FE80::202:17FF:FEE2:A401, Serial0/0/0

D 2001:DB8:ACAD:5::/64 [90/2170112]

 via FE80::20D:BDFF:FE23:9801, Serial0/1/0

D 2001:DB8:ACAD:6::/64 [90/2170112]

 via FE80::20D:BDFF:FE23:9801, Serial0/1/0

C 2001:DB8:ACAD:9::/127 [0/0]

 via ::, Serial0/0/0

L 2001:DB8:ACAD:9::/128 [0/0]

 via ::, Serial0/0/0

C 2001:DB8:ACAD:9::2/127 [0/0]

 via ::, Serial0/0/1

L 2001:DB8:ACAD:9::2/128 [0/0]

 via ::, Serial0/0/1

C 2001:DB8:ACAD:9::4/127 [0/0]

 via ::, Serial0/1/0

L 2001:DB8:ACAD:9::4/128 [0/0]

 via ::, Serial0/1/0

C 2001:DB8:ACAD:9::6/127 [0/0]

 via ::, Serial0/1/1

L 2001:DB8:ACAD:9::6/128 [0/0]

 via ::, Serial0/1/1

L FF00::/8 [0/0]

 via ::, Null0

Branch1# **show ipv6 route**

IPv6 Routing Table - 17 entries

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

 U - Per-user Static route, M - MIPv6

 I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

 O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

 ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

 D - EIGRP, EX - EIGRP external

EX ::/0 [170/7289856]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

D 2001:DB8:ABCD::/127 [90/2681856]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

D 2001:DB8:ACAD::/60 [90/2682112]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

D 2001:DB8:ACAD::/61 [90/2682112]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

D 2001:DB8:ACAD::/62 [5/2816]

 via ::, Null0

C 2001:DB8:ACAD:1::/64 [0/0]

 via ::, GigabitEthernet0/0

L 2001:DB8:ACAD:1:FFFF:FFFF:FFFF:FFFF/128 [0/0]

 via ::, GigabitEthernet0/0

C 2001:DB8:ACAD:2::/64 [0/0]

 via ::, GigabitEthernet0/1

L 2001:DB8:ACAD:2:FFFF:FFFF:FFFF:FFFF/128 [0/0]

 via ::, GigabitEthernet0/1

D 2001:DB8:ACAD:5::/64 [90/2682112]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

D 2001:DB8:ACAD:6::/64 [90/2682112]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

C 2001:DB8:ACAD:9::/127 [0/0]

 via ::, Serial0/0/0

L 2001:DB8:ACAD:9::1/128 [0/0]

 via ::, Serial0/0/0

D 2001:DB8:ACAD:9::2/127 [90/2681856]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

D 2001:DB8:ACAD:9::4/127 [90/2681856]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

D 2001:DB8:ACAD:9::6/127 [90/2681856]

 via FE80::260:3EFF:FE77:E701, Serial0/0/0

L FF00::/8 [0/0]

 via ::, Null0

Show IPv6 Protocols

HQ# **show ipv6 protocol**

IPv6 Routing Protocol is "connected"

IPv6 Routing Protocol is "static

IPv6 Routing Protocol is "eigrp 100"

 EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

 EIGRP maximum hopcount 100

 EIGRP maximum metric variance 1

 Interfaces:

 Serial0/0/0

 Serial0/0/1

 Serial0/1/0

 Serial0/1/1

 Serial0/2/1

Redistributing: eigrp 100, static

 Address Summarization:

 2001:DB8:ACAD::/60 for Serial0/2/1

 Maximum path: 16

 Distance: internal 90 external 170

Branch1#show ipv6 protocol

IPv6 Routing Protocol is "connected"

IPv6 Routing Protocol is "static

IPv6 Routing Protocol is "eigrp 100"

 EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

 EIGRP maximum hopcount 100

 EIGRP maximum metric variance 1

 Interfaces:

 GigabitEthernet0/0

 GigabitEthernet0/1

 Serial0/0/0

Redistributing: eigrp 100

 Address Summarization:

 2001:DB8:ACAD::/62 for Serial0/0/0

 Maximum path: 16

 Distance: internal 90 external 170

Show IPv6 EIGRP Topology

HQ# **show ipv6 eigrp topology**

IPv6-EIGRP Topology Table for AS 100/ID(1.1.1.1)

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

 r - Reply status

P 2001:DB8:ACAD:9::4/127, 1 successors, FD is 2169856

 via Connected, Serial0/1/0

P 2001:DB8:ACAD:9::6/127, 1 successors, FD is 2169856

 via Connected, Serial0/1/1

P 2001:DB8:ACAD:9::/127, 1 successors, FD is 2169856

 via Connected, Serial0/0/0

P 2001:DB8:ACAD:5::/64, 1 successors, FD is 2170112

 via FE80::20D:BDFF:FE23:9801 (2170112/2816), Serial0/1/0

P 2001:DB8:ACAD:6::/64, 1 successors, FD is 2170112

 via FE80::20D:BDFF:FE23:9801 (2170112/2816), Serial0/1/0

P 2001:DB8:ACAD:9::2/127, 1 successors, FD is 2169856

 via Connected, Serial0/0/1

P 2001:DB8:ACAD::/61, 1 successors, FD is 2170112

 via FE80::2D0:FFFF:FE73:E101 (2170112/2816), Serial0/0/1

P 2001:DB8:ACAD::/62, 1 successors, FD is 2170112

 via FE80::202:17FF:FEE2:A401 (2170112/2816), Serial0/0/0

P 2001:DB8:ACAD::/60, 1 successors, FD is 2169856

 via Summary (2169856/0), Null0

P ::/0, 1 successors, FD is 6777856

 via Rstatic (6777856/0)

P 2001:DB8:ABCD::/127, 1 successors, FD is 2169856

 via Connected, Serial0/2/1

Branch1# **show ipv6 eigrp topology**

IPv6-EIGRP Topology Table for AS 100/ID(2.2.2.2)

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

 r - Reply status

P 2001:DB8:ACAD:1::/64, 1 successors, FD is 2816

 via Connected, GigabitEthernet0/0

P 2001:DB8:ACAD:2::/64, 1 successors, FD is 2816

 via Connected, GigabitEthernet0/1

P 2001:DB8:ACAD:9::/127, 1 successors, FD is 1340928

 via Connected, Serial0/0/0

P 2001:DB8:ACAD::/62, 1 successors, FD is 2816

 via Summary (2816/0), Null0

P 2001:DB8:ACAD:9::4/127, 1 successors, FD is 2681856

 via FE80::260:3EFF:FE77:E701 (2681856/2169856), Serial0/0/0

P 2001:DB8:ACAD:9::6/127, 1 successors, FD is 2681856

 via FE80::260:3EFF:FE77:E701 (2681856/2169856), Serial0/0/0

P 2001:DB8:ACAD:5::/64, 1 successors, FD is 2682112

 via FE80::260:3EFF:FE77:E701 (2682112/2170112), Serial0/0/0

P 2001:DB8:ACAD:6::/64, 1 successors, FD is 2682112

 via FE80::260:3EFF:FE77:E701 (2682112/2170112), Serial0/0/0

P 2001:DB8:ACAD:9::2/127, 1 successors, FD is 2681856

 via FE80::260:3EFF:FE77:E701 (2681856/2169856), Serial0/0/0

P 2001:DB8:ACAD::/61, 1 successors, FD is 2682112

 via FE80::260:3EFF:FE77:E701 (2682112/2170112), Serial0/0/0

P 2001:DB8:ACAD::/60, 1 successors, FD is 2682112

 via FE80::260:3EFF:FE77:E701 (2682112/2170112), Serial0/0/0

P ::/0, 1 successors, FD is 7289856

 via FE80::260:3EFF:FE77:E701 (7289856/6777856), Serial0/0/0

P 2001:DB8:ABCD::/127, 1 successors, FD is 2681856

 via FE80::260:3EFF:FE77:E701 (2681856/2169856), Serial0/0/0

Show IPv6 Access Lists

HQ# **show ipv6 access-list**

IPv6 access list WEB\_ACCESS

 permit tcp host 2001:DB8:ACAD::1 host 2001:DB8:CAFE:1::3 eq www

 permit tcp host 2001:DB8:ACAD::1 host 2001:DB8:CAFE:1::3 eq 443

 permit tcp host 2001:DB8:ACAD::3 host 2001:DB8:CAFE:1::3 eq www

 permit tcp host 2001:DB8:ACAD::3 host 2001:DB8:CAFE:1::3 eq 443

 permit tcp host 2001:DB8:ACAD::5 host 2001:DB8:CAFE:1::3 eq www

 permit tcp host 2001:DB8:ACAD::5 host 2001:DB8:CAFE:1::3 eq 443

 permit tcp host 2001:DB8:ACAD::7 host 2001:DB8:CAFE:1::3 eq www

 permit tcp host 2001:DB8:ACAD::7 host 2001:DB8:CAFE:1::3 eq 443

 deny tcp any host 2001:DB8:CAFE:1::3 eq www

 deny tcp any host 2001:DB8:CAFE:1::3 eq 443

 permit ipv6 any any

Branch1# **show ipv6 access-**list

IPv6 access list NO\_ACCESS

 permit tcp host 2001:DB8:ACAD::1 host 2001:DB8:ACAD:1:FFFF:FFFF:FFFF:FFFF eq telnet

 permit tcp host 2001:DB8:ACAD::2 host 2001:DB8:ACAD:2:FFFF:FFFF:FFFF:FFFF eq telnet

 deny tcp any host 2001:DB8:ACAD:2:FFFF:FFFF:FFFF:FFFF eq telnet

 deny tcp any host 2001:DB8:ACAD:1:FFFF:FFFF:FFFF:FFFF eq telnet