

C O N F I G U R A T I O N

```
R2 (config)# ipv6 unicast-routing
R2 (config)# ipv6 router eigrp 1
                The Autonomous System (AS) number (1) must match on all neighbors
R2 (config-rtr)# eigrp router-id 0.0.0.2
                The keyword "eigrp" is not legal in Version 12.4(15)T14 it's just "router-id..."
                It IS legal in 12.4(24)T8
                Note that this router-id is separate from the "eigrp router-id #.#.#" statement under IPv4's
                "router eigrp 1." They can coexist with no knowledge of each other.
R2 (config-rtr)# no shutdown
                Can shutdown & no shutdown the EIGRP process. May default to not shutdown.
R2 (config-rtr)# interface gi0/0
R2 (config-if)# ipv6 eigrp 1
                Add each participating interface to the EIGRP process—There are no "network" statements.
```

Most commands are unchanged from IPv4 EIGRP.

```
R2 (config-if)# bandwidth 64
R2 (config-if)# delay 1000
                Kb/s and 10s of microseconds—Note these would change IPv4 EIGRP too, since the metrics are
                identical
R2 (config)# ipv6 router eigrp 1
R2 (config-rtr)# variance 2
R2 (config-rtr)# maximum-paths 4
                These are the same commands as IPv4 EIGRP, but in EIGRPv6 subcommands, so no conflict.
```

Some commands just change “ip” to “ipv6”

```
R5 (config)# interface Gi0/0
R5 (config-if)# ipv6 hello-interval eigrp 1 10
R5 (config-if)# ipv6 hold-time eigrp 1 30
```

The “[no] auto-summary” command is gone because EIGRPv6 never auto-summarizes.

O P E R A T I O N & T R O U B L E S H O O T I N G

EIGRPv6 neighbors don't need to be in the same subnet, perhaps because they use link-local.

EIGRPv6 never auto-summarizes

All “show” commands are identical, except for “show ipv6...” instead of “show ip...”

When routes are missing, look for adjacency problems. For the purposes of 200-101, assume that a successful adjacency always leads to a successful topology exchange. Check that EIGRPv6 is enabled on the right interfaces and that they're not passive. Passive interfaces form no relationships.

```
R5# show ipv6 eigrp interfaces
                Omits any mention of passive interfaces with EIGRPv6 enabled
R5# show ipv6 protocols
                Has a list of EIGRPv6-enabled interfaces with “(passive)” “when appropriate”
```

Interface Problems—Interfaces to be advertised need EIGRPv6 enabled, even if they're not used for establishing adjacencies with neighbors

Neighbor Requirements—In EIGRPv6, interfaces needn't be in same subnet; for IPv4, they did.

REQUIREMENT	VERIFICATION
Interfaces up/up	<code>show ipv6 interface brief</code>
No ACLs blocking EIGRPv6 (These appear to be out of scope)	<code>show ipv6 access-list</code> <i>Didn't test this with an access-list, just that its output is empty w/o one</i>
AS Number Match	<code>show ipv6 protocols</code> <code>show ipv6 eigrp topology</code>
Router IDs Unique—Adjacencies will form, but external routes not added	<code>show ipv6 eigrp topology</code> Far right on top line after ASN
Hello & Hold Timers Match	<code>show ipv6 eigrp interfaces detail</code>
K-Values Match	<code>show ipv6 protocols</code> Changing these is out of scope
Neighbor Authentication (if config'd)	(<code>debug</code>)

C O N F I G U R A T I O N S & V E R I F I C A T I O N S

CONFIGURATION (ETHERNET DEFAULTS)	CONFIRMATION
R6(config)# <code>ipv6 router eigrp 1</code> R6(config-rtr)# <code>no shutdown</code>	<code>show ipv6 protocols</code> Displays ASN prominently
R6(config-rtr)# <code>eigrp router-id 0.0.0.6</code>	<code>show ipv6 eigrp topology</code> Far right on top line after ASN
R6(config-rtr)# <code>shutdown</code>	<code>show ipv6 eigrp topology</code> <code>show ipv6 eigrp 1 neighbors</code> <code>show ipv6 eigrp interfaces</code> Any of these will give an error that the protocol is shut down.
R5(config-rtr)# <code>passive-interface Gi0/1</code>	<code>show ipv6 protocols</code> Interface list has "(passive)" next to interface <code>show ipv6 eigrp interfaces</code> passive interfaces are missing from list
R6(config-rtr)# <code>variance 2</code> Multiplier. Default is 1.	<code>show ipv6 protocols</code>
R6(config-rtr)# <code>maximum-paths 4</code> Default 16	<code>show ipv6 protocols</code>
R6(config)# <code>interface fa0/1</code> R6(config-if)# <code>ipv6 eigrp 1</code> This replaces the "network" statements in config-rtr of IPv4	<code>show ipv6 protocols</code> <code>show ipv6 eigrp interfaces</code> Probably topology too, but that's a stretch.
R6(config-if)# <code>bandwidth 100000</code> 1000s of bits / second. This is 100 Mbit / s fastEthernet	<code>show interfaces [fa0/0]</code> <code>show ipv6 eigrp topology FD05::/64</code> Tells minimum along entire path
R6(config-if)# <code>delay 10</code> 10s of µsecs. (10 = 100 µsec)	<code>show interfaces [fa0/0]</code> <code>show ipv6 eigrp topology FD05::/64</code> Tells cumulative along entire path
R6(config-if)# <code>ipv6 hello-interval eigrp 1 5</code> This is independent of IPv4 eigrp and can exist in parallel.	<code>show ipv6 eigrp interfaces detail</code>
R6(config-if)# <code>ipv6 hold-time eigrp 1 15</code> Again independent of IPv4 EIGRP's value. Hello and hold timers are in seconds.	<code>show ipv6 eigrp neighbors</code> Hold column is a countdown, usually between hold and hold-hello before resetting to hold.

TROUBLESHOOTING ROUTES

No Route

- Check routers attached to the missing net—eigrp on that interface & not passive
- Check the adjacency (neighbor) chain back to the router where the route is missing

Suboptimal Route

- Check the adjacency chain over the best (but not chosen) path
- Check bandwidth & delay settings on interfaces along the best (but not chosen) path

VIEWING THE TOPOLOGY TABLE

The topology table shows feasible successor routes [Line 8] that don't show up in the routing table [Lines 19-20] unless the variance (unequal load-balancing) is large enough.

```
1 R6# show ipv6 eigrp topology
2 EIGRP-IPv6 Topology Table for AS(42)/ID(0.0.0.6)
3 Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
4       r - reply Status, s - sia Status
5
6 P 2001:DB8:7::/64, 1 successors, FD is 156160
7     via FE80::21F:6CFF:FED4:3C40 (156160/128256), GigabitEthernet0/1
8     via FE80::21F:6CFF:FED4:3C40 (40640000/128256), Serial0/2/0
9 P 2001:DB8:67B::/64, 1 successors, FD is 40512000
10    via Connected, Serial0/2/0
11 P 2001:DB8:56::/64, 1 successors, FD is 2816
12    via Connected, GigabitEthernet0/0
13 P 2001:DB8:67A::/64, 1 successors, FD is 28160
14    via Connected, GigabitEthernet0/1
15
16 R6# show ipv6 route
17 IPv6 Routing Table - default - 8 entries
18 ...
19 D   2001:DB8:7::/64 [90/156160]
20    via FE80::21F:6CFF:FED4:3C40, GigabitEthernet0/1
```

A "P," in the left column, for "Passive" is good; it means the route is not currently being recalculated, or under "Active" (A) consideration.

Looking at [Lines 7-8], in parentheses we see pairs of numbers. These represent our cost to the destination and the reported "feasible distance" cost that the next-hop router sees. In this case, we see that in each case, the next hop router has the same cost to the destination (which happens to be directly connected to that router). The difference is in how we reach that next hop. Of course, we remember that the feasible distance (128256) must be less than our best distance (156160) for the whole trip in order for the second route to be a feasible successor. Equal is not good enough.