

Topology & EIGRP Invocation

- Router-ID is in the EIGRP block
- Interfaces included at each interface
- Passive interfaces designated in the EIGRP block
- The EIGRP block may require a “no shutdown”

R5	R6
<pre> ipv6 unicast-routing interface Loopback0 ipv6 address FD05::1/64 ipv6 eigrp 1 ! interface GigabitEthernet0/0 ipv6 address FD56::5/64 ipv6 eigrp 1 ! interface GigabitEthernet0/1 ipv6 address FD45::5/64 ipv6 eigrp 1 ! ipv6 router eigrp 1 eigrp router-id 0.0.0.5 no shutdown passive-interface GigabitEthernet0/1 passive-interface Loopback0 </pre>	<pre> ipv6 unicast-routing interface FastEthernet0/0 ipv6 address FD56::6/64 ipv6 eigrp 1 ! ipv6 router eigrp 1 no shutdown <i>This IOS version defaults to shutdown. YMMV.</i> eigrp router-id 0.0.0.6 <i>This was added after show protocols (below)</i> </pre>

Router# show ipv6 protocols

- Shows interfaces running EIGRPV6
- Shows passive interfaces
- If a router lacks an “eigrp router-id #.#.#” in the “ipv6 eigrp 1” section, this command will simply show the interfaces as missing from its list.

R5	R6
<pre> R5# sho ipv6 protocols IPv6 Routing Protocol is "connected" IPv6 Routing Protocol is "static" IPv6 Routing Protocol is "eigrp 1" 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 (passive) Loopback0 (passive) Redistribution: None Maximum path: 16 Distance: internal 90 external 170 </pre>	<pre> R6# sho ipv6 protocols IPv6 Routing Protocol is "connected" IPv6 Routing Protocol is "eigrp 1" EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0 EIGRP maximum hopcount 100 EIGRP maximum metric variance 1 Interfaces: <i>router-id was missing for this example (fixed later)</i> Redistribution: None Maximum path: 16 <i>This is load balancing (+ variance, above)</i> Distance: internal 90 external 170 </pre>

Router# show ipv6 eigrp neighbors [detail | fa0/0]

The book doesn't actually mention the “detail” option. Hold (sec) column is a countdown from 3x hello = 3x5?

```

R6# sho ipv6 eigrp neighbors detail
IPv6-EIGRP neighbors for process 1
H   Address                               Interface      Hold Uptime    SRTT    RTO  Q  Seq
                               (sec)         (ms)          Cnt  Num
0   Link-local address:                   Fa0/0         14 00:01:37    6     300  0  3
          
```

```
FE80::21E:13FF:FE21:E3A8
```

```
Version 12.4/1.2, Retrans: 2, Retries: 0
```

Last line is added by "detail." Normally two lines per neighbor. No neighbor Router-ID.

Router# show ipv6 eigrp interfaces [detail | fa0/0]

Passive interfaces are missing. Shutdown interfaces show a mean SRTT of 0.

```
R5# show ipv6 eigrp interfaces detail
```

```
IPv6-EIGRP interfaces for process 1
```

Interface	Peers	Xmit Queue Un/Reliable	Mean SRTT	Pacing Time Un/Reliable	Multicast Flow Timer	Pending Routes
Gi0/0	1	0/0	1280	0/1	50	0

The 1280 SRTT is probably from Gi0/0 being shut down for a while.

The lines that follow only show up with the "detail" keyword.

```
Hello interval is 5 sec
```

```
Next xmit serial <none>
```

```
Un/reliable mcasts: 0/3 Un/reliable ucasts: 7/9
```

```
Mcast exceptions: 2 CR packets: 2 ACKs suppressed: 1
```

```
Retransmissions sent: 1 Out-of-sequence rcvd: 1
```

```
Authentication mode is not set
```

```
Use multicast
```

Router# show ipv6 route [eigrp]

Limiting the output with the eigrp keyword shows all headers, but only eigrp-learned routes appear (the Ds).

```
R6#sho ipv6 route
```

```
IPv6 Routing Table - Default - 5 entries
```

```
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
```

```
B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
```

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

```
D - EIGRP, EX - EIGRP external
```

```
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 FD05::/64 [90/156160]  
  via FE80::21E:13FF:FE21:E3A8, FastEthernet0/0
```

```
D FD45::/64 [90/30720]  
  via FE80::21E:13FF:FE21:E3A8, FastEthernet0/0
```

```
C FD56::/64 [0/0]  
  via FastEthernet0/0, directly connected
```

```
L FD56::6/128 [0/0]  
  via FastEthernet0/0, receive
```

```
L FF00::/8 [0/0]  
  via Null0, receive
```

Router# show ipv6 route | section FD05::/64

```
R6#sho ipv6 route | section FD05::/64
```

```
D FD05::/64 [90/156160]  
  via FE80::21E:13FF:FE21:E3A8, FastEthernet0/0
```

Router# show ipv6 route { FD05::/64 | FD05::1 }

```
R6# sho ipv6 route FD05::/64
```

```
Routing entry for FD05::/64
```

```
Known via "eigrp 1", distance 90, metric 156160, type internal
```

```
Route count is 1/1, share count 0
```

```
Routing paths:
```

FE80::21E:13FF:FE21:E3A8, FastEthernet0/0
Last updated 00:15:16 ago

Router# show ipv6 eigrp topology [all-links]

All-links actually not mentioned in the book.

```
R6# show ipv6 eigrp topology
```

```
IPv6-EIGRP Topology Table for AS(1)/ID(0.0.0.6)
```

```
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,  
r - reply Status, s - sia Status
```

```
P FD05::/64, 1 successors, FD is 156160  
  via FE80::21E:13FF:FE21:E3A8 (156160/128256), FastEthernet0/0  
P FD45::/64, 1 successors, FD is 30720  
  via FE80::21E:13FF:FE21:E3A8 (30720/28160), FastEthernet0/0  
P FD56::/64, 1 successors, FD is 28160  
  via Connected, FastEthernet0/0  
  via FE80::21E:13FF:FE21:E3A8 (30720/28160), FastEthernet0/0  
  This last line only shows up with all-links (redundant in this case)
```

Router# show ipv6 eigrp topology FD56::/64

Tells total delay and minimum bandwidth along the entire path. Includes the all-links path (redundant here).

```
R6#sho ipv6 eigrp topology FD56::/64
```

```
IPv6-EIGRP (AS 1): Topology entry for FD56::/64
```

```
State is Passive, Query origin flag is 1, 1 Successor(s), FD is 28160
```

```
Routing Descriptor Blocks:
```

```
:: (FastEthernet0/0), from Connected, Send flag is 0x0
```

```
  Composite metric is (28160/0), Route is Internal
```

```
  Vector metric:
```

```
    Minimum bandwidth is 100000 Kbit
```

```
    Total delay is 100 microseconds
```

```
    Reliability is 255/255
```

```
    Load is 1/255
```

```
    Minimum MTU is 1500
```

```
    Hop count is 0
```

```
FE80::21E:13FF:FE21:E3A8 (FastEthernet0/0), from FE80::21E:13FF:FE21:E3A8, Send flag is 0x0
```

```
  Composite metric is (30720/28160), Route is Internal
```

```
  Vector metric:
```

```
    Minimum bandwidth is 100000 Kbit
```

```
    Total delay is 200 microseconds
```

```
    Reliability is 255/255
```

```
    Load is 1/255
```

```
    Minimum MTU is 1500
```

```
    Hop count is 1
```

Load Balancing

```
R6(config-rtr)#variance 2
```

```
R6(config-rtr)#maximum-paths 4
```

Defaults: variance 1 & maximum-paths 16

```
R6#show ipv6 protocols
```

```
IPv6 Routing Protocol is "connected"
```

```
IPv6 Routing Protocol is "eigrp 1"
```

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

```
  EIGRP maximum hopcount 100
```

```
  EIGRP maximum metric variance 2
```

```
  Interfaces:
```

```
    FastEthernet0/0
```

```
  Redistribution:
```

```
    None
```

Maximum path: 4

Distance: internal 90 external 170

Manipulating Path Selection

```
R6(config-if)#bandwidth 100000
```

Value in kbits / second; this is fastethernet 100 Mbits / sec.

```
R6(config-if)#delay 10
```

Value in 10s of μsecs. This is 100 μsecs, the default.

Commands to Make / Fix a Mess

```
R6(config-if)#ipv6 hello-interval eigrp 1 5
```

Hello shown "show ipv6 eigrp interfaces detail"

```
R6(config-if)#ipv6 hold-time eigrp 1 15
```

Hold shown as countdown in "show ipv6 eigrp neighbors"

Routing Process Shutdown

```
R6(config)# ipv6 router eigrp 1
```

```
R6(config-rtr)# shutdown
```

```
R6# sho ipv6 eigrp topology
```

```
IPv6-EIGRP Topology Table for AS(1)/ID(0.0.0.6)
```

```
% EIGRP 1 is in SHUTDOWN
```

```
R6# show ipv6 eigrp 1 neighbors
```

```
IPv6-EIGRP neighbors for process 1
```

```
% EIGRP 1 is in SHUTDOWN
```

```
R6# show ipv6 eigrp interfaces
```

```
IPv6-EIGRP interfaces for process 1
```

```
% EIGRP 1 is in SHUTDOWN
```

Missing Router ID

```
R6(config)# ipv6 router eigrp 1
```

```
R6(config-rtr)# no eigrp router-id
```

```
R6#show ipv6 eigrp neighbors
```

```
IPv6-EIGRP neighbors for process 1
```

```
% No router ID for EIGRP 1
```

```
R6# sho ipv6 eigrp topology
```

```
IPv6-EIGRP Topology Table for AS(1)/ID(0.0.0.0)
```

```
% No router ID for EIGRP 1
```

```
R6# sho ipv6 eigrp interfaces
```

```
IPv6-EIGRP interfaces for process 1
```

```
% No router ID for EIGRP 1
```

```
R6# show ipv6 protocols
```

```
IPv6 Routing Protocol is "connected"
```

```
IPv6 Routing Protocol is "eigrp 1"
```

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

```
EIGRP maximum hopcount 100
```

```
EIGRP maximum metric variance 2
```

```
Interfaces:
```

This is far more subtle. All interfaces are missing from list.

```
Redistribution:
```

```
None
```

Maximum path: 4
Distance: internal 90 external 170