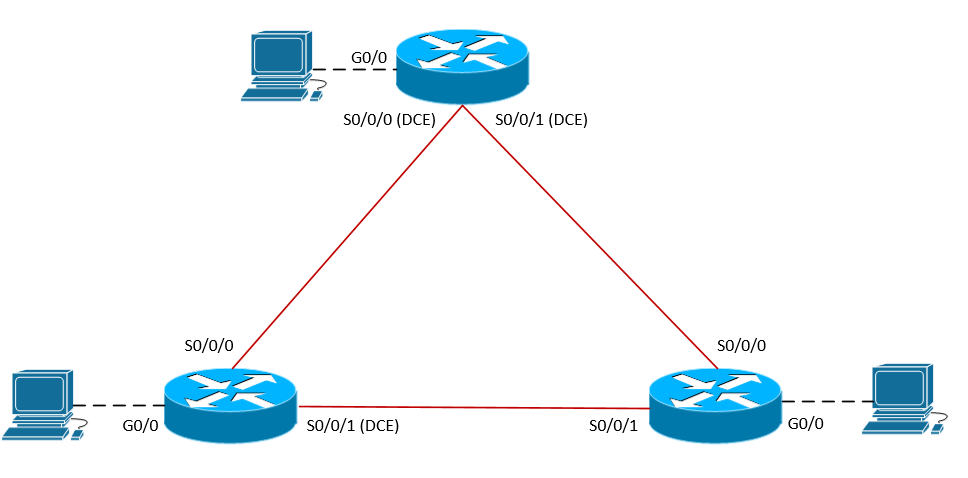
Packet Tracer – IPv6 Dynamic Routing – EIGRP

(Instructor Version)

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

Topology



1. Scenario

NetVise Corporation found it too tedious to manage multiple IPv6 static routes across their growing infrastructure. The CEO has requested that dynamic routing is implemented to allow the network to scale and provide for simplified routing configurations. Your manager has requested that the IPv6 implementation is fully documented and verified.   
  
Prior to starting this lab, your manager provided you with some supporting training material. You are expected to review the provided material thoroughly before starting this lab.

1. Addressing Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Device | Interface | Type | IP Address | Prefix | Default Gateway |
| S1-RTR | S0/0/0 | Global Unicast | 2001:cc1a:0:12::1 | /64 | N/A |
| S0/0/1 | Global Unicast | 2001:cc1a:0:13::1 | /64 | N/A |
| G0/0 | Global Unicast | 2001:cc1a:0:1::1 | /64 | N/A |
| S1-PC | NIC | Static | 2001:cc1a:0:1::100 | /64 | 2001:cc1a:0:1::1 |
| S2-RTR | S0/0/0 | Global Unicast | 2001:cc1a:0:12::2 | /64 | N/A |
| S0/0/1 | Global Unicast | 2001:cc1a:0:23::2 | /64 | N/A |
| G0/0 | Global Unicast | 2001:cc1a:0:2::1 | /64 | N/A |
| S2-PC | NIC | Static | 2001:cc1a:0:2::100 | /64 | 2001:cc1a:0:2::1 |
| S3-RTR | S0/0/0 | Global Unicast | 2001:cc1a:0:13::3 | /64 | N/A |
| S0/0/1 | Global Unicast | 2001:cc1a:0:23::3 | /64 | N/A |
| G0/0 | Global Unicast | 2001:cc1a:0:3::1 | /64 | N/A |
| S3-PC | NIC | Static | 2001:cc1a:0:3::100 | /64 | 2001:cc1a:0:3::1 |

1. Objectives

* Enable IPv6 routing.
* Configure IPv6 Global Unicast Addresses according to the address table.
* Assign IPv6 addresses statically to all workstations according to the address table.
* Configure dynamic routing using EIGRPv6.
  + Setting router-ids manually
  + Enable EIGRPv6 process
  + Enable EIGRPv6 on the appropriate interfaces
  + Enable EIGRPv6 passive on the appropriate interfaces
  + Propagate default route to neighbors
  + Summarize networks
* Verify routing and network connectivity.

**Task 1: Enable IPv6 routing and assign IPv6 addresses to the appropriate interfaces.**

**Step 1:** Although this step is not required to assign IPv6 addresses to the interfaces, you must enable IPv6 in order to forward IPv6 unicast datagrams (routing).

**S1-RTR(config)#** ipv6 unicast-routing  
!

**S2-RTR(config)#** ipv6 unicast-routing

**!  
S3-RTR(config)#** ipv6 unicast-routing

**Step 2:** Assign IPv6 global unicast addresses according to the table provided.

**S1-RTR**(config)# interface s0/0/0  
S1-RTR(config-if)# ipv6 address 2001:cc1a:0:12::1/64   
S1-RTR(config-if)# clock rate 64000  
S1-RTR(config-if)# no shutdown  
!S1-RTR(config-if)# interface s0/0/1  
S1-RTR(config-if)# ipv6 address 2001:cc1a:0:13::1/64  
S1-RTR(config-if)# clock rate 64000  
S1-RTR(config-if)# no shutdown  
!  
S1-RTR(config-if)# interface g0/0  
S1-RTR(config-if)# ipv6 address 2001:cc1a:0:1::1/64  
S1-RTR(config-if)# no shutdown

**S2-RTR**(config)# interface s0/0/0  
S2-RTR(config-if)# ipv6 address 2001:cc1a:0:12::2/64  
S2-RTR(config-if)# no shutdown  
!

S2-RTR(config)# interface s0/0/1  
S2-RTR(config-if)# ipv6 address 2001:cc1a:0:23::2/64  
S2-RTR(config-if)# clock rate 64000  
S2-RTR(config-if)# no shutdown  
!  
S2-RTR(config-if)# interface g0/0  
S2-RTR(config-if)# ipv6 address 2001:cc1a:0:2::1/64  
S2-RTR(config-if)# no shutdown

**S3-RTR**(config)# interface s0/0/0  
S3-RTR(config-if)# ipv6 address 2001:cc1a:0:13::3/64  
S3-RTR(config-if)# no shutdown  
!

S3-RTR(config)# interface s0/0/1  
S3-RTR(config-if)# ipv6 address 2001:cc1a:0:23::3/64  
S3-RTR(config-if)# no shutdown  
!  
S3-RTR(config-if)# interface g0/0  
S3-RTR(config-if)# ipv6 address 2001:cc1a:0:3::1/64  
S3-RTR(config-if)# no shutdown

**S1-RTR# show ipv6 interface brief**

GigabitEthernet0/0 [up/up]

FE80::2D0:D3FF:FE34:1A01

2001:CC1A:0:1::1

Serial0/0/0 [up/up]

FE80::260:3EFF:FE3D:6D01

2001:CC1A:0:12::1

Serial0/0/1 [up/up]

FE80::260:3EFF:FE3D:6D02

2001:CC1A:0:13::1

**S2-RTR# show ipv6 interface brief**

GigabitEthernet0/0 [up/up]

FE80::2D0:BCFF:FE1D:4501

2001:CC1A:0:2::1

Serial0/0/0 [up/up]

FE80::2E0:8FFF:FE22:C901

2001:CC1A:0:12::2

Serial0/0/1 [up/up]

FE80::2E0:8FFF:FE22:C902

2001:CC1A:0:23::2

**S3-RTR# show ipv6 interface brief**

GigabitEthernet0/0 [up/up]

FE80::207:ECFF:FE26:ED01

2001:CC1A:0:3::1

Serial0/0/0 [up/up]

FE80::2E0:8FFF:FEEA:7A01

2001:CC1A:0:13::3

Serial0/0/1 [up/up]

FE80::2E0:8FFF:FEEA:7A02

2001:CC1A:0:23::3

**Task 2: Assign IPv6 addresses to hosts.**

**Step 1:** S1-PC, S2-PC, and S3-PC should be statically configured.

1. PC **>** Config **>** Gateway/DNS IPv6 > Assign default gateway.
2. Interface **>** FastEthernet0 > Assign IPv6 address and gateway.
3. Document host configuration and ping the default gateway.

**S1-PC>ipv6config**

FastEthernet0 Connection:(default port)

Link-local IPv6 Address.........: FE80::2E0:B0FF:FED8:71DA

IPv6 Address....................: 2001:CC1A:0:1::100/64

Default Gateway.................: 2001:CC1A:0:1::1

**S2-PC>ipv6config**

FastEthernet0 Connection:(default port)

Link-local IPv6 Address.........: FE80::202:17FF:FE06:49A6

IPv6 Address....................: 2001:CC1A:0:2::100/64

Default Gateway.................: 2001:CC1A:0:2::100

**S3-PC>ipv6config**

FastEthernet0 Connection:(default port)

Link-local IPv6 Address.........: FE80::205:5EFF:FEB0:877B

IPv6 Address....................: 2001:CC1A:0:3::100/64

Default Gateway.................: 2001:CC1A:0:3::1

**Task 3: Configure dynamic routing allow all PCs to communicate using EIGRPv6.**

**Step 1:** Enable EIGRPv6 on all routers an assign appropriate router-id, create a loopback for each /32 address.

* Autonomous System Number: 99
* S1-RTR: 1.1.1.1
* S2-RTR: 2.2.2.2
* S3-RTR: 3.3.3.3

**S1-RTR(config)#** interface loopback0

S1-RTR(config-if)#ip address 1.1.1.1 255.255.255.255S1-RTR(config)# ipv6 router eigrp 99

S1-RTR(config-rtr)# router-id 1.1.1.1

S1-RTR(config-rtr)# no shutdown

**S2-RTR(config)#** interface loopback0

S2-RTR(config-if)#ip address 2.2.2.2 255.255.255.255  
  
S2-RTR(config)# ipv6 router eigrp 99

S2-RTR(config-rtr)# router-id 2.2.2.2

S2-RTR(config-rtr)# no shutdown

**S3-RTR(config)#** interface loopback0

S3-RTR(config-if)#ip address 3.3.3.3 255.255.255.255

S3-RTR(config)# ipv6 router eigrp 99

S3-RTR(config-rtr)# router-id 3.3.3.3

S3-RTR(config-rtr)# no shutdown

**Step 2:** Enable EIGRPv6 routing according to the address table.

* S1-RTR S0/0/0 & S0/0/1
* S2-RTR S0/0/0 & S0/0/1
* S3-RTR S0/0/0 & S0/0/1

**S1-RTR(config-if)#** interface s0/0/0

S1-RTR(config-if)# ipv6 eigrp 99

!

S1-RTR(config-if)# interface s0/0/1

S1-RTR(config-if)# ipv6 eigrp 99

!

S1-RTR(config-if)# interface g0/0

S1-RTR(config-if)# ipv6 eigrp 99

**S2-RTR(config-if)#** interface s0/0/0

S2-RTR(config-if)# ipv6 eigrp 99

!

S2-RTR(config-if)# interface s0/0/1

S2-RTR(config-if)# ipv6 eigrp 99  
!

S2-RTR(config-if)# interface g0/0

S2-RTR(config-if)# ipv6 eigrp 99

**S3-RTR(config-if)#** interface s0/0/0

S3-RTR(config-if)# ipv6 eigrp 99

!

S3-RTR(config-if)# interface s0/0/1

S3-RTR(config-if)# ipv6 eigrp 99

!

S3-RTR(config-if)# interface g0/0

S3-RTR(config-if)# ipv6 eigrp 99

**S1-RTR# show ipv6 protocols**

IPv6 Routing Protocol is "connected"

IPv6 Routing Protocol is "static

IPv6 Routing Protocol is "eigrp 99 "

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  
 GigabitEthernet0/0

Redistributing: eigrp 99

Maximum path: 16

Distance: internal 90 external 170

**S2-RTR# show ipv6 protocols**

IPv6 Routing Protocol is "connected"

IPv6 Routing Protocol is "static

IPv6 Routing Protocol is "eigrp 99 "

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  
 GigabitEthernet0/0

Redistributing: eigrp 99

Maximum path: 16

Distance: internal 90 external 170

**S3-RTR# show ipv6 protocols**

IPv6 Routing Protocol is "connected"

IPv6 Routing Protocol is "static

IPv6 Routing Protocol is "eigrp 99 "

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

GigabitEthernet0/0

Redistributing: eigrp 99

Maximum path: 16

Distance: internal 90 external 170

**S1-RTR# show ipv6 eigrp neighbors**

IPv6-EIGRP neighbors for process 99

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 Link-local address: Se0/0/0 13 00:00:29 40 1000 0 4

FE80::2E0:8FFF:FE22:C901

1 Link-local address: Se0/0/1 14 00:00:14 40 1000 0 6

FE80::2E0:8FFF:FEEA:7A01

**S2-RTR# show ipv6 eigrp neighbors**

IPv6-EIGRP neighbors for process 99

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 Link-local address: Se0/0/0 10 00:00:45 40 1000 0 3

FE80::260:3EFF:FE3D:6D01

1 Link-local address: Se0/0/1 14 00:00:27 40 1000 0 8

FE80::2E0:8FFF:FEEA:7A02

**S3-RTR# show ipv6 eigrp neighbors**

IPv6-EIGRP neighbors for process 99

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 Link-local address: Se0/0/0 10 00:00:54 40 1000 0 4

FE80::260:3EFF:FE3D:6D02

1 Link-local address: Se0/0/1 12 00:00:51 40 1000 0 6

FE80::2E0:8FFF:FE22:C902

**Step 3:** Enable EIGRPv6 passive interfaces for all router-id loopbacks.

* S1-RTR Lo0
* S2-RTR Lo0
* S3-RTR Lo0

**S1-RTR(config)#** ipv6 router eigrp 99

S1-RTR(config-rtr)# passive-interface lo0

**S2-RTR(config)#** ipv6 router eigrp 99

S2-RTR(config-rtr)# passive-interface lo0

**S3-RTR(config)#** ipv6 router eigrp 99

S3-RTR(config-rtr)# passive-interface lo0

**NOTE:** As of July, 2013 passive interfaces cannot be configured in packet tracer 6.0.1 for EIGRPv6.

**Step 4:** Propagate default route from S1-RTR to S2-RTR.

**S1-RTR(config)#** interface s0/0/0  
S1-RTR(config-if)# ipv6 summary-address eigrp 99 ::/0

**NOTE:** This task can be accomplished in two different ways, either using redistribution or summary advertisements.

**Step 5:** Summarize the following networks sourcing from S2-RTR.

* Create the following loopbacks on S2-RTR.
  + **Lo40:** 2001:DB8:0:40::4/64
  + **Lo50:** 2001:DB8:0:50::5/64
  + **Lo60:** 2001:DB8:0:60::6/64

**S2-RTR(config)#** interface Loopback40

S2-RTR(config-if)# ipv6 address 2001:DB8:0:40::4/64

S2-RTR(config-if)# ipv6 eigrp 99

!

S2-RTR(config)# interface Loopback50

S2-RTR(config-if)# ipv6 address 2001:DB8:0:50::5/64

S2-RTR(config-if)# ipv6 eigrp 99

!

S2-RTR(config)# interface Loopback60

S2-RTR(config-if)# ipv6 address 2001:DB8:0:60::6/64

S2-RTR(config-if)# ipv6 eigrp 99

S2-RTR(config)# interface serial0/0/0

S2-RTR(config-if)# ipv6 summary-address eigrp 99 2001:DB8::/54 5

!

S2-RTR(config)# interface serial0/0/1

S2-RTR(config-if)# ipv6 summary-address eigrp 99 2001:DB8::/54 5

**S3-RTR# show ipv6 route**

IPv6 Routing Table - 11 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

D 2001:DB8::/54 [90/2169856]

via FE80::2E0:8FFF:FE22:C902, Serial0/0/1

**NOTE:** Ensure summary configuration is applied to all outgoing interfaces, otherwise S3-RTR will learn about the more specific routes via S1-RTR and the summary route will not be installed.