

Enhanced Interior Gateway Routing Protocol

Mikey Carroll | Advanced Cisco | 1/31/2022

# Purpose

The purpose of this lab was to setup and configure an EIGRP network and understand its core functionality.

# Background Information

Enhanced Interior Gateway Routing protocol or EIGRP is an advanced distance vector routing protocol that is used on networks to automate a group of routers. EIGRP uses the diffusing update algorithm (DUAL) to calculate routes. This algorithm allows EIGRP to find the most efficient routes and have extremely fast convergence times.

# Lab Summary

For this lab we had to setup EIGRP on 6 Cisco ISR 4321’s and design an IPv4 and IPv6 network.

# Lab Commands

Router(config)# ipv6 unicast-routing

* This command globally enables ipv6 routing on our router.

Router(config)# router eigrp 1

* This command starts EIGRP on our router with an autonomous system id of 1.

Router(config-router)# network 192.168.1.0 0.0.0.255

* This command adds the network 192.168.1.0/24 to our EIGRP instance.

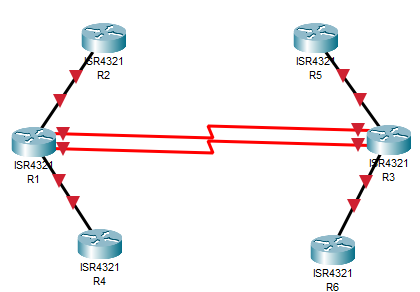
Router(config-router)# router-id 1.1.1.1

* This command sets a router ID on our router that is needed for EIGRP to work properly.

Router(config-router)# variance 2

* This command enables unequal cost load balancing on our router.

# Network Diagram



# Configurations

R1

R1#show run

Building configuration...

Current configuration : 2017 bytes

!

version 15.5

service timestamps debug datetime msec

service timestamps log datetime msec

no platform punt-keepalive disable-kernel-core

!

hostname R1

!

boot-start-marker

boot-end-marker

!

!

vrf definition Mgmt-intf

!

address-family ipv4

exit-address-family

!

address-family ipv6

exit-address-family

!

!

no aaa new-model

!

no ip domain lookup

!

ipv6 unicast-routing

!

license udi pid ISR4321/K9 sn FDO214811ZM

!

spanning-tree extend system-id

!

redundancy

mode none

!

interface Loopback0

ip address 192.168.10.1 255.255.255.0

ipv6 address 100:1::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/0

ip address 10.0.1.1 255.255.255.0

negotiation auto

ipv6 address 10:1::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/1

ip address 10.0.0.1 255.255.255.0

negotiation auto

ipv6 address 10:2::1/64

ipv6 eigrp 1000

!

interface Serial0/1/0

bandwidth 500

ip address 10.0.2.1 255.255.255.0

delay 200

ipv6 address 10:5::1/64

ipv6 eigrp 1000

!

interface Serial0/1/1

bandwidth 500

ip address 10.0.3.1 255.255.255.0

ipv6 address 10:6::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

!

interface Vlan1

no ip address

shutdown

!

!

router eigrp 1000

metric weights 0 1 1 1 1 0

network 10.0.0.0 0.0.0.255

network 10.0.1.0 0.0.0.255

network 10.0.2.0 0.0.0.255

network 10.0.3.0 0.0.0.255

network 192.168.10.0

eigrp router-id 1.1.1.1

!

ipv6 router eigrp 1000

eigrp router-id 1.1.1.1

variance 2

R1#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

C 10.0.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.0.0.1/32 is directly connected, GigabitEthernet0/0/1

C 10.0.1.0/24 is directly connected, GigabitEthernet0/0/0

L 10.0.1.1/32 is directly connected, GigabitEthernet0/0/0

C 10.0.2.0/24 is directly connected, Serial0/1/0

L 10.0.2.1/32 is directly connected, Serial0/1/0

C 10.0.3.0/24 is directly connected, Serial0/1/1

L 10.0.3.1/32 is directly connected, Serial0/1/1

D 10.1.0.0/24 [90/5191534] via 10.0.2.2, 01:00:03, Serial0/1/0

D 10.1.1.0/24 [90/5191534] via 10.0.2.2, 01:00:03, Serial0/1/0

192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.10.0/24 is directly connected, Loopback0

L 192.168.10.1/32 is directly connected, Loopback0

D 192.168.20.0/24 [90/130826] via 10.0.0.2, 01:00:03, GigabitEthernet0/0/1

D 192.168.30.0/24 [90/5319278] via 10.0.2.2, 01:00:03, Serial0/1/0

D 192.168.40.0/24 [90/130826] via 10.0.1.2, 01:00:03, GigabitEthernet0/0/0

D 192.168.50.0/24 [90/5319534] via 10.0.2.2, 01:00:03, Serial0/1/0

D 192.168.60.0/24 [90/5319534] via 10.0.2.2, 01:00:03, Serial0/1/0

R1#show ipv6 route

IPv6 Routing Table - default - 18 entries

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

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

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

C 10:1::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 10:1::1/128 [0/0]

via GigabitEthernet0/0/0, receive

C 10:2::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 10:2::1/128 [0/0]

via GigabitEthernet0/0/1, receive

D 10:3::/64 [90/5171456]

via FE80::2C1:B1FF:FED5:5330, Serial0/1/0

via FE80::2C1:B1FF:FED5:5330, Serial0/1/1

D 10:4::/64 [90/5171456]

via FE80::2C1:B1FF:FED5:5330, Serial0/1/0

via FE80::2C1:B1FF:FED5:5330, Serial0/1/1

C 10:5::/64 [0/0]

via Serial0/1/0, directly connected

L 10:5::1/128 [0/0]

via Serial0/1/0, receive

C 10:6::/64 [0/0]

via Serial0/1/1, directly connected

L 10:6::1/128 [0/0]

via Serial0/1/1, receive

C 100:1::/64 [0/0]

via Loopback0, directly connected

L 100:1::1/128 [0/0]

via Loopback0, receive

D 100:2::/64 [90/130816]

via FE80::B6A8:B9FF:FE47:9471, GigabitEthernet0/0/1

D 100:3::/64 [90/5299200]

via FE80::2C1:B1FF:FED5:5330, Serial0/1/0

via FE80::2C1:B1FF:FED5:5330, Serial0/1/1

D 100:4::/64 [90/130816]

via FE80::227:90FF:FED4:F31, GigabitEthernet0/0/0

D 100:5::/64 [90/5299456]

via FE80::2C1:B1FF:FED5:5330, Serial0/1/0

via FE80::2C1:B1FF:FED5:5330, Serial0/1/1

D 100:6::/64 [90/5299456]

via FE80::2C1:B1FF:FED5:5330, Serial0/1/0

via FE80::2C1:B1FF:FED5:5330, Serial0/1/1

L FF00::/8 [0/0]

via Null0, receive

R2

R2#show run

Building configuration...

Current configuration : 1736 bytes

!

version 15.5

service timestamps debug datetime msec

service timestamps log datetime msec

no platform punt-keepalive disable-kernel-core

!

hostname R2

!

boot-start-marker

boot-end-marker

!

vrf definition Mgmt-intf

!

address-family ipv4

exit-address-family

!

address-family ipv6

exit-address-family

!

no aaa new-model

!

no ip domain lookup

!

ipv6 unicast-routing

!

license udi pid ISR4321/K9 sn FDO214414TX

!

spanning-tree extend system-id

!

interface Loopback0

ip address 192.168.20.1 255.255.255.0

ipv6 address 100:2::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/0

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0/0/1

ip address 10.0.0.2 255.255.255.0

negotiation auto

ipv6 address 10:1::2/64

ipv6 eigrp 1000

!

interface Serial0/1/0

no ip address

shutdown

!

interface Serial0/1/1

no ip address

shutdown

!

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

!

interface Vlan1

no ip address

shutdown

!

router eigrp 1000

metric weights 0 1 1 1 1 0

network 10.0.0.0 0.0.0.255

network 192.168.20.0

eigrp router-id 2.2.2.2

!

ipv6 router eigrp 1000

eigrp router-id 2.2.2.2

variance 2

!

R2#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

C 10.0.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.0.0.2/32 is directly connected, GigabitEthernet0/0/1

D 10.0.1.0/24 [90/3082] via 10.0.0.1, 01:11:37, GigabitEthernet0/0/1

D 10.0.2.0/24 [90/5191534] via 10.0.0.1, 01:09:29, GigabitEthernet0/0/1

D 10.0.3.0/24 [90/5652334] via 10.0.0.1, 01:09:22, GigabitEthernet0/0/1

D 10.1.0.0/24 [90/5191790] via 10.0.0.1, 01:09:25, GigabitEthernet0/0/1

D 10.1.1.0/24 [90/5191790] via 10.0.0.1, 01:09:25, GigabitEthernet0/0/1

D 192.168.10.0/24 [90/130826] via 10.0.0.1, 01:11:37, GigabitEthernet0/0/1

192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.20.0/24 is directly connected, Loopback0

L 192.168.20.1/32 is directly connected, Loopback0

D 192.168.30.0/24

[90/5319534] via 10.0.0.1, 01:09:25, GigabitEthernet0/0/1

D 192.168.40.0/24 [90/131082] via 10.0.0.1, 01:11:35, GigabitEthernet0/0/1

D 192.168.50.0/24

[90/5319790] via 10.0.0.1, 01:09:25, GigabitEthernet0/0/1

D 192.168.60.0/24

[90/5319790] via 10.0.0.1, 01:09:25, GigabitEthernet0/0/1

R2#show ipv6 route

IPv6 Routing Table - default - 15 entries

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

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

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

C 10:1::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 10:1::2/128 [0/0]

via GigabitEthernet0/0/1, receive

D 10:2::/64 [90/3072]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 10:3::/64 [90/5632512]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 10:4::/64 [90/5632512]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 10:5::/64 [90/5171456]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 10:6::/64 [90/5632256]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 100:1::/64 [90/130816]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

C 100:2::/64 [0/0]

via Loopback0, directly connected

L 100:2::1/128 [0/0]

via Loopback0, receive

D 100:3::/64 [90/5760256]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 100:4::/64 [90/131072]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 100:5::/64 [90/5760512]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

D 100:6::/64 [90/5760512]

via FE80::267E:12FF:FE55:5721, GigabitEthernet0/0/1

L FF00::/8 [0/0]

via Null0, receive

R3

R3#show run

Building configuration...

Current configuration : 2029 bytes

!

version 15.5

service timestamps debug datetime msec

service timestamps log datetime msec

no platform punt-keepalive disable-kernel-core

!

hostname R3

!

boot-start-marker

boot-end-marker

!

!

vrf definition Mgmt-intf

!

address-family ipv4

exit-address-family

!

address-family ipv6

exit-address-family

!

!

no aaa new-model

!

no ip domain lookup

!

ipv6 unicast-routing

!

subscriber templating

multilink bundle-name authenticated

!

license udi pid ISR4321/K9 sn FDO210907U3

!

spanning-tree extend system-id

!

redundancy

mode none

!

vlan internal allocation policy ascending

!

interface Loopback0

ip address 192.168.30.1 255.255.255.0

ipv6 address 100:3::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/0

ip address 10.1.1.1 255.255.255.0

negotiation auto

ipv6 address 10:4::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/1

ip address 10.1.0.1 255.255.255.0

negotiation auto

ipv6 address 10:3::1/64

ipv6 eigrp 1000

!

interface Serial0/1/0

bandwidth 500

ip address 10.0.2.2 255.255.255.0

delay 200

ipv6 address 10:5::2/64

ipv6 eigrp 1000

!

interface Serial0/1/1

bandwidth 500

ip address 10.0.3.2 255.255.255.0

ipv6 address 10:6::2/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

!

interface Vlan1

no ip address

shutdown

!

router eigrp 1000

metric weights 0 1 1 1 1 0

variance 2

network 10.0.2.0 0.0.0.255

network 10.0.3.0 0.0.0.255

network 10.1.0.0 0.0.0.255

network 10.1.1.0 0.0.0.255

network 192.168.30.0

eigrp router-id 3.3.3.3

!

ipv6 router eigrp 1000

eigrp router-id 3.3.3.3

variance 2

!

R3#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 10 subnets, 2 masks

D 10.0.0.0/24 [90/5652334] via 10.0.3.1, 01:16:15, Serial0/1/1

[90/5191534] via 10.0.2.1, 01:16:15, Serial0/1/0

D 10.0.1.0/24 [90/5652334] via 10.0.3.1, 01:16:15, Serial0/1/1

[90/5191534] via 10.0.2.1, 01:16:15, Serial0/1/0

C 10.0.2.0/24 is directly connected, Serial0/1/0

L 10.0.2.2/32 is directly connected, Serial0/1/0

C 10.0.3.0/24 is directly connected, Serial0/1/1

L 10.0.3.2/32 is directly connected, Serial0/1/1

C 10.1.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.1.0.1/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.0/24 is directly connected, GigabitEthernet0/0/0

L 10.1.1.1/32 is directly connected, GigabitEthernet0/0/0

D 192.168.10.0/24 [90/5780078] via 10.0.3.1, 01:16:15, Serial0/1/1

[90/5319278] via 10.0.2.1, 01:16:15, Serial0/1/0

D 192.168.20.0/24 [90/5780334] via 10.0.3.1, 01:16:15, Serial0/1/1

[90/5319534] via 10.0.2.1, 01:16:15, Serial0/1/0

192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.30.0/24 is directly connected, Loopback0

L 192.168.30.1/32 is directly connected, Loopback0

D 192.168.40.0/24 [90/5780334] via 10.0.3.1, 01:16:15, Serial0/1/1

[90/5319534] via 10.0.2.1, 01:16:15, Serial0/1/0

D 192.168.50.0/24 [90/130826] via 10.1.0.2, 01:16:15, GigabitEthernet0/0/1

D 192.168.60.0/24 [90/130826] via 10.1.1.2, 01:16:15, GigabitEthernet0/0/0

R3#show ipv6 route

IPv6 Routing Table - default - 18 entries

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

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

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

D 10:1::/64 [90/5171456]

via FE80::267E:12FF:FE55:5720, Serial0/1/0

via FE80::267E:12FF:FE55:5720, Serial0/1/1

D 10:2::/64 [90/5171456]

via FE80::267E:12FF:FE55:5720, Serial0/1/0

via FE80::267E:12FF:FE55:5720, Serial0/1/1

C 10:3::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 10:3::1/128 [0/0]

via GigabitEthernet0/0/1, receive

C 10:4::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 10:4::1/128 [0/0]

via GigabitEthernet0/0/0, receive

C 10:5::/64 [0/0]

via Serial0/1/0, directly connected

L 10:5::2/128 [0/0]

via Serial0/1/0, receive

C 10:6::/64 [0/0]

via Serial0/1/1, directly connected

L 10:6::2/128 [0/0]

via Serial0/1/1, receive

D 100:1::/64 [90/5299200]

via FE80::267E:12FF:FE55:5720, Serial0/1/0

via FE80::267E:12FF:FE55:5720, Serial0/1/1

D 100:2::/64 [90/5299456]

via FE80::267E:12FF:FE55:5720, Serial0/1/0

via FE80::267E:12FF:FE55:5720, Serial0/1/1

C 100:3::/64 [0/0]

via Loopback0, directly connected

L 100:3::1/128 [0/0]

via Loopback0, receive

D 100:4::/64 [90/5299456]

via FE80::267E:12FF:FE55:5720, Serial0/1/0

via FE80::267E:12FF:FE55:5720, Serial0/1/1

D 100:5::/64 [90/130816]

via FE80::B6A8:B9FF:FE01:B5A1, GigabitEthernet0/0/1

D 100:6::/64 [90/130816]

via FE80::B6A8:B9FF:FE47:96B1, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R4

R4#show run

Building configuration...

Current configuration : 1616 bytes

!

version 15.5

service timestamps debug datetime msec

service timestamps log datetime msec

no platform punt-keepalive disable-kernel-core

!

hostname R4

!

boot-start-marker

boot-end-marker

!

vrf definition Mgmt-intf

!

address-family ipv4

exit-address-family

!

address-family ipv6

exit-address-family

!

no aaa new-model

!

no ip domain lookup

!

ipv6 unicast-routing

!

subscriber templating

multilink bundle-name authenticated

!

license udi pid ISR4321/K9 sn FDO214328EH

!

spanning-tree extend system-id

!

redundancy

mode none

!

interface Loopback0

ip address 192.168.40.1 255.255.255.0

ipv6 address 100:4::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/0

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0/0/1

ip address 10.0.1.2 255.255.255.0

negotiation auto

ipv6 address 10:2::2/64

ipv6 eigrp 1000

!

interface Serial0/1/0

no ip address

shutdown

!

interface Serial0/1/1

no ip address

shutdown

!

interface Service-Engine0/2/0

!

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

!

interface Vlan1

no ip address

shutdown

!

router eigrp 1000

metric weights 0 1 1 1 1 0

network 10.0.1.0 0.0.0.255

network 192.168.40.0

eigrp router-id 4.4.4.4

!

ipv6 router eigrp 1000

eigrp router-id 4.4.4.4

variance 2

!

R4#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

D 10.0.0.0/24 [90/3082] via 10.0.1.1, 01:19:38, GigabitEthernet0/0/1

C 10.0.1.0/24 is directly connected, GigabitEthernet0/0/1

L 10.0.1.2/32 is directly connected, GigabitEthernet0/0/1

D 10.0.2.0/24 [90/5191534] via 10.0.1.1, 01:17:30, GigabitEthernet0/0/1

D 10.0.3.0/24 [90/5652334] via 10.0.1.1, 01:17:22, GigabitEthernet0/0/1

D 10.1.0.0/24 [90/5191790] via 10.0.1.1, 01:17:26, GigabitEthernet0/0/1

D 10.1.1.0/24 [90/5191790] via 10.0.1.1, 01:17:26, GigabitEthernet0/0/1

D 192.168.10.0/24 [90/130826] via 10.0.1.1, 01:19:38, GigabitEthernet0/0/1

D 192.168.20.0/24 [90/131082] via 10.0.1.1, 01:19:34, GigabitEthernet0/0/1

D 192.168.30.0/24

[90/5319534] via 10.0.1.1, 01:17:26, GigabitEthernet0/0/1

192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.40.0/24 is directly connected, Loopback0

L 192.168.40.1/32 is directly connected, Loopback0

D 192.168.50.0/24

[90/5319790] via 10.0.1.1, 01:17:26, GigabitEthernet0/0/1

D 192.168.60.0/24

[90/5319790] via 10.0.1.1, 01:17:26, GigabitEthernet0/0/1

R4#show ipv6 route

IPv6 Routing Table - default - 15 entries

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

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

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

D 10:1::/64 [90/3072]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

C 10:2::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 10:2::2/128 [0/0]

via GigabitEthernet0/0/1, receive

D 10:3::/64 [90/5632512]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

D 10:4::/64 [90/5632512]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

D 10:5::/64 [90/5171456]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

D 10:6::/64 [90/5632256]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

D 100:1::/64 [90/130816]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

D 100:2::/64 [90/131072]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

D 100:3::/64 [90/5760256]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

C 100:4::/64 [0/0]

via Loopback0, directly connected

L 100:4::1/128 [0/0]

via Loopback0, receive

D 100:5::/64 [90/5760512]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

D 100:6::/64 [90/5760512]

via FE80::267E:12FF:FE55:5720, GigabitEthernet0/0/1

L FF00::/8 [0/0]

via Null0, receive

R5

R5#show run

Building configuration...

Current configuration : 1616 bytes

!

version 15.5

service timestamps debug datetime msec

service timestamps log datetime msec

no platform punt-keepalive disable-kernel-core

!

hostname R5

!

boot-start-marker

boot-end-marker

!

vrf definition Mgmt-intf

!

address-family ipv4

exit-address-family

!

address-family ipv6

exit-address-family

!

no aaa new-model

!

no ip domain lookup

!

ipv6 unicast-routing

!

subscriber templating

multilink bundle-name authenticated

!

license udi pid ISR4321/K9 sn FDO214421CH

!

spanning-tree extend system-id

!

redundancy

mode none

!

vlan internal allocation policy ascending

!

interface Loopback0

ip address 192.168.50.1 255.255.255.0

ipv6 address 100:5::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/0

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0/0/1

ip address 10.1.0.2 255.255.255.0

negotiation auto

ipv6 address 10:3::2/64

ipv6 eigrp 1000

!

interface Serial0/1/0

no ip address

shutdown

!

interface Serial0/1/1

no ip address

shutdown

!

interface Service-Engine0/2/0

!

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

!

interface Vlan1

no ip address

shutdown

!

router eigrp 1000

metric weights 0 1 1 1 1 0

network 10.1.0.0 0.0.0.255

network 192.168.50.0

eigrp router-id 5.5.5.5

!

ipv6 router eigrp 1000

eigrp router-id 5.5.5.5

variance 2

!

R5#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

D 10.0.0.0/24 [90/5191790] via 10.1.0.1, 01:20:30, GigabitEthernet0/0/1

D 10.0.1.0/24 [90/5191790] via 10.1.0.1, 01:20:30, GigabitEthernet0/0/1

D 10.0.2.0/24 [90/5191534] via 10.1.0.1, 01:20:30, GigabitEthernet0/0/1

D 10.0.3.0/24 [90/5652334] via 10.1.0.1, 01:20:28, GigabitEthernet0/0/1

C 10.1.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.1.0.2/32 is directly connected, GigabitEthernet0/0/1

D 10.1.1.0/24 [90/3082] via 10.1.0.1, 01:22:42, GigabitEthernet0/0/1

D 192.168.10.0/24

[90/5319534] via 10.1.0.1, 01:20:30, GigabitEthernet0/0/1

D 192.168.20.0/24

[90/5319790] via 10.1.0.1, 01:20:30, GigabitEthernet0/0/1

D 192.168.30.0/24 [90/130826] via 10.1.0.1, 01:22:42, GigabitEthernet0/0/1

D 192.168.40.0/24

[90/5319790] via 10.1.0.1, 01:20:30, GigabitEthernet0/0/1

192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.50.0/24 is directly connected, Loopback0

L 192.168.50.1/32 is directly connected, Loopback0

D 192.168.60.0/24 [90/131082] via 10.1.0.1, 01:22:40, GigabitEthernet0/0/1

R5#show ipv6 route

IPv6 Routing Table - default - 15 entries

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

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

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

D 10:1::/64 [90/5632512]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

D 10:2::/64 [90/5632512]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

C 10:3::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 10:3::2/128 [0/0]

via GigabitEthernet0/0/1, receive

D 10:4::/64 [90/3072]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

D 10:5::/64 [90/5171456]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

D 10:6::/64 [90/5632256]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

D 100:1::/64 [90/5760256]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

D 100:2::/64 [90/5760512]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

D 100:3::/64 [90/130816]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

D 100:4::/64 [90/5760512]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

C 100:5::/64 [0/0]

via Loopback0, directly connected

L 100:5::1/128 [0/0]

via Loopback0, receive

D 100:6::/64 [90/131072]

via FE80::2C1:B1FF:FED5:5331, GigabitEthernet0/0/1

L FF00::/8 [0/0]

via Null0, receive

R6

R6#show run

Building configuration...

Current configuration : 1584 bytes

!

version 15.5

service timestamps debug datetime msec

service timestamps log datetime msec

no platform punt-keepalive disable-kernel-core

!

hostname R6

!

boot-start-marker

boot-end-marker

!

vrf definition Mgmt-intf

!

address-family ipv4

exit-address-family

!

address-family ipv6

exit-address-family

!

no aaa new-model

!

no ip domain lookup

!

ipv6 unicast-routing

!

subscriber templating

multilink bundle-name authenticated

!

license udi pid ISR4321/K9 sn FDO214414VU

!

spanning-tree extend system-id

!

redundancy

mode none

!

vlan internal allocation policy ascending

!

interface Loopback0

ip address 192.168.60.1 255.255.255.0

ipv6 address 100:6::1/64

ipv6 eigrp 1000

!

interface GigabitEthernet0/0/0

no ip address

shutdown

negotiation auto

!

interface GigabitEthernet0/0/1

ip address 10.1.1.2 255.255.255.0

negotiation auto

ipv6 address 10:4::2/64

ipv6 eigrp 1000

!

interface Serial0/1/0

no ip address

shutdown

!

interface Serial0/1/1

no ip address

shutdown

!

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

!

interface Vlan1

no ip address

shutdown

!

router eigrp 1000

metric weights 0 1 1 1 1 0

network 10.1.1.0 0.0.0.255

network 192.168.60.0

eigrp router-id 6.6.6.6

!

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

!

ipv6 router eigrp 1000

eigrp router-id 6.6.6.6

variance 2

!

R6#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

a - application route

+ - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

D 10.0.0.0/24 [90/5191790] via 10.1.1.1, 01:27:47, GigabitEthernet0/0/1

D 10.0.1.0/24 [90/5191790] via 10.1.1.1, 01:27:47, GigabitEthernet0/0/1

D 10.0.2.0/24 [90/5191534] via 10.1.1.1, 01:27:47, GigabitEthernet0/0/1

D 10.0.3.0/24 [90/5652334] via 10.1.1.1, 01:27:45, GigabitEthernet0/0/1

D 10.1.0.0/24 [90/3082] via 10.1.1.1, 01:30:00, GigabitEthernet0/0/1

C 10.1.1.0/24 is directly connected, GigabitEthernet0/0/1

L 10.1.1.2/32 is directly connected, GigabitEthernet0/0/1

D 192.168.10.0/24

[90/5319534] via 10.1.1.1, 01:27:47, GigabitEthernet0/0/1

D 192.168.20.0/24

[90/5319790] via 10.1.1.1, 01:27:47, GigabitEthernet0/0/1

D 192.168.30.0/24 [90/130826] via 10.1.1.1, 01:30:00, GigabitEthernet0/0/1

D 192.168.40.0/24

[90/5319790] via 10.1.1.1, 01:27:47, GigabitEthernet0/0/1

D 192.168.50.0/24 [90/131082] via 10.1.1.1, 01:29:56, GigabitEthernet0/0/1

192.168.60.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.60.0/24 is directly connected, Loopback0

L 192.168.60.1/32 is directly connected, Loopback0

R6#show ipv6 route

IPv6 Routing Table - default - 15 entries

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

B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2

IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP external

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

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

D 10:1::/64 [90/5632512]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 10:2::/64 [90/5632512]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 10:3::/64 [90/3072]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

C 10:4::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 10:4::2/128 [0/0]

via GigabitEthernet0/0/1, receive

D 10:5::/64 [90/5171456]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 10:6::/64 [90/5632256]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 100:1::/64 [90/5760256]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 100:2::/64 [90/5760512]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 100:3::/64 [90/130816]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 100:4::/64 [90/5760512]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

D 100:5::/64 [90/131072]

via FE80::2C1:B1FF:FED5:5330, GigabitEthernet0/0/1

C 100:6::/64 [0/0]

via Loopback0, directly connected

L 100:6::1/128 [0/0]

via Loopback0, receive

L FF00::/8 [0/0]

via Null0, receive

# Problems

The only issue we had with this lab was trying to get asymmetric load balancing working.

# Conclusion

In summary we created an IPv4 and IPv6 addressing scheme, configured EIGRP, and troubleshooted some load balancing.