Configurations

Running Configurations:

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Router 1:

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Last configuration change at 22:09:04 UTC Mon Sep 9 2019

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

hostname R1

boot-start-marker

boot-end-marker

no aaa new-model

memory-size iomem 10

ip cef

no ip domain lookup

ipv6 unicast-routing

ipv6 cef

multilink bundle-name authenticated

voice-card 0

license udi pid CISCO2901/K9 sn FTX1704Y038

license accept end user agreement

license boot module c2900 technology-package securityk9

license boot module c2900 technology-package uck9

vtp domain cisco

vtp mode transparent

redundancy

interface Embedded-Service-Engine0/0

no ip address

interface GigabitEthernet0/0

ip address 192.168.51.2 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:A::1/64

interface GigabitEthernet0/1

ip address 192.168.2.1 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:B::1/64

ipv6 ospf 1 area 51

interface Serial0/0/0

no ip address

clock rate 2000000

interface Serial0/0/1

no ip address

clock rate 2000000

router ospf 1

router-id 1.1.1.1

network 192.168.2.0 0.0.0.255 area 51

network 192.168.51.0 0.0.0.255 area 51

ip forward-protocol nd

no ip http server

no ip http secure-server

ipv6 router ospf 1

router-id 1.1.1.1

control-plane

mgcp profile default

gatekeeper

shutdown

line con 0

password cisco

login

line aux 0

line 2

no activation-character

no exec

transport preferred none

transport output pad telnet rlogin lapb-ta mop udptn v120 ssh

stopbits 1

line vty 0 4

login

transport input all

scheduler allocate 20000 1000

end

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Router 2:

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! Last configuration change at 21:31:21 UTC Mon Sep 9 2019

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

hostname R2

boot-start-marker

boot-end-marker

no aaa new-model

memory-size iomem 10

ip cef

ipv6 unicast-routing

ipv6 cef

multilink bundle-name authenticated

voice-card 0

license udi pid CISCO2901/K9 sn FTX15208075

license accept end user agreement

license boot module c2900 technology-package securityk9

license boot module c2900 technology-package uck9

vtp domain cisco

vtp mode transparent

redundancy

interface Embedded-Service-Engine0/0

no ip address

shutdown

interface GigabitEthernet0/0

ip address 192.168.2.2 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:B::2/64

ipv6 ospf 1 area 51

interface GigabitEthernet0/1

ip address 192.168.3.1 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:C::1/64

ipv6 ospf 1 area 0

interface Serial0/0/0

no ip address

shutdown

clock rate 2000000

interface Serial0/0/1

no ip address

shutdown

clock rate 2000000

interface GigabitEthernet0/1/0

no ip address

shutdown

duplex auto

speed auto

router ospf 1

router-id 2.2.2.2

network 192.168.2.0 0.0.0.255 area 51

network 192.168.3.0 0.0.0.255 area 0

ip forward-protocol nd

no ip http server

no ip http secure-server

ipv6 router ospf 1

router-id 2.2.2.2

control-plane

mgcp profile default

gatekeeper

shutdown

line con 0

line aux 0

line 2

no activation-character

no exec

transport preferred none

transport input all

transport output lat pad telnet rlogin lapb-ta mop udptn v120 ssh

stopbits 1

line vty 0 4

login

transport input all

scheduler allocate 20000 1000

end

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Router 3:

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! Last configuration change at 15:56:37 UTC Mon Sep 2 2002

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

hostname R3

boot-start-marker

boot-end-marker

no aaa new-model

memory-size iomem 10

ip cef

ipv6 unicast-routing

ipv6 cef

multilink bundle-name authenticated

voice-card 0

license udi pid CISCO2901/K9 sn FTX1520806V

license accept end user agreement

license boot module c2900 technology-package securityk9

license boot module c2900 technology-package uck9

vtp domain cisco

vtp mode transparent

redundancy

interface Embedded-Service-Engine0/0

no ip address

shutdown

interface GigabitEthernet0/0

ip address 192.168.4.1 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::3 link-local

ipv6 address 2001:DB8:D::1/64

ipv6 ospf 1 area 0

interface GigabitEthernet0/1

ip address 192.168.3.2 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::3 link-local

ipv6 address 2001:DB8:C::2/64

ipv6 ospf 1 area 0

interface Serial0/0/0

no ip address

clock rate 2000000

interface Serial0/0/1

no ip address

shutdown

clock rate 2000000

interface GigabitEthernet0/1/0

no ip address

duplex auto

speed auto

router ospf 1

router-id 3.3.3.3

network 192.168.3.0 0.0.0.255 area 0

network 192.168.4.0 0.0.0.255 area 0

ip forward-protocol nd

no ip http server

no ip http secure-server

ipv6 router ospf 1

router-id 3.3.3.3

control-plane

mgcp profile default

gatekeeper

shutdown

line con 0

line aux 0

line 2

no activation-character

no exec

transport preferred none

transport input all

transport output lat pad telnet rlogin lapb-ta mop udptn v120 ssh

stopbits 1

line vty 0 4

login

transport input all

scheduler allocate 20000 1000

end

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Router 4:

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! Last configuration change at 20:43:10 UTC Mon Sep 9 2019

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

hostname R4

boot-start-marker

boot-end-marker

no aaa new-model

memory-size iomem 10

ip cef

ipv6 unicast-routing

ipv6 cef

multilink bundle-name authenticated

voice-card 0

license udi pid CISCO2901/K9 sn FTX180180ME

license accept end user agreement

license boot module c2900 technology-package securityk9

license boot module c2900 technology-package uck9

vtp domain cisco

vtp mode transparent

redundancy

interface Embedded-Service-Engine0/0

no ip address

shutdown

interface GigabitEthernet0/0

ip address 192.168.5.1 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::4 link-local

ipv6 address 2001:DB8:E::1/64

ipv6 ospf 1 area 17

interface GigabitEthernet0/1

ip address 192.168.4.2 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::4 link-local

ipv6 address 2001:DB8:D::2/64

ipv6 ospf 1 area 0

interface Serial0/0/0

no ip address

shutdown

clock rate 2000000

interface Serial0/0/1

no ip address

shutdown

clock rate 2000000

interface GigabitEthernet0/1/0

no ip address

shutdown

duplex auto

speed auto

router ospf 1

router-id 4.4.4.4

network 192.168.4.0 0.0.0.255 area 0

network 192.168.5.0 0.0.0.255 area 17

ip forward-protocol nd

no ip http server

no ip http secure-server

ipv6 router ospf 1

router-id 4.4.4.4

control-plane

mgcp profile default

gatekeeper

shutdown

line con 0

line aux 0

line 2

no activation-character

no exec

transport preferred none

transport output lat pad telnet rlogin lapb-ta mop udptn v120 ssh

stopbits 1

line vty 0 4

login

transport input all

scheduler allocate 20000 1000

end

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Router 5:

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! Last configuration change at 21:22:39 UTC Mon Sep 9 2019

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

hostname R5

boot-start-marker

boot-end-marker

no aaa new-model

memory-size iomem 10

ip cef

ipv6 unicast-routing

ipv6 cef

multilink bundle-name authenticated

voice-card 0

license udi pid CISCO2901/K9 sn FTX180180MA

license accept end user agreement

license boot module c2900 technology-package securityk9

license boot module c2900 technology-package uck9

vtp domain cisco

vtp mode transparent

redundancy

interface Embedded-Service-Engine0/0

no ip address

shutdown

interface GigabitEthernet0/0

ip address 192.168.17.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/1

ip address 192.168.5.2 255.255.255.0

duplex auto

speed auto

ipv6 address FE80::5 link-local

ipv6 address 2001:DB8:E::2/64

ipv6 ospf 1 area 17

interface Serial0/0/0

no ip address

shutdown

clock rate 2000000

interface Serial0/0/1

no ip address

shutdown

clock rate 2000000

router ospf 1

router-id 5.5.5.5

network 192.168.5.0 0.0.0.255 area 17

network 192.168.17.0 0.0.0.255 area 17

ip forward-protocol nd

no ip http server

no ip http secure-server

ipv6 router ospf 1

router-id 5.5.5.5

control-plane

mgcp profile default

gatekeeper

shutdown

line con 0

line aux 0

line 2

no activation-character

no exec

transport preferred none

transport output lat pad telnet rlogin lapb-ta mop udptn v120 ssh

stopbits 1

line vty 0 4

login

transport input all

scheduler allocate 20000 1000

end

IPv4 and IPv6 Routes:

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Router 1:

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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

+ - replicated route, % - next hop override

Gateway of last resort is not set

192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.2.0/24 is directly connected, GigabitEthernet0/1

L 192.168.2.1/32 is directly connected, GigabitEthernet0/1

O IA 192.168.3.0/24 [110/2] via 192.168.2.2, 00:35:12, GigabitEthernet0/1

O IA 192.168.4.0/24 [110/3] via 192.168.2.2, 00:34:06, GigabitEthernet0/1

O IA 192.168.5.0/24 [110/4] via 192.168.2.2, 00:33:12, GigabitEthernet0/1

R1#show ipv6 route

IPv6 Routing Table - default - 6 entries

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

B - BGP, R - RIP, H - NHRP, 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

C 2001:DB8:B::/64 [0/0]

via GigabitEthernet0/1, directly connected

L 2001:DB8:B::1/128 [0/0]

via GigabitEthernet0/1, receive

OI 2001:DB8:C::/64 [110/2]

via FE80::2, GigabitEthernet0/1

OI 2001:DB8:D::/64 [110/3]

via FE80::2, GigabitEthernet0/1

OI 2001:DB8:E::/64 [110/4]

via FE80::2, GigabitEthernet0/1

L FF00::/8 [0/0]

via Null0, receive

R1#show ospf database

OSPFv3 1 address-family ipv6 (router-id 1.1.1.1)

Router Link States (Area 51)

ADV Router Age Seq# Fragment ID Link count Bits

1.1.1.1 660 0x80000002 0 1 None

2.2.2.2 660 0x80000007 0 1 B

Net Link States (Area 51)

ADV Router Age Seq# Link ID Rtr count

2.2.2.2 660 0x80000001 4 2

Inter Area Prefix Link States (Area 51)

ADV Router Age Seq# Prefix

2.2.2.2 691 0x80000001 2001:DB8:C::/64

2.2.2.2 513 0x80000001 2001:DB8:D::/64

2.2.2.2 468 0x80000001 2001:DB8:E::/64

2.2.2.2 159 0x80000001 2001:DB8:ACAD:A::/64

Link (Type-8) Link States (Area 51)

ADV Router Age Seq# Link ID Interface

1.1.1.1 146 0x80000003 4 Gi0/0

1.1.1.1 695 0x80000005 5 Gi0/1

2.2.2.2 695 0x80000005 4 Gi0/1

Intra Area Prefix Link States (Area 51)

ADV Router Age Seq# Link ID Ref-lstype Ref-LSID

1.1.1.1 146 0x80000009 0 0x2001 0

2.2.2.2 660 0x80000001 4096 0x2002 4

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Router 2:

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R2#sh 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

+ - replicated route, % - next hop override

Gateway of last resort is not set

192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.2.0/24 is directly connected, GigabitEthernet0/0

L 192.168.2.2/32 is directly connected, GigabitEthernet0/0

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.3.0/24 is directly connected, GigabitEthernet0/1

L 192.168.3.1/32 is directly connected, GigabitEthernet0/1

O 192.168.4.0/24 [110/2] via 192.168.3.2, 00:36:20, GigabitEthernet0/1

O IA 192.168.5.0/24 [110/3] via 192.168.3.2, 00:36:10, GigabitEthernet0/1

R2#sh ipv6 route

IPv6 Routing Table - default - 7 entries

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

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

H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea

IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO

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, l - LISP

C 2001:DB8:B::/64 [0/0]

via GigabitEthernet0/0, directly connected

L 2001:DB8:B::2/128 [0/0]

via GigabitEthernet0/0, receive

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

via GigabitEthernet0/1, directly connected

L 2001:DB8:C::1/128 [0/0]

via GigabitEthernet0/1, receive

O 2001:DB8:D::/64 [110/2]

via FE80::3, GigabitEthernet0/1

OI 2001:DB8:E::/64 [110/3]

via FE80::3, GigabitEthernet0/1

L FF00::/8 [0/0]

via Null0, receive

R2#show ospf neighbor

R2#show ospf database

OSPFv3 1 address-family ipv6 (router-id 2.2.2.2)

Router Link States (Area 0)

ADV Router Age Seq# Fragment ID Link count Bits

2.2.2.2 823 0x80000006 0 1 B

3.3.3.3 643 0x80000003 0 2 None

4.4.4.4 643 0x80000002 0 1 B

Net Link States (Area 0)

ADV Router Age Seq# Link ID Rtr count

3.3.3.3 824 0x80000001 5 2

4.4.4.4 644 0x80000001 5 2

Inter Area Prefix Link States (Area 0)

ADV Router Age Seq# Prefix

2.2.2.2 851 0x80000001 2001:DB8:B::/64

2.2.2.2 819 0x80000001 2001:DB8:A::/64

2.2.2.2 302 0x80000001 2001:DB8:ACAD:B::/64

4.4.4.4 685 0x80000001 2001:DB8:ACAD:A::/64

4.4.4.4 685 0x80000001 2001:DB8:E::/64

Link (Type-8) Link States (Area 0)

ADV Router Age Seq# Link ID Interface

2.2.2.2 859 0x80000005 5 Gi0/1

3.3.3.3 859 0x80000005 5 Gi0/1

Intra Area Prefix Link States (Area 0)

ADV Router Age Seq# Link ID Ref-lstype Ref-LSID

3.3.3.3 824 0x80000001 5120 0x2002 5

4.4.4.4 644 0x80000001 5120 0x2002 5

Router Link States (Area 51)

ADV Router Age Seq# Fragment ID Link count Bits

1.1.1.1 822 0x80000002 0 1 None

2.2.2.2 820 0x80000007 0 1 B

Net Link States (Area 51)

ADV Router Age Seq# Link ID Rtr count

2.2.2.2 820 0x80000001 4 2

Inter Area Prefix Link States (Area 51)

ADV Router Age Seq# Prefix

2.2.2.2 851 0x80000001 2001:DB8:C::/64

2.2.2.2 673 0x80000001 2001:DB8:D::/64

2.2.2.2 628 0x80000001 2001:DB8:E::/64

2.2.2.2 319 0x80000001 2001:DB8:ACAD:A::/64

Link (Type-8) Link States (Area 51)

ADV Router Age Seq# Link ID Interface

1.1.1.1 857 0x80000005 5 Gi0/0

2.2.2.2 856 0x80000005 4 Gi0/0

Intra Area Prefix Link States (Area 51)

ADV Router Age Seq# Link ID Ref-lstype Ref-LSID

1.1.1.1 308 0x80000009 0 0x2001 0

2.2.2.2 820 0x80000001 4096 0x2002 4

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Router 3:

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R3#sh 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

+ - replicated route, % - next hop override

Gateway of last resort is not set

O IA 192.168.2.0/24 [110/2] via 192.168.3.1, 00:39:59, GigabitEthernet0/1

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.3.0/24 is directly connected, GigabitEthernet0/1

L 192.168.3.2/32 is directly connected, GigabitEthernet0/1

192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.4.0/24 is directly connected, GigabitEthernet0/0

L 192.168.4.1/32 is directly connected, GigabitEthernet0/0

O IA 192.168.5.0/24 [110/2] via 192.168.4.2, 00:38:21, GigabitEthernet0/0

R3#sh ipv6 route

IPv6 Routing Table - default - 7 entries

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

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

H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea

IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO

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, l - LISP

OI 2001:DB8:B::/64 [110/2]

via FE80::2, GigabitEthernet0/1

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

via GigabitEthernet0/1, directly connected

L 2001:DB8:C::2/128 [0/0]

via GigabitEthernet0/1, receive

C 2001:DB8:D::/64 [0/0]

via GigabitEthernet0/0, directly connected

L 2001:DB8:D::1/128 [0/0]

via GigabitEthernet0/0, receive

OI 2001:DB8:E::/64 [110/2]

via FE80::4, GigabitEthernet0/0

L FF00::/8 [0/0]

via Null0, receive

R3#show ospf database

OSPFv3 1 address-family ipv6 (router-id 3.3.3.3)

Router Link States (Area 0)

ADV Router Age Seq# Fragment ID Link count Bits

2.2.2.2 940 0x80000006 0 1 B

3.3.3.3 758 0x80000003 0 2 None

4.4.4.4 759 0x80000002 0 1 B

Net Link States (Area 0)

ADV Router Age Seq# Link ID Rtr count

3.3.3.3 939 0x80000001 5 2

4.4.4.4 759 0x80000001 5 2

Inter Area Prefix Link States (Area 0)

ADV Router Age Seq# Prefix

2.2.2.2 967 0x80000001 2001:DB8:B::/64

2.2.2.2 935 0x80000001 2001:DB8:A::/64

2.2.2.2 419 0x80000001 2001:DB8:ACAD:B::/64

4.4.4.4 799 0x80000001 2001:DB8:ACAD:A::/64

4.4.4.4 799 0x80000001 2001:DB8:E::/64

Link (Type-8) Link States (Area 0)

ADV Router Age Seq# Link ID Interface

2.2.2.2 975 0x80000005 5 Gi0/1

3.3.3.3 974 0x80000005 5 Gi0/1

3.3.3.3 793 0x80000002 4 Gi0/0

4.4.4.4 793 0x80000002 5 Gi0/0

Intra Area Prefix Link States (Area 0)

ADV Router Age Seq# Link ID Ref-lstype Ref-LSID

3.3.3.3 939 0x80000001 5120 0x2002 5

4.4.4.4 759 0x80000001 5120 0x2002 5

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Router 4:

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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

+ - replicated route, % - next hop override

Gateway of last resort is not set

O IA 192.168.2.0/24 [110/3] via 192.168.4.1, 00:38:55, GigabitEthernet0/1

O 192.168.3.0/24 [110/2] via 192.168.4.1, 00:38:55, GigabitEthernet0/1

192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.4.0/24 is directly connected, GigabitEthernet0/1

L 192.168.4.2/32 is directly connected, GigabitEthernet0/1

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.5.0/24 is directly connected, GigabitEthernet0/0

L 192.168.5.1/32 is directly connected, GigabitEthernet0/0

R4#show ipv6 route

IPv6 Routing Table - default - 7 entries

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

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

H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea

IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO

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, l - LISP

OI 2001:DB8:B::/64 [110/3]

via FE80::3, GigabitEthernet0/1

O 2001:DB8:C::/64 [110/2]

via FE80::3, GigabitEthernet0/1

C 2001:DB8:D::/64 [0/0]

via GigabitEthernet0/1, directly connected

L 2001:DB8:D::2/128 [0/0]

via GigabitEthernet0/1, receive

C 2001:DB8:E::/64 [0/0]

via GigabitEthernet0/0, directly connected

L 2001:DB8:E::1/128 [0/0]

via GigabitEthernet0/0, receive

L FF00::/8 [0/0]

via Null0, receive

R4#sh ospf database

OSPFv3 1 address-family ipv6 (router-id 4.4.4.4)

Router Link States (Area 0)

ADV Router Age Seq# Fragment ID Link count Bits

2.2.2.2 989 0x80000006 0 1 B

3.3.3.3 808 0x80000003 0 2 None

4.4.4.4 807 0x80000002 0 1 B

Net Link States (Area 0)

ADV Router Age Seq# Link ID Rtr count

3.3.3.3 988 0x80000001 5 2

4.4.4.4 807 0x80000001 5 2

Inter Area Prefix Link States (Area 0)

ADV Router Age Seq# Prefix

2.2.2.2 1017 0x80000001 2001:DB8:B::/64

2.2.2.2 985 0x80000001 2001:DB8:A::/64

2.2.2.2 469 0x80000001 2001:DB8:ACAD:B::/64

4.4.4.4 847 0x80000001 2001:DB8:ACAD:A::/64

4.4.4.4 847 0x80000001 2001:DB8:E::/64

Link (Type-8) Link States (Area 0)

ADV Router Age Seq# Link ID Interface

3.3.3.3 843 0x80000002 4 Gi0/1

4.4.4.4 842 0x80000002 5 Gi0/1

Intra Area Prefix Link States (Area 0)

ADV Router Age Seq# Link ID Ref-lstype Ref-LSID

3.3.3.3 988 0x80000001 5120 0x2002 5

4.4.4.4 807 0x80000001 5120 0x2002 5

Router Link States (Area 17)

ADV Router Age Seq# Fragment ID Link count Bits

4.4.4.4 847 0x80000003 0 1 B

5.5.5.5 1383 0x80000002 0 1 None

Net Link States (Area 17)

ADV Router Age Seq# Link ID Rtr count

5.5.5.5 1383 0x80000001 5 2

Inter Area Prefix Link States (Area 17)

ADV Router Age Seq# Prefix

4.4.4.4 837 0x80000001 2001:DB8:D::/64

4.4.4.4 802 0x80000001 2001:DB8:C::/64

4.4.4.4 802 0x80000001 2001:DB8:A::/64

4.4.4.4 802 0x80000001 2001:DB8:B::/64

4.4.4.4 467 0x80000001 2001:DB8:ACAD:B::/64

Link (Type-8) Link States (Area 17)

ADV Router Age Seq# Link ID Interface

4.4.4.4 1417 0x80000002 4 Gi0/0

5.5.5.5 1417 0x80000002 5 Gi0/0

Intra Area Prefix Link States (Area 17)

ADV Router Age Seq# Link ID Ref-lstype Ref-LSID

5.5.5.5 880 0x80000001 0 0x2001 0

5.5.5.5 1383 0x80000001 5120 0x2002 5

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Router 5:

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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

+ - replicated route, % - next hop override

Gateway of last resort is not set

O IA 192.168.2.0/24 [110/4] via 192.168.5.1, 00:33:47, GigabitEthernet0/1

O IA 192.168.3.0/24 [110/3] via 192.168.5.1, 00:33:47, GigabitEthernet0/1

O IA 192.168.4.0/24 [110/2] via 192.168.5.1, 00:33:47, GigabitEthernet0/1

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.5.0/24 is directly connected, GigabitEthernet0/1

L 192.168.5.2/32 is directly connected, GigabitEthernet0/1

R5#show ipv6 route

IPv6 Routing Table - default - 6 entries

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

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

H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea

IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO

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, l - LISP

OI 2001:DB8:B::/64 [110/4]

via FE80::4, GigabitEthernet0/1

OI 2001:DB8:C::/64 [110/3]

via FE80::4, GigabitEthernet0/1

OI 2001:DB8:D::/64 [110/2]

via FE80::4, GigabitEthernet0/1

C 2001:DB8:E::/64 [0/0]

via GigabitEthernet0/1, directly connected

L 2001:DB8:E::2/128 [0/0]

via GigabitEthernet0/1, receive

L FF00::/8 [0/0]

via Null0, receive

R5#sh ospf database

OSPFv3 1 address-family ipv6 (router-id 5.5.5.5)

Router Link States (Area 17)

ADV Router Age Seq# Fragment ID Link count Bits

4.4.4.4 897 0x80000003 0 1 B

5.5.5.5 1431 0x80000002 0 1 None

Net Link States (Area 17)

ADV Router Age Seq# Link ID Rtr count

5.5.5.5 1431 0x80000001 5 2

Inter Area Prefix Link States (Area 17)

ADV Router Age Seq# Prefix

4.4.4.4 888 0x80000001 2001:DB8:D::/64

4.4.4.4 853 0x80000001 2001:DB8:C::/64

4.4.4.4 853 0x80000001 2001:DB8:A::/64

4.4.4.4 853 0x80000001 2001:DB8:B::/64

4.4.4.4 517 0x80000001 2001:DB8:ACAD:B::/64

Link (Type-8) Link States (Area 17)

ADV Router Age Seq# Link ID Interface

5.5.5.5 929 0x80000002 4 Gi0/0

4.4.4.4 1468 0x80000002 4 Gi0/1

5.5.5.5 1467 0x80000002 5 Gi0/1

Intra Area Prefix Link States (Area 17)

ADV Router Age Seq# Link ID Ref-lstype Ref-LSID

5.5.5.5 929 0x80000001 0 0x2001 0

5.5.5.5 1431 0x80000001 5120 0x2002 5

Pings and Traceroutes from End Routers:

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PC 1🡪2:

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C:\Users\cisco>ping 192.168.17.2

Pinging 192.168.17.2 with 32 bytes of data:

Reply from 192.168.17.2: bytes=32 time=1ms TTL=123

Reply from 192.168.17.2: bytes=32 time=1ms TTL=123

Reply from 192.168.17.2: bytes=32 time=1ms TTL=123

Reply from 192.168.17.2: bytes=32 time=1ms TTL=123

Ping statistics for 192.168.17.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\cisco>ping 2001:db8:acad:a::2

Pinging 2001:db8:acad:a::2 with 32 bytes of data:

Reply from 2001:db8:acad:a::2: time=1ms

Reply from 2001:db8:acad:a::2: time=1ms

Reply from 2001:db8:acad:a::2: time=1ms

Reply from 2001:db8:acad:a::2: time=1ms

Ping statistics for 2001:db8:acad:a::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\cisco>tracert 192.168.17.2

Tracing route to 192.168.17.2 over a maximum of 30 hops

1 <1 ms <1 ms <1 ms 192.168.51.1

2 <1 ms <1 ms <1 ms 192.168.2.2

3 1 ms <1 ms <1 ms 192.168.3.2

4 1 ms 1 ms 1 ms 192.168.4.2

5 1 ms 1 ms 1 ms 192.168.5.2

6 1 ms 1 ms 1 ms 192.168.17.2

Trace complete.

C:\Users\cisco>tracert 2001:db8:acad:a::2

Tracing route to 2001:db8:acad:a::2 over a maximum of 30 hops

1 <1 ms <1 ms <1 ms 2001:db8:acad:b::1

2 <1 ms <1 ms <1 ms 2001:db8:b::2

3 1 ms <1 ms <1 ms 2001:db8:c::2

4 1 ms 1 ms 1 ms 2001:db8:d::2

5 1 ms 1 ms 1 ms 2001:db8:e::2

6 1 ms 1 ms 1 ms 2001:db8:acad:a::2

Trace complete.

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PC 2🡪1:

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C:\Users\cisco>ping 2001:db8:ACAD:B::2

Pinging 2001:db8:acad:b::2 with 32 bytes of data:

Reply from 2001:db8:acad:b::2: time=1ms

Reply from 2001:db8:acad:b::2: time=1ms

Reply from 2001:db8:acad:b::2: time=1ms

Reply from 2001:db8:acad:b::2: time=1ms

Ping statistics for 2001:db8:acad:b::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\cisco>ping 192.168.51.2

Pinging 192.168.51.2 with 32 bytes of data:

Reply from 192.168.51.2: bytes=32 time=1ms TTL=123

Reply from 192.168.51.2: bytes=32 time=1ms TTL=123

Reply from 192.168.51.2: bytes=32 time=1ms TTL=123

Reply from 192.168.51.2: bytes=32 time=1ms TTL=123

Ping statistics for 192.168.51.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\cisco>tracert 192.168.51.2

Tracing route to 192.168.51.2 over a maximum of 30 hops

1 <1 ms <1 ms <1 ms 192.168.17.1

2 <1 ms <1 ms <1 ms 192.168.5.1

3 1 ms <1 ms <1 ms 192.168.4.1

4 1 ms 1 ms 1 ms 192.168.3.1

5 1 ms 1 ms 1 ms 192.168.2.1

6 1 ms 1 ms 1 ms 192.168.51.2

Trace complete.

C:\Users\cisco>tracert 2001:db8:acad:b::2

Tracing route to 2001:db8:acad:b::2 over a maximum of 30 hops

1 <1 ms <1 ms <1 ms 2001:db8:acad:a::1

2 <1 ms <1 ms <1 ms 2001:db8:e::1

3 1 ms <1 ms <1 ms 2001:db8:d::1

4 1 ms 1 ms 1 ms 2001:db8:c::1

5 1 ms 1 ms 1 ms 2001:db8:b::1

6 1 ms 1 ms 1 ms 2001:db8:acad:b::2

Trace complete.