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Single-Topology IS-IS

« IS-IS Route Leaking (/workbook/view/service-provider-v4/task/is-is-route-leaking-Mjg0Mw%3D%3D) | Multi-Topology IS-IS (/workbook/view/service-provider-v4/task/multi-topology-is-is-Mjg0NQ%3D%3D) »

Last updated: April 23, 2016

Note:

Initial Configuration & Diagrams: Load the initial configuration files for the section named **Base IPv4 and IPv6**, which can be found in CCIE SPv4 Topology Diagrams & Initial Configurations (http://labs.ine.com/workbook/view/service-provider-v4/task/ccie-spv4-topology-diagrams-initial-configs). Refer to the **Base IPv4 and IPv6 Diagram** in order to complete this task.

Task

- Using the Base IPv4 and IPv6 diagram, configure IS-IS Level 2 on all interfaces of all devices.
- Use NET addresses in the format 49.0001.0000.0000.000Y.00, where *Y* is the router number.
- Advertise both the IPv4 and IPv6 addresses of all links using single topology IS-IS.
- Advertise the Loopback interfaces of the routers using the **passive-interface** or **passive** command.
- Once complete, all devices should have both IPv4 and IPv6 connectivity to each other.

Configuration **Click to *collapse***

```
R1:
interface GigabitEthernet1.12
 ip router isis
 ipv6 router isis
!
router isis
 net 49.0001.0000.0000.0001.00
 is-type level-2-only
 passive-interface Loopback0

R2:
interface GigabitEthernet1.23
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.24
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.12
 ip router isis
 ipv6 router isis
!
router isis
 net 49.0001.0000.0000.0002.00
 is-type level-2-only
 passive-interface Loopback0

R3:
interface GigabitEthernet1.23
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.34
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.36
 ip router isis
 ipv6 router isis
!
router isis
 net 49.0001.0000.0000.0003.00
 is-type level-2-only
 passive-interface Loopback0

R4:
interface GigabitEthernet1.24
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.34
 ip router isis
```

```
 ipv6 router isis
!
interface GigabitEthernet1.45
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.46
 ip router isis
 ipv6 router isis
!
router isis
 net 49.0001.0000.0000.0004.00
 is-type level-2-only
 passive-interface Loopback0

R5:
interface GigabitEthernet1.45
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.56
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.519
 ip router isis
 ipv6 router isis
!
router isis
 net 49.0001.0000.0000.0005.00
 is-type level-2-only
 passive-interface Loopback0

R6:
interface GigabitEthernet1.36
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.46
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.56
 ip router isis
 ipv6 router isis
!
interface GigabitEthernet1.619
 ip router isis
 ipv6 router isis
!
router isis
 net 49.0001.0000.0000.0006.00
 is-type level-2-only
 passive-interface Loopback0
```

```
XR1:
router isis 1
 is-type level-2-only
 net 49.0001.0000.0000.0019.00
 address-family ipv6 unicast
  single-topology
 !
 interface Loopback0
  passive
  address-family ipv6 unicast
  address-family ipv6 unicast
  !
 !
 interface GigabitEthernet0/0/0/0.519
  address-family ipv4 unicast
  address-family ipv6 unicast
  !
!
interface GigabitEthernet0/0/0/0.619
  address-family ipv4 unicast
  address-family ipv6 unicast
 !
!
interface GigabitEthernet0/0/0/0.1920
  address-family ipv4 unicast
  address-family ipv6 unicast
  !
 !
!

XR2:
router isis 1
 is-type level-2-only
 net 49.0001.0000.0000.0020.00
 address-family ipv6 unicast
  single-topology
 !
 interface Loopback0
  passive
  address-family ipv4 unicast
  address-family ipv6 unicast
 !
!
interface GigabitEthernet0/0/0/0.1920
  address-family ipv4 unicast
  address-family ipv6 unicast
  !
 !
!
```

Single Topology IS-IS is used when multiple protocol stacks, such as IPv4 and IPv6, are configured in an identical 1:1 basis on all interfaces in the topology. Since the multi-protocol topology is essentially identical, it allows a single SPF calculation to apply to both protocol stacks at the same time, simplifying the database calculation and protocol overhead of IS-IS. In other words, for single topology IS-IS to work, each interface that runs IPv4 must also run IPv6, and each interface that runs IPv6 must also run IPv4. This is one of the design advantages of IS-IS over OSPFv2, as OSPFv2 and OSPFv3 are unrelated protocols used to route IPv4 and IPv6 respectively, while IS-IS can route both with a single calculation, arguably resulting in a more efficient design. Note however that there is a newer version of OSPFv3 which is Multi-Address Family aware, and can route IPv4 and IPv6 under the same instance.

By default, IS-IS instances in regular IOS run in Single Topology mode, while IOS XR IS-IS instances run in Multi Topology mode. These modes are not compatible with each other and must be configured to match, or to run in transition mode. In this example Single Topology is run on all devices since the IPv4 and IPv6 topology is on a 1:1 basis.

From an operational point of view as seen below, IS-IS still maintains a single adjacency between devices even though it is routing both IPv4 and IPv6, as opposed to OSPF which would require a separate OSPFv2 and OSPFv3 adjacency to accomplish the same design. Even the Multi-AF version of OSPFv3 requires separate adjacencies per address family.

```
R6#show isis neighbors


System Id      Type Interface   IP Address      State Holdtime Circuit Id
R3             L2   Gi1.36      20.3.6.3        UP    9        R3.03
R4             L2   Gi1.46      20.4.6.4        UP    21       R6.02
R5             L2   Gi1.56      20.5.6.5        UP    24       R6.03
XR1            L2   Gi1.619     20.6.19.19      UP    24       R6.04




RP/0/0/CPU0:XR1#show isis adjacency
Wed Apr 29 22:34:57.021 UTC

IS-IS 1 Level-2 adjacencies:
System Id      Interface        SNPA           State Hold Changed  NSF IPv4 IPv6
                                                                    BFD  BFD
R6             Gi0/0/0/0.619    0050.569e.5cec Up    7    00:06:38 Yes None None
R5             Gi0/0/0/0.519    0050.569e.0962 Up    23   00:03:14 Yes None None
XR2            Gi0/0/0/0.1920   0050.569e.27ac Up    25   00:06:30 Yes None None


Total adjacency count: 3
```

From the surface the database structure looks identical to normal IPv4 only IS-IS, i.e. Integrated IS-IS.

```
R6#show isis database

IS-IS Level-2 Link State Database:
LSPID                 LSP Seq Num  LSP Checksum  LSP Holdtime      ATT/P/OL
R1.00-00              0x00000003   0x21E6        561               0/0/0
R1.01-00              0x00000001   0x21B9        562               0/0/0
R2.00-00              0x00000005   0x8997        577               0/0/0
R2.02-00              0x00000001   0x5283        578               0/0/0
R3.00-00              0x00000005   0x3FA2        745               0/0/0
R3.01-00              0x00000001   0x2DA9        573               0/0/0
R3.02-00              0x00000001   0x587B        580               0/0/0
R3.03-00              0x00000001   0x834D        746               0/0/0
R4.00-00              0x00000EAF   0x2776        963               0/0/0
R4.03-00              0x00000001   0x705F        964               0/0/0
R5.00-00              0x00000005   0xB7B2        987               0/0/0
R6.00-00            * 0x00000006   0x995A        989               0/0/0
R6.02-00            * 0x00000001   0x6A63        748               0/0/0
R6.03-00            * 0x00000002   0x7A50        986               0/0/0
R6.04-00            * 0x00000001   0x6B4B        763               0/0/0
XR1.00-00             0x00000005   0x9052        813               0/0/0
XR1.01-00             0x00000001   0xA2E9        768               0/0/0
XR1.05-00             0x00000003   0xDCC4        982               0/0/0
XR2.00-00             0x00000004   0x50B7        820               0/0/0

RP/0/0/CPU0:XR1#show isis database
Wed Apr 29 22:36:01.976 UTC

IS-IS 1 (Level-2) Link State Database
LSPID                 LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
R1.00-00              0x00000003   0x21e6        575             0/0/0
R1.01-00              0x00000001   0x21b9        576             0/0/0
R2.00-00              0x00000005   0x8997        591             0/0/0
R2.02-00              0x00000001   0x5283        592             0/0/0
R3.00-00              0x00000005   0x3fa2        758             0/0/0
R3.01-00              0x00000001   0x2da9        587             0/0/0
R3.02-00              0x00000001   0x587b        594             0/0/0
R3.03-00              0x00000001   0x834d        759             0/0/0
R4.00-00              0x00000eaf   0x2776        937             0/0/0
R4.03-00              0x00000001   0x705f        938             0/0/0
R5.00-00              0x00000005   0xb7b2        964             0/0/0
R6.00-00              0x00000006   0x995a        962             0/0/0
R6.02-00              0x00000001   0x6a63        761             0/0/0
R6.03-00              0x00000002   0x7a50        960             0/0/0
R6.04-00              0x00000001   0x6b4b        787             0/0/0
XR1.00-00           * 0x00000005   0x9052        790             0/0/0
XR1.01-00             0x00000001   0xa2e9        788             0/0/0
XR1.05-00             0x00000003   0xdcc4        959             0/0/0
XR2.00-00             0x00000004   0x50b7        796             0/0/0

 Total Level-2 LSP count: 19     Local Level-2 LSP count: 1
```

When we look into the details of the database, the difference becomes evident that both IPv4 and IPv6 attributes are now associated with the link states. Additionally, a new NLPID (Network Layer Protocol ID) is advertised in the Supported Protocols TLV: 0x8E. This protocol ID represents IPv6, 0xCC is for IPv4.

```
R6#show isis database R1.00-00 detail



IS-IS Level-2 LSP R1.00-00
LSPID                 LSP Seq Num  LSP Checksum  LSP Holdtime      ATT/P/OL
R1.00-00              0x00000004   0x1FE7        1184              0/0/0
  Area Address: 49.0001
  NLPID:        0xCC 0x8E
  Hostname: R1
  Metric: 10         IS R1.01
  IP Address:   1.1.1.1
  Metric: 10         IP 10.1.2.0 255.255.255.0
  Metric: 0          IP 1.1.1.1 255.255.255.255
  IPv6 Address: 2001::1:1:1:1
  Metric: 10         IPv6 2001:10:1:2::/64
  Metric: 0          IPv6 2001::1:1:1:1/128



RP/0/0/CPU0:XR1#show isis database R1.00-00 detail
Wed Apr 29 22:36:32.884 UTC

IS-IS 1 (Level-2) Link State Database
LSPID                 LSP Seq Num  LSP Checksum  LSP Holdtime  ATT/P/OL
R1.00-00              0x00000003   0x21e6        544             0/0/0
  Area Address: 49.0001
  NLPID:        0xcc
  NLPID:        0x8e
  Hostname:     R1
  Metric: 10         IS R1.01
  IP Address:   1.1.1.1
  Metric: 10         IP 10.1.2.0/24
  Metric: 0          IP 1.1.1.1/32
  IPv6 Address: 2001::1:1:1:1
  Metric: 10         IPv6 2001:10:1:2::/64
  Metric: 0          IPv6 2001::1:1:1:1/128
```

From the routing table and forwarding plane's point of view, the result is the same as if the IPv4 and IPv6 FIBs had been populated by two separate protocols.

```
R1#show ip route isis
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

Gateway of last resort is not set

      2.0.0.0/32 is subnetted, 1 subnets
i L2     2.2.2.2 [115/10] via 10.1.2.2, 00:17:53, GigabitEthernet1.12
      3.0.0.0/32 is subnetted, 1 subnets
i L2     3.3.3.3 [115/20] via 10.1.2.2, 00:17:43, GigabitEthernet1.12
      4.0.0.0/32 is subnetted, 1 subnets
i L2     4.4.4.4 [115/20] via 10.1.2.2, 00:17:43, GigabitEthernet1.12
      5.0.0.0/32 is subnetted, 1 subnets
i L2     5.5.5.5 [115/30] via 10.1.2.2, 00:11:17, GigabitEthernet1.12
      6.0.0.0/32 is subnetted, 1 subnets
i L2     6.6.6.6 [115/30] via 10.1.2.2, 00:14:55, GigabitEthernet1.12
      10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
i L2     10.19.20.0/24 [115/50] via 10.1.2.2, 00:14:38, GigabitEthernet1.12
      20.0.0.0/8 is variably subnetted, 10 subnets, 2 masks
i L2     20.2.3.0/24 [115/20] via 10.1.2.2, 00:17:53, GigabitEthernet1.12
i L2     20.2.4.0/24 [115/20] via 10.1.2.2, 00:17:53, GigabitEthernet1.12
i L2     20.3.4.0/24 [115/30] via 10.1.2.2, 00:17:43, GigabitEthernet1.12
i L2     20.3.6.0/24 [115/30] via 10.1.2.2, 00:17:43, GigabitEthernet1.12
i L2     20.4.5.0/24 [115/30] via 10.1.2.2, 00:17:43, GigabitEthernet1.12
i L2     20.4.6.0/24 [115/30] via 10.1.2.2, 00:17:43, GigabitEthernet1.12
i L2     20.5.6.0/24 [115/40] via 10.1.2.2, 00:11:17, GigabitEthernet1.12
i L2     20.5.19.0/24 [115/40] via 10.1.2.2, 00:11:17, GigabitEthernet1.12
i L2     20.6.19.0/24 [115/40] via 10.1.2.2, 00:14:55, GigabitEthernet1.12
i L2     20.20.20.20/32 [115/50] via 10.1.2.2, 00:13:48, GigabitEthernet1.12



R1#show ipv6 route isis
IPv6 Routing Table - default - 22 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
       la - LISP alt, lr - LISP site-registrations, ld - LISP dyn-eid
       a - Application
I2  2001::2:2:2:2/128 [115/10]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001::3:3:3:3/128 [115/20]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001::4:4:4:4/128 [115/20]
```

```
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001::5:5:5:5/128 [115/30]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001::6:6:6:6/128 [115/30]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001::19:19:19:19/128 [115/40]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001::20:20:20:20/128 [115/50]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:10:19:20::/64 [115/50]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:2:3::/64 [115/20]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:2:4::/64 [115/30]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:3:4::/64 [115/30]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:3:6::/64 [115/30]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:4:2::/64 [115/20]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:4:5::/64 [115/30]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:4:6::/64 [115/30]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:5:6::/64 [115/40]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:5:19::/64 [115/40]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12
I2  2001:20:6:19::/64 [115/40]
     via FE80::250:56FF:FE9E:35D1, GigabitEthernet1.12



RP/0/3/CPU0:XR2#show route ipv4 isis
Wed Apr 29 22:44:05.553 UTC

i L2 1.1.1.1/32 [115/40] via 20.6.19.6, 00:12:17, GigabitEthernet0/0/0/0.619
                [115/40] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 2.2.2.2/32 [115/30] via 20.6.19.6, 00:12:17, GigabitEthernet0/0/0/0.619
                [115/30] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 3.3.3.3/32 [115/20] via 20.6.19.6, 00:14:55, GigabitEthernet0/0/0/0.619
i L2 4.4.4.4/32 [115/20] via 20.6.19.6, 00:12:17, GigabitEthernet0/0/0/0.619
                [115/20] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 5.5.5.5/32 [115/10] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 6.6.6.6/32 [115/10] via 20.6.19.6, 00:14:55, GigabitEthernet0/0/0/0.619
i L2 10.1.2.0/24 [115/40] via 20.6.19.6, 00:12:17, GigabitEthernet0/0/0/0.619
                 [115/40] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 20.2.3.0/24 [115/30] via 20.6.19.6, 00:14:55, GigabitEthernet0/0/0/0.619
i L2 20.2.4.0/24 [115/30] via 20.6.19.6, 00:12:17, GigabitEthernet0/0/0/0.619
                 [115/30] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 20.3.4.0/24 [115/30] via 20.6.19.6, 00:12:17, GigabitEthernet0/0/0/0.619
                 [115/30] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 20.3.6.0/24 [115/20] via 20.6.19.6, 00:14:55, GigabitEthernet0/0/0/0.619
i L2 20.4.5.0/24 [115/20] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
```

```
i L2 20.4.6.0/24 [115/20] via 20.6.19.6, 00:14:55, GigabitEthernet0/0/0/0.619
i L2 20.5.6.0/24 [115/20] via 20.6.19.6, 00:12:17, GigabitEthernet0/0/0/0.619
                 [115/20] via 20.5.19.5, 00:12:17, GigabitEthernet0/0/0/0.519
i L2 20.20.20.20/32 [115/10] via 10.19.20.20, 00:14:55, GigabitEthernet0/0/0/0.1920


RP/0/3/CPU0:XR2#show route ipv6 isis
Wed Apr 29 22:44:10.183 UTC


i L2 2001::1:1:1:1/128
     [115/40] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
     [115/40] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001::2:2:2:2/128
     [115/30] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
     [115/30] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001::3:3:3:3/128
     [115/20] via fe80::250:56ff:fe9e:5cec, 00:14:59, GigabitEthernet0/0/0/0.619
i L2 2001::4:4:4:4/128
     [115/20] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
     [115/20] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001::5:5:5:5/128
     [115/10] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001::6:6:6:6/128
     [115/10] via fe80::250:56ff:fe9e:5cec, 00:14:59, GigabitEthernet0/0/0/0.619
i L2 2001::20:20:20:20/128
     [115/10] via fe80::250:56ff:fe9e:27ac, 00:14:59, GigabitEthernet0/0/0/0.1920
i L2 2001:10:1:2::/64
     [115/40] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
     [115/40] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001:20:2:3::/64
     [115/30] via fe80::250:56ff:fe9e:5cec, 00:14:59, GigabitEthernet0/0/0/0.619
i L2 2001:20:2:4::/64
     [115/30] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
     [115/30] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001:20:3:4::/64
     [115/30] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
     [115/30] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001:20:3:6::/64
     [115/20] via fe80::250:56ff:fe9e:5cec, 00:14:59, GigabitEthernet0/0/0/0.619
i L2 2001:20:4:2::/64
     [115/40] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
     [115/40] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001:20:4:5::/64
     [115/20] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
i L2 2001:20:4:6::/64
  [115/20] via fe80::250:56ff:fe9e:5cec, 00:14:59, GigabitEthernet0/0/0/0.619
i L2 2001:20:5:6::/64
  [115/20] via fe80::250:56ff:fe9e:5cec, 00:12:21, GigabitEthernet0/0/0/0.619
  [115/20] via fe80::250:56ff:fe9e:962, 00:12:21, GigabitEthernet0/0/0/0.519
```

The final result is that all devices should have full IPv4 and IPv6 reachability to each other.

```
R1#ping 20.20.20.20
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 20.20.20.20, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/5/11 ms

R1#ping 2001::20:20:20:20
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001::20:20:20:20, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 15/19/32 ms

RP/0/0/CPU0:XR2#ping 1.1.1.1
Wed Apr 29 22:45:50.866 UTC
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/9 ms

RP/0/0/CPU0:XR2#ping 2001::1:1:1:1
Wed Apr 29 22:45:59.166 UTC
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001::1:1:1:1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 19/19/19 ms
```

Note that IPv4 and IPv6 traffic must follow the same path throughout the network now, as the Shortest Path Tree for each of them are the same.

```
R1#traceroute 20.20.20.20
Type escape sequence to abort.
Tracing the route to 20.20.20.20
VRF info: (vrf in name/id, vrf out name/id)
  1 10.1.2.2 1 msec 2 msec 1 msec
  2 20.2.3.3 1 msec 1 msec 6 msec
  3 20.3.6.6 2 msec 1 msec 1 msec
  4 20.6.19.19 9 msec 12 msec 13 msec
  5 10.19.20.20 13 msec *  3 msec

R1#traceroute 2001::20:20:20:20
Type escape sequence to abort.
Tracing the route to 2001::20:20:20:20

  1 2001:10:1:2::2 3 msec 2 msec 1 msec
  2 2001:20:2:3::3 2 msec 1 msec 6 msec
  3 2001:20:3:6::6 4 msec 15 msec 14 msec
  4 2001:20:6:19::19 17 msec 12 msec 22 msec
  5 2001::20:20:20:20 28 msec 20 msec 20 msec
```

« IS-IS Route Leaking (/workbook/view/service-provider-v4/task/is-is-route-leaking-Mjg0Mw%3D%3D) | Multi-Topology IS-IS (/workbook/view/service-provider-v4/task/multi-topology-is-is-Mjg0NQ%3D%3D) »