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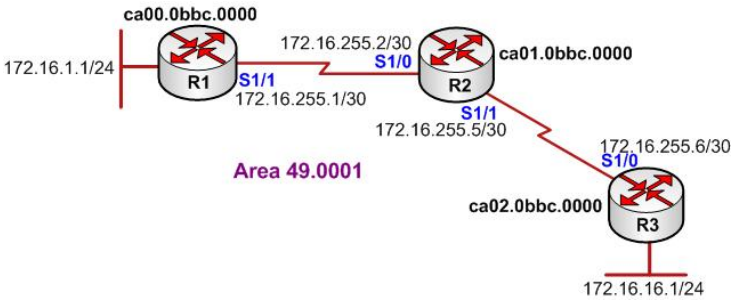
IS-IS Lab1 - Configuring Basic IS-IS

?Lab Objectives?

1. To master the basic IS-IS routing protocol configuration.
2. To understand the type of L1 routing.
3. To master the configuration methods for changing router types.

?Lab Topology?



?Lab Steps?

1. Configure the router's IP address, and use the command Ping to confirm the connect's interoperability of each router.
2. Enable the IS-IS Routing Protocol on R1, R2 and R3, the configuration is shown as below:

```
R1(config)#router isis   cisco
R1(config-router)#net 49.0001.ca00.0bbc.0000.00
R1(config-router)#exit
R1(config)#
R1(config)#interface   loopback 0
R1(config-if)#ip router isis   cisco
R1(config-if)#exit
R1(config)#interface   serial 1/1
R1(config-if)#ip   router isis cisco
R1(config-if)#exit
```

```
R2(config)#router isis cisco
R2(config-router)#net   49.0001.ca01.0bbc.0000.00
R2(config-router)#exit
R2(config)#interface   serial 1/0
R2(config-if)#ip   router isis cisco
```

```
R2(config-if)#exit
R2(config)#interface   serial 1/1
R2(config-if)#ip   router isis cisco
R2(config-if)#exit
```

```
R3(config)#router isis cisco
R3(config-router)#net   49.0001.ca02.0bbc.0000.00
R3(config-router)#exit
R3(config)#interface   serial 1/0
R3(config-if)#ip   router isis cisco
R3(config-if)#exit
R3(config)#interface   loopback 0
R3(config-if)#ip   router isis cisco
R3(config-if)#exit
```

3. After configuration is completed, to check the routing table of any of the routers:

```
R1#show ip route

Gateway of last resort   is not set

 172.16.0.0/16 is variably subnetted, 4   subnets, 2 masks
C  172.16.255.0/30 is directly connected,   Serial1/1
i L1 172.16.255.4/30 [115/20] via 172.16.255.2, Serial1/1
i L1 172.16.16.0/24 [115/30] via 172.16.255.2, Serial1/1
C 172.16.1.0/24 is directly connected,   Loopback0
```

4. Use command ping to confirm the route:

```
R1#ping 172.16.16.1
```

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.16.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 116/152/192 ms

5. Check ISIS neighbor table of router R2

R2#show isis neighbors
System Id Type Interface IP Address State Holdtime Circuit Id
R3 L1L2 Se1/1 172.16.255.6 UP 27 00
R1 L1L2 Se1/0 172.16.255.1 UP 28 00
R2#
R2#show clns neighbors
System Id Interface SNPA State Holdtime Type Protocol
R3 Se1/1 *HDLC* Up 25 L1L2 IS-IS
R1 Se1/0 *HDLC* Up 29 L1L2 IS-IS

6. Check the host name and system ID

R1#show isis hostname
Level System ID Dynamic Hostname (cisco)
1 CA01.0BBC.0000 R2
* CA00.0BBC.0000 R1
1 CA02.0BBC.0000 R3

7. Check IS-IS link state database, as the default, CISCO router is the router of L1 as well as L2.Each router will be set up adjacent relationship of L1 type and as well as L2. It is for this reason that each route will be displayed link state database of type L1 and type L2 at the same time.

R1#show isis database

```
IS-IS Level-1 Link State   Database:
LSPID LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
01CA.000B.BC00.00-00 0x00000001 0x6107 0 (1083) 0/0/0
R1.00-00 * 0x00000005 0xDC1C 897 0/0/0
R2.00-00 0x00000005 0x21A8  787 0/0/0
R3.00-00 0x00000004 0xE2F0 717 0/0/0
IS-IS Level-2 Link State   Database:
LSPID LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
01CA.000B.BC00.00-00 0x00000001 0x6107  0 (1083) 0/0/0
R1.00-00 * 0x00000007 0xD846 947 0/0/0
R2.00-00 0x00000007 0xF207 802 0/0/0
R3.00-00 0x00000005 0x7796 756 0/0/0
```

8. Check the details of link state database.

```
R1#show isis database detail

IS-IS Level-1 Link State   Database:
LSPID LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
R1.00-00  * 0x00000008 0xD61F 924 0/0/0
 Area Address: 49.0001
 NLPID: 0xCC
 Hostname: R1
 IP Address: 172.16.1.1
 Metric: 10 IP   172.16.255.0 255.255.255.252
 Metric: 10 IP 172.16.1.0 255.255.255.0
 Metric: 10 IS R2.00
R2.00-00 0x00000008 0x1BAB 897  0/0/0
 Area Address: 49.0001
 NLPID: 0xCC
 Hostname: R2
 IP Address: 172.16.255.5
??????
R3.00-00 0x00000008 0x7199 754 0/0/0
 Area Address: 49.0001
 NLPID: 0xCC
 Hostname: R3
 IP Address: 172.16.16.1
 Metric: 10 IS R2.00
 Metric: 20 IP 172.16.255.0 255.255.255.252
 Metric: 10 IP 172.16.255.4 255.255.255.252
 Metric: 10 IP 172.16.16.0 255.255.255.0
 Metric: 30 IP 172.16.1.0 255.255.255.0
```

In the small network, it is acceptable that the router retains their default type configuration of the router. While in a larger network, it will reduce the efficiency of the router by using the default type because it needs to maintain two link state database tables at the same time, and will consume a large amount of memory and CPU resources. Therefore, you can manually designate suitable type to different routers.
In this lab, because there is no more areas exist, so that all the routers can be designated as Level-1 type of router.
To configure the router type manually in the router R1, R2 and R3:

```
R1(config)#router isis cisco
R1(config-router)#is-type level-1
R1(config-router)#exit
R1(config)#exit
```

```
R2(config)#router isis cisco
R2(config-router)#is-type   level-1
R2(config-router)#exit
R2(config)#exit
```

```
R3(config)#router isis cisco
R3(config-router)#is-type   level-1
R3(config-router)#exit
```

10. Check the link state database of R1 again, to confirm the change:

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```
R1#show isis database
IS-IS Level-1 Link State   Database:
LSPID LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
R1.00-00 * 0x0000000A 0xD025 829 0/0/0
R2.00-00 0x0000000B 0x13B2 835 0/0/0
R3.00-00  0x00000009 0xD6F9 834 0/0/0
```

11. Lab completed
Hope to helpful for you!