

Configuring IS–IS over IPv6

Document ID: 40262

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Introduction

This document provides a sample configuration for Intermediate System–to–Intermediate System (IS–IS) over IP version 6 (IPv6). It also discusses how to verify and troubleshoot the configuration.

Prerequisites

Requirements

Before you attempt this configuration, ensure that you meet these requirements:

- A basic understanding of IS–IS. For more information, refer to [Configuring IS–IS for IP on Cisco Routers](#).
- A basic understanding of IPv6. For more information, refer to [IPv6 for Cisco IOS Software](#).

Components Used

The information in this document is based on these software and hardware versions:

- 12.2(13)T with Enterprise feature set
- Cisco 7200 Platform

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Conventions

For more information on document conventions, refer to [Cisco Technical Tips Conventions](#).

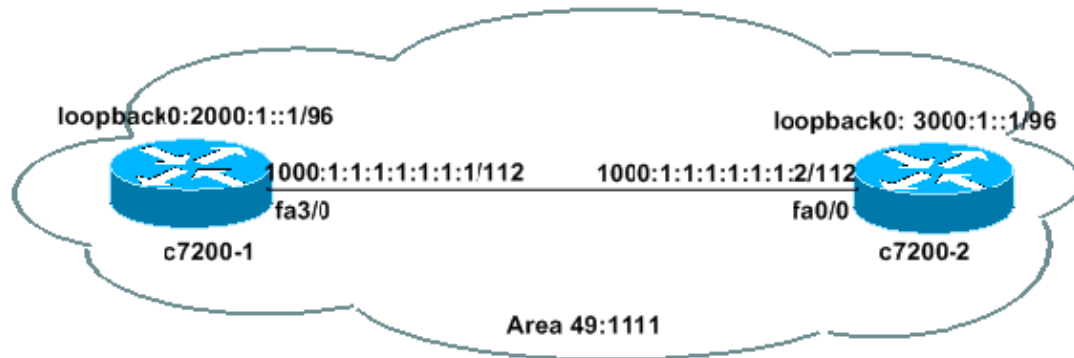
Configure

In this section, you are presented with the information to configure the features described in this document.

Note: To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

Network Diagram

This document uses the network setup shown in the diagram below.



Configurations

This document uses the configurations shown below.

- c7200-1
- c7200-2

c7200-1
<pre>c7200-1# show run ipv6 unicast-routing ! Enable the forwarding of IPv6 unicast datagrams ! interface Loopback0 no ip address ipv6 address 2000:1::1/96 circuit-type level-2-only address-family ipv6 unicast ! !--- If the sole purpose of the loopback is a router ID, !--- a /128 is preferred. !--- A /96 is used here to advertise this route through IS-IS. !--- Last two commands for getting advertised in the LSP ipv6 router isis alpha !--- Enables IS-IS on the interface for area "alpha." ! interface FastEthernet3/0 ip address 172.16.88.51 255.255.255.224 duplex half ipv6 address 1000:1:1:1:1:1:1:1/112</pre>

```

ipv6 router isis alpha
!
router isis alpha

!--- Enables the IS-IS routing process for area "alpha."

net 49.1111.2220.3330.4440.00

!--- Defines the area addresses for the IS-IS area and the system ID
!--- of the router. 49.1111 is the area id SysID is 2220.3330.4440.

!
end

```

c7200-2

```

c7200-2# show run
ipv6 unicast-routing
!
interface Loopback0
no ip address
ipv6 address 3000:1::1/96
ipv6 router isis alpha
!
interface FastEthernet0/0
ip address 172.16.88.50 255.255.255.224
duplex auto
speed auto
ipv6 address 1000:1:1:1:1:1:2/112
ipv6 router isis alpha
!
router isis alpha
net 49.1111.2222.3333.4444.00
!
end

```

Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

- **show clns interface**– Used to list the Connectionless Network Service (CLNS)–specific information about interface

```

c7200-1# show clns int fa3/0
FastEthernet3/0 is up, line protocol is up
  Checksums enabled, MTU 1497, Encapsulation SAP
  ERPDUs enabled, min. interval 10 msec.
  CLNS fast switching enabled
  CLNS SSE switching disabled

DEC compatibility mode OFF for this interface
Next ESH/ISH in 43 seconds
Routing Protocol: IS-IS
  Circuit Type: level-1-2
  Interface number 0x0, local circuit ID 0x1
  Level-1 Metric: 10, Priority: 64, Circuit ID: c7200-1.01
  Number of active level-1 adjacencies: 1
  Level-2 Metric: 10, Priority: 64, Circuit ID: c7200-1.01
  Number of active level-2 adjacencies: 1

```

Next IS-IS LAN Level-1 Hello in 1 seconds
Next IS-IS LAN Level-2 Hello in 1 seconds

- **show clns neighbors** – Used to show the CLNS neighbors state.

```
c7200-1# show clns neighbors
System Id      Interface  SNPA                State  Holdtime  Type Protocol
c7200-2        Fa3/0     0004.281e.e008      Up     25        L1L2 IS-IS
```

- **show ipv6 route** – Used to verify if a route exists on the IPv6.

```
c7200-1# show ipv6 route
IPv6 Routing Table - 7 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
L 1000:1:1:1:1:1:1:1/128 [0/0]
   via ::, FastEthernet3/0
C 1000:1:1:1:1:1:1:0/112 [0/0]
   via ::, FastEthernet3/0
L 2000:1::1/128 [0/0]
   via ::, Loopback0
C 2000:1::/96 [0/0]
   via ::, Loopback0
I1 3000:1::/96 [115/20]
   via FE80::204:28FF:FE1E:E008, FastEthernet3/0
L FE80::/10 [0/0]
   via ::, Null0
L FF00::/8 [0/0]
   via ::, Null0
```

```
c7200-1# show ipv6 route 3000:1::1
IPv6 Routing Table - 7 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
I1 3000:1::/96 [115/20]
   via FE80::204:28FF:FE1E:E008, FastEthernet3/0
```

- **show isis database detail** – Used to show the IS-IS database details.

```
c7200-1# show isis database detail
IS-IS Level-1 Link State Database:
LSPID                LSP Seq Num  LSP Checksum  LSP Holdtime  AT
c7200-1.00-00        * 0x000000DB  0xC383        1103          0/
Area Address: 49.1111
NLPID:               0x8E
Hostname: c7200-1
IPv6 Address: 2000:1::1
Metric: 10           IPv6 1000:1:1:1:1:1:1:0/112
Metric: 10           IPv6 2000:1::/96
Metric: 10           IS c7200-1.01
c7200-1.01-00        * 0x000000D8  0x5C9A        1078          0/
Metric: 0            IS c7200-1.00
Metric: 0            IS c7200-2.00
c7200-2.00-00        0x000000DD   0x0219        757           0/
Area Address: 49.1111
NLPID:               0x8E
Hostname: c7200-2
IPv6 Address: 3000:1::1
Metric: 10           IPv6 1000:1:1:1:1:1:1:0/112
Metric: 10           IPv6 3000:1::/96
Metric: 10           IS c7200-1.01
IS-IS Level-2 Link State Database:
LSPID                LSP Seq Num  LSP Checksum  LSP Holdtime  AT
c7200-1.00-00        * 0x000000DC  0x2569        893           0/
Area Address: 49.1111
NLPID:               0x8E
```

```

Hostname: c7200-1
IPv6 Address: 2000:1::1
Metric: 10      IS c7200-1.01
Metric: 10      IPv6 1000:1:1:1:1:1:1:0/112
Metric: 10      IPv6 2000:1::/96
Metric: 20      IPv6 3000:1::/96
c7200-1.01-00    * 0x000000D9      0xE994      773
Metric: 0      IS c7200-1.00
Metric: 0      IS c7200-2.00
c7200-2.00-00    0x000000DF      0x88E8      937
Area Address: 49.1111
NLPID: 0x8E
Hostname: c7200-2
IPv6 Address: 3000:1::1
Metric: 10      IS c7200-1.01
Metric: 10      IPv6 1000:1:1:1:1:1:1:0/112
Metric: 20      IPv6 2000:1::/96
Metric: 10      IPv6 3000:1::/96

```

- **ping** – Used to determine if a remote host is active or inactive, and the round-trip delay in communicating with the host.

```

7200-2# ping 1000:1:1:1:1:1:1:1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1000:1:1:1:1:1:1:1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms

```

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

- **debug isis adj-packets** – Used to show the IS-IS Hello (IIH) packets going across CLNS neighbors.

Troubleshooting Procedure

Below is troubleshooting information relevant to this configuration. If IPv6 IS-IS is not working properly, follow the instructions below to troubleshoot your configuration.

1. **Ping** the neighbor and make sure the pings work. If it fails, check to make sure the addresses fall in the same subnet, and also check Layer 1 and Layer 2. It is helpful to have an IPv4 address on each interface. Check to see if the IPv4 pings work, and this will help exclude any Layer 1 and Layer 2 issues.
2. Check to see if the configuration is correct. Refer to the sample configurations in the Configurations section of this document. If the configuration appears correct, issue a **debug clns adj-packets** command.

You should see IIH packets going in both directions, as shown in sample **debug** output below:

Note: Before issuing **debug** commands on a production network, refer to Important Information on Debug Commands.

```

c7200-1# debug isis adj-packets
IS-IS Adjacency related packets debugging is on

5d23h: ISIS-Adj: Sending L1 LAN IIH on FastEthernet3/0, length 1497
5d23h: ISIS-Adj: Sending L2 LAN IIH on Loopback0, length 1514n
5d23h: ISIS-Adj: Sending L2 LAN IIH on FastEthernet3/0, length 1497
5d23h: ISIS-Adj: Rec L1 IIH from 0004.281e.e008 (FastEthernet3/0), cir type L1L2,

```

cir id 2220.3330.4440.01, length 1497

3. If the IS-IS IPv6 neighbors are not binding, check for a duplicate system-id.

For more details on configuring IS-IS over IPv6, refer to Cisco IOS IPv6 Configuration Library.

Related Information

- [IPv6 for Cisco IOS Software](#)
 - [IP Routed Protocols Support Page](#)
 - [IS-IS Support Page](#)
 - [Technical Support & Documentation – Cisco Systems](#)
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Updated: Aug 10, 2005

Document ID: 40262
