Ring Provisioning

This chapter provides information and sample procedures for setting up VC circuits over existing subnetwork connection protection ring (SNCP) and multiplex section shared protection ring (MS-SPRing) configurations using TL1, including:

- SNCP topology
- SNCP cross-connections
- Ring-to-ring interconnection
- 1-way drop and continue

5.1 SNCP Topology

No special configuration of the physical SNCP topology is required other than connecting the fibers to the desired ports on the desired nodes. The east and west paths must exit a node at different ports (to ensure link diversity), but there are no other physical topology restrictions.

ONS 15454 SDH networks give you the option to set up path-protected mesh networks (PPMNs). PPMNs extend the protection scheme of a SNCP from the basic ring configuration to the meshed architecture of several interconnected rings. For more information about PPMN refer to the Cisco ONS 15454 SDH Procedure Guide.

5.2 SNCP Cross-Connections

To create a SNCP cross-connection using TL1, you only need to designate whether it is a 1-way or 2-way cross-connect, but the access identifier (AID) must be more explicit. For example, to create a 1-way SNCP circuit over the network with nodes A, B, C, and D and segments A-B, B-D, A-C, C-D as shown in Figure 5-1, enter the following commands (Node A is the source node and Node D is the destination node):

ENT-CRS-VC1:A:FROM,TO1&TO2;CTAG1::1WAY;
ENT-CRS-VC1:B:FROM,TO;CTAG2::1WAY;
ENT-CRS-VC1:C:FROM,TO;CTAG3::1WAY;
ENT-CRS-VC1:D:FROM1&FROM2,TO;CTAG4::1WAY;
5.3 Ring-to-Ring Interconnection

In the following examples, the form “5/1/1” represents “Slot 5, Port 1, VC 1.” For VCs add the normal VC Group and VC ID extensions. These examples also assume that the slots/ports have been auto-provisioned (via a plug-in event) and that the ports involved have been placed into the in service state using a port configuration command, for example, ED-STMn.

For the examples in this section, both rings traverse the same node; therefore, only a single cross-connection is required to create the ring-to-ring connection. Use the network map shown in Figure 5-2 with the node named “Cisco” in the nexus.
**5.3.1 Sample SNCP to SNCP Connection**

Ring 1 = SNCP  
Ring 2 = SNCP  

This example, illustrated in Figure 5-3, uses a STM-3-4 to feed Ring 2. Ring 1 can have any STM-N trunk card, but the trunk card is most likely a single-port STM-16 or STM-4.

---

**Note**  
VC 12/3/2 maps to VC-12-8 (((3-1)*3) +2).  
The VC calculation formula is: (((Port # -1)*Number of VC per port)+VC#).

---

**Figure 5-3 SNCP to SNCP Connection Specifications Through The Cisco Node**

Use the ENT-CRS-VC1:CISCO:VC-5-1&VC-6-1,VC-12-8&VC-13-8:CTAG1::2WAY; to create a selector between 5/1/1 and 6/1/1 which is bridged to Ring 2 (12/3/2 and 13/3/2), as shown in Figure 5-4.
5.3.2 Sample SNCP to Two-Fiber MS-SPRing Connection

Ring 1 = SNCP
Ring 2 = Two-fiber MS-SPRing

This example, illustrated in Figure 5-6, uses a SNCP end-point with a drop on a two-fiber MS-SPRing and the west span of the two-fiber MS-SPRing (Ring 2) for the active path of the circuit. The example also uses multiport addressing for Ring 2 and is based on a multiport STM-4 card (this is only important for computing the VC AID for multiport cards) where 13/3/2 = VC-13-26 and where 26 = (((3-1)*12) +2).

Use the ENT-CRS-VC1:CISCO:VC-5-1&VC-6-1,VC12-26:CTAG2::2WAY; to create a selector between 5/1/1 and 6/1/1 which connects to 12/3/2 on Ring 2, as shown in Figure 5-7.
5.3.3 Sample Two-Fiber MS-SPRing to SNCP Connection

Ring 1 = Two-fiber MS-SPRing
Ring 2 = SNCP

This example, illustrated in Figure 5-9, uses a SNCP end-point with a drop on a two-fiber MS-SPRing and uses the east span of the two-fiber MS-SPRing (Ring 1) for the active path of the circuit. For VC addressing, the SNCP is an STM-1 (e.g. VC-13-8).

Figure 5-9  Two-Fiber MS-SPRing to SNCP

Node Cisco

\[
\begin{array}{|c|c|c|}
\hline
 & \text{West} & \text{East} \\
5/1/1 & & 6/1/1 \\
12/3/2 & \text{SNCP RING 2} & 13/3/2 \\
\hline
\end{array}
\]

Use the ENT-CRS-VC1:CISCO:VC-6-1,VC-12-8&VC-13-8:CTAG3::2WAY; to create a bridge from 6/1/1 to Ring 2 (12/3/2 and 13/3/2), as shown in Figure 5-10.
5.3.4 Sample Two-Fiber MS-SPRing to Two-Fiber MS-SPRing Connection

Ring 1 = Two-fiber MS-SPRing
Ring 2 = Two-fiber MS-SPRing

All protection for a two-fiber MS-SPRing interconnecting to a two-fiber MS-SPRing is performed at the line level. You can make the connection with a 2-way cross-connect from an VC on the working side of the two-fiber MS-SPRing span of Ring 1 to an VC on the working side of a two-fiber MS-SPRing span on Ring 2. The connections can be east to east, east to west, west to east, and west to west. This example, illustrated in Figure 5-12, uses Ring 1 west to Ring 2 east and assumes a STM-12-4 in Slots 12 and 13 for subtending to a two-fiber MS-SPRing (Ring 2).

Figure 5-12 Two-Fiber MS-SPRing to Two-Fiber MS-SPRing

Use the ENT-CRS-VC1:CISCO:VC-5-1,VC-13-26:CTAG4::2WAY; to create a 2-way connection from 5/1/1 to 13/3/2 as shown in Figure 5-13.
5.3.5 Sample Two-Fiber MS-SPRing to Four-Fiber MS-SPRing Connection

Ring 1 = Two-fiber MS-SPRing
Ring 2 = Four-fiber MS-SPRing

All protection for a two-fiber MS-SPRing interconnecting to a four-fiber MS-SPRing is performed at the line level. You can make the connection with a simple 2-way cross-connect from the appropriate side, east or west, of the two-fiber MS-SPRing to the working fiber of the appropriate side, east or west, of the four-fiber MS-SPRing, as shown in Figure 5-14.

Figure 5-14 Two-Fiber MS-SPRing to Four-Fiber MS-SPRing

Use the ENT-CRS-VC1:CISCO:VC-1-1,VC-5-1:CTAG5::2WAY; to create a 2-way connection from 1/1/1 to 5/1/1, as shown in Figure 5-15.

Figure 5-15 2-Way Connection from 1/1/1 to 5/1/1

In the event of a failure, the software will automatically switch the traffic to the appropriate line and path.
5.3.6 Sample SNCP to Four-Fiber MS-SPRing Connection

Ring 1 = SNCP
Ring 2 = Four-fiber MS-SPRing

This example uses the west span of the four-fiber MS-SPRing (Ring 2) for the active path of the circuit. The example also assumes that the four-fiber MS-SPRing travels over STM-64 spans, as shown in Figure 5-16.

**Figure 5-16 SNCP to Four-Fiber MS-SPRing**

Use the ENT-CRS-VC1:CISCO:VC-1-1&VC-2-1&VC-5-190:CTAG6::2WAY to create a selector between 1/1/1 and 2/1/1 to Ring 2 (5/1/190), as shown in Figure 5-17.

**Figure 5-17 Selector Between 1/1/1 and 2/1/1 to Ring 2 (5/1/190)**

The command also creates a bridge from 5/1/190 to Ring 1 (1/1/1 and 2/1/1), as shown in Figure 5-18.

**Figure 5-18 Bridge from 5/1/190 to Ring 1 (1/1/1 and 2/1/1)**
5.4 1-Way Drop and Continue

The following examples show how to create a 1-way drop and continue cross-connect. The examples use three nodes (Node 1, Node 2, and Node 3) in a ring configuration (Figure 5-19). Node 1 is the source node, Node 2 has the drop and continue, and Node 3 is the destination.

Figure 5-19  1-Way Drop and Continue

Figure 5-20 shows a circuit diagram example of the orientation of AIDs associated with the ENT-CRS command used to establish drop and continue connections.

Figure 5-20  Orientation of AIDs Used to Establish Drop and Continue Connections
5.4.1 Sample Node 1 Configuration (Source Node)

Issue the ENT-CRS-VCn::VC-1-1,VC-5-1&VC-6-1:CTAG::1WAY; command on Node 1.

Figure 5-21 Bridge from 1/1/1 to 5/1/1 and 6/1/1

5.4.2 Sample Node 2 Configuration (Drop and Continue Node)

Issue the ENT-CRS-VCn::VC-5-1&VC-6-1,VC-1-1:CTAG::1WAYDC; on Node 2.

Figure 5-22 Selector Between 5/1/1 and 6/1/1 to 1/1/1

5.4.3 Sample Node 3 Configuration (Destination Node)

Issue the ENT-CRS-VCn::VC-5-1&VC-6-1,VC-1-1:CTAG::1WAY; on Node 3.

Figure 5-23 Selector Between 5/1/1 and 6/1/1 to 1/1/1