TL1 Gateway

This chapter describes the TL1 Gateway and provides procedures and examples for implementing TL1 Gateway on the ONS 15454 or ONS 15327.

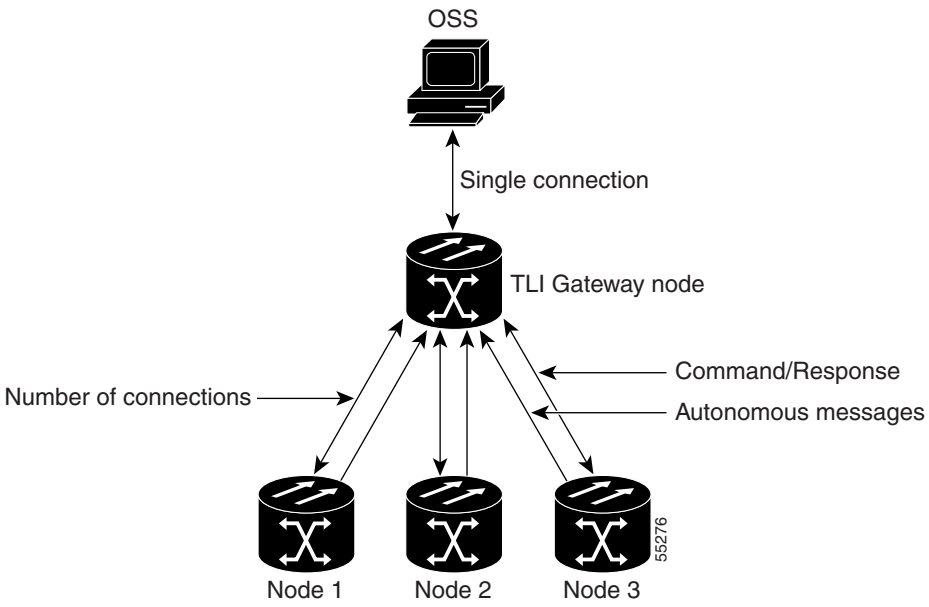
2.1 Gateway Network Element Topology

You can issue TL1 commands to multiple nodes via a single connection through the TL1 Gateway. Any node can serve as a Gateway Network Element (GNE), End-Point Network Element (ENE), or Intermediate Network Element (INE). A node becomes a GNE when a TL1 user connects to it and enters a command destined for another node. An ENE is an end node because it processes a TL1 command that is passed to it from another node. An INE is an intermediate node because of topology; it has no special hardware, software, or provisioning.

To implement the TL1 Gateway, use the desired ENE's TID in the ACT-USER command to initiate a session between the GNE and the ENE. Once a session is established you need to enter the ENE's TID in all of the subsequent commands that are destined for the ENE. From the GNE, you can access several remote nodes which become the ENEs. The ENEs are the message destinations or origins. The INE handles the DCC TCP/IP packet exchange.

The GNE Session is the connection that multiplexes TL1 messages between the OSS/craftsperson and the GNE. The GNE demulitplexes incoming operations support system (OSS) TL1 commands and forwards them to the remote ENE. The GNE also multiplexes incoming responses and autonomous messages to the GNE Session. The ENE Session is the connection that exchanges messages between the GNE and the remote ENE. Figure 2-1 shows the GNE topology.

Figure 2-1 Example of a GNE topology



Starting with R4.0 the Cisco ONS 15454 supports two TCC cards (TCC+ and TCC2). The GNE/ENE functionality varies depending on the type of card used. In R4.5 and later the TCC+ card is not supported.

With the TCC2, each GNE can support eleven (10+1) concurrent gateway communication sessions (connections from an OS to the GNE). Ten of these sessions are via the LAN (wire-wrap, active TCC2 LAN port, or DCC) and the eleventh session is reserved for the active TCC2 serial port. With the TCC+ (or the Cisco ONS 15327 XTC card), each GNE can support six (5+1) concurrent gateway communication sessions. Five of these sessions are via the LAN (wire wrap, active TCC+/XTC LAN port or DCC) and the sixth session is reserved for the active TCC+/XTC serial port.

Each GNE can support 6 (TCC+/XTC) or 11 (TCC2) concurrent communication gateway sessions and up to a maximum of 96 (TCC+/XTC) or 176 (TCC2) ENEs/GNE. You can dynamically distribute the ENEs to balance the number of concurrent gateway communication sessions versus the number of NEs on the DCC. The GNE treats the 6 (5+1 for TCC+/XTC) or 11 (10+1 for TCC2) concurrent gateway communication sessions and 96 (TCC+/XTC) or 176 (TCC2) ENEs/GNE limit as a resource pool (Table 2-1) and continues to allocate resources until the pool is exhausted (see Table 2-2 for allocation examples). When the pool is exhausted the GNE returns an “All Gateways in Use” message or an “All ENE Connections in Use” message.

Table 2-1 Gateway Resource Pool

Number of GNEs	Number of GNE Sessions	Number of ENEs
1 (Cisco ONS 15327)	6 (5+1) XTC	96 (dynamically allocated)
1 (Cisco ONS 15454)	6 (5+1) TCC+ (R4.1 only)	96 (dynamically allocated)
	11 (10+1) TCC2 (R4.1 or R4.5)	176 (dynamically allocated)

Table 2-2 Examples of a Single GNE Topology Showing How the GNE/ENE Resources can be Allocated

Number of GNE Communication Sessions	Number of ENEs
1	16
2	32
3	48
4	64
5	80
6	96
The following values, 7 through 11, apply to the TCC2 only	
7	112
8	128
9	144
10	160
11	176

Note Issuing commands to specific nodes in the network is accomplished by entering a unique node name in the TID field in each TL1 message. The TID field is synonymous with the name of the node and is the second token in a TL1 command.

2.2 Implementing TL1 Gateway

The following procedures demonstrate TL1 Gateway on a four-node ring (without TL1 Gateway in Figure 2-2 and with TL1 Gateway in Figure 2-3), where:

Node 0 is the GNE.
Node 1 is the ENE 1.
Node 2 is the INE 2.
Node 3 is the ENE 3.

Figure 2-2 Four-node ring without TL1 Gateway

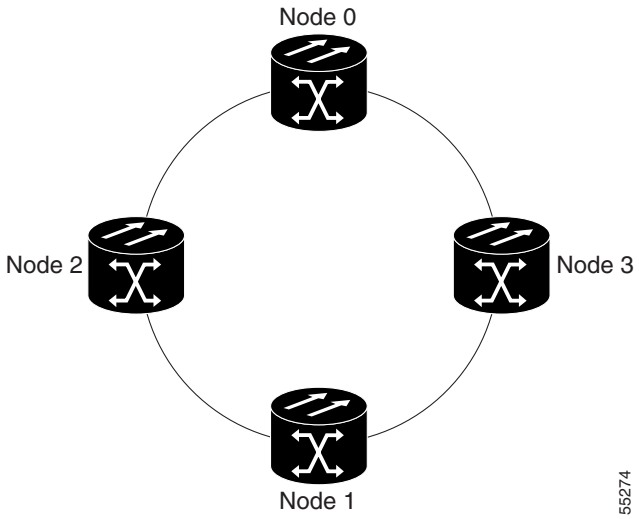
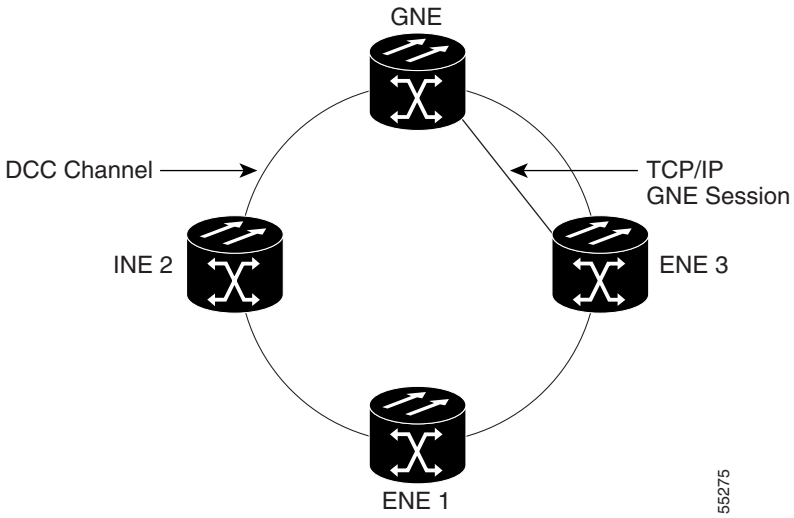


Figure 2-3 Four-node ring with TL1 Gateway



Log Into a Remote ENE

Step 1 Telnet or serial port to Node 0, which will become the GNE.

Step 2 To connect to the ENE 1 node, enter the TL1 login command using the following input example:

ACT-USER:NODE1:USERNAME:1234:PASSWORD;

The GNE forwards the login to ENE 1. After successful login, ENE 1 sends a COMPLD response.

Step 3 When you are logged into ENE 1, enter the following TL1 login command to connect to ENE 3:

ACT-USER:NODE3:USERNAME:1234:PASSWORD;

The GNE forwards the login to ENE 3. After successful login, the ENE 3 sends a COMPLD response.

Forward Commands by Specifying the ENE TID (Node 1 or Node 3)

When you are logged into ENE 1 and ENE 3, enter a command and designate a specific TID, as shown in the following example:

RTRV-HDR:NODE1::1; will retrieve the header of Node 1 and

RTRV-HDR:NODE3::3; will retrieve the header of Node 3.

Receive Autonomous Messages from the Remote ENE

To receive autonomous messages from the remote ENE, you must log into the remote ENE. When you are logged in, you will start receiving autonomous messages. The source of the message is identified in the header of the message.

Log Out of a Remote ENE

To disconnect from a remote ENE, you must use the CANC-USER command as follows:

CANC-USER:NODE1:USERNAME:1; will disconnect ENE 1 and

CANC-USER:NODE3:USERNAME:3; will disconnect ENE 3.

The GNE forwards the logout to the remote ENEs. The GNE/ENE TCP session is closed.