# Inter-Node Data Links

This chapter describes the creation of an inter-node data link (INDL) between a local Cisco 6732 node and a remote Cisco 6705 node. An INDL allows the provisioning of a remote node over an established ("nailed-up") connection to the local node.

The provisioning of an INDL requires one node to be designated the **local node**, and another node designated the **remote node**. In this example, the Cisco 6732 serves as the local node, and the Cisco 6705 as the remote node. It is also possible to create an INDL between two Cisco 6732 nodes.

**Note** The following procedures are also used to create a **non-data link**. A non-data link does not allow provisioning of a remote node, but it can still be used to carry inter-node traffic and cross connects.

**Note** An INDL created on an MSDSL-2W card must use the **HDLU** framing type. Before creating an INDL, provision the MSDSL-2W line for HDLU framing.

Each node must be provisioned with a separate "half link" before the INDL can be used. Complete the following procedures to establish communications with an INDL:

- Create a Local Half Link
- Create a Remote Half Link
- Verify the INDL

## **Create a Local Half Link**

To create a half link from the local node to the remote node, complete the following steps starting in net view:

- **Step 1** Connect the EMS workstation to the local node (Cisco 6732).
- **Step 1** Go to the EMS net view. (See Figure 6-1.)

#### Figure 6-1 Net View

Alerst 0	Major Alams D	Minor Alares: 0	Subnet: root	Inter Node Provision	le li Unio Caj
root					
			m		
		node9 192.168.0.100	node8 192.170.0.2		

Step 2 Click and drag a line from the local node (Cisco 6732) to the remote node (Cisco 6705). (See Figure 6-2.)

#### Figure 6-2 Draw Line to Remote Node

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• root				
_				
	192.168.0.100	192.170.0.2		

**Step 3** This creates a visual link between the two nodes. (See Figure 6-3.)

#### Figure 6-3 Visual Link









**Step 5** Click on the **Inter-Node Provision** button (located in the upper right corner of the net view window). EMS launches the inter-node provisioning window. (See Figure 6-5.)





**Step 6** Double-click the line between the two nodes. EMS launches the inter-node link display. (See Figure 6-6.)

7% Inter Node Link Disp	olay	
Applications	Back to Network Map	
node9 Node ID: 9 11-2 V35 • • •	node8 Node ID: 8	
<u>الم</u>		

Figure 6-6 Inter-Node Link Display

**Note** The local node (Cisco 6732), on the left side of the display, shows the installed cards that can be used to create an INDL. The remote node (Cisco 6705), shown as a gray box on the right side of the display, does not display any card information.

- **Step 7** Select a line from the local node display that will be provisioned with the half link.
- **Step 8** Click and drag a visual link from the line on the local node to the remote node. (See Figure 6-7.)



Figure 6-7 Draw Line to Remote Node

**Step 9** After creating the visual link, EMS launches the inter node link provision window. (See Figure 6-8.)

#### Figure 6-8 Inter-Node Provision Window

Est	8732 Harrer Card Type: Card: Line: Dets Link: Link Orachian: Link Operation Status: DSØ Link Problem Lint:	rode9 T1 29/35 10 1 Nore LocaNode	8785 Hame: Card Type: Card: Line: Data Link: Link Brotian: Link Problem Lint; *	rode8 <u>T12V35</u> Picra PresotaNiada
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**Step 10** In the inter-node link provision window, set the following parameters:

• **Data Link**: set to **DS0** (uses a DS0 channel for the data link) or **FDL** (uses DS1 overhead bandwidth for the data link). Cisco recommends the DS0 format; some line cards (particularly the OC3-AUPSR card) can not use the FDL format.

**Note** To create a non-data link (used only for cross connects), set the **Data Link** field to **None**.

- Link Direction: set to LocalNode
- Card Type: set to type of card used in the remote node
- **Card**: set to the slot number of the card used in the remote node.
- Line: set to the line number used in the remote node.
- Step 11 Click Create (at the bottom of the window). EMS changes the Create button to Refresh. (See Figure 6-9.)

Figure 6-9 Local Half Link Created

And a state of the second s		550711		2023
in State pd. Process-	6732 Harnet	noted	6705 Hartan:	rodell
Fuit	Card Types	T1-23/35	Card Type:	1122/35
	Cardt	10	Cards	4
	Line	1	Lines	1-1
	Data Linic	D50	Date Links	050
	Link Direction:	LacaNode	Link Direction	RemoteRiode
	Link Operation Status:		Link Operation Status:	
	058		054	
	Link Problem List		* Link Problem Lint	
			لغي	
		<u>.</u>		• [*]
			Report 1	
			neman	

**Step 12** Click **Exit** to close the inter node link provision window. EMS returns to the inter-node link display. (See Figure 6-10.)

7% Inter Node Link Disp	olay	
Applications	Back to Network Map	
node9 Node ID: 9 ₩35	node8 Node ID: 8	
<u> </u>		

Figure 6-10 Inter Node Link Display with Local Half Link

The newly created half link is shown as a blue line connecting the local node and remote node.

Step 13 Click Back to Network Map (at the top of the window) to return to the net view.

## **Create a Remote Half Link**

After creating the INDL half link on the local node, a similar half link must created on the remote node—in this example, the Cisco 6705.

- **Step 1** Connect the EMS workstation to the remote node (Cisco 6705).
- **Step 2** Click on the **Inter-Node Provision** button (located in the upper right corner of the net view window). EMS launches the inter-node provisioning window. (See Figure 6-11.)

Figure 6-11 Inter-Node Provisioning Window



**Step 3** Double-click the line between the two nodes. EMS launches the inter-node link display. (See Figure 6-12.)

#### Figure 6-12 Inter-Node Link Display

7‰Inter Node Link Disp	olay	_ 🗆 ×
Applications	Back to Network Map	
node8 Node ID: 8 T1-2 V33 • • •	node9 Node ID: 9	<u>_</u>
41		

**Note** In the inter-node link display, the remote node (Cisco 6705) is at the left side of the display. The local node (Cisco 6732), shown as a gray box, is at the right side of the display.

**Step 4** Select the line from the remote node display to be provisioned with the half link.

**Note** The line selected on the remote node must be **the same line** used in the "Create a Local Half Link" section on page 6-1.

**Step 5** Click and drag a visual link from the local line to the remote node. (See Figure 6-13.)

Figure 6-13 Draw Line to Remote Node

7% Inter Node Link Dis	play	_ 🗆 ×
Applications	Back to Network Map	
node8 Node ID: 8 T1-2 V35	Node ID: 9	<u> </u>
4		_ 
		<u> </u>

**Step 6** After creating the visual link, EMS launches the inter node link provision window. (See Figure 6-14.)

of this field out loose	\$705 Horne:	nedeli	\$732 Harris:	node9
Est.	Card Type: Card: Line: Data Link:	11-2/25 4 1 Nore	Card Type: Card: Line: Refei Infe	
	Link Desetters Link Operation Status: US& Link Problem List		Link Director: Link Operation Status: 058 Link Problem List	flenoteliode
		. <u> </u>		33403

Figure 6-14 Inter Node Link Provision Window



• **Data Link**: set to **DS0** (uses DS0 line 1) or **FDL** (uses DS1 overhead bandwidth). Cisco recommends the DS0 format; some line cards (particularly the OC3-AUPSR card) can not use the FDL format.

**Note** The data link selection must be consistent with the selection in the "Create a Local Half Link" procedure. For example, if the local node is provisioned to use a DS0 data link, the remote node must use a DS0 data link as well.

**Note** To create a non-data link (used only for cross connects), set the **Data Link** field to **None**.

- Link Direction: set to RemoteNode
- Card Type: set to type of card used in the local node (in this example, the Cisco 6732)
- Card: set to slot number of the card used in the local node.
- Line: set to facility number of the line being used in the local node.
- Step 8 Click Create (at the bottom of the window). EMS changes the Create button to Refresh. (See Figure 6-15.)





**Step 9** Click **Exit** to close the inter node link provision window. EMS returns to the inter-node link display. (See Figure 6-16.)





The newly created half link is shown as a blue line connecting the remote node and local node.

**Step 10** Click **Back to Network Map** (at the top of the window) to return to the net view. (See Figure 6-17.)

al Alamic 0 Maj	a Alere 0	Minor Alama 0	Suhnet: root	Inter Node Provision	in politices (Ann
laan *					1
			<b>m</b>		
		192, 168, 0, 100	192.170.0.2		

#### Figure 6-17 Net View with Visual Link

**Note** This step completes the creation of a non-data link. The non-data link can now be used to carry traffic and cross connects between the local and remote node.

**Step 11** Open the remote node (Cisco 6705) by double-clicking the remote node icon in net view. EMS launches the node view of the remote node. (See Figure 6-18.)





**Step 12** Double-click the node nameplate. (See Figure 6-19.)

#### Figure 6-19 Node View and Node Nameplate



**Step 13** EMS launches the NE provision window. (See Figure 6-20.)

#### Figure 6-20 NE Provision Window

E Provision for 6732 node: n	de1	×
System Basic Provisioning	NE Name:	6732
IP Address Configuration	Alias:	
Dataliak Pouto Configuration	NE Location:	Central Office
Datalink houte conliguiation	NE Node Type:	NetworkNode
Ping Node	NE Time Of Day:	1993-03-14,21:03:29.0
Node ID Configuration	NE Uptime:	0d 0:3:29
Node ID Conligatedon	NE Backplane Version:	1.3
Inter Node Link Configuration	NE Loaded Software Version:	1.3.23
Timing Source Selection & Control	NE CLEI Code:	BP
	NE Serial Number:	1359
NE Time Ut Day Set	NE Backplane Type:	6732
Alarm Provisioning	Alarm Status:	normal
Common Control Card Switch Over	Problem List:	<b>^</b>
Software Upgrade		-
Database Backup		
Error Log Retrieval	Ap	ply Refresh
Exit		

**Step 14** From the function bar on the left, click on the **Datalink Route Configuration** button. This brings up the datalink route configuration window. (See Figure 6-21.)

NE Provision for 6705 node: no	de8	×
System Basic Provisioning	Interface:	Type Card Line
IP Address Configuration	Destination IP Address:	
Datalink Route Configuration	Gateway IP Address: Netmask:	
Ping Node	Route Type:	Host
Node ID Configuration	Route List:	ID Interface
Inter Node Link Configuration		
Timing Source Selection & Control		
NE Time Of Day Set		
Alarm Provisioning		
Software Upgrade		
Database Backup		
Error Log Retrieval		
Exit		Add Delete Refresh
	•	

#### Figure 6-21 Datalink Route Configuration Window

**Step 15** Set the following parameters in the datalink route configuration window:

- Card Type: Card used in the remote node (Cisco 6705)
- Card: Slot number of the card used in the remote node
- Line: Facility number of the line used on the card in the remote node
- Destination Address: Leave blank
- Gateway Address: IP address of the local node (Cisco 6732)
- Netmask: Leave blank
- Route Type: Set to Default

Click Add when finished.

- Step 16 Click the Exit button (from the function bar) to return to the node view.
- Step 17 Select File > Exit to return to the net view.
- **Step 18** Using the TCP/IP configuration utility on your EMS workstation, set the **Default Gateway** to the same address as the local node (Cisco 6732) IP address.

Figure 6-22 shows the TCP/IP configuration window for Windows NT. For the complete TCP/IP configuration procedure, see the "Configure TCP/IP on the EMS Workstation" section on page 3-2.

#### Figure 6-22 Windows NT—TCP/IP Properties

Microsoft TCP/IP Properties
IP Address DNS WINS Address Routing
An IP address can be automatically assigned to this network card by a DHCP server. If your network does not have a DHCP server, ask your network administrator for an address, and then type it in the space below.
Adapter:
[1] 3Com Fast EtherLink XL NIC (3C9058-TX)
C <u>O</u> btain an IP address from a DHCP server
● Specify an IP address
P Address: 172 . 17 . 1 . 42
Subnet Mask: 255 . 255 . 0 . 0
Default <u>G</u> ateway: 172 . 17 . 1 . 2
Advanced
OK Cancel Apply

Step 19 Click OK to configure TCP/IP on the EMS workstation, and reboot if necessary.

## Verify the INDL

To verify the INDL has been successfully created, connect a EMS workstation to the local node (Cisco 6732). Open EMS net view and double click on the remote node (the Cisco 6705). The remote node should open, displaying the node view. This means EMS is able to use the INDL to access the remote node.

Verify the INDL