



IBM Channel Attach Commands

Use the commands in this chapter to configure IBM channel attach interface features. For hardware technical descriptions and for information about installing the router interfaces, refer to the hardware installation and maintenance publication for your particular product.

For interface configuration information and examples, refer to the “Configuring IBM Channel Attach” chapter of the *Bridging and IBM Networking Configuration Guide*.

For a conversion table of the modular products and Cisco 7000 series processors, refer to the “Platform Support” appendix of the *Configuration Fundamentals Command Reference*.

adapter

Use the **adapter** internal LAN configuration command to configure an internal adapter interface on an internal LAN. Use the **no** form of this command to remove an internal adapter configuration.

adapter *adapter-number mac-address*
no adapter *adapter-number mac-address*

Syntax Description

<i>adapter-number</i>	Number in the range 0 to 17 that uniquely identifies the relative adapter number (ADAPNO) on this interface. This value must correspond to the ADAPNO parameter configured in the corresponding virtual telecommunications access method (VTAM) XCA definition.
<i>mac-address</i>	Media access control (MAC) address of this relative adapter. This is a hexadecimal value in the form of <i>xxxx.xxxx.xxxx</i> .

Default

This command has no defaults.

Command Mode

Internal LAN configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Before you can configure an internal adapter interface, you must use the **bridge-group** internal LAN configuration command or the **source-bridge** internal LAN configuration command to configure the bridging type. The only way to get packets to the Channel Interface Processor (CIP) Systems Network Architecture (SNA) feature is through bridging. These two commands are identical to their interface configuration forms.

For transparent bridging, the bridge-group statements identify the interfaces in the same bridge group. Frames are sent only to the interface in the same bridge group.

For source-route bridging, the source-bridge statements identify the interfaces in the same ring group. Frames are sent only to interfaces in the same ring group.

An Ethernet internal LAN can have a **bridge-group** command.

A Token Ring or FDDI internal LAN can have either a **bridge-group** or a **source-bridge** command, but not both.

Note If the **source-bridge** command is changed while adapters have active sessions, those sessions will be terminated.

Example

The following example configures an Ethernet internal LAN adapter on relative adapter 12 and MAC address 87AD.0462.3FDE:

```
interface channel 1/2
  lan ethernet 20
  bridge-group 1
  adapter 12 87AD.0462.3FDE
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

bridge-group †
llc2 †
name
source-bridge †
lan

channel-protocol

Use the **channel-protocol** interface configuration command to define a data rate of either 3 megabytes per second or 4.5 megabytes per second for the Parallel Channel Adapter (PCA) card.

channel-protocol [s | s4]

Syntax Description

s (Optional) Specifies a data rate of 3 megabytes per second.

s4 (Optional) Specifies a data rate of 4.5 megabytes per second.

Default

If no value is specified, the default data rate for the PCA is 3 megabytes per second.

Command Mode

Interface configuration

Usage Guideline

This command first appeared in Cisco IOS Release 10.3.

This command is valid for a PCA adapter card configured on a CIP on the Cisco 7000 series.

Example

The following command specifies a data rate of 4.5 megabytes per second for the interface:

```
channel-protocol s4
```

claw

Use the **claw** interface configuration command to establish the IBM channel attach configuration for an ESCON Channel Adapter (ECA) interface or bus-and-tag Parallel Channel Adapter (PCA) interface on the Cisco 7000 series.

claw *path device-address ip-address host-name device-name host-app device-app* [**broadcast**]

Syntax Description

<i>path</i>	Hexadecimal value in the range 0x0000 to 0xFFFF. This value specifies the data path and consists of two digits for the physical connection (either on the host or on the ESCON director switch); one digit for the control unit logical address, and one digit for the channel logical address. If not specified in the IOCP, the control unit logical address and channel logical address default to 0.
<i>device-address</i>	Hexadecimal value in the range 0x00 to 0xFE. This is the unit address associated with the control unit number and path as specified in the host IOCP file. The device address must have an even value.
<i>ip-address</i>	IP address specified in the HOME statement of the host TCP/IP application configuration file.
<i>host-name</i>	Host name specified in the device statement in the host TCP/IP application configuration file.
<i>device-name</i>	CLAW workstation name specified in the device statement in the host TCP/IP application configuration file.
<i>host-app</i>	Host application name as specified in the host application file. When connected to the IBM TCP host offerings, this value will be tcpip , which is the constant specified in the host TCP/IP application file. When attached to other applications, this value must match the value hard coded in the host application.
<i>device-app</i>	CLAW workstation application specified in the host TCPIP application. When connected to the IBM TCP host offerings, this value will be tcpip , which is the constant specified in the host TCP/IP application file. When attached to other applications, this value must match the value hard coded in the host application.
broadcast	(Optional) Enables broadcast processing for this subchannel.

Default

This command has no defaults.

Command Mode

Interface configuration

Usage Guideline

This command first appeared in Cisco IOS Release 10.3.

This command defines information that is specific to the interface hardware and the IBM channels supported on the interface.

Example

The following example shows how to enable IBM channel attach routing on the CIP port 0, which is supporting a directly connected ESCON channel:

```
interface channel 3/0
ip address 198.92.0.1 255.255.255.0
claw 0100 00 198.92.0.21 CISCOVM EVAL TCPIP TCPIP
```

csna

Use the **csna** interface configuration command to specify the path and device/subchannel on a physical channel of the Cisco 7000 series router to communicate with an attached mainframe. Use the **no** form of this command to delete the CIP SNA (CSNA) path.

```
csna path device [maxpiu value] [time-delay value] [length-delay value]
no csna path device
```

Syntax Description

<i>path</i>	Four-digit hexadecimal value in the range 0x0000 to 0xFFFF. This value specifies the data path and consists of two digits for the physical connection (either on the mainframe or on the ESCON director switch): one digit for the control unit address, and one digit for the channel logical address. The control unit address and channel logical address must be specified. For PCA, use the value 0x0100.
<i>device</i>	Device address transmitted on the channel path to select the channel-attached device. For PCA (bus-and-tag), this value refers to the subchannel defined in the XCA major node on the host system.
maxpiu value	(Optional) Maximum packet size in bytes that will be transmitted on the interface. The range is 4096 to 65535. The default is 20470 bytes.
time-delay value	(Optional) Number of milliseconds to delay before transmitting a received packet on the interface. The range is 0 to 100. The default is 10 ms.
length-delay value	(Optional) Amount of data to accumulate, in bytes, before transmitting on the interface. The range is 0 to 65535. The default is 20470 bytes.

Defaults

maxpiu value: 20470 (0x4ff6) bytes

time-delay value: 10 ms

length-delay value: 20470 (0x4ff6) bytes

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

This command is valid for an ESCON or PCA card configured on a CIP on the Cisco 7000 series. This command is required for CSNA support over a physical channel.

Use the **maxpiu**, **time-delay**, and **length-delay** keywords to adjust the CIP interface transmission characteristics. You can set the maximum size of packet that the interface will transmit to match the packet size accepted by the host system. You can adjust the delay between the time a packet is

received on one of the CIP internal interfaces and transmitted to the host. You can also adjust the transmit-to-host delay by changing the amount of data the CIP accumulates before transmitting to the host.

Changes to the delay values take effect immediately. Any change to the maximum packet size will take effect after the channel is reinitialized. A **length-delay** value of 0 sends the packet as soon as possible.

Using the **no csna** command terminates all subchannels (path and devices) configured on the channel and all Logical Link Control, type 2 (LLC2) sessions established over the subchannels.

Example

The following example shows CSNA, offload, and CLAW configured on the CIP in slot 1, port 0. CSNA can be configured by itself, without dependency on offload or CLAW:

```
interface channel 1/0
  no ip address
  no keepalive
  offload c700 c0 172.18.1.217 TCPIP OS2TCP TCPIP TCPIP TCPIP API
  claw C700 A0 192.18.1.219 EVAL CISCOVM AAA BBB
  csna 0100 10
  csna 0100 11
  csna 0100 12
```

dlur

Use the **dlur** TN3270 configuration command to enable the Systems Network Architecture (SNA) session switch function on the CIP, or to enter dependent logical unit requester (DLUR) configuration mode. Use the **no** form of this command to disable the SNA session switch function and discard all parameter values associated with the SNA session switch.

```
dlur
dlur fq-cpname fq-dlusname
no dlur
```

Syntax Description

<i>fq-cpname</i>	Fully qualified control point (CP) name used by the SNA session switch and the logical unit (LU) name for the DLUR function. This name must be unique among APPN nodes in the network including other <i>fq-cpname</i> values specified on all other TN3270 servers running under the Cisco IOS software.
<i>fq-dlusname</i>	Fully qualified name of the primary choice for the dependent LU server (DLUS). This is the name of an LU, usually a CP, in an APPN host. The <i>fq-dlusname</i> value can be repeated and shared across servers.

Default

No DLUR function is enabled.

Command Mode

TN3270 configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

If the SNA session switch function is already enabled, the **dlur** command with no arguments puts you in DLUR configuration mode.

Several parameters in the DLUR configuration mode consist of fully qualified names, as defined by the APPN architecture. Fully qualified names consist of two case-insensitive alphanumeric strings, separated by a period. However, for compatibility with existing APPN products, including VTAM, the characters “#” (pound), “@” (at), and “\$” (dollar) are allowed in the fully qualified name strings. Each string is from one to eight characters long; for example, RA12.NODM1PP. The portion of the name before the period is the NETID and is shared between entities in the same logical network.

The **no dlur** command hierarchically deletes all resources defined beneath it.

Example

The following command performs two functions: It enters DLUR configuration mode; and it enables the DLUR function and defines the LU name for the DLUR as SYD.TN3020 and the primary choice for DLUS as SYD.VMG. Note that the NETID portion of both names is the same:

```
dlur SYD.TN3020 SYD.VMG
```

dlus-backup

Use the **dlus-backup** DLUR configuration command to specify a backup DLUS for the DLUR function. Use the **no** form of this command to remove a backup DLUS name.

```
dlus-backup dlusname2  
no dlus-backup
```

Syntax Description

dlusname2 Fully qualified name of the backup DLUS for the DLUR.

Default

No backup DLUS is specified.

Command Mode

DLUR configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Only one backup DLUS can be specified per CIP. If the backup DLUS specified in the **dlus-backup** command is in use when a **no dlus-backup** is issued, the connection is not torn down.

Several parameters in the DLUR configuration mode consist of fully qualified names, as defined by the APPN architecture. Fully qualified names consist of two case-insensitive alphanumeric strings, separated by a period. However, for compatibility with existing APPN products, including VTAM, the characters “#” (pound), “@” (at), and “\$” (dollar) are allowed in the fully qualified name strings. Each string is from one to eight characters long; for example, RA12.NODM1PP. The portion of the name before the period is the NETID and is shared between entities in the same logical network.

Example

The following command specifies SYD.VMX as the backup DLUS:

```
dlus-backup SYD.VMX
```

generic-pool

Use the **generic-pool** TN3270 configuration command to specify whether or not left-over LUs will be made available to TN3270 sessions that do not request a specific LU or LU pool through TN3270E. Use the **no** form of this command to selectively remove the permit or deny condition of generic pool use.

```
generic-pool {permit | deny}
no generic-pool
```

Syntax Description

permit	Left-over LUs should be made available to TN3270 users wanting generic sessions. This value is the default.
deny	Left-over LUs should not be given to a generic pool. The physical unit (PU) is not automatically fully populated with 255 LOCADDR definitions. The default is the value configured in TN3270 configuration mode.

Defaults

In TN3270 configuration mode, generic pool use is permitted.

In PU configuration mode, the default is the value currently configured in TN3270 configuration mode.

Command Modes

TN3270 configuration

PU configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

A left-over LU is defined as one for which all of the following conditions are true:

- The system services control point (SSCP) did not send an ACTLU during PU start-up; and
- The PU controlling the LU is capable of carrying product set ID (PSID) vectors on network management vector transport (NMVT) messages, thus allowing dynamic definition of dependent LU (DDDLU) operation for that LU.

All LUs in the generic pool are, by definition, DDDLU capable.

Values entered for **generic-pool** in TN3270 configuration mode apply to all PUs for that TN3270 server but can be changed in PU configuration mode.

In PU configuration mode, a **no generic-pool** command will restore the **generic-pool** value entered in TN3270 command mode.

In TN3270 configuration mode, the **no generic-pool** command reverts to the default, which permits generic pool use.

The command takes effect immediately. If **generic-pool deny** is specified on a PU, no further dynamic connections to it will be allowed. Existing sessions are unaffected, but as they terminate the LUs will not become available for dynamic connections.

Similarly, if **generic-pool permit** is specified, any inactive LUs are immediately available for dynamic connections. Moreover, any active LUs that were dynamic previously (before **generic-pool deny** was issued) return to being dynamic.

Example

The following command permits generic LU pool use:

```
generic-pool permit
```


interface channel

Use the **interface channel** global configuration command to specify a channel attach interface and enter interface configuration mode.

interface channel *slot/port*

Syntax Description

<i>slot</i>	Specifies the slot number where the CIP is located. The value is in the range 0 to 5.
<i>port</i>	Specifies the port number where the CIP is located. The value is in the range 0 to 2. Port 0 and 1 are for physical interfaces. Port 2 is for configuring an internal LAN interface on the CIP.

Default

This command has no defaults.

Command Mode

Global configuration

Usage Guideline

This command first appeared in Cisco IOS Release 11.0. It is used only on the Cisco 7000 series.

Example

The following example shows how to enter interface configuration mode for a CIP in slot 2 and begin configuring port 0:

```
interface channel 2/0
```

Related Commands

- claw**
- csna**
- lan**
- max-llc2-sessions**
- offload**
- tn3270-server**

Examples

The following command sets an keepalive disconnect value of 15 minutes (900 seconds):

```
keepalive 900
```

The following example entered in TN3270 configuration mode sets the keepalive disconnect value to 51800 seconds, a value greater than 50000, and enables the sending of power-off Reply product set ID (PSID) network management vector transport (NMVT) to the host.

```
keepalive 51800
```

The following command entered in TN3270 configuration mode sets the keepalive disconnect value to 1800 seconds, the default:

```
no keepalive
```

lan

Use the **lan** interface configuration command to configure an internal LAN on a CIP interface. Use the **no lan** form of the command to remove an internal LAN interface.

```
lan type lan-id  
no lan type lan-id
```

Syntax Description

<i>type</i>	Interface type for this internal LAN: ethernet , tokenring , or fdi .
<i>lan-id</i>	A number 0 to 31 that uniquely identifies this internal LAN on this CIP. This value must be unique between all internal LANs of the same interface type on a CIP.

Default

This command has no defaults.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

An internal LAN can be configured only on CIP interface port 2. Interface port 2 represents an internal port on the CIP. You receive an error message if you attempt to configure an internal LAN on any CIP port other than port 2.

Example

The following example shows how to configure an internal LAN Ethernet with a LAN ID of 20 on the CIP in slot 1, port 2:

```
interface channel 1/2  
  lan ethernet 20
```

link

Use the **link** DLUR SAP configuration command to define and activate a link to a host. Use the **no** form of this command to delete the link definition.

link *name* [**r***mac mac*] [**r***sap sap*]
no link *name*

Syntax Description

<i>name</i>	Link name, from one to eight alphanumeric characters. The first character must be alphabetic. The name must be unique within the DLUR function.
<i>r</i> <i>mac</i>	(Optional) Remote MAC address of the form <i>xxxx.xxxx.xxxx</i> in hexadecimal. If not specified, a loopback link to another SAP on the same internal LAN adapter is assumed.
<i>r</i> <i>sap</i>	(Optional) Remote SAP address, 04 to FC in hexadecimal. The <i>r</i> <i>sap</i> value must be even and should be a multiple of 4, but this requirement is not enforced. The <i>r</i> <i>sap</i> value default is 04.

Defaults

No DLUR link is defined.

The default remote SAP address is 04 (hexadecimal).

Command Mode

DLUR SAP configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

The combination of *r**mac* and *r**sap* must be unique within the DLUR SAP function. These values can only be changed by deleting the link definition, using the **no link** command, and recreating the link definition.

For a link via a channel on this CIP, the TN3270 server and the hosts should open different adapters in the same internal LAN. Using different adapters avoids any contention for SAP numbers, and is also necessary if you configure duplicate MAC addresses for fallback CSNA access to the host. By configuring the adapters in the same internal LAN, you achieve the same performance—bypassing the DLC stacks—as looping back on a single adapter.

Examples

The following command defines a link name and a remote SAP address:

```
link LINK5 rsap 08
```

The following example shows different adapter numbers configured on the same internal LAN to avoid SAP contention. The host uses SAP 4 on token ring adapter 0.

```
lan tokenring 0
  adapter 0 4000.0000.0001
  adapter 1 4000.0000.0002
tn3270-server
dlur ...
lsap token-adapter 1
link HOST rmac 4000.0000.0001 rsap 4
```

lsap

Use the **lsap** DLUR configuration command to create a SAP in the SNA session switch, or to enter DLUR SAP configuration mode. Use the **no** form of this command to delete a SAP and all SNA session switch links using the internal LAN interface.

```
lsap  
lsap type adapter-number [lsap]  
no lsap type adapter-number [lsap]
```

Syntax Description

<i>type</i>	Internal adapter type on the CIP card, which corresponds to the value specified in the lan internal LAN configuration command. The currently supported type is token-adapter .
<i>adapter-number</i>	Internal adapter interface on the CIP card, which is the same value specified in the adapter internal LAN configuration command.
<i>lsap</i>	(Optional) Local SAP number, 04 to FC, in hex. The value must be even and should normally be a multiple of four. It must be unique within the internal adapter in that no other 802.2 clients of that adapter, in the router or in a host, should be allocated the same SAP. The default value is C0.

Default

The default value for *lsap* is hexadecimal C0.

Command Mode

DLUR configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

If the SAP in the SNA session switch function is already created, the **lsap** command with no arguments puts you in DLUR SAP configuration mode.

The **lsap** command can be entered only in DLUR configuration mode.

The **lsap** command uses values that are defined in two other commands: the **lan** internal LAN configuration command and the **adapter** internal LAN configuration command. The **lan** *type* and **adapter** *adapter-number* values configured on the CIP internal LAN interface are used in the **lsap** command.

However, the **lan** *type* keyword is a little different. Where the *type* on the **lan** command is **tokenring**, the corresponding *type* on **lsap** is **token-adapter**. This emphasizes that the number that follows is an **adapter** number, not a **lan** number.

The **no lsap** command hierarchically deletes any links using it. Any sessions using those links are lost.

Example

The following command defines an adapter type, an adapter number, and a local SAP:

```
lsap token 0 B0
```

Related Commands

adapter

lan

max-llc2-sessions

Use the **max-llc2-sessions** internal adapter configuration command to specify the number of concurrent LLC2 sessions that will be supported on the CIP interface. Use the **no** form of this command to remove a value.

max-llc2-sessions *number*
no max-llc2-sessions *number*

Syntax Description

number A value in the range 0 to 6000. If no value is specified, the default is 256.

Default

The default number of sessions is 256.

Command Mode

Internal adapter configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

The maximum number of LLC2 sessions can be configured only on CIP interface port 2. To specify an unlimited number of LLC2 sessions, either omit this command from the adapter configuration on CIP interface port 2, or use a value of 0.

When configured for an unlimited number of LLC2 sessions, the actual number of sessions is determined by the available memory on the CIP.

Example

The following example limits the maximum number of LLC2 sessions to 212:

```
max-llc2-sessions 212
```

maximum-lus

Use the **maximum-lus** TN3270 configuration command to limit the number of LU control blocks that will be allocated for TN3270 server use. Use the **no** form of this command to restore the default value.

maximum-lus *number*
no maximum-lus

Syntax Description

number Maximum number of LU control blocks allowed. The allowed range is 0 to 32000. However, the practical upper limit for concurrently operating TN3270 sessions depends on the hardware and usage characteristics. The default is 2100.

Default

Because of the license structure, the default is 2100, which represents the limit of the lower-priced license (2000) plus a five percent buffer. If you configure a value greater than the default, a license reminder is displayed.

Command Mode

TN3270 configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Although the value may be varied at any time, reducing it below the current number of LU control blocks will not release those blocks until a PU is inactivated by DACTPU or by using the **no pu** command.

If the number of LUs in use reaches 94% of the current setting of maximum-lus, a warning message is displayed on the console. To prevent annoyance, the threshold for generating such messages is raised for a period.

The TN3270 server attempts to allocate one LU control block for each LU activated by the hosts. In the case of dynamic definition of dependent LU (DDDLU) the control block is allocated when the client requests the LU, in anticipation of an ACTLU from the SSCP host.

By limiting the number of LU control blocks allocated, you can make sure enough memory is available to support other CIP functions. The control blocks themselves take about 1K bytes per LU. During session activity, a further 2K per LU may be needed for data. On a CIP, 32 MB of memory will support 4000 LUs. To support more than 4000 LUs, we recommend 64 MB of memory.

Example

The following command allows 5000 LU control blocks to be allocated:

```
maximum-lus 5000
```

Related Command

pu

name

Use the **name** internal adapter configuration command to give a name to the internal adapter. Use the **no name** form of the command to remove the name assigned to an internal adapter.

name *name*
no name *name*

Syntax Description

name Name that identifies this internal adapter. Consists of up to 8 characters that does not include blanks.

Default

This command has no defaults.

Command Mode

Internal adapter configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following example assigns a name to an internal adapter interface:

```
name VTAM_B14
```

offload

Use the **offload** interface configuration command to configure an offload task on the CIP. Use the **no** form of this command to cancel the offload task on the CIP.

```
offload path device-address ip-address host-name device-name host-app device-app host-link  
device-link [broadcast]  
no offload path device-address
```

Syntax Description

<i>path</i>	Hexadecimal value in the range 0x0000 to 0xFFFF. This value specifies the data path and consists of two digits for the physical connection (either on the host or on the ESCON director switch): one digit for the control unit address, and one digit for the channel logical address. If not specified in the IOCP, the control unit address and channel logical address default to 0.
<i>device-address</i>	Hexadecimal value in the range 0x00 to 0xFE. This is the unit address associated with the control unit number and path as specified in the host IOCP file. The device address must have an even value.
<i>ip-address</i>	IP address specified in the host TCP/IP application configuration file.
<i>host-name</i>	Host name specified in the device statement in the host TCP/IP application configuration file.
<i>device-name</i>	CLAW workstation name specified in the device statement in the host TCP/IP application configuration file.
<i>host-app</i>	Host application name as specified in the host application file. When connected to the IBM TCP host offerings, this value will be tcpip , which is the constant specified in the host TCP/IP application file. When attached to other applications, this value must match the value hard-coded in the host application.
<i>device-app</i>	CLAW workstation application specified in the host TCP/IP application. When connected to the IBM TCP host offerings, this value will be tcpip , which is the constant specified in the host TCP/IP application file. When attached to other applications, this value must match the value hard-coded in the host application.
<i>host-link</i>	Host application name providing the CLAW API link. For IBM compatible offload software, this will always be tcpip .
<i>device-link</i>	CLAW workstation application name providing the CLAW API link. For IBM compatible offload software, this will always be api .
broadcast	(Optional) Enables broadcast processing for this subchannel.

Default

This command has no defaults.

Command Mode

Interface configuration

Usage Guideline

This command first appeared in Cisco IOS Release 11.0.

The **offload** command uses the same underlying configuration parameters as does the **claw** command.

Example

The following example shows how to enable IBM channel attach offload routing on the CIP port 0, which is supporting a directly connected ESCON channel:

```
interface channel 3/0
ip address 198.92.0.1 255.255.255.0
offload 0100 00 198.92.0.21 CISCOVM EVAL TCPIP TCPIP TCPIP API
```


pu (DLUR)

Use the **pu** DLUR configuration command to create a PU entity that has no direct link to a host or to enter PU configuration mode. Use the **no** form of this command to remove the PU entity.

```

pu pu-name
pu pu-name idblk-idnum ip-address
no pu pu-name

```

Syntax Description

<i>pu-name</i>	Name that uniquely identifies this PU.
<i>idblk-idnum</i>	This value must match the <i>idblk-idnum</i> value defined at the host. The value must be unique within the subarea; however, the TN3270 server generally cannot tell which remote hosts are in which subareas, so the server only enforces uniqueness within the set of DLUR PUs.
<i>ip-address</i>	IP address that the clients should use as host IP address to map to LU sessions under this PU.

Default

No PU is defined.

Command Mode

DLUR configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

If the PU is already created, the **pu** *pu-name* command with no arguments puts you in PU configuration mode. In this mode you can modify an existing PU DLUR entity.

A typical usage for the IP address is to reserve an IP address per host application. For example, clients wanting to connect to TSO specify an IP address that will be defined with PUs that have LOGAPPL=TSO.

Example

The following sequence of commands define three PUs. Two of the PUs share the same IP address and the third PU has a separate IP address:

```

pu p0 05D99001 192.195.80.40
pu p1 05D99002 192.195.80.40
pu p2 05D99003 192.195.80.41

```

pu (direct)

Use the **pu** TN3270 configuration command to create a PU entity that has its own direct link to a host, or to enter PU configuration mode. Use the **no** form of this command to remove the PU entity.

```
pu pu-name idblk-idnum ip-address type adapter-number lsap [rmac rmac] [rsap rsap]
    [lu-seed lu-name-stem]
no pu pu-name
```

Syntax Description

<i>pu-name</i>	Name that uniquely identifies this PU.
<i>idblk-idnum</i>	This value must match the IDBLK-IDNUM value defined at the host. The value must be unique within the subarea; however, the TN3270 Server cannot tell which remote hosts are in which subareas and does not enforce the unique value requirement.
<i>ip-address</i>	IP address that the clients should use as host IP address to map to LU sessions under this PU.
<i>type</i>	Internal adapter type on the CIP card, which corresponds to the value specified in the lan internal LAN configuration command. The currently supported type is token-adapter .
<i>adapter-number</i>	Internal adapter interface on the CIP card, which is the same value specified in the adapter internal LAN configuration command.
<i>lsap</i>	Local SAP number in hexadecimal, ranging from 04 to FC. The value must be even, and must be unique within the internal adapter so that no other 802.2 clients of that adapter, in the router or in a host, should be allocated the same SAP. Other direct links from TN3270 server direct PUs may use the same value on the internal adapter as long as the remote MAC or SAP is different.
rmac <i>rmac</i>	(Optional) Remote MAC address. The remote MAC address of the form <i>xxxx.xxxx.xxxx</i> hexadecimal, specifying the MAC address of the remote host. If not specified, a loopback link to another SAP on the same internal LAN adapter is assumed.
rsap <i>rsap</i>	(Optional) Remote SAP address. The remote SAP address is a one- or two-character hexadecimal string, ranging from 04 to FC, specifying the SAP address of the remote host. The default is 04.
lu-seed <i>lu-name-stem</i>	(Optional) Provides an LU name that the client can use when a specific LU name request is needed. The format can be <i>x...x##</i> or <i>x...x###</i> where <i>x..x</i> is an alphanumeric string. When ## is specified, it is replaced with the LU LOCADDR in hexadecimal digits to form the complete LU name. When ### is specified, decimal digits are used, padded with leading zeroes to make three characters. The first <i>x</i> must be alphabetic and the entire string, including the # symbols, must not exceed 8 characters.

Defaults

No PU is defined.

The default remote SAP address is 04 (hexadecimal).

Command Mode

TN3270 configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

If the PU is already created, the **pu** *pu-name* command with no arguments puts you in PU configuration mode, where you can modify an existing PU entity.

The **pu** (direct) command uses values that are defined in two other commands: the **lan** internal LAN configuration command and the **adapter** internal LAN configuration command. The **lan type** and **adapter adapter-number** values configured on the CIP internal LAN interface are used in the **pu** command.

For a link via a channel on this CIP, the TN3270 server and the hosts should open different adapters in the same internal LAN. Using different adapters avoids any contention for SAP numbers, and is also necessary if you configure duplicate MAC addresses for fallback CSNA access to the host. By configuring the adapters in the same internal LAN, you achieve the same performance—bypassing the DLC stacks—as looping back on a single adapter.

Examples

The following commands configure the TN3270 server to be active, and has one PU, CAPPU1, trying to connect in. An LU seed using hexadecimal digits is defined.

```
tn3270-server
pu CAPPU1 05D18101 10.14.20.34 token-adapter 3 rmac 4000.0501.0001 lu-seed CAP01L##
```

The following example shows different adapter numbers configured on the same internal LAN to avoid SAP contention. The host uses SAP 4 on token ring adapter 0.

```
lan tokenring 0
adapter 0 4000.0000.0001
adapter 1 4000.0000.0002
tn3270-server
pu PU1 05d00001 10.0.0.1 token-adapter 1 8 rmac 4000.0000.0001 rsap 4
```

Related Commands

adapter

lan

show extended channel connection-map llc2

Use the **show extended channel connection-map llc2** privileged EXEC command to display the number of active LLC2 connections for each SAP and the mapping of the internal MAC adapter and the SAP to the resource that activated the SAP.

show extended channel *slot/port* connection-map llc2

Syntax Description

slot Slot number.

port Port number.

connection-map llc2 Displays a connection map of LLC2 connections.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0(3).

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel connection-map llc2** command.

```
router# show extended channel 1/2 connection-map llc2
LAN Token 0 Adapter 0 4000.7000.0747
  Local SAP=08 LLC2 Connections=4 CSNA Port=1 Path=C200 Device=60
  Local SAP=0C LLC2 Connections=4 CSNA Port=1 Path=C200 Device=60
  Local SAP=10 LLC2 Connections=2 CSNA Port=1 Path=C200 Device=60
  Local SAP=14 LLC2 Connections=0 CSNA Port=1 Path=C200 Device=60

LAN Token 1 Adapter 1 4000.7000.0767
  Local SAP=08 LLC2 Connections=3 CSNA Port=1 Path=C200 Device=61
  Local SAP=0C LLC2 Connections=3 CSNA Port=1 Path=C200 Device=61
  Local SAP=10 LLC2 Connections=2 CSNA Port=1 Path=C200 Device=61
  Local SAP=14 LLC2 Connections=2 CSNA Port=1 Path=C200 Device=61

LAN Token 2 Adapter 2 4000.7000.0737
No SAPs open on this interface

Total : SAPs opened = 8      Connections active = 20
```

show extended channel csna

Use the **show extended channel csna** privileged EXEC command to display information about the CSNA subchannels on the Cisco 7000 series.

show extended channel *slot/port csna* [*path* [*device-address*]] [admin | oper | stats]

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
<i>path</i>	(Optional) A hexadecimal value in the range of 0x0000 – 0xFFFF. This specifies the data path and consists of two digits for the physical connection (either on the host or on the ESCON Director switch), one digit for the control unit address, and one digit for the channel logical address. If not specified, information is displayed for all CSNA subchannels configured on the selected interface.
<i>device-address</i>	(Optional) A hexadecimal value in the range of 0x00 – 0xFE. This is the unit address associated with the control unit number and path as specified in the host IOCP file. If not specified, information is displayed for all CSNA subchannels configured with the specified path on the selected interface.
admin	(Optional) Displays configured values for CSNA channel devices. If neither admin , oper , or stats is specified, admin is the default.
oper	(Optional) Displays operational values for CSNA channel devices.
stats	(Optional) Displays statistics for CSNA channel devices.

Default

The default is to show the administrative (configured) values as specified by the optional **admin** keyword.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0(3).

This command displays information that is specific to the interface hardware. The information is generally useful for diagnostic tasks performed by technical support personnel only.

Sample Displays

The following is sample output on the Cisco 7000 from the **show extended channel csna** command. Three examples are provided, one for each type of output as specified by the **admin**, **oper**, and **stats** keywords.

The following example displays the configured values for all CSNA devices on interface channel 1/0.

```
router# show extended channel 1/0 csna admin

      Path Dv  maxpiu      time-delay  length-delay
CSNA C200 60  64000      100         64000
CSNA C200 61  64000      100         64000
CSNA C200 62  64000      100         64000
```

Table 66 describes the fields shown in the display.

The following example displays operational data for all CSNA devices configured on interface channel 1/0. The channel interface must be up (no shut) for this information to be displayed.

```
router# show extended channel 1/0 csna oper

      Path Dv  Status      SlowDown  maxpiu      time-delay  length-delay
CSNA C200 60  setupComple off        64000      100         64000
CSNA C200 61  setupComple off        64000      100         64000
CSNA C200 62  setupComple off        64000      100         64000
```

Table 66 describes the fields shown in the display.

The following example displays CSNA statistics for subchannel path c200, device 60. The channel interface must be up (no shut) for this information to be displayed. If the maxpiu value is reconfigured while the CSNA subchannel is active (setupComplete) then the maxpiu value displayed by the **oper** keyword is the old, operational value.

```
router# show extended channel 1/0 csna c200 60 stats

CSNA      C200 60
Blocks Transmitted = 38979079 Received = 38979075
Bytes Transmitted = 79251477K Received = 13554
Slow downs Sent = 0 Received = 0
Txd by maxpiu      : Blocks = 0 Bytes = 0
Txd by time-delay  : Blocks = 222 Bytes = 12522
Txd by length-delay: Blocks = 0 Bytes = 0
```

Table 66 describes the fields shown in the display.

Table 62 Show Extended Channel CSNA Field Descriptions

Field	Description
Path	Path from the CSNA configuration.
Dev	Device address from the CSNA configuration.

Table 62 Show Extended Channel CSNA Field Descriptions (Continued)

Field	Description
Status	<p>State of the CSNA device. One of the following values:</p> <ul style="list-style-type: none"> • closed —Subchannel is closed. • pendingOpen —An Open Subchannel command has been received from VTAM. • open —Subchannel is open. • pendingSetup —VTAM has queried CIP for all configured MAC adapters. • setupComplete —All internal MAC adapter information has been responded to the CIP. The CSNA subchannel is operational. • pendingClose —A Close Subchannel command has been received from VTAM. • unknown —Current state of the CSNA subchannel cannot be determined.
SlowDown	<p>Status of flow control for the CSNA device.</p> <ul style="list-style-type: none"> • off —Subchannel is normal (both CIP and VTAM are able to send data). • sent — The CIP has put VTAM into a slow down state for this CSNA subchannel. • received —VTAM has put the CIP into a slow down state for this CSNA subchannel. • both —Both VTAM and the CIP are in a slow down state for this subchannel. • unknown —Current state of flow control on this subchannel cannot be determined.
maxpiu	<p>Maximum size of a channel i/o block that the CSNA subchannel can send to the host. This value may differ from the configured maxpiu value if the value is reconfigured while the CSNA subchannel is active (setupComplete).</p> <p>CSNA blocks SNA frames into channel i/o blocks which must not exceed the maxpiu value. A length-delay value less than the maxpiu value can cause the channel i/o blocks to be limited to the lower value.</p> <p>The maxpiu value may be reconfigured while the subchannel is operational but the new maxpiu value does not take effect until the subchannel is reinitialized (in other words, until the XCA major node is recycled). In this case, the maxpiu value displayed with the admin keyword will be the new, configured value while the maxpiu displayed by the oper keyword will be the old, operational value.</p>
time-delay	<p>CSNA blocks SNA frames destined for VTAM for time-delay milliseconds from the time the first SNA frame within a channel i/o block is blocked for transmission. This can increase the overall throughput of CSNA by minimizing the number of channel i/o operations. However, blocking can induce response time latency of a transaction by up to the time-delay value. If time-delay=0, CSNA ignores length-delay and puts each frame into the channel i/o block for transmission to the host. Even with a time-delay=0, CSNA may still block frames while waiting for a previous channel i/o to complete.</p>

Table 62 Show Extended Channel CSNA Field Descriptions (Continued)

Field	Description
length-delay	<p>CSNA blocks SNA frames destined for VTAM when the current block reaches the length-delay value in size (bytes). This will increase the chance of using larger block sizes for CSNA channel i/o. SNA frames are blocked up to either time-delay milliseconds or until the block reaches the length-delay size, at which time CSNA starts the channel i/o.</p> <p>The length-delay is ignored if larger than the maxpiu value. It can be used to force CSNA blocking to generate smaller i/o blocks than specified by maxpiu. In general, however, larger blocks result in better channel throughput and efficiency. A value of zero causes the length-delay value to be ignored; blocking is then controlled by the maxpiu and time-delay parameters.</p>
Blocks Transmitted	<p>Number of channel i/o blocks sent to VTAM from this CSNA subchannel. The Blocks Transmitted value may be higher than the total blocks for the Txd by maxpiu, Txd by time-delay, and Txd by length-delay counters. This is due to NULL blocks (8 bytes each with no data) that CSNA transmits. The channel program used for LSA traffic consists of a write/read CCW chain. When VTAM has data for CSNA it sends it with the write CCW. When the chained read CCW is executed CSNA will respond with any pending inbound data. If CSNA has no pending inbound data the read CCW is satisfied with an 8-byte header indicating no data.</p>
Blocks Received	<p>Number of channel i/o blocks received from VTAM by this CSNA subchannel.</p>
SlowDowns Sent	<p>Number of times CSNA put VTAM into a slow down (flow control) for this subchannel device.</p>
SlowDowns Received	<p>Number of times VTAM put CSNA into a slow down (flow control) for this subchannel.</p>
Txd by maxpiu Blocks/Bytes	<p>Number of channel i/o blocks and bytes transmitted to VTAM by this CSNA subchannel because the size of the channel i/o block reached the maxpiu value configured for this subchannel.</p>
Txd by time-delay Blocks/Bytes	<p>Number of channel i/o blocks and bytes transmitted to VTAM by this CSNA subchannel because blocking time-delay configured for this subchannel expired.</p>
Txd by length-delay Blocks/Bytes	<p>Number of channel i/o blocks and bytes transmitted to VTAM by this CSNA subchannel because blocking length-delay configured for this subchannel was reached.</p>

show extended channel icmp-stack

Use the **show extended channel icmp-stack** privileged EXEC command to display information about the Internet Control Message Protocol (ICMP) stack running on the CIP interfaces in a Cisco 7000 series.

show extended channel *slot/port icmp-stack* [*ip-address*]

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
<i>ip-address</i>	(Optional) Offload or TN3270-server IP address.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output from the **show extended channel icmp-stack** command:

```
router# show extended channel 4/0 icmp-stack

ICMP Statistics for IP Address 198.92.1.120
  InMsgs      : 200          InErrors      : 201          InDestUnreachs: 202
  InTimeExcds : 203          InParmProbs   : 204          InSrcQuenchs  : 205
  InRedirects  : 206          InEchos       : 207          OutEchoReps   : 213
  OutTimestamps : 214        OutTimestampReps: 215        OutAddrMasks  : 216
  OutAddrMaskReps: 217

ICMP Statistics for IP Address 198.92.1.121
  InMsgs      : 201          InErrors      : 202          InDestUnreachs: 203
  InTimeExcds : 204          InParmProbs   : 205          InSrcQuenchs  : 206
  InRedirects  : 207          InEchos       : 208          OutEchoReps   : 214
  OutTimestamps : 215        OutTimestampReps: 216        OutAddrMasks  : 217
  OutAddrMaskReps: 218
```

Table 63 describes the fields shown in the display.

Table 63 Show Extended Channel icmp-stack Field Descriptions

Field	Description
InMsgs	Total number of ICMP messages which the entity received. Note that this counter includes all those counted by icmpInErrors.
InErrors	Number of ICMP messages which the entity received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, etc.).
InDestUnreachs	Number of ICMP Destination Unreachable messages received.

Table 63 Show Extended Channel icmp-stack Field Descriptions (Continued)

Field	Description
InTimeExcds	Number of ICMP Time Exceeded messages received.
InParmPrbs	Number of ICMP Parameter Problem messages received.
InSrcQuenchs	Number of ICMP Source Quench messages received.
InRedirects	Number of ICMP Redirect messages received.
InEchos	Number of ICMP Echo (request) messages received.
OutEchoReps	Number of ICMP Echo Reply messages sent.
OutTimestamps	Number of ICMP Timestamp (request) messages sent.
OutTimestampReps	Number of ICMP Timestamp Reply messages sent.
OutAddrMasks	Number of ICMP Address Mask Request messages sent.
OutAddrMaskReps	Number of ICMP Address Mask Reply messages sent.

Related Commands

You can use the master indexes or search online to find documentation of related commands.

- pu (direct)**
- pu (DLUR)**
- offload**

show extended channel ip-stack

Use the **show extended channel ip-stack** privileged EXEC command to display information about the IP stack running on the CIP interfaces in a Cisco 7000 series.

show extended channel *slot/port ip-stack* [*ip-address*]

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
<i>ip-address</i>	(Optional) Offload IP address.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output from the **show extended channel ip-stack** command:

```
router# show extended channel ip-stack

IP Statistics for IP Address 198.92.1.120
  Forwarding      : forwarding   DefaultTTL      : 2           InReceives     : 3
  InHdrErrors    : 4             InAddrErrors    : 5           ForwDatagrams  : 6
  InUnknownProtos: 7             InDiscards      : 8           InDelivers     : 1313371
  OutRequests    : 10            OutDiscards     : 11          OutNoRoutes    : 12
  ReasmTimeout   : 13            ReasmReqds     : 14          ReasmOKs       : 15
  ReasmFails     : 16            FragOKs         : 17          FragFails      : 18
  FragCreates    : 19            RoutingDiscards: 20

IP Statistics for IP Address 198.92.1.121
  Forwarding      : noforward    DefaultTTL      : 3           InReceives     : 4
  InHdrErrors    : 5             InAddrErrors    : 6           ForwDatagrams  : 7
  InUnknownProtos: 8             InDiscards      : 9           InDelivers     : 1313371
  OutRequests    : 11            OutDiscards     : 12          OutNoRoutes    : 13
  ReasmTimeout   : 14            ReasmReqds     : 15          ReasmOKs       : 16
  ReasmFails     : 17            FragOKs         : 18          FragFails      : 19
  FragCreates    : 20            RoutingDiscards: 21
```

Table 64 describes the fields shown in the display.

Table 64 Show Extended Channel ip-stack Field Descriptions

Field	Description
Forwarding	<p>Indication of whether this entity is acting as an IP gateway in respect to the forwarding of datagrams received by, but not addressed to, this entity. IP gateways forward datagrams. IP hosts do not (except those source-routed via the host).</p> <p>Note that for some managed nodes, this object may take on only a subset of the values possible. Accordingly, it is appropriate for an agent to return a 'badValue' response if a management station attempts to change this object to an inappropriate value.</p>
DefaultTTL	The default value inserted into the Time-To-Live field of the IP header of datagrams originated at this entity, whenever a TTL value is not supplied by the transport layer protocol.
InReceives	Total number of input datagrams received from interfaces, including those received in error, for this IP Address instance.
InHdrErrors	Number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options, etc.
InAddrErrors	Number of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., 0.0.0.0) and addresses of unsupported Classes (e.g., Class E). For entities which are not IP Gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.
ForwDatagrams	Number of input datagrams for which this entity was not their final IP destination, as a result of which an attempt was made to find a route to forward them to that final destination. In entities which do not act as IP Gateways, this counter will include only those packets which were Source-Routed via this entity, and the Source-Route option processing was successful.
InUnknownProtos	Number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.
InDiscards	Number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (for example, for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly.
InDelivers	Total number of input datagrams successfully delivered to IP user-protocols (including ICMP)
OutRequests	Total number of IP datagrams which local IP user-protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in ipForwDatagrams.
OutDiscards	Number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (for example, for lack of buffer space). Note that this counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.

Table 64 Show Extended Channel ip-stack Field Descriptions (Continued)

Field	Description
OutNoRoutes	Number of IP datagrams discarded because no route could be found to transmit them to their destination. Note that this counter includes any packets counted in ipForwDatagrams which meet this 'no-route' criterion. Note that this includes any datagrams which a host cannot route because all of its default gateways are down.
ReasmTimeout	Maximum number of seconds which received fragments are held while they are awaiting reassembly at this entity.
ReasmReqds	Number of IP fragments received which needed to be reassembled at this entity.
ReasmOKs	Number of IP datagrams successfully reassembled."
ReasmFails	Number of failures detected by the IP reassembly algorithm (for whatever reason: timed out, errors, etc). Note that this is not necessarily a count of discarded IP fragments since some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.
FragOKs	Number of IP datagrams that have been successfully fragmented at this entity.
FragFails	Number of IP datagrams that have been discarded because they needed to be fragmented at this entity but could not be, for example, because their Don't Fragment flag was set.
FragCreates	Number of IP datagram fragments that have been generated as a result of fragmentation at this entity.
RoutingDiscards	Number of routing entries which were chosen to be discarded even though they are valid. One possible reason for discarding such an entry could be to free-up buffer space for other routing entries.

Related Commands

You can use the master indexes or search online to find documentation of related commands.

pu (direct)

pu (DLUR)

offload

show extended channel llc2

Use the **show extended channel llc2** privileged EXEC command to display information about the LLC2 sessions running on the CIP interfaces in a Cisco 7000 series.

```
show extended channel slot/port llc2 [admin | oper | stats] [lmac [lsap [rmac [rsap]]]]
```

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
admin	(Optional) Shows configured values for internal adapters.
oper	(Optional) Shows operational values for: <ul style="list-style-type: none">• Internal adapters• SAPs opened on the internal adapters• LLC2 connections on the internal adapters
stats	(Optional) Shows statistics or: <ul style="list-style-type: none">• Internal adapters• SAPs opened on the internal adapters• LLC2 connections on the internal adapters
<i>lmac</i>	(Optional) Local MAC address.
<i>lsap</i>	(Optional) Local SAP address, 0–256.
<i>rmac</i>	(Optional) Remote MAC address.
<i>rsap</i>	(Optional) Remote SAP address, 0–256.

Default

The default is to show the administrative (configured) values as specified by the optional **admin** keyword.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0(3).

To specify LLC information for internal adapters:

- Specify the *lmac* to get information for a specific internal adapter.
- Omit the *lmac* parameter to display information for all internal adapters on the specified channel interface.

To display LLC information for SAPs opened on an internal adapter:

- Specify the *lmac* and *lsap* parameters to display information for a particular SAP.
- Specify the *lmac* parameter and '*' to display information for all SAPs opened on the specified channel adapter.

To display information for LLC2 connections on a channel interface:

- Specify the *lmac*, *lsap*, *rmac*, and *rsap* parameters to display information for a particular active LLC2 connection.
- Specify the *lmac*, *lsap*, and *rmac* parameters to display information for all LLC2 connections active between the specified remote MAC address and the specified local SAP opened on the specified internal adapter.
- Specify the *lmac* and *lsap* parameters, and '*' to display information for all LLC2 connections active on the specified local SAP and the specified internal adapter and any remote MAC address the connections are active with.
- Specify the *lmac*, '*' for the local SAP, and *rmac* to display information for all LLC2 connections active between the specified internal adapter and the remote MAC address.
- Specify the *lmac*, '*' for the local SAP, and '*' for the remote MAC address to display information for all active LLC2 connections on the specified internal adapter.

Sample Displays

The following is sample output on the Cisco 7000 from the **show extended channel llc2** command. Three examples are provided, one for each type of output as specified by the **admin**, **oper**, and **stats** keywords.

The following sample displays the configured values for all LLC2 connections on channel 2/2.

```
router# show extended channel 2/2 llc2 admin
      Lan Token adapter  0 0004.0004.0004
      t1-time    = 1000  tpf-time  = 1000  trej-time = 3200  tbusy-tim = 9600
      idle-time =60000  local-win =   7  recv-wind =   7  N2      =   8
      N1        = 1033  ack-delay =  100  ack-max   =   3  nw       =   0
```

The following table describes the fields shown in the display.

Field	Description
t1-time	Length of time the CIP waits for an acknowledgment to a transmitted I-frame before polling the remote LLC2 station.
tpf-time	Amount of time the CIP waits for a final response to a poll before resending the original poll frame.
trej-time	Amount of time the CIP waits for a correct frame after sending a reject command to a remote LLC2 station.

show extended channel llc2

Field	Description
tbusy-time	Amount of time the CIP waits before repolling a busy LLC2 station.
idle-time	Frequency of polls during periods of idle traffic.
local-win	Maximum number of I-frames that a CIP LLC2 connection can send to the remote LLC2 station without receiving an acknowledgment.
recv-wind	Maximum number of I-frames that a CIP LLC2 connection can receive without receiving an acknowledgment.
N2	Number of times a CIP LLC2 connection will resend an unacknowledged I-frame
N1	Maximum size of LLC frames supported by the CIP adapter. The value configured on the CIP has no effect. The maximum size LLC frame supported on the CIP is controlled by other factors including the largest interface MTU between CIP and the remote network device, and configured values at VTAM and at the end station.
ack-delay	Maximum amount of time the CIP allows received I-frames to remain unacknowledged. The CIP LLC2 connection will acknowledge received I-frames within the ack-delay time.
ack-max	Maximum number of I-frames a CIP LLC2 connection receives before sending an acknowledgment.
Nw	Working send window size. When I-frames sent by a CIP LLC2 connection are rejected by the remote LLC2 station, the CIP LLC2 connection reduces its working send window size to 1. Then, for every subsequent I-frame sent by the CIP LLC2 connection that is positively acknowledged by the remote LLC2 station, the CIP increases its working send window by the Nw value until the working send window reaches the configured local-window value.

The following sample displays the operational values for all LLC2 connections on channel 2/2.

```
router#show extended channel 5/2 llc oper
  LAN Token 0 Adapter 0 4000.1010.2020
    Open SAPs=1
    Max SAPs Opened=1
```

The following table describes the fields shown in the display.

Field	Description
Open SAPs	Number of SAPs currently opened on this internal MAC adapter.
Max SAPs Opened	Number of SAPs concurrently opened on this internal MAC adapter since the last reset of the channel adapter of channel interface.

The following sample displays statistics for all LLC2 connections on channel 2/2.

```
router#show extended channel 5/2 llc stat
  LAN Token 0 Adapter 0 4000.1010.2020
    PDUsIn      = 223339    PDUsOut      = 9564
    OctetsIn    = 6949875   OctetsOut    = 307448
    TESTCmdsIn = 213293    TESTRspOut  = 2
    LocalBusies= 0          UnknownSAPs = 0
```

The following table describes the fields shown in the display. These statistics are available on the adapter because when LLC2 connections are deactivated, users can no longer retrieve the information per LLC2 connection.

Field	Description
PDUsIn	Protocol Data Units received by the internal adapter.
PDUsOut	Protocol Data Units sent by the internal adapter.
OctetsIn	PDU bytes received by the internal adapter.
OctetsOut	PDU bytes sent by the internal adapter.
TESTCmdsIn	Number of TEST commands received destined for this MAC address.
TESTRspOut	Number of TEST responses sent by this MAC address repoding to TEST commands received.
Local Busies	Number of times LLC2 connection stations on this adapter entered a busy state, send RNRs to the remote LLC2 station.
UnknownSAPs	Number of frames received that are destined for a SAP that does not exist on this adapter.

show extended channel llc2

The following sample displays statistics for all LLC2 connections on channel 2/2.

```
router#sho ext ch 5/2 llc2 oper 4000.1010.2020 04  
LAN Token 0 Adapter 0 4000.1010.2020  
Local SAP=04  
Open Connections=2  
Max Connections Opened=2
```

The following table describes the fields shown in the display.

Field	Description
Open Connections	Number of LLC2 connections active on the SAP.
Max Connections	Highest number of LLC2 connections concurrently active on that SAP since the SAP has been active.

The following sample displays statistics for all LLC2 connections on channel 2/2.

```
router#sho ext ch 5/2 llc2 stats 4000.1010.2020 04
LAN Token 0 Adapter 0 4000.1010.2020
Local SAP=04
TESTRspIn      =          0  TESTCmdsOut    =          0
XIDCmdsIn      =         14  XIDCmdsOut    =         16
XIDRspIn       =          4  XIDRspOut     =          0
UIFramesIn     =          0  UIFramesOut   =          0
UIOctetsIn     =          0  UIOctetsOut   =          0
ConnectOk      =          2  ConnectFail   =          0
DiscNorm       =          0  DiscByTmr     =          0
DiscByFRMRSent =          0  DiscByFRMRRcvd =          0
DMsInABM      =          0  SABMEsInABM  =          0
```

The following table describes the fields shown in the display. All statistics for SAPs are based on the time the SAP was last opened.

Field	Description
TESTRspIn	Number of TEST responses received on this SAP for TEST commands sent by VTAM (connect out).
TESTCmdsOut	Number of TEST commands sent by this SAP to explore for a remote MAC address (VTAM connect out).
XIDCmdsIN	Number of XID commands received by this SAP from a remote link station.
XIDCmdsOut	Number of XID commands sent by this SAP to a remote link station.
XIDRspIN	Number of XID responses received by this SAP from a remote link station.
XIDRspOut	Number of XID responses sent by this SAP to a remote link station.
UIFramesIn	Number of Unnumbered I-frames received by this SAP from a remote link station.
UIFramesOut	Number of Unnumbered I-frames sent by this SAP to a remote link station.
UIOctetsIn	Number of Unnumbered I-frame bytes received by this SAP from a remote link station.
UIOctetsOut	Number of Unnumbered I-frame bytes sent by this SAP to a remote link station.
ConnectOk	Number of successful LLC2 connection attempts on this SAP.
ConnectFail	Number of LLC2 connections that failed.
DiscNorm	Number of normal LLC2 connection disconnections.
DisByTmr	Number of LLC2 connections disconnected due to the CIP LLC2 link station not getting responses to polls from the remote LLC2 station, typically due to the remote station being powered off or a severe network failure/congestion. The CIP generates an event each time it detects this condition. The event can be configured to generate a NetView alert, SNMP trap, or a router console message.
DiscByFRMRSent	Number of times a CIP LLC2 connection disconnected after detecting a protocol violation and sending a FRNR to the remote LLC2 station. The CIP generates an event each time it detects this condition. The event can be configured to generate a NetView alert, SNMP trap, or a router console message.

show extended channel llc2

Field	Description
DiscByFRMRrcvd	Number of times the CIP LLC2 connection disconnected after the remote LLC2 station detected a protocol violation and sent a FRMR to the CIP LLC2 station. The CIP generates an event each time it detects this condition. The event can be configured to generate a NetView alert, SNMP trap, or a router console message.
DMsInABM	Number of times the CIP LLC2 station went into disconnect mode after receiving a DM. The CIP generates an event each time it detects this condition. The event can be configured to generate a NetView alert, SNMP trap, or a router console message.
SABMEDsInABM	Number of times the CIP LLC2 station went into disconnect mode after receiving a SABME from the LLC2 station. The CIP generates an event each time it detects this condition. The event can be configured to generate a NetView alert, SNMP trap, or a router console message.

The following sample displays statistics for all LLC2 connections on

```
router#sho ext ch 5/2 llc2 oper 4000.1010.2020 04 4000.1234.1030 18
LAN Token 0 Adapter 0 4000.1010.2020
Local SAP=04 Remote MAC=4000.1234.1030 Remote SAP=18 State=normal
t1-time = 1000 tpf-time = 1000 trej-time = 3200 tbusy-tim = 9600
idle-time =60000 local-win = 7 recv-wind = 7 N2 = 8
N1-Send = 4105 N1-Rcv = 4105 ack-delay = 100 ack-max = 3
Nw = 0 Ww = 7
Last Ww Cause = neverInvoked
Connection Time: 17:50:11
Last modified: never
```

The following table describes the fields shown in the display. The output reflects the LLC2 parameters in use by the LLC2 connection. These parameters are the ones configured on the internal adapter 4000.0000.0001 at the time the LLC2 connection was established. If the LLC2 parameters on the internal adapter are changed while this connection is active, the connection will not reflect the changes to the adapter.

Field	Description
State	<ul style="list-style-type: none"> • aDM • setup • conn • normal • busy • reject • await • awaitBusy • awaitReject • discConn • reset • error • pendDiscRsp <p>The descriptions for each state can be found in Section 7.8.3, IOS 8802-2 : 1989, ANSI/IEEE Std 802.2 - 1989.</p>
t1-time	Length of time the CIP waits for an acknowledgment to a transmitted I-frame before polling the remote LLC2 station.
tpf-time	Amount of time the CIP waits for a final response to a poll before resending the original poll frame.
trej-time	Amount of time the CIP waits for a correct frame after sending a reject command to a remote LLC2 station.
tbusy-tim	Amount of time the CIP waits before repolling a busy LLC2 station.
idle-time	Frequency of polls during periods of idle traffic.
local-win	Maximum number of I-frames that a CIP LLC2 connection can send to the remote LLC2 station without receiving an acknowledgment.
rcv-wind	Maximum number of I-frames that a CIP LLC2 connection can receive without receiving an acknowledgment.
N2	Number of times a CIP LLC2 connection will resend an unacknowledged I-frame
N1-Send	Largest frame size this LLC2 link station is allowed to send.
N1-Rcv	Largest frame size this LLC2 link station can receive.
ack-delay	Maximum amount of time the CIP allows received I-frames to remain unacknowledged. The CIP LLC2 connection will acknowledge received I-frames within the ack-delay time.
ack-max	Maximum number of I-frames a CIP LLC2 connection receives before sending an acknowledgment.
Nw	Working send window size. When I-frames sent by a CIP LLC2 connection are rejected by the remote LLC2 station, the CIP LLC2 connection reduces its working send window size to 1. Then, for every subsequent I-frame sent by the CIP LLC2 connection that is positively acknowledged by the remote LLC2 station, the CIP increases its working send window by the Nw value until the working send window reaches the configured local-window value.

show extended channel llc2

Field	Description
Ww	Current working window size for this LLC2 link station. This is the current number of unacknowledged I-frames that this LLC2 link station will send.
Last Ww Cause	Last event that caused the working window to change values. Valid values are: <ul style="list-style-type: none">• neverInvoked - This LLC2 station has not detected a condition to change the working window from the initial value at activation time.• lostData - The current working window value was changed due to loss of data by the remote LLC2 link station• macLayerCongestion - The current working window value was changed due to the remote end station sending this LLC2 link station a RNR frame.
Connection Time	Length of time this LLC2 connection has been active.
Last modified	Length of time since one of the LLC2 parameters for this connection was last modified.

The following sample displays statistics for all LLC2 connections between LMAC 4000.1010.2020 LSAP 04 and RMAC 4000.1234.1030 RSAP 18.

```
router#sho ext ch 5/2 llc2 stats 4000.1010.2020 04 4000.1234.1030 18
LAN Token 0 Adapter 0 4000.1010.2020
Local SAP=04 Remote MAC=4000.1234.1030 Remote SAP=18
LocalBusies      =          0 RemoteBusies    =          0
IFramesIn       =          1 IFramesOut     =          1
IOctetsIn       =         19 IOctetsOut    =         21
SFramesIn       =          0 SFramesOut    =          0
REJsIn          =          0 REJsOut       =          0
RetransmitsOut  =          0 WwCountChanges =          0
```

The following table describes the fields shown in the display.

Field	Description
LocalBusies	Number of times the CIP LLC2 link station entered the busy state. This occurs for a CIP LLC2 link station when there are n I-Frames received from the remote LLC2 station on the CIP queued to be sent over the channel to VTAM. Where n is 2 times the rcv-wind. The CIP LLC2 link station will also enter into busy state whenever it receives a flow control command from VTAM.
RemoteBusies	Number of times the remote LLC2 link station entered into busy state.
IFramesIn	Number of LLC2 Information Frames received by the CIP LLC2 link station from the remote link station.
IFramesOut	Number of LLC2 Information Frames sent by the CIP link station to the remote link station.
IOctetsIn	Number of LLC2 Information Frame bytes received by the CIP LLC2 link station from the remote link station.
IOctetsOut	Number of LLC2 Information Frame bytes sent by the CIP link station to the remote link station.
SFramesIn	Number of LLC2 supervisory frames received by the CIP link station from the remote link station. These include RRs, RNRs and REJs.
SFramesOut	Number of LLC2 supervisory frames sent by the CIP link station to the remote link station. These include RRs, RNRs and REJs.
REJsIn	Number of LLC2 REJ frames received by the CIP link station from the remote link station. This indicates the number of times the remote link station detected dropped I-Frames sent from the CIP LLC2 station.
REJsOut	Number of LLC2 REJ frames sent by the CIP link station to the remote link station. This indicates the number of times the CIP link station detected dropped I-Frames sent by the remote link station.
RetransmitsOut	Number of I-Frames the CIP link station was required to retransmit.
WwCountChanges	Number of times the CIP LLC2 link station changed its working send window (local-win). See Nw above for a description of when the LLC2 link stations working send window is changed.

show extended channel max-llc2-sessions

Use the **show extended channel max** privileged EXEC command to display information about the number of LLC2 sessions supported on the CIP.

show extended channel *slot/port* **max-llc2-sessions**

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
max-llc2-sessions	Display the maximum number of LLC2 sessions supported on the CIP.

Default

Are there any defaults we should mention?

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0(3).

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel max-llc2-sessions** command:

```
router# show extended channel 1/2 max-llc2-sessions
Administrative max-llc2-sessions = 1000
Operational max-llc2_sessions = 1000
Highest concurrent LLC2 sessions = 30
LLC2 session allocation failures = 0
```

The following table describes the fields shown in the display.

Table 65 Show extended channel max-llc2-sessions Field Descriptions

Field	Description
Administrative max-llc2-sessions	Maximum number of LLC2 sessions configured.
Operational max-llc2-sessions	Maximum number of LLC2 sessions configured on the CIP. This value differs from the value for the administrative max-llc2-sessions if the maximum number of LLC2 sessions is decreased by configuring a new value while the CIP virtual interface is up. If the CIP's virtual interface is reset (shut / no shut), both the administrative and operational max-llc2-sessions numbers will match.
Highest concurrent llc2 sessions	Highest number of LLC2 sessions active concurrently since the CIP LLC2 was started. When the CIP llc2 is initiated, the following message displays: <pre>%CIP1-6-MSG: %MSG802-6-LLC_START: Starting LLC-2 with a session capacity of 1000</pre>
LLC2 session allocation failure	Number of times network devices tried to establish an LLC2 connection with the CIP and failed because the operational max-llc2-sessions limit was reached when the the connection was attempted

show extended channel statistics

Use the **show extended channel statistics** privileged EXEC command to display information about the CIP interfaces on the Cisco 7000 series. This command displays information that is specific to the interface hardware. The information is generally useful only for diagnostic tasks performed by technical support personnel.

show extended channel *slot/port* **statistics** [*path* [*device-address*]]

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
<i>path</i>	(Optional) Hexadecimal value in the range 0x0000 to 0xFFFF. This specifies the data path and consists of two digits for the physical connection (either on the host or on the ESCON Director switch): one digit for the control unit address, and one digit for the channel logical address. If not specified, the control unit address and channel logical address default to 0.
<i>device-address</i>	(Optional) Hexadecimal value in the range 0x00 to 0xFE. This value is the unit address associated with the control unit number and path as specified in the host IOCP file. For CLAW and offload support, the device address must have an even value.

Default

The data path default for the control unit address and the channel logical address is 0.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel statistics** command:

```
router# show extended channel 3/0 statistics

Path: C300 - ESTABLISHED

```

Dev	Connects	Command Retries	Cancel	Selective Reset	System Reset	Device Errors	CU Busy
60	92	85	5	4	1	0	0
61	94	0	4	3	1	0	0

Dev-Lnk	Blocks		Bytes		Dropped Blk		Memd	
	Read	Write	Read	Write	Read	Write	wait	Con
60-00	6	0	192	0	8	0	0	Y
60-01	82	0	7373	0	0	0	0	Y
Total:	88	0	7565	0	8	0	0	
61-00	0	4	0	128	0	0	0	Y
61-01	0	85	0	9081	0	0	0	Y
Total:	0	89	0	9209	0	0	0	
Path C300								
Total:	88	89	7565	9209	8	0	0	

Last stats 8 seconds old, next in 2 seconds

Table 66 describes the fields shown in the display.

Table 66 Show Extended Channel Statistics Field Descriptions

Field	Description
Path	The path from the CLAW, offload, or CSNA configuration. It tells which port on the switch is used by the channel side of the configuration.
Dev	The device address for each device. For CLAW you get two device addresses. In the configuration statement, you only specify the even address. Both CLAW and offload get two devices and CSNA gets 1.
Connects	The number of times the channel started a channel program on the device.
Command Retries	The number of times the CIP either had no data to send to the channel (for the read subchannel) or the number of times the CIP had no buffers to hold data from the channel (for the write subchannel). Every command retry that is resumed results in a connect. A command retry may be ended via a cancel.
Cancel	The host requested any outstanding operation to be terminated. It is a measure of the number of times the host program was started.
Selective Reset	Selective reset affects only one device, whereas a system reset affects all devices on the given channel. It is a reset of the device. On VM this will occur whenever you have a device attached and issue a CP IPL command.
System Reset	The number of times the system Initial program load (IPL) command was issued. The command is always issued when the ECA is initialized, and when the channel is taken off line.
Device Errors	Errors detected by the ECA or PCA due to problems on the link. This value should always be 0.
CU Busy	The number of times the adapter returned a control unit busy indication to the host. This occurs after a cancel or reset if the host requests an operation before the CIP has finished processing the cancel or reset.
Dev-Lnk	The first number is the device address. The second number is the logical link. Link 0 is always used for CLAW control messages. For IP datagram mode, link 1 is for actual datagram traffic. For offload, link 2 is for API traffic. For CSNA, the Dev-Lnk is not relevant.
Blocks Read/Blocks Write	CLAW uses the even subchannel for reads and the odd subchannel for writes. Each count is one IP datagram or one control message.

Table 66 Show Extended Channel Statistics Field Descriptions (Continued)

Field	Description
Bytes Read/Bytes Write	Bytes is the sum of the bytes in the blocks.
Dropped Blk Read/Write	If the router switch processor sends data to the CIP faster than it can send it to the channel, then the block is dropped. High values mean the host is not running fast enough. There are drops on write too. A write drop will occur if the CIP fails to get a MEMD buffer <i>n</i> times for a given block. See Memd wait counter.
Memd wait	The number of times the CIP could not obtain a MEMD buffer on the first try. If this value is high, try allocating more large buffers. The Memd information does not apply to CSNA devices.
Con	For link 0, connect of Y means the system validation has completed. For all other links, it means the connection request sequence has completed. Con is an abbreviation for connected. For CSNA devices, a value of Y is displayed when the CSNA device status becomes setupComplete. For all other states, the Con shows a value of N.

show extended channel subchannel

Use the **show extended channel subchannel** privileged EXEC command to display information about the CIP interfaces on the Cisco 7000 series. This command displays information that is specific to the interface hardware. The information displayed is generally useful only for diagnostic tasks performed by technical support personnel.

show extended channel *slot/port* **subchannel**

Syntax Description

slot Slot number.

port Port number.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel subchannel** command:

```
router# show extended channel 3/0 subchannel

Channel3/0: state up
  Flags: VALID ESCON LOADED RQC_PEND MEMD_ENABLED
  Link: C4, Buffers 0, CRC errors 0, Load count 1
  Link Incident Reports
    implicit 0, bit-error 0, link failed 0,
    NOS 0, sequence timeout 0, invalid sequence 0
  Neighbor Node - VALID
    Class: Switch           Type Number : 009033           Tag: C4
    Model: 001              Manufacturer: IBM
    Plant: 51               Sequence      : 000000010067
  Local Node - VALID
    Class: CTCA-standalone Type Number : C7000           Tag: 30
    Model: 0                Manufacturer: CSC
    Plant: 17               Sequence      : 00000C04953F

Mode      Path Device                               Last Sense
CLAW      C300  60  198.92.1.58 CISCOVM AUBURN TCPIP TCPIP      0000
CLAW      C300  61  198.92.1.58 CISCOVM AUBURN TCPIP TCPIP      0080

Last stats 1 seconds old, next in 9 seconds
```

The first line describes the status of the specified CIP and port. The status can be up, down, or administratively down:

```
Channel3/0: state up
```

The next line describes the flags on the CIP:

```
Flags: VALID ESCON LOADED RQC_PEND MEMD_ENABLED
```

- VALID—An adapter is installed. All displays should contain this.
- ESCON—The adapter is an ESCON adapter.
- LOADED—The microcode on the adapter is loaded.
- RQC_PEND—The adapter is attempting to send status to the channel.
- MEMD_ENABLED—The adapter is allowed to send and receive datagrams.
- SIGNAL—The ECA signal light is detected.

The next line describes Link information on the CIP:

```
Link: C4, Buffers 0, CRC errors 0, Load count 1
```

- Link: xx - The Director Port number the physical channel is connected to. If the physical channel is direct connected, then this value is host dependent.
- Buffers - Number of times the CIP has dropped a packet bound for the route processor because no packet switching buffer was available on the route processor.
- CRC errors - Number of CRC errors detected on the channel for ESCON. Number of parity errors detected on the channel for Parallel.
- Load Count - For a CIP physical channel interface, this is the number of times the channel adapter microcode has been loaded.

The next line displays Link Incident Reports:

```
Link Incident Reports  
implicit 0, bit-error 0, link failed 0,  
NOS 0, sequence timeout 0, invalid sequence 0
```

Link Incidents are errors on an ESCON channel. These errors are reported to the host operating system and are recorded here for additional information.

Implicit incidents indicate a recoverable error occurred in the ECA.

Bit errors indicate the bit error rate threshold was reached. The bit error rate threshold is 15 error bursts within 5 minutes. An error burst is defined as a time period of 1.5+/-0.5 seconds during which one or more code violations occurred. A code violation error is caused by an incorrect sequence of 10 bit characters.

Link failed means a loss of synchronization or light has occurred.

NOS means the channel or switch transmitted the Not Operational Sequence.

Sequence timeout occurs when a connection recovery timeout occurs or when waiting for the appropriate response while in the transmit off-line sequence (OLS) state.

Invalid Sequence occurs when a UD or UDR is recognized in the wait for offline sequence state. UD is an unconditional disconnect and UDR is an unconditional disconnect response.

The neighbor node describes the channel or switch. The local node describes the router. The VALID flag shows information has been exchanged between the router and channel or switch.

The information displayed under Neighbor Node is as follows:

```
Neighbor Node - VALID  
Class: Switch           Type Number : 009033       Tag: C4  
Model: 001              Manufacturer: IBM  
Plant: 51               Sequence      : 000000010067
```

Class will be switch or channel depending on whether the connection is a switched point-to-point connection or a point-to-point connection. The type number describes the model of switch or processor. The TAG describes the physical location of the connector. Model is a further classification of type. Manufacturer describes who made switch or processor. Plant and sequence are manufacturer specific information to uniquely define this one device.

The information displayed under Local Node is as follows:

```
Local Node - VALID
  Class: CTCA-standalone Type Number : C7000          Tag: 30
  Model: 0                Manufacturer: CSC
  Plant: 17               Sequence      : 00000C04953F
```

The class will be CTCA. The type number and model define the router. The tag is the slot and port where the channel interface processor resides. Manufacturer will always be CSC (for Cisco Systems). Plant is the location where the CIP was manufactured. Sequence is the base Ethernet address assigned to the route processor (RP).

The last three lines show currently configured information for the inbound and outbound channel connections:

Mode	Path	Device							Last Sense
CLAW	C300	60	198.92.1.58	CISCOVM	AUBURN	TCPIP	TCPIP		0000
CLAW	C300	61	198.92.1.58	CISCOVM	AUBURN	TCPIP	TCPIP		0080

Mode can be CLAW, offload, or CSNA. Path, device, IP address, and names are from the CLAW command. Because CLAW and offload commands define two devices, both devices are shown. Last sense is the two bytes of sense data transmitted to the host at the time of the last unit exception. Normally the value will be 0000 if no unit exception has occurred, or 0080 to indicate that a resetting event has occurred. Resetting events occur whenever an ESCON device starts unless the first command is a 0x02 read command. The CLAW read subchannel always starts with a 0x02 read command so a resetting event will not occur.

show extended channel tcp-connections

Use the **show extended channel tcp-connections** EXEC command to display information about the Transmission Control Protocol (TCP) sockets on a channel interface.

```
show extended channel slot/port tcp-connections [[loc-ip-addr [loc-port [rem-ip-addr [rem-port]]] [detail | summary]
```

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
tcp-connections	Specifies TCP connections display.
<i>loc-ip-addr</i>	(Optional). Local IP address. IP address of the local connection endpoint. Restricts the output to those connections with a matching local IP address.
<i>loc-port</i>	(Optional). Local TCP port. This is the TCP port of the local connection endpoint. Restricts the output to those connections with a matching local TCP port. An asterisk (*) is a wildcard that matches every port.
<i>rem-ip-addr</i>	(Optional). Remote IP address. IP address of the remote connection endpoint. Restricts the output to those connections with a matching remote IP address.
<i>rem-port</i>	(Optional). Remote TCP port. TCP port of the remote connection endpoint. Restricts the output to those connections with a matching remote TCP port.
detail	(Optional). Prints detailed information about every matching connection.
summary	(Optional). This is the default. Prints a summary of all matching connections.

Command Mode

EXEC for summary and Privileged EXEC for detail.

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

The **show extended channel tcp-connections** command is valid on both physical and virtual channel interfaces. If no IP addresses or TCP ports are specified, all TCP connections are displayed in a summary for the specified interface.

The command displays detailed information about a large number of sessions that can take a long time. Consider restricting the output by IP address and TCP port to connections of interest.

Sample Display

The following is sample output for the **show extended channel tcp-connections detail** command:

```
Router#show extended channel 0/1 tcp-connections detail
```

Local IP Addr	Port	Remote IP Addr	Port	State	In Bytes	Out Bytes
80.11.198.2	21	0.0.0.0	0	listen	0	0
80.11.198.2	21	172.18.48.194	38668	establish	62	298
80.11.198.2	23	0.0.0.0	0	listen	0	0
80.11.198.2	23	172.18.48.194	38666	establish	124	11966
80.11.198.2	1025	0.0.0.0	0	listen	0	0
80.11.198.2	1025	172.18.48.194	38705	closeWait	24	1
80.11.198.3	7	0.0.0.0	0	listen	0	0
80.11.198.3	9	0.0.0.0	0	listen	0	0
80.11.198.3	19	0.0.0.0	0	listen	0	0
80.11.198.3	21	0.0.0.0	0	listen	0	0
80.11.198.3	23	0.0.0.0	0	listen	0	0
80.11.198.3	23	172.18.48.194	38667	establish	85	446

The following is sample output for the **show extended channel tcp-connections summary** command:

```
Router# show extended channel 0/1 tcp-connections summary
```

```
TCP Connections=12  Input Bytes=      294  Output Bytes=    13049
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

pu (direct)

pu (DLUR)

offload

show extended channel tcp-stack

show extended channel tcp-stack

Use the **show extended channel tcp-stack** privileged EXEC command to display information about the TCP stack running on the CIP interfaces in a Cisco 7000 series.

show extended channel *slot/port tcp-stack* [*ip-address*]

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
tcp-stack	IP address for the TCP stack on the CIP.
<i>ip-address</i>	(Optional) Offload or TN3270-server IP address.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output from the **show channel tcp-stack** command:

```
router# show extended channel tcp-stack

TCP Statistics for IP Address 198.92.1.120
RtoAlgorithm: other      RtoMin      : 101      RtoMax      : 102
MaxConn      : 103      ActiveOpens : 104      PassiveOpens: 105
AttemptFails: 106      EstabResets : 107      CurrEstab  : 108
InSegs      : 109      OutSegs     : 110      RetransSegs: 111
InErrs      : 112      OutRsts     : 113

TCP Statistics for IP Address 198.92.1.121
RtoAlgorithm: constant  RtoMin      : 102      RtoMax      : 103
MaxConn      : 104      ActiveOpens : 105      PassiveOpens: 106
AttemptFails: 107      EstabResets : 108      CurrEstab  : 109
InSegs      : 110      OutSegs     : 111      RetransSegs: 112
InErrs      : 113      OutRsts     : 114
```

Table 67 describes the fields shown in the display.

Table 67 Show Extended Channel tcp-stack Field Descriptions

Field	Description
RtoAlgorithm	The algorithm used to determine the timeout value used for retransmitting unacknowledged octets.
RtoMin	The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the LBOUND quantity described in RFC 793.
RtoMax	The maximum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the UBOUND quantity described in RFC 793."
MaxConn	The limit on the total number of TCP connections the entity can support. In entities where the maximum number of connections is dynamic, this object should contain the value -1.
ActiveOpens	Number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state.
PassiveOpens	Number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.
AttemptFails	Number of times TCP connections have made a direct transition to the CLOSED state from either the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the LISTEN state from the SYN-RCVD state.
EstabResets	Number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE-WAIT state.
CurrEstab	Number of TCP connections for which the current state is either ESTABLISHED or CLOSE- WAIT.
InSegs	Total number of segments received, including those received in error. This count includes segments received on currently established connections.
OutSegs	Total number of segments sent, including those on current connections but excluding those containing only retransmitted octets.
RetransSegs	Total number of segments retransmitted - that is, the number of TCP segments transmitted containing one or more previously transmitted octets.
InErrs	Total number of segments received in error (for example, bad TCP checksums).
OutRsts	Number of TCP segments sent containing the RST flag.

Related Commands

You can use the master indexes or search online to find documentation of related commands.

pu (direct)

pu (DLUR)

offload

show extended channel tn3270-server

Use the **show extended channel tn3270-server** privileged EXEC command to display current server configuration parameters and the status of the PUs defined in each TN3270 server.

show extended channel *slot/2* tn3270-server

Syntax Description

slot/2 Specifies a particular CIP in the router where *slot* is the slot number. The port value for a TN3270 server is always 2.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server** command:

```
router# show extended channel 3/2 tn3270-server

<current stats> < connection stats > <response time(ms)>
server-ip:tcp      lu in-use  connect disconn fail  host  tcp
172.28.1.106:23   510    1      12      11    0    54   40
172.28.1.107:23   511    0       0       0    0     0    0
172.28.1.108:23   255    0       0       0    0     0    0
total             1276    1
configured max_lu 20000
idle-time 0      keepalive 1800      unbind-action disconnect
tcp-port 23      generic-pool permit no timing-mark
dlur MPX.GOANCP      status NOTQRYD SHUT
dlus MPX.NGMVMPC

name(index)  ip:tcp      xid  state  link  destination  r-lsap
EXT2(1)     172.28.1.106:23  05D18092 ACTIVE tok 0 4000.7470.00e7 08 04
PUS10(2)    172.28.1.107:23  05D19010 ACTIVE tok 0 4000.7470.00e7 08 2C
PUS11(3)    172.28.1.107:23  05D19011 ACTIVE tok 0 4000.7470.00e7 08 28
PUS12(4)    172.28.1.108:23  05D19012 ACTIVE tok 0 4000.7470.00e7 08 24
PUS9(5)     172.28.1.109:23  05D18509 SHUT   tok 0 4001.3745.1088 04 40
SDTF(7)     172.28.1.107:23  12345678 ACTIVE tok 0 0800.5a4b.1cbc 04 08
TEST(8)     172.28.1.106:23  05D18091 ACTIVE tok 0 4000.7470.00e7 08 30
INT1(6)     172.28.1.106:23  05D18091 SHUT   dlur
```

Table 68 describes significant fields in the display. Those fields not described correspond to configured values.

Table 68 Show tn3270-server Field Descriptions

Field	Description
SERVER-IP:TCP	IP address and TCP port number, listening point, configured on one or more PUs.
LU <i>number</i>	Total number of LUs available for this listening point.
IN-USE <i>number</i>	Number of LUs currently in use.
CONNECT <i>number</i>	Total number of connect ins since the TN3270 feature was started.
DISCONN <i>number</i>	Total number of disconnects since the TN3270 feature was started.
FAIL <i>number</i>	Total number of failed connects since the TN3270 feature was started.
RESPONSE TIME, HOST <i>number</i>	The average response time from the host across all sessions through this server IP address. This is measured from sending CD to the host to receiving the reply.
RESPONSE TIME, TCP <i>number</i>	Average response time from the clients on this server IP address. This is measured only when TIMING MARKs are sent. If no timing-mark is configured, they are only sent on special occasions, such as Bind.
IDLE-TIME <i>number</i>	Configured idle-time for this PU.
KEEPALIVE <i>number</i>	Configured keepalive for this PU.
UNBIND-ACTION <i>type</i>	Configured unbind action for LUs on this PU.
TCP-PORT <i>number</i>	Configured TCP port number.
GENERIC-POOL <i>type</i>	Configured generic-pool for LUs on this PU.
DLUR <i>fq-cpname</i>	Configured fully qualified DLUR CP name.
STATUS	Possible dlur-dlus-status values and their meanings are: reset—The DLUR-DLUS pipe is reset. pnd-actv—The DLUR-DLUS pipe is pending active. active—The DLUR-DLUS pipe is active. pnd-inac—The DLUR-DLUS pipe is pending inactive.
DLUS <i>fq-dlusname</i>	Currently active DLUS.
NAME <i>pu-name</i>	This is the name of the PU as configured.
IP:TCP <i>ip-addr:tcpport</i>	IP address and TCP port number configured for the PU.
XID <i>number</i>	Configured XID - idblk and idnum.

Table 68 Show tn3270-server Field Descriptions (Continued)

Field	Description
STATE <i>value</i>	<p>Possible STATE values and their meanings are:</p> <ul style="list-style-type: none"> • shut—The PU is configured but in shut state. • reset—The link station of this PU is not active. • test—PU is sending a TEST to establish link. • xid—TEST is responded, XID is sent. • p-actpu—The link station is up but no ACTPU is received. • active—ACTPU is received and acknowledged positively. • act/busy—Awaiting host to acknowledge the SSCP-PU data. • wait—Waiting for PU status from CIP. • other—PU in undefined state. • p-rqactpu-r—DLUR PU is pending request ACTPU response. • p-active—ACTPU received by DLUR but not yet passed to PU. • p-dactpu—PU is pending DACTPU.
LINK <i>type</i>	LINK type is either internal adapter type and internal adapter number or dlur if it is a SNA Session Switch PU.
DESTINATION <i>mac-address or PU-name</i>	If a direct PU, then it is the destination MAC address, otherwise, it is the name of the partner PU.
R-LSAP <i>number number</i>	Remote and local SAP values.

show extended channel tn3270-server client-ip-address

Use the **show extended channel tn3270-server client-ip-address** privileged EXEC command to display information about all clients at a specific IP address.

show extended channel *slot/2* tn3270-server client-ip-address *ip-address* [disconnected | in-session | pending]

Syntax Description

<i>slot/2</i>	(Optional) Specifies a particular CIP in the router where <i>slot</i> is the slot number. The port value for a TN3270 server will always be 2.
<i>ip-address</i>	IP address of the client.
disconnected	(Optional) Shows all clients with <i>ip-address</i> in disconnected state. Disconnected state refers to an LU session state of ACTIVE or INACTIVE. In this case, the <i>ip-address</i> refers to the client that last used the LU.
in-session	(Optional) Shows all clients with <i>ip-address</i> in active session state. Active session state refers to an LU session state of ACT/SESS.
pending	(Optional) Shows all clients with <i>ip-address</i> in pending state. Pending session state refers to an LU session state of P-SDT, P-ACTLU, P-NTF/AV, P-NTF/UA, P-RESET, P-PSID, P-BIND, P-UNBIND, WT-UNBND, WT-SDT or UNKNOWN.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Sample Displays

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server client-ip-address** command. The example shows only active sessions because no other session types exist at this client IP address.

```
router# show extended channel 3/2 tn3270-server client-ip 192.195.80.40

lu   name  client-ip:tcp      state  model  frames in out  idle for
1   PUS11001 192.195.80.40:3169 ACT/SESS 327804 5      5      0:5:47

pu is PUS11, lu is DYNAMIC type 2, negotiated TN3270
bytes 155 in, 1758 out; RuSize 1024 in, 3840 out; NegRsp 0 in, 0 out
pacing window 0 in, 1 out; credits 0 in, queue-size 0 in, 0 out
```

```
traces:
  Client disconnect req
  Reply PSID pos rsp
  actlu req
  bind req
  sdt req
```

The following is sample output using the **disconnected** argument:

```
Router# show extended channel 2/2 tn3270 client-ip 10.14.1.21 disconnected
Total 2 clients found using 10.14.1.21
```

The following is sample output using the **in-session** argument:

```
Router# show extended channel 2/2 tn3270 client-ip 10.14.1.21 in-session
Note: if state is ACT/NA then the client is disconnected

lu   name   client-ip:tcp      nail state   model   frames in out   idle for
3    PU1L03  10.14.1.21:35215  N   ACT/SESS 327804    317    316    0:0:1

pu is PU1, lu is DYNAMIC type 2, negotiated TN3270
bytes 12167 in, 225476 out; RuSize 2048 in, 1536 out; NegRsp 0 in, 0 out
pacing window 0 in, 1 out; credits 0 in, queue-size 0 in, 0 out
Note: if state is ACT/NA then the client is disconnected

lu   name   client-ip:tcp      nail state   model   frames in out   idle for
4    PU1L04  10.14.1.21:35216  N   ACT/SESS 327804    317    316    0:0:1

pu is PU1, lu is DYNAMIC type 2, negotiated TN3270
bytes 12167 in, 225476 out; RuSize 2048 in, 1536 out; NegRsp 0 in, 0 out
pacing window 0 in, 1 out; credits 0 in, queue-size 0 in, 0 out
Note: if state is ACT/NA then the client is disconnected
Total 2 clients found using 10.14.1.21
```

The following is sample output using the **pending** argument:

```
Router# show extended channel 2/2 tn3270 client-ip 10.14.1.21 pending
Total 2 clients found using 10.14.1.21
```

Table 69 describes significant fields in the display.

Table 69 Show tn3270-server client-ip-address Field Descriptions

Field	Description
LU <i>locaddr</i>	LOCADDR of the LU.
LU <i>lu-name</i>	If the PU is directly connected, then the name shown is the one generated by the seed. If DLUR, then only the unqualified portion is shown. The NETID portion will be the same as the current DLUS.
CLIENT-IP:TCP <i>ip-addr:tcpport</i>	Client's IP address and TCP port number
STATE <i>lu-state</i>	The LU state and their meanings are: <ul style="list-style-type: none"> • unknown—LU in an undefined state. • inactive—LU didn't receive ACTLU. • active—LU received ACTLU and acknowledged positively. • p-sdt—LU is bound but there is no SDT yet. • act/sess—LU is bound and in session. • p-actlu—Telnet connects in and is waiting for ACTLU. • p-ntf/av—Awaiting host notify-available response. • p-ntf/ua—Awaiting host notify-unavailable response. • p-reset—Awaiting a buffer to send DACTLU response. • p-psid—Awaiting NMVT Reply PSID response. • p-bind—Waiting for host to send bind. • p-unbind—Awaiting host unbind response. • wt-unbnd—Waiting for client to acknowledge disconnection. • wt-sdt—Waiting for client to acknowledge SDT.
MODEL <i>model</i>	3278 model type of client; blank if STATIC LU.
FRAMES IN <i>number</i>	Number of frames sent inbound to the host.
FRAMES OUT <i>number</i>	Number of frames sent outbound from the host.
IDLE FOR <i>time</i>	Time the client has been idle. The time is in HH:MM:SS.
PU IS <i>pu-name</i>	Name of the PU.
LU IS <i>type</i>	Whether LU is DYNAMIC or STATIC.
NEGOTIATED <i>type</i>	Whether client is TN3270 or TN3270E.
BYTES IN / OUT <i>number/number</i>	Total number of bytes sent to/received from the host.
RUSIZE IN / OUT <i>number/number</i>	RU size as configured in the bind.
NEGRSP IN / OUT <i>number/number</i>	Number of SNA negative responses sent to/received from the host.
PACING WINDOW IN / OUT <i>number/number</i>	SNA pacing window as configured in the bind.

Table 69 Show tn3270-server client-ip-address Field Descriptions (Continued)

Field	Description
CREDITS IN <i>number</i>	Number of frames that can be sent inbound without requiring an isolated pacing response.
QUEUE SIZE IN <i>number</i>	If non-zero, indicates the number of SNA frames waiting to be sent to the host which are blocked, waiting for a pacing response.
QUEUE SIZE OUT <i>number</i>	SNA frames not yet acknowledged by an isolated pacing response by the TN3270 server.

show extended channel tn3270-server dlur

Use the **show extended channel tn3270-server dlur** privileged EXEC command to display information about the SNA session switch.

show extended channel *slot/2* tn3270-server dlur

Syntax Description

slot/2 Specifies a particular CIP in the router where *slot* is the slot number. The port value for a TN3270 server will always be 2.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server dlur** command:

```
router# show extended channel 3/2 tn3270-server dlur
dlur MPX.GOANCP
current dlus MPX.NGMVMPC          dlur-dlus status ACTIVE
preferred dlus MPX.NGMVMPC        backup dlus MPX.NGMVMPB
preferred server MPX.NGMVMMPA
lsap token-adapter 0 5C          vrn MPX.LAN4          status ACTIVE
link P390                remote 4000.7470.00e7 08 status ACTIVE
```

Table 70 describes significant fields in the display.

Table 70 Show tn3270-server dlur Field Descriptions

Field	Description
DLUR <i>fq-luname</i>	Fully qualified CP name used by the SNA session switch and the LU name for the DLUR function configured as the <i>fq-cpname</i> on the dlur statement.
CURRENT DLUS <i>fq-luname</i>	Name of the currently active DLUS, either the primary DLUS or the backup DLUS.
DLUR-DLUS STATUS <i>dlur-status</i>	Possible <i>dlur-dlus-status</i> values and their meanings are: <ul style="list-style-type: none"> reset—The DLUR-DLUS pipe is reset. pnd-actv—The DLUR-DLUS pipe is pending active. active—The DLUR-DLUS pipe is active. pnd-inac—The DLUR-DLUS pipe is pending inactive.
PREFERRED-DLUS <i>fq-luname</i>	Name of the DLUS as configured on the DLUR statement.
BACKUP-DLUS <i>fq-luname</i>	Name of the DLUS that is used if the preferred DLUS is unavailable.

Table 70 Show tn3270-server dlur Field Descriptions (Continued)

Field	Description
PREFERRED SERVER <i>fq-luname</i>	Fully qualified name of the preferred network node server.
LSAP	Configured value for the local SAP on the configured internal adapter. Token-adapter specifies the type of internal adapter used.
VRN <i>fq-name</i>	Name of the connection network as configured by the <i>vrn</i> statement for this LSAP and internal adapter pair.
LSAP...STATUS <i>status</i>	Possible <i>sap-status</i> values and their meanings are: <ul style="list-style-type: none"> • inactive—Not connected to adapter. • pnd-actv—SAP activation in progress. • active—SAP open. • pnd-inac—SAP deactivation in progress.
LINK <i>name</i>	Name of the configured link. If not a configured link, then the name is an invented name, @DLUR <i>nn</i> .
REMOTE <i>mac sap</i>	Remote MAC and SAP for this link.
LINK...STATUS <i>status</i>	Possible <i>link-status</i> values and their meanings are: <ul style="list-style-type: none"> • inactive—Not connected to host. • pnd-actv—Link activation in progress. • active—Link active. • pnd-inac—Link deactivation in progress.

show extended channel tn3270-server dlurlink

Use the **show extended channel tn3270-server dlurlink** privileged EXEC command to display information about the DLUR components.

show extended channel *slot/2* tn3270-server dlurlink *name*

Syntax Description

slot/2 Specifies a particular CIP in the router where slot is the slot number. The port value for a TN3270 server will always be 2.

name Name of the SNA session switch link to be displayed.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server dlurlink** command:

```
router# show extended channel 3/2 tn3270-server dlurlink P390

lsap token-adapter 0 5C   vrn MPX.LAN4           status ACTIVE
link P390              remote 4000.7470.00e7 08 status ACTIVE
partner MPX.NGMVMPC    tgn 1                  maxdata 1033
```

Table 71 describes significant fields in the display.

Table 71 Show tn3270-server dlurlink Field Descriptions

Field	Description
LSAP...VRN...STATUS <i>status</i>	Possible <i>sap-status</i> values and their meanings are: <ul style="list-style-type: none"> • inactive—Not connected to adapter. • pnd-actv—SAP activation in progress. • active—SAP open. • pnd-inac—SAP deactivation in progress.
LINK <i>name</i>	Name is an invented name, @DLUR <i>nn</i> , if not a configured link.
LINK ...STATUS <i>status</i>	Possible <i>link-status</i> values and their meanings are: <ul style="list-style-type: none"> • inactive—Not connected to host. • pnd-actv—Link activation in progress. • active—Link active. • pnd-inac—Link deactivation in progress.
PARTNER <i>name</i>	CP name of the remote node for this link.

Table 71 Show tn3270-server dlurlink Field Descriptions (Continued)

Field	Description
TGN <i>tg-number</i>	Transmission group number for this link. Because the SNA session switch only supports 1 transmission group per pair of CP names, it is typically 0 or 1.
MAXDATA <i>maxdata</i>	Maximum frame size allowed on this link.

show extended channel tn3270-server pu

Use the **show extended channel tn3270-server pu** privileged EXEC command to display the PU configuration parameters, statistics and all the LUs currently attached to the PU.

show extended channel *slot/2 tn3270-server pu pu-name*

Syntax Description

extended channel (Optional) Specifies a particular CIP in the router where *slot* is the slot number. The port value for a TN3270 server will always be 2.

pu-name PU name that uniquely identifies this PU.

Command Mode

Privileged EXEC

Usage Guideline

This command first appeared in Cisco IOS Release 11.2.

The display shown depends on whether the PU is a direct PU or a SNA session switch PU.

Sample Displays

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server pu** command for a direct PU:

```
router# show extended channel 3/2 tn3270-server pu EXT2

name(index)  ip:tcp          xid  state  link  destination  r-lsap
EXT2(1)      172.28.1.106:23 05D18092 ACTIVE tok 0 4000.7470.00e7 08 04

idle-time    0      keepalive    0      unbind-act  discon  generic-pool perm
bytes 100 in, out; frames 90 in, 4 out; NegRsp 6 in, 0 out
actlus 4, dacltus 0, binds 0

lu   name  client-ip:tcp  state  model  frames in out  idle for
1   EXT2001  171.69.176.34:1897  ACTIVE  327805  1  1  4:32:49
2   EXT2002  never connected  ACTIVE  1  1  4:32:49
```

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server pu** command for a SNA session switch PU:

```
router# show extended channel 3/2 tn3270-server pu INT1

name(index)  ip:tcp          xid  state  link  destination  r-lsap
INT1(5)      172.28.1.106:23 05D18091 ACTIVE  dlur  MPX.GOAN1

idle-time    0      keepalive    0      unbind-act  discon  generic-pool perm
bytes 50 in, out; frames 87 in, 2 out; NegRsp 3 in, 0 out
actlus 2, dacltus 0, binds 0

lu   name  client-ip:tcp  state  model  frames in out  idle for
1   GOAN1X01  never connected  ACTIVE  1  1  0:32:14
2   GOAN1X02  never connected  ACTIVE  1  1  0:32:14
```

Table 72 describes significant fields in the display.

Table 72 Show tn3270-server pu Field Descriptions

Field	Description
NAME <i>pu-name</i>	Name of the PU as configured.
IP:TCP <i>ip-addr:tcpport</i>	IP address and TCP port number configured for the PU.
XID <i>number</i>	Configured XID - idblk and idnum.
STATE <i>pu-state</i>	Possible STATE values and their meanings are: <ul style="list-style-type: none"> • shut—The PU is configured but in shut state. • reset—The link station of this PU is not active. • test—PU is sending a TEST to establish link. • xid—TEST is responded, XID is sent. • p-actpu—The link station is up but no ACTPU is received. • active—ACTPU is received and acknowledged positively. • act/busy—Awaiting host to acknowledge the SSCP-PU data. • wait—Waiting for PU status from CIP. • unknown—Direct PU in undefined state. • p-rqactpu-r—PU is pending request ACTPU response. • p-active—DLUR PU and direct PU states disagree. • p-dactpu—PU is pending DACTPU. • dlur???—DLUR PU is in undefined state.
LINK <i>type</i>	LINK type is either internal adapter type and internal adapter number or dlur if it is a SNA Session Switch PU.
DESTINATION <i>mac-address or PU-name</i>	If a direct PU, then it is the destination MAC address, otherwise, it is the name of the partner PU.
R-LSAP <i>number number</i>	Remote and local SAP values.
IDLE-TIME <i>number</i>	Configured idle-time for this PU.
KEEPALIVE <i>number</i>	Configured keepalive for this PU.
UNBIND-ACT <i>type</i>	Configured unbind action for LUs on this PU.
GENERIC-POOL <i>type</i>	Configured generic-pool for LUs on this PU.
BYTES IN / OUT <i>number/number</i>	Total number of bytes sent to/received from the host for this PU.
FRAMES IN / OUT <i>number/number</i>	Total number of frames sent to/received from the host for this PU.
NEGRSP IN / OUT <i>number/number</i>	Total number of SNA negative responses sent to/received from the host.
ACTLUS <i>number</i>	Total number of ACTLUs received from the host.
DACTLUS <i>number</i>	Total number of DACTLUs received from the host.
BINDS <i>number</i>	Total number of BINDs received from the host.
LU <i>number</i>	LOCADDR of the LU.
NAME <i>lu-name</i>	Name of the TN3270 LU.

Table 72 Show tn3270-server pu Field Descriptions (Continued)

Field	Description
CLIENT-IP:TCP <i>ip-addr:tcpport</i>	Client's IP address and TCP port number.
STATE <i>lu-state</i>	The LU states and their meanings are: <ul style="list-style-type: none"> • unknown—LU in an undefined state. • inactive—LU didn't receive ACTLU. • active—LU received ACTLU and acknowledged positively. • p-sdt—LU is bound but there is no SDT yet. • act/sess—LU is bound and in session. • p-actlu—Telnet connects in and is awaiting ACTLU. • p-ntf/av—Awaiting host notify-available response. • p-ntf/ua—Awaiting host notify-unavailable response. • p-reset—Waiting for a buffer to send DACTLU response. • p-psid—Waiting for NMVT Reply psid response. • p-bind—Waiting for host to send bind. • p-unbind—Awaiting host unbind response. • wt-unbnd—Waiting for client to acknowledge disconnection. • wt-sdt—Waiting for client to acknowledge SDT.
MODEL <i>model</i>	3278 model type of client.
FRAMES IN <i>number</i>	Number of frames sent inbound to the host.
FRAMES OUT <i>number</i>	Number of frames sent outbound from the host.
IDLE FOR <i>time</i>	Time the client has been idle. The time is in HH:MM:SS.

show extended channel tn3270-server pu lu

Use the **show extended channel tn3270-server pu lu** privileged EXEC command to display information about the TN3270 server LUs running on CIP interface in a Cisco 7000 series.

show extended channel *slot/2* **tn3270-server pu** *pu-name* **lu** *locaddr* [**history**]

Syntax Description

<i>slot/2</i>	Specifies a particular CIP in the router where <i>slot</i> is the slot number. The port value for a TN3270 server will always be 2.
<i>pu-name</i>	PU name that uniquely identifies this PU.
<i>locaddr</i>	LU LOCADDR that uniquely identifies the LU.
history	(Optional) Displays the LU trace history.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Sample Displays

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server pu lu** command for a direct PU:

```
router# show extended channel 3/2 tn3270 pu ext2 lu 3

lu   name   client-ip:tcp      state   model   frames in out   idle for
3   EXT2003  171.69.176.77:3829 ACTIVE   327902E  8     9     0:4:43

pu is EXT2, lu is DYNAMIC type 0, negotiated TN3270
bytes 203 in, 2954 out; RuSize 0 in, 0 out; NegRsp 1 in, 0 out
pacing window 0 in, 1 out; credits 0 in, queue-size 0 in, 0 out
```

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server pu lu** command for a SNA session switch PU:

```
router# show extended channel 3/2 tn3270 pu int1 lu 1

lu   name   client-ip:tcp      state   model   frames in out   idle for
1   GOAN1X01 171.69.176.77:3828 ACTIVE                    4     4     0:4:51

pu is INT1, lu is STATIC type 0, negotiated TN3270E
bytes 74 in, 1219 out; RuSize 0 in, 0 out; NegRsp 0 in, 0 out
pacing window 0 in, 0 out; credits 0 in, queue-size 0 in, 0 out
```

The following is sample output on the Cisco 7000 from the **show extended channel tn3270-server pu lu history** command:

```
router# show extended channel 3/2 tn3270 pu pus20 lu 1 history

lu   name   client-ip:tcp      state   model   frames in out   idle for
1    PUS20001 192.195.80.40:2480 ACT/SESS 327804   5     4     0:0:8

pu is PUS20, lu is DYNAMIC type 2, negotiated TN3270
bytes 155 in, 1752 out; RuSize 1024 in, 3840 out; NegRsp 0 in, 0 out> pacing window 0 in,
1 out; credits 0 in, queue-size 0 in, 0 out
traces:
      Client connect req
      Reply PSID pos rsp
      actlu req
      bind req
      sdt req
OUT len=12  2Dxxxxxxxx456B80000D0201
IN  len=25  xxxxxxxxxxx45EB80000D0201000000
OUT len=53  2Dxxxxxxxx466B800031010303B1
IN  len=10  2D0001010646EB800031
OUT len=10  2D00010106476B8000A0
IN  len=10  2D0001010647EB8000A0
OUT len=1677 2Cxxxxxxxx010381C07EC7114040
IN  len=9   2C0001010001838100
```

Table 73 describes significant fields in the display.

Table 73 Show tn3270-server pu lu Field Descriptions

Field	Description
LU <i>locaddr</i>	LOCADDR of the LU.
NAME <i>lu-name</i>	Name of the TN3270 LU.
CLIENT-IP:TCP <i>ip-addr:tcpport</i>	Client's IP address and TCP port number.
STATE <i>lu-state</i>	The LU state and their meanings are: <ul style="list-style-type: none"> • unknown—LU in an undefined state. • inactive—LU didn't receive ACTLU. • active—LU received ACTLU and acknowledged positively. • p-sdt—LU is bound but there is no SDT yet. • act/sess—LU is bound and in session. • p-actlu—Telnet connects in and is awaiting ACTLU. • p-ntf/av—Awaiting host notify-available response. • p-ntf/ua—Awaiting host notify-unavailable response. • p-reset—Waiting for a buffer to send DACTLU response. • p-psid—Waiting for NMVT Reply psid response. • p-bind—Waiting for host to send bind. • p-unbind—Awaiting host unbind response. • wt-unbnd—Waiting for client to acknowledge disconnection. • wt-sdt—Waiting for client to acknowledge SDT.
MODEL <i>model</i>	3278 model type of client; blank if STATIC LU.
FRAMES IN <i>number</i>	Number of frames sent inbound to the host.

Table 73 Show tn3270-server pu lu Field Descriptions (Continued)

Field	Description
<i>FRAMES OUT number</i>	Number of frames sent outbound from the host.
<i>IDLE FOR time</i>	Time the client has been idle. The time is in HH:MM:SS.
<i>PU IS pu-name</i>	Name of the PU.
<i>LU IS type</i>	Whether LU is DYNAMIC or STATIC.
<i>NEGOTIATED type</i>	Whether client is TN3270 or TN3270E.
<i>BYTES IN / OUT number/number</i>	Total number of bytes sent to/received from the host.
<i>RUSIZE IN / OUT number/number</i>	RU size as configured in the bind.
<i>NEGRSP IN / OUT number/number</i>	Number of SNA negative responses sent to/received from the host.
<i>PACING WINDOW IN / OUT number/number</i>	SNA pacing window as configured in the bind.
<i>CREDITS IN number</i>	Number of frames that can be sent inbound without requiring an isolated pacing response.
<i>QUEUE SIZE IN number</i>	If non-zero, indicates the number of SNA frames waiting to be sent to the host which are blocked, waiting for a pacing response.
<i>QUEUE SIZE OUT number</i>	SNA frames not yet acknowledged by an isolated pacing response by the TN3270 server.

show extended channel udp-listeners

Use the **show extended channel udp-listeners** privileged EXEC command to display information about the User Datagram Protocol (UDP) listener sockets running on the CIP interfaces in a Cisco 7000 series.

show extended channel *slot/port* **udp-listeners** [*ip-address*]

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
udp-listeners	Specifies UDP listener port display.
<i>ip-address</i>	(Optional) IP address specified in an offload interface configuration command.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output on the Cisco 7000 from the **show channel udp-listeners** command:

```
router# show extended channel 4/0 udp-listeners 198.92.1.120
UDP Listener: IP Address 198.92.1.120      LocalPort 0
UDP Listener: IP Address 198.92.1.120      LocalPort 1
UDP Listener: IP Address 198.92.1.120      LocalPort 2
UDP Listener: IP Address 198.92.1.120      LocalPort 3
UDP Listener: IP Address 198.92.1.120      LocalPort 4
router# show extended channel 4/0 udp-listeners 198.92.1.121
UDP Listener: IP Address 198.92.1.121      LocalPort 0
UDP Listener: IP Address 198.92.1.121      LocalPort 1
UDP Listener: IP Address 198.92.1.121      LocalPort 2
UDP Listener: IP Address 198.92.1.121      LocalPort 3
UDP Listener: IP Address 198.92.1.121      LocalPort 4
```

show extended channel udp-stack

Use the **show extended channel udp-stack** privileged EXEC command to display information about the UDP stack running on the CIP interfaces in a Cisco 7000 series.

```
show extended channel slot/port udp-stack [ip-address]
```

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
udp-stack	Selects UDP stack display.
<i>ip-address</i>	(Optional) IP address specified in an offload interface configuration command.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Sample Display

The following is sample output on the Cisco 7000 from the **show extended channel udp-stack** command:

```
router# show extended channel udp-stack

UDP Statistics for IP Address 198.92.1.120
  InDatagrams : 300          NoPorts      : 301
  InErrors    : 302          OutDatagrams: 303

UDP Statistics for IP Address 198.92.1.121
  InDatagrams : 301          NoPorts      : 302
  InErrors    : 303          OutDatagrams: 304
```

Table 74 describes the fields shown in the display.

Table 74 Show Extended Channel udp-stack Field Descriptions

Field	Description
InDatagrams	Total number of UDP datagrams delivered to UDP users.
NoPorts	Total number of received UDP datagrams for which there was no application at the destination port.
InErrors	Number of received UDP datagrams that could not be delivered for reasons other than the lack of an application at the destination port.
OutDatagrams	Total number of UDP datagrams sent from this entity.

show interfaces channel

Use the **show interfaces channel** privileged EXEC command to display information about the CIP interfaces on the Cisco 7000 series. This command displays information that is specific to the interface hardware. The information displayed is generally useful for diagnostic tasks performed by technical support personnel only.

show interfaces channel *slot/port* [**accounting**]

Syntax Description

<i>slot</i>	Slot number.
<i>port</i>	Port number.
accounting	(Optional) Shows interface accounting information.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Sample Display

The following is sample output on the Cisco 7000 from the **show interfaces channel** command:

```
Router# show interfaces channel 3/0

Channel3/0 is up, line protocol is up
Hardware is cxBus IBM Channel
Internet address is 198.92.1.145, subnet mask is 255.255.255.248
MTU 4096 bytes, BW 0 Kbit, DLY 0 usec, rely 255/255, load 1/255
Encapsulation CHANNEL, loopback not set, keepalive not set
ECA type daughter card
Data transfer rate 12 Mbytes Number of subchannels 1
Last input never, output never, output hang never
Last clearing of "show interface" counters 0:00:04
Output queue 0/0, 0 drops; input queue 0/75, 0 drops
Five minute input rate 0 bits/sec, 0 packets/sec
Five minute output rate 0 bits/sec, 0 packets/sec
  0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 packets output, 0 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets, 0 restarts
```

Table 75 describes the fields shown in the display.

Table 75 Show Interfaces Channel Field Descriptions

Field	Description
Channel... is {up down administratively down}	Indicates whether the interface hardware is currently active (whether synchronization is achieved on an ESCON channel, or whether operational out is enabled on a parallel channel) and whether it has been taken down by an administrator.
line protocol is {up down administratively down}	Indicates whether the software processes that handle the line protocol think the line is usable (that is, whether keepalives are successful).
Hardware is	Hardware type.
Internet address is	IP address and subnet mask.
MTU	Maximum transmission unit of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100% reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes. The calculation uses the value from the bandwidth interface configuration command.
Encapsulation	Encapsulation method assigned to interface.
loopback	Indicates whether loopbacks are set or not.
keepalive	Indicates whether keepalives are set or not.
daughter card	Type of adapter card.
Data transfer rate	Rate of data transfer.
Number of subchannels	Number of subchannels.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed.
Last output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because of a transmission that took too long. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
Last clearing	The time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Note that variables that might affect routing (for example, load and reliability) are not cleared when the counters are cleared. These asterisks (***) indicate the elapsed time is too large to be displayed. 0:00:00 indicates the counters were cleared more than 2^{31} ms (and less than 2^{32} ms) ago.
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped due to a full queue.

Table 75 Show Interfaces Channel Field Descriptions (Continued)

Field	Description
Five minute input rate, Five minute output rate	Average number of bits and packets transmitted per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so that this sum may not balance with the other counts.
CRC	Number of code violation errors seen on the ESCON interface, where a received transmission character is recognized as invalid. On a parallel interface, the number of parity errors seen.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets. This value is always 0.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data. This value is always 0.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different than the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be incremented.
abort	Illegal sequence of one bits on a serial interface. This usually indicates a clocking problem between the serial interface and the data link equipment. This value is always 0.
packets output	Total number of messages transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, as some datagrams may have more than one error, and others may have errors that do not fall into any of the specifically tabulated categories.
output errors	Number of output errors.
collisions	Number of collisions detected. This value is always 0.

Table 75 Show Interfaces Channel Field Descriptions (Continued)

Field	Description
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for transmission were not sent within several seconds. On a serial line, this can be caused by a malfunctioning modem that is not supplying the transmit clock signal, or by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down. On the Channel Interface Processor (CIP), this may occur if the host software is not requesting data
restarts	Number of times the controller was restarted because of errors.

shutdown

Use the **shutdown** interface configuration command to shutdown a physical interface or the internal LAN interface on the CIP when you are in interface configuration mode. The **shutdown** command also shuts down TN3270 entities, such as PU, DLUR, and DLUR SAP, depending on which configuration mode you are in when the command is issued. Use the **no** form of this command to restart the interface or entity. The entity affected depends on the mode in which the command is issued.

shutdown
no shutdown

Syntax Description

This command has no arguments or keywords.

Default

The interface or entity is enabled.

Command Modes

CIP interface configuration

TN3270 configuration

PU configuration

DLUR configuration

DLUR SAP configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

In CIP interface configuration mode, the command applies to the entire CIP.

In TN3270 configuration mode, the command applies to the whole TN3270 Server.

In PU configuration mode, the command applies to the DLUR or direct PU.

In DLUR configuration mode, the command applies to the whole DLUR subsystem.

In DLUR SAP configuration, mode the command applies to the local SAP.

Example

The following command issued in TN3270 configuration mode shuts down the entire TN3270 server:

```
shutdown
```

tcp-port

Use the **tcp-port** TN3270 configuration command to override the default TCP port setting of 23. Use the **no** form of this command to restore the default.

tcp-port *port-number*
no tcp-port

Syntax Description

port-number A valid TCP port number in the range of 0 to 65534. The default is 23, which is the IETF standard. The value 65535 is reserved by the TN3270 server.

Defaults

In TN3270 configuration mode, the default is 23.

In PU configuration mode the default is the value currently configured in TN3270 configuration mode.

Command Modes

TN3270 configuration

PU configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

The **tcp-port** command can be entered in either TN3270 configuration mode or PU configuration mode. A value entered in TN3270 mode applies to all PUs for that TN3270 server, except as overridden by values entered in PU configuration mode. The **tcp-port** command affects only future TN3270 sessions.

The **no tcp-port** command entered in PU configuration mode removes the override.

Example

The following command entered in TN3270 configuration mode returns the TCP port value to 23:

```
no tcp-port
```

tn3270-server

Use the **tn3270-server** interface configuration command to start the TN3270 server on a CIP or to enter TN3270 configuration mode. Use the **no** form of this command to disable all TN3270 server activity on a CIP.

tn3270-server
no tn3270-server

Syntax Description

This command has no arguments or keywords.

Default

No TN3270 server function is enabled.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Only one TN3270 server can run on a CIP. It will always be configured on port 2, which is the internal LAN interface port.

The **no tn3270-server** command shuts down TN3270 server immediately. All active sessions will be disconnected and all DLUR and PU definitions deleted from the router configuration. To restart a TN3270 server, you must reconfigure all parameters.

Example

The following command starts the TN3270 server and enters TN3270 configuration mode:

```
tn3270-server
```

timing-mark

Use the **timing-mark** TN3270 configuration mode command to select whether a WILL TIMING-MARK is transmitted when the host application needs an SNA response (definite or pacing response). Use the **no** form of the command to turn off WILL TIMING-MARK transmission except as used by the keepalive function.

timing-mark
no timing-mark

Syntax Description

This command has no arguments or key words.

Default

No WILL TIMING-MARKS are transmitted except by keepalive.

Command Mode

TN3270 configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

If **timing-mark** is configured the TN3270 server will send WILL TIMING-MARK as necessary to achieve an end-to-end response protocol. Specifically, TIMING-MARK will be sent if any of the following are true:

- The host application has requested a pacing response.
- The host application has requested a Definite Response, and either the client is not using TN3270E, or the request is not Begin Chain.

The use of the **timing-mark** command can degrade performance. Some clients do not support **timing-mark** used in this way. Therefore, **timing-mark** should only be configured where both of the following are true:

- All clients support this usage.
- The application benefits from end-to-end acknowledgment.

Example

The following command enables TIMING-MARK transmission:

```
timing-mark
```

Related Commands

idle-time
keepalive

unbind-action

Use the **unbind-action** TN3270 configuration command to select what action to take when the TN3270 server receives an UNBIND. Use the **no** form of this command to restore the default.

```
unbind-action { keep | disconnect }  
no unbind-action
```

Syntax Description

keep	No automatic disconnect will be made by the server upon receipt of an UNBIND.
disconnect	Session will be disconnected upon receipt of an UNBIND.

Defaults

In TN3270 configuration mode, the default is **disconnect**.

In PU configuration mode the default is the value currently configured in TN3270 configuration mode.

Command Modes

TN3270 configuration

PU configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

The **unbind-action** command can be entered in either TN3270 configuration mode or PU configuration mode. A value entered in TN3270 mode applies to all PUs for that TN3270 server, except as overridden by values entered in PU configuration mode. The **unbind-action** command affects currently active and future TN3270 sessions.

The **no unbind-action** command entered in PU configuration mode removes the override.

The **unbind-action** command affects currently active and future TN3270 sessions.

Example

The following command prevents automatic disconnect:

```
unbind-action keep
```

vrn

Use the **vrn** DLUR SAP configuration command to tell the SNA session switch which connection network the internal adapter interface on the CIP card belongs to. Use the **no** form of this command to remove a network name.

```
vrn vrn-name  
no vrn
```

Syntax Description

vrn-name Fully qualified name.

Default

The adapter is not considered to be part of a connection network.

Command Mode

DLUR SAP configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

The **vrn** command is used to discover routes without having to configure all possible links.

A connection network is also known as a shared-access transport facility (SATF). This means, at the MAC level, that all nodes in the network can reach each other using the same addressing scheme and without requiring the services of SNA session routing. A bridged LAN (whether source-route or transparent) is an example. Such a network is represented in the APPN topology as a kind of node, termed a virtual routing node (VRN).

To make use of this function, all APPN nodes must use the same VRN name for the SATF.

Refer to the VTAM operating system documentation for your host system for additional information regarding the VTAM VNGROUP and VNNAME parameters on the PORT statement of an XCA major node.

Several parameters in the DLUR configuration mode consist of fully qualified names, as defined by the APPN architecture. Fully qualified names consist of two case-insensitive alphanumeric strings, separated by a period. However, for compatibility with existing APPN products, including VTAM, the characters “#” (pound), “@” (at), and “\$” (dollar) are allowed in the fully qualified name strings. Each string is from one to eight characters long; for example, RA12.NODM1PP. The portion of the name before the period is the NETID and is shared between entities in the same logical network.

Example

The following command sets a VRN name for the TN3270 internal adapter on the CIP:

```
vrn SYD.BLAN25
```

Related Commands

adapter

lan