Doc. No. 78-3610-09

Cisco IOS Release 11.0 BT Release Note and Update to Configuration Guides and Command References

January 15, 1999

This document supplements the Cisco IOS Release 11.0 documentation set with new and changed commands that support Cisco IOS Release 11.0(10)BT and later. Note that Cisco IOS Release 11.0(10)BT is the initial release of Cisco IOS Release 11.0 BT. No prior versions of Cisco IOS Release 11.0 BT exist. The TN3270 server function is supported on a Channel Interface Processor card in a Cisco 7000 series or Cisco 7500 series router. The following Cisco IOS releases are covered by this release note publication:

- Cisco IOS 11.0(10)BT
- Cisco IOS 11.0(11)BT
- Cisco IOS 11.0(12)BT
- Cisco IOS 11.0(13a)BT

Note Cisco IOS Release 11.0(13)BT was renumbered and released as 11.0(13a)BT.)

- Cisco IOS 11.0(14)BT, Cisco IOS 11.0(14a)BT1

Note Shipment of Cisco IOS Release 11.0(14)BT was halted due to CSCdj05366. A fix was implemented and the release was renumbered and released as 11.0(14a)BT1.

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- Cisco IOS 11.0(15)BT
- Cisco IOS 11.0(16)BT
- Cisco IOS 11.0(17)BT
- Cisco IOS 11.0(18)BT
- Cisco IOS 11.0(19)BT
- Cisco IOS 11.0(20)BT
- Cisco IOS 11.0(21)BT
- Cisco IOS 11.0(22)BT

Cisco IOS Release 11.0 BT is based on Cisco IOS Release 11.0.

Introduction

This Release Note and Update is divided into the following sections:

Use this document in conjunction with the *Router Products Release Notes for Cisco IOS Release 11.0* and the Cisco IOS Release 11.0 configuration guide and command reference publications, specifically the *Router Products Configuration Guide Chapters 1 to 6*, *Router Products Configuration Guide Chapters 22 to 33*, *Router Products Command Reference Chapters 1 to 6*, *Router Products Command Reference Chapters 22 to 33*.

Release Note

Cisco IOS Release 11.0 BT introduces TN3270 server support on Channel Interface Processor (CIP) cards.

Note To enable the TN3270 server feature, you must have a CIP card installed in a Cisco 7000 series router or Cisco 7500 series router. The TN3270 server is different from the TN3270 terminal emulation access feature described in the "Configuring TN3270" chapter of the *Access and Communication Servers Configuration Guide*.

Platform Support

Cisco IOS Release 11.0 BT supports the following router platforms:

- Cisco 7500 series
- Cisco 7000 series and Cisco 7000 series with RSP7000

Cisco IOS Packaging

The following feature sets are available in Release 11.0 BT. Refer to the *Router Products Release Notes for Cisco IOS Release 11.0* for a list of the features provided in the Cisco 7000 and Cisco 7500 series feature sets.

- Enterprise (this feature set includes CIP)
- Enterprise/CIP2

Boot ROM Requirements

Boot ROMs that support Cisco IOS Release 11.0 are required. No special requirements exist for Cisco IOS Release 11.0 BT.

CIP Boot Image Requirements

The CIP boot image is bundled in the Cisco IOS Release 11.0 BT image. You must have the image that supports your CIP or your CIP2 hardware. You cannot run a CIP and a CIP2 card in the same router. See Table 1 for a list of image names and supported CIP or CIP2 cards.

Table 1 11.0 BT Image Names for CIP and CIP2 Hardware

Image Names	Supported CIP Hardware
rsp-k-mz	CIP
rsp-k2-mz	CIP2
gs7-k-mz	CIP
gs7-k2-mz	CIP2

Memory Requirements

The memory requirements for Cisco IOS 11.0 BT are shown in Table 2. The CIP supports up to 128 Mb of memory.

Table 2 11.0 BT Memory Requirements

Cisco 7500 Series and Cisco 7000 with RSP7000	Minimum Required Code Memory	Required Main Memory	Required CIP Memory	Release 11.0 Runs From
Enterprise Set (rsp-k-mz)	8 MB Flash memory card	24 Mb	32 Mb	RAM
Enterprise/CIP2 Set (rsp-k2-mz)	8 MB Flash memory card	24 Mb	32 Mb	RAM

Cisco 7500 Series and Cisco 7000 with RSP7000	Minimum Required Code Memory	Required Main Memory	Required CIP Memory	Release 11.0 Runs From
Cisco 7000 Series		**Required Code Memory**	**Required CIP Memory**	**Release 11.0 Runs From**
Enterprise Set (gs7-k-mz)	8 MB Flash memory card	16 Mb	32 Mb	RAM
Enterprise/CIP2 Set (gs7-k2-mz)	8 MB Flash memory card	16 Mb	32 Mb	RAM

Microcode Software

Note that microcode software images are bundled with the system software image. Bundling eliminates the need to store separate microcode images. When the router starts up, the system software unpacks the microcode software bundle and loads the proper software on all the interface processor boards.

New Software Features in 11.0(10)BT

The TN3270 server is a new feature on the CIP of the Cisco 7000 family of routers. The TN3270 server allows TN3270 clients access to IBM and IBM-compatible mainframes. It can reduce the cycles spent by the mainframe on TCP/IP and TN3270 processing by a factor of ten or more and off-load the TCP/IP and TN3270 cycles from the mainframe.

The TN3270 server supports up to 8000 (CIP1) or up to 16000 (CIP2) concurrent sessions, while most external gateway solutions can support only 1000 to 2000 sessions. The TN3270 server offers the following capabilities:

- Load Balancing and Redundancy—Provides effective CIP resource utilization and more consistent response times. (This feature is initially provided by means of an external, prototype implementation.)
- End-to-End Session Visibility—Provides enhanced resource management.
- Systems Network Architecture (SNA) Session Switching—Off-loads VTAM by providing session routing.
- TN3270E Support—In combination with a TN3270E client, provides advanced SNA management and SNA functionality, including printer support.
- Dynamic Definition of Dependent Logical Units (LU)—Provides simplified configuration and network definition at the router and in VTAM.
- Dynamic Allocation of LUs—Makes efficient use of LU pool resources while supporting multiple SNA model types.

TN3270 server requires 32 MB of CIP dynamic RAM to support up to 4000 sessions, 64 MB to support 8000 sessions, and 128 MB to support 16000 sessions (CIP2 only). TN3270 server can run concurrently with any of the other CIP applications (IP Datagram, TCP/IP Offload, or CIP SNA (CSNA)), but operation of any of these features will affect the total number of sessions supported because of contention for CIP processor cycles.

Update to Configuration Guide

The information that follows is an update to the *Router Products Configuration Guide, Chapters 23 to 33*. Add the TN3270 information as a standalone chapter following page 33-22.

Configuring TN3270 Server on the Channel Interface Processor

This chapter describes TN3270 server support provided by the Channel Interface Processor (CIP) card for Systems Network Architecture (SNA) devices. For a complete description of the commands mentioned in this chapter, refer to the "TN3270 Server Commands" update chapter.

Cisco's Implementation of TN3270 on a Channel Interface Processor

The TN3270 server feature on a CIP card provides mapping between an SNA 3270 host and a TN3270 client connected to a TCP/IP network as shown in Figure 1. Functionally, it is useful to view the TN3270 server from two different perspectives: SNA functions and Telnet Server functions.

- SNA Functions

  From the perspective of an SNA 3270 host connected to the CIP, the TN3270 server is an SNA device that supports multiple physical units (PUs), with each PU supporting up to 255 logical units (LUs). The LU can be Type 1, 2, or 3. The SNA host is unaware of the existence of the TCP/IP extension on the implementation of these LUs.

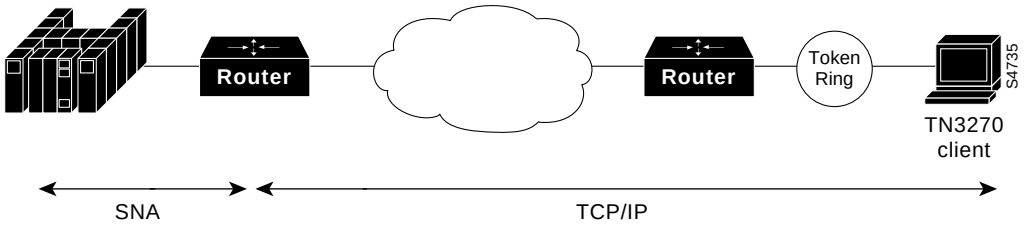
  The LUs implemented by TN3270 server are dependent LUs. To route these dependent LU sessions to multiple virtual telecommunications access method (VTAM) hosts connected to the server in the CIP card, rather than routing in the VTAM hosts, the TN3270 server implements a SNA session switch with end node dependent LU requester (DLUR) function. Using the DLUR is optional so that the TN3270 server can be used with VTAM versions prior to version 4.2, which provide no APPN support.

  SNA session switch allows you to eliminate SNA subarea routing between hosts of TN3270 traffic by establishing APPN links with the primary LU hosts directly.

- Telnet Server Functions

  From the perspective of a TN3270 client, the TN3270 server is a Telnet server that can support approximately 8000 (CIP1) or 16000 (CIP2) concurrent Telnet sessions. The server on the CIP card supports Telnet connection negotiation and data format as specified in RFC 1576 (referred to as "traditional TN3270") and RFC 1647 (referred to as "TN3270E").

Figure 1 TN3270 Implementation



Because the TN3270 server configuration is performed after an interface is configured for CIP SNA (CSNA) support, TN3270 configuration issues and tasks are addressed separately from the interface configuration tasks. The description of TN3270 configuration issues and tasks begins in the section "Configuring TN3270 on a Channel Interface Processor," later in this chapter.

Note To enable the TN3270 server feature, you must have a CIP installed in a Cisco 7000 family router. The TN3270 server is different from the TN3270 terminal emulation access feature described in the "Configuring TN3270" chapter of the *Access Services Configuration Guide*.

Configuring TN3270 on a Channel Interface Processor

The following sections describe additional features of TN3270 server support on the CIP. The features discussed include the following:

- Dynamic LU Allocation
- Formation of LU Model Type and Number
- Specific LU Allocation
- SNA Session Switch—End Node DLUR
- Multiple Hosts Support

You will also need to understand the following information before proceeding with TN3270 configuration tasks:

- VTAM Host Configuration Considerations for Dynamic LU Allocation
- TN3270 Configuration Modes

Dynamic LU Allocation

This will be the most common form of request from TN3270 clients emulating a TN3270 terminal. The user typically wants to specify emulating a particular terminal type and normally is not interested in what LOCADDR or LU name is allocated by the host, as long as a network solicitor logon menu is presented. The server will perform the following on such a session request:

- Form an EBCDIC string based on the model type and number requested by the client (see "Formation of LU Model Type and Number" for the algorithm used). This string is used as a field in a Reply product set ID (PSID) network management vector transport (NMVT).
- Allocate a LOCADDR from the next available LU in the generic LU pool. This LOCADDR is used in the NMVT.
- Send the formatted Reply PSID NMVT to VTAM.

When VTAM receives the NMVT, it will use the EBCDIC model type and number string to look up an LU template under the LUGROUP. For example, the string "327802E" will find a match in the sample configuration shown in Figure 2. An ACTLU will be sent and a terminal session with the model and type requested by the client is established.

Formation of LU Model Type and Number

VTAM requires a model type and number from the Reply PSID NMVT to use as a key to look up in the LU group to find an LU template. The model type is a four character string; the model number is a two or three character string. The server will accept the following formats of terminal type string from the client:

- IBM-<XXXX>-<Y>[-E]: This will be formatted as "XXXX0Y"or "XXXX0YE" in the model type and number field in the Reply PSID NMVT.

- IBM-DYNAMIC: This will result in “DYNAMIC” being put in the model type and number field. The VTAM configuration will need to have “DYNAMIC” defined as a template in the LU group. In fact “IBM-ZZ..Z,” where “ZZ..Z” does not match the preceding syntax, will be forwarded as “ZZ..Z.”

Note The “E” in the model string refers to 3270 extended datastream. It has no connection with the “E” in “TN3270E”.

- Any other string is forwarded as is.
- In all cases, the string forwarded is translated from ASCII to EBCDIC and truncated at seven characters.

A complication arises with TN3270E clients that request a copy of the BIND-IMAGE. Such clients require system control services (SCS) datastream on the system services control point (SSCP)-LU flow. All other clients require 3270 datastream on that flow. Therefore, these two kinds of client must be directed to different LUGROUP entries at the host. To make this as easy as possible, the SCS requirement is also encoded into the model string sent to the host. Following the previously described terminal type string formats accepted by the server, this additional condition is applied:

- If the client has negotiated to receive BIND-IMAGE, the character “S” is overlaid on the fifth character of the string, or appended if the string is less than five characters. (See Table 3.)

Table 3 Examples of Model String Mapping

String from client (ASCII)	BIND-IMAGE requested?	String to Host (EBCDIC)
IBM-3278-4	No	327804
IBM-3279-5E	No	327905E
IBM-3279-3-E	Yes	3279S5E
IBM-DYNAMIC	Yes	DYNASIC
ABC	Yes	ABCS
ABCDEFGH	Yes	ABCDSFG

Specific LU Allocation

A TN3270E client can request a specific LU name by using the TN3270E command CONNECT as documented in RFC 1647. The name requested must match the name by which the TN3270 server knows the LU (see the section “LU Names in the TN3270 Server”), and the host must have activated the LU (with ACTLU).

LU Names in the TN3270 Server

Where SNA session switching is configured (that is, on DLUR PUs) the TN3270 server learns the LU names from the ACTLUs.

For direct PUs, a “seed” name can be configured on the PU. The TN3270 server uses this name in conjunction with the LOCADDRS to generate names for the LUs. It is best to use the same naming convention as the host, if possible.

SNA Session Switch—End Node DLUR

An end node DLUR function is implemented as part of the TN3270 server. The purpose of the DLUR is to allow the routing of TN3270 LUs to multiple VTAM hosts to be performed in the CIP card rather than on the VTAM hosts. The need for this feature will increase with the introduction of the new multi-CPU CMOS mainframe which comprises up to 16 CPUs that appear as separate VTAMs.

The implementation of TN3270 server LUs under DLUR also allows the server to learn about the LU names on the ACTLU, which greatly simplifies the configuration to support specifically requested LUs such as printers.

Multiple Hosts Support

The TN3270 server supports access to multiple hosts via the configuration on a PU basis (Table 4). PUs connected to different hosts or applications can be configured with different IP address.

Table 4 Direct PU Configuration in Router

Command	PU Name	IDBLK	IP-address	Type	Adapter number	LSAP	RMAC	RMAC	LU-seed	LU-name
pu	X1	05D30001	192.195.80.40	tok	1	4	rmac	4100.cafe.0001	lu-seed	TN3X1###
pu	X2	05D30002	171.69.176.43	tok	1	8	rmac	4100.cafe.0002	lu-seed	TN3X2###

From the **pu (direct)** TN3270 configuration command values shown in Table 4, PU X2 establishes a link to a host at SAP 8 on MAC address 4100.cafe.0002. A client connecting to IP address 171.69.176.43 is allocated an LU from that PU and is routed to that host.

Note that by using the DLUR function, all the LUs in the server can be defined and owned by a controlling VTAM. When a client requests an application residing on a different VTAM host, the controlling VTAM will issue the request to the target host which will send a BIND directly to the client. All LU-LU data will then flow directly between the target host and the client without needing to go through the controlling VTAM.

VTAM Host Configuration Considerations for Dynamic LU Allocation

Other non-Cisco implementations of TN3270 support depend on predefined, static pools of LUs to support different terminal types requested by the TN3270 clients. The CIP TN3270 server implementation removes the static nature of these configurations by using a VTAM release 3.4 feature, dynamic definition of dependent LU (DDDLU). (Refer to the VTAM operating system manuals for your host system, under the descriptions for LUGROUP for additional information.) DDDLU dynamically requests LUs using the terminal type provided by TN3270 clients. The dynamic request eliminates the need to define any LU configuration in the server to support TN3270 clients emulating a generic TN3270 terminal.

To support DDDLU, the PUs used by the TN3270 server have to be defined in VTAM with LUSEED and LUGROUP parameters as shown in Figure 2.

Figure 2 VTAM Host Values Defining LUSEED and LUGROUP

```
Example VTAM host values defining LUSEED and LUGROUP name parameters:

TN3270PU     PU         .                          *     define other PU parameters
                        IDBLK=05D,
                        IDNUM=30001,
                        LUSEED=TN3X1###,           *     define the seed component of the LU names
                                                         created by DDDLU (e.g. LOCADDR 42 will have
                                                         the name TN3X1042)
                        LUGROUP=AGROUP             *     define the LU group name
*
TN3X1100     LU         LOCADDR=100,               *     define a terminal which requires a
                        MODETAB=AMODETAB                 specific LU name
*
TN3X1101     LU         LOCADDR=101,               *     define a printer which requires a specific
                        DLOGMODE=M3287CS                 LU name


Example VTAM host values defining LUGROUPname, AGROUP:

AGROUP       LUGROUP                               *     define LU group to support various
                                                         terminal types
327802E      LU         USSTAB=USSXXX,             *     define template to support IBM 3278
                        LOGAPPL=TPXP001,                 terminal model 2 with Extended Data
                        DLOGMOD=SNX32702,                Stream. Note that the USS messages in
                        SSCPFM=USS3270                   USSXXX should be in 3270 datastream.
3278S2E      LU         USSTAB=USSYYY,             *     define template to support IBM 3278
                        LOGAPPL=TPXP001,                 terminal model 2 with Extended Data
                        DLOGMOD=SNX32702,                Stream, for TN3270E clients requesting
                        SSCPFM=USSSCS                    BIND-IMAGE.
327805       LU         USSTAB=USSXXX,             *     define template to support IBM 3279
                        LOGAPPL=TPXP001,                 terminal model 5
                        DLOGMOD=D4C32785,
                        SSCPFM=USS3270
@            LU         USSTAB=USSXXX,                   this is the default template to match any
                        LOGAPPL=TPXP001,                 other terminal types
                        DLOGMOD=D4A32772,
                        SSCPFM=USS3270
```

With the configuration shown in Figure 2 defined in the host, the ACTPU sent by VTAM for the PU TN3270PU will have the “Unsolicited NMVT Support” set in the system services control point (SSCP) capabilities control vector. This allows the PU to dynamically allocate LUs by sending NMVT with a “Reply Product Set ID” control vector.

After the TN3270 server sends a positive response to the ACTPU, it will wait for VTAM to send ACTLUs for all specifically defined LUs. In the sample configuration shown in Figure 2, ACTLUs will be sent for TN3X1100 and TN3X1101. The server sends a positive response and sets SLU DISABLED. The LOCADDR of these LUs are put into the specific LU cache and reserved for specific LU name requests only.

To allow sufficient time for the VTAM host to send all the ACTLUs, a 30-second timer is started and restarted when an ACTLU is received. When the time expires, it is assumed all ACTLUs defined in VTAM for the PU have been sent. All LUs that have not been activated are available in a generic LU pool to be used for DDDLU unless they have been reserved by the configuration using the **generic-pool deny** TN3270 configuration command.

After the VTAM activation, the server can support session requests from clients using dynamic or specific LU allocation.

TN3270 Configuration Modes

The TN3270 configuration modes and router command prompts are described in the following sections and displayed in Figure 3. The TN3270 server can be configured only on Port 2, the internal LAN port, of a CIP card.

Some configuration commands create entities on the CIP. For most of these, the command changes to the mode associated with that entity (for example, a PU). In general, the parameters provided to create the entity come in two sets: those which identify the specific instance of the entity (for example, a PU name) and those that merely set operating parameters. To return to the mode later, the same command is used but with only the first set of parameters. The following example tasks clarify how to return to a command mode without necessarily creating a new entity:

To create a DLUR LSAP and enter DLUR LSAP configuration mode, perform the following task beginning in TN3270 DLUR configuration mode:

Task	Command
Create a DLUR LSAP and enter DLUR LSAP configuration mode.	**lsap token-adapter 1 84**

To return later to the DLUR LSAP configuration mode on the same entity, perform the following task beginning in TN3270 DLUR configuration mode:

Task	Command
Enter DLUR LSAP configuration mode on the same LSAP.	**lsap token-adapter 1**

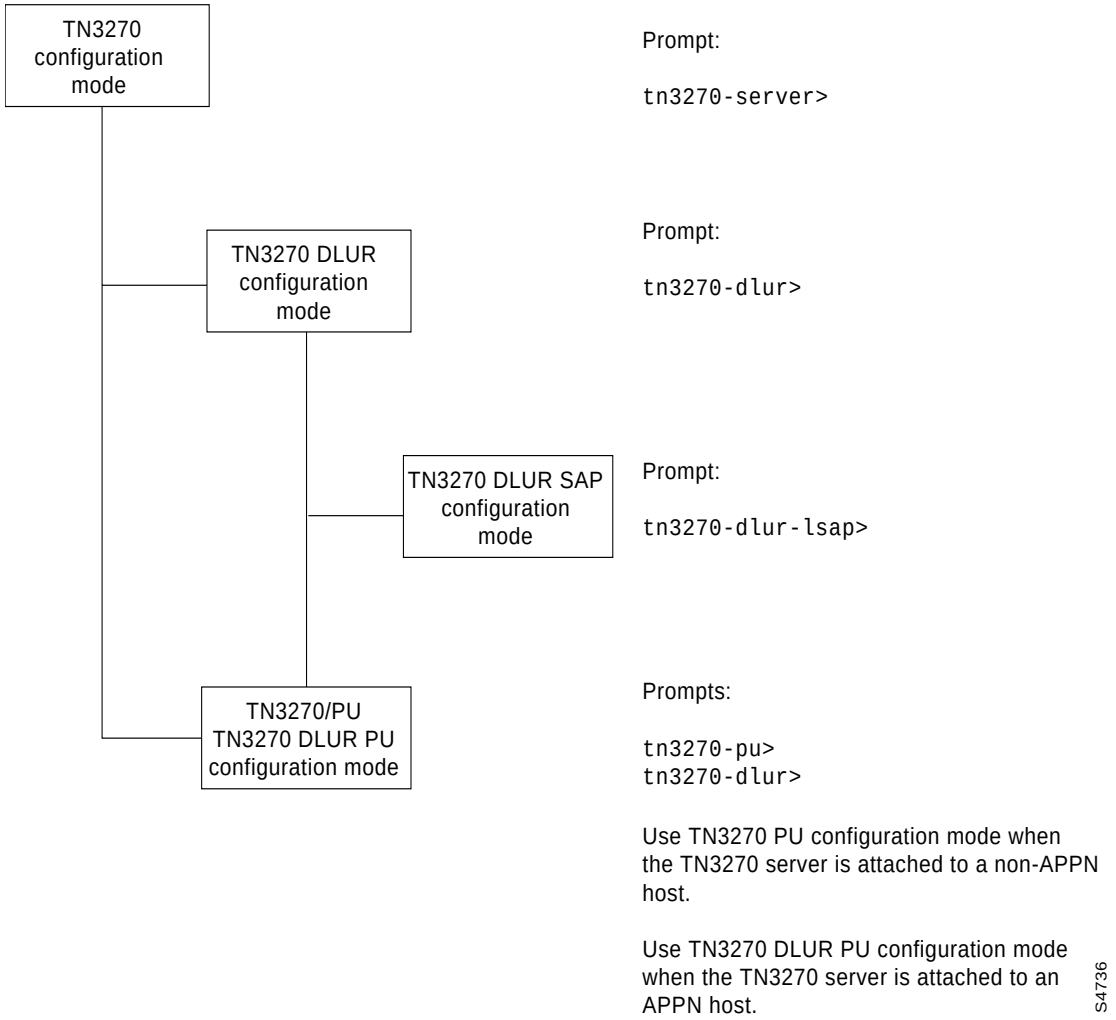
To remove an entity, the same identification parameters are needed. Perform the following task beginning in TN3270 DLUR configuration mode:

Task	Command
Remove a previously defined DLUR LSAP entity.	**no lsap token-adapter 1**

TN3270 configuration modes described in this section include the following:

- TN3270 Server Configuration Mode
- DLUR Configuration Mode
- DLUR SAP Configuration Mode
- PU Configuration Mode
- Commands Allowed in Multiple Modes

Figure 3 TN3270 Configuration Modes



TN3270 Server Configuration Mode

From interface configuration mode, **tn3270-server** command puts you in TN3270 server configuration mode.

Prompt:

```
tn3270-server>
```

DLUR Configuration Mode

From TN3270 server configuration mode, the **dlur** command puts you in DLUR configuration mode.

Prompt:

```
tn3270-dlur>
```

DLUR SAP Configuration Mode

From DLUR server configuration mode, **lsap** command puts you in DLUR SAP configuration mode.

Prompt:

```
tn3270-dlur-lsap>
```

PU Configuration Mode

There are two paths to PU configuration mode: from the TN3270 server configuration mode, or from the DLUR configuration mode. In either mode, the **pu** command puts you in PU configuration mode.

From TN3270 configuration mode, the **pu** command to create a new PU is:

pu *pu-name idblk-idnum ip-address type adapno lsap* [**rmac** *rmac*] [**rsap** *rsap*] [**lu-seed** *lu-name-stem*]

From DLUR configuration mode, the **pu** command to create a new PU is:

pu *pu-name idblk-idnum ip-address*

From either mode, to return to PU configuration mode on PU pu-name the command is:

pu *pu-name*

Prompts:

```
tn3270-pu>
tn3270-dlur-pu>
```

Commands Allowed in Multiple Modes

The following commands are valid in TN3270 configuration mode, or in either variation of PU configuration mode:

[**no**] **tcp-port** *port-number*

[**no**] **idle-time** *seconds*

[**no**] **keepalive** *seconds*

[**no**] **unbind-action** {**keep** | **disconnect**}

[**no**] **generic-pool** {**permit** | **deny**}

[**no**] **shutdown**

Values entered in PU configuration mode override settings made in TN3270 configuration mode. In addition, the **no** form of these commands entered in PU configuration mode will restore the command value entered in TN3270 command mode.

TN3270 Configuration Task List

The following sections describe how to configure TN3270 server support on the CIP. Not all tasks are required. Refer to "TN3270 Configuration Example" for configuration examples.

Note The TN3270 server is configured on an internal LAN interface in the CIP, which is port 2 of a CIP. Port 0 and port 1 represent physical interface ports; port 2 is a "virtual" port and is always reserved for the internal LAN interface.

Task List for Multiple APPN Hosts

When the host site uses APPN and the TN3270 server can reach multiple hosts, we recommend you use the SNA Session Switch feature and configure your PUs under DLUR. In this instance, perform the following tasks:

- Configure SNA Support
- Configure TN3270 Server
- Configure DLUR
- Configure SAPs under DLUR
- Configure PUs under DLUR
- Monitor the TN3270 Server

Note You can also use DLUR to reach a mix of APPN and non-APPN hosts. The host owning the PUs must be an APPN network node that also supports the subarea (that is, an interchange node). When an SLU starts a session with any of the APPN hosts, it can use session switching to reach that host directly. When it starts a session with a non-APPN host, the traffic will be routed through the owning host.

Task List for Non-APPN Hosts

When the host site does not use APPN, or you have a single APPN host, you configure your PU parameters for a directly connected host. In this instance, perform the following tasks:

- Configure SNA Support
- Configure TN3270 Server
- Configure PU Parameters on the TN3270 Server
- Monitor the TN3270 Server

Configure SNA Support

CIP SNA support (CSNA) must be configured prior to configuring TN3270 support. Refer to the section "Configure IBM Channel Attach for CSNA Support," in the "Configuring IBM Channel Attach" chapter of *Bridging and IBM Networking Configuration Guide*.

After you have configured CSNA support, proceed with TN3270 configuration.

Configure TN3270 Server

This task is required. To establish a TN3270 server on the internal LAN interface on the CIP, perform the following tasks beginning in global configuration mode:

Task	Command
Select the channel attach internal LAN interface and enter interface configuration mode.	**interface channel** *slot*/**2**
Specify a TN3270 server on the internal LAN interface and enter TN3270 configuration mode.	**tn3270-server**
(Optional) Configure maximum number of LUs allowed.	**maximum-lus** *max-number-of-lu-allocated*
(Optional) Configure transmission of a WILL TIMING-MARK.	**timing-mark**
(Optional) Assign a TCP port other than the default of 23. This command is also available in PU configuration mode.	**tcp-port** *port-nbr*
(Optional) Specify the idle time for server disconnect. This command is also available in PU configuration mode.	**idle-time** *num-of-seconds*
(Optional) Specify the maximum time allowed between keepalive marks before the server disconnects. This command is also available in PU configuration mode.	**keepalive** *num-of-seconds*
(Optional) Specify whether the TN3270 session will disconnect when an UNBIND command is received. This command is also available in PU configuration mode.	**unbind-action** {*keep* | *disconnect*}
(Optional) Select whether "left-over" LUs can be used from a generic LU pool. This command is also available in PU configuration mode.	**generic-pool** {*permit* | *deny*}

When you use the **tn3270-server** command, you enter TN3270 configuration mode and can use all other commands in the task list. You can later override many configuration values you enter in TN3270 configuration mode from PU configuration mode. On IBM host systems, these types of commands are often referred to as "sift down" commands because their values can sift down through several levels of configuration and can be optionally altered at each configuration level.

Configure PU Parameters on the TN3270 Server

This task is required when configuring PUs that do not use the SNA Session Switch feature. To configure PU parameters for the TN3270 server, perform the following tasks beginning in TN3270 configuration mode.

Task	Command
Enter PU configuration mode and create or delete PUs with direct host links.	**pu** *pu-name idblk-idnum ip-address type adapno lsap* [**rmac** *rmac*] [**rsap** *rsap*] [**lu-seed** *lu-name-stem*]
(Optional) Assign a TCP port other than the default of 23. This command is also available in TN3270 configuration mode.	**tcp-port** *port-nbr*

Task	Command
(Optional) Specify the idle time for server disconnect. This command is also available in TN3270 configuration mode.	**idle-time** *num-of-seconds*
(Optional) Specify the maximum time allowed between keepalive marks before the server disconnects. This command is also available in TN3270 configuration mode.	**keepalive** *num-of-seconds*
(Optional) Specify whether the TN3270 session will disconnect when an UNBIND command is received. This command is also available in TN3270 configuration mode.	**unbind-action** {*keep* | *disconnect*}
(Optional) Select whether "left-over" LUs can be used from a generic LU pool. This command is also available in TN3270 configuration mode.	**generic-pool** {*permit* | *deny*}

When you use the **pu** command, you enter PU configuration mode and can use all other commands in this task list. Configuration values you enter in PU configuration mode will override other values entered while in TN3270 configuration mode. In addition, you can enter PU configuration mode from DLUR configuration mode when configuring PUs that are connected by means of DLUR.

If you are configuring PUs for directly connected hosts, you need not perform any additional configuration tasks.

Configure DLUR

This task is required when configuring DLUR connected hosts. To configure DLUR parameters for the TN3270 server, perform the following tasks beginning in TN3270 configuration mode.

Task	Command
Create a DLUR function in the TN3270 server and enter DLUR configuration mode.	**dlur** *fq-cpname fq-dlusname*
(Optional) Specify the fallback choice for the DLUR DLUS.	**dlus-backup** *dlusname2*
(Optional) Specify the preferred network node (NN) server.	**preferred-nnserver** *NNserver*

Configure SAPs under DLUR

To configure SAPs under the DLUR function, perform the following tasks beginning in DLUR configuration mode.

Task	Command
Create a SAP function under DLUR and enter DLUR SAP configuration mode.	**lsap** *type adapno* [*lsap*]
(Optional) Identify an APPN virtual routing node (VRN).	**vrn** *vrn-name*

Task	Command
(Optional) Create named links to hosts. A link should be configured to each potential NN server. (The alternative is to configure the NN servers to connect to DLUR.) If VRN is used it is not necessary to configure links to other hosts. Do not configure multiple links to the same host.	**link** *name* [**rmac** *rmac*] [**rsap** *rsap*]

Configure PUs under DLUR

This task is required when configuring DLUR connected hosts. To configure PUs under the DLUR function, perform the following tasks beginning in DLUR configuration mode.

Task	Command
Create a PU function under DLUR and enter PU configuration mode.	**pu** *pu-name idblk-idnum ip-address*
Assign a TCP port other than the default of 23.	**tcp-port** *port-nbr*
Specify the idle time for server disconnect.	**idle-time** *num-of-seconds*
Specify the maximum time allowed between keepalive marks before the server disconnects.	**keepalive** *num-of-seconds*
Specify whether the TN3270 session will disconnect when an UNBIND command is received.	**unbind-action** {*keep* | *disconnect*}
Select whether “left-over” LUs can be used from a generic LU pool.	**generic-pool** {*permit* | *deny*}

The **pu** command entered in DLUR configuration mode has different parameters than when it is entered from TN3270 configuration mode.

Monitor the TN3270 Server

The following table lists some of the monitoring tasks specific to the TN3270 server. To display the full list of **show** commands, enter **show ?** at the EXEC prompt.

Use the following commands in privileged EXEC mode:

Task	Command
Display the current server configuration parameters and the status of the PUs defined in each server.	**show extended channel tn3270-server**
Display the PU configuration parameters, statistics and all the LUs currently attached to the PU.	**show extended channel tn3270-server** *pu-name*
Display the status of the LU.	**show extended channel tn3270-server** *pu-name* **lu** *lu-number* [**history**]
Display the information about LUs that are defined under an IP address.	**show extended channel tn3270-server client-ip-address** *ip-address*
Display information about the DLUR components.	**show extended channel tn3270-server dlur**

TN3270 Configuration Example

The following configuration has three PUs using DLUR and two more with direct connections.

The initial CIP configuration is as follows:

```
interface Channel2/2
 ip address 10.10.20.126 255.255.255.128
 no ip redirects
 no ip directed-broadcast
 ip pim query-interval 0
 ip igmp query-interval 0
 no ip route-cache
 no keepalive
 no clns checksum
 clns congestion-threshold 0
 clns erpdu-interval 0
 clns rdpdu-interval 0
 no clns route-cache
 no clns send-erpdu
 no clns send-rdpdu
 lan TokenRing 0
  source-bridge 223 1 2099
  adapter 0 4100.cafe.0001
   llc2 N1 2057
  adapter 1 4100.cafe.0002
   llc2 N1 2057
```

Configuration dialog to configure the TN3270 function follows:

```
! HOSTA is channel-attached and will open SAP 8 on adapter 0.
! HOSTB is reached via token-ring
! HOSTC is channel-attached non-APPN and will open SAP 4 on adapter 0.

! enter interface configuration mode for the virtual interface in slot 2
router(config)#int channel 2/2

! create TN3270 Server entity
router(config-if)#tn3270-server

! set server-wide defaults for PU parameters
router(cfg-tn3270)#keepalive 0
router(cfg-tn3270)#unbind-action disconnect
router(cfg-tn3270)#generic-pool permit

! define DLUR parameters and enter DLUR configuration mode
router(cfg-tn3270)#dlur SYD.TN3020 SYD.VMG

! create PUs under DLUR
! Note that the first two share an IP address
router(tn3270-dlur)#pu pu0 05d99001 10.10.20.1
router(tn3270-dlur-pu)#pu pu1 05d99002 10.10.20.1
router(tn3270-dlur-pu)#pu pu2 05d99003 10.10.20.2

! create a DLUR LSAP and enter DLUR LSAP configuration mode
router(tn3270-dlur-pu)#lsap token-adapter 1

! specify the VRN name of the network containing this lsap
router(tn3270-dlur-lsap)#vrn syd.lan4

! create a link from this lsap
router(tn3270-dlur-lsap)#link hosta rmac 4100.cafe.0001 rsap 8
router(tn3270-dlur-lsap)#link hostb rmac 4000.7470.0009 rsap 4
router(tn3270-dlur-lsap)#exit
router(tn3270-dlur)#exit
```

```
! create direct pus for the non-APPN Host
! note that they must use different lsaps because they go to the same Host
router(cfg-tn3270)#pu pu3 05d00001 10.10.20.5 tok 1 24 rmac 4100.cafe.0001 lu-seed pu3###
router(tn3270-pu)#pu pu4 05d00002 10.10.20.5 tok 1 28 rmac 4100.cafe.0001 lu-seed pu4###
router(tn3270-pu)#end
```

The resulting configuration from the initial configuration and the configuration dialog follows:

```
interface Channel2/2
 ip address 10.10.20.126 255.255.255.128
 no ip redirects
 no ip directed-broadcast
 ip pim query-interval 0
 ip igmp query-interval 0
 no ip route-cache
 no keepalive
 no clns checksum
 clns congestion-threshold 0
 clns erpdu-interval 0
 clns rdpdu-interval 0
 no clns route-cache
 no clns send-erpdu
 no clns send-rdpdu
 lan TokenRing 0
  source-bridge 223 1 2099
  adapter 0 4100.cafe.0001
   llc2 N1 2057
  adapter 1 4100.cafe.0002
   llc2 N1 2057
tn3270-server
  pu PU3     05D00001 10.10.20.5   token-adapter 1  24 rmac 4100.cafe.0001 lu-seed PU3###
  pu PU4     05D00002 10.10.20.5   token-adapter 1  28 rmac 4100.cafe.0001 lu-seed PU4###
    dlur SYD.TN3020 SYD.VMG
      lsap token-adapter 1
         vrn SYD.LAN4
         link HOSTB    rmac 4000.7470.0009
         link HOSTA    rmac 4100.cafe.0001 rsap 08
      pu PU0      05D99001 10.10.20.1
      pu PU1      05D99002 10.10.20.1
      pu PU2      05D99003 10.10.20.2
```

Update to Command Reference

The information that follows is an update to the *Router Products Command Reference, Chapters 23 to 33*. Add the TN3270 information as a standalone chapter following page 33-30.

TN3270 Server Commands

This update describes the commands to configure TN3270 support on the Channel Interface Processor (CIP). For TN3270 configuration tasks and examples, refer to the "Configuring TN3270 Server on the Channel Interface Processor" update chapter of this Release Note.

The following commands are documented in this update chapter:

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

fq-cpname	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 *fq-cpname* values specified on all other TN3270 servers running under the Cisco IOS software.
fq-dlusname	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 *fq-dlusname* value can be repeated and shared across servers.

Default

No DLUR function is enabled.

Command Mode

TN3270 configuration

Usage Guidelines

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

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

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
```

idle-time

Use the **idle-time** TN3270 configuration command to specify how many seconds of LU inactivity, from both host and client, before the TN3270 session is disconnected. Use the **no** form of this command to cancel the idle time period and return to the default.

idle-time *seconds*
no idle-time

Syntax Description

seconds	Number of seconds, from 0 to 65535. A value of 0 means the session is never disconnected.

Defaults

The default in TN3270 configuration mode is that the session is never disconnected (0).

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

Command Modes

TN3270 configuration

PU configuration

Usage Guidelines

The **idle-time** 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.

A **no idle-time** command entered in PU configuration mode will restore the idle-time value entered in TN3270 command mode.

The **idle-time** command affects currently active and future TN3270 sessions. For example, if the **idle-time** value is reduced from 900 seconds to 600 seconds, sessions that have been idle for between 600 and 900 seconds are immediately disconnected.

Note For the purposes of idle-time logic, TIMING-MARKs generated by the keepalive logic do not constitute “activity.”

Examples

The following command sets an idle-time disconnect value of 10 minutes:

```
idle-time 600
```

The following command entered in TN3270 configuration mode sets the default idle-time disconnect value to 0, or never disconnect:

```
no idle-time
```

keepalive

Use the **keepalive** TN3270 configuration command to specify how many seconds of inactivity elapse before transmission of a DO TIMING-MARK to the TN3270 client. Use the **no** form of this command to cancel the keepalive period and return to the default.

keepalive *seconds*
no keepalive

Syntax Description

seconds	Number of seconds, from 0 to 65535. A value of 0 means no keepalive signals are sent. The default is 1800 seconds (30 minutes).

Defaults

The default in TN3270 configuration mode is 1800 seconds (30 minutes).

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

Command Modes

TN3270 configuration

PU configuration

Usage Guidelines

The **keepalive** 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. A **no keepalive** command entered in PU configuration mode will restore the **keepalive** value entered in TN3270 command mode.

If the client does not reply within 30 minutes of the transmission of the DO TIMING-MARK, the TN3270 server disconnects the TN3270 session. The DO TIMING-MARK is a Telnet protocol operation that does not affect the client operation.

If the IP path to the client is broken, the TCP layer will detect the failure to acknowledge the DO TIMING-MARK and initiate disconnection. This action will usually take much less than 30 minutes.

The **keepalive** command affects currently active and future TN3270 sessions. For example, reducing the value to a smaller nonzero value will cause an immediate burst of DO TIMING-MARKs on those sessions that have been inactive for a period of time greater than the new, smaller value.

Examples

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

```
keepalive 900
```

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

```
no keepalive
```

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* [**rmac** *rmac*] [**rsap** *rsap*]
no link *name*

Syntax Description

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

The combination of *rmac* and *rsap* 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

type	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**.
adapter-number	Internal adapter interface on the CIP card, which is the same value specified in the **adapter** internal LAN configuration command.
lsap	(Optional) Local SAP number, 04 to FC, in hexadecimal. The value must be even and should normally be a multiple of 4. 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

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

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 a typical license (2000) plus a 5 percent buffer. If you configure a value greater than the default, a license reminder is displayed.

Command Mode

TN3270 configuration

Usage Guidelines

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 percent of the current setting of **maximum-lus**, a warning message is displayed on the console. To prevent constant warning displays, 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 1 K bytes per LU. During session activity, a further 2 K 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

preferred-nnserver

Use the **preferred-nnserver** DLUR configuration command to specify a preferred network node (NN) as server. Use the **no** form of this command to remove the preference.

preferred-nnserver *name*
no preferred-nnserver

Syntax Description

name	A fully qualified name of a NN.

Default

This command has no defaults.

Command Mode

DLUR configuration

Usage Guidelines

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.

When no preferred server is specified, the DLUR will request NN server support from the first suitable node with which it makes contact. If refused, it will try the next one, and so on.

If a preferred server is specified, then DLUR will wait a short time to allow a link to the preferred server to materialize. If the preferred server is not found in that time, any suitable node can be used, as above.

DLUR will not relinquish the current NN server merely because the preferred server becomes available.

Example

The following command selects SYD.VMX as the preferred NN server:

```
preferred-nnserver SYD.VMX
```

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*
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

pu-name	Name that uniquely identifies this PU.
idblk-idnum	This value must match the IDBLK-IDNUM value defined at the host. The value must be unique within the domain; however, the TN3270 Server cannot tell which remote hosts are in which domains and does not enforce the unique value requirement.
ip-address	IP address that the clients should use as host IP address to map to LU sessions under this PU.
type	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**.
adapter-number	Internal adapter interface on the CIP card, which is the same value specified in the **adapter** internal LAN configuration command.
lsap	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 *rmac*	(Optional) Remote MAC address. The remote MAC address of the form *xxxx.xxxx.xxxx* 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 *rsap*	(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 *lu-name-stem*	(Optional) Provides an LU name that the client can use when a specific LU name request is needed. The format can be *x...x*## or *x...x*### where *x..x* 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 *x* 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

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

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

pu-name	Name that uniquely identifies this PU.
idblk-idnum	This value must match the *idblk-idnum* value defined at the host. The value must be unique within the domain; however, the TN3270 server generally cannot tell which remote hosts are in which domains, so the server only enforces uniqueness within the set of DLUR PUs.
ip-address	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

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
```

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

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

Table 5 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 *number*	Total number of LUs available for this listening point.
IN-USE *number*	Number of LUs currently in use.
CONNECT *number*	Total number of connect ins since the TN3270 feature was started.

Table 5 Show tn3270-server Field Descriptions (Continued)

Field	Description
DISCONN *number*	Total number of disconnects since the TN3270 feature was started.
FAIL *number*	Total number of failed connects since the TN3270 feature was started.
RESPONSE TIME, HOST *number*	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 *number*	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 *number*	Configured idle-time for this PU.
KEEPALIVE *number*	Configured keepalive for this PU.
UNBIND-ACTION *type*	Configured unbind action for LUs on this PU.
TCP-PORT *number*	Configured TCP port number.
GENERIC-POOL *type*	Configured generic-pool for LUs on this PU.
DLUR *fq-cpname*	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 *fq-dlusname*	Currently active DLUS.
NAME *pu-name*	This is the name of the PU as configured.
IP:TCP *ip-addr:tcpport*	IP address and TCP port number configured for the PU.
XID *number*	Configured XID - idblk and idnum.
STATE *value*	Possible STATE values and their meanings are: • **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.

Table 5 Show tn3270-server Field Descriptions (Continued)

Field	Description
LINK *type*	LINK type is either internal adapter type and internal adapter number or dlur if it is a SNA Session Switch PU.
DESTINATION *mac-address or PU-name*	If a direct PU, then it is the destination MAC address, otherwise, it is the name of the partner PU.
R-LSAP *number number*	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*

Syntax Description

slot/**2**	(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.
ip-address	IP address of the client.

Command Mode

Privileged EXEC

Sample Display

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

```
router# show extended channel 3/2 tn3270-server client-ip 171.69.136.130

lu    name   client-ip:tcp        state    model   frames in out   idle for
1            171.69.136.130:3736  INACTIVE 327904E  23      18      3:37:58

pu is TN3PU02, lu is DYNAMIC type 0, negotiated TN3270
bytes 509 in, 3438 out; RuSize 0 in, 0 out; NegRsp 0 in, 0 out
pacing window 0 in, 1 out; credits 0 in, queue-size 0 in, 0 out
traces:
         dynamic timer expired
         warm actpu req
         warm actpu req
         warm actpu req
         warm actpu req
         warm actpu req
         warm actpu req
         warm actpu req
IN  len=9    2C0001010009838100
OUT len=15   2Cxxxxxxxx0A038120F3000501FF
IN  len=9    2C000101000A838100
IN  len=170  xxxxxxxxxx0403922088000D818080
OUT len=1730 2Cxxxxxxxx0B0381207EC3110000
IN  len=9    2C000101000B838100
OUT len=55   2Dxxxxxxxx276B8000320F000000
IN  len=10   2D000101D427EB800032

lu    name   client-ip:tcp        state    model   frames in out   idle for
4            171.69.136.130:4074  INACTIVE 327904E  77      58      6:49:55

pu is TN3PU02, lu is DYNAMIC type 0, negotiated TN3270
bytes 1308 in, 21068 out; RuSize 0 in, 0 out; NegRsp 0 in, 0 out
pacing window 0 in, 1 out; credits 0 in, queue-size 0 in, 0 out
traces:
         Reply PSID pos rsp
         actlu req
         bind req
```

```
          sdt req
          unbind req
          Client disconnect req
          notify resp
          warm actpu req
   OUT len=28   2Cxxxxxxxx16038100F14011C3F0
   IN  len=9    2C0001040016838100
   OUT len=35   2Dxxxxxxxx3D6B80003201000000
   IN  len=10   2D000104043DEB800032
   OUT len=132  2Cxxxxxxxx0303800005C21D607C
   IN  len=9    2C0000040003838000
   IN  len=20   xxxxxxxxxx110B80008106200C0600
   OUT len=12   2Cxxxxxxxx118B8000810620
```

Table 6 describes significant fields in the display.

Table 6 Show tn3270-server client-ip-address Field Descriptions

Field	Description
LU *locaddr*	LOCADDR of the LU.
LU *lu-name*	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 *ip-addr:tcpport*	Client's IP address and TCP port number
STATE *lu-state*	The LU state and their meanings are: • **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 *model*	3278 model type of client; blank if STATIC LU.
FRAMES IN *number*	Number of frames sent inbound to the host.
FRAMES OUT *number*	Number of frames sent outbound from the host.
IDLE FOR *time*	Time the client has been idle. The time is in HH:MM:SS.
PU IS *pu-name*	Name of the PU.
LU IS *type*	Whether LU is DYNAMIC or STATIC.
NEGOTIATED *type*	Whether client is TN3270 or TN3270E.

Table 6 Show tn3270-server client-ip-address Field Descriptions (Continued)

Field	Description
BYTES IN/OUT *number/number*	Total number of bytes sent to/received from the host.
RUSIZE IN/OUT *number/number*	RU size as configured in the bind.
NEGRSP IN/OUT *number/number*	Number of SNA negative responses sent to/received from the host.
PACING WINDOW IN/OUT *number/number*	SNA pacing window as configured in the bind.
CREDITS IN *number*	Number of frames that can be sent inbound without requiring an isolated pacing response.
QUEUE SIZE IN *number*	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 *number*	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

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.NGMVMPA
lsap token-adapter   0 5C     vrn MPX.LAN4           status ACTIVE
link P390                remote 4000.7470.00e7 08  status ACTIVE
```

Table 7 describes significant fields in the display.

Table 7 Show tn3270-server dlur Field Descriptions

Field	Description
DLUR *fq-luname*	Fully qualified CP name used by the SNA session switch and the LU name for the DLUR function configured as the *fq-cpname* on the dlur statement.
CURRENT DLUS *fq-luname*	Name of the currently active DLUS, either the primary DLUS or the backup DLUS.
DLUR-DLUS STATUS *dlur-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.
PREFERRED-DLUS *fq-luname*	Name of the DLUS as configured on the DLUR statement.
BACKUP-DLUS *fq-luname*	Name of the DLUS that is used if the preferred DLUS is unavailable.
PREFERRED SERVER *fq-luname*	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.

Table 7 Show tn3270-server dlur Field Descriptions (Continued)

Field	Description
VRN *fq-name*	Name of the connection network as configured by the virtual routing node (VRN) statement for this LSAP and internal adapter pair.
LSAP...STATUS status	Possible *sap-status* values and their meanings are: • **inactive**—Not connected to adapter. • **pnd-actv**—SAP activation in progress. • **active**—SAP open. • **pnd-inac**—SAP deactivation in progress.
LINK *name*	Name of the configured link. If not a configured link, then the name is an invented name, @DLUR*nn*.
REMOTE *mac sap*	Remote MAC and SAP for this link.
LINK...STATUS *status*	Possible *link-status* values and their meanings are: • **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

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 8 describes significant fields in the display.

Table 8 Show tn3270-server dlurlink Field Descriptions

Field	Description
LSAP...VRN...STATUS *status*	Possible *sap-status* values and their meanings are: • **inactive**—Not connected to adapter. • **pnd-actv**—SAP activation in progress. • **active**—SAP open. • **pnd-inac**—SAP deactivation in progress.
LINK *name*	Name is an invented name, @DLUR*nn*, if not a configured link.
LINK...STATUS *status*	Possible *link-status* values and their meanings are: • **inactive**—Not connected to host. • **pnd-actv**—Link activation in progress. • **active**—Link active. • **pnd-inac**—Link deactivation in progress.
PARTNER *name*	CP name of the remote node for this link.
TGN *tg-number*	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 *maxdata*	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 *slot*/**2**	(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

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, dactlus 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, dactlus 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 9 describes significant fields in the display.

Table 9 Show tn3270-server pu Field Descriptions

Field	Description
NAME *pu-name*	Name of the PU as configured.
IP:TCP *ip-addr:tcpport*	IP address and TCP port number configured for the PU.
XID *number*	Configured XID - idblk and idnum.
STATE *pu-state*	Possible state values and their meanings are: • **shut**—The PU is configured, but is in a 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 is in an undefined state. • **p-rqactpu-r**—PU is pending a 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 *type*	LINK type is either internal adapter type and internal adapter number or dlur if it is a SNA session switch PU.
DESTINATION *mac-address or PU-name*	If a direct PU, then it is the destination MAC address, otherwise, it is the name of the partner PU.
R-LSAP *number number*	Remote and local SAP values.
IDLE-TIME *number*	Configured idle-time for this PU.
KEEPALIVE *number*	Configured keepalive for this PU.
UNBIND-ACT *type*	Configured unbind action for LUs on this PU.
GENERIC-POOL *type*	Configured generic-pool for LUs on this PU.
BYTES IN/OUT *number/number*	Total number of bytes sent to/received from the host for this PU.
FRAMES IN/OUT *number/number*	Total number of frames sent to/received from the host for this PU.
NEGRSP IN/OUT *number/number*	Total number of SNA negative responses sent to/received from the host.
ACTLUS *number*	Total number of ACTLUs received from the host.
DACTLUS *number*	Total number of DACTLUs received from the host.
BINDS *number*	Total number of BINDs received from the host.
LU *number*	LOCADDR of the LU.
NAME *lu-name*	Name of the TN3270 LU.

Table 9 Show tn3270-server pu Field Descriptions (Continued)

Field	Description
CLIENT-IP:TCP *ip-addr:tcpport*	Client's IP address and TCP port number.
STATE *lu-state*	The LU states and their meanings are: • **unknown**—LU is in an undefined state. • **inactive**—LU did not 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 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 *model*	3278 model type of client.
FRAMES IN *number*	Number of frames sent to the host.
FRAMES OUT *number*	Number of frames sent out from the host.
IDLE FOR *time*	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

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.
pu-name	PU name that uniquely identifies this PU.
locaddr	LU LOCADDR that uniquely identifies the LU.
history	(Optional) Displays the LU trace history.

Command Mode

Privileged EXEC

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   xxxxxxxxxx45EB80000D0201000000
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 10 describes significant fields in the display.

Table 10 Show tn3270-server pu lu Field Descriptions

Field	Description
LU *locaddr*	LOCADDR of the LU.
NAME *lu-name*	Name of the TN3270 LU.
CLIENT-IP:TCP *ip-addr:tcpport*	Client's IP address and TCP port number.
STATE *lu-state*	The LU state and their meanings are: • **unknown**—LU is in an undefined state. • **inactive**—LU did not 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 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 *model*	3278 model type of client; blank if STATIC LU.
FRAMES IN *number*	Number of frames sent to the host.
FRAMES OUT *number*	Number of frames sent out from the host.
IDLE FOR *time*	Time the client has been idle. The time is in HH:MM:SS.
PU IS *pu-name*	Name of the PU.
LU IS *type*	Whether LU is DYNAMIC or STATIC.
NEGOTIATED *type*	Whether client is TN3270 or TN3270E.
BYTES IN/OUT *number/number*	Total number of bytes sent to/received from the host.

Table 10 Show tn3270-server pu lu Field Descriptions (Continued)

Field	Description
RUSIZE IN/OUT *number/number*	RU size as configured in the bind.
NEGRSP IN/OUT *number/number*	Number of SNA negative responses sent to/received from the host.
PACING WINDOW IN/OUT *number/number*	SNA pacing window as configured in the bind.
CREDITS IN *number*	Number of frames that can be sent inbound without requiring an isolated pacing response.
QUEUE SIZE IN *number*	If non-zero, indicates the number of SNA frames waiting to be sent to the host that are blocked while waiting for a pacing response.
QUEUE SIZE OUT *number*	SNA frames not yet acknowledged by an isolated pacing response by the TN3270 server.

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

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

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
```

timing-mark

Use the **timing-mark** TN3270 configuration mode command to select whether a DO 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 DO 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 DO TIMING-MARKS are transmitted except by keepalive.

Command Mode

TN3270 configuration

Usage Guidelines

If **timing-mark** is configured the TN3270 server will send DO TIMING-MARK as necessary to achieve an end-to-end response protocol. Specifically, DO 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-timer
keepalive

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

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
```

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	LUT2 session clients will be disconnected upon receipt of an UNBIND. LUT1 and LUT3 session clients are not automatically disconnected.

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

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 virtual routing node (VRN) name.

Default

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

Command Mode

DLUR SAP configuration

Usage Guidelines

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 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

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- Telnet: cco.cisco.com
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

Cisco Connection Documentation

The complete caveats against this release are available on the Cisco Connection Documentation, Enterprise Series CD—formerly UniverCD—which is the Cisco library of product information on CD-ROM. On CD, access the Cisco IOS 11.0 caveats in the Cisco IOS Release 11.0 database.

The CD is updated and shipped monthly so it might be more current than printed documentation. To order the CD, contact your local sales representative or call Customer Service. The CD is available both as a single CD and as an annual subscription. You can also access Cisco technical documentation on the World Wide Web URL

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This document is to be used in conjunction with the *Router Products Release Notes for Cisco IOS Release 11.0* publication.

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