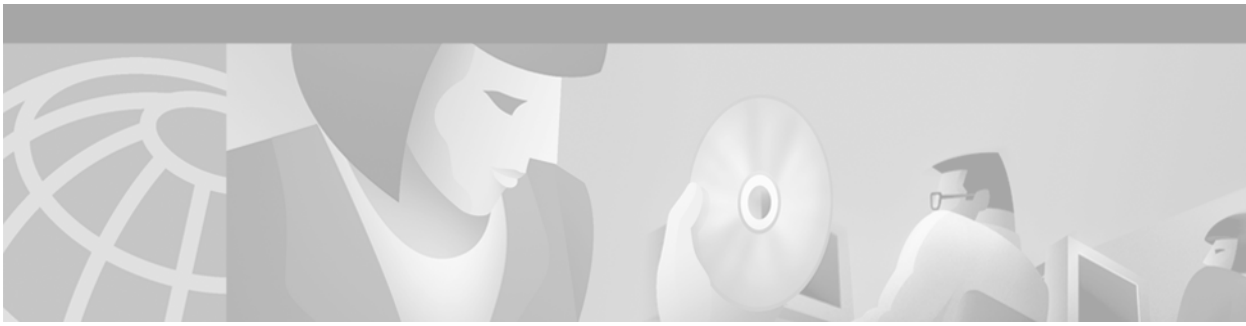

Cisco Mainframe Channel Connection Commands

Use the commands in this chapter to configure and monitor the Cisco Mainframe Channel Connection (CMCC) products which include the Channel Interface Processor (CIP) and the Channel Port Adapter (CPA). For commands to configure specific features on a CMCC adapter, see the corresponding chapters in this publication.

For hardware technical descriptions and for information about installing the router interfaces, refer to the hardware installation and maintenance publication for your particular product.

Note Unless otherwise specified, all commands in this chapter are supported on the Cisco 7000 with RSP7000, Cisco 7500 and the Cisco 7200 series routers.

For interface configuration information and examples, refer to the "Configuring Cisco Mainframe Channel Connection Adapters" chapter of the *Cisco IOS Bridging and IBM Networking Configuration Guide*.

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

adapter

To configure internal adapters, use the **adapter** command in internal LAN interface configuration submode. To remove an internal adapter, use the **no** form of this command.

adapter *adapter-number* [*mac-address*] [**hsma-partner** *hsma-mac-address*]

no adapter *adapter-number* [*mac-address*]

Syntax Description

adapter-number	Number in the range from 0 to 31 that uniquely identifies the internal adapter (relative adapter number) for all internal LANs of the same type on the Cisco Mainframe Channel Connection (CMCC) adapter. In Cisco Systems Network Architecture (CSNA), this value corresponds to the adaptor number (ADAPNO) parameter defined in the Virtual Telecommunications Access Method (VTAM) Extended Communications Adapter (XCA) Major Node.
mac-address	(Optional) MAC address for this internal adapter. This is a hexadecimal value in the form *xxxx.xxxx.xxxx*.
hsma-partner	(Optional) Specifies a hot standby MAC address (HSMA) partner.
hsma-mac-address	(Optional) MAC address of the HSMA partner control adapter.

Defaults

No default behavior or values

Command Modes

Internal LAN interface configuration

Command History

Release	Modification
11.0	This command was introduced.
12.3(3)	The **hsma-partner** keyword and *hsma-mac-address* argument were added.

Usage Guidelines

This command is valid only on the virtual channel interface. Internal adapters are used to provide LAN gateway MAC addresses for the following CMCC adapter features: CSNA, Cisco Multipath Channel (CMPC), and TN3270 Server.

Up to 18 internal adapters can be configured on a CMCC adapter. Internal adapters are configured on internal LANs. The only limit to the number of internal adapters that you can configure on a single internal LAN is the limit of up to 18 total internal adapters per CMCC.

When an internal adapter configuration command is removed or an existing internal adapter is modified, the *mac-address* parameter is not required. In internal adapter configuration mode, the router prompt appears as follows:

```
router(cfg-adap-type n-m)#
```

In this syntax, *type* is the internal LAN type, *n* is the LAN ID, and *m* is the adapter number.

HSMA is designed to allow redundant CMCC internal adapter MAC addresses in an Ethernet environment. Communication between the HSMA control adapters is used to ensure that only one of the adapters is active at a time.

Examples

The following example shows how to configure internal adapters 3 and 4 (with their corresponding MAC addresses) on the internal Token Ring LAN number 20, and internal adapter 1 on the internal Token Ring LAN number 10:

```
interface channel 1/2
 lan tokenring 20
  adapter 3 4000.7500.0003
  adapter 4 4000.7500.0004
 lan tokenring 10
  source-bridge 100 1 2000
  adapter 1 4000.7500.1111
```

The following example shows how to configure internal adapter 9 to communicate with the HSMA partner at the MAC address 4043.3333.001a:

```
interface Channel1/0
 lan TokenRing 20
  source-bridge 310 3 100
  adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
 lan TokenRing 26
  source-bridge 319 9 100
  adapter 26 4043.1111.001a
   hsma enable
```

Related Commands

Command	Description
lan	Configures an internal LAN on a CMCC adapter interface and enters the internal LAN configuration mode.
name	Assigns a name to an internal adapter.
show extended channel lan	Displays the internal LANs and adapters configured on a CMCC adapter.
show extended channel llc2	Displays information about the LLC2 sessions running on CMCC adapter interfaces.
show extended channel connection-map llc2	Displays the number of active LLC2 connections for each SAP and the mapping of the internal MAC adapter and the SAP to the resource that activated the SAP.
source-bridge	Configures an interface for SRB.

channel-protocol

To define a data rate of either 3 MBps or 4.5 MBps for Parallel Channel Interfaces, use the **channel-protocol** interface configuration command. To return to the default rate of 3 MBps, use the **no** form of this command.

channel-protocol [**s** | **s4**]

no channel-protocol

Syntax Description

s	(Optional) Specifies a data rate of 3 MBps.
s4	(Optional) Specifies a data rate of 4.5 MBps.

Defaults

If no value is specified, the default data rate for the Parallel Channel Adapter (PCA) and the Parallel Channel Port Adapter (PCPA) is 3 MBps.

Command Modes

Interface configuration

Command History

Release	Modification
10.2	This command was introduced.

Usage Guidelines

This command is valid on Parallel Channel Interfaces.

Examples

The following example specifies a data rate of 4.5 MBps for the interface:

```
channel-protocol s4
```

clear extended counters

To clear the extended interface counters associated with CMCC features, use the **clear extended counters** EXEC command.

clear extended counters [**channel** *slot*/*port* [**csna** | **icmp-stack** | **ip-stack** | **llc2** | **statistics** | **tcp-connections** | **tcp-stack** | **tg** | **tn3270-server** | **udp-stack**]]

Syntax Description

channel	(Optional) Specifies a channel interface.
slot	(Optional) Slot number.
port	(Optional) Port number.
csna	(Optional) Clears CSNA feature counters.
icmp-stack	(Optional) Clears ICMP stack counters.
ip-stack	(Optional) Clears IP stack counters.
llc2	(Optional) Clears LLC2 counters.
statistics	(Optional) Clears subchannel statistic counters.
tcp-connections	(Optional) Clears TCP connection counters.
tcp-stack	(Optional) Clears TCP stack counters.
tg	(Optional) Clears TG counters.
tn3270-server	(Optional) Clears TN3270 Server counters.
udp-stack	(Optional) Clears UDP stack counters.

Command Modes

EXEC

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

This command is valid on both the physical and virtual channel interfaces. To clear counters for a selected CMCC feature, you must specify the channel interface on which the feature is configured or running.

Counters displayed using the **show extended channel** EXEC command are cleared using this command.

Entering any form of this command will prompt the user for a confirmation before clearing any counters. A “CLEAR-5-EXT_COUNT” message is displayed to indicate successful completion of the command.

These counters will be cleared in the show commands and remain uncleared when obtained through the SNMP interface.

Examples

The following is an example of the command:

```
clear extended counters
```

Related Commands

Command	Description
show extended channel csna	Displays information about the CSNA subchannels configured on the specified CMCC interface.
show extended channel icmp-stack	Displays information about the ICMP stack running on the CMCC channel interfaces.
show extended channel ip-stack	Displays information about the IP stack running on CMCC channel interfaces.
show extended channel lan	Displays the internal LANs and adapters configured on a CMCC adapter.
show extended channel llc2	Displays information about the LLC2 sessions running on the CMCC adapter interfaces.
show extended channel statistics	Displays statistical information about subchannels on the physical interface of a CMCC adapter and displays information that is specific to the interface channel devices. The information generally is useful only for diagnostic tasks performed by technical support personnel.
show extended channel tcp-connections	Displays information about the TCP sockets on a channel interface.
show extended channel tcp-stack	Displays information about the TCP stack running on CMCC adapter interfaces.
show extended channel udp-listeners	Displays information about the UDP listener sockets running on the CMCC adapter interfaces.
show extended channel udp-stack	Displays information about the UDP stack running on the CMCC adapter interfaces.

exception slot

To provide a core dump of a CMCC adapter, use the **exception slot** global configuration command. To disable the core dump, use the **no** form of this command.

exception slot [*slot*] *protocol***://***host***/***filename*

no exception slot [*slot*] *protocol***://***host***/***filename*

Syntax Description

slot	(Optional) Slot number of the CMCC adapter. If no *slot* is specified, all installed CMCC adapters will output a core dump when they halt unexpectedly.
protocol	Protocol for transferring the file. Currently, the only allowed value is FTP.
host	Name or IP address of the host that receives the core dump information.
filename	Filename on the host that receives the core dump information. The maximum name length is 31 characters. When written to the host, *slot* is automatically appended, where *slot* is the slot number.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

This command is only supported on the Cisco 7000 with RSP7000 and Cisco 7500 series routers.

You must configure FTP services on the router before you can create a CMCC adapter core dump.

Do not exceed your host limits on filename length. An additional two characters are added to the filename, *slot*, where *slot* is the slot number.

Examples

The following example shows how to configure a router to perform a CMCC adapter core dump. Assuming the CIP is installed in slot 3, the filename `cipdump.3` will be written to the host.

```
ip domain-name cisco.com
ip name-server 168.69.161.21
ip ftp username tech1
ip ftp password tech1
exception slot ftp://168.18.2.196/cipdump
```

Related Commands

Command	Description
ip domain-name	Defines a default domain name to complete unqualified host names (names without a dotted-decimal domain name).
ip name-server	Specifies the address of one or more name servers to use for name and address resolution.
ip ftp username	Configures the username for FTP connections.
ip ftp password	Specifies the password to be used for FTP connections.

interface channel

To specify a channel-attached interface and enter interface configuration mode, use the **interface channel** global configuration command.

interface channel *slot/port*

Syntax Description

slot	Slot number where the CMCC adapter is located.
port	Interface where the CMCC adapter is located.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
10.2	This command was introduced.

Examples

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

```
interface channel 2/0
```

Related Commands

Command	Description
channel-protocol	Defines a data rate of either 3 MBps or 4.5 MBps for Parallel Channel Interfaces.
claw (primary)	Configures a CLAW device (read and write subchannel) for communication with a mainframe TCP/IP stack in IP datagram mode and also configures individual members of a CLAW backup group for the IP Host Backup feature.
cmpc	Configures a CMPC (or CMPC+) read subchannel and a CMPC (or CMPC+) write subchannel.
csna	Configures SNA support on a CMCC physical channel interface and specifies the path and device/subchannel on a physical channel of the router to communicate with an attached mainframe.
lan	Configures an internal LAN on a CMCC adapter interface and enters internal LAN configuration mode.
max-llc2-sessions	Specifies the maximum number of LLC2 sessions supported on the CMCC adapter.

Command	Description
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.
offload (backup)	Configures a backup group of Offload devices.
tg (CMPC)	Defines LLC connection parameters for the CMPC TG.
tn3270-server	Starts the TN3270 server on a CMCC adapter and enters TN3270 server configuration mode.

lan

To configure an internal LAN on a CMCC adapter interface and enter the internal LAN configuration mode, use the **lan** interface configuration command. To remove an internal LAN interface, use the **no** form of this command.

lan *type lan-id*

no lan *type lan-id*

Syntax Description

type	Interface type for this internal LAN: **tokenring**.
lan-id	Number 0 to 31 that uniquely identifies the internal LAN on this CMCC adapter. This value must be unique between all internal LANs of the same interface type on a CMCC adapter.

Defaults

No default behavior or values.

Command Modes

Interface configuration

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

Token Ring is the only type of internal LAN that is supported.

This command is valid only on the virtual channel interface. All internal adapters configured on the internal LAN must be removed first before the internal LAN can be removed.

A CMCC internal LAN can be configured as a SRB LAN. This allows LLC packets to be bridged between the CMCC adapter and IOS, providing a means to link the internal LAN to Cisco IOS SNA features such as SRB, DLSw+, RSRB, SDLLC, QLLC, APPN, and SR/TLB.

An internal LAN can only be configured on a virtual channel interface of a CMCC adapter. You enter the internal LAN configuration mode by issuing the command for an internal LAN that already exists or when you configure an internal LAN for the first time. In the internal LAN configuration mode, the router prompt appears as follows:

```
router (cfg-lan-type n) #
```

In this syntax, *type* is the specified internal LAN type and *n* is the specified value for the *lan-id*.

Examples

The following example shows how to configure an internal LAN Token Ring with a LAN ID of 20 on the channel interface 1/2:

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

Related Commands

Command	Description
adapter	Configures internal adapters.
locaddr-priority	Assigns an RSRB priority group to an input interface.
sap-priority	Defines a priority list on an interface.
show extended channel lan	Displays the internal LANs and adapters configured on a CMCC adapter.
source-bridge	Configures an interface for SRB.

max-llc2-sessions

To specify the maximum number of LLC2 sessions supported on the CMCC adapter, use the **max-llc2-sessions** interface configuration command. To restore the default value, use the **no** form of this command.

max-llc2-sessions *number*

no max-llc2-sessions *number*

Syntax Description

number	A value in the range 1 to 6000 LLC sessions. If this command is not configured, the default is 256 sessions.

Defaults

The default number of sessions is 256.

Command Modes

Interface configuration

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

This command is configured on the virtual interface of a CIP, and the physical interface of a CPA. If you do not configure this parameter on the CMCC adapter, then the limit of LLC2 sessions is 256.

This command will fail if there is not enough memory currently available on the CMCC adapter to support the specified number of LLC2 sessions.

Note A value of 0 sets the maximum number of LLC2 sessions to the default value of 256. In this case, the value does not appear in your configuration when you use the **show run** command.

Examples

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

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

name

To assign a name to the internal adapter, use the **name** internal adapter configuration command. To remove the name assigned to an internal adapter, use the **no** form of this command.

name *name*

no name *name*

Syntax Description

name	Name that identifies this internal adapter. The name consists of up to 8 characters (not including blanks).

Defaults

No default behavior or values.

Command Modes

Internal adapter configuration

Command History

Release	Modification
11.0	This command was introduced.

Examples

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

```
name VTAM_B14
```

Related Commands

Command	Description
adapter	Configures internal adapters.

show controllers channel

To display CPA-specific information, including the currently loaded microcode, use the **show controllers channel** EXEC command.

show controllers channel [*slot*/*port*]

Syntax Description

slot	(Optional) Slot number.
port	(Optional) Interface number.

Command Modes

EXEC

Command History

Release	Modification
11.3T	This command was introduced.

Examples

The following is sample output from the **show controllers channel** command:

```
Router# show controllers channel 5/0

ECPA 5, hardware version 1.0, microcode version 26.0
    Mailbox commands: 0 forevers, 0 max elapsed usecs
    Microcode loaded from flash slot0:xcpa26-0_kernel_xcpa
    Loaded:seg_eca         Rev. 0    Compiled by cip-release on 01-Apr-98
    EPROM version 1.0, VPLD version 1.1
    ECA0: hw version 255, microcode version C50602D1
    Load metrics:
      Memory    sram 2964552/4096K, dram 11552952/16M
      CPU       1m   0%, 5m   0%, 60m   0%
      DMA       1m   0%, 5m   0%, 60m   0%
      ECA0      1m   0%, 5m   0%, 60m   0%
 Interface Channel5/0
 Hardware is Escon Channel
  HW Registers control status=0x0001EC07  LED control=0x00045DD5
  HW Poll Register 4B05D4E0:[00000001]
  Free buffer queues
    queue=0 max_entries=128 size=600 head=39 ring=4B095F00
    queue=1 max_entries=32 size=4520 head=31 ring=4B095E40
    queue=2 max_entries=64 size=4520 head=63 ring=4B096140
  Tx Queues
    queue=0 head=0 tail=0 tx_cnt=0 tx_pakcnt=0
    max_entries=128 type=1 poll_index=0 ring=4B0963C0
    fspak buffers swapped out=0
    queue=1 head=31 tail=31 tx_cnt=0 tx_pakcnt=0
    max_entries=32 type=2 poll_index=1 ring=4B096280
    fspak buffers swapped out=0
  Rx Queues
    max_entries=221 poll_index=3 head=57 ring=4B096800
    max packets per interrupt count = 0
```

show extended channel connection-map llc2

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

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

Syntax Description

slot	Slot number.
port	Port number.
connection-map llc2	Displays a connection map of LLC2 connections.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.0(3)	This command was introduced.

Usage Guidelines

The **show extended channel connection-map llc2** command is valid only on the virtual channel interfaces.

Examples

The following is sample output from the **show extended channel connection-map llc2** command:

```
Router# show extended channel 1/2 connection-map llc2

LAN Token  0 Adapter   0 4000.7000.0747
 Local SAP=08 LLC2 Connections=4   CSNA Port=1 Path=C200 Device=60
 Local SAP=0C LLC2 Connections=4   CSNA Port=1 Path=C200 Device=60
 Local SAP=10 LLC2 Connections=2   CSNA Port=1 Path=C200 Device=60
 Local SAP=14 LLC2 Connections=0   CSNA Port=1 Path=C200 Device=60

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

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

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

show extended channel icmp-stack

To display information about the Internet Control Message Protocol (ICMP) stack running on the CMCC channel interfaces, use the **show extended channel icmp-stack** EXEC command.

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

Syntax Description

slot	Slot number.
port	Port number.
ip-address	(Optional) IP address specified by the **offload** interface configuration command or the **tn3270-server pu** command.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.0(7)T	Alias addresses field added to the output.

Usage Guidelines

The **show extended channel icmp-stack** command is valid on both physical and virtual channel interfaces.

Examples

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

```
Router# show extended channel 0/1 icmp-stack

ICMP Statistics for IP Address 80.11.198.2
  InMsgs         : 3            InErrors        : 0            InDestUnreachs: 0
  InTimeExcds    : 0            InParmProbs     : 0            InSrcQuenchs  : 0
  InRedirects    : 0            InEchos         : 3            OutEchoReps   : 3
  OutTimestamps  : 0            OutTimestampReps: 0            OutAddrMasks  : 0
  OutAddrMaskReps: 0
ICMP Statistics for IP Address 80.11.198.3
  InMsgs         : 1            InErrors        : 0            InDestUnreachs: 0
  InTimeExcds    : 0            InParmProbs     : 0            InSrcQuenchs  : 0
  InRedirects    : 0            InEchos         : 1            OutEchoReps   : 1
  OutTimestamps  : 0            OutTimestampReps: 0            OutAddrMasks  : 0
  OutAddrMaskReps: 0
```

The following example shows sample output from the **show extended channel icmp-stack** for an offload device at real IP address 10.10.21.3 and alias IP address of 10.2.33.88:

```
Router# show extended channel 3/1 icmp-stack

ICMP Statistics for IP Address 10.10.21.3
 Alias addresses: 10.2.33.88
  InMsgs         : 0            InErrors        : 0            InDestUnreachs: 0
  InTimeExcds    : 0            InParmProbs     : 0            InSrcQuenchs  : 0
  InRedirects    : 0            InEchos         : 0            OutEchoReps   : 0
  OutTimestamps  : 0            OutTimestampReps: 0            OutAddrMasks  : 0
  OutAddrMaskReps: 0
```

Table 10 describes the fields shown in the display.

Table 10 show extended channel icmp-stack Field Descriptions

Field	Description
Alias addresses	Virtual IP addresses assigned to the real IP address of an offload device.
InMsgs	Total number of ICMP messages which the entity received. Note that this counter includes all those counted by icmpInErrors.
InErrors	Number of ICMP messages which the entity received but determined as having ICMP-specific errors (for example, bad ICMP checksums, bad length).
InDestUnreachs	Number of ICMP Destination Unreachable messages received.
InTimeExcds	Number of ICMP Time Exceeded messages received.
InParmPrbs	Number of ICMP Parameter Problem messages received.
InSrcQuenchs	Number of ICMP Source Quench messages received.
InRedirects	Number of ICMP Redirect messages received.
InEchos	Number of ICMP Echo (request) messages received.
OutEchoReps	Number of ICMP Echo Reply messages sent.
OutTimestamps	Number of ICMP Timestamp (request) messages sent.
OutTimestampReps	Number of ICMP Timestamp Reply messages sent.
OutAddrMasks	Number of ICMP Address Mask Request messages sent.
OutAddrMaskReps	Number of ICMP Address Mask Reply messages sent.

Related Commands

Command	Description
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.
pu (TN3270)	Creates a PU entity that has its own direct link to a host and enters PU configuration mode.
pu (DLUR)	Creates a PU entity that has no direct link to a host and enters DLUR PU configuration mode.

show extended channel ip-stack

To display information about the IP stack running on CMCC channel interfaces, use the **show extended channel ip-stack** EXEC command.

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

Syntax Description

slot	Slot number.
port	Port number.
ip-address	(Optional) IP address specified by the **offload** interface configuration command or the **tn327-server pu** command.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.0(7)T	Alias addresses field added to the output.

Usage Guidelines

The **show extended channel ip-stack** command is valid on both physical and virtual channel interfaces.

Examples

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

```
Router# show extended channel 0/1 ip-stack

IP Statistics for IP Address 80.11.198.2
  Forwarding     : no           DefaultTTL     : 64          InReceives   : 165
  InHdrErrors    : 0            InAddrErrors   : 0           ForwDatagrams: 0
  InUnknownProtos: 0            InDiscards     : 0           InDelivers   : 165
  OutRequests    : 157          OutDiscards    : 0           OutNoRoutes  : 0
  ReasmTimeout   : 60           ReasmReqds     : 0           ReasmOKs     : 0
  ReasmFails     : 0            FragOKs        : 0           FragFails    : 0
  FragCreates    : 0            RoutingDiscards: 0
IP Statistics for IP Address 80.11.198.3
  Forwarding     : no           DefaultTTL     : 64          InReceives   : 77
  InHdrErrors    : 0            InAddrErrors   : 0           ForwDatagrams: 0
  InUnknownProtos: 0            InDiscards     : 0           InDelivers   : 77
  OutRequests    : 78           OutDiscards    : 0           OutNoRoutes  : 0
  ReasmTimeout   : 60           ReasmReqds     : 0           ReasmOKs     : 0
  ReasmFails     : 0            FragOKs        : 0           FragFails    : 0
  FragCreates    : 0            RoutingDiscards: 0
```

The following example shows sample output from the **show extended channel ip-stack** for an offload device at real IP address 10.10.21.3 and alias IP address of 10.2.33.88:

```
Router# show extended channel 3/1 ip-stack
IP Statistics for IP Address 10.10.21.3
 Alias addresses: 10.2.33.88
  Forwarding     : no           DefaultTTL     : 64           InReceives   : 16
  InHdrErrors    : 0            InAddrErrors   : 0            ForwDatagrams: 0
  InUnknownProtos: 0            InDiscards     : 0            InDelivers   : 16
  OutRequests    : 7            OutDiscards    : 0            OutNoRoutes  : 0
  ReasmTimeout   : 60           ReasmReqds     : 0            ReasmOKs     : 0
  ReasmFails     : 0            FragOKs        : 0            FragFails    : 0
  FragCreates    : 0            RoutingDiscards: 0
```

The following example shows sample output from the **show extended channel ip-stack** when you specify the alias IP address for an offload device at real IP address 10.10.21.3:

```
Router# show extended channel 3/1 ip-stack 10.2.33.88

IP Statistics for IP Address 10.10.21.3
 Alias addresses: 10.2.33.88
  Forwarding     : no           DefaultTTL     : 64           InReceives   : 16
  InHdrErrors    : 0            InAddrErrors   : 0            ForwDatagrams: 0
  InUnknownProtos: 0            InDiscards     : 0            InDelivers   : 16
  OutRequests    : 7            OutDiscards    : 0            OutNoRoutes  : 0
  ReasmTimeout   : 60           ReasmReqds     : 0            ReasmOKs     : 0
  ReasmFails     : 0            FragOKs        : 0            FragFails    : 0
  FragCreates    : 0            RoutingDiscards: 0
```

Table 11 describes the fields shown in the display.

Table 11 show extended channel ip-stack Field Descriptions

Field	Description
Alias addresses	Virtual IP addresses assigned to the real IP address of an offload device.
Forwarding	Indication of whether this entity is acting as an IP gateway in respect to the forwarding of datagrams received by, but not addressed to, this entity. IP gateways forward datagrams. IP hosts do not (except those source-routed via the host). Note that for some managed nodes, this object may take on only a subset of the values possible. Accordingly, it is appropriate for an agent to return a 'badValue' response if a management station attempts to change this object to an inappropriate value.
DefaultTTL	The default value inserted into the Time-To-Live field of the IP header of datagrams originated at this entity, whenever a TTL value is not supplied by the transport layer protocol.
InReceives	Total number of input datagrams received from interfaces, including those received in error, for this IP Address instance.
InHdrErrors	Number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options, etc.

Table 11 show extended channel ip-stack Field Descriptions (continued)

Field	Description
InAddrErrors	Number of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (for example, 0.0.0.0) and addresses of unsupported Classes (for example, Class E). For entities which are not IP Gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.
ForwDatagrams	Number of input datagrams for which this entity was not their final IP destination, as a result of which an attempt was made to find a route to forward them to that final destination. In entities that do not act as IP Gateways, this counter will include only those packets that were Source-Routed through this entity, and the Source-Route option processing was successful.
InUnknownProtos	Number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.
InDiscards	Number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (for example, for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly.
InDelivers	Total number of input datagrams successfully delivered to IP user-protocols (including ICMP)
OutRequests	Total number of IP datagrams that local IP user-protocols (including ICMP) supplied to IP in requests for sending. Note that this counter does not include any datagrams counted in ipForwDatagrams.
OutDiscards	Number of output IP datagrams for which no problem was encountered to prevent sending them to their destination, but which were discarded (for example, for lack of buffer space). Note that this counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.
OutNoRoutes	Number of IP datagrams discarded because no route could be found to send them to their destination. Note that this counter includes any packets counted in ipForwDatagrams that meet this ‘no-route’ criterion. Note that this includes any datagrams which a host cannot route because all of its default gateways are down.
ReasmTimeout	Maximum number of seconds that received fragments are held while they are awaiting reassembly at this entity.
ReasmReqds	Number of IP fragments received that needed to be reassembled at this entity.
ReasmOKs	Number of IP datagrams successfully reassembled.
ReasmFails	Number of failures detected by the IP reassembly algorithm (for whatever reason: timed out, errors, and so on). Note that this is not necessarily a count of discarded IP fragments since some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.
FragOKs	Number of IP datagrams that have been successfully fragmented at this entity.
FragFails	Number of IP datagrams that have been discarded because they needed to be fragmented at this entity but could not be, for example, because their Don't Fragment flag was set.

Table 11 show extended channel ip-stack Field Descriptions (continued)

Field	Description
FragCreates	Number of IP datagram fragments that have been generated as a result of fragmentation at this entity.
RoutingDiscards	Number of routing entries that were chosen to be discarded even though they are valid. One possible reason for discarding such an entry could be to free-up buffer space for other routing entries.

Related Commands

Command	Description
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.
pu (TN3270)	Creates a PU entity that has its own direct link to a host and enters PU configuration mode.
pu (DLUR)	Creates a PU entity that has no direct link to a host and enters DLUR PU configuration mode.

show extended channel lan

To display the internal LANs and adapters configured on a CMCC adapter, use the **show extended channel lan** EXEC command.

show extended channel *slot/port* **lan** [*tokenring* [*lan-id* [*adapno*]]]

Syntax Description

slot	Slot number.
port	Port number.
tokenring	(Optional) Specify CMCC internal LAN type to be displayed.
lan-id	(Optional) Specify the CMCC internal LAN number to be displayed.
adapno	(Optional) Specify the CMCC internal adapter number on the selected internal LAN to be displayed.

Defaults

Display all internal LANs and adapters on the selected channel interface.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

This command is valid only on the virtual channel interface.

Examples

The following is sample output from the **show extended channel lan** command:

```
Router# show extended channel 3/2 lan

Lan TokenRing 0
        Adapno Mac Address    Name     Vcnum
             0 4000.1111.1112            544
            20 4000.1111.2200            564
            30 4000.3030.0101            574
Lan TokenRing 1
        source-bridge 207 1 2002
        Adapno Mac Address    Name     Vcnum
             1 4000.2222.2222            545
Lan TokenRing 2
        source-bridge 50 1 1500
        Adapno Mac Address    Name     Vcnum
             2 4000.3333.2222            546
```

```
Lan TokenRing 5
        source-bridge 112 1 3000
        Adapno Mac Address    Name     Vcnum
             5 4000.1234.5656            549
Lan TokenRing 9
        source-bridge 111 1 3000
        Adapno Mac Address    Name     Vcnum
             9 4000.9999.1111            553
Lan TokenRing 10
        source-bridge 110 1 3000
        Adapno Mac Address    Name     Vcnum
            10 4000.aaaa.1111            554
Lan TokenRing 20
        source-bridge 20 1 2002
        Adapno Mac Address    Name     Vcnum
            21 4000.2020.2020            565
```

Related Commands

Command	Description
adapter	Configures internal adapters.
lan	Configures an internal LAN on a CMCC adapter interface and enters internal LAN configuration mode.

show extended channel llc2

To display information about the LLC2 sessions running on the CMCC adapter interfaces, use the **show extended channel llc2** EXEC command.

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

Syntax Description

slot	Slot number.
port	Port number.
admin	(Optional) Shows configured values. This is the default.
oper	(Optional) Shows operational values for: • Internal adapters • SAPs opened on the internal adapters • LLC2 connections on the internal adapters
stats	(Optional) Displays statistics for: • Internal adapters • SAPs opened on the internal adapters • LLC connections on the internal adapters
lmac	(Optional) Local MAC address.
lsap	(Optional) Local service access point (SAP) address, 0 to 256.
rmac	(Optional) Remote MAC address.
rsap	(Optional) Remote SAP address, 0 to 256.

Command Modes

EXEC

Command History

Release	Modification
11.0(3)	This command was introduced.

Usage Guidelines

The **show extended channel llc2** command is valid on virtual channel interfaces.

To specify LLC information for internal adapters:

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

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

- Specify values for the *lmac* and *lsap* arguments to display information for a particular SAP.
- Specify a value for the *lmac* argument and '*' to display information for all SAPs opened on the specified channel adapter.

To display information for LLC2 connections on a channel interface:

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

Examples

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

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

```
Router# show extended channel 2/2 llc2 admin

    Lan Token adapter   0 0004.0004.0004
  t1-time   = 1000  tpf-time  = 1000  trej-time = 3200  tbusy-tim = 9600
  idle-time =60000  local-win =    7  recv-wind =    7  N2        =    8
  N1        = 1033  ack-delay =  100  ack-max   =    3  nw        =    0
```

Table 12 describes the fields shown in the display.

Table 12 show extended channel llc2 admin Field Descriptions—All LLC2 Connections

Field	Description
t1-time	Length of time the CMCC LLC2 link station waits for an acknowledgment to a sent I-frame before polling the remote LLC2 station.
tpf-time	Amount of time the CMCC LLC2 link station waits for a final response to a poll before resending the original poll frame.
trej-time	Amount of time the CMCC LLC2 link station waits for a correct frame after sending a reject command to a remote LLC2 station.
tbusy-time	Amount of time the CMCC LLC2 link station waits before repolling a busy LLC2 station.
idle-time	Frequency of polls during periods of idle traffic.
local-win	Maximum number of I-frames that the CMCC LLC2 link station connection can send to the remote LLC2 station without receiving an acknowledgment.
recv-wind	Maximum number of I-frames that the CMCC LLC2 link station connection can receive without receiving an acknowledgment.
N2	Number of times the CMCC LLC2 link station connection will resend an unacknowledged I-frame.

Table 12 show extended channel llc2 admin Field Descriptions—All LLC2 Connections (continued)

Field	Description
N1	Maximum size of LLC frames supported by the CMCC LLC2 link station. The maximum size LLC frame supported on the CMCC is controlled by other factors including the largest interface MTU between the CMCC and the remote network device, and configured values at VTAM and at the end station.
ack-delay	Maximum amount of time the CMCC LLC2 link station allows received I-frames to remain unacknowledged. The CMCC LLC2 connection will acknowledge received I-frames within the ack-delay time.
ack-max	Maximum number of I-frames the CIP LLC2 link station receives before sending an acknowledgment.
Nw	Working send window size. When I-frames sent by the CMCC are rejected by the remote LLC2 station, the CMCC LLC2 connection reduces its working send window size to 1. Then, for every subsequent I-frame sent by the CMCC LLC2 connection that is positively acknowledged by the remote LLC2 station, the CMCC LLC2 connection increases its working send window by the Nw value until the working send window reaches the configured local-window value.

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

```
Router# show extended channel 5/2 llc oper

  LAN Token  0 Adapter   0 4000.1010.2020
      Open SAPs=1
      Max SAPs Opened=1
```

Open SAPS is the number of SAPs currently opened on this internal MAC adapter. *Max SAPs Opened* is the number of SAPs concurrently opened on this internal MAC adapter since the last reset of the channel adapter of channel interface.

The following sample displays operational information for the specified SAP opened on a CMCC internal adapter:

```
Router# show extended channel 5/2 llc stat

LAN Token  0 Adapter   0 4000.1010.2020
      PDUsIn     =     223339    PDUsOut     =       9564
      OctetsIn   =    6949875    OctetsOut   =     307448
      TESTCmdsIn =     213293    TESTRspsOut =          2
      LocalBusies=          0    UnknownSAPs =          0
```

Table 13 describes the fields shown in the display. These statistics are available on the adapter because when LLC2 connections are deactivated, users can no longer retrieve the information per LLC2 connection.

Table 13 show extended channel llc2 stats Field Descriptions—all LLC2 Connections

Field	Description
PDUsIn	Protocol Data Units received by the internal adapter.
PDUsOut	Protocol Data Units sent by the internal adapter.
OctetsIn	PDU bytes received by the internal adapter.
OctetsOut	PDU bytes sent by the internal adapter.

Table 13 show extended channel llc2 stats Field Descriptions—all LLC2 Connections (continued)

Field	Description
TESTCmdsIn	Number of TEST commands received destined for this MAC address.
TESTRspsOut	Number of TEST responses sent by this MAC address responding to TEST commands received.
Local Busies	Number of times LLC2 connection stations on this adapter entered a busy state, send RNRs to the remote LLC2 station.
UnknownSAPs	Number of frames received that are destined for a SAP that does not exist on this adapter.

The following sample displays operational information for the specified SAP opened on the internal adapter, 4000.1010.2020 configured on channel interface 5/2:

```
Router# show extended channel 5/2 llc2 oper 4000.1010.2020 04

  LAN Token  0 Adapter   0 4000.1010.2020
    Local SAP=04
      Open Connections=2
      Max Connections Opened=2
```

Table 14 describes the fields shown in the display.

Table 14 show extended channel llc2 oper Field Descriptions for Specified Interface

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

The following sample displays statistics for the specified SAP on the internal adapter, 4000.1010.2020 configured on channel interface 5/2:

```
Router# show extended channel 5/2 llc2 stats 4000.1010.2020 04

  LAN Token  0 Adapter   0 4000.1010.2020
    Local SAP=04
      TESTRspsIn     =          0  TESTCmdsOut    =          0
      XIDCmdsIn      =         14  XIDCmdsOut     =         16
      XIDRspsIn      =          4  XIDRspsOut     =          0
      UIFramesIn     =          0  UIFramesOut    =          0
      UIOctetsIn     =          0  UIOctetsOut    =          0
      ConnectOk      =          2  ConnectFail    =          0
      DiscNorm       =          0  DiscByTmr      =          0
      DiscByFRMRSent =          0  DiscByFRMRRcvd =          0
      DMsInABM       =          0  SABMEsInABM    =          0
```

Table 15 describes the fields shown in the display. All statistics for SAPs are based on the time the SAP was last opened.

Table 15 show extended channel llc2 stats Field Descriptions for Specified Interface

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

Table 15 show extended channel llc2 stats Field Descriptions for Specified Interface (continued)

Field	Description
DMsInABM	Number of times the CMCC LLC2 link station went into disconnect mode after receiving a DM. The CMCC LLC2 stack generates an event each time it detects this condition. The event can be configured to generate a NetView alert, SNMP trap, and a router console message.
SABMEDsInABM	Number of times the CMCC LLC2 link station went into disconnect mode after receiving a SABME from the LLC2 station. The CMCC LLC2 stack generates an event each time it detects this condition. The event can be configured to generate a NetView alert, SNMP trap, and a router console message.

The following sample displays operation information for the specified CMCC link station:

```
Router# show extended channel 5/2 llc2 oper 4000.1010.2020 04 4000.1234.1030 18

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

Table 16 explains parameters in use by the LLC2 connection. These parameters are the ones configured on the internal adapter 4000.0000.0001 at the time the LLC2 connection was established. If the LLC2 parameters on the internal adapter are changed while this connection is active, the connection will not reflect the changes to the adapter.

Table 16 show extended channel llc2 Field Descriptions for Internal LAN Adapter

Field	Description
State	• ADM (Asynchronous Disconnect Mode) • setup • conn • normal • busy • reject • await • awaitBusy • awaitReject • discConn • reset • error • pendDiscRsp The descriptions for each state can be found in Section 7.8.3, IOS 8802-2: 1989, ANSI/IEEE Std 802.2 - 1989.
t1-time	Length of time the CMCC LLC2 link station waits for an acknowledgment to a sent I-frame before polling the remote LLC2 station.
tpf-time	Amount of time the CMCC LLC2 link station waits for a final response to a poll before resending the original poll frame.
trej-time	Amount of time the CMCC LLC2 link station waits for a correct frame after sending a reject command to a remote LLC2 station.
tbusy-tim	Amount of time the CMCC LLC2 link station waits before repolling a busy LLC2 station.
idle-time	Frequency of polls during periods of idle traffic.
local-win	Maximum number of I-frames that the CMCC LLC2 link station can send to the remote LLC2 station without receiving an acknowledgment.
recv-wind	Maximum number of I-frames that a CMCC LLC2 link station can receive without receiving an acknowledgment.
N2	Number of times a CMCC LLC2 link station will resend an unacknowledged I-frame.
N1-Send	Largest frame size this CMCC LLC2 link station is allowed to send.
N1-Rcv	Largest frame size this CMCC LLC2 link station can receive.
ack-delay	Maximum amount of time the CMCC LLC2 link station allows received I-frames to remain unacknowledged. The CIP LLC2 connection will acknowledge received I-frames within the ack-delay time.

Table 16 show extended channel llc2 Field Descriptions for Internal LAN Adapter (continued)

Field	Description
ack-max	Maximum number of I-frames a CMCC LLC2 link station receives before sending an acknowledgment.
Nw	Working send window size. When I-frames sent by a CMCC LLC2 link station are rejected by the remote LLC2 station, the CMCC LLC2 link station reduces its working send window size to 1. Then, for every subsequent I-frame sent by the CMCC LLC2 connection that is positively acknowledged by the remote LLC2 station, the CMCC LLC2 link station increases its working send window by the Nw value until the working send window reaches the configured local-window value.
Ww	Current working window size for this LLC2 link station. This is the current number of unacknowledged I-frames that this LLC2 link station will send.
Last Ww Cause	Last event that caused the working window to change values. Valid values are: • neverInvoked - This LLC2 station has not detected a condition to change the working window from the initial value at activation time. • lostData - The current working window value was changed due to loss of data by the remote LLC2 link station. • macLayerCongestion - The current working window value was changed due to the remote end station sending this LLC2 link station a RNR frame.
Connection Time	Length of time this LLC2 connection has been active.
Last modified	Length of time since one of the LLC2 parameters for this connection was last modified.

The following sample displays statistics for the CMCC LLC2 link station connection between LMAC 4000.1010.2020 LSAP 04 and RMAC 4000.1234.1030 RSAP 18:

```
Router# show extended channel 5/2 llc2 stats 4000.1010.2020 04 4000.1234.1030 18

  LAN Token  0 Adapter   0 4000.1010.2020
    Local SAP=04 Remote MAC=4000.1234.1030 Remote SAP=18
      LocalBusies    =          0  RemoteBusies   =          0
      IFramesIn      =          1  IFramesOut     =          1
      IOctetsIn      =         19  IOctetsOut     =         21
      SFramesIn      =          0  SFramesOut     =          0
      REJsIn         =          0  REJsOut        =          0
      RetransmitsOut =          0  WwCountChanges =          0
```

Table 17 describes the fields shown in the display.

Table 17 show extended channel llc2 stats Field Descriptions

Field	Description
LocalBusies	Number of times the CMCC LLC2 link station entered the busy state. This state occurs for a CMCC LLC2 link station when there are *n* I-frames received from the remote LLC2 station on the CMCC queued to be sent over the channel to VTAM. Where *n* is two times the recv-wind. The CMCC LLC2 link station will also enter into busy state whenever it receives a flow control command from VTAM.
RemoteBusies	Number of times the remote LLC2 link station entered into busy state.

Table 17 show extended channel llc2 stats Field Descriptions

Field	Description
IFramesIn	Number of LLC2 information frames received by the CMCC LLC2 link station from the remote link station.
IFramesOut	Number of LLC2 information frames sent by the CMCC link station to the remote link station.
IOctetsIn	Number of LLC2 information frame bytes received by the CMCC LLC2 link station from the remote link station.
IOctetsOut	Number of LLC2 information frame bytes sent by the CMCC link station to the remote link station.
SFramesIn	Number of LLC2 supervisory frames received by the CMCC link station from the remote link station. These include RRs, RNRs and REJs.
SFramesOut	Number of LLC2 supervisory frames sent by the CMCC link station to the remote link station. These include RRs, RNRs and REJs.
REJsIn	Number of LLC2 REJ frames received by the CMCC link station from the remote link station. This field indicates the number of times the remote link station detected dropped I-frames sent from the CMCC LLC2 station.
REJsOut	Number of LLC2 REJ frames sent by the CMCC link station to the remote link station. This indicates the number of times the CMCC link station detected dropped I-frames sent by the remote link station.
RetransmitsOut	Number of I-frames the CMCC link station was required to resend.
WwCountChanges	Number of times the CMCC LLC2 link station changed its working send window (local-win). See Nw field description in Table 15 for a description of when the LLC2 link stations working send window is changed.

Related Commands

Command	Description
adapter	Configures internal adapters.

show extended channel max-llc2-sessions

To display information about the number of LLC2 sessions supported on the CMCC adapter, use the **show extended channel max-llc2-sessions** privileged EXEC command.

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

Syntax Description

slot	Slot number.
port	Port number.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.0(3)	This command was introduced

Usage Guidelines

This command is valid only on the virtual channel interface.

Examples

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

```
Router# show extended channel 1/2 max-llc2-sessions

Administrative max-llc2-sessions = 1000
Operational max-llc2_sessions = 1000
Highest concurrent LLC2 sessions = 30
LLC2 session allocation failures = 0
```

Table 18 describes the fields shown in the display.

Table 18 show extended channel max-llc2-sessions Field Descriptions

Field	Description
Administrative max-llc2-sessions	Maximum number of LLC2 sessions configured.
Operational max-llc2-sessions	Maximum number of LLC2 sessions configured on the CMCC adapter. This value differs from the value for the administrative max-llc2-sessions if the maximum number of LLC2 sessions is decreased by configuring a new value while the CMCC adapter's virtual interface is up. If the CMCC adapter's virtual interface is reset (**shut**/**no shut**), both the administrative and operational max-llc2-sessions numbers will match.

Table 18 show extended channel max-llc2-sessions Field Descriptions (continued)

Field	Description
Highest concurrent llc2 sessions	Highest number of LLC2 sessions active concurrently since the CMCC adapter LLC2 was started. When the CMCC adapter llc2 is initiated, the following message displays: `%CIP1-6-MSG: %MSG802-6-LLC_START: Starting LLC-2 with a session capacity of 1000`
LLC2 session allocation failure	Number of times network devices tried to establish an LLC2 connection with the CMCC adapter and failed because the operational max-llc2-sessions limit was reached when the connection was attempted.

Related Commands

Command	Description
adapter	Configures internal adapters.
show extended channel connection-map llc2	Displays the number of active LLC2 connections for each SAP and the mapping of the internal MAC adapter and the SAP to the resource that activated the SAP.

show extended channel statistics

To display statistical information about subchannels on the physical interface of a CMCC adapter, use the **show extended channel statistics** EXEC command. This command displays information that is specific to the interface channel devices. The information is generally useful only for diagnostic tasks performed by technical support personnel.

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

Syntax Description

slot	Slot number.
port	Port number.
path	(Optional) Hexadecimal value in the range 0x0000 to 0xFFFF. This value specifies the data path and consists of two digits for the physical connection (either on the host or on the ESCON Director switch): one digit for the control unit address, and one digit for the channel logical address.
device-address	(Optional) Hexadecimal value in the range 0x00 to 0xFE. This value is the unit address associated with the control unit number and path as specified in the host IOCP file. For CLAW and offload support, the device address must have an even value.
connected	(Optional) For each backup group, only display information about the active subchannel or the first subchannel defined in the group if none are active.

Command Modes

EXEC

Command History

Release	Modification
10.2	This command was introduced.
12.0(3)T	Support for the CMPC+ feature was added.

Examples

The following is sample output for the **show extended channel statistics** command from a CMCC adapter configured with CLAW, Offload, CSNA, and CMPC:

```
Router# show extended channel 0/1 statistics E010

Path: E010  -- ESTABLISHED
                  Command             Selective     System     Device        CU
Dev   Connects    Retries    Cancels      Reset      Reset     Errors       Busy
 D0       4459       4459          0          0          0          0          0
 D1       4950          0          0          0          0          0          0
 D2       2529       2526          0          0          0          0          0
 D3       2600          0          0          0          0          0          0
 D9       2211          0          0          0          0          0          0
 DA       4048       2024          0          0          0          0          0
                Blocks              Bytes             Dropped Blk    Memd
```

```
Dev-Lnk      Read      Write      Read     Write       Read      Write  wait Con
 D0-00          0          0         0         0          0          0     0   Y
 D0-01       5017          0   1215457         0          0          0     0   Y
Total:       5017          0   1215457         0          0          0     0
 D1-00          0          0         0         0          0          0     0   Y
 D1-01          0       5039         0   1247307          0          0     0   Y
Total:          0       5039         0   1247307          0          0     0
 D2-00          0          0         0         0          0          0     0   Y
 D2-01          0          0         0         0          0          0     0   Y
 D2-02       2671          0    661621         0          0          0     0   Y
Total:       2671          0    661621         0          0          0     0
 D3-00          0          0         0         0          0          0     0   Y
 D3-01          0          0         0         0          0          0     0   Y
 D3-02          0       2680         0    653285          0          0     0   Y
Total:          0       2680         0    653285          0          0     0
 D9-00          0       2214         0    223418          0          0     0   Y
 DA-00       2024          0    124587         0          0          0     0   Y
Path E010
Total:       9712       9933   2001665   2124010          0          0     0
  Last statistics 5 seconds old, next in 5 seconds
```

The following is sample output for the **show extended channel statistics** command from a CMCC adapter configured with CLAW, Offload, CSNA, and CMPC+:

```
tanzania# show extended channel 0/1 statistics

Path:C020  -- ESTABLISHED
                  Command             Selective     System     Device         CU
Dev   Connects    Retries    Cancels      Reset      Reset     Errors       Busy
 30           5          0          0          0          3          0          0
 31           5          0          0          0          3          0          0
 36          27         15          1          0          3          0          0
 37          29          6          1          0          3          0          0

                Blocks              Bytes             Dropped Blk    Memd
Dev-Lnk      Read      Write      Read     Write       Read      Write  wait Con
 30-00          0          0         0         0          0          0     0   N
 31-00          0          0         0         0          0          0     0   N
 36-00         19          6     54236       789          0          0     0   Y
 37-00          9         17       801     63302          0          0     0   Y

Path C020
Total:         28         23     55037     64091          0          0     0

Path:C190  -- ESTABLISHED
                  Command             Selective     System     Device         CU
Dev   Connects    Retries    Cancels      Reset      Reset     Errors       Busy
 34          12          0          0          0          5          0          0
 35          12          0          0          0          5          0          0
 36         251        226          6          0          5          0          0
 37         258         14          8          0          5          0          0
 3E          12          0          0          0          5          0          0
 3F          12          0          0          0          5          0          0

                Blocks              Bytes             Dropped Blk    Memd
Dev-Lnk      Read      Write      Read     Write       Read      Write  wait Con
 34-00          0          0         0         0          0          0     0   N
 35-00          0          0         0         0          0          0     0   N
 36-00        236         12   3604441      1578          0          0     0   Y
 37-00         18        236      1602   4217913          0          0     0   Y
 3E-00          0          0         0         0          0          0     0   N
 3F-00          0          0         0         0          0          0     0   N

Path C190
```

```
Total:       254        248   3606043   4219491          0          0     0

Adapter Card
Total:       282        271   3661080   4283582          0          0     0

  Last statistics 8 seconds old, next in 2 seconds
tanzania#
```

Table 19 describes the fields shown in the display.

Table 19 show extended channel statistics Field Descriptions

Field	Description
Path	Path from the CLAW, offload, CMPC, CMPC+, or CSNA configuration.
Dev	Address for each device. For CLAW and offload, there are two device addresses. In the configuration statement, you specify only the even address. Both CSNA, CMPC, and CMPC+ have one device.
Connects	Number of times the channel started a channel program on the device.
Command Retries	Number of times the CMCC adapter either had no data to send to the channel (for the read subchannel) or the number of times the CMCC adapter had no buffers to hold data from the channel (for the write subchannel). Every command retry that is resumed results in a connect. A command retry can be ended via a cancel.
Cancels	Host requested any outstanding operation to be terminated. It is a measure of the number of times the host program was started.
Selective Reset	Resets only one device. On VM, selective reset occurs when a device is attached and a CP Initial Program Load (IPL) command is issued.
System Reset	Number of times the system IPL command was issued. A system reset affects all devices on the given channel. The command is always issued when the ECA is initialized, and when the channel is taken off line.
Device Errors	Errors detected by the ESCON or Parallel interface because of problems on the link. This value should always be 0.
CU Busy	Number of times the adapter returned a control unit busy indication to the host. This indication occurs after a cancel or reset if the host requests an operation before the CMCC adapter has finished processing the cancel or reset.
Dev-Lnk	First number is the device address. The second number is the logical link. Link 0 is always used for CLAW control messages. For IP datagram mode, link 1 is for actual datagram traffic. For offload, link 2 is for API traffic. For CSNA, CMPC, and CMPC+, the Dev-Lnk is not relevant.
Blocks Read/Write	Count of channel blocks that are read and written from the mainframe.
Bytes Read/Bytes Write	Sum of the bytes in the blocks.
Dropped Blk Read/Write	If the route processor sends data to the CMCC adapter faster than it can send it to the channel, then the block is dropped. High values mean the host is not running fast enough. A write drop occurs if the CMCC adapter fails to get a router processor buffer *n* times for a given block. See the Memd wait counter.

Table 19 show extended channel statistics Field Descriptions (continued)

Field	Description
Memd wait	Number of times the CMCC adapter could not obtain a buffer.
Con	For link 0, a connection of Y means the system validation is complete. For all other links, Con means the connection request sequence is completed. For CSNA devices, a value of Y is displayed when the CSNA device status is complete. For all other states, the Con shows a value of N. **Note** If you halt the host or terminate VTAM using the Z NET, CANCEL command, VTAM does not halt the subchannels, and CON shows a value of Y until the subchannels time out (approximately 180 seconds).

The following is sample output for the CSNA path, using the **show extended channel statistics** command:

```
Router# show extended channel 0/1 statistics E200

Path: E200  -- ESTABLISHED
                    Command              Selective     System     Device         CU
Dev    Connects     Retries    Cancels      Reset       Reset     Errors       Busy
 D0      217440      108293          1          0           0          0          0
 D1       59530       19800          1          0           0          0          0
 D2        1065         252          2          0           0          0          0
 D3        1329          16          2          0           0          0          0
 D4        1066         251          2          0           0          0          0
 D5         887          29          2          0           0          0          0
 DA        1073          17          2          0           0          0        373
 DB         410         174          2          0           0          0          0
 DC        1154          14          2          0           0          0        459
 DD         254          17          2          0           0          0          0
                  Blocks                Bytes              Dropped Blk    Memd
Dev-Lnk      Read       Write       Read      Write        Read      Write  wait Con
 D0-00     109096      109095 237799616     880468           0          0     0   Y
 D1-00      19877       19875    160688 237876362           0          0     0   Y
 D2-00          9       12842       801   52554701           0          0     0   Y
 D3-00       1315           8  30378114       1052           0          0     0   Y
 D4-00          9       12842       801   52554701           0          0     0   Y
 D5-00        860           8  17003956       1052           0          0     0   Y
 DA-00        687           8  14617852       1052           0          0     0   Y
 DB-00          9        3578       801   14613989           0          0     0   Y
 DC-00        682           8  14513604       1052           0          0     0   Y
 DD-00          9        3594       801   14679517           0          0     0   Y
Path E200
Total:     132553      161858 314477034 373163946           0          0     0
  Last statistics 3 seconds old, next in 7 seconds
```

Related Commands

Command	Description
claw (primary)	Configures a CLAW device (read and write subchannel) for communication with a mainframe TCP/IP stack in IP datagram mode and also configures individual members of a CLAW backup group for the IP Host Backup feature.
cmpc	Configures a CMPC (or CMPC+) read subchannel and a CMPC (or CMPC+) write subchannel.
csna	Configures SNA support on a CMCC physical channel interface and specifies the path and device/subchannel on a physical channel of the router to communicate with an attached mainframe.
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.

show extended channel subchannel

To display information about the CMCC adapter physical interfaces, use the **show extended channel subchannel** EXEC command. This command displays information that is specific to the interface channel connection. The information displayed is generally useful only for diagnostic tasks performed by technical support personnel.

show extended channel *slot*/*port* **subchannel** [**connected**]

Syntax Description

slot	Slot number.
port	Port number.
connected	(Optional) For each backup group, displays information about the active subchannel or the first subchannel defined in the group if none are active.

Command Modes

EXEC

Command History

Release	Modification
10.2	This command was introduced.
12.0(3)T	Support for the CMPC+ feature was added.

Examples

The following is sample output from the **show extended channel subchannel connected** command used on a CMCC adapter configured for CLAW, Offload, and CSNA:

```
Router# show extended channel 1/0 subchannel

Channel1/0:state up
  Flags:VALID ESCON LOADED ENABLED SIGNAL
  Link:E9, Buffers 0, CRC errors 1, Load count 1
  Link Incident Reports
    implicit 0, bit-error 0, link failed 1,
    NOS 0, sequence timeout 0, invalid sequence 0
  Neighbor Node - VALID
    Class:Switch          Type Number :009032        Tag:E9
    Model:002             Manufacturer:IBM
    Plant:02              Sequence    :000000010685
  Local Node - VALID
    Class:CTCA-standalone Type Number :C7200         Tag:10
    Model:6               Manufacturer:CSC
    Plant:A               Sequence    :8083599
                                                                 Last
   Mode    Path Device                                           Sense
   CLAW    E020 90 172.18.55.12  CISCOMVS TRAILMIX TCPIP  TCPIP    0000  Flags:RESET_EVENT
   CLAW    E020 91 172.18.55.12  CISCOMVS TRAILMIX TCPIP  TCPIP    0000  Flags:RESET_EVENT
   CSNA    E020 94 maxpiu 20470 time-delay  10 length-delay 20470  0000  Flags:RESET_EVENT
   OFFLOAD E140 90 172.18.55.11  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  TCPIP  API   Flags:CMD_RETRY
   OFFLOAD E140 91 172.18.55.11  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  TCPIP  API   Flags:CMD_RETRY
   CLAW    E150 90 172.18.55.13  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E150 91 172.18.55.13  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E150 96 172.18.55.22  CISCOMVS TRAILMIX TCPIP  TCPIP    0080
   CLAW    E150 97 172.18.55.22  CISCOMVS TRAILMIX TCPIP  TCPIP    0080
   CLAW    E160 90 172.18.55.14  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E160 91 172.18.55.14  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E170 90 172.18.55.15  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E170 91 172.18.55.15  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E180 90 172.18.55.20  VMV2R3   TRAILMIX TCPIP  TCPIP    0000  Flags:CMD_RETRY
   CLAW    E180 91 172.18.55.20  VMV2R3   TRAILMIX TCPIP  TCPIP    0000  Flags:CMD_RETRY
   CLAW    E180 92 172.18.55.21  TSOMAIN  TRAILMIX TCPIP  TCPIP    0000  Flags:CMD_RETRY
   CLAW    E180 93 172.18.55.21  TSOMAIN  TRAILMIX TCPIP  TCPIP    0000  Flags:CMD_RETRY
   CLAW    E190 90 172.18.55.17  CISCOMVS TRAILMIX TCPIP  TCPIP    0000  Flags:RESET_EVENT
   CLAW    E190 91 172.18.55.17  CISCOMVS TRAILMIX TCPIP  TCPIP    0000  Flags:RESET_EVENT
   CLAW    E1E0 90 172.18.55.18  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E1E0 91 172.18.55.18  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E1F0 90 172.18.55.19  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY
   CLAW    E1F0 91 172.18.55.19  CISCOMVS TRAILMIX TCPIP  TCPIP    0080  Flags:CMD_RETRY

  Last statistics 6 seconds old, next in 4 seconds
```

Table 20 describes the fields shown in the display.

Table 20 show extended channel subchannel Field Descriptions

Field	Description
Channel*x/y*: state	State can be up, down, or administratively down.
Flags	• GO-OFF—CMCC adapter is trying to shut down the channel interface. This state should not persist for more than a few seconds. This flag is not applicable to the virtual channel interface. • INVALID—All displays for virtual channel interfaces should contain this flag. On physical channel interfaces, it indicates a problem with the CMCC adapter microcode. • LOADED—Channel firmware for the physical channel interface is loaded. The channel firmware is loaded only if the interface configuration contains at least one device configuration statement and is not shut down. This flag matches the state of the "loaded" LED. This flag is not applicable to the virtual channel interface. • LOVE—Note indicating an interface state change (up-down or down-up) is pending on this interface. This state should not persist for more than a few seconds. • OFFLINE—For an ESCON channel interface, this flag indicates that no mainframe has established an ESCON logical path corresponding to the paths specified in any device configuration statement (claw, offload, csna, or cmpc). For a Parallel channel interface, this flag indicates that the x'0100' path is not defined in any device configuration statement or SIGNAL is not present. • ONLINE—For an ESCON Channel interface, this flag indicates that at least one mainframe has established an ESCON logical path corresponding to the paths specified in one of the device configuration statements (CLAW, offload, CSNA, CMPC, or CMPC+). For a Parallel Channel interface, this flag indicates that the x'0100' path is defined in at least one device configuration statement and SIGNAL is present. • RQC_PEND—CMCC adapter is attempting to send status to the channel on this interface. This state should not persist for more than a few seconds. This flag is not applicable to the virtual channel interface. • RESET_EVENT—Indicates that a reset event has been received. • SIGNAL—For an ESCON channel interface, this flag indicates that light is detected. For a Parallel channel interface, this flag indicates that the "operational out" signal is detected. This flag matches the state of the "signal" LED. It will only be set if the LOADED flag is set as well. This flag is not applicable to the virtual channel interface. • STAT_PEND—CMCC adapter has status to present for this device. The indication is cleared when the mainframe accepts the status.

Table 20 show extended channel subchannel Field Descriptions (continued)

Field	Description
Flags (continued)	• SUSPEND—Indicates that the CMCC device task has decided to suspend data transfer for a particular device. • VALID—A physical interface is installed. All displays for physical channel interfaces should contain this. This flag matches the state of the "present" LED.
Link: xx	Director Port number to which the physical channel is connected. If the physical channel is directly connected, then this value is host dependent.
Buffers	Number of times the CMCC adapter has dropped a packet bound for the route processor because no packet switching buffer was available on the route processor.
CRC errors	Number of CRC errors detected on the channel for ESCON. Number of parity errors detected on the channel for Parallel.
Load count	For a CMCC physical channel interface, the number of times the channel adapter microcode has been loaded.
Link Incident Reports	Link incidents are errors on an ESCON channel. These errors are reported to the host operating system and are recorded here for additional information. • Implicit incidents—Recoverable error occurred in the ECA. • Bit errors—Bit error rate threshold was reached. The bit error rate threshold is 15 error bursts within 5 minutes. An error burst is defined as a time period of 1.5 +/- .5 seconds during which one or more code violations occurred. A code violation error is caused by an incorrect sequence of 10 bit characters. • Link failed—Loss of synchronization or light has occurred. • NOS—Channel or switch sent the Not Operational Sequence. • Sequence timeout—Connection recovery timeout has occurred or the router is waiting for the appropriate response while in the send off-line sequence (OLS) state. • Invalid Sequence—Unconditional disconnect (UD) or unconditional disconnect response (UDR) is recognized in the wait for offline sequence state.
Neighbor node	Describes the channel or switch. Valid values are: • VALID—Information has been exchanged between the router and channel or switch. • Class—Switch or channel depending on whether the connection is a switched point-to-point connection or a point-to-point connection. • Type number—Model of switch or processor. • TAG—Physical location of the connector. • Model—A further classification of type. • Manufacturer—Identifies who made switch or processor. • Plant and sequence—Manufacturer-specific information to uniquely define this one device.

Related Commands

Command	Description
claw (primary)	Configures a CLAW device (read and write subchannel) for communication with a mainframe TCP/IP stack in IP datagram mode and also configures individual members of a CLAW backup group for the IP Host Backup feature.
cmpc	Configures a CMPC (or CMPC+) read subchannel and a CMPC (or CMPC+) write subchannel.
csna	Configures SNA support on a CMCC physical channel interface and specifies the path and device/subchannel on a physical channel of the router to communicate with an attached mainframe.
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.

show extended channel tcp-connections

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

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

Syntax Description

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

Command Modes

EXEC for summary and privileged EXEC for detail.

Command History

Release	Modification
11.0	This command was introduced.
12.0(7)T	Stack address field added to the output.

Usage Guidelines

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

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

Examples

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

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

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

The following example shows sample output from the **show extended channel tcp-connections** command when you specify the **detail** keyword for an offload device at real IP address 10.10.21.3 with an alias address of 10.2.33.88:

```
Router# show extended channel3/1 tcp-connections 10.10.21.3 detail

Stack Address 10.10.21.3:
Local IP Addr   Port  Remote IP Addr  Port   State        In Bytes   Out Bytes Addr
0.0.0.0         23    0.0.0.0         0      listen             0           0
10.2.33.88      23    70.70.5.140     61954  establish         59         105
```

Table 21 describes the fields shown in the display.

Table 21 show extended channel tcp-connections Field Descriptions

Field	Description
Stack Address	Real IP address of the TCP/IP stack or offload device.
Local IP Addr	Local IP address on the connection.
State	The state of this TCP connection. The only value that may be set by a management station is deleteTCB(12). Accordingly, it is appropriate for an agent to return a 'badValue' response if a management station attempts to set this object to any other value. If a management station sets this object to the value deleteTCB(12), then this has the effect of deleting the TCB (as defined in RFC 793) of the corresponding connection on the managed node, resulting in immediate termination of the connection. As an implementation-specific option, an RST segment may be sent from the managed node to the other TCP endpoint (note however that RST segments are not sent reliably).

Table 21 show extended channel tcp-connections Field Descriptions (continued)

Field	Description
In Bytes	Number of bytes sent for this TCP connection. **Note** To support SNMP Version 1 Managers, this variable is supplied as a 32-bit value which can wrap very frequently.
Out Bytes	Number of bytes received for this TCP connection. **Note** To support SNMP Version 1 Managers, this variable is supplied as a 32-bit value which can wrap very frequently.

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

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

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

Related Commands

Command	Description
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.
pu (TN3270)	Creates a PU entity that has its own direct link to a host and enters PU configuration mode.
pu (DLUR)	Creates a PU entity that has no direct link to a host and enters DLUR PU configuration mode.
show extended channel tcp-stack	Displays information about the TCP stack running on CMCC adapter interfaces.

show extended channel tcp-stack

To display information about the TCP stack running on CMCC adapter interfaces, use the **show extended channel tcp-stack** EXEC command.

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

Syntax Description

slot	Slot number.
port	Port number.
tcp-stack	Specifies **tcp stack** display.
ip-address	(Optional) IP address specified by the **offload** interface configuration command or the **tn327-server pu** command.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.0(7)T	Alias addresses field added to the output.

Usage Guidelines

The **show extended channel tcp-stack** command is valid on both physical and virtual channel interfaces. If no *ip-address* argument is specified, then information is displayed for all IP addresses configured on the specified interface.

Examples

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

```
Router# show extended channel 0/1 tcp-stack

TCP Statistics for IP Address 80.11.198.2
  RtoAlgorithm: vanj         RtoMin      : 1000         RtoMax      : 64000
  MaxConn     : -1           ActiveOpens : 1            PassiveOpens: 17
  AttemptFails: 0            EstabResets : 0            CurrEstab   : 5
  InSegs      : 181          OutSegs     : 147          RetransSegs : 0
  InErrs      : 0            OutRsts     : 0
TCP Statistics for IP Address 80.11.198.3
  RtoAlgorithm: vanj         RtoMin      : 1000         RtoMax      : 64000
  MaxConn     : -1           ActiveOpens : 0            PassiveOpens: 1
  AttemptFails: 0            EstabResets : 0            CurrEstab   : 6
  InSegs      : 25           OutSegs     : 23           RetransSegs : 0
  InErrs      : 0            OutRsts     : 0
```

The following example shows sample output from the **show extended channel tcp-stack** command when you specify the real IP address for an offload device at 10.10.21.3:

```
Router# show extended channel 3/1 tcp-stack 10.10.21.3

TCP Statistics for IP Address 10.10.21.3
 Alias addresses: 10.2.33.88
  RtoAlgorithm: vanj         RtoMin      : 1000         RtoMax      : 64000
  MaxConn     : -1           ActiveOpens : 0            PassiveOpens: 1
  AttemptFails: 0            EstabResets : 0            CurrEstab   : 2
  InSegs      : 16           OutSegs     : 7            RetransSegs : 0
  InErrs      : 0            OutRsts     : 0
```

The following example shows sample output from the **show extended channel tcp-stack** command when you specify the alias IP address for an offload device at 10.2.33.88:

```
Router# show extended channel 3/1 tcp-stack 10.2.33.88

TCP Statistics for IP Address 10.10.21.3
 Alias addresses: 10.2.33.88
  RtoAlgorithm: vanj         RtoMin      : 1000         RtoMax      : 64000
  MaxConn     : -1           ActiveOpens : 0            PassiveOpens: 1
  AttemptFails: 0            EstabResets : 0            CurrEstab   : 2
  InSegs      : 16           OutSegs     : 7            RetransSegs : 0
  InErrs      : 0            OutRsts     : 0
```

Table 22 describes the fields shown in the display.

Table 22 show extended channel tcp-stack Field Descriptions

Field	Description
Alias addresses	Virtual IP addresses assigned to the real IP address of an offload device.
RtoAlgorithm	The algorithm used to determine the timeout value used for resending unacknowledged octets.
RtoMin	The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the LBOUND quantity described in RFC 793.
RtoMax	The maximum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the UBOUND quantity described in RFC 793."
MaxConn	The limit on the total number of TCP connections the entity can support. In entities where the maximum number of connections is dynamic, this object should contain the value -1.
ActiveOpens	Number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state.
PassiveOpens	Number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.

Table 22 show extended channel tcp-stack Field Descriptions (continued)

Field	Description
AttemptFails	Number of times TCP connections have made a direct transition to the CLOSED state from either the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the LISTEN state from the SYN-RCVD state.
EstabResets	Number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE-WAIT state.
CurrEstab	Number of TCP connections for which the current state is either ESTABLISHED or CLOSE- WAIT.
InSegs	Total number of segments received, including those received in error. This count includes segments received on currently established connections.
OutSegs	Total number of segments sent, including those on current connections but excluding those containing only resent octets.
RetransSegs	Total number of segments resent—that is, the number of TCP segments sent containing one or more previously sent octets.
InErrs	Total number of segments received in error (for example, bad TCP checksums).
OutRsts	Number of TCP segments sent containing the RST flag.

Related Commands

Command	Description
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.
pu (TN3270)	Creates a PU entity that has its own direct link to a host and enters PU configuration mode.
pu (DLUR)	Creates a PU entity that has no direct link to a host and enters DLUR PU configuration mode.
show extended channel tcp-connections	Displays information about the TCP sockets on a channel interface.

show extended channel udp-listeners

To display information about the User Datagram Protocol (UDP) listener sockets running on the CMCC adapter interfaces, use the **show extended channel udp-listeners** EXEC command.

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

Syntax Description

slot	Slot number.
port	Port number.
udp-listeners	Specifies UDP listener port display.
ip-address	(Optional) IP address specified by the **offload** interface configuration command or the **tn3270-server pu** command.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

The **show extended channel tn3270-server udp-listeners** command is valid on both physical and virtual channel interfaces.

Examples

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

```
Router# show extended channel 0/1 udp-listeners

UDP Listener: IP Address 80.11.198.3        LocalPort 7
UDP Listener: IP Address 80.11.198.3        LocalPort 9
UDP Listener: IP Address 80.11.198.3        LocalPort 19
```

Related Commands

Command	Description
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.
pu (TN3270)	Creates a PU entity that has its own direct link to a host and enters PU configuration mode.
pu (DLUR)	Creates a PU entity that has no direct link to a host and enters DLUR PU configuration mode.

show extended channel udp-stack

To display information about the UDP stack running on the CMCC adapter interfaces, use the **show extended channel udp-stack** EXEC command.

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

Syntax Description

slot	Slot number.
port	Port number.
udp-stack	Selects UDP stack display.
ip-address	(Optional) IP address specified by the **offload** interface configuration command or the **tn3270-server pu** command.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.0(7)T	Alias addresses field added to the output.

Usage Guidelines

The **show extended channel udp-stack** command is valid on both physical and virtual channel interfaces.

Examples

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

```
Router# show extended channel udp-stack

rispix#show extended channel 0/1 udp-stack
UDP Statistics for IP Address 80.11.198.2
  InDatagrams : 6            NoPorts     : 6
  InErrors    : 0            OutDatagrams: 0
UDP Statistics for IP Address 80.11.198.3
  InDatagrams : 6            NoPorts     : 6
  InErrors    : 0            OutDatagrams: 1
```

The following examples show sample output from the **show extended channel udp-stack** command when you specify the real IP address or the alias IP address, for an offload device at real IP address 10.10.21.3 and alias IP address of 10.2.33.88:

```
Router# show extended channel 3/1 udp-stack 10.10.21.3

UDP Statistics for IP Address 10.10.21.3
 Alias addresses: 10.2.33.88
  InDatagrams : 6            NoPorts     : 6
  InErrors    : 0            OutDatagrams: 1

Router# show extended channel 3/1 udp-stack 10.2.33.88

UDP Statistics for IP Address 10.10.21.3
 Alias addresses: 10.2.33.88
  InDatagrams : 6            NoPorts     : 6
  InErrors    : 0            OutDatagrams: 1
```

Table 23 describes the fields shown in the display.

Table 23 show extended channel udp-stack Field Descriptions

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

Related Commands

Command	Description
offload (primary)	Configures an Offload device (read and write subchannel) for communication with a mainframe TCP/IP stack in offload mode and also configures individual members of an Offload backup group for the IP Host Backup feature.
pu (TN3270)	Creates a PU entity that has its own direct link to a host and enters PU configuration mode.
pu (DLUR)	Creates a PU entity that has no direct link to a host and enters DLUR PU configuration mode.

show interfaces channel

To display information about the CMCC adapter interfaces, use the **show interfaces channel** privileged EXEC command. This command displays information that is specific to the interface hardware. The information displayed is generally useful for diagnostic tasks performed by technical support personnel only.

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

Syntax Description

slot	Slot number.
port	Port number.
accounting	(Optional) Displays interface accounting information.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.2	This command was introduced.

Examples

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

```
Router# show interfaces channel 3/0

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

Table 24 describes the fields shown in the display.

Table 24 show interfaces channel Field Descriptions

Field	Description
Channel... is {up | down | administratively down}	Indicates whether the interface hardware is currently active (whether synchronization is achieved on an ESCON channel, or whether operational out is enabled on a parallel channel) and whether it has been taken down by an administrator.
line protocol is {up | down | administratively down}	Indicates whether the software processes that handle the line protocol think the line is usable (that is, whether keepalives are successful).
Hardware is	Hardware type.
Internet address is	IP address and subnet mask.
MTU	Maximum transmission unit of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100% reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes. The calculation uses the value from the **bandwidth** interface configuration command.
Encapsulation	Encapsulation method assigned to interface.
loopback	Indicates whether loopbacks are set or not.
keepalive	Indicates whether keepalives are set or not.
daughter card	Type of adapter card.
Data transfer rate	Rate of data transfer.
Number of subchannels	Number of subchannels.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed. This counter is updated only when packets are process switched, not when packets are fast switched.
Last output	Number of hours, minutes, and seconds since the last packet was successfully sent by an interface. This counter is updated only when packets are process switched, not when packets are fast switched.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because of data that took too long to send. When the number of hours in any of the “last” fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.

Table 24 show interfaces channel Field Descriptions (continued)

Field	Description
Last clearing	The time at which the counters that measure cumulative statistics (such as number of bytes sent and received) shown in this report were last reset to zero. Note that variables that might affect routing (for example, load and reliability) are not cleared when the counters are cleared. These asterisks (***) indicate the elapsed time is too large to be displayed. 0:00:00 indicates the counters were cleared more than 2^{31}ms (and less than 2^{32}ms) ago.
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped due to a full queue.
Five minute input rate, Five minute output rate	Average number of bits and packets sent per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so that this sum may not balance with the other counts.
CRC	Number of code violation errors seen on the ESCON interface, where a received transmission character is recognized as invalid. On a parallel interface, the number of parity errors seen.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets. This value is always 0.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data. This value is always 0.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different than the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be incremented.

Table 24 show interfaces channel Field Descriptions (continued)

Field	Description
abort	Illegal sequence of one bits on a serial interface. This usually indicates a clocking problem between the serial interface and the data link equipment. This value is always 0.
packets output	Total number of messages sent by the system.
bytes	Total number of bytes, including data and MAC encapsulation, sent by the system.
underruns	Sum of all errors that prevented the final sending of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, as some datagrams may have more than one error, and others may have errors that do not fall into any of the specifically tabulated categories.
output errors	Number of output errors.
collisions	Number of collisions detected. This value is always 0.
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for sending were not sent within several seconds. On a serial line, this can be caused by a malfunctioning modem that is not supplying the send clock signal, or by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down. On the CMCC adapter, this may occur if the host software is not requesting data.
restarts	Number of times the controller was restarted because of errors.

shutdown (CMCC)

To shut down an interface or the virtual interface on the CMCC adapter when you are in interface configuration mode, use the **shutdown** CMCC command. The **shutdown** TN3270 server 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. To restart the interface or entity, use the **no** form of this command. 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.

Defaults

The interface or entity is enabled.

Command Modes

Interface configuration

Command History

Release	Modification
10.2	This command was introduced.

Usage Guidelines

In channel interface configuration mode, the command applies to the entire CMCC adapter.

Examples

The following example issued in interface configuration mode shuts down the entire CMCC adapter:

```
shutdown
```

state-tracks-signal

To allow the channel interface state to track the state of the physical interface signal on a Channel Port Adapter (CPA), use the **state-tracks-signal** interface configuration command. To disable tracking of the physical interface signal on a Channel Port Adapter interface, use the **no** form of this command.

state-tracks-signal

no state-tracks-signal

Syntax Description

This command has no arguments or keywords.

Defaults

The physical interface signal is not tracked.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(4.1)	This command was introduced.

Usage Guidelines

The **state-tracks-signal** command is useful in environments where you are using Hot Standby Router Protocol (HSRP) or SNMP alerts to monitor channel interface status.

The **state-tracks-signal** command is valid only on channel interfaces which combine the functions of both a physical and virtual interface. The ECPA and PCPA are examples of this type of channel interface. The command is not valid for the CIP, which has a separate channel interface for the virtual channel functions.

When the **state-tracks-signal** command is used on an interface that is configured for **no shutdown**, then the state of the channel interface is reported according to the status of the physical channel interface signal. If the physical channel interface signal is not present, then the channel interface status is DOWN/DOWN.

When the channel interface is configured for **no state-tracks-signal** (the default) and **no shutdown**, the channel interface status is always reported as UP/UP, even when there is no signal present on the physical connection. This configuration is useful for TN3270 server environments that are operating in a mode without any physical channel interface connections.

Examples

The following example specifies that the channel interface state tracks the physical channel interface signal and reports the channel interface state according to the presence or absence of the physical interface signal when the interface is configured for **no shutdown**:

```
interface channel 5/0
state-tracks-signal
```