

IBM Channel Attach Commands

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

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

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

adapter

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

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

Syntax Description

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

Default

This command has no defaults.

Command Mode

Internal LAN configuration

Usage Guidelines

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

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

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

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

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

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

Example

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

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

```
bridge-group 1
adapter 12 87AD.0462.3FDE
```

Related Commands

A dagger (†) indicates that the command is documented in another chapter.

bridge-group[†]

llc2

name

source-bridge[†]

lan

channel-protocol

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

channel-protocol [s | s4]

Syntax Description

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

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

Default

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

Command Mode

Interface configuration

Usage Guidelines

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

Example

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

```
channel-protocol s4
```

claw

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

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

Syntax Description

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

Default

This command has no defaults.

Command Mode

Interface configuration

Usage Guidelines

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

Example

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

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

csna

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

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

Syntax Description

| | |
|---------------------------|---|
| <i>path</i> | A 4-digit hexadecimal value in the range of 0x0000 through 0xFFFF. This value specifies the data path and consists of two digits for the physical connection (either on the mainframe or on the ESCON director switch), one digit for the control unit address, and one digit for the channel logical address. The control unit address and channel logical address must be specified. For PCA, use the value 0x0100. |
| <i>device</i> | The device address transmitted on the channel path to select the channel-attached device. For PCA (bus-and-tag), this value refers to the subchannel defined in the XCA major node on the host system. |
| maxpiu value | (Optional) 4096 through 65535. The maximum packet size in bytes that will be transmitted on the interface. |
| time-delay value | (Optional) 0 through 100. The number of milliseconds to delay before transmitting a received packet on the interface. |
| length-delay value | (Optional) 4096 through 65535. The amount of data to accumulate, in bytes, before transmitting on the interface. |

Defaults

maxpiu value—20470 (0x4ff6)
time-delay value—10 ms
length-delay value—20470 (0x4ff6)

Command Mode

Interface configuration

Usage Guidelines

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

Use the **maxpiu**, **time-delay**, and **length-delay** keywords to adjust the CIP interface transmission characteristics. You can set the maximum size of packet that the interface will transmit to match the packet size accepted by the host system. You can adjust the delay between the time a packet is received on one of the CIP internal interfaces and transmitted to the host. You can also adjust the transmit-to-host delay by changing the amount of data the CIP accumulates before transmitting to the host.

Changes to the delay values take effect immediately. Any change to the maximum packet size will take effect after the channel is reinitialized.

Using the **no csna** command terminates all subchannels (path and devices) configured on the channel and all LLC2 sessions established over the subchannels.

Example

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

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

interface channel

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

interface channel *slot*/*port*

Syntax Description

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

Default

This command has no defaults.

Command Mode

Global configuration

Usage Guidelines

This command is used only on the Cisco 7000 series.

Example

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

```
interface channel 2/0
```

Related Commands

claw
csna
lan
max-llc2-sessions
offload

lan

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

```
lan {ethernet | tokenring | fddi} lan-id  
no lan {ethernet | tokenring | fddi} lan-id
```

Syntax Description

ethernet | **tokenring** | **fddi** The interface type for this internal LAN.

lan-id A number 0–31 that uniquely identifies this internal LAN on this CIP. This value must be unique between all internal LANs of the same interface type on a CIP.

Default

This command has no defaults.

Command Mode

Interface configuration

Usage Guidelines

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

Example

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

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

max-llc2-sessions

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

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

Syntax Description

number A value in the range 0 to 4000. If no value is specified, the default is 256.

Default

The default number of sessions is 256.

Command Mode

Internal adapter configuration

Usage Guidelines

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

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

Example

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

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

name

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

name *name*
no name *name*

Syntax Description

name A name that identifies this internal adapter.

Default

This command has no defaults.

Command Mode

Internal adapter configuration

Usage Guidelines

The *name* can be any string of up to 8 characters that does not include blanks.

Example

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

```
name VTAM_B14
```

offload

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

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

Syntax Description

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

Default

This command has no defaults.

Command Mode

Interface configuration

Usage Guidelines

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

Example

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

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

show extended channel connection-map llc2

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

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

Syntax Description

slot Slot number.

port Port number.

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

Command Mode

Privileged EXEC

Usage Guidelines

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

Sample Display

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

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

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

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

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

show extended channel csna

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

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

Syntax Description

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

Default

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

Command Mode

Privileged EXEC

Usage Guidelines

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

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

Sample Display

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

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

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

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

Table 33-1 describes the fields shown in the display.

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

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

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

Table 33-1 describes the fields shown in the display.

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

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

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

Table 33-1 describes the fields shown in the display.

Table 33-1 Show Extended Channel CSNA Field Descriptions

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

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

show extended channel icmp-stack

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

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

Syntax Description

slot Slot number.

port Port number.

ip-address (Optional) Offload IP address.

Command Mode

Privileged EXEC

Sample Display

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

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

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

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

Table 33-2 describes the fields shown in the display.

Table 33-2 Show Extended Channel icmp-stack Field Descriptions

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

Table 33-2 Show Extended Channel icmp-stack Field Descriptions (Continued)

| Field | Description |
|------------------|--|
| InEchos | Number of ICMP Echo (request) messages received. |
| OutEchoReps | Number of ICMP Echo Reply messages sent. |
| OutTimestamps | Number of ICMP Timestamp (request) messages sent. |
| OutTimestampReps | Number of ICMP Timestamp Reply messages sent. |
| OutAddrMasks | Number of ICMP Address Mask Request messages sent. |
| OutAddrMaskReps | Number of ICMP Address Mask Reply messages sent. |

Related Commands

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

offload

show extended channel ip-stack

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

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

Syntax Description

| | |
|-------------------|--|
| <i>slot</i> | Slot number. |
| <i>port</i> | Port number. |
| <i>ip-address</i> | (Optional) IP address specified by the offload interface configuration command. |

Command Mode

Privileged EXEC

Sample Display

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

```
router# show extended channel ip-stack

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

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

Table 33-3 describes the fields shown in the display.

Table 33-3 Show Extended Channel ip-stack Field Descriptions

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

Table 33-3 Show Extended Channel ip-stack Field Descriptions (Continued)

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

Related Commands

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

offload

show extended channel llc2

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

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

Syntax Description

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

Default

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

Command Mode

Privileged EXEC

Usage Guidelines

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

To specify LLC information for internal adapters:

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

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

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

To display information for LLC2 connections on a channel interface:

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

Sample Displays

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

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

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

The following table describes the fields shown in the display.

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

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

show extended channel llc2

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

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

The following table describes the fields shown in the display.

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

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

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

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

| Field | Description |
|--------------|--|
| PDUsIn | Protocol Data Units received by the internal adapter. |
| PDUsOut | Protocol Data Units sent by the internal adapter. |
| OctetsIn | PDU bytes received by the internal adapter. |
| OctetsOut | PDU bytes sent by the internal adapter. |
| TESTCmdsIn | Number of TEST commands received destined for this MAC address. |
| TESTRspOut | Number of TEST responses sent by this MAC address repending 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 statistics for all LLC2 connections on channel 2/2.

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

The following table describes the fields shown in the display.

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

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

```

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

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

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

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

The following sample displays statistics for all LLC2 connections on

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

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

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

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

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

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

The following table describes the fields shown in the display.

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

show extended channel max-llc2-sessions

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

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

Syntax Description

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

Default

Are there any defaults we should mention?

Command Mode

Privileged EXEC

Usage Guidelines

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

Sample Display

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

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

Table 33-4 describes the fields shown in the display.

Table 33-4 Show extended channel max-llc2-sessions Field Descriptions

| Field | Description |
|----------------------------------|---|
| Administrative max-llc2-sessions | Maximum number of LLC2 sessions configured. |
| Operational max-llc2-sessions | Maximum number of LLC2 sessions configured on the CIP. This value differs from the value for the administrative max-llc2-sessions if the maximum number of LLC2 sessions is decreased by configuring a new value while the CIP virtual interface is up. If the CIP's virtual interface is reset (shut / no shut), both the administrative and operational max-llc2-sessions numbers will match. |
| Highest concurrent llc2 sessions | Highest number of LLC2 sessions active concurrently since the CIP LLC2 was started. When the CIP llc2 is initiated, the following message displays: <pre data-bbox="716 737 1386 785">%CIP1-6-MSG: %MSG802-6-LLC_START: Starting LLC-2 with a session capacity of 1000</pre> |
| LLC2 session allocation failure | Number of times network devices tried to establish an LLC2 connection with the CIP and failed because the operational max-llc2-sessions limit was reached when the the connection was attempted |

show extended channel statistics

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

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

Syntax Description

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

Command Mode

Privileged EXEC

Sample Display

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

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

Path: C300 - ESTABLISHED

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

      Blocks          Bytes          Dropped Blk      Memd
Dev-Lnk  Read   Write  Read  Write  Read  Write  wait  Con
 60-00      6       0    192   0      8     0     0     Y
 60-01     82       0   7373   0     0     0     0     Y
Total:    88       0   7565   0     8     0     0

 61-00      0       4     0    128   0     0     0     Y
 61-01      0      85     0   9081   0     0     0     Y
Total:      0      89     0   9209   0     0     0

Path C300
Total:    88      89   7565   9209   8     0     0

Last stats 8 seconds old, next in 2 seconds
```

Table 33-5 describes the fields shown in the display.

Table 33-5 Show Extended Channel Statistics Field Descriptions

| Field | Description |
|--------------------------|---|
| Path | The path from the CLAW, offload, or CSNA configuration. It tells which port on the switch is used by the channel side of the configuration. |
| Dev | The device address for each device. For CLAW you get two device addresses. In the configuration statement, you only specify the even address. Both CLAW and offload get two devices and CSNA gets 1. |
| Connects | The number of times the channel started a channel program on the device. |
| Command Retries | The number of times the CIP either had no data to send to the channel (for the read subchannel) or the number of times the CIP had no buffers to hold data from the channel (for the write subchannel). Every command retry that is resumed results in a connect. A command retry may be ended via a cancel. |
| Cancel | The host requested any outstanding operation to be terminated. It is a measure of the number of times the host program was started. |
| Selective Reset | Selective reset affects only one device, whereas a system reset affects all devices on the given channel. It is a reset of the device. On VM this will occur whenever you have a device attached and issue a CP IPL command. |
| System Reset | The number of times the system IPL command was issued. the command is always issued when the ECA is initialized, and one when the channel is taken off line. |
| Device Errors | Errors detected by the ECA or PCA due to problems on the link. This value should always be 0. |
| CU Busy | The number of times the adapter returned a control unit busy indication to the host. This occurs after a cancel or reset if the host requests an operation before the CIP has finished processing the cancel or reset. |
| Dev-Lnk | The first number is the device address. The second number is the logical link. Link 0 is always used for CLAW control messages. For IP datagram mode, link 1 is for actual datagram traffic. For offload, link 2 is for API traffic. For CSNA, the Dev-Lnk is not relevant. |
| Blocks Read/Blocks Write | CLAW uses the even subchannel for reads and the odd subchannel for writes. Each count is one IP datagram or one control message. |
| Bytes Read/Bytes Write | Bytes is the sum of the bytes in the blocks. |
| Dropped Blk Read/Write | If the router switch processor sends data to the CIP faster than it can send it to the channel, then the block is dropped. High values mean the host is not running fast enough. There are drops on write too. A write drop will occur if the CIP fails to get a MEMD buffer <i>n</i> times for a given block. See Memd wait counter. |
| Memd wait | The number of times the CIP could not obtain a MEMD buffer on the first try. If this value is high, try allocating more large buffers. The Memd wait information does not apply to CSNA devices. |

| Field | Description |
|-------|---|
| Con | For link 0, connect of Y means the system validation has completed. Con is an abbreviation for connected. For CSNA devices, a value of Y is displayed when the CSNA device status becomes setupComplete. For all other links, it means the connection request sequence has completed. |

show extended channel subchannel

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

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

Syntax Description

slot Slot number.

port Port number.

Command Mode

Privileged EXEC

Sample Display

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

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

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

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

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

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

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

The next line describes the flags on the CIP:

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

- **VALID**—An adapter is installed. All displays should contain this.
- **ESCON**—The adapter is an ESCON adapter.

- LOADED—The microcode on the adapter is loaded.
- RQC_PEND—The adapter is attempting to send status to the channel.
- MEMD_ENABLED—The adapter is allowed to send and receive datagrams.
- SIGNAL—The ECA signal light is detected.

The next line describes Link information on the CIP:

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

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

The next line displays Link Incident Reports:

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

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

Implicit incidents indicate a recoverable error occurred in the ECA.

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

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

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

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

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

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

The information displayed under Neighbor Node is as follows:

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

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

show extended channel subchannel

The information displayed under Local Node is as follows:

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

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

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

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

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

show extended channel tcp-connections

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

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

Syntax Description

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

Command Mode

EXEC for summary and Privileged EXEC for detail.

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

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

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

show extended channel tcp-connections

Sample Display

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

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

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

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

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

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

Related Commands

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

offload

show extended channel tcp-stack

show extended channel tcp-stack

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

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

Syntax Description

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

Command Mode

Privileged EXEC

Sample Display

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

```
router# show extended channel tcp-stack

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

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

Table 33-6 describes the fields shown in the display.

Table 33-6 Show Extended Channel tcp-stack Field Descriptions

| Field | Description |
|--------------|---|
| RtoAlgorithm | The algorithm used to determine the timeout value used for retransmitting unacknowledged octets. |
| RtoMin | The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the LBOUND quantity described in RFC 793. |

Table 33-6 Show Extended Channel tcp-stack Field Descriptions (Continued)

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

Related Commands

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

offload

show extended channel udp-listeners

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

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

Syntax Description

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

Command Mode

Privileged EXEC

Sample Display

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

```
router# show extended channel 4/0 udp-listeners 198.92.1.120

UDP Listener: IP Address 198.92.1.120      LocalPort 0
UDP Listener: IP Address 198.92.1.120      LocalPort 1
UDP Listener: IP Address 198.92.1.120      LocalPort 2
UDP Listener: IP Address 198.92.1.120      LocalPort 3
UDP Listener: IP Address 198.92.1.120      LocalPort 4

router# show extended channel 4/0 udp-listeners 198.92.1.121

UDP Listener: IP Address 198.92.1.121      LocalPort 0
UDP Listener: IP Address 198.92.1.121      LocalPort 1
UDP Listener: IP Address 198.92.1.121      LocalPort 2
UDP Listener: IP Address 198.92.1.121      LocalPort 3
UDP Listener: IP Address 198.92.1.121      LocalPort 4
```

show extended channel udp-stack

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

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

Syntax Description

| | |
|-------------------|--------------------------------|
| <i>slot</i> | Slot number. |
| <i>port</i> | Port number. |
| udp-stack | Selects UDP stack display. |
| <i>ip-address</i> | (Optional) Offload IP address. |

Command Mode

Privileged EXEC

Sample Display

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

```
router# show extended channel udp-stack

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

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

Table 33-7 describes the fields shown in the display.

Table 33-7 Show Extended Channel udp-stack Field Descriptions

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

Related Commands

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

show interfaces channel

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

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

Syntax Description

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

Command Mode

Privileged EXEC

Sample Display

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

```
Router# show interfaces channel 3/0

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

Table 33-8 describes the fields shown in the display.

Table 33-8 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. |

show interfaces channel

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

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

show interfaces channel

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