

Channel Interface Processor Frequently Asked Questions

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Will that be any value between *eee* and *eee* + 256?

Given this statement on the SWNET major node: PATH

DIALNO=*xx*04400031740001 where *xx* is the port number, is this value of any significance for Cisco Systems Network Architecture (CSNA) implementation? If yes, to what should it be mapped?

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Related Information

Introduction

This page attempts to answer many of the questions that you may have about Channel Interface Processor (CIP) functions. If you have a question that is not listed here, contact Cisco Systems Technical Support.

Q. Does the CIP card support bus and tag or Enterprise System Connection (ESCON)?

A. Both bus and tag and ESCON channels are supported. For bus and tag, you must order the extra `cab-pca-va` cable, which is ordered separately from the CIP card. ESCON does not come with a fiber cable; it is provided by the customer.

Refer to these documents before you implement any bus and tag connection:

- ◆ PA-1C-E and PA-1C-P Channel Port Adapters End of Sales Announcement Update
- ◆ Bus and Tag Channel Interface Processor End of Sales Announcement for CX-CIP2-PCA1, CX-CIP2-PCA2, and CIX-CIP2-ECAP1

Q. What is the minimum RAM required for Cisco Systems Network Architecture (CSNA), Offload, and both?

A. 16 MB is recommended for CSNA and Offload. Individually, 8 MB is sufficient. The default DRAM is 32 MB on CIP2 modules.

Q. What is the minimum level of CIP Ucode required?

A. 11.0 for the Cisco 7000 platform and 21.0 for the Cisco 7500 platform.

Q. What are the major components of Cisco Systems Network Architecture (CSNA)?

- ◆ CIP Virtual Interface
- ◆ CIP Internal LAN
- ◆ CIP Internal Adapter
- ◆ External Communication Adapter (XCA) Major Node
- ◆ Switched Major Node
- ◆ Source-route Bridging the interface to CSNA

Q. What kinds of dependency does Cisco Systems Network Architecture (CSNA) have on physical interfaces?

A. CSNA is dependent only on ring groups and bridge groups of physical interfaces. CSNA does not open service access points (SAPs) on physical interfaces.

Q. What is the CIP Virtual Interface?

A. The CIP Virtual Interface allows you to share internal adapters between CIP physical interfaces. It is always port 2 of slot x (for example, CIP slot $x/2$).

Note: The Channel Port Adapter (CPA) does not have a virtual interface.

Q. What is the CIP Internal LAN?

A. The CIP Internal LAN is used to set up bridging to Cisco Systems Network Architecture (CSNA). It anchors the Internal Adapter configuration and has a maximum of thirty-two Internal LANs that may be defined per CIP.

Q. What is the CIP Internal Adapter?

A. The CIP Internal Adapter is used to configure MAC, Logical Link Control, type 2 (LLC2), and external communication adapter (XCA) information. It contains the Relative Adapter Number (RAN), the local MAC address, and the LLC2 connection parameters (T1, Ti, and so forth).

Q. If you are looking for remote source–route bridging (RSRB) connectivity across the WAN, what channel device types should you use?

A. Cisco Systems Network Architecture (CSNA) implementation is similar to an IBM 3172. CSNA requires only one address for the LSA, unlike CLAW for TCP/IP, which requires two addresses. You may want to define multiple addresses to the Cisco router for spares.

Q. Does Cisco Systems Network Architecture (CSNA) support duplicate MAC addresses?

A. Yes, CSNA supports duplicate MAC addresses. However, each must be on a different internal LAN and each must have a different Relative Adapter Number (RAN).

Q. What is the maximum capacity per CIP for Cisco Systems Network Architecture (CSNA) support?

A. Capacity goals:

- ◆ Maximum number of concurrent channel–attached hosts: 64
- ◆ Maximum number of internal LANs: 32 (This is limited by the maximum number of internal adapters, which is 18.)
- ◆ Maximum number of internal adapters: 18
- ◆ Maximum number of opened service access points (SAPs): 128
- ◆ Maximum number of Logical Link Control, type 2 (LLC2) sessions: 6000

Q. What is the IOCP/HOST definition?

A. Use these IOCP statements to answer the next five questions:

```
CNTLUNIT CUNUMBR=aaaa,  
PATH=(bb),UNIT=cccc,UNITADD=((dd,256)),  
IODEVICE ADDRESS=(eee,256),CUNUMBR=(ffff),UNIT=gggg
```

Q. What parameters should be used for the CNTLUNIT and IODEVICE macros?

A. CUNUMBR in the CNTLUNIT macro is a unique one– to four–digit hexadecimal number in the range of 0000 through FFFE; it is arbitrarily assigned to each control unit. UNITADD in the CNTLUNIT macro is a two–digit hexadecimal number in the range of 00 through FF, which specifies the unit addresses of the I/O devices that are recognized by the control unit. ADDRESS in the IODEVICE macro is a one– to four–digit hexadecimal number in the range of 0000 through FFFF, which specifies the device number.

If this configuration is new, try to make *aaaa* equal to *eee*. For example, make CUNUMBR=0D00 and ADDRESS=(D00,256).

Also, make *dd* in UNITADD start at the last two digits of *eee*. For example, make UNITADD=(00,256) and ADDRESS=(D00,256).

Q. Can Cisco Systems Network Architecture (CSNA) use all 256 channel-attached hosts, as defined in the ADDRESS parameter of the IODEVICE macro?

A. No. You may define 256 channel addresses, but the CSNA will support only 64 concurrent channel-attached hosts per physical CIP port.

Q. For an ESCON channel, what value should cccc be in the UNIT parameter (such as 3088, 3172, SCTC, and so on) on the CNTLUNIT macro?

A. Use UNIT=3172.

Q. For a bus and tag channel, what value should cccc be in the UNIT parameter (such as 3088, 3172, SCTC, and so on) of the CNTLUNIT macro?

A. Use UNIT=3088.

Q. For an ESCON channel, what value should gggg be in the UNIT parameter of the IODEVICE macro?

A. Use UNIT=3172.

Q. For a bus and tag channel, what value should gggg be in the UNIT parameter of the IODEVICE macro?

A. Use UNIT=CTC.

Q. On the external communication adapter (XCA) major node, which of the above fields on the IOCP GEN should be mapped to the CUADDR value? For example, PORTTR PORT ADAPNO=0, CUADDR=???, SAPADDR=04, MEDIUM=RING, TIMER=15? Will that be any value between eee and eee + 256?

A. CUADDR= in the XCA major node is the ADDRESS parameter in the IODEVICE macro. If the UNITADD for I/O device is 00 (CNTLUNIT macro), and its corresponding ADDRESS ID is D00 (IODEVICE macro); then you must code CUADDR=D00 in the XCA major nodes, *if an only* if you are using I/O device 00 as the device parameter on the router configuration (that is, the Cisco Systems Network Architecture [CSNA] path device). Use a CUNUMBR from the range indicated by the ADDRESS=(eee, 256) such as x'D08'.

Q. Given this statement on the SWNET major node: PATH DIALNO=xx04400031740001 where xx is the port number, is this value of any significance for Cisco Systems Network Architecture (CSNA) implementation? If yes, to what should it be mapped?

A. *xx* is ignored for external communication adapter (XCA) major node and, therefore, is insignificant for CSNA.

Q. Given this statement for router configuration: CSNA 0100 *hh* if CUADDR on external communication adapter (XCA) major node is D08, would the *hh* value be 08?

A. It depends. Remember that the UNITADD in the CNTLUNIT macro is a two-digit hexadecimal number in the range of 00 through FF, which specifies the unit addresses of the I/O devices that are recognized by the control unit. This is the parameter that you code in the router for *device* in the CSNA *path device* definition. *hh* is dependant on what is specified in UNITADD=((*xx,nn*)), where *xx* is the starting address and *nn* is the number of addresses that are allocated to this definition. For example, UNITADD=((00 , 16)) says the addresses start with 00 and end with 0F.

Q. What is the IOCP GEN for an ESCON channel with an ESCON Director switch?

A. Use this diagram to answer the next four questions:

ESCON Director Switch E1



```
CHPID PATH=( ( 18 ) ) ,TYPE=CNC ,SWITCH=E1
CNTLUNIT CUNUMBR=320 ,PATH=( 18 ) ,CUADD=A ,UNITADD=( ( 20 , 256 ) ) ,LINK=E4 ,UNIT=SCTC
IODEVICE ADDRESS=( 320 , 256 ) ,CUNUMBR=( 320 ) ,UNIT=SCTC
```

Q. Is this IOCP GEN valid?

A. Yes. However, this example could be misleading because E1 is interpreted as the SWITCH number as well as the outgoing port to the host, from the point of view of the CIP.

Q. Is this Cisco Systems Network Architecture (CSNA) statement in the router valid (CUADDR on XCA is 328): CSNA E10A 08?

A. It depends entirely upon what is configured in the UNITADD=(20 , 256) definition. In this example, the I/O devices start at 20 and not 00, and go up to 256 or x'ff'. You need to use CSNA E10A 28 or any free address in this range that you have chosen.

Q. What is the minimum virtual telecommunications access method (VTAM) level required for Cisco Systems Network Architecture (CSNA) support on the host?

- ◆ Advanced Communications Function (ACF)/VTAM V3 R4.1 or later for Multiple Virtual Storage (MVS)/ESA.
- ◆ ACF/VTAM V3 R4 or later, for Virtual Machine (VM)/ESA, VM/SP, or VSE/ESA.

Q. What are the Mainframe Platforms that can support Cisco Systems Network Architecture (CSNA)?

A. CSNA is supported in all major Mainframes. However, customers should be aware that Hitachi, IBM, and Amdahl have their own coded implementations for IOCP or HCD.

Q. Why am I unable to ping the channel interface from the router?

A. The channel is a point-to-point link. There is no defined interface to which to send the ping packet. Therefore, there is no way to wrap the packet back to the interface and respond to the ping.

Q. What should the MTU size be for the CIP in the TCP/IP profile?

A. 4096, if you want maximum performance. If you are using a gateway statement, you should also configure any network whose path will permit it to 4096, for maximum performance.

Q. When I turn on debug channel events, I see love letters. What are they?

A. Interface processors have two mechanisms to send status information to the route processor. One is the love note. This is a MEMD buffer header with no data area. It is useful for sending 16 bits of information. The CIP uses this to indicate to the Route Processor (RP) that it should check the status of the carrier, because something has changed. The love letter is a real MEMD buffer. It contains up to 4096 bytes of data (RP/SP) or 1642 bytes of data (RSP). This data contains the statistics that are associated with each connection. It provides some of the output for the **show extended channel** commands and the MIB.

Q. What is a resetting event?

A. The coding unit (CU) gets into the resetting event condition whenever a system reset condition occurs. The ESCON specification states that, when this condition is present, you reject any command that is not an x'02' read or certain model-dependent commands. In that code, the CIP also accepts x'04', x'e4', x'84', and x'03'. If the first command that is sent down for this device is not one of those, then the CIP presents a unit check and sets the resetting event indication in the sense byte.

Q. Will the CIP share Routing Information Protocol (RIP) routing information with the mainframe?

A. As of Cisco IOS® Software Release 10.2(4.1), the CIP will send RIP routing information to the mainframe host. If you are running the RouteD process on the mainframe, the mainframe will be able to make routing decisions based on this information.

Note: In order for the CIP to send the routing information to the mainframe, you must use the **broadcast** keyword at the end of the CLAW statement in the router configuration.

Q. What type of Routing Information Protocol (RIP) implementation is available on the mainframe?

A. TCP/IP for Multiple Virtual Storage (MVS) and virtual machine (VM) has its own version of Routed. Routed is RIP-compatible. With OS/390 V2R6 and later, the OMPROUTE application could be used for RIP.

Q. What type of information is available from the CIP via the Simple Network Management Protocol (SNMP) MIB? Where can I get the CIP MIB?

A. For each CIP card:

- ◆ Total memory.
- ◆ Free memory.
- ◆ CPU utilization.
- ◆ Time since last reset.
- ◆ Daughter board information.

Daughter board information:

- ◆ Daughter board type (such as ESCON or bus and tag).
- ◆ Daughter board status (such as up or down).
- ◆ If the daughter board has sensed light on the fiber (ESCON), or the Op Out Tag line (bus and tag).
- ◆ If the daughter board has established a path with at least one channel.
- ◆ The number of times that the ESCON processor has recovered from an internal error.
- ◆ The number of code violation errors.
- ◆ The number of link failures due to various conditions.

For each subchannel:

- ◆ Device address.
- ◆ Device connects.
- ◆ Halt subchannels.
- ◆ Selective resets.
- ◆ System resets.
- ◆ Device level errors.
- ◆ Write blocks dropped.
- ◆ Last sense data sent to the channel.
- ◆ The CLAW configuration.

For each CLAW link:

- ◆ Number of blocks read, written, and dropped.
- ◆ Number of bytes read and written.
- ◆ Number of times a buffer was requested and none were available.

The channel MIB is available via anonymous FTP from ftp.cisco.com:

SNMP	FTP Directory	Files
SNMP v1	/pub/mibs/v1/	<ul style="list-style-type: none"> ◆ CISCO-CHANNEL-MIB-V1\$.MI.my ◆ Files that start with CISCO-CIP.
SNMP v2	pub/mibs/v2	<ul style="list-style-type: none"> ◆ CISCO-CHANNEL-MIB.my ◆ Files that start with CISCO-CIP.

Q. What is EMIF? Do I have to have an ESCON director to run EMIF?

A. ESCON Multiple Image Facility (EMIF) is a mainframe I/O software function that allows you to share one ESCON channel among multiple logical partitions (LPARs) on the same mainframe. An ESCON director is a piece of physical hardware that allows you to share one ESCON channel among multiple device control units or one device control unit among multiple ESCON channels.

Q. How much memory is needed for Offload and Systems Network Architecture (SNA)?

A. This is the current Offload memory calculation:

$(64 \text{ KB} \times \text{FTP sessions}) + (4 \text{ KB} \times \text{Telnet sessions})$

At least 8 MB is required. For SNA, at least 8 MB is required. In both cases, the total can not exceed 64 MB.

Q. When TCP/IP Offload is available, what are the specifics on where the processing of the packets will be done?

A. Offload extends the application interface calls to the CIP, but the application resides on the mainframe. The TCP stack on the CIP terminates the TCP session, so all of the TCP/IP protocol processing takes place on the CIP. Application programming interface (API, socket) calls are transported from the mainframe to the CIP across the channel. IBM TCP/IP V3R2 is the last release to support Offload.

Q. What type of Systems Network Architecture (SNA) session information will be available from the CIP card via a Simple Network Management Protocol (SNMP) MIB?

A. SNA sessions are not visible at the level of the CIP. What the CIP sees are logical link control (LLC) sessions, which map one-for-one into SNA physical units (PUs). The MIB support will provide a lot of information about the LLC connections; and so, by inference, the user can derive the state of the SNA devices. However, the CIP passes through the SNA session data transparently.

Q. When Systems Network Architecture (SNA) support is added to the CIP, what will the CIP look like to the mainframe?

A. The SNA support on the CIP will make it look like a 3172. In other words, the CIP appears to the mainframe as a set of external LAN adapters. Support is provided for physical unit type 2 (PU2), PU2.1, PU4, and PU5 just as if they were LAN-attached to a 3172. Neither the 3172 nor the CIP present a PU image to the mainframe. They appear as a set of external communication adapter (XCA) Switched Major Nodes to virtual telecommunications access method (VTAM).

Q. What portion of TN3270 processing is done on the CIP?

A. If you enable the TN3270 Server functions in the router, you can Offload TN3270 and TCP/IP processing from the host and saves host CPU cycles.

Q. Can the same CUADDR be used across different paths or channel path identifiers (CHPIDs) in an ESCON Multiple Image Facility (EMIF) scenario?

A. Yes.

Q. There is no documentation or recommendation on the second value in the UNITADD parameter in the IOCP GEN. How many devices should be coded for each path? Are there any recommendations? Is there a minimum requirement?

A. In the past, most people would use a minimum of 16. The CIP minimum is 2. If you only have one TCP/IP stack per partition, two should be adequate. However, it actually makes sense to define more than two subchannels, if you want to use these:

- ◆ Second TCP/IP address space for:
 - ◇ Testing new versions or other products.
 - ◇ Security.
 - ◇ Performance.
- ◆ Something else, like Interlink DECnet.

Q. What is the difference between coding UNIT=RS6K and UNIT=3172 in the IOCP GEN? Is RS6K preferential and why?

A. On older Multiple Virtual Storage (MVS) Systems, the SENSEID information returned from an RS6K shows that it is a 3088 model 61, and the 3172 shows that it is a 3088 model (x'1F'). If you see the Host message, IOS445I Physical device is inconsistent with logical, then you are on an older version of MVS. You might need to install a PTF for APAR OY67361 or upgrade your MVS operating system to a newer, IBM-supported release. APAR OY67361 introduced changes, which included new UIMs for the 3172 and RS6K device type. Subsequent to release of the PTFs for this APAR, the recommendation which comes directly from this APAR states:

A parallel or ESCON-attached 3172 should now be defined from the Hardware Configuration Definition (HCD) as UNIT=3172.

Because your device appears to the operating system as a 3172, it is also recommended that you define your device as a 3172 on both the control unit and on the I/O device definitions.

Q. When I issue a show extended channel *slot/port* statistics command, I see a large number of command retries. What does this mean?

A. There will always be a large number of retries with the CIP. This is normal. The retries counter increments when the CIP runs out of data for the host to read and goes into retry. You would expect the number of connects to be somewhat larger than the number of retries. If the number of connects is quite a bit larger than the number of retries, it indicates that the host is having trouble keeping up with the CIP card.

Q. Are there any limits to the number of CLAW connections that you can have through a CIP card?

A. There are two limits. There is a limit of 256 devices per adapter. This limit restricts the number of CLAW connections to 128. In addition, there is a limit based on the amount of memory that each CLAW device requires.

This is the formula:

$$n_1 + (n_2 \times \text{number of ECA adapters}) + (n_3 \times \text{number of PCA adapters}) + (n_4 \times \text{number of CLAW connections}) + (n_5 \times \text{number of unique paths}) = \text{amount of memory required}$$

- ◆ $n_1 = 555776$
- ◆ $n_2 = 705824$
- ◆ $n_3 = 714016$
- ◆ $n_4 = 10912$
- ◆ $n_5 = 1072$

Note: The above are approximate numbers. They can change as software is updated. This gives roughly eleven CLAW device pairs on a dual ESCON Channel Adapter (ECA) with only 2 MB of DRAM. (In fact, you will probably get a little more because some of the control blocks will be allocated from 512 KB of SRAM, but this is a conservative calculation.)

Q. Can the CIP card autonomously switch IP packets to all other media types?

A. Yes, CIP can autonomously switch to any other media type.

Q. What does the sense data that I receive from the show extended channel *slot/port* subchannel command mean?

A. The sense data denotes this:

Byte	Bit	Meaning
Byte 0	0	Command Reject
	1	Intervention required
	2	Bus-out check
	3	Equipment check
	4	Data check
	5	Overrun
	6	Reserved
	7	Cancel
Byte 1	0	Resetting Event
	1	Reserved
	2	Reserved
	3	Reserved
	4	Reserved

5	Reserved
6	Reserved
7	Reserved

Q. What do the 4 `resyncs` mean in this show controller `cbus` command output from a Cisco 7000 router with Cisco IOS Software Release 11.0(10):

```
CIP 4, hardware version 5.0, microcode version 21.10
Microcode loaded from flash slot0:cipp2110.bin
Controller Sync: 4 timeouts, 4 resyncs 0 failures, 0 max phase count
```

A. The Route Processor (RP) sends commands to the CIP via the Switch Processor (SP). The SP gives the CIP 12 μ s to respond. If it does not respond in time, the RP counts a time-out: there were four of them. The RP then retries the request; part of the retry process is to make ensure that the CIP and the RP are synchronized and that the CIP is responding to the correct request. There were four resynchronization attempts. Most of the time, these occur when the RP is retrieving error counters, which it does once every 10 seconds.

The RP will retry each request 16 times. If the 16 resynchronizations fail, then a failure is counted. There were no failures counted in this example.

You may also see an 8010 error message, depending on the type of request. For some requests, the RP just ignores the 8010 error.

The `max phase count` reflects the maximum number of times that the resynchronization had to be retried. In this example, no resynchronizations were retried.

Related Information

- [Troubleshooting CSNA](#)
- [CIP CSNA Description](#)
- [Understanding Buffer Misses and Failures](#)
- [Technology Support](#)
- [Product Support](#)
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