

Troubleshooting Connectivity Problems on a WS-X6608 PRI Gateway

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Introduction

The Cisco WS-X6608-T1/E1 is an eight-port digital gateway and/or digital signal processor (DSP) farm that uses Skinny Client Control Protocol (SCCP) to interact with Cisco CallManager 3.x. For details on configuring the WS-X6608-T1/E1 module, please refer to the Configuring a Catalyst WS-X6608-T1 Port as a T1 VoIP Gateway with Cisco CallManager 3.0.

This document gives an in-depth overview of the debug- and engineering-level commands that are available for troubleshooting problems with WS-6608-T1/E1 gateways. It covers everything from troubleshooting registration problems to obtaining information directly from the 860 processor and DSPs.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on the software and hardware versions below.

- Cisco WS-X6608-T1/E1 Digital Gateway
- Cisco CallManager 3.x

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

Troubleshoot via the Catalyst 6000 Command-Line Interface

This section explains how to troubleshoot the PRI module operation through the command-line interface (CLI) of a Catalyst 6000-series digital switch. You would start by ensuring that the module is being recognized in the chassis and is in an operational state.

Verify Power

Verify power to the module:

1. Enter the command **show env power** [*module number*].

```

evoice-cat6k-6a (enable) show env power 7
Module 7:
Slot power Requirement/Usage :

Slot Card Type                PowerRequested PowerAllocated CardStatus
Watts   A @42V Watts   A @42V
-----
3      WS-X6608-T1            83.16   1.98   83.16   1.98   ok
  
```

If the card type shows up correctly, then the module is recognized. The CardStatus field shows other while the card is powering up, and eventually should show ok. If the card shows deny, then there is not enough power in the system to power up the module. For more information, refer to the Understanding IP Phone In-Line Power Provisioning on the Catalyst 6000 Switch document.

2. Check the application load and DSP load versions using the **show version** command:

```

dtl17-1-cat6000-a (enable) show version 3
Mod Port Model                Serial #   Versions
-----
3   8   WS-X6608-T1                SAD04380DAW
                                     Hw : 1.1
                                     Fw : 5.4(2)
                                     Sw : 6.1(1a)
                                     HP1: D004G300; DSP1: D005B300 (3.3.18)
                                     HP2: D004G300; DSP2: D005B300 (3.3.18)
                                     HP3: D004G300; DSP3: D005B300 (3.3.18)
                                     HP4: D004G300; DSP4: D005B300 (3.3.18)
                                     HP5: C001H300; DSP5: C002F300 (3.1.2)
                                     HP6: C001H300; DSP6: C002F300 (3.1.2)
                                     HP7: M001H300; DSP7: M002F300 (3.1.2)
                                     HP8: M001H300; DSP8: M002F300 (3.1.2)
  
```

There are eight separate 860 Host Processors (HPs) on the module. The load ID that follows is referred to as the application (app) load. The DSP field indicates the version number of the DSP code loaded on the eight DSPs for that particular port (giving a total of 64 DSPs). These fields may be empty if the DSPs are currently being updated.

The application load version also tells you what function the port is currently configured for. The three valid settings are Digital PRI Gateway, Conference Bridge, or Transcoder/MTP. The first four characters of the load file tells you what kind of file it is, as shown in the following table:

Load Filename Prefix	File Type
D004	Digital gateway app load

D005	Digital gateway DSP load
C001	Conference bridge app load
C002	Conference bridge DSP load
M001	Transcoder/MTP app load
M002	Transcoder/MTP DSP load

The DSP load file name is never configured by the user. It is directly tied to a particular application load file. Multiple application load files will generally point to the same DSP load file, because fewer changes are made to DSP loads. For example, the D0040300, D004A300, and D004B300 load files can all use DSP load file D0050300.

Verify Registration

Check to see if the module has valid IP configuration information, and that it is registered with Cisco CallManager.

Enter the command **show port** *[port number]* .

```

dtl17-1-cat6000-a (enable) show port 3
Port  Name                Status      Vlan      Duplex  Speed  Type
-----
3/1                connected   17        full    1.544  T1
3/2                connected   17        full    1.544  T1
3/3                connected   17        full    1.544  T1
3/4                connected   17        full    1.544  T1
3/5                enabled     17        full    -      Conf  Bridge
3/6                enabled     17        full    -      Conf  Bridge
3/7                enabled     17        full    -      MTP
3/8                enabled     17        full    -      MTP

Port      DHCP      MAC-Address      IP-Address      Subnet-Mask
-----
3/1      enable    00-01-c9-d8-55-74  10.192.17.98    255.255.255.0
3/2      enable    00-01-c9-d8-55-75  10.192.17.107   255.255.255.0
3/3      enable    00-01-c9-d8-55-76  10.192.17.108   255.255.255.0
3/4      enable    00-01-c9-d8-55-77  10.192.17.109   255.255.255.0
3/5      enable    00-01-c9-d8-55-78  10.192.17.110   255.255.255.0
3/6      enable    00-01-c9-d8-55-79  10.192.17.93    255.255.255.0
3/7      enable    00-01-c9-d8-55-7a  10.192.17.95    255.255.255.0
3/8      enable    00-01-c9-d8-55-7b  10.192.17.96    255.255.255.0

Port      Call-Manager(s)      DHCP-Server      TFTP-Server      Gateway
-----
3/1      172.18.112.17*
          172.18.112.18
3/2      172.18.112.17*
          172.18.112.18
3/3      172.18.112.17*
          172.18.112.18
3/4      172.18.112.17*
          172.18.112.18
3/5      172.18.112.17*
          172.18.112.18
3/6      172.18.112.17*
          172.18.112.18
3/7      172.18.112.17*
          172.18.112.18
3/8      172.18.112.17*
          172.18.112.18

```

(*): Primary

Port	DNS-Server(s)	Domain
3/1	161.44.15.250*	cisco.com
	161.44.21.250	
3/2	161.44.15.250*	cisco.com
	161.44.21.250	
3/3	161.44.15.250*	cisco.com
	161.44.21.250	
3/4	161.44.15.250*	cisco.com
	161.44.21.250	
3/5	161.44.15.250*	cisco.com
	161.44.21.250	
3/6	161.44.15.250*	cisco.com
	161.44.21.250	
3/7	161.44.15.250*	cisco.com
	161.44.21.250	
3/8	161.44.15.250*	cisco.com
	161.44.21.250	

(*): Primary

Port	CallManagerState	DSP-Type
3/1	registered	C549
3/2	registered	C549
3/3	registered	C549
3/4	registered	C549
3/5	registered	C549
3/6	registered	C549
3/7	registered	C549
3/8	registered	C549

Port	NoiseRegen	NonLinearProcessing
3/1	enabled	enabled
3/2	enabled	enabled
3/3	enabled	enabled
3/4	enabled	enabled
3/5	disabled	disabled
3/6	disabled	disabled
3/7	disabled	disabled
3/8	disabled	disabled

Port	Trap	IfIndex
3/1	disabled	1262
3/2	disabled	1263
3/3	disabled	1264
3/4	disabled	1265
3/5	disabled	1266
3/6	disabled	1267
3/7	disabled	1268
3/8	disabled	1269

In the above example, ensure that the IP address, subnet mask, gateway, Domain Name Servers (DNS) server(s), domain, and TFTP server addresses are correct. Also make sure the ports are in the correct VLAN. Each port can be put on a different subnet and acts independently of the other ports on the same module.

Also important to check is whether or not the card has registered with Cisco CallManager. If the card is not registered and has been configured on Cisco CallManager, please refer to the Troubleshooting Registration Problems section.


```

00:00:00.030 NMPTask:get DIAGCMD
00:00:00.030 NMPTask:send DIAGCMD TCP ack
00:00:00.030 SPAN: Transmit clock slaved to span 3
00:00:00.030 SPAN: Transmit clock set to internal osc.
00:00:00.580 (DSP) Test Begin -> Mask<0x00FFFFFF>
00:00:01.570 SPAN: Transmit clock slaved to span 3
00:00:01.570 SPAN: Transmit clock set to internal osc.
00:00:01.570 (DSP) Test Complete -> Results<0x00FFFFFF/0x00FFFFFF>
00:00:01.810 NMPTask:get VLANCONFIG
00:00:02.870 (CFG) Starting DHCP
00:00:02.870 (CFG) Booting DHCP for dynamic configuration.
00:00:03.170 (CFG) DHCP Request or Discovery Sent, DHCPState = INIT
00:00:03.170 (CFG) DHCP Server Response Processed, DHCPState = REQUESTING
00:00:03.170 (CFG) DHCP Server Response Processed, DHCPState = BOUND
00:00:03.170 (CFG) Requesting DNS Resolution of CiscoCM1
00:00:16.170 (CFG) DNS Server Timeout on Resolving TFTP Server Name.
00:00:16.170 (CFG) TFTP Server IP Set by DHCP Option 150 = 172.18.112.17
00:00:16.170 (CFG) Requesting SDA0001C9D85577.cnf File From TFTP Server
00:00:16.170 (CFG) TFTP Error: .cnf File Not Found!
00:00:16.170 (CFG) Requesting SDADefault.cnf File From TFTP Server
00:00:16.170 (CFG) .cnf File Received and Parsed Successfully.
00:00:16.170 (CFG) Updating Configuration ROM...
00:00:16.620 GMSG: GWEvent = CFG_DONE --> GWState = SrchActive
00:00:16.620 GMSG: CCM#0 CPEvent = CONNECT_REQ --> CPState = AttemptingSocket
00:00:16.620 GMSG: Attempting TCP socket with CCM 172.18.112.17
00:00:16.620 GMSG: CCM#0 CPEvent = SOCKET_ACK --> CPState = BackupCCM
00:00:16.620 GMSG: GWEvent = SOCKET_ACK --> GWState = RegActive
00:00:16.620 GMSG: CCM#0 CPEvent = REGISTER_REQ --> CPState = SentRegister
00:00:16.770 GMSG: CCM#0 CPEvent = CLOSED --> CPState = NoTCPsocket
00:00:16.770 GMSG: GWEvent = DISCONNECT --> GWState = SrchActive
00:00:16.770 GMSG: CCM#1 CPEvent = CONNECT_REQ --> CPState = AttemptingSocket
00:00:16.770 GMSG: Attempting TCP socket with CCM 172.18.112.18
00:00:16.770 GMSG: CCM#1 CPEvent = SOCKET_NACK --> CPState = NoTCPsocket
00:00:16.770 GMSG: GWEvent = DISCONNECT --> GWState = Rollover
00:00:31.700 GMSG: GWEvent = TIMEOUT --> GWState = SrchActive
00:00:31.700 GMSG: CCM#0 CPEvent = CONNECT_REQ --> CPState = AttemptingSocket
00:00:31.700 GMSG: Attempting TCP socket with CCM 172.18.112.17
00:00:31.700 GMSG: CCM#0 CPEvent = SOCKET_ACK --> CPState = BackupCCM
00:00:31.700 GMSG: GWEvent = SOCKET_ACK --> GWState = RegActive
00:00:31.700 GMSG: CCM#0 CPEvent = REGISTER_REQ --> CPState = SentRegister
00:00:31.850 GMSG: CCM#0 CPEvent = CLOSED --> CPState = NoTCPsocket
00:00:31.850 GMSG: GWEvent = DISCONNECT --> GWState = SrchActive
00:00:31.850 GMSG: CCM#1 CPEvent = CONNECT_REQ --> CPState = AttemptingSocket
00:00:31.850 GMSG: Attempting TCP socket with CCM 172.18.112.18
00:00:31.850 GMSG: CCM#1 CPEvent = SOCKET_NACK --> CPState = NoTCPsocket
00:00:31.850 GMSG: GWEvent = DISCONNECT --> GWState = Rollover

```

The **show port** command shows the port as being not registered as follows:

```

dtl7-1-cat6000-a (debug-eng) show port 3/4
Port Name Status Vlan Duplex Speed Type
-----
3/4 enabled 17 full - unknown

Port DHCP MAC-Address IP-Address Subnet-Mask
-----
3/4 enable 00-01-c9-d8-55-77 10.192.17.109 255.255.255.0

Port Call-Manager(s) DHCP-Server TFTP-Server Gateway
-----
3/4 - 172.18.112.11 172.18.112.17 10.192.17.254

Port DNS-Server(s) Domain
-----
3/4 161.44.15.250* cisco.com
161.44.21.250

```

```

(*) : Primary

Port      CallManagerState DSP-Type
-----
3/4      notregistered   C549

Port      NoiseRegen NonLinearProcessing
-----
3/4      -              -

Port      Trap      IfIndex
-----
3/4      disabled  1265

```

Another possible registration problem is caused when the load information is incorrect, or the load file is corrupt. The problem could also occur if the TFTP server is not working. In this case, **tracy** clearly shows that the TFTP server reported that the file is not found:

```

00:00:07.390 MSG: CCM#0 CPEvent = REGISTER_REQ --> CPState = SentRegister
00:00:08.010 MSG: TFTP Request for application load D0041300
00:00:08.010 MSG: CCM#0 CPEvent = LOADID --> CPState = AppLoadRequest
00:00:08.010 MSG: *** TFTP Error: File Not Found ***
00:00:08.010 MSG: CCM#0 CPEvent = LOAD_UPDATE --> CPState = LoadResponse

```

In this case, you can see that the module is requesting app load D0041300 although the correct load name would be D0040300. The same problem can occur when a new app load needs to get its corresponding DSP load as well. If the new DSP load is not found, a similar message appears.

Troubleshoot Active Calls

Once a call is connected, the **show port voice active** command can be used to gather information about all active calls on the system and detailed information on individual calls. The type will show **call** for a gateway port, **conferencing** for a conference port and **transcoding** for both transcoding and MTP.

```

dtl17-1-cat6000-a (debug-eng) show port voice active
Port Type      Total Conference-ID/ Party-ID IP-Address
Transcoding-ID
-----
3/1 call        2      -      -      10.192.17.115
                                     10.192.17.93
3/6 conferencing 1      1      6      10.192.17.98
                                     7      10.192.17.112
                                     5      10.192.17.114
3/8 transcoding 1      2      9      172.18.112.109
                                     11     10.192.17.113

```

You can obtain additional details by issuing the command for a single port. The following is what a gateway call looks like.

```

dtl17-1-cat6000-a (debug-eng) show port voice active 3/1
Port 3/1 :
Channel #22:
  Remote IP address      : 10.192.17.115
  Remote UDP Port       : 20972
  ACOM Level Current    : 200
  Call State            : voice
  Codec Type            : G711 ULAW PCM
  Coder Type Rate       : 20
  ERL Level             : 200
  Voice Activity Detection : disabled
  Echo Cancellation     : enabled
  Fax Transmit Duration (ms) : 0

```

```

Hi Water Playout Delay           : 65
Low Water Playout Delay          : 65
Receive Bytes                    : 0
Receive Delay                    : 65
Receive Packets                  : 0
Transmit Bytes                   : 7813280
Transmit Packets                 : 48833
Tx Duration (ms)                 : 3597580
Voice Tx Duration (ms)          : 3597580

```

The following is the same command for a conferencing port. Each conference show the participants of the conference as well as the codec being used and the packet size.

```

dt17-1-cat6000-a (debug-eng) show port voice active 3/6
Port 3/6 :
  Conference ID: 1
    Party ID: 6
      Remote IP address           : 10.192.17.98
      UDP Port                    : 26522
      Codec Type                  : G711 ULAW PCM
      Packet Size (ms)           : 20
    Party ID: 7
      Remote IP address           : 10.192.17.112
      UDP Port                    : 17164
      Codec Type                  : G711 ULAW PCM
      Packet Size (ms)           : 20
    Party ID: 5
      Remote IP address           : 10.192.17.114
      UDP Port                    : 19224
      Codec Type                  : G711 ULAW PCM
      Packet Size (ms)           : 20

```

Finally, the following is the output from a transcoding port. Here you can see the two different codecs that are being transcoded. If the port is only doing MTP without transcoding, the codec type is the same for the two participants.

```

dt17-1-cat6000-a (debug-eng) show port voice active 3/8
Port 3/8 :
  Transcoding ID: 2
    Party ID: 9
      Remote IP address           : 172.18.112.109
      UDP Port                    : 17690
      Codec Type                  : G7231 HIGH RATE
      Packet Size (ms)           : 30
    Party ID: 11
      Remote IP address           : 10.192.17.113
      UDP Port                    : 18732
      Codec Type                  : G729 B CS ACELP VAD
      Packet Size (ms)           : 20
Total: 1

```

Check Physical Layer Statistics

Originally, the only Layer 1 statistics that could be obtained from the ports configured as a T1/E1 gateway were through the following command. This option was only available for T1 ports, since there is no provision for Facility Data Link (FDL) on E1.

1. Issue the **show port** command.

```

cat6k-2 (enable) show port voice fdl 3/1

Port  ErrorEvents  ErroredSecond  SeverlyErroredSecond

```

	Last 15'	Last 24h	Last 15'	Last 24h	Last 15'	Last 24h
3/1	65535	65535	900	20864	900	20864
Port	FailedSignalState		FailedSignalSecond			
	Last 15'	Last 24h	Last 15'	Last 24h	Last 15'	Last 24h
3/1	1	1	900	20864		
Port	LES		BES		LCV	
	Last 15'	Last 24h	Last 15'	Last 24h	Last 15'	Last 24h
3/1	0	0	0	0	0	0

However as of Application Load D004S030.bin, it is possible to get more detailed statistics from the ports by using the CLI debug option **tracy_send_cmd** as shown below.

2. Issue the **tracy_send_cmd**.

```
cat6k-2 (debug-eng) tracy_start 3 1

cat6k-2 (debug-eng) tracy_send_cmd
Usage: tracy_send_cmd <modN> <portN> " <taskID> <enable/set/get> <cmd>[options]
<level>/[level]
```

Tracy debugging can also be done by running the DickTracy application on one's PC and accessing the HP860 host processor on the module via an IP session. If you are using the DickTracy application:

3. Once the IP session is established with the 860, set the following using the menu options to set the Framers Task ID to 16 and execute the following commands:

a. **show config**

```
00:00:51.660 SPAN: CLI Request --> show span configuration
  Applique type is Channelized E1
  Line Encoding -----> HDB3
  Framing Format -----> CRC4
  Signaling Mode -----> ISDN
  Facility Data Link --> NONE (Disabled)
  D-channel -----> Enabled
  Timing Source -----> slaved to Span 0 Rx Clock
  Line Loopback Type --> No Loopback
  Span Description ----->
```

The following is a T1 example:

```
00:01:11.020 SPAN: CLI Request --> show span configuration
  Applique type is Channelized T1
  Line Encoding -----> B8ZS
  Framing Format -----> ESF
  Signaling Mode -----> ISDN
  Facility Data Link --> AT&T PUB 54016
  Yellow Alarm Mode ---> F-bit Insertion
  Line Buildout -----> 0dB
  D-channel -----> Enabled
  Timing Source -----> Internal Osc.
  Line Loopback Type --> No Loopback
  Span Description ----->
```

b. **show status**

```
00:00:36.160 SPAN: CLI Request --> show span summary status
E1 6/1 is up
  No alarms detected.
Alarm MIB Statistics
  Yellow Alarms -----> 1
  Blue Alarms -----> 0
```

```
Frame Sync Losses ---> 0
Carrier Loss Count --> 0
Frame Slip Count ----> 0
D-chan Tx Frame Count ----> 5
D-chan Tx Frames Queued --> 0
D-chan Tx Errors -----> 0
D-chan Rx Frame Count ----> 5
D-chan Rx Errors -----> 0
```

The following is a T1 example:

```
00:00:51.310 SPAN: CLI Request --> show span summary status
T1 6/1 is down
  Transmitter is sending Remote Alarm
  Receiver has AIS Indication
Alarm MIB Statistics
  Yellow Alarms -----> 1
  Blue Alarms -----> 2
  Frame Sync Losses ---> 2
  Carrier Loss Count --> 0
  Frame Slip Count ----> 0
  D-chan Tx Frame Count ----> 43
  D-chan Tx Frames Queued --> 0
  D-chan Tx Errors -----> 0
  D-chan Rx Frame Count ----> 0
  D-chan Rx Errors -----> 0
```

c. **show fdlintervals** <n>

```
00:01:21.350 SPAN: CLI Request --> dump local FDL 15-min interval history
0 Complete intervals stored.
Data in current interval (78 seconds elapsed):
  1 Line Code Violations, 0 Path Code Violations, 0 Received E-bits
  0 Slip Secs, 3 Fr Loss Secs, 1 Line Err Secs
  3 Errored Secs, 0 Bursty Err Secs, 3 Severely Err Secs, 0 Unavail Secs
24-Hr Totals:
  0 Line Code Violations, 0 Path Code Violations, 0 Received E-bits
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
```

d. **show dtefd1** <n>

The above command can provide far-end statistics by using FDL, and hence is only useful for T1 if the FDL is functional and requests are being serviced by the CO.

Related Information

- [Voice Technology Support](#)
- [Voice and Unified Communications Product Support](#)
- [Recommended Reading: Troubleshooting Cisco IP Telephony](#)
- [Technical Support – Cisco Systems](#)

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