



# Cisco 6608 Gateway - PBX Interoperability: NEC 2400 ICS Release J 5.8 PBX with CallManager Using E1 QSIG as MGCP Gateway

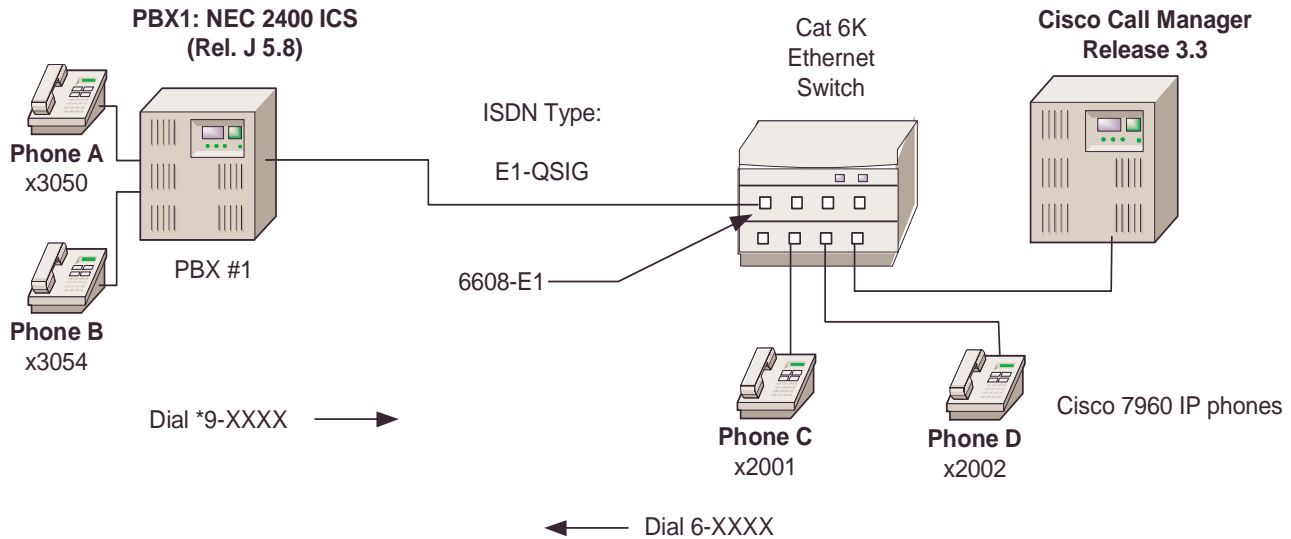
## Introduction

- This note describes the connectivity of the NEC 2400 ICS Release J 5.8 PBX, Cisco CallManager, and Cisco 6608 gateway.
- Connectivity is achieved by using the PRI ISO QSIG E1 protocol type on the gateway configured as Network side and ETSI QSIG switch type on the NEC 2400 PBX configured as User side.
- The network topology diagram shows the end-to-end interoperability.
- Features supported are as follows:
  - Calling Name Identification Presentation
  - Calling Number Identification Presentation
  - Calling Number Identification Restriction
  - Connected Name Identification Presentation
  - Connected Number Identification Presentation
  - Honor Calling/Connected Name Identification Restriction
  - Honor Calling/Connected Number Identification Restriction



Network Topology  
Figure 1. Network Topology

### Basic Call Setup End-to-End Configuration



#### Limitations

- Calling and connected name did not display on either side because the NEC 2400 PBX is using the ETSI standard and Cisco CallManager is using the ISO standard.
- Connected number is not displayed on the Cisco 7960 IP phone since the NEC 2400 PBX sends the connected number with presentation of "Restricted."
- When calling from the Cisco 7960 IP phone to the NEC digital phone, the connected number is not displayed on the IP phone after the call is answered. It was verified using an ISDN protocol analyzer that the NEC 2400 PBX was sending the connected number information with presentation of "Restricted." This is an NEC QSIG protocol issue.
- When calling from the NEC digital phone to the Cisco 7960 IP phone, both sides display the number after the call is answered.
- Though the NEC 2400 PBX can be configured as either "network side" (master) or "user side" (slave), configuration as "network side" is not recommended. The NEC TAC center will not resolve a case presented with the NEC PBX configured as "network side".
- CallManager features that are not supported are as follows:
  - Sending Alerting Name Identification
  - Sending Busy Name Identification
  - Sending Calling/Connected Name Identification Restriction
  - Sending Connected Number Identification Restriction
  - Updating Connected Name and Number for Call Transfers
  - Updating Connected Name and Number for Call Forwarding



## System Components

### Hardware Requirements

- Cisco Catalyst 6000 switch with 6608-E1 gateway
- NEC 2400 ICS PBX, PA-30PRTB

### Software Requirements

- PBX Software Release J 5.8
- Cisco CallManager Release 3.3

## Configuration

### Configuring the NEC 2400 ICS PBX

The NEC PBX requires a substantial amount of programming and circuit card switch settings to properly install E1 QSIG. It is beyond the scope of this document to provide the entire configuration; therefore the NEC PBX information that follows is mostly helpful for NEC technicians. It is strongly recommended that you have a NEC ISDN certified technician set up the NEC portion. Refer to the NEC 2400 PBX documentation for complete configuration information.

Step 1. Install circuit card (PA-30PRTB) and set the switches.

Switch	Position	Description	Setting
SW00		Make Busy	Down
SW01	0	All Channel Make Busy	Off
	1	External Loop Back	Off
	2	Internal Loop Back	Off
	3	Dch Handler Make Busy	Off
SW02 (SENSE - Rotary)		1 = AT&T 2 = Australia 3 = NTT Japan 4 = NEC/ETSI 5 = AT&T 6 = INS A = Q.SIG	A
SW10	Jumper	Off = Coax On = Twisted Pair	On
SW11	Jumper	Off = Coax On = Twisted Pair	On
SW12	Jumper	Off = Coax On = Twisted Pair	On
SW13	1	On = PAD ROM Special Version Off = PAD ROM Standard Version	Off
	2	On = ISDN BUS Not Used Off = ISDN BUS Used	On
	3	Not Used	Off



Switch	Position	Description	Setting
	4	Not Used	Off
SW14	1	On = CCITT Signaling Off = CEPT Signaling	On
	2	On = Alarm Release: 2sec (Aus) Off = Alarm Release 15 Sec.	On
	3	PAD	On
	4	PAD	On
	5	PAD	On
	6	PAD	On
	7	PAD	On
	8	Fixed Off	Off
SW15	1	Loopback Pattern Off = Loopback inhibited	Off
	2	Loopback Pattern Off = Loopback inhibited	Off
	3	Loopback Pattern Off = Loopback inhibited	Off
	4	Loopback Pattern Off = Loopback inhibited	Off
	5	TS16 Control: On = Data Through (CCIS/ISDN) Off = Signaling	On
	6	On = No CRC4 Off = CRC4	Off
	7	Firmware (CCITT/China/Thailand/Aux)	On
	8	Firmware (CCITT/China/Thailand/Aux)	On
SW16	1	Fixed Off	Off
	2	Fixed Off	Off
	3	All "1" Supervision On = To be controlled Off = Not to be controlled	Off
	4	On = Dch User Side Off = Dch Network Side	On
	5	On = Dch NegativeLogic Off = Dch Positive Logic	Off
	6	On = Dch Packet Service On Off = Dch Packet Service Off	Off
	7	Fixed Off	Off



Switch	Position	Description	Setting
	8	Fixed Off	Off

Step 2. Configure the route (ARTD). The following are the route settings found in ARTD. Route 19 is the B channel and route 20 is the D channel. Setting the NEC PBX to emulate the network side is not supported by NEC. However, you can have limited success emulating network side. CDN 64 must remain set to 0 or the calling number is not be passed.

```
[LRTD]                CISCO TEST FACILITY      02/05/10      PAGE: 7

*  ROUTE CLASS DATA LIST  *

CDN FUNCTION      ----- R O U T E      N U M B E R      -----
                  16          17          18          19          20
1  OSGS           4            0            0            0            0
2  ONSG           3            2            2            2            2
3  ISGS           4            0            0            0            0
4  INSG           3            2            2            2            2
5  TF             3            3            3            3            3

6  TCL            4            4            4            4            4
7  L/T            1            1            1            1            1
8  RLP            2            2            2            2            2
9  TQ             0            1            0            0            0
10 SMDR           0            1            1            0            0

11 TD             0            0            0            0            0
12 DR             1            0            0            0            0
13 AC             1            1            0            1            0
14 TNT            0            0            0            0            0
15 LSG           5            12           13           12           13

16 SMDR2         0            0            0            0            0
17 H/M           0            0            0            0            0
18 MC            0            0            0            0            0
19 ANI           0            0            0            0            0
20 D             0            0            0            0            0

21 MSB           0            0            0            0            0
22 MSW           0            0            0            0            0
23 TR            0            0            0            0            0
24 OC            0            0            0            0            0
25 R/L           0            0            0            0            0

26 RVSD          0            0            0            0            0
27 TL            0            0            0            0            0
28 ANS           0            1            0            1            0
29 TELP          0            0            0            0            0
30 PAD           0            7            7            7            7

31 OGRL          0            1            1            1            1
32 ICRL          0            1            1            1            1
33 HD            0            0            0            0            0
34 GUARD         0            1            1            1            1
35 WINK          0            0            0            0            0

36 VAD           0            0            0            0            0
37 CLD           0            0            0            0            0
38 FA            0            0            0            0            0
```

```
[LRTD]                CISCO TEST FACILITY      02/05/10      PAGE: 8

*  ROUTE CLASS DATA LIST  *

CDN FUNCTION      ----- R O U T E      N U M B E R      -----
                  16          17          18          19          20
```



39	BC	0	0	0	0	0
40	TCM	0	0	0	0	0
41	TDMQ	0	0	0	0	0
42	TRSC	0	0	0	0	0
43	BT	0	1	1	1	1
44	PRV	0	0	0	0	0
45	A/D	0	1	1	1	1
46	CW	0	0	0	0	0
47	TPQ	0	0	0	0	0
48	BL	0	0	0	0	0
49	TRKS	0	1	1	1	0
50	DPLY	0	1	1	1	0
51	ACD	0	0	0	0	0
52	2W/4W	0	0	0	0	0
53	FAAT	0	0	0	0	0
54	GW	0	0	0	0	0
55	TCMA	0	0	0	0	0
56	SMDR3	0	0	0	0	0
57	HDT	0	0	0	0	0
58	CD	0	0	0	0	0
59	CCH	0	0	0	0	0
60	TC/EC	0	0	0	0	0
61	IRE	0	0	0	0	0
62	SCR	0	0	0	0	0
63	LYER1	0	1	1	1	1
64	NET	0	0	0	0	0
65	INT	0	10	10	10	10
66	DC	0	4	4	4	4
67	HKS	0	0	0	0	0
68	SCF	0	0	0	0	0
69	SMDR4	0	0	0	0	0



## Configuring Cisco CallManager

Step 1. Configure the 6608-E1 gateway. Use the following screens as a reference.

The screenshot displays the Cisco CallManager 3.3 Administration interface for Gateway Configuration. The browser window title is "Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer". The address bar shows the URL: `dmin/gatewayconfig.asp?pkid={CB557D64-12B9-451A-979A-E4D32198D86A}&Status=US&Action=Update&Type=2&MGCP=`. The page header includes the Cisco CallManager logo and the Cisco Systems logo. The main heading is "Gateway Configuration" with a link to "Back to Find/List Gateways".

**Product : Cisco Catalyst 6000 E1 VoIP Gateway**  
**Gateway : SO/DS1-0@SDA000164122280**  
**Device Protocol: Digital Access PRI**  
**Registration: Registered with Cisco CallManager 10.10.10.1**  
**IP Address: 10.10.10.104**

Status: Update completed.

**Device Information**

MAC Address*	<input type="text" value="000164122280"/>
Description	<input type="text" value="SDA000164122280"/>
Device Pool*	<input type="text" value="Default"/>
Network Locale*	<input type="text" value="United States"/>
Media Resource Group List	<input type="text" value="&lt; None &gt;"/>
Location	<input type="text" value="&lt; None &gt;"/>
AAR Group	<input type="text" value="&lt; None &gt;"/>
Load Information	<input type="text"/>

**Interface Information**

PRI Protocol Type*	<input type="text" value="PRI ISO QSIG E1"/>
Protocol Side*	<input type="text" value="Network"/>
Channel Selection Order*	<input type="text" value="Top Down"/>
Channel IE Type*	<input type="text" value="Timeslot Number"/>

Reset succeeded. Local intranet



Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address <http://ferengi/CCMAdmin/gatewayconfig.asp?pkid={CB557D64-12B9-451A-979A-E4D32198D86A}&type=2> Go Links

PCM Type\* A-law

Delay for first restart (1/8 sec ticks) 32

Delay between restarts (1/8 sec ticks) 4

Inhibit restarts at PRI initialization

Enable status poll

**Call Routing Information**

**Inbound Calls**

Significant Digits\* 23

Calling Search Space < None >

AAR Calling Search Space < None >

Prefix DN

**Outbound Calls**

Calling Party Presentation\* Allowed

Calling Party Selection\* Originator

Called party IE number type unknown\* Cisco CallManager

Calling party IE number type unknown\* Cisco CallManager

Called Numbering Plan\* Private

Calling Numbering Plan\* Cisco CallManager

Number of digits to strip\* 0

Caller ID DN

**PRI Protocol Type Specific Information**

Display IE Delivery

Redirecting Number IE Delivery - Outbound

Done Local intranet





Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address <http://ferengi/CCMAdmin/gatewayconfig.asp?pkid={CB557D64-12B9-451A-979A-E4D32198D86A}&type=2> Go Links

Redirecting Number IE Delivery - Inbound

Send Extra Leading Character In DisplayIE\*\*\*

Setup non-ISDN Progress Indicator IE Enable\*\*\*\*

MCDN Channel Number Extension Bit Set to Zero\*\*

Interface Identifier Present\*\*

Interface Identifier Value\*\*

**Product Specific Configuration**

Clock Reference*	<input type="text" value="Network"/>
Framing*	<input type="text" value="CRC4"/>
Audio Signal Adjustment into IP Network*	<input type="text" value="NoDbPadding"/>
Audio Signal Adjustment from IP Network*	<input type="text" value="NoDbPadding"/>
Zero Suppression*	<input type="text" value="HDB3"/>
Digit On Duration(50-500ms)*	<input type="text" value="100"/>
Interdigit Duration(50-500msec)*	<input type="text" value="100"/>
Adaptive Gain Control Enable*	<input checked="" type="checkbox"/>
SNMP Community String	<input type="text" value="public"/>
Debug Port Enable*	<input checked="" type="checkbox"/>
Hold Tone Silence Duration*	<input type="text" value="0"/>
Port Used for Voice Calls*	<input checked="" type="checkbox"/>
Port Used for Modem Calls*	<input checked="" type="checkbox"/>
Port Used for Fax Calls*	<input checked="" type="checkbox"/>

**Fax and Modem Parameters**

Done Local intranet



Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address <http://ferengi/CCMAdmin/gatewayconfig.asp?pkid={CB557D64-12B9-451A-979A-E4D32198D86A}&type=2> Go Links

### Fax and Modem Parameters

Fax Relay Enable*	<input checked="" type="checkbox"/>
Fax Error Correction Mode Override*	<input checked="" type="checkbox"/>
Maximum Fax Rate*	14400bps
Fax Payload Size*	20
Non Standard Facilities Country Code*	65535
Non Standard Facilities Vendor Code*	65535
Fax/Modem Packet Redundancy*	<input type="checkbox"/>
V.21 Flag Sequence Detection Count*	4
NSE Type*	Non-IOS Gateways

### Playout Delay Parameters

Initial Playout Delay*	40
Minimum Playout Delay*	20
Maximum Playout Delay*	150

\* indicates required item  
\*\* applicable to DMS-100 protocol only  
\*\*\* applicable to DMS-100 protocol and DMS-250 protocol only  
\*\*\*\* may be required to force ringback from some PBXs

[Back to Find/List Gateways](#)

Local intranet



Step 2. Configure the enbloc route pattern. Use the following screen as a reference.

Cisco CallManager 3.3 Administration - Route Pattern Configuration - Microsoft Internet Explorer

Address: http://ferengi/CCMAdmin/routepatternconfig.asp?pkid={AB9DD1D1-A861-44F8-A286-72E0CA4426A1}

### Route Pattern: 6.XXXX

Status: Ready  
Note: Any update to this route pattern automatically resets the associated gateway/route list

Copy Update Delete

#### Pattern Definition

Route Pattern*	6.XXXX
Partition	< None >
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Gateway/Route List*	S0/DS1-0@SDA000164122280 (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern
<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Urgent Priority

#### Calling Party Transformations

Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Calling Party Presentation	Default

#### Called Party Transformations

Discard Digits	PreDot
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	

#### ISDN Network-Specific Facilities Information Element

Carrier Identification Code		
Network Service Protocol	— Not Selected —	
Network Service	Service Parameter Name	Service Parameter Value
— Not Selected —	< Not Exist >	

Done Local intranet



## Configuring the Catalyst 6000 Switch

- Verify the software version with the **show version** command from the console. The following is sample output.

```

Console> (enable) sh version

WS-C6506 Software, Version NmpSW: 6.1(4)
Copyright (c) 1995-2001 by Cisco Systems
NMP S/W compiled on May 15 2001, 12:27:20

System Bootstrap Version: 5.3(1)

Hardware Version: 2.0 Model: WS-C6506 Serial #: TBA04110341

Mod Port Model Serial # Versions
-----
1 2 WS-X6K-SUP1A-2GE SADO41504XL Hw : 3.1
Fw : 5.3(1)
Fw1: 5.1(1)CSX
Sw : 6.1(4)
Sw1: 6.1(4)
3 48 WS-F6K-PFC SADO413097K Hw : 1.1
WS-X6248-RJ-45 SADO4150CK1 Hw : 1.2
Fw : 5.1(1)CSX
Sw : 6.1(4)
4 24 WS-X6624-FXS SADO50203M8 Hw : 3.0
Fw : 5.4(2)
Sw : 6.1(4)
HP : A00203030009; DSP : A003D033 (3.6.
33)
5 8 WS-X6608-E1 SADO43300AJ Hw : 1.1
Fw : 5.4(2)
Sw : 6.1(4)
HP1: D00403030009; DSP1: D005D033 (3.6.
33)
HP2: D00403030009; DSP2: D005D033 (3.6.
33)
HP3: D00403030009; DSP3: D005D033 (3.6.
33)
HP4: D00403030009; DSP4: D005D033 (3.6.
33)
HP5: C00103010007; DSP5: C002E031 (3.3.
2)
HP6: C00103010007; DSP6: C002E031 (3.3.
2)
HP7: C00103010007; DSP7: C002E031 (3.3.
2)
HP8: C00103010007; DSP8: C002E031 (3.3.
2)

Module DRAM FLASH NVRAM
Total Used Free Total Used Free Total Used Free
-----
1 65408K 43764K 21644K 16384K 5327K 11057K 512K 245K 267K

Uptime is 229 days, 22 hours, 39 minutes
Console> (enable)

```

- Verify the modules with the **show module** command from the console. The following is sample output.

```

Console> (enable) sh module

Mod Slot Ports Module-Type Model Sub Status
-----
1 1 2 1000BaseX Supervisor WS-X6K-SUP1A-2GE yes ok
3 3 48 10/100BaseTX Ethernet WS-X6248-RJ-45 no ok
4 4 24 FXS WS-X6624-FXS no ok
5 5 8 E1 WS-X6608-E1 no ok
6 6 8 T1 WS-X6608-T1 no ok

```



```

Mod Module-Name          Serial-Num
-----
1                        SAD041504XL
3                        SAD04150CK1
4                        SAD050203M8
5                        SAD043300AJ
6                        SAD04400EM0

Mod MAC-Address(es)      Hw      Fw      Sw
-----
1  00-d0-d3-37-f9-8e to 00-d0-d3-37-f9-8f 3.1    5.3(1)  6.1(4)
   00-d0-d3-37-f9-8c to 00-d0-d3-37-f9-8d
   00-01-63-af-5c-00 to 00-01-63-af-5f-ff
3  00-01-97-4a-10-30 to 00-01-97-4a-10-5f 1.2    5.1(1)CSX 6.1(4)
4  00-03-32-ba-2e-35          3.0    5.4(2)  6.1(4)
5  00-01-64-12-22-80 to 00-01-64-12-22-87 1.1    5.4(2)  6.1(4)
6  00-01-c9-d9-3a-98 to 00-01-c9-d9-3a-9f 1.1    5.4(2)  6.1(4)

Mod Sub-Type              Sub-Model          Sub-Serial  Sub-Hw
-----
1  L3 Switching Engine    WS-F6K-PFC        SAD0413097K 1.1
Console> (enable)

```

- Verify the ports with the **show port** command from the console. The following is sample output.

```

Console> (enable) sh port 5/1

Port Name                Status      Vlan      Duplex Speed Type
-----
5/1                      connected  1         full  2.048 E1

Port  DHCP      MAC-Address      IP-Address      Subnet-Mask
-----
5/1   enable  00-01-64-12-22-80 10.10.10.104    255.255.255.0

Port  Call-Manager(s)  DHCP-Server      TFTP-Server      Gateway
-----
5/1   10.10.10.1       10.10.10.1       10.10.10.1       10.10.10.125

Port  DNS-Server(s)    Domain
-----
5/1   -                -

Port  CallManagerState DSP-Type
-----
5/1   registered       C549

Port  NoiseRegen NonLinearProcessing
-----
5/1   enabled          enabled

Port  Trap      IfIndex
-----
5/1   disabled  66
Console> (enable)

```



## Important Information

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