

Cisco 6608 Gateway - PBX Interoperability: NEC 2400 ICS Rel. J 5.8 PBX with CallManager using E1 PRI EURO to an MGCP Gateway

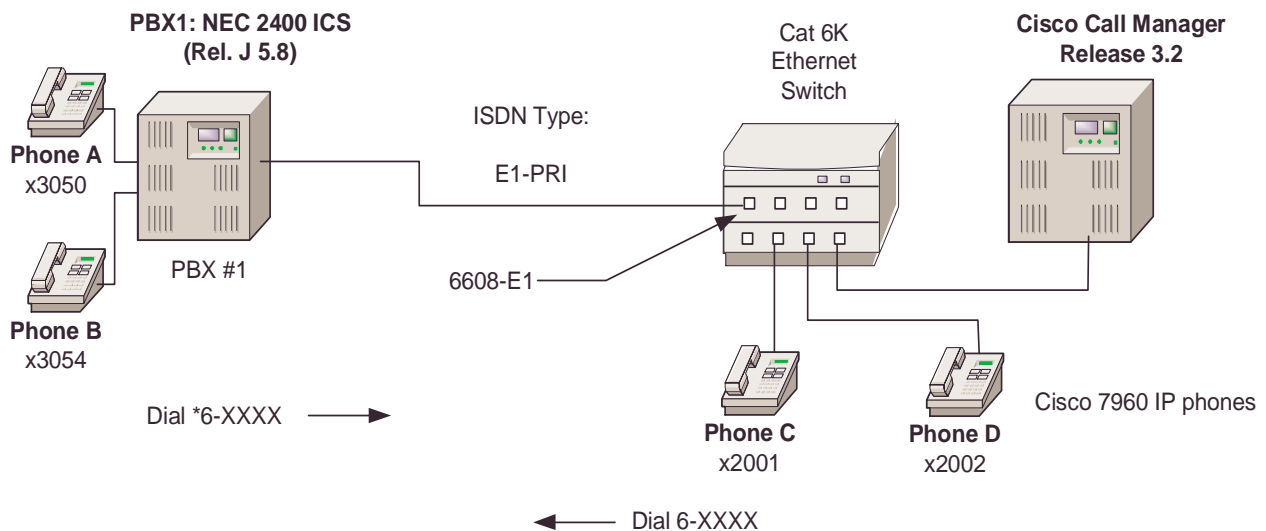
Introduction

- This note describes the interoperability of the NEC 2400 ICS Release J 5.8 PBX, Cisco CallManager, and Cisco 6608 Catalyst switch in an MGCP gateway. The signaling protocol is E1 PRI.
- The network topology diagram shows the end-to-end interoperability.
- Connectivity is achieved by using the PRI EURO protocol on the gateway and NEC/ETSI switch type on the NEC 2400 PBX.

Network Topology

Figure 1. Network Topology

Basic Call Setup End-to-End Configuration



Limitations

- Though the NEC 2400 PBX can be configured as either “network side” (master) or “user side” (slave), this is not recommended and the NEC TAC center will not resolve a case presented with the NEC PBX configured as “network side.”
- Calling name delivery and presentation features are not supported by the NEC 2400 PBX.
- Cisco CallManager does not send “Connected Number” information in the CONNECT message back to PBX.



- When calling from a Cisco 7960 IP phone to a NEC digital phone, both phones display the calling number after the call is answered as expected. When calling from a NEC digital phone to a Cisco 7960 IP phone, the Cisco IP phone displays the connected number after the call is answered. The NEC phone, however, does not get updated when the call is answered. It displays the numbers being dialed instead (that is, access code + extension number). It was verified using an ISDN protocol analyzer that the Cisco CallManager was not sending “Connected Number” information in the CONNECT message back to PBX.

System Components

Hardware Requirements

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

Software Requirements

- PBX Software Release J 5.8.
- Cisco CallManager Release 3.2

Configuration

Configuring the NEC 2400 ICS Rel. J5.8 PBX

The NEC requires a substantial amount of programming and circuit card switch settings to properly install E1 PR. It is beyond the scope of this document to provide the entire configuration; therefore the NEC information below is mostly helpful for NEC techs. It is highly recommended to have a NEC ISDN certified technician setup the NEC portion. Refer to the NEC 2400 PBX documentation for complete configuration information.

Step 1. Install the 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	4
SW10	Jumper	Off = Coax On = Twisted Pair	On
SW11	Jumper	Off = Coax On = Twisted Pair	On
SW12	Jumper	Off = Coax On = Twisted Pair	On



Switch	Position	Description	Setting
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
	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



Switch	Position	Description	Setting
	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
	8	Fixed Off	Off

Step 2. Configure the route (ARTD). Below are the route settings found in ARTD. Route 12 is the B channel and route 13 is the D channel.

```

[LRTD]                CISCO TEST FACILITY        02/05/10        PAGE: 5

*  ROUTE CLASS DATA LIST  *

----- R O U T E      N U M B E R -----
CDN FUNCTION    11      12      13      14      15

  1  OSGS        7        0        0        0        0
  2  ONSG        3        2        0        2        2
  3  ISGS        7        0        0        0        0
  4  INSG        3        2        0        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        0        2        0
  9  TQ          0        0        0        0        0
 10  SMDR        0        1        1        1        1

 11  TD          0        0        0        0        0
 12  DR          0        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        1        1        1        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        1        1        1
 29  TELP        0        0        0        0        0
 30  PAD         0        4        7        4        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: 6

* ROUTE CLASS DATA LIST *

CDN FUNCTION	R O U T E N U M B E R				
	11	12	13	14	15
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	0	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	0	0
50 DPLY	0	1	1	1	1
51 ACD	0	0	0	0	0
52 2W/4W	1	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	1	0	0	0
65 INT	0	4	4	4	4
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 Cisco 6608-E1 gateway. Use the following screens as a reference.

The screenshot shows the Cisco CallManager Administration web interface in Microsoft Internet Explorer. The browser title is "Cisco CallManager 3.2 Administration - Gateway Configuration - Microsoft Internet Explorer". The address bar shows "http://klingon/CCMAdmin/gate". The page has a navigation menu with "System", "Route Plan", "Service", "Feature", "Device", "User", "Application", and "Help". The main content area is titled "Gateway Configuration" and includes a "Back to Find/List Gateways" link. The configuration details for a Cisco Catalyst 6000 E1 VoIP Gateway are displayed, including its MAC address, description, device pool, and various audio source settings. At the bottom, there are buttons for "Update", "Delete", "Reset Gateway", and "Cancel Changes".

Product : Cisco Catalyst 6000 E1 VoIP Gateway
Gateway : S0/DS1-0@SDA0001C9D8633E
Device Protocol: Digital Access PRI
Registration: Registered with Cisco CallManager 10.1.1.2
IP Address: [10.1.1.104](#)

Status: Ready

MAC Address*	<input type="text" value="0001C9D8633E"/>
Description	<input type="text"/>
Device Pool*	<input type="text" value="Default"/>
Media Resource Group List	<input type="text" value="< None >"/>
Network Hold Audio Source	<input type="text" value="< None >"/>
User Hold Audio Source	<input type="text" value="< None >"/>
Calling Search Space	<input type="text" value="< None >"/>
Location	<input type="text" value="< None >"/>
Load Information	<input type="text"/>
Channel Selection Order*	<input type="text" value="Top Down"/>
PCM Type*	<input type="text" value="A-law"/>
Protocol Side*	<input type="text" value="Network"/>
Caller ID DN	<input type="text"/>
Calling Party Selection*	<input type="text" value="Originator"/>



Cisco CallManager 3.2 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print Address <http://klingon/CCMAdmin/gate> Go Links

Channel IE Type*	Use Number when 1B
MCDN Channel Number Extension Bit Set to Zero**	<input type="checkbox"/>
Interface Identifier Present**	<input type="checkbox"/>
Interface Identifier Value**	0
Display IE Delivery	<input checked="" type="checkbox"/>
Redirecting Number IE Delivery - Outbound	<input checked="" type="checkbox"/>
Redirecting Number IE Delivery - Inbound	<input type="checkbox"/>
Delay for first restart (1/8 sec ticks)	32
Delay between restarts (1/8 sec ticks)	4
Num Digits*	23
Sig Digits	<input checked="" type="checkbox"/>
Prefix DN	
Presentation Bit*	Allowed
Called party IE number type unknown*	Cisco CallManager
Calling party IE number type unknown*	Cisco CallManager
Called Numbering Plan*	Cisco CallManager
Calling Numbering Plan*	Cisco CallManager
PRI Protocol Type*	PRI EURO
Inhibit restarts at PRI initialization	<input checked="" type="checkbox"/>
Enable status poll	<input type="checkbox"/>
Number of digits to strip*	0
Network Locale	United States
Setup non-ISDN Progress Indicator IE Enable****	<input type="checkbox"/>

Local intranet



Cisco CallManager 3.2 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print Address http://kingon/CCMAdmin/gate Go Links

Product Specific Configuration i

Clock Reference*	Network
Framing*	CRC4
Audio Signal Adjustment into IP Network*	NoDbPadding
Audio Signal Adjustment from IP Network*	NoDbPadding
Zero Suppression*	HDB3
Digit On Duration(50-500ms)*	100
Interdigit Duration(50-500msec)*	100
Adaptive Gain Control Enable*	<input type="checkbox"/>
SNMP Community String	public

Fax Parameters

Fax Relay Enable*	<input checked="" type="checkbox"/>
Fax Error Correction Mode Override*	<input checked="" type="checkbox"/>

* 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 route pattern. Use the following screen as a reference.

Cisco CallManager 3.2 Administration - Route Pattern Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Address 6-482E-82A5-26FFF0723031 Go Links

System Route Plan Service Feature Device User Application Help

Cisco CallManager Administration
For Cisco IP Telephony Solutions

Route Pattern Configuration

[Add a New Route Pattern](#)
[Back to Find/List Route Patterns](#)

Route Pattern: 6.XXXX

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

Copy Update Delete Cancel Changes

Pattern Definition

Route Pattern* 6.XXXX

Partition < None >

Numbering Plan* North American Numbering Plk

Route Filter < None >

Gateway/Route List* S0/DS1-0@SDA0001C9D8633E (Edit)

Route Option
 Route this pattern Block this pattern

Provide Outside Dial Tone Urgent Priority

Calling Party Transformations

Use Calling Party's External Phone Number Mask

Calling Party Transform Mask

Prefix Digits (Outgoing Calls)

Called Party Transformations

Discard Digits PreDot

Called Party Transform Mask

Prefix Digits (Outgoing Calls)

* indicates required item.

Done Local intranet



Configuring the Catalyst 6000 Switch

- Verify the software version using the **show version** command. The following is sample output.

```

Console> (enable) sh version

WS-C6006 Software, Version NmpSW: 5.5(6a)
Copyright (c) 1995-2001 by Cisco Systems
NMP S/W compiled on Feb 23 2001, 10:23:18

System Bootstrap Version: 5.3(1)

Hardware Version: 2.0 Model: WS-C6006 Serial #: TBA04511172

Mod Port Model Serial # Versions
-----
1 2 WS-X6K-SUP1A-2GE SAD05010NBK Hw : 7.0
Fw : 5.3(1)
Fw1: 5.4(2)
Sw : 5.5(6a)
Sw1: 5.5(6a)
3 48 WS-F6K-PFC SAD05020221 Hw : 1.1
WS-X6348-RJ-45 SAD04420N7B Hw : 1.4
Fw : 5.4(2)
Sw : 5.5(6a)
4 24 WS-F6K-VPWR SAD050203M8 Hw : 1.0
WS-X6624-FXS Hw : 3.0
Fw : 5.4(2)
Sw : 5.5(6a)
HP : A00203010038; DSP : A003Q031 (3.6.
15)
6 8 WS-X6608-E1 SAD04380DW1 Hw : 1.1
Fw : 5.4(2)
Sw : 5.5(6a)
HP1: D00403010044; DSP1: D005Q031 (3.6.
15)
HP2: D00403010044; DSP2: D005Q031 (3.6.
15)
HP3: D00403010044; DSP3: D005Q031 (3.6.
15)
HP4: D00403010044; DSP4: D005Q031 (3.6.
15)
HP5: D00403010044; DSP5: D005Q031 (3.6.
15)
HP6: D00403010044; DSP6: D005Q031 (3.6.
15)
HP7: D00403010044; DSP7: D005Q031 (3.6.
15)
HP8: D00403010044; DSP8: D005Q031 (3.6.
15)

DRAM FLASH NVRAM
Module Total Used Free Total Used Free Total Used Free
-----
1 65408K 37340K 28068K 16384K 11546K 4838K 512K 198K 314K

Uptime is 127 days, 7 hours, 31

```

- Verify modules using the **show module** command. 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-X6348-RJ-45 yes ok
4 4 24 FXS WS-X6624-FXS no ok
6 6 8 E1 WS-X6608-E1 no ok

```



```

Mod  Module-Name          Serial-Num
-----
1      SAD05010NBK
3      SAD04420N7B
4      SAD050203M8
6      SAD04380DW1

Mod  MAC-Address(es)      Hw      Fw      Sw
-----
1      00-04-c0-f8-42-02 to 00-04-c0-f8-42-03 7.0      5.3(1)   5.5(6a)
      00-04-c0-f8-42-00 to 00-04-c0-f8-42-01
      00-04-9b-f0-78-00 to 00-04-9b-f0-7b-ff
3      00-02-fc-20-5e-50 to 00-02-fc-20-5e-7f 1.4      5.4(2)   5.5(6a)
4      00-03-32-ba-2e-35      3.0      5.4(2)   5.5(6a)
6      00-01-c9-d8-63-3e to 00-01-c9-d8-63-45 1.1      5.4(2)   5.5(6a)

Mod  Sub-Type              Sub-Model          Sub-Serial  Sub-Hw
-----
1      L3 Switching Engine    WS-F6K-PFC        SAD05020221 1.1
3      Inline Power Module    WS-F6K-VPWR        1.0

```

- Verify the ports using the **show port** command. The following is sample output.

```

Console> (enable) sh port 6/1

Port  Name              Status      Vlan      Duplex  Speed  Type
-----
6/1              connected   1          full    2.048  E1

Port  DHCP      MAC-Address      IP-Address      Subnet-Mask
-----
6/1      enable    00-01-c9-d8-63-3e 10.1.1.104      255.255.255.0

Port  Call-Manager(s)  DHCP-Server      TFTP-Server      Gateway
-----
6/1      10.1.1.2        10.1.1.2         10.1.1.2         10.1.1.7

Port  DNS-Server(s)    Domain
-----
6/1      -                -

Port  CallManagerState  DSP-Type
-----
6/1      registered        C549

Port  NoiseRegen  NonLinearProcessing
-----
6/1      enabled      enabled
Console> (enable)

```

Important Information

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.



Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters

Cisco Systems International
BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters

Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the **Cisco Web site at www.cisco.com/go/offices.**

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

Copyright 2003 Cisco Systems, Inc. All rights reserved. Cisco, Cisco Systems, and the Cisco Systems logo are registered trademarks or trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and certain other countries. All other trademarks mentioned in this document or Web site are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0301R)