



Cisco Catalyst 6000 Series Gateway-PBX Interoperability: Alcatel 4400 with E1 PRI Signaling

This document describes the interoperability and configuration of a Cisco Catalyst 6000 series voice gateway with a Alactel 4400 PBX using E1 PRI signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Alcatel 4400
PBX Release	R3.2
Telephony Signaling	E1 PRI
Voice Gateway	Cisco Catalyst 6608
Gateway Release	5.5(6a)
Call Manager Release	3.1.1
VoX Protocol	MGCP

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Alcatel PBX Configuration
- Cisco Call Manager Configuration
- Cisco Catalyst 6608 Gateway Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

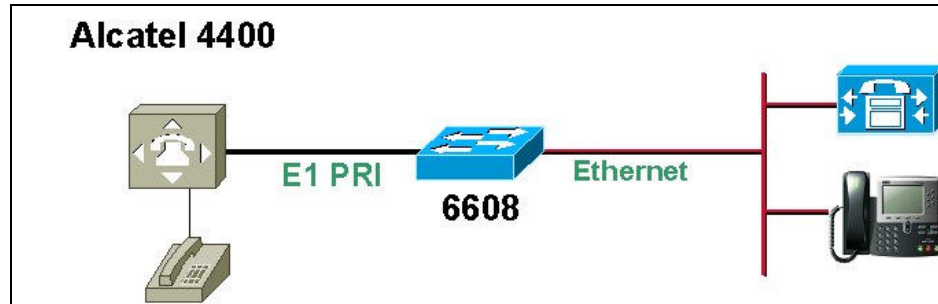


Figure 1 represents the configuration used for testing: an Alcatel 4400PBX connected to a Cisco Catalyst 6608 voice gateway via an E1 PRI connection.

Set Up Notes

- The Cisco 6608-E1 Gateway with ISDN protocol type setting of PRI-EURO supports both protocol sides by selecting “Network/User” in the protocol side field when configuring the Gateway via CallManager.
- The Alcatel 4400, supports both “USER” (slave) and “NETWORK” (master) protocol sides.
- The following options are of particular interest:
 - Trunk **interface type** must be set to **PRA2**.
 - Network/User options are set in the Board/Digital Access Options menu. **Network mode** must be set to **Yes** for (Master/Network) or **No** (Slave/User).
 - **Access Type** must be set to **T2**.
 - **Q931 signal variant** is used to determine Protocol type. This option was set to **ISDN all countries**.

Alcatel PBX Configuration

Alcatel PBX Version Information

- Software: Version R3.2
- Hardware: PRA2, 3BA23076.

Alcatel PBX Sample Configuration

Configure in the following sequence:

1. Configure Board

2. Configure Digital Access Options
3. Configure Trunk Group
4. Configure Trunk Detail

Configure Board

Interface type must be set to PRA2.

```
\compidea\Shelf::0\Board::3

Board Address                3
Interface Type               PRA2
Usage State                  Busy
Operational State           Enabled
Main/Standby State          Main (Master)
Number Of Sets Being Connect. 1
CRC4                         YES
Country Protocol Type       USA
Incidents Teleservice       YES
ISDN Board Layer 2 Parameters
  Retransmission Timer      100
  TEI Identity Check Timer  100
  Polling Timer              1000
  Nb_Of_Retransmission      3
  Max Frame Size (Bytes)    260
  Window Size In Frames SAPI S T0 1
  Window Size In Frames SAPI P T0 3
  Window Size In Frames SAPI S T2 7
  Window Size In Frames SAPI P T2 7
Passive board                NO
SS7 signalling               NO
```

Configure Digital Access Options

Network mode must be set to **Yes** for (Master/Network) or **No** - (Slave/User).
Access Type must be set to **T2**.

```
\compidea\Shelf::0\Board::3\Digital Access::0

T0/T2 Access No.           0
Access Type                T2
Synchronisation Priority    255
Network Mode                YES
Max Nb Of Used B Channels   30
Max_Nb_Of_Compressed_B_Channels 0
TieLine Mode                NO
With Alarm                   NO
Reserved1                    YES
Reserved2                    YES
Network Date Time Update    NO
CRC4                         YES
```

Configure Trunk Group

The **Q.931 signal variant** is used to set the protocol type to **ISDN all countries**.

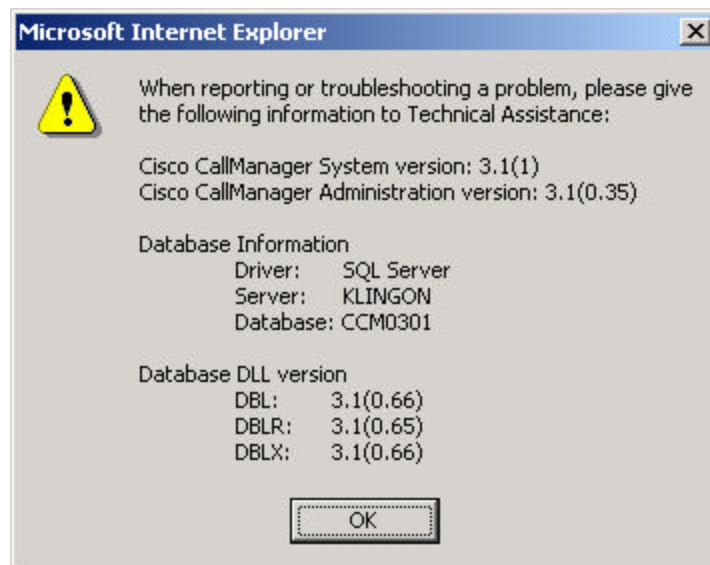
```
\compidea\Trunk Groups::0
      Trunk Group Id           0
      Trunk Group Type        T2
      Trunk Group Name        PRA2_EURO
      Node number             1
      Transcom Trunk Group     False
      Auto.reserv.by Attendant False
      Overflow trunk group No. -1
      Tone on seizure          True
      Private Trunk Group      False
      Q931 signal variant      ISDN all countries
      Number Compatible With   -1
      Number Of Digits To Send 4
      Channel selection type    Quantum
      Remote Network           15
      Shared Trunk Group       False
      auto.DTMF dialing on outgoing call NO
      T2 Specificity           None
      Public Network Category  0
      DDI transcoding          False
      Special Services         Nothing
      Can support UUS in SETUP  True
```

Configure Trunk Detail

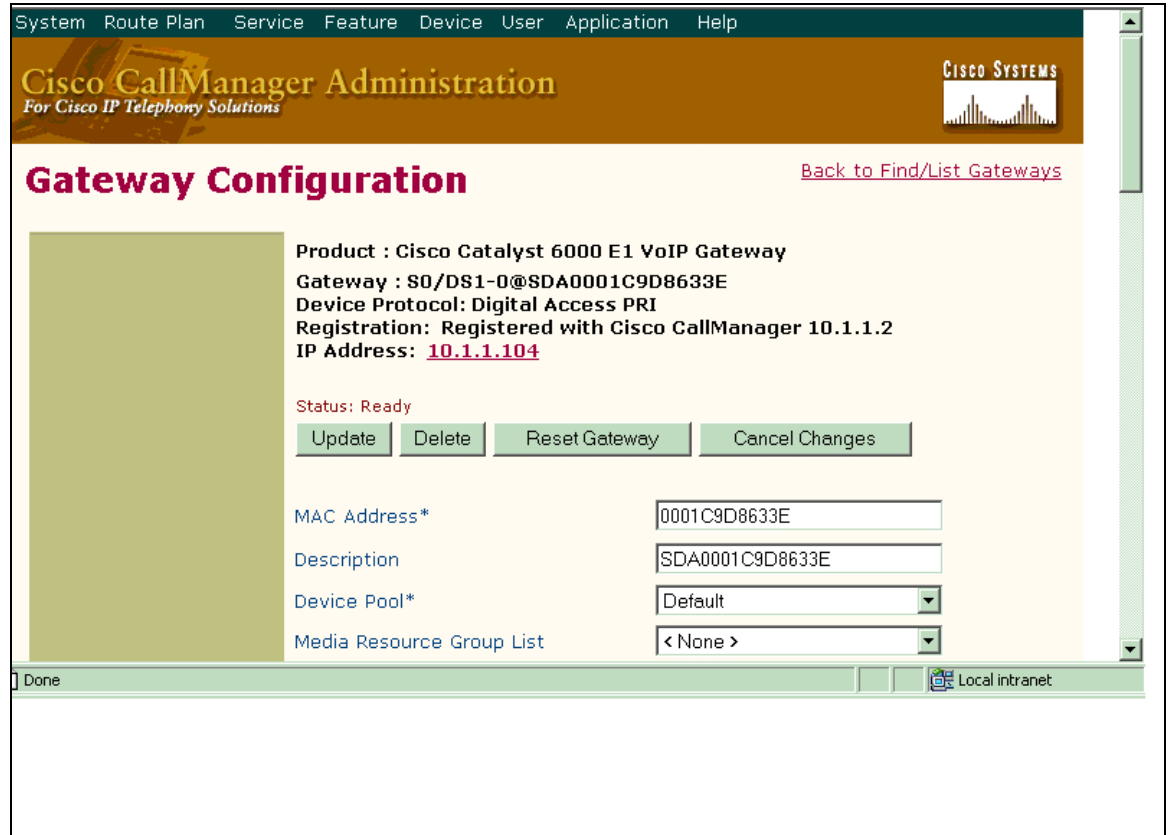
```
\compidea\Trunk Groups::0\Trunk Group::1
      Instance (reserved)     1
      Trunk Group Type        T2
      Public Network Ref.
      Dialling end to end     NO
      DTMF end to end signal. NO
      Trunk group used in DISA NO
      DISA Secret Code
      VG for non-existent No. YES
      Routing To Executive    NO
      Trunk Category Id       19
      Nb of digits unused (ISDN) 0
      B Channel Choice        YES
      Channels Reserved By Attend. 0
      Dissuasion For ACD      NO
      DTO joining             NO
      Enquiry Call On B Channel NO
      Automated Attendant     NO
      Calling party Rights category 0
      Entity Number           0
      TS Overflow             YES
      Number To Be Added
      Supervised by Routing    NO
      VPN Cost Limit for Incom.Calls 0
      Immediat Trk Listening For VPNCall YES
      VPN TS %                 50
      Csta Monitored          NO
      Max.% of trunks out CCD  0
      Charge Calling And ADN Creation NO
      Ratio analog.to ISDN tax
      LogicalChannel           1__15 & 17__31
      TS Distribution on Accesses YES
      Use Split Acces         NO
      Heterogeneous Remote Network NO
      Barring mode            Not barred
      ARS class of service     31
      Quality profile for voice on IP Profile #1
      IP compression type     Default
      Use of volume in system  YES
```

Call Manager Configuration

Call Manager Version Information



6608 Gateway Configuration



The screenshot shows the Cisco CallManager Administration web interface. At the top, there is a navigation menu with items: System, Route Plan, Service, Feature, Device, User, Application, and Help. Below the menu is a header banner with the Cisco CallManager Administration logo and the Cisco Systems logo. The main content area is titled "Gateway Configuration" and includes a link "Back to Find/List Gateways". The configuration details for a gateway are displayed:

- 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](#)

The status is "Ready". Below the status are four buttons: Update, Delete, Reset Gateway, and Cancel Changes. The configuration fields are as follows:

MAC Address*	<input type="text" value="0001C9D8633E"/>
Description	<input type="text" value="SDA0001C9D8633E"/>
Device Pool*	<input type="text" value="Default"/>
Media Resource Group List	<input type="text" value="< None >"/>

At the bottom of the page, there is a "Done" button and a "Local intranet" icon.

Network Hold Audio Source	< None >
User Hold Audio Source	< None >
Calling Search Space	< None >
Location	< None >
Load Information	
Channel Selection Order*	Top Down
PCM Type*	A-law
Protocol Side*	User
Caller ID DN	
Calling Party Selection*	Originator
Channel IE Type*	Use Number when 1B
Interface Identifier Present**	<input type="checkbox"/>
Interface Identifier Value**	0
Display IE Delivery	<input type="checkbox"/>
Redirecting Number IE Delivery	<input checked="" type="checkbox"/>
Delay for first restart (1/8 sec ticks)	32

Local intranet

Delay between restarts (1/8 sec ticks)	<input type="text" value="4"/>
Num Digits*	<input type="text" value="23"/>
Sig Digits	<input checked="" type="checkbox"/>
Prefix DN	<input type="text"/>
Presentation Bit*	<input type="text" value="Allowed"/>
Called party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Calling party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Called Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Calling Numbering Plan*	<input type="text" value="Cisco CallManager"/>
PRI Protocol Type*	<input type="text" value="PRI EURO"/>
Inhibit restarts at PRI initialization	<input checked="" type="checkbox"/>
Enable status poll	<input type="checkbox"/>
Number of digits to strip*	<input type="text" value="0"/>
Country Code*	<input type="text" value="North America"/>
Setup non-ISDN Progress Indicator IE Enable***	<input type="checkbox"/>

Local intranet

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"/>

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

[Back to Find/List Gateways](#)

Local intranet

Route Pattern Configuration

The screenshot shows the Cisco CallManager Administration web interface. At the top, there is a navigation menu with links for System, Route Plan, Service, Feature, Device, User, Application, and Help. The main header area contains the Cisco CallManager Administration logo and the Cisco Systems logo. The page title is "Route Pattern Configuration".

On the right side, there are two links: "Add a New Route Pattern" and "Back to Find/List Route Patterns".

The main content area displays the configuration for a route pattern named "6.XXXX". The status is "Ready". A note states: "Note: Any update to this route pattern automatically resets the associated gateway/route list". Below the note are four buttons: "Copy", "Update", "Delete", and "Cancel Changes".

The "Pattern Definition" section contains the following fields:

- 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

At the bottom right of the interface, there is a "Local intranet" icon.

Partition	< None >
Numbering Plan*	North American Numbering Plk
Route Filter	< None >
Gateway/Route List*	S0/DS1-0@SDA0001C9D8633E (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	
	<input type="checkbox"/> Use Calling Party's External Phone Number Mask
Calling Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>
Called Party Transformations	
Discard Digits	PreDot
Called Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>
* indicates required item.	

Cisco Catalyst 6608 Gateway Configuration

The following is the configuration of the Cisco Catalyst 6608 voice gateway connected to the Alcatel 4400 PBX E1 PRI interface.

Cisco Catalyst 6608 Voice Gateway Version Information

```

Console> 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)
    
```

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```

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     SAD050203M8 Hw : 3.0
                        Fw : 5.4(2)
                        Sw : 5.5(6a)
5  8   WS-X6608-T1      SAD04400EM0 HP : A00203010007; DSP : A003C031 (3.3.30)
                        Hw : 1.1
                        Fw : 5.4(2)
                        Sw : 5.5(6a)
                        HP1: D00403010013; DSP1: D005C031 (3.3.30)
                        HP2: D00403010013; DSP2: D005C031 (3.3.30)
                        HP3: D00403010013; DSP3: D005C031 (3.3.30)
                        HP4: D00403010013; DSP4: D005C031 (3.3.30)
                        HP5: D00403010013; DSP5: D005C031 (3.3.30)
                        HP6: D00403010013; DSP6: D005C031 (3.3.30)
                        HP7: D00403010013; DSP7: D005C031 (3.3.30)
                        HP8: D00403010013; DSP8: D005C031 (3.3.30)
6  8   WS-X6608-E1    SAD04380DW1 Hw : 1.1
                        Fw : 5.4(2)
                        Sw : 5.5(6a)
                        HP1: D00403010013; DSP1: D005C031 (3.3.30)
                        HP2: D00403010013; DSP2: D005C031 (3.3.30)
                        HP3: D00403010013; DSP3: D005C031 (3.3.30)
                        HP4: D00403010013; DSP4: D005C031 (3.3.30)
                        HP5: D00403010013; DSP5: D005C031 (3.3.30)
                        HP6: D00403010013; DSP6: D005C031 (3.3.30)
                        HP7: D00403010013; DSP7: D005C031 (3.3.30)
                        HP8: D00403010013; DSP8: D005C031 (3.3.30)

```

Module	DRAM			FLASH			NVRAM		
	Total	Used	Free	Total	Used	Free	Total	Used	Free
1	65408K	37541K	27867K	16384K	11546K	4838K	512K	198K	314K

Uptime is 27 days, 4 hours, 16 minutes
Console>

Cisco Catalyst 6608 Voice Gateway Sample Configuration

Console> **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
5	5	8	T1	WS-X6608-T1	no	ok
6	6	8	E1	WS-X6608-E1	no	ok

Mod	Module-Name	Serial-Num
1		SAD05010NBK
3		SAD04420N7B
4		SAD050203M8
5		SAD04400EM0
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)
5 00-01-c9-d9-3a-98 to 00-01-c9-d9-3a-9f 1.1 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
Console>

```

Console> sh port 6

```

Port Name          Status      Vlan      Duplex Speed Type
-----
6/1              connected  1          full  2.048 E1
6/2              notconnect 1          full  2.048 E1
6/3              notconnect 1          full  2.048 E1
6/4              notconnect 1          full  2.048 E1
6/5              notconnect 1          full  2.048 E1
6/6              notconnect 1          full  2.048 E1
6/7              notconnect 1          full  2.048 E1
6/8              notconnect 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
6/2   enable  00-01-c9-d8-63-3f 10.1.1.118      255.255.255.0
6/3   enable  00-01-c9-d8-63-40 10.1.1.123      255.255.255.0
6/4   enable  00-01-c9-d8-63-41 10.1.1.117      255.255.255.0
6/5   enable  00-01-c9-d8-63-42 10.1.1.120      255.255.255.0
6/6   enable  00-01-c9-d8-63-43 10.1.1.121      255.255.255.0
6/7   enable  00-01-c9-d8-63-44 10.1.1.122      255.255.255.0
6/8   enable  00-01-c9-d8-63-45 10.1.1.124      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
6/2   10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/3   10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/4   10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/5   10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/6   10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/7   10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
6/8   10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7

```

```

Port  DNS-Server(s)  Domain
-----
6/1   -              -
6/2   -              -
6/3   -              -
6/4   -              -
6/5   -              -
6/6   -              -
6/7   -              -
6/8   -              -

```

```

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

```

```
6/8      registered      C549

Port  NoiseRegen  NonLinearProcessing
-----
6/1   enabled    enabled
6/2   enabled    enabled
6/3   enabled    enabled
6/4   enabled    enabled
6/5   enabled    enabled
6/6   enabled    enabled
6/7   enabled    enabled
6/8   enabled    enabled
Console>
```

Caveats

- Calling Name delivery and presentation features are not supported by the Alcatel 4400 PBX.
- When configuring Cisco 6608 Gateway to emulate User side (Alcatel emulates Network side), make sure that the “Display IE Delivery” box is NOT checked, otherwise calls will not be completed. The Alcatel PBX complains about the Display information being sent in the “SETUP” message from Cisco CallManager by sending STATUS message with cause of “IE non-existent/unimplemented”.
- When calling from Cisco 7960 IP phone to Alcatel digital phone, Calling/Called Number is displayed on both phones after the call is answered. When calling from an Alcatel digital phone to a Cisco 7960 IP phone, the IP phone displays the Connected Number after the call is answered. The Alcatel phone however does NOT get updated when the call is answered. It displays the trunk name.