



Alcatel 4400 PBX with CallManager using 6608-E1 PRI EURO Gateway

This application note illustrates connectivity for Alcatel 4400 Release Cisco CallManager using Cisco 6608-E1 PRI EURO Gateway.

Integration Description

Connectivity is achieved using the ETSI standard PRI protocol. The Alcatel 4400 can be configured as either NETWORK or USER side.

Cisco Systems Equipment needed

Hardware (Gateway): 6608 E1 Port

Software: CallManager Release 3.1

PBX Hardware and Software Requirements

Hardware: PRA2, 3BA23076.

Software: Version R3.2

Features Supported

Key features supported:

- Calling/Called Number

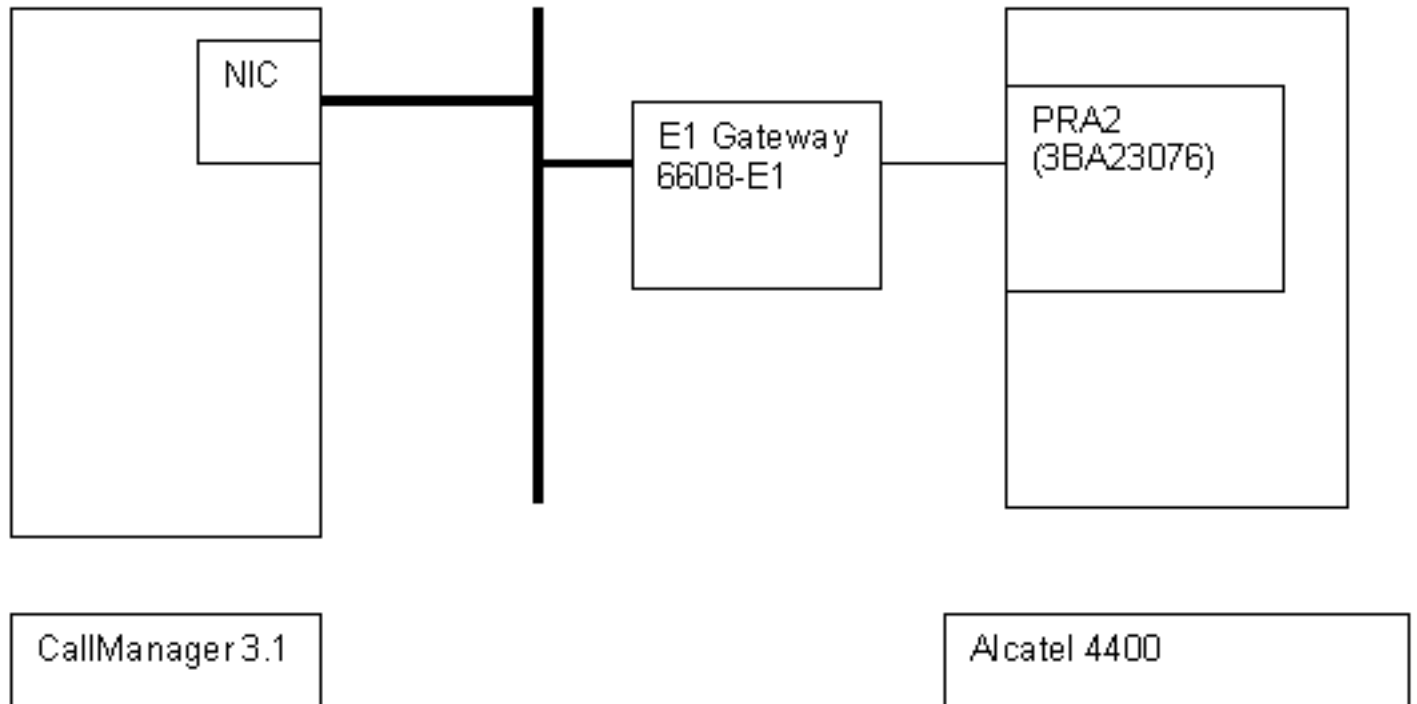
Key features not supported:

- Calling/Called Name



Network Diagram

Figure 1
Network Test Topology



Configuring the Alcatel 4400 PBX

Configure in the following sequence:

1. [“Configure Board” on page 3](#)
2. [“Configure Digital Access Options” on page 3](#)
3. [“Configure Trunk Group” on page 4](#)
4. [“Configure Trunk Detail” on page 5](#)



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

Q931 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



Configuring Cisco CallManager

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 text "Cisco CallManager Administration For Cisco IP Telephony Solutions" 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 as follows:

- 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 this, there are four buttons: Update, Delete, Reset Gateway, and Cancel Changes. At the bottom, there are four input fields:

- MAC Address*: 0001C9D8633E
- Description: SDA0001C9D8633E
- Device Pool*: Default
- Media Resource Group List: < None >

The bottom of the page shows 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*	Network
Framing*	CRC4
Audio Signal Adjustment into IP Network*	NoDbPadding
Audio Signal Adjustment from IP Network*	NoDbPadding
Zero Suppression*	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

System Route Plan Service Feature Device User Application Help

Cisco CallManager Administration
For Cisco IP Telephony Solutions

CISCO SYSTEMS

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

Pattern Definition

Route Pattern*	<input type="text" value="6.XXXX"/>
Partition	<input type="text" value="< None >"/>
Numbering Plan*	<input type="text" value="North American Numbering Plk"/>
Route Filter	<input type="text" value="< None >"/>
Gateway/Route List*	<input type="text" value="S0/DS1-0@SDA0001C9D8633E"/> (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern

Local intranet



Partition	< None >
Numbering Plan*	North American Numbering Plr
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.

Considerations

Calling Name and Number Feature

Calling Name delivery and presentation features are not supported by the Alcatel 4400 PBX.

When configuring Cisco 6608 Gateway to emulate User side (Alcatel emulate Network side), make sure that the "Display IE Delivery" box is NOT checked, otherwise calls will not be completed. Alcatel PBX complains about the Display information being sent in the "SETUP" message from CallManager by sending STATUS message with cause of "IE non-existent/unimplemented".

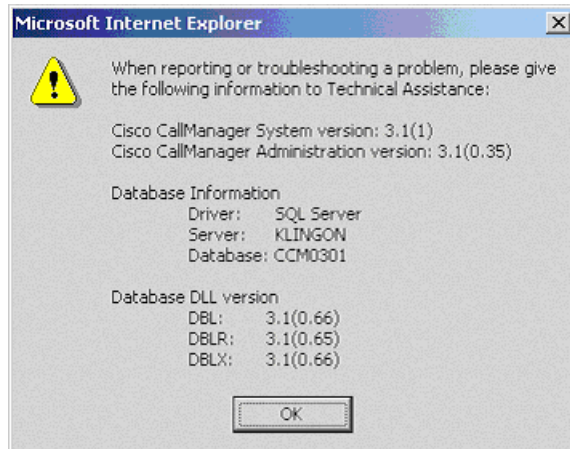
When calling from Cisco 7960 IP phone to Alcatel digital phone, Calling/Called Number is displayed on both phones after the call is answered as expected.

When calling from Alcatel digital phone to Cisco 7960 IP phone, IP phone displays Connected Number after the call is answered. Alcatel phone however does NOT get updated when the call is answered. It displays the trunk name. It was verified using ISDN protocol analyzer that the CallManager was not sending "Connected Number" information in the connect message back to PBX.



Appendix A

CallManager Software release:



Alcatel 4400 Software Version

Version Information

\compidea\Node

```
Node Number (reserved) 1
Software Version        R3.2
Version name            c1.712
Patch No.               5
Notes
Object Identity
Node Number (reserved) 1
Ethernet Notes
  Netmask
  Local CPU
    Name                x000000_tun
    IP Address          172.30.253.253
  Twin Cpu
    Name
    IP Address
  Main Cpu
    Name                xm000000
    IP Address          10.253.253.3
  StandBy Cpu
    Name
    IP Address
SL Notes
IP/X25 Tunnel Notes
  Netmask              255.255.0.0
  Local Node
    Name                x000000_tun
    IP Address          172.30.253.253
```

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Catalyst 6000 Switch Configuration

```

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)
3	48	WS-F6K-PFC WS-X6348-RJ-45	SAD05020221 SAD04420N7B	Hw : 1.1 Hw : 1.4 Fw : 5.4(2) Sw : 5.5(6a)
4	24	WS-F6K-VPWR WS-X6624-FXS	SAD050203M8	Hw : 1.0 Hw : 3.0 Fw : 5.4(2) Sw : 5.5(6a)
5	8	WS-X6608-T1	SAD04400EM0	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>

```



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 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	7.0	5.3(1)	5.5(6a)
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

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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

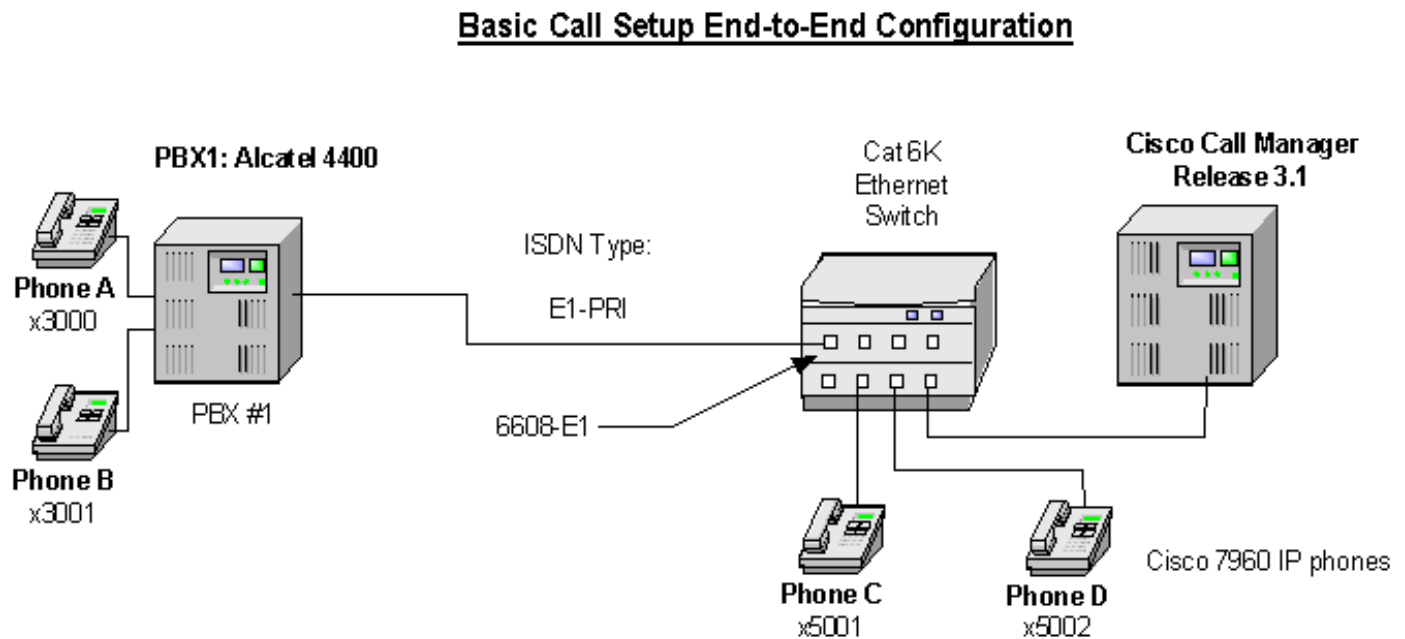
Port	NoiseRegen	NonLinearProcessing
6/1	enabled	enabled
6/2	enabled	enabled
6/3	enabled	enabled
6/4	enabled	enabled
6/5	enabled	enabled
6/6	enabled	enabled
6/7	enabled	enabled
6/8	enabled	enabled

Console>



Test Configuration

Figure 2
Test Topology



The above diagram is representative of the various configurations used for testing.

As shown in the diagram above, an Alcatel 4400 PBX was connected via an ISDN E1 PRI link to a Cisco 6608-E1 Gateway, which in turn, was connected to an Ethernet switch. The interoperability testing involved Layers 1, 2 and 3 on the ISDN PRI link between a Cisco 6608-E1 and the PBX.

Layer 1 (Physical Layer)

The Alcatel 4400 PBX configuration screen for the E1 trunk interface is reached using both Alcatel Board and Board\Digital Access menus, setting the E1 physical layer parameters.

Layers 2 & 3 (Q.921 and Q.931)

Layer 2 and 3 packet exchanges were monitored using an Acacia Clarinet protocol analyzer, bridged across the PRI link in high impedance mode.

Layer 2 Q.921 packets were monitored to ensure that each PBX/6608-E1 software configuration properly exchanged SABME/UA packets to initialize the ISDN link, and then RR packets were exchanged every 30 seconds.

Layer 3 Q.931 packets were monitored to ensure that the appropriate call setup/teardown packets were exchanged for each configuration, and that the SETUP packets contained the mandatory Information Elements with the necessary details, as well as optional IEs such as Calling Name and Number.

Telephone calls were made end-to-end in both directions through the Cisco 6608-E1 Gateway, and a check was made to ensure that there was an audio path in both directions for each call.



User/Network Settings

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.

Test Results

Testing was performed by Test Engineer(s): Samir Batio, August 14, 2001

Test Setup 1

Test configuration:

- PBX1 configured as ETSI, emulates Network
- Cisco 6608-E1 Gateway configured as PRI EURO, emulates User

Table 1 Test Setup 1 Switch and Gateway Settings

Alcatel 4400 Switch-type / Protocol-Side Setting	Cisco 6608-E1 ISDN protocol-type/ Protocol-Side Setting
ETSI/Network	PRI EURO/User

Table 2 Basic Calls: (Enbloc Sending)

Calls Made	Call Comp?	“ Calling Number” Passed to Final Destination?	“ Calling Name” Passed to Final Destination?	“ Called Number” Passed to Orig. Side?	“ Called Name” Passed to Orig. Side?	Notes
Phone A to Phone C	Yes	Yes	No	No ¹	No	2
Phone C to Phone A	Yes	Yes	No	Yes	No	

1. CallManager is not sending “Connected Number” information in the connect message back to PBX.
2. Calling Name delivery and presentation features are not supported by the Alcatel ISDN PRI Link.



Table 3 Call Transfers: (Supervised Local Transfers)

Calls Made	Call Comp?	Orig. "Calling Number" displayed on Final Dest. phone?	Orig. "Calling Name" displayed on Final Dest. phone?	"Called Number" display on Orig. phone updated after transfer?	"Called Name" display on Orig. phone updated after transfer?	Notes
Phone C to Phone A Xfr to Phone B	Yes	Yes	No	No	No	
Phone A to Phone C Xfr to Phone D	Yes	Yes	No	No	No	

Table 4 Call Conferencing (Local)

Calls Made	Call Comp?	"Calling Number" passed to remaining conferee when the conferencing phone drops out?	"Calling Name" passed to remaining conferee when the conferencing phone drops out?	"Connected Number" updated on Orig. Caller phone display when a conferee drops out?	"Connected Name" updated on Orig. Caller phone display when a conferee drops out?	Notes
Phone C to Phone A, Phone A conf Phone B	Yes	(A Drops out) Yes	(A Drops out) No	(A Drops out) No	(A Drops out) No	
Phone C to Phone A, Phone C conf Phone D	Yes	(C Drops out) No	(C Drops out) No	(D Drops out) No	(D Drops out) No	
Phone A to Phone C, Phone C conf Phone D	Yes	(C Drops out) No	(C Drops out) No	(C Drops out) No	(C Drops out) No	
Phone A to Phone C, Phone A conf Phone B	Yes	(A Drops out) No	(A Drops out) No	(B Drops out) No	(B Drops out) No	



Table 5 Call Forward (Local)

Calls Made	Call Comp?	Original "Calling Number" passed to Final Dest.?	Original "Calling Name" passed to Final Dest.?	Forwarding "Called Number" passed to Final Dest.?	Forwarding "Called Name" passed to Final Dest.?	Final dest. "Connec ted Number" updated at orig. side?	Final dest. "Connec ted Name" updated at orig. side?	Notes
Phone C to Phone A fwd to Phone B	Yes	Yes	No	No	No	No	No	
Phone A to Phone C fwd to Phone D	Yes	Yes	No	No	No	No	No	

Test Setup 2

Test configuration:

- PBX1 configured as ETSI, emulates User
- Cisco 6608-E1 Gateway configured as PRI EURO, emulates Network

Table 6 Test Setup 2 Switch and Gateway Settings

Alcatel 4400 Switch-type/ Protocol side setting	Cisco 6608-E1 ISDN protocol-type/ Protocol-side Settings
ETSI / User	PRI EURO/Network

The test results are identical as in [Test Setup 1](#). Refer to the tables in [Test Setup 1](#) for details.



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

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Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland
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