



Cisco 2621 Gateway-PBX Interoperability: Alcatel 4400 with E1 PRI NET5 Signaling

This document describes the interoperability and configuration of a Cisco 2621 Gateway with an Alcatel 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 NET5 |
| Voice Gateway | Cisco 2621 Gateway |
| Gateway Release | IOS Release 12.2(3.5)T |
| Call Manager Release | 3.1.1 |
| VoX Protocol | H.323 |

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Alcatel PBX Configuration
- Call Manager Configuration
- Cisco 2621 Gateway Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

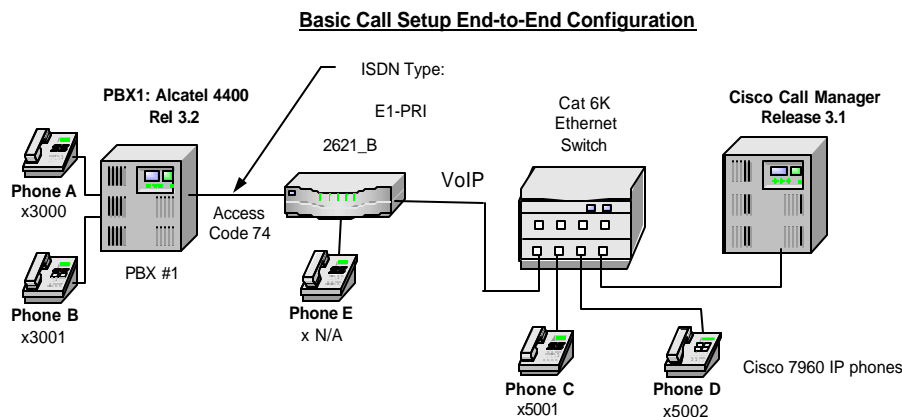


Figure 1 represents the configuration used for testing: an Alcatel 4400 PBX connected to a Cisco 2621 Gateway via a E1 PRI connection.

Set Up Notes

- The Alcatel 4400 supports both user (peer-slave) and network (peer-master) protocol sides by using the ETSI standard PRI protocol.
- 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.
- When configuring a Cisco 2621 Gateway to emulate user side (Alcatel emulate network side), make sure that the “Display IE Delivery” box is *not* checked in the CallManager H.323 Gateway Configuration, otherwise calls will not be completed. Alcatel 4400 PBX complains about the Caller ID Display information being sent in the SETUP message from CallManager by sending STATUS message with cause of “IE non-existent/unimplemented”.
- When calling from a Cisco 7960 IP phone to an Alcatel digital phone, Calling/Called Number is displayed on both phones after the call is answered.
- When calling from an Alcatel digital phone to Cisco 7960 IP phone, the IP phone displays connected number after the call is answered. The Alcatel phone however, does *not* get updated when the call is answered. It displays the word private instead. This was verified by using the ISDN protocol analyzer that the CallManager was not sending connected number information in the connect message back to the PBX.
- The Cisco 2621 Gateway with ISDN switch type setting of **primary-net5** supports both protocol sides by using the **isdn protocol-emulate network/user** command.

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

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

```

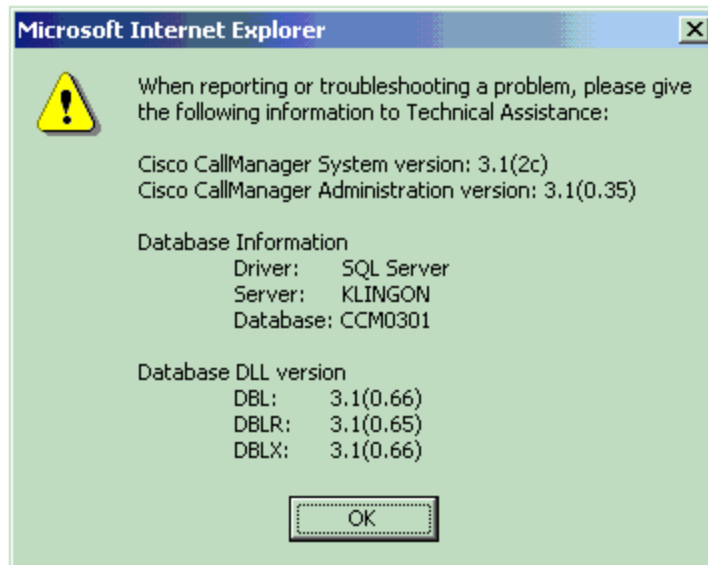
\compidea\Trunk Groups::0\Trunk Group::1

Instance (reserved)                1
Trunk Group Type                    T2
Public Network Ref.                 NO
Dialling end to end                 NO
DTMF end to end signal.             NO
Trunk group used in DISA            NO
DISA Secret Code                    NO
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                  NO
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            NO
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



Cisco 2621 Gateway Configuration



Cisco CallManager 3.1 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address n/CCMAdmin/gatewayconfig.asp?pkid={E014BCF6-F6EA-48AA-A39B-C7E3082EED18}&Status=US&Action=Update&Type=17 Go Links

| | |
|--------------------------------------|-------------------------------------|
| Network Hold Audio Source | < None > |
| User Hold Audio Source | < None > |
| Calling Search Space | < None > |
| Location | < None > |
| Caller ID DN | |
| Calling Party Selection* | Originator |
| Presentation Bit* | Allowed |
| Display IE Delivery | <input type="checkbox"/> |
| Gatekeeper Name | < None > |
| Media Termination Point Required | <input type="checkbox"/> |
| Num Digits* | 23 |
| Sig Digits | <input type="checkbox"/> |
| Prefix DN | |
| Run H225D On Every Node | <input checked="" type="checkbox"/> |
| Called party IE number type unknown* | Cisco CallManager |

Reset succeeded. Local intranet

| | |
|---------------------------------------|-------------------------------------|
| Num Digits* | 23 |
| Sig Digits | <input type="checkbox"/> |
| Prefix DN | |
| Run H225D On Every Node | <input checked="" type="checkbox"/> |
| 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 |

* indicates required item

[Back to Find/List Gateways](#)

Restart succeeded. 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

Copy Update Delete Cancel Changes

Pattern Definition

Route Pattern*

Partition

Numbering Plan*

Route Filter

Gateway/Route List* (Edit)

Route Option Route this pattern Block this pattern

Local intranet

Partition

Numbering Plan*

Route Filter

Gateway/Route List* (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

Called Party Transform Mask

Prefix Digits (Outgoing Calls)

* indicates required item.

Local intranet

Cisco 2621 Gateway Configuration

The following is the configuration of the Cisco 2621 gateway connected to the Alcatel 4400 E1 PRI interface.

Cisco 2621 Gateway Version Information

```
2621_B#sh version
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-JS-M), Version 12.2(3.5)T,  MAINTENANCE INTERIM S
OFTWARE
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 03-Aug-01 22:45 by ccai
Image text-base: 0x80008088, data-base: 0x81631DD8

ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)

2621_B uptime is 16 hours, 6 minutes
System returned to ROM by power-on
System image file is "flash:c2600-js-mz.122-3.5.T"

cisco 2621 (MPC860) processor (revision 0x200) with 56320K/9216K bytes of memory
.
Processor board ID JAD051516TX (503811939)
M860 processor: part number 0, mask 49
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
2 FastEthernet/IEEE 802.3 interface(s)
31 Serial network interface(s)
2 Channelized E1/PRI port(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

2621_B#
```

```
2621_B#sh diag
Slot 0:
C2621 2FE Mainboard Port adapter, 2 ports
Port adapter is analyzed
Port adapter insertion time unknown
EEPROM contents at hardware discovery:
Hardware Revision      : 2.0
PCB Serial Number     : JAD051516TX (503811939)
Part Number           : 73-3200-08
RMA History           : 00
RMA Number            : 0-0-0-0
Board Revision        : A0
Deviation Number      : 0-21249
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF 40 00 A2 41 02 00 C1 17 4A 41 44 30 35 31
0x10: 35 31 36 54 58 20 28 35 30 33 38 31 31 39 33 39
0x20: 29 82 49 0C 80 08 04 00 81 00 00 00 00 42 41 30
0x30: 80 00 00 53 01 FF FF FF FF FF FF FF FF FF FF
0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

```
0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

Slot 1:

```
High Density Voice Port adapter
Port adapter is analyzed
Port adapter insertion time unknown
EEPROM contents at hardware discovery:
Hardware Revision      : 1.1
Top Assy. Part Number  : 800-03567-01
Board Revision         : F1
Deviation Number      : 0-0
Fab Version            : 02
PCB Serial Number     : JAB05080LU9
RMA Test History      : 00
RMA Number             : 0-0-0-0
RMA History           : 00
EEPROM format version 4
EEPROM contents (hex):
0x00: 04 FF 40 00 CC 41 01 01 C0 46 03 20 00 0D EF 01
0x10: 42 46 31 80 00 00 00 00 02 02 C1 8B 4A 41 42 30
0x20: 35 30 38 30 4C 55 39 03 00 81 00 00 00 00 04 00
0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

```
VIC Slot 0:
E1 (2 Port) Multi-Flex Trunk WAN Daughter Card
Hardware revision 1.0      Board revision B0
Serial number 18801733    Part number 800-04479-01
Test history 0x0         RMA number 00-00-00
Connector type PCI
EEPROM format version 1
EEPROM contents (hex):
0x20: 01 23 01 00 01 1E E4 45 50 11 7F 01 00 00 00 00
0x30: 58 00 00 00 00 03 09 00 FF FF FF FF FF FF FF FF

HDV firmware: Compiled Fri 23-Mar-01 00:20 by miriyala
HDV memory size 524280 heap free 175065
```

2621_B#

```
2621_B#sh controllers e1 1/0
E1 1/0 is up.
  Applique type is Channelized E1 - balanced
  No alarms detected.
  alarm-trigger is not set
  Version info Firmware: 20010710, FPGA: 15
  Framing is CRC4, Line Code is HDB3, Clock Source is Line.
  Data in current interval (71 seconds elapsed):
    0 Line Code Violations, 0 Path Code Violations
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
2621_B#
```

Cisco 2621 Gateway Sample Configuration

```
2621_B#sh configuration
Using 1813 out of 29688 bytes
!
version 12.2
no parser cache
service timestamps debug datetime msec localtime show-timezone
service timestamps log uptime
no service password-encryption
!
hostname 2621_B
!
no logging buffered
enable password cisco
!
!
!
memory-size iomem 15
voice-card 1
  dspfarm
!
ip subnet-zero
!
!
no ip domain-lookup
!
isdn switch-type primary-net5
!
!
voice class codec 1
  codec preference 1 g729r8
  codec preference 2 g711ulaw
  codec preference 3 g711alaw
!
!
!
!
!
!
controller E1 1/0
  pri-group timeslots 1-31
!
controller E1 1/1
!
!
!
!
interface FastEthernet0/0
  ip address 192.168.100.2 255.255.255.0
  no ip mroute-cache
  load-interval 30
  no keepalive
  speed auto
  half-duplex
!
interface FastEthernet0/1
  ip address 10.1.1.129 255.255.255.0
  no ip mroute-cache
  duplex auto
  speed auto
!
interface Serial1/0:15
  no ip address
  no logging event link-status
```

```
isdn switch-type primary-net5
isdn incoming-voice voice
isdn T321 40000
isdn T203 30000
isdn T306 60000
isdn T310 30000
isdn bchan-number-order ascending
no cdp enable
!
router rip
network 1.0.0.0
network 192.168.100.0
!
ip classless
no ip http server
ip pim bidir-enable
!
dialer-list 1 protocol ip permit
dialer-list 1 protocol ipx permit
!
!
snmp-server packetsize 4096
snmp-server manager
tftp-server nvram
call rsvp-sync
!
voice-port 1/0:15
!
!
mgcp profile default
!
dial-peer cor custom
!
!
!
dial-peer voice 1 pots
destination-pattern 3...
direct-inward-dial
port 1/0:15
prefix 3
!
dial-peer voice 3 voip
destination-pattern 5...
progress_ind setup enable 1
voice-class codec 1
session target ipv4:10.1.1.2
dtmf-relay h245-alphanumeric
!
!
line con 0
exec-timeout 0 0
line aux 0
exec-timeout 0 0
line vty 0 4
exec-timeout 0 0
password cisco
login
line vty 5 15
exec-timeout 0 0
login
!
scheduler allocate 3996 1000
!
end

2621_B#
```

Caveats

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