



Cisco AS5300 Universal Gateway-PBX Interoperability: Alcatel 4400 Quad E1/PRI card with E1 ISDN PRI Signaling

This document describes the interoperability and configuration between Alcatel 4400 PBX to Cisco AS5300 with quad E1/PRI card to Alcatel 4400 PBX via an ISDN E1-PRI link. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Alcatel 4400
PBX Release	R3.2
Telephony Signaling	E1 PRI and ISDN E1 -PRI
Voice Gateway	Cisco AS5300 Universal Gateway
Gateway Release	Cisco IOS Release 12.2(1a)
VoX Protocol	H.323

Configuration Tasks

See the following sections for configuration tasks for this feature:

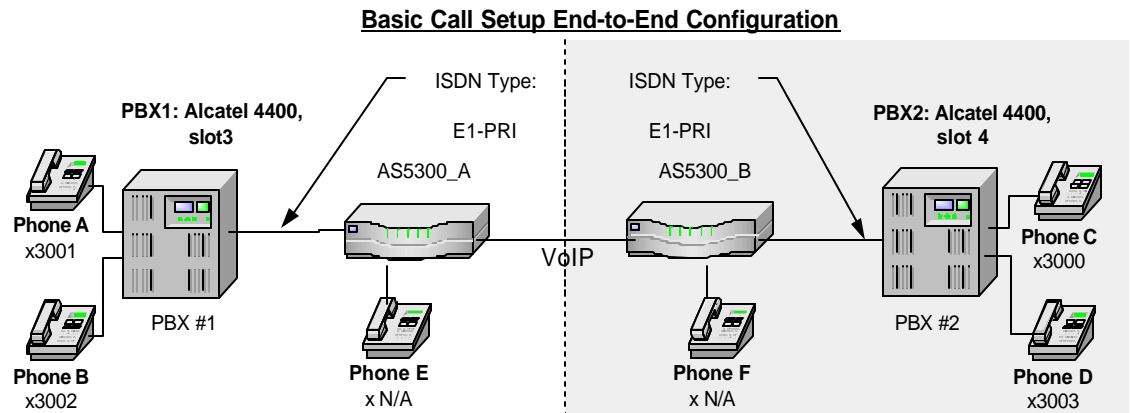
- Set Up
- Alcatel 4400 PBX Configuration
- Cisco AS5300 Universal Gateway Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams



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

PBX Trunk (Slot 3) with access code 70 is connected to AS5300_A.

PBX Trunk (Slot 4) with access code 74 is connected to AS5300_B.

As shown in the diagram above, an Alcatel 4400 PBX was connected via slot 3, an ISDN E1-PRI link to a Cisco AS5300, which in turn, was connected to another Cisco AS5300 by an Ethernet connection. The second Cisco AS5300 was connected to the same Alcatel 4400 PBX via slot 4, another ISDN E1-PRI link. The interoperability testing involved Layers 1, 2 and 3 on the ISDN PRI link between a Cisco AS5300 and the PBX.

Set Up Notes

- The Cisco AC5300 universal gateway with switch type setting of **primary-net5** supports both protocol sides by using the “isdn protocol-emulate network/user” command
- 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 4400 PBX Configuration

Alcatel 4400 PBX Version Information

- Software: Version R3.2

Alcatel 4400 PBX Sample Configuration

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
```

Trunk cards were configured the same:

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
```

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
```

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
```

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
```

Cisco AS5300 Universal Gateway Configuration

The following is the configuration of the Cisco AS5300 universal gateways connected to the Alcatel 4400 PBX to Cisco AS5300 with quad E1/PRI card to Alcatel 4400 PBX via an ISDN E1-PRI link.

Cisco AS5300 Universal Gateway Sample Configuration

Configure in the following sequence:

1. Cisco AS5300_A Voice Gateway Sample Configuration
2. Cisco AS5300_B Voice Gateway Sample Configuration

Cisco AS5300_A Universal Gateway Version Information

```
AS5300_A#sh ver
Cisco Internetwork Operating System Software
IOS (tm) 5300 Software (C5300-JS-M), Version 12.2(1a), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 25-May-01 22:32 by pwade
Image text-base: 0x60008958, data-base: 0x611DA000

ROM: System Bootstrap, Version 12.0(2)XD1, EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
BOOTFLASH: 5300 Software (C5300-BOOT-M), Version 12.0(4)T1, RELEASE SOFTWARE (fc1)

AS5300_A uptime is 20 hours, 25 minutes
System returned to ROM by reload at 00:10:38 UTC Sat Jan 1 2000
System image file is "flash:c5300-js-mz.122-1a.bin"

cisco AS5300 (R4K) processor (revision A.32) with 131072K/16384K bytes of memory
.
Processor board ID 13241546
R4700 CPU at 150Mhz, Implementation 33, Rev 1.0, 512KB L2 Cache
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.
Backplane revision 2
Manufacture Cookie Info:
  EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x30,
  Board Hardware Version 3.1, Item Number 800-2544-03,
  Board Revision D0, Serial Number 13241546,
  PLD/ISP Version 0.0, Manufacture Date 17-May-2000.
1 Ethernet/IEEE 802.3 interface(s)
1 FastEthernet/IEEE 802.3 interface(s)
35 Serial network interface(s)
4 Channelized E1/PRI port(s)
60 Voice resource(s)
128K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)
8192K bytes of processor board Boot flash (Read/Write)

Configuration register is 0x2102

AS5300_A#
```

Cisco AS5300_A Voice Gateway Sample Configuration

The following is the configuration of the AS5300_A router directly connected to Alcatel 4400 PBX, slot 4 ISDN PRI interface.

```
AS5300_A#sh controllers e1 0
E1 0 is up.
  Applique type is Channelized E1 - balanced
  No alarms detected.
  alarm-trigger is not set
  Version info of slot 0: HW: 1, PLD Rev: 11
  Framers Version: 0x8

Manufacture Cookie Info:
  EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x4B,
  Board Hardware Version 3.1, Item Number 800-3881-02,
  Board Revision B0, Serial Number 20744904,
  PLD/ISP Version 0.1, Manufacture Date 23-Jun-2000.

  Framing is CRC4, Line Code is HDB3, Clock Source is Line Primary.
  Data in current interval (228 seconds elapsed):
```

Cisco AS5300 Universal Gateway-PBX Interoperability: Alcatel 4400 PBX to Cisco AS5300 with quad E1/PRI card to Alcatel 4400 PBX via an ISDN E1-PRI link

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
AS5300_A#

```
AS5300_A#sh conf
Using 2214 out of 124920 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname AS5300_A
!
logging rate-limit console 10 except errors
enable secret 5 $1$/.SG$h05ycqcEN3shrrgYfUUo91
enable password cisco
!
!
!
resource-pool disable
!
call rsvp-sync
ip subnet-zero
no ip finger
no ip domain-lookup
!
no ip dhcp-client network-discovery
isdn switch-type primary-net5
!
!
!
!
!
fax interface-type vfc
mta receive maximum-recipients 0
!
!
controller E1 0
  clock source line primary
  pri-group timeslots 1-31
!
controller E1 1
  shutdown
!
controller E1 2
  shutdown
  clock source line secondary 2
!
controller E1 3
  shutdown
  clock source line secondary 3
!
!
interface Ethernet0
  ip address 10.1.1.203 255.255.255.0
  no cdp enable
!
interface Serial0
  no ip address
  shutdown
  no fair-queue
  clockrate 2015232
!
interface Serial1
  no ip address
  shutdown
  no fair-queue
  clockrate 2015232
  no cdp enable
!
interface Serial2
  no ip address
  shutdown
  no fair-queue
```



```
clockrate 2015232
no cdp enable
!
interface Serial3
no ip address
shutdown
no fair-queue
clockrate 2015232
no cdp enable
!
interface Serial0:15
no ip address
no logging event link-status
isdn switch-type primary-net5
isdn overlap-receiving
isdn incoming-voice modem
isdn T203 30000
isdn T310 60000
isdn bchan-number-order ascending
no cdp enable
!
interface FastEthernet0
ip address 1.1.1.1 255.255.255.0
duplex auto
speed auto
no cdp enable
!
router rip
network 1.0.0.0
!
ip kerberos source-interface any
ip classless
no ip http server
!
dialer-list 1 protocol ip permit
dialer-list 1 protocol ipx permit
!
!
!
voice-port 0:D
!
dial-peer voice 2 voip
destination-pattern 3000
progress_ind setup enable 1
session target ipv4:1.1.1.2
!
dial-peer voice 1 pots
destination-pattern 3001
direct-inward-dial
port 0:D
prefix 3001
!
dial-peer voice 3 pots
destination-pattern 3002
direct-inward-dial
port 0:D
prefix 3002
!
dial-peer voice 4 voip
destination-pattern 3003
session target ipv4:1.1.1.2
!
!
!
line con 0
exec-timeout 0 0
logging synchronous
transport input none
line aux 0
line vty 0 4
password cisco
login
!
```

```
scheduler interval 1000
end
```

```
AS5300_A#
```

Cisco AS5300 Universal Gateway Version Information

The following is the configuration of the AS5300_B router directly connected to Alcatel 4400 PBX, slot 4 ISDN PRI interface.

```
AS5300_B#sh ver
Cisco Internetwork Operating System Software
IOS (tm) 5300 Software (C5300-JS-M), Version 12.2(1a), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 25-May-01 22:32 by pwade
Image text-base: 0x60008958, data-base: 0x611DA000

ROM: System Bootstrap, Version 12.0(2)XD1, EARLY DEPLOYMENT RELEASE SOFTWARE (fc
1)
BOOTFLASH: 5300 Software (C5300-BOOT-M), Version 12.0(4)T1, RELEASE SOFTWARE (f
c1)

AS5300_B uptime is 20 hours, 29 minutes
System returned to ROM by reload at 00:18:59 UTC Sat Jan 1 2000
System image file is "flash:c5300-js-mz.122-1a.bin"

cisco AS5300 (R4K) processor (revision A.32) with 131072K/16384K bytes of memory
.
Processor board ID 20238282
R4700 CPU at 150Mhz, Implementation 33, Rev 1.0, 512KB L2 Cache
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.
Backplane revision 2
Manufacture Cookie Info:
  EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x30,
  Board Hardware Version 3.1, Item Number 800-2544-03,
  Board Revision D0, Serial Number 20238282,
  PLD/ISP Version 0.0, Manufacture Date 12-May-2000.
1 Ethernet/IEEE 802.3 interface(s)
1 FastEthernet/IEEE 802.3 interface(s)
35 Serial network interface(s)
4 Channelized E1/PRI port(s)
60 Voice resource(s)
128K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)
8192K bytes of processor board Boot flash (Read/Write)

Configuration register is 0x2102

AS5300_B#
```

Cisco AS5300_B Voice Gateway Sample Configuration

```
AS5300_B#sh controllers e1 0
E1 0 is up.
  Applique type is Channelized E1 - balanced
  No alarms detected.
  alarm-trigger is not set
  Version info of slot 0: HW: 1, PLD Rev: 11
  Framer Version: 0x8

Manufacture Cookie Info:
  EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x4B,
```

Cisco AS5300 Universal Gateway-PBX Interoperability: Alcatel 4400 PBX to Cisco AS5300 with quad E1/PRI card to Alcatel 4400 PBX via an ISDN E1-PRI link

Board Hardware Version 3.1, Item Number 800-3881-02,
Board Revision B0, Serial Number 20664860,
PLD/ISP Version 0.1, Manufacture Date 23-Jun-2000.

Framing is CRC4, Line Code is HDB3, Clock Source is Line Primary.
Data in current interval (27 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
AS5300_B#

```
AS5300_B#sh conf
Using 2238 out of 124920 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname AS5300_B
!
logging rate-limit console 10 except errors
enable secret 5 $1$iJdG$J.bdACJeFouly4AEW.QQU.
enable password cisco
!
!
!
resource-pool disable
!
call rsvp-sync
ip subnet-zero
no ip finger
no ip domain-lookup
!
no ip dhcp-client network-discovery
isdn switch-type primary-net5
!
!
!
!
!
fax interface-type vfc
mta receive maximum-recipients 0
!
!
controller E1 0
  clock source line primary
  pri-group timeslots 1-31
!
controller E1 1
  shutdown
  clock source line secondary 1
!
controller E1 2
  shutdown
  clock source line secondary 2
!
controller E1 3
  shutdown
  clock source line secondary 3
!
!
interface Ethernet0
  ip address 10.1.1.204 255.255.255.0
  no cdp enable
!
interface Serial0
  no ip address
  shutdown
  no fair-queue
  clockrate 2015232
```

```
!  
interface Serial1  
  no ip address  
  shutdown  
  no fair-queue  
  clockrate 2015232  
  no cdp enable  
!  
interface Serial2  
  no ip address  
  shutdown  
  no fair-queue  
  clockrate 2015232  
  no cdp enable  
!  
interface Serial3  
  no ip address  
  shutdown  
  no fair-queue  
  clockrate 2015232  
  no cdp enable  
!  
interface Serial0:15  
  no ip address  
  no logging event link-status  
  isdn switch-type primary-net5  
  isdn overlap-receiving  
  isdn protocol-emulate network  
  isdn incoming-voice modem  
  no isdn T309-enable  
  isdn T203 30000  
  isdn T310 60000  
  isdn bchan-number-order ascending  
  no cdp enable  
!  
interface FastEthernet0  
  ip address 1.1.1.2 255.255.255.0  
  duplex auto  
  speed auto  
  no cdp enable  
!  
ip kerberos source-interface any  
ip classless  
no ip http server  
!  
dialer-list 1 protocol ip permit  
dialer-list 1 protocol ipx permit  
!  
!  
!  
voice-port 0:D  
!  
dial-peer voice 2 voip  
  destination-pattern 3001  
  session target ipv4:1.1.1.1  
!  
dial-peer voice 1 pots  
  destination-pattern 3000  
  direct-inward-dial  
  port 0:D  
  prefix 3000  
!  
dial-peer voice 3 voip  
  destination-pattern 3002  
  session target ipv4:1.1.1.1  
!  
dial-peer voice 4 pots  
  destination-pattern 3003  
  direct-inward-dial  
  port 0:D  
  prefix 3003  
!
```

```
!  
line con 0  
  exec-timeout 0 0  
  logging synchronous  
  transport input none  
line aux 0  
line vty 0 4  
  password cisco  
  login  
!  
scheduler interval 1000  
end  
  
AS5300_B#
```

Caveats

- Calling/Called name is not supported on Alcatel ISDN PRI link.
- When a call is completed, it takes approximately 5 seconds for the original caller phone display to update called number.