Cisco 3600 Series Gateway-PBX Interoperability: Alcatel 4400 with BRI Q.931 Signaling

This document describes the interoperability and configuration of a Cisco3600 series voice gateway with an Alcatel 4400 PBX using BRI Q.931 signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Alcatel 4400 PBX
PBX Release	Version R3.2, Version c1.712
Telephony Signaling	BRI Q.931
Voice Gateway	Cisco 3640
Gateway Release	Cisco IOS™ 12.2(1a)
VoX Protocol	H.323

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Alcatel PBX Configuration
- Cisco 3640 Gateway Configuration

Set Up

This section includes the following information:
- Connectivity Diagrams
- Set Up Notes

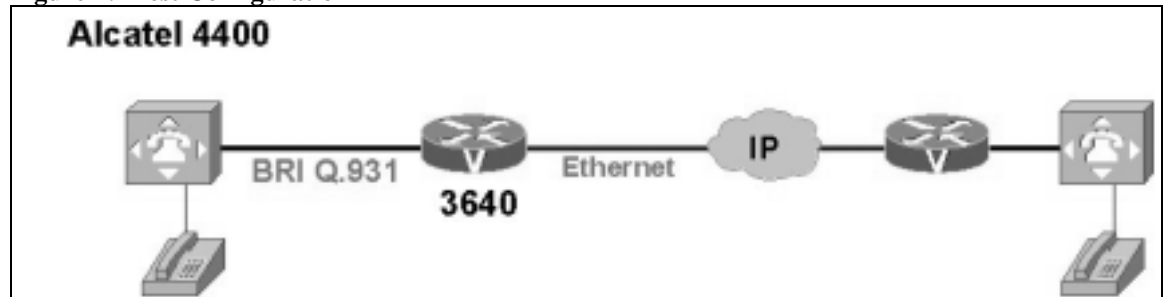## Connectivity Diagrams

Figure 1: Test Configuration

Figure 1 represents the configuration used for testing: an Alcatel 4400 PBX connected to a Cisco 3640 voice gateway via a BRI Q.931 NET3 connection.

Set Up Notes

- The Alcatel 4400 PBX configuration screen for the BRI trunk interface is reached using both Alcatel Board and Board\Digital Access menus, setting the BRI physical layer parameters.
- To configure Layer 1 operation for the Cisco 3640 BRI voice port as clock master (NT) or clock slave (TE), use the **isdn layer1-emulate** {**user** | **network**} command is used. The default setting is user.
- The Cisco 3640 routers with ISDN switch type setting of basic-net3 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 trunk interface type must be set to BRA2.
- Network/User options are set in the Board/Digital Access Options menu. Network mode must be set to Yes for Master/Network or No for Slave/User.
- The access type must be set to T0.
- Q931 signal variant is used to determine Protocol type. This option was set to ISDN all countries.

Alcatel PBX Configuration

☞ **Note:** 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.

Alcatel PBX 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
```

Sample Alcatel PBX Configuration

See the following sections for sample PBX configuration:

- Trunk Cards
- Digital Access Options
- Trunk Group
- Trunk Detail

Trunk Cards

```
\compidea\Shelf::0\Board::9

      Board Address                      9
      Interface Type                     BRA2
      Usage State                        Active
      Operational State                  Enabled
      Main/Standby State                 Main (Master)
      Number Of Sets Being Connect.      1
      Country Protocol Type              Default
      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
```

☞ **Note：** Trunk cards were configured identically.

Digital Access Options

```
\compidea\Shelf::0\Board::9\Digital Access::2

      T0/T2 Access No.             2
      Access Type                  T0
      Synchronisation Priority     255
      Network Mode                 YES
```

```
        Max Nb Of Used B Channels       2
        Max_Nb_Of_Compressed_B_Channels 0
        TieLine Mode                    NO
        Access Type S0                  YES
        Reserved1                       YES
        Reserved2                       NO
        Network Date Time Update        NO
```

Trunk Group

```
\compidea\Trunk Groups::8

        Trunk Group Id                  8
        Trunk Group Type                T0
        Trunk Group Name                BRI-ISDN
        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
        Security Patrol                 False
        Q931 signal variant             ISDN all countries
        Number Compatible With          -1
        Number Of Digits To Send        4
        Remote Network                  15
        Shared Trunk Group              False
        auto.DTMF dialing on outgoing call  NO
        Public Network Category         0
        DDI transcoding                 False
        Special Services                Nothing
        Can support UUS in SETUP        True
```

Trunk Detail

```
\compidea\Trunk Groups::8\Trunk Group::1

        Instance (reserved)             1
        Trunk Group Type                T0
        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               18
        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
        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 3640 Gateway Configuration

The following is the configuration of the Cisco 3640 gateway connected to the Alcatel 4400 PBX BRI interface.

Cisco 3640 Voice Gateway Version Information

```
Cisco_3640# show version

Cisco Internetwork Operating System Software
IOS (tm) 3600 Software (C3640-JS-M), Version 12.2(1a), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Sat 26-May-01 02:40 by pwade
Image text-base: 0x60008950, data-base: 0x61492000

ROM: System Bootstrap, Version 11.1(7)AX [kuong (7)AX], EARLY DEPLOYMENT RELEASE SOFTWARE
(fc2)

Cisco_3640 uptime is 1 hour, 1 minute
System returned to ROM by power-on
System image file is "flash:c3640-js-mz.122-1a.bin"

cisco 3640 (R4700) processor (revision 0x00) with 59392K/6144K bytes of memory.
Processor board ID 05247801
R4700 CPU at 100Mhz, Implementation 33, Rev 1.0
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.
Basic Rate ISDN software, Version 1.1.
2 Ethernet/IEEE 802.3 interface(s)
31 Serial network interface(s)
2 ISDN Basic Rate interface(s)
2 Channelized E1/PRI port(s)
2 Voice FXS interface(s)
4 Voice NT or TE BRI interface(s)
DRAM configuration is 64 bits wide with parity disabled.
125K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102
```

Cisco 3640 Voice Gateway Sample Configuration

```
Cisco_3640# show running-config
Building configuration...

Current configuration : 2247 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
no service dhcp
!
hostname Cisco_3640
!
boot system flash
logging rate-limit console 10 except errors
```

```
!
voice-card 1
!
ip subnet-zero
!
!
no ip finger
no ip domain-lookup
ip host whiz 171.69.1.162
ip host dirt 171.69.1.129
ip host danube 171.69.17.14
!
no ip dhcp-client network-discovery
isdn switch-type basic-net3
call rsvp-sync
cns event-service server
!
!
!
!
!
!
!
controller E1 1/0
 shutdown
 framing NO-CRC4
 ds0-group 1 timeslots 1 type r2-analog r2-compelled
 cas-custom 1
!
controller E1 1/1
 shutdown
 pri-group timeslots 1-31
!
!
interface Tunnel1
 no ip address
!
interface Ethernet0/0
 ip address 100.100.100.2 255.255.255.0
 no ip mroute-cache
 half-duplex
 no cdp enable
!
interface Ethernet0/1
 ip address 171.69.231.23 255.255.255.0
 no ip mroute-cache
 half-duplex
 no cdp enable
!
interface Serial1/1:15
 no ip address
 no logging event link-status
 shutdown
 isdn switch-type primary-net5
 isdn overlap-receiving
 isdn protocol-emulate network
 isdn incoming-voice voice
 no isdn T309-enable
 isdn T203 30000
 isdn T310 60000
 isdn bchan-number-order ascending
 no cdp enable
!
interface BRI3/0
 no ip address
 no ip route-cache
 no ip mroute-cache
 isdn switch-type basic-net3
 isdn protocol-emulate network
 isdn layer1-emulate network
 isdn incoming-voice voice
 isdn static-tei 0
```

```
 isdn skipsend-idverify
!
interface BRI3/1
 no ip address
 shutdown
 isdn switch-type basic-net3
 isdn T310 120000
!
ip kerberos source-interface any
ip classless
no ip http server
!
dialer-list 1 protocol ip permit
no cdp run
!
!
voice-port 1/0:1
!
voice-port 1/1:15
!
voice-port 2/0/0
!
voice-port 2/0/1
!
voice-port 3/0/0
 compand-type a-law
!
voice-port 3/0/1
!
dial-peer cor custom
!
!
!
dial-peer voice 2 pots
 destination-pattern 4200
 port 2/0/0
!
dial-peer voice 4 voip
 destination-pattern 2...
 session target ipv4:100.100.100.1
!
dial-peer voice 3 pots
 destination-pattern 3...
 direct-inward-dial
 port 3/0/0
 prefix 3
!
dial-peer voice 6 voip
 destination-pattern 5...
 session target ipv4:100.100.100.1
!
!
line con 0
 transport input none
line aux 0
line vty 0 4
 no login
!
end
```

Caveats

- Calling/Called Name is not supported on Alcatel ISDN (All countries BRI link).
- The Cisco 3640 router must be configured for a static TEI value =0 to successfully establish communication at layer 2 with the Alcatel 4400 PBX.