Cisco 2600 Series Gateway-PBX Interoperability: Alcatel 4400 with BRI Q.931 Signaling

This document describes the interoperability and configuration of a Cisco 2600 series voice gateway with an Alcatel 4400 PBX using BRI Q.931signaling. 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 2621
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 2621 Gateway Configuration

Set Up

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

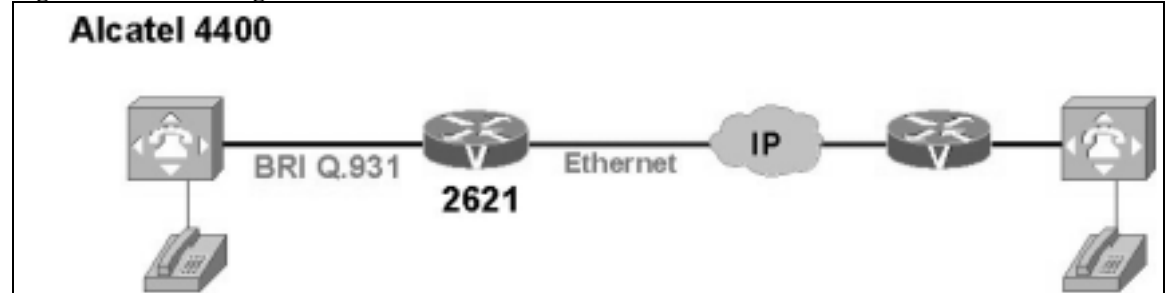## Connectivity Diagrams

Figure 1: Test Configuration

Figure 1 represents the configuration used for testing: an Alcatel 4400 connected to a Cisco 2621 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 2651 BRI voice port as clock master (NT) or clock slave (TE), the **isdn layer1-emulate {user | network}** command is used. The default setting is user.
- The Cisco 2621 routers with ISDN switch type setting of basic-net3 support 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.
- The Network/User options are set in the Board/Digital Access Options menu. The 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
```

Alcatel Sample PBX Configuration

See the following sections for sample PBX configuration:

- Trunk Configuration
- Digital Access Options
- Trunk Group
- Trunk Detail

Trunk Configuration

```
\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:** The 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 2621 Gateway Configuration

The following is the configuration of the Cisco 2621 gateway connected to the Alcatel 4400 PBX BRI interface.

Cisco 2621 Voice Gateway Version Information

```
Cisco_2621# show version

Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-JS-M), Version 12.2(1a), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Sat 26-May-01 11:01 by pwade
Image text-base: 0x80008088, data-base: 0x81371A24

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

Cisco_2621 uptime is 2 days, 19 hours, 20 minutes
System returned to ROM by power-on
System image file is "flash:c2600-js-mz.122-1a.bin"

cisco 2621 (MPC860) processor (revision 0x200) with 53248K/12288K bytes of memory.
Processor board ID JAD051516TV (4151953086)
M860 processor: part number 0, mask 49
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Basic Rate ISDN software, Version 1.1.
2 FastEthernet/IEEE 802.3 interface(s)
2 ISDN Basic Rate interface(s)
4 Voice NT or TE BRI interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102
```

Cisco 2621 Voice Gateway Sample Configuration

```
Cisco_2621# show running-config

Building configuration...

Current configuration : 1401 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Cisco_2621
!
logging rate-limit console 10 except errors
!
memory-size iomem 20
ip subnet-zero
!
!
no ip finger
!
no ip dhcp-client network-discovery
isdn switch-type basic-net3
```

```
call rsvp-sync
!
!
!
!
interface FastEthernet0/0
 ip address 100.100.100.2 255.255.255.0
 no ip mroute-cache
 speed auto
 half-duplex
!
interface FastEthernet0/1
 ip address 10.1.1.206 255.255.255.0
 duplex auto
 speed auto
!
interface BRI1/0
 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 BRI1/1
 no ip address
 shutdown
 isdn switch-type basic-net3
 isdn T310 120000
!
ip kerberos source-interface any
ip classless
no ip http server
!
!
!
voice-port 1/0/0
 compand-type a-law
!
voice-port 1/0/1
!
dial-peer cor custom
!
!
!
dial-peer voice 1 pots
 destination-pattern 3...
 direct-inward-dial
 port 1/0/0
 prefix 3
!
dial-peer voice 4 voip
 destination-pattern 5...
 session target ipv4:100.100.100.1
!
dial-peer voice 5 voip
 destination-pattern 22..
 session target ipv4:100.100.100.1
!
!
line con 0
 transport input none
line aux 0
line vty 0 4
 login
line vty 5 15
 login
!
end
```

Caveats

- Calling/Called Name is not supported on Alcatel ISDN (All countries BRI link).
- The Cisco 2621 must be configured for a static TEI value =0 to successfully establish communication at layer 2 with the Alcatel 4400 PBX.