Cisco 2621 Series Router-PBX Interoperability: VIC 2B-NT/TE card to Alcatel 4400 PBX with BRI ISDN QSIG Signaling

This document describes the interoperability and configuration of a Cisco 2621 series router with a VIC 2B-NT/TE card to an Alcatel 4400 PBX using BRI ISDN QSIG signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Alcatel 4400
PBX Release	R3.2
Telephony Signaling	BRI ISDN QSIG
Voice Gateway	Cisco 2621 series router
Gateway Release	Cisco IOS Release 12.2(1a)
VoX Protocol	H.323

Configuration Tasks

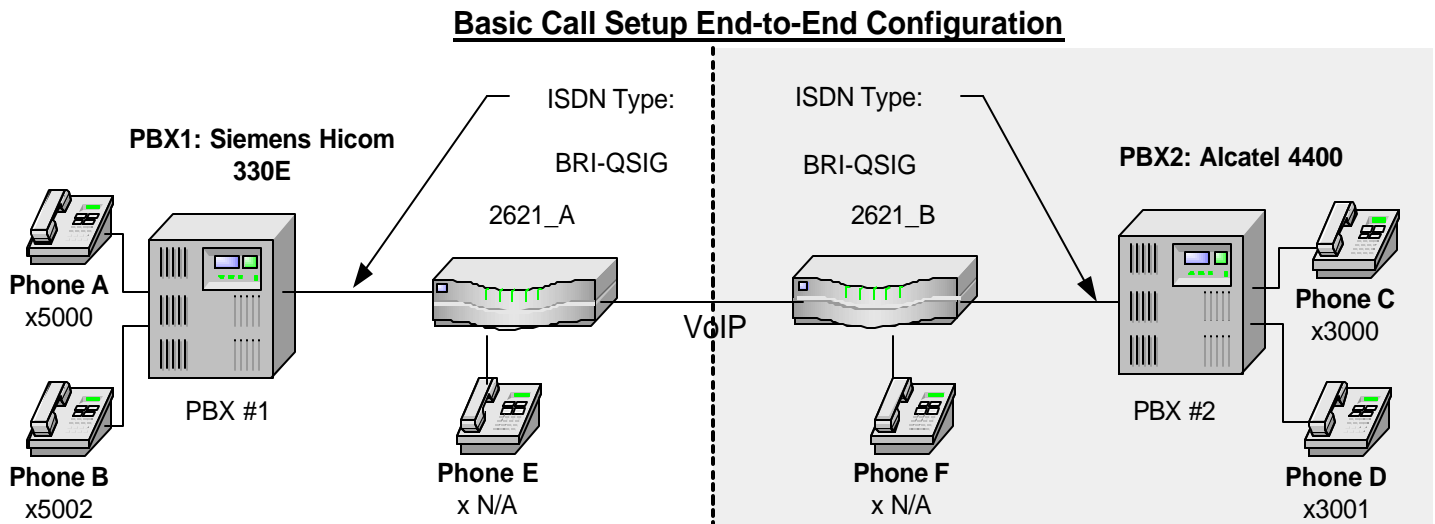See the following sections for configuration tasks for this feature:
- Set Up
- Alcatel PBX Configuration
- Cisco 2621 Series Router Configuration

Set Up

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

Connectivity Diagrams

Basic Call Setup End-to-End Configuration

Figure 1: Test Configuration

Figure 1 represents the configuration used for testing: an Alcatel 4400PBX connected to a Cisco 2621 series router through a BRI ISDN QSIG connection.

Set Up Notes

The Cisco 2621 router with ISDN switch type setting of **basic-qsig** 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 **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.
    - **Access Type** must be set to **T0**.
    - **Q931 signal variant** is used to determine Protocol type. This option was set to **ISDN ABC-F.**

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.

Alcatel PBX Configuration

Alcatel PBX Version Information

- Software: Version R3.2
- Hardware: BRA2, 3BA23076.

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 PBX Sample Configuration

See the following sections for sample configuration information:

- Trunk Cards Were Configured the Same
- Digital Access Options
- Trunk Group
- Trunk Detail

Trunk Cards Were Configured the Same

Interface type must be set to **BRA2.**

```
\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
```

Digital Access Options

Network mode must be set to **Yes** for Master/Network or **No** for Slave/User.
Access Type must be set to **T0**.

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

T0/T2 Access No.              2
Access Type                   T0
Synchronisation Priority      255
Network Mode                  NO
Max Nb Of Used B Channels     2
Max_Nb_Of_Compressed_B_Channels  0
TieLine Mode                  NO
Access Type S0                NO
Reserved1                     NO
Reserved2                     NO
Network Date Time Update       NO
```

Trunk Group

Q931 signal variant is used to determine Protocol type. **ISDN ABC-F** is Alcatel proprietary.

```
\compidea\Trunk Groups::8

Trunk Group Id                8
Trunk Group Type              T0
Trunk Group Name              BRI-ABC-F
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                  ABC-F
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)           4
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 Series Router Configuration

The following is the configuration of the Cisco 2621 series router connected to the Alcatel 4400 ISDN BRI ISDN QSIG signaling interface.

- Cisco 2621 Series Router Version Information
- Cisco 2621 Series Router Sample Configuration

Cisco 2621 Series Router Version Information

- Cisco IOS™ (C2600-JS-M), Version 12.2(1a).
- Cisco 2621 (MPC860) processor (revision 0x200) with 53248K/12288K bytes of memory.

```
2621_B#
2621_B#sho ver
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)

2621_B uptime is 17 hours, 2 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

2621_B#
2621_B#
2621_B#
2621_B#
```

Cisco 2621 Series Router Sample Configuration

The following is a sample configuration of the Cisco 7206VXR series router directly connected to Alcatel 4400 PBX, slot 3 ISDN PRI interface.

```
2621_B#
2621_B#sho 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        : JAD051516TV (4151953086)
        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 18 4A 41 44 30 35 31
          0x10: 35 31 36 54 56 20 28 34 31 35 31 39 35 33 30 38
          0x20: 36 29 82 49 0C 80 08 04 00 81 00 00 00 00 42 41
          0x30: 30 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 FF
          0x50: FF 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 FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Slot 1:
        4 PORT Voice PM for C2600 Port adapter
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware revision 1.1          Board revision H0
        Serial number    25140072      Part number     800-02491-02
        Test history     0x0           RMA number      00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 65 01 01 01 7F 9B 68 50 09 BB 02 00 00 00 00
          0x30: 88 00 00 00 01 02 15 17 FF FF FF FF FF FF FF FF

        VIC Slot 0:
        NT or TE BRI Voice daughter card (2 port)
        Hardware revision 1.255        Board revision V7
        Serial number    4294967295    Part number     800-11534335-255
        Test history     0xFF          RMA number      255-255-255
        Connector type   PCI
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 32 01 FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF


2621_B#
2621_B#
2621_B#
2621_B#
2621_B#
2621_B#
2621_B#
2621_B#
2621_B#sho interface bri 1/0
BRI1/0 is up, line protocol is up (spoofing)
  Hardware is Voice NT or TE BRI
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation VOICE, loopback not set
  Last input 00:00:08, output never, output hang never
  Last clearing of "show interface" counters 00:01:22
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/16 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 48 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     19 packets input, 607 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
2621_B#
```

```
2621_B#
2621_B#
2621_B#
2621_B#
2621_B#
2621_B#sho run
Building configuration...

Current configuration : 1282 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 2621_B
!
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-qsig
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-qsig
 isdn overlap-receiving
 isdn protocol-emulate network
 isdn layer1-emulate network
 isdn incoming-voice voice
 isdn T310 40000
 isdn skipsend-idverify
!
interface BRI1/1
 no ip address
!
ip kerberos source-interface any
ip classless
no ip http server
!
!
!
voice-port 1/0/0
!
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
!
!
line con 0
 transport input none
line aux 0
line vty 0 4
 login
line vty 5 15
 login
!
no scheduler allocate
end

2621_B#
2621_B#
2621_B#
```

Caveats

- Calling/Called Number is not shown on Alcatel phone display (one line display phone show Name only) due to limitation on one line display phone.