



Cisco 3640 Series Router-PBX Interoperability: VIC 2BRI-NT/TE card to Alcatel 4400 PBX with BRI ISDN QSIG Signaling

This document describes the interoperability and configuration of a Cisco 3640 series router with a VIC 2BRI-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 3640 series router |
| Gateway Release | Cisco IOS Release 12.2(1 a) |
| VoX Protocol | H.323 |

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Alcatel PBX Configuration
- Cisco 3640 Series Router Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

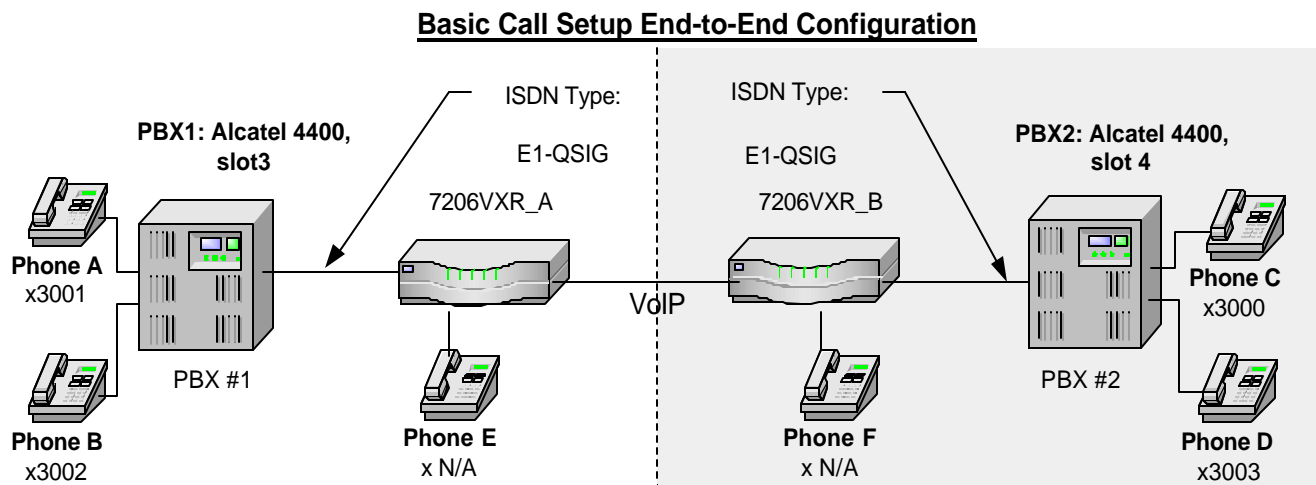


Figure 1 represents the configuration used for testing: an Alcatel 4400PBX connected to a Cisco 3640 series router through an E1-QSIG connection.

Set Up Notes

The Cisco 3640 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                    TO
Public Network Ref.                 NO
Dialling end to end                 NO
DTMF end to end signal.             NO
Trunk group used in DISA            NO
DISA Secret Code                    0
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                  0
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            0
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 Series Router Configuration

The following is the configuration of the Cisco 3640 series router connected to the Alcatel 4400 ISDN BRI ISDN QSIG signaling interface.

- Cisco 3640 Series Router Version Information
- Cisco 3640 Series Router Sample Configuration

Cisco 3640 Series Router Version Information

- Cisco IOS™ (C3640-JS-M), Version 12.2(1a).
- Cisco 3640 (R4700) processor (revision 0x00) with 59392K/6144K bytes of f memory.

```
3640_B#
3640_B#sho ver
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)

3640_B uptime is 1 hour, 21 minutes
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

3640_B#
3640_B#
```

Cisco 3640 Series Router Sample Configuration

The following is a sample configuration of the Cisco 3640 series router directly connected to Alcatel 4400 PBX, slot 3 ISDN PRI interface.

```
3640_B#
3640_B#sho diag
Slot 0:
    Combo 2E, 2W Port adapter, 4 ports
    Port adapter is analyzed
```

```
Port adapter insertion time unknown
EEPROM contents at hardware discovery:
Hardware revision 1.2          Board revision B0
Serial number 7687847         Part number 800-01171-04
Test history 0x0              RMA number 00-00-00
EEPROM format version 1
EEPROM contents (hex):
 0x20: 01 1E 01 02 00 75 4E A7 50 04 93 04 00 00 00 00
 0x30: 58 00 00 00 98 02 28 17 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      : 1.0
Top Assy. Part Number  : 800-03567-01
Board Revision        : A0
Deviation Number      : 0-0
Fab Version           : 02
PCB Serial Number     : JAB03350B9K
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 00 C0 46 03 20 00 0D EF 01
 0x10: 42 41 30 80 00 00 00 00 02 02 C1 8B 4A 41 42 30
 0x20: 33 33 35 30 42 39 4B 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 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
```

```
WIC Slot 0:
E1 (2 Port) Multi-Flex Trunk WAN Daughter Card
Hardware revision 1.0          Board revision B0
Serial number 18779824         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 8E B0 50 11 7F 01 00 00 00 00
 0x30: 58 00 00 00 00 02 25 00 FF FF FF FF FF FF FF FF

HDV firmware: Compiled Wed 04-Oct-00 20:58 by mani
HDV memory size 524280 heap free 180601
```

Slot 2:

```
4 PORT Voice PM for MARS Port adapter
Port adapter is analyzed
Port adapter insertion time unknown
EEPROM contents at hardware discovery:
Hardware revision 1.1          Board revision D0
Serial number 15077168         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 00 E6 0F 30 50 09 BB 02 00 00 00 00
 0x30: 68 00 00 00 99 07 31 17 FF FF FF FF FF FF FF FF

WIC Slot 0:
FXS Voice daughter card (2 port)
Hardware revision 1.1          Board revision F0
Serial number 14674684         Part number 800-02493-01
Test history 0x0              RMA number 00-00-00
Connector type Wan Module
EEPROM format version 1
EEPROM contents (hex):
 0x20: 01 0E 01 01 00 DF EA FC 50 09 BD 01 00 00 00 00
 0x30: 78 00 00 00 99 07 12 01 FF FF FF FF FF FF FF FF
```

```
Slot 3:
 4 PORT Voice PM for MARs 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

WIC 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
```

```
3640_B#
3640_B#
3640_B#sho interfaces bri 3/0
BRI3/0 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 00:00:00, output never, output hang never
  Last clearing of "show interface" counters 00:00:12
  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
    2 packets input, 8 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
```

```
3640_B#
3640_B#
3640_B#
3640_B#
3640_B#sho run
Building configuration...

Current configuration : 2259 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 3640_B
!
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-qsig  
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 Tunnell  
  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-qsig  
  isdn overlap-receiving  
  isdn protocol-emulate network  
  isdn layer1-emulate network  
  isdn incoming-voice voice  
  isdn T310 40000  
  isdn skipsend-idverify
```

```

!
interface BRI3/1
  no ip address
  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
  comand-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

3640_B#
3640_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.