



# Cisco Catalyst 6000 Series Gateway-PBX Interoperability: Alcatel 4400 with E1 PRI Signaling

This document describes the interoperability and configuration of a Cisco Catalyst 6000 series voice gateway with a Alactel 4400 PBX using E1 PRI signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

## System Components

|                             |                     |
|-----------------------------|---------------------|
| <b>PBX Model</b>            | Alcatel 4400        |
| <b>PBX Release</b>          | R3.2                |
| <b>Telephony Signaling</b>  | E1 PRI              |
| <b>Voice Gateway</b>        | Cisco Catalyst 6608 |
| <b>Gateway Release</b>      | 5.5(6a)             |
| <b>Call Manager Release</b> | 3.1.1               |
| <b>VoX Protocol</b>         | MGCP                |

## Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Alcatel PBX Configuration
- Cisco Call Manager Configuration
- Cisco Catalyst 6608 Gateway Configuration

## Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

### Connectivity Diagrams

Figure 1: Test Configuration

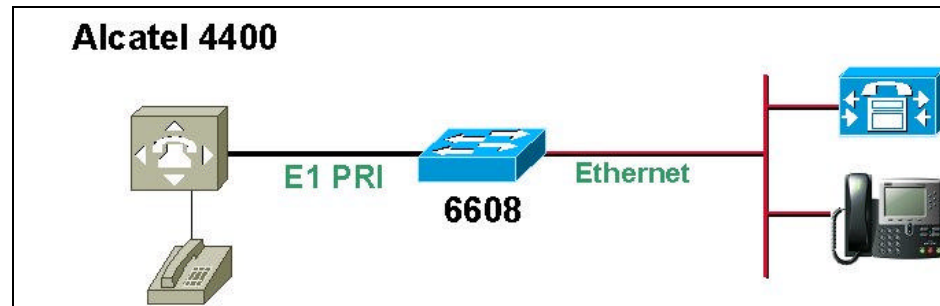


Figure 1 represents the configuration used for testing: an Alcatel 4400PBX connected to a Cisco Catalyst 6608 voice gateway via an E1 PRI connection.

### Set Up Notes

- The Cisco 6608-E1 Gateway with ISDN protocol type setting of PRI-EURO supports both protocol sides by selecting “Network/User” in the protocol side field when configuring the Gateway via CallManager.
- The Alcatel 4400, supports both “USER” (slave) and “NETWORK” (master) protocol sides.
- The following options are of particular interest:
  - o Trunk **interface type** must be set to **PRA2**.
  - o 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).
  - o **Access Type** must be set to **T2**.
  - o **Q931 signal variant** is used to determine Protocol type. This option was set to **ISDN all countries**.

## Alcatel PBX Configuration

### Alcatel PBX Version Information

- Software: Version R3.2
- Hardware: PRA2, 3BA23076.

### Alcatel PBX Sample Configuration

Configure in the following sequence:

1. Configure Board

2. Configure Digital Access Options
3. Configure Trunk Group
4. Configure Trunk Detail

---

## Configure Board

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
```

---

## Configure 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
```

---

## Configure Trunk Group

The **Q.931 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               |

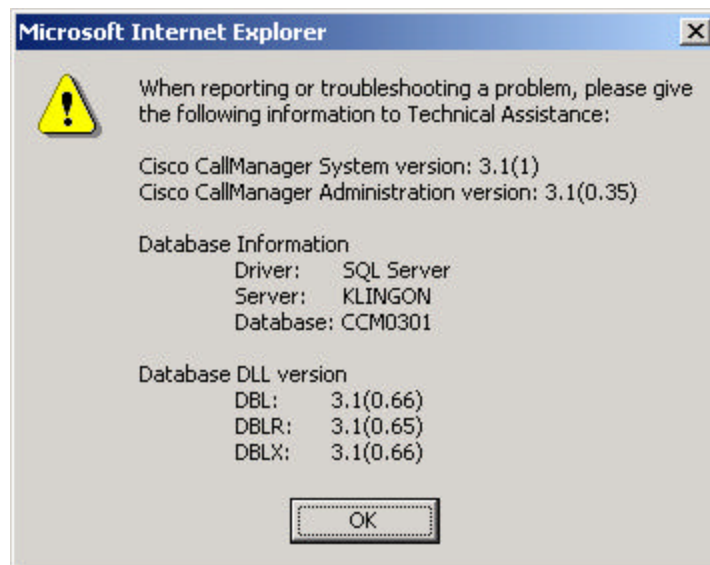
### Configure Trunk Detail

\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             |
| DT0 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            |

# Call Manager Configuration

## Call Manager Version Information



## 6608 Gateway Configuration

[System](#) [Route Plan](#) [Service](#) [Feature](#) [Device](#) [User](#) [Application](#) [Help](#)



### Gateway Configuration

[Back to Find/List Gateways](#)

**Product :** Cisco Catalyst 6000 E1 VoIP Gateway

**Gateway :** S0/DS1-0@SDA0001C9D8633E

**Device Protocol:** Digital Access PRI

**Registration:** Registered with Cisco CallManager 10.1.1.2

**IP Address:** [10.1.1.104](#)

Status: Ready

MAC Address\*

Description

Device Pool\*

Media Resource Group List

Done

 Local intranet

|                                         |                                     |
|-----------------------------------------|-------------------------------------|
| Network Hold Audio Source               | < None >                            |
| User Hold Audio Source                  | < None >                            |
| Calling Search Space                    | < None >                            |
| Location                                | < None >                            |
| Load Information                        |                                     |
| Channel Selection Order*                | Top Down                            |
| PCM Type*                               | A-law                               |
| Protocol Side*                          | User                                |
| Caller ID DN                            |                                     |
| Calling Party Selection*                | Originator                          |
| Channel IE Type*                        | Use Number when 1B                  |
| Interface Identifier Present**          | <input type="checkbox"/>            |
| Interface Identifier Value**            | 0                                   |
| Display IE Delivery                     | <input type="checkbox"/>            |
| Redirecting Number IE Delivery          | <input checked="" type="checkbox"/> |
| Delay for first restart (1/8 sec ticks) | 32                                  |

Local intranet

|                                                |                                                |
|------------------------------------------------|------------------------------------------------|
| Delay between restarts (1/8 sec ticks)         | <input type="text" value="4"/>                 |
| Num Digits*                                    | <input type="text" value="23"/>                |
| Sig Digits                                     | <input checked="" type="checkbox"/>            |
| Prefix DN                                      | <input type="text"/>                           |
| Presentation Bit*                              | <input type="text" value="Allowed"/>           |
| Called party IE number type unknown*           | <input type="text" value="Cisco CallManager"/> |
| Calling party IE number type unknown*          | <input type="text" value="Cisco CallManager"/> |
| Called Numbering Plan*                         | <input type="text" value="Cisco CallManager"/> |
| Calling Numbering Plan*                        | <input type="text" value="Cisco CallManager"/> |
| PRI Protocol Type*                             | <input type="text" value="PRI EURO"/>          |
| Inhibit restarts at PRI initialization         | <input checked="" type="checkbox"/>            |
| Enable status poll                             | <input type="checkbox"/>                       |
| Number of digits to strip*                     | <input type="text" value="0"/>                 |
| Country Code*                                  | <input type="text" value="North America"/>     |
| Setup non-ISDN Progress Indicator IE Enable*** | <input type="checkbox"/>                       |

Local intranet



**Product Specific Configuration**

Clock Reference\*

Network

Framing\*

CRC4

Audio Signal Adjustment into IP Network\*

NoDbPadding

Audio Signal Adjustment from IP Network\*

NoDbPadding

Zero Suppression\*

HDB3

\* indicates required item

\*\* applicable to DMS-100 protocol only

\*\*\* may be required to force ringback from some PBXs

Back to Find/List Gateways

Local intranet

## Route Pattern Configuration

[System](#) [Route Plan](#) [Service](#) [Feature](#) [Device](#) [User](#) [Application](#) [Help](#)

**Cisco CallManager Administration**  
*For Cisco IP Telephony Solutions*

**CISCO SYSTEMS**

### Route Pattern Configuration

[Add a New Route Pattern](#)  
[Back to Find/List Route Patterns](#)

**Route Pattern: 6.XXXX**

Status: Ready  
Note: Any update to this route pattern automatically resets the associated gateway/route list

[Copy](#) [Update](#) [Delete](#) [Cancel Changes](#)

**Pattern Definition**

|                     |                                                                                                           |
|---------------------|-----------------------------------------------------------------------------------------------------------|
| Route Pattern*      | <input type="text" value="6.XXXX"/>                                                                       |
| Partition           | <input data-bbox="711 808 998 835" type="text" value=" &lt; None &gt; "/>                                 |
| Numbering Plan*     | <input data-bbox="711 846 998 873" type="text" value="North American Numbering Plan"/>                    |
| Route Filter        | <input data-bbox="711 884 998 911" type="text" value=" &lt; None &gt; "/>                                 |
| Gateway/Route List* | <input data-bbox="711 921 1015 949" type="text" value="S0/DS1-0@SDA0001C9D8633E"/> <a href="#">(Edit)</a> |
| Route Option        | <input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern              |

[Local intranet](#)

|                                                                                                        |                                                                                              |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Partition                                                                                              | < None >                                                                                     |
| Numbering Plan*                                                                                        | North American Numbering Plk                                                                 |
| Route Filter                                                                                           | < None >                                                                                     |
| Gateway/Route List*                                                                                    | S0/DS1-0@SDA0001C9D8633E (Edit)                                                              |
| Route Option                                                                                           | <input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern |
| <input checked="" type="checkbox"/> Provide Outside Dial Tone <input type="checkbox"/> Urgent Priority |                                                                                              |
| <b>Calling Party Transformations</b>                                                                   |                                                                                              |
| <input type="checkbox"/> Use Calling Party's External Phone Number Mask                                |                                                                                              |
| Calling Party Transform Mask                                                                           |                                                                                              |
| Prefix Digits (Outgoing Calls)                                                                         |                                                                                              |
| <b>Called Party Transformations</b>                                                                    |                                                                                              |
| Discard Digits                                                                                         | PreDot                                                                                       |
| Called Party Transform Mask                                                                            |                                                                                              |
| Prefix Digits (Outgoing Calls)                                                                         |                                                                                              |
| * indicates required item.                                                                             |                                                                                              |

## Cisco Catalyst 6608 Gateway Configuration

The following is the configuration of the Cisco Catalyst 6608 voice gateway connected to the Alcatel 4400 PBX E1 PRI interface.

### Cisco Catalyst 6608 Voice Gateway Version Information

```

Console> sh version
WS-C6006 Software, Version NmpSW: 5.5(6a)
Copyright (c) 1995-2001 by Cisco Systems
NMP S/W compiled on Feb 23 2001, 10:23:18

```

System Bootstrap Version: 5.3(1)

Hardware Version: 2.0 Model: WS-C6006 Serial #: TBA04511172

| Mod | Port | Model            | Serial #    | Versions                                                               |
|-----|------|------------------|-------------|------------------------------------------------------------------------|
| 1   | 2    | WS-X6K-SUP1A-2GE | SAD05010NBK | Hw : 7.0<br>Fw : 5.3(1)<br>Fw1: 5.4(2)<br>Sw : 5.5(6a)<br>Sw1: 5.5(6a) |

```

3    48    WS-F6K-PFC                SAD05020221 Hw : 1.1
      WS-X6348-RJ-45                SAD04420N7B Hw : 1.4
                                      Fw : 5.4(2)
                                      Sw : 5.5(6a)
4    24    WS-F6K-VPWR                SAD050203M8 Hw : 1.0
      WS-X6624-FXS                  Hw : 3.0
                                      Fw : 5.4(2)
                                      Sw : 5.5(6a)
5    8      WS-X6608-T1                SAD04400EM0 HP : A00203010007; DSP : A003C031 (3.3.30)
                                      Hw : 1.1
                                      Fw : 5.4(2)
                                      Sw : 5.5(6a)
                                      HP1: D00403010013; DSP1: D005C031 (3.3.30)
                                      HP2: D00403010013; DSP2: D005C031 (3.3.30)
                                      HP3: D00403010013; DSP3: D005C031 (3.3.30)
                                      HP4: D00403010013; DSP4: D005C031 (3.3.30)
                                      HP5: D00403010013; DSP5: D005C031 (3.3.30)
                                      HP6: D00403010013; DSP6: D005C031 (3.3.30)
                                      HP7: D00403010013; DSP7: D005C031 (3.3.30)
                                      HP8: D00403010013; DSP8: D005C031 (3.3.30)
6    8      WS-X6608-E1                SAD04380DW1 Hw : 1.1
                                      Fw : 5.4(2)
                                      Sw : 5.5(6a)
                                      HP1: D00403010013; DSP1: D005C031 (3.3.30)
                                      HP2: D00403010013; DSP2: D005C031 (3.3.30)
                                      HP3: D00403010013; DSP3: D005C031 (3.3.30)
                                      HP4: D00403010013; DSP4: D005C031 (3.3.30)
                                      HP5: D00403010013; DSP5: D005C031 (3.3.30)
                                      HP6: D00403010013; DSP6: D005C031 (3.3.30)
                                      HP7: D00403010013; DSP7: D005C031 (3.3.30)
                                      HP8: D00403010013; DSP8: D005C031 (3.3.30)

```

| Module | DRAM   |        |        | FLASH  |        |       | NVRAM |      |      |
|--------|--------|--------|--------|--------|--------|-------|-------|------|------|
|        | Total  | Used   | Free   | Total  | Used   | Free  | Total | Used | Free |
| 1      | 65408K | 37541K | 27867K | 16384K | 11546K | 4838K | 512K  | 198K | 314K |

Uptime is 27 days, 4 hours, 16 minutes  
Console>

## Cisco Catalyst 6608 Voice Gateway Sample Configuration

Console> **sh module**

| Mod | Slot | Ports | Module-Type           | Model            | Sub | Status |
|-----|------|-------|-----------------------|------------------|-----|--------|
| 1   | 1    | 2     | 1000BaseX Supervisor  | WS-X6K-SUP1A-2GE | yes | ok     |
| 3   | 3    | 48    | 10/100BaseTX Ethernet | WS-X6348-RJ-45   | yes | ok     |
| 4   | 4    | 24    | FXS                   | WS-X6624-FXS     | no  | ok     |
| 5   | 5    | 8     | T1                    | WS-X6608-T1      | no  | ok     |
| 6   | 6    | 8     | E1                    | WS-X6608-E1      | no  | ok     |

| Mod | Module-Name | Serial-Num  |
|-----|-------------|-------------|
| 1   |             | SAD05010NBK |
| 3   |             | SAD04420N7B |
| 4   |             | SAD050203M8 |
| 5   |             | SAD04400EM0 |
| 6   |             | SAD04380DW1 |

| Mod | MAC-Address(es)                                                                  | Hw  | Fw     | Sw      |
|-----|----------------------------------------------------------------------------------|-----|--------|---------|
| 1   | 00-04-c0-f8-42-02 to 00-04-c0-f8-42-03<br>00-04-c0-f8-42-00 to 00-04-c0-f8-42-01 | 7.0 | 5.3(1) | 5.5(6a) |

```

    00-04-9b-f0-78-00 to 00-04-9b-f0-7b-ff
3   00-02-fc-20-5e-50 to 00-02-fc-20-5e-7f 1.4   5.4(2)   5.5(6a)
4   00-03-32-ba-2e-35                      3.0   5.4(2)   5.5(6a)
5   00-01-c9-d9-3a-98 to 00-01-c9-d9-3a-9f 1.1   5.4(2)   5.5(6a)
6   00-01-c9-d8-63-3e to 00-01-c9-d8-63-45 1.1   5.4(2)   5.5(6a)

```

```

Mod Sub-Type          Sub-Model          Sub-Serial  Sub-Hw
-----
1   L3 Switching Engine  WS-F6K-PFC      SAD05020221 1.1
3   Inline Power Module  WS-F6K-VPWR      1.0
Console>

```

Console> **sh port 6**

| Port | Name | Status     | Vlan | Duplex | Speed | Type |
|------|------|------------|------|--------|-------|------|
| 6/1  |      | connected  | 1    | full   | 2.048 | E1   |
| 6/2  |      | notconnect | 1    | full   | 2.048 | E1   |
| 6/3  |      | notconnect | 1    | full   | 2.048 | E1   |
| 6/4  |      | notconnect | 1    | full   | 2.048 | E1   |
| 6/5  |      | notconnect | 1    | full   | 2.048 | E1   |
| 6/6  |      | notconnect | 1    | full   | 2.048 | E1   |
| 6/7  |      | notconnect | 1    | full   | 2.048 | E1   |
| 6/8  |      | notconnect | 1    | full   | 2.048 | E1   |

| Port | DHCP   | MAC-Address       | IP-Address | Subnet-Mask   |
|------|--------|-------------------|------------|---------------|
| 6/1  | enable | 00-01-c9-d8-63-3e | 10.1.1.104 | 255.255.255.0 |
| 6/2  | enable | 00-01-c9-d8-63-3f | 10.1.1.118 | 255.255.255.0 |
| 6/3  | enable | 00-01-c9-d8-63-40 | 10.1.1.123 | 255.255.255.0 |
| 6/4  | enable | 00-01-c9-d8-63-41 | 10.1.1.117 | 255.255.255.0 |
| 6/5  | enable | 00-01-c9-d8-63-42 | 10.1.1.120 | 255.255.255.0 |
| 6/6  | enable | 00-01-c9-d8-63-43 | 10.1.1.121 | 255.255.255.0 |
| 6/7  | enable | 00-01-c9-d8-63-44 | 10.1.1.122 | 255.255.255.0 |
| 6/8  | enable | 00-01-c9-d8-63-45 | 10.1.1.124 | 255.255.255.0 |

| Port | Call-Manager(s) | DHCP-Server | TFTP-Server | Gateway  |
|------|-----------------|-------------|-------------|----------|
| 6/1  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |
| 6/2  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |
| 6/3  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |
| 6/4  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |
| 6/5  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |
| 6/6  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |
| 6/7  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |
| 6/8  | 10.1.1.2        | 10.1.1.2    | 10.1.1.2    | 10.1.1.7 |

| Port | DNS-Server(s) | Domain |
|------|---------------|--------|
| 6/1  | -             | -      |
| 6/2  | -             | -      |
| 6/3  | -             | -      |
| 6/4  | -             | -      |
| 6/5  | -             | -      |
| 6/6  | -             | -      |
| 6/7  | -             | -      |
| 6/8  | -             | -      |

| Port | CallManagerState | DSP-Type |
|------|------------------|----------|
| 6/1  | registered       | C549     |
| 6/2  | registered       | C549     |
| 6/3  | registered       | C549     |
| 6/4  | registered       | C549     |
| 6/5  | registered       | C549     |
| 6/6  | registered       | C549     |
| 6/7  | registered       | C549     |

```
6/8      registered      C549
Port  NoiseRegen  NonLinearProcessing
-----
6/1   enabled    enabled
6/2   enabled    enabled
6/3   enabled    enabled
6/4   enabled    enabled
6/5   enabled    enabled
6/6   enabled    enabled
6/7   enabled    enabled
6/8   enabled    enabled
Console>
```

---

## Caveats

- Calling Name delivery and presentation features are not supported by the Alcatel 4400 PBX.
- When configuring Cisco 6608 Gateway to emulate User side (Alcatel emulates Network side), make sure that the “Display IE Delivery” box is NOT checked, otherwise calls will not be completed. The Alcatel PBX complains about the Display information being sent in the “SETUP” message from Cisco CallManager by sending STATUS message with cause of “IE non-existent/unimplemented”.
- When calling from Cisco 7960 IP phone to Alcatel digital phone, Calling/Called Number is displayed on both phones after the call is answered. When calling from an Alcatel digital phone to a Cisco 7960 IP phone, the IP phone displays the Connected Number after the call is answered. The Alcatel phone however does NOT get updated when the call is answered. It displays the trunk name.