Avaya Definity CM 2.0 to a Cisco IAD243X using PRI T1 5ESS ISDN with SIP

January 5, 2007 Initial Version

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Introduction

This is an application note for connectivity to the Avaya Definity G3 Communications Manager 2.0 with Cisco IAD243X Gateway via PRI 5ESS-to-SIP communication (10/100baseT).

The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco IAD243X Gateway connected to the PBX via PRI 5ESS ISDN (T1). IP trunk connectivity between the IAD243X’s is achieved by using SIP protocol.
Network Topology

Figure 1. Network Topology

Basic Call Setup End-to-End Configuration

Limitations

Connected Name feature does not interoperate. The limitation is due to the IAD2432 not supporting this feature.

Overlap sending/receiving is not supported in IOS when configured for ISDN “switch-type primary-dms100.”

Connected Number does not follow the CallForward feature (e.g. If Phone A calls Phone C, and Phone C is forwarded to Phone D, the connected number displayed on Phone A will be Phone C’s number, not Phone D’s). The limitation is due to the IAD2432.

Connected number restriction is not honored. The limitation is due to the IAD2432.

When a call conference is initiated by the external calling phone to conference a local phone (i.e. Phone A calls Phone C, Phone A conferences Phone D), in order for the call not to drop between the local phones at the instance that the conferencing phone leaves (i.e. Phone A hangs-up), the Avaya trunk configuration must be set for “Disconnect Supervision – In? yes Out? yes. This is detailed in the Configuration section.
Hardware Requirements

- 2 Cisco IAD2432 24FXS
- 2 Avaya Definity G3 w/ TN464F circuit pack
- 4 Avaya Digital stations 8410D
- 1 Cisco Catalyst switch (CAT6500)

Software Requirements

- Avaya PBX: G3 Version 12 Communications Manager 2.0
- Cisco IOS Release: c2430-ik9o3s-mz-124-9.T1

Features

Features Supported

- Basic end-to-end calls with CLIP (Calling Number) and COLP (Connected Number)
- Calling Number Restricted (CLIR calling number only)
- Call Transfer – Local and Network/External
- Call Waiting
- Call on-hold
- Call Forward (Unconditional, Busy and No answer) – local and Network/External
- 3-way Conference

Features Not Supported

- Connected Name presentation
- Overlap sending/receiving

Configuration

Configuration Sequence and Tasks for the Avaya System

1. DS1 Configuration
2. Trunk group
3. Signaling Group
4. Assign trunk members
5. Uniform-dialing
6. ARR
7. Route Pattern
8. Digital station config
### DS1 Circuit Pack

<table>
<thead>
<tr>
<th>Location: 01A12</th>
<th>Name: Tony B.IAD test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit Rate: 1.544</td>
<td>Line Coding: b8zs</td>
</tr>
<tr>
<td>Line Compensation: 1</td>
<td>Framing Mode: esf</td>
</tr>
<tr>
<td>Signaling Mode: isdn-pri</td>
<td></td>
</tr>
<tr>
<td>Connect: pbx</td>
<td>Interface: network</td>
</tr>
<tr>
<td>TN-C7 Long Timers? n</td>
<td>Country Protocol: 1</td>
</tr>
<tr>
<td>Interworking Message: PROGRESS</td>
<td>Protocol Version: a</td>
</tr>
<tr>
<td>Interface Companding: mu-law</td>
<td>CRC? n</td>
</tr>
<tr>
<td>Idle Code: 11111111</td>
<td></td>
</tr>
</tbody>
</table>

DCP/Analog Bearer Capability: 3.1kHZ

<table>
<thead>
<tr>
<th>Slip Detection? n</th>
<th>Near-end CSU Type: other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block Progress Indicator? n</td>
</tr>
<tr>
<td>TRUNK GROUP</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td><strong>Group Number:</strong> 12</td>
<td><strong>Group Type:</strong> isdn</td>
</tr>
<tr>
<td><strong>Group Name:</strong> Tony B. IAD testing</td>
<td><strong>COR:</strong> 1</td>
</tr>
<tr>
<td><strong>Direction:</strong> two-way</td>
<td><strong>Outgoing Display:</strong> n</td>
</tr>
<tr>
<td><strong>Dial Access:</strong> y</td>
<td><strong>Busy Threshold:</strong> 99</td>
</tr>
<tr>
<td><strong>Queue Length:</strong> 0</td>
<td><strong>Auth Code:</strong> n</td>
</tr>
<tr>
<td><strong>Service Type:</strong> tie</td>
<td><strong>Far End Test Line No:</strong></td>
</tr>
</tbody>
</table>

**TestCall DCC:** 4

**TRUNK PARAMETERS**

- **Codeset to Send Display:** 0
- **Codeset to Send National IEs:** 6
- **Max Message Size to Send:** 260
- **Charge Advice:** none
- **Supplementary Service Protocol:** a
- **Digit Handling (in/out):** enbloc/enbloc
- **Trunk Hunt:** descend
- **QSIG Value-Added?** n
- **Digital Loss Group:** 13

**Calling Number - Delete:**

| **Bit Rate:** 1200 |
| **Synchronization:** async |
| **Duplex:** Full |

**Disconnect Supervision - In?** y  
**Out?** y

**Answer Supervision Timeout:** 0
### TRUNK FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA Assignment?</td>
<td>n</td>
</tr>
<tr>
<td>Measured: none</td>
<td></td>
</tr>
<tr>
<td>Internal Alert?</td>
<td>n</td>
</tr>
<tr>
<td>Maintenance Tests?</td>
<td>y</td>
</tr>
<tr>
<td>Data Restriction?</td>
<td>n</td>
</tr>
<tr>
<td>NCA-TSC Trunk Member:</td>
<td>1</td>
</tr>
<tr>
<td>Send Name:</td>
<td>y</td>
</tr>
<tr>
<td>Send Calling Number:</td>
<td>y</td>
</tr>
<tr>
<td>Used for DCS?</td>
<td>n</td>
</tr>
<tr>
<td>Suppress # Outpulsing?</td>
<td>n</td>
</tr>
<tr>
<td>Numbering Format:</td>
<td>public</td>
</tr>
<tr>
<td>Outgoing Channel ID Encoding:</td>
<td>preferred</td>
</tr>
<tr>
<td>UUI IE Treatment:</td>
<td>service-provider</td>
</tr>
<tr>
<td>Replace Restricted Numbers?</td>
<td>y</td>
</tr>
<tr>
<td>Replace Unavailable Numbers?</td>
<td>y</td>
</tr>
<tr>
<td>Send Connected Number:</td>
<td>y</td>
</tr>
<tr>
<td>Send UUI IE?</td>
<td>n</td>
</tr>
<tr>
<td>Send UCID?</td>
<td>n</td>
</tr>
<tr>
<td>Send Codeset 6/7 LAI IE?</td>
<td>n</td>
</tr>
<tr>
<td>Dst Echo Cancellation?</td>
<td>n</td>
</tr>
<tr>
<td>SBS?</td>
<td>n</td>
</tr>
<tr>
<td>Network (Japan) Needs Connect Before Disconnect?</td>
<td>n</td>
</tr>
</tbody>
</table>

### SIGNALING GROUP

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Number:</td>
<td>12</td>
</tr>
<tr>
<td>Group Type:</td>
<td>isdn-pri</td>
</tr>
<tr>
<td>Associated Signaling?</td>
<td>y</td>
</tr>
<tr>
<td>Max number of NCA TSC:</td>
<td>12</td>
</tr>
<tr>
<td>Primary D-Channel:</td>
<td>01A1224</td>
</tr>
<tr>
<td>Max number of CA TSC:</td>
<td>12</td>
</tr>
<tr>
<td>Trunk Group for NCA TSC:</td>
<td>12</td>
</tr>
<tr>
<td>Trunk Group for Channel Selection:</td>
<td>12</td>
</tr>
<tr>
<td>X-Mobility/Wireless Type:</td>
<td>NONE</td>
</tr>
<tr>
<td>Supplementary Service Protocol:</td>
<td>y</td>
</tr>
</tbody>
</table>
**Note:** When adding members to the trunk group you will need to add all available ports to the trunk group. For T1 you will configure all 23 available timeslots (e.g. 01A1201 thru 01A1223). Do so in a sequential manner.

<table>
<thead>
<tr>
<th>Port</th>
<th>Code Sfx</th>
<th>Name</th>
<th>Night</th>
<th>Sig Grp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td>01A1201</td>
<td>TN464 F</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>2:</td>
<td>01A1202</td>
<td>TN464 F</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>3:</td>
<td>01A1203</td>
<td>TN464 F</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>4:</td>
<td>01A1204</td>
<td>TN464 F</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

**Uniform Dial Plan Table**

<table>
<thead>
<tr>
<th>Matching Pattern</th>
<th>Insert Len</th>
<th>Del Digits</th>
<th>Net Conv Num</th>
<th>Matching Pattern</th>
<th>Insert Len</th>
<th>Del Digits</th>
<th>Net Conv Num</th>
</tr>
</thead>
<tbody>
<tr>
<td>4001</td>
<td>4</td>
<td>0</td>
<td>612 aar n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4002</td>
<td>4</td>
<td>0</td>
<td>612 aar n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AAR Digit Analysis Table**

<table>
<thead>
<tr>
<th>Dialed String</th>
<th>Total Min</th>
<th>Total Max</th>
<th>Route Pattern</th>
<th>Call Type</th>
<th>Node Num</th>
<th>AHI Reqd</th>
</tr>
</thead>
<tbody>
<tr>
<td>612</td>
<td>7</td>
<td>7</td>
<td>12</td>
<td>aar</td>
<td>n</td>
<td></td>
</tr>
</tbody>
</table>
### Station Information

**Extension:** 2004  
**Type:** 8410D  
**Port:** 01A0604  
**Name:** PRX-Ken1

**Station Options**
- **Loss Group:** 2  
- **Data Module:** n  
- **Speakerphone:** 2-way  
- **Display Language:** english

**Personalized Ringing Pattern:** 1  
**Message Lamp Ext:** 2004  
**Mute Button Enabled:** y  
**Media Complex Ext:**  
**IP SoftPhone:** n

---

### Pattern Information

**Pattern Number:** 12  
**Pattern Name:**

<table>
<thead>
<tr>
<th>Grp</th>
<th>FRL</th>
<th>NPA</th>
<th>Pfx</th>
<th>Hop</th>
<th>Toll No</th>
<th>Inserted Digits</th>
<th>Del Digits</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Mrk</td>
<td>Lmt</td>
<td>List</td>
<td>Digits</td>
<td>Intw</td>
<td>n user</td>
<td>user</td>
</tr>
</tbody>
</table>

#### BCC VALUE TSC CA-TSC ITC BCIE Service/Feature BAND No. Numbering LAR Digits Format Subaddress

| 1 | y | y | y | y | y | n | y | none | rest |
| 2 | y | y | y | y | y | n | n | none | rest |
| 3 | y | y | y | y | y | n | n | none | rest |
| 4 | y | y | y | y | y | n | n | none | rest |
| 5 | y | y | y | y | y | n | n | none | rest |
| 6 | y | y | y | y | y | n | n | none | rest |
STATION

FEATURE OPTIONS
LWC Reception: spc
LWC Activation? y
LWC Log External Calls? n
GDR Privacy? n
Redirect Notification? y
Per Button Ring Control? n
Bridged Call Alerting? n
Active Station Ringing: single
H.320 Conversion? n
Service Link Mode: as-needed
Multimedia Mode: basic
HWI Served User Type:

Auto Select Any Idle Appearance? n
Coverage Msg Retrieval? y
Auto Answer: none
Data Restriction? n
Idle Appearance Preference? n
Restrict Last Appearance? n
Per Station CPM – Send Calling Number?
Audible Message Waiting? y
Display Client Redirection? y
Select Last Used Appearance? n
Coverage After Forwarding? s
Multimedia Early Answer? n
Direct IP-IP Audio Connections? y
IP Audio Hairpinning? y

Emergency Location Ext: 2004

STATION

SITE DATA
Room:  
Jack:  
Cable:  
Floor:  
Building:  

Headset? n  
Speaker? n  
Mounting: d  
Cord Length: 0  
Set Color:  

ABBREVIATED DIALING
List1:  
List2:  
List3:  

BUTTON ASSIGNMENTS
1: call-appr  
2: call-appr  
3: cfwd-bsyda Ext:  
4:  
5:  
6:  
7:  
8:  
9:  
10: last-numb
Cisco IAD2432 24FXS Configuration

IAD_V7#sh run
Building configuration...

Current configuration : 2033 bytes

version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname IAD_V7
!
boot-start-marker
boot system flash:c2430-ik9o3s-mz-124-9.T1.bin
boot-end-marker
!
card type t1 1
enable secret 5 $1$SWJPesZ0iKHvDdxTEDUc2AwOoM0
!
no aaa new-model
!
resource policy
!
network-clock-participate T1 1/0
network-clock-participate T1 1/1
network-clock-select 1 T1 1/0
!
no ip domain lookup

SOFTKEY BUTTON ASSIGNMENTS

1: lwc-store
2: lwc-cancel
3: auto-cback
4: timer
5: call-fwd   Ext:
6: call-park
7: date-time
8: priority
9: abr-prog
10: abr-spchar Char: ~p
11: abr-spchar Char: ~m
12: abr-spchar Char: ~w
isdn switch-type primary-ni
isdn gateway-max-interworking
!
voice-card 0
!
controller T1 1/0
framing esf
linecode b8zs
pri-group timeslots 1-2,24
!
controller T1 1/1
framing esf
linecode b8zs
!
!
interface FastEthernet0/0
ip address 172.20.8.40 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
no ip address
ip broadcast-address 0.0.0.0
duplex auto
speed auto
!
interface Serial1/0:23
no ip address
encapsulation hdlc
isdn switch-type primary-5ess
isdn incoming-voice voice
isdn supp-service name calling ie 40 cs 0
no cdp enable
!
interface Serial1/0:23
default-gateway 172.20.8.1
ip http server
no ip http secure-server
!
interface Serial1/0:23
default-gateway 172.20.8.1
ip http server
no ip http secure-server
!
interface Serial1/0:23
default-gateway 172.20.8.1
ip http server
no ip http secure-server
!
interface Serial1/0:23
default-gateway 172.20.8.1
ip http server
no ip http secure-server
!
voice-port 2/2

voice-port 2/3

voice-port 2/4

voice-port 2/5

voice-port 2/6

voice-port 2/7

voice-port 2/8

voice-port 2/9

voice-port 2/10

voice-port 2/11

voice-port 2/12

voice-port 2/13

voice-port 2/14

voice-port 2/15

voice-port 2/16

voice-port 2/17

voice-port 2/18

voice-port 2/19

voice-port 2/20

voice-port 2/21

voice-port 2/22

voice-port 2/23

!

! dial-peer voice 4000 voip
  destination-pattern 4...
  supplementary-service pass-through
  session protocol sipv2
  session target ipv4:172.20.8.41

! dial-peer voice 2000 pots
  destination-pattern 2...
  supplementary-service pass-through
  direct-inward-dial
  port 1/0:23
  forward-digits all

!

!
!
!
!

line con 0
password cisco
login
line aux 0
line vty 0 4
password cisco
login
!
end
IAD_V7#
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAD</td>
<td>Integrated Access Device</td>
</tr>
<tr>
<td>SIP</td>
<td>Session Initiation Protocol</td>
</tr>
</tbody>
</table>
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