Introduction

- This application note contains the test results of Avaya Definity G3r V6 PBX interoperability testing via digital trunk (T1 CAS, E&M, wink start) interfaces under test to a Cisco C3745 Voice Router via installed NM-HDV2-T1/E1 Voice Interface Modules.
- This application note is directed toward testing interoperability of the NM-HDV2-T1/E1 Voice Interface Modules with an Avaya G3r V6 PBX.
- The application note is for Connectivity/Interoperability testing of the Avaya Definity G3r V6 PBX connected via the NM-HDV2-T1/E1 Voice Interface Modules to a Cisco C3745 Voice Router. The Cisco C3745 Voice Router under test is connected via Ethernet to an Ethernet switch which also has a Cisco Call Manager and IP Phones in the Network Topology.
- Figure 1 shows the test set-up for a Cisco C3745 Voice Router connected through an Ethernet switch and controlled via MGCP by a Cisco Call Manager.

Network Topology

Figure 1. Network Topology or Test Setup

The above diagram is representative of the configuration used for testing. As shown in the diagram above, a PBX is connected via an interface to a Cisco router, which in turn, is connected to an Ethernet switch which also has the CCM (Cisco Call Manager) IP Phones and a second Cisco router. The second Cisco router is connected to a second PBX. The interoperability testing involved signaling and audio path confirmation on the voice interfaces under test between each Cisco router and its associated PBX.
Limitations

- It was found that the correct position of J7 was critical to establish Layer 1 connectivity with the Nortel T1 PBX interface. Looking into the NM-HDV2-T1/E1 Voice Interface Modules in the direction of insertion into the Cisco Voice Router, the jumper should be placed to connect the left and middle pins.
- When phone A calls phone C and phone C answers the call or not, the actual call was placed from phone A to phone K, and then forwarded to phone C (see Figure 1).
- When phone C calls phone A and phone A answers the call or not, the actual call was placed from phone C to phone K, and then forwarded to phone A (see Figure 1).
- When phone G calls phone H and phone H answers the call, it may take a few seconds for this call to be torn down before it can be repeated (see Figure 1).
- When phone G calls phone H and phone H answers the call or not, it may take a few seconds for this call to be torn down before it can be repeated.
- When phone K calls phone H and phone H answers the call or not, the actual call was placed from phone K to phone C, and then forwarded to phone H (see Figure 1).

System Components

Hardware Requirements

- Cisco C3745 Voice Router with NM-HDV2-T1/E1 Voice Interface Modules
- Avaya Definity G3r V6 PBX

Software Requirements

- Cisco Unified CallManager Release 4.01
- Avaya Definity G3V6i.01.0.018.2
- Cisco Voice Router C3745: Cisco IOS Software, 3700 Software (C3745-ADENTERPRISEK9-M), Version 12.3(7)T, RELEASE SOFTWARE (fc1)

Configuration

Configuration Menus and Commands
Configuring the Avaya Definity G3 V6 PBX

Terminal Screenshot for Avaya T1 Trunk Configuration (1 of 5)

```
display trunk-group 13

TRUNK GROUP

Group Number: 13  Group Type: tie  CDR Reports: n
Group Name: T1/E1 TRUNK - SLOT 13  COR: 1  TN: 1  TAC: 613
Direction: two-way  Outgoing Display? y  Trunk Signaling Type:
Dial Access? y  Busy Threshold: 95  Night Service:
Queue Length: 0  Incoming Destination:
Comm Type: voice  Auth Code? n  Trunk Flash? n

TRUNK PARAMETERS

Trunk Type (in/out): wink/wink  Incoming Retery Timeout (sec): 
Outgoing Dial Type: tone  INCOMING Dial Type: tone
Wink Timer (msec): 300  Disconnect Timing (msec):
Digit Treatment:  Digits:
Connected to Toll? n  Sig Bit Inversion: none
Incoming Dial Tone? y  DTT to ECO Loss: normal

Disconnect Supervision - In? y  Out? n
Answer Supervision Timeout: 0  Receive Answer Supervision? y
```

CANCEL  REFRESH  HELP  GO TO  NEXT  PREV

Page 3 of 17
<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA Assignment</td>
<td>n</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>Call Handling</td>
<td>none</td>
</tr>
<tr>
<td>Used for DCS</td>
<td>n</td>
</tr>
<tr>
<td>Suppress # Outpulsing</td>
<td>n</td>
</tr>
<tr>
<td>Seize When Maintenance Busy</td>
<td>neither-end</td>
</tr>
<tr>
<td>Incoming Tona (DTMF) ANI</td>
<td>n</td>
</tr>
<tr>
<td>Connected to CO</td>
<td>n</td>
</tr>
</tbody>
</table>
Terminal Screenshot for Avaya T1 Trunk Configuration (3 of 5)

```
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>display trunk-group 13</td>
<td>TRUNK GROUP</td>
</tr>
</tbody>
</table>

**Administrable Timers**

<table>
<thead>
<tr>
<th>Timer Type</th>
<th>Value (msec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incoming Disconnect</td>
<td>500</td>
</tr>
<tr>
<td>Incoming Dial Guard</td>
<td>70</td>
</tr>
<tr>
<td>Incoming Glare Guard</td>
<td>1500</td>
</tr>
<tr>
<td>Outgoing Disconnect</td>
<td>500</td>
</tr>
<tr>
<td>Outgoing Dial Guard</td>
<td>1600</td>
</tr>
<tr>
<td>Outgoing Glare Guard</td>
<td>1500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Timer Type</th>
<th>Value (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outgoing Seizure Response</td>
<td>5</td>
</tr>
<tr>
<td>Programmed Dial Pause</td>
<td>1500</td>
</tr>
<tr>
<td>Disconnect Signal Error</td>
<td>240</td>
</tr>
<tr>
<td>Flash Length</td>
<td>540</td>
</tr>
<tr>
<td>Incoming Incomplete Dial Alarm</td>
<td>255</td>
</tr>
</tbody>
</table>

**End to End Signalling**

<table>
<thead>
<tr>
<th>Timer Type</th>
<th>Value (msec)</th>
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</thead>
<tbody>
<tr>
<td>Tone</td>
<td>350</td>
</tr>
<tr>
<td>Pause</td>
<td>150</td>
</tr>
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</table>

**Outputting Information**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPS</td>
<td>10</td>
</tr>
<tr>
<td>Make (msec)</td>
<td>40</td>
</tr>
<tr>
<td>Break (msec)</td>
<td>60</td>
</tr>
</tbody>
</table>
```
Terminal Screenshot for Avaya T1 Trunk Configuration (4 of 5)

<table>
<thead>
<tr>
<th>Display trunk-group 13</th>
<th>Page 4 of 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMS THRESHOLDS</td>
<td></td>
</tr>
<tr>
<td>TTL Type: 105-v-c1</td>
<td>TTL Contact:</td>
</tr>
<tr>
<td>TTL Vendor:</td>
<td>Trunk Contact:</td>
</tr>
<tr>
<td>Trunk Vendor:</td>
<td></td>
</tr>
<tr>
<td>Trunk Length:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NARGINAL</td>
</tr>
<tr>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>1004 Hz Loss:</td>
<td>-2</td>
</tr>
<tr>
<td>-Dev</td>
<td>+Dev</td>
</tr>
<tr>
<td>404 Hz Loss:</td>
<td>9</td>
</tr>
<tr>
<td>2004 Hz Loss:</td>
<td>9</td>
</tr>
<tr>
<td>Maximum C Message Noise:</td>
<td>55</td>
</tr>
<tr>
<td>Maximum C Notched Noise:</td>
<td>74</td>
</tr>
<tr>
<td>Minimum SRL-HI:</td>
<td>0</td>
</tr>
<tr>
<td>Minimum SRL-LO:</td>
<td>0</td>
</tr>
<tr>
<td>Minimum ERL:</td>
<td>0</td>
</tr>
</tbody>
</table>

Allow ATMS Busyout, Error Logging and Alarming? n

CANCEL  REFRESH  HELPFULL   GO TO   NEXT   PREV

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### Terminal Screenshot for Avaya T1 Trunk Configuration (5 of 5)

```
Display trunk-group 13

**TRUNK GROUP**

Administered Members (min/max): 1/12
Total Administered Members: 12

<table>
<thead>
<tr>
<th>Port</th>
<th>Code</th>
<th>STX Name</th>
<th>Right</th>
<th>Mode</th>
<th>Type</th>
<th>Ans Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>D1A1301</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>D1A1302</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>D1A1303</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>D1A1304</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>D1A1305</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>D1A1306</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>D1A1307</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>D1A1308</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>D1A1309</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>D1A1310</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>D1A1311</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>D1A1312</td>
<td>TN464</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

```
Configuring Cisco Unified CallManager

Route Patterns

Screenshot for Cisco Unified CallManager Route Patterns (Overview)
Screenshot for Cisco Unified CallManager Route Patterns (Pattern 7.XXXX to Avaya PBX)

<table>
<thead>
<tr>
<th>Route Pattern/Hunt Pilot: 7.XXXX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status: Ready</td>
</tr>
<tr>
<td>Note: Any update to this Route Pattern or Hunt Pilot automatically resets the associated gateway or Route/Hunt List</td>
</tr>
</tbody>
</table>

### Pattern Definition

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route Pattern/Hunt Pilot*</td>
<td>7.XXXX</td>
</tr>
<tr>
<td>Partition</td>
<td>&lt; None &gt;</td>
</tr>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Numbering Plan*</td>
<td>North American Numbering Plan</td>
</tr>
<tr>
<td>Route Filter</td>
<td>&lt; None &gt;</td>
</tr>
<tr>
<td>MLPP Precedence</td>
<td>Default</td>
</tr>
<tr>
<td>Gateway or Route/Hunt List*</td>
<td>SAD81-1GA-3745</td>
</tr>
<tr>
<td>Route Option</td>
<td>Route this pattern</td>
</tr>
<tr>
<td></td>
<td>Block this pattern</td>
</tr>
</tbody>
</table>

- **Provide Outside Dial Tone**
- **Allow Overlap Sending**
- **Urgent Priority**

### Calling Party Transformations

- **Use Calling Party's External Phone Number Mask**
- **Calling Party Transform Mask**: Not specified
- **Prefix Digits (Outgoing Calls)**: Not specified
- **Calling Line ID Presentation**: Default
- **Calling Name Presentation**: Default

### Connected Party Transformations

- **Connected Line ID Presentation**: Default
- **Connected Name Presentation**: Default

### Called Party Transformations

- **Discard Digits**: PreDot 11/0C>7D
- **Called Party Transform Mask**: Not specified
- **Prefix Digits (Outgoing Calls)**: Not specified

### ISDN Network-Specific Facilities Information Element

<table>
<thead>
<tr>
<th>Carrier Identification Code</th>
<th>Not specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Service Protocol</td>
<td>Not Selected</td>
</tr>
<tr>
<td>Network Service</td>
<td>Not Selected</td>
</tr>
<tr>
<td>Service Parameter Name</td>
<td>Not specified</td>
</tr>
<tr>
<td>Service Parameter Value</td>
<td>Not specified</td>
</tr>
</tbody>
</table>

* indicates required item.
### Gateway Configuration

**Product:** Cisco 3745  
**Gateway:** A-3745

**Status:** Ready

- [Update](#)  
- [Delete](#)  
- [Reset Gateway](#)

**Domain Name:** A-3745  
**Description:** A-3745  
**Cisco CallManager Group:** Default

#### Installed Voice Interface Cards

<table>
<thead>
<tr>
<th>Slot</th>
<th>Module</th>
<th>Subunit</th>
<th></th>
<th></th>
<th></th>
<th>Endpoint Identifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainboard</td>
<td>Slot 1</td>
<td>0</td>
<td>&lt;None&gt;</td>
<td>VIC2-2FXS</td>
<td>Begin</td>
<td>4/0/</td>
</tr>
<tr>
<td>Module in Slot 1</td>
<td></td>
<td>1</td>
<td>&lt;None&gt;</td>
<td></td>
<td>Port</td>
<td>0</td>
</tr>
<tr>
<td>Module in Slot 2</td>
<td></td>
<td>0</td>
<td>&lt;None&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module in Slot 3</td>
<td></td>
<td>0</td>
<td>&lt;None&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module in Slot 4</td>
<td></td>
<td>0</td>
<td>NM-HD-2VE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Product Specific Configuration

- **Global ISDN Switch Type:** 4ESS  
- **Switchback Timing:** Grostrau  
- **Switchback uptime-delay (min):** 10  
- **Switchback schedule (hh:mm):** 12:00

* indicates required item
Configuring the Cisco C3745 Voice Router

A-3745# sho run
Building configuration...

Current configuration : 2425 bytes

!

version 12.3

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname A-3745

!

boot-start-marker

boot-end-marker

!

card type t1 4 1

logging buffered 4096 debugging

!

no network-clock-participate slot 1

no network-clock-participate slot 2

no network-clock-participate slot 3

no network-clock-participate slot 4

no network-clock-participate wic 0

no network-clock-participate wic 1

no network-clock-participate wic 2

no network-clock-participate aim 0

no network-clock-participate aim 1

no aaa new-model

ip subnet-zero

ip cef

!

!

ip host B9 172.20.43.253

ip audit po max-events 100
no ftp-server write-enable
isdn switch-type primary-4ess
voice-card 4
dspfarm
!
!
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server 172.20.43.253
ccm-manager config
!
!
controller T1 4/0
   framing esf
   linecode b8zs
   pri-group timeslots 1-2,24 service mgcp
!
controller T1 4/1
   framing esf
   linecode b8zs
   ds0-group 1 timeslots 1-12 type e&m-wink-start
!
no crypto isakmp enable
!
!
interface FastEthernet0/0
   ip address 172.20.43.151 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
   no ip address
shutdown
duplex auto
speed auto
!
interface Serial4/0:23
no ip address
no logging event link-status
isdn switch-type primary-dms100
isdn protocol-emulate network
isdn incoming-voice modem
isdn incoming-voice voice
isdn bind-13 ccm-manager
no cdp enable
!
ip classless
ip route 0.0.0.0 0.0.0.0 FastEthernet0/0
!
ip http server
no ip http secure-server
!
!
control-plane
!
voice-port 4/0/0
!
voice-port 4/0/1
!
voice-port 4/0:23
!
voice-port 4/1:1
!
mgcp
mgcp call-agent 172.20.43.253 2427 service-type mgcp version 0.1
mgcp dtmf-relay voip codec all mode out-of-band
mgcp rtp unreachable timeout 1000 action notify
mgcp modem passthrough voip mode nse
mgcp package-capability rtp-package
no mgcp package-capability res-package
mgcp package-capability sst-package
no mgcp package-capability fxr-package
no mgcp timer receive-rtcp
mgcp sdp simple
mgcp fax t38 inhibit
mgcp rtp payload-type g726r16 static
!
mgcp profile default
!
!
dial-peer voice 999411 pots
   application mgcpapp
   port 4/1:1
!
dial-peer voice 999400 pots
   application mgcpapp
   port 4/0/0
!
dial-peer voice 999401 pots
   application mgcpapp
   port 4/0/1
!
line con 0
line aux 0
line vty 0 4
login
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