



## Avaya Solution & Interoperability Test Lab

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# Application Notes for Citrix Communication Gateway with Avaya Communication Manager using E1 and T1 ISDN-PRI QSIG – Issue 1.0

### Abstract

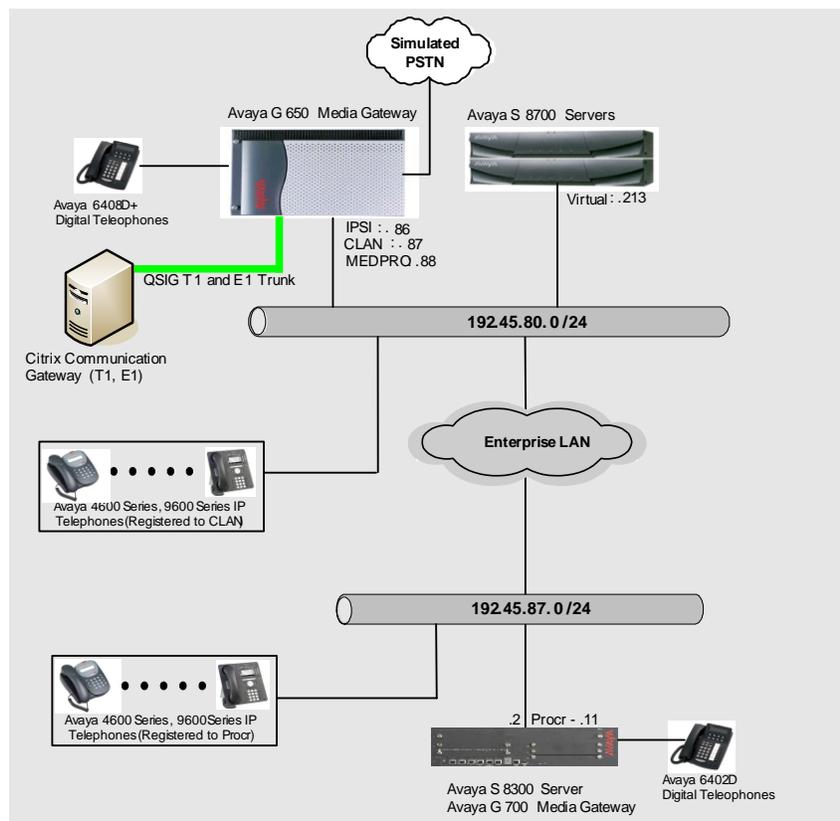
These Application Notes describe the procedures for configuring E1 and T1 ISDN-PRI QSIG integration between Citrix Communication Gateway and Avaya Communication Manager. Citrix Communication Gateway enables emergency phone redirection from a users work phone to an emergency number defined by the employee in the event of a workforce disruption scenario. Citrix Communication Gateway also provides click to call capability via standard E1 and T1 ISDN-PRI QSIG trunks. When users select a telephone number from within an application, or the Citrix Directory service, the Citrix Communication Gateway places a call to the user. When the user answers, the Citrix Communication Gateway places a second call to the desired destination. The Citrix Communication Gateway then connects the two call legs and disconnects, freeing its resources to handle additional calls.

Information in these Application Notes has been obtained through *DeveloperConnection* compliance testing and additional technical discussions. Testing was conducted via the *DeveloperConnection* Program at the Avaya Solution and Interoperability Test Lab.

# 1. Introduction

These Application Notes describe the procedures for configuring E1 and T1 ISDN-PRI QSIG integration between Citrix Communication Gateway and Avaya Communication Manager. Citrix Communication Gateway enables emergency phone redirection from a users work phone to an emergency number defined by the employee in the event of a workforce disruption scenario. Citrix Communication Gateway also provides click to call capability via standard E1 and T1 ISDN-PRI QSIG trunks. When users select a telephone number from within an application, or the Citrix Directory service, the Citrix Communication Gateway places a call to the user. When the user answers, the Citrix Communication Gateway places a second call to the desired destination. The Citrix Communication Gateway then connects the two call legs and disconnects, freeing its resources to handle additional calls.

**Figure 1** illustrates a sample configuration consisting of an Avaya S8300 Server, an Avaya G700 Media Gateway, and Citrix Communication Gateway. The solution described herein is also extensible to other Avaya Servers and Media Gateways. Avaya S8700 Servers with an Avaya G650 Media Gateway were included in the test to provide an inter-switch scenario. For completeness, Avaya 4600 Series H.323 IP Telephones, Avaya 9600 Series H.323 IP Telephones, and Avaya 6400 Series Digital Telephones, are included.



**Figure 1: Avaya DeveloperConnection Compliance Test Configuration**

## 2. Equipment and Software Validated

The following equipment and software/firmware were used for the sample configuration provided:

Equipment		Software/Firmware
Avaya S8700 Servers		Avaya Communication Manager 4.0.1 (R014x.00.1.731.2)
Avaya G650 Media Gateway		-
	TN2312BP IP Server Interface	HW11 FW030
	TN799DP C-LAN Interface	HW1 FW 17
	TN2302AP IP Media Processor	HW20 FW108
	TN464F DS1	000018
Avaya S8300 Server with Avaya G700 Media Gateway		Avaya Communication Manager 4.0.1 (R014x.00.1.731.2)
Avaya 4600 Series IP Telephones		
	4620SW (H.323)	2.7.0.4
	4625SW (H.323)	2.7.0.4
Avaya 9600 Series IP Telephone		1.1
	9630 (H.323)	S1.2.1
	9650 (H.323)	S1.2.0
Avaya 6400 Series Digital Telephones		-
Citrix Communication Gateway on Linux 2.6.17-1.2142_FC4		1.0

### 3. Configure Avaya Communication Manager

This section describes the steps for configuring E1 and T1 ISDN-PRI QSIG trunks, call coverage and call routing on Avaya Communication Manager. The steps are performed from the Avaya Communication Manager System Access Terminal (SAT) interface.

#### 3.1. E1 Configuration

In the Avaya G650 media gateway, the DS1 circuit pack must be physically configured for an appropriate mode (T1 or E1). The DS1 board has 24 channels in T1 mode or 32 channels in E1 mode. The default is set to the T1 mode. To modify the DS1 board to use in E1 mode, the dipswitch on the DS1 circuit pack must be switched to the 32 channels side. However, a DS1 board in the Avaya G700 media gateway does not required the above physical change.

##### 3.1.1. System Parameters

This section reviews the features that are required for the solution described in these Application Notes. Contact an authorized Avaya account representative to obtain the licenses for required licensed features that are not enabled in the system-parameters customer-options form discussed below.

Step	Description
1.	<p data-bbox="277 984 1393 1052">Enter the <b>display system-parameters customer-options</b> command. On Page 3, verify the DS1 MSP field is set to <b>y</b> to create an E1 interface.</p> <pre data-bbox="277 1089 1414 1577"> display system-parameters customer-options                               Page 3 of 11                                 OPTIONAL FEATURES  Abbreviated Dialing Enhanced List? n      Audible Message Waiting? n Access Security Gateway (ASG)? n          Authorization Codes? y Analog Trunk Incoming Call ID? n          CAS Branch? n A/D Grp/Sys List Dialing Start at 01? n   CAS Main? n Answer Supervision by Call Classifier? n   Change COR by FAC? n ARS? y      Computer Telephony Adjunct Links? n ARS/AAR Partitioning? y                   Cvg Of Calls Redirected Off-net? n ARS/AAR Dialing without FAC? y            DCS (Basic)? n ASAI Link Core Capabilities? y            DCS Call Coverage? n ASAI Link Plus Capabilities? y           DCS with Rerouting? n Async. Transfer Mode (ATM) PNC? n Async. Transfer Mode (ATM) Trunking? n    Digital Loss Plan Modification? n ATM WAN Spare Processor? n                DS1 MSP? y ATMS? n      DS1 Echo Cancellation? n Attendant Vectoring? n </pre> <p data-bbox="410 1661 1338 1686">(NOTE: You must logoff &amp; login to effect the permission changes.)</p>

Step	Description
2.	<p data-bbox="277 233 951 268">On Page 4, verify that the ISDN-PRI field is set to y.</p> <pre data-bbox="277 302 1430 867"> display system-parameters customer-options                               Page 4 of 11                                 OPTIONAL FEATURES  Emergency Access to Attendant? y                                     IP Stations? y   Enable 'dadmin' Login? y   Enhanced Conferencing? y   ISDN Feature Plus? n   Enhanced EC500? y   ISDN Network Call Redirection? n Enterprise Survivable Server? n                                     ISDN-BRI Trunks? n   Enterprise Wide Licensing? n                                       ISDN-PRI? y   ESS Administration? n   Local Survivable Processor? n   Extended Cvg/Fwd Admin? y   Malicious Call Trace? n External Device Alarm Admin? n                                     Media Encryption Over IP? y Five Port Networks Max Per MCC? n   Mode Code for Centralized Voice Mail? n   Flexible Billing? n Forced Entry of Account Codes? n                                   Multifrequency Signaling? y   Global Call Classification? n                                       Multimedia Call Handling (Basic)? n   Hospitality (Basic)? y   Multimedia Call Handling (Enhanced)? n Hospitality (G3V3 Enhancements)? n   IP Trunks? y  IP Attendant Consoles? y </pre>
3.	<p data-bbox="277 879 1065 915">On Page 5, verify that the Private Networking field is set to y.</p> <pre data-bbox="277 949 1430 1461"> display system-parameters customer-options                               Page 5 of 11                                 OPTIONAL FEATURES  Multinational Locations? y   Station and Trunk MSP? y Multiple Level Precedence &amp; Preemption? n   Station as Virtual Extension? n   Multiple Locations? y Personal Station Access (PSA)? n   System Management Data Transfer? n   Posted Messages? n   Tenant Partitioning? n   PNC Duplication? n   Terminal Trans. Init. (TTI)? n   Port Network Support? n   Time of Day Routing? n   Processor and System MSP? n   Uniform Dialing Plan? y   Private Networking? y   Usage Allocation Enhancements? y   Processor Ethernet? y   N2501 VAL Maximum Capacity? y   Remote Office? n   Wideband Switching? n   Restrict Call Forward Off Net? y   Wireless? n   Secondary Data Module? y </pre>
4.	<p data-bbox="277 1474 1078 1509">On Page 8, verify that the highlighted fields below are set to y.</p> <pre data-bbox="277 1543 1430 1814"> display system-parameters customer-options                               Page 8 of 11                                 QSIG OPTIONAL FEATURES  Basic Call Setup? y Basic Supplementary Services? y   Centralized Attendant? y   Interworking with DCS? n Supplementary Services with Rerouting? y   Transfer into QSIG Voice Mail? y   Value-Added (VALU)? y </pre>

### 3.1.2. Configure E1 ISDN-PRI QSIG Trunk

This section describes the steps for configuring the Avaya Communication Manager side of the E1 ISDN-PRI QSIG trunk.

Step	Description
1.	<p>Enter the <b>list configuration all</b> command, and note the Board Number for the DS1 circuit pack to be configured.</p> <pre data-bbox="277 485 1455 867"> list configuration all                                  SYSTEM CONFIGURATION  Board                               Assigned Ports Number  Board Type                Code   Vintage  u=unassigned t=tti p=psa 001V1   ICC MM                    S8300B HW04 FW001 001V2   DS1 MM                    MM710AP HW05 FW018 01 02 03 04 05 06 07 08                                 09 10 u u u u u 16                                 u u u u u u u u                                 u u u u u u u u 001V3   DCP MM                    MM712AP HW07 FW007 01 u u u u u u u 001V4   ANA MM                    MM711AP HW27 FW068 01 u u u u u u u </pre>
2.	<p>Enter the <b>add ds1 x</b> command, where <b>x</b> is the board number of the DS1 circuit pack noted in Step 1. Enter a descriptive Name and set the other highlighted fields below to the values indicated.</p> <p><i>Note: Avaya Communication Manager was set to peer-master on the Interface field. This means Citrix Communication Gateway should be set to peer-slave or CPE on its Interface field.</i></p> <pre data-bbox="277 1163 1455 1663"> add ds1 lv2                                     Page 1 of 1                                  DS1 CIRCUIT PACK  Location: 001V2                                Name: Citrix-E1 Bit Rate: 2.048                                Line Coding: hdb3  Signaling Mode: isdn-pri Connect: pbx                                    Interface: peer-master TN-C7 Long Timers? n                           Peer Protocol: Q-SIG Interworking Message: PROGRESS                  Side: b Interface Companding: alaw                       CRC? y Idle Code: 11111111                            Channel Numbering: sequential DCP/Analog Bearer Capability: 3.1kHz  T303 Timer(sec): 4  Slip Detection? n                               Near-end CSU Type: other </pre>

Step	Description
3.	<p>Enter the <b>add signaling-group s</b> command, where <b>s</b> is an unused signaling group number. Set the highlighted fields below to the values indicated. Note that the Primary D-Channel field is channel 16 on the DS1 board for an E1.</p> <pre> add signaling-group 12                                     Page 1 of 1                 SIGNALING GROUP  Group Number: 12                Group Type: isdn-pri                 Associated Signaling? y                Max number of NCA TSC: 30                 Primary D-Channel: 001V216                Max number of CA TSC: 30                 Trunk Group for NCA TSC:                 Trunk Group for Channel Selection:                 TSC Supplementary Service Protocol: b </pre>
4.	<p>Enter the <b>add trunk-group t</b> command, where <b>t</b> is an unused trunk group number. On Page 1 of the trunk-group form, enter a descriptive Group Name and enter a TAC that is valid under the provisioned dial plan. Set the other highlighted fields below to the values indicated.</p> <pre> add trunk-group 12                                     Page 1 of 21                 TRUNK GROUP  Group Number: 12                Group Type: isdn                CDR Reports: y Group Name: E1-Citrix                COR: 1                TN: 1                TAC: 112                 Direction: two-way                Outgoing Display? n                Carrier Medium: PRI/BRI                 Dial Access? n                Busy Threshold: 255                Night Service:                 Queue Length: 0                 Service Type: tie                Auth Code? n                TestCall ITC: rest                 Far End Test Line No:                 TestCall BCC: 4 </pre>
5.	<p>On Page 2, set the Supplementary Service Protocol field to <b>b</b> to indicate that QSIG supplementary services will be provided on this trunk group.</p> <pre> add trunk-group 12                                     Page 2 of 21                 Group Type: isdn  TRUNK PARAMETERS                 Codeset to Send Display: 6                Codeset to Send National IEs: 6                 Max Message Size to Send: 260                Charge Advice: none                 Supplementary Service Protocol: b                Digit Handling (in/out): enbloc/enbloc                  Trunk Hunt: ascend                  Digital Loss Group: 13                 Incoming Calling Number - Delete:                Insert:                Format: lev0-pvt                 Bit Rate: 1200                Synchronization: async                Duplex: full                 Disconnect Supervision - In? y                Out? y                 Answer Supervision Timeout: 0                 Administer Timers? n </pre>

Step	Description
6.	<p data-bbox="277 233 893 268">On Page 3, set the highlighted fields below to y.</p> <pre data-bbox="277 302 1453 871"> add trunk-group 12                                     Page 3 of 21 TRUNK FEATURES   ACA Assignment? n                               Measured: none           Wideband Support? n  Internal Alert? n         Maintenance Tests? y  Data Restriction? n      NCA-TSC Trunk Member: 1  Send Name: y             Send Calling Number: y   Used for DCS? n                               Hop Dgt? n               Send EMU Visitor CPN? n   Suppress # Outpulsing? n                     Format: private   Outgoing Channel ID Encoding: preferred       UUI IE Treatment: service-provider   Replace Restricted Numbers? n  Replace Unavailable Numbers? n  Send Connected Number: y  Hold/Unhold Notifications? n  Modify Tandem Calling Number? n    Send UUI IE? y                               Modify Tandem Calling Number? n   Send UCID? n   Send Codeset 6/7 LAI IE? y                   Ds1 Echo Cancellation? n    Apply Local Ringback? n   Show ANSWERED BY on Display? y  Network (Japan) Needs Connect Before Disconnect? n </pre>
7.	<p data-bbox="277 884 1128 919">On Page 4, set the highlighted fields below to the values indicated.</p> <pre data-bbox="277 953 1453 1304"> add trunk-group 12                                     Page 4 of 21  QSIG TRUNK GROUP OPTIONS    TSC Method for Auto Callback: drop-if-possible   Diversion by Reroute? y   Path Replacement? y   Path Replacement with Retention? n   Path Replacement Method: always  SBS? n   Display Forwarding Party Name? y   Character Set for QSIG Name: eurofont   QSIG Value-Added? N </pre>

Step	Description
8.	<p>On Page 5, add trunk members by entering:</p> <ul style="list-style-type: none"> <li>• <b>xxxxzz</b> for <b>Port</b>, where <b>xxxx</b> is the board number of the DS1 circuit pack configured in Step 2, and <b>zz</b> is a channel in the E1 ISDN-PRI.</li> <li>• The number of the signaling group configured in Step 3 for the Sig Grp field.</li> </ul> <p>For the compliance test, channels 1 – 10 of the E1 ISDN-PRI were added. Channel 16, the signaling channel configured in Step 3, was excluded.</p> <pre data-bbox="277 527 1453 982"> add trunk-group 12                                     Page 5 of 21                                      TRUNK GROUP                                      Administered Members (min/max): 1/10 GROUP MEMBER ASSIGNMENTS                               Total Administered Members: 10     Port   Code Sfx Name      Night      Sig Grp ----- 1: 001V201 MM710                12 2: 001V202 MM710                12 3: 001V203 MM710                12 4: 001V204 MM710                12 5: 001V205 MM710                12 6: 001V206 MM710                12 7: 001V207 MM710                12 8: 001V208 MM710                12 9: 001V209 MM710                12 10: 001V210 MM710                12 </pre>
9.	<p>Enter the <b>change signaling-group s</b> command, where <b>s</b> is the number of the signaling group configured in Step 3. Set the Trunk Group for Channel Selection field value to the trunk group configured in Step 4.</p> <pre data-bbox="277 1136 1453 1373"> change signaling-group 12                               Page 1 of 1                                      SIGNALING GROUP  Group Number: 12          Group Type: isdn-pri Associated Signaling? y   Max number of NCA TSC: 30 Primary D-Channel: 001V216 Max number of CA TSC: 30                                      Trunk Group for NCA TSC: 12 Trunk Group for Channel Selection: 12 TSC Supplementary Service Protocol: b </pre>

## 3.2. T1 Configuration

Steps for the T1 configuration are mostly the same as for the E1 configuration, previously discussed in Section 3.1. This section only describes the steps unique to the T1 configuration.

### 3.2.1. System Parameters

Refer to Section 3.1.1.

### 3.2.2. Configure T1 ISDN-PRI QSIG Trunk

This section describes the steps for configuring the Avaya Communication Manager side of the T1 ISDN-PRI QSIG trunk.

Step	Description
1.	<p>Enter the <b>list configuration all</b> command, and note the Board Number for the DS1 circuit pack to be configured.</p> <pre data-bbox="277 325 1453 682"> list configuration all                                  SYSTEM CONFIGURATION  Board                               Assigned Ports Number  Board Type                Code    Vintage  u=unassigned t=tti p=psa  001V1   ICC MM                    S8300B  HW04 FW001 001V2   DS1 MM                      MM710AP HW05 FW018 01 02 03 04 05 06 07 08                                 09 10 u  u  u  u  u  u                                 u  u  u  u  u  u  u  24 001V3   DCP MM                    MM712AP HW07 FW007 01 u  u  u  u  u  u 001V4   ANA MM                    MM711AP HW27 FW068 01 u  u  u  u  u  u </pre>
2.	<p>Enter the <b>add ds1 x</b> command, where <b>x</b> is the board number of the DS1 circuit pack noted in Step 1. Enter a descriptive Name and set the other highlighted fields below to the values indicated.</p> <p><i>Note: Avaya Communication Manager was set to peer-master on the Interface field. This means Citrix Communication Gateway should be set to peer-slave or CPE on its Interface field.</i></p> <pre data-bbox="277 976 1453 1474"> add ds1 lv2                                Page 1 of 2                                  DS1 CIRCUIT PACK  Location: 001V2                            Name: Citrix-T1 Bit Rate: 1.544                            Line Coding: b8zs Line Compensation: 1                        Framing Mode: esf Signaling Mode: isdn-pri                    Interface: peer-master Connect: pbx                                Peer Protocol: Q-SIG TN-C7 Long Timers? n                        Side: a Interworking Message: PROGRESS              CRC? n Interface Companding: mulaw                 Idle Code: 11111111                                 DCP/Analog Bearer Capability: 3.1kHz                                 T303 Timer(sec): 4  Slip Detection? n                            Near-end CSU Type: other </pre>

Step	Description
3.	<p>Enter the <b>add signaling-group s</b> command, where <b>s</b> is an unused signaling group number. Set the highlighted fields below to the values indicated. Note that the Primary D-Channel field is channel 24 on the DS1 board for an T1.</p> <pre data-bbox="277 373 1453 625"> add signaling-group 12                                     Page 1 of 1                 SIGNALING GROUP  Group Number: 12                Group Type: isdn-pri                 Associated Signaling? y                Max number of NCA TSC: 20                 Primary D-Channel: 001V224                Max number of CA TSC: 20                 Trunk Group for NCA TSC:                 Trunk Group for Channel Selection:                 TSC Supplementary Service Protocol: b </pre>
4.	<p>Enter the <b>add trunk-group t</b> command, where <b>t</b> is an unused trunk group number. On Page 1 of the trunk-group form, enter a descriptive Group Name and enter a TAC that is valid under the provisioned dial plan. Set the other highlighted fields below to the values indicated.</p> <pre data-bbox="277 814 1453 1121"> add trunk-group 12                                     Page 1 of 21                 TRUNK GROUP  Group Number: 12                Group Type: isdn                CDR Reports: y Group Name: T1-Citrix                COR: 1                TN: 1                TAC: 112                 Direction: two-way                Outgoing Display? n                Carrier Medium: PRI/BRI                 Dial Access? n                Busy Threshold: 255                Night Service:                 Queue Length: 0                 Service Type: tie                Auth Code? n                TestCall ITC: rest                 Far End Test Line No:                 TestCall BCC: 4 </pre>
5.	<p>On Page 2, set the Supplementary Service Protocol field to <b>b</b> to indicate that QSIG supplementary services will be provided on this trunk group.</p> <pre data-bbox="277 1234 1453 1642"> add trunk-group 12                                     Page 2 of 21                 Group Type: isdn  TRUNK PARAMETERS                 Codeset to Send Display: 6                Codeset to Send National IEs: 6                 Max Message Size to Send: 260                Charge Advice: none                 Supplementary Service Protocol: b                Digit Handling (in/out): enbloc/enbloc                  Trunk Hunt: ascend                  Digital Loss Group: 13                 Incoming Calling Number - Delete:                Insert:                Format: lev0-pvt                 Bit Rate: 1200                Synchronization: async                Duplex: full                 Disconnect Supervision - In? y                Out? y                 Answer Supervision Timeout: 0                 Administer Timers? n </pre>

Step	Description
6.	<p data-bbox="277 233 894 268">On Page 3, set the highlighted fields below to y.</p> <pre data-bbox="277 302 1453 871"> add trunk-group 12 TRUNK FEATURES   ACA Assignment? n   Measured: none   Wideband Support? n   Internal Alert? n   Maintenance Tests? y   Data Restriction? n   NCA-TSC Trunk Member: 1   Send Name: y   Send Calling Number: y   Used for DCS? n   Hop Dgt? n   Send EMU Visitor CPN? n   Suppress # Outpulsing? n   Format: private   Outgoing Channel ID Encoding: preferred   UUI IE Treatment: service-provider   Replace Restricted Numbers? n   Replace Unavailable Numbers? n   Send Connected Number: y   Hold/Unhold Notifications? n   Modify Tandem Calling Number? n   Send UUI IE? y   Send UCID? n   Send Codeset 6/7 LAI IE? y   Ds1 Echo Cancellation? n   Apply Local Ringback? n   Show ANSWERED BY on Display? y   Network (Japan) Needs Connect Before Disconnect? n </pre>
7.	<p data-bbox="277 884 1130 919">On Page 4, set the highlighted fields below to the values indicated.</p> <pre data-bbox="277 953 1453 1304"> add trunk-group 12 QSIG TRUNK GROUP OPTIONS   TSC Method for Auto Callback: drop-if-possible   Diversion by Reroute? y   Path Replacement? y   Path Replacement with Retention? n   Path Replacement Method: always   SBS? n   Display Forwarding Party Name? y   Character Set for QSIG Name: eurofont   QSIG Value-Added? N </pre>

Step	Description
8.	<p>On Page 5, add trunk members by entering:</p> <ul style="list-style-type: none"> <li>• <b>xxxxzz</b> for <b>Port</b>, where <b>xxxx</b> is the board number of the DS1 circuit pack configured in Step 2, and <b>zz</b> is a channel in the T1 ISDN-PRI.</li> <li>• The number of the signaling group configured in Step 3 for the Sig Grp field.</li> </ul> <p>For the compliance test, channels 1 – 10 of the T1 ISDN-PRI were added. Channel 24, the signaling channel configured in Step 3, was excluded.</p> <pre data-bbox="277 527 1453 982"> add trunk-group 12                                     Page 5 of 21                                      TRUNK GROUP                                      Administered Members (min/max): 1/10 GROUP MEMBER ASSIGNMENTS                               Total Administered Members: 10     Port   Code Sfx Name      Night      Sig Grp ----- 1: 001V201 MM710                12 2: 001V202 MM710                12 3: 001V203 MM710                12 4: 001V204 MM710                12 5: 001V205 MM710                12 6: 001V206 MM710                12 7: 001V207 MM710                12 8: 001V208 MM710                12 9: 001V209 MM710                12 10: 001V210 MM710                12 </pre>
9.	<p>Enter the <b>change signaling-group s</b> command, where <b>s</b> is the number of the signaling group configured in Step 3. Set the Trunk Group for Channel Selection field value to the trunk group configured in Step 4.</p> <pre data-bbox="277 1136 1453 1375"> change signaling-group 12                               Page 1 of 1                                      SIGNALING GROUP  Group Number: 12          Group Type: isdn-pri Associated Signaling? y   Max number of NCA TSC: 20 Primary D-Channel: 001V224 Max number of CA TSC: 20                                      Trunk Group for NCA TSC: 12 Trunk Group for Channel Selection: 12 TSC Supplementary Service Protocol: b </pre>

### 3.3. Configure Coverage Path

This section describes the steps for configuring a coverage path and assigning the coverage path to Avaya Communication Manager stations.

Step	Description
<p><b>1.</b></p>	<p>Enter the <b>add coverage path c</b> command, where <b>c</b> is the number of an unused coverage path, and set the Point1 field to the remote call coverage.</p> <pre> add coverage path 79                                     Page 1 of 1                                 COVERAGE PATH                                 Coverage Path Number: 79                                 Next Path Number:          Hunt after Coverage? y   Linkage                                 COVERAGE CRITERIA                                 Station/Group Status   Inside Call   Outside Call                                 Active?                n             n                                 Busy?                  Y             Y                                 Don't Answer?          Y             Y             Number of Rings: 2                                 All?                   n             n                                 DND/SAC/Goto Cover?    Y             Y                                 Holiday Coverage?     n             n                                 COVERAGE POINTS                                 Terminate to Coverage Pts. with Bridged Appearances? n                                 Point1: r1001          Rng:          Point2:                                 Point3:                Point4:                                 Point5:                Point6:           </pre>
<p><b>2.</b></p>	<p>Enter the <b>change coverage remote r</b> command, where <b>r</b> is the remote call coverage table. The remote call coverage was set to r1001 in Step 1. That means the remote call coverage table should be 2, since the remote call coverage table 2 covers for the remote call coverage 1001 to 2000.</p> <p>During compliance testing, the extension 44444 was configured on Citrix Communication Gateway.</p> <pre> change coverage remote 2                                 Page 1 of 23                                 REMOTE CALL COVERAGE TABLE                                 ENTRIES FROM 1001 TO 2000                                 01: 44444            16:           31:                                 02:                   17:           32:                                 03:                   18:           33:           </pre>

Step	Description
3.	<p>Enter the <b>change station e</b> command, where <b>e</b> is the extension of a station under test. On Page 1, set <b>Coverage Path</b> to the number of the coverage path configured in Step 1.</p> <pre> change station 72002                                     Page 1 of 5                                      STATION  Extension: 72002   Lock Messages? n      BCC: 0 Type: 4625   Security Code: x      TN: 1 Port: S00010   Coverage Path 1: 79   COR: 1 Name: G700-IP2   Coverage Path 2:      COS: 1  Hunt-to Station:  STATION OPTIONS  Loss Group: 19   Time of Day Lock Table:  Personalized Ringing Pattern: 1  Message Lamp Ext: 72002 Speakerphone: 2-way                                       Mute Button Enabled? y Display Language: english                               Expansion Module? n Survivable GK Node Name:                                 Media Complex Ext: Survivable COR: internal                                 IP SoftPhone? n Survivable Trunk Dest? y   Customizable Labels? y </pre>

### 3.4. Configure Call Routing

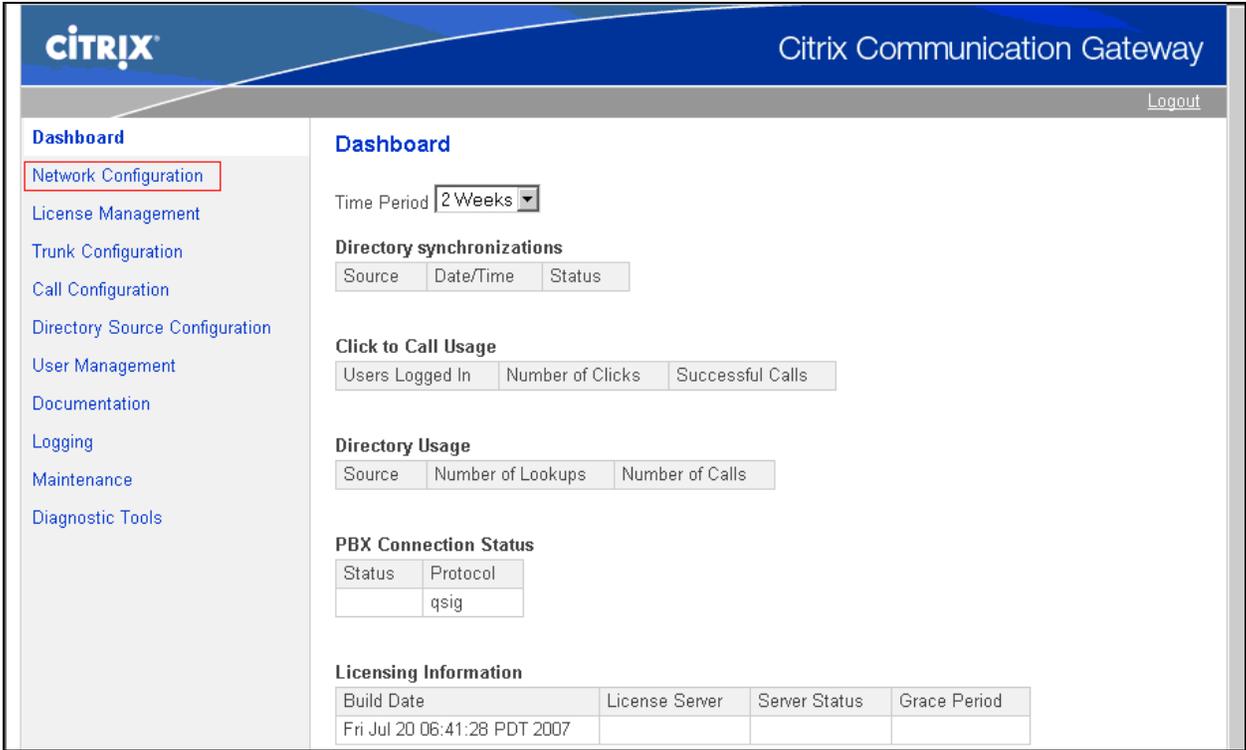
This section describes the configuration steps for routing calls to the E1 and T1 ISDN-PRI QSIG trunk connected to Citrix Communication Gateway and Citrix Voice Messaging.

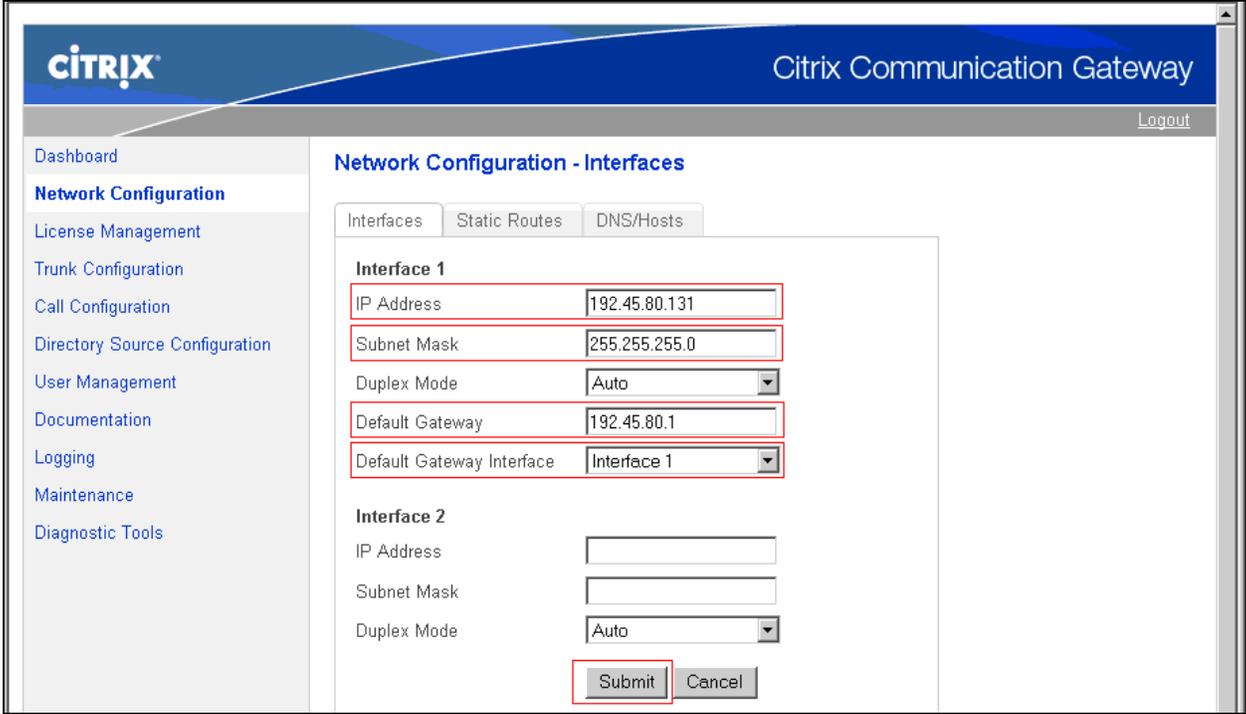
Step	Description
1.	<p>Enter the <b>change uniform-dialplan d</b> command, where <b>d</b> is any digit that is valid under the provisioned dial plan. Enter the whole or a partial Citrix Communication Gateway extension. Enter the Citrix Communication Gateway extension's first digit (or first few digits) for the Matching Pattern field. Enter the length of the Citrix Communication Gateway extension for the Len field. The Del field set to <b>0</b>, and the Net field is set to <b>aar</b>.</p> <pre> change uniform-dialplan 4                               Page 1 of 2                                      UNIFORM DIAL PLAN TABLE                                      Percent Full: 0  Matching          Insert          Node Pattern          Len Del          Digits          Net Conv Num 44444            5 0            aar n </pre>
2.	<p>Enter the <b>change aar analysis d</b> command, where <b>d</b> is any digit that is valid under the provisioned dial plan. Enter the whole or a partial Citrix Communication Gateway extension configured in Step 2 in Section 3.3. Enter the number of an unused route pattern for the Route Pattern field. The route pattern will be defined in Step 3. The Call Type field is set to <b>aar</b>.</p> <pre> change aar analysis 4                                   Page 1 of 2                                      AAR DIGIT ANALYSIS TABLE                                      Percent Full: 1  Dialed          Total          Route          Call          Node          ANI String          Min Max          Pattern          Type          Num          Reqd 44444          5 5            12            aar          n </pre>

Step	Description
<p><b>3.</b></p>	<p>Enter the <b>change route-pattern r</b> command, where <b>r</b> is the number of the route pattern specified in Step 2. Enter the number of the trunk group configured in Section 3.1.1 or 3.1.2 Steps 4 – 8 for the Grp No field. Assign a Facility Restriction Level to this routing preference for the FRL field. The FRL value 0 is the least restrictive.</p> <p>Note: The route pattern shown below consists of two routes, one to trunk group 12 and the other to trunk group 99. It was necessary to configure two route patterns to test the call redirect feature from Citrix Communication Gateway. The following describes this scenario:</p> <ul style="list-style-type: none"> <li>• Avaya Communication Manager sends Call Setup message to Citrix Communication Gateway.</li> <li>• As the Call Setup message arrives, Citrix Communication Gateway sends Denial Events message (34 –No circ/channel available) back to Avaya Communication manager, using the same trunk member.</li> <li>• When Avaya Communication Manager receives the Denial Events message (34), it looks at the LAR field. If the value is set to <b>next</b>, it will send the Call Setup message to the next route in the route pattern.</li> </ul> <pre> change route-pattern 12                                     Page 1 of 3       Pattern Number: 12  Pattern Name: Citrix                 SCCAN? n   Secure SIP? n   Grp FRL NPA Pfx Hop Toll No.  Inserted                DCS/IXC   No          Mrk Lmt List Del  Digits                QSIG                                      Dgts                Intw 1: 12   0          0          0          0          n use 2: 99   0          0          0          0          n use        BCC VALUE  TSC CA-TSC   ITC BCIE Service/Feature PARM  No. Numbering LAR       0 1 2 M 4 W      Request          Subaddress 1: y y y y y n  y  as-needed  bothept          lev0-pvt next 2: y y y y y n  n          rest          none </pre>
<p><b>4.</b></p>	<p>To allow external/PSTN calls to access Citrix Communication Gateway, ensure that the proper digit treatment is applied to incoming trunk calls. This can be accomplished by using the <b>change inc-call-handling-trmt trunk-group x</b>, where <b>x</b> is the incoming calls trunk group number.</p> <pre> change inc-call-handling-trmt trunk-group 80               Page 1 of 30   Service/      Called      Called      Del Insert          Per Call Night   Feature       Len         Number          CPN/BN  Serv tie            5  22942          5  72002 </pre>

## 4. Configuring Citrix Communication Gateway

Citrix configures the Communication Gateway application for their end customers. Ensure that the Communication Gateway configuration is consistent with the corresponding Avaya Communication Manager configurations described in Section 3. This section only focuses on the interface between Avaya Communication Manager and Citrix Communication Gateway.

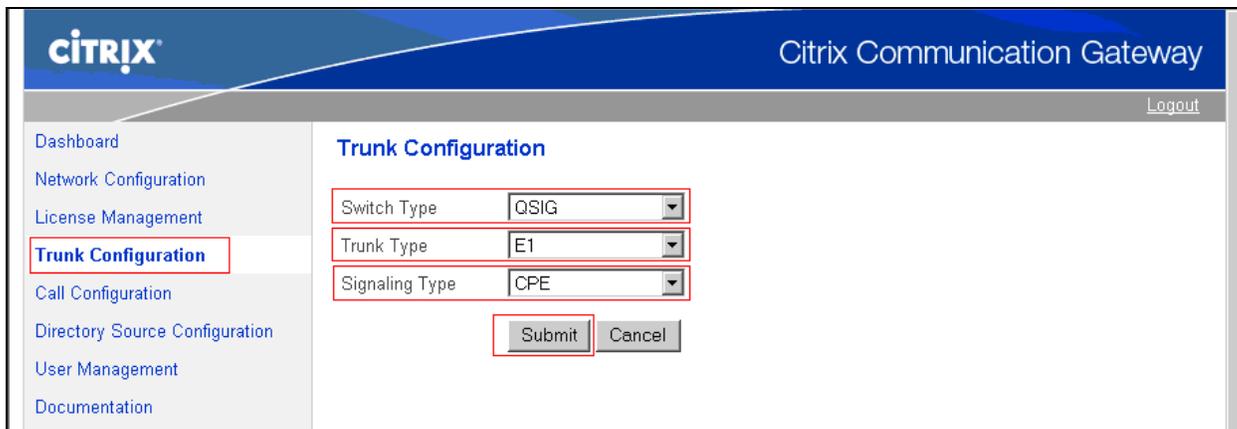
Step	Description
1.	<p>Launch a web browser by entering <a href="https://&lt;IP address of Citrix Communication Gateway&gt;:8443">https://&lt;IP address of Citrix Communication Gateway&gt;:8443</a> in the URL, and log in with the appropriate credentials for accessing the Dashboard page.</p> 
2.	<p>In the Dashboard page, select the <b>Network Configuration</b> link from the left pane to configure the network configuration.</p> 

Step	Description
3.	<p>In the Network Configuration-Interface page, the following highlighted fields were configured for the compliance test:</p> <ul style="list-style-type: none"> <li>• IP Address – Enter the IP address of Citrix Communication Gateway.</li> <li>• Subnet Mask – Enter the subnet mask of the network that Citrix Communication Gateway is located.</li> <li>• Default Gateway – Enter the default gateway IP address of Citrix Communication Gateway.</li> <li>• Default Gateway Interface – Select an interface, using the drop down menu, that the default gateway should utilize.</li> </ul> <p>Click on the <b>Submit</b> button to save the network configuration. After the completion, select the <b>Trunk Configuration</b> link from the left pane to configure the trunk.</p> 

Step	Description
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4. **For E1:** In the Trunk Configuration page, the following highlighted fields were configured for the compliance test:
- Switch Type – Set to **QSIG**, using the drop down menu.
  - Trunk Type – Set to **E1**, using the drop down menu.
  - Signal Type – Set to **CPE**, using the drop down menu.

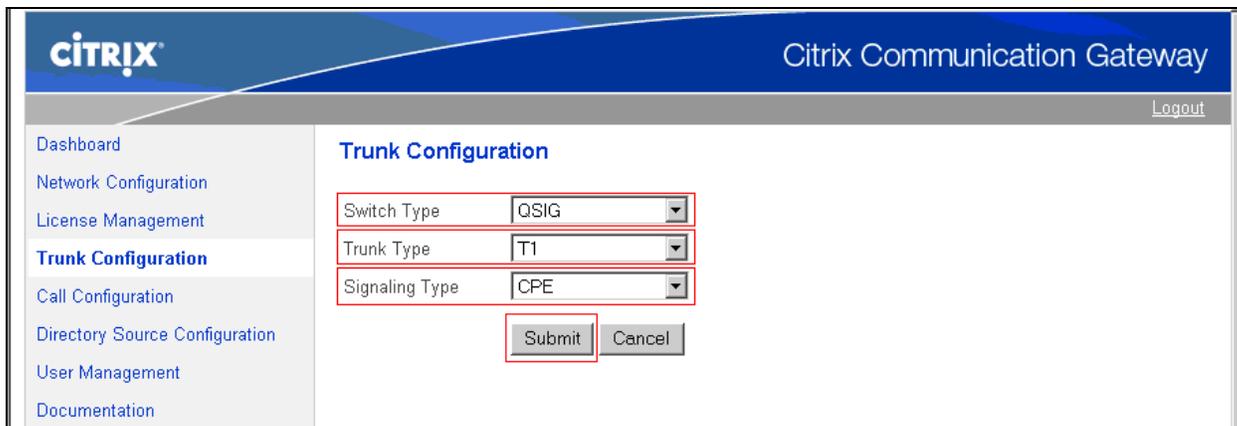
Click on the **Submit** button to save the trunk configuration.



- For T1:** In the Trunk Configuration page, the following highlighted fields were configured for the compliance test:
- Switch Type – Set to **QSIG**, using the drop down menu.
  - Trunk Type – Set to **T1**, using the drop down menu.
  - Signal Type – Set to **CPE**, using the drop down menu.

Note: Prior to T1 configuration, the dip switch in the quad-T1/E1 board has to be configured for T1. The quad-T1/E1 board set to E1, as a default.

Click on the **Submit** button to save the trunk configuration.



## 5. Interoperability Compliance Testing

The interoperability compliance testing focused on verifying the path replacement and call redirect features utilizing E1 and T1 ISDN-PRI QSIG integration between Avaya Communication Manager and Citrix Communication Gateway.

### 5.1. General Test Approach

The general test approach was to place intra-switch, inter-switch and PSTN calls manually to a station that configured a coverage path to Citrix Communication Gateway. Citrix Communication Gateway then locates the employ by dialing the number at which the employ provisioned the number where they can be reached. Calls from intra-switch, inter-switch and PSTN callers are able to leave voice messages, using a call redirect feature. Citrix Communication Gateway is able to place two calls to two different stations and bridge these two phones using click to call feature.

### 5.2. Test Results

The feature and functionality test cases passed.

## 6. Verification Steps

The following steps may be used to verify the configuration:

- Verify a path replacement – From the SAT, enter the command **status trunk s**, where **s** is the number of the trunk group configured in Section 3, and verify that two trunk group members are utilized during the call. However, those two trunk members are freed after a few seconds.
- Verify a call redirect – From the SAT, enter the command **status trunk s**, where **s** is the number of the trunk group configured in Section 3, and verify that a trunk group member is utilized during the Call Setup message. After the call redirect, the trunk group member is freed.
- Verify click to call – Let Citrix Communication Gateway call two numbers (“a” and “b”). As station “a” picks up, station “b” should ring. At this point, enter the command **status trunk s**, where **s** is the number of the trunk group configured in Section 3, and verify that two trunk group members are utilized. As station “b” goes off-hook, those two trunk members are freed after few seconds.

## 7. Support

For technical support on Citrix Communication Gateway, contact Citrix support at:

- Phone: 1-800-424-8749
- E-mail: [Ravinder.Braich@citrix.com](mailto:Ravinder.Braich@citrix.com)

## 8. Conclusion

These Application Notes describes the procedures for configuring E1 and T1 ISDN-PRI QSIG integration between Citrix Communication Gateway (Release 1.0) and Avaya Communication Manager (Release 4.0.1). Citrix Communication Gateway successfully performed path replacement, call redirect, and click to call.

## 9. Additional References

The following Avaya product documentation can be found at <http://support.avaya.com>.

[1] *Feature Description and Implementation for Avaya Communication Manager*, Release 4.0, Issue 5, February 2007, Document Number 555-245-205.

[2] *Application Enablement Services Administration and Maintenance Guide*, Release 4.0, Issue 6, February 2007, Document Number 02-300357.

The following document was provided by Citrix.

[3] *Design Specification, Communication Server*, July 18 2007

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