



Avaya Solution & Interoperability Test Lab

Application Notes for Lyrinx Enterprise Voice Messaging and Auto Attendant with Avaya Communication Manager 3.1.2 using E1 ISDN-PRI QSIG – Issue 1.0

Abstract

These Application Notes describe the procedures for configuring E1 ISDN-PRI QSIG integration between a Lyrinx Enterprise Voice Messaging and Auto Attendant server and Avaya Communication Manager 3.1.2. The Lyrinx Enterprise Voice Messaging and Auto Attendant platforms are Linux-based software applications deployed on Dell PowerEdge servers. During compliance testing, Lyrinx Enterprise Voice Messaging successfully provided typical voice messaging functionality, including Message Waiting Indicator, and Lyrinx Auto Attendant successfully transferred calls to the appropriate Avaya Communication Manager extension. Information in these Application Notes has been obtained through 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 a compliance-tested solution comprised of Avaya Communication Manager 3.1.2, Lyrix Enterprise Voice Messaging, and Lyrix Auto Attendant. Lyrix provides administrative and technical management of enterprises' voice messaging operations through its managed service program called Voice Messaging Services (VMS). The voice mail platforms supported under the Lyrix VMS program include Lyrix Enterprise Voice Messaging and certain other third-party voice mail servers. The solution described in these Application Notes pertains only to the Lyrix Enterprise Voice Messaging and Auto Attendant platforms, which are Linux-based software applications deployed on Dell PowerEdge servers (e.g. 2600, 2650, 2800, 2850, 2900, 2950).

Figure 1 illustrates a sample configuration consisting of an Avaya S8710 Media Server, an Avaya G650 Media Gateway, Avaya 4600 Series IP Telephones, Avaya 2400 and 8400 Series Digital Telephones, analog telephones, and a Lyrix Enterprise Voice Messaging and Auto Attendant server. Avaya Communication Manager runs on the S8710 Media Server. The solution described herein is also extensible to other Avaya Media Servers and Media Gateways. The Lyrix Enterprise Voice Messaging and Auto Attendant server are connected to the Avaya G650 Media Gateway by an E1 ISDN-PRI QSIG trunk.

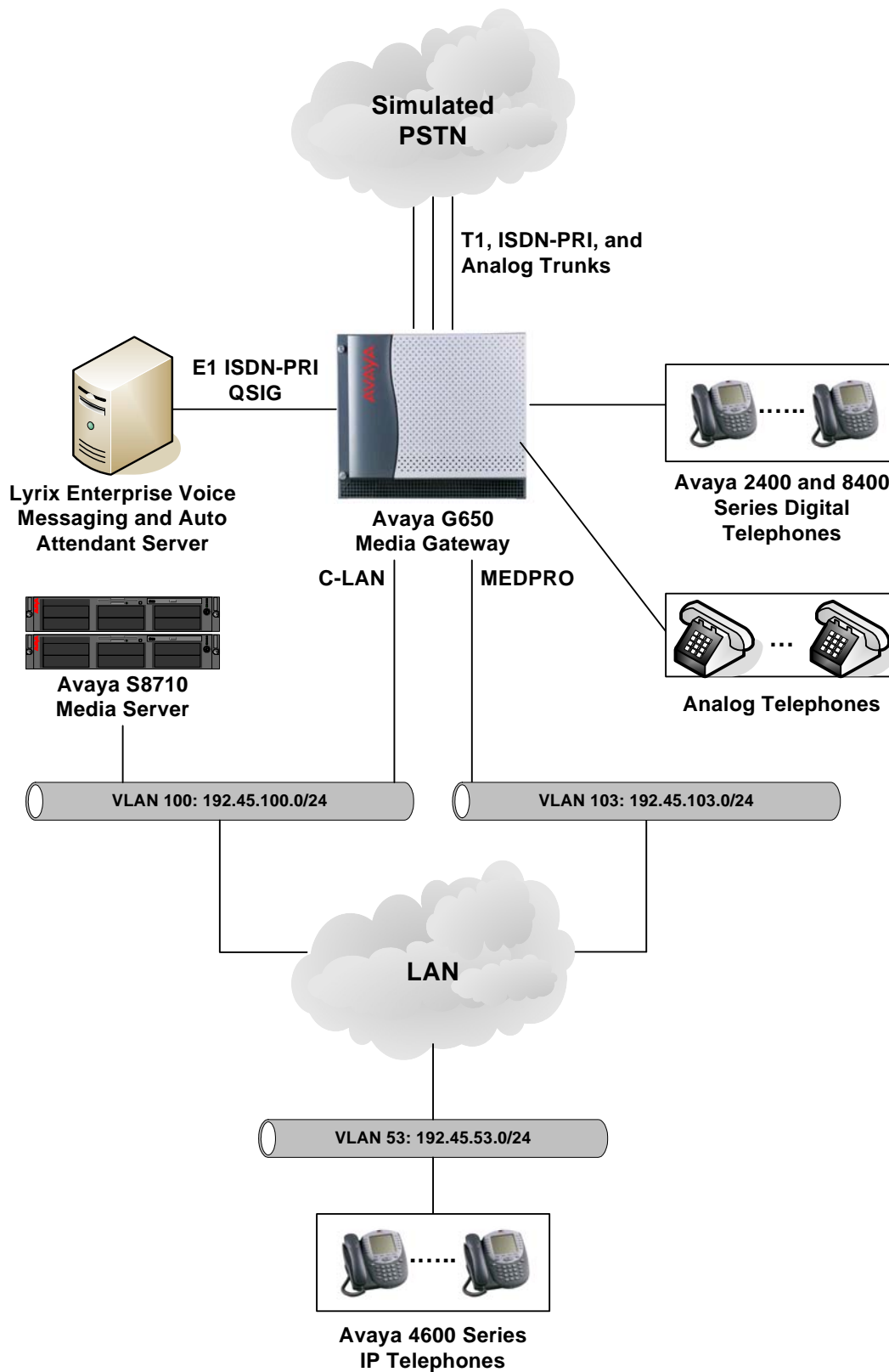


Figure 1: Sample configuration.

2. Equipment and Software Validated

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

Equipment		Software/Firmware
Avaya S8710 Media Server		Avaya Communication Manager 3.1.2 (R013x.01.2.632.1) with Patch 12261
Avaya G650 Media Gateway		-
	TN2312BP IP Server Interface	HW12 FW 31
	TN799DP C-LAN Interface	HW1 FW 17
	TN2302AP IP Media Processor	HW20 FW 112
	TN464GP DS1	HW2 FW18
Avaya 4600 Series IP Telephones		2.4 (4610SW H.323) 2.5 (4625SW H.323)
Avaya 2400 and 8400 Series Digital Telephones		-
Dell PowerEdge 2600 Server		-
	Red Hat Linux	7.2 kernel 2.4.20-28.7
	Intel Dialogic D/600JCT-2E1	SR 5.1 FP2 SU61
	Informix DBMS	9.30.UC1
	Lyrix Enterprise Voice Messaging	4.1.101
	Lyrix Auto Attendant	4.5.101
	Lyrix Toolkit Application Environment	3.1.1
Analog Telephones		-

3. Configure Avaya Communication Manager

This section describes the steps for configuring E1 ISDN-PRI QSIG integration, 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. System Parameters

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

Step	Description
1.	<p>Enter the display system-parameters customer-options command. On Page 3 of the system-parameters customer-options form, verify that Audible Message Waiting is set to “y”. This license allows Avaya Communication Manager telephones to receive stutter dial tone when a message is waiting. With the Audible Message Waiting license enabled, Audible Message Waiting can also be enabled and disabled on a per-telephone basis.</p> <pre>display system-parameters customer-options Page 3 of 10 OPTIONAL FEATURES Abbreviated Dialing Enhanced List? y Audible Message Waiting? y Access Security Gateway (ASG)? n Authorization Codes? n Analog Trunk Incoming Call ID? n Backup Cluster Automatic Takeover? n A/D Grp/Sys List Dialing Start at 01? n CAS Branch? n Answer Supervision by Call Classifier? n CAS Main? n ARS? y Change COR by FAC? n ARS/AAR Partitioning? n Computer Telephony Adjunct Links? n ARS/AAR Dialing without FAC? y Cvg Of Calls Redirected Off-net? n ASAI Link Core Capabilities? y DCS (Basic)? n ASAI Link Plus Capabilities? n DCS Call Coverage? n Async. Transfer Mode (ATM) PNC? n DCS with Rerouting? n Async. Transfer Mode (ATM) Trunking? n ATM WAN Spare Processor? n Digital Loss Plan Modification? n ATMS? n DS1 MSP? n Attendant Vectoring? n DS1 Echo Cancellation? n</pre>

Step	Description
2.	<p>On Page 4 of the system-parameters customer-options form, verify that ISDN-PRI is set to “y”.</p> <pre> display system-parameters customer-options Page 4 of 10 OPTIONAL FEATURES Emergency Access to Attendant? y IP Stations? y Enable 'dadmin' Login? y Internet Protocol (IP) PNC? n 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? n 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 Appl. Server Interface (MASI)? n Hospitality (Basic)? y Multimedia Call Handling (Basic)? n Hospitality (G3V3 Enhancements)? n Multimedia Call Handling (Enhanced)? n IP Trunks? y IP Attendant Consoles? y </pre>
3.	<p>On Page 5 of the system-parameters customer-options form, verify that Private Networking is set to “y”.</p> <pre> display system-parameters customer-options Page 5 of 10 OPTIONAL FEATURES Multinational Locations? n Station and Trunk MSP? n Multiple Level Precedence & Preemption? n Station as Virtual Extension? n Multiple Locations? n 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? y Time of Day Routing? n Processor and System MSP? n Uniform Dialing Plan? y Private Networking? y Usage Allocation Enhancements? y Processor Ethernet? n TN2501 VAL Maximum Capacity? y Remote Office? n Wideband Switching? n Restrict Call Forward Off Net? y Wireless? n Secondary Data Module? y </pre>

Step	Description
4.	<p>On Page 8 of the system-parameters customer-options form, verify that the bolded fields below are set to “y”.</p> <pre> display system-parameters customer-options QSIG OPTIONAL FEATURES Basic Call Setup? y Basic Supplementary Services? y Centralized Attendant? n Interworking with DCS? n Supplementary Services with Rerouting? y Transfer into QSIG Voice Mail? y Value-Added (VALU)? y </pre>
5.	<p>Enter the change system-parameters features command. On Page 8 of the system-parameters features form, configure the following:</p> <ul style="list-style-type: none"> • QSIG TSC Extension – enter any unused extension that is valid under the provisioned dial plan. • MWI - Number of Digits Per Voice Mail Subscriber – enter the number of digits used for station extensions. • QSIG Path Replacement Extension – enter any unused extension that is valid under the provisioned dial plan. <pre> change system-parameters features FEATURE-RELATED SYSTEM PARAMETERS ISDN PARAMETERS Send Non-ISDN Trunk Group Name as Connected Name? n Display Connected Name/Number for ISDN DCS Calls? n Send ISDN Trunk Group Name on Tandem Calls? n QSIG TSC Extension: 56100 MWI - Number of Digits Per Voice Mail Subscriber: 5 National CPN Prefix: International CPN Prefix: Pass Prefixed CPN to ASAI? n Unknown Numbers Considered Internal for AUDIX? n USNI Calling Name for Outgoing Calls? n Path Replacement with Measurements? n QSIG Path Replacement Extension: 56200 Path Replace While in Queue/Vectoring? n </pre>

Step	Description
6.	<p>Enter the change system-parameters coverage-forwarding command. Set Maintain SBA at Principal to “n” to ensure that when a call redirects to coverage (i.e., to voicemail), the appearance on the covered station is removed. Removal of the appearance prevents a person at the station from bridging onto the covered call (i.e., prevents a person from listening to the call as a voice message is being left).</p>
	<pre> change system-parameters coverage-forwarding SYSTEM PARAMETERS CALL COVERAGE / CALL FORWARDING CALL COVERAGE/FORWARDING PARAMETERS Local Cvg Subsequent Redirection/CFWD No Ans Interval (rings): 2 Off-Net Cvg Subsequent Redirection/CFWD No Ans Interval (rings): 2 Coverage - Caller Response Interval (seconds): 4 Threshold for Blocking Off-Net Redirection of Incoming Trunk Calls: 1 COVERAGE Keep Held SBA at Coverage Point? y External Coverage Treatment for Transferred Incoming Trunk Calls? n Immediate Redirection on Receipt of PROGRESS Inband Information? n Maintain SBA At Principal? n QSIG VALU Coverage Overrides QSIG Diversion with Rerouting? n Station Hunt Before Coverage? n FORWARDING Call Forward Override? y Coverage After Forwarding? y </pre>

3.2. Dial Plan

Enter the **display dialplan analysis** command to view the provisioned dial plan. Note the following dialed strings are configured in the dial plan below:

- 3-digit dial access codes (indicated with a **Call Type** of “**dac**”) beginning with the digit “1” – Trunk Access Codes defined for trunk groups must conform to this format.
- 5-digit extensions (indicated with a **Call Type** of “**ext**”) beginning with the digit “5” – station, hunt group, QSIG extensions, etc. must conform to this format.
- Single-digit (“8” and “9”) feature access codes (indicated with a **Call Type** of “**fac**”) – These dialed strings will be interpreted as Feature Access Codes (FACs).

display dialplan analysis						Page 1 of 12		
						DIAL PLAN ANALYSIS TABLE		
						Percent Full: 2		
Dialed String	Total Length	Call Type	Dialed String	Total Length	Call Type	Dialed String	Total Length	Call Type
1	3	dac						
5	5	ext						
8	1	fac						
9	1	fac						

3.3. 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 list configuration all command and note the Board Number DS1 circuit pack to be configured.</p> <pre>list configuration all</pre> <p style="text-align: right;">Page 6</p> <pre> SYSTEM CONFIGURATION Board Number Board Type Code Vintage Assigned Ports u=unassigned t=tti p=psa 01B09 DS1 INTERFACE TN464GP HW02 FW018 u u u u u u u u u u u u u u u u u u u u u u u u u u u u u u u u </pre>
2.	<p>Enter the add ds1 xxxxx command, where xxxxx is the board number of the DS1 circuit pack noted in Step 1. Enter a descriptive Name and set the other bolded fields below to the values indicated.</p> <pre>add ds1 1b09</pre> <p style="text-align: right;">Page 1 of 1</p> <pre> DS1 CIRCUIT PACK Location: 01B09 Name: PRI QSIG 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: a Interface Companding: alaw CRC? y Idle Code: 11111111 Channel Numbering: timeslot 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 add signaling-group s command, where s is an unused signaling group number. Set the bolded fields below to the values indicated. Note that the Primary D-Channel is set to the 16th channel of the DS1 circuit pack configured in the previous step.</p> <pre> add signaling-group 9 Page 1 of 1 SIGNALING GROUP Group Number: 9 Group Type: isdn-pri Associated Signaling? y Max number of NCA TSC: 10 Primary D-Channel: 01B0916 Max number of CA TSC: 10 Trunk Group for NCA TSC: Trunk Group for Channel Selection: Supplementary Service Protocol: b </pre>
4.	<p>Enter the add trunk-group t command, where t is an unused trunk group number. On Page 1 of the trunk-group form, enter a descriptive Group Name and enter a Trunk Access Code (TAC) that is valid under the provisioned dial plan. Set the other bolded fields below to the values indicated.</p> <pre> add trunk-group 9 Page 1 of 21 TRUNK GROUP Group Number: 9 Group Type: isdn CDR Reports: y Group Name: QSIG-E1 COR: 1 TN: 1 TAC: 109 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 of the trunk-group form, set “Supplementary Service Protocol to “b” to indicate that QSIG supplementary services will be provided on this trunk group.</p> <pre> add trunk-group 9 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: cyclical QSIG Value-Added? n Digital Loss Group: 13 Incoming Calling Number - Delete: Insert: Format: Bit Rate: 1200 Synchronization: async Duplex: full Disconnect Supervision - In? y Out? n Answer Supervision Timeout: 0 </pre>

Step	Description
6.	<p>On Page 3 of the trunk-group form, set the bolded fields below to the values indicated.</p> <pre> add trunk-group 9 Page 3 of 21 TRUNK FEATURES ACA Assignment? n Measured: none Wideband Support? n Maintenance Tests? y Data Restriction? n NCA-TSC Trunk Member: Send Name: y Send Calling Number: y Used for DCS? n Send EMU Visitor CPN? n Suppress # Outpulsing? n Format: unk-pvt Outgoing Channel ID Encoding: preferred UII IE Treatment: service-provider Replace Restricted Numbers? n Replace Unavailable Numbers? n Send Connected Number: y Hold/Unhold Notifications? y Send UII IE? y Modify Tandem Calling Number? n Send UCID? n Send Codeset 6/7 LAI IE? y Dsl Echo Cancellation? n Apply Local Ringback? n Network (Japan) Needs Connect Before Disconnect? n </pre>
7.	<p>On Page 4 of the trunk-group form, set the bolded fields below to the values indicated.</p> <pre> add trunk-group 9 Page 4 of 21 QSIG TRUNK GROUP OPTIONS 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 </pre>

Step	Description
8.	<p>On Page 5 of the trunk-group form, add trunk members by entering:</p> <ul style="list-style-type: none"> • xxxxxxzz for Port, where xxxxxx is the board number of the DS1 circuit pack configured in Step 2, and zz is a channel in the E1 ISDN-PRI. • the number of the signaling group configured in Step 3 for Sig Grp. <p>For the compliance test, channels 1 – 15 and 17 – 31 of the E1 ISDN-PRI were added (channel 16, the signaling channel configured in Step 3, was excluded).</p> <pre> add trunk-group 9 Page 5 of 21 TRUNK GROUP Administered Members (min/max): 0/0 GROUP MEMBER ASSIGNMENTS Total Administered Members: 0 Port Code Sfx Name Night Sig Grp 1: 01B0901 TN464 G 9 2: 01B0902 TN464 G 9 3: 01B0903 TN464 G 9 4: 01B0904 TN464 G 9 5: 01B0905 TN464 G 9 6: 01B0906 TN464 G 9 7: 01B0907 TN464 G 9 8: 01B0908 TN464 G 9 9: 01B0909 TN464 G 9 10: 01B0910 TN464 G 9 11: 01B0911 TN464 G 9 12: 01B0912 TN464 G 9 13: 01B0913 TN464 G 9 14: 01B0914 TN464 G 9 15: 01B0915 TN464 G 9 </pre>
9.	<p>Return to Page 3 of the trunk-group form, and set NCA-TSC Trunk Member to a trunk member added in Step 8.</p> <pre> add trunk-group 9 Page 3 of 21 TRUNK FEATURES ACA Assignment? n Measured: none Wideband Support? n Maintenance Tests? y Data Restriction? n NCA-TSC Trunk Member: 31 Send Name: y Send Calling Number: y Send EMU Visitor CPN? n Used for DCS? n Suppress # Outpulsing? n Format: unk-pvt Outgoing Channel ID Encoding: preferred UII IE Treatment: service-provider Replace Restricted Numbers? n Replace Unavailable Numbers? n Send Connected Number: y Hold/Unhold Notifications? y Modify Tandem Calling Number? n Send UII IE? y Send UCID? n Send Codeset 6/7 LAI IE? y Dsl Echo Cancellation? n Apply Local Ringback? n Network (Japan) Needs Connect Before Disconnect? n </pre>

Step	Description
10.	<p>Enter the change signaling-group s command, where s is the number of the signaling group configured in Step 3. Set Trunk Group for NCA TSC and Trunk Group for Channel Selection to the trunk group configured in Steps 4 – 9.</p> <pre> change signaling-group 9 Page 1 of 1 SIGNALING GROUP Group Number: 9 Group Type: isdn-pri Associated Signaling? y Max number of NCA TSC: 10 Primary D-Channel: 01B0916 Max number of CA TSC: 10 Trunk Group for NCA TSC: 9 Trunk Group for Channel Selection: 9 Supplementary Service Protocol: b </pre>
11.	<p>Enter the change private numbering command. Ensure that Network Level is set to “0” and the Level 2 Code and Level 1 Code field values are blank.</p> <pre> change private-numbering Page 1 of 1 NUMBERING - PRIVATE FORMAT Network Level: 0 PBX Identifier: Level 2 Code: Deleted Digits: 0 Level 1 Code: </pre>
12.	<p>Enter the change public-unknown numbering l command, where l is an extension length defined in the dial plan (see Section 3.2). This table defines the Calling Party Number (CPN) on outbound calls sent to specific ISDN-PRI trunk groups, such as the trunk group connected to Lyrix Enterprise Voice Messaging. Add an entry as follows:</p> <ul style="list-style-type: none"> • Ext Len and Ext Code – set to the length and first digit (or first few digits), respectively, of extensions assigned to Avaya Communication Manager stations. • Trk Grp(s) – enter the number of the trunk group configured in Steps 4 – 9. • CPN Prefix – enter any digits to prepend to the extension of the Avaya Communication Manager calling station. In the example below, no additional digits are prepended. • CPN Len – enter the total CPN length, comprised of the Ext Len and the CPN Prefix. <pre> change public-unknown-numbering 5 Page 1 of 2 NUMBERING - PUBLIC/UNKNOWN FORMAT Ext Len Ext Code Trk Grp(s) CPN Prefix Total CPN Len 5 50 9 5 </pre>

3.4. Routing to Lyrix Enterprise Voice Messaging

This section describes the configuration steps for routing calls to the E1 ISDN-PRI QSIG trunk connected to Lyrix Enterprise Voice Messaging.

Step	Description
1.	<p>Enter the change feature-access-codes command. For Auto Alternate Routing (AAR) Access Code, enter a FAC that is valid under the provisioned dial plan. In the example below, “8” is used to invoke AAR.</p> <pre> change feature-access-codes Page 1 of 6 FEATURE ACCESS CODE (FAC) Abbreviated Dialing List1 Access Code: Abbreviated Dialing List2 Access Code: Abbreviated Dialing List3 Access Code: Abbreviated Dial - Prgm Group List Access Code: Announcement Access Code: Answer Back Access Code: Attendant Access Code: Auto Alternate Routing (AAR) Access Code: 8 Auto Route Selection (ARS) - Access Code 1: 9 Access Code 2: Automatic Callback Activation: Deactivation: Call Forwarding Activation Busy/DA: #97 All: Deactivation: Call Park Access Code: Call Pickup Access Code: CAS Remote Hold/Answer Hold-Unhold Access Code: CDR Account Code Access Code: Change COR Access Code: Change Coverage Access Code: Contact Closure Open Code: Close Code: Contact Closure Pulse Code: </pre>
2.	<p>Enter the add hunt-group h command, where h is an unused hunt group number. On Page 1 of the hunt-group form, enter a descriptive Group Name and assign a Group Extension that is valid under the provisioned dial plan.</p> <pre> add hunt-group 2 Page 1 of 60 HUNT GROUP Group Number: 2 ACD? n Group Name: Voicemail Queue? n Group Extension: 55000 Vector? n Group Type: ucd-mia Coverage Path: TN: 1 Night Service Destination: COR: 1 MM Early Answer? n Security Code: Local Agent Preference? n ISDN/SIP Caller Display: grp-name </pre>

Step	Description												
3.	<p>On Page 2 of the hunt-group form, configure the following:</p> <ul style="list-style-type: none">• Message Center – set to “qsig-mwi”.• Voice Mail Number – enter a number to be used for routing calls to Lyrix Voice Messaging.• Routing Digits (e.g. AAR/ARS Access Code) – set to the AAR FAC defined in Step 1. <p>Calls placed to the Group Extension of this hunt group (i.e., for retrieval of voice messages or management of voice mailboxes) will be routed via AAR. Calls placed to Avaya Communication Manager stations and covered to this hunt group will also be routed via AAR. AAR will use the Voice Mail Number to select a route pattern containing the QSIG trunk group to Lyrix Enterprise Voice Messaging.</p>												
	<div><div>add hunt-group 2</div><div><div>HUNT GROUP</div><div>LWC Reception: none AUDIX Name:</div><div>Message Center: qsig-mwi Send Reroute Request: y Voice Mail Number: 8555000</div><div>Routing Digits (e.g. AAR/ARS Access Code): 8 Provide Ringback? n TSC per MWI Interrogation? n</div></div><div>Page 2 of 60</div></div>												
4.	<p>Enter the change aar analysis d command, where d is any digit. Add an entry as follows:</p> <ul style="list-style-type: none">• Dialed String – enter the Voice Mail Number configured in Step 3.• Route Pattern – enter the number of an unused route pattern. The route pattern will be defined in the next step.• Call Type – set to “aar”.												
	<div><div>change aar analysis 8</div><div><div>AAR DIGIT ANALYSIS TABLE</div><div>Percent Full: 2</div><table><tr><th>Dialed String</th><th>Total Min Max</th><th>Route Pattern</th><th>Call Type</th><th>Node Num</th><th>ANI Req'd</th></tr><tr><td>8555000</td><td>7 7</td><td>9</td><td>aar</td><td></td><td>n</td></tr></table></div><div>Page 1 of 2</div></div>	Dialed String	Total Min Max	Route Pattern	Call Type	Node Num	ANI Req'd	8555000	7 7	9	aar		n
Dialed String	Total Min Max	Route Pattern	Call Type	Node Num	ANI Req'd								
8555000	7 7	9	aar		n								

Step	Description
5.	<p>Enter the change route-pattern r command, where r is the number of the route pattern specified in Step 4. Add a routing preference entry as follows:</p> <ul style="list-style-type: none"> • Grp No – enter the number of the trunk group configured in Section 3.3 Steps 4 – 9. • FRL – assign a Facility Restriction Level to this routing preference. “0” is the least restrictive. <p>Note: In the route pattern example below, the first two digits of the dialed number are deleted in order to present the 5-digit called party number “55000” to Lyrix Enterprise Voice Messaging (recall that in Step 4, calls to the 7-digit number “8555000” are processed by this route pattern). During compliance testing, “55000” was configured on Lyrix Enterprise Voice Messaging as the voicemail access number. However, since actual configurations may use different voicemail access numbers of different lengths, the digit string manipulation performed in the route pattern may also vary.</p> <pre> change route-pattern 9 Pattern Number: 9 Pattern Name: PRI_QSIG 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: 9 0 n user 2: n user 3: n user 4: n user 5: n user 6: n user BCC VALUE TSC CA-TSC ITC BCIE Service/Feature PARM No. Numbering LAR 0 1 2 3 4 W Request Dgts Format Subaddress 1: y y y y y n n rest none 2: y y y y y n n rest none 3: y y y y y n n rest none 4: y y y y y n n rest none 5: y y y y y n n rest none 6: y y y y y n n rest none </pre>
6.	<p>To allow external/PSTN callers to access Lyrix Enterprise Voice Messaging (i.e., to retrieve voice messages) ensure that the proper digit treatment is applied to incoming trunk calls. For example, the incoming called number can be manipulated to match the hunt group extension.</p>

3.5. Routing to Lyrix Auto Attendant

This section describes the configuration steps for routing calls to the Lyrix Auto Attendant.

Step	Description																																																										
1.	<p>Reserve a number (“8555001” in the example below) for accessing the Lyrix Auto Attendant, and enter the number in the AAR Digit Analysis Table. Use the same Route Pattern used for Lyrix Voice Messaging.</p> <table><tr><td colspan="6">change aar analysis 8</td><td>Page</td><td>1 of</td><td>2</td></tr><tr><td colspan="9">AAR DIGIT ANALYSIS TABLE</td></tr><tr><td colspan="6"></td><td colspan="3">Percent Full:</td><td>2</td></tr><tr><td>Dialed</td><td>Total</td><td>Route</td><td>Call</td><td>Node</td><td>ANI</td><td colspan="3"></td><td></td></tr><tr><td>String</td><td>Min</td><td>Max</td><td>Pattern</td><td>Type</td><td>Num</td><td>Reqd</td><td colspan="3"></td></tr><tr><td>8555001</td><td>7</td><td>7</td><td>9</td><td>aar</td><td></td><td>n</td><td colspan="3"></td></tr></table>	change aar analysis 8						Page	1 of	2	AAR DIGIT ANALYSIS TABLE															Percent Full:			2	Dialed	Total	Route	Call	Node	ANI					String	Min	Max	Pattern	Type	Num	Reqd				8555001	7	7	9	aar		n			
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2.	<p>Ensure that the proper digit treatment is applied to incoming trunk calls from the PSTN (i.e., trunk group 6 in the example below). In the example below, the incoming called number “7325551234” is deleted and replaced with “88555001”. The first “8” invokes AAR, and the remaining digits are matched in the AAR Digit Analysis Table in Step 1, thereby routing the call to the route pattern containing the QSIG trunk group to Lyrix Enterprise Voice Messaging.</p> <p>Note: This example illustrates only one approach to digit treatment; other approaches are possible.</p> <table><tr><td colspan="6">change inc-call-handling-trmt trunk-group 6</td><td>Page</td><td>1 of</td><td>30</td></tr><tr><td colspan="9">INCOMING CALL HANDLING TREATMENT</td></tr><tr><td>Service/</td><td>Called</td><td>Called</td><td>Del</td><td>Insert</td><td>Per Call</td><td>Night</td><td colspan="2"></td></tr><tr><td>Feature</td><td>Len</td><td>Number</td><td></td><td></td><td>CPN/BN</td><td>Serv</td><td colspan="2"></td></tr><tr><td>tie</td><td>10</td><td>7325551234</td><td>10</td><td>88555001</td><td colspan="4"></td></tr></table>	change inc-call-handling-trmt trunk-group 6						Page	1 of	30	INCOMING CALL HANDLING TREATMENT									Service/	Called	Called	Del	Insert	Per Call	Night			Feature	Len	Number			CPN/BN	Serv			tie	10	7325551234	10	88555001																	
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3.6. Coverage Path

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

Step	Description
1.	<p>Enter the add coverage path c command, where c is the number of an unused coverage path, and set Point1 to the hunt group configured in Section 3.4 Steps 2 - 3.</p> <pre> add coverage path 2 Page 1 of 1 COVERAGE PATH Coverage Path Number: 2 Next Path Number: Hunt after Coverage? n Linkage COVERAGE CRITERIA Station/Group Status Inside Call Outside Call Active? n n Busy? Y Y Don't Answer? Y Y Number of Rings: 3 All? n n DND/SAC/Goto Cover? Y Y Holiday Coverage? n n COVERAGE POINTS Terminate to Coverage Pts. with Bridged Appearances? n Point1: h2 Rng: Point2: Point3: Point4: Point5: Point6: </pre>
2.	<p>Enter the change station e command, where e is the extension of a station that is a Lyrrix Enterprise Voice Messaging subscriber. On Page 1 of the station form, set Coverage Path to the number of the coverage path configured in the previous step.</p> <pre> change station 50001 Page 1 of 4 STATION Extension: 50001 Lock Messages? n BCC: 0 Type: 4610 Security Code: ***** TN: 1 Port: S00003 Coverage Path 1: 2 COR: 1 Name: STA-50001 Coverage Path 2: COS: 1 Hunt-to Station: STATION OPTIONS Loss Group: 19 Personalized Ringing Pattern: 1 Message Lamp Ext: 50001 Speakerphone: 2-way Mute Button Enabled? y Display Language: english Survivable GK Node Name: Survivable COR: internal Media Complex Ext: Survivable Trunk Dest? y IP SoftPhone? y IP Video Softphone? y Customizable Labels? y </pre>

Step	Description																														
3.	<p>On Page 2 of the station form, set MWI Served User Type to “qsig-mwi”. If the station does not have a MWI, e.g. if the station is an analog telephone, then it may be desirable to set Audible Message Waiting to “y”.</p> <p>change station 50001 Page 2 of 4</p> <p style="text-align: center;">STATION</p> <p>FEATURE OPTIONS</p> <table> <tr> <td>LWC Reception: spe</td><td>Auto Select Any Idle Appearance? n</td></tr> <tr> <td>LWC Activation? y</td><td>Coverage Msg Retrieval? y</td></tr> <tr> <td>LWC Log External Calls? n</td><td>Auto Answer: none</td></tr> <tr> <td>CDR Privacy? n</td><td>Data Restriction? n</td></tr> <tr> <td>Redirect Notification? y</td><td>Idle Appearance Preference? n</td></tr> <tr> <td>Per Button Ring Control? n</td><td>Bridged Idle Line Preference? n</td></tr> <tr> <td>Bridged Call Alerting? n</td><td>Restrict Last Appearance? y</td></tr> <tr> <td>Active Station Ringing: single</td><td>Conf/Trans on Primary Appearance? n</td></tr> <tr> <td></td><td>EMU Login Allowed? n</td></tr> <tr> <td>H.320 Conversion? n</td><td>Per Station CPN - Send Calling Number?</td></tr> <tr> <td>Service Link Mode: as-needed</td><td></td></tr> <tr> <td>Multimedia Mode: enhanced</td><td>Audible Message Waiting? n</td></tr> <tr> <td>MWI Served User Type: qsig-mwi</td><td>Display Client Redirection? n</td></tr> <tr> <td></td><td>Select Last Used Appearance? n</td></tr> <tr> <td></td><td>Coverage After Forwarding? s</td></tr> </table> <p>Remote Softphone Emergency Calls: as-on-local Direct IP-IP Audio Connections? y</p> <p>Emergency Location Ext: 50001 Always Use? n IP Audio Hairpinning? y</p>	LWC Reception: spe	Auto Select Any Idle Appearance? n	LWC Activation? y	Coverage Msg Retrieval? y	LWC Log External Calls? n	Auto Answer: none	CDR Privacy? n	Data Restriction? n	Redirect Notification? y	Idle Appearance Preference? n	Per Button Ring Control? n	Bridged Idle Line Preference? n	Bridged Call Alerting? n	Restrict Last Appearance? y	Active Station Ringing: single	Conf/Trans on Primary Appearance? n		EMU Login Allowed? n	H.320 Conversion? n	Per Station CPN - Send Calling Number?	Service Link Mode: as-needed		Multimedia Mode: enhanced	Audible Message Waiting? n	MWI Served User Type: qsig-mwi	Display Client Redirection? n		Select Last Used Appearance? n		Coverage After Forwarding? s
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MWI Served User Type: qsig-mwi	Display Client Redirection? n																														
	Select Last Used Appearance? n																														
	Coverage After Forwarding? s																														
4.	Repeat Steps 2 – 3 as necessary for others stations that are Lyrinx Enterprise Voice Messaging subscribers.																														

4. Lyrix Enterprise Voice Messaging and Auto Attendant

Lyrix configures Enterprise Voice Messaging and Auto Attendant for their end customers. Ensure that the Enterprise Voice Messaging and Auto Attendant configurations are consistent with the corresponding Avaya Communication Manager configurations described in Section 3.

5. Interoperability Compliance Testing

The interoperability compliance testing focused on verifying E1 ISDN-PRI QSIG integration between Avaya Communication Manager and the Lyrix Enterprise Voice Messaging and Auto Attendant server, in the context of typical voice messaging and auto attendant functions.

5.1. General Test Approach

The general test approach was to place direct and coverage calls to exercise the voice messaging capabilities of Lyrix Enterprise Voice Messaging, and the call transfer capabilities of Lyrix Enterprise Voice Messaging and Auto Attendant. The main objectives were to verify that:

- Internal and external callers are able to leave voice messages on the Lyrix Enterprise Voice Messaging server for the correct subscribers.
- Subscribers are able to retrieve their voice messages from the Lyrix Enterprise Voice Messaging server from their own stations, other stations, and external telephones.
- Lyrix Enterprise Voice Messaging properly turns the Message Waiting Indicator (MWI) of subscriber stations on and off.
- Subscribers are able to use Lyrix Enterprise Voice Messaging to call or transfer to internal extensions and external numbers.
- The Lyrix Enterprise Voice Messaging Find-me and Ring-me functions are successful in calling alternate numbers defined by the subscriber.
- Calls from internal and external callers placed to the Lyrix Auto Attendant are successfully transferred to the extension selected or entered by the caller.
- Lyrix Enterprise Voice Messaging and Auto Attendant properly recognize DTMF transmissions.
- The Lyrix Enterprise Voice Messaging and Auto Attendant components function properly after recovering from failures such as cable disconnects, maintenance activities (busyout/release and reset) on the Avaya TN464GP DS1 circuit pack, reset of the Lyrix Enterprise Voice Messaging and Auto Attendant server, and reset of Avaya Communication Manager.
- Lyrix Enterprise Voice Messaging successfully perform QSIG path replacement after transferring a caller to an Avaya Communication Manager extension (an Avaya Communication Manager patch is required, as described in Section 5.2).

5.2. Test Results

The test objectives of Section 5.1 were verified. The following observations were made during testing:

- Avaya Communication Manager patch 12260 is required to resolve a QSIG path replacement issue. Avaya Communication Manager patch 12261, which combines patch 12260 and Avaya Communication Manager 3.1.2 Service Pack 1, was applied and verified.
- The Lyrix Enterprise Voice Messaging and Auto Attendant Find-me function did not successfully perform QSIG path replacement after connecting a caller to a Find-me alternate contact number. Lyrix is investigating this issue; contact Lyrix for further updates.

6. Verification Steps

The following steps may be used to verify the configuration:

- From the SAT, enter the command **status signaling-group s**, where **s** is the number of the signaling group configured in Section 3.3, and verify that the Group State is “in-service”.
- From the SAT, enter the command **status trunk-group s**, where **s** is the number of the signaling group configured in Section 3.3, and verify that the Service States of all trunks are either “in-service/idle” or “in-service/active”.
- Place a call to a subscriber telephone and let the call cover to Lyrix Enterprise Voice Messaging. Leave a message and verify that the MWI of the subscriber’s telephone is turned on. Retrieve the message and verify that the MWI is turned off.
- Place a call to the Lyrix Auto Attendant number and enter the extension of an Avaya Communication Manager station. Verify that the call is successfully transferred and that the trunks between Avaya Communication Manager and the Lyrix server are released due to QSIG path replacement.
- Place a call to the Lyrix Auto Attendant number and select a menu option. Verify that the call is transferred to the correct Avaya Communication Manager station.

7. Support

For technical support on Lyrix Enterprise Voice Messaging and Auto Attendant, contact Lyrix support at:

- Phone: 1-877-597-4946
- E-mail: lyrix@lyrix.com

8. Conclusion

These Application Notes described the procedures for configuring E1 ISDN-PRI QSIG integration between a Lyrix Enterprise Voice Messaging and Auto Attendant server and Avaya Communication Manager 3.1.2. The Lyrix Enterprise Voice Messaging and Auto Attendant platforms are Linux-based software applications deployed on Dell PowerEdge servers (e.g. 2600, 2650, 2800, 2850, 2900, 2950). During compliance testing, Lyrix Enterprise Voice Messaging successfully provided typical voice messaging functionality, including Message Waiting Indicator, and Lyrix Auto Attendant successfully transferred calls to the appropriate Avaya Communication Manager extension.

9. Additional References

Product documentation for Avaya products may be found at <http://support.avaya.com>.

[1] *Administrator Guide for Avaya Communication Manager*, Issue 2.1, May 2006, Document Number 03-300509

Product documentation for Lyrinx products may be requested at <http://www.lyrix.com>.

[2] *Lyrix Enterprise Voice Messaging User's Guide*, May 2006 Version 4.0.100

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