Avaya Solution & Interoperability Test Lab

Application Notes for Configuring Trio Enterprise R3.1 with Avaya Communication Server 1000E R7.5 using QSIG Trunk Connections – Issue 1.0

Abstract

These Application Notes describe how to configure an Avaya Communication Server 1000E R7.5 to interface with Trio Enterprise R3.1, which is operating as an attendant answering position. Trio Enterprise is a software application installed on a Windows server that interfaces with Avaya Communication Server 1000E using QSIG trunks and provides users with the call functions of an attendant console without having to install a hardware attendant position.

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

1. Introduction

These Application Notes describe the test configuration for Avaya Communication Server 1000E R7.5 with Trio Enterprise R3.1. Trio Enterprise is a client/server based application running on Microsoft Windows operating systems. Trio Enterprise provides users with an attendant answering position for Communication Server 1000E that does not need attendant telephony hardware (e.g., 2250 attendant console). Trio Enterprise connects to the Communication Server 1000E using QSIG trunks and calls are made over these trunks to PSTN destinations as well as internal Avaya Communication Server 1000E users. Trio Enterprise can perform the usual range of attendant call functions, i.e. centralized answering position; extend PSTN calls to users, place PSTN calls on behalf of internal users, perform internal telephone directory lookups.

2. General Test Approach and Test Results

The general test approach was to configure a simulated enterprise voice network using a Communication Server 1000E. The Trio Enterprise server connects to the Communication Server 1000E call server via QSIG trunks. See **Figure 1** for a network diagram. A basic Distance Steering Code configuration (DSC) was configured on the Communication Server 1000E to route all calls to the Trio attendant position. An Avaya 1140E IP telephone was used as the Trio attendant telephony device.

During tests, calls are placed to a four digit number which is associated with the Trio attendant position. The Communication Server 1000E call server routes all calls destined for the Trio Enterprise server over the QSIG trunk connection. The Trio Enterprise server then automatically places a call to the telephone the attendant is using for answering purposes. When the attendant answers the call, the Trio server bridges the two calls. When the attendant extends the call to another phone, Trio Enterprise server performs a QSIG path replacement and the caller and the called user are now directly connected. It is possible to have multiple Trio attendant positions on a Communication Server 1000E system, only limited by the number of QSIG trunks available.

A variety of Avaya telephones were installed and configured on the Communication Server 1000E. The Trio attendant client provides a view of contacts, schedules, and communication tasks. It was installed on the same server as the Trio Server, but can be installed on a separate platform if required.

2.1. Interoperability Compliance Testing

The compatibility tests included the following.

- QSIG trunk configuration and operation
- Attendant answers direct call
- Supervised and unsupervised transfer with answer
- Directing calls to busy extensions
- Call queuing and retrieval
- Loop detection for busy and unanswered extensions

2.2. Test Results

Tests were performed to insure full interoperability between the Trio Enterprise and the CS1000E. The tests were all functional in nature and performance testing was not included. All the test cases passed successfully.

2.3. Support

For technical support on Trio products, please use the following web link.
http://www.trio.com/web/Support.aspx

3. Reference Configuration

Figure 1 shows the network topology during compliance testing. Communication Server 1000E was used as the hosting PBX. The Trio Enterprise is connected to the hosting PBX using a QSIG Trunk. One side of the QSIG trunk is configured on a PRI Card inserted into the Communication Server 1000E chassis, and the other side is configured on a Natural Micro Systems (Dialogic) Card inserted into the Trio Enterprise Server.

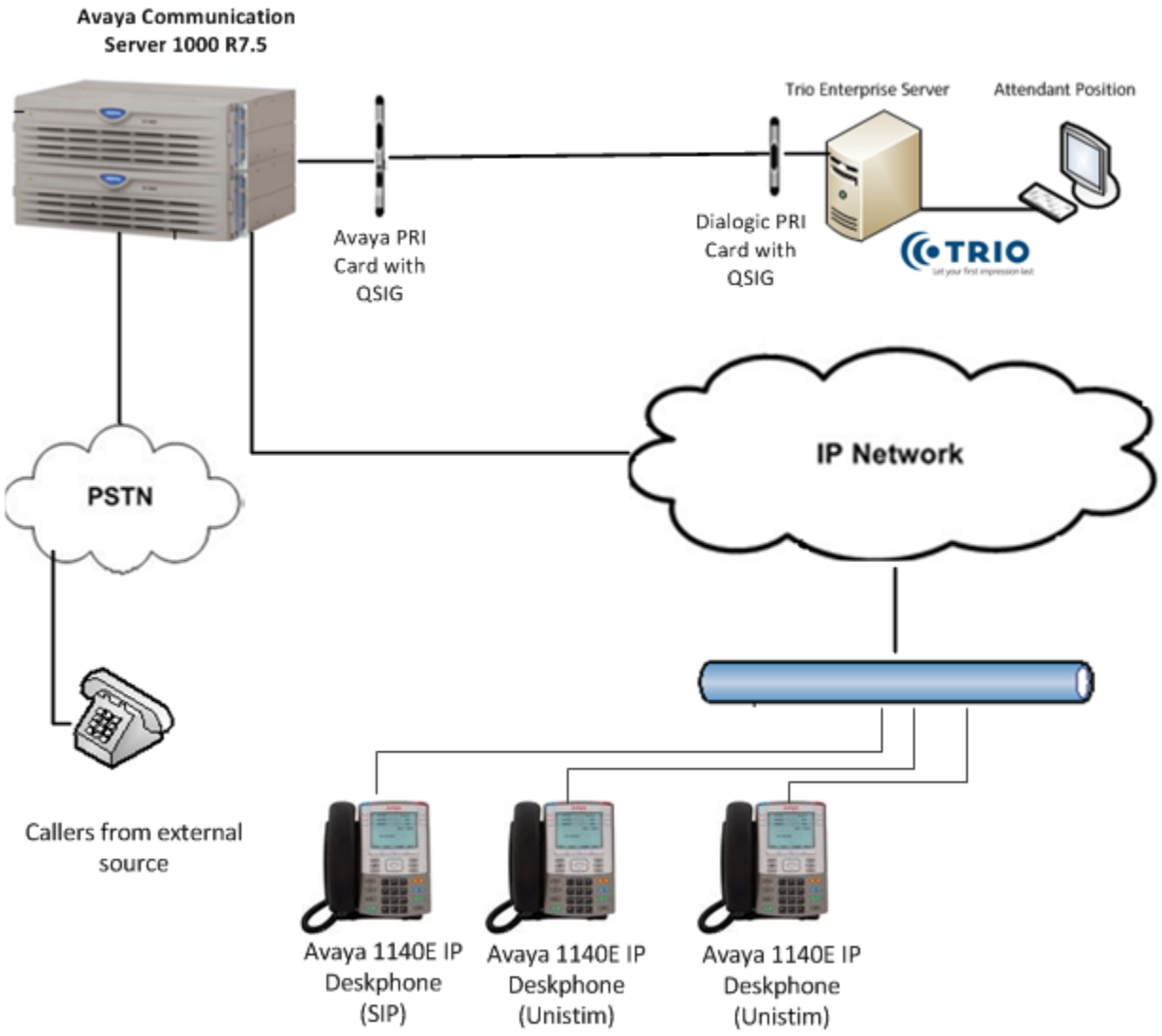


Figure 1: Configuration for Avaya Communication Server 1000E and Trio Enterprise R3.1

4. Equipment and Software Validated

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

Avaya Equipment	Software / Firmware Version
Avaya Communication Server 1000E CPPM	Avaya Communication Server 1000E R7.5 SP1
Avaya PRI Card	NTBK50
Avaya 1100 series IP Telephones • 1140e • 1120e Avaya M3900 series Telephones • M3904	 0625C8A (UniStim 5.0) 0624C8A (UniStim 5.0) Version: AA93
Trio Equipment	**Software / Firmware Version**
Trio Enterprise Server platform	Trio Enterprise 3.1
Natural Micro Systems (Dialogic) Card	AG4040

5. Configure Avaya Communication Server 1000E

Configuration and verification operations on the CS1000E illustrated in this section were all performed using terminal access over a serial link to a TTY port on the CS1000E using Telnet. The information provided in this section describes the configuration of the CS1000E for this solution. For all other provisioning information such as initial installation and configuration, please refer to the product documentation in **Section 10**.

Note: The configuration of the PRI interface to the PSTN is outside the scope of these Application Notes.

5.1. Configuring QSIG

To configure the QSIG connection there are a number of steps.

- Configure Network Attendant Service (NAS) and Night (NIT) Data
- Create a D-channel for QSIG
- Create Route Data Block
- Adding TIE Trunks
- QSIG Path replacement (NET_DATA)

5.1.1. Configure NAS and NIT Data

The Communication Server 1000E is configured with attendant groups where the NAS and NIT functions route the calls between the nodes and out to Trio Enterprise. Use the **NEW** command in **LD 86** to configure **NAS**.

LD 86

Prompt	Response	Description
>	**LD 86**	Enter Overlay 86
REQ	**NEW**	New Data
CUST	**0**	Customer Number
FEAT	**NAS**	Network Attendant Service
TBL	**0**	NAS routing Table 0

Use the **NEW** command in **LD 15** to configure **NIT_DATA**

LD 15

Prompt	Response	Description
>	**LD 15**	Enter Overlay 15
REQ	**CHG**	Change
TYPE	NIT	Night Service
CUST	**0**	Customer Number
NIT1	5000	XXXXXXXXXXXXXXXX

5.1.2. Create a D-Channel

Use the **CHG** command in **LD 17** to create a D-channel for the QSIG connection. In the example below, D-Channel 58 was created. At the **IFC** prompt, enter **ISGF** this signifies QSIG.

Note: In the Telnet screenshots below, only the unique prompt inputs are shown. Enter a carriage return (CR) for all other prompts to set default values.

LD 17

Prompt	Response	Description
>	**LD 17**	Enter Overlay 17
REQ	**CHG**	Change
TYPE	**ADAN**	Change the Action Device and Number
ADAN	**NEW**	Create New Action Device and Number
TYPE	**DCH 58**	Create new D-Channel 58
CTYP	**MSDL**	Multi-purpose Serial Link
USR	**PRI**	Integrated Services Signaling Link
IFC	**ISFG**	D-Channel interface type
SIDE.	**NET**	**Node type**

5.1.3. Create Route Data Block

Use the **NEW** command in **LD 16** to create a Route Data Block. The route created is a **TIE** route in order to connect to the Trio system.

LD 16

Prompt	Response	Description
>	**LD 16**	Enter Overlay 16
REQ	**NEW**	Create new
TYPE	RDB	Route Data block
CUST	0	Customer Number as defined in LD15
ROUT	58	Route Number
TKTP	TIE	Route Type
VTRK	NO	Virtual Route
DTRK	YES	Digital Trunk Route
DGTP	PRI2	Digital Trunk type
ISDN	YES	Integrated Services Digital Network
MODE	PRA	mode of operation
IFC	ISGF	Interface type QSIG
ACOD	47048	Access Code for trunk route

5.1.4. Adding TIE Trunks

Use the **NEW** command in **LD 14** to add **TIE** trunks to the new route created in **Section 5.1.2.** If adding multiple trunks, for each route use **NEW XX**, where XX is the number of trunks. In the example below **10** trunks were added.

LD 14

Prompt	Response	Description
>	**LD 14**	Enter Overlay 14
REQ	**NEW 10**	Create New
TYPE	TIE	TIE trunk
TN	058 01	Loop Shelf Card Unit
CUST	0	Customer Number as defined in LD15
TRK	PRI2	Trunk type
RTMB	58 1	Route number and Member number

5.1.5. QSIG Path replacement (NET_DATA)

Use the **NEW** command in **LD 15** to create **NET_DATA**. It is important that the PINX_DN has the same length as internal extensions. In the example below the **PINX_DN** was set to **0001**.

LD 15

Prompt	Response	Description
>	**LD 15**	Enter Overlay 15
REQ	**NEW**	Create New
TYPE	NET	Networking
ISDN	YES	Integrated Services Digital Network
PINX_DN	0001	Node DN

5.2. Configure a Coordinated Dialing Plan

There are a number of ways to setup a dialing plan to call the Trio Enterprise. For the compliance testing a Coordinated Dialing Plan (CDP) was used.

5.2.1. Create a Route List Index

In order to create a CDP, a Route List Index (RLI) in overlay 86 is required. Use the **NEW** command in **LD 86** to create a **RLI**.

Note: Enter the route **(ROUT)** that was created in **Section 5.1.3.**

LD 86

Prompt	Response	Description
>**LD 86**	Enter Overlay 86	
REQ	NEW	Create New
CUST	0	Customer Number as defined in LD15
FEAT	RLB	Route list Block
TYPE	**RLI**	Route list Index
RLI	36	Route list Index number
ENTR	0	First entry for the RLI
ROUT	58	Enter the route number

5.2.2. Create CDP

Use the **NEW** command in **LD 87** to create a CDP entry for the Trio Enterprise. For each extension, a CDP entry needs to be created. In the example below, the **DSC** is **4000**, **FLEN** is **4** and the **RLI** is **36.**

Note: The RLI number used is the one created in **Section 5.2.1.**

LD 87

Prompt	Response	Description
>	**LD 87**	Enter Overlay 87
REQ	**NEW**	Create new
CUST	0	Customer Number as defined in LD15
FEAT	**CDP**	Coordinated dialing plan
TYPE	DSC	Distance Steering code
DSC	4000	Distant Steering code
FLEN	4	Flexible Length number of digits
RLI	36	Route list index Number

6. Configure TRIO Enterprise Server

The primary purpose of Trio Enterprise is to provide an attendant position to Communication Server 1000E systems. Trio Enterprise overcomes the installation limitation of 1000 feet from the call server by using a QSIG trunk connection to the Communication Server 1000E call server. This allows the Trio attendant to be located anywhere in the building or offsite if required. The Trio Server consists of a Windows PC running Microsoft XP or Server 2003/2008 with the Trio Enterprise software installed. For the QSIG connection, the Trio Enterprise Server has a Natural Micro Systems (Dialogic) Card installed.
The following procedures are discussed.

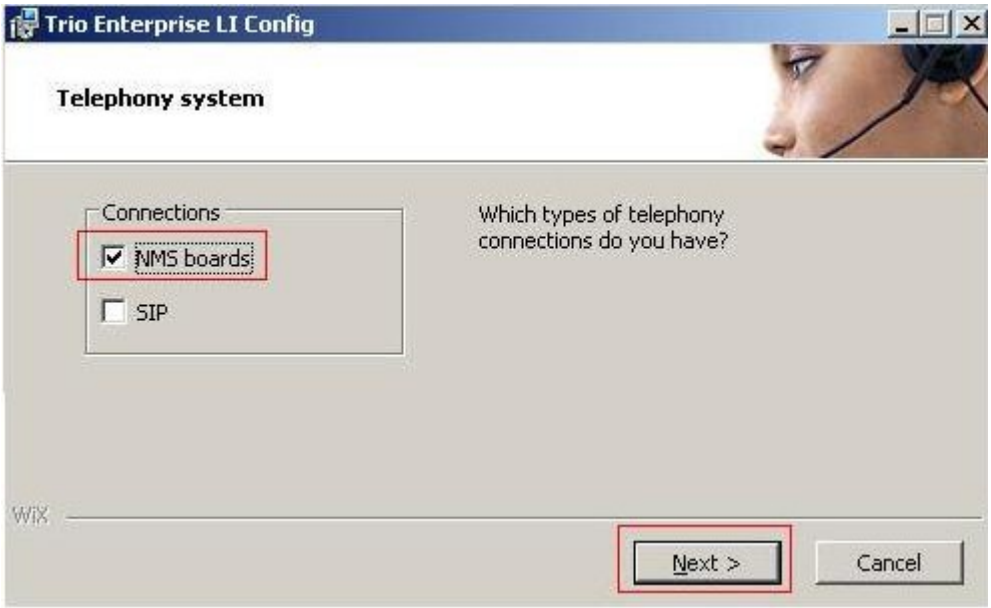
- Configure Trio Enterprise to use QSIG trunks
- InteractionStudio configuration

Note: During the configuration of the Trio Enterprise, some windows mention **Nortel CS1000/Meridian**, this relates to the **Avaya Communication Server 1000E.**

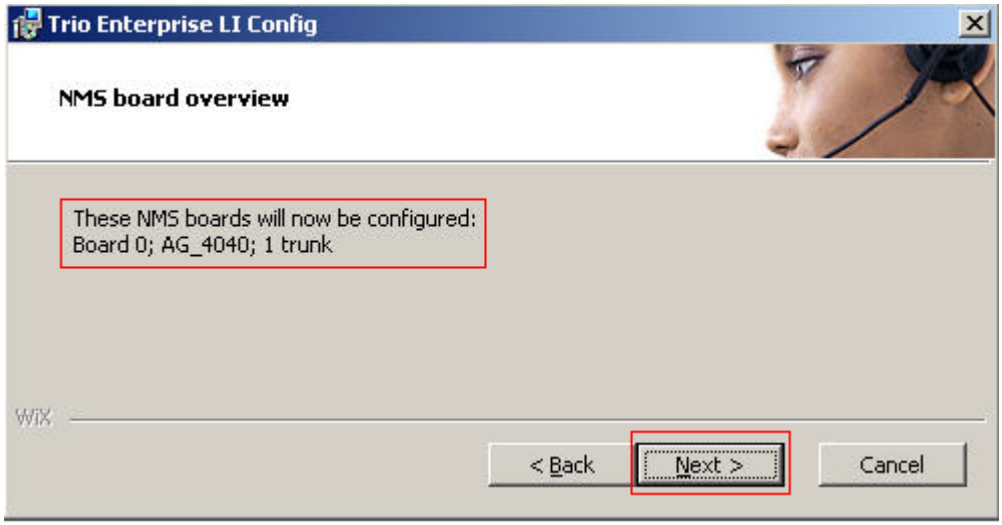
6.1. Configure Trio Enterprise to use QSIG Trunks

Trio Enterprise must be connected to Communication Server 1000E before it can process calls. This section shows how to configure Trio Enterprise QSIG trunks with the Communication Server 1000E QSIG trunks. The installation of the Trio Enterprise software is assumed to be completed and the Trio services are up and running. The steps to configure QSIG Trunks are as follows:

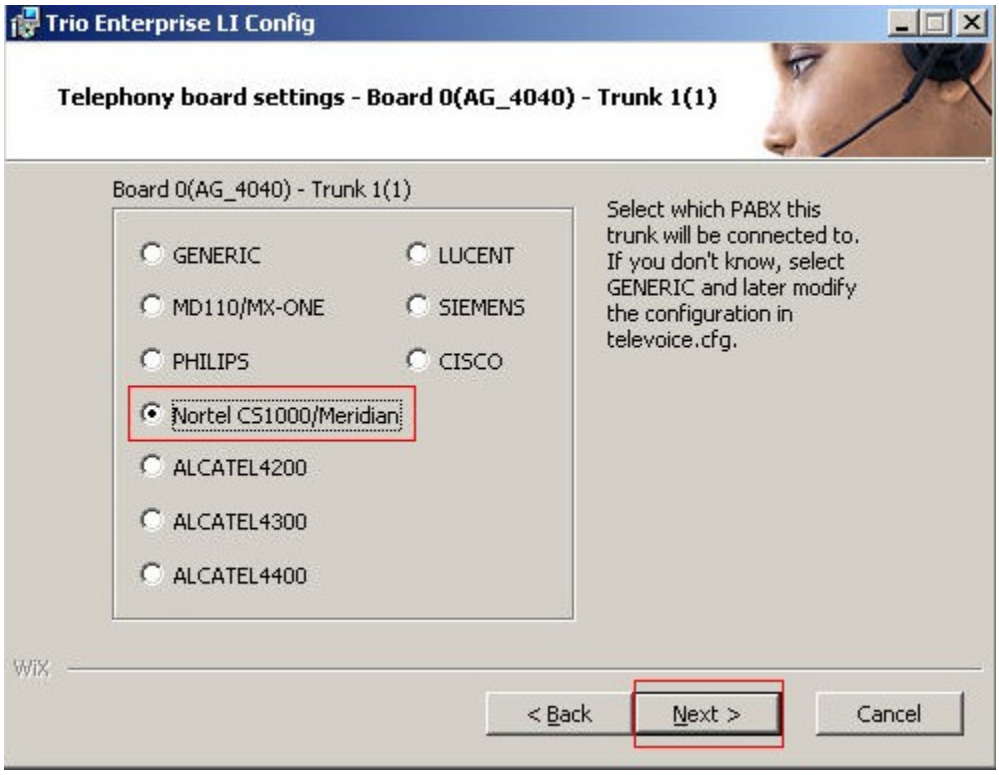
- Access Windows services.
  Select **Start → Run**, then type **services.msc** into the command line. Press return.
- Locate the Trio Televoice service and stop the service.
  When the standard services window opens, locate the Trio Televoice service and stop the service.
- Launch the Trio configuration application.
  Select **Start → Programs → Trio Enterprise → Line Interface** and click on the **Config** entry (not shown). The configuration application starts up and presents the screenshot below. Ensure the **NMS boards** entry in the **Connections** area is checked.
- Click **Next** to continue.



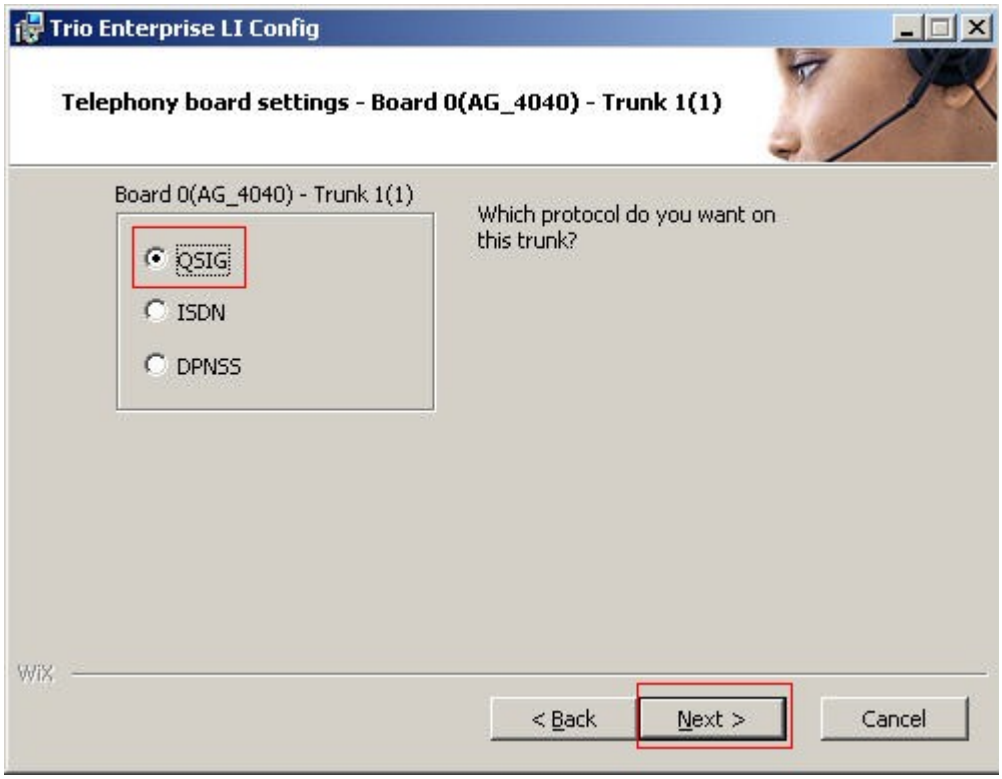
A **NMS board overview** screen appears. This is for information only; it reports the onboard configuration of the hardware QSIG trunks installed in Trio Enterprise Server. The **AG_4040** is the Natural Micro Systems (Dialogic) Card. Click **Next** to continue.



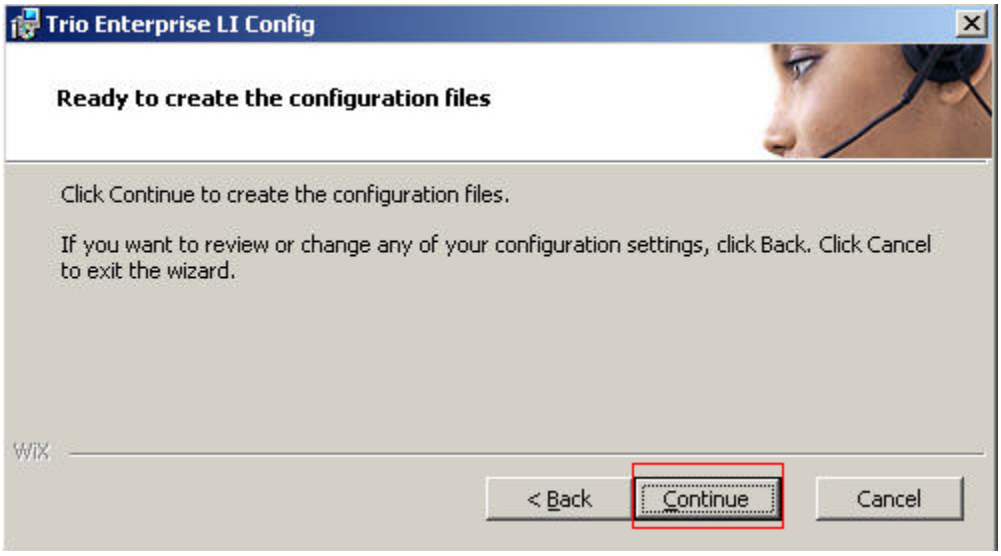
A **Telephony board settings** screen appears. Check the **Nortel CS1000/Meridian** radio button. Click on **Next** when ready.



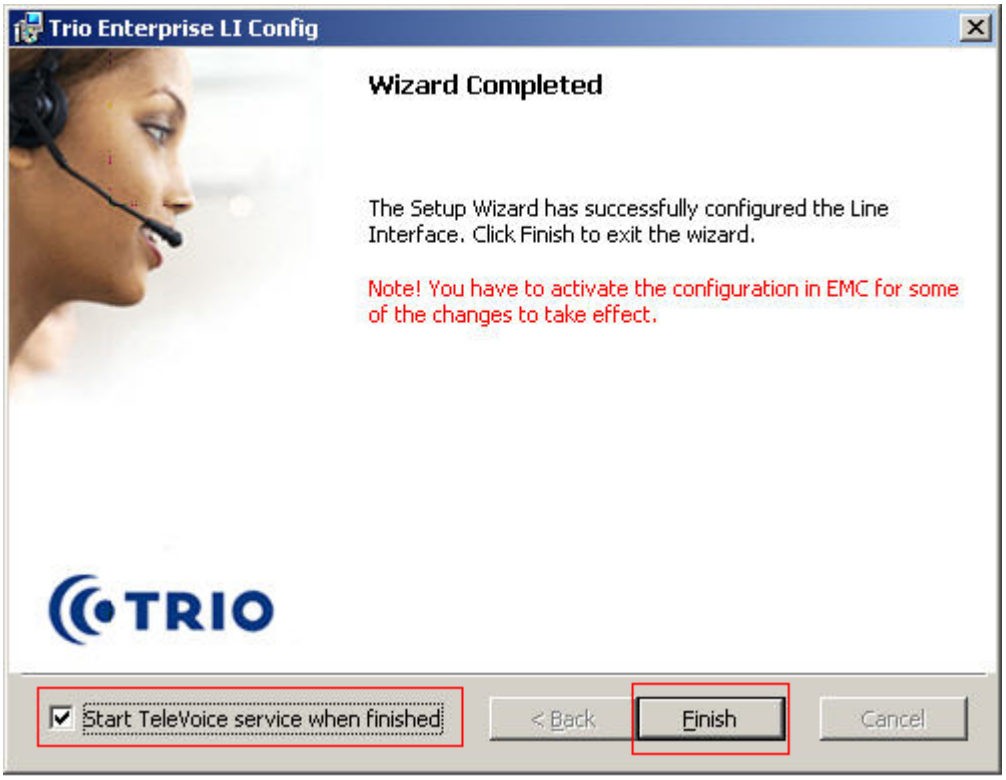
In the next window, click the **QSIG** radio button. Click on **Next** when ready.



A **Ready to create the configuration files** screen appears. The Trio Enterprise is ready to save and activate the QSIG configuration. Click **Continue** to continue.



When the configuration wizard completes successfully, the following Window appears. Ensure the **Start Televoice service when finished** option is checked. Click on the **Finish** button to complete the configuration procedure. This concludes Trio Enterprise QSIQ configuration.



6.2. InteractionStudio Configuration

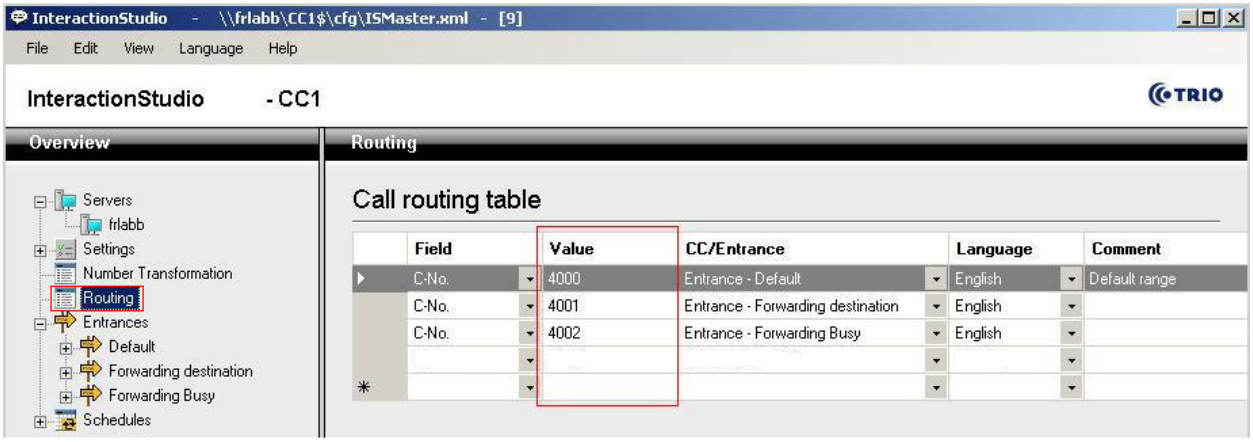
The InteractionStudio is used to configure many features for Trio Enterprise. For compliance testing, the following were configured.

- Call routing table
- Service
- Loop Detection via DTMF for Busy signal
- Loop Detection via DTMF for No Answer signal

6.2.1. Configure Call routing table

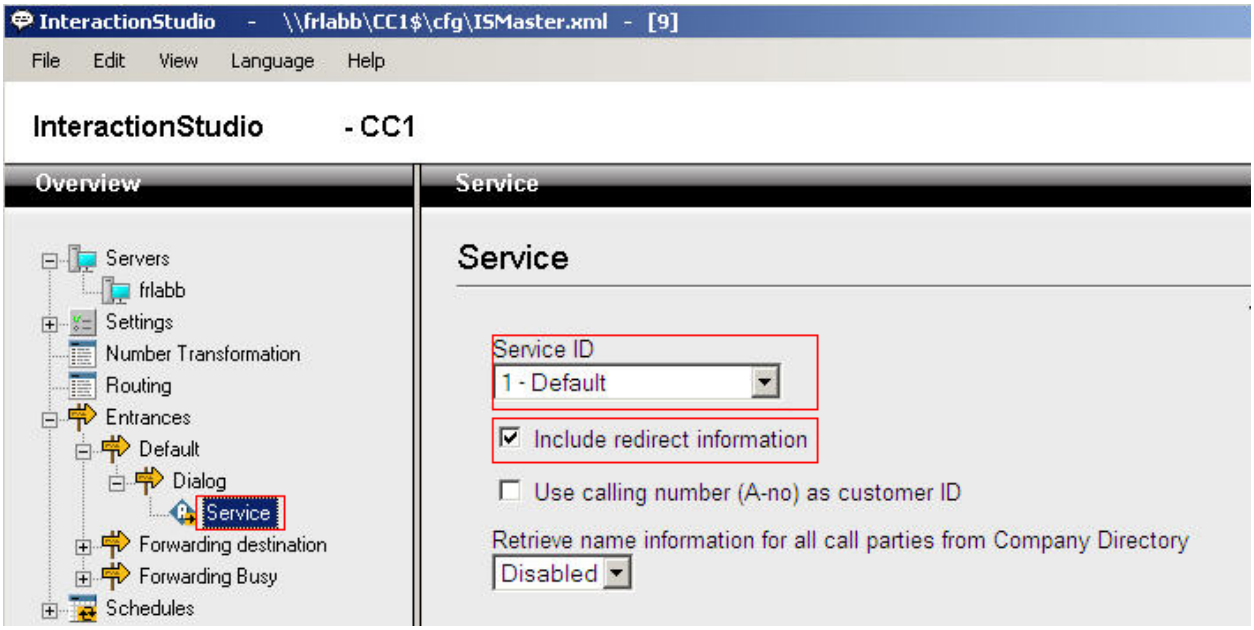
On the Trio Enterprise server, double click on the **InteractionStudio** executable file. When the InteractionStudio window opens, navigate to **Routing**. A Call routing table will open. In the example below:

- Extension **4000** is the main queue number
- Extension **4001** is the number that calls go to when Call forward No Answer is activated.
- Extension **4002** is the number that calls go to when Call forward Busy is activated.



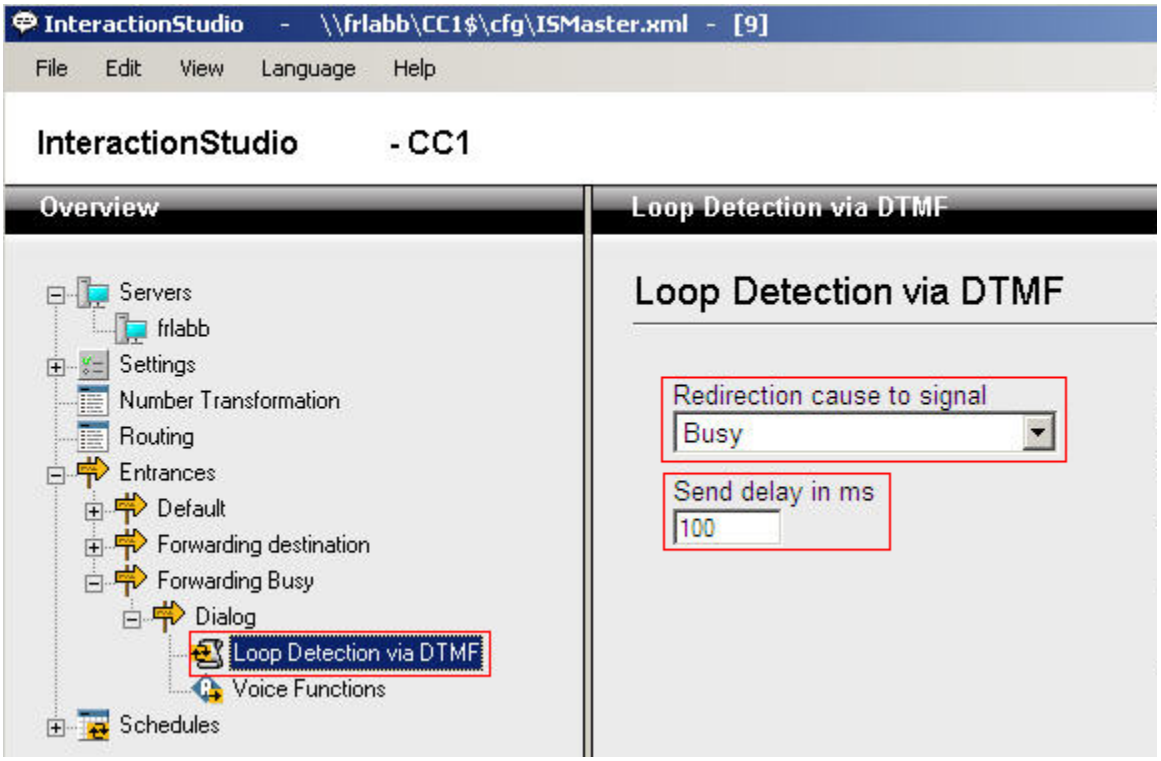
6.2.2. Configure Attendant Service

Navigate to **Entrances → Default → Dialog →Service.** Choose **Default** from the **Service ID** dropdown box, and check the **Include redirect information** check box.



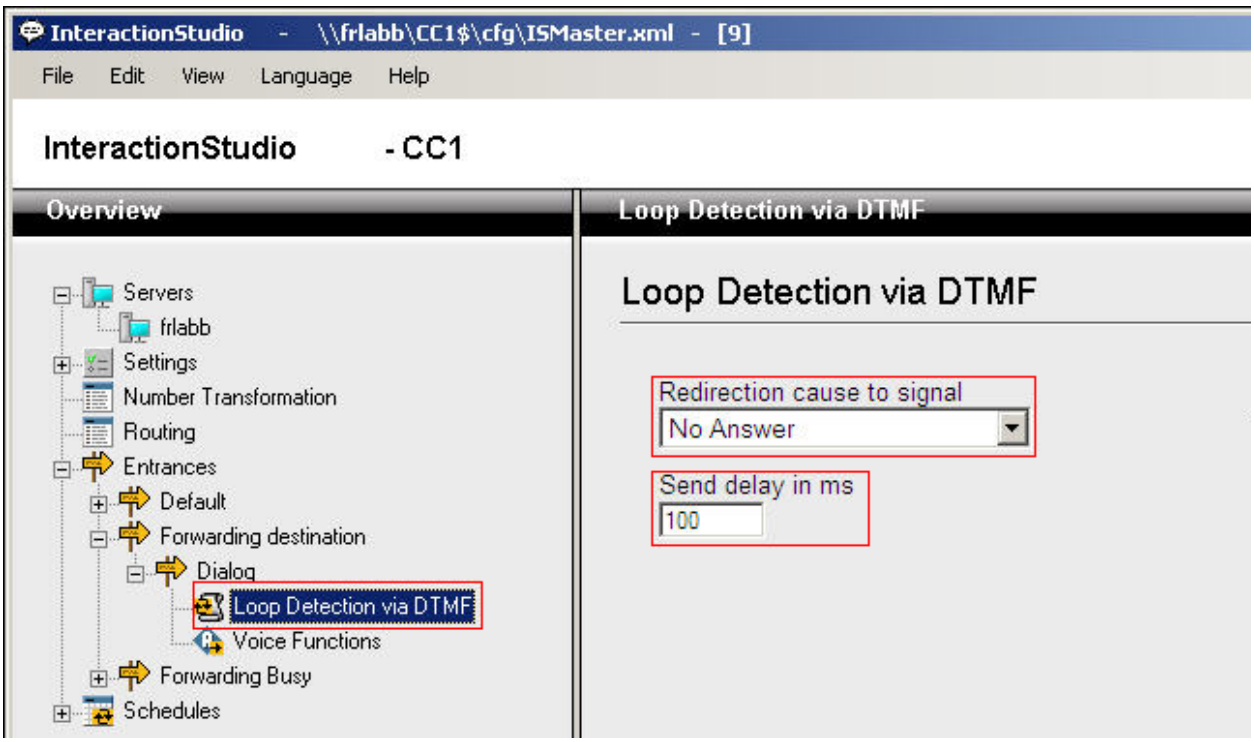
6.2.3. Configure Loop Detection via DTMF for Busy signal

Navigate to **Entrances → Forwarding Busy → Dialog → Loop Detection via DTMF.** Choose **Busy** from the **Redirection cause to signal** dropdown box, and enter **100** in the **Send delay in ms** box.



6.2.4. Configure Loop Detection via DTMF for No Answer signal

Navigate to **Entrances → Forwarding destination → Dialog → Loop Detection via DTMF.** Choose **No Answer** from the **Redirection cause to signal** dropdown box, and enter **100** in the **Send delay in ms** box.

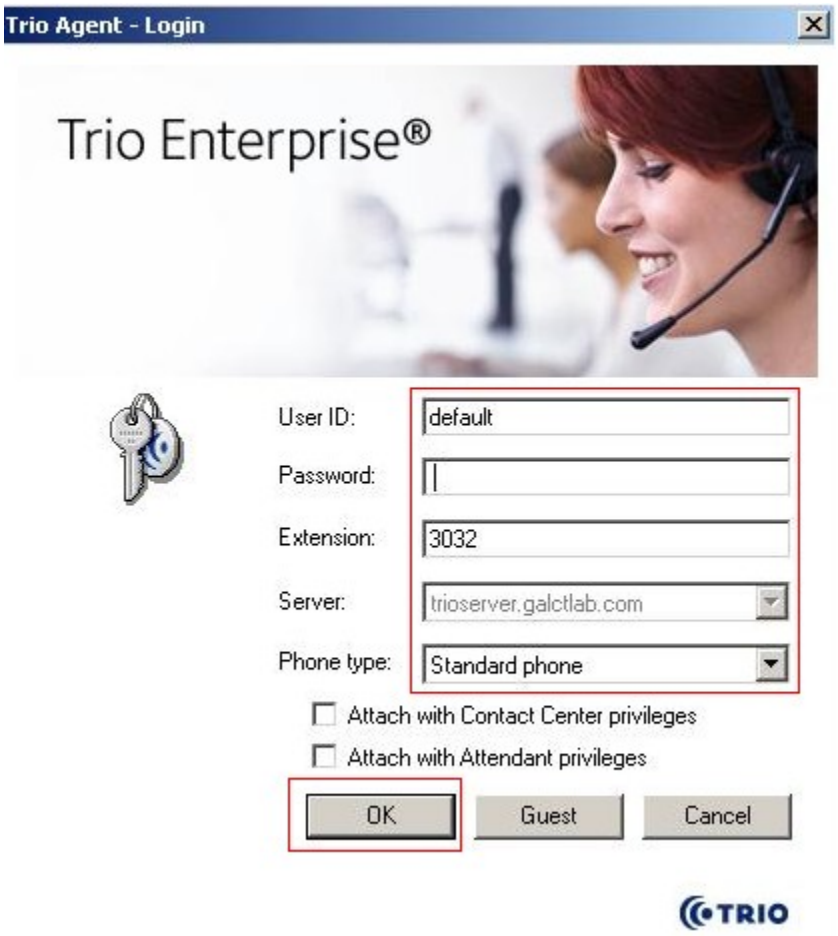


6.3. Configuring Trio Attendant

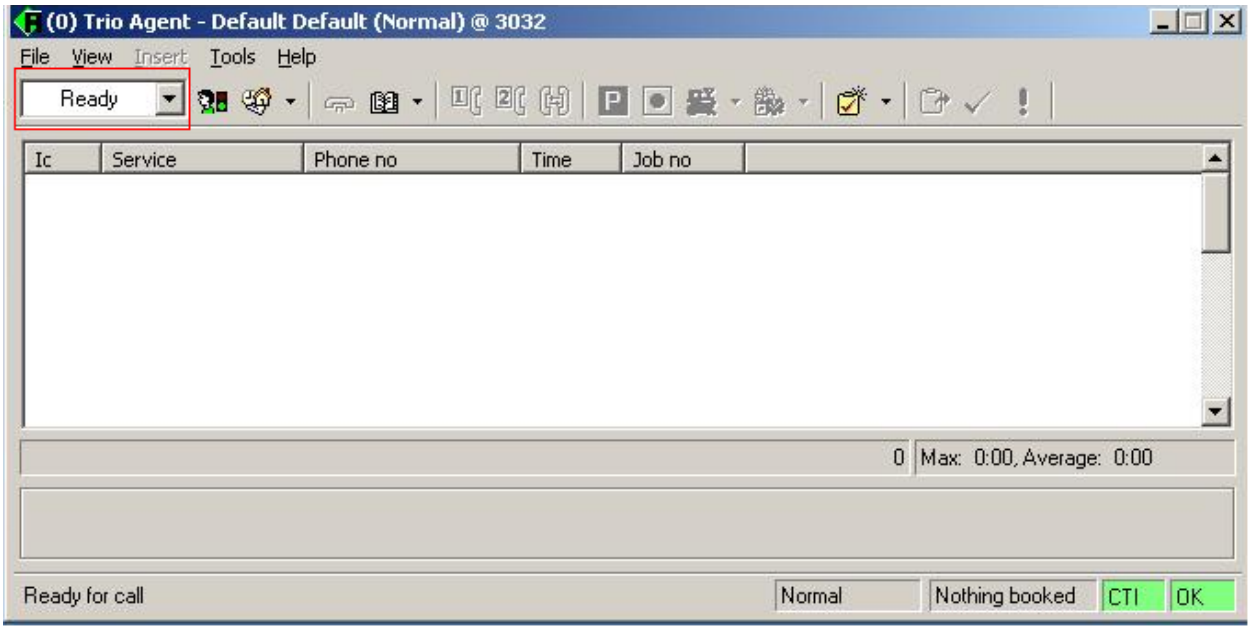
Trio attendant is a separate application to Trio Enterprise server and can run concurrently on the same platform. The attendant uses a regular Communication Server 1000E telephone to make and receive calls, which are directed to the phone by Trio Enterprise server. The steps to configure Trio Attendant are as follows.

Click on **Start → Programs → Trio Enterprise → Contact Centre → Agent Client**.

The following window opens (see next screenshot). Enter a valid **User ID** and **Password**. For **Extension**, select the Communication Server 1000E telephone number that will be used as the agent's audio device (number **3032** in this example). Ensure the correct Trio Enterprise server is selected if there is more than one on the network (default is the current Trio server). Confirm **Phone type** is set to **Standard phone**. Click on the **OK** button when finished.



The Trio Agent window appears. Select **Ready** from the drop down box (confirm the traffic light goes green in the small icon to the right of the drop down box).



7. Verification Steps

This section provides the tests that can be performed to verify correct configuration of CS1000 system with TRIO Enterprise 3.1.

7.1. Status of D-Channel on Avaya Communication Server 1000E

Check the status of the D-channel setup in **Section 5.1.1** by running the command **STAT DCH** in overlay 96 as shown below. The example below shows that D-Channel 58 is operational and established.

LD 96

Prompt	**Response**	**Description**
>	**LD 96**	Enter Overlay 96
.	STAT DCH	Check status of all D-Channels
DCH 058	**OPER EST**	**DES :to_Trio**

7.2. Status of D-Channel on Trio Enterprise

To confirm successful Trio Enterprise connection with the CS1000E, click on **Start → Programs → Trio Enterprise → Line Interface** and then select the **Telestatus** entry. A new window opens, showing the QSIG trunk channel status as a series of green squares with the first and sixteenth squares grayed out (these are the D-Channel and resync timeslots). Confirm the trunks are all in the idle state (unfilled green squares).

8. Conclusion

These Application Notes describe the configuration steps required for Trio Enterprise 3.1 to successfully interoperate with Avaya Communication Server 1000E using QSIG. Trio Enterprise 3.1 passed all compliance testing successfully.

9. Additional References

The following documents and external references may be helpful in understanding operation of particular CS1000 features and may provide more detailed information:

This section references the Avaya documentation that may be relevant to these Application Notes. Product documentation for Avaya products may be found at http://support.avaya.com

[1] *Software Input Reference Administration Avaya Communication Server 1000, Release 7.5; Document No. NN43001-611_05.02, Dec 2010*

[2] *Administering Avaya Aura® Session Manager, Doc # 03603324, Issue 1 Release 6.1*

Appendix A: Installed call server dependency lists

VERSION 4121
RELEASE 7
ISSUE 50 Q +
DepList 1: core Issue: 01 (created: 2011-03-15 10:26:33 (est))

IN-SERVICE PEPS

PAT#	CR #	PATCH REF #	NAME	DATE	FILENAME	SPECINS
000	wi00688505	ISS1:1OF1	p30595_1	14/06/2011	p30595_1.cpl	NO
001	wi00835294	ISS1:1OF1	p30565_1	14/06/2011	p30565_1.cpl	NO
002	wi00832106	ISS1:1OF1	p30550_1	14/06/2011	p30550_1.cpl	NO
003	wi00837618	ISS1:1OF1	p30594_1	14/06/2011	p30594_1.cpl	NO
004	wi00852365	ISS1:1OF1	p30707_1	14/06/2011	p30707_1.cpl	NO
005	wi00843623	ISS1:1OF1	p30731_1	14/06/2011	p30731_1.cpl	YES
006	wi00839255	ISS1:1OF1	p30591_1	14/06/2011	p30591_1.cpl	NO
007	wi00832626	ISS2:1OF1	p30560_2	14/06/2011	p30560_2.cpl	NO
008	wi00857566	ISS1:1OF1	p30766_1	14/06/2011	p30766_1.cpl	NO
009	wi00841980	ISS1:1OF1	p30618_1	14/06/2011	p30618_1.cpl	NO
010	wi00837461	ISS1:1OF1	p30597_1	14/06/2011	p30597_1.cpl	NO
011	wi00839821	ISS1:1OF1	p30619_1	14/06/2011	p30619_1.cpl	NO
012	wi00842409	ISS1:1OF1	p30621_1	14/06/2011	p30621_1.cpl	NO
013	wi00838073	ISS1:1OF1	p30588_1	14/06/2011	p30588_1.cpl	NO
014	wi00850521	ISS1:1OF1	p30709_1	14/06/2011	p30709_1.cpl	YES
015	wi00860722	ISS1:1OF1	p30784_1	14/06/2011	p30784_1.cpl	YES
016	wi00839134	ISS1:1OF1	p30698_1	14/06/2011	p30698_1.cpl	YES
017	wi00836981	ISS1:1OF1	p30613_1	14/06/2011	p30613_1.cpl	NO

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya DevConnect Program at devconnect@avaya.com.