Avaya Solution & Interoperability Test Lab

Application Notes for Configuring Trio Enterprise R4.0 with Avaya Communication Server 1000E R7.5 using a QSIG Connection – Issue 1.0

Abstract

These Application Notes describe how to configure an Avaya Communication Server 1000E R7.5 to interface with Trio Enterprise R4.0, 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.

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1. Introduction

These Application Notes describe the compliance tested configuration for Avaya Communication Server 1000E R7.5 with Trio Enterprise R4.0. Trio Enterprise is a client/server based application running on Microsoft Windows 2008 Server operating systems. Trio Enterprise provides users with an attendant answering position for Avaya Communication Server 1000E that does not need attendant telephony hardware e.g., Avaya 2250 attendant console. Trio Enterprise connects to the Avaya 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 an Avaya Communication Server 1000E (CS1000E). The Trio Enterprise server connects to the CS1000E via QSIG trunks. See **Figure 1** for a network diagram. A basic Distance Steering Code configuration (DSC) was configured on the CS1000E to route all calls to the Trio attendant position.

During tests, calls are placed to a number which is associated with the Trio attendant position. The CS1000E 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. **Note:** The Trio Enterprise server places a call to the attendant's deskphone, for compliance testing an Avaya 1140E was used. When the attendant is called the Trio Enterprise server calls the 1140E and bridges the call.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly-defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

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2.1. Interoperability Compliance Testing

The compatibility tests included the following.

- 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

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3. Reference Configuration

Figure 1 shows the network topology during compliance testing. The Trio Enterprise is connected to the CS1000E using a QSIG Trunk. One side of the QSIG trunk is configured on a PRI Card inserted into the CS1000E chassis, and the other side is configured on a Natural Micro Systems Dialogic Card inserted into the Trio Enterprise Server.

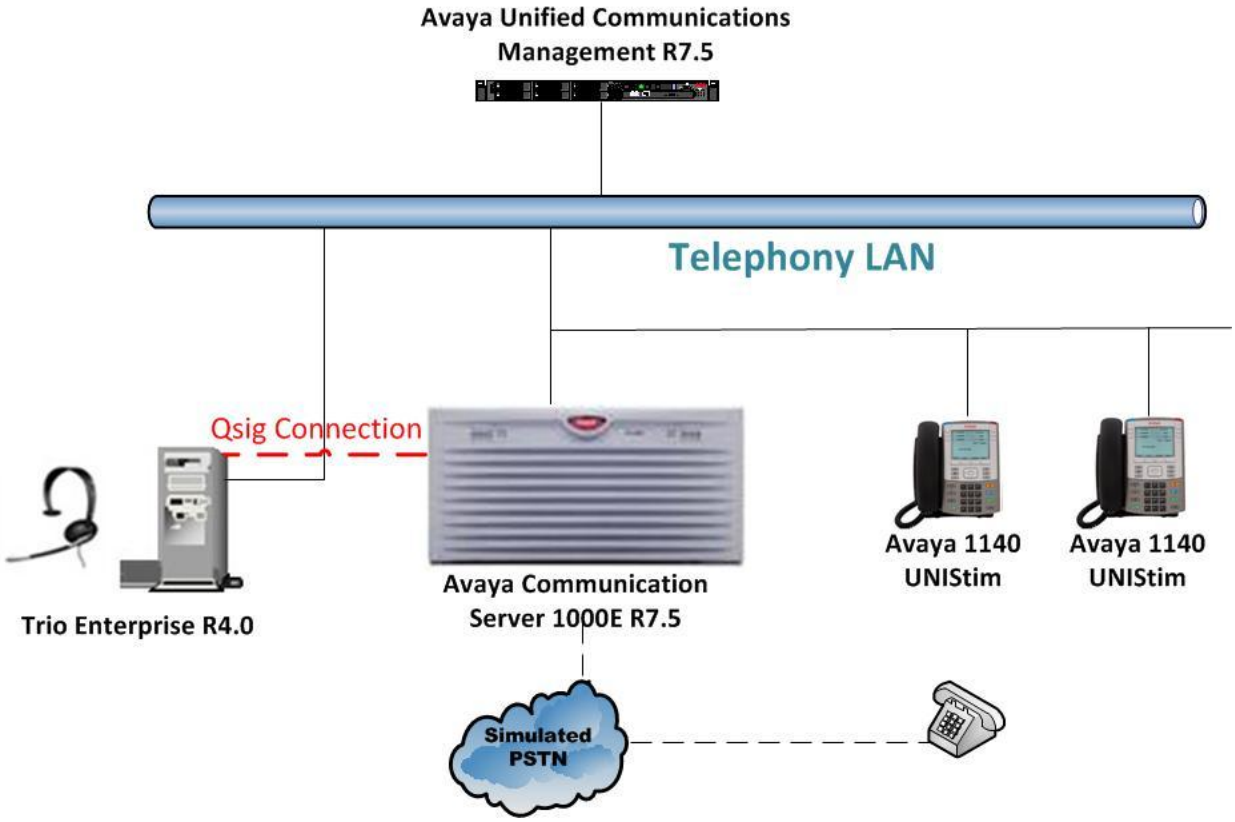

Figure 1: Configuration for Avaya Communication Server 1000E R7.5 and Trio Enterprise R4.0

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4. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya Communication Server 1000E on CPPM	R7.5 (See Appendix for list of patches)
Avaya Unified Communications Management running on CPPM	R7.5
Avaya PRI Card	NTBK50
Avaya 1140 UNIStim Deskphone	UNIStim V0625C8D
Trio Enterprise Running on Desktop PC (Minimum Specification Pentium IV, 3 GHz, 1 GB Ram, 1 USB Handset/Headset	Version 4.0

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5. Configure Avaya Communication Server 1000E

The configuration operations illustrated in this section were performed using terminal access to the CS1000E over a telnet session. 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 11**.

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

Note: Not all prompts need an answer. The prompts outlined below are mandatory for a basic configuration. Accept the default responses for all other prompts by pressing the return key.

5.1. Configuring QSIG

To configure the QSIG connection for Trio the following steps are used.

- 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. 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 (**DCH 58**) was created. At the **IFC** prompt, enter **ISGF** this signifies QSIG.

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

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5.1.2. 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	20	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

5.1.3. 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 10 New Trunks
TYPE	**TIE**	IP TIE trunk
TN	58 0	Card Unit
CUST	0	Customer Number as defined in LD15
RTMB	20 1	Route number and Member number

5.1.4. 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

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5.2. Configure a Coordinated Dialing Plan

In order to setup a Coordinated Dialing Plan (CDP) both a route list index and a CDP are added.

5.2.1. Create a Route List Index

Use the **NEW** command in **LD 86** to create a **RLI**. Enter the route (**ROUT)** that was created in **Section 5.1.2.**

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	20	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

5.3. Configure TR87 on CS1000E

To allow Trio observe TR87 events from a specific phoneset TR87, AST and IAPG must be set on a per phoneset basis. Enter overlay 20 to make all of these changes by typing **LD20** at the > prompt. Set the Class of Service (**CLS**) to **TR87A** and set the **AST** to **00** (Key 0) and **IAPG** to **1** to allow TR87 events get passed from the phoneset to the Trio application.

Prompt	Response	Description
>	**LD 20**	Enter Overlay 20
REQ	CHG	Change
TYPE	1140	Change phoneset type 1140
TN	L S C U	Terminal Number Loop Shelf Card Unit
CLS	**TR87A**	Change TR87 to "Allowed"
AST	**00**	Set AST for key 00
IAPG	**1**	Set CTI messaging to "Yes"

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5.4. Configure Intercept Computer Update on CS1000E

Trio uses Intercept Computer Update (ICP) on the CS1000E to change the presence state of the phoneset. A physical port on the CS1000E must be configured for ICP along with the ICP configuration in the Customer Data Block.

5.4.1. Configuration of ICP Port

Enter overlay 17 to add a new terminal to connect to the Trio for ICP use. Follow the instructions below to configure a physical connection on port 2 connected to MGC card 4 0. Type **LD 17** at the > prompt to enter overlay 17.

Prompt	Response	Description
>	**LD 17**	Enter Overlay 17
REQ	**CHG**	Change
TYPE	**ADAN**	Change the Action Device and Number
ADAN	New TTY x	New tty port x
CTYP	MGC	Nedia Gateway Controller
IPMG	4 0	Loop and Shelf
DNUM	14	Data number
PORT	2	Port number
DES	ICP2	Description
BPS	1200	Bits per Second
BITL	7	Bit Length
STOP	1	Stop bit
PARY	EVEN	Parity
FLOW	NO	Flow
USER	ICP	User type is set to ICP

5.4.2. Configuration of ICP in the Customer Data Block

Enter Overlay 15 to change the Intercept Computer Update (ICP) data block by typing **LD 15** at the > prompt and follow the instructions as shown below to configure ICP for Trio.

Prompt	Response	Description
>	**LD 15**	Enter Overlay 17
REQ	**CHG**	Change
TYPE	**icp**	Change the Intercept Computer Update
CUST	0	Customer Number
APL	14	Auxiliery Processor Link used
NIPN	9	Number of Intercept positions
ICCR	NO	Intercept Position Cancelling Reply
ICDN	4002	Internal Call DN
ECDN	4002	External Call DN
ICDL	4	CP DN Length
ICPD	0	ICP Padding Digit
ICTD	YES	Intercept Terminal Dail from Directory

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6. Configure Avaya Communication Server 1000E Signalling Server for TR87 events

SIP CTI (TR/87) services must be enabled and configured on the CS 1000 IP Telephony Node to allow applications obtain presence information or invoke a make call operation. Navigate to the Unified Communications Management webpage and enter the proper login credentials to gain access to Element Manager on the CS1000E.

Once logged in correctly click on the Element Manager link highlighted below.

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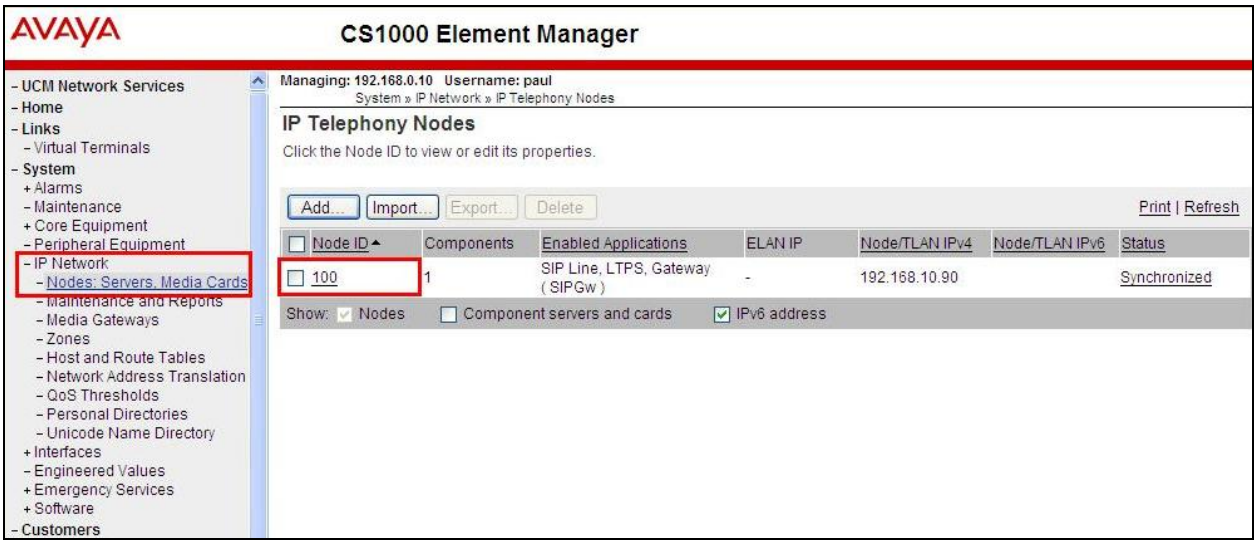
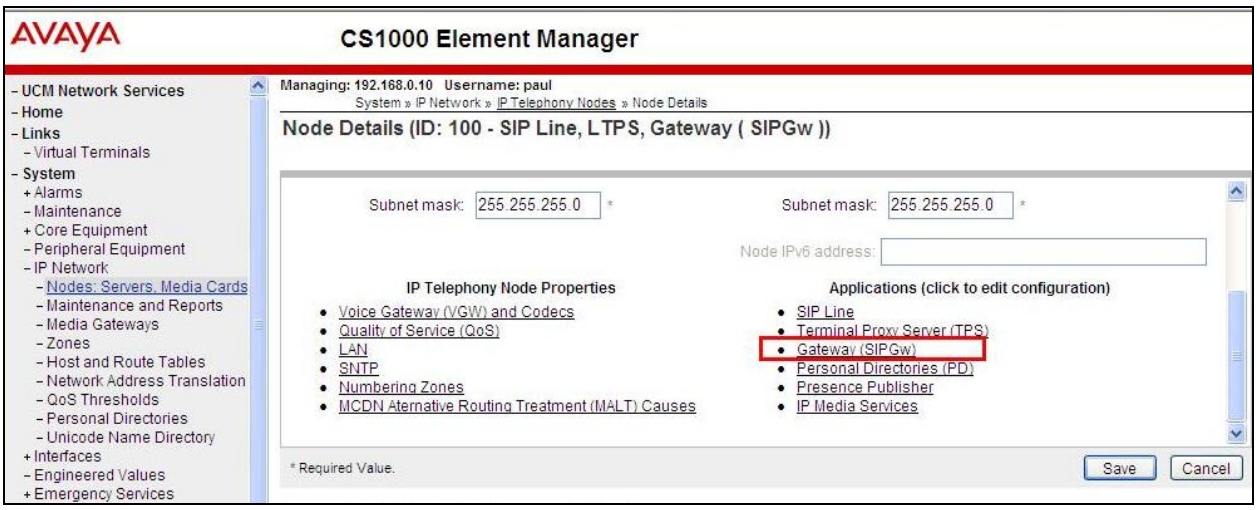
Click on **IP Network →Nodes, Servers, Media Cards** in the left window. Click on the **Node ID** displayed in the right window.



Select **Gateway (SIPGw)** highlighted below.



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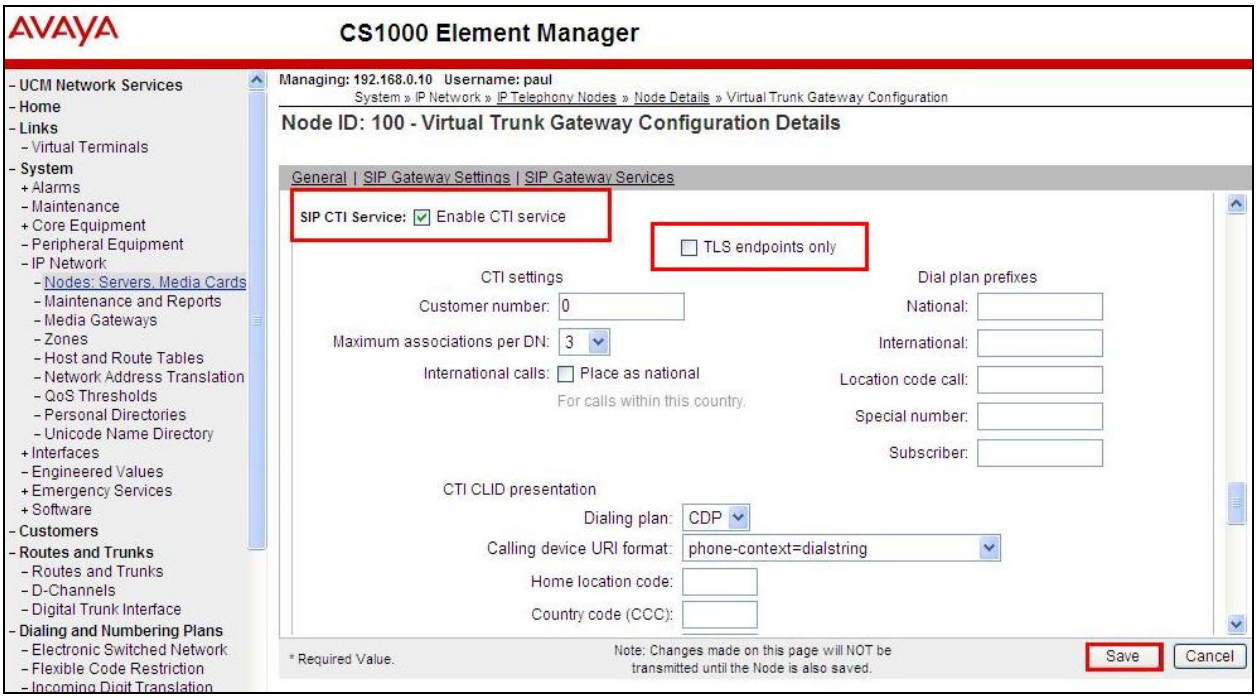
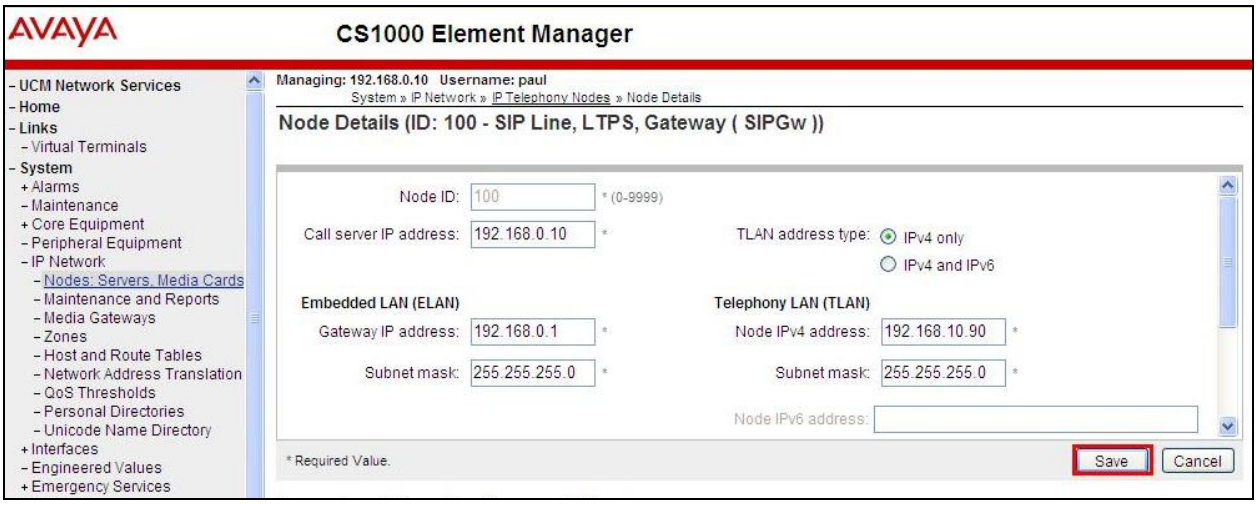
Ensure that **SIP CTI Service** is ticked as shown below and untick the **TLS endpoints only** if this is ticked, everything else can be left as default. Click on **Save** once finished.



Once Save above is clicked then the following screen appears, click on **Save** as shown below.



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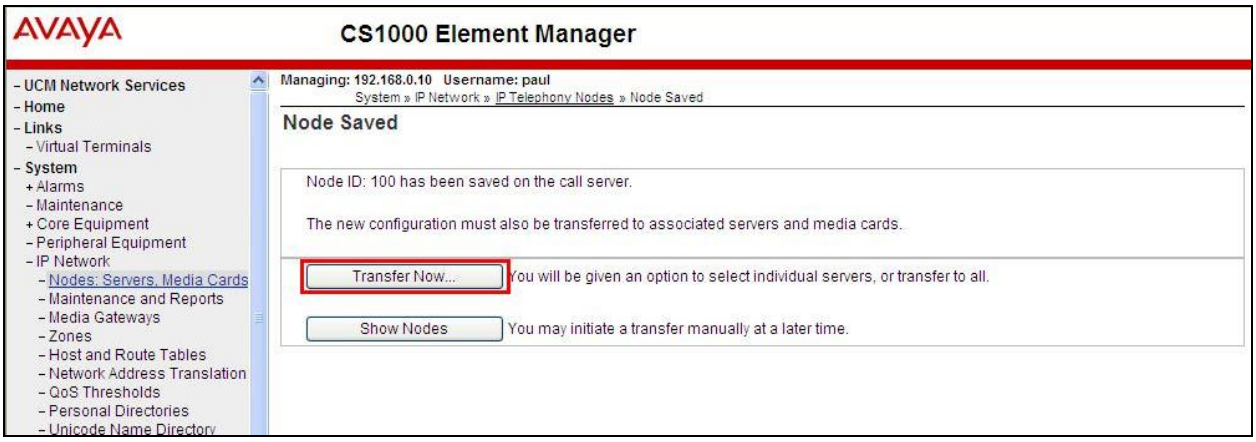
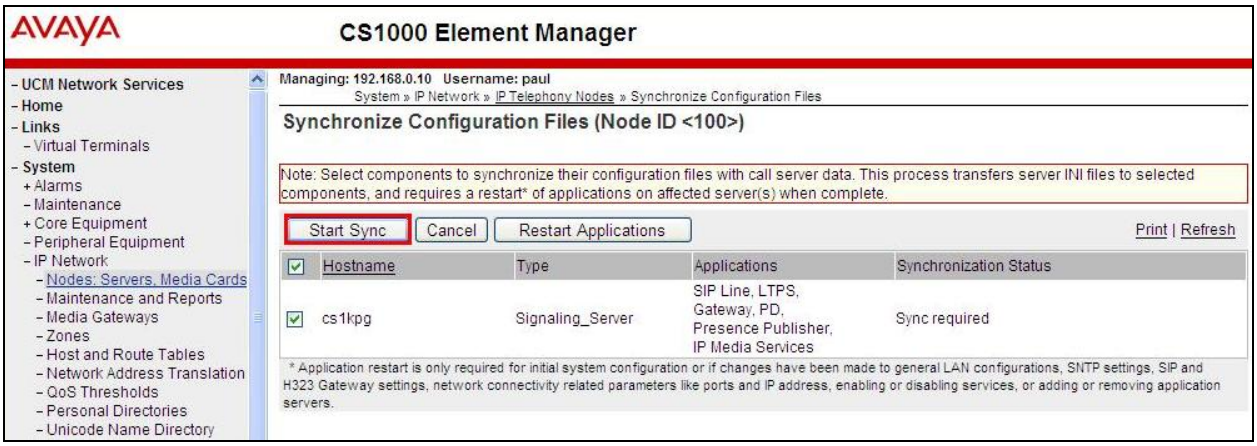
Once Save above is clicked the following screen appears. Select **Transfer Now** as highlighted below.



Once the information is transferred over then the components need to synchronise their configuration files with the CS1000E call server. Select the **Hostname** as shown below and click on **Start Sync**.



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Once the components are synchronised the application will require a restart, select the **Hostname** and click on **Restart Applications** as highlighted below.

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7. Configure TRIO Enterprise

The primary purpose of Trio Enterprise is to provide an attendant position to the CS1000E. 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.

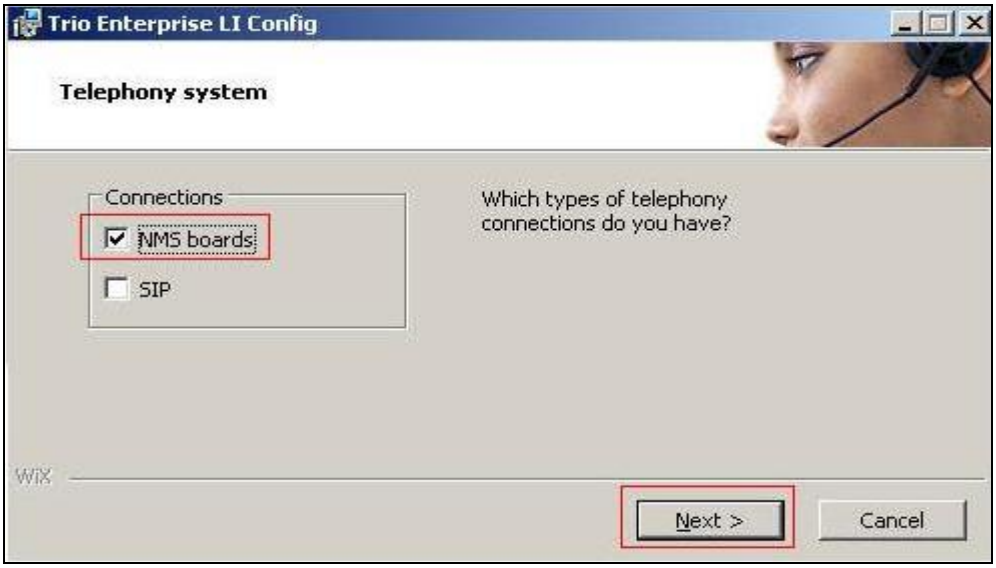
- Configure Trio Enterprise to use QSIG trunks
- InteractionStudio configuration

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

7.1. 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:

1. Access Windows services. Select **Start → Run**, then type **services.msc** into the command line (not shown). Press return.
2. When the standard services window opens, locate the Trio Televoice service and stop the service (not shown).
3. 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.
4. Ensure the **NMS boards** entry in the **Connections** area is checked.
5. Click **Next** to continue.



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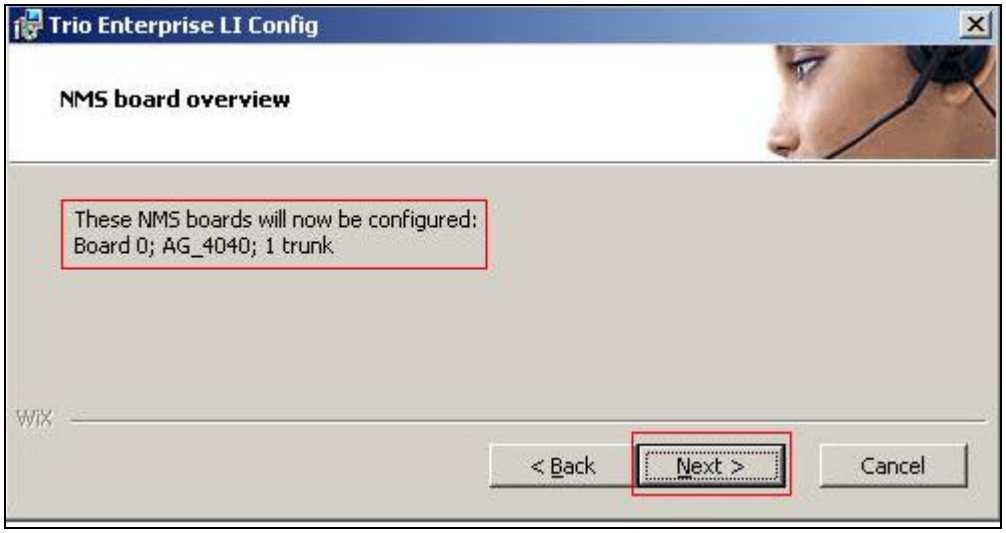
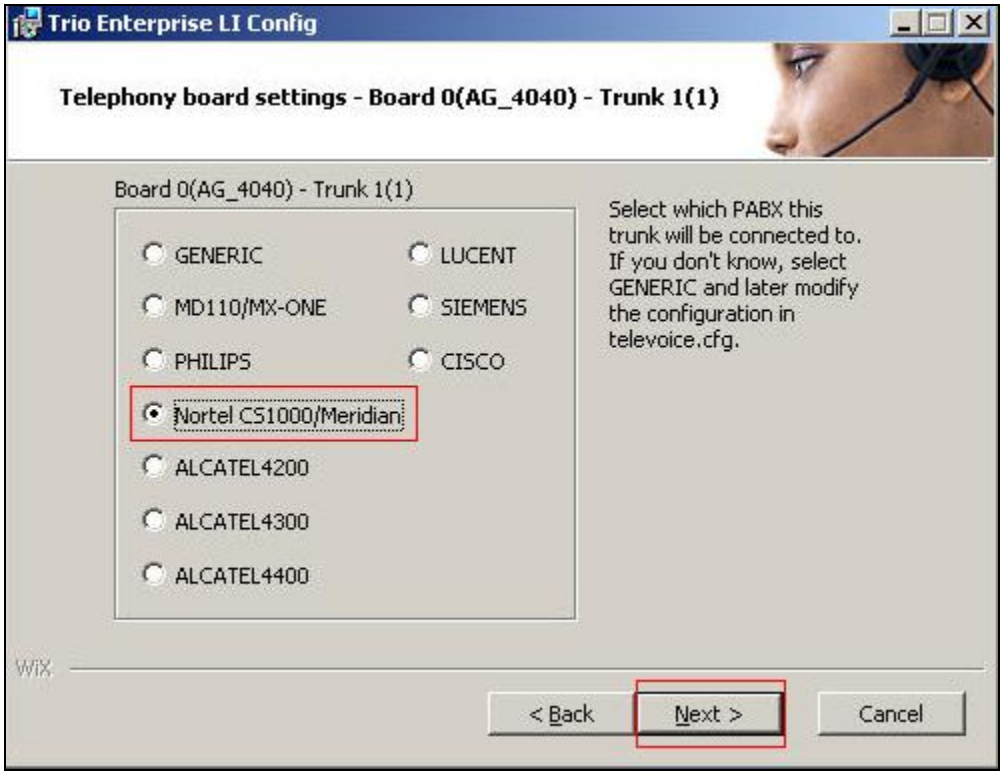
A **NMS board overview** screen appears. This is for information only; it reports the onboard configuration of the hardware QSIG trunks installed in Trio Enterprise Server. The **AG_4040** is the Natural Micro Systems (Dialogic) Card. Click **Next** to continue.



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



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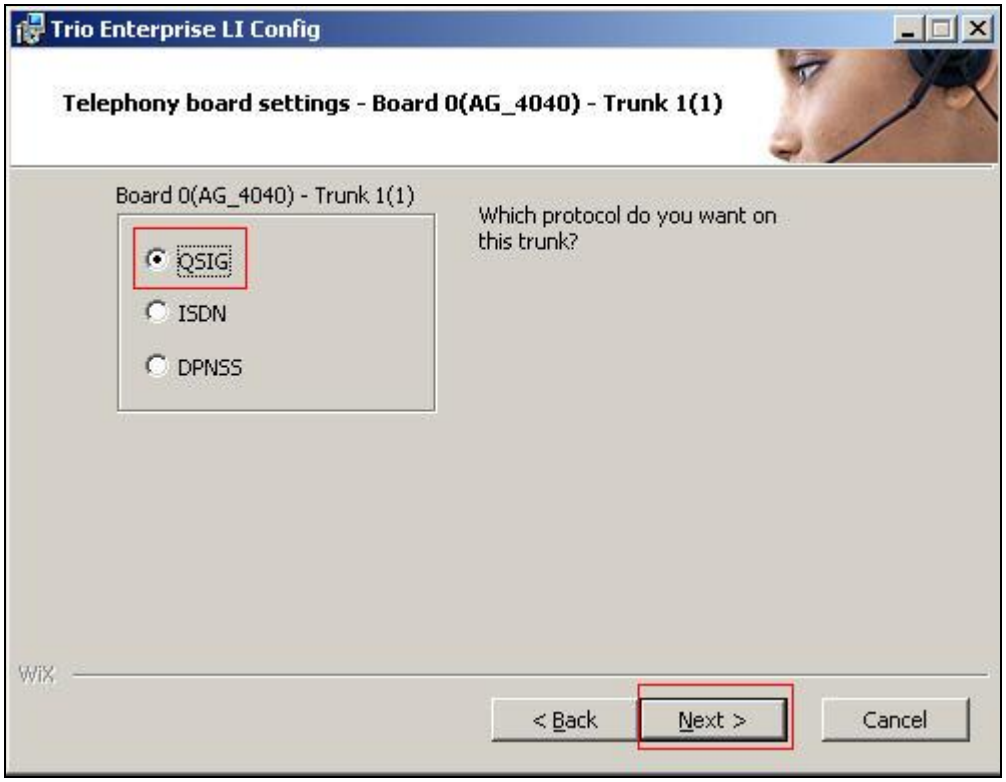
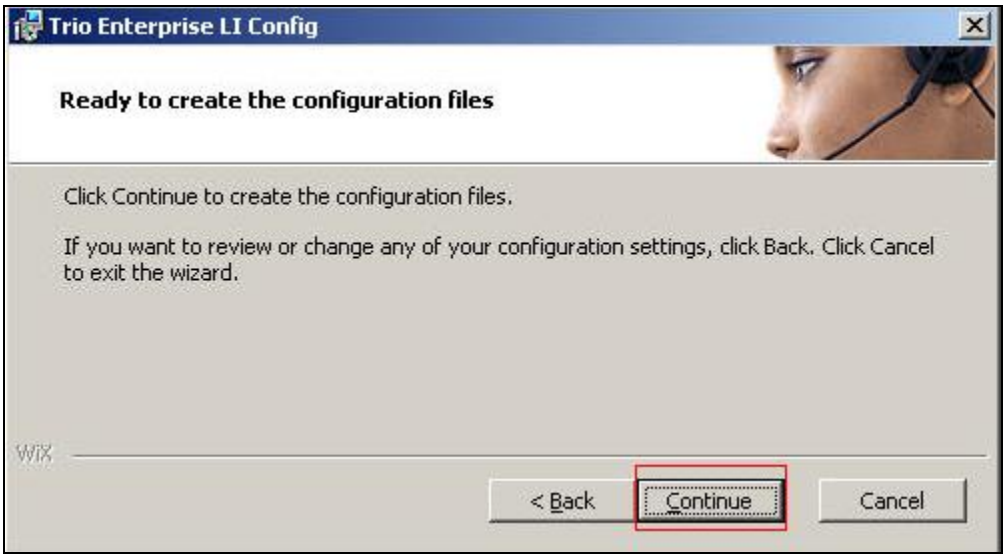
In the next window, click the **QSIG** radio button. Click on **Next** when ready.



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.



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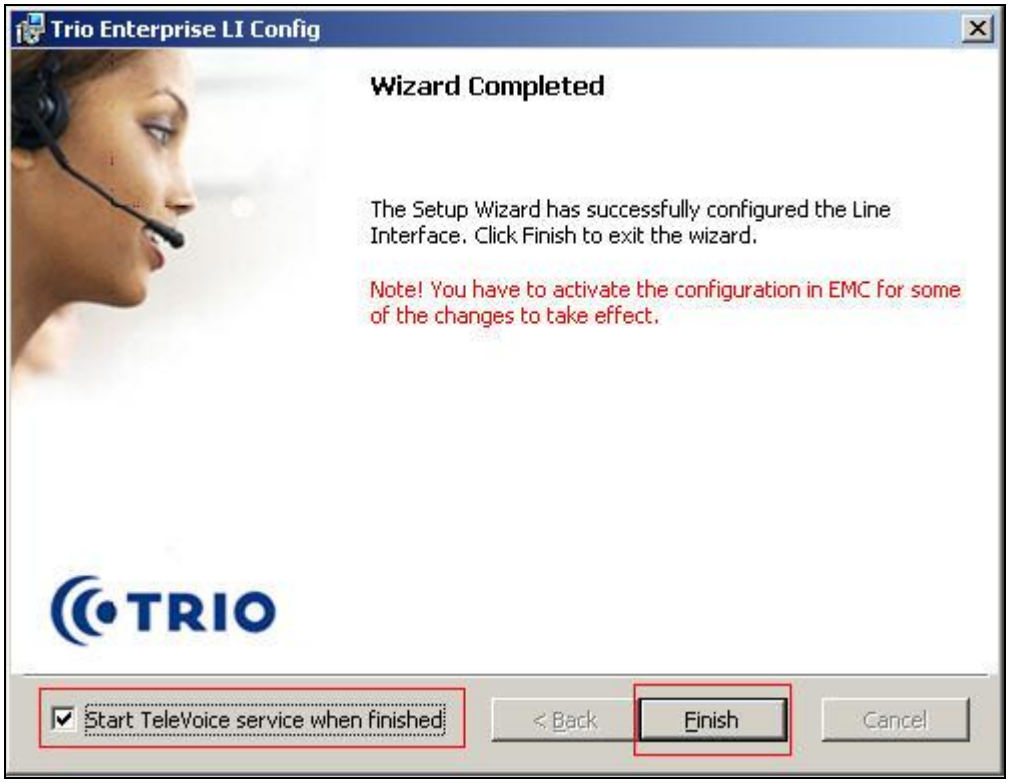
When the configuration wizard completes successfully, the following Window appears. Ensure the **Start Televoice service when finished** option is checked. Click on the **Finish** button to complete the configuration procedure. This concludes Trio Enterprise QSIQ configuration.



7.2. 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

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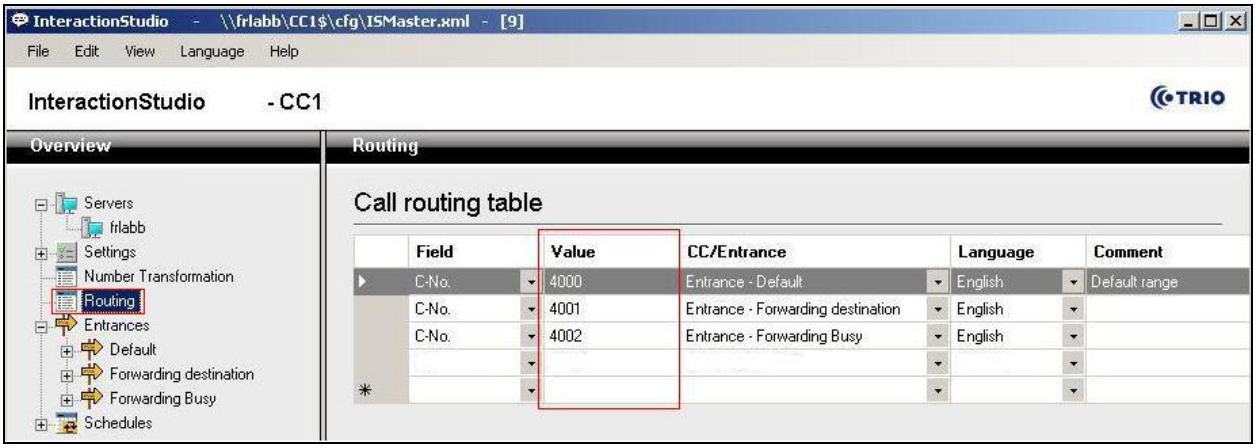
7.2.1. Configure Call routing table

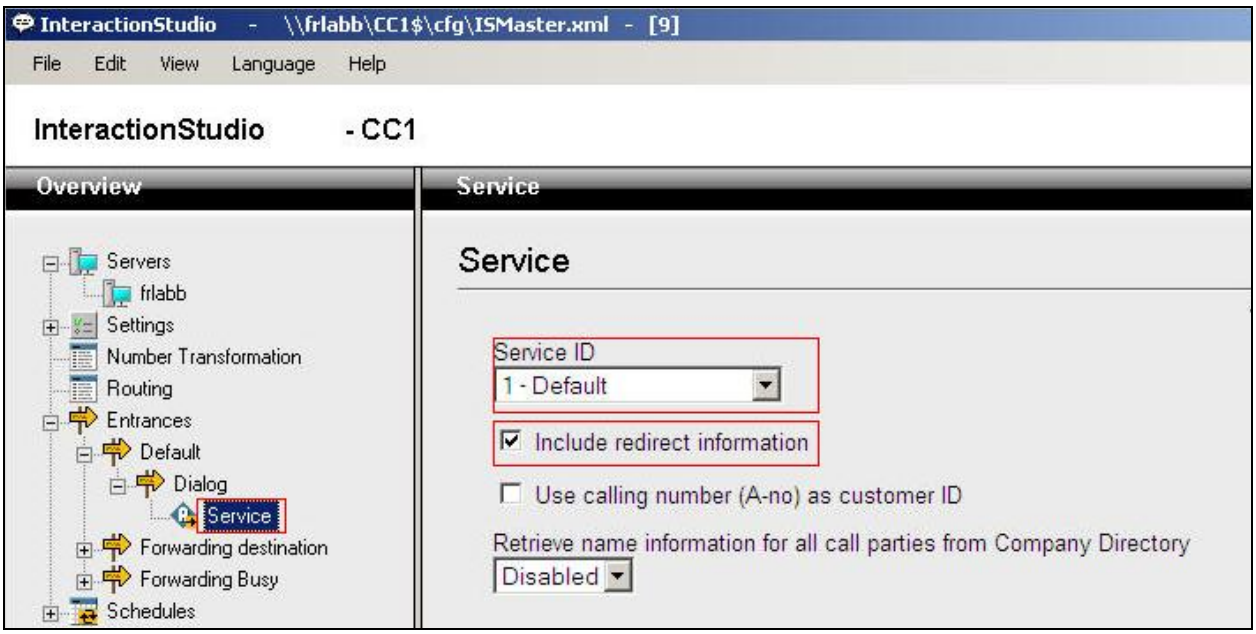
On the Trio Enterprise server, click the **Start** button → **Programs** → **Trio Enterprise** → **Contact Center** → **CC1** → **Interaction Studio** (not shown). When the InteractionStudio window opens, navigate to **Routing**. A Call routing table will open. In the example below:

- 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.



7.2.2. Configure Attendant Service

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



7.2.3. Configure Loop Detection via DTMF for Busy signal

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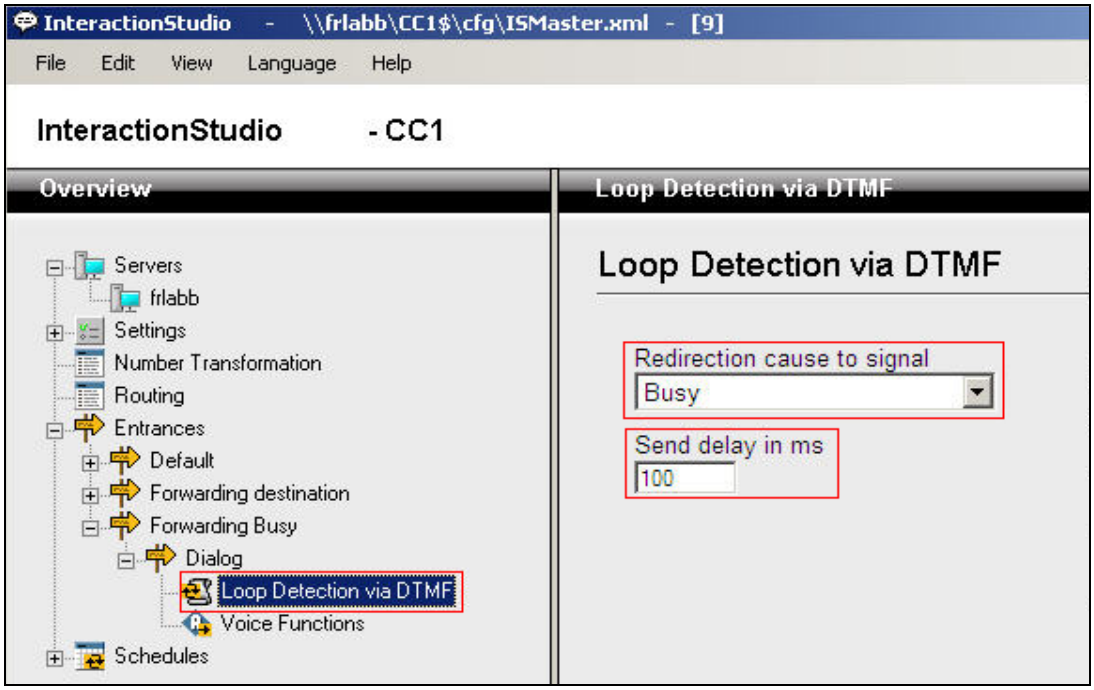
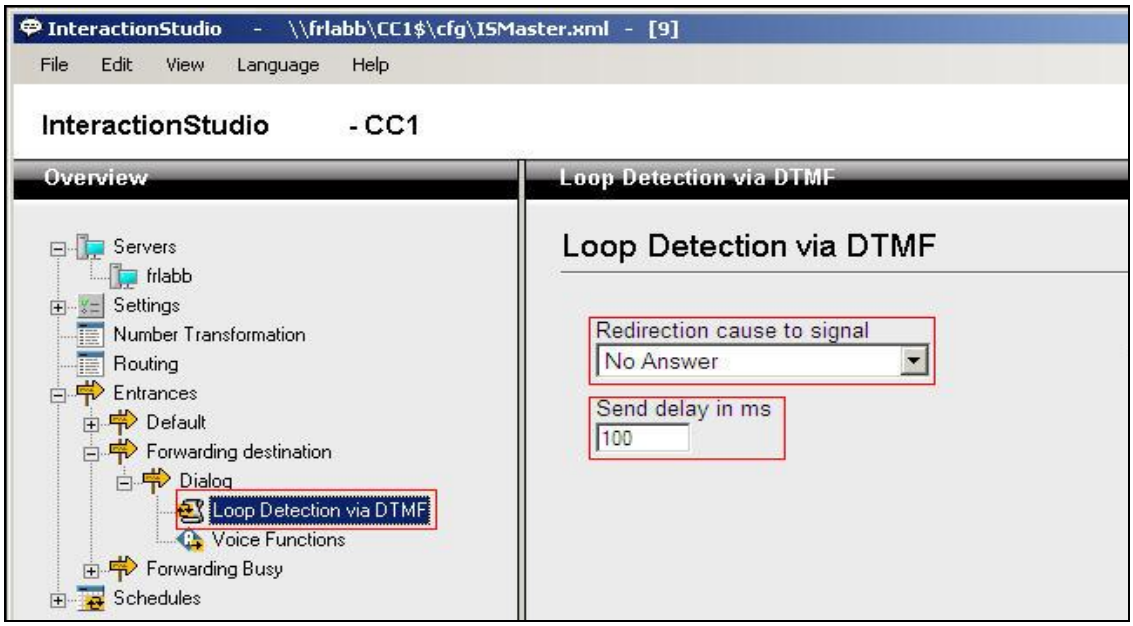
Navigate to **Entrances → Forwarding Busy → Dialog → Loop Detection via DTMF.** Choose **Busy** from the **Redirection cause to signal** drop down box, and enter **100** in the **Send delay in ms** box.



7.2.4. 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** drop down box, and enter **100** in the **Send delay in ms** box.



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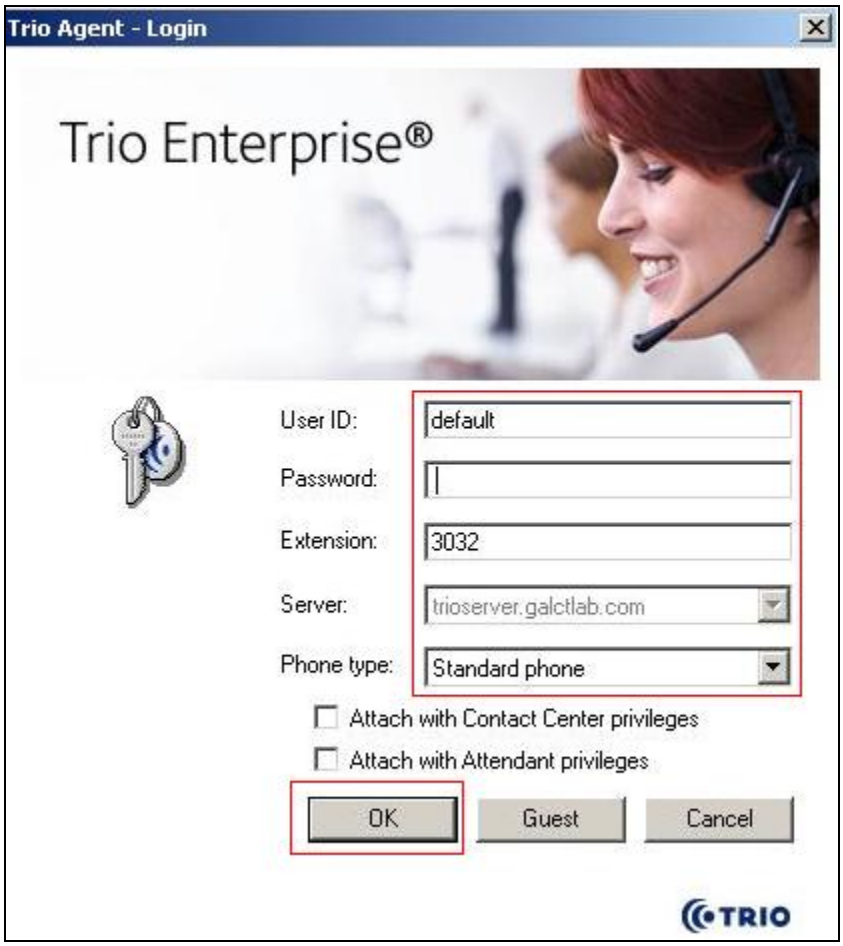
7.3. Configuring Trio Attendant

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. To configure Trio Attendant click on **Start → Programs → Trio Enterprise → Contact Centre → Agent Client** (not shown).

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.



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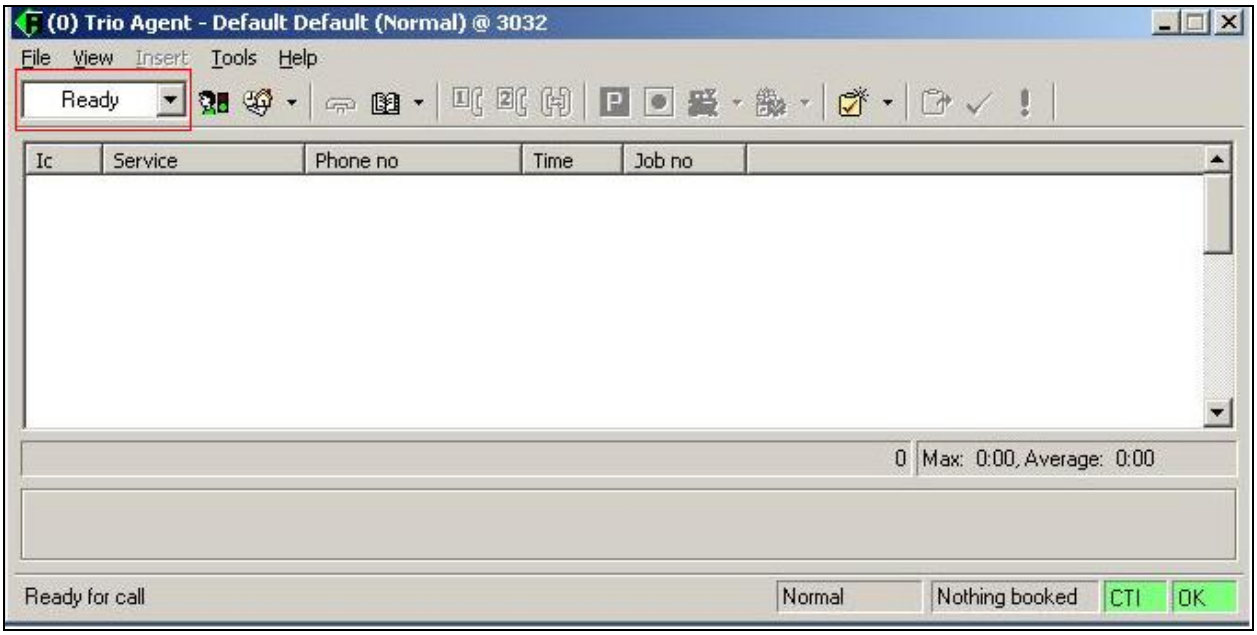
The Trio Agent window appears. Select **Ready** from the drop down box (confirm the traffic light goes green in the small icon to the right of the drop down box).



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7.4. Configure TR87 on Trio Enterprise

Click on **Start→Programs→Enterprise Management Center**.

Enter the proper credentials and click on **OK**.

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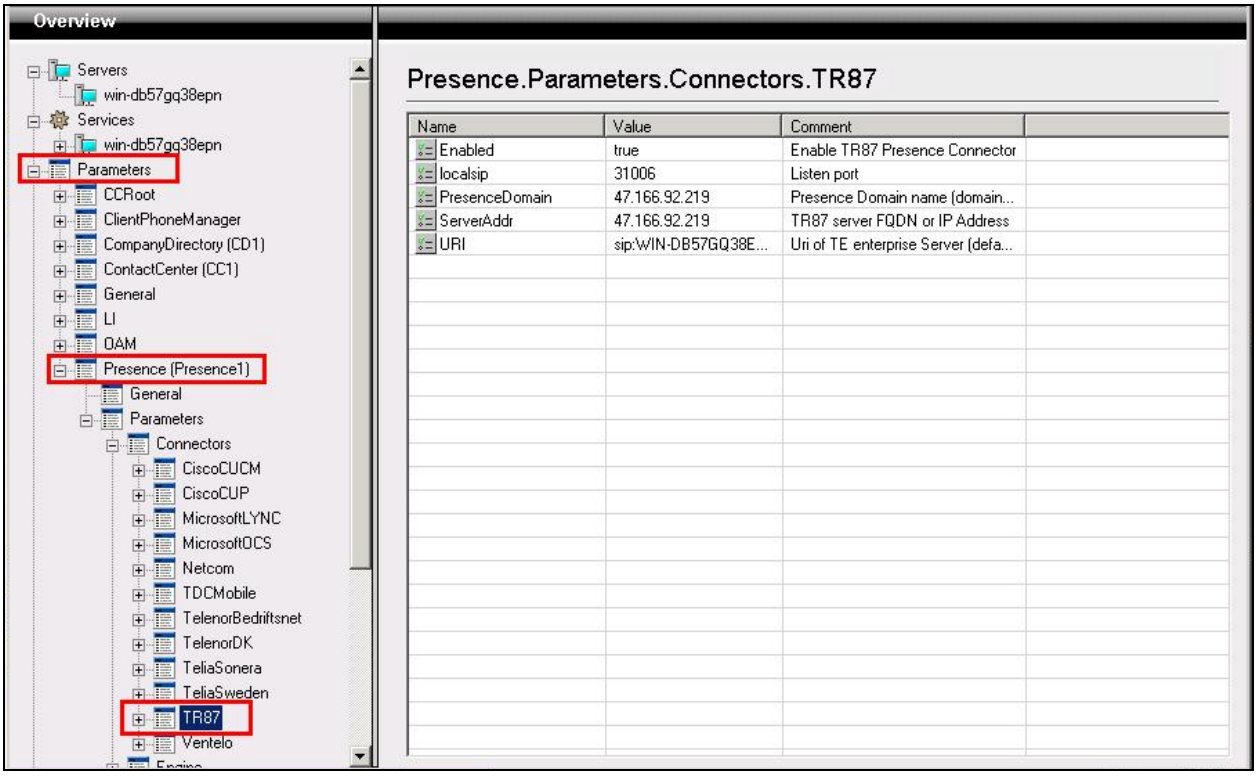
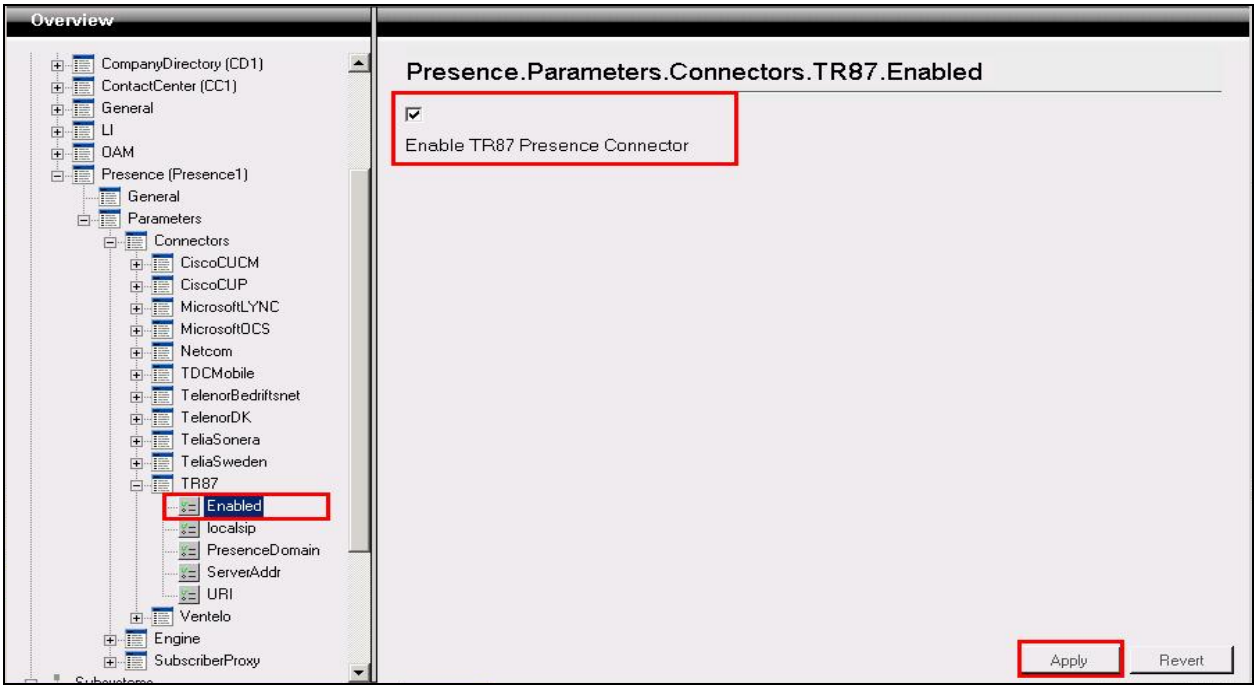
Click on **Parameters→Presence→Parameters→Connectors→TR87** in the left window.



Under **TR87** select **Enabled** in the left window. Ensure that **Enable TR87 Presence Connector** is ticked as shown below. Click **Apply** to continue.



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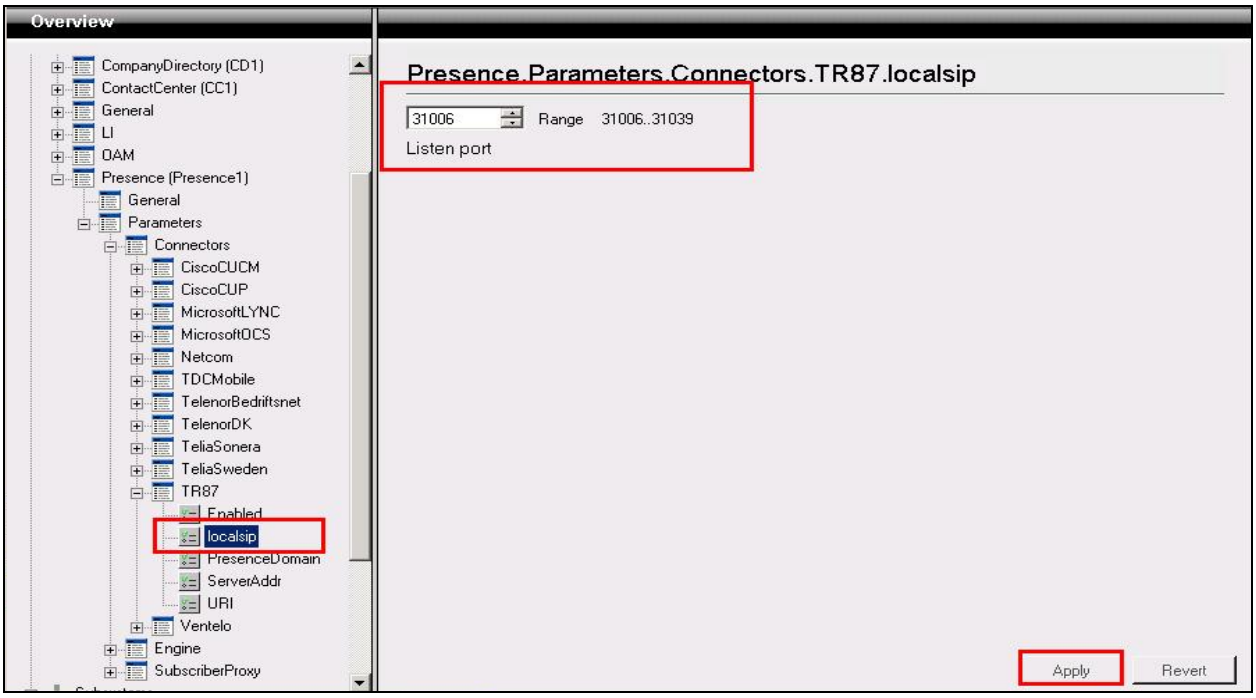
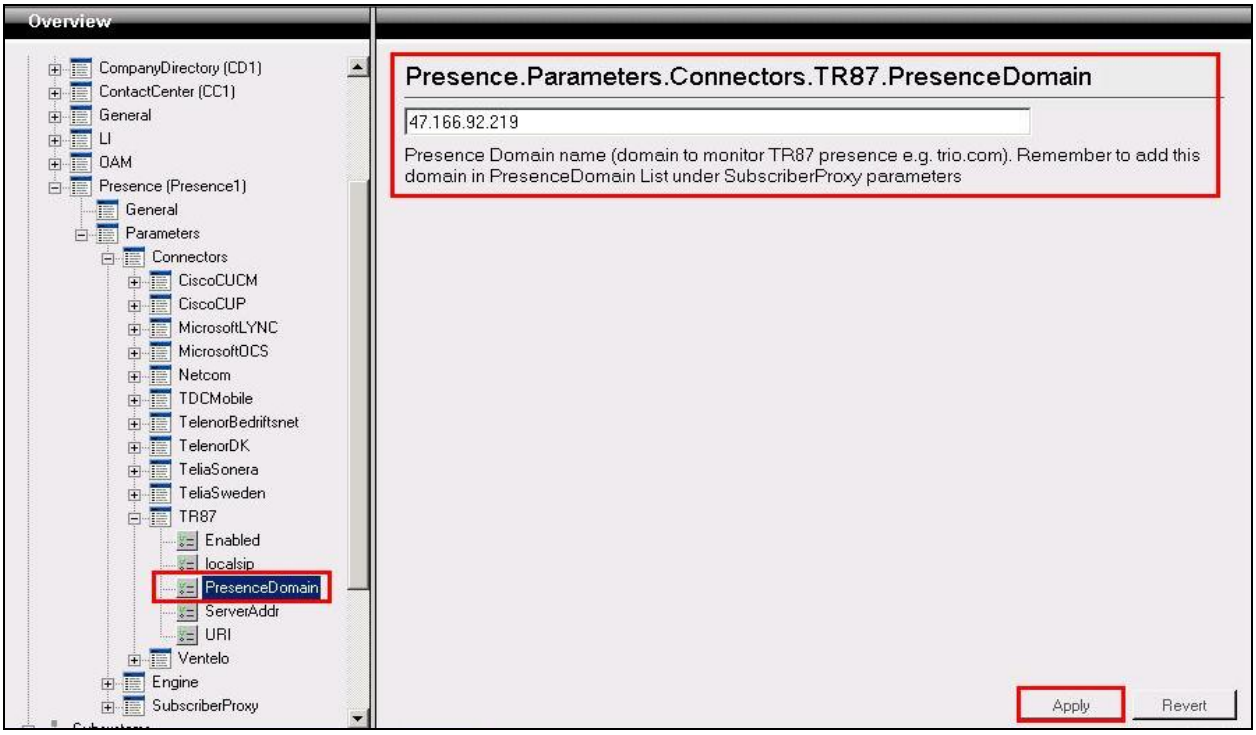
Select **localsip** under **TR87** in the left window and select the **Listen port** for TR87, for compliance testing this was left as default **31006** as shown below. Click **Apply** to continue.



Select **PresenceDomain** under **TR87** in the left window. Enter the Node IP address of the CS1000E. Click **Apply** to continue.



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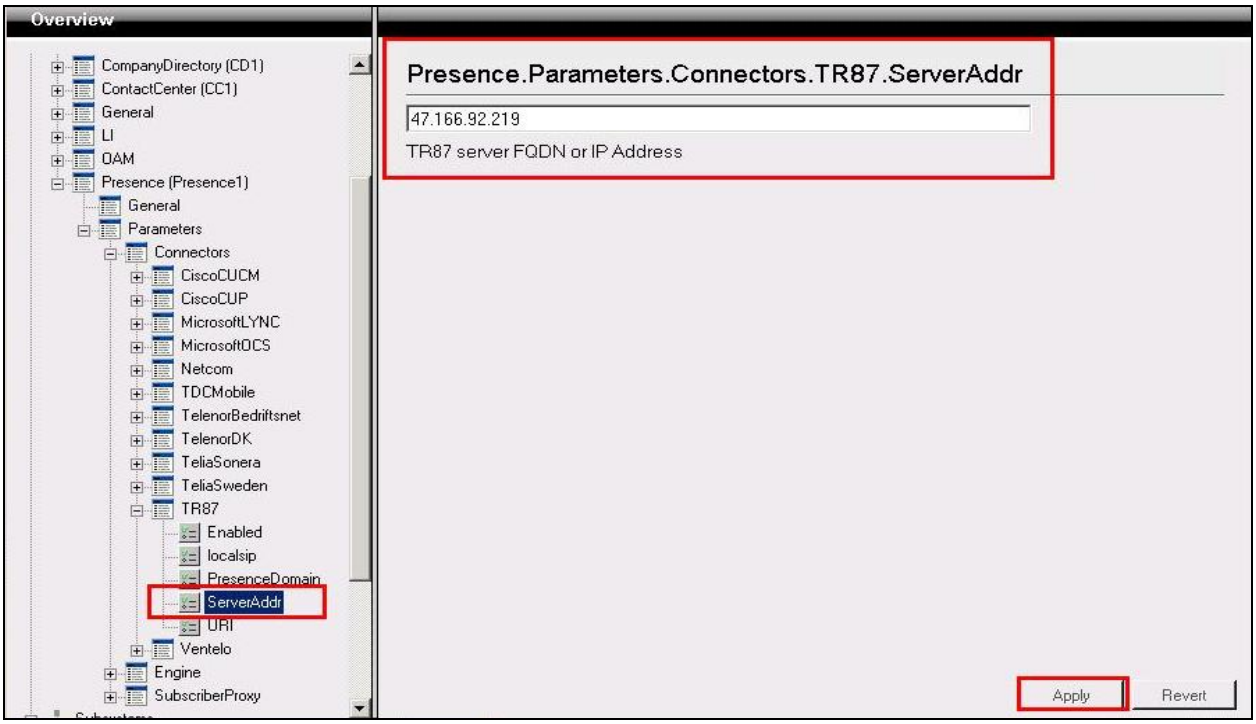
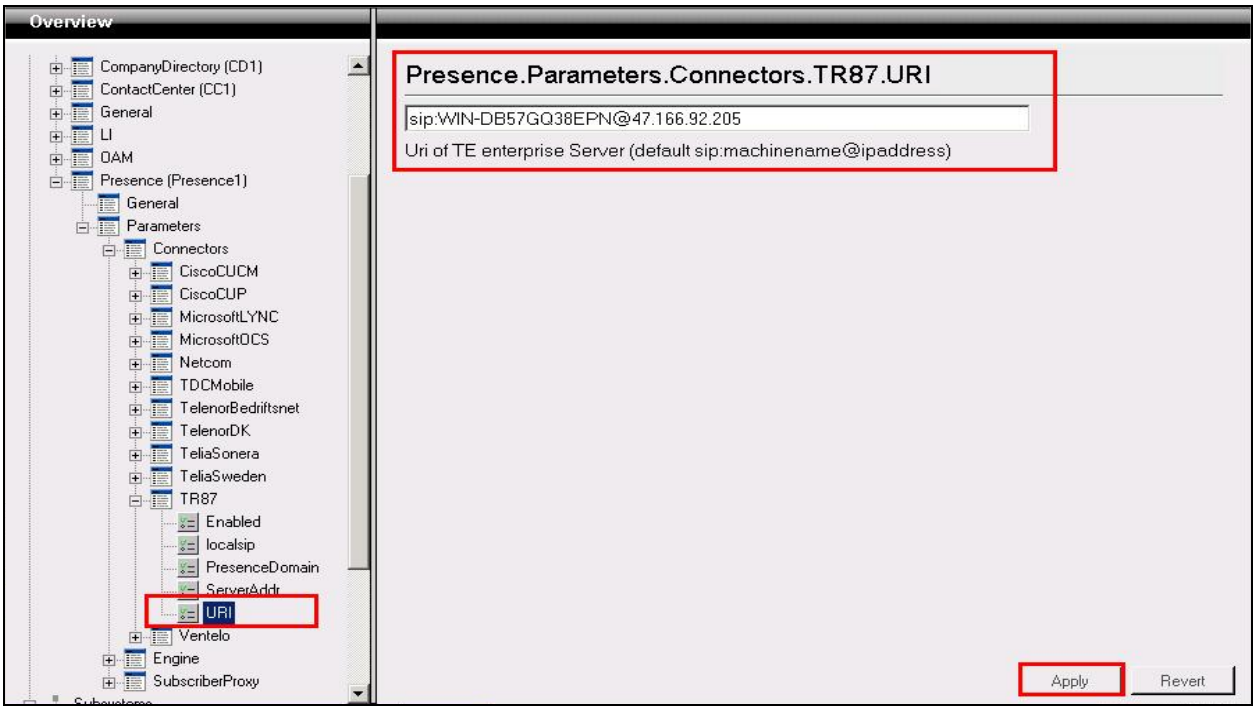
Select **ServerAddr** under **TR87** in the left window and again enter the Node IP address of the CS1000E. Click **Apply** to continue.



Select **URI** under **TR87** in the left window and enter the **machinename@ipaddress** preceded with **sip:** as shown below. Click Apply to continue.



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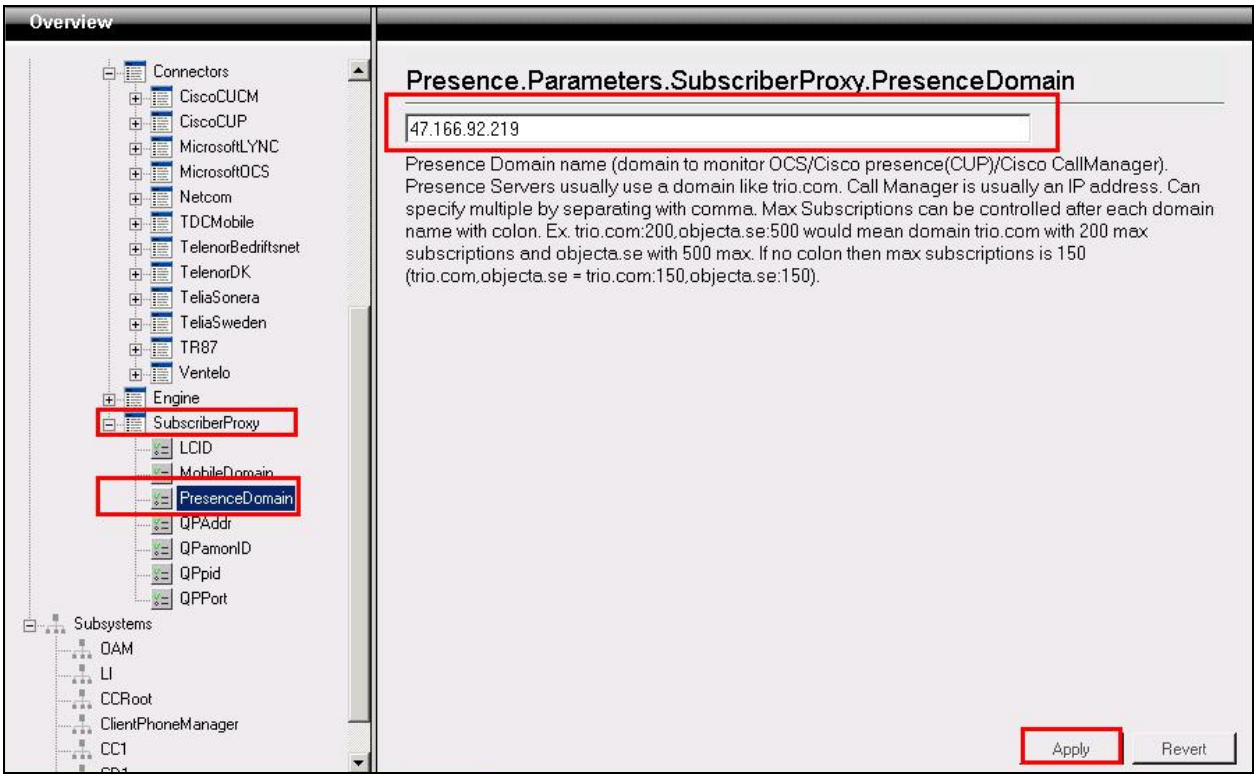
Select **PresenceDomain** under **SubscribeProxy** in the left window. Enter the Node IP address of the CS1000E in the right window. Click **Apply** to continue.



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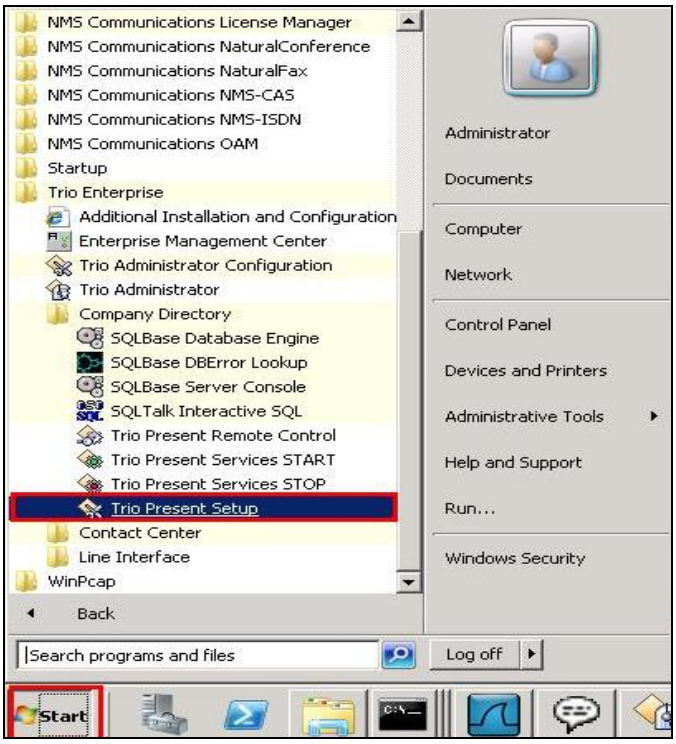
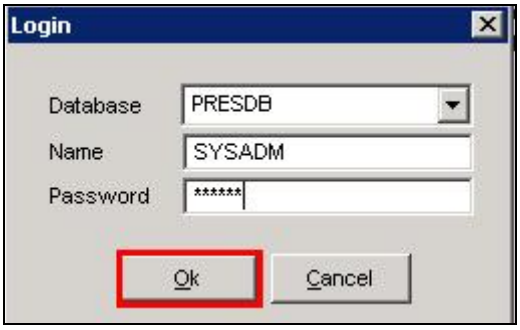
7.5. Configure ICP on TRIO

Select **Start→ Programs→Trio Enterprise→ Company Directory→Trio Present Setup** as shown below.



Enter the proper credentials and click **Ok**.



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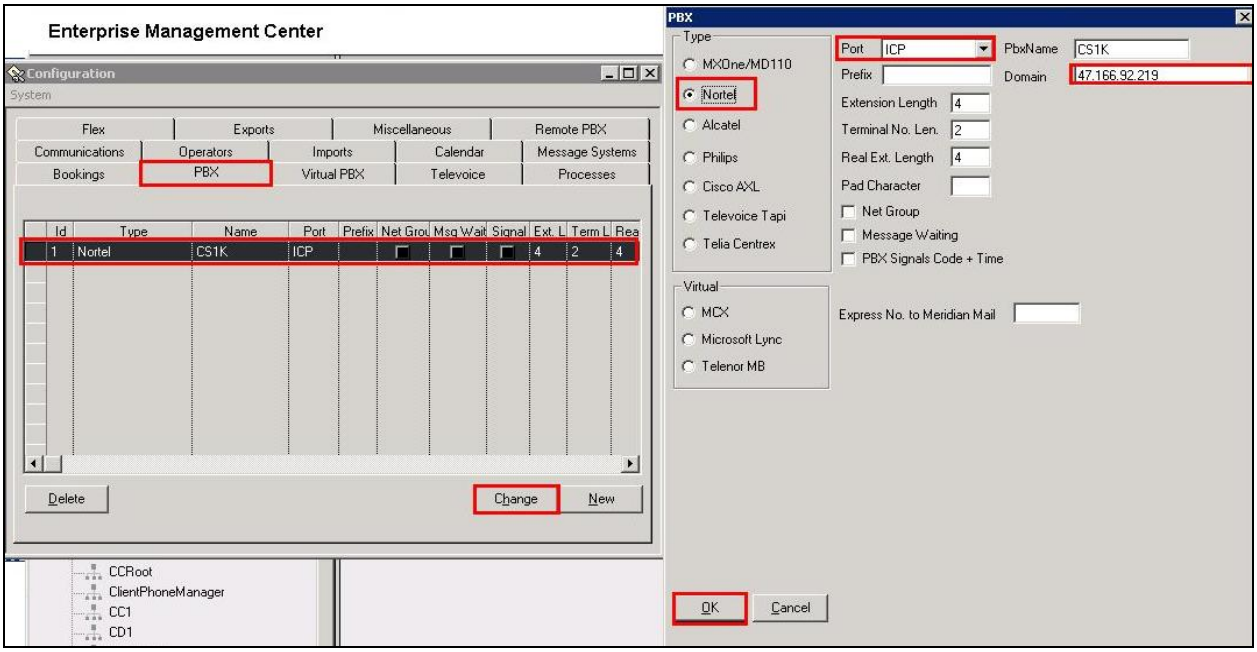
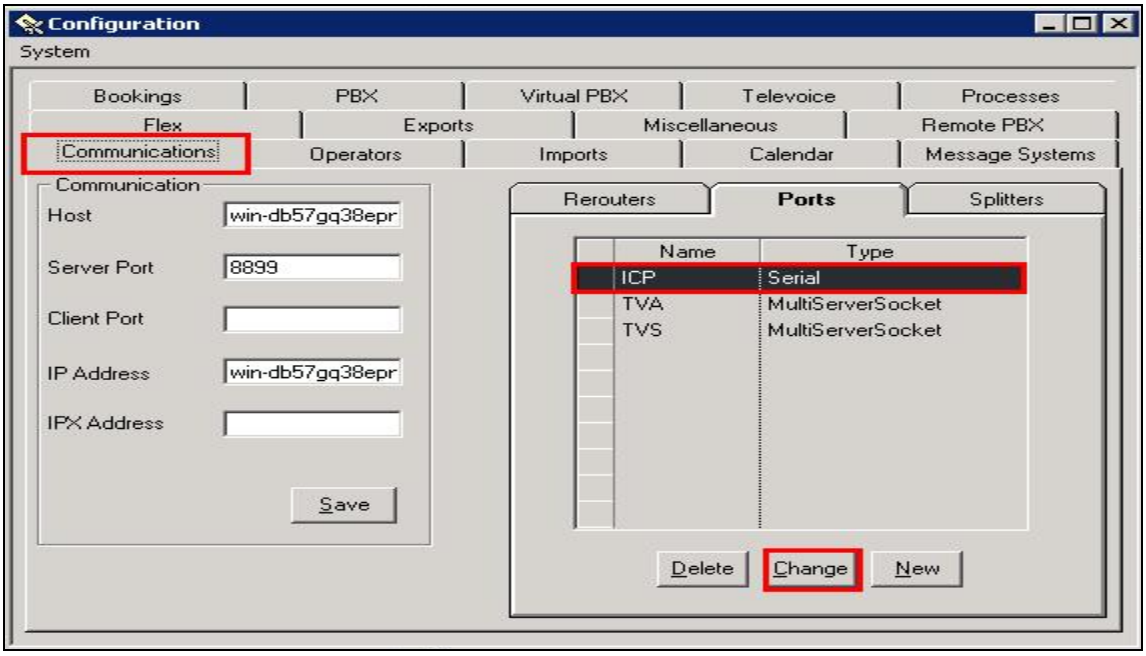
Highlight the selected PBX under the PBX tab and click on change. This opens the window displayed on the right. Ensure the following are selected.

- **Type** **Nortel**
- **Port** **ICP**
- **Domain** Node IP address of CS1000E

Select **OK** once the correct information is entered.



Under the **Communications** tab select **ICP** as highlighted below and click **Change**.



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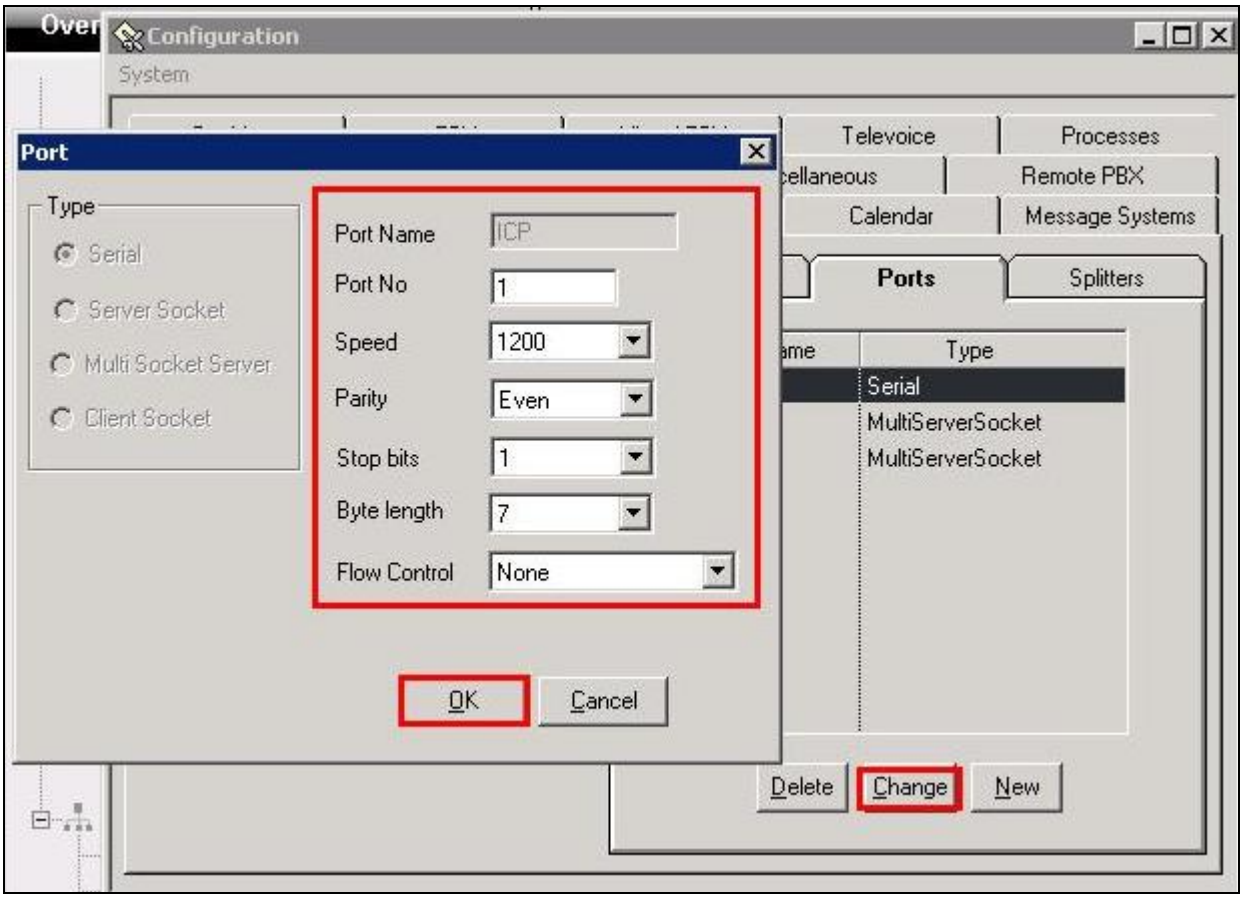
Enter the information that was entered in **Section 5.4.1** previous, click **OK** once all correct information is added.



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8. Verification Steps

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

8.1. 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
```

8.2. 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).

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9. Conclusion

These Application Notes describe the configuration steps required for Trio Enterprise R3.2 to successfully interoperate with Avaya Communication Server 1000E R7.5 using QSIG trunks. Trio Enterprise R3.2 passed all compliance testing successfully; please see **Section 2.2** of these Application Notes for results and observations.

10. Additional References

This section references documentation relevant to these Application Notes. The Avaya product documentation is available at http://support.avaya.com where the following documents can be obtained.

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

[2] *Unified Communications Management Common Services Fundamentals Avaya Communication Server 1000;* Document No NN43001-116 05.17

All information on the product installation and configuration TRIO Enterprise Server can be found at http://www.trio.com

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Appendix A
Installed Avaya Communication Server 1000E dependency list

```
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
```


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