Avaya Solution & Interoperability Test Lab

Application Notes for Configuring Trio Enterprise R3.1 with Avaya Communication Server 1000E R7.5 and Avaya Aura® Session Manager R6.1 using a SIP connection – Issue 1.1

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 a SIP connection via Avaya Aura® Session Manager R6.1 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 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 a SIP connection via Avaya Aura® Session Manager R6.1. Calls are made over 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 the Session Manager. 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 SIP 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 SIP 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.

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 and 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.

- Session Manager 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 SIP connection via the Session Manager. The Trio Enterprise Server is configured as a SIP Endpoint. A System Manager is used to configure the Session Manager.

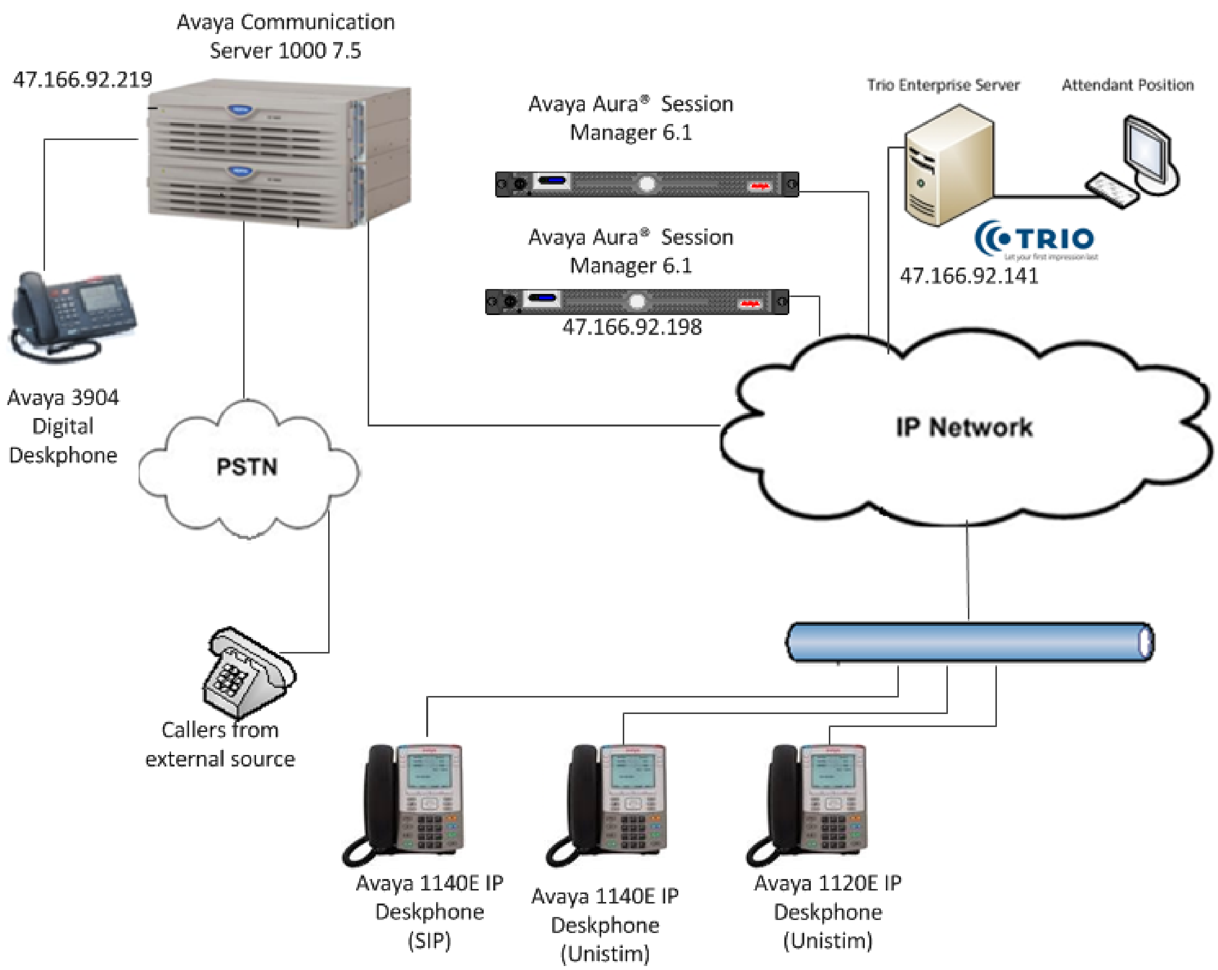


Figure 1: Configuration for Avaya Communication Server 1000E and Trio Enterprise R3.1

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 Media Gateway	NTDW60 FPGA AA18
Avaya S8800 Media Server	Avaya Aura® System Manager R6.1 Build 6.1.0023
Avaya S8800 Media Server	Avaya Aura® Session Manager R6.1 Build 6.1.0012
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

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 9**.

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

5.1. Configuring Avaya Communication Server 1000E

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

- Configure Network Attendant Service (NAS) and Night (NIT) Data
- Create a D-channel for the SIP trunk
- Create Route Data Block
- Adding TIE Trunks

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	**NEW**	Change
TYPE	NIT	Night Service
CUST	**0**	Customer Number
NIT1	5000	Night number

5.1.2. Create a D-Channel

Use the **CHG** command in **LD 17** to create a D-channel for the SIP connection. In the example below, D-Channel 66 (i.e. **DCH 66**) was created. At the **CTYP** prompt, enter **DCIP.** This signifies the SIP D-Channel.

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 66**	Create new D-Channel 66
CTYP	**DCIP**	Card type is IP D-Channel
USR	**ISDL**	Integrated Services Digital Line
IFC	**SL1**	D-Channel interface 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	**20**	Route Number
TKTP	**TIE**	Route Type
VTRK	YES	Virtual Route
PCID	SIP	Protocol ID for route
DTRK	NO	Digital Trunk Route
ISDN	YES	Integrated Services Digital Network
MODE	ISDL	mode of operation
IFC	SL1	Interface type
ACOD	8020	Access Code for trunk route

5.1.4. Adding TIE Trunks

Use the **NEW** command in **LD 14** to add (**IPTI**) **TIE** trunks to the new route created in **Section 5.1.3** 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	IPTI	IP TIE trunk
TN	096 0 3 1	Loop Shelf Card Unit
CUST	0	Customer Number as defined in LD15
TRK	ANLG	Trunk type
RTMB	20 1	Route number and Member number

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	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

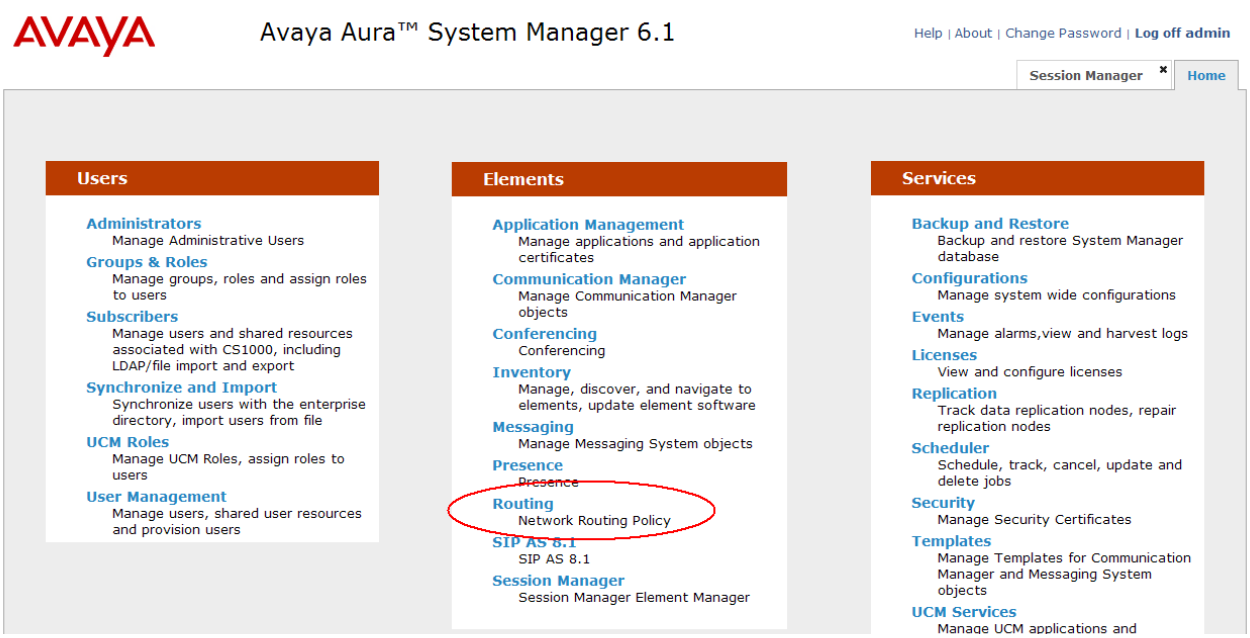
5.3. Creating the Trio Enterprise Server as a SIP Endpoint on the Avaya Aura® Session Manager

To create the Trio Enterprise Server as a SIP Entity on the Session Manager, The System Manager is used. The following must be configured.

- SIP Entity
- SIP Entity Details
- Create an Entity Link

Note: To get more information for any input field you can press the **Help** link at anytime.

Configuration is accomplished by accessing the browser-based GUI of Avaya Aura® System Manager, using the URL **http://<fqdn>/SMGR** or **http://<ip-address>/SMGR**, where "<fqdn> is the fully qualified domain name of System Manager or the **<ipaddress>** is the IP address of System Manager. Log in with the appropriate credentials. Once logged in select the **Routing** link under the **Elements** column.



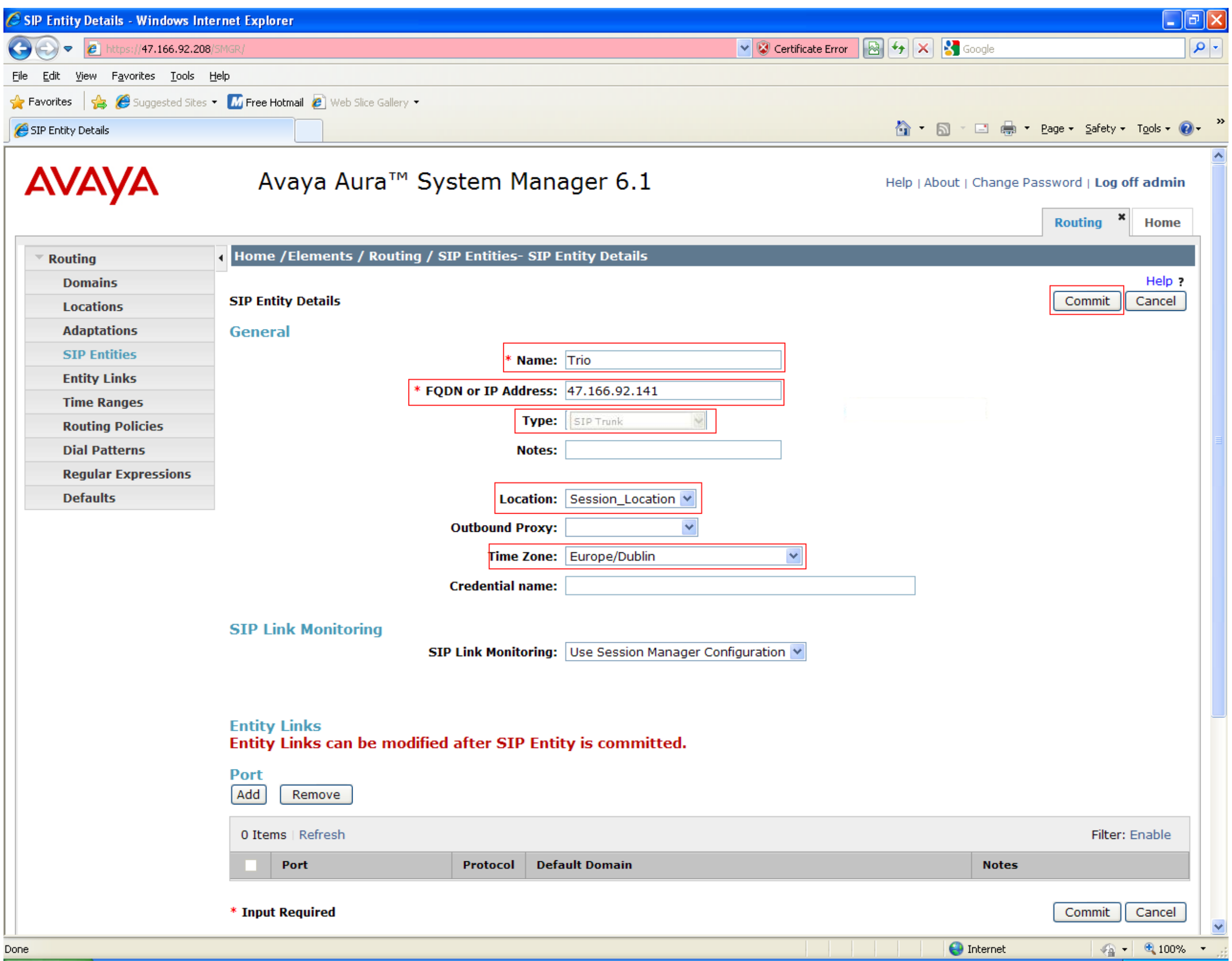
5.4. Adding Trio Enterprise SIP Entity

A SIP Entity must be added for Trio Enterprise Endpoint. To add a SIP Entity, select **SIP Entities** on the left panel menu and then click on the **New** button (not shown).

Enter the following for the Trio SIP Entity:
Under **General:**

- **Name** An informative name (e.g., **Trio**)
- **FQDN or IP Address** IP address of the signaling interface on the Trio Enterprise
- **Type** **SIP Trunk** for Trio
- **Location** **Session_Location**
- **Time Zone** Time zone for this location **Europe/Dublin**

Once the correct information is entered click the **Commit** button.



5.5. Adding Communication Server 1000E SIP Entity

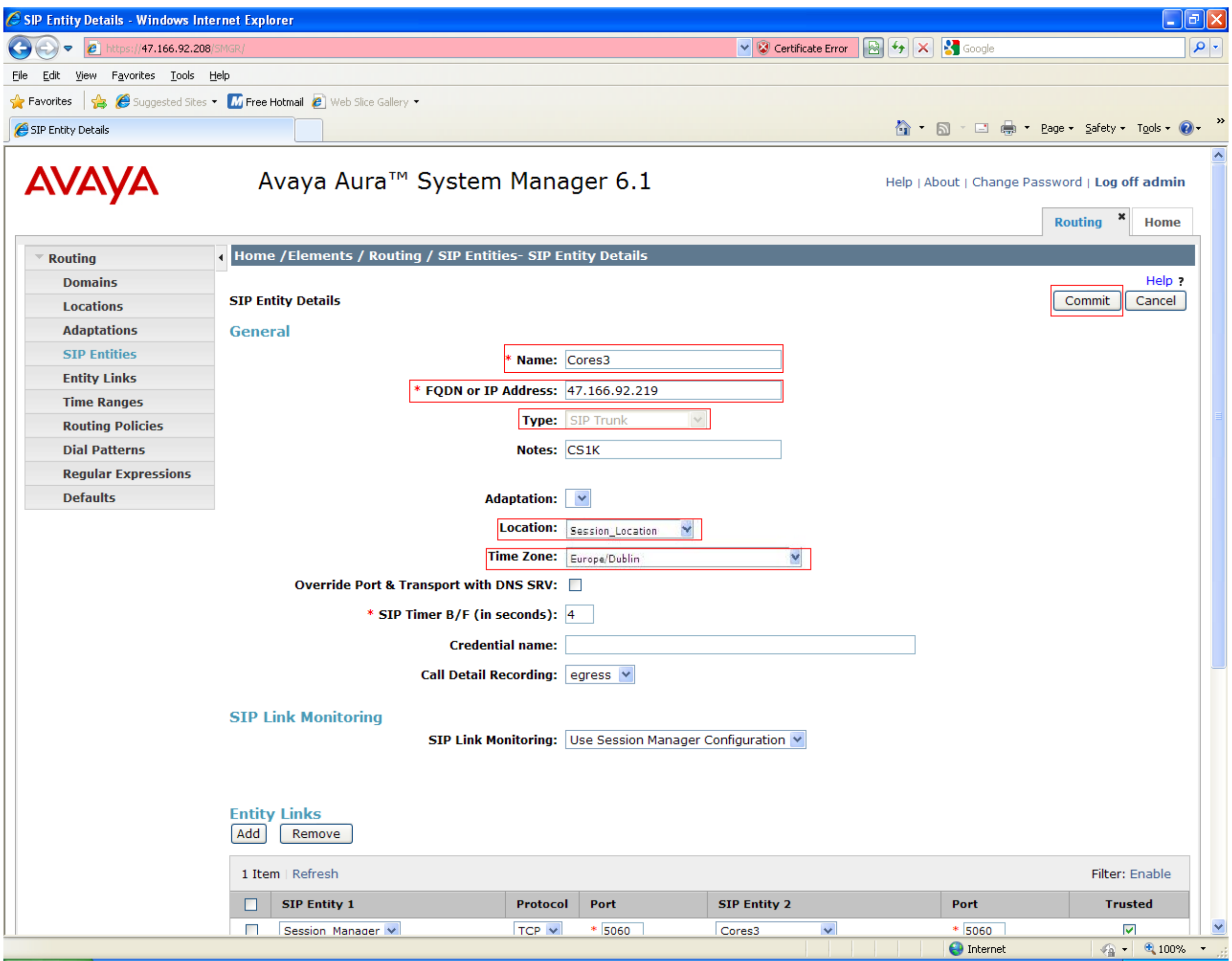
A SIP Entity must be added for Communication Server 1000E. To add a SIP Entity, select **SIP Entities** on the left panel menu and then click on the **New** button (not shown).

Notes: A SIP Entity was already configured for the Communication Server 1000E and was called **cores3**.

Enter the following for the Trio SIP Entity:
Under **General:**

- **Name** An informative name (e.g., **Cores3**)
- **FQDN or IP Address** IP address of the signaling interface on the Trio Enterprise
- **Type** **SIP Trunk** for Cores3
- **Location** **Session_Location**
- **Time Zone** Time zone for this location **Europe/Dublin**

Once the correct information is entered click the **Commit** button.



5.6. Create an Entity Link to Trio Enterprise

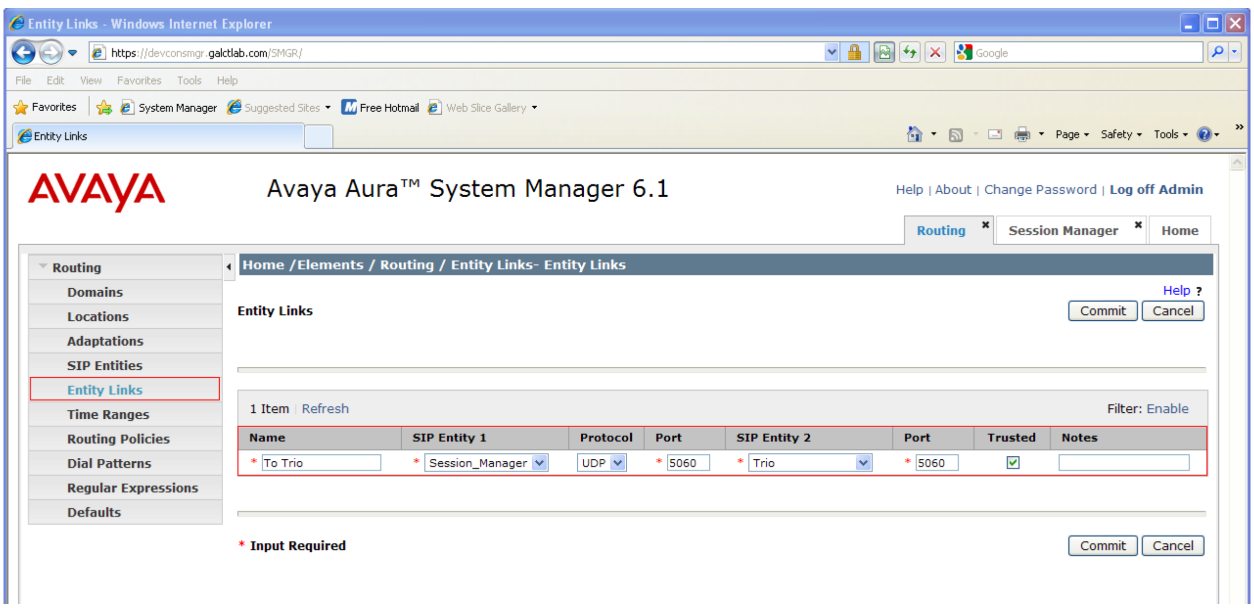
A SIP trunk between a Session Manager and the Trio Enterprise is required.

Notes: An Entity Link was already configured between Session Manager and the Communication Server 1000E and was called **to coeres3**.

To add an Entity Link, select **Entity Links** on the left panel menu and click on the **New** button (not shown). Fill in the following fields in the new row that is displayed.

- **Name** An informative name, e.g. **To Trio**
- **SIP Entity 1** Select **Session_Manager** from the **SIP Entity 1** dropdown box
- **Protocol** Select **UDP** from the Protocol
- **Port** Enter **5060** as the Port
- **SIP Entity 2** Select **Trio** from the **SIP Entity 2** dropdown box
- **Port** Enter **5060** as the Port
- **Trusted** Check the **Trusted** check box

Click **Commit** to save changes. The following screen shows the Entity Links used.



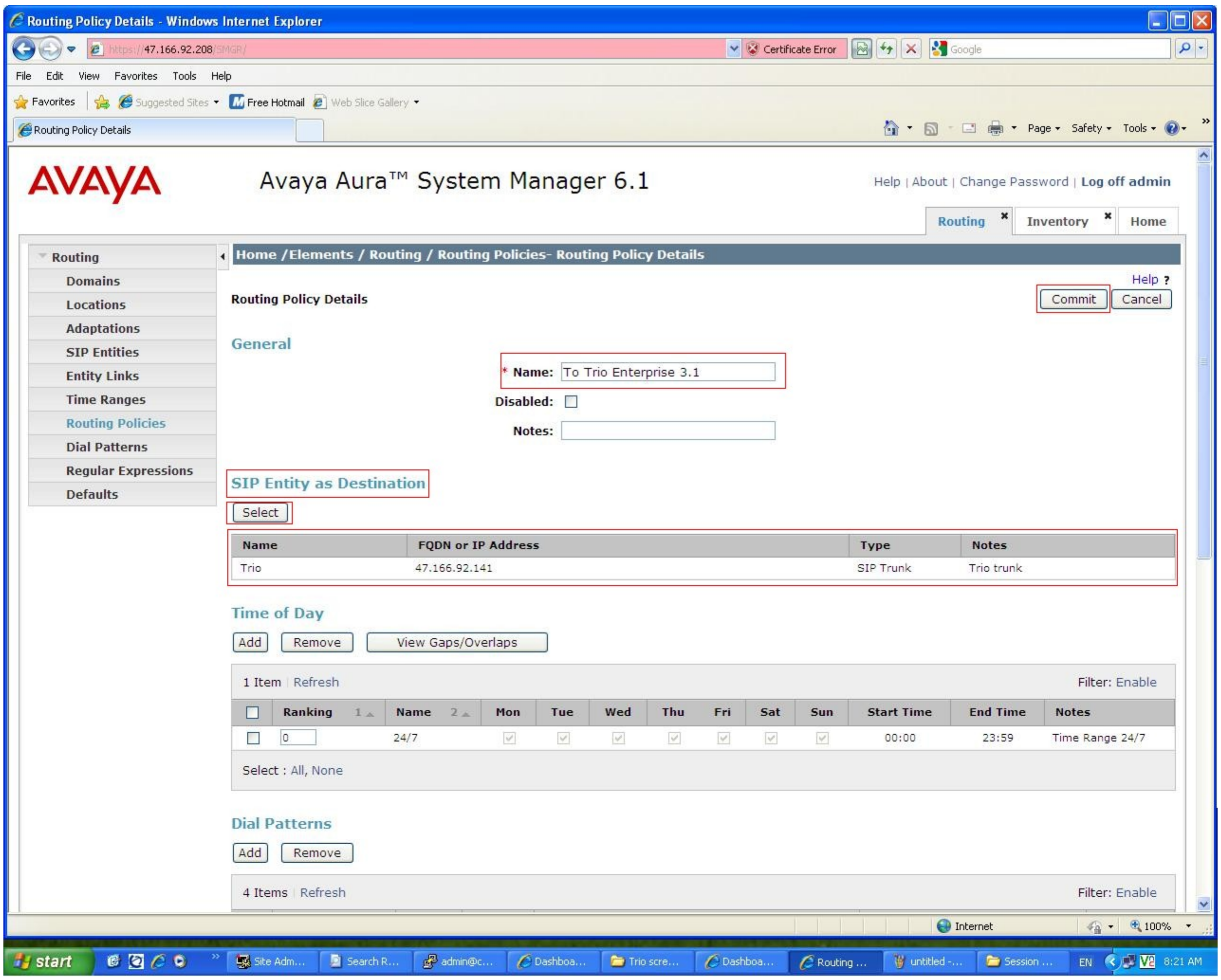
5.7. Configure Routing Policy for Trio Enterprise

Create routing policies to direct calls to Trio Enterprise. To add a routing policy, select **Routing Policies** on the left panel menu and then click on the **New** button (not shown).

Under **General** enter the following:

- **Name** Enter an informative name , (e.g., **To Trio Enterprise 3.1**)

Under **SIP Entity as Destination,** click **Select**, and then check the **Trio** radio button (not shown). Click on the **Select** button to confirm the chosen options and then be returned to the **Routing Policies Details** screen and click the **Commit** button to save. The following screen shows the **Routing Policy Details** for calls to Trio.



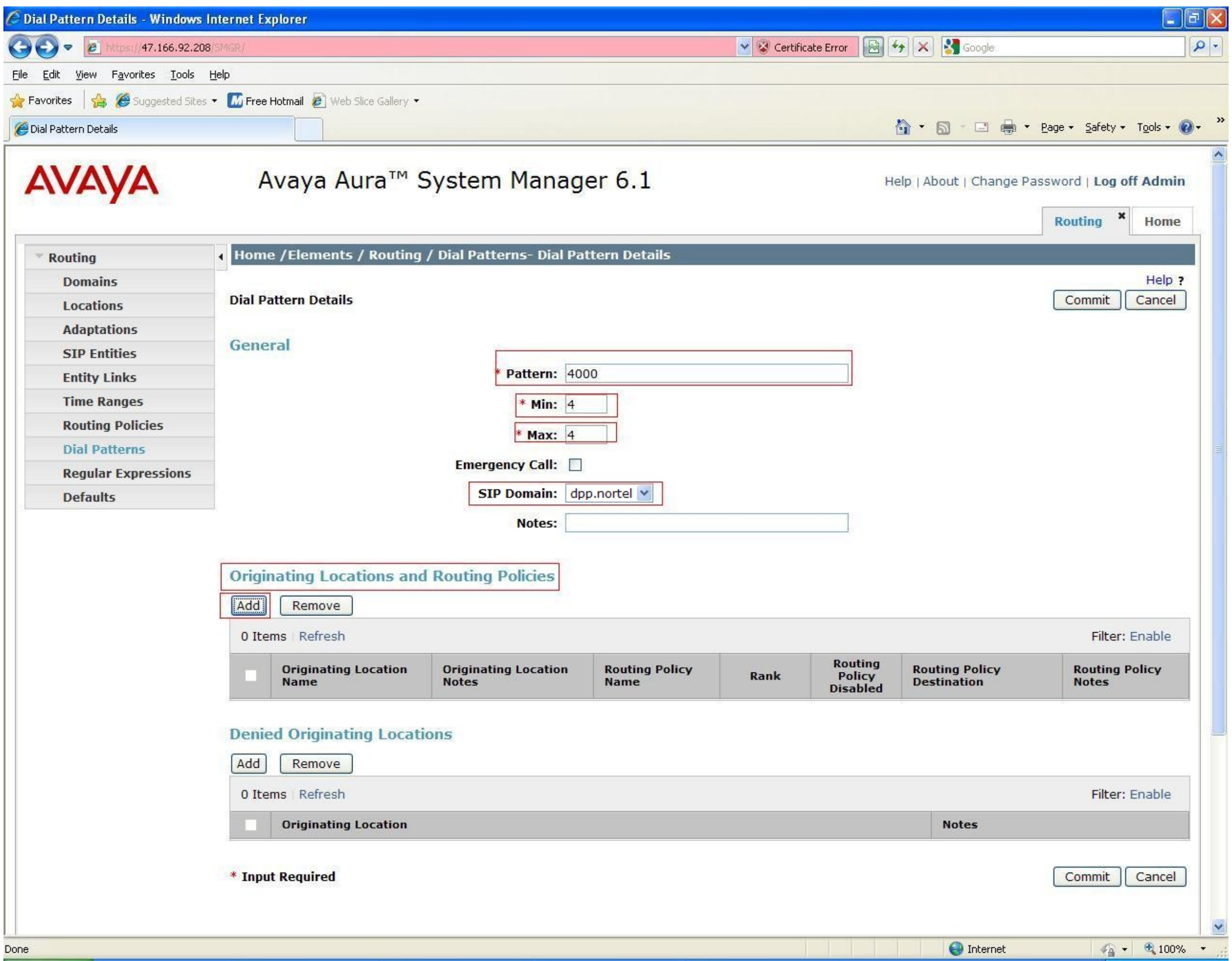
5.8. Create Trio Enterprise Dial Pattern

A dial pattern must be defined that will direct calls to the Trio Enterprise. During testing 4 numbers were used 4000, 4001, 4002, and 5030, the Domain name was **dpp.nortel**. To configure the Trio Enterprise Pattern select **Dial Patterns** on the left panel menu and then click on the **New** button (not shown).

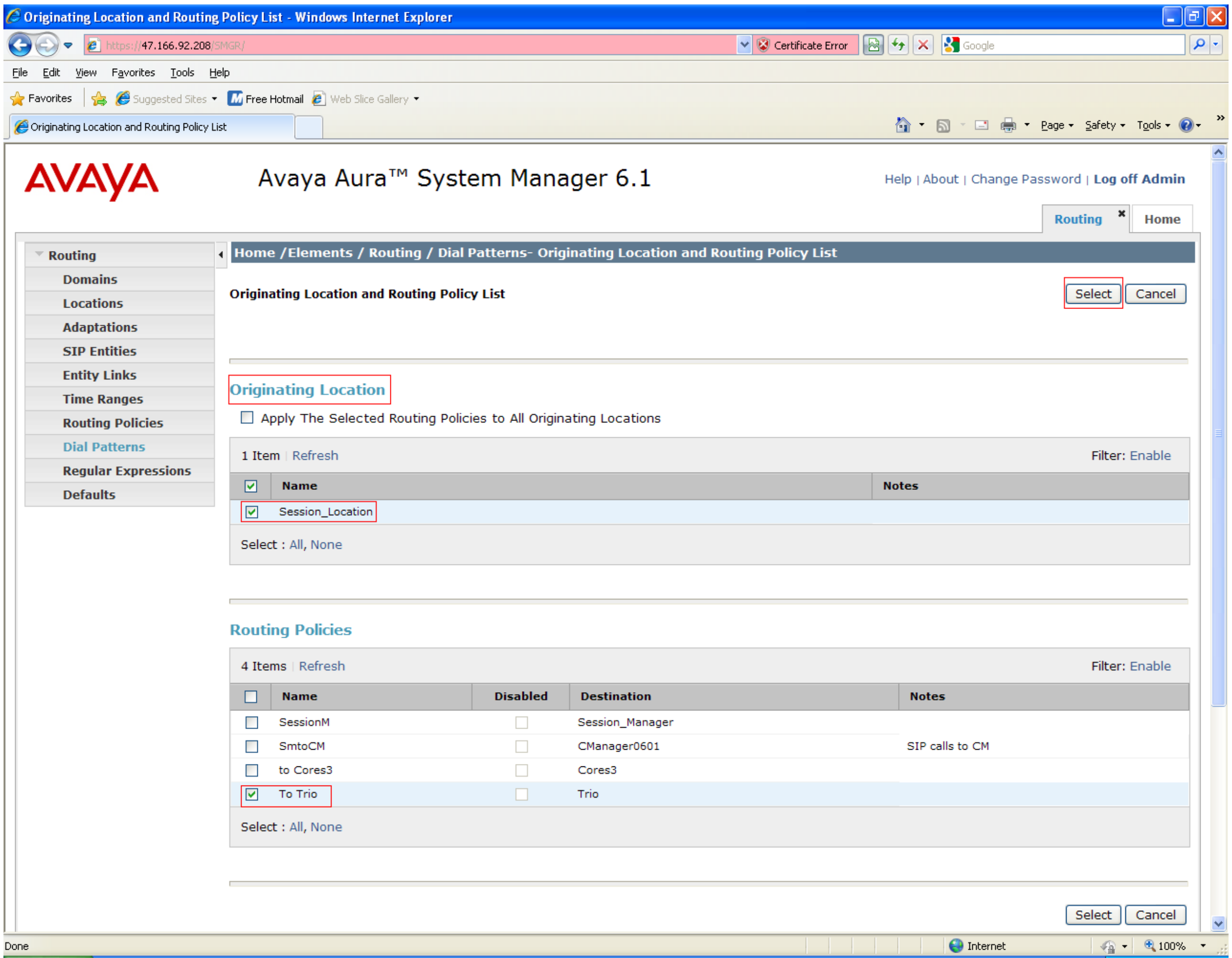
Under **General** carry out the following for each number

- **Pattern** Dialed number or prefix **4000**
- **Min** Minimum length of dialed number **4**
- **Max** Maximum length of dialed number **4**
- **SIP Domain** Select **dpp.nortel**

Continue to **Originating Locations and Routing Policy List.**



Select **Add** (not shown). Under **Originating Location** check **Session_Location** check box, and under **Routing Policies** check **ToTrio** check box. Click on the **Select** button to confirm the chosen options and then be returned to the Dial Pattern screen (shown previously). Click the **Commit** button to save.

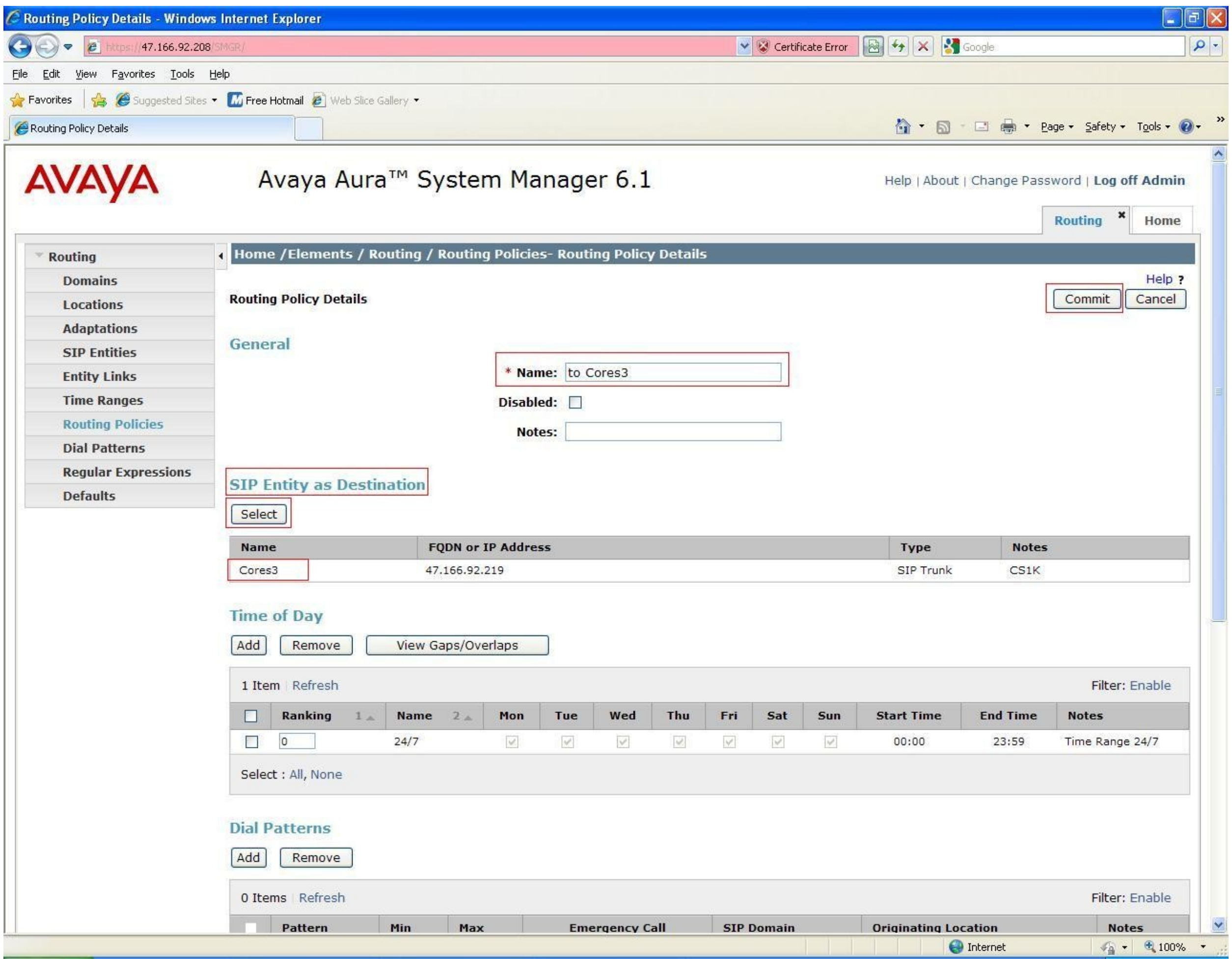


5.9. Configure Routing Policies for Communication Server 1000E

Create routing policies to direct calls to Communication Server 1000E. To add a routing policy, select **Routing Policies** on the left panel menu and then click on the **New** button (not shown). Under **General** enter the following:

- **Name** Enter an informative name, (e.g. **to Cores3**)

Under **SIP Entity as Destination,** click **Select**, and then check the **cores3** radio button (not shown). Click on the **Select** button to confirm the chosen options and then be returned to the **Routing Policies Details** screen and click the **Commit** button to save. The following screen shows the **Routing Policy Details** for calls to Communication Server 1000E.



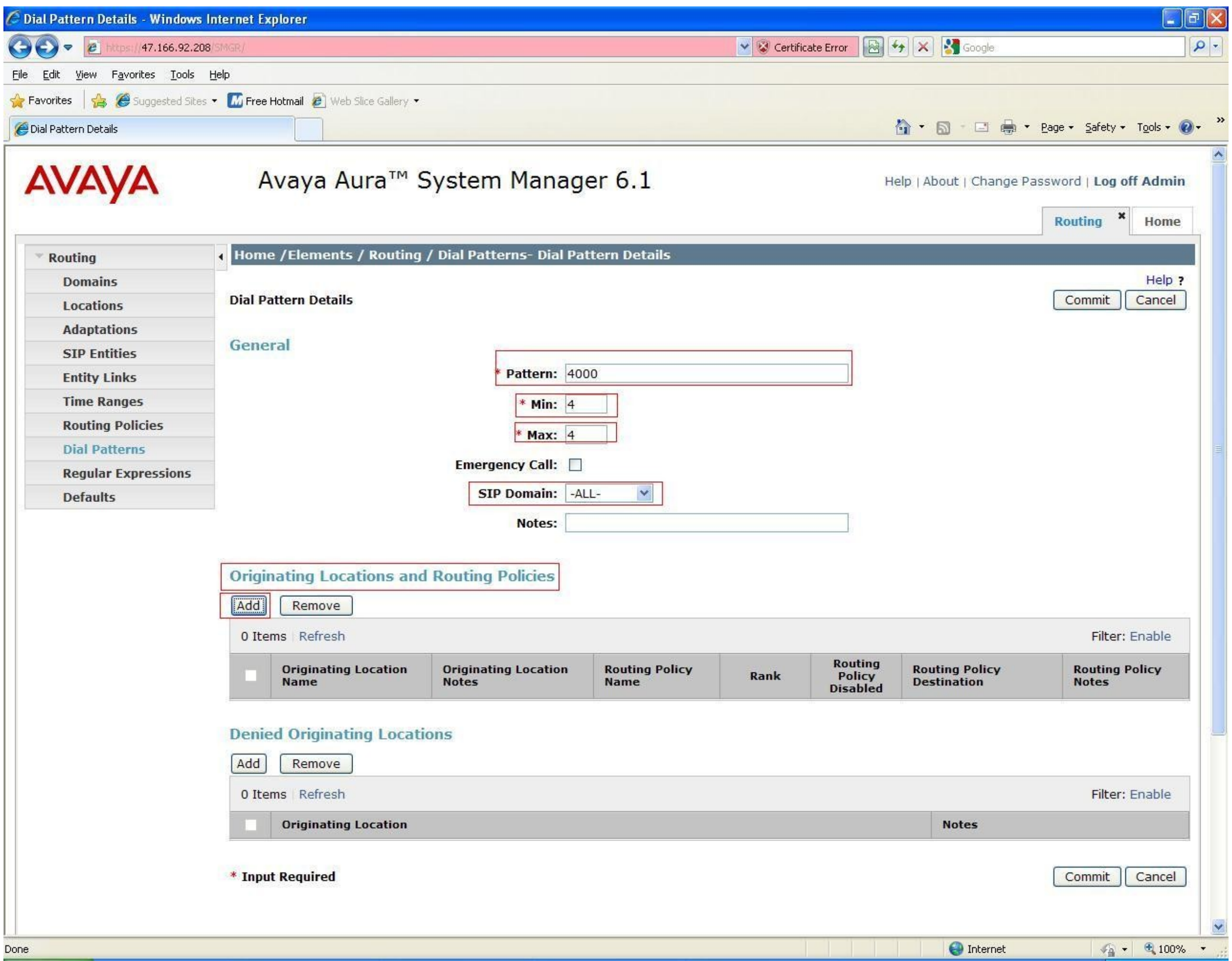
5.10. Create Avaya Communication Server 1000E Dial Pattern

A dial pattern must be defined that will direct calls to the Communication Server 1000E. During testing 4 numbers were used 4000, 4001, 4002, and 5030. To configure the Communication Server 1000E select **Dial Patterns** on the left panel menu and then click on the **New** button (not shown).

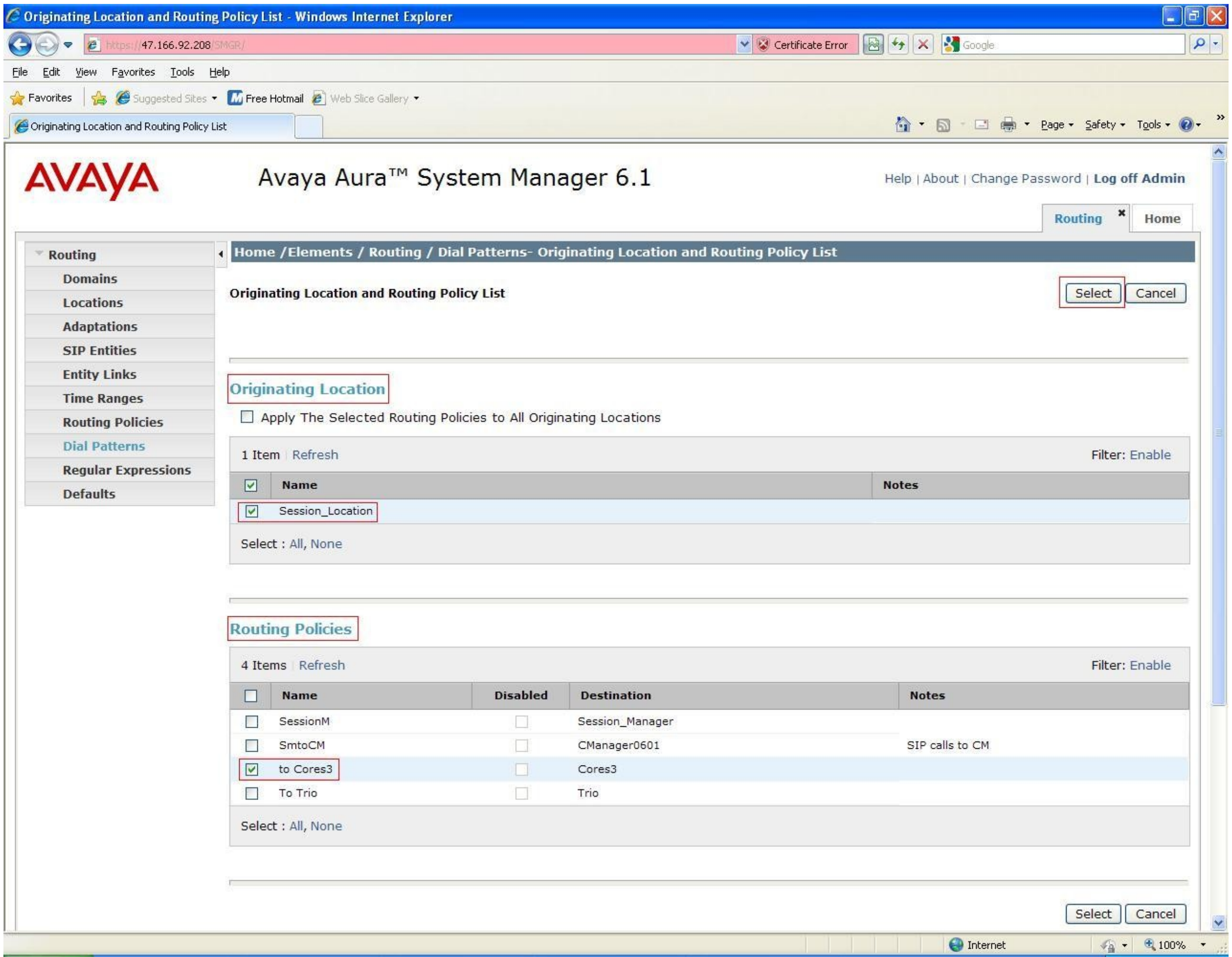
Under **General** carry out the following for each number

- **Pattern** Dialed number or prefix **4000**
- **Min** Minimum length of dialed number **4**
- **Max** Maximum length of dialed number **4**
- **SIP Domain** Select **ALL**

Continue to **Originating Locations and Routing Policy List.**



Select **Add** (not shown). Under **Originating Location**, check **Session Location** check box and and under **Routing Policies** select **to Cores3.** Click **Select** button to confirm the chosen options and then be returned to the Dial Pattern screen (shown previously). Click the **Commit** button to save.



6. Configure TRIO Enterprise Server

Configure Trio Enterprise to use SIP Trunks. Trio Enterprise must be connected to Communication Server 1000E before it can process calls. This section shows how to configure Trio Enterprise SIP trunks with the Communication Server 1000E SIP 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 SIP Trunks are as follows:

- Access Windows services.

Select **Start → Run**, then type **services.msc** into the command line. Press return.

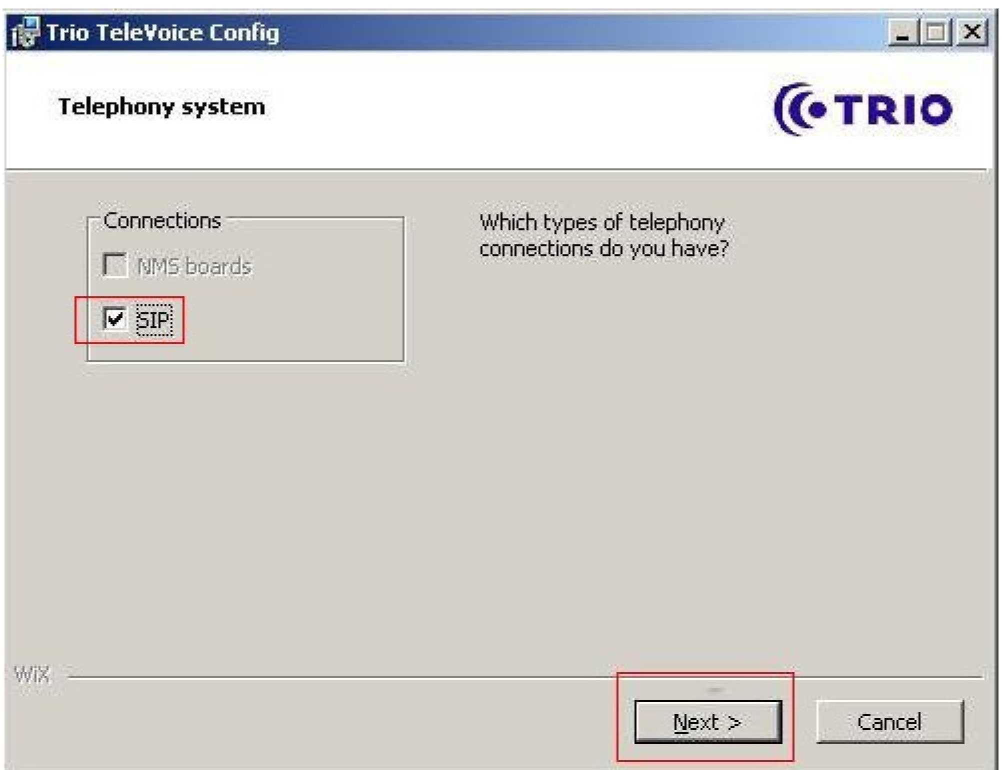
- Locate the Trio Televoice service and stop the service.

When the services window opens, locate the **Trio Televoice s**ervice right click and select **stop** to stop the service.

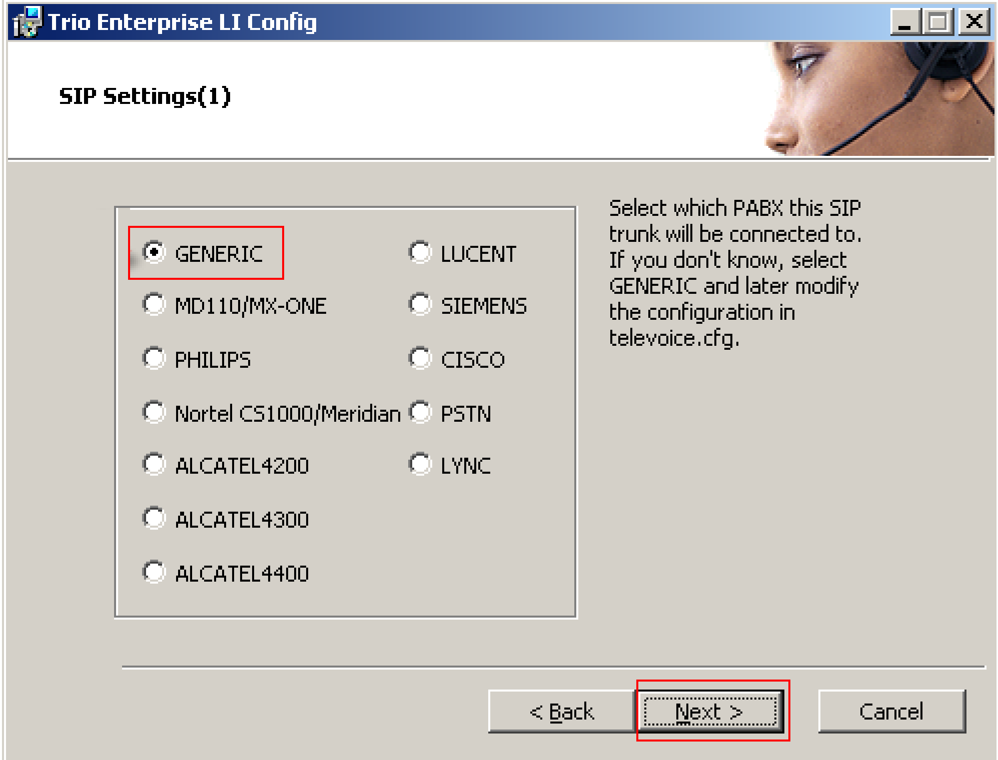
- Launch the Trio configuration application.

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 **SIP** entry in the **Connections** area is checked.

Click **Next** to continue.



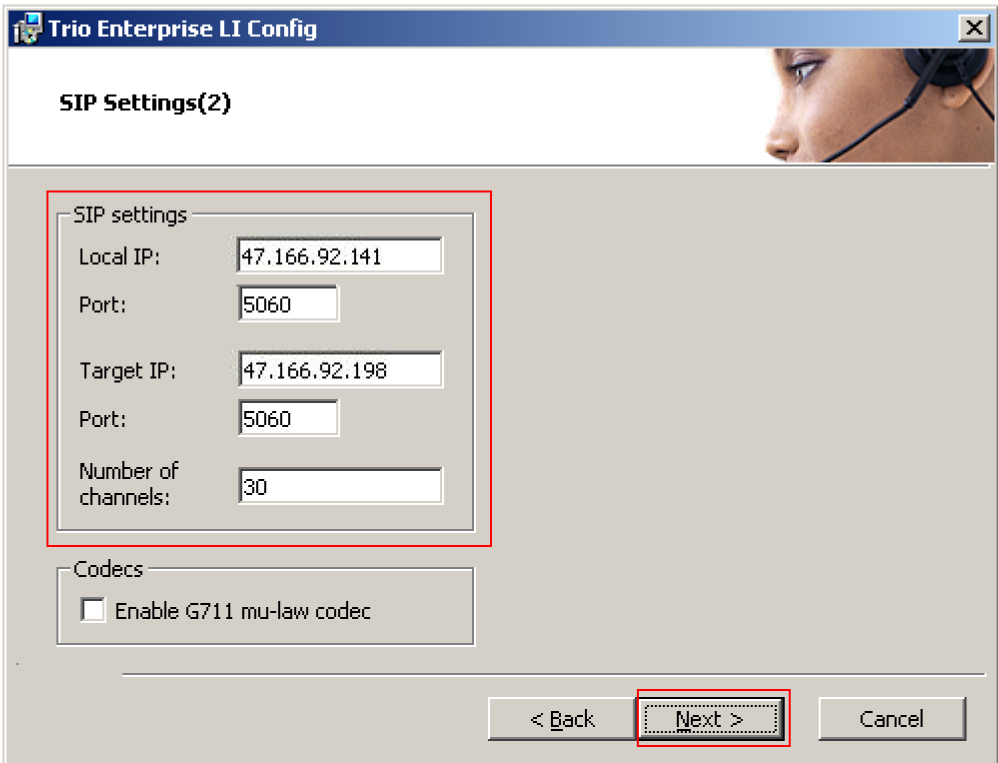
Select **GENERIC** under **SIP Settings**. Click **Next** to continue.



On the next **SIP settings** page, enter the following SIP settings.

- **Local IP** Enter the local IP address of the Trio Enterprise server
- **Port** Enter the SIP **Port 5060**
- **Target IP** Enter the IP address of the Session Manager
- **Port** Enter the SIP **Port 5060**
- **Number of channels** Enter **30** as the number of channels
-

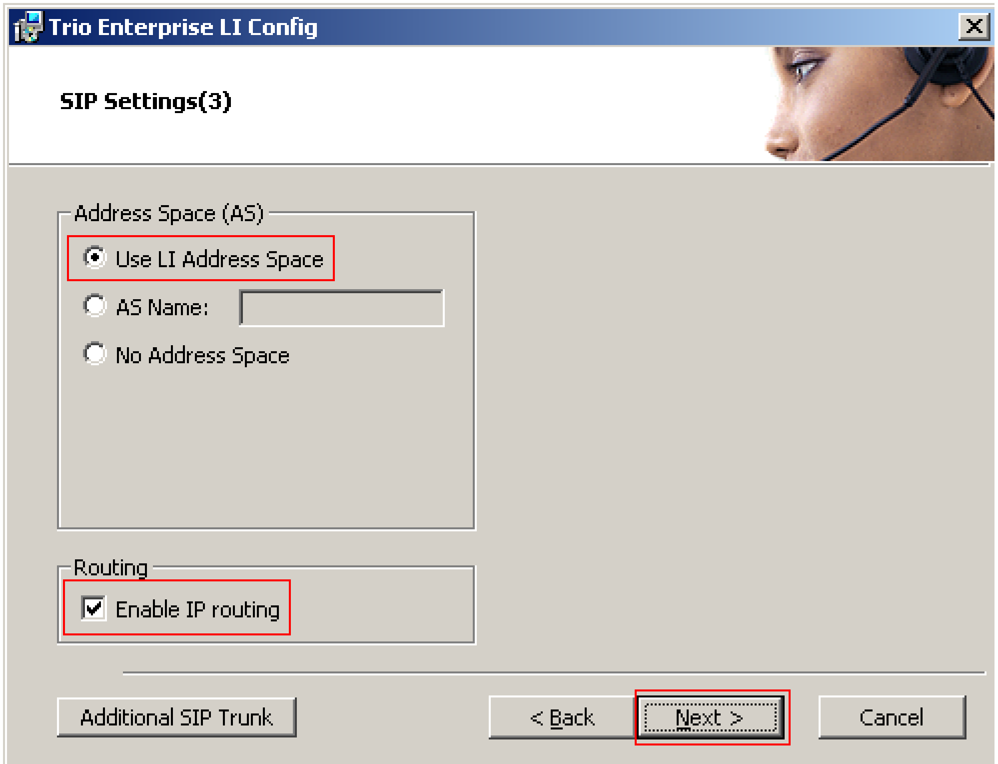
Click **Next** to continue.



On the next **SIP settings** page, enter the following SIP settings.

- Select **Use LI Address Space**
- Check **Enable IP routing**

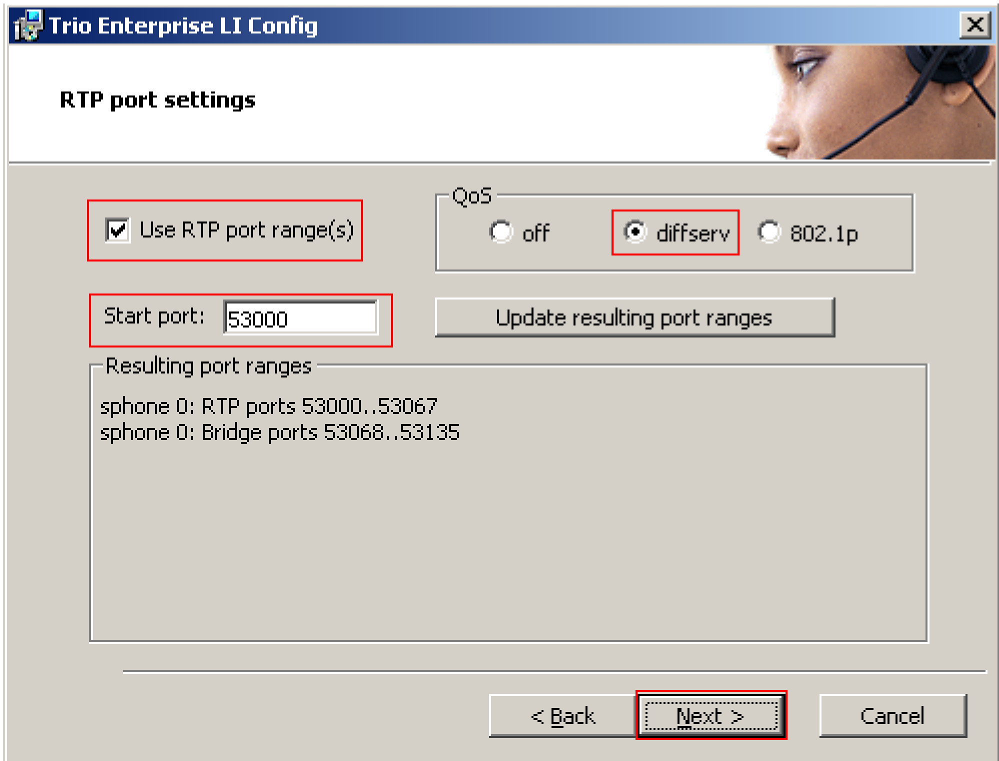
Click **Next** to continue.



On the **RPT port settings** page, enter the following settings.

- Check the **Use RPT port range(s)**
- Select **diffserv**
- **Start port** Enter **53000**

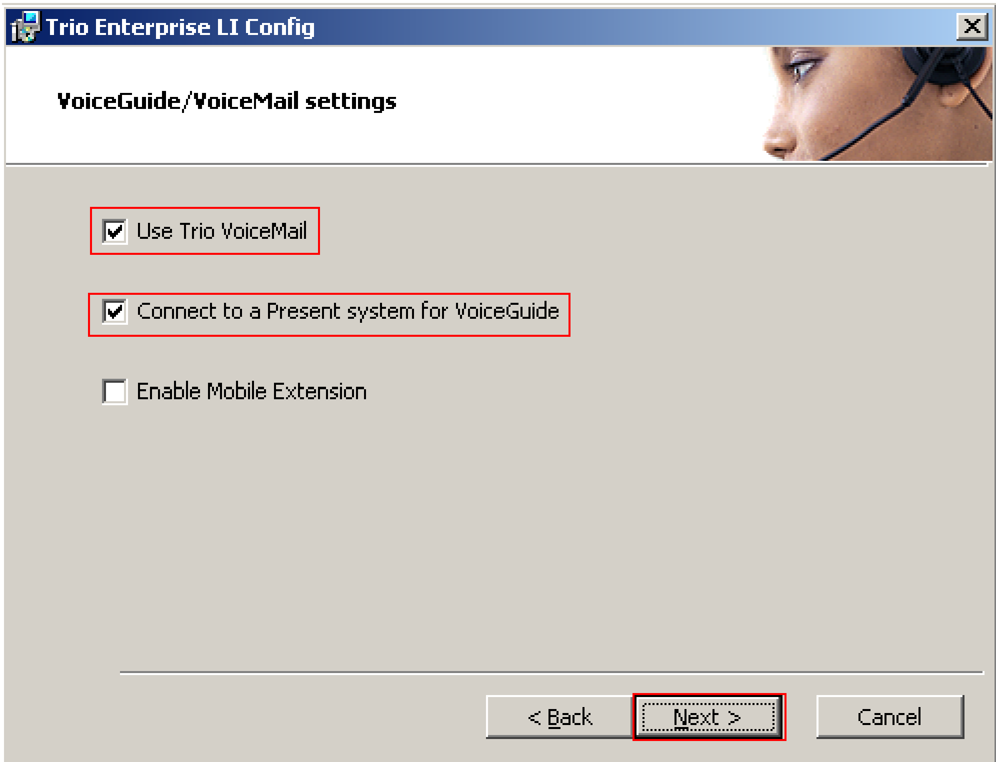
Click **Next** to continue.



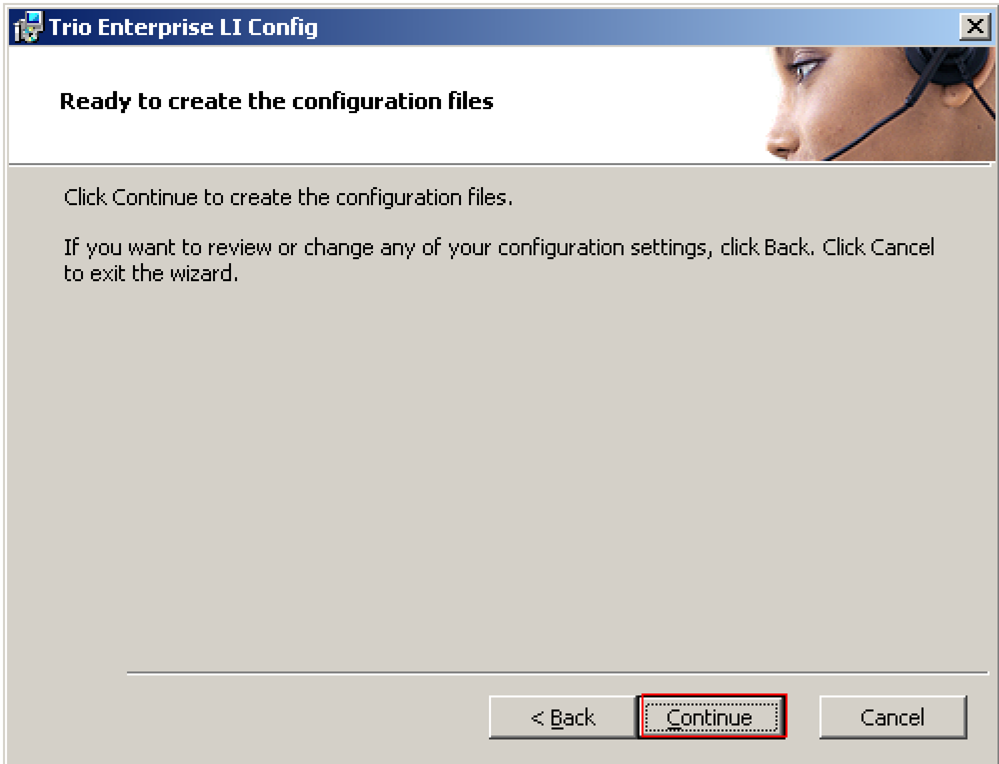
On the **VoiceGuide/VoiceMail settings** page, enter the following settings.

- Check **Use Trio VoiceMail**
- Check **Connect to Present system for VoiceGuide**

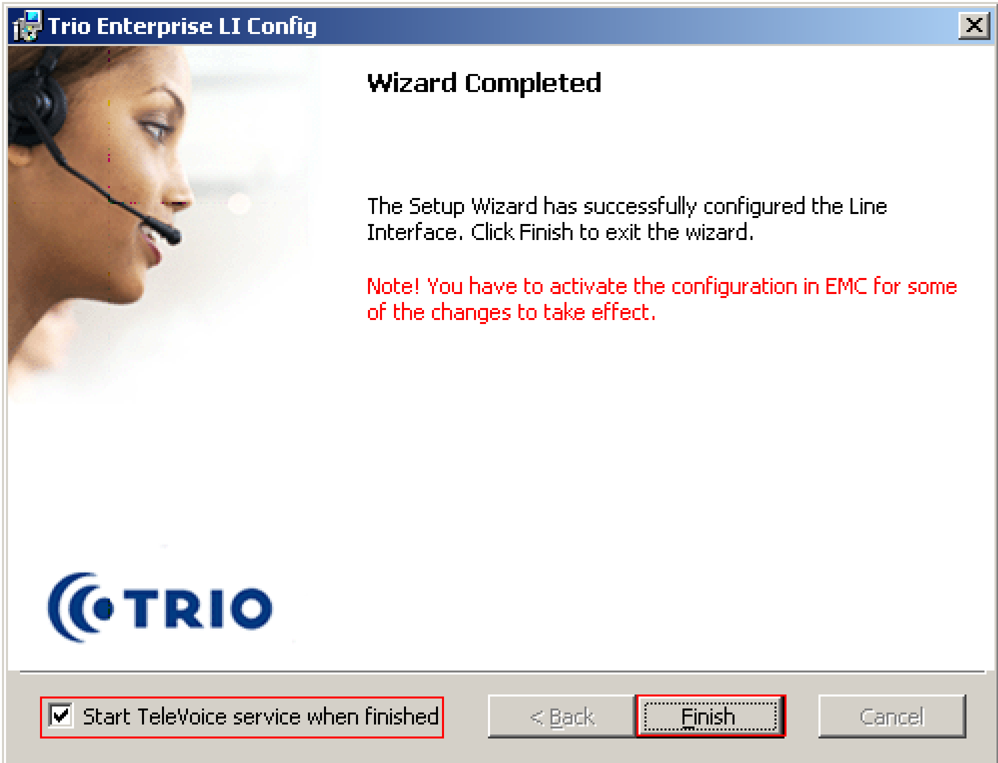
Click **Next** to continue.



On the **Ready to create the configuration files** page click on **Continue** button.



On the **Wizard Completed** page check **Start TeleVoice service when finished**, followed by the **Finished** button.



6.1. InteractionStudio Configuration

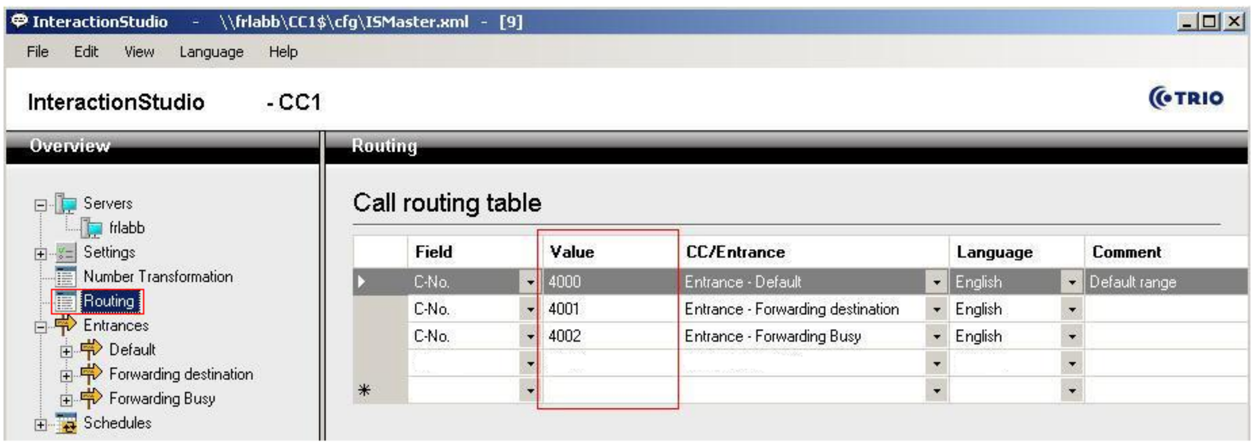
The InteractionStudio is used to configure many features for Trio Enterprise. For compliance testing, the following were configured.

- Configure Call Routing table
- Configure Attendant Service
- Configure Loop Detection via DTMF for Busy signal
- Configure Loop Detection via DTMF for No Answer signal

6.1.1. Configure Call Routing table

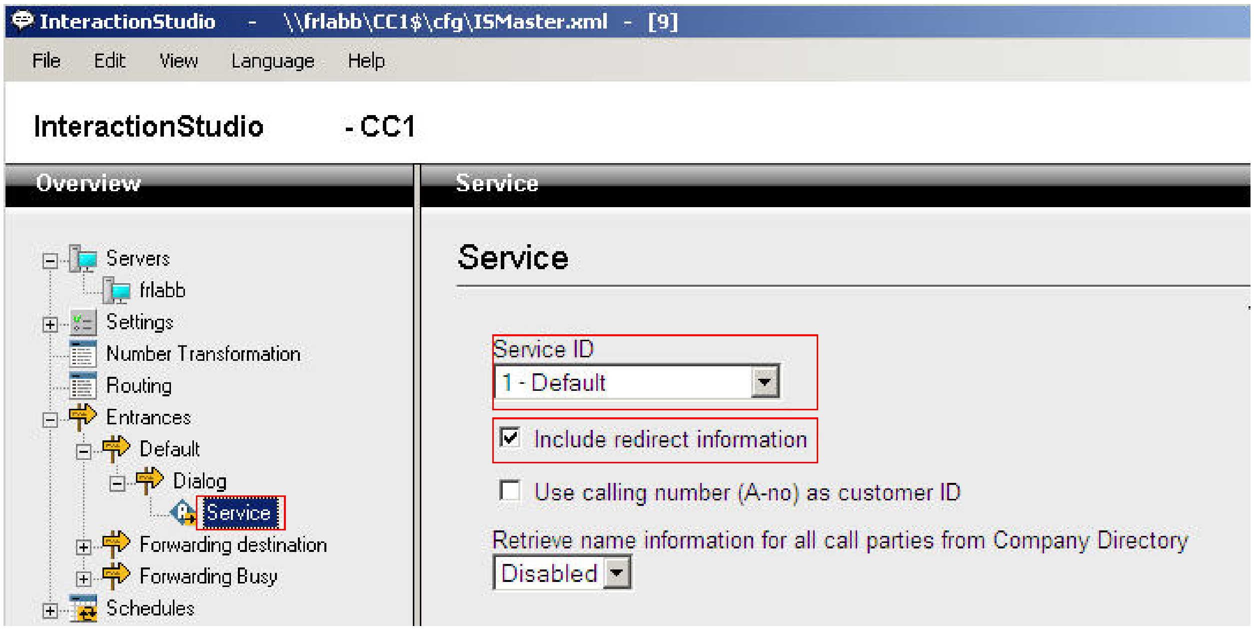
On the Trio Enterprise server, double click on the **InteractionStudio** executable file. When the InteractionStudio window opens, navigate to **Routing**. A **Call routing table** will open. In the example below:

- 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



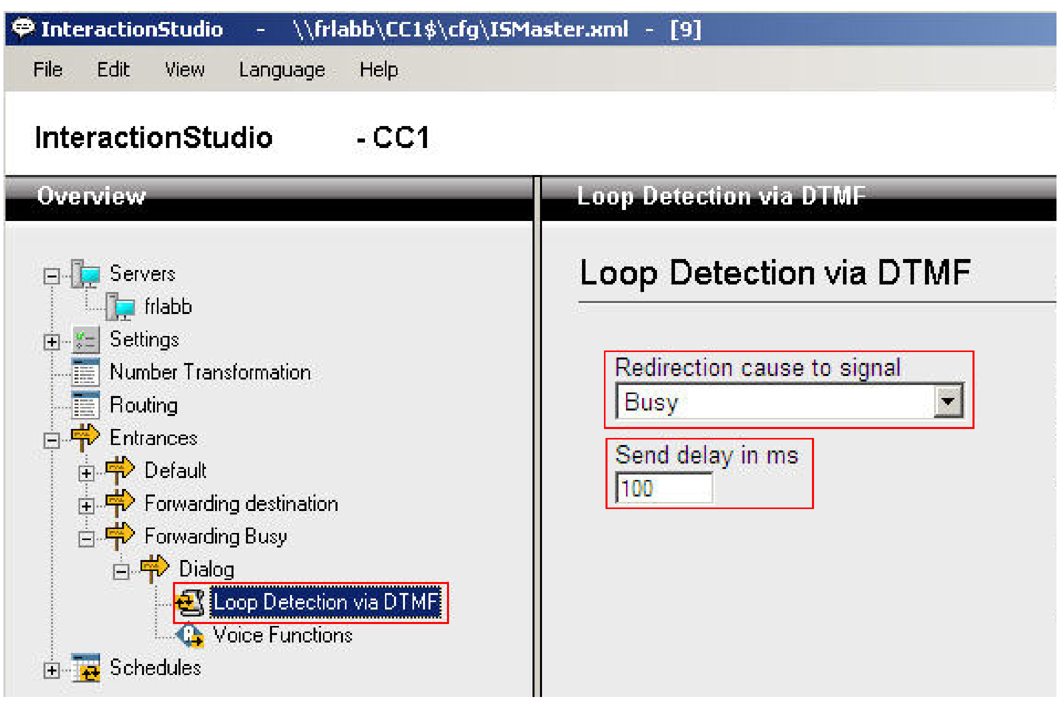
6.1.2. Configure Attendant Service

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



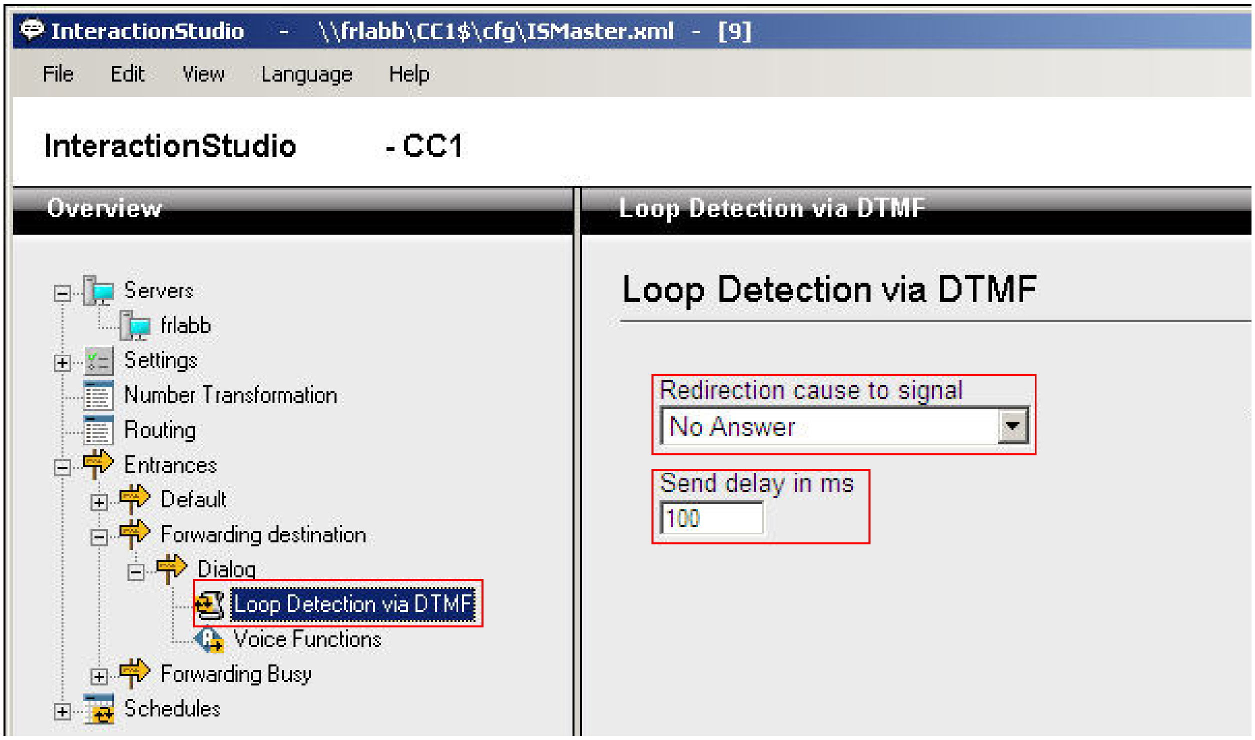
6.1.3. Configure Loop Detection via DTMF for Busy signal

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.



6.1.4. Configure Loop Detection via DTMF for No Answer signal

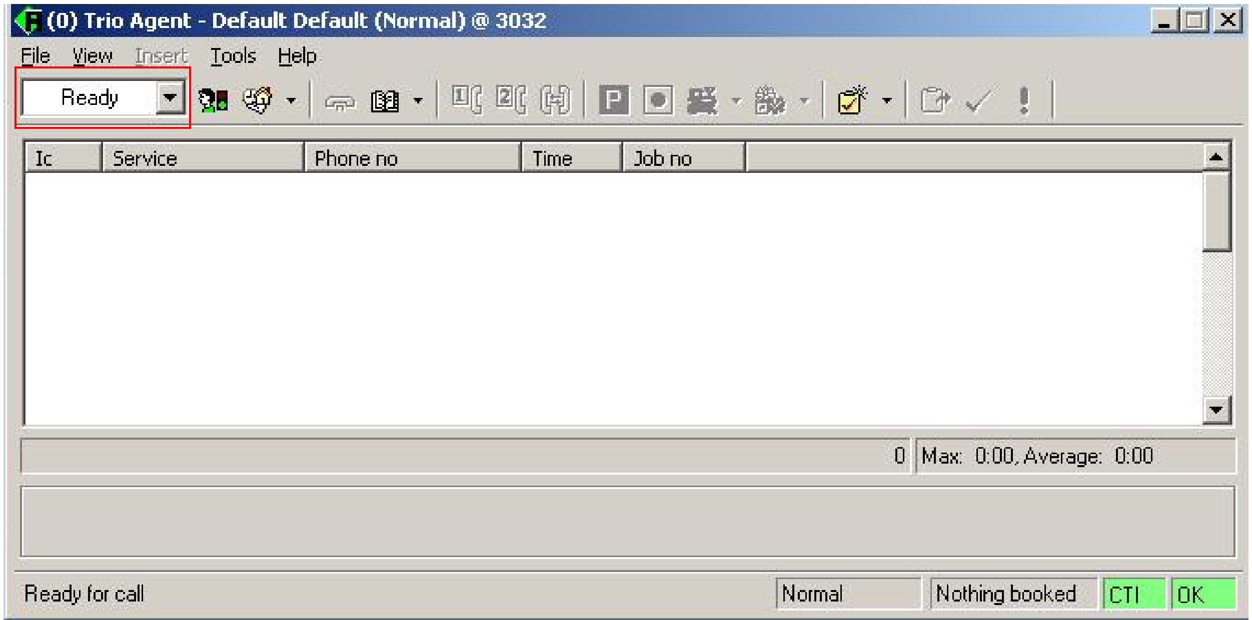
Navigate to **Entrances → Forwarding destination → Dialog → Loop Detection via DTMF.** Choose **No Answer** from the **Redirection cause to signal** dropdown box, and enter **100** in the **Send delay in ms** box.



6.2. 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 to 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 CS1000E system with TRIO Enterprise.

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

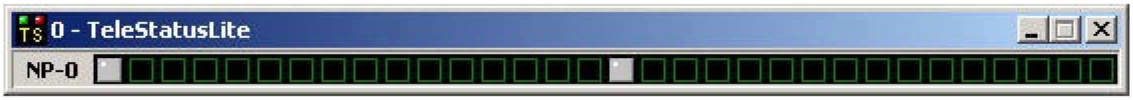
Check the status of the D-channel setup in **Section 5.1.2** by running the command **STAT DCH** in overlay 96 as shown below. The example below shows that D-Channel **66** is operational and established.

LD 96

Prompt	**Response**	**Description**
>	**LD 96**	Enter Overlay 96
.	**STAT DCH**	Check status of all D-Channels
DCH 066	**OPER EST**	**DES :to_Trio**

7.2. Status of D-Channel on Trio Enterprise

To confirm a 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 SIP trunk channel status as a series of green squares with the first and seventeenth 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 R3.1 to successfully interoperate with Avaya Communication Server 1000E using SIP trunks. Trio Enterprise 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.

[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.