



Avaya Solution & Interoperability Test Lab

Application Notes for Configuring Avaya Communication Server 1000E R7.6 and Avaya Session Border Controller for Enterprise R6.2 to support Eircom SIP Trunk Service - Issue 1.0

Abstract

These Application Notes describe the steps to configure Session Initiation Protocol (SIP) trunking between an Avaya SIP enabled enterprise solution and Eircom SIP Trunk service. The Avaya solution consists of Avaya Communication Server 1000E connected to an Avaya Session Border Controller for Enterprise. Eircom is a member of the Global SIP Service Provider program.

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 necessary steps to configure Session Initiation Protocol (SIP) trunking between an Avaya SIP enabled enterprise solution and Eircom SIP Trunk service. The Avaya solution consists of Avaya Communication Server 1000E (CS1000E) and Avaya Session Border Controller for Enterprise (Avaya SBCE) connected to the Eircom SIP Trunk service. Customers using this Avaya SIP enabled enterprise solution with the Eircom SIP Trunk service are able to place and receive PSTN calls via a dedicated Internet connection using the SIP protocol. This converged network solution is an alternative to traditional PSTN trunks. The approach normally results in lower cost and a more flexible implementation for the enterprise customers.

2. General Test Approach and Test Results

The general test approach was to configure a simulated enterprise site using an Avaya SIP telephony solution consisting of Communication Server 1000E and the Avaya SBCE. The enterprise site was configured to use the SIP Trunk service provided by Eircom, with all PSTN traffic transiting via the Eircom SIP Trunk service.

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.

2.1. Interoperability Compliance Testing

The interoperability test included the following:

- Incoming calls to the enterprise site from the PSTN were routed to the DDI numbers assigned by Eircom. Incoming PSTN calls were terminated on Digital, UNISTim, SIP and Analog telephones at the enterprise side.
- Outgoing calls from the enterprise site were completed via Eircom to PSTN telephones. Outgoing calls from the enterprise to the PSTN were made from Digital, UNISTim, SIP and Analog telephones.
- Calls were made using G.729 and G.711A codecs.
- Fax calls to/from a group 3 fax machine to a PSTN-connected fax machine using T.38
- DTMF transmission using RFC 2833 with successful IVR menu progression.
- Various call types including: local, long distance, international, toll free (outbound) and directory assistance.
- User features such as hold and resume, transfer, conference, call forwarding, etc.
- Caller ID Presentation and Caller ID Restriction.
- Call coverage and call forwarding for endpoints at the enterprise site.

2.2. Test Results

Interoperability testing of the sample configuration was completed with successful results for the Eircom SIP Trunk service with the following observations:

- The CS1000E default configuration will not allow a blind transfer to be executed (incoming SIP Service Provider trunk to outgoing SIP Service Provider trunk) if the SIP Service Provider in question does not support the SIP UPDATE method. With the installation of plugin 501 on the CS1000E, the blind transfer will be allowed and the call will be completed. The limitation of this plugin is that no ringback is provided to the originator of the call for the duration that the destination set is ringing. In addition to plugin 501, it is required that **VTRK SU version “cs1000-vtrk-7.65.16.22.-4.i386.000.ntl”** or higher be used on all SSG signalling servers to ensure proper operation of the blind transfer feature. The use of plugin 501 does not restrict the use of the SIP UPDATE method of blind transfer to other parties that do happen to support the UPDATE method, but rather extends support to those parties that do not. Note that plugin 501 is independent of and does not require the Global Plugin Package 409.
- Mobile X was not tested and is not supported by Eircom.
- On inbound calls, SIP INVITE messages from Eircom contains the “+” sign in front of the number. The “+” needs to be removed in order for inbound calls to route to the CS1000E successfully as the CS1000E is unable to handle the “+” in E.164 numbering format. The script removes the “+353” and replace it with a “0” for calling and called numbers for inbound calls in the Request Line, From, To, Contact and P-Asserted-Identity headers. The details of the Sigma Script are outlined in **Section 7.2.7**.
- All unwanted MIME and Headers was stripped on outbound calls using a Sigma Script with the Avaya SBCE. The details of the Sigma Script are outlined in **Section 7.2.7**.
- No inbound toll free numbers were tested as none were available from the Service Provider.
- No Emergency Services numbers tested as test calls to these numbers should be pre-arranged with the Operator.

2.3. Support

For technical support on the Avaya products described in these Application Notes visit <http://support.avaya.com>.

For technical support on Eircom products please contact Eircom Customer Care at:

- Telephone: 1800 255 255
- Telephone: +353 1 4688530
- Email: servicedesk@eircom.ie

3. Reference Configuration

Figure 1 illustrates the test configuration. The test configuration shows an Enterprise site connected to Eircom's SIP Trunk service. Located at the Enterprise site is an Avaya SBCE and CS1000E. Endpoints are Avaya 1140 series IP telephones, Avaya 1230 series IP telephones (with Unistim and SIP firmware), Avaya IP Softphones (Avaya 3456 IP Softphone, 2050 IP Softphone and Avaya one-X® Communicator), Avaya Digital telephone, Analog telephone and fax machine. For security purposes, any public IP addresses or PSTN routable phone numbers used in the compliance test are not shown in these Application Notes.

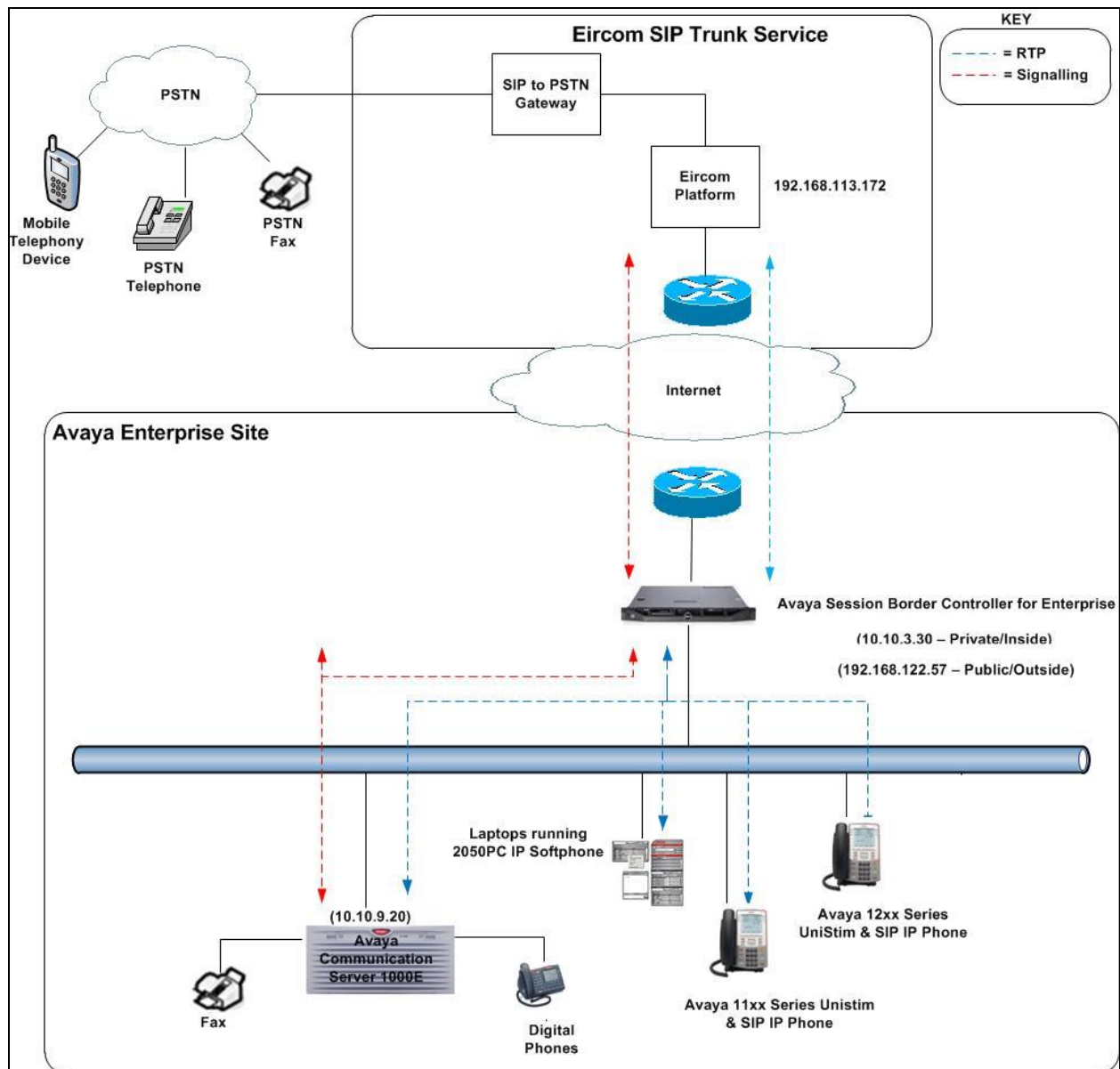


Figure 1: Test Setup Eircom SIP Trunk Service to Avaya Enterprise

4. Equipment and Software Validated

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

Equipment	Software
Avaya Session Border Controller for Enterprise	Version 6.2.1.Q07
Avaya Communication Server 1000E running on CP+PM server as co-resident configuration	Avaya Communication Server 1000E R7.6 Version 7.65.P Deplist: CPL_X21_07_65P All CS1000E patches listed in Appendix A
Avaya Communication Server 1000E Media Gateway	CSP Version: MGCC DC01 MSP Version: MGCM AB02 APP Version: MGCA BA18 FPGA Version: MGCF AA22 BOOT Version: MGCB BA18 DBL1 Version: DSP2 AB07
Avaya 1140e and 1230 UNISTim Telephones	FW: 0625C8A
Avaya 1140e and 1230 SIP Telephones	FW: 04.04.10.00.bin
Avaya 2050 IP Softphone	Release 4.3.0081
Avaya Analogue Telephone	N/A
Avaya M3904 Digital Telephone	024
Eircom Equipment	Software
Eircom SIP Trunk	Broadsoft Broadworks rel 19SP1 Ericsson IMS rel 13A AcmePacket SD running on 4500 platform, software release 6.4

5. Configure Avaya Communication Server 1000E

This section describes the Avaya Communication Server 1000E configuration, focusing on the routing of calls to Eircom over a SIP trunk. In the sample configuration, Avaya Communication Server 1000E Release 7.65 was deployed as a co-resident system with the SIP Signaling Server, and Call Server applications all running on the same CP-PM server platform.

This section focuses on the SIP Trunking configuration. Although sample screens are illustrated to document the overall configuration, it is assumed that the basic configuration of the Call Server and SIP Signaling Server applications has been completed, and that the Avaya Communication Server 1000E is configured to support analog, digital, UNISim, and SIP telephones.

Specific CS1000E configuration was performed using Element Manager and the system terminal interface. The general installation of the CS1000E and Avaya SBCE is presumed to have been previously completed and is not discussed here. Configuration details will be provided as required to draw attention to changes in default system configurations.

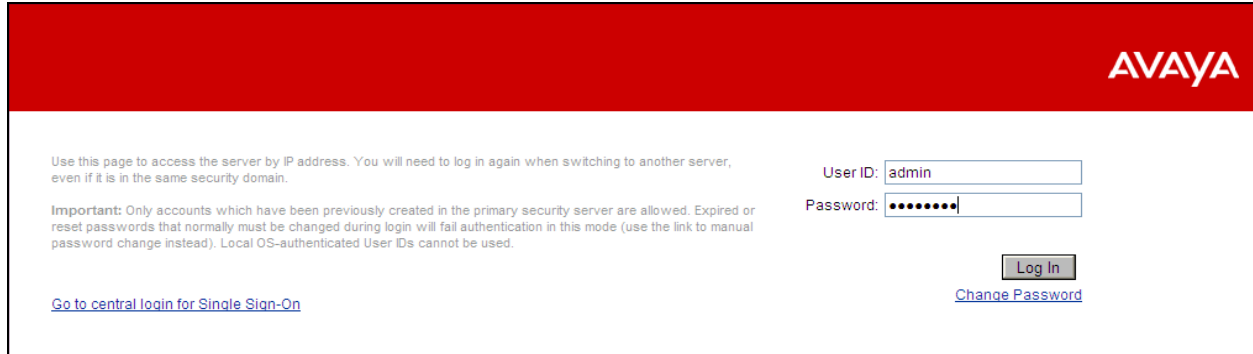
5.1. Logging into the Avaya Communication Server 1000E

Configuration on the CS1000E will be performed by using both SSH Putty session and Avaya Unified Communications Management GUI.

Log in using SSH to the ELAN IP address of the Call Server with a username containing the correct privileges. Once logged in type **csconsole**, this will take the user into the vxworks shell of the call server. Next type **login**; the user will then be asked to login with correct credentials. Once logged-in the user can then progress to load any overlay.

Log in using the web based Avaya Unified Communications Management GUI. Avaya Unified Communications Management GUI may be launched directly via <http://<ipaddress>> where the relevant <ipaddress> is the TLAN IP address of the CS1000E. Avaya Unified Communications Management can also be implemented on System Manager.

The following screen shows the login screen. Login with the appropriate credentials.



The login screen features a red header with the Avaya logo. Below the header, there is a message: "Use this page to access the server by IP address. You will need to log in again when switching to another server, even if it is in the same security domain." An important note states: "Important: Only accounts which have been previously created in the primary security server are allowed. Expired or reset passwords that normally must be changed during login will fail authentication in this mode (use the link to manual password change instead). Local OS-authenticated User IDs cannot be used." The login form includes fields for "User ID" (containing "admin") and "Password" (masked with dots). There are "Log In" and "Change Password" buttons. A link "Go to central login for Single Sign-On" is also present.

AVAYA

Use this page to access the server by IP address. You will need to log in again when switching to another server, even if it is in the same security domain.

Important: Only accounts which have been previously created in the primary security server are allowed. Expired or reset passwords that normally must be changed during login will fail authentication in this mode (use the link to manual password change instead). Local OS-authenticated User IDs cannot be used.

User ID: admin

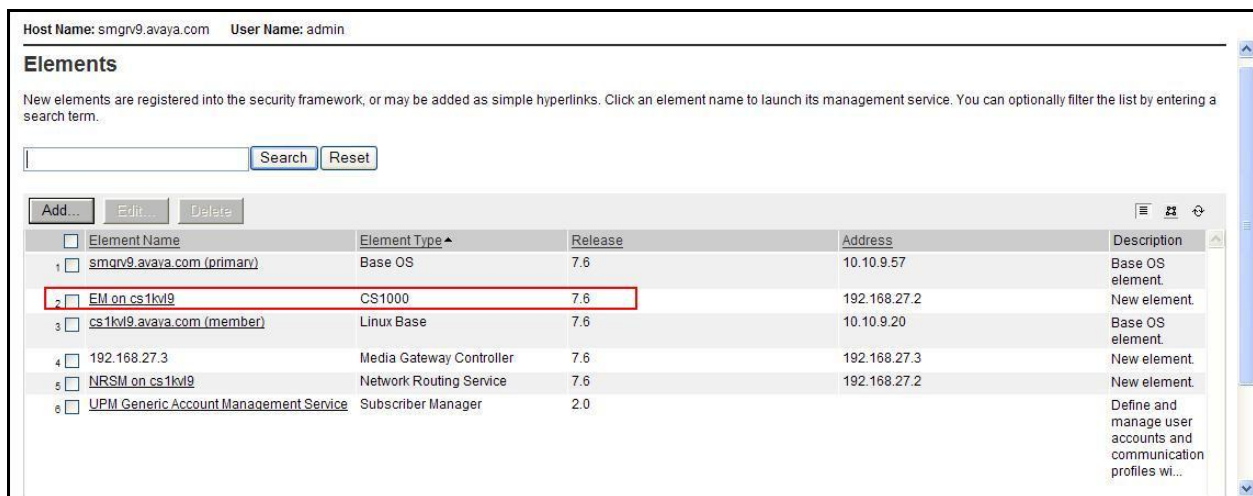
Password:

Log In

[Change Password](#)

[Go to central login for Single Sign-On](#)

The Avaya Unified Communications Management **Elements** page will be used for configuration. Click on the Element Name corresponding to CS1000E in the Element Type column. In the abridged screen below, the user would click on the Element Name **EM on cs1kv19**.



The Elements page shows a list of elements. The table has columns: Element Name, Element Type, Release, Address, and Description. The element "EM on cs1kv19" is highlighted with a red box.

Host Name: smgrv9.avaya.com User Name: admin

Elements

New elements are registered into the security framework, or may be added as simple hyperlinks. Click an element name to launch its management service. You can optionally filter the list by entering a search term.

Search Reset

Add... Edit... Delete

<input type="checkbox"/>	Element Name	Element Type	Release	Address	Description
<input type="checkbox"/>	smgrv9.avaya.com (primary)	Base OS	7.6	10.10.9.57	Base OS element.
<input checked="" type="checkbox"/>	EM on cs1kv19	CS1000	7.6	192.168.27.2	New element.
<input type="checkbox"/>	cs1kv19.avaya.com (member)	Linux Base	7.6	10.10.9.20	Base OS element.
<input type="checkbox"/>	192.168.27.3	Media Gateway Controller	7.6	192.168.27.3	New element.
<input type="checkbox"/>	NRSRM on cs1kv19	Network Routing Service	7.6	192.168.27.2	New element.
<input type="checkbox"/>	UPM Generic Account Management Service	Subscriber Manager	2.0		Define and manage user accounts and communication profiles wi...

5.2. Confirm System Features

The keycode installed on the Call Server controls the maximum values for these attributes. If a required feature is not enabled or there is insufficient capacity, contact an authorized Avaya sales representative to add additional capacity. Use the CS1000E system terminal and manually load overlay 22 to print the System Limits (the required command is **slt**), and verify that the number of SIP Access Ports reported by the system is sufficient for the combination of trunks to the Eircom network, and any other SIP trunks needed. See the following screenshot for a typical System Limits printout. The value of **SIP ACCESS PORTS** defines the maximum number of SIP trunks for the CS1000E.

System type is - Communication Server 1000E/CP PM					
CP PM - Pentium M 1.4 GHz					
IPMGs Registered: 4					
IPMGs Unregistered: 0					
IPMGs Configured/unregistered: 2					
TRADITIONAL TELEPHONES	120	LEFT	110	USED	10
DECT USERS	16	LEFT	16	USED	0
IP USERS	10000	LEFT	9954	USED	46
BASIC IP USERS	16	LEFT	13	USED	3
TEMPORARY IP USERS	8	LEFT	8	USED	0
DECT VISITOR USER	16	LEFT	16	USED	0
ACD AGENTS	192	LEFT	185	USED	7
MOBILE EXTENSIONS	8	LEFT	7	USED	1
TELEPHONY SERVICES	16	LEFT	13	USED	3
CONVERGED MOBILE USERS	8	LEFT	8	USED	0
AVAYA SIP LINES	16	LEFT	12	USED	4
THIRD PARTY SIP LINES	16	LEFT	16	USED	0
PCA	20	LEFT	18	USED	2
ITG ISDN TRUNKS	0	LEFT	0	USED	0
H.323 ACCESS PORTS	524	LEFT	524	USED	0
AST	6652	LEFT	6640	USED	12
SIP CONVERGED DESKTOPS	16	LEFT	16	USED	0
SIP CTI TR87	16	LEFT	8	USED	8
SIP ACCESS PORTS	524	LEFT	518	USED	6
RAN CON	90	LEFT	90	USED	0
MUS CON	120	LEFT	120	USED	0

Load Overlay 21 and confirm the customer is setup to use **ISDN** trunks by typing the **PRT** and **NET_DATA** commands as shown below.

```

REQ: prt
TYPE: net
TYPE NET_DATA
CUST 0

TYPE NET_DATA
CUST 00
OPT RTD
AC1 INTL NPA SPN NXX LOC
AC2
FNP YES
ISDN YES

```


5.3. Configure Codecs for Voice and FAX operation

Eircom's SIP Trunk service supports G.711A and G.729 voice codecs. Using the CS1000E Element Manager sidebar, select **Nodes, Servers, Media Cards**. Navigate to the **IP Network → IP Telephony Nodes → Node Details → VGW and Codecs** property page and configure the CS1000E **General** codec settings as in the following screenshots. The values highlighted are required for correct operation. The following screenshot shows the necessary **General** settings.

Managing: 192.168.27.2 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » VGW and Codecs

Node ID: 200 - Voice Gateway (VGW) and Codecs

General | Voice Codecs | Fax

General

Echo cancellation: ☒ Use canceller, with tail delay: 128 (ms)
☒ Dynamic attenuation

Voice activity detection threshold: -17 (-20 - +10 DBM)

Idle noise level: -65 (-327 - +327 DBM)

Signaling options: ☒ DTMF tone detection
☐ Low latency mode
☒ Remove DTMF delay (squelch DTMF from TDM to IP)
☒ Modem/Fax pass-through
☒ V.21 Fax tone detection
☐ R factor calculation

Move down to the Voice Codecs section and configure the G.711 codec settings. The following screenshot shows the G.711 codec settings.

Managing: 192.168.27.2 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » VGW and Codecs

Node ID: 200 - Voice Gateway (VGW) and Codecs

General | Voice Codecs | Fax

Codec G711: ☒ Enabled (required)

Voice payload size: 20 (milliseconds per frame)

Voice playout (jitter buffer) delay: 40 80 (milliseconds)

Nominal Maximum

Maximum delay may be automatically adjusted based on nominal settings.

☐ Voice Activity Detection (VAD)

Next, scroll down to the G.729 codec section and configure the settings.

Managing: 192.168.27.2 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » VGW and Codecs

Node ID: 200 - Voice Gateway (VGW) and Codecs

[General](#) | [Voice Codes](#) | [Fax](#)

Codec G729: ☒ Enabled

Voice payload size: 20 (milliseconds per frame)

Voice playout (jitter buffer) delay: 40 80 (milliseconds)

Nominal Maximum

Maximum delay may be automatically adjusted based on nominal settings.

☐ Voice Activity Detection (VAD)

Finally, configure the Fax settings as in the highlighted section of the next screenshot. Click on the **Save** button when finished.

Fax

Codec name: T.38 FAX

Maximum rate: 14400 (bps)

Fax TCF method: 2

Fax playout nominal delay: 100 (0 - 300 milliseconds)

FAX no activity timeout: 20 (10 - 32000 milliseconds)

Packet size: 30 (bps)

5.4. Virtual Trunk Gateway Configuration

Use CS1000E Element Manager to configure the system node properties. Navigate to the **System → IP Networks → IP Telephony Nodes → Node Details** and verify the highlighted section is completed with the correct IP addresses and subnet masks of the Node. The call server and signaling server have previously been configured with IP addresses. The Node IPv4 address is the IP address that the IP phones use to register.

Managing: 192.168.27.2 Username: admin
System » IP Network » IP Telephony Nodes » Node Details

Node Details (ID: 200 - SIP Line, LTPS, PD, Gateway (SIPGw))

Node ID:	<input type="text" value="200"/>	* (0-9999)
Call server IP address:	<input type="text" value="192.168.27.2"/>	*
TLAN address type:		<input checked="" type="radio"/> IPv4 only <input type="radio"/> IPv4 and IPv6
Embedded LAN (ELAN)		Telephony LAN (TLAN)
Gateway IP address:	<input type="text" value="192.168.27.1"/>	*
Subnet mask:	<input type="text" value="255.255.255.0"/>	*
Node IPv4 address:		<input type="text" value="10.10.9.21"/>
Subnet mask:		<input type="text" value="255.255.255.0"/>
Node IPv6 address:		<input type="text"/>

* Required Value.

Save Cancel

The next two screenshots show the SIP Virtual Trunk Gateway configuration, navigate to **System → IP Networks → IP Telephony Nodes → Node Details → Gateway (SIPGW) Virtual Trunk Configuration Details** and fill in the highlighted areas with the relevant settings.

- **Vtrk gateway application:** Provides option to select Gateway applications. The three supported modes are **SIP Gateway (SIPGw)**, **H.323Gw**, and **SIPGw and H.323Gw**
- **SIP domain name:** The SIP domain name is the SIP Service Domain. The SIP domain name configured in the Signaling Server properties must match the Service Domain name configured in NRS, in this case **avaya.com**
- **Local SIP port:** The Local SIP Port is the port to which the gateway listens. The default value is **5060**
- **Gateway endpoint name:** This field cannot be left blank so a value is needed here. This field is used when a Network Routing Server is used for registration of the endpoint, in this case **cs1kv19** is used.
- **Application node ID:** This is a unique value that can be alphanumeric and is for the new Node that is being created, in this case **200**
- **Proxy or Redirect Server:** Primary TLAN IP address is the IP address of the NRS. The **Transport protocol** used for **SIP**, in this case is **TCP**
- **SIP URI Map:** **Public E.164 - National** and **Private - Unknown** are left blank. All other fields in the SIP URI Map are left with default values

Managing: 192.168.27.2 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » Virtual Trunk Gateway Configuration

Node ID: 200 - Virtual Trunk Gateway Configuration Details

General | SIP Gateway Settings | SIP Gateway Services

Vtrk gateway application: ☒ Enable gateway service on this node

General

Vtrk gateway application: SIP Gateway (SIPGw) ▼

SIP domain name: avaya.com *

Local SIP port: 5060 * (1 - 65535)

Gateway endpoint name: cs1kv19 *

Gateway password: * *

Application node ID: 200 * (0-9999)

Enable failsafe NRS: ☐

Note: FailSafe NRS cannot be enabled, if all servers in the node have NRS application deployed.

Virtual Trunk Network Health Monitor

☐ Monitor IP addresses (listed below)

Information will be captured for the IP addresses listed below.

Monitor IP: Add

Monitor addresses:

Remove

☐ Enable Shared Bandwidth Management

Proxy Or Redirect Server:

Proxy Server Route 1:

Primary TLAN IP address:

The IP address can have either IPv4 or IPv6 format based on the value of "TLAN address type"

Port: (1 - 65535)

Transport protocol:

Options: ☒ Support registration
☒ Primary CDS proxy

SIP URI Map:

Public E.164 domain names	Private domain names
National: <input type="text"/>	UDP: <input type="text" value="udp"/>
Subscriber: <input type="text" value="subscriber"/>	CDP: <input type="text" value="cdp.udp"/>
Special number: <input type="text" value="PublicSpecial"/>	Special number: <input type="text" value="PrivateSpecial"/>
Unknown: <input type="text" value="PublicUnknown"/>	Vacant number: <input type="text" value="PrivateUnknown"/>
	Unknown: <input type="text"/>

5.5. Configure Bandwidth Zones

Bandwidth Zones are used for alternate call routing between IP stations and for bandwidth management. SIP trunks require a unique zone, not shared with other resources and best practice dictates that IP telephones and Media Gateways are all placed in separate zones. In the sample configuration SIP trunks use zone 01 and IP and SIP Telephones use zone 02; system defaults were used for each zone other than the parameter configured for **Zone Intent**. For SIP Trunks (zone 01), **VTRK** is configured for **Zone Intent**. For IP, SIP Telephones (zone 02), **MO** is configured for **Main Office**.

Use Element Manager to define bandwidth zones as in the following highlighted example. Use Element Manager and navigate to **System → IP Network → Zones → Bandwidth Zones** and add new zones as required.

Managing: 192.168.27.2 Username: admin
System » IP Network » Zones » Bandwidth Zones

Bandwidth Zones

	Zone ▲	Intrazone Bandwidth	Intrazone Strategy	Interzone Bandwidth	Interzone Strategy	Resource Type	Zone Intent	Description
1	1	1000000	BQ	1000000	BQ	SHARED	VTRK	
2	2	1000000	BQ	1000000	BQ	SHARED	MO	

5.6. Configure Incoming Digit Conversion Table

A limited number of Direct Dial Inwards (DDI) numbers were available. The Incoming Digit Conversion (IDC) table was configured to translate incoming PSTN numbers to four digit local telephone extension numbers. The digits of the actual PSTN DDI number are obscured for security reasons. The following screenshot shows the incoming PSTN numbers converted to local extension numbers. These were altered during testing to map to various SIP, Analog, Digital or UNISim telephones depending on the particular test case being executed.

Managing: 192.168.27.2 Username: admin
Dialing and Numbering Plans » Incoming Digit Translation » Customer 00 » Digit Conversion Tree 0 Configuration

Digit Conversion Tree 0 Configuration

Regular IDC tree
Send calling party DID disabled

	Incoming Digits ▲	Converted Digits	CPND Name	CPND language
1	07689	6000		
2	07689	6001		
3	07689	6002		
4	07689	6050		

5.7. Configure SIP Trunks

Communication Server 1000E virtual trunks will be used for all inbound and outbound PSTN calls to the Eircom SIP Trunk service. Six separate steps are required to configure Communication Server 1000E virtual trunks:

- Configure a D-Channel Handler (**DCH**); configure using the CS1000E system terminal and overlay 17
- Configure a SIP trunk Route Data Block (**RDB**); configure using the CS1000E system terminal and overlay 16
- Configure SIP trunk members; configure using the CS1000E system terminal and overlay 14
- Configure a Digit Manipulation Data Block (**DGT**), configure using the CS1000E system terminal and overlay 86
- Configure a Route List Block (**RLB**); configure using the CS1000E system terminal and overlay 86
- Configure Co-ordinated Dialling Plan(s) (**CDP**); configure using the CS1000E system terminal and overlay 87

The following is an example DCH configuration for SIP trunks. Load **Overlay 17** at the CS1000E system terminal and enter the following values. The highlighted entries are required for correct SIP trunk operation. Exit overlay 17 when completed.

```
Overlay 17
ADAN      DCH 1
CTYP DCIP
DES  VIR TRK
USR  ISLD
ISLM 4000
SSRC 3700
OTBF 32
NASA YES
IFC  SL1
CNEG 1
RLS  ID 4
RCAP ND2
MBGA NO
H323
    OVLR NO
    OVLS NO
```

Next, configure the SIP trunk Route Data Block (RDB) using the CS1000E system terminal and overlay 16. Load **Overlay 16**, enter **RDB** at the prompt, press return and commence configuration. The value for **DCH** is the same as previously entered in overlay 17. The value for **NODE** should match the node value in **Section 5.4**. The value for **ZONE** should match that used in **Section 5.5** for **VTRK**. The remaining highlighted values are important for correct SIP trunk operation.

Overlay 16 TYPE: RDB CUST 00 ROUT 1 TYPE RDB CUST 00 ROUT 1 DES VIR_TRK TKTP TIE NPID_TBL_NUM 0 ESN NO RPA NO CNVT NO SAT NO RCLS EXT VTRK YES ZONE 00001 PCID SIP CRID NO NODE 200 DTRK NO ISDN YES MODE ISLD DCH 1 IFC SL1 PNI 00000 NCNA YES NCRD YES TRO NO FALT NO CTYP UKWN INAC NO ISAR NO DAPC NO MBXR NO MBXOT NPA MBXT 0 PTYP ATT CNDP UKWN AUTO NO DNIS NO DCDR NO ICOG IAO SRCH LIN TRMB YES STEP	ACOD 1111 TCPP NO PII NO AUXP NO TARG CLEN 1 BILN NO OABS INST IDC YES DCNO 0 NDNO 0 * DEXT NO DNAM NO SIGO STD STYP SDAT MFC NO ICIS YES OGIS YES TIMR ICF 1920 OGF 1920 EOD 13952 LCT 256 DSI 34944 NRD 10112 DDL 70 ODT 4096 RGV 640 GTO 896 GTI 896 SFB 3 PRPS 800 NBS 2048 NBL 4096 IENB 5 TFD 0 VSS 0 VGD 6 EESD 1024 SST 5 0 DTD NO SCDT NO 2 DT NO NEDC ORG FEDC ORG	CPDC NO DLTN NO HOLD 02 02 40 SEIZ 02 02 SVFL 02 02 DRNG NO CDR NO NATL YES SSL CFWR NO IDOP NO VRAT NO MUS YES MRT 21 PANS YES RACD NO MANO NO FRL 0 0 FRL 1 0 FRL 2 0 FRL 3 0 FRL 4 0 FRL 5 0 FRL 6 0 FRL 7 0 OHQ NO OHQT 00 CBQ NO AUTH NO TTBL 0 ATAN NO OHTD NO PLEV 2 OPR NO ALRM NO ART 0 PECL NO DCTI 0 TIDY 1600 100 ATRR NO TRRL NO SGRP 0 ARDN NO CTBL 0 AACR NO
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Next, configure virtual trunk members using the CS1000E system terminal and **Overlay 14**. Configure sufficient trunk members to carry both incoming and outgoing PSTN calls. The following example shows a single SIP trunk member configuration. Load **Overlay 14** at the system terminal and type **new X**, where X is the required number of trunks. Continue entering data until the overlay exits. The **RTMB** value is a combination of the **ROUT** value entered in the previous step and the first trunk member (usually 1). The remaining highlighted values are important for correct SIP trunk operation.

```
Overlay 14
TN 100 0 0 0
DATE
PAGE
DES VIR TRK
TN 100 0 00 00 VIRTUAL
TYPE IPTI
CDEN 8D
CUST 0
XTRK VTRK
ZONE 00001
TIMP 600
BIMP 600
AUTO_BIMP NO
NMUS NO
TRK ANLG
NCOS 0
RTMB 1 1
CHID 1
TGAR 1
STRI/STRO IMM IMM
SUPN YES
AST NO
IAPG 0
CLS UNR DIP CND ECD WTA LPR APN THFD XREP SPCD MSBT
P10 NTC
TKID
AACR NO
```

Next, configure a Digit Manipulation data block (DGT) in overlay 86. Load **Overlay 86** at the system terminal and type **new**. The following example shows the values used. **Note: ISPN** is set to **0** as Eircom required a prefix of 0 to be inserted before the dialed number for outbound calls. The value for Digit Manipulation Index (**DMI**) is the same as when inputting the **DMI** value during configuration of the Route List Block.

Overlay 86

```
CUST 0
FEAT dgt
DMI 10
DEL 0
ISPN 0
CTYP NPA
```

Configure a Route List Block (RLB) in overlay 86. Load **Overlay 86** at the system terminal and type **new**. The following example shows the values used. The value for **ROUT** is the same as previously entered in overlay 16. The **RLI** value is unique to each RLB.

Overlay 86

```
CUST 0
FEAT rlb
RLI 10
ELC NO
ENTR 0
LTER NO
ROUT 1
TOD 0 ON 1 ON 2 ON 3 ON
    4 ON 5 ON 6 ON 7 ON
VNS NO
SCNV NO
CNV NO
EXP NO
FRL 0
DMI 10
CTBL 0
ISDM 0
```

```
FCI 0
FSNI 0
BNE NO
DORG NO
SBOC NRR
PROU 1
IDBB DBD
IOHQ NO
OHQ NO
CBQ NO
```

```
ISSET 0
NALT 5
MFRL 0
OVL 0
```

Next, configure Co-ordinated Dialling Plan(s) (CDP) which users will dial to reach PSTN numbers. Use the CS1000E system terminal and **Overlay 87**. The following are some example CDP entries used. The highlighted **RLI** value previously configured in overlay 86 is used as the Route List Index (**RLI**), this is the default PSTN route to the SIP Trunk service.

```
TSC 00353
FLEN 0
RRPA NO
RLI 10
CCBA NO
```

```
TSC 18
FLEN 0
RRPA NO
RLI 10
CCBA NO
```

```
TSC 800
FLEN 0
RRPA NO
RLI 10
CCBA NO
```

```
TSC 08
FLEN 0
RRPA NO
RLI 10
CCBA NO
```

5.8. Calling Line Identification

This section documents basic configuration relevant to the Eircom configuration. **Load Overlay 15** at system terminal and enter the required values in bold. As shown below, **CLID** is set to **YES** and **ENTRY** is set to **0**. **HNTN** and **HLCL** match the required digits assigned by Eircom and **DIDN** is set to **NO**.

```
Load Overlay 15
TYPE NET_DATA
CUST 0
OPT
AC2
FNP
CLID YES
    SIZE
    INTL
    ENTRY 0
HNTN 07689
    ESA_HLCL
    ESA_INHN NO
    ESA_APDN NO
    HLCL 11010
    DIDN NO
    DIDN_LEN 0
    HLOC
    LSC
    CLASS_FMT DN
```

5.9. Configure Analog, Digital and IP Telephones

A variety of telephone types were used during the testing, the following is the configuration for the Avaya 1140e UNISim IP telephone. Load **Overlay 20** at the system terminal and enter the following values. A unique four digit number is entered for the **KEY 00**. The value for **CFG_ZONE** is the value used in **Section 5.5** for IP and SIP Telephones.

Load Overlay 20 IP Telephone configuration

```
DES 1140
TN 100 0 03 0 VIRTUAL
TYPE 1140
CDEN 8D
CTYP XDLC
CUST 0
NUID
NHTN
CFG_ZONE 00002
CUR_ZONE 00002
ERL 0
ECL 0
FDN 0
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 1
SCI 0
SSU
LNRS 16
XLST
SCPW
SFLT NO
CAC_MFC 0
CLS UNR FBA WTA LPR PUA MTD FNA HTA TDD HFA CRPD
MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
POD SLKD CCSD SWD LNA CNDA
CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBF
ICDA CDMD LLCN MCTD CLBD AUTR
GPUD DPUD DNDA CFXA ARHD FITD CLTD ASCD
CPFA CPTA ABDD CFHD FICD NAID BUZZ AGRD MOAD
UDI RCC HBTA AHD IPND DDGA NAMA MIND PRSD NRWD NRCD NROD
DRDD EXR0
USMD USRD ULAD CCBF RTDD RBDD RBHD PGND OCBF FLXD FTTC DNDY DNO3 MCBN
FDSD NOVD VOLA VOUD CDMR PRED RECA MCDD T87D SBMD KEM3 MSNV FRA PKCH MUTA MWTD
---continued on next page---
```

---continued from previous page---

```
DVLD CROD CROD
CPND_LANG ENG
RCO 0
HUNT 0
LHK 0
PLEV 02
PUID
DANI NO
AST 00
IAPG 1
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
MLNG ENG
DNDR 0
KEY 00 MCR 6000 0      MARP
      CPND
      CPND_LANG ROMAN
      NAME IP1140
      XPLN 10
      DISPLAY_FMT FIRST, LAST
01 MCR 6000 0
      CPND
      CPND_LANG ROMAN
      NAME IP1140
      XPLN 10
      DISPLAY_FMT FIRST, LAST
02
03 BSY
04 DSP
05
06
07
08
09
10
11
12
13
14
15
16
17 TRN
18 AO6
19 CFW 16
20 RGA
21 PRK
22 RNP
23
24 PRS
25 CHG
26 CPN
```

Digital telephones are configured using the overlay 20; the following is a sample 3904 digital set configuration. Again, a unique number is entered for the **KEY 00** and **KEY 01** value.

Overlay 20 - Digital Set configuration

```
TYPE: 3904
DES 3904
TN 000 0 09 08 VIRTUAL
TYPE 3904
CDEN 8D
CTYP XDLC
CUST 0
MRT
ERL 0
FDN 0
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 1
SCI 0
SSU
LNRS 16
XLST
SCPW
SFLT NO
CAC_MFC 0
CLS UNR FBD WTA LPR PUA MTD FND HTD TDD HFA GRLD CRPA STSD
MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
POD SLKD CCSD SWD LNA CNDA
CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBF
ICDA CDMA LLCN MCTD CLBD AUTU
GPUD DPUD DNDA CFXA ARHD FITD CNTD CLTD ASCD
CPFA CPTA ABDA CFHD FICD NAID BUZZ AGRD MOAD
UDI RCC HBTB AHA IPND DDGA NAMA MIND PRSD NRWD NRCD NROD
DRDD EXR0
USMD USRD ULAD CCBF RTDD RBDD RBHD PGND OCBF FLXD FTTC DNDY DNO3 MCBN
FDSD NOVD CDMR PRED RECA MCDD T87D SBMD PKCH CROD CROD
CPND LANG ENG
RCO 0
HUNT
PLEV 02
PUID
DANI NO
SPID NONE
AST
IAPG 1
AACS
ACQ
ASID
SFNB
SFRB
USFB
CALB
FCTB
ITNA NO
DGRP
PRI 01
MLWU_LANG 0
```

---continued on next page---

---continued from previous page---

MLNG ENG

DNDR 0

KEY 00 MCR 6066 0 MARP

CPND

CPND_LANG ROMAN

NAME Digital Set

XPLN 10

DISPLAY_FMT FIRST, LAST

01 MCR 6066 0

CPND

CPND_LANG ROMAN

NAME Digital Set

XPLN 10

DISPLAY_FMT FIRST, LAST

02 DSP

03 MSB

04

05

06

07

08

09

10

11

12

13

14

15

16

17 TRN

18 AO6

19 CFW 16

20 RGA

21 PRK

22 RNP

23

24 PRS

25 CHG

26 CPN

27 CLT

28 RLT

29

30

31

Analog telephones are also configured using overlay 20; the following example shows an analog port configured for Plain Ordinary Telephone Service (POTS) and also configured to allow fax transmission. A unique value is entered for **DN**, this is the extension number. **DTN** is required if the telephone uses DTMF dialing. Values **FAXA** and **MPTD** configure the port for T.38 Fax transmissions.

```

Overlay 20 - Analog Telephone Configuration
DES 500
TN 100 0 00 03
TYPE 500
CDEN 4D
CUST 0
MRT

ERL 00000
WRLS NO
DN 6004
AST NO
IAPG 0
HUNT
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 0
XLST
SCI 0
SCPW
SFLT NO
CAC_MFC 0
CLS UNR DTN FBD XFD WTA THFD FND HTD ONS
    LPR XRD AGRD CWD SWD MWD RMMD SMWD LPD XHD SLKD CCSD LND TVD
    CFTD SFD MRD C6D CNID CLBD AUTU
    ICDD CDMD LLCN EHTD MCTD
    GPUD DPUD CFXD ARHD OVDD AGTD CLTD LDTD ASCD SDND
    MBXD CPFA CPTA UDI RCC HBTD IRGD DDGA NAMA MIND
    NRWD NRCD NROD SPKD CRD PRSD MCRD
    EXR0 SHL SMSD ABDD CFHD DNDY DNO3
    CWND USMD USRD CCBD BNRD OCBF RTDD RBDD RBHD FAXA CNUD CNAD PGND FTTC
    FDSD NOVD CDMR PRED MCDD T87D SBMD PKCH MPTD
PLEV 02
PUID
AACS NO
MLWU_LANG 0
FTR DCFW 4

```


5.10. Configure the SIP Line Gateway Service

SIP terminal operation requires the Communication Server node to be configured as a SIP Line Gateway (SLG) before SIP telephones can be configured. Prior to configuring the SIP Line node properties, the SIP Line service must be enabled in the customer data block. Use the Communication Server 1000E system terminal and overlay 15 to activate SIP Line services (SLS_DATA), as in the following example where **SIPL_ON** is set to **YES**.

```
SLS_DATA
SIPL_ON YES
UAPR 11
NMME NO
```

If a numerical value is entered against the **UAPR** setting, this number will be pre appended to all SIP Line configurations, and is used internally in the SIP Line server to track SIP terminals. Use Element Manager and navigate to the **IP Network → IP Telephony Nodes → Node Details → SIP Line Gateway Configuration** page. See the following screenshot for highlighted critical parameters.

- **SIP Line Gateway Application:** Enable the SIP line service on the node, check the box to enable
- **SIP Domain Name:** The value must match that configured in **Section 6.2**
- **SLG endpoint name:** The endpoint name is the same endpoint name as the SIP Line Gateway and will be used for SIP gateway registration
- **SLG Local Sip port:** Default value is **5070**
- **SLG Local TLS port:** Default value is **5071**

Managing: 192.168.27.2 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » SIP Line Configuration

Node ID: 200 - SIP Line Configuration Details

General | SIP Line Gateway Settings | SIP Line Gateway Service

SIP Line Gateway Application: ☒ Enable gateway service on this node

General

SIP domain name: *

SLG endpoint name:

SLG Group ID:

SLG Local Sip port: (1 - 65535)

SLG Local Tls port: (1 - 65535)

Virtual Trunk Network Health Monitor

☐ Monitor IP addresses (listed below)
Information will be captured for the IP addresses listed below.

Monitor IP:

Monitor addresses:

5.11.Configure SIP Line Telephones

When SIP Line service configuration is completed, use the CS1000E system terminal and **Overlay 20** to add a Universal Extension (UEXT). See the following example of a SIP Line extension. The value for **UXTY** must be **SIPL**. This example is for an Avaya SIP telephone, so the value for **SIPN** is 1. The **SIPU** value is the username, **SCPW** is the logon password and these values are required to register the SIP telephone to the SLG. The value for **CFG_ZONE** is the value used in **Section 5.5** for IP and SIP Telephones. A unique telephone number is entered for value **KEY 00**. The value for **KEY 01** is comprised of the **UAPR** (set in **Section 5.8**) value and the telephone number used in **KEY 00**.

Load Overlay 20 - SIP Telephone Configuration

```
DES  SIPD
TN    100 0 03 3  VIRTUAL
TYPE  UEXT
CDEN  8D
CTYP  XDLC
CUST  0
UXTY SIPL
MCCL YES
SIPN 1
SIP3  0
FMCL  0
TLSV  0
SIPU 6002
NDID  200
SUPR  NO
SUBR  DFLT MWI RGA CWI MSB
UXID
NUID
NHTN
CFG_ZONE 00002
CUR_ZONE 00002
ERL   0
ECL   0
VSIT  NO
FDN
TGAR  0
LDN   NO
NCOS  0
SGRP  0
RNPG  0
SCI   0
SSU
XLST
SCPW 1234
SFLT  NO
CAC   MFC 0
CLS   UNR FBD WTA LPR MTD FNA HTA TDD HFD CRPD
      MWD LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
      POD SLKD CCSD SWD LND CNDA
      CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBF
      ICDD CDMD LLCN MCTD CLBD AUTU
      GPUD DPUD DNDA CFXA ARHD FITD CLTD ASCD
      CPFA CPTA ABDD CFHD FICD NAID BUZZ AGRD MOAD
```

---continued on next page---

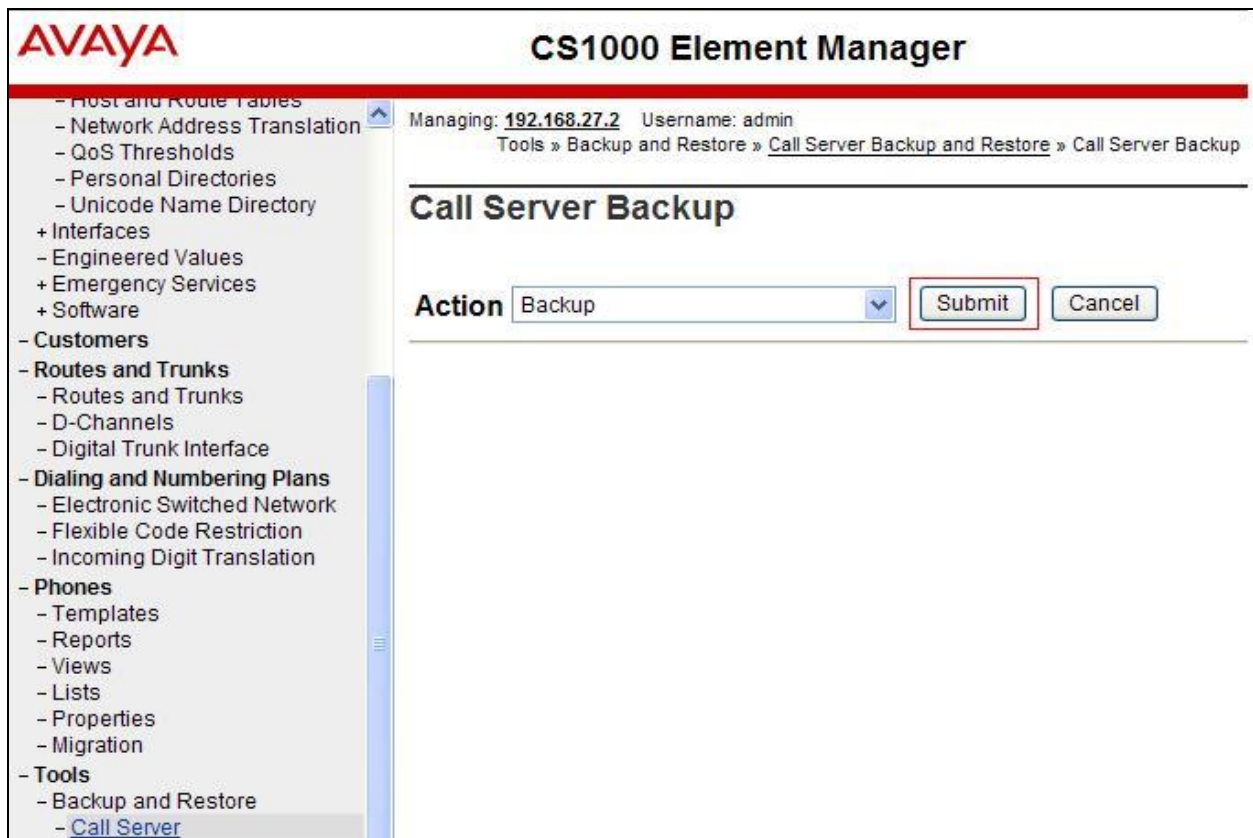
---continued from previous page---

```
UDI RCC HBTD AHA IPND DDGA NAMA MIND PRSD NRWD NRCD NROD
DRDD EXR0
USMD USRD ULAD CCBD RTDD RBDD RBHD PGND OCBF FLXD FTTC DNDY DNO3 MCBN
FDSD NOVD VOLA VOUD CDMR PRED RECD MCDD T87D SBMD ELMD MSNV FRA PKCH MWTD DVLD
CROD CROD
CPND_LANG ENG
RCO 0
HUNT
LHK 0
PLEV 02
PUID
DANI NO
AST
IAPG 0 *

AACS NO
ITNA NO
DGRP
MLWU_LANG 0
MLNG ENG
DNDR 0
KEY 00 MCR 6002 0      MARP
      CPND
      CPND_LANG ROMAN
      NAME Sigma 1140
      XPLN 11
      DISPLAY_FMT FIRST, LAST*
01 HOT U 116002 MARP 0
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17 TRN
18 AO6
19 CFW 16
20 RGA
21 PRK
22 RNP
23 *
24 PRS
25 CHG
26 CPN
27
28
29
30
31
```

5.12. Save Configuration

Expand **Tools** → **Backup and Restore** on the left navigation panel and select **Call Server**. Select **Backup** (not shown) and click **Submit** to save configuration changes as shown below.



The screenshot shows the AVAYA CS1000 Element Manager web interface. On the left is a navigation tree with categories like Host and Route Tables, Network Address Translation, QoS Thresholds, Personal Directories, Unicode Name Directory, Interfaces, Engineered Values, Emergency Services, Software, Customers, Routes and Trunks, Dialing and Numbering Plans, Phones, and Tools. The 'Tools' category is expanded, showing 'Backup and Restore' and 'Call Server'. The main content area is titled 'Call Server Backup'. It shows the managed IP as 192.168.27.2 and the username as admin. The breadcrumb trail is 'Tools » Backup and Restore » Call Server Backup and Restore » Call Server Backup'. The 'Action' dropdown menu is set to 'Backup'. The 'Submit' button is highlighted with a red box.

The backup process will take several minutes to complete. Scroll to the bottom of the page to verify the backup process completed successfully as shown below.

```
Backing up reten.bkp to "/var/opt/nortel/cs/fs/cf2/backup/single"
Database backup Complete!
TEMU207
Backup process to local Removable Media Device ended successfully.
```

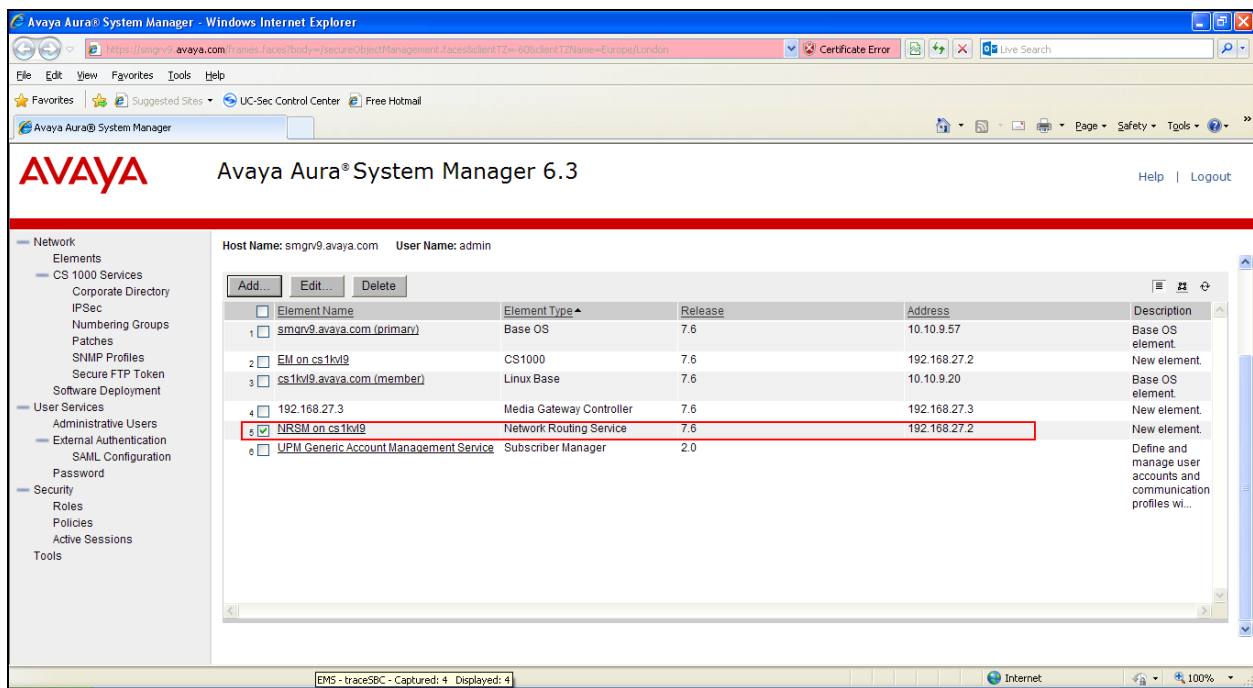
Configuration of Communication Server 1000E is complete.

6. Configuring Avaya Network Routing Server

This section provides the procedure for configuring the NRS to receive and route calls over the SIP trunk between the Avaya SBCE and the CS1000E. These instructions assume other administration activities have already been completed such as defining system wide settings. The following administration activities will be described.

- Define SIP Domain
- Define Endpoints
- Define Routes

Configuration is accomplished by accessing the browser-based GUI of the Unified Communications Manager (UCM), using the URL **https://<ip-address>/network-login**, where **<ip-address>** is the IP address of UCM. Once logged on click on the NRS Manager link on the UCM front page and log in with the appropriate credentials.



The **NRS Server** screen is displayed with additional details as shown below. Under the Server Configuration, make a note of the **Primary TLAN IPV4 address**. In the sample configuration below, **10.10.9.20** was used. This IP address will be used when configuring the Avaya SBCE with a Routing Profile to the CS1000E NRS in **Section 7.2.3** and the Server Configuration for the CS1000E NRS in **Section 7.2.4**.

AVAYA Network Routing Service Manager

System » NRS Server

NRS Server

Service Status

Enable Graceful disable Restart

	Service Name	Service Status
<input type="checkbox"/>	SIP Proxy Server (SPS)	In service
<input type="checkbox"/>	Gatekeeper (GK)	In service
<input type="checkbox"/>	Network Connection Server (NCS)	In service

Server Configuration

NRS Setting

Host name cs1k19
Address type IPv4 only
Primary TLAN IPv4 address 10.10.9.20
Secondary TLAN IPv4 address 0.0.0.0
Secondary server host name SecondaryHostName
Control priority 40
Server mate communication port 5005
Realm name realmName
Server role Primary

H.323 Gatekeeper Settings

Location request (LRQ) response timeout 3

Scroll down and verify the **SIP Server Settings**. The **Primary server UDP** and **Primary server TCP** port settings should match the ports entered in the SIP Gateway in **Section 5.4**

Server Configuration

SIP Server Settings

Public name for non-trusted networks unknown
Public number for non-trusted networks 000-000

UDP Transport enabled ☒

Primary server UDP IPv4 10.10.9.20
Primary server UDP port 5060
Secondary server UDP IPv4 0.0.0.0
Secondary server UDP port 5060

TCP Transport enabled ☒

Primary server TCP IPv4 10.10.9.20
Primary server TCP port 5060
Secondary server TCP IPv4 0.0.0.0

6.1. Administer SIP Domain

Create a SIP Domain by clicking on **Numbering Plans** → **Domains**, click **Add** (not shown). Enter a name for your Domain name and click on **Save**. In the test configuration **avaya.com** was used and this is the same domain that is configured on the CS1000E as per **Section 5.4**.

The screenshot shows the 'Edit Service Domain' form in the AVAYA Network Routing Service Manager. The left sidebar contains a navigation menu with 'Numbering Plans' and 'Domains' highlighted. The main form area has a 'Domain name' field containing 'avaya.com' and a 'Domain description' field. A red box highlights the 'Domain name' field. The 'Managing' section at the top shows 'Standby database' selected. A 'Save' button is located at the bottom right.

Select the **L1 Domains (UDP) (1)** tab and in the **Filter by Domain** select the newly created domain. Click on the **Add** button and enter **udp** as the L1 Domain as shown below.

The screenshot shows the 'Domains' page in the AVAYA Network Routing Service Manager. The 'Filter by Domain' dropdown is set to 'avaya.com'. The 'Add...' button is highlighted with a red box. The table below shows the L1 Domains (UDP) (1) tab selected, with one entry: 'udp'. The table has columns for ID, Description, # of L0 Domains, # of Gateway Endpoints, # of Routing Entries, and Context.

ID	Description	# of L0 Domains	# of Gateway Endpoints	# of Routing Entries	Context
1	udp	1	2	5	avaya.com

Select the **L0 Domains (CDP) (1)** tab and in the **Filter by Domain** select the newly created domain and the newly created L1 domain. Click on the **Add** button and enter **cdp** as the L0 Domain as shown below.

Managing: ☐ Active database 192.168.27.2
☒ Standby database [Numbering Plans » Domains](#)

Domains
 Domains establish the basic structure of your converged network, defined by Service domains, L1 (UDP) and L0 (CDP) domains.

Service Domains (1) L1 Domains (UDP) (1) L0 Domains (CDP) (1)

Filter by Domain: avaya.com / udp

Add... Delete Refresh

ID	Description	# of Gateway Endpoints	# of Routing Entries	Context
1 cdp	cdp	2	5	avaya.com / udp

1 - 1 of 1 L0 Domain(s) Page 1 of 1 First| Previous| Next| Last

6.2. Define Endpoints

For this test configuration two endpoints were configured on the NRS. A static endpoint was configured for the Avaya SBCE and a dynamic endpoint for the CS1000E. Create an Endpoint by clicking on **Numbering Plans → Endpoints**. Select the domain and sub-domains (e.g. **avaya.com/udp/cdp**) where you want to create the endpoint and click **Add**.

Managing: ☐ Active database 192.168.27.2
☒ Standby database [Numbering Plans » Endpoints](#)

Search for Endpoints Hide

Enter an endpoint ID (use * for all) and click Search. You may narrow the search by specifying a particular domain.

Endpoint ID: *

Limit results to Domain: avaya.com / udp / cdp

Results per page: 50 Search

Gateway Endpoints (2) User Endpoints (0)

Add... Delete SIP phone context... Refresh

ID	Supported Protocols	SIP mode	Call Signaling IP	Description	# of Routing Entries	Context
1 Avaya_SBCE	Static SIP endpoint	Proxy Mode	10.10.3.30	Enterprise SBC	4	avaya.com / udp / cdp
2 cs1kvl9	Dynamic SIP endpoint	Proxy Mode	Not available	CS1K_NRS	1	avaya.com / udp / cdp

6.2.1. Configure Static Endpoint for Avaya Session Border Controller for Enterprise

This section shows how to add a static endpoint for the Avaya SBCE. Enter the following values and use default values for remaining fields.

- **End point name:** Avaya_SBCE was used in this configuration
- **Trust Node:** Checked
- **Static endpoint address:** This is the ip address of Avaya SBCE
- **H.323 support** **H.323 not supported**
- **SIP support:** Set this to **Static SIP endpoint**
- **SIP mode:** Set this to **Proxy mode**
- **SIP TCP transport enabled:** Checked
- **SIP TCP Port** **5060**
- **SIP UDP transport enabled:** Checked
- **SIP UDP Port** **5060**
- **Persistent TCP support enabled** Checked

Click on **Save** (not shown). The two screenshots below show the Avaya SBCE Endpoint configuration used for the testing.

Managing: ☐ Active database 192.168.27.2
☒ Standby database Numbering Plans > Endpoints > Gateway Endpoint

Edit Gateway Endpoint avaya.com / udp / cdp)

End point name: Avaya_SBCE *

Description: Enterprise SBC

Trust Node: ☒

Tandem gateway endpoint name: Not Applicable

Endpoint authentication enabled: Authentication off

Authentication password:

E.164 country code:

E.164 area code:

E.164 international dialing access code:

E.164 international dialing code length: (0-99)

E.164 national dialing access code:

E.164 national dialing code length: (0-99)

E.164 local (subscriber) dialing access code:

Edit Gateway Endpoint avaya.com / udp / cdp)

Static endpoint address type: IP version 4

Static endpoint address: 10.10.3.30

H.323 support: H.323 not supported

SIP support: Static SIP endpoint

SIP mode: ☒ Proxy Mode ☐ Redirect Mode

SIP TCP transport enabled: ☒

SIP TCP port: 5060

SIP UDP transport enabled: ☒

SIP UDP port: 5060

SIP TLS transport enabled: ☐

SIP TLS port: 5061

Persistent TCP support enabled: ☒

End to end security support: ☐

Network Connection Server enabled: ☐

6.2.2. Configure Dynamic Endpoint for Avaya Communication Server 1000E

This section shows how to add a static endpoint for the CS1000E. Enter the following values and use default values for remaining fields.

- **End point name:** cs1kvl9 was used in this configuration
- **Trust Node:** Checked
- **H.323 support:** H.323 not supported
- **SIP support:** Set this to **Dynamic SIP endpoint**
- **SIP mode:** Set this to **Proxy mode**
- **SIP TCP transport enabled:** Checked
- **SIP TCP Port:** 5060
- **SIP UDP transport enabled:** Checked
- **SIP UDP Port:** 5060
- **Persistent TCP support enabled:** Checked

Click on **Save** (not shown). The two screenshots below show the CS1000E Endpoint configuration used for the testing.

Managing: ☐ Active database 192.168.27.2
☒ Standby database [Numbering Plans » Endpoints » Gateway Endpoint](#)

Edit Gateway Endpoint avaya.com / udp / cdp)

End point name: cs1kvl9 *

Description: CS1K_NRS

Trust Node: ☒

Tandem gateway endpoint name: Not Applicable

Endpoint authentication enabled: Authentication off

Authentication password:

E.164 country code:

E.164 area code:

E.164 international dialing access code:

E.164 international dialing code length: (0-99)

Edit Gateway Endpoint avaya.com / udp / cdp)

Static endpoint address type: IP version 4

Static endpoint address:

H.323 support: H.323 not supported

SIP support: Dynamic SIP endpoint

SIP mode: ☒ Proxy Mode ☐ Redirect Mode

SIP TCP transport enabled: ☒

SIP TCP port: 5060

SIP UDP transport enabled: ☒

SIP UDP port: 5060

SIP TLS transport enabled: ☐

SIP TLS port: 5061

Persistent TCP support enabled: ☒

End to end security support: ☐

Network Connection Server enabled: ☐

6.3. Define Routes

Routes need to be defined for each endpoint. Routes are how the NRS routes out calls to an endpoint based on digits it receives.

6.3.1. Configure Route to the Avaya Communication Server 1000E

This section shows how to add routes to the CS1000E. This is incoming calls from the PSTN to the CS1000E. Create a Route by clicking on **Numbering Plans → Routes**. Select the domain and sub-domains (e.g. **avaya.com/udp/cdp**) and endpoint where you want to create the route (e.g. **cs1kv19**) and click **Add**.

Managing: ☐ Active database 192.168.27.2
☒ Standby database [Numbering Plans » Routes](#)

Search for Routing Entries [Hide](#)

Enter a DnPrefix and Dn Type (use * for all) and click Search. You may narrow the search by specifying a particular domain.

DN Prefix: * DN Type: All DN Types

Limit results to Domain: avaya.com / udp / cdp

Endpoint Name: cs1kv19

Results per page: 50 [Search](#)

Routing Entries (1) **Default Routes (0)** **Emergency Fallback Routes (0)**

[Add...](#) [Copy...](#) [Move...](#) [Import...](#) [Export...](#) [Routing test...](#) [Delete](#) [Refresh](#)

<input type="checkbox"/>	DN Prefix	DN Type	Route Cost	SIP URI Phone Context	Context
<input type="checkbox"/>	076	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / cs1kv19

Enter the following values

- **DN type:** Select **Private level 0 regional (CDP steering code)**
- **DN prefix:** **076** prefix matches the DN extensions on the test sets on the CS1000E. This also matches the first 2 digits of the DDI range given for the test
- **Route cost:** **1** is used as this is the only route available

Click on **Save**.

Managing: ☐ Active database 192.168.27.2
☒ Standby database [Numbering Plans » Routes » Routing Entry](#)

Edit Routing Entry (avaya.com / udp / cdp / cs1kv19)

DN type: Private level 0 regional (CDP steering code)

DN prefix: 076 *

Route cost: 1 * (1-255)

* Required value.

[Save](#) [Cancel](#)

6.3.2. Configure Route to the Avaya Session Border Controller for Enterprise

This section shows how to add routes to the Avaya SBCE. This is outgoing calls from the CS1000E to the PSTN. Create a Route by clicking on **Numbering Plans** → **Routes**. Select the domain and sub-domains (e.g. **avaya.com/udp/cdp**) and endpoint where you want to create the route (e.g. **Avaya_SBCE**) and click **Add**.

Managing: ☐ Active database 192.168.27.2
☒ Standby database Numbering Plans » Routes

Search for Routing Entries Hide

Enter a DnPrefix and Dn Type (use * for all) and click Search. You may narrow the search by specifying a particular domain.

DN Prefix: * DN Type: All DN Types

Limit results to Domain: avaya.com / udp / cdp

Endpoint Name: Avaya_SBCE

Results per page: 50 Search

Routing Entries (4) Default Routes (0) Emergency Fallback Routes (0)

Add... Copy... Move... Import... Export... Routing test... Delete Refresh

	DN Prefix	DN Type	Route Cost	SIP URI Phone Context	Context
1	001	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / Avaya_SBCE
2	0087	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / Avaya_SBCE
3	0089	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / Avaya_SBCE
4	0091	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / Avaya_SBCE

Enter the following values;

- **DN type:** Select **Private level 0 regional (CDP steering code)**
- **DN prefix:** **0091** prefix matches the digits going to be dialed for a national call
- **Route cost:** **1** is used as this is the only route available

Click on **Save**.

Managing: ☐ Active database 192.168.27.2
☒ Standby database Numbering Plans » Routes » Routing Entry

Edit Routing Entry (avaya.com / udp / cdp / Avaya_SBCE)

DN type: Private level 0 regional (CDP steering code)

DN prefix: 0091 *

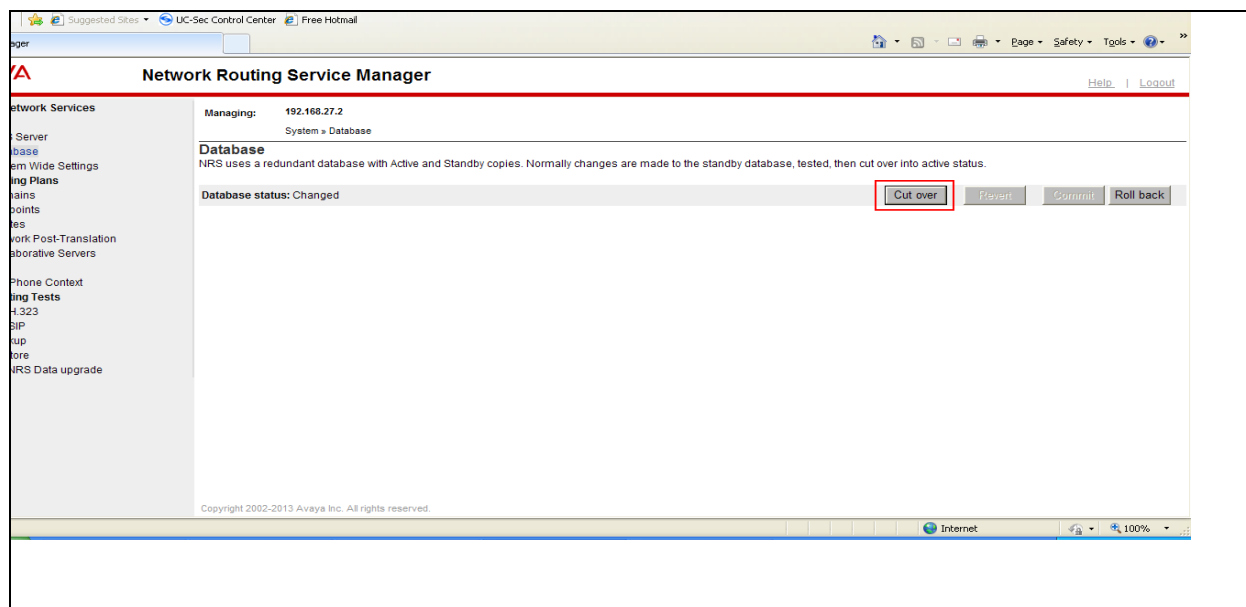
Route cost: 1 * (1-255)

* Required value.

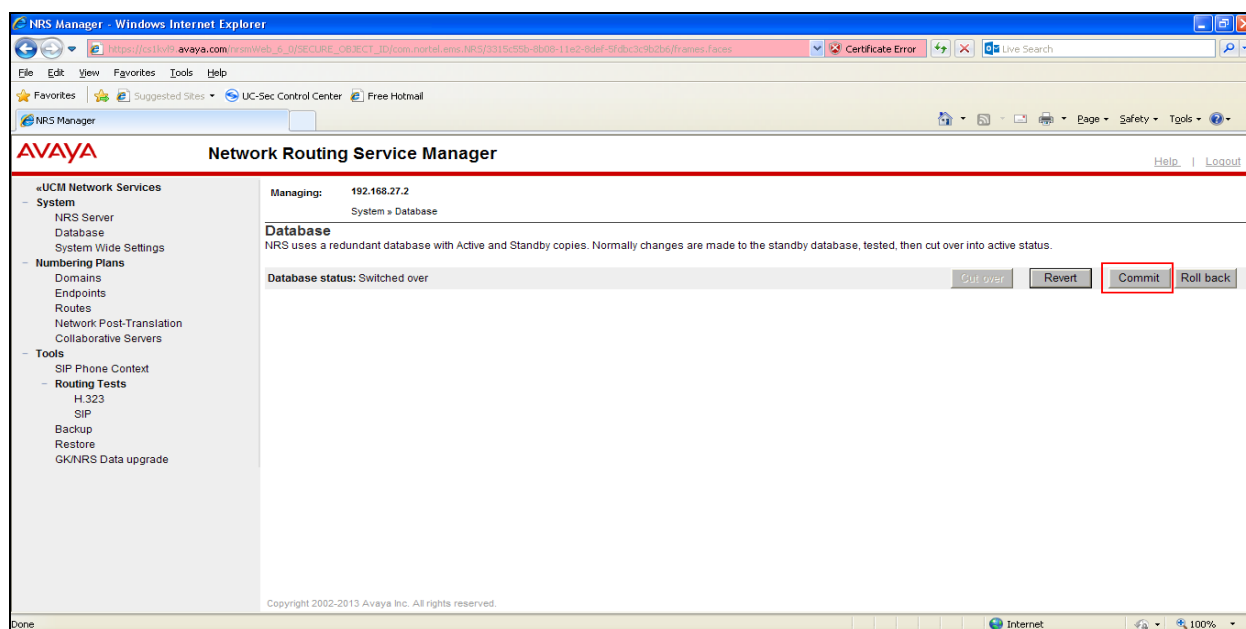
Save Cancel

6.4. Activate Configuration

All configuration changes thus far have taken place on the Standby database. Before the changes can take effect, the standby database must be cut over and committed to the active database. Expand **System** on the left-hand panel and select **Database**. Select the **Cut Over** button as shown below.



The Database Status will update from **Changed** to **Switched over** as shown below. Click on the **Commit** button to activate the database.

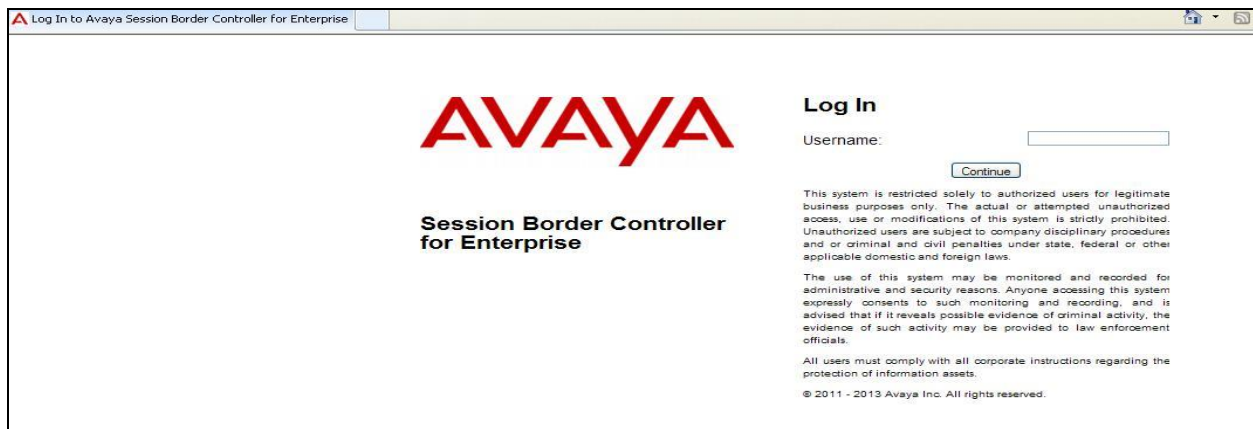


7. Configure Avaya Session Border Controller for Enterprise

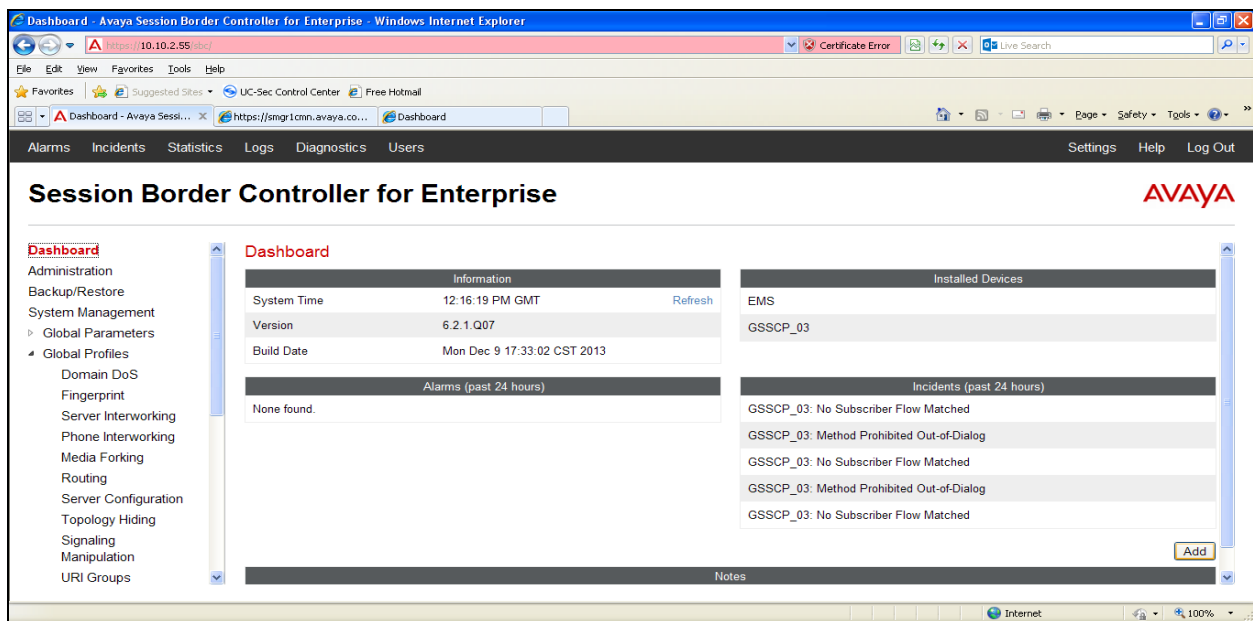
This section describes the configuration of the Avaya SBCE. The Avaya SBCE provides security and manipulation of signalling to provide an interface to the Service Provider's SIP Trunk that is standard where possible and adapted to the Service Provider's SIP implementation where necessary.

7.1. Access Avaya Session Border Controller for Enterprise

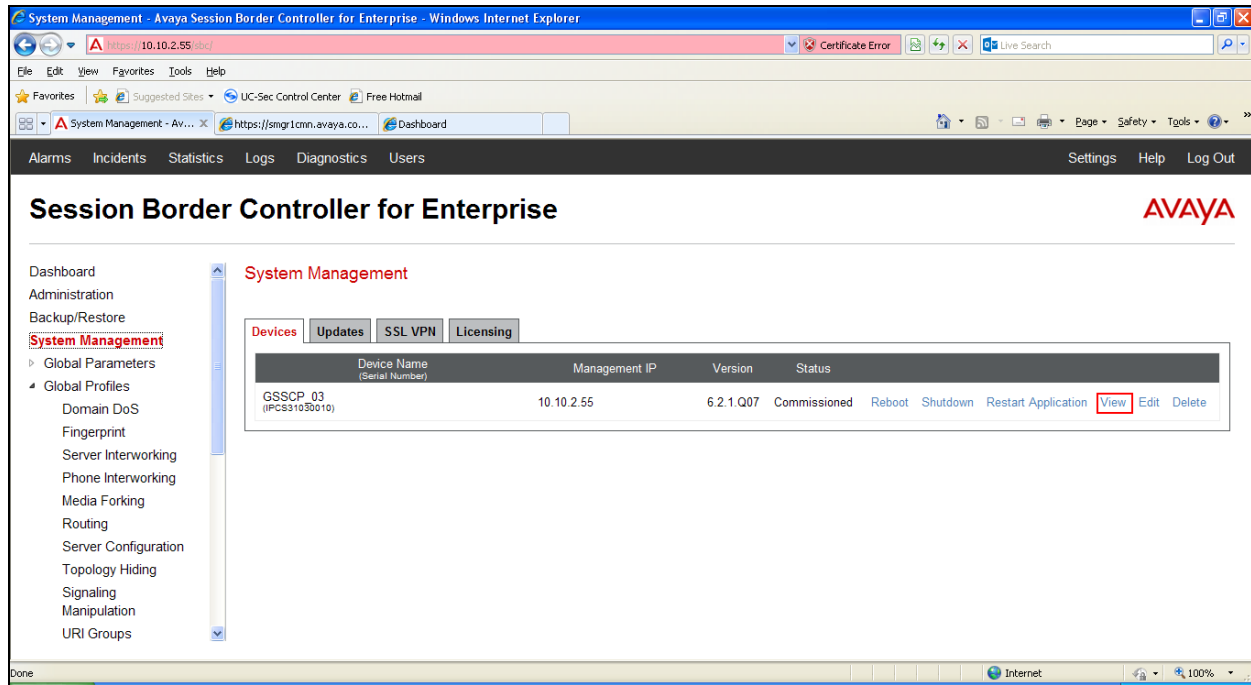
Access the Avaya SBCE using a web browser by entering the URL **https://<ip-address>**, where **<ip-address>** is the management IP address configured at installation and enter the **Username** and **Password**.



The main page of the Avaya SBCE will appear.



To view system information that was configured during installation, navigate to **System Management**. A list of installed devices is shown in the right pane. In the case of the sample configuration, a single device named **GSSCP_03** is shown. To view the configuration of this device, click **View** (the third option from the right).



The System Information screen shows the **Appliance Name**, **Device Settings** and **DNS Configuration** information.

System Information: GSSCP_03																			
General Configuration Appliance Name: GSSCP_03 Box Type: SIP Deployment Mode: Proxy		Device Configuration HA Mode: No Two Bypass Mode: No																	
Network Configuration <table border="1"> <thead> <tr> <th>IP</th> <th>Public IP</th> <th>Netmask</th> <th>Gateway</th> <th>Interface</th> </tr> </thead> <tbody> <tr> <td>10.10.3.30</td> <td>10.10.3.30</td> <td>255.255.255.0</td> <td>10.10.3.1</td> <td>A1</td> </tr> <tr> <td>192.168.122.57</td> <td>192.168.122.57</td> <td>255.255.255.128</td> <td>192.168.122.7</td> <td>B1</td> </tr> </tbody> </table>					IP	Public IP	Netmask	Gateway	Interface	10.10.3.30	10.10.3.30	255.255.255.0	10.10.3.1	A1	192.168.122.57	192.168.122.57	255.255.255.128	192.168.122.7	B1
IP	Public IP	Netmask	Gateway	Interface															
10.10.3.30	10.10.3.30	255.255.255.0	10.10.3.1	A1															
192.168.122.57	192.168.122.57	255.255.255.128	192.168.122.7	B1															
DNS Configuration Primary DNS: 8.8.8.8 Secondary DNS: 10.10.7.100 DNS Location: DMZ DNS Client IP: 192.168.122.57		Management IP(s) IP: 10.10.2.55																	

7.2. Global Profiles

When selected, Global Profiles allows for configuration of parameters across all Avaya SBCE appliances.

7.2.1. Server Interworking - Avaya

Server Interworking allows you to configure and manage various SIP call server-specific capabilities such as call hold and T.38. From the left-hand menu select **Global Profiles** → **Server Interworking** and click on **Add Profile**.

- Enter profile name such as **CS1K** and click **Next** (Not Shown)
- Check **Hold Support=None**
- Check **T.38 Support**
- All other options on the **General** Tab can be left at default

Click on **Next** on the following screens.

The screenshot shows a configuration window titled "Profile: CS1K" with a close button (X) in the top right corner. The window contains a "General" tab with various configuration options. The options and their current states are as follows:

Option	Value / State
Hold Support	<input checked="" type="radio"/> None <input type="radio"/> RFC2543 - c=0.0.0.0 <input type="radio"/> RFC3264 - a=sendonly
180 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
181 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
182 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
183 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
Refer Handling	<input type="checkbox"/>
URI Group	None (dropdown menu)
3xx Handling	<input type="checkbox"/>
Diversion Header Support	<input type="checkbox"/>
Delayed SDP Handling	<input type="checkbox"/>
Re-Invite Handling	<input type="checkbox"/>
T.38 Support	<input checked="" type="checkbox"/>
URI Scheme	<input checked="" type="radio"/> SIP <input type="radio"/> TEL <input type="radio"/> ANY
Via Header Format	<input checked="" type="radio"/> RFC3261 <input type="radio"/> RFC2543

At the bottom right of the window is a "Next" button.

Default values can be used for the **Advanced Settings** window. Click **Finish**

Profile: CS1K X

Record Routes	<input type="radio"/> None <input type="radio"/> Single Side <input checked="" type="radio"/> Both Sides
Topology Hiding: Change Call-ID	<input type="checkbox"/>
Call-Info NAT	<input type="checkbox"/>
Change Max Forwards	<input checked="" type="checkbox"/>
Include End Point IP for Context Lookup	<input type="checkbox"/>
OCS Extensions	<input type="checkbox"/>
AVAYA Extensions	<input type="checkbox"/>
NORTEL Extensions	<input type="checkbox"/>
Diversion Manipulation	<input type="checkbox"/>
Diversion Header URI	<input type="text"/>
Metaswitch Extensions	<input type="checkbox"/>
Reset on Talk Spurt	<input type="checkbox"/>
Reset SRTP Context on Session Refresh	<input type="checkbox"/>
Has Remote SBC	<input checked="" type="checkbox"/>
Route Response on Via Port	<input type="checkbox"/>
Cisco Extensions	<input type="checkbox"/>

Finish

7.2.2. Server Interworking – Eircom

Server Interworking allows you to configure and manage various SIP call server-specific capabilities such as call hold and T.38. From the left-hand menu select **Global Profiles** → **Server Interworking** and click on **Add Profile**.

- Enter profile name such as **Eircom** and click **Next** (Not Shown)
- Check **Hold Support** = **None**
- Check **T.38 Support**
- All other options on the **General** Tab can be left at default

Click on **Next** on the following screens.

The screenshot shows a configuration window titled "Profile: Eircom" with a close button (X) in the top right corner. The window displays the "General" tab for configuring SIP server interworking settings. The settings are as follows:

Setting	Value
Hold Support	<input checked="" type="radio"/> None <input type="radio"/> RFC2543 - c=0.0.0.0 <input type="radio"/> RFC3264 - a=sendonly
180 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
181 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
182 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
183 Handling	<input checked="" type="radio"/> None <input type="radio"/> SDP <input type="radio"/> No SDP
Refer Handling	<input type="checkbox"/>
URI Group	None (dropdown menu)
3xx Handling	<input type="checkbox"/>
Diversion Header Support	<input type="checkbox"/>
Delayed SDP Handling	<input type="checkbox"/>
Re-Invite Handling	<input type="checkbox"/>
T.38 Support	<input checked="" type="checkbox"/>
URI Scheme	<input checked="" type="radio"/> SIP <input type="radio"/> TEL <input type="radio"/> ANY
Via Header Format	<input checked="" type="radio"/> RFC3261 <input type="radio"/> RFC2543

At the bottom right of the window is a "Next" button.

Default values can be used for the **Advanced Settings** window. Click **Finish**.

Profile: Eircom	
Record Routes	<input checked="" type="radio"/> None <input type="radio"/> Single Side <input type="radio"/> Both Sides
Topology Hiding: Change Call-ID	<input type="checkbox"/>
Call-Info NAT	<input type="checkbox"/>
Change Max Forwards	<input checked="" type="checkbox"/>
Include End Point IP for Context Lookup	<input type="checkbox"/>
OCS Extensions	<input type="checkbox"/>
AVAYA Extensions	<input type="checkbox"/>
NORTEL Extensions	<input type="checkbox"/>
Diversion Manipulation	<input type="checkbox"/>
Diversion Header URI	<input type="text"/>
Metaswitch Extensions	<input type="checkbox"/>
Reset on Talk Spurt	<input type="checkbox"/>
Reset SRTP Context on Session Refresh	<input type="checkbox"/>
Has Remote SBC	<input checked="" type="checkbox"/>
Route Response on Via Port	<input type="checkbox"/>
Cisco Extensions	<input type="checkbox"/>
<input type="button" value="Finish"/>	

7.2.3. Routing

Routing profiles define a specific set of packet routing criteria that are used in conjunction with other types of domain policies to identify a particular call flow and thereby ascertain which security features will be applied to those packets. Parameters defined by Routing Profiles include packet transport settings, name server addresses and resolution methods, next hop routing information, and packet transport types.

Routing information is required for routing to CS1000E on the internal side and the Eircom address on the external side. The IP addresses and ports defined here will be used as the destination addresses for signalling. If no port is specified in the **Next Hop IP Address**, default 5060 is used.

Create a Routing Profile for both CS1000E and Eircom SIP trunk. To add a routing profile, navigate to **Global Profiles → Routing** and select **Add Profile**. Enter a **Profile Name** and click **Next** to continue.

In the new window that appears, enter the following values. Use default values for all remaining fields:

- **URI Group:** Select “*” from the drop down box
- **Next Hop Server 1:** Enter the Domain Name or IP address of the Primary Next Hop server
- **Next Hop Server 2:** (Optional) Enter the Domain Name or IP address of the secondary Next Hop server
- **Routing Priority Based on Next Hop Server:** Checked
- **Use Next Hop for In-Dialog Messages:** Select only if there is no secondary Next Hopserver
- **Outgoing Transport:** Choose the protocol used for transporting outgoing signaling packets

Click **Finish**.

The following screen shows the Routing Profile to CS1000E.

The screenshot shows the 'Routing Profiles: CS1K' configuration window. On the left, a sidebar lists 'Routing Profiles' with options 'default', 'CS1K' (highlighted), and 'Eircom'. The main area has a blue header bar with 'Click here to add a description.' and buttons 'Rename', 'Clone', and 'Delete'. Below this is a 'Routing Profile' section with an 'Add' button. A table lists the profile details:

Priority	URI Group	Next Hop Server 1	Next Hop Server 2	
1	*	10.10.9.20	---	View Edit

The following screen shows the Routing Profile to Eircom.

Priority	URI Group	Next Hop Server 1	Next Hop Server 2
1	*	192.168.113.172	---

7.2.4. Server Configuration– Avaya

Servers are defined for each server connected to the Avaya SBCE. In this case, Eircom is connected as the Trunk Server and CS1000E is connected as the Call Server.

The **Server Configuration** screen contains four tabs: **General**, **Authentication**, **Heartbeat**, and **Advanced**. Together, these tabs allow you to configure and manage various SIP call server-specific parameters such as TCP and UDP port assignments, IP Server type, heartbeat signaling parameters and some advanced options. From the left-hand menu, select **Global Profiles** → **Server Configuration** and click on **Add Profile** and enter a descriptive name. On the **Add Server Configuration Profile** tab, set the following:

- Select **Server Type** to be **Call Server**
- Enter **IP Addresses / Supported FQDNs** to **10.10.9.20**
- For **Supported Transports**, check **TCP**
- **TCP Port:5060**
- Click on **Next** (not shown) to use default entries on the **Authentication** and **Heartbeat** tabs

Server Type: Call Server

IP Addresses / Supported FQDNs: 10.10.9.20

Supported Transports: ☒ TCP, ☐ UDP, ☐ TLS

TCP Port: 5060

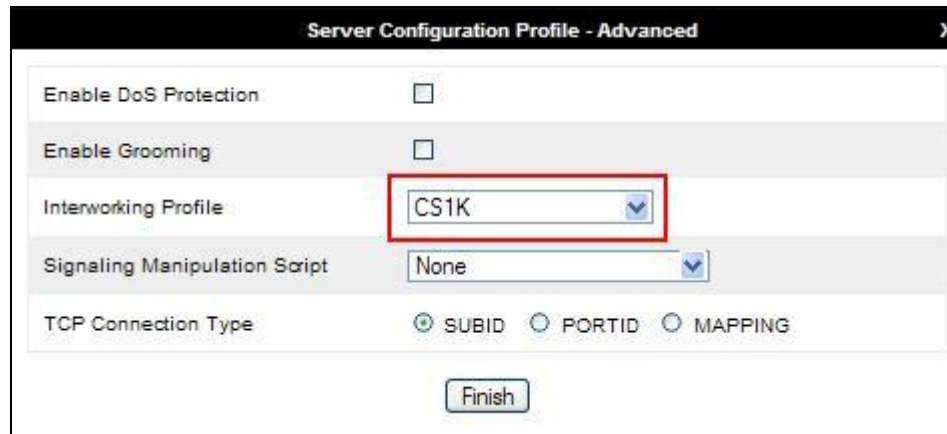
UDP Port:

TLS Port:

Finish

On the **Advanced** tab:

- Select **CS1K** for **Interworking Profile**
- Click **Finish**



Server Configuration Profile - Advanced

Enable DoS Protection ☐

Enable Grooming ☐

Interworking Profile **CS1K**

Signaling Manipulation Script **None**

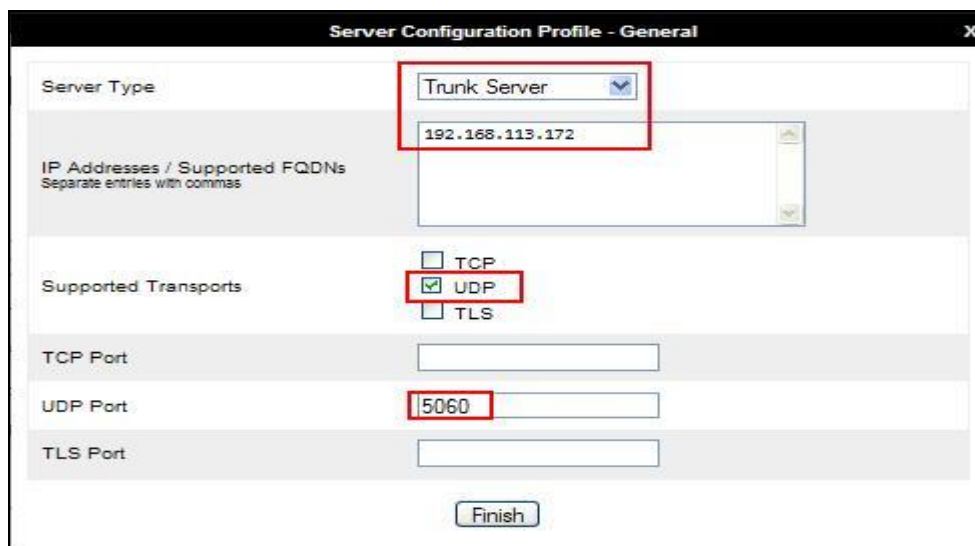
TCP Connection Type ☒ SUBID ☐ PORTID ☐ MAPPING

Finish

7.2.5. Server Configuration– Eircom

To define the Eircom Trunk Server, navigate to select **Global Profiles → Server Configuration** and click on **Add Profile** and enter a descriptive name. On the **Add Server Configuration Profile** tab, click on **Edit** and set the following:

- Select **Server Type** as **Trunk Server**
- Set **IP Address** to **192.168.113.172** (Eircom SIP Trunk)
- **Supported Transports**: Check **UDP**
- **UDP Port**: **5060**
- Hit **Next**



Server Configuration Profile - General

Server Type **Trunk Server**

IP Addresses / Supported FQDNs
Separate entries with commas
192.168.113.172

Supported Transports
☐ TCP
☒ **UDP**
☐ TLS

TCP Port

UDP Port **5060**

TLS Port

Finish

In the new window that appears, enter the following values as Eircom require authentication to connect to their network:

- **Enabled Authentication:** Checked
- **User Name:** Enter username provided by the Service Provider
- **Realm:** Enter realm details provided by the Service Provider
- **Password** Enter password provided by the Service Provider
- **Confirm Password** Re-enter password provided by the Service Provider

Click **Next** to continue.

Server Configuration Profile - Authentication

Enable Authentication ☒

User Name p0000000x_TG1@ngv.eir

Realm
(Leave blank to detect from server challenge)

Password
(Leave blank to keep existing password)

Confirm Password

Finish

In the new window that appears, enter the following values.

- **Enabled Heartbeat:** Checked
- **Method:** Select **REGISTER** from the drop-down box
- **Frequency:** Choose the desired frequency in seconds the Avaya SBCE will send SIP REGISTERS
- **From URI:** Enter an URI to be sent in the FROM header for SIP REGISTERS
- **TO URI:** Enter an URI to be sent in the TO header for SIP REGISTERS

Click **Next** to continue.

Server Configuration Profile - Heartbeat

Enable Heartbeat ☒

Method REGISTER

Frequency 300 seconds

From URI xxxxxxxxx_TG1@ngv.eir

To URI xxxxxxxxx_TG1@ngv.eir

Finish

On the **Advanced** tab:

- Select **Eircom** for **Interworking Profile**
- Select **Eircom_CS1K** script defined in **Section 7.2.7** from the Signaling Manipulation Script drop down menu
- Click **Finish**

Server Configuration Profile - Advanced

Enable DoS Protection ☐

Enable Grooming ☐

Interworking Profile Eircom

Signaling Manipulation Script Eircom_CS1K

UDP Connection Type ☒ SUBID ☐ PORTID ☐ MAPPING

Finish

7.2.6. Topology Hiding

Topology hiding is used to hide local information such as private IP addresses and local domain names. The local information can be overwritten with a domain name or IP addresses. The default **Replace Action** is **Auto**, this replaces local information with IP addresses, generally the next hop. Topology hiding has the advantage of presenting single Via and Record-Route headers externally where multiple headers may be received from the enterprise. In some cases where Topology Hiding can't be applied, in particular the Contact header, IP addresses are translated to the Avaya SBCE external addresses using NAT.

To define Topology Hiding for the CS1000E, navigate to **Global Profiles → Topology Hiding** from the menu on the left-hand side. Click on **Add** and enter details in the **Topology Hiding Profile** pop-up menu (not shown).

- In the **Profile Name** field enter a descriptive name such as **CS1K** and click **Next**
- Under the **Header** field for **To**, **From** and **Request Line**, select **IP/Domain** under **Criteria** and **Overwrite** under **Replace Action**. For Overwrite value, insert **avaya.com**.
- Click **Finish** (not shown)

The screenshot shows the 'Topology Hiding Profiles: CS1K' configuration page. On the left, a sidebar lists 'Topology Hiding Profiles' with options: 'default', 'cisco_th_profile', 'CS1K' (highlighted in red), and 'Eircom'. The main area has a blue header bar with 'Click here to add a description.' and buttons for 'Add', 'Rename', 'Clone', and 'Delete'. Below the header is a table titled 'Topology Hiding' with columns for Header, Criteria, Replace Action, and Value. The table contains the following data:

Header	Criteria	Replace Action	Value
Refer-To	IP/Domain	Auto	---
Via	IP/Domain	Auto	---
Request-Line	IP/Domain	Overwrite	avaya.com
To	IP/Domain	Overwrite	avaya.com
From	IP/Domain	Overwrite	avaya.com
SDP	IP/Domain	Auto	---
Referred-By	IP/Domain	Auto	---
Record-Route	IP/Domain	Auto	---

An 'Edit' button is located at the bottom right of the table.

To define Topology Hiding for the Eircom, navigate to **Global Profiles → Topology Hiding** from the menu on the left hand side. Click on **Add** and enter details in the **Topology Hiding Profile** pop-up menu (not shown).

- Enter a descriptive Profile Name such as **Eircom**
- Under the **Header** field for **To**, **From** and **Request Line**, select **IP/Domain** under **Criteria** and **Overwrite** under **Replace Action**. For Overwrite value, insert **ngv.eircom.net**
- Click **Finish** (not shown)

Header	Criteria	Replace Action	Overwrite Value
Request-Line	IP/Domain	Overwrite	ngv.eircom.net
Record-Route	IP/Domain	Auto	---
SDP	IP/Domain	Auto	---
Refer-To	IP/Domain	Auto	---
From	IP/Domain	Overwrite	ngv.eircom.net
Referred-By	IP/Domain	Auto	---
To	IP/Domain	Overwrite	ngv.eircom.net
Via	IP/Domain	Auto	---

7.2.7. Signaling Manipulation

The Signaling Manipulation feature allows the ability to add, change and delete any of the headers in a SIP message. This feature will add the ability to configure such manipulation in a highly flexible manner using a proprietary scripting language called SigMa. The SigMa scripting language is designed to express any of the SIP header manipulation operations to be done by the Avaya SBCE. Using this language, a script can be written and associated with a particular Server Configuration (**Section 7.2.5**). The Avaya SBCE then interprets this script at the given entry point.

To define the signalling manipulation to delete the first line of information from the History-Info Headers and remove the additional media and unused headers from the Invite, navigate to **Global Profiles → Signaling Manipulation** in the main menu on the left hand side. Click on **Add**. In the compliance test, a SigMa script named **Eircom_CS1K** was created and applied to Server Configuration for **Eircom** in **Section 7.2.5**. The script text is displayed below.

SIP INVITE message from Eircom contains the “+” sign in front of the number. The “+353” needs to be removed in order for inbound calls to route to the CS1000E successfully. The script below is to remove the “+353” and replace it with a “0” for calling and called numbers for inbound calls in the Request Line, From, To, Contact and P-Asserted-Identity headers. This changes the numbering format from E.164 to national on inbound calls.

The statement **act on message where %DIRECTION="Outbound"and %Entry_Point="POST_ROUTING"** is to specify the script will take effect on all type of messages for outbound calls from the CS1000E and the manipulation will be done on the header of the INVITE message to remove unwanted headers on outbound calls.

```
within session "ALL"
{
  act on message where %DIRECTION="INBOUND" and %ENTRY_POINT="AFTER_NETWORK"
  {
    %HEADERS["Request_Line"][1].URI.USER.regex_replace("(\\+353)","0");
    %HEADERS["From"][1].URI.USER.regex_replace("(\\+353)","0");
    %HEADERS["To"][1].URI.USER.regex_replace("(\\+353)","0");
    %HEADERS["Contact"][1].URI.USER.regex_replace("(\\+353)","0");
    %HEADERS["P-Asserted-Identity"][1].URI.USER.regex_replace("(\\+353)","0");
  }
  act on request where %DIRECTION="OUTBOUND" and %ENTRY_POINT="POST_ROUTING"
  {
    // Remove unwanted Headers
    remove(%HEADERS["Alert-Info"][1]);
    remove(%HEADERS["x-nt-el64-clid"][1]);
    remove(%HEADERS["P-AV-Message-Id"][1]);
    remove(%HEADERS["P-Charging-Vector"][1]);
    remove(%HEADERS["Av-Global-Session-ID"][1]);
    remove(%HEADERS["Remote-Address"][1]);
    remove(%HEADERS["P-Location"][1]);

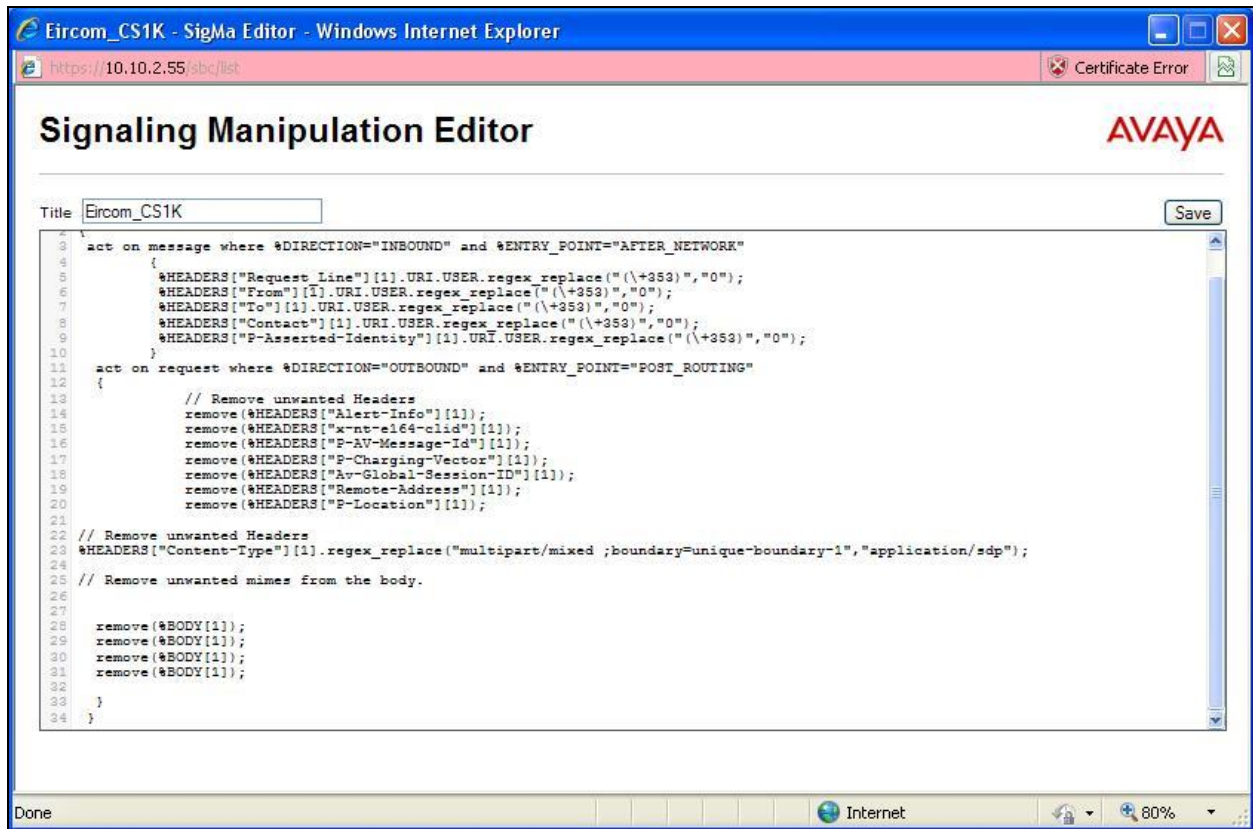
    // Remove unwanted Headers
    %HEADERS["Content-Type"][1].regex_replace("multipart/mixed ;boundary=unique-boundary-1","application/sdp");

    // Remove unwanted mimes from the body.

    remove(%BODY[1]);
    remove(%BODY[1]);
    remove(%BODY[1]);
    remove(%BODY[1]);

  }
}
```

Once entered and saved, the script appears as shown in the following screenshot



7.3. Define Network Information

Network information is required on the Avaya SBCE to allocate IP addresses and masks to the interfaces. Note that only the **A1** and **B1** interfaces are used, typically the **A1** interface is used for the internal side and **B1** is used for external. Each side of the Avaya SBCE can have only one interface assigned.

To define the network information, navigate to **Device Specific Settings → Network Management** from the menu on the left-hand side and click on **Add IP**. Enter details in the blank box that appears at the end of the list

- Define the internal IP address with screening mask and assign to interface **A1**.
- Select **Save Changes** to save the information.
- Click on **Add IP**.
- Define the external IP address with screening mask and assign to interface **B1**.
- Select **Save Changes** to save the information.
- Click on **System Management** in the main menu.
- Select **Restart Application** indicated by an icon in the status bar (not shown).

Network Management: GSSCP_03

Devices: GSSCP_03

Network Configuration | Interface Configuration

Modifications or deletions of an IP address or its associated data require an application restart before taking effect. Application restarts can be issued from System Management.

Changes will not take effect until the interface is updated.

A1 Netmask: 255.255.255.0 A2 Netmask: B1 Netmask: 255.255.255.128 B2 Netmask:

[Add] [Save] [Clear]

IP Address	Public IP	Gateway	Interface	
10.10.3.30		10.10.3.1	A1	Delete
192.168.122.57		192.168.122.7	B1	Delete

Select the **Interface Configuration** tab and click on **Toggle State** to enable the interfaces.

Network Management: GSSCP_03

Devices: GSSCP_03

Network Configuration | Interface Configuration

Name	Administrative Status	
A1	Enabled	Toggle
A2	Disabled	Toggle
B1	Enabled	Toggle
B2	Disabled	Toggle

7.4. Define Interfaces

When the IP addresses and masks are assigned to the interfaces, these are then configured as signalling and media interfaces.

7.4.1. Signalling Interfaces

The Signalling Interface screen allows the IP address and ports to be set for transporting signaling messages over the SIP trunk. The Avaya SBCE listens for SIP requests on the defined ports. Create a Signaling Interface for both the inside and outside IP interfaces. To create a new Signaling Interface, navigate to **Device Specific Settings → Signaling Interface** and click **Add**.

- **Name: Int_Sig**
- **Signaling IP: 10.10.3.30** (Internal address for calls toward CS1000E)
- **TCP Port: 5060**
- **UDP Port: 5060**
- Click **Finish**
- Select **Add**
- **Name: Ext_Sig**
- **Signaling IP: 192.168.122.57** (External address for calls toward Eircom)
- **UDP Port: 5060**
- Click **Finish**

The following screen shows the signaling interfaces created in the sample configuration for the inside and outside IP interfaces.

Name	Signaling IP	TCP Port	UDP Port	TLS Port	TLS Profile		
Int_Sig	10.10.3.30	5060	5060	---	None	Edit	Delete
Ext_Sig	192.168.122.57	5060	5060	---	None	Edit	Delete

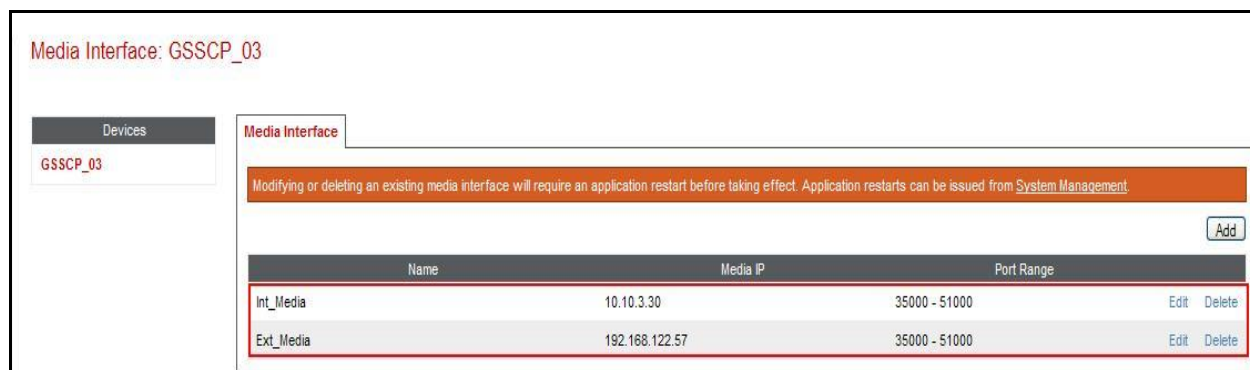
7.4.2. Media Interfaces

The Media Interface screen allows the IP address and ports to be set for transporting Media over the SIP trunk. The Avaya SBCE listens for SIP media on the defined ports.

To create a new Media Interface, navigate to **Device Specific Settings → Media Interface**.

- Select **Add**
- **Name: Int_Media**
- **Media IP: 10.10.3.30** (Internal address for calls toward CS1000E)
- **Port Range: 35000-51000**
- Click **Finish**
- Select **Add**
- **Name: Ext_Media**
- **Media IP: 192.168.122.57** (External address for calls toward Eircom)
- **Port Range: 35000-51000**
- Click **Finish**

The following screen shows the Media Interfaces created in the sample configuration for the inside and outside IP interfaces.



Media Interface: GSSCP_03

Devices

GSSCP_03

Media Interface

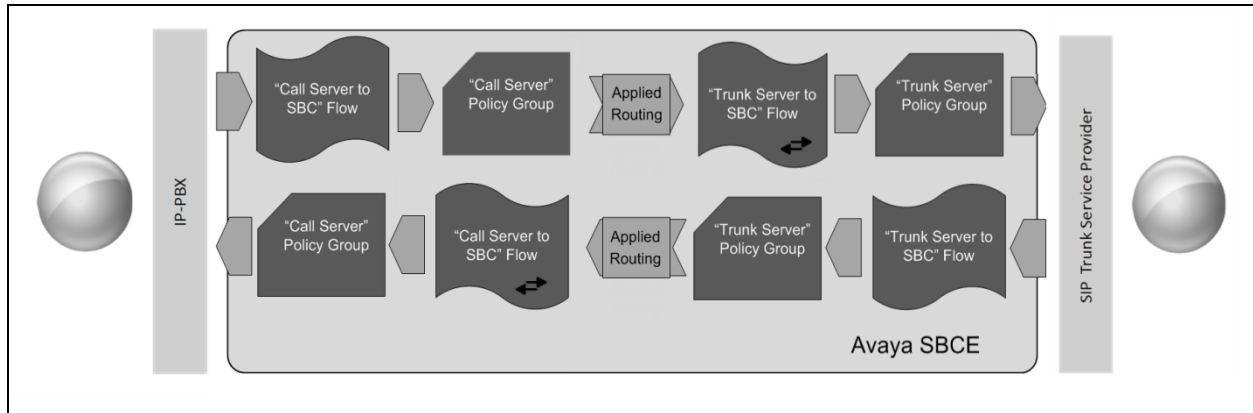
Modifying or deleting an existing media interface will require an application restart before taking effect. Application restarts can be issued from [System Management](#).

Add

Name	Media IP	Port Range	Edit	Delete
Int_Media	10.10.3.30	35000 - 51000	Edit	Delete
Ext_Media	192.168.122.57	35000 - 51000	Edit	Delete

7.5. Server Flows

When a packet is received by the Avaya SBCE, the content of the packet (IP addresses, URIs, etc.) is used to determine which flow it matches. Once the flow is determined, the flow points to a policy which contains several rules concerning processing, privileges, authentication, routing, etc. Once routing is applied and the destination endpoint is determined, the policies for this destination endpoint are applied. The context is maintained, so as to be applied to future packets in the same flow. The following screen illustrates the flow through the Avaya SBCE to secure a SIP Trunk call.



To create a Server Flow, navigate to **Device Specific Settings → End Point Flows**. Select the **Server Flows** tab and click **Add Flow**.

- **Flow Name:** Enter a descriptive name
- **Server Configuration:** Select a Server Configuration created in **Section 7.2.4** and **7.2.5** and assign to the Flow
- **Received Interface:** Select the Signaling Interface the Server Configuration is allowed to receive SIP messages from
- **Signaling Interface:** Select the Signaling Interface used to communicate with the Server Configuration
- **Media Interface:** Select the Media Interface used to communicate with the Server Configuration
- **End Point Policy Group:** Select the policy assigned to the Server Configuration
- **Routing Profile:** Select the profile the Server Configuration will use to route SIP messages
- **Topology Hiding Profile:** Select the profile to apply toward the Server Configuration

Click **Finish** to save and exit.

The following screen shows the Server Flow for CS1000E.

Profile: CS1K

General

Hold Support: ☒ None ☐ RFC2543 - c=0.0.0.0 ☐ RFC3264 - a=sendonly

180 Handling: ☒ None ☐ SDP ☐ No SDP

181 Handling: ☒ None ☐ SDP ☐ No SDP

182 Handling: ☒ None ☐ SDP ☐ No SDP

183 Handling: ☒ None ☐ SDP ☐ No SDP

Refer Handling: ☐

URI Group:

3xx Handling: ☐

Diversion Header Support: ☐

Delayed SDP Handling: ☐

Re-Invite Handling: ☐

T.38 Support: ☒

URI Scheme: ☒ SIP ☐ TEL ☐ ANY

Via Header Format: ☒ RFC3261 ☐ RFC2543

Next

The following screen shows the Server Flow for Eircom.

Flow: Trunk_Server

Flow Name:

Server Configuration:

URI Group:

Transport:

Remote Subnet:

Received Interface:

Signaling Interface:

Media Interface:

End Point Policy Group:

Routing Profile:

Topology Hiding Profile:

File Transfer Profile:

Finish

This configuration ties all the previously entered information together so that calls can be routed from CS1000E to Eircom SIP Trunk service and vice versa. The following screenshot shows all configured flows.

End Point Flows: GSSCP_03

Devices

GSSCP_03

Subscriber Flows

Server Flows

Add

Hover over a row to see its description.

Server Configuration: CS1K

Priority	Flow Name	URI Group	Received Interface	Signaling Interface	End Point Policy Group	Routing Profile	
1	Call_Server	*	Ext_Sig	Int_Sig	default-low	Eircom	View Clone Edit Delete

Server Configuration: Eircom

Priority	Flow Name	URI Group	Received Interface	Signaling Interface	End Point Policy Group	Routing Profile	
1	Trunk_Server	*	Int_Sig	Ext_Sig	default-low	CS1K	View Clone Edit Delete

8. Eircom Configuration

The configuration of the Eircom equipment used to support the Eircom SIP Trunk service is outside of the scope of these Application Notes and will not be covered. To obtain further information on Eircom equipment and system configuration, please contact an authorized Eircom representative.

9. Verification Steps

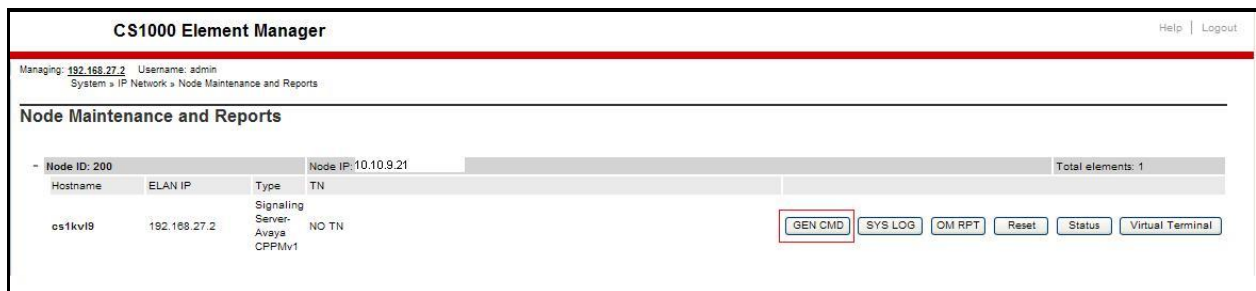
This section provides verification steps that may be performed in the field to verify that the solution is configured properly.

9.1. Avaya Communication Server 1000E Verification

This section illustrates sample verifications that may be performed using the Avaya CS1000E Element Manager GUI.

9.1.1. IP Network Maintenance and Reports Commands

From Element Manager, navigate to **System → IP Network → Maintenance and Reports** as shown below. In the resultant screen on the right, click the **Gen CMD** button.



The **General Commands** page is displayed. A variety of commands are available by selecting an appropriate Group and Command from the drop-down menus, and selecting **Run**.

To check the status of the SIP Gateway to Avaya SBCE in the sample configuration, select **Sip** from the Group menu and **SIPGwShow** from the **Command** menu. Click **Run**. The example output below shows that Avaya SBCE has **SIPNPM Status “Active”**.

Managing: 192.168.27.2 Username: admin
System > IP Network > Node Maintenance and Reports > General Commands

General Commands

Element IP : 192.168.27.2 Element Type : Signaling Server-Avaya CPPMv1

Group: **Sip** Command: **SIPGwShow** Sip: **Sip** **RUN**

IP address: 192.168.27.2 Number of pings: 3 **PING**

```

SIPGWM Status : Active
Primary Proxy IP address : 10.10.3.55
Primary Proxy port : 5060
Primary Proxy Transport : TCP
Secondary Proxy IP address : 0.0.0.0
Secondary Proxy port : 5060
Secondary Proxy Transport : TCP
Primary Proxy2 IP address : 10.10.3.55
Primary Proxy2 port : 5060
Primary Proxy2 Transport : TCP
Active Proxy : Primary :Register Not Supported
Time To Next Registration : 0 Seconds
Channels Busy / Idle / Total : 0 / 34 / 34
Stack version : 5.5.0.13
TLS Security Policy : Security Disabled
  
```

The following screen shows a means to view registered SIP telephones. The screen shows the output of the **Command sigSetShowAll** in **Group SipLine**.

Managing: 192.168.27.2 Username: admin
System > IP Network > Node Maintenance and Reports > General Commands

General Commands

Element IP : 192.168.27.2 Element Type : Signaling Server-Avaya CPPMv1

Group: **SipLine** Command: **sigSetShowAll** **RUN**

IP address: 192.168.27.2 Number of pings: 3 **PING**

UserID	AuthId	TN	Clients	Calls	SetHandle	Pos ID	SIPL Type
----- IPv4 Endpoints -----							
6003	6003	100-00-03-03	1	0	0x91e82d0		SIP Lines
6002	6002	100-00-03-02	1	0	0x91c4158		SIP Lines
Total User Registered = 2 V4 Registered = 2 V6 Registered = 0							

The following screen shows a means to view IP UNISTim telephones. The screen shows the output of the **Command isetShow** in **Group Iset**.

Managing: 192.168.27.2 Username: admin
System > IP Network > Node Maintenance and Reports > General Commands

General Commands

Element IP : 192.168.27.2 Element Type : Signaling Server-Avaya CPPMv1

Group: **Iset** Command: **isetShow** Range: 0 500 **RUN**

IP address: 192.168.27.2 Number of pings: 3 **PING**

IP Address	NAT	Model Name	Type	RegType	State	Up
10.10.9.200	1230	IP Deskphone	1230	Regular	online	13
10.10.9.201	1140E	IP Deskphone	1140	Regular	online	13
Total sets = 2						

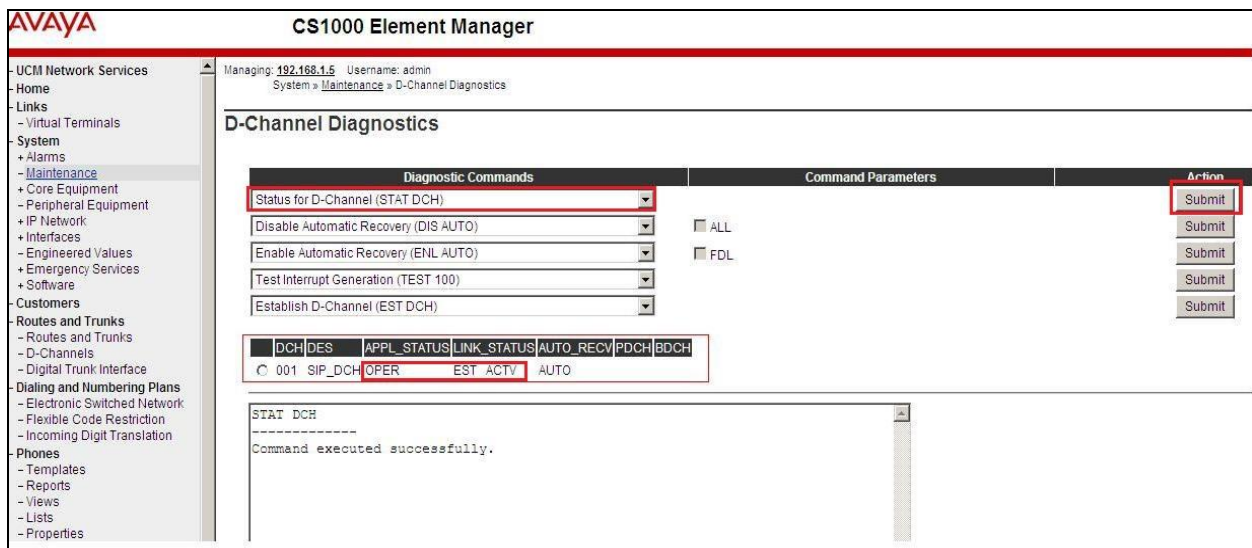
9.2. Verify Avaya Communication Server 1000E Operational Status

Expand **System** on the left navigation panel and select **Maintenance**. Select **LD 96 - D-Channel** from the **Select by Overlay** table and the **D-Channel Diagnostics** function from the **Select by Functionality** table as shown below.



Select **Status for D-Channel (STAT DCH)** command and click **Submit** to verify status of virtual D-Channel as shown below. Verify the status of the following fields.

- **APPL_STATUS** Verify status is **OPER**
- **LINK_STATUS** Verify status is **EST ACTV**

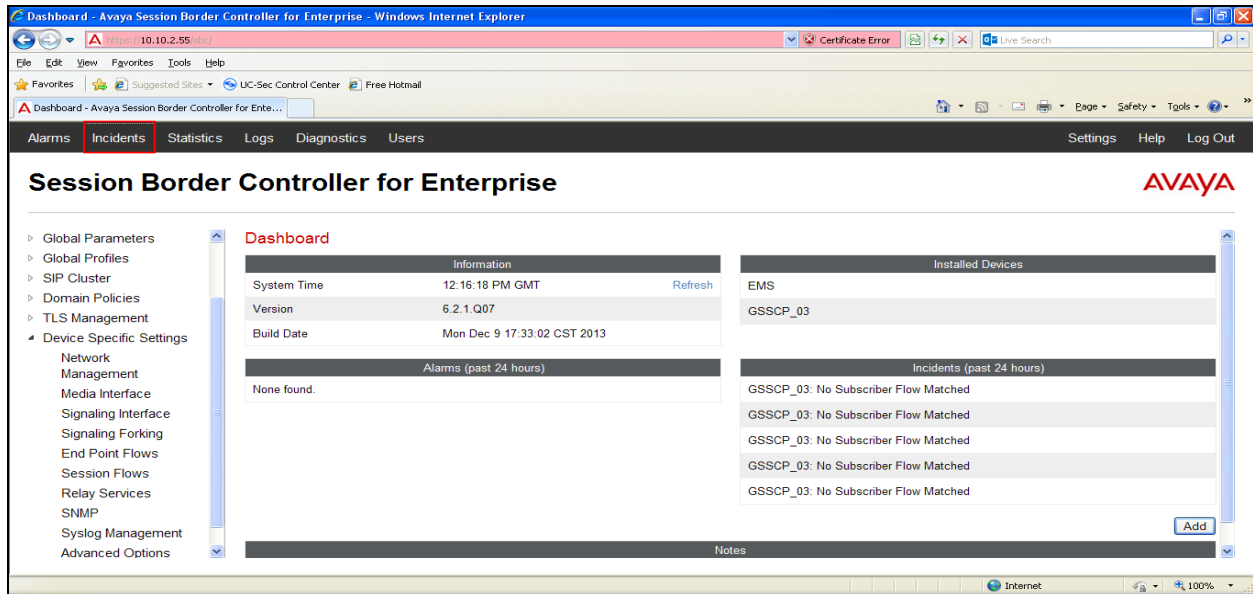


9.3. Avaya Session Boarder Controller for Enterprise Verification

This section contains verification steps that may be performed using the Avaya Session Border Controller for Enterprise.

9.3.1. Incidents

The Incidents Log Viewer display alerts captured by the Avaya SBCE. Select the **Incidents** link along the top of the screen.



The following screen shows example SIP messages that do not match a Server Flow for an incoming message.

Incident Viewer

AVAYA

DeviceAllCategoryAllClear Filters

RefreshGenerate Report

Displaying results 1 to 15 out of 603.

Type	ID	Date	Time	Category	Device	Cause
Message Dropped	706471684087078	10/10/14	12:16 PM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706471486082457	10/10/14	12:09 PM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706471368498333	10/10/14	12:05 PM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706471277221116	10/10/14	12:02 PM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706471035327165	10/10/14	11:54 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706470918622823	10/10/14	11:50 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706470766301280	10/10/14	11:45 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706470613337585	10/10/14	11:40 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706470468747359	10/10/14	11:35 AM	Policy	GSSCP_03	No Subscriber Flow Matched
ACK Message Out of Dialog	706470365826028	10/10/14	11:32 AM	Protocol Discrepancy	GSSCP_03	General Method not allowed Out-Of-Dialog
Message Dropped	706470365826010	10/10/14	11:32 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Call Denied	706470365706217	10/10/14	11:32 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Call Denied	706470347690753	10/10/14	11:31 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706470297932988	10/10/14	11:29 AM	Policy	GSSCP_03	No Subscriber Flow Matched

9.3.2. Trace Settings

The Trace Settings tool is for configuring and displaying call traces and packet captures for the Avaya SBCE.

To define the trace, navigate to **Device Specific Settings → Advanced Options → Troubleshooting → Trace** in the main menu on the left hand side and select the **Packet Capture** tab.

- Select the SIP Trunk interface from the **Interface** drop down menu
- Select the signalling interface IP address from the **Local Address** drop down menu
- Enter the IP address of the network SBC in the **Remote Address** field or enter a * to capture all traffic
- Specify the **Maximum Number of Packets to Capture**, 10000 is shown as an example
- Specify the filename of the resultant pcap file in the **Capture Filename** field

The screenshot shows the 'Packet Capture Configuration' window. On the left, a sidebar lists 'Devices' with 'GSSCP_03' selected. The main window has three tabs: 'Call Trace', 'Packet Capture' (active), and 'Captures'. The configuration fields are as follows:

Field	Value
Status	Ready
Interface	B1
Local Address (IP:Port)	192.168.122.57
Remote Address (*, *Port, IP, IP:Port)	*
Protocol	All
Maximum Number of Packets to Capture	10000
Capture Filename (Using the name of an existing capture will overwrite it.)	SIP_Trunk_Test.pcap

At the bottom are 'Start Capture' and 'Clear' buttons.

To view the trace, select the **Captures** tab and click on the relevant filename in the list of traces.

The screenshot shows the 'Captures' tab. It features a 'Refresh' button in the top right corner. Below is a table with the following data:

File Name	File Size (bytes)	Last Modified	
SIP_Trunk_Test_20140916121852.pcap	0	September 16, 2014 12:18:52 PM GMT	Delete

The trace is viewed as a standard pcap file in Wireshark. If the SIP trunk is working correctly, a SIP response in the form of a 200 OK will be seen from the Eircom network.

10. Conclusion

These Application Notes describe the configuration necessary to connect Avaya Communication Server 1000E R7.6 and Avaya Session Border Controller for Enterprise to Eircom SIP Trunk service. Eircom's SIP Trunk service is a SIP-based Voice over IP solution providing businesses a flexible, cost-saving alternative to traditional hardwired telephony trunks. The service was successfully tested with a number of observations listed in **Section 2.2**.

11. References

This section references the documentation relevant to these Application Notes. Additional Avaya product documentation is available at <http://support.avaya.com>.

- [1] *Installing and Configuring Avaya Aura® System Platform Release 6.3*
- [2] *Implementing Avaya Aura® System Manager Release 6.3*
- [3] *Upgrading Avaya Aura® System Manager to 6.3*
- [4] *Avaya Communication Server 1000E Installation and Commissioning*, Document Number NN43041-310.
- [5] *Feature Listing Reference Avaya Communication Server 1000*, Document Number NN43001-111, 05.01.
- [6] *Linux Platform Base and Applications Installation and Commissioning Avaya Communication Server 1000*, Document Number NN43001-315
- [7] *Unified Communications Management Common Servers Fundamentals Avaya Communication Server 1000*, Document Number NN43001-116
- [8] *Software Input Output Reference – Maintenance Avaya Communication Server 1000*, Document Number NN43001-711
- [9] *Signaling Server IP Line Applications Fundamentals Avaya Communication Server 1000*, Document Number NN43001-125
- [10] *SIP Software for Avaya 1100 Series IP Deskphones-Administration*, Document Number NN43170-600
- [11] *Installing Avaya Session Border Controller for Enterprise*, Release 6.2
- [12] *Upgrading Avaya Session Border Controller for Enterprise* Release 6.2
- [13] *Administering Avaya Session Border Controller for Enterprise* Release 6.2
- [14] RFC 3261 SIP: Session Initiation Protocol, <http://www.ietf.org/>

Appendix A – Communication Server 1000 Software

Communication Server 1000E call server patches and plug ins

TID: 46379

VERSION 4121

System type is - Communication Server 1000E/CPPM Linux
CPPM - Pentium M 1.4 GHz

IPMGs Registered: 1
IPMGs Unregistered: 0
IPMGs Configured/unregistered: 0

RELEASE 7

ISSUE 65 P +

IDLE_SET_DISPLAY NORTEL

DepList 1: core Issue: 01(created: 2013-05-28 04:19:50 (est))

MDP>LAST SUCCESSFUL MDP REFRESH :2013-09-12 14:50:17(Local Time)

MDP>USING DEPLIST ZIP FILE DOWNLOADED :2013-05-28 04:30:29(est)

SYSTEM HAS NO USER SELECTED PEPS IN-SERVICE

LOADWARE VERSION: PSWV 100+

INSTALLED LOADWARE PEPS : 1

PAT#	CR #	PATCH REF #	NAME	DATE	FILENAME
00	wi01057886	ISS1:1OF1	DSP2AB07	13/09/2013	DSP2AB07.LW

ENABLED PLUGINS : 2

PLUGIN	STATUS	PRS/CR_NUM	MPLR_NUM	DESCRIPTION
201	ENABLED	Q00424053	MPLR08139	PI:Cant XFER OUTG TRK TO OUTG TRK
501	ENABLED	Q02138637	MPLR30070	Enables blind transfer to a SIP endpoint even if SIP UPDATE is not supported by the far en

Communication Server 1000E call server deplists

VERSION 4121

RELEASE 7

ISSUE 65 P +

DepList 1: core Issue: 01 (created: 2013-05-28 04:19:50 (est))

IN-SERVICE PEPS

PAT#	CR #	PATCH REF #	NAME	DATE	FILENAME	SPECINS
000	wi01058359	ISS1:1OF1	p32331_1	24/04/2014	p32331_1.cpl	NO
001	wi01064599	iss1:1of1	p32580_1	24/04/2014	p32580_1.cpl	NO
002	wi01056067	ISS1:1OF1	p32457_1	24/04/2014	p32457_1.cpl	NO
003	wi01063263	ISS1:1OF1	p32573_1	24/04/2014	p32573_1.cpl	NO
004	wi01065842	ISS1:1OF1	p32478_1	24/04/2014	p32478_1.cpl	NO
005	wi01062607	ISS1:1OF1	p32503_1	24/04/2014	p32503_1.cpl	NO
006	wi01070756	ISS1:1OF1	p32444_1	24/04/2014	p32444_1.cpl	NO
007	wi01039280	ISS1:1OF1	p32423_1	24/04/2014	p32423_1.cpl	NO
008	wi01087543	ISS1:1OF1	p32662_1	24/04/2014	p32662_1.cpl	NO
009	wi00933195	ISS1:1OF1	p32491_1	24/04/2014	p32491_1.cpl	NO
010	wi01071379	ISS1:1OF1	p32522_1	24/04/2014	p32522_1.cpl	NO
011	wi01068669	ISS1:1OF1	p32333_1	24/04/2014	p32333_1.cpl	NO
012	wi01066991	ISS1:1OF1	p32449_1	24/04/2014	p32449_1.cpl	NO
013	wi01070474	iss1:1of1	p32407_1	24/04/2014	p32407_1.cpl	NO
014	WI0110261	ISS1:1OF1	p32758_1	24/04/2014	p32758_1.cpl	NO
015	wi01094305	ISS1:1OF1	p32640_1	24/04/2014	p32640_1.cpl	NO
016	wi01047890	ISS1:1OF1	p32697_1	24/04/2014	p32697_1.cpl	NO
017	wi01055300	ISS1:1OF1	p32543_1	24/04/2014	p32543_1.cpl	NO

018	wi01082456	ISS1:10F1	p32596_1	24/04/2014	p32596_1.cpl	NO
019	wi01058621	ISS1:10F1	p32339_1	24/04/2014	p32339_1.cpl	NO
020	wi01061484	ISS1:10F1	p32576_1	24/04/2014	p32576_1.cpl	NO
021	wi01078723	ISS1:10F1	p32532_1	24/04/2014	p32532_1.cpl	NO
022	wi01048457	ISS1:10F1	p32581_1	24/04/2014	p32581_1.cpl	NO
023	wi01075355	ISS1:10F1	p32594_1	24/04/2014	p32594_1.cpl	NO
024	wi01053597	ISS1:10F1	p32304_1	24/04/2014	p32304_1.cpl	NO
025	wi01045058	ISS1:10F1	p32214_1	24/04/2014	p32214_1.cpl	NO
026	wi01075359	ISS1:10F1	p32671_1	24/04/2014	p32671_1.cpl	NO
027	wi01025156	ISS1:10F1	p32136_1	24/04/2014	p32136_1.cpl	NO
028	wi01061481	ISS1:10F1	p32382_1	24/04/2014	p32382_1.cpl	NO
029	wi01035976	ISS1:10F1	p32173_1	24/04/2014	p32173_1.cpl	NO
030	wi01088775	ISS1:10F1	p32659_1	24/04/2014	p32659_1.cpl	NO
031	wi01070465	iss1:10f1	p32562_1	24/04/2014	p32562_1.cpl	NO
032	wi01088585	ISS1:10F1	p32656_1	24/04/2014	p32656_1.cpl	NO
033	wi01063864	ISS1:10F1	p32410_1	24/04/2014	p32410_1.cpl	YES
034	wi01034961	ISS1:10F1	p32144_1	24/04/2014	p32144_1.cpl	NO
035	wi01055480	ISS1:10F1	p32712_1	24/04/2014	p32712_1.cpl	NO
036	wi01034307	ISS1:10F1	p32615_1	24/04/2014	p32615_1.cpl	NO
037	wi01065118	ISS1:10F1	p32397_1	24/04/2014	p32397_1.cpl	NO
038	wi01075360	iss1:10f1	p32602_1	24/04/2014	p32602_1.cpl	NO
039	wi00884716	ISS1:10F1	p32517_1	24/04/2014	p32517_1.cpl	NO
040	wi01068851	ISS1:10F1	p32439_1	24/04/2014	p32439_1.cpl	NO
041	wi01053314	ISS1:10F1	p32555_1	24/04/2014	p32555_1.cpl	NO
042	wi01059388	iss1:10f1	p32628_1	24/04/2014	p32628_1.cpl	NO
043	wi01087528	ISS1:10F1	p32700_1	24/04/2014	p32700_1.cpl	NO
044	wi01072027	ISS1:10F1	p32689_1	24/04/2014	p32689_1.cpl	NO
045	wi01052428	ISS1:10F1	p32606_1	24/04/2014	p32606_1.cpl	NO
046	wi01053920	ISS1:10F1	p32303_1	24/04/2014	p32303_1.cpl	NO
047	wi01070468	iss1:10f1	p32418_1	24/04/2014	p32418_1.cpl	NO
048	wi01067822	ISS1:10F1	p32466_1	24/04/2014	p32466_1.cpl	YES
049	wi01060826	ISS1:10F1	p32379_1	24/04/2014	p32379_1.cpl	NO
050	wi01075352	ISS1:10F1	p32603_1	24/04/2014	p32603_1.cpl	NO
051	wi01043367	ISS1:10F1	p32232_1	24/04/2014	p32232_1.cpl	NO
052	wi01083584	ISS1:10F1	p32619_1	24/04/2014	p32619_1.cpl	NO
053	wi01060241	ISS1:10F1	p32381_1	24/04/2014	p32381_1.cpl	NO
054	wi01053195	ISS1:10F1	p32297_1	24/04/2014	p32297_1.cpl	NO
055	wi00897254	ISS1:10F1	p31127_1	24/04/2014	p31127_1.cpl	NO
056	wi01061483	ISS1:10F1	p32359_1	24/04/2014	p32359_1.cpl	NO
057	wi01085855	ISS1:10F1	p32658_1	24/04/2014	p32658_1.cpl	NO
058	wi01075353	ISS1:10F1	p32613_1	24/04/2014	p32613_1.cpl	NO
059	wi01070471	ISS1:10F1	p32415_1	24/04/2014	p32415_1.cpl	NO
060	wi01074003	ISS1:10F1	p32421_1	24/04/2014	p32421_1.cpl	NO
061	wi01060382	iss1:10f1	p32623_1	24/04/2014	p32623_1.cpl	YES
062	wi01068042	ISS1:10F1	p32669_1	24/04/2014	p32669_1.cpl	NO
063	wi01072023	ISS1:10F1	p32130_1	24/04/2014	p32130_1.cpl	YES
064	wi01065922	ISS1:10F1	p32516_1	24/04/2014	p32516_1.cpl	NO
065	wi01057403	ISS1:10F1	p32591_1	24/04/2014	p32591_1.cpl	NO
066	wi01069441	ISS1:10F1	p32097_1	24/04/2014	p32097_1.cpl	NO
067	wi01070473	ISS1:10F1	p32413_1	24/04/2014	p32413_1.cpl	NO
068	wi01056633	ISS1:10F1	p32322_1	24/04/2014	p32322_1.cpl	NO
069	wi01052968	ISS1:10F1	p32540_1	24/04/2014	p32540_1.cpl	NO
070	wi01072032	ISS1:10F1	p32448_1	24/04/2014	p32448_1.cpl	NO
071	wi01073100	ISS1:10F1	p32599_1	24/04/2014	p32599_1.cpl	NO
072	wi01035980	ISS1:10F1	p32558_1	24/04/2014	p32558_1.cpl	NO
073	wi01041453	ISS1:10F1	p32587_1	24/04/2014	p32587_1.cpl	NO
074	wi01032756	ISS1:10F1	p32673_1	24/04/2014	p32673_1.cpl	NO
075	wi01092300	ISS1:10F1	p32692_1	24/04/2014	p32692_1.cpl	NO
076	wi00996734	ISS1:10F1	p32550_1	24/04/2014	p32550_1.cpl	NO
077	wi01022599	ISS1:10F1	p32080_1	24/04/2014	p32080_1.cpl	NO
078	wi01060341	ISS1:10F1	p32578_1	24/04/2014	p32578_1.cpl	NO
079	wi01091447	ISS1:10F1	p32675_1	24/04/2014	p32675_1.cpl	NO
080	wi01070580	ISS1:10F1	p32380_1	24/04/2014	p32380_1.cpl	NO
081	wi01089519	ISS1:10F1	p32665_1	24/04/2014	p32665_1.cpl	NO
082	WI01077073	ISS1:10F1	p32534_1	24/04/2014	p32534_1.cpl	NO
083	wi01080753	ISS1:10F1	p32518_1	24/04/2014	p32518_1.cpl	NO
084	wi01065125	ISS1:10F1	p32416_1	24/04/2014	p32416_1.cpl	NO
Communication Server 1000E signaling server service updates						

In System service updates: 36

PATCH#	IN SERVICE	DATE	SPECINS	REMOVABLE	NAME
0	Yes	14/07/14	YES	YES	cs1000-csmWeb-7.65.16.22-2.i386.000
1	Yes	14/07/14	YES	YES	cs1000-linuxbase-7.65.16.23-1.i386.000
2	Yes	02/04/14	YES	yes	tzdata-2013c-2.el5.i386.001
3	Yes	14/07/14	NO	YES	cs1000-Jboss-Quantum-7.65.16.22-8.i386.000
4	Yes	14/07/14	YES	YES	cs1000-patchWeb-7.65.16.22-4.i386.000
5	Yes	14/07/14	YES	YES	cs1000-dmWeb-7.65.16.22-6.i386.000
6	Yes	27/09/13	NO	yes	cs1000-cs1000WebService_6-0-7.65.16.21-00.i386.000
7	Yes	14/07/14	YES	YES	cs1000-csoneksvrmgr-7.65.16.22-5.i386.000
8	Yes	27/09/13	NO	YES	cs1000-pd-7.65.16.21-00.i386.000
9	Yes	27/09/13	NO	YES	cs1000-shared-carrdtct-7.65.16.21-01.i386.000
10	Yes	27/09/13	NO	YES	cs1000-shared-tpselect-7.65.16.21-01.i386.000
11	Yes	14/07/14	YES	YES	cs1000-baseWeb-7.65.16.22-4.i386.000
12	Yes	27/09/13	NO	yes	cs1000-dbcom-7.65.16.21-00.i386.000
13	Yes	14/07/14	YES	YES	cs1000-bcc-7.65.16.22-14.i386.000
15	Yes	02/04/14	YES	YES	cs1000-cs-7.65.P.100-02.i386.000
23	Yes	02/04/14	NO	YES	cs1000-shared-omm-7.65.16.21-2.i386.000
25	Yes	14/07/14	YES	YES	cs1000-ftrpkg-7.65.16.22-2.i386.000
27	Yes	14/07/14	YES	YES	cs1000-oam-logging-7.65.16.22-4.i386.000
30	Yes	02/10/13	NO	YES	cs1000-snmp-7.65.16.21-00.i686.000
31	Yes	14/07/14	YES	YES	cs1000-csv-7.65.16.22-2.i386.000
32	Yes	14/07/14	YES	YES	cs1000-tps-7.65.16.22-8.i386.000
33	Yes	14/07/14	YES	YES	cs1000-nrsm-7.65.16.22-3.i386.000
34	Yes	14/07/14	YES	YES	cs1000-mscTone-7.65.16.22-2.i386.000
35	Yes	14/07/14	YES	YES	cs1000-mscMusc-7.65.16.22-4.i386.000
36	Yes	14/07/14	YES	YES	cs1000-mscConf-7.65.16.22-2.i386.000
38	Yes	02/04/14	YES	YES	cs1000-emWebLocal 6-0-7.65.16.22-1.i386.000
40	Yes	02/04/14	YES	YES	cs1000-ipsec-7.65.16.22-1.i386.000
42	Yes	02/04/14	NO	YES	cs1000-cppmUtil-7.65.16.22-1.i686.000
47	Yes	14/07/14	YES	YES	cs1000-mscAnnc-7.65.16.22-2.i386.000
48	Yes	14/07/14	YES	YES	cs1000-mscAttn-7.65.16.22-2.i386.000
49	Yes	14/07/14	NO	YES	cs1000-gk-7.65.16.22-1.i386.000
50	Yes	14/07/14	YES	YES	cs1000-emWeb 6-0-7.65.16.22-9.i386.000
51	Yes	14/07/14	NO	YES	cs1000-sps-7.65.16.22-3.i386.000
52	Yes	14/07/14	YES	YES	cs1000-shared-pbx-7.65.16.22-3.i386.000
53	Yes	14/07/14	YES	YES	cs1000-shared-xmsg-7.65.16.22-1.i386.000
54	Yes	14/07/14	YES	YES	cs1000-vtrk-7.65.16.22-50.i386.000

Communication Server 1000E system software

Product Release: 7.65.16.00

Base Applications

base	7.65.16	[patched]
NTAFS	7.65.16	
sm	7.65.16	
cs1000-Auth	7.65.16	
Jboss-Quantum	n/a	[patched]
cnd	7.65.16	
lhmonitor	7.65.16	
baseAppUtils	7.65.16	
dfoTools	7.65.16	
cppmUtil	n/a	[patched]
oam-logging	n/a	[patched]
dmWeb	n/a	[patched]
baseWeb	n/a	[patched]
ipsec	n/a	[patched]
Snmp-Daemon-TrapLib	n/a	[patched]
ISECSH	7.65.16	
patchWeb	n/a	[patched]
EmCentralLogic	7.65.16	

Application configuration: CS+SS+NRS+EM

Packages:

CS+SS+NRS+EM

Configuration version: 7.65.16-00

cs	7.65.16	[patched]
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dbcom	7.65.16.21	[patched]
cslogin	7.65.16	
sigServerShare	7.65.16	[patched]
csv	7.65.16	[patched]
tps	7.65.16	[patched]
vtrk	7.65.16	[patched]
pd	7.65.16.21	[patched]
sps	7.65.16	[patched]
nsc	7.65.16	
gk	7.65.16	[patched]
nrsm	7.65.16	[patched]
nrsmWebService	7.65.16	
managedElementWebService	7.65.16	
EmConfig	7.65.16	
emWeb_6-0	7.65.16	[patched]
emWebLocal_6-0	7.65.16	[patched]
esmWeb	7.65.16	[patched]
bcc	7.65.16	[patched]
ftrpkg	7.65.16	[patched]
cs1000WebService_6-0	7.65.16	[patched]
mscAnnc	7.65.16	[patched]
mscAttn	7.65.16	[patched]
mscConf	7.65.16	[patched]
mscMusc	7.65.16	[patched]
mscTone	7.65.16	[patched]

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