



Application Notes for Configuring Avaya Communication Server 1000 R7.6 with Avaya Aura[®] Session Manager R6.3 and Avaya Session Border Controller for Enterprise R6.2 to support BT Ireland 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 BT Ireland SIP Trunk service. The Avaya solution consists of Avaya Aura[®] Session Manager and Avaya Communication Server 1000 connected to an Avaya Session Border Controller for Enterprise. BT Ireland is a member of the Global SIP Service Provider program.

Readers should pay attention to **Section 2**, in particular the scope of testing as outlined in **Section 2.1** as well as the observations noted in **Section 2.2**, to ensure that their own use cases are adequately covered by this scope and results.

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 BT Ireland SIP Trunk service. The Avaya solution consists of Avaya Aura[®] Session Manager, Avaya Communication Server 1000 (CS1000) and Avaya Session Border Controller for Enterprise (Avaya SBCE) connected to the BT Ireland SIP Trunk service. Customers using this Avaya SIP enabled enterprise solution with the BT Ireland 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 1000, Session Manager, and the Avaya SBCE. The enterprise site was configured to use the SIP Trunk service provided by BT Ireland, with all PSTN traffic transiting via the BT Ireland 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 BT Ireland. Incoming PSTN calls were terminated on Digital, UNISim, SIP and Analog telephones at the enterprise side.
- Outgoing calls from the enterprise site were completed via BT Ireland to PSTN telephones. Outgoing calls from the enterprise to the PSTN were made from Digital, UNISim, 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 BT Ireland SIP Trunk service with the following observations:

- The CS1000 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 CS1000, 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.
- When there were no matching codecs in the SDP offer of an outbound call, “408 Service Unavailable” response was returned from the BT Ireland network. The more commonly used response is “488 Not Acceptable Here”.
- No inbound toll free numbers were tested, however routing of inbound DDI numbers and the relevant number translation was successfully tested
- All unwanted MIME was stripped on outbound calls using the Adaptation Module in Session Manager.
- 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 BT Ireland products described in these Application Notes, please contact BT Ireland Customer Support at:

- Telephone: 1800 924 924
- Telephone: +353 1 4328846

3. Reference Configuration

Figure 1 illustrates the test configuration. The test configuration shows an Enterprise site connected to BT Ireland's SIP Trunk service. Located at the Enterprise site is an Avaya SBCE, Session Manager and CS1000. Endpoints are Avaya 1140 series IP telephones (with Unistim and SIP firmware), Avaya 1230 series IP telephones (with Unistim and SIP firmware), Avaya IP Softphones (Avaya 3456 IP Softphone, 2050 IP Softphone), 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.

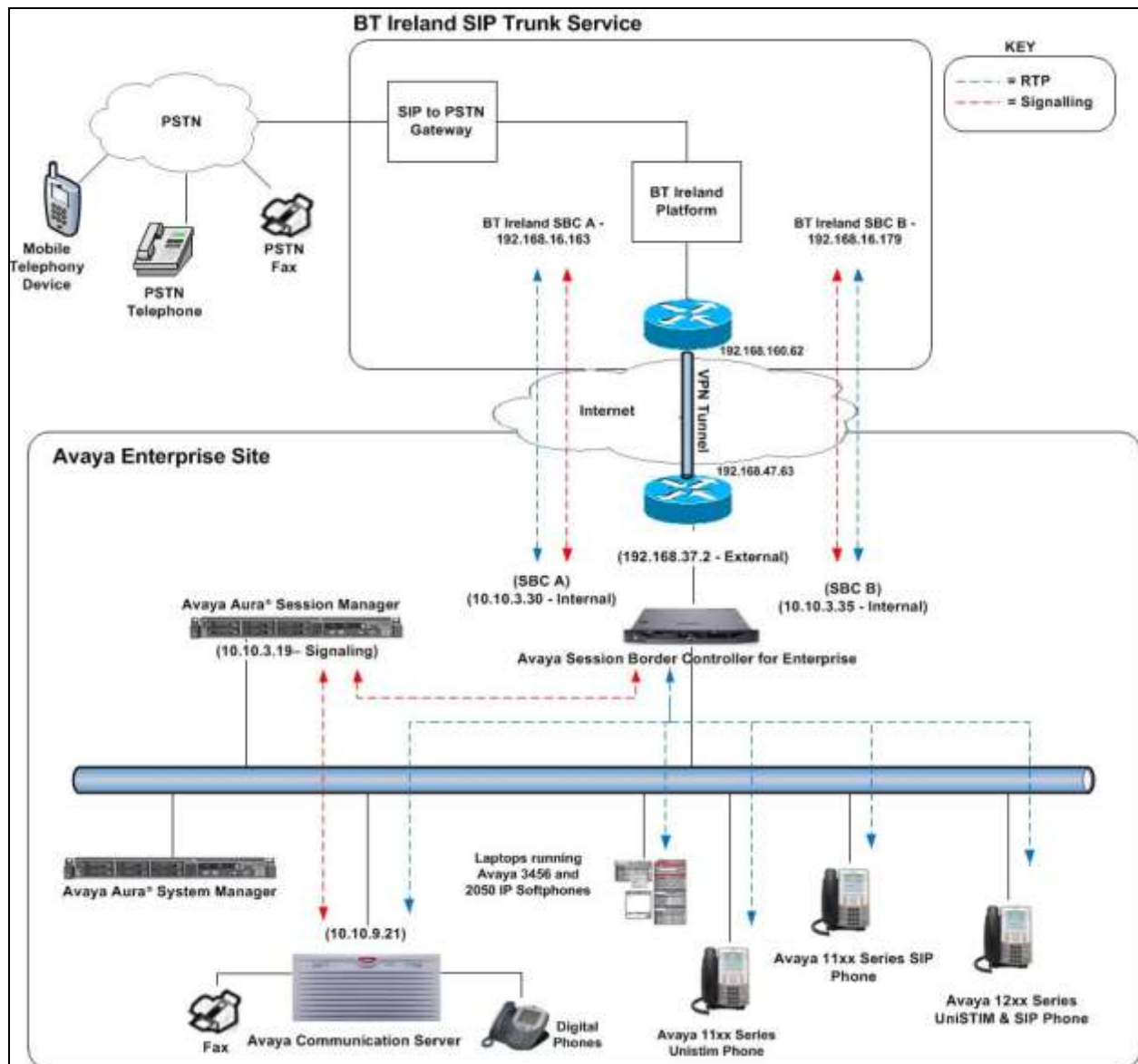


Figure 1: Test Setup BT Ireland SIP Trunk Service to Avaya Enterprise

4. Equipment and Software Validated

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

Avaya Equipment	Release/Version
Dell PowerEdge R620 running Session Manager on VM Version 8	R6.3.10 - 6.3.10.0.631008
Dell PowerEdge R620 running System Manager on VM Version 8	R6.3.10 - Build No. - 6.3.0.8.5682-6.3.8.4514 Software Update Revision No: 6.3.10.7.2656
Avaya Session Border Controller for Enterprise	Version 6.2.1.Q18
Avaya Communication Server 1000 running on CP+PM server as co-resident configuration	Avaya Communication Server 1000 R7.6 Version 7.65.P Depllist: CPL_X21_07_65P All CS1000 patches listed in Appendix A
Avaya Communication Server 1000 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 UNISlim Telephones	FW: 0625C8A
Avaya 1140e and 1230 SIP Telephones	FW: 04.04.10.00.bin
Avaya IP Softphone 3456	Version 2.6 build 53715
Avaya 2050 IP Softphone	Release 4.3.0081
Avaya Analogue Telephone	N/A
Avaya M3904 Digital Telephone	N/A
BT Ireland Equipment	Release/Version
BT Ireland SIP Trunk	Genband Q20 SBC R.8.3.2.0 Genband Experius Call Server R.17.0.18.3

5. Configure Avaya Communication Server 1000

This section describes the steps required to configure Communication Server 1000 for SIP Trunking and also the basic configuration for telephones (analog, SIP and IP phones). SIP trunks are established between CS1000 and Session Manager. SIP trunks are also established between Session Manager and the Avaya SBCE private interface. The Avaya SBCE public interface connects to the BT Ireland's SIP trunks. Incoming PSTN calls from the BT Ireland SIP Trunk service traverse the Avaya SBCE and are directed to Session Manager, which directs the calls to CS1000 (see **Figure 1**).

When a SIP message arrives at CS1000, further incoming call treatment, such as incoming digit translations and class of service restrictions may be performed. All outgoing calls to the PSTN are processed within CS1000 and may be first subject to outbound features such as route selection, digit manipulation and class of service restrictions. When CS1000 selects a SIP trunk for outgoing PSTN calls, SIP signalling is directed to Session Manager. Session Manager directs the outbound SIP messages to the Avaya SBCE private interface. The Avaya SBCE public interface manages outgoing SIP sessions onwards to BT Ireland's SIP trunks.

Specific CS1000 configuration was performed using Element Manager and the system terminal interface. The general installation of the CS1000, System Manager, Session Manager 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.

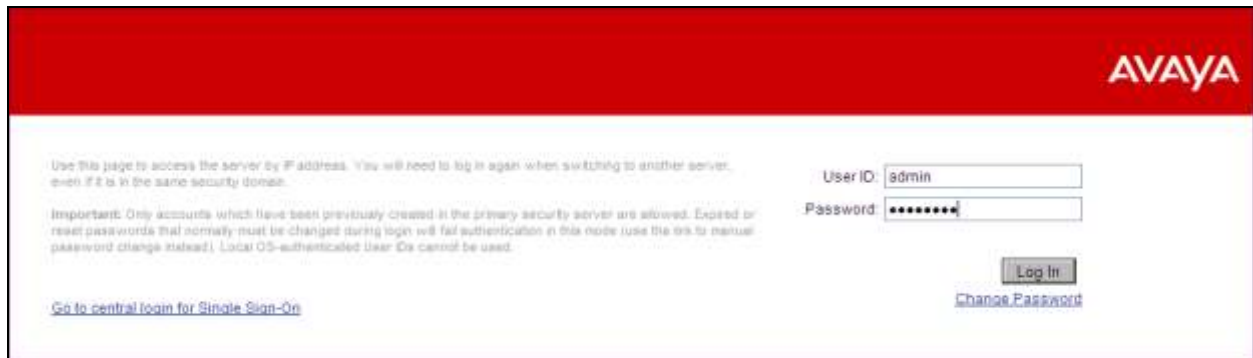
5.1. Logging into the Avaya Communication Server 1000

Configuration on the CS1000 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 CS1000. 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.

Go to central login for Single Sign-On

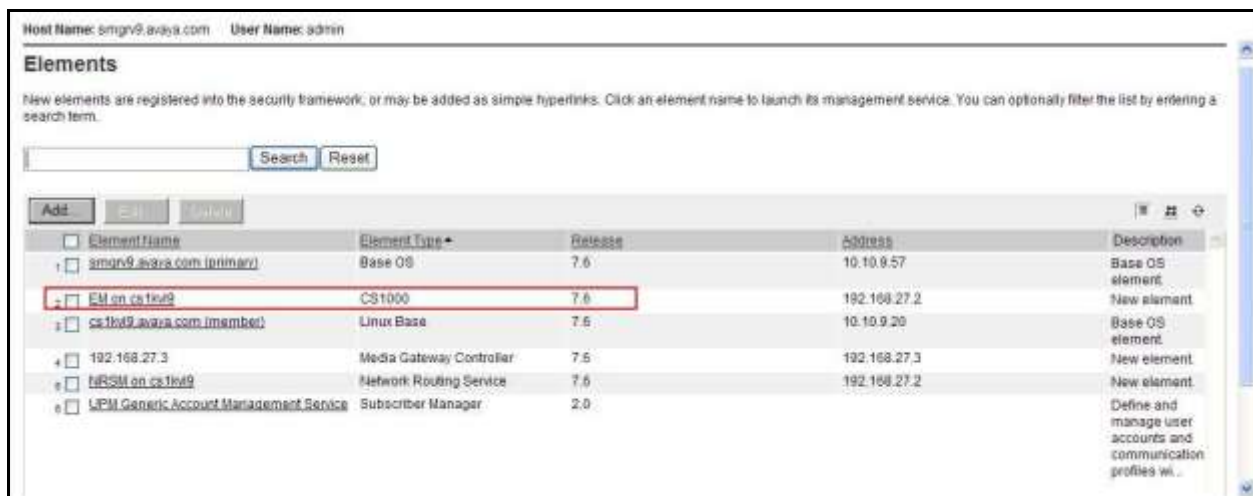
User ID: admin

Password: *****

Log In

Change Password

The Avaya Unified Communications Management **Elements** page will be used for configuration. Click on the Element Name corresponding to CS1000 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 registered elements. The table has columns for 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

Element Name	Element Type	Release	Address	Description
smgrv9.avaya.com (primary)	Base OS	7.6	10.10.9.57	Base OS element
EM on cs1kv19	CS1000	7.6	192.168.27.2	New element
cs1kv19.avaya.com (member)	Unix Base	7.6	10.10.9.20	Base OS element
192.168.27.3	Media Gateway Controller	7.6	192.168.27.3	New element
hRSM on cs1kv19	Network Routing Service	7.6	192.168.27.2	New element
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 CS1000 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 BT Ireland 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 CS1000.

System type is - Communication Server 1000/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

BT Ireland's SIP Trunk service supports G.711A and G.729 voice codecs. Using the CS1000 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 CS1000 **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

Voice Codecs

Codec G711: ☒ Enabled (required)

Voice payload size: 20 (milliseconds per frame)

Voice playout (jitter buffer) delay: 40 (Nominal) 80 (Maximum) (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 Codecs | 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 CS1000 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. This is also where the SIP trunk connection is made to Session Manager. When an entity link is added in Session Manager for the CS1000, it is the Node IPv4 address that is used (see **Section 6.5** – Define SIP Entities for more details).

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: 200 * (0-9999)

Call server IP address: 192.168.27.2 *

TLAN address type: ☒ IPv4 only
☐ IPv4 and IPv6

Embedded LAN (ELAN)
Gateway IP address: 192.168.27.1 *
Subnet mask: 255.255.255.0 *

Telephony LAN (TLAN)
Node IPv4 address: 10.10.9.21 *
Subnet mask: 255.255.255.0 *

Node IPv6 address:

IP Telephony Node Properties

- [Voice Gateway \(VGW\) and Codecs](#)
- [Quality of Service \(QoS\)](#)
- [LAN](#)
- [SNTP](#)
- [Numbering Zones](#)
- [MCDN Alternative Routing Treatment \(MALT\) Causes](#)

Applications (click to edit configuration)

- [SIP Line](#)
- [Terminal Proxy Server \(TPS\)](#)
- [Gateway \(SIPGw\)](#)
- [Personal Directories \(PD\)](#)
- [Presence Publisher](#)
- [IP Media Services](#)

* Required Value.

SaveCancel

CMN; Reviewed:
SPOC 6/9/2015

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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 Session Manager; 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 network a Session Manager is used so any value can be put in here and will not be 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 Security Module IP address of Session Manager. The **Transport protocol** used for **SIP**, in this case is **TCP**
- **SIP URI Map: Public E.164 domain names - National and Subscriber** 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

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"/>	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" value="UnknownUnknown"/>

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	Location Name	Reserved BY Block Size
1 1	1000000	BQ	1000000	BQ	SHARED	VTRK			0
2 2	1000000	BQ	1000000	BQ	SHARED	MO			0

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 0144	6000		
2 0144	6001		
3 0144	6003		
4 0144	6005		
5 0144	6500		
6 0144	6007		

5.7. Configure SIP Trunks

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

- Configure a D-Channel Handler (**DCH**); configure using the CS1000 system terminal and overlay 17
- Configure a SIP trunk Route Data Block (**RDB**); configure using the CS1000 system terminal and overlay 16
- Configure SIP trunk members; configure using the CS1000 system terminal and overlay 14
- Configure a Digit Manipulation Data Block (**DGT**), configure using the CS1000 system terminal and overlay 86
- Configure a Route List Block (**RLB**); configure using the CS1000 system terminal and overlay 86
- Configure Co-ordinated Dialling Plan(s) (**CDP**); configure using the CS1000 system terminal and overlay 87

The following is an example DCH configuration for SIP trunks. Load **Overlay 17** at the CS1000 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
OVLN NO
OVLS NO
```


Next, configure the SIP trunk Route Data Block (RDB) using the CS1000 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 CS1000 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 BT Ireland 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 CS1000 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 BT Ireland 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 BT Ireland 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 HBTD 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 CCBF 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 1000 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 CS1000 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---
```

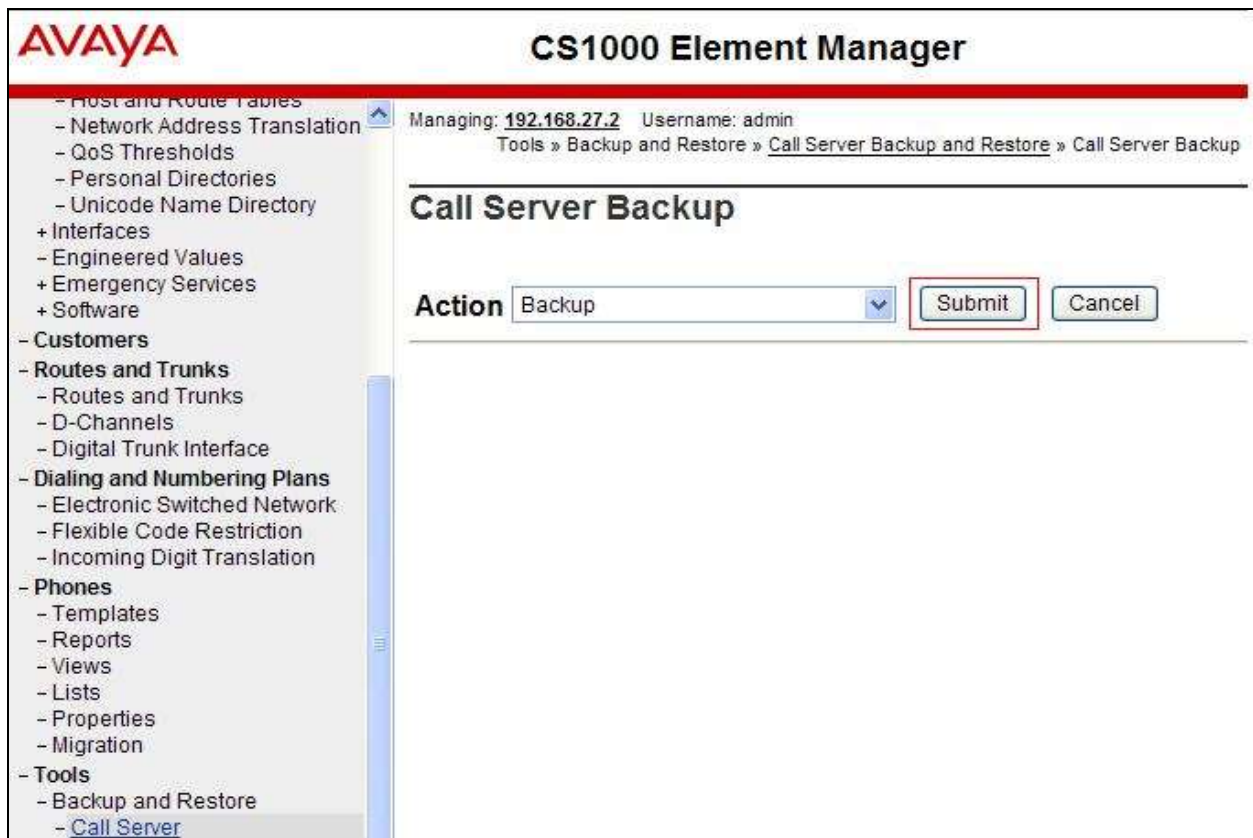
---continued from previous page---

```
UDI RCC HBTB 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 user 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', and 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 1000 is complete.

6. Configuring Avaya Aura® Session Manager

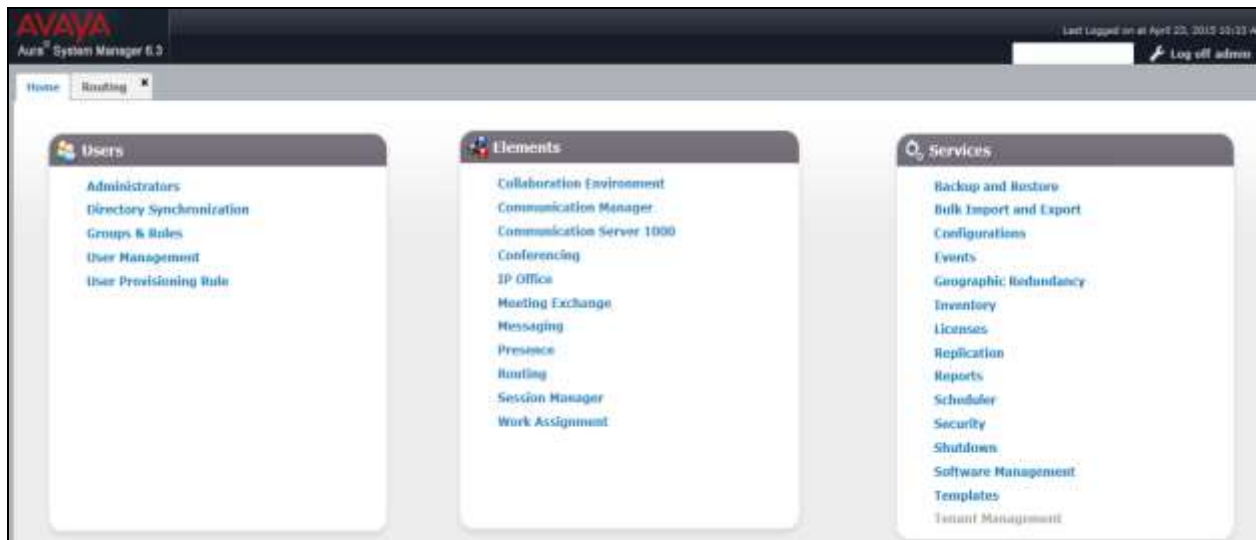
This section provides the procedures for configuring Session Manager. Session Manager is configured via System Manager. The procedures include the following areas:

- Log in to Avaya Aura® System Manager.
- Administer SIP Domain.
- Administer SIP Location.
- Administer Adaptations.
- Administer SIP Entities.
- Administer Entity Links.
- Administer Routing Policies.
- Administer Dial Patterns.

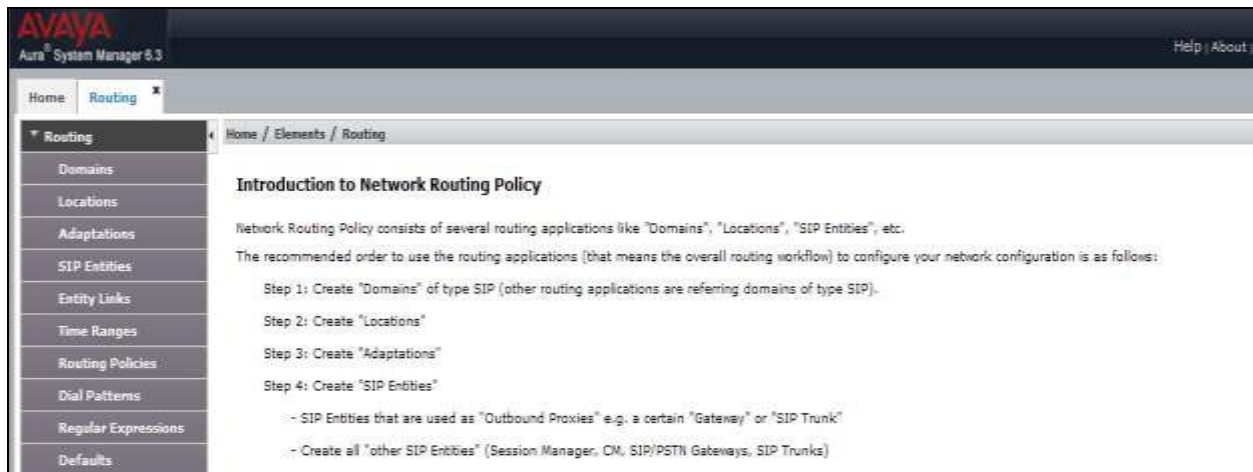
It may not be necessary to create all the items above when creating a connection to the service provider since some of these items would have already been defined as part of the initial Session Manager installation. This includes items such as certain SIP domains, locations, SIP entities, and Session Manager itself. However, each item should be reviewed to verify the configuration.

6.1. Log in to Avaya Aura® System Manager

Access the System Manager using a Web Browser by entering **http://<FQDN>/SMGR**, where **<FQDN>** is the fully qualified domain name of System Manager. Log in using appropriate credentials (not shown) and the **Home** tab will be presented with menu options shown below.



Most of the configuration items are performed in the Routing Element. Click on **Routing** in the Elements column shown above to bring up the Introduction to Network Routing Policy screen.



6.2. Administer SIP Domain

Create a SIP domain for each domain for which Session Manager will need to be aware in order to route calls. Expand **Elements** → **Routing** and select **Domains** from the left navigation menu, click **New** (not shown). Enter the following values and use default values for remaining fields.

- **Name** Enter a Domain Name. In the sample configuration, **avaya.com** was used.
- **Type** Verify **SIP** is selected.
- **Notes** Add a brief description [Optional].

Click **Commit** to save. The screen below shows the SIP Domain defined for the sample configuration.



6.3. Administer Locations

Locations can be used to identify logical and/or physical locations where SIP Entities reside for purposes of bandwidth management and call admission control. To add a location, navigate to **Routing → Locations** in the left-hand navigation pane and click the **New** button in the right pane (not shown). In the **General** section, enter the following values. Use default values for all remaining fields:

- **Name:** Enter a descriptive name for the location.
- **Notes:** Add a brief description (optional).

The Location Pattern is used to identify call routing based on IP address. Session Manager matches the IP address against the patterns defined in this section. If a call is from a SIP Entity that does not match the IP address pattern then Session Manager uses the location administered for the SIP Entity. In the **Location Pattern** section, click **Add** and enter the following values.

- **IP Address Pattern** Enter the logical pattern used to identify the location.
- **Notes** Add a brief description [Optional].

Click **Commit** to save. The screenshot below shows the Location **VM_SMGR** defined for the compliance testing.

The screenshot displays the Avaya Session Manager Administration console. The top navigation bar shows 'Home / Elements / Routing / Locations'. The main content area is divided into two sections: 'Location Details' and 'Location Pattern'.

Location Details

- General**:
 - Name:** VM_SMGR
 - Notes:** (empty text area)
- Dial Plan Transparency in Survivable Mode**:
 - Enabled:** ☐
 - Listed Directory Number:** (empty text field)
 - Associated CM SIP Entity:** (empty dropdown menu)
- Overall Managed Bandwidth**:
 - Managed Bandwidth Units:** Kbit/sec
 - Total Bandwidth:** (empty text field)
 - Multimedia Bandwidth:** (empty text field)
 - Audio Calls Can Take Multimedia Bandwidth:** ☒

Location Pattern

Below the 'Location Pattern' section, there is a table with columns for 'IP Address Pattern' and 'Notes'. The table contains several rows with IP address patterns like '10.10.2.*', '10.10.3.*', '10.10.5.*', '10.10.7.*', '10.10.8.*', and '10.10.9.*'. The 'Notes' column is empty for all rows.

At the bottom of the console, there are 'Commit' and 'Cancel' buttons.

6.4. Administer Adaptations

Adaptations can be used to modify the called and calling party numbers to meet the requirements of the service. The called party number present in the SIP INVITE Request URI is modified by the **Digit Conversion** in the Adaptation. The example below was applied to the Avaya SBCE SIP Entity and was used in test to convert numbers being passed between the Avaya SBCE and Session Manager.

To add an adaptation, under the **Routing** tab select **Adaptations** on the left hand menu and then click on the **New** button (not shown). Under **Adaptation Details** → **General**:

- In the **Adaptation Name** field enter an informative name.
- In the **Module Name** field click on the down arrow and then select the **<click to add module>** entry from the drop down list and type **DigitConversionAdapter** in the resulting **New Module Name** field.
- **Module parameter** **MIME=no** Strips MIME message bodies on egress from Session Manager
fromto=true Modifies from and to headers of a message

Home / Elements / Routing / Adaptations

Adaptation Details

Commit Cancel

General

* Adaptation Name: BT_Ireland

Module Name: DigitConversionAdapter

Module Parameter Type: Name-Value Parameter

Add Remove

Name	Value
fromto	true
MIME	no

Select : All, None

Egress URI Parameters:

Notes:

Scroll down the page and under **Digit Conversion for Incoming Calls to SM**, click the **Add** button and specify the digit manipulation to be performed as follows:

- Enter the leading digits that will be matched in the Matching Pattern field.
- In the **Min** and **Max** fields set the minimum and maximum digits allowed in the digit string to be matched.
- In the **Delete Digits** field enter the number of leading digits to be removed.
- In the **Insert Digits** field specify the digits to be prefixed to the digit string.
- In the **Address to modify** field specify the digits to manipulate by the adaptation. In this configuration the dialed number is the target so **both** have been selected.

Digit Conversion for Incoming Calls to SM

Add Remove

1 Item Filter: Enable

<input type="checkbox"/>	Matching Pattern	Min	Max	Phone Context	Delete Digits	Insert Digits	Address to modify	Adaptation Data	Notes
<input type="checkbox"/>	*+353	*4	*16		*4	0	both		

Select: All, None

This will ensure any incoming numbers will have the + 353 digits removed and 0 digit inserted before being presented to the Communication Server 1000.

6.5. Administer SIP Entities

A SIP Entity must be added for each SIP-based telephony system, supported by a SIP connection to Session Manager. To add a SIP Entity, select **SIP Entities** on the left panel menu and then click on the **New** button (not shown). The following will need to be entered for each SIP Entity.

Under **General**:

- In the **Name** field enter an informative name.
- In the **FQDN or IP Address** field enter the IP address of Session Manager or the signalling interface on the connecting system.
- In the **Type** field use **Session Manager** for a Session Manager SIP entity, **Other** for a Communication Server 1000 SIP entity and **SIP Trunk** for the Avaya SBCE SIP entity.
- In the **Adaptation** field (not available for Session Manager SIP Entity), select the appropriate Adaptation from the drop down menu.
- In the **Location** field select the appropriate location from the drop down menu.
- In the **Time Zone** field enter the time zone for the SIP Entity.

In this configuration there are three SIP Entities:

- Session Manager SIP Entity
- Communication Server 1000 SIP Entity
- Avaya SBCE SIP Entity

6.5.1. Avaya Aura® Session Manager SIP Entity

The following screens show the SIP entity for Session Manager. The **FQDN or IP Address** field is set to the IP address of Session Manager SIP signaling interface. Set the location to that defined in **Section 6.3** and the **Time Zone** to the appropriate time zone.

The screenshot shows the 'SIP Entity Details' form in a web application. The breadcrumb trail at the top is 'Home / Elements / Routing / SIP Entities'. The 'General' tab is selected. The form contains the following fields:

- Name:** Session_Manager
- FQDN or IP Address:** 10.10.3.19
- Type:** Session Manager (dropdown menu)
- Notes:** (empty text area)
- Location:** VM_SMGR (dropdown menu)
- Outbound Proxy:** (empty dropdown menu)
- Time Zone:** Europe/Dublin (dropdown menu)
- Credential name:** (empty text area)

At the bottom, there is a 'SIP Link Monitoring' section with a dropdown menu set to 'Use Session Manager Configuration'. Buttons for 'Commit', 'Cancel', and 'Help ?' are located at the top right of the form area.

Session Manager must be configured with the port numbers on the protocols that will be used by the other SIP entities. To configure these scroll to the bottom of the page and under **Port**, click **Add**, then edit the fields in the resulting new row.

- In the **Port** field enter the port number on which the system listens for SIP requests
- In the **Protocol** field enter the transport protocol to be used for SIP requests
- In the **Default Domain** field, from the drop down menu select **avaya.com** as the default domain

Port configuration interface showing a table with 3 items. The table has columns: Port, Protocol, Default Domain, and Notes. The rows show ports 5060, 5061, and 5062, all using TCP, UDP, and TLS protocols respectively, with the default domain set to avaya.com.

Port	Protocol	Default Domain	Notes
5060	TCP	avaya.com	
5061	UDP	avaya.com	
5062	TLS	avaya.com	

6.5.2. Avaya Communication Server 1000 SIP Entity

The following screen shows the SIP entity for Communication Server 1000. The **FQDN or IP Address** field is set to the Node IP address of the interface on CS1000 that will be providing SIP signalling as shown in **Section 5.4**. Set the location to that defined in **Section 6.3** and the **Time Zone** to the appropriate time zone.

SIP Entity Details configuration page. The General tab is selected. Fields include Name (CS1K_7.6), FQDN or IP Address (10.10.9.21), Type (Other), Location (VM_SMGR), Time Zone (Europe/Dublin), SIP Timer B/F (4), Credential name, Call Detail Recording (none), CominProfile Type Preference, Loop Detection Node (OFF), and SIP Link Monitoring (Use Session Manager Configuration).

6.5.3. Avaya Session Border Controller for Enterprise SIP Entity

The following screen shows the SIP entity for the Avaya SBCE used for routing calls. The **FQDN or IP Address** field is set to the IP address of the private interfaces administered in **Section 7** of this document. Set the location to that defined in **Section 6.3**, set **Adaptation** to one created in **Section 6.4** and the **Time Zone** to the appropriate time zone.

Home / Elements / Routing / SIP Entities

SIP Entity Details

General

Name: AvayaSBCE

FQDN or IP Address: loadbalance.avaya.com

Type: SIP Trunk

Notes:

Adaptation: BT_Ireland

Location: VM_SMGR

Time Zone: Europe/Dublin

SIP Timer B/F (in seconds): 4

Credential name:

Call Detail Recording: egress

Loop Detection Mode: Off

SIP Link Monitoring: Use Session Manager Configuration

6.6. Administer Entity Links

A SIP trunk between Session Manager and another system is described by an Entity Link. To add an Entity Link, select **Entity Links** on the left panel menu and click on the **New** button (not shown). Fill in the following fields in the new row that is displayed.

- In the **Name** field enter an informative name.
- In the **SIP Entity 1** field select **Session Manager**.
- In the **Protocol** field enter the transport protocol to be used to send SIP requests
- In the **Port** field enter the port number to which the other system sends its SIP requests.
- In the **SIP Entity 2** field enter the other SIP Entity for this link, created in **Section 6.5**.
- In the **Port** field enter the port number to which the other system expects to receive SIP requests.
- Select **Trusted** from the drop down menu to make the other system trusted.

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

Home / Elements / Routing / Entity Links

Entity Links

Commit Cancel

1 Item Filter: Enable

Name	SIP Entity 1	Protocol	Port	SIP Entity 2	DNS Override	Port	Connection Policy	Deny New Service	Notes
*AvayaSBCE	*Session_Manager	TCP	*5060	*AvayaSBCE	<input type="checkbox"/>	*5060	trusted	<input type="checkbox"/>	

Select : All, None

Home / Elements / Routing / Entity Links

Entity Links

Commit Cancel

1 Item Filter: Enable

Name	SIP Entity 1	Protocol	Port	SIP Entity 2	DNS Override	Port	Connection Policy	Deny New Service	Notes
*CS1K_R7.6	*Session_Manager	TCP	*5060	*CS1K_R7.6	<input type="checkbox"/>	*5060	trusted	<input type="checkbox"/>	

Select : All, None

6.7. Administer Routing Policies

Routing policies must be created to direct how calls will be routed to a system. To add a routing policy, select **Routing Policies** on the left panel menu and then click on the **New** button (not shown).

Under **General**:

- Enter an informative name in the **Name** field.
- Under **SIP Entity as Destination**, click **Select**, and then select the appropriate SIP entity to which this routing policy applies.
- Under **Time of Day**, click **Add**, and then select the time range.

The following screen shows the routing policy for Communication Server 1000:

The screenshot shows the 'Routing Policy Details' window with the following sections:

- General**: Contains fields for Name (to_CS1K_R.76), Disabled (checkbox), Retries (0), and Notes.
- SIP Entity as Destination**: Includes a 'Select' button and a table with columns Name, FQDN or IP Address, Type, and Notes. The table contains one entry: CS1K_R.7.6, 10.10.9.21, Other.
- Time of Day**: Includes buttons for Add, Remove, and View Gaps/Overlaps. Below is a table with columns for Ranking, Name, and days of the week (Mon-Sun), along with Start Time, End Time, and Notes. The table shows one item with Ranking 0, Name 24/7, and Time Range 24/7.

Name	FQDN or IP Address	Type	Notes
CS1K_R.7.6	10.10.9.21	Other	

Ranking	Name	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Notes
0	24/7								00:00	22:59	Time Range 24/7

The following screen shows the routing policy for the Avaya SBCE:

Home / Elements / Routing / Routing Policies Help ?

Routing Policy Details Commit Cancel

General

* Name:

Disabled: ☐

* Retries:

Notes:

SIP Entity as Destination

Selected

Name	FQDN or IP Address	Type	Notes
AvayaSBCE	loadbalance.avaya.com	SIP Trunk	

Time of Day

Add Remove View Gaps/Overlap

1 Item Filter: Enable

<input type="checkbox"/>	Ranking	Name	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Notes
<input type="checkbox"/>	0	24/7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00:00	23:59	Time Range 24/7

Select: All, None

6.8. Administer Dial Patterns

A dial pattern must be defined to direct calls to the appropriate telephony system. To configure a dial pattern select **Dial Patterns** on the left panel menu and then click on the **New** button (not shown).

Under **General**:

- In the **Pattern** field enter a dialed number or prefix to be matched.
- In the **Min** field enter the minimum length of the dialed number.
- In the **Max** field enter the maximum length of the dialed number.
- In the **SIP Domain** field select **-ALL-**.

Under **Originating Locations and Routing Policies**. Click **Add**, in the resulting screen (not shown) under **Originating Location** select **Locations** created in **Section 6.3** and under **Routing Policies** select one of the routing policies defined in **Section 6.7**. Click **Select** button to save (not shown).

The following screen shows an example dial pattern configured for the Avaya SBCE which will route the calls out to the PSTN via the BT Ireland SIP Trunk service.

Home / Elements / Routing / Dial Patterns

Dial Pattern Details

Commit Cancel

Help ?

General

* Pattern: 091

* Min: 3

* Max: 15

Emergency Call: ☐

Emergency Priority: 1

Emergency Type:

SIP Domain: -ALL-

Notes:

Originating Locations and Routing Policies

Add Remove

1 Item

Filter: Enable

<input type="checkbox"/>	Originating Location Name	Originating Location Notes	Routing Policy Name	Rank	Routing Policy Disabled	Routing Policy Destination	Routing Policy Notes
<input type="checkbox"/>	VM_SMGR		to_AvayaSBCE	0	<input type="checkbox"/>	AvayaSBCE	

Select : All, None

The following screen shows an example dial pattern configured for the CS1000. This dial pattern will route the calls to the CS1000 endpoints.

Home / Elements / Routing / Dial Patterns

Help ?

Dial Pattern Details

Commit Cancel

General

* Pattern: 01448

* Min: 5

* Max: 16

Emergency Call: ☐

Emergency Priority: 1

Emergency Type:

SIP Domain: ~ALL- ☒

Notes:

Originating Locations and Routing Policies

Add Remove

1 Item

Filter: Enable

<input type="checkbox"/>	Originating Location Name	Originating Location Notes	Routing Policy Name	Rank	Routing Policy <input type="checkbox"/> Disabled	Routing Policy Destination	Routing Policy Notes
<input type="checkbox"/>	VM_SMGR		to_CS1K_R76	0	<input type="checkbox"/>	CS1K_R7.6	

Selected: All, None

7. Configure Avaya Session Border Controller for Enterprise

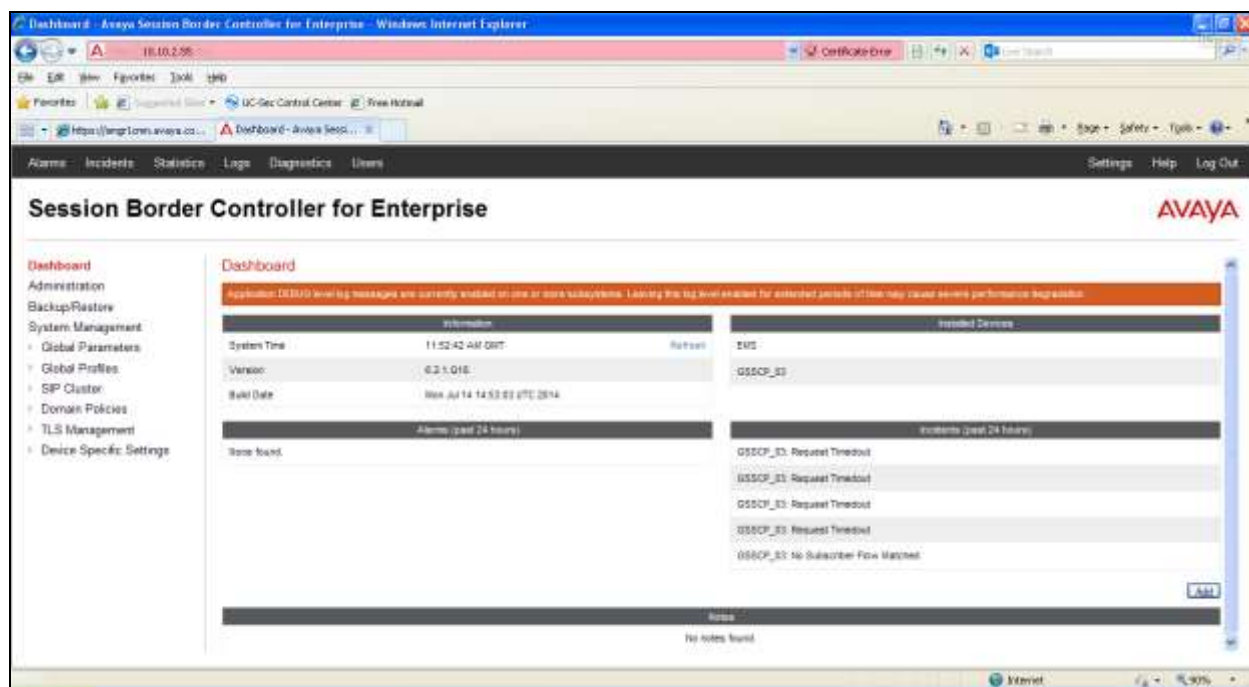
This section describes the configuration of the Avaya SBCE. The Avaya SBCE provides security and manipulation of signalling to provide an interface to the Service Provider's SIP Trunk that is standard where possible and adapted to the Service Provider's SIP implementation where necessary.

7.1. Access Avaya Session Border Controller for Enterprise

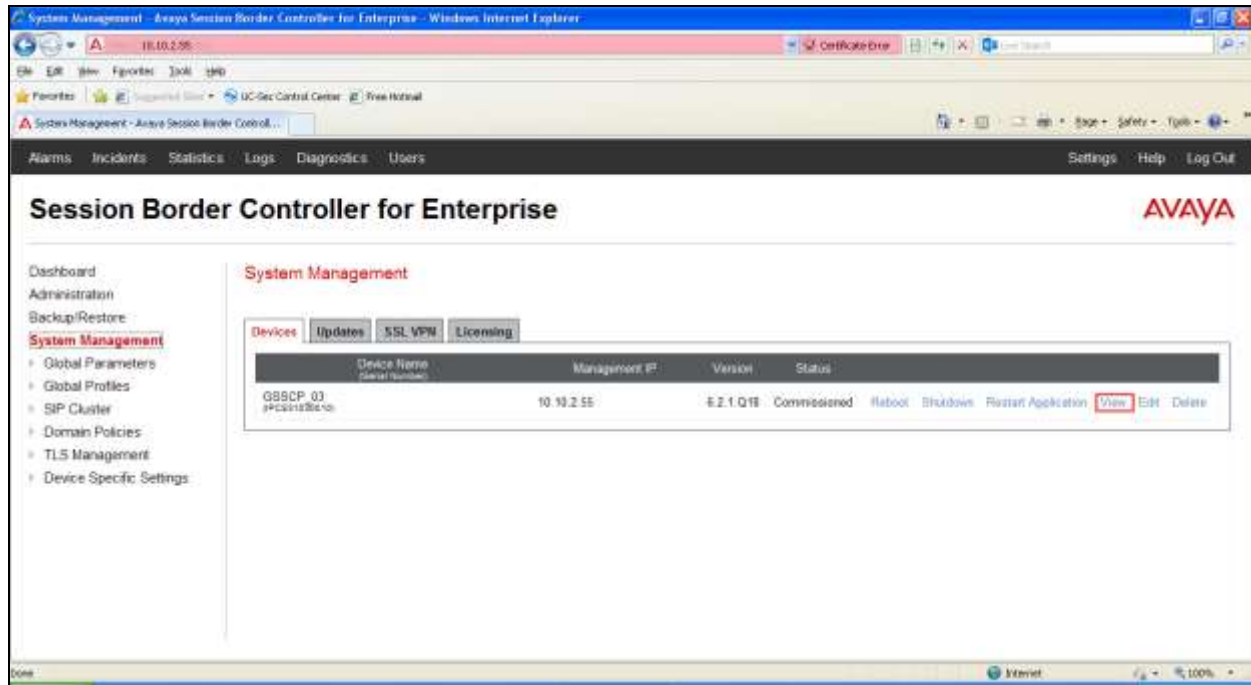
Access the Avaya SBCE using a web browser by entering the URL **https://<ip-address>**, where **<ip-address>** is the management IP address configured at installation and enter the **Username** and **Password**.



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		Device Configuration		
Appliance Name	GSSCP_03	HA Mode	No	
Box Type	SIP	Two Bypass Mode	No	
Deployment Mode	Proxy			
Network Configuration				
IP	Public IP	Netmask	Gateway	Interface
10.10.3.30	10.10.3.30	255.255.255.0	10.10.3.1	A1
192.168.37.2	192.168.37.2	255.255.255.128	192.168.37.1	B1
10.10.3.35	10.10.3.35	255.255.255.0	10.10.3.1	A1
DNS Configuration		Management IP(s)		
Primary DNS	8.8.8.8	IP	10.10.2.55	
Secondary DNS	10.10.7.100			
DNS Location	DMZ			
DNS Client IP	192.168.37.2			

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 the configuration and management of 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 **Avaya_SM** 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.

Profile: Avaya	
General	
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
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
<input type="button" value="Next"/>	

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

Profile: Avaya 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 – BT Ireland

Server Interworking allows the configuration and management of 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 **BT** 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: BT" with a close button (X) in the top right corner. The window contains a "General" tab with various 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: BT 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

7.2.3. 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 Session Manager on the internal side and BT Ireland addresses 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 Session Manager and BT Ireland 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, e.g. Session Manager.
- **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 Hop server.
- **Outgoing Transport:** Choose the protocol used for transporting outgoing signalling packets.

Click **Finish**.

The following screen shows the Routing Profile to Session Manager.



The following screen shows the Routing Profile to BT Ireland SBC A.

Routing Profiles: BT_SBC_A

Buttons: Add, Rename, Clone, Delete

Routing Profiles:

- default
- Avaya
- BT_SBC_A
- BT_SBC_B

Click here to add a description

Routing Profile

Buttons: Add

Priority	URI Group	Next Hop Server 1	Next Hop Server 2	
1	*	192.168.16.163	—	View Edit

The following screen shows the Routing Profile to BT Ireland SBC B.

Routing Profiles: BT_SBC_B

Buttons: Add, Rename, Clone, Delete

Routing Profiles:

- default
- Avaya
- BT_SBC_A
- BT_SBC_B

Click here to add a description

Routing Profile

Buttons: Add

Priority	URI Group	Next Hop Server 1	Next Hop Server 2	
1	*	62.172.16.179	—	View Edit

7.2.4. Server Configuration– Avaya Aura® Session Manager

Servers are defined for each server connected to the Avaya SBCE. In this case, BT Ireland is connected as the Trunk Server and Session Manager is connected as the Call Server.

The **Server Configuration** screen contains four tabs: **General**, **Authentication**, **Heartbeat**, and **Advanced**. Together, these tabs allow administrator to configure and manage various SIP call server-specific parameters such as TCP and UDP port assignments, IP Server type, heartbeat signalling 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 **10.10.3.19** (Session Manager IP Address).
- For **Supported Transports**, check **TCP**.
- **TCP Port: 5060**.
- Click on **Next** (not shown) to use default entries on the **Authentication** and **Heartbeat** tabs.

The screenshot displays the 'Server Configuration Profile - General' window. It contains the following fields and settings:

- Server Type:** Call Server (selected from a dropdown menu).
- IP Addresses / Supported FQDNs:** 10.10.3.19 (text input field).
- Supported Transports:** TCP (checked), UDP (unchecked), TLS (unchecked).
- TCP Port:** 5060 (text input field).
- UDP Port:** (empty text input field).
- TLS Port:** (empty text input field).
- Finish:** A button at the bottom of the window.

On the **Advanced** tab:

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

The screenshot shows a window titled "Server Configuration Profile - Advanced" with a close button (X) in the top right corner. The window contains several configuration options:

- Enable DoS Protection**: A checkbox that is currently unchecked.
- Enable Grooming**: A checkbox that is currently unchecked.
- Interworking Profile**: A dropdown menu with "Avaya" selected. This dropdown is highlighted with a red rectangular box.
- Signaling Manipulation Script**: A dropdown menu with "None" selected.
- TCP Connection Type**: Three radio buttons labeled "SUBID", "PORTID", and "MAPPING". The "SUBID" radio button is selected.

At the bottom center of the window is a button labeled "Finish".

7.2.5. Server Configuration – BT Ireland

To define the BT Ireland SBC as a Trunk Servers, navigate to select **Global Profiles** → **Server Configuration** and click on **Add** 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 **192.168.16.163** (BT Ireland SBC A)
- **Supported Transports**: Check **UDP**
- **UDP Port**: **5060**
- Hit **Next** (not shown)

Server Configuration Profile - General

Server Type: Trunk Server

IP Addresses / Supported FQDNs: 192.168.16.163

Supported Transports: ☐ TCP, ☒ UDP, ☐ TLS

TCP Port:

UDP Port: 5060

TLS Port:

Finish

In the new window that appears, enter the following values as BT Ireland 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

Realm
(Leave blank to detect from server challenge)

Password
(Leave blank to keep existing password)

Confirm Password

Finish

On the **Advanced** tab:

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

Server Configuration Profile - Advanced

Enable DoS Protection ☐

Enable Grooming ☐

Interworking Profile

Signaling Manipulation Script

UDP Connection Type ☒ SUBID ☐ PORTID ☐ MAPPING

Finish

To define the second BT Ireland SBC B as a Trunk Servers, 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 **192.168.16.179** (BT Ireland SBC B)
- **Supported Transports**: Check **UDP**
- **UDP Port**: **5060**
- Hit **Next** (not shown)

Server Configuration Profile - General

Server Type: Trunk Server

IP Addresses / Supported FQDNs
Separate entries with commas: 192.168.16.179

Supported Transports:
☐ TCP
☒ UDP
☐ TLS

TCP Port:

UDP Port: 5060

TLS Port:

Finish

In the new window that appears, enter the following values as BT Ireland 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 (not shown).

Server Configuration Profile - Authentication

Enable Authentication ☒

User Name

Realm
(Leave blank to detect from server challenge)

Password
(Leave blank to keep existing password)

Confirm Password

Finish

On the Advanced tab:

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

Server Configuration Profile - Advanced

Enable DoS Protection ☐

Enable Grooming ☐

Interworking Profile

Signaling Manipulation Script

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, particularly from Session Manager. 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 Session Manager, navigate to **Global Profiles → Topology Hiding** from 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 **Avaya_SM**.
- If the required Header is not shown, click on **Add Header**.
- 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).

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

To define Topology Hiding for BT Ireland, 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 for BT Ireland such as **BT** and click **Next**.
- If the required Header is not shown, click on **Add Header**.
- Under the **Header** field for **To**, **From** and **Request Line**, select **IP/Domain** under **Criteria** and **Auto** under **Replace Action**.
- Click **Finish** (not shown).

Topology Hiding Profiles: BT

Click here to add a description.

Topology Hiding

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

Buttons: Add, Rename, Close, Delete, Edit

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.

In the test configuration, two IP addresses were used on the internal interface so that different server flows could be assigned depending on which interface address the SIP messages were received on. These server flows were used to direct traffic to the two BT Ireland SBCs separately.

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 two internal IP address with screening mask and assign to interface **A1**
- Select **Save** to save the information
- Click on **Add IP**
- Define the external IP address with screening mask and assign to interface **B1**
- Select **Save** 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.

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
192.168.37.2		192.168.37.1	B1 Delete
10.10.3.35		10.10.3.1	A1 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	Toggle
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

To define the signalling interfaces on the Avaya SBCE, navigate to **Device Specific Settings** → **Signaling Interface** from the menu on the left hand side. Details of transport protocol and ports for the internal and external SIP signalling are entered here.

To enter details of transport protocol and ports for the SIP signalling on the internal interface to be used in the server flow for BT Ireland SBC A:

- Select **Add** and enter details of the first internal signalling interface in the pop-up menu (not shown)
- In the **Name** field enter a descriptive name for the interface
- For **Signaling IP**, select one of the **internal** signalling interface IP addresses defined in **Section 7.3**
- Select **TCP** port number, **5060** is used for the Session Manager

To enter details of transport protocol and ports for the SIP signalling on internal interface to be used in the server flow for BT Ireland SBC B:

- Select **Add** and enter details of the internal signalling interface in the pop-up menu (not shown)
- In the **Name** field enter a descriptive name for interface
- For **Signaling IP**, select the other **internal** signalling interface IP address defined in **Section 7.3**
- Select **TCP** port number, **5060** is used for the Session Manager

To enter details of the external SIP signalling:

- Select **Add** and enter details of the external signalling interface in the pop-up menu (not shown)
- In the **Name** field enter a descriptive name for the external signalling interface
- For **Signaling IP**, select an **external** signalling interface IP address defined in **Section 7.3**

Select **UDP** port number, **5060** is used for the SIP Trunk

Name	Signaling IP	TCP Port	UDP Port	TLS Port	TLS Profile	
Int_Sig_A	10.10.3.30	5060		—	None	Edit Delete
Ext_Sig	192.168.37.2	5060	5060	—	None	Edit Delete
Int_Sig_B	10.10.3.35	5060		—	None	Edit Delete

7.4.2. Media Interfaces

To define the media interfaces on the Avaya SBCE, navigate to **Device Specific Settings** → **Media Interface** from the menu on the left hand side. Details of the RTP and SRTP port ranges for the internal and external media streams are entered here. The IP addresses for media can be the same as those used for signalling.

To enter details of the media IP and RTP port range on the internal interface to be used in the server flow for BT Ireland SBC A.

- Select **Add Media Interface** and enter details in the pop-up menu
- In the **Name** field enter a descriptive name for the internal media interface
- For **Media IP**, select an **internal** media interface IP address defined in **Section 6.3**
- Select **RTP port** ranges for the media path with the enterprise end-points

To enter details of the media IP and RTP port range on the internal interface to be used in the server flow for BT Ireland SBC B.

- Select **Add Media Interface** and enter details in the pop-up menu
- In the **Name** field enter a descriptive name for the internal media interface
- For **Media IP**, select an **internal** media interface IP address defined in **Section 6.3**
- Select **RTP port** ranges for the media path with the enterprise end-points

To enter details of the media IP and RTP port range on the external interface to be used in the server flow.

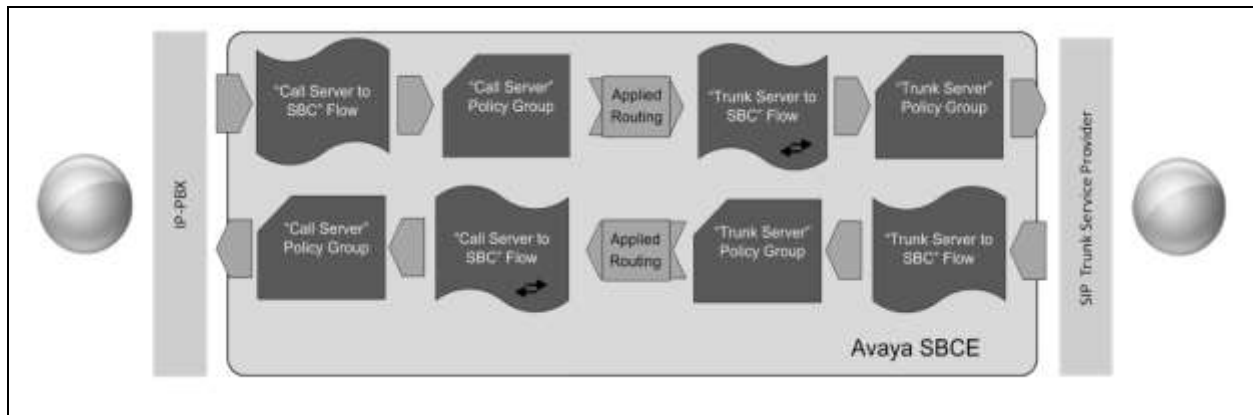
- Select **Add Media Interface** and enter details in the pop-up menu
- In the **Name** field enter a descriptive name for the external media interface
- For **Media IP**, select an **external** media interface IP address defined in **Section 6.3**
- Select **RTP port** ranges for the external media path

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

Name	Media IP	Port Range	Edit	Delete
Int_Media_A	10.10.3.30	10000-51000	Edit	Delete
Ext_Media	192.168.37.2	10000-51000	Edit	Delete
Int_Media_B	10.10.3.35	10000-51000	Edit	Delete

7.5. Server Flows

Server Flows combine the previously defined profiles into outgoing flows from Session Manager to BT Ireland's SIP Trunk and incoming flows from BT Ireland's SIP Trunk to Session Manager. This configuration ties all the previously entered information together so that signalling can be routed from Session Manager to the PSTN via the BT Ireland network and vice versa. The following screen illustrates the flow through the Avaya SBCE to secure a SIP Trunk call.



Two server flows are required for outgoing traffic and two are required for incoming. This is so that traffic can be routed to both the network SBCs and can also be received from both network SBCs. As mentioned previously, the network SBCs have been designated as BT Ireland SBC A and BT Ireland SBC B for the purposes of the testing and documentation.

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

Subscriber Flows

Server Flows

Add

Hover over a row to see its description.

Server Configuration: Avaya

Update

Priority	Flow Name	URI Group	Received Interface	Signaling Interface	End Point Policy Group	Routing Profile	
1	Call_Server_A	*	Ext_Sig	Int_Sig_A	default-low	BT_SBC_A	View Clone Edit Delete
2	Call_Server_B	*	Ext_Sig	Int_Sig_B	default-low	BT_SBC_B	View Clone Edit Delete

Server Configuration: BT_SBC_A

Priority	Flow Name	URI Group	Received Interface	Signaling Interface	End Point Policy Group	Routing Profile	
1	Trunk_Server_A	*	Int_Sig_A	Ext_Sig	default-low	Avaya	View Clone Edit Delete

Server Configuration: BT_SBC_B

Priority	Flow Name	URI Group	Received Interface	Signaling Interface	End Point Policy Group	Routing Profile	
1	Trunk_Server_B	*	Int_Sig_B	Ext_Sig	default-low	Avaya	View Clone Edit Delete

To define a Server Flow for Session Manager to each of the network SBCs, navigate to **Device Specific Settings → End Point Flows**.

- Click on the **Server Flows** tab.
- Select **Add Flow** and enter details in the pop-up menu.
- In the **Name** field enter a descriptive name for the server flow for the Session Manager, in this case **Call_Server_A** was used.
- In the **Server Configuration** drop down menu, select the Server defined in **Section 7.2.4** for Session manager.
- In the **Received Interface** drop-down menu, select the external SIP signalling interface defined in **Section 7.4.1**.
- In the **Signaling Interface** drop-down menu, select the first internal SIP signalling interface defined in **Section 7.4.1**.
- In the **Media Interface** drop-down menu, select the internal media interface defined in **Section 7.4.2**.
- In the **Routing Profile** drop-down menu, select the routing profile of BT Ireland SBC A defined in **Section 7.2.3**.
- In the **Topology Hiding Profile** drop-down menu, select the topology hiding profile of the Session Manager defined in **Section 7.2.6** and click **Finish**.

The screenshot shows a configuration window titled "Flow: Call_Server_A". It contains the following fields and values:

Field	Value
Flow Name	Call_Server_A
Server Configuration	Avaya
URI Group	*
Transport	*
Remote Subnet	*
Received Interface	Ext_Sig
Signaling Interface	Int_Sig_A
Media Interface	Int_Media_A
End Point Policy Group	default-low
Routing Profile	BT_SBC_A
Topology Hiding Profile	Avaya
File Transfer Profile	None

A "Finish" button is located at the bottom right of the window.

Repeat the above process for Call_Server_B, selecting the specific Call_Server_B entries for server flow configuration.

To define Server Flows for the BT Ireland network SBCs (BT Ireland SBC A and BT Ireland SBC B), navigate to **Device Specific Settings → End Point Flows**.

- Click on the **Server Flows** tab.
- Select **Add Flow** and enter details in the pop-up menu.
- In the **Name** field enter a descriptive name for the server flow for BT Ireland SBC A, in this case **Trunk_Server_A** was used.
- In the **Server Configuration** drop down menu, select the Server defined in **Section 7.2.5** for BT Ireland SBC A
- In the **Received Interface** drop-down menu, select the internal SIP signalling interface defined in **Section 7.4.1**.
- In the **Signaling Interface** drop-down menu, select the external SIP signalling interface defined in **Section 7.4.1**.
- In the **Media Interface** drop-down menu, select the external media interface defined in **Section 7.4.2**.
- In the **Routing Profile** drop-down menu, select the routing profile of the Session Manager defined in **Section 7.3**.
- In the **Topology Hiding Profile** drop-down menu, select the topology hiding profile of BT Ireland defined in **Section 7.2.6** and click **Finish**.

Flow: Trunk_Server_A

Flow Name	Trunk_Server_A
Server Configuration	BT_SBC_A
URI Group	*
Transport	*
Remote Subnet	*
Received Interface	Int_Sig_A
Signaling Interface	Ext_Sig
Media Interface	Ext_Media
End Point Policy Group	default-low
Routing Profile	Avaya
Topology Hiding Profile	BT
File Transfer Profile	None

Finish

Repeat the above process for BT Ireland SBC B, selecting the specific BT Ireland SBC B entries for server flow configuration.

8. BT Ireland Configuration

The configuration of the BT Ireland equipment used to support the BT Ireland SIP Trunk service is outside of the scope of these Application Notes and will not be covered. To obtain further information on BT Ireland equipment and system configuration, please contact an authorized BT Ireland 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 1000 Verification

This section illustrates sample verifications that may be performed using the Avaya CS1000 Element Manager GUI.

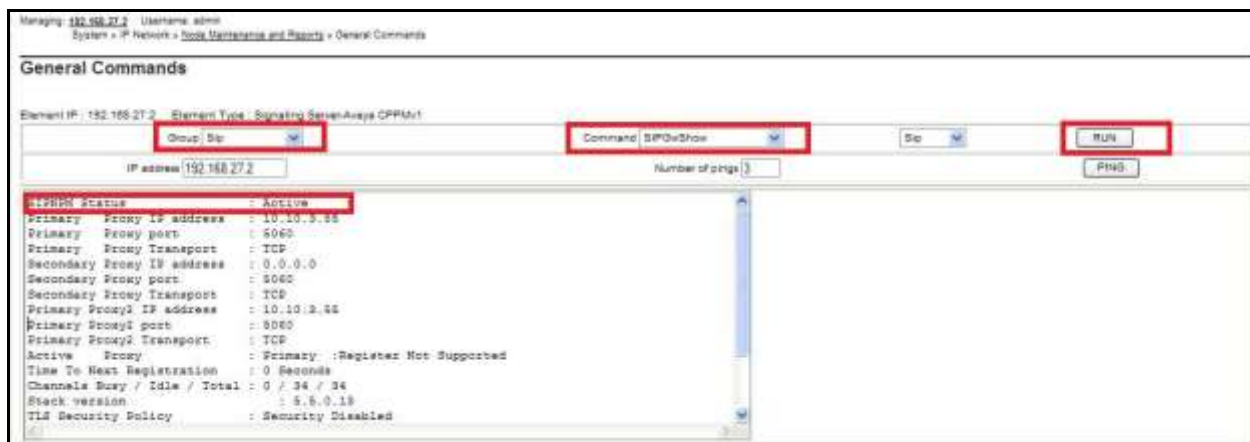
9.1.1. IP Network Maintenance and Reports Commands

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.

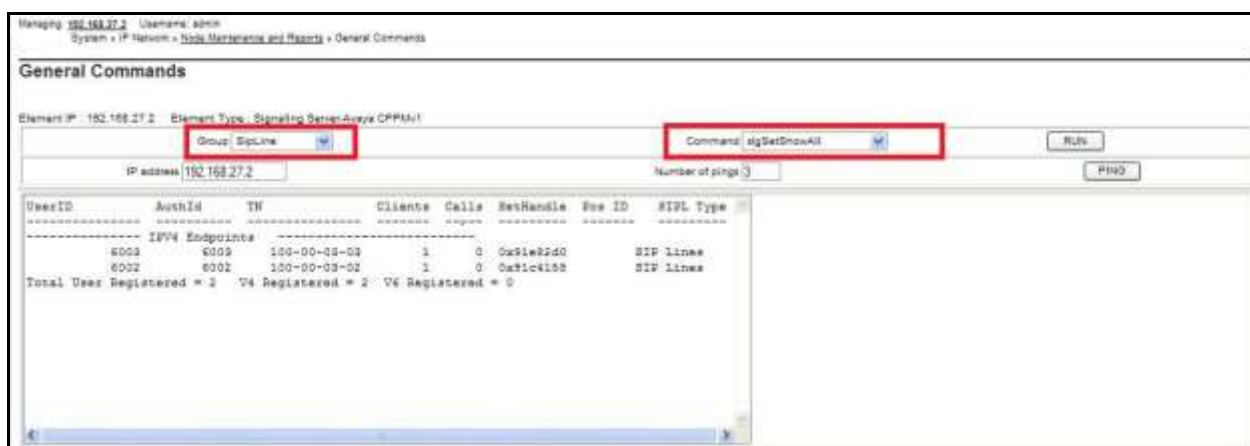


The **General Commands** page is displayed. A variety of commands are available by selecting an appropriate Group and Command from the drop-down menus, and selecting **Run**.

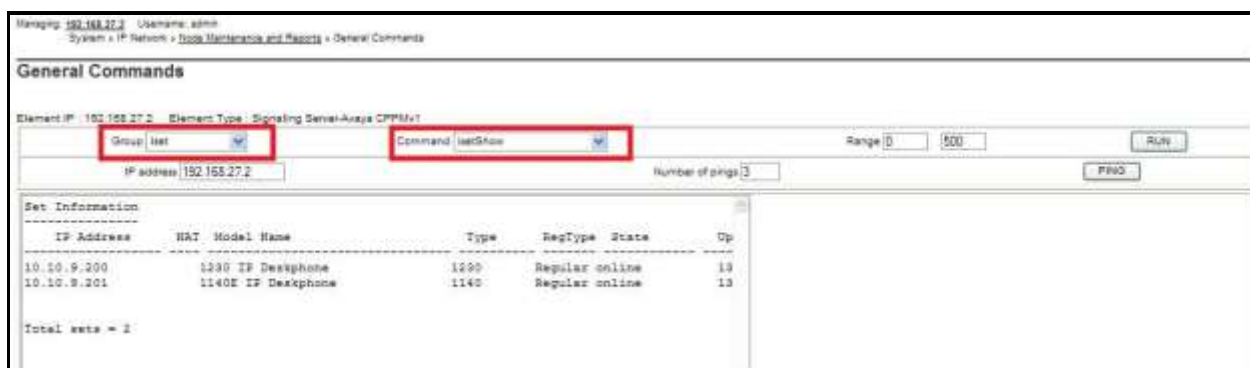
To check the status of the SIP Gateway to Session Manager in the sample configuration, select **Sip** from the Group menu and **SIPGwShow** from the **Command** menu. Click **Run**. The example output below shows that Session Manager has **SIPNPM Status “Active”**.



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



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



9.2. Verify Avaya Communication Server 1000 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. Verify Avaya Aura® Session Manager Operational Status

9.3.1. Verify Avaya Aura® Session Manager is Operational

Navigate to **Elements → Session Manager → Dashboard** (not shown) to verify the overall system status for Session Manager. Specifically, verify the status of the following fields as shown below.

Home / Elements / Session Manager / Dashboard

Help ?

Session Manager Dashboard

This page provides the overall status and health summary of each administered Session Manager.

Session Manager Instances

Service State

Shutdown System

As of 9:31 AM

Item

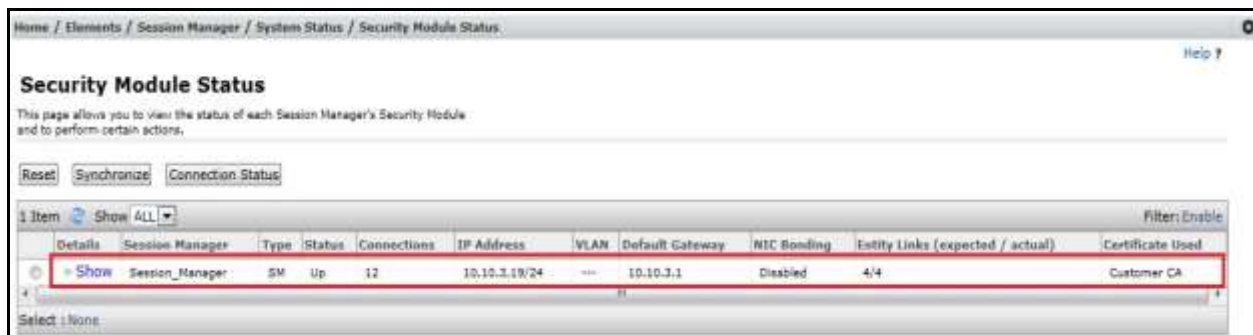
Show ALL

Filter: Enable

Item	Type	Tests Pass	Alarms	Security Module	Service State	Entity Monitoring	Active Call Count	Registrations	Data Replication	User Data Storage Status	Version
<div>Session Manager</div>	Core	0/0/0	Up	Accept New Service	0/4	0	3/3	✓	✓	6.3.11.0.631103	

Select | All, None

Navigate to **Elements → Session Manager → System Status → Security Module Status** (not shown) to view more detailed status information on the status of Security Module for the specific Session Manager. Verify the **Status** column displays **Up** as shown below.



The screenshot shows the 'Security Module Status' page with a table of security module details. The first entry, 'Session Manager', is highlighted with a red box. The table columns include Details, Session Manager, Type, Status, Connections, IP Address, VLAN, Default Gateway, NIC Bonding, Entity Links (expected / actual), and Certificate Used.

Details	Session Manager	Type	Status	Connections	IP Address	VLAN	Default Gateway	NIC Bonding	Entity Links (expected / actual)	Certificate Used
Show	Session_Manager	SM	Up	12	10.10.3.19/24	---	10.10.3.1	Disabled	4/4	Customer CA

9.3.2. Verify SIP Entity Link Status

Navigate to **Elements → Session Manager → System Status → SIP Entity Monitoring** (not shown) to view more detailed status information for one of the SIP Entity Links. Select the SIP Entity for CS1000 from the **All Monitored SIP Entities** table (not shown) to open the **SIP Entity, Entity Link Connection Status** page. In the **All Entity Links to SIP Entity: Session Manager** table, verify the **Conn. Status** for the link is **Up** as shown below.

All Entity Links for Session Manager: Session Manager

Summary View

Status Details for the selected Session Manager:

4 Items | Refresh Filter: Enable

	SIP Entity Name	SIP Entity Resolved IP	Port	Proto.	Deny	Conn. Status	Reason Code	Link Status
<input checked="" type="radio"/>	Avaya SBCE	10.10.3.30	5060	TCP	FALSE	UP	200 OK	UP
<input checked="" type="radio"/>	CS1K 7.6	10.10.9.21	5060	TCP	FALSE	UP	200 OK	UP
<input type="radio"/>	Communication Manager	10.10.8.67	5060	TCP	FALSE	UP	200 OK	UP
<input type="radio"/>	Messaging	10.10.2.82	5060	TCP	FALSE	UP	200 OK	UP

Verify the status of the SIP link is up between Session Manager and the Avaya SBCE by going through the same process as outlined above but selecting the SIP Entity for the Avaya SBCE in the **All Monitored SIP Entities** table.

All Entity Links to SIP Entity: AvayaSBCE

Summary View

Status Details for the selected Session Manager:

1 Items | Refresh Filter: Enable

	Session Manager Name	SIP Entity Resolved IP	Port	Proto.	Deny	Conn. Status	Reason Code	Link Status
<input checked="" type="radio"/>	Session Manager	10.10.3.30	5060	TCP	FALSE	UP	200 OK	UP

9.3.3. Verify Avaya Aura® Session Manager Instance

The creation of a Session Manager Instance provides the linkage between System Manager and Session Manager. This was most likely done as part of the initial Session Manager installation. To add a Session Manager, navigate to **Elements → Session Manager → Session Manager Administration** in the left-hand navigation pane and click on the **New** button in the right pane (not shown). If Session Manager instance already exists, click **View** (not shown) to view the configuration. Enter/verify the data as described below and shown in the following screen:

In the **General** section, enter the following values:

- **SIP Entity Name:** Select the SIP Entity created for Session Manager
- **Description:** Add a brief description (optional)
- **Management Access Point Host Name/IP:** Enter the IP address of Session Manager management interface

The following screen shows Session Manager values used for the compliance test.

The screenshot displays the 'View Session Manager' configuration page. The breadcrumb navigation at the top reads 'Home / Elements / Session Manager / Session Manager Administration'. The page title is 'View Session Manager' with a 'Return' button. Below the title is a tabbed interface with 'General' selected. The 'General' tab contains the following fields:

- SIP Entity Name: Session_Manager
- Description: (empty)
- Management Access Point Host Name/IP: 10.10.3.18
- Direct Routing to Endpoints: Enable
- VMware Virtual Machine: ☐

In the **Security Module** section, enter the following values:

- **SIP Entity IP Address:** Should be filled in automatically based on the SIP Entity Name. Otherwise, enter IP address of Session Manager signaling interface
- **Network Mask:** Enter the network mask corresponding to the IP address of Session Manager
- **Default Gateway:** Enter the IP address of the default gateway for Session Manager

Use default values for the remaining fields. Click **Save** (not shown). The following screen shows the remaining Session Manager values used for the compliance test.



The screenshot displays the 'Security Module' configuration page. A red rectangular box highlights the following fields and their values:

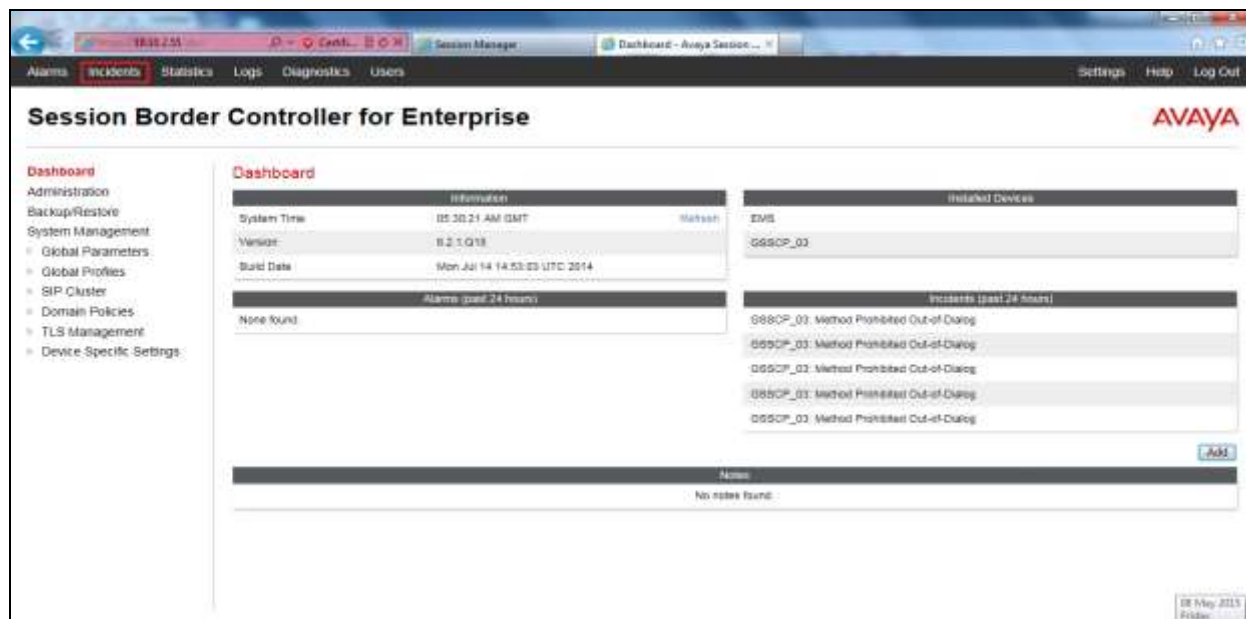
- SIP Entity IP Address: 10.10.3.19
- Network Mask: 255.255.255.0
- Default Gateway: 10.10.3.1
- Call Control PHB: 46
- QOS Priority: 6
- Speed & Duplex: Auto
- VLAN ID: -
- *SIP Firewall Configuration: SM 6.3.4.0

9.4. Avaya Session Boarder Controller for Enterprise Verification

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

9.4.1. 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.

The screenshot shows the Avaya Incident Viewer web interface. The top navigation bar includes links for Alarms, Incidents, Statistics, Logs, Diagnostics, and Users. The main content area is titled 'Incident Viewer' and features a sidebar with a 'Dashboard' menu. The 'Incidents' tab is selected, displaying a list of incidents. The incidents are categorized by 'Information' and 'Alarms (past 24 hours)'. The 'Information' section shows system details like System Time, Version, and Build Date. The 'Alarms' section shows a list of incidents, including 'GSSCP_03: Method Prohibited Out-of-Dialog'. The 'Incidents (last 24 hours)' section shows a list of incidents, including 'GSSCP_03: Method Prohibited Out-of-Dialog'.

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	706471035327166	10/10/14	11:54 AM	Policy	GSSCP_03	No Subscriber Flow Matched
Message Dropped	706470919522823	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	706470468747369	10/10/14	11:35 AM	Policy	GSSCP_03	No Subscriber Flow Matched
ACK Message Out of Dialog	706470365826026	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	706470347590753	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

9.4.2. 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 'Trace: GSSCP_03' interface. On the left, there is a 'Devices' sidebar with 'GSSCP_03' selected. The main area has three tabs: 'Call Trace', 'Packet Capture' (which is active), and 'Captures'. The 'Packet Capture Configuration' form contains the following fields:

- Status: Ready
- Interface: B1 (dropdown)
- Local Address (IP: Port): 192.168.122.57 (dropdown)
- Remote Address (*: *Port, IP: Port): *
- Protocol: All (dropdown)
- 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 of the form 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 'Trace: GSSCP_03' interface with the 'Captures' tab selected. A 'Refresh' button is in the top right corner. Below it is a table with the following data:

File Name	File Size (bytes)	Last Modified	
SIP_Trunk_Test_20140915121852.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 BT Ireland network.

10. Conclusion

These Application Notes describe the configuration necessary to connect Avaya Communication Server 1000 R7.6, Avaya Aura® Session Manager R6.3 and Avaya Session Border Controller for Enterprise R6.2 to BT Ireland SIP Trunk service. BT Ireland'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] *Implementing Avaya Aura® Session Manager*, Release 6.3
- [2] *Installing Service Packs for Avaya Aura® Session Manager*, Release 6.3
- [3] *Upgrading Avaya Aura® Session Manager*, Release 6.3
- [4] *Maintaining and Troubleshooting Avaya Aura® Session Manager Release 6.3*
- [5] *Installing and Configuring Avaya Aura® System Platform Release 6.3*
- [6] *Implementing Avaya Aura® System Manager Release 6.3*
- [7] *Upgrading Avaya Aura® System Manager to 6.3*
- [8] *Avaya Communication Server 1000 Installation and Commissioning*, Document Number NN43041-310.
- [9] *Feature Listing Reference Avaya Communication Server 1000*, Document Number NN43001-111, 05.01.
- [10] *Linux Platform Base and Applications Installation and Commissioning Avaya Communication Server 1000*, Document Number NN43001-315
- [11] *Unified Communications Management Common Servers Fundamentals Avaya Communication Server 1000*, Document Number NN43001-116
- [12] *Software Input Output Reference – Maintenance Avaya Communication Server 1000*, Document Number NN43001-711
- [13] *Signaling Server IP Line Applications Fundamentals Avaya Communication Server 1000*, Document Number NN43001-125
- [14] *SIP Software for Avaya 1100 Series IP Deskphones-Administration*, Document Number NN43170-600
- [15] *Installing Avaya Session Border Controller for Enterprise*, Release 6.2
- [16] *Upgrading Avaya Session Border Controller for Enterprise* Release 6.2
- [17] *Administering Avaya Session Border Controller for Enterprise* Release 6.2
- [18] RFC 3261 SIP: Session Initiation Protocol, <http://www.ietf.org/>

Appendix A – Communication Server 1000 Software

Communication Server 1000 call server patches and plug ins

TID: 46379

VERSION 4121

System type is - Communication Server 1000/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 1000 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 1000 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 1000 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]
csmWeb	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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