



Application Notes for Configuring Avaya Communication Server 1000E R7.5 with Avaya Aura[®] Session Manager R6.1 and Avaya Aura[®] Session Border Controller to support BT Global Services NOAS SIP Trunk - Issue 1.1

Abstract

These Application Notes describe the steps to configure Session Initiation Protocol (SIP) trunking between an Avaya SIP enabled enterprise solution and the BT Global Services NOAS SIP Trunk Service. The Avaya solution consists of an Avaya Aura[®] Session Manager and an Avaya Communication Server 1000E connected to an Avaya Aura[®] Session Border Controller. BT is a member of the Global SIP Service Provider program.

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

1. Introduction

These Application Notes describe the necessary steps to configure Session Initiation Protocol (SIP) trunking between an Avaya SIP enabled enterprise solution and the BT Global Services NOAS SIP Trunk Service. The Avaya solution consists of an Avaya Aura[®] Session Manager, an Avaya Communication Server 1000E and an Avaya Aura[®] Session Border Controller (AASBC) connected to the BT SIP Trunk Service. Customers using this Avaya SIP enabled enterprise solution with the BT 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 Session Manager, Communication Server 1000E and the AASBC. The enterprise site was configured to use the SIP Trunk Service provided by BT, with all PSTN traffic transiting via the BT SIP Trunk Service.

2.1. Interoperability Compliance Testing

The interoperability test included the following:

- Incoming calls to the enterprise site from the PSTN were routed to the DID numbers assigned by BT. Incoming PSTN calls were terminated on Digital, Unistim, SIP and Analog telephones at the enterprise side.
- Outgoing calls from the enterprise site were completed via BT to PSTN telephones. Outgoing calls from the enterprise to the PSTN were made from Digital, Unistim, SIP and Analog telephones.
- Calls were made using G.729A, and G.711A codec's.
- Fax calls to/from a group 3 fax machine to a PSTN connected fax machine using T.38 transmission.
- DTMF transmission using RFC 2833 with successful IVR menu progression.
- 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.
- Transmission of SIP OPTIONS messages sent by BT requiring Avaya response and sent by Avaya requiring BT response.

2.2. Test Results

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

- No inbound toll free numbers were tested, however routing of inbound DID numbers and the relevant number translation was successfully tested.
- Routing to emergency numbers (such as 112) was not tested.
- G729 annex b (silence suppression) is not supported by BT SIP Trunk Service and thus was not tested.
- Early media is only supported for UEXT type phones on Communication Server 1000E.
- PSTN called party hanging up an active call did not cause the call to drop. The Communication Server 1000E caller must hang up first, or wait for the PSTN T2ISUP timer to expire.
- Unsupervised transfer of incoming or outgoing PSTN calls to PSTN called parties is not permitted. The same restriction exists for supervised transfers of an existing PSTN call to a PSTN called party. This is due to configuration restrictions imposed by the local PSTN the NOAS SIP Trunk service was connected to.
- Call hold has a time limit of 15 minutes. If this limit is exceeded the call drops. This is due to the NOAS SIP Session timer refresh not refreshing the session. BT has produced a system patch to address this problem. The patch has not been independently verified by the compliance test process.
- Calls to/from SMC 3456 soft clients using unsupported codecs failed, most likely because the call server was unable to determine the phone capabilities and the SMC 3456 not correctly handling the calls.
- The BT SIP Trunk Service did not handle accumulation of SIP 5xx messages correctly, causing Call Admission Control (CAC) issues with PSTN calls on one occasion, with the effect of disabling the SIP trunks. A workaround was to manually clear the CAC counters.
- Avaya one-X[®] Communicator three-party-conferences did not work if one or more of the parties was a PSTN user. The affected user received no speech from the conference bridge. This was not observed on non-NOAS SIP trunks.

2.3. Support

For technical support on BT products please use the following web link.

<http://btbusiness.custhelp.com/app/contact>

Avaya customers may obtain documentation and support for Avaya products by visiting <http://support.avaya.com>. Selecting the **Support Contact Options** link followed by **Maintenance Support** provides the worldwide support directory for Avaya Global Services. Specific numbers are provided for both customers and partners based on the specific type of support or consultation services needed. Some services may require specific Avaya service support agreements. Alternatively, in the United States, (866) GO-AVAYA (866-462-8292) provides access to overall sales and service support menus.

3. Reference Configuration

Figure 1 illustrates the tested configuration. The test configuration shows an Avaya enterprise site connected to the BT SIP Trunk Service. Located at the enterprise site are a Session Manager and a Communication Server 1000E. Endpoints are Avaya 1140e series IP telephones (one with SIP firmware), Avaya 1220 IP telephones, Avaya 3904 series Digital telephones, a one-X Communicator soft phone, an SMC 3456 Soft Client, an Analog Telephone and a 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.

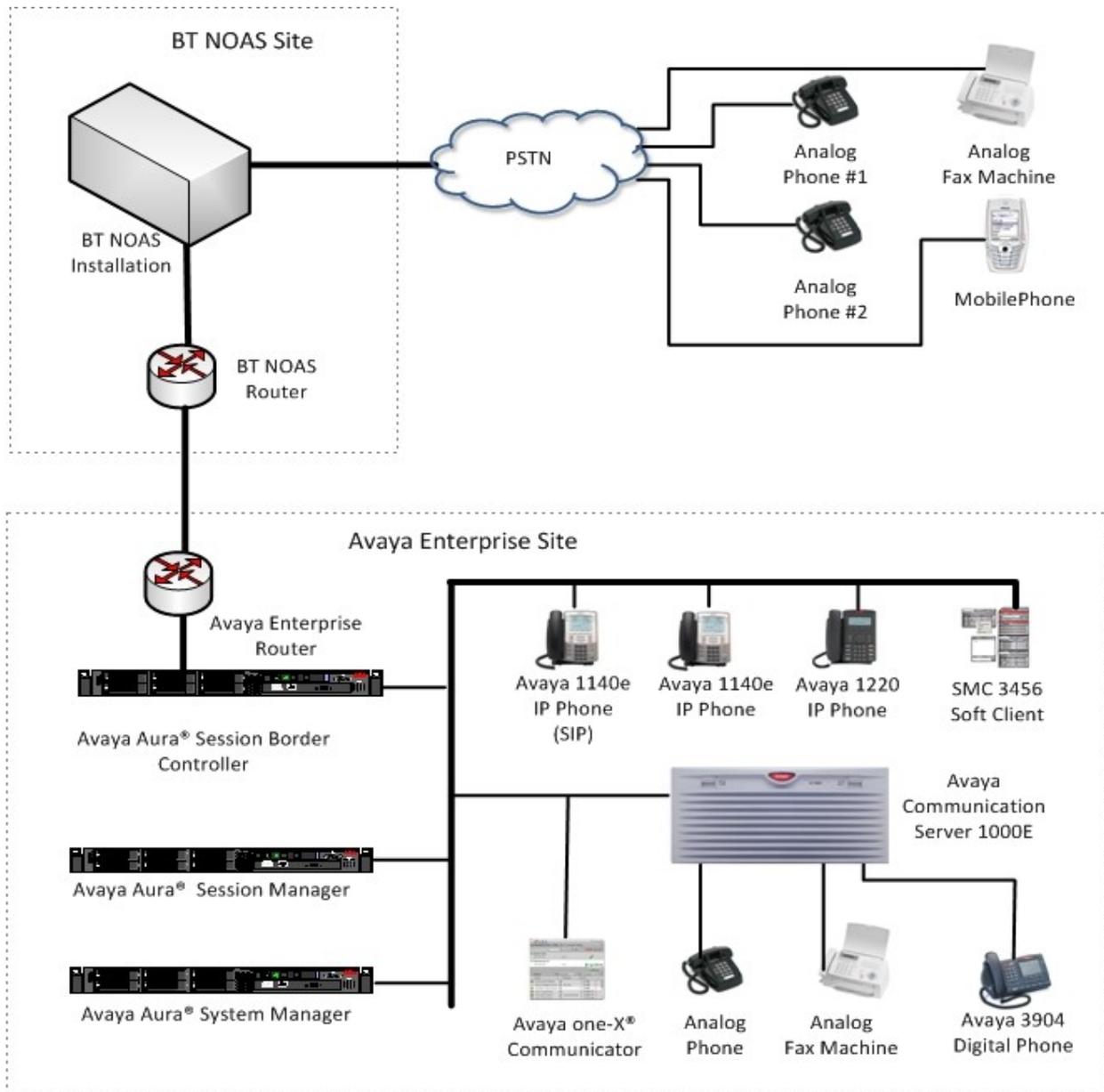


Figure 1: BT NOAS and Avaya Enterprise Test Configuration Network Diagram

4. Equipment and Software Validated

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

Equipment	Software
Avaya Communication Server 1000E	Avaya Communication Server 1000E R7.5 007.50Q/ 7.50.17 (PSWV 100 with latest Patches and Deplist)
Avaya Communication Server 1000E Media Gateway	CSP Version: MGCC CD01 MSP Version: MGCM AB01 APP Version: MGCA BA07 FPGA Version: MGCF AA18 BOOT Version: MGCB BA07 DSP1 Version: DSP1 AB03 DSP2 Version: DSP2 AB03
Avaya S8800 Server	Avaya Aura [®] Session Manager R6.1 (6.1.3.0.613006)
Avaya S8800 Server	Avaya Aura [®] System Manager R6.1 (6.1.7.1.1260)
Avaya S8800 Server	Avaya Aura [®] Session Border Controller (E362P4)
Avaya 1140e Unistim Phone	5.0
Avaya 1140e SIP Phone	4.00.03.00
Avaya 1220 Unistim Phone	5.0
Avaya 3904 Digital Phone	AA94
Avaya SMC3456 Soft Client	Version 2.6
Avaya one-X [®] Communicator	CS6.10.10
Analog Phone	N/A
BT SIP Trunk Service	2.1.0.8

5. Configure Avaya Communication Server 1000E

This section describes the steps required to configure Communication Server 1000E for SIP Trunking and also the basic configuration for telephones (analog, SIP and IP phones). SIP trunks are established between Communication Server 1000E and Session Manager. SIP trunks are also established between Session Manager and the AASBC private interface. The AASBC public interface connects to the BT Global Services NOAS SIP trunks. Incoming PSTN calls from the BT Global Services NOAS SIP Trunk Service traverse the AASBC and are directed to the Session Manager, which directs the calls to Communication Server 1000E (see **Figure 1**).

The AASBC media manager has been configured to ensure RTP packets are managed correctly from the AASBC public interface to the private interface and vice versa. When a SIP message arrives at Communication Server 1000E, 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 Communication Server 1000E and may be first subject to outbound features such as route selection, digit manipulation and class of service restrictions. When Communication Server 1000E selects a SIP trunk for outgoing PSTN calls, SIP signaling is directed to the Session Manager. The Session Manager directs the outbound SIP messages to the AASBC private interface. The AASBC public interface manages outgoing SIP sessions onwards to the BT Global Services NOAS SIP trunks.

Specific Communication Server 1000E configuration was performed using Element Manager and the system terminal interface. The general installation of the Avaya Communication Server 1000E, System Manager, Session Manager and AASBC is presumed to have been previously completed and is not discussed here. Configuration details provided in these application notes draw attention to changes from default system configurations.

5.1. 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 for adding additional capacity. Use the Communication Server 1000E 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 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 Communication Server 1000E.

```
System type is - Communication Server 1000E/CP PM
CP PM - Pentium M 1.4 GHz
```

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

Load overlay 21, and confirm the customer is set up to use **ISDN** trunks (see 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
```

5.2. Configure Codec's for Voice and FAX operation

The BT Global Services NOAS SIP Trunk Service supports G.711A and G.729A voice codecs and T.38 FAX transmissions. Using the Communication Server 1000E element manager sidebar, select **System** → **IP Networks** → **Nodes: Servers, Media Cards**. Navigate to the **IP Network** → **IP Telephony Nodes** → **Node Details** → **VGW and Codecs** property page and configure the Communication Server 1000E General codec settings as in the following screenshots. The values highlighted were used during testing. The following screenshot shows the necessary **General** settings.

The screenshot displays the AVAYA CS1000 Element Manager interface. The left sidebar shows a navigation tree with 'Nodes: Servers, Media Cards' highlighted. The main content area is titled 'Node ID: 1231 - Voice Gateway (VGW) and Codecs' and has tabs for 'General', 'Voice Codecs', and 'Fax'. The 'General' tab is active, and a red box highlights the following settings:

- Echo cancellation: Use canceller, with tail delay: 128
- 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 used for calls.

The screenshot displays the AVAYA CS1000 Element Manager interface, showing the 'Voice Codecs' section. The left sidebar is the same as in the previous screenshot. The main content area is titled 'Node ID: 1231 - Voice Gateway (VGW) and Codecs' and has tabs for 'General', 'Voice Codecs', and 'Fax'. The 'Voice Codecs' tab is active, and a red box highlights the following settings:

- 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 low bandwidth codec settings.

The screenshot shows the AVAYA CS1000 Element Manager interface. The left sidebar contains a navigation tree with 'Nodes: Servers, Media Cards' highlighted. The main content area is titled 'Node ID: 1231 - Voice Gateway (VGW) and Codecs'. Under the 'Voice Codecs' tab, the 'Codec G729' is checked as 'Enabled'. Below this, the 'Voice payload size' is set to 30 milliseconds per frame, and the 'Voice playback (jitter buffer) delay' is set to 60 milliseconds (Nominal) and 120 milliseconds (Maximum). A note states: 'Maximum delay may be automatically adjusted based on nominal settings.' At the bottom, there is a checkbox for 'Voice Activity Detection (VAD)' which is currently unchecked.

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

The screenshot shows the AVAYA CS1000 Element Manager interface, now on the 'Fax' tab. The 'Nodes: Servers, Media Cards' is still highlighted in the sidebar. The main content area shows 'Node ID: 1231 - Voice Gateway (VGW) and Codecs'. Under the 'Voice Codecs' tab, 'Codec G723.1' is unchecked. The 'Voice payload size' is 30 milliseconds per frame, and the 'Voice playback (jitter buffer) delay' is 60 milliseconds (Nominal) and 120 milliseconds (Maximum). The 'Coding rate' is set to 5.3 kbps. In the 'Fax' section, 'Codec name' is 'T.38 FAX'. The 'Maximum rate' is set to 14400 bps, 'Fax TCF method' is 2, 'Fax playback nominal delay' is 100 milliseconds (0 - 300 milliseconds), 'FAX no activity timeout' is 20 milliseconds (10 - 32000 milliseconds), and 'Packet size' is 30 bps. A note at the bottom states: 'Note: Changes made on this page will NOT be transmitted until the Node is also saved.' There are 'Save' and 'Cancel' buttons at the bottom right.

5.3. Virtual Trunk Gateway Configuration

Use Communication Server 1000E 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. The **Call Server IP address** is normally the same as the server ELAN IP address for a Co-resident installation and the **Node IPv4 address** is a virtual IP address which will be used for all telephony signaling.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System » IP Network » IP Telephony Nodes » Node Details

Node Details (ID: 1231 - SIP Line, LTPS, PD, IP Media Services, Gateway (SIPGw, H323Gw))

Node ID: * (0-9999)

Call server IP address: * TLAN address type: IPv4 only
 IPv4 and IPv6

Embedded LAN (ELAN) **Telephony LAN (TLAN)**

Gateway IP address: * Node IPv4 address: *

Subnet mask: * Subnet mask: *

Node IPv6 address:

* Required Value.

Associated Signaling Servers & Cards

Select to add [Print](#) | [Refresh](#)

<input type="checkbox"/>	Hostname ^	Type	Deployed Applications	ELAN IP	TLAN IPv4	Role
<input type="checkbox"/>	primflwr-leads	Signaling_Server	LTPS, Gateway, PD, Presence Publisher, IP Media Services	192.168.51.19	192.168.51.36	Follower
<input type="checkbox"/>	primleader-leads	Signaling_Server	LTPS, Gateway, PD, Presence Publisher, IP Media Services	192.168.51.18	192.168.51.35	Leader

Show: IPv6 address

The next screenshot shows the SIP Virtual Trunk Gateway configuration. Navigate to **System → IP Networks → IP Telephony Nodes → Node Details → Virtual Trunk Gateway Configuration** and in the **General** section, fill in the highlighted areas with the relevant settings.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System > IP Network > IP Telephony Nodes > Node Details > Virtual Trunk Gateway Configuration

Node ID: 1231 - Virtual Trunk Gateway Configuration Details

General | SIP Gateway Settings | SIP Gateway Services | H.323 Gateway Settings

Vtrk gateway application: Enable gateway service on this node

General

Vtrk gateway application: SIPGw and H.323Gw
SIP domain name: umlab.local
Local SIP port: 5060 *(1 - 65535)
Gateway endpoint name: PRIM_SS_LEADER
Gateway password: *
H.323 ID: PRIM_SS_LEADER
Application node ID: 1231 *(0-9999)
Enable failsafe NRS:

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:
192.168.131.186
192.168.51.46
Remove

Scroll down to the **Proxy or Redirect Server** area and fill in the values for **Proxy Server Route 1**; the Primary **TLAN IP address**, **Port** and **Transport protocol** values are required. This is the Session Manager SIP Signaling Interface IP address connection information.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System > IP Network > IP Telephony Nodes > Node Details > Virtual Trunk Gateway Configuration

Node ID: 1231 - Virtual Trunk Gateway Configuration Details

General | SIP Gateway Settings | SIP Gateway Services | H.323 Gateway Settings

Proxy Or Redirect Server:

Proxy Server Route 1:

Primary TLAN IP address: 192.168.131.186
The IP address can have either IPv4 or IPv6 format based on the value of "TLAN address type"
Port: 5060 (1 - 65535)
Transport protocol: TCP
Options: Support registration
 Primary CDS proxy

Secondary TLAN IP address: 0.0.0.0
The IP address can have either IPv4 or IPv6 format based on the value of "TLAN address type"
Port: 5060 (1 - 65535)
Transport protocol: TCP

Move down the page and fill in **Tertiary IP address**, **Port** and **Transport protocol** (see the next screenshot). Fill in the **Proxy Server Route 2: Primary TLAN IP address**, **Port** and **Transport protocol**. In this case, the same values as **Proxy Server Route 2** were used.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » Virtual Trunk Gateway Configuration

Node ID: 1231 - Virtual Trunk Gateway Configuration Details

General | SIP Gateway Settings | SIP Gateway Services | H.323 Gateway Settings

Tertiary IP address: 192.168.51.169
Port: 5060 (1 - 65535)
Transport protocol: TCP

Options: Support registration
 Tertiary CDS proxy

Proxy Server Route 2:

Primary TLAN IP address: 192.168.131.186
The IP address can have either IPv4 or IPv6 format based on the value of "TLAN address type"
Port: 5060 (1 - 65535)
Transport protocol: TCP

Options: Registration not supported
 Primary CDS proxy

Scroll down to the CLID Presentation section and fill in the **Country code (CCC)** and **Area code** values.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » Virtual Trunk Gateway Configuration

Node ID: 1231 - Virtual Trunk Gateway Configuration Details

General | SIP Gateway Settings | SIP Gateway Services | H.323 Gateway Settings

Options: Registration not supported
 Primary CDS proxy

CLID Presentation:

Country code (CCC): 44
Area code: 113 NPA in North America

Move to the **SIP URI Maps**: section and fill in the values (see next screenshot).

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » Virtual Trunk Gateway Configuration

Node ID: 1231 - Virtual Trunk Gateway Configuration Details

General | SIP Gateway Settings | SIP Gateway Services | H.323 Gateway Settings

SIP URI Map:

Public E.164 domain names		Private domain names	
National:	E164.Nat	UDP:	udp
Subscriber:	E164.Sub	CDP:	cdp.udp
Special number:	PublicSpecial	Special number:	PrivateSpecial
Unknown:	PublicUnknown	Vacant number:	PrivateUnknown
		Unknown:	UnknownUnknown

Scroll down to the bottom of the page and click on the **Save** button (not shown).

5.4. 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. 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.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System » IP Network » Zones » Bandwidth Zones

Bandwidth Zones

Add... Edit... Import... Export Maintenance... Delete Refresh

Zone	Intrazone Bandwidth	Intrazone Strategy	Interzone Bandwidth	Interzone Strategy	Resource Type	Zone Intent	Description
1	100000	BQ	100000	BB	SHARED	MO	GR_PRIM
2	100000	BQ	100000	BB	SHARED	MO	GR_SEC
3	100000	BQ	10000	BB	SHARED	MO	SURV_MG1000
4	1000000	BQ	1000000	BQ	SHARED	VTRK	SIPLINEZONE
5	253	BQ	1000000	BB	SHARED	VTRK	SIP_VTRK_NOAS
6	254	BQ	10000	BQ	SHARED	MO	VIRTUALSETS
7	255	BQ	100000	BQ	SHARED	VTRK	VIRTUAL_TRKS

5.5. Configure Incoming Digit Conversion Table

A limited number of Direct Dial Inwards (DDI) numbers were available from the service provider; an IDC table was configured to translate incoming PSTN DDI numbers to five digit local telephone extension numbers. Use Element Manager and navigate to **Dialing and Numbering Plans → Incoming Digit Translation**. In the Digit Conversion Tree Configuration screen (not shown), enter the incoming PSTN telephone numbers and the mapped local telephone numbers. The last four digits of the actual PSTN DDI number are obscured for security reasons. The following screenshot shows **Digit Conversion Tree 10 Configuration**, where the incoming PSTN numbers are converted to local extension numbers. These were altered during testing to map to various SIP, Analog, Digital or Unistim telephones depending on the particular test case being executed.

The screenshot shows the AVAYA CS1000 Element Manager interface. The main content area is titled "Digit Conversion Tree 10 Configuration". Below the title, there are buttons for "Add...", "Delete IDC", and "Delete IDC tree", along with a "Refresh" link. A table displays the configuration data:

	Incoming Digits	Converted Digits	CPND Name	CPND language
1	0207960	52201		
2	0207960	52000		
3	0207960	52200		
4	0207960	52200		
5	0207960	52000		
6	0207960	52201		

5.6. Configure SIP Trunks

Communication Server 1000E virtual trunks will be used for all inbound and outbound PSTN calls from/to the BT SIP Trunk Service. Five separate steps are required to configure Communication Server 1000E virtual trunks:

- Configure a D-Channel Handler (DCH) configured by using the Communication Server 1000E system terminal and overlay 17.
- Configure a SIP trunk Route Data Block (RDB) configured by using the Communication Server 1000E system terminal and overlay 16.
- Configure SIP trunk members configured by using the Communication Server 1000E system terminal and overlay 14.
- Configure a Route List Block (RLB) configured by using the Communication Server 1000E system terminal and overlay 86.
- Configure Special Prefix Numbers (SPN's) configured by using the Communication Server 1000E system terminal and overlay 90.

The following is an example DCH configuration for SIP trunks. Load **Overlay 17** at the Communication Server 1000E 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 50
  CTYP DCIP
  DES  VIR_TRK
  USR  ISLD
  ISLM 4000
  SSRC 1800
  OTBF 32
  NASA YES
  IFC  SL1
  CNEG 1
  RLS  ID 5
  RCAP ND2
  MBGA NO
  H323
    OVLR NO
    OVLS NO
```

Next, configure the SIP trunk Route Data Block (RDB) using the Communication Server 1000E 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 5.3**. The value for **ZONE** should match that used in **Section 5.4** for **SIP_VTRK_NOAS**. The remaining highlighted values are important for correct SIP trunk operation.

<pre> Overlay 16 TYPE: rdb CUST 00 ROUT 100 TYPE RDB CUST 00 ROUT 100 DES VIR_TRK TKTP TIE NPID_TBL_NUM 0 ESN NO RPA NO CNVT NO SAT NO RCLS EXT VTRK YES ZONE 00253 PCID SIP CRID NO NODE 1231 DTRK NO ISDN YES MODE ISLD DCH 50 IFC SL1 PNI 00001 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 </pre>	<pre> ACOD 1600 TCPP NO PII NO AUXP NO TARG CLEN 1 BILN NO OABS INST IDC YES DCNO 10 NDNO 10 * 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 </pre>	<pre> 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 ATTR NO TRRL NO SGRP 0 ARDN NO CTBL 0 AACR NO </pre>
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Next, configure virtual trunk members using the Communication Server 1000E 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 160 0 0 0
DATE
PAGE
DES VIR_TRK
TN 160 0 00 00 VIRTUAL
TYPE IPTI
CDEN 8D
CUST 0
XTRK VTRK
ZONE 00253
TIMP 600
BIMP 600
AUTO_BIMP NO
NMUS NO
TRK ANLG
NCOS 0
RTMB 100 1
CHID 1
TGAR 1
STRI/STRO WNK WNK
SUPN YES
AST NO
IAPG 0
CLS TLD DTN CND ECD WTA LPR APN THFD XREP SPCD MSBT
P10 NTC
TKID
AACR NO

```

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.

<pre> Overlay 86 CUST 0 FEAT rlb RLI 24 ELC NO ENTR 0 LTER NO ROUT 100 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 0 </pre>	 <pre> CTBL 0 ISDM 0 FCI 0 FSNI 0 BNE NO DORG NO SBOC NRR PROU 1 IDBB DBD IOHQ NO OHQ NO CBQ NO ISET 0 NALT 5 MFRL 0 OVLL 0 </pre>
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Next, configure Special Prefix Number(s) (SPN) which users will dial to reach PSTN numbers. Use the Communication Server 1000E system terminal and **Overlay 90**. The following are some example SPN 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.

SPN 999	SPN 90	SPN 2	SPN 15
FLEN 3	FLEN 7	FLEN 7	FLEN 3
ITOH NO	ITOH NO	ITOH NO	ITOH NO
CLTP NONE	CLTP NONE	CLTP NONE	CLTP NONE
RLI 24	RLI 24	RLI 24	RLI 24
SDRR NONE	SDRR NONE	SDRR NONE	SDRR NONE
ITEI NONE	ITEI NONE	ITEI NONE	ITEI NONE

5.7. 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 Unistim IP telephone. Load **Overlay 20** at the system terminal and enter the following values. A unique five digit number is entered for the **KEY 00** and **KEY 01** value. The value for **CFG_ZONE** is the value used in **Section 5.4** for **VIRTUALSETS**.

```

Overlay 20 IP Telephone configuration
DES 1140
TN 096 0 01 16 VIRTUAL
TYPE 1140
CDEN 8D
CTYP XDLC
CUST 0
NUID
NHTN
CFG_ZONE 00254
CUR_ZONE 00254
ERL 0
ECL 0
FDN 0
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 1
SCI 0
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
FDSO NOVQ VOLA VOUD CDMR PRED RECA MCDD T87D SBMD KEM3 MSNV FRA PKCH MUTA MWTD

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```

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```
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 52000 0      MARP
      CPND
        CPND_LANG ROMAN
          NAME IP1140
          XPLN 10
          DISPLAY_FMT FIRST, LAST
01 MCR 52000 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 CCBD RTDD RBDD RBHD PGND OCBD 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
```

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```
MLNG ENG
DNDR 0
KEY 00 MCR 52001 0      MARP
      CPND
        CPND_LANG ROMAN
          NAME Digital Set
          XPLN 10
          DISPLAY_FMT FIRST, LAST
01 MCR 52001 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 T.38 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 52002
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 HBTB IRGD DDGA NAMA MIND
NRWD NRCN NROD SPKD CRD PRSD MCRD
EXR0 SHL SMSD ABDD CFHD DNDY DNO3
CWND USMD USRD CCBN BNRD OCBN 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

```

5.8. Configure the SIP Line Gateway Service

SIP terminal operation requires the Communication Server node to be configured as a SIP Line Gateway (SLG) before SIP telephones can be configured. Prior to configuring the SIP Line node properties, the SIP Line service must be enabled in the customer data block. Use the Communication Server 1000E system terminal and overlay 15 to activate SIP Line services, as in the following example where **SIPL_ON** is set to **YES**. The numerical value entered for the **UAPR** setting will be pre-appended to all SIP Line phones, and is used internally to track SIP phones.

```
SLS_DATA
SIPL_ON YES
UAPR 78
NMME NO
```

Use Element Manager and navigate to **System → IP Network → IP Telephony Nodes → Node Details → SIP Line Configuration**. In the **General** section, configure the **SIP domain name**, **SLG Local SIP port** and **SLG Local Tls port**. The **SIP domain Name** must match that configured in **Section 6.5.1**.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » SIP Line Configuration

Node ID: 1231 - 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:

SIP Line Gateway Settings

Security policy:

Number of byte re-negotiation:

Options: Client authentication

* Required Value.

Note: Changes made on this page will NOT be transmitted until the Node is also saved.

Scroll down to the **Branch / GR Office Settings** area. The IP address for **MO SLG IPv4 address** is the system **NODE Ipv4 address**, previously configured in **Section 5.3**. The **MO SLG port** and **MO SLG transport** values will be 5070 and TCP. Click on the **Save** button when finished.

AVAYA CS1000 Element Manager

Managing: 192.168.51.21 Username: admin
System » IP Network » IP Telephony Nodes » Node Details » SIP Line Configuration

Node ID: 1231 - SIP Line Configuration Details

General | SIP Line Gateway Settings | SIP Line Gateway Service

SIP Line Gateway Settings

Security policy: Best Effort
Number of byte re-negotiation: 0
Options: Client authentication
 x509 Certificate authentication enabled

SIP Line Gateway Service

Branch / GR Office Settings:

SLG role: MO
SLG mode: S1/S2
MO SLG IPv4 address: 192.168.51.34
The IP address can have either IPv4 or IPv6 format based on the value of "TLAN address type"
MO SLG IPv6 address:
MO SLG port: 5070 (1 - 65535)
MO SLG transport: TCP

* Required Value. Note: Changes made on this page will NOT be transmitted until the Node is also saved. [Save] [Cancel]

5.9. Configure SIP Line Telephones

When SIP Line service configuration is completed, use the Communication Server 1000E 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 set for **SIPLINEZONE** in **Section 5.4**. A unique telephone number is entered for value **KEY 00**. The value for **KEY 01** is comprised of the **UAPR** value (set to 78 previously in **Section 5.8**) and the telephone number used in **KEY 00**.

```
Overlay 20 - SIP Telephone Configuration
DES SIPD
TN 096 0 01 15 VIRTUAL
TYPE UEXT
CDEN 8D
CTYP XDLC
CUST 0
UXTY SIPL
MCCL YES
SIPN 1
SIP3 0
FMCL 0
TLSV 0
SIPU 52003
NDID 5
SUPR NO
SUBR DFLT MWI RGA CWI MSB
UXID
NUID
NHTN
CFG_ZONE 00004
CUR_ZONE 00004
ERL 0
ECL 0
VSIT NO
FDN
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
XLST
SCPW 52003
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

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```

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```
UDI RCC HBTD AHA IPND DDGA NAMA MIND PRSD NRWD NRCD NROD
DRDD EXR0
USMD USRD ULAD CCBD RTDD RBDD RBHD PGND OCBF FLXD FTTC DNDY DNO3 MCBN
FDSO 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 52003 0 MARP
CPND
CPND_LANG ROMAN
NAME Sigma 1140
XPLN 11
DISPLAY_FMT FIRST, LAST*
01 HOT U 7852003 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
```

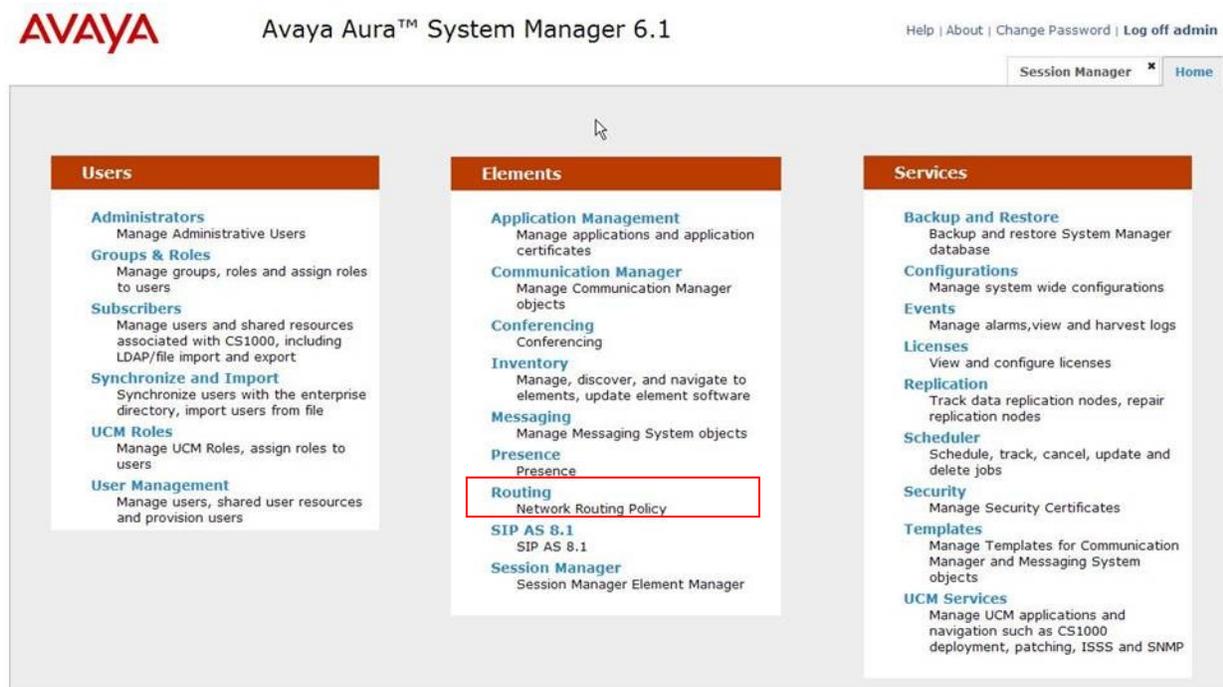
6. Configuring Avaya Aura® Session Manager

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

- Log in to System Manager
- Administer SIP domain
- Administer Locations
- Administer Adaptations
- Administer SIP Entities
- Administer Entity Links
- Administer Routing Policies
- Administer Dial Patterns
- Administer Avaya Communication Server 1000E as Managed Element

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** screen will be presented with menu options shown below.



6.2. Administer SIP Domain

To add the SIP domain that will be used with Session Manager, select **Routing** from the **Elements** menu and in the resulting screen select **Domains** under **Routing** from left-hand menu. Click the **New** button (not shown) to create a new SIP domain entry. In the **Name** field enter the domain name (e.g., **umlab.local**) and optionally a description for the domain in the **Notes** field. Click **Commit** to save changes.

The screenshot shows the Avaya Aura System Manager 6.1 interface. The top navigation bar includes the Avaya logo, the title "Avaya Aura™ System Manager 6.1", and links for "Help | About | Change Password | Log off admin". The breadcrumb trail is "Home / Elements / Routing / Domains - Domain Management". The left-hand menu is expanded to "Routing", with "Domains" highlighted. The main content area is titled "Domain Management" and contains a table with one item. The table has columns for "Name", "Type", "Default", and "Notes". The row contains the values "umlab.local", "SIP", a checked checkbox, and "Avaya Blue CStabs SIP Domain". There are "Commit" and "Cancel" buttons at the top right and bottom right of the table area.

Name	Type	Default	Notes
umlab.local	SIP	<input checked="" type="checkbox"/>	Avaya Blue CStabs SIP Domain

6.3. Administer Locations

Locations can be used to identify logical and/or physical locations where SIP Entities reside for the purposes of bandwidth management. One location is added to the sample configuration for the enterprise SIP entities. Under **Routing** select **Locations** from the left-hand menu. Under **General**, in the **Name** field enter an informative name for the location. Scroll to the bottom of the page and under **Location Pattern**, click **Add**, then enter an **IP Address Pattern** in the resulting new row, The character '*' is used to specify any number of allowed characters at the end of the string. Below is the location configuration used for the simulated Enterprise site.

The screenshot displays the Avaya Aura System Manager 6.1 interface. The left-hand navigation menu has 'Locations' highlighted. The main content area shows the 'Location Details' page for 'Marlborough Street Lab'. The 'General' section contains the following fields:

- Name: Marlborough Street Lab
- Notes: Leeds

The 'Overall Managed Bandwidth' section shows:

- Managed Bandwidth Units: Mbit/sec
- Total Bandwidth: 1000

The 'Per-Call Bandwidth Parameters' section shows:

- Default Audio Bandwidth: 80 Kbit/sec

The 'Location Pattern' section includes an 'Add' button and a table with one entry:

IP Address Pattern	Notes
192.168.51.*	Marlborough Street Lab

6.4. Administer Adaptations

To ensure that the E.164 numbering format is used between the enterprise and BT SIP Trunk Service, an adaptation module is used to perform some digit manipulation. This adaptation is applied to the Communication Server 1000E SIP entity. To add an adaptation, under **Routing** select **Adaptations** from the left-hand menu and then click on the **New** button (not shown).

Under **Adaption 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 **CS1000Adapter** in the resulting New Module Name field



The screenshot displays the Avaya Aura System Manager 6.1 interface. The left-hand navigation menu is expanded to show 'Routing', with 'Adaptations' highlighted. The main content area is titled 'Adaptation Details' and shows the 'General' tab. The 'Adaptation name' field contains the text 'adapt PRIM_SS_LEADER'. The 'Module name' field is a dropdown menu currently showing 'CS1000Adapter'. Below these fields are input boxes for 'Module parameter:', 'Egress URI Parameters:', and 'Notes:'. The top right of the interface includes the Avaya logo, the title 'Avaya Aura™ System Manager 6.1', and navigation links for 'Help', 'About', 'Change Password', and 'Log off admin'. The breadcrumb trail at the top reads 'Home / Elements / Routing / Adaptations - Adaptation Details'. There are 'Commit' and 'Cancel' buttons at the bottom right of the form area.

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 destination has been selected.

This will ensure any destination numbers received from Communication Server 1000E are converted to the E.164 numbering format before being processed by Session Manager. The following screenshot shows the settings used.

Matching Pattern	Min	Max	Phone Context	Delete Digits	Insert Digits	Address to modify	Notes
*003	*3	*36	PrivateSpecia	*2	+	destination	Ireland IDD Code
*0113	*4	*36	PrivateSpecia	*1	+44	destination	Leeds Area STD Code
*0121	*4	*36	PrivateSpecia	*1	+44	destination	Birmingham Area STD Code
*0131	*4	*36	PrivateSpecia	*1	+44	destination	Edinburgh Area STD Code
*01903	*5	*36	PrivateSpecia	*1	+44	destination	Worthing Area STD Code
*0191	*4	*36	PrivateSpecia	*1	+44	destination	Tyneside Area STD Code
*020	*3	*36	PrivateSpecia	*1	+44	destination	London Area STD Code
*05	*2	*36		*0	+	both	Type:E164 Local, special rule
*07	*2	*36	PrivateSpecia	*1	+44	destination	UK Mobile Services
*x	*1	*36	cdp.udp	*0	55	both	Type:Level 0 Regional, special rule
*x	*1	*36	PrivateSpecia	*0	56	both	Type:Special, general rule
*x	*1	*36	+1	*0	+1	both	Type:E164 National, special rule

Under **Digit Conversion for Outgoing Calls from Session Manager** 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 destination has been selected.

This will ensure any destination numbers will have the + symbol and international dialing code removed before being presented to Communication Server 1000E. See the following screenshot for the settings used.

Digit Conversion for Outgoing Calls from SM

Add Remove

3 Items Refresh Filter: Enable

<input type="checkbox"/>	Matching Pattern	Min	Max	Phone Context	Delete Digits	Insert Digits	Address to modify	Notes
<input type="checkbox"/>	*#	*1	*36	udp	*0		both	Type:Level 1 Regional Entity:PRIM
<input type="checkbox"/>	*+4420	*5	*36		*3	0	destination	IC BT NOAS Call translation
<input type="checkbox"/>	*55	*2	*36	cdp.udp	*2		both	Type:Level 0 Regional Entity:PRIM

6.5. Administer SIP Entities

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

Under **SIP Entity Details** → **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 signaling interface on the connecting system.
- In the **Type** field use **Session Manager** for a Session Manager SIP entity, **Other** for a Communication Server 1000E SIP entity.
- 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 enterprise site configuration there are three SIP Entities configured.

- Avaya Aura® Session Manager SIP Entity
- Communication Server 1000E SIP Entity
- Avaya Aura® Session Border Controller SIP Entity

6.5.1. Avaya Aura® Session Manager SIP Entity

The following two screens show the SIP entity for Session Manager. The **FQDN or IP Address** field is set to the IP address of the Session Manager SIP signaling interface.

AVAYA Avaya Aura™ System Manager 6.1 Help | About | Change Password | Log off admin

Routing x Home

Home / Elements / Routing / SIP Entities - SIP Entity Details

SIP Entity Details

General

* Name: Leeds SM 6.1

* FQDN or IP Address: 192.168.51.46

Type: Session Manager

Notes:

Location: Marlborough Street Lab

Outbound Proxy:

Time Zone: Europe/London

Credential name:

SIP Link Monitoring: Use Session Manager Configuration

The Session Manager must be configured with the port numbers of 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 **umlab.local** as the default domain.

Port	Protocol	Default Domain	Notes
5060	TCP	umlab.local	
5060	UDP	umlab.local	
5061	TLS	umlab.local	

6.5.2. Avaya Communication Server 1000E SIP Entity

The following screenshot shows the SIP entity for Communication Server 1000E. The **Type** is set to **Other**. The **FQDN or IP Address** field is set to the Communication Server 1000E node IP address. For the **Adaptation** field, select the adaptation module previously defined for dial plan digit manipulation in **section 6.4**.

Avaya Aura™ System Manager 6.1

Home / Elements / Routing / SIP Entities - SIP Entity Details

SIP Entity Details

General

* Name: PRIM_SS_LEADER

* FQDN or IP Address: 192.168.51.34

Type: Other

Notes: GR PRIME SITE

Adaptation: adapt_PRIM_SS_LEADER

Location: [Dropdown]

Time Zone: Europe/London

Override Port & Transport with DNS SRV:

* SIP Timer B/F (in seconds): 4

Credential name: [Text Field]

Call Detail Recording: none

SIP Link Monitoring: Link Monitoring Enabled

6.5.3. Avaya Aura® Session Border Controller SIP Entity

The following screen shows the SIP Entity for the AASBC. The **FQDN or IP Address** field is set to the IP address of the AASBC private network interface.

The screenshot displays the Avaya Aura System Manager 6.1 interface. The left sidebar shows a navigation menu with 'SIP Entities' highlighted. The main content area is titled 'SIP Entity Details' and shows the configuration for 'Romford AASBC 6.0'. The 'FQDN or IP Address' field is set to '192.168.131.122'. Other fields include 'Name' (Romford AASBC 6.0), 'Type' (Other), 'Notes' (Avaya Aura SBC), 'Adaptation' (empty), 'Location' (Romford Avaya Lab), 'Time Zone' (Europe/London), 'SIP Timer B/F (in seconds)' (4), 'Credential name' (empty), and 'Call Detail Recording' (none). The 'SIP Link Monitoring' section at the bottom is set to 'Link Monitoring Enabled'.

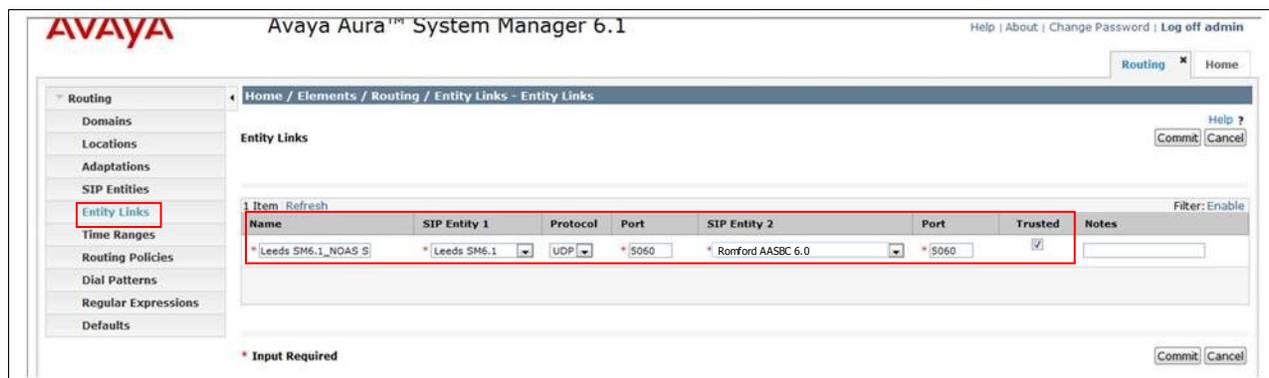
Field	Value
Name	Romford AASBC 6.0
FQDN or IP Address	192.168.131.122
Type	Other
Notes	Avaya Aura SBC
Adaptation	
Location	Romford Avaya Lab
Time Zone	Europe/London
Transport with DNS SRV	<input type="checkbox"/>
SIP Timer B/F (in seconds)	4
Credential name	
Call Detail Recording	none
SIP Link Monitoring	Link Monitoring Enabled

6.6. Administer Entity Links

A SIP trunk between a 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 from which the other system expects to receive SIP requests.
- Select the **Trusted** tick box to make the other system trusted.

Click **Commit** to save changes. The following screen shows the Entity Link used in the compliance test configuration between Session Manager and AASBC.



Avaya Aura™ System Manager 6.1

Home / Elements / Routing / Entity Links - Entity Links

Name	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted	Notes
* Leeds SM6.1_NOAS S	* Leeds SM6.1	UDP	* 5060	* Romford AASBC 6.0	* 5060	<input checked="" type="checkbox"/>	

* Input Required

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 (see next screenshot) 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 1000E. The **SIP Entity as Destination** value is set to **PRIM_SS_LEADER**, as entered in **Section 6.5.2**. The **Time of Day** is set to 24 hour by 7 day operation.

The screenshot displays the Avaya Aura System Manager 6.1 interface. The left sidebar shows the navigation menu with 'Routing Policies' highlighted. The main content area is titled 'Routing Policy Details' and is divided into three sections: 'General', 'SIP Entity as Destination', and 'Time of Day'. The 'General' section shows the policy name 'Incoming to Leeds CS1000 Direct', a 'Disabled' checkbox, and a note 'Calls to Prim_SS_Leader'. The 'SIP Entity as Destination' section shows a table with one entry: 'PRIM_SS_LEADER' with FQDN '192.168.51.34', Type 'Other', and Note 'GR PRIME SITE'. The 'Time of Day' section shows a table with one entry: '0' with Name '24/7', days 'Mon-Sun' checked, Start Time '00:00', End Time '23:59', and Note 'Time Range 24/7'.

Name	FQDN or IP Address	Type	Notes
PRIM_SS_LEADER	192.168.51.34	Other	GR PRIME SITE

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

The following screen shows the routing policy for the AASBC. The **SIP Entity as Destination** value is set to **Romford AASBC 6.0**, as entered in **Section 6.5.3**. The **Time of Day** is set to 24 hour by 7 day operation.

The screenshot displays the Avaya Aura System Manager 6.1 interface for configuring a Routing Policy. The breadcrumb trail is Home / Elements / Routing / Routing Policies - Routing Policy Details. The left-hand navigation menu includes Domains, Locations, Adaptations, SIP Entities, Entity Links, Time Ranges, Routing Policies (highlighted with a red box), Dial Patterns, Regular Expressions, and Defaults. The main content area is titled 'Routing Policy Details' and contains the following sections:

- General:**
 - Name: Romford AASBC
 - Disabled:
 - Notes: outbound calls to NOAS using AA
- SIP Entity as Destination:**
 - Select: Romford AASBC 6.0
- Time of Day:**
 - Buttons: Add, Remove, View Gaps/Overlaps
 - Summary: 1 Item | Refresh | Filter: Enable
 - Table:

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

At the bottom of the Time of Day section, there is a 'Select' dropdown menu currently set to '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 (see below) and then click on the **New** button (not shown).

Under **Dial Pattern Details** → **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 the domain configured in **Section 6.2**

Under **Originating Locations and Routing Policies**, click **Add**. In the resulting screen (not shown) under **Originating Location** select **ALL** and under **Routing Policies** select one of the routing policies defined in **Section 6.7**. Click **Select** button to save. The following screen shows an example dial pattern configured for BT SIP Trunk Service. Note the ranking for each routing policy as applied in **Section 6.7**. The routing policy with the lowest rank will be selected first, if this route is unavailable or does not respond then the routing policy with the next lowest rank will be selected and so on. This allows for redundant routing within Session Manager.

The screenshot displays the 'Dial Pattern Details' configuration page. The left sidebar shows the navigation menu with 'Dial Patterns' highlighted. The main content area is divided into two sections: 'General' and 'Originating Locations and Routing Policies'.

General Section:

- Pattern:** +3
- Min:** 2
- Max:** 15
- Emergency Call:**
- SIP Domain:** -ALL-
- Notes:** international Irish calls

Originating Locations and Routing Policies Section:

Buttons: Add, Remove

6 Items Refresh Filter: Enable

<input type="checkbox"/>	Originating Location Name 1 ▲	Originating Location Notes	Routing Policy Name	Rank 2 ▲	Routing Policy Disabled	Routing Policy Destination	Routing Policy Notes
<input type="checkbox"/>	-ALL-	Any Locations	SIP Trunk calls to Man2	30	<input checked="" type="checkbox"/>	NOAS SBC Man2	c
<input type="checkbox"/>	-ALL-	Any Locations	SIP Trunk calls to Man1	40	<input checked="" type="checkbox"/>	NOAS SBC Man1	d
<input type="checkbox"/>	-ALL-	Any Locations	Outbound calls to AASBC for NOAS	5	<input checked="" type="checkbox"/>	Romford AASBC 6.0	
<input type="checkbox"/>	-ALL-	Any Locations	Romford AASBC	5	<input type="checkbox"/>	Romford AASBC 6.0	outbound calls to NOAS using AASBC
<input type="checkbox"/>	-ALL-	Any Locations	SIP Trunk Calls to Birm2	60	<input checked="" type="checkbox"/>	NOAS SBC Birm2	a
<input type="checkbox"/>	-ALL-	Any Locations	SIP Tunk calls to Birm1	70	<input checked="" type="checkbox"/>	NOAS SBC Birm1	b

Select : All, None

The following screen shows an example dial pattern configured for Communication Server 1000E.

The screenshot displays the 'Dial Pattern Details' configuration page. The left sidebar shows a navigation menu with 'Dial Patterns' highlighted. The main content area is titled 'Dial Pattern Details' and includes a 'General' section with the following fields:

- Pattern:** +44207960325
- Min:** 12
- Max:** 36
- Emergency Call:**
- SIP Domain:** -ALL-
- Notes:** Inbound DDI +44207 96325X from NOAS Serv

Below the 'General' section is the 'Originating Locations and Routing Policies' section, which contains a table with one entry:

Originating Location Name	Originating Location Notes	Routing Policy Name	Rank	Routing Policy Disabled	Routing Policy Destination	Routing Policy Notes
<input type="checkbox"/> NOAS SIP Service		Incoming to Leads CS1000 Direct	0	<input type="checkbox"/>	PRIM_SS_LEADER	Calls to Prim_SS_Leader

At the bottom of the table, there is a 'Select' dropdown menu set to 'All, None'.

7. Configure Avaya Aura® Session Border Controller

This section describes the configuration of the AASBC. This configuration is done in two parts. The first part is done during the AASBC installation via the installation wizard. These Application Notes will not cover the AASBC installation in its entirety but will include the use of the installation wizard. For information on installing the System Platform and the loading of the AASBC template see **Reference [1] & [2]**. The second part of the configuration is done after the installation is complete using the AASBC web interface.

7.1. Installation Wizard

During the installation of the AASBC template, the installation wizard will prompt the installer for information that will be used to create the initial configuration of the AASBC. The first screen of the installation wizard is the Network Settings screen. Fill in the fields as described below and shown in the following screen:

- In the **IP Address** field enter the IP address of the private side of the AASBC
- In the **Hostname** field enter a host name for the AASBC
- Specify a domain in the **Domain** and **Default Domain** fields

Click **Next Step** to continue.

AVAYA

Home

Configuration

Installation

- Load
- Network Settings
- Logins
- VPN Access
- SBC
- Summary
- Save

Network Settings

Enter network settings

Domain-0 IP Address: 192.168.131.120

CDom IP Address: 192.168.131.121

Gateway IP Address: 192.168.131.0

Network Mask: 255.255.255.0

Primary DNS:

Secondary DNS (Optional):

Default Search List (Optional):

HTTPS Proxy (Optional) [IP Address:Port Number]:

Virtual Machine	IP Address	Hostname	Domain
SBC	192.168.131.122	rom-aasbc	rom2.bt.com (Optional)

Default Domain: rom2.bt.com (Optional)

Apply to all VMs

Previous Step Next Step

From the Logins screen specify passwords for the services logins to the AASBC. Click **Next Step** to continue.

Login name	Password	Re-type password
craft
init
dadmin

VPN remote access to the AASBC was not part of the compliance test. Thus, on the VPN Access screen, select **No** to the question, **Would you like to configure the VPN remote access parameters for System Platform?**, click **Next Step** to continue.

Would you like to configure the VPN remote access parameters for System Platform?

Yes No

VPN Access Configuration

VPN Router IP Address (Optional)

Remote Access Network

Remote Access Network Subnet Mask

The data on this page is used to configure static routes on System Platform to enable remote VPN access to the component applications and the Avaya Aura™ System Platform Web Console.

Once the template has been installed, the user must access the Avaya Aura™ System Platform Web Console and check the "Server Management -> Static Route Configuration" page to verify that the static routes configured by the Wizard are suitable for the intended remote access application.

If in doubt, please refer to the documentation.

On the **SBC** screen, in the **SIP Service Provider Data** section fill in the fields as described below and shown in the following screen:

- In the **Service Provider** select the name of the service provider to which the AASBC will connect. This will allow the wizard to select a configuration file customized for this service provider. At the time of the compliance test, a customized configuration file did not exist for BT. Therefore, **Generic** was chosen
- In the **Port** field enter the port number that BT uses to listen for SIP traffic
- In the **IP Address1** and **IP Address2** fields enter the first two BT provided IP addresses for the SIP Trunk Service. The remaining IP addresses will be added after the AASBC template is installed (**Section 7.3**)
- In the **Signaling/Media Network1** field enter the BT provided subnet where media traffic will originate. An additional subnet can be provided for **Signaling/Media Network2**
- In the **Media Netmask** field enter the netmask corresponding to the Media Network

Scroll down to continue.

The screenshot shows the Avaya SBC configuration interface. The left sidebar contains a navigation menu with options like Configuration, Installation, Load, Network Settings, Logins, VPN Access, SBC, Summary, and Save. The main content area is titled 'SBC Session Border Controller Data' and contains a sub-section 'SIP Service Provider Data'. This sub-section has a table with the following fields:

Service Provider	Port	IP Address1	Signalling/Media Network1	Signalling/Media Netmask1	IP Address2 (Optional)	Signalling/Media Network2 (Optional)	Signalling/Media Netmask2 (Optional)	Hunting (Optional)
Generic	5060	192.168.5.62	192.168.5.0	255.255.255.0	192.168.5.58	192.168.5.0	255.255.255.0	

Further down on the same **SBC** screen, in the **SBC Network Data** section fill in the fields as described below:

- In the **Public IP Address** field enter the IP address of the public side of the AASBC
- In the **Public Net Mask** field enter the netmask associated with the public network to which the AASBC connects
- In the **Public Gateway** field enter the default gateway of the public network

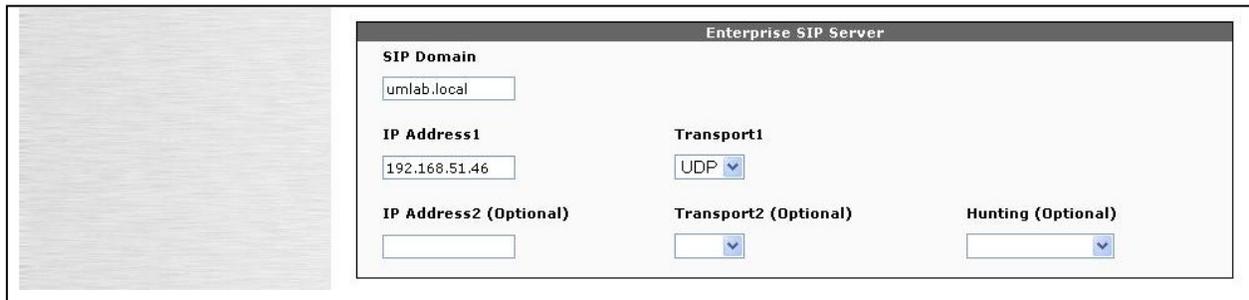
The screenshot shows the 'SBC Network Data' section of the configuration screen. It contains a table with the following data:

Interface	IP Address	Net Mask	Gateway
Private (Management)	192.168.131.122	255.255.255.0	192.168.131.0
Public	192.168.4.9	255.255.255.0	192.168.4.1

In the **Enterprise SIP Server** section fills in the fields as described below:

- In the **IP Address1** field enter the IP address of the Enterprise SIP Server to which the AASBC will connect. In the case of the compliance test, this is the IP address of the Session Manager SIP signaling interface
- In the **Transport1** field select the transport protocol to be used for SIP traffic between the AASBC and Session Manager
- In the **SIP Domain** field enter the enterprise SIP domain

Click **Next Step** to continue. A summary screen will be displayed (not shown). Check the displayed values and click **Next Step** again to install the template with the values entered.

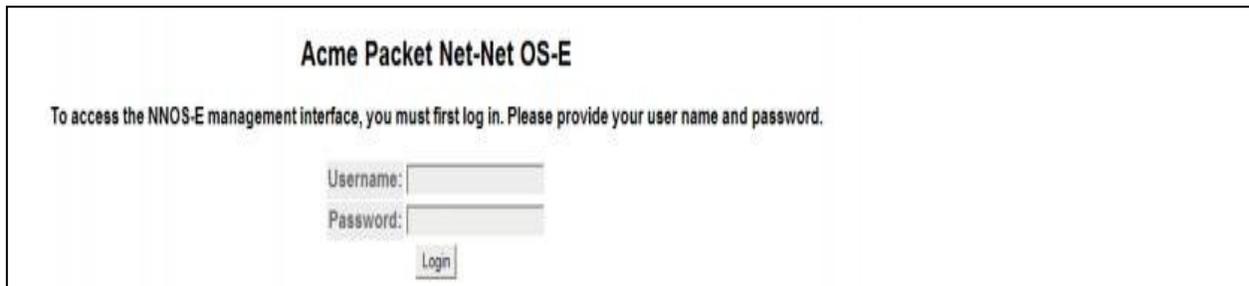


The screenshot shows a configuration window titled "Enterprise SIP Server". It contains several input fields and dropdown menus:

- SIP Domain:** A text input field containing "umlab.local".
- IP Address1:** A text input field containing "192.168.51.46".
- Transport1:** A dropdown menu with "UDP" selected.
- IP Address2 (Optional):** An empty text input field.
- Transport2 (Optional):** A dropdown menu with an arrow pointing down.
- Hunting (Optional):** A dropdown menu with an arrow pointing down.

7.2. Access Avaya Aura® Session Border Controller

Access the AASBC using a web browser by entering the URL **https://<ip-address>**, where <ip-address> is the private IP address configured in Section 7.1. Log in with the appropriate credentials.



The screenshot shows the login page for "Acme Packet Net-Net OS-E". The page title is "Acme Packet Net-Net OS-E". Below the title, there is a message: "To access the NNOS-E management interface, you must first log in. Please provide your user name and password." Below this message, there are two input fields: "Username:" and "Password:". Below the "Password:" field, there is a "Login" button.

7.3. Add Additional Service Provider IP Addresses

To add the additional IP addresses for the remaining BT SBCs that were not configured during the AASBC installation click on the **Configuration** tab and browse to **vsp** → **enterprise** → **servers** → **sip-gateway Telco** → **server-pool**. A list of the IP addresses already configured in the server pool is displayed in the right hand pane. Click the **Add server** link.

The screenshot shows the Avaya Aura Configuration interface. The breadcrumb path is Configuration > vsplenterprise\servers\sip-gateway Telco\server-pool. A table lists existing servers:

server	admin	host	transport	port	outbound-normalization	inbound-normalization	admission-control
server Telco1	enabled	192.168.5.62	UDP	5060	Configure	Configure	disabled
server Telco2	enabled	192.168.5.58	UDP	5060	Configure	Configure	disabled

An **Add server** button is highlighted with a red box. Below the table are buttons for 'Set', 'Reset', and 'Back'.

In the resulting page enter a name for the server in the server-name field and an IP address in the host field. Click **Create** to continue.

The screenshot shows the 'Create vsplenterprise\servers\sip-gateway Telco\server-pool\server - Step 1 of 1: Edit server' page. The page prompts the user to provide basic information for the server. The 'General' section contains the following fields:

- * server-name: Telco3
- * host: 192.168.5.54 (host name or n.n.n.n)

Buttons for 'Create', 'Reset', and 'Cancel' are visible at the bottom.

In the resulting page verify the details entered and click the **Set** button.

The screenshot shows the Avaya Aura Configuration interface. The main heading is "Configure vsplenterprise\servers\sip-gateway Telco\server-pool\server Telco3". Below this, there are buttons for "Set", "Reset", "Back", "Copy", and "Delete". The "Set" button is highlighted with a red box. The "General" section contains the following fields:

- * server-name: Telco3
- admin: enabled (Resource is active)
- * host: 192.168.5.54 (host name or n.n.n.n)

Repeat these steps for each additional IP address that needs to be added to the AASBC server pool. The screen below shows the server pool that was configured for the compliance test.

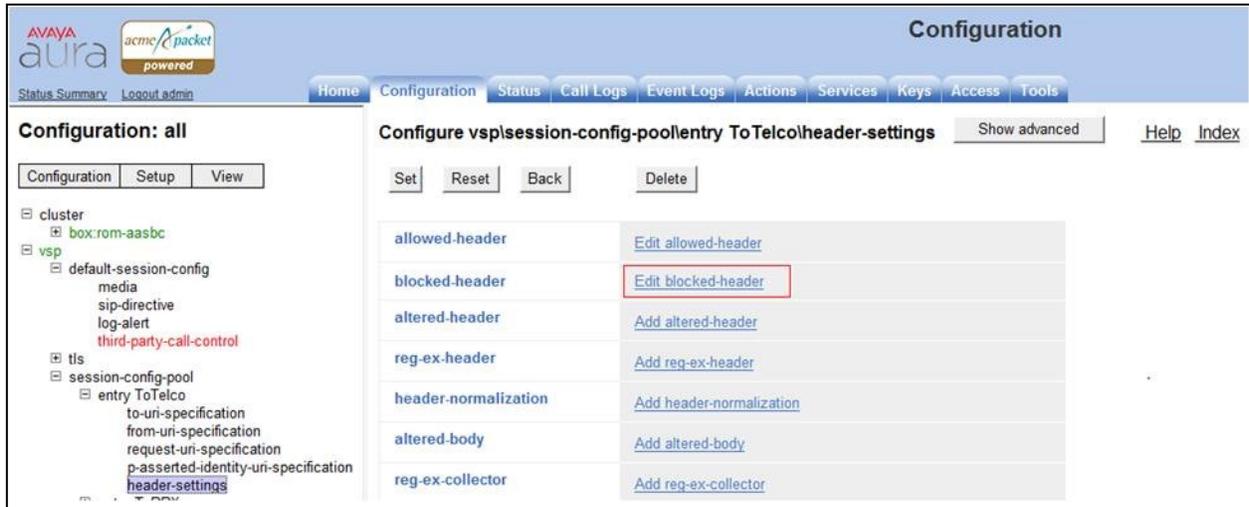
The screenshot shows the Avaya Aura Configuration interface displaying a list of servers in a Telco server pool. The main heading is "Configure vsplenterprise\servers\sip-gateway Telco\server-pool". Below this, there are buttons for "Set", "Reset", "Back", and "Delete". The "server" section contains a table with the following data:

		server	admin	host	transport	port	outbound-normalization	inbound-normalization	admission-control
▼	Edit Delete	server Telco1	enabled	192.168.5.62	UDP	5060	Configure	Configure	disabled
▲▼	Edit Delete	server Telco2	enabled	192.168.5.58	UDP	5060	Configure	Configure	disabled
▲▼	Edit Delete	server Telco3	enabled	192.168.5.54	UDP	5060	Configure	Configure	disabled
▲	Edit Delete	server Telco4	enabled	192.168.5.50	UDP	5060	Configure	Configure	disabled

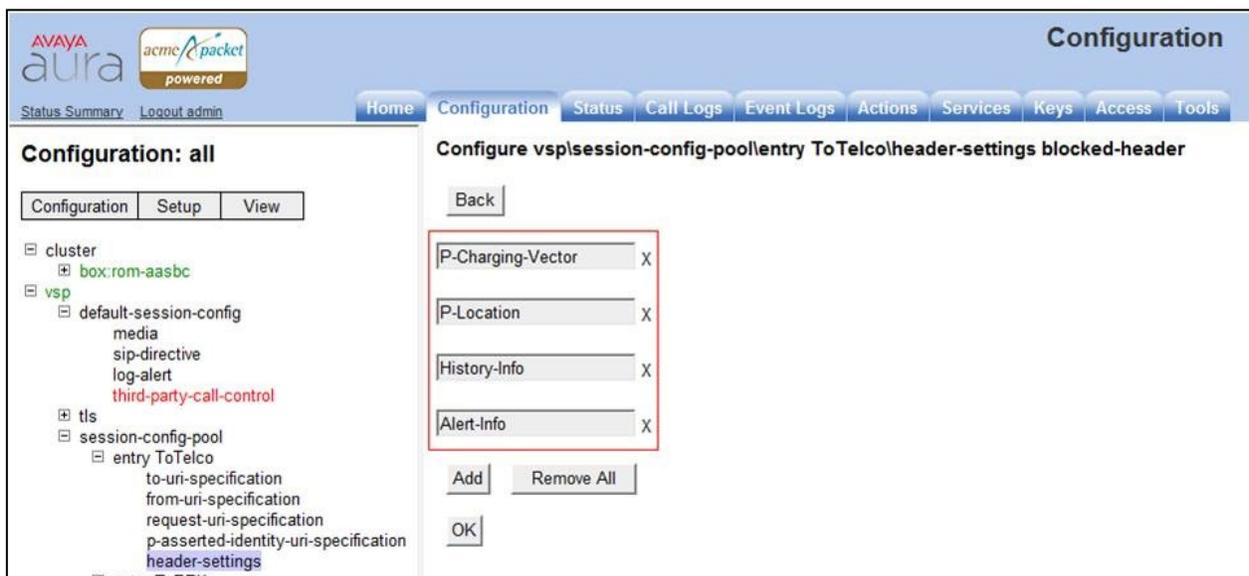
Below the table is an "Add server" link. A red box highlights the table content.

7.4. Stripping SIP Headers

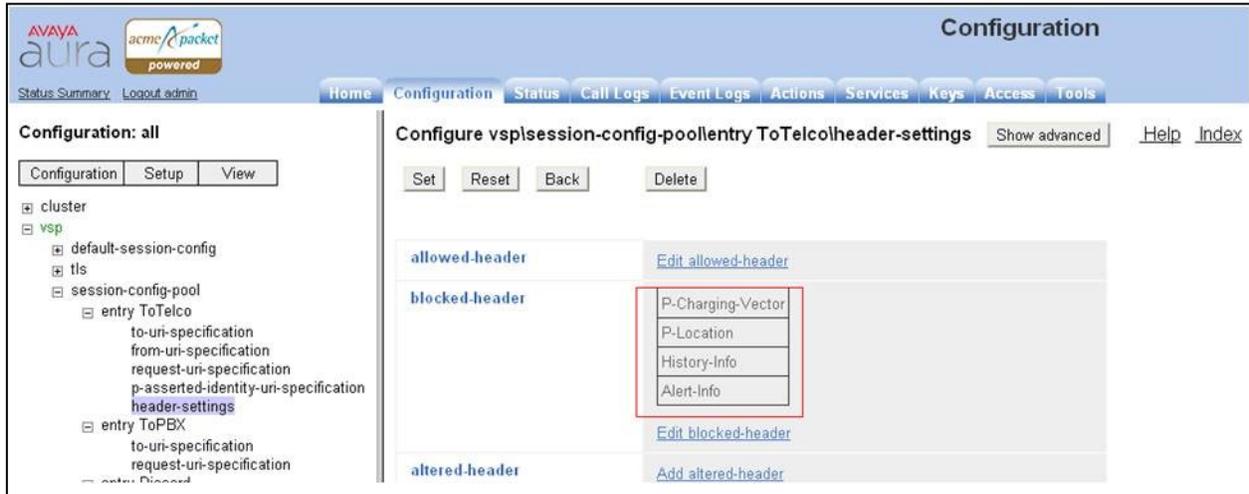
The AASBC can be used to strip SIP headers to prevent particular headers from being sent to the public SIP Service Provider. To strip a SIP header navigate to **vsp** → **session-config-pool** → **entry ToTelco** → **header-settings** and click on the **Edit blocked-header** link.



In the resulting page click the **Add** button to open a new entry field and enter the name of the header to be removed. Repeat this action for all the headers to be removed. Click the **OK** button when finished.

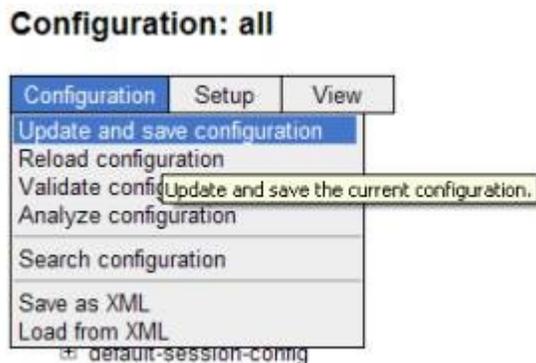


The following screen shows the headers being stripped during testing.



7.5. Save the Configuration

To save the configuration, click on **Configuration** in the left pane to display the configuration menu. Next, select **Update and save configuration**.



8. Service Provider Configuration

The configuration of the BT equipment used to support the BT SIP Trunk Service is outside of the scope for these application notes and will not be covered. To obtain further information on BT equipment and system configuration please contact an authorized BT representative using the contact details provided in **Section 2.3**.

9. Verification Steps

This section provides steps that may be performed to verify that the solution is configured correctly.

1. From System Manager **Home** screen (see **Section 6.1**), click on **Session Manager** under **Elements**, then navigate to **Session Manager** → **System Status** → **SIP Entity Monitoring**. Select the relevant SIP Entity from the list and observe if the **Conn Status** and **Link Status** are showing as up. See the following screenshot for an example.

The screenshot shows the Avaya Aura System Manager 6.1 interface. The breadcrumb navigation is: Home / Elements / Session Manager / System Status / SIP Entity Monitoring - SIP Entity Monitoring. The page title is "SIP Entity, Entity Link Connection Status". Below the title, it says "This page displays detailed connection status for all entity links from all Session Manager instances to a single SIP entity." The main heading is "All Entity Links to SIP Entity: Leeds SM6.1". There is a "Summary View" button. Below that, it says "1 Item | Refresh" and "Filter: Enable". A table displays the connection status for the selected SIP entity.

Details	Session Manager Name	SIP Entity Resolved IP	Port	Proto.	Conn. Status	Reason Code	Link Status
Show	Leeds SM6.1	192.168.51.45	5060	TCP	Up	200 OK	Up

2. From the Communication Server 1000Esystem terminal; load overlay 32 and run the command 'stat vtrm <cust> <x>' where 'cust' is the customer number (usually 0) and 'x' is a previously configured SIP trunk route. Confirm all channels on the trunk group display **IDLE REGISTERED**.

```
stst vtrm 0 100

*****
STATUS OF VTRL IP TRUNK ROUTE AND MBRs
*****

=====
CUST ROUTE PROTOCOL CALL_DIRCTN
0 100 SIP IN AND OUT

DCH 50 SSRC TOTAL 2048 SSRC USED 77 SSRC AVAILABLE 1971

MBR STATUS

IDLE UNREGISTERED 0
IDLE REGISTERED 15
BUSY 0
MBSY 0
DSBL UNREGISTERED 0
DSBL REGISTERED 0
LCKO 0
```

3. Verify that endpoints at the enterprise site can place calls to the PSTN and that the call remains active.
4. Verify that endpoints at the enterprise site can receive calls from the PSTN and that the call remains active.
5. Verify that the user on the PSTN can end an active call by hanging up.
6. Verify that an endpoint at the enterprise site can end an active call by hanging up.

10. Conclusion

These Application Notes describe the configuration necessary to connect Avaya Communication Server 1000E, Avaya Aura® Session Manager and Avaya Aura® Session Border Controller to the BT SIP Trunk Service. BT SIP Trunk Service is a SIP-based Voice over IP solution providing businesses with a flexible, cost-saving alternative to traditional hardwired telephony trunks.

11. References

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

- [1] *Installing and Configuring Avaya Aura® System Platform*, Release 6.0.3, February 2011.
- [2] *Administering Avaya Aura® System Platform*, Release 6.0.3, February 2011.
- [3] *Avaya Communication Server 1000E Installation and Commissioning*, Release 7.5, November 2011, Document Number NN43041-310, 05.06.
- [4] *Feature Listing Reference Avaya Communication Server 1000*, Release 7.5, November 2010, Document Number NN43001-111, 05.01.
- [5] *Installing and Upgrading Avaya Aura® System Manager*, Release 6.1, April 2011, Document Number 03-603473.
- [7] *Administering Avaya Aura® Session Manager*, Release 6.1, March 2011, Document Number 03-603324.
- [8] RFC 3261 *SIP: Session Initiation Protocol*, <http://www.ietf.org/>

Appendix A – Avaya Communication Server 1000 Software

Avaya Communication Server 1000E call server patches and plug_ins

```
18/08/11 10:33:16
TID: 008808096

VERSION 4021

System type is - Communication Server 1000E/CP PM

CP PM - Pentium M 1.4 GHz

IPMGs Registered:          4
IPMGs Unregistered:       0
IPMGs Configured/unregistered: 2

RELEASE 7
ISSUE 50 Q +
IDLE SET DISPLAY Avaya 7.5
DepList 1: core Issue: 02 (created: 2010-11-30 15:12:45 (est))

MDP>LAST SUCCESSFUL MDP REFRESH :2010-12-06 15:33:54 (Local Time)
MDP>USING DEPLIST ZIP FILE DOWNLOADED :2010-12-01 08:31:36 (est)
SYSTEM HAS NO USER SELECTED PEPS IN-SERVICE

LOADWARE VERSION: PSWV 100
INSTALLED LOADWARE PEPS : 0
ENABLED PLUGINS : 0
```

Avaya Communication Server 1000E call server deplists

```
VERSION 4021
RELEASE 7
ISSUE 50 Q +
DepList 1: core Issue: 02 (created: 2010-11-30 15:12:45 (est))

IN-SERVICE PEPS
PAT# CR #          PATCH REF #    NAME      DATE      FILENAME      SPECINS
000 wi00832106      ISS1:1OF1    p30550_1    14/12/2010 p30550_1.cpm  NO
001 wi00835093      ISS1:1OF1    p30553_1    14/12/2010 p30553_1.cpm  YES
002 wi00832626      ISS2:1OF1    p30560_2    14/12/2010 p30560_2.cpm  NO
MDP>LAST SUCCESSFUL MDP REFRESH :2010-12-06 15:33:54 (Local Time)
MDP>USING DEPLIST ZIP FILE DOWNLOADED :2010-12-01 08:31:36 (est)
```

Avaya Communication Server 1000E signaling server service updates

Product Release: 7.50.17.00

In system patches: 0

In System service updates: 8

PATCH#	IN_SERVICE	DATE	SPECINS	REMOVABLE	NAME
0	Yes	07/02/11	NO	YES	cs1000-baseWeb-7.50.17.01-1.i386.000
1	Yes	07/02/11	NO	YES	cs1000-linuxbase-7.50.17.04-00.i386.000
2	Yes	07/02/11	NO	YES	cs1000-sps-7.50.17-01.i386.000
3	Yes	07/02/11	NO	YES	cs1000-shared-pbx-7.50.17-01.i386.000
4	Yes	07/02/11	NO	YES	cs1000-bcc-7.50.17.03-00.i386.000
5	Yes	07/02/11	NO	YES	cs1000-Jboss-Quantum-7.50.17.01-1.i386.000
6	Yes	07/02/11	NO	YES	cs1000-vtrk-7.50.17-11.i386.000
7	Yes	07/02/11	NO	YES	cs1000-dmWeb-7.50.17.04-00.i386.001

[admin@primleader-leeds ~]\$ spstat

There is no SP in loaded status. The last applied SP: Service_Pack_Linux_7.50.17_20110118.n11. It is a STANDARD SP. Has been applied by user nortel on Mon Feb 7 14:59:01 2011.

Avaya Communication Server 1000E system software

Product Release: 7.50.17.00

Base Applications

base	7.50.17	[patched]
NTAFS	7.50.17	
sm	7.50.17	
cs1000-Auth	7.50.17	
Jboss-Quantum	7.50.17	[patched]
lhmonitor	7.50.17	
baseAppUtils	7.50.17	
dfoTools	7.50.17	
nnnm	7.50.17	
cppmUtil	7.50.17	
oam-logging	7.50.17	
dmWeb	n/a	[patched]
baseWeb	n/a	[patched]
ipsec	7.50.17	
Snmp-Daemon-TrapLib	7.50.17	
ISECSH	7.50.17	
patchWeb	7.50.17	
EmCentralLogic	7.50.17	

Application configuration: SS_EM

Packages: SS EM

Configuration version:	7.50.17-00	
dbcom	7.50.17	
cslogin	7.50.17	
sigServerShare	7.50.17	[patched]
csv	7.50.17	
tps	7.50.17	
vtrk	7.50.17	[patched]
pd	7.50.17	
sps	7.50.17	[patched]
ncs	7.50.17	
gk	7.50.17	
EmConfig	7.50.17	
emWeb_6-0	7.50.17	
emWebLocal_6-0	7.50.17	
csmWeb	7.50.17	
bcc	7.50.17	[patched]
ftrpkg	7.50.17	
cs1000WebService_6-0	7.50.17	
managedElementWebService	7.50.17	
mscAnnc	7.50.17	
mscAttn	7.50.17	
mscConf	7.50.17	
mscMusc	7.50.17	
mscTone	7.50.17	

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