



## **Avaya Solution & Interoperability Test Lab**

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# **Application Notes for Configuring Avaya Aura® Communication Manager R6.2, Avaya Aura® Session Manager R6.2 and Avaya Session Border Controller for Enterprise to Support Gamma IP Direct Connect SIP Trunking Service – Issue 1.0**

## **Abstract**

These Application Notes describe the steps to configure Session Initiation Protocol (SIP) trunking between Gamma IP Direct Connect SIP Trunking Service and an Avaya SIP enabled enterprise solution. The Avaya solution consists of Avaya Aura® Session Manager, Avaya Aura® Communication Manager and Avaya Session Border Controller for Enterprise. Gamma Telecom is a member of the DevConnect 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 steps to configure Session Initiation Protocol (SIP) trunking between Gamma IP Direct Connect SIP Trunking Service and an Avaya SIP enabled enterprise solution. IP Direct Connect (IPDC) is the product name for Gamma's SIP Trunking service, marketed and sold within the UK via authorised Channel Partners. The service provides VoIP connectivity for certified PBXs, allowing inbound and outbound telephony through Gamma's network for termination to both national and international destinations.

The Avaya solution consists of Avaya Aura® Session Manager, Avaya Aura® Communication Manager and Avaya Session Border Controller for Enterprise (Avaya SBCE). Customers using this Avaya SIP-enabled enterprise solution with the Gamma IPDC Service are able to place and receive PSTN calls via a dedicated Internet connection and the SIP protocol. This converged network solution is an alternative to traditional PSTN trunks. This approach generally results in lower cost for the enterprise.

## 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 Manager, Session Manager and Session Border Controller for Enterprise. The enterprise site was configured to use the IPDC service provided by Gamma.

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 Gamma. Incoming PSTN calls were made to H.323, SIP and Analogue telephones at the enterprise.
- Outgoing calls from the enterprise site were completed via Gamma to PSTN destinations.
- Outgoing calls from the enterprise to the PSTN were made from H.323, SIP and Analogue telephones.
- Calls using G.729A and G.711A codec's.
- Fax calls to/from a group 3 fax machine to a PSTN connected fax machine using G.711 (configuration not described as T.38 is the only Avaya supported method of fax transmission).
- DTMF transmission using RFC 2833 with successful Vector navigation for inbound and outbound calls.
- User features such as hold and resume, transfer, conference, call forwarding, etc.

- Caller ID Presentation and Caller ID Restriction.
- Direct IP-to-IP media (also known as “shuffling”) with SIP and H.323 telephones, and the Avaya Desktop Video Device (Avaya DVD) running Flare Experience.
- 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 Gamma IPDC service with the following observations:

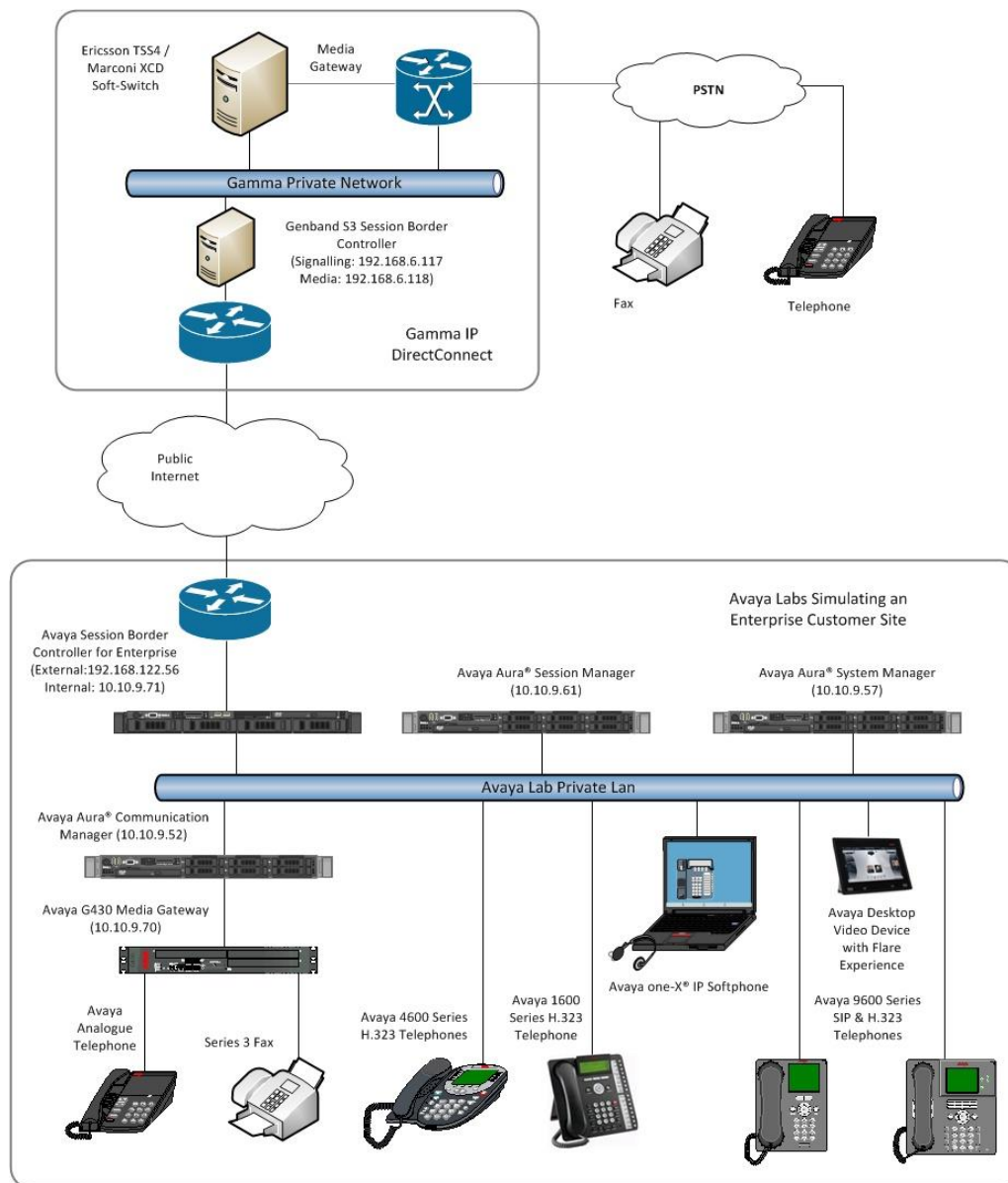
- When ring no answer was tested, the CM responded after 3 minutes with a SIP 480 “Temporarily Unavailable” message. This was not passed on to the network by the Avaya SBCE and was under investigation at the time of writing.
- During Test, SIP 491 “Request Pending” message from Gamma was seen on a small number of seemingly random outgoing calls with no noticeable effect.
- G.729B is not supported by Gamma and the network responds to SDPs that include G.729 and “annexb=yes” with an SDP that includes G.729 and “annexb=no”.
- No test call was made to the Emergency Services Operator as no test was booked.
- No Privacy header was received on incoming calls with withheld CLI. In this case, the equipment displays the user portion of the “From” URI.
- Significant delays were observed in the speech path for all PSTN to PSTN calls. This includes call forwarding, call transfer and EC500.
- T.38 Fax is not supported.

## 2.3. Support

For technical support on Gamma SIP trunking, please contact an authorised Gamma Partner or visit the website at [www.gamma.co.uk](http://www.gamma.co.uk)

### 3. Reference Configuration

**Figure 1** illustrates the test configuration. The test configuration shows an Enterprise site connected to Gamma IPDC. Located at the Enterprise site is the Avaya Session Border Controller for Enterprise, Session Manager and Communication Manager. Endpoints are Avaya 96x0 series and Avaya 96x1 series IP telephones (with SIP and H.323 firmware), Avaya 46xx series IP telephones (with H.323 firmware), Avaya 16xx series IP telephones (with SIP firmware) Avaya A175 Desktop Video Device running Flare Experience, Avaya analogue telephones and an analogue fax machine. Also included in the test configuration was an Avaya one-X® Communicator soft phone running on a laptop PC configured for H.323.



**Figure 1: Gamma IP Direct Connect Solution Topology**

## 4. Equipment and Software Validated

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

Equipment/Software	Release/Version
<b>Avaya</b>	
Avaya Aura® Communication Manager running on Avaya S8800 Server	R6.2 Build R016x.02.0.823.0
Avaya G430 Media Gateway	FW 30.12.1
Avaya Aura® Session Manager running on Avaya S8800 Server	R6.2 Build 6.2.0.0.620110
Avaya Aura® System Manager running on Avaya S8800 Server	R6.2 (System Platform 6.2.0.0.27, Template 6.2.12.0)
Avaya Session Border Controller for Enterprise running on Dell R210 V2 server	4.0.5.Q09
Avaya 1616 Phone (H.323)	1.301
Avaya 4621 Phone (H.323)	2.902
Avaya 9630 Phone (H.323)	3.103
Avaya A175 Desktop Video Device (SIP)	Flare Experience Release 1.1
Avaya 9630 Phone (SIP)	R2.6 SP6
Avaya one-X® Communicator (H.323) on Lenovo T510 Laptop PC	6.1.3.08-SP3-Patch2-35791
Analogue Phone	N/A
<b>Gamma</b>	
Genband S3 SBC	7.1.7.1
Ericsson TSS4 Softswitch	1.2_LSV05_CM09_MP-S20_EP3.3
Marconi XCD Softswitch	4.2.1vc

## 5. Configure Avaya Aura ® Communication Manager

This section describes the steps for configuring Communication Manager for SIP Trunking. SIP trunks are established between Communication Manager and Session Manager. These SIP trunks will carry SIP signalling associated with the Gamma IPDC service. For incoming calls, the Session Manager receives SIP messages from the Avaya Session Border Controller for Enterprise (Avaya SBCE) and directs the incoming SIP messages to Communication Manager. Once the message arrives at Communication Manager, 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 Manager and may be first subject to outbound features such as automatic route selection, digit manipulation and class of service restrictions. Once Communication Manager selects a SIP trunk, the SIP signalling is routed to the Session Manager. The Session Manager directs the outbound SIP messages to the Avaya SBCE at the enterprise site that then sends the SIP messages to the Gamma network. Communication Manager Configuration was performed using the System Access Terminal (SAT). Some screens in this section have been abridged and highlighted for brevity and clarity in presentation. The general installation of the Avaya S8800 Servers and Avaya G430 Media Gateway is presumed to have been previously completed and is not discussed here.

## 5.1. Confirm System Features

The license file installed on the system 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 **display system-parameters customer-options** command and on **Page 2**, verify that the **Maximum Administered SIP Trunks** supported by the system is sufficient for the combination of trunks to the Gamma network, and any other SIP trunks used.

display system-parameters customer-options		Page 2 of 11
OPTIONAL FEATURES		
IP PORT CAPACITIES	USED	
Maximum Administered H.323 Trunks:	12000	0
Maximum Concurrently Registered IP Stations:	18000	3
Maximum Administered Remote Office Trunks:	12000	0
Maximum Concurrently Registered Remote Office Stations:	18000	0
Maximum Concurrently Registered IP eCons:	414	0
Max Concur Registered Unauthenticated H.323 Stations:	100	0
Maximum Video Capable Stations:	18000	0
Maximum Video Capable IP Softphones:	18000	0
<b>Maximum Administered SIP Trunks:</b>	<b>24000</b>	<b>12</b>
Maximum Administered Ad-hoc Video Conferencing Ports:	24000	0
Maximum Number of DS1 Boards with Echo Cancellation:	522	0
Maximum TN2501 VAL Boards:	128	0
Maximum Media Gateway VAL Sources:	250	1
Maximum TN2602 Boards with 80 VoIP Channels:	128	0
Maximum TN2602 Boards with 320 VoIP Channels:	128	0
Maximum Number of Expanded Meet-me Conference Ports:	300	0

On **Page 4**, verify that the **IP Trunks** field is set to **y**.

display system-parameters customer-options		Page 4 of 11
OPTIONAL FEATURES		
Emergency Access to Attendant? y		IP Stations? y
Enable 'dadmin' Login? y		
Enhanced Conferencing? y		ISDN Feature Plus? n
Enhanced EC500? y	ISDN/SIP Network Call Redirection? y	
Enterprise Survivable Server? n		ISDN-BRI Trunks? y
Enterprise Wide Licensing? n		ISDN-PRI? y
ESS Administration? y	Local Survivable Processor? n	
Extended Cvg/Fwd Admin? y	Malicious Call Trace? y	
External Device Alarm Admin? y	Media Encryption Over IP? n	
Five Port Networks Max Per MCC? n	Mode Code for Centralized Voice Mail? n	
Flexible Billing? n		
Forced Entry of Account Codes? y	Multifrequency Signaling? y	
Global Call Classification? y	Multimedia Call Handling (Basic)? y	
Hospitality (Basic)? y	Multimedia Call Handling (Enhanced)? y	
Hospitality (G3V3 Enhancements)? y	Multimedia IP SIP Trunking? y	
IP Trunks? y		
IP Attendant Consoles? y		

## 5.2. Administer IP Node Names

The node names defined here will be used in other configuration screens to define a SIP signalling group between Communication Manager and Session Manager. In the **IP Node Names** form, assign the node **Name** and **IP Address** for the Session Manager. In this case, **SM100** and **10.10.9.61** are the **Name** and **IP Address** for the Session Manager SIP interface. Also note the **procr** name as this is the processor interface that Communication Manager will use as the SIP signalling interface to Session Manager.

display node-names ip		IP NODE NAMES
Name	IP Address	
<b>SM100</b>	<b>10.10.9.61</b>	
Sipera-SBC	10.10.9.71	
default	0.0.0.0	
procr	10.10.9.52	
procr6	::	

### 5.3. Administer IP Network Region

Use the **change ip-network-region 1** command to set the following values:

- The **Authoritative Domain** field is configured to match the domain name configured on Session Manager. In this configuration, the domain name is **avaya.com**.
- By default, **IP-IP Direct Audio** (both **Intra-** and **Inter-Region**) is enabled (**yes**) to allow audio traffic to be sent directly between endpoints without using gateway VoIP resources. When a PSTN call is shuffled, the media stream is established directly between the enterprise end-point and the internal media interface of the Avaya SBCE.
- The **Codec Set** is set to the number of the IP codec set to be used for calls within the IP network region. In this case, codec set **1** is used.

```
change ip-network-region 1                                     Page 1 of 20
                                                                IP NETWORK REGION
Region: 1
Location: 1           Authoritative Domain: avaya.com
Name: default
MEDIA PARAMETERS
  Codec Set: 1
  Intra-region IP-IP Direct Audio: yes
  Inter-region IP-IP Direct Audio: yes
  UDP Port Min: 2048
  UDP Port Max: 3329
  IP Audio Hairpinning? n
DIFFSERV/TOS PARAMETERS
  Call Control PHB Value: 46
  Audio PHB Value: 46
  Video PHB Value: 26
802.1P/Q PARAMETERS
  Call Control 802.1p Priority: 6
  Audio 802.1p Priority: 6
  Video 802.1p Priority: 5
  AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS
  RSVP Enabled? n
  H.323 Link Bounce Recovery? y
  Idle Traffic Interval (sec): 20
  Keep-Alive Interval (sec): 5
  Keep-Alive Count: 5
```



## 5.4. Administer IP Codec Set

Open the **IP Codec Set** form for the codec set specified in the IP Network Region form, **Section 5.3**. Enter the list of audio codecs eligible to be used in order of preference. For the interoperability test the codecs supported by Gamma were configured, namely **G.729A**, and **G.711A**.

change ip-codec-set 1				Page 1 of 2
IP Codec Set				
Codec Set: 1				
Audio Codec	Silence Suppression	Frames Per Pkt	Packet Size (ms)	
1: G.729A	n	2	20	
2: G.711A	n	2	20	
3:				

The Gamma IPDC service does not currently support T.38 for transmission of fax. Although not supported as a standard configuration by Avaya, G.711 transmission of fax was tested. To configure the CM to accept any fax transmission method, navigate to **Page 2** and configure by setting the **Fax Mode** to **off** as shown below.

change ip-codec-set 1			Page 2 of 2
IP Codec Set			
Allow Direct-IP Multimedia? n			
	Mode	Redundancy	
<b>FAX</b>	<b>off</b>	0	
Modem	off	0	
TDD/TTY	US	3	
Clear-channel	n	0	

## 5.5. Administer SIP Signaling Groups

The signaling group (and trunk group) will be used for inbound and outbound PSTN calls to the Gamma IPDC service. During test, this was configured to use **TCP** and port **5060** to facilitate tracing and fault analysis. It is recommended however, to use TLS (Transport Layer Security) and the default TLS port of 5061 for security. Configure the **Signaling Group** using the **add signaling-group x** command, where **x** is an available signaling group, as follows:

- Set **Group Type** to **sip**
- Set **Transport Method** to **tcp**
- Set **Peer Detection Enabled** to **y** allowing the Communication Manager to automatically detect if the peer server is a Session Manager
- Set **Near-end Node Name** to the processor interface (node name **procr** as defined in the **IP Node Names** form shown in **Section 5.2**)
- Set **Far-end Node Name** to the Session Manager (node name **SM100** as defined in the **IP Node Names** form shown in **Section 5.2**)
- Set **Near-end Listen Port** and **Far-end Listen Port** to **5060** (Commonly used TCP port value)
- Set **Far-end Network Region** to the IP Network Region configured in **Section 5.3**. (logically establishes the far-end for calls using this signaling group as network region **1**)
- Leave **Far-end Domain** blank (allows the CM to accept calls from any SIP domain on the associated trunk )
- Set **Direct IP-IP Audio Connections** to **y**
- Leave **DTMF over IP** at default value of **rtp-payload** (Enables **RFC2833** for DTMF transmission from the Communication Manager)

The default values for the other fields may be used.

change signaling-group 1		Page 1 of 2
SIGNALING GROUP		
Group Number: 1	Group Type: sip	
IMS Enabled? n	Transport Method: tcp	
Q-SIP? n		
IP Video? n	Enforce SIPS URI for SRTP? y	
Peer Detection Enabled? y	Peer Server: SM	
Near-end Node Name: procr	Far-end Node Name: SM100	
Near-end Listen Port: 5060	Far-end Listen Port: 5060	
	Far-end Network Region: 1	
Far-end Domain:		
Incoming Dialog Loopbacks: eliminate	Bypass If IP Threshold Exceeded? n	
DTMF over IP: rtp-payload	RFC 3389 Comfort Noise? n	
Session Establishment Timer(min): 3	Direct IP-IP Audio Connections? y	
Enable Layer 3 Test? y	IP Audio Hairpinning? n	
H.323 Station Outgoing Direct Media? n	Initial IP-IP Direct Media? n	
	Alternate Route Timer(sec): 6	

## 5.6. Administer SIP Trunk Group

A trunk group is associated with the signaling group described in **Section 5.5**. Configure the trunk group using the **add trunk-group x** command, where **x** is an available trunk group. On **Page 1** of this form:

- Set the **Group Type** field to **sip**
- Choose a descriptive **Group Name**
- Specify a trunk access code (**TAC**) consistent with the dial plan (in the test system the dial plan includes 1 as a three digit dac – not shown)
- The **Direction** is set to **two-way** to allow incoming and outgoing calls
- Set the **Service Type** field to **public-ntwrk**
- Specify the signaling group associated with this trunk group in the **Signaling Group** field as previously configured in **Section 5.5**
- Specify the **Number of Members** supported by this SIP trunk group

<b>add trunk-group 1</b>		<b>Page 1 of 21</b>	
TRUNK GROUP			
Group Number: 1	<b>Group Type: sip</b>	CDR Reports: y	
<b>Group Name: Group 1</b>	COR: 1	TN: 1	<b>TAC: 101</b>
<b>Direction: two-way</b>	Outgoing Display? y		
Dial Access? n	Night Service:		
Queue Length: 0			
<b>Service Type: public-ntwrk</b>	Auth Code? n		
		Member Assignment Method: auto	
		<b>Signaling Group: 1</b>	
		<b>Number of Members: 10</b>	

On **Page 2** of the trunk-group form, the **Preferred Minimum Session Refresh Interval (sec)** field should be set to a value mutually agreed upon with Gamma to prevent unnecessary SIP messages during call setup.

<b>Add trunk-group 1</b>		<b>Page 2 of 21</b>	
Group Type: sip			
TRUNK PARAMETERS			
Unicode Name: auto			
		Redirect On OPTIM Failure: 5000	
SCCAN? n	Digital Loss Group: 18		
		<b>Preferred Minimum Session Refresh Interval(sec): 600</b>	
Disconnect Supervision - In? y Out? y			

On **Page 3**, set the **Numbering Format** field to **public**. This allows delivery of CLI in E.164 format with a leading “+”.

add trunk-group 1	<b>Page 3 of 21</b>
TRUNK FEATURES	
ACA Assignment? n	Measured: none
	Maintenance Tests? y
<b>Numbering Format: public</b>	
	UI Treatment: service-provider
	Replace Restricted Numbers? n
	Replace Unavailable Numbers? n

On **Page 4** of this form:

- Set **Prepend '+' to Calling Number** to **y** to ensure that CLOI is sent in E.164 format with leading +.
- Set the **Telephone Event Payload Type** to **101** to match the value preferred by Gamma
- Set **Always Use re-INVITE for Display Updates** to **y** as the most effective method employed by Communication Manager of modifying an existing dialogue

add trunk-group 1	<b>Page 4 of 21</b>
PROTOCOL VARIATIONS	
Mark Users as Phone? n	
<b>Prepend '+' to Calling Number? y</b>	
Send Transferring Party Information? n	
Network Call Redirection? n	
Send Diversion Header? n	
Support Request History? y	
<b>Telephone Event Payload Type: 101</b>	
Convert 180 to 183 for Early Media? n	
<b>Always Use re-INVITE for Display Updates? y</b>	
Identity for Calling Party Display: P-Asserted-Identity	
Enable Q-SIP? n	

## 5.7. Administer Calling Party Number Information

Use the **change public-unknown-numbering** command to configure Communication Manager to send the calling party number. In the test configuration, individual stations were mapped to send numbers allocated from the Gamma DDI range supplied. This calling party number is sent in the SIP From, Contact and PAI headers, and displayed on display-equipped PSTN telephones. Note that the digits identifying the DDI range are not shown.

change public-unknown-numbering 0					Page 1 of 2
NUMBERING - PUBLIC/UNKNOWN FORMAT					
Ext Len	Ext Code	Trk Grp(s)	CPN Prefix	Total CPN Len	
4	2000	1	44131nnnnnnn	4 12	Total Administered: 8
4	2291	1	44131nnnnnnn	8 12	Maximum Entries: 9999
4	2296	1	44131nnnnnnn	7 12	Note: If an entry applies to a SIP connection to Avaya Aura(R) Session Manager, the resulting number must be a complete E.164 number.
4	2316	1	44131nnnnnnn	4 12	
4	2346	1	44131nnnnnnn	6 12	
4	2396	1	44131nnnnnnn	5 12	
4	2400	1	44131nnnnnnn	8 12	
4	2601	1	44131nnnnnnn	8 12	

## 5.8. Administer Route Selection for Outbound Calls

In the test environment, the Automatic Route Selection (ARS) feature was used to route outbound calls via the SIP trunk to the Gamma IPDC service. The single digit **9** was used as the ARS access code providing a facility for telephone users to dial 9 to reach an outside line. Use the **change feature-access-codes** command to configure a digit as the **Auto Route Selection (ARS) - Access Code 1**.

change feature-access-codes		Page 1 of 10
FEATURE ACCESS CODE (FAC)		
Abbreviated Dialing List1 Access Code:		
Abbreviated Dialing List2 Access Code:		
Abbreviated Dialing List3 Access Code:		
Abbreviated Dial - Prgm Group List Access Code:		
Announcement Access Code: *69		
Answer Back Access Code:		
Attendant Access Code:		
Auto Alternate Routing (AAR) Access Code: 7		
<b>Auto Route Selection (ARS) - Access Code 1: 9</b>		Access Code 2:

Use the **change ars analysis** command to configure the routing of dialled digits following the first digit 9. A small sample of dial patterns are shown here as an example. Further administration of ARS is beyond the scope of this document. The example entries shown will match outgoing calls to national, international and some Operator numbers. Note that exact maximum number lengths should be used where possible to reduce post-dial delay. Calls are sent to **Route Pattern 1**.

change ars analysis 0							Page 1 of 2
ARS DIGIT ANALYSIS TABLE							
Location: all							Percent Full: 0
Dialed String	Total Min	Max	Route Pattern	Call Type	Node Num	ANI Reqd	
0	8	14	1	pubu		n	
00	13	17	1	pubu		n	
00353	10	14	1	pubu		n	
0044	12	14	1	pubu		n	
01	7	14	1	pubu		n	
0800	11	11	1	pubu		n	
118	5	6	1	pubu		n	

Use the **change route-pattern x** command, where **x** is an available route pattern, to add the SIP trunk group to the route pattern that ARS selects. In this configuration, route pattern **1** is used to route calls to trunk group **1**. In ISDN terms, Numbering Plan Indicator (NPI) of the Calling Party Number is set to E.164 and Type of Numbering (TON) is set to international by using **Numbering Format** of **intl-pub**. Though SIP doesn't directly use TON and NPI, this setting affects calling party number format, in particular the prefixing of the "+".

change route-pattern 1													Page 1 of 3						
Pattern Number: 1 Pattern Name: all calls																			
SCCAN? n Secure SIP? n																			
Grp	FRL	NPA	Pfx	Hop	Toll	No.	Inserted						DCS/	IXC					
No			Mrk	Lmt	List	Del	Digits						QSIG						
							Dgts						Intw						
1:	1	0											n	user					
2:													n	user					
3:													n	user					
4:													n	user					
5:													n	user					
6:													n	user					
BCC VALUE		TSC	CA-TSC	ITC BCIE Service/Feature				PARM	No.	Numbering	LAR								
0	1	2	M	4	W	Request					Dgts Format								
												Subaddress							
1:	y	y	y	y	y	n	n	rest				intl-pub	none						
2:	y	y	y	y	y	n	n	rest					none						
3:	y	y	y	y	y	n	n	rest					none						
4:	y	y	y	y	y	n	n	rest					none						
5:	y	y	y	y	y	n	n	rest					none						
6:	y	y	y	y	y	n	n	rest					none						

## 5.9. Administer Incoming Digit Translation

This step configures the settings necessary to map incoming DDI calls to the proper Communication Manager extension(s). The incoming digits sent in the INVITE message from Gamma can be manipulated as necessary to route calls to the desired extension. In the example, the incoming DDI numbers provided by Gamma for testing are assigned to the internal extensions of the test equipment configured within the Communication Manager. The **change inc-call-handling-trmt trunk-group 1** command is used to translate numbers **0131nnnnnn4** to **0131nnnnnn8** to the 4 digit extension by deleting **all** of the incoming digits and inserting the extension number. Note that the significant digits beyond the city code have been obscured.

change inc-call-handling-trmt trunk-group 1				Page	1 of 30
INCOMING CALL HANDLING TREATMENT					
Service/ Feature	Number Len	Number Digits	Del	Insert	
public-ntwrk	11	0131nnnnnn4	all	2000	
public-ntwrk	11	0131nnnnnn5	all	2396	
public-ntwrk	11	0131nnnnnn6	all	2346	
public-ntwrk	11	0131nnnnnn7	all	2296	
public-ntwrk	11	0131nnnnnn8	all	2291	

## 5.10. EC500 Configuration

When EC500 is enabled on the Communication Manager station, a call to that station will generate a new outbound call from Communication Manager to the configured EC500 destination, typically a mobile phone. The following screen shows an example EC500 configuration for the user with station extension 2396. Use the command **change off-pbx-telephone station mapping x** where **x** is the Communication Manager station.

- The **Station Extension** field will automatically populate with station extension
- For **Application** enter **EC500**
- Enter a **Dial Prefix** (e.g., 9) if required by the routing configuration
- For the **Phone Number** enter the phone that will also be called (e.g. **0035386xxxxxxx**)
- Set the **Trunk Selection** to **1** so that Trunk Group 1 will be used for routing
- Set the **Config Set** to **1**

change off-pbx-telephone station-mapping 2396						Page	1 of	3
STATIONS WITH OFF-PBX TELEPHONE INTEGRATION								
Station Extension	Application	Dial Prefix	CC	Phone Number	Trunk Selection	Config Set	Dual Mode	
1601	EC500	-		0035386xxxxxxx	1	1		
		-						

Save Communication Manager changes by entering **save translation** to make them permanent.

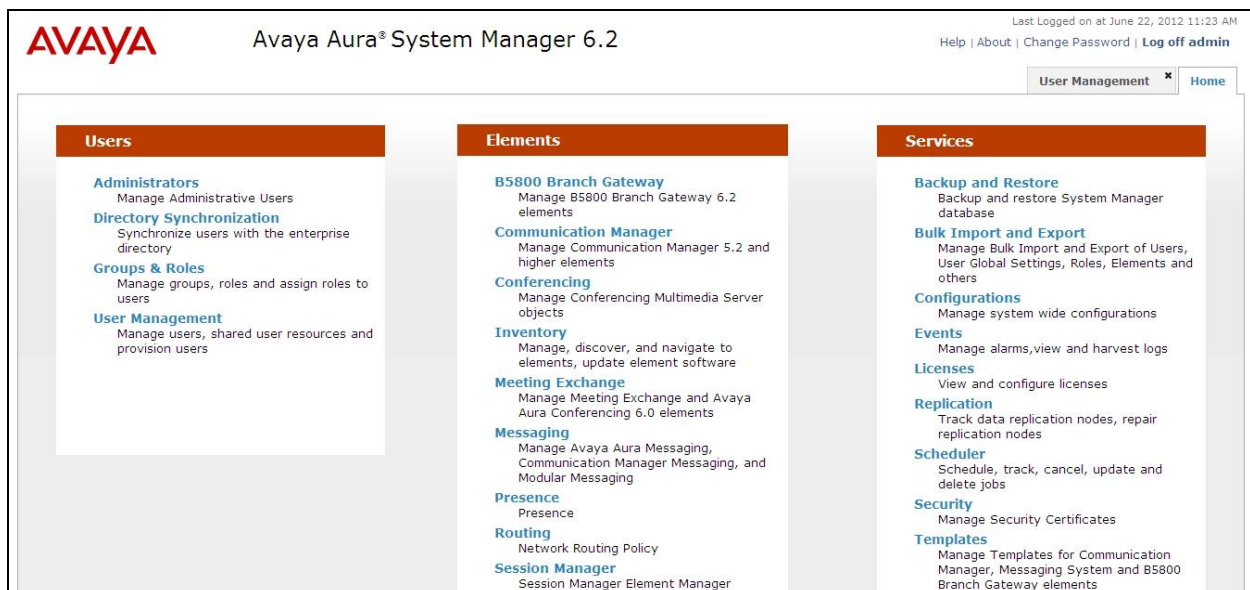
## 6. Configuring Avaya Aura® Session Manager

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 Avaya Aura® System Manager
- Administer SIP domain
- Administer Locations
- Administer SIP Entities
- Administer Entity Links
- Administer Routing Policies
- Administer Dial Patterns
- Administer Application for Avaya Aura® Communication Manager
- Administer Application Sequence for Avaya Aura® Communication Manager
- Administer SIP Extensions

### 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.





## 6.2. Administer SIP Domain

To add the SIP domain that will be used with Session Manager, select **Routing** from the **Home** tab menu and in the resulting tab select **Domains** from left hand menu. Click the **New** button to create a new SIP domain entry. In the **Name** field enter the domain name (e.g., **avaya.com**) and optionally a description for the domain in the **Notes** field. Click **Commit** to save changes.

[Home](#) / [Elements](#) / [Routing](#) / [Domains](#)[Help ?](#)

**Domain Management**

[Edit](#) [New](#) [Duplicate](#) [Delete](#) [More Actions](#) ▼

1 Item | [Refresh](#) Filter: [Enable](#)

<input type="checkbox"/>	Name	Type	Default	Notes
<input type="checkbox"/>	avaya.com	sip	<input type="checkbox"/>	

Select : All, None

## 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 all of the enterprise SIP entities. On the **Routing** tab 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, \* is used to specify any number of allowed characters at the end of the string. Below is the location configuration used for the test enterprise.

Home / Elements / Routing / Locations

Location Details

Help ?

Commit

Cancel

General

\* Name:

Galway

Notes:

Overall Managed Bandwidth

Managed Bandwidth Units:

Kbit/sec

Total Bandwidth:

Multimedia Bandwidth:

Audio Calls Can Take Multimedia Bandwidth:

☒

Per-Call Bandwidth Parameters

Maximum Multimedia Bandwidth (Intra-Location):

1000

Kbit/Sec

Maximum Multimedia Bandwidth (Inter-Location):

1000

Kbit/Sec

\* Minimum Multimedia Bandwidth:

64

Kbit/Sec

\* Default Audio Bandwidth:

80

Kbit/sec

Alarm Threshold

Overall Alarm Threshold:

80

%

Multimedia Alarm Threshold:

80

%

\* Latency before Overall Alarm Trigger:

5

Minutes

\* Latency before Multimedia Alarm Trigger:

5

Minutes

Location Pattern

Add

Remove

3 Items

Refresh

Filter: Enable

<input type="checkbox"/>	IP Address Pattern	Notes
<input type="checkbox"/>	* 10.10.9.*	Private

## 6.4. 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 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, **CM** for a Communication Manager SIP entity and **Gateway** for the Session Border Controller 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 configuration there are three SIP Entities:

- Avaya Aura® Session Manager SIP Entity
- Avaya Aura® Communication Manager SIP Entity
- Avaya Session Border Controller for Enterprise SIP Entity

### 6.4.1. 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 the Session Manager SIP signalling interface.

The screenshot shows the 'SIP Entity Details' configuration page. The breadcrumb trail at the top is 'Home / Elements / Routing / SIP Entities'. The page title is 'SIP Entity Details'. There are 'Commit' and 'Cancel' buttons in the top right corner, along with a 'Help ?' link. The 'General' tab is selected. The form contains the following fields:

- Name:** Session Manager
- FQDN or IP Address:** 10.10.9.61
- Type:** Session Manager (dropdown menu)
- Notes:** (empty text field)
- Location:** Galway (dropdown menu)
- Outbound Proxy:** (empty dropdown menu)
- Time Zone:** Europe/Dublin (dropdown menu)
- Credential name:** (empty text field)

Below the 'General' tab is the 'SIP Link Monitoring' section, which contains a dropdown menu set to 'Use Session Manager Configuration'.

The 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**

TCP Failover port:

TLS Failover port:

3 Items Refresh Filter: Enable

<input type="checkbox"/>	Port	Protocol	Default Domain	Notes
<input type="checkbox"/>	5060	TCP	avaya.com	
<input type="checkbox"/>	5060	UDP	avaya.com	
<input type="checkbox"/>	5061	TLS	avaya.com	

Select : All, None

## 6.4.2. Avaya Aura® Communication Manager SIP Entity

The following screen shows the SIP entity for Communication Manager which is configured as an Evolution Server. The **FQDN or IP Address** field is set to the IP address of the interface on Communication Manager that will be providing SIP signalling.

Home / Elements / Routing / SIP Entities

SIP Entity Details Help ?

**General**

\* Name: Communication Manager

\* FQDN or IP Address: 10.10.9.52

Type: CM

Notes:

Adaptation:

Location: Galway

Time Zone: Europe/Dublin

Override Port & Transport with DNS SRV: ☐

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

Credential name:

Call Detail Recording: none

**SIP Link Monitoring**

SIP Link Monitoring: Use Session Manager Configuration

### 6.4.3. Avaya Session Border Controller for Enterprise SIP Entity

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

The screenshot displays the 'SIP Entity Details' configuration page for 'Sipera SBC'. The breadcrumb trail at the top is 'Home / Elements / Routing / SIP Entities'. In the top right corner, there is a 'Help ?' link and 'Commit' and 'Cancel' buttons. The 'General' tab is selected. The configuration fields are as follows:

- Name:** Sipera SBC
- FQDN or IP Address:** 10.10.9.71
- Type:** Gateway (dropdown menu)
- Notes:** (empty text field)
- Adaptation:** (empty dropdown menu)
- Location:** Galway (dropdown menu)
- Time Zone:** Europe/Dublin (dropdown menu)
- Override Port & Transport with DNS SRV:** ☐
- \* SIP Timer B/F (in seconds):** 4
- Credential name:** (empty text field)
- Call Detail Recording:** none (dropdown menu)

## 6.5. 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 the name given to the Session Manager Entity, in this case **Session Manager**
- 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 6.4**
- In the **Port** field enter the port number to which the other system expects to receive SIP requests
- In the **Connection Policy** field enter **Trusted** to make the other system trusted
- In the **Protocol** field enter the transport protocol to be used to send SIP requests

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

Home / Elements / Routing / Entity Links

Entity Links Help ?

Edit

New

Duplicate

Delete

More Actions ▾

3 Items

Refresh

Filter: Enable

<input type="checkbox"/>	Name	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Connection Policy	Notes
<input type="checkbox"/>	<a href="#">Messaging Link</a>	Session Manager	TCP	5060	Messaging	5060	Trusted	
<input type="checkbox"/>	<a href="#">Session Manager Communication Manager</a>	Session Manager	TCP	5060	Communication Manager	5060	Trusted	
<input type="checkbox"/>	<a href="#">Sipera SBC Link</a>	Session Manager	TCP	5060	Sipera SBC	5060	Trusted	

Select : All, None

## 6.6. 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 Manager.

Home / Elements / Routing / Routing Policies

Routing Policy Details Help ? Commit Cancel

**General**

\* Name:

Disabled: ☐

\* Retries:

Notes:

**SIP Entity as Destination**

Select

Name	FQDN or IP Address	Type	Notes
Communication Manager	10.10.9.52	CM	

**Time of Day**

Add Remove View Gaps/Overlaps

1 Item | Refresh Filter: Enable

<input type="checkbox"/>	Ranking	1 ▲	Name	2 ▲	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Notes
<input type="checkbox"/>	0		24/7		✓	✓	✓	✓	✓	✓	✓	00:00	23:59	Time Range 24/7

Select : All, None

The following screen shows the routing policy for the Session Border Controller.

Home / Elements / Routing / Routing Policies

Routing Policy Details

Help ?

CommitCancel

General

\* Name: External

Disabled: ☐

\* Retries: 0

Notes:

SIP Entity as Destination

Select

Name	FQDN or IP Address	Type	Notes
Sipera SBC	10.10.9.71	Gateway	

Time of Day

AddRemoveView Gaps/Overlaps

1 Item RefreshFilter: Enable

<input type="checkbox"/>	Ranking	1	Name	2	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Notes
<input type="checkbox"/>	0		24/7		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00:00	23:59	Time Range 24/7

Select : All, None



## 6.7. 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 dialled number or prefix to be matched
- In the **Min** field enter the minimum length of the dialled number
- In the **Max** field enter the maximum length of the dialled number
- In the **SIP Domain** field select **ALL** or alternatively one of those 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 6.6**. Click the **Select** button to save. The following screen shows an example dial pattern configured for the Avaya SBCE which will route the calls out to the Gamma IPDC service.

Home / Elements / Routing / Dial Patterns

Help ?

Commit Cancel

Dial Pattern Details

General

\* Pattern: 00353

\* Min: 5

\* Max: 14

Emergency Call: ☐

Emergency Priority: 1

Emergency Type:

SIP Domain: -ALL-

Notes:

Originating Locations and Routing Policies

Add Remove

1 Item 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"/>	Galway		External	0	<input type="checkbox"/>	Spera SBC	

Select : All, None

The following screen shows the test dial pattern configured for Communication Manager. Note that the number format received from Gamma was national with leading 0.

Home / Elements / Routing / Dial Patterns

Dial Pattern Details Help ?

Commit Cancel

**General**

\* Pattern: 0131 nnnnnn

\* Min: 10

\* Max: 11

Emergency Call: ☐

Emergency Priority: 1

Emergency Type:

SIP Domain: -ALL- ▼

Notes:

**Originating Locations and Routing Policies**

Add Remove

1 Item | 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"/>	Galway		Internal	0	<input type="checkbox"/>	Communication Manager	

Select : All, None

## 6.8. Administer Application for Avaya Aura® Communication Manager

From the Home tab, select **Session Manager** from the menu. In the resulting tab from the left panel menu, select **Application Configuration → Applications** and click **New**.

- In the **Name** field enter a name for the application
- In the **SIP Entity** field select the SIP entity for the Communication Manager
- In the **CM System for SIP Entity** field select the SIP entity for the Communication Manager

Select **Commit** to save the configuration.

Home / Elements / Session Manager / Application Configuration / Applications Help ?

### Application Editor

Commit Cancel

Application

\*Name

\*SIP Entity

\*CM System for SIP Entity  Refresh [View/Add CM Systems](#)

Description

**Application Attributes (optional)**

Name	Value
Application Handle	<input type="text"/>
URI Parameters	<input type="text"/>

**Application Media Attributes**

Enable Media Filtering ☐

Audio	Video	Text	Match Type	If SDP Missing
<input type="text" value="YES"/>	<input type="text" value="YES"/>	<input type="text" value="YES"/>	<input type="text" value="NOT EXACT"/>	<input type="text" value="ALLOW"/>

## 6.9. Administer Application Sequence for Avaya Aura® Communication Manager

From the left panel, navigate to **Session Manager** → **Application Configuration** → **Application Sequences** and click on **New**.

- In the **Name** field enter a descriptive name
- Under **Available Applications**, click the + sign in front of the appropriate application instance. When the screen refreshes, the application should be displayed under the **Applications in this Sequence** heading.

Select **Commit**.

The screenshot shows the 'Application Sequence Editor' interface. At the top, there is a breadcrumb trail: 'Home / Elements / Session Manager / Application Configuration / Application Sequences'. Below this, the title 'Application Sequence Editor' is displayed with 'Commit' and 'Cancel' buttons. The 'Application Sequence' section contains a 'Name' field with the value 'cm-app-seq' and an empty 'Description' field. Below this, the 'Applications in this Sequence' section has 'Move First', 'Move Last', and 'Remove' buttons. A table lists the applications in the sequence, showing one item: 'cm-app' with 'Communication Manager' as the SIP Entity and 'Mandatory' checked. Below the table is a 'Select : All, None' option. The 'Available Applications' section at the bottom shows a table with one item: 'cm-app' with 'Communication Manager' as the SIP Entity. A 'Filter: Enable' option is also present.

Home / Elements / Session Manager / Application Configuration / Application Sequences

Help ?

### Application Sequence Editor

Commit Cancel

Application Sequence

\*Name

Description

#### Applications in this Sequence

Move First Move Last Remove

1 Item

<input type="checkbox"/>	Sequence Order (first to last)	Name	SIP Entity	Mandatory	Description
<input type="checkbox"/>		<a href="#">cm-app</a>	Communication Manager	<input checked="" type="checkbox"/>	

Select : All, None

#### Available Applications

1 Item Refresh Filter: Enable

Name	SIP Entity	Description
<a href="#">+ cm-app</a>	Communication Manager	

## 6.10. Administer SIP Extensions

SIP extensions are registered with the Session Manager and use Communication Manager for their feature and configuration settings. From the Home tab, select **User Management** from the menu. Then select **Manage Users** and click **New** (not shown).

On the **Identity** tab:

- Enter the user's name in the **Last Name** and **First Name** fields
- In the **Login Name** field enter a unique system login name in the form of **user@domain** (e.g. **2296@avaya.com**) which is used to create the user's primary handle
- The **Authentication Type** should be **Basic**
- In the **Password/Confirm Password** fields enter an alphanumeric password

Home / Users / User Management / Manage Users

Help ?

### New User Profile

Commit & Continue Commit Cancel

Identity \* Communication Profile \* Membership Contacts

Identity

\* Last Name: SIP

\* First Name: 9630

Middle Name:

Description:

\* Login Name: 2296@avaya.com

\* Authentication Type: Basic

\* Password: .....

\* Confirm Password: .....

Localized Display Name:

Endpoint Display Name:

Title:

Language Preference:

Time Zone: (+1:0)GMT : Dublin, Edinburgh, Lisbon, London, Casablanca

On the **Communication Profile** tab, enter a numeric **Communication Profile Password** and confirm it, then expand the **Communication Address** section and click **New**. For the **Type** field, select **Avaya SIP** from the drop-down menu. In the **Fully Qualified Address** field, enter an extension number and select the relevant domain from the drop-down menu. Click the **Add** button.

The screenshot displays the 'Communication Profile' configuration page. At the top, there are tabs for 'Identity', 'Communication Profile', 'Membership', and 'Contacts'. The 'Communication Profile' tab is selected. Below the tabs, there is a section for 'Communication Profile' with two password fields: 'Communication Profile Password' and 'Confirm Password', both masked with dots. Below these fields are buttons for 'New', 'Delete', 'Done', and 'Cancel'. A table with one row is shown, with the header 'Name' and the value 'Primary'. Below the table, there is a 'Select : None' option. A section for 'Communication Address' is expanded, showing a table with columns 'Type', 'Handle', and 'Domain'. The table contains one record with 'Type' set to 'Avaya SIP'. Below the table, there is a section for 'Communication Address' with buttons for 'New', 'Edit', and 'Delete'. A form for adding a new address is shown, with fields for 'Type' (set to 'Avaya SIP'), 'Fully Qualified Address' (set to '2296'), and 'Domain' (set to 'avaya.com'). There are 'Add' and 'Cancel' buttons at the bottom right.

Name
Primary

Select : None

\* Name: Primary

Default : ☒

Communication Address

Type	Handle	Domain
No Records found		

Type:	Avaya SIP	
* Fully Qualified Address:	2296	@ avaya.com

Add Cancel

Expand the **Session Manager Profile** section.

- Make sure the **Session Manager** check box is checked
- Select the appropriate Session Manager instance from the drop-down menu in the **Primary Session Manager** field
- Select the appropriate application sequence from the drop-down menu in the **Origination Application Sequence** field configured in **Section 6.9**
- Select the appropriate application sequence from the drop-down menu in the **Termination Application Sequence** field configured in **Section 6.9**
- Select the appropriate location from the drop-down menu in the **Home Location** field

☒ Session Manager Profile

\* Primary Session Manager

Session Manager

Secondary Session Manager

(None)

Origination Application Sequence

cm-app-seq

Termination Application Sequence

cm-app-seq

Conference Factory Set

(None)

Survivability Server

(None)

\* Home Location

Galway

Primary	Secondary	Maximum
3	0	3

Primary	Secondary	Maximum

Expand the **Endpoint Profile** section.

- Select the Communication Manager SIP Entity from the **System** drop-down menu
- Select **Endpoint** from the drop-down menu for **Profile Type**
- Enter the extension in the **Extension** field
- Select the desired template from the **Template** drop-down menu
- For the **Port** field select **IP**
- Select the **Delete Endpoint on Unassign of Endpoint from User or on Delete User** check box
- Select **Commit** to save changes and the System Manager will add the Communication Manager user configuration automatically

The screenshot shows the 'CM Endpoint Profile' configuration form. The form includes the following fields and options:

- System:** CM Instance (dropdown)
- Profile Type:** Endpoint (dropdown)
- Use Existing Endpoints:** ☐
- Extension:** 2296 (text field with a search icon)
- Endpoint Editor:** (button)
- Template:** DEFAULT\_9630SIP\_CM\_6\_2 (dropdown)
- Set Type:** 9630SIP (text field)
- Security Code:** (text field)
- Port:** IP (text field with a search icon)
- Voice Mail Number:** (text field)
- Preferred Handle:** (None) (dropdown)
- Delete Endpoint on Unassign of Endpoint from User or on Delete User:** ☒
- Override Endpoint Name:** ☒



## 7. Configure Avaya Session Border Controller for Enterprise

This section describes the configuration of the Session Border Controller for Enterprise. At the time of writing the Avaya Session Border Controller for Enterprise was badged as the Sipera E-SBC (Enterprise Session Border Controller) developed for Unified Communications Security (UC-Sec). The Avaya Session Border Controller for Enterprise is administered using the UC-Sec Control Center.

### 7.1. Access Avaya Session Border Controller for Enterprise

Access the Session Border Controller using a web browser by entering the URL **https://<ip-address>**, where **<ip-address>** is the private IP address configured at installation. Select the **UC-Sec Control Center**.



Log in with the appropriate credentials.

The UC-Sec™ family of products from Sipera Systems delivers comprehensive VoIP security by adapting the best practices of internet security and by using unique, sophisticated techniques such as VoIP protocol misuse & anomaly detection, behavioral learning based anomaly detection and voice spam detection to protect VoIP networks.

[Visit the Sipera Systems website to learn more.](#)

**NOTICE TO USERS:** This system is for authorized use only. Unauthorized use of this system is strictly prohibited. Unauthorized or improper use of this system may result in civil and/or criminal penalties. Use of this system constitutes consent to security monitoring. All activity is logged with login info, host name and IP address.

## 7.2. Define Network Information

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

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

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

Device Specific Settings > Network Management: GSSCP\_V9

UC-Sec Devices  
GSSCP\_V9

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 IP Save Changes Clear Changes

IP Address	Public IP	Gateway	Interface	
10.10.9.71		10.10.9.1	A1	X
192.168.122.56		192.168.122.7	B1	X

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

Device Specific Settings > Network Management: GSSCP\_07

UC-Sec Devices  
GSSCP\_V9

Network Configuration Interface Configuration

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

## 7.3. Define Interfaces

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

### 7.3.1. Signalling Interfaces

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

- Select **Add Signaling Interface** and enter details in the pop-up menu
- In the **Name** field enter a descriptive name for the internal signalling interface
- For **Signaling IP**, select an **internal** signalling interface IP address defined in **Section 7.2**
- Select **UDP** and **TCP** port numbers, **5060** is used for the Session Manager
- Select **Add Signaling Interface** and enter details in the pop-up menu
- 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 7.2**
- Select **UDP** and **TCP** port numbers, **5060** is used for Gamma

Name	Signaling IP	TCP Port	UDP Port	TLS Port	TLS Profile		
Int_Sig	10.10.9.71	5060	5060	---	None		
Ext_Sig	192.168.122.56	5060	5060	---	None		

### 7.3.2. Media Interfaces

To define the media interfaces on the Avaya SBCE, navigate to **Device Specific Settings** → **Media Interface** in the **UC-Sec Control Center** 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.

- 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 7.2**
- Select **RTP port** ranges for the media path with the enterprise end-points
- 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 7.2**
- Select **RTP port** ranges for the media path with the Gamma SBC

Device Specific Settings > Media Interface: GSSCP\_V9

UC-Sec Devices

GSSCP\_V9

Media Interface

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

Add Media Interface

Name	Media IP	Port Range		
Int_Med	10.10.9.71	2048 - 3329		
Ext-Med	192.168.122.56	35000 - 40000		

## 7.4. Define Server Interworking

Server interworking is defined for each server connected to the Avaya SBCE. In this case, the Gamma SBC is connected as the Trunk Server and the Session Manager is connected as the Call Server. To define server interworking on the Avaya SBCE, navigate to **Global Profiles** → **Server Interworking** in the **UC-Sec Control Center** menu on the left hand side. To define Server Interworking for the Session Manager, highlight the **avaya-ru** profile which is a factory setting appropriate for Avaya equipment and select **Clone Profile**. A pop-up menu is generated headed **Clone Profile** (not shown)

- In the **Clone Name** field enter a descriptive name for the Session Manager and click **Finish** – in test **ASM9** was used
- Select **Edit** and enter details in the pop-up menu.
- Check the **T.38** box
- Change the **Hold Support** RFC to **RFC2543** then click **Next** and **Finish**

General	
Hold Support	<input checked="" 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"/>
3xx Handling	<input type="checkbox"/>
Diversion Header Support	<input type="checkbox"/>
Delayed SDP 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

Next

To define Server Interworking for the Gamma SBC, highlight the previously defined profile for the Session Manager and select **Clone Profile**. A pop-up menu is generated headed **Clone Profile** (not shown)

- In the **Clone Name** field enter a descriptive name for server interworking profile for the Gamma SBC and click **Finish** – in test **Gamma\_Trunk** was used
- Select **Edit** and enter details in the pop-up menu
- Check the **T.38** box
- Select **Next** three times and **Finish**

## 7.5. Define Servers

Servers are defined for each server connected to the Avaya SBCE. In this case, the Gamma SBC is connected as the Trunk Server and the Session Manager is connected as the Call Server. To define the Session Manager, navigate to **Global Profiles → Server Configuration** in the **UC-Sec Control Center** menu on the left hand side. Click on **Add Profile** and enter details in the pop-up menu

- In the **Profile Name** field enter a descriptive name for the Session Manager and click **Next** (not shown)
- In the **Server Type** drop down menu, select **Call Server**
- In the **IP Addresses / Supported FQDNs** box, type the Session Manager SIP interface address which is the same as that defined on the Communication Manager in **Section 5.2**
- Check **TCP** in **Supported Transports**
- Define the **TCP** port for SIP signalling, **5060** is used for the Session Manager
- Click **Next** three times then select the **Interworking Profile** for the Session Manager defined in **Section 7.4** from the drop down menu

Edit Server Configuration Profile - General	
Server Type	Call Server
IP Addresses / Supported FQDNs <small>Comma separated list</small>	10.10.9.61
Supported Transports	<input checked="" type="checkbox"/> TCP <input type="checkbox"/> UDP <input type="checkbox"/> TLS
TCP Port	5060
UDP Port	
TLS Port	
Finish	

Edit Server Configuration Profile - Advanced	
Enable DoS Protection	<input type="checkbox"/>
Enable Grooming	<input type="checkbox"/>
Interworking Profile	ASM9
Signaling Manipulation Script	None
TCP Connection Type	<input checked="" type="radio"/> SUBID <input type="radio"/> PORTID <input type="radio"/> MAPPING
Finish	

To define the Gamma SBC as a Trunk Server, navigate to **Global Profiles → Server Configuration** in the **UC-Sec Control Center** menu on the left hand side. Click on **Add Profile** and enter details in the pop-up menu

- In the **Profile Name** field enter a descriptive name for the Gamma SBC and click **Next** (not shown)
- In the **Server Type** drop down menu, select **Trunk Server**
- In the **IP Addresses / Supported FQDNs** box, type the IP address of the Gamma SBC
- Check **UDP** in **Supported Transports**
- Define the **UDP** port for SIP signaling, **5060** is used for Gamma
- Click **Next** three times then select the **Interworking Profile** for the Gamma SBC defined in **Section 7.4** from the drop down menu

Edit Server Configuration Profile - General		Edit Server Configuration Profile - Advanced	
Server Type	Trunk Server	Enable DoS Protection	<input type="checkbox"/>
IP Addresses / Supported FQDNs <small>Comma seperated list</small>	192.168.6.117	Enable Grooming	<input type="checkbox"/>
Supported Transports	<input type="checkbox"/> TCP <input checked="" type="checkbox"/> UDP <input type="checkbox"/> TLS	Interworking Profile	Gamma_Trunk
TCP Port		Signaling Manipulation Script	None
UDP Port	5060	UDP Connection Type	<input checked="" type="radio"/> SUBID <input type="radio"/> PORTID <input type="radio"/> MAPPING
TLS Port			
Finish		Finish	



## 7.6. Define Routing

Routing information is required for routing to the Session Manager on the internal side and the Gamma SBC 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. To define routing to the Session Manager, navigate to **Global Profiles → Routing** in the **UC-Sec Control Center** menu on the left hand side. Click on **Add Profile** and enter details in the **Routing Profile** pop-up menu (not shown).

- In the **Profile Name** field enter a descriptive name for the Session Manager and click **Next**
- Enter the Session Manager SIP interface address and port in the **Next Hop Server 1** field
- Select **TCP** for the **Outgoing Transport**
- Click **Finish**

**Note:** Port is not required in the next hop IP address if default value 5060 is used.

Priority	URI Group	Next Hop Server 1	Next Hop Server 2	Next Hop Priority	NAPTR	SRV	Next Hop in Dialog	Ignore Route Header	Outgoing Transport
1	*	10.10.9.61	---	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	TCP

To define routing to the Gamma SBC, navigate to **Global Profiles → Routing** in the **UC-Sec Control Center** menu on the left hand side. Click on **Add Profile** and enter details in the **Routing Profile** pop-up menu.

- In the **Profile Name** field enter a descriptive name for the Gamma SBC and click **Next**
- Enter the Gamma SBC IP address and port in the **Next Hop Server 1** field
- Select **UDP** for the **Outgoing Transport**
- Click **Finish**

Priority	URI Group	Next Hop Server 1	Next Hop Server 2	Next Hop Priority	NAPTR	SRV	Next Hop in Dialog	Ignore Route Header	Outgoing Transport
1	*	192.168.6.117	---	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	UDP



## 7.7. 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 the 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 the Session Manager, navigate to **Global Profiles → Topology Hiding** in the **UC-Sec Control Center** menu on the left hand side. Click on **Add Profile** and enter details in the **Topology Hiding Profile** pop-up menu (not shown).

- In the **Profile Name** field enter a descriptive name for the Session Manager and click **Next**
- If the **Record-Route** and **Via** Headers aren't shown, click on **Add Header** and select from the **Header** drop down menu
- For both of the above headers, leave the **Replace Action** at the default value of **Auto**
- If the **Request-Line**, **From**, **To** and **SDP** Headers aren't shown, click on **Add Header** and select from the **Header** drop down menu
- For each of the above headers, select **IP** from the **Criteria** drop down menu (important for the **From** header so that the "anonymous.invalid" domain name for restricted CLI is not overwritten)
- For each of the headers leave the **Replace Action** at the default value of **Auto**

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

**Note:** The use of **Auto** results in an IP address being inserted in the host portion of the Request-URI as opposed to a domain name. If a domain name is required, the action **Overwrite** must be used where appropriate, and the required domain names entered in the **Overwrite Value** field. Different domain names could be used for the enterprise and the Gamma network.

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

- In the **Profile Name** field enter a descriptive name for the Gamma SBC and click **Next**
- If the **Request-Line** header isn't shown, click on **Add Header** and select from the **Header** drop down menu
- Select the required action from the **Replace Action** drop down menu, **Next Hop** was used for test
- If the **Record-Route** and **Via** Headers aren't shown, click on **Add Header** and select from the **Header** drop down menu
- For both of the above headers, leave the **Replace Action** at the default value of **Auto**
- If the **From**, **To** and **SDP** Headers aren't shown, click on **Add Header** and select from the **Header** drop down menu
- For each of the above headers, select **IP** from the **Criteria** drop down menu (important for the **From** header so that the "anonymous.invalid" domain name for restricted CLI is not overwritten)
- For each of the headers leave the **Replace Action** at the default value of **Auto**

Global Profiles > Topology Hiding: Gamma

Add Profile

Topology Hiding Profiles

default

cisco\_th\_profile

ASMS

Gamma

Rename Profile

Clone Profile

Delete Profile

Click here to add a description.

Topology Hiding

Header	Criteria	Replace Action	Overwrite Value
Via	IP/Domain	Auto	---
To	IP	Auto	---
Record-Route	IP/Domain	Auto	---
Request-Line	IP/Domain	Next Hop	---
From	IP	Auto	---
SDP	IP	Auto	---

Edit

## 7.8. Server Flows

Server Flows combine the previously defined profiles into an outgoing flow from the Session Manager to the Gamma SBC and an incoming flow from the Gamma SBC to the Session Manager. This configuration ties all the previously entered information together so that calls can be routed from the Session Manager to the Gamma SBC and vice versa. The information for all Server Flows is shown on a single screen on the Avaya SBCE.

Device Specific Settings > End Point Flows: GSSCP\_V9

UC-Sec Devices

GSSCP\_V9

Subscriber Flows

Server Flows

Add Flow

Click here to add a row description.

Server Configuration: ASM9\_Call\_Server



Priority	Flow Name	URI Group	Transport	Remote Subnet	Received Interface	Signaling Interface	Media Interface	End Point Policy Group	Routing Profile	Topology Hiding Profile	File Transfer Profile			
1	ASM9_Call_Flow	*	*	*	Ext_Sig	Int_Sig	Int_Med	default-low	Gamma	ASM9	None			

Server Configuration: Gamma\_Trunk\_Server

Priority	Flow Name	URI Group	Transport	Remote Subnet	Received Interface	Signaling Interface	Media Interface	End Point Policy Group	Routing Profile	Topology Hiding Profile	File Transfer Profile			
1	Gamma_Trunk_Flow	*	*	*	Int_Sig	Ext_Sig	Ext-Med	default-low	ASM9	Gamma	None			



To define an outgoing Server Flow, 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 (not shown)
- In the **Name** field enter a descriptive name for the outgoing server flow to the Gamma SBC
- In the **Received Interface** drop-down menu, select the internal SIP signalling interface defined in **Section 7.3**
- In the **Signaling Interface** drop-down menu, select the external SIP signalling interface defined in **Section 7.3**
- In the **Media Interface** drop-down menu, select the external media interface defined in **Section 7.3**
- In the **Routing Profile** drop-down menu, select the routing profile of the Session Manager defined in **Section 7.6**
- In the **Topology Hiding Profile** drop-down menu, select the topology hiding profile of the Gamma SBC defined in **Section 7.7** and click **Finish**

Server Configuration: Gamma_Trunk_Server													
Priority	Flow Name	URI Group	Transport	Remote Subnet	Received Interface	Signaling Interface	Media Interface	End Point Policy Group	Routing Profile	Topology Hiding Profile	File Transfer Profile		
1	Gamma_Trunk_Flow	*	*	*	Int_Sig	Ext_Sig	Ext-Med	default-low	ASM9	Gamma	None		

An incoming Server Flow is defined as a reversal of the outgoing Server Flow

- Click on the **Server Flows** tab
- Select **Add Flow** and enter details in the pop-up menu (not shown)
- In the **Name** field enter a descriptive name for the incoming server flow to the Session Manager
- In the **Received Interface** drop-down menu, select the external SIP signalling interface defined in **Section 7.3**
- In the **Signaling Interface** drop-down menu, select the internal SIP signalling interface defined in **Section 7.3**
- In the **Media Interface** drop-down menu, select the internal media interface defined in **Section 7.3**
- In the **Routing Profile** drop-down menu, select the routing profile of the Gamma SBC defined in **Section 7.6**
- In the **Topology Hiding Profile** drop-down menu, select the topology hiding profile of the Session Manager defined in **Section 7.7** and click **Finish**

Server Configuration: ASM9_Call_Server													
Priority	Flow Name	URI Group	Transport	Remote Subnet	Received Interface	Signaling Interface	Media Interface	End Point Policy Group	Routing Profile	Topology Hiding Profile	File Transfer Profile		
1	ASM9_Call_Flow	*	*	*	Ext_Sig	Int_Sig	Int_Med	default-low	Gamma	ASM9	None		

## 8. Gamma Configuration

The configuration required by Gamma to allow the tests to be carried out is not covered in this document and any further information required shown be obtained through the local Gamma representative.

## 9. Verification Steps

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

1. From System Manager Home Tab click on Session Manager and 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**. The screenshot shows the status of the Entity Link for the Avaya SBCE

Home / Elements / Session Manager / System Status / SIP Entity Monitoring							
SIP Entity, Entity Link Connection Status							
This page displays detailed connection status for all entity links from all Session Manager instances to a single SIP entity.							
All Entity Links to SIP Entity: Sipera SBC							
<button>Summary View</button>							
1 Item   Refresh <span>Filter: Enable</span>							
Details	Session Manager Name	SIP Entity Resolved IP	Port	Proto.	Conn. Status	Reason Code	Link Status
► Show	Session Manager	10.10.9.71	5060	TCP	Up	200 OK	Up

2. From the Communication Manager SAT interface run the command **status trunk n** where **n** is a previously configured SIP trunk. Observe if all channels on the trunk group display **in-service/idle**.

```
status trunk 1
```

TRUNK GROUP STATUS			
Member	Port	Service State	Mtce Connected Ports Busy
0001/001	T00001	in-service/idle	no
0001/002	T00002	in-service/idle	no
0001/003	T00003	in-service/idle	no
0001/004	T00004	in-service/idle	no
0001/005	T00005	in-service/idle	no
0001/006	T00006	in-service/idle	no
0001/007	T00007	in-service/idle	no
0001/008	T00008	in-service/idle	no
0001/009	T00009	in-service/idle	no
0001/010	T00010	in-service/idle	no

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 can remain 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.
7. Should issues arise with the SIP trunk, check from the Avaya SBCE using **OPTIONS**. This is done by defining the heartbeat in the Server configuration then running a trace. To define the heartbeat, navigate to **Global Profiles → Server Configuration** in the **UC-Sec Control Center** menu on the left hand side and click on the Trunk Server profile. Select the **Heartbeat** tab and click on **Edit**
  - Check the **Enable Heartbeat** box
  - Select **OPTIONS** from the **Method** drop down menu
  - Enter the **Frequency** in seconds, for convenience this can be set to the minimum value of **60** seconds
  - Enter the **From URI** in Fully Qualified Domain Name format
  - Enter the **To URI** in FQDN
  - Click on **Finish**

Edit Server Configuration Profile - Heartbeat	
Enable Heartbeat	<input checked="" type="checkbox"/>
Method	OPTIONS
Frequency	60 seconds
From URI	ping@192.168.122.56
To URI	ping@192.168.6.117
TCP Probe	<input type="checkbox"/>
TCP Probe Frequency	seconds
<b>Finish</b>	

To define the trace, navigate to **Troubleshooting → Trace Settings** in the **UC-Sec Control Center** 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 Service Provider's 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
- Click on **Start Capture**

The screenshot shows the 'Troubleshooting > Trace Settings: GSSCP\_V9' window. On the left, under 'UC-Sec Devices', 'GSSCP\_V9' is selected. The main area has four tabs: 'Packet Trace', 'Call Trace', 'Packet Capture', and 'Captures'. The 'Packet Capture' tab is active, showing the 'Packet Capture Configuration' form. The form includes the following fields: 'Currently capturing' (No), 'Interface' (B1), 'Local Address (ip:port)' (192.168.122.56), 'Remote Address (\*, \*:port, ip, ip:port)' (\*), 'Protocol' (All), 'Maximum Number of Packets to Capture' (10000), and 'Capture Filename' (OPTIONS.pcap). A note below the filename field states 'Existing captures with the same name will be overwritten'. At the bottom right are 'Start Capture' and 'Clear' buttons. Red boxes highlight the 'Interface', 'Local Address', 'Remote Address', 'Protocol', 'Maximum Number of Packets to Capture', and 'Capture Filename' fields.

To view the trace, select the **Captures** tab and click on the relevant filename in the list of traces. The trace is viewed as a standard pcap file in Wireshark. If the SIP trunk is working correctly, a SIP 200 OK response will be seen from the Service Provider.



## 10. Conclusion

These Application Notes describe the configuration necessary to connect Avaya Aura® Communication Manager, Avaya Aura® Session Manager and Avaya Session Border Controller for Enterprise to Gamma IPDC service. The service was successfully tested with a number of observations listed in **Section 2.2**.

## 11. References

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

- [1] *Installing and Configuring Avaya Aura® System Platform Release 6.2*, March 2012.
- [2] *Administering Avaya Aura® System Platform Release 6.2*, February 2012.
- [3] *Administering Avaya Aura® Communication Manager*, Release 6.2, February 2012.
- [4] *Avaya Aura® Communication Manager Feature Description and Implementation*, February 2012, Document Number 555-245-205.
- [5] *Implementing Avaya Aura® System Manager Release 6.2*, March 2012.
- [6] *Implementing Avaya Aura® Session Manager*, February 2012, Document Number 03-603473
- [7] *Administering Avaya Aura® Session Manager*, February 2012, Document Number 03-603324.
- [8] *Various Application Notes for the Avaya Session Border Controller for Enterprise*, March 2012
- [9] *RFC 3261 SIP: Session Initiation Protocol*, <http://www.ietf.org/>



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