



Avaya Solution & Interoperability Test Lab

Applications Notes for Avaya Aura™ Communication Manager 5.2.1, Avaya Aura™ Session Manager 5.2 and Acme Packet Net-Net 2600 with AT&T IP Flexible Reach SIP Trunk Service Offer – Issue 1.1

Abstract

These Application Notes describe the steps for configuring Avaya Aura™ Session Manager, Avaya Aura™ Communication Manager, and the Acme Packet Net-Net 2600 with the AT&T IP Flexible Reach service using either **AVPN** or **MIS-PNT** transport service connections.

Avaya Aura™ Session Manager 5.2 is a core SIP routing and integration engine that connects disparate SIP devices and applications within an enterprise. Avaya Aura™ Communication Manager 5.2.1 is a telephony application server and is the point of connection between the enterprise endpoints and Avaya Aura™ Session Manager. An Acme Packet Net-Net 2600 is the point of connection between Avaya Aura™ Session Manager and the AT&T IP Flexible Reach service and is used to not only secure the SIP trunk, but also to make adjustments to the signaling for interoperability.

The AT&T IP Flexible Reach service is one of several SIP-based Voice over IP (VoIP) services offered to enterprises for a variety of voice communications needs. The AT&T IP Flexible Reach service allows enterprises in the U.S.A. to place outbound local and long distance calls, receive inbound Direct Inward Dialing (DID) calls from the PSTN, and place calls between an enterprise's sites.

AT&T is a member of the Avaya DevConnect Service Provider program. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program.

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1. Introduction

These Application Notes describe the steps for configuring Avaya Aura™ Session Manager, Avaya Aura™ Communication Manager, and the Acme Packet Net-Net 2600 with the AT&T IP Flexible Reach service using either **AVPN**¹ or **MIS/PNT**² transport service connections.

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The AT&T IP Flexible Reach service is one of several SIP-based Voice over IP (VoIP) services offered to enterprises for a variety of voice communications needs. The AT&T IP Flexible Reach service allows enterprises in the U.S.A. to place outbound local and long distance calls, receive inbound Direct Inward Dialing (DID) calls from the PSTN, and place calls between an enterprise's sites.

1.1. Interoperability Compliance Testing

The interoperability compliance testing focused on verifying inbound and outbound call flows (see **Section 2.2** for examples) between Avaya Aura™ Session Manager, Avaya Aura™ Communication Manager, Acme Packet Net-Net 2600, and the AT&T IP Flexible Reach service.

The compliance testing was based on a test plan provided by AT&T, for the functionality required for certification as a solution supported on the AT&T network. Calls were made to and from the PSTN across the AT&T network (see **Section 2.2** for sample call flows). The following features were tested as part of this effort:

- SIP trunking.
- T.38 Fax.
- Passing of DTMF events and their recognition by navigating automated menus.
- PBX features such as hold, resume, conference and transfer.
- Call redirection with Diversion Header. In cases where the alternate destination is an N11, NPA-555-1212, or 8xx number, the AT&T IP Flexible Reach service requires the use of Diversion Header (see **Section 2.2.3**).

1.2. Support

AT&T customers may obtain support for the AT&T IP Flexible Reach service by calling (877) 288-8362.

¹ AVPN uses compressed RTP (cRTP).

² MIS/PNT does not support cRTP.

Avaya customers may obtain documentation and support for Avaya products by visiting <http://support.avaya.com>. The “Connect with Avaya” section provides the worldwide support directory. In the United States, (866) GO-AVAYA (866-462-8292) provides access to overall sales and service support menus. Customers may also use specific numbers (provided on <http://support.avaya.com>) to directly access specific support and consultation services based upon their Avaya support agreements.

1.3. Known Limitations

1. Although Avaya Aura™ Session Manager release 5.2 supports the possibility of using SIP phones, SIP phones were not tested as part of the configuration used to validate this solution.
2. G.711 faxing is not supported between Avaya Aura™ Communication Manager and the AT&T IP Flexible Reach service. Avaya Aura™ Communication Manager does not support the protocol negotiation that AT&T requires to have G.711 fax calls work. T.38 faxing is supported, as is Group 3 and Super Group 3 fax. Fax speeds are limited to 9600 in the configuration tested. In addition, Fax Error Correction Mode (ECM) is not supported by Avaya Aura™ Communication Manager.
3. Emergency 911/E911 Services Limitations and Restrictions - Although AT&T provides 911/E911 calling capabilities, AT&T does not warrant or represent that the equipment and software (e.g., IP PBX) reviewed in this customer configuration guide will properly operate with AT&T IP Flexible Reach to complete 911/E911 calls; therefore, it is Customer’s responsibility to ensure proper operation with its equipment/software vendor.

While AT&T IP Flexible Reach services support E911/911 calling capabilities under certain Calling Plans, there are circumstances when that E911/911 service may not be available, as stated in the Service Guide for AT&T IP Flexible Reach found at <http://new.serviceguide.att.com>. Such circumstances include, but are not limited to, relocation of the end user’s CPE, use of a non-native or virtual telephone number, failure in the broadband connection, loss of electrical power, and delays that may occur in updating the Customer’s location in the automatic location information database. Please review the AT&T IP Flexible Reach Service Guide in detail to understand the limitations and restrictions.

4. Avaya Modular Messaging 5.2 currently uses a SIP telephone event type 127 for the Find-Me feature. This may cause connectivity issues with AT&T IP Flexible Reach service. As a result, the Find-Me feature is not supported until Modular Messaging target release MM R5.2 SP5.
5. H.323 stations requiring the Avaya Aura™ Session Manager Extend Call feature, must have shuffling disabled.

2. Reference Configuration

The reference configuration used in these Application Notes is shown in **Figure 1** and consists of several components:

- Session Manager provides core SIP routing and integration services that enables communications between disparate SIP-enabled entities, e.g., PBXs, SIP proxies, gateways, adjuncts, trunks, applications, etc. across the enterprise. Avaya Aura™ Session Manager allows enterprises to implement centralized and policy-based routing, centralized yet flexible dial plans, consolidated trunking, and centralized access to adjuncts and applications.
- Avaya Aura™ System Manager provides a common administration interface for centralized management of all Session Manager instances in an enterprise.
- Communication Manager provides the voice communications services for a particular enterprise site. In this reference configuration, Avaya Aura™ Communication Manager runs on an Avaya S8720 Server. This solution is extensible to other Avaya S8xxx Servers.
- The Avaya Media Gateway provides the physical interfaces and resources for Avaya Aura™ Communication Manager. In this reference configuration, an Avaya G650 Media Gateway is used. This solution is extensible to other Avaya Media Gateways.
- Avaya “desk” phones are represented with Avaya 4600 and 9600 Series IP Telephones running H.323 software, and Avaya 6400 Series Digital Telephones.
- The Acme Packet Net-Net 2600 provides SIP Session Border Controller (SBC) functionality, including address translation and SIP header manipulation between the AT&T IP Flexible Reach service and the enterprise internal network.
- An existing Avaya Modular Messaging system (in Multi-Site mode in this reference configuration) provides the corporate voice messaging capabilities in the reference configuration. However the provisioning of Modular Messaging is beyond the scope of this document
- Outbound calls were originated from a phone or fax provisioned on Communication Manager. Signaling passed from Communication Manager to Session Manager and on to the Acme Packet Net-Net 2600, before being sent to the AT&T network for termination. Media was sent from the calling phone to the Communication Manager Media Processor initially on call setup, but when applicable, the media was redirected directly from the station (“shuffled”) via the Acme Packet Net-Net 2600.
- Inbound calls were sent from AT&T, through the Acme Packet Net-Net 2600 to the Session Manager which routed the call to Communication Manager. Communication Manager terminated the call to the appropriate phone or fax extension. The H.323 phones on the enterprise side registered directly to the Communication Manager Control LAN (C-LAN).
- Enterprise sites may have additional or alternate routes to PSTN using analog or digital TDM trunks. However these trunks were not available in the reference configuration.

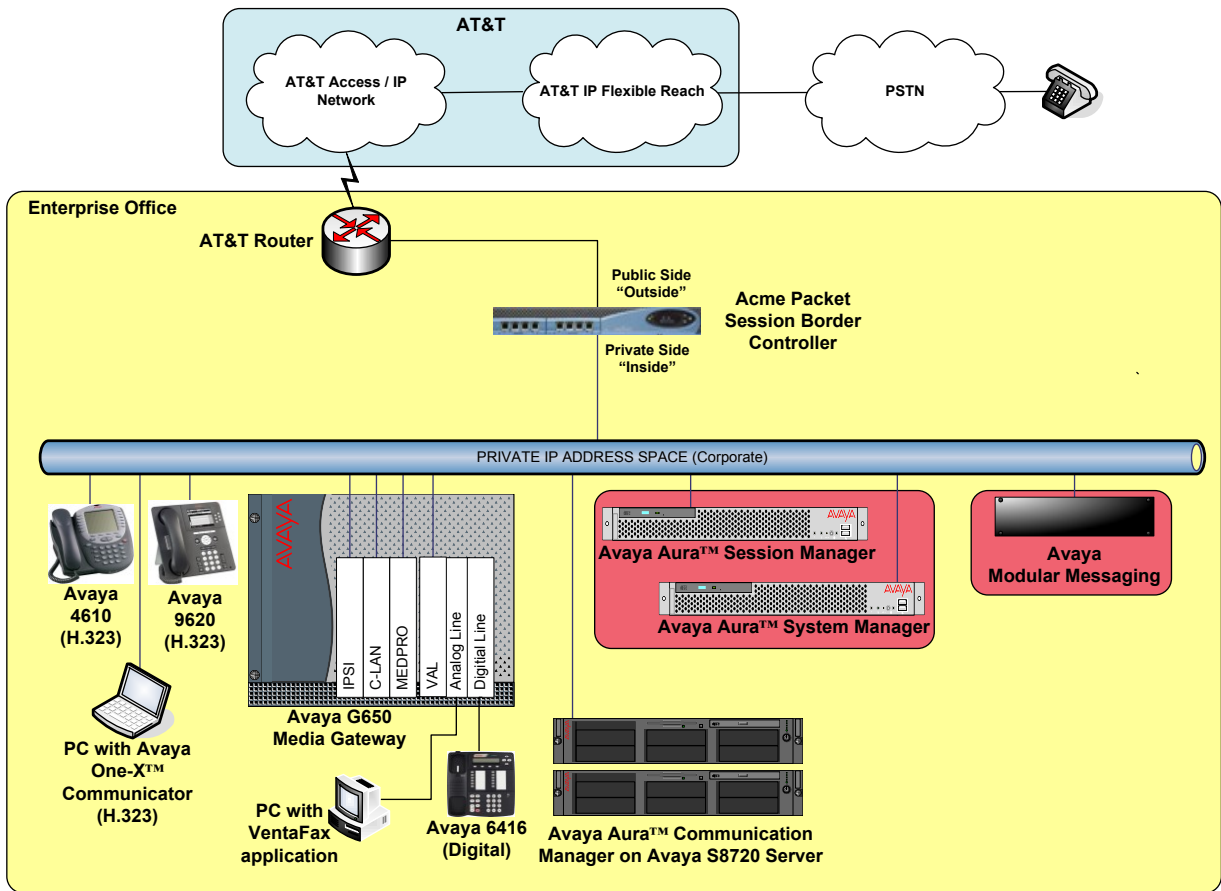


Figure 1: Reference configuration

2.1. Illustrative Configuration Information

The specific values listed in **Table 1** below and in subsequent sections are used in the reference configuration described in these Application Notes, and are **for illustrative purposes only**. Customers must obtain and use the specific values for their own specific configurations.

Note - The AT&T IP Flexible Reach service border element IP addresses shown in this document are examples. AT&T Customer Care will provide the actual IP addresses as part of the IP Flexible Reach provisioning process.

Component	Illustrative Value in these Application Notes
Avaya Aura™ System Manager	
Management IP Address	192.168.67.135
Avaya Aura™ Session Manager	
Management IP Address	192.168.67.136
SM100 Card IP Address	192.168.67.137
Avaya Aura™ Communication Manager	
C-LAN IP Address	192.168.67.13
Avaya Aura™ Communication Manager extensions	26xxx
Avaya CPE (Customer Premise Equipment) local dial plan	17231126xxx
Voice Messaging Pilot Extension	26000
Avaya Modular Messaging	
Messaging Application Server (MAS) IP Address	192.168.67.141
Messaging Server (MSS) IP Address	192.168.67.140
Pilot Number	17231126000
Acme Packet SBC	
IP Address of “Outside” (Public) Interface (connected to AT&T Access Router/IP Flexible Reach Service)	192.168.64.130
IP Address of “Inside” (Private) Interface (connected to Avaya Aura™ Session Manager)	192.168.67.130
AT&T IP Flexible Reach Service	
Border Element IP Address	135.25.29.74
AT&T Access router interface (to Acme outside)	192.168.64.254
AT&T Access Router NAT address (Acme outside address)	135.16.170.55

Table 1: Illustrative Values Used in these Application Notes

2.2. Call Flows

To understand how inbound AT&T IP Flexible Reach service calls are handled by Session Manager and Communication Manager, four basic call flows are described in this section, however for brevity not all possible call flows are described.

2.2.1. Inbound

The first call scenario illustrated in **Figure 2** is an inbound AT&T IP Flexible Reach service call that arrives on Session Manager and is subsequently routed to Communication Manager, which in turn routes the call to a phone, fax, or in some cases, a vector.

1. A PSTN phone originates a call to an AT&T IP Flexible Reach service number.
2. The PSTN routes the call to the AT&T IP Flexible Reach service network.
3. The AT&T IP Flexible Reach service routes the call to the Acme Packet SBC.
4. The Acme Packet SBC performs SIP Network Address Translation (NAT) and any necessary SIP header modifications, and routes the call to Session Manager.
5. Session Manager applies any necessary SIP header adaptations and digit conversions, and based on configured Network Routing Policies, determines to where the call should be routed next. In this case, Session Manager routes the call to Communication Manager.
6. Depending on the called number, Communication Manager routes the call to a phone, a fax or a vector.

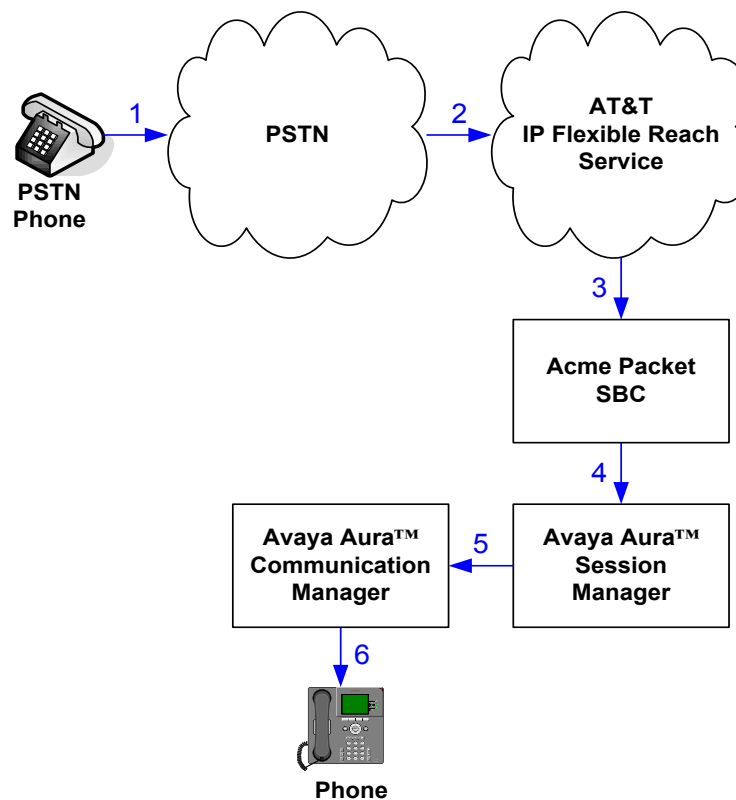


Figure 2: Inbound AT&T IP Flexible Reach Call

2.2.2. Outbound

The second call scenario illustrated in **Figure 3** is an outbound call initiated on Communication Manager, routed to Session Manager and is subsequently sent to the Acme SBC for delivery to AT&T IP Flexible Reach service.

1. An Communication Manager phone or fax originates a call to an AT&T IP Flexible Reach service number for delivery to PSTN.
2. Communication Manager routes the call to the Session Manager.
3. Session Manager applies any necessary SIP header adaptations and digit conversions, and based on configured Network Routing Policies, determines to where the call should be routed next. In this case, Session Manager routes the call to the Acme Packet SBC.
4. The Acme Packet SBC performs SIP Network Address Translation (NAT) and any necessary SIP header modifications, and routes the call to the AT&T IP Flexible Reach service.
5. The AT&T IP Flexible Reach service delivers the call to PSTN.
6. The PSTN delivers the call to the PSTN Phone.

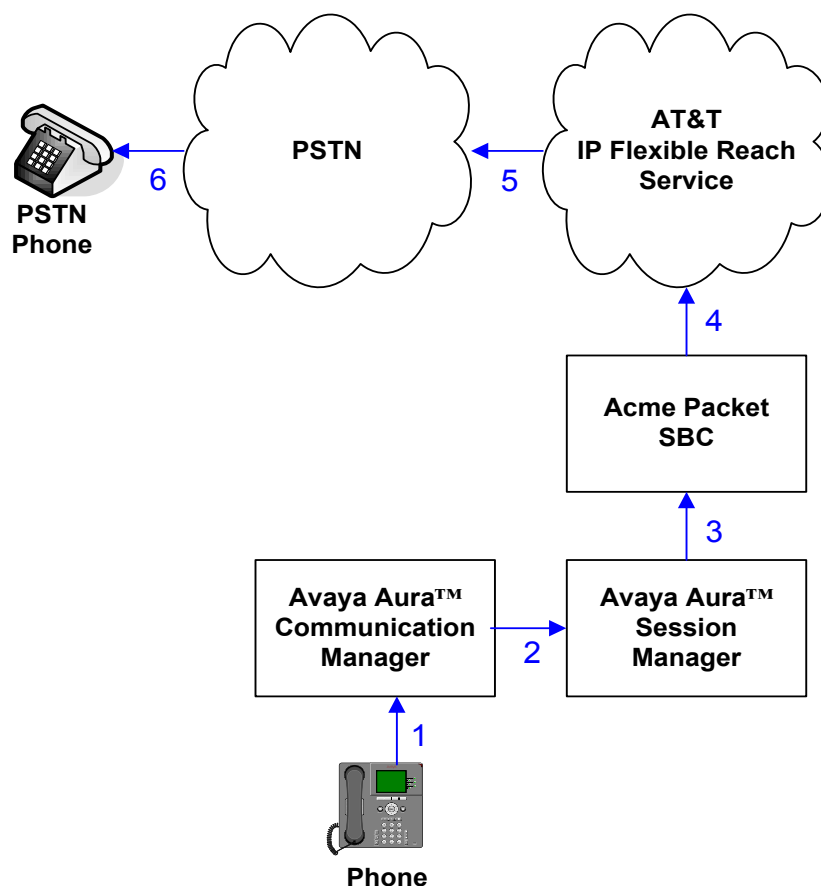


Figure 3: Outbound AT&T IP Flexible Reach Call

2.2.3. Call Forward Re-direction

The third call scenario illustrated in **Figure 4** is an inbound AT&T IP Flexible Reach service call that arrives on Session Manager and subsequently Communication Manager. Communication Manager routes the call to a destination station, however the station has set Call Forwarding to an alternate destination. Without answering the call, Communication Manager immediately redirects the call back to the AT&T IP Flexible Reach service for routing to the alternate destination.

Note – In cases where the alternate destination is an N11, NPA-555-1212, or 8xx number, then the AT&T IP Flexible Reach service requires the use of SIP Diversion Header for the redirected call to complete (see **Section 5.4.2, Figure 57**).

1. Same as the first call scenario in **Section 2.2.1**.
2. Because the Communication Manager phone has set Call Forward to another AT&T IP Flexible Reach service number, Communication Manager initiates a new call back out to Session Manager, the Acme Packet SBC, and to the AT&T IP Flexible Reach service network.
3. The AT&T IP Flexible Reach service places a call to the alternate destination and upon answer, Communication Manager connects the calling party to the target party.

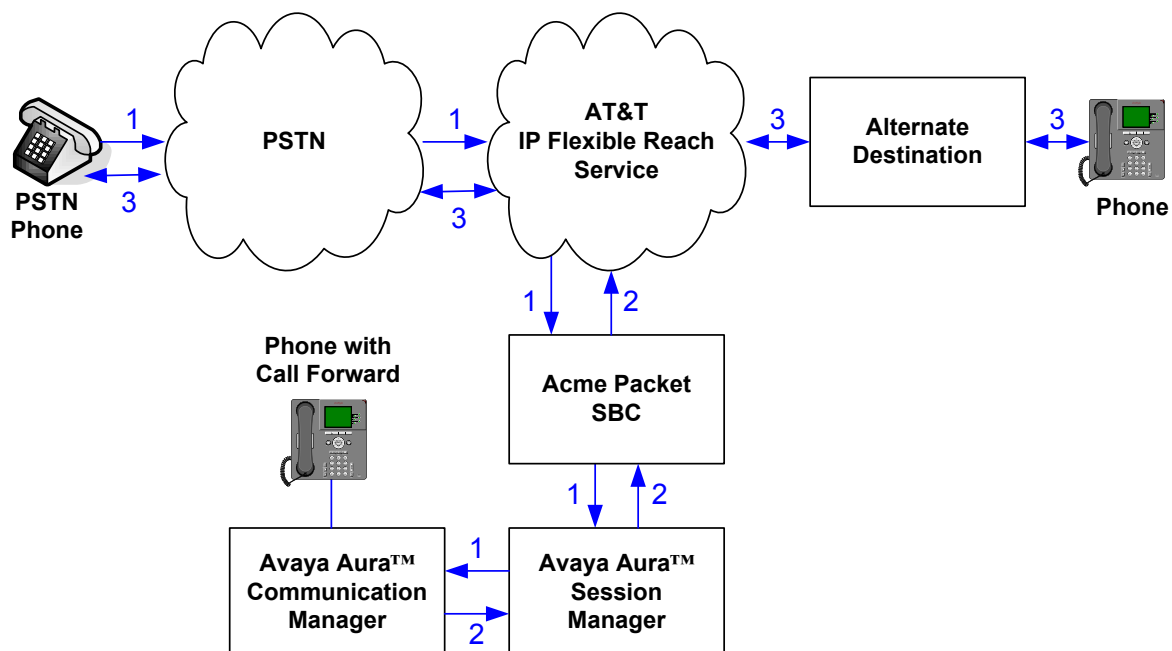


Figure 4: Re-directed (e.g. Call Forward) AT&T IP Flexible Reach Call

2.2.4. Coverage to Voicemail

The call scenario illustrated in **Figure 5** is an inbound call that is covered to voicemail. In this scenario, the voicemail system is an Avaya Modular Messaging system connected to Session Manager.

1. Same as the first call scenario in **Section 2.2.1**.
2. The called Communication Manager phone does not answer the call, and the call covers to the phone's voicemail. Communication Manager forwards³ the call to Session Manager.
3. Session Manager applies any necessary SIP header adaptations and digit conversions, and based on configured Network Routing Policies, determines to where the call should be routed next. In this case, Session Manager routes the call to Avaya Modular Messaging. Avaya Modular Messaging answers the call and connects the caller to the called phone's voice mailbox. Note that the call⁴ continues to go through Communication Manager.

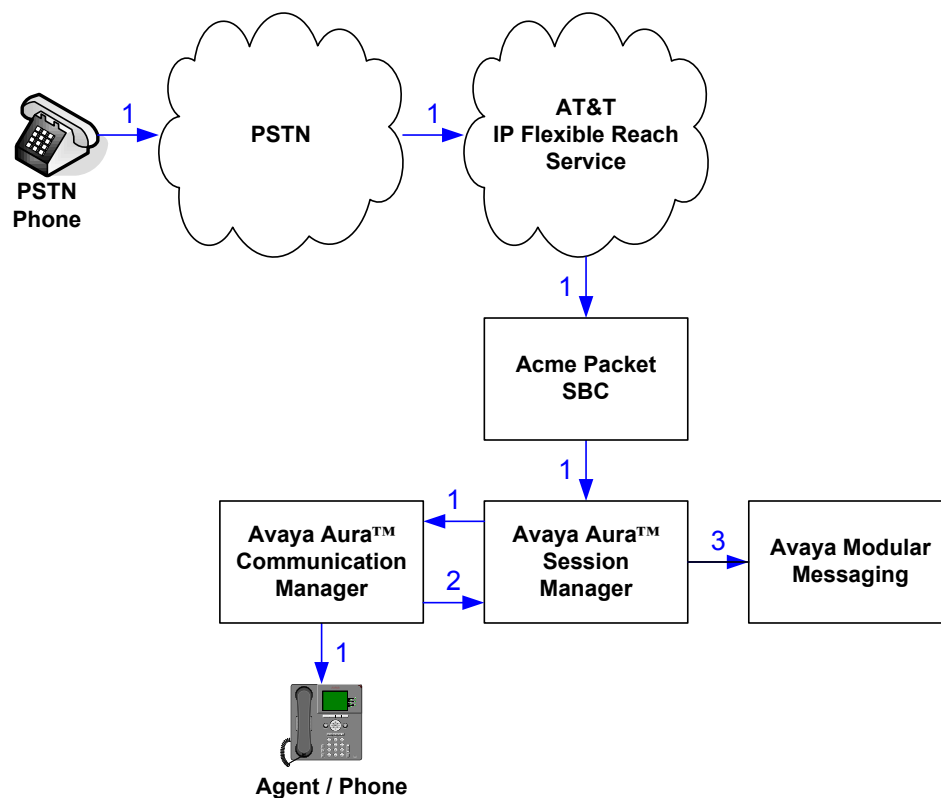


Figure 5: Coverage to Voicemail

³ Avaya Aura™ Communication Manager places a call to Avaya Modular Messaging, and then connects the inbound caller to Avaya Modular Messaging. SIP redirect methods, e.g., 302, are not used.

⁴ The SIP signaling path still goes through Avaya Aura™ Communication Manager. In addition, since the inbound call and Avaya Modular Messaging use different codecs (G.729 and G.711, respectively), Avaya Aura™ Communication Manager performs the transcoding, and thus the RTP media path also goes through Avaya Aura™ Communication Manager.

3. Equipment and Software Validated

The following equipment and software was used for the reference configuration described in these Application Notes.

Component	Version
Avaya S8510 Server	Avaya Aura™ System Manager 5.2 (5.2.0.0.520008)
Avaya S8510 Server	Avaya Aura™ Session Manager 5.2 (5.2.0.0.520011)
SM100 Card	-
Avaya S8720 Server	Avaya Aura™ Communication Manager 5.2.1 (R015x.02.1.016.4)
Avaya G650 Media Gateway	
TN2312BP IP Server Interface (IPSI)	HW15 FW047
TN799DP Control-LAN (C-LAN)	HW01 FW034
TN2302AP IP Media Processor (MedPro)	HW18 FW120
TN2602AP IP Media Resource 320 (MedPro)	HW02 FW049
TN2501AP VAL-ANNOUNCEMENT	HW03 FW021
TN2224CP Digital Line	HW08 FW015
TN793B Analog Line	HW05 FW010
Avaya 9630 IP Telephone	Avaya one-X™ Deskphone Edition H.323 Release 3.1
Avaya 9640 IP Telephone	Avaya one-X™ Deskphone Edition H.323 Release 3.1
Avaya one-X™ Communicator	1.0.0.98
Avaya 4610SW IP Telephone	2.9.1
Avaya 6416D+ Digital Telephone	-
Avaya S3500 Server	Avaya Modular Messaging 5.1-4.0 (9.0.424.1.013)
Fax device	Ventafax Home Version 6.1.59.144
Acme Packet Net-Net 2600	E3.6.0M1P1 (GA Build – 46312)
AT&T IP Flexible Reach Service using MIS-PNT transport service connections.	VNI 18

Table 2: Equipment and Software Versions

4. Avaya Aura™ Session Manager

These Application Notes assume that basic Avaya Aura™ System Manager and Session Manager administration has already been performed. Consult [1] and [2] for further details if necessary. Configuration of Session Manager is performed from Avaya Aura™ System Manager. To invoke the Avaya Aura™ System Manager Common Console, launch a web browser, enter `https://<IP address of the Avaya Aura™ System Manager server>/SMGR` in the URL, and log in with the appropriate credentials.

4.1. Background

Session Manager serves as a central point for supporting SIP-based communication services in an enterprise. Session Manager connects and normalizes disparate SIP network components and provides a central point for external SIP trunking to the PSTN. The various SIP network components are represented as “SIP Entities” and the connections/trunks between Session Manager and those components are represented as “Entity Links”. Thus, rather than connecting to every other SIP Entity in the enterprise, each SIP Entity simply connects to Session Manager and relies on Session Manager to route calls to the correct destination. This approach reduces the dial plan and trunking administration needed on each SIP Entity, and consolidates said administration in a central place, namely Avaya Aura™ System Manager.

When calls arrive at Session Manager from a SIP Entity, Session Manager applies SIP protocol and numbering modifications to the calls. These modifications, referred to as “Adaptations”, are sometimes necessary to resolve SIP protocol differences between disparate SIP Entities, and also serve the purpose of “normalizing” the calls to a common or uniform numbering format, which allows for simpler administration of routing rules in Session Manager. Session Manager then matches the calls against certain criteria embodied in profiles termed “Dial Patterns”, and determines the destination SIP Entities based on “Network Routing Policies” specified in the matching Dial Patterns. Lastly, before the calls are routed to the respective destinations, Session Manager again applies Adaptations in order to bring the calls into conformance with the SIP protocol interpretation and numbering formats expected by the destination SIP Entities.

4.2. Network Routing Policies (NRP)

Network Routing Policies define how Session Manager routes calls between SIP network elements. A Network Routing Policy is dependent on the administration of several inter-related items:

- SIP Entities – SIP Entities represent SIP network elements such as Session Manager instances, Communication Manager systems, Session Border Controllers, SIP gateways, SIP trunks, and other SIP network devices.
- Entity Links – Entity Links define the SIP trunk/link parameters, e.g., ports, protocol (UDP/TCP/TLS), and trust relationship, between Session Manager instances and other SIP Entities.
- SIP Domains – SIP Domains are the domains for which Session Manager is authoritative in routing SIP calls. In other words, for calls to such domains, Session Manager applies Network Routing Policies to route those calls to SIP Entities. For calls to other domains, Session Manager routes those calls to another SIP proxy (either a pre-defined default SIP proxy or one discovered through DNS).

- **Locations** – Locations define the physical and/or logical locations in which SIP Entities reside. Call Admission Control (CAC) / bandwidth management may be administered for each location to limit the number of calls to and from a particular Location.
- **Adaptations** – Adaptations are used to apply any necessary protocol adaptations, e.g., modify SIP headers, and apply any necessary digit conversions for the purpose of inter-working with specific SIP Entities. For example, an AT&T-specific Adaptation is used in these Application Notes to remove SIP History-Info headers from SIP messages sent to the AT&T IP Flexible Reach service network. As another example, basic “Digit Conversion” Adaptations are used in this reference configuration to convert digit strings in “destination” (e.g., Request-URI) and “origination” (e.g. P-Asserted Identity) type headers, of SIP messages sent to and received from SIP Entities.
- **Dial Patterns** – A Dial Pattern specifies a set of criteria and a set of Network Routing Policies for routing calls that match the criteria. The criteria include the called party number and SIP domain in the Request-URI, and the Location from which the call originated. For example, if a call arrives at Session Manager and matches a certain Dial Pattern, then Session Manager selects one⁵ of the Network Routing Policies specified in the Dial Pattern. The selected Network Routing Policy in turn specifies the SIP Entity to which the call is to be routed. Note that Dial Patterns are matched after ingress Adaptations have already been applied.
- **Time Ranges** – Time Ranges specify customizable time periods, e.g., Monday through Friday from 9AM to 5:59PM, Monday through Friday 6PM to 8:59AM, all day Saturday and Sunday, etc. A Network Routing Policy may be associated with one or more Time Ranges during which the Network Routing Policy is in effect. For example, for a Dial Pattern administered with two Network Routing Policies, one Network Routing Policy can be in effect on weekday business hours and the other Network Routing Policy can be in effect on weekday off-hours and weekends. In the reference configuration no restrictions were placed on calling times.

The general strategy employed in this reference configuration with regard to Called Party Number manipulation and matching, and call routing is as follows:

- Use common number formats and uniform numbers in matching called party numbers for routing decisions.
- On ingress to Session Manager, apply any called party number modifications necessary to “normalize” the number to a common format or uniform number as defined in the Dial Patterns.
- On egress from SM, apply any called party number modifications necessary to conform to the expectations of the next-hop SIP Entity. For example, on egress from Session Manager to Communication Manager, modify the called party number such that the number is consistent with the dial plan on Communication Manager.

Of course, the above is just one of many possible strategies that can be implemented with Session Manager.

⁵ The Network Routing Policy in effect at that time with highest ranking is attempted first. If that Network Routing Policy fails, then the Network Routing Policy with the next highest rankings is attempted, and so on.

To view the sequenced steps required for configuring network routing policies, click on “**Network Routing Policy**” (NRP) in the left pane of the Avaya Aura™ System Manager Common Console (see **Figure 6**).

AVAYA Avaya Aura™ System Manager 5.2

Welcome, **admin** Last Logged on at Dec. 19, 2009 8:02 AM [Help](#) | [Log off](#)

Home / **Network Routing Policy**

▶ Asset Management
 ▶ Communication System Management
 ▶ User Management
 ▶ Monitoring
 ▼ **Network Routing Policy**
 Adaptations
 Dial Patterns
 Entity Links
 Locations
 Regular Expressions
 Routing Policies
 SIP Domains
 SIP Entities
 Time Ranges
 Personal Settings
 ▶ Security
 ▶ Applications
 ▶ Settings
 ▶ Session Manager

Shortcuts

[Change Password](#)
[Landing Page](#)
[Help for Import All Data](#)
[Help for Export All Data](#)
[Help for Committing configuration changes](#)

Introduction to Network Routing Policy (NRP)

Network Routing Policy consists of several NRP applications like "Domains", "Locations", "SIP Entities", etc.

The recommended order to use the NRP applications (that means the overall NRP workflow) to configure your network configuration is as follows:

- Step 1: Create "Domains" of type SIP (other NRP applications are referring domains of type SIP).
- Step 2: Create "Locations"
- Step 3: Create "Adaptations"
- Step 4: Create "SIP Entities"
 - SIP Entities that are used as "Outbound Proxies" e.g. a certain "Gateway" or "SIP Trunk"
 - Create all "other SIP Entities" (Session Manager, CM, SIP/PSTN Gateways, SIP Trunks)
 - Assign the appropriate "Locations", "Adaptations" and "Outbound Proxies"
- Step 5: Create the "Entity Links"
 - Between Session Managers
 - Between Session Managers and "other SIP Entities"
- Step 6: Create "Time Ranges"
 - Align with the tariff information received from the Service Providers
- Step 7: Create "Routing Policies"
 - Assign the appropriate "Routing Destination" and "Time Of Day"
 - (Time Of Day = assign the appropriate "Time Range" and define the "Ranking")
- Step 8: Create "Dial Pattern"
 - Assign the appropriate "Locations" and "Routing Policies" to the "Dial Pattern"
- Step 9: Create "Regular Expressions"
 - Assign the appropriate "Routing Policies" to the "Regular Expressions"

Each "Routing Policy" defines the "Routing Destination" (which is a "SIP Entity") as well as the "Time of Day" and its associated "Ranking".

IMPORTANT: the appropriate dial patterns are defined and assigned afterwards with the help of NRP application "Dial pattern". That's why this overall NRP workflow can be interpreted as

"Dial Pattern driven approach to define routing policies"

That means (with regard to steps listed above):

- Step 7: "Routing Policies" are defined
- Step 8: "Dial Pattern" are defined and assigned to "Routing Policies" and "Locations" (one step)
- Step 9: "Regular Expressions" are defined and assigned to "Routing Policies" (one step)

Figure 6: Introduction to Network Routing Policy (NRP) Page

4.3. SIP Domains

The steps in this section specify the SIP domains for which Session Manager is authoritative.

1. In the left pane under **Network Routing Policy**, click on “**SIP Domains**”. In the **SIP Domains** page (not shown), click on “**New**”.
2. Continuing in the **SIP Domains** page, enter a SIP domain (e.g. **customerera.com**) for **Name** and click on “**Commit**”.

The screenshot shows the Avaya Aura System Manager 5.2 interface. The top navigation bar includes the Avaya logo, the title 'Avaya Aura™ System Manager 5.2', and a user status 'Welcome, admin Last Logged on at Dec. 17, 2009 2:40 PM' with links for 'Help' and 'Log off'. The breadcrumb trail is 'Home / Network Routing Policy / SIP Domains'. The left sidebar contains a tree view with categories: Asset Management, Communication System Management, User Management, Monitoring, and Network Routing Policy. Under Network Routing Policy, the items are Adaptations, Dial Patterns, Entity Links, Locations, Regular Expressions, Routing Policies, SIP Domains (highlighted), and SIP Entities. The main content area is titled 'Domain Management' and has 'Commit' and 'Cancel' buttons at the top right. Below this is a table with one item, 'customerera.com'. The table has columns for Name, Type (set to 'sip'), Default (checkbox), and Notes. A red asterisk is next to the Name field, indicating it is required. At the bottom right of the table area, there are 'Commit' and 'Cancel' buttons and a message '* Input Required'.

Figure 7: SIP Domains Page

3. Repeat Steps 1 - 2 to add any additional SIP domains.

4.4. Locations

The steps in this section define the physical and/or logical locations in which SIP Entities reside.

1. In the left pane under **Network Routing Policy**, click on “**Locations**”. In the **Location** page (not shown), click on “**New**”.
2. In the **Location Details** page, enter a descriptive **Name** (e.g. **Main**).
3. [Optional] To limit the number of calls going to and from this Location, i.e., apply CAC, specify the **Managed Bandwidth** and **Average Bandwidth per Call**.
4. [Optional] To identify IP addresses associated with this Location, add **Location Pattern** entries accordingly.
5. Click on “**Commit**”.

AVAYA Avaya Aura™ System Manager 5.2 Welcome, admin Last Logged on at Dec. 17, 2009 2:40 PM Help | Log off

Home / Network Routing Policy / Locations / Location Details

Location Details [Commit] [Cancel]

General

* Name:

Notes:

Managed Bandwidth:

* Average Bandwidth per Call: Kbit/sec

* Time to Live (secs):

Location Pattern

[Add] [Remove]

0 Items [Refresh] Filter: Enable

IP Address Pattern	Notes

* Input Required [Commit] [Cancel]

Figure 8: Location Details Page

6. Repeat Steps 1 - 5 to add any additional Locations.

4.5. Adaptations

In this section, Adaptations are administered for the following purposes:

- Modification⁶ of SIP messages sent to the AT&T IP Flexible Reach service.
- Modification of digit strings in URIs of “origination” and “destination” type headers in SIP messages sent to and received from Communication Manager.
- Modification of digit strings in URIs of “origination” and “destination” type headers in SIP messages sent to and received from Avaya Modular Messaging.

4.5.1. Adaptation for AT&T

The Adaptation administered in this section is applied to SIP messages sent to/from the AT&T IP Flexible Reach service (by way of the Acme Packet SBC).

1. In the left pane under **Network Routing Policy**, click on “**Adaptations**”. In the **Adaptations** page (not shown), click on “**New**”.
2. In the **Adaptation Details** page, enter:
 - a. A descriptive **Name**.
 - b. Select “**AttAdapter**” from the **Module Name** drop down menu (if no module name is present, select “<click to add module>” and enter the Adaptation module name).
 - c. Enter the IP address of the AT&T Border Element in the **Module parameter** field. This will replace the SIP Domain of Session manager (customera.com) in the *outbound* Request URI to AT&T.

⁶ Currently, the AT&T Adaptation automatically removes the History-Info header sent by default from Avaya Aura™ Communication Manager.

- d. In the **Digit Conversion for Incoming Calls to SM** section, enter the *inbound* digits from AT&T that need to be modified before further processing by NRP.
 - i. Enter an entire, or partial, inbound digit string that will be sent by AT&T in the **Matching Pattern** column.
 - ii. Enter the number of digits in the string in the **Min/Max** columns.
 - iii. Enter the number of digits to replace in the **Delete Digits** column.
 - iv. Enter the replacement digit string in the **Insert Digits** column.
 - v. Specify that this should be applied to the SIP **Destination** headers in the **Address to modify** column (“destination” - e.g., Request-URI , “origination” – e.g. P-Asserted Identity, or “both”).
 - vi. Enter any desired notes.
- e. Click on **“Commit”**.

For example, in **Figure 9** below, AT&T will deliver an INVITE with a Request URI for the 10 digit number 3143325383. All 10 digits will be deleted and replaced with the local number 17231126101 in the Request URI (destination). Then the INVITE will continue to be processed by the remainder of the NPR functions (e.g. Dial Patterns, Routing Policies).

No Outbound digit conversions are required for this Adaptation.

Asset Management
 Communication System Management
 User Management
 Monitoring
 Network Routing Policy
 Adaptations
 Dial Patterns
 Entity Links
 Locations
 Regular Expressions
 Routing Policies
 SIP Domains
 SIP Entities
 Time Ranges
 Personal Settings
 Security
 Applications
 Settings
 Session Manager
 shortcuts
 Change Password
 Help for Adaptation Details fields
 Help for Committing configuration changes

Adaptation Details

Commit Cancel

General

* Adaptation name:
 Module name:
 Module parameter:
 Egress URI Parameters:
 Notes:

Digit Conversion for Incoming Calls to SM

Add Remove

8 Items Refresh Filter: Enable

<input type="checkbox"/>	Matching Pattern	Min	Max	Delete Digits	Insert Digits	Address to modify	Notes
<input type="checkbox"/>	* 3143325383	* 10	* 10	* 10	17231126101	destination	nsn_4610
<input type="checkbox"/>	* 3143325384	* 10	* 10	* 10	17231126103	destination	nsn_9620
<input type="checkbox"/>	* 3143325385	* 10	* 10	* 10	17231126000	destination	MM
<input type="checkbox"/>	* 3143325386	* 10	* 10	* 10	17231126104	destination	nsn_digital
<input type="checkbox"/>	* 4386	* 4	* 4	* 4	17231126299	destination	sonus_Digital
<input type="checkbox"/>	* 7323204383	* 10	* 10	* 10	17231126101	destination	sonus/cisco_4610
<input type="checkbox"/>	* 7323204384	* 10	* 10	* 10	17231126103	destination	sonus/cisco_9620
<input type="checkbox"/>	* 7323204385	* 10	* 10	* 10	26000	destination	MM

Select : All, None (0 of 8 Selected)

Digit Conversion for Outgoing Calls from SM

Add Remove

1 Item Refresh Filter: Enable

<input type="checkbox"/>	Matching Pattern	Min	Max	Delete Digits	Insert Digits	Address to modify	Notes
--------------------------	------------------	-----	-----	---------------	---------------	-------------------	-------

Select : All, None

Figure 9: Adaptation Details Page – Adaptation for AT&T

Note – An eleven digit local numbering plan was used based on the existing Avaya Modular Messaging configuration (17231126xxx). These eleven digit numbers will be converted to five digit Communication Manager extensions in the DigitConversionAdapter defined in **Section 4.5.2**.

4.5.2. Adaptation for Avaya Aura™ Communication Manager

The Adaptation administered in this section is used for digit conversion on SIP messages to and from Communication Manager as follows:

- On egress SIP messages from Session Manager to Communication Manager where the Request-URI header contains a 11-digit number associated with an extension on Communication Manager or the Avaya Modular Messaging pilot number, the Adaptation converts the number to the extension, (e.g. 17231126101 becomes 26101 and 17231126000 becomes 26000).
- On ingress SIP messages from Communication Manager to Session Manager where the P-Asserted-Identity header contains an extension on Communication Manager, the Adaptation converts the extension to an 11-digit number, (e.g. 26101 becomes 17231126101).
- On ingress SIP messages from Communication Manager to Session Manager where the Request-URI contains the Avaya Modular Messaging pilot extension (as dialed by Communication Manager), the Adaptation converts the pilot extension to a uniform 11-digit pilot number (e.g. 26000 becomes 17231126000).

1. In the left pane under **Network Routing Policy**, click on “**Adaptations**”. In the **Adaptations** page (not shown), click on “**New**”.
2. In the **Adaptation Details** page, enter:
 - a. A descriptive **Name**, e.g. C-LAN.
 - b. Select “**DigitConversionAdapter**” from the **Module Name** drop down menu (if no module name is present, select “<click to add module>” and enter the Adaptation module name).
 - c. No **Module parameter** is required.
 - d. In the **Digit Conversion for Incoming Calls to SM** section, enter the *inbound* digits from Session Manager that need to be modified before further processing by NRP.
 - i. Enter an entire, or partial, inbound digit string that will be sent by Session Manager in the **Matching Pattern** column.
 1. **2(xxxx)** is for local extensions on Communication Manager
 - a. Enter **5** in the **Min/Max** columns.
 - b. Enter **0** replace in the **Delete Digits** column.
 - c. Enter **172311** string in the **Insert Digits** column.
 - d. Specify that this should be applied to the SIP **Origination** headers in the **Address to modify** column.
 - e. **Enter any desired notes.**
 2. **26000** is for the Avaya Modular messaging pilot number.
 - a. Enter **5** in the **Min/Max** columns.
 - b. Enter **0** in the **Delete Digits** column.

- c. Enter **172311** string in the **Insert Digits** column.
 - d. Specify that this should be applied to the SIP **Destination** headers in the **Address to modify** column
 - e. Enter any desired notes.
- e. In the **Digit Conversion for Outgoing Calls from SM** section, enter the *outbound* digits from Session Manager that need to be modified before sending them to Communications Manager.
 - ii. Enter an entire, or partial, inbound digit string that will be sent to Session Manager in the **Matching Pattern** column.
 - 1. **172311**(xxxxx) is for local extensions on Session Manager. These are the digit strings created by the ATAdapter (see **Section 4.5.1**).
 - a. Enter **11** in the **Min/Max** columns.
 - b. Enter **6** replace in the **Delete Digits** column.
 - c. Leave the **Insert Digits** column blank.
 - d. Specify that this should be applied to the SIP **Destination** headers in the **Address to modify** column.
 - e. Enter any desired notes.
- f. Click on “**Commit**”.

For example, in **Figure 10** below, for inbound calls from Communication Manager to Session Manager, the 5 digit local extension 2xxxx is converted to 1723112xxxx. The Avaya Modular messaging pilot number 26000 is converted to 17231126000. For outbound calls from Session Manager to Communication Manager, all 11 digit local numbers 172311xxxxx , have the 172311 removed leaving the 5 digit local Communication Manager extensions.

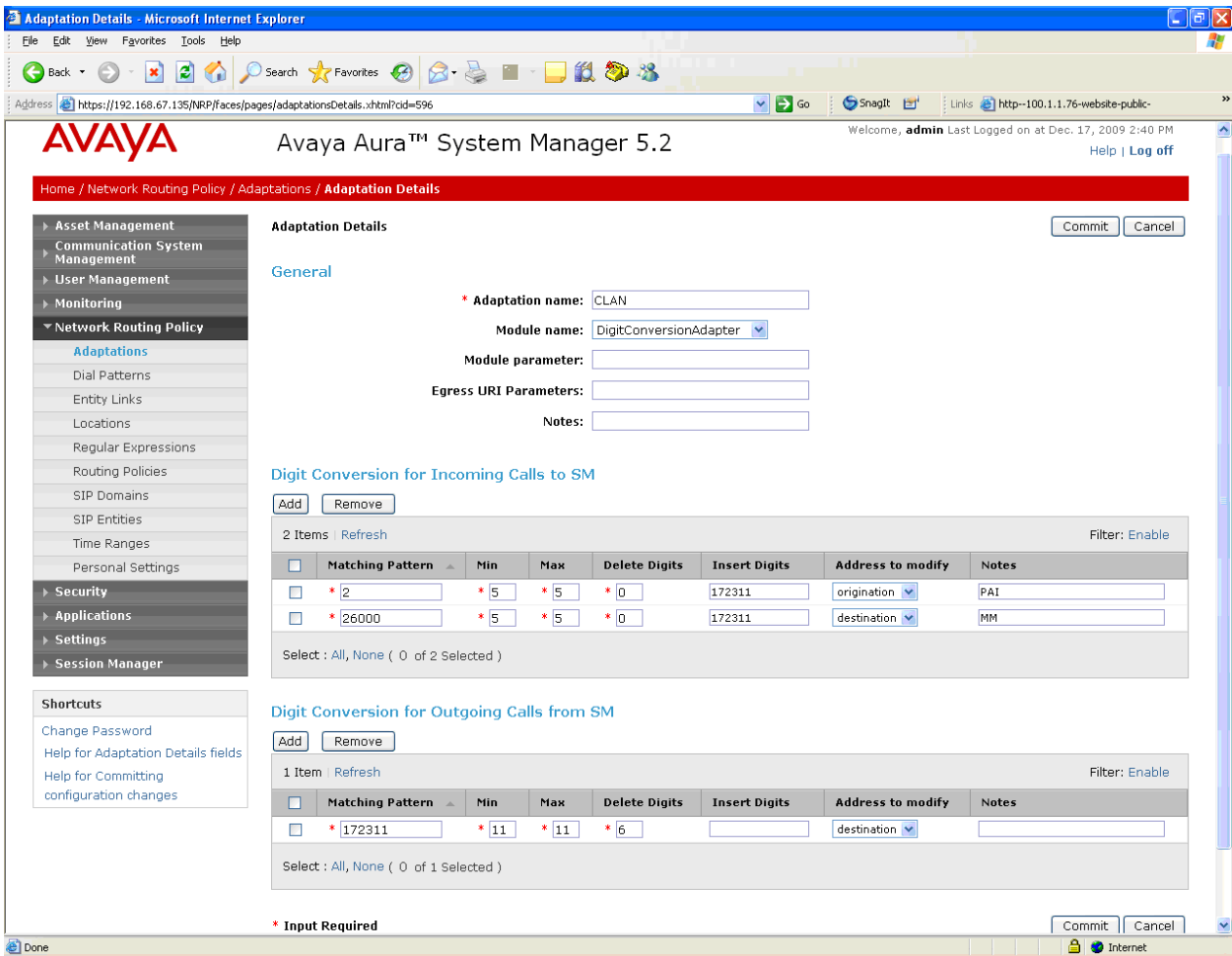


Figure 10: Adaptation Details Page – Adaptation for Avaya Aura™ Communication Manager

4.5.3. Adaptation for Avaya Modular Messaging

The Adaptation administered in this section is used for digit conversion on SIP messages to and from Avaya Modular Messaging as follows:

- The existing Avaya Modular messaging system used in the reference configuration was provisioned with 11 digit mailbox numbers beginning with 172311xxxxx, where xxxxx is the 5 digit Communication Manager extension. However for Message Wait Indicator (MWI) notifications (SIP NOTIFY messages) Avaya Modular Messaging was provisioned to send the 5 digit Communication Manager extension. Therefore this 5 digit number must be converted back to an 11 digit number before NRP processing is performed.

- In the left pane under **Network Routing Policy**, click on “**Adaptations**”. In the **Adaptations** page (not shown), click on “**New**”.
- In the **Adaptation Details** page, enter:
 - A descriptive **Name**, e.g. **Multi-Site MM Digit Conversion**.

- h. Select “**DigitConversionAdapter**” from the **Module Name** drop down menu (if no module name is present, select “<click to add module>” and enter the Adaptation module name).
- i. No **Module parameter** is required.
- j. In the **Digit Conversion for Incoming Calls to SM** section, enter the *inbound* digits from Avaya Modular Messaging that need to be modified before further processing by NRP.
 - iii. **2(xxxx)** is for local extensions on Session Manager
 - 1. Enter **5** in the **Min/Max** columns.
 - 2. Enter **0** replace in the **Delete Digits** column.
 - 3. Enter **172311** string in the **Insert Digits** column.
 - 4. Specify that this should be applied to the SIP **Destination** headers in the **Address to modify** column.
 - 5. Enter any desired notes.
- k. Click on “**Commit**”.

For example, in **Figure 11** below, inbound calls from Avaya Modular Messaging to Session Manager, the 5 digit local extension 2xxxx is converted to 1723112xxxx.

No Outbound digit conversions are required for this Adaptation.

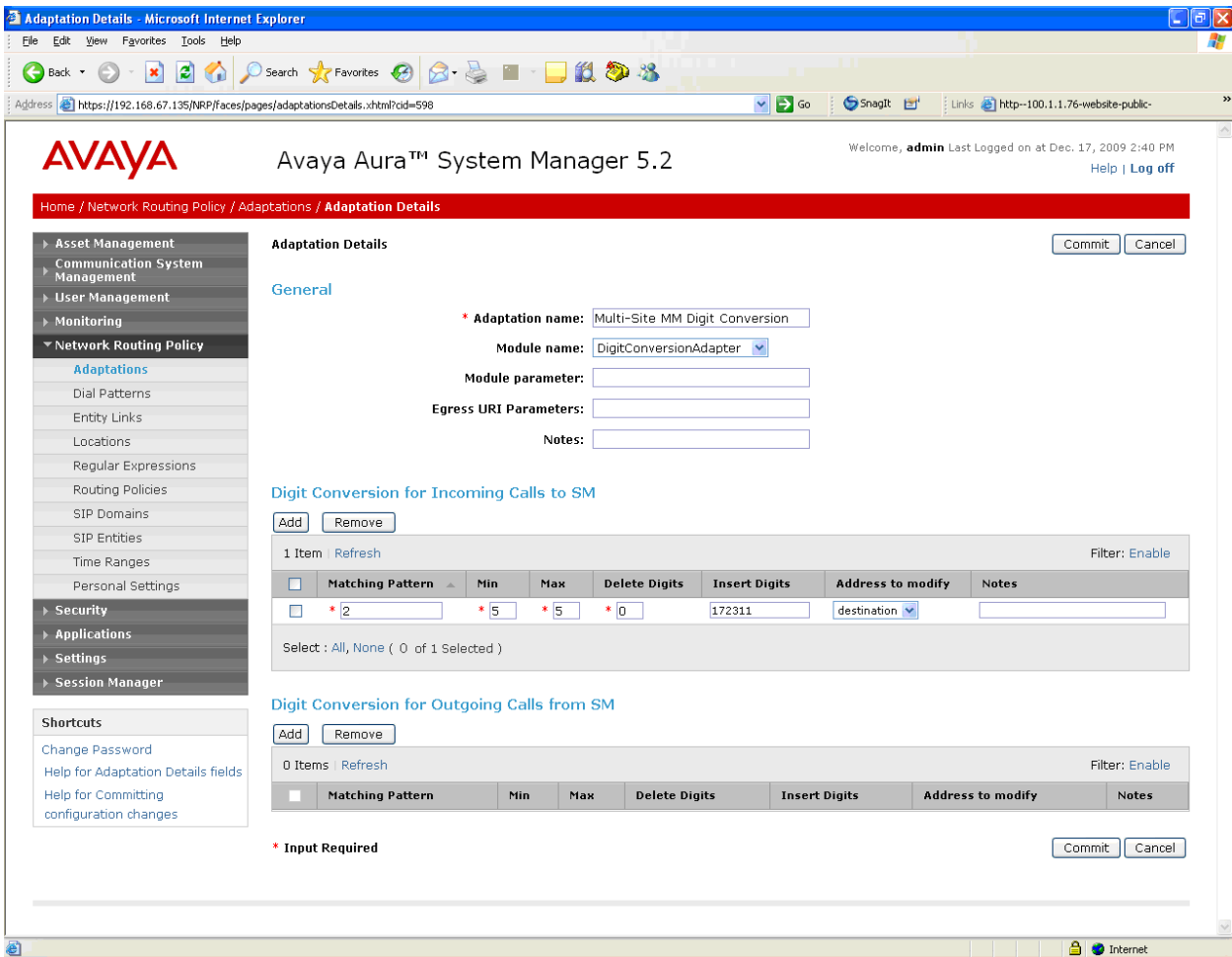


Figure 11: Adaptation Details Page – Adaptation for Avaya Modular Messaging

4.6. SIP Entities

In this section, SIP Entities are administered for the following SIP network elements:

- Avaya Aura™ Session Manager
- Avaya Aura™ Communication Manager
- Acme Packet SBC
- Avaya Modular Messaging

4.6.1. Avaya Aura™ Session Manager SIP Entity

1. In the left pane under **Network Routing Policy**, click on “**SIP Entities**”. In the **SIP Entities** page (not shown), click on “**New**”.
2. In the **General** section of the **SIP Entity Details** page, provision the following:
 - **Name** – Enter a descriptive name for Session Manager (e.g. **SM 1**).
 - **FQDN or IP Address** – Enter the IP address of the SM100 card on Session Manager (e.g. **192.168.67.137**).

- **Type** – Select “**Session Manager**”.
 - **Location** – Select location “**Main**” (Section 4.4).
 - **Outbound Proxy** – (Optional) Leave blank or select another SIP Entity. For calls to SIP domains for which Session Manager is not authoritative, Session Manager routes those calls to this **Outbound Proxy** or to another SIP proxy discovered through DNS if **Outbound Proxy** is not specified.
 - **Time Zone** – Select the time zone in which Session Manager resides (Section 4.8).
3. In the **SIP Link Monitoring** section of the **SIP Entity Details** page select:
 - a. Select **Link Monitoring Enabled** for **SIP Link Monitoring**
 - b. Use the default values for the remaining parameters.
 4. Any provisioned Entity Links (see Section 4.7) will be displayed In the **Entity Links** section. Links may be may be modified here (“**Add/Remove**”) or at the SIP Entity Link page.
 - a. Verify the **Trusted** box is checked for each Entity Link.
 5. In the **Port** section of the **SIP Entity Details** page, click on “**Add**” and provision an entry as follows:
 - **Port** – Enter “**5060**” (see note below).
 - **Protocol** – Select “**TCP**” (see note below).
 - **Default Domain** – (Optional) Select a SIP domain administered in Section 4.3. This entry enables Session Manager to accept SIP requests on the specified ports/protocols. In addition, Session Manager will associate SIP requests containing the IP address of the Session Manager SM100 card (192.168.67.137) in the host part of the Request-URI with the selected SIP **Default Domain** (e.g. **customera.com**)
 6. Repeat Step 4 to provision another similar entry, except with “**5061**” for **Port** and “**TLS**” for **Protocol**.
 7. Click on “**Commit**”.

Note – In the reference configuration TCP was used to simplify protocol tracing. TLS/port 5061 is the Avaya best practices recommendation.



Avaya Aura™ System Manager 5.2

Welcome, **admin** Last Logged on at Feb. 09,
2010 4:07 PM

[Help](#) | [Log off](#)

[Home](#) / [Network Routing Policy](#) / [SIP Entities](#) / [SIP Entity Details](#)

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 - Adaptations
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 - Entity Links
 - Locations
 - Regular Expressions
 - Routing Policies
 - SIP Domains
 - SIP Entities**
 - Time Ranges
 - Personal Settings
- ▶ Security
- ▶ Applications
- ▶ Settings
- ▶ Session Manager

Shortcuts

[Change Password](#)
[Help for SIP Entity Details fields](#)
[Help for Committing configuration changes](#)

SIP Entity Details

[Commit](#) [Cancel](#)

General

* Name:

* FQDN or IP Address:

Type:

Notes:

Location:

Outbound Proxy:

Time Zone:

Credential name:

SIP Link Monitoring

SIP Link Monitoring:

* Proactive Monitoring Interval (in seconds):

* Reactive Monitoring Interval (in seconds):

* Number of Retries:

Entity Links

[Add](#) [Remove](#)

4 Items | [Refresh](#) Filter: [Enable](#)

<input type="checkbox"/>	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted
<input type="checkbox"/>	<input type="text" value="Session Manager 1"/>	<input type="text" value="TCP"/>	* <input type="text" value="5060"/>	<input type="text" value="Acme"/>	* <input type="text" value="5060"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="text" value="Session Manager 1"/>	<input type="text" value="TCP"/>	* <input type="text" value="5060"/>	<input type="text" value="CM_SIP_FS"/>	* <input type="text" value="5060"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="text" value="Session Manager 1"/>	<input type="text" value="TCP"/>	* <input type="text" value="5060"/>	<input type="text" value="Multi_Site_MM"/>	* <input type="text" value="5060"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="text" value="Session Manager 1"/>	<input type="text" value="TCP"/>	* <input type="text" value="5060"/>	<input type="text" value="Main_Site_Clan1"/>	* <input type="text" value="5060"/>	<input checked="" type="checkbox"/>

Select : All, None (0 of 4 Selected)

Port

[Add](#) [Remove](#)

2 Items | [Refresh](#) Filter: [Enable](#)

<input type="checkbox"/>	Port	Protocol	Default Domain	Notes
<input type="checkbox"/>	<input type="text" value="5060"/>	<input type="text" value="TCP"/>	<input type="text" value="customera.com"/>	<input type="text"/>
<input type="checkbox"/>	<input type="text" value="5061"/>	<input type="text" value="TLS"/>	<input type="text" value="customera.com"/>	<input type="text"/>

Select : All, None (0 of 2 Selected)

* Input Required

[Commit](#) [Cancel](#)

Figure 12: SIP Entity Details Page – Avaya Aura™ Session Manager SIP Entity

4.6.2. Avaya Aura™ Communication Manager SIP Entity

1. In the **SIP Entities** page, click on “**New**”.
2. In the **General** section of the **SIP Entity Details** page, provision the following:
 - **Name** – Enter a descriptive name for Communication Manager.
 - **FQDN or IP Address** – Enter the IP address of the Communication Manager C-LAN board provisioned in **Section 5.3.3**.
 - **Type** – Select “**CM**”.
 - **Adaptation** – Select the Adaptation administered in **Section 4.5.2**.
 - **Location** – Select a Location administered in **Section 4.4**.
 - **Time Zone** – Select the time zone in which Communication Manager resides.
 - In the **SIP Monitoring** section of the **SIP Entity Details** page select:
 - Select **Link Monitoring Enabled** for **SIP Link Monitoring**
 - Use the default values for the remaining parameters.
3. Any provisioned Entity Links (see **Section 4.7**) will be displayed In the **Entity Links** section. Links may be may be modified here (“**Add/Remove**”) or at the SIP Entity Link page.
 - a. Verify the **Trusted** box is checked for each Entity Link.
4. Click on “**Commit**”.

Avaya Aura™ System Manager

5.2

Welcome, **admin** Last Logged on at Dec. 19, 2009 11:06 AM

[Help](#) | [Log off](#)

Home / Network Routing Policy / SIP Entities / SIP Entity Details

Asset Management

Communication System Management

User Management

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Change Password

Help for SIP Entity Details fields

Help for Committing configuration changes

SIP Entity Details

Commit Cancel

General

* Name: Main_Site_Clan1

* FQDN or IP Address: 192.168.67.13

Type: CM

Notes:

Adaptation: CLAN

Location: Main

Time Zone: America/New_York

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: Link Monitoring Enabled

* Proactive Monitoring Interval (in seconds): 900

* Reactive Monitoring Interval (in seconds): 120

* Number of Retries: 1

Entity Links

Add Remove

1 Item | Refresh

Filter: Enable

	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted
<input type="checkbox"/>	Session Manager 1	TCP	* 5060	Main_Site_Clan1	* 5060	<input checked="" type="checkbox"/>

Select : All, None (0 of 1 Selected)

* Input Required

Commit Cancel

Figure 13: SIP Entity Details Page – Avaya Aura™ Communication Manager SIP Entity

4.6.3. Acme Packet SBC SIP Entity

1. In the **SIP Entities** page, click on “New”.
2. In the **General** section of the **SIP Entity Details** page, provision the following:
 - **Name** – Enter a descriptive name for the Acme Packet SBC.
 - **FQDN or IP Address** – Enter the IP address of the private (“inside”) interface of the Acme Packet SBC (see **Section 7**).

- **Type** – Select “Other”.
 - **Adaptation** – Select the Adaptation administered in **Section 4.5.1**.
 - **Location** – Select the location administered in **Section 4.4**.
 - **Time Zone** – Select the time zone in which Acme Packet SBC resides.
 - In the **SIP Monitoring** section of the **SIP Entity Details** page select:
 - Select **Link Monitoring Enabled** for **SIP Link Monitoring**
 - Use the default values for the remaining parameters.
3. Any provisioned Entity Links (see **Section 4.7**) will be displayed In the **Entity Links** section. Links may be may be modified here (“**Add/Remove**”) or at the SIP Entity Link page.
 - a. Verify the **Trusted** box is checked for each Entity Link.
 4. Click on “**Commit**”.

Home / Network Routing Policy / SIP Entities / SIP Entity Details

SIP Entity Details Commit Cancel

General

* Name:

* FQDN or IP Address:

Type:

Notes:

Adaptation:

Location:

Time Zone:

Override Port & Transport with DNS SRV: ☐

* SIP Timer B/F (in seconds):

Credential name:

Call Detail Recording:

SIP Link Monitoring

SIP Link Monitoring:

Entity Links

Add Remove

1 Item Refresh Filter: Enable

<input type="checkbox"/>	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted
<input type="checkbox"/>	Session Manager 1	TCP	* 5060	Acme	* 5060	<input checked="" type="checkbox"/>

Select : All, None (0 of 1 Selected)

* Input Required Commit Cancel

Figure 14: SIP Entity Details Page – Acme Packet SBC SIP Entity

4.6.4. Avaya Modular Messaging SIP Entity

1. In the **SIP Entities** page, click on “**New**”.
2. In the **General** section of the **SIP Entity Details** page, provision the following:
 - **Name** – Enter a descriptive name for the Acme Packet SBC.
 - **FQDN or IP Address** – Enter the IP address of Avaya Modular Messaging Messaging Application Server (MAS)
 - **Type** – Select “**Other**”.
 - **Adaptation** – Select the Adaptation administered in **Section 4.5.3**.
 - **Location** – Select the location administered in **Section 4.4**.
 - **Time Zone** – Select the time zone in which Acme Packet SBC resides.
 - In the **SIP Monitoring** section of the **SIP Entity Details** page select:
 - Select **Link Monitoring Enabled** for **SIP Link Monitoring**
 - Use the default values for the remaining parameters.
3. Any provisioned Entity Links (see **Section 4.7**) will be displayed In the **Entity Links** section. Links may be may be modified here (“**Add/Remove**”) or at the SIP Entity Link page.
 - a. Verify the **Trusted** box is checked for each Entity Link.
4. Click on “**Commit**”.

SIP Entity Details

General

* Name: Multi_Site_MM

* FQDN or IP Address: 192.168.67.141

Type: Other

Notes:

Adaptation: Multi-Site MM Digit Conversion

Location: Main

Time Zone: America/New_York

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: Link Monitoring Enabled

* Proactive Monitoring Interval (in seconds): 900

* Reactive Monitoring Interval (in seconds): 120

* Number of Retries: 1

Entity Links

Add Remove

1 Item Refresh Filter: Enable

<input type="checkbox"/>	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted
<input type="checkbox"/>	Session Manager 1	TCP	* 5060	Multi_Site_MM	* 5060	<input checked="" type="checkbox"/>

Select : All, None (0 of 1 Selected)

* Input Required

Commit Cancel

Figure 15: SIP Entity Details Page – Avaya Modular Messaging SIP Entity

4.7. Entity Links

In this section, Entity Links are administered between Session Manager and the following SIP Entities:

- Avaya Aura™ Communication Manager
- Acme Packet SBC
- Avaya Modular Messaging

4.7.1. Entity Link to Avaya Aura™ Communication Manager

1. In the left pane under **Network Routing Policy**, click on “**Entity Links**”. In the **Entity Links** page (not shown), click on “**New**”.
2. Continuing in the **Entity Links** page, provision the following:

- **Name** – Enter a descriptive name for the link to Communication Manager.
 - **SIP Entity 1** – Select the SIP Entity administered in **Section 4.6.1** for Session Manager. SIP Entity 1 must always be an Session Manager instance.
 - **SIP Entity 1 Port** – Enter “5060” (see Note in **Section 4.6.1**).
 - **SIP Entity 2** –Select the SIP Entity administered in **Section 4.6.2** for Communication Manager.
 - **SIP Entity 2 Port** - Enter “5060” (see Note in **Section 4.6.1**).
 - **Trusted** – Check the checkbox.
 - **Protocol** – Select “TCP” (see Note in **Section 4.6.1**).
3. Click on “Commit”.

Avaya Aura™ System Manager 5.2

Welcome, **admin** Last Logged on at Dec. 17, 2009 2:40 PM [Help](#) | [Log off](#)

Home / Network Routing Policy / Entity Links

Entity Links

1 Item | Refresh Filter: Enable

Name	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted	Notes
* To_Main_Site_Clan	* Session Manager 1	TCP	* 5060	* Main_Site_Clan1	* 5060	<input checked="" type="checkbox"/>	

* Input Required

Commit Cancel

Figure 16: Entity Links Page – Entity Link to Avaya Aura™ Communication Manager

4.7.2. Entity Link to AT&T IP Flexible Reach Service via Acme Packet SBC

Repeat Section 4.7.1 with the following differences:

- **Name** – Enter a descriptive name for the link to the AT&T IP Flexible Reach service, by way of the Acme Packet SBC.
- **SIP Entity 2** – Select the SIP Entity administered in **Section 4.6.3** for the Acme Packet SBC.

Avaya Aura™ System Manager 5.2

Welcome, **admin** Last Logged on at Dec. 17, 2009 2:40 PM

Help | Log off

Home / Network Routing Policy / Entity Links

Entity Links

1 Item | Refresh Filter: Enable

Name	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted	Notes
* Acme	* Session Manager 1	TCP	* 5060	* Acme	* 5060	<input checked="" type="checkbox"/>	

* Input Required

Commit Cancel

Figure 17: Entity Links Page – Entity Link to AT&T IP Flexible Reach Service via Acme Packet SBC

4.7.3. Entity Link to Avaya Modular Messaging

Repeat Section 4.7.1 with the following differences:

- **Name** – Enter a descriptive name for the link to Avaya Modular Messaging.
- **SIP Entity 2** – Select the SIP Entity administered in Section 4.6.4 for Avaya Modular Messaging.

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Home / Network Routing Policy / Entity Links

Entity Links

1 Item | Refresh Filter: Enable

Name	SIP Entity 1	Protocol	Port	SIP Entity 2	Port	Trusted	Notes
* Multi_Site_MM	* Session Manager 1	TCP	* 5060	* Multi_Site_MM	* 5060	<input checked="" type="checkbox"/>	

* Input Required

Commit Cancel

Figure 18: Entity Links Page – Entity Link to Avaya Modular Messaging

4.8. Time Ranges

1. In the left pane under **Network Routing Policy**, click on “**Time Ranges**”. In the **Time Ranges** page (not shown), click on “**New**”.
2. Continuing in the **Time Ranges** page, enter a descriptive **Name**, check the checkboxes for the desired day(s) of the week, and enter the desired **Start Time** and **End Time**.
3. Click on “**Commit**”.
4. Repeat Steps 1 – 3 to provision additional time ranges.

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Edit
New
Duplicate
Delete
More Actions
Commit

2 Items | Refresh
Filter: Enable

	Name	Mo	Tu	We	Th	Fr	Sa	Su	Start Time	End Time	Notes
<input checked="" type="checkbox"/>	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 (0 of 2 Selected)

Figure 19: Time Ranges Page

4.9. Routing Policies

In this section, Routing Policies are administered for routing calls to the following SIP Entities:

- To the AT&T network (via the Acme)
- Avaya Aura™ Communication Manager
- Avaya Modular Messaging

4.9.1. Routing Policy for Routing to AT&T

1. In the left pane under **Network Routing Policy**, click on “**Routing Policies**”. In the **Routing Policies** page (not shown), click on “**New**”.
2. In the **General** section of the **Routing Policy Details** page, enter a descriptive **Name** for routing calls to AT&T, and ensure that the **Disabled** checkbox is unchecked to activate this Network Routing Policy.

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Help for Routing Policy Details fields

Help for SIP Entity List

Help for Time Range List

Help for Pattern List

Help for Regular Expressions List

Help for Committing configuration changes

Routing Policy Details

Commit

Cancel

General

* Name:

To_AT&T

Disabled:

☐

Notes:

SIP Entity as Destination

Select

Name	FQDN or IP Address	Type	Notes

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
<div> <div><</div> <div></div> <div>></div> </div>												
Select : All, None												

Dial Patterns

Add

Remove

9 Items | Refresh

Filter: Enable

<input type="checkbox"/>	Pattern ▲	Min	Max	Emergency Call	SIP Domain	Originating Location	Notes
Select : All, None							

Regular Expressions

Add

Remove

0 Items | Refresh

Filter: Enable

<input type="checkbox"/>	Pattern	Rank Order	Deny	Notes

* Input Required

Commit

Cancel

Figure 20: Routing Policy Details Page - Routing to AT&T via Acme

3. In the **SIP Entity as Destination** section of the **Routing Policy Details** page, click on “**Select**”.
4. In the **SIP Entity List** page, select the SIP Entity administered in **Section 4.6.3** for Acme (**Acme**), and click on “**Select**”.

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Home / Network Routing Policy / Routing Policies / Routing Policy Details / **SIP Entity List**

SIP Entity List [Select](#) [Cancel](#)

SIP Entities

4 Items | [Refresh](#) Filter: [Enable](#)

	Name	FQDN or IP Address	Type	Notes
<input checked="" type="radio"/>	Acme	192.168.67.130	Other	
<input type="radio"/>	Main_Site_Clan1	192.168.67.13	CM	
<input type="radio"/>	Multi_Site_MM	192.168.67.141	Other	
<input type="radio"/>	Session Manager 1	192.168.67.137	Session Manager	

Select : [None](#)

[Select](#) [Cancel](#)

Figure 21: SIP Entity List Page - Routing to AT&T

5. Returning to the Routing Policy Details page (**Figure 20**), in the Time of Day section, click on “**Add**”.
6. In the **Time Range List** page, check the checkbox(s) corresponding to one or more Time Ranges administered in **Section 4.8**, and click on “**Select**”.



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SIP Entities

Time Ranges

Personal Settings

Time Range List

Select

Cancel

Time Ranges

1 Item | [Refresh](#)

Filter: [Enable](#)

<input type="checkbox"/>	Name	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Notes
<input checked="" type="checkbox"/>	AllTimes	<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	

Select : [All](#), [None](#) (0 of 1 Selected)

Select

Cancel

Figure 22: Time Range List Page - Routing to AT&T

- Returning to the **Routing Policy Details** page (**Figure 20**), in the **Time of Day** section, enter a **Ranking** (the lower the number, the higher the ranking) for each Time Range, and click on “**Commit**”.
- Any **Dial Patterns** that were previously defined (see **Section 4.10**) will be displayed. Entries may be added or removed here.
- No **Regular Expressions** were used in the reference configuration.

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Help for Pattern List

Help for Regular Expressions List

Help for Committing configuration changes

Routing Policy Details

Commit

Cancel

General

* Name:

To_AT&T

Disabled:

☐

Notes:

SIP Entity as Destination

Select

Name	FQDN or IP Address	Type	Notes
Acme	192.168.67.130	Other	

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	<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 (0 of 1 Selected)

Dial Patterns

Add

Remove

9 Items | Refresh

Filter: Enable

<input type="checkbox"/>	Pattern ▲	Min	Max	Emergency Call	SIP Domain	Originating Location	Notes
<input type="checkbox"/>	011	14	20	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	1314	11	11	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	1732	11	11	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	1800	11	11	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	1848	11	11	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	1908	11	11	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	1914	11	11	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	511	3	3	<input type="checkbox"/>	-ALL-	-ALL-	
<input type="checkbox"/>	800	10	10	<input type="checkbox"/>	-ALL-	-ALL-	

Select : All, None (0 of 9 Selected)

Regular Expressions

Add

Remove

0 Items | Refresh

Filter: Enable

<input type="checkbox"/>	Pattern	Rank Order	Deny	Notes
--------------------------	---------	------------	------	-------

* Input Required

Commit

Cancel

Figure 23: Routing Policy Details Page to AT&T - Completed

10. Click on **Commit**.

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4.9.2. Routing Policy for Routing to Avaya Aura™ Communication Manager

Repeat Section 4.9.1 with the following differences:

- In the **General** section of the **Routing Policy Details** page, enter a descriptive **Name** for routing calls to Communication Manager (**Main_Site_CLAN1**) and ensure that the **Disabled** checkbox is unchecked to activate this Network Routing Policy.
- In the **SIP Entity List** page, select the SIP Entity administered in Section 4.6.4 for Communication Manager (**Main_Site_CLAN1**) and click on “**Select**”.
- See **Section 4.10** for the associated Dial Patterns.

Home / Network Routing Policy / Routing Policies / Routing Policy Details

Routing Policy Details

Commit Cancel

General

* Name: Main_Site_Clan1

Disabled: ☐

Notes:

SIP Entity as Destination

Select

Name	FQDN or IP Address	Type	Notes
Main_Site_Clan1	192.168.67.13	CM	

Time of Day

Add Remove View Gaps/Overlaps

1 Item Refresh Filter: Enable

Ranking	Name	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start Time	End Time	Notes
1	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 (0 of 1 Selected)

Dial Patterns

Add Remove

3 Items Refresh Filter: Enable

Pattern	Min	Max	Emergency Call	SIP Domain	Originating Location	Notes
1723112	11	11	<input type="checkbox"/>	-ALL-	-ALL-	
26000	5	5	<input type="checkbox"/>	-ALL-	-ALL-	MM pilot number

Select : All, None (0 of 3 Selected)

Figure 24: Routing Policy Details Page - Routing to Avaya Aura™ Communication Manager

4.9.3. Routing Policy for Routing to Avaya Modular Messaging

Repeat Section 4.9.1 with the following differences:

- In the **General** section of the **Routing Policy Details** page, enter a descriptive **Name** for routing calls to Avaya Modular Messaging (**Multi-Site_MM**), and ensure that the **Disabled** checkbox is unchecked to activate this Network Routing Policy.
- In the **SIP Entity List** page, select the SIP Entity administered in Section 4.6.4 for Avaya Modular Messaging (**Multi-Site_MM**), and click on “**Select**”.

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 Help for Pattern List
 Help for Regular Expressions List
 Help for Committing configuration changes

Routing Policy Details

Commit

Cancel

General

* Name: Multi_Site_MM

Disabled: ☐

Notes:

SIP Entity as Destination

Select

Name	FQDN or IP Address	Type	Notes
Multi_Site_MM	192.168.67.141	Other	

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	<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 Rang 24/7

Select : All, None (0 of 1 Selected)

Dial Patterns

Add

Remove

1 Item | Refresh

Filter: Enable

<input type="checkbox"/>	Pattern ▲	Min	Max	Emergency Call	SIP Domain	Originating Location	Notes
<input type="checkbox"/>	17231126000	11	11	<input type="checkbox"/>	-ALL-	-ALL-	

Select : All, None (0 of 1 Selected)

Regular Expressions

Add

Remove

0 Items | Refresh

Filter: Enable

<input type="checkbox"/>	Pattern	Rank Order	Deny	Notes
--------------------------	---------	------------	------	-------

* Input Required

Commit

Cancel

Figure 25: Routing Policy Details Page - Routing to Avaya Modular Messaging

4.10. Dial Patterns

In this section, Dial Patterns are administered matching the following calls:

- Inbound/outbound PSTN calls via AT&T IP Flexible Reach service specifying toll free or Direct Inward Dial numbers (DIDs).
- Calls to/from 11-digit local dial plan numbers associated with extensions on Communication Manager or the Avaya Modular Messaging pilot number.

- Notifications from Avaya Modular Messaging (MWI) to Communications Manager 5 digit local extensions.

4.10.1. Matching Outbound AT&T IP Flexible Reach Service Calls

1. In the left pane under **Network Routing Policy**, click on “**Dial Patterns**”. In the **Dial Patterns** page (not shown), click on “**New**”.
2. In the **General** section of the **Dial Pattern Details** page (**Figure 26**), provision the following:
 - **Pattern** – Enter matching patterns for outbound dialed digits, e.g. 1800(xxxxxxxx). Other patterns included 1732(xxxxxxxx) and 1914(xxxxxxxx).
 - **Min** and **Max** – Enter **11**.
 - **SIP Domain** – Select one of the SIP Domains defined in **Section 4.3** or “**-ALL-**”, to select all of those administered SIP Domains. Only those calls with the same domain in the Request-URI as the selected SIP Domain (or all administered SIP Domains if “**-ALL-**” is selected) can match this Dial Pattern.
Note – As only one domain was administered for the reference configuration (“**Main**”), the same result is achieved whether “**Main**” or “**All**” is specified.
3. In the **Originating Locations and Routing Policies** section of the **Dial Pattern Details** page, click on “**Add**”.

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Home / Network Routing Policy / Dial Patterns / Dial Pattern Details

Dial Pattern Details [Commit](#) [Cancel](#)

General

* **Pattern:**

* **Min:**

* **Max:**

Emergency Call: ☐

SIP Domain:

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"/>				0	<input type="checkbox"/>		

Select : All, None (0 of 1 Selected)

Denied Originating Locations

[Add](#) [Remove](#)

0 Items [Refresh](#) Filter: Enable

<input type="checkbox"/>	Originating Location	Notes
--------------------------	----------------------	-------

* Input Required [Commit](#) [Cancel](#)

Figure 26: Dial Pattern Details Page - Matching Outbound AT&T IP Flexible Reach Service Calls

4. In the **Originating Location** section of the **Originating Location and Routing Policy List** page (**Figure 27**), check the checkbox corresponding to the Location to which the Acme Packet SBC is assigned (see **Section 4.6.3**). Note that only those calls that originate from the selected Location(s), or all administered Locations if “-ALL-” is selected, can match this Dial Pattern.
5. In the **Routing Policies** section of the **Originating Location and Routing Policy List** page, check the checkbox corresponding to the Routing Policy administered for routing calls to the AT&T IP Flexible Reach service in **Section 4.9.1**.
6. In the **Originating Location and Routing Policy List** page, click on “Select”.

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Home / Network Routing Policy / Dial Patterns / Dial Pattern Details / **Locations and Routing Policy List**

Originating Location and Routing Policy List Select Cancel

Originating Location

2 Items | Refresh Filter: Enable

<input type="checkbox"/>	Name	Notes
<input checked="" type="checkbox"/>	-ALL-	Any Locations
<input type="checkbox"/>	Main	Main Site

Select : All, None (1 of 2 Selected)

Routing Policies

3 Items | Refresh Filter: Enable

<input type="checkbox"/>	Name	Disabled	Destination	Notes
<input type="checkbox"/>	Main_Site_Clan1	<input type="checkbox"/>	Main_Site_Clan1	
<input type="checkbox"/>	Multi_Site_MM	<input type="checkbox"/>	Multi_Site_MM	
<input checked="" type="checkbox"/>	To_AT&T	<input type="checkbox"/>	Acme	

Select : All, None (1 of 3 Selected)

Select Cancel

Figure 27: Originating Location and Routing Policy List Page - Matching Outbound AT&T IP Flexible Reach Service Calls

7. Returning to the **Dial Pattern Details** page (**Figure 28**), click on “Commit”.

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Help | Log off

Home / Network Routing Policy / Dial Patterns / Dial Pattern Details

Dial Pattern Details Commit Cancel

General

* Pattern:

* Min:

* Max:

Emergency Call: ☐

SIP Domain:

Notes:

Originating Locations and Routing Policies

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"/>	-ALL-	Any Locations	To AT&T	0	<input type="checkbox"/>	Acme	

Select : All, None (0 of 1 Selected)

Denied Originating Locations

0 Items Refresh Filter: Enable

<input type="checkbox"/>	Originating Location	Notes
--------------------------	----------------------	-------

* Input Required Commit Cancel

Shortcuts

- Change Password
- Help for Dial Pattern Details fields
- Help for Location and Routing Policy Lists
- Help for Denied Location fields
- Help for Committing configuration changes

Figure 28: Dial Pattern Details - Matching Outbound AT&T IP Flexible Reach Service Calls (Final)

4.10.2. Matching Inbound Calls with 11 digit Called Party Numbers Associated with Extensions on Avaya Aura™ Communication Manager

1. In the left pane under **Network Routing Policy**, click on “**Dial Patterns**”. In the **Dial Patterns** page (not shown), click on “**New**”.
2. In the **General** section of the **Dial Pattern Details** page, provision the following:
 - **Pattern** – In the reference configuration, AT&T sends 11 digit called numbers that are converted to the CPE private 11 digit 1723112xxxx strings by the DigitConversionAdapter specified in **Section 4.5.2 step e**. Therefore in this field enter **1723112**.
 - **Min** and **Max** – Enter **11**.
 - **SIP Domain** – Select one of the SIP Domains defined in **Section 4.3** or “**-ALL-**”, to select all of those administered SIP Domains. Only those calls with the same domain in the Request-URI as the selected SIP Domain (or all administered SIP Domains if “**-ALL-**” is selected) can match this Dial Pattern.
3. In the **Originating Locations and Routing Policies** section of the **Dial Pattern Details** page, click on “**Add**”.

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[Help for Committing configuration changes](#)

Dial Pattern Details

Commit
Cancel

General

* Pattern: 1723112

* Min: 11

* Max: 11

Emergency Call: ☐

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"/>				0	<input type="checkbox"/>		

Select : All, None (0 of 1 Selected)

Denied Originating Locations

Add
Remove

0 Items Refresh

Filter: Enable


<input type="checkbox"/>	Originating Location	Notes
--------------------------	----------------------	-------

* Input Required

Commit
Cancel

Figure 29: Dial Pattern Details Page - Matching Inbound AT&T IP Flexible Reach Service Calls

- In the **Originating Location** section of the **Originating Location and Routing Policy List** page, check the checkbox corresponding to the Location to which the Acme Packet SBC is assigned (see **Section 4.6.3**). Note that only those calls that originate from the selected Location(s), or all administered Locations if “-ALL-” is selected, can match this Dial Pattern.
- In the **Routing Policies** section of the **Originating Location and Routing Policy List** page, check the checkbox corresponding to the Routing Policy administered for routing calls to Communication Manager in **Section 4.9.2**.
- In the **Originating Location and Routing Policy List** page, click on “Select”.



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Applications

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Originating Location and Routing Policy List

Select Cancel

Originating Location

2 Items Refresh Filter: Enable

<input type="checkbox"/>	Name	Notes
<input checked="" type="checkbox"/>	-ALL-	Any Locations
<input type="checkbox"/>	Main	Main Site

Select : All, None (1 of 2 Selected)

Routing Policies

3 Items Refresh Filter: Enable

<input type="checkbox"/>	Name	Disabled	Destination	Notes
<input checked="" type="checkbox"/>	Main_Site_Clan1	<input type="checkbox"/>	Main_Site_Clan1	
<input type="checkbox"/>	Multi_Site_MM	<input type="checkbox"/>	Multi_Site_MM	
<input type="checkbox"/>	To_AT&T	<input type="checkbox"/>	Acme	

Select : All, None (1 of 3 Selected)

Select Cancel

Figure 30: Originating Location and Routing Policy List Page - Matching Inbound AT&T IP Flexible Reach Service Calls

7. Returning to the **Dial Pattern Details** page (**Figure 31**), click on “**Commit**”.

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Help | Log off

Home / Network Routing Policy / Dial Patterns / **Dial Pattern Details**

Dial Pattern Details Commit Cancel

General

* **Pattern:** 1723112

* **Min:** 11

* **Max:** 11

Emergency Call: ☐

SIP Domain: -ALL- v

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"/>	-ALL-	Any Locations	Main_Site_Clan1	0	<input type="checkbox"/>	Main_Site_Clan1	

Select : All, None (0 of 1 Selected)

Denied Originating Locations

Add Remove

0 Items | Refresh Filter: Enable

<input type="checkbox"/>	Originating Location	Notes
--------------------------	----------------------	-------

* Input Required Commit Cancel

Figure 31: Dial Pattern Details - Matching Inbound AT&T IP Flexible Reach Service Calls (Final)

4.10.3. Matching Inbound Calls to Avaya Modular Messaging Pilot Number via Avaya Aura™ Communication Manager

Avaya Aura™ Communication Manager stations cover to Avaya Modular Messaging using a pilot number (26000 in the reference configuration).

1. In the left pane under **Network Routing Policy**, click on “**Dial Patterns**”. In the **Dial Patterns** page (not shown), click on “**New**”.
2. In the **General** section of the **Dial Pattern Details** page, provision the following:
 - **Pattern** – Enter the Avaya Modular Messaging pilot number (e.g. 26000)
 - **Min** and **Max** – Enter 5.
 - **SIP Domain** – Select one of the SIP Domains defined in **Section 4.3** or “**-ALL-**”, to select all of those administered SIP Domains. Only those calls with the same domain in the Request-URI as the selected SIP Domain (or all administered SIP Domains if “**-ALL-**” is selected) can match this Dial Pattern.
3. In the **Originating Locations and Routing Policies** section of the **Dial Pattern Details** page, click on “**Add**”.

Home / Network Routing Policy / Dial Patterns / **Dial Pattern Details**

Asset Management
Communication System Management
User Management
Monitoring
Network Routing Policy
Adaptations
Dial Patterns
Entity Links
Locations
Regular Expressions
Routing Policies
SIP Domains
SIP Entities
Time Ranges
Personal Settings
Security
Applications
Settings
Session Manager

Dial Pattern Details

Commit Cancel

General

* Pattern:

* Min:

* Max:

Emergency Call: ☐

SIP Domain:

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"/>	-ALL-	Any Locations	Main_Site_Clan1	1	<input type="checkbox"/>	Main_Site_Clan1	

Select : All, None (0 of 1 Selected)

Denied Originating Locations

Add Remove

0 Items Refresh Filter: Enable

<input type="checkbox"/>	Originating Location	Notes
--------------------------	----------------------	-------

* Input Required

Commit Cancel

Figure 32: Dial Pattern Details – Matching Avaya Modular Messaging Pilot Number

- Repeat steps 4 through 7 as shown in **Section 4.10.2** to complete the form.

4.10.4. Calls to Avaya Modular Messaging Pilot Number

Note – PSTN calls to the DID mapped to the Avaya Modular Messaging pilot number are routed to Avaya Aura™ Communication Manager for processing.

- In the **Dial Patterns** page, click on “New”.
- In the **General** section of the **Dial Pattern Details** page, provision the following:
 - Pattern** – Enter the Avaya Modular Messaging uniform pilot number, (e.g. **17231126000**).
 - Min** and **Max** – Enter “11”.
 - SIP Domain** – Select “-ALL-”.
- In the **Originating Locations and Routing Policies** section of the **Dial Pattern Details** page, click on “Add”.

Avaya Aura™ System Manager 5.2

Welcome, **admin** Last Logged on at Dec. 19, 2009 1:01 PM
[Help](#) | [Log off](#)

Home / Network Routing Policy / Dial Patterns / **Dial Pattern Details**

Dial Pattern Details [Commit](#) [Cancel](#)

General

* Pattern:

* Min:

* Max:

Emergency Call: ☐

SIP Domain:

Notes:

Originating Locations and Routing Policies

[Add](#) [Remove](#)

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

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

Select : All, None (0 of 1 Selected)

Denied Originating Locations

[Add](#) [Remove](#)

0 Items | [Refresh](#) Filter: [Enable](#)

<input type="checkbox"/>	Originating Location	Notes
--------------------------	----------------------	-------

* Input Required [Commit](#) [Cancel](#)

Figure 33: Dial Pattern Details Page - Matching Calls to Avaya Modular Messaging

4. In the **Originating Location** section of the **Originating Location and Routing Policy List** page, check the checkbox corresponding to “-ALL-”.
5. In the **Routing Policies** section of the **Originating Location and Routing Policy List** page, check the checkbox corresponding to the Routing Policy administered for routing calls to Avaya Modular Messaging in **Section 4.9.3**.
6. In the **Originating Location and Routing Policy List** page, click on “Select”.

Avaya Aura™ System Manager 5.2

Welcome, **admin** Last Logged on at Dec. 19, 2009 1:01 PM
[Help](#) | [Log off](#)

Home / Network Routing Policy / Dial Patterns / Dial Pattern Details / **Locations and Routing Policy List**

Originating Location and Routing Policy List [Select](#) [Cancel](#)

Originating Location

2 Items | [Refresh](#) Filter: [Enable](#)

<input type="checkbox"/>	Name	Notes
<input checked="" type="checkbox"/>	-ALL-	Any Locations
<input type="checkbox"/>	Main	Main Site

Select : All, None (1 of 2 Selected)

Routing Policies

3 Items | [Refresh](#) Filter: [Enable](#)

<input type="checkbox"/>	Name	Disabled	Destination	Notes
<input type="checkbox"/>	Main_Site_Clan1	<input type="checkbox"/>	Main_Site_Clan1	
<input checked="" type="checkbox"/>	Multi_Site_MM	<input type="checkbox"/>	Multi_Site_MM	
<input type="checkbox"/>	To_AT&T	<input type="checkbox"/>	Acme	

Select : All, None (1 of 3 Selected)

[Select](#) [Cancel](#)

Figure 34: Originating Location and Routing Policy List Page - Matching Calls to Avaya Modular Messaging

7. Returning to the **Dial Pattern Details** page (Figure 35), click on “Commit”.

AVAYA Avaya Aura™ System Manager 5.2 Welcome, **admin** Last Logged on at Dec. 19, 2009 1:01 PM
Help | Log off

Home / Network Routing Policy / Dial Patterns / **Dial Pattern Details**

- ▶ Asset Management
- ▶ Communication System Management
- ▶ User Management
- ▶ Monitoring
- ▼ Network Routing Policy
 - Adaptations
 - Dial Patterns**
 - Entity Links
 - Locations
 - Regular Expressions
 - Routing Policies
 - SIP Domains
 - SIP Entities
 - Time Ranges
 - Personal Settings
- ▶ Security
- ▶ Applications
- ▶ Settings
- ▶ Session Manager

Shortcuts
[Change Password](#)
[Help for Dial Pattern Details fields](#)
[Help for Location and Routing Policy Lists](#)
[Help for Denied Location fields](#)
[Help for Committing configuration changes](#)

Dial Pattern Details

Commit Cancel

General

* Pattern:

* Min:

* Max:

Emergency Call: ☐

SIP Domain:

Notes:

Originating Locations and Routing Policies

Add Remove
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	Multi_Site_MM	0	<input type="checkbox"/>	Multi_Site_MM	

Select : All, None (0 of 1 Selected)

Denied Originating Locations

Add Remove
Filter: Enable

<input type="checkbox"/>	Originating Location	Notes
0 Items Refresh		

* Input Required

Commit Cancel

Figure 35: Dial Pattern Details Page - Matching Calls to Avaya Modular Messaging (Final)

Repeat the steps described in **Section 4.10** to add any additional Dial Patterns. **Figure 36** shows a completed Dial Patterns page used in the reference configuration.

Home / Network Routing Policy / Dial Patterns

▶ Asset Management
▶ Communication System Management
▶ User Management
▶ Monitoring
▼ Network Routing Policy
Adaptations
Dial Patterns
Entity Links
Locations
Regular Expressions
Routing Policies
SIP Domains
SIP Entities
Time Ranges
Personal Settings
▶ Security
▶ Applications
▶ Settings
▶ Session Manager

Shortcuts
Change Password

Dial Patterns

Edit
New
Duplicate
Delete
More Actions ▼
Commit

14 Items Refresh
Filter: Enable

<input type="checkbox"/>	Pattern	Min	Max	Emergency Call	SIP Domain	Notes
<input type="checkbox"/>	011	14	20	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	1314	11	11	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	1723112	11	11	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	17231126000	11	11	<input type="checkbox"/>	-ALL-	To MM
<input type="checkbox"/>	172311266	11	11	<input type="checkbox"/>	-ALL-	CM_SIP_FS
<input type="checkbox"/>	1732	11	11	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	1800	11	11	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	1848	11	11	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	1908	11	11	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	1914	11	11	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	26000	5	5	<input type="checkbox"/>	-ALL-	MM pilot number
<input type="checkbox"/>	511	3	3	<input type="checkbox"/>	-ALL-	
<input type="checkbox"/>	800	10	10	<input type="checkbox"/>	-ALL-	

Select : All, None

Figure 36: Dial Patterns Page - (Reference Configuration)

4.11. Session Manager Administration

1. In the left pane under **Session Manager**, click on “**Session Manager Administration**”. In the **Session Manager Administration** page (not shown), click on “**New**”.
2. In the **General** section of the **Add Session Manager** page, provision the following:
 - **SIP Entity Name** – Select the SIP Entity administered for Session Manager in **Section 4.6.1**.
 - **Management Access Point Host Name/IP** – Enter the IP address of the management interface on Session Manager.
3. In the **Security Module** section of the **Add Session Manager** page, enter the **Network Mask** and **Default Gateway** of the SM100 card.
4. In the **Monitoring** section, verify that the **Enable Monitoring** box is checked.
5. Use the default values for the remaining fields.
6. Click on “**Commit**”.

Avaya Aura™ System Manager 5.2

Welcome, **admin** Last Logged on at Dec. 19, 2009 1:01 PM
[Help](#)
[Log off](#)

Home / Session Manager / Session Manager Administration / New Session Manager

Asset Management
Communication System Management
User Management
Monitoring
Network Routing Policy
Security
Applications
Settings
Session Manager
Session Manager Administration
Network Configuration
Device and Location Configuration
Application Configuration
System Status
System Tools

Shortcuts
Change Password
Help for Session Manager Administration
Help for Page Fields

Add Session Manager

Commit Cancel

General | Security Module | Monitoring | CDR | Personal Profile Manager (PPM) - Connection Settings | Event Server |
Expand All | Collapse All

General

*SIP Entity Name

SM1

Description

*Management Access Point Host Name/IP

192.168.67.136

*Direct Routing to Endpoints

Enable

Security Module

SIP Entity IP Address

*Network Mask

255.255.255.0

*Default Gateway

192.168.67.1

*Call Control PHB

46

*QOS Priority

6

*Speed & Duplex

Auto

VLAN ID

Monitoring

Enable Monitoring

☒

*Proactive cycle time (secs)

900

*Reactive cycle time (secs)

120

*Number of Retries

1

CDR

Enable CDR

☐

User

CDR_User

Password

Confirm Password

Personal Profile Manager (PPM) - Connection Settings

Limited PPM client connection

☒

*Maximum Connection per PPM client

3

*PPM Connection Timeout (mins)

5

PPM Packet Rate Limiting

☒

*PPM Packet Rate Limiting Threshold

50

Event Server

Clear Subscription on Notification Failure

No

*Required

Commit Cancel

Figure 37: Add Session Manager Page

5. Avaya Aura™ Communication Manager

This section describes the administration steps for Communication Manager in support of the reference configuration described in these Application Notes. The steps are performed from the Communication Manager System Access Terminal (SAT) interface. These Application Notes assume that basic Communication Manager administration, including stations, C-LAN, Media Processor, and announcement boards, etc., has already been performed. Consult [3] and [4] for further details if necessary.

Note – In the following sections, only the parameters that are highlighted in **bold** text are applicable to these application notes. Other parameter values may or may not match based on local configurations.

5.1. System Parameters

This section reviews the Communication Manager licenses and features that are required for the reference configuration described in these Application Notes. For required licenses that are not enabled in the steps that follow, contact an authorized Avaya account representative to obtain the licenses.

1. Enter the **display system-parameters customer-options** command. On Page 2 of the **system-parameters customer-options** form, verify that the **Maximum Administered SIP Trunks** number is sufficient for the number of expected SIP trunks (e.g. 5000).

display system-parameters customer-options		Page	2 of	11
OPTIONAL FEATURES				
IP PORT CAPACITIES		USED		
Maximum Administered H.323 Trunks: 8000		0		
Maximum Concurrently Registered IP Stations: 18000		4		
Maximum Administered Remote Office Trunks: 0		0		
Maximum Concurrently Registered Remote Office Stations: 0		0		
Maximum Concurrently Registered IP eCons: 0		0		
Max Concur Registered Unauthenticated H.323 Stations: 0		0		
Maximum Video Capable H.323 Stations: 0		0		
Maximum Video Capable IP Softphones: 0		0		
Maximum Administered SIP Trunks: 5000		250		
Maximum Administered Ad-hoc Video Conferencing Ports: 0		0		
Maximum Number of DS1 Boards with Echo Cancellation: 0		0		
Maximum TN2501 VAL Boards: 10		1		
Maximum Media Gateway VAL Sources: 0		0		
Maximum TN2602 Boards with 80 VoIP Channels: 128		0		
Maximum TN2602 Boards with 320 VoIP Channels: 128		2		
Maximum Number of Expanded Meet-me Conference Ports: 0		0		
(NOTE: You must logoff & login to effect the permission changes.)				

Figure 38: System-Parameters Customer-Options Form – Page 2

2. On Page 4 of the **system-parameters customer-options** form:

- a. Verify that the **IP Trunks** field in the following screenshot 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? y	
Enhanced EC500? y	ISDN/SIP Network Call Redirection? n	
Enterprise Survivable Server? n	ISDN-BRI Trunks? y	
Enterprise Wide Licensing? n	ISDN-PRI? y	
ESS Administration? n	Local Survivable Processor? n	
Extended Cvg/Fwd Admin? y	Malicious Call Trace? n	
External Device Alarm Admin? n	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? n	Multifrequency Signaling? y	
Global Call Classification? n	Multimedia Call Handling (Basic)? y	
Hospitality (Basic)? y	Multimedia Call Handling (Enhanced)? y	
Hospitality (G3V3 Enhancements)? n	Multimedia IP SIP Trunking? n	
IP Trunks? y		
IP Attendant Consoles? n		

Figure 39: System-Parameters Customer-Options Form – Page 4

5.2. Dial Plan

Enter the **change dialplan analysis** command to provision the dial plan. Note the following dialed strings administered in **Figure 40**:

- 3-digit dial access codes (indicated with a **Call Type** of “**dac**”) beginning with the digit “1” – Trunk Access Codes (TACs) defined for trunk groups in this reference configuration conform to this format.
- 5-digit extensions with a **Call Type** of “**ext**” beginning with the digits “26” – local extensions for Communication Manager stations, agents, and Vector Directory Numbers (VDNs) in this reference configuration conform to this format.
- 1-digit facilities access code (indicated with a **Call Type** of “**fac**”) beginning with the digit “9” – access code for outbound ARS dialing..

change dialplan analysis							Page 1 of 12		
DIAL PLAN ANALYSIS TABLE									
Location: all							Percent Full: 2		
Dialed	Total	Call	Dialed	Total	Call	Dialed	Total	Call	
String	Length	Type	String	Length	Type	String	Length	Type	
1	3	dac							
26	5	ext							
9	1	fac							

Figure 40: Dialplan Analysis Form

5.3. IP Network Parameters

These Application Notes assume that the appropriate IP network regions and IP codec sets have already been administered to support internal calls, i.e., calls within the Avaya site. For simplicity in this reference configuration, all Communication Manager elements, e.g., stations, C-LAN and MedPro boards, etc., within the Avaya site are assigned to a single IP network region (region 1) and all internal calls use a single IP codec set. This section describes the steps for administering an additional IP network region to represent the AT&T IP Flexible Reach service, and another IP codec set for external calls, i.e., inbound AT&T IP Flexible Reach calls.

5.3.1. IP Codec Parameters

1. Enter the **change ip-codec-set x** command, where **x** is the number of an IP codec set used only for internal calls. On Page 1 of the **ip-codec-set** form, ensure that “**G.711MU**”, “**G.729B**”, and “**G.729A**” are included in the codec list as shown in **Figure 41**.
2. Use the default values for page 2 of this form.

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.711MU	n	2	20		
2: G.729B	n	2	20		
3: G.729A	n	2	20		

Figure 41: IP-Codec-Set Form for Internal Calls – Page 1

3. Enter the **change ip-codec-set x** command, where **x** is the number of an unused IP codec set (e.g. 2). This IP codec set will be used for inbound and outbound AT&T IP Flexible Reach calls. On Page 1 of the **ip-codec-set** form, provision the codecs in the order shown in **Figure 42**, as well as setting the **Frames Per PKT** to 3 (note that the **Packet Size** column will automatically change to 30).

change ip-codec-set 2				Page 1 of 2	
IP Codec Set					
Codec Set: 2					
Audio Codec	Silence Suppression	Frames Per Pkt	Packet Size (ms)		
1: G.729B	n	3	30		
2: G.729A	n	3	30		
3: G.711MU	n	3	30		

Figure 42: IP-Codec-Set 2 Form for External Calls – Page 1

On Page 2 of the **ip-codec-set** form, set **FAX Mode** to “**t.38-standard**”.

change ip-codec-set 2		Page 2 of 2
IP Codec Set		
Allow Direct-IP Multimedia? n		
	Mode	Redundancy
FAX	t.38-standard	0
Modem	off	0
TDD/TTY	off	0
Clear-channel	n	0

Figure 43: IP-Codec-Set 2 Form for External Calls – Page 2

5.3.2. IP Network Regions

5.3.2.1 IP Network Region 1 – Local Region

In the reference configuration local Communication Manager elements (e.g. C-LANs) as well as other local Avaya devices (e.g. Modular Messaging) are assigned to ip-network-region 1.

1. Enter a descriptive name (e.g. **Local**).
2. Enter the **change ip-network-region x**, where **x** is the number of an unused IP network region (e.g. **region 1**). This IP network region will be used to represent the AT&T IP Flexible Reach service.
 - Enter **1** for the **Codec Set** parameter.
 - Set **UDP Port Min:** to **16384**
 - Set **UDP Port Max:** to **32767**
 - **Intra IP-IP Audio Connections** – Set to “**yes**”, indicating that the RTP paths should be optimized to reduce the use of MedPro resources when possible within the same region.
 - **Inter IP-IP Audio Connections** – Set to “**yes**”, indicating that the RTP paths should be optimized to reduce the use of MedPro resources when possible between regions.

change ip-network-region 1		Page 1 of 19
IP NETWORK REGION		
Region: 1		
Location:	Authoritative Domain: customera.com	
Name: Local		
MEDIA PARAMETERS		Intra-region IP-IP Direct Audio: yes
Codec Set: 1		Inter-region IP-IP Direct Audio: yes
UDP Port Min: 16384	IP Audio Hairpinning? n	
UDP Port Max: 32767		
DIFFSERV/TOS PARAMETERS		RTCP Reporting Enabled? y
Call Control PHB Value: 46	RTCP MONITOR SERVER PARAMETERS	
Audio PHB Value: 46	Use Default Server Parameters? y	
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	

Figure 44: IP-Network-Region Form for the Network Region Representing the Avaya Aura™ Communication Manager elements – Page 1

On page 3 of the form, verify that region 1 is using codec 1 as specified on page 1 (this field is automatically populated).

change ip-network-region 1										Page 3 of 19		
Source Region:		1		Inter Network Region Connection Management						I	M	
										G	A e	
dst	codec	direct	WAN-BW-limits	Video	Intervening		Dyn	A	G	a		
rgn	set	WAN	Units	Total Norm	Prio	Shr	Regions	CAC	R	L	s	
1	1											
2												
3												

Figure 45: IP-Network-Region Form for the Network Region Representing the Avaya Aura™ Communication Manager elements – Page 3

On Page 6 of the **ip-network-region** form, set region 51 to communicate to region 1 using codec 2 as follows:

- **codec set** – Set to codec set 2.
- **direct WAN** – Set to “y”.
- **WAN-BW-limits** – Set to the maximum number of calls or bandwidth allowed between the two IP network regions.

change ip-network-region 1										Page 6 of 19		
Source Region:		1		Inter Network Region Connection Management						I	M	
										G	A e	
dst	codec	direct	WAN-BW-limits	Video	Intervening		Dyn	A	G	a		
rgn	set	WAN	Units	Total Norm	Prio	Shr	Regions	CAC	R	L	s	
48												
49												
50												
51	2	y	NoLimit								n	

Figure 46: IP-Network-Region Form for the Network Region Representing the Avaya Aura™ Communication Manager elements – Page 6

5.3.2.2 IP Network Region 51 – SIP Trunking Region

In the reference configuration SIP trunk calls on Communication Manager are assigned to ip-network-region 51.

1. Enter the **change ip-network-region x**, where **x** is the number of an unused IP network region (e.g. **region 51**). This IP network region will be used to access the AT&T IP Flexible Reach service.
 - Enter **2** for the **Codec Set** parameter.
 - Set **UDP Port Min:** to **16384**
 - Set **UDP Port Max:** to **32767**
 - **Intra IP-IP Audio Connections** – Set to “yes”, indicating that the RTP paths should be optimized to reduce the use of MedPro resources when possible within the same region.

- **Inter IP-IP Audio Connections** – Set to “yes”, indicating that the RTP paths should be optimized to reduce the use of MedPro resources when possible between regions.

change ip-network-region 51		Page 1 of 19
IP NETWORK REGION		
Region: 51		
Location: Authoritative Domain: customera.com		
Name: AT&T IPFR		
MEDIA PARAMETERS		Intra-region IP-IP Direct Audio: yes
Codec Set: 2		Inter-region IP-IP Direct Audio: yes
UDP Port Min: 16384		IP Audio Hairpinning? n
UDP Port Max: 32767		
DIFFSERV/TOS PARAMETERS		RTCP Reporting Enabled? y
Call Control PHB Value: 46		RTCP MONITOR SERVER PARAMETERS
Audio PHB Value: 46		Use Default Server Parameters? y
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		

Figure 47: IP-Network-Region Form for the Network Region Representing the AT&T IP Flexible Reach Service – Page 1

On Page 3 of the **ip-network-region** form, set region 1 to communicate to region 51 using codec 2 as follows:

- **codec set** – Set to the codec to **2**.
- **direct WAN** – Set to “y”.
- **WAN-BW-limits** – Set to the maximum number of calls or bandwidth allowed between the two IP network regions.

change ip-network-region 51		Page 3 of 19
Source Region: 51		Inter Network Region Connection Management
		I M
		G A e
dst	codec	direct
set	WAN	Units
1	2	y
2	NoLimit	
3		

Figure 48: IP-Network-Region Form for an IP Network Region Representing the AT&T IP Flexible Reach Service– Page 3

On page 6 of the form, verify that region 51 is using codec 2 as specified on page 1 (this field is automatically populated).

change ip-network-region 51										Page 6 of 19	
Source Region: 51 Inter Network Region Connection Management										I	M
										G	A
dst codec direct WAN-BW-limits Video Intervening										Dyn	A
rgn set WAN Units Total Norm Prio Shr Regions										CAC	R
48										L	s
49											
50											
51 2											

Figure 49: IP-Network-Region Form for an IP Network Region Representing the AT&T IP Flexible Reach Service – Page 6

5.3.3. IP Node Names Parameters

Node names define IP addresses to various Avaya components in the CPE.

1. Enter the **change node-names ip** command, and add a node name and the IP address for the Session Manager SM100 card (**MainSM**). Also note the node name and IP address of a C-LAN board (**MainCLAN1A02**) that is assigned to IP network region 1 as described in **Section 5.3.2**. The C-LAN board will be used in **Section 5.4** for administering a SIP trunks to Session Manager.

change node-names ip		Page 1 of 2	
IP NODE NAMES			
Name	IP Address		
Gateway001	192.168.67.1		
MainCLAN1A02	192.168.67.13		
MainMP1A04	192.168.67.15		
MainSM	192.168.67.137		
MainVAL1A06	192.168.67.17		
default	0.0.0.0		
procr	0.0.0.0		

Figure 50: Change Node-Names IP Form

5.4. SIP Trunks

Three SIP trunks are defined on Communication Manager in the reference configuration:

- Inbound – SIP Trunk 52
- Outbound – SIP Trunk 51
- Modular Messaging – SIP Trunk 50

SIP trunks are defined on Session Manager by provisioning a Signaling Group and a corresponding Trunk Group.

5.4.1. Inbound SIP Trunk

This section describes the steps for administering the inbound SIP trunk from Session Manager. This trunk corresponds to the Main_Site_CLAN_1 SIP Entity defined in **Section 4.6.2**. Communication Manager looks at the contents of the PAI for admission control to the Signaling Groups. The contents of the PAI

1. Enter the **add signaling-group x** command, where **x** is the number of an unused signaling group (e.g. **52**), and provision the following:
 - **Group Type** – Set to “**sip**”.
 - **Transport Method** – Set to “**tcp**”. **Note** – In the reference configuration TCP was used to simplify protocol tracing. TLS/port 5061 is the Avaya best practices recommendation. The transport protocol used between Session Manager and the Acme Packet SBC is TCP, and the transport protocol used between the Acme Packet SBC and the AT&T IP Flexible Reach service is UDP.
 - **Near-end Node Name** – Set to the node name of the C-LAN board noted in **Section 5.3.3**.
 - **Far-end Node Name** – Set to the node name of Session Manager as administered in **Section 5.3.3**.
 - **Near-end Listen Port** and **Far-end Listen Port** – set to “**5060**” (see Transport Method note above).
 - **Far-end Network Region** – Set to the IP network region **51**, as defined in **Section 5.3.2.2** to represent the AT&T IP Flexible Reach service.
 - **Far-end Domain** – Leave blank. **Note** – leaving this field blank allows inbound calls from any source IP address or FQDN.
 - **DTMF over IP** – Set to “**rtp-payload**” to enable Communication Manager to use DTMF according to RFC 2833.
 - **Direct IP-IP Audio Connections** – Set to “**y**”, indicating that the RTP paths should be optimized to reduce the use of MedPro resources when possible.

add signaling-group 52	
SIGNALING GROUP	
Group Number: 52	Group Type: sip
	Transport Method: tcp
IMS Enabled? n	
Near-end Node Name: MainCLAN1A02	Far-end Node Name: MainSM
Near-end Listen Port: 5060	Far-end Listen Port: 5060
	Far-end Network Region: 51
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	Direct IP-IP Early Media? n
	Alternate Route Timer(sec): 6

Figure 51: Signaling-Group 52 Form for Inbound AT&T IP Flexible Reach Calls

2. Enter the **add trunk-group x** command, where **x** is the number of an unused trunk group (e.g. **52**). On Page 1 of the **trunk-group** form, provision the following:
 - **Group Type** – Set to “**sip**”.
 - **Group Name** – Enter a descriptive name (e.g. **ASM-Inbound**).
 - **TAC** – Enter a trunk access code that is consistent with the dial plan (e.g. **152**).
 - **Direction** – Set to “**incoming**”.
 - **Service Type** – Set to “**public-ntwrk**”.
 - **Signaling Group** – Set to the number of the signaling group administered in **Step 1**.
 - **Number of Members** – Enter the maximum number of simultaneous calls permitted on this trunk group (e.g. **20**).

add trunk-group 52		Page 1 of 21	
TRUNK GROUP			
Group Number: 52	Group Type: sip	CDR Reports: y	
Group Name: ASM - Inbound	COR: 1	TN: 1	TAC: 152
Direction: incoming	Outgoing Display? n		
Dial Access? n	Night Service:		
Service Type: public-ntwrk		Auth Code? n	
		Signaling Group: 52	
		Number of Members: 20	

Figure 52: Trunk-Group 52 Form for Inbound AT&T IP Flexible Reach Calls – Page 1

5.4.2. Outbound SIP Trunk

This section describes the steps for administering the outbound SIP trunk to Session Manager. This trunk corresponds to the Acme SIP Entity defined in **Section 4.6.3**.

1. Enter the **add signaling-group x** command, where **x** is the number of an unused signaling group (e.g. **51**), and provision the following:
 - **Group Type** – Set to “**sip**”.
 - **Transport Method** – Set to “**tcp**”. **Note** – In the reference configuration TCP was used to simplify protocol tracing. TLS/port 5061 is the Avaya best practices recommendation (see **Section 4.6.1**). The transport protocol used between Session Manager and the Acme Packet SBC is TCP, and the transport protocol used between the Acme Packet SBC and the AT&T IP Flexible Reach service is UDP.
 - **Near-end Node Name** – Set to the node name of the C-LAN board noted in **Section 5.3.3**.
 - **Far-end Node Name** – Set to the node name of Session Manager as administered in **Section 5.3.3**.
 - **Near-end Listen Port** and **Far-end Listen Port** – set to “**5060**” (see Transport Method note above).
 - **Far-end Network Region** – Set to the IP network region **51**, as defined in **Section 5.3.2.2** to represent the AT&T IP Flexible Reach service.
 - **Far-end Domain** – Set to the local SIP domain – **customera.com**. This is the same SIP domain specified for Session Manager in **Section 4.3**.

- **DTMF over IP** – Set to “**rtp-payload**” to enable Communication Manager to use DTMF according to RFC 2833.
- **Direct IP-IP Audio Connections** – Set to “**y**”, indicating that the RTP paths should be optimized to reduce the use of MedPro resources when possible.

```

add signaling-group 51
                                SIGNALING GROUP
Group Number: 51                Group Type: sip
                                Transport Method: tcp
IMS Enabled? n
Near-end Node Name: MainCLAN1A02    Far-end Node Name: MainSM
Near-end Listen Port: 5060          Far-end Listen Port: 5060
                                Far-end Network Region: 51
Far-end Domain: customera.com
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  Direct IP-IP Early Media? n
                                           Alternate Route Timer(sec): 6

```

Figure 53: Signaling-Group 51 Form for Outbound AT&T IP Flexible Reach Calls

2. Enter the **add trunk-group x** command, where **x** is the number of an unused trunk group.
 - a. On Page 1 of the **trunk-group** form, provision the following:
 - **Group Type** – Set to “**sip**”.
 - **Group Name** – Enter a descriptive name (e.g. **ASM - Outbound**).
 - **TAC** – Enter a trunk access code that is consistent with the dial plan (e.g. **151**).
 - **Direction** – Set to “**two-way**”.
 - **Service Type** – Set to “**public-ntwrk**”.
 - **Signaling Group** – Set to the number of the signaling group administered in Step 1.
 - **Number of Members** – Enter the maximum number of simultaneous calls permitted on this trunk group (e.g. **20**).

```

add trunk-group 51
                                TRUNK GROUP
Group Number: 51                Group Type: sip
Group Name: ASM - Outbound      CDR Reports: y
Direction: two-way             COR: 1      TN: 1      TAC: 151
Dial Access? n                 Outgoing Display? n
                                Night Service:
                                Auth Code? n
Service Type: public-ntwrk
                                Signaling Group: 51
                                Number of Members: 20

```

Figure 54: Trunk-Group 51 Form for Outbound AT&T IP Flexible Reach Calls – Page 1

- b. On Page 2 of the **Trunk Group** form:

- Set the **Preferred Minimum Session Refresh Interval(sec):** to **900**. This entry will actually cause a value of 1800 to be generated in the SIP header. 1800 is the value required by AT&T IP Flexible Reach service.

add trunk-group 51		Page 2 of 21
Group Type: sip		
TRUNK PARAMETERS		
Unicode Name: auto		Redirect On OPTIM Failure: 5000
SCCAN? n	Digital Loss Group: 18	
Preferred Minimum Session Refresh Interval(sec) : 900		

Figure 55: Outbound Voice Trunk Group 51 – Page 2

- c. On Page 3 of the **Trunk Group** form:
- Set **Numbering Format:** to **public**

add trunk-group 51		Page 3 of 21
TRUNK FEATURES		
ACA Assignment? n	Measured: none	Maintenance Tests? y
Numbering Format: public		
UII Treatment: service-provider		
Replace Restricted Numbers? n		
Replace Unavailable Numbers? n		
Show ANSWERED BY on Display? y		

Figure 56: Outbound Voice Trunk Group 51 – Page 3

- d. On Page 4 of the **Trunk Group** form:
- Set **Send Diversion Header** to **Y** (see note in **Section 2.2.3**).
 - Set “**Telephone Event Payload Type**” to the RTP payload type required by the AT&T IP Flexible Reach service. Contact AT&T or examine a SIP trace of an inbound call from the AT&T IP Flexible Reach service to determine this value.
 - Let all other values default.

Note – The AT&T IP Flexible Reach service does not support History Info headers however Communication Manager enables History Info Headers by default (*Support Request History?* y). Although these headers could be disabled by changing this setting to “N”, in the reference configuration this default value is used and Session Manager is configured to remove any History Info Headers sent by Communication Manager (see **Section 4.5.1**).

add trunk-group 51	Page 4 of 21
PROTOCOL VARIATIONS Mark Users as Phone? n Prepend '+' to Calling Number? n Send Transferring Party Information? n Send Diversion Header? y Support Request History? y Telephone Event Payload Type: 100	

Figure 57: Outbound Voice Trunk Group 51 – Page 4

5.4.3. Modular Messaging SIP Trunk

This section describes the steps for administering the outbound SIP trunk to Avaya Modular Messaging. This trunk corresponds to the Modular Messaging SIP Entity defined in **Section 4.6.4**.

1. Enter the **add signaling-group x** command, where **x** is the number of an unused signaling group (e.g. **50**), and provision the following:
 - **Group Type** – Set to “**sip**”.
 - **Transport Method** – Set to “**tcp**”.
 - **Near-end Node Name** – Set to the node name of the C-LAN board noted in **Section 5.3.3**.
 - **Far-end Node Name** – Set to the node name of Avaya Modular Messaging as administered in **Section 5.3.3**.
 - **Near-end Listen Port** and **Far-end Listen Port** – set to “**5060**”
 - **Far-end Network Region** – Set to the IP network region to **1**, as defined in **Section 5.3.2.1**.
 - **Far-end Domain** – Set to the local SIP domain – **customera.com**. **Note** – This is the same SIP domain specified for Session Manager in **Section 4.3**.
 - **DTMF over IP** – Set to “**rtp-payload**” to enable Communication Manager to use DTMF according to RFC 2833.
 - **Direct IP-IP Audio Connections** – Set to “**y**”, indicating that the RTP paths should be optimized to reduce the use of MedPro resources when possible.

add signaling-group 50	SIGNALING GROUP
Group Number: 50	Group Type: sip
	Transport Method: tcp
IMS Enabled? n	
Near-end Node Name: MainCLAN1A02	Far-end Node Name: MainSM
Near-end Listen Port: 5060	Far-end Listen Port: 5060
	Far-end Network Region: 1
Far-end Domain: customera.com	
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	Direct IP-IP Early Media? n
	Alternate Route Timer(sec): 6

Figure 58: Signaling-Group 50 Form for Modular Messaging Calls

2. Enter the **add trunk-group x** command, where **x** is the number of an unused trunk group (e.g. **50**). On Page 1 of the **trunk-group** form, provision the following:
 - **Group Type** – Set to “**sip**”.
 - **Group Name** – Enter a descriptive name (e.g. **Modular_Messaging**).
 - **TAC** – Enter a trunk access code that is consistent with the dial plan (e.g. **150**).
 - **Direction** – Set to “**two-way**”.
 - **Service Type** – Set to “**tie**”.
 - **Signaling Group** – Set to the number of the signaling group administered in Step 1.
 - **Number of Members** – Enter the maximum number of simultaneous calls permitted on this trunk group (e.g. **20**).

add trunk-group 50		Page 1 of 21	
TRUNK GROUP			
Group Number: 50	Group Type: sip	CDR Reports: y	
Group Name: MM	COR: 1	TN: 1	TAC: 150
Direction: two-way	Outgoing Display? n		
Dial Access? n	Night Service:		
Service Type: tie		Auth Code? n	
		Signaling Group: 50	
		Number of Members: 20	

Figure 59: Trunk-Group 50 Form for Modular messagingCalls – Page 1

5.5. Public Unknown Numbering

For AT&T Flexible Reach service call admission control purposes, calling number origination SIP header contents (e.g. From and PAI) need to be converted to public numbers (previously identified to AT&T), instead of Communication Manager local extensions. In addition, Avaya Modular Messaging also uses these headers for mail-box processing. These function may be accomplished using the Communication Manager *change public-unknown-numbering* command.

1. Enter the **change public-unknown-numbering 0** command to specify that connected party numbers that are to be returned to the PSTN for AT&T IP Flexible Reach service calls. In the **public-unknown-numbering** form, for each local extension range assigned to Avaya Aura™ Communication Manager (phones, agents, skills, hunt groups, or VDNs), provision an entry as follows:
 - **Ext Len** – Enter the total number of digits in the local extension range.
 - **Ext Code** – Enter enough leading digits to identify the local extension range.
 - **Trk Grp(s)** – Enter the number of the outbound trunk group (e.g. **51**).
 - **CPN Prefix** – Leave blank.
 - **CPN Len** – Enter the total number of digits in the local extension range.

For example, in **Figure 60**, any extension beginning with 26 and 5 digits long will remain unchanged for trunk 50 (Modular Messaging processing). However when 5 digit extension 26101 calls out to Session Manager, the originating number will be converted to 17323204383.

change public-unknown-numbering 0					Page 1 of 2
NUMBERING - PUBLIC/UNKNOWN FORMAT					
				Total	
Ext Len	Ext Code	Trk Grp (s)	CPN Prefix	CPN Len	
					Total Administered: 3
					Maximum Entries: 9999
5	26	50		5	
5	26101	51	17323204383	11	
5	26103	51	17323204384	11	
5	26	52		5	

Figure 60: Public-Unknown-Numbering Form

5.6. Optional Features

The reference configuration uses hunt groups, vectors, and Vector Directory Numbers (VDNs), to provide additional functionality during testing:

- Hunt Group 1 – Modular Messaging coverage for Communication Manager extensions.
- VDN 26298/Vector 8 – Auto-attendant.
- VDN 26299/Vector 5 – Meet-me Conference

Note - The administration of Communication Manager Call Center elements – hunt groups, vectors, and Vector Directory Numbers (VDNs) are beyond the scope of these Application Notes. Additional licensing may be required for some of these features. Consult [3], [4], [5], and [6] for further details if necessary. The samples that follow are provided for reference purposes only.

5.6.1. Hunt Group for Station Coverage to Modular Messaging

Hunt group 1 is used in the reference configuration to verify the Send-All-Calls functionality. The hunt group (e.g. 1) is defined with the 5 digit Modular Messaging pilot number (e.g. 26000 in Figure 61). The hunt group is associated with a coverage path (e.g.H1 in Figure 63) and the coverage path is assigned to a station (e.g. 26102 in Figure 64).

display hunt-group 1		Page 1 of 60
HUNT GROUP		
Group Number: 1	ACD?	n
Group Name: MM	Queue?	n
Group Extension: 26000	Vector?	n
Group Type: ucd-mia	Coverage Path:	
TN: 1	Night Service Destination:	
COR: 1	MM Early Answer?	n
Security Code:	Local Agent Preference?	n
ISDN/SIP Caller Display: mbr-name		

Figure 61: Hunt Group 1Form – Page 1

display hunt-group 1		Page 2 of 60
HUNT GROUP		
Message Center: sip-adjunct		
Voice Mail Number	Voice Mail Handle	Routing Digits
		(e.g., AAR/ARS Access Code)
26000	26000	8

Figure 62: Hunt Group 1 Form – Page 2

display coverage path 1	
COVERAGE PATH	
Coverage Path Number: 1	
Cvg Enabled for VDN Route-To Party? n	Hunt after Coverage? n
Next Path Number:	Linkage
COVERAGE CRITERIA	
Station/Group Status	Inside Call Outside Call
Active?	n n
Busy?	Y Y
Don't Answer?	Y Y Number of Rings: 3
All?	n n
DND/SAC/Goto Cover?	Y Y
Holiday Coverage?	n n
COVERAGE POINTS	
Terminate to Coverage Pts. with Bridged Appearances? n	
Point1: h1	Rng: 2 Point2:
Point3:	Point4:
Point5:	Point6:

Figure 63: Coverage Path 1 Form

display station 26102		Page 1 of 5
STATION		
Extension: 26102	Lock Messages? n	BCC: 0
Type: 9620	Security Code: 123456	TN: 1
Port: S00000	Coverage Path 1: 1	COR: 1
Name: H323-9630	Coverage Path 2:	COS: 1
	Hunt-to Station:	
STATION OPTIONS		
	Time of Day Lock Table:	
Loss Group: 19	Personalized Ringing Pattern: 1	
	Message Lamp Ext: 26102	
Speakerphone: 2-way	Mute Button Enabled? y	
Display Language: english		
Survivable GK Node Name:		
Survivable COR: internal	Media Complex Ext:	
Survivable Trunk Dest? y	IP SoftPhone? n	
	Customizable Labels? y	

Figure 64: Station 26102 Form

5.6.2. Auto Attendant

A basic auto-attendant functionality is defined in the reference configuration for DTMF testing. The auto-attendant is defined by a VDN (e.g. **26298**) and a Vector (e.g. **8**). As with other inbound calls from the AT&T Flexible Reach service, calls may be directed to the auto-attendant VDN extension via the AT&T Adaptation described in **Section 4.5.1**.

display vdn 26298	Page 1 of 2
VECTOR DIRECTORY NUMBER	
Extension: 26298	
Name*: auto attend	
Destination: Vector Number	8
Meet-me Conferencing? n	
Allow VDN Override? n	
COR: 1	
TN*: 1	
Measured: none	

Figure 65: Auto Attendant VDN

display vector 8	Page 1 of 6
CALL VECTOR	
Number: 8	Name: auto attend
Meet-me Conf? n	
Lock? n	
Basic? y	EAS? n G3V4 Enhanced? y
Prompting? y	ANI/II-Digits? y ASAI Routing? y
Variables? n	LAI? n G3V4 Adv Route? n CINFO? n BSR? n Holidays? n
3.0 Enhanced? n	
01 wait-time	4 secs hearing ringback
02 collect	5 digits after announcement 26504
03 route-to	digits with coverage n
04 wait-time	5 secs hearing silence
05 stop	
06	
07	

Figure 66: Auto Attendant Vector

5.6.3. Meet-me Conference

A basic meet-me conference functionality is defined in the reference configuration for DTMF testing. The meet-me conference functionality is defined by a VDN (e.g. **26299**) and a Vector (e.g. **5**). As with other inbound calls from the AT&T Flexible Reach service, calls may be directed to the meet-me conference VDN extension via the AT&T Adaptation described in **Section 4.5.1**.

```

display vdn 26299                                     Page 1 of 2
                VECTOR DIRECTORY NUMBER

                Extension: 26299
                Name: meet-me vdn 1
                Destination: Vector Number 5

                Meet-me Conferencing? y
                COR: 1
                TN: 1

```

Figure 67: Meet-me Conference VDN – Page 1

```

display vdn 26299                                     Page 2 of 2
                VECTOR DIRECTORY NUMBER

                MEET-ME CONFERENCE PARAMETERS:

                Conference Access Code: 123456
                Conference Controller: 26201
                Conference Type: 6-party

```

Figure 68: Meet-me Conference VDN – Page 2

```

display vector 5                                       Page 1 of 6
                CALL VECTOR

                Number: 5                               Name: meet-me vec

                Basic? y    EAS? n    G3V4 Enhanced? y    Meet-me Conf? y    Lock? y
                Prompting? y    LAI? n    G3V4 Adv Route? n    ANI/II-Digits? y    ASAI Routing? y
                Variables? n    3.0 Enhanced? n    CINFO? n    BSR? n    Holidays? n

01 wait-time 5 secs hearing ringback
02 collect 6 digits after announcement 26501
03 goto step 5 if digits = meet-me-access
04 goto step 2 if unconditionally
05 announcement 26503
06 route-to meetme
07 stop
08

```

Figure 69: Meet-me Conference Vector

6. Avaya Modular Messaging

In this reference configuration, Avaya Modular Messaging is used to verify DTMF, Message Wait Indicator (MWI), as well as basic call coverage functionality. The Avaya Modular Messaging used in the reference configuration is provisioned for Multi-Site mode. Multi-Site mode allows Avaya Modular Messaging to server subscribers in multiple locations. The administration for Modular Messaging is beyond the scope of these Application Notes. Consult [7], [8], [9], and [10] for further details.

7. Configure Acme Packet SBC

These Application Notes assume that basic Acme Packet 2600 SBC administration and networking has already been performed. However the Acme Packet 2600 SBC interface connected to the AT&T IP Flexible Reach service (typically called the “outside” or “public” interface), must be set to the RTP media UPD port range required by AT&T.

1. Connect to the Acme Packet 2600 via the web interface as outlined in [11].
2. Select the **Configuration** tab.
3. In the left column, navigate to Cluster → box 1 → interface x (where x is the interface to AT&T).
4. Under the IP port name defined for the interface (e.g. Outside), select **media-ports**.
5. In the **base-port** field enter **16384**. This defines the starting port number.
6. In the count field enter **16384**. This defines the number of ports (up to the maximum port value of 32767).
7. Click on **Set**.
8. Click on the **Configuration** button in the left column and select **Update and Save Configuration** (not shown).

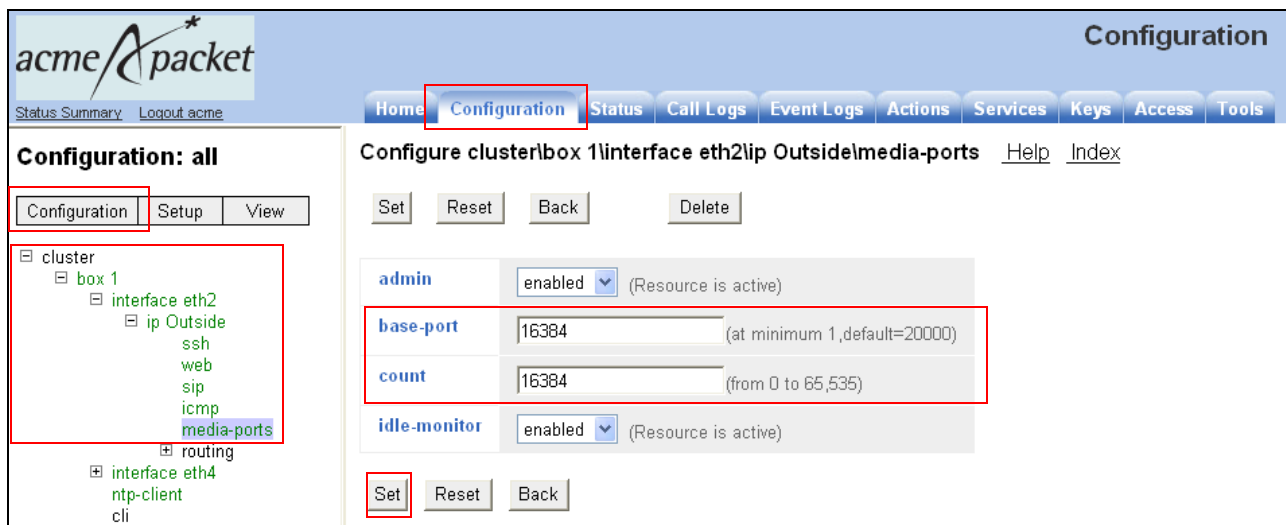


Figure 70: Acme Packet 2600 media-port setting

The remaining Acme Packet SBC provisioning used in the reference configuration is provided below as a reference. Consult with Acme Packet Support Error! Reference source not found. for further details and explanations on the configuration below.

```
#  
# Copyright (c) 2004-2010 Acme Packet Inc.  
# All Rights Reserved.  
#
```

```

# File: /cxc/cxc.cfg
# Date: 09:42:21 Wed 2010-08-18
#
config cluster
config box 1
  set identifier 00:15:17:7e:bc:18
  config interface eth2
    config ip Outside
      set ip-address static 192.168.64.130/24
      config ssh
      return
      config web
      return
      config sip
        set udp-port 5060 "" "" any 0
      return
      config icmp
      return
    config media-ports
      set base-port 16384
      set count 16384
    return
  config routing
    config route Outside_Default
      set gateway 192.168.64.1
      set metric 10
    return
    config route To_ATT
      set destination host 135.25.29.74
      set gateway 192.168.64.1
    return
  return
return
config interface eth4
config ip Inside
  set ip-address static 192.168.67.130/24
  config telnet
  return
  config ssh
  return
  config web
  return
  config sip
    set tcp-port 5060 "" "" any 0
  return
  config icmp
  return
  config media-ports
    set base-port 16384
    set count 16384
  return
  config routing
    config route Inside_Default
      set gateway 192.168.67.1

```

```

        return
    return
return
return
config ntp-client
    set server 135.8.139.1
return
config cli
    set prompt Acme_2600_Lab
return
return
return

config services
config event-log
    config file Admin
        set filter access debug
        set filter cms debug
        set filter general info
        set filter radius debug
        set filter web debug
    return
    config file System
        set filter archive debug
        set filter msg debug
        set filter sensor debug
        set filter snmp debug
        set filter system debug
    return
    config file Network
        set filter dns crit
        set filter dos debug
        set filter h323 crit
        set filter ip crit
        set filter sip crit
        set filter vrrp debug
    return
    config file Krnlsys
        set filter krnlsys debug
    return
    config file Db
        set filter db debug
        set filter dosDatabase info
    return
    config file Dos
        set filter dosSip alert
    return
    config file Eventlog
        set filter all error
    return
    config local-database
        set filter all error
        set history 45
    return
return

```



```

return

config master-services
  config cluster-master
    set group 2
  return
config accounting
  set group 6
return
config database
  set group 6
  set media enabled
return
config sampling
  set group 4
  config database
    config status
      config interface-details
      return
      config interface-throughput
      return
      config system-heap
      return
      config available-memory
      return
      config trunk-groups
      return
      config cpu-usage
      return
      config sip-stack
      return
      config call-admission-control
      return
      config dos-transport-counters
      return
      config dos-sip-counters
      return
      config dos-url-counters
      return
    return
  return
return
return
return

config vsp
  set admin enabled
  config default-session-config
  config sip-settings
    set outleg-tos overwrite 96
  return
  config to-uri-specification
    set host next-hop
  return
  config from-uri-specification
    set host local-ip

```

```

return
config request-uri-specification
    set host next-hop
return
config media
    set anchor enabled
    set packet-marking tos 0xb8
    set rtp-stats enabled
    set rtcp generate-always false
    set rtp-splice enabled
return
config in-codec-preferences
    set preference audio g729 1
    set preference audio g729a 2
    set preference audio t38 3
    set preference audio pcmu 4
    set preference audio telephone-event 5
    set preference audio any 0
return
config out-codec-preferences
    set preference audio g729 1
    set preference audio g729a 2
    set preference audio t38 3
    set preference audio pcmu 4
    set preference audio telephone-event 5
    set preference audio any 0
return
config sip-directive
    set directive allow
return
config log-alert
    set logging enabled
    set apply-to-methods-for-filtered-logs
return
config forking-settings
    set outbound-arbiter-rule most-preferred
return
config header-settings
    config reg-ex-header 1
        set destination P-Asserted-Identity
        set create P-Asserted-Identity (.)sip:(.)@(.)>(.) "\1sip:\2@\1>\4"
        set apply-to-methods INVITE+REFER
    return
    config reg-ex-header 2
        set destination Diversion
        set create Diversion (.)sip:(.)@(.)>(.) "\1sip:\2@\1>\4"
        set apply-to-methods INVITE+REFER
    return
return
config third-party-call-control
    set admin enabled
    set terminate-update-locally enabled
return
config handle-response
    set entry 486 forward

```

```

    set entry 504 try-next-peer
    return
    config codec-specific-parameters
    set codec-parameters g729 annexb=no
    return
return
config static-stack-settings
    set location-lookup-pattern user-only
    set t1 500
    set t2 2000
    set t4 4000
return
config dial-plan
    config source-route From_Avaya_To_ATT
    set peer hunt-group "vsp\carriers\hunt-group ATT"
    set source-match server "vsp\enterprise\servers\sip-gateway
AvayaSessionManager1"
    return
    config source-route From_ATT_To_Avaya
    set peer hunt-group "vsp\carriers\hunt-group AvayaSessionManager"
    set source-match server "vsp\enterprise\servers\sip-gateway ATT1"
    return
return
config enterprise
    config servers
    config sip-gateway AvayaSessionManager1
    set failover-detection ping
    config server-pool
    config server AvayaSessionManager1
    set host 192.168.67.137
    set transport TCP
    config error-response-codes
    set server-down-error-code 503
    return
    return
    return
    return
    config sip-gateway ATT1
    set failover-detection ping
    config server-pool
    config server ATT1
    set host 135.25.29.74
    return
    return
    return
return
return
config carriers
    config hunt-group ATT
    set option server "vsp\enterprise\servers\sip-gateway ATT1" none
    return
    config hunt-group AvayaSessionManager
    set option server "vsp\enterprise\servers\sip-gateway AvayaSessionManager1"
none
return

```

```

return
config dtmf-generation
    set digit-duration 250
return
return

config external-services
return

config preferences
config gui-preferences
    set show-unlicensed-features false
return
return

config access
return

config features
return

```

8. General Test Approach and Test Results

The test environment consisted of:

- A simulated enterprise with Avaya Aura™ System Manager, Avaya Aura™ Session Manager, Avaya Aura™ Communication Manager, Avaya phones, fax machines (Ventafax application), Acme Packet SBC, and Avaya Modular Messaging.
- A laboratory version of the AT&T IP Flexible Reach service, to which the simulated enterprise was connected.

The main test objectives were to verify the following features and functionality:

- Inbound AT&T IP Flexible Reach service calls to Communication Manager telephones and VDNs/Vectors.
- Call and two-way talk path establishment between PSTN and Communication Manager phones via the AT&T Flexible Reach service..
- Basic supplementary telephony features such as hold, resume, transfer, and conference.
- G.729 and G.711 codecs.
- T.38 fax calls between Communication Manager the AT&T IP Flexible Reach service/PSTN G3 and SG3 fax endpoints.
- DTMF tone transmission using RFC 2833 between Communication Manager the AT&T IP Flexible Reach service/PSTN automated access systems.
- Inbound AT&T IP Flexible Reach service calls to Communication Manager that are directly routed to stations, and unanswered, can be covered to Avaya Modular Messaging.
- Long duration calls.

The test objectives stated in **Section 8**, with limitations as noted in **Section 1.3**, were verified.

9. Verification Steps

9.1. Verification Tests

The following steps may be used to verify the configuration:

1. Place an inbound call, answer the call, and verify that two-way talkpath exists. Verify that the call remains stable for several minutes and disconnect properly.
2. Place an inbound call to an agent or phone, but do not answer the call. Verify that the call covers to voicemail.
3. Verify the call routing administration on Session Manager.
 - a. In the left pane of the Avaya Aura™ System Manager Common Console, under **Session Manager/System Tools**, click on “**Call Routing Test**”. The **Call Routing Test** page shown in **Figure 70** will open. The fields shown are automatically populated.

AVAYA Avaya Aura™ System Manager 5.2 Welcome, **admin** Last Logged on at Dec. 24, 2009 8:31 AM Help Log off

Home / Session Manager / System Tools / Call Routing Test

Call Routing Test

This page allows you to test SIP routing algorithms on Session Manager instances. Enter information about a SIP INVITE to learn how it will be routed based on current administration.

SIP INVITE Parameters

Called Party URI

Calling Party URI

Day Of Week
Friday

Time (UTC)
12:35

Called Session Manager Instance
Session Manager 1

Calling Party Address


Session Manager Listen Port
5060

Transport Protocol
TCP

Execute Test

Figure 70: Call Routing Test Page

- b. In the **Call Routing Test** page, enter the appropriate parameters of the test call. **Figure 71** shows a routing test for an inbound call from PSTN to AT&T DID **7323204384** at the IP address of Session Manager (**192.168.67.137**). The call arrives from the Acme Packet SBC (note that the source address of the call, **192.168.67.130**, is the “Inside” IP address of the Acme SBC) and the calling number is a PSTN phone **7326712438**.
- c. Click on “**Execute Test**”.



Avaya Aura™ System Manager
5.2

Welcome, **admin** Last Logged on at Dec. 24, 2009 8:31 AM
[Help](#) [Log off](#)

Home / Session Manager / System Tools / Call Routing Test

▶ Asset Management
▶ Communication System Management
▶ User Management
▶ Monitoring
▶ Network Routing Policy
▶ Security
▶ Applications
▶ Settings
▼ Session Manager
 Session Manager Administration
 ▶ Network Configuration

Call Routing Test

This page allows you to test SIP routing algorithms on Session Manager instances. Enter information about a SIP INVITE to learn how it will be routed based on current administration.

SIP INVITE Parameters

Called Party URI <input type="text" value="7323204384@192.168.67.137"/>	Calling Party Address <input type="text" value="192.168.67.130"/>
Calling Party URI <input type="text" value="7326712438@192.168.67.130"/>	Session Manager Listen Port <input type="text" value="5060"/>
Day Of Week <input type="text" value="Friday"/>	Time (UTC) <input type="text" value="12:35"/>
Called Session Manager Instance <input type="text" value="Session Manager 1"/>	Transport Protocol <input type="text" value="TCP"/>

Execute Test

Figure 70: Call Routing Test Page -Completed

- d. The results of the test are displayed as shown in **Figures 72-74**. The ultimate routing decision is displayed under the heading **Routing Decisions**. The example test shows that the PSTN call to **7323204384** is sent by Session Manager to the Communication Manager extension **26103**. Under that section the **Routing Decision Process** steps are displayed (depending on the complexity of the routing, multiple pages may be generated). Verify that the test results are consistent with the expected results of the routing administered on Session Manager in **Section 4**.

Routing Decisions

Route < sip:26103@customera.com > to SIP Entity Main_Site_Clan1 (192.168.67.13). Terminating Location is Main.

Routing Decision Process

NRP Sip Entities: Replacing Session Manager FQDN/IP address < 192.168.67.137 > with < customera.com > in request URI.

Checking NRP to determine if this is a call to an emergency number.

Originating Location is Main. Using digits < 7323204384 > and host < customera.com > for routing.

NRP Dial Patterns: No matches for digits < 7323204384 > and domain < customera.com >.

NRP Dial Patterns: No matches for digits < 7323204384 > and domain < null >.

NRP Dial Patterns: No matches found for Main. Trying again using NRP Dial Patterns that specify -ALL- NRP Locations.

NRP Dial Patterns: No matches for digits < 7323204384 > and domain < customera.com >.

NRP Dial Patterns: No matches for digits < 7323204384 > and domain < null >.

NRP Dial Patterns: No matches found. Proceeding to the next phase.

NRP Regular Expressions: Full URI did not match any Regular Expression. Trying only < 7323204384@customera.com >.

NRP Regular Expressions: No matches found. Proceeding to the next phase.

No Outbound Proxy found for Session Manager 1

NRP Adaptations: AT&T Adaptation applied.

NRP Adaptations: Request URI set to sip:17231126103@customera.com

NRP Adaptations: P-Asserted-Identity set to sip:7326712438@192.168.67.130

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Figure 71: Call Routing Test Results - Page 1

Routing Decision Process

NRP Sip Entities: Originating SIP Entity is Acme.

Originating Location is Main. Using digits < 17231126103 > and host < customera.com > for routing.

NRP Dial Patterns: No matches for digits < 17231126103 > and domain < customera.com >.

NRP Dial Patterns: No matches for digits < 17231126103 > and domain < null >.

NRP Dial Patterns: No matches found for Main. Trying again using NRP Dial Patterns that specify -ALL- NRP Locations.

NRP Dial Patterns: No matches for digits < 17231126103 > and domain < customera.com >.

NRP Dial Patterns: Found a Dial Pattern match for pattern < 1723112 > Min/Max length 11/11 and domain < null >.

NRP Routing Policies: Ranked destination NRP Sip Entities: Main_Site_Clan1.

NRP Routing Policies: Removing disabled routes.

NRP Routing Policies: Ranked destination NRP Sip Entities: Main_Site_Clan1.

Adapting and proxying for SIP Entity Main_Site_Clan1.

NRP Entity Links: Found direct link to destination. Link uses TCP to port 5060.

NRP Adaptations: CLAN applied.

NRP Adaptations: P-Asserted-Identity set to sip:7326712438@192.168.67.130

NRP Adaptations: Request-URI set to sip:26103@customera.com

[< Previous](#) | Page **2** of 3 | [Next >](#)

Figure 72: Call Routing Test Results - Page 2

Routing Decision Process

Route < sip:26103@customera.com > to SIP Entity Main_Site_Clan1 (192.168.67.13). Terminating Location is Main.

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Figure 73: Call Routing Test Results - Page 3

9.2. Troubleshooting Tools

The Communication Manager “list trace station”, “list trace vector”, “list trace vdn”, “list trace tac”, and/or “status trunk-group” commands are helpful diagnostic tools to verify correct operation and to troubleshoot problems. MST (Message Sequence Trace) diagnostic traces (performed by Avaya Support) can be helpful in understanding the specific interoperability issues.

The logging and reporting functions within the Avaya Aura™ System Manager Common Console may be used to examine the details of Session Manager calls. In addition, if port monitoring is available, a SIP protocol analyzer such as Wireshark (a.k.a. Ethereal) can be used to capture SIP traces at the various interfaces. SIP traces can be instrumental in understanding SIP protocol issues resulting from configuration problems.

10. Conclusion

As illustrated in these Application Notes, Avaya Aura™ Session Manager, Avaya Aura™ Communication Manager, and the Acme Packet Net-Net 2600 can be configured to interoperate successfully with the **AT&T IP Flexible Reach** service via either the AT&T **AVPN** or **MIS/PNT** transport services. This solution provides users of Avaya Aura™ Communication Manager the ability to support inbound and outbound calls over an AT&T IP Flexible Reach SIP trunk service connection. These Application Notes further demonstrated that the Avaya Aura™ Session Manager AT&T Adaptation Module could be utilized to remove History-Info header information on egress SIP messages to the AT&T IP Flexible Reach service as well as provide required digit manipulation for inbound and outbound calls. Additionally the ability of Avaya Aura™ Communication Manager to provide SIP Diversion Header to the AT&T IP Flexible Reach service for certain outbound call scenarios (see **Section 2.2.3**) was demonstrated.

The reference configuration shown in these Application Notes is representative of a basic enterprise customer configuration and is intended to provide configuration guidance to supplement other Avaya product documentation. It is based upon formal interoperability compliance testing as part of the Avaya DevConnect Service Provider program.

11. References

The Avaya product documentation is available at <http://support.avaya.com> unless otherwise noted.

- [1] *Avaya Aura™ Session Manager Overview*, Issue 2, Release 5.2, November 2009, Document Number 03-603323
- [2] *Administering Avaya Aura™ Session Manager*, Issue 2, Release 5.2, November 2009, Document Number 03-603324
- [3] *Administering Avaya Aura™ Communication Manager*, Issue 5.0, Release 5.2, May 2009, Document Number 03-300509
- [4] *Avaya Aura™ Communication Manager Feature Description and Implementation*, Issue 7, Release 5.2, May 2009, Document Number 555-245-205
- [5] *Avaya Aura™ Call Center 5.2 Call Vectoring and Expert Agent Selection (EAS) Reference*, Release 5.2, April 2009, Document Number 07-600780
- [6] *Avaya Aura™ Call Center 5.2 Automatic Call Distribution Reference*, Release 5.2, April 2009, Document Number 07-602568
- [7] *Modular Messaging Multi-Site Guide Release 5.1*, June 2009
- [8] *Modular Messaging for Microsoft Exchange Release 5.1 Installation and Upgrades*, June 2009
- [9] *Modular Messaging for the Avaya Message Storage Server (MSS) Configuration Release 5.1 Installation and Upgrades*, June 2009
- [10] *Modular Messaging for IBM Lotus Domino 5.1 Installation and Upgrades*, June 2009

Acme Packet Support (login required):

- [11] *Net-Net 2600, Release 3.6, System Administration Guide, 400-1007-36, Revision 1.00, December 1, 2009* - available at <http://support.acmepacket.com>

AT&T IP Flexible Reach Service Descriptions:

- [12] *AT&T IP Flexible Reach*
<http://www.business.att.com/enterprise/Service/business-voip-enterprise/network-based-voip-enterprise/ip-flexible-reach-enterprise/>

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