Avaya Solution & Interoperability Test Lab

Configuring SIP Connectivity Between Avaya Communications Process Manager and Cisco Unified Communications Manager via Avaya SIP Enablement Services to Provide a Solution for Avaya Communications Enabled Business Processes - Issue 0.1

Abstract

These Application Notes describe the procedures for configuring SIP connectivity between Avaya Communications Process Manager (CPM) and Cisco Unified Communications Manager (UCM) via Avaya SIP Enablement Services. Employing this configuration enables call origination/termination between endpoints registered to Cisco UCM and Avaya CPM, where the signaling is SIP and the media is Real-time Transport Protocol (RTP). This configuration integrates endpoints registered to Cisco UCM with web services for business applications offered by Avaya CPM to provide a solution for Avaya Communications Enabled Business Processes (CEBP).

1. Introduction

These Application Notes describe the procedures for configuring SIP connectivity between Avaya Communications Process Manager (CPM) and Cisco Unified Communications Manager (UCM) via Avaya SIP Enablement Services. Employing this configuration enables call origination/termination between endpoints registered to Cisco UCM and Avaya CPM, where the signaling is SIP and the media is Real-time Transport Protocol (RTP). This configuration integrates endpoints registered to Cisco UCM with web services for business applications offered by Avaya CPM to provide a solution for Avaya Communications Enabled Business Processes (CEBP).

Figure 1 illustrates the sample configuration utilized for these Application Notes.
Avaya CPM is a Service-Oriented Architecture (SOA) based platform that exposes web services to enable continuous, closed-loop communications. All Avaya CEBP communications are continuous and “closed loop”, e.g., information about actions taken by users can be communicated back to the originating system that triggers an event, affecting the business process in real-time. Once an action is set in motion, Avaya CEBP helps assure that the business process keeps moving toward resolution Refer to [**1**] and [**2**] for required/optional hardware/software components regarding Avaya CPM deployments.

Cisco UCM provides enterprise telephony features for the IP telephones present in this sample configuration. Cisco UCM is provisioned for call origination via SIP trunking to Avaya CPM.

The following web services are offered by Avaya CPM and were used to verify SIP connectivity between Avaya CPM and Cisco UCM:

- Advisory service - Sends a notification that consists of a subject and message to one or more recipients. Advisories can be sent to a telephone, e-mail account or SMS account as defined by user preference settings. Recipients acknowledge receipt of an advisory by telephone or the Avaya CPM Web Portal. For this sample configuration, only telephones, registered to Cisco UCM are utilized for receiving and acknowledging this service. The originator receives notification of users who have and have not acknowledged the advisory.
- Notify and Respond - Sends a notification to one or more recipients and collects responses. The notification includes context information (subject, message and possible responses). Notifications can be sent to a telephone, e-mail account or SMS account as defined by user preference settings. The response is more complex than an Advisory acknowledgement in that actual response data is returned to Avaya CPM. The response data can be an answer to a multiple choice question and can include optional associated data. Recipients can respond by telephone or the Avaya CPM Web Portal. For this sample configuration, only telephones, registered to Cisco UCM are utilized for receiving and acknowledging this service.
- Notify and Conference - Sends a notification to one or more recipients that invite them to join a conference. Recipients can respond and join in the following ways:
    - o They can respond by telephone that they wish to join and are then automatically placed in the conference

    - They can respond through the Avaya CPM Web Portal and provide a callback number at which to contact them. Avaya CPM then calls them and places them in the conference.
    - They can call into Avaya CPM to join the conference.
- Find and Call - Locates users by trying multiple devices according to user contact preferences and then sets up a conference call.

For this sample configuration, Avaya CPM is comprised of a server hosting the Avaya CPM software application, Avaya SIP Enablement Services, Avaya Meeting Exchange Express Edition (Meeting Exchange) and Avaya Voice Portal. Avaya CPM offered web services to users with an account defined on Avaya CPM as well as transient users, with no account. Both users and transient users used Cisco IP Phones registered to Cisco UCM. Avaya SIP Enablement Services provides SIP proxy functionality between Avaya CPM and Cisco UCM.

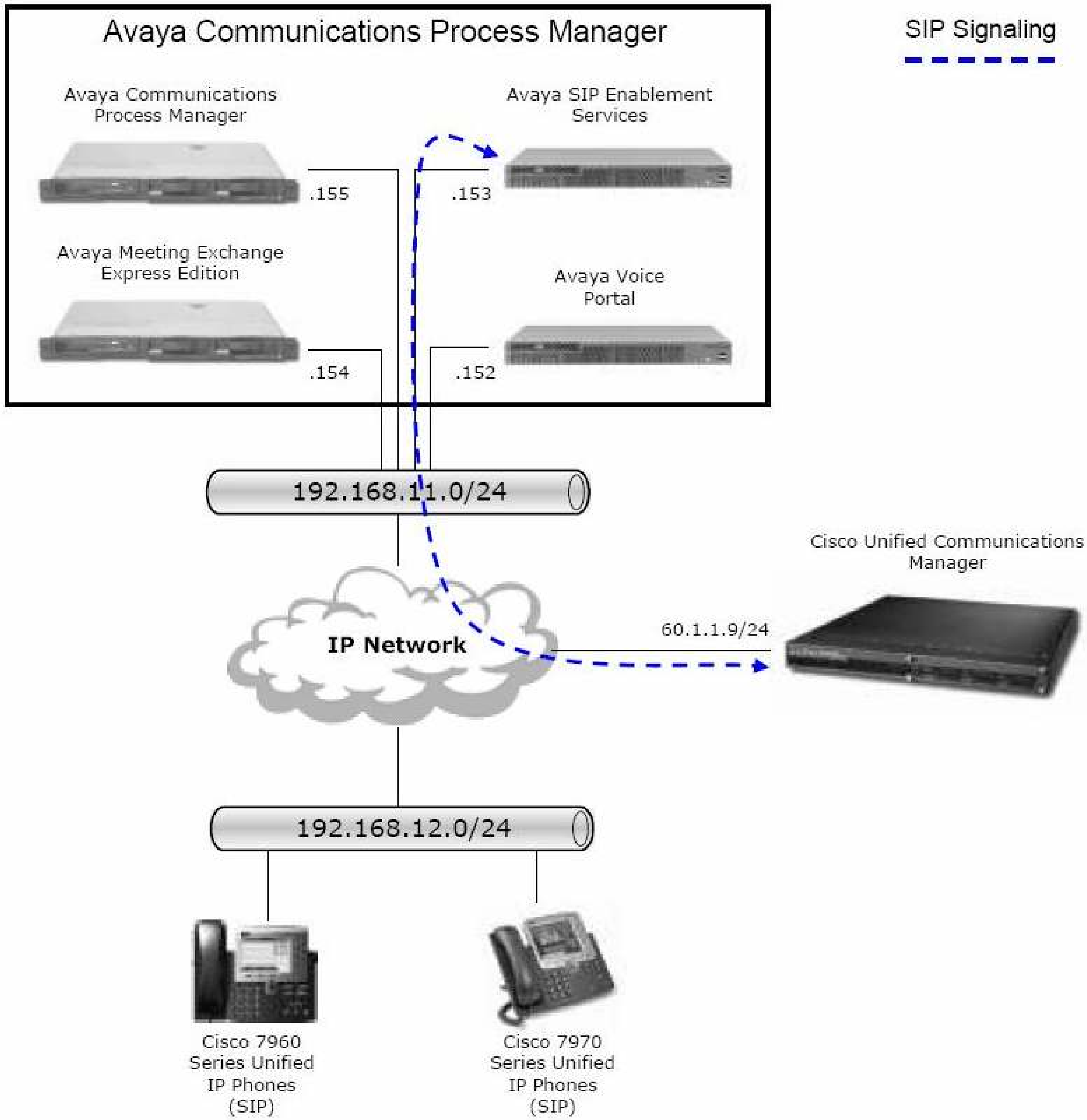


Figure 1: Sample Configuration

2. Equipment and Software Validated

The following equipment and software versions are used for this sample configuration:

Equipment	Software Version
Avaya Communications Process Manager • Avaya Communications Process Manager • Avaya SIP Enablement Services • Avaya Meeting Exchange Express Edition • Avaya Voice Portal	CPM 2.1 cpm 2.1.53 3.1-03.1.018.0 2.5.22.0 4.0.0.0.2901
Cisco Unified Communications Manager	CUCM 6.0 (6.0.1.2000-3)
Cisco 7960 Series IP Phones (SIP)	P0S3-08-6-02
Cisco 7970 Series IP Phones (SIP)	SIP70.8-3-1S

Table 1: Equipment and Software Versions

3. Avaya Communications Process Manager Configuration

This section describes the configuration for enabling Avaya CPM to interoperate with Cisco UCM via Avaya SIP Enablement Services. For this sample configuration, it is assumed that Avaya CPM is provisioned to communicate with Avaya communication resources, e.g., Avaya Voice Portal, Avaya Meeting Exchange and Avaya SIP Enablement Services. Refer to [**1**] and [**2**] for additional information regarding the administration of Avaya CPM. Avaya CPM has two user interfaces:

- Web Portal - A web-based thin client that lets users manage their account, e.g., provision contact rules so their notifications are based on their preferences and availability. For this sample configuration, the Web Portal interface is used to invoke the web services as described in **Section 1** to both users and transient users. The Web Portal is accessed over a secure connection by entering **https://<Avaya CPM IP Address or Fully Qualified Domain Name (FQDN)>** into a web browser's Uniform Resource Locator (URL) bar.
- Operations Administration and Maintenance (OAM) - A web-based thin client user interface that lets a system administrator configure Avaya CPM with connectivity to Avaya communication resources. The OAM interface also provides access to system status, statistics, licenses, security certificates, logs and alarms. For this sample configuration, the OAM interface is used to provision Avaya CPM for dial-in services. The OAM interface is accessed over a secure connection by entering **https://<Avaya CPM IP Address or FQDN>/admin** into a web browser's URL bar.

Note*: Some features described in these Application Notes require licensing. If a required feature is not enabled or there is insufficient capacity, contact an authorized Avaya account representative to make the appropriate changes.*

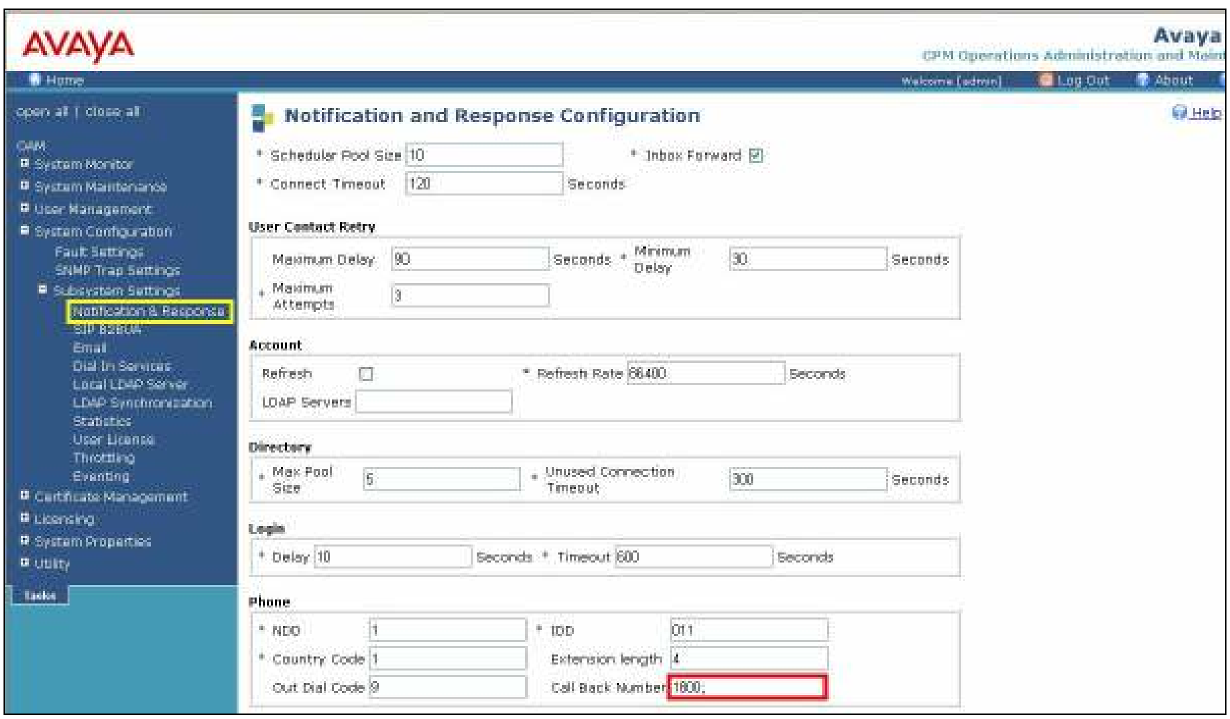
3.1. Configure Avaya Communications Process Manager

This section describes the steps for configuring Avaya CPM to interoperate with Cisco UCM via Avaya SIP Enablement Services.

- **Steps 3.1.1 - 3.1.4** describe the provisioning of dial-in services. This enables endpoints registered to Cisco UCM to dial-in to Avaya CPM via Avaya SIP Enablement Services.
- **Step 3.1.5** describes the provisioning of call routing from Avaya CPM to endpoints registered to Cisco UCM via Avaya SIP Enablement Services. This enables the web services (see **Section 1**) delivery to endpoints registered to Cisco UCM.
- **Steps 3.1.6 - 3.1.8** describe the provisioning of a user account on Avaya CPM.

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.1.1</td><td>
From the Avaya CPM OAM interface, administer settings to notify users on Avaya CPM of a call back number to use for dial-in services as follows:

- Click **System Configuration ➔ Subsystem Settings ➔ Notification & Response**.
- From the **Notification and Response Configuration** page, provision the **Call Back Number** field to define the telephone number that is specified in notifications for recipients to call into Avaya CPM. This number is included in e-mail, SMS notifications and voice mail messages.
  __Note__: The semicolon is added to this field by Avaya CPM when this page is submitted.
- [***Not Shown***] *Click **Update**.*



</td></tr>
</table>

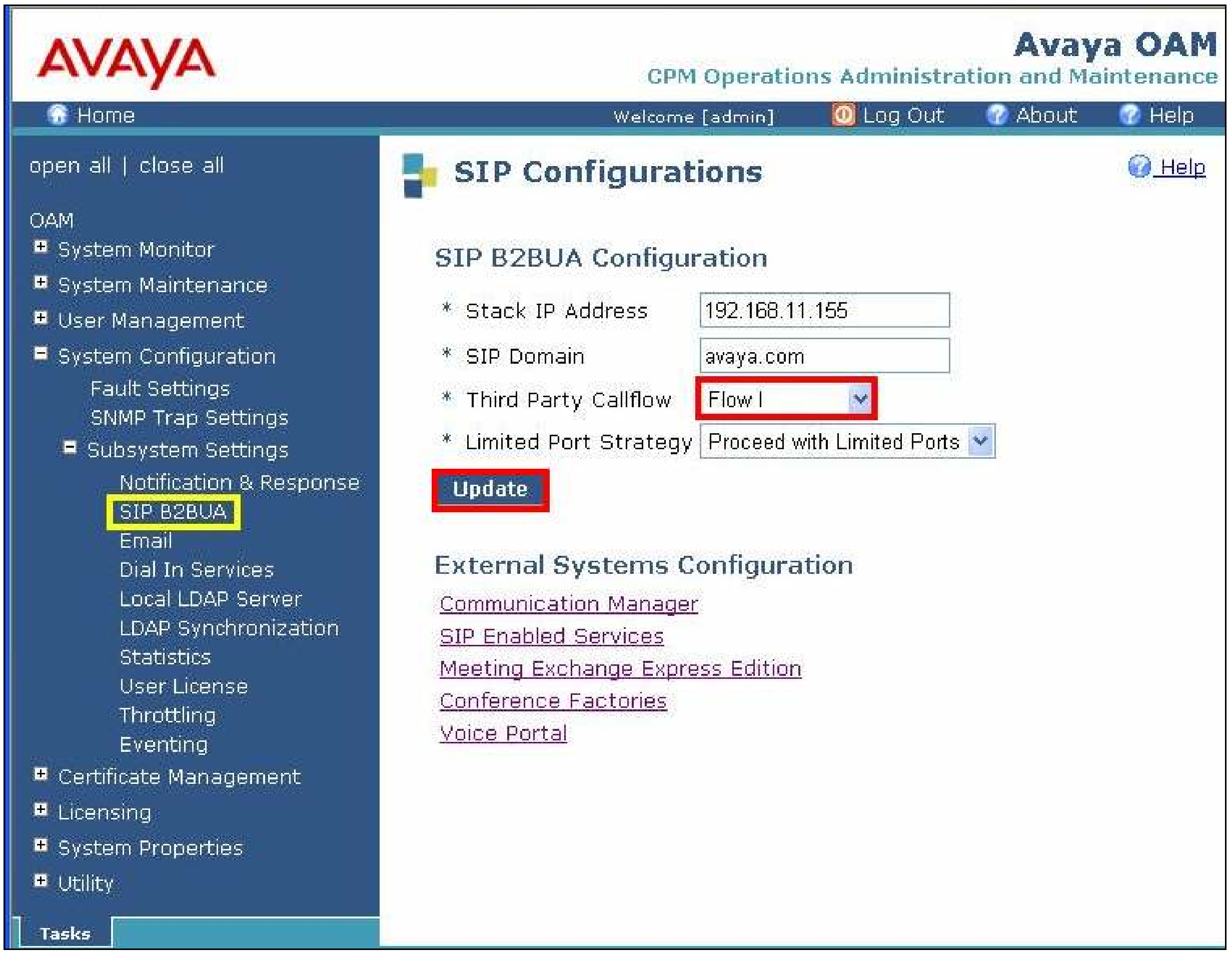
Step	Description
3.1.2	From the Avaya CPM OAM interface, administer settings that enable dial-in services to Avaya CPM as follows: • Click **System Configuration → Subsystem Settings → Dial In Services**. • From the **Dial In Services** page, modify or add an entry that associates the dialed telephone number with specific Avaya CPM services that users can access by calling into Avaya CPM. Modify the entry by selecting the appropriate entry and clicking **Modify**. 

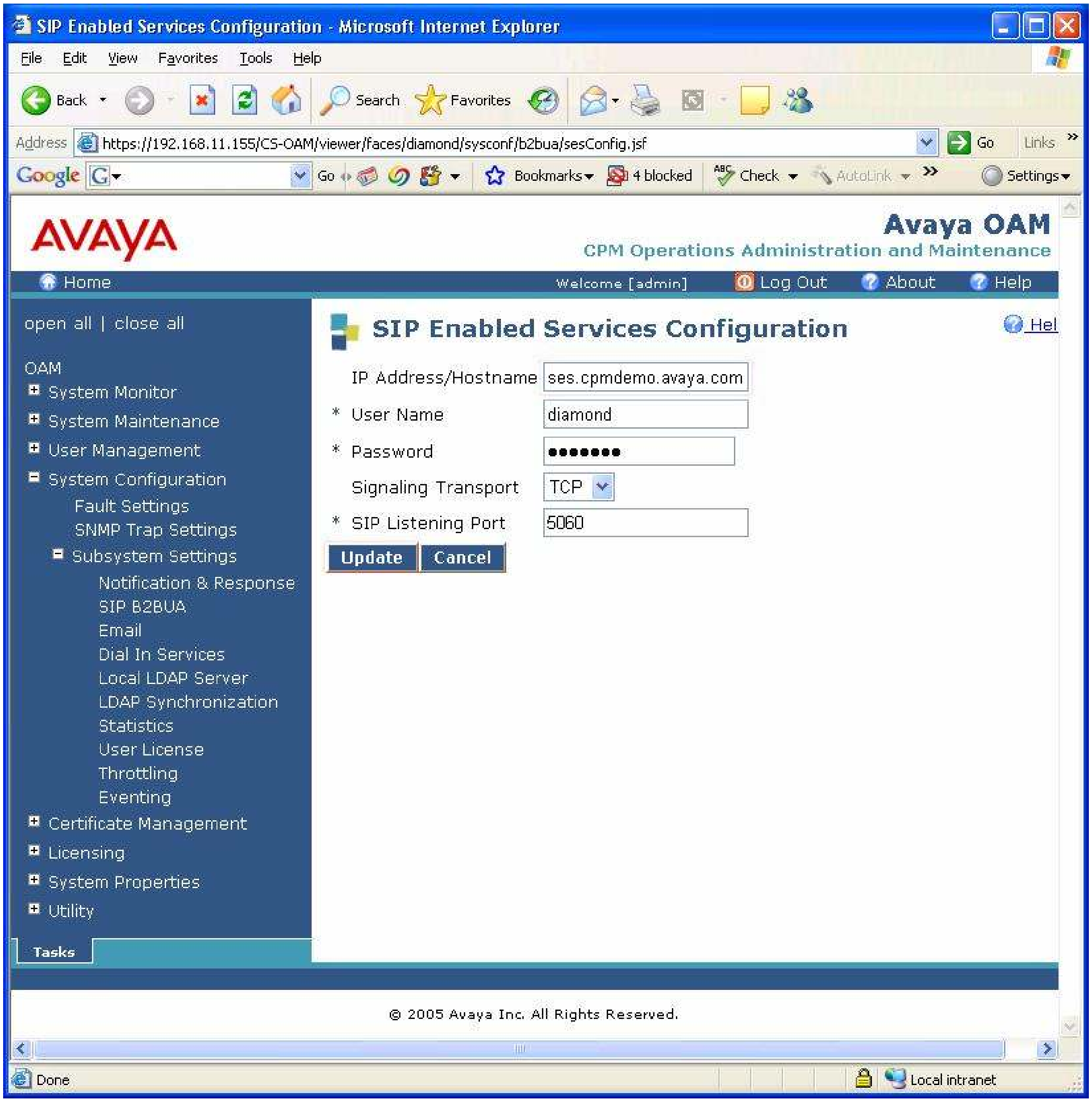
<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.1.3</td><td>From the Modify Dial In Service page, administer settings as displayed.

Enter the dialed telephone number in the Dial In Number field. Calls directed to Avaya CPM and targeted to this number will reach the b2buaOutputSender service.
Note: The Service Name field defines the interface to which incoming calls to Avaya CPM are routed. Do not change the default setting for this field unless a customized interface has been written and deployed for Avaya CPM. Changing this field for any other reason may cause dial-in services to stop functioning.
Refer to [2] for definitions regarding the remaining fields on this page.
Click Update.

</td></tr>
</table>

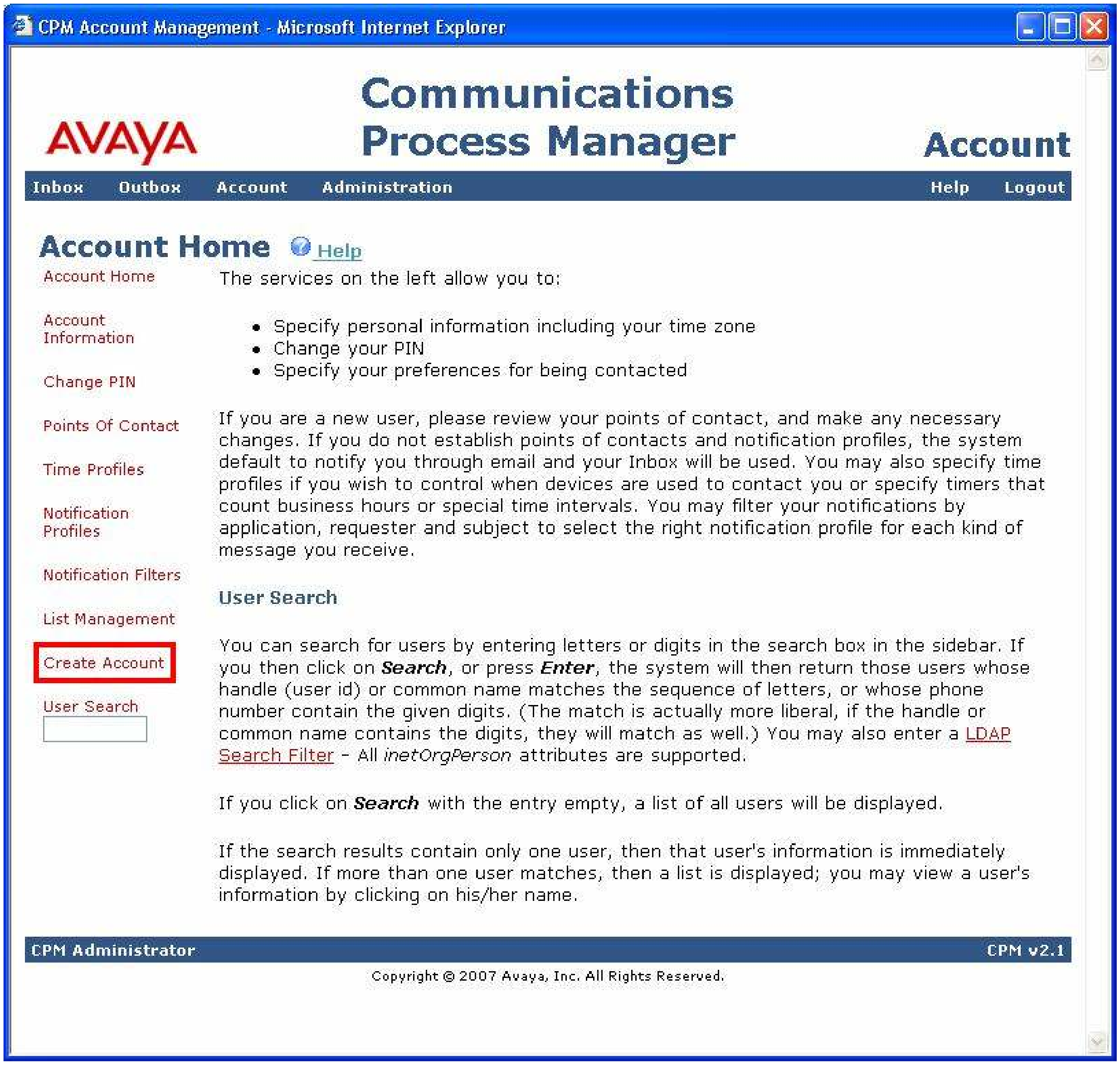
Step	Description

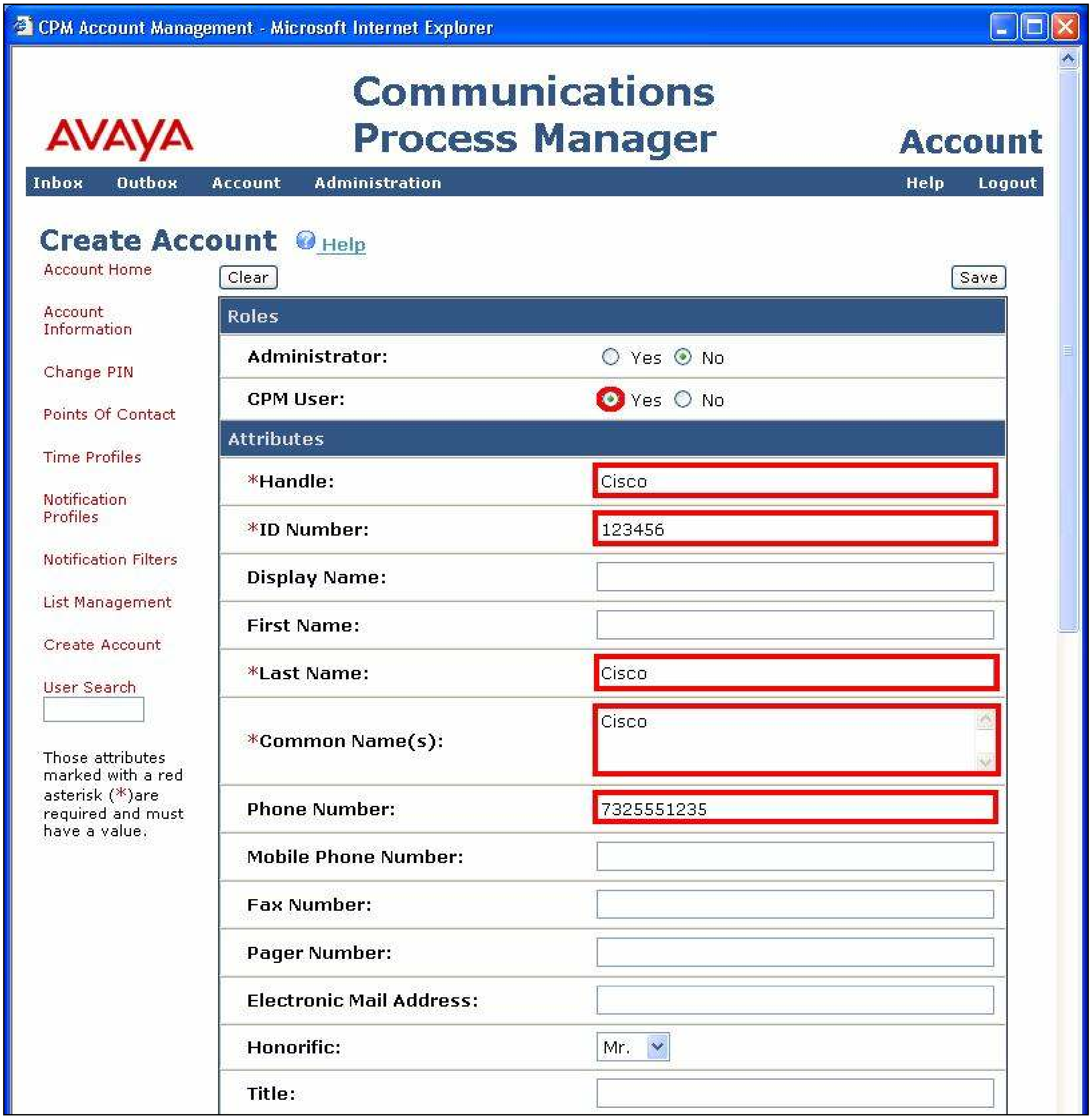
3.1.4	From the Avaya CPM OAM interface, administer settings for the **SIPB2BUA** as follows:
	• Click **System Configuration → Subsystem Settings → SIPB2BUA**.
	  o From the **SIP Configurations** page, provision the **Third Party Callflow** field to define 3pcc Call Establishment as per RFC 3725.
	  o Click **Update**.
	• To provision call routing from Avaya CPM to endpoints registered to Cisco UCM via Avaya SIP Enablement Services, click **SIP Enabled Services**.
	
	

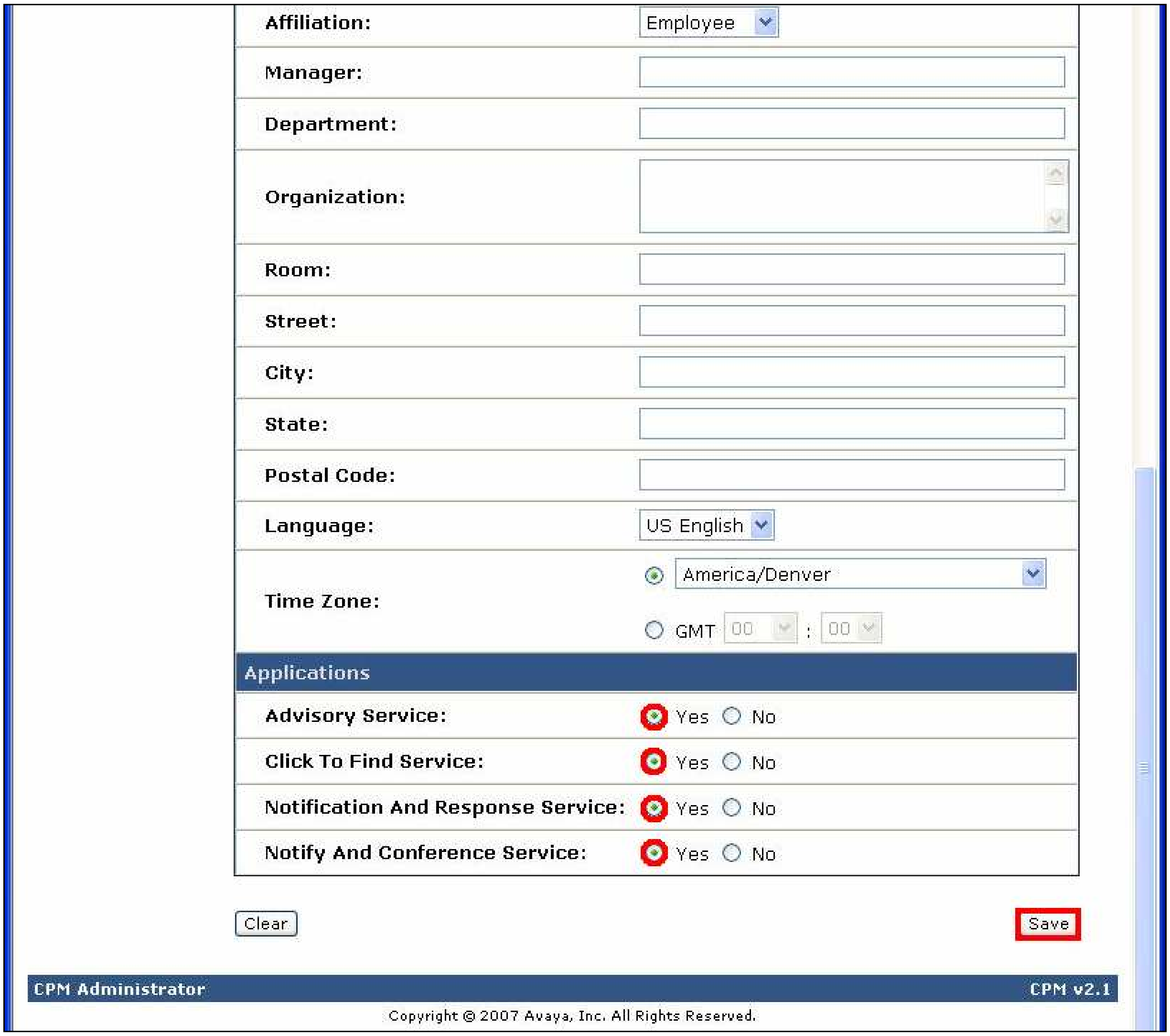
Step	Description
3.1.5	From the **SIP Enabled Services Configuration** page, verify Avaya CPM is provisioned for connectivity with Avaya SIP Enablement Services. ***Note***: *It is assumed that* Avaya CPM *is provisioned to communicate with Avaya communication resources, e.g., Avaya Voice Portal, Avaya Meeting Exchange and Avaya SIP Enablement Services. Refer to [**1**] and [**2**] for additional information regarding the administration of connectivity between* Avaya CPM *and Avaya communication resources*. 

Step	Description
3.1.6	From the Avaya CPM OAM interface, add a user account as follows: • Click **User Management ➔ Users**. • From the **User Management** page, click **Launch application**. 

Step	Description
3.1.7	From the Account Home page, click **Create Account**.



Step	Description
3.1.8a	Provision settings for a user account as displayed and scroll down. For this sample configuration, the **Phone Number** field corresponds to an endpoint registered to Cisco UCM. 

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.1.8b</td><td>Provision settings for a user account as displayed and click Save.

</td></tr>
</table>

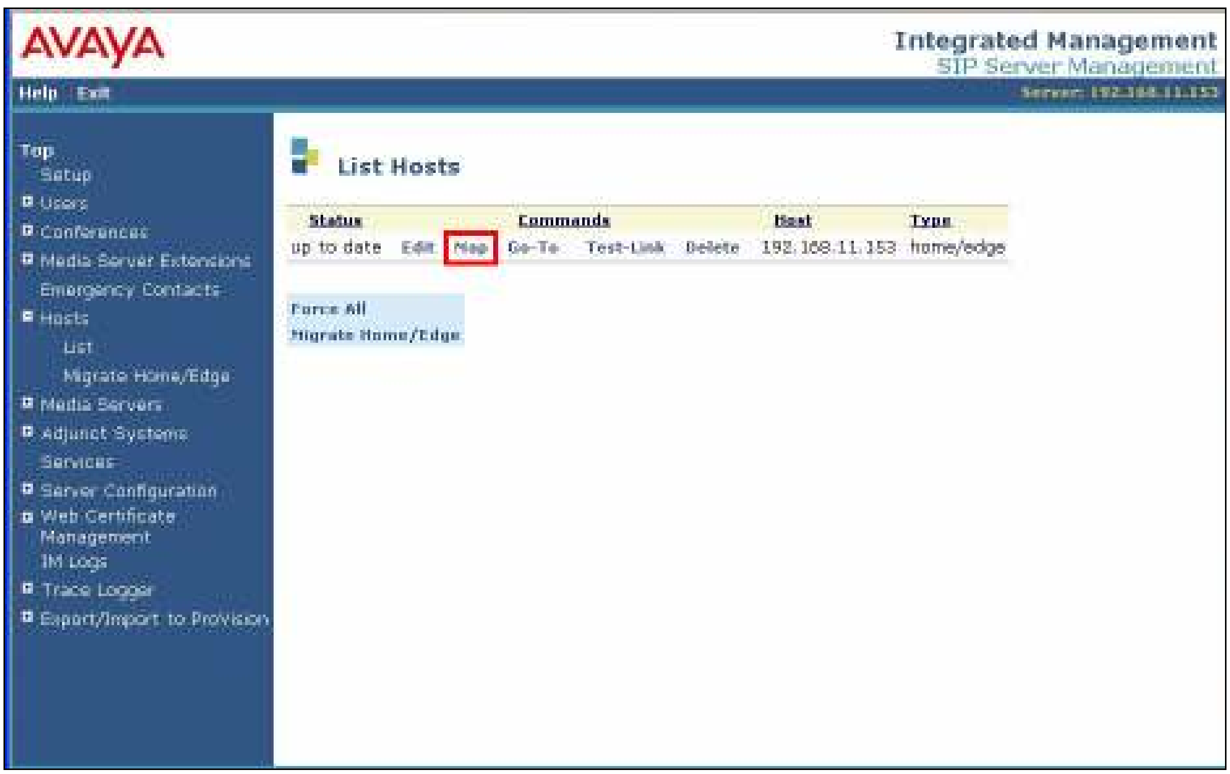
3.2. Configure Avaya SIP Enablement Services

This section describes the steps for configuring call routing between Avaya CPM and endpoints registered to Cisco UCM via Avaya SIP Enablement Services. Avaya SIP Enablement Services is administered over a secure connection by entering **https://<Avaya SIP Enablement Services IP Address or FQDN>/admin** into a web browser's URL bar.

- **Steps 3.2.1 - 3.2.6** describe the provisioning of call routing from Avaya CPM to endpoints registered to Cisco UCM via Avaya SIP Enablement Services. This enables the web services (see **Section 1**) delivery to endpoints registered to Cisco UCM.
- **Steps 3.2.7 - 3.2.9** describe the provisioning of call routing from endpoints registered to Cisco UCM to Avaya CPM via Avaya SIP Enablement Services. This enables the dial-in services for endpoints registered to Cisco UCM.

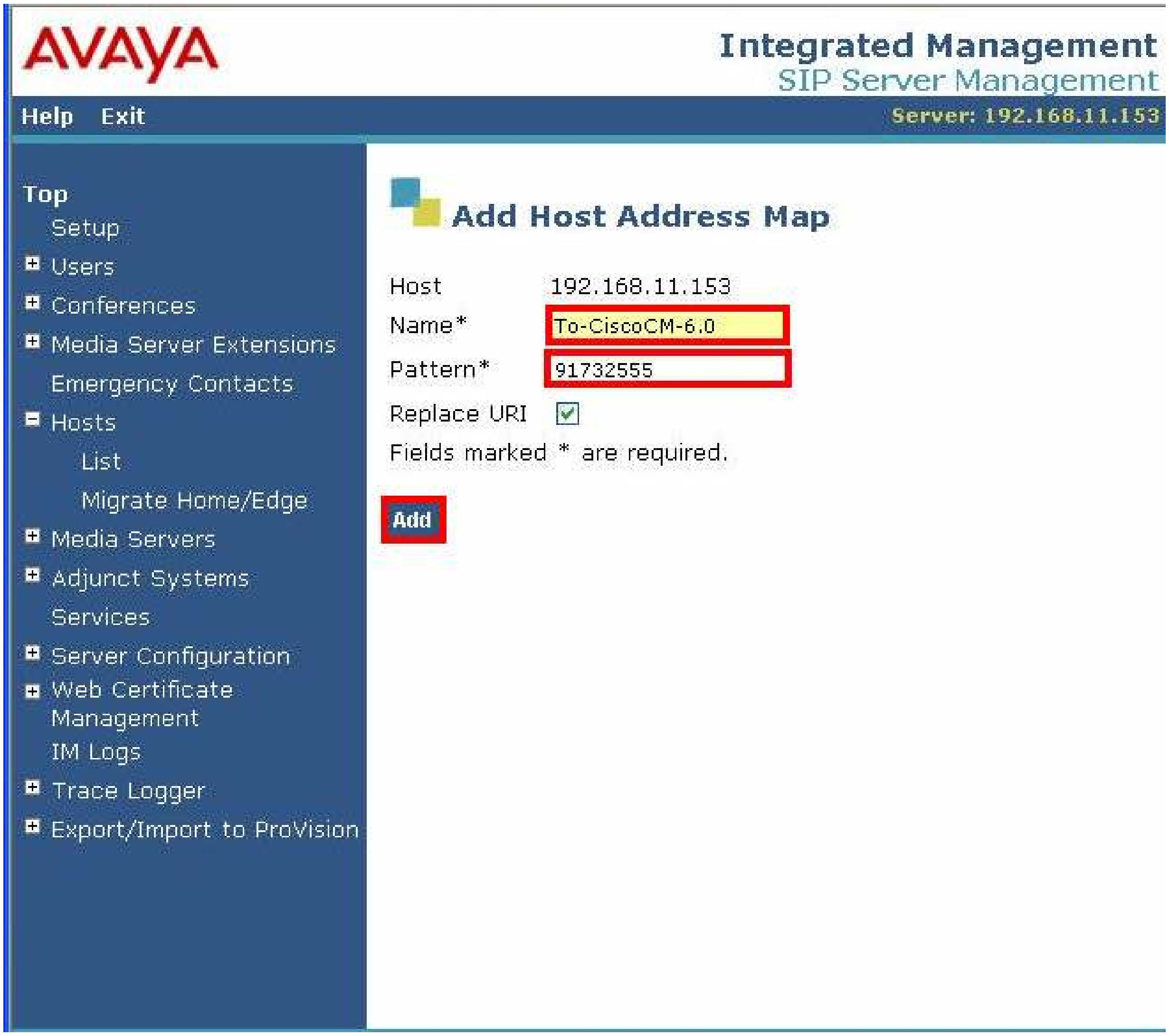
<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.2.1</td><td>
To enable call routing from Avaya CPM to endpoints registered to Cisco UCM via Avaya SIP Enablement Services, add a host Map as follows. From the Administration Web Interface:

- Click **Hosts ➔ List**.
- From the **List Hosts**, click **Map**.



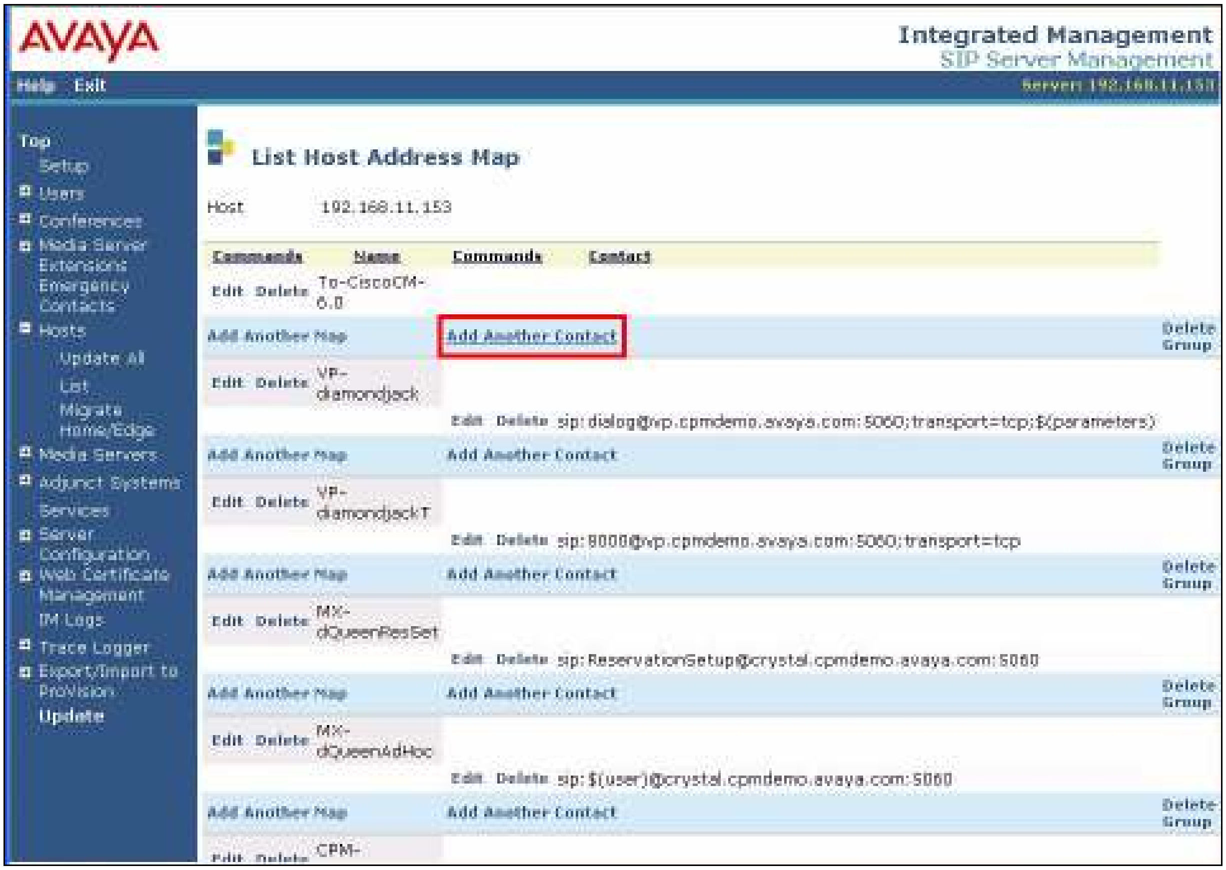
</td></tr>
</table>

Step	Description
3.2.2	From the **List Host Address Map** page, click **Add Map In New Group**.

Step	Description
3.2.3	From the **Add Host Address Map** page, provision as displayed. For this sample configuration, the **Pattern** field corresponds to endpoints registered to Cisco UCM. 

Step	Description
3.2.4	Click **Continue**. 

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.2.5</td><td>From the List Host Address Map page, specify routing information for the Host Address Map defined in Step 3.2.3. Click Add Another Contact.

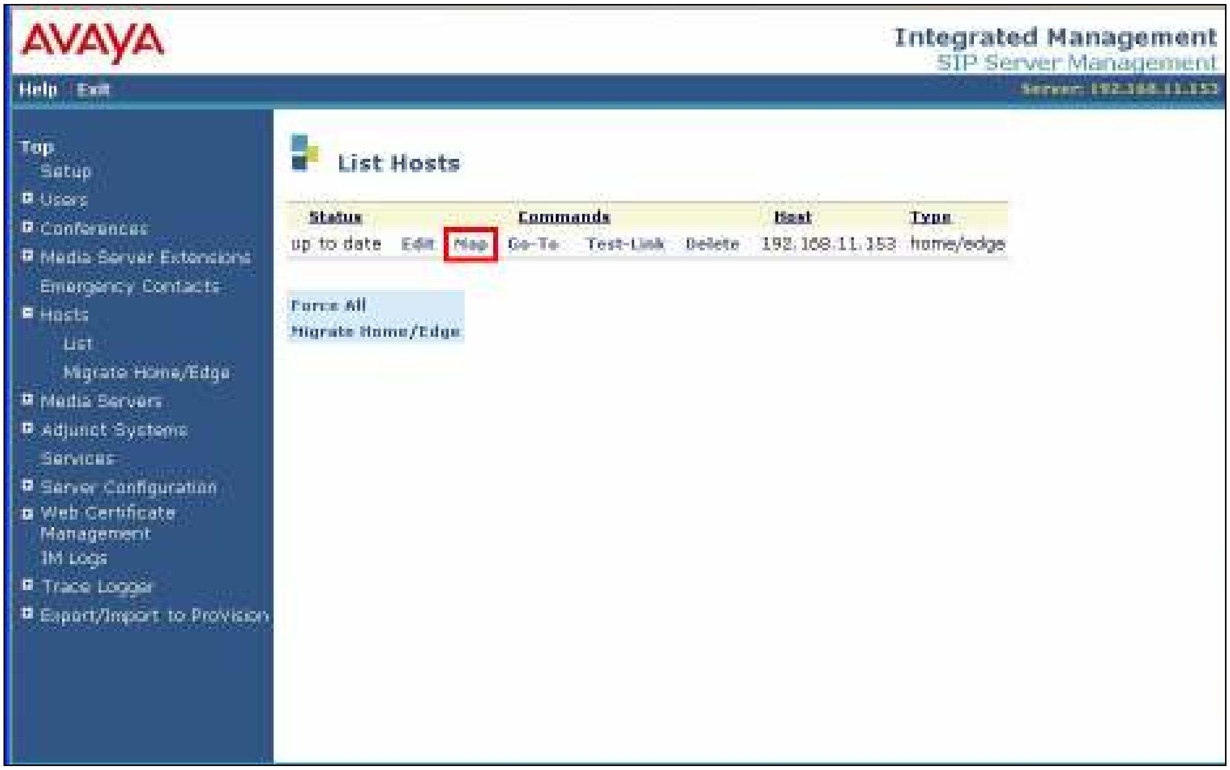


</td></tr>
</table>

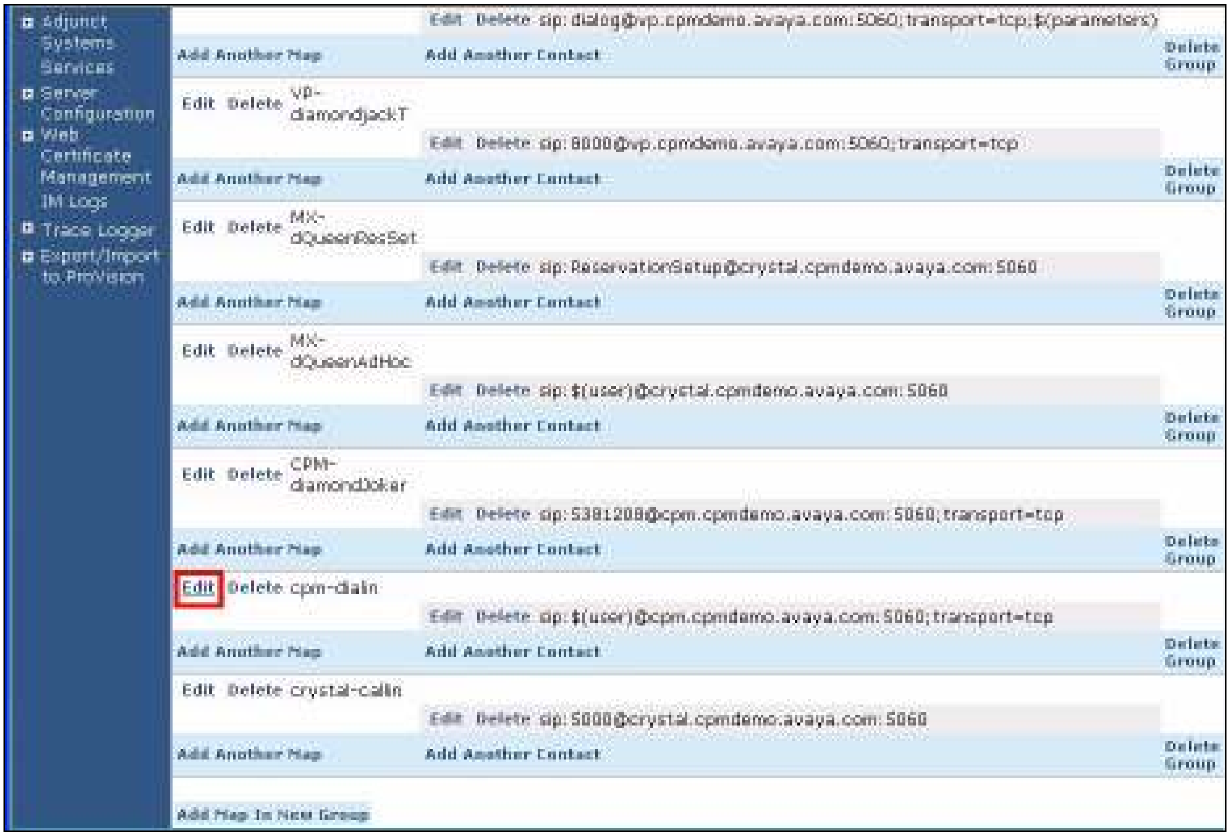
Step	Description
3.2.6	From the **Add Host Contact** page, provision as displayed. The **Contact** field corresponds to a SIP-URI. • To enable SIP connectivity via TCP to Cisco UCM, enter **sip:$(user)@60.1.1.9:5060;transport=tcp** in the **Contact** field. *__Note__: The hostport and transport-param are consistent with the SIP configuration for Cisco UCM defined in __Step 4.1.1__. Avaya SIP Enablement Services substitutes "__$(user)__" with the "User" Field obtained from the originating Request-URI. To enable SIP connectivity over UDP, set the transport-param in the SIP-URI to udp.* • Click **Add**. • [***Not Shown***] *Click **Continue** on the confirmation page.* 

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.2.7</td><td>To enable call routing from endpoints registered to Cisco UCM to Avaya CPM via Avaya SIP Enablement Services, add a host Map as follows. From the Administration Web Interface:

Click Hosts ➔ List.
From the List Hosts, click Map.

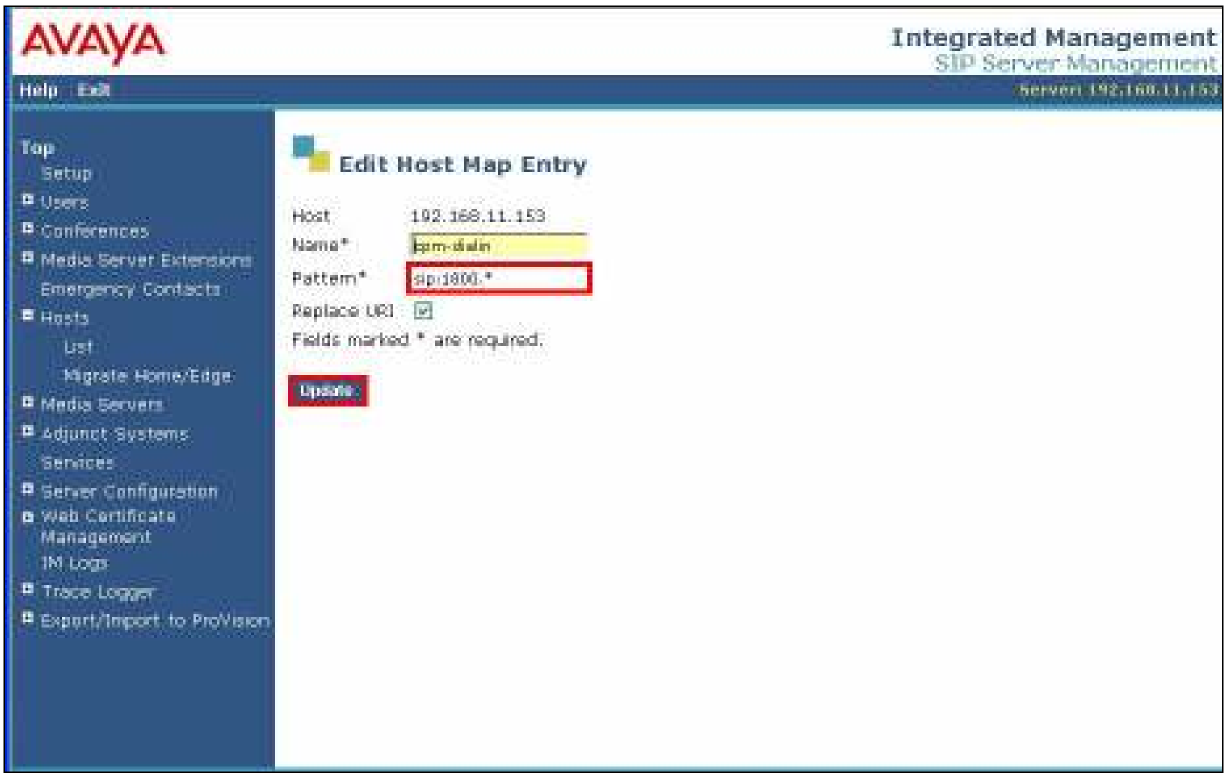


</td></tr>
</table>

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.2.8</td><td>From the List Host Address Map page, locate the entry for used for dial-in services and click Edit.


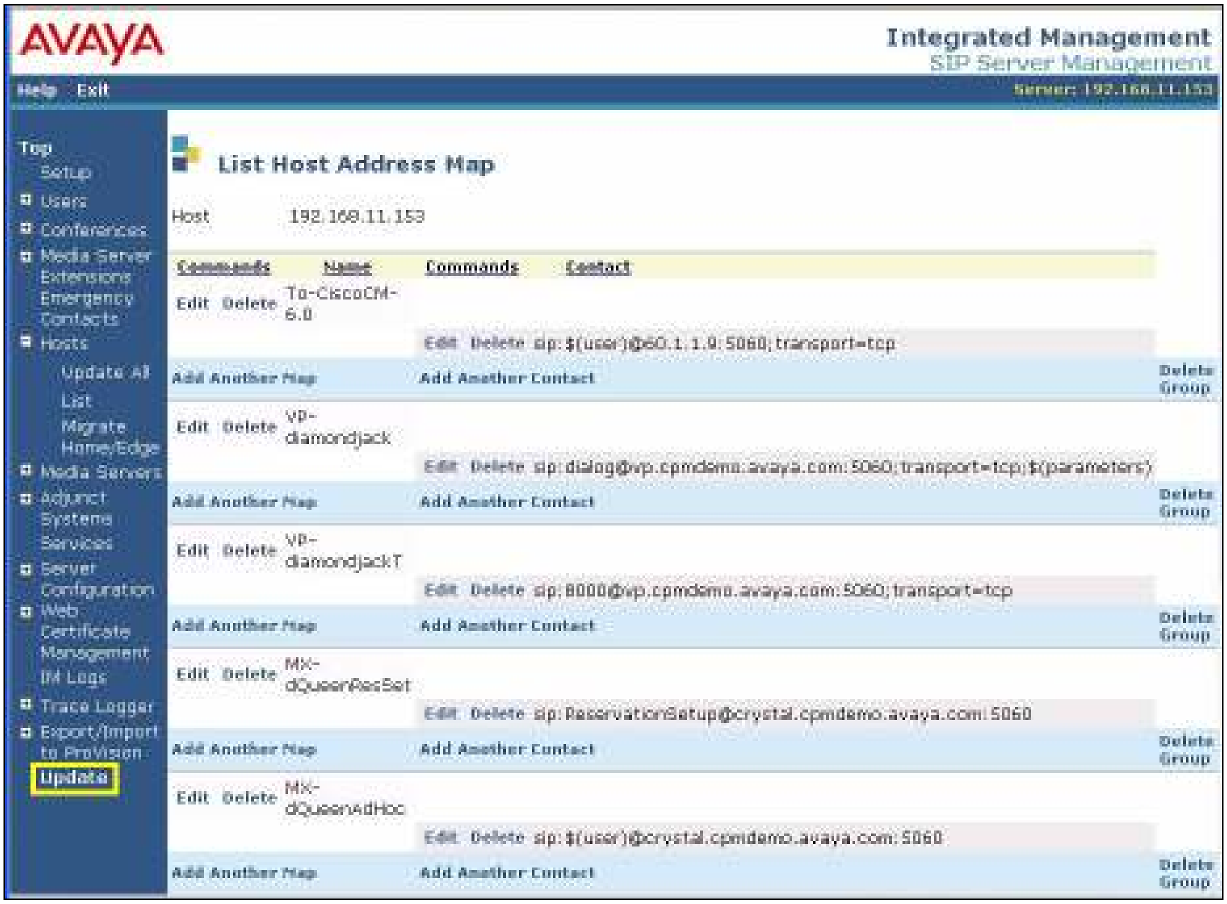
</td></tr>
</table>

Step	Description
3.2.9	From the **Edit Host Map Entry** page, provision as displayed. For this sample configuration, the **Pattern** field corresponds to the telephone number dialed from endpoints registered to Cisco UCM. This field also correlates with dial-in services provisioned on Avaya CPM in **Steps 3.1.1 - 3.1.3**. • Click Update. • [***Not Shown***] *Click **Continue** on the confirmation page.*



<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.2.10</td><td>

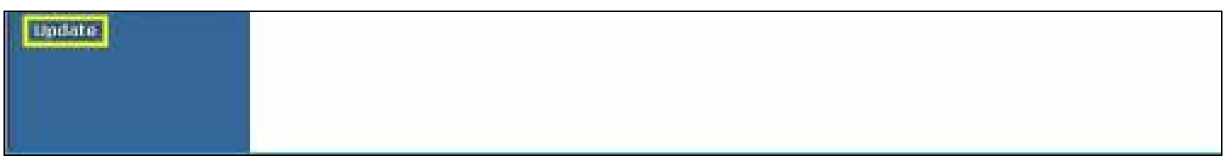
To apply the administration in **Section 3.2**, click on **Update** on the left side of the page.



</td></tr>
</table>

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.2.11</td><td>Add Cisco UCM as a trusted host on Avaya SIP Enablement Services. All SIP user agents, proxies and gateways to which calls can be routed should be administered as trusted hosts on Avaya SIP Enablement Services. This permits call setup and termination by remote parties to be handled without authentication challenges. Trusted hosts are provisioned at the Avaya SIP Enablement Services command line of the edge, or home/edge server.
• Log in to the Avaya SIP Enablement Services console with the appropriate credentials.
• Add Cisco UCM as a trusted host by entering the following command:
trustedhost -a <trusted host IP address> -n <trusting SES IP address> [-c <comment text>].

SES> trustedhost -a 60.1.1.9 -n 192.168.11.153 -c Cisco_CM_6.0</td></tr>
<tr><td>3.2.12</td><td>Verify trusted host entries by entering the following command: trustedhost –L.

SES> trustedhost -L
Third party trusted hosts.
Trusted Host | CCS Host Name | Comment
--------------------------+----------------------------+-------------------------
60.1.1.9 | 192.168.11.153 | Cisco_CM_6.0</td></tr>
<tr><td>3.2.13</td><td>To apply the administration defined in Step 3.2.11, click on Update on the left side of the page on the web browser interface.

</td></tr>
</table>

3.3. Configure Avaya Voice Portal

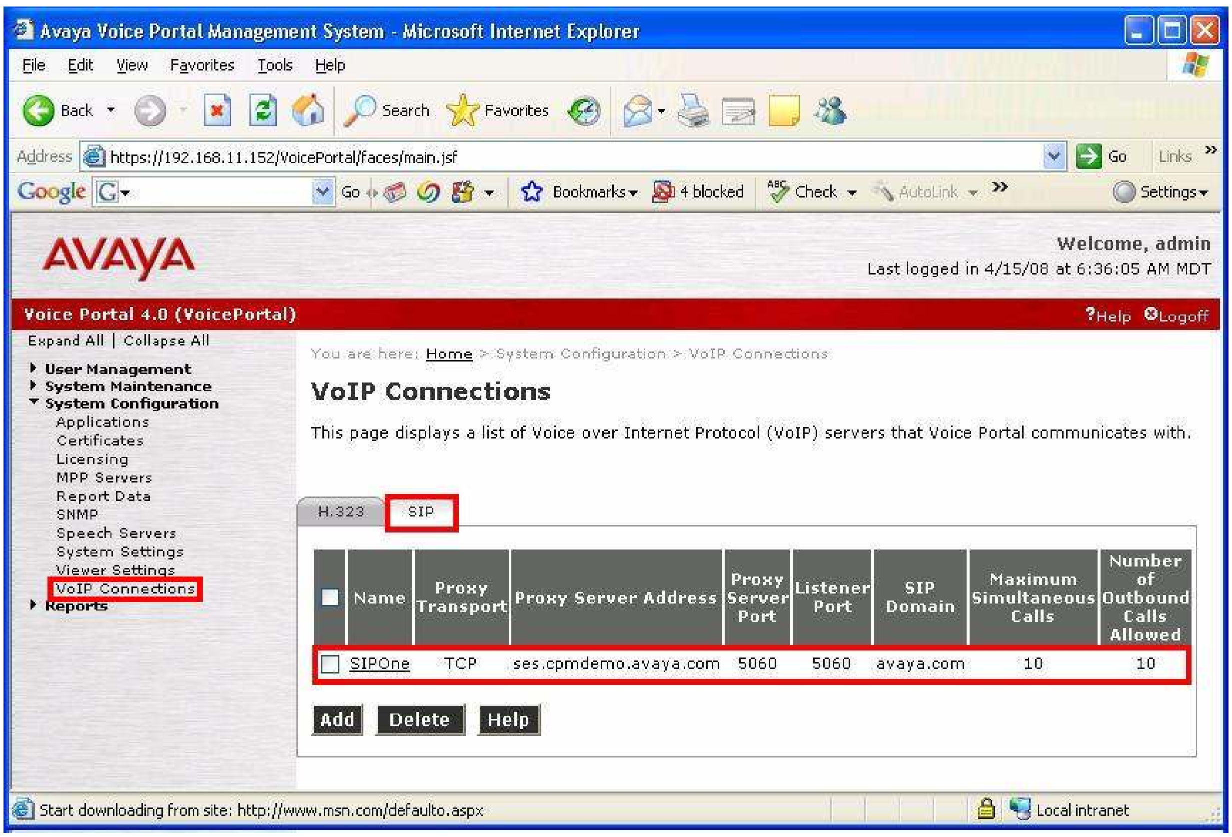
This section describes the steps for configuring Avaya Voice Portal to interoperate with Avaya CPM via Avaya SIP Enablement Services. Avaya Voice Portal is administered via the Voice Portal Management System (VPMS) over a secure connection by entering **https://<Avaya Voice Portal IP Address or FQDN>/VoicePortal** into a web browser's URL bar.

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>3.3.1</td><td>

From the Avaya Voice Portal VPMS interface, verify settings to enable SIP connectivity with Avaya SIP Enablement Services as follows:

- Click **System Configuration → VoIP Connections**.
- From the **SIP** tab on the **VoIP Connections** page, verify the configuration of the entry corresponding to Avaya SIP Enablement Services.

Note*: It is assumed that* Avaya CPM *is provisioned to communicate with Avaya communication resources, e.g., Avaya Voice Portal, Avaya Meeting Exchange and Avaya SIP Enablement Services. Refer to [****1****] and [****2****] for additional information regarding the administration of connectivity between* Avaya CPM *and Avaya communication resources*.



</td></tr>
</table>

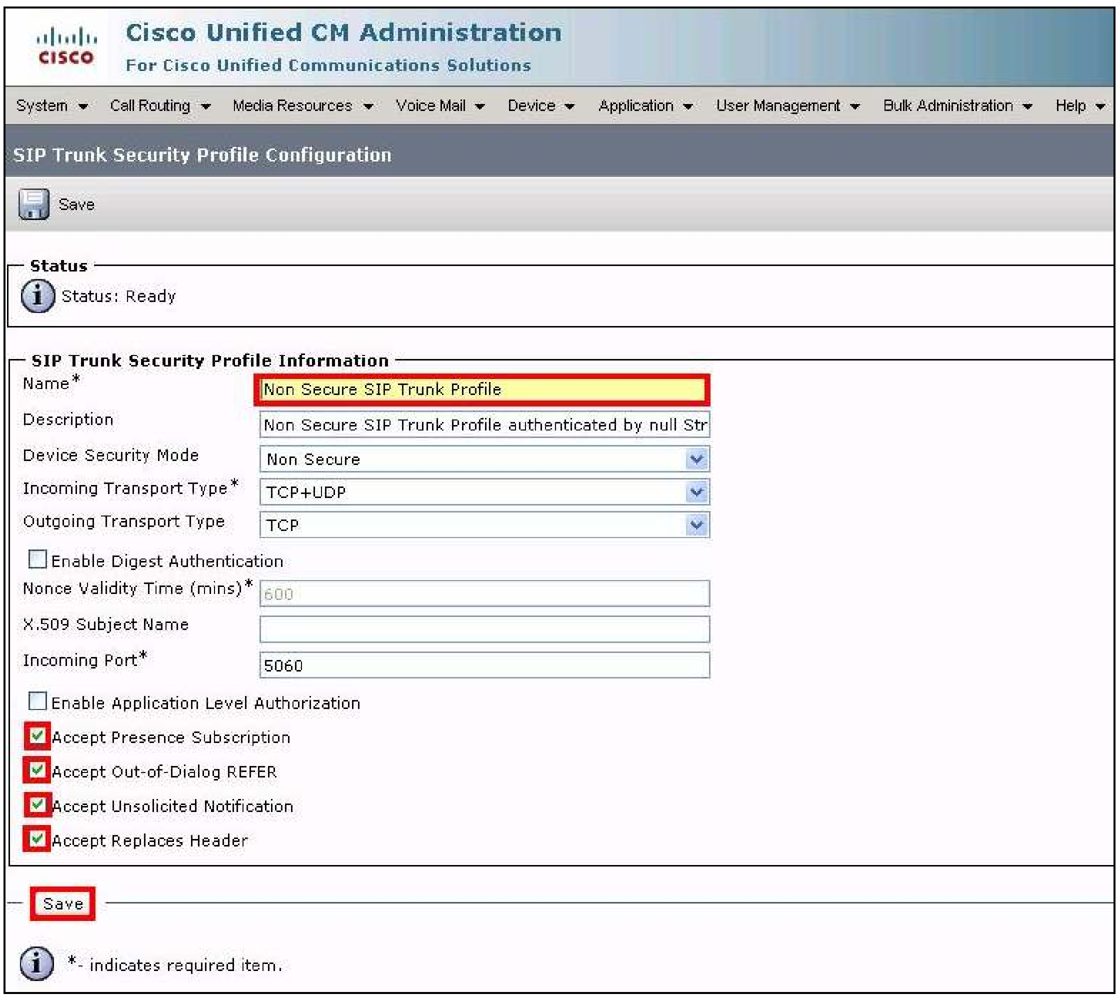
4. Cisco Unified Communications Manager Configuration

This section describes the configuration for enabling Cisco UCM to interoperate with Avaya CPM. Cisco UCM is administered and maintained using a standard web browser over a secure connection by entering **https://<Cisco UCM IP Address or FQDN>** into the web browser's URL bar. Refer to [**3**] for additional information regarding the administration of Cisco UCM.

- **Section 4.1** describes the provisioning of SIP connectivity utilizing TCP between Cisco UCM and Avaya CPM via Avaya SIP Enablement Services. This enables call origination/termination between endpoints registered to Cisco UCM and Avaya CPM,
- **Section 4.2** describes the provisioning of SIP connectivity utilizing TCP between Cisco UCM and Avaya Meeting Exchange. This enables Cisco UCM to properly handle the web services that utilize the SIP REFER method to access Avaya Meeting Exchange:
    - Find and Call
    - Notify and Conference

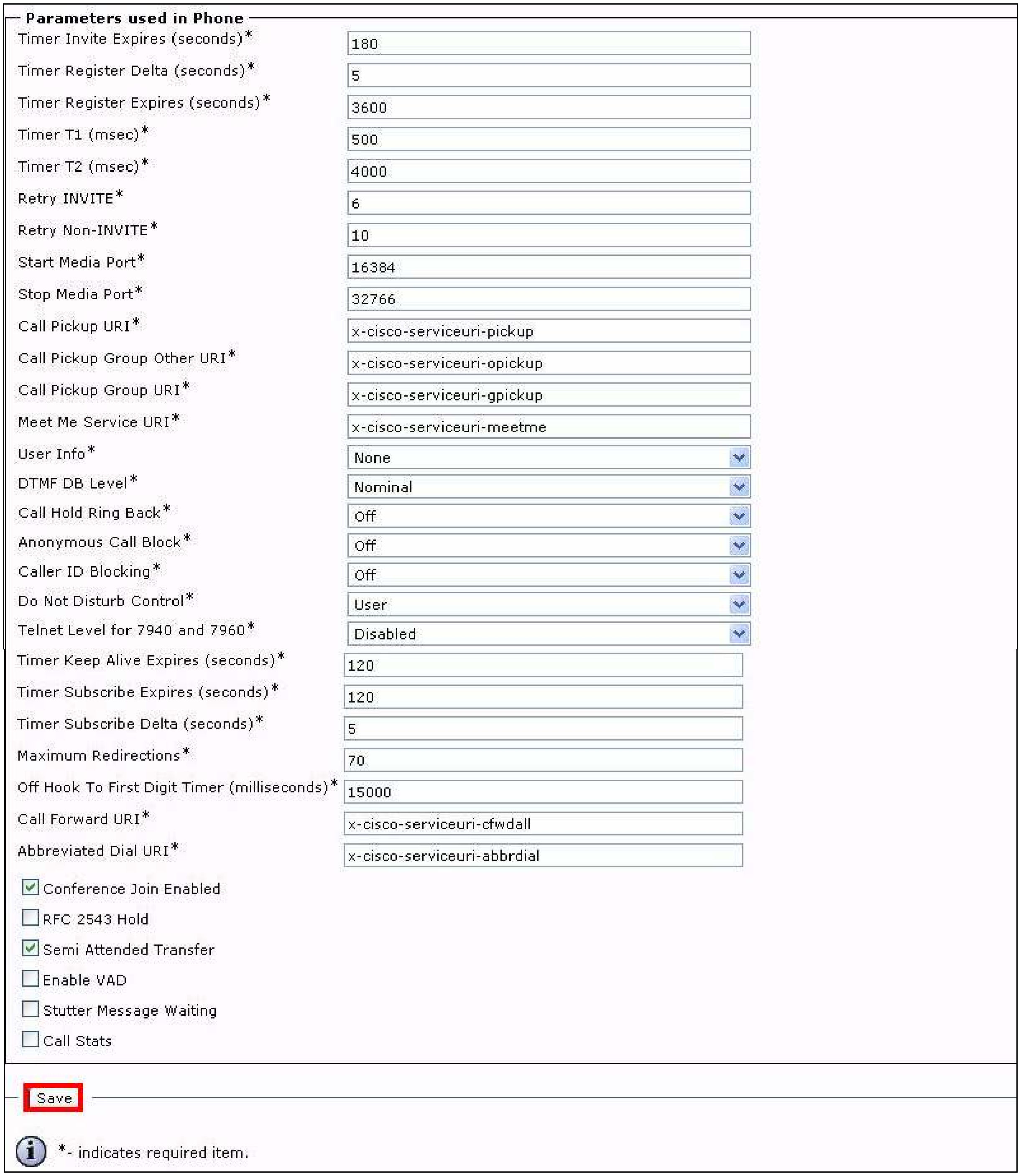
4.1. Configure Connectivity to Avaya SIP Enablement Services

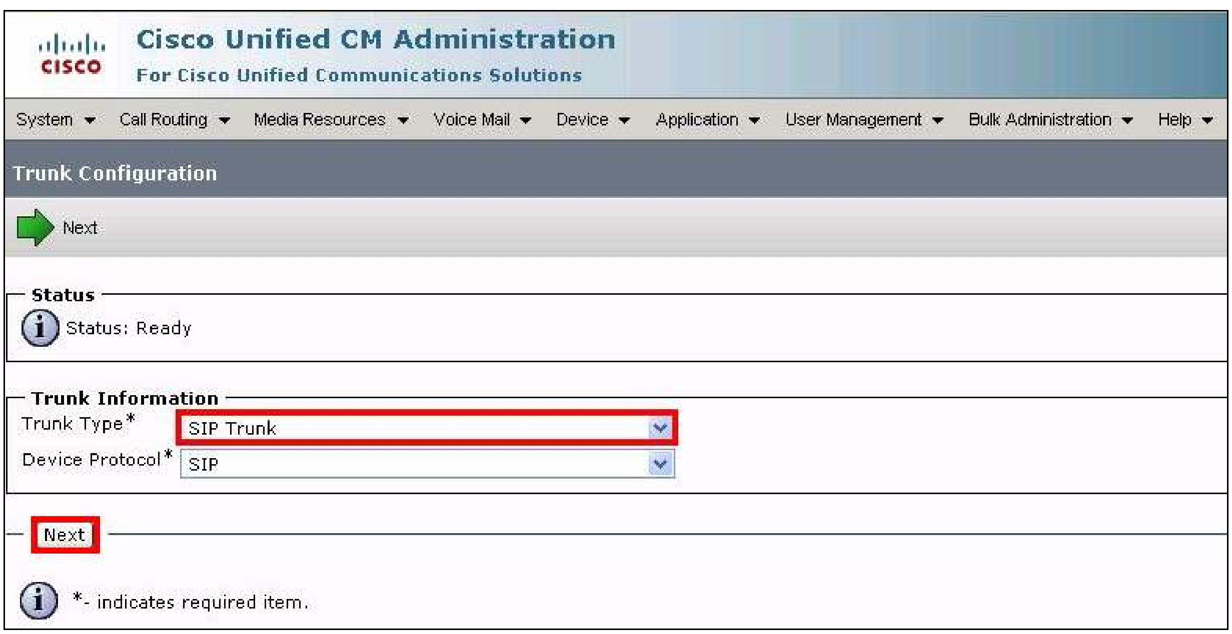
This section describes the steps for configuring SIP connectivity between Cisco UCM and Avaya CPM via Avaya SIP Enablement Services.

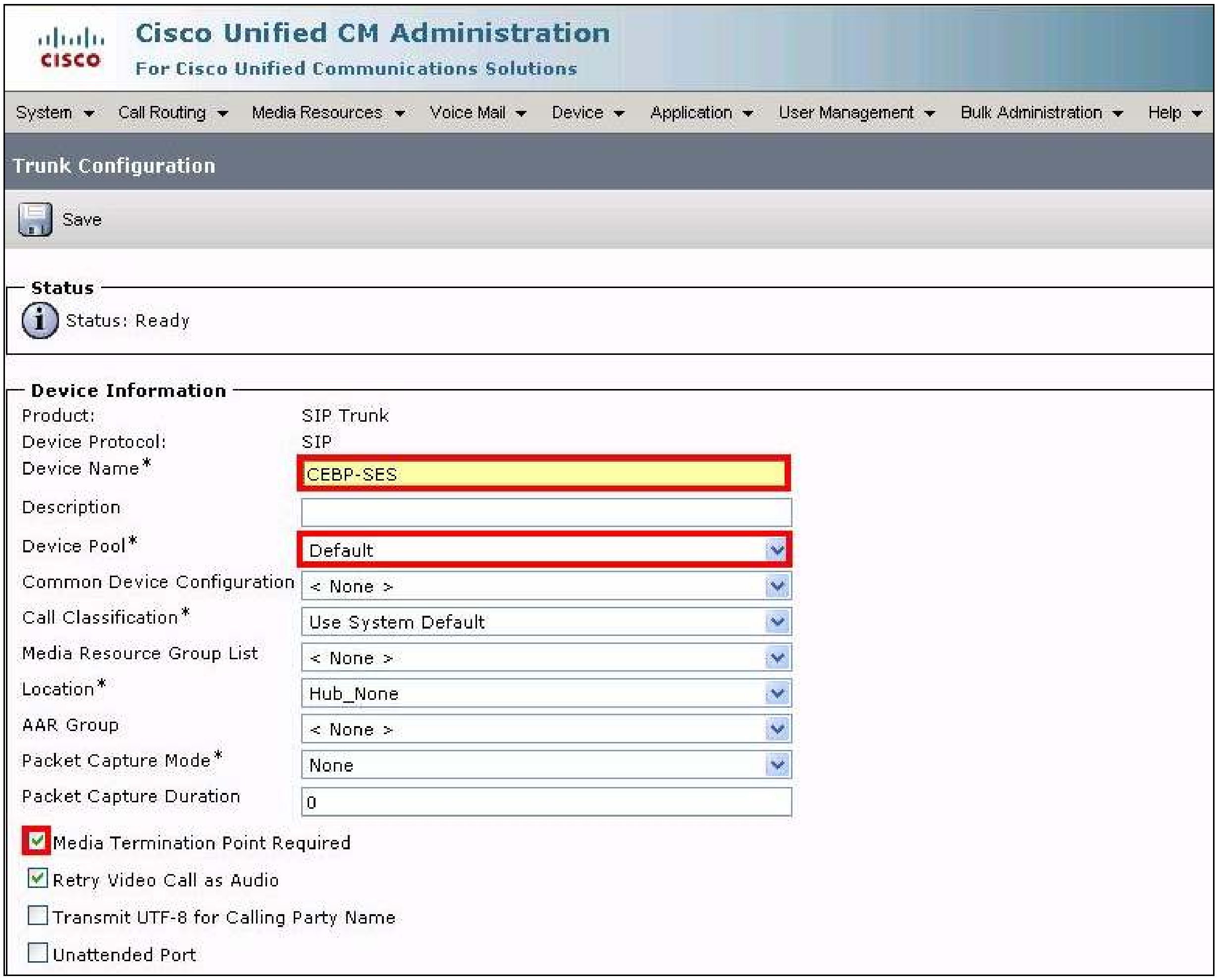
Step	Description
4.1.1	To enable SIP connectivity with Avaya CPM via Avaya SIP Enablement Services utilizing TCP, configure a **SIP Trunk Security Profile** as follows: • From the Cisco UCM main menu, select **System** ➔ **Security Profile** ➔ **SIP Trunk Security Profile**. • [*Not Shown*] *Click **Add New** to create a new **SIP Trunk Security Profile**.* • Provision settings as displayed and click **Save**. ***Note**: To enable SIP connectivity to with* Avaya CPM *via Avaya SIP Enablement Services utilizing UDP, set the **Outgoing Transport Type** field to UDP.* 

Step	Description
4.1.2a	To enable SIP connectivity with Avaya CPM via Avaya SIP Enablement Services, configure a **SIP Profile** as follows: • From the Cisco UCM main menu, select **Device** ➔ **Device Settings** ➔ **SIP Profile**. • [***Not Shown***] *Click **Add New** to create a new **SIP Profile**.* • Provision settings under **SIP Profile Information** as displayed and scroll down. 

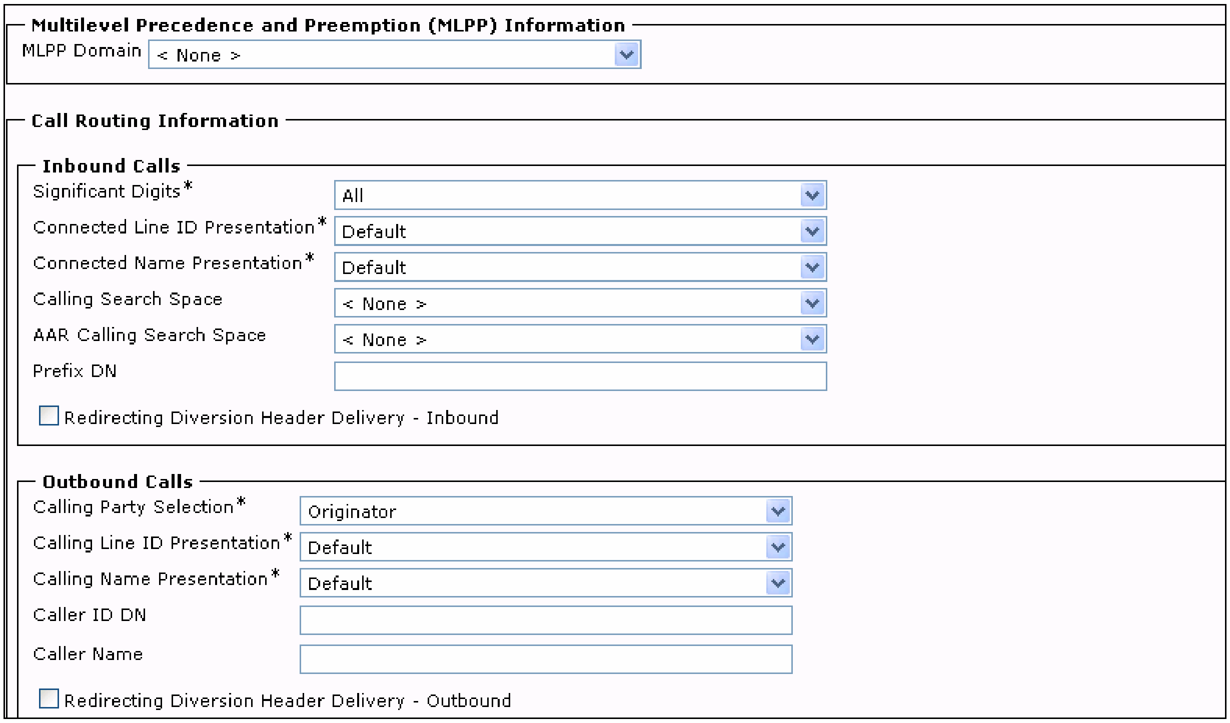
Step	Description
4.1.2b	Use default settings under **Parameters used in Phone** as displayed and click **Save**.

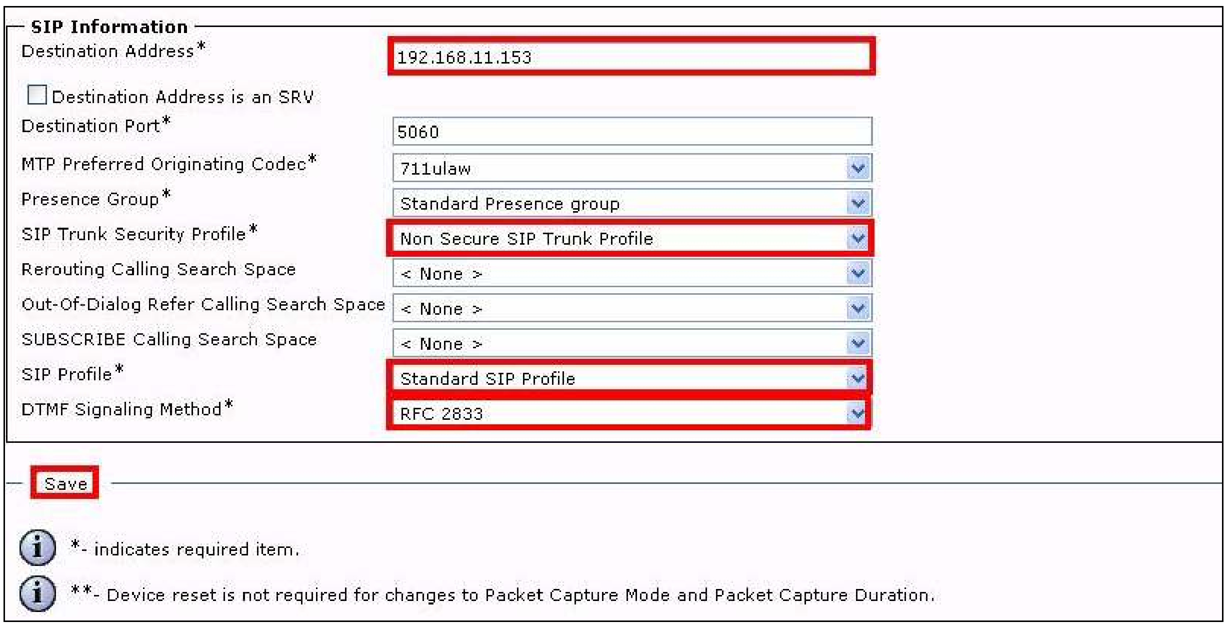


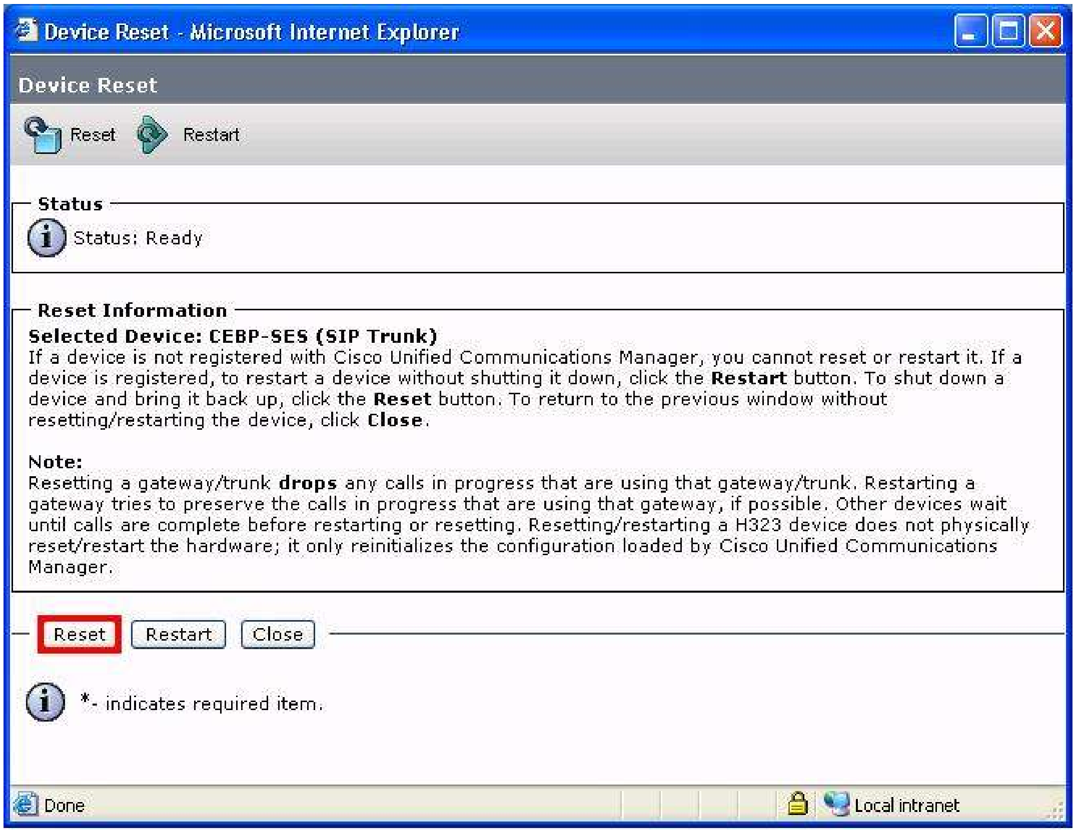
Step	Description
4.1.3	To enable SIP connectivity with Avaya CPM via Avaya SIP Enablement Services, configure a **SIP Trunk** as follows: • From the Cisco UCM main menu, select **Device** ➔ **Trunk**. • Click **Add New** to create a new **SIP Trunk**. 
4.1.4	Select **SIP Trunk** from the drop-down list for the **Trunk Type** field. Accept the default setting for the **Device Protocol** field and click **Next**. 

Step	Description
4.1.5a	Provision settings under **Device Information** as displayed and scroll down. The **Location** field specifies the total bandwidth that is available for calls between this location and the central location, or hub. Using the default setting **Hub_None** specifies unlimited available bandwidth. 

Step	Description
4.1.5b	Use default settings as displayed and scroll down.

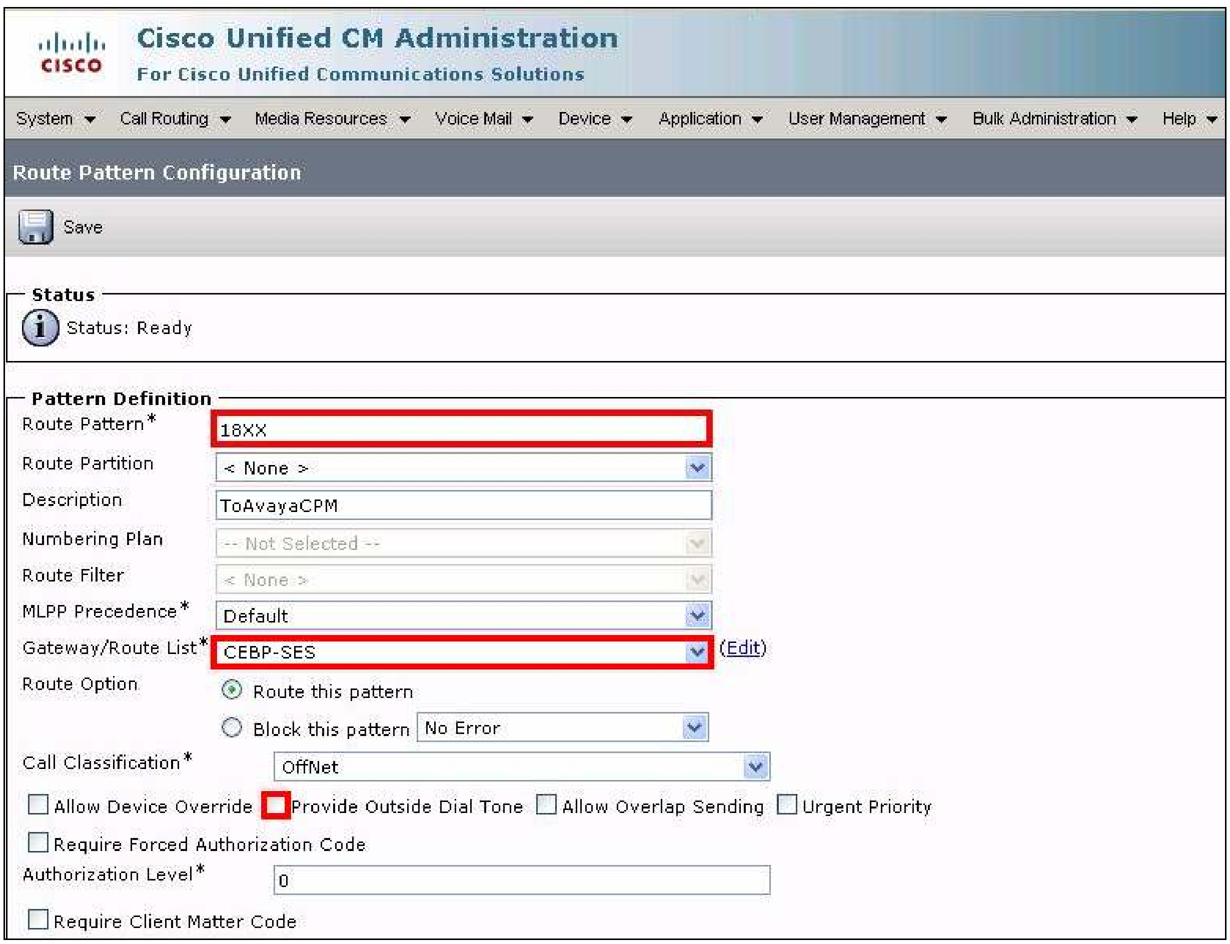


Step	Description
4.1.5c	Provision settings under **SIP Information** as displayed. • Enter the IP address of Avaya SIP Enablement Services in the **Destination Address** field. • Select the SIP Trunk Security Profile provisioned in **Step 4.1.1** from the drop-down list for the **SIP Trunk Security Profile** field. • Select the SIP Profile provisioned in **Step 4.1.2** from the drop-down list for the **SIP Profile** field. • Select **RFC 2833** from the drop-down list for the **DTMF Signaling Method** field. • Click **Save**. 
4.1.6	From the pop-up window, click **OK** and reset the trunk by clicking **Reset**,  [***Not Shown****, located at the bottom of the* ***SIP Trunk*** *page*]. 

Step	Description
4.1.7	From the pop-up window, click **Reset**. 

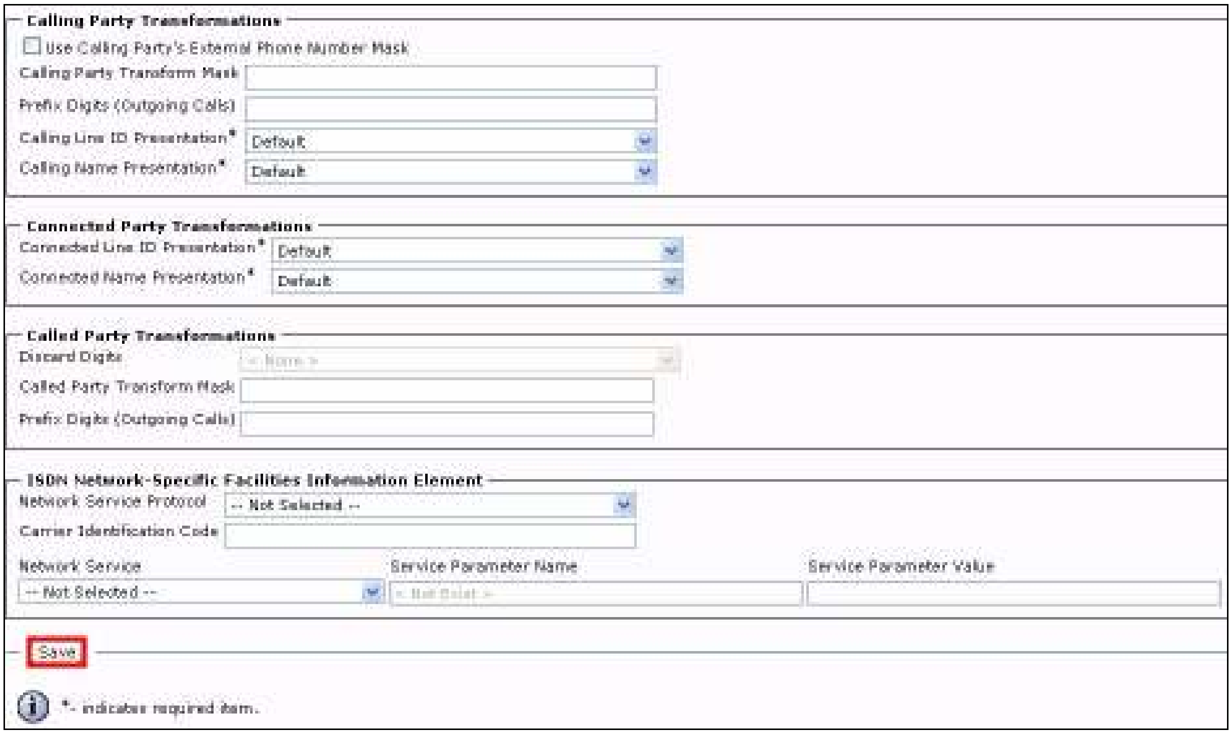
<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>4.1.8a</td><td>
To enable call routing from Cisco UCM to Avaya CPM utilizing the SIP trunk provisioned in the previous steps, configure a Route Pattern as follows:

- From the Cisco UCM main menu, select **Call Routing → Route/Hunt → Route Pattern**.
- [*Not Shown*] *Click **Add New** to create a new **Route Pattern**.*
- Provision settings under **Pattern Definition** as displayed and scroll down.
    - Enter a pattern in the **Route Pattern** field that corresponds to the Host Map provisioned on Avaya SIP Enablement Services in **Step 3.2.9**. Note that "**X**" is a wildcard and represents any digit 0 through 9.
    - Select the SIP trunk provisioned in **Steps 4.1.4 - 4.1.5** from the drop-down list for the **Gateway/Route List** field.
    - Verify that the **Provide Outside Dial Tone** field is not selected.

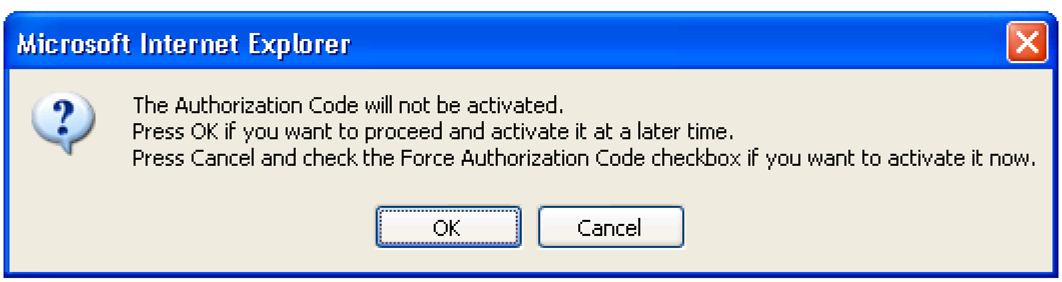


</td></tr>
</table>

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>4.1.8b</td><td>Use default settings as displayed and click Save.



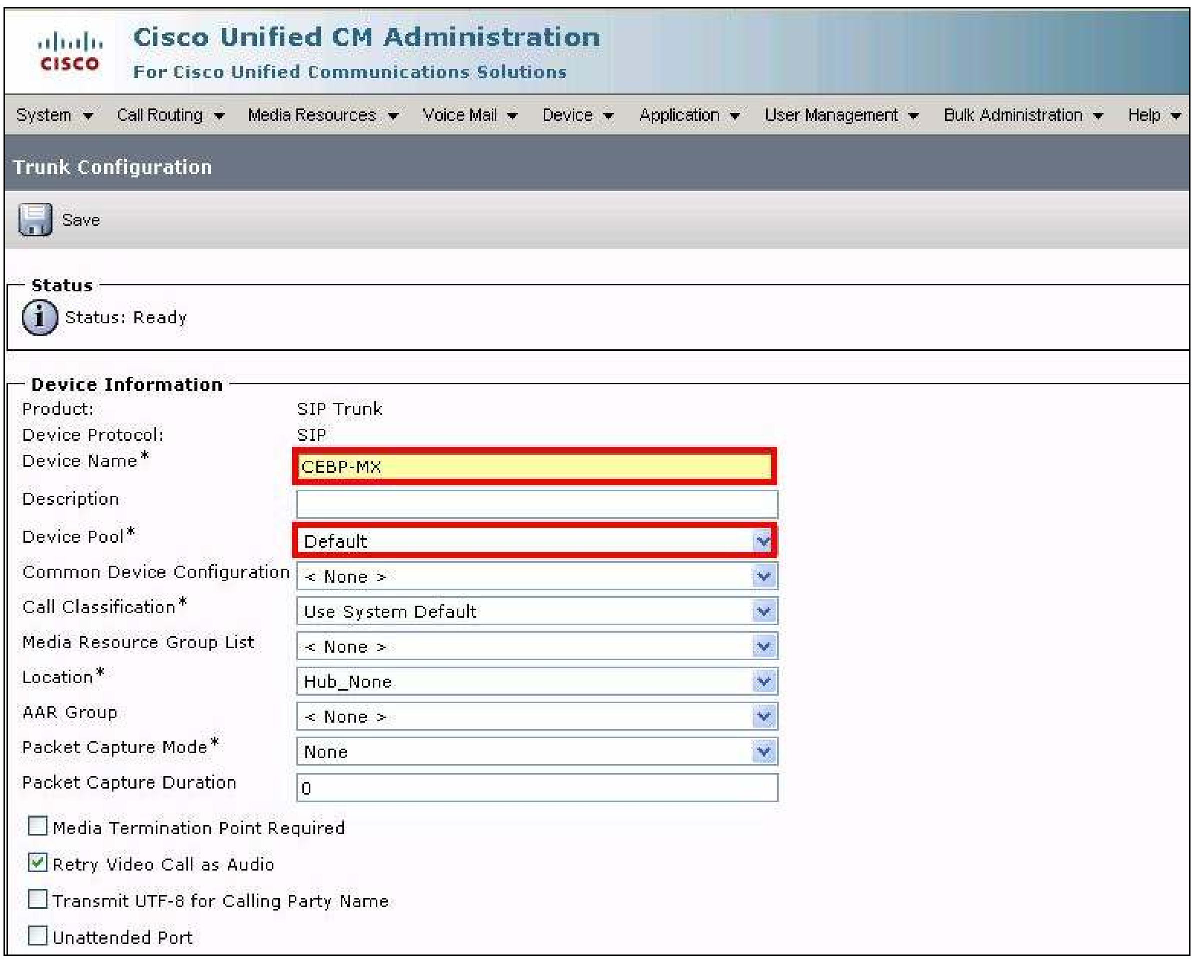
</td></tr>
<tr><td>4.1.9</td><td>The Require Forced Authorization Code option was not enabled in Step 4.1.8, click OK.



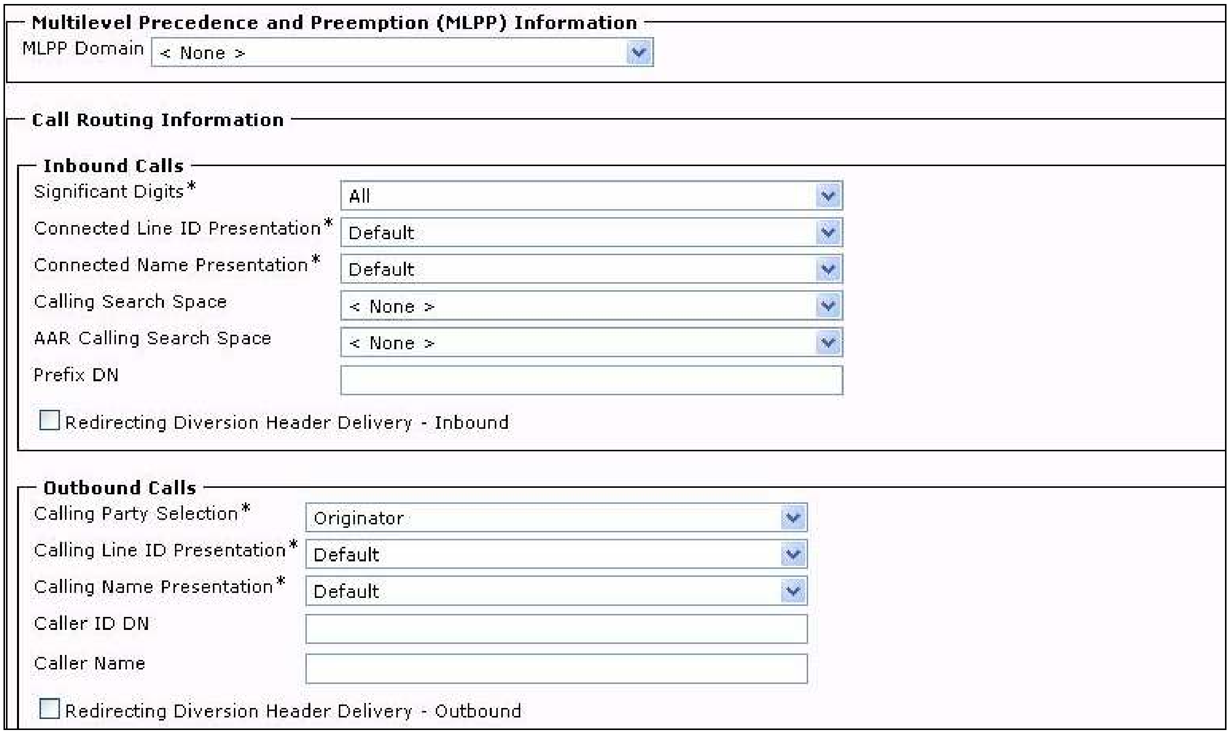
</td></tr>
</table>

4.2. Configure Connectivity to Avaya Meeting Exchange Express Edition

This section describes the steps for configuring SIP connectivity between Cisco UCM and Avaya Meeting Exchange. This configuration enables Cisco UCM to properly handle the web services that utilize the SIP REFER method to access Avaya Meeting Exchange.

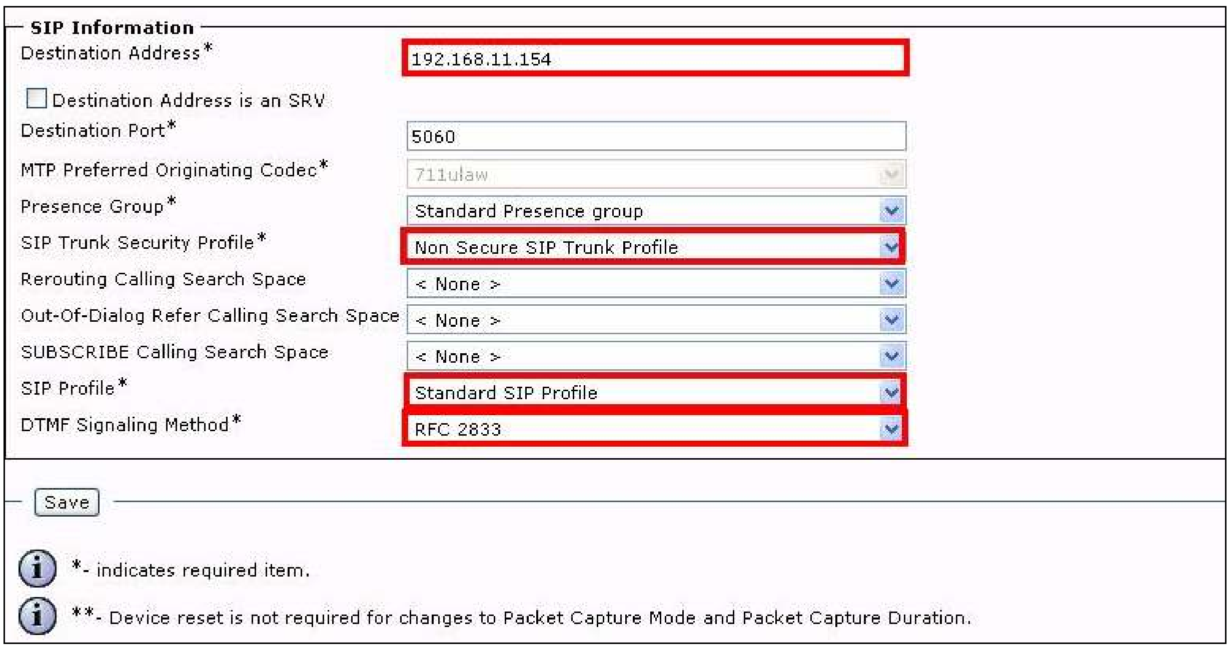
Step	Description
4.2.1	Repeat **Steps 4.1.3 - 4.1.4** to add a **SIP Trunk** that enables SIP connectivity with Avaya Meeting Exchange.
4.2.2a	Provision settings under **Device Information** as displayed and scroll down. The **Location** field specifies the total bandwidth that is available for calls between this location and the central location, or hub. Using the default setting **Hub_None** specifies unlimited available bandwidth. 

Step	Description
4.2.2b	Use default settings as displayed and scroll down.



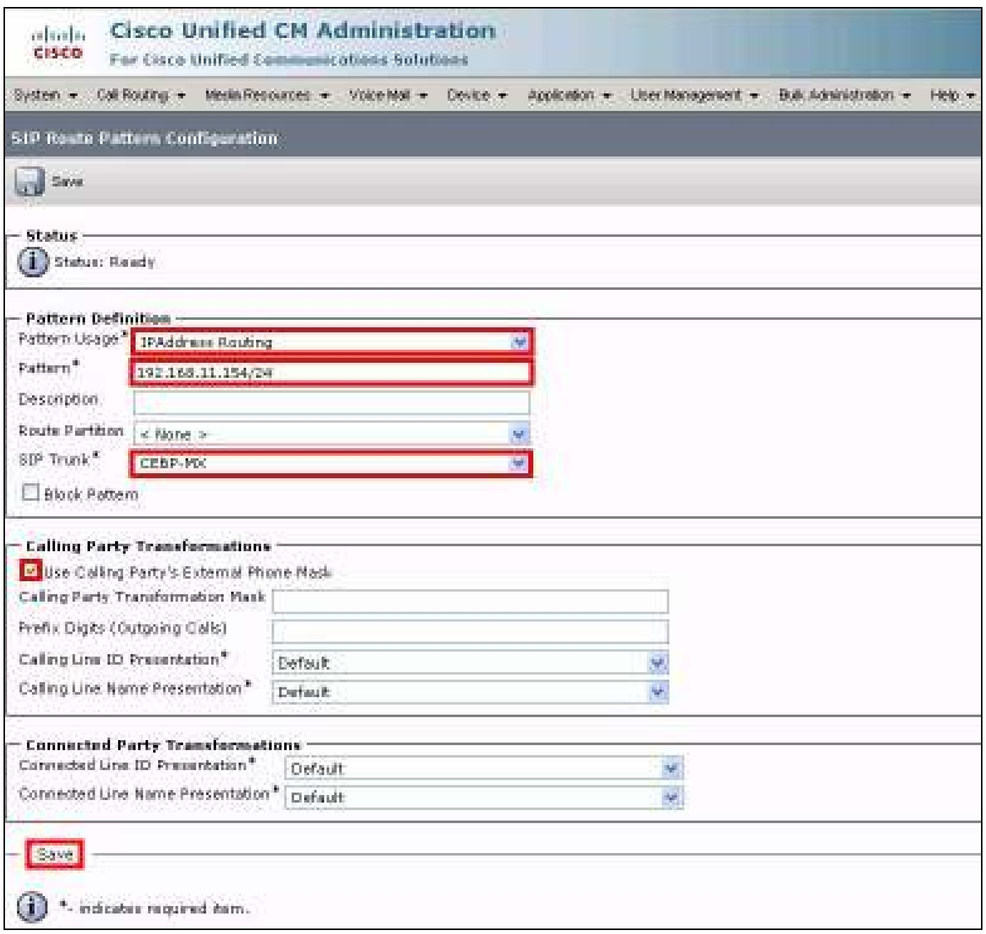
<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>4.2.2c</td><td>Provision settings under SIP Information as displayed.

Enter the IP address of Avaya SIP Enablement Services in the Destination Address field.
Select the SIP Trunk Security Profile provisioned in Step 4.1.1 from the drop-down list for the SIP Trunk Security Profile field.
Select the SIP Profile provisioned in Step 4.1.2 from the drop-down list for the SIP Profile field.
Select RFC 2833 from the drop-down list for the DTMF Signaling Method field.
Click Save.



</td></tr>
<tr><td>4.2.3</td><td>Repeat Steps 4.1.6 - 4.1.7 to Reset the trunk.</td></tr>
</table>

Step	Description
4.2.4	To enable call routing from Cisco UCM to Avaya Meeting Exchange utilizing the SIP trunk provisioned in the previous steps, configure a **Route Pattern** as follows: • From the Cisco UCM main menu, select **Call Routing → SIP Route Pattern**. • [***Not Shown***] *Click* ***Add New*** *to create a new* ***SIP Route Pattern***. • Provision settings under **Pattern Definition** as displayed. o Select the appropriate routing choice from the drop-down list for the **Pattern Usage** field. o Enter the IP address of Avaya Meeting Exchange in Classless Inter-Domain Routing (CIDR) notation in the **Pattern** field. o Select the SIP trunk provisioned in **Steps 4.2.1 - 4.2.2** from the drop-down list for the **SIP Trunk** field. o To enable the full, external phone number to be used for calling line identification (CLID) on outgoing calls, select the **Use Calling Party's External Phone Mask** field. • Click **Save**.



5. Interoperability Testing

5.1. General Test Approach

The general test approach was to place calls between endpoints registered to Cisco UCM and Avaya CPM, utilizing the sample configuration displayed in **Figure 1**.
The main objectives were to verify the following:

- Web services offered by Avaya CPM to endpoints registered to Cisco UCM via Avaya SIP Enablement Services:
  - Advisory
  - Find and Call
  - Notify and Response
  - Notify and Conference
- Dial-in services from endpoints registered to Cisco UCM to Avaya CPM via Avaya SIP Enablement Services
- Record/Playback of messages from endpoints registered to Cisco UCM
- Transport methods for signaling between Avaya CPM and Cisco UCM via Avaya SIP Enablement Services:
  - SIP/TCP
  - SIP/UDP
- Transport methods for media between Avaya CPM and Cisco UCM:
  - RTP/UDP
- Codecs:
  - G711MU
- Voice quality, verified subjectively from endpoints registered to Cisco UCM
- 3pcc Call Establishment as defined by RFC 3725:
  - Flow 1
- DTMF transmission as defined by RFC 2833

5.2. Test Results

All test cases, as defined by the general test approach, passed.

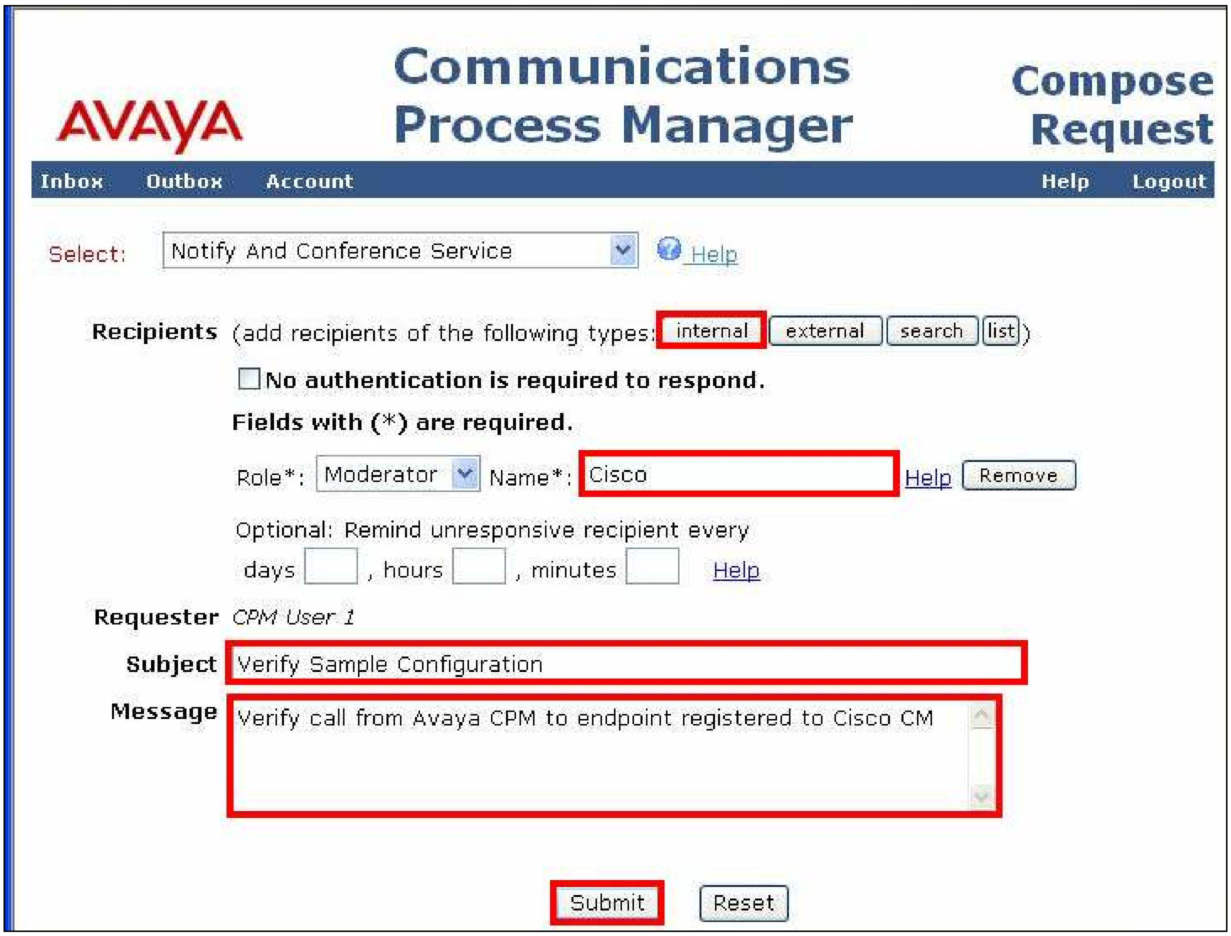
6. Verification Steps

The following steps were used to verify the administrative steps presented in these Application Notes and are applicable for similar configurations in the field.

Step	Description
6.1.1	Validate signaling and media connectivity for call origination from Avaya CPM to Cisco UCM. This is accomplished by verifying that the SIP trunks provisioned in **Section 4** are utilized when a web service to endpoint(s) registered to Cisco UCM is initiated. To verify that both trunks are operational, a web service that utilizes the SIP REFER method is initiated as displayed. • From a sample account accessed via the Avaya CPM Web Portal, click **Outbox**. • Select **Notify And Conference Service** from the drop-down list for the **Select** field. 

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>6.1.2</td><td>Initiate the Notify And Conference Service to an endpoint registered to Cisco UCM. For this sample configuration the endpoint provisioned in Step 3.1.8 is selected as displayed.

To display the Role and Name fields, click internal.
Enter the name of the endpoint provisioned in Step 3.1.8 in the Name field.
Enter descriptive test in the Subject and Message fields.
Click Submit.

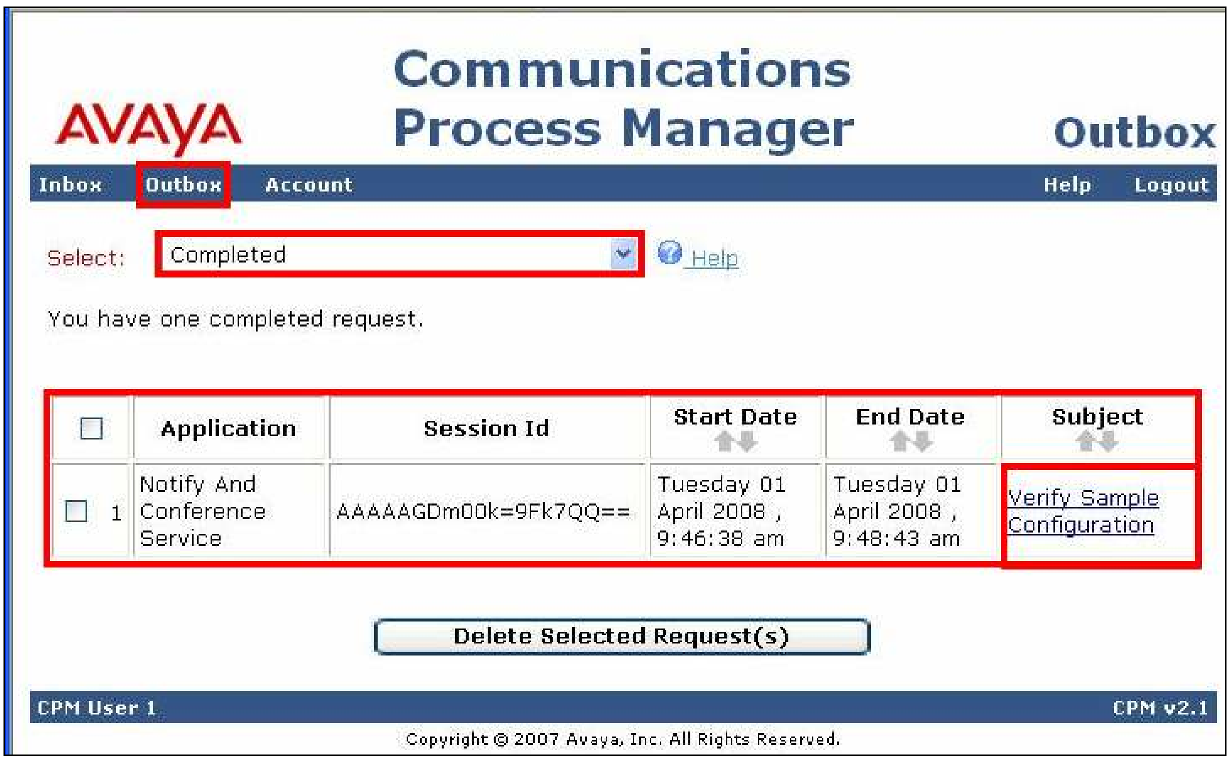


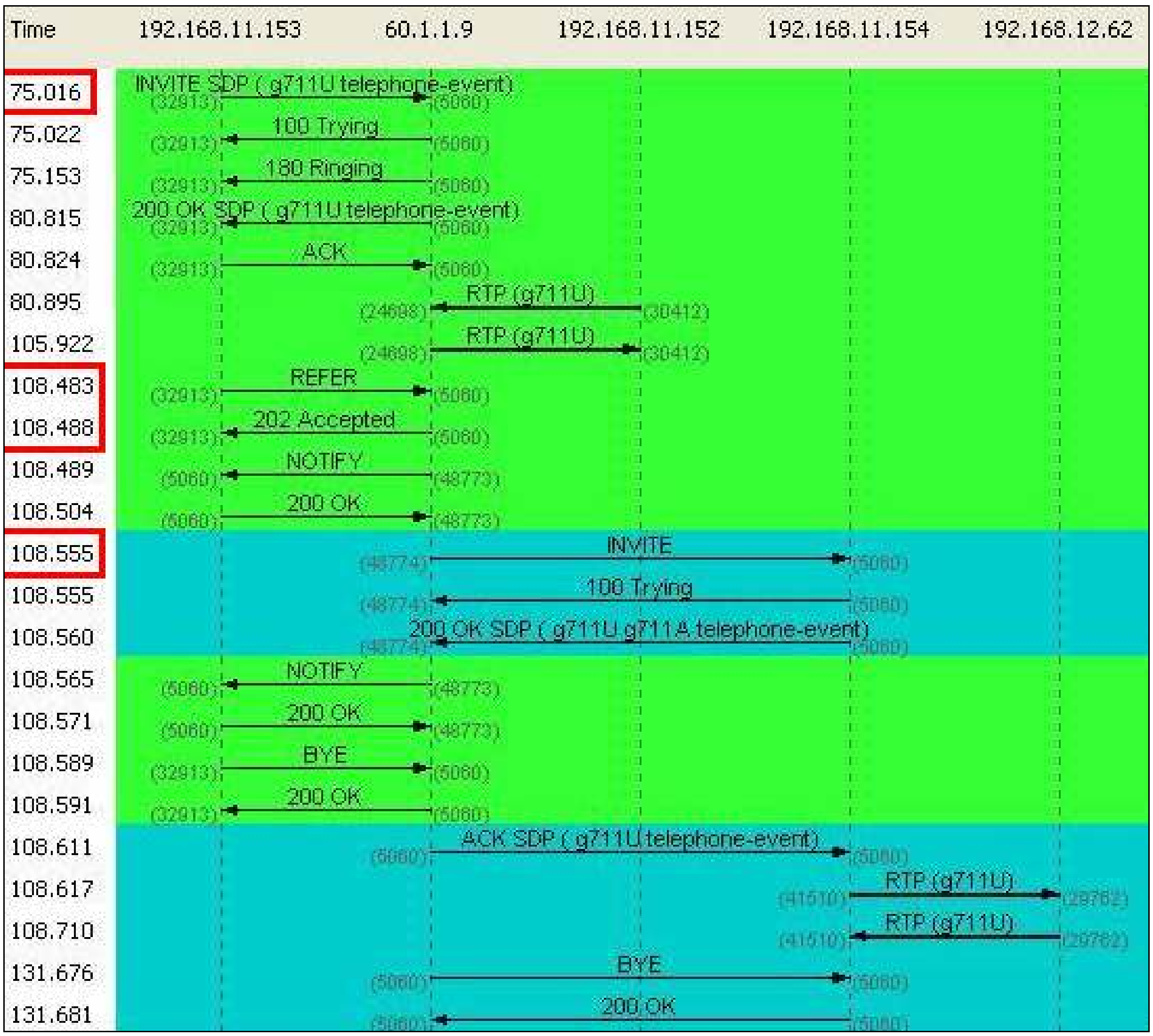
</td></tr>
</table>

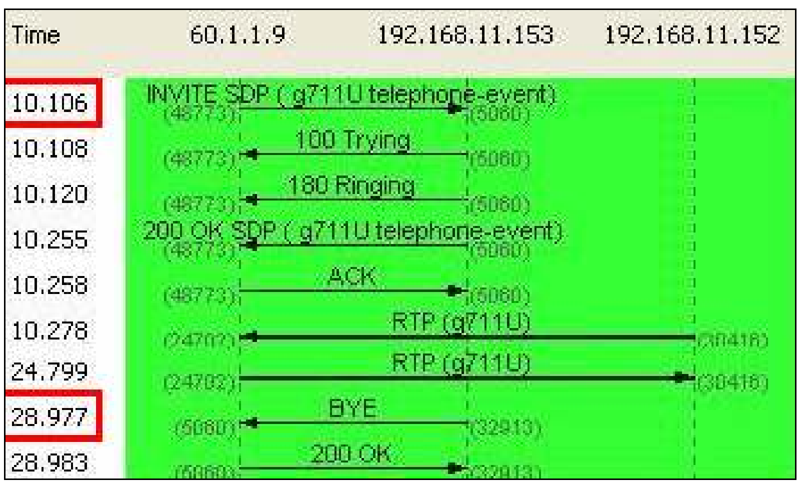
Step	Description

6.1.3	Verify the following:
	• The endpoint selected in **Step 6.1.2** rings.
	• The account where the **Notify And Conference Service** was initiated is updated as displayed.
	  o From the sample account where the **Notify And Conference Service** was initiated, click **Outbox**.
	  o Select **Pending** from the drop-down list for the **Select** field.
	  o Verify the **Notify And Conference Service** is listed.
	

Step	Description

6.1.4	Answer the call from Avaya CPM and verify the following:
	• The endpoint receives prompts from Avaya CPM.
	• The endpoint can enter appropriate responses (via DTMF) to navigate through the **Notify And Conference Service**.
	    o The endpoint is placed in conference and has media connectivity with Avaya Meeting Exchange.
	    o The endpoint can terminate the call by going on-hook or by entering the appropriate response (via DTMF).
	• Avaya CPM moves the **Notify And Conference Service** from Pending to Completed.
	    o From the sample account where the **Notify And Conference Service** was initiated, click **Outbox**.
	    o Select **Completed** from the drop-down list for the **Select** field.
	    o Verify the **Notify And Conference Service** is listed.
	

Step	Description
6.1.5	Below is a SIP call flow of the **Notify And Conference Service** initiated in **Steps 6.1.1 - 6.1.4**. This trace is intended display the provisioning presented in these Application Notes and may be used for verification purposes. • Avaya SIP Enablement Services (**192.168.11.153**) sends a SIP INVITE to Cisco UCM (**60.1.1.9**) at Time **75.016**. • Avaya SIP Enablement Services (**192.168.11.153**) sends a SIP REFER to Cisco UCM (**60.1.1.9**) at Time **108.483**. • Cisco UCM accepts the REFER at Time **108.488** and sends and INVITE to Avaya Meeting Exchange (**192.168.11.154**) at Time **108.555**. 

Step	Description
6.1.6	Validate signaling and media connectivity for call origination from Cisco UCM to Avaya Meeting Exchange. This is accomplished by verifying that the SIP trunk provisioned in **Section 4.1** is utilized when a call from an endpoint registered to Cisco UCM dials in to Avaya CPM. From an endpoint registered to Cisco UCM, dial **1800** to initiate dial-in services and verify the following: • The endpoint receives prompts from Avaya CPM. • The endpoint can enter appropriate responses (via DTMF) to navigate through the dial-in service. • The call terminates automatically if there are no pending requests. Below is a SIP call flow of the dial-in service. This trace is intended display the provisioning presented in these Application Notes and may be used for verification purposes. • Cisco UCM (**60.1.1.9**) sends a SIP INVITE to Avaya SIP Enablement Services (**192.168.11.153**)at Time **10.106**. • Avaya SIP Enablement Services (**192.168.11.153**) sends a BYE to Cisco UCM (**60.1.1.9**) at Time **28.977**. 

7. Conclusion

These Application Notes present a sample configuration comprised of Avaya Communications Process Manager (CPM) and Cisco Unified Communications Manager (UCM) via Avaya SIP Enablement Services. Employing this configuration enables call origination/termination between endpoints registered to Cisco UCM and Avaya CPM, where the signaling is SIP and the media is Real-time Transport Protocol (RTP). This configuration integrates endpoints registered to Cisco UCM with web services for business applications offered by Avaya CPM to provide a solution for Avaya Communications Enabled Business Processes (CEBP).

8. Additional References

Avaya references are available at http://support.avaya.com.

[1] Communications Process Manager Installation and Configuration Guide, Issue 3, Doc ID 04-601158, December 2007.

[2] Communications Process Manager Administration and Maintenance Guide, Issue 5, Doc ID 04-601159, December 2007.

Cisco references are available at http://www.cisco.com.

[3] Cisco Unified Communications Manager Administration Guide Release 6.0(1), Document #: OL-12525-01.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Solution & Interoperability Test Lab at interoplabnotes@list.avaya.com