



Configuring Alternate Route Selection in Avaya IP Office to Support Failover of SIP Voice Services with ISDN-PRI and Analog Trunks – Issue 1.0

Abstract

These Application Notes describe the procedures required for configuring the Avaya IP Office for Alternate Route Selection to provide redundancy for voice services. The Alternate Route Selection (ARS) feature in the Avaya IP Office provides call routing facilitated by short codes and alternative routing measures for outgoing calls during network failure.

The ARS feature was implemented in firmware release 4.0 and above for Avaya IP Office and replaces the Least Cost Routing feature used in previous releases. These Application Notes will also encompass administration tasks for Avaya SIP Enablement Services related to the configuration of Avaya IP Office.

1. Introduction

These Application Notes describe the procedures required for configuring the Avaya IP Office for Alternate Route Selection to provide redundancy for voice services. The Alternate Route Selection (ARS) feature in the Avaya IP Office provides call routing facilitated by short codes and alternative routing measures for outgoing calls during network failure. The ARS feature was implemented in releases 4.0 and above for Avaya IP Office and replaces the Least Cost Routing feature used in previous releases of Avaya IP Office.

When the dialed digits match a specific short code configured on the Avaya IP Office, the short code routes the outgoing call to the ARS configuration as the destination. The final routing of the outgoing call is controlled by the ARS configuration when triggered by the dialed digits based on the matching short code. If the initial ARS configuration is unavailable, an alternate ARS configuration is referenced to provide failover to the PSTN. The testing approach of these Application Notes is to confirm the failover capabilities of ARS for the Avaya IP Office 500 hosted at the Branch location using the simulated WAN and PSTN. For outgoing calls from the Avaya IP Office, if the SIP trunk is not seized within a specified time or is unavailable, the ARS configuration will activate the ISDN-PRI trunk as the first alternate route. If the ISDN-PRI trunk is not seized within a specified time or is unavailable, the ARS configuration will activate the analog trunk as the second alternate route.

Figure 1 illustrates the network environment used to verify these Application Notes. The Main location consists of Avaya S8710 Media Servers hosting Avaya Communication Manager with an Avaya G650 Media Gateway as well as Avaya SIP Enablement Services (SES) to provide functionality for SIP telephony. The Main location communicates with the Branch location through the WAN and has PSTN connectivity using ISDN-PRI facilities. The Branch location hosts an Avaya IP Office 500 and communicates with the Main location through the WAN and has PSTN connectivity using an ISDN-PRI facility and an analog trunk. Avaya Communication Manager and the Avaya IP Office 500 have SIP trunks connected to the Avaya SES Server hosted at the Main location for routing SIP proxy requests. The Main and Branch locations communicate through a Multi-Protocol Label Switched (MPLS) network simulating the WAN and basic telephony service is provided by a simulated PSTN environment.

With the exception of the components mentioned above, any configuration related to the underlying network infrastructure will not be covered. Also, these Application Notes provide a sample of the administrative tasks that can be performed by the ARS feature for the Avaya IP Office and does not cover all its features and capabilities. Please see **Section 8** of these Application Notes for additional references on configuration for Avaya IP Office.

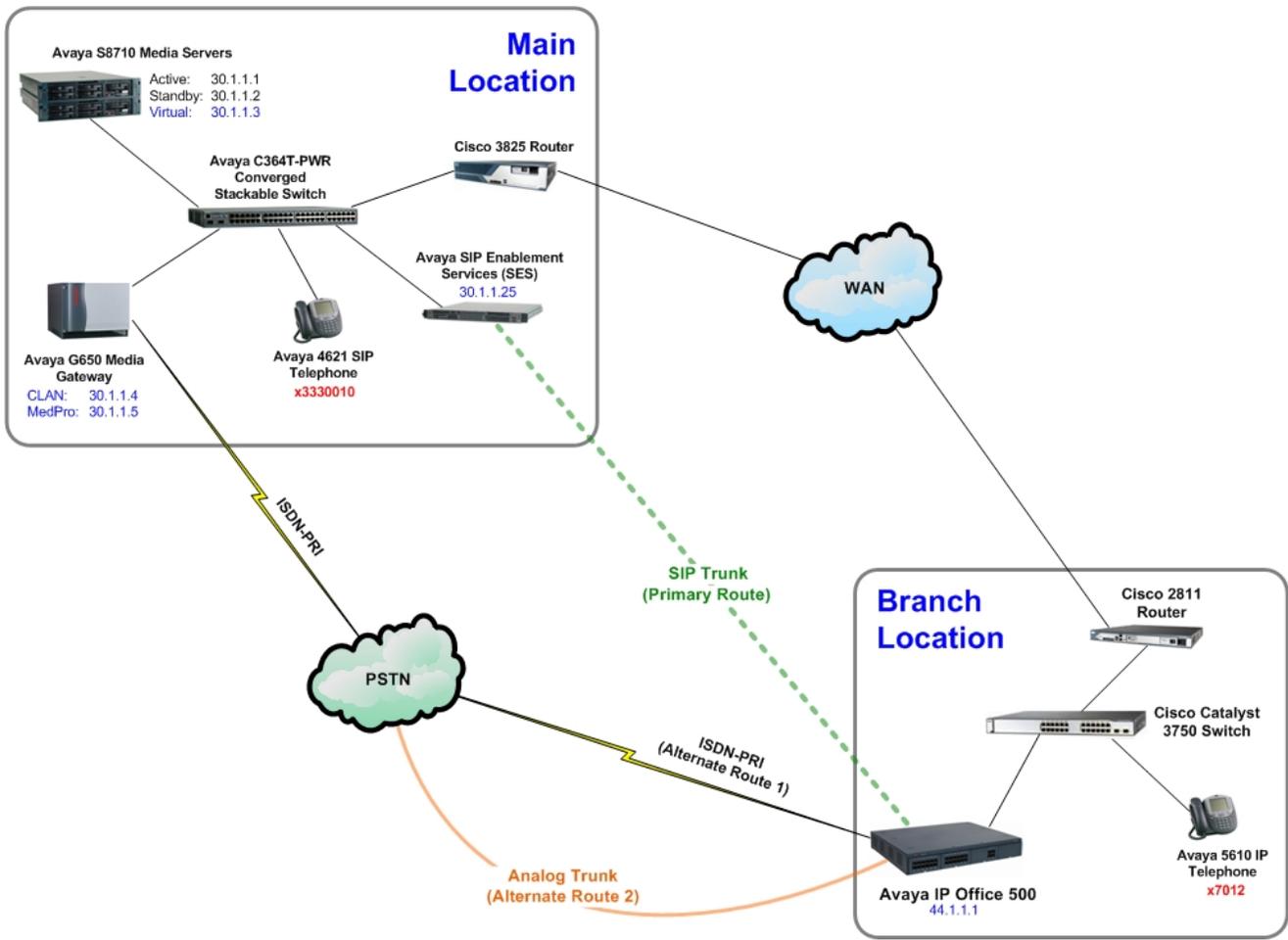


Figure 1: Network Configuration

2. Equipment and Software Validated

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

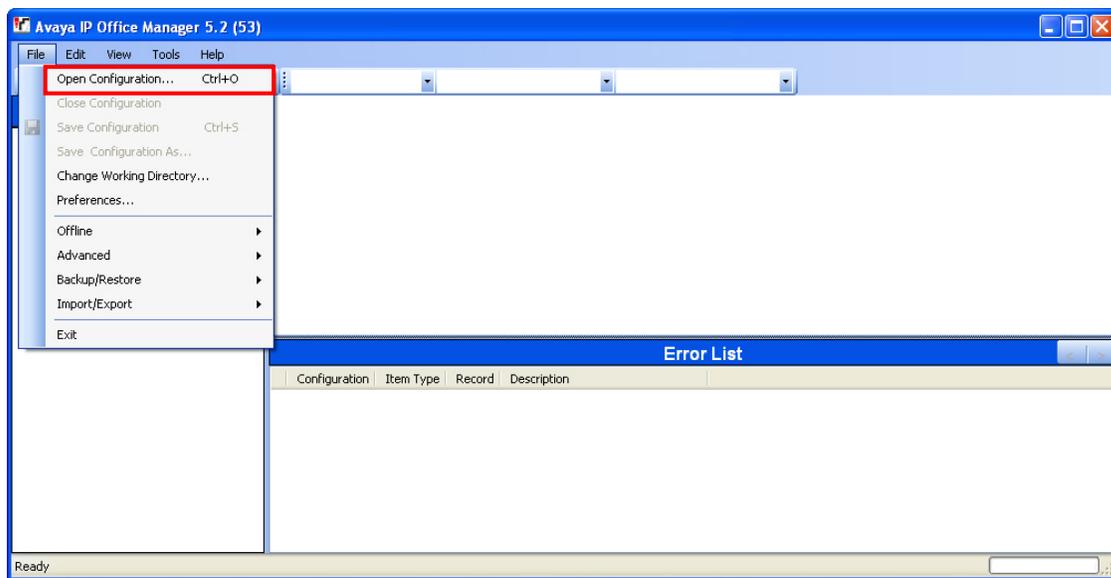
| Equipment | Software |
|--|--|
| Avaya IP Office 500 | 4.0(5) |
| Avaya S8710 Media Server (2) <ul style="list-style-type: none">• Avaya Communication Manager | 4.0 (R014x.00.0.730.5) |
| Avaya G650 Media Gateway <ul style="list-style-type: none">• C-LAN• MEDPRO | <ul style="list-style-type: none">• FW24 HW01• FW116 HW20 |
| Avaya SIP Enablement Services | 3.1.2(306) |
| Avaya C363T-PWR Converged Stackable Switch | 4.5.14 |
| Avaya 4621 IP Telephone | 2.7 |
| Avaya 5610 IP Telephone | 2.3 |
| Cisco Catalyst 3750 Switch | 12.4 |
| Cisco 3825 WAN Router | 12.4 |
| Cisco 2811 Access Router | 12.4 |

3. Configure the Avaya IP Office 500

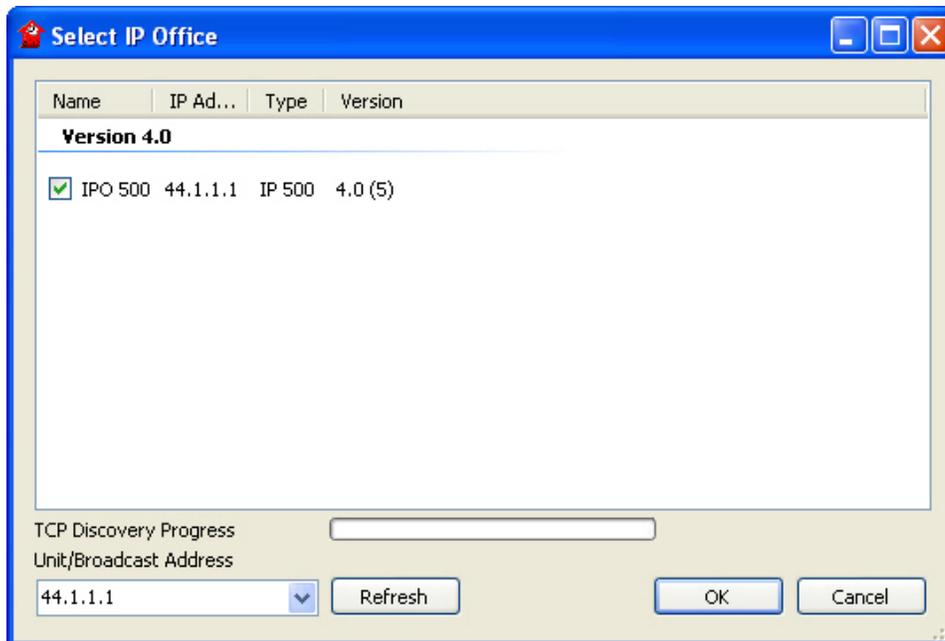
Listed below are the steps used to provision the Avaya IP Office 500 at the Branch location illustrated in **Figure 1**. The Avaya IP Office 500 will be configured for WAN and PSTN connectivity as well as enable the ARS feature to perform call redundancy for outbound calls. For brevity, this section will assume the reader of these Application Notes has a basic understanding of Avaya IP Telephony and will not cover details regarding the initial configuration for Avaya IP Office.

Note: These Application Notes cover implementing the ARS feature for redundancy of the Avaya IP Office only. See Section 8 for references on redundancy measures for Avaya Communication Manager.

1. Open the Avaya IP Office Manager application. From the Avaya IP Office Manager, select the **File** option from the top menu and scroll to the **Open Configuration...** selection. This will open a new window displaying the Avaya IP Office systems available to the Avaya IP Office Manager.



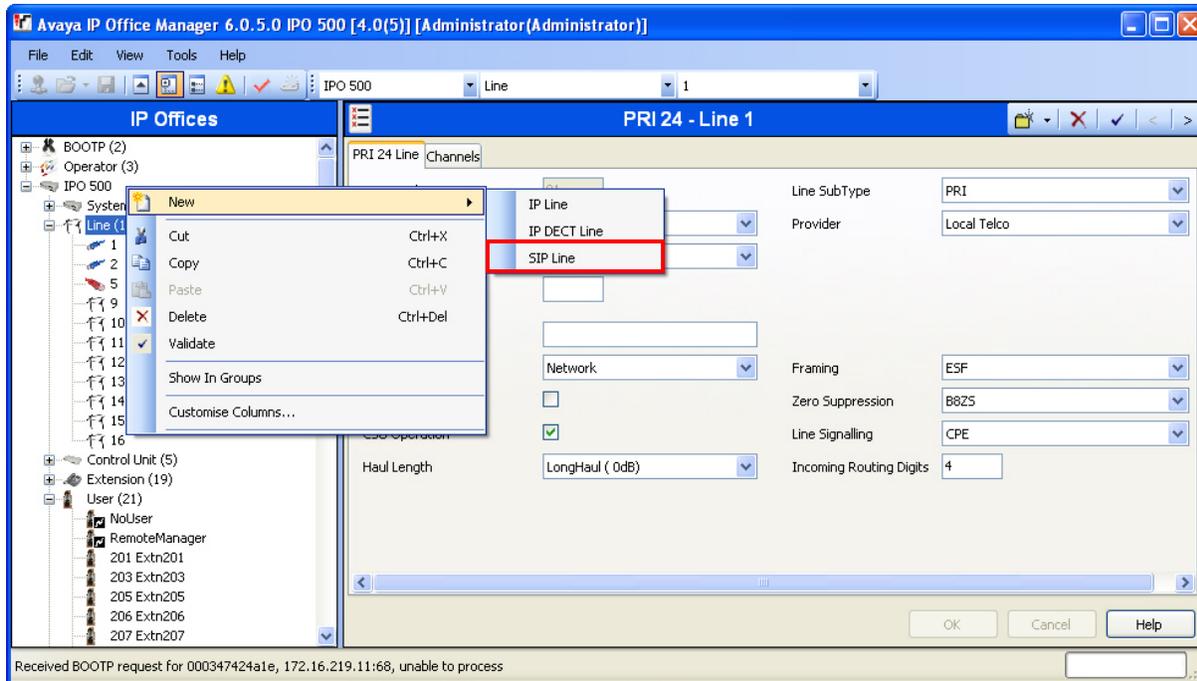
2. In the new window, mark the checkbox for the Avaya IP Office system slated for configuration. Click the **OK** button to display the authentication prompt for accessing the selected Avaya IP Office system.



3. Enter valid credentials at the Service User Login prompt. Click the **OK** button to display the opening page of the Avaya IP Office Manager application for the selected system.

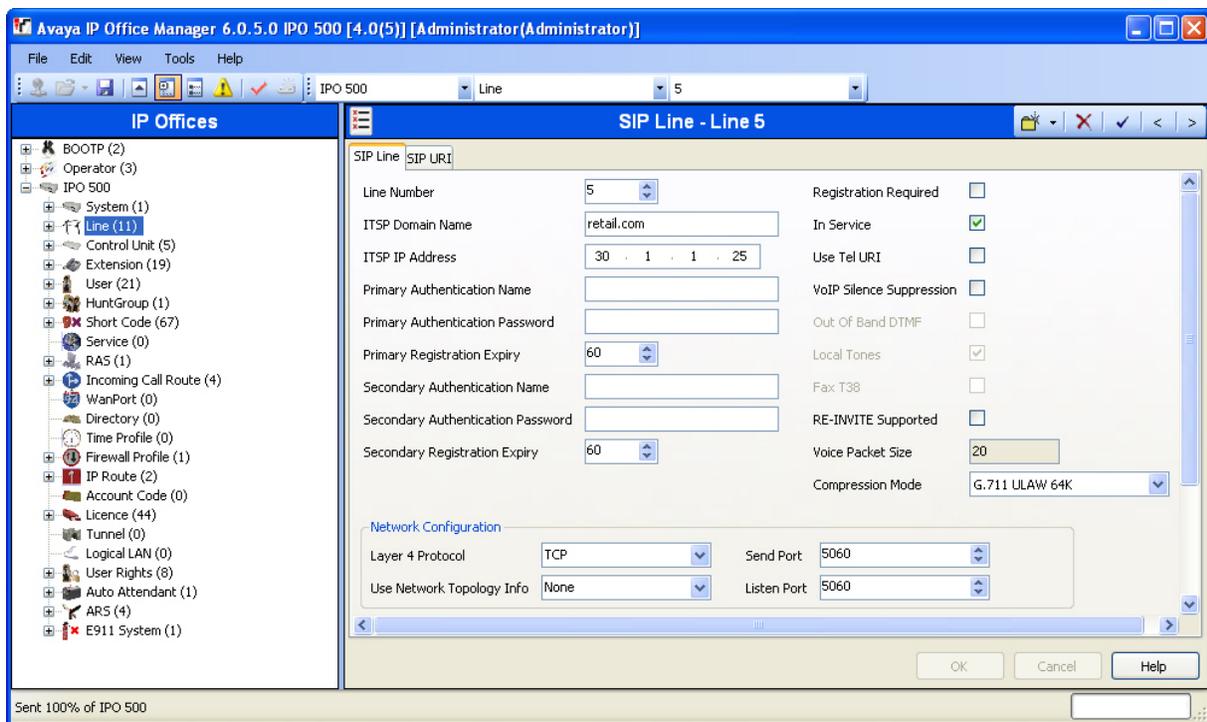


4. When the Avaya IP Office Manager opens, right-click on **Line** from the configuration list under the left window. Select **New > SIP Line** to open a new window for configuring the SIP trunk to the Avaya SES Server.



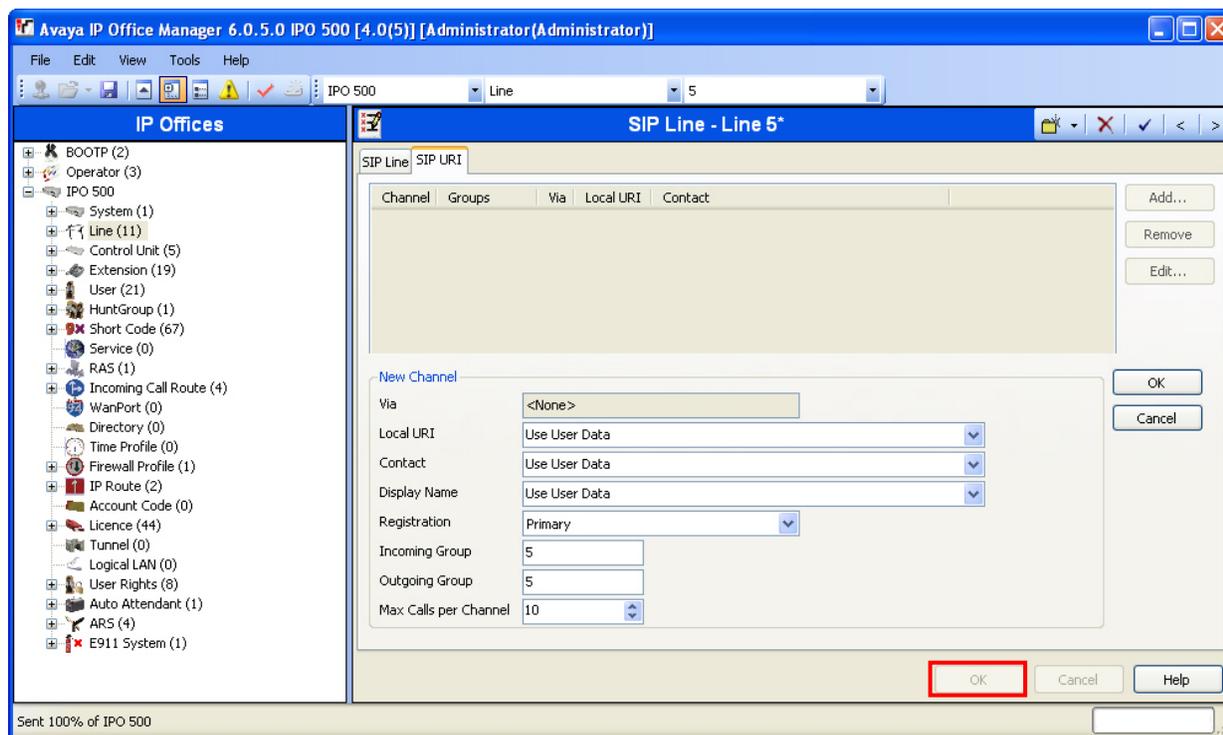
5. In the new window for the SIP Line, use the automatically assigned value or select a line number to identify the SIP trunk in the **Line Number** field. Enter the SIP URI (domain name) and IP address that will be used by the Avaya SES Server in the **ITSP Domain Name** and **ITSP IP Address** fields respectively. Mark the **In Service** checkbox to register this line number with the Avaya IP Office and place the SIP trunk in the operational state. Select the **G.711 ULAW 64K** option from the **Compression Mode** drop-down list to define the method of voice compression.

Under Network Configuration, select the **TCP** option from the **Layer 4 Protocol** drop-down list to define the transport method for the SIP trunk and select **None** from the **Use Network Topology Info** drop-down list. Enter **5060** as the port value for the **Send Port** (outgoing) and **Listen Port** (incoming) fields. Leave remaining parameters at the default settings and click the SIP URI tab to configure trunk channel properties.



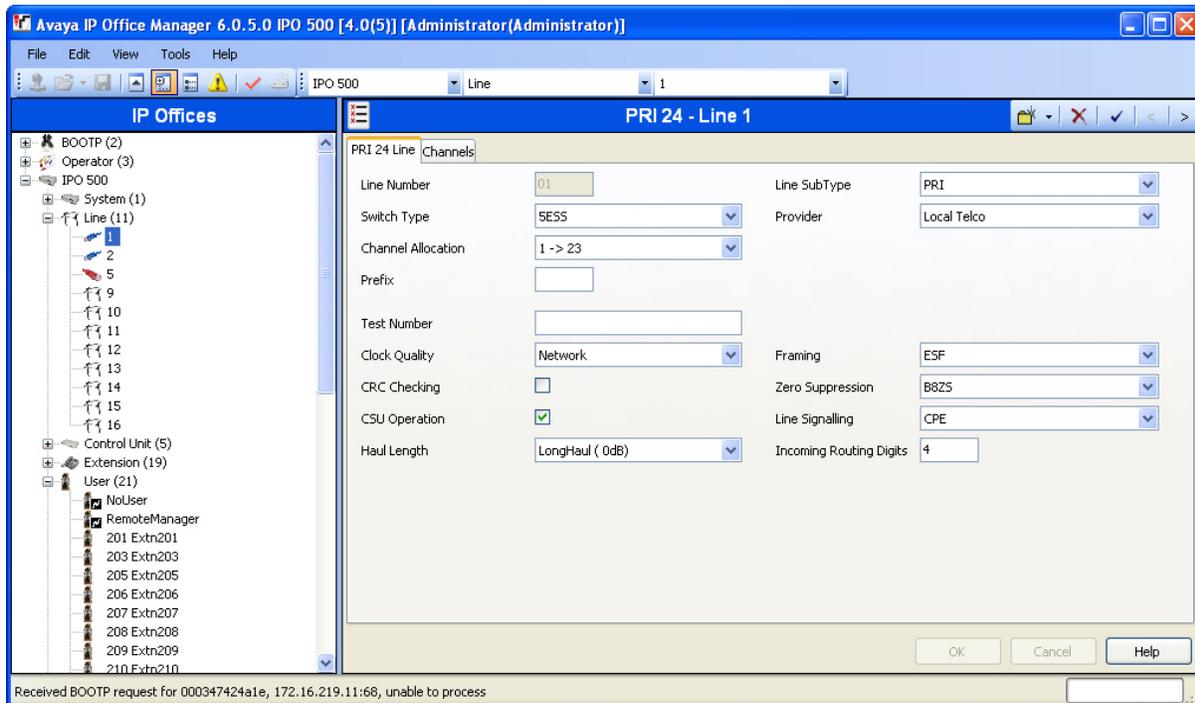
6. At the window for the SIP URI tab, click the **Add** button to open the New Channel window and configure channel properties for the SIP trunk. In the New Channel window, select **Use User Data** from the **Local URI**, **Contact** and **Display Name** drop-down lists to apply values on a per-user basis when making calls that seize the SIP trunk.

Enter the line number identified in the previous step in the **Incoming Group** and **Outgoing Group** fields to reference the new channel. Leave the remaining parameters at the default setting and click the **OK** button in the New Channel window. Click the **OK** button to submit the line form for the configured SIP trunk.



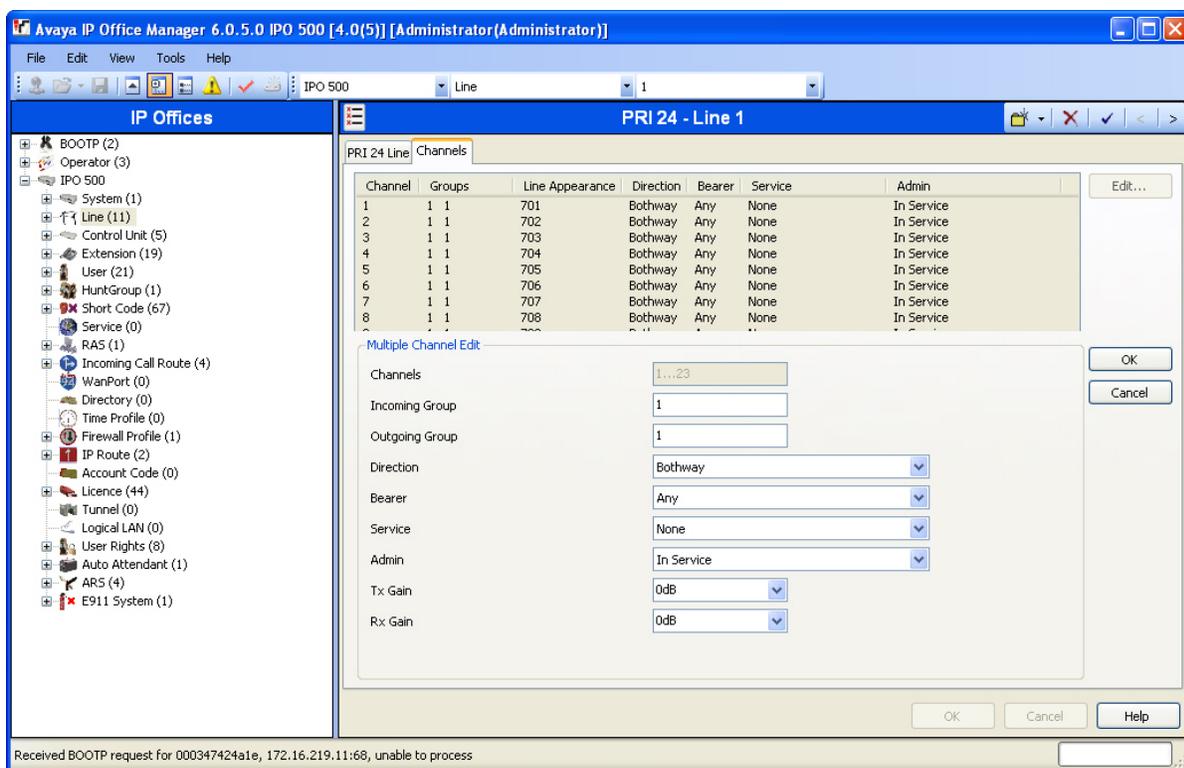
7. From the Avaya IP Office Manager, right-click on **Line** from the configuration list under the left window. Select an available line denoted by the  icon to open the window for configuring an ISDN-PRI trunk to the PSTN. Select the **PRI** option from the **Line SubType** drop-down list to enable T1 ISDN operation and select **SESS** from the **Switch Type** drop-down list to define the ISDN switch version. Select **Network** from the **Clock Quality** drop-down list to define clock source for line synchronization and select the **ESF** option from the **Framing** drop-down list to define the framing type.

From the **Zero Suppression** drop-down list, select **B8ZS** and select **CPE** (Customer Premise Equipment) from the **Line Signaling** drop-down list. (Optional) Mark the checkbox for **CSU Operation** and select a desired line length from the **Haul Length** drop-down list. Leave remaining parameters at the default settings and click the Channel tab to configure ISDN-PRI channel properties.

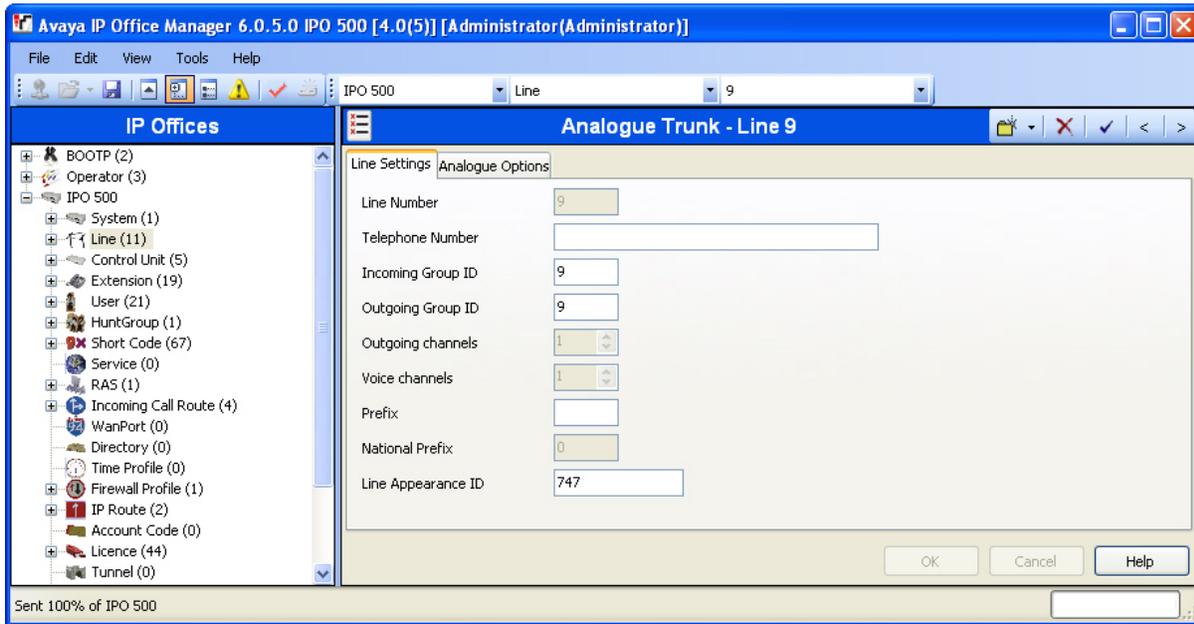


8. At the window for the Channel tab, hold the Shift key and highlight the desired number of channels belonging to the ISDN-PRI trunk. Click the **Edit** button to open the Multiple Channel Edit window to configure channel properties for the ISDN-PRI trunk. In the Multiple Channel Edit window, enter the line number identified in the previous step in the **Incoming Group** and **Outgoing Group** fields to reference the multiple channels selected. Select the **Bothway** option from the **Direction** drop-down list and select the **Any** option from the **Bearer** drop-down list to define the traffic type.

From the **Service** drop-down list, select **None** and select the **In Service** option from the **Admin** drop-down list to enable operational status for the highlighted channels. Leave the remaining parameters at the default setting and click the **OK** button in the Multiple Channel Edit window. Click the **OK** button to submit the line form for the configured ISDN-PRI trunk.

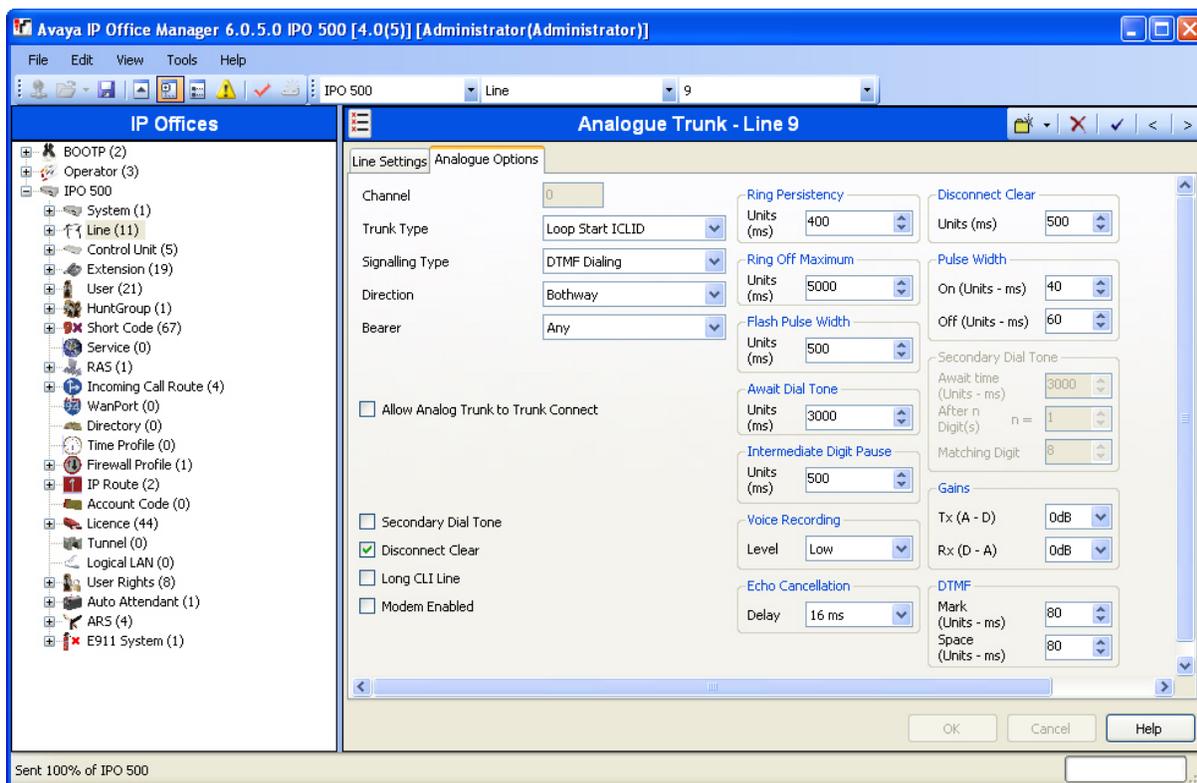


9. From the Avaya IP Office Manager, right-click on **Line** from the configuration list under the left window. Select an available physical analog port in the Avaya IP Office to open the window for configuring an analog trunk to the PSTN. Enter an available line number in the **Incoming Group** and **Outgoing Group** fields to identify the analog trunk. Leave remaining parameters at the default settings and click the **Analogue Options** tab to configure line parameters for the analog trunk.

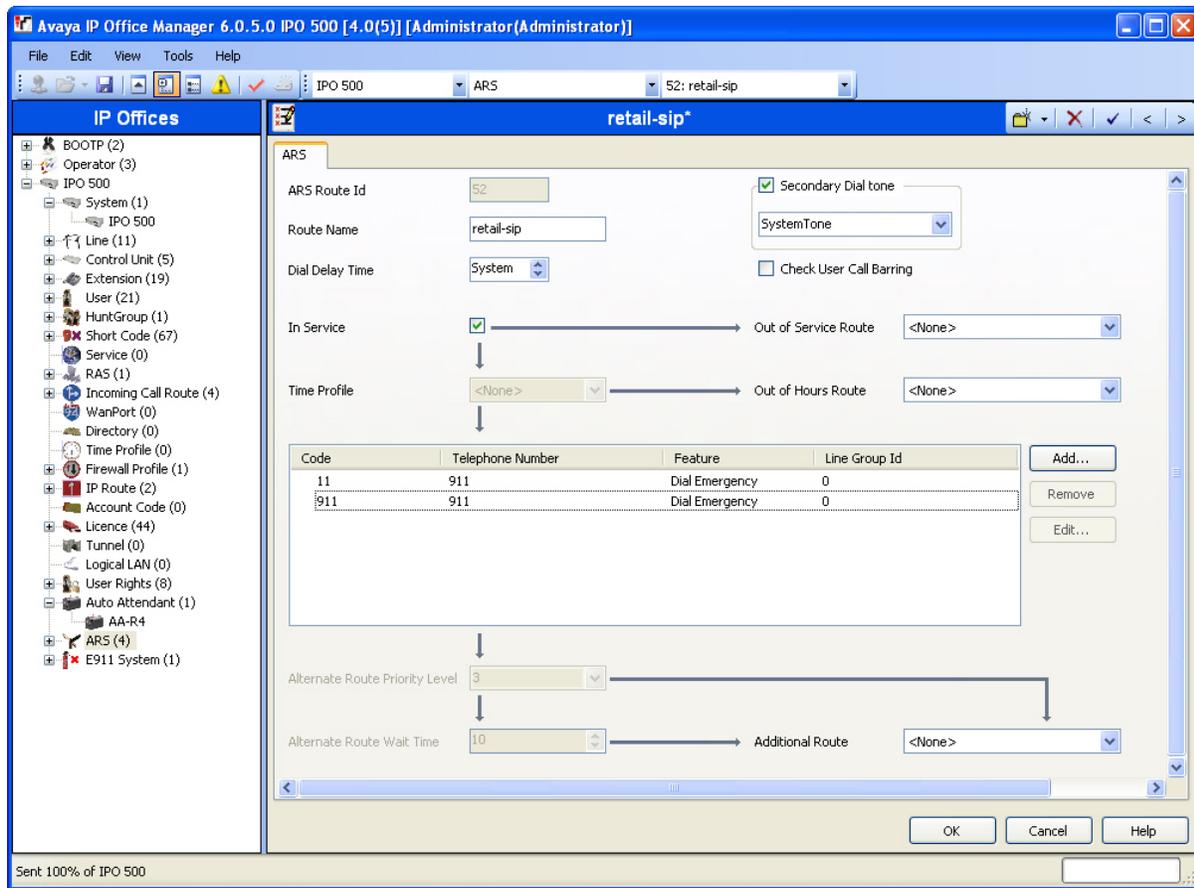


10. At the window for the Analogue Options tab, select the **Loop Start ICLID** option from the **Trunk Type** drop-down list to define the line type used for the analog trunk. Select the **Bothway** option from the **Direction** drop-down list and select the **Any** option from the **Bearer** drop-down list to define the traffic type. Leave the remaining parameters at the default setting and click the **OK** button to submit the line form for the configured analog trunk.

Note: Calls using analog trunks set to Loop Start ICLID do not send Caller ID information instantaneously therefore the Avaya IP Office will delay service while waiting for all ICLID digits before call routing is determined.



11. From the Avaya IP Office Manager, right-click on **ARS** from the configuration list under the left window. Select **New** to open a window for provisioning a new ARS entry for the SIP trunk configured in Steps 5 and 6 of this section. At the window for the new ARS entry, enter a descriptive name for the ARS using the SIP trunk in the **Route Name** field. Mark the checkbox for **Secondary Dial tone** to invoke secondary dial tone during calls until a trunk channel is seized and mark the checkbox for **In Service** to place the ARS entry in operational state. Leave the remaining parameters at the default setting and click the **Add** button to open the New Short Code window to add matching criteria for call routing.

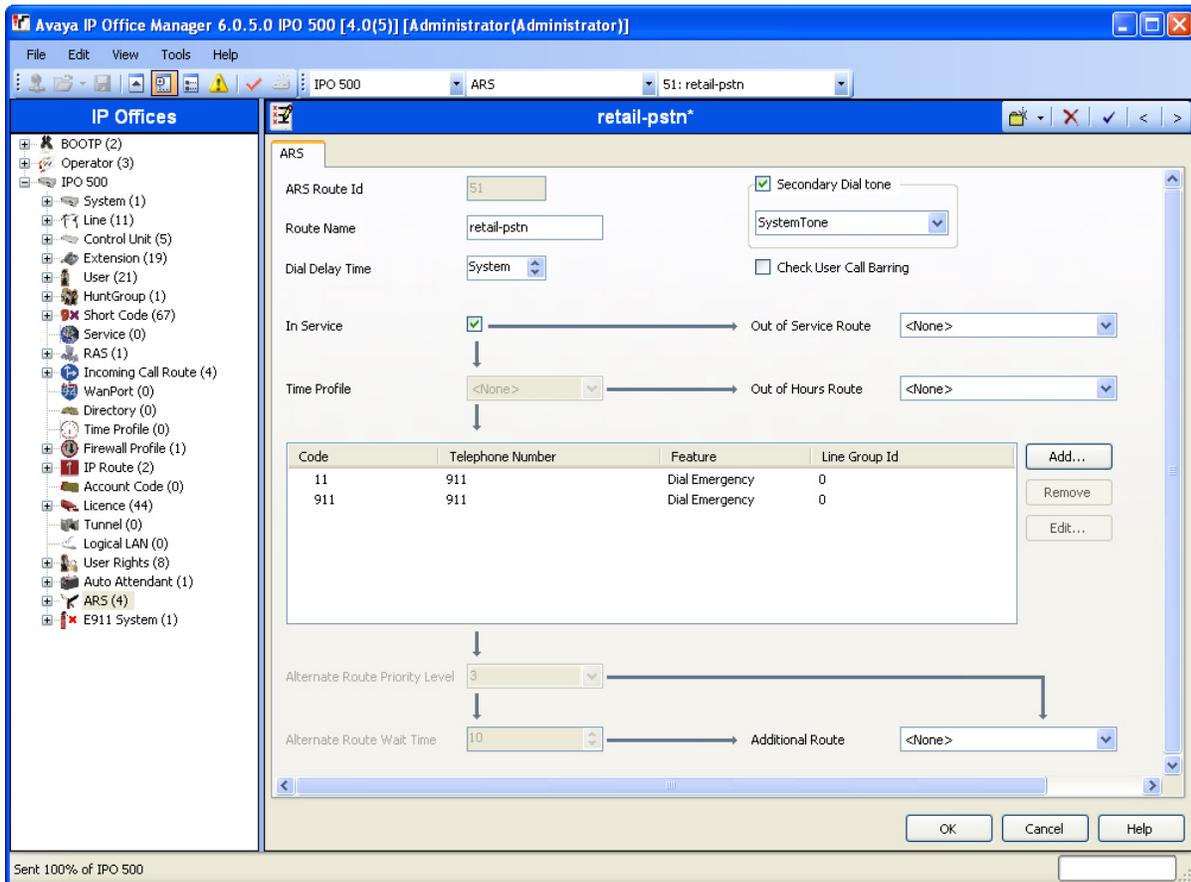


12. At the New Short Code window, enter the dialing digits used to trigger the short code for extensions registered to Avaya Communication Manager at the Main location in the **Code** field. Select the **Dial** feature from the **Feature** drop-down list to define the action of the short code. In the **Telephone Number** field, enter the dialing digits for extensions registered to Avaya Communication Manager at the Main location and include a suffix with the special characters, “@<IP address of Avaya SES Server>”. See Section 8 for references on special characters used in short code configurations for the Avaya IP Office.

Select the line number for the SIP trunk configured in Steps 5 and 6 of this section from the **Line Group Id** drop-down list. Leave the remaining parameters at the default setting and click the **OK** button to return to the ARS entry window for the SIP trunk. Click the **OK** button at the ARS entry window to submit this ARS entry for the SIP trunk. Repeat this step as necessary for all dialing digits destined for call routing by this ARS entry.

| New Short Code | |
|--------------------|--------------------------|
| Code | 333N; |
| Feature | Dial |
| Telephone Number | 333N"@30.1.1.25" |
| Line Group Id | 5 |
| Locale | |
| Force Account Code | <input type="checkbox"/> |

13. From the Avaya IP Office Manager, right-click on **ARS** from the configuration list under the left window. Select **New** to open a window for provisioning a new ARS entry for the ISDN-PRI trunk configured in Steps 7 and 8 of this section. Repeat Step 11 of this section to configure the ARS entry.



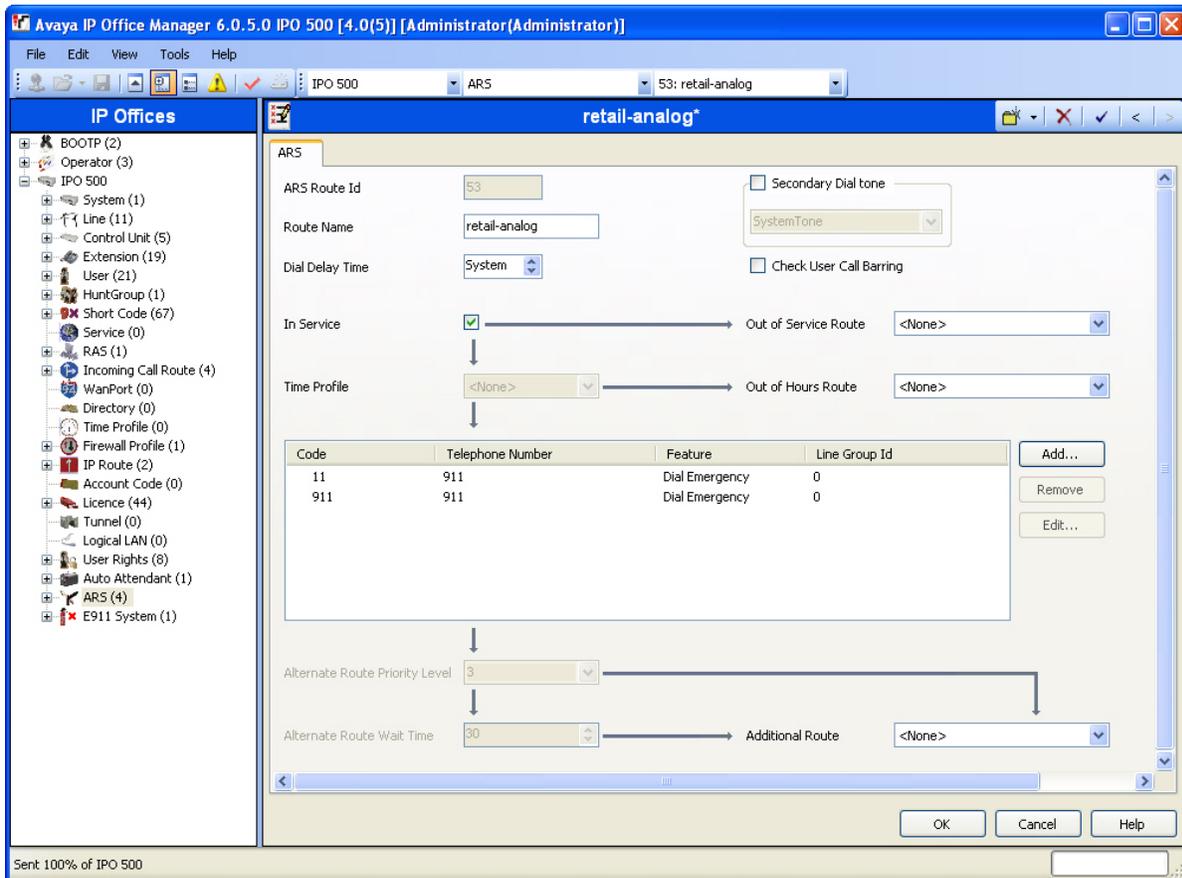
14. At the New Short Code window, enter the dialing digits used to trigger the short code for extensions registered to Avaya Communication Manager at the Main location in the **Code** field. Select the **Dial** feature from the **Feature** drop-down list to define the action of the short code. In the **Telephone Number** field, enter the dialing digits or special characters for extensions registered to Avaya Communication Manager at the Main location. See Section 8 for references on special characters used in short code configurations for the Avaya IP Office.

Select the line number for the ISDN-PRI trunk configured in Steps 7 and 8 of this section from the **Line Group Id** drop-down list. Leave the remaining parameters at the default setting and click the **OK** button to return to the ARS entry window for the ISDN-PRI trunk. Click the **OK** button at the ARS entry window to submit this ARS entry for the ISDN-PRI trunk. Repeat this step as necessary for all dialing digits destined for call routing by this ARS entry.

New Short Code

| | | |
|--------------------|------------------------------------|---------------------------------------|
| Code | <input type="text" value="333N;"/> | <input type="button" value="OK"/> |
| Feature | <input type="text" value="Dial"/> | <input type="button" value="Cancel"/> |
| Telephone Number | <input type="text" value="333N"/> | |
| Line Group Id | <input type="text" value="1"/> | |
| Locale | <input type="text"/> | |
| Force Account Code | <input type="checkbox"/> | |

15. From the Avaya IP Office Manager, right-click on **ARS** from the configuration list under the left window. Select **New** to open a window for provisioning a new ARS entry for the analog trunk configured in Steps 9 and 10 of this section. Repeat Step 11 of this section to configure the ARS entry.

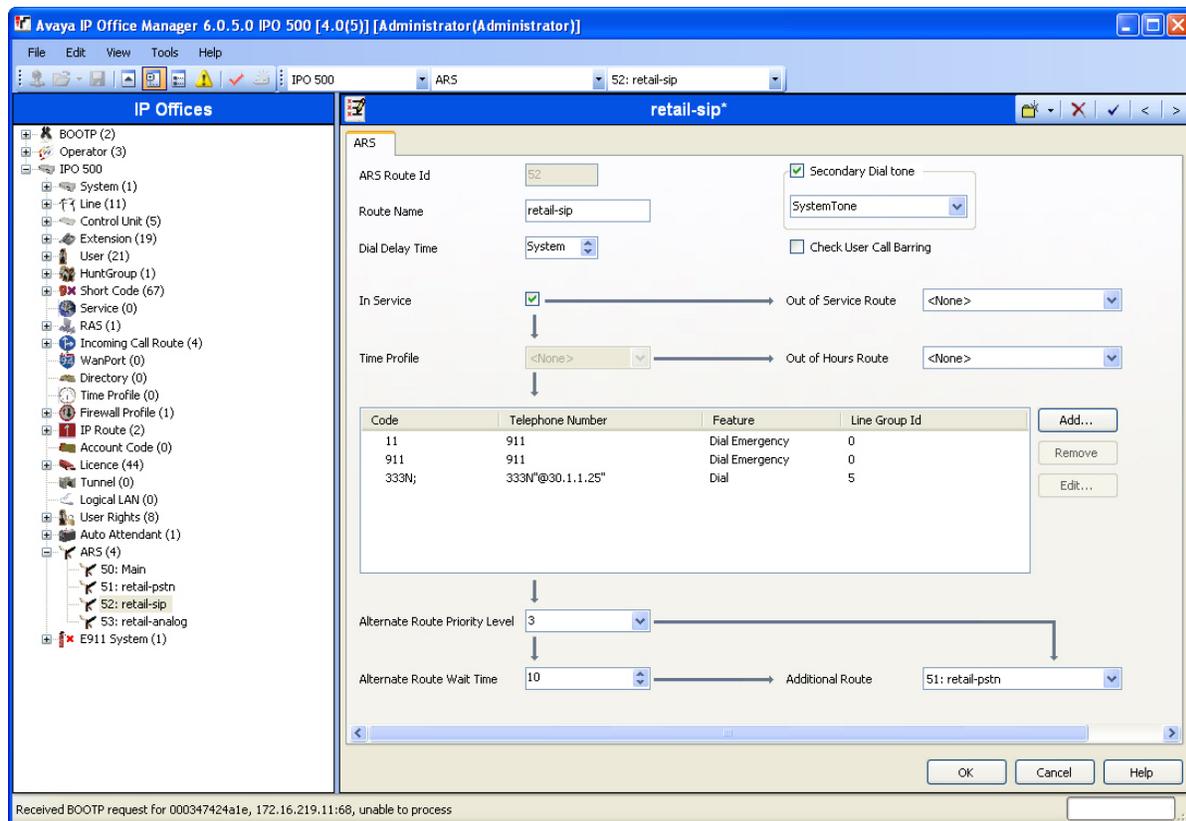


16. At the New Short Code window, enter the dialing digits used to trigger the short code for extensions registered to Avaya Communication Manager at the Main location in the **Code** field. Select the **Dial** feature from the **Feature** drop-down list to define the action of the short code. In the **Telephone Number** field, enter the dialing digits or special characters for extensions registered to Avaya Communication Manager at the Main location. See Section 8 for references on special characters used in short code configurations for the Avaya IP Office.

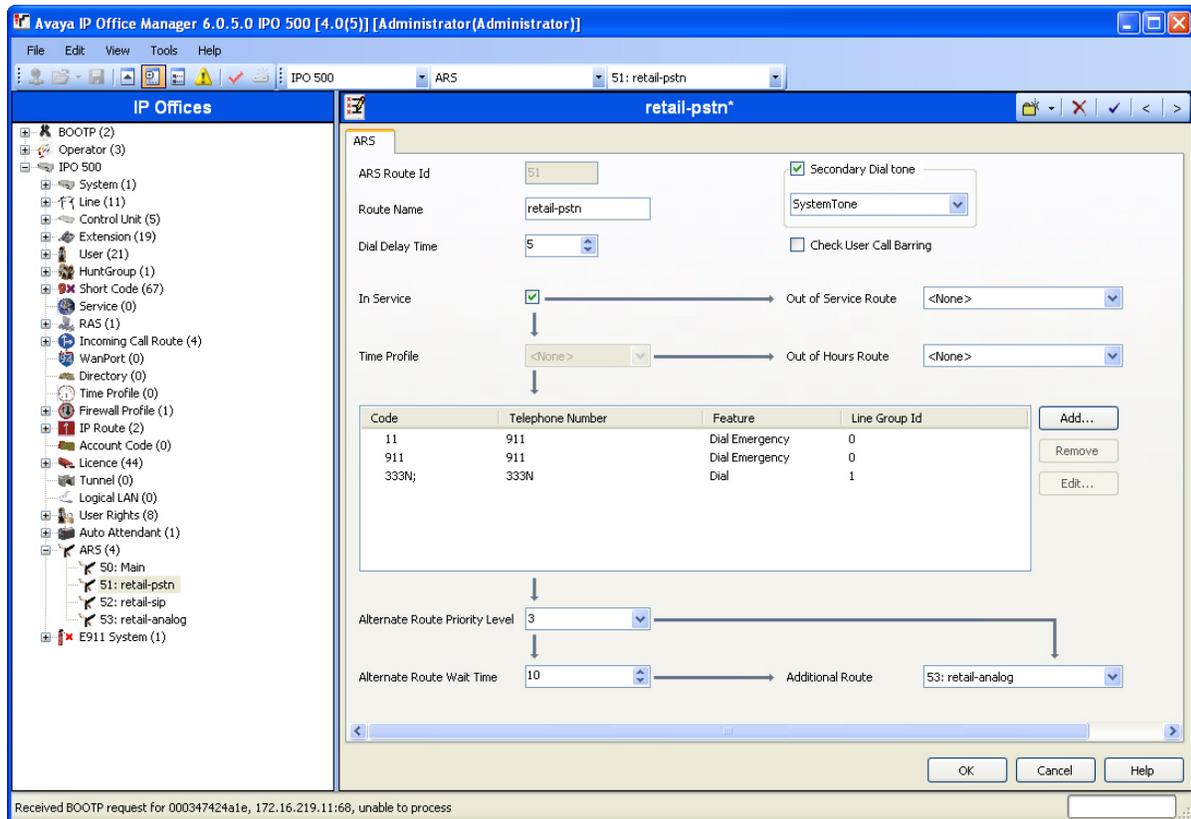
Select the line number for the analog trunk configured in Steps 9 and 10 of this section from the **Line Group Id** drop-down list. Leave the remaining parameters at the default setting and click the **OK** button to return to the ARS entry window for the analog trunk. Click the **OK** button at the ARS entry window to submit this ARS entry for the analog trunk. Repeat this step as necessary for all dialing digits destined for call routing by this ARS entry.

| New Short Code | |
|--------------------|--------------------------|
| Code | 333N; |
| Feature | Dial |
| Telephone Number | 333N |
| Line Group Id | 9 |
| Locale | |
| Force Account Code | <input type="checkbox"/> |

17. From the Avaya IP Office Manager, click on the entry under **ARS** configured for the SIP trunk in Steps 11 and 12 of this section. At the window for the ARS entry, select the ARS entry configured for the ISDN-PRI trunk in Steps 13 and 14 of this section from the **Additional Route** drop-down list. This will route calls with matching criteria specified in the short code configuration to the ARS entry for ISDN-PRI when the ARS entry for SIP is unavailable. Select a priority level for accessing the designated additional route for ISDN-PRI from the **Alternate Route Priority Level** drop-down list. Leave the remaining parameters at the default setting and click the **OK** button to submit the ARS entry for SIP.

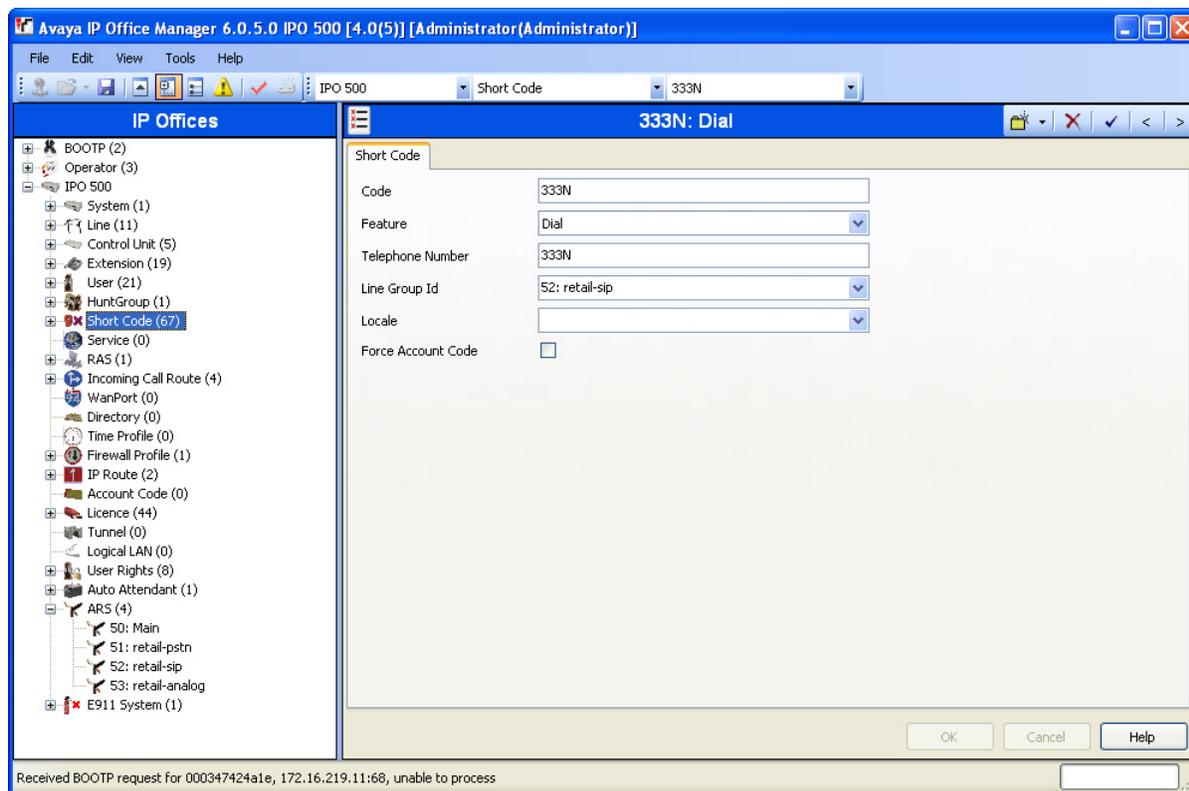


18. From the Avaya IP Office Manager, click on the entry under **ARS** configured for the ISDN-PRI trunk in Steps 13 and 14 of this section. At the window for the ARS entry, select the ARS entry configured for the analog trunk in Steps 15 and 16 of this section from the **Additional Route** drop-down list. This will route calls with matching criteria specified in the short code configuration to the ARS entry for the analog trunk when the ARS entry for ISDN-PRI is unavailable. Select a priority level for accessing the designated additional route for analog from the **Alternate Route Priority Level** drop-down list. Leave the remaining parameters at the default setting and click the **OK** button to submit the ARS entry for ISDN-PRI.

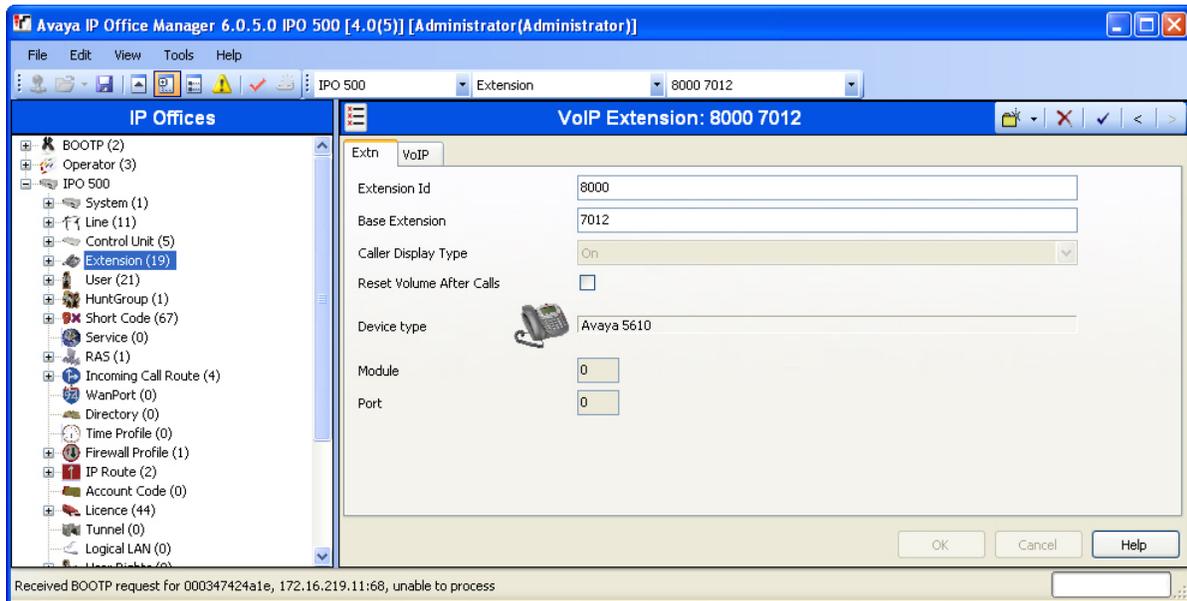


19. From the Avaya IP Office Manager, right-click on **Short Code** from the configuration list under the left window and select **New**. From the New Short Code window, enter the dialing digits used to trigger the short code for extensions registered to Avaya Communication Manager at the Main location in the **Code** field. Select the **Dial** feature from the **Feature** drop-down list to define the action of the short code. In the **Telephone Number** field, enter the dialing digits or special characters for extensions registered to Avaya Communication Manager at the Main location. See Section 8 for references on special characters used in short code configurations for the Avaya IP Office.

Select the ARS entry for the SIP trunk configured in Steps 11, 12 and 17 of this section from the **Line Group Id** drop-down list. Leave the remaining parameters at the default setting and click the **OK** button to submit the short code configuration. Repeat this step as necessary for all dialing digits requiring a short code configuration destined for call routing by ARS.

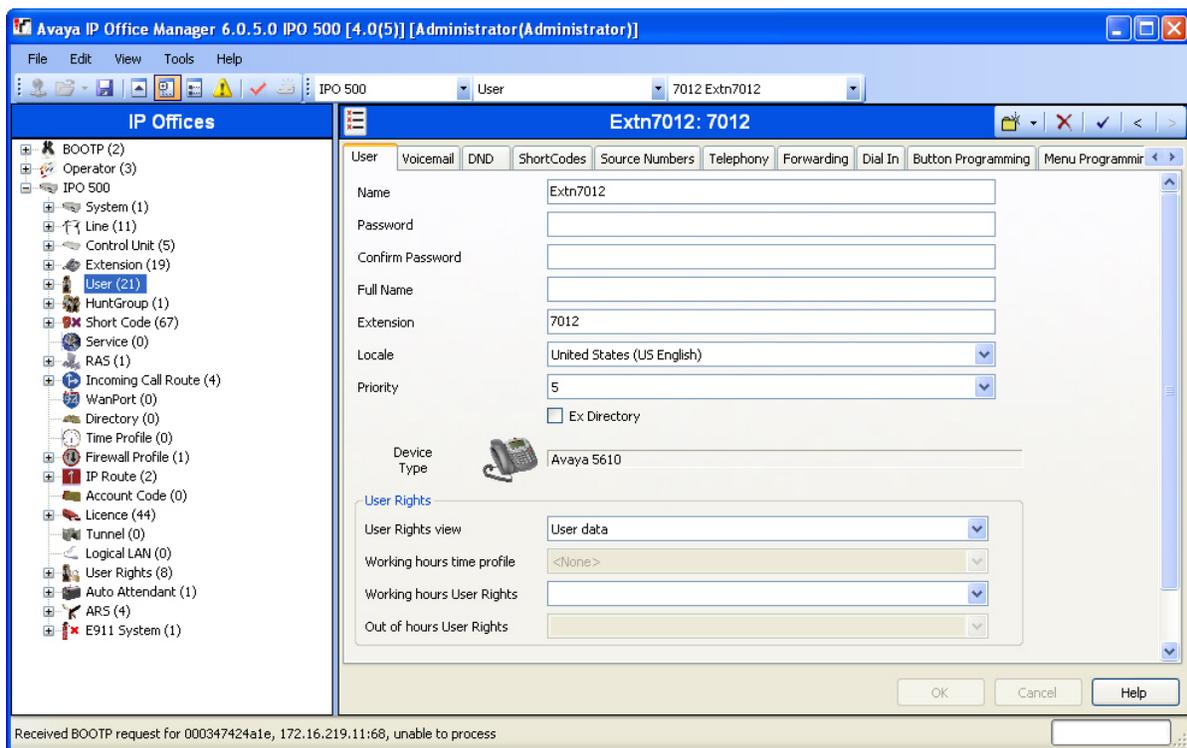


20. From the Avaya IP Office Manager, right-click on **Extension** from the configuration list under the left window and select **New**. From the New VoIP Extension window, enter digits for dialing the extension in the **Base Extension** field. Leave the remaining parameters at the default setting and click the **OK** button to submit the New VoIP Extension configuration.



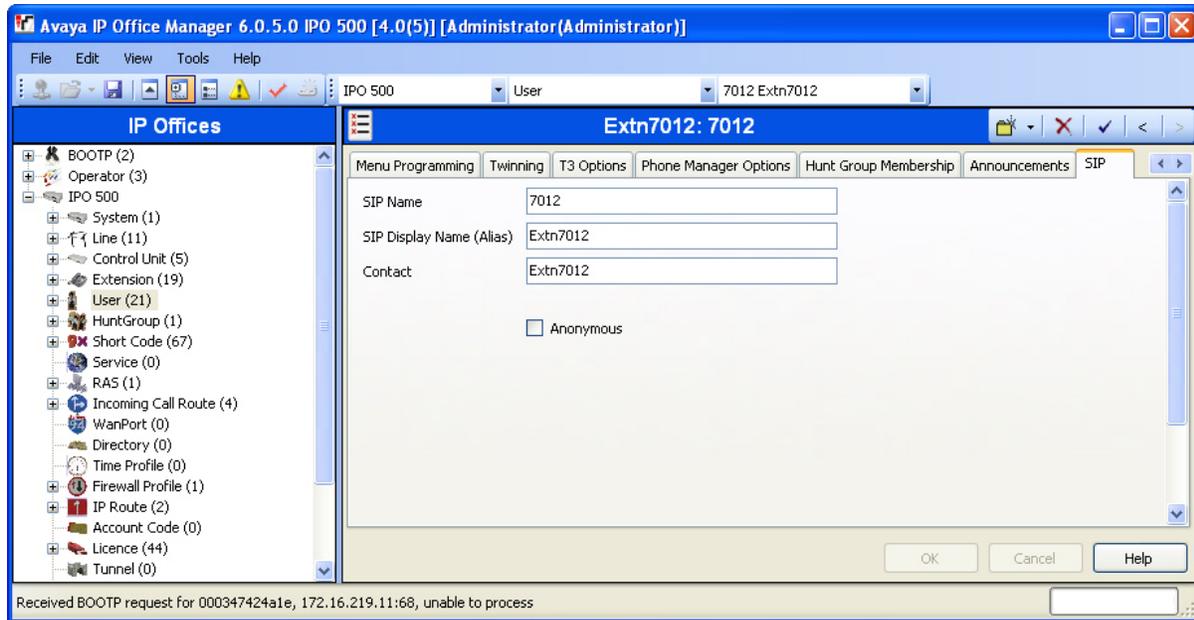
21. From the Avaya IP Office Manager, right-click on **User** from the configuration list under the left window and select **New**. From the New User window, enter a descriptive name for the user in the **Name** field. In the **Extension** field, enter the dialing digits configured in the previous step to associate the user with the proper extension. Select a priority level for the user from the **Priority** drop-down list. The value for the priority level should be the same or greater than the Alternate Route Priority Level defined in Steps 17 and 18. Leave the remaining parameters at the default setting and scroll the **User** configuration tabs using the  button to the SIP tab.

Note: The Device Type field is automatically populated with the physical characteristics of the endpoint when associated with the corresponding extension.

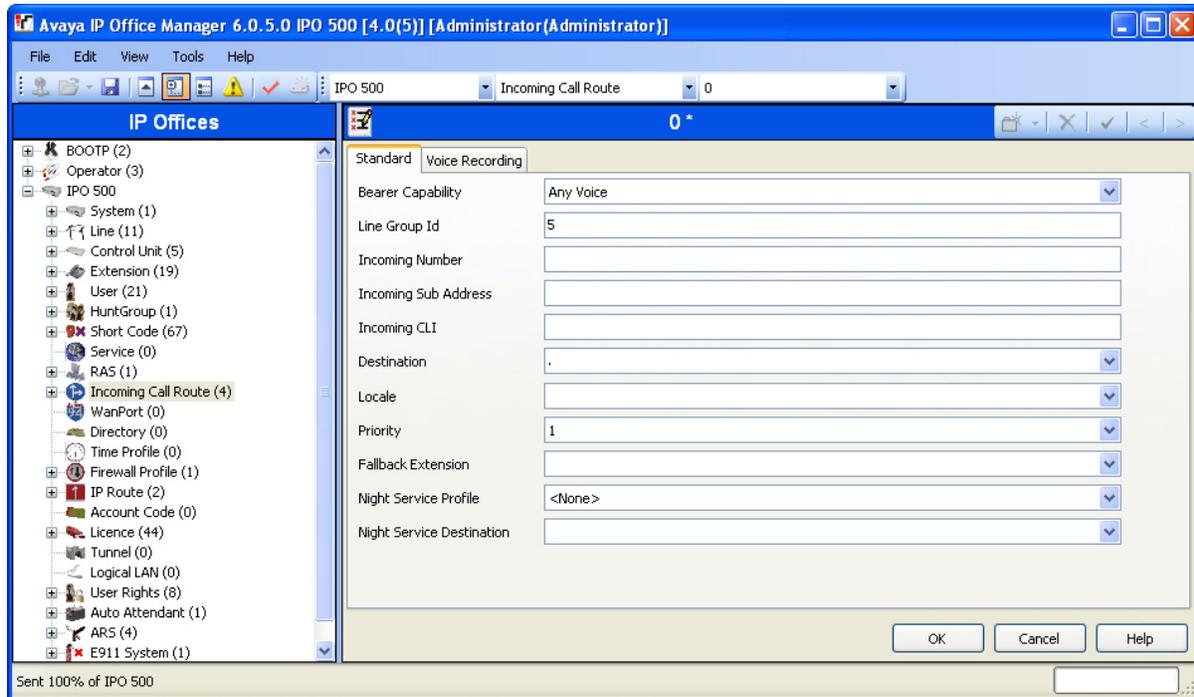


22. From the SIP tab of the New User window, enter the extension digits that will be sent to the Avaya SES Server in the **SIP Name** field. Leave the remaining parameters at the default setting and click the **OK** button to submit the New User configuration.

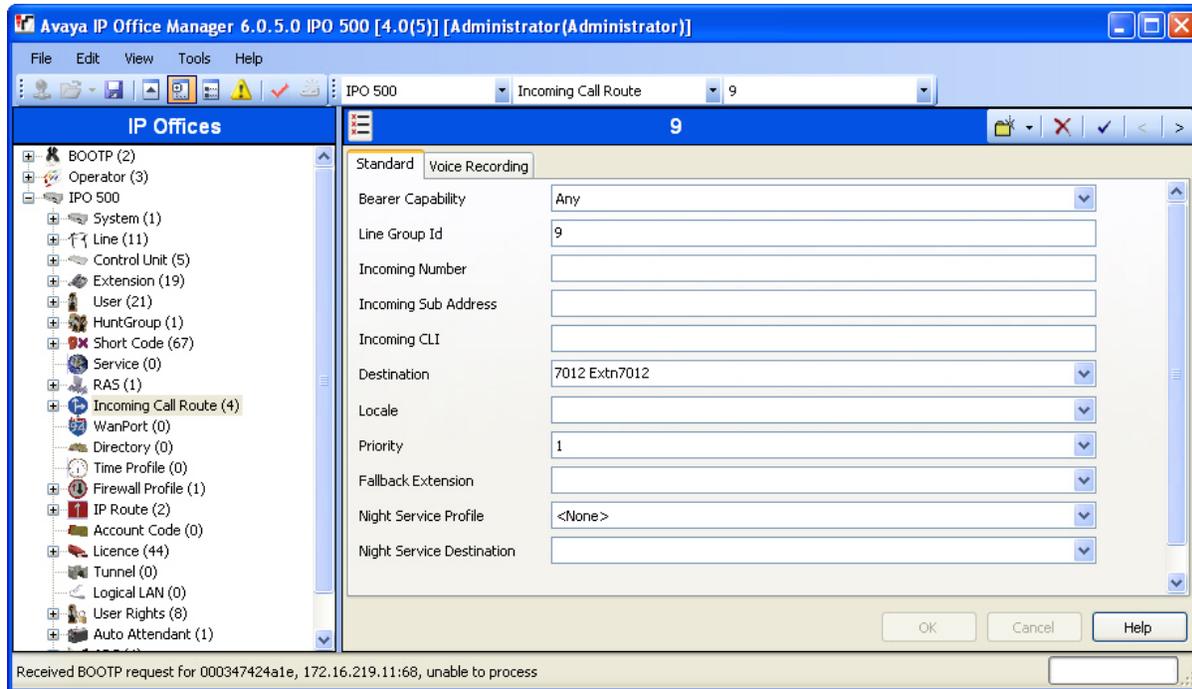
Note: The value for the SIP Name displayed in the respective fields use the SIP URI according to the SIP trunk channel configuration in the Local URI, Contact and Display Name drop-down lists in Step 6 of this section.



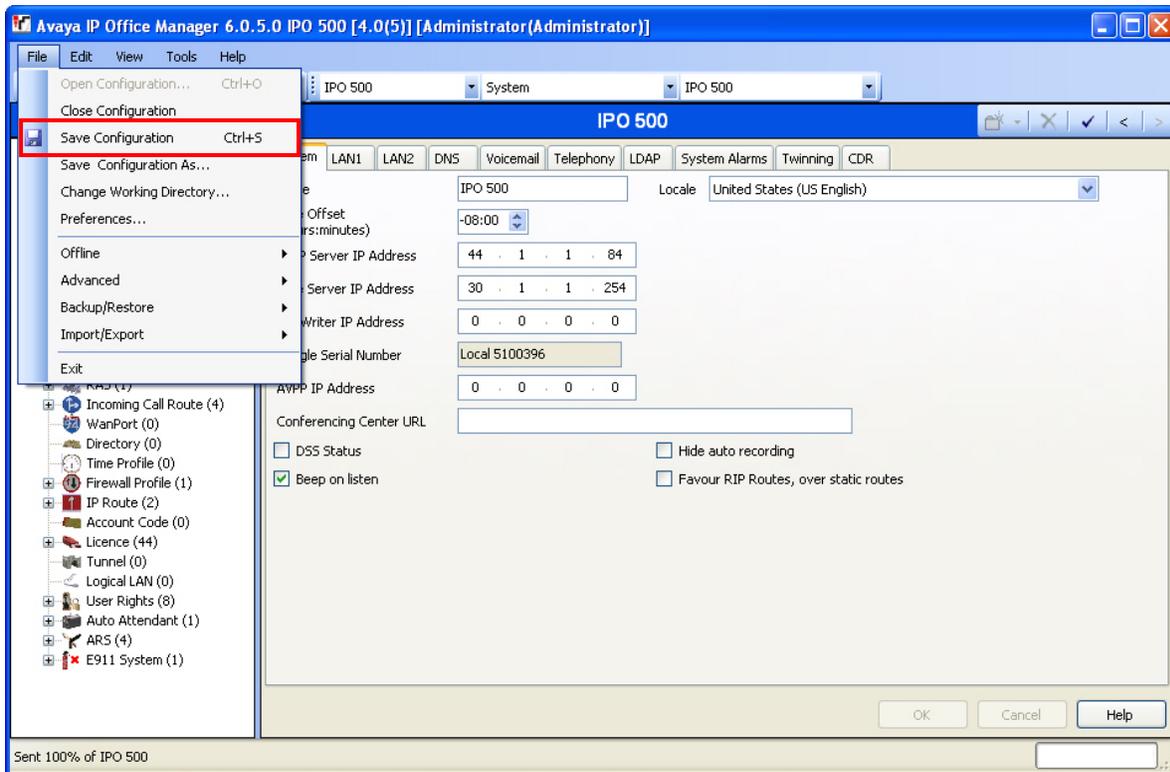
23. From the Avaya IP Office Manager, right-click on **Incoming Call Route** from the configuration list under the left window and select **New**. From the window for New Incoming Call Route, select the **Any Voice** option from the **Bearer Capability** drop-down list to define the incoming traffic type. In the **Line Group Id** field, enter the line number configured in Step 5 of this section to associate the incoming call route with the SIP trunk. Enter the special character '.' in the **Destination** drop-down list to route any incoming dialed digits to the matching extension. Leave the remaining parameters at the default setting and click the **OK** button to submit the incoming call route for the SIP trunk.



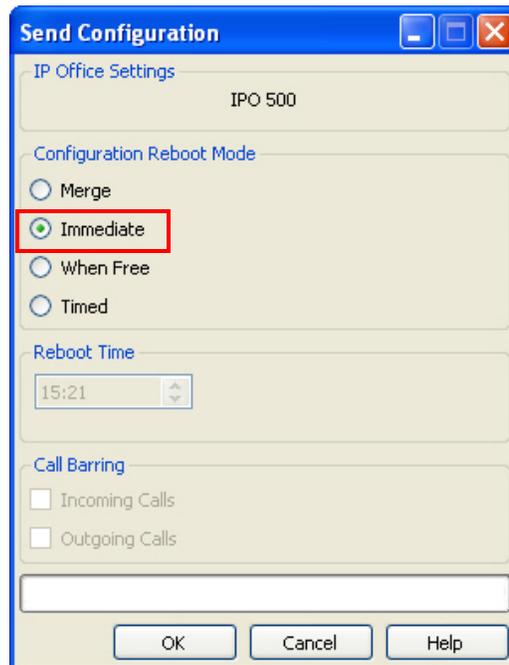
24. From the Avaya IP Office Manager, right-click on **Incoming Call Route** from the configuration list under the left window and select **New**. From the window for New Incoming Call Route, select the **Any** option from the **Bearer Capability** drop-down list to define the incoming traffic type. In the **Line Group Id** field, enter the line number defined in Step 9 of this section to associate the incoming call route with the analog trunk. Select the user configured in Step 21 from the **Destination** drop-down list to route any incoming dialed digits from the analog trunk to the specified extension. Leave the remaining parameters at the default setting and click the **OK** button to submit the incoming call route for the analog trunk.



25. From the Avaya IP Office Manager, click on **File > Save Configuration** to open the Send Configuration window and upload the configuration for the Avaya IP Office 500.



26. At the Send Configuration window, verify the **Immediate** radio button is selected under Configuration Reboot Mode and click the **OK** button to open the Service User Login prompt. Enter valid credentials at the Service User Login prompt. Click the **OK** button to submit the configuration of the above steps from the Avaya IP Office Manager and reboot the Avaya IP Office 500 immediately.



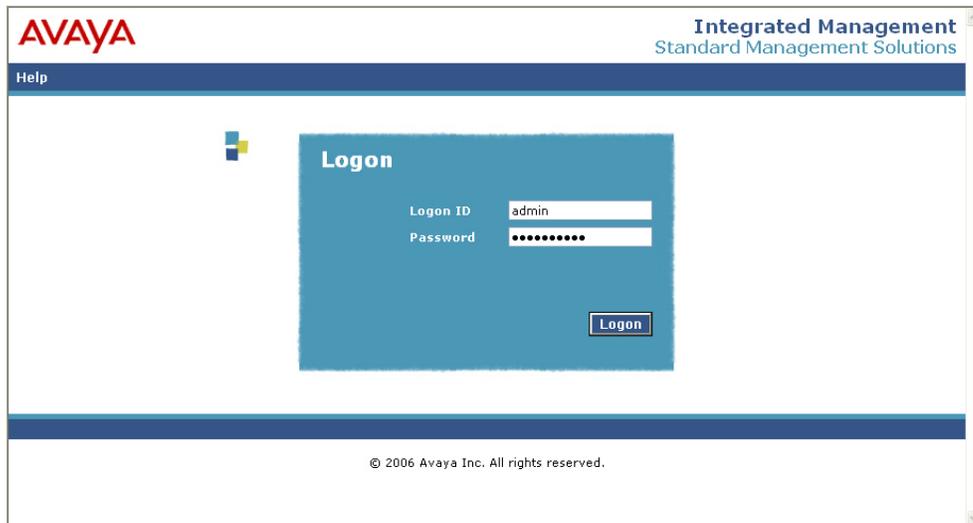
4. Configure Avaya Communication Manager

For brevity, this section will assume the reader of these Application Notes has a basic understanding of Avaya IP Telephony and will not cover details regarding the configuration of Avaya Communication Manager. See the additional references in **Section 8** for further information.

5. Configure Avaya SIP Enablement Services

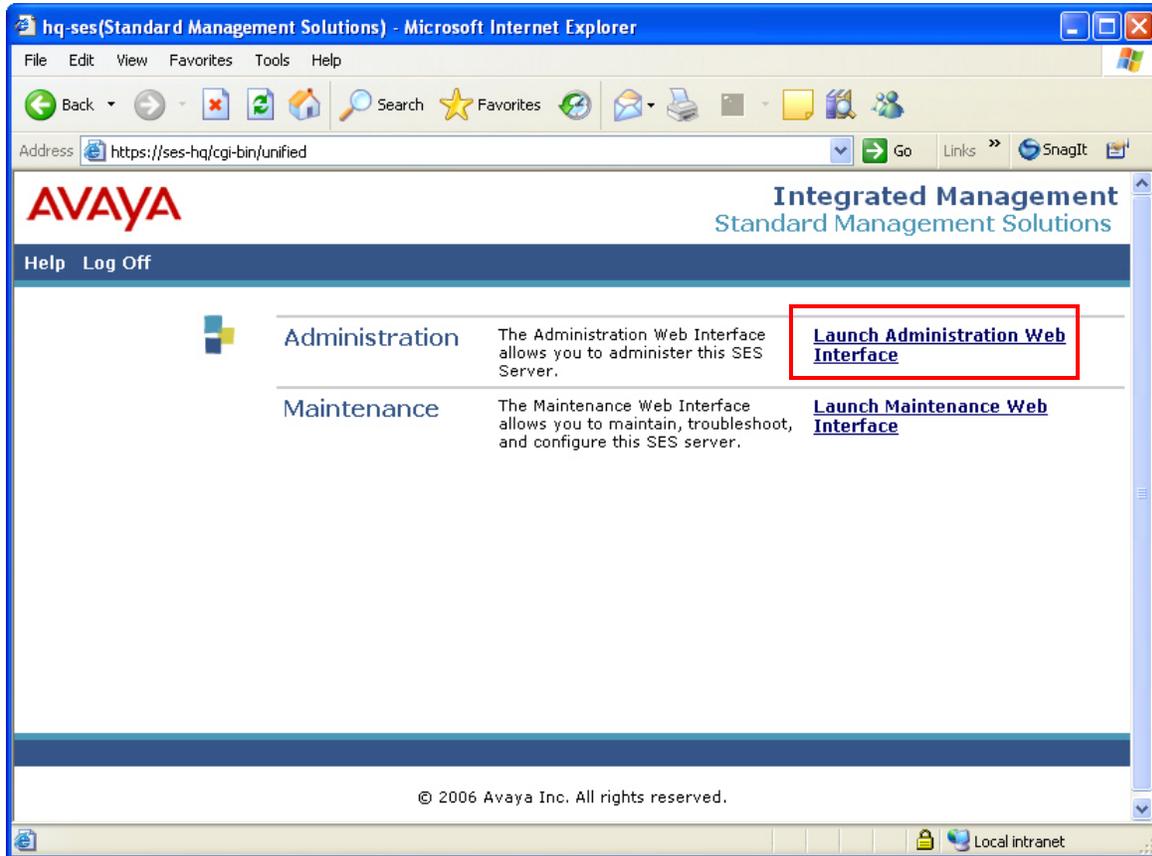
Listed below are the steps used to configure the Avaya SES Server as a SIP proxy for integration with the Avaya IP Office 500. These Application Notes assume the proper licensing as well as initial setup for Home and Edge configuration for Avaya SES Server has been provisioned.

1. Using a web browser, enter `http://<a.b.c.d>` at a web browser where a.b.c.d is the IP address of the Avaya SES Server. At the prompt, enter valid login credentials in the **Logon ID** and **Password** fields. Click **Logon** when finished to display the administration and maintenance web interface.

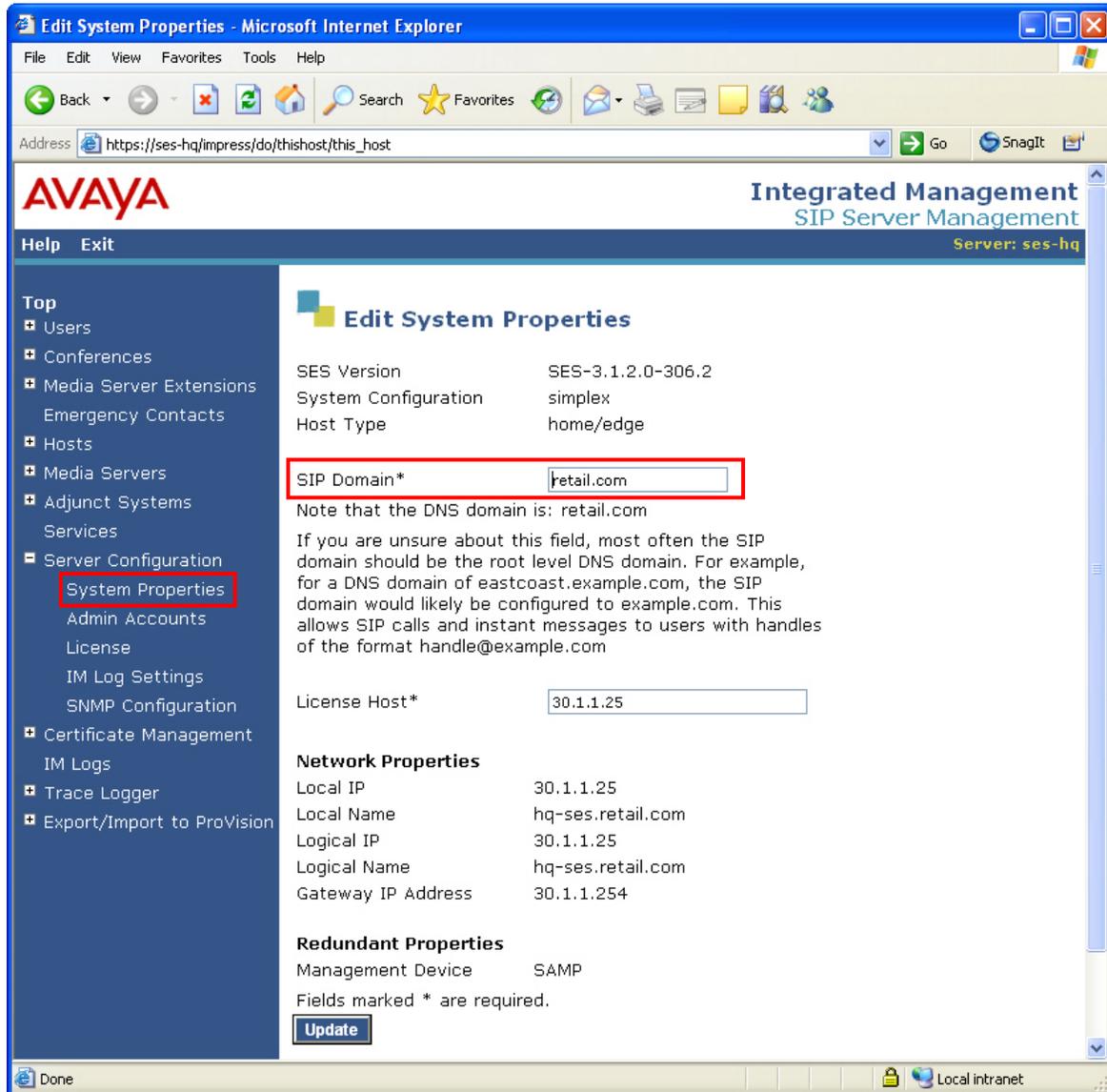


The screenshot shows the Avaya Integrated Management Standard Management Solutions login interface. The page features the Avaya logo in the top left corner and the text "Integrated Management Standard Management Solutions" in the top right. A "Help" link is located in the top left of the main content area. The central focus is a blue "Logon" box containing two input fields: "Logon ID" with the text "admin" and "Password" with masked characters. A "Logon" button is positioned below the password field. At the bottom of the page, a copyright notice reads "© 2006 Avaya Inc. All rights reserved."

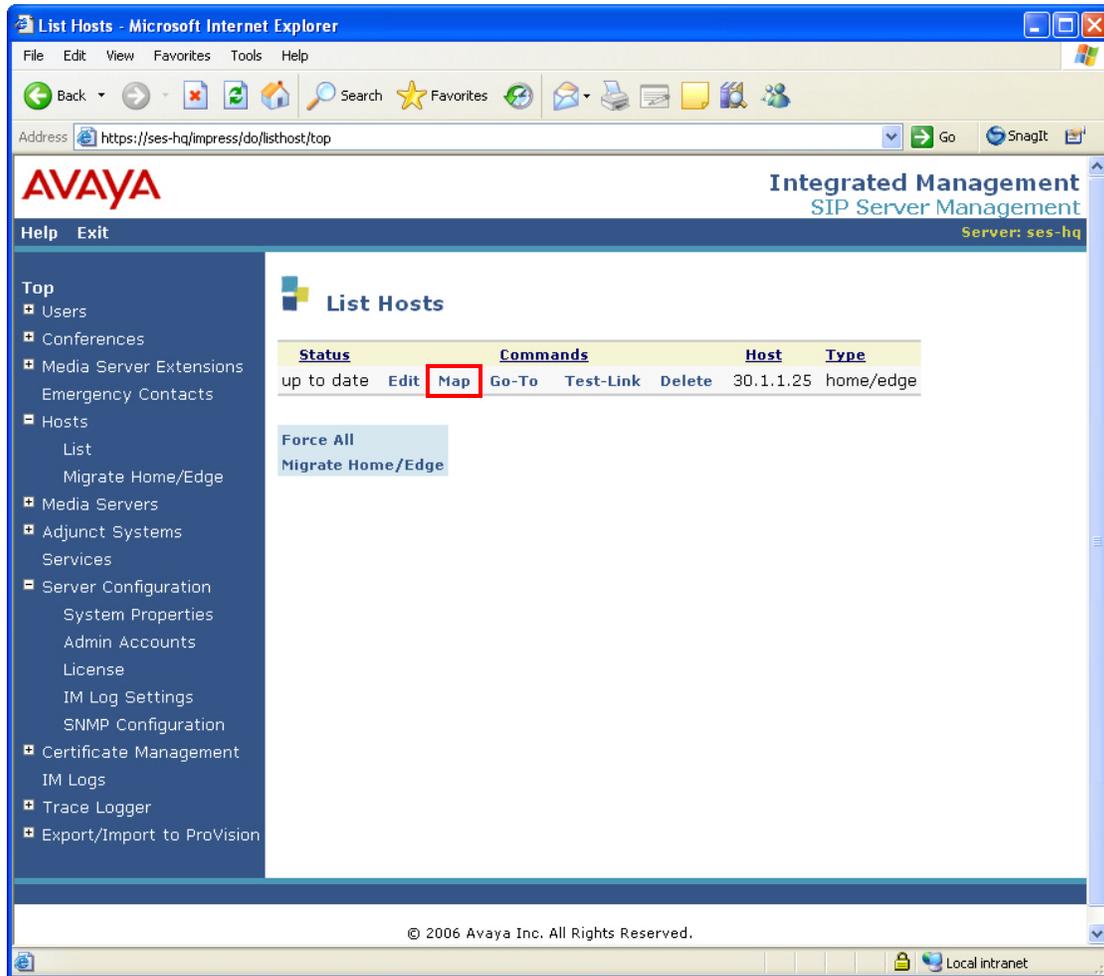
2. Click **Launch Administration Web Interface** to open the SIP Server Management window containing the options for Avaya SES Server administration.



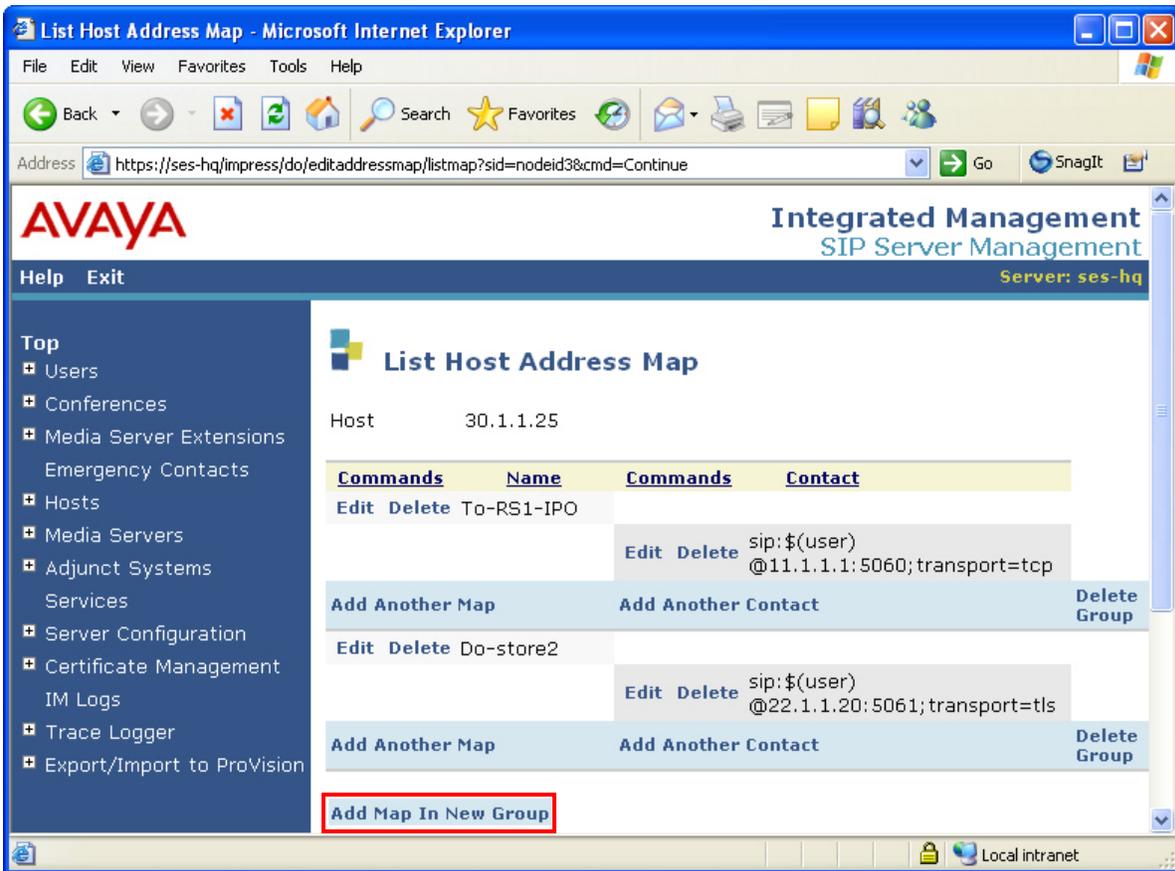
3. At the SIP Server Management window, click on **System Properties** under the **Server Configuration** menu to view the SES configuration. If it is not populated, enter the domain name used by the SIP environment in the **SIP Domain** field. Leave the remaining fields at default settings and click the **Update** button. Click the **Continue** button at the update confirmation screen. (*not shown*)



4. At the SIP Server Management window, click on **List** under the **Hosts** menu to view hosts configured on the Avaya SES Server. Click the **Map** link to display the list of address map statements for the administered host.



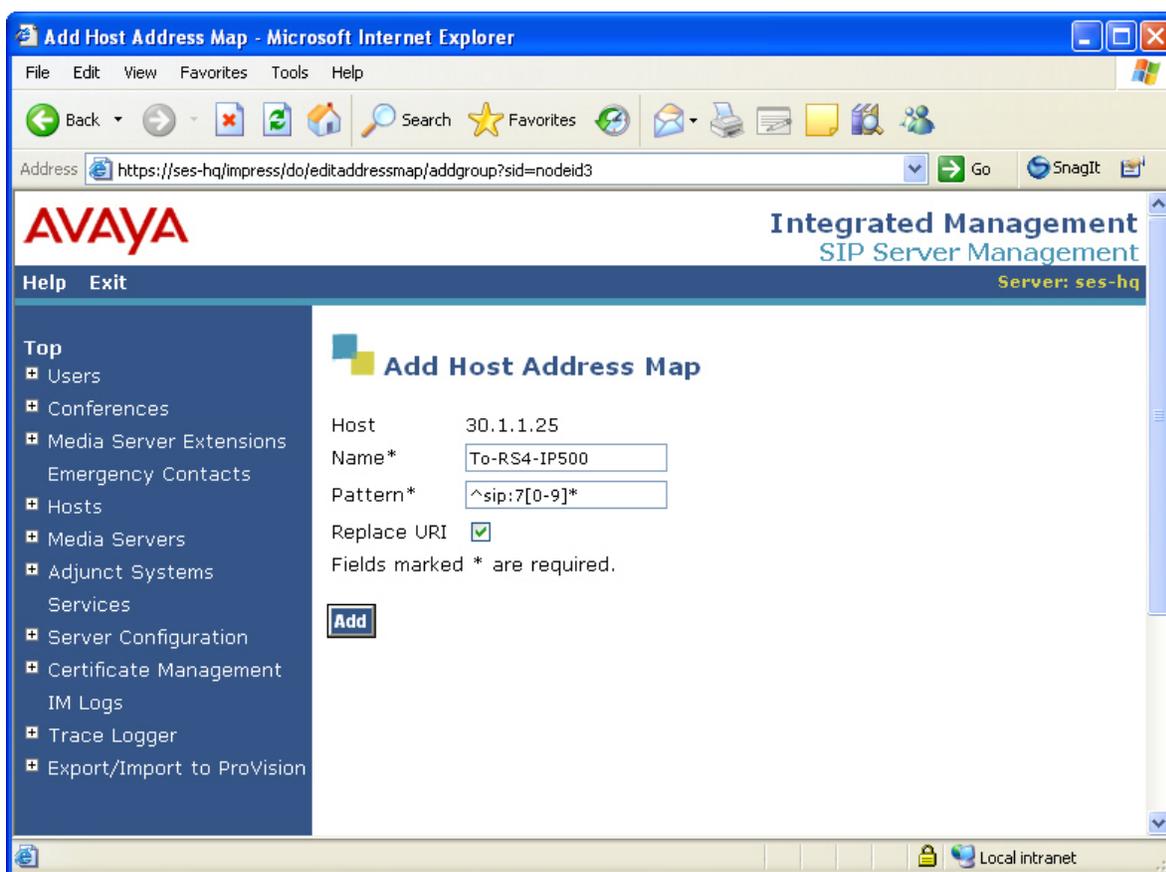
5. At the List Host Address Map window, click on **Add Map In New Group** to create a host address map statement for redirecting calls to the Avaya IP Office 500.



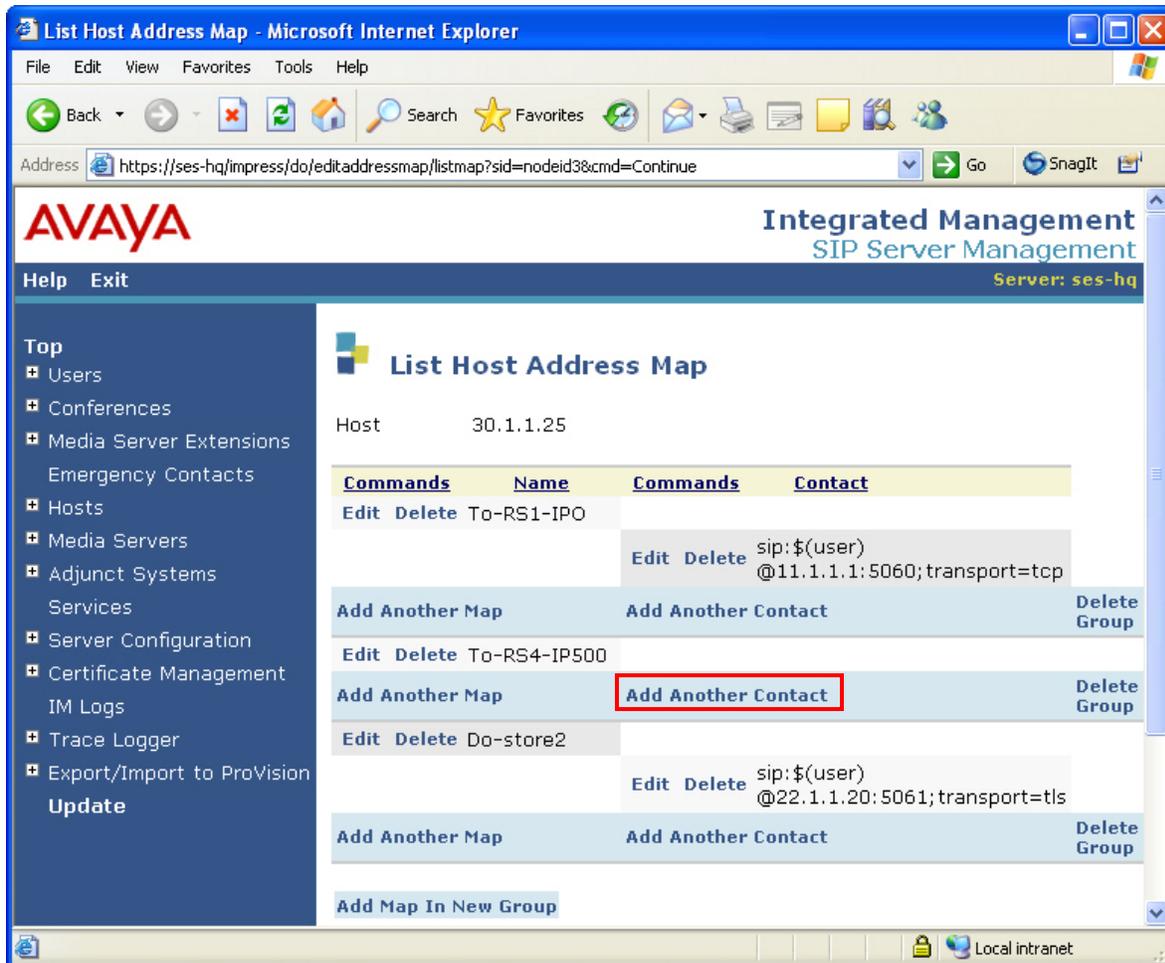
6. At the Add Host Address Map window, enter a descriptive name for identifying the address map statement in the **Name** field. In the **Pattern** field, enter the map string used to match SIP URI messages for the Avaya IP Office 500. The values for the matching pattern should be consistent with the dialing digits for the Avaya IP Office extension configured in Step 20 of Section 3. Place a check mark in the **Replace URI** box to indicate this pattern will be forwarded by the **Host** shown. Click the **Add** button when finished to return to the List Host Address Map window.

Use the Linux regular expressions below for the syntax of the host address map pattern:

| | |
|--------------|-------------------------------------|
| ^ | Match position in the SIP URI field |
| sip: | Indicates the protocol used |
| 0-9 | Match a specific digit |
| [0-9] | Match any digits |
| * | Indicates any digit and length |



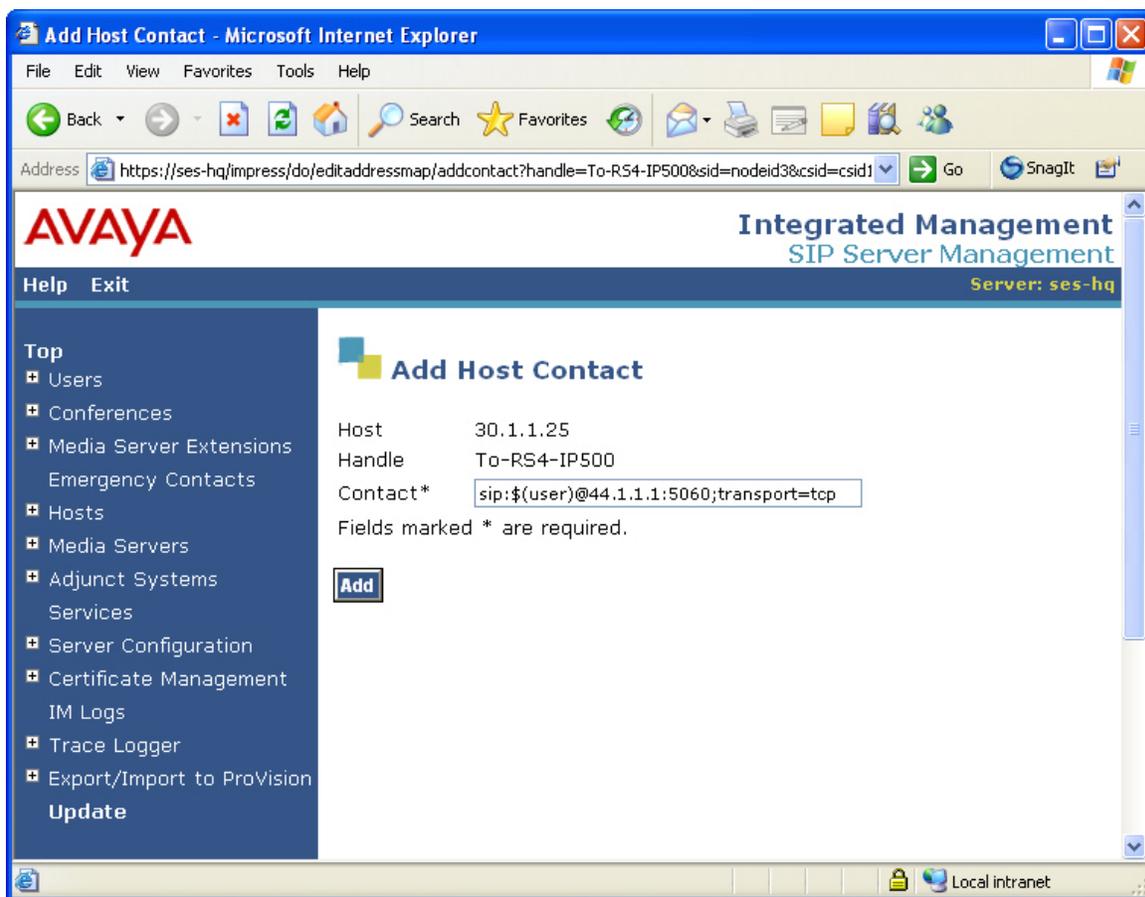
7. At the List Host Address Map window, click on **Add Another Contact** under **Commands** to add the Avaya IP Office 500 as the destination contact for the corresponding host address map.



8. At the Add Host Contact window, enter the string used for routing traffic destined for the Avaya IP Office 500 in the **Contact** field. Click the **Add** button when finished to return to the List Host Address Map window.

Use the Linux regular expressions below for the syntax of the host address map pattern:

sip: Indicates the protocol used
\$(user) Variable for user portion of the SIP message
@ x.x.x.x Format for the Avaya IP Office 500 IP address
5060 Port number used by TCP transport method.
transport = tcp Indicates transport method.

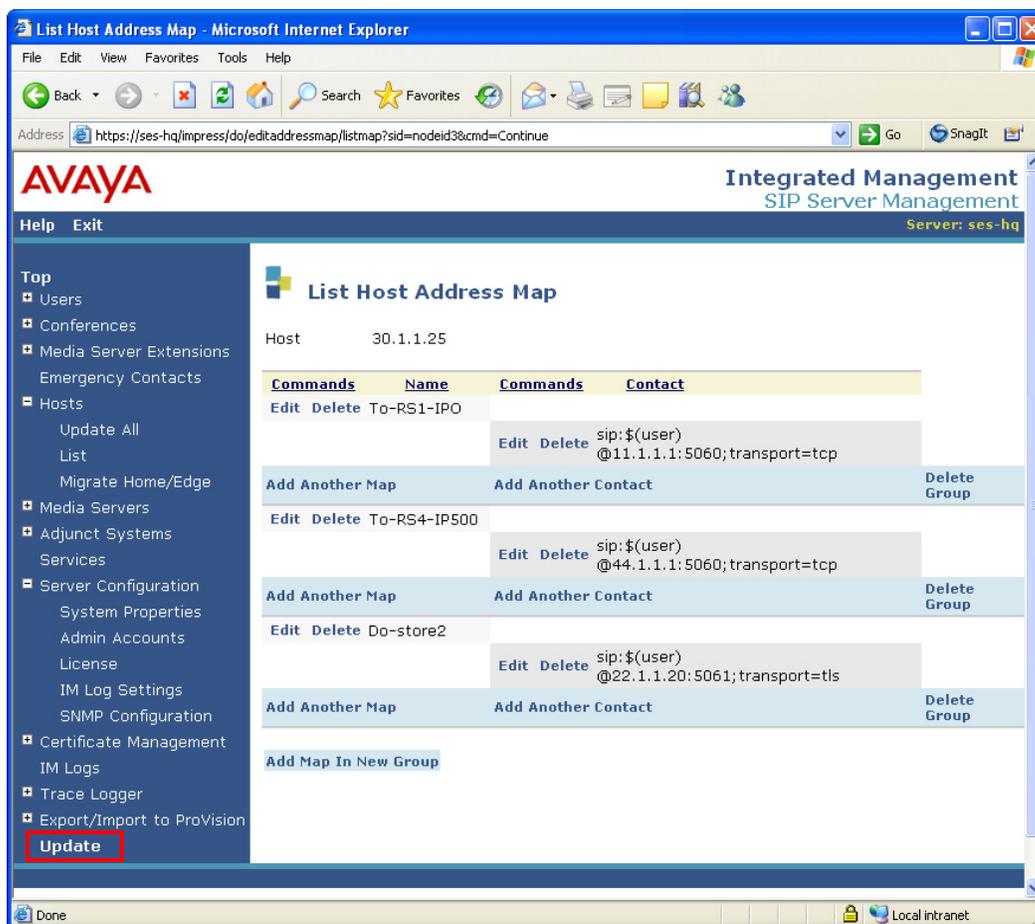


9. Open a telnet session to the Avaya SES Server and access the Linux shell using administrative login credentials. At the Linux shell prompt, enter the **trustedhost** command to configure the Avaya IP Office 500 as a trusted host on the Avaya SES Server. As a trusted host, the Avaya SES Server will not issue authentication challenges for incoming SIP requests from the Avaya IP Office 500. Use the following arguments for the **trustedhost** command to add the Avaya IP Office 500:

- a : Add new third party trusted host
- c : Optional comment when adding a third party trusted host
- n : SES host IP address trusted host

```
admin@hq-ses> trustedhost -a 44.1.1.1 -n 30.1.1.25 -c ipo500
```

10. At the SIP Server Management window, click on the **Update** link to submit the configuration to the Avaya SES Server. At the Update confirmation screen, click **Continue** [not shown].

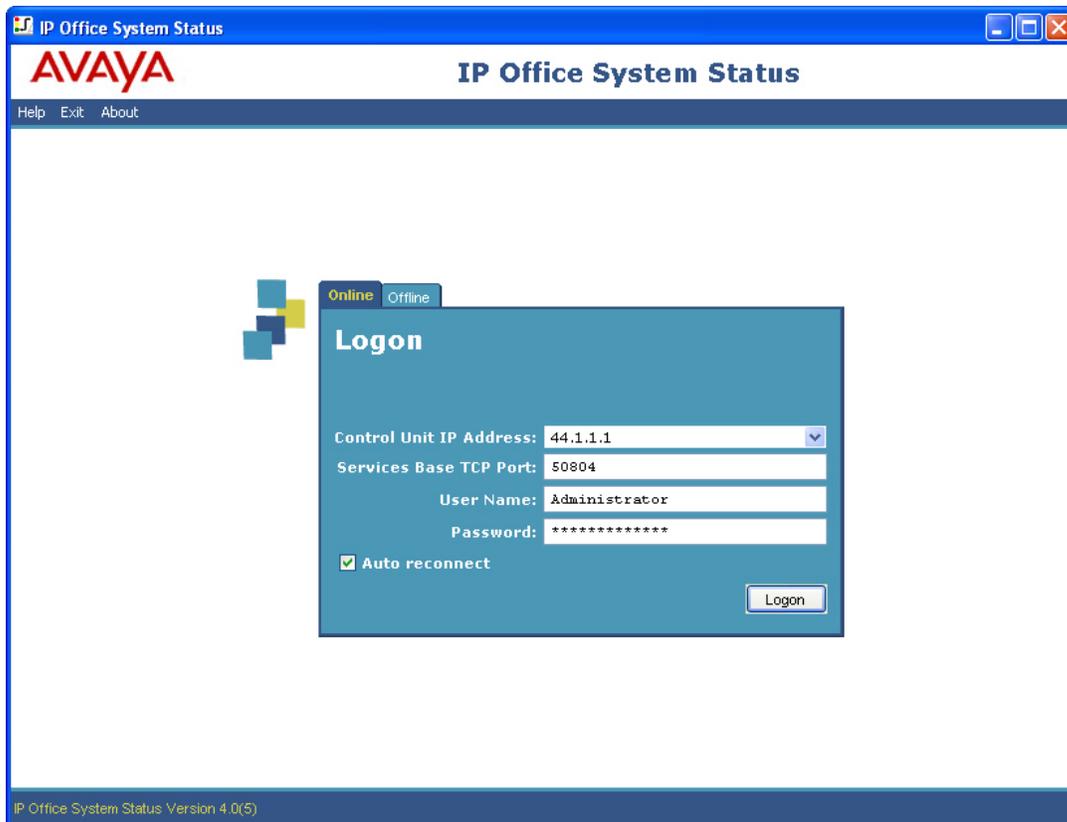


6. Verification

These Application Notes confirmed the functionality of the ARS feature in Avaya IP Office 500 using the procedures listed in the subsequent sections below. Each section will describe the verification steps used to determine system status of the Avaya IP Office 500 and operation of the ARS feature.

6.1. Avaya IP Office Verification

1. Open the Avaya IP Office System Status application. From Avaya IP Office System Status, enter the IP address of the Avaya IP Office 500 in the **Control Unit IP Address** field and enter valid credentials in the **Username** and **Password** fields. Click the **Logon** button to display the opening page of the Avaya IP System Status application.



2. From the Avaya IP Office System Status application, click the extension created in Step 20 of Section 3 on the Avaya IP Office 500 under the **Extensions** drop-down menu. Verify the functional status of the configured extension.

The screenshot displays the Avaya IP Office System Status application window. The title bar reads "IP Office System Status - IPO 500 (44.1.1.1)". The main window features the Avaya logo and the title "IP Office System Status". A menu bar includes "Help", "Snapshot", "LogOff", "Exit", and "About".

On the left side, there is a navigation pane with the following sections:

- System
- Alarms (12)
- Extensions (18)
 - 201
 - 203
 - 205
 - 206
 - 207
 - 208
 - 209
 - 210
 - 211
 - 212
 - 213
 - 214
 - 215
 - 7008
 - 7009
 - 7010
 - 7011
 - 7012** (highlighted with a red arrow)
- Trunks (11)
- Active Calls
- Resources

The main content area is titled "Extension Status" and displays the following configuration details for extension 7012:

- Extension Number: 7012
- IP address: 44.1.1.4
- MAC address: 00-09-6E-10-A7-B0
- Telephone Type: 5610
- Current User Extension Number: 7012
- Current User Name: Extn7012
- Forwarding: Off
- Twinning: Off
- Do Not Disturb: Off
- Message Waiting: On
- Number of New Messages: 1
- Phone Manager Type: None

Below the configuration details is a table showing call history for extension 7012. The table has the following columns: Button Number, Button Type, Call Ref, Current State, Time in State, Calling Number or Called, Direction, and Other Party on Call. The first row is highlighted with a red border:

| Button Number | Button Type | Call Ref | Current State | Time in State | Calling Number or Called | Direction | Other Party on Call |
|---------------|-------------|----------|---------------|---------------|--------------------------|-----------|---------------------|
| 1 | CA | | Idle | 05:39:26 | | | |
| 2 | CA | | Idle | | | | |
| 3 | CA | | Idle | | | | |

At the bottom of the application, there is a toolbar with buttons for "Trace", "Trace All", "Pause", "Ping", "Back", "Call Details", "Print...", and "Save As...". The status bar at the bottom right shows the time "4:04:04 PM" and the status "Online".

3. Place a call from the extension configured in Step 20 of Section 3 on the Avaya IP Office 500 to an extension configured on Avaya Communication Manger at the Main location. Verify two-way audio and voice quality is acceptable. Click the line number configured for the SIP trunk in Steps 5 and 6 of Section 3 under the **Trunks** drop-down menu. Verify channel seizure of the SIP trunk for the extension configured in Step 20 of Section 3 on the Avaya IP Office 500.

The screenshot displays the Avaya IP Office System Status window for IP Office 500 (44.1.1.1). The interface includes a navigation menu on the left with sections for System, Alarms (12), Extensions (18), and Trunks (14). Under Trunks, Line 5 is selected. The main area shows the SIP Trunk Summary with the following details:

- Peer Domain Name: retail.com
- Gateway Address: 30.1.1.25
- Line Number: 5
- Number of Administered Channels: 9
- Number of Channels in Use: 1
- Administered Compression: G711Mu
- Silence Suppression: Off

Below the summary is a table showing call activity for the trunk. The first row is highlighted in red, indicating an active call.

| Chann | URI | Call | Current | Time in | Remote | Codec | Conne | Caller | Other Party | Direction | Round | Receiv | Receiv | Trans | Tr |
|--------|-----|------|-----------|---------|----------|---------|-------|--------|----------------|-----------|-------|--------|--------|--------|-----|
| Number | Grp | Ref | State | State | Address | | Type | Dialed | on Call | of Call | Delay | Litter | Loss | Litter | l.c |
| 2 | 1 | 157 | Connected | 00:0... | 30.1.1.5 | G711 Mu | VCM | | Extn 7012, Ext | Outgoing | Sms | 0ms | 0% | 0ms | |
| 1 | | | Idle | 8 da... | | | | | | | | | | | |
| 3 | | | Idle | 8 da... | | | | | | | | | | | |
| 4 | | | Idle | 8 da... | | | | | | | | | | | |
| 5 | | | Idle | 8 da... | | | | | | | | | | | |
| 6 | | | Idle | 8 da... | | | | | | | | | | | |
| 7 | | | Idle | 8 da... | | | | | | | | | | | |
| 8 | | | Idle | 8 da... | | | | | | | | | | | |
| 9 | | | Idle | 8 da... | | | | | | | | | | | |

At the bottom of the window, there are buttons for Trace, Trace All, Ping, Call Details, Print..., and Save As... The status bar shows the time as 4:07:35 PM and the system is Online.

4. Remove the connection from the Cisco 2811 Router providing WAN access for the Avaya IP Office 500. Place a call from the extension configured in Step 20 of Section 3 on the Avaya IP Office 500 to an extension configured on Avaya Communication Manger at the Main location. Verify two-way audio and voice quality is acceptable. Click the line number configured for the ISDN-PRI trunk in Steps 7 and 8 of Section 3 under the **Trunks** drop-down menu. Verify channel seizure of the ISDN-PRI trunk for the extension configured in Step 20 of Section 3 on the Avaya IP Office 500.

The screenshot displays the Avaya IP Office System Status web interface. The title bar indicates the system is 'IP Office System Status - IPO 500 (44.1.1.1)'. The main content area is titled 'IP Office System Status' and includes a navigation menu on the left with options like System, Alarms (12), Extensions (18), and Trunks (11). The 'Trunks' section is expanded to show 'Line: 1' selected. The main display area shows a 'Digital Trunk Summary' for Line 1, Slot 1, Port 1, which is a T1PRI Local line with 23 channels, 23 administered channels, and 1 channel in use. Below this is a table of channel states:

| Channel Number | Call Ref | Current State | Time in State | Routing Digits | Caller ID or Dialed Digits | Other Party on Call | Direction of Call |
|----------------|----------|---------------|---------------|----------------|----------------------------|---------------------|-------------------|
| 1 | 158 | Connected | 00:00:12 | | 3330010 | Extn 7012, Extn7012 | Outgoing |
| 2 | | Idle | 03:53:20 | | | | |
| 3 | | Idle | 03:53:20 | | | | |
| 4 | | Idle | 03:53:20 | | | | |
| 5 | | Idle | 03:53:20 | | | | |
| 6 | | Idle | 03:53:20 | | | | |
| 7 | | Idle | 03:53:20 | | | | |
| 8 | | Idle | 03:53:20 | | | | |
| 9 | | Idle | 03:53:20 | | | | |
| 10 | | Idle | 03:53:20 | | | | |

At the bottom of the interface, there are buttons for 'Trace', 'Trace All', 'Call Details', 'Print...', and 'Save As...'. The status bar at the bottom right shows the time as 4:09:44 PM and the system is 'Online'.

5. Remove the connection from the Cisco 2811 Router providing WAN access and the ISDN-PRI connection from the Avaya IP Office 500. Place a call from the extension configured in Step 20 of Section 3 on the Avaya IP Office 500 to an extension configured on Avaya Communication Manger at the Main location. Verify two-way audio and voice quality is acceptable. Click the line number configured for the analog trunk in Steps 9 and 10 of Section 3 under the **Trunks** dropdown menu. Verify line seizure of the analog trunk for the extension configured in Step 20 of Section 3 on the Avaya IP Office 500.

IP Office System Status - IPO 500 (44.1.1.1)

AVAYA IP Office System Status

Help Snapshot LogOff Exit About

- System
- Alarms (13)
- Extensions (18)
- Trunks (11)
 - Line: 1
 - Line: 2
 - Line: 5
 - Line: 9 - 12
 - Line: 13 - 16
- Active Calls
- Resources

Status Utilization Summary Alarms

Analog Trunk Summary

Slot/Module: Slot: 3
 Number of Trunks: 4
 Number of Administered Trunks: 4
 Number of Trunks in Use: 1

| Port ID | Line | Line Type | Call Ret | Current State | Time in State | Caller ID or Dialed Digits | Other Party on Call | Direction of Call |
|---------|-------------------------|----------------|----------|---------------|------------------|----------------------------|---------------------|-------------------|
| 9 | Line: 9 Slot: 3 Port... | Loop Start CLI | 161 | Connected | 00:00:11 | 3330010 | Extn 7012, Extn7 | Outgoing |
| 10 | Line: 10 Slot: 3 Po... | Loop Start CLI | | Idle | 00:03:04 | | | |
| 11 | Line: 11 Slot: 3 Po... | Loop Start CLI | | Idle | 8 days 02:30:... | | | |
| 12 | Line: 12 Slot: 3 Po... | Loop Start CLI | | Idle | 8 days 02:30:... | | | |

Trace Trace All Call Details Print... Save As...

4:21:41 PM Online

6. Open the Avaya IP Office System Monitor application and start a logging session with the Avaya IP Office 500. Capture the live events during Step 4 of this section and view the log results in the Avaya IP Office System Monitor. Verify ARS operation of the outgoing call and confirm the ARS entry submitted for the ISDN-PRI trunk is activated.

```
769238714mS CMARS:          MOVE TO ALTERNATE FORM: retail-pstn
769238714mS CMARS:          FORM: retail-pstn - Received Number: 3330010
769238714mS CMARS:          FOUND A SHORT CODE - short_code: 333N; - Tel: 333N -
Called_Party: 3330010 - Line Group Id: 1
769238714mS CMARS:          CMARSHandler::FindActiveARSByGroupID GroupID=1
769238714mS SipDebugInfo: SIPTrunks: Make Target voip, line group id is 1 and
ip of 1e010119
769238714mS SipDebugInfo: SIPTrunks cannot find a suitable SIP URI to dial out
769238715mS CMCallEvt:      0.1667.0 -1 BaseEP: NEW CMEndpoint f58dd5e8 TOTAL
NOW=4 CALL_LIST=1
769238716mS CMARS:          FOUND LINE - Line Id: 1 - using line group id: 1 -
Called Number: 3330010 - Calling Number: 7012
```

7. Capture the live events during Step 5 of this section and view the log results in the Avaya IP Office System Monitor. Verify ARS operation of the outgoing call and confirm the ARS entry submitted for the analog trunk is activated.

```
769333234mS CMARS:          MOVE TO ALTERNATE FORM: retail-analog
769333234mS CMARS:          FORM: retail-analog - Received Number: 3330010
769333234mS CMARS:          FOUND A SHORT CODE - short_code: 333N; - Tel: 333N -
Called_Party: 3330010 - Line Group Id: 9
769333234mS CMARS:          CMARSHandler::FindActiveARSByGroupID GroupID=9
769333234mS SipDebugInfo: SIPTrunks: Make Target voip, line group id is 9 and
ip of 1e010119
769333234mS SipDebugInfo: SIPTrunks cannot find a suitable SIP URI to dial out
769333235mS CMCallEvt:      0.1673.0 -1 BaseEP: NEW CMEndpoint f58dd5dc TOTAL
NOW=4 CALL_LIST=1
769333236mS CMARS:          FOUND LINE - Line Id: 9 - using line group id: 9 -
Called Number: 3330010 - Calling Number: 7012
```

6.2. Avaya SIP Enablement Services Verification

1. Open a telnet session to the Avaya SES Server and access the Linux shell using administrative login credentials. At the Linux shell prompt, enter the **trustedhost -L** command to list all trusted hosts currently configured on the Avaya SES Server. Verify the IP address of the Avaya IP Office 500 is displayed as a trusted host in the command output.

```
admin@hq-ses> trustedhost -L
```

```
Third party trusted hosts.
```

```
Trusted Host IP address | SES Host IP address | Comment
```

```
-----+-----+-----  
44.1.1.1 | 30.1.1.25 |  
11.1.1.1 | 30.1.1.25 |  
22.1.1.20 | 30.1.1.25 |
```

7. Conclusion

These Application Notes illustrate the procedures required for configuring the Alternate Route Selection feature on the Avaya IP Office to provide redundancy through the PSTN when WAN access is unavailable. System options were successfully provisioned in Avaya IP Office for SIP trunking and establishing PSTN connectivity using ISDN-PRI and analog trunks. These Application Notes also describe some administrative steps performed for Avaya SIP Enablement Services related to the configuration of the Avaya IP Office 500. The Avaya IP Office 500 at the Branch location was able to communicate with Avaya Communication Manager at the Main location through the WAN using SIP trunking. As a result of the ARS configuration, the Avaya IP Office 500 at the Branch location was also able to communicate with Avaya Communication Manager at the Main location through the PSTN using ISDN-PRI and analog trunks.

8. References

The following references below can be found at <http://support.avaya.com>:

- Avaya IP Office 4.0 Manager: 01. Using Manager, Issue 19k, January 2007
- Avaya IP Office 4.0 Manager: 02. Configuration Settings, Issue 19k, January 2007
- Avaya IP Office 4.0 Manager: 03. Short Codes, Issue 19k, January 2007
- Avaya IP Office 4.0 Manager: 04. Telephony Features, Issue 19k, January 2007
- Avaya IP Office 4.0 System Status Application User Guide, Issue 1, January 2007
- Installing and Administering SIP Enablement Services Release 3.1.2, Issue 2.1, March 2007
- SIP Support in Release 3.1.2 of Avaya Communication Manager Running on the Avaya S8300, S8500, S8500B, S8700, and S8710 Media Server, Issue 6.1, March 2007
- Administration for Network Connectivity for Avaya Communication Manager, Issue 12, February 2007

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