Avaya Solution & Interoperability Test Lab

Configuring Remote Workers with Avaya Session Border Controller for Enterprise Rel. 6.2, Avaya Aura® Communication Manager Rel. 6.3 and Avaya Aura® Session Managers Rel. 6.3 - Issue 1.0

Abstract

These Application Notes describe the procedures necessary for configuring the Avaya Session Border Controller for Enterprise Rel. 6.2, Avaya Aura® Communication Manager Rel. 6.3 and Avaya Aura® Session Manager Rel. 6.3 to support Remote Workers on Avaya 96x1 SIP Deskphones, Avaya Flare® Experience for Windows and Avaya One-X® Communicator endpoints.

Testing was performed to verify basic functionalities of audio calls on the Avaya 96x1 SIP Deskphones and Avaya Flare® Experience for Windows, audio and video calls on Avaya One-X® Communicator. The calls were placed to and from Remote Worker users residing outside of the enterprise, across the public internet, to various Avaya endpoints located at the enterprise. For privacy, TLS for Signaling and SRTP for media encryption across the public internet were used. RTP, or non-encrypted media, was used inside of the enterprise (private network side).

Readers should pay attention to section 2, in particular the scope of testing as outlined in Section 2.1 as well as the observations noted in Section 2.2, to ensure that their own use cases are adequately covered by this scope and results.

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

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1. Introduction

These Application Notes describe the procedures necessary for configuring Avaya Session Border Controller for Enterprise Rel. 6.2, Avaya Aura® Communication Manager Rel. 6.3 and Avaya Aura® Session Manager Rel. 6.3 to support Remote Workers on Avaya 96x1 SIP Deskphones, Avaya Flare® Experience for Windows and Avaya One-X® Communicator endpoints.

Testing was performed to verify basic functionalities of audio calls on the Avaya 96x1 SIP Deskphones and Avaya Flare® Experience for Windows, audio and video calls on Avaya One-X® Communicator. The calls were placed to and from Remote Worker users residing outside of the enterprise, across the public internet, to various Avaya endpoints located at the enterprise.

The Avaya Session Border Controller for Enterprise (Avaya SBCE) authenticates SIP-based users/clients to the enterprise, securely proxy registrations and client device provisioning and securely manages communication without requiring the use of VPN. For privacy over the public internet, the public side of the Avaya SBCE facing the remote workers should be configured to use the recommended values of TLS for Signaling and SRTP for media encryption of audio and video. In the configuration depicted in these Application Notes, SRTP media encryption of audio and video was used across the public internet, and RTP, or non-encrypted media, was used inside of the enterprise (private network side)

The Avaya SBCE can effectively protect the enterprise network against all types of inadvertent and malicious intrusions and attacks. The Avaya SBCE two-wire-in-line topology performs border access control functionality such as Firewall/ Network Address Translation (NAT) traversal, access management and control based on user-configurable domain policies, and intrusion functionality to protect against DoS, spoofing, and stealth attacks, along with voice SPAM.

2. General Test Approach and Test Results

The general test approach was to simulate an enterprise site in the Solution & Interoperability Test Lab by configuring the Avaya SBCE, Communication Manager and Session Manager to support Remote Workers, allowing Remote Worker SIP endpoints residing outside of the enterprise to register to Session Manager, provide client device provisioning using HTTPS, and communicate effectively with enterprise endpoints using SRTP encryption of audio and video across the public internet without requiring the use of VPN, as depicted in **Figure 1.**

Currently there are several supported Avaya SIP endpoints for Remote Workers. Testing covered under these Application Notes only included the following SIP endpoints: Avaya 96x1 SIP deskphones, Avaya one-X® Communicator softphone (configured for SIP mode) and Avaya Flare® Experience for Windows SIP softphone. The Avaya 96x1 SIP Deskphones supports SRTP audio encryption, Avaya one-X® Communicator supports SRTP audio and video encryption, Avaya Flare® Experience for Windows softphone (as of Release 1.1.4.23) supports audio SRTP encryption, but currently does not support SRTP video encryption.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly-defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute for full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

2.1. Test Coverage

To verify Remote Worker basic functionality, the following areas were tested:

- Re-starting the 96x1 Deskphones, ensuring proper download and upgrade of new firmware. Also, proper download of settings defined in the configuration file (46xxsettings) via HTTPS.
- Making provisioning changes in Session Manager, ensuring proper download of PPM data.
- Remote Worker endpoint registrations to Session Manager, using the proper credentials.
- Basic audio calls to and from Remote Workers using 96x1 Deskphones, Avaya One-X® Communicator and Avaya Flare® Experience for Windows to various Avaya endpoint types located at the enterprise. SRTP media encryption of audio was used across the public internet. RTP, or non-encrypted media, of audio was used inside of the enterprise (private network side). For signaling, SIP over TLS was used across the public internet and inside of the enterprise (private network side).
- Basic audio calls, with video, to and from Remote Workers using Avaya One-X® Communicator to Avaya One-X® Communicator endpoints located at the enterprise. SRTP media encryption of audio and video was used across the public internet. RTP, or non-encrypted media, of audio and video was used inside of the enterprise (private network side). For signaling, SIP over TLS was used across the public internet and inside of the enterprise (private network side).
- Basic call handling features, such as Call hold, transfer, call forward, and conference were tested.
- Call coverage to Avaya Aura® Messaging and Message Waiting Indicator (MWI) activation/deactivation.

Note: The intent behind these Application Notes is not to perform Interoperability Compliance Testing or to test every supported Remote Worker SIP endpoint type, but simply to illustrate the provisioning steps that are required in order to support Remote Workers on Avaya enterprise solutions involving Communication Manager, Session Manager and the Avaya SBCE. Remote worker integration with SIP Trunking was not part of the reference configuration. Interoperability Compliance Testing of Remote Worker endpoints with SIP Trunking should be done independently with each Service Provider. Testing additional supported Remote Worker SIP endpoints, not listed under these Application Notes, is outside the scope of these Application Notes.

2.2. Test Results

Basic Remote Worker functionality was verified successfully with the following observations/limitations.

- **Avaya Flare® Experience for Windows SRTP video encryption** – SRTP video encryption is currently not supported on Avaya Flare® Experience for Windows (**Release 1.1.4.23**). Video has to be disabled on the Avaya Flare® Experience for Windows PC application if SRTP encryption is enabled in the Avaya SBCE for Avaya Flare® under **Subscriber Flows**. If video is enabled the user will receive busy signal when attempting to make calls.
- The inside IP address of the Avaya SBCE (private network side) used for Remote Workers needs to be "whitelisted" in the Session Manager Firewall.

2.3. Support

Avaya customers may obtain documentation and support for Avaya products by visiting http://support.avaya.com. Alternatively, in the United States, (866) GO-AVAYA (866-462-8292) provides access to overall sales and service support menus.

3. Reference Configuration

In the reference configuration, an existing Avaya SBCE is provisioned to supports Remote Worker, allowing remote SIP endpoints, connected via the public Internet, access to the private enterprise without the use of VPN.

For Remote Workers, standard and Advanced Session Licenses are required on the Avaya SBCE. Contact an authorized Avaya representative for assistance if additional licensing is required. The settings presented here illustrate a sample configuration and are not intended to be prescriptive.

Figure 1 below illustrates the Remote Worker topology used in the reference configuration.

The Avaya components used to create the simulated enterprise site included:

- Avaya S8300 Server running Avaya Aura® Communication Manager.
- Avaya G450 Media Gateway.
- Avaya HP® Proliant DL360 G7 server running Avaya Aura® Session Manager.
- Avaya HP® Proliant DL360 G7 server running Avaya Aura® System Manager.
- Dell R210 V2 Server running Avaya Session Border Controller for Enterprise.
- Avaya 96x0-Series IP Deskphones (H.323 and SIP) at the enterprise site.
- Avaya 96x1-Series IP Deskphones (H.323 and SIP) at the enterprise site.
- Avaya 96x1-Series IP Deskphones (SIP) at the Remote Worker site.
- Avaya one-X® Communicator soft phones (H.323 and SIP) at the enterprise site.
- Avaya one-X® Communicator soft phones (SIP) at the Remote Worker site.
- Avaya Flare® Experience for Windows (SIP) at the enterprise site and at the Remote Worker sites.

- Desktop PC running a HTTPS file server at the enterprise site.

In the reference configuration, Remote Workers Internet access is simulated by a Router/NAT/Firewall/Default Gateway located at the Remote Worker site, between the Remote Worker private network side and the public Internet. The router also provides DHCP service to the SIP endpoints.

Located at the edge of the enterprise is a stand-alone Avaya SBCE. It has a public network side that connects to the public internet and a private network side that connects to the enterprise network. All SIP and media traffic entering or leaving the enterprise flows through the Avaya SBCE. This way, the Avaya SBCE can protect the enterprise against any SIP-based attacks. The Avaya SBCE provides network address translation at both the IP and SIP layers. For privacy over the public internet, the Avaya SBCE was configured to use SRTP for media encryption of audio and video on its public network side. The Avaya SBCE was configured to use RTP, or non-encrypted media, for audio and video inside of the enterprise (private network side).

The transport protocol used between the Avaya SBCE and the Remote Workers across the public internet is SIP over TLS. The transport protocol used between the Avaya SBCE and Session Manager across the enterprise private network was also SIP over TLS.

For security reasons, any actual public IP addresses used in the configuration have been masked.

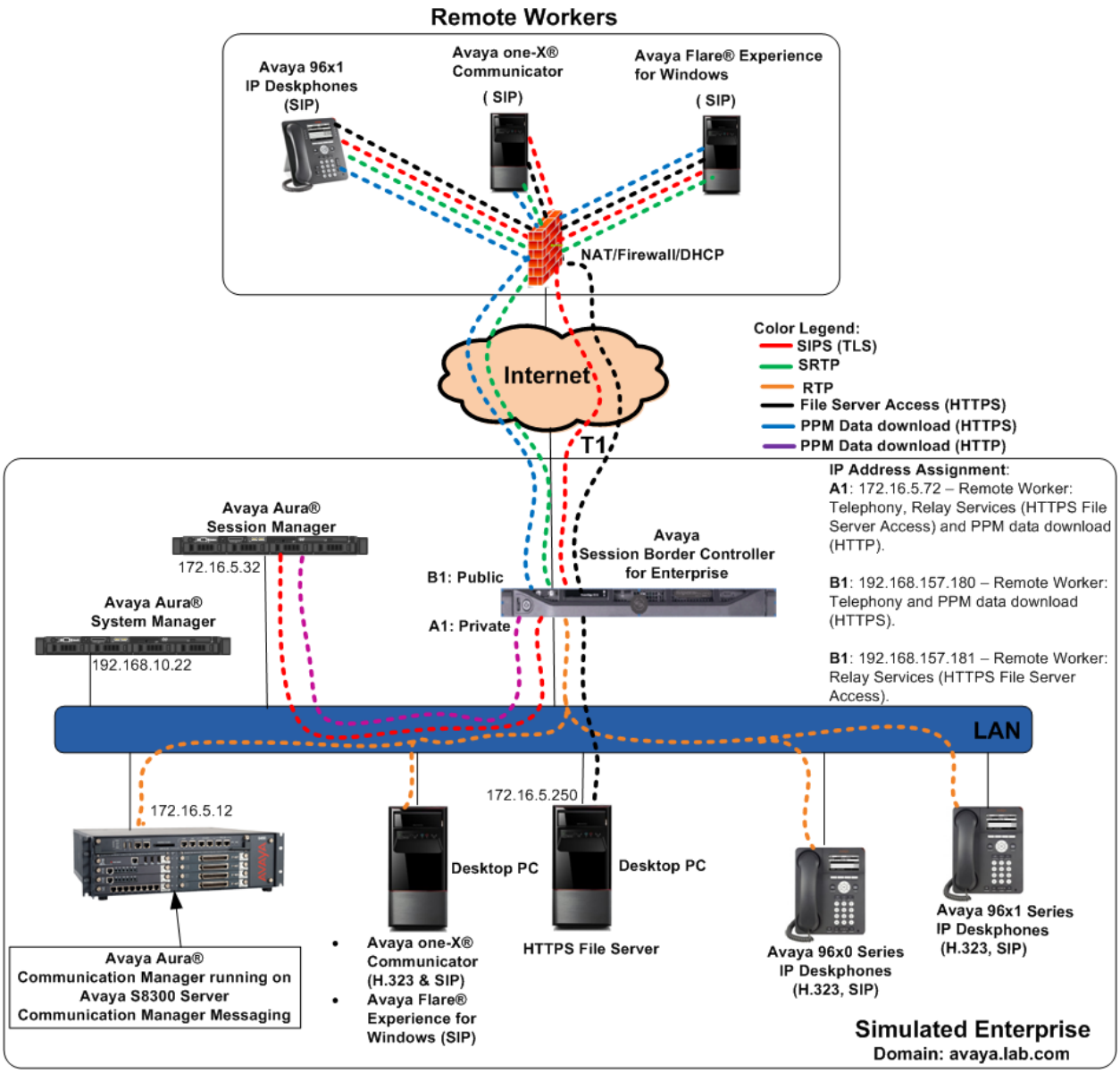


Figure 1: Remote Worker topology used in the reference configuration

4. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya	
Avaya Aura® Communication Manager running on an Avaya S8300D Server	6.3.5 (Service Pack 5) (03.0.124.0-21460)
G450 Gateway	35.8.0
Avaya Aura® Session Manager running on a HP® Proliant DL360 G7 Server	6.3.7 (Service Pack 7) (6.3.7.0.637008)
Avaya Aura® System Manager running on a HP® Proliant DL360 G7 Server	6.3.7 Build No. 6.3.0.8.5682-6.3.8.3204 Software Update Rev. No. 6.3.7.7.2275
Avaya Session Border Controller for Enterprise running on a DELL R210 V2 Server	6.2.1.Q07
Avaya Aura® Integrated Management Site Administrator	6.0.07
Avaya Aura® Communication Manager Messaging (CMM)	CMM 6.3 (Service Pack 2) (03.0.124.0-0202)
Avaya one-X® Communicator (SIP & H.323)	6.2.2.07-SP2
Avaya Flare® Experience for Windows (SIP)	1.1.4.23
Avaya 96x1 Series IP Deskphones (SIP)	Avaya one-X® Deskphone SIP Version 6.3.1.22
Avaya 96x1 Series IP Deskphones (H.323)	Avaya one-X® Deskphone H.323 Version 6.3.0.37
Avaya 96x0 Series IP Deskphones (H.323)	Avaya one-X® Deskphone Edition Version S3.212A
Avaya 96x0 Series IP Deskphones (SIP)	Avaya one-X® Deskphone SIP Version 2.6.11.4

Table 2 – Hardware and Software Components Tested

5. Configure Avaya Aura® Communication Manager

This section describes the required configuration of Communication Manager for video support on Avaya Softphones.

It is assumed that the general installation of Communication Manager, the Avaya G450 Media Gateway and Session Manager has been previously completed.

The Communication Manager configuration was performed using the Avaya Integrated Management Site Administrator.

Note: The Communication Manager Configuration shown under this section is **only** required if the customer is planning to use video on Avaya softphones.

On Avaya Flare® Experience for Windows, testing was done with video disabled since SRTP video encryption is not supported in the current release of Avaya Flare® Experience for Windows (**Release 1.1.4.23**). Please refer to the note in **Section 7.8.3.1** for additional information regarding video settings and using SRTP encryption for audio.

5.1. Signaling Group

Use the **change signaling-group** command to enable **IP Video** on the **Signaling Group** being used for calls within (inside) the enterprise. For the compliance test **Signaling Group 1** was used.

Use the **change signaling-group 1** command to enable **IP Video,** as follows:

- Set **IP Video?** to ***y***.
- Leave remaining parameters with the existing values.

```
change signaling-group 1                                        Page   1 of   2
                                SIGNALING GROUP

 Group Number: 1              Group Type: sip
  IMS Enabled? n        Transport Method: tls
        Q-SIP? n
     IP Video? y          Priority Video? n        Enforce SIPS URI for SRTP? y
  Peer Detection Enabled? y  Peer Server: SM
 Prepend '+' to Outgoing Calling/Alerting/Diverting/Connected Public Numbers? y
Remove '+' from Incoming Called/Calling/Alerting/Diverting/Connected Numbers? n
Alert Incoming SIP Crisis Calls? n
   Near-end Node Name: procr            Far-end Node Name: Lab-HG-SM
 Near-end Listen Port: 5061           Far-end Listen Port: 5061
                                    Far-end Network Region: 1

Far-end Domain: avaya.lab.com
                                      Bypass If IP Threshold Exceeded? n
Incoming Dialog Loopbacks: eliminate          RFC 3389 Comfort Noise? n
         DTMF over IP: rtp-payload     Direct IP-IP Audio Connections? y
Session Establishment Timer(min): 3            IP Audio Hairpinning? n
         Enable Layer 3 Test? y            Initial IP-IP Direct Media? n
H.323 Station Outgoing Direct Media? n     Alternate Route Timer(sec): 6
```

5.2. IP Codec Set

Use the change **ip-codec-set** command to enable **Allow Direct-IP Multimedia** on the **IP Codec Set** being used for calls within (inside) the enterprise.

Use the **change ip-codec-set 1** command to enable **Allow Direct-IP Multimedia,** as follows:

On page **2 of 2**:

- Set **Allow Direct-IP Multimedia?** to ***y***.
- Set the **Maximum Call Rate for Direct-IP Multimedia** to a value specific for the enterprise, the default value of ***384 Kbits*** was used in the sample configuration.
- Set the **Maximum Call Rate for Priority Direct-IP Multimedia** to a value specific for the enterprise, the default value of ***384 Kbits*** was used in the sample configuration.
- Leave remaining parameters with the existing values.

```
change ip-codec-set 1                                          Page   2 of   2

                         IP CODEC SET

                           Allow Direct-IP Multimedia? y
          Maximum Call Rate for Direct-IP Multimedia:  384:Kbits
Maximum Call Rate for Priority Direct-IP Multimedia:  384:Kbits

                                                                     Packet
                         Mode                  Redundancy            Size(ms)
FAX                      t.38-standard          0          ECM: y
Modem                    off                    0
TDD/TTY                  US                     3
H.323 Clear-channel      n                      0
SIP 64K Data             n                      0                     20
```

Note: To save all Communication Manager provisioning changes, enter the command **save translations**.

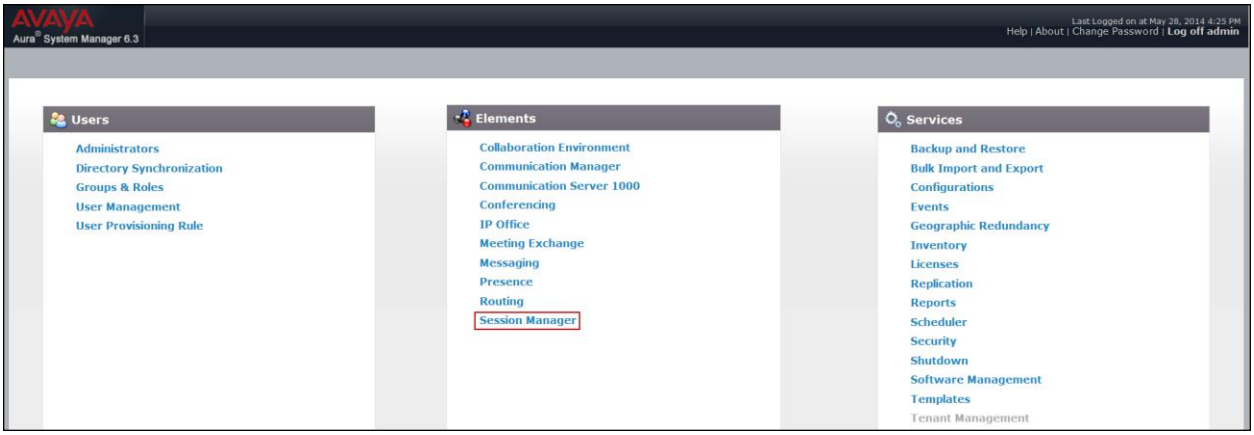
6. Configure Avaya Aura® Session Manager

This section describes the required configuring of Session Manager for the support of Remote Workers.

Note: Some of the default information in the screenshots that follow may have been cut out (not included) for brevity.

6.1. System Manager Login and Navigation

Session Manager configuration is accomplished by accessing the browser-based GUI of System Manager, using the URL "https://<ip-address>/SMGR", where "<ip-address>" is the IP address of System Manager. Log in with the appropriate credentials (not shown). The screen shown below is then displayed. Click on **Session Manager**.

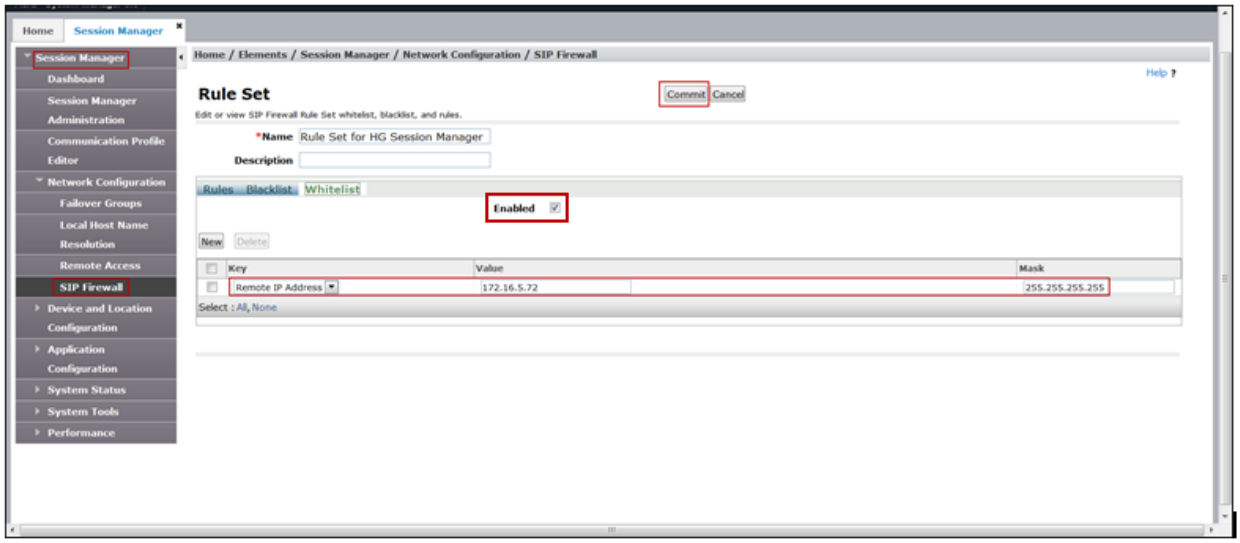


6.2. Modify Session Manager Firewall

Under **Elements → Session Manager → Network Configuration → SIP Firewall**, select the Session Manager instance (e.g., HG Session Manager) (not shown). Use values specific for the enterprise, the following values were used in the reference configuration:

- Select **Edit** (not shown).
- Select **Whitelist** tab.
- Verify **Enabled** is checked.
- Select **New**.
- Under the **Key** field select ***Remote IP Address***.
- Under the **Value** field enter the internal (private network side) IP address of the Avaya SBCE used for Remote Worker (e.g., ***172.16.5.72***) (see **Section 7.3**).
- Under the **Mask** field enter the appropriate mask (e.g., ***255.255.255.255***).
- Click **Commit**.

The following screenshot show the values of the SIP Firewall after the changes were made.

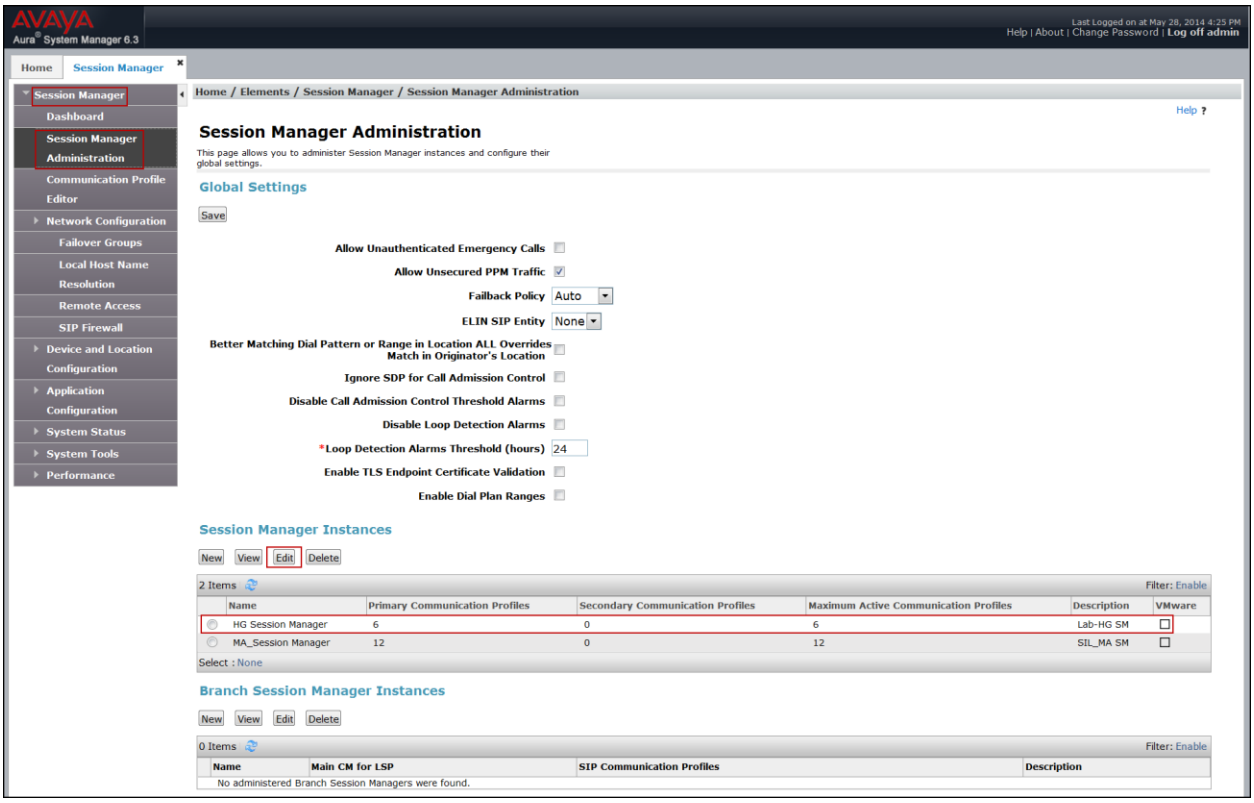


Note: If this is a new Session Manager installation, you will need to create a rule set for the Session Manager. In later Session Manager software releases, the rule set is not created automatically; instead, the Session Manager is assigned to a default rule set which cannot be modified. Thus, the appropriate rule set must be copied, assigned to the Session Manager, and then modified using the procedure listed above.

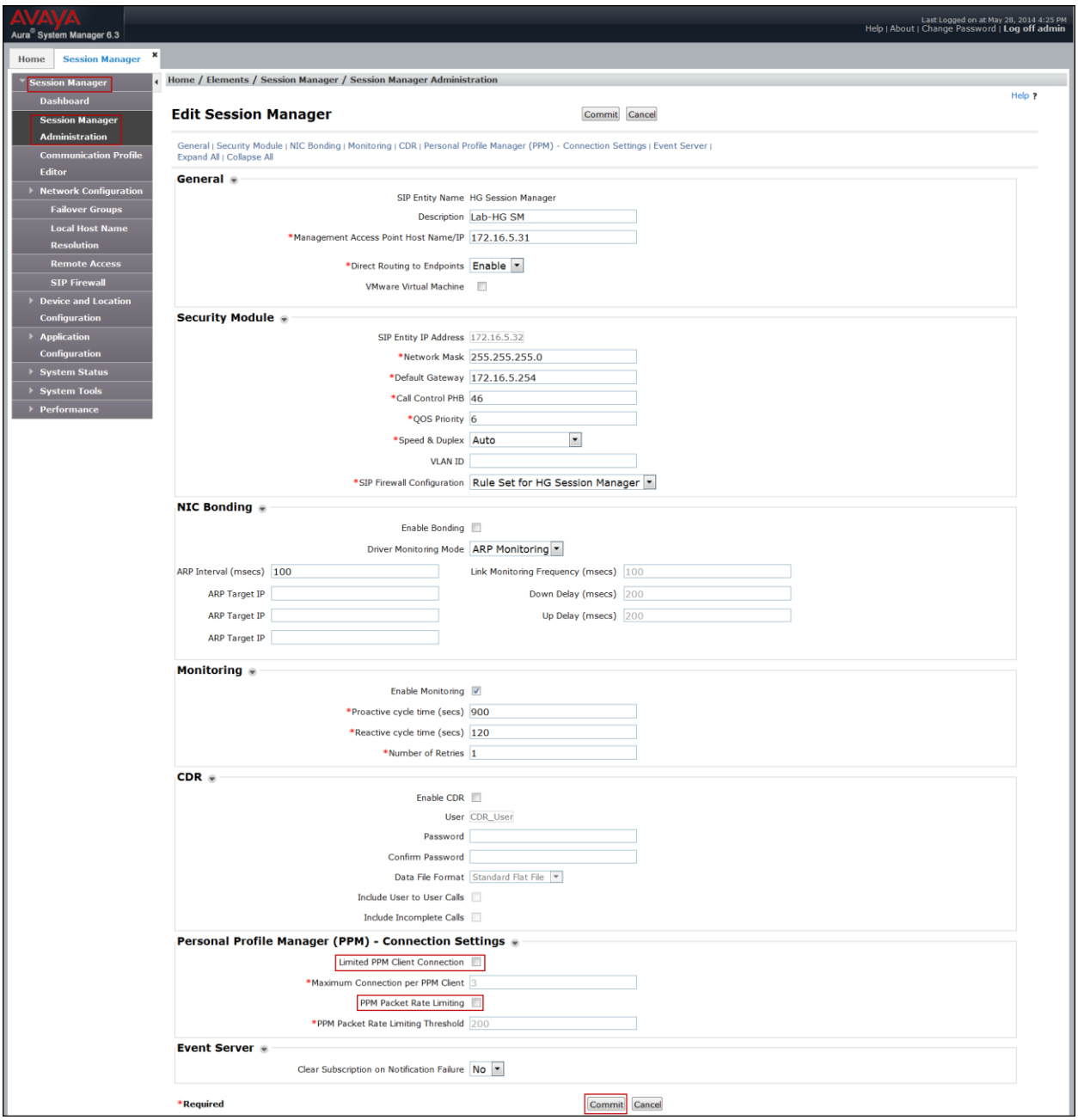
6.3. Disable PPM Limiting

Under **Elements → Session Manager → Session Manager Administration**, Select the Session Manager instance (e.g., HG Session Manager).

- Select **Edit**.



- The **Edit Session Manager** screen is displayed. Scroll down to the **Personal Profile Manager (PPM) – Connection Settings** section.
- Uncheck the **Limited PPM Client Connections** and **PPM Packet Rate Limiting** options.
- Click **Commit**.



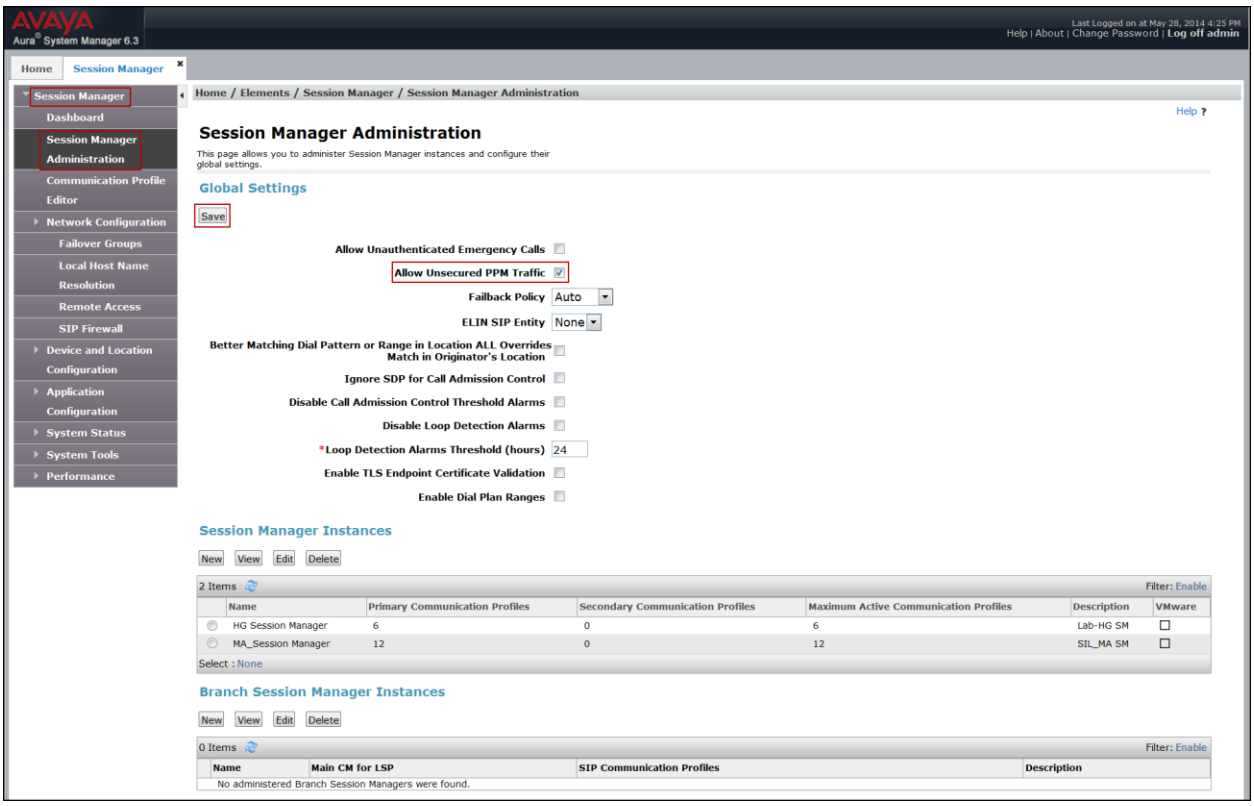
6.4. HTTP Access from the Avaya SBCE to Avaya Aura® Session Manager for PPM data downloads.

Remote Worker connection between the Avaya SBCE and Session Manager may use HTTPS or HTTP for PPM data download based on the **Allow Unsecured PPM Traffic** setting. In the reference configuration, HTTPS was used between the Remote Worker phones and the Avaya SBCE and HTTP was used between the Avaya SBCE and Session Manager.

6.4.1. HTTP Access from the Avaya SBCE to Avaya Aura® Session Manager

Under **Elements → Session Manager → Session Manager Administration**.

- Verify that **Allow Unsecure PPM Traffic** option is checked.
- Click **Save**.



Note: In the reference configuration, **Allow Unsecured PPM Traffic was checked**, resulting in unsecured (HTTP) PPM traffic between the Avaya SBCE and Session Manager (private network side). Secured PPM traffic (HTTPS) was used between Remote Worker endpoints and the Avaya SBCE (public network side).

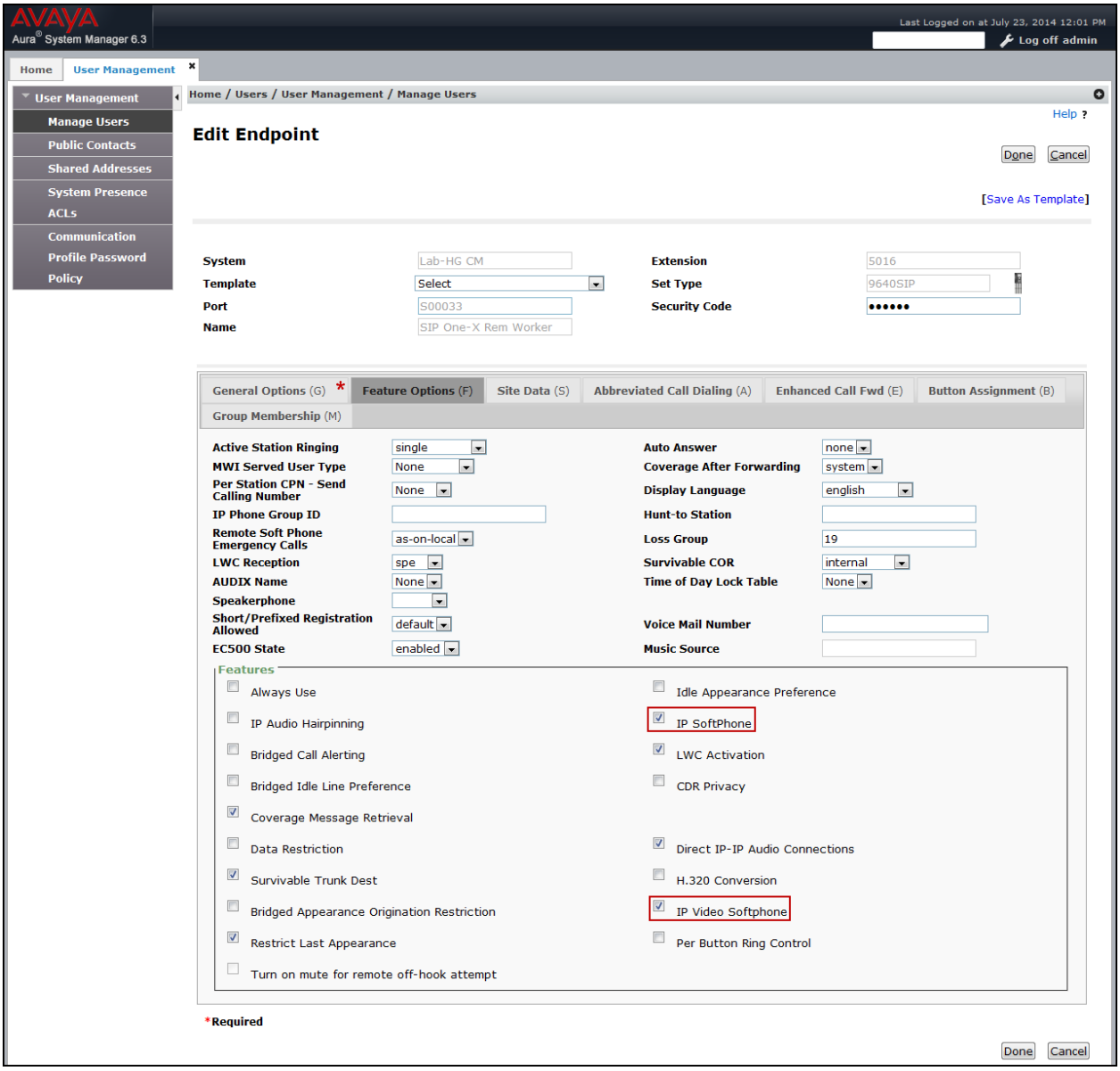
6.5. Enable video on Avaya SIP Softphones

This section describes the required configuration of Session Manager for video support on Avaya SIP Softphones, including Remote Worker SIP softphones (e.g., Avaya one-X® Communicator).

It is assumed that SIP user provisioning in Session Manager has been previously completed. Refer to item [12] in **Section 10** for instruction on how to add SIP users in Session Manager.

Under **Users → User Management**, select **Manage Users**. Select the user instance to enable video (not shown), click **Edit**. Under **CM Endpoint Profile**, click on **Endpoint Editor** (not shown). **Under Feature Options (F):**

- Verify that **IP Softphone** is checked.
- Check **IP Video Softphone**.
- Click **Done**, then on **Commit** on the next screen (not shown).



7. Configure the Avaya Session Border Controller for Enterprise (Avaya SBCE)

This section describes the required configuring of the Avaya SBCE for the support of Remote Workers.

It is assumed that the Avaya SBCE was provisioned and the appropriate licenses were installed and is ready to be used; the configuration shown here is accomplished using the Avaya SBCE web interface.

Note: During the next pages, and for brevity in these Application Notes, not every provisioning step will have a screenshot associated with it.

7.1. Avaya Session Border Controller for Enterprise Configuration

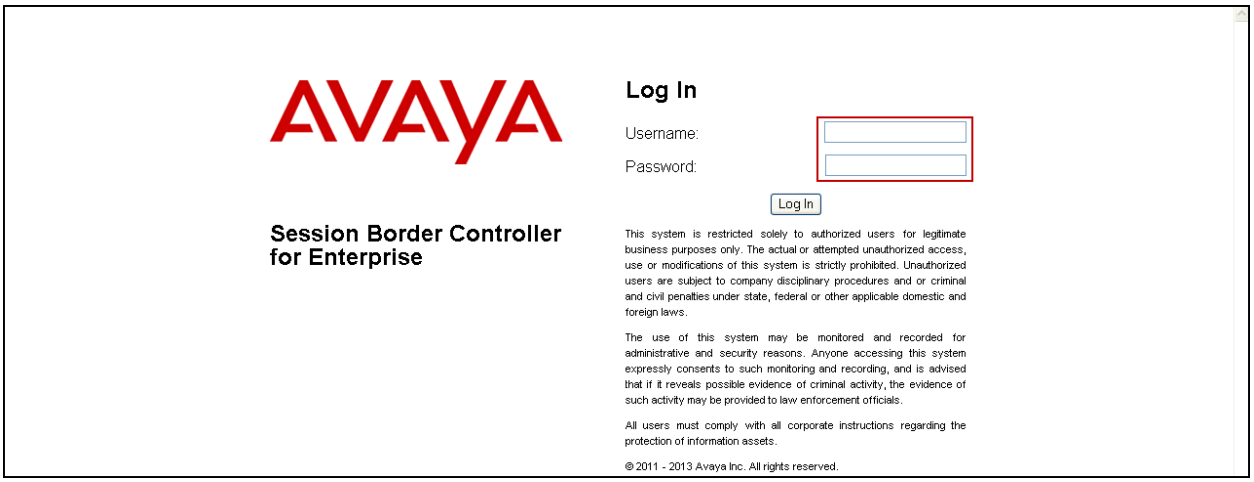
The configuration steps on the Avaya SBCE include the following:

- Add network interfaces.
- Create User Agents.
- Create Server Interworking Profile.
- Create Routing Profile.
- Create Server Configuration Profile.
- Create SIP Cluster Proxy.
- Create Application Rules.
- Create Media Rules.
- Create Signaling Rules.
- Create Endpoint Policy Group.
- Create Media and Signaling Interfaces.
- Create Endpoint Subscriber Flow.
- Create Endpoint Server flow.
- Create Relays Services.

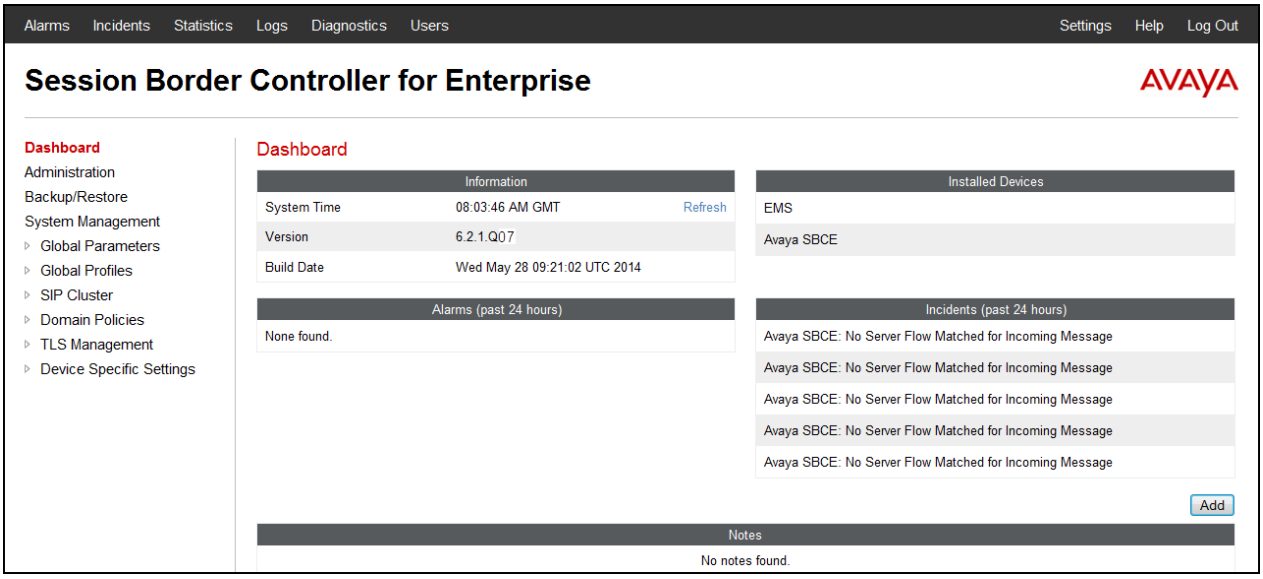
7.2. System Access

Use a web browser to access the Avaya SBCE web interface, enter https://<ip-addr>/sbc in the address field of the web browser, where <ip-addr> is the management IP address of the Avaya SBCE.

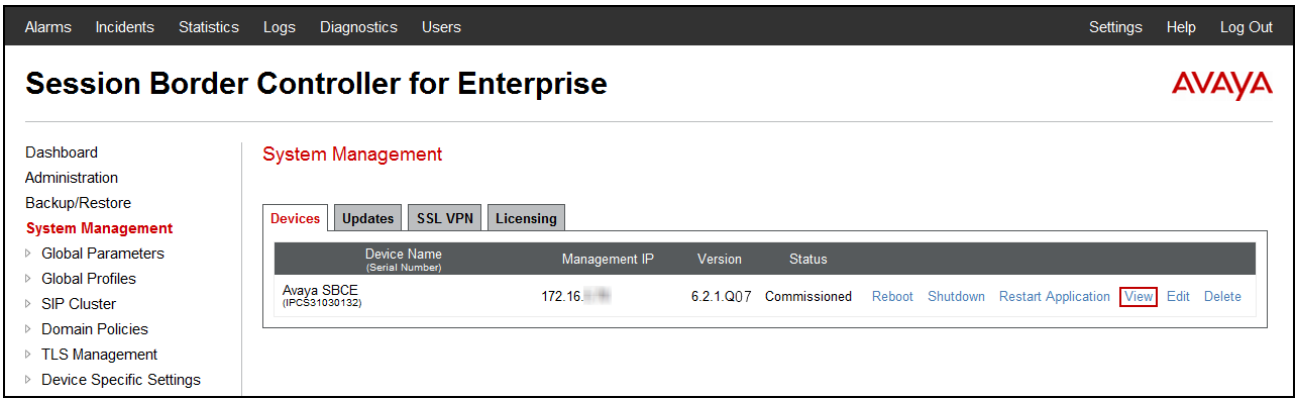
Enter the appropriate credentials and then click **Log In**.



The **Dashboard** main page will appear as shown below.



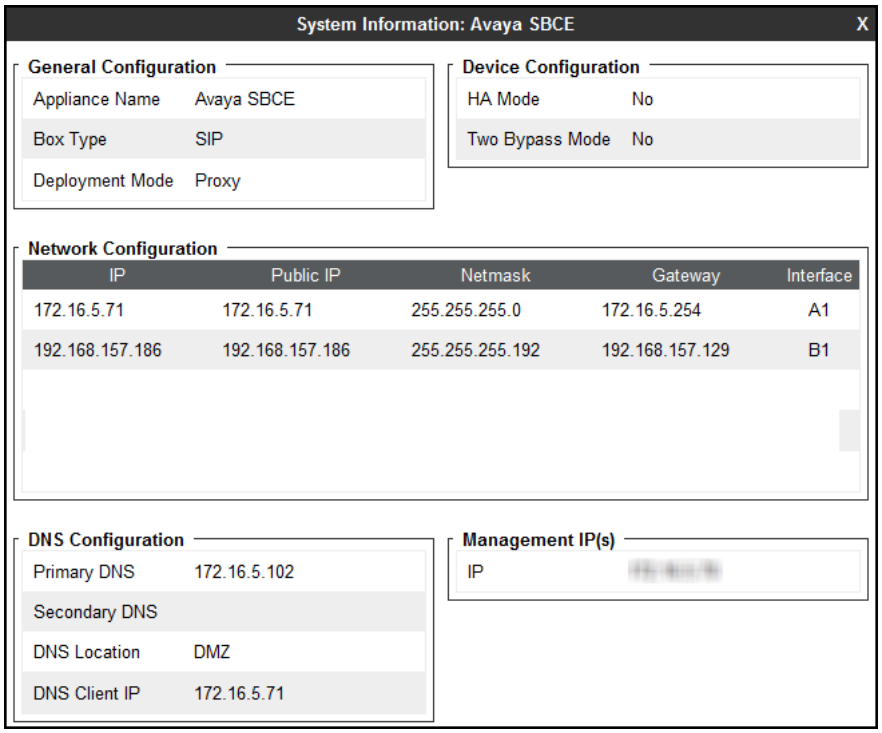
To view the system information that has been configured during installation, navigate to **System Management**. A list of installed devices is shown in the right pane. In the compliance testing, a single Device Name **Avaya SBCE** was already added. To view the configuration of this device, click on **View** as shown in the screenshot below.



The **System Information** window is displayed as shown below.

The **System Information** screen shows **Network Settings**, **DNS Configuration** and **Management IP** information provided during installation. The **Box Type** was set to ***SIP*** and the **Deployment Mode** was set to ***Proxy***. Default values were used for all other fields.

The **A1** and **B1** interfaces and IP addresses shown below are part of a prior configuration that was added to support SIP Trunks only and are **not** relevant to the configuration required by Remote Workers. The configuration required to support Remote Workers is illustrated on sections that follow. The management IP was blurred out for security reasons.

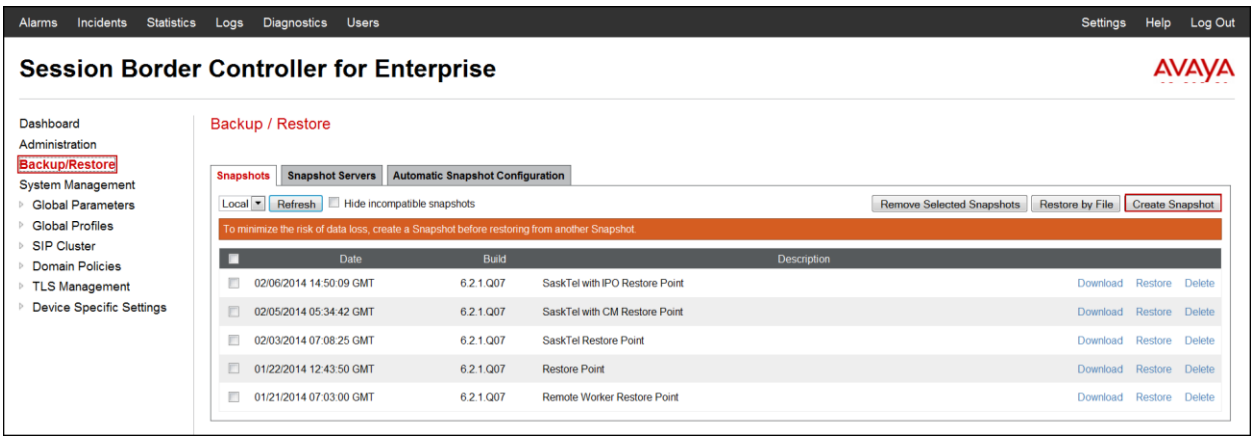


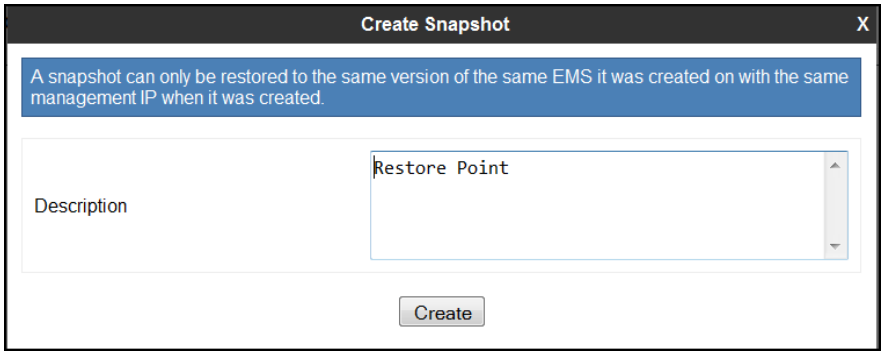
7.2.1. Create Backup

It's always a good idea to backup the configuration prior to making changes to the Avaya SBCE.

Under **Backup/Restore → Snapshots** tab:

- Click on **Create Snapshot**, give a description and Click **Create**.
- Save the backup to the desktop by clicking **Download** and save the file to the PC.
- After finishing the configuration it is recommended to take another snapshot and to save the file to the PC.





7.3. Network Management

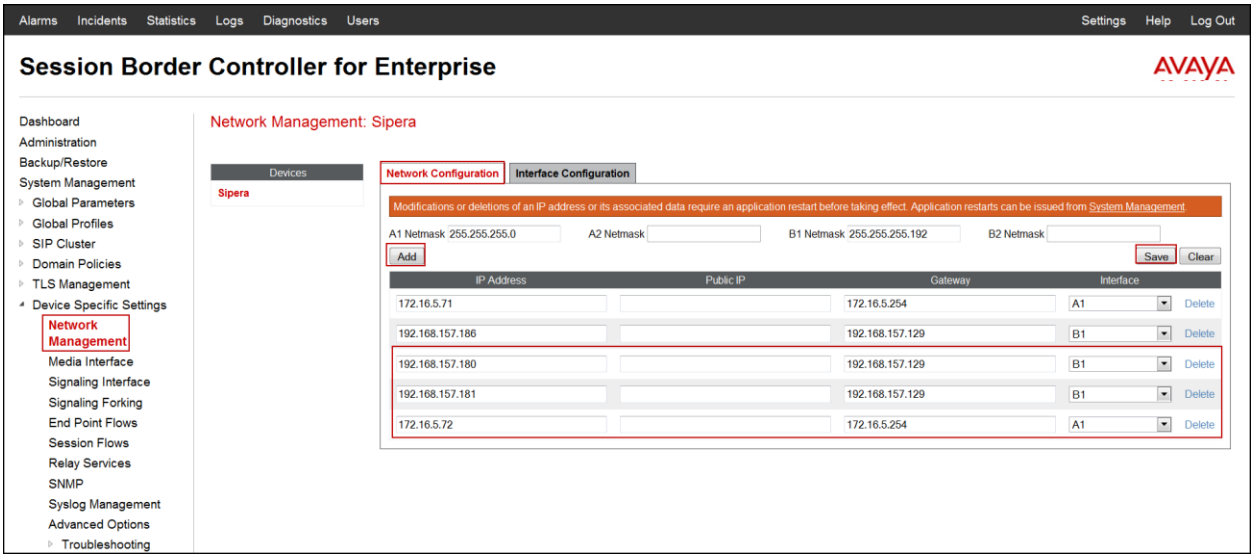
The following screen shows the Network Configuration of the Avaya SBCE. In the reference configuration shown, the Avaya SBCE was configured with three "public" IP addresses assigned to physical interface B1, and two "private" IP addresses assigned to physical interface A1.

Note: For Remote Worker configuration, only two "public" IP addresses and one "private" IP address are required (enclosed in a red bracket). The other IP addresses shown (not enclosed in red bracket) were previously configured and are used for SIP Trunking only; they are not relevant to the functionality of Remote Workers. The Avaya SBCE used in the reference configuration was provisioned to support SIP Trunking and Remote Worker functionalities, IP addresses used for SIP Trunking are listed here simply for clarification.

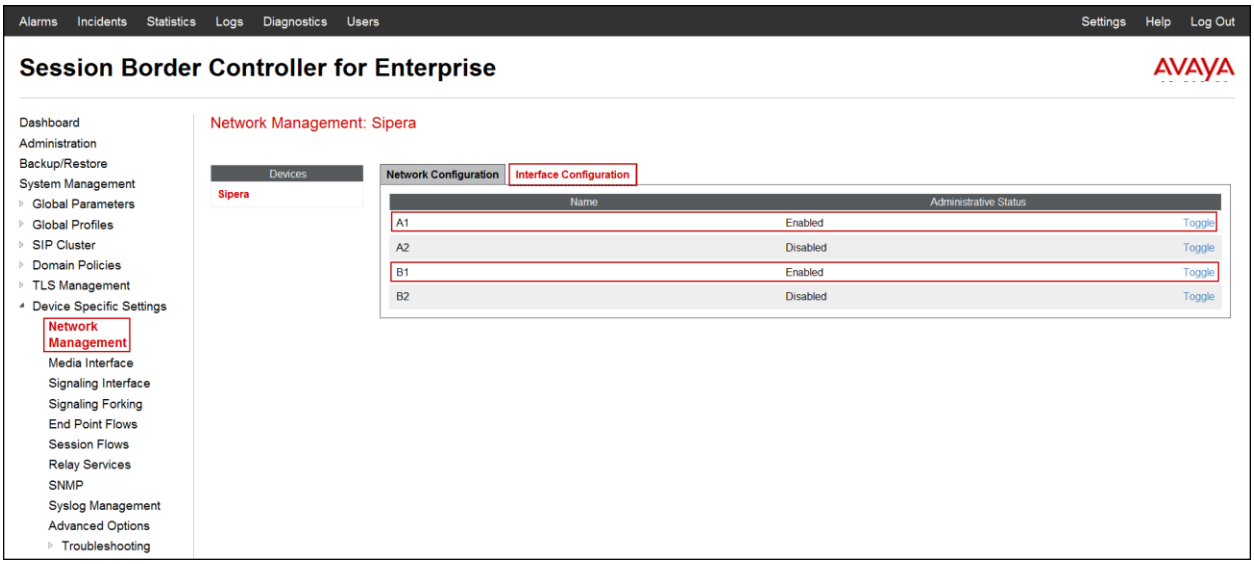
Following are the IP addresses and associated interfaces used in the reference configuration:

- **172.16.5.71** is the Avaya SBCE "private" address previously provisioned for SIP Trunks. This address is **not** relevant to Remote Workers functionality and is not discussed in this document.
- **172.16.5.72** is the new Avaya SBCE "private" address added for Remote Workers access to the enterprise private network (e.g., Session Manager). Note that this address is also used to access the HTTPS file server residing inside of the enterprise (private network side) containing the 46xxsettings.txt configuration and phone firmware files (see **Section 7.8.4**).
- **192.168.157.186** is the Avaya SBCE "public" address previously provisioned for SIP Trunks to the Service Providers. This address is **not** relevant to Remote Workers functionality and is not discussed in this document.
- **192.168.157.180** is one of the two new Avaya SBCE "public" addresses added for Remote Worker access to Session Manager via the Avaya SBCE. Remote Worker SIP endpoints will use this "public" address to established connection to Session Manager through the Avaya SBCE, for registration, telephony functions and PPM data download.
- **192.168.157.181** is one of the two new Avaya SBCE "public" addresses added for Remote Worker access to the HTTPS file server residing inside of the enterprise (private network side) containing the 46xxsettings.txt configuration file and Deskphone firmware. This address is also referred to as the "Relay Services" address.

Under **Device Specific Settings → Network Management → Network Configuration** tab, select **Add** to create a new interface entry. Use IP address values specific to the enterprise. Values shown below were used in the reference configuration. Select **Save** when done (not shown). Repeat the steps for each entry.



On the Interface Configuration tab, click the **Toggle** control for interfaces **A1** and **B1** to change the status to **Enabled**. It should be noted that the default state for all interfaces is **Disabled**, so it is important to perform this step or the Avaya SBCE will not be able to communicate on any of its interfaces.

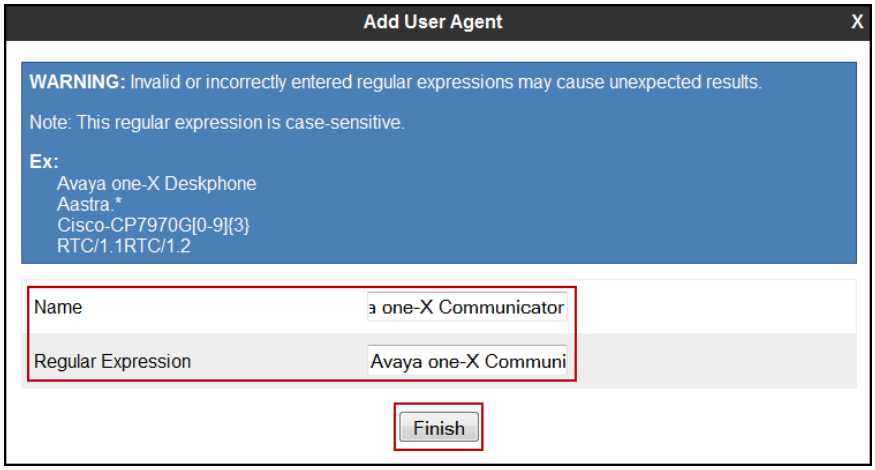


7.4. User Agents

User Agents were created for each type of endpoint tested. This allows for different policies to be applied based on the type of device being used.

Under **Global Parameters → User Agents**, select **Add** (not shown), use values specific to the enterprise. The following values were used in the reference configuration:

- Under **Name** enter ***Avaya one-X Communicator***
- Under **Regular Expression** enter ***Avaya one-x Communicator.****
- Click **Finish**.

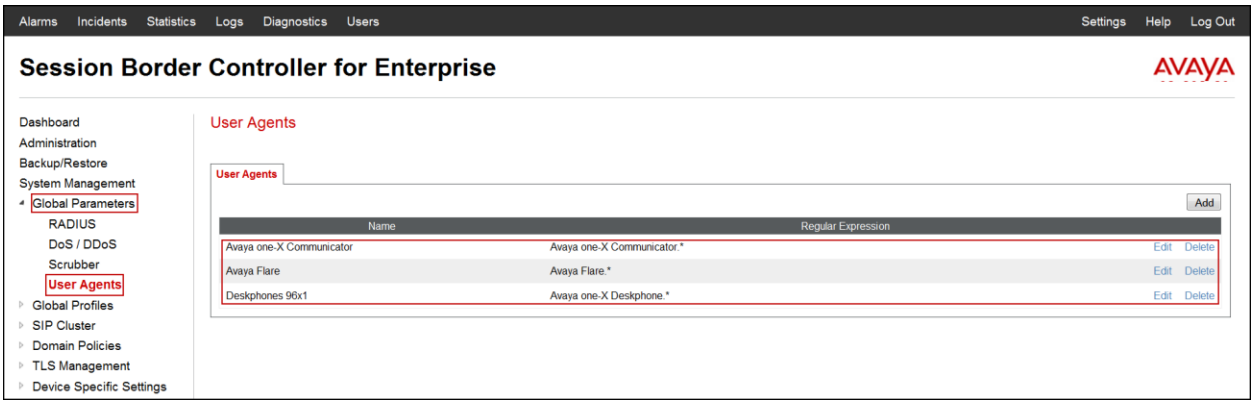


Repeat the above steps adding two additional User Agents with the following values:

- **Name:** ***Avaya Flare***
- **Regular Expression:** ***Avaya Flare.****

- **Name:** ***Deskphone 96x1***
- **Regular Expression:** ***Avaya one-X Deskphone.****

The following screenshot shows the User Agents after they were added.



The following abridged output of traceSM shows the details of an Invite message from an Avaya one-X Deskphone. The **User-Agent** shown in this trace will match User Agent with **Regular Expression** of "Avaya one-X Deskphone.*". In this example, the expression ".*" will match any software version listed after the user agent name.

```
                                                    172.16.5.72:15137 --TLS-> 172.16.5.32:5061
-----------------------------------------------------------------------------------------------
INVITE sips:5015@172.16.5.32;avaya-cm-fnu=off-hook SIP/2.0
From: <sips:5015@172.16.5.32>;tag=27a305d8538dcabf-58e46800_F501510.10.10.13
To: <sips:5015@172.16.5.32;avaya-cm-fnu=off-hook>
CSeq: 10 INVITE
Call-ID: a_538dcabf6c62b81e-58e46a80_I@10.10.10.13
Contact: <sips:5015@172.16.5.72:5061;transport=tls;subid_ipcs=972640342>;+avaya-cm-line=1
Record-Route: <sip:172.16.5.72:5061;ipcs-line=76;lr;transport=tls;subid_ipcs=972640342>
Allow: INVITE,ACK,BYE,CANCEL,SUBSCRIBE,NOTIFY,MESSAGE,REFER,INFO,PRACK,PUBLISH,UPDATE
Supported: 100rel,eventlist,feature-ref,replaces,tdialog
User-Agent: Avaya one-X Deskphone 6.3.1.22 (22)
Max-Forwards: 69
Via: SIP/2.0/TLS 172.16.5.72:5061;branch=z9hG4bK-s1632-002066383241-1--s1632-
Expires: 30
Accept-Language: en
Content-Length: 0
```

7.5. Global Profiles

The Global Profiles menu, on the left navigation pane, allows the configuration of parameters across all Avaya SBCE appliances.

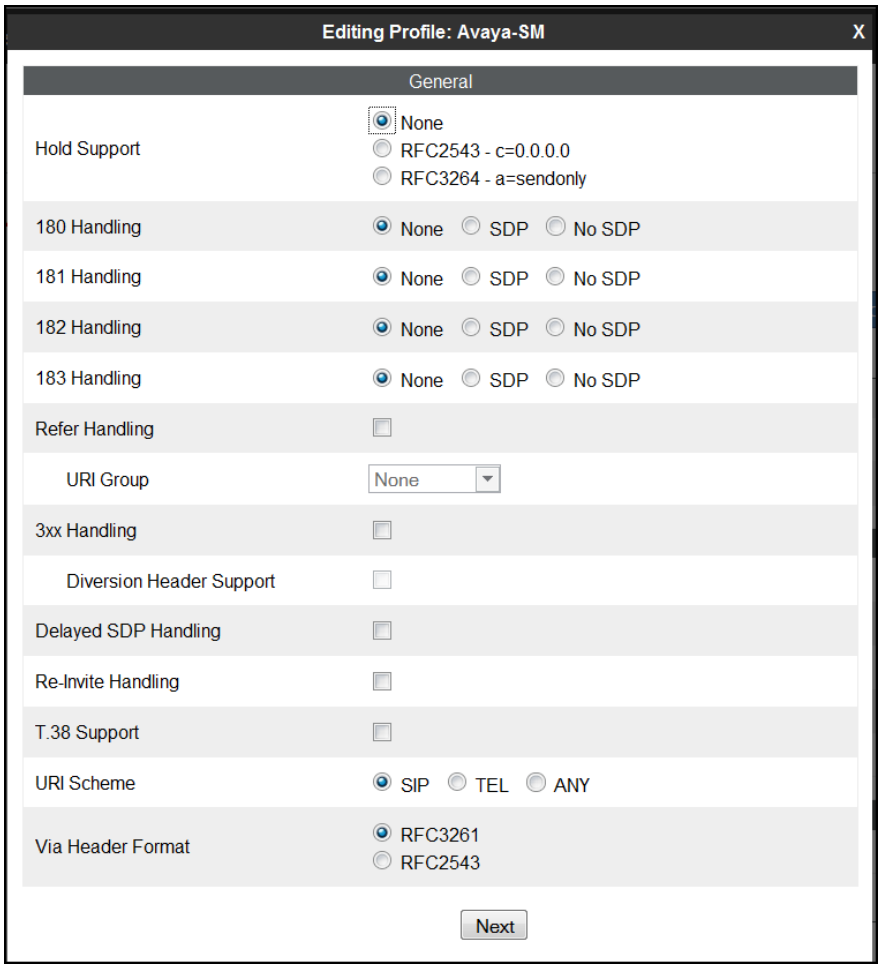
7.5.1. Server Interworking Profile

Under **Global Profiles → Server Interworking**, select the existing Server Interworking profile that was previously created for Session Manager, if one exist (see note below). In the reference configuration the Server Interworking profile by the name of **Avaya-SM** was previously created for SIP Trunking.

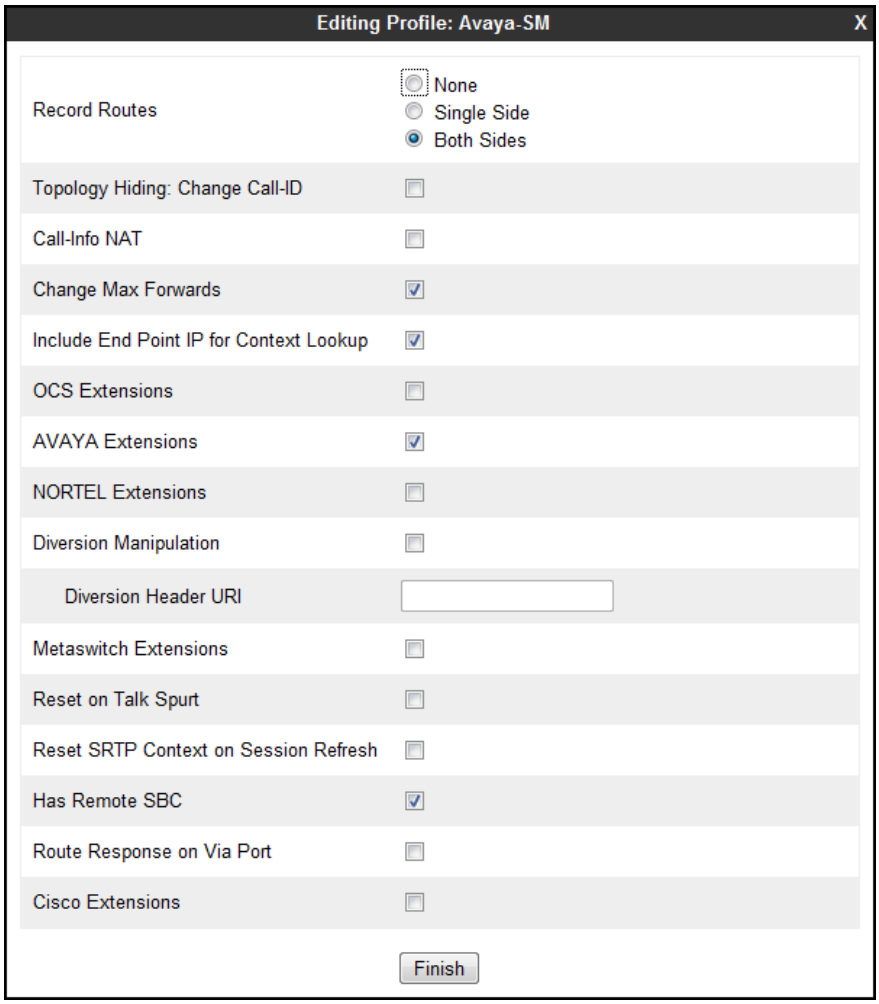
The following screenshots show the Server Interworking profile **Avaya-SM** that was previously created for SIP Trunking; no changes were made for Remote Workers. It's shown here since it will later be used in **Section 7.5.3**.

Note: The Avaya SBCE used in the reference configuration was provisioned to support SIP Trunking and Remote Worker functionalities. If there is no existing Server Interworking Profile for SIP Trunking, the default **avaya-ru** profile can be cloned to create a new Server Interworking Profile. The new profile can then be modified to meet the specific requirements for the enterprise. Directly modifying an existing default profile is not recommended.

The following screenshot shows the **General** tab of the existing **Avaya-SM** Server Interworking profile.



The following screenshot shows the **Advanced** tab of the existing **Avaya-SM** Server Interworking profile.



7.5.2. Routing Profile

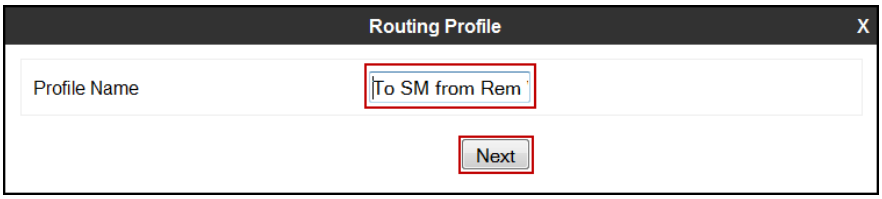
Routing profiles define a specific set of routing criteria that are used, in conjunction with other types of domain policies, to determine the route that SIP packets should follow to arrive at their intended destination.

Note: **172.16.5.32** is the IP address of Session Manager Security module in the reference configuration (this address can be found in the screenshots shown in **Section 6.3** under **Security Module**).

The Routing Profile **To SM from Rem W** was created for Remote Workers access to Session Manager.

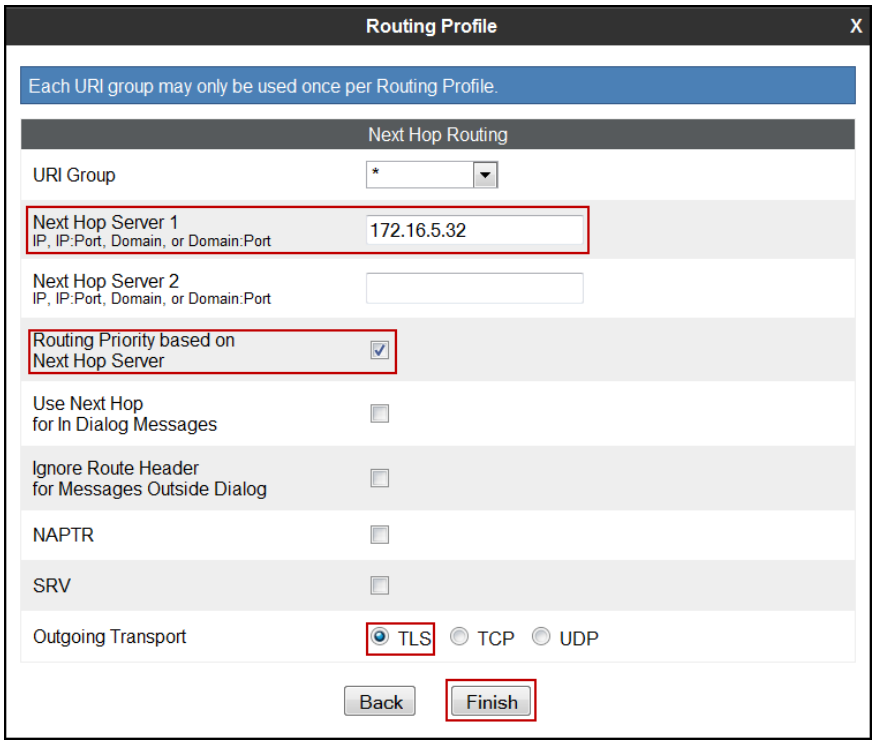
Under **Global Profiles → Routing**, select **Add** on top, left (not shown), use values specific to the enterprise. The following values were used in the reference configuration:

- Under **Profile Name** enter ***To SM from Rem W*** and click on **Next**.

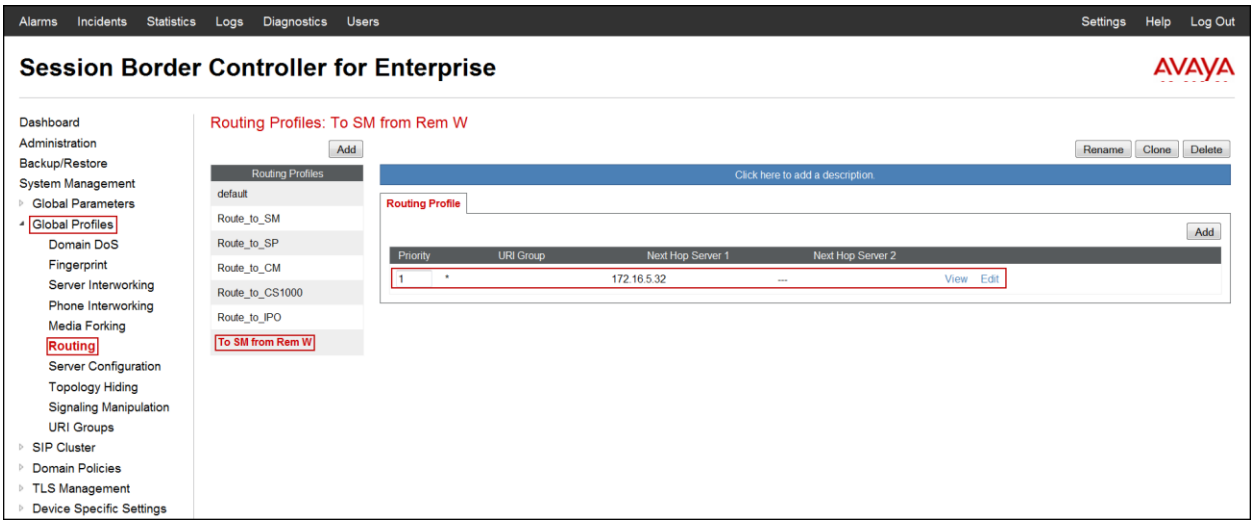


Under **Routing Profile** enter the following:

- Under **Next Hop Server 1** field enter the IP address of Session Manager (e.g., ***172.16.5.32***).
- Verify the **Routing Priority based on Next Hop Server** box is checked.
- Select **TLS** for the **Outgoing Transport**.
- Use defaults for all remaining parameters.
- Click on **Finish**.



The following screenshot shows the newly created **To SM from Rem W** routing profile.



7.5.3. Server Configuration

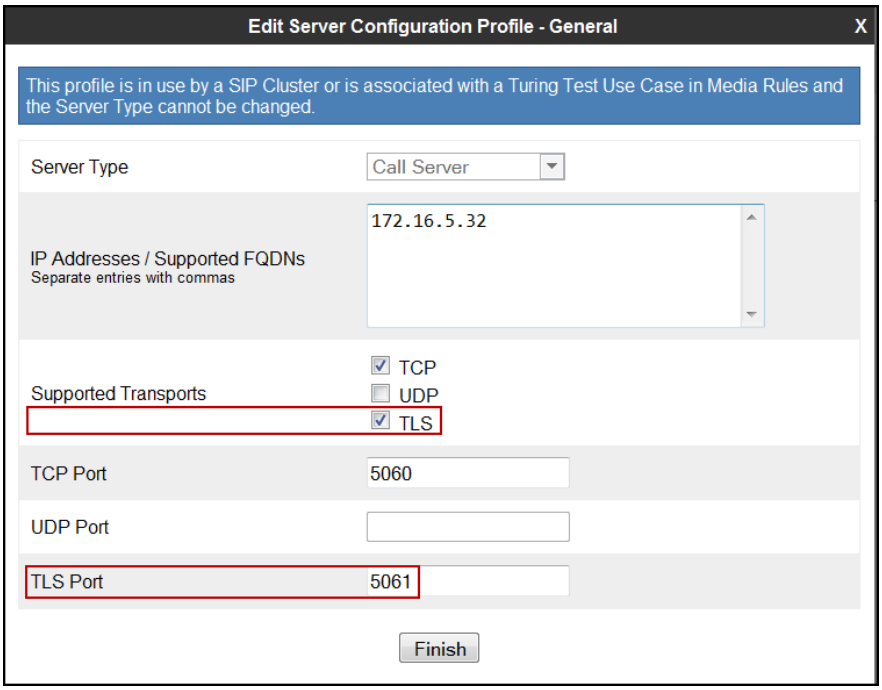
Server Profiles should be created for the Avaya SBCE's peers. In the reference configuration, the server configuration by the name of **Session Manager** was previously created for SIP Trunking. The configuration shown was previously configured with TCP transport and port 5060. TLS transport and port 5061 were added for Remote Workers.

To edit an existing Server Configuration profile, under **Global Profiles → Server Configuration**, select the existing Server Configuration toward Session Manager and select **Edit** under the **General** tab (not shown). The following values were used in the reference configuration:

- Under **Supported Transports** select **TLS**.
- Under **TLS Port** enter ***5061***.
- Keep all other values as default.
- Click on **Finish**.

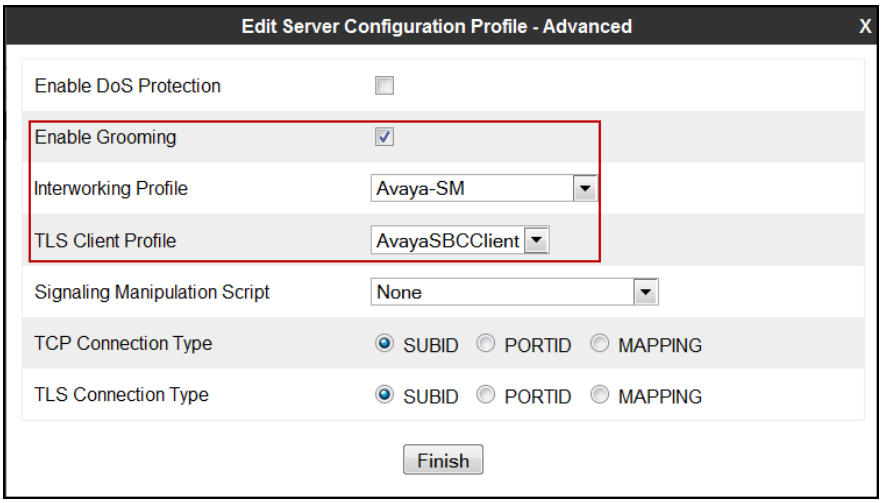
Note: **172.16.5.32** is the IP address of Session Manager in the reference configuration. The Avaya SBCE used in the reference configuration was provisioned to support SIP Trunking and Remote Worker functionalities. If there is no existing configuration for SIP Trunking, and if the Server Configuration will only be used for Remote Workers, add a new Server Configuration profile with ***TLS*** transport and port ***5061***.

The following screenshot shows the parameters under the **General** tab that were changed in the existing **Session Manager** Server Configuration profile, previously created for SIP Trunks.

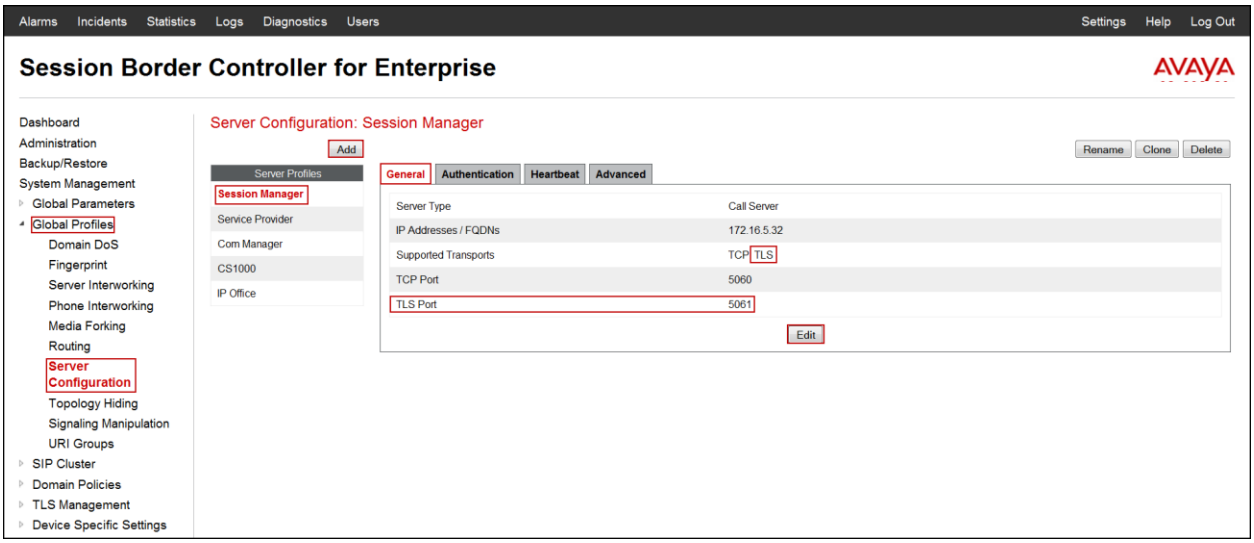


On the existing **Session Manager** Server configuration profile, under the **Advanced** tab, select **Edit**, or if adding a new profile, continue selecting **Next** until the **Advanced** tab is reached. The following values were used in the reference configuration:

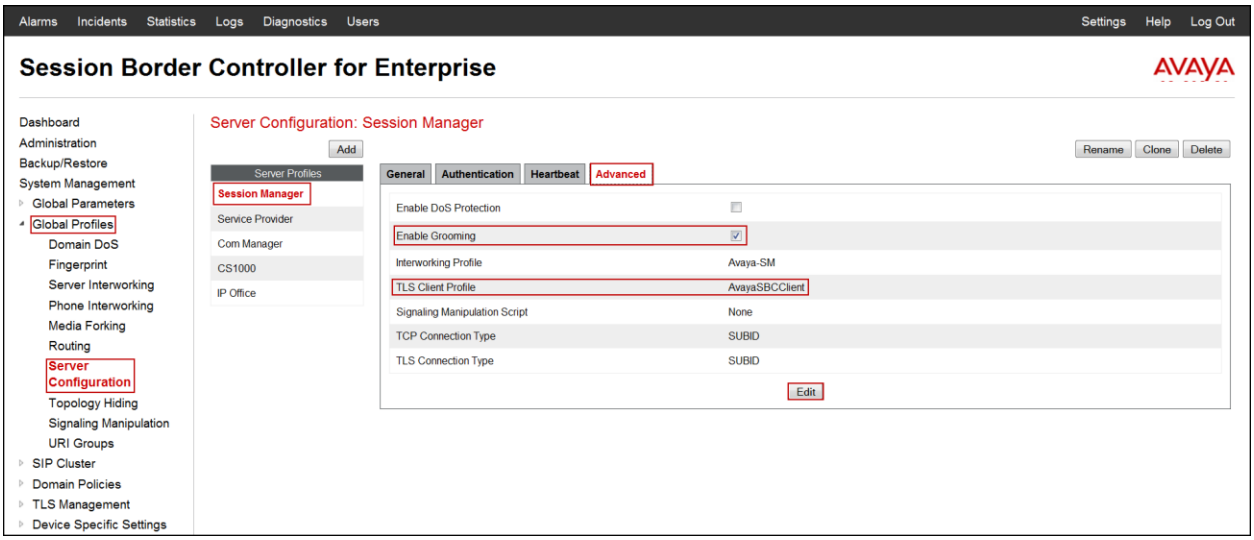
- Check **Enable Grooming**, if not already checked.
- Under Interworking Profile, ***Avaya-SM*** was previously created and was selected for SIP Trunking. If a new Server Configuration is being added, and if a **Server Interworking** profile was not previously created for SIP Trunks, select the interworking profile created in **Section 7.5.1**.
- Under **TLS Client Profile** select ***AvayaSBCClient***.
- Keep all other values as default.
- Click on **Finish**.



The following screenshot shows the **General** tab of the existing **Session Manager** Server Configuration profile after changes were made.



The following screenshot shows the **Advanced** tab of the existing **Session Manager** Server Configuration profile after changes were made.



7.6. SIP Cluster Proxy

A SIP Cluster Proxy is defined for Personal Profile Manager (PPM) data and Presence services between the Remote Worker endpoints and Session Manager. The following screen shows the cluster proxy named **Remote_Workers** created in the reference configuration. The SIP Cluster Proxy enables the remote Avaya SIP endpoints to send and receive PPM data to and from Session Manager via the Avaya SBCE.

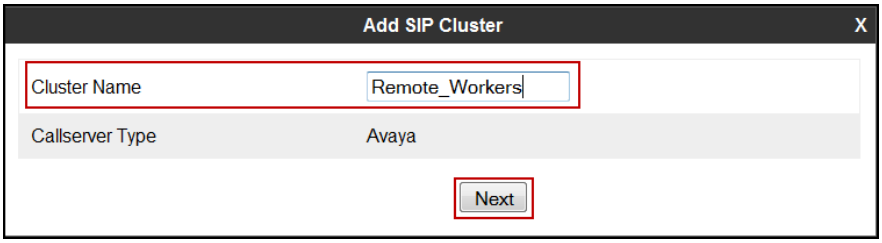
Note: A Presence Services server was not part of the reference configuration. Therefore, configuration of the Cluster Proxy for use with Presence is not shown.

The Cluster Proxy may be configured to use HTTPS between the Remote Worker phones and the Avaya SBCE, as well as between the Avaya SBCE and Session Manager. Alternatively, HTTP may be defined between the Avaya SBCE and Session Manager. In the reference configuration HTTPS was used between the Remote Worker phones and the Avaya SBCE and HTTP was used between the Avaya SBCE and Session Manager.

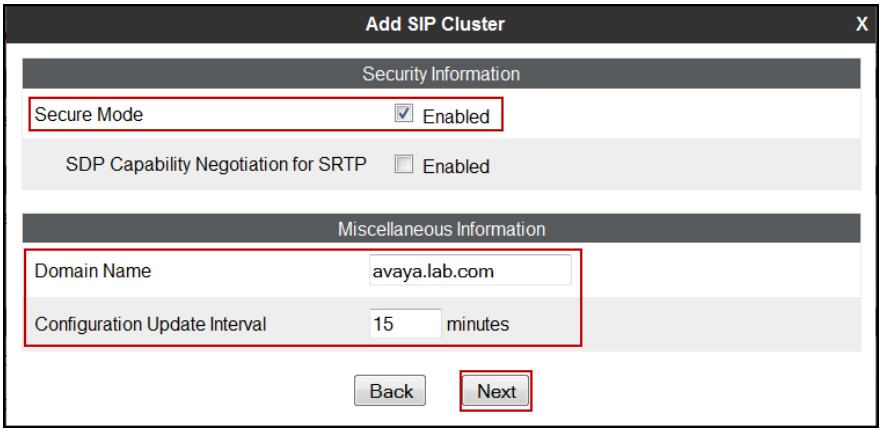
In this configuration HTTPS (port 443) is used between the Remote Workers and the Avaya SBCE, and HTTP (port 80) is used between the Avaya SBCE and Session Manager.

Under **SIP Cluster → Cluster Proxy**, select **Add** (not shown), use values specific to the enterprise. The following values were used in the reference configuration:

- Under **Cluster Name** enter ***Remote_Workers*** and click **Next**. Note that the **CallServer Type** field will default *to **Avaya***.

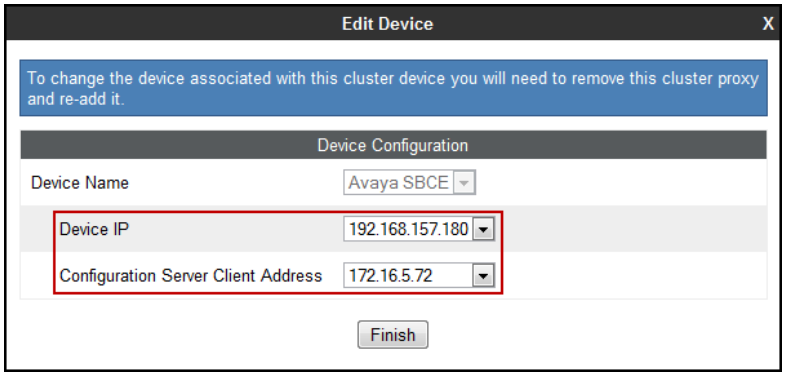


- Check **Secure Mode**, leave **SDP Capability Negotiation for SRTP** unchecked
- Under **Domain Name** field enter the enterprise domain name, ***avaya.lab.com*** was used.
- Under **Configuration Update Interval** field enter **15** (minutes). Note: This field is not used anymore but an entry is required.
- Click **Next**. The **Primary Device** window will open.



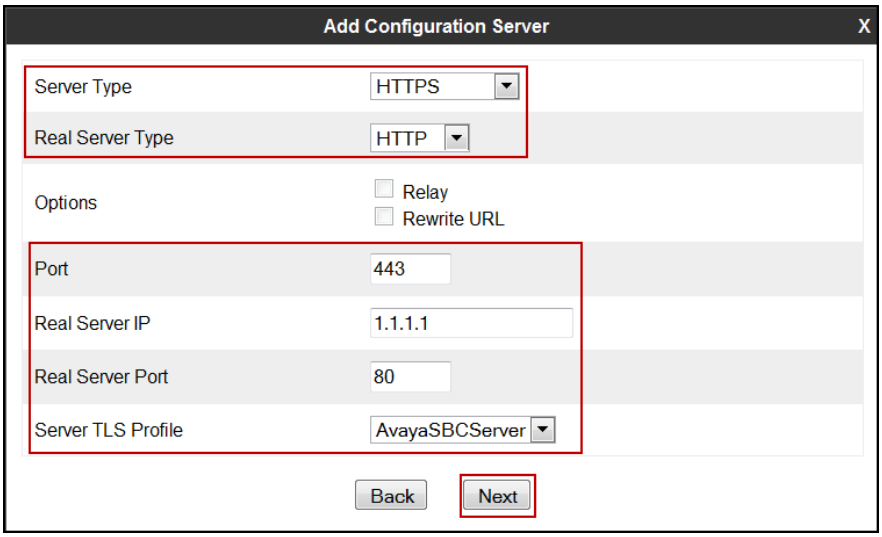
In the **Primary Device** section, PPM traffic received on **Device IP 192.168.157.180** (public IP) will be routed to the **Configuration Server Client Address 172.16.5.72** (private IP). Enter the following values (for IP address assignment refer to **Section 7.3**):

- Under **Device Name** the default is ***Avaya SBCE*** since it was previously defined.
- Under **Device IP** field enter ***192.168.157.180*** (public IP not used for relay services).
- Under **Configuration Server Client Address** field enter ***172.16.5.72*** (private IP).
- Click **Next** to open the **Configuration Server** window (note that "Finish" is shown in the screenshot below since this entry was previously created and **Edit** was used instead).



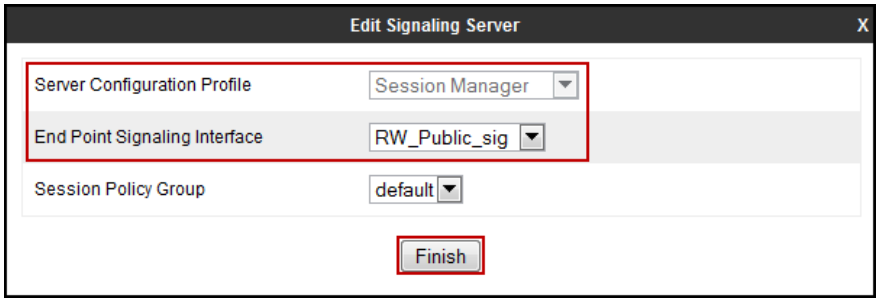
Under **Add Configuration Server** section enter the following values:

- Under **Server Type** select ***HTTPS*** from the drop down menu.
- Under **Real Server Type** select ***HTTP*** from the drop down menu.
- Under **Port** enter ***443***.
- Under **Real Server IP** enter any IP address (e.g., ***1.1.1.1***). This address entry is not used.
- Under **Real Server Port** enter ***80***.
- Under **Server TLS Profile** the default value of ***AvayaSBCServer*** will be displayed.
- Click **Next**.

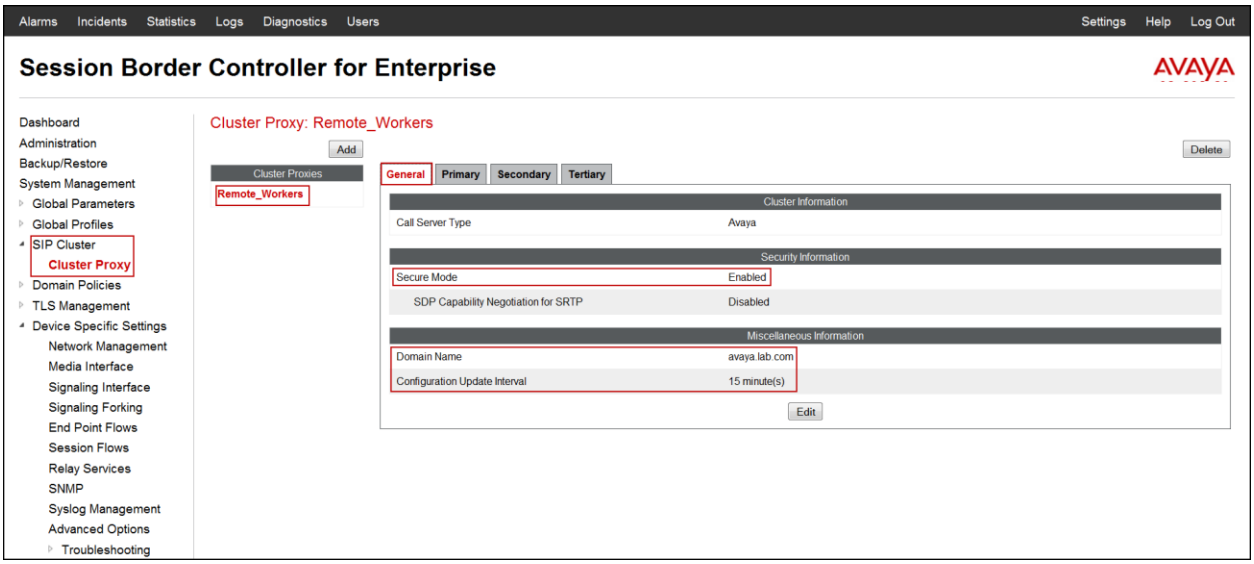


Under **Add Signaling Server** section enter the following values:

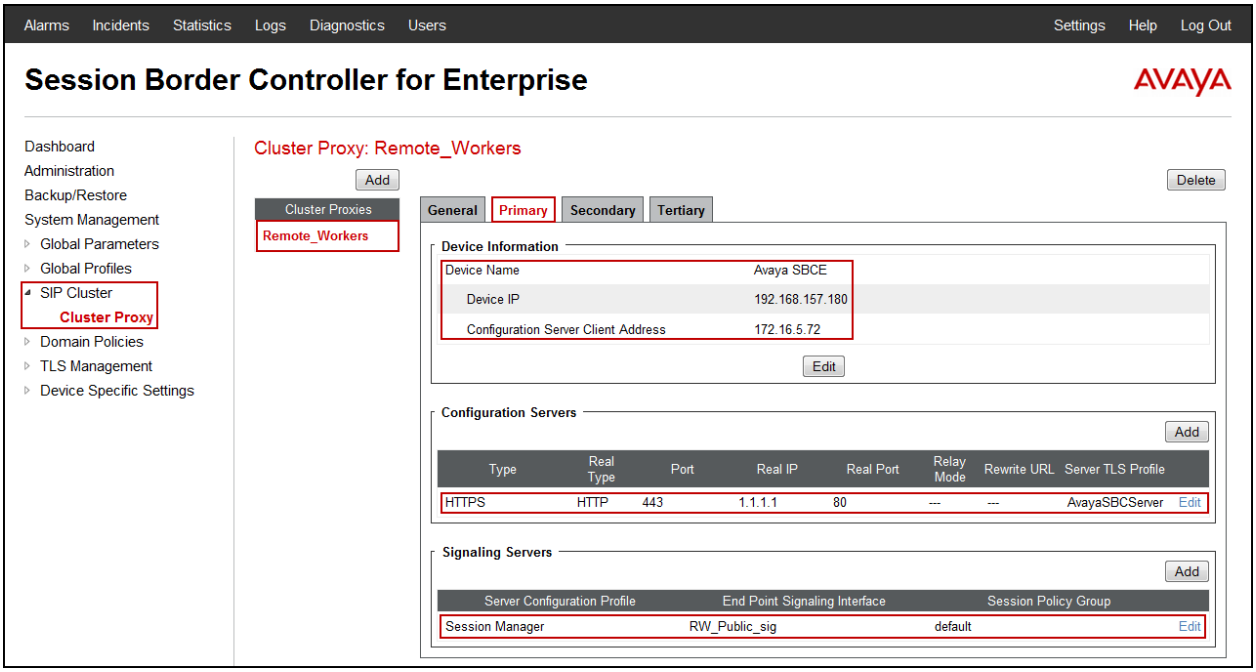
- Under **Server Configuration Profile** field select ***Session Manager*** from the drop down menu.
- Under **End Point Signaling Interface** field select ***RW_Public_sig*** from the drop down menu. Note: **Signaling Interface** entries needs to be created first (refer to **Section 7.8.2)**.
- Under **Session Policy Group** field use the ***default*** value.
- Click on **Finish**.



The following screenshot shows the **General** tab of the newly created **Remote_Workers** SIP Cluster Proxy.



The following screenshot shows the **Primary** tab of the newly created **Remote_Workers** SIP Cluster Proxy.



7.7. Domain Policies

Domain Policies allow configuring, managing and applying various sets of rules designed to control and normalize the behavior of call flows, based upon various criteria of communication sessions originating from or terminating in the enterprise.

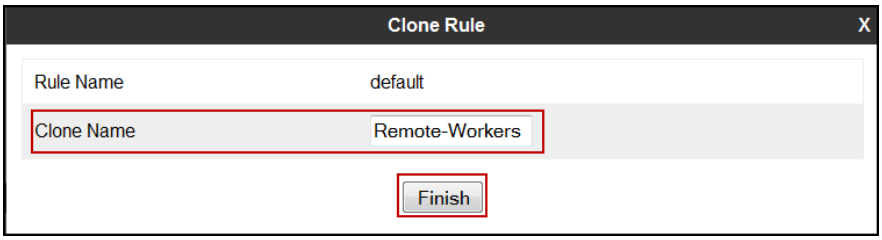
7.7.1. Application Rules

Application Rules defines which types of SIP-based Unified Communications (UC) applications the Avaya SBCE will protect: voice, video, and/or Instant Messaging (IM). In addition, Application Rules defines the maximum number of concurrent voice and video sessions the network will process in order to prevent resource exhaustion.

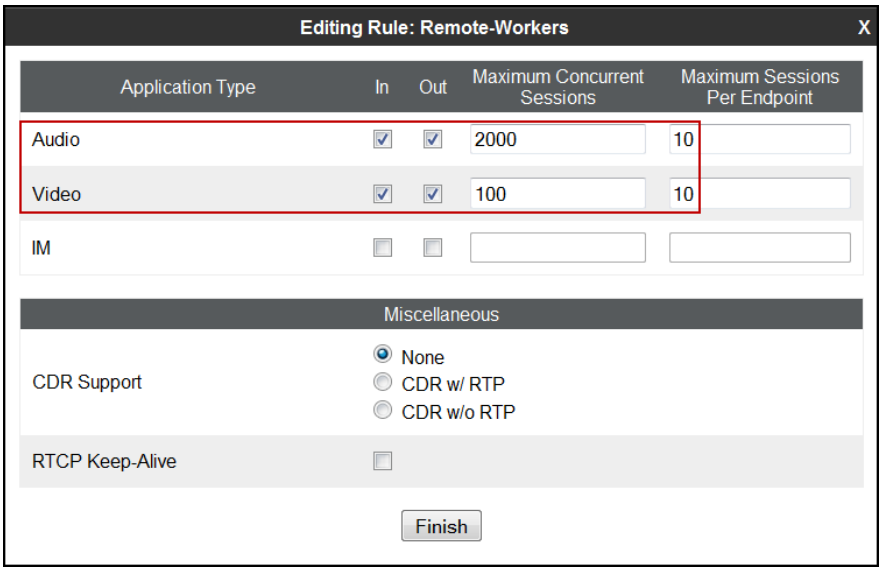
Note: The **Maximum Concurrent Sessions** and the **Maximum Sessions Per Endpoint** for Audio and Video should be set per the customer licenses purchased for the specific enterprise site. The values shown below are just an example; they represent the values used in the reference configuration.

From the navigation menu on the left-hand side, select **Domain Policies → Application Rules** (not shown).

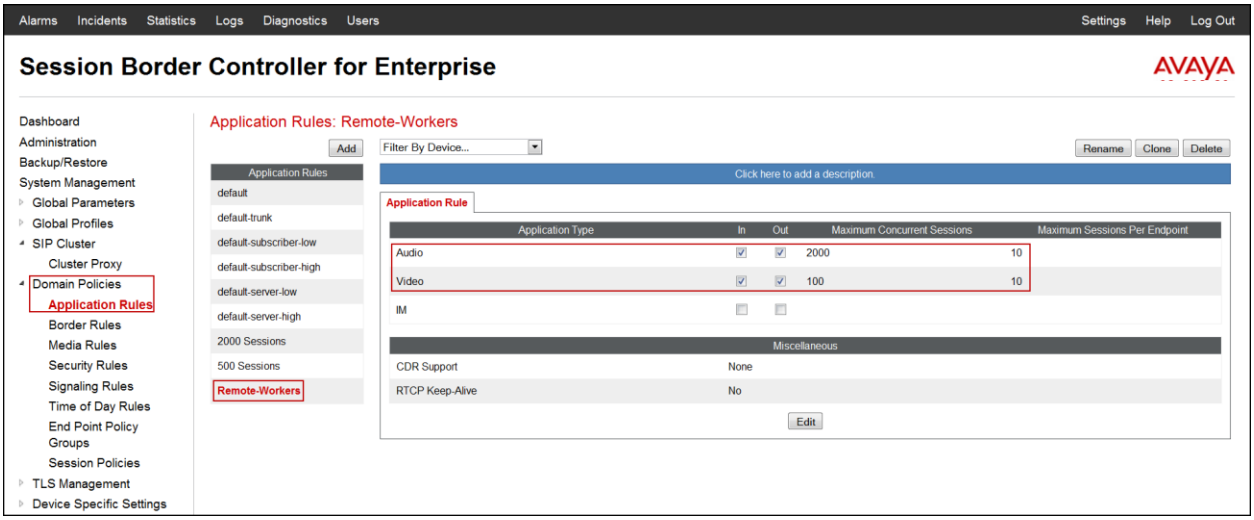
- Select ***default*** in the **Application Rules** list (not shown).
- Click the **Clone** button on top right of the screen (not shown).
- Name**:** enter the name of the profile (e.g., ***Remote-Workers)***.
- Click **Finish**.



- Select the newly created Application Rule and Click **Edit** (not shown).
- For **Audio** set the **Maximum Concurrent Sessions to *2000***.
- For **Audio** set **the Maximum Sessions Per Endpoint** to ***10***.
- For **Video** set the **Maximum Concurrent Sessions to *100***.
- For **Video** set **the Maximum Sessions Per Endpoint** to ***10***.
- Click **Finish**.



The following screen capture shows the newly created **Remote-Workers** application rule.

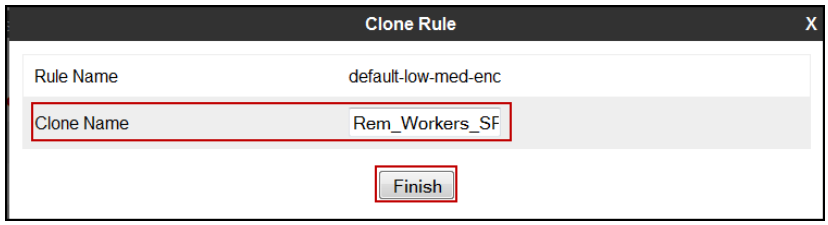


7.7.2. Media Rules

The following section shows the new Media Rule **Rem_Workers_SRTP** added for Remote Worker (cloned from the **default-low-med-enc** rule).

From the navigation menu on the left-hand side, select **Domain Policies → Media Rules** (not shown)

- Select ***default-low-med-enc*** in the **Media Rules** list (not shown).
- Click the **Clone** button on top right of the screen (not shown).
- Name**:** enter the name of the profile (e.g., ***Rem_Workers_SRTP***).
- Click **Finish**.



For the newly created **Rem_Workers_SRTP** Media Rule, select the **Media Encryption** tab; click **Edit** (not shown):

Under **Audio Encryption** section, select the following values:

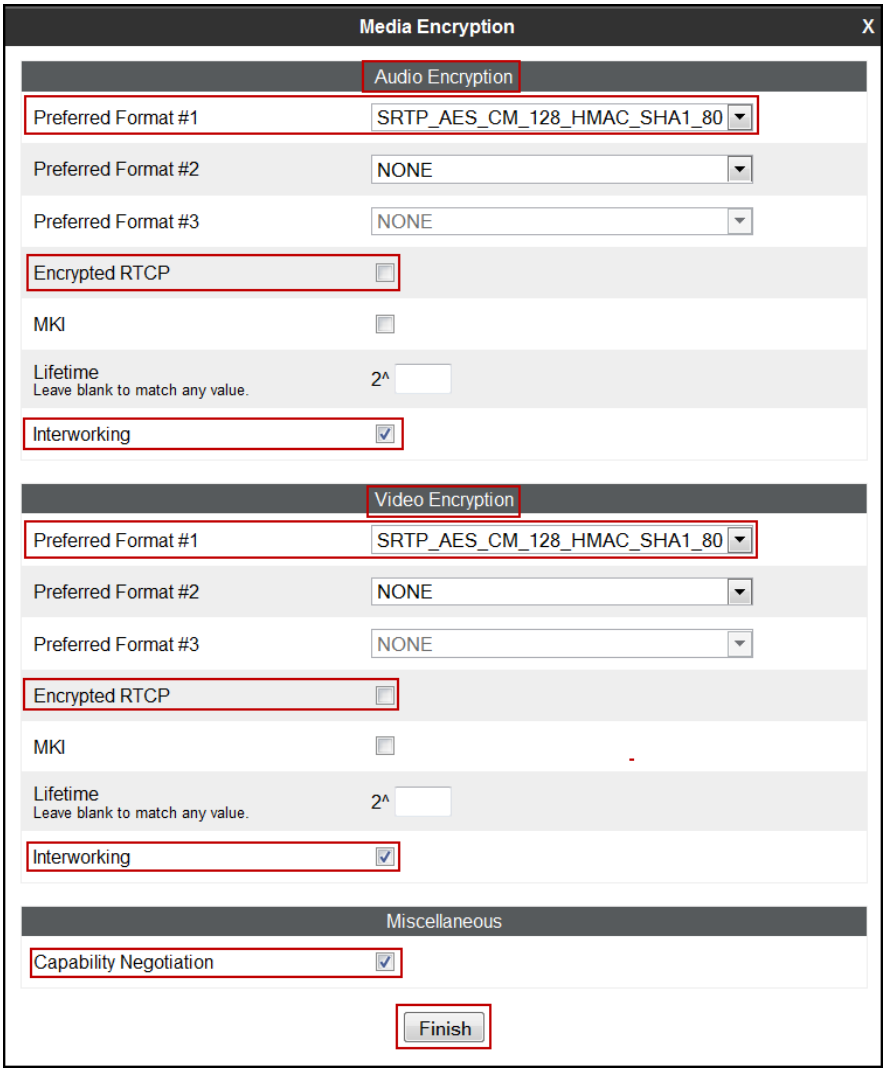
- From the drop down menu, set **Preferred Formats** to ***SRTP_AES_CM_128_HMAC_SHA1_80***.
- Uncheck **Encrypted RTCP**.
- Verify that **Interworking** is checked.

Under **Video Encryption** section, select the following values:

- From the drop down menu, set **Preferred Formats** to ***SRTP_AES_CM_128_HMAC_SHA1_80***.
- Verify **Encrypted RTCP** is unchecked.
- Verify that **Interworking** is checked.

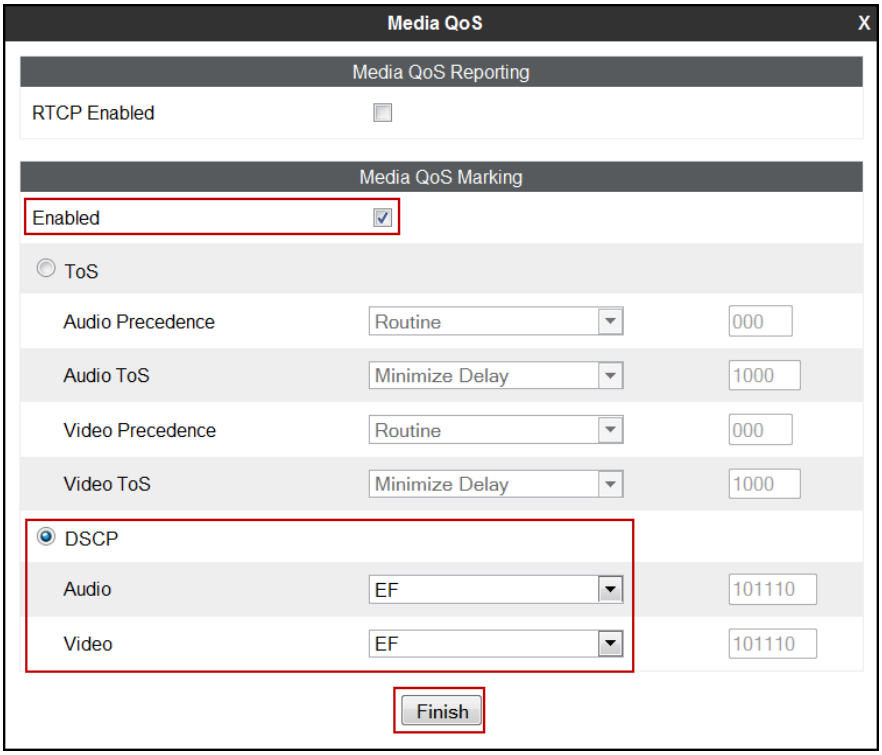
Under the **Miscellaneous** section, select the following values

- Check **Capability Negotiation**.
- Click **Finish**.



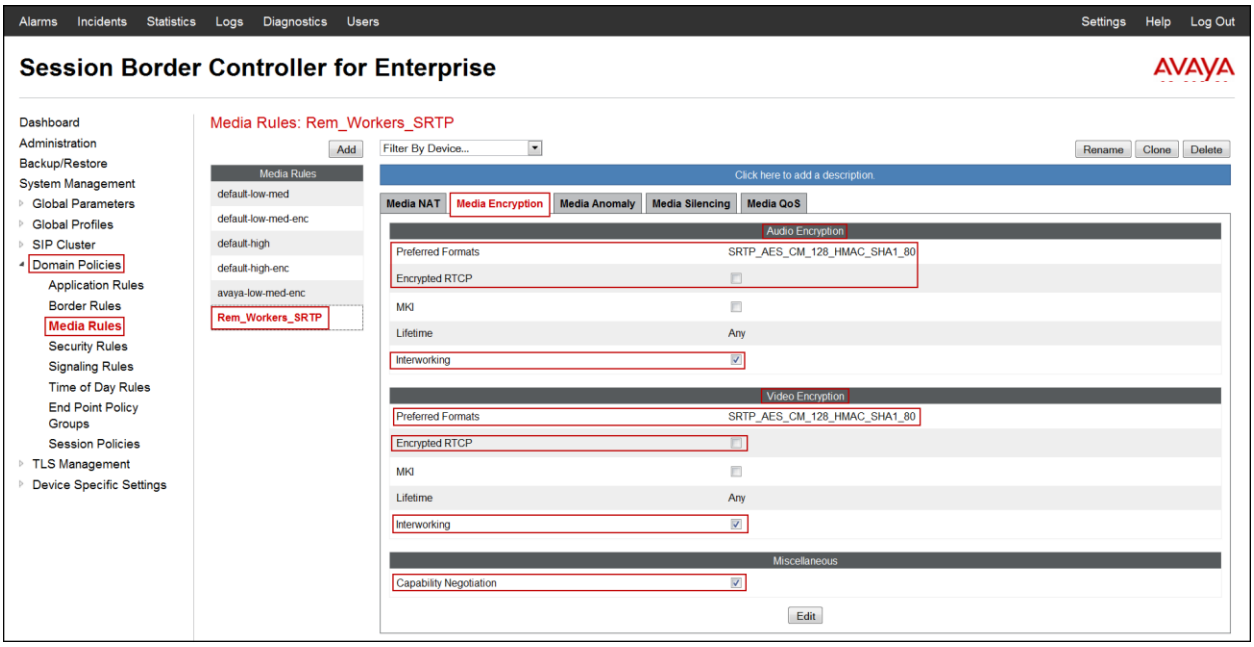
For the newly created **Rem_Workers_SRTP** Media Rule, select the **Media QoS** tab; click **Edit** (not shown):

- Under **Media QoS Marking** check **Enabled**.
- Check **DSCP**.
- **DSCP** for Audio and Video will default to ***EF***.
- **Click Finish**.

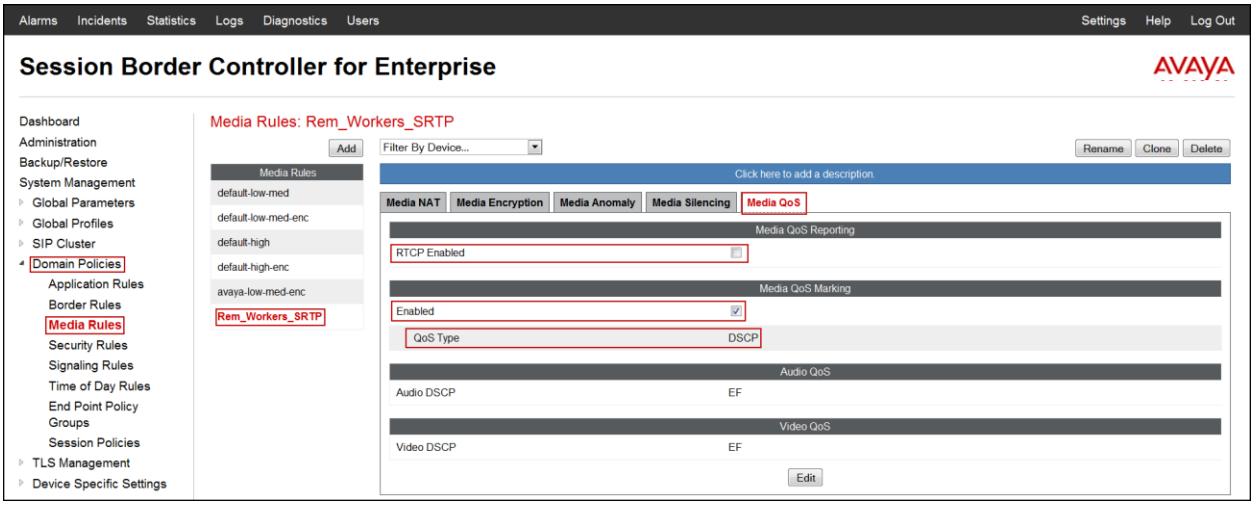


Note: The Media **QoS** settings shown above are the recommended values (default). **QoS** values for audio and video should be set according to specific enterprise requirements and should match values agreed on, otherwise the Avaya SBCE will override the **QoS** values with the settings shown above.

The following screenshot shows the **Media Encryption** tab of the newly created **Rem_Workers_SRTP** Media Rule.



The following screenshot shows the **Media QoS** tab of the newly created **Rem_Workers_SRTP** Media Rule.



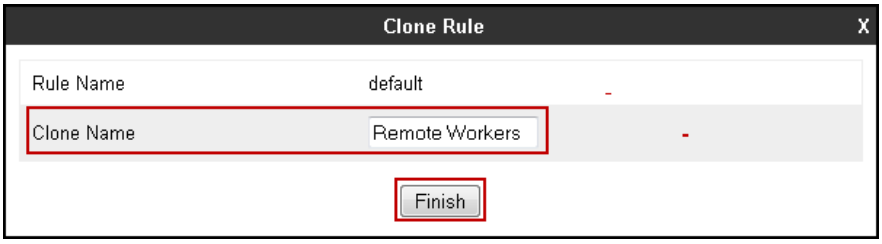
7.7.3. Signaling Rules

Signaling Rules define the actions to be taken (Allow, Block, Block with Response, etc.) for each type of SIP-specific signaling request and response message. They also allow the control of the Quality of Service of the signaling packets.

The following section describes the new Signaling Rule **Remote Workers**, cloned from the **default** signaling rule.

From the navigation menu on the left-hand side, select **Domain Policies → Signaling Rules** (not shown).

- Select **default** in the **Signaling Rules** list (not shown).
- Click the **Clone** button on top right of the screen (not shown).
- Name**:** enter the name of the profile (e.g., ***Remote Workers***).
- Click **Finish**.



For the newly created **Remote Workers** Signaling Rule, select the **Signaling QoS** tab; click **Edit** (not shown):

Under the **Signaling QoS** tab, enter the following values:

- Select **DSCP** (the **Value** field will default to ***AF41***).
- Click **Finish**.

Note: The Media **QoS** settings shown above are the recommended values (default). **QoS** values for audio and video should be set according to specific enterprise requirements and should match values agreed on, otherwise the Avaya SBCE will override the **QoS** values with the settings shown above.

7.7.4. End Point Policy Groups

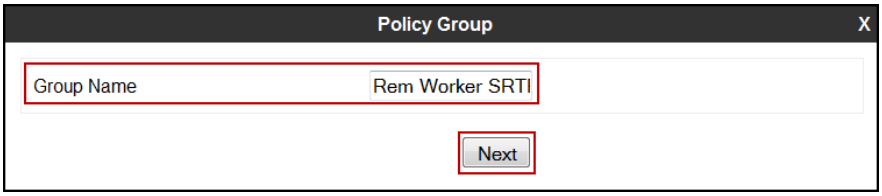
End Point Policy Groups are associations of different sets of rules (Media, Signaling, Security, etc.) to be applied to specific SIP messages traversing through the Avaya SBCE.

Two new End Point Policy Groups were created for Remote Workers, **Rem Workers SRTP**, and **Rem Workers RTP**.

To create the new **Rem Workers SRTP** group, do the following:

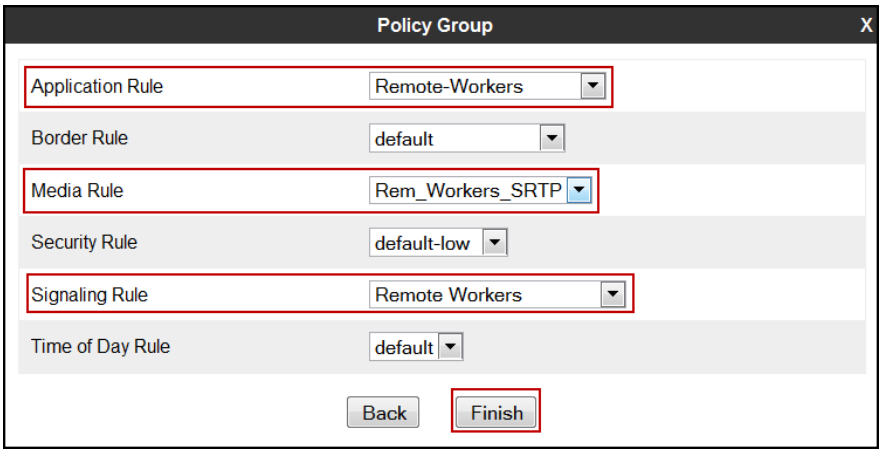
Under **Domain Policies → End Point Policy Groups**, select **Add** (not shown), use values specific to the enterprise. The following values were used in the reference configuration:

- Under **Group Name** enter ***Rem Worker SRTP***.
- **Click Next**.



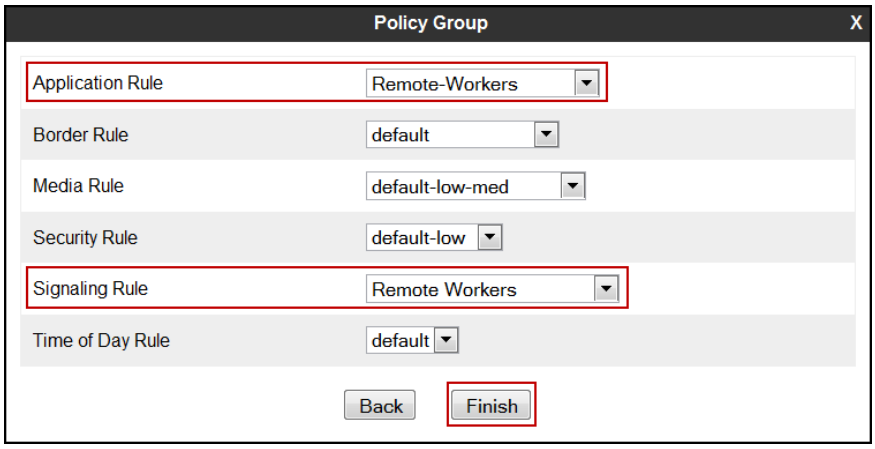
The **Policy Group** window will open. Enter the following:

- Under **Application Rule** select ***Remote-Workers*** from the drop down menu.
- Under **Media Rule** select ***Remote_Workers_SRTP*** from the drop down menu.
- Under **Signaling Rule** select ***Remote Workers*** from the drop down menu.
- Remaining fields should left with default values.
- Click **Finish**.

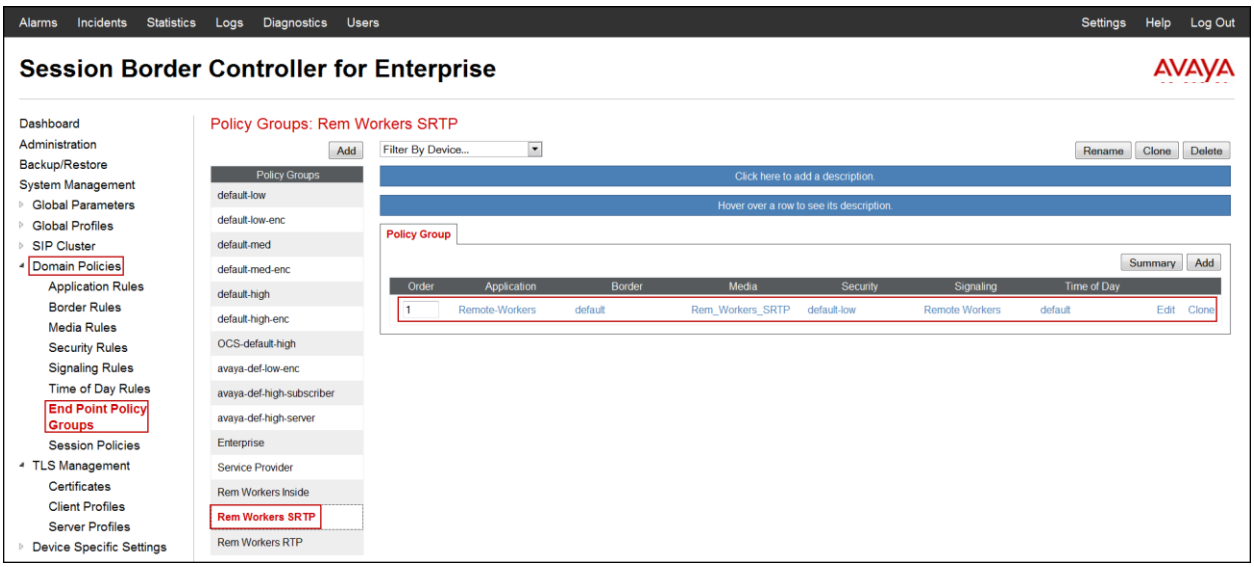


To create the new **Rem Workers RTP** End Point Policy Group, follow the above steps, use the following values:

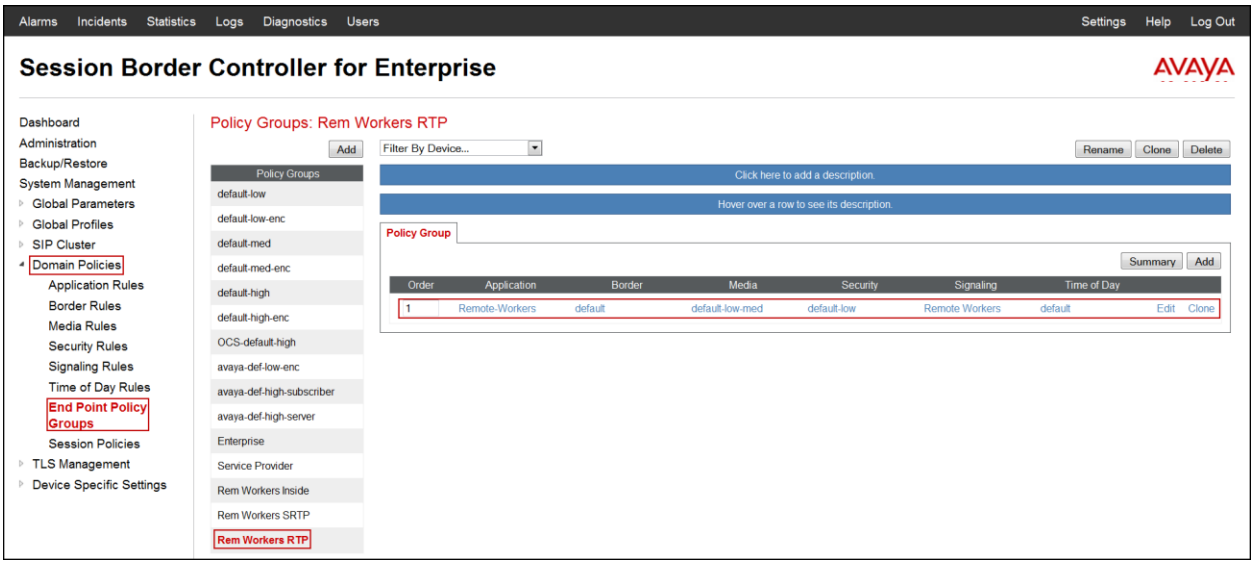
- Under **Group Name** enter ***Rem Worker RTP*** (not shown).
- Under **Application Rule** select ***Remote-Workers*** from the drop down menu.
- Under **Media Rule** use the default value of ***default-low-med.***
- Under **Signaling Rule** select ***Remote Workers*** from the drop down menu.
- Remaining fields should with default values.
- Click on **Finish**.



The following screenshot shows the newly created **Rem Workers SRTP** End Point Policy Group.



The following screenshot shows the newly created **Rem Workers RTP** End Point Policy Group.



7.8. Device Specific Settings

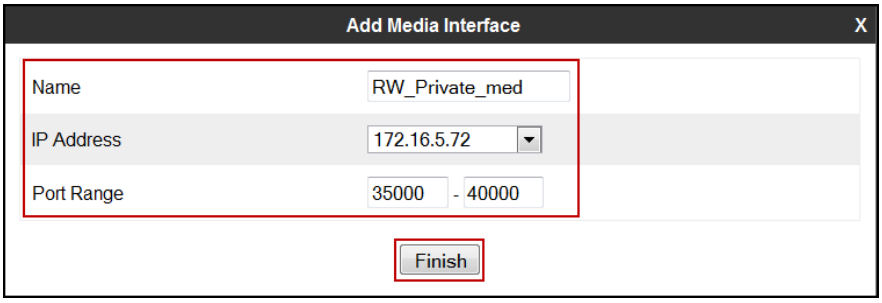
The Device Specific Settings allow the management of various device-specific parameters, which determine how a particular device will function when deployed in the network. Specific server parameters, like network and interface settings, as well as call flows, etc. are defined here.

7.8.1. Media Interfaces

Media Interfaces were created to adjust the port range assigned to media streams leaving the interfaces of the Avaya SBCE. On the Private and Public interfaces of the Avaya SBCE, the port range 35000 to 40000 was used.

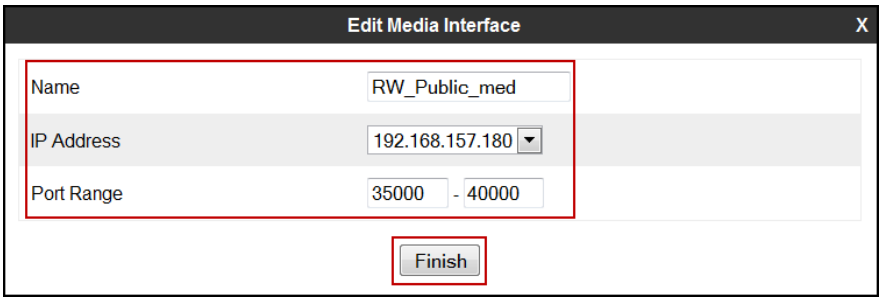
Under **Device Specific Settings → Media Interface**, select **Add** to create a new Media Interface (not shown). Use values specific to the enterprise, the following values were used in the reference configuration:

- Under **Name** enter ***RW_Private_med***.
- Under **IP Address** pull down menu select ***172.16.5.72***. This is the "private" IP address for interface A1 used for Remote Workers.
- Under **Port Range** leave the default port range of ***35000-40000***.
- Click **Finish**.

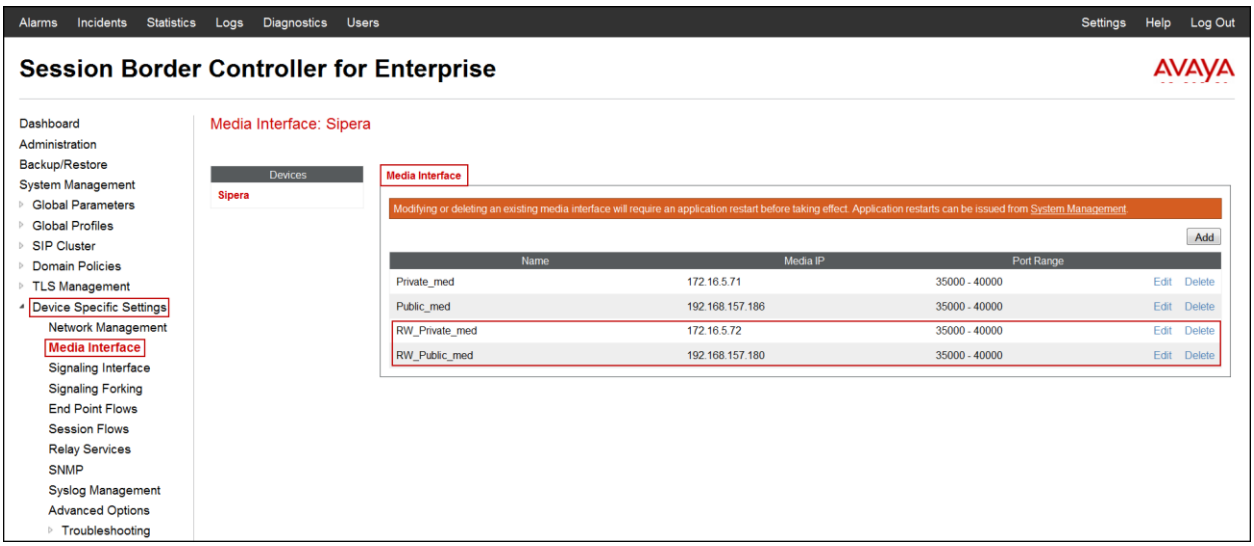


Repeat the above procedure for the "public" interfaces using the following values:

- Under **Name** enter ***RW_Public_med***.
- Under **IP Address** pull down menu select ***192.168.157.180***. This is one of the two "public" IP addresses for interface B1 used for Remote Worker (public IP not used for relay services).
- Under **Port Range** leave the default port range of ***35000-40000***.
- Click **Finish**.



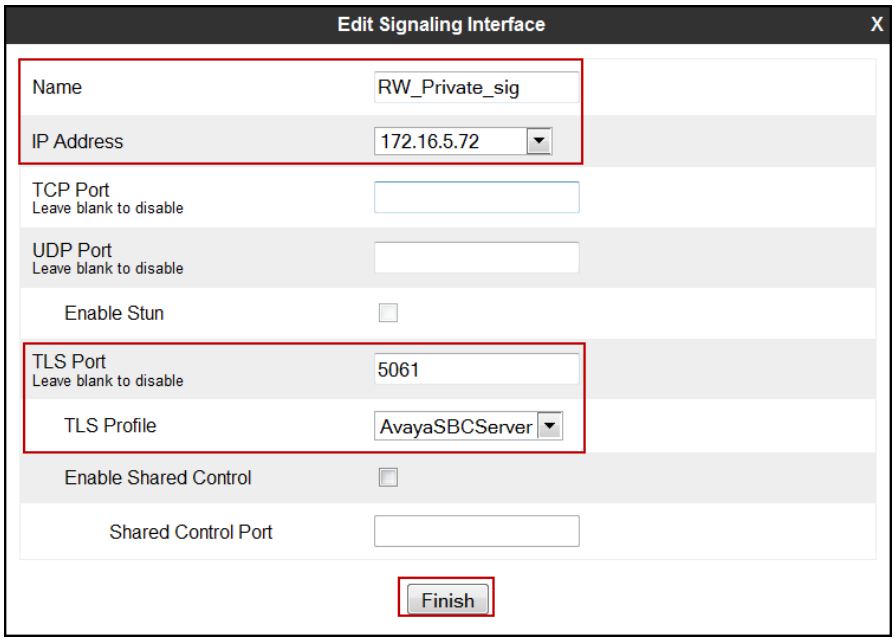
The following screenshot shows the newly created **RW_Private_med** and **RW_Public_med** Media Interfaces.



7.8.2. Signaling Interfaces

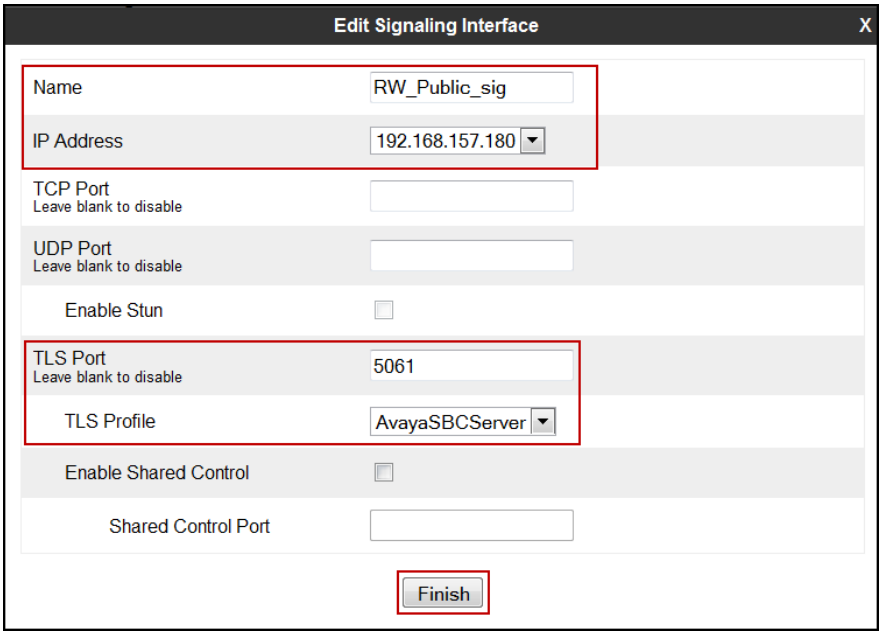
Under **Device Specific Settings → Signaling Interface**, select **Add** to create a new Signaling Interface (not shown). Use values specific to the enterprise, the following values were used in the sample configuration:

- Under **Name** enter ***RW_Private_sig***.
- Under **IP Address** pull down menu select ***172.16.5.72***. This is the private IP address for interface A1 used for Remote Workers.
- Under **TLS Port** enter ***5061***. TLS is the preferred transport towards Session Manager, port 5061 is used for TLS.
- Under **TLS Profile** the default ***AvayaSBCServer*** profile will be displayed.
- Click **Finish**.

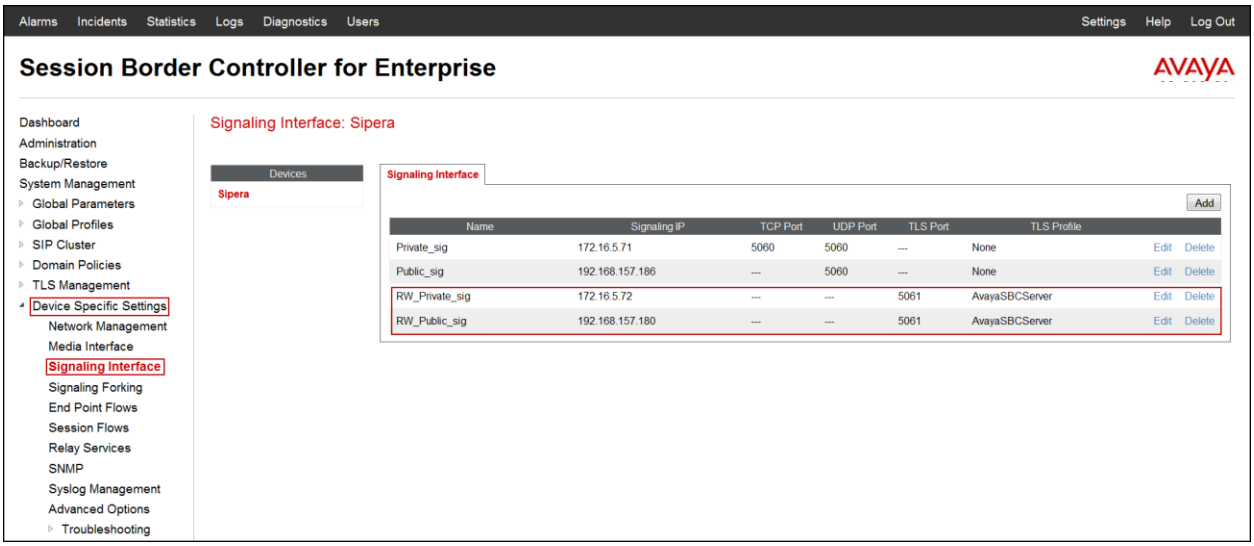


Repeat the above procedure for the "public" interface using the following values:

- Under **Name** enter ***RW_Public_sig***.
- Under **IP Address** pull down menu select ***192.168.157.180***. This is one of the two "public" IP addresses for interface B1 used for Remote Worker (public IP not used for relay services).
- Under **TLS Port** enter ***5061*.** TLS is the preferred transport towards the Remote Workers, port 5061 is used for TLS.
- Under **TLS Profile** the default ***AvayaSBCServer*** profile will be displayed.
- Click **Finish**.



The following screenshot shows the newly created **RW_Private_sig** and **RW_Public_sig** Signaling Interfaces.



7.8.3. End Point Flows

When a packet is received by Avaya SBCE, the content of the packet (IP addresses, URIs, etc.) is used to determine which flow it matches. Once the flow is determined, the flow points to a policy group which contains several rules concerning processing, privileges, authentication, routing, etc. Once routing is applied and the destination endpoint is determined, the policies for this destination endpoint are applied. The context is maintained, so as to be applied to future packets in the same flow.

The End-Point Flows define certain parameters that pertain to the signaling and media portions of a call, whether it originates from within the enterprise or outside of the enterprise.

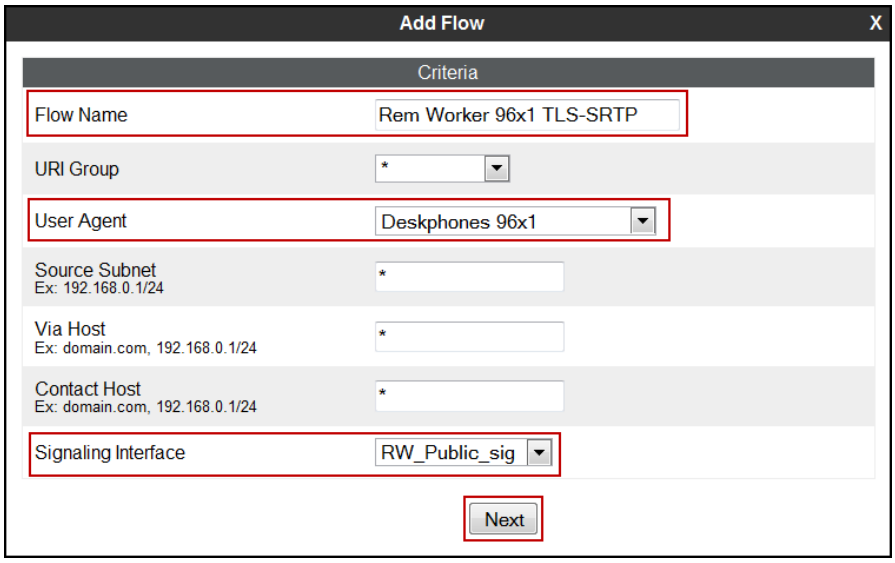
7.8.3.1 Subscriber Flow

Three Subscriber Flows were defined for Remote Workers. One for each User Agent previously created, as follows: **Deskphones 96x1** (for Avaya 96x1 Deskphones), **Avaya Flare** (for Avaya Flare® Experience for Windows softphone) and **Avaya one-X Communicator** (for one-X® Communicator softphone).

The following screen shows the details of the Subscriber Flow **Deskphones 96x1** used in the reference configuration.

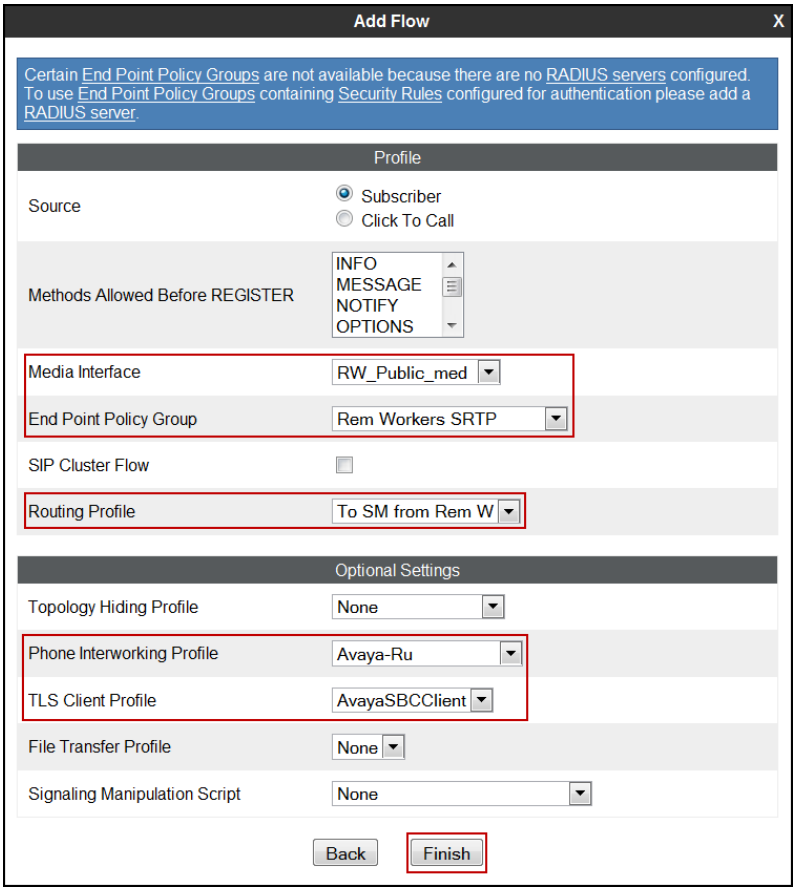
Under Device **Specific Setting → End Point Flows → Subscriber Flows** tab, click on **Add** (not shown). The following values were used in the reference configuration:

- Under **Flow Name** enter ***Rem Worker 96x1 TLS-SRTP***.
- Under **User Agent** select ***Deskphone 96x1*** from the pull down menu (created in **Section 7.4**).
- Under **Signaling Interface** select ***RW_Public_sig*** from the pull down menu (created in **Section 7.8.2**).
- Leave remaining fields with default values.
- Click **Next**.



The **Profile** and **Optional Settings** window will open. Enter the following values:

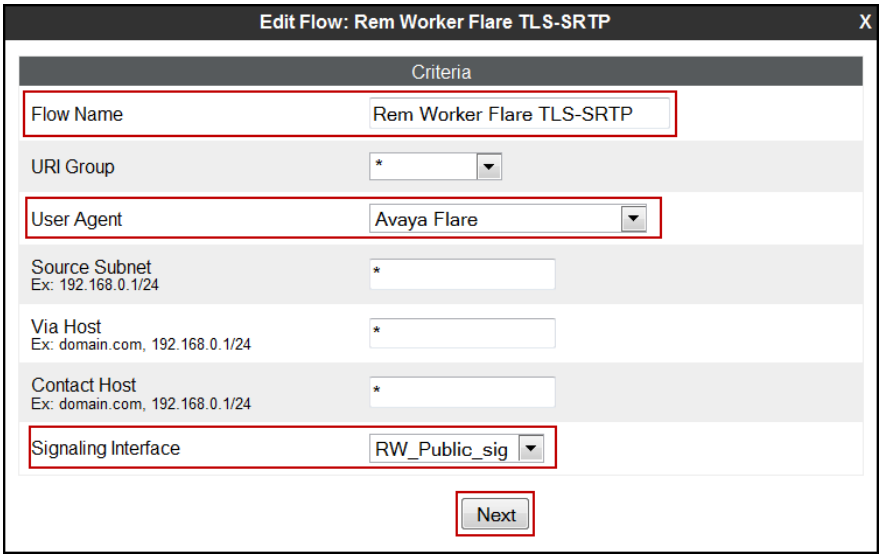
- Under **Media Interface** select ***RW_Public_med*** from the pull down menu (created in **Section 7.8.1**).
- Under **End Point Policy Group** select ***Rem Workers SRTP*** from the pull down menu (created in **Section 7.7.4**).
- Under **Routing Profile** select **To *SM from Rem W*** from the pull down menu (created in **Section 7.5.2**).
- Under **Phone Interworking Profile** select ***Avaya-RU*** from the pull down menu (existing default profile).
- Under **TLS Client Profile** select ***AvayaSBCClient*** from the pull down menu (existing profile).
- Leave remaining fields with default values.
- Click **Finish**.



Repeat the above steps to create Subscriber Flows for **Avaya Flare** (used with Avaya Flare® Experience for Windows softphone), as follows:

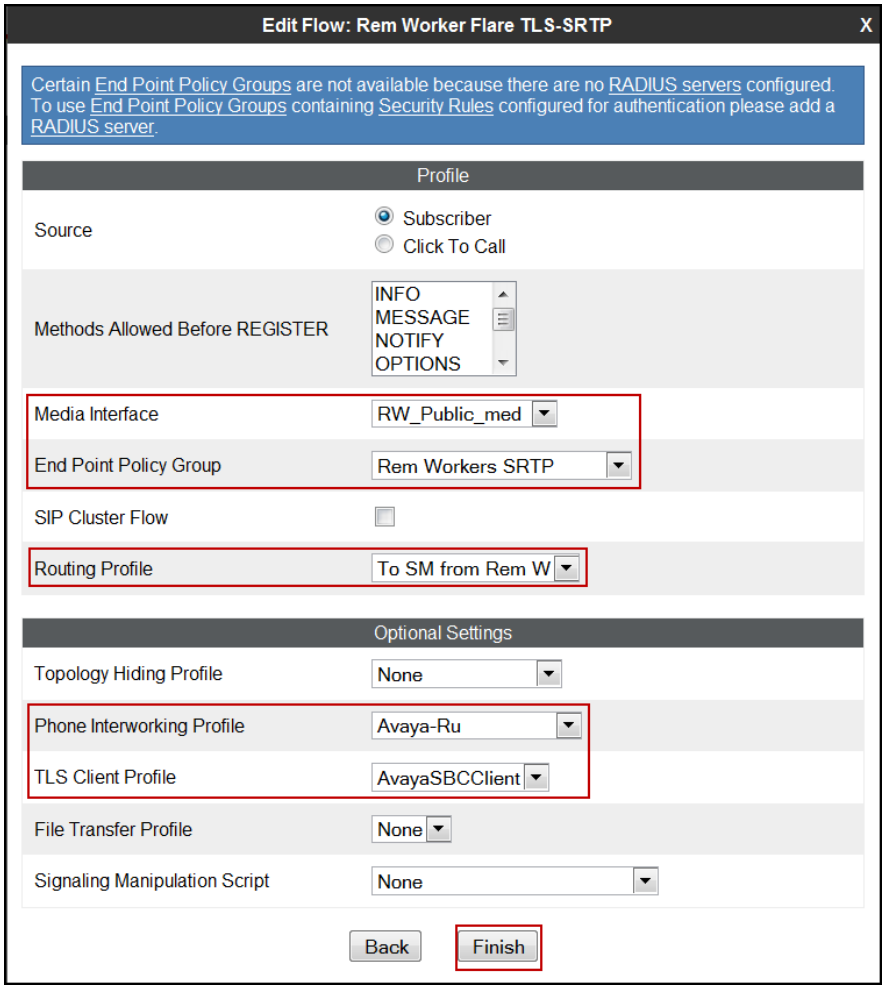
To create the **Avaya Flare** Subscriber Flow, click on **Add** (not shown). The following values were used in the reference configuration:

- Under **Flow Name** enter ***Rem Worker Flare TLS-SRTP***.
- Under **User Agent** select ***Avaya Flare*** from the pull down menu (created in **Section 7.4**).
- Under **Signaling Interface** select ***RW_Public_sig*** from the pull down menu (created in **Section 7.8.2**).
- Leave remaining fields with default values.
- Click **Next**.



The **Profile** and **Optional Settings** window will open. The following values were used in the reference configuration:

- Under **Media Interface** select ***RW_Public_med*** from the pull down menu (created in **Section 7.8.1**).
- Under **End Point Policy Group** select ***Rem Workers SRTP*** from the pull down menu (created in **Section 7.7.4**) (see note below).
- Under **Routing Profile** select ***To SM from Rem W*** from the pull down menu (created in **Section 7.5.2**).
- Under **Phone Interworking Profile** select ***Avaya-RU*** from the pull down menu (existing default profile).
- Under **TLS Client Profile** select ***AvayaSBCClient*** from the pull down menu (existing profile).
- Leave remaining fields with default values.
- Click **Finish**.

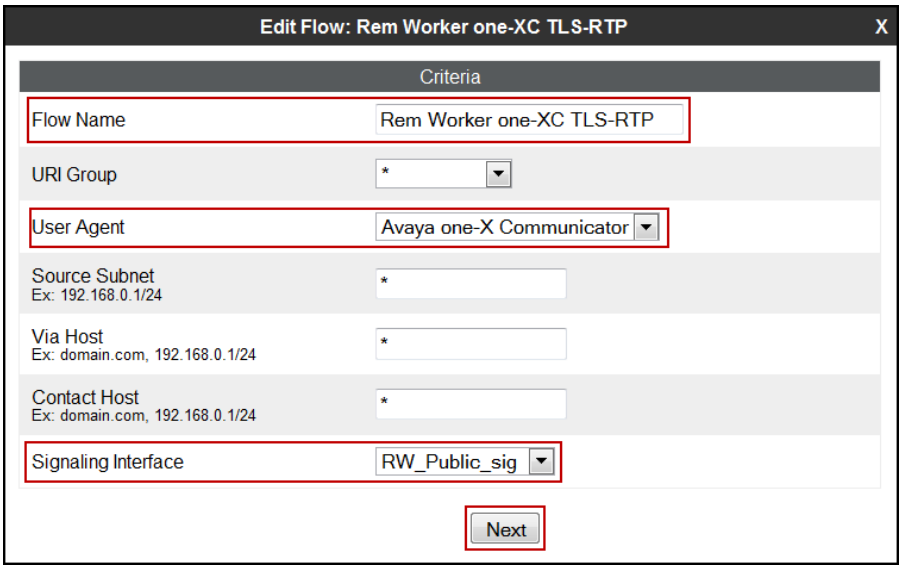


Note: The current release of Avaya Flare® Experience for Windows softphone (Rel. 1.1.4.23) doesn't support SRTP video encryption; testing was done with video disabled on the Avaya Flare® Experience for Windows PC client application (under **Settings → Video**). With the Avaya Flare® Experience for Windows End Point Policy Group setting shown above (**Rem Worker SRTP**), audio is encrypted across the public internet. With this setting; video has to be disabled on the Avaya Flare® Experience for Windows PC client application, as mentioned. If video is enabled with this setting, calls origination attempts from the PC client application will fail with busy tone to the user. If video is required for Remote Workers using Avaya Flare® Experience for Windows and audio/video encryption is not crucial to the enterprise across the public internet, the End Point Policy Group setting for the Avaya Flare® Experience for Windows shown above can be set to the value of **Rem Workers RTP** instead (selected from the pull down menu). With this setting, video can be enabled on the PC client application. Please keep in mind that with this setting media encryption of audio and video will not be done across the public internet. If privacy is crucial to the enterprise, **Rem Workers RTP** should not be used for audio. This restriction only applies to Remote Workers using Avaya Flare® Experience for Windows. The current release of one-X® Communicator softphone (Rel. 6.2.2.07-SP2) supports SRTP audio and video encryption.

Repeat the above steps to create a subscriber flow for **Avaya one-X Communicator** (used with Avaya one-X® Communicator softphone), as follows:

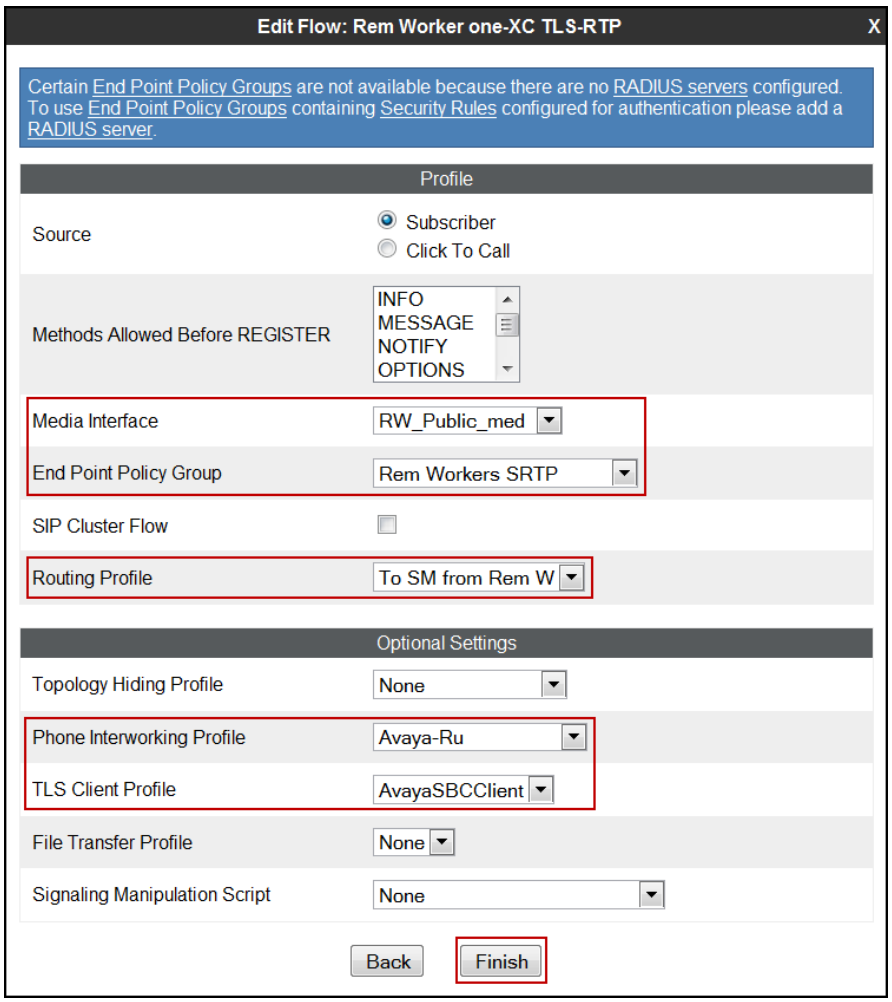
To create the **Avaya one-X Communicator** Subscriber Flow, click on **Add** (not shown). The following values were used in the reference configuration:

- Under **Flow Name** enter ***Rem Worker one-XC TLS-SRTP***.
- Under **User Agent** select ***Avaya one-X Communicator*** from the pull down menu (created in **Section 7.4**).
- Under **Signaling Interface** select ***RW_Public_sig*** from the pull down menu (created in **Section 7.8.2**).
- Leave remaining fields with default values.
- Click **Next**.

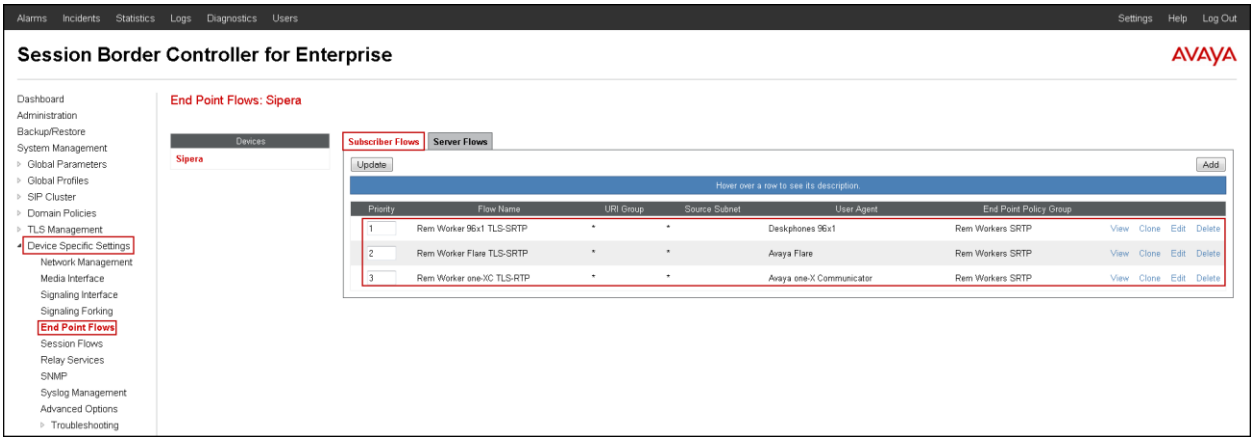


The **Profile** and **optional settings** window will open. The following values were used in the reference configuration:

- Under **Media Interface** select ***RW_Public_med*** from the pull down menu (created in **Section 7.8.1**).
- Under **End Point Policy Group** select ***Rem Workers SRTP*** from the pull down menu (created in **Section 7.7.4**).
- Under **Routing Profile** select ***To SM from Rem W*** from the pull down menu (created in **Section 7.5.2**).
- Under **Phone Interworking Profile** select ***Avaya-Ru*** from the pull down menu (existing default profile).
- Under **TLS Client Profile** select ***AvayaSBCClient*** from the pull down menu (existing profile).
- Leave remaining fields with default values.
- Click **Finish**.



The following screenshot shows the newly created Subscriber Flows.



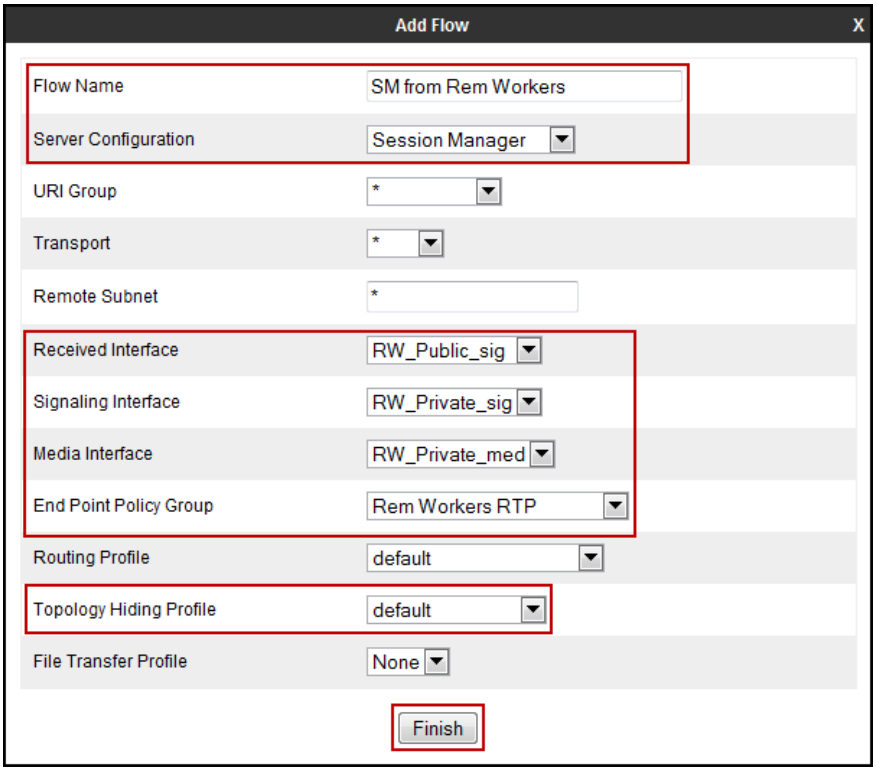
7.8.3.2 Remote Worker Server Flow

The following screens show the new Server Flow settings for Remote Worker access to Session Manager.

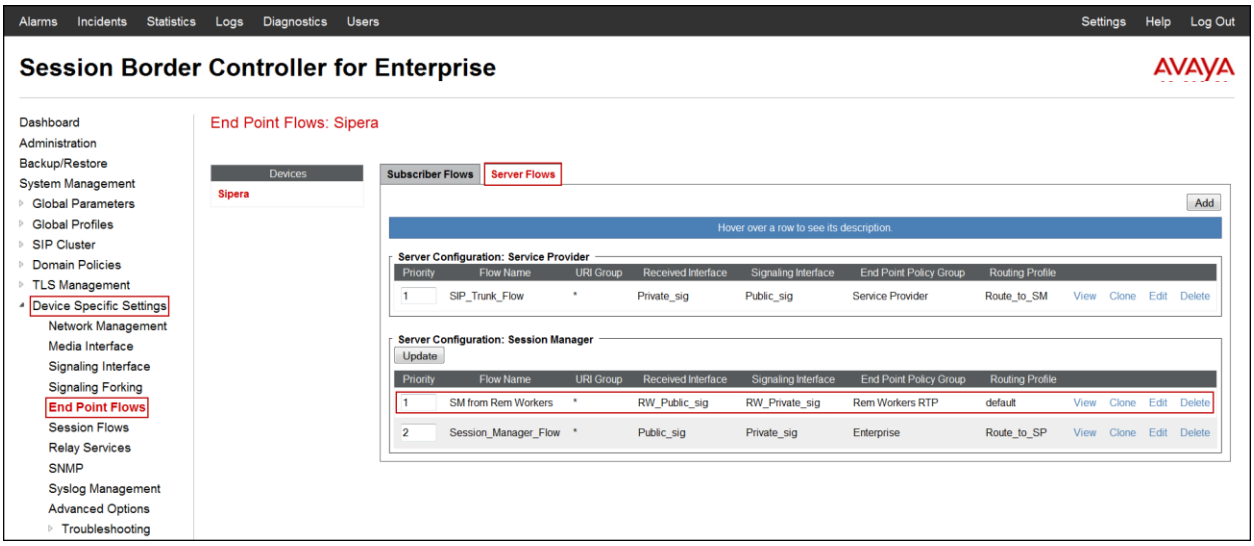
To create a new Server Flow for Remote Workers access to Session Manager, do the following:

Under **Device Specific Setting → End Point Flows → Server Flows** tab, click on **Add** (not shown). The following values were used in the reference configuration:

- Under **Flow Name** enter ***SM from Rem Workers***.
- Under **Server Configuration** select ***Session Manager*** from the pull down menu (created in **Section 7.5.3**).
- Under **Received Interface** select ***RW_Public_Sig*** from the pull down menu (created in **Section 7.8.2**).
- Under **Signaling Interface** select ***RW_Private_Sig*** from the pull down menu (created in **Section 7.8.2**).
- Under **Media Interface** select ***RW_Private_med*** from the pull down menu (created in **Section 7.8.1**).
- Under **End Point Policy Group** select ***Rem Workers RTP*** from the pull down menu (created in **Section 7.7.4**) (see note below).
- Under **Topology Hiding Profile** select ***default*** from the pull down menu.
- Leave remaining fields with default values.
- Click **Finish**.



The following screenshot shows the newly created **SM from Rem Workers** Server Flow. The other Server Flows shown in the screenshot (not enclosed in red bracket) were previously added and are used for SIP Trunking only; they are not relevant to Remote Worker functionality.



Note: With the End Point Policy Group setting of **Rem Workers RTP** assigned to the Server Flow shown above, RTP, or non-media encryption, will be used inside of the enterprise (private network side), this is the recommended value inside of the enterprise (private network side). Keep in mind that Server Flow settings only impact how signaling and media will be treated inside of the enterprise (private network side), while Subscriber Flow settings impact how signaling and media will be treated outside of the enterprise (public network side).

7.8.4. Relay Services

Relay Services are used to define how file transfers (e.g., for phone firmware upgrades and configuration), are routed to the Remote Worker endpoints. Both HTTP and HTTPS protocols are supported.

In the reference configuration, both protocols (HTTP and HTTPS) were configured and used for accessing the file server located at the enterprise, HTTPS is the preferred method. To create a new Relay Service for Remote Workers, do the following:

7.8.4.1 For accessing the file server using HTTP protocol:

Under **Device Specific Setting → Relay Services,** click on **Add** (not shown).

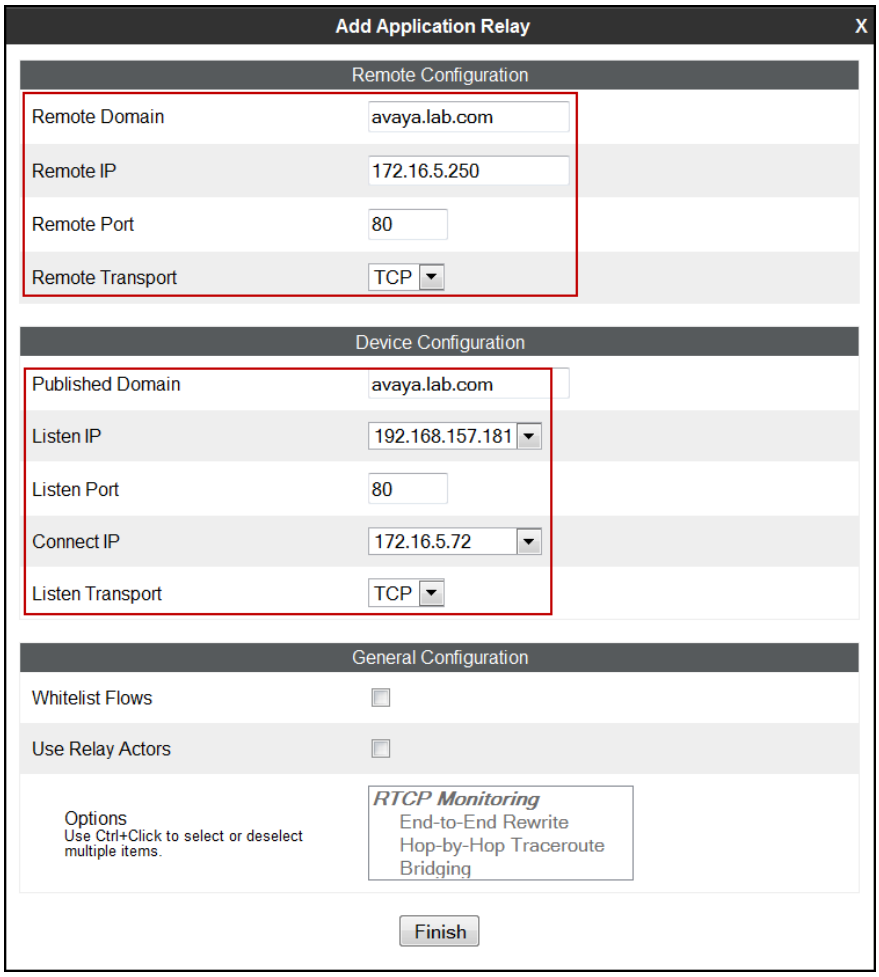
The following values were used in the reference configuration:

Under the **Remote Configuration** section:

- Set **Remote Domain** to the enterprise domain name (e.g., ***avaya.lab.com***) (match the enterprise domain name used in Session Manager).
- Under **Remote IP** enter the IP address of the enterprise HTTP file server (e.g., ***172.16.5.250***) used to provide the firmware file updates and configuration files to Remote Worker endpoints.
- Under **Remote Port** enter ***80*** (HTTP).
- Under **Remote Transport** select ***TCP***.

Under the **Device Configuration** section:

- Set the **Remote Domain** to the enterprise domain name (e.g., ***avaya.lab.com***) (match the enterprise domain name used in Session Manager).
- Under **Listen IP** select the IP address of the Avaya SBCE's public IP address designated for file transfers/relay services (***192.168.157.181***).
- Under **Listen Port** enter ***80*** (HTTP).
- Under **Connected IP** select the internal or private IP address of the Avaya SBCE used for Remote Worker (***172.16.5.72***).
- Under **Listen Transport** select ***TCP***.
- Click on **Finish**.



7.8.4.2 For accessing the file server using HTTPS protocol:

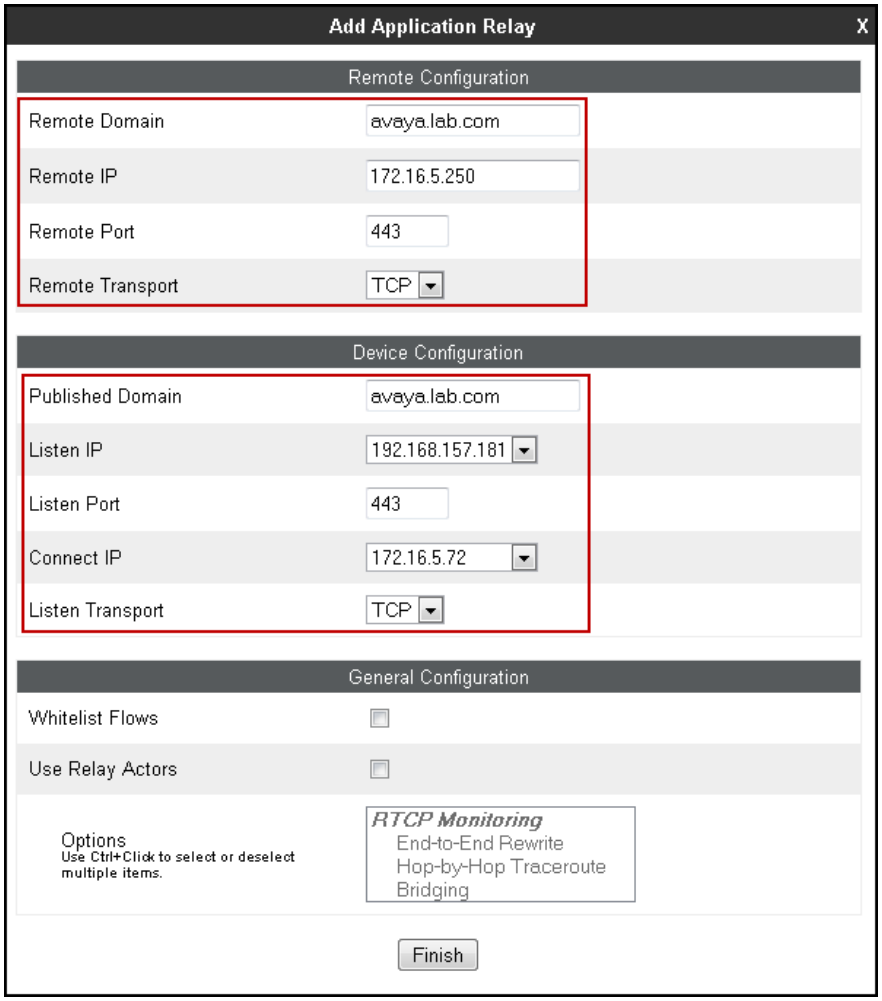
Under **Device Specific Setting → Relay Services,** click on **Add** (not shown). The following values were used in the reference configuration:

Under the **Remote Configuration** section:

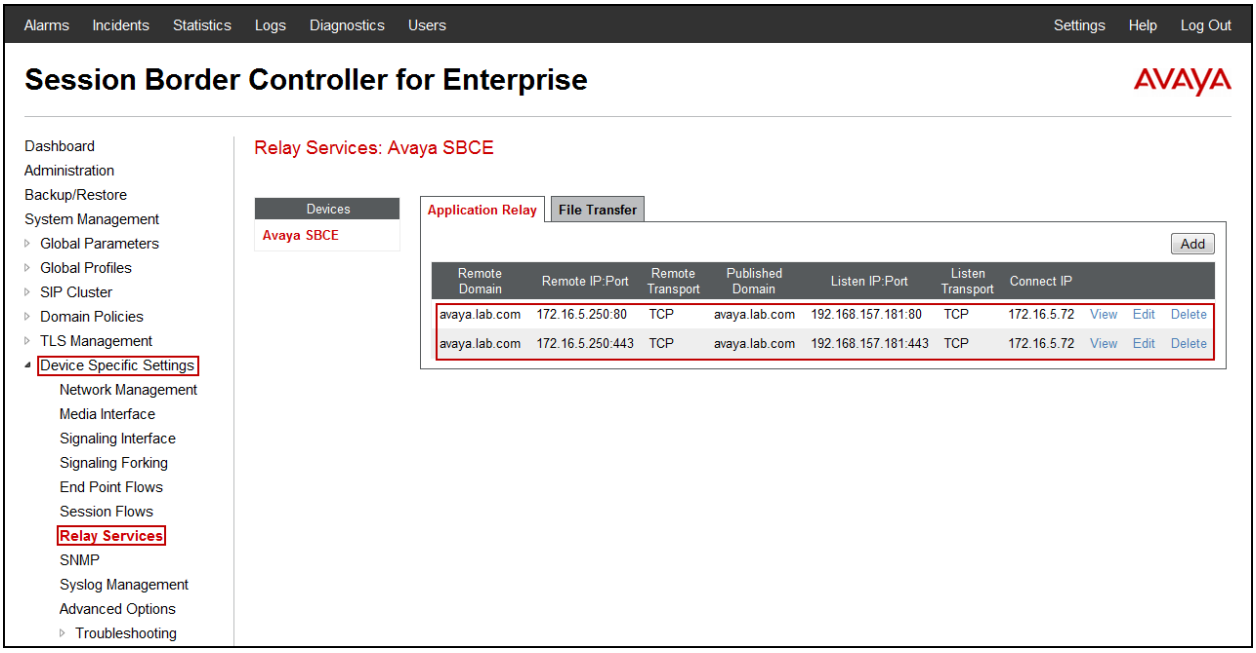
- Set **Remote Domain** to the enterprise domain name (e.g., ***avaya.lab.com***) (match the enterprise domain name used in Session Manager).
- Under **Remote IP** enter the IP address of the enterprise file server (e.g., ***172.16.5.250***) used to provide the firmware updates and configuration data to Remote Worker endpoints.
- Under **Remote Port** enter ***443*** (HTTPS).
- Under **Remote Transport** select ***TCP***.

Under the **Device Configuration** section:

- Set the **Remote Domain** to the enterprise domain name (e.g., ***avaya.lab.com***) (match the enterprise domain name used in Session Manager).
- Under **Listen IP** select the IP address of the Avaya SBCE's public IP address designated for file transfers/relay services (***192.168.157.181***).
- Under **Listen Port** enter ***443*** (HTTPS).
- Under **Connected IP** select the internal or private IP address of the Avaya SBCE used for Remote Worker (***172.16.5.72***).
- Under **Listen Transport** select ***TCP***.
- Click on **Finish**.



The following screenshot shows the newly created Relay Services.



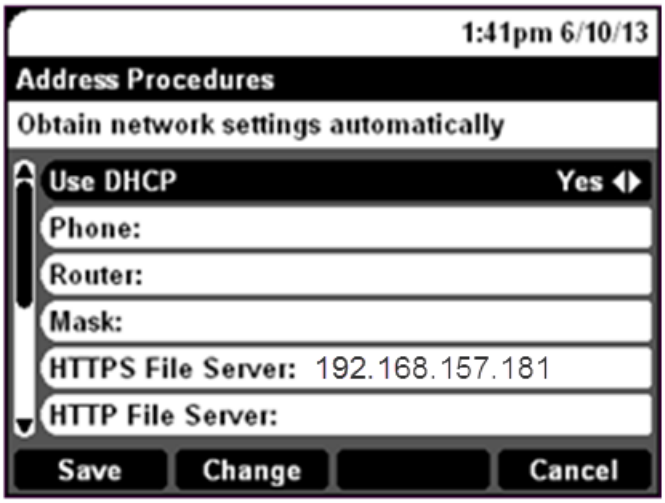
8. Remote Worker IP Deskphones (96x1 SIP) Configuration

The following screens illustrate the administration settings for a Remote Worker 96x1 SIP Deskphone used in the reference configuration.

8.1. ADDR Screen

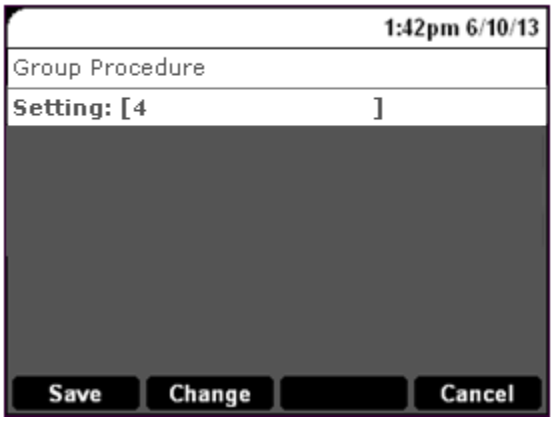
In the reference configuration, both protocols (HTTP and HTTPS) were used for accessing the file server located at the enterprise. HTTPS is the preferred method, shown below.

In the reference configuration, the 96x1 SIP Deskphones used DHCP to receive IP address assignments, therefore the **Use DHCP** field was set to ***Yes*** (a router was used as the DHCP server as well as the firewall and default gateway, see **Section 3**). Since HTTPS is the preferred method for file transfer, an HTTPS file server was configured at the enterprise. The Avaya SBCE IP address defined for Remote Worker file transfers/relay services, ***192.168.157.181***, was specified in the **HTTPS File Server** field.



8.2. Set Group Number Screen

In the reference configuration, the Remote Worker 96x1 Deskphones was set to use group **4**. The configuration parameters used specifically for Remote Worker endpoints are specified in the 46xxsettings.txt file under this group number, refer to **Section 8.3** below. Non-Remote Worker endpoints used **GROUP_0** (not shown under the 46xxsettings.txt file).



Note: In the reference configuration, the setting parameters: **Use DHCP** set to ***Yes*** is the default value for new phones. **HTTPS File Server** and **GROUP** specified above were the only settings that were configured manually on the Remote Worker 96x1 SIP Deskphones, remaining configuration parameters were downloaded automatically from the **46xxsettings.txt** file once the connection to the HTTPS file server was established. The DHCP server can also be used to automatically assign values, such as the HTTPS File Server address, this is accomplished with the use of DHCP options, not shown here.

8.3. Avaya IP Deskphones (96x1 SIP) 46xxsettings Configuration File

The **46xxsettings.txt** file contains configuration parameters used by Avaya IP endpoints. This file resides in the HTTPS file server used in the reference configuration. Whenever an Avaya IP endpoint is rebooted, it will attempt to download the **46xxsettings** file from the designated file server.

In the **46xxsettings** file, **GROUP_4** specifies parameters specifically used by Remote Worker endpoints, non-Remote Worker endpoints use **GROUP_0** (not shown)

```
#################### For Remote Workers ####################
IF $GROUP SEQ 4 GOTO GROUP_4
##
# GROUP_4
##########  Add SET Statements for GROUP 4 below  ############
SET SIG 2
SET SIPDOMAIN avaya.lab.com
SET SIP_CONTROLLER_LIST 192.168.157.180:5061;transport=tls
SET ENABLE_PPM_SOURCED_SIPPROXYSRVR 0
SET CONFIG_SERVER 192.168.157.180
SET CONFIG_SERVER_SECURE_MODE 2
SET DIALPLAN 3xxx|5xxx|91xxxxxxxxxx|9[2-9]xxxxxxxxx
SET GMTOFFSET "-5:00"
SET WAIT_FOR_REGISTRATION_TIMER 40
SET SECURECALL 1
SET MEDIAENCRYPTION 1

################# END OF GROUP 4 SETTINGS #####################
GOTO END
```

9. Personal Computer (PC) Configuration

This section describes the Personal Computer (PC) settings required when running Avaya Flare® Experience for Windows or Avaya one-X® Communicator on a PC used for Remote Workers.

In the reference configuration, the Network Adapter on the PC was configured to ***obtain an IP address automatically***.

9.1. Remote Worker Avaya Flare® Experience for Windows Configuration

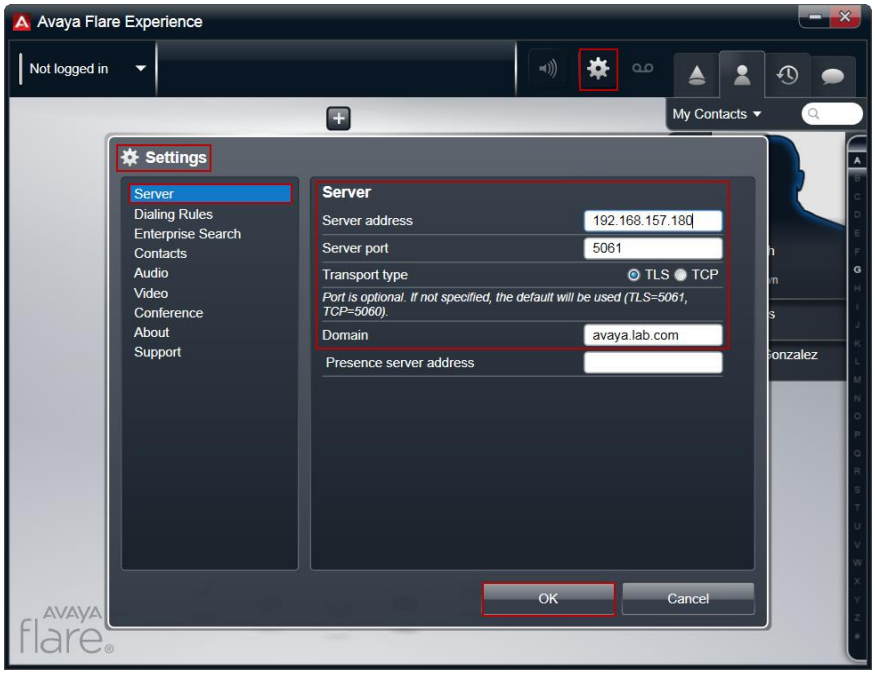
The following screens illustrate the Avaya Flare® Experience for Windows administration settings for the Remote Worker used in the reference configuration.

To configure Avaya Flare® Experience for Windows, do the following:

On the Avaya Flare® Experience for Windows application running on the PC, click on the **Settings** icon on the top right to display the **Settings** window.

Click on **Server,** the following values were used in the reference configuration:

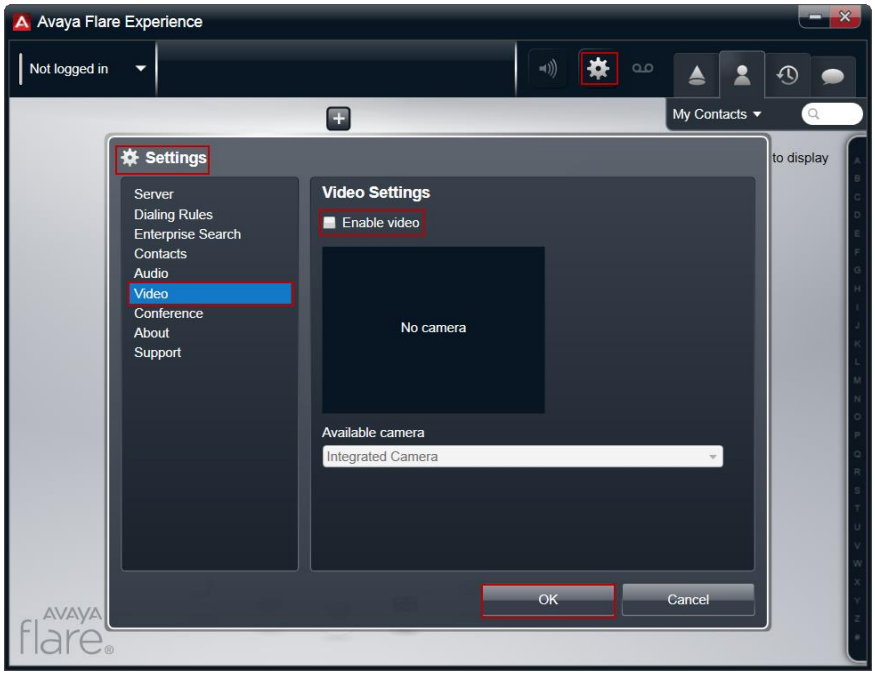
- Under **Server address** enter ***192.168.157.180*** (This is one of the two "public" IP addresses for interface B1 on the Avaya SBCE used for Remote Worker access to Session Manager (public IP not used for relay services).
- Under **Transport type** select ***TLS***.
- **Server port** will default to ***5061*** if TLS was selected above.
- Under **Domain** enter the enterprise domain name, ***avaya.lab.com*** in the reference configuration (match the enterprise domain name used in Session Manager).
- Click **OK**.



As mentioned previously, currently SRTP video encryption is not supported on Avaya Flare® Experience for Windows (Release 1.1.4.23), thus if SRTP encryption for audio is enabled under the Avaya SBCE Subscriber Flows, ensure video is disabled as shown below. If video is enabled the user will get a busy signal when attempting to make call; refer to **Section 7.8.3.1**.

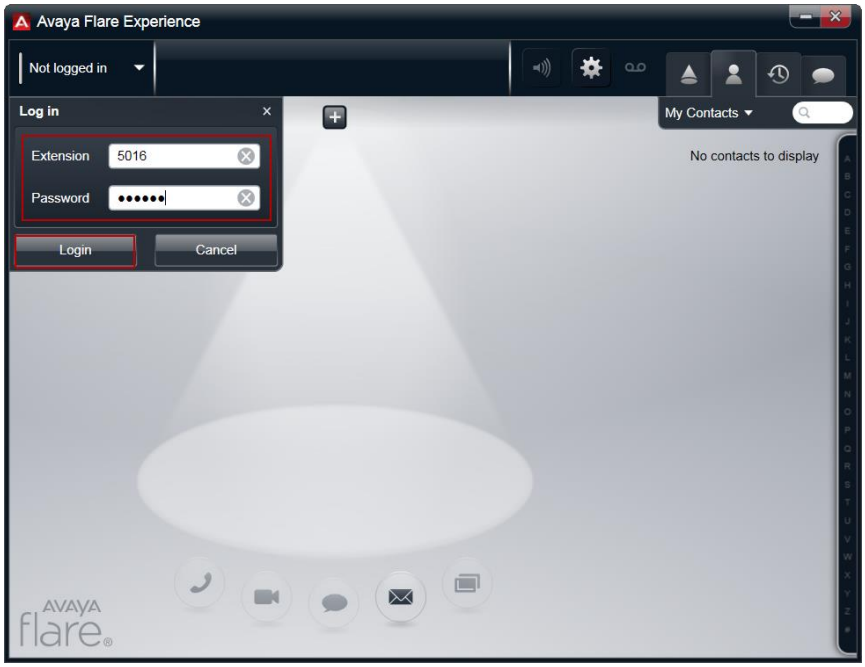
To verify that video is disabled do the following:
Click on the **Settings** icon on the top right to display the Settings window.
Click on **Video,** the following value was used in the reference configuration:

- Verify that **Enable video** is **not** checked.
- Click **OK**.

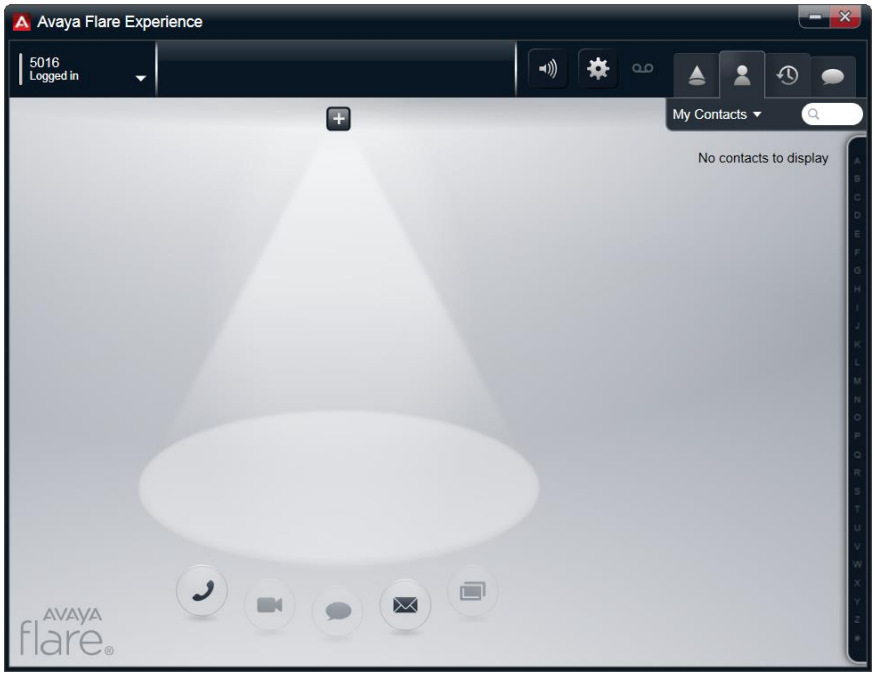


To login into Avaya Flare® Experience for Windows:

- Enter the **Extension** number provided for the Remote Worker user.
- Enter the **Password** provided for the Remote Worker user.
- Click **Login**.



The following screen will appear after the login process is completed, the Remote Worker user is now ready to make and receive audio calls.



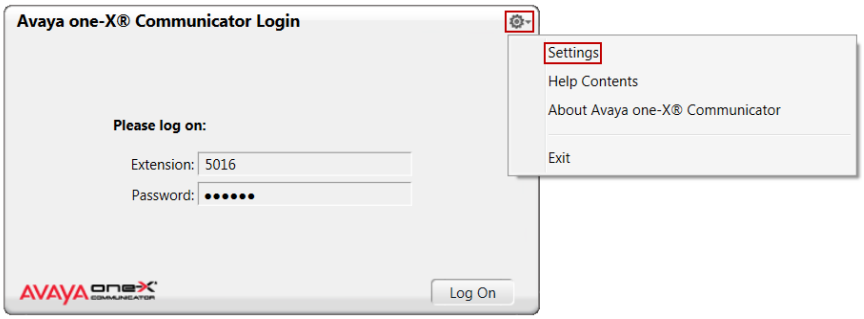
9.2. Remote Worker Avaya one-X® Communicator Configuration

The following screens illustrate Avaya one-X® Communicator administration settings for the Remote Worker used in the reference configuration.

To configure Avaya one-X® Communicator, do the following:

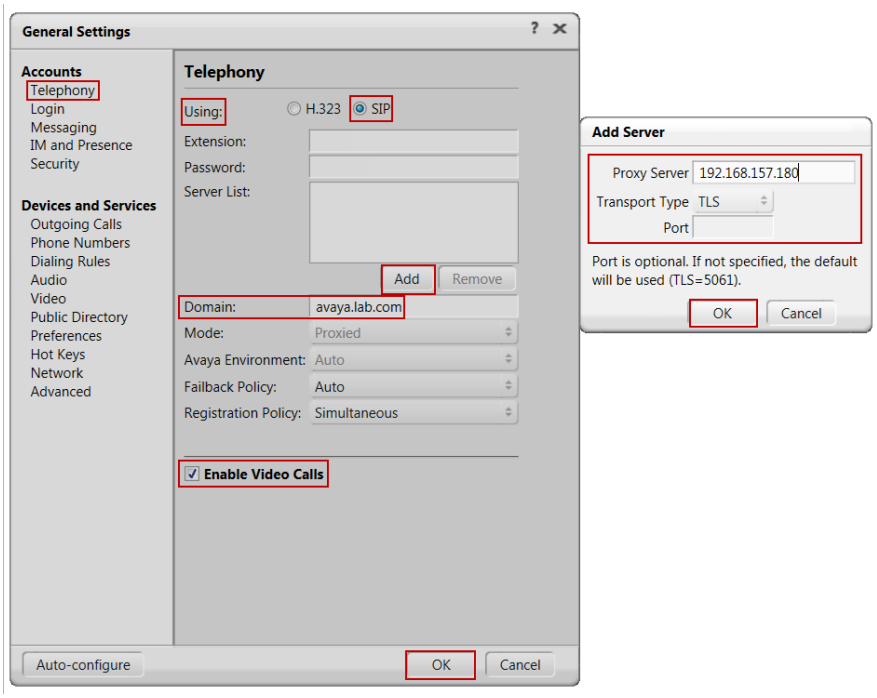
On the Avaya one-X® Communicator application running on the PC, click on the **Settings** icon on the top right to display the Settings window.

- Click on **Settings**.



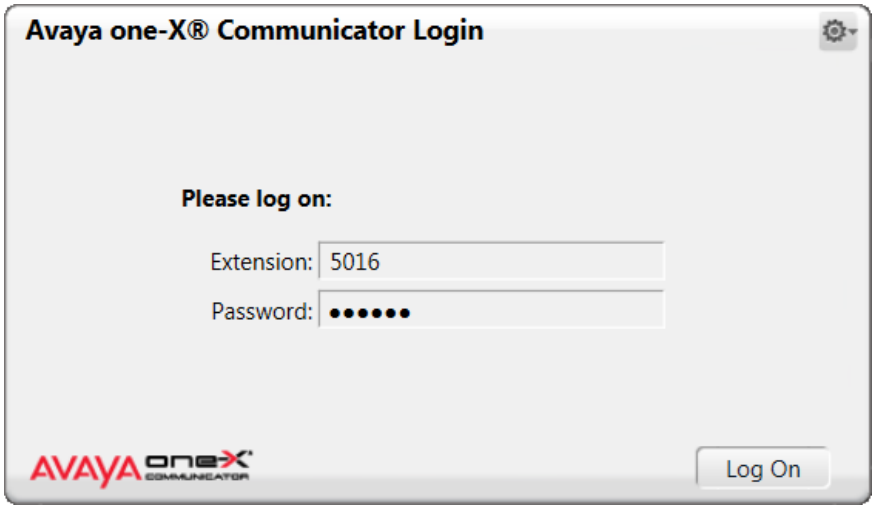
Click on **Telephony,** the **General Settings** window will appear. The following values were used in the reference configuration:

- Under **Using:** select ***SIP*** (SIP must be selected; H.323 is not supported for Remote Workers).
- Under **Server List**, click **Add** (the **Add Server** window to the right will appear).
- Under **Proxy Server** enter ***192.168.157.180*** (This is one of the two "public" IP addresses for interface B1 on the Avaya SBCE used for Remote Worker access to Session Manager (public IP not used for relay services).
- Under **Transport** select ***TLS***.
- **Server port** will default to ***5061*** if TLS was selected above.
- Click **OK** on the **Add Server** window.
- Under **Domain** enter the enterprise domain name, ***avaya.lab.com*** in the reference configuration.
- **Enable Video Calls** can be checked if the Remote Worker user wishes to use video (SRTP audio and video encryption is supported on Avaya one-X® Communicator).
- Click **OK** under the **General Settings** window.

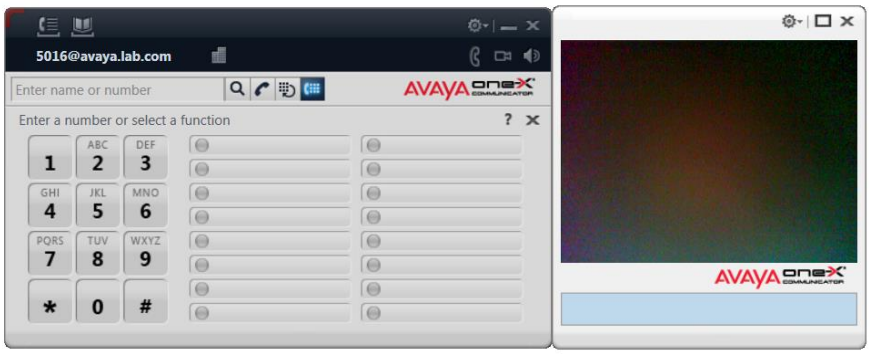


To login into Avaya one-X® Communicator:

- Enter the **Extension** number provided for the Remote Worker user.
- Enter the **Password** provided for the Remote Worker user.
- Click **Log On**.



The following screen will appear after the login process is completed. Note that **Enable Video Calls** was selected above, a separate video window will appear to the right. The Remote Worker user is ready to make and receive audio calls with video.



10.References

This section references the documentation relevant to these Application Notes.

Product documentation for Avaya Aura® Communication Manager, including the following, is available at: http://support.avaya.com/

[1] *Administering Avaya Aura® Communication Manager*, Release 6.3, June 2014, Document Number 03-300509.

Product documentation for Avaya Aura® System Manager, including the following, is available at: http://support.avaya.com/

[2] *Administering Avaya Aura® System Manager for* Release 6.3.8, Issue 4, Issue 4, June 2014.

Product documentation for Avaya Aura® Session Manager, including the following, is available at: http://support.avaya.com/

[3] *Administering Avaya Aura® Session Manager*, Release 6.3, Issue 4, June 2014.

Product documentation for the Avaya Session Border Controller for Enterprise, including the following, is available at: http://support.avaya.com/

[4] *Administering Avaya Session Border Controller for Enterprise,* Release 6.2, Issue 2, January 2014.
[5] *Installing Avaya Session Border Controller for Enterprise,* Release 6.2, Issue 3, June 2013.
[6] *Upgrading Avaya Session Border Controller for Enterprise,* Release 6.2, Issue 4, June 2014.

Product documentation for the Avaya 96x1 IP Deskphones, Avaya one-X® Communicator and Avaya Flare® Experience for Windows, including the following, is available at: http://support.avaya.com/

[7] Administering Avaya 9601/9608/9608G/9611G/9621G/9641G IP Deskphones SIP, Release 6.3.1, Issue 3, January 2014
[8] *Administering Avaya one-X® Communicator*, July 2013.
[9] *Using Avaya one-X® Communicator, Release 6.2,* December 2013
[10] *Administering Avaya Flare® Experience for Windows,* Release 1.1, Document Number: 18-604156, Issue 4, September 2013.
[11] *Implementing Avaya Flare® Experience for Windows,* Release 1.1, Document Number: 18-604153, Issue 2, February 2013.
[12] *How to Add SIP users in Avaya Aura Session Manager*, Documents ID: VIDEO100959, Version 1.0, July 17, 2014.

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 DevConnect Program at devconnect@avaya.com.