Avaya Solution & Interoperability Test Lab

Configuring the IP Trade Solution with Avaya SIP Enablement Services, Avaya Communication Manager and Avaya Modular Messaging - Issue 1.0

Abstract

These Application Notes describe the procedures for configuring IP Trade's IP-based trading floor solution to communicate with Avaya SIP Enablement Services, Avaya Communication Manager and Avaya Modular Messaging.

The IP Trade solution consists of a set of IP Trade turrets, a Turret Support Server (TSS), and a Turret Proxy to Open Line Dealing (TPO) server. The trading turrets, as well as the Open Line Dealing (OLD) extensions defined in the TPO server, register as SIP endpoints with Avaya SIP Enablement Services. This enables these devices to integrate with Avaya Communication Manager, Avaya SIP Enablement Services and, in the case of the turrets, Avaya Modular Messaging.

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 at the request of the Solutions Marketing Team.

1. Introduction

These Application Notes describe the procedures for configuring IP Trade's IP-based trading floor solution to communicate with Avaya SIP Enablement Services (SES), Avaya Communication Manager and Avaya Modular Messaging (MM). The IP Trade solution consists of the following components:

- **Turret Support Server (TSS)**: The TSS provides security extensions, end user profile management, hunt group capabilities, and bridges to middle-office applications.

- **IP Trade turret**: The IP Trade turret is SIP-based VoIP trading phone. Its call handling panel uses Avaya Communication Manager feature name extensions (FNE) and/or IP Trade Profile internal features to provide a variety of call features (e.g., Hold, Transfer, Conference, Call Park, Call Forward, Call Pickup, Call Dispatch, Barge-In, etc.).

- **Turret Proxy to Open Line Dealing (TPO) Server**: The TPO server serves as a proxy phone between a remote place extension and the local IP Trade end-users (turrets). When local IP Trade end-users dial the Open Line Dealing (OLD) extension of a remote place, all of the users are connected to that remote location via a single PSTN call from the OLD extension to the remote location, and are each able to speak publicly or privately to that remote location. In these Application Notes, the TPO server registers one SIP endpoint as an OLD extension with Avaya SIP Enablement Services. One Avaya IP extension was used for a simulated remote place.

2. Test Configuration

Figure 1 illustrates the configuration used to verify these Application Notes. It consists of a pair of redundant Avaya SES Home and Edge servers, Avaya Communication Manager (on a pair of Avaya S8710 Servers in a High Reliability configuration), a two-cabinet Avaya SCC1 Media Gateway[1] (with DS1 facilities to a simulated PSTN where OLD extension calls are routed), Avaya MM servers, Avaya H.323 and SIP telephones, Avaya 6400 Series Digital Telephones, IP Trade Profile IK and Profile EK turrets, an IP Trade TSS server (on which also resides a TFTP server used for downloading configuration parameters to the turrets), and an IP Trade TPO server.

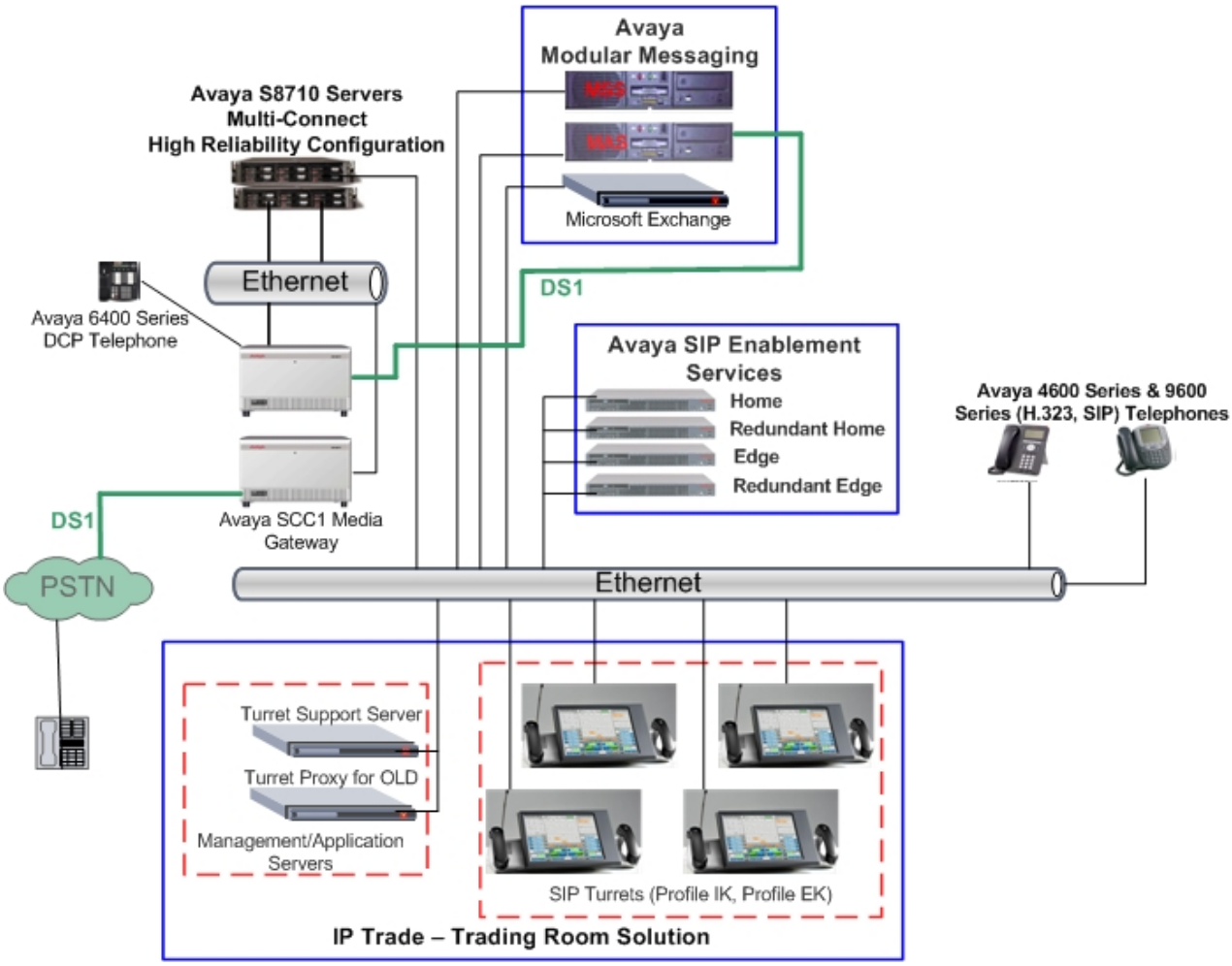


Figure 1: Reference Configuration

[1] The solution described in these Application Notes is also extensible to other Avaya Servers and Media Gateways.

3. Equipment and Software Validated

The following equipment and software/firmware were used for the reference configuration provided:

Equipment	Software/Firmware
Avaya S8710 Servers (2)	Avaya Communication Manager 5.0 (R015x.00.0.825.4)
Avaya SCC1 Media Gateway: • IPSI (TN2312BP) • C-LAN (TN799DP) • MedPro (TN2302AP) • Digital Line (TN2224B) • DS1 (TN464F)	 HW12 FW065 HW01 FW024 HW20 FW116 000003 000020
Avaya S8500C Servers (4)	Avaya SIP Enablement Services 5.0 (SES-5.0.0.0-825.31)
Avaya Modular Messaging Servers: • Messaging Application Server (MAS) • Message Storage Server (MSS)	3.1 (3.1-12.1)
Avaya 9620 IP Telephones	2.0 (SIP)
Avaya 4610SW IP Telephones	2.8 (H.323)
Avaya 4620SW IP Telephones	2.8 (H.323)
Avaya 6400 Series Digital Telephones	-
IP Trade components: • Turret Support Server (TSS) • Turret Proxy for Open Line Dealing (TPO) • Profile IK Turret • Profile EK Turret	 V 1.7 Release 4996 V 1.7 Release 4996 V 1.7 Release 4996 V 1.7 Release 4996
Microsoft Exchange (with Active Directory)	5.2

4. Configure Avaya Communication Manager

This section details the administration on Avaya Communication Manager to enable the IP Trade turrets to register as SIP endpoints and utilize certain Avaya Communication Manager features. The commands listed in the following sections were issued at the Avaya System Access Terminal (SAT).

This section assumes that a SIP network interface has been configured between Avaya Communication Manager and Avaya SES, although some of the steps shown are intended to verify that certain aspects of this configuration were completed adequately for this solution. This interface is a trunk group that handles all SIP signaling between Avaya SES (which interfaces with the IP Trade turrets and OLD extensions as a SIP proxy) and Avaya Communication Manager. For details concerning the establishment of this interface, please refer to [1]. For further information about Avaya Communication Manager features and their administration, please refer to [4] and [5].

Step	Description
1.	Enter **display system-parameters customer-options** to verify that sufficient SIP trunk capacity exists. On **Page 2**, under the **IP PORT CAPACITIES** section, verify that the **Maximum Administered SIP Trunks** is enough to support the expected total traffic to and from all IP Trade turrets and OLD extensions. Any call involving a SIP endpoint will use one SIP trunk per SIP endpoint. If the capacity indicated is deemed insufficient, an authorized Avaya support technician will need to install an appropriately enabled license file.

```
display system-parameters customer-options                      Page   2 of  11
                                OPTIONAL FEATURES

IP PORT CAPACITIES                                             USED
                     Maximum Administered H.323 Trunks: 200   112
           Maximum Concurrently Registered IP Stations: 2000  16
             Maximum Administered Remote Office Trunks: 8000  0
Maximum Concurrently Registered Remote Office Stations: 12000 0
              Maximum Concurrently Registered IP eCons: 20    0
  Max Concur Registered Unauthenticated H.323 Stations: 200   0
                       Maximum Video Capable Stations: 100   22
                   Maximum Video Capable IP Softphones: 100   11
                      Maximum Administered SIP Trunks: 400   262
  Maximum Administered Ad-hoc Video Conferencing Ports: 0     0
   Maximum Number of DS1 Boards with Echo Cancellation: 12    0
                             Maximum TN2501 VAL Boards: 10    1
                     Maximum Media Gateway VAL Sources: 10    2
           Maximum TN2602 Boards with 80 VoIP Channels: 128   0
          Maximum TN2602 Boards with 320 VoIP Channels: 128   1
   Maximum Number of Expanded Meet-me Conference Ports: 300   0

        (NOTE: You must logoff & login to effect the permission changes.)
```

Step	Description

2.	Enter **change ip-network-region *n***, where ***n*** is the IP network region where the Avaya SES server resides. In this example, region 1, the default region for the Avaya S8710 Server running Avaya Communication Manager, was used. Verify and/or take note of the following fields:
	
	• **Intra-region IP-IP Direct Audio, Inter-region IP-IP Direct Audio:** These fields should be set to **yes** to allow audio traffic to be sent directly between IP endpoints without using media resources in the Avaya Media Gateway (a feature known as "shuffling").
	• **Codec Set:** The administration of the IP codec set specified here (see **Step 3**) determines the set of audio codecs to be used for calls within this IP network region. Since the Avaya S8710 Server and the Avaya SES server are in the same region in this example, all calls to and from any IP phone (H.323 or SIP) within the enterprise will use this IP codec set. If the Avaya S8710 Server and the Avaya SES server are placed in separate regions, then calls between IP Trade turrets and other IP telephones would be subject to the IP codec set specifications on **Page 3** of the corresponding **IP Network Region** forms.
	• **Authoritative Domain:** This value will be used when administering IP Trade turrets in **Section 7**.
	
	`change ip-network-region 1  Page 1 of 19`
	`IP NETWORK REGION`
	`Region: 1`
	`Location: 1  Authoritative Domain: trade.com`
	`Name: Lincroft`
	`MEDIA PARAMETERS  Intra-region IP-IP Direct Audio: yes`
	`Codec Set: 1  Inter-region IP-IP Direct Audio: yes`
	`UDP Port Min: 2048  IP Audio Hairpinning? y`
	`UDP Port Max: 65535`
	`DIFFSERV/TOS PARAMETERS  RTCP Reporting Enabled? y`
	`Call Control PHB Value: 46  RTCP MONITOR SERVER PARAMETERS`
	`Audio PHB Value: 46  Use Default Server Parameters? y`
	`Video PHB Value: 26`
	`802.1P/Q PARAMETERS`
	`Call Control 802.1p Priority: 6`
	`Audio 802.1p Priority: 6`
	`Video 802.1p Priority: 5  AUDIO RESOURCE RESERVATION PARAMETERS`
	`H.323 IP ENDPOINTS  RSVP Enabled? n`
	`H.323 Link Bounce Recovery? y`
	`Idle Traffic Interval (sec): 3483`
	`Keep-Alive Interval (sec): 5`
	`Keep-Alive Count: 5`

Step	Description
3.	Enter **change ip-codec-set *n*** (where ***n*** is the number of the IP codec set referenced in **Step 2**) to specify the audio codecs to be used for calls routed to and from the IP Trade turrets and OLD extensions via Avaya SES. (The default values can be retained for the additional parameters associated with each audio codec, e.g., Silence Suppression.) The order of the codecs listed will determine the negotiating preference for each call established. A prime consideration is whether voice quality is more important than bandwidth utilization (e.g., the higher bandwidth used by the G.711 codecs corresponds to better quality). The codecs supported by the IP Trade SIP devices are listed below. In addition, the **Media Encryption** preference must be set to **none**, since the IP Trade solution does not support media encryption.

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

                           IP Codec Set

    Codec Set: 1

    Audio        Silence      Frames   Packet
    Codec        Suppression  Per Pkt  Size(ms)
 1: G.711MU           n         2        20
 2: G.711A            n         2        20
 3: G.729B            n         2        20
 4:
 5:
 6:
 7:


Media Encryption
 1: none
 2:
```

Step	Description
4.	Enter **change signaling-group *n***, where ***n*** is the number of the signaling group used by the SIP trunk group between Avaya Communication Manager and Avaya SES (see **Step 5**). In this example, signaling group 10 was created. Verify that the **Direct IP-IP Audio Connections** field is set to **y** to enable shuffling between the near-end and far-end IP endpoints.

```
change signaling-group 10                                        Page   1 of   1
                               SIGNALING GROUP

 Group Number: 10             Group Type: sip
                        Transport Method: tls

          IP Video? y     Priority Video? n




   Near-end Node Name: C-LAN-B               Far-end Node Name: TF-SES-HOME
 Near-end Listen Port: 5061                Far-end Listen Port: 5061
                                         Far-end Network Region: 1
       Far-end Domain: trade.com

                                            Bypass If IP Threshold Exceeded? n

         DTMF over IP: rtp-payload           Direct IP-IP Audio Connections? y
                                                       IP Audio Hairpinning? n
         Enable Layer 3 Test? n
 Session Establishment Timer(min): 120
```

5.	Enter **change trunk-group *n***, where ***n*** is the number of the SIP trunk group between Avaya Communication Manager and Avaya SES. In this example, trunk group 11 was used. On **Page 1**, verify that the **Number of Members** field is appropriate to support the anticipated traffic involving the turrets, but not exceeding the maximum number of available SIP trunks as indicated in **Step 1**.

```
change trunk-group 11                                            Page   1 of  21
                               TRUNK GROUP

Group Number: 11                   Group Type: sip           CDR Reports: y
  Group Name: TF-SES-HOME                 COR: 1        TN: 1        TAC: 111
   Direction: two-way        Outgoing Display? n
 Dial Access? n                                     Night Service:
Queue Length: 0
Service Type: tie                   Auth Code? n

                                                      Signaling Group: 10
                                                    Number of Members: 50
```

Step	Description
6.	All SIP stations (including the IP Trade turrets and SIP extensions used by the TPO server) are configured as OPS stations in Avaya Communication Manager. Enter **display system-parameters customer-options** and examine **Page 1** to confirm that the license file has allocated enough OPS extensions (**Maximum Off-PBX Telephones – OPS**) to support all SIP endpoints. If not, an authorized Avaya support technician will need to install an appropriately enabled license file.

```
display system-parameters customer-options                      Page   1 of  11
                                OPTIONAL FEATURES

     G3 Version: V15                              Software Package: Standard
       Location: 1                              RFA System ID (SID): 1
       Platform: 6                              RFA Module ID (MID): 1

                                                             USED
                                Platform Maximum Ports: 44000 1808
                                       Maximum Stations: 36000 1171
                             Maximum XMOBILE Stations: 400   0
                     Maximum Off-PBX Telephones - EC500: 400   13
                     Maximum Off-PBX Telephones -   OPS: 400   101
                     Maximum Off-PBX Telephones - PBFMC: 0     0
                     Maximum Off-PBX Telephones - PVFMC: 0     0
                     Maximum Off-PBX Telephones - SCCAN: 400   0




        (NOTE: You must logoff & login to effect the permission changes.)
```

Step	Description

7.	Enter **add station *x*** (where ***x*** is an available valid extension in the dial plan) to create a station extension for a SIP endpoint. Enter the following values on **Page 1**:
	
	• **Type**: Set to a type that will accommodate the number of call appearances desired for this endpoint (in this example, **6416D+**).
	• **Port**: Enter **X**. This indicates that the station is Administered Without Hardware (AWOH) and is not assigned to a specific port on Avaya Communication Manager.
	• **Name**: Enter a descriptive name.
	• **Coverage Path 1**: Enter the number of the coverage path used by Avaya MM subscribers (see **Section 6** for Avaya MM configuration details).
	
	`add station 30063 Page 1 of 6`
	`STATION`
	`Extension: 30063 Lock Messages? n BCC: 0`
	`Type: 6416D+ Security Code: TN: 1`
	`Port: X Coverage Path 1: 10 COR: 1`
	`Name: IP Trade Bob Funds Coverage Path 2: COS: 1`
	`Hunt-to Station:`
	`STATION OPTIONS`
	`Time of Day Lock Table:`
	`Loss Group: 2 Personalized Ringing Pattern: 1`
	`Data Option: none Message Lamp Ext: 30063`
	`Speakerphone: 2-way Mute Button Enabled? y`
	`Display Language: english Expansion Module? n`
	`Survivable COR: internal Media Complex Ext:`
	`Survivable Trunk Dest? y IP SoftPhone? n`
	`Remote Office Phone? n`
	`IP Video? N`

Step	Description

8.	On **Page 2**, enter the following values:
	
	• **Restrict Last Appearance**: Enter **n** to allow the last call appearance to be used for either an incoming or outgoing call.
	• **Direct IP-IP Audio Connections**: Enter **y** to enable shuffling for calls involving this station.
	
	`change station 30063  Page 2 of 6`
	`STATION`
	`FEATURE OPTIONS`
	`LWC Reception: spe  Auto Select Any Idle Appearance? n`
	`LWC Activation? y  Coverage Msg Retrieval? y`
	`LWC Log External Calls? n  Auto Answer: none`
	`CDR Privacy? n  Data Restriction? n`
	`Redirect Notification? y  Idle Appearance Preference? n`
	`Per Button Ring Control? n  Bridged Idle Line Preference? n`
	`Bridged Call Alerting? n  Restrict Last Appearance? n`
	`Active Station Ringing: single`
	
	`H.320 Conversion? n  Per Station CPN - Send Calling Number?`
	`Service Link Mode: as-needed`
	`Multimedia Mode: basic  Audible Message Waiting? n`
	`MWI Served User Type:  Display Client Redirection? n`
	`AUDIX Name:  Select Last Used Appearance? n`
	`Coverage After Forwarding? s`
	`Multimedia Early Answer? n`
	`Direct IP-IP Audio Connections? y`
	`Emergency Location Ext: 30063  IP Audio Hairpinning? n`

9.	On **Page 4**, add a **call-appr** button for each call appearance to be used by this endpoint. Use **Page 5** (see **Step 10**) to add more than eight call appearances. In this sample configuration, ten call appearances (the maximum allowed by Avaya Communication Manager) were added for each SIP station used by the IP Trade turrets.
	
	`add station 30063  Page 4 of 6`
	`STATION`
	`SITE DATA`
	`Room:  Headset? n`
	`Jack:  Speaker? n`
	`Cable:  Mounting: d`
	`Floor:  Cord Length: 0`
	`Building:  Set Color:`
	
	`ABBREVIATED DIALING`
	`List1:  List2:  List3:`
	
	`BUTTON ASSIGNMENTS`
	`1: call-appr  5: call-appr`
	`2: call-appr  6: call-appr`
	`3: call-appr  7: call-appr`
	`4: call-appr  8: call-appr`

Step	Description

10.	Assign to available feature buttons (in this example, on **Page 5)** the No-Hold Conference (**no-hld-conf**) and Automatic Call Back (**auto-cback**) features. These must be present in order for any SIP endpoints to use the Conference on Answer and Automatic Call Back FNEs, respectively.
	
	`add station 30063  Page 5 of 6`
	`STATION`
	
	`FEATURE BUTTON ASSIGNMENTS`
	
	`9: call-appr`
	`10: call-appr`
	`11: no-hld-cnf`
	`12: auto-cback`
	`13:`
	`14:`
	`15:`
	`16:`

11.	Enter **add off-pbx-telephone station-mapping** to map the new station extension to an OPS station. Enter the following values in the first available row:
	
	• **Station Extension:** Enter the extension of the station created in **Step 7**.
	• **Application:** Enter **OPS**.
	• **Phone Number:** Enter the phone number of the associated Off-PBX Telephone.
	• **Trunk Selection:** Enter the number of the SIP trunk group referenced in **Step 5** (in this example, **11**).
	• **Configuration Set:** Retain the default value.
	
	`add off-pbx-telephone station-mapping  Page 1 of 2`
	`STATIONS WITH OFF-PBX TELEPHONE INTEGRATION`
	
	`Station Extension  Application  Dial Prefix  CC  Phone Number  Trunk Selection  Config Set`
	`30063  OPS  -  30063  11  1`
	`-`
	`-`

12.	On **Page 2**, set the **Call Limit** to the number of call appearances set on the station form in **Step 9**. Verify that the **Mapping Mode** is set to **both**.
	
	`add off-pbx-telephone station-mapping  Page 2 of 2`
	`STATIONS WITH OFF-PBX TELEPHONE INTEGRATION`
	
	`Station Extension  Call Limit  Mapping Mode  Calls Allowed  Bridged Calls  Location`
	`30063  10  both  all  both`

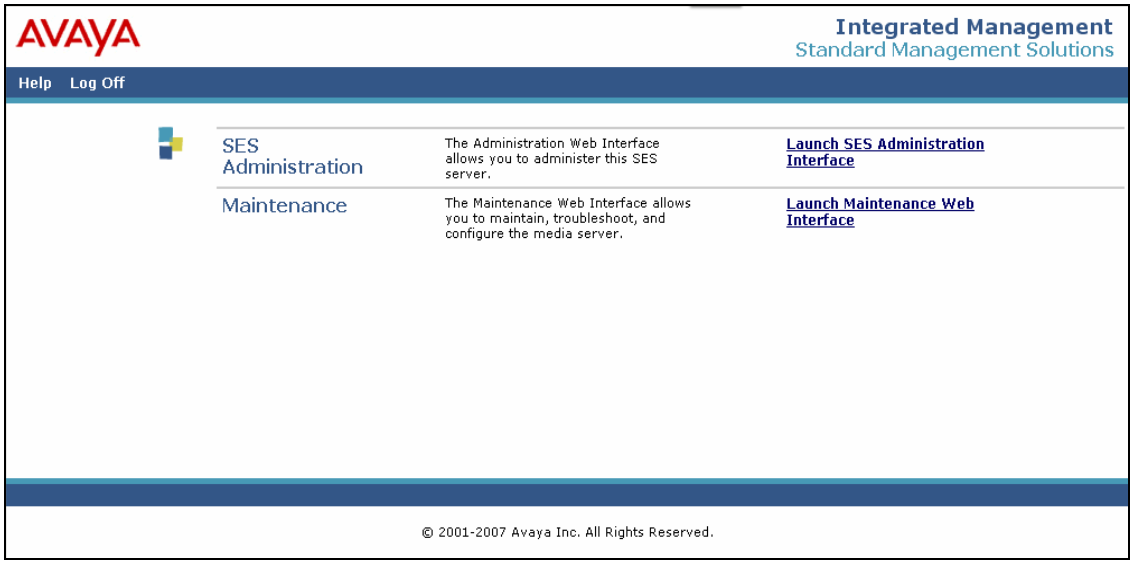
Step	Description
13.	Repeat **Steps 7 - 12** as necessary to add additional SIP extensions.
14.	Enter **change off-pbx-telephone feature-name-extensions** to administer the FNEs that will be used by the IP Trade turrets and the Avaya SIP endpoints to activate certain Avaya Communication Manager features. The FNEs shown in **bold** were the subset that were used in the reference configuration. (NOTE: For each of the FNEs highlighted, the associated Feature Access Code (FAC) must also be administered.)

```
change off-pbx-telephone feature-name-extensions set 1          Page   1 of   2
     EXTENSIONS TO CALL WHICH ACTIVATE FEATURES BY NAME
                      Set Name:

     Active Appearance Select:
          Automatic Call Back: 29001
   Automatic Call-Back Cancel: 29002
             Call Forward All: 29003
  Call Forward Busy/No Answer: 29004
          Call Forward Cancel: 29005
                    Call Park: 29006
        Call Park Answer Back: 29007
                 Call Pick-Up: 29008
         Calling Number Block:
       Calling Number Unblock:
        Conference on Answer: 29011
       Directed Call Pick-Up: 29012
       Drop Last Added Party: 29013
    Exclusion (Toggle On/Off):
   Extended Group Call Pickup:
       Held Appearance Select:
```

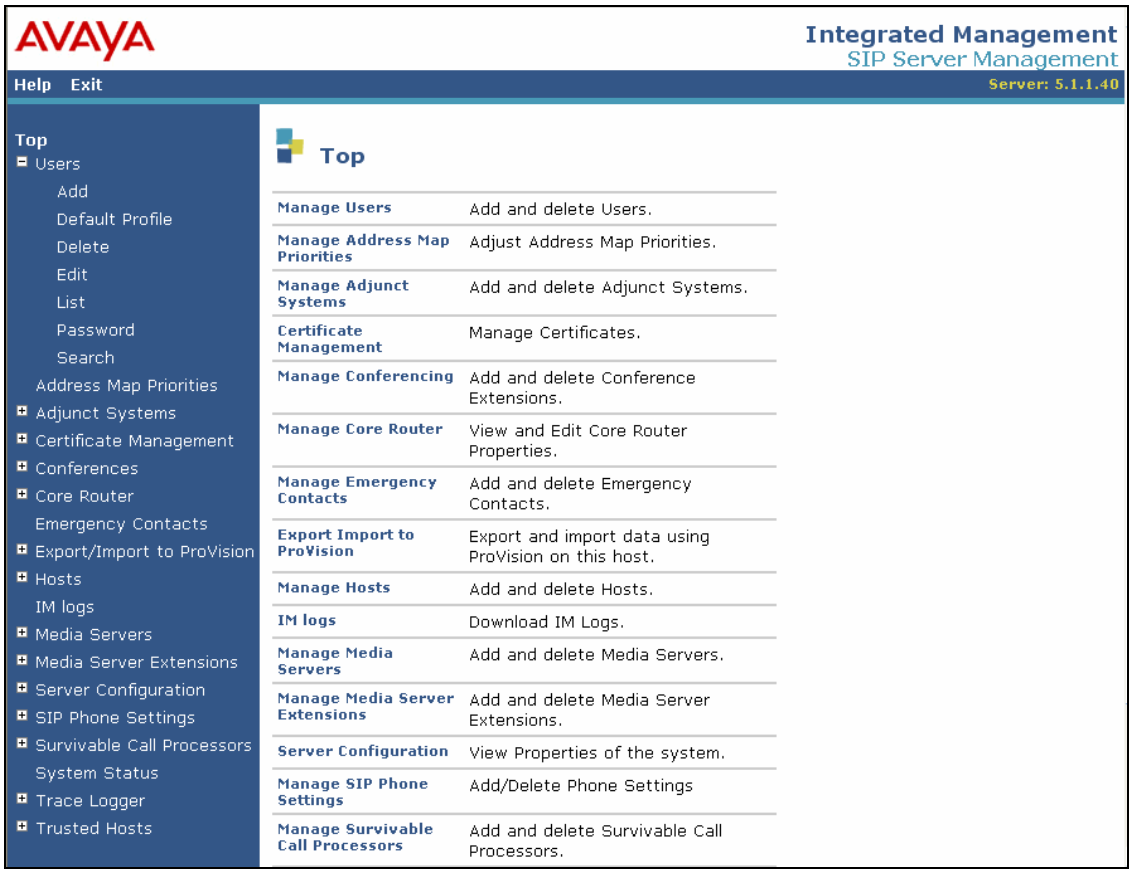
```
change off-pbx-telephone feature-name-extensions set 1          Page   2 of   2
     EXTENSIONS TO CALL WHICH ACTIVATE FEATURES BY NAME

       Idle Appearance Select:
           Last Number Dialed: 29021
         Malicious Call Trace:
  Malicious Call Trace Cancel:
          Off-Pbx Call Enable:
         Off-Pbx Call Disable:
                Priority Call:
               Send All Calls: 29022
        Send All Calls Cancel: 29023
          Transfer On Hang-Up: 29024
       Transfer to Voice Mail: 29025
      Whisper Page Activation:
```

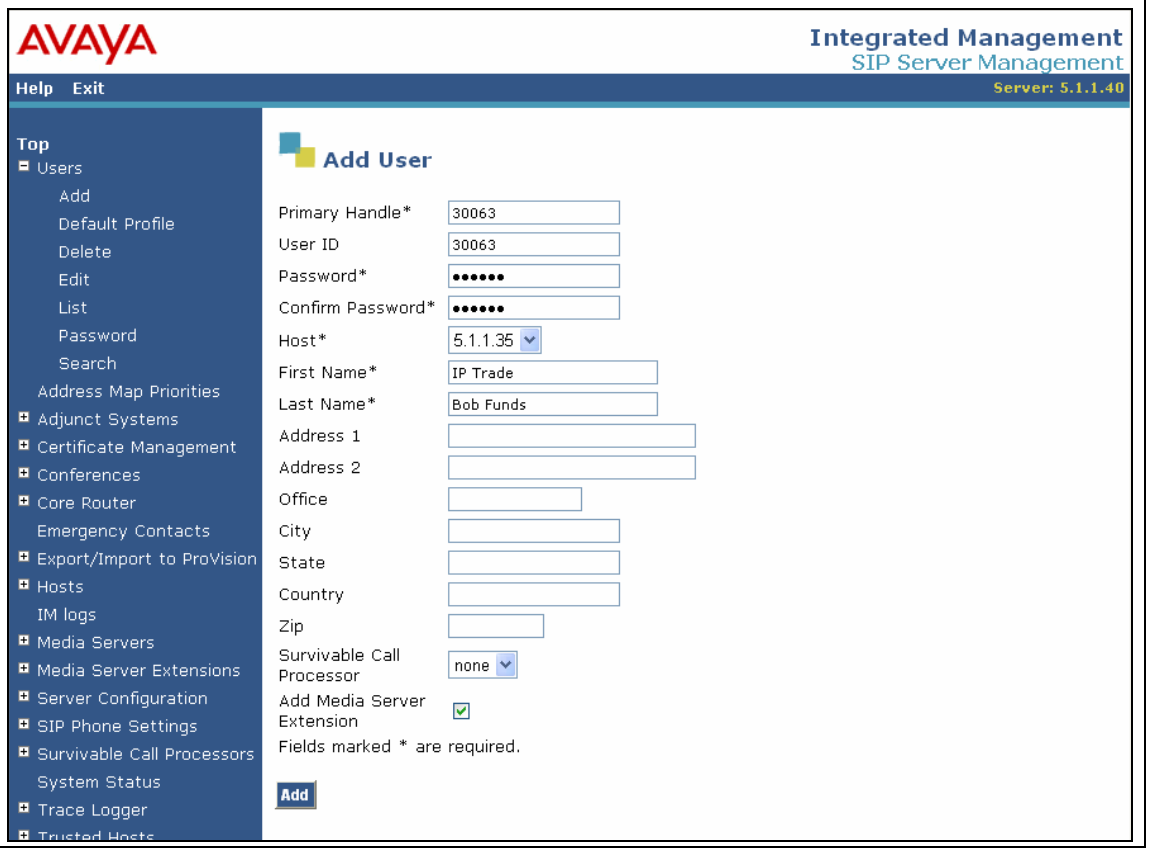
5. Configure Avaya SIP Enablement Services

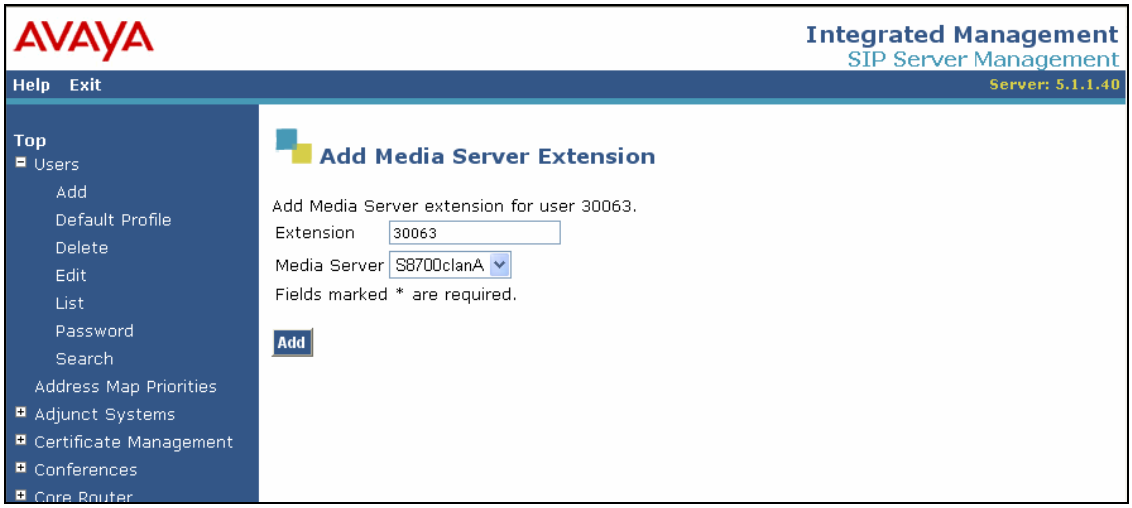
This section addresses the administrative steps to be performed on Avaya SIP Enablement Services to enable the IP Trade turrets and OLD extensions to register as SIP endpoints. The installation of the Avaya SES software and license file, as well as the initial configuration of the server and its basic integration with Avaya Communication Manager, is beyond the scope of this document. Please see [6] for the details of these procedures.

Step	Description
1.	From a Web browser, navigate to http://<*ip-addr*>/admin (where <*ip-addr*> is the IP address of the Avaya SES Edge server). After logging in with an appropriate login and password, the main page appears. Click on the **Launch SES Administration Interface** link. 

Step	Description
2.	The administration home page appears.



Step	Description
3.	To add SIP users (identified by the corresponding telephone extensions), select **Users** → **Add** from the left pane. Enter the following values: ▪ **Primary Handle:** This specifies a user in Avaya SES (in this example, **30063**). While not required, it is recommended that the Primary handle be the same as the **User ID**. ▪ **User ID:** Set the same value as **Primary Handle**. ▪ **Password:** This must match the password associated with the corresponding **SIP Extension** configured on the IP Trade solution for a turret in **Section 7.1**, **Steps 1** and **2.** ▪ **Confirm Password:** Re-enter the above **Password**. ▪ **Host:** Select from the drop-down menu the host name or IP address of the Avaya SES Home server (in this example, **5.1.1.35**). ▪ **First Name, Last Name:** Enter descriptive values. ▪ **Add Media Server Extension:** Check this box to add a media server extension for the user (see **Step 5**). The completed form appears as follows. Click **Add** to submit the form. 

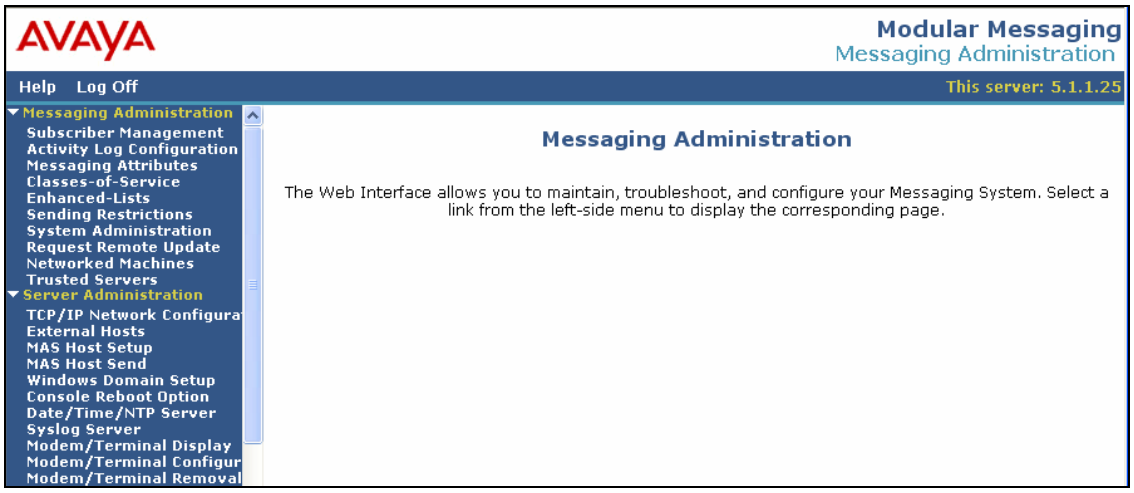
Step	Description
4.	On the page that follows (see below), click **Continue**. 
5.	The **Add Media Server Extension** page will appear as shown below. Enter the following values: ▪ **Extension:** Enter the OPS extension corresponding to the station configured in Avaya Communication Manager. See **Section 4**, **Steps 11** and **12**. ▪ **Media Server**: Select the Media Server where the associated station resides (in this example, **S8700clanA**). The completed form appears as follows. Click **Add** to submit the form. 
6.	Repeat **Steps 3-5** to add additional users to support the remaining IP Trade turrets and OLD extensions.

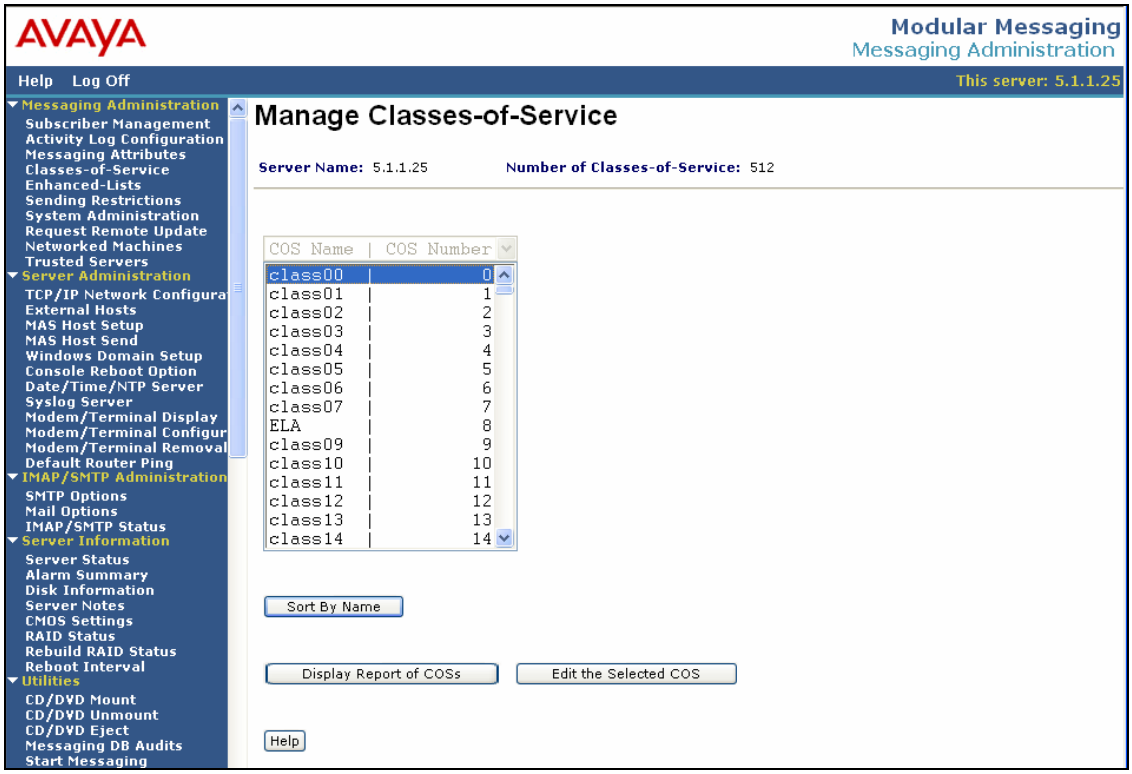
6. Configure Avaya Modular Messaging

This section specifies the configuration of new subscribers in Avaya Modular Messaging that will allow IP Trade turret users to interact successfully with Avaya MM. Procedures are presented for both available storage options: Avaya's Message Storage Server and Microsoft Exchange.

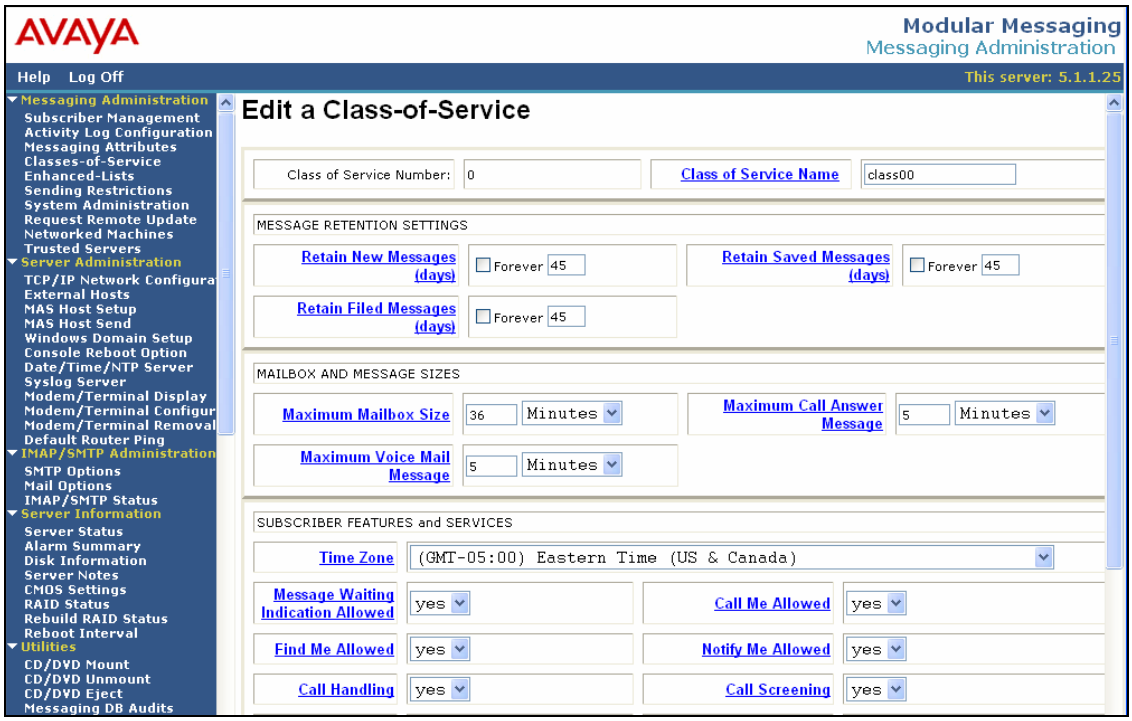
It is assumed that basic integration of Avaya MM with Avaya Communication Manager has already been established. For the details of these integration procedures, please refer to [2] and [3].

6.1. Messaging Application Server with Message Storage Server

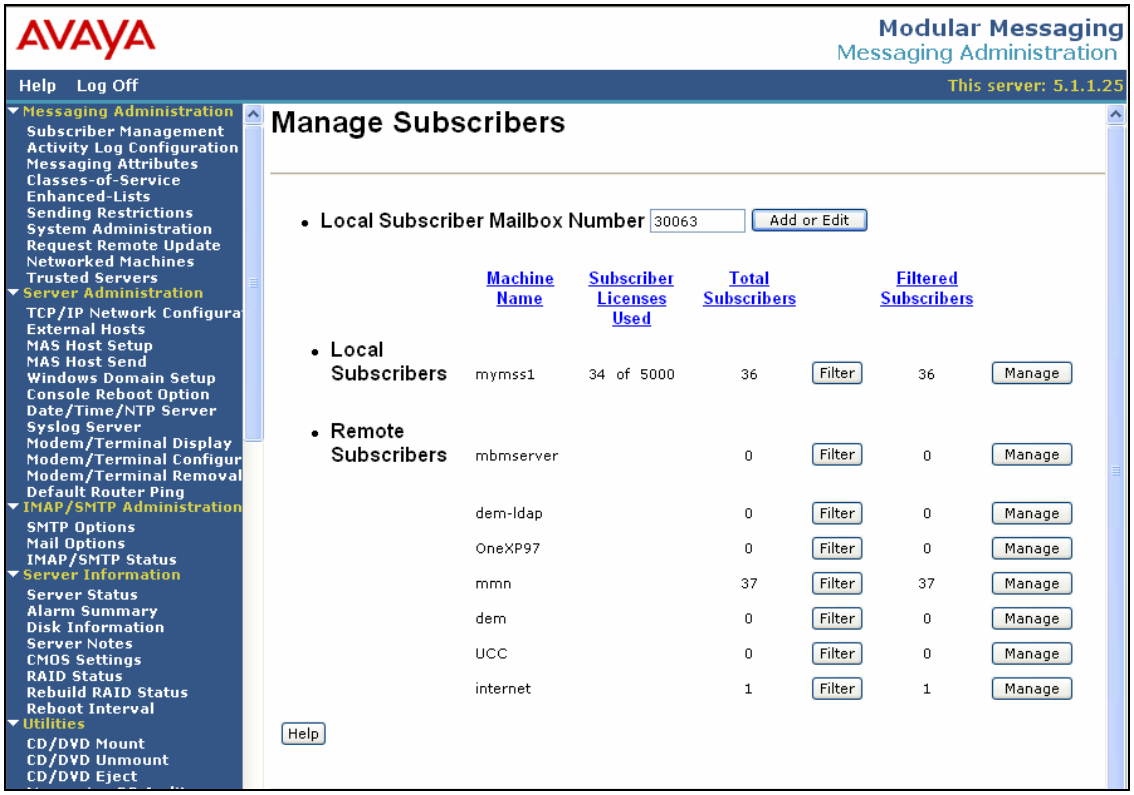
Step	Description
1.	From a Web browser, navigate to http://<*ip-addr*> (where <*ip-addr*> is the IP address of the Avaya MSS). After logging in with an appropriate login and password, the main page appears. 

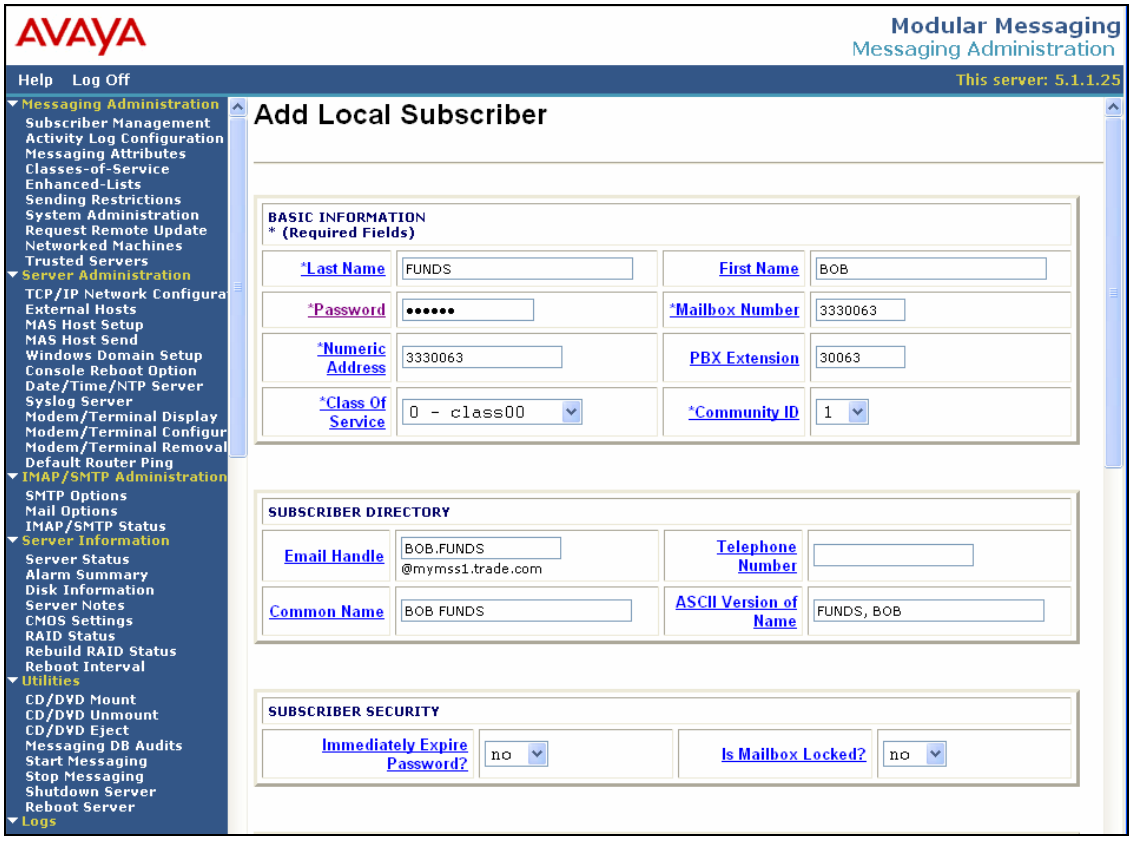
Step	Description
2.	Select **Messaging Administration → Classes-of-Service** from the left pane. From the **Manage Classes-of-Service** screen that is presented, select a Class of Service (COS) that will be used by subscribers using IP Trade turrets (in this example **class00** was selected). Click the **Edit the Selected COS** button. 

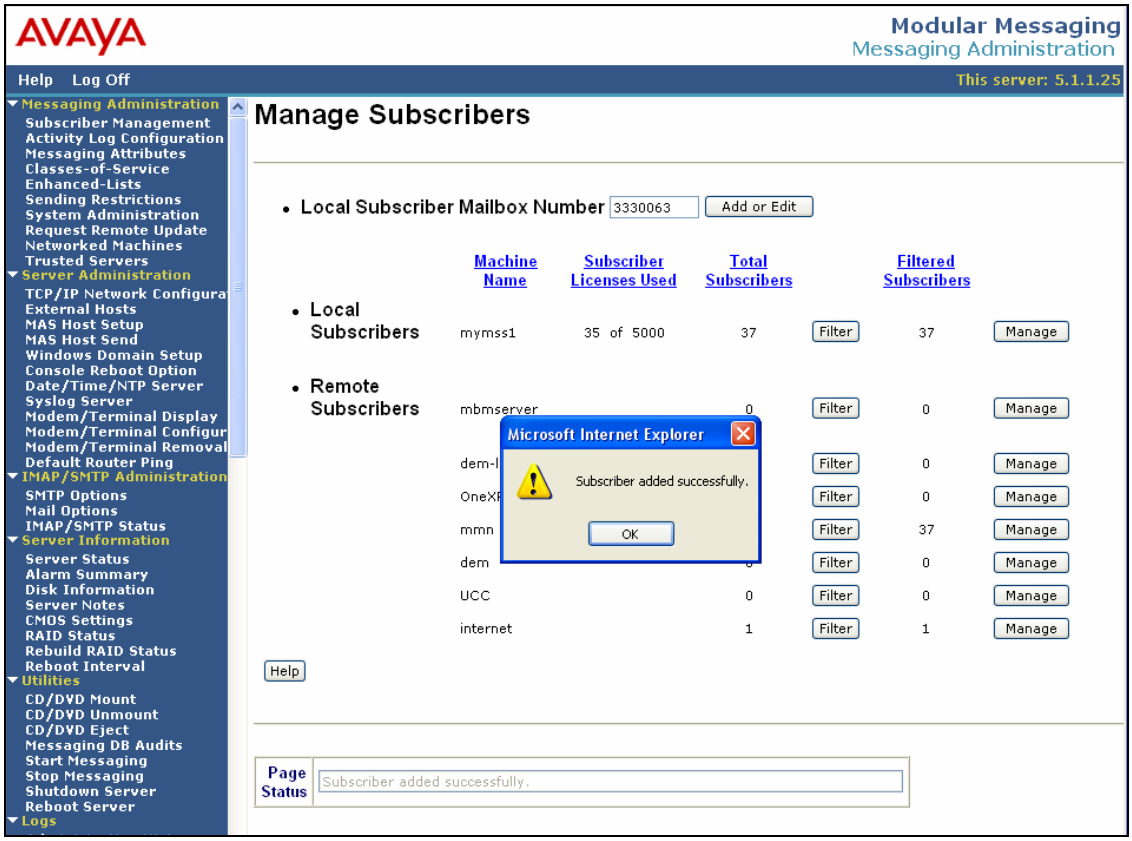
Step	Description
3.	In the **Edit a Class-of-Service** screen that follows, select **yes** from the drop-down menu for the **Message Waiting Indication Allowed** field. Scroll down to the bottom of the screen and click the **Save** button (not shown).



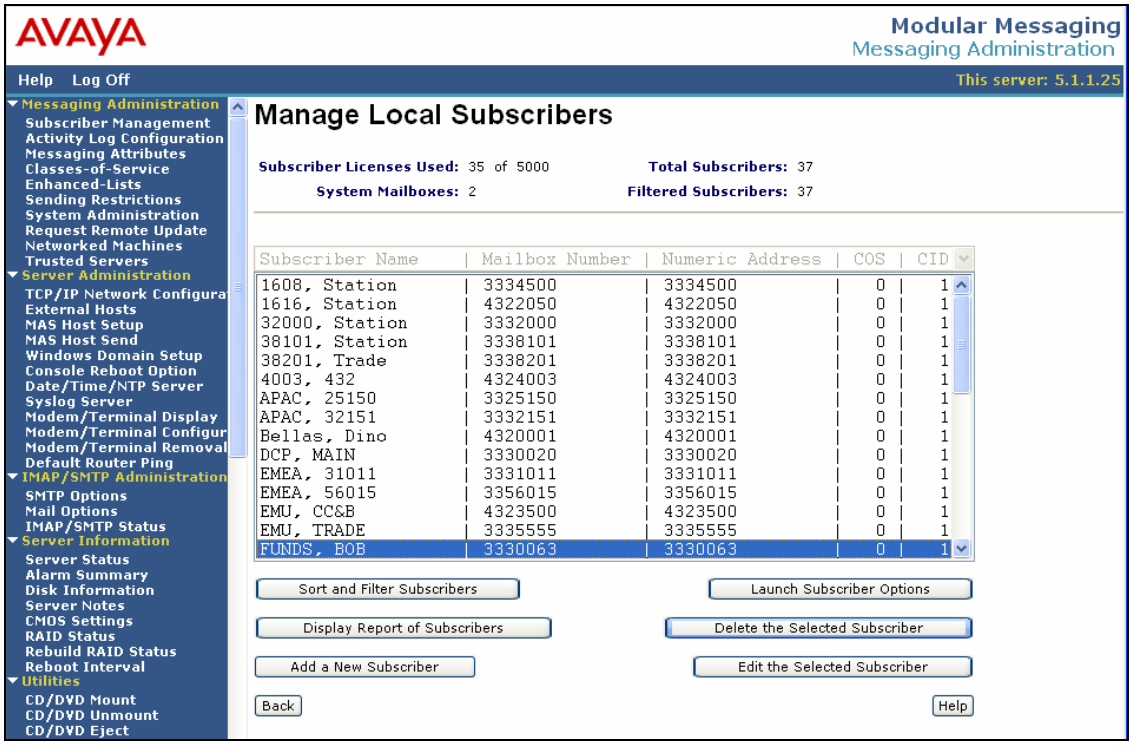
Step	Description
4.	Select **Messaging Administration → Subscriber Management** in the left pane. The **Manage Subscribers** page appears, as shown below. In the **Local Subscriber Mailbox Number** field, enter the extension of the desired IP Trade turret and click the **Add or Edit** button.



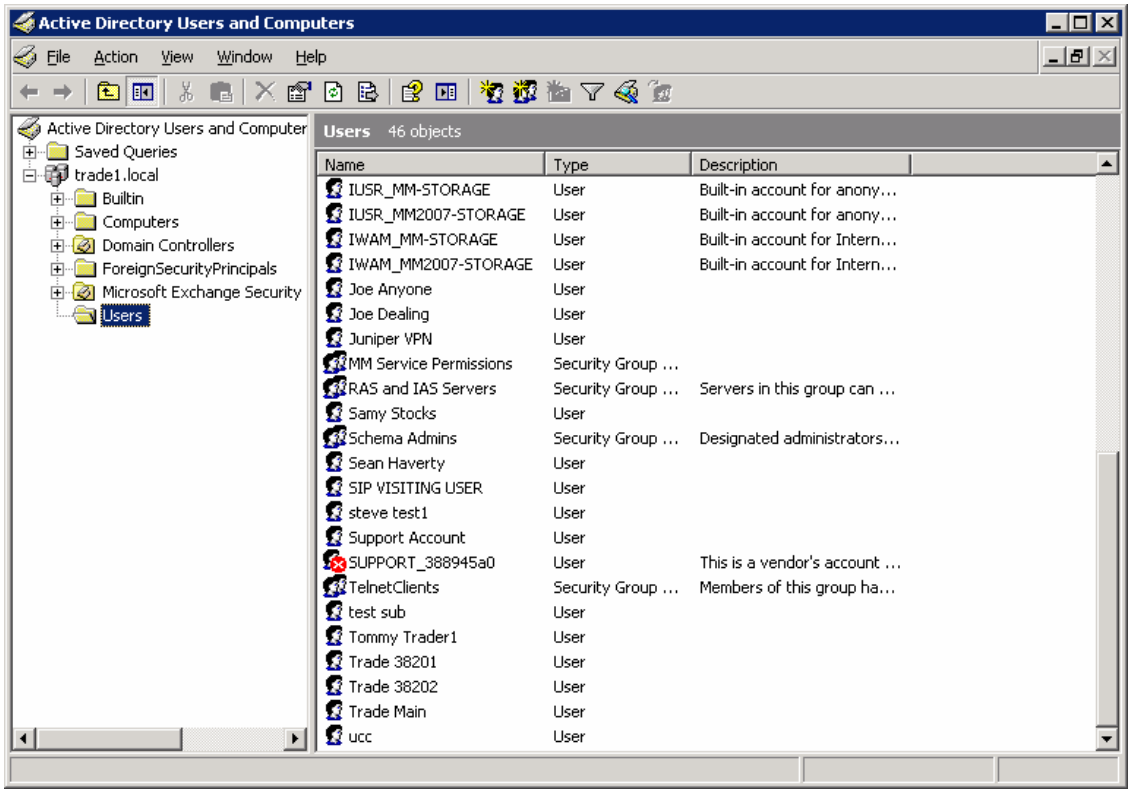
Step	Description
5.	In the **Add Local Subscriber** screen (see below), enter the following values: ▪ **Last Name, First Name:** Enter values appropriate for this user. ▪ **Password:** Enter a default password for accessing the subscriber's mailbox, from one to 15 digits. ▪ **Mailbox Number:** Enter a number, from two to 10 digits in length, which uniquely identifies the mailbox for the purpose of logging in or addressing messages. It must be within the range of Mailbox Numbers assigned to this system and be a valid length on the local machine. In this example, **3330063** was used. ▪ **Numeric Address:** Enter a unique address in the voice mail network, from one to 32 digits in length. It can contain the Mailbox Number, but this is not required. In this example, **3330063** was used. ▪ **Class Of Service:** Select the Class of Service modified in **Step 3**. Retain the default values for all other fields as appropriate. Some fields were populated in this example (**Email Handle**, etc.), but are not mandatory. Scroll to the bottom of the screen and click **Save** (not shown) to submit the form. 

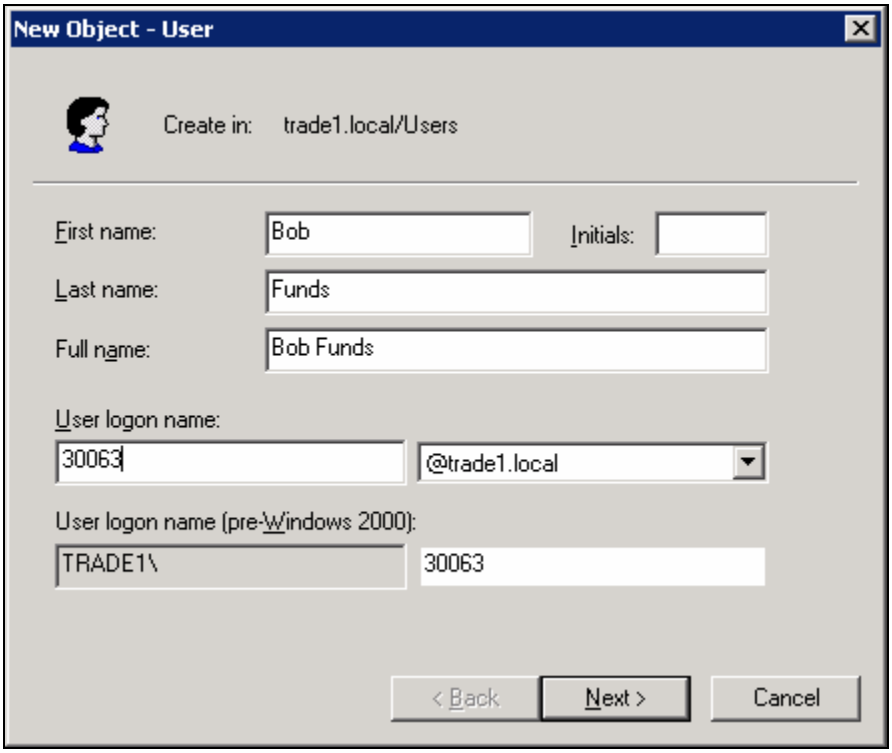
Step	Description
6.	When the **Subscriber added successfully** dialog box is presented, click **OK**. 
7.	Repeat **Steps 4-6** to add additional mailboxes to support the remaining IP Trade turret users.

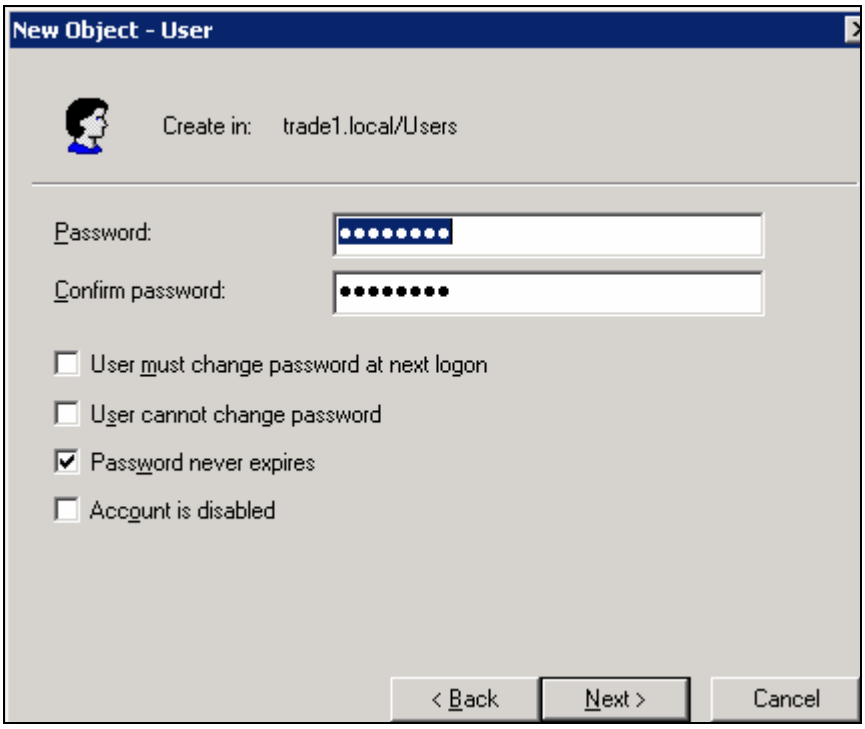
Step	Description
8.	To verify that the mailboxes have been created, select the **Manage** button to the right of the **Local Subscribers** entry in the table of the **Manage Subscribers** screen. In the **Manage Local Subscribers** screen that is presented (see below), verify that the mailboxes created appear in the list of subscribers.

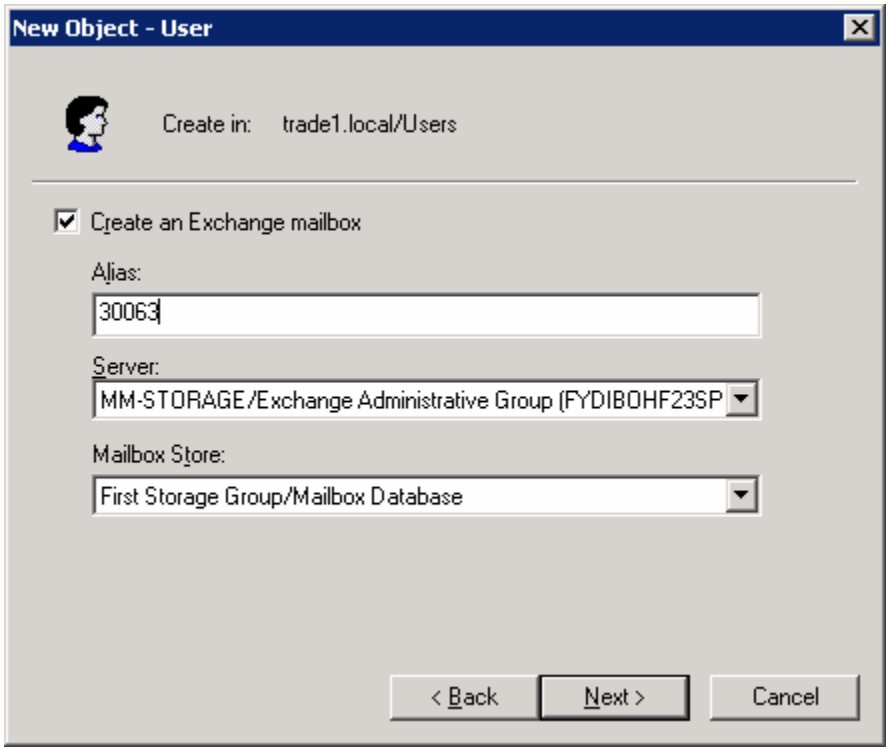


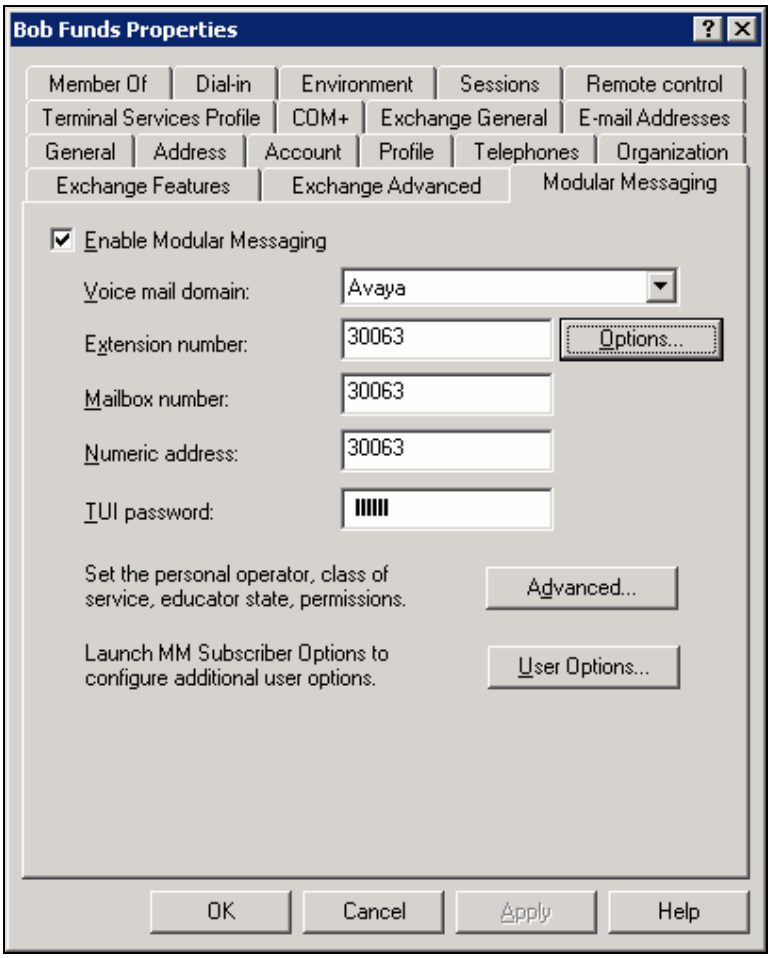
6.2. Messaging Application Server with Microsoft Exchange

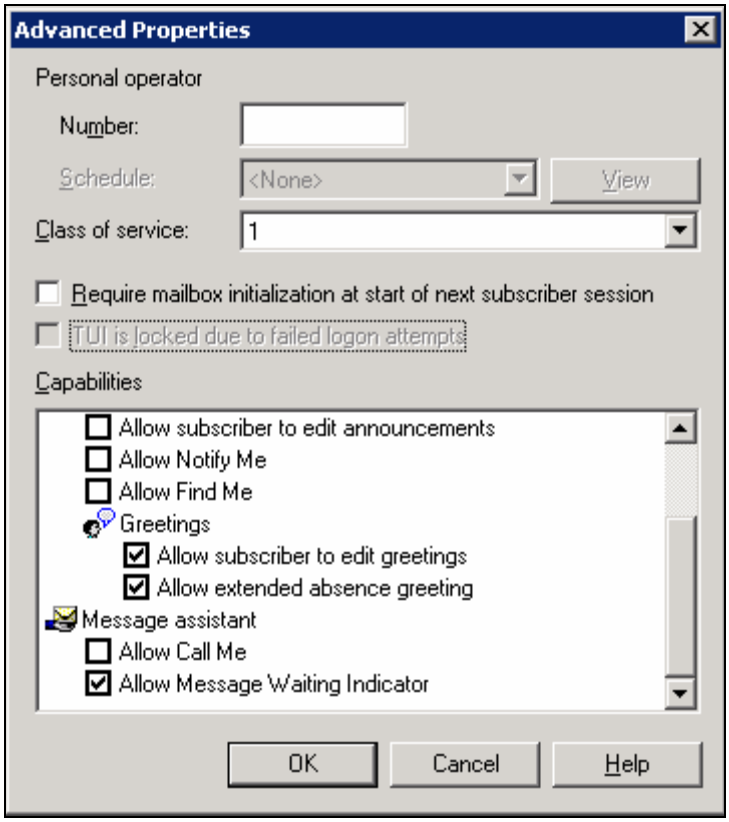
Step	Description
1.	Using the appropriate credentials, log into the server running Microsoft Exchange. Select **Start → Programs → Microsoft Exchange → Active Directory Users and Computers**. In the right pane of the window that is presented, right-click and select **New → User**. 

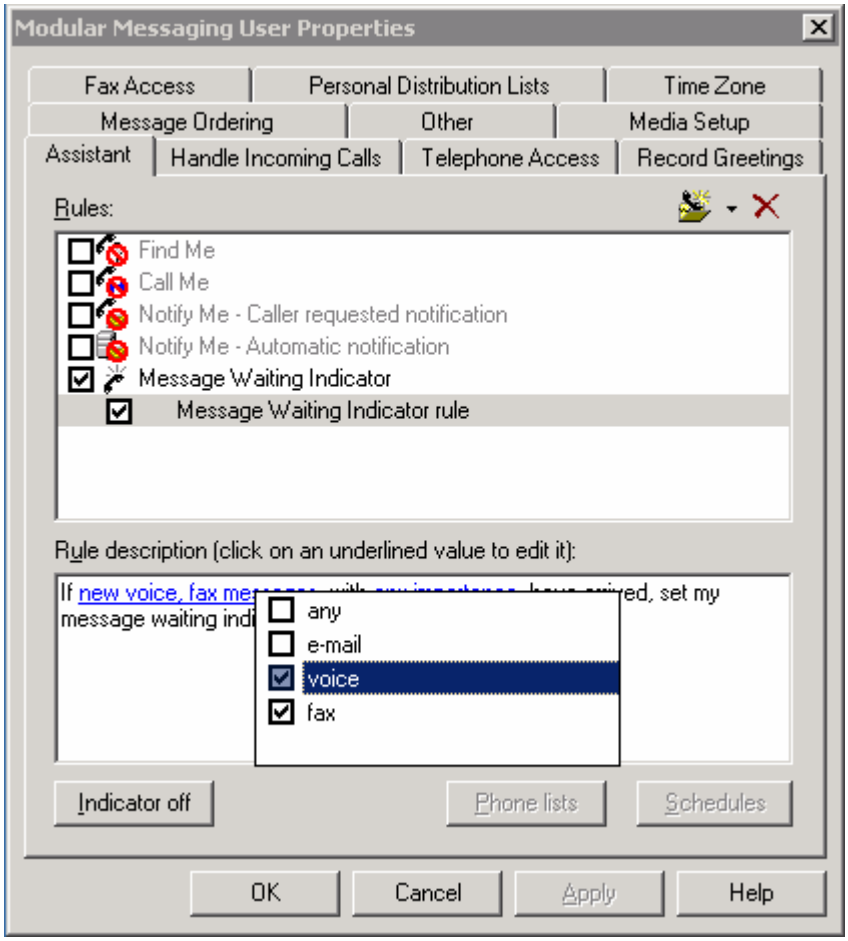
Step	Description
2.	In the **New Object – User** dialog box that is presented (see below), enter appropriate strings for **First name** and **Last name** (the **Full name** field will be populated automatically) as well as a **User logon name** (this is required by Active Directory, although it is not used by Avaya MM). Click **Next**. 

Step	Description
3.	In the subsequent dialog box (see below), entire a valid password in the **Password** and **Confirm password** fields, make sure the **Password never expires** check box is the only check box selected (this will minimize the need to maintain the Windows-level credentials for this user, since it is assumed to be used only as an Avaya MM subscriber), and select **Next**. 

Step	Description
4.	In the subsequent dialog box (see below), retain all of the default values and click **Next**. At the confirmation dialog box that follows (not shown), click **Finish**. 

Step	Description
5.	Double-click on the newly created user in the **Active Directory Users and Computers** window. In the **Properties** dialog box that is presented, select the **Modular Messaging** tab (see below) and enter values as follows: ▪ **Enable Modular Messaging:** Check this box. ▪ **Voice mail domain**: Select **Avaya** from the drop-down menu. ▪ **Extension number**: Enter the extension of the IP Trade turret that will use this mailbox. In this example, **30063** was used. ▪ **Mailbox number**: Enter a unique mailbox number to be use for logging in and addressing messages to this subscriber. In this example, **30063** was used. ▪ **Numeric address**: Enter a unique address in the voice mail network. It can contain the **Mailbox Number**, but this is not required. In this example, **30063** was used. ▪ **TUI password**: Enter a valid password for accessing this mailbox. The completed form appears as follows. Click **Advanced** to access additional parameters. 

Step	Description
6.	In the **Advanced Properties** dialog box (see below), scroll to the **Message assistant** section and check the **Allow Message Waiting Indicator** box. Click **OK**. 

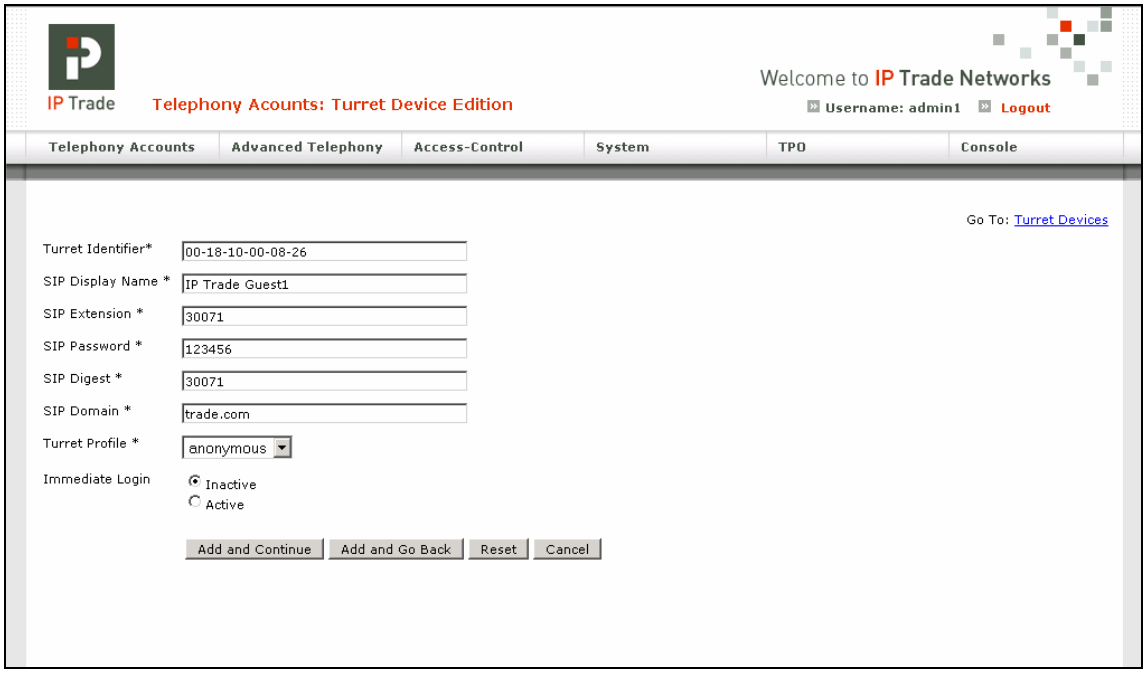
Step	Description
7.	The **Properties** dialog box is active once again (not shown). Click **User Options**; the Modular Messaging User Properties dialog box appears (see below). Select the **Assistant** tab and, in the **Rules** pane, check the **Message Waiting Indicator rule** box. In the **Rule description** pane, click on the hyperlinks displayed and select from the available criteria (in this example, the subscriber's Message Waiting Indicator will be activated for all new voice and fax messages received). Click **OK**. Control will return to the **Properties** dialog box (not shown). Click **OK** to complete the administration of the subscriber's mailbox. 
8.	Repeat **Steps 1-7** to add additional mailboxes to support the remaining IP Trade turret users.

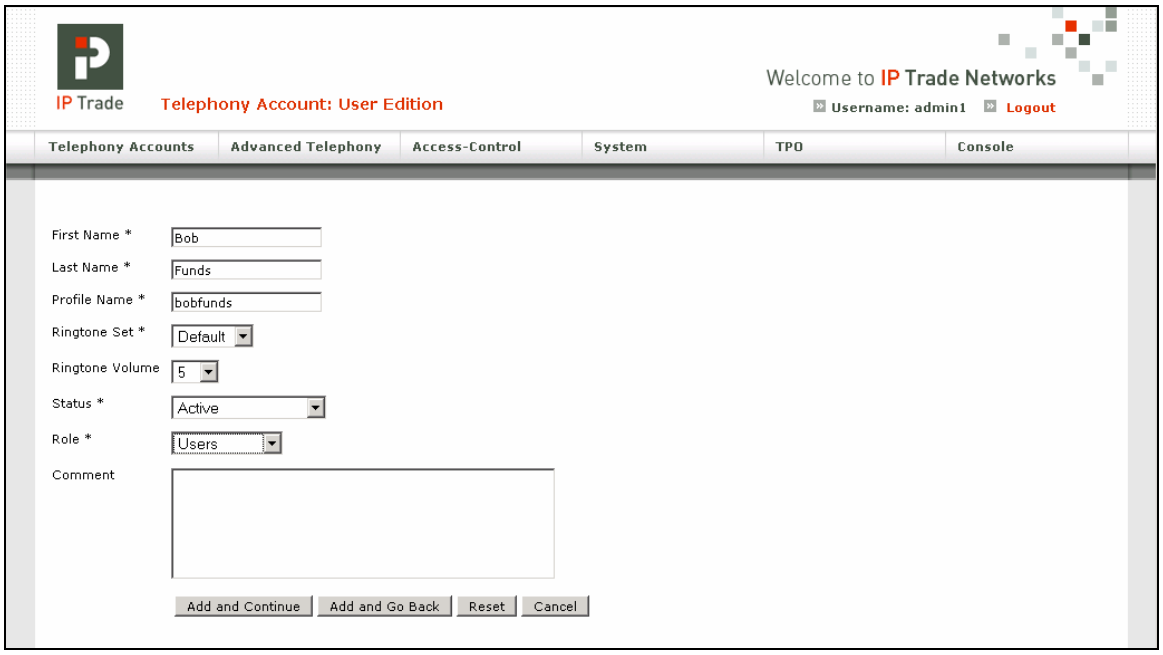
7. Configure IP Trade System

This section addresses the administrative steps to be performed on the IP Trade solution. The installation of the IP Trade solution software, as well as the initial configuration of the turrets and servers, is beyond the scope of this document. Please see [7], [8] and [9] for the details of these procedures.

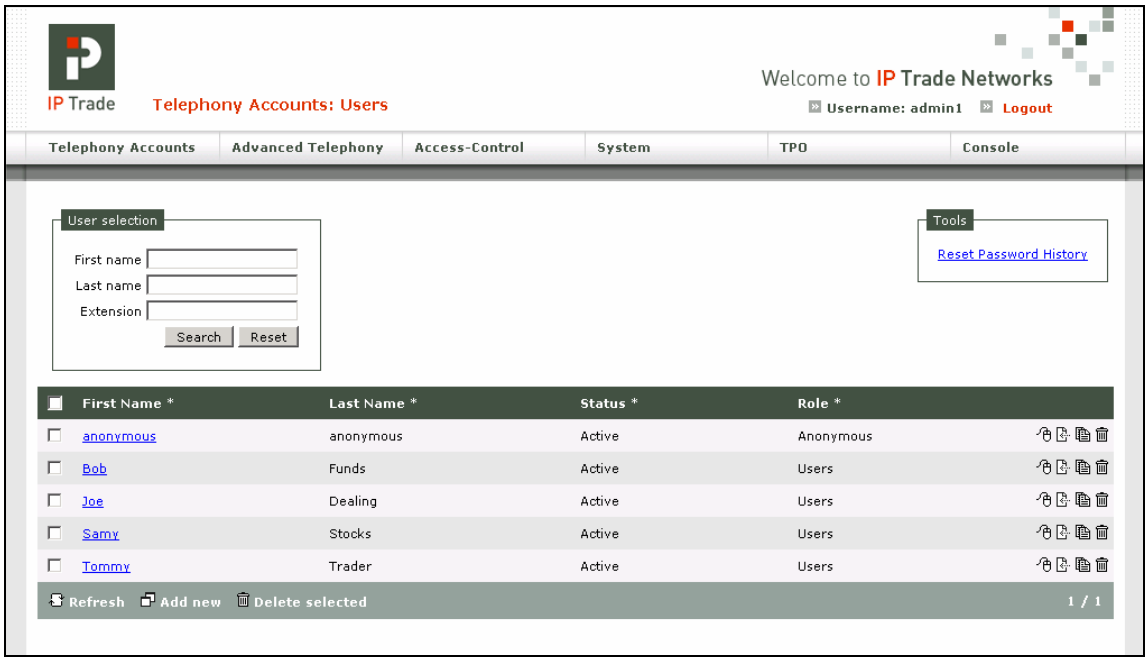
7.1. Configure IP Trade Turret Support Server

This section describes the procedure for configuring the IP Trade TSS. This procedure assumes that the TSS has already been configured with an anonymous profile and that a TFTP server (typically co-resident with the TSS) is being used for downloading certain configuration parameters to the turrets.

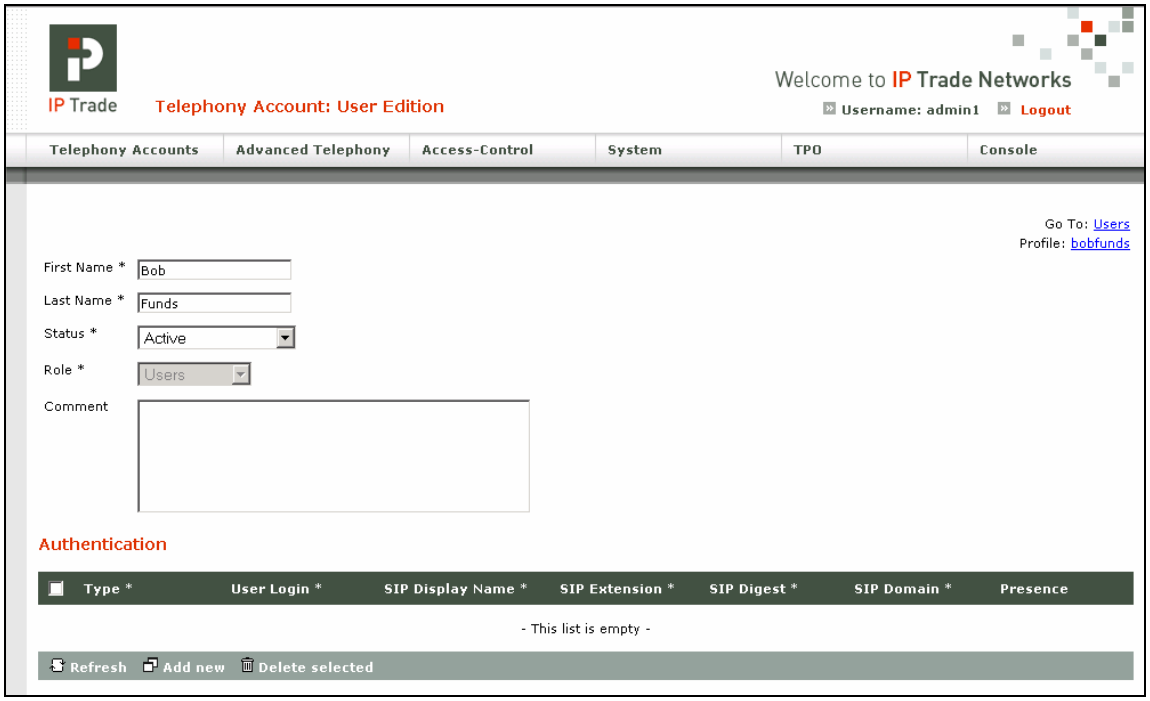
Step	Description
1.	From a Web browser, navigate to http://<*ip-addr*>/iptradenet.console (where <*ip-addr*> is the IP address of the TSS). After logging in with an appropriate set of credentials, the main page appears (not shown). Turret devices can be added to provide default user settings in the event that a user logs into the turret as a guest. To add a turret device, select **Telephony Accounts → Turret Devices** and click **Add new**. In the **Telephony Accounts: Turret Device Edition** screen that is presented (see below), enter values as follows: • **Turret Identifier**: Enter the MAC address of the turret device. • **SIP Display Name**: Enter a descriptive name. • **SIP Extension**: Enter the extension of a SIP endpoint that will used for a guest login (in this example, **30071**). • **SIP Password**: Enter the password to be used in order for the above **SIP Extension** to register with Avaya SES. • **SIP Digest**: Enter the same value entered in the **SIP Extension** field. • **SIP Domain**: This must match the **Authoritative Domain** field configured on the **IP Network Region** form in Avaya Communication Manager shown in **Section 4, Step 2** (in this example, **trade.com**). • **Turret Profile**: Select **anonymous** from the drop-down menu. Retain all other default values. To add additional turret devices, click **Add and Continue**. When finished adding turret devices, click **Add and Go Back**. 

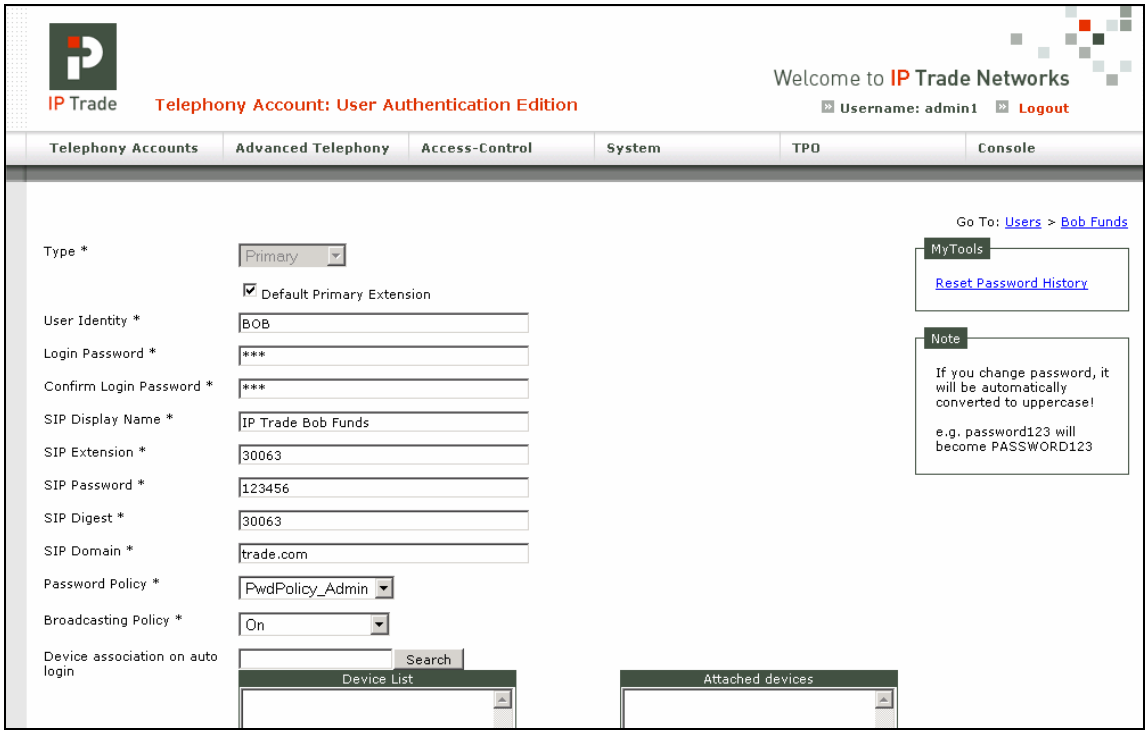
Step	Description
2.	To add a new user, select **Telephony Accounts** → **Users** and click **Add new**. In the **Telephony Account: User Edition** screen that is presented (see below), enter values as follows: • **First Name, Last Name**: Enter the values that are consistent with those entered for the related station in **Section 4**, the SIP user in **Section 5**, and the mailbox in **Section 6.1** or **Section 6.2**. • **Profile Name**: Enter a descriptive name for the profile to be created for this user (in this example, **bobfunds**). • **Role**: Select **Users** from the drop-down menu. Retain all other default values. To add additional users, click **Add and Continue**. When finished adding users, click **Add and Go Back**. 

Step	Description
3.	At the **Telephony Accounts: Users** screen (see below), click on the **First Name** of a newly created user.



Step	Description
4.	The **Telephony Account: User Edition** screen for the selected user appears. Under the **Authentication** section, select **Add new**.

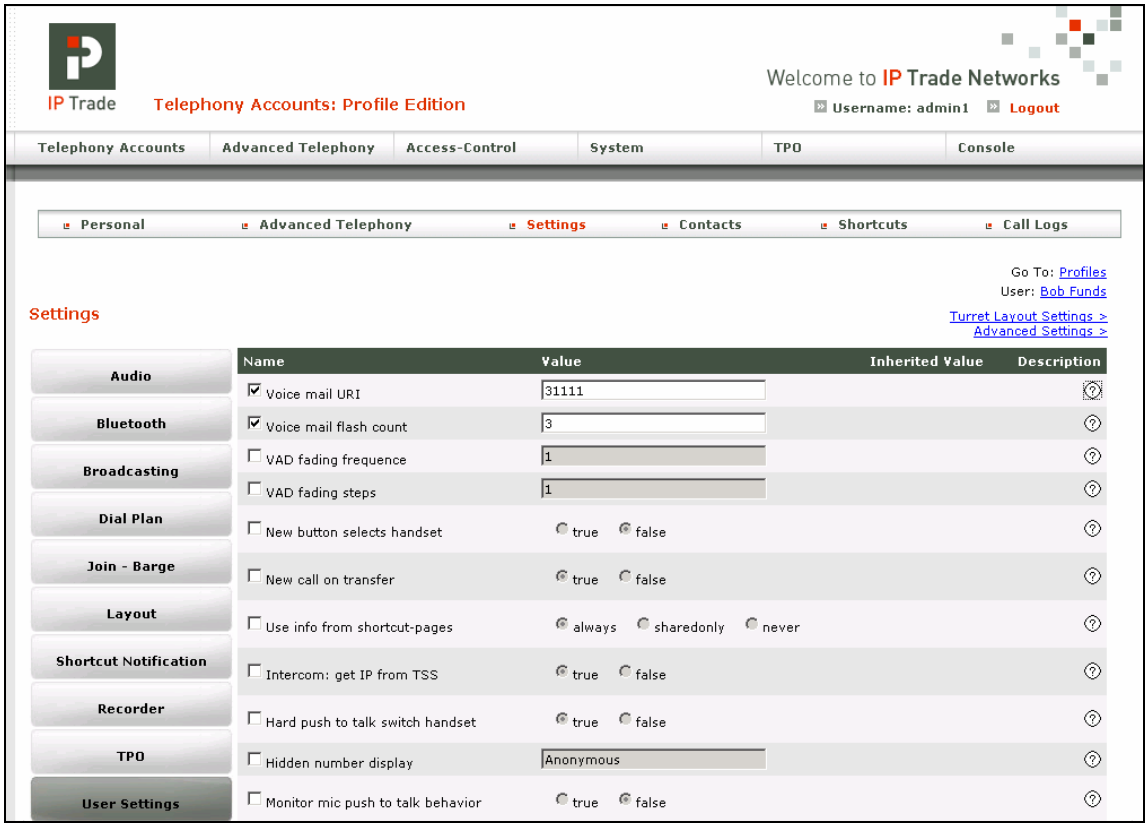


Step	Description
5.	The **Telephony Account: User Authentication Edition** screen appears. Enter values as follows: • **User Identity**: Enter a unique string (in this example, **BOB**). • **Login Password, Confirm Login Password**: Enter an appropriate password. • **SIP Display Name**: Enter the display name of the user (in this example, **IP Trade Bob Funds**). • **SIP Extension**: Enter the extension number assigned to this user (in this example, **30063**). This must match the **Primary Handle** field administered in **Section 5, Step 3**. • **SIP Password**: This must match the **Password** field administered in **Section 5, Step 3**. • **SIP Digest**: Enter the value of the **SIP Extension** field. • **SIP Domain**: This must match the **Authoritative Domain** field configured on the **IP Network Region** form in Avaya Communication Manager shown in **Section 4, Step 2** (in this example, **trade.com**). Retain all other default values. When finished, scroll down and click **Add and Go Back** (not shown). 
6.	Repeat **Steps 3-5** as necessary to add additional user profiles.

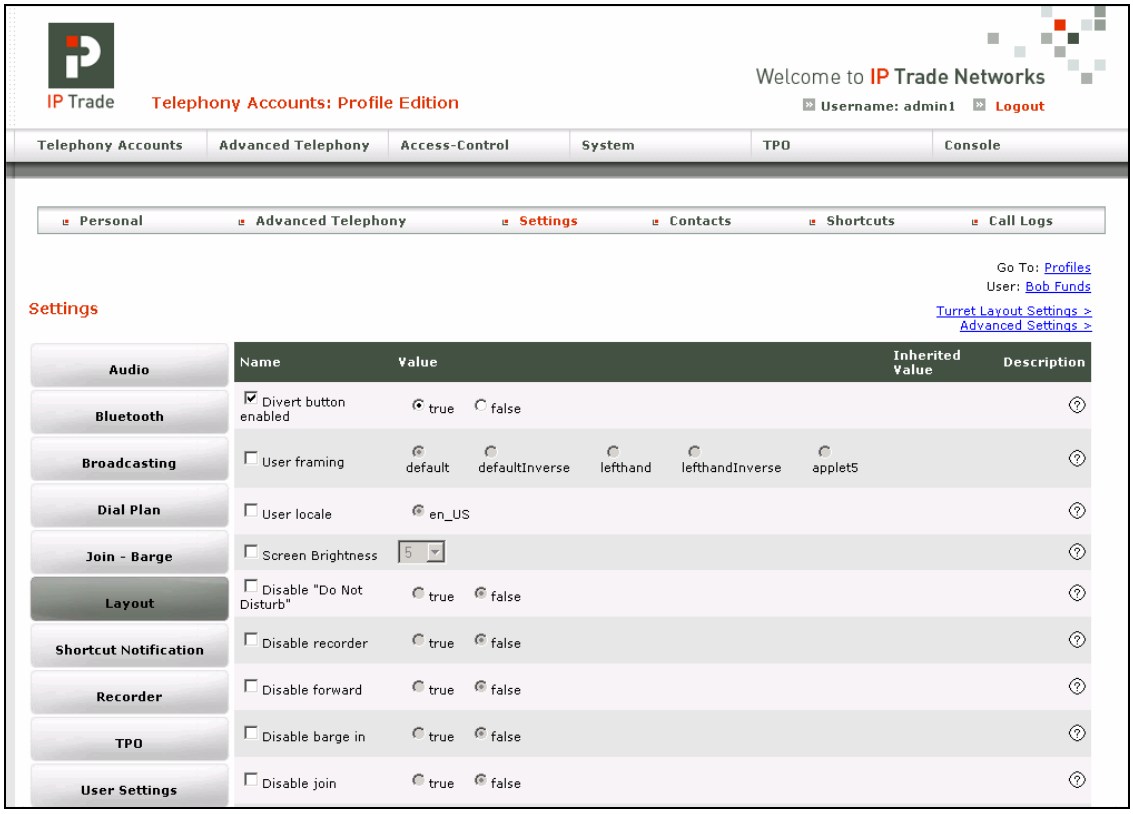
<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>7.</td><td>
To administer Voice mail settings specific to a given user, select Telephony Accounts → Profiles (not shown) and select the profile of the user to be modified. At the Telephony Accounts: Profile Edition screen that follows (not shown), select the User Settings tab on the left. The Settings screen for the selected profile is presented, as shown below. Enter values as follows:

Voice mail URI: Enter the extension of the hunt group used by the coverage path of the station specified in Section 4, Step 7 (in this example, 31111).
Voice mail flash count: Enter the number of times that the user's Voice mail button will flash when a new message is delivered to the user's mailbox.

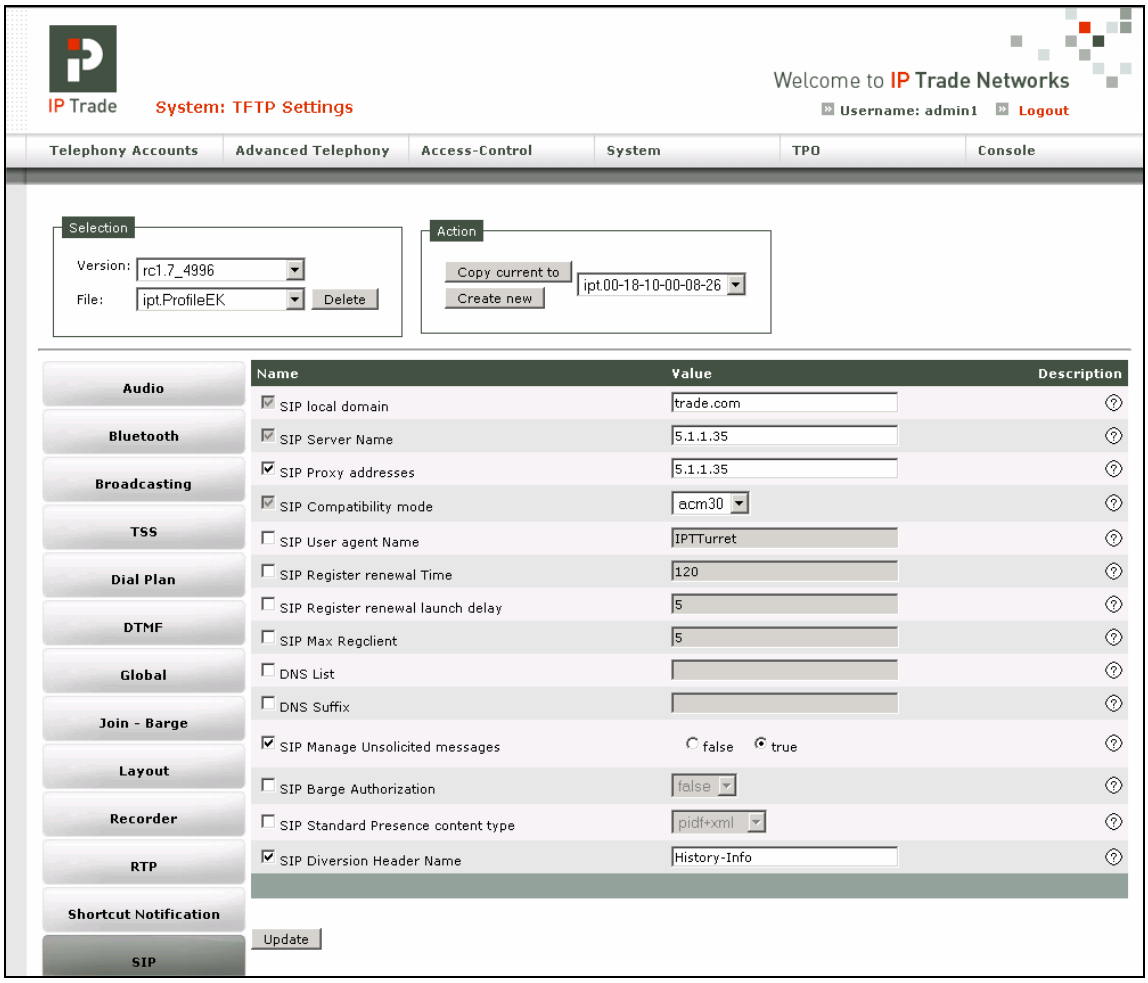
Retain all other default values.



<table>
<tr><th>Name</th><th>Value</th><th>Inherited Value</th><th>Description</th></tr>
<tr><td>☑ Voice mail URI</td><td>31111</td><td></td><td>?</td></tr>
<tr><td>☑ Voice mail flash count</td><td>3</td><td></td><td>?</td></tr>
<tr><td>☐ VAD fading frequence</td><td>1</td><td></td><td>?</td></tr>
<tr><td>☐ VAD fading steps</td><td>1</td><td></td><td>?</td></tr>
<tr><td>☐ New button selects handset</td><td>○ true ● false</td><td></td><td>?</td></tr>
<tr><td>☐ New call on transfer</td><td>● true ○ false</td><td></td><td>?</td></tr>
<tr><td>☐ Use info from shortcut-pages</td><td>● always ○ sharedonly ○ never</td><td></td><td>?</td></tr>
<tr><td>☐ Intercom: get IP from TSS</td><td>● true ○ false</td><td></td><td>?</td></tr>
<tr><td>☐ Hard push to talk switch handset</td><td>● true ○ false</td><td></td><td>?</td></tr>
<tr><td>☐ Hidden number display</td><td>Anonymous</td><td></td><td>?</td></tr>
<tr><td>☐ Monitor mic push to talk behavior</td><td>○ true ● false</td><td></td><td>?</td></tr>
</table>
</td></tr>
</table>

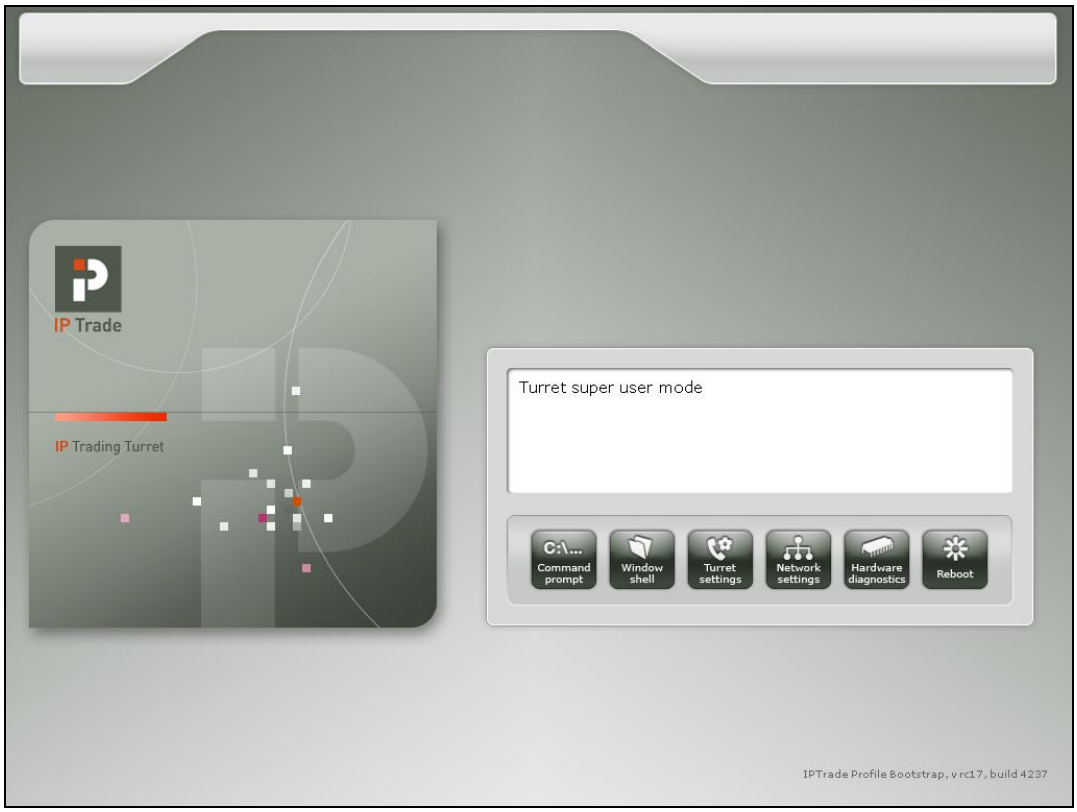
<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td>8.</td><td>
<p>Select the Layout tab on the left. Check the Divert button enabled box and select the associated true radio button. (This will enable the user’s Voice mail button to be used to dial the Avaya MM hunt group extension automatically.)</p>
<p>Retain all other default values. When finished, scroll down to the bottom of the screen and click Update (not shown).</p>


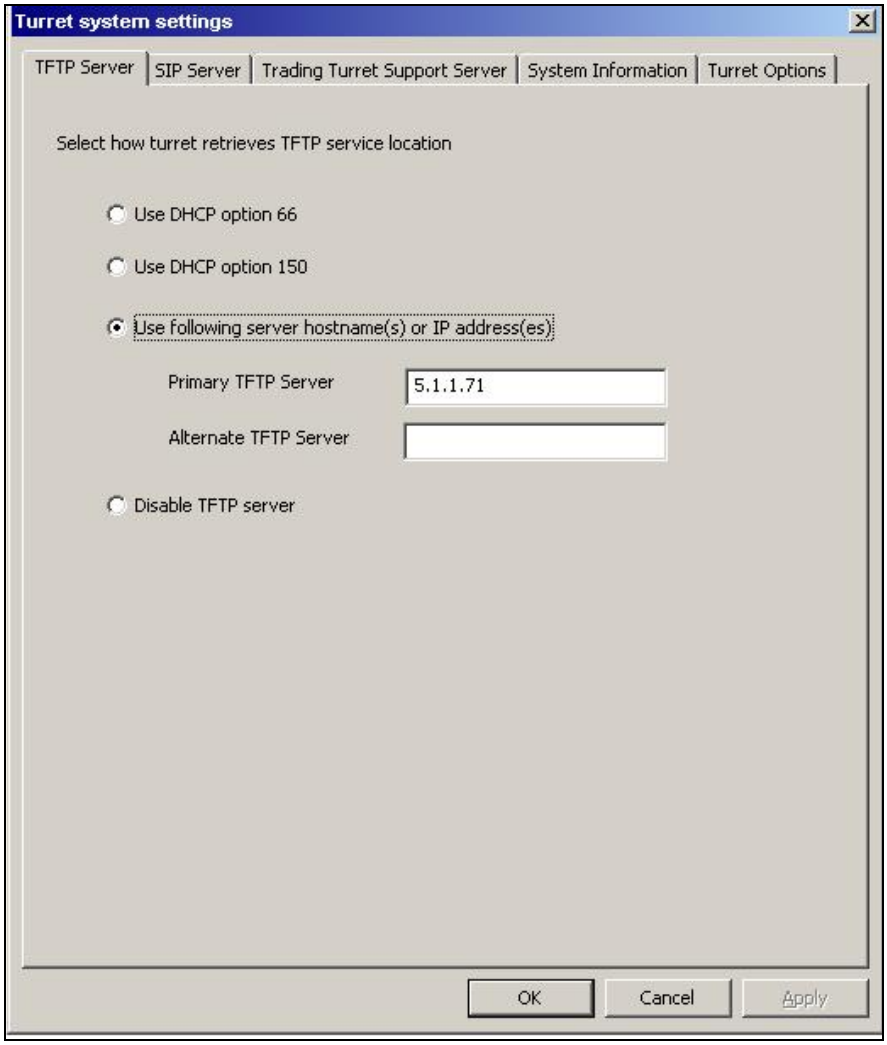
<table>
<tr><th>Name</th><th>Value</th><th>Inherited Value</th><th>Description</th></tr>
<tr><td>☑ Divert button enabled</td><td>● true ○ false</td><td></td><td>?</td></tr>
<tr><td>☐ User framing</td><td>● default ○ defaultInverse ○ lefthand ○ lefthandInverse ○ applet5</td><td></td><td>?</td></tr>
<tr><td>☐ User locale</td><td>● en_US</td><td></td><td>?</td></tr>
<tr><td>☐ Screen Brightness</td><td>5</td><td></td><td>?</td></tr>
<tr><td>☐ Disable "Do Not Disturb"</td><td>○ true ● false</td><td></td><td>?</td></tr>
<tr><td>☐ Disable recorder</td><td>○ true ● false</td><td></td><td>?</td></tr>
<tr><td>☐ Disable forward</td><td>○ true ● false</td><td></td><td>?</td></tr>
<tr><td>☐ Disable barge in</td><td>○ true ● false</td><td></td><td>?</td></tr>
<tr><td>☐ Disable join</td><td>○ true ● false</td><td></td><td>?</td></tr>
</table>
</td></tr>
<tr><td>9.</td><td>Repeat Steps 7-8 as necessary to add Voice mail settings to the remaining user profiles.</td></tr>
</table>

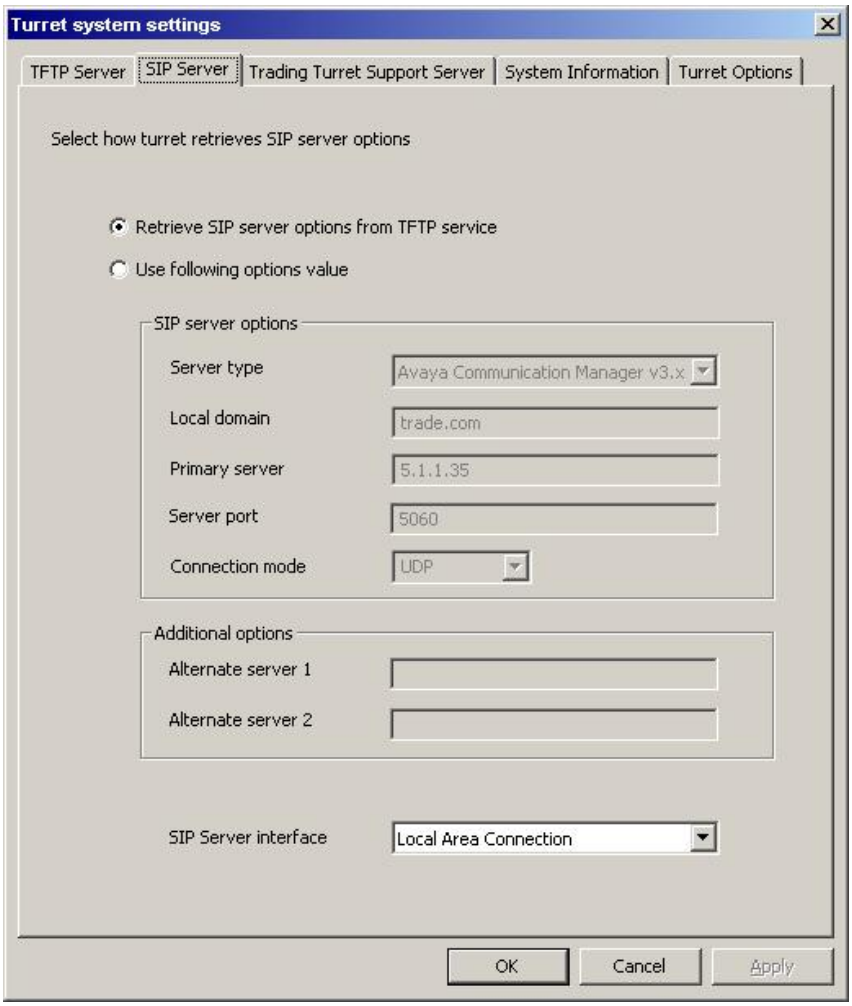
Step	Description
10.	Select **System → TFTP Settings**. In the **Selection** section, select the appropriate **Version** of turret firmware in use and the configuration **File** corresponding to the given turret type. Select the **SIP** tab on the left. • To allow the associated turret to register with Avaya SES, check the **SIP Proxy addresses** field and enter the IP address of the Avaya SES Home server (in this example, **5.1.1.35**). (Note in the screen below that the check boxes for **SIP local domain**, **SIP Server Name** and **SIP Compatibility mode** are checked and disabled, indicating that these values were set elsewhere within the IP Trade system (see **Section 7.3, Step 1**).) • To enable Message Waiting Indication (MWI) check the box labeled **SIP Manage Unsolicited messages** and select the **true** radio button. When finished, scroll down to the bottom of the screen and click **Update**. 

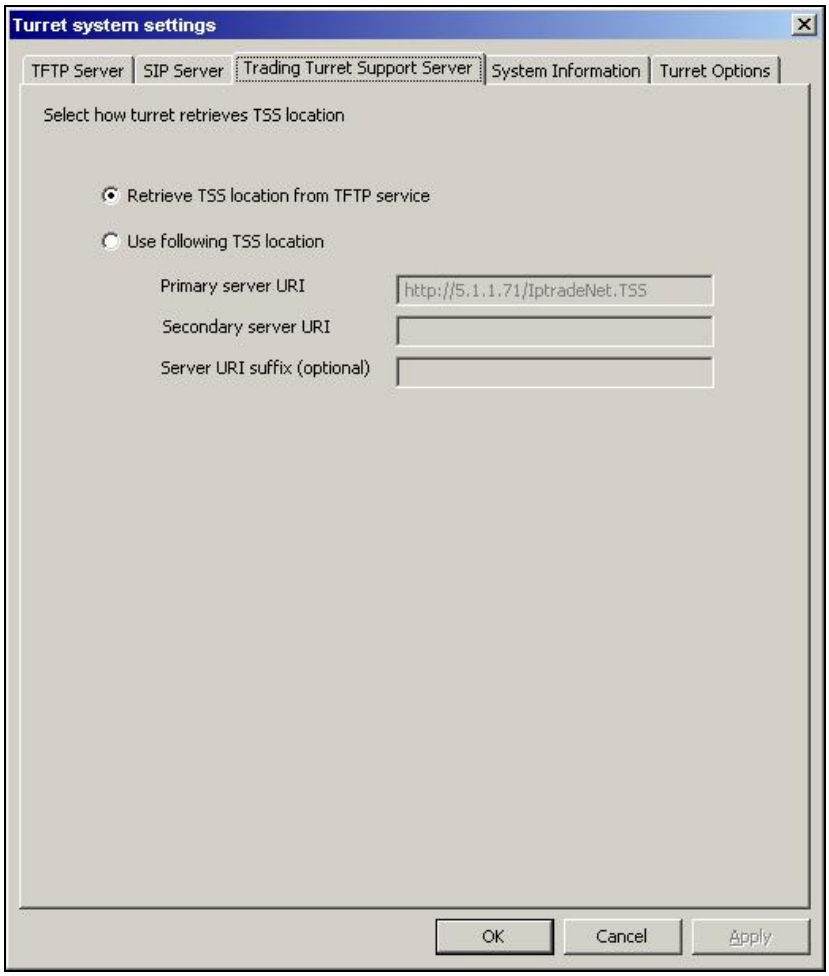
7.2. Configure the IP Trade Turret

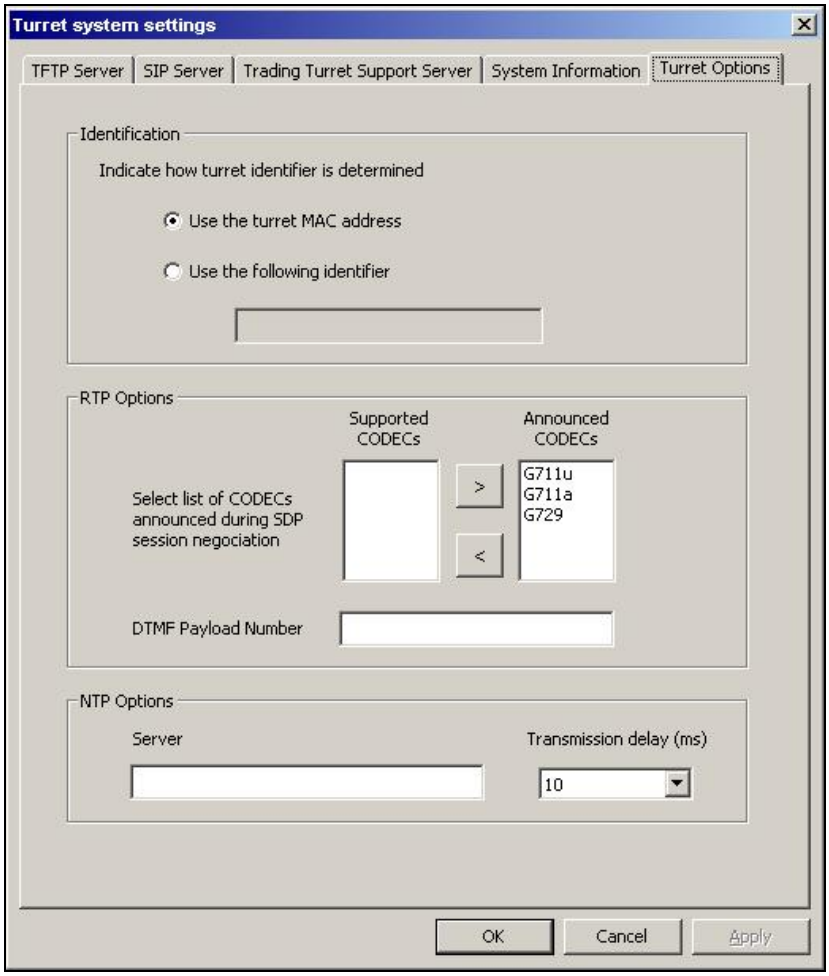
This section describes the procedure for configuring the IP Trade turret. When the turret is in Turret super user mode, it can be accessed for the purpose of administering turret system options. The commands listed in the following sections were issued at the IP Trade turret GUI interface. **NOTE**: The steps in this section assume the presence of a TFTP server (typically co-resident with the TSS) for downloading certain configuration parameters to the turrets. As can be seen in the accompanying figures, these parameters can also be set statically using the same screen navigation.

Step	Description
1.	To administer IP Trade turret, make sure that the turret is logged out. Connect a keyboard to the turret. Enter **ALT-F4** from the keyboard to dismiss the application windows at the turret. For the last window, hold down the **F2** key while dismissing the window via the touch screen. The **Turret super user mode screen** appears (see below). Select **Turret settings**. 

Step	Description
2.	Select the **TFTP Server** tab. Select **Use the following server hostname(s) or IP address(es)**, and enter in the **Primary TFTP Server** field the IP address of the TFTP server (in the reference configuration, the TFTP server resides on the TSS platform, **5.1.1.71**). 

Step	Description
3.	Select the **SIP Server** tab and click **Retrieve SIP server options from TFTP service**. For **SIP Server interface**, select **Local Area Connection** from the drop-down menu. 

Step	Description
4.	Select the **Trading Turret Support Server** tab and click **Retrieve TSS location from TFTP service**. 

Step	Description
5.	Click the **Turret Options** tab, and then click **Use the turret MAC address**. To specify the audio codecs to be used, select the IP codecs **G711u, G711a,** and **G729** from the **Supported CODECs** column and move them to the **Announced CODECs** column. Click **OK**. 
6.	When finished with **Steps 1-5**, reboot the turret device.
7.	Repeat **Steps 1-6** for each of the remaining turrets.

7.3. Configure Turret Proxy to Open Line Dealing

The TPO server reads the TPO configuration file to run the TPO service. This configuration file is maintained by the IP Trade solution. The fields modified for this sample configuration are shown in **Step 1**.

Step	Description
1.	

```
# ------------------------------------------------------------------------#
#                                                                         #
#                            Global configuration                         #
#                                                                         #
# ------------------------------------------------------------------------ #


# here we define places and associated extensionsplace.names = Paris
```

#The dialed number for the remote place, in this example, **97671001**.

```
place.Paris.extension      = ondemand, 97671001
place.Paris.conferencemode = all
```

#The SIP extension number used as the proxy number, in this example, **30069**.

```
place.Paris.localextensions = 30069
place.Paris.30069.localdigest = 30069
place.Paris.30069.localpwd = 123456

.
.
.
```

Avaya SIP server Information, etc.

```
application.sip.server.name                    = 5.1.1.35

application.sip.server.port                    = 5060
application.sip.server.expire                  = 30
application.sip.server.registeringbeforeexpire = 7
application.sip.connection.mode                = UDP
# tcp/tls persistency, 3 possible values: none, transaction,transactionuser
application.sip.connection.persistency         = none
application.sip.connection.port                = 5060
.
application.sip.server.mediagateway            = 5.1.1.7

# if the proxy.hostname config is set , the ipaddress is not necessary
application.sip.proxy.address                  = 5.1.1.35
application.sip.proxy.transporttype            = UDP
application.sip.localdomain                    = trade.com
application.sip.gateway.pstn                   = 5.1.1.35
```

The IP addresses of the TPO server

```
application.sip.connection.ipaddress           = 5.1.1.91
```

8. Interoperability Compliance Testing

This section describes the interoperability compliance testing executed to verify the interoperability between the IP Trade solution and Avaya SIP Enablement Services, Avaya Communication Manager and Avaya Modular Messaging. This section covers the general test approach and the test results.

The following features and functionality were covered during the interoperability compliance testing. All tests involved various Avaya telephones/endpoints and the IP Trade turrets.

- Calls between IP Trade turrets and Avaya telephones
- Basic Avaya Communication Manager telephone features (e.g., hold, transfer, conference, etc.) as well as more advanced capabilities (e.g., Meet-Me Conference)
- Support of G.711 and G.729 codecs
- Interactions between IP Trade turrets and Avaya MM (e.g., MWI activation/deactivation, DTMF tone transmission, etc.)
- Access to Avaya Communication Manager features using feature name extensions
- Direct IP-to-IP media (also know as "shuffling") with SIP and H.323 telephones
- IP Trade turret-specific features (Group Call, Intercom, Open Line Dealing, Call Join/Barge-in, Call Intercept Key)

8.1. Test Results

Interoperability testing of the sample configuration was completed successfully, with the exception of the following observations:

1. When requesting a G.729 audio codec for turret calls, either G.729B or G.729AB may be specified in the corresponding IP Codec Sets. In either case, however, G.729B is always used in establishing the call.
2. Since the turret keypads do not include the digit-to-letter mapping found on most standard telephone keypads, many of the key sequences described by Avaya MM's automated response interface (e.g., *D to delete a message) will not be obvious to the turret user.
3. When IP Trade's Intercom feature is enabled, the Call Forward-Busy criterion for any turret is met when N-1 call appearances of an N-call-appearance turret are busy (with Restrict Last Appearance set to n in Avaya Communication Manager). For example, this would apply to a turret station that has 10 call appearances and 9 of the call appearances are busy. This problem exists because the one-way RTP stream established from the turret to the TPO server to maintain Intercom connectivity reserves a call appearance.
4. Some other interactions with Avaya Communication Manager features (Conference on Answer, Bridged Call Appearances) are impacted by IP Trade's Intercom feature. If this feature is disabled in the TPO server, the Avaya Communication Manager features are unaffected.
5. The Call Intercept Key (CIK) could not be used to answer a ringing call at another turret, due to a change in the SIP message sequence provided by Avaya SES.

IP Trade is aware of the above issues, and plans to address them in a future firmware/software release.

9. Verification Steps

The following steps can be used to verify that the configuration steps documented in these Application Notes have been done correctly.

- To verify that IP Trade turrets register with Avaya SES, select **User → Search Registered Users** on the Avaya SES Home server's Administration Web Interface.
- Verify that calls can be placed between two IP Trade turrets and can remain connected for at least two minutes.
- Verify IP Trade turrets can place calls to Avaya telephones and that the calls remain connected for two minutes.
- Verify IP Trade turrets can receive calls from Avaya telephones and that the calls remain connected for two minutes.
- Verify that all above calls are properly disconnected when either end disconnects first.
- Using the **list trace tac** command in Avaya Communication Manager, verify that voice calls are using the expected audio codec.
- Verify that calls to an IP Trade turret can be redirected to the appropriate subscriber mailbox in Avaya MM when coverage criteria are met, and that recorded messages result in the turret's MWI button being lit.
- Verify that IP Trade turret users can log into their associated Avaya MM mailbox and retrieve/save/delete messages.

10. Support

Technical support for the IP Trade products can be obtained from IP Trade. See the Support link at www.IPTrade-networks.com for contact information.

11. Conclusion

These Application Notes describe how to configure Avaya SIP Enablement Services, Avaya Communication Manager and Avaya Modular Messaging to support IP Trade's IP-based trading floor solution..

12. Additional References

The following Avaya product documentation can be found at http://support.avaya.com:

[1] *SIP Support in Avaya Communication Manager Running on the Avaya S8xxx Servers*, January 2008, Issue 8, Document Number 555-245-206.
[2] *Modular Messaging Release 3.1 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS,* February 2007.
[3] *Modular Messaging Release 3.1 Messaging Application Server Administration Guide for Avaya Modular Messaging with Microsoft Exchange,* February 2007.
[4] *Feature Description and Implementation For Avaya Communication Manager*, Issue 6, January 2008, Document Number 555-245-205.

[5] *Administrator Guide for Avaya Communication Manager*, Issue 4, January 2008, Document Number 03-300509.
[6] *Installing, Administering, Maintaining, and Troubleshooting SIP Enablement Services*, Issue 5, January 2008, Document Number 03-600768.

The following IP Trade product documentation is available from IP Trade. Visit http://www.IP Trade-networks.com for company and product information.

[7] *IP Phone for Trading Room Applicative Layer - Turret Installation, Release 2.0.*
[8] *IP Phone for Trading Room Applicative Layer - TSS Installation, Release 1.0.*
[9] *IP Phone for Trading Room Applicative Layer – Open Line Dealing (OLD), Release 1.0.*

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.