Avaya Solution & Interoperability Test Lab

Application Notes for Configuring Esna Technologies Telephony Office-LinX (TOL) Voicemail, Automated Attendant, and Speech Enabled Automated Attendant with Avaya IP Office - Issue 1.0

Abstract

These Application Notes describe the procedure for configuring Esna Technologies Telephony Office-LinX (TOL) Voicemail, Automated Attendant and Speech Enabled Automated Attendant to work with Avaya IP Office. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes focus on the steps required for configuring Esna Technologies Telephony Office-LinX (TOL) Voicemail, Automated Attendant and Speech Enabled Automated Attendant to work with Avaya IP Office.

Esna Technologies Telephony Office-LinX Unified Communications Platform provides enhanced access and control over communications, featuring a suite of applications including multilingual speech-enabled auto attendant, unified messaging, text-to-speech, and secure wireless messaging support. This Communications Platform empowers the user with call control, web access, instant messaging, one number Find Me functionality and presence management functions.

The configuration in **Figure 1** shows a network consisting of an Avaya IP Office 406v2 with Avaya IP400 Phone Module, Avaya IP Office Manager PC, Esna Technologies TOL server, Avaya 6408D+ digital telephones, Avaya 4600-series IP telephones and analog telephones. Avaya IP Office has T1/PRI and analog trunks to the central office. Analog and digital extensions are connected to Avaya IP Office as well.

TOL interfaces with Avaya IP Office via TAPI 3rd party call control for voicemail integration to enable/disable the message-waiting indicators (MWI) on the telephones and for call control. TOL interfaces with Avaya IP Office via TAPI WAVE for media for voice messages.

The Avaya IP Office TAPI driver must be installed on the TOL server to establish a TAPI 3rd party call control connection to Avaya IP Office. The Avaya IP Office TAPI WAVE driver must also be installed on the TOL server. The TAPI WAVE extensions used on the TOL server must be defined and configured on Avaya IP Office to belong to the same hunt group. While TOL is not configured as the system voicemail on Avaya IP Office, it uses Avaya IP Office call forwarding capabilities to provide voicemail functionality to users.

The tested configuration is shown in **Figure 1**.

The following TOL functionality was addressed in this compliance test:

Voicemail
Avaya IP Office system voicemail must be disabled. Each IP Office user requiring voicemail must be configured to forward Busy or No Answer calls to a hunt group containing TOL TAPI WAVE extensions. For Busy/No Answer calls, IP Office forwards calls to the TOL hunt group. TOL records and stores the caller's voicemail and toggles MWI on via TAPI of the callee's extension. The callee can then later retrieve the voicemail and TOL via TAPI toggles MWI off.

Automated Attendant
Incoming call routing is setup to route calls to a hunt group containing TOL TAPI WAVE extensions. Upon receipt of the call, TOL plays an automated attendant welcome greeting and

prompts the caller to either enter a menu selection or enter a desired extension to which to be transferred. Calls are then TAPI blind-transferred to the proper destination IP Office extension based on the caller's DTMF input and navigation through the TOL automated attendant menu.

Speech Enabled Automated Attendant
Behavior is the same as for Automated Attendant. However, when Speech-Enabled Automated Attendant is enabled, a caller can speak the name associated with the desired destination extension. TOL performs a TAPI blind-transfer to transfer the caller to the appropriate destination extension based on the caller's spoken input.

Note: For security purposes, Avaya IP Office does not support nested forwarding. In the event TOL becomes unavailable, calls to extensions, which are forwarded to the TOL hunt group as coverage calls, will not be routed to the TOL hunt group's overflow or fallback path. If such a scenario occurs, the administrator must make alternate call routing arrangements until the TOL becomes available.

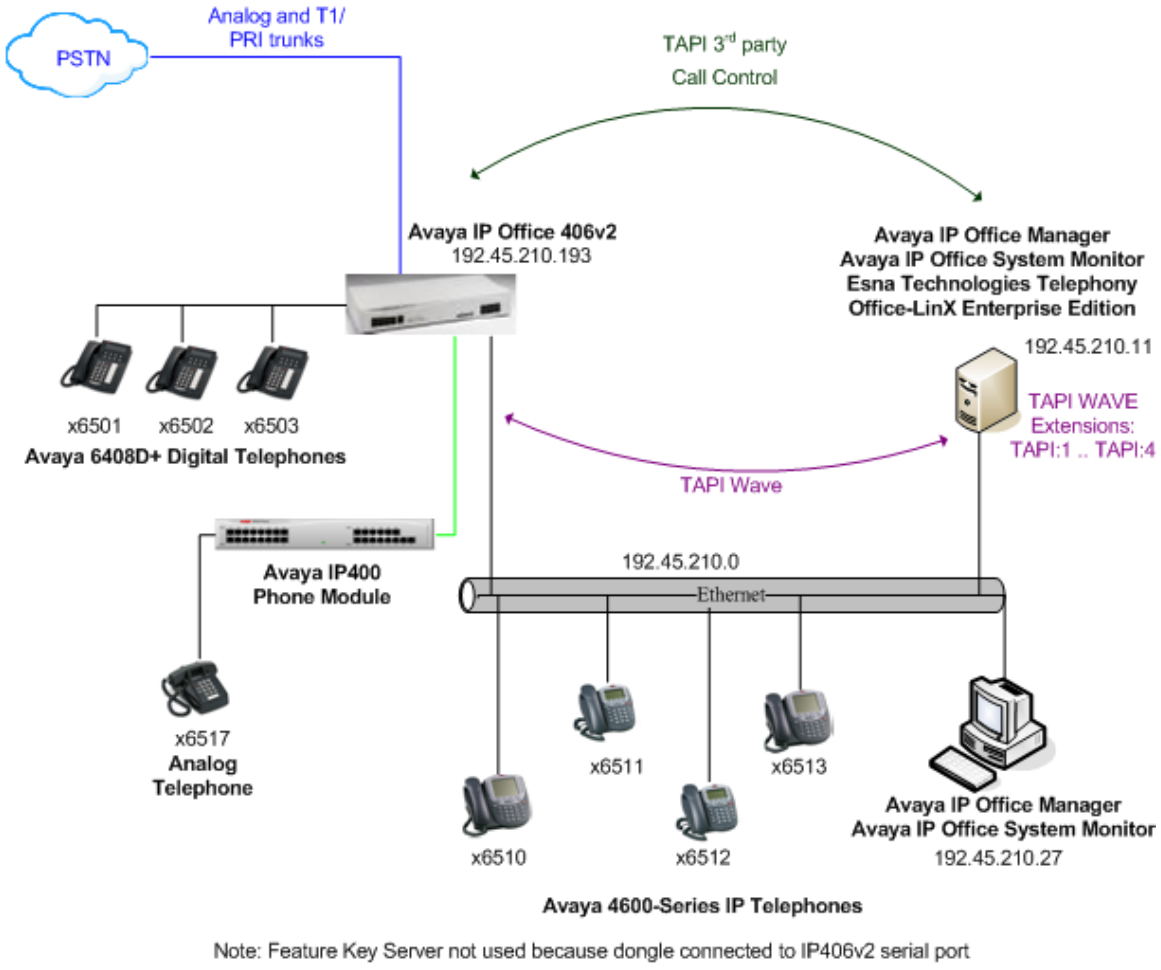


Figure 1 – Network Configuration Diagram

Table 1 lists all users and associated extension numbers for **Figure 1**.

End User Name	Extension
Operator	6501
Kit Tankhiwale	6502
John Yaya	6503
Marketing	6510
Tech Support	6511
John Finnegan	6512
Khoa Bui	6513
Returns	6517
TOL Hunt Group	
EsnaVM	6570
TOL TAPI WAVE Extensions	
TAPI:1	6581
TAPI:2	6582
TAPI:3	6583
TAPI:4	6584

Table 1 – User to Extension Mapping

2. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya IP Office 406v2	3.2(17)
Avaya IP400 Office Phone Module	5.2(17)
Avaya IP Office Manager	5.2(17)
Avaya IP Office TAPI Driver	1.0.0.27
Avaya IP Office TAPI WAVE Driver	2.0.0.0
Avaya 4600-Series IP Telephones (4610SW, 4620SW)	2.3
Avaya 6408D+ Digital Telephones	-
Esna Technologies Telephony Office-LinX Enterprise Edition	7.0 (Build 7.0.0.9606)

Table 2 – Equipment and Software / Firmware Versions Validated

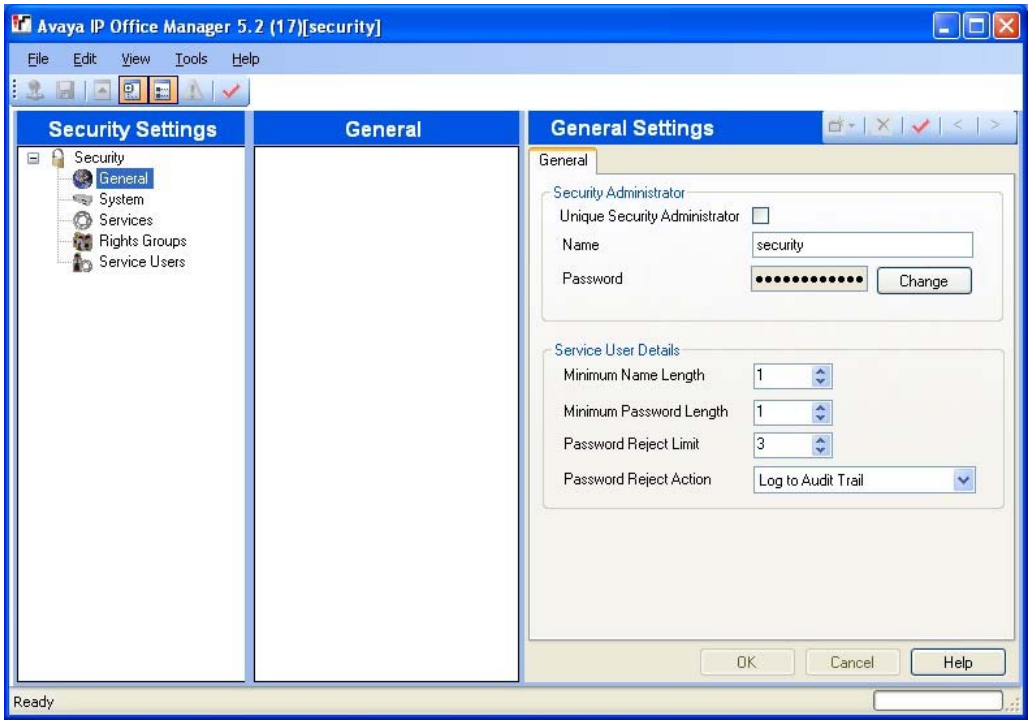
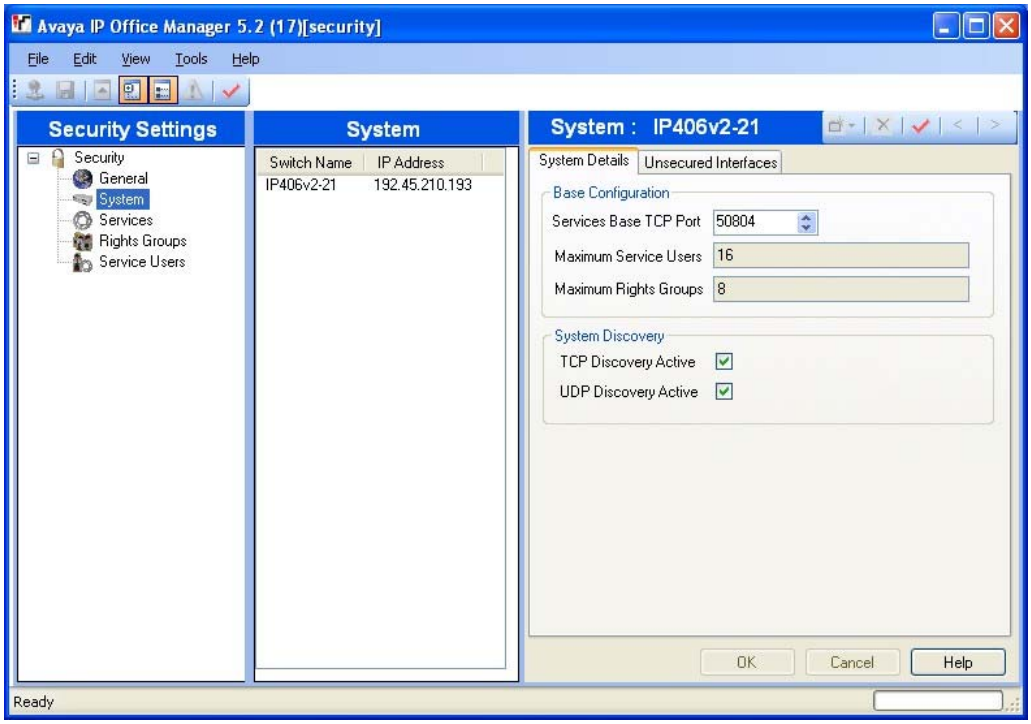
3. Configure Avaya IP Office

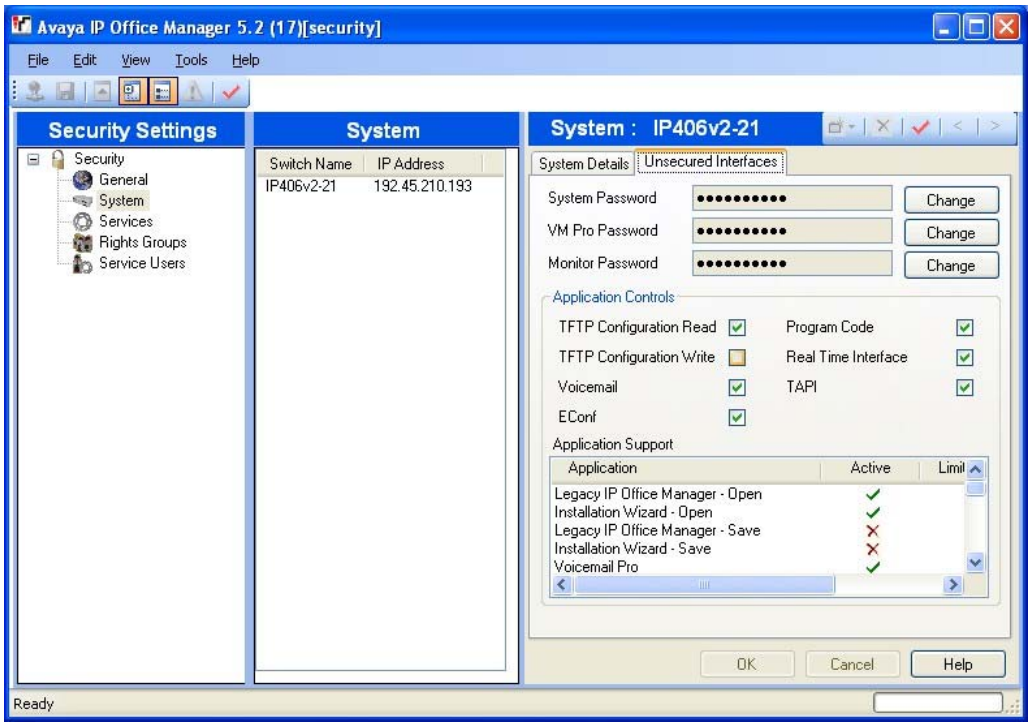
The configuration information provided in this section describes the steps required to set up Avaya IP Office for this solution.

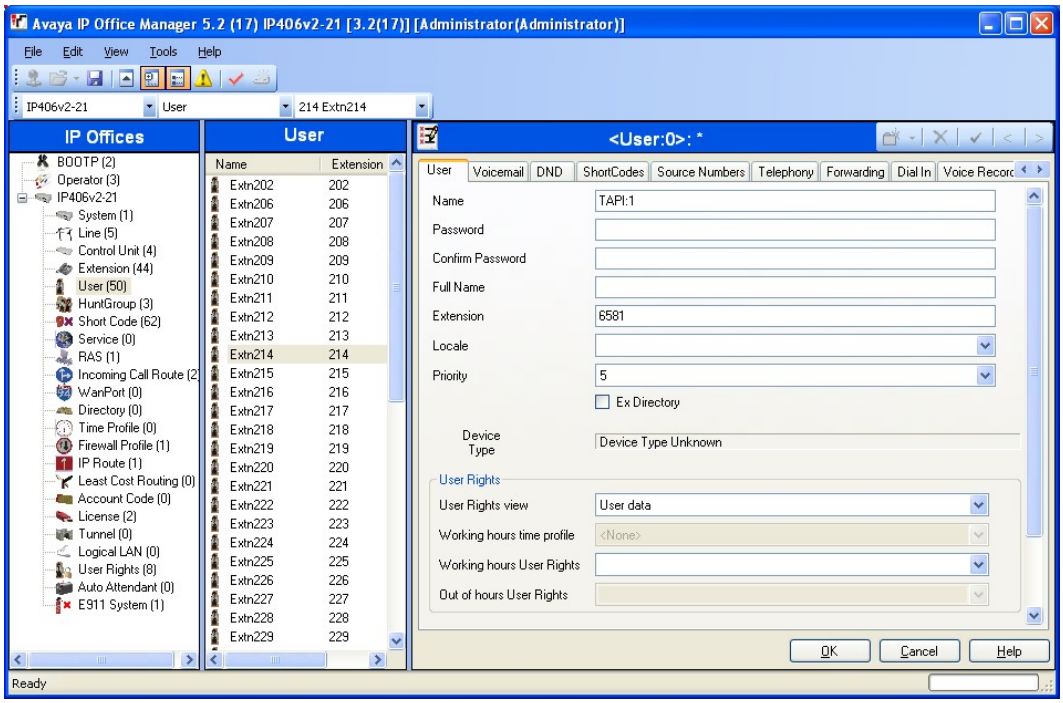
*Be sure to have the **Avaya IP Office CTI Link Pro** and **Wave User** license keys on hand as it will be required as part of this configuration.*

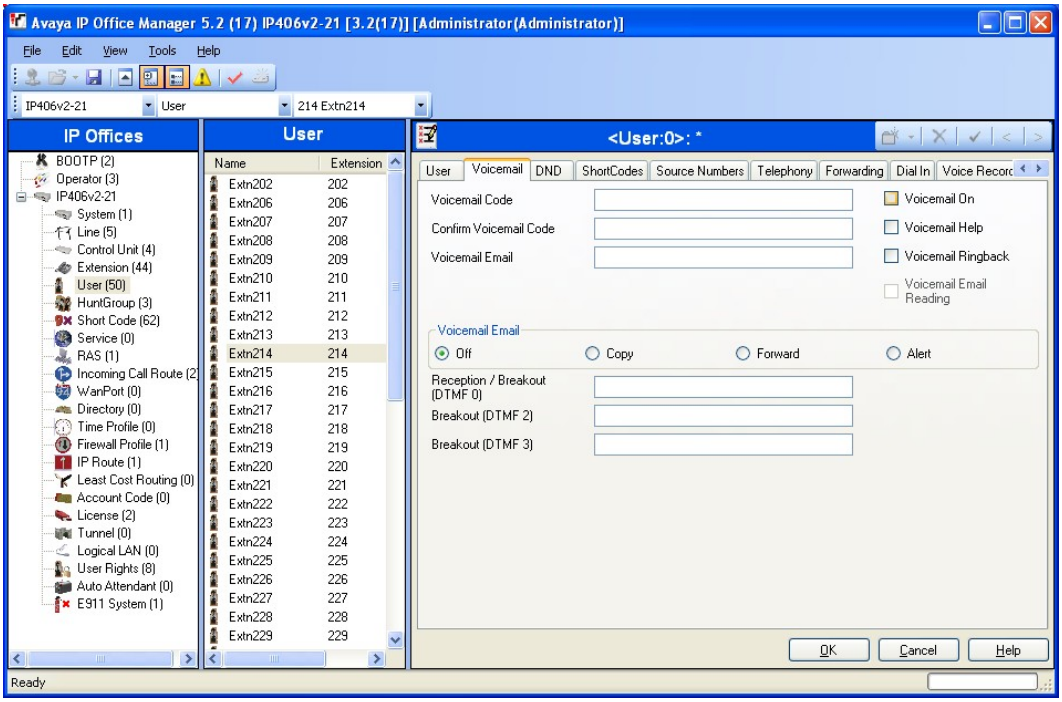
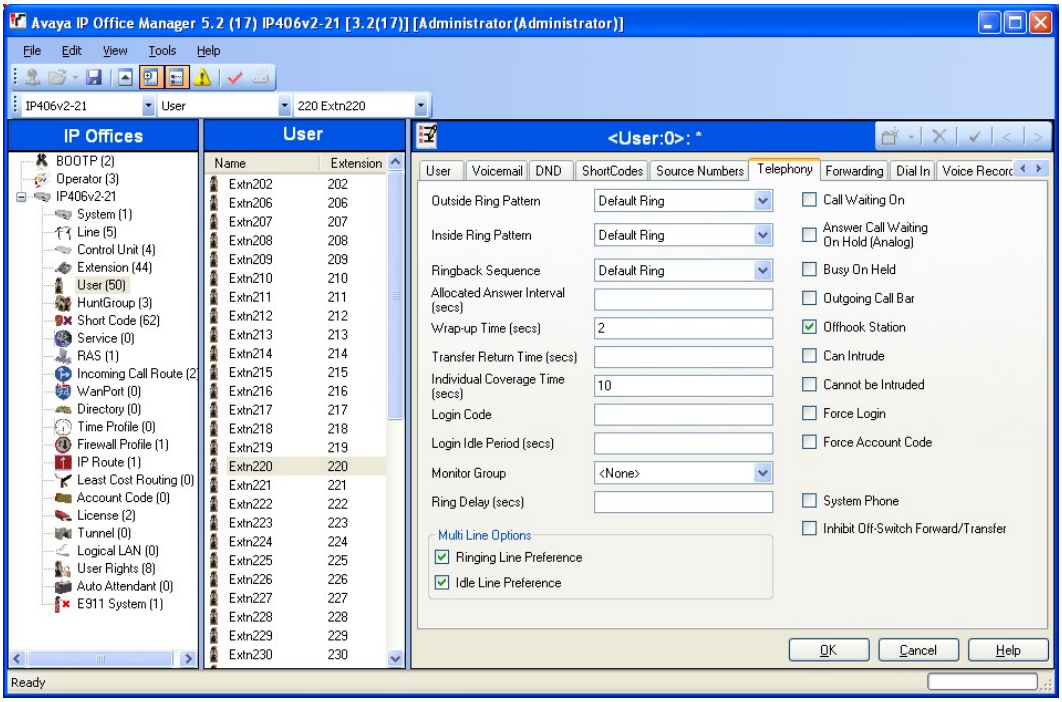
For all other provisioning information, such as Avaya IP Office installation and configuration, please refer to Avaya IP Office product documentation in reference [1].

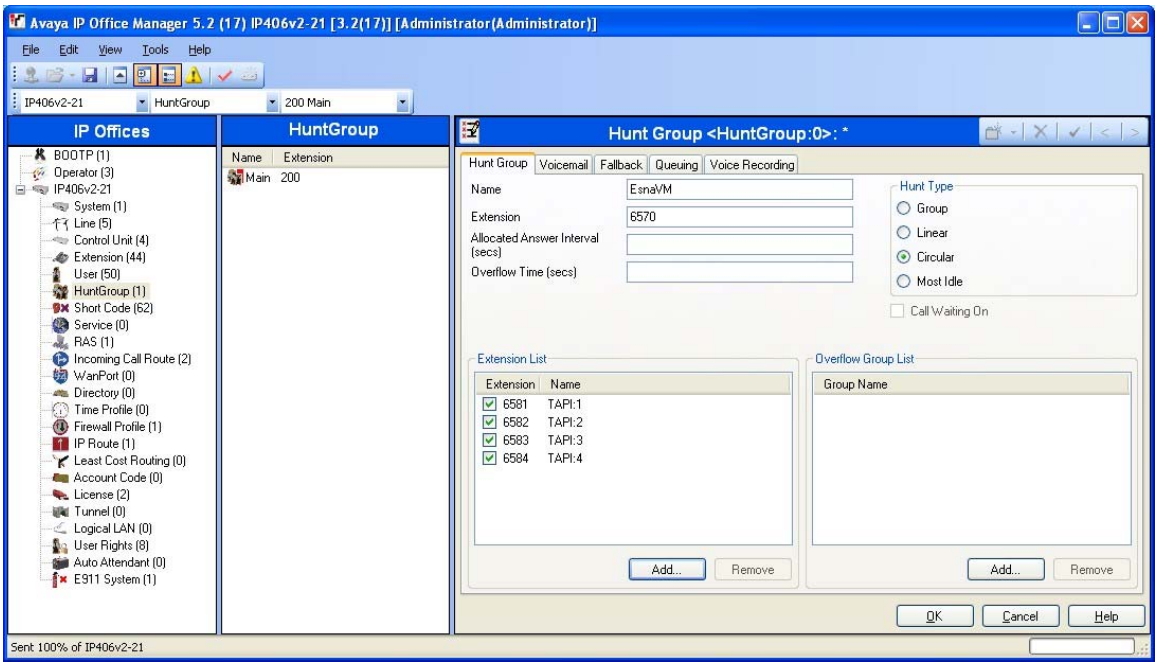
Step	Description
1.	Log into the IP Office Manager PC and go to **Start → Programs → IP Office → Manager** to launch the Manager application.
	Configure system password for TAPI applications in Security Settings
2.	In the Manager window that appears, select **File → Advanced → Security Settings…** to search for IP Office in the network. 
3.	Log into IP Office using the appropriate **Security Service User Login** credentials to receive its security settings.

Step	Description
4.	In the Security Settings General window that appears, click **System** in the left pane. 
5.	In the System window that appears, select the Unsecured Interfaces tab. 

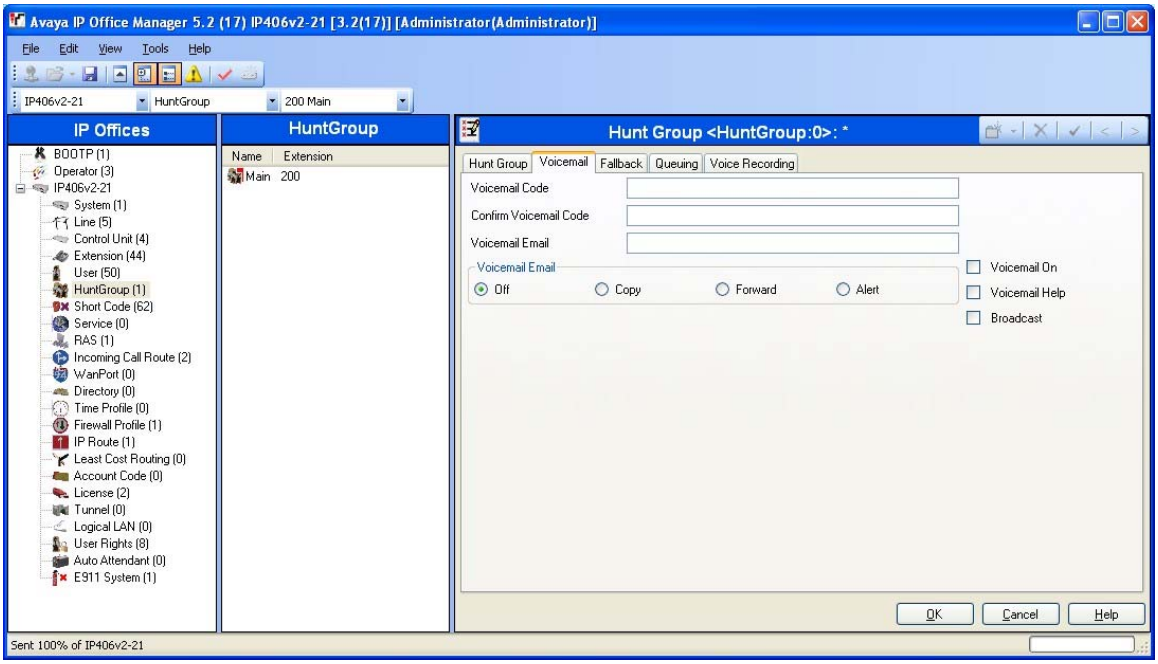
Step	Description
6.	In the Unsecured Interfaces tab that appears, make a note of the password used for **System Password,** as it will be required in Section 4.1 Step 7. Please review reference [1] for more information on Security Settings and System Password. 
7.	In the Manager window, select **File → Close Security Settings**. 

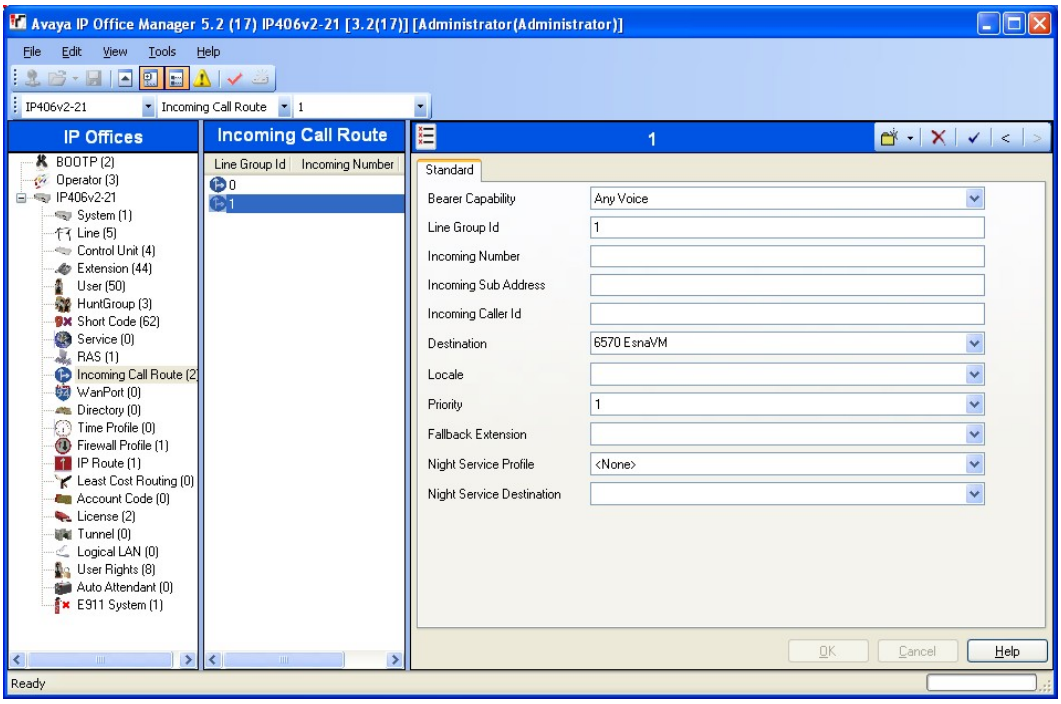
Step	Description
8.	In the Manager window, select **File → Configuration**. 
	Open IP Office configuration
9.	In the Manager window, select **File → Open** to search for IP Office in the network.
10.	Log into IP Office using the appropriate login credentials to receive its configuration.
	Configure TAPI WAVE extensions
11.	In the Manager window, go to the Configuration Tree and click **User**. In the right hand pane, right-click **New** to add a user.
12.	In the User window that appears, set **Name** to the name of the first TOL TAPI WAVE extension listed in **Table 1**, set **Extension** to the extension number for the first TOL TAPI WAVE extension listed in **Table 1**. Select the Voicemail tab. 

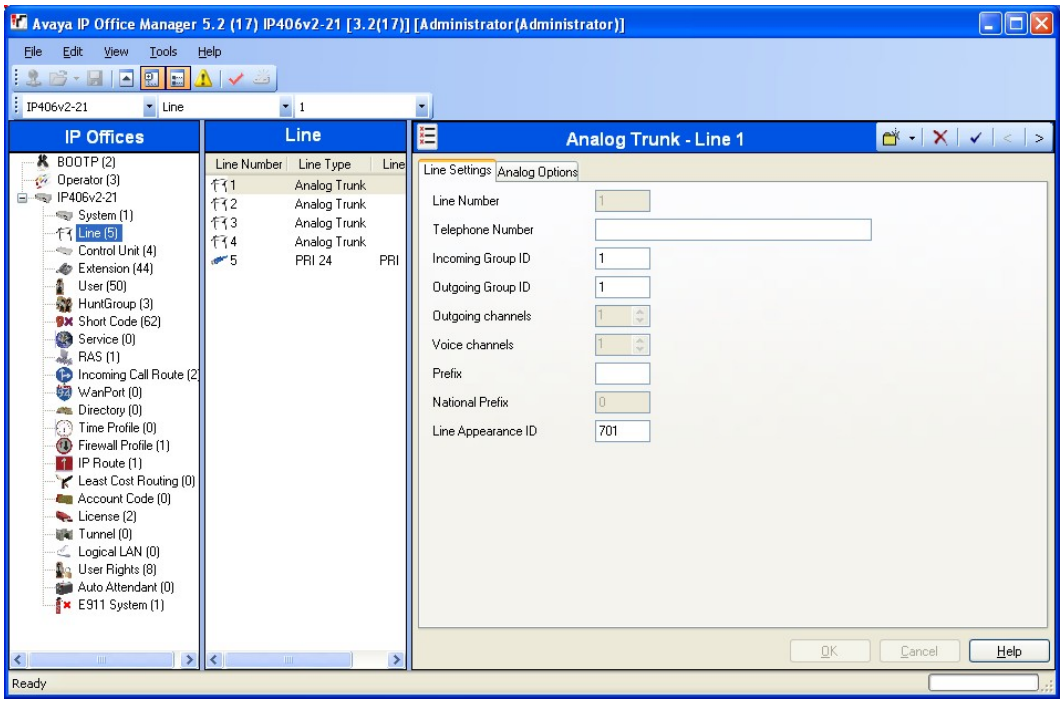
Step	Description
13.	In the Voicemail tab, uncheck **Voicemail On**. Select the Telephony tab. 
14.	In the Telephony tab, uncheck **Answer Call Waiting On Hold (Analog)**, uncheck **Cannot be Intruded**, check **Offhook Station** and click **OK**. 

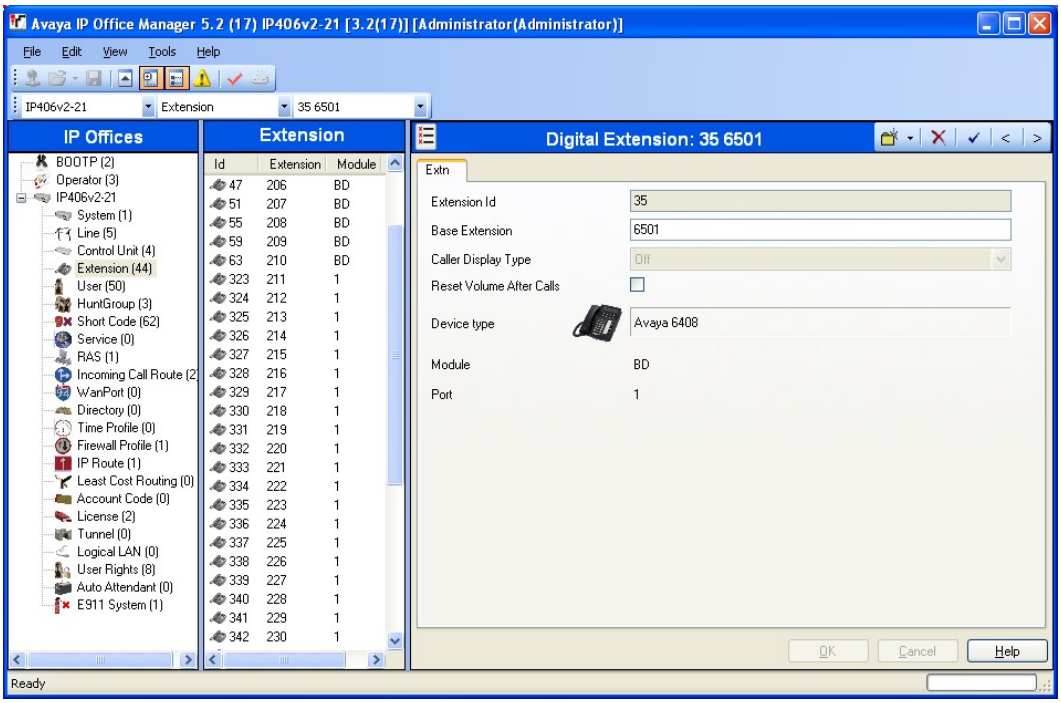
Step	Description
15.	Repeat Steps 11 – 14 for each TOL TAPI WAVE extension listed in **Table 1**. For the purposes of these Application Notes, TOL TAPI WAVE extensions 6581 – 6584 were created.
	Configure TOL hunt group
16.	In the Manager window, go to the Configuration Tree and click **Hunt Group.** Right-click **New** to add a hunt group.
17.	In the hunt group window that appears, set **Name** to the name of the TOL hunt group listed in **Table 1**, set **Extension** to the extension number listed for the TOL hunt group in **Table 1**, add all the TOL TAPI WAVE extensions listed in **Table 1** to the **Extension List**, and select ***Circular*** for **Hunt Type**. Select the Voicemail tab.  **Note**: TOL presents different voice prompts based on the caller's origination point. Internal extension callers directly dialing the TOL hunt group will hear the voicemail login prompt. Coverage callers forwarded to the TOL hunt group will hear the callee's voicemail greeting. Outside callers routed to the TOL hunt group based on call routing will hear the TOL Automated Attendant.

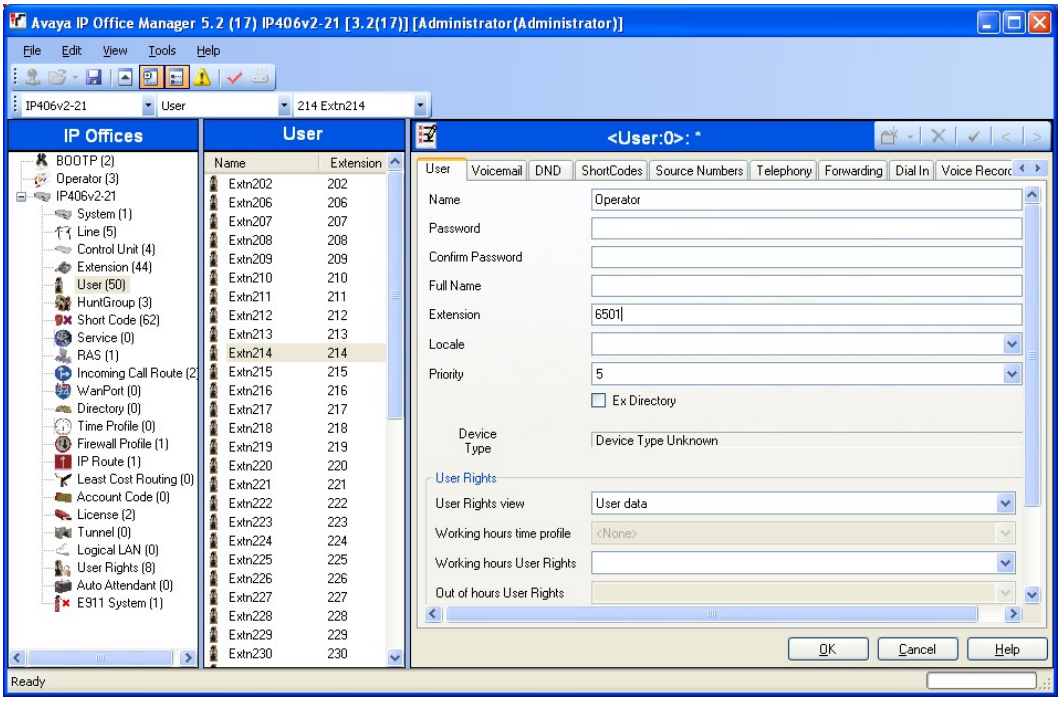
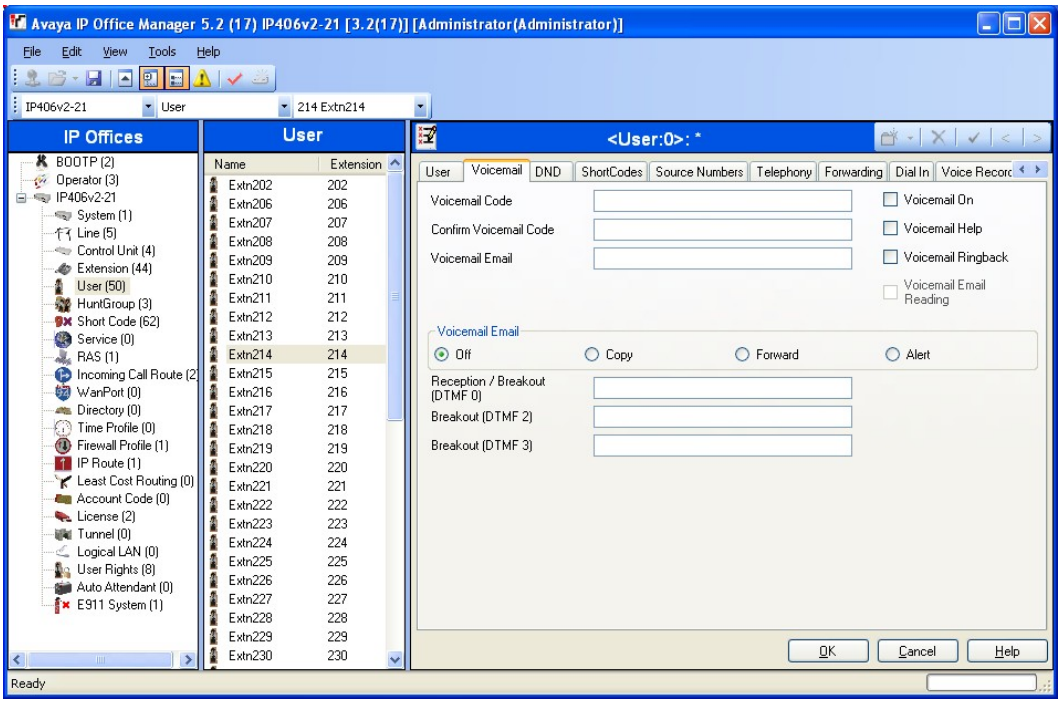
Step	Description
18.	In the Voicemail tab, uncheck **Voicemail On**. Click **OK**.

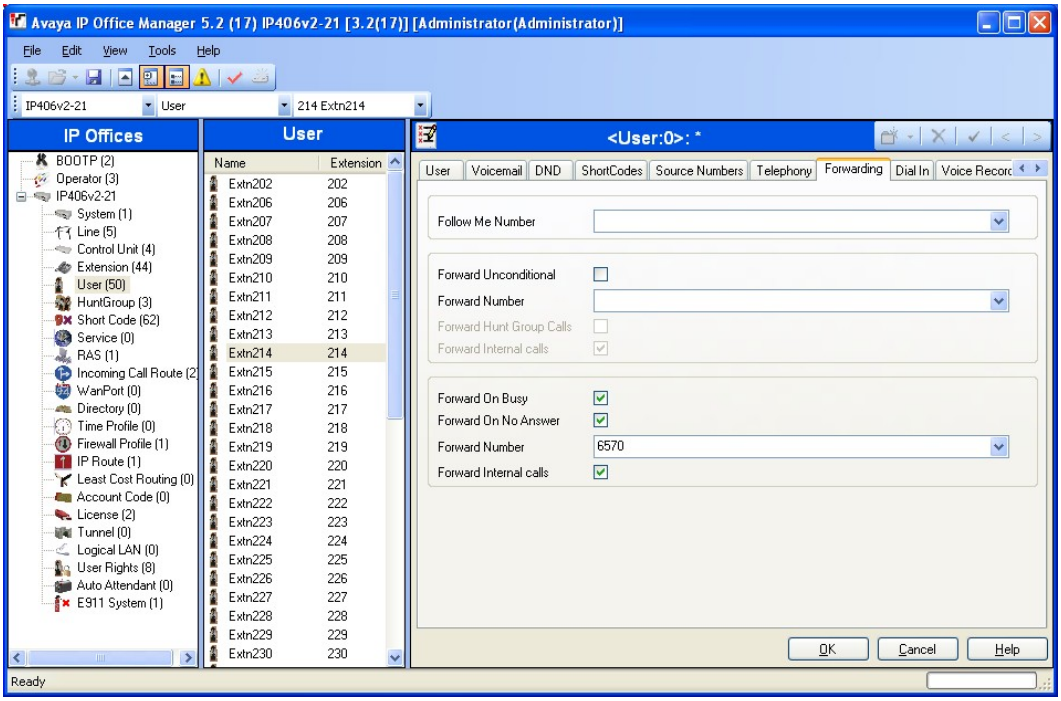


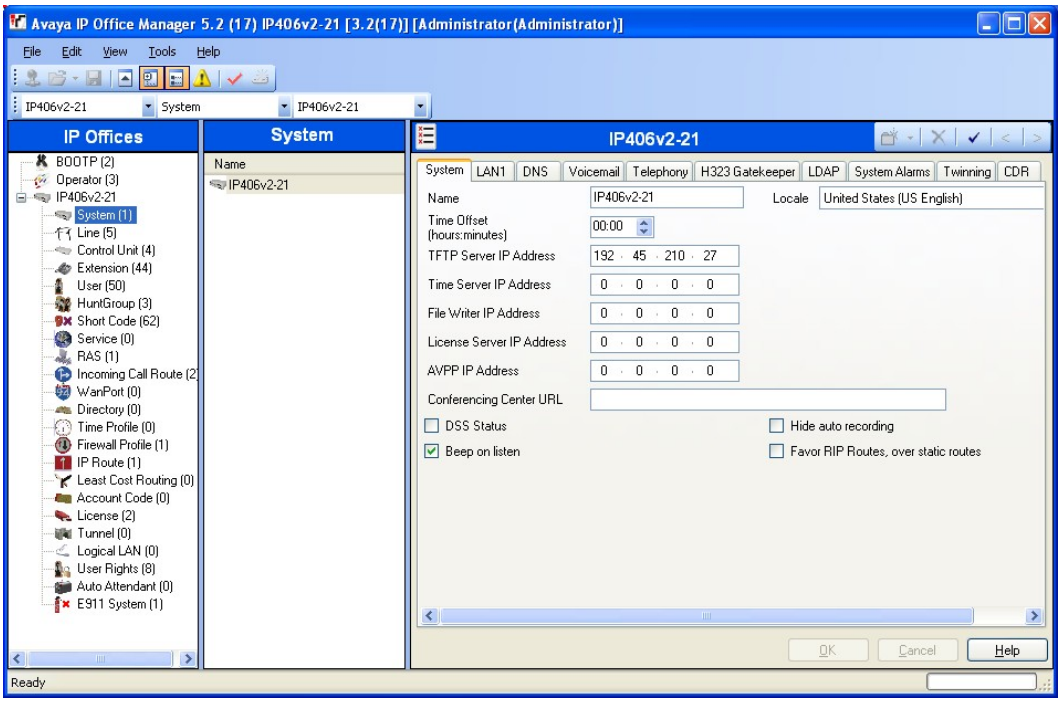
Step	Description
	Configure incoming call route to route calls to TOL Hunt Group (Automated Attendant)
19.	In the Manager window, go to the Configuration Tree and click **Incoming Call Route.** In the right hand pane, right-click **New** to add an incoming call route.
20.	In the Incoming Call Route window that appears, set **Line Group Id** to a unique number, set **Destination** to ***6570 EsnaVM***. Click **OK**.  **Note**: Make sure no other incoming call route is configured with the same **Line Group Id**.

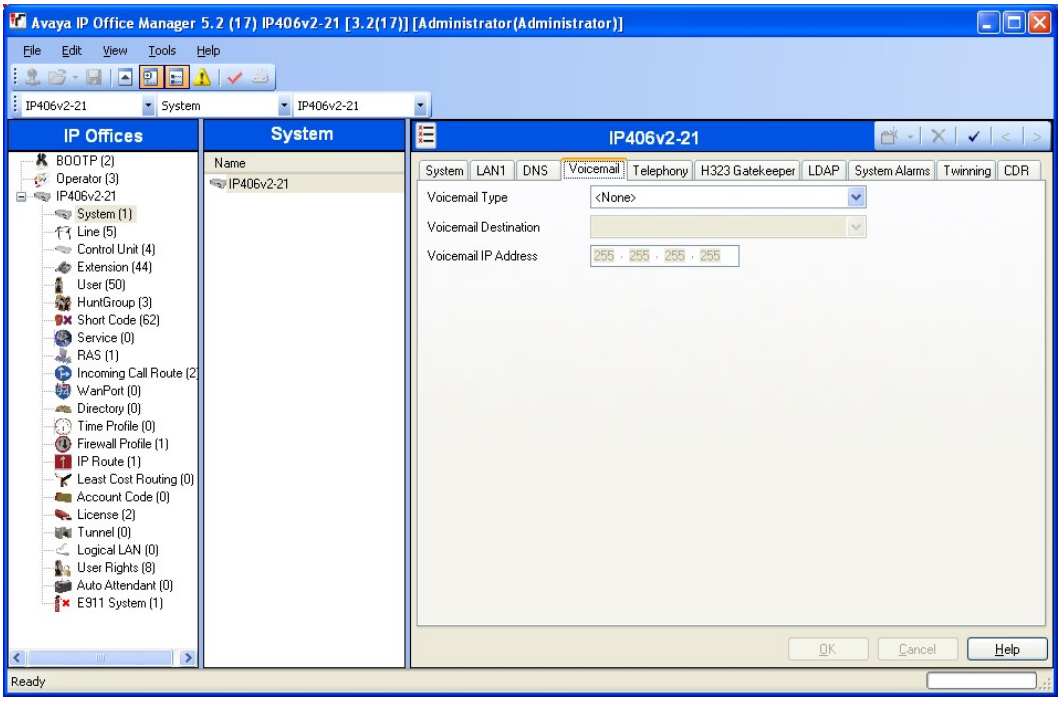
Step	Description
	Assign incoming call route to inbound trunks being used
21.	In the Manager window, go to the Configuration Tree and click **Line**. In the list of lines that appear, click the line (analog or digital) whose incoming calls are to be routed to the TOL hunt group (Automated Attendant) extension.
22.	In the window that appears, set **Incoming Group ID** to the value used for **Line Group Id** in Step 20. A similar procedure is used on the T1/PRI lines. Click **OK**. 
23.	Repeat Steps 21 – 22 for each line (trunk) assigned to the Incoming Call Route.

Step	Description
	Configure user extensions
24.	In the Manager window, go to the Configuration Tree and click **Extension.** In the list of extensions that appear, click the **Id** that will be associated with the first end user listed in **Table 1**.
25.	In the Extension window that appears, set **Extension** to the extension number of the first end user in **Table 1**. Click **OK**. 
26.	In the Manager window, go to the Configuration Tree and double-click **User**. In the right hand pane, right-click **New** to add a user.

Step	Description
27.	In the User window that appears, set **Name** to the name of the first end user listed in **Table 1**, set **Extension** to the extension number associated with the first end user in **Table 1**. Select the Voicemail tab. 
28.	In the Voicemail tab that appears, uncheck **Voicemail On**. Select the Forwarding tab. 

Step	Description
29.	In the Forwarding tab that appears, check **Forward on Busy**, check **Forward on No Answer**, set **Forward Number** to the number of the TOL Hunt Group listed in **Table 1**, check **Forward Internal calls**. Click **OK**. 
30.	Repeat Steps 24 – 29 for each end user extension listed in **Table 1**. For the purposes of these Application Notes, end user extensions 6501 – 6503, 6510 – 6513, and 6517 were created.

Step	Description
	Disable system level voicemail since forwarding being used with TOL
31.	In the **Manager** window, go to the Configuration Tree and double-click **System**. In the **System** tab of the System Configuration window that appears, verify **License Server IP Address** is set to the IP address of the machine to which the Avaya Software Sentinel key (dongle) is connected. If the dongle is connected to Avaya IP Office directly, it should be set to ***0.0.0.0***. Select the Voicemail tab. 

Step	Description
32.	In the Voicemail tab that appears, select ***None*** for **Voicemail Type** and click **OK**. 
	Install CTI Link Pro and Wave User licenses
33.	In the **Manager** window, go to the Configuration Tree and double-click **License**. In the right-hand pane, right-click **New** in the popup that appears.
34.	In the License popup that appears, enter the license string for the **CTI Link Pro** license and click **OK**.
35.	In the License right-hand pane, right-click **New** in the popup that appears.
36.	In the License popup that appears, enter the license string for the **Wave User** license and click **OK**. Though an unlimited TAPI WAVE lab license was used for compliance testing, for the purposes of these Application Notes, a 5-user Wave User license would have been sufficient.
37.	In the Manager window, select **File** → **Save** to push the configuration to IP Office and wait for the system to update. This completes configuration of Avaya IP Office for this solution.

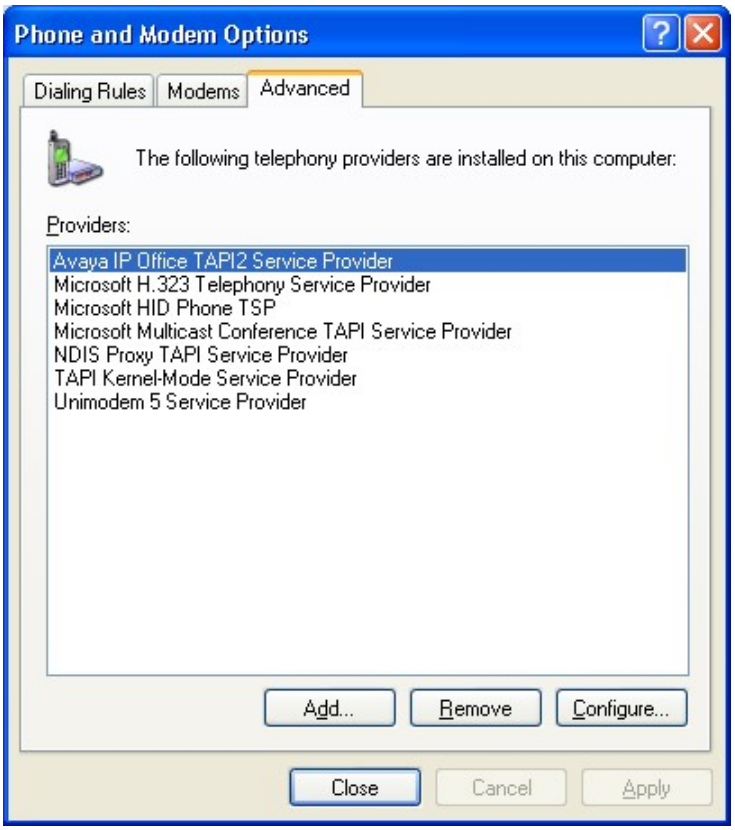
4. Configure Esna Technologies TOL PC

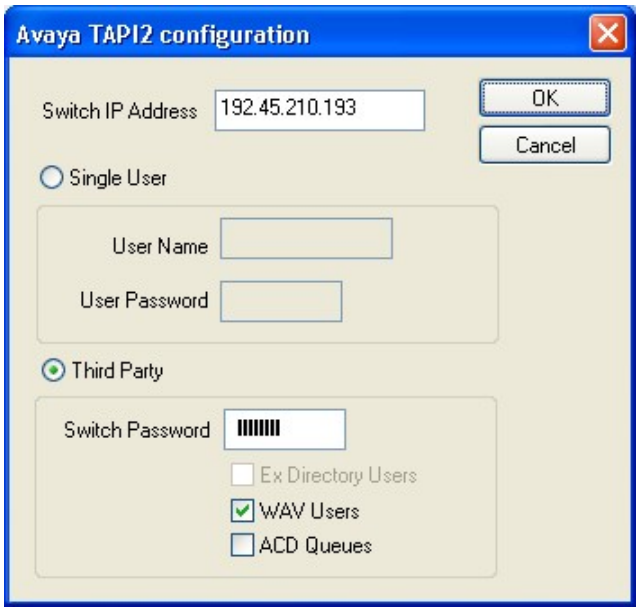
The configuration information provided in this section describes the steps required to configure Esna Technologies TOL to work with Avaya IP Office for this solution.

*Be sure to have the **Avaya IP Office TAPI WAVE driver** on hand as it will be required as part of this configuration. The **Avaya IP Office TAPI WAVE driver** is not generally available; it can only be obtained from a current Avaya IP Office DeveloperConnection Program member who has access to the latest version of the driver.*

For all other provisioning information, such as software installation, installation of optional components, and/or the configuration of TOL, please refer to the Esna Technologies TOL product documentation in reference [3].

4.1. Install and Configure Avaya IP Office TAPI Driver

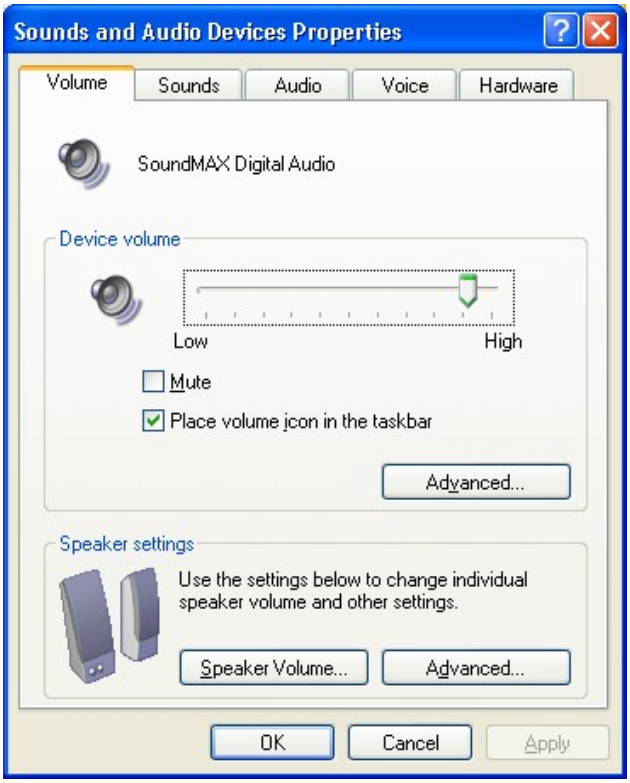
Step	Description
1.	From the TOL PC, launch the Avaya IP Office User Suite **setup.exe** in the CDROM drive from an account with administrative privileges.
2.	Click **Custom** in the InstallShield wizard. Uncheck **Phone Manager** and check **TAPI** to install the IP Office TAPI driver on the PC.
3.	Click **Next** to complete the installation of the Avaya IP Office User Suite. At the InstallShield Wizard Complete window, click **Finish**.
4.	Go to **Start → Control Panel** and double-click the **Phone and Modem Options** icon in the Control Panel window that appears.
5.	In the Phone and Modem Options window that appears, select the **Advanced** tab.
6.	In the Advanced tab window that appears, highlight **Avaya IP Office TAPI2 Service Provider** and click **Configure…** 

Step	Description
7.	In the Avaya TAPI2 configuration window that appears, set **Switch IP Address** to the IP address of Avaya IP Office, select **Third Party**, set **Switch Password** to the IP Office system password referenced in Section 3 Step 6, check **WAV Users**, and uncheck **ACD Queues**. Click **OK**. 
8.	In the Phone and Modem Options window, click **OK**.
9.	Reboot the PC for the changes to take effect. This completes configuration of the Avaya IP Office TAPI Driver on the TOL PC for this solution.

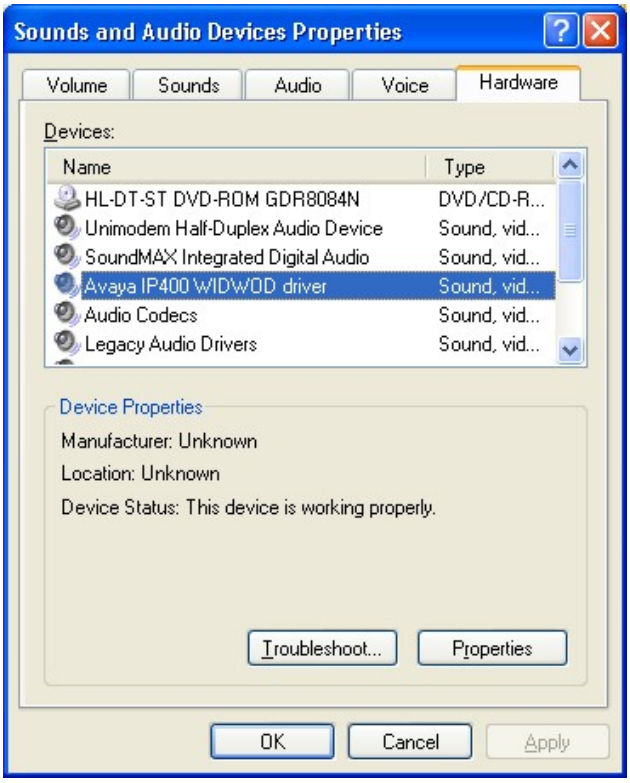
4.2. Install and Configure Avaya IP Office TAPI WAVE Driver

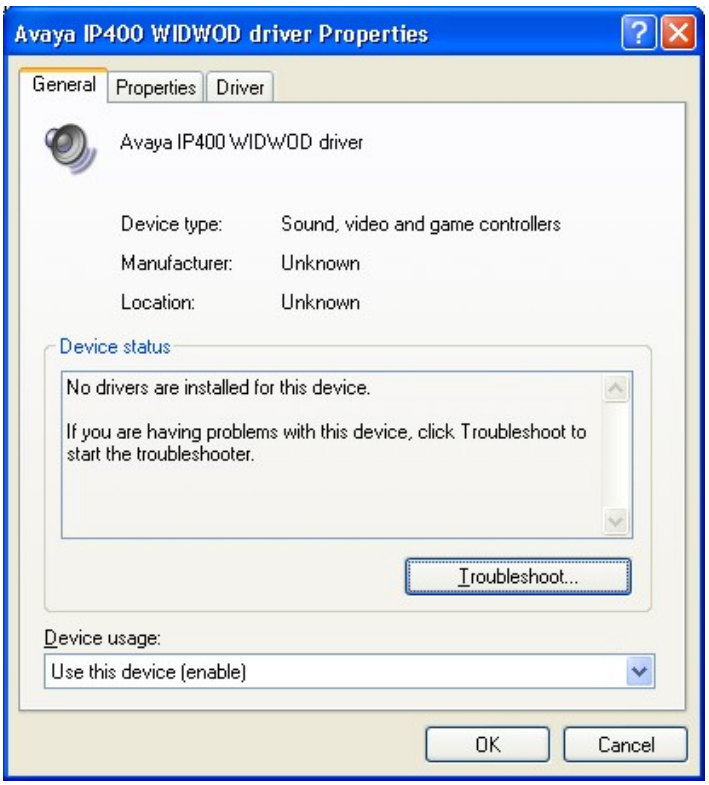
The steps provided in this section assume a copy of the Avaya IP Office TAPI WAVE driver has been placed in a folder of the TOL PC.

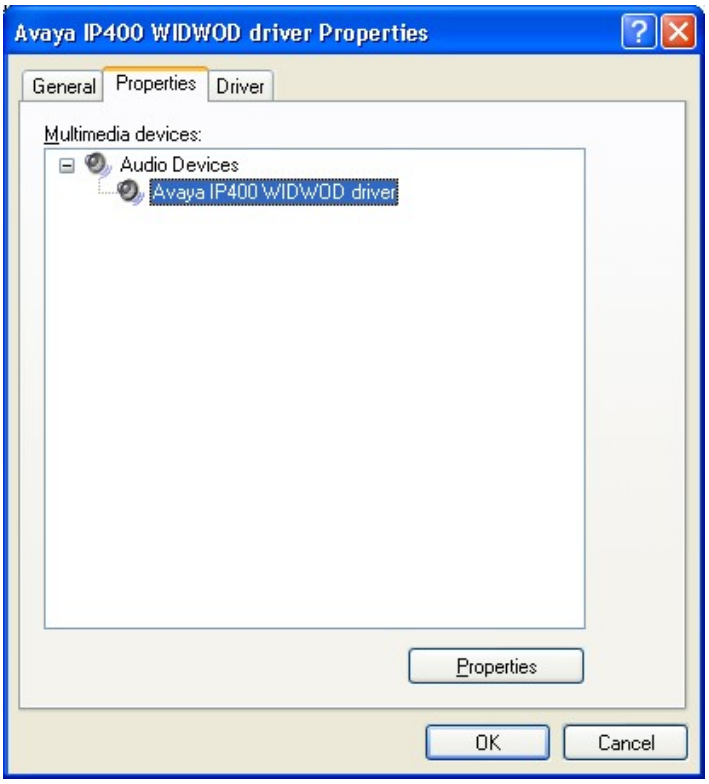
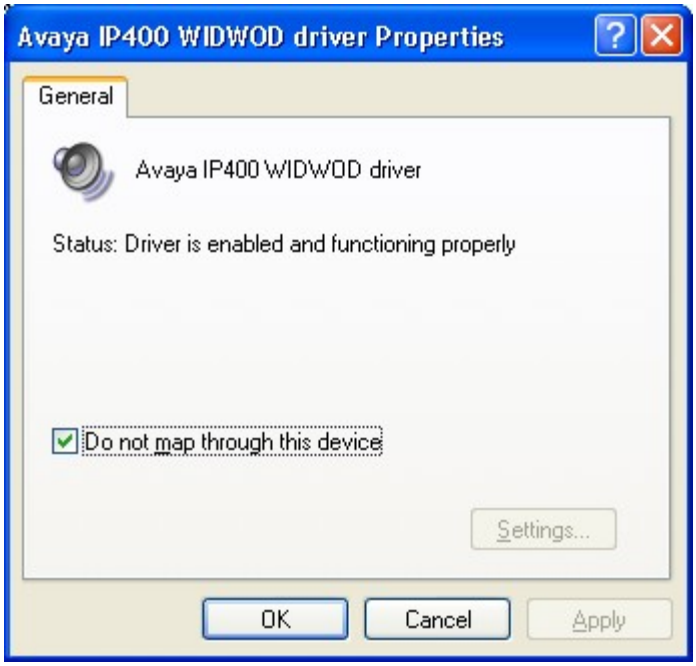
Step	Description
1.	From the TOL PC, go to **Start → Control Panel** and double-click the **Add Hardware** icon in the Control Panel window that appears.
2.	In the Add Hardware Wizard window that appears, click **Next**.
3.	In the next Add Hardware Wizard window that appears, select **Yes, I have already connected the hardware**. Click **Next**.
4.	In the next Add Hardware Wizard window that appears, select ***Add a new hardware device*** for **Installed hardware**. Click **Next**.
5.	In the next Add Hardware Wizard window that appears, select **Install the hardware that I manually select from a list (Advanced)**. Click **Next**.
6.	In the next Add Hardware Wizard window that appears, select **Sound, video and game controllers**. Click **Next**.
7.	In the next Add Hardware Wizard window that appears, click **Have Disk…**
8.	In the Install From Disk popup that appears, click **Browse…**.

Step	Description
9.	In the Locate File popup that appears, navigate to the location where the Avaya IP Office TAPI WAVE driver has been placed and select the **oemsetup.inf** file. Click **Open**.
10.	In the Install From Disk popup, click **OK**.
11.	In the Software Installation popup that appears, click **Continue Anyway.**
12.	In the next Add Hardware Wizard window that appears, **Avaya IP400 WIDWOD driver** should listed as the device driver to be installed. Click **Next**.
13.	In the next Add Hardware Wizard window that appears, click **Next**.
14.	In the Hardware Installation popup that appears, click **Continue Anyway.**
15.	In the next Add Hardware Wizard window that appears, click **Finish**.
16.	In the System Settings Change popup that appears, click **Yes** to reboot the computer.
17.	Following the system reboot, log into the TOL PC using the appropriate administrative credentials.
18.	Go to **Start → Control Panel** and double-click the **Sounds and Audio Devices** icon in the Control Panel window that appears.
19.	In the Sounds and Audio Devices Properties window that appears, select the Hardware tab. 

Step	Description
20.	In the Hardware tab that appears, double-click **Avaya IP400 WIDWOD driver.**



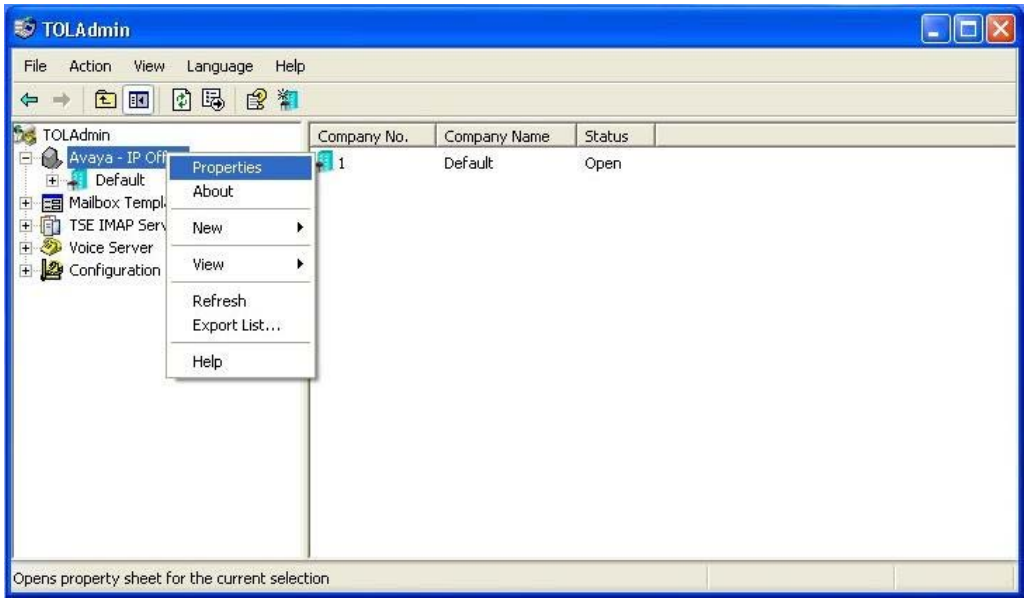
Step	Description
21.	In the Avaya IP400 WIDWOD driver Properties window that appears, select the Properties tab. 

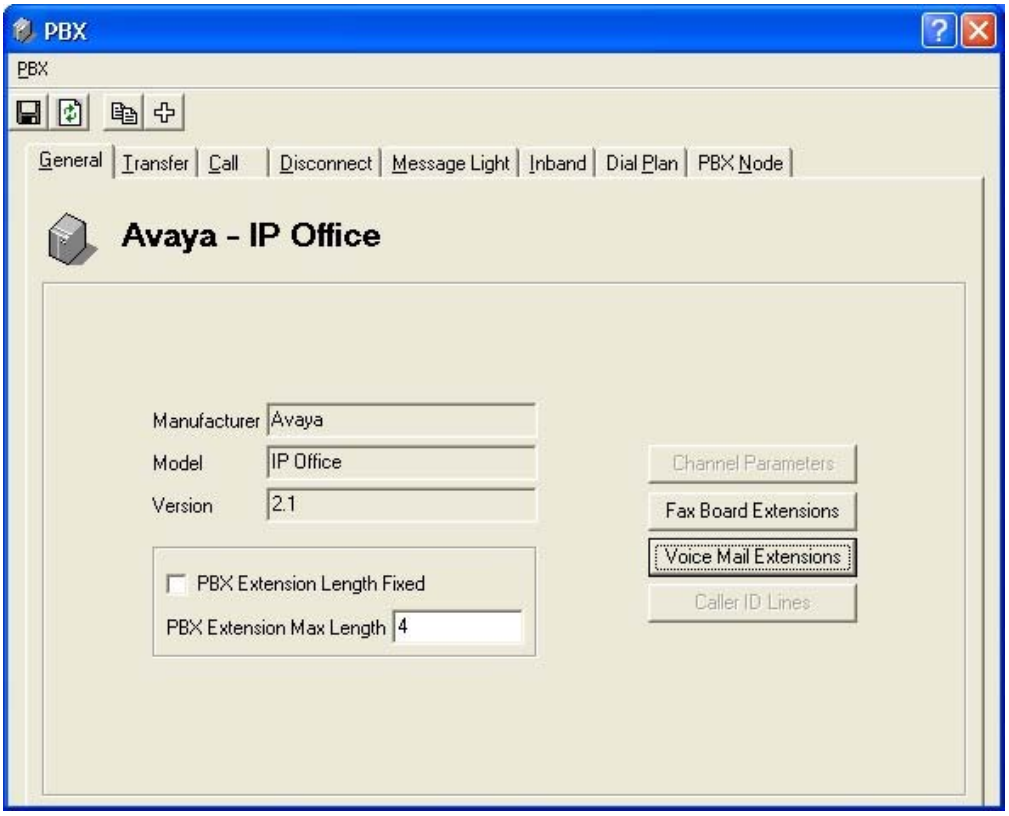
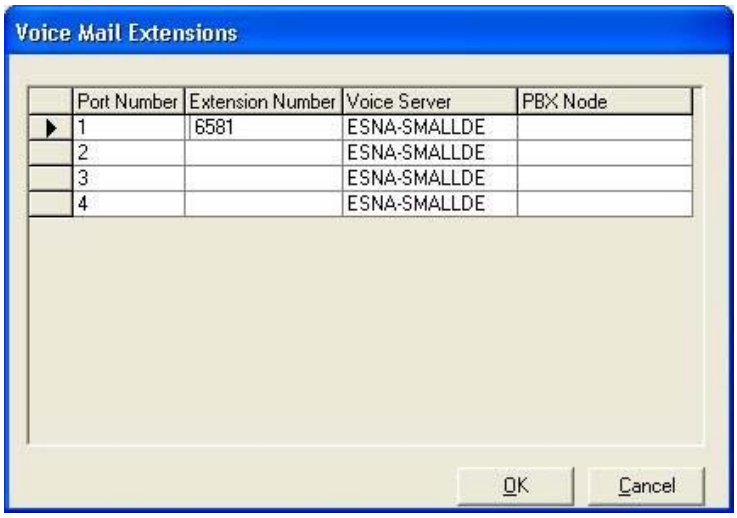
Step	Description
22.	In the Properties tab that appears, double-click **Avaya IP400 WIDWOD driver**. 
23.	In the Avaya IP400 WIDWOD driver Properties popup that appears, check **Do not map through this device**. Click **OK**. 

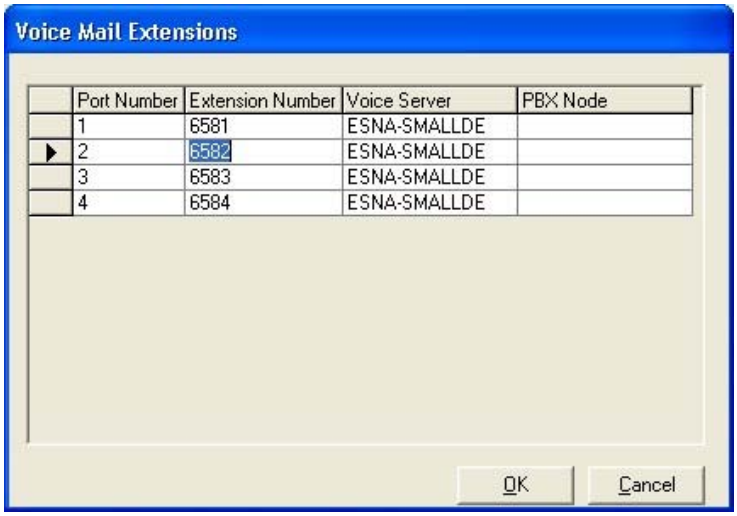
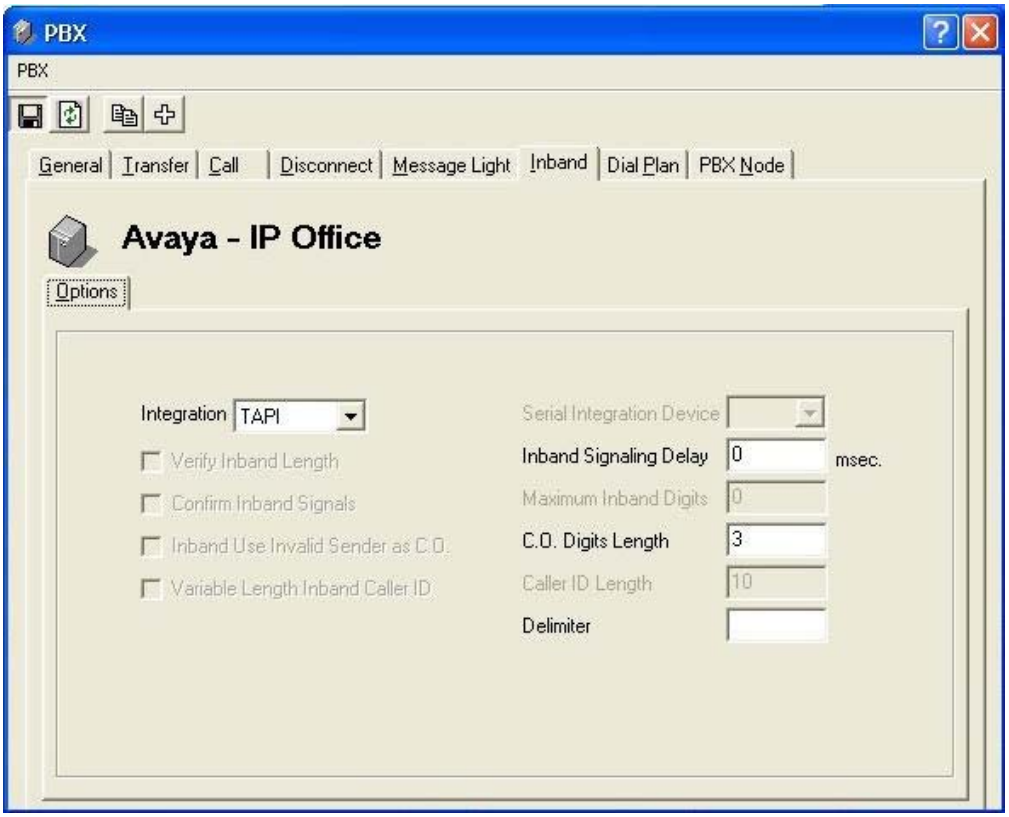
Step	Description
10.	Reboot the PC for the changes to take effect. This completes configuration of the Avaya IP Office TAPI Wave Driver on the TOL PC for this solution.

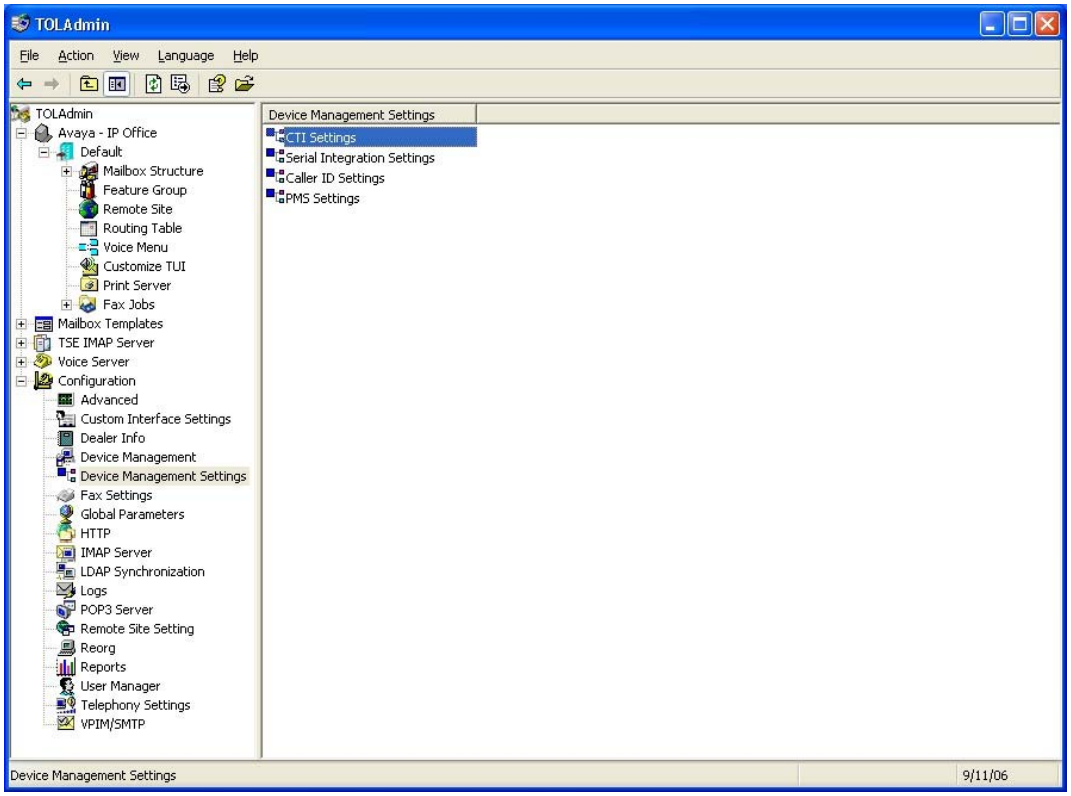
4.3. Configure TOL

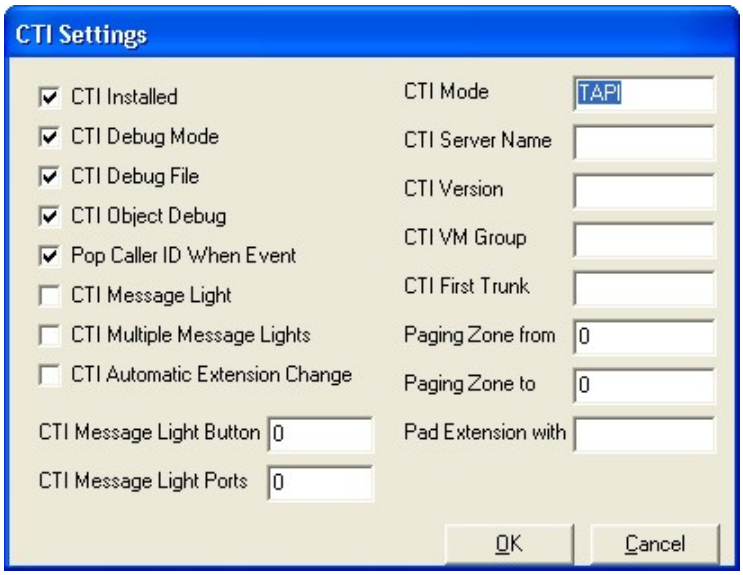
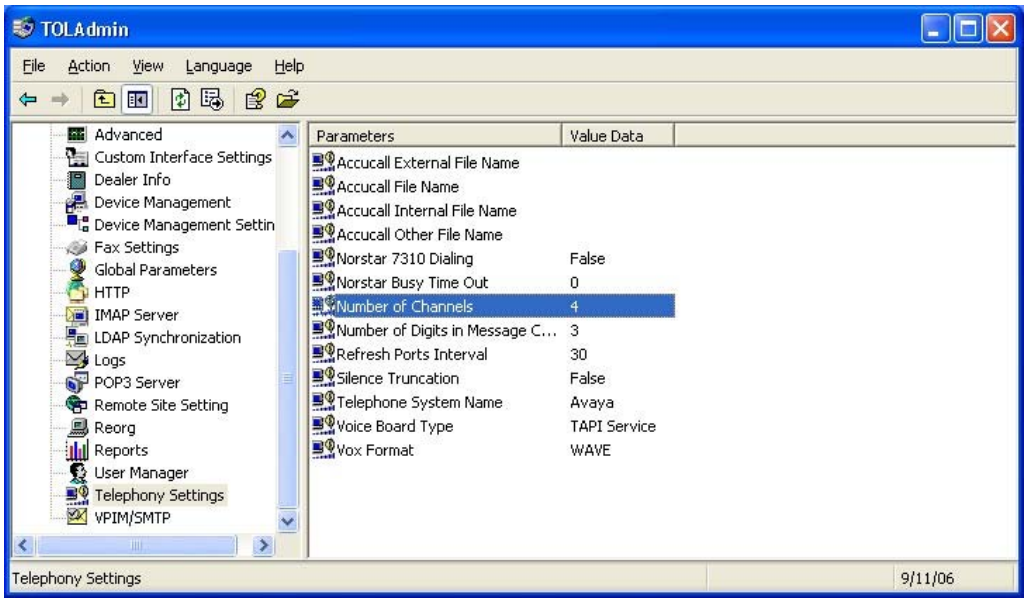
4.3.1. Configure TOL CTI and User Voicemail

Step	Description
1.	Log into the TOL PC with administrative privileges. Go to **Start → Programs → Telephony Office LinX Enterprise Edition → Telephony Office LinX Enterprise Admin** to launch the TOL Administrator application.
2.	In the Login Information popup that appears, log in using the appropriate administrative credentials. 
	Configure TOL Voice Mail "Ports"
3.	In the TOLAdmin window that appears, right-click **Avaya – IP Office** in the left pane and select **Properties** in the popup menu that appears. 

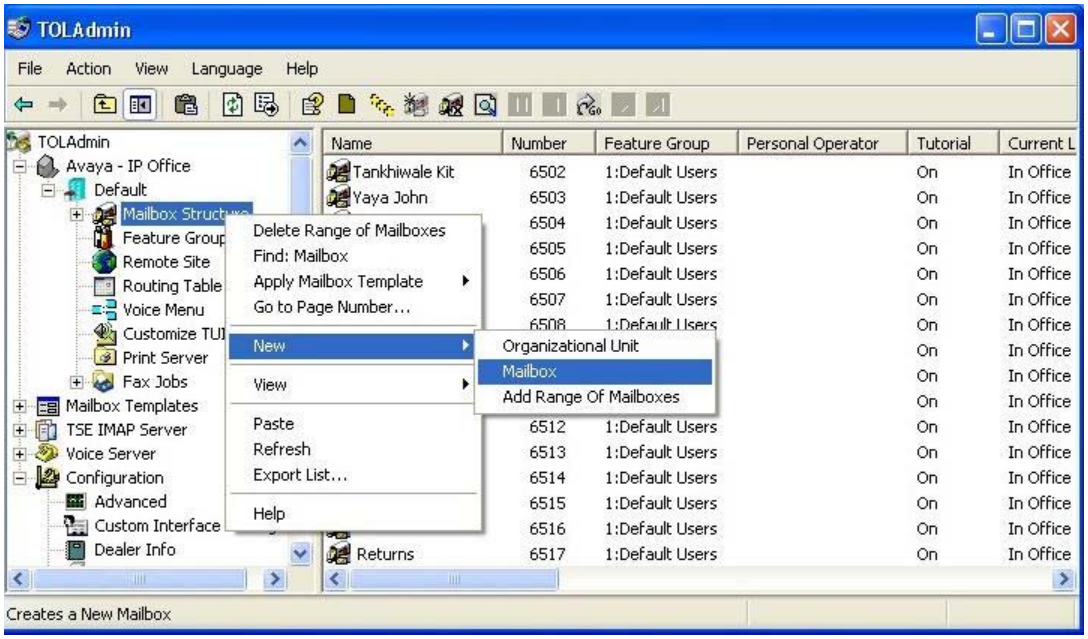
Step	Description
4.	In the PBX window that appears, click **Voice Mail Extensions** in the General tab. 
5.	In the Voice Mail Extensions window that appears, set **Port Number 1 Extension Number** to the first TAPI WAVE Extension listed in **Table 1**. 

Step	Description
6.	Repeat Step 5 for each remaining TAPI WAVE Extension listed in **Table 1**. Click **OK**. For the purposes of these Application Notes, TAPI WAVE Extensions 6581 – 6584 were configured as Voice Mail Extensions. 
7.	In the PBX window that appears, select the Inband tab.
8.	In the Inband tab that appears, verify **Integration** is set to ***TAPI***. Click the save icon (💾). 

Step	Description
9.	In the Save popup that appears, click **Yes**. 
	Verify TOL TAPI settings
10.	In the TOLAdmin window that appears, click **Device Management Settings** in the left pane and double-click **CTI Settings** in the right pane. 

Step	Description
11.	In the CTI Settings window that appears, verify **CTI Installed**, **CTI Debug Mode**, **CTI Debug File**, **CTI Object Debug**, **Pop Caller ID When Event** are checked and verify **CTI Mode** is set to ***TAPI***. Click **OK**. 
12.	In the TOLAdmin window, click **Telephony Settings** in the left pane and verify **Number of Channels** on the right pane is set to the number of TAPI WAVE extensions configured for the solution. For the purposes of these Application Notes, four TAPI WAVE extensions were configured. In the same pane, verify **Telephone System Name** is set to ***Avaya*** and verify **Voice Board Type** is set to ***TAPI Service***. 

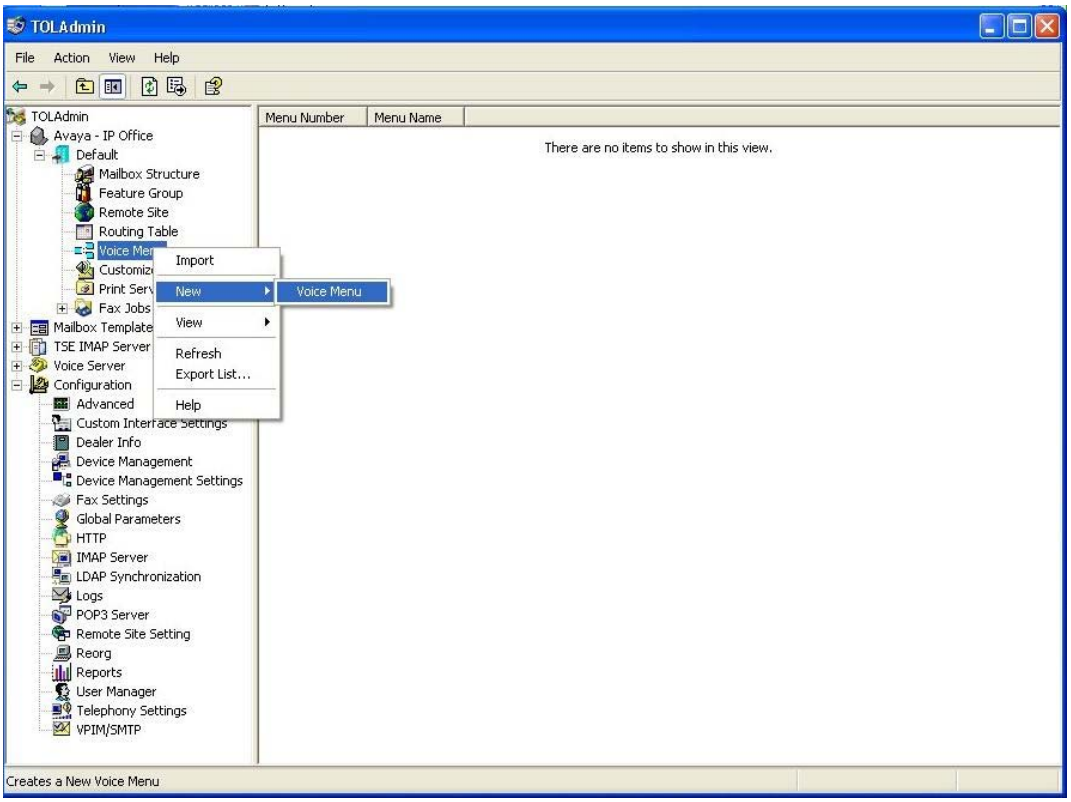
Step	Description
	Configure end user voicemail
13.	In the TOLAdmin window, right-click **Mailbox Structure** in the left pane and select **New → Mailbox** in the popup menu that appears.

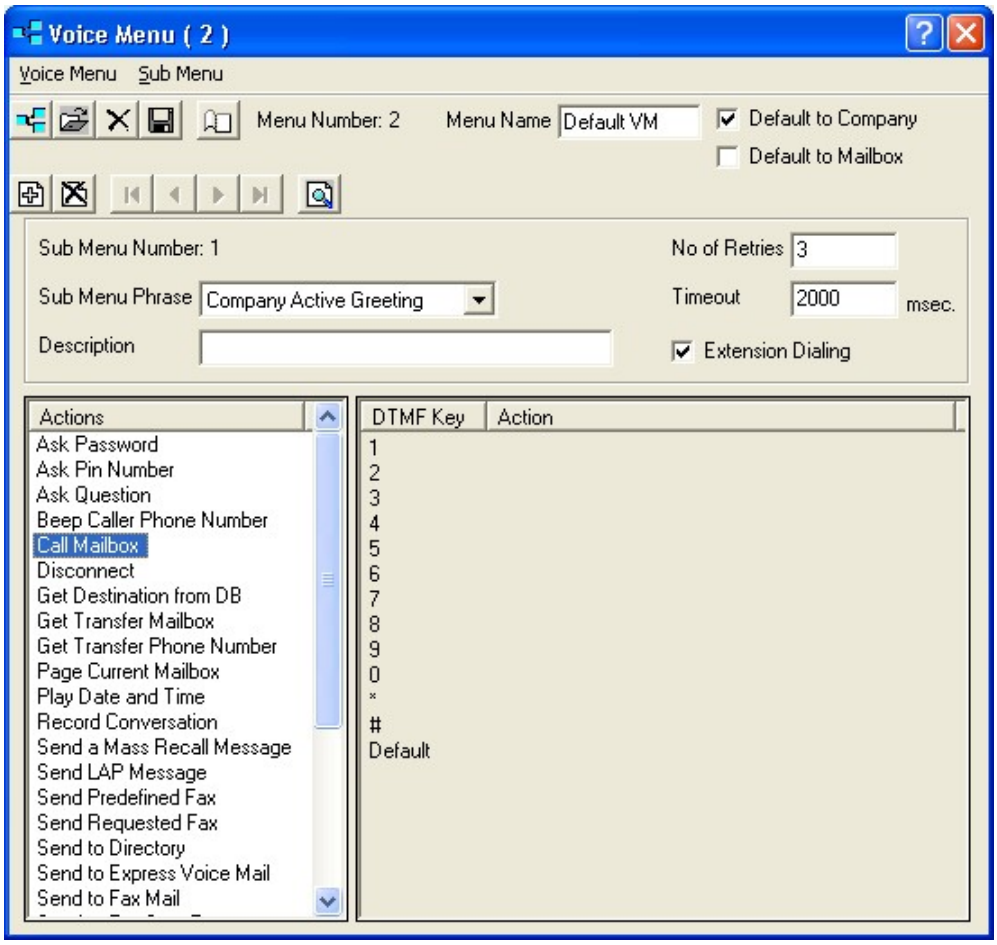


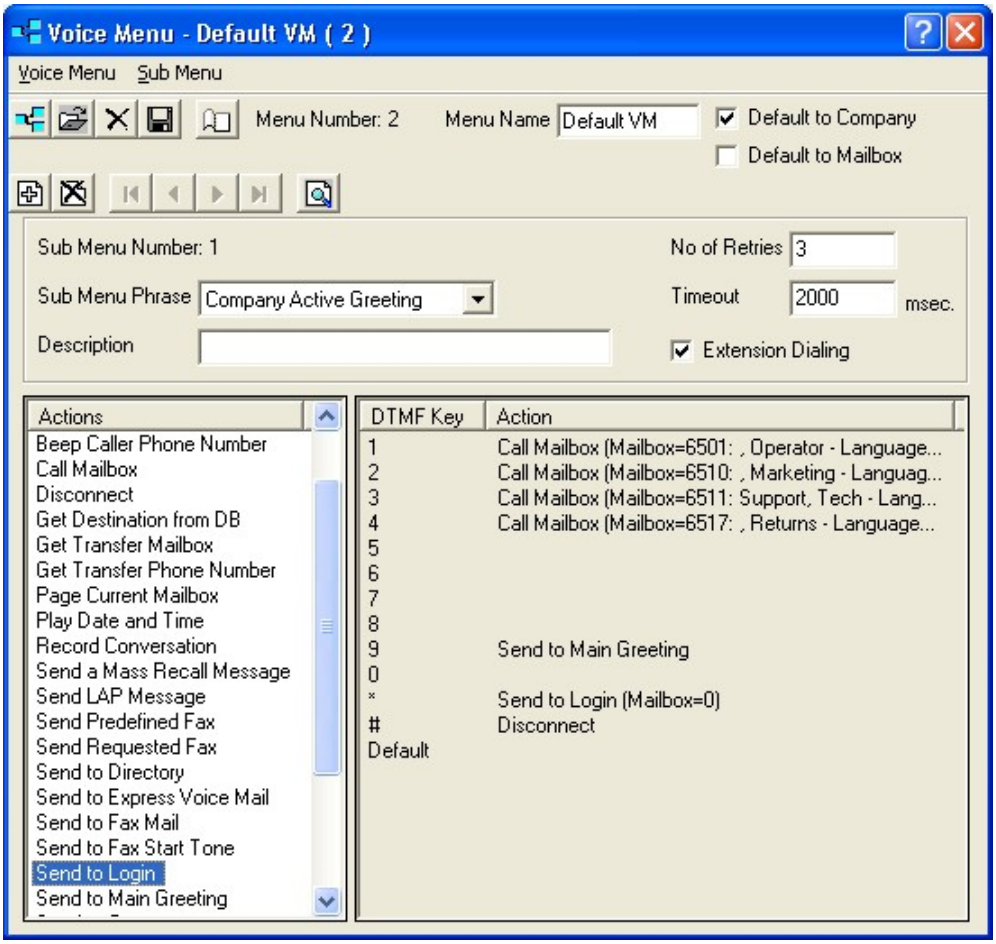
Step	Description
14.	In the Mailbox window that appears, set **Mailbox Number** to the first end user extension number listed in **Table 1**, set **Last Name** and **First Name** to the name of the first end user listed in **Table 1**. Set **Password** and **Confirm Password** in the Numeric Password pane to the PIN the user will use to log into their voicemail. Click the save icon ().
15.	Repeat Steps 13 – 14 for each end user listed in **Table 1**. For the purposes of these Application Notes, voicemail mailboxes were created for end user extensions 6501 – 6503, 6510 – 6513, and 6517. This completes basic configuration of TOL.

4.3.2. Configure TOL Automated Attendant

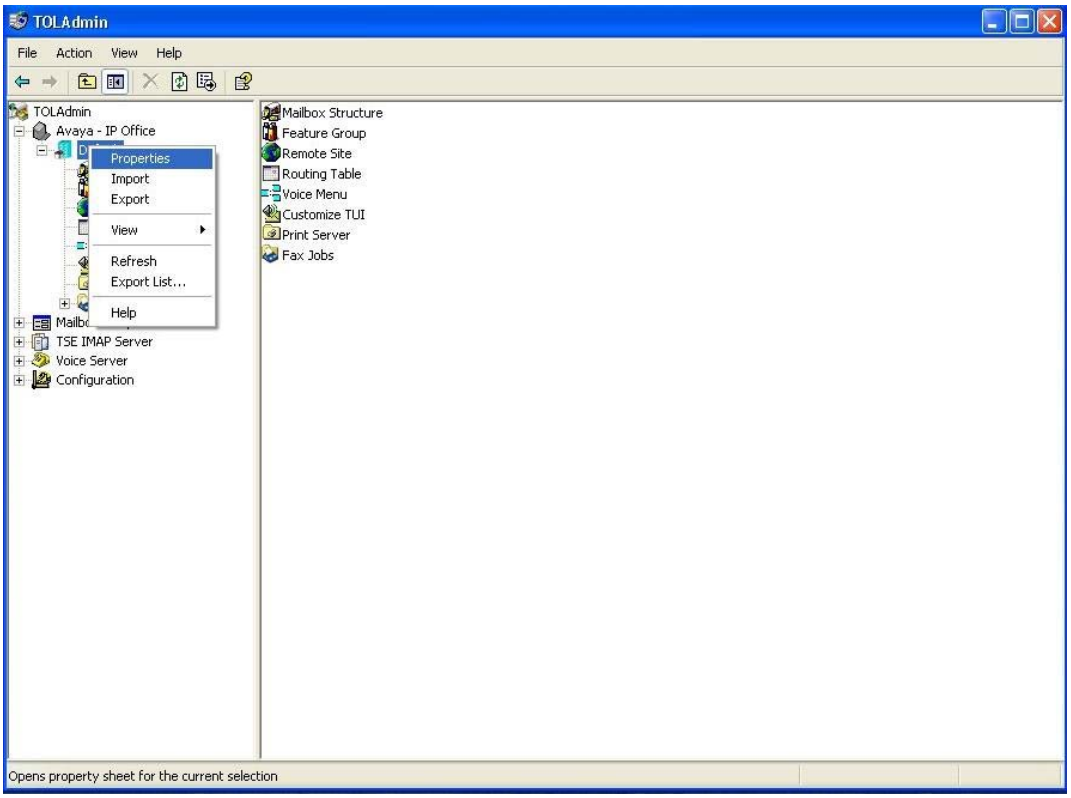
Step	Description
1.	In the TOLAdmin window, right-click **Voice Menu** in the left pane and select **New → Voice Menu** in the popup menu that appears.



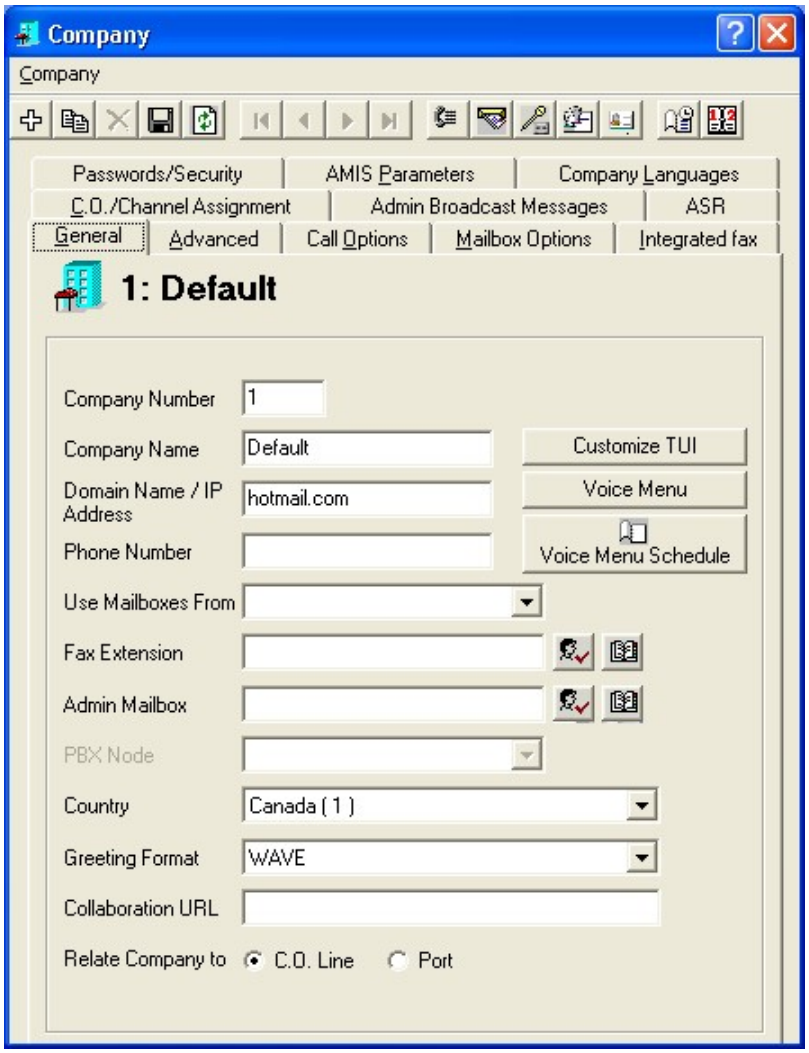
Step	Description
2.	In the Voice Menu window that appears, set **Menu Name** to the name of the automated attendant menu, check **Default to Company**, and set **Sub Menu Phrase** to ***Company Active Greeting***. Double-click **Call Mailbox**. 
3.	In the Parameters (Call Mailbox) popup that appears, set **Mailbox** to ***6501:, Operator*** and click **OK**. Call Mailbox transfers callers to the extension associated with the Mailbox. **Note**: TOL Automated Attendant can only transfer calls to IP Office extensions that have a corresponding TOL Mailbox. 

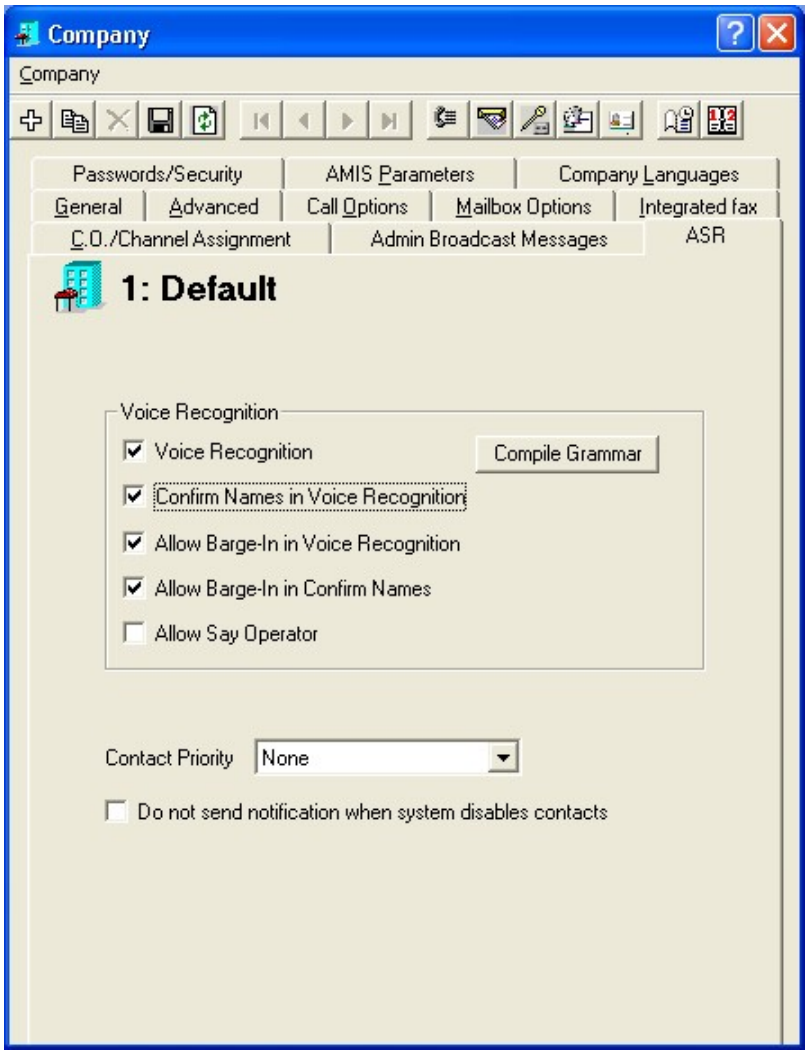
Step	Description
4.	In the Voice Menu window, click desired Actions for the Automated Attendant Menu. When finished, click the save icon (). For the purposes of these Application Notes, the Automated Attendant was configured as shown below. This completes configuration of TOL Automated Attendant for this solution.  **Note 1**: The **Call Mailbox** action transfers the caller to the extension number associated with the Mailbox number appearing in the parameters list. **Note 2**: The **Send to Main Greeting** action plays back the recording associated with this automated attendant menu. **Note 3**: The **Send to Login** action transfers the caller to the Voicemail Login prompt for voicemail retrieval. **Note 4**: The **Disconnect** action disconnects the caller.

4.3.3. Configure TOL Speech Enabled Automated Attendant

Step	Description
1.	In the TOLAdmin window, right-click **Default** in the left pane and select **Properties** in the popup menu that appears. 

Step	Description
2.	In the Company window that appears, select the ASR tab.



Step	Description
3.	In the ASR tab that appears, check **Voice Recognition**, check **Confirm Names in Voice Recognition**, check **Allow Barge-In in Voice Recognition**, check **Allow Barge-In in Confirm Names**. Click the save icon (). This completes configuration of TOL Speech Enabled Automated Attendant for this solution.  **Note**: For configurations where analog trunks and/or analog stations are connected to Avaya IP Office, disable Barge-In: uncheck **Allow Barge-In in Voice Recognition**, uncheck **Allow Barge-In Confirm Names**. Please refer to Section 5.2 for further information.

5. Interoperability Compliance Testing

Interoperability compliance testing examined the ability of Esna Technologies TOL to work with Avaya IP Office. The following TOL features were verified: basic automated attendant, speech enabled automated attendant and voicemail.

5.1. General Test Approach

Feature functionality testing was performed manually. Inbound calls were made to Avaya IP Office through analog and T1/PRI trunks, as well as from internal extensions (analog, digital and IP Telephone). IP Office routed inbound calls to the TOL hunt group. For automated attendant functionality, upon receipt of a call at a TAPI WAVE extension, TOL would play the automated attendant greeting and transfer calls according to DTMF input. For speech enabled automated attendant functionality, upon receipt of a call at a TAPI WAVE extension, TOL would play the automated attendant greeting and transfer calls according to the caller's spoken input (word or name recognition is supported). For voicemail functionality, upon receipt of a covered call, TOL played the extension user's voicemail recording, stored the voicemail left by the caller and enabled the extension user's message waiting lamp to indicate new voicemail received.

Load tests were performed using a call generator to generate inbound calls over four channels on a PRI trunk to Avaya IP Office. For the voicemail load test, a call generator script would navigate the TOL automated attendant and select a transfer to a destination extension, which would not answer. Upon being routed to coverage, the call generator script would leave a voicemail message and hang up. A second script was then used to place another inbound call over the PRI trunk to Avaya IP Office, navigate the TOL automated attendant, log into the called extension's voicemail, retrieve the voicemail, delete it and hang up. For the automated attendant load test, four call generator analog ports were connected to four Avaya IP Office analog station ports. A call generator script was written to place calls over four channels on the PRI trunk to Avaya IP Office, navigate the TOL automated attendant, select a transfer to a destination extension, answer the call at the destination extension then hang up the call. For the speech enabled automated attendant load test, the automated attendant call generator test scripts were modified by replacing the DTMF input with playing different wave files, each playing the name of a different end user in **Table 1**.

5.2. Test Results

Except for the analog station/trunk barge-in limitation and the modifications needed in the call generator to permit load testing this solution, all executed test cases were completed successfully. Observations and/or issues made during testing are noted below.

- **The TOL speech recognition portion of this solution is limited to IP Office configurations using only T1/PRI trunks and no analog stations**: The current version of the Avaya IP Office TAPI Wave driver does not separate incoming and outgoing audio streams on analog devices (trunk and station). It is recommended that barge-in be disabled on TOL systems connected to Avaya IP Office systems configured with analog trunks and/or analog stations. IP Office configurations using T1/PRI trunks only and no analog stations are unaffected. Feature request FEAT592 was submitted regarding this limitation.

- **Call generator default DTMF tones altered for successful load test**: The call generator default DTMF tones of 80 ms on/off were altered to 200 ms on/off during load testing. Issues

were experienced during load testing where either the Windows system where the TOL server resides or the TAPI Wave driver was not capturing all DTMF input resulting in incomplete or failed load test calls. The IP Office team suggested this is an operating system limitation that might be worked around by altering some TAPI WAVE registry settings; however, due to time constraints, this could not be attempted. To workaround the issues experienced, the default DTMF tones on the call generator were modified as previously indicated. This permitted successful load testing of this solution using four TAPI WAVE ports and the call rates indicated below. Using higher numbers of TAPI WAVE ports or call rates will require a new compliance test.

- **Voicemail Load Test:** A load test with a call rate of ~300 call attempts per hour using 4 PRI trunk channels and calls averaging 42.97 seconds in length was run for two hours. The call generator was limited to placing no more than 4 calls at a time.
    - For each loop of the call generator scripts, 2 calls were placed to Avaya IP Office. The 1st call was to leave voicemail and the 2nd call was to retrieve voicemail.
    - For each loop of the call generator scripts, 3 calls were counted by TOL as follows:
        - For the 1st call from the call generator, TOL processed 2 calls. The 1st was to perform an automated attendant transfer to an extension. The 2nd was the call returning for coverage when the extension called was not answered.
        - For the 2nd call from the call generator, TOL processed 1 call to retrieve voicemail.

  The call generator reported 600 calls. The scripts executed looped 300 (or 600/2) times. Since TOL was processing 3 calls for each time the call generator looped, it reported 900 (or 300*3) calls. At the conclusion of the load test, all message-waiting lamps on the telephone extensions used for the load test were off as expected. However, 3 voicemail messages remained, 2 for one extension and 1 for another. This was attributed to the Windows system and/or TAPI Wave driver not capturing the DTMF input to delete the voicemail (previous note). However, since this occurred on 3 of 900 calls processed or less than 1%, it was considered acceptable.

- **Automated Attendant Load Test:** A load test with a call rate of ~640 call attempts per hour using 4 PRI trunk channels and calls averaging 18.73 seconds in length was run for one hour. The call generator was limited to placing no more than 4 calls at a time. At the conclusion of the load test, the call generator and TOL server each reported 660 calls completed successfully.

- **Speech Enabled Automated Attendant Load Test:** A load test with a call rate of ~650 call attempts per hour using 4 PRI trunk channels and calls averaging 18.85 seconds in length was run for one hour. The call generator was limited to placing no more than 4 calls at a time. At the conclusion of the load test, the call generator and TOL server each reported 653 calls completed successfully.

- **Do Not Disturb is not supported for this solution**: When the **Voicemail Type** on IP Office is set to ***None***, there is no coverage path for Do Not Disturb. Calls to extensions with Do Not Disturb enabled will ring as busy. Esna Technologies has chosen to proceed with this configuration scenario for this solution because call forwarding provides TOL with more granularity for its presence management feature.

- **Recorded Greeting-Clipping Observation**: Either beginning or ending portions of greetings recorded on the TOL get clipped on playback. Users are advised to pause for 1 – 2 seconds prior to recording a greeting. TOL is investigating clipping of the beginning and end portion of greetings.

6. Verification Steps

The following steps may be used to verify the configuration:

- To verify network connectivity, ping all the devices depicted in **Figure 1** from the TOL PC.

- To verify TAPI is enabled on Avaya IP Office, confirm the CTI Link Pro and Wave User licenses are installed and valid via Avaya IP Office Manager (Section 3).

- To verify TOL is TAPI enabled, confirm the Avaya TAPI driver is installed and configured on the TOL (Section 4.1).

- To verify TOL is TAPI Wave enabled, confirm the Avaya TAPI Wave driver is installed and configured on the TOL (Section 4.2).

- To verify TOL is properly receiving calls, call the TOL hunt group and verify TOL answers the call and plays the appropriate greeting for the call.

7. Support

For technical support on Telephony Office-LinX, consult Esna Technologies at http://www.esnatech.com or contact the Esna Technologies Technical Support at:

- Phone: 905-707-1234
- E-mail: techsupp@esna.com

8. Conclusion

These Application Notes describe the steps for configuring Esna Technologies Telephony Office-LinX voicemail and automated attendant to work with Avaya IP Office. Except for the analog station/trunk barge-in issue and the call generator modifications described in Section 5.2, all test cases completed successfully. This solution is compliance tested for configurations using up to four TAPI WAVE ports with call rates no higher than those described in Section 5.2. Larger configurations or higher call rates should be verified prior to deployment.

9. Additional References

Product documentation for Avaya products may be found at http://support.avaya.com.

[1] "Avaya IP Office 3.2 Manager", Issue 18g, 28th June 2006

[2] "Avaya IP Office CTI Link Installation Manual", 40DHB0002UKAB – Issue 11a, 22nd September 2005

Product documentation for Esna Technologies products may be found at http://www.esnatech.com/tech_support/knowledge_base/index.asp.

[3] "Telephony Office-LinX Administrator Console"

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 Developer*Connection* Program at devconnect@avaya.com.