



## Avaya Solution & Interoperability Test Lab

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# Application Notes for Configuring SpeechSwitch Speech Enabled Automated Attendant – analog integration with Avaya IP Office - Issue 1.0

### Abstract

These Application Notes describe the procedure for configuring SpeechSwitch Speech Enabled Automated Attendant – analog integration 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 *DeveloperConnection* Program at the Avaya Solution and Interoperability Test Lab.

# 1. Introduction

These Application Notes focus on the steps required for configuring SpeechSwitch Speech Enabled Automated Attendant to work with Avaya IP Office.

The SpeechSwitch Speech-Enabled Auto Attendant (SEAA) is a stand-alone auto attendant that enables businesses to incorporate speech recognition into their current communication systems without duplicating voice mail applications. Features provided by SEAA include:

- Recognizing any name or word in the English language
- Allowing callers to barge-in on the Auto Attendant at any time
- GUI Configurable User/Extension Dictionary

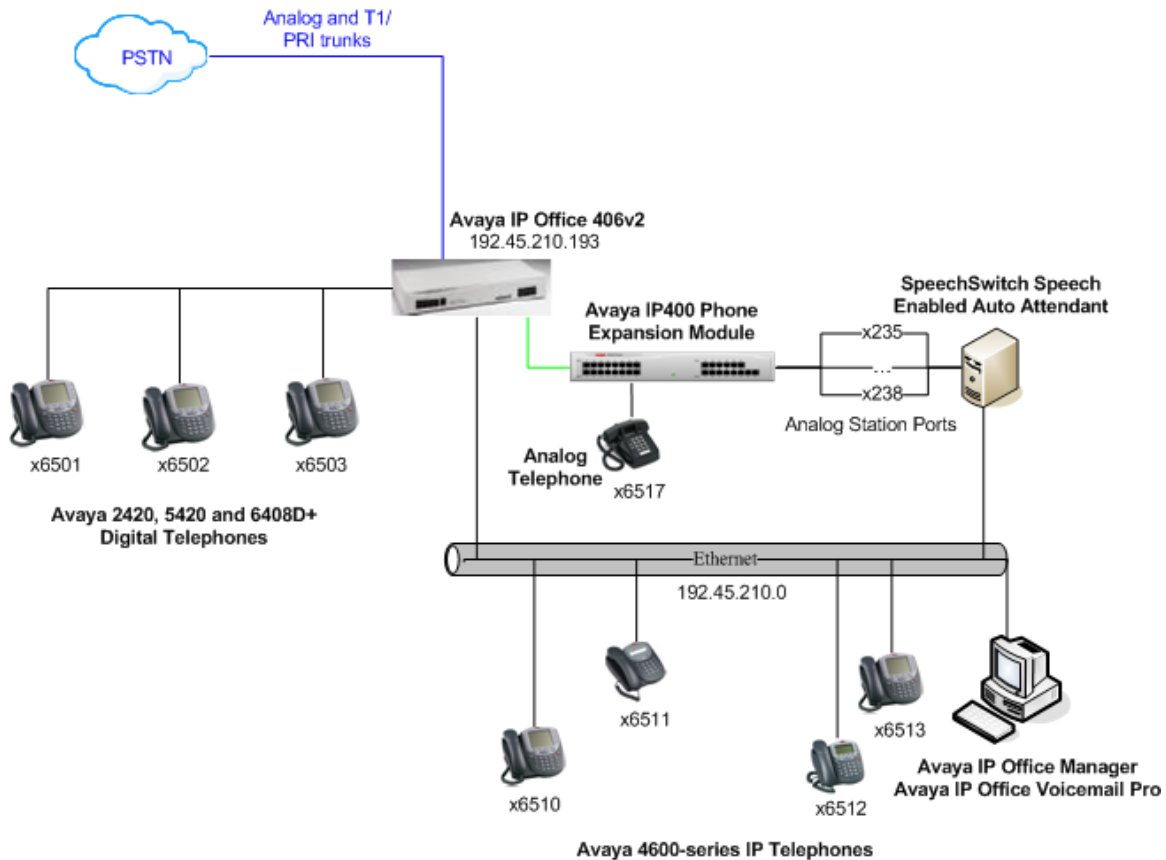
Upon initial configuration, the SEAA goes through a tuning period where it adapts to the speech levels, noise levels, and line clarity of the phone system it is using. After the initial tuning period, the success rate for recognizing names increases. The SEAA has the ability to speed up tuning, but this requires experienced SEAA operators and is not left to the end-user to configure. After three failed attempts by the caller, the SEAA will route the call to an extension defined in the SEAA as the Operator extension.

The configuration in **Figure 1** shows a network consisting of an Avaya IP Office 406v2 with Avaya IP400 Phone Expansion Module, Avaya IP Office Manager/Voicemail Pro PC, SpeechSwitch SEAA, Avaya 2420, 5420 and 6408D+ digital telephones, Avaya 4600-series IP telephones and analog telephones. Avaya IP Office has T1/PRI and analog trunks to the central office.

The SEAA interfaces with IP Office via station trunking interface using a Dialogic card. The Dialogic card is connected to analog station ports on Avaya IP Office and/or the Avaya IP400 Phone Expansion Module. IP Office is configured to route inbound calls to a hunt group made up of the analog station ports connected to the SEAA. Upon receipt of the inbound calls, the SEAA determines the destination extension via voice recognition or by the caller DTMF digits entered. The SEAA then transfers the call to the destination extension by performing a hook flash transfer – TAPI is not used in this solution. The SEAA is not a voice mail system.

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

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



**Figure 1 – Network Configuration Diagram**

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

End User Name	Extension
Khoa Bui	6501
John Yaya	6502
Marketing	6503
Kit Tankhiwale	6510
Tech Support	6511
John Finnegan	6512
John Bigbootei	6513
Returns	6517
SEAA Operator	206
<b>Hunt Group</b>	
SEAA HG	6570
<b>SEAA port Extensions</b>	
seaa 1	235

End User Name	Extension
seaa 2	236
seaa 3	237
seaa 4	238

**Table 1 – User to Extension Mapping**

## 2. Equipment and Software Validated

The following equipment and software/firmware were used for the sample configuration provided in **Figure 1**:

Equipment	Software/Firmware
Avaya IP Office 406v2	4.0(5)
Avaya IP400 Office Phone Expansion Module	6.0(5)
Avaya IP Office Manager	6.0(5)
Avaya IP Office Voicemail Pro	4.0(15)
Avaya 4600-series IP Telephones (4610SW, 4620SW)	2.3
Avaya 2420, 5420, and 6408D+ Digital Telephones	-
Avaya Analog Telephone	-
SpeechSwitch Speech Enabled Auto Attendant	3.2.0

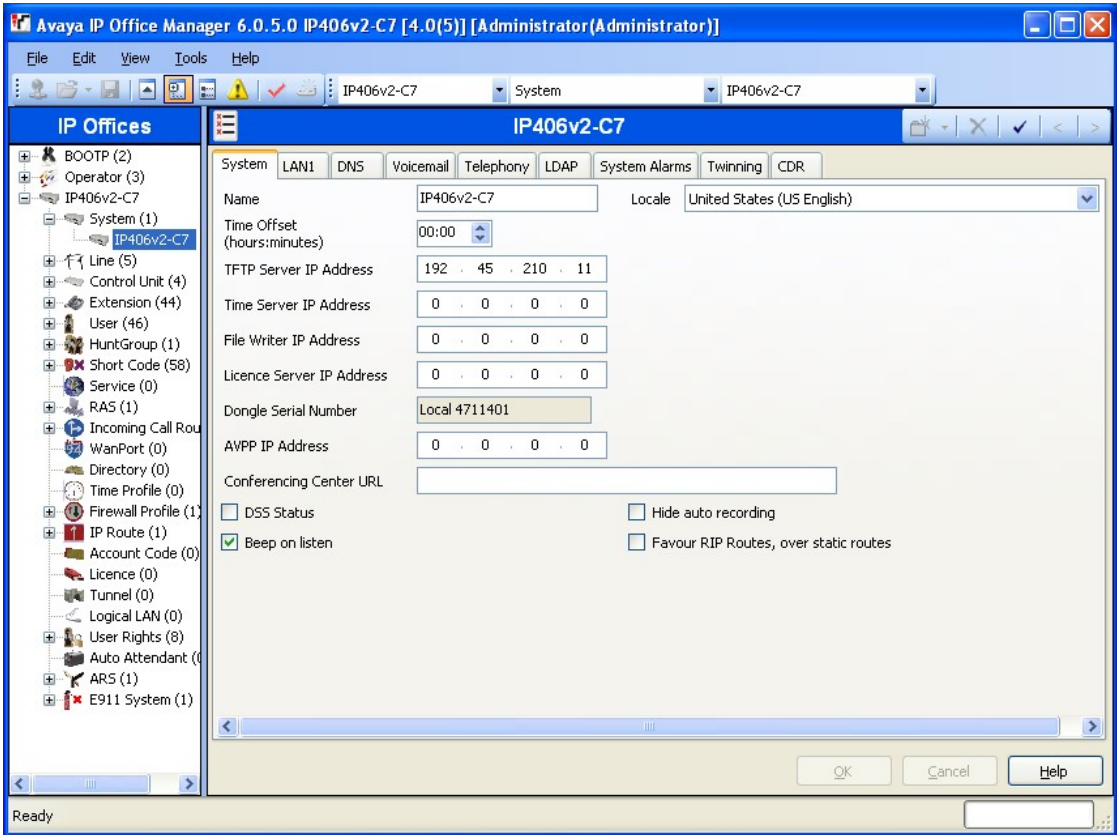
**Table 2 – Equipment and Software / Firmware Versions Validated**

## 3. Configure Avaya IP Office

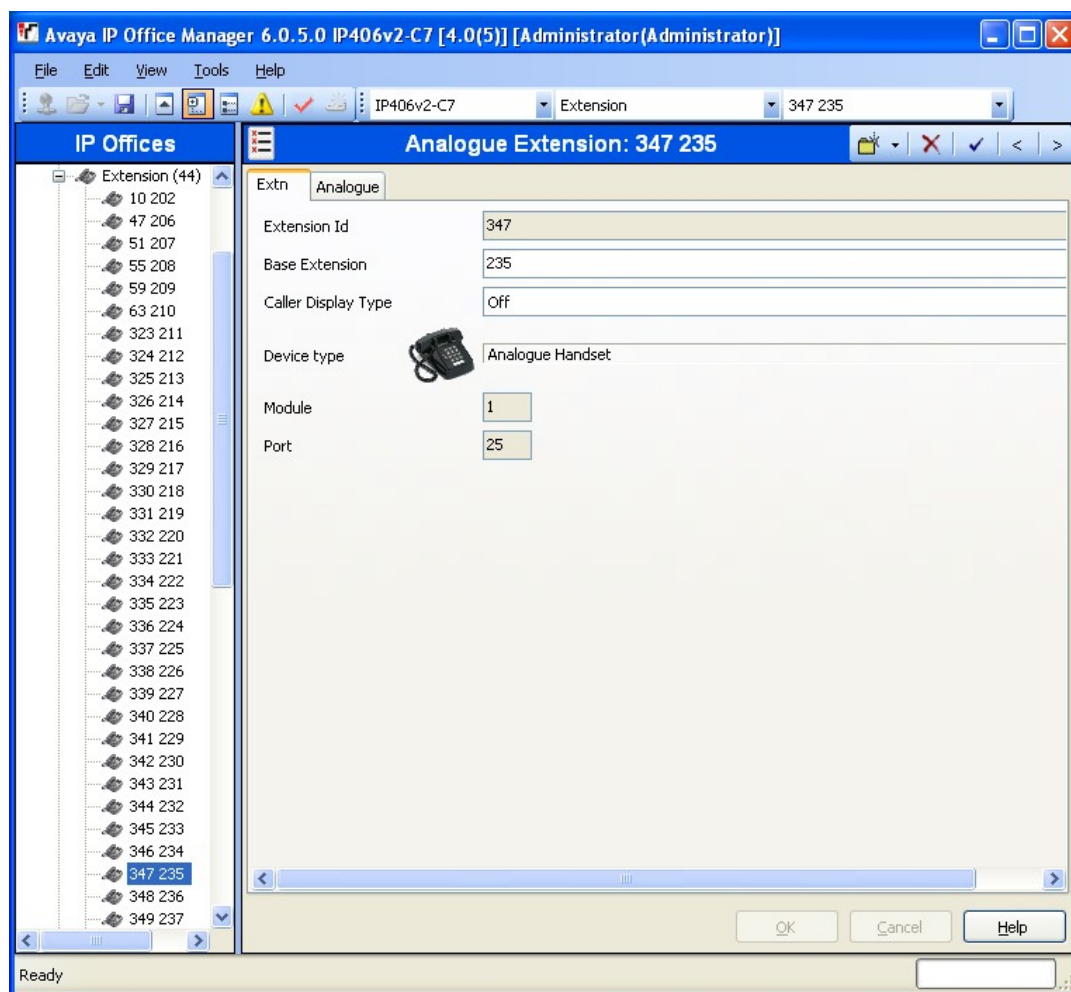
The configuration information provided in this section describes the steps required to set up Avaya IP Office for this solution.

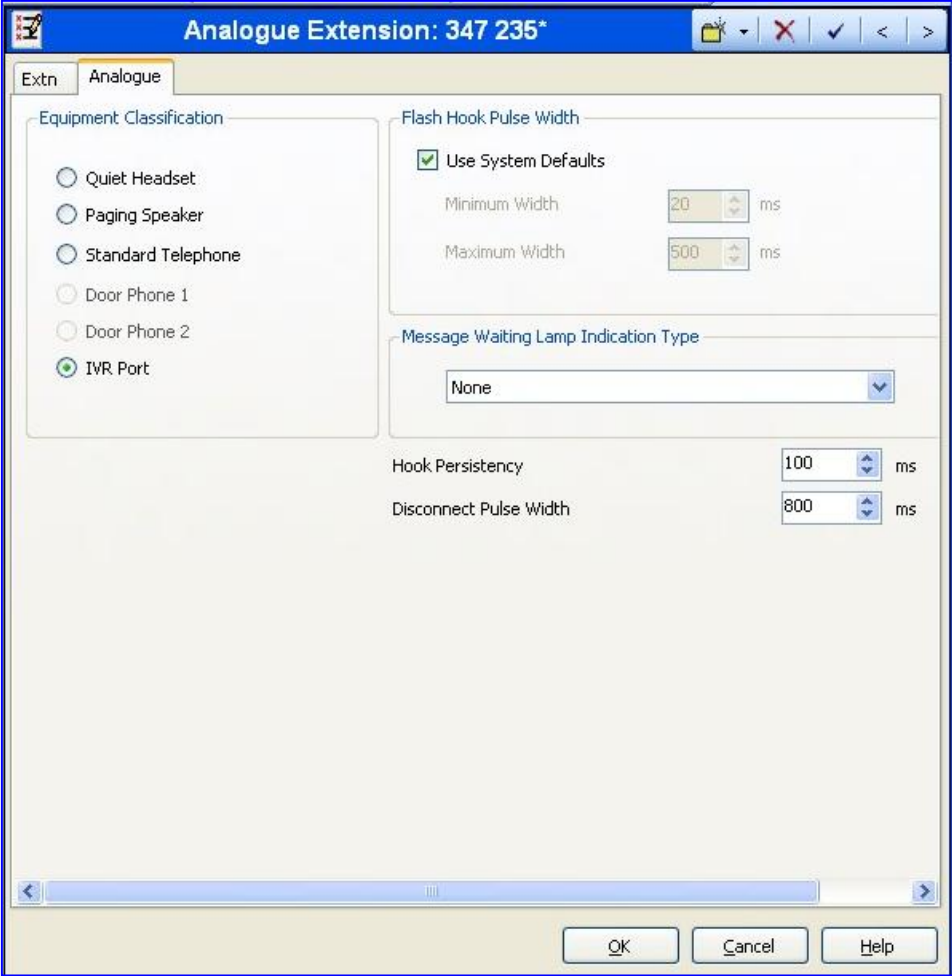
For all other provisioning information, such as Avaya IP Office installation and configuration, please refer to Avaya IP Office product documentation in reference [1].

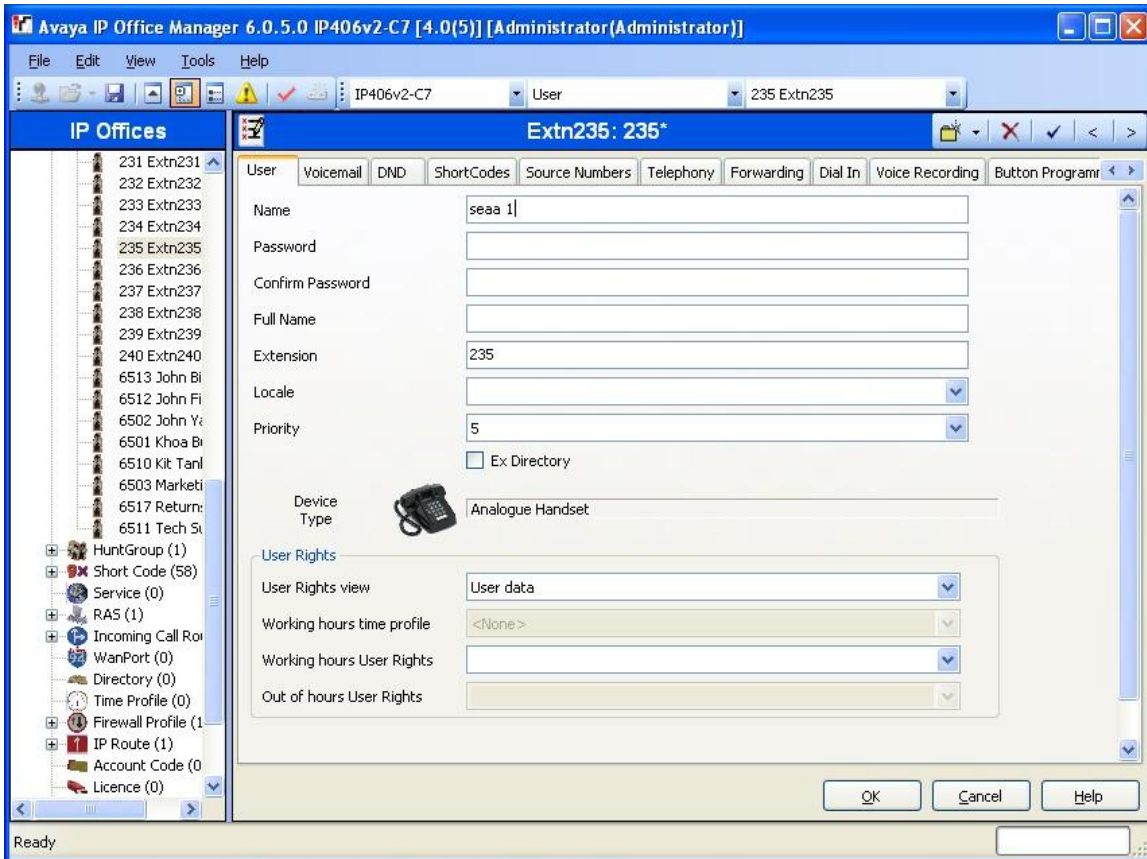
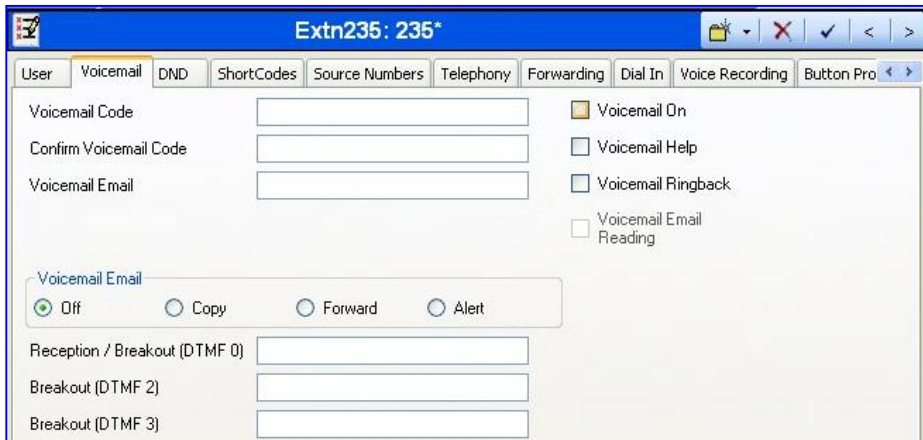
Step	Description
1.	Log into the IP Office Manager PC with the appropriate administrative privileges and go to <b>Start → All Programs → IP Office → Manager</b> to launch the Manager application.
2.	In the Manager window, select <b>File → Open Configuration...</b> to search for IP Office in the network.

Step	Description
3.	<p>Log into IP Office using the appropriate login credentials to receive its configuration.</p>  <p>The screenshot displays the Avaya IP Office Manager 6.0.5.0 interface. The title bar indicates the user is logged in as Administrator. The left-hand pane shows a hierarchical tree of system components, with 'IP406v2-C7' selected. The right-hand pane shows the configuration for this system, with the 'System' tab active. Fields include Name (IP406v2-C7), Locale (United States (US English)), Time Offset (00:00), TFTP Server IP Address (192.45.210.11), Time Server IP Address (0.0.0.0), File Writer IP Address (0.0.0.0), Licence Server IP Address (0.0.0.0), Dongle Serial Number (Local 4711401), AVPP IP Address (0.0.0.0), and Conferencing Center URL. Checkboxes for 'DSS Status', 'Beep on listen', 'Hide auto recording', and 'Favour RIP Routes, over static routes' are also visible.</p>

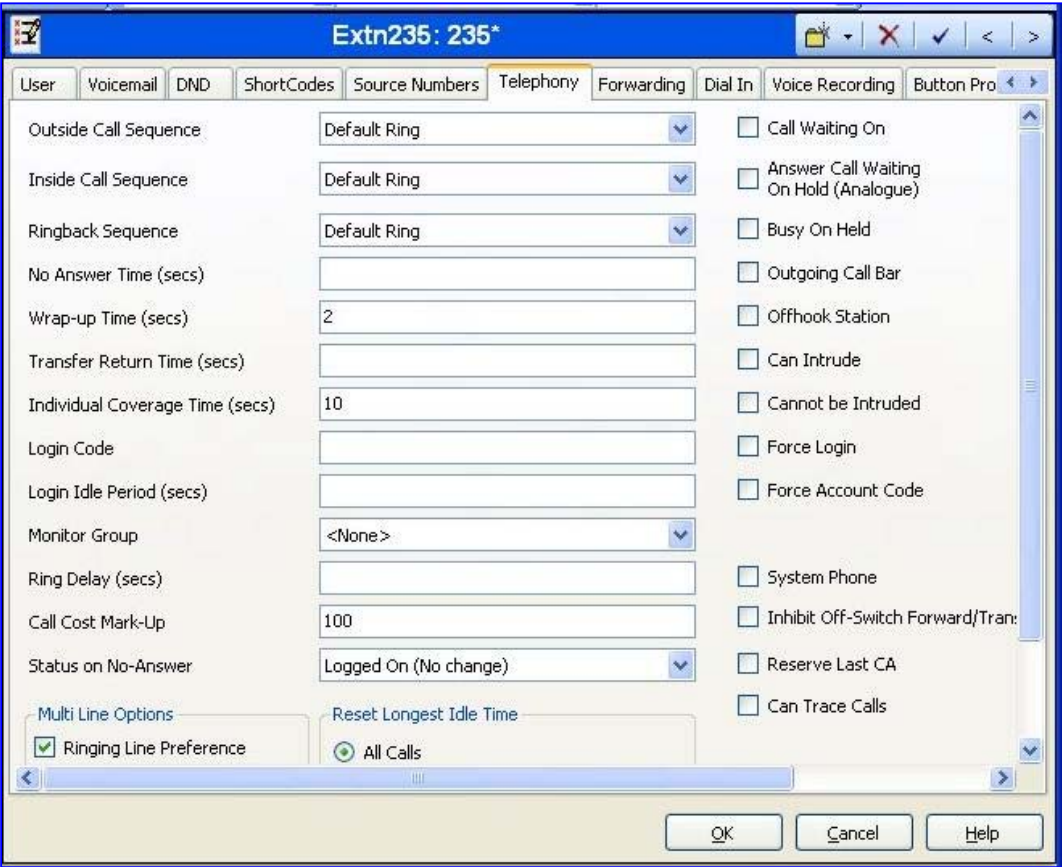
Step	Description
	Configure SEAA port extensions
4.	In the Manager window, go to the Configuration Tree in the left pane and double-click <b>Extension</b> to open the list of extensions on IP Office.
5.	In the extension list that appears, click the extension number that matches the first SEAA port extension in <b>Table 1</b> . Select the Analogue tab.



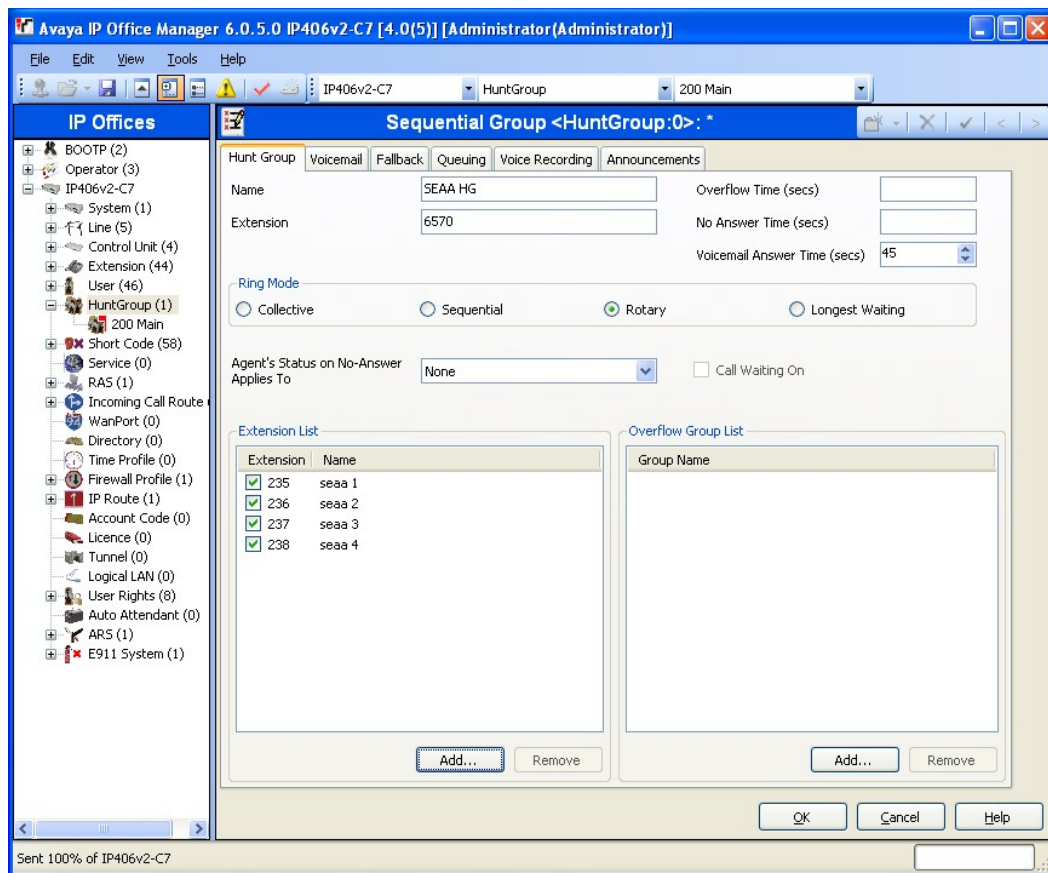
Step	Description
6.	<p>In the Analogue tab, select <b>IVR Port</b> and click <b>OK</b>.</p> 


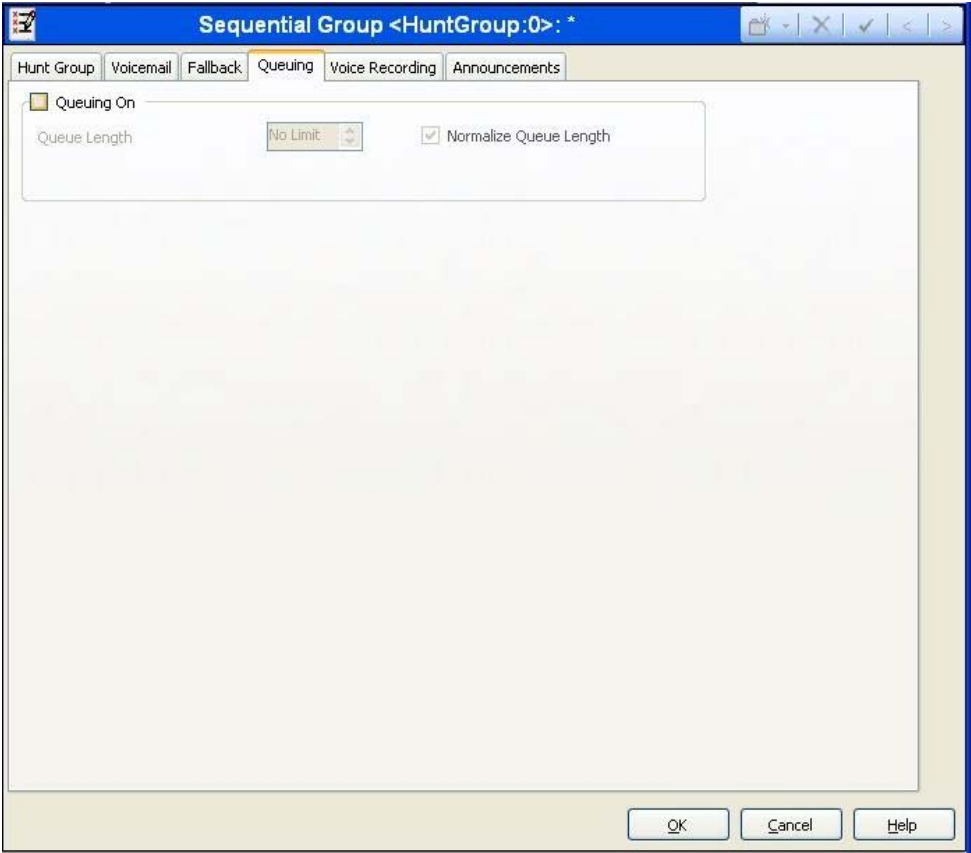
Step	Description
7.	<p>In the Manager window, go to the Configuration Tree and double-click <b>User</b> to open the list of users on IP Office. In the list of users that appears, select the extension number that matches the first SEAA port extension number in <b>Table 1</b>. In the User window that appears, set <b>Name</b> to the name of the first SEAA port extension listed in <b>Table 1</b>. Select the Voicemail tab.</p> 
8.	<p>In the Voicemail tab, uncheck <b>Voicemail On</b>. Select the Telephony tab.</p> 

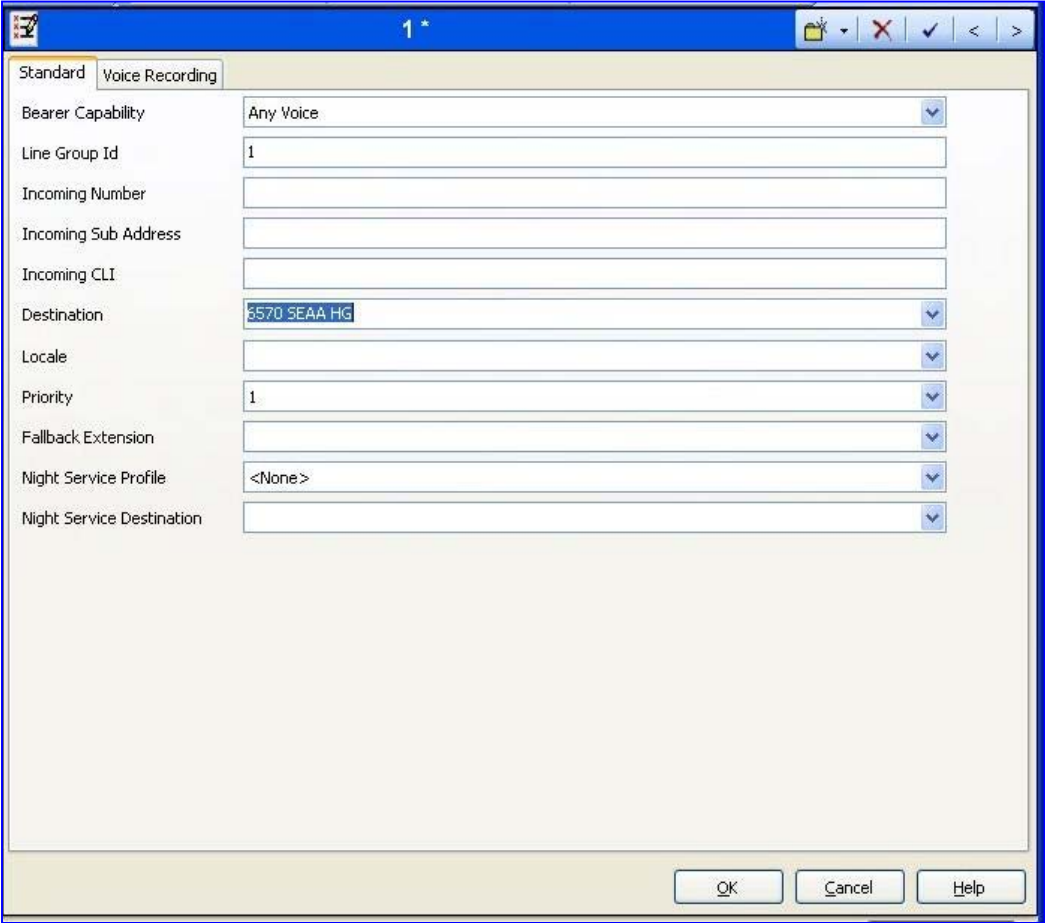


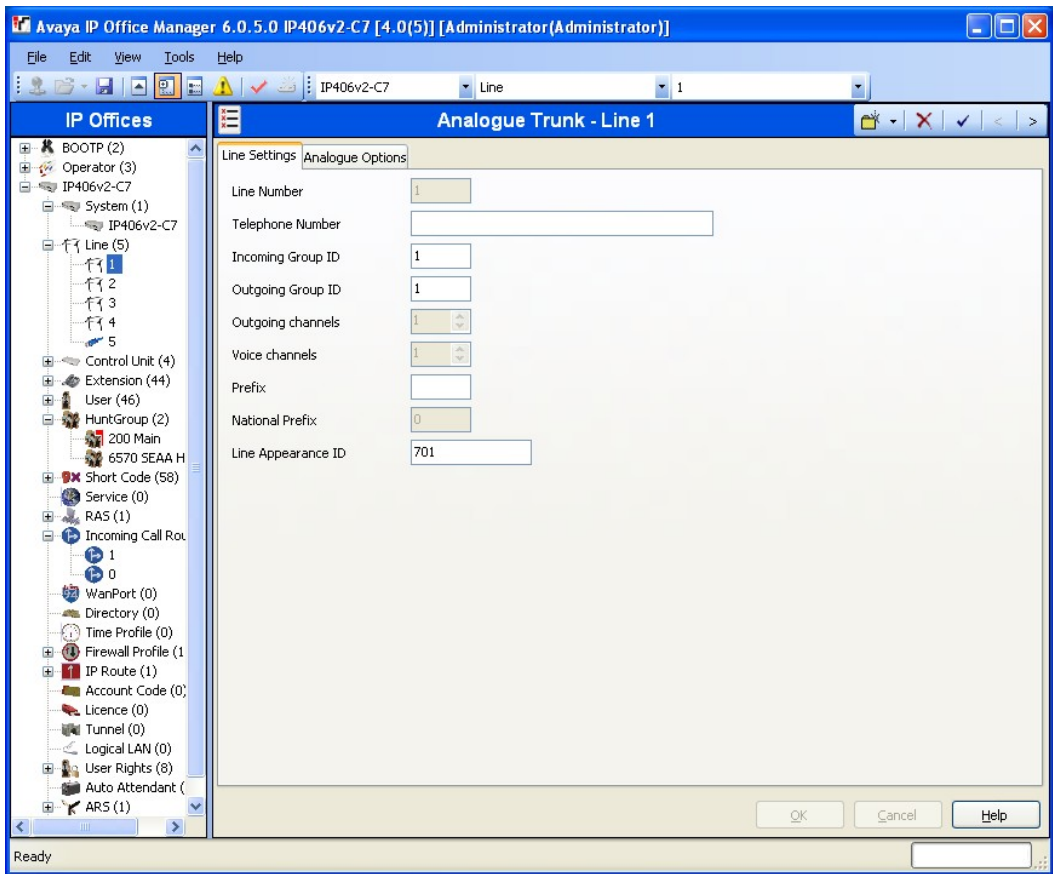
Step	Description
9.	<p>In the Telephony tab, uncheck <b>Call Waiting On</b>, uncheck <b>Answer Call Waiting On Hold (Analogue)</b>, uncheck <b>Cannot be Intruded</b> and click <b>OK</b>.</p> 
10.	<p>Repeat Steps 5 – 9 for each SEAA port extension listed in <b>Table 1</b>. For the purposes of these Application Notes, extensions 235 – 238 were configured in this manner.</p>

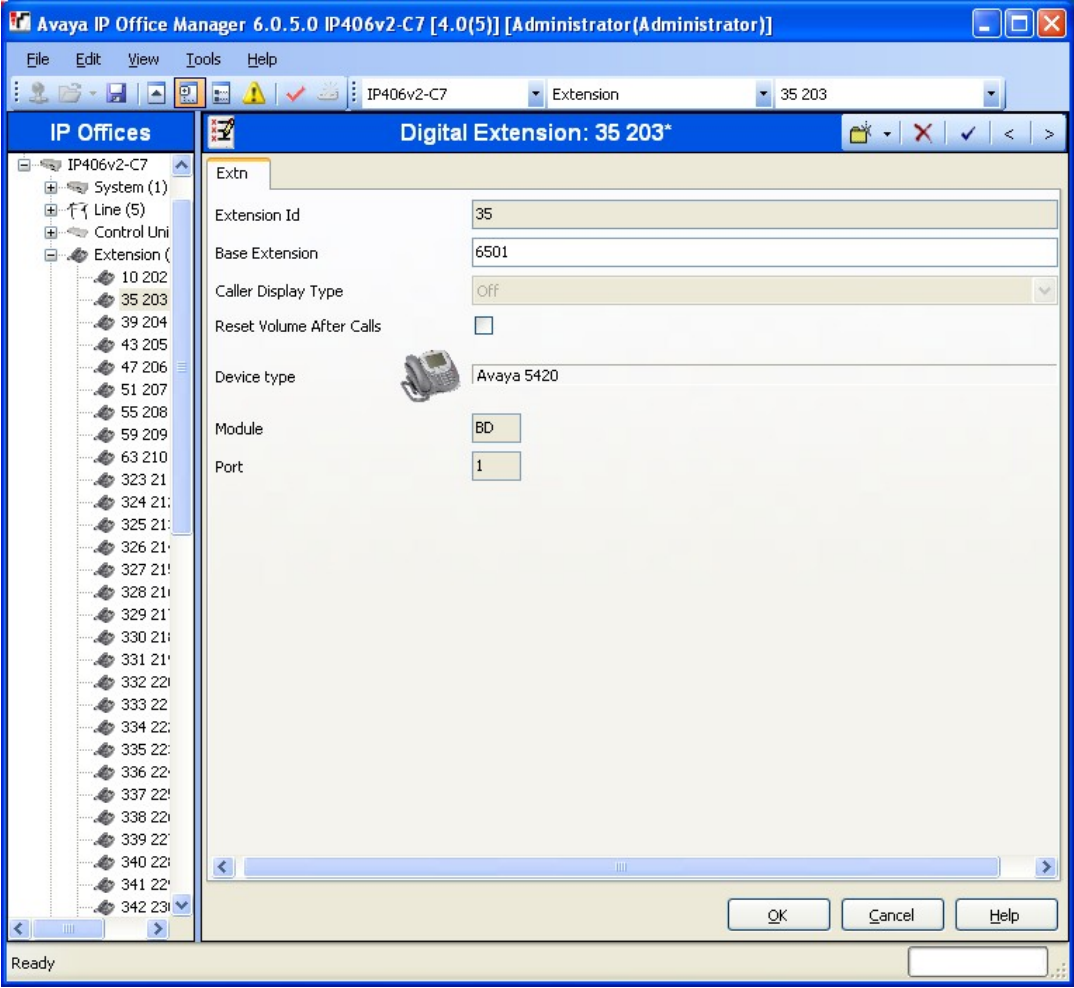
Step	Description
	Configure SEAA hunt group
11.	In the Manager window, go to the Configuration Tree, right-click <b>Hunt Group</b> and select <b>New</b> in the popup that appears.
12.	In the hunt group window that appears, set <b>Name</b> to the name of the SEAA hunt group listed in <b>Table 1</b> , set <b>Extension</b> to the extension number listed for the SEAA hunt group in <b>Table 1</b> . Add all the SEAA port extensions listed in <b>Table 1</b> to the <b>Extension List</b> . Select <b>Rotary</b> for <b>Ring Mode</b> . Select the Voicemail tab.

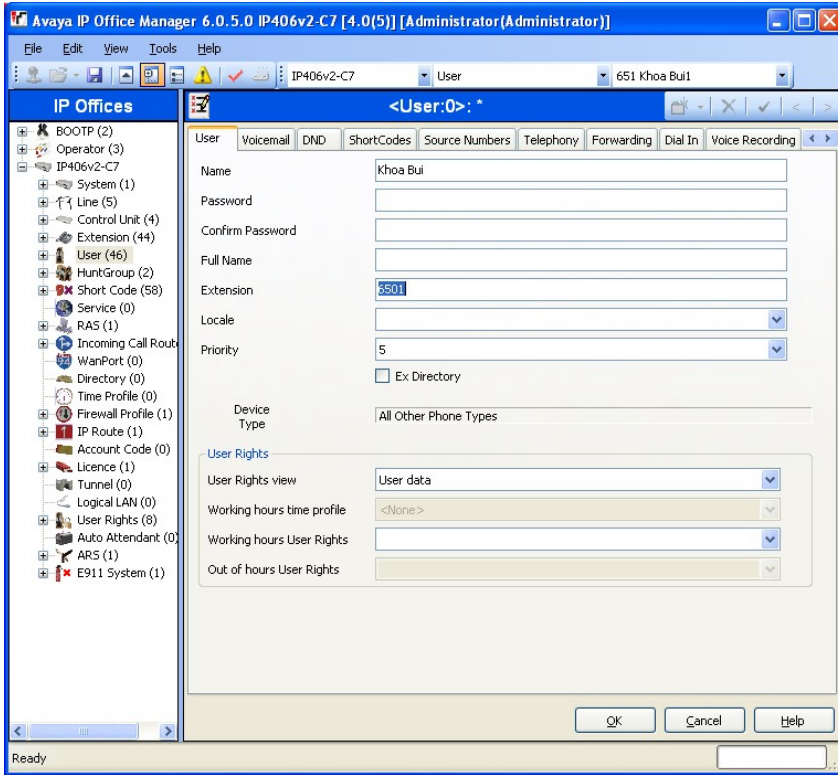


Step	Description
13.	<p>In the Voicemail tab, uncheck <b>Voicemail On</b>. Select the Queuing tab.</p>  <p>The screenshot shows the 'Sequential Group &lt;HuntGroup:0&gt;: *' dialog box with the 'Voicemail' tab selected. The 'Voicemail On' checkbox is unchecked. The 'Queuing' tab is selected, and the 'Queue Length' is set to 'No Limit' and 'Normalize Queue Length' is checked.</p>
14.	<p>In the Queuing tab, uncheck <b>Queuing On</b>. Click OK.</p>  <p>The screenshot shows the 'Sequential Group &lt;HuntGroup:0&gt;: *' dialog box with the 'Queuing' tab selected. The 'Queuing On' checkbox is unchecked. The 'Queue Length' is set to 'No Limit' and 'Normalize Queue Length' is checked.</p>

Step	Description
	Configure incoming call route to route calls to SEAA hunt group
15.	In the Manager window, go to the Configuration Tree, right-click <b>Incoming Call Route</b> and select <b>New</b> in the popup that appears.
16.	<p>In the Incoming Call Route window that appears, set <b>Line Group Id</b> to a unique number and <b>Destination</b> to <b>6570 SEAA HG</b>. Click <b>OK</b>. <b>Note:</b> Make sure no other incoming call route is configured with the same <b>Line Group Id</b>.</p> 

Step	Description
	Assign incoming call route to inbound trunks being used
17.	In the Manager window, go to the Configuration Tree and click <b>Line</b> . In the list of lines that appear, click the line (analog or digital) whose incoming calls are to be routed to the SEAA hunt group extension. For the purposes of these Application Notes, analog line <b>1</b> is selected.
18.	In the window that appears, set <b>Incoming Group ID</b> to the value used for <b>Line Group Id</b> in Step 16. A similar procedure is used on the T1/PRI lines. Click <b>OK</b> .
	 <p>The screenshot shows the Avaya IP Office Manager 6.0.5.0 interface. On the left, the 'IP Offices' tree is expanded to 'Line (5)', with 'Line 1' selected. The main window displays the 'Analogue Trunk - Line 1' configuration. The 'Line Settings' tab is active, showing the following values: Line Number: 1, Telephone Number: (empty), Incoming Group ID: 1, Outgoing Group ID: 1, Outgoing channels: 1, Voice channels: 1, Prefix: (empty), National Prefix: 0, and Line Appearance ID: 701. The status bar at the bottom indicates 'Ready'.</p>
19.	Repeat Steps 17 – 18 for each line (trunk) assigned to the Incoming Call Route.

Step	Description
	Configure user extensions
20.	In the Manager window, go to the Configuration Tree and click <b>Extension</b> . In the list of extensions that appear, click the <b>Extension Id</b> that will be assigned to the first end user listed in <b>Table 1</b> .
21.	<p>In the Extension window that appears, set <b>Base Extension</b> to the extension number of the first end user in <b>Table 1</b>. Click <b>OK</b>.</p> 
22.	In the Manager window, go to the Configuration Tree, right-click <b>User</b> and select <b>New</b> in the popup that appears.

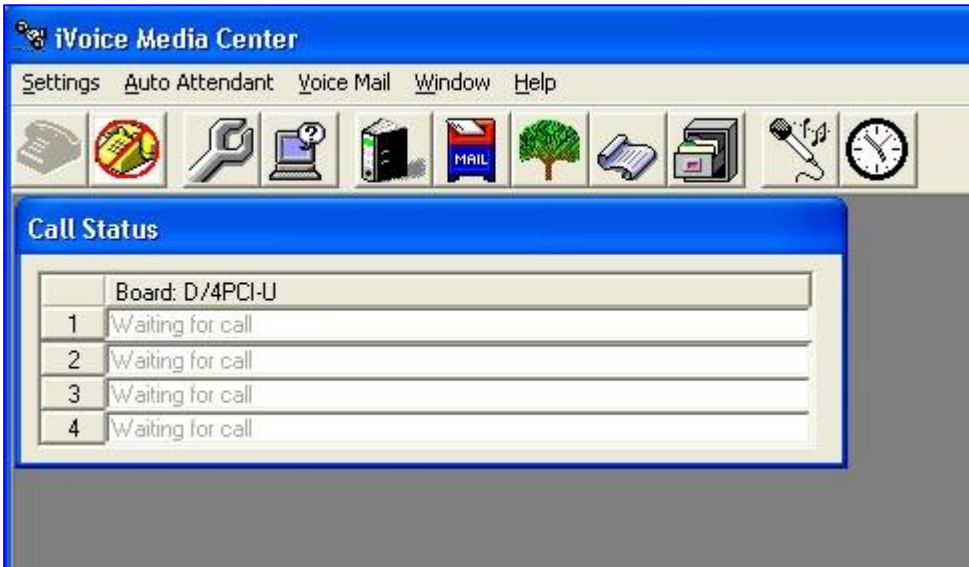
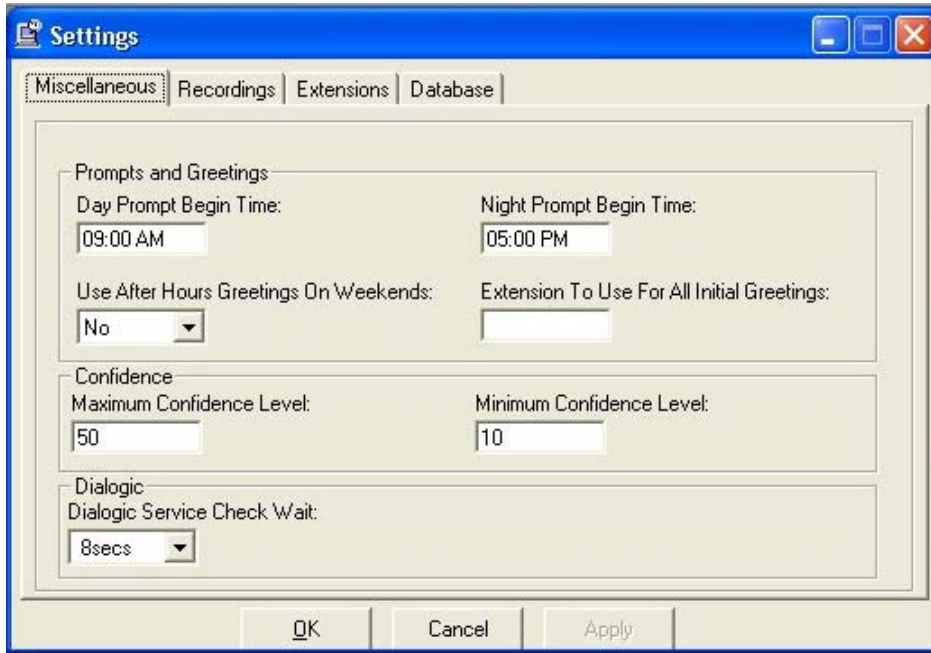
Step	Description
23.	<p>In the User window that appears, set <b>Name</b> to the name of the first end user listed in <b>Table 1</b>, set <b>Extension</b> to the extension number associated with the first end user in <b>Table 1</b>. Click <b>OK</b>.</p> 
24.	<p>Repeat Steps 20 – 23 for each end user extension listed in <b>Table 1</b>. For the purposes of these Application Notes, end user extensions 6501 – 6503, 6510 – 6513, and 6517 were created.</p>
25.	<p>In the Manager window, select <b>File</b> → <b>Save</b> to push the configuration to IP Office. In the Send Configuration popup that appears, select <b>Immediate</b> for <b>Configuration Reboot Mode</b> and click <b>OK</b>. Wait for the system to update. This completes configuration of Avaya IP Office for this solution.</p>

## 4. Configure SpeechSwitch Speech Enabled Automated Attendant

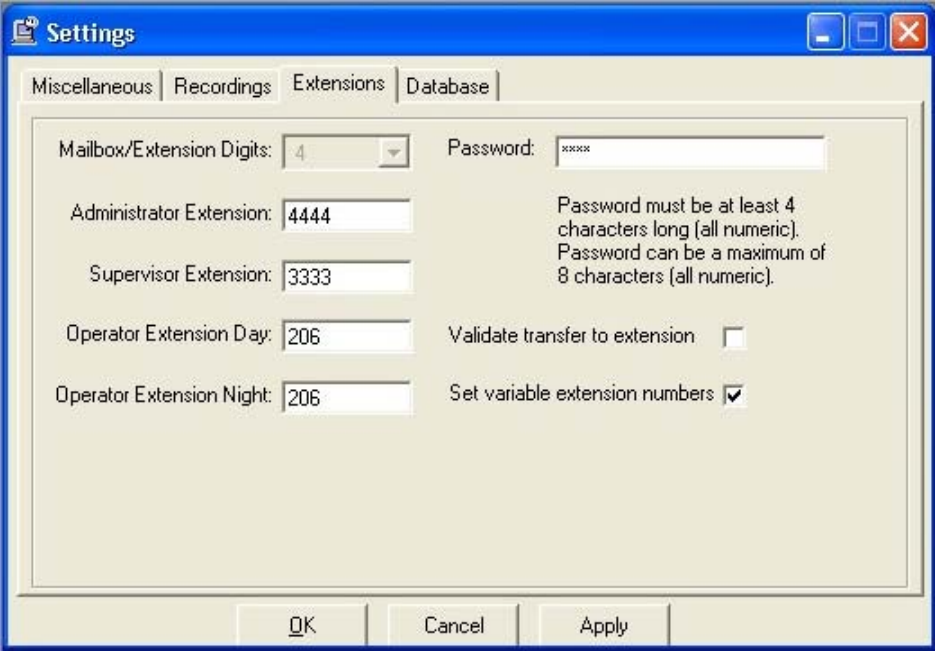

The configuration information provided in this section describes the steps required to configure SpeechSwitch SEAA to work with Avaya IP Office for this solution.

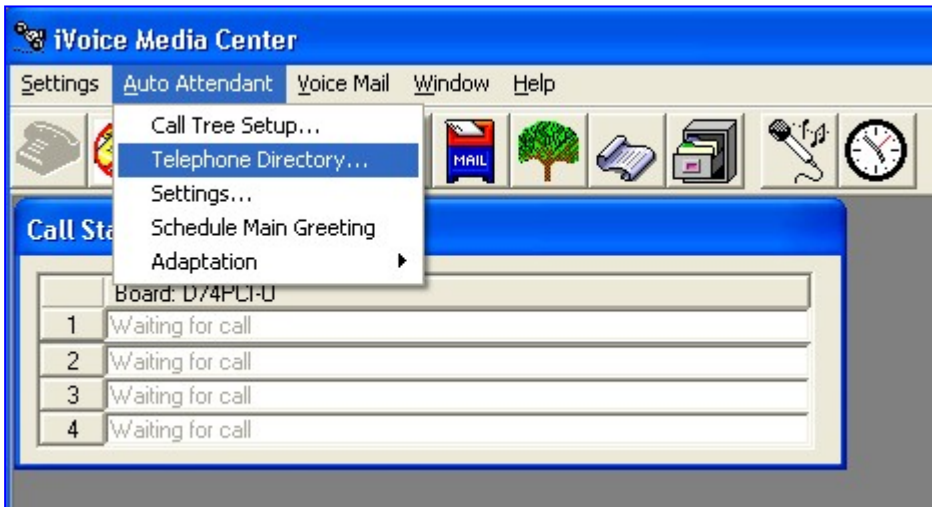
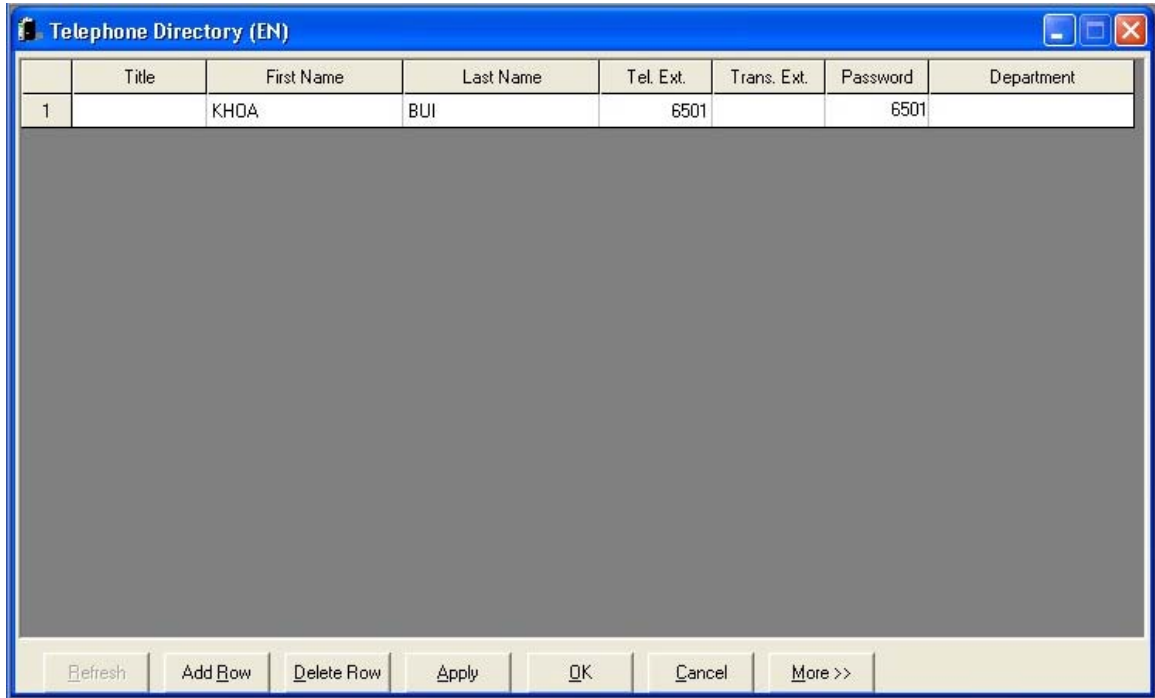
For all other provisioning information, such as software installation, installation of optional components, and/or the configuration of SEAA, please refer to the SpeechSwitch SEAA product documentation in reference [2].

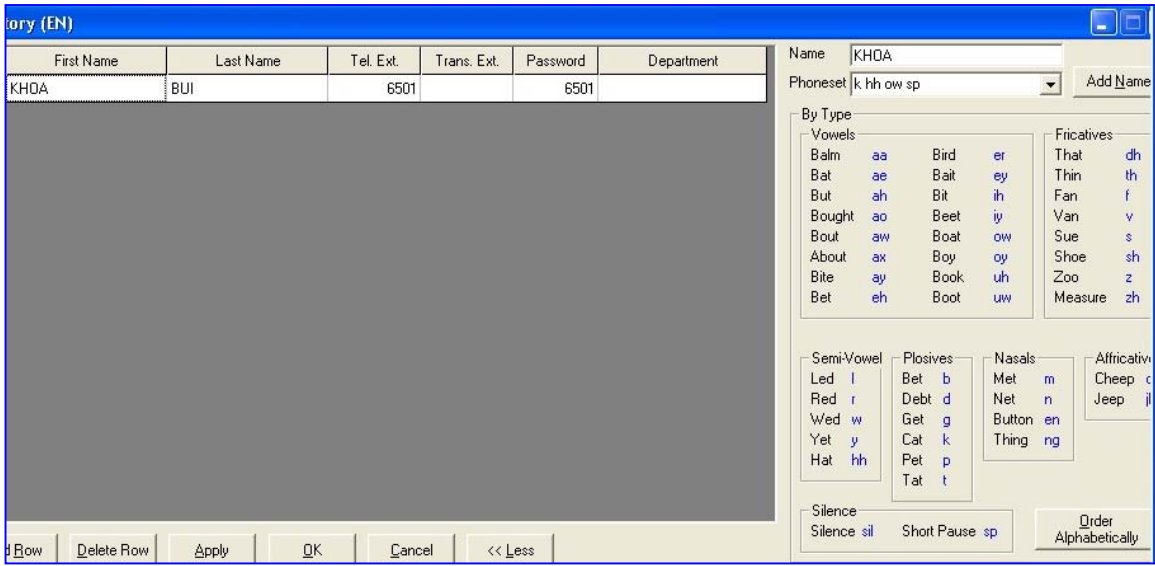



Step	Description
1.	Log into the SEAA PC with the appropriate administrative privileges and go to <b>Start → All Programs → iVoice → iVoice Media Center</b> to launch the SEAA application. <b>Note:</b> SpeechSwitch was formerly known as iVoice.
2.	<p>In the iVoice Media Center window that appears, select <b>Auto Attendant → Settings</b>.</p> 
3.	<p>In the Settings window that appears, select the Extensions tab.</p> 



Step	Description
4.	<p>In the Extensions tab, set <b>Mailbox/Extension Digits</b> to <b>4</b>, set <b>Operator Extension Day</b> to the SEAA Operator extension number defined in <b>Table 1</b>, set <b>Operator Extension Night</b> to the SEAA Operator extension number defined in <b>Table 1</b>, and check <b>Set variable extension numbers</b>. Click <b>OK</b>. <b>Note:</b> The <b>Mailbox/Extension Digits</b> field becomes grayed out when <b>Set variable extension numbers</b> is checked.</p> 
5.	<p>In the Media Center popup that appears, click <b>OK</b>.</p> 
	Recording Prompts
6.	Place an internal call to the SEAA hunt group. When the welcome greeting plays, dial the supervisor extension as defined in Step 4. When prompted, enter the supervisor password as defined in Step 4.
7.	To record the day greeting, press <b>1</b> . Press <b>2</b> to record the night greeting. For both the day and night greeting, press <b>1</b> to record, <b>2</b> to review the recording and <b>#</b> to exit.
8.	Hang up when finished.

Step	Description
	Adding User Names to the SEAA Telephone Directory
9.	<p>In the iVoice Media Center window, select <b>Auto Attendant</b> → <b>Telephone Directory</b>.</p> 
10.	<p>In the Telephone Directory window that appears, click <b>Add Row</b> to add a new row to the directory listing. In the new row that appears, set <b>First Name</b> and <b>Last Name</b> to the name of the first user listed in <b>Table 1</b>, set <b>Tel. Ext.</b> to the extension number of the first user listed in <b>Table 1</b>, and set <b>Password</b> to the extension number of the first user listed in <b>Table 1</b>. Click the <b>More&gt;&gt;</b> button.</p> 

Step	Description
11.	<p>The Telephone Directory window expands to show the Dictionary entry form on the right with the name (word) that is not in the dictionary as well as a phonetically generated pronunciation for it. Click <b>Add Name</b> to add the name to the dictionary.</p>  <p>If the name is added successfully to the dictionary, the following popup appears. Click <b>OK</b>.</p> 
12.	In the Telephone Directory window, click <b>Apply</b> to save the entry.
13.	Repeat Steps 10 – 12 for each end user listed in <b>Table 1</b> . For the purposes of these Application Notes, entries were made for the names associated with extensions 6501 – 6503, 6510 – 6513, and 6517. This completes configuration of the SEAA.

## 5. Interoperability Compliance Testing

Interoperability compliance testing examined the ability of SpeechSwitch SEAA to properly transfer inbound and internal calls to the appropriate destination extension (digital, analog, IP telephone) on IP Office regardless of whether the caller used spoken or DTMF input. Performance load testing verified the configuration to continue operating when under load.

## 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 SEAA hunt group. Upon receipt of a call at an SEAA port extension, SEAA would play the automated attendant greeting and transfer calls according to the caller's spoken input.

A load test was performed using a call generator to generate inbound calls over four channels on a PRI trunk to Avaya IP Office. Four call generator analog ports were connected to four Avaya IP Office analog station ports. Four call generator scripts were written to place calls over the PRI trunk to Avaya IP Office and select transfer to a destination extension by playing a wave file. Each wave file played the name of a different end user listed in **Table 1**. Each call generator script played a different wave file.

## 5.2. Test Results

Except for the load test issues described below, all test cases were completed successfully. Observations and/or issues made during testing are noted below.

- **Hook flash transfer**– When SEAA performs hook flash transfer (using its Intel Dialogic card), the caller will hear the hook flash followed by 2 beeps.
- **SEAA does not support \*17 as valid DTMF input** – The \*17 is the default short code for voicemail retrieval on IP Office. SEAA does not recognize \*17 as valid DTMF input. However, SEAA can be programmed with a user entry in its Telephone Directory called Voicemail so when the caller speaks 'Voicemail', the caller is transferred to voicemail.
- **Pause prior to hearing SEAA welcome greeting issue** – When a call is answered by the SEAA, there is a noticeable pause, between 2 – 5 seconds, before the caller will hear the Welcome greeting play. This can be confusing to callers who will think the call did not go through.  
**Status:** SpeechSwitch is aware of this issue and will incorporate changes in their next release to reduce this pause interval.
- **Load Test Issue (SEAA periodically did not recognize call generator wave file)** – During the first couple of load test attempts, there were instances where SEAA did not recognize the wave file played by the call generator script. In those instances, SEAA asked the caller to repeat the spoken input.  
**Workaround:** The call generator scripts were modified to first play a wave file, pause for 1 – 2 seconds, and then automatically generate the DTMF digits of the desired destination extension. This was meant to obtain a successful call transfer using DTMF input if spoken input was not successful.  
**Status:** This issue is under investigation by SpeechSwitch.

- **Load Test** – A load test with a call rate of ~532 call attempts per hour using 4 PRI trunk channels and calls averaging 18.91 seconds in length was run for one and a half hours. The call generator reported placing 793 calls, SEAA reported placing 743 blind transfers, and IP Office System Monitor reported completing 712 transfers.
  - **Issue 1: Mixed length extensions** – There were instances where the SEAA failed to transfer a call even though according to the logs, SEAA recognized the DTMF input. SpeechSwitch suspects that modifications introduced to support mixed length extensions may have contributed to the disparity in the numbers reported by the call generator and SEAA.
  - **Status:** This issue is under investigation by SpeechSwitch.
  - **Issue 2 (Blind transfers not always successful)** – There were some blind transfers performed by SEAA that were not completed successfully. Of the 743 blind transfers reported by SEAA, IP Office System Monitor reported 712 were completed.
  - Status:** This issue is under investigation by SpeechSwitch.

## 6. Verification Steps

The following steps may be used to verify the configuration:

- To verify the SEAA hunt group is operating properly: connect analog phones to all analog station ports assigned to the hunt group and call the hunt group. Verify one of the phones rings.
- To verify the SEAA is operating properly for internal calls: place a call to the SEAA hunt group. Verify the SEAA Welcome greeting plays and either speak a name or department, or enter the DTMF of a valid extension on IP Office. Verify the call is transferred to the correct extension.
- To verify the SEAA is operating properly for external calls: place a call to IP Office through one of the trunks assigned to the SEAA hunt group. Verify the SEAA Welcome greeting plays and either speak a name or department, or enter the DTMF of a valid extension on IP Office. Verify the call is transferred to the correct extension.

## 7. Support

For technical support on Speech Enabled Automated Attendant, consult SpeechSwitch at [www.speechswitch.com](http://www.speechswitch.com) or contact the SpeechSwitch Technical Support at:

- Phone: (732) 441-7700 x129 or say “Tech Support”
- E-mail: [techsupport@ivoice.com](mailto:techsupport@ivoice.com)

## 8. Conclusion

These Application Notes describe the steps for configuring SpeechSwitch Speech Enabled Automated Attendant to work with Avaya IP Office. Except for the load test issues described in Section 5.2, all test cases completed successfully.

## 9. Additional References

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

[1] Avaya IP Office 4.0 Manager: 02. Configuration Settings, Issue 19k, 22<sup>nd</sup> January 2007

The following SpeechSwitch documentation is provided in the Installation CD:

[2] SpeechSwitch Speech Enabled Automated Attendant System Guide, Version 3.1.0

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