



Avaya Solution & Interoperability Test Lab

Application Notes for KnoahSoft Harmony with Avaya IP Office – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for KnoahSoft Harmony to interoperate with Avaya IP Office. KnoahSoft Harmony is a solution that can provide monitoring, recording, quality assurance, reporting, and analytic features for contact centers. The compliance testing focused on the call recording feature.

In the compliance testing, KnoahSoft Harmony used the TAPI interface from Avaya IP Office to obtain information on calls, the SNMP interface from Avaya IP Office to map IP addresses to extensions, and the port mirroring method to capture the media associated with the monitored agents for call recording.

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.

1. Introduction

These Application Notes describe the configuration steps required for KnoahSoft Harmony to interoperate with Avaya IP Office. KnoahSoft Harmony is a solution that can provide monitoring, recording, quality assurance, reporting, and analytic features for contact centers. The compliance testing focused on the call recording feature.

In the compliance testing, KnoahSoft Harmony used the TAPI interface from Avaya IP Office to obtain information on calls, the SNMP interface from Avaya IP Office to map IP addresses to extensions and the port mirroring method to capture the media associated with the monitored agents for call recording.

KnoahSoft Harmony uses the TAPI 2 function calls in third party mode from the TAPI 3 client to monitor agents on Avaya IP Office. The agents are configured as users on Avaya IP Office. When a call is delivered to an agent on Avaya IP Office, KnoahSoft Harmony is informed of the call via call events from the Avaya TAPI interface, and starts the call recording by using the replicated media from the port mirroring method. The mapping of IP addresses in the media packets to extensions in the TAPI events are accomplished using the SNMP Get function. The Avaya TAPI call events are also used to determine when to stop the call recordings.

1.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing. The feature testing focused on verifying the following on KnoahSoft Harmony:

- Handling of TAPI call events from Avaya IP Office.
- Use of SNMP Get function from Avaya IP Office for proper mapping of telephone IP addresses to agent extensions.
- Proper recording, logging, and playback of calls for scenarios involving inbound, outbound, internal, external, hunt group, non-hunt group, hold, reconnect, simultaneous calls, conference, and transfer.

The serviceability testing focused on verifying the ability of KnoahSoft Harmony to recover from adverse conditions, such as disabling/re-enabling the network connection to the KnoahSoft Harmony server.

1.2. Support

Technical support on the KnoahSoft Harmony can be obtained through the following:

- **Phone:** (650) 385-6795
- **Email:** support@knoahsoft.com
- **Web:** <http://www.knoahsoft.com/support.html>

2. Reference Configuration

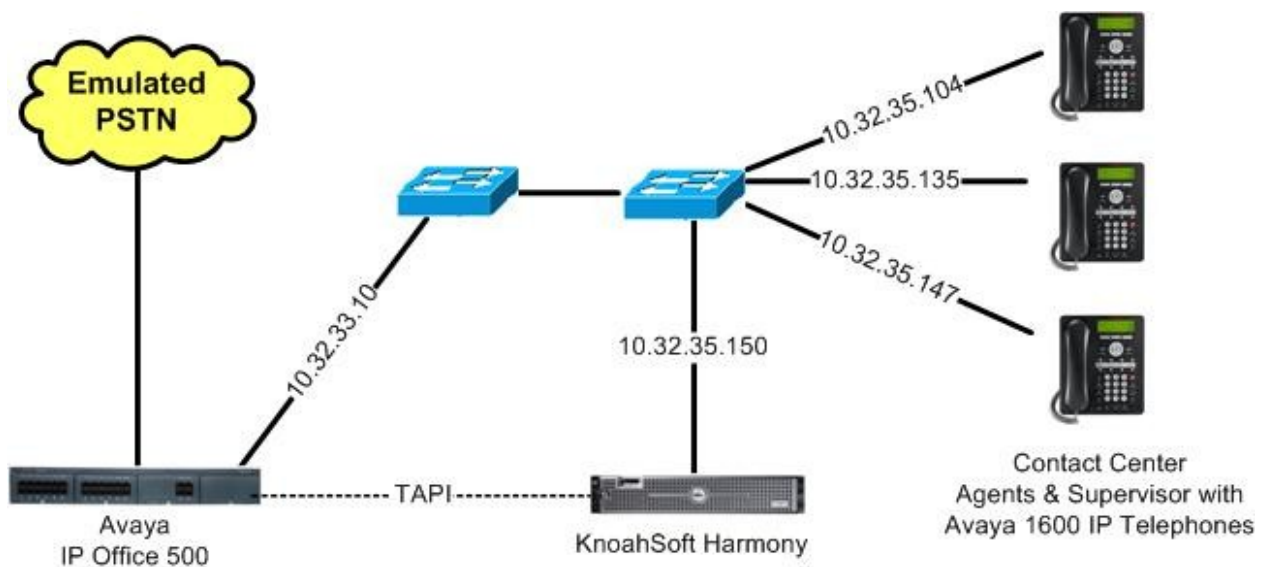
KnoahSoft Harmony can be configured on a single server or with components distributed across multiple servers. The compliance test used a single server configuration, as shown below.

In the compliance testing, the RTP stream for the contact center agents on Avaya IP Office with Avaya IP Telephones, were mirrored from the layer 2 switch and replicated over to the Knoahsoft Harmony server.

The detailed administration of contact center devices is not the focus of these Application Notes and will not be described. In addition, the port mirroring of the layer 2 switch is also outside the scope of these Application Notes and will not be described.

In the compliance testing, the contact center devices consisted of a hunt group, a supervisor, and two agents shown in the table below. KnoahSoft Harmony monitored the agent extensions.

Device Type	Extension
Hunt Group	25555
Supervisor	21254
Hot Desking Agent	25001
Non Hot Desking Agent	25002



3. Equipment and Software Validated

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

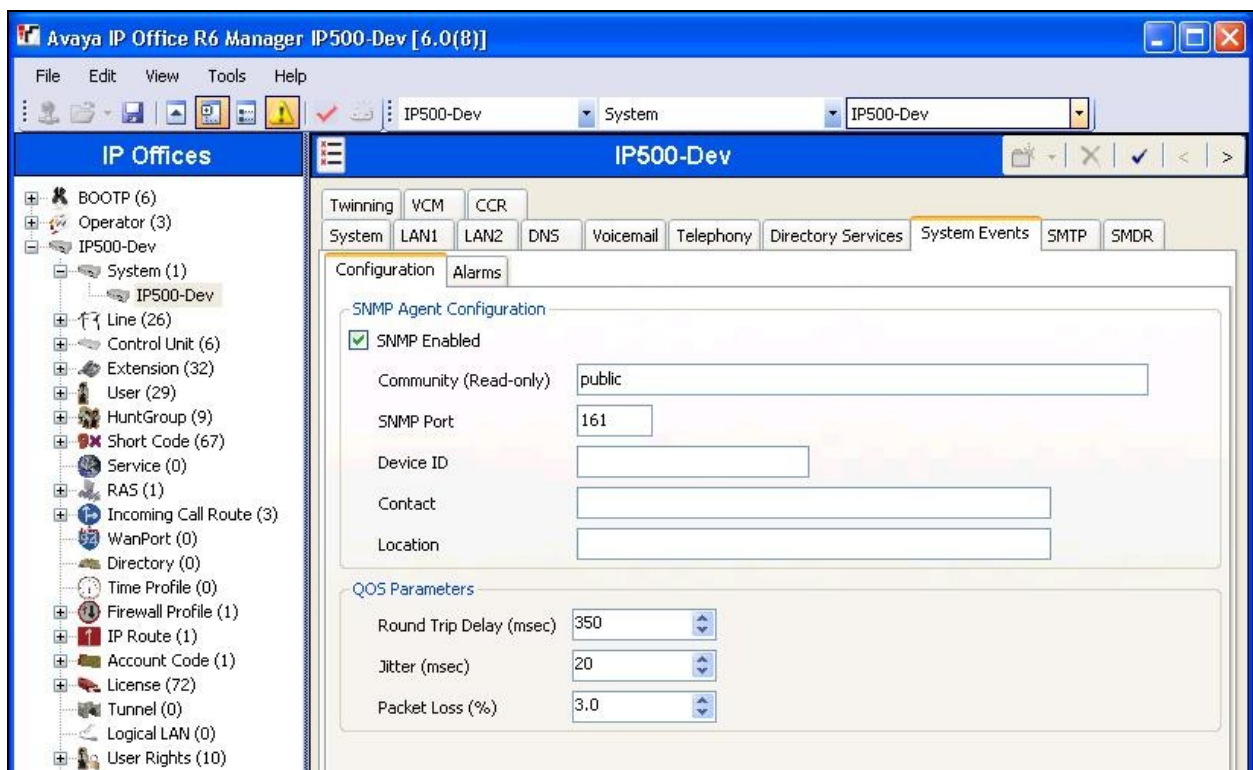
Equipment	Software
Avaya IP Office IP500	6.0 (8)
Avaya 1600 Series IP Telephones (H.323)	1.21
KnoahSoft Harmony on Windows 2003 Server with Service Pack 2	3.0
• TAPI Adapter	3.0.1 (06162010_0011)
• Web Application Server	4.2.3
• Avaya IP Office TAPI3 Driver (tspi3w)	1.0.0.17

4. Configure Avaya IP Office

This section provides the procedures for configuring SNMP on Avaya IP Office.

From a PC running the Avaya IP Office Manager application, select **Start > Programs > IP Office > Manager** to launch the Manager application. Select the proper IP Office system, and log in with the appropriate credentials.

The **Avaya IP Office R6 Manager** screen is displayed. From the configuration tree in the left pane, select **System** to display the **IP500-Dev** screen in the right pane. Select the **System Events** tab, followed by the **Configuration** sub-tab. Check the **SNMP Enabled** field, and retain the default values in the remaining fields.



5. Configure KnoahSoft Harmony

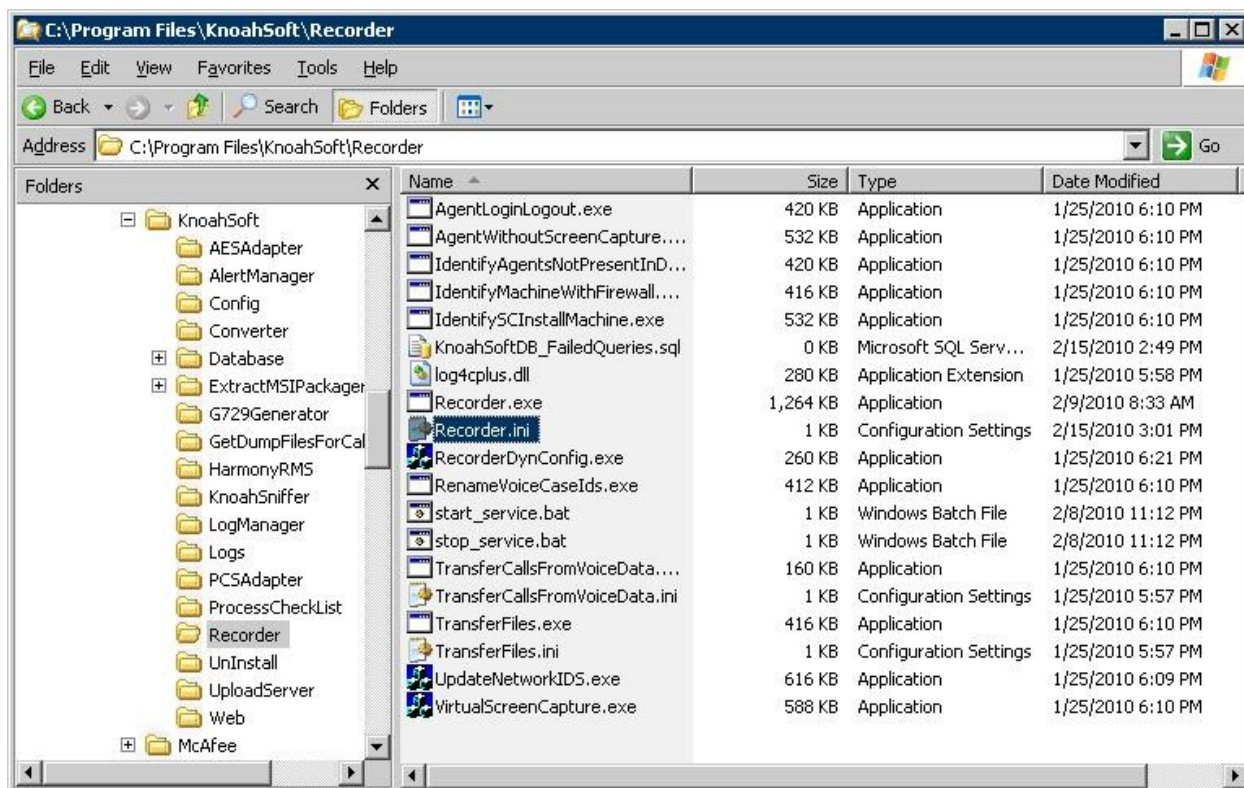
This section provides the procedures for configuring KnoahSoft Harmony. The procedures include the following areas:

- Administer Recorder.ini
- Administer TAPIAdapter.ini
- Launch Harmony web interface
- Administer supervisors
- Administer agents
- Administer TAPI driver

The configuration of Harmony is performed by KnoahSoft installers and partners. The procedural steps are presented in these Application Notes for informational purposes.

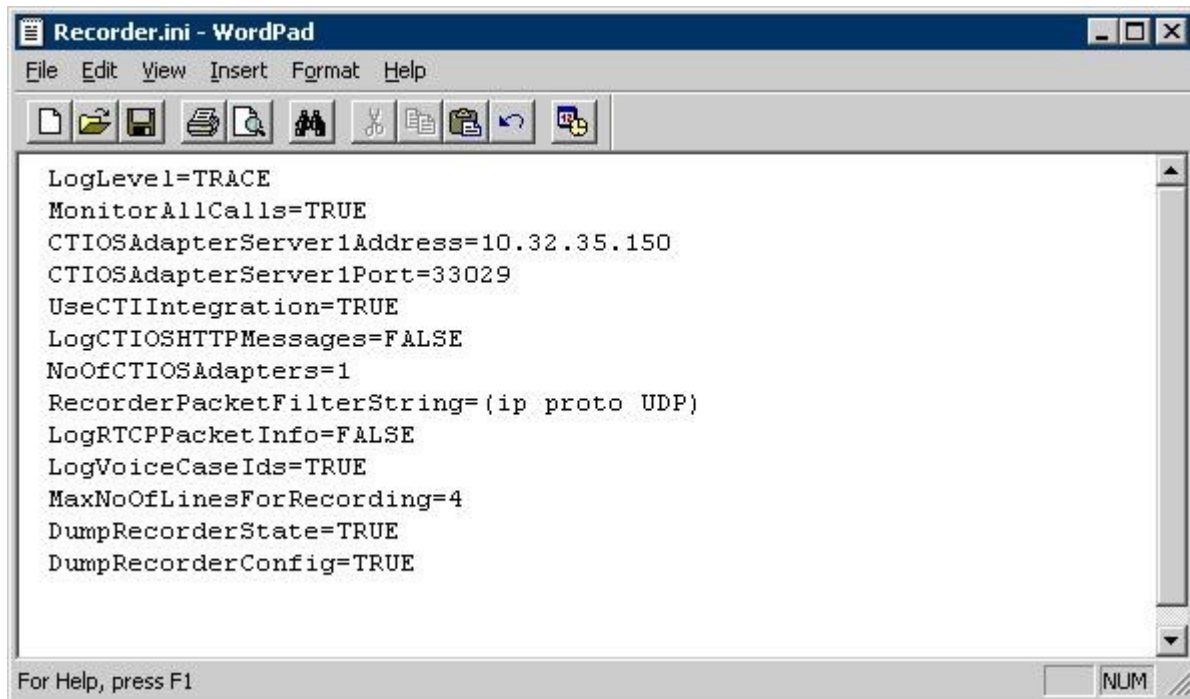
5.1. Administer Recorder.ini

From the Harmony server running the Recorder service, navigate to the **C:\Program Files\KnoahSoft\Recorder** directory to locate the **Recorder.ini** file shown below.



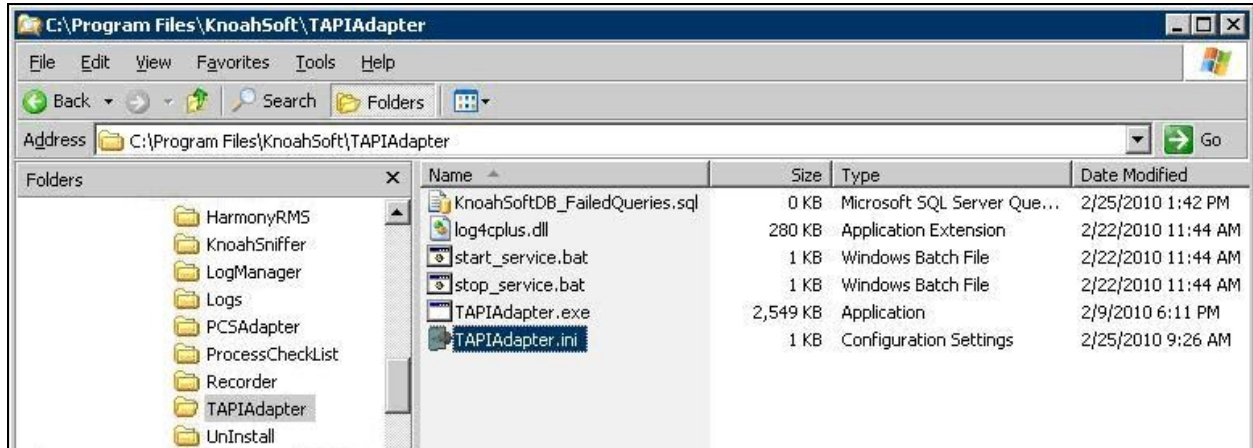
Open the **Recorder.ini** file with the WordPad application. Enter the following values for the specified fields, and retain the default values for the remaining fields.

- **CTIOSAdapterServer1Address:** IP address of server with the TAPI Adapter component.
- **CTIOSAdapterServer1Port:** "33029"
- **UseCTIIIntegration:** "TRUE"
- **LogCTIOSHTTPMessages:** "FALSE"
- **NoOfCTIOSAdapters:** "1"



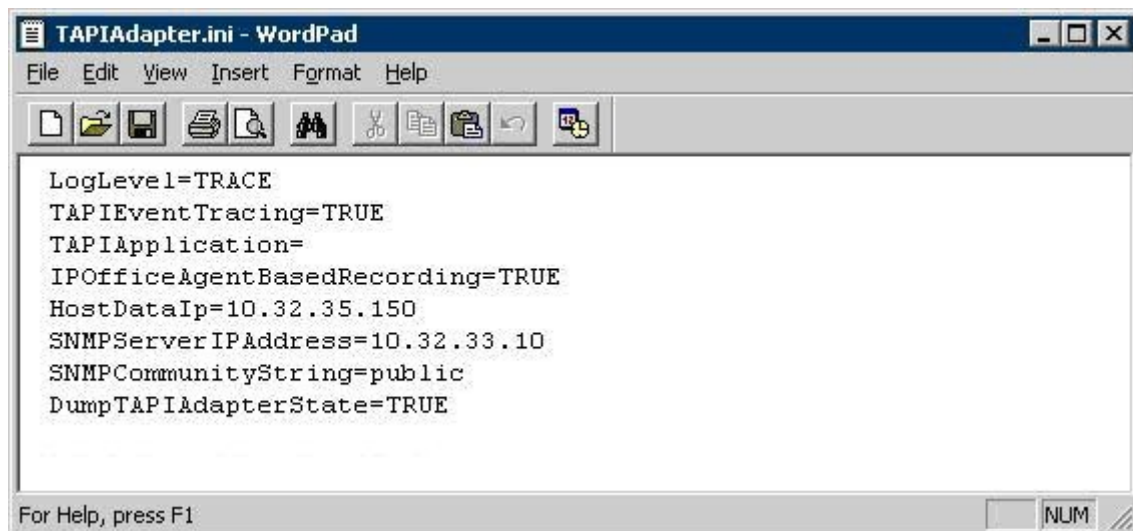
5.2. Administer TAPIAdapter.ini

From the Harmony server running the TAPI Adapter component, navigate to the **C:\Program Files\KnoahSoft\TAPIAdapter** directory to locate the **TAPIAdapter.ini** file shown below.



Open the **TAPIAdapter.ini** file with the WordPad application. Add the following parameters and values.

- **IPOfficeAgentBasedRecording:** "TRUE"
- **HostDataIp:** IP address of server with the TAPI Adapter component.
- **SNMPServerIPAddress:** IP address of Avaya IP Office.
- **SNMPCommunityString:** Community string from **Section 4**.
- **DumpTAPIAdapterState:** "TRUE"



5.3. Launch Harmony Web Interface

Launch the Harmony web interface by using the URL “https://ip-address:8080/knoahsoft” in an Internet browser window, where “ip-address” is the IP address of the Harmony server running the Web Application Server component.

The **Welcome to Harmony** screen is displayed. Log in using the administrator credentials.



5.4. Administer Supervisors

The **Harmony** screen is displayed. Select the **Employee Management** tab. Enter desired values for **Employee Code**, **Employee First Name**, **Email**, **Alias**, **Employee Last Name**, and **Network Id**. Retain the default values for **Status** and **Hire Date**, and check **Is a Harmony User**.

Select the desired values for **Location**, **Department**, and **Designation**. Check the desired boxes for **Client/Sites**, **Work Type**, and **Access to**. The screenshot below shows the settings used for the compliance testing.

The screenshot displays the Harmony web application interface for Employee Management. The top navigation bar includes the Harmony logo, "Powered by KnoahSoft", and user information: "Jun 15, 2010 08:14 AM (EST)", "Admin (Administrator)", and links for "Broadcast", "Change Password", "Log-out", "Help", and "About Us". The main navigation tabs are "Administration", "Organization", "Work Type", "Employee Management" (selected), "Voice Configuration", "Custom Groups", and "Message Thresholds".

The "Employee Management" section contains a search bar with "Employee Code" selected and a "Go" button. Below it is a table with columns "Employee Code" and "Employee Name", and a "Search for Employees" button. To the right, there are license counts: "Agent License - 0 / 90" and "Seat License - 0 / 30", and a "Photo Upload" button with a "Browse..." link.

The main form area is divided into several sections:

- Employee Details:** Fields for Employee Code (101), Employee First Name (Supervisor), Employee Last Name (KnoahSoft), Email (super@test.com), Status (Active), Alias (super), Hire Date (06/15/2010), and Network Id (super).
- Is a Harmony User?** A checkbox that is checked, with "Reset Password" and "Release Lock" buttons.
- Reporting Profile:** A dropdown menu showing "My Site".
- Recording Rules:** A dropdown menu showing "IT".
- User Feature Permissions:** A dropdown menu showing "Supervisor".
- Report Feature Permissions:** A dropdown menu showing "Supervisor".
- Client/Work Type:** A section with two sub-sections:
 - Client/Sites:** A checkbox for "My Client[My Site]" which is checked.
 - Work Type:** Two checkboxes for "INBOUND [MYCLI/MSITE]" and "OUTBOUND [MYCLI/MSITE]", both of which are checked.
- List of Groups:** A section with two sub-sections:
 - Belongs to:** An empty list box.
 - Access to:** A checkbox for "SUPERVISOR_GROUP" which is checked.

At the bottom of the form, there are three buttons: "Save", "Save & Add New", and "Add New".

Select step 2 **Recording Rules**. Click **Delete Extension** toward the bottom of the screen, as supervisor extensions are not monitored by Harmony. Retain the default values in the remaining fields.

The screenshot shows the Harmony Employee Management interface. The top navigation bar includes 'Administration', 'Organization', 'Work Type', 'Employee Management' (selected), 'Voice Configuration', 'Custom Groups', and 'Message Thresholds'. The 'Employee Management' section is active, showing a search bar, a photo upload button, and a progress bar with four steps: 1. Reporting Profile, 2. Recording Rules (selected), 3. User Feature Permissions, and 4. Report Feature Permissions. Below the progress bar, there is a table for 'Voip Extensions and Recording Rules' with columns: Extension, Enable Recording, Recording Type, No of Calls (Recording), Enable Screen Capture, Screen Capture Type, No of Calls (Screen Capture), Screen Capture Interval (in sec), and Call Type. The table has one row with the following values: Extension (Delete Extension), Enable Recording (checkbox), Recording Type (Continuous), No of Calls (Recording) (All), Enable Screen Capture (checkbox), Screen Capture Type (Continuous), No of Calls (Screen Capture) (All), Screen Capture Interval (in sec) (5), and Call Type (All). At the bottom, there are buttons for 'Save', 'Save & Add New', and 'Add New'.

Select step 3 **User Feature Permissions**. Check the appropriate **Module** selections listed below and retain the default values in the remaining fields. The screenshot below shows the settings used for the compliance testing. Click **Save** at the bottom of the screen (not shown).

Repeat this section to administer all supervisors.

The screenshot shows the Harmony Employee Management interface. The top navigation bar is the same as the previous screenshot. The 'Employee Management' section is active, and the progress bar shows step 3, 'User Feature Permissions', as the selected step. Below the progress bar, there is a table for 'Module' with columns: Module, Administration, Other Settings, Recorder, Reports, and Monitor. The table has one row with the following values: Module (checkbox), Administration (checkbox), Other Settings (checkbox), Recorder (checkbox), Reports (checkbox), and Monitor (checkbox). At the bottom, there are buttons for 'Save', 'Save & Add New', and 'Add New'.

5.5. Administer Agents

Select the **Employee Management** tab. Enter desired values for **Employee Code**, **Employee First Name**, **Email**, **Alias**, **Employee Last Name**, and **Network Id**. Retain the default values for **Status** and **Hire Date**, and check **Is a Harmony User**.

Select the desired values for **Location**, **Department**, **Supervisor**, and **Designation**. Check the desired boxes for **Client/Sites**, **Work Type**, **Belongs To**, and **Access to**. The screenshot below shows the settings used for the compliance testing.

The screenshot displays the Harmony web application interface for managing agents. The top navigation bar includes the Harmony logo, "Powered by KnoahSoft", and user information: "Jun 15, 2010 08:14 AM (EST)", "Admin (Administrator)", and links for "Broadcast", "Change Password", and "Log-out". The main navigation tabs are "Administration", "Organization", "Work Type", "Employee Management" (selected), "Voice Configuration", "Custom Groups", and "Message Thresholds".

The "Employee Management" section contains a search box with "Employee Code" selected and a "Go" button. Below it is a table with columns "Employee Code" and "Employee Name". To the right, there are license counts: "Agent License - 0 / 90" and "Seat License - 0 / 30", and a "Photo Upload" button with a "Browse..." link.

The main form area is divided into several sections:

- Employee Details:** Fields for Employee Code (201), Employee First Name (Agent1), Employee Last Name (KnoahSoft), Email (agent1@test.com), Status (Active), Alias (agent1), Hire Date (06/15/2010), and Network Id (agent1).
- Is a Harmony User?** A checkbox that is checked, with "Reset Password" and "Release Lock" buttons.
- Reporting Profile:** A tab in a sequence of four (1, 2, 3, 4).
- Recording Rules:** A tab in a sequence of four (1, 2, 3, 4).
- User Feature Permissions:** A tab in a sequence of four (1, 2, 3, 4).
- Report Feature Permissions:** A tab in a sequence of four (1, 2, 3, 4).
- Client/Work Type:** Fields for Location (My Site), Department (IT), Supervisor (Supervisor), and Designation (Agent).
- Client/Sites:** A checkbox for "My Client[My Site]" which is checked.
- Work Type:** Two checkboxes: "INBOUND [MYCLI/MSITE]" and "OUTBOUND [MYCLI/MSITE]", both of which are checked.
- List of Groups:** Two sections: "Belongs to" and "Access to", each with a checkbox for "SUPERVISOR_GROUP" which is checked.

At the bottom, there are buttons for "Save", "Save & Add New", and "Add New".

Select step 2 **Recording Rules**. For **Extension**, enter the first agent extension from **Section 2**. Check the **Enable Recording** field, and retain the default values in the remaining fields.

The screenshot shows the Harmony Employee Management interface. The top navigation bar includes 'Administration', 'Organization', 'Work Type', 'Employee Management' (selected), 'Voice Configuration', 'Custom Groups', and 'Message Thresholds'. The 'Employee Management' section is active, showing a search bar for 'Employee Code' and 'Employee Name'. The 'Agent License' is 0/90 and 'Seat License' is 2/30. A photo upload button is present. The 'Employee Code' is 201, 'Employee First Name' is Agent1, 'Employee Last Name' is KnoahSoft, 'Email' is agent1@test.com, 'Hire Date' is 06/15/2010, and 'Status' is Active. The 'Is a Harmony User?' checkbox is checked. Below this is a progress bar with four steps: 1. Reporting Profile, 2. Recording Rules (selected), 3. User Feature Permissions, and 4. Report Feature Permissions. The 'Voip Extensions and Recording Rules' table is shown below the progress bar.

	Extension	Enable Recording	Recording Type	No of Calls (Recording)	Enable Screen Capture	Screen Capture Type	No of Calls (Screen Capture)	Screen Capture Interval (in sec)	Call Type
Delete Extension	25001	<input checked="" type="checkbox"/>	Continuous	All	<input type="checkbox"/>	Continuous	All	5	All

At the bottom of the table are buttons for 'Save', 'Save & Add New', and 'Add New'.

Select step 3 **User Feature Permissions**. Check the appropriate **Module** selections listed below, and retain the default values in the remaining fields. The screenshot below shows the settings used for the compliance testing. Click **Save** at the bottom of the screen (not shown).

Repeat this section to administer all agents.

The screenshot shows the Harmony Employee Management interface. The top navigation bar is the same as the previous screenshot. The 'Employee Management' section is active. The 'Agent License' is 0/90 and 'Seat License' is 0/30. The 'Employee Code' is 201, 'Employee First Name' is Agent1, 'Employee Last Name' is KnoahSoft, 'Email' is agent1@test.com, 'Hire Date' is 06/15/2010, and 'Status' is Active. The 'Is a Harmony User?' checkbox is checked. Below this is a progress bar with four steps: 1. Reporting Profile, 2. Recording Rules, 3. User Feature Permissions (selected), and 4. Report Feature Permissions. The 'Module' section is shown below the progress bar.

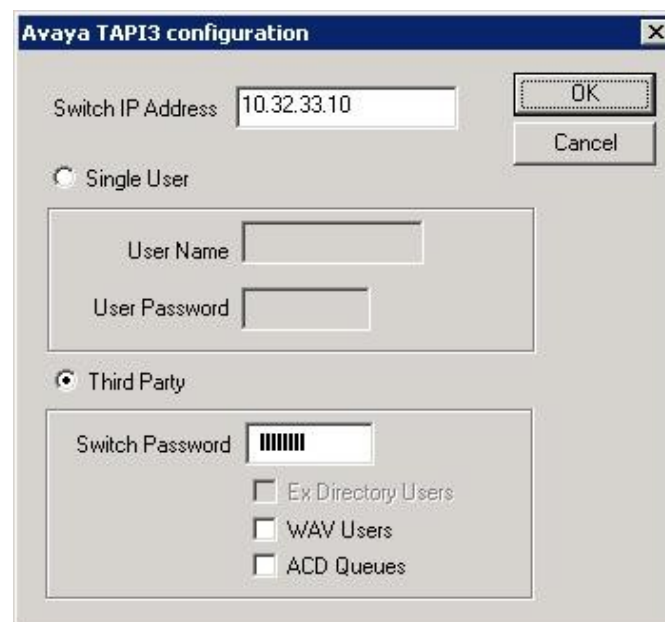
Module ☐ Administration ☒ Other Settings ☒ Recorder ☒ Reports ☐ Monitor

5.6. Administer TAPI Driver

From the Harmony server running the TAPI Adapter component, select **Start > Control Panel > Phone and Modem Options**, to display the **Phone and Modem Options** screen. Select the **Avaya IP Office TAPI3 Service Provider** entry under the **Advanced** tab, and click **Configure**.



The **Avaya TAPI3 configuration** screen is displayed. For **Switch IP Address**, enter the IP address of Avaya IP Office. Select the radio button for **Third Party**, and enter the IP Office password into the **Switch Password** field. Reboot the Harmony server.



6. General Test Approach and Test Results

The feature test cases were performed both automatically and manually. Upon start of the KnoahSoft Harmony application, the application automatically requests monitoring of devices.

For the manual part of the testing, each call was handled manually on the agent telephone with generation of unique audio content for the recordings. Necessary user actions such as hold and reconnect were performed from the agent telephones to test the different call scenarios.

The serviceability test cases were performed manually by disconnecting/reconnecting the Ethernet cable to the KnoahSoft Harmony server.

The verification of tests included using the KnoahSoft Harmony logs for proper message exchanges, and using the KnoahSoft Harmony web interface for proper logging and playback of the calls.

All test cases were executed and passed. The following were the observations on KnoahSoft Harmony from the compliance testing.

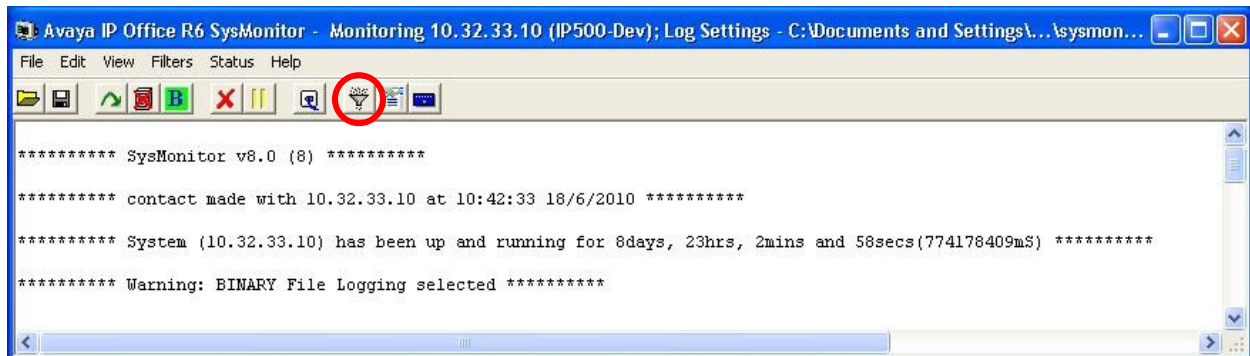
- The Call Ended By Agent icon is shown in the bottom of the supervisor report, but not reflected in the recording entries for calls dropped by the agent.
- All outbound recording entries have the ANI and DNIS field values reversed.
- In the attended transfer scenario, there were two recording entries with the same ANI, DNIS, and call direction, with each recording entry captured a different portion of the call.
- In the blind conference scenario, there was a recording entry without an ANI value.
- In the attended conference scenario with the conference-to agent dropped from the call, the remaining conversation between the conference-from agent with the customer is not captured in the recording entries.
- After a link recovery, any call established before the outage and dropped during the outage will be recorded after a new call occurs at the agent. In the case that the outage was 60 seconds or longer, the call recording included the outage period until the new call occurs at the agent, and the recording playback contained silence for these periods, which can be very long.
- After a link recovery, the initial selection of a recording entry for play back received the “voice file does not exist” message. The workaround is to select the recording entry for play back again.

7. Verification Steps

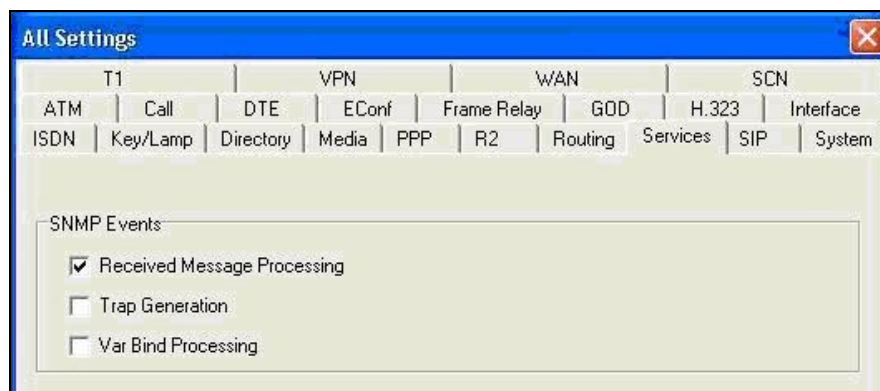
This section provides the tests that can be performed to verify proper configuration of Avaya IP Office and KnoahSoft Harmony.

7.1. Verify Avaya IP Office

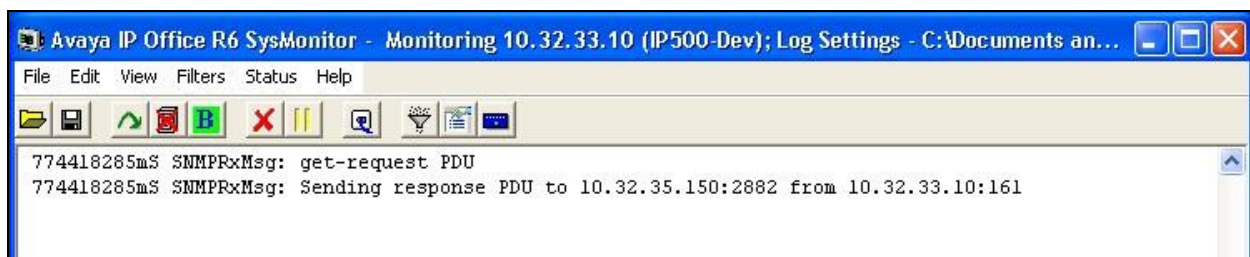
From a PC running the Avaya IP Office Monitor application, select **Start > Programs > IP Office > Monitor** to launch the application. The **Avaya IP Office R6 SysMonitor** screen is displayed, as shown below. Select the **Trace Options** icon circled below.



The **All Settings** screen is displayed. Select the **Services** tab, and check **Received Message Processing** under **SNMP Events**.



The **Avaya IP Office R6 SysMonitor** screen is displayed again. Verify that within one minute, a SNMP message request and response is displayed, as shown below.



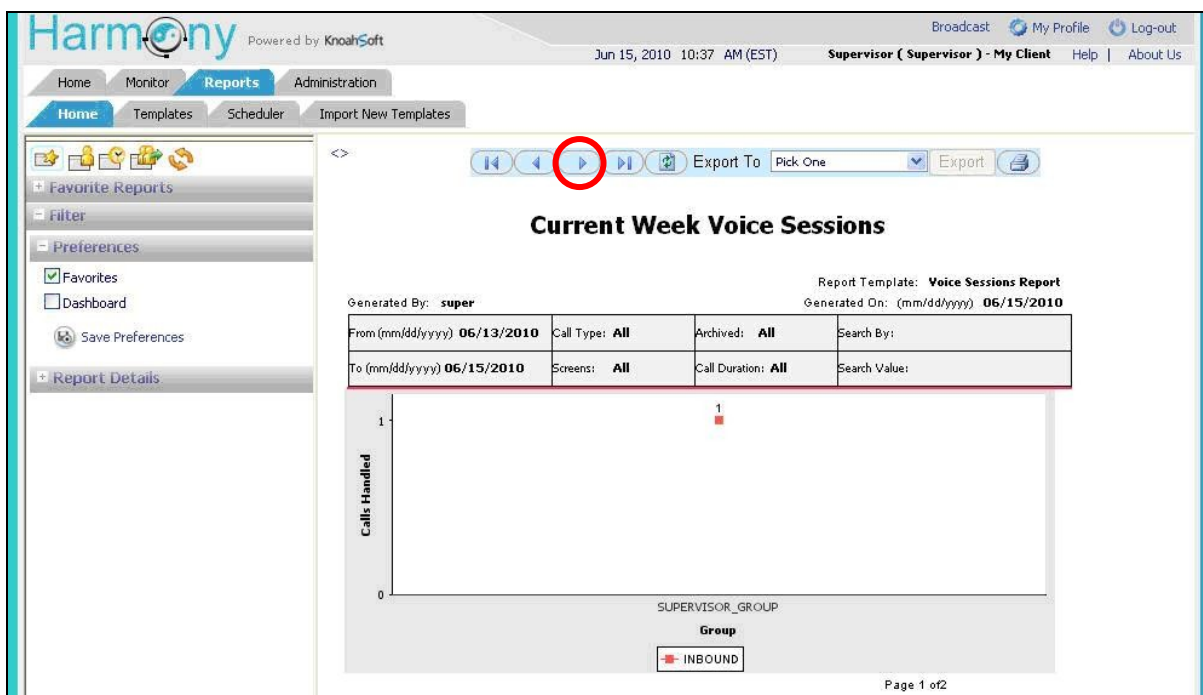
7.2. Verify KnoahSoft Harmony

Log an agent in to handle and complete a hunt group call. From the supervisor PC, follow the navigation in **Section 5.3** to launch the Harmony web interface, and log in with supervisor credentials. The **Harmony** screen is displayed.

Select the **Reports** tab, and click on the reports icon circled below to show the **Reports** selections. Select **Reports > Recorder > Current Week Voice Sessions**.



The **Current Week Voice Sessions** screen is displayed in the right pane. Click on the next page icon circled below.



Page forward as needed to the page that displays the outbound calls for the agent that just completed the hunt group call. Verify that there is an entry reflecting the last call, with proper values in the relevant fields. Click on the associated icon in the **Play** column to bring up the detail recording entry.

Harmony Powered by KnoahSoft

Jun 15, 2010 10:41 AM (EST) Supervisor (Supervisor) - My Client Help | About Us

Home Monitor **Reports** Administration

Home Templates Scheduler Import New Templates

Favorite Reports

Filter

Preferences

☒ Favorites

☐ Dashboard

Save Preferences

Report Details

Export To Pick One Export

Work	INBOUND									
Group:	SUPERVISOR_GROUP									
Employee	Agent1									
Emp No	Employee	Tenure(wks)	Voice Sessions	Call Type:	AHT	Screens:	Archived:			
				Inbound Outbound		Yes No	Yes	No		
201	Agent1	19	1	1 0	1:15	0 1	0	1		
Play	Record Id	Start Time	End Time	Duration (hh:mm)	Call Type:	ANI Number	Screens:	Archived:	-	
	agent1_MYCLI_MSITE_25001_06152010_103502_000115_0	06/15/2010 10:35:02	06/15/2010 10:36:17	00:01:15	Inbound	9088485000	No	No	X	
Employee	Agent1								Total Calls	1
Group:	SUPERVISOR_GROUP								Total Calls	1
Work	INBOUND								Total Calls	1

06/15/2010 Call Ended By Agent Voice Sessions Report

-End of the Report Page 2 of 2

Verify that the **Segment Summary** screen pops up in a new browser window, and that the recording can be played back.

Segment Summary

Customer Interaction

Start Time 06/15/2010 10:35:02

End Time 06/15/2010 10:36:17

Dialed in From(ANI) 9088485000

Dialed To(DNIS) 25555

Duration 00:01:15

Total No of Holds 0

Total Hold Time 00:00

Total No of Transfers 0

Total No of Conferences 0

Segment Details

Record ID agent1_MYCLI_MSITE_25001_06152010_103502_000115_0

Start Time 06/15/2010 10:35:02

End Time 06/15/2010 10:36:17

Duration 00:01:15

Emp Code 201

Employee Name Agent1

Extension 25001

Location My Site

Group SUPERVISOR_GROUP

Supervisor Supervisor

Channel Voice

Screen No

Number of Holds 0

Total Hold Time 00:00

Transfer No -

Hold Details

10:35 Total Duration: 00:01:15

Agent1 [201] 01:15

Download Email

Playing 00:09 / 01:16

8. Conclusion

These Application Notes describe the configuration steps required for KnoahSoft Harmony to successfully interoperate with Avaya IP Office. All feature and serviceability test cases were completed with observations noted in **Section 6**.

9. Additional References

This section references the product documentation relevant to these Application Notes.

1. *IP Office 6.0 Documentation CD*, February 2010, available at <http://support.avaya.com>.
2. *KnoahSoft Harmony Administration Guide*, Version 3.0, available on the Harmony server as part of installation.
3. *KnoahSoft Harmony Enterprise Edition User Guide*, Version 3.0, available on the Harmony server as part of installation.

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