



Avaya Solution & Interoperability Test Lab

Application Notes for KnoahSoft Harmony with Avaya IP Office 8.1 – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for KnoahSoft Harmony to interoperate with Avaya IP Office 8.1. 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 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 8.1. 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 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 used TAPI 2 function calls in third party mode from the TAPI 3 client to monitor agents 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 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 TAPI call events are also used to determine when to stop the call recordings.

2. General Test Approach and Test Results

The feature test cases were performed both automatically and manually. Upon start of the Harmony application, the application established TAPI connectivity to IP Office for monitoring of agents.

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

The serviceability test cases were performed manually by disconnecting/reconnecting the Ethernet cable to the Harmony server running the TAPI Adapter component.

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

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

2.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing focused on verifying the following on Harmony:

- Handling of TAPI events.
- Use of SNMP Get function 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, hot desking, hold, reconnect, simultaneous, conference, and transfer.

The serviceability testing focused on verifying the ability of Harmony to recover from adverse conditions, such as disconnecting/reconnecting the Ethernet cable to the Harmony server.

2.2. Test Results

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

- In the attended transfer scenario, the recording entry associated with the transfer-from agent contained audio up to start of transfer, followed by silence for the interval the transfer-from agent was talking to the transfer-to destination. The audio for this interval was captured in a separate recording entry.
- In the attended conference scenario, one of the recording entries associated with the conference-from agent contained audio up to start of conference, followed by silence for the interval the conference-from agent was talking to the conference-to destination. The audio for this interval was captured in a separate recording entry.
- In the blind conference scenario, there was a recording entry without an ANI value.
- After a link recovery, the initial selection of a recording entry for play back may receive the “voice file does not exist” message. The workaround is to select the recording entry for play back again.

2.3. Support

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

- **Phone:** (702) 722-5000
- **Email:** support@knoahsoft.com
- **Web:** <http://www.knoahsoft.com/support/index.html>

3. Reference Configuration

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

In the compliance test, the RTP stream for contact center agents on IP Office with Avaya IP Telephones, were mirrored from the layer 2 switch and replicated over to the Harmony server running the Recorder component. The contact center devices consisted of a hunt group, a supervisor, and two agents shown in the table below. Harmony monitored the agent extensions.

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.

Device Type	Extension
Hunt Group	29000
Agents	20031, 20032
Supervisor	20035

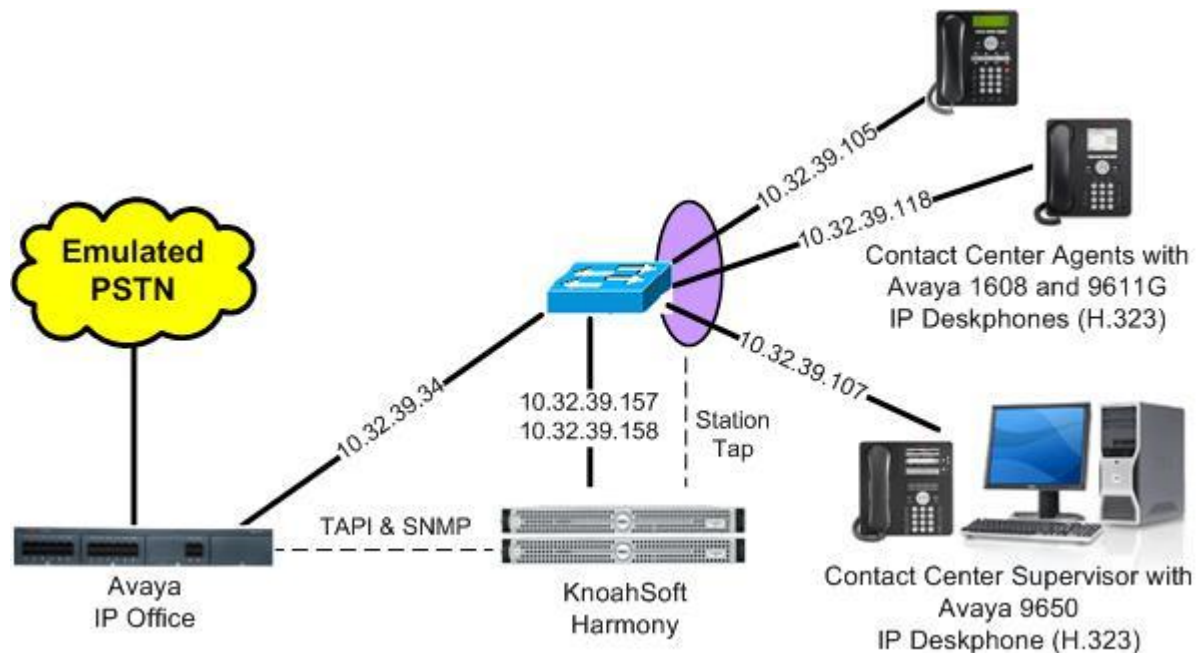


Figure 1: Compliance Testing Configuration

4. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya IP Office on IP500 V2	8.1 (63)
Avaya 1608 IP Deskphone (H.323)	1.302S
Avaya 9611G IP Deskphone (H.323)	6.2209
Avaya 9650 IP Deskphone (H.323)	3.105S
KnoahSoft Harmony on Windows 2003 Server with Service Pack 2 <ul style="list-style-type: none">RecorderTAPI AdapterAvaya IP Office TAPI3 Driver (tspi3w)	3.5.1 3.5.1 3.5.1.1 1.0.0.17
KnoahSoft Harmony on Windows 2008 Server with Service Pack 2 <ul style="list-style-type: none">Web Application ServerRMSDatabase Server	3.5.1 3.5.1 3.5.1 Microsoft SQL Server 2008

Testing was performed with IP Office 500 V2 R8.1, but also applies to IP Office Server Edition R8.1 . Note that IP Office Server Edition requires an Expansion IP Office 500 V2 R8.1 to support analog or digital endpoints or trunks.

5. Configure Avaya IP Office

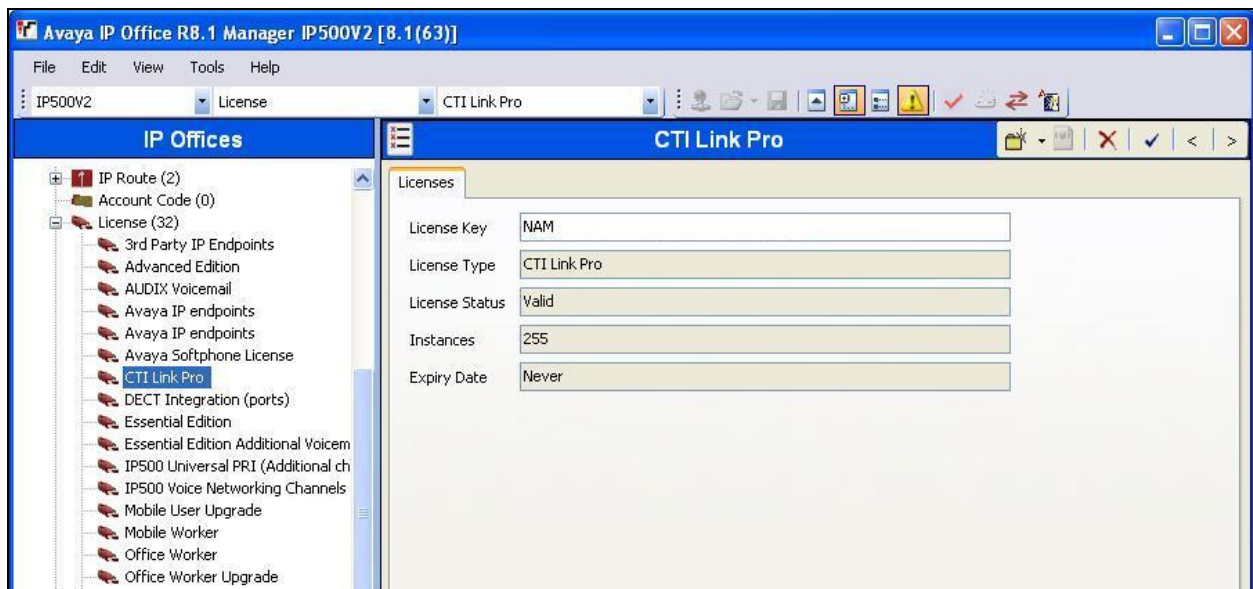
This section provides the procedures for configuring IP Office. The procedures include the following areas:

- Verify license
- Administer SNMP

5.1. Verify License

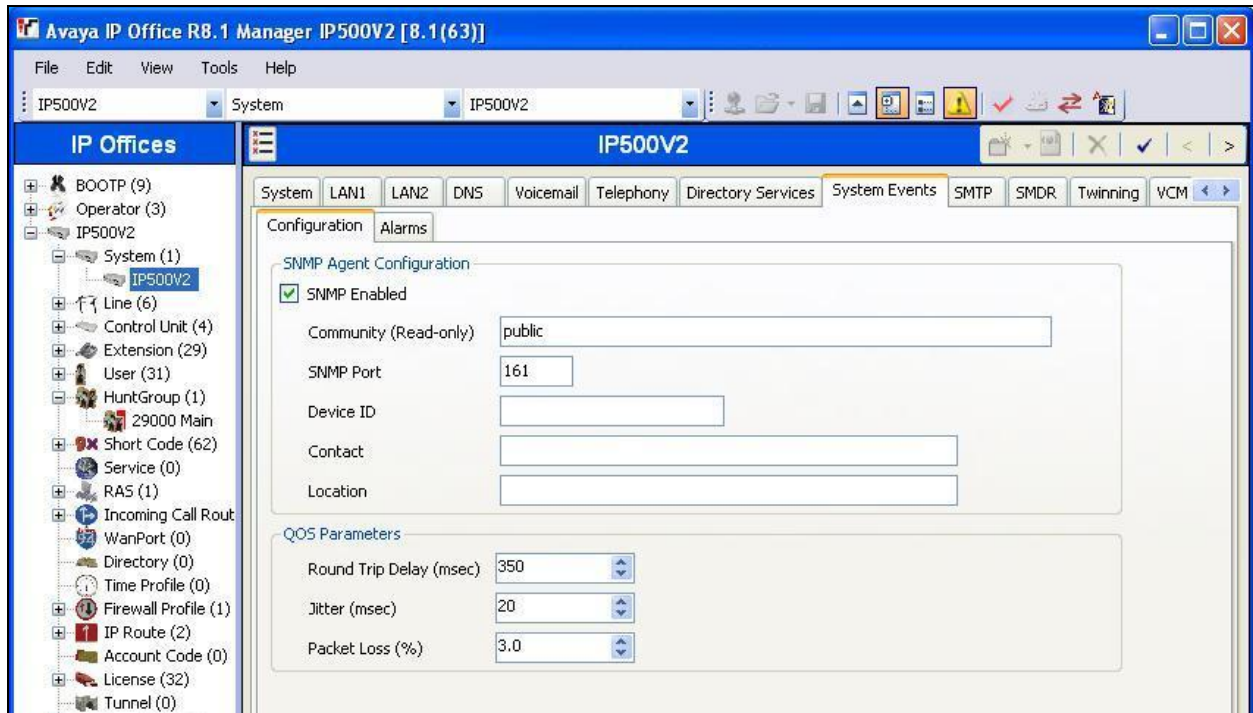
From a PC running the IP Office Manager application, select **Start → Programs → IP Office → Manager** to launch the application. Select the proper IP Office system, and log in using the appropriate credentials.

The **Avaya IP Office R8.1 Manager** screen is displayed. From the configuration tree in the left pane, select **License → CTI Link Pro**, to display the **CTI Link Pro** screen in the right pane. Verify that the **License Status** is “Valid”.



5.2. Administer SNMP

From the configuration tree in the left pane, select **System** to display the **IP500V2** 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.



6. Configure KnoahSoft Harmony

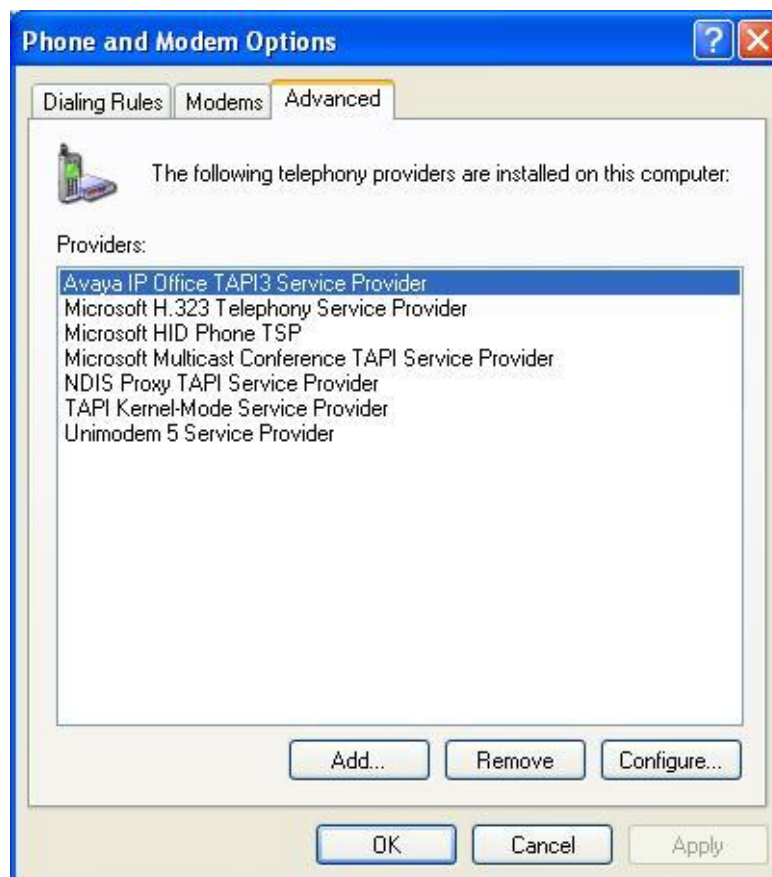
This section provides the procedures for configuring Harmony. The procedures include the following areas:

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

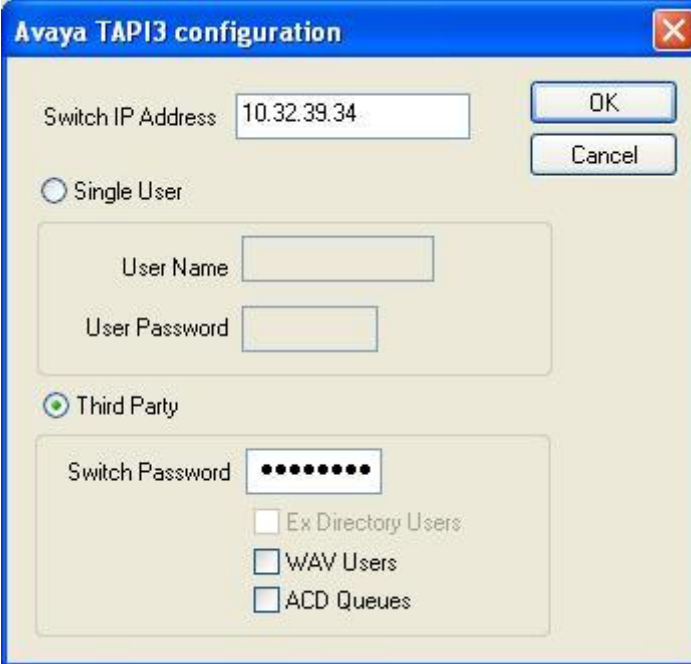
The configuration of Harmony is performed by KnoahSoft installers and partners. The procedural steps are presented in these Application Notes for informational purposes.

6.1. 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**.



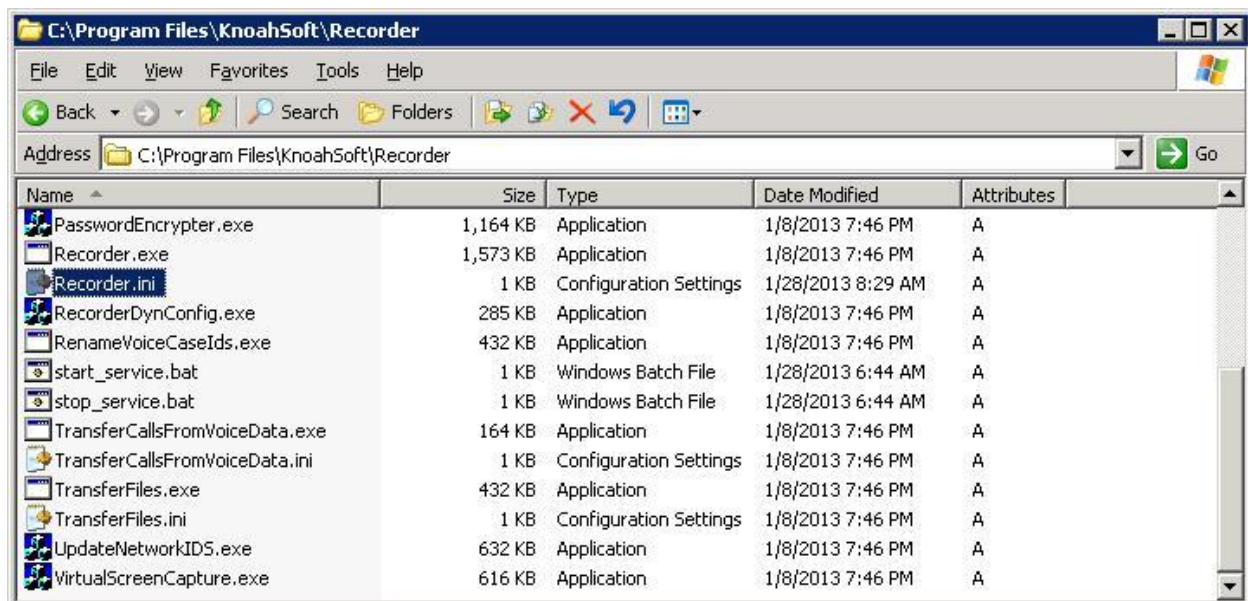
The **Avaya TAPI3 configuration** screen is displayed. For **Switch IP Address**, enter the IP address of IP Office. Select the radio button for **Third Party**, and enter the IP Office password into the **Switch Password** field. Reboot the Harmony server.



The image shows the 'Avaya TAPI3 configuration' dialog box. It has a title bar with a close button. Inside, there's a 'Switch IP Address' field with the value '10.32.39.34'. To the right are 'OK' and 'Cancel' buttons. Below this is a radio button for 'Single User'. Underneath are 'User Name' and 'User Password' fields. The 'Third Party' radio button is selected. Below it is a 'Switch Password' field filled with dots. At the bottom are three checkboxes: 'Ex Directory Users', 'WAV Users', and 'ACD Queues', all of which are currently unchecked.

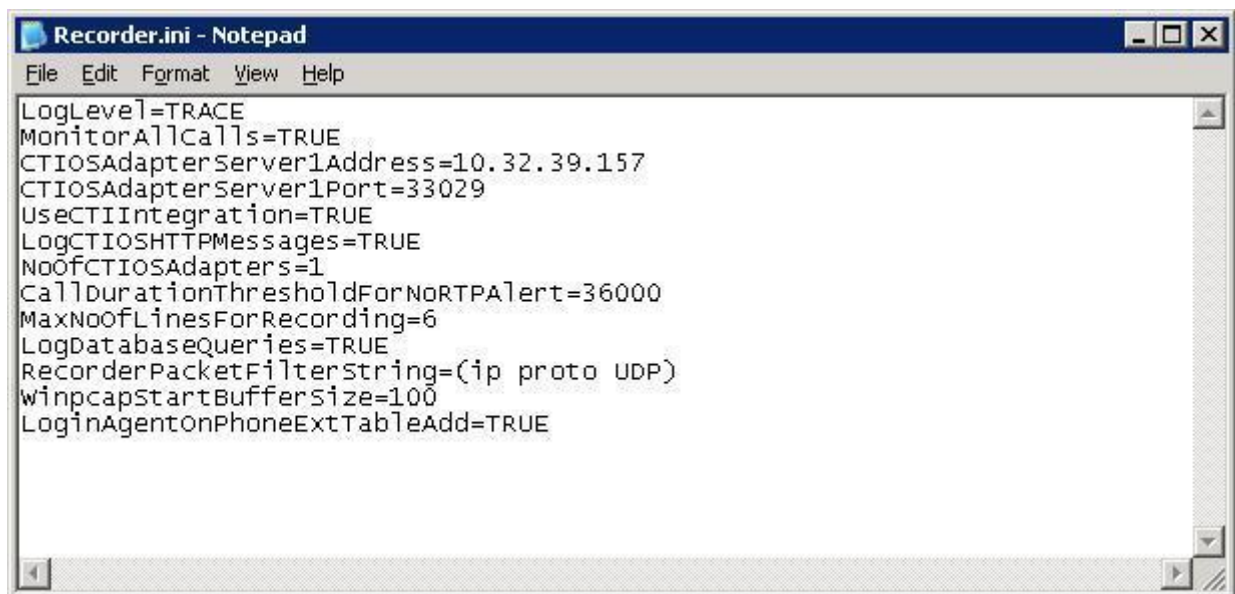
6.2. Administer Recorder.ini

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



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

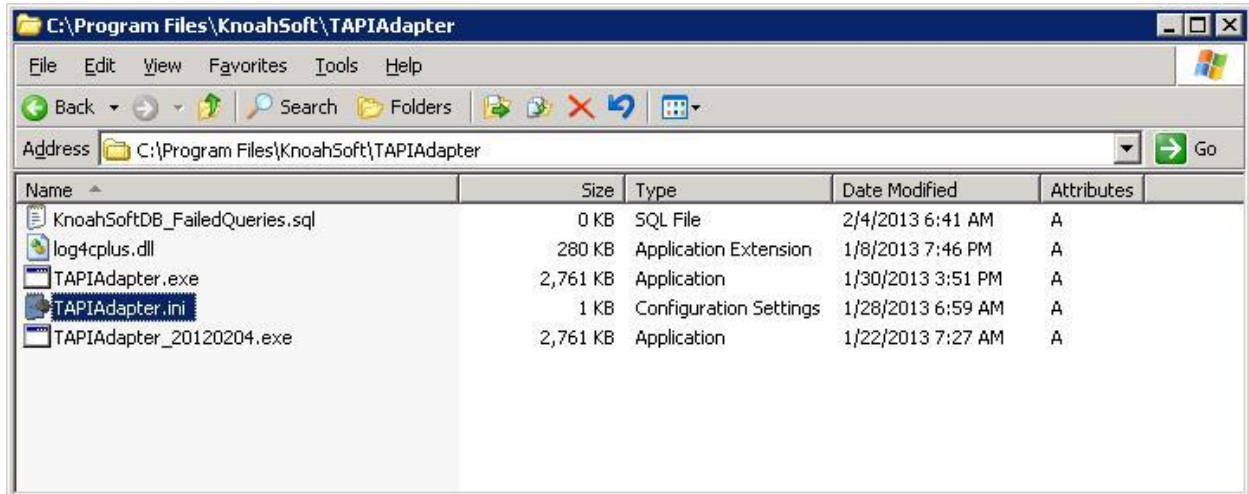
- **CTIOSAdapterServer1Address:** IP address of server with TAPI Adapter component.
- **CTIOSAdapterServer1Port:** "33029"
- **UseCTIIntegration:** "TRUE"
- **NoOfCTIOSAdapters:** "1"
- **MaxNoOfLinesForRecording:** "6"
- **RecorderPacketFilterString:** "(ip proto UDP)"
- **LoginAgentOnPhoneExtTableAdd:** "TRUE"



```
LogLevel=TRACE
MonitorAllCalls=TRUE
CTIOSAdapterServer1Address=10.32.39.157
CTIOSAdapterServer1Port=33029
UseCTIIntegration=TRUE
LogCTIOSHTTPMessages=TRUE
NoOfCTIOSAdapters=1
CallDurationThresholdForNoRTPAlert=36000
MaxNoOfLinesForRecording=6
LogDatabaseQueries=TRUE
RecorderPacketFilterString=(ip proto UDP)
winpcapStartBufferSize=100
LoginAgentOnPhoneExtTableAdd=TRUE
```

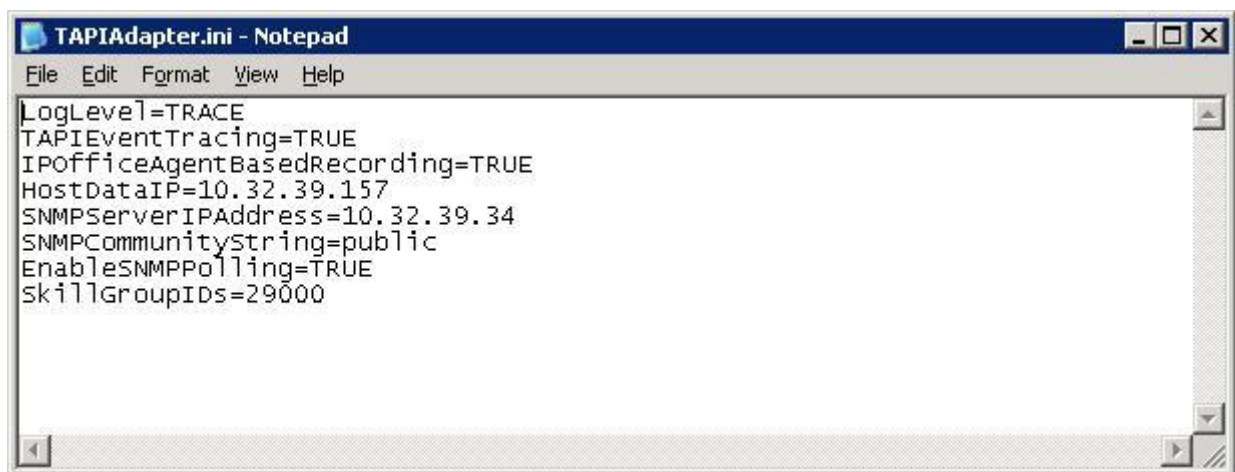
6.3. Administer TAPIAdapter.ini

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 Notepad application. Add the following parameters and values.

- **IPOfficeAgentBasedRecording:** "TRUE"
- **HostDataIp:** IP address of server with TAPI Adapter component.
- **SNMPServerIPAddress:** IP address of IP Office.
- **SNMPCommunityString:** IP Office community string from **Section 5.2**.
- **EnableSNMPPolling:** "TRUE"
- **SkillGroupIDs:** Hunt group extensions from **Section 3**.



6.4. 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.



6.5. Administer Supervisors

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

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

The screenshot displays the Harmony web application interface for Employee Management. The top navigation bar includes 'Administration', 'Organization', 'Work Type', 'Employee Management' (selected), 'Voice Configuration', 'Custom Groups', 'Message Thresholds', and 'Rules'. The 'Employee Management' section shows a search bar with 'Employee Code' selected, a license status of 'Agent License - 0 / 40' and 'Seat License - 0 / 10', and a 'Photo Upload' button. The main form contains fields for Employee Code (101), Employee Name (Supervisor), Email (supervisor@test.com), Status (Active), Alias (super), Hire Date (01/22/2013), and Network Id (super1). A checkbox 'Is a Harmony User?' is checked, with 'Reset Password' and 'Release Lock' options. Below this is a progress bar with four steps: 1. Reporting Profile, 2. Recording Rules, 3. User Feature Permissions, and 4. Report Feature Permissions. The 'Recording Rules' section includes dropdowns for Location (My Site), Department (Support), and Designation (SupportEngg Supervisor), along with a 'Belongs To Client' checkbox checked and 'My Client' selected. The 'Client/Work Type' section has a 'Client' table with 'My Client' checked and a 'Work Type' table with 'INBOUND [MYCLI]' and 'OUTBOUND [MYCLI]' checked. The 'List of Groups' section has a 'Belongs to' table and an 'Access to' table with 'SUPERVISOR_GROUP' checked. At the bottom are 'Save', 'Save & Add New', and 'Add New' buttons.

Harmony Powered by KnoahSoft

Broadcast Change Password Log-out

Feb 11, 2013 Admin (Administrator) - Help | About Us

Administration Organization Work Type **Employee Management** Voice Configuration Custom Groups Message Thresholds Rules

Employee Management

Search By Employee Code Look For Go

Employee Code Employee Name

Search for Employees

Agent License - 0 / 40 Seat License - 0 / 10

Photo Upload Browse...

IMAGE NOT FOUND

* Employee Code 101

* Employee Name Supervisor

* Email supervisor@test.com

* Status Active

* Alias super

* Hire Date 01/22/2013

* Network Id super1

Is a Harmony User ? ☒ Reset Password Release Lock

1 2 3 4

Reporting Profile Recording Rules User Feature Permissions Report Feature Permissions

* Location My Site

* Department Support

* Designation SupportEngg Supervisor

* Belongs To Client ☒ My Client

Client/Work Type

Client

☒ My Client

Work Type

☒ INBOUND [MYCLI]

☒ OUTBOUND [MYCLI]

List of Groups

Belongs to

Access to

☒ SUPERVISOR_GROUP

Save Save & Add New Add New

Select **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 'Employee Management' tab is active, and the 'Recording Rules' step in the workflow is highlighted with a red circle. The workflow consists of four steps: 1. Reporting Profile, 2. Recording Rules, 3. User Feature Permissions, and 4. Report Feature Permissions. Below the workflow, there is a table for 'Voip Extensions and Recording Rules'.

	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		<input type="checkbox"/>	Continuous	All	<input type="checkbox"/>	Continuous	All	5	All

Select **3 User Feature Permissions**. Check the recording selections below and any other desired modules. The screenshot below shows the settings used in the compliance testing. Repeat this section to administer all supervisors.

The screenshot shows the Harmony Employee Management interface. The 'Employee Management' tab is active, and the 'User Feature Permissions' step in the workflow is highlighted with a red circle. The workflow consists of four steps: 1. Reporting Profile, 2. Recording Rules, 3. User Feature Permissions, and 4. Report Feature Permissions. Below the workflow, there is a section for 'Expand/Collapse Modules below:' with checkboxes for Administration, Other Settings, Recordings, Reports, and Monitor. The 'Recordings' section is expanded, showing a table with columns: All, Read, Write, Delete, and Update.

	All	Read	Write	Delete	Update
On Demand Recording	<input type="checkbox"/>				
Call Recordings	<input checked="" type="checkbox"/>				

6.6. Administer Agents

Select the **Employee Management** tab. Enter desired values for **Employee Code**, **Employee Name**, **Email**, **Alias**, and **Network Id**. Select “Supervisor” for **Supervisor**. Retain the default values for **Status** and **Hire Date**.

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

The screenshot displays the Harmony Admin interface, specifically the **Employee Management** tab. The interface includes a search bar, a list of employee details, and a configuration section for agent1.

Search Bar: Search By: Employee Code, Look For: [Empty], Go button.

Employee List:

Employee Code	Employee Name
Search for Employees	

Agent License - 0 / 40 Seat License - 0 / 10

Photo Upload: [Empty] [Browse...]

Employee Details:

- * Employee Code: 201
- * Employee Name: agent1
- * Email: agent1@test.com
- * Status: Active
- * Alias: agent1
- * Hire Date: 01/22/2013
- * Network Id: agent1

Is a Harmony User? ☐ **Reset Password** **Release Lock**

Configuration Steps: 1. Reporting Profile, 2. Recording Rules, 3. User Feature Permissions, 4. Report Feature Permissions

Configuration Fields:

- * Location: My Site
- * Department: Support
- * Designation: JrSupportEngg
- * Supervisor: Supervisor
- * Belongs To Client: ☒ My Client

Client/Work Type:

Client	Work Type
<input checked="" type="checkbox"/> My Client	<input checked="" type="checkbox"/> INBOUND [MYCLI]
	<input checked="" type="checkbox"/> OUTBOUND [MYCLI]

List of Groups:

Belongs to	Access to
<input checked="" type="checkbox"/> SUPERVISOR_GROUP	

Buttons: Save, Save & Add New, Add New

Select **2 Recording Rules**. For **Extension**, enter the first agent extension from **Section 3**, in this case “20031”. Check the **Enable Recording** field, and retain the default values in the remaining fields.

Harmony Powered by KnoahSoft

Broadcast Change Password Log-out
Feb 11, 2013 Admin (Administrator) - Help About Us

Administration Organization Work Type **Employee Management** Voice Configuration Custom Groups Message Thresholds Rules

Employee Management

Search By Employee Code Look For Go

Employee Code Employee Name
Search for Employees

Agent License - 0 / 40 Seat License - 0 / 10 Photo Upload Browse...

IMAGE NOT FOUND

* Employee Code 101
* Employee Name Supervisor
* Email supervisor@test.com
* Status Active

* Alias super
* Hire Date 01/22/2013
* Network Id super1

Is a Harmony User ? ☒ Reset Password Release Lock

1 2 3 4
Reporting Profile **Recording Rules** User Feature Permissions Report Feature Permissions

Voip Extensions and Recording Rules Add New Extension

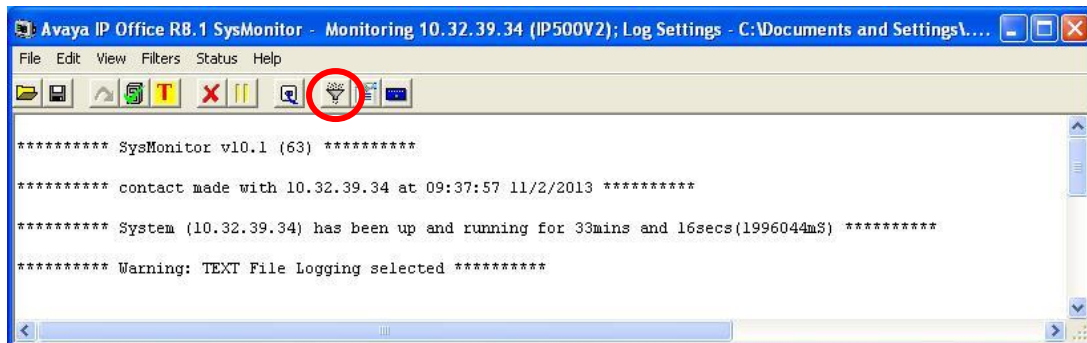
	Extension	Enable Recording	Recording Type	No of Calls (Recording)	Enable Screen Capture	Screen Capture Type	No of Calls (Screen Capture)	Screen Capture Interval (in sec)	Call Typ
Delete Extension	20031	<input checked="" type="checkbox"/>	Continuous	All	<input type="checkbox"/>	Continuous	All	5	All

7. Verification Steps

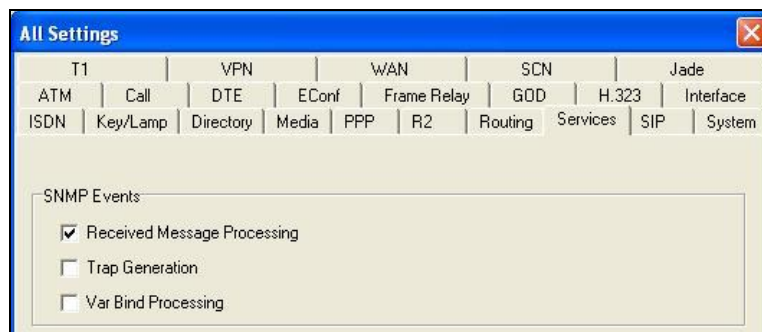
This section provides the tests that can be performed to verify proper configuration of IP Office and Harmony.

7.1. Verify Avaya IP Office

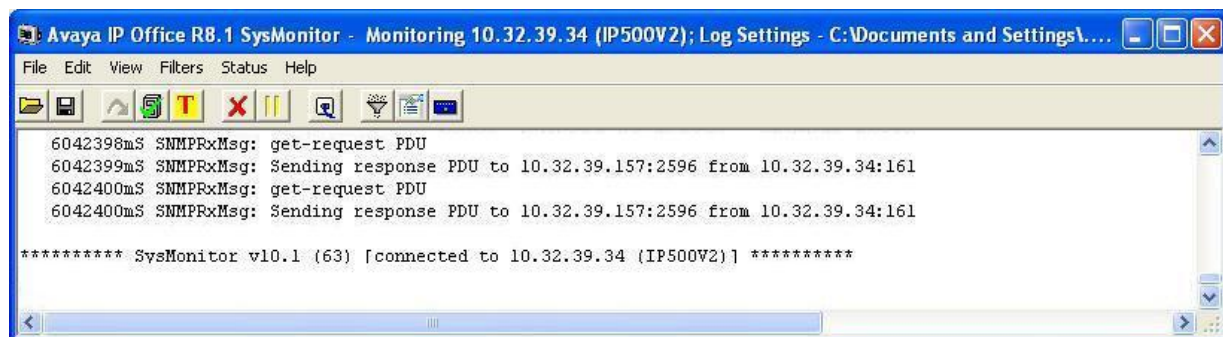
From a PC running the Avaya IP Office Monitor application, select **Start → Programs → IP Office → Monitor** to launch the application. The **Avaya IP Office R8.1 SysMonitor** screen is displayed, as shown below. Select the **Trace Options** icon circled below.



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

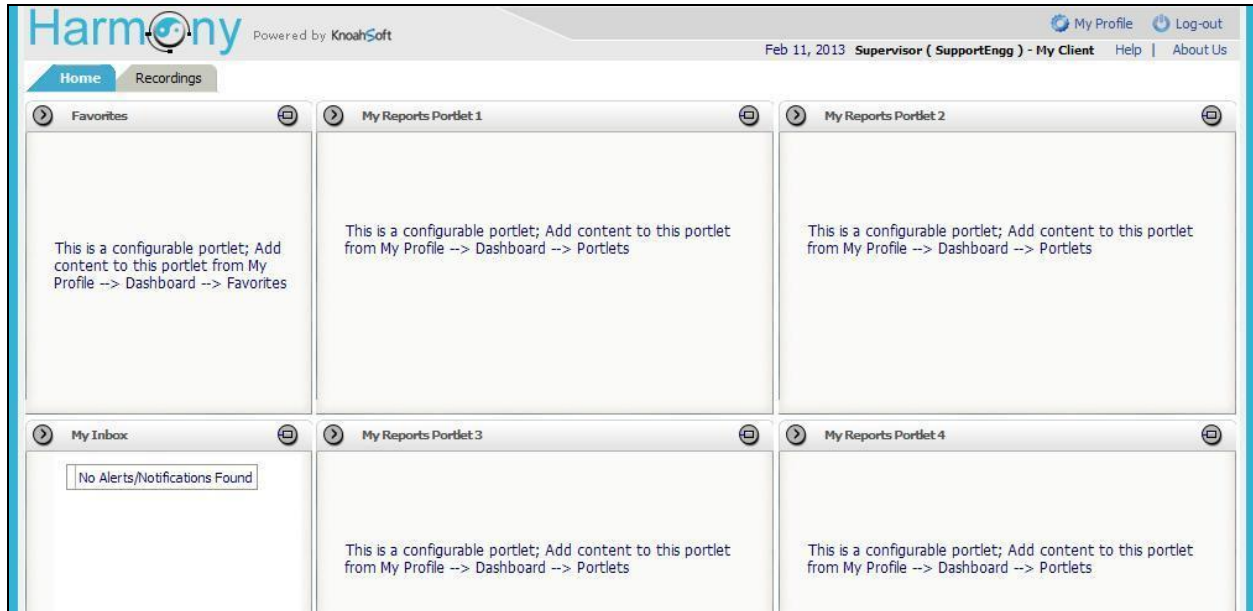


The **Avaya IP Office R8.1 SysMonitor** screen is displayed again. Verify that within one minute, SNMP message requests and responses are displayed, as shown below.

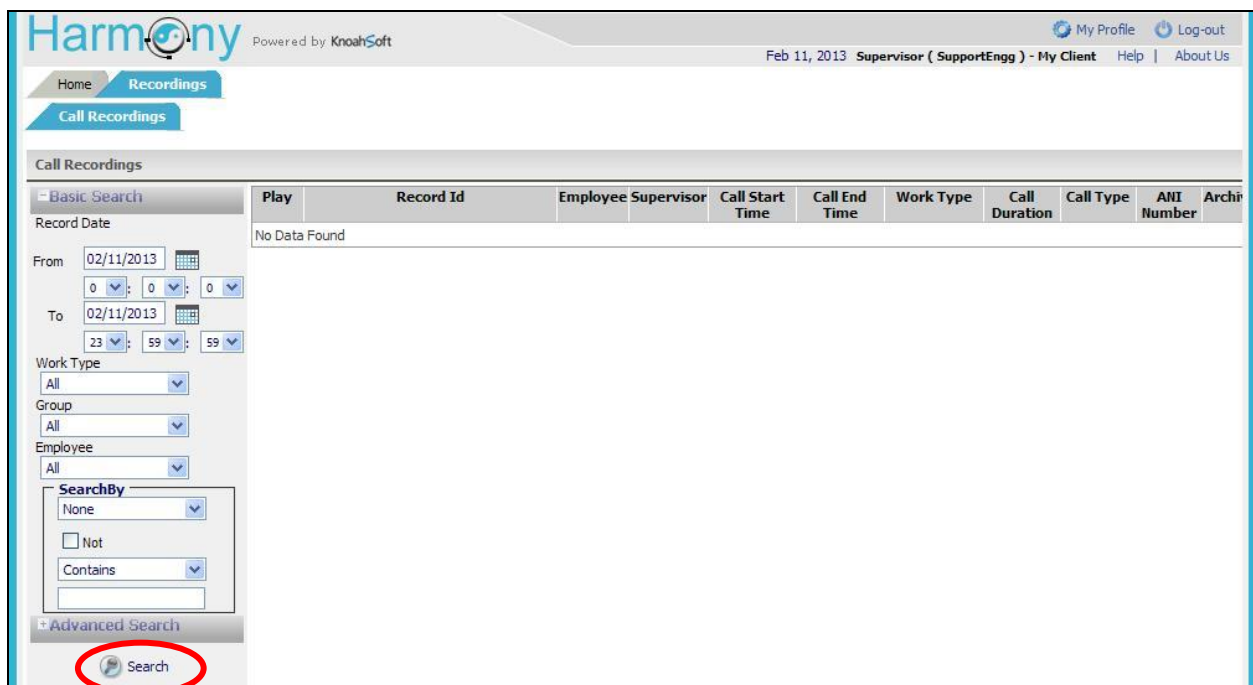


7.2. Verify KnoahSoft Harmony

Log an agent in to handle and complete a hunt group call. From the supervisor PC, follow the navigation in **Section 6.4** to launch the Harmony web interface, and log in with supervisor credentials. The **Harmony** screen is displayed. Select the **Recordings** tab.



The screen is updated as shown below. Click **Search** to list all recordings for the current day.



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.

Harmony Powered by KnoahSoft

Feb 11, 2013 Supervisor (SupportEngg)

Home Recordings

Call Recordings

Call Recordings

Basic Search

Record Date

From 02/11/2013

To 02/11/2013

Work Type All

Record Id	Employee	Supervisor	Call Start Time	Call End Time	Work Type	Call Duration	Call Type	ANI Number
agent1_MYCLI_MSITE_20031_02112013_075025_000106_0	agent1 [201]	Supervisor	02/11/13 07:50:25	02/11/13 07:51:31	INBOUND	00:01:06	Inbound	9088445001

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

Call Comments

Submit

Customer Interaction

Start Time	02/11/2013 07:50:25
End Time	02/11/2013 07:51:31
Dialed in From(ANI)	9088445001
Dialed To(DNIS)	29000
Duration	00:01:06
Total No of Holds	0
Total Hold Time	00:00:00
Total No of Transfers	0
Total No of Conferences	0

Segment Details

Record ID	agent1_MYCLI_MSITE_20031_02112013_075025_000106_0
Start Time	02/11/2013 07:50:25
End Time	02/11/2013 07:51:31
Duration	00:01:06
Emp Code	201
Employee Name	agent1
Extension	20031
Location	My Site
Group	SUPERVISOR_GROUP
Supervisor	Supervisor
Channel	Voice
Screen	No
Number of Holds	0
Total Hold Time	00:00:00
Transfer No	-

Hold Details[*Calls with Zero or One Second Hold duration are not displayed]

Previous Comments

Previous call comments doesnot exists.

07:50

agent1 [201]

01:06

Total Duration: 00:01:06

07:51

00:12 / 01:06

agent1_MYCLI_MSITE_20031_02112013_075025_000106_0

8. Conclusion

These Application Notes describe the configuration steps required for KnoahSoft Harmony to successfully interoperate with Avaya IP Office 8.1. All feature and serviceability test cases were completed with observations noted in **Section 2.2**.

9. Additional References

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

1. *IP Office Manager 8.1*, Document 15-601011, Issue 25o, April 2012, available at <http://support.avaya.com>.
2. *KnoahSoft Harmony Administration Guide*, Version 3.5.1, available on the Harmony server as part of installation.
3. *KnoahSoft Harmony Installation Guide*, Version 3.5.1, available on the Harmony server as part of installation.

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