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Avaya Solution & Interoperability Test Lab

Application Notes for Configuring NovaLink NovaTax with Avaya IP Office – Issue 1.0

Abstract

These Application Notes describe the compliance testing of the NovaLink NovaTax call accounting system with Avaya IP Office. These Application Notes contain an extensive description of the configurations for both NovaLink NovaTax and Avaya IP Office.

Information in these Application Notes has been obtained through Avaya DevConnect compliance testing and additional technical discussions. Testing was conducted via the Avaya DevConnect Program at the Avaya Solution and Interoperability Test Lab.

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1. Introduction

The purpose of this document is to describe the compliance testing done with NovaLink NovaTax and Avaya IP Office, including a description of the configuration of each, a description of the tests that were performed, and a summary of the results of those tests.

The NovaTax call accounting server processes Call Detail Records (CDRs) and generates statistics and invoices to be used for customer billing. NovaTax calculates the cost of a call based on the duration, origin, and destination of the call. NovaLink can differentiate calls made via trunks to the PSTN from calls made to trunks to other PBXs, and calculate call costs accordingly.
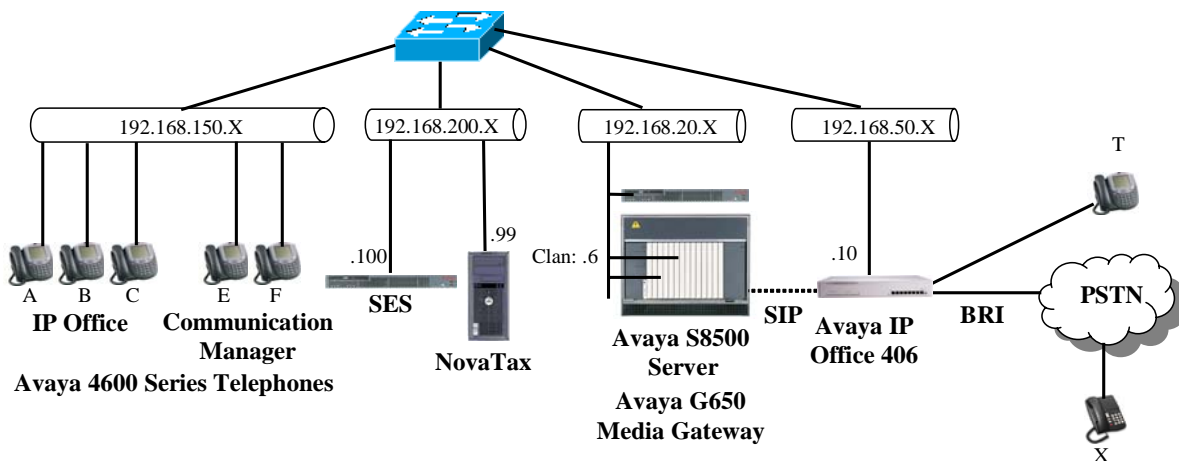

Figure 1: NovaTax Test Configuration

The presence of Avaya S8500 Server and the Avaya SIP Enablement Services (SES) systems in the above configuration is solely for the purpose of generating CDR records (from the IPO) for calls which are made via a trunk to another PBX, and are otherwise not essential for usage of NovaTax with IP Office. The SIP trunk between the Avaya IP Office 406 and the Avaya S8500 Server could be replaced with any other type of trunk supported by both systems, i.e. PRI, PRI, etc. The S8500 system is not configured to generate CDR records. The function of each of the components in **Figure 1** is as follows:

- The NovaTax server processes CDR records which it receives from Avaya IP Office 406.
- Avaya IP Office 406 sends CDR records to the NovaTax server as call events occur.
- Avaya IP Office 406 has a SIP trunk interface to the Avaya S8500 Server via the Avaya SIP Enablement Services (SES) server. The Avaya S8500 Server is not configured to generate CDR records.
- The Avaya IP Office has a BRI trunk interface to the Public Switched Telephone Network (PSTN) over which it can make and receive external calls.
- The Avaya 4600 Series IP Telephones with the designation A-C are registered with Avaya IP Office 406.

- The Avaya 4600 Series IP Telephones with the designation E-G are registered with the Avaya S8500 Server.

2. Equipment and Software Validated

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

Equipment	Software Version
Avaya IP 406 v2	4.0 (6)
Avaya 4600 series H.323 stations	2.8
NovaLink NovaTax	4.0
Microsoft Windows Server 2003 SE	SP2

Table 1: Version Numbers of Equipment and Software

3. Configuration

The following table contains the extensions that are used for testing. The capital letter designations correspond to the telephones shown in **Figure 1**.

Extension	Designation	MSN
5000136	A	
5000134	B	
5000133	C	069 7500 9560
5000001	T	069 7500 9497
1000113	E	
1000114	F	
069 7505 6630	X	

Table 2: Extensions Used for Testing

The configuration of Avaya Communication Manager and Avaya SIP Enablement Services is out of the scope of these application notes.

3.1. Configure Avaya IP Office

The configuration and verification operations illustrated in this section were all performed using the Avaya IP Office Manager application. The information provided in this section describes the configuration of Avaya IP Office for this solution. For other information concerning installation, configuration, and provisioning please refer to the product documentation in reference [1].

Many of the descriptions contained within this section make reference to the "left frame" of the IPO Manager application. This portion of the Manager's main display contains a list of the components which can be configured by the Manager program, shown as follows:
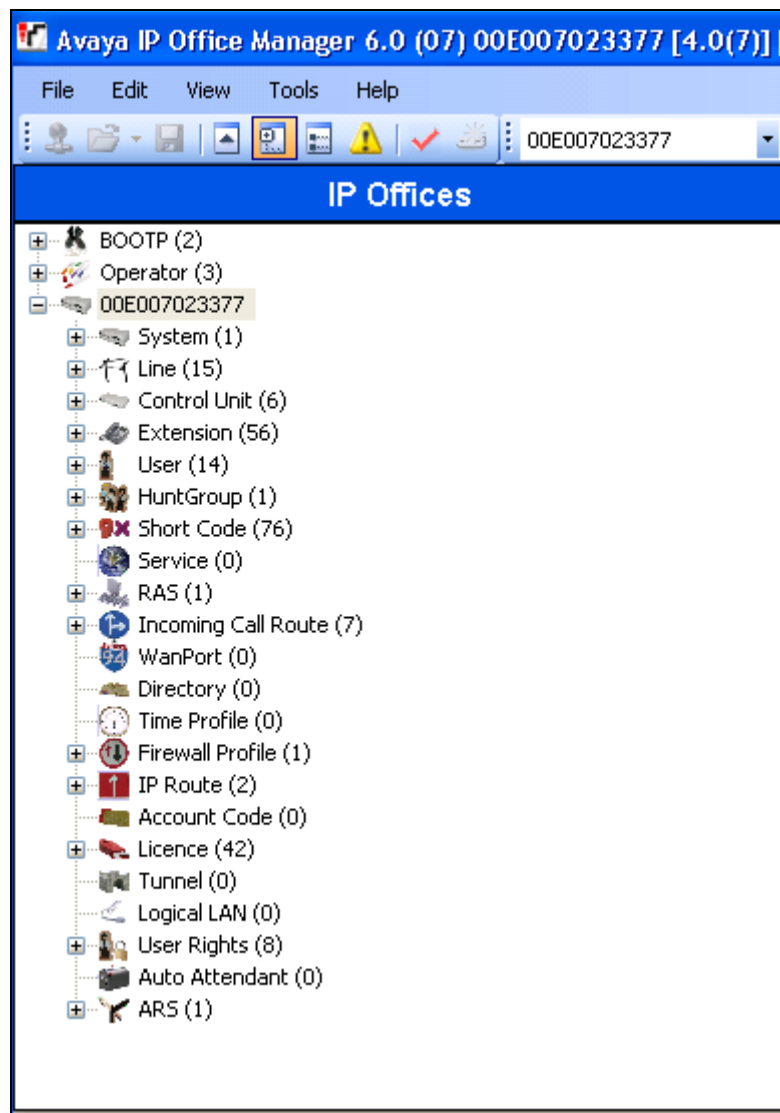

Figure 2: IPO Manager Main Menu

3.1.1. Verify Licenses
No additional licenses are required for these tests.

3.1.2. Configure System Settings

Select the IPO "System" icon from the left frame of the Manager application, and set the parameters as shown in **Table 3**.

Tab	Parameter	Usage
LAN1 / LAN Settings	IP Address	The IP address which is to be assigned to IP Office.
	IP Mask	The IP mask which is to be assigned to IP Office.
Telephony	Companding Law: Switch	Select the appropriate value for the region in which the system is located: ALAW for Europe.
	Companding Law: Line	Select the appropriate value for the region in which the system is located: ALAW for Europe.
CDR	Enable CDRs	Check this box.
	Enable intra-switch CDRs	Check this box.
	Record Format	Select "Unformatted".
	Record Options	Select "Normal".
	Date Format	Select "Day\Month".
	IP Address	Enter the address of the NovaTax server.

Table 3: "System" Parameters

Figure 3: IPO System Parameters: LAN1 / LAN Settings

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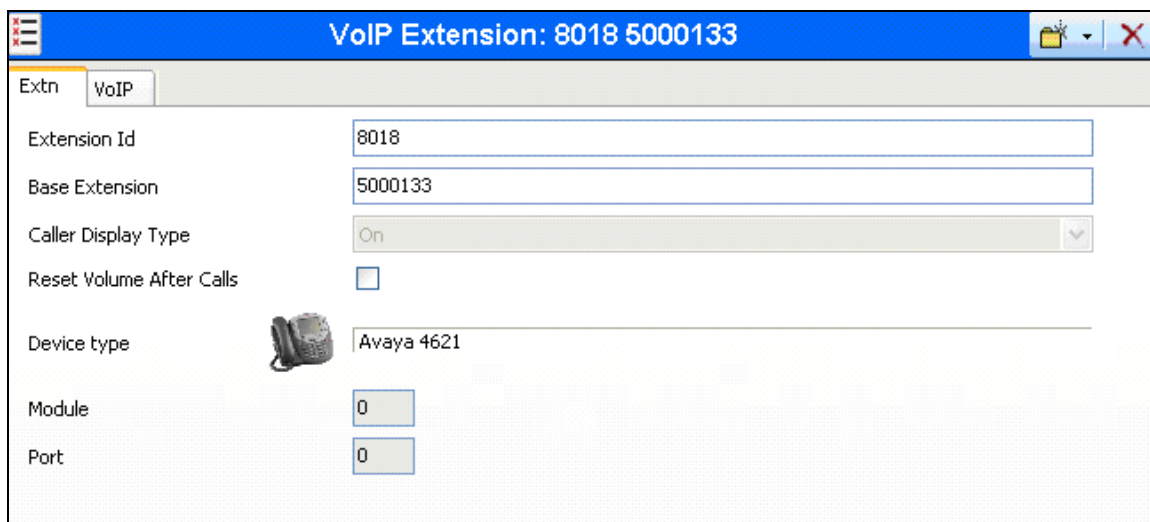
Figure 4: IPO System Parameters: Telephony

Figure 5: IPO System Parameters: CDR

3.1.3. Configure H.323 Telephone Extensions

Configure stations A-C by performing an "add" operation via the "Extensions" icon contained in the left frame of the main Manager window.

Tab	Parameter	Usage
Extn	Base Extension	Enter one of the extension to be assigned to stations A-C.
VoIP	Compression Mode	Select G.711 ALAW 64K.
	Out Of Band DTMF	Check this box.
	Allow Direct Media Path	Check this box.

Table 4: Extension Parameters
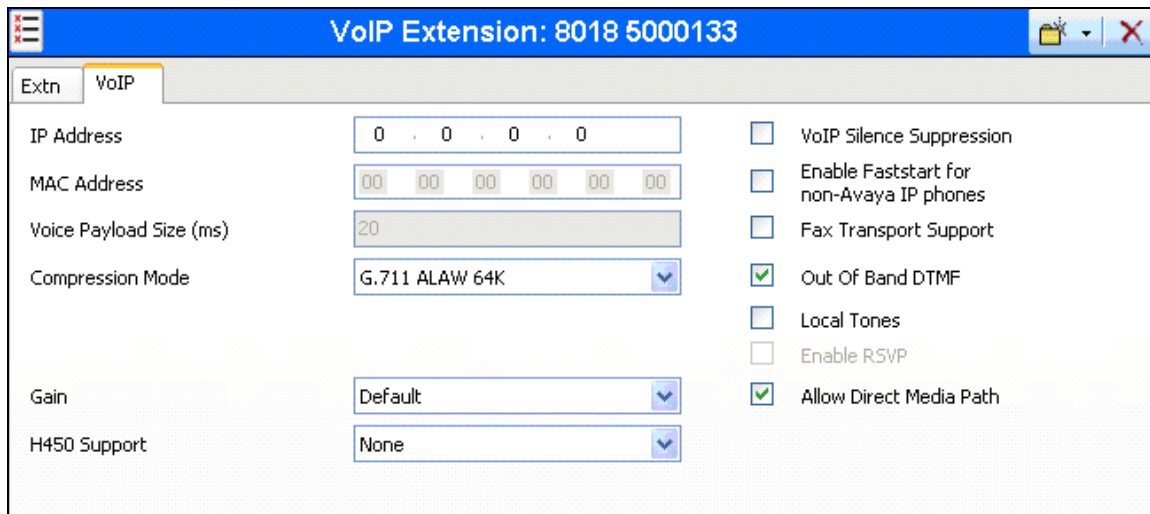
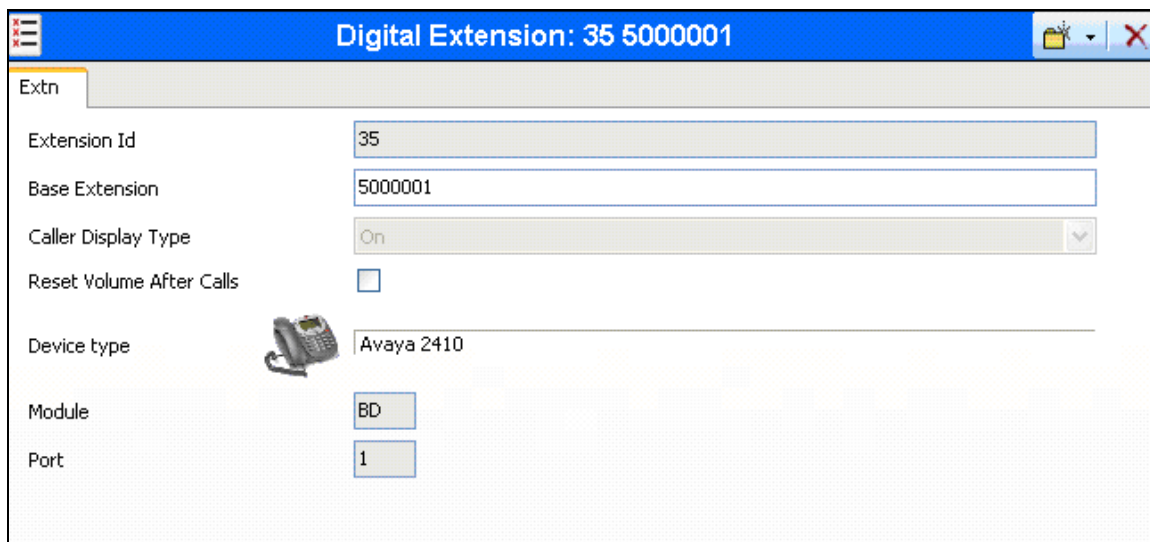

Figure 6: Extensions: Extn Tab

Figure 7: Extensions: VoIP Tab

3.1.4. Configure Digital Telephone Extensions

Configure station T by performing an "add" operation via the "Extensions" icon contained in the left frame of the main Manager window.

Tab	Parameter	Usage
Extn	Base Extension	Enter the extension to be assigned to station T.

Table 5: Extension Parameters

Figure 8: Extensions: Extn Tab

3.1.5. Configure Users

Configure users by performing an "add" operation via the "Users" icon contained in the left frame of the main Manager window for stations A-C and T. Note that the "SIP" tab will only appear if the SIP line has been configured as shown in **Section 3.1.7.1**.

Tab	Parameter	Usage
User	Name	Enter a name which identifies the user.
	Extension	Enter one of the extensions A-C,T.
Telephony	Can Intrude	Check this box.
	Cannot be Intruded	Uncheck this box.
SIP	All parameters	Accept defaults.

Table 6: User Parameters

Figure 9: Users: User Tab

Figure 10: Users: Telephony Tab

Figure 11: Users: SIP Tab

3.1.6. Configure Short Codes

Configure Short Codes by performing an "add" operation via the "Short Codes" icon contained in the left frame of the main Manager window.

3.1.6.1 Configure Short Code for Routing to Avaya S8500

Create a short code to route calls to seven-digit extensions beginning with "1" to the SIP trunk, and append the string "@ffm.com" to the number, as required to form a SIP URI.

Tab	Parameter	Usage
Short Code	Code	Enter "1XXXXXX".
	Feature	Enter "Dial".
	Telephone Number	Enter 1N"@ffm.com".
	Line Group Id	Enter the group number assigned to the SIP line: "1".

Table 7: SIP Short Code Parameters

Figure 12: SIP Short Codes: Short Code Tab

3.1.6.2 Configure Short Code for Routing to PSTN

Create a short code to route calls to extensions beginning with "0" to the BRI trunk.

Tab	Parameter	Usage
Short Code	Code	Enter "0n".
	Feature	Enter "Dial".
	Telephone Number	Enter "N".
	Line Group Id	Enter the group number assigned to the BRI line: "4".

Table 8: BRI Short Code Parameters

Figure 13: BRI Short Codes: Short Code Tab

3.1.7. Configure SIP Trunk Connection

3.1.7.1 Configure SIP Line

Configure the SIP line which is connected to Avaya Communication Manager via the Avaya SES server, using the parameters shown in the following table.

Tab	Value	Usage
ITSP Domain Name	ITSP Domain Name	Enter the domain name configured for Avaya SES.
	ITSP IP Address	Enter the IP address of Avaya SES.
SIP URI	Incoming Group	Enter "1", the group number of the SIP line.
	Outgoing Group	Enter "1", the group number of the SIP line.

Table 9: SIP Line Parameters

Figure 14: SIP Line Form

Figure 15: SIP URI Form

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3.1.7.2 Configure Incoming Call Routes

Configure the Incoming Calls route for the SIP line which is connected to Avaya Communication Manager via the Avaya SES server.

Value	Usage
Line Group Id	Specify "1", the group ID assigned to the SIP line.
Destination	Enter "." to preserve the number.

Table 10: Extension Parameters

The screen below shows Incoming Call Route assignments for the SIP connection to Avaya Communication Manager.

Figure 16: Incoming Call Route: Standard Tab

3.1.8. Configure Connection to PSTN

3.1.8.1 Configure BRI Line

Configure the BRI line which is connected to the PSTN, using the parameters shown in the following table.

Value	Usage
Incoming Group ID	Specify "4", the group ID assigned to line 5, the first BRI port.
Outgoing Group ID	Specify the same as for Incoming Group ID.
Line SubType	Specify "ETSI", as required by BRI connections in Germany.

Table 11: PBR Line Parameters

Figure 17: BRI Line

3.1.8.2 Configure Incoming Call Routes

Configure the Incoming Calls route for the BRI line which is connected to the PSTN. Create one call route each for extensions C and T as shown in **Table 2**.

Value	Usage
Line Group Id	Specify "4", the group ID assigned to line 5, the first BRI port.
Incoming Number	Enter the number assigned to the MSN for this extension, as shown in **Table 2**.
Destination	Enter the extension, as shown in **Table 2**.

Table 12: Extension Parameters

The screen below shows Incoming Call Route assignments for the PSTN connection for extension C shown in **Table 2**.

Figure 18: Incoming Call Route: Standard Tab

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3.1.8.3 Save Configuration Changes

Upon completion of configuration changes to Avaya IP Office, click on the "Save Configuration" control at the top of the Avaya IP Office Manager shown in **Figure 19**, and follow the instructions.
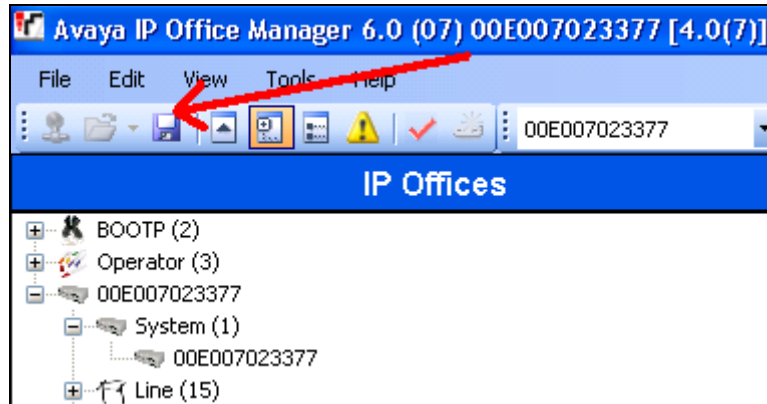
Figure 19: Save Configuration

3.2. Configure NovaLink NovaTax

Use the Windows "Start" button to select the program "NovaTax Setup Wizard". Enter your choice of language and click "Next".
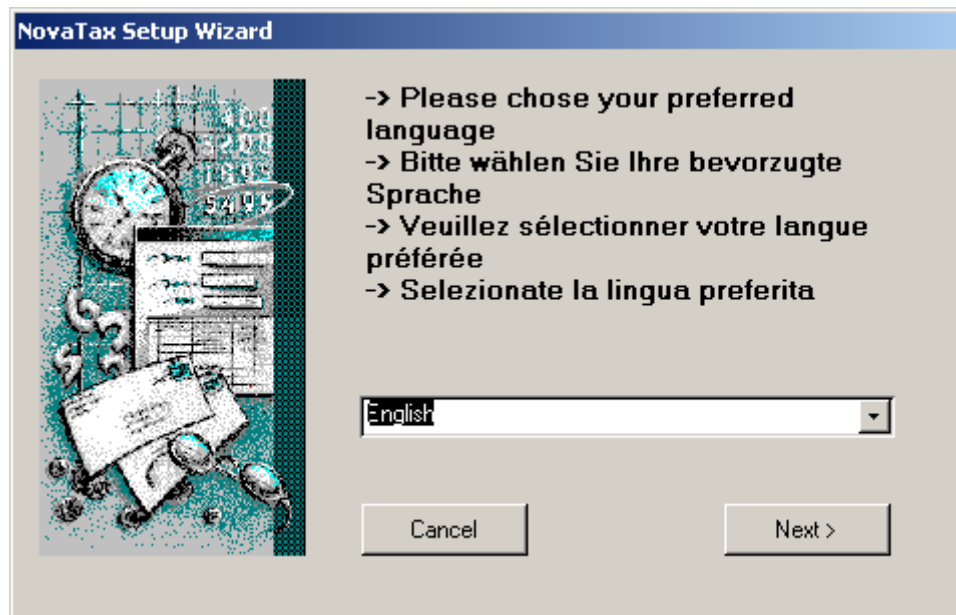
Figure 20: NovaTax Language Selection Screen

Choose "Configure PABX-Settings" from the drop-down box and click "Next".
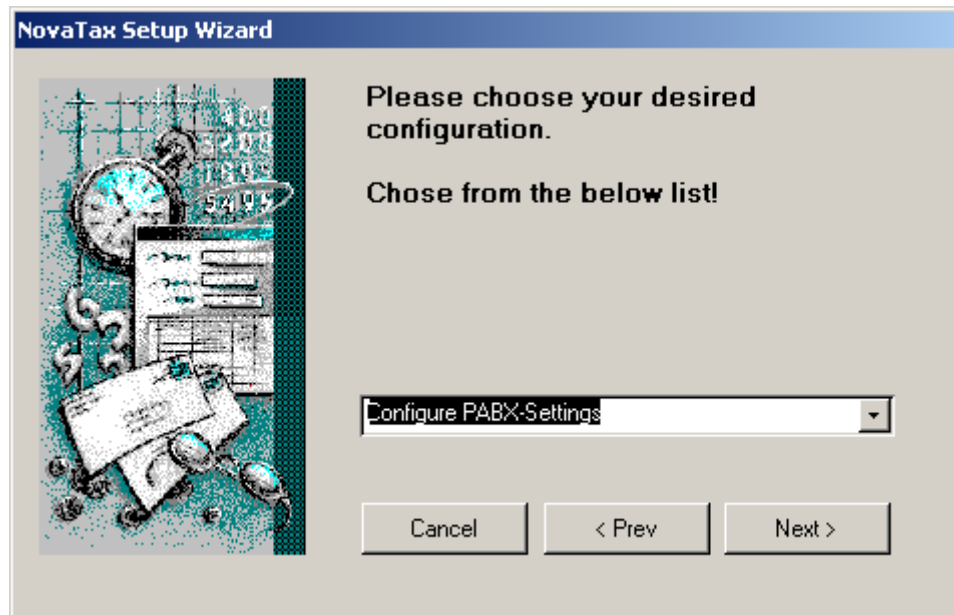
Figure 21: NovaTax Configuration Type Selection Screen

Select "Avaya IPO" from the drop-down box and click "Next".
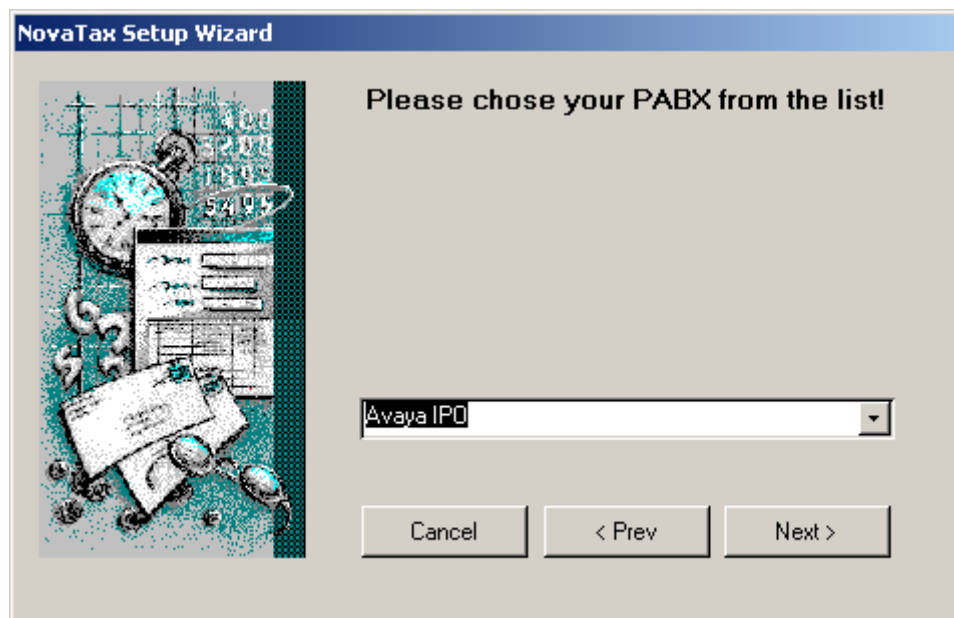
Figure 22: NovaTax PBX Vendor Selection Screen

Select "Connection over IP" from the drop-down box and click "Next".
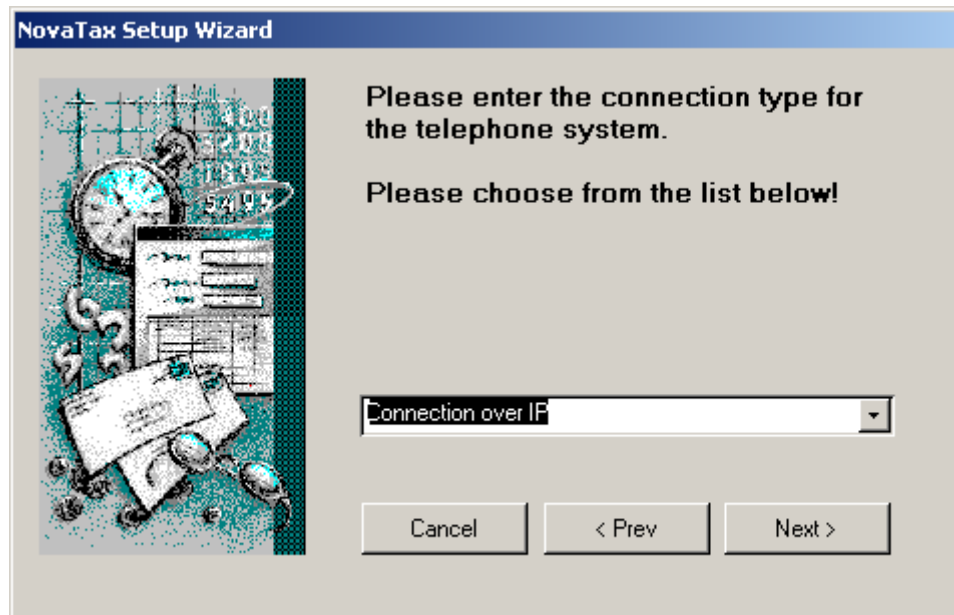
Figure 23: NovaTax Interface Selection Screen

Specify an IP address of "0.0.0.0" to listen on the local address, and click "Next".
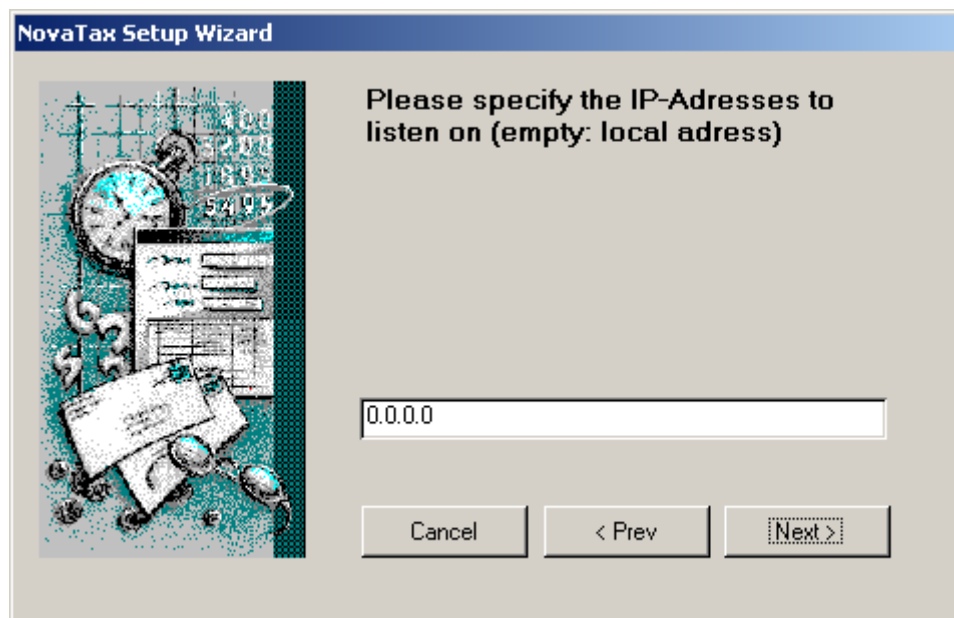
Figure 24: NovaTax Listen Address Selection Screen

Specify a TCP port of "9000" and click "Next". This port must match the port which is shown in **Figure 5** ("9000" is the default port used by Avaya IP Office as CDR interface).
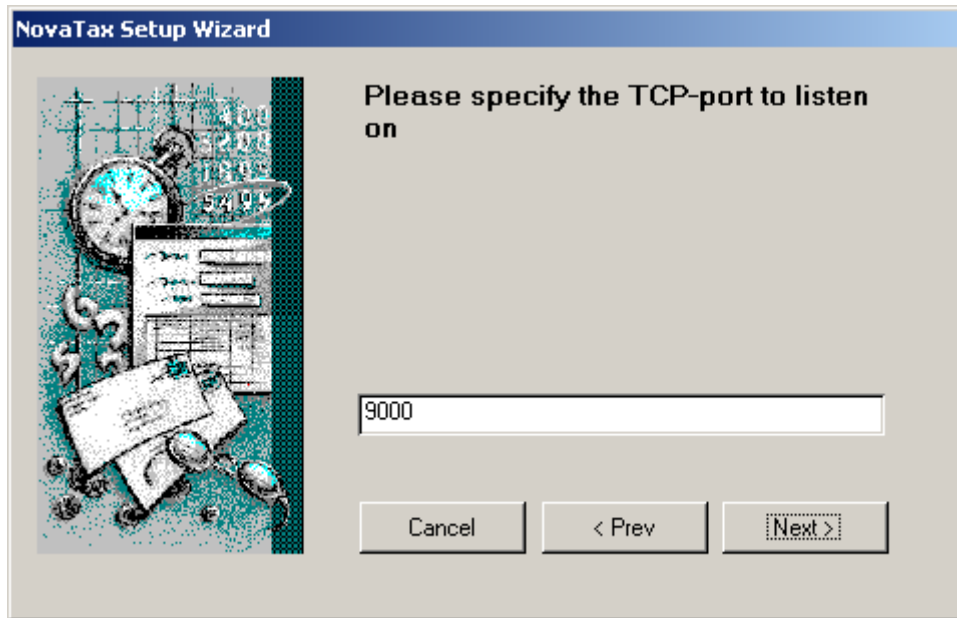
Figure 25: NovaTax Listen Port Selection Screen

Note the name of the configuration file used by NovaTax, and click "Next".
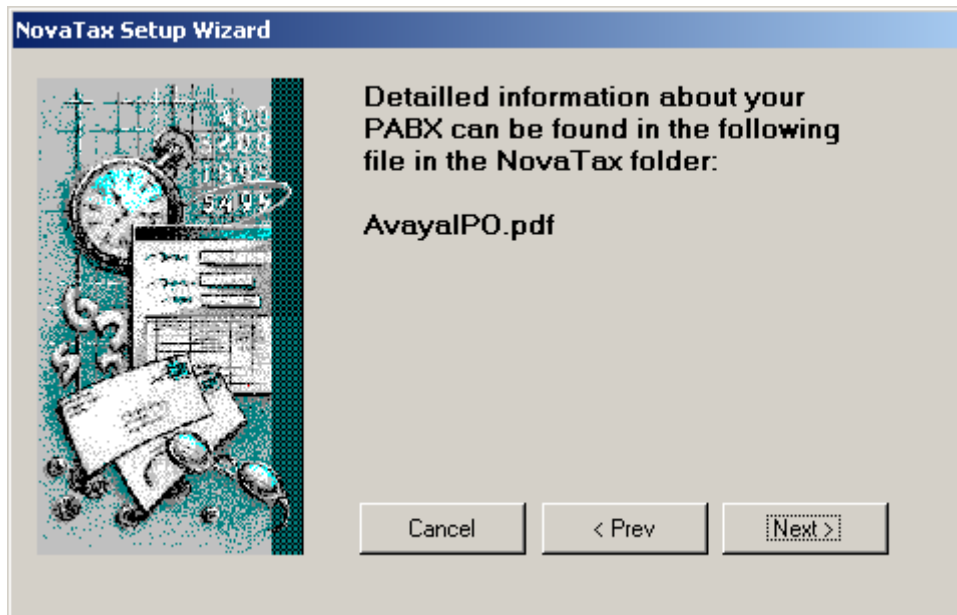
Figure 26: NovaTax Configuration File Screen

Click "Next" to complete the configuration of NovaTax and exit the Wizard by clicking "Finish".
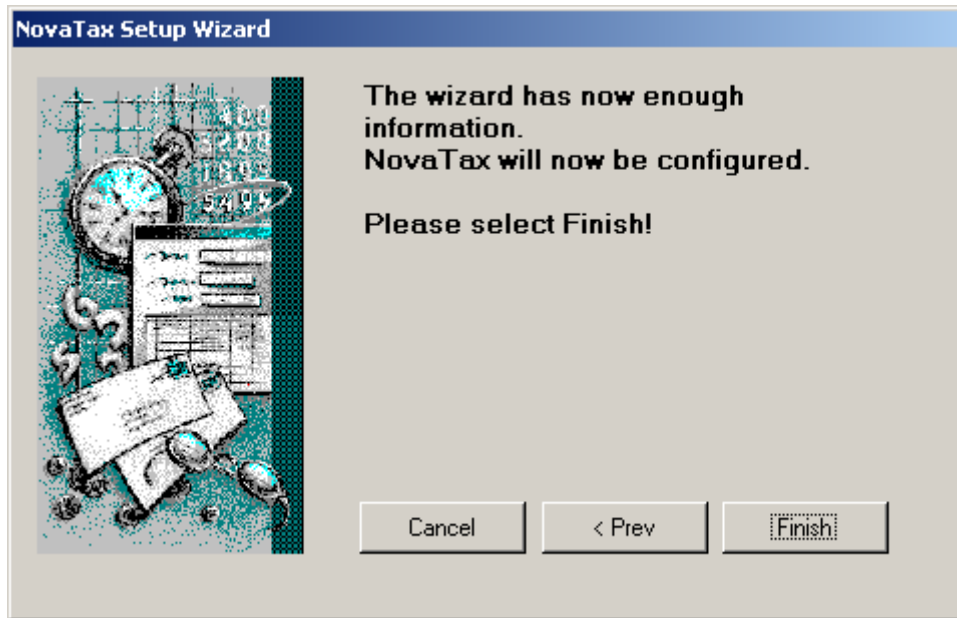
Figure 27: NovaTax Farewell Screen

To log records for calls which traverse the Avaya S8500 Server (Trunk 9) as internal, one must add a virtual carrier. In the NovaTax client menu, choose Database – Rate Structure – Carriers. Enter the parameters show in the following table.

Parameter	Usage
Carrier ID	This value is automatically assigned by NovaTax.
Carrier	Choose a description.
Starting Trunk	Enter the Trunk Access Code of the trunk to the other PBX.
Ending Trunk	Enter the Trunk Access Code of the trunk to the other PBX.
Save as internal	Check this box to save calls to this trunk as internal.

Table 13: NovaTax Carrier Parameters for Internal Calls

Leave the other fields at the default values. Click the "Define new Rates" button to save the changes. Consult the NovaTax manual [3] for further reference.

Figure 28: NovaTax Carrier Configuration for Internal Trunk

Configure NovaTax to log records for PSTN calls. In the NovaTax client menu, choose Database – Rate Structure – Carriers. Enter the parameters show in the following table.

Parameter	Usage
Carrier ID	This value is automatically assigned by NovaTax.
Carrier	Choose a description.
Default Carrier	Check this box.
Omit selection number	Check this box.
PABX Charge	Check this box.

Table 14:: NovaTax Carrier Parameters for PSTN Calls

Leave the other fields at the default values. Click the "Define new Rates" button to save the changes. Consult the NovaTax manual [3] for further reference.

Figure 29: NovaTax Carrier Configuration for PSTN Trunk

4. Interoperability Compliance Testing

The interoperability compliance tests included feature and serviceability testing.

The feature testing focused on testing scenarios that involve interaction between the NovaTax server and Avaya products, including various sequences involving the following:

- Verification of the ability of the NovaTax server to correctly compute call charges for calls made to local stations, calls made to stations attached to another PBX via a trunk, and calls made to external telephones attached to the PSTN.
- Verification of the ability of the NovaTax server to differentiate between incoming and outgoing calls.
- Verification of the ability of NovaTax to correctly assign call charges to stations which participate in hold, transfer, blind transfer, and conferencing operations with local, external, and stations attached to another PBX.
- Verification of the ability of the NovaTax server to ignore ineffective call attempts.
- Verification of the ability of the NovaTax server to correctly allocate call charges for calls which are made to or from bridged appearances.
- Verification of the ability of the NovaTax server to not lose data when the data link to Avaya IP Office is interrupted.
- Verification of the ability of the NovaTax server to recover from unexpected power interruption.

4.1. General Test Approach

The test method employed can be described as follows:

- The ability of NovaTax to correctly assess calling changes to various types of calls was tested by manually performing the call operation, and then creating a call invoice from NovaTax and verifying its correctness.
- The robustness of NovaTax was tested by verifying its ability to recover from interruptions to its external connection to Avaya IP Office without losing call charging information.

All testing was performed manually. The tests were all functional in nature, and no performance testing was done.

4.2. Test Results

NovaTax correctly interpreted all CDR records which were generated by Avaya IP Office. NovaTax was also able to recover from interruptions to its data link to the IP Office as well loss of power without loss of CDR records.

5. Verification Steps

The following steps can be performed to verify the basic operation of the various system components:

- Verify that Avaya IP Office and the NovaTax server can ping each other. The "ping" command can be executed from the NovaTax server by executing the "cmd" component via the run facility from the Windows "Start" control and entering "ping" followed by the IP address to which the ping message is to be sent. The "ping" command can be executed from Avaya IP Office via an SSH login session.
- Verify that the Avaya IP Telephones can call each other.
- Make calls to local, external, and stations attached via a trunk, and verify that the content of the invoice generated by NovaTax correctly reflects the actual resource utilization.
- Perform hold, transfer, blind transfer, and conferencing operations, and verify that the content of the invoice generated by NovaTax correctly reflects the actual resource utilization.
- Make calls to and from bridged appearances and verify that the content of the invoice generated by NovaTax allocates charges to the correct station number.
- Perform calling operations while NovaTax is disconnected from the network and verify that those calls are show correctly in the invoice which is generated after NovaTax is reconnected to the network.

6. Support

Technical support from NovaLink can be obtained through the following:

> NovaLink GmbH
> Businesstower
> Zuercherstrasse 310
> 8500 Frauenfeld
> Switzerland
> helpdesk@novalink.ch
> Phone: +41 52 762 66 77
> Fax: +41 52 762 66 99

7. Conclusion

These Application Notes describe the conformance testing of the NovaLink NovaTax with Avaya IP Office. The ability of NovaTax to generate invoices which correctly reflect telephone activity was tested. A detailed description of the configuration required for both the Avaya and the NovaLink equipment is documented within these Application Notes. NovaTax passed all of the tests performed, which included both functional and robustness tests.

8. Additional References

[1] *Administrator Guide for Avaya IP Office*, February 2007, Issue 3, Document Number 03-300509

[2] *Feature Description and Implementation for Avaya IP Office*, February 2007, Issue 5, Document Number 555-245-205

[3] *NovaTax 4.0 Manual*

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