Avaya Solution & Interoperability Test Lab

Application Notes for Configuring NovaLink NovaTax with Avaya Communication Manager– Issue 1.0

Abstract

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

Information in these Application Notes has been obtained through Developer*Connection* compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* 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 NovaTax and Avaya Communication Manager, 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.
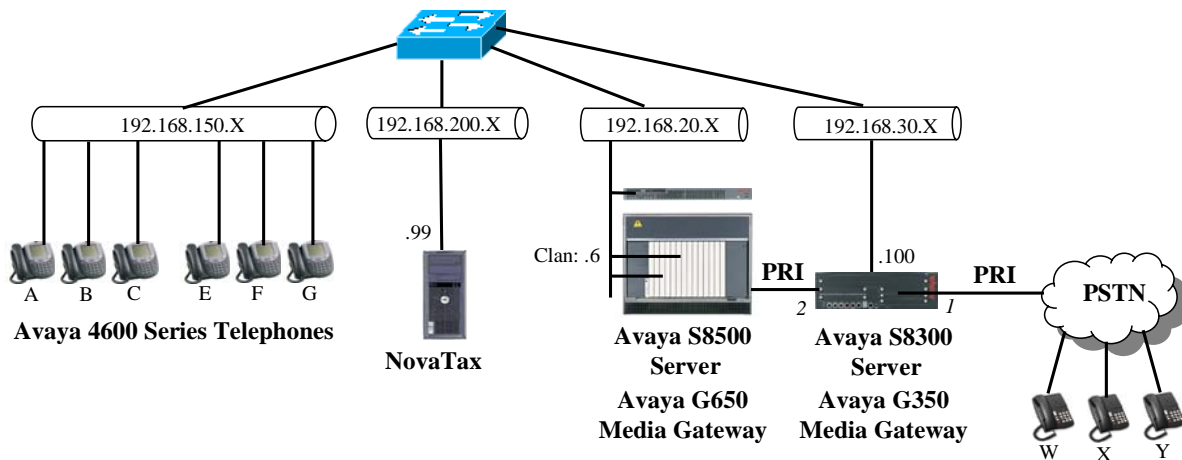
Figure 1: NovaTax Test Configuration

The numbers associated with PRI trunks shown in the diagram correspond to trunk numbers which were configured for Avaya Communication Manager. The function of each of the components in **Figure 1** is as follows:

- The NovaTax server processes CDR records which it receives from the Avaya S8300 Server.
- The Avaya S8300 Server sends CDR records to the NovaTax server as call events occur.
- The Avaya G650 Media Gateway has a PRI trunk interface to the Avaya G350 Media Gateway. The Avaya G650 Media Gateway generates call activity over this PRI trunk, however the Avaya S8500 Server does not generate CDR records.
- The Avaya S8300 Server has a PRI 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 the Avaya S8300 Server.
- 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 S8300 Server	Avaya Communication Manager 4.0 (R014x.00.0.730.5) Service Pack 00.0.730.5-13566
Avaya G350 Media Gateway	26.31.0
MM712AP DCP	HW05 FW008
MM710AP DS1	HW05 FW018
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
3000136	A
3000134	B
3000133	C
2000013	E
2000121	F
2000126	G
01000113	W
01000114	X
01000118	Y

Table 2: Extensions Used for Testing

3.1. Configure Avaya Communication Manager

The configuration and verification operations illustrated in this section were all performed using the Avaya Communication Manager SAT terminal via SSH port 5022.

The information provided in this section describes the configuration of Avaya Communication Manager for this solution. For all other provisioning information such as installation and configuration, please refer to the product documentation in reference [1].

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The configuration operations describe in this section can be summarized as follows:

- Verify that the licenses allocated to the system are sufficient to the support the required configuration.
- Configure IP node name to be used by NovaTax.
- Configure the telephone stations that are to be used for testing.
- Configure the CDR IP service which sends the CDR records to NovaTax.
- Configure the format of the CDR records which are sent to NovaTax.
- Designate the list of stations for which intra-switch CDR records are to be generated.

The configuration of the PRI trunks which attach to the PSTN and the Avaya S8500 Server is outside the scope of these Application Notes.

3.1.1. Verify system-parameters customer-options

Use the **display system-parameters customer-options** command to verify that Avaya Communication Manager is licensed to meet the minimum requirements to interoperate with the NovaTax server. Those items shown in bold indicate required values or minimum capacity requirements. If these are not met in the configuration, please contact an Avaya representative for further assistance.

On page 2, the value configured for "Maximum Concurrently Registered IP Stations" must be sufficient to support the total number of IP stations used.

```
display system-parameters customer-options                      Page   2 of  10
                           OPTIONAL FEATURES

IP PORT CAPACITIES                                               USED
                 Maximum Administered H.323 Trunks: 30    5
          Maximum Concurrently Registered IP Stations: 10    3
             Maximum Administered Remote Office Trunks: 0     0
Maximum Concurrently Registered Remote Office Stations: 0     0
             Maximum Concurrently Registered IP eCons: 0     0
  Max Concur Registered Unauthenticated H.323 Stations: 0     0
                 Maximum Video Capable H.323 Stations: 0     0
                  Maximum Video Capable IP Softphones: 0     0
                     Maximum Administered SIP Trunks: 10    3

   Maximum Number of DS1 Boards with Echo Cancellation: 0     0
                        Maximum TN2501 VAL Boards: 0     0
                   Maximum Media Gateway VAL Sources: 0     0
          Maximum TN2602 Boards with 80 VoIP Channels: 0     0
         Maximum TN2602 Boards with 320 VoIP Channels: 0     0
  Maximum Number of Expanded Meet-me Conference Ports: 0     0
```

Figure 2: System-Parameters Customers-Options Form, Page 2

On page 4, the "IP Stations" parameter must be set to "y" so that IP stations can be configured.

```
display system-parameters customer-options                      Page   4 of  10
                              OPTIONAL FEATURES

     Emergency Access to Attendant? y                           IP Stations? y
             Enable 'dadmin' Login? y
             Enhanced Conferencing? n                      ISDN Feature Plus? n
                     Enhanced EC500? y          ISDN Network Call Redirection? n
      Enterprise Survivable Server? n                         ISDN-BRI Trunks? y
        Enterprise Wide Licensing? n                                 ISDN-PRI? y
                 ESS Administration? n              Local Survivable Processor? n
             Extended Cvg/Fwd Admin? n                    Malicious Call Trace? n
          External Device Alarm Admin? n              Media Encryption Over IP? n
   Five Port Networks Max Per MCC? n     Mode Code for Centralized Voice Mail? n
                 Flexible Billing? n
     Forced Entry of Account Codes? n                   Multifrequency Signaling? y
        Global Call Classification? n      Multimedia Call Handling (Basic)? n
                Hospitality (Basic)? y   Multimedia Call Handling (Enhanced)? n
 Hospitality (G3V3 Enhancements)? n
                        IP Trunks? y


             IP Attendant Consoles? n
```

Figure 3: System-Parameters Customers-Options Form, Page 4

3.1.2. Configure Node Names

Use the **change node-names ip** command to configure the IP address of the NovaTax and the Avaya S8300 server.

```
change node-names ip                                            Page   1 of   2
                              IP NODE NAMES
     Name              IP Address
default              0.0.0.0
NovaTax              192.168.200.99
procr                192.168.30.100
```

Figure 4: Node-Names IP Form

3.1.3. Configure Telephone Stations

Use the **add station** command to configure all of the telephones shown in **Table 2**.

Parameter	Usage
Type	Enter the type of station that is to be configured.
Security Code	Enter a numeric security code
Name	Enter a descriptive name for the user of the station.

Table 3: Station Parameters

```
add station 3000136                                              Page   1 of   5
                                 STATION

Extension: 300-0136                     Lock Messages? n                BCC: 0
     Type: 4621                    Security Code: 6310003                TN: 1
     Port: S00006                 Coverage Path 1:                      COR: 1
     Name: extn 3000136           Coverage Path 2:                      COS: 1
                                   Hunt-to Station:
STATION OPTIONS
                                          Time of Day Lock Table:
           Loss Group: 19        Personalized Ringing Pattern: 1
                                           Message Lamp Ext: 300-0136
          Speakerphone: 2-way           Mute Button Enabled? y
      Display Language: english          Expansion Module? n
 Survivable GK Node Name:
         Survivable COR: internal        Media Complex Ext:
   Survivable Trunk Dest? y                     IP SoftPhone? n



                                   Customizable Labels? y
```

Figure 5: Add Station Form, Page 1

3.1.4. Configure IP Services

Use the **change ip-services** command to configure the IP service which sends CDR records to NovaTax.

Parameter	Usage
Service Type	Enter "CDR1" to specify that the primary CDR interface is to be used to send CDR records to NovaTax. This must correspond to the "Primary Output Endpoint" parameter which is shown in **Figure 8**.
Local Node	Enter "procr" to specify the G350 processor IP interface is to be used to send CDR records. This value must be configured in **Figure 4**.
Remote Node	Enter "novatax" to specify that CDR records are to be sent to the NovaTax server. This value must be configured in **Figure 4**.
Remote Port	Enter "9000" to specify that CDR records are to be sent to the NovaTax port which is in **Figure 16**.
Reliable Protocol	Set this parameter to "y" to indicate that CDR records are to be sent using the Reliable Protocol to prevent data loss due to transmission errors.

Table 4: Station Parameters

```
change ip-services                                          Page   1 of   3


                              IP SERVICES
  Service      Enabled      Local       Local       Remote      Remote
   Type                     Node        Port         Node        Port
 CDR1                      procr          0        novatax       9000
```

Figure 6: Node-Names IP Form, Page 1

```
change ip-services                                          Page   3 of   3


                           SESSION LAYER TIMERS
   Service      Reliable  Packet Resp  Session Connect  SPDU  Connectivity
    Type        Protocol    Timer       Message Cntr    Cntr     Timer

   CDR1            y          30             3           3         60
```

Figure 7: Node-Names IP Form, Page 3

3.1.5. Configure CDR Interface to NovaTax

Use the **change system-parameters cdr** command to configure the Avaya S8300 Server to send CDR records using the format required by NovaTax. Set the parameters on page 1 of this form as show in the following table.

Parameter	Usage
Primary Output Format	Set this field to "customized" so that CDR records can be generated using the format required by NovaTax.
Primary Output Endpoint	Set this field to "CDR1" to use the CDR IP output device which was configured in **section 3.1.4**.

Table 5: Values Used for System-Parameters CDR, Page 1

```
change system-parameters cdr                                      Page  1 of  2
                            CDR SYSTEM PARAMETERS

 Node Number (Local PBX ID):                          CDR Date Format: day/month
     Primary Output Format: customized    Primary Output Endpoint: CDR1
   Secondary Output Format:
             Use ISDN Layouts? y                    Enable CDR Storage on Disk? n
        Use Enhanced Formats? n     Condition Code 'T' For Redirected Calls? n
      Use Legacy CDR Formats? n                 Remove # From Called Number? y
Modified Circuit ID Display? n                            Intra-switch CDR? n
              Record Outgoing Calls Only? n     Outg Trk Call Splitting? y
 Suppress CDR for Ineffective Call Attempts? y       Outg Attd Call Record? y
     Disconnect Information in Place of FRL? n      Interworking Feat-flag? n
 Force Entry of Acct Code for Calls Marked on Toll Analysis Form? n
                                 Calls to Hunt Group - Record: group-ext
Record Called Vector Directory Number Instead of Group or Member? n

    Inc Trk Call Splitting? n
 Record Non-Call-Assoc TSC? n          Call Record Handling Option: warning
    Record Call-Assoc TSC? n   Digits to Record for Outgoing Calls: dialed
 Privacy - Digits to Hide: 0               CDR Account Code Length: 15
```

Figure 8: System-Parameters CDR Form, Page 1

The parameters on page 2 of the **system-parameters cdr** form define the format of the CDR record which is sent to NovaTax. Set the parameters on this form as shown in the following table. Additional information on this subject is contained in **[2].**

Parameter	Len	Usage	Parameter	Len	Usage
date	6	Call date	code-used	4	Used for outgoing calls when trunk group differs from access code dialed by user
time	4	Call time	out-crt-id	3	Trunk number within trunk group used for outgoing call
sec-dur	5	Call duration in 1/10 of minute units	code-dial	4	Access code that the user dials to place an outgoing call
vdn	5	VDN used for call.	cond-code	1	Condition code.
space	1	A space character	isdn-cc	5	ISDN condition code.
calling-num	15	The calling number	attd-console	4	attendant console number, if call participant
space	1	A space character	bcc	1	ISDN bearer capability class
dialed-num	18	The called number	ppm	5	PPM pulse count
acct-code	15	The account code for the call	return	1	A CR character
auth-code	7	User authorization code	line-feed	1	A LF character
in-trk-code	4	Incoming trunk group access code.	null	1	A NULL character
in-crt-id	3	Trunk number within trunk group used for incoming call			

Table 6: Values Used for System-Parameters CDR, Page 2

```
change system-parameters cdr                                   Page   2 of   2
                         CDR SYSTEM PARAMETERS
     Data Item - Length          Data Item - Length       Data Item - Length
  1: date            - 6   17: isdn-cc         - 5   33:                   -
  2: time            - 4   18: attd-console    - 4   34:                   -
  3: sec-dur         - 5   19: bcc             - 1   35:                   -
  4: vdn             - 5   20: ppm             - 5   36:                   -
  5: space           - 1   21: return          - 1   37:                   -
  6: calling-num     - 15  22: line-feed       - 1   38:                   -
  7: space           - 1   23: null            - 1   39:                   -
  8: dialed-num      - 18  24:                 -     40:                   -
  9: acct-code       - 15  25:                 -     41:                   -
 10: auth-code       - 7   26:                 -     42:                   -
 11: in-trk-code     - 4   27:                 -     43:                   -
 12: in-crt-id       - 3   28:                 -     44:                   -
 13: code-used       - 4   29:                 -     45:                   -
 14: out-crt-id      - 3   30:                 -     46:                   -
 15: code-dial       - 4   31:                 -     47:                   -
 16: cond-code       - 1   32:                 -     48:                   -

                          Record length = 114
```

Figure 9: System-Parameters CDR Form, Page 2

3.1.6. Configure Intra-Switch CDR Numbers

Use the **change intra-switch-cdr** command to specify that the CDR records are to be generated for locally-attached stations. Enter the local extensions A – C which are shown in **Table 1**.

```
change intra-switch-cdr                                        Page   1 of   3
                         INTRA-SWITCH CDR

                          Assigned Members:   4    of 1000   administered
   Extension          Extension          Extension          Extension
   300-0133
   300-0134
   300-0136
```

Figure 10: Intra-Switch CDR Form, Page 1

3.2. Configure NovaTax

Use the Windows "Start" button to select the program "NovaTax Setup Wizard". Enter your choice of language and click "Next".
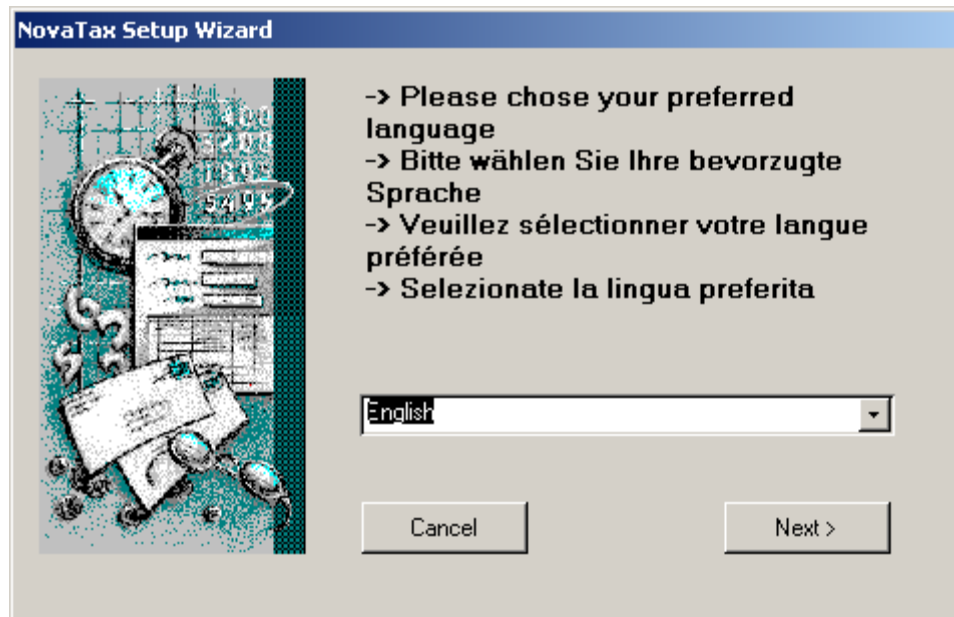
Figure 11: NovaTax Language Selection Screen

Choose "Configure PABX-Settings" from the drop-down box and click "Next".
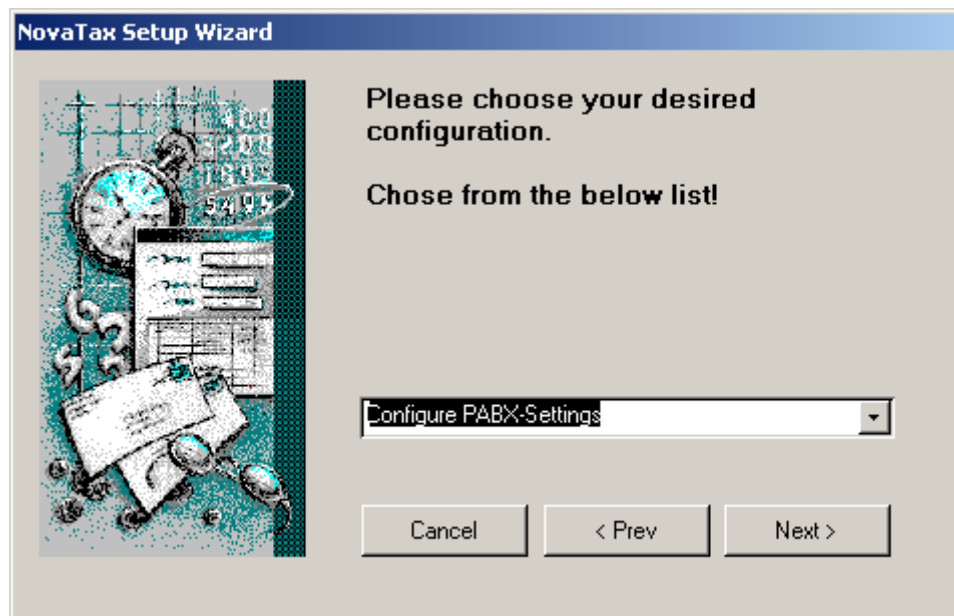
Figure 12: NovaTax Configuration Type Selection Screen

Select "Avaya ACM" from the drop-down box and click "Next".
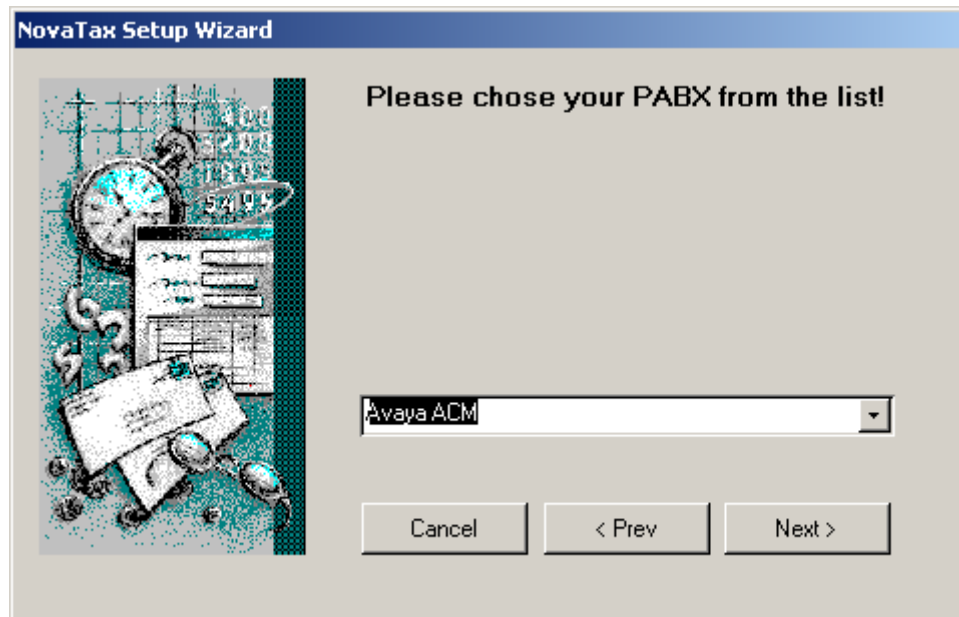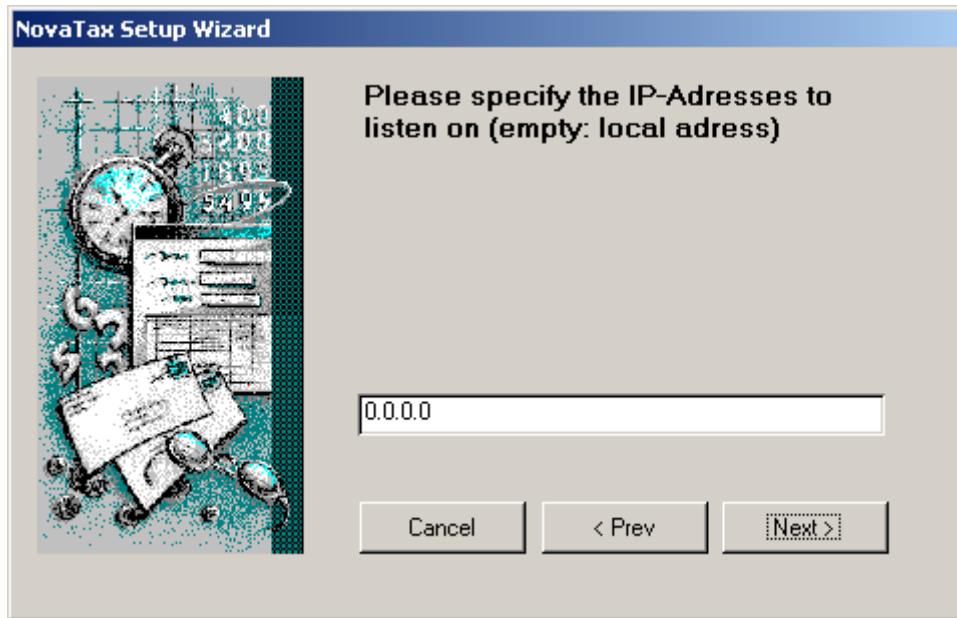
Figure 13: NovaTax PBX Vendor Selection Screen

Select "Avaya ACM IP Link" from the drop-down box and click "Next".
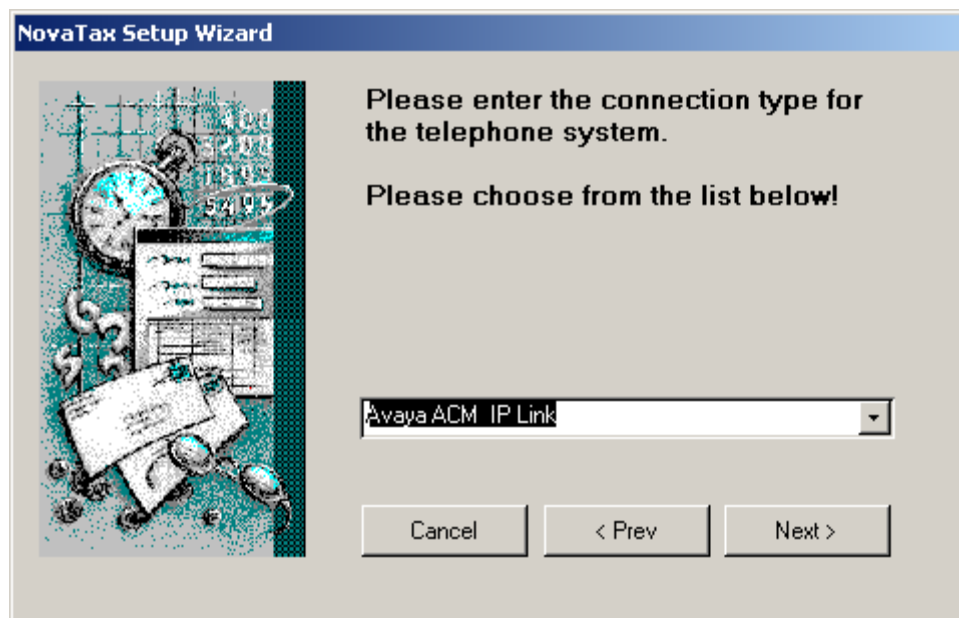
Figure 14: NovaTax Interface Selection Screen
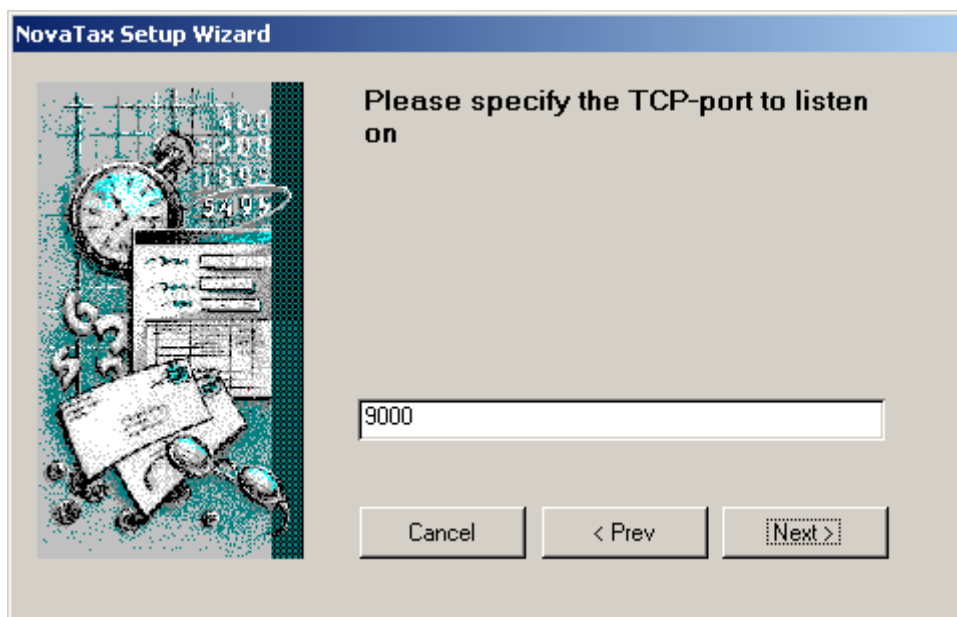
Specify an IP address of "0.0.0.0" from the drop-down box to listen on the local address, and click "Next".

Figure 15: NovaTax Listen Address Selection Screen

Specify a TCP port of "9000" and click "Next". This port must match the port which was specified in the **Figure 6**.

Figure 16: NovaTax Listen Port Selection Screen

Note the name of the configuration file used by NovaTax, and click "Next".
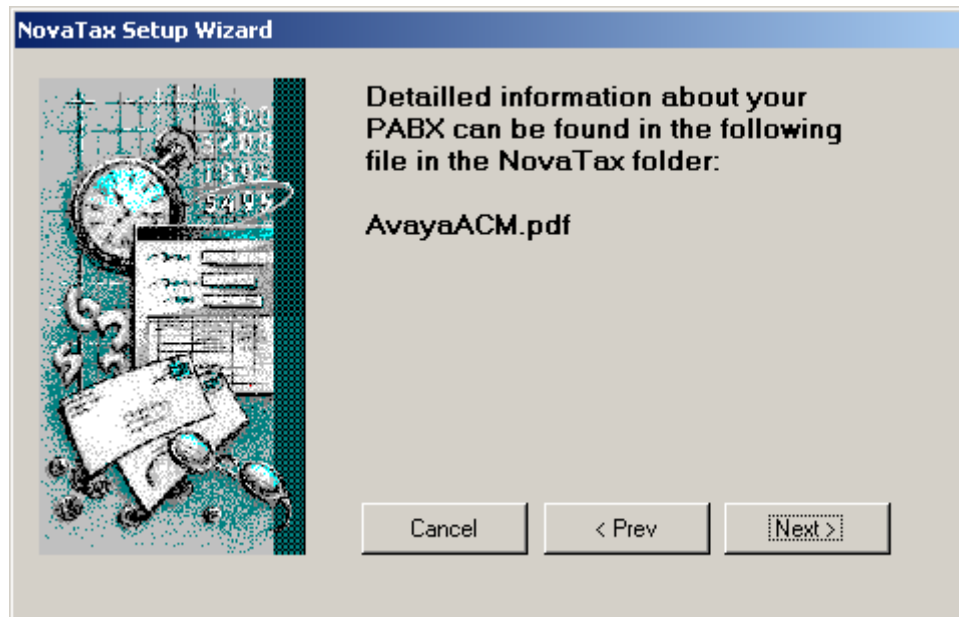
Figure 17: NovaTax Configuration File Screen

Click "Next" to complete the configuration of NovaTax and exit the Wizard by clicking "Finish".
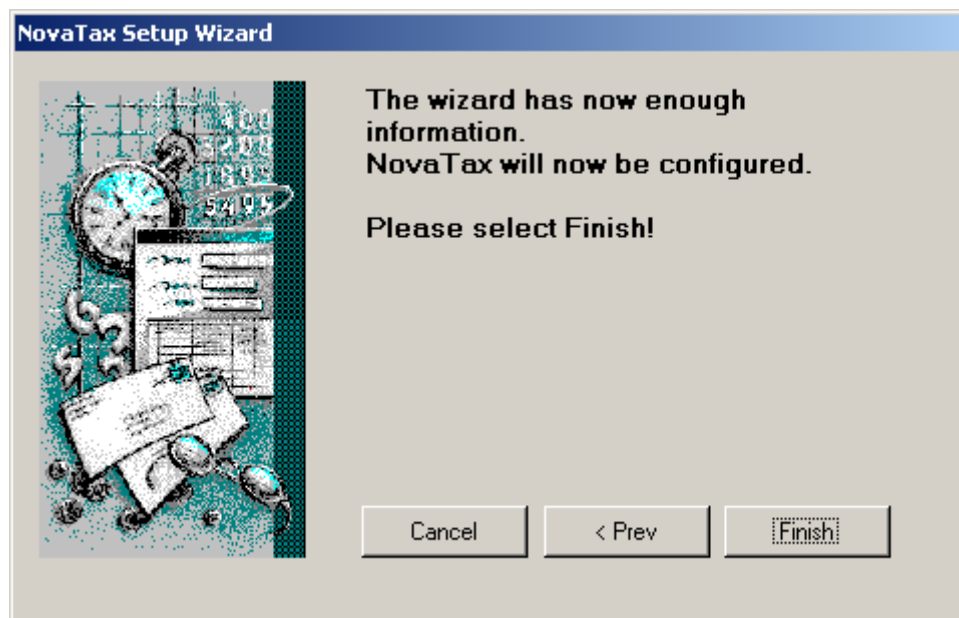
Figure 18: NovaTax Farewell Screen

To save calls to the Avaya G650 Media Gateway (Trunk 2) as internal, one must add a virtual carrier. In the NovaTax client menu, choose Database – Rate Structure – Carriers.

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.

Leave the other fields at the default values. Consult the NovaTax manual [4] for further reference.

Figure 19: NovaTax Carrier Configuration for Internal 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 correctly allocate call charges for calls which are made to a hunt group.
- Verification of the ability of the NovaTax server to not lose data when the data link to Avaya Communications Manager 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 Communication Manager 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

The following was observed during testing:

- NovaLink was unable to suppress the generation of invoice records for ineffective call attempts. However, since no charges were contained it those records, this was seen as a minor problem.

5. Verification Steps

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

- Verify that Avaya Communication Manager 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 Communication Manager 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.
- Make calls from external telephones to a VDN and verify that NovaTax correctly allocates the call to the VDN.
- 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.

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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 NovaTax with Avaya Communication Manager. 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. Other than the minor problem described in **Section 4.2**, NovaTax passed all of the tests performed, which included both functional and robustness tests.

8. Additional References

[1] *Administrator Guide for Avaya Communication Manager*, February 2007, Issue 3, Document Number 03-300509
[2] *Feature Description and Implementation for Avaya Communication Manager*, February 2007, Issue 5, Document Number 555-245-205
[3] *Installing and Administering SIP Enablement Services*, March 2007, Issue 2.1, Document Number 03-600768
[4] *NovaTax 4.0 Manual*