



Avaya Solution & Interoperability Test Lab

Application Notes for Envoy CT Connect with Avaya Communication Manager and Avaya Application Enablement Services using TSAPI – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Envoy CT Connect to interoperate with Avaya Communication Manager and Avaya Application Enablement Services using the Telephony Service API (TSAPI) interface. Envoy CT Connect is a Computer Telephony Integration (CTI) middleware platform that provides call control and monitoring functionality through various application programming interfaces to end user applications.

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

Envox CT Connect is computer telephony call control server software capable of connecting a variety of TDM and VoIP telephone switches to distributed computer application environments.

Envox CT Connect can implement one of two mechanisms to integrate with Avaya Communication Manager, via the Avaya Application Enablement Services (AES) server:

- Avaya Telephony Service API (TSAPI) interface
- Avaya Adjunct Switch Application Interface (ASAI) protocol

This document focuses on integration using TSAPI. Envox CT Connect implements TSAPI to provide Computer Telephony Integration (CTI) call control and monitoring functionality and application programming interfaces to end user business applications. The integration with Avaya Communication Manager is accomplished through the Avaya Application Enablement TSAPI service, as illustrated in **Figure 1**.

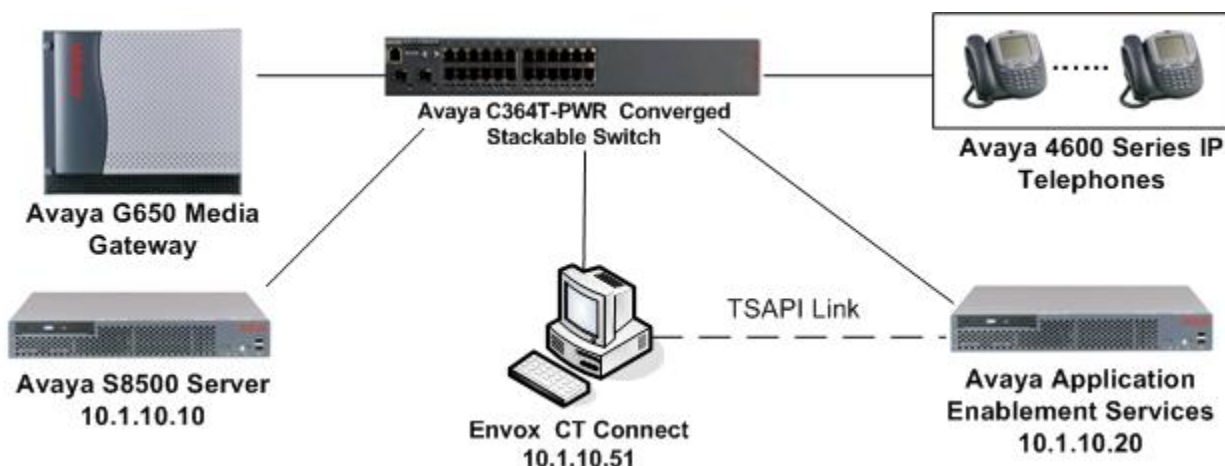


Figure 1: Envox CT Connect with Avaya Communication Manager using Avaya AES

Envox CT Connect utilizes a client/server model to support client applications that can be developed with C, C++, Java, TAPI, and ActiveX to enable application developers to integrate call control features into existing business applications.

The server component of the software runs under Microsoft Windows operating system environments, and supports call control and monitoring through links to telephony switches. The software also includes client application programming interfaces for Microsoft Windows 2000, Microsoft Windows 2003, Microsoft Windows XP, Sun Solaris, Hewlett-Packard HP-UX, Compaq Tru64 UNIX, and OpenVMS operating systems.

The compliance testing focused on verification of the Envoy CT Connect server with Avaya Communication Manager, and did not include verification of interfaces between the Envoy CT Connect server with the Envoy CT Connect client applications. An Envoy CT Connect test tool was utilized to emulate client applications to initiate call actions, verify feature functionality, and troubleshoot.

The range of applications that can be developed utilizing Envoy CT Connect includes:

- Customer relationship management
- Call recording and quality monitoring
- Contact center workforce management
- Contact center
- Help desk
- Interactive voice response
- Screen pop

2. Equipment and Software Validated

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

Equipment	Software
Avaya S8500B Server	Avaya Communication Manager 5.0 (R015x.00.0.825.4), patch 15175
Avaya Application Enablement Services	4.1, build 31-2
Avaya G650 Media Gateway C-LAN TN799DP Medpro TN2302AP	HW 1, FW24 HW 20, FW116
Avaya C364T-PWR Converged Stackable Switch	4.3.12
Avaya 4600 Series IP Telephones	2.8 (H.323)
Envoy CT Connect on Dell PC	7.0 build 742 SP3 Windows XP Professional

3. Configure Avaya Communication Manager

Basic configuration of Avaya Communication Manager and Avaya Application Enablement Services Server are beyond the scope of these Application Notes. The detailed administration of contact center devices, such as ACD/Skill groups and logical agents, is assumed to be in place and are not covered in these Application Notes. See Section 10 for Avaya documentation details.

3.1. Verify Avaya Communication Manager License

Log into the System Access Terminal (SAT) to verify that the Avaya Communication Manager license has proper permissions for features illustrated in these Application Notes. Use the **display system-parameters customer-options** command. On Page 3, verify that the **Computer Telephony Adjunct Links** option is set to “y”.

```
display system-parameters customer-options                               Page 3 of 11
                                OPTIONAL FEATURES

    Abbreviated Dialing Enhanced List? y          Audible Message Waiting? y
    Access Security Gateway (ASG)? n              Authorization Codes? y
    Analog Trunk Incoming Call ID? y Backup Cluster Automatic Takeover? n
    A/D Grp/Sys List Dialing Start at 01? y        CAS Branch? n
    Answer Supervision by Call Classifier? y        CAS Main? n
    ARS? y                                         Change COR by FAC? n
    ARS/AAR Partitioning? y Computer Telephony Adjunct Links? y
    ARS/AAR Dialing without FAC? y Cvg Of Calls Redirected Off-net? y
    ASAI Link Core Capabilities? n                DCS (Basic)? y
    ASAI Link Plus Capabilities? n                DCS Call Coverage? y
    Async. Transfer Mode (ATM) PNC? n             DCS with Rerouting? y
    Async. Transfer Mode (ATM) Trunking? y
    ATM WAN Spare Processor? n Digital Loss Plan Modification? n
    ATMS? y                                       DS1 MSP? n
    Attendant Vectoring? n                      DS1 Echo Cancellation? N
```

On Page 6, verify that the **Vectoring (Basic)** customer option is set to “y” for applications that utilize the Adjunct Routing feature.

```
display system-parameters customer-options                               Page 6 of 11
                                CALL CENTER OPTIONAL FEATURES

                                Call Center Release: 3.0

    ACD? y                                         Reason Codes? y
    BCMS (Basic)? y                               Service Level Maximizer? n
    BCMS/VuStats Service Level? y                Service Observing (Basic)? y
    BSR Local Treatment for IP & ISDN? n          Service Observing (Remote/By FAC)? y
    Business Advocate? n                         Service Observing (VDNs)? y
    Call Work Codes? y                           Timed ACW? y
    DTMF Feedback Signals For VRU? n             Vectoring (Basic)? y
    Dynamic Advocate? n                         Vectoring (Prompting)? y
```

3.2. Administer CTI Link for TSAPI Service

Add a CTI link using the **add cti-link n** command, where “n” is an available CTI link number. Enter an available extension number in the **Extension** field. Note that the CTI link number and extension number may vary. Enter “ADJ-IP” in the **Type** field, and a descriptive name in the **Name** field. Default values may be used in the remaining fields.

```
add cti-link 3                                     Page 1 of 2
                                         CTI LINK
CTI Link: 3
Extension: 13303
Type: ADJ-IP
                                         COR: 1
Name: Envox TSAPI Link
```

3.3. Administer Vector and VDN for Adjunct Routing

For applications that utilize the Adjunct Routing feature to make call routing decisions, administer a vector and a Vector Directory Number (VDN). Modify the vector using the **change vector n** command, where “n” is an existing vector number. The vector will be used to provide adjunct routing to the CTI link defined previously in Section 3.2. Note that the vector **Number**, **Name**, **wait-time** step, and **route-to number** step may vary. The **route-to number** step is used as the covering point to provide failure coverage in case of failures from adjunct route.

```
change vector 1                                     Page 1 of 3
                                         CALL VECTOR
Number: 1
Name: Envox Rt Vector
Multimedia? n
Basic? y      EAS? y    G3V4 Enhanced? y    Meet-me Conf? n    Lock? n
Prompting? y  LAI? y    G3V4 Adv Route? y    ANI/II-Digits? y   ASAI Routing? y
Variables? n  3.0 Enhanced? n    CINFO? y    BSR? n    Holidays? n
01 adjunct    routing link 3
02 wait-time  30 secs hearing ringback
03 route-to   number 10005        with cov n if unconditionally
04
```

Add the VDN using the **add vdn n** command, where “n” is an available extension number. Enter a descriptive name for the **Name** field, and the vector number from above for the **Vector Number** field. Retain the default values for all remaining fields.

```
add vdn 1                                           Page 1 of 2
                                         VECTOR DIRECTORY NUMBER
Extension: 17001
Name: Envox Routing VDN
Vector Number: 1
Meet-me Conferencing? n
Allow VDN Override? n
COR: 1
TN: 1
```

4. Configure Avaya Application Enablement Services Server

This section provides the procedures for configuring Avaya Application Enablement Services. The procedures fall into the following areas:

- Verify Avaya Application Enablement Services License
- Administer TSAPI link

4.1. Verify Avaya AES Licensing

Initialise the Avaya AES OAM web interface by browsing to “http://x.x.x.x:8443/MVAP/index.jsp”, where “x.x.x.x” is the IP address of the Avaya AES, and log in (not shown). From the OAM Home screen select **CTI OAM Admin** (not shown) to bring up the CTI OAM Home screen. Verify the TSAPI service is licensed at the Welcome to CTI OAM Screens screen by ensuring that “TSAPI” is in the list of services in the License Information section.

AVAYA **Application Enablement Services**
Operations Administration and Maintenance

CTI OAM Home > CTI OAM Home

Welcome to CTI OAM Screens

[craft] logged in on Tue Sept 18 10:43:28 G.M.T. 2007

IMPORTANT: AE Services must be restarted for administrative changes to fully take effect. Changes to the Security Database do not require a restart.

Service	Controller Status
ASAI Link Manager	Running
DMCC Service	Running
CVLAN Service	Running
DLG Service	Running
Transport Layer Service	Running
TSAPI Service	Running

For status on actual services, please use [Status and Control](#).

License Information

You are licensed to run Application Enablement (CTI) version 4.0.

You are licensed for the following services

- DLG
- CVLAN
- TSAPI

4.2. Administer TSAPI link

From the CTI OAM Home menu, select **Administration** → **CTI Link Admin** → **TSAPI Links**. On the TSAPI Links screen (not shown), select **Add Link**. On the Add / Edit TSAPI Links screen, enter the following values for the specified fields and retain the default values in the remaining fields.

- **Link:** Use the drop-down list to select an unused link number.
- **Switch Connection:** Choose the switch connection already configured from the drop-down list.
- **Switch CTI Link Number:** Corresponding CTI link number configured in Section 3.2.

Once completed, click **Apply Changes**. On the Apply Changes to Link screen that appears next (not shown), click on **Apply**.

AVAYA Application Enablement Services
Operations Administration and Maintenance

You are here: > Administration > CTI Link Admin > TSAPI Links

Add / Edit TSAPI Links

Link: 1
Switch Connection: Clan1A1
Switch CTI Link Number: 3
ASAI Link Version: 4
Security: Unencrypted

Apply Changes Cancel Changes

The TSAPI Service must be restarted to effect the changes made in this section. From the CTI OAM Home menu, select **Maintenance** → **Service Controller**. Check the **TSAPI Service** check box and click **Restart Service**. On the Restart Service screen (not shown), select **Restart**.

AVAYA Application Enablement Services
Operations Administration and Maintenance

You are here: > Maintenance > Service Controller

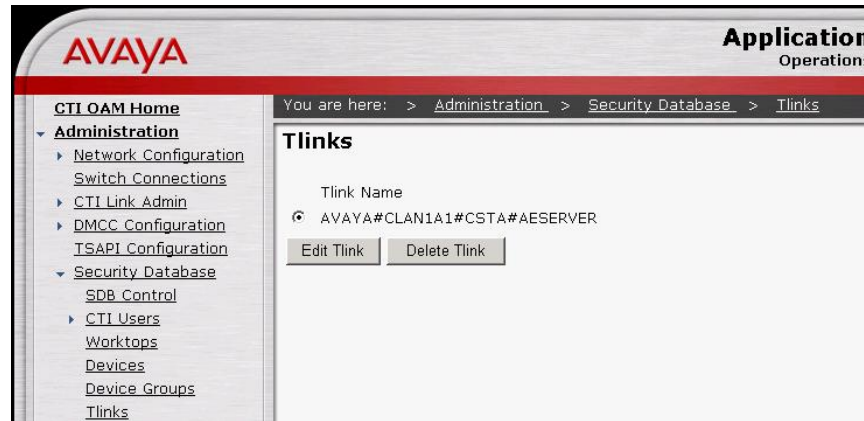
Service Controller

Service	Controller Status
<input type="checkbox"/> ASAI Link Manager	Running
<input type="checkbox"/> DMCC Service	Running
<input type="checkbox"/> CVLAN Service	Running
<input type="checkbox"/> DLG Service	Running
<input type="checkbox"/> Transport Layer Service	Running
<input type="checkbox"/> TSAPI Service	Running

For status on actual services, please use [Status and Control](#).

Start Stop Restart Service Restart AE Server Restart Linux

Navigate to the Tlinks screen by selecting **Administration → Security Database → Tlinks**. Note the value of the **Tlink Name**, this will be needed for configuring the Envoy CT Connect server in Section 5.4. The **Tlink Name** shown below is automatically created by the Avaya AES server.



4.3. Administer Envoy CT Connect User

A user ID and a password need to be configured for the Envoy CT Connect server to communicate as a TSAPI Client with the Avaya AES server. Click on **OAM Home → User Management** and log into the User Management pages. Click on **User Management** and then **Add User**. In the Add User screen shown below, enter the following values:

- **User Id** – This will be used by the Envoy CT Connect Server in Section 5.4
- **Common Name** and **Surname** – Descriptive names need to be entered
- **CT User** – Select “Yes” from the dropdown menu
- **New Password** and **Confirm Password** – This will be used with **Username** in Section 5.4

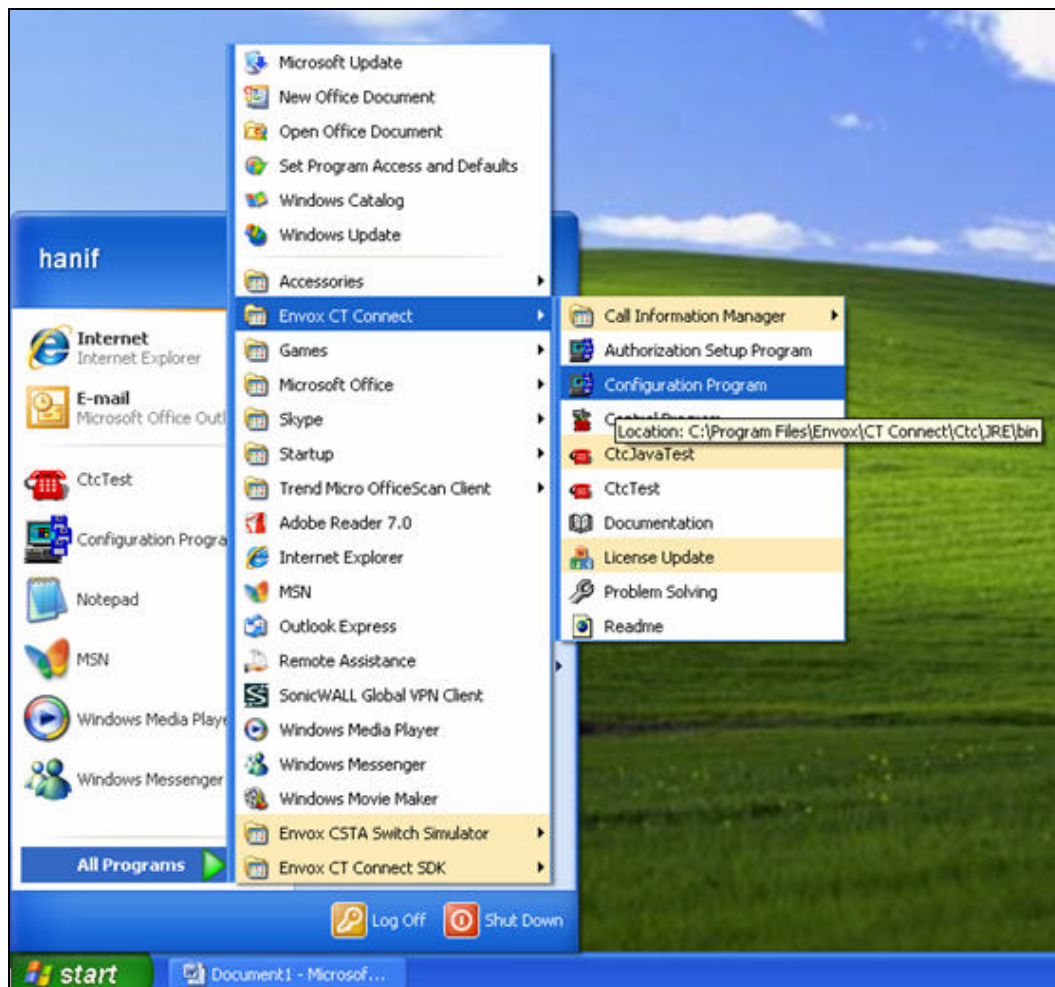
5. Configure Envoy CT Connect

This section provides the procedures for configuring the Envoy CT Connect server. The procedures include the following areas:

- Launch configuration program
- Administer link
- Administer switch type
- Administer IP address and link number

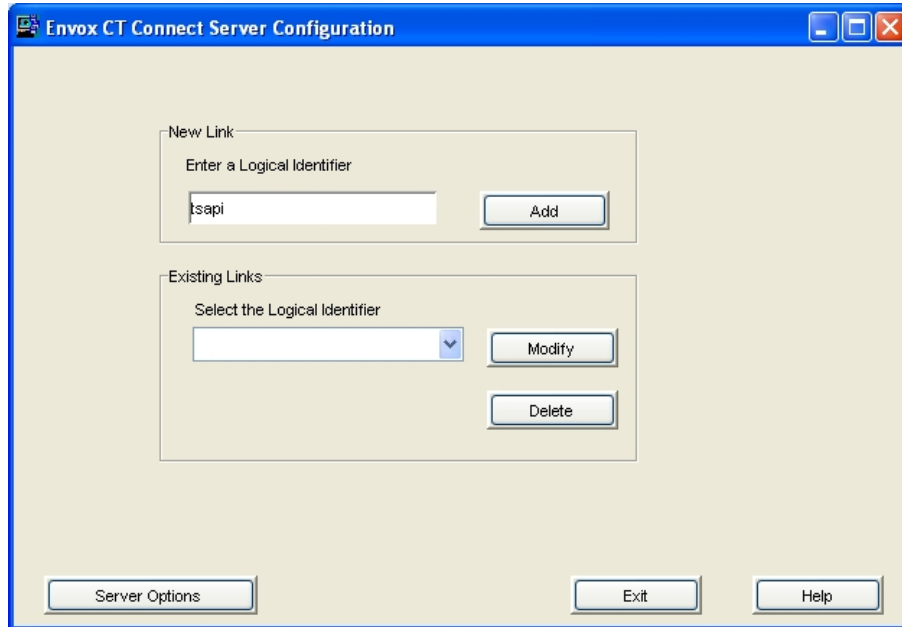
5.1. Launch Configuration Program

Envoy CT Connect uses a GUI based configuration program to configure communication links between the Envoy CT Connect server and telephone switches. From the Envoy CT Connect server, launch the configuration program by selecting **Start → All Programs → Envoy CT Connect → Configuration Program** as shown below.



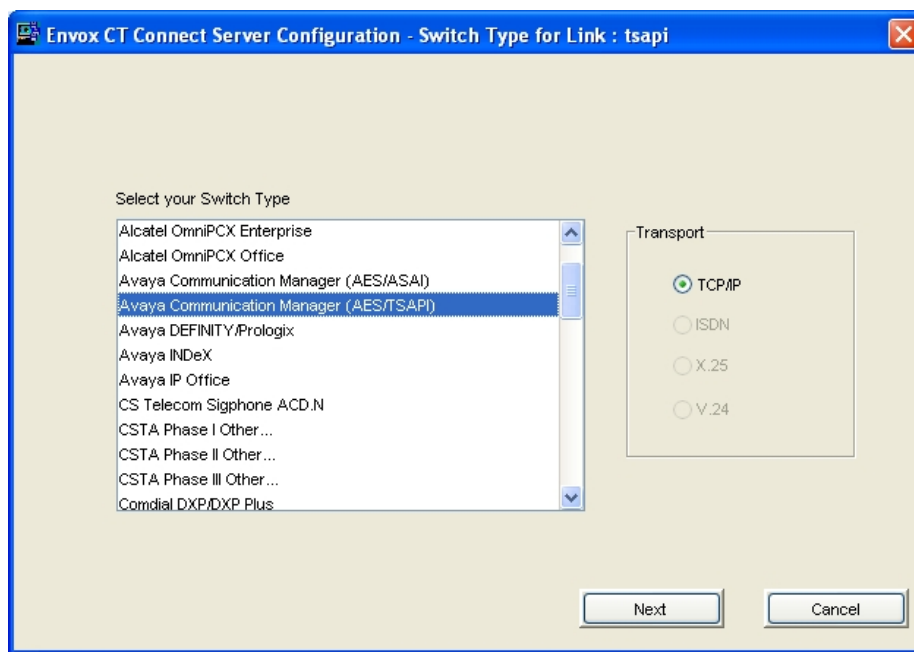
5.2. Administer Link

The Envoy CT Connect Server Configuration screen is displayed. Enter a descriptive name for the **Enter a Logical Identifier** field, in this case “tsapi”. Click on the **Add** button.



5.3. Administer Switch Type

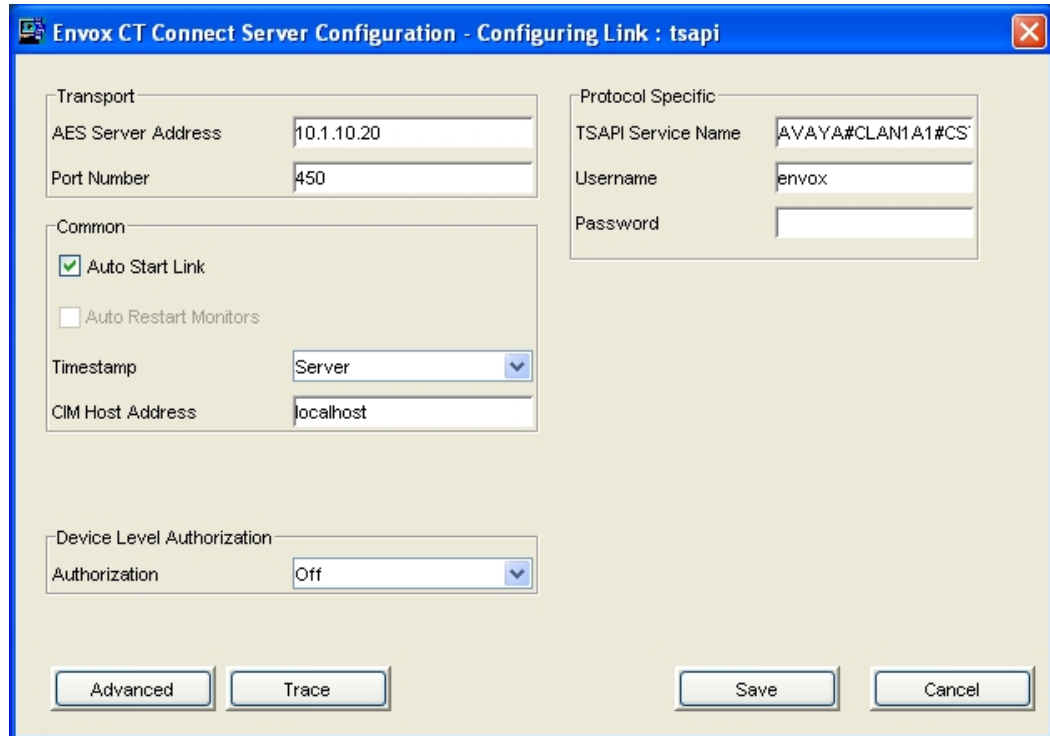
Select **Avaya Communication Manager (AES/TSAPI)** from the list and click **Next**.



5.4. Administer IP Address and Link Number

Enter the following values for the specified fields, and retain the default values in the remaining fields. Click on **Save**.

- **AES Server Address:** AES client connectivity IP address from **Figure 1**.
- **TSAPI Service Name:** enter the **Tlink Name** from Section 4.2.
- **Username:** enter **User Id** configured in Section 4.3.
- **Password:** enter **Password** configured in Section 4.3.



The image shows a Windows-style dialog box titled "Envox CT Connect Server Configuration - Configuring Link : tsapi". The dialog is divided into several sections for configuring a TSAPI link.

- Transport Section:** Contains two text input fields. "AES Server Address" is set to "10.1.10.20" and "Port Number" is set to "450".
- Common Section:** Contains two checkboxes, "Auto Start Link" (checked) and "Auto Restart Monitors" (unchecked). It also has a "Timestamp" dropdown menu set to "Server" and a "CIM Host Address" text input field set to "localhost".
- Protocol Specific Section:** Contains three text input fields. "TSAPI Service Name" is set to "AVAYA#CLAN1A1#CS", "Username" is set to "envox", and "Password" is empty.
- Device Level Authorization Section:** Contains a dropdown menu for "Authorization" set to "Off".

At the bottom of the dialog, there are four buttons: "Advanced", "Trace", "Save", and "Cancel".

6. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing. The feature testing focused on verifying Envoy CT Connect handling of CTI messages in the areas of domain control, call control, event notification, routing, value query, request feature, and set value. The serviceability testing focused on verifying the ability of Envoy CT Connect to recover from adverse conditions, such as busying out the CTI link and disconnecting the Ethernet cable for the CTI link.

6.1. General Test Approach

All feature and serviceability test cases were performed manually. The Envoy CT Connect test tool was used to emulate a client application's initiation of domain control, call control, device monitoring, adjunct routing, value query, request feature, and set value requests. Incoming calls were made to the monitored/controlled/routing devices, to verify proper handling of event reports and routing requests by Envoy CT Connect. The verification included both manual checking of proper states at the telephone sets, and capturing CTI message traces and analyzing them with the Envoy CT Connect test tool.

6.2. Test Results

All feature test cases were executed and passed.

7. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Avaya Communication Manager, Avaya Application Enablement Services, and Envoy CT Connect.

7.1. Verify Avaya Communication Manager

Verify the status of the administered CTI link by using the **status aesvcs cti-link** command. Verify that the **Service State** is “established” for the CTI link number administered in Section 3.2, as shown below.

```
status aesvcs cti-link
```

AE SERVICES CTI LINK STATUS						
CTI Link	Version	Mnt Busy	AE Services Server	Service State	Msgs Sent	Msgs Rcvd
2	4	no	AEServer	established	14	14
3	4	no	AEServer	established	30	15

7.2. Verify Avaya Application Enablement Services

From the **CTI OAM Home** screen, verify the status of the TSAPI link by selecting **Status and Control** → **Services Summary** from the left pane. Click on **TSAPI Service**, followed by the **Details** button (not shown). The **TSAPI Service Summary** screen is displayed. Verify that the **Connection Status** is “Talking”, as shown below.

AVAYA

Application Enablement Service
Operations Administration and Maintenance

[OAM Home](#) [Help](#) [Login](#)

CTI OAM Home

[Administration](#)

[Status and Control](#)

[Maintenance](#)

[Alarms](#)

[Logs](#)

[Utilities](#)

[Switch Conn Summary](#)

[Services Summary](#)

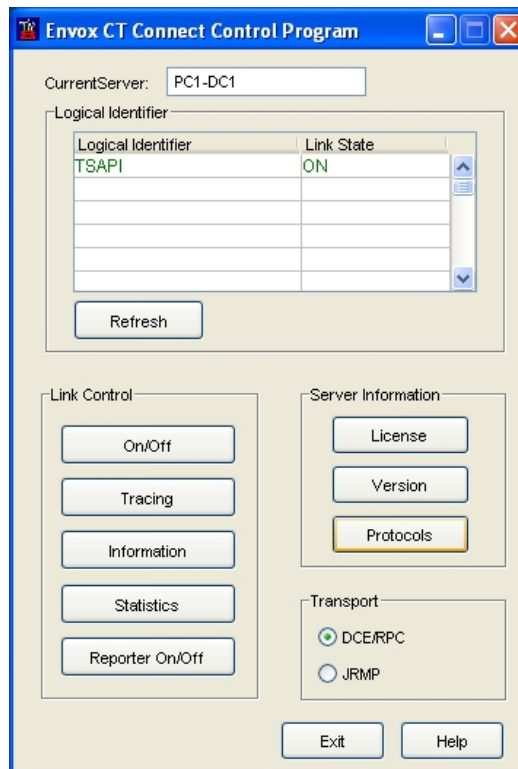
You are here: > [Status and Control](#) > [Services Summary](#)

TSAPI Link Details

Link	Switch Conn Name	Switch CTI Link Number	Conn Status	Since	Service State	Switch Version	Number of Associations	ASAI Message Rate
1	Clan1A1	3	Talking	2008-03-26 16:58:34.0	Online	15	2	15

7.3. Verify Envoy CT Connect

From the Envoy CT Connect server, select **Start → All Programs → Envoy CT Connect → Control Program** to bring up the Envoy CT Connect Control Program screen below. Check that the **Link State** associated with the administered **Logical Identifier** from Section 5.2 (in this case “TSAPI”) is “ON”.



8. Support

For technical support on Envoy CT Connect, contact the regional Envoy support center or the local Envoy distributor. Envoy technical support contact details are as follows:

Americas

+1 508 898 2600

us.support@envoy.com

EMEA

+44 1252 61 8888

euro.support@envoy.com

Asia Pacific

+65 6358 2241

asia.support@envoy.com

9. Conclusion

These Application Notes describe the configuration steps required for Envoy CT Connect 7.0 to interoperate with Avaya Communication Manager 5.0 and Avaya Application Enablement Services 4.1 using TSAPI. All feature and serviceability test cases were completed.

10. Additional References

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

Avaya product documentation can be found at <http://support.avaya.com>.

- *Administrator Guide for Avaya Communication Manager (5.0)*, Document ID 03-300509, Issue 4, January 2008
- *Avaya Application Enablement Services 4.1 Administration and Maintenance Guide*, Document ID 02-300357, Issue 9, February 2008

Envoy CT Connect product information available at:

<http://www.envoy.com/software/envoy-ct-connect.asp>

- Envoy CT Connect Product Brief
- Envoy CT Connect Documentation
- Download Evaluation Server

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