



Avaya Solution & Interoperability Test Lab

Application Notes for Envoy CT Connect 6.1 with Avaya Communication Manager 3.0 using Avaya Application Enablement Services – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Envoy CT Connect 6.1 to successfully interoperate with Avaya Communication Manager 3.0 using Avaya Application Enablement Services. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the *DeveloperConnection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

Envox CT Connect is computer telephony call control server software capable of connecting telephone switches to data processing environments. Envox CT Connect implements the Avaya ASAI protocol to provide CTI call control and monitoring functionality, and application programming interfaces to end user business applications. The integration with Avaya Communication Manager 3.0 is accomplished through the Avaya Application Enablement Services (AES) Definity LAN Gateway (DLG) service, as illustrated in **Figure 1**.

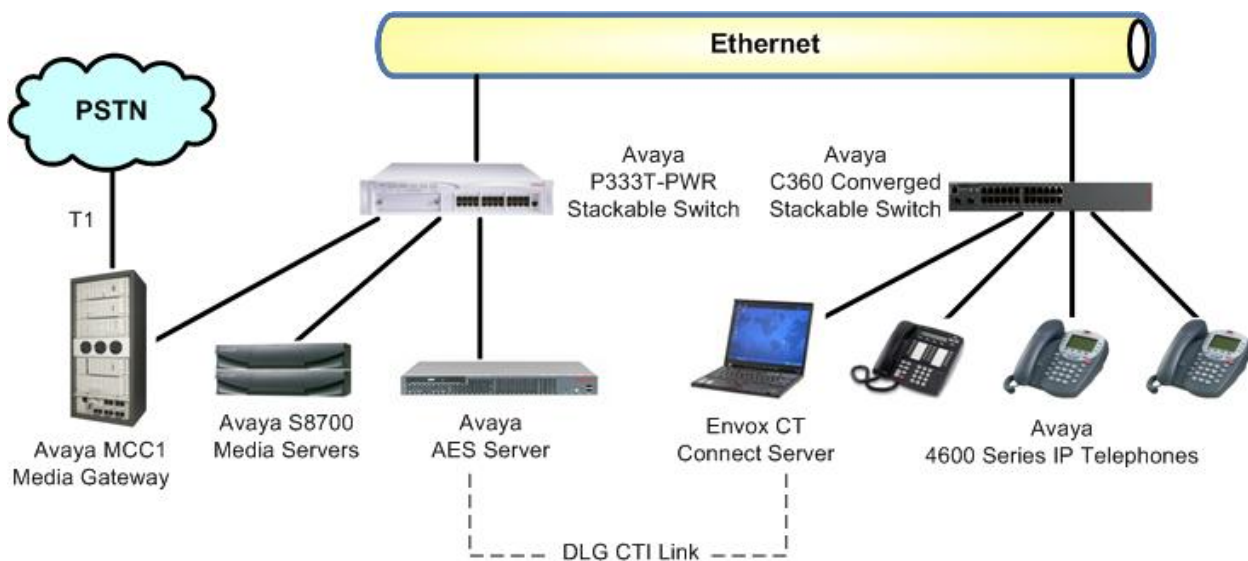


Figure 1: Envox CT Connect with Avaya Communication Manager using AES

The Envox CT Connect software client/server technology supports industry-standard hardware, operating systems, network services, and call control programming interfaces such as C, C++, Java, TAPI, and ActiveX, allowing application developers to easily integrate more intelligent call control features into existing business applications.

The server component of the software runs under Windows operating system environments and supports comprehensive call control and monitoring through links to many popular telephony switches. The software also includes client application programming interfaces for Microsoft Windows 2000, Windows 2003, Windows XP, Sun Solaris, Hewlett-Packard HP-UX, and 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 its client applications. An Envoy CT Connect test tool was utilized to emulate client applications to initiate call scenarios, verify feature functionality, and assist with troubleshooting.

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

- 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 S8700 Media Servers	Avaya Communication Manager 3.0
Avaya MCC1 Media Gateway <ul style="list-style-type: none">• TN799DP C-LAN Circuit Pack• TN2302AP IP Media Processor Circuit Pack	HW01 FW015 HW13 FW095
Avaya Application Enablement Services	3.0
Avaya 4600 Series IP Telephones	2.1.3 (4610SW), 1.8.3 (4624SW)
Envoy CT Connect on IBM ThinkPad with Windows 2003	6.1 SP1

3. Configure Avaya Communication Manager

This section provides the procedures for configuring Avaya Communication Manager. The procedures fall into the following areas:

- Administer C-LAN for AES connectivity
- Administer transport link for AES connectivity
- Administer CTI link with DLG service
- Administer call vector for adjunct routing

3.1. Administer C-LAN for AES Connectivity

Prior to any administration, verify that the **ASAI Link Core Capabilities** customer option is set to “y” on Page 3 using the “display system-parameters customer-options” command, as shown in **Figure 2** below. If the **ASAI Link Core Capabilities** is not set to “y”, then contact the Avaya sales team or business partner for a proper license file. The system license file controls the settings on the customer-options form.

Also verify that the **ASAI Link Plus Capabilities** customer option is set to “y”, for applications that utilize Adjunct Routing, Selective Listening, Switch Classified Outbound Calls, and/or ISDN Redirecting Number information.

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? y	DCS (Basic)? y	
ASAI Link Plus Capabilities? y	DCS Call Coverage? y	
Async. Transfer Mode (ATM) PNC? n	DCS with Rerouting? y	
Async. Transfer Mode (ATM) Trunking? y	Digital Loss Plan Modification? n	
ATM WAN Spare Processor? n	DS1 MSP? n	
ATMS? y	DS1 Echo Cancellation? n	
Attendant Vectoring? n		
(NOTE: You must logoff & login to effect the permission changes.)		

Figure 2: System Parameters Customer Options

The C-LAN administration procedure will involve adding an IP node, an IP interface, and a data module.

First, add an entry for the C-LAN in the node-names form. Use the “change node-names ip” command, as shown in **Figure 3**. In this case, “clan-1b09” and “192.45.100.87” are entered as the **Name** and **IP Address** for the C-LAN that will be used for connectivity to the AES server. The actual node name and IP address may vary. Submit these changes.

```
change node-names ip
```

IP NODE NAMES	
Name	IP Address
clan-1b09	192.45 .100.87
clanP2-1a04	192.168.61 .21
clanP27-2a03	172.16 .252.200
clanP7-3a04	192.168.1 .10
default	0 .0 .0 .0

Figure 3: IP Node Names

Next, add the C-LAN to the system configuration using the “add ip-interface 1b09” command. Note that the actual slot number may vary. In this case, “1b09” is used as the slot number, as shown in **Figure 4** below. Enter the node name assigned from **Figure 3** above, and the IP address will then be populated automatically. Set the **Enable Ethernet Port** field to “y”.

The values to be entered for the **Subnet Mask**, **Gateway Address**, **Network Region**, **VLAN**, **Number of CLAN Sockets Before Warning**, and **Auto** fields will be determined by the network administrator. Submit these changes.

```
add ip-interface 1b09
```

IP INTERFACES	
Type:	C-LAN
Slot:	01B09
Code/Suffix:	TN799 D
Node Name:	clan-1b09
IP Address:	192.45 .100.87
Subnet Mask:	255.255.255.0
Gateway Address:	192.45 .100.1
Enable Ethernet Port?	y
Network Region:	2
VLAN:	n
Number of CLAN Sockets Before Warning: 400	
ETHERNET OPTIONS	
Auto?	y

Figure 4: IP Interface

Now, add a new data module using the “add data-module n” command, where “n” is an available extension. Enter the following values as shown in **Figure 5**.

- **Name:** Descriptive name
- **Type:** “ethernet”
- **Port:** Same slot number from **Figure 4** and port “17”
- **Link:** A link number not previously assigned on this switch

```
add data-module 2001
```

DATA MODULE	
Data Extension: 2001	Name: CLAN 1B09 Data Module
Type: ethernet	
Port: 01B0917	
Link: 11	

Network uses 1's for Broadcast Addresses? y

Figure 5: Data Module

3.2. Administer Transport Link for AES Connectivity

Administer the transport link to Avaya Application Enablement Services (AES) with the “change ip-services” command. Add an entry with the following values for fields on Page 1 as shown in **Figure 6** below:

- **Service Type:** “AESVCS”
- **Enabled:** “y”
- **Local Node:** Node name for the C-LAN assigned in **Figure 3**
- **Local Port** Keep the default of “8765”

```
change ip-services
```

Page 1 of 3

IP SERVICES					
Service Type	Enabled	Local Node	Local Port	Remote Node	Remote Port
SAT	y	clanP27-2a03	5023	any	0
SAT	y	clan-1b04	5023	any	0
AESVCS	y	clan-1b04	8765		
AESVCS	y	clan-1b09	8765		

Figure 6: IP Services Page 1

Go to Page 3 of the IP Services form, and enter the following values as shown in **Figure 7**:

- **AE Services:** Same name administered on the AES. In this case, “AES-DevCon2”.
- **Password:** Same password to be administered on the AES
- **Enabled:** “y”

Note that the name and password entered for the **AE Services** and **Password** fields must match the name and password on the AES. The administered name can be obtained from the AES server by typing “uname -n” at the Linux command prompt, and the password is set on the AES server under **Administration > Switch Connections > Edit Connection > Set Password**.

change ip-services				Page	3 of	3
AE Services Administration						
Server ID	AE Services Server	Password	Enabled	Status		
1:	devconaes01	*	y	in use		
2:	AES-DevCon2	*	y			
3:						
4:						
5:						

Figure 7: IP Services Page 3

3.3. Administer CTI Link with DLG Service

Add a CTI link and set the values as shown in **Figure 8** below using the “add cti-link n” command, where “n” is the CTI link number. Enter a valid extension number in the **Extension** field. Note that the CTI link number and extension number may vary. Enter “ASAI-IP” in the **Type** field, and a descriptive name in the **Name** field. The rest of the values may be left at their defaults. Submit these changes.

add cti-link 1		Page 1 of 2	
CTI LINK			
CTI Link: 1			
Extension: 2201			
Type: ASAI-IP			
		COR: 1	
Name: AES-DevCon2 DLG			

Figure 8: CTI Link

3.4. Administer Call Vector for Adjunct Routing

This configuration step is only needed for applications that utilize the routing functions that Envoy CT Connect can provide. Modify a vector to send adjunct route requests to the CTI link defined previously in **Figure 8**. Note that the vector in **Figure 9** below is a sample vector only and can be modified as needed for different call treatments.

change vector 123		Page 1 of 3	
CALL VECTOR			
Number: 123		Name: CTConnect Route	
Multimedia? n		Meet-me Conf? n	Lock? n
Basic? y	EAS? y G3V4 Enhanced? y	ANI/II-Digits? y	ASAI Routing? y
Prompting? y	LAI? y G3V4 Adv Route? y	CINFO? y	BSR? n Holidays? n
Variables? n	3.0 Enhanced? n		
01 adjunct	routing link 1		
02 wait-time	30 secs hearing ringback		
03 route-to	number 22721 with cov n if unconditionally		
04			

Figure 9: Vector for Adjunct Routing

Add a Vector Directory Number (VDN) as shown in **Figure 10** below, and set the Vector Number field to the same call vector number assigned in **Figure 9**.

add vdn 55123		Page 1 of 2	
VECTOR DIRECTORY NUMBER			
Extension: 55123			
Name: VDN Route CT Connect			
Vector Number: 123			
Meet-me Conferencing? n			
Allow VDN Override? n			
COR: 1			
TN: 1			
Measured: none			
VDN of Origin Annc. Extension:			
1st Skill:			
2nd Skill:			
3rd Skill:			

Figure 10: VDN for Adjunct Routing

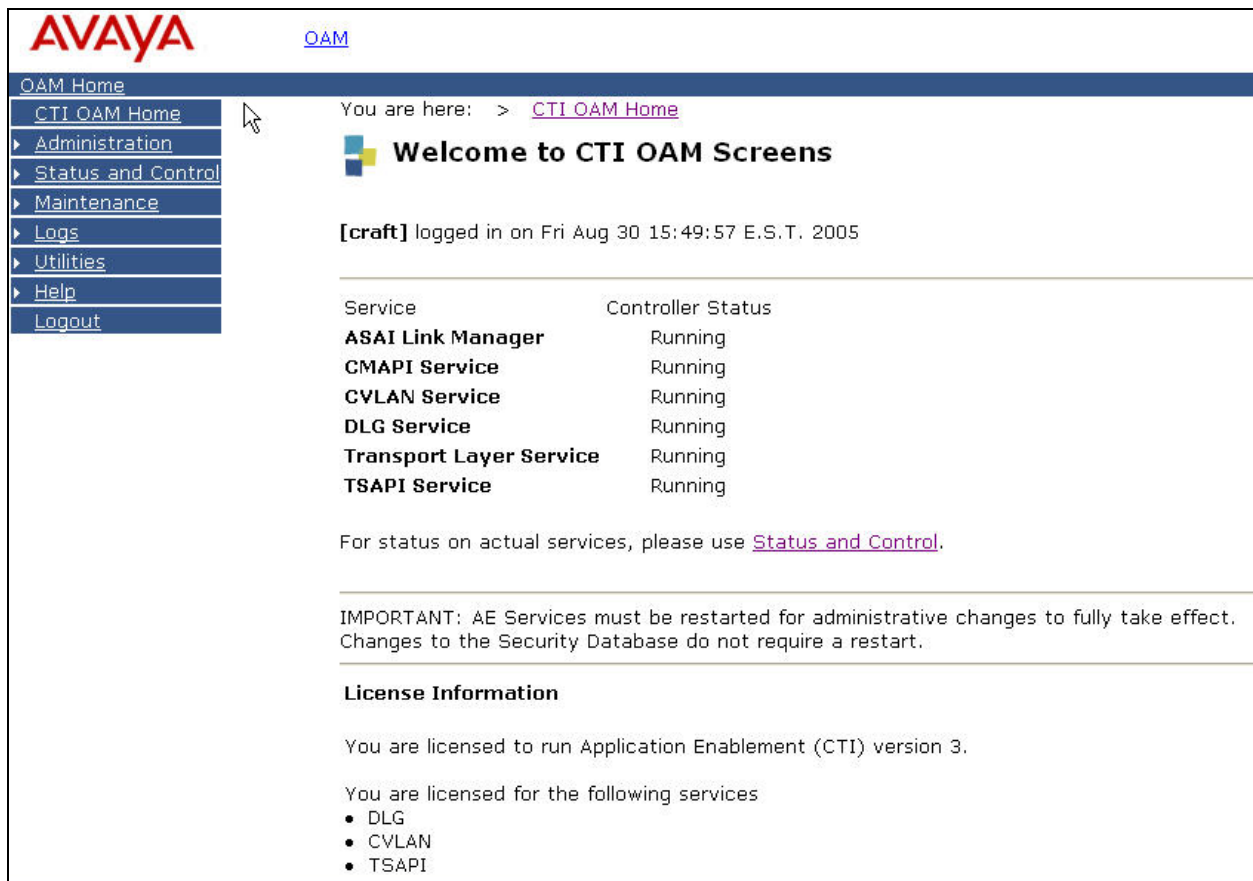
4. Configure Avaya Application Enablement Services

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

- Administer local IP
- Administer switch connections
- Administer DLG link

4.1. Administer Local IP

Prior to any administration, verify the DLG service has been licensed properly. Log into the AES OAM web interface, select CTI OAM Admin and check to make sure the DLG service is licensed as shown in **Figure 11** below. If the DLG service is not licensed, then contact the Avaya sales team or business partner for a proper license file.



The screenshot shows the Avaya OAM Home interface. The top header includes the Avaya logo and a link to OAM. A left sidebar contains navigation links: OAM Home, CTI OAM Home, Administration, Status and Control, Maintenance, Logs, Utilities, Help, and Logout. The main content area displays the user's current location as 'CTI OAM Home' and a welcome message. Below this, a table lists services and their controller status, all of which are 'Running'. A note directs users to 'Status and Control' for actual service status. An important notice states that AE services must be restarted for administrative changes to take effect. Finally, the license information section confirms the user is licensed for version 3 of Application Enablement (CTI) and lists the licensed services: DLG, CVLAN, and TSAPI.

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

License Information

You are licensed to run Application Enablement (CTI) version 3.

You are licensed for the following services

- DLG
- CVLAN
- TSAPI

Figure 11: OAM Home License

From the CTI OAM Admin menu, select **Administration > Local IP**. As shown in **Figure 12**, in the **Client Connectivity** field, select the local IP address that Envoy CT Connect will use to connect to the AES server. In the **Switch Connectivity** field, select the local IP address the AES will use to connect to Avaya Communication Manager. Click on **Apply Changes**.

The screenshot shows the Avaya OAM Admin interface. The top navigation bar includes the Avaya logo and a link to OAM. Below this is a sidebar menu with options: OAM Home, CTI OAM Home, Administration (expanded), Local IP, Ports, Switch Connections, CTI Link Admin, CMAPI Configuration, TSAPI Configuration, Security Database, and Status and Control. The main content area shows the 'Local IP' configuration page. It includes a breadcrumb trail: 'You are here: > Administration > Local IP'. The page title is 'Local IP'. There are three dropdown menus: 'Client Connectivity' set to 'eth0:192.45.100.152', 'Switch Connectivity' set to 'eth1:192.45.101.153', and 'Media Connectivity' set to 'Any'. An 'Apply Changes' button is at the bottom.

Figure 12: Local IP

4.2. Administer Switch Connections

From the CTI OAM Admin menu, select **Administration > Switch Connections**, as shown in **Figure 13**. Enter a descriptive name for the switch connection and click on **Add Connection**. In this case, “devcon27S8700” is used, and the actual switch connection name may vary.

The screenshot shows the Avaya OAM Admin interface. The top navigation bar includes the Avaya logo and a link to OAM. Below this is a sidebar menu with options: OAM Home, CTI OAM Home, Administration (expanded), Local IP, Ports, Switch Connections, CTI Link Admin, CMAPI Configuration, TSAPI Configuration, Security Database, and Status and Control. The main content area shows the 'Switch Connections' page. It includes a breadcrumb trail: 'You are here: > Administration > Switch Connections'. The page title is 'Switch Connections'. There is a text input field containing 'devcon27S8700' and an 'Add Connection' button. Below this is a table with two columns: 'Connection Name' and 'Number of Active Connections'. The table has one row with 'devcon35S8710' and '0'. At the bottom of the table are four buttons: 'Edit Connection', 'Edit CLAN IPs', 'Edit H.323 Gatekeeper', and 'Delete Connection'.

Figure 13: Switch Connections

Next, the Set Password screen will be displayed by OAM, as shown in **Figure 14**. Enter the same password that was administered on Avaya Communication Manager on the IP Services form back in **Figure 7**. Re-enter the same password in the **Confirm Switch Password** field. Note that the **SSL** field can be left at its default. For the Avaya Definity Server G3csi switch, however, the **SSL** field needs to be unchecked as it is not supported. Click on **Apply**.

AVAYA OAM

OAM Home

CTI OAM Home

Administration

Local IP

Ports

Switch Connections

CTI Link Admin

CMAPI Configuration

TSAPI Configuration

Security Database

Status and Control

Maintenance

You are here: > Administration > Switch Connections

Set Password - devcon27S8700

Switch Password: [password field]

Confirm Switch Password: [password field]

SSL: ☒

Please note that changing the password affects only new connections, not open connections.

Apply Cancel

Figure 14: Set Password

From the Switch Connection page shown in **Figure 15**, select the newly added switch connection name and click on **Edit CLAN IPs**.

AVAYA OAM

OAM Home

CTI OAM Home

Administration

Local IP

Ports

Switch Connections

CTI Link Admin

CMAPI Configuration

TSAPI Configuration

Security Database

Status and Control

Maintenance

You are here: > Administration > Switch Connections

Switch Connections

[input field] Add Connection

	Connection Name	Number of Active Connections
<input checked="" type="radio"/>	devcon27S8700	0
<input type="radio"/>	devcon35S8710	0

Edit Connection Edit CLAN IPs Edit H.323 Gatekeeper Delete Connection

Figure 15: Switch Connections

On the Edit CLAN IPs page, enter the host name or IP address of the C-LAN used for AES connectivity as shown in **Figure 16**. In this case, “192.45.100.87” is used, which corresponds to the C-LAN administered on Avaya Communication Manager back in **Figure 4**. Click on **Add Name or IP**.

Figure 16: Edit CLAN IPs

4.3. Administer DLG Service

To administer a DLG link on AES, select **Administration > CTI Link Admin > DLG Links** from the CTI OAM Admin menu as shown in **Figure 17** below. Click on **Add Link**.

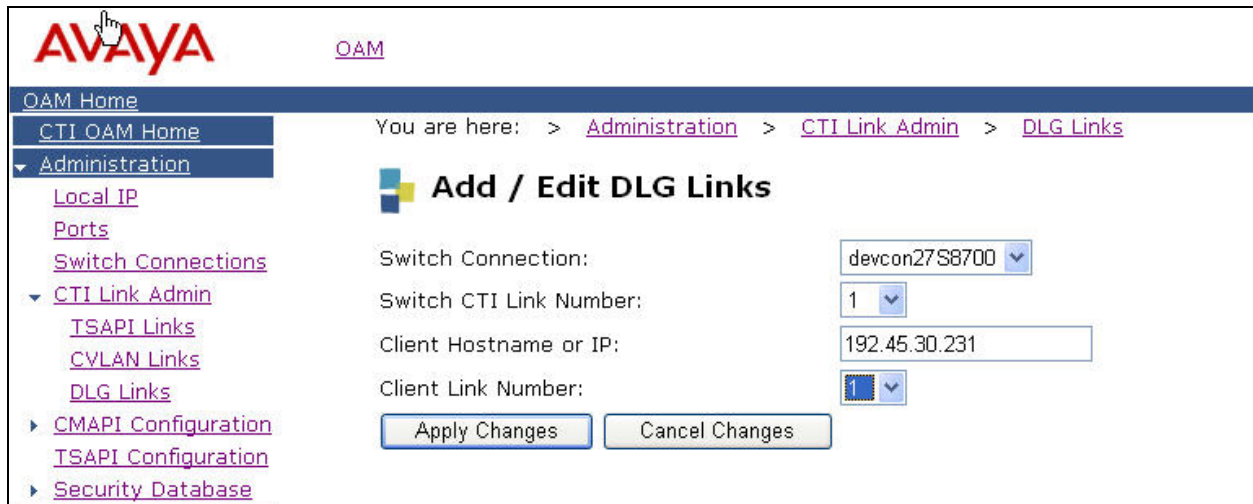
Switch Connection	Switch CTI Link #	Client Host Name or IP Address	Client Link Number
devcon35S8710	2	192.45.100.146	9

Figure 17: DLG Links

In the Add/Edit DLG Links screen, enter the following values as shown in **Figure 18**:

- **Switch Connection:** Administered switch connection configured back in **Figure 13**
- **Switch CTI Link Number:** Corresponding CTI link number configured back in **Figure 8**
- **Client Hostname or IP:** Host name or IP address of the client application
- **Client Link Number:** The link number used by the client application. In this case, the Envoy CT Connect server is the client application.

Note that the actual values for all four fields may vary. Click on **Apply Changes**.



The screenshot displays the Avaya OAM web interface for adding or editing DLG Links. The top left features the Avaya logo and a 'QAM' link. Below this is a navigation bar with 'OAM Home' and 'CTI OAM Home'. A left-hand menu shows 'Administration' expanded, with sub-links for 'Local IP', 'Ports', 'Switch Connections', 'CTI Link Admin' (which is further expanded to show 'TSAPI Links', 'CVLAN Links', and 'DLG Links'), 'CMAPI Configuration', 'TSAPI Configuration', and 'Security Database'. The main content area is titled 'Add / Edit DLG Links' and includes a breadcrumb trail: 'You are here: > Administration > CTI Link Admin > DLG Links'. The form contains four fields: 'Switch Connection' (a dropdown menu showing 'devcon27S8700'), 'Switch CTI Link Number' (a dropdown menu showing '1'), 'Client Hostname or IP' (a text input field containing '192.45.30.231'), and 'Client Link Number' (a dropdown menu showing '1'). At the bottom of the form are two buttons: 'Apply Changes' and 'Cancel Changes'.

Figure 18: Add/Edit DLG Links

5. Configure Envoy CT Connect

This section provides the procedures for configuring the Envoy CT Connect server. CT Connect uses a GUI based configuration program to configure communication links between the CT Connect server and switches.

Bring up the Configuration Program by selecting **Start > All Programs > Envoy CT Connect Server > Configuration Program** as shown in **Figure 19**.

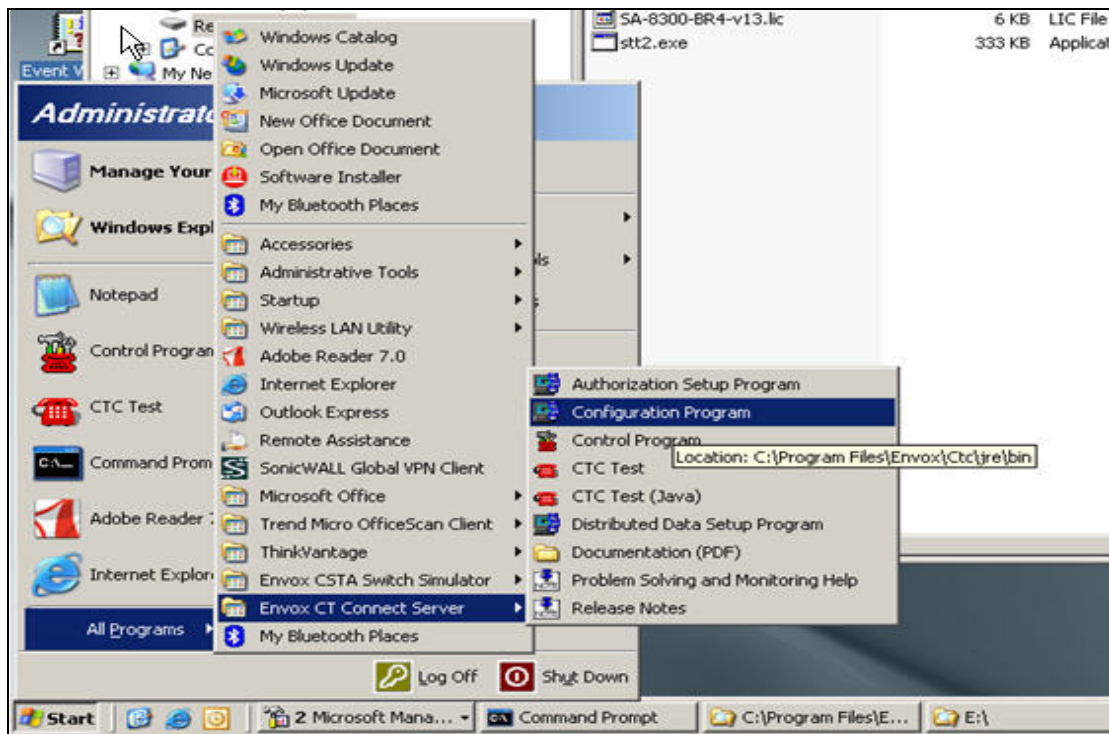


Figure 19: Start Configuration Program

In the Server Configuration screen shown in **Figure 20**, enter a descriptive name for the **Enter a Logical Identifier** field. In this case, “asai” is used. Note that the actual name may vary. Click on the **Add** button.

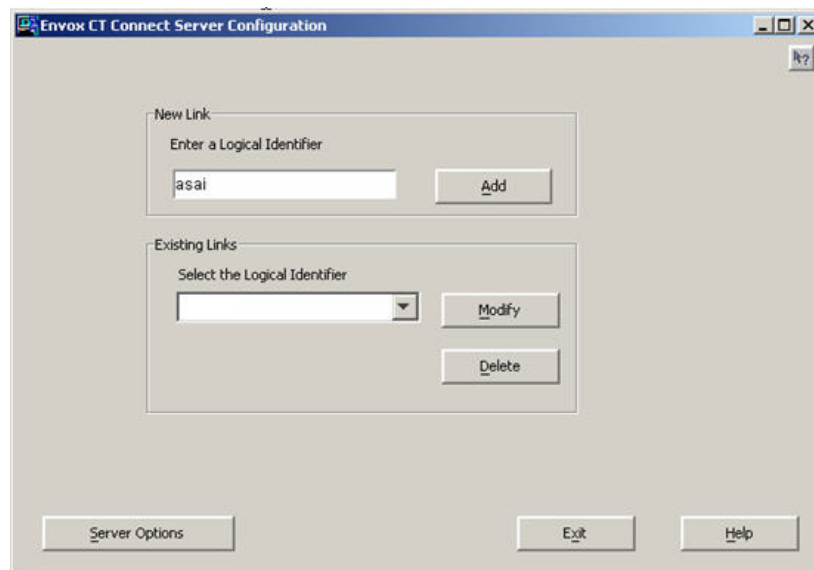


Figure 20: Server Configuration

Next, the Configuration Program displays the Switch Type screen as shown in **Figure 21**. Select **Avaya Communication Manager** from the list and click **Next**.

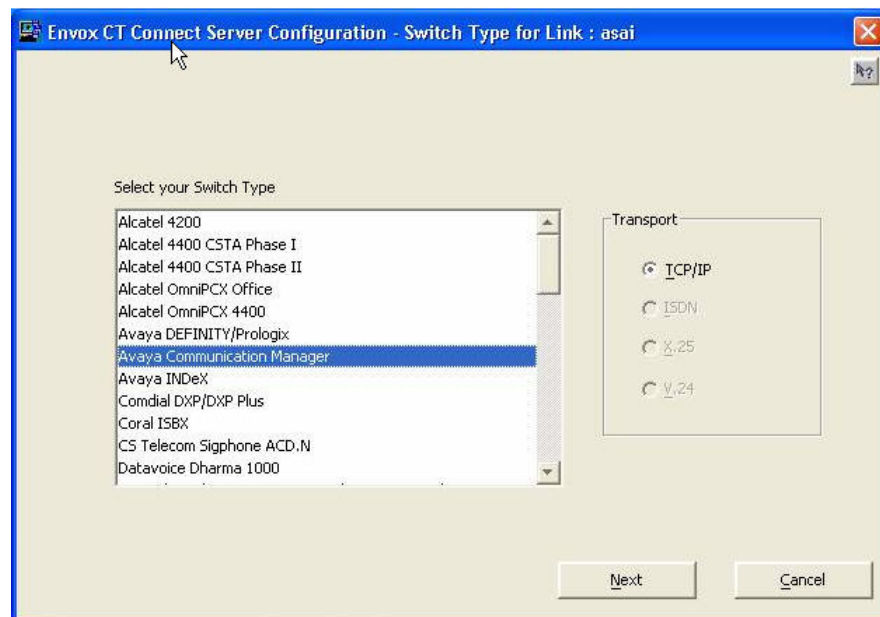


Figure 21: Switch Type

The Configuration Program then displays the Avaya TCP/IP Link screen, as shown in **Figure 22**. Enter the following values:

- **Switch IP Address:** Corresponding IP address on the AES server for client connectivity
- **Link Number:** Link number on CT Connect used for connectivity to the AES server
- **Maximum Monitor:** Maximum monitored channels specified in the CT Connect license

Note that the **Switch IP Address** should match the Client Connectivity administered on the AES Local IP screen back in **Figure 12**, and the **Link Number** should match the Client Link Number administered on the AES Add/Edit DLG Link back in **Figure 18**. Accept the default value for the remaining fields and click on **Save**.

The screenshot shows a Windows-style dialog box titled "Envoy CT Connect Server Configuration - Configuring Avaya TCP/IP Link : asai". The dialog has a light beige background and a blue title bar. It contains several input fields and checkboxes. The "Switch IP Address" field is set to "192.45.100.152". The "Link Number" field is set to "1". The "Maximum Monitors" field is set to "1000". There are two checkboxes: "Auto Start Link" (checked) and "Auto Restart Monitors" (unchecked). An "Optional" section is expanded, showing "Local IP Address" and "Network Node ID" fields. A "Device Level Authorisation" section is also present, with an "Enable" checkbox (unchecked) and a "Password" dropdown menu (set to "None"). At the bottom, there are four buttons: "Advanced", "Trace", "Save", and "Cancel".

Figure 22: Avaya TCP/IP Link

6. Interoperability Compliance Testing

The Interoperability compliance test included both feature functionality and serviceability testing.

The feature functionality testing focused on verifying Envoy CT Connect handling of ASAI messages in the areas of domain control, call control, event notification, routing, value query, request feature, and set value. Testing also included rainy day scenarios to verify successful handling of negative acknowledgements.

The serviceability testing focused on verifying Envoy CT Connect ability 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 functionality and serviceability test cases were performed manually. The verification included both human checking of proper states at the telephone sets, and of capturing ASAI message traces and analyzing them with the Envoy CT Connect test tool. The same test tool was also used to initiate certain test scenarios from Envoy CT Connect.

6.2. Test Results

All feature functionality test cases passed successfully.

All serviceability test cases were completed, with an observation that when the link was down for more than 15 seconds, the Envoy CT Connect server began to lose the control/monitor associations, such that not all associations can automatically be re-established by the server upon link recovery. The workaround for this is for the client applications to re-initiate the control/monitor associations, upon receiving the link recovery notification from the CT Connect server.

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 as shown in **Figure 23**.

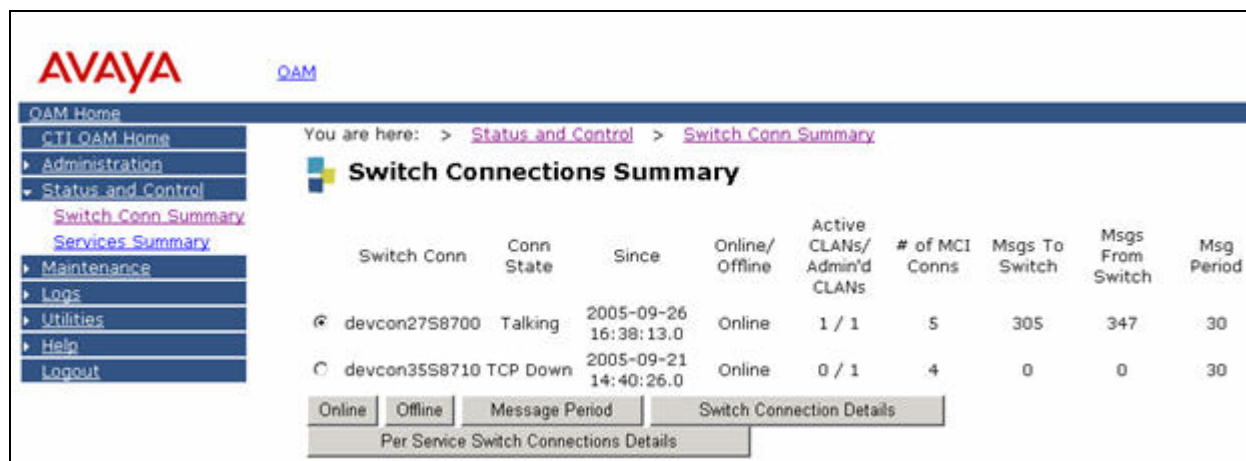
```
status aesvcs cti-link
```

AE SERVICES CTI LINK STATUS						
CTI Link	Version	Mnt Busy	AE Services Server	Service State	Msgs Sent	Msgs Rcvd
1	4	no	AES-DevCon2	established	135	90
2	4	no	AES-DevCon2	established	16	17
3	4	no	AES-DevCon2	established	16	16
4	4	no	AES-DevCon2	established	16	17
15	4	no	devconaes01	established	15	15
16		no		down	0	0

Figure 23: Status Aesvcs CTI-link

7.2. Verify Avaya Enablement Services

From the AES OAM Admin menu, verify the status of the administered CTI link by selecting **Status and Control > Switch Conn Summary**, as shown in **Figure 24**.



Switch Conn	Conn State	Since	Online/Offline	Active CLANs/ Admin'd CLANs	# of MCI Conns	Msgs To Switch	Msgs From Switch	Msg Period
devcon2758700	Talking	2005-09-26 16:38:13.0	Online	1 / 1	5	305	347	30
devcon3558710	TCP Down	2005-09-21 14:40:26.0	Online	0 / 1	4	0	0	30

Figure 24: Status Aesvcs CTI-link

7.3. Verify Envoy CT Connect

To verify the status of the administered CTI link, bring up the Control Program by selecting **Start > All Programs > Envoy CT Connect Server > Control Program**. Check the **Link State** associated with the administered **Logical Identifier**, as shown in **Figure 25**. In this case, “ASAI” is used as the Logical Identifier, which was administered back in **Figure 20**.

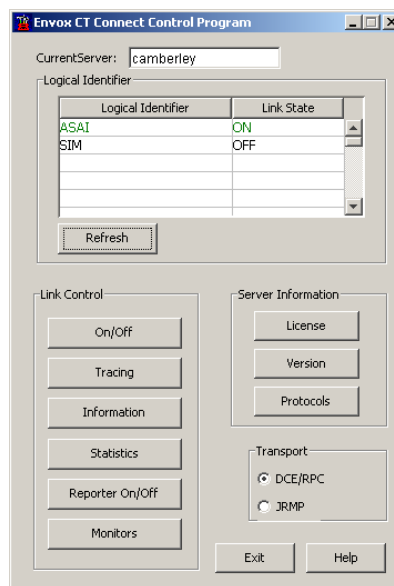


Figure 25: Status Aesvcs CTI-link

8. Support

For technical support on Envoy CT Connect, contact the regional Envoy support center or the local Envoy distributor.

9. Conclusion

These Application Notes describe the configuration steps required for Envoy CT Connect 6.1 to successfully interoperate with Avaya Communication Manager 3.0 using Avaya Application Enablement Services. All feature functionality and serviceability test cases were completed.

The one observation from the interoperability testing is that when the link was down for more than 15 seconds, the Envoy CT Connect began to lose the control/monitor associations, such that the associations cannot be automatically re-established by the server upon link recovery. The workaround for this is for the client applications to re-initiate the control/monitor associations, upon receiving the link recovery notification from the CT Connect server.

10. Additional References

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

- *Avaya Application Enablement Services 3.0 Administration and Maintenance Guide*, Document ID 02-300357, Issue 1, June 2005, available at <http://support.avaya.com>
- *Envox CT Connect 6.1 Installation and Configuration*, Software/Version Envoy CT Connect 6.1, available at <http://www.envox.com>

10.1. Glossary

Technical Term	Definition as it pertains to this document.
AES	Application Enablement Services
ASAI	Adjunct Switch Application Interface
CTI	Computer Telephony Integration
DLG	Definity LAN Gateway
PSTN	Public Switched Telephone Network
VDN	Vector Directory Number

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