



Avaya Solution & Interoperability Test Lab

Application Notes for the Amcom CTI Layer with Avaya Aura™ Communication Manager and Avaya Aura™ Application Enablement Services - Issue 1.0

Abstract

These Application Notes describe a compliance-tested configuration comprised of Avaya Aura™ Communication Manager, Avaya Aura™ Application Enablement Services, Avaya IP and Digital Telephones, and Amcom CTI Layer desktop applications.

Amcom CTI Layer is a middleware that interfaces with Avaya Aura™ Communication Manager via Avaya Aura™ Application Enablement Services for Amcom PC console 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

These Application Notes describe a compliance-tested configuration comprised of Avaya Aura™ Communication Manager, Avaya Aura™ Application Enablement Services, Avaya IP and Digital Telephones, and Amcom CTI Layer applications.

Amcom CTI Layer is a software service that provides a mapping of DMCC commands and functions to a telephony API compatible with all Amcom PC Console products. Amcom PC Consoles are software applications, specialized for different vertical markets that allow a user to operate a physical telephone and view call and telephone display information through a graphical user interface (GUI). The CTI Layer controls a physical telephone using first party call control, specifically the Device, Media and Control Services of Application Enablement Services.

The compliance testing will focus on the integration between Amcom CTI Layer service, Communication Manager, Application Enablement Services, and Avaya IP and digital telephones. Amcom provided the CTI Layer application with a special configuration file designed to fully test the CTI Layer functionality. Telephone operations such as off-hook, on-hook, dialing, answering, hold, transfer, conference, etc. will be performed from the physical telephones and from the CTI Layer application. In addition, telephone displays and call states on the physical telephones and in the CTI Layer will be verified for consistency.

1.1. Interoperability Compliance Testing

The interoperability compliance test included features and serviceability. The focus of the compliance testing was primarily on verifying the interoperability between Amcom CTI Layer, Application Enablement Services, and Communication Manager.

1.2. Support

Technical support for the Amcom CTI Layer solution can be obtained by contacting Amcom:

- URL – <https://secure5.inet7.com/amcomsoftware-com/Support/online.aspx>
- Phone – (888) 797-7487

2. Reference Configuration

Figure 1 illustrates the configuration used in these Application Notes. The sample configuration shows an enterprise with an Application Enablement Services server and Avaya S8720 Media Servers with G650 Media Gateway. The CTI Layer was located in a different VLAN. Endpoints include Avaya 9600 Series H.323 IP Telephones, an Avaya 4625 H.323 IP Telephone, and an Avaya 6408D Digital Telephone. An Avaya S8300 Server with an Avaya G450 Media Gateway was included in the test to provide an inter-switch scenario.

Note: Basic administration of the Application Enablement Services server is assumed. For details, see [2].

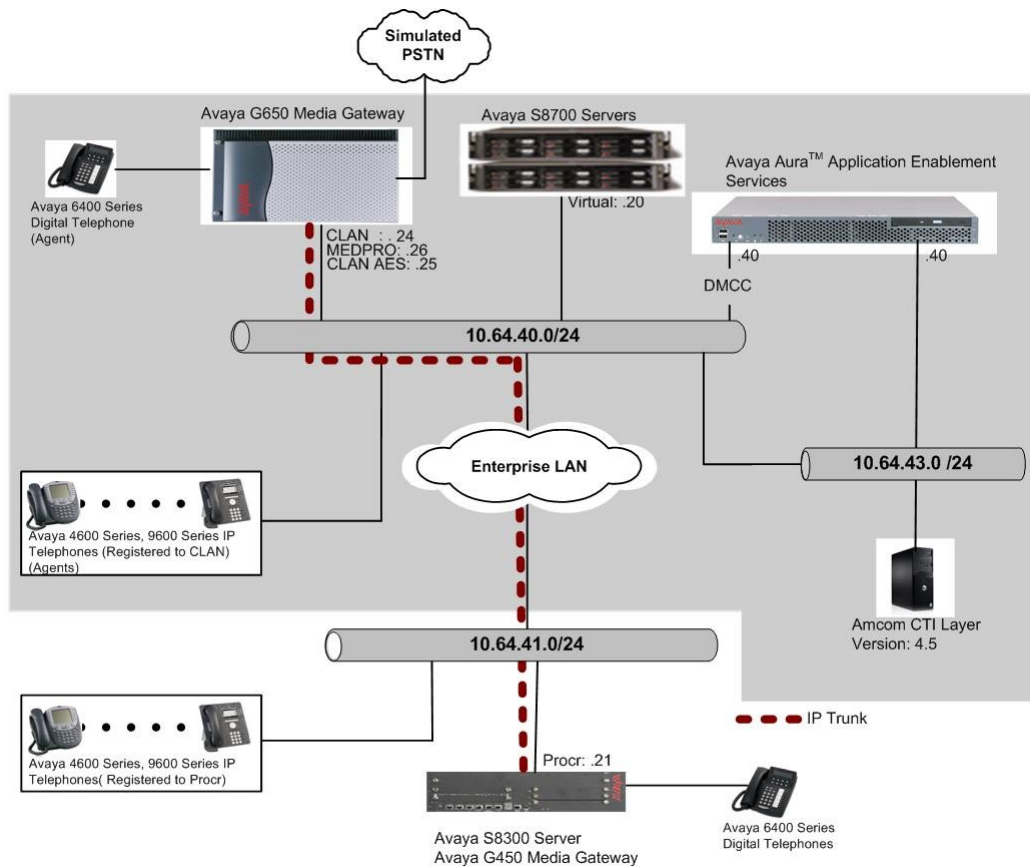


Figure 1: Amcom CTI Layer Test Configuration

3. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya S8720 Media Servers	Avaya Aura™ Communication Manager 5.2.1 (R015x.02.1.016.4)
Avaya G650 Media Gateway	
TN2312BP IP Server Interface	HW12 FW22
TN799DP C-LAN Interface	HW1 FW16
TN2302AP IP Media Processor	HW11 FW107
Avaya S8300 Media Server with Avaya G450 Media Gateway	Avaya Aura™ Communication Manager 5.2.1 (R015x.02.1.016.4)
Avaya Aura™ Application Enablement Services Server	5.2 (r5-2-0-98-0)
Avaya 4625SW IP Telephone	2.5
Avaya 9600 Series IP Telephones	
9620 (H.323)	3.1
9630 (H.323)	3.1
9650 (H.323)	3.1
Avaya 6424D+ Digital Telephone	-
Amcom CTI Layer	4.5

4. Configure Avaya Communication Manager

This section describes the procedure for setting up Feature Access Codes, abbreviated dialing, and controlled telephones.

4.1. Configure IP Services

Enter the **change node-names ip** command. In the compliance-tested configuration, the CLAN IP address was used for registering H.323 endpoints, and the CLAN-AES IP address was used for connectivity to Application Enablement Services.

change node-names ip

Page 1 of 1

IP NODE NAMES	
Name	IP Address
CDR_buffer	192.45 .80 .250
CLAN	10.64.40.24
CLAN-AES	10.64.40.25
G350	10.64.42.21
MEDPRO	10.64.40.26
S8300	10.64.41.21
default	0 .0 .0 .0

Enter the **change ip-services** command. On **Page 1**, configure the Service Type field to **AESVCS** and the Enabled field to **y**. The Local Node field should be pointed to the **CLAN-AES** board that was configured previously in the IP NODE NAMES form in this section. During the compliance test, the default port was used for the Local Port field.

change ip-services

Page1 of 4

IP SERVICES					
Service Type	Enabled	Local Node	Local Port	Remote Node	Remote Port
AESVCS	y	CLAN-AES	8765		

On **Page 4**, enter the hostname of the Application Enablement Services server for the AE Services Server field. The server name may be obtained by logging in to the Application Enablement Services server using ssh, and running the command **uname -a**. Enter an alphanumeric password for the Password field. Set the Enabled field to **y**. The same password will be configured on the Application Enablement Services server in **Section 5.2**.

change ip-services			Page 4 of 4	
AE Services Administration				
Server ID	AE Services Server	Password	Enabled	Status
1:	server1	xxxxxxxxxxxxxxxx	y	idle
2:				
3:				
4:				
5:				

4.2. Configure Feature Access Codes (FAC)

Enter the **display feature-access-codes** command. On Page 5 of the **feature-access-codes** form, configure and enable the following access codes:

- After Call Work Access Code
- Auto-In Access Code
- Aux Work Access Code
- Login Access Code
- Logout Access Code

```
display feature-access-codes                                     Page 5 of 9
FEATURE ACCESS CODE (FAC)
Automatic Call Distribution Features
After Call Work Access Code: 120
Assist Access Code: 121
Auto-In Access Code: 122
Aux Work Access Code: 123
Login Access Code: 124
Logout Access Code: 125
Manual-in Access Code: 126
Service Observing Listen Only Access Code: 127
Service Observing Listen/Talk Access Code: 128
Service Observing No Talk Access Code:
Add Agent Skill Access Code: 130
Remove Agent Skill Access Code: 131
Remote Logout of Agent Access Code: 132
```

4.3. Configure Abbreviated Dialing

Enter the **add abbreviated-dialing group g** command, where **g** is the number of an available abbreviated dialing group. In the **DIAL CODE** list, enter the Feature Access Codes for ACD Login and Logout from **Section 4.2**.

```
add abbreviated-dialing group 1                                Page 1 of 1
ABBREVIATED DIALING LIST
Group List: 1          Group Name: Call Center
Size (multiple of 5): 5 Program Ext:          Privileged? n
DIAL CODE
11: 124
12: 125
13:
```

4.4. Configure Controlled Telephones

Enter the **change station r** command, where **r** is the extension of a registered, physical Avaya IP or Digital telephone. On **Page 1** of the **station** form, enter a phone Type, descriptive name, Security Code and set IP SoftPhone field to **y** to allow the physical station to be controlled by a softphone such as the CTI Layer application.

add station 22001		Page 1 of 5
STATION		
Extension: 22001	Lock Messages? n	BCC: 0
Type: 4625	Security Code: *	TN: 1
Port: S00416	Coverage Path 1:	COR: 1
Name: DMCC-1	Coverage Path 2:	COS: 1
	Hunt-to Station:	
STATION OPTIONS		
Loss Group: 19	Time of Day Lock Table:	
	Personalized Ringing Pattern: 1	
Speakerphone: 2-way	Message Lamp Ext: 22001	
Display Language: english	Mute Button Enabled? y	
Survivable GK Node Name:	Expansion Module? n	
Survivable COR: internal	Media Complex Ext:	
Survivable Trunk Dest? y	IP SoftPhone? y	
	IP Video Softphone? n	

On **Page 4** of the station form, for **ABBREVIATED DIALING List 1**, enter the abbreviated dialing group configured in **Section 4.2**. On **Pages 4** and **5** of the station forms, configure the following **BUTTON ASSIGNMENTS** in addition to the call-appr (call appearance) buttons:

- aux-work
- abrv-dial – configure two of these buttons, one for Login and one for Logout, along with the Dial Codes from Abbreviated Dialing **List1** for ACD Login and Logout, respectively.
- after-call
- auto-in (On Page 5)
- release (On Page 5)

add station 22001		Page 4 of 5
STATION		
SITE DATA		
Room:	Headset? n	
Jack:	Speaker? n	
Cable:	Mounting: d	
Floor:	Cord Length: 0	
Building:	Set Color:	
ABBREVIATED DIALING		
List1: personal 1	List2: group 1	List3:
BUTTON ASSIGNMENTS		
1: call-appr	5: aux-work	RC: Grp:
2: call-appr	6: abrv-dial	List: 2 DC: 11
3: brdg-appr B:1 E:22101	7: abrv-dial	List: 2 DC: 12
4: brdg-appr B:2 E:22101	8: after-call	Grp:

add station 22001	Page 5 of 5
STATION	
FEATURE BUTTON ASSIGNMENTS	
9: auto-in	Grp:
10: release	

Repeat the instructions provided in this section for each physical station that is to be controlled / monitored by an Amcom CTI Layer.

5. Configure Avaya Application Enablement Services

The Avaya Application Enablement Services server enables Computer Telephony Interface (CTI) applications to control and monitor telephony resources on Communication Manager.

This section assumes that installation and basic administration of the Application Enablement Services server has been performed. The steps in this section describe the configuration of a Switch Connection, a CTI user, a CMAPI port.

5.1. Device and Media Control API Station Licenses

The Amcom CTI Service instances appear as “virtual” stations/softphones to Communication Manager. Each of these virtual stations, hereafter called Device and Media Control API station, requires a license. Note that this is separate and independent of Avaya IP Softphone licenses, which are required for Avaya IP Softphones but not required for Device and Media Control API stations. To check and verify that there are sufficient DMCC licenses, log in to <https://<IP address of the Application Enablement Services server>/index.jsp>, and enter appropriate login credentials to access the Application Enablement Services Management Console page. Select the **Licensing** → **WebLM Server Access** link from the left pane of the window.

Application Enablement Services
Management Console

Welcome: User craft
Last login: Thu Jan 28 12:30:09 2010 from 10.64.43.10
HostName/IP: server1/10.64.40.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

Licensing
Home | Help | Logout

> AE Services
> Communication Manager Interface
▼ Licensing
WebLM Server Address
WebLM Server Access
> Maintenance
> Networking
> Security
> Status
> User Management
> Utilities
> Help

Licensing


If you are setting up and maintaining the WebLM, you need to use the following:

- WebLM Server Address

If you are importing, setting up and maintaining the license, you need to use the following:

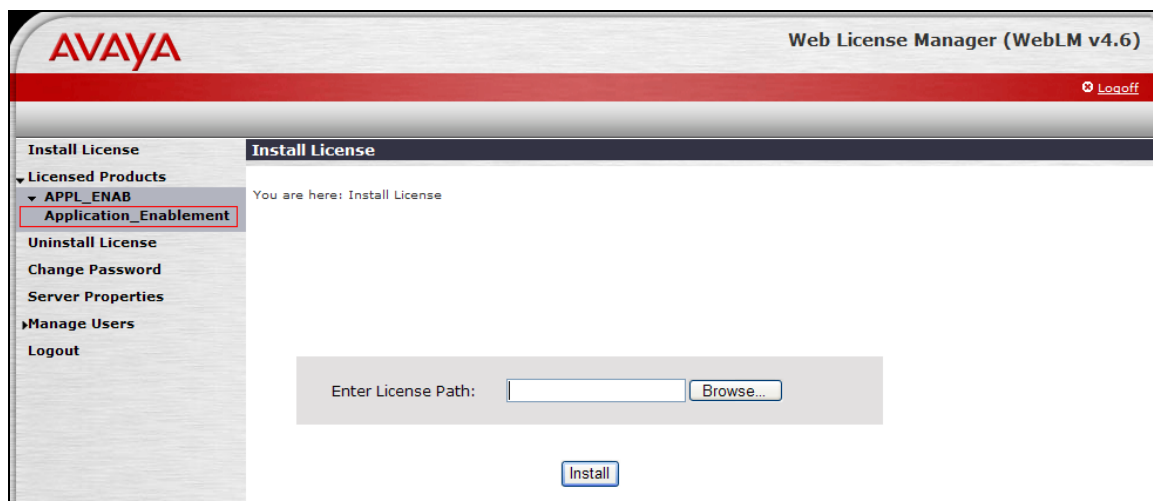
- WebLM Server Access (**NOTE: Please disable your pop-up blocker if you are having difficulty with opening this page.**)

Provide appropriate login credentials to access the Web License Manager page.



The image shows the login page of the Avaya Web License Manager (WebLM v4.6). The page has a red header with the Avaya logo and the text "Web License Manager (WebLM v4.6)". Below the header, the word "Logon" is centered. There are two input fields: "User Name:" and "Password:". A gray button with a right-pointing arrow is located below the password field.

On the Install License page, select **License Products** → **Application_Enablement** link from the left pane of the window.



The image shows the "Install License" page of the Avaya Web License Manager (WebLM v4.6). The page has a red header with the Avaya logo and the text "Web License Manager (WebLM v4.6)". A "Logoff" link is in the top right corner. On the left, there is a navigation pane with the following items: "Install License", "Licensed Products" (expanded), "APPL_ENAB" (expanded), "Application_Enablement" (highlighted with a red box), "Uninstall License", "Change Password", "Server Properties", "Manage Users", and "Logout". The main content area has a title bar "Install License" and a breadcrumb "You are here: Install License". Below this, there is a form with the label "Enter License Path:" followed by a text input field and a "Browse..." button. At the bottom of the form is an "Install" button.

On the Licensed Features page, verify that there are sufficient DMCC licenses.

AVAYA Web License Manager (WebLM v4)

Install License

Licensed Products

APPL_ENAB

Application Enablement

Uninstall License

Change Password

Server Properties

Manage Users

Logout

Application Enablement (CTI) - Release: 5 - SID: 10503000 (Standard License File)

You are here: Licensed products > Application Enablement (CTI)

License installed on: 2009. 12. 11 오후 3시 36분 39초 EST

[View Peak Usage](#)

Licensed Features

Feature (Keyword)	Expiration Date	Licensed	Acquired
Unified CC API Desktop Edition (VALUE_AES_AEC_UNIFIED_CC_DESKTOP)	permanent	1000	0
Device Media and Call Control (VALUE_AES_DMCC_DMC)	permanent	13	0
DLG (VALUE_AES_DLG)	permanent	13	0
CVLAN ASAI (VALUE_AES_CVLAN_ASAI)	permanent	13	0
AES ADVANCED SMALL SWITCH (VALUE_AES_AEC_SMALL_ADVANCED)	permanent	3	0
CVLAN Proprietary Links (VALUE_AES_PROPRIETARY_LINKS)	permanent	13	0
AES ADVANCED LARGE SWITCH (VALUE_AES_AEC_LARGE_ADVANCED)	permanent	3	0
TSAPI Simultaneous Users (VALUE_AES_TSAPI_USERS)	permanent	1000	0
AES ADVANCED MEDIUM SWITCH (VALUE_AES_AEC_MEDIUM_ADVANCED)	permanent	3	0
SmallServerTypes: s8300c;s8300d;icc;premio;tn8400;laptop MediumServerTypes: ibmx306;ibmx306m;dell1950;xen;hs20;hs20_8832_vm LargeServerTypes: isp2100;ibmx305;d1380g3;d1385g1;d1385g2;unknown TrustedApplications: IPS_001, BasicUnrestricted, AdvancedUnrestricted, DMCUnrestricted; 1XP_001, BasicUnrestricted, AdvancedUnrestricted, DMCUnrestricted; 1XM_001, BasicUnrestricted, AdvancedUnrestricted, DMCUnrestricted; PC_001,			

5.2. Configure Switch Connection

Launch a web browser, enter <https://<IP address of the Application Enablement Services server>> in the address field, and log in with the appropriate credentials for accessing the Application Enablement Services Management Console pages.

Application Enablement Services
Management Console

Please login here:

Username

Password

Click on **Communication Manager Interface** → **Switch Connection** in the left pane to invoke the Switch Connections page.

The screenshot shows the Avaya Application Enablement Services Management Console. At the top, the Avaya logo is on the left, followed by the title 'Application Enablement Services Management Console'. On the right, a welcome message and system information are displayed. Below the title bar is a red navigation bar with 'Home' on the left and 'Home | Help | Logout' on the right. A left-hand menu contains links to 'AE Services', 'Communication Manager Interface', 'Licensing', 'Maintenance', 'Networking', 'Security', 'Status', 'User Management', 'Utilities', and 'Help'. The main content area, titled 'Welcome to OAM', explains the purpose of the OAM web and lists administrative domains: AE Services, Communication Manager Interface, Licensing, Maintenance, Networking, Security, Status, User Management, Utilities, and Help, each with a brief description of its function.

AVAYA Application Enablement Services
Management Console

Welcome: User craft
Last login: Tue Jan 26 11:34:52 2010 from 10.64.43.10
HostName/IP: server1/10.64.40.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

Home Home | Help | Logout

▶ AE Services
▶ Communication Manager Interface
▶ Licensing
▶ Maintenance
▶ Networking
▶ Security
▶ Status
▶ User Management
▶ Utilities
▶ Help

Welcome to OAM

The AE Services Operations, Administration, and Management (OAM) Web provides you with tools for managing the AE Server. OAM spans the following administrative domains:

- AE Services - Use AE Services to manage all AE Services that you are licensed to use on the AE Server.
- Communication Manager Interface - Use Communication Manager Interface to manage switch connection and dialplan.
- Licensing - Use Licensing to manage the license server.
- Maintenance - Use Maintenance to manage the routine maintenance tasks.
- Networking - Use Networking to manage the network interfaces and ports.
- Security - Use Security to manage Linux user accounts, certificate, host authentication and authorization, configure Linux-PAM (Pluggable Authentication Modules for Linux) and so on.
- Status - Use Status to obtain server status informations.
- User Management - Use User Management to manage AE Services users and AE Services user-related resources.
- Utilities - Use Utilities to carry out basic connectivity tests.
- Help - Use Help to obtain a few tips for using the OAM Help system

Depending on your business requirements, these administrative domains can be served by one administrator for both domains, or a separate administrator for each domain.

A Switch Connection defines a connection between the Application Enablement Services server and Communication Manager. Enter a descriptive name for the switch connection and click on **Add Connection**.

AVAYA Application Enablement Services Management Console

Welcome: User craft
Last login: Fri Dec 11 17:36:53 2009 from 10.32.11.10
HostName/IP: server1/10.32.8.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

Communication Manager Interface | Switch Connections [Home](#) | [Help](#) | [Logout](#)

- AE Services
 - Communication Manager Interface
 - Switch Connections**
 - Dial Plan
 - Licensing
 - Maintenance
 - Networking
 - Security
 - Status
 - User Management
 - Utilities
 - Help

Switch Connections

S8720G650

Connection Name	Processor Ethernet	Msg Period	Number of Active Connections
S8300G450	No	30	1

The next window that appears prompts for the Switch Connection password. Enter the same password that was administered in Avaya Communication Manager in **Section 4.1**. Click on **Apply**.

AVAYA Application Enablement Services Management Console

Welcome: User craft
Last login: Fri Dec 11 17:36:53 2009 from 10.32.11.10
HostName/IP: server1/10.32.8.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

Communication Manager Interface | Switch Connections [Home](#) | [Help](#) | [Logout](#)

- AE Services
 - Communication Manager Interface
 - Switch Connections**
 - Dial Plan
 - Licensing
 - Maintenance
 - Networking
 - Security
 - Status
 - User Management
 - Utilities
 - Help

Connection Details - S8720G650

Switch Password:

Confirm Switch Password:

Msg Period: Minutes (1 - 72)

SSL: ☒

Processor Ethernet: ☐

After returning to the Switch Connections page, select the radio button corresponding to the switch connection added previously, and click on the **Edit H.323 Gatekeeper** button for DMCC call control and monitor.

AVAYA Application Enablement Services Management Console

Welcome: User craft
 Last login: Fri Dec 11 17:36:53 2009 from 10.32.11.10
 HostName/IP: server1/10.32.8.40
 Server Offer Type: TURNKEY
 SW Version: r5-2-0-98-0

Communication Manager Interface | Switch Connections Home | Help | Logout

Switch Connections

Connection Name	Processor Ethernet	Msg Period	Number of Active Connections
<input type="radio"/> S8300G450	No	30	1
<input checked="" type="radio"/> S8720G650	No	30	0

Edit Connection Edit PE/CLAN IPs **Edit H.323 Gatekeeper** Delete Connection

On the **Edit H.323 Gatekeeper – S8720G650** page, enter the C-LAN IP address which will be used for the DMCC service. Click on **Add Name or IP**. Repeat this step as necessary to add other C-LAN boards enabled with Application Enablement Services.

Note: Avaya recommends using a CLAN board for phone registration, and another CLAN board for H.323 Gatekeeper.

AVAYA Application Enablement Services Management Console

Welcome: User craft
 Last login: Tue Jan 26 13:40:05 2010 from 10.64.43.10
 HostName/IP: server1/10.64.40.40
 Server Offer Type: TURNKEY
 SW Version: r5-2-0-98-0

Communication Manager Interface | Switch Connections Home | Help | Logout

Edit H.323 Gatekeeper - S8720G650

10.32.8.25 Add Name or IP

Name or IP Address

Delete IP

5.3. Configure the CTI Users

Navigate to **User Management** → **User Admin** → **Add User** link from the left pane of the window. On the Add User page, provide the following information:

- User Id
- Common Name
- Surname
- User Password
- Confirm Password

The above information (User ID and User Password) must match with the information configured in the CTI Layer Configuration page in **Section 6**.

Select **Yes** using the drop down menu on the CT User field. This enables the user as a CTI user. Default values may be used in the remaining fields. Click the **Apply** button (not shown) at the bottom of the screen to complete the process.

AVAYA Application Enablement Services Management Console

Welcome: User craft
Last login: Thu Jan 28 16:35:23 2010 from 10.64.43.10
HostName/IP: server1/10.64.40.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

User Management | User Admin | Add User Home | Help | Logout

Add User

Fields marked with * can not be empty.

* User Id: Amcom
* Common Name: Amcom
* Surname: Amcom1238
* User Password:
* Confirm Password:

Admin Note:
Avaya Role: None
Business Category:
Car License:
CM Home:
Cxx Home:
CT User: Yes
Department Number:
Display Name:
Employee Number:

Once the user is created, navigate to the **Security** → **Security Database** → **CTI Users** → **List All Users** link from the left pane of the window. Select the User ID created previously, and click the **Edit** button to set the permission of the user.

AVAYA Application Enablement Services Management Console

Welcome: User craft
Last login: Thu Jan 28 16:35:23 2010 from 10.64.43.10
HostName/IP: server1/10.64.40.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

Security | Security Database | CTI Users | List All Users

Home | Help | Logout

- ▶ AE Services
- ▶ Communication Manager Interface
- ▶ Licensing
- ▶ Maintenance
- ▶ Networking
- ▼ Security
 - ▶ Account Management
 - ▶ Audit
 - ▶ Certificate Management
 - Enterprise Directory
 - ▶ Host AA
 - ▶ PAM
 - ▼ Security Database
 - Control
 - ▣ CTI Users
 - List All Users
 - Search Users
 - Devices
 - Device Groups
 - Tlinks
 - Tlink Groups
 - Worktops

CTI Users

User ID	Common Name	Worktop Name	Device ID
Amcom	Amcom	NONE	NONE

Edit

List All

Provide the user with unrestricted access privileges by checking the **Unrestricted Access** button. Click on the **Apply Changes** button.

AVAYA **Application Enablement Services**
Management Console

Welcome: User craft
Last login: Thu Jan 28 16:35:23 2010 from 10.64.43.10
HostName/IP: server1/10.64.40.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

Security | Security Database | CTI Users | List All Users

Home | Help | Logout

AE Services

Communication Manager Interface

Licensing

Maintenance

Networking

Security

Account Management

Audit

Certificate Management

Enterprise Directory

Host AA

PAM

Security Database

Control

CTI Users

List All Users

Search Users

Devices

Device Groups

Tlinks

Tlink Groups

Worktops

Edit CTI User

User Profile:

User ID

Common Name

Worktop Name

Amcom

Amcom

NONE

Unrestricted Access

Call Origination and Termination / Device Status

None

Call and Device Monitoring:

Device

Call / Device

Call

None

None

None

Routing Control:

Allow Routing on Listed Devices

None

Apply Changes

Cancel Changes

5.4. Configure the CTI Port

Navigate to the **Networking → Ports** link, from the left pane of the window, to set the DMCC server port. During the compliance test, the default port values were utilized. The following screen displays the default port values. Since the unencrypted port was utilized during the compliance test, set the Unencrypted Port field to **Enabled**. Default values may be used in the remaining fields. Click the **Apply Changes** button (not shown) at the bottom of the screen to complete the process.

AVAYA Application Enablement Services Management Console

Welcome: User craft
Last login: Fri Feb 19 16:19:59 2010 from 10.64.43.10
HostName/IP: server1/10.64.40.40
Server Offer Type: TURNKEY
SW Version: r5-2-0-98-0

Networking | Ports Home | Help | Logout

Ports

CVLAN Ports

			Enabled Disabled
Unencrypted TCP Port	9999		<input checked="" type="radio"/> <input type="radio"/>
Encrypted TCP Port	9998		<input checked="" type="radio"/> <input type="radio"/>

DLG Port

TCP Port	
5678	

TSAPI Ports

			Enabled Disabled
TSAPI Service Port	450		<input checked="" type="radio"/> <input type="radio"/>
Local TLINK Ports			
TCP Port Min	1024		
TCP Port Max	1039		
Unencrypted TLINK Ports			
TCP Port Min	1050		
TCP Port Max	1065		
Encrypted TLINK Ports			
TCP Port Min	1066		
TCP Port Max	1081		

DMCC Server Ports

			Enabled Disabled
Unencrypted Port	4721		<input checked="" type="radio"/> <input type="radio"/>
Encrypted Port	4722		<input checked="" type="radio"/> <input type="radio"/>
TR/87 Port	4723		<input type="radio"/> <input checked="" type="radio"/>

6. Configure Amcom CTI Layer

Amcom installs, configures, and customizes CTI Layer application for their end customers.

7. General Test Approach and Test Results

The general approach was to exercise basic telephone and call operations on Avaya IP and Digital telephones using the aforementioned Amcom desktop application. The main objectives were to verify that:

- The user may successfully use CTI Layer to perform off-hook, on-hook, dial, answer, hold, retrieve, transfer, conference, and release operations on the physical telephone.
- The agent user may successfully use CTI Layer to log into and out of an ACD, and move between agent work modes.
- Manual operations performed on the physical telephone are correctly reflected in the CTI Layer GUI.

- CTI Layer and manual telephone operations may be used interchangeably; for example, go off-hook using CTI Layer and manually dial digits.
- Display and call information on the physical telephone is accurately reflected in the CTI Layer GUI.
- Call states are consistent between CTI Layer and the physical telephone.

The objectives of **Section 7** were verified. For serviceability testing, the Amcom CTI Service was able to regain control of the physical telephone after restarts of the Amcom CTI Service, the computer on which it runs, and the Application Enablement Services server. In addition, after Amcom CTI Service lost network connectivity to the Application Enablement Services server, it was able to recover the existing session to the Application Enablement Services server when network connectivity was restored before the session expired, and establish a new session when network connectivity was restored after the previous session expired.

8. Verification Steps

The following steps may be used to verify the configuration:

- From the Amcom client computers, ping IP interfaces, in particular the Application Enablement Services server, and verify connectivity.
- For the physical IP telephones, verify that the physical telephones are registered by using the **list registered-ip-stations** command on the SAT. For the physical Digital telephones, verify that the telephones are attached to the correct ports.
- Go off-hook and on-hook on the controlled telephones manually and using CTI Layer, and verify consistency.
- Place and answer calls from the controlled telephones manually and using CTI Layer, and verify consistency.

9. Conclusion

These Application Notes described a compliance-tested configuration comprised of Communication Manager, Application Enablement Services, Avaya IP and Digital Telephones, and the Amcom CTI Layer application. Amcom CTI Layer allows a user to operate a physical telephone and view call and telephone display information through a graphical user interface (GUI). During compliance testing, calls were successfully placed to and from Avaya IP and Digital Telephones that were controlled and monitored by CTI Layer.

10. Additional References

Product documentation for Avaya products may be found at <http://support.avaya.com>.

[1] *Administering Avaya Aura™ Communication Manager*, Issue 5.0, May 2009, Document Number 03-300509

[2] *Avaya Aura™ Application Enablement Services Administration and Maintenance Guide*, Issue 11, November 2009, Document Number 02-300357

Product information for Amcom products may be found at <http://www.amcomsoft.com/products.cfm>.

©2010 Avaya Inc. All Rights Reserved.

Avaya and the Avaya Logo are trademarks of Avaya Inc. All trademarks identified by ® and ™ are registered trademarks or trademarks, respectively, of Avaya Inc. All other trademarks are the property of their respective owners. The information provided in these Application Notes is subject to change without notice. The configurations, technical data, and recommendations provided in these Application Notes are believed to be accurate and dependable, but are presented without express or implied warranty. Users are responsible for their application of any products specified in these Application Notes.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya DevConnect Program at devconnect@avaya.com.