Avaya Aura® Application Enablement Services Overview and Specification

Release 7.0.1
Issue 3
April 2020

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Contents

Chapter 1: Introduction

Purpose

This document describes tested characteristics and capabilities of Avaya Aura® Application Enablement Services, including feature descriptions, interoperability, performance specifications, security, and licensing requirements.

This document is intended for anyone who wants to gain a high-level understanding of Avaya Aura® Application Enablement Services features, functions, capacities, and limitations within the context of solutions and verified reference configurations.

Change history

The following changes have been made to this document since the last issue:

Issue	Date	Summary of changes
3.0	April 2020	Updated the AE Services offers on page 12 section.
2.0	May 2016	• Merged the Purpose and Intended Audience sections per GIS Content Evolution Updated Document Standards. • Heading name for this section renamed from *Document changes since last issue* to *Change history*. • Updated the *Training* reference library under the heading *Related Resources*.

Note:

This section only talks about what's new in the document structure. To learn what's new in Avaya Aura® Application Enablement Services 7.0.1, see *Chapter 3: New in this release* later in this guide.

Related resources

Documentation

The following table lists the related documents for Avaya Aura® Application Enablement Services. Most of the documents listed are Release 7.0.1. Those listed that are for earlier releases have not required an update and remain compatible with AE Services 7.0.1. Obtain the related documents and documents about other Avaya products mentioned in this guide from the Avaya Support Web site at https://support.avaya.com/.

#	Document title	Number	Release
1	*Avaya Aura® Application Enablement Services Overview and Specification*	02-300360	7.0.1
3	*Deploying Avaya Aura® Application Enablement Services in a Software-Only Environment*	02-300355	7.0.1
5	*Deploying Avaya Aura® Application Enablement Services in Virtualized Environment*	Not applicable	7.0.1
6	*Administering and Maintaining Avaya Aura® Application Enablement Services*	02-300357	7.0.1
7	*Deploying Avaya Aura® Application Enablement Services for Microsoft® Lync Server Products*	02-601893	7.0.1
8	*Avaya Aura® Application Enablement Services Integration Guide for IBM® Sametime®*	02-602818	7.0.1
9	*Avaya Aura® Application Enablement Services Online Help* (packaged with Application Enablement Services software and not available on the Web)	Not applicable	7.0.1
10	*Avaya Aura® Application Enablement Services TSAPI Exerciser Help* (Online, packaged with the AE Services TSAPI Client SDK software and not available on the Web)	Not applicable	7.0.1
11	*Avaya Aura® Application Enablement Services Web Services Programmer's Guide*	02-300362	5.2
12	*Avaya Aura® Application Enablement Services Device, Media and Call Control API .NET Programmer's Guide*	02-602658	7.0.1
13	*Avaya Aura® Application Enablement Services Device, Media, and Call Control .NET Programmer's Reference* (an HTML document is available on the Web only at the Avaya Support Site https://support.avaya.com/ or Avaya DevConnect Site http://www.avaya.com/devconnect).	Not applicable	7.0.1
14	*Avaya Aura® Application Enablement Services Device, Media, and Call Control XML Programmer's Guide*	02-300358	7.0.1

Table continues…

#	Document title	Number	Release
15	*Avaya Aura® Application Enablement Services Device, Media, and Call Control XML Programmer 's Reference* (an HTML document is available on the Web only at the Avaya Support Site https://support.avaya.com/ or Avaya DevConnect Site http://www.avaya.com/devconnect).	Not applicable	7.0.1
16	*Avaya Aura® Application Enablement Services Device, Media, and Call Control Java Programmer 's Guide*	02-300359	7.0.1
17	*Avaya Aura® Application Enablement Services Device, Media, and Call Control Java Programmer's Reference* (an HTML document available on the Web only at the Avaya Support Site, https://support.avaya.com/ or Avaya DevConnect Site, http://www.avaya.com/devconnect)	Not applicable	7.0.1
18	*Avaya Aura® Application Enablement Services Device, Media, and Call Control Media Stack API Reference* (an HTML document is available on the Web only at the Avaya Support Site https://support.avaya.com/ or Avaya DevConnect Site http://www.avaya.com/devconnect).	Not applicable	7.0.1
19	*Avaya Aura® Application Enablement Services TSAPI and CVLAN Client and SDK Installation Guide*	02-300543	7.0.1
20	*Avaya Aura® Application Enablement Services TSAPI for Avaya Communication Manager Programmer's Reference*	02-300544	7.0.1
21	*Avaya Aura® Application Enablement Services TSAPI Programmer's Reference*	02-300545	4.1
22	*Avaya Aura® Application Enablement Services CVLAN Programmer's Reference*	02-300546	4.1
23	*Avaya Aura® Application Enablement Services JTAPI Programmer's Guide*	02–603488	5.2
24	*Avaya Application Enablement Services JTAPI Programmer's Reference* (an HTML document available on the Web only at the Avaya Support Site, https://support.avaya.com/ or Avaya DevConnect Site, http://www.avaya.com/devconnect)	Not applicable	5.2
25	*Avaya Application Enablement Services ASAI Technical Reference*	03-300549	4.1
26	*Avaya Aura® Application Enablement Services ASAI Protocol Reference*	03-300550	3.1

Related links

Finding documents on the Avaya Support website on page 9

Finding documents on the Avaya Support website

About this task

Use this procedure to find product documentation on the Avaya Support website.

Procedure

1. Use a browser to navigate to the Avaya Support website at http://support.avaya.com/.
2. At the top of the screen, enter your username and password and click **Login**.

3. Put your cursor over **Support by Product**.
4. Click **Documents**.
5. In the **Enter your Product Here** search box, type the product name and then select the product from the drop-down list.
6. If there is more than one release, select the appropriate release number from the **Choose Release** drop-down list.
7. Use the **Content Type** filter on the left to select the type of document you are looking for, or click **Select All** to see a list of all available documents.

   For example, if you are looking for user guides, select **User Guides** in the **Content Type** filter. Only documents in the selected category will appear in the list of documents.
8. Click **Enter**.

Related links

Documentation on page 8

Training

The following courses are available on the Avaya Learning Web site at http://www.avaya-learning.com. After logging in to the Web site, enter the course code or the course title in the **Search** field and click **Go** to search for the course.

Course code	Course title
4100	Avaya Aura® Application Enablement Services Implementation Test.
ATI02595IEN	Avaya Aura® Application Enablement Services Implementation and Administration.
ATI02595VEN	Avaya Aura® Application Enablement Services Implementation and Administration.
4301W	Avaya Unified Communications - Core Components.
7120V	Integration Basics for Avaya Enterprise Team Engagement Solutions (Virtual Instructor Led).

Viewing Avaya Mentor videos

Avaya Mentor videos provide technical content on how to install, configure, and troubleshoot Avaya products.

About this task

Videos are available on the Avaya Support website, listed under the video document type, and on the Avaya-run channel on YouTube.

- To find videos on the Avaya Support website, go to http://support.avaya.com and perform one of the following actions:
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  - In **Search**, type the product name. On the Search Results page, select **Video** in the **Content Type** column on the left.
- To find the Avaya Mentor videos on YouTube, go to www.youtube.com/AvayaMentor and perform one of the following actions:
  - Enter a key word or key words in the **Search Channel** to search for a specific product or topic.
  - Scroll down Playlists, and click the name of a topic to see the available list of videos posted on the website.

Note:

Videos are not available for all products.

Support

Go to the Avaya Support website at http://support.avaya.com for the most up-to-date documentation, product notices, and knowledge articles. You can also search for release notes, downloads, and resolutions to issues. Use the online service request system to create a service request. Chat with live agents to get answers to questions, or request an agent to connect you to a support team if an issue requires additional expertise.

Warranty

Avaya provides a 90-day limited warranty on Application Enablement Services. To understand the terms of the limited warranty, see the sales agreement or other applicable documentation. In addition, the standard warranty of Avaya and the details regarding support for Application Enablement Services in the warranty period is available on the Avaya Support website at https://support.avaya.com/ under **Help & Policies > Policies & Legal > Warranty & Product Lifecycle**. See also **Help & Policies > Policies & Legal > License Terms**.

Chapter 2: Overview

Avaya Aura® Application Enablement Services overview

Avaya Aura® Application Enablement Services (AE Services) is a software platform that leverages the capabilities of Avaya Aura® Communication Manager. AE Services provides an enhanced set of Application Programming Interfaces (APIs), protocols, and web services that expose the functionality of Avaya Communication solutions to corporate application developers, third-party independent software vendors, and system integrators.

Note:

AE Services supports existing Communication Manager standalone implementations and Avaya Aura® Session Manager configurations with Communication Manager as an Access Server. AE Services does not support Communication Manager as a Feature Server.

AE Services runs on a Linux server and is tightly integrated with Communication Manager and Avaya Contact Center solutions. AE Services provides an open platform for supporting existing applications and serves as a catalyst for creating the next generation of applications and business solutions.

For information about new features for Release 7.0, see What's new in Application Enablement Services on page 14. AE Services 7.0 is backward compatible with previous releases of Communication Manager, going back to Release 6.0.x. For more information about feature compatibility, see AE Services Release 7.0.1 compatibility on page 67. To learn more about Avaya Aura®contact your Avaya client executive, authorized business partner, or see the Avaya Support Web site http://www.avaya.com/support.

Related links

New in this release on page 14
AE Services Release 7.0.1 compatibility on page 67

AE Services offers

AE Services Release 7.0.1 provides the following product offers.

Avaya Application Enablement Services Software-Only

This offer is available for customers who want to install AE Services on a computer that meets or exceeds the minimum server requirements for AE Services. The High Availability Failover feature is not available with the Software-Only offer.

Avaya Application Enablement Services using VMWare® in the Avaya Aura® Virtualized Environment

The VMWare offer introduced in Release 6.2 deploys the Avaya Aura® Application Enablement Services virtual application in the Avaya Aura® Virtualized Environment. This offer consists of the AE Services template enabled for VMWare. The AE Services template includes the AE Services 7.0.1 software with the Linux® Operating System version 6.5, running as a virtual machine on a system running the VMWare ESXi version 6.0 virtualization environment and Appliance Virtualization Platform (AVP).

Note:

AE Services VMWare offer is also supported on VMWare ESXi versions 5.0, 5.1 and 5.5.

Note:

AE Services Release 7.0.1 deployment via System Manager Solution Deployment Manager client on Dell™ PowerEdge™ R610 server with 4 GB or 6 GB RAM is insufficient. Upgrade your system RAM to a minimum of 12 GB before deploying AE Services 7.0.1.

Note:

AE Services 7.0.1 deployment via Avaya Virtualization Platform client on Dell™ PowerEdge™ R610 or HP ProLiant DL360 G7 is insufficient. It is recommended that the total memory be increased to a minimum of 12 GB before deploying AE Services 7.0.1.

Chapter 3: New in this release

This chapter presents an overview of the new features and enhancements for Avaya Application Enablement Services (AE Services).

What's new in this release

This chapter provides an overview of the new features and enhancements for Application Enablement Services Release 7.0.1.

Application Enablement Services 7.01 OVA for virtualized environment

Application Enablement Services 7.01 OVA VMWare Virtual Appliance offer supports a fresh installation of Application Enablement Services 7.0.1 running on the ESXi 5.x or 6.0 VMM. The OVA may be installed as a virtual machine on a system running VMWare's vSphere version 5.0, 5.1, 5.5 or 6.0 virtualization platform.

Application Enablement Services 7.0.1 ISO for Software-only version

The Avaya-supplied Application Enablement Services ISO will contain the following software:

- Application Enablement Services 7.0 or 7.0.1
- Third-party software for Application Enablement Services
- Customer-provided server hardware and the RHEL 6.5 OS software

Support for Appliance Virtualization Platform 7.0.1 platform

Application Enablement Services 7.0.1 software is deployable on Appliance Virtualization Platform Release 7.0.1.

Bin files as a method for Application Enablement Services deployment

Application Enablement Services 7.0.1 can be deployed over the 7.0 GA version. Application Enablement Services 7.0.1 bin file can be deployed from the Application Enablement Services system command prompt.

Application Enablement Services 7.0.1 Embedded WebLM Server

This feature will provide a local WebLM server to Application Enablement Services for use in an Enterprise-Wide licensing environment.

Support for VMware ESXi 6.0

The virtual appliance offer will be installed as a virtual machine running on VMware ESXi 5.0, 5.1 and 5.5 platforms. However, for Application Enablement Services 7.0.1, support has been expanded to include VMware ESXi 6.0.

Support for SNMP v3

From a security point of view, it is recommended to enable products only with SNMP v3, with authentication and privacy modes. Therefore, SNMP v3 with authentication and privacy modes is now the mandatory requirement for both current and future development for all Avaya products.

Logging Enhancements

Application Enablement Services configuration changes will be logged through Syslog which will enable the changes to be tracked in logs that can be automatically audited by operations. Customers will need to export logs for regular backups. With this capability the exports can be automatic rather than manual. This enables improved manageability and monitoring and will address customer concerns about audit gaps.

Support for Common Server Release 3 (CSR3) hardware

Application Enablement Services 7.0.1 supports CSR3 hardware.

Support of Internet Explorer 9, 10, and 11

Application Enablement Services OAM web pages can now be correctly displayed when using the Internet Explorer Web browser versions 9, 10, and 11.

Chapter 4: AE Services Product Summary

Introduction

AE Services provides a platform that supports existing contact center application requirements, along with new, emerging Application Programming Interfaces (APIs). AE Services provides programs that perform specific functions and provide APIs, protocols, and Web-based interfaces. A description of each service that is included in AE Services is provided in this chapter. For a high-level illustration of AE Services see configuration at a glance on page 19.

DMCC service

The Device, Media, and Call Control (DMCC) service provides third-party call control and first-party call control (device control and media control). The DMCC SDK provides a Java, XML and .NET API. For more information about the DMCC SDKs, see SDKs on page 46.

- DMCC first-party call control (1PCC)
  - DMCC with Device Control can set up a DMCC softphone that gains exclusive or shared control of a softphone-enabled Communication Manager telephone or extension. A DMCC softphone is an instance of a phone or extension that is created by AE Services and then registered on Communication Manager.
  - DMCC with Media Control provides the ability to record media from a call into a WAV file or play a voice announcement or tone that is prerecorded in a WAV file. Media session control also provides a way for a client application to send and receive TTY characters over Real-time Transport Protocol (RTP) streams in the form of RFC2833 packets. Applications can use this capability to implement Voice Carry Over (VCO). The TTY capability is available in client-media mode only.
- DMCC third-party call control (3PCC)

  DMCC with Call Control Services uses the TSAPI service to provide an expanded set of third party call control capabilities, such as the ability to place calls, create conference calls, deflect calls, reconnect call, and monitor call control events, just to name a few.
- Routing Services

  Routing Services allows applications to request and receive routing instructions for a call. These instructions, issued by a client routing server application, are based on the incoming call information provided by Communication Manager.

- System Services

  System Services allows applications to request and receive health status of a TSAPI TLink.

  System Services also allows applications to request and receive events on the status of TSAPI CTI (Tlink) connections between the AE Services server and the Communications Manager(s). Once an application is registered, notification events are sent when the Tlink status changes for example linkUp/linkDown for the switches for which it has registered.

DMCC call recording solutions - IP Migration Readiness and Optimization analysis

For DMCC call recording solutions, Avaya recommends that you use the Avaya IP Migration Readiness and Optimization services to help you safely implement IP-based solutions in a stable, optimized infrastructure.

These services include a two-phased, detailed analysis of the entire network to help assess whether you can deploy a converged IP solution such as AE Services without adversely affecting your existing network applications and services.

The first phase of this analysis is the Customer Infrastructure Readiness Survey (CIRS). Certified Avaya engineers conduct a high-level evaluation of the local and wide area network infrastructure to identify any significant network issues that must be resolved prior to deploying the proposed IP solution.

The second phase of this analysis — Network Analysis/Network Optimization (NANO), is required when the CIRS indicates that the network cannot support the proposed IP solution at the desired performance levels. Starting with the information and data gathered for the CIRS, Avaya engineers perform problem diagnosis to get at the root causes of network issues. They also provide functional requirements and recommendations for a network design that optimizes all of the resources needed to support the IP solution.

TSAPI service

Telephony Services API (TSAPI) is a C/C++ based API that provides a full complement of third-party call control capabilities such as controlling specific calls or stations, completing routing of incoming calls, receiving notifications of events, invoking Communication Manager features and querying Communication Manager for information. Java Telephony API (JTAPI) is a client-side interface to the TSAPI service, and, as such, it provides third party call control. For more information about the TSAPI SDK and the JTAPI SDK, see SDKs on page 46.

Web services

Web services provide a higher-level abstraction than the finer grained APIs. Web services provide convenient access to commonly used functionality through a published Web Services Definition Language (WSDL) and Simple Object Access Protocol (SOAP) connectivity.

For more information about the Web services SDKs, see SDKs on page 46.

System Management Service

The System Management Service reveals the management features of Communication Manager. This service enables its clients to display, list, add, change and remove specific managed objects on Communication Manager.

Telephony Web Service

The Telephony Web Service is a Web services interface that enables high level call control functionality over standard Web services interfaces (SOAP/XML).The service hides the complicated concepts associated with traditional CSTA based call control such as connections, call identifiers and call states.

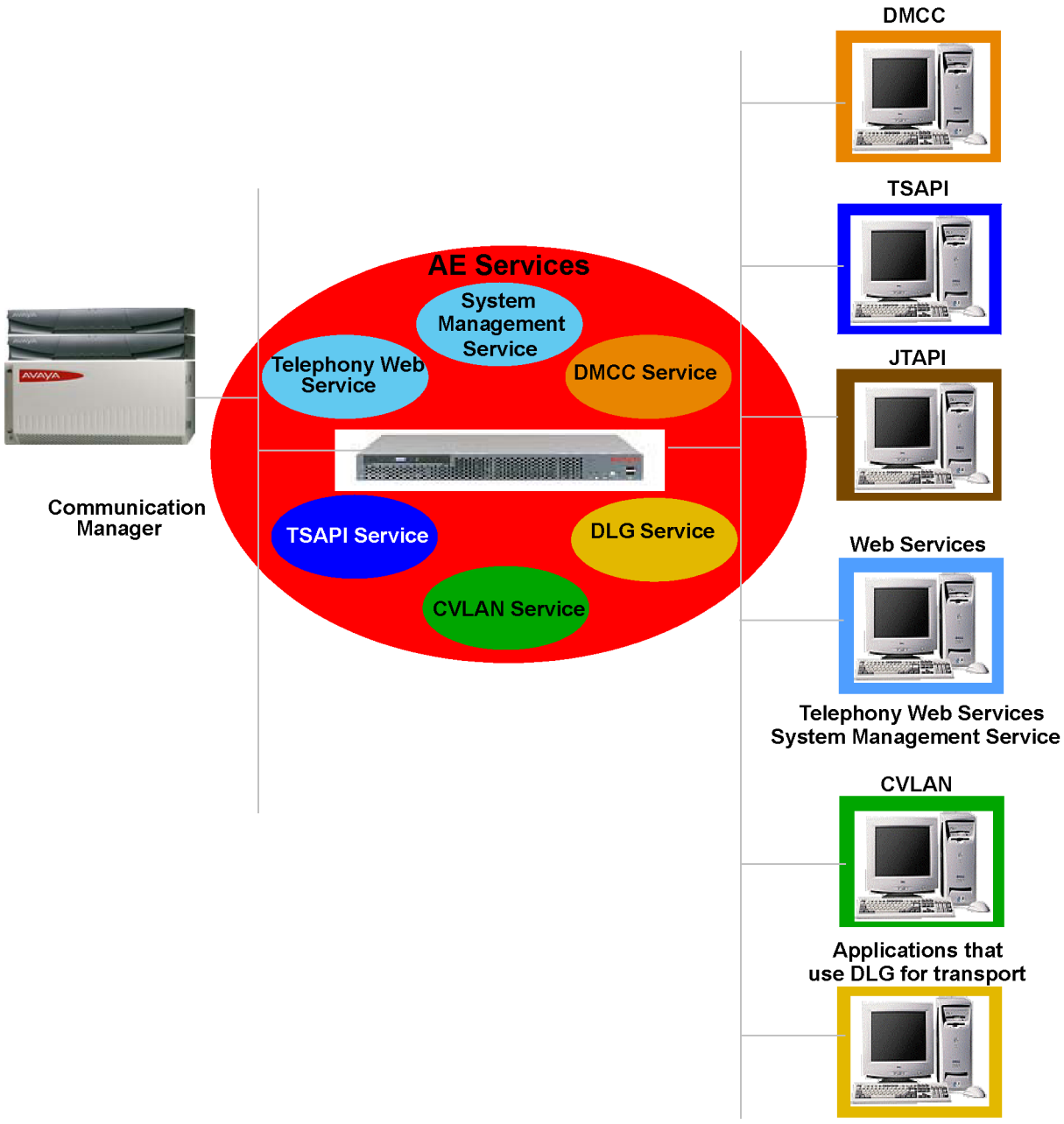
CVLAN service

The CallVisor LAN (CVLAN) service is a C/C++ based API that enables applications to exchange Adjunct/Switch Application Interface (ASAI) messages with the AE ServicesServer. CVLAN provides a full complement of third-party call control capabilities such as controlling specific calls or stations, completing routing of incoming calls, receiving notifications of events, invoking Communication Manager features and querying Communication Manager for information. CVLAN is an Avaya specific protocol and is not intended for new application development.

DLG service

The DEFINITY LAN Gateway (DLG) service tunnels messages over TCP/IP. That is, the DLG service supports a set of TCP/IP connections for the communications channel between Communication Manager and AE Services. The DLG service is also used for transporting ASAI/Q.931 messages. DLG is an Avaya specific protocol and is not intended for new application development.

AE Services configuration at a glance



Chapter 5: Network Security and Reliability

AE Services security features

The following list highlights the AE Services security features.

Linux shell access control

The Modify Login page in the AE Services Management Console (**Security** > **Account Management** > **Modify Login**) provides the AE Services administrator with the ability to control Linux shell access for a Linux account.

Login Audit

The Unused Login Audit page in AE Services Management Console (**Security** > **Audit** > **Login Audit**) lets the AE Services administrator enable an audit process for disabling any unused Linux account.

Lock or unlock a Linux account

The Lock/Unlock Login feature in AE Services Management Console (**Security** > **Account Management** > **Lock/Unlock Login**) lets the AE Services administrator lock or unlock a Linux account.

Login Reports

The Login Reports feature in AE Services Management Console (**Security** > **Audit** > **Login Reports**) lets the AE Services administrator generate reports based on a login ID.

Role Based Access Control (RBAC)

Access to AE Services Management Console Web pages can be restricted by user authorization level. The operations that users are allowed to perform such as read, edit and delete can also be restricted.

Additional AE Services security features information

For more information about AE Services security features, see “Chapter 5: Security Administration and Additional PAM Management” in the *Avaya Application Enablement Services Administration and Maintenance Guide*. This document and other related information is located on the Avaya Support Web site http://www.avaya.com/support.

Secure application links

You can configure all the AE Services APIs to use secure application links. The AE Services server comes pre-installed with a set of default server certificates for lab use , that is out-of-the-box deployments. These default server certificates should not be used in a production environment. It is highly recommended to replace all default installed certificates using your own Public Key Infrastructure or a third party vendor.

Note:

For AE Services 7.0, the CA used to sign the server default certificate has changed. In order to allow your client to connect to the AE Services 7.0 server using a TLS socket connection for lab testing, the new AE Services CA certificate will need to be exported from the server and imported into your client trust store.

DMCC API

The DMCC API provides:

- Validation of the AE Services server certificate on the DMCC client application
- Optional validation of the client certificate on the AE Services Server

  For more information see the following documents:

  - *Avaya Application Enablement Services Device, Media and Call Control API Java Programmers Guide*, 02-300359
  - *Avaya Application Enablement Services Device, Media and Call Control API XML Programmers Guide*, 02-300358
  - *Avaya Application Enablement Services Device, Media and Call Control API .NET Programmers Guide*, 02-602658
  - *Administering and Maintaining Avaya Aura® Application Enablement Services*, 02-300357

TSAPI, JTAPI, and CVLAN

TSAPI, JTAPI, and CVLAN provide validation of the server certificate. For more information, see the following documents:

- *Avaya Application Enablement Services TSAPI and CVLAN Client and SDK Installation Guide*, 02-300543.
- *Avaya Application Enablement Services JTAPI Programmers Guide*, 02-603488.

Web Services

For Web Services, AE Services provides a Tomcat RPM that includes a default certificate and a default keystore of encryption keys for use in connecting to the AE Services server via Secure Sockets Layer (SSL). For more information, see the *Application Enablement Services Web Services Programmer Guide*, 02-300362.

Note:

Default server certificates should not be used in a production environment. It is highly recommended to replace all default installed certificates using your own Public Key Infrastructure or a third party vendor.

AE Services link resiliency and failover

AE Services provides an AEP connection that establishes and maintains a secure communication channel between AE Services and Communication Manager. This transport service, implemented on the AE Services server and on Communication Manager, tunnels ASAI and call information services messages over TCP/IP, using a proprietary Avaya protocol called Application Enablement Protocol (AEP). The AEP connection is secured via Transport Layer Security (TLS).

An AEP transport connection is a secure TCP/IP connection between the AE Services server and a CLAN or Processor Ethernet connection on Communication Manager. When the transport service starts up, it establishes the Communication Manager/AEP transport connection sessions based on the switch connections administered in the AE Services Management Console.

The Link Bounce Resiliency feature provides increased link reliability to the AEP transport connection. This feature ensures that no messages are lost during an interchange or a short network outage of up to 30 seconds.

One AE Services server can support up to 16 AEP transport connections. The 16 AEP connections provide a redundancy failover capability for configurations that use CLAN or Processor Ethernet connections.

- If a CLAN goes down or is not accessible over the network, the traffic is redistributed to the remaining CLANs. This failure should be transparent to the application, provided that the failed CLAN was not necessary to support the message bandwidth required by the application.
- If a Processor Ethernet connection goes down or is not accessible over the network, the session is still preserved. As long as it is reestablished within 30 seconds, no data will be lost.

Support for an Enterprise Survivable Server configuration

Prior to AE Services 6.1, only switch connections on CLANs were supported for Enterprise Survivable Server (ESS) configurations. Beginning with AE Services 6.1, switch connections on both CLANs and Processor Ethernet (PE) connections are supported for ESS configurations. Additionally, any DMCC endpoints registered to the main switch (using the Time-to-Service feature) will automatically re-register to the ESS or LSP.

Note:

A combination of CLANs and PEs for ESS configurations are supported if the main switch connection is configured as a CLAN. If the main switch connection is configured as a PE connection, then all ESS configurations should be configured as PE connections.

Uninterrupted telephony is important for many enterprises, especially for mission-critical applications. Avaya Communication Manager provides Enterprise Survivable Server (ESS) and Local Survivable Processor (LSP) for failover from the main media server. This feature provides

the ability for media gateways, endpoints, application servers like AE Services and its applications to continue their operations without major interruption.

AE Services recommends that all applications in an ESS configuration connect to a local AE Services server which, in turn, is connected to either the media server at the main site or a media gateway with an ESS or LSP at the remote site. In this configuration, the applications and associated AE Services server at the remote sites are always active and are supplying functionality for the local resources at the remote site. This type of configuration ensures the most seamless survivability in an ESS configuration.

For more information, see *White paper on Avaya Application Enablement Services High Availability (HA) Configurations,* located on the Avaya Support Web site http://www.avaya.com/support.

Chapter 6: Guidelines for configuring AES

Guidelines and requirements for configuring AE Services

This topic provides some requirements and guidelines for configuring AE Services. For more information about configuring AE Services, see *White paper on Avaya Application Enablement Services High Availability (HA) Configurations,* located on the Avaya Support Web site http://www.avaya.com/support.

- Only one instance of the AE Services server software can reside on an AE Services server machine (requirement).
- More than one AE Services server can connect to the same Communication Manager server.
  - If your applications do not use an AEP connection, there is no limit to the number of connections to Communication Manager servers. For example, if you are using the DMCC service for Device and Media control only that is, first-party call control, and you are using Communication Manager licenses for DMCC endpoints , you would not use the transport link. If you want to use WebLM's DMCC-DMC licenses, you need a transport link.
  - If your applications use an AEP connection, AE Services can support up to 16 connections to Communication Manager servers. For more information, see Configurations that use AEP connections on page 25.
- AE Services recommends that you use the Processor Ethernet interface for all configurations.
- Applications must run on a separate client application machine (several applications can run on one machine if the machine has the resources to run these applications).
- It is recommended that Communication Manager be configured for H.323 registration using the Time-to-Service feature. For High Availability Failover and ESS, it is required that Communication Manager be configured for H.323 registration using the Time-to-Service feature in order to do silent recovery of DMCC registrations. For AE Services 6.1 and later, DMCC device control depends on the Call Information Link and the AEP connection to determine if the Communication Manager server supports the H.323 Time to Service registration feature for AE Services.
- An application that uses the Device, Media and Call Control (DMCC) service should keep trying to reestablish the DMCC session when it loses its socket communication link to the DMCC service. Because the runtime state is preserved, once the session is reestablished, all of the DeviceIDs, device or call monitors, and device registrations will still be intact.
- An application that uses the CVLAN, DLG or TSAPI service should reestablish its sessions when it loses the socket connection to the service on the AE Services server. Because no

runtime state is preserved for these services, the application should also reestablish any monitors/associations.

- The AE Services server can support a mixed environment that includes TSAPI, DMCC, Web Services, CVLAN, and DLG based applications.

Configurations that use AEP connections

AE Services can support up to 16 AEP connections to Communication Manager. AE Services recommends that you use the Processor Ethernet interface for all configurations. If, however, you use CLANs, AE Services strongly recommends that you use at least 2 CLANs for each switch connection to Communication Manager.

- TSAPI

  The following APIs, services, and integrations also use the TSAPI service:

  - JTAPI
  - AE Services integration for IBM Lotus Sametime
  - AE Services integration for Microsoft Live Communications Server 2005
  - AE Services integration for Microsoft Office Communications Server 2007
  - AE Services integration for Microsoft Lync Server 2010
  - AE Services integration for Microsoft Lync Server 2013
  - DMCC with Call Control
  - Telephony Web Services
- DMCC endpoint registration using WebLM's DMCC-DMC licenses
- DMCC with Call Information Services
- CVLAN
- DLG

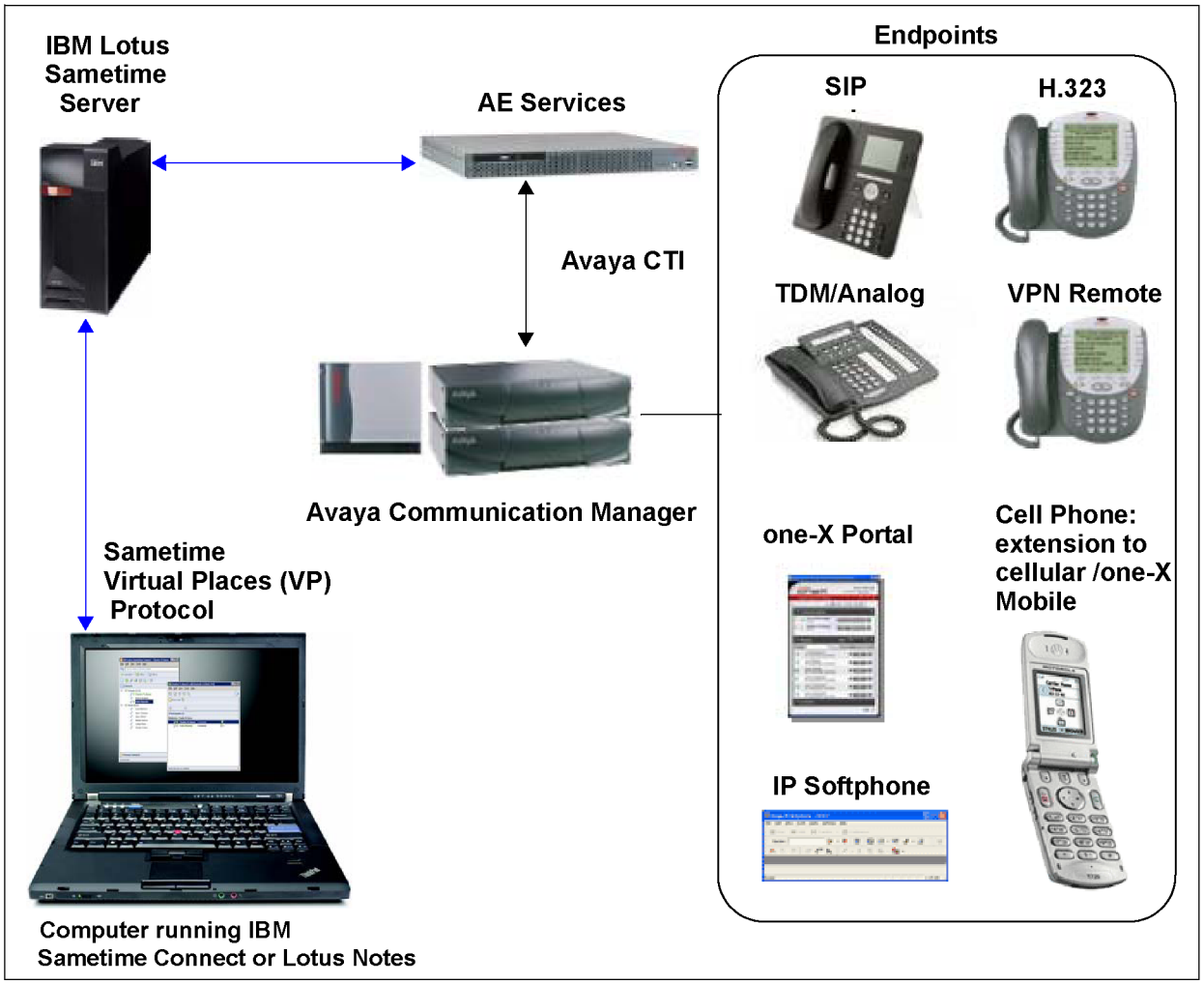
Chapter 7: AE Services Architecture

AE Services integration for IBM Lotus Sametime

The AE Services integration for IBM Lotus Sametime is a special packaging of the AE Services DMCC service that is positioned as an offer. The AE Services integration for IBM Lotus Sametime provides a solution for controlling your Avaya telephone or IP softphone using IBM Lotus Sametime. AE Services integration for IBM Lotus Sametime was introduced in AE Services 4.2. For Release 7.0, AE Services supports IBM Sametime 8.5.2 in addition to IBM Sametime 8.5.1, 8.5.0, 8.0.2, and 7.5.

The AE Services integration for IBM Lotus Sametime requires a Telephony Conferencing Provider Interface (TCSPI) plug-in which is provided by the DMCC client.

For more information, see the *Avaya Application Enablement Services Integration Guide for IBM Lotus Sametime*, 02-602818.



AE Services integration with Microsoft Office Communication Servers and Microsoft Lync Servers

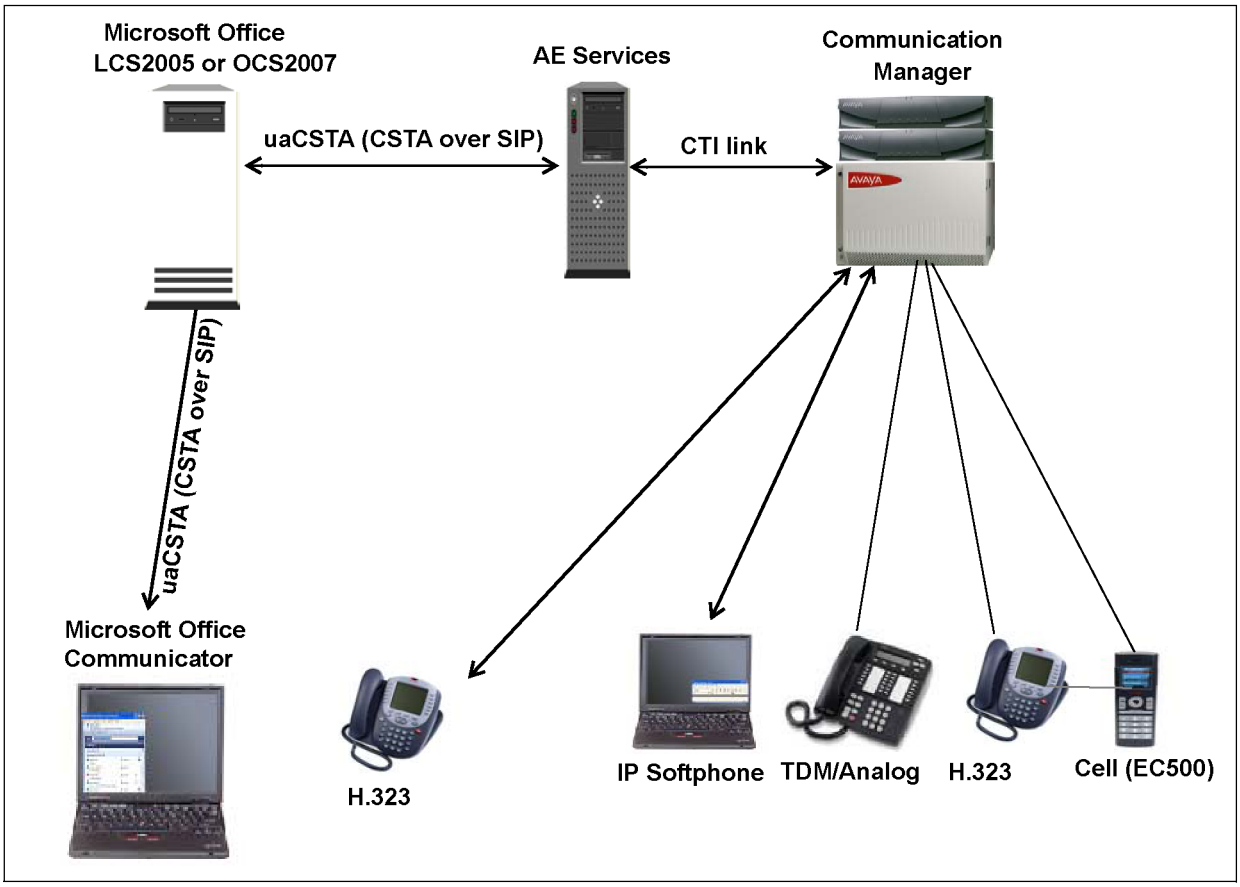
AE Services provides an integration solution that is compatible with either of the following Microsoft Office platforms:

- Microsoft Office Live Communications Server 2005
- Microsoft Office Communications Server 2007 R1 and R2
- Microsoft Lync Server 2010
- Microsoft Lync Server 2013

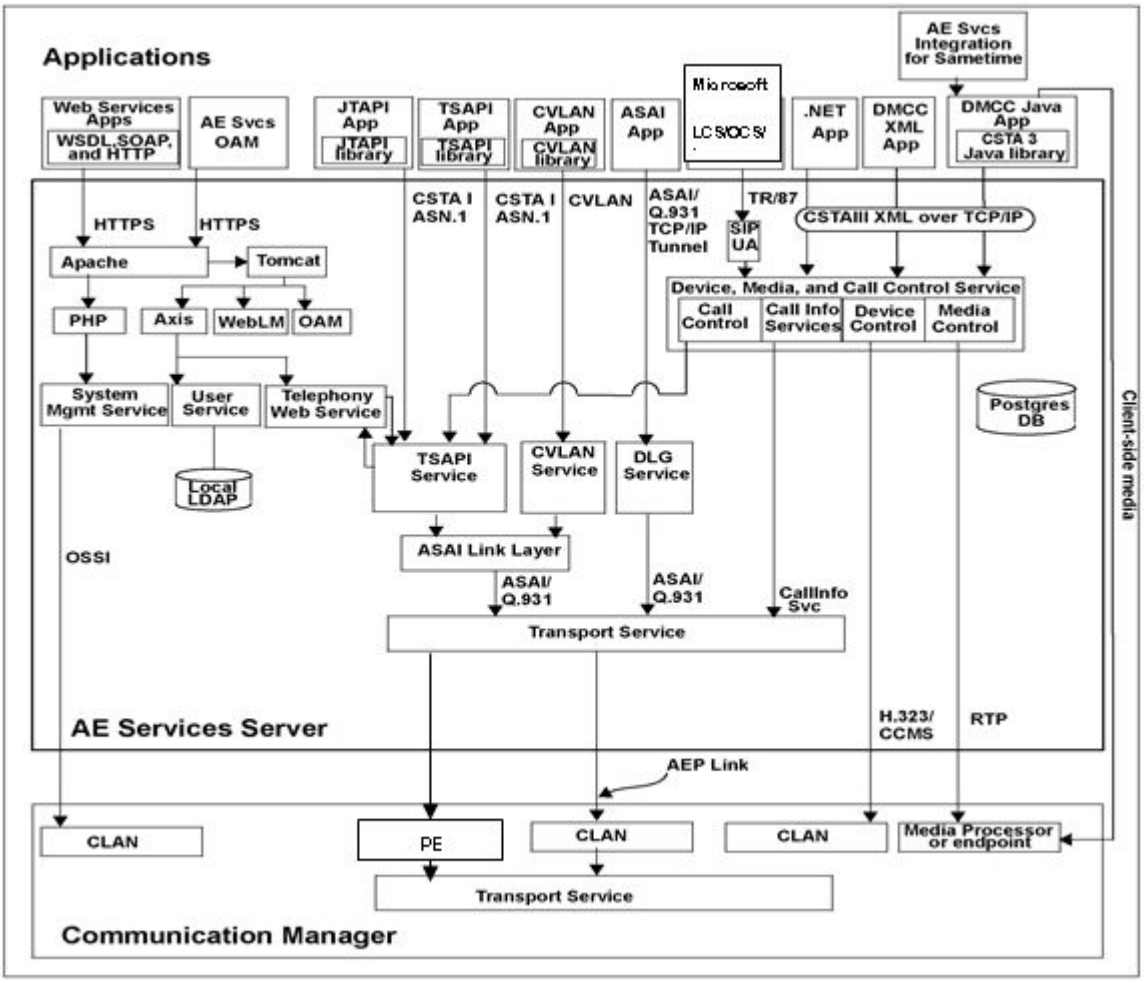
The AE Services integration with Microsoft Office and Lync products is a special packaging of the AE Services DMCC service that is positioned as an offer. The AE Services integration with

Microsoft Office and Lync provides a solution for controlling your Avaya telephone or IP softphone using Microsoft Office Communicator or Microsoft Lync client. You do not have to install any Avaya software on the Microsoft Office client or Lync client, and the AE Services server can support a mixed environment that includes either of the AE Services Microsoft Office and Lync platforms as well as TSAPI, DMCC, Web Services, CVLAN and DLG based applications. The AE Services integration with Microsoft Office Live Communications Server was initially released in AE Services 4.0. The AE Services integration with Microsoft Office Communications Server 2007 was initially released in AE Services 4.1.

For more information, see the *Deploying Avaya Aura® Application Enablement Services for Microsoft® Lync Server Products*, 02-601893.



AE Services architecture at a glance



Chapter 8: Session Initiation Protocol (SIP)

SIP support

The Session Initiation Protocol (SIP) is a control (signaling) protocol for creating, modifying, and terminating sessions with one or more participants. These sessions include Internet telephone calls, multimedia distribution, and multimedia conferences. In more familiar terms, SIP means real-time communication, presence, and collaboration in a variety of forms including voice, video, or instant text messaging.

Specific Avaya SIP endpoints can be controlled with AE Services 4.1 or later and Communication Manager 5.0 or later. AE Services 5.2 or later supports SIP enabled endpoints Avaya 96XX (including 9620, 9630, 9630G, 9640 and 9640 G), and 9601 (SIP Only) with firmware version 2 or greater and Avaya 16CC with all firmware versions.

The requirements for SIP support are as follows:

- Communication Manager 5.0 or later
- SIP Enablement Services (SES) 5.0 or later, or Avaya Session Manager (ASM)

AE Services 4.1 with Communication Manager 5.0 and SIP Enablement Services (SES) 5.0 introduced the ability to control Avaya SIP endpoints via TSAPI/JTAPI. This capability is not available through DLG.

For AE Services 7.0, the following table lists the SIP endpoints that have been tested to date. In general, all AE Services third-party call control functions are supported for these SIP endpoints, except for the limitations outlined in the next section.

Endpoint	Administered as	Endpoint Firmware	AE Services Release	CM/ASM Pair	
				CM- ES Version	ASM Version
9620	9620SIP	2.6 SP12	7.0	7.0	7.0
9640	9640SIP	2.6 SP12	7.0	7.0	7.0
9640G	9640SIP	2.6 SP12	7.0	7.0	7.0
9630G	9630SIP	2.6 SP12	7.0	7.0	7.0
9650	9600SIP	2.6 SP12	7.0	7.0	7.0
9601	9608SIP	6.4	7.0	7.0	7.0
9608	9608SIPCC	6.4	7.0	7.0	7.0

Table continues…

Endpoint	Administered as	Endpoint Firmware	AE Services Release	CM/ASM Pair	
				CM- ES Version	ASM Version
9611	9611SIPCC	6.4	7.0	7.0	7.0
9621	9621SIPCC	6.4	7.0	7.0	7.0
9641	9641SIPCC	6.4	7.0	7.0	7.0
Avaya Flare	9641SIP	Flare for Windows Ver 2.0.0.15	7.0	7.0	7.0

SIP limitations

The following topics list the SIP limitations for AE Services. For more information about SIP limitations, see the Application Enablement Services Release Notes.

DMCC

All third-party call control capabilities are supported for the endpoints listed in SIP support on page 30. The following scenarios are not supported for SIP endpoints:

- The media forking implementation approach to call recording introduced in AE Services 4.2 is not supported. That is, an application registering a DMCC softphone in dependent mode with the same extension as the user's SIP phone or softphone is not supported. If the DMCC endpoint is registered as dependent to the SIP extension, it will not receive media.
- With respect to device control, DMCC cannot register an application controlled softphone in dependent mode with the same extension as the user's SIP phone or softphone for purposes such as pressing buttons, monitoring LEDs, and monitoring display.

TSAPI/JTAPI

All third-party call control capabilities are supported for the endpoints listed in SIP support on page 30, except the following capabilities:

- Third-Party Selective Listening Hold
- Third-Party Selective Listening Retrieve

IBM Lotus Sametime integration

All third-party call control capabilities are supported for the endpoints listed in SIP support on page 30, except the following capabilities:

- Send DTMF (Dual Tone Multi-Frequency) digits
- Third-Party Selective Listening Disconnect
- Third-Party Selective Listening Reconnect
- The automatic setting and unsetting of the Send All Calls feature based on a user's Do Not Disturb status does not work for SIP endpoints.

Microsoft Office Communications Server (OCS) integration

All third-party call control capabilities are supported for the endpoints listed in SIP support on page 30, except the following capabilities:

- Send DTMF (Dual Tone Multi-Frequency) digits
- Third-Party Selective Listening Disconnect
- Third-Party Selective Listening Reconnect

Chapter 9: AE Services Licensing

AE Services licensing summary

The table in this topic summarizes how features are licensed on Communication Manager and AE Services. For further information about licensing for a specific product, see the following topics:

AE Services product or service	Required feature licensed on Communication Manager	Optional feature licensed on Communication Manager	AE Services feature
	Use display system-parameters customer-options command to see if the feature is provided by the Communication Manager License.		**Use WebLM to see if this feature is provided by the Application Enablement license.**
AE Services Integration with Office Communications Server	Not applicable	Not applicable	Unified Desktop

Table continues…

AE Services product or service	Required feature licensed on Communication Manager	Optional feature licensed on Communication Manager	AE Services feature
	Use display system-parameters customer-options command to see if the feature is provided by the Communication Manager License.		**Use WebLM to see if this feature is provided by the Application Enablement license.**
AE Services Integration IBM Lotus Sametime	Not applicable	Not applicable	Unified Desktop
DMCC - Device and Media Control	• STA • IP_STA	IP-API_A - all pre-existing IP_API_A licenses in Communication Manager license remain there and may be used once the AE Services feature licenses are exhausted.	Device, Media, and Call Control
DMCC - Call Control	• Computer Telephony Adjunct Links • If using Call Control along with Device and Media Control, see Device Media and Call Control DMCC licensing on page 36.	None	• TSAPI Basic license (denoted as TSAPI Simultaneous Users in license file)
TSAPI Service (which includes JTAPI) for applications that use a Basic TSAPI license	Computer Telephony Adjunct Links	None	TSAPI Basic license (denoted as TSAPI Simultaneous users in license file)
TSAPI Service (which includes JTAPI) for applications that use an Advanced TSAPI license	Computer Telephony Adjunct Links	Increased Adjunct Routes	• AES Advanced Small Switch • AES Advanced Medium Switch • AES Advanced Large Switch
Web Services - Telephony Web Service	Computer Telephony Adjunct Links	None	• TSAPI Basic license (denoted as TSAPI Simultaneous Users in license file)
Web Services- System Management Service	None	None	None

Table continues…

AE Services product or service	Required feature licensed on Communication Manager	Optional feature licensed on Communication Manager	AE Services feature
	Use display system-parameters customer-options command to see if the feature is provided by the Communication Manager License.		**Use WebLM to see if this feature is provided by the Application Enablement license.**
CVLAN Service (Avaya Interaction Center)	Computer Telephony Adjunct Links	Increased Adjunct Route Capacity (for adjunct routing applications)	CVLAN Proprietary Links
CVLAN Service (Non-Avaya applications) **Note:** ASAI Core and ASAI Plus are included for one Communication Manager server when purchasing the CVLAN service.	ASAI Core	• CTI Stations • Phantom Calls • Adjunct Routing (Communication Manager 5.1 or later) • Increased Adjunct Route Capacity	CVLAN ASAI
DLG Service **Note:** ASAI Core and ASAI Plus are included for one Communication Manager server when purchasing the DLG service.	ASAI Core	• CTI Stations • Phantom Calls • Adjunct Routing (Communication Manager 5.1 or later) • Increased Adjunct Routes	DLG

Application Enablement Protocol connections licensing

Beginning in AE Services 5.2, an Application Enablement Protocol (AEP) is no longer discretely licensed in AE Services. This capability is provided to all licensed systems.

You can administer a total of 16 AEP connections but AE Services strongly recommends that you use 2 AEP connections to Communication Manager when the CLAN is used for connectivity. When all AEP connections are in use, no additional AEP connections are brought online. For more information, see Configurations that use AEP connections on page 25. Only a single AEP connection is required when connecting to Communication Manager using the Processor Ethernet interface.

You can use WebLM to determine the number of licensed AEP connections. You can check for the number of AEP connections on the **AE Services License** page.

AE Services integration for Microsoft Office Communications Server and Microsoft Lync Server licensing

The AE Services integration with either Microsoft Office Live Communications Server 2005, Microsoft Office Communications Server 2007, and Microsoft Lync Server 2010 and 2013 requires the Unified Desktop Edition RTU (Right To Use) license.

Every active Microsoft Office Communicator/Lync client consumes one Unified Desktop license for the duration of the period that it has an active dialog with AE Services (every registered Microsoft Office Communicator/Lync client, not only those in the call).

For more information, see *Deploying Avaya Aura® Application Enablement Services for Microsoft® Lync Server Products*, 02-601893.

AE Services integration for IBM Lotus Sametime licensing

The AE Services integration for IBM Lotus Sametime integration requires the AE Services Unified Desktop Edition RTU (Right To Use) license.

Every active Sametime Connect/Lotus Notes client will consume one Unified Desktop Edition RTU license for the duration of the dialog with AE Services.

For more information, see *Avaya Aura® Application Enablement Services Integration Guide for IBM Lotus Sametime*, 02-602818.

Device, Media, and Call Control (DMCC) licensing

The DMCC Service provides control of devices and media streams and a subset of third-party call control services.

DMCC Device and Media Control Service

Historically, licensing for registering a DMCC (formerly CMAPI) station was in the Communication Manager license file, via the IP_API_A field. For customers who had previously purchased those licenses, the IP_API_A licenses will continue to remain accessible by AE Services applications, regardless of which AE Services release the server is running.

Factoring in release levels: In certain circumstances, purchases of new or add-on DMCC licenses are reflected in the AE Services license file as well as in the IP_API_A on Communication Manager, literally doubling the quantity of DMCC Basic licenses with every order.

For customers who have existing licenses in IP_API_A and then purchase additional DMCC licenses, the information provided above about factoring in release levels continues to apply. Effective with Communication Manager Release 6.0, all new DMCC licenses will be added only to the AE Services license file VALUE_DMCC_DMC field.

Upon a registration request, AE Services will first attempt to consume a DMCC license from the AE Services license file. If these are exhausted, AE Services will look to IP_API_A for additional licenses to consume.

Note:

Contact your Account Team to reconcile any DMCC double licensing.

Note:

Regardless of whether DMCC registrations are licensed on Communication Manager or on AE Services, the addition of a DMCC station on Communication Manager also consumes an IP_STA license and an STA license.

DMCC Call Information Service

Licenses are not required to use the DMCC Call Information Service.

DMCC Call Control Service

To use the DMCC Call Control Service, you must license and enable Computer Telephony Adjunct Links on Communication Manager. Because the DMCC Call Control Service uses third-party call control, the AE Services TSAPI Basic Users license is also required.

DMCC/CMAPI Double Licensing Reconciliation Process

When Application Enablement Services (AES) was deployed on Communication Manager (CM) releases prior to 6.x, DMCC Basic (formerly known as CMAPI Basic) licenses were also included in the CM license file as IP_API_A licenses as well as in the AE Services license file for compatibility reasons. This meant Avaya literally doubled the quantity of DMCC Basic licenses with every order which still continues today (for example AE Services 6.3.3 deployed on a CM 5.2.x). This is creating a discrepancy between the customer’s quantities purchased and the actual licenses in place and should be reconciled when the customer’s CM release is upgraded to 6.x or newer, and or an AE Services upgrade or SA/UA recast (with existing CM 6+) or a license move is requested in a CM 6.x (or later) environment.

Account teams are responsible to initiate reconciliations and should perform an analysis of current license quantities. Once this analysis has been completed, Avaya Product Operations should be engaged to make the actual corrections within Avaya’s licensing tools. The following tasks should be performed by the account team with the customer:

- Verify the license quantities in AES, CM, and PLDS.
- Verify the license quantities purchased.
- If the customer has licenses that were not purchased, determine the total license quantities along with the quantities that are in use.
  - Determine the quantities to be purchased and/or removed.

- If licenses will be removed, determine what platform (CM, AES, PLDS) they will be removed from and the associated quantities.

The following additional information will assist in determining an accurate inventory count of the DMCC / CMAPI Basic licenses:

Note:

Some CM releases included a licensing quantity of 4-IP_API_As so the total license count may need to reflect this quantity.

Note:

Avaya Self-Service Offers add some additional complexity to determining the total license count because they use the IP_API_A with Voice Portal and Experience Portal H.323 connections and our Self-Service Offers support CM 6.x and 7.x (along with pre-PLDS CMs: CM 5.2.x with RFA). This needs to be taken into account in any reconciliation.

Web services licensing

For the Telephony Web Service, Communication Manager requires Computer Telephony Adjunct Links to be licensed for Web services. Because the Telephony Web Service uses third-party call control, the AE Services TSAPI Basic Users license is also required.

System Management Service (SMS) licensing

Beginning in AE Services 5.2, System Management Service (SMS) is no longer discretely licensed in AE Services. This capability is provided to all licensed systems.

TSAPI service (including JTAPI) licensing

The TSAPI Service provides third-party call control services. AE Services JTAPI is a client-side interface to the TSAPI service, and, as such it provides third-party call control as well.

For TSAPI (and JTAPI), AE Services provides two types of licenses: the TSAPI Basic Users license, and the TSAPI Advanced license. The TSAPI Advanced license provides access to a different set of features than the TSAPI Basic User license. That is, the Advanced license does not include the capabilities provided by the TSAPI Basic Users license.

TSAPI basic user license

The TSAPI basic user license is often referred to as either an “agent-based license” or a “station based license.” It is intended for applications that want to monitor or control a station or monitor an ACD split. In the license file it is referred to as a “Simultaneous User” license. It is scaled in terms of the number of agents, stations, or ACD splits that you want to monitor and control.

The TSAPI basic user license requires that you license and enable Computer Telephony Adjunct Links on Communication Manager. The following table shows the TSAPI basic user license capabilities in terms of TSAPI service requests.

Call Control Service Group	Monitor Service Group
Alternate Call	Monitor Device
Answer Call	Change Monitor Filter
Clear Connection	
Conference Call	
Consultation Call	
Deflect Call	
Hold Call	
Make Call	
Pickup Call	
Reconnect Call	
Retrieve Call	
Single Step Conference Call	
Single Step Transfer Call	
Transfer Call	

Once a TSAPI basic user license has been allocated on behalf of a station, that license will remain in use as long as one of the following conditions exists:

- The station is being monitored.
- There are any calls present at the station.

Once a TSAPI basic user license has been allocated on behalf of an ACD split, that license will remain in use as long as the ACD split is being monitored.

Note:

The TSAPI basic user licenses may be reserved or pre-allocated through OAM. The reserved TSAPI basic user licenses are acquired when the TSAPI Service is started and remain in use until the TSAPI Service is stopped.

TSAPI advanced license

The TSAPI advanced license is intended for applications that launch calls (predictive dialing applications) or route calls. The TSAPI advanced license is based on the number of Communication Manager servers you want to license and the size of the Communication Manager platform: Small (S84xx), Medium (S85xx), and Large (S87xx and S8800).

Note:

When used as a replacement for the S85xx, the S8800 platform is a Medium platform.

The following table shows the capabilities provided with the TSAPI advanced license.

Call Control Service Group	Routing Service Group
Make Predictive Call	Route Select
Selective Listening Hold	Route Select Inv
Selective Listening Retrieve	

The TSAPI Advanced License requires that you license and enable the Communication Manager feature for Computer Telephony Adjunct Links.

If you have a routing application that requires additional capacity, you have the option of licensing the Increased Adjunct Route Capacity feature on Communication Manager.

Once a TSAPI advanced license is acquired on behalf of a Communication Manager server, that license remains in use till the TSAPI Service is stopped or restarted.

CVLAN licensing

The CVLAN Service provides third-party call control. The CVLAN Service is integrated with Avaya applications, and it is used by customer applications.

- When the CVLAN Service is used for customer applications, it requires a Communication Manager license for ASAI Core. CVLAN bundles ASAI Core and ASAI Plus for a single Communication Manager. Optionally, you can license the following features on Communication Manager: ASAI Plus, CTI Stations, Phantom Calls, Adjunct Route, and Increased Adjunct Route Capacity. Customer applications must use an ASAI-IP link type on Communication Manager. This link type requires ASAI Core and ASAI Plus.
- Avaya Interaction Center (IC) requires an ADJ-IP link type.

  Note:

  Avaya IC is the only CVLAN application that can use an ADJ-IP link on Communication Manager.

DLG licensing

The DLG Service requires a Communication Manager license for ASAI Core. DLG bundles ASAI Core and ASAI Plus for a single Communication Manager. Optionally, you can license the following features on Communication Manager: ASAI Plus, CTI Stations, Phantom Calls, Adjunct Route, and Increased Adjunct Route Capacity. Customer applications must use an ASAI-IP link type on Communication Manager. This link type requires ASAI Core and ASAI Plus.

Enterprise-wide licensing

AE Services supports enterprise-wide licensing. With enterprise-wide licensing, AE Services customers are able to purchase any number of licenses and then allocate those licenses to various AE Servers at their own discretion. This means that AE Services customers are able to pool or share all AE Services server features, and Rights To Use (RTU) among AE Servers. This applies only to AE Services features licensed in the AE Services license file and not those licensed in the Communication Manager license file.

- To compare standard licensing with enterprise-wide licensing, see Comparison of standard licensing and enterprise-wide licensing on page 41.
- For examples of licensing configurations, see Licensing configuration examples on page 42.

Comparison of standard licensing and enterprise-wide licensing

Standard licensing	Enterprise-wide licensing
The standard license file continues to be used for standalone AE Services server licensing. A standard license is generated by the Product Licensing and Delivery System (PLDS) from the system record for an AE Services server.	Enterprise-wide licensing includes a master enterprise license file (ELF) and an allocation license file (ALF). • The master enterprise license file (ELF) is generated by the PLDS from the system record from the enterprise. The master license file can reside on an AE Services server or a dedicated WebLM server. • The allocation license file (ALF) is generated by WebLM based on features in the master license file and user allocations on the AE Services server. The ALF or ALFs can reside on one or more AE Services servers.

Table continues…

Standard licensing	Enterprise-wide licensing
The standard license file is installed on the AE Services server. In a standard licensing arrangement, AE Services and the WebLM server are normally co-resident.	With enterprise wide licensing, the WebLM server does not have to be co-resident with AE Services, but each local WebLM server is normally co-resident with the AE Services server that it licenses.
With standard licensing, a license can not be moved from one server to another, and capacities can not be reallocated.	With enterprise-wide licensing, you can reallocate enterprise capacities and features as desired.

Licensing configuration examples

To understand how licensing configurations work, this section provides a description of standard licensing and enterprise-wide licensing.

Standard licensing

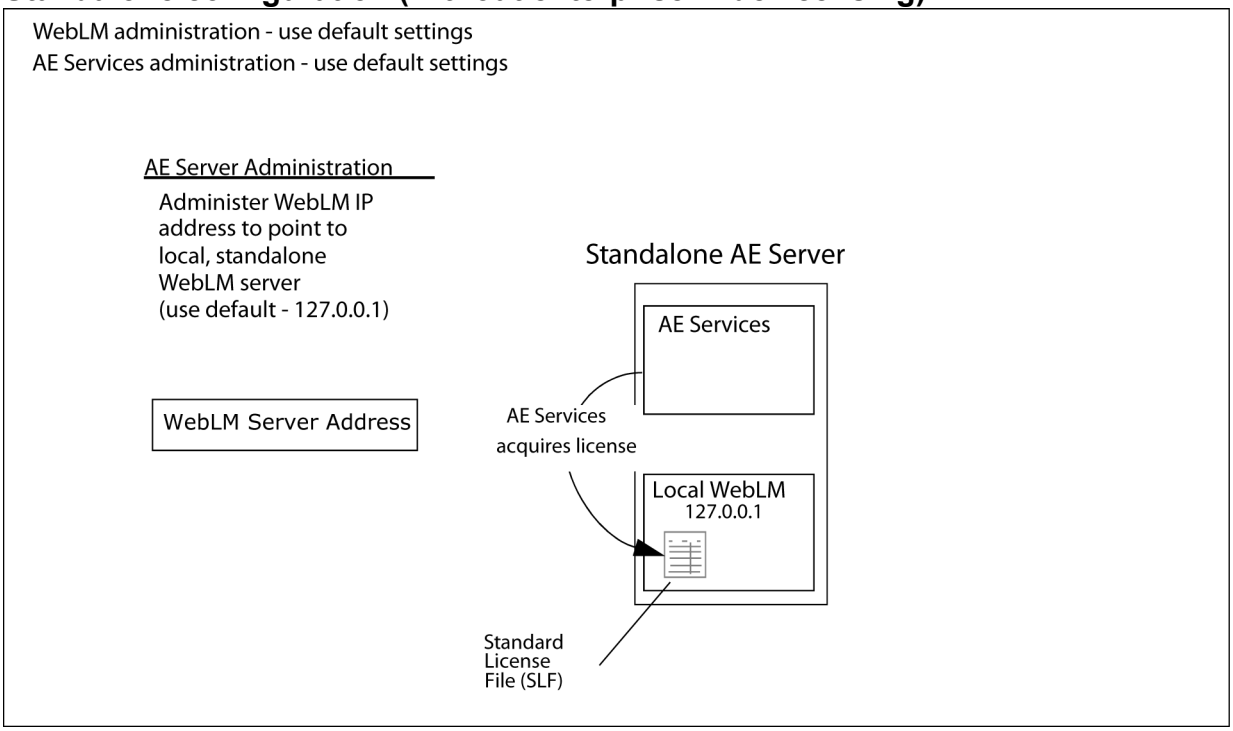
In a standard licensing configuration for Software-only offer, the standard license file (SLF) is installed on the AE Services server and is controlled by the WebLM server running on the AE Services server.

The following figure illustrates the standard licensing configuration.

Note:

If you use the standalone configuration, use the default settings on the WebLM Server Address page in the AE Services Management Console.

Standalone configuration (without enterprise-wide licensing)



Note:

The default IP address, 127.0.0.1, shown in the illustration above is for both, the AE Services Software-only offer and VMware offer.

Enterprise-wide licensing — allocating licenses or features

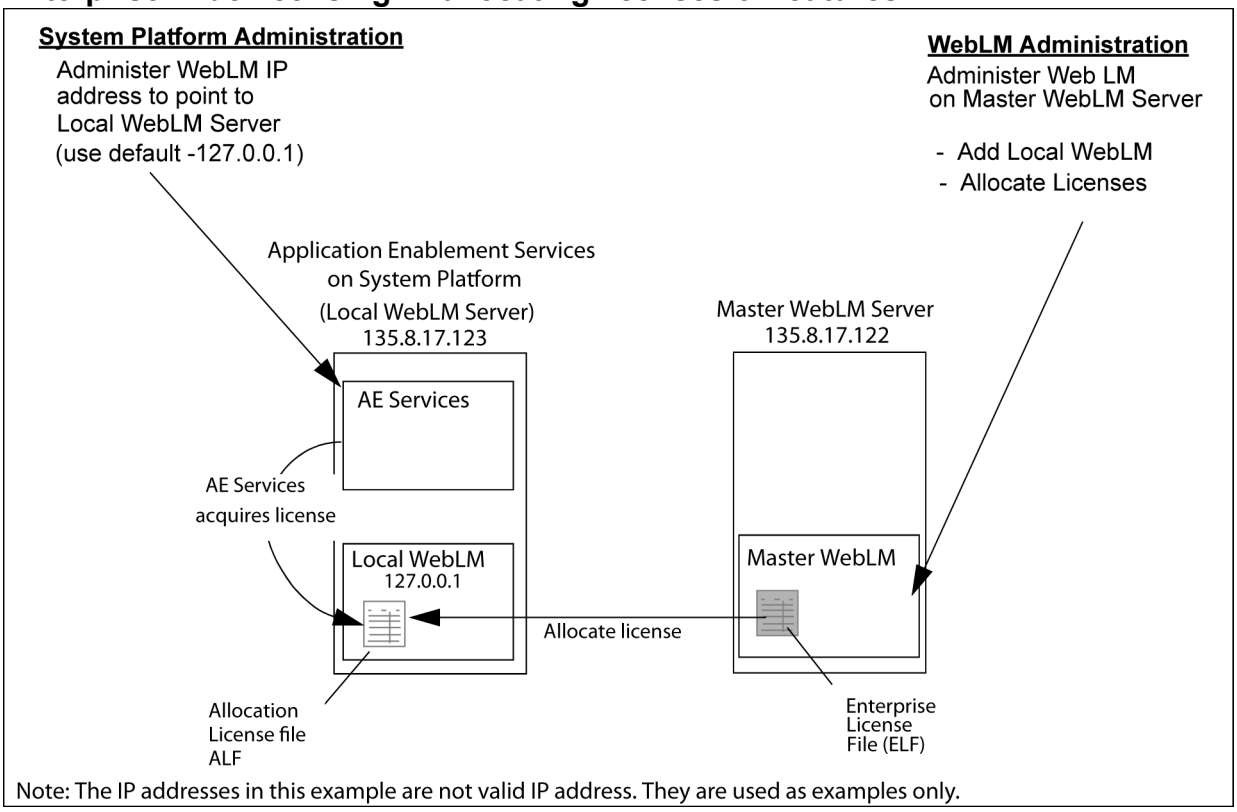
AE Services expanded its licensing capabilities to include enterprise-wide licensing. Enterprise-wide licensing provides the flexibility to move capacities and features from one AE Services server to another. With enterprise-wide licensing, you can move capacities or features from one server to another by using a master WebLM server to allocate license features to different AE Services servers.

Because this configuration relies on a master enterprise license file (ELF), which generates allocation license files (ALF), it is referred to as an ELF/ALF configuration. Each ALF will reside on an AE Services server with a Local WebLM Server. This is the recommended model for AE Services enterprise configurations. If you use the ELF/ALF model, you do not need to change the default settings on the WebLM Server Address page.

For this configuration you must use WebLM Administration to configure the master WebLM server so that it can allocate licenses to each local WebLM server on the AE Services servers. (In the WebLM Administration, select **Licensed Products** > **Application Enablement (CTI)** > **Configure Local WebLMs** > **Add Local WebLM**.)

The following figure illustrates an ELF/ALF configuration:

Enterprise-wide licensing — allocating licenses or features



Note:

Beginning with AE Services 7.0, System Platform is not supported.

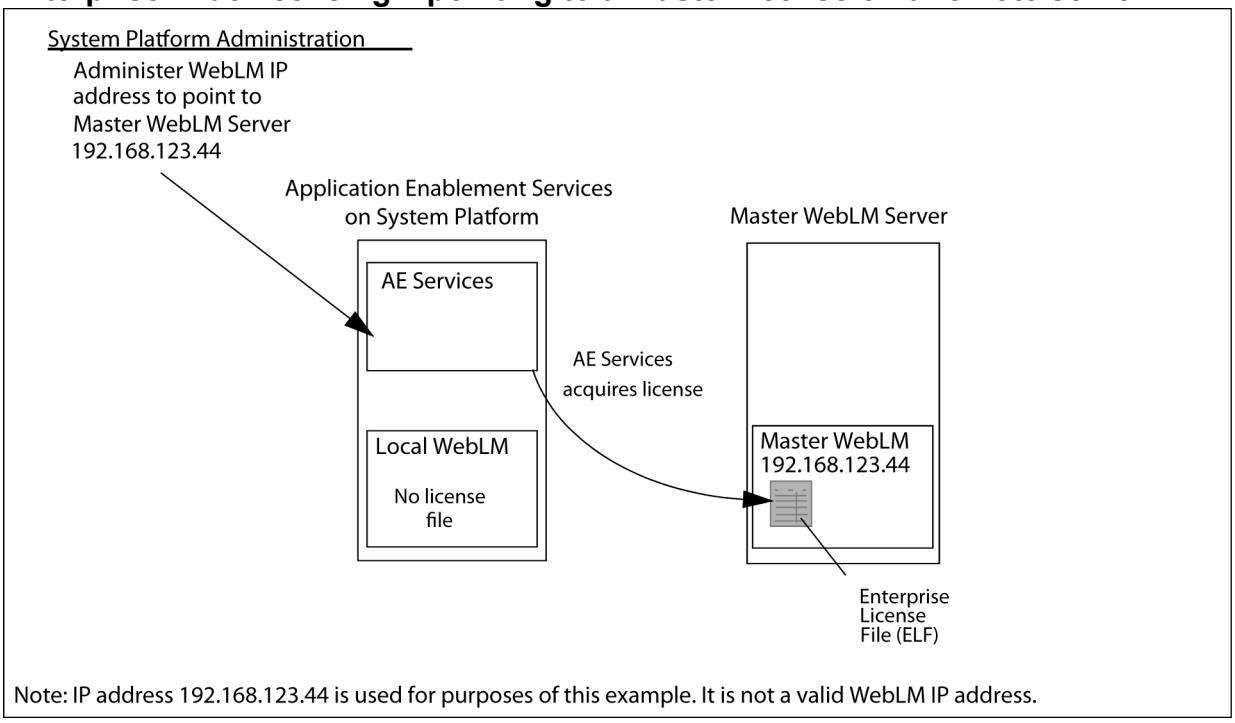
Enterprise-wide licensing — pointing to a master license on a remote server

Another type of enterprise licensing configuration is an enterprise license file (ELF)-only configuration. In an ELF-only configuration, the enterprise license file resides on a master WebLM server, and one or more AE Services servers point to the IP address of the master WebLM server. No allocation license files (ALFs) reside on AE Services servers.

If you use the ELF-only configuration, you must administer the WebLM Server Address page in the AE Services Management Console with the WebLM IP address and WebLM port number for the master WebLM server that hosts the ELF.

The following figure illustrates an ELF-only configuration.

Enterprise-wide licensing – pointing to a master license on a remote server



Note:

Beginning with AE Services 7.0, System Platform is not supported.

Caution:

Using the ELF-only configuration is not recommended because network latency and outages can affect the ability of the AE Services server to acquire licenses, and it creates a single point of failure for licensing.

Additional documents

See the following documents for more information about AE Services licensing.

- *Implementing Avaya Application Enablement Services in a Software-Only Environment*, Release 7.0.
- *Avaya Application Enablement Services Administration and Maintenance Guide*, Release 7.0.
- *Avaya white paper on Application Enablement Services Enterprise-Wide Licensing*

Chapter 10: Application Enablement Services Client and SDKs

All Application Enablement Services Software Development Kits (SDKs), with the exception of the TSAPI SDK, are available on the Avaya Support Web site http://www.avaya.com/support and the Avaya DevConnect Web site www.avaya.com/devconnect where you can download them at no charge. If you prefer a DVD-ROM copy of an SDK, contact your account executive. The following table lists the SDKs provided with Application Enablement Services.

Name	Distribution	Material code/URL
Application Enablement Services TSAPI SDK	Contact your account executive	700500048
Application Enablement Services TSAPI client		700510417
Application Enablement Services CVLAN client	Avaya DevConnect Developer Program	www.avaya.com/devconnect
Application Enablement Services DMCC Java SDK		
Application Enablement Services DMCC XML SDK		
Application Enablement Services DMCC .NET SDK supporting .NET Framework 4.5.2		
Application Enablement Services Web Service — Telephony Web Svc SDK		
Application Enablement Services JTAPI SDK		
Application Enablement Services SMS SDK		

Chapter 11: Communication Manager features not supported

Maintenance state of Communication Manager endpoints

ASAI is not informed of and does not report the maintenance state (in service/out of service) of any Communication Manager endpoints via a domain control.

QSIG Interactions

- **ASAI:** For ISDN trunks administered with Supplementary Service Protocol “b” (also referred to as QSIG-enabled), ASAI is not able to track calls with supplementary UUI information. ASAI does not support QSIG path replacement. If any of the QSIG optional parameters are enabled on the Communication Manager QSIG Optional Features form, ASAI can not keep track of the call.

  Note:

  Device, Media, and Call Control (DMCC) does not support the extensions of digits in length.

- **CVLAN:** Because the CVLAN service is implemented using ASAI, CVLAN support for this feature is also incomplete.
- **TSAPI:** The TSAPI service does not properly handle certain call scenarios involving QSIG trunks.
- **JTAPI:** Because JTAPI is an interface to TSAPI, JTAPI does not properly handle certain call scenarios involving QSIG trunks.

Bridging

- **ASAI:** A bridged call appearance is selected for a single-step conference by Communication Manager only if there are no regular call appearances available at the added station. Other than that, bridging is not supported with either single-step conference or phantom calls.

  Note:

  ASAI does not support configurations where there are more than 16 bridged appearances administered for a given call appearance.

- **CVLAN:** Because the CVLAN service is implemented using ASAI, CVLAN support for this feature is also incomplete.
- **TSAPI:** Because the TSAPI service is implemented using ASAI, TSAPI support for this feature is also incomplete.
- **JTAPI:** Because JTAPI is an interface to TSAPI, JTAPI support for this feature is also incomplete.

Call Park

- **ASAI:** A call may be parked manually at a station by using the call park button (with or without the conference and transfer buttons), or by using the feature access code and the conference or transfer buttons. When a call is parked using the call park button (without either the conference or the transfer buttons) no event reports are generated. When the call is unparked, a Connected Event Report is generated with the calling and called numbers indicating the station on which the call had been parked, and the connected number is that of the station unparking the call. If the call remains active at the parking station (via conference), no changes occur to the listening disconnected paths as a result of parking. If the call drops from the parking station (via transfer), its paths are disconnected from everyone on the call. A single-step conference request will be denied if the call is parked.
- **CVLAN:** Because the CVLAN service is implemented using ASAI, CVLAN support for this feature is also incomplete.
- **TSAPI:** Because the TSAPI service is implemented using ASAI, TSAPI support for this feature is also incomplete.
- **JTAPI:** Because JTAPI is an interface to TSAPI, JTAPI support for this feature is also incomplete.

Meet-me Conference feature

The Meet-me Conference feature is not supported in AE Services.

Chapter 12: Capacities for AE Services

This chapter provides the capacities for AE Services.

Related links

Hardware resources configuration matrix

AE Services 7.0 OVA provides 3 AE ServicesProfiles with different CPU and memory sizes during the installation process. The specified CPU and memory is assigned and reserved to that particular AE ServicesVirtualized Environment. Profile 1 has 1 CPU 2 GB resource, being the lowest footprint, Profile 2 has 2 CPU 2 GB resources, and Profile 3 has 4 CPU 4 GB resources. Each footprint/Profile has different capacities based on the number of users and BHCC.

AE Services 7.0 supports the following footprint matrix:

	DMCC — Third party call control: Microsoft OCS/Lync, IBM Sametime, Avaya Aura® Contact Center		DMCC — First Party call control		TSAPI, DLG, CVLAN
Footprint	**Maximum number of users or agents**	**Maximum BHCC**	**Maximum number of users or agents**	**Maximum BHCC**	**Maximum Messages per second (MPS) Rate**
1 CPU and 2 GB RAM	1K 10K	20K BHCC 6K BHCC	1K	9K BHCC	1K MPS
2 CPU and 2 GB RAM	2.5K 12K	50K BHCC 12K BHCC	2.4K	18K BHCC	1K MPS
4 CPU and 4 GB RAM	5K 20K	100K BHCC 24K BHCC	8K	36K BHCC	2K MPS

Related links

Capacities for AE Services on page 49

AE Services integration for Microsoft Office Communication Server

Microsoft Office Communicator Clients per AE Server	
AE Server dedicated to Microsoft Office Communicator integration.	Support for up to 20,000 concurrent clients at 24,000 BHCC.
Microsoft Office Communicator and other API traffic.	Support for up to 5,000 concurrent OC clients at 6000 BHCC and 2000 DMCC clients in client media mode at 36,000 BHCC.

Related links

Capacities for AE Services on page 49

AE Services integration for IBM Sametime

IBM Sametime Connect Clients per AE Server	
AE Server dedicated to IBM Sametime integration.	10,000 concurrent clients at 12,000 BHCC.
IBM Sametime and other API traffic.	Support for up to 10,000 concurrent Sametime clients at 6000 BHCC and 2000 DMCC clients in client media mode at 36,000 BHCC.

Related links

Capacities for AE Services on page 49

Capacities for calls in DMCC applications

The number of simultaneous active calls that Device, Media, and Call Control (DMCC) applications can expect to handle depends on many factors.

- If either Client or Server Media mode is used, the following should be taken into consideration:
  - Your application's demand for VoIP resources relative to the VoIP resources available on Communication Manager
  - The codec used and packet size chosen for media
  - Media encryption
- Whether encryption is used for the application link or the signaling link

Compare the DMCC capacities listed in Table 1: Non-server media (client media, telecommuter, and no-media) on page 51 and Table 2: Server media on page 53 with the Communication Manager resources and capacities described in capacities for DMCC on page 57 to make sure that you have adequate Communication Manager resources for a given DMCC implementation.

Table 1: Non-server media (client media, telecommuter, and no-media)

Session and H323 Signaling Encryption Profile	AE Server Capacity	Traffic Rate for Applications
None	8,000 endpoints and a 36,000 BHCC (Avaya Common Server – Dell R620, HP DL360 G7, Dell R610, or equivalent customer-provided server)	AE Services and Communication Manager can support up to 20 outstanding registration requests by an application at any time If multiple CLANs are used, the client must distribute 20 outstanding registration requests evenly among allocated CLANs. If signaling encryption is used, the number of outstanding registration requests must not exceed 10.

Table continues…

Session and H323 Signaling Encryption Profile	AE Server Capacity	Traffic Rate for Applications
PIN-EKE	3,200 endpoints and a 28,800 BHCC (Avaya Common Server – Dell R620, HP DL360 G7, Dell R610, or equivalent customer-provided server)	AE Services and Communication Manager can support up to 20 maximum registration requests by an application in a 10-second interval. Based on a recommendation of 5 registrations per CLAN, this can be reached by having 4 CLANs, which are able to process 5 encrypted registrations each. Note that the same limit of 20 registrations in a 10-second limit applies for Processor Ethernet also. Developers need to consider this limit when designing applications (that is, a gap of 10 seconds is required between each set of 20 registrations if 4 CLANs are being utilized; a gap of 10 seconds is required between each set of 15 registrations if 3 CLANs are being utilized; a gap of 10 seconds is required between each set of 20 registrations if 10 CLANs are being utilitzed with 4 registrations per CLAN; and so forth).
H323TLS	2,000 endpoints and a 18,000 BHCC (Avaya Common Server – Dell R620, HP DL360 G7, Dell R610, or equivalent customer-provided server) For more information see, Additional AE Services Restrictions on page 56.	AE Services and Communication Manager can support up to 20 registration, when sent by an application, in a 10-second interval. Avaya recommends 5 registrations per CLAN. 4 CLANs can fulfill the capacity for 20 registrations. **Note:** The 20 registrations in a 10-second limit applies for Processor Ethernet as well.

Table 2: Server media

	Code Type	AE Server Capacity	Traffic Rate for Applications
No signaling and media encryption	G729	120 endpoints	AE Services and Communication Manager can support up to 100 maximum simultaneous registration requests by an application in a 10-second interval. Based on a recommendation of 20 registrations per CLAN, this can be reached by having 10 CLANs, which are able to process 20 unencrypted registrations each per 10-second interval. Note that the same limit of 100 registrations in a 10-second interval applies for Processor Ethernet also. Developers need to consider this limit when designing applications (that is, a gap of 10 seconds is required between each set of 100 registrations if 10 CLANs are being utilized; a gap of 10 seconds is required between each set of 80 registrations if 4 CLANs are being utilized; and so forth).

Table continues…

	Code Type	AE Server Capacity	Traffic Rate for Applications
	G711	75 endpoints	AE Services and Communication Manager can support up to 75 maximum simultaneous registration requests by an application in a 10-second interval. Based on a recommendation of 20 registrations per CLAN, this can be reached by having 4 CLANs, which are able to process 20 unencrypted registrations each per 10-second interval. Note that the same limit of 75 registrations in a 10-second interval applies for Processor Ethernet also. Developers need to consider this limit when designing applications (that is, a gap of 10 seconds is required between each set of 75 registrations if 4 CLANs are being utilized; a gap of 10 seconds is required between each set of 60 registrations if 3 CLANs are being utilized; and so forth).

Table continues…

	Code Type	AE Server Capacity	Traffic Rate for Applications
Signaling and media encryption	G729	96 endpoints	AE Services and Communication Manager can support up to 96 maximum registration requests by an application in a 10-second interval. Based on a recommendation of 5 registrations per CLAN, this can be reached by having 20 CLANs, which are able to process 5 encrypted registrations each. Note that the same limit of 96 registrations in a 10-second limit applies for Processor Ethernet also. Developers need to consider this limit when designing applications (that is, a gap of 10 seconds is required between each set of 20 registrations if 4 CLANs are being utilized; a gap of 10 seconds is required between each set of 15 registrations if 3 CLANs are being utilized; a gap of 10 seconds is required between each set of 20 registrations if 10 CLANs are being utilitzed with 4 registrations per CLAN; and so forth).

Table continues…

	Code Type	AE Server Capacity	Traffic Rate for Applications
	G711	60 endpoints	AE Services and Communication Manager can support up to 60 maximum registration requests by an application in a 10-second interval. Based on a recommendation of 5 registrations per CLAN, this can be reached by having 12 CLANs, which are able to process 5 encrypted registrations each. Note that the same limit of 60 registrations in a 10-second limit applies for Processor Ethernet also. Developers need to consider this limit when designing applications (that is, a gap of 10 seconds is required between each set of 20 registrations if 4 CLANs are being utilized; a gap of 10 seconds is required between each set of 15 registrations if 3 CLANs are being utilized; a gap of 10 seconds is required between each set of 20 registrations if 10 CLANs are being utilitzed with 4 registrations per CLAN; and so forth).

Note:

Traffic rate for applications is a gap of 10 seconds between each set of 100 registrations.

Related links

Capacities for AE Services on page 49
Additional AE Services Restrictions on page 56

Additional AE Services Restrictions

Following are some additional AE Services Restrictions:

- Using the PIN-EKE Security Profile can reduce the capacity of each AE Services server by 20%.
- Using the H323TLS Security Profile can reduce the capacity of each AE Services server by 50% .
- Supporting Communication Manager versions for FIPS and the H323TLS Security Profile:
  - The H323TLS Security Profile when used with Processor Ethernet is supported with the Communication Manager FIPS template for Communication Manager 6.3.6 and later.

- The H323TLS Security Profile when used with CLAN is supported with the Communication Manager FIPS template for Communication Manager 6.3.7 and later.

Related links

Capacities for calls in DMCC applications on page 51

Communication Manager capacities for DMCC

Component	Capacity
For each IP endpoint in a call, including AE Services endpoints	• 1 VoIP channel is used (with a G.711 codec) • 2 VoIP channels are used (with a G.729 codec)
TN2302 media processor card	64 channels
TN2602 Crossfire media processor card	320 channels
MM760 VoIP card	64 channels
G700 media gateway motherboard VoIP	64 channels
G350 media gateway motherboard VoIP	32 channels
TN799DP CLAN card	400 DMCC station registrations For more information, see Additional Communication Manager Restrictions on page 57
Processor Ethernet	For the capacity of registered DMCC H.323 endpoints, see the row Maximum Concurrently Registered H.323 Stations in the Avaya Aura® *Communication Manager System Capacities Table* document. Also see Additional Communication Manager Restrictions on page 57 for more information.

Related links

Capacities for AE Services on page 49
Additional Communication Manager restrictions on page 57

Additional Communication Manager restrictions

Following are the additional restrictions for Communication Manager:

- Using the PIN-EKE Security Profile can reduce the capacity of the Communication Manager platform by 15%.

- Using the H323TLS Security Profile can reduce the Communication Manager platform capacity by 50%. Communication Manager limits the number of H323TLS registration based on its size.
  - 160 DMCC station registrations for a Small Communication Manager platform (S83xx or S84xx)
  - 1000 DMCC station registrations for a Medium Communication Manager platform
  - 2000 DMCC station registrations for a Large Communication Manager platform

    When Secure Mode with FIPS option is enabled, the H323TLS Security Profile is used by default. The actual number of H323TLS connections for an AE Services server across multiple Communication Managers may be limited by the capacity of each individual Communication Manager. If a mix of FIPS enabled Communication Managers and non FIPS Communication Mangers are used, you can calculate the number of registrations DMCC can support by considering that a H323TLS signaling channel consumes double the resources as that of a non-H323TLS DMCC registration.
- Supported Communication Manager versions for FIPS and the H323TLS Security Profile.
  - The H323TLS Security Profile when used with Processor Ethernet is supported with the Communication Manager FIPS template for Communication Manager 6.3.6 and later.
  - The H323TLS Security Profile when used with CLAN is supported with the Communication Manager FIPS template for Communication Manager 6.3.7 and later.

Related links

Communication Manager capacities for DMCC on page 57

System capacities – Communication Manager

For information about Communication Manager system capacities, see Avaya Aura® Communication Manager System Capacities Table on http://support.avaya.com/

Note:

The overall system limit is not restricted by the type of underlying transport that is used. For example, either a single Processor Ethernet connection or 10 CLANs plus 1 redundant CLAN will be able to reach 2000 msgs/sec.

Related links

Capacities for AE Services on page 49

System capacities – AE Services server 7.0

Component	Capacity
Communication Manager servers supported by one AE Services Server	16
Connections to a Communication Manager server with one AE Services Server	16
Messages per second per AE Services Server connection: To Communication Manager (1 CLAN) From Communication Manager (1 CLAN)	 200 240
Messages per second per AE Services Server connection to and from Communication Manager (processor ethernet)	2000
Messages per second (per system)	2000 (see Note below)

Note:

The overall system limit is not restricted by the type of underlying transport that is used. For example, either a single Processor Ethernet connection or 10 CLANs plus 1 redundant CLAN will be able to reach 2000 msgs/sec.

Related links

Capacities for AE Services on page 49

ASAI associations

The number of supported generic associations on the AE Services 7.0 server is 128,000.

Related links

Capacities for AE Services on page 49

CVLAN service capacities

Component	Capacity
Clients supported	60
ASAI associations	128,000, shared over 16 links
Links	16

Related links

Capacities for AE Services on page 49

DLG service capacities

Component	Capacity
Clients supported	16
Links	16

Related links

Capacities for AE Services on page 49

TSAPI service capacities

Component	Capacity
Users (client connections) **Note:** A client connection refers to a unique AE Services session established by a TSAPI application. A single client connection may be used to monitor and control multiple stations or agents.	2500 TLinks
Links	16 (each to a different Communication Manager)

Note:

For any AE Server, there may be only one TSAPI link to any given Communication Manager.

Related links

Capacities for AE Services on page 49

Chapter 13: AE Services Documentation

Select documents based on products you use

One way of identifying the appropriate documents to use is to select a group of related AE Services documents for a specific product. For example, if you use the Device, Media, and Call Control (DMCC) API in a Java environment, the following documents would be applicable.

- *Avaya Aura® Avaya Application Enablement Services Device, Media and Call Control API Java Programmers Guide*, 02-300359

  This guide describes how to use the Device, Media and Call Control API, and it provides tips for writing an application.
- *Avaya Aura® Application Enablement Services Device, Media, and Call Control Java Programmer Reference* (HTML document)

  This guide provides the implementation details that you need when you are designing or implementing an application, such as which features and interfaces are supported by AE Services.
- *Avaya Aura® Application Enablement Services Device, Media, and Call Control Media Stack API Reference* (HTML document)

  This document is optional. You will need this document if your DMCC application is handling its own media, and you are using the media stack provided by Avaya.
- *Administering and Maintaining Avaya Aura® Application Enablement Services*, 02-300357.

Guidelines for selecting documents based on your role within an organization

Planners

If you are involved with planning an Application Enablement Services server installation use this document, the *Avaya Aura® Application Enablement Services Overview and Specification*, 02-300360. Depending on the scope of your planning, you might want to consult additional documents for more information. The following sections provide information about using additional documents for implementing Application Enablement Services.

AE Services with IBM Lotus Sametime integration

If you plan to integrate AE Services with IBM Lotus Sametime, see the following documents.

- *Avaya Aura® Application Enablement Services Integration Guide for IBM Lotus Sametime*, 02–602818. This guide is a high-level planning and implementation guide for integrating AE Services and IBM Lotus Sametime. It is directed toward an AE Services and a IBM Lotus Sametime administrative audience.
- *Implementing Avaya Aura® Application Enablement Services in a Software-Only Environment*, 02–300355. If your integration uses the AE Services Software-Only server consult this document for information about installing AE Services.
- *Avaya Aura® Application Enablement Services Administration and Maintenance Guide*, 02–300357. Use this document for information about administering Avaya Communication Manager and the AE Services server.
- *Avaya Aura® Application Enablement Services Management Console online help*. Use this online help for information about administering the AE Services server.

AE Services integration with Microsoft Office Communications Server and Microsoft Lync Server 2010 and 2013

If you plan to integrate AE Services with Microsoft Office Live Communications Server 2005, Microsoft Office Communications Server 2007, or Microsoft Lync Server 2010 or 2013, see the following documents.

- *Deploying Avaya Aura® Application Enablement Services for Microsoft® Lync Server Products*, 02–601893
- *Deploying Avaya Aura® Application Enablement Services in a Software-Only Environment*, 02–300355. If your integration uses the AE Services Software-Only server, consult this document for information about installing AE Services.
- *Administering and Maintaining Avaya Aura® Application Enablement Services*, 02–300357. Use this document for information about administering Avaya Communication Manager and the AE Services server.
- *Avaya Aura® Application Enablement Services Management Console online help*. Use this online help for information about administering the AE Services server.

Installers and administrators — VMWare offer

To install the AE Servicessoftware and to configure Communication Manager and AE Services, use the following documents:

- *Deploying Avaya Aura® Application Enablement Services in Virtualized Environment*
- *Administering and Maintaining Avaya Aura® Application Enablement Services*
- *Avaya® Aura Application Enablement Services Online Help*

Note:

AE Services does not assume that you will install a browser on the AE Services. To access WebLM (Avaya Web-based license management software) and to administer AE Services, you need a computer running a browser with network access to the AE Services.

If you are installing TSAPI and CVLAN clients and SDKs, refer to *Avaya Aura® Application Enablement Services TSAPI and CVLAN Client and SDK Installation Guide*, 02–300543.

Installers and administrators — Software-Only offer

To install the AE Services software and to configure Communication Manager and AE Services, use the following documents.

- *Implementing Avaya Aura® Application Enablement Services in a Software-Only Environment*, 02–3003565.
- *Avaya Aura® Application Enablement Services Administration and Maintenance Guide*, 02–300357.
- *Avaya Aura® Application Enablement Services Management Console online help*.

Note:

AE Services does not assume that you will install a browser on the AE Server. To access WebLM (Avaya Web-based license management software) and to administer AE Services, you need a computer running a browser with network access to the AE Server.

If you are installing TSAPI and CVLAN clients and SDKs, refer to *Avaya Aura® Application Enablement Services TSAPI and CVLAN Client and SDK Installation Guide*, 02–300543.

Application developers

Application Enablement Services provides Software Development Kits (SDKs) and programming documents for developing applications. For a list of the Application Enablement Services SDKs, see SDKs on page 46.

Avaya DevConnect Program

Application developers who want to take advantage of the AE Services APIs or protocols are encouraged to participate in the Avaya DevConnect Program. The Avaya DevConnect Program gives you access to a comprehensive set of support and marketing programs that help you create the new generation of intelligent communications solutions. For more information, go to the Avaya DevConnect Web site www.avaya.com/devconnect.

Web services programmers

Application Enablement Services provides the following Web services.

- System Management Service

The System Management Service is used to enable SOAP-based access to Communication Manager administration functions. AE Services 5.2 introduced the following SMS enhancements:

- XML formatted input and output
- Template look and feel
- Unicode support
- ISV model schema enhancements

- Telephony Web Service

  The Telephony Web Service allows users SOAP-based access to simple third-party call control features such as:

  - make call
  - answer call
  - drop call
  - conference call
  - transfer call

For more information about Web services, see the *Avaya Aura® Application Enablement Services Web Services Programmer's Guide*, 02–300362.

DMCC API programmers

Application Enablement Services provides DMCC programmers with tools that help them learn how to use the APIs and with SDKs for implementing the APIs.

Note:

DMCC API was formerly known as Communication Manager API.

- To see the capabilities of an AE Services DMCC application, see “Sample Device, Media, and Call Control applications” in the *Administering and Maintaining Avaya Aura® Application Enablement Services*, 02–300357.
- If you are ready to program, see the following documents.
  - *Avaya Aura® Application Enablement Services Device, Media, and Call Control XML Programmer's Guide*, 02–300358
  - *Avaya Aura® Application Enablement Services Device, Media, and Call Control XML Programmer 's Reference* (an HTML document available on the Web only at the Avaya Support Site or Avaya DevConnect Site)
  - *Avaya Aura® Application Enablement Services Device, Media, and Call Control Java Programmer 's Guide*, 02–300359
  - *Avaya Aura® Application Enablement Services Device, Media, and Call Control Java Programmer's Reference* (an HTML document available on the Web only at the Avaya Support Site or Avaya DevConnect Site)

- *Avaya Aura® Application Enablement Services Device, Media and Call Control API .NET Programmer's Guide*, 02–602658
- *Avaya Aura® Application Enablement Services Device, Media, and Call Control .NET Programmer's Reference* (an HTML document available on the Web only at the Avaya Support Site or Avaya DevConnect Site)

TSAPI programmers

If you program to TSAPI, use the following documents to develop or maintain your applications.

- *Avaya Aura® Application Enablement Services TSAPI for Avaya Communication Manager Programmer's Reference*, 02-300544. Use this document as your primary reference for TSAPI applications. It documents all third-party call control services, including Private Data Services, provided by Avaya Communication Manager. Private Data Services allow you to take advantage of the extended functionality of Communication Manager services.
- For information about installing the TSAPI clients and SDKs, see the *Avaya Aura® Application Enablement Services TSAPI and CVLAN Client and SDK Installation Guide*, 02-300543.
- *Application Enablement Services TSAPI Programmer's Reference*, 02-300545. This document describes the Telephony Services API, which is based on ECMA CSTA Standards 179 and 180. This document is required only if you need to learn the fundamental principles of TSAPI. If you are developing or maintaining TSAPI applications, and you are familiar with TSAPI, use the *Application Enablement Services TSAPI for Avaya Communication Manager Programmer's Reference*, 02-300544, as your primary reference.

JTAPI programmers

If you program to JTAPI, use the following documents to develop or maintain your applications.

- *Avaya Aura® Application Enablement Services JTAPI Programmers Guide*, 02-603488. This document describes how to use the AE Services JTAPI implementation to develop, debug, and deploy telephony applications.
- *Avaya Aura® Application Enablement Services JTAPI Programmer's Reference* (an HTML document available on the Web only at the Avaya Support Site and the Avaya DevConnect Site). This document provides you with a reference to API calls in the Avaya implementation of the Java Telephony API. This document describes all call control services, including Private Data Services, provided by Avaya Communication Manager. Private Data Services allow you to take advantage of the extended functionality of Communication Manager services.

CVLAN programmers

If you program to the CVLAN API (which is an implementation of the ASAI protocol), use the following documents.

Note:

AE Services does not support newly-developed CVLAN applications.

- *Avaya Aura® Application Enablement Services CVLAN Programmer's Reference*, 02-300546. Use this document as your primary reference for CVLAN applications. It documents all call control services provided by Avaya Communication Manager.
- For information about installing the CVLAN clients and SDKs, see the *Avaya Aura® Application Enablement Services TSAPI and CVLAN Client and SDK Installation Guide*, 02-300543.
- *Application Enablement Services ASAI Technical Reference*, 03–300549. The CVLAN call control capabilities are based on the capabilities described in this document. Consult this document when a high level of detail is required.
- *Application Enablement Services ASAI Protocol Reference*, 03–300550. CVLAN uses the ASAI protocol. Consult this document when a high level of detail regarding information elements and the layout of ASAI messages is required.

ASAI programmers

If you program directly to the Adjunct Switch Application Interface (ASAI) protocol, use the following documents as your primary reference.

Note:

AE Services does not support newly-developed ASAI applications.

- *Application Enablement Services ASAI Technical Reference*, 03–300549. This document provides technical descriptions of ASAI third-party call control capabilities.
- *Application Enablement Services ASAI Protocol Reference*, 03–300550. This document provides byte-level descriptions of ASAI messages.

Appendix A: AE Services Release 7.0.1 compatibility

This appendix describes the clients, API, and versions of Communication Manager that AE Services 7.0.1 supports. Additionally, this appendix describes the Communication Manager platforms that support AE Services 7.0.1.

API and client compatibility

AE Services 7.0.1 supports the API and clients described in this topic.

DMCC compatibility

Note:

- DMCC 5.x refers to any of the following releases: 5.2, 5.2.1, 5.2.2, 5.2.3 and 5.2.4.
- DMCC API refers to any of the following releases: XML API, .NET SDK and Java SDK on JDK 5.0.
- DMCC 6.2.x Java API applications
- DMCC 6.2.x XML applications
- DMCC 6.3.x Java API applications
- DMCC 6.3.x XML applications

AE Services 7.0.1 is compatible with the following DMCC API-based applications.

- XML developers should be aware that AE Services changed to ECMA 323 edition 3 and the schemas have therefore changed. DMCC 3.1.x XML applications should continue to request 3.0 protocol version (ECMA 323 edition 2).
- The DMCC 4.2.x Java API applications:

  The DMCC 4.2.x client library and Java SDK 5.0 will work with the AE Services 7.0.1 DMCC Service.
- DMCC 4.2.x XML applications:

  The DMCC 4.2.x XML applications will work with the AE Services 7.0.1 DMCC Service.
- The DMCC 5.2.x Java API applications:

The DMCC 5.2.x client library and Java SDK 5.0 will work with the AE Services 7.0.1 DMCC Service.

- DMCC 5.2.x XML applications:

  The DMCC 5.2.x XML applications will work with the AE Services 7.0.1 DMCC Service.

- The DMCC 6.1.x Java API applications:

  The DMCC 6.1.x client library and Java SDK 5.0 will work with the AE Services 7.0.1 DMCC Service.

- DMCC 6.1.x XML applications:

  The DMCC 6.1.x XML applications will work with the AE Services 7.0.1 DMCC Service.

Web Services compatibility

For AE Services 7.0.1, the Telephony Web Service does not introduce any new features.

System Management Service compatibility

For AE Services 7.0.1, the System Management Service does not introduce any new features.

TSAPI compatibility

AE Services 7.0.1 TSAPI Service includes all of the functionality provided by AE Services 5.x, 6.1, 6.2, 6.3, 6.3.x, 7.0 and Avaya CT 1.x. AE Services 7.0.1 TSAPI Service is backward compatible with the following TSAPI/JTAPI clients and libraries: AE Services 5.x, 6.1, 6.2, 6.3 and 7.0.

CVLAN compatibility

The AE Services 7.0.1 CVLAN Service includes all of the functionality provided by AE Services 7.0 CVLAN Service, CVLAN on MAPD, and the CVLAN R9 Server for Linux. The AE Services 7.0.1 CVLAN Service is backward compatible with the following CVLAN clients and libraries: AE Services 5.x, 6.1, 6.2, 6.3 and 6.3.x., and 7.0.

DLG compatibility

AE Services 7.0.1 and Communication Manager 6.3.2 releases do not introduce any new DLG Service features.

- The AE Services 7.0.1 DLG Service includes all of the functionality provided by previous releases of the AE Services DLG Service (3.x through 7.0), the “DLG on the MAPD”, and the “Co-Res (co-resident) DLG.”
- The AE Services 7.0.1 DLG Service is compatible with existing applications that rely on the DLG Service.

Product compatibility

For the latest and most accurate compatibility information, go to http://support.avaya.com/CompatibilityMatrix/Index.aspx.

AE Services compatibility with Communication Manager 7.0.1 CTI interfaces

AE Services relies on the CLAN and the Processor Ethernet for communications with Communication Manager. (The CLAN and the Processor Ethernet reside on Communication Manager).

Note:

Communication Manager S8300 supports only Processor Ethernet. Other supported Communication Manager servers support Processor Ethernet and CLAN connectivity with AE Services.

Note:

With AE Services 5.2 or later, and Communication Manager 5.2.1 or later, switch connections, H.323 links, and SMS connections can now be established directly to the Processor Ethernet on Communication Manager on supported hardware. For more details, refer to the *Avaya Aura® Communication Manager Overview and Specification* guide.

Communication Manager 7.0.1 - ASAI capabilities

For customer-developed CVLAN and ASAI-based applications, Communication Manager must be provisioned with ASAI features.

ASAI Core features

- Adjunct Call Control Group (for example, third-party call control)
- Domain Control Group (for example, domain control of a station)
- Event Notification Group (for example, event stream for VDN)
- Request Feature Group (for example, login agent and send all calls)
- Set Value Group (for example, set message waiting indicator)
- Single Step Conference
- II Digits

ASAI Plus features

- Switch classified call (Predictive Dialing)
- Answering Machine Detection (from within classified call)
- Selective Listening Hold/Retrieve

ASAI Optional Features

- CTI Stations
- Phantom Calls

- Adjunct Routing
- Increased Adjunct Route Capacity

Glossary

Application Enablement Protocol (AEP)	The protocol used by an AEP connection.
Application Enablement Protocol (AEP) connection	Refers to the secure TCP connection between the AE Server and Communication Manager. It tunnels ASAI messages and Call Information Services messages between AE Services and Communication Manager.
ASAI	Adjunct Switch Application Interface. ASAI is a protocol that enables software applications to access call processing capabilities provided by Communication Manager.
Authentication	The process of validating the identity of a user by means of user profile attributes.
Authorization	The process of granting a user the ability to carry out certain activities based on permissions.
Call Information Service	The Call Information Service allows applications to get detailed call information and to determine the status of the call information link.
CLAN	Control LAN. CLAN refers to the Avaya TN799 Control LAN circuit pack, which resides on Communication Manager. AE Services relies on the CLAN for communicating with Communication Manager.
Computer Telephony Integration	Abbreviated as CTI. The integration of services provided by a computer and a telephone. In simplest terms, it means connecting a computer to a communications server (or switch) and having the computer issue commands that control calls.
CTI Link	The term CTI link refers to a generic link type that is used in the context of Communication Manager administration. As a generic link type, it can refer to any of the following AE Services links: CVLAN links, DLG links, and TSAPI links (JTAPI and the Telephony Web Service use TSAPI links). When an OAM Web page, such as TSAPI Service Summary, displays a column heading for a CTI link type, it is referring to TSAPI link as it is administered on Communication Manager. Up to 64 links can be administered on Communication Manager.

DMCC Service	Device, Media, and Call Control. The DMCC Service encompasses Device Control, Media Control, and Call Control capabilities. Device Control enables applications to monitor and control station lamps and displays. Media Control allows applications to direct media connections, play sounds, and interpret voice/tones on a media stream. Call Control allows applications to monitor and control calls.
First-Party Call Control	First-party call control refers to the application acting as the user would operate their telephone. The application invokes operations such as [1], [2]," and so forth, until the switch collects enough digits to initiate the call.
JTAPI	Java Telephony Application Programming Interface. JTAPI is an API that provides access to the complete set of third-party call control features provided by the TSAPI Service. JTAPI uses the TSAPI Service for communication with Communication Manager.
LDAP	Lightweight Directory Access Protocol. LDAP defines a standard protocol for organizing directory hierarchies and a standard interface for clients to access directory servers.
Link	A communications channel between system components.
Monitor	A monitor refers to a capability that watches for activity on a call or a device. A monitor placed on a device or a call causes reports of changes in the status of the device or call to be sent to the client requesting the monitor. If your application places a device monitor on your phone, your application is notified of changes in your phone's status (for example, an incoming call has been received, a call ended, and so forth). Many applications rely on monitors to provide this type of information.
Operations, Administration, and Maintenance	Abbreviated as OAM. The administrative interface for the Application Enablement Services platform. Now referred to as the AE Services Management Console.
PKI	Public Key Infrastructure. PKI is a system or framework that provides users of a non-secure public network to securely and privately exchange data through the use of a cryptographic key pair that is provided by a trusted authority, typically a Certificate Authority. A public key infrastructure includes of a certificate authority (CA), a registration authority (RA) and a means of managing certificates.
PLDS	Product Licensing and Delivery System. AE Services7.0 uses the PLDS for license management and software distribution.

[1] Go off-hook
[2] Press button

Private Data	Private data is a switch-specific software implementation that provides value added services.
Registration, Administration, and Status	Abbreviated as RAS. RAS is an International Telecommunications Union specification for terminal registration and authentication. RAS is part of the H.323 protocol suite.
Routing	Selecting an appropriate path for a call. When a routing application is started, it sends route registration requests, which contain a device ID, to Communication Manager. Routing requests instruct Communication Manager to send all incoming calls to these device IDs. The TSAPI or CVLAN Service sends the call to the application for routing. Communication Manager does not route these calls. Also referred to as adjunct routing.
RTP	Real-time Transport Protocol. RTP is an Internet standard for transmission of time-critical data, and for control of the transmission.
SDK	Software Development Kit. An SDK is a package that enables a programmer to develop applications for a specific platform. Typically, an SDK includes one or more APIs, documentation, and perhaps programming tools.
SIP	Session Initiation Protocol. SIP is a control (signaling) protocol for creating, modifying, and terminating sessions with one or more participants. These sessions include Internet telephone calls, multimedia distribution, and multimedia conferences. The current SIP specification only covers first party call control functionality.
Switch Connection Name	Switch Connection Name is a term that refers to either of the following: (1) A collection of Host Names or IP addresses associated with one (and only one) switch. This definition applies to the TSAPI Service, the Web Telephony Service, the CVLAN Service, and the DLG Service. (2) A collection of H.323 Gatekeepers that are associated with one (and only one) switch. AE Services supports up to 16 switch connections to Communication Manager. Switch Connection names, also referred to as switch connections can consist of multiple CLAN connections (up to 16).
Telephony Web Service	An interface that enables high level call control functionality over standard web services interfaces (SOAP/XML).The service hides the complicated concepts associated with traditional CSTA based call control such as connections, call identifiers and call states.
Third-Party Call Control	Third-party call control means that, rather than acting as the user, the application is making requests on the behalf of the user. A third-party make call says “Make a call from extension X to extension Y”.

Tlink	A Tlink is a service identifier that is created when the administrator adds a TSAPI Link in AE Services OAM. A Tlink refers to a switch connection between a specific switch and a specific AE Server.
Transport link	A transport link is a secure TCP/IP connection between the AE Services server and a CLAN on Communication Manager. When the AE Services Transport Service starts up, it establishes the transport link between the AE Services server and the Communication Manager server, based on administering a switch connection in AE Services Management Console. The CLAN IP addresses that you administer from the Edit CLAN IPs page in AE Services Management Console are used to set up TLS connections between AE Services and Communication Manager. These TLS connections are called transport links.
TSAPI Service	The CSTA-based third-party call control services provided by AE Services.
Web Services	A set of standards that allow a service to be described and consumed in a platform-neutral way.