



Avaya Solution & Interoperability Test Lab

Application Notes for Pegasystems Pega Call 8.4 with Avaya Aura® Communication Manager 8.1.3 using Avaya Aura® Application Enablement Services 8.1.3 – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Pegasystems Pega Call 8.4 to interoperate with Avaya Aura® Communication Manager 8.1.3 and Avaya Aura® Application Enablement Services 8.1.3. Pegasystems Pega Call provides telephony integration for Pegasystems' customer relationship and process management frameworks.

In the compliance testing, Pegasystems Pega Call used the Java Telephony Application Programming Interface from Avaya Aura® Application Enablement Services to route incoming calls to Avaya Aura® Communication Manager and provide screen pop and call control via a web-based agent interface.

Readers should pay attention to **Section 2**, in particular the scope of testing as outlined in **Section 2.1** as well as any observations noted in **Section 2.2**, to ensure that their own use cases are adequately covered by this scope and results.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe the configuration steps required for Pegasystems Pega Call 8.4 to interoperate with Avaya Aura® Communication Manager 8.1.3 and Avaya Aura® Application Enablement Services 8.1.3. Pegasystems Pega Call provides telephony integration for Pegasystems' customer relationship and process management frameworks.

In the compliance testing, Pegasystems Pega Call used the Java Telephony Application Programming Interface (JTAPI) from Avaya Aura® Application Enablement Services to provide screen pop and call control via a web-based agent interface. The testing also included the optional Enhanced Routing feature on Pegasystems Pega Call, which used JTAPI adjunct routing capabilities to route incoming calls on Avaya Aura® Communication Manager.

JTAPI is a client-side interface to the Telephony Services Application Programmer Interface (TSAPI) on Avaya Aura® Application Enablement Services. As such, these Application Notes will describe the required configurations for creation and connectivity to the TSAPI service.

The compliance test covered the default out-of-the-box Phone Toolbar used by the agents and a sample routing rule. Any customized agent and routing applications developed using Pegasystems Pega Call is outside the scope of this compliance test.

2. General Test Approach and Test Results

The feature test cases were performed manually. Incoming calls were placed to the routing VDNs with available agents running the web based Pega Call Phone Toolbar application on the desktops. Manual call controls were exercised from Pega Call to verify proper call actions such as answer and transfer.

The serviceability test cases were performed manually by disconnecting/reconnecting the Ethernet connections to the Pega Call server and to the agent desktop.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

Avaya recommends our customers implement Avaya solutions using appropriate security and encryption capabilities enabled by our products. The testing referenced in these DevConnect Application Notes included the enablement of supported encryption capabilities in the Avaya products. Readers should consult the appropriate Avaya product documentation for further information regarding security and encryption capabilities supported by those Avaya products.

Support for these security and encryption capabilities in any non-Avaya solution component is the responsibility of each individual vendor. Readers should consult the appropriate vendor-supplied product documentation for more information regarding those products.

For the testing associated with this Application Notes, the interface between Avaya systems and Pegasystem Pega Call utilized enabled capabilities of secure JTAPI.

2.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing. The feature testing focused on verifying the following on Pega Call:

- Handling of JTAPI/TSAPI messages in the areas of event notifications, value queries, and set agent states.
- Use of JTAPI/TSAPI routing services to properly route incoming calls.
- Use of JTAPI/TSAPI call control services to support call control actions such as answer and transfer from the agent desktops.
- Proper handling of call scenarios involving inbound, outbound, ACD, non-ACD, transfer, conference, multiple agents, multiple calls, and long duration.

The serviceability testing focused on verifying the ability of Pega Call to recover from adverse conditions, such as disconnecting/reconnecting the Ethernet connections to the Pega Call server and to the agent desktop.

2.2. Test Results

All test cases were executed and verified successfully. The following were observations on Pega Call from the compliance testing.

- By design, Pega Call uses a separate JTAPI session for support of the Enhanced Routing feature.

2.3. Support

Technical support on Pega Call can be obtained through the following:

- **Phone:** (800) 414-8064, (617) 866-6700
- **Email:** support@pega.com
- **Web:** <http://pdn.pega.com>

3. Reference Configuration

The configuration used for the compliance testing is shown in **Figure 1**. The detailed administration of basic connectivity between Communication Manager and Application Enablement Services is not the focus of these Application Notes and will not be described. In the compliance testing, Pega Call monitored the agent station extensions shown in the table below.

Device Type	Extension
Routing VDN	88000, 88001
Skill Group	87000, 87001
Agent Station	70009, 70010
Supervisor Station	80000
Agent ID	80001, 80002

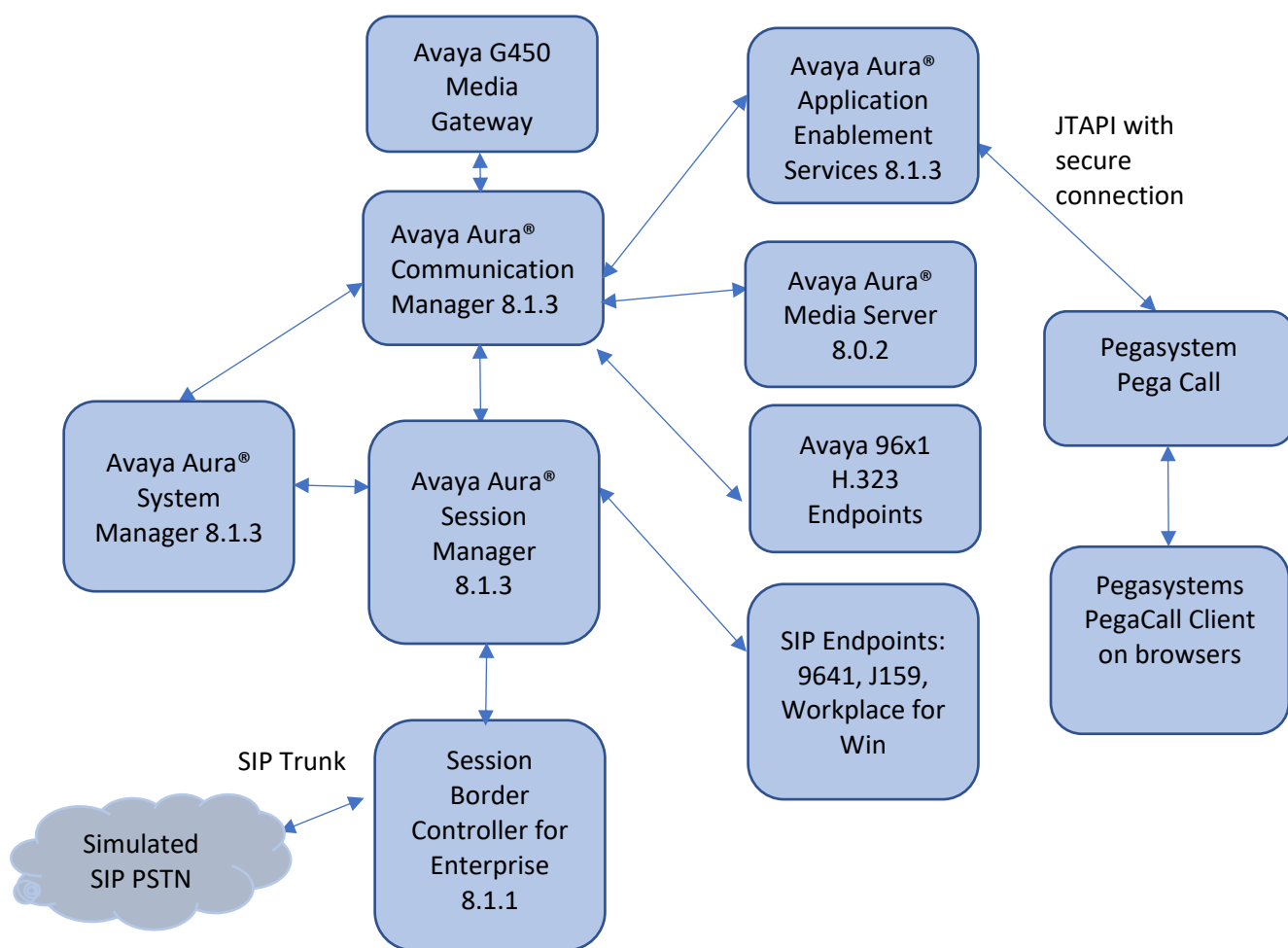


Figure 1: Compliance Testing Configuration

4. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya Aura® System Manager in Virtual Environment	8.1.3
Avaya Aura® Session Manager in Virtual Environment	8.1.3
Avaya Aura® Communication Manager in Virtual Environment	8.1.3
Avaya G450 Media Gateway	41.34.1
Avaya Aura® Media Server in Virtual Environment	8.0 SP2
Avaya Aura® Application Enablement Services in Virtual Environment	8.1.3
Avaya Session Border Controller for Enterprise	8.1.1
Avaya 9621G & 9641G IP Desk phone (SIP)	7.1.8
J159 SIP Desk phone	4.0.6
Avaya 9608G & 9641G IP Desk phone (H.323)	6.8.3
Pegasystems PegaCall	8.4

5. Configure Avaya Aura® Communication Manager

This section provides the procedures for configuring Communication Manager. The procedures include the following areas:

- Verify license
- Administer CTI link
- Obtain UCID setting
- Administer reason codes
- Administer hunt group and agent
- Administer vectors and VDNs

5.1. Verify License

Log into the System Access Terminal to verify that the Communication Manager license has proper permissions for features illustrated in these Application Notes. Use the “display system-parameters customer-options” command to verify that the **Computer Telephony Adjunct Links** customer option is set to “y” on **Page 4**. If this option is not set to “y”, then contact the Avaya sales team or business partner for a proper license file.

```
display system-parameters customer-options                                     Page      4 of 12
                                OPTIONAL FEATURES

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

(NOTE: You must logoff & login to effect the permission changes.)
```

Navigate to **Page 7**, and verify that **Vectoring (Basic)** is set to “y”.

display system-parameters customer-options	Page 7 of 12
CALL CENTER OPTIONAL FEATURES	
Call Center Release: 8.0	
ACD? y	Reason Codes? y
BCMS (Basic)? y	Service Level Maximizer? n
BCMS/VuStats Service Level? y	Service Observing (Basic)? y
BSR Local Treatment for IP & ISDN? y	Service Observing (Remote/By FAC)? y
Business Advocate? n	Service Observing (VDNs)? y
Call Work Codes? y	Timed ACW? y
DTMF Feedback Signals For VRU? y	Vectoring (Basic)? y
Dynamic Advocate? n	Vectoring (Prompting)? y
Expert Agent Selection (EAS)? y	Vectoring (G3V4 Enhanced)? y
EAS-PHD? y	Vectoring (3.0 Enhanced)? y
Forced ACD Calls? n	Vectoring (ANI/II-Digits Routing)? y
Least Occupied Agent? y	Vectoring (G3V4 Advanced Routing)? y
Lookahead Interflow (LAI)? y	Vectoring (CINFO)? y
Multiple Call Handling (On Request)? y	Vectoring (Best Service Routing)? y
Multiple Call Handling (Forced)? y	Vectoring (Holidays)? y
PASTE (Display PBX Data on Phone)? y	Vectoring (Variables)? y
(NOTE: You must logoff & login to effect the permission changes.)	

5.2. Administer CTI Link

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

add cti-link 1	Page 1 of 3
CTI LINK	
CTI Link: 1	
Extension: 79999	
Type: ADJ-IP	
Name: aes95	COR: 1

5.3. Obtain UCID Setting

Use the “display system-parameters features” command and navigate to **Page 5**. Make a note of the **Create Universal Call ID (UCID)** setting, which will be used later to configure Pega Call.

```
change system-parameters features                                     Page 5 of 19
                                FEATURE-RELATED SYSTEM PARAMETERS

SYSTEM PRINTER PARAMETERS
  Endpoint:                      Lines Per Page: 60

SYSTEM-WIDE PARAMETERS
                                Switch Name:
      Emergency Extension Forwarding (min): 10
      Enable Inter-Gateway Alternate Routing? n
      Enable Dial Plan Transparency in Survivable Mode? n
                                COR to Use for DPT: station
                                EC500 Routing in Survivable Mode: dpt-then-ec500
MALICIOUS CALL TRACE PARAMETERS
      Apply MCT Warning Tone? n    MCT Voice Recorder Trunk Group:
      Delay Sending RElease (seconds): 0
SEND ALL CALLS OPTIONS
      Send All Calls Applies to: station    Auto Inspect on Send All Calls? n
      Preserve previous AUX Work button states after deactivation? n
UNIVERSAL CALL ID
      Create Universal Call ID (UCID)? y    UCID Network Node ID:1
```

Navigate to **Page 13**, and make a note of the **Send UCID to ASAI** setting, which will be used later to configure Pega Call.

```
change system-parameters features                                     Page 13 of 19
                                FEATURE-RELATED SYSTEM PARAMETERS

CALL CENTER MISCELLANEOUS
      Callr-info Display Timer (sec): 10
                                Clear Callr-info: next-call
      Allow Ringer-off with Auto-Answer? n

      Reporting for PC Non-Predictive Calls? n

      Agent/Caller Disconnect Tones? n
Interruptible Aux Notification Timer (sec): 3
      Zip Tone Burst for Callmaster Endpoints: double

ASAI
      Copy ASAI UUI During Conference/Transfer? n
      Call Classification After Answer Supervision? n
                                Send UCID to ASAI? y
      For ASAI Send DTMF Tone to Call Originator? y
      Send Connect Event to ASAI For Announcement Answer? n
      Prefer H.323 Over SIP For Dual-Reg Station 3PCC Make Call? n
```


5.4. Administer Reason Codes

For contact centers that use reason codes, enter the “change reason-code-names” command. Configure the **Aux Work** and **Logout** reason codes as desired. The compliance testing used the default values used by Pega Call, which are shown below.

change reason-code-names		Page	1 of	1
REASON CODE NAMES				
Aux Work/ Interruptible?		Logout		
Reason Code 1:	In a Meeting	/n	Break	
Reason Code 2:	Out of Office	/n	Lunch	
Reason Code 3:	Lunch	/n		
Reason Code 4:		/n		
Reason Code 5:		/n		
Reason Code 6:		/n		
Reason Code 7:		/n	Other	
Reason Code 8:		/n		
Reason Code 9:		/n		
Default Reason Code:				

5.5. Administer Hunt Group and Agent

This section shows the steps required to add a new service or skill on Communication Manager. Services are accessed by calling a Vector Directory Number (VDN), which points to a vector. The vector then points to a hunt group associated with an agent. The following sections give step by step instructions on how to add the following

- Hunt Group
- Agent

5.5.1. Add Hunt Group

To add a new skillset or hunt group type, **add hunt-group x**, where **x** is the new hunt group number. For example, hunt group **1** is added for the **Voice Service** queue. Ensure that **ACD**, **Queue** and **Vector** are all set to **y**. Also, that **Group Type** is set to **ucd-mia**.

add hunt-group 1		Page 1 of 4
HUNT GROUP		
Group Number: 1	ACD? y	
Group Name: Voice Service	Queue? y	
Group Extension: 87000	Vector? y	
Group Type: ucd-mia		
TN: 1		
COR: 1	MM Early Answer? n	
Security Code:	Local Agent Preference? n	
ISDN/SIP Caller Display:		
Queue Limit: unlimited		
Calls Warning Threshold:	Port:	
Time Warning Threshold:	Port:	

On **Page 2** ensure that **Skill** is set to **y** as shown below.

add hunt-group 1		Page 2 of 4
HUNT GROUP		
Skill? y	Expected Call Handling Time (sec): 180	
AAS? n		
Measured: none		
Supervisor Extension:		
Controlling Adjunct:		
Multiple Call Handling: none		
Timed ACW Interval (sec):	After Xfer or Held Call Drops? n	

5.5.2. Add Agent

In the compliance testing, the agents 80000 and 80001 were created.

To add a new agent, type **add agent-loginID x**, where x is the login id for the new agent.

add agent-loginID 80000		Page 1 of 3
AGENT LOGINID		
Login ID: 80000	AAS? n	
Name: Voice Agent	AUDIX? n	
TN: 1	Check skill TNs to match agent TN? n	
COR: 1		
Coverage Path:	LWC Reception: spe	
Security Code:	LWC Log External Calls? n	
	AUDIX Name for Messaging:	
	LoginID for ISDN/SIP Display? n	
	Password:	
	Password (enter again):	
	Auto Answer: station	
	MIA Across Skills: system	
	ACW Agent Considered Idle: system	
	Aux Work Reason Code Type: system	
	Logout Reason Code Type: system	
	Maximum time agent in ACW before logout (sec): system	
	Forced Agent Logout Time: :	
WARNING: Agent must log in again before changes take effect		

On **Page 2**, add the required skills. Note that the skill **1** is added to this agent so when a call for **Voice Service** is initiated, the call is routed correctly to this agent.

add agent-loginID 80000		Page 2 of 3					
AGENT LOGINID							
Direct Agent Skill:	Service Objective? n						
Call Handling Preference: skill-level	Local Call Preference? n						
SN	RL SL	SN	RL SL	SN	RL SL	SN	RL SL
1: 1	1	16:		31:		46:	
2:		17:		32:		47:	
3:		18:		33:		48:	
4:		19:		34:		49:	
5:		20:		35:		50:	
6:		21:		36:		51:	
7:		22:		37:		52:	
8:		23:		38:		53:	
9:		24:		39:		54:	
10:		25:		40:		55:	

Repeat this section to add another agent 80001.

5.6. Administer Vectors and VDNs

Add a vector using the **change vector n** command, where **n** is a vector number. Note that the vector steps may vary, and below is a sample vector used in the compliance testing.

change vector 1	Page 1 of 6
CALL VECTOR	
Number: 1	Name: VoiceService
Multimedia? n	Attendant Vectoring? n Meet-me Conf? n Lock? n
Basic? y	EAS? y G3V4 Enhanced? y ANI/II-Digits? y ASAI Routing? y
Prompting? y	LAI? y G3V4 Adv Route? y CINFO? y BSR? y Holidays? y
Variables? y	3.0 Enhanced? y
01 adjunct	routing link 1
02 wait-time	5 secs hearing silence
03 route-to	number 80000 cov n if unconditionally
04 stop	
05	
06	
07	
08	
09	
10	
11	
12	
Press 'Esc f 6' for Vector Editing	

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

add vdn 88000	Page 1 of 3
VECTOR DIRECTORY NUMBER	
Extension: 88000	Unicode Name? n
Name*: Voice VDN	
Destination: Vector Number	1
Attendant Vectoring? n	
Meet-me Conferencing? n	
Allow VDN Override? n	
COR: 1	
TN*: 1	
Measured: none	Report Adjunct Calls as ACD*? n
VDN of Origin Annc. Extension*:	
1st Skill*:	
2nd Skill*:	
3rd Skill*:	
SIP URI:	
* Follows VDN Override Rules	

Repeat this section to administer the desired number of vectors and VDNs. In the compliance testing, two sets of vectors and VDNs were created, as shown below.

list vdn									
VECTOR DIRECTORY NUMBERS									
Name (22 characters)	Ext/Skills	VDN		Vec			Orig		Evt
		Ovr	COR	TN	PRT	Num	Meas	Annc	Noti
									Adj
Voice VDN	88000	n 1	1	V	1	none			1
Voice VDN	88001	n 1	1	V	2	none			1

6. Configure Avaya Aura® Application Enablement Services

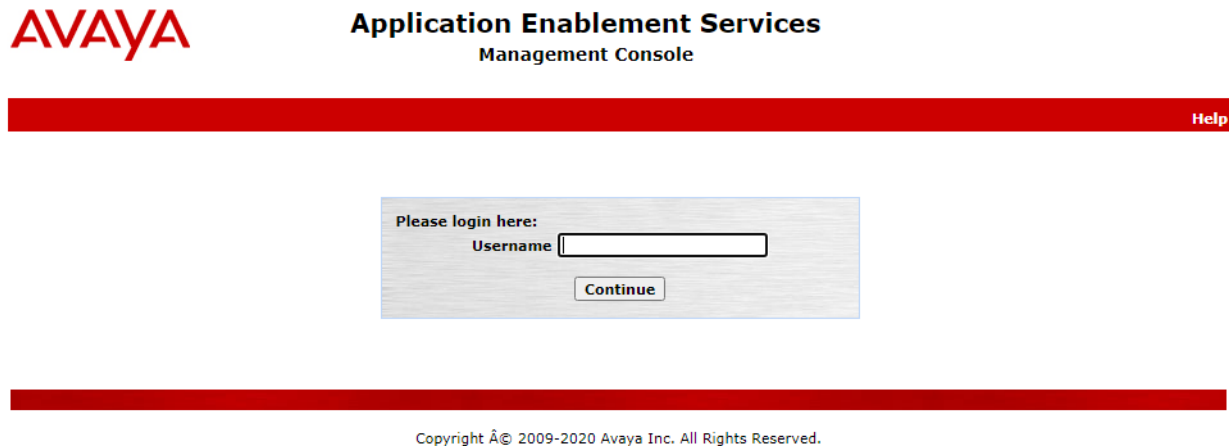
This section provides the procedures for configuring Application Enablement Services. The procedures include the following areas:

- Launch OAM interface
- Verify license
- Administer TSAPI link
- Administer Pega user
- Administer security database
- Restart services
- Obtain Tlink name

6.1. Launch OAM Interface

Access the OAM web-based interface by using the URL “https://ip-address” in an Internet browser window, where **ip-address** is the IP address of the Application Enablement Services server.

The **Please login here** screen is displayed. Log in using the appropriate credentials.



The screenshot shows the Avaya Application Enablement Services Management Console login interface. At the top left is the Avaya logo. To its right, the text "Application Enablement Services" is displayed in bold, with "Management Console" underneath it. A red horizontal bar spans the width of the page, containing a "Help" link on the right. Below this bar is a light gray login box with the text "Please login here:" followed by a "Username" label and a text input field. A "Continue" button is positioned below the input field. At the bottom of the page, another red horizontal bar contains the copyright notice: "Copyright © 2009-2020 Avaya Inc. All Rights Reserved."

The **Welcome to OAM** screen is displayed next.



Application Enablement Services Management Console

Welcome: User cust
Last login: Thu Feb 18 14:36:40 2021 from 10.128.224.59
Number of prior failed login attempts: 0
HostName/IP: aes95/10.30.5.95
Server Offer Type: VIRTUAL_APPLIANCE_ON_VMWARE
SW Version: 8.1.3.0.0.25-0
Server Date and Time: Mon Feb 22 17:38:46 ICT 2021
HA Status: Not Configured

[Home](#)

[Home](#) | [Help](#) | [Logout](#)

- ▶ **AE Services**
- ▶ **Communication Manager Interface**
- ▶ **High Availability**
- ▶ **Licensing**
- ▶ **Maintenance**
- ▶ **Networking**
- ▶ **Security**
- ▶ **Status**
- ▶ **User Management**
- ▶ **Utilities**
- ▶ **Help**

Welcome to OAM

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

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

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

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6.2. Verify License

Select **Licensing** → **WebLM Server Access** in the left pane, to display the applicable WebLM server log in screen (not shown). Log in using the appropriate credentials and navigate to display installed licenses (not shown).



Application Enablement Services Management Console

Welcome: User cust
Last login: Thu Feb 18 14:36:40 2021 from 10.128.224.59
Number of prior failed login attempts: 0
HostName/IP: aes95/10.30.5.95
Server Offer Type: VIRTUAL_APPLIANCE_ON_VMWARE
SW Version: 8.1.3.0.0.25-0
Server Date and Time: Mon Feb 22 17:39:12 ICT 2021
HA Status: Not Configured

Licensing[Home](#) [Help](#) [Logout](#)

▶ AE Services

▶ Communication Manager Interface

▶ High Availability

▼ Licensing

WebLM Server Address

WebLM Server Access

Reserved Licenses

▶ Maintenance

▶ Networking

▶ Security

▶ Status

▶ User Management

▶ Utilities

▶ Help

Licensing

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

- WebLM Server Address

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

- WebLM Server Access

If you want to administer TSAPI Reserved Licenses or DMCC Reserved Licenses, you need to use the following:

- Reserved Licenses

NOTE: Please disable your pop-up blocker if you are having difficulty with opening this page

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Verify that there are sufficient licenses for **TSAPI Simultaneous Users**, as shown below. The TSAPI license is used for device monitoring.

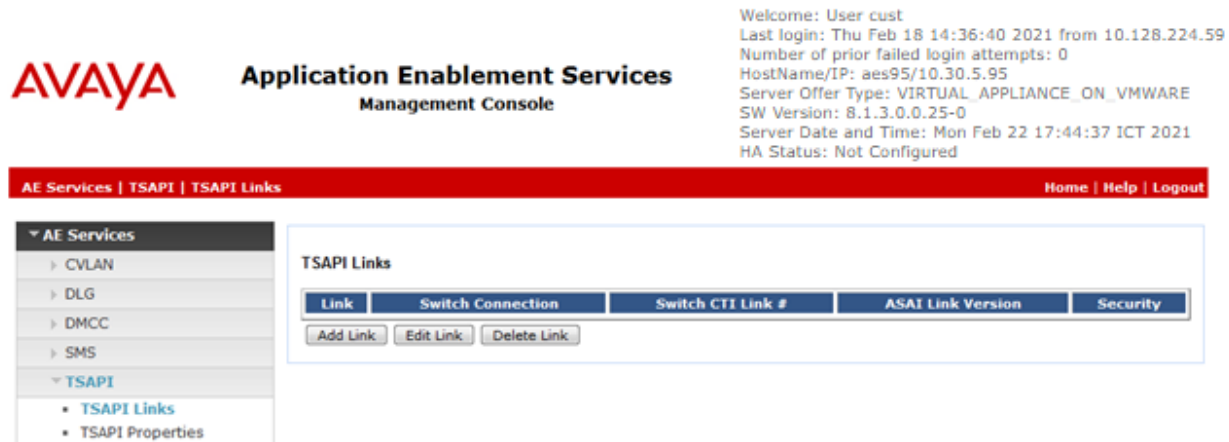
NAQ; Reviewed
SPOC: 3/21/2021

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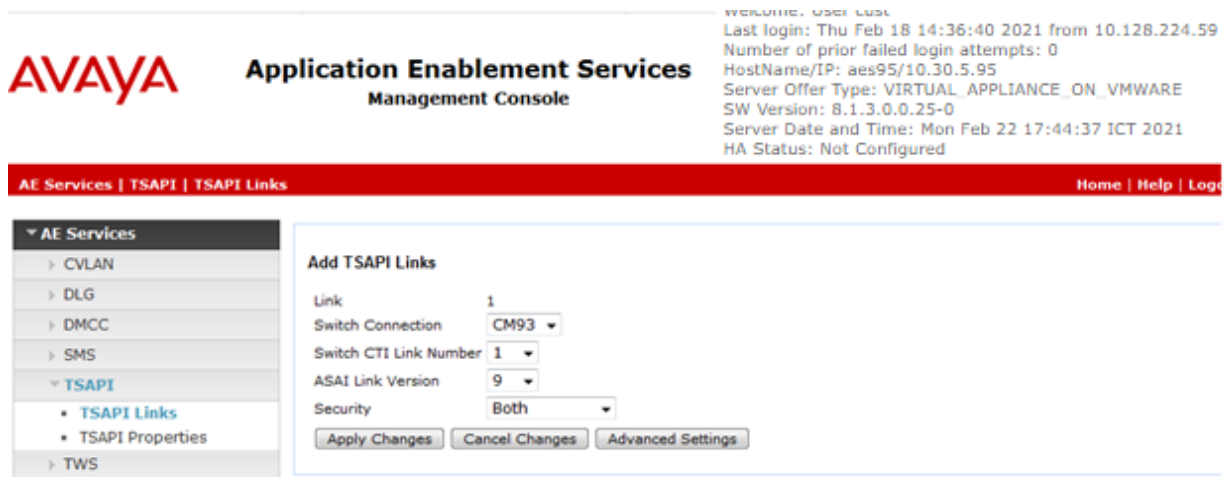
6.3. Administer TSAPI Link

Select **AE Services** → **TSAPI** → **TSAPI Links** from the left pane of the **Management Console**, to administer a TSAPI link. The **TSAPI Links** screen is displayed, as shown below. Click **Add Link**.



The **Add TSAPI Links** screen is displayed next.

The **Link** field is only local to the Application Enablement Services server, and may be set to any available number. For **Switch Connection**, select the relevant switch connection from the drop-down list. In this case, the existing switch connection **CM93** is selected. For **Switch CTI Link Number**, select the CTI link number from **Section 5.2**. Retain the default values in the remaining fields.



6.4. Administer Pega User

Select **User Management** → **User Admin** → **Add User** from the left pane, to display the **Add User** screen in the right pane.

Enter desired values for **User Id**, **Common Name**, **Surname**, **User Password**, and **Confirm Password**. For **CT User**, select **Yes** from the drop-down list. Retain the default value in the remaining fields.

AVAYA **Application Enablement Services**
Management Console

Welcome: User cust
Last login: Tue Feb 23 16:18:26 2021 from 10.128.224.163
Number of prior failed login attempts: 0
HostName/IP: aes95/10.30.5.95
Server Offer Type: VIRTUAL_APPLIANCE_ON_VMWARE
SW Version: 8.1.3.0.0.25-0
Server Date and Time: Tue Feb 23 16:32:10 ICT 2021
HA Status: Not Configured

User Management | User Admin | List All UsersHome | Help | Logout

▶ AE Services

▶ Communication Manager Interface

▶ High Availability

▶ Licensing

▶ Maintenance

▶ Networking

▶ Security

▶ Status

▼ User Management

▶ Service Admin

▼ User Admin

▪ Add User

▪ Change User Password

▪ List All Users

▪ Modify Default Users

▪ Search Users

▶ Utilities

▶ Help

Add User

* User Id

pega

* Common Name

pega

* Surname

pega

User Password

.....

Confirm Password

Admin Note

Avaya Role

None

Business Category

Car License

CM Home

Css Home

CT User

Yes

Department Number

Display Name

Employee Number

Employee Type

Enterprise Handle

6.5. Administer Security Database

Select **Security** → **Security Database** → **Control** from the left pane, to display the **SDB Control for DMCC, TSAPI, JTAPI and Telephony Web Services** screen in the right pane. Uncheck both fields below.

In the event that the security database is used by the customer with parameters already enabled, then follow reference [6] to configure access privileges for the Pega user from **Section 6.4**.

The screenshot displays the Avaya Application Enablement Services Management Console. The top header includes the Avaya logo, the title "Application Enablement Services Management Console", and a welcome message for user "cust" along with system information like last login, failed attempts, and server details. A red navigation bar contains "Security | Security Database | Control" and links for "Home | Help | Logout". The left sidebar lists various service categories, with "Security" expanded to show "Security Database" and "Control" selected. The main content area, titled "SDB Control for DMCC, TSAPI, JTAPI and Telephony Web Services", contains two unchecked checkboxes: "Enable SDB for DMCC Service" and "Enable SDB for TSAPI Service, JTAPI and Telephony Web Services", followed by an "Apply Changes" button.

6.6. Restart Services

Select **Maintenance** → **Service Controller** from the left pane, to display the **Service Controller** screen in the right pane. Check **TSAPI Service**, and click **Restart Service**.



Application Enablement Services Management Console

Maintenance | Service Controller

- ▶ AE Services
- ▶ Communication Manager Interface
- ▶ High Availability
- ▶ Licensing
- ▼ Maintenance
 - Date Time/NTP Server
 - ▶ Security Database
 - Service Controller**
 - ▶ Server Data
- ▶ Networking
- ▶ Security
- ▶ Status
- ▶ User Management
- ▶ Utilities
- ▶ Help

Service Controller


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

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

6.7. Obtain Tlink Name

Select **Security** → **Security Database** → **Tlinks** from the left pane. The **Tlinks** screen shows a listing of the Tlink names. A new Tlink name is automatically generated for the TSAPI service. Locate the Tlink name associated with the relevant switch connection, which would use the name of the switch connection as part of the Tlink name. Make a note of the associated Tlink name, to be used later for configuring Pega Call.

In this case, the associated Tlink name is **AVAYA#CM93#CSTA-S#AES95**. Note the use of the switch connection **CM93** from **Section 6.3** as part of the Tlink name.

**Application Enablement Services**
Management Console

Welcome: User cust
Last login: Tue Feb 23 16:18:26 2021 from 10.128.224.163
Number of prior failed login attempts: 0
HostName/IP: aes95/10.30.5.95
Server Offer Type: VIRTUAL_APPLIANCE_ON_VMWARE
SW Version: 8.1.3.0.0.25-0
Server Date and Time: Tue Feb 23 16:34:17 ICT 2021
HA Status: Not Configured

Security | Security Database | Tlinks

Home | Help | Logout

▶ AE Services

▶ Communication Manager Interface

High Availability

▶ Licensing

▶ Maintenance

▶ Networking

▼ Security

▶ Account Management

▶ Audit

▶ Certificate Management

Enterprise Directory

▶ Host AA

▶ PAM

▼ Security Database

■ Control

▣ CTI Users

■ Devices

■ Device Groups

■ **Tlinks**

Tlinks

Tlink Name

☐ AVAYA#CM93#CSTA#AES95

☒ AVAYA#CM93#CSTA-S#AES95

Delete Tlink

7. Configure Pegasystems Pega Call

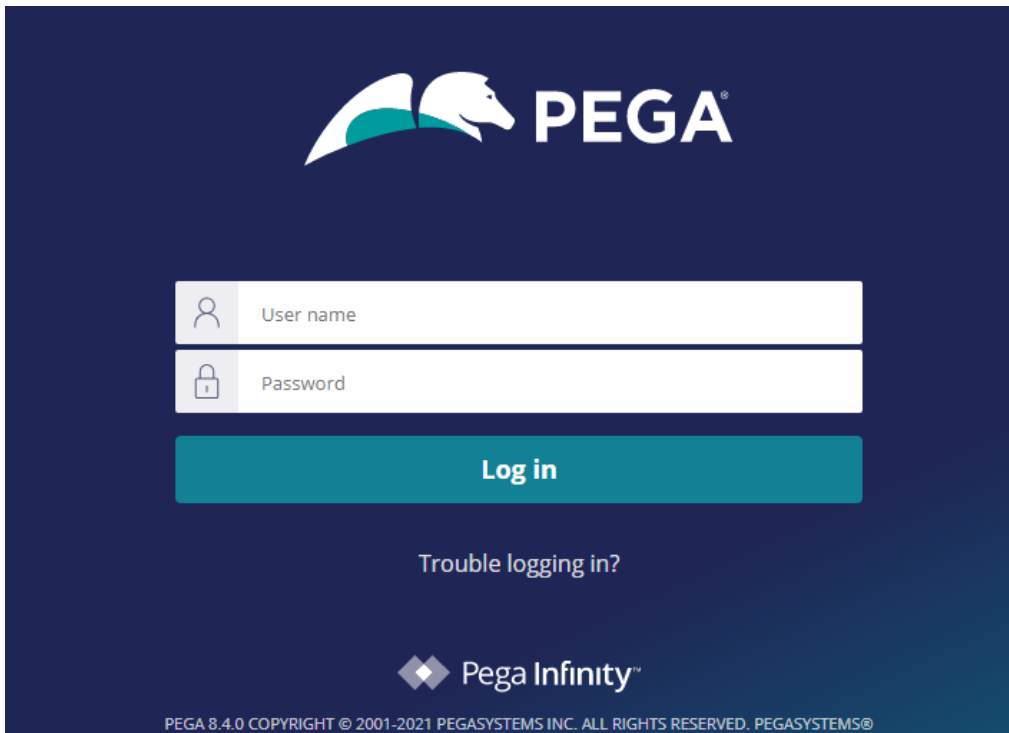
This section provides the procedures for configuring Pega Call. The procedures include the following areas:

- Launch web interface
- Administer CTI link
- Administer route points
- Administer decision tree

The configuration of Pega Call is performed by Pegasystems service personnel. The procedural steps are presented in these Application Notes for informational purposes. Pega Call can be configured on a single server or with components distributed across multiple servers. The solution provides a customizable platform that uses the J2EE framework with either Tomcat, WebSphere, WebLogic or JBoss as the application server, and either Oracle, SQL, DB2 or PostgreSQL as the database component. For ease of compliance testing, the configuration used a single server hosting all components including Tomcat and PostgreSQL.

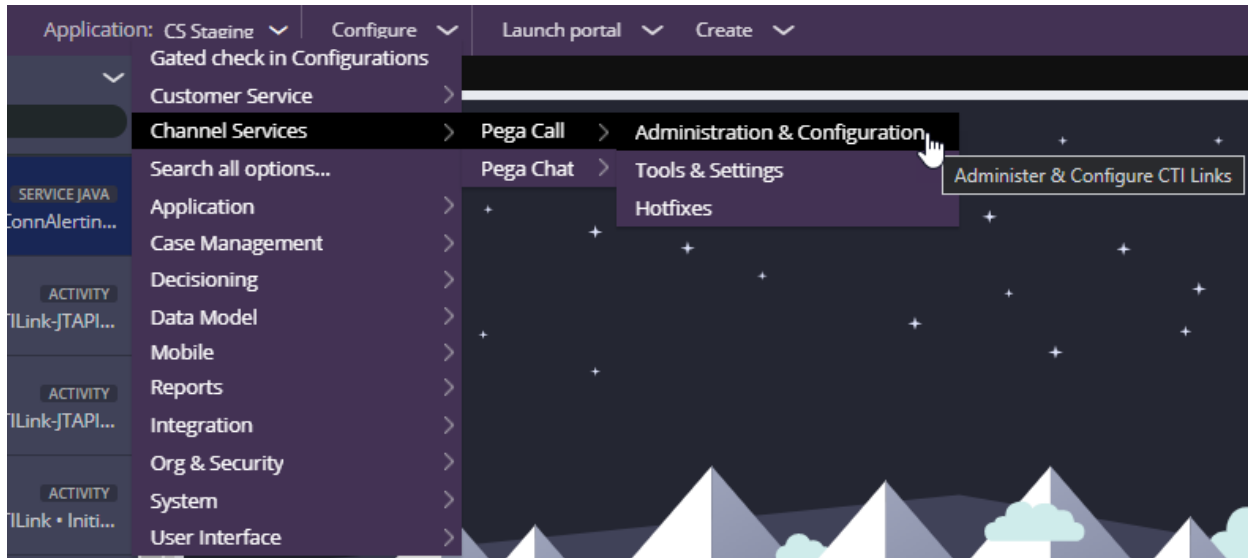
7.1. Launch Web Interface

Access the web-based interface by using the URL “http://ip-address:port/prweb/PRServlet” in an Internet browser window, where “ip-address” is the IP address of the Pega Call server, and “port” is the pertinent port number from Pegasystems. The screen below is displayed. Log in using the administrator credentials.

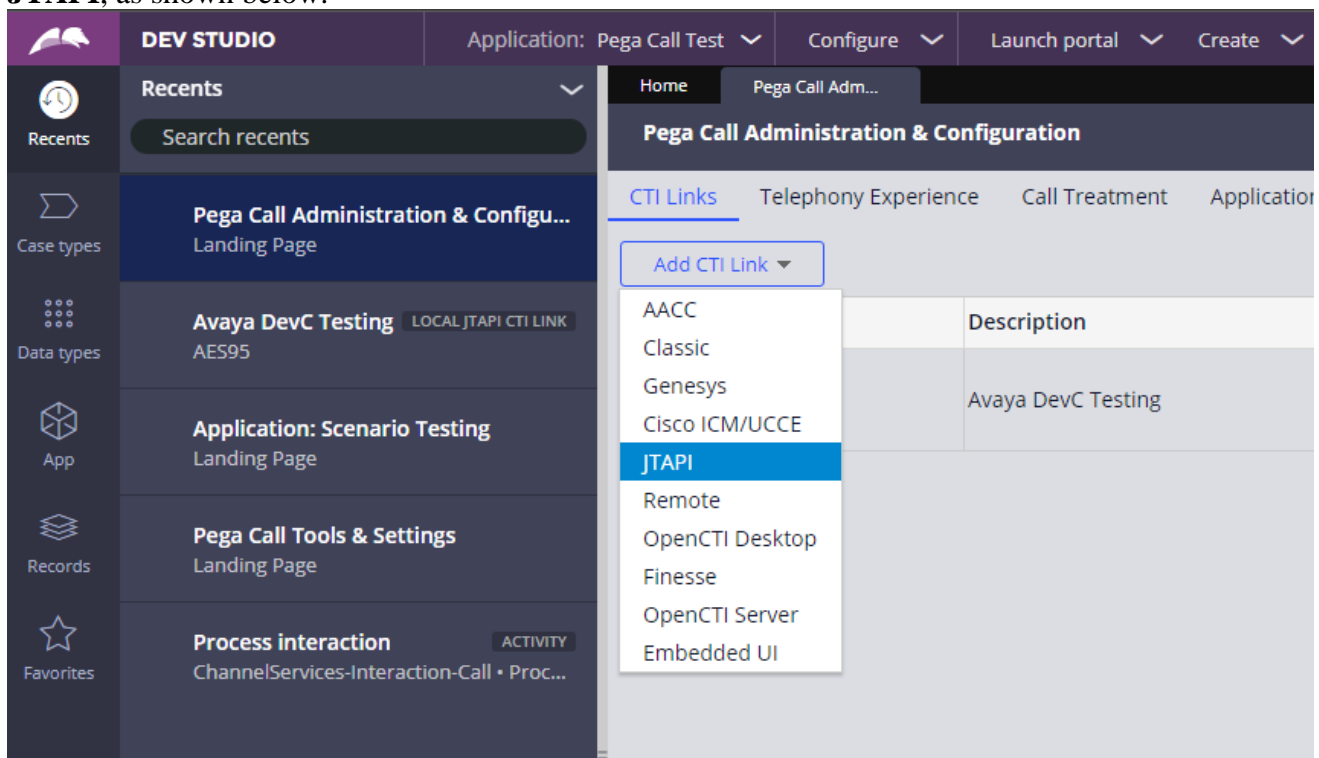
The image shows the Pega Call login interface. At the top, there is the Pega logo, which consists of a stylized white horse head and the word "PEGA" in white capital letters. Below the logo, there are two input fields: "User name" and "Password". Each field has a small icon on the left (a person for the username and a lock for the password). Below these fields is a large teal button with the text "Log in" in white. Underneath the button, there is a link that says "Trouble logging in?". At the bottom of the screen, there is the "Pega Infinity" logo, which is a diamond shape made of four smaller diamonds, followed by the text "Pega Infinity". At the very bottom, there is a small line of text: "PEGA 8.4.0 COPYRIGHT © 2001-2021 PEGASYSTEMS INC. ALL RIGHTS RESERVED. PEGASYSTEMS®".

7.2. Administer CTI Link

The screen below is displayed next. Select **Configure** → **Channel Services** → **Pega Call** → **Administration & Configuration** from the top menu.



The **Pega Call Administration & Configuration** screen is displayed. Select **Add CTI Link** → **JTAPI**, as shown below.



The **Create Local JTAPI CTI Link** screen is displayed. Enter desired values for **Short description** and **Link Definition Name**. Click **Create and open**.

Home Pega Call Too... X Pega Call Adm... New

Create Local JTAPI CTI Link ? Cancel Create and open

Short description *

Avaya DevC Testing

Link Definition Name

AES95

The **Edit Local JTAPI CTI Link** screen is displayed. Enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Auto Start:** Check this field.
- **AES Server Host Name:** IP address of Application Enablement Services.
- **TLINK:** The Tlink name from **Section 6.7**.
- **AES User ID:** The Pega Call user credentials from **Section 6.4**.
- **Password:** The Pega Call user credentials from **Section 6.4**.
- **Enable UCID Support:** Check when both UCID settings in **Section 5.3** are enabled.

The screenshot shows the 'DEV STUDIO' interface with the 'Pega Call Admin' tab selected. The 'AES95' configuration page is displayed, showing the 'Link configuration' tab. The 'Enabled' checkbox is checked, and 'Auto Start' is also checked. The 'JTAPI Vendor' is set to 'Avaya AES'. The 'Avaya AES Connectivity' section contains the following fields: 'AES Server Host Name' (10.30.5.95), 'Port' (450), 'TLINK' (AVAYA#CM93#CSTA-S#AES95), 'AES User ID' (pega), 'Password' (masked with dots), 'Connection Timeout (s)' (60), 'Retry Interval (s)' (60), 'Primary Reconnection Attempts' (10), and 'Secondary Retry Interval (s)' (600). The 'Enable UCID Support' checkbox is checked. Below this, the 'Site ID' and 'Dial Plan' fields are empty. The 'Desktop Heartbeats' section has 'Enabled' checked, 'Heartbeat Interval (s)' (60), 'Heartbeat Timeout (s)' (300), 'Behavior upon timeout' (Make agent Not-Ready and unmonitor device), and 'Not-Ready Reason Code' (empty). A 'Test Connectivity' button is at the bottom.

DEV STUDIO

Home Pega Call Admin... AES95

ID: AES95 RS: No associated ruleset [Edit]

Link configuration Failover Logging Route points VDN Monitoring Peering Switch capabilities Phone books Advanced

Enabled: ☒ Auto Start: ☒

JTAPI Vendor: Avaya AES

Avaya AES Connectivity

AES Server Host Name: 10.30.5.95 Port: 450

TLINK: AVAYA#CM93#CSTA-S#AES95

AES User ID: pega Password:

Connection Timeout (s): 60 Retry Interval (s): 60

Primary Reconnection Attempts: 10 Secondary Retry Interval (s): 600

Enable UCID Support: ☒

Site ID:

Dial Plan:

Desktop Heartbeats

Enabled: ☒

Heartbeat Interval (s): 60 Heartbeat Timeout (s): 300

Behavior upon timeout: Make agent Not-Ready and unmonitor device Not-Ready Reason Code:

Test Connectivity

7.3. Administer Route Points

This section is only applicable to systems that use the Enhanced Routing feature.

Select the **Route points** tab. For **Monitor Route Points on Node**, select the applicable node. In the **Route Points to Monitor** sub-section, add the routing VDN extensions from **Section 5.6**.

For systems that use the Enhanced Routing feature, click on the menu selection drop-down list from the upper left corner of the screen shown below.

The screenshot displays the Avaya DevC Testing web interface. At the top, there is a navigation bar with a menu icon (a 3x3 grid) highlighted by a red box. Below this, the breadcrumb trail shows 'Home' and 'AES95'. The main header area includes the text 'Edit Local JTAPI CTI Link: Avaya DevC Testing' and 'ID: AES95 RS: No associated ruleset [Edit]', along with 'Delete' and 'Actions' buttons. A horizontal tab bar contains 'Link configuration', 'Failover', 'Logging', 'Route points' (which is selected and underlined), 'VDN Monitoring', 'Peering', 'Switch capabilities', and 'Phone books'. The 'Route points' section is divided into two parts: 'Monitor Route Points on Node:' followed by an empty text input field, and 'Route Points to Monitor' which contains a table. The table has two columns, 'RANGE - START' and 'RANGE - END', with the first row containing the values '88000' and '88001' respectively. A trash icon is located to the right of the '88001' value. A blue plus sign is positioned below the table, indicating an option to add new entries.

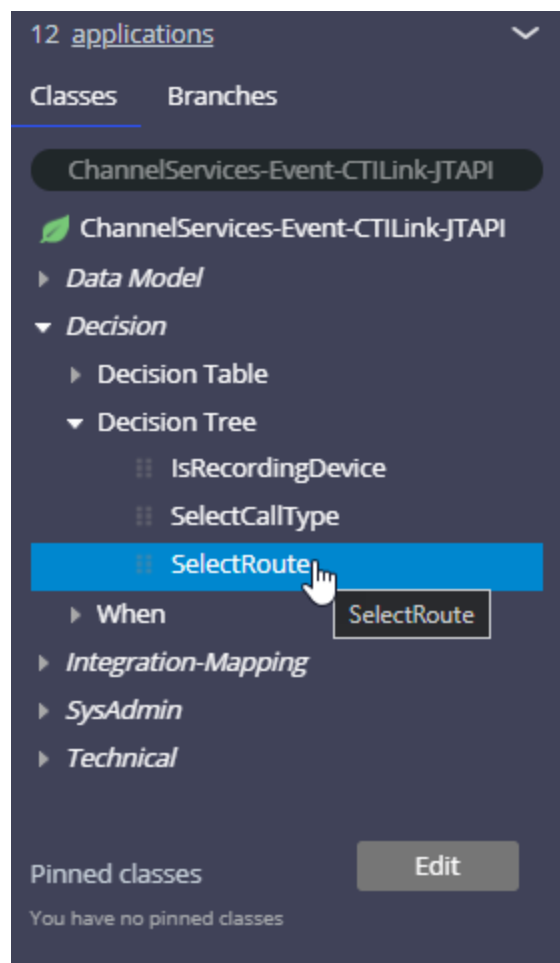
RANGE - START	RANGE - END
88000	88001

7.4. Administer Decision Tree

This section is only applicable to systems that use the Enhanced Routing feature.

Prior to administering decision tree, follow reference [6] to create a RuleSet, which is a set of rule that define an application or a major portion of an application. In the compliance testing, the default out-of-box RuleSet named **Pega-CTI** with ID of **SelectRoute** was used. The screen below is displayed next. Select App from the far-left pane and enter “**ChannelServices-Event-CTILink-JTAPI**” in the search area.

Scroll down the left pane and select **Decision** → **Decision Tree** → **SelectRoute**.



The **Decision Tree: SelectRoute** screen is displayed. Follow reference [6] to configure the desired routing logic.

The screenshot below shows the routing logic used in the compliance testing. The **.pyAddress** parameter was used as the matching criteria to the routing VDN extensions in **Section 5.6**.

As shown in **Section 3**, extensions **87000** and **87001** are existing skill groups on Communication Manager, and extension **80000** is the supervisor.

The screenshot displays the 'Decision' tab of a configuration interface. At the top, there are tabs for 'Decision', 'Configuration', 'Parameters', 'Pages & Classes', 'Test cases', 'Specifications', and 'History'. Below the tabs, there are two buttons: 'Show Conflicts' and 'Show Completeness'. The main area shows a decision tree logic:

- if ".pyAddress" = "88000" then return "87000"
- if ".pyAddress" = "88001" then return "87001"
- otherwise RETURN "80000"

The second 'if' statement is highlighted in light blue. Each 'if' statement has a trash icon to its right. The 'otherwise' clause has a dropdown menu set to 'RETURN' and a text box containing '"80000"', followed by a gear icon.

8. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Communication Manager, Application Enablement Services, and Pega Call.

8.1. Verify Avaya Aura® Communication Manager

On Communication Manager, verify status of the administered CTI link by using the “status aesvcs cti-link” command. Verify that the **Service State** is “established” for the CTI link number administered in **Section 5.2. as shown below.**

```
status aesvcs cti-link
```

AE SERVICES CTI LINK STATUS						
CTI Link	Version	Mnt Busy	AE Services Server	Service State	Msgs Sent	Msgs Rcvd
1	9	no	aes95	established	14	14

Enter the command **list agent-loginID** verify that agent **80000** and **80001** shown in **Section 5.4** is logged-in to extension **70010** and **70009**.


```
list agent-loginID
```

AGENT LOGINID									
Login ID	Name	Extension		Dir	Agt	AAS/AUD		COR	Ag Pr SO
	Skil/Lv	Skil/Lv	Skil/Lv	Skil/Lv	Skil/Lv	Skil/Lv	Skil/Lv	Skil/Lv	Skil/Lv
80000	Voice Agent	70010						1	lvl
	1/01	/	/	/	/	/	/	/	
80001	Voice Agent1	70009						1	lvl
	1/01	/	/	/	/	/	/	/	

8.2. Verify Avaya Aura® Application Enablement Services

On Application Enablement Services, verify the status of the TSAPI link by selecting **Status** → **Status and Control** → **TSAPI Service Summary** from the left pane. The **TSAPI Link Details** screen is displayed.

Verify the **Status** is “Talking” for the TSAPI link administered in **Section 6.3**, and that the **Associations** column reflects the total number of agents, in this case “2”.



Application Enablement Services
Management Console

Welcome: User cust
Last login: Thu Feb 18 14:36:40 2021 from 10.128.224.59
Number of prior failed login attempts: 0
HostName/IP: aes95/10.30.5.95
Server Offer Type: VIRTUAL_APPLIANCE_ON_VMWARE
SW Version: 8.1.3.0.0.25-0
Server Date and Time: Mon Feb 22 18:04:34 ICT 2021
HA Status: Not Configured

Status | Status and Control | TSAPI Service SummaryHome | Help | Logout

AE Services

Communication Manager Interface

High Availability

Licensing

Maintenance

Networking

Security

Status

Alarm Viewer

Logs

Log Manager

Status and Control

CVLAN Service Summary

DLG Services Summary

DMCC Service Summary

Switch Conn Summary

TSAPI Service Summary

TSAPI Link Details

☐ Enable page refresh every 60 seconds

	Link	Switch Name	Switch CTI Link ID	Status	Since	State	Switch Version	Associations	Msgs to Switch	Msgs from Switch	Msgs Period
	1	CM93	1	Talking	Mon Mar 16 16:16:51 2020	Online	18	2	15	15	30


OnlineOffline

For service-wide information, choose one of the following:

TSAPI Service StatusTLink StatusUser Status

8.3. Verify Avaya Aura® Application Enablement Services TSAPI Service

The following steps are carried out on the Application Enablement Services to ensure that the communication link between Communication Manager and the Application Enablement Services server is functioning correctly. Verify the status of the TSAPI service by selecting **Status → Status and Control → TSAPI Service Summary → CTI User Status**. The **Open Streams** section of this page displays open stream created by the **pega** user with the **Tlink**.

**Application Enablement Services**
Management Console

Welcome: User cust
Last login: Wed Feb 24 16:10:50 2021 from 10.128.224.163
Number of prior failed login attempts: 0
HostName/IP: aes95/10.30.5.95
Server Offer Type: VIRTUAL_APPLIANCE_ON_VMWARE
SW Version: 8.1.3.0.0.25-0
Server Date and Time: Wed Feb 24 16:25:28 ICT 2021
HA Status: Not Configured

Status | Status and Control | TSAPI Service SummaryHome | Help | Logout

▶ AE Services

▶ Communication Manager Interface

▶ High Availability

▶ Licensing

▶ Maintenance

▶ Networking

▶ Security

▼ Status

Alarm Viewer

▶ Logs

▶ Log Manager

▼ Status and Control

■ CVLAN Service Summary

■ DLG Services Summary

■ DMCC Service Summary

■ Switch Conn Summary

■ **TSAPI Service Summary**

CTI User Status

☐ Enable page refresh every seconds

CTI Users

Open Streams 3

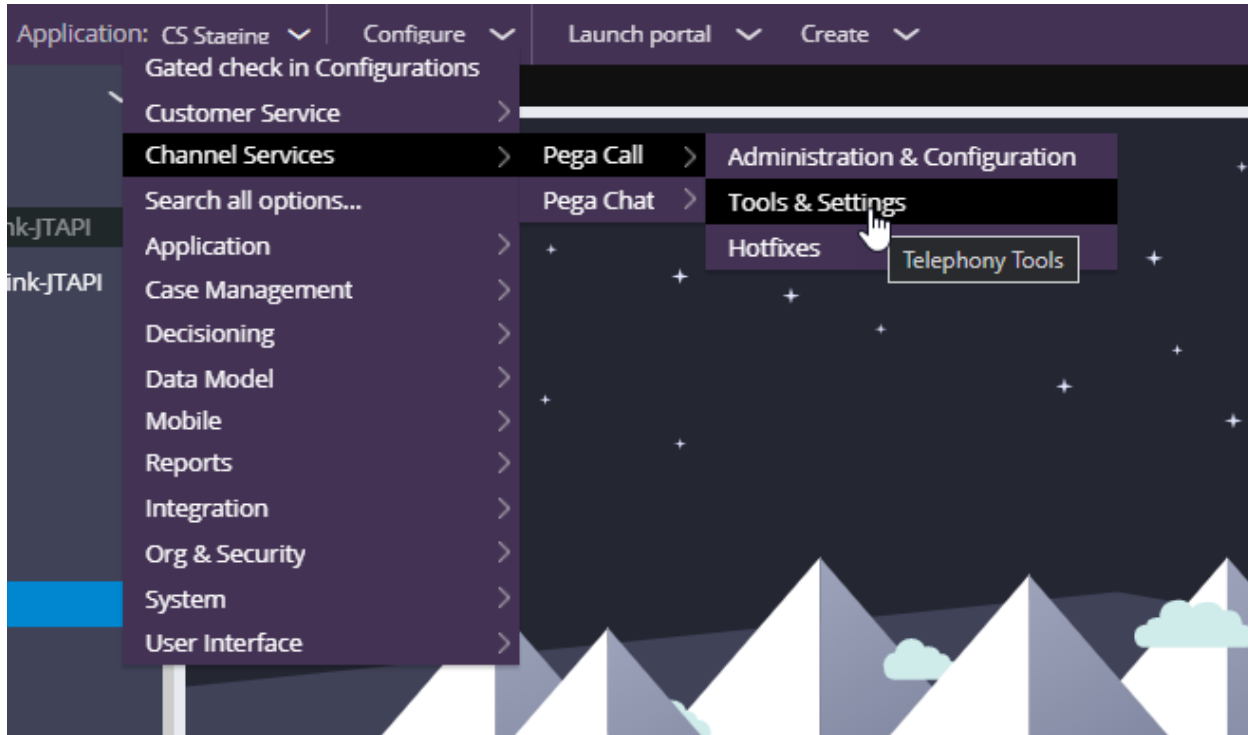
Closed Streams 1

Open Streams

Name	Time Opened	Time Closed	Tlink Name
pega	Wed 24 Feb 2021 03:57:40 PM +07		AVAYA#CM93#CSTA-S#AES95
pega	Wed 24 Feb 2021 03:59:40 PM +07		AVAYA#CM93#CSTA-S#AES95
pega	Wed 24 Feb 2021 11:28:16 AM +07		AVAYA#CM93#CSTA-S#AES95

8.4. Verify Pegasystems Pega Call

From the agent PC, follow the procedures in **Section 7.1** to launch the web-based interface, and log in using the appropriate user credentials. Select **DESIGNER STUDIO → Channel Services → Pega Call → Tools and Settings** from the top menu.



The Phone Login pop-up box is displayed. Enter the following values for the specified fields and retain the default values for the remaining fields. Click Login.

CTI Link: Select the CTI link from **Section 7.2**.

Extension: The relevant agent station extension from **Section 3**.

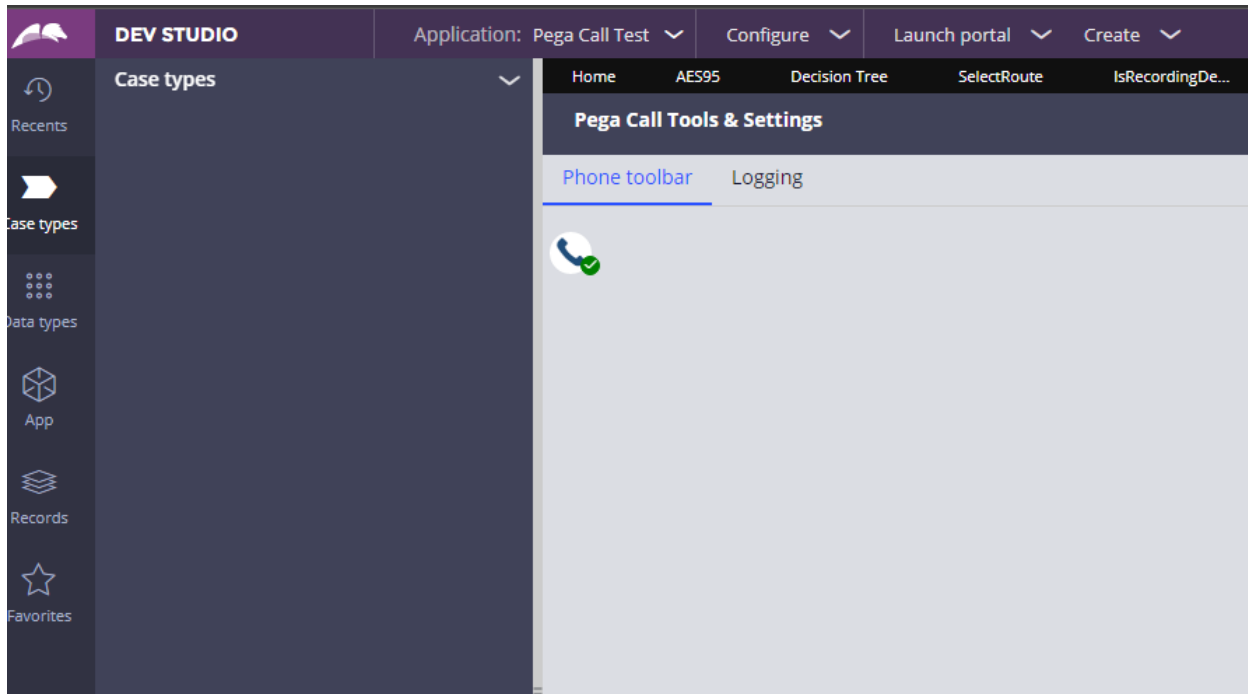
Agent ID: The relevant agent ID from **Section 3**.

Password: The relevant agent password from **Section 3**.

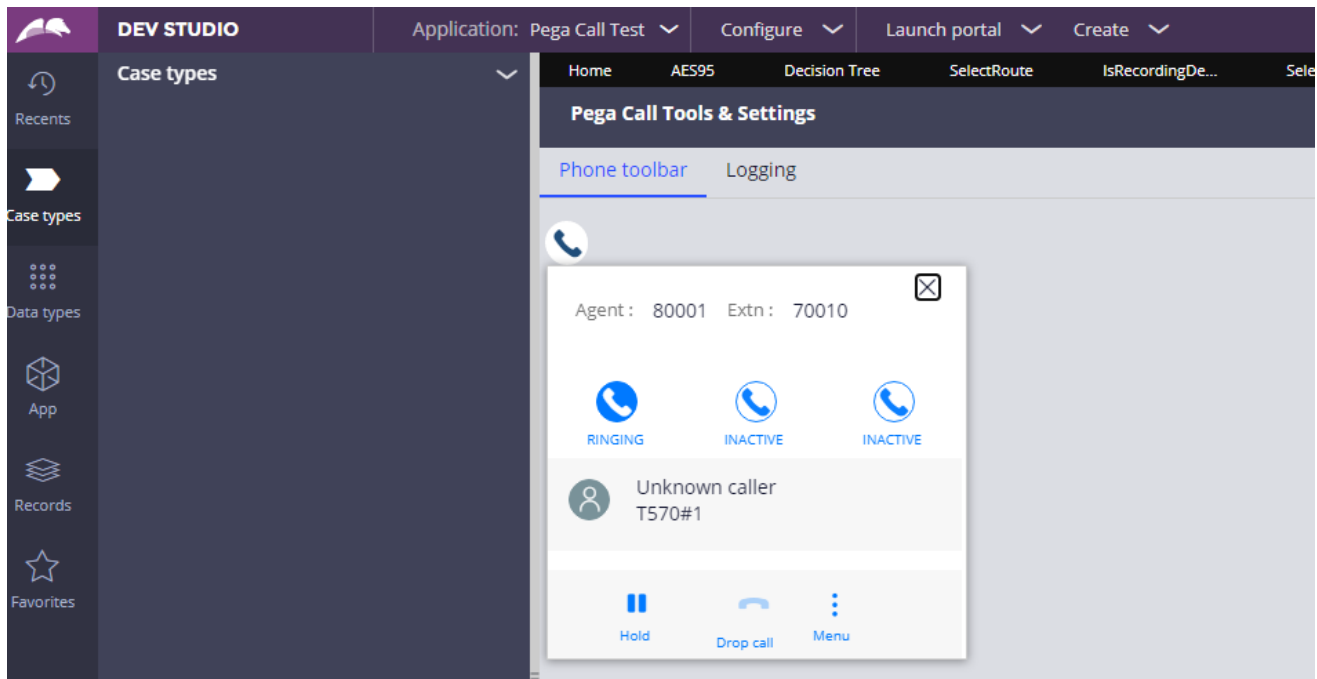
Work Mode: Select the desired work mode, in this case “AUTO_IN”.

The screenshot displays the Pega Dev Studio application. The top navigation bar includes 'DEV STUDIO', 'Application: Pega Call Test', 'Configure', 'Launch portal', and 'Create'. The left sidebar contains navigation icons for 'Recents', 'Case types', 'Data types', 'App', 'Records', and 'Favorites'. The main workspace shows the 'Pega Call Tools & Settings' panel with tabs for 'Phone toolbar' and 'Logging'. A 'Phone Log In' pop-up box is open, featuring the following fields: 'CTI Link' (a dropdown menu with 'Avaya DevC Testing' selected), 'Extension' (a text field with '70010'), 'Agent ID' (a text field with '80001'), 'Password' (a masked text field with '*****'), and 'Work Mode' (a dropdown menu with 'AUTO_IN' selected). At the bottom of the pop-up are 'Cancel' and 'Login' buttons.

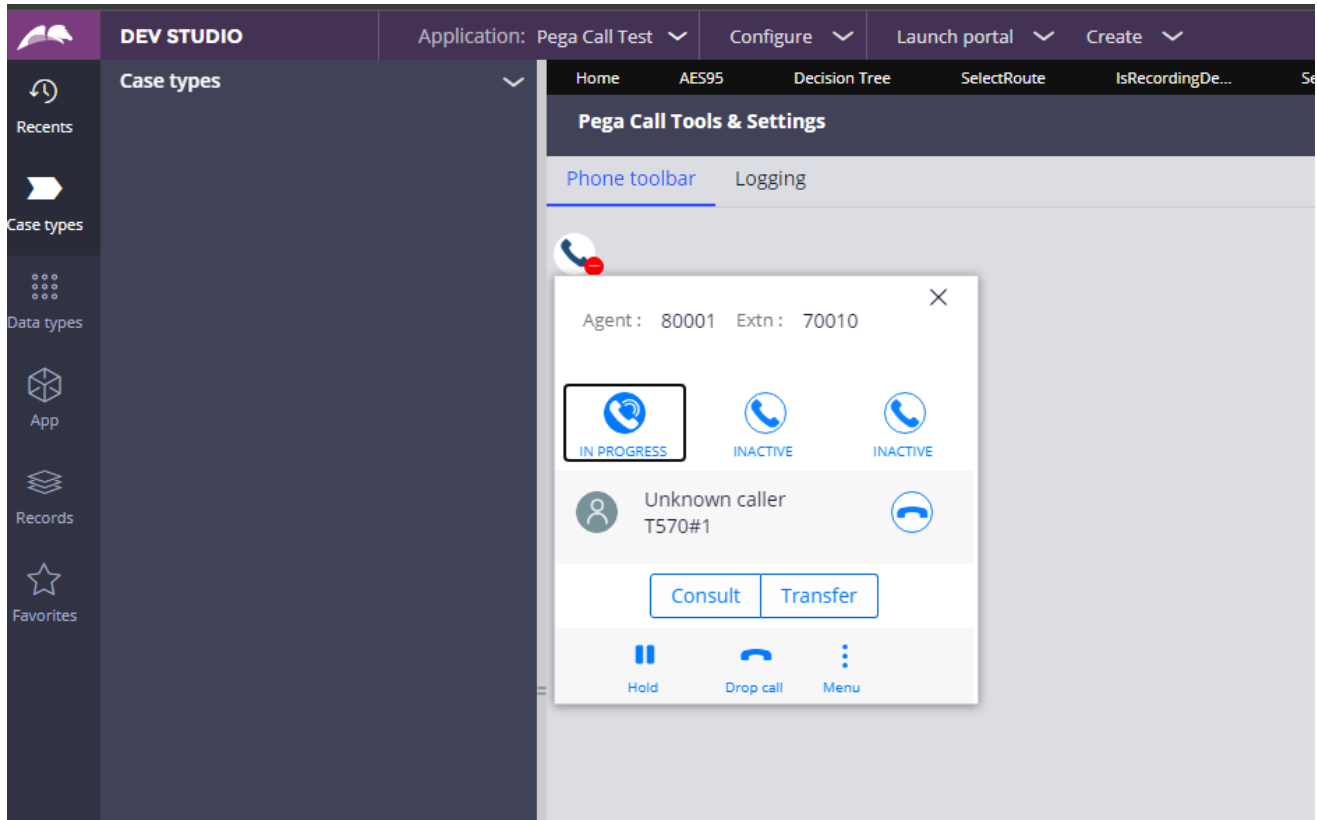
Verify that the screen is updated as shown below with a green handset icon, indicating the agent is logged in and available for ACD calls.



Make an incoming call from the PSTN to one of the routing VDNs. Verify that the call is ringing at the available agent's telephone. Also verify that a pop-up box is displayed on the agent desktop with proper call information, as shown below.



Press **RINGING** line to connect the call. Verify that the agent is connected to the PSTN with two-way talk path, and that the agent screen is updated with **IN PROGRESS** line as shown below.



9. Conclusion

These Application Notes describe the configuration steps required for the Pega Call Solution to successfully interoperate with Avaya Aura® Communication Manager and Avaya Aura® Application Enablement Services. All feature and serviceability test cases were completed with observations noted in **Section 2.2**.

10. Additional References

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

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

1. *Administering Avaya Aura® Communication Manager, Release 8.1.x, Issue 8, Nov 2020*
2. *Administering Avaya Aura® Session Manager, Release 8.1.x, Issue 8, Feb 2021*
3. *Administering Avaya Aura® System Manager, Release 8.1.x, Issue 9, Feb 2021*
4. *Administering Avaya Aura® Application Enablement Services, Release 8.1.x, Issue 9, Feb 2021*
5. *Pega Call Configuration and Operations Guide for CTI Link Engine with Avaya AES CTI, Software Version 7.21, May 2016, available at <https://pdn.pegacom>.*
6. *Pega 7 platform Help for application developers, available as part of the Pegasystems web interface and at <https://pdn.pegacom>.*

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