



## **Avaya Solution & Interoperability Test Lab**

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# **Application Notes for Mattersight Predictive Behavioral Routing 4.3 with Avaya Aura® Application Enablement Services 7.1 – Issue 1.0**

### **Abstract**

These Application Notes describe the configuration steps required for Mattersight Predictive Behavioral Routing 4.3 to interoperate with Avaya Aura® Communication Manager 7.1 and Avaya Aura® Application Enablement Services 7.1. Mattersight Predictive Behavioral Routing (PBR) is an intelligent call mapping system that interfaces with Avaya Aura® Application Enablement services using CTI.

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 Mattersight Predictive Behavioral Routing 4.3 to interoperate with Avaya Aura® Communication Manager 7.1 and Avaya Aura® Application Enablement Services 7.1. Mattersight Predictive Behavioral Routing (PBR) is an intelligent call mapping system that interfaces with Avaya Aura® Application Enablement Services (AES) using the Telephony Services Application Programming Interface (TSAPI) from Avaya Aura® Application Enablement Services.

The TSAPI interface was used by PBR to perform adjunct call routing and gather data to calculate agent utilization, monitor agent state and determine agent to skill mapping.

PBR is integrated into a Customer's ACD through the use of new Vector Variables and Vector updates. The PBR registers itself as a routing server with AES and receives and responds to adjunct route requests from Vectors. If agents are available for the selected skill the PBR routes the call to the best available agent's station in that skill; otherwise, call control is returned back to the calling Vector. PBR sends the agent's station and the skill in the route response. By sending the station extension and skill in the route response the call is counted in the correct skill allowing PBR to route calls for multi-skilled agents.

# 2. General Test Approach and Test Results

The feature test cases were performed both automatically and manually. Upon start of the PBR, the application used TSAPI to request monitoring on skills, and agent stations and establishes itself as a routing server for appropriate VDN's. For the manual part of the testing, calls were made to the VDNs. Manual call controls from the agent telephones were exercised.

The serviceability test cases were performed manually by disconnecting and reconnecting the Ethernet connection to the PBR server.

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.

## 2.1. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing focused on verifying the following on PBR:

- Handling of TSAPI messages in areas of event notification and call control.
- Handling of various call scenarios including internal, external, inbound, outbound, answer, hold/resume, drop, blind/attended transfer, conference, voicemail coverage, ACD queue, multiple agents, and multiple calls.
- Reporting of basic call scenarios including inbound, outbound, hold/resume, and drop.

The serviceability testing focused on verifying the ability of PBR to recover from adverse conditions, such as disconnecting and reconnecting the Ethernet connection to the PBR server or to the PBR Client.

## 2.2. Test Results

All test cases were executed and verified.

## 2.3. Support

Technical support on Mattersight Predictive Behavioral Routing can be obtained through the following:

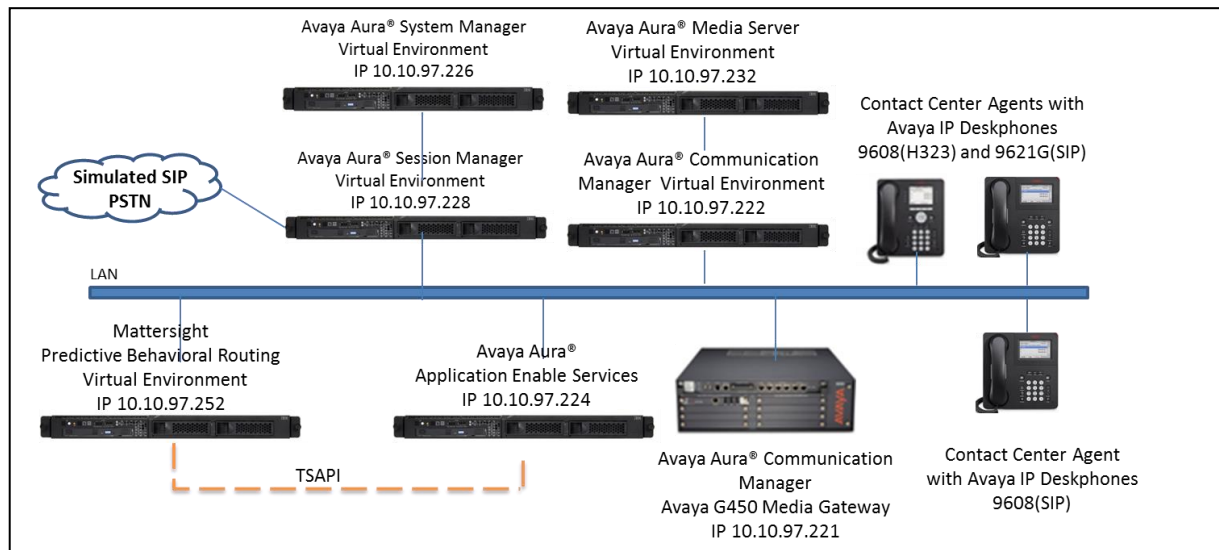
- **Phone:** 877.235.6925
- **Email:** [support@mattersight.com](mailto:support@mattersight.com)

### 3. Reference Configuration

The configuration used for the compliance testing is shown in **Figure 1**. The PBR solution consisted of the PBR server. The detailed administration of basic connectivity between Communication Manager, Application Enablement Services, System Manager, and Session Manager are not the focus of these Application Notes and will not be described. The applicable domain name was “bvwwdev.com”.

In the compliance testing, PBR monitored skills and station extensions and established itself as a routing server for appropriate VDN’s shown in the table below. The agent stations were pre-existing.

Device Type	Extension
VDN	56001
Skills	56300, 56304
Agent Station	56201, 56202, 56106
Agent ID	1000, 1001, 1003



**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® Communication Manager in Virtual Environment	7.1.0.0.532
Avaya G450 Media Gateway	NA
Avaya Aura® Media Server in Virtual Environment	7.8 SP4
Avaya Aura® Application Enablement Services in Virtual Environment	7.1
Avaya 9608, 9621G IP Deskphone (SIP)	7.0.1.2.9
Avaya 9608 IP Deskphones (H.323)	6.6401
PBR on Windows Server 2012 R2 Standard	4.3
• Avaya TSAPI Windows Client (csta32.dll)	7.1

## 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
- Administer system parameters features
- Administer VDNs
- Administer vectors
- Administer COR
- Administer Coverage Path
- Administer Station

### 5.1. Verify License

Log into the System Access Terminal (SAT) 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, navigate to **Page 4**, and verify that the **Computer Telephony Adjunct Links** customer option is set to “y”. 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? n          DCS (Basic)? y
ASAI Link Core Capabilities? n          DCS Call Coverage? y
ASAI Link Plus Capabilities? n          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
```

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

display system-parameters customer-options		Page 7 of 12
CALL CENTER OPTIONAL FEATURES		
Call Center Release: 7.1		
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	<b>Vectoring (Basic)? y</b>	
Dynamic Advocate? n	Vectoring (Prompting)? y	
Expert Agent Selection (EAS)? y	Vectoring (G3V4 Enhanced)? y	
EAS-PHD? y	Vectoring (3.0 Enhanced)? y	

## 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		
<b>Extension: 56000</b>		
<b>Type: ADJ-IP</b>		
COR: 1		
<b>Name: DevvmAES</b>		

## 5.3. Administer System Parameters Features

Use the **change system-parameters features** command to enable **Create Universal Call ID (UCID)** and enter an available node ID in the **UCID Network ID** field on **Page 5**. This node ID will be prepended to all the UCID’s generated by Communication Manager.

display 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 enable **Send UCID to ASAI**. This parameter allows for the universal call ID to be sent to PBR.

```
display 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 UII 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 Vector Variables

Create new vector variables using the information provided in the table below.

Var	Description
MA	Holds the 4 digit token representing the agent pool to be considered for agent selection.
MB	This is a flag that Mattersight will set to signify when a valid route response was provided.
MC	Variable will store the original VDN extension captured with the MD variable. The <i>Length</i> should be changed to match the number of digits in the VDN extensions.
MD	Used to capture the active VDN for the current vector

The vector variables listed and their starting positions and lengths are dependent on the configuration of a customer's environment. If the digit buffer is allocated to other applications and is not available to use the UUI variable can be used instead. When the digit buffer is used the MA and MB variables will not be created and will not be used in the vector logic. Below is example of variables used during compliance test:

change variables		VARIABLES FOR VECTORS					Page 19 of 39
Var	Description	Type	Scope	Length	Start	Assignment	VAC
LM							
LN							
LO							
LP							
LQ							
LR							
LS							
LT							
LU							
LV							
LW							
LX							
LY							
LZ							
MA	PBR Token	asaiuui	L	4	30		
MB	PBR Route Flag	asaiuui	L	1	34		
MC	PBR Original VDN	collect	P	5	1		
MD	Active VDN	vdn	L			active	

## 5.5. Administer VDNs

Administer a set of vectors and VDN for routing of calls. The number of VDNs and vectors, and the detailed vector steps may vary based on customer needs. In the compliance testing, two VDNs were created.

VDN	Purpose
56001	Contact Center number on Communication Manager
56012	Used by Coverage Path to send call back to queue

### 5.5.1. Communication Manager Contact Center VDN

Add a VDN using the “add vdn n” command, where “n” is an available extension, below is example of existing VDN used in Communication Manager, in this case “56001”.

- **Name:** A descriptive name.
- **Destination:** “Vector Number” along with the vector number created in Section 5.6.1.
- **COR:** Ensure to use the COR 2 created in Section 5.77

```
display vdn 56001                                     Page 1 of 3
                                         VECTOR DIRECTORY NUMBER
                                         Extension: 56001
                                         Name*: Basic
                                         Destination: Vector Number      1
Attendant Vectoring? n
Meet-me Conferencing? n
Allow VDN Override? n
                                         COR: 2
                                         TN*: 1
                                         Measured: internal Report Adjunct Calls as ACD*? n
Acceptable Service Level (sec): 20
VDN of Origin Annc. Extension*:
    1st Skill*: 1
    2nd Skill*:
    3rd Skill*:
* Follows VDN Override Rules
```

A VDN variable is added to the configuration of all in-scope VDNs. This variable will hold the Mattersight PBR token which is a 4 digit value that will be assigned to the digits (CED) value in the vector steps. Mattersight can also leverage the UUI variable assuming there is sufficient room available within the UUI value. The token represents a mapping between the VDN and the skills serviced by that VDN to create a single logical agent pool for agent selection.

Each VDN will have one or more unique tokens determined by how the skills are queued within the vector. Mattersight will dictate this value.

```
display vdn 56001                                     Page 3 of 3
                                         VECTOR DIRECTORY NUMBER
                                         VDN VARIABLES*
Var  Description      Assignment
V1   PBR.Token        1001
V2
V3
V4
V5
V6
V7
V8
V9
VDN Time-Zone Offset*: + 00:00
Daylight Saving Rule*: system
Use VDN Time Zone For Holiday Vectoring*? n
Apply Ringback for Auto Answer calls*? y
* Follows VDN Override Rules
```

### 5.5.2. Coverage Path VDN to Mattersight

The new Coverage Path VDN is called by the newly created Coverage Path. The VDN is linked to the new Coverage Path vector (created in next Section 5.6.2) which routes the call to the appropriate VDN. Create a new VDN matching the one outlined below substituting in the following values:

- **Extension:** Enter any available Extension.
- **Name:** A descriptive name.
- **Destination:** Vector Number enter vector number created in Section 5.6.2.
- **Allow VDN Override?** y
- **COR:** enter preferred value.
- **TN:** preferred value.
- **Measured:** enter “external”.

```
display vdn 56012                                     Page 1 of 3
                                         VECTOR DIRECTORY NUMBER
                                         Extension: 56012
                                         Name*: MATR Coverage
                                         Destination: Vector Number 11
Attendant Vectoring? n
Meet-me Conferencing? n
Allow VDN Override? y
COR: 1
TN*: 1
Measured: external      Report Adjunct Calls as ACD*? n
VDN of Origin Annc. Extension*:
1st Skill*:
2nd Skill*:
3rd Skill*:
* Follows VDN Override Rules
```

## 5.6. Administer Vector

Vector	Vector Name	Purpose
1	Basic	Vector used for Communication Manager Contact Center
11	MATR Coverage	Vector for the Coverage Path to PBR
12	MATR Adjunct	To encapsulate the adjunct route command and related logic required to call the PBR adjunct.

### 5.6.1. Communication Manager Contact Center

Modify a vector using the “change vector n” command, where “n” is an available vector number used to support integration of Mattersight’s PBR service. The go-to vector step represents the call to PBR’s Adjunct vector created in **5.6.3**. This step is typically inserted before any queue-to command so Mattersight’s PBR service is called before the customer’s vector queues the call to a skill.

display vector 1	CALL VECTOR	Page 1 of 6
Number: 1	Name: Basic	
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 wait-time	3 secs hearing ringback	
02 announcement	56002	
03 #	Mattersight bypass if coverage	
04 goto step	7 if MC	<> none
05 #	Mattersight Adjunct Vector	
06 goto vector	12 @step 1 if unconditionally	
07 queue-to	skill 1 pri h	
08 announcement	56002	
09 goto step	8 if unconditionally	
10 stop		
11		
12		

## 5.6.2. Coverage Vector

Coverage vector for Coverage VDN created in Section 5.5.2.

display vector 11	CALL VECTOR	Page 1 of 6
Number: 11	Name: MATR Coverage	
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 #	Main Coverage VDN	
02 wait-time	0 secs hearing silence	
03 #	Route to original VDN	
04 route-to	number MC	with cov n if unconditionally
05 #	If no VDN Var go direct to queue vector	
06 goto vector	1 @step 1 if unconditionally	

## 5.6.3. Adjunct Vector

Create one new vector to encapsulate the adjunct route command, in this case it is 12, and related logic required to call the PBR adjunct. The new vector is setup to call the PBR 2 times in succession if necessary. The vector is structured this way to cover the rare use case where there is an error when the first route attempt is made. When this occurs, the PBR service will be called again so the call can be properly routed to another agent.

Creating this vector as displayed below:

display vector 12	CALL VECTOR	Page 1 of 6
Number: 12	Name: MATR Adjunct	
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 #	Mattersight Adjunct Call	
02 #	Capture active VDN extension	
03 set	MC = MD	ADD none
04 #	Set Digits buffer to PBR.Token	
05 set	digits = V1	ADD none
06 adjunct	routing link 1	
07 wait-time	5 secs hearing silence	
08 adjunct	routing link 1	
09 wait-time	5 secs hearing silence	
10 return		

## 5.7. Administer COR

Update or create COR, example 2, with **Direct Agent Calling** setting set to “y” as display below. This COR 2 are used in VDN and Stations as displayed in Section 5.5.1 and 5.9.

Note: Do not enable Direct Agent Calling on the COR used for agents.

display cor 2	Page 1 of 23
CLASS OF RESTRICTION	
COR Number: 2	
COR Description: Mattersight DA	
FRL: 1	APLT? y
Can Be Service Observed? y	Calling Party Restriction: none
Can Be A Service Observer? y	Called Party Restriction: none
Time of Day Chart: 1	Forced Entry of Account Codes? n
Priority Queuing? n	<b>Direct Agent Calling? y</b>
Restriction Override: all	Facility Access Trunk Test? n
Restricted Call List? n	Can Change Coverage? n
Access to MCT? y	Fully Restricted Service? n
Group II Category For MFC: 7	Hear VDN of Origin Annc.? n
Send ANI for MFE? n	Add/Remove Agent Skills? n
MF ANI Prefix:	Automatic Charge Display? n
Hear System Music on Hold? y	PASTE (Display PBX Data on Phone)? n
Can Be Picked Up By Directed Call Pickup? y	Can Use Directed Call Pickup? y
	Group Controlled Restriction: inactive

## 5.8. Coverage Path

The new Coverage Path defines where to send a call when it is sent to an agent's station and the agent is already handling a call.

Create a new Coverage Path matching the one outlined below substituting in the following values:

- **Coverage Path Number:** enter any available number, example: 5.
- **Cvg Enabled for VDN Route-To Party?:** n
- **Hunt after Coverage?:** n
- **Coverage Criteria:** set to "n" except those listed below:
  - Set Outside Call Active?: "y"
  - Set Outside Call Busy?: "y"
  - Set Outside Call Don't Answer?: "y", Number of Rings 3
- **Terminate to Coverage Pts. with Bridged Appearances?:** n
- **Coverage Point1:** Use the extension assigned to the Coverage Path VDN created in Section 5.5.2, example 56012.

Leave all other Coverage Points blank as default.

```
display coverage path 5
```

### COVERAGE PATH

```
      Coverage Path Number: 5
Cvg Enabled for VDN Route-To Party? n      Hunt after Coverage? n
      Next Path Number:                    Linkage
```

### COVERAGE CRITERIA

Station/Group Status	Inside Call	Outside Call	
Active?	n	Y	
Busy?	n	Y	
Don't Answer?	n	Y	Number of Rings: 3
All?	n	n	
DND/SAC/Goto Cover?	n	n	
Holiday Coverage?	n	n	

### COVERAGE POINTS

```
      Terminate to Coverage Pts. with Bridged Appearances? n
Point1: v56012      Rng: 1      Point2:
Point3:              Point4:
Point5:              Point6:
```

Command:



## 5.9. Administer Agent's Station

In Station page, modify **Coverage Path 1** to coverage path created in **Section 5.8** as displayed, and **COR** to the COR created in **Section 5.77**.

display station 56106		Page 1 of 4
STATION		
Extension: 56106	Lock Messages? n	BCC: 0
Type: 1608	Security Code: *	TN: 1
Port: S00095	<b>Coverage Path 1: 5</b>	<b>COR: 2</b>
Name: 1608Station	Coverage Path 2:	COS: 1
	Hunt-to Station:	Tests? y
STATION OPTIONS		
Time of Day Lock Table:		
Loss Group: 19	Personalized Ringing Pattern: 1	
	Message Lamp Ext: 56106	
Speakerphone: 2-way	Mute Button Enabled? y	
Display Language: english		
Survivable GK Node Name:		
Survivable COR: internal	Media Complex Ext:	
Survivable Trunk Dest? y	IP SoftPhone? n	
	IP Video? n	
	Short/Prefixed Registration Allowed: default	

## 6. Configure Avaya Aura® Application Enablement Services

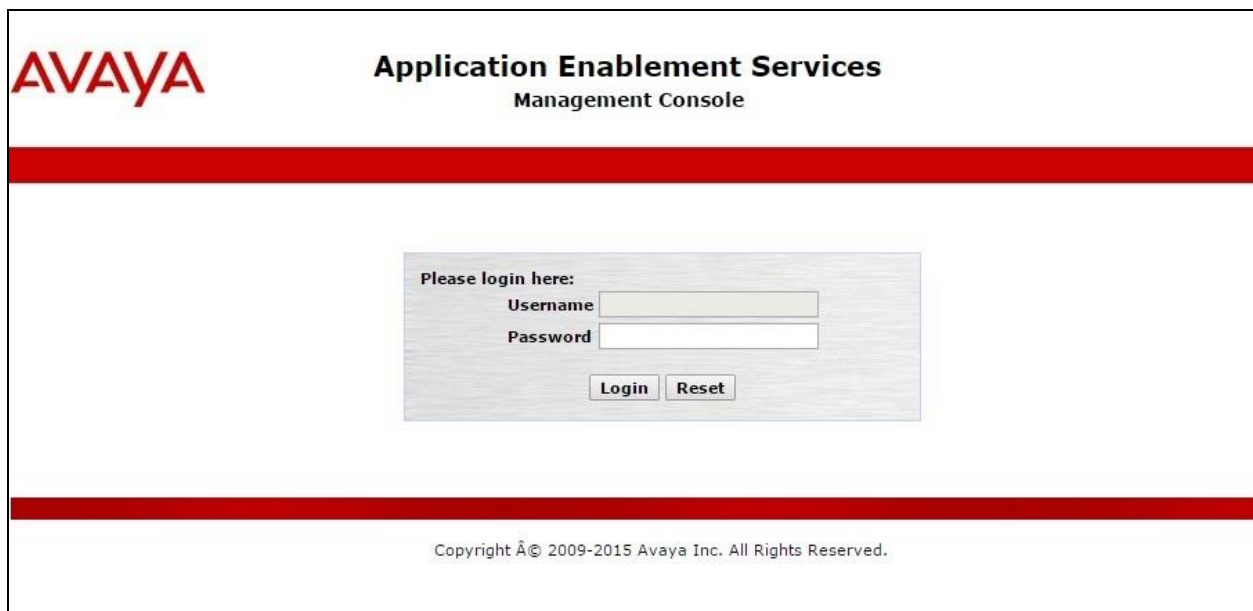
This section provides the procedures for configuring Application Enablement Services. The procedures include the following areas:

- Launch OAM interface
- Verify license
- Administer TSAPI link
- Administer PBR user
- Restart TSAPI service
- 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 a large, bold font, with "Management Console" in a smaller font below it. A thick red horizontal bar spans the width of the page. In the center, there is a light gray rectangular box containing the login form. The form has the text "Please login here:" followed by two input fields: "Username" and "Password". Below these fields are two buttons: "Login" and "Reset". Another thick red horizontal bar is located below the login form. At the bottom of the page, centered, is the copyright notice: "Copyright © 2009-2015 Avaya Inc. All Rights Reserved."

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

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" with login details. A red navigation bar contains "Home", "Help", and "Logout" links. On the left, a sidebar lists various services: AE Services, Communication Manager Interface, High Availability, Licensing, Maintenance, Networking, Security, Status, User Management, Utilities, and Help. The main content area, titled "Welcome to OAM", explains the purpose of the OAM web interface and lists administrative domains: AE Services, Communication Manager Interface, High Availability, Licensing, Maintenance, Networking, Security, Status, User Management, Utilities, and Help. It also notes that these domains can be managed by one administrator or multiple administrators.

Welcome: User cust  
Last login: Mon Aug 14 13:46:36 2017 from 10.98.75  
Number of prior failed login attempts: 0  
HostName/IP: DevvmAES/10.97.224  
Server Offer Type: VIRTUAL\_APPLIANCE\_ON\_VMWARE  
SW Version: 7.1.0.0.17-0  
Server Date and Time: Mon Aug 21 12:27:23 EDT 2017  
HA Status: Not Configured

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.

## 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).

The screenshot displays the Avaya Application Enablement Services Management Console with the "Licensing" section selected. The top header and navigation bar are identical to the previous screenshot. The sidebar now highlights "Licensing" and lists sub-options: WebLM Server Address, WebLM Server Access, and Reserved Licenses. The main content area, titled "Licensing", provides instructions on how to set up and maintain the WebLM, including the need to use the WebLM Server Address, WebLM Server Access, and Reserved Licenses.

Welcome: User  
Last login: Tue Jan 5 09:31:34 2016 from 192.168.200.20  
Number of prior failed login attempts: 0  
HostName/IP: aes7/10.64.101.239  
Server Offer Type: VIRTUAL\_APPLIANCE\_ON\_VMWARE  
SW Version: 7.0.0.0.1.13  
Server Date and Time: Tue Jan 05 09:57:01 EST 2016  
HA Status: Not Configured

Home | Help | Logout

AE Services  
Communication Manager Interface  
High Availability  
Licensing  
WebLM Server Address  
WebLM Server Access  
Reserved Licenses  
Maintenance  
Networking

**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

Select **Licensed products** → **APPL\_ENAB** → **Application\_Enablement** in the left pane, to display the **Application Enablement (CTI)** screen in the right pane.

Verify that there are sufficient licenses for **TSAPI Simultaneous Users** and **AES Advanced**, as shown below.

APPL_ENAB	License installed on: May 19, 2017 8:11:40 PM +00:00		
▼ Application_Enablement			
View license capacity	License File Host IDs: VB-2F-D8-98-35-4B-01		
View peak usage			
CCTR	Licensed Features		
►ContactCenter			
CE	10 Items  Show All <input type="button" value="v"/>		
►COLLABORATION_ENVIRONMENT			
COMMUNICATION_MANAGER			
►Call_Center			
►Communication_Manager			
Configure Centralized Licensing			
MESSAGING			
►Messaging			
MSR			
►Media_Server			
SYSTEM_MANAGER			
	Feature (License Keyword)	Expiration date	Licensed capacity
	Unified CC API Desktop Edition VALUE_AES_AEC_UNIFIED_CC_DESKTOP	permanent	1000
	CVLAN ASAI VALUE_AES_CVLAN_ASAI	permanent	16
	Device Media and Call Control VALUE_AES_DMCC_DMC	permanent	1000
	AES ADVANCED SMALL SWITCH VALUE_AES_AEC_SMALL_ADVANCED	permanent	3
	DLG VALUE_AES_DLG	permanent	16
	TSAPI Simultaneous Users VALUE_AES_TSAPI_USERS	permanent	1000

### 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 screenshot shows 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 the user. The left navigation pane shows "AE Services" expanded, with "TSAPI" selected, and "TSAPI Links" highlighted. The main content area displays the "TSAPI Links" screen, which includes a table with columns: Link, Switch Connection, Switch CTI Link #, ASAI Link Version, and Security. Below the table are buttons for "Add Link", "Edit Link", and "Delete Link".

Link	Switch Connection	Switch CTI Link #	ASAI Link Version	Security
------	-------------------	-------------------	-------------------	----------

[Add Link](#) [Edit Link](#) [Delete Link](#)

The **Add TSAPI Links** screen is displayed next (not show). Below is example of existing CTI used during compliance test. 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 “devvmcm” is selected. For **Switch CTI Link Number**, select the CTI link number from **Section 5.2**. Retain the default values in the remaining fields.

The screenshot shows the Avaya Application Enablement Services Management Console, specifically the "Edit TSAPI Links" screen. The left navigation pane shows "AE Services" expanded, with "TSAPI" selected, and "TSAPI Links" highlighted. The main content area displays the "Edit TSAPI Links" form, which includes fields for Link, Switch Connection, Switch CTI Link Number, ASAI Link Version, and Security. The "Switch Connection" field is set to "devvmcm", "Switch CTI Link Number" is set to "1", "ASAI Link Version" is set to "5", and "Security" is set to "Unencrypted". Below the form are buttons for "Apply Changes", "Cancel Changes", and "Advanced Settings".

Link	1
Switch Connection	devvmcm
Switch CTI Link Number	1
ASAI Link Version	5
Security	Unencrypted

[Apply Changes](#) [Cancel Changes](#) [Advanced Settings](#)

## 6.4. Administer PBR 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.

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' with login details. A red navigation bar contains 'User Management | User Admin | List All Users' and links for 'Home | Help | Logout'. The left sidebar lists various services, with 'User Management' expanded to show 'User Admin' options: 'Add User', 'Change User Password', 'List All Users' (highlighted), 'Modify Default Users', and 'Search Users'. The main content area is titled 'Edit User' and contains a form with the following fields: '\* User Id' (text box with 'mattersight'), '\* Common Name' (text box with 'mattersight'), '\* Surname' (text box with 'mattersight'), 'User Password' (text box), 'Confirm Password' (text box), 'Admin Note' (text box), 'Avaya Role' (dropdown menu with 'None' selected), 'Business Category' (text box), 'Car License' (text box), 'CM Home' (text box), 'Css Home' (text box), 'CT User' (dropdown menu with 'Yes' selected), and 'Department Number' (text box).

## 6.5. Administer PBR User access

It is recommended to setup the Mattersight TSAPI user created in **Section 6.4** with unrestricted access so that customers don't have to give access to each configuration element in the Avaya CM in the AES Security Database.

Select **Security** → **Security Database** → **CTI Users** → **List All Users** from the left pane, to display the list of AES CTI users.

Security | Security Database | CTI Users | List All Users Home | Help | Logout

CTI Users

User ID	Common Name	Worktop Name	Device ID
<input checked="" type="radio"/> mattersight	mattersight	NONE	NONE
<input type="radio"/> Taske	Taske	NONE	NONE

Locate the user created in **Section 6.4** and click on Edit. Click the **Unrestricted Access** checkbox and click on **Apply Changes**.

**Edit CTI User**

User Profile: User ID: mattersight  
Common Name: mattersight  
Worktop Name: NONE ▾  
Unrestricted Access: ☒


Call and Device Control: Call Origination/Termination and Device Status: None ▾

Call and Device Monitoring: Device Monitoring: None ▾  
Calls On A Device Monitoring: None ▾  
Call Monitoring: ☐

Routing Control: Allow Routing on Listed Devices: None ▾

## 6.6. Restart TSAPI Service

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

Welcome: User cust  
Last login: Mon Aug 21 12:26:38 2017 from 10.98.75  
Number of prior failed login attempts: 0  
HostName/IP: DevvmAES/10.97.224  
Server Offer Type: VIRTUAL\_APPLIANCE\_ON\_VMWARE  
SW Version: 7.1.0.0.17-0  
Server Date and Time: Mon Aug 21 13:01:53 EDT 2017  
HA Status: Not Configured

Maintenance | Service ControllerHome | Help | Logout

▶ AE Services

▶ Communication Manager Interface

High Availability

▶ Licensing

▼ Maintenance

Date Time/NTP Server

▶ Security Database

Service Controller

▶ Server Data

▶ Networking

▶ Security

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](#)

StartStopRestart ServiceRestart AE ServerRestart LinuxRestart Web Server



## 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 PBR.

In this case, the associated Tlink name is “AVAYA#DEVVMCM#CSTA#DEVAES”. Note the use of the switch connection “DEVVMCM” from **Section 6.3** as part of the Tlink name.

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" with login details. A red navigation bar contains "Security | Security Database | Tlinks" and links for "Home | Help | Logout". The left sidebar shows a tree view with categories like AE Services, Communication Manager, and Security. Under Security, the Security Database is expanded, showing sub-items like Control, CTI Users, and Tlinks. The main content area, titled "Tlinks", shows a list of Tlink names with radio buttons. The first option, "AVAYA#DEVVMCM#CSTA#DEVVMAES", is selected. A "Delete Tlink" button is also present.

Welcome: User cust  
Last login: Mon Aug 21 12:26:38 2017 from 10.98.75  
Number of prior failed login attempts: 0  
HostName/IP: DevvmAES/10.97.224  
Server Offer Type: VIRTUAL\_APPLIANCE\_ON\_VMWARE  
SW Version: 7.1.0.0.17-0  
Server Date and Time: Mon Aug 21 13:03:55 EDT 2017  
HA Status: Not Configured

**AVAYA** Application Enablement Services Management Console

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  
Tlink Groups  
Worktops

**Tlinks**

Tlink Name

☒ AVAYA#DEVVMCM#CSTA#DEVVMAES  
☐ AVAYA#DEVVMCM#CSTA-S#DEVVMAES

Delete Tlink

## 7. Configure PBR

This section provides the procedures for configuring the PBR server. The procedures include the following areas:

- Administer TSLIB
- Administer WorkerSetting.config
- Start services

The configuration of PBR server is performed by Mattersight technicians. The procedural steps are presented in these Application Notes for informational purposes.

### 7.1. Administer TSLIB

In TSLIB, enter IP address of Avaya Applicable Enablement Server

## 7.2. Administer WorkerSettings.config

In WorkerSettings.config file enter Avaya Enablement Server information as display below:

- **Server ID:** enter Avaya Enablement Server Tlink as display in **Section 6.7**.

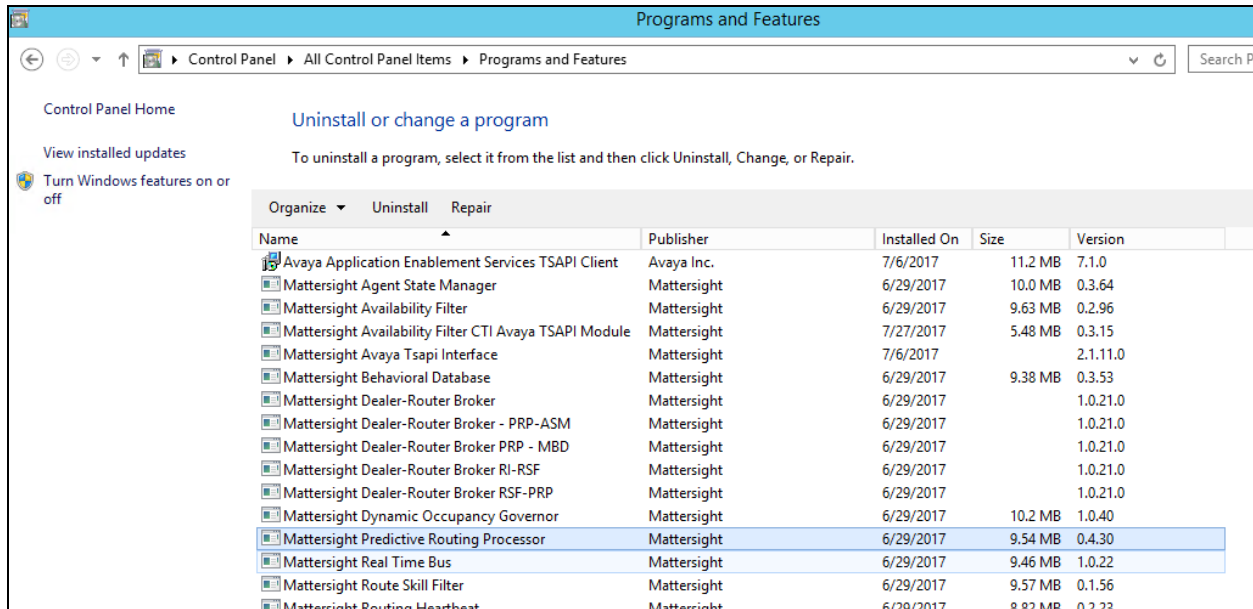
```
<add key="CallCaptureSkillWhiteListPath" value=".\_config\CallCaptureSkillWhiteList.csv"/>
<add key="CallFilter" value="0"/>
<add key="EncryptedPassword" value=""/>
<add key="FeatureFilter" value="0"/>
<add key="LoginId" value="mattersight"/><!--TSAPI_PRC_1-->
<add key="LogUi" value="true"/>
<add key="MaintenanceFilter" value="0"/>
<add key="PassStationFlag" value="true"/>
<add key="Password" value="mattersight"/> <!--TIL: AvayaPRC@2-->
<add key="PrivateFilter" value="0"/>
<add key="PrpDealerEndpoints" value="tcp://127.0.0.1:56016"/>
<add key="PublisherEndpoints" value="tcp://127.0.0.1:56000" />
<add key="RoutingAgentWhiteListPath" value=".\_config\RoutingAgentWhiteList.csv" />
<add key="RoutingSkillWhiteListPath" value=".\_config\RoutingSkillWhiteList.csv" />
<add key="ScreenCaptureAgentWhiteListPath" value=".\_config\ScreenCaptureAgentWhiteList.csv"/>
<add key="ScreenCaptureSkillWhiteListPath" value=".\_config\ScreenCaptureSkillWhiteList.csv"/>
<add key="ServerId" value="AVAYA#DEVVMCM#CSTA#DEVVMAES"/><!--TIL: AVAYA#CM#CSTA#MN2FNCAVA701-->
<add key="SubscriberEndpoints" value="tcp://127.0.0.1:56001" />
<add key="UseAgentSkillQuery" value="false"/>
<add key="UseCallEvents" value="true"/><!--set UseCallEvents to false to poll avaya constantly-->
<add key="UseDACMode" value="false"/>
<add key="UiParsingStrategy" value="default"/>
<add key="MaxStaleAgentStateInSecs" value="240"/>
</workerSettings>
```

- **LoginId:** enter Avaya Enablement Server user as created in **Section 6.4**.
- **Password:** enter Avaya Enablement Server password as created in **Section 6.4**.

```
<add key="CallCaptureSkillWhiteListPath" value=".\_config\CallCaptureSkillWhiteList.csv"/>
<add key="CallFilter" value="0"/>
<add key="EncryptedPassword" value=""/>
<add key="FeatureFilter" value="0"/>
<add key="LoginId" value="mattersight"/><!--TSAPI_PRC_1-->
<add key="LogUi" value="true"/>
<add key="MaintenanceFilter" value="0"/>
<add key="PassStationFlag" value="true"/>
<add key="Password" value="mattersight"/> <!--TIL: AvayaPRC@2-->
<add key="PrivateFilter" value="0"/>
<add key="PrpDealerEndpoints" value="tcp://127.0.0.1:56016"/>
<add key="PublisherEndpoints" value="tcp://127.0.0.1:56000" />
<add key="RoutingAgentWhiteListPath" value=".\_config\RoutingAgentWhiteList.csv" />
<add key="RoutingSkillWhiteListPath" value=".\_config\RoutingSkillWhiteList.csv" />
<add key="ScreenCaptureAgentWhiteListPath" value=".\_config\ScreenCaptureAgentWhiteList.csv"/>
<add key="ScreenCaptureSkillWhiteListPath" value=".\_config\ScreenCaptureSkillWhiteList.csv"/>
<add key="ServerId" value="AVAYA#DEVVMCM#CSTA#DEVVMAES"/><!--TIL: AVAYA#CM#CSTA#MN2FNCAVA701-->
<add key="SubscriberEndpoints" value="tcp://127.0.0.1:56001" />
<add key="UseAgentSkillQuery" value="false"/>
<add key="UseCallEvents" value="true"/><!--set UseCallEvents to false to poll avaya constantly-->
<add key="UseDACMode" value="false"/>
<add key="UiParsingStrategy" value="default"/>
<add key="MaxStaleAgentStateInSecs" value="240"/>
</workerSettings>
```

## 7.3. Start Services

Select **Start → Control Panel → Administrative Tools → Services**, to display the **Services** screen. Navigate to the **Mattersight Avaya TSAPI Interface** entry, right-click on the entry and select **Start**.



## 8. Verification Steps

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

### 8.1. Verify Avaya Aura® Communication Manager


On Communication Manager, verify the status of the administered CTI link by using the “status aesvcs cti-link” command. Verify that the **Service State** is “established” for the CTI link number administered in **Section 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	5	no	DevvmAES	established	61	61

## 8.2. Verify Avaya Aura® Application Enablement Services

On Application Enablement Services, verify 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 monitored VDN and station extensions from **Section 3**.



# Application Enablement Services

## Management Console

Last login: Mon Aug 21 12:57:15 2017 from 10.98.75  
Number of prior failed login attempts: 0  
HostName/IP: DevvmAES/10.97.224  
Server Offer Type: VIRTUAL\_APPLIANCE\_ON\_VMWARE  
SW Version: 7.1.0.0.17-0  
Server Date and Time: Mon Aug 21 13:59:13 EDT 2017  
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

▶ Log Manager

▶ Logs

▼ Status and Control

■ CVLAN Service Summary

■ DLG Services Summary

■ DMCC Service Summary

■ Switch Conn Summary

■ TSAPI Service Summary

### TSAPI Link Details

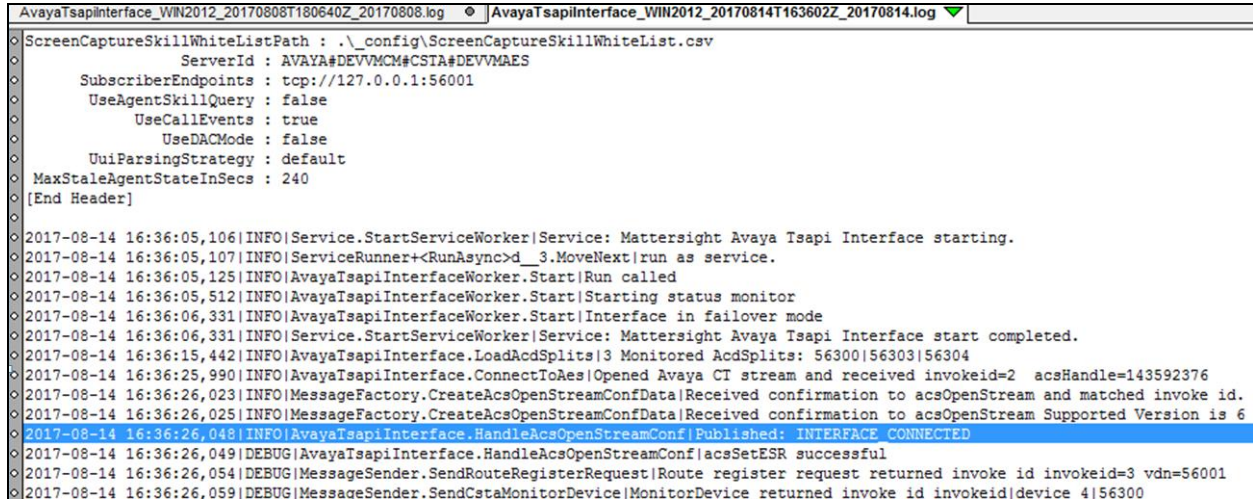
☐ Enable page refresh every 60 seconds

	Link	Switch Name	Switch CTI Link ID	Status	Since	State	Switch Version	Associations	Msgs to Switch	Msgs from Switch	Msgs Period
<input checked="" type="radio"/>	1	devvmcm	1	Talking	Thu Jul 27 15:21:43 2017	Online	17	0	15	15	30

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

### 8.3. Verify PBR

From the PBR server, open log file AvayaTSAPIInterface.log to verify PBR is successfully connected as highlighted in below screenshot.



```
AvayaTsapiInterface_WIN2012_20170808T180640Z_20170808.log  AvayaTsapiInterface_WIN2012_20170814T163602Z_20170814.log
ScreenCaptureSkillWhiteListPath : .\_config\ScreenCaptureSkillWhiteList.csv
ServerId : AVAYA#DEVVMCM#CSTA#DEVVMAES
SubscriberEndpoints : tcp://127.0.0.1:56001
UseAgentSkillQuery : false
UseCallEvents : true
UseDACMode : false
UuiParsingStrategy : default
MaxStaleAgentStateInSecs : 240
[End Header]
2017-08-14 16:36:05,106|INFO|Service.StartServiceWorker|Service: Mattersight Avaya Tsapi Interface starting.
2017-08-14 16:36:05,107|INFO|ServiceRunner+<RunAsync>d__3.MoveNext|run as service.
2017-08-14 16:36:05,125|INFO|AvayaTsapiInterfaceWorker.Start|Run called
2017-08-14 16:36:05,512|INFO|AvayaTsapiInterfaceWorker.Start|Starting status monitor
2017-08-14 16:36:06,331|INFO|AvayaTsapiInterfaceWorker.Start|Interface in failover mode
2017-08-14 16:36:06,331|INFO|Service.StartServiceWorker|Service: Mattersight Avaya Tsapi Interface start completed.
2017-08-14 16:36:15,442|INFO|AvayaTsapiInterface.LoadAcdSplits|3 Monitored AcdSplits: 56300|56303|56304
2017-08-14 16:36:25,990|INFO|AvayaTsapiInterface.ConnectToAes|Opened Avaya CT stream and received invokeid=2 acsHandle=143592376
2017-08-14 16:36:26,023|INFO|MessageFactory.CreateAcsOpenStreamConfData|Received confirmation to acsOpenStream and matched invoke id.
2017-08-14 16:36:26,025|INFO|MessageFactory.CreateAcsOpenStreamConfData|Received confirmation to acsOpenStream Supported Version is 6
2017-08-14 16:36:26,048|INFO|AvayaTsapiInterface.HandleAcsOpenStreamConf|Published: INTERFACE CONNECTED
2017-08-14 16:36:26,049|DEBUG|AvayaTsapiInterface.HandleAcsOpenStreamConf|acsSetESR successful
2017-08-14 16:36:26,054|DEBUG|MessageSender.SendRouteRegisterRequest|Route register request returned invoke id invokeid=3 vdn=56001
2017-08-14 16:36:26,059|DEBUG|MessageSender.SendCstaMonitorDevice|MonitorDevice returned invoke id invokeid=device 4|56300
```

## 9. Conclusion

These Application Notes describe the configuration steps required for Mattersight Predictive Behavioral Routing 4.3 to successfully interoperate with Avaya Aura® Communication Manager 7.1, Avaya Aura® Application Enablement Services 7.1. All feature and serviceability test cases were completed as noted in **Section 2.2**.

## 10. Additional References

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

1. *Administering Avaya Aura® Communication Manager*, Release 7.1, Issue 1, August 2015, available at <http://support.avaya.com>.
2. *Administering and Maintaining Aura® Application Enablement Services*, Release 7.1, Issue 1, August 2015, available at <http://support.avaya.com>.
3. Mattersight Predictive Behavioral Routing document available upon request to Mattersight Support.



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