Application Notes for Configuring Avaya Aura®
Communication Manager R8.1 and Avaya Aura®
Application Enablement Services R8.1 to interoperate with
Red Box Recorder’s Quantify 5B using Single Step
Conference – Issue 1.0

Abstract

These Application Notes describe the configuration steps for Red Box Recorders Quantify 5B solution with Avaya Aura® Communication Manager and Avaya Aura® Application Enablement Services. Red Box Recorder’s Quantify 5B system is a voice recording solution which can be used to record voice streams for Avaya telephony.

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

The purpose of this document is to describe the compliance testing carried out using the Single Step Conference recording method on Red Box Recorder’s Quantify solution with Avaya Aura® Communication Manager and Avaya Aura® Application Enablement Services. It includes a description of the configuration of both the Avaya and the Red Box Recorder’s Quantify solutions, a description of the tests that were performed and a summary of the results of those tests.

Quantify is a voice recording system which can be used to record the voice stream of Avaya telephony endpoints. In this compliance test, it uses Avaya Aura® Communication Manager’s Single Step Conference feature via the Avaya Aura® Application Enablement Services (AES) Device, Media, and Call Control (DMCC) interface to capture the audio and call details for call recording. The application uses the Avaya Aura® Application Enablement Services DMCC service to register virtual extensions that are associated with the extensions to be recorded. When the extension receives an event pertaining to the start of a call, the application opens a conference with the extensions and records the RTP media stream.

The Quantify solution comprises of Red Box Recorder’s Server licensed for Avaya “Active” recording.

2. General Test Approach and Test Results

The test approach was to verify that the calls placed and recorded using the Quantify solution with Avaya solution functioned correctly with good audio quality received. Functionality testing included basic telephony operations such as answer, hold/retrieve, transfer, conference, call pick-up, call park, call forward and calls to/from the PSTN. Tests also included ACD Agent Recording. Serviceability testing were also included where the LAN cables were disconnected to AES, Quantify Server and Media Gateway. All tests were successful.

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 these Application Notes, the interface between Avaya systems and Quantify did not include use of any specific encryption features as requested by Red Box Recorders.

2.1. Interoperability Compliance Testing
The interoperability compliance test included both feature functionality and serviceability testing. The feature functionality testing focused on placing and recording calls in different call scenarios to ensure good quality audio recordings were received. Intra-switch calls were made on the Communication Manager and inbound and outbound calls from/to the PSTN. The serviceability testing focused on verifying the ability of Quantify to recover from disconnection and reconnection of the Avaya solution.

2.2. Test Results
All functionality and serviceability test cases were completed successfully with the following observations.

- When a call is transferred using the consult method the recording contained three calls. Quantify shows the initial call, the consult, and the consult and transferred call. The call containing the consult and transferred call displays as being between the called and transferred party and does not indicate there is a call between the caller and transferred party.
- When an initial caller whether internal or external party calls a recorded station, this station makes a blind conference with an internal station which is also recorded, there is no recording for the conference or after the conference maker drops off. This issue is identified by Red Box Recorders and will be fixed with a patch.

2.3. Support
Technical support can be obtained for Red Box Recorder’s solution as follows:

- Email: support@redboxrecorders.com
- Website: www.redboxrecorders.com
- Phone: +44 (0) 115 9377100
3. Reference Configuration

Figure 1 illustrates the network topology used during compliance testing. The Avaya solution consists of an Avaya Aura® Communication Manager with Avaya G430 Media Gateway as the PBX and Avaya Aura® Application Enablement Services. Avaya Vantage (SIP), 96x1 series IP Deskphones (SIP and H.323), 1600 Series IP Deskphones (H.323), J100 series IP Deskphones (SIP and H.323) and 9400 series Digital Deskphones are connected to the PBX and used in the testing. Avaya one-X® Agent (H.323) is setup as softphone. The Quantify server was used in the compliance test. The Quantify system is installed on a Windows 2016 server.

Figure 1: Avaya Aura® Communication Manager with Avaya Aura® Application Enablement Services Server and Red Box Recorder’s Quantify 5B Configuration
4. Equipment and Software Validated

The following equipment and software were used for the sample configuration as shown in Figure 1.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avaya Aura® System Manager running on a virtual server</td>
<td>System Manager 8.1.1.0</td>
</tr>
<tr>
<td></td>
<td>Build No. – 8.1.0.0.733078</td>
</tr>
<tr>
<td></td>
<td>Software Update Revision No: 8.1.1.0.0.0310503</td>
</tr>
<tr>
<td></td>
<td>Feature Pack 1</td>
</tr>
<tr>
<td>Avaya Aura® Session Manager running on a virtual server</td>
<td>Session Manager R8.1 FP1</td>
</tr>
<tr>
<td></td>
<td>Build No. – 8.1.0.0.810015</td>
</tr>
<tr>
<td>Avaya Aura® Communication Manager running on Virtual Server</td>
<td>R018x.01.0.890.0</td>
</tr>
<tr>
<td></td>
<td>R8.1.0.2.0 – SP2</td>
</tr>
<tr>
<td></td>
<td>Update ID 01.0.890.0-25578</td>
</tr>
<tr>
<td>Avaya Aura® Application Enablement Services running on Virtual Server</td>
<td>R8.1</td>
</tr>
<tr>
<td></td>
<td>Build No – 8.1.0.0.1.9-1</td>
</tr>
<tr>
<td>Avaya G430 Media Gateway</td>
<td>41.10.0 /1</td>
</tr>
<tr>
<td>Avaya Media Server running on a Virtual Server</td>
<td>R8.0.1.121</td>
</tr>
<tr>
<td>Avaya 9608 H323 Deskphone</td>
<td>6.8202</td>
</tr>
<tr>
<td>Avaya 1616 -I H323 Deskphone</td>
<td>1.312</td>
</tr>
<tr>
<td>Avaya J179 H323 Deskphone</td>
<td>6.8202</td>
</tr>
<tr>
<td>Avaya 9641 SIP Deskphone</td>
<td>7.1.6.1.3</td>
</tr>
<tr>
<td>Avaya J129 SIP Deskphone</td>
<td>4.0.2.1.3</td>
</tr>
<tr>
<td>Avaya Vantage Equinox</td>
<td>3.7.0.104</td>
</tr>
<tr>
<td>Avaya 9408 Digital Deskphone</td>
<td>2.0 SP9 (R20)</td>
</tr>
<tr>
<td>Avaya one-X® Agent</td>
<td>R2.5.12</td>
</tr>
<tr>
<td>Red Box Quantify Recording Suite running on Windows 2016</td>
<td>5B Build 39</td>
</tr>
</tbody>
</table>
5. Configure Avaya Aura® Communication Manager

The configuration and verification operations illustrated in this section were all performed using Communication Manager System Administration Terminal (SAT). The information provided in this section describes the configuration of Communication Manager for this solution. For all other provisioning information such as initial installation and configuration, please refer to the product documentation as referenced in Section 10. The configuration operations described in this section can be summarized as follows:

- Verify System Parameters Customer Options
- Configure Virtual Extensions for the Recording Pool
- Configure Interface to AES

5.1. Verify System Parameters Customer Options

Use the `display system-parameters customer-options` command to verify that Communication Manager has permissions for features illustrated in these Application Notes. On Page 4, ensure that `Computer Telephony Adjunct Links?` is set to y as shown below.

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

(NOTE: You must logoff & login to effect the permission changes.)
5.2. Configure virtual stations for the recording pool

Use the `add station` command to configure a station for each of the virtual stations to be used for the recorder channels. Enter in a descriptive Name and Security Code for each one. The Security Code will be referenced by Quantify when setting up the recording extensions. Set the IP Softphone? to y.

```
add station 19901

Extension: 19901
Type: 9640
Port: SD00395
Name: RedBox Virtual #1
PrivateKey Name? n

STATION

Lock Messages? n
BCC: 0
Security Code: *
TN: 1
Coverage Path 1: Coverage Path 2: COR: 1 COS: 1
Name: RedBox Virtual #1
Coverage Path 2: Hunt-to Station: Tests? y
BCC: 0

STATION OPTIONS

Time of Day Lock Table:
Loss Group: 19
Personalized Ringing Pattern: 1
Message Lamp Ext: 19901
Mute Button Enabled? y
Speakerphone: 2-way
Button Modules: 0
Display Language: english

Survivable GK Node Name:
Survivable COR: internal
Survivable Trunk Dest? y
Media Complex Ext:

IP SoftPhone? y

IP Video Softphone? n
Short/Prefixed Registration Allowed: default

Customizable Labels? y
```
5.3. Configure Interface to Avaya Aura® Application Enablement Services

In order for Communication Manager to establish a connection to Application Enablement Services, administer the CTI Link as shown below. Add an available cti-link number which in this case is 3. Specify an available Extension number, set the Type as ADJ-IP, which denotes that this is a link to an IP connected adjunct, and name the link for easy identification.

```
add cti-link 3
CTI Link: 3
Extension: 10093
Type: ADJ-IP
Name: TSAPI Service - AES 8x
Unicode Name? n
```

Obtain the AES server host name from the AES console using the “uname -a” command as below:

```
[cust@aes ~]$ uname -a
Linux aes 3.10.0-1062.1.2.el7.x86_64 #1 SMP Mon Sep 16 14:19:51 EDT 2019 x86_64
x86_64 x86_64 GNU/Linux
[cust@aes ~]$  
```

Configure IP-Services for the AESVCS service using change ip-services command. Using the Local Node name procr which means the server processor interface. Set Enabled to y and leave the Port as default.

```
change ip-services
IP SERVICES
Service       Enabled      Local       Local       Remote       Remote
Type          Node         Port        Node        Port
AESVCS        y            procr      8765         0           FCSGW       5052
CDR1          procr       0           FCSGW       5052
PMS           procr       0           FCSGW       5053
```

Navigate to Page 4, set the AE Services Server which is the AES host name above and the Password the AES Server will use to authenticate with Communication Manager as created in Section 6.2.

```
change ip-services
AE Services Administration
Server ID   AE Services    Password   Enabled   Status
Server      aes            *          y         in use
```

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6. Configuration of Avaya Aura® Application Enablement Services

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

- Verify Licensing
- Create Switch Connection
- Create CTI User
- Enable CTI User
- Configure DMCC Port

6.1. Verify Licensing

Access the Web License Manager used by the Application Enablement Services Server. The Web License Manager screen below is displayed. Select Licensed products → APPL_ENAB → Application_Enablement in the left pane, to display the Licensed Features screen in the right pane. Verify that there are sufficient licenses for Device Media and Call Control, as shown below. If not, consult with your Avaya Account Manager or Business Partner to acquire the proper license for your solution.

![Web License Manager Screen](image)
6.2. Create Switch Connection
Access the OAM web-based interface of the Application Enablement Services Server, using the URL https://<Server_IP>. The Management console is displayed, login using the appropriate credentials.

The Welcome to OAM screen is displayed next.
To establish the connection between Communication Manager and the Application Enablement Services Server, click **Communication Manager Interface → Switch Connections**. In the field next to **Add Connection**, enter **Duplex** and click on **Add Connection** (not shown), the following screen will be displayed.

![Communication Manager Interface | Switch Connections](image)

Complete the configuration as shown and enter the password specified in **Section 5.3** when configuring AESVCS in ip-services. Enter an appropriate **Switch Password**. Click on **Apply**, the screen below will be displayed.

![Communication Manager Interface | Switch Connections](image)

Click on **Edit PE/CLAN IPs** (at the bottom of the last screenshot) in order to specify the IP address of the Communication Manager. Next to **Add Name or IP**, enter the IP address of the Communication Manager and click on **Add Name or IP**.

![Communication Manager Interface | Switch Connections](image)
Click on **Back** and then click on **Edit H.323 Gatekeeper**. Enter the IP address of the Communication Manager and click on **Add Name or IP**.

Select **AE Services** from the left-hand menu and select **DMCC** to verify that the **DMCC Service** is licensed by ensuring that **DMCC Service** is in the list of services and that the **License Mode** is showing **NORMAL MODE**. If not, consult with your Avaya Account Manager or Business Partner to acquire the proper license for your solution.
6.3. Create CTI User

A user ID and password needs to be configured for the Red Box recorder to communicate as a DMCC Client with the Application Enablement Services. Select User Management → User Admin → Add User from the left-hand menu, 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. Click Apply at the bottom of the screen (not shown below).
6.4. Enable CTI User

Navigate to the CTI Users screen by selecting Security → Security Database → CTI Users → List All Users. In the CTI Users window, select the user that was set up in Section 6.3 and select the Edit option.

The Edit CTI User screen appears. Tick the Unrestricted Access box and Apply Changes at the bottom of the screen.
6.5. Configure DMCC Port

On the AES Management Console navigate to **Networking → Ports** to set the DMCC server port. During the compliance test, the **Unencrypted Port** set to **4721** was **Enabled** as shown in the screen below. Click the **Apply Changes** button (not shown) at the bottom of the screen to complete the process.
7. Configuration of Quantify

The Quantify Server is provided pre-installed with Quantify 5B. Administering an IP address on Microsoft Windows is outside of the scope of this document. There are two main components to configure the recording solution as follows.

- Register extensions to Quantify
- Configure Quantify to connect to Application Enablement Services

7.1. Register Extensions to Quantify

Run the CTI Reg Tool, located in C:\LTR\utils on the Red Box Recorder Server, the CTI Reg Tool is used to access the Red Box Recorder server and assign extensions which are to be recorded. Accept the default Recorder IP Address, Recorder Username and Recorder Password and click Connect. Select the radio button Avaya Single Step Conferencing and enter the extension numbers to be recorded in the Extension or Range to register field. Click Register and the devices are registered with the recorder. Select Disconnect button when complete and close down the CTI Registration Tool dialog box.
The web interface is used to configure the extensions. Use http://<server IP> to access the **Recording** screen of the Red Box Recorder. The extensions which were added earlier in this section should appear in the **Recording** screen as shown below.

![Recording Screen](image)

<table>
<thead>
<tr>
<th>Device Text</th>
<th>Channel Name</th>
<th>Recording Enabled</th>
</tr>
</thead>
<tbody>
<tr>
<td>* 10002</td>
<td>10002</td>
<td></td>
</tr>
<tr>
<td>* 10003</td>
<td>10003</td>
<td></td>
</tr>
<tr>
<td>* 10004</td>
<td>10004</td>
<td></td>
</tr>
<tr>
<td>* 10005</td>
<td>10005</td>
<td></td>
</tr>
<tr>
<td>* 10007</td>
<td>10007</td>
<td></td>
</tr>
<tr>
<td>* 10048</td>
<td>10048</td>
<td></td>
</tr>
<tr>
<td>* 10049</td>
<td>10049</td>
<td></td>
</tr>
<tr>
<td>* 10053</td>
<td>10053</td>
<td></td>
</tr>
<tr>
<td>19901</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19902</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19903</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

50 devices enabled for recording.
Tick the checkbox under column **Recording Enabled** to configure these extensions for recording. Select **Update** (not shown) below and the extensions will be enabled for recording.
7.2. Configure Red Box Recorder to connect to the Avaya Aura® Application Enablement Services

Use the config file CTIServer_AvayaActive.config placed in default location of C:\LTR\Config to configure AES to Red Box Recorder solution. Open the file in text editor and enter in the following values. See below sample config file.

- **aesAddress**: Set this to 10.1.10.70 which is the AES IP Address
- **username**: Set this to the CTI username that was set in Section 6.3
- **password**: Set this to the CTI user password set in Section 6.3
- **switchName**: This is the name of the switch connection as set in Section 6.2
- **audioDestinationAddress**: Enter in the IP address that was assigned to the Red Box Recorder

Under <!-- the ssc section is only required if Single Step Conferencing is required-->
- `<ssc stationPassword="******">`: Enter the Virtual Station password set in Section 5.2
- **add start**: Set this to the range of associated extensions

Under <!-- To Add a range of recording devices -->
- `<add start="first Extension" end="last Extension">`: Enter the range of Virtual Extensions added in Section 5.2

```xml
<avaya>
  <dmcc
    useSsl="false"
    aesAddress="10.1.10.70"
    username="Redbox"
    password="Redbox#1"
    dmccPort="4721"
    sessionDuration="180"
    sessionCleanupDelay="60" />

  <device
    switchName="Duplex"
    audioDestinationAddress="10.1.10.125"
    multiRegistrationModeIndependent="true" />

  <!-- ACD monitoring for agent in/out info-->
  <agent
    agentMonitorDevice="10003" />

  <mr stationPassword="111222" />

  <!-- the ssc section is only required if Single Step Conferencing is required-->
  <ssc stationPassword="******">
    <devices>
      <!-- To add a single recording device -->
      <!-- add device="8230001" -->
  ```
Save the file.

Restart the recorder from the web interface, click on **Configuration ➔ Recorder (Maintenance) icon**. Select the **Restart** radio button and click **Stop Recorder** as shown below. The Red Box Recorder will restart and is now configured to the Application Enablement Services.
8. Verification Steps

This section provides the tests that can be performed to verify correct configuration of Avaya and Red Box Recorder solution.

8.1. Verify Avaya Aura® Communication Manager CTI Service State

The following steps can ensure that the communication between Communication Manager and the Application Enablement Services server is functioning correctly. Check the AESVCS link status with Application Enablement Services by using the command `status aesvcs cti-link`. The CTI Link is 3. Verify the Service State of the CTI link is established.

```
status aesvcs cti-link

AE SERVICES CTI LINK STATUS

CTI Link Version Mnt AE Services Service State Msgs Mngs
Busy Server Sent Rcvd

3 10 no aes established 15 15
```

8.2. Verify Avaya Aura® Application Enablement Services DMCC 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 DMCC service by selecting Status → Status and Control → DMCC Service Summary. The DMCC Service Summary – Session Summary screen is displayed as shown below. The Application is set to Red Box Recorder and the Far-end Identifier is given as the IP address of the Quantify server.
8.3. Verify Quantify Configuration

The following steps can be performed to verify the basic operation of the system components. Click on Configuration → Recorder Status (Status) icon. The Recorder Status page of the Quantify Recorder will show any alarms running. Note Calls Being Recorded will show number of calls currently being recorded. This page loads once logged into the recorder. See below screenshot.

Choose the Version Information icon on the recorder screen to check the version numbers of the recorder to ensure that the version is as expected.
9. Conclusion
These Application Notes describe the configuration steps required for the Red Box Recorder’s Quantify 5B to successfully interoperate with Avaya Aura® Communication Manager and Avaya Aura® Application Enablement Services. All functionality and serviceability test cases were completed successfully with observations shown in Section 2.2.

10. Additional References
Product documentation for Avaya products may be found at http://support.avaya.com

Product documentation for Red Box Recorder can be found at http://www.redboxrecorders.com