



## Avaya Solution & Interoperability Test Lab

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# **Application Notes for LumenVox Automated Speech Recognizer, LumenVox Text-to-Speech Server and Call Progress Analysis with Avaya Aura® Experience Portal – Issue 1.0**

## **Abstract**

These Application Notes describe the configuration steps required to integrate LumenVox Automated Speech Recognizer, Text-to-Speech Server and Call Progress Analysis with Avaya Aura® Experience Portal.

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 objective of compliance test was to validate interoperability of LumenVox Automated Speech Recognizer, Text-to-Speech Server and Call Progress Analysis with Avaya Aura® Experience Portal.

LumenVox provides a complete set of speech recognition and text-to-speech technologies for use in interactive voice response (IVR) applications. The product set includes the LumenVox Automatic Speech Recognizer (ASR) and Text-to-Speech (TTS) Server. Both products are used in conjunction with the LumenVox Media Server which provides an interface to Avaya Aura® Experience Portal using the Media Resource Control Protocol (MRCP). LumenVox Call Progress Analysis (CPA) solution leverages the strength of LumenVox Automated Speech Recognizer (ASR) by constantly listening for various tones, just as it would when performing speech recognition. These are compared to special acoustic models for matches, similar to our ASR's function. The result is more reliable and highly accurate message delivery.

## 2. General Test Approach and Test Results

General test approach was to test various VoiceXML scripts that exercise various types of grammars in LumenVox ASR and TTS. A predefined set of VoiceXML scripts tested built-in grammars, menu grammars and SRGS grammars. Also, to test several call scenarios that would test the capabilities of LumenVox CPA.

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 tests. Feature tests focused on the ability of LumenVox ASR and TTS to successfully exercise appropriate grammar and return expected results. Additionally, feature tests for CPA focused on the ability of LumenVox CPA to detect tones for Voicemail or Answering Machine and Human Voice.

Serviceability testing focused on verifying the ability of LumenVox ASR and TTS server to recover from adverse conditions, such as restart, power failures and network disconnects.

### 2.2. Test Results

All test cases were passed.

## 2.3. Support

To obtain technical support for LumenVox:

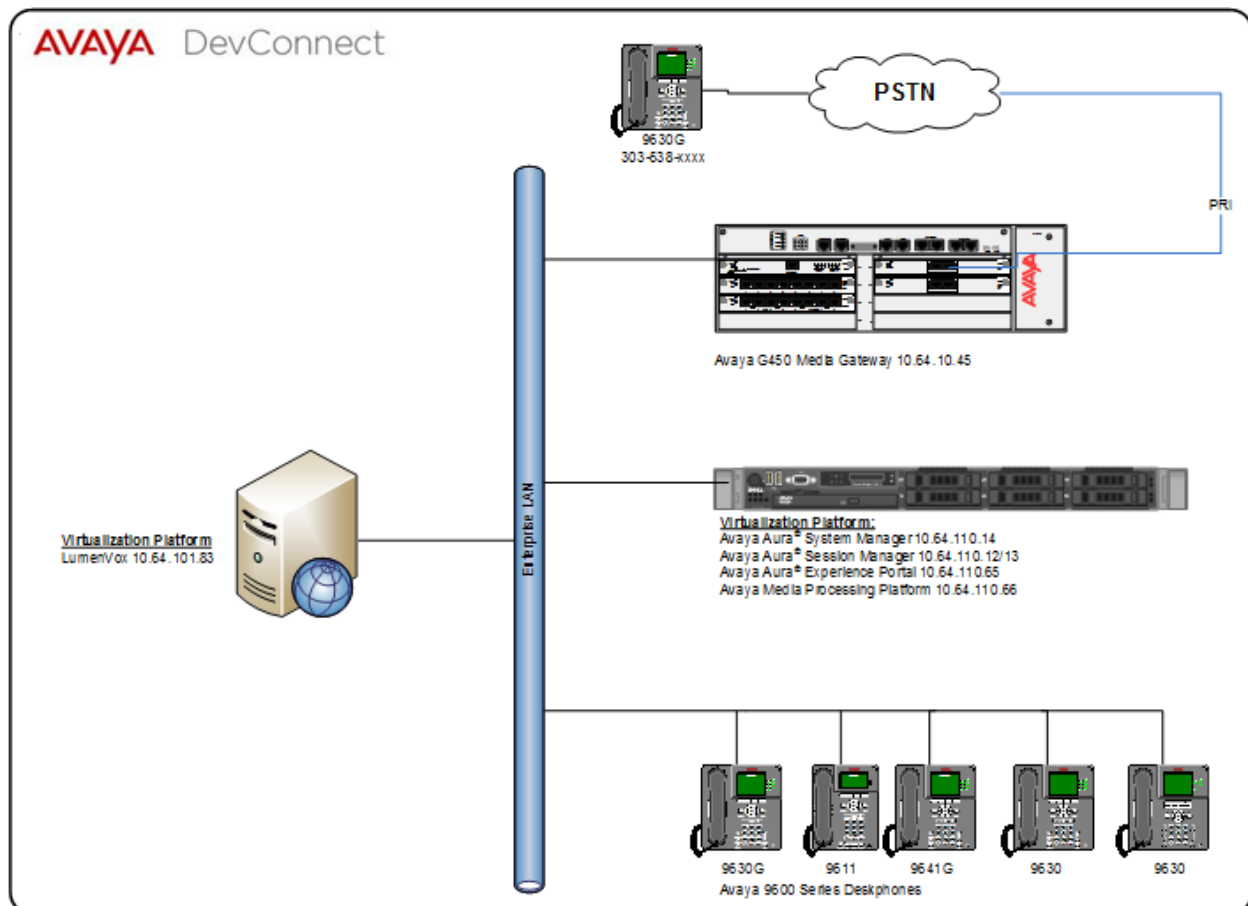
- **Web:** [www.lumenvox.com/help/](http://www.lumenvox.com/help/)
- **Email:** support@lumenvox.com
- **Phone:** (858)707-7700 ask for “Support”

## 3. Reference Configuration

Following diagram shows the configuration used during interoperability compliance test.

Reference configuration consisted of:

- Avaya Aura® Experience Portal
- Avaya Aura® Communication Manager
- Avaya Aura® Session Manager
- Avaya Aura® System Manager
- Avaya G450 Media Gateway
- Avaya 9600 Series IP Deskphones
- LumenVox



**Figure 1: Reference Configuration**

### 3.1. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya Aura® Experience Portal	7.2.1.0.0605
Avaya G450 Media Gateway	37.19.0
Avaya Aura® Communication Manager	7.1.2.0.0.532.24184
Avaya 9600 Series IP Deskphones	Various
Avaya Aura® Session Manager	7.1.2
Avaya Aura® System Manager	7.1.2
LumenVox	16.0.100

## 4. Configure Avaya Aura® Experience Portal

Configuration and verification for Experience Portal illustrated in this section were all performed using either the Experience Portal Manager (EPM) or SSH connection to the Experience Portal server. It is implied a working system is already in place, including Media Processing Platform (MPP), Apache Tomcat Application Server and SIP routing via Session Manager. Installation of Voice XML applications is also out with the scope of this document. For all other provisioning information such as initial installation and configuration, please refer to the product documentation in **Section 8**. The configuration described in this section can be summarized as follows:

- Update languages property files to allow LumenVox speech server type.
- Add LumenVox Speech servers

### 4.1. Update Language properties

LumenVox does not appear in the drop down list of ASR/TTS server types when using Experience Portal 7.2.1, so at this time 2 files need to be updated on the Experience portal server. First, the updated files must be obtained from LumenVox or downloaded via LumenVox Knowledge base website, article number AA-02166.

Please note that the following steps have to be done with root level privileges.

- Copy the new language files on to the Experience Portal server, the files will be named:
  - languages.properties\_lib
  - languages.properties\_webapps
- Log in to Experience portal via SSH.
- Switch user to a privileged administrator account with permissions to make these changes.
- Use **cd \$CATALINA\_HOME/lib/config**
  - Default EPM Tomcat Directory is /opt/tomcat/tomcat
- Rename the current languages.properties (e.g. **mv languages.properties languages.orig**) and copy languages.properties\_lib to this directory, renaming it as languages.properties (e.g. **mv <\_lib file location>languages.properties\_lib languages.properties**).
- Use **chown avayavp languages.properties** to set the correct owner for this file.
- Use **chmod 750 languages.properties** to set the correct permissions.
- Use **cd \$CATALINA\_HOME/webapps/VoicePortal/WEB-INF/classes/messages/**
- Rename the current languages.properties (e.g. **mv languages.properties languages.orig**) and copy languages.properties\_webapps to this directory renaming it as languages.properties (e.g. **mv <\_lib file location>languages.properties\_lib languages.properties**).
- Use **chown avayavp languages.properties** to set the correct owner for this file.
- Use **chmod 750 languages.properties** to set the correct permissions.

Tomcat must now be restarted.

- Use **cd \$CATALINA\_HOME/bin**
  - **./shutdown.sh**
- Wait for this to complete.

- `./startup.sh`

## 4.2. Add Speech Servers

Avaya Aura® Experience Portal is configured via the Experience Portal Manager (EPM) web interface. To access the web interface, enter `https://<ip-addr>/` as the URL in a web browser, where `<ip-addr>` is the IP address of EPM. Log in using the appropriate credentials.

On the left pane, click on **Speech Servers**.

**AVAYA** Welcome, epadr  
Last logged in May 2, 2018 at 2:06:04 PM

**Avaya Aura® Experience Portal 7.2.1 (ExperiencePortal)** Home Help Log

Expand All | Collapse All

**▼ User Management**  
Roles  
Users  
Login Options

**▼ Real-time Monitoring**  
System Monitor  
Active Calls  
Port Distribution

**▼ System Maintenance**  
Audit Log Viewer  
Trace Viewer  
Log Viewer  
Alarm Manager

**▼ System Management**  
EPM Manager  
MPP Manager  
Software Upgrade  
System Backup

**▼ System Configuration**  
Applications  
EPM Servers  
MPP Servers  
SNMP  
Speech Servers  
VoIP Connections  
Zones

**▼ Security**  
Certificates  
Licensing

**▼ Reports**  
Standard  
Custom  
Scheduled

**▼ Multi-Media Configuration**  
Email  
HTML  
SMS

You are here: Home

### Avaya Aura® Experience Portal Manager

Avaya Aura® Experience Portal Manager (EPM) is the consolidated web-based application for administering Experience Portal. Through the EPM interface you can configure Experience Portal, check the status of an Experience Portal component, and generate reports related to system operation.

### Installed Components

**Media Processing Platform**  
Media Processing Platform (MPP) is an Avaya media processing server. When an MPP receives a call from a PBX, it invokes (or CCXML) application on an application server. It then communicates with ASR and TTS servers as necessary to process the call.

**Email Service**  
Email Service is an Experience Portal feature which provides e-mail capabilities.

**HTML Service**  
HTML Service is an Experience Portal feature which supports web applications with HTML5 capabilities. It includes support for mobile devices.

**SMS Service**  
SMS Service is an Experience Portal feature which provides SMS capabilities.

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REVISED: May 1, 2017

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## 4.2.1. ASR Server

To add an **ASR** server, click on the **ASR** tab, and click **Add**.

- Type in a **Name**.
- Set **Enable** to **Yes**.
- Set **Engine Type** to **LumenVox**.
- Type in the IP address of LumenVox Automated Speech Recognizer in **Network Address**.
- Type in appropriate value in **Total Number of Licensed ASR Resources**.
- Set **New Connection per Session** to **Yes**.
- Set **Languages** to **en-US**.
- Set **Protocol** to **MRCP V2**.
- Set **Listener Port** to **5060**.
- Click **Save** to save changes.

Note that the screen capture below displays the configuration during compliance testing.

**AVAYA** Welcome  
Last logged in May 2, 2018 at 2

**Avaya Aura® Experience Portal 7.2.1 (ExperiencePortal)** Home Help

Expand All | Collapse All

You are here: [Home](#) > [System Configuration](#) > [Speech Servers](#) > [Change ASR Server](#)

### Change ASR Server

Use this page to change the configuration of an ASR server.

Name: LVASR

Enable: ☒ Yes ☐ No

Engine Type: LumenVox

Network Address: 10.64.101.83

Base Port: 5060

Total Number of Licensed ASR Resources: 10

New Connection per Session: ☒ Yes ☐ No

**Languages**

en-AU  
**en-GB**  
en-IN  
es-CO  
es-MX  
pt-BR  
Canadian French fr-CA  
Standard German de-DE

**Selected Languages**

en-US

**MRCP**

Ping Interval: 15 seconds

Response Timeout: 4 seconds

Protocol: MRCP V2

Enable Session XML: ☐ Yes ☒ No

Transport Protocol: TCP

Listener Port: 5060

**Save Apply Cancel Help**

## 4.2.2. TTS Server

To add a TTS server, click on the TTS tab on **Speech Servers** page, and click **Add**.

- Type in a **Name**.
- Set **Enable** to **Yes**.
- Set **Engine Type** to **LumenVox**.
- Type in the IP address of LumenVox Text-to-Speech in **Network Address**.
- Type in appropriate value in **Total Number of Licensed TTS Resources**.
- Set **New Connection per Session** to **Yes**.
- Set **Voices** to **en-US Chris M**.
- Set **Protocol** to **MRCP V2**.
- Set **Listener Port** to **5060**.
- Click **Save** to save changes.

Note that the screen capture below displays the configuration during compliance testing.

**AVAYA** Welcome  
Last logged in May 2, 2018 at 2:0

**Avaya Aura® Experience Portal 7.2.1 (ExperiencePortal)** Home Help

Expand All | Collapse All

You are here: [Home](#) > [System Configuration](#) > [Speech Servers](#) > [Change TTS Server](#)

### Change TTS Server

Use this page to change the configuration of a TTS server.

Name: LVTTTS

Enable: ☒ Yes ☐ No

Engine Type: LumenVox

Network Address: 10.64.101.83

Base Port: 5060

Total Number of Licensed TTS Resources: 10

New Connection per Session: ☒ Yes ☐ No

**Voices**

- cy-GB Gavin M
- cy-GB Gwendolyn F
- da-DK Helsa F
- da-DK Mikkel M
- en-AU Ian M
- en-AU Molly F
- en-GB Ben M
- en-GB Chloe F
- en-GB Gavin M
- en-GB Gwendolyn F

**Selected Voices**

- en-US Chris M

**MRCP**

Ping Interval: 15 seconds

Response Timeout: 4 seconds

Protocol: MRCP V2

Enable Session XML: ☐ Yes ☒ No

Transport Protocol: TCP

Listener Port: 5060

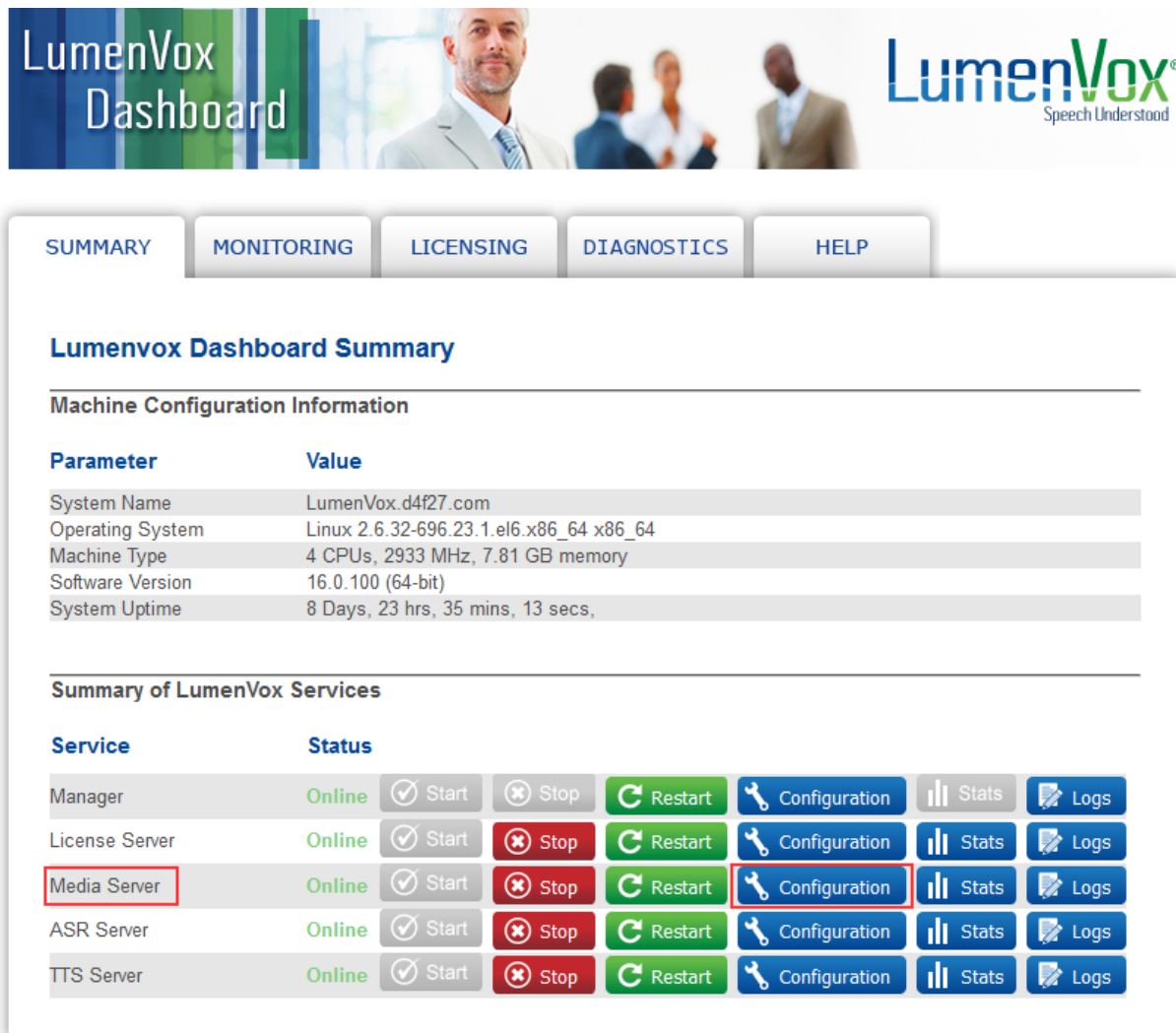
**Save Apply Cancel Help**



## 5. Configure LumenVox

LumenVox is configured via the LumenVox Dashboard web interface. To access the LumenVox Dashboard, enter `https://<ip-addr>:8080` as the URL in a web browser, where `<ip-addr>` is the IP address of the LumenVox server.

Configure the **MRCP\_SERVER\_IP** to the IP Address of the server running the LumenVox Media Server; it should NOT be left as the default 127.0.0.1. This is configured by selecting the **Configuration** button for **Media Server Service**.



**Lumenvox Dashboard Summary**

**Machine Configuration Information**

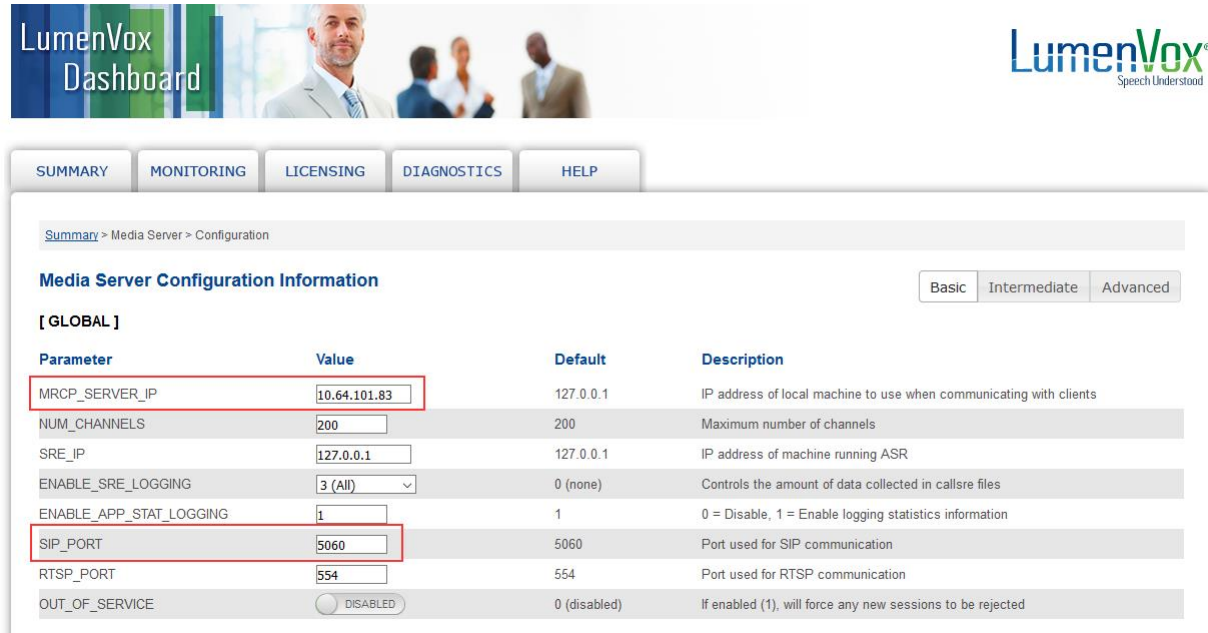
Parameter	Value
System Name	LumenVox.d4f27.com
Operating System	Linux 2.6.32-696.23.1.el6.x86_64 x86_64
Machine Type	4 CPUs, 2933 MHz, 7.81 GB memory
Software Version	16.0.100 (64-bit)
System Uptime	8 Days, 23 hrs, 35 mins, 13 secs,

**Summary of LumenVox Services**

Service	Status	Start	Stop	Restart	Configuration	Stats	Logs
Manager	Online						
License Server	Online						
Media Server	Online						
ASR Server	Online						
TTS Server	Online						

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As shown below, configure the **MRCP\_SERVER\_IP** to be the IP Address of LumenVox Media Server. Also, verify the **SIP\_PORT** is set to **5060**, which is used for MRCP V2 as configured in Experience Portal **Section 4.2**.



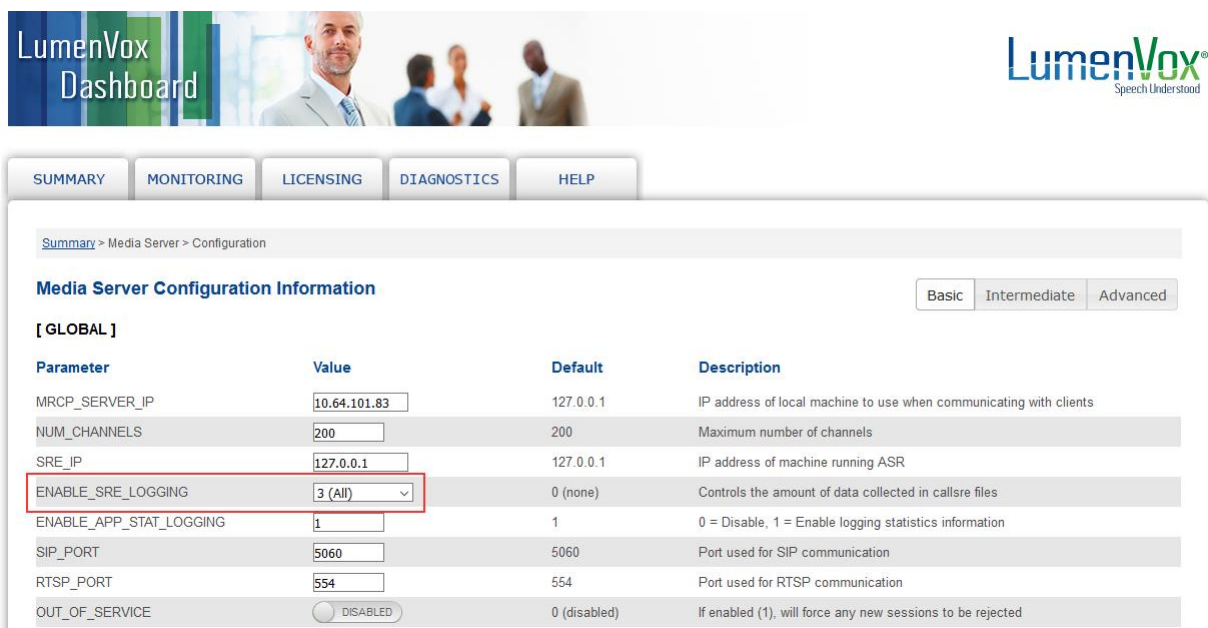
**LumenVox Dashboard**

**Media Server Configuration Information**

[ GLOBAL ]

Parameter	Value	Default	Description
MRCP_SERVER_IP	10.64.101.83	127.0.0.1	IP address of local machine to use when communicating with clients
NUM_CHANNELS	200	200	Maximum number of channels
SRE_IP	127.0.0.1	127.0.0.1	IP address of machine running ASR
ENABLE_SRE_LOGGING	3 (All)	0 (none)	Controls the amount of data collected in callsre files
ENABLE_APP_STAT_LOGGING	1	1	0 = Disable, 1 = Enable logging statistics information
SIP_PORT	5060	5060	Port used for SIP communication
RTSP_PORT	554	554	Port used for RTSP communication
OUT_OF_SERVICE	<input type="radio"/> DISABLED	0 (disabled)	If enabled (1), will force any new sessions to be rejected

One the same page, if needed, set **ENABLE\_SRE\_LOGGING** to **3** which will enable the LumenVox Media Server to save Response Files which are useful for troubleshooting and speech tuning. Note that this needs to be only done to collect Response Files for use with troubleshooting, or application tuning. When enabled, the files created may take a sizable portion of disk space, depending on your system configuration. The default setting of 0 disables generation of these files.



**LumenVox Dashboard**

**Media Server Configuration Information**

[ GLOBAL ]

Parameter	Value	Default	Description
MRCP_SERVER_IP	10.64.101.83	127.0.0.1	IP address of local machine to use when communicating with clients
NUM_CHANNELS	200	200	Maximum number of channels
SRE_IP	127.0.0.1	127.0.0.1	IP address of machine running ASR
ENABLE_SRE_LOGGING	3 (All)	0 (none)	Controls the amount of data collected in callsre files
ENABLE_APP_STAT_LOGGING	1	1	0 = Disable, 1 = Enable logging statistics information
SIP_PORT	5060	5060	Port used for SIP communication
RTSP_PORT	554	554	Port used for RTSP communication
OUT_OF_SERVICE	<input type="radio"/> DISABLED	0 (disabled)	If enabled (1), will force any new sessions to be rejected

The **MACHINE\_IP** setting should be set to the IP Address of the server running the LumenVox Manager Service. Assigning this to the machines local IP Address will allow the manager to correctly identify which services are running locally, and which are remote. This provides better visual feedback in the Dashboard Summary page as well as when performing diagnostic tests, which can be very useful in situations where distributed LumenVox servers co-exist within a local area network.

From the LumenVox Dashboard, select **Configuration** for **Manager** Service.

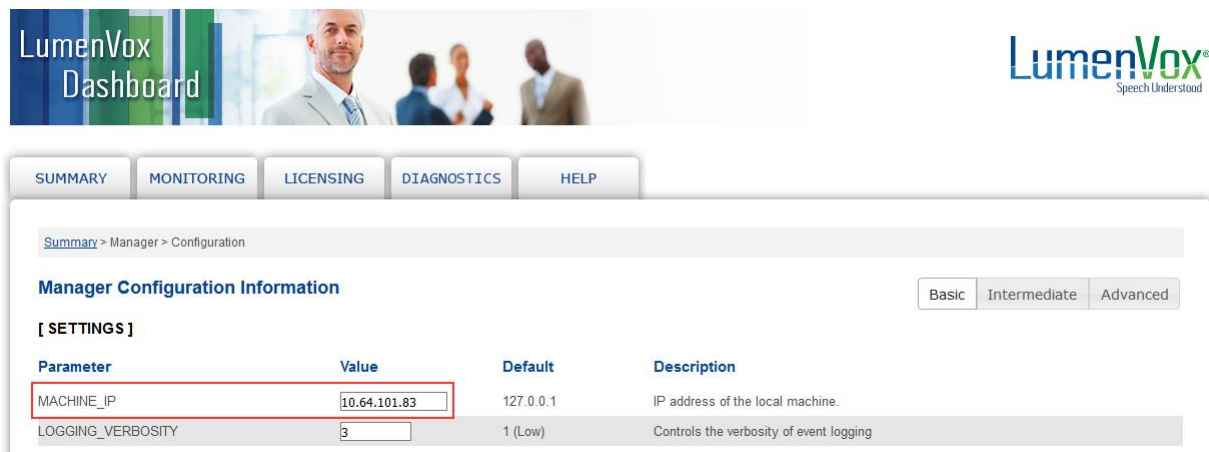
The screenshot shows the LumenVox Dashboard with the 'SUMMARY' tab selected. The 'Lumenvox Dashboard Summary' section displays 'Machine Configuration Information' and a 'Summary of LumenVox Services' table. The 'Manager' service is highlighted, and the 'Configuration' button is circled in red.

Parameter	Value
System Name	LumenVox.d4f27.com
Operating System	Linux 2.6.32-696.23.1.el6.x86_64 x86_64
Machine Type	4 CPUs, 2933 MHz, 7.81 GB memory
Software Version	16.0.100 (64-bit)
System Uptime	8 Days, 23 hrs, 44 mins, 36 secs,

Service	Status	Start	Stop	Restart	Configuration	Stats	Logs
Manager	Online	Start	Stop	Restart	Configuration	Stats	Logs
License Server	Online	Start	Stop	Restart	Configuration	Stats	Logs
Media Server	Online	Start	Stop	Restart	Configuration	Stats	Logs
ASR Server	Online	Start	Stop	Restart	Configuration	Stats	Logs
TTS Server	Online	Start	Stop	Restart	Configuration	Stats	Logs

As shown below, configure the **MACHINE\_IP** to be the IP Address of LumenVox Manager Service.



The screenshot shows the LumenVox Dashboard with the 'Manager Configuration Information' page. The 'MACHINE\_IP' parameter is highlighted with a red box. The page includes a navigation bar with tabs for SUMMARY, MONITORING, LICENSING, DIAGNOSTICS, and HELP. The configuration page has tabs for Basic, Intermediate, and Advanced settings. The 'MACHINE\_IP' parameter is set to 10.64.101.83, with a default of 127.0.0.1. The 'LOGGING\_VERBOSITY' parameter is set to 3, with a default of 1 (Low).

Parameter	Value	Default	Description
MACHINE_IP	10.64.101.83	127.0.0.1	IP address of the local machine.
LOGGING_VERBOSITY	3	1 (Low)	Controls the verbosity of event logging

For more information on available configuration options, see the [LumenVox Knowledge Base](#) or the [LumenVox Developers Network](#).

## 6. Verification Steps

### 6.1. Avaya Aura® Experience Portal

This section provides the verification steps that may be performed to verify that Avaya Aura® Experience Portal can run LumenVox ASR and TTS servers.

Verify the Speech Servers are UP. On the left page, select **System Monitor** and navigate to **MPP → Service Menu → Resources → Speech Servers**.

The screenshot displays the Avaya Aura Experience Portal MPP 7.2.1.0.0605 interface. The top header shows the Avaya logo and the user 'Welcome, epadmin'. Below the header, a red banner indicates the version and URL. The left sidebar contains a navigation menu with options: Home, Activity (Calls, Sessions), Applications (Statistics), Certificates, Configuration, Diagnostics, Logs, and Resources (ASR, TTS, Speech Servers). The main content area shows the 'Speech Servers' page, with a breadcrumb trail: 'You are here: Home > Resources > Speech Servers'. The page title is 'Speech Servers'. Below the title is a table with the following data:

Name	Type	Status	Values	Ports	Errors	Latency
LVASR	ASR	Server is UP	H (Total): 10 M (Simultaneous): 10	Active: 0 Reserve: 0	Timeout: 0 Setup: 0 Application: 0	Average: 0 Maximum: 0 Minimum: 0
LVTTS	TTS	Server is UP	H (Total): 10 M (Simultaneous): 10	Active: 0 Reserve: 0	Timeout: 0 Setup: 0 Application: 0	Average: 0 Maximum: 0 Minimum: 0

Below the table, the date and time 'Tue May 8 15:48:51 2018' are displayed.

## 6.2. LumenVox

From a command line, run the following command:

- Linux:
  - `/usr/bin/lv_show_config -mrcp_test`
- Windows:
  - `cd "C:\Program Files\LumenVox\Engine\"`
  - `LVShowConfig.exe -mrcp_test`

This will run a series of tests to verify that ASR, TTS, and the LumenVox Media Server are working correctly:

```
[interop@LumenVox ~]$ /usr/bin/lv_show_config -mrcp_test

=====

Testing LumenVox Media Server
WARNING: 127.0.0.1 (i.e. localhost) detected as default network
interface
        Some functionality may not work.

Testing MRCP v1 (en-US) TTS Synthesis
The MRCP v1 TTS Synthesis completed successfully

Testing MRCP v2 (en-US) TTS Synthesis (SIP/UDP)
The MRCP v2 TTS Synthesis completed successfully

Testing MRCP v2 (en-US) TTS Synthesis (SIP/TCP)
The MRCP v2 TTS Synthesis completed successfully

Testing MRCP v1 (en-US) ASR Recognition
The MRCP v1 ASR Recognition completed successfully

Testing MRCP v2 (en-US) ASR Recognition (SIP/UDP)
The MRCP v2 ASR Recognition completed successfully

Testing MRCP v2 (en-US) ASR Recognition (SIP/TCP)
The MRCP v2TCP ASR Recognition completed successfully

=====
```

Note that if you do not have ASR or TTS licenses, some or all of these tests might fail (e.g. if you only have TTS licenses, then you would expect the ASR tests to fail).

LumenVox Dashboard Diagnostics allows users to perform a series of Diagnostic tests as well as check the configuration of the LumenVox services on the system along with a number of other options. LumenVox Dashboard is available via browser, <https://<ip-address>:8080>, where ip-address is the IP Address of LumenVox



SUMMARY
MONITORING
LICENSING
DIAGNOSTICS
HELP

### Lumenvox Dashboard Summary

#### Machine Configuration Information

Parameter	Value
System Name	LumenVox.d4f27.com
Operating System	Linux 2.6.32-696.23.1.el6.x86_64 x86_64
Machine Type	4 CPUs, 2933 MHz, 7.81 GB memory
Software Version	16.0.100 (64-bit)
System Uptime	8 Days, 2 hrs, 28 mins, 2 secs,

#### Summary of LumenVox Services

Service	Status							
Manager	Online	Start	Stop	Restart	Configuration	Stats	Logs	
License Server	Online	Start	Stop	Restart	Configuration	Stats	Logs	
Media Server	Online	Start	Stop	Restart	Configuration	Stats	Logs	
ASR Server	Online	Start	Stop	Restart	Configuration	Stats	Logs	
TTS Server	Online	Start	Stop	Restart	Configuration	Stats	Logs	

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To verify whether LumenVox is properly configured or not, navigate to **LumenVox Dashboard** → **DIAGNOSTICS** → **Run Diagnostic Tests**.

SUMMARY
MONITORING
LICENSING
DIAGNOSTICS
HELP

### System Diagnostics

Run Diagnostic Tests

Perform a series of configuration and functional tests, generating a report

This will run a series of tests including a check of the current configuration settings and will generate a detailed description of the configuration settings relating to all of the LumenVox services.



## 7. Conclusion

These Application Notes describe the configuration steps required to integrate LumenVox Automated Speech Recognizer, LumenVox Text-to-Speech Server and Call Progress Analysis with Avaya Aura® Experience Portal. All feature and serviceability test cases were completed successfully.

## 8. Additional References

This section references the Avaya documentation relevant to these Application Notes. The following Avaya product documentation is available at <http://support.avaya.com>.

*[1] Administering Avaya Aura® Experience Portal, Release 7.2.1, Issue 1, March 2018*

LumenVox documentation is always available from <http://www.lumenvox.com/knowledgebase>.



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