Avaya Solution & Interoperability Test Lab

A Sample Configuration for Nuance OpenSpeech Recognizer and Nuance Speechify Text-to-Speech Using Avaya Interactive Response - Issue 1.0

Abstract

These Application Notes discuss a sample setup for configuring an Avaya Interactive Response system with Nuance OpenSpeech Recognizer (OSR) and Nuance Speechify Text-to-Speech (TTS) engines. The Nuance OSR engine recognizes the caller’s speech input and the Nuance Speechify TTS engine generates synthesized speech output from text. A VoiceXML application installed on the Avaya Interactive Response system interacts with the caller and provides input to the Nuance OSR and Speechify TTS engines. Software installed on the Avaya Interactive Response system is configured to interface with the Nuance OSR and Speechify TTS engines. These Application Notes were written to provide users with one complete self-contained resource that describes setup configuration.
1. Introduction and Scope

The installation, configuration, start-up and connectivity between a Nuance OpenSpeech Recognizer (OSR) and Nuance Speechify Text-to-Speech (TTS) server and an Avaya Interactive Response system are discussed in a step-by-step fashion in this document.

Note: Scansoft and Scansoft Speechworks have been renamed to Nuance.

A sample setup for this configuration is displayed in Figure 1 below.

Figure 1: A sample setup for testing Avaya Interactive Response applications using Nuance OpenSpeech Recognizer and Nuance Speechify TTS.
As shown in Figure 1, the setup contains duplex Avaya S8700 Media Servers with an Avaya G600 Media Gateway. The G600 Media Gateway contains the analog and T1/E1 boards required for this configuration. The telephony board on the Avaya Interactive Response system is configured to accept calls over a T1 link. A line side T1 cable connects the Avaya Interactive Response system to the T1/E1 board on the G600 Media Gateway. A loop start analog line connects an analog board in the G600 Media Gateway to the PSTN. A Windows server with Nuance OSR and Nuance Speechify TTS installed is connected to the Avaya Interactive Response over the local area network. Connectivity to the Nuance OSR and Nuance Speechify is established by configuring the Avaya Interactive Response software.

The incoming call from a PSTN network is delivered to a TN429D analog trunk circuit pack on the G600 Media Gateway. The port on the analog trunk circuit pack answering the call is mapped to an extension of a channel on Avaya Communication Manager. This extension corresponds to a physical\(^1\) channel on the Avaya Interactive Response system. The call is delivered using a TN464F T1/E1 circuit pack over a line side T-1 connection between the G600 Media Gateway and the Avaya Interactive Response system. A VoiceXML application deployed on the Avaya Interactive Response channel answers the incoming call. This application prompts the caller to verify the Nuance OSR and TTS connectivity through a touch-tone menu.

---

\(^1\) A T-1 telephony board channel
2. Equipment and Software used

Table 1 shows the equipment and software version information

<table>
<thead>
<tr>
<th>Equipment/Software</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avaya Interactive Response on Sun Blade Server</td>
<td>V1.3.104</td>
</tr>
<tr>
<td>Avaya S8700 Media Server(s)</td>
<td>Avaya Communication Manager 3.0.1 (R013x.00.1.346.0)</td>
</tr>
<tr>
<td>Avaya G600 Media Gateway</td>
<td></td>
</tr>
<tr>
<td>• Avaya TN464F (DS1)</td>
<td></td>
</tr>
<tr>
<td>• Avaya TN429D (DIO/D/CO)</td>
<td>000020</td>
</tr>
<tr>
<td>• Avaya TN429D (DIO/D/CO)</td>
<td>000002</td>
</tr>
<tr>
<td>Nuance OpenSpeech Recognizer on Windows 2000 Professional SP4 server</td>
<td>V 3.0.4.2005052414 (US – English) Language Pack 3.0.3 US English (en-US)</td>
</tr>
<tr>
<td>Nuance Speechify 3.0.4 on Windows 2000 Professional SP4 server</td>
<td>Build 4170 (US – English) Voice – Jill</td>
</tr>
</tbody>
</table>

Table 1: Equipment and Software Version Information

3. Configuring Avaya Interactive Response

3.1. Installing Core Speech Recognition and Proxy Text-to-Speech Client Packages

The following core packages must be installed to enable Speech Recognition and Text-to-Speech functionality. These packages are located on the /export/optional_features directory on the Avaya Interactive Response system.
1. AVsproxy – Speech Proxy Base Software.
3. AVttsprxy – Proxy Text-to-Speech Package.
3.1.1. Procedure for Installing Avaya Interactive Response Packages

**Step 1.** Log into the Avaya Interactive Response system with the appropriate credentials.

**Step 2.** Once logged in, type `cd /export/optional_features`.

**Step 3.** Verify that the above packages (see Section 3.1) are not already installed by typing `pkginfo -c IVR`. A sample output below displays the `<AVpackagename>` packages installed on the system. If the desired package cannot be viewed in this output, follow steps 4 and 5 below to install that package.

```
speakch(root)# pkginfo -c IVR
IVR  AVasai  Adjunct/Switch Application Interface
IVR  AVdps  Backup/Restore Utilities
IVR  AVdat  Call Data Interface Process
IVR  AVdp  Avaya Dial Pulse Recognizer
IVR  AVtest  Feature Test Script Package
IVR  AVir  Interactive Response Base System
IVR  AVint  JDC Integration
IVR  AVone  NMS Package
IVR  AVenc  Service Creation Integration Package Release 5.
IVR  AVproxy  Speech Proxy Base Software
IVR  AVproxy  Speech Proxy CR - Speech Recognition
IVR  AVtxt  License Modification Package
IVR  AVs  Transaction State Machine
IVR  AVtxspyr  Proxy Text-to-Speech Package
IVR  AVucid  Universal Call ID
IVR  AVua  Avaya IR System Validation Package
IVR  AVusb  VoiceXML Interpreter
IVR  AVusbip  Voice Over IP
IVR  AVwebadm  Web Administration
IVR  AVweb  Call Transfer and Bridge Package
IVR  AVL  Patch for Interactive Response Base System
IVR  AVm  Patch for NMS Package 1.3
IVR  AVp  Patch for Service Creation Integration Package
Release 5.2
IVR  AVxml2013001  Patch for Voice XML Interpreter
IVR  AVxml2013001  Web Administration Patch 1.3
IVR  AVxml2013002  Patch for Call Transfer and Bridge Package
```
Step 4. Stop the voice system by typing ‘stop_vs’.

Step 5. Install each package by typing ‘pkgadd –d packagename’.

Step 6. Start the voice system by typing ‘start_vs’.

Note: The instructions for installing additional patches for the packages are accessible under the Avaya Interactive Response section on the http://support.avaya.com site.

3.2. Stopping and Starting the Voice System

Use the method below to start and stop the voice system on the Avaya Interactive Response system after installing packages or making configuration changes.

3.2.1. Using Web Administration

Step 1. Open any web browser and log in to the web administration screen by typing ‘http://<IP address of Avaya Interactive Response server>’ as shown below.
Step 2. Locate the links for **Start Voice System** and **Stop Voice System** under System Control as shown below. For stopping the voice system, enter an appropriate wait time and click the **Submit** button.

**Note:** Select a reasonable wait time depending on whether a call is in progress or if background tasks or running. Use the default value displayed on the screen if unsure.

![Image of System Control](image1.png)

Step 3. Click on the **Start Voice System** link and the **Submit** button to start the voice system.

![Image of Start Voice System](image2.png)
3.3. Installing and Configuring Client Packages

The following packages must be installed on the Avaya Interactive Response system for connectivity to Nuance OSR and Nuance Speechify Text-to-Speech.
1. **Avosr204** – Speechworks OSR Client Libraries and Configuration files, version 2.0.4.
2. **Avspw301** – Speechworks Speechify 3.0.1 Proxy TTS Integration Package.

Additional patches for the above packages and installation instructions can be obtained from [http://support.avaya.com](http://support.avaya.com) under the Interactive Response section.

**Note:** Scansoft and Scansoft Speechworks have been renamed to Nuance. The Avaya Interactive Response package names and descriptions mentioned above are not renamed to maintain consistency with published documentation.

3.4. Configuring Nuance OpenSpeech Recognizer Package through Avaya Interactive Response Web Administration

**Step 1.** Open any web browser and log in to the web administration screen by typing ‘http://<IP address of Avaya Interactive Response server>’ as shown below.
Step 2. Enter the root username and password. If the base Speech packages mentioned in section 3.3 are installed correctly then the **Speech and DPR Administration** links should be seen under the **Feature Packages** section as shown below.

![Image](image1.png)

---

Step 3. Click on **Administration** under the **Speech and DPR Administration** section to view the **Speech Proxy Administration** page as shown below. Click on the **Speech Recognition and DPR Configuration** link.

![Image](image2.png)
Step 4. Click on the **Assign New Recognition Type** button shown below.

Step 5. Select the value as *OPSR4* in the **Recognition Type** field. Select *speechworks* from the **Engine** drop down box as shown below.

*Note: Nuance OpenSpeech Recognizer 3.0* was previously named *Speechworks OpenSpeech Recognizer 3.0.*

Step 6. Click on the **Assign New Server** button shown below.
Step 7. Enter the appropriate values for the OSR in the **Server Name**, **IP Address**, **Ports** and **Base Port** fields as shown below. Use the default value for the **Recognition Type** displayed by the system. Press the **Submit** button to save the values entered.

**Note:** The value of number of ports in the **Ports** field should not exceed the total number of licensed ports. The **Base Port** for connecting to the Nuance OSR is 4904.

---

Step 8. The final configuration screen is shown below.

---

Step 9. Follow the steps detailed in **Section 3.2** to stop and start the voice system in order to enable connection to the Nuance OSR server.
3.5. Configuring Nuance Speechify Text-to-Speech Package through Avaya Interactive Response Web Administration

**Step 1.** Click on *Administration* under the *Speech and DPR Administration* section. Click on the *Text-to-Speech Configuration* link on the *Speech Proxy Administration* page.

**Step 2.** Click on the *Change* button as shown below to set the *Default Voice* to the voice supported by the Nuance Speechify TTS engine.
Step 3. Enter the voice name in the Default Voice field as shown below. This install uses Jill (US –English) as the default voice. The process for installing this voice is described in section 4.4. Click the Submit button to apply the changes.

Step 4. Click on the Assign New Text-to-Speech Type button shown below.

Step 5. Select speechify from the Text-to-Speech Type drop-down box as shown below and click the Submit button.
Step 6. Click on the **Assign New Server** button to assign a Text-to-Speech server.

Step 7. Enter the appropriate values in the **Server Name** and **IP Address** fields as shown below and click the **Submit** button.

Step 8. Click on **Assign New Voice** button as shown below.
Step 9. Enter the appropriate values in the *Voice Name*, *Voice Ports* and *Voice Base Port* fields as shown below. Click on the **Submit** button to save the values entered.

**Note:** The value of number of ports in the *Ports* field should not exceed the total number of licensed ports. The *Voice Base Port* for connecting to the Nuance Speechify TTS is 5581.

Step 10. The final configuration screen is shown below.

Step 11. Follow the steps detailed in **Section 3.2** to stop and start the voice system in order to enable connection to the Nuance Speechify TTS server.
3.6. Configuring the Avaya ‘vxmlFeatureTest.vxml’ Application

The *vxmlFeatureTest.vxml* application is automatically installed while installing the AVvoicxml2-0 package.

This application is VXML 2.0 compliant and will not work with the earlier AVvoicxml package. The AVvoicxml2-0 package is located on the Avaya Interactive Response server under the optional_features folder in the /export directory. For details on installing an Avaya Interactive Response package, refer to Section 3.1.1.

Follow the steps below to locate and assign *vxmlFeatureTest.vxml* to an Avaya Interactive Response channel.

**Step 1.** Log in to the Avaya Interactive Response system with the appropriate credentials.

**Step 2.** Once logged in, type ‘cd /vs/data/vxml’. At the command prompt, type ‘ls’ and ensure that the *vxmlFeatureTest.vxml* application exists at this directory location.

**Step 3.** Close or minimize the Telnet window and log in to Avaya Interactive Response through a Web browser by typing ‘http:\<IP address of Avaya Interactive Response server>’. Enter the root login and password.
Step 4. Click on the **Channel Services** link under **Voice Services**. Select the desired channel(s) in the **Channel Services** table by clicking on the checkboxes alongside the channels under the **Select** column. Click the **Assign Selected** button to assign an application to these channels.

![Image of Channel Services](image1)

Step 5. Select **VXML URI** as the value for the **Assign** field as shown below. Click the **Submit** button to proceed.

![Image of Assign Services to Channels](image2)
**Step 6.** Enter the complete path to the `vxmlFeatureTest.vxml` application under the **URI** field shown below. Ensure that the selected channels are displayed in the **To Chan(s)** field. Click on the **Submit** button to apply the changes.

**Step 7.** The screen displayed below lists the channels and the complete path to the `vxmlFeatureTest.vxml` application.

**Step 8.** Ensure that the voice system is running. Refer to **Section 3.2** for starting the voice system. Place a call and verify that the welcome prompt is played.
Step 9. The application prompts the caller to press 1 to verify TTS and 2 to verify OSR connectivity.

Step 10. The connection to the Nuance Speechify TTS server is verified if the caller hears a TTS generated prompt. The prompt informs the caller that the prompt being played back is generated by the TTS server.

Step 11. The caller can verify connectivity to Nuance OSR by selecting option 2. The application plays a prompt asking the caller to speak two digits. The connectivity is verified if the recognition results are played back to the caller.
4. Configuring Nuance OpenSpeech Recognizer (OSR) and Nuance Speechify Text-to-Speech Engine

4.1. Installing Nuance OpenSpeech Recognizer Speech Recognizer

Step 1. Locate the Nuance OSR software. Double-click on the `setup.exe` file to start the installation process.

Step 2. Accept the default settings in the subsequent installation screens. Click the Next button to move to the next screen in the installation process.
**Step 3.** Select the components shown below. Ensure that the correct installation location is displayed. Click on the **Change** button to browse and select the desired installation location. Click the **Next** button to proceed.

**Note:** The OpenSpeech Recognizer Client is not a required component for connecting to the Avaya Interactive Response system.

**Step 4.** Click the **Install** button to start installing the components. Use the **Back** button to change or review any settings in the previous screens. Restart the server after completing the installation.
4.2. Installing a Language Pack for Nuance OpenSpeech Recognizer (OSR)

**Note:** The Nuance OSR software must be installed before installing a Language Pack.

**Step 1.** Locate the Nuance OSR Language Pack. Double-click on the `setup.exe` file to start the installation process.

**Step 2.** Accept the default settings in the subsequent installation screens. Click the *Next* button to move to the next screen in the installation process. Click the *Install* button to start installing the components. Use the *Back* button to change or review any settings in the previous screens.
4.3. Installing Nuance Speechify Text-to-Speech (TTS)

**Step 1.** Locate the Nuance Speechify TTS software. Double-click on the `setup.exe` file to start the installation process.

**Step 2.** Accept the default settings in the subsequent installation screens. Click the **Next** button to move to the next screen in the installation process.

**Step 3.** Select the desired installation type. Click on the **Typical** install option (recommended).
Step 4. Click the **Install** button to start installing the components. Use the **Back** button to change or review any settings in the previous screens. Restart the server after completing the installation.
4.4. Installing Nuance Speechify Voice System

**Step 1.** Locate the Nuance Speechify Voice System software. Double-click on the `setup.exe` file to start the installation process.

![Nuance Speechify Voice System software installation](image)

**Step 2.** Accept the default settings in the subsequent installation screens. Click the Next button to move to the next screen in the installation process.

**Step 3.** Select the components as shown below. The voice system is installed under the Speechify installation directory, for example `C:\Program Files\SpeechWorks\Speechify\en-US\jill`. Click the Next button to proceed.

*Note:* The *Speechify Client SAPI Settings* is not a required component for connecting to the Avaya Interactive Response system.
Step 4. Click the **Install** button to start installing the components. Use the **Back** button to change or review any settings in the previous screens.
4.5. Installing Nuance OpenSpeech Recognizer and Nuance Speechify License Files Using Third Party Licensing Components

For additional information on obtaining, installing and configuring a Nuance OSR and Nuance Speechify license, refer to [3] and [4].

**Step 1.** Locate the license file obtained from Nuance and rename it to `osr.lic`.

**Note:** It is possible to have both OSR and Speechify licenses in different license files. This document assumes that both licenses are located in the same file named `osr.lic`.

**Step 2.** Copy the license file to the license folder located under the `flexlm` folder in the Nuance OSR installation directory as shown below, for example `C:\Program Files\SpeechWorks\OpenSpeech Recognizer\flexlm\license folder`.

**Note:** If the Speechify license file is provided separately, then rename the file to `speechify.lic` and copy the file to the license folder located under the `flexlm` folder in the Speechify installation directory, for example: `C:\Program Files\SpeechWorks\Speechify\flexlm\license folder`.

![Image of license folder]

**Image Description:**
- The image shows the license folder structure with files such as `osr.lic`, `speechify.lic`, `osr-log`, and `osr-bin`. The modified dates range from 3/25/2006 to 11/1/2006.
Step 3. Click on the Start menu and select Programs. Click on OpenSpeech Recognizer 3.0 and select Licensing Tools as shown below.

Step 4. Click on the Service/License File tab. Check the Configuration using Services radio button and click on the OSR licensing Service shown below.
Step 5. Select the **Start/Stop/Reread** tab. Ensure that the message **Using License File: <path name>** is displayed as shown below. Click on the **Start Server** button and verify that the license server is running.

![License Server Status](image1.png)

Step 6. Select the **Server Status** tab and click on the **Perform Status Enquiry** button to view the status of the installed licenses.

![License Server Status](image2.png)
4.6. Starting Nuance OpenSpeech Recognizer (OSR) Engine

**Step 1.** Open a DOS window prompt on the Nuance server. Change directory to the `bin` folder located in the Nuance OSR installation directory, for example `C:\Program Files\SpeechWorks\OpenSpeech Recognizer\bin`.

```
C:\WINNT\system32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
C:\>cd program files
C:\Program Files>cd speechworks
C:\Program Files\SpeechWorks>cd openspeech Recognizer
C:\Program Files\SpeechWorks\OpenSpeech Recognizer>cd bin
C:\Program Files\SpeechWorks\OpenSpeech Recognizer\bin>
```

**Step 2.** To start the OSR, invoke the `SWIsvc` application in the `bin` folder by typing ‘`SWIsvc –start`’ on the command line. If the Nuance OSR is configured correctly, then the status message shown below is displayed.

```
C:\WINNT\system32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
C:\>cd program files
C:\Program Files>cd speechworks
C:\Program Files\SpeechWorks>cd OpenSpeech Recognizer
C:\Program Files\SpeechWorks\OpenSpeech Recognizer>cd bin
C:\Program Files\SpeechWorks\OpenSpeech Recognizer\bin>SWIsvc –start
OSR Server successfully started
```

**Note:** To shut down the Nuance OSR, type ‘`SWIsvc –stop`’ on the command line.
4.7. Starting Nuance Speechify Voice System

Step 1. Click on the **Start** menu. Select **Programs**. Click on **Speechify** and select **Speechify Server Management** as shown below.

![Start menu screenshot](image1)

Step 2. The Speechify Server Management application is shown below. Click on the **Start Voice** icon to start the voice system.

![Speechify Server Management screenshot](image2)
5. Verification

5.1. Verifying Speech Recognition and Text-to-Speech Packages on the Avaya Interactive Response System

The connections between the Nuance OpenSpeech Recognizer and Nuance Speechify Text-to-Speech Server and Avaya Interactive Response can be verified by the following methods described below.

5.1.1. Check Configuration File Settings

**Step 1.** Log into the Avaya Interactive Response system with the appropriate credentials.

**Step 2.** Type `cd /vs/sproxy/cfg` on the command line. Check the Nuance OSR settings by locating the file named with the recognition type selected during configuration. Locate and open the file. For example, if the recognition type is OPSR4 then the file name would be **OPSR4.cfg**. The connection settings contained in a sample file are shown below.

![OPSR4.cfg sample](image)

**Step 3.** Check the Nuance Speechify TTS settings by locating the file with the Text-to-Speech type selected during configuration. Locate and open the file. For example, if the recognition type is TTS0, then the file name would be **TTS0.cfg**. The connection settings contained in a sample file are shown below.

![TTS0.cfg sample](image)
5.1.2. Verifying Connectivity using ‘sproxyadm’ Command on the Avaya Interactive Response System

The ‘sproxyadm’ command is used to administer proxy speech resources. Follow the steps below to use the ‘sproxyadm’ command to view Nuance OSR and Nuance Speechify TTS resources.

**Step 1.** Log into the Avaya Interactive Response system with the appropriate credentials.

**Step 2.** At the command line, type ‘sproxyadm –d –r ALL’ to view all active resources and verify that the Speech Recognizer and TTS ports are active as shown below.

**Note:** Type ‘sproxyadm’ at the command line to view the description of all available options.
5.1.2.1 ‘sproxyadm’ Command Does Not Show Configured Speech Recognition and TTS Ports

![Figure 2: Output of ‘sproxyadm’ Command](image)

Stop and start the voice system detailed in Section 3.2 if the error message displayed in Figure 2 is displayed and retry the command. If the error re-occurs, then reinstall the OSR and/or TTS packages on Avaya Interactive Response system.

Configure the packages through the Avaya Interactive Response web administration interface and run the ‘sproxyadm’ command. Refer to Section 3.1.1 for installing speech packages.
5.1.3. Using Web Administration

This feature is available only for checking the connection status to the Nuance OSR server.

**Step 1.** Open any web browser and log in to the web administration screen by typing ‘http:\<IP address of Avaya Interactive Response server>’. Click the **Display Status** link under **Speech and DPR Administration** to view the **Display Speech Proxy Status** page as shown below. The **Speech Resource Status** link displays the number of active ports and the **Speech Server Status** link displays the connectivity to the specified speech server.

![Display Speech Proxy Status](image1)

**Step 2.** Click on the **Speech Resource Status** link to check number of active ports or the **Speech Server Status** link to check the connectivity to the specified speech server. Select the Desired ‘Resource Type’ and ‘Server’ to view the status of available ports as shown below.

![Speech Resource Status](image2)
6. **Conclusion**

These Application Notes describe a sample configuration for configuring Nuance OSR and Nuance Speechify TTS with the Avaya Interactive Response system. The setup uses Nuance OSR and Nuance Speechify TTS engines to add speech recognition and Text-to-Speech functionality for self service applications deployed on the Avaya Interactive Response platform.

7. **References**

The following references can be found at the Avaya support site [http://support.avaya.com](http://support.avaya.com).


The following references are available as part of Nuance product documentation:

