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# Azure SR Plugin

## Administrator Guide

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# 1 Overview

This guide describes how to obtain and install binary packages for the Microsoft Azure Speech Recognition (SR) plugin to the UniMRCP server on Debian-based Linux distributions. The document is intended for system administrators and developers.

## 1.1 Applicable Versions

Instructions provided in this guide are applicable to the following versions.

 UniMRCP 1.5.0 and above UniMRCP Azure SR Plugin 1.0.0 and above
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## 1.2 Supported Endpoints

The plugin supports the following Speech Service endpoints.

Service Endpoint	Availability
Speech Service (regional)	Azure SR 1.6.0 and above
Custom Speech Service (regional)	Azure SR 1.9.0 and above
Speech Service (containerized)	Azure SR 1.14.0 and above
Custom Speech Service (containerized)	Azure SR 1.14.0 and above

## 1.3 Supported Distributions

UniMRCP binary packages are currently available only for x86\_64 (64-bit) architecture.

Operating System	32-bit	64-bit
Ubuntu 16.04 LTS (xenial)		
Ubuntu 18.04 LTS (bionic)		

Note: packages for other distributions can be made available upon request. For more information, contact [services@unimrcp.org](mailto:services@unimrcp.org).

## 1.4 Authentication

UniMRCP binary packages are available to authenticated users only. In order to register a free account with UniMRCP, please visit the following page.



<https://www.unimrcp.org/profile-registration>

Note: a new account needs to be verified and activated prior further proceeding.

## 2 Installing Deb Packages Using Apt-Get

Using the APT package handling utility (`apt-get`) is recommended for installation of UniMRCP binary packages.

### 2.1 Repository Configuration

The content of a typical configuration file of the APT repository, to be placed in `/etc/apt/sources.list.d/unimrcp.list`, is provided below.

```
deb [arch=amd64] https://username:password@unimrcp.org/repo/apt/ distr main
```

The *username* and *password* fields included in the HTTPS URI must be replaced with the corresponding account credentials.

The *distr* field must be replaced with the corresponding distribution code name such as *xenial*, *bionic*, etc.

### 2.2 GnuPG Key

For verification of binary packages, UniMRCP provides a public GnuPG key, which can be retrieved and installed as follows.

```
wget -O - https://unimrcp.org/keys/unimrcp-gpg-key.public | sudo apt-key add -
```

### 2.3 Repository Update

In order to check for updates and apply the changes in the APT configuration, use the following command.

```
sudo apt-get update
```

### 2.4 Azure SR Plugin Installation

In order to install the Azure SR plugin, including all the dependencies, use the following command.

```
sudo apt-get install unimrcp-azure-sr
```

As a result, `apt-get` will check and prompt to download all the required packages by installing them in the directory `/opt/unimrcp`.

In order to install the additional data files for the sample client application *umc*, the following command can be used.

```
sudo apt-get install umc-addons
```

Note: this package is optional and provides additional data which can be used for validation of basic setup.

## 3 Installing Deb Packages Manually

UniMRCP deb packages can be installed manually using the *dpkg* utility. Note, however, that the system administrator should take care of package dependencies and install all the packages in appropriate order.

The deb packages have the following naming convention:

```
$packagename_$universion-$distr_$arch.deb
```

where

- *packagename* is the name of a package
- *universion* is the UniMRCP version
- *distr* is the distribution code name (trusty, xenial, ...)
- *arch* is the architecture (amd64, i386, all, ...)

### 3.1 Package List

The following is a list of UniMRCP deb packages required for the installation of the Azure SR plugin.

Package Name	Description
<b>unimrcp-azure-sr</b>	Azure SR plugin to the server.
<b>unilibevent</b>	UniMRCP edition of the libevent library.
<b>umc-addons</b>	Sample en-US data files used with umc. [Optional]
<b>unilicnodegen</b>	Node information retrieval tool, required for license deployment.
<b>unimrcp-server</b>	Shared library and application of the server.
<b>unimrcp-client</b>	Shared libraries and sample applications of the client. [Optional]
<b>unimrcp-demo-plugins</b>	Set of demo plugins to the server. [Optional]
<b>unimrcp-common</b>	Data common for the client and the server.
<b>uniapr</b>	UniMRCP edition of the Apache Portable Runtime (APR) library.

<b>uniapr-util</b>	UniMRCP edition of the Apache Portable Runtime Utility (APR-Util) library.
<b>unisofia-sip</b>	UniMRCP edition of the Sofia SIP library.

## 3.2 Package Installation Order

Packages for APR, APR-Util and Sofia-SIP libraries must be installed first.

```
sudo dpkg --install uniapr_${saprversion}-${distr}_${sarch}.deb
sudo dpkg --install uniapr-util_${sapuversion}-${distr}_${sarch}.deb
sudo dpkg --install unisofia-sip_${sofiaversion}-${distr}_${sarch}.deb
```

Then, a package containing common data for the client and the server, and a package for the server should follow.

```
sudo dpkg --install unimrcp-common_${suniversion}-${distr}_${sarch}.deb
sudo dpkg --install unimrcp-server_${suniversion}-${distr}_${sarch}.deb
```

Next, a package containing the utility tool *unilicnodegen*, required for license deployment.

```
sudo dpkg --install unilicnodegen_${stoolversion}-${distr}_${sarch}.deb
```

Next, a package containing the libevent library.

```
sudo dpkg --install unilibevent_${libeventversion}-${distr}_${sarch}.deb
```

Finally, a package containing the Azure SR plugin should follow.

```
sudo dpkg --install unimrcp-azure-sr_${suniversion}-${distr}_all.deb
```



# 4 Obtaining License

The Azure SR plugin to the UniMRCP server is a commercial product, which requires a license file to be installed.

## 4.1 License Type

The following license types are available:

- Trial
- Production
- Test and Development

## 4.2 Node Information

The license files are bound to a node the product is installed on. In order to obtain a license, the corresponding node information needs to be retrieved and submitted for generation of a license file.

Use the installed tool *unilicnodegen* to retrieve the node information.

```
sudo /opt/unimrcp/bin/unilicnodegen
```

As a result, a text file *uninode.info* will be saved in the current directory. Submit the file *uninode.info* for license generation to [services@unimrcp.org](mailto:services@unimrcp.org) by mentioning the product name in the subject.

## 4.3 License Installation

The license file needs to be placed into the directory */opt/unimrcp/data*.

```
sudo cp umsazuresr_*.lic /opt/unimrcp/data
```

# 5 Obtaining Service Credentials



Instructions provided in this section are applicable to Azure SR 1.6.0 and above. Support for the old format remains in-tact, but is no longer documented.

In order to utilize either the deprecated Bing Speech API or the new Speech Service API, a corresponding service subscription key and an authentication endpoint need to be retrieved from the Microsoft Azure portal and further installed to the UniMRCP server.

## 5.1 Service Subscription

Navigate to the Microsoft Azure dashboard and create a new resource.

1. Navigate to the Dashboard.  
<https://portal.azure.com>
2. Create a new resource (+).
3. Type 'Speech' in the text box. (Note: for the deprecated Bing service, type 'Bing Speech')
4. Select and create the resource by filling out all the required parameters based on your needs.
5. Go to the created resource.
6. Collect one of the two keys (1) and the region-based authentication endpoint (2).

## 5.2 Installation of Credentials

Create a text file *cognitive.subscription.key* in the directory */opt/unimrcp/data*.

```
sudo nano /opt/unimrcp/data/cognitive.subscription.key
```

Proceed with the instructions for one of:

- Speech Service (default)
- Custom Speech Service
- Speech Service Container

### Speech Service

Place the collected key and the authentication endpoint in the following JSON format. Leave the service endpoint empty by default.

```
{
  "auth-endpoint": "*****",
  "auth-key": "*****",
  "service-endpoint": ""
}
```

The field *auth-endpoint* is composed based on the following pattern.

Authentication Endpoint	URI
Speech Service (regional)	<a href="https://\$region.api.cognitive.microsoft.com/sts/v1.0/issuetoken">https://\$region.api.cognitive.microsoft.com/sts/v1.0/issuetoken</a>

The field *service-endpoint* is implicitly composed based on the following pattern.

Service Endpoint	URI
Speech Service (regional)	<a href="https://\$region.stt.speech.microsoft.com/speech/recognition/interactive/cognitiveservices/v1">https://\$region.stt.speech.microsoft.com/speech/recognition/interactive/cognitiveservices/v1</a>

Where *\$region* is one of *westus*, *eastus*, *westeurope* and others. See [Speech Service Regions](#).

## Custom Speech Service

Place the collected key and the authentication endpoint in the following JSON format. Note that the field *service-endpoint* is supported since Azure SR 1.9.0 and must be explicitly specified when a custom speech endpoint is used.

```
{
  "auth-endpoint": "*****",
  "auth-key": "*****",
  "service-endpoint": "*****"
}
```

## Speech Service Container

Speech Service containers are supported since Azure SR 1.14.0.

Install and run a container per instructions available in [this](#) guide. Collect and place the container service endpoint in the following JSON format. Leave the auth endpoint and key empty.

```
{
  "auth-endpoint": "",
  "auth-key": "",
  "service-endpoint": "*****"
}
```

The field *service-endpoint* is composed based on the following pattern.

Service Endpoint	URI
Speech Service (containerized)	<a href="ws://\$host:5000/speech/recognition/interactive/cognitiveservices/v1">ws://\$host:5000/speech/recognition/interactive/cognitiveservices/v1</a>

# 6 Configuring Server and Plugin

## 6.1 Plugin Factory Configuration

In order to load the Azure SR plugin into the UniMRCP server, open the file *unimrcpserver.xml*, located in the directory */opt/unimrcp/conf*, and add the following entry under the XML element `<plugin-factory>`. Disable other recognition plugins, if available. The remaining demo plugins might also be disabled, if not installed.

```
<!-- Factory of plugins (MRCP engines) -->
<plugin-factory>
  <engine id="Demo-Synth-1" name="demosynth" enable="true"/>
  <engine id="Demo-Recog-1" name="demorecog" enable="false"/>
  <engine id="Demo-Verifier-1" name="demoverifier" enable="true"/>
  <engine id="Recorder-1" name="mrcpreorder" enable="true"/>
  <engine id="Azure-SR-1" name="umsazuresr" enable="true"/>
</plugin-factory>
```

## 6.2 RTP Configuration

Since the Azure Speech API supports PCM audio sampled at 16 kHz only, the corresponding codecs needs to be specified in the configuration file *unimrcpserver.xml* under the XML element `<rtp-settings>` as follows.

```
<rtp-settings id="RTP-Settings-1">
  <codecs own-preference="false">PCMU/97/16000 PCMA/98/16000 L16/99/16000
    telephone-event/102/16000</codecs>
</rtp-settings>
```

Note that, starting from Azure SR 1.3.0, the plugin supports resampling of audio data from 8 kHz to 16 kHz. In order to support both 8 and 16 kHz audio in the incoming RTP stream, the corresponding 8 kHz codecs needs to be specified as well.

```
<rtp-settings id="RTP-Settings-1">
  <codecs own-preference="false"> PCMU PCMA L16/96/8000 telephone-event/101/8000
    PCMU/97/16000 PCMA/98/16000 L16/99/16000 telephone-
    event/102/16000</codecs>
</rtp-settings>
```

For the basic verification test to work, similar settings should be specified in the client configuration file *unimrcpclient.xml* as well.

```
<rtp-settings id="RTP-Settings-1">  
  
  <codecs>PCMU PCMA L16/96/8000 telephone-event/101/8000 PCMU/97/16000  
    PCMA/98/16000 L16/99/16000 telephone-event/102/16000</codecs>  
  
</rtp-settings>
```

## 6.3 Logger Configuration

In order to enable log output from the plugin and set filtering rules, open the configuration file *logger.xml*, located in the directory */opt/unimrcp/conf*, and add the following entry under the element *<sources>*.

```
<source name="AZURES-R-PLUGIN" priority="INFO" masking="NONE"/>
```

## 6.4 Azure SR Plugin Configuration

The configuration file of the plugin is located in */opt/unimrcp/conf/umsazuresr.xml*. Default settings should be sufficient for generic use.

Refer to the *Usage Guide* for more information.

# 7 Validating Setup

Validate your setup by using the sample UniMRCP client and server applications on the same host. The default configuration and data files should be sufficient for a basic test.

## 7.1 Launching Server

Launch the UniMRCP server application.

```
cd /opt/unimrcp/bin
sudo ./unimrcpserver
```

In the server log output, check whether the plugin is normally loaded.

```
[INFO] Load Plugin [Azure-SR-1] [/opt/unimrcp/plugin/umsazuresr.so]
```

Next, check for the license information.

```
[NOTICE] UniMRCP AZURESr License

-product name:  umsazuresr
-product version: 1.0.0
-license owner:  -
-license type:   trial
-issue date:    2017-10-26
-exp date:     2017-11-25
-channel count: 2
-feature set:   0
```

## 7.2 Launching Client

Note: the optional package *umc-addons* must be installed for this test to work.

Launch the sample UniMRCP client application *umc*.

```
cd /opt/unimrcp/bin
./umc
```

Run a typical speech recognition scenario by issuing the command *run bsr1* from the console of the *umc* client application.

```
run bsr1
```

This command sends a RECOGNIZE request to the server and then starts streaming a sample audio input file *whatstheweatherlike.pcm* to recognize.

Check for the NLSML results to be returned as expected.

```
<?xml version="1.0"?>
<result>
  <interpretation grammar="builtin:speech/transcribe" confidence="0.95">
    <instance>what's the weather like</instance>
    <input mode="speech">what's the weather like</input>
  </interpretation>
</result>
```

Visually inspect the log output for any possible warnings or errors.

Note that utterances are stored in the *var* directory, if the corresponding parameter is enabled in the configuration file *umsazure.sr.xml* and/or requested by the client.