

aum**tech**

**Aumtech MRCP Connector User's Guide**  
**V1.0.4**

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Published by  
Aumtech Incorporated  
East Brunswick, New Jersey

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## Revision History

Revision	Date	Description	Name
1.0.0	2007/02/26	Initial Revision	Robert McCarthy
1.0.1	2007/02/28	Added "Tested" section	Robert McCarthy
1.0.2	2007/05/29	Added screen captures for GUI installation and removal.	Robert McCarthy
1.0.3	2007/06/04	Added clarification information after document QA was complete.	Robert McCarthy George Bottarini Harshal Patel
1.0.4	2007/07/13	Added SrResultParamName and Days To Keep Logs to the ArcMrcpConnector configuration file.	Robert McCarthy
1.0.4	2007/07/16	Added illustrative sequences between MRCP Client and MRCP Connector	A. Kapoor

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# 1. Introduction

The Aumtech MRCP (Media Resource Control Protocol) Connector for the Microsoft® Office Communications Server 2007 Speech Server (OCS) provides an open standards-based access to Speech Recognition and TTS (Text-to-Speech) functions of the OCS. Since the MRCP Connector is based on the W3C's open standard MRCP V2, applications running on Microsoft or open platforms such as Linux can access the Speech Recognition and TTS functions of the OCS.

The purpose of this document is to describe the components, functions and proper usage of the MRCP Connector. The intended audience of this document is both an administrator responsible for installing, configuring and supporting the MRCP Connector and a system architect looking for an understanding of the MRCP Connector's role in an overall Speech Recognition solution. This document is not intended to be used as a low level design document describing the fine detail of the functionality of the MRCP Connector.

# 2. MRCP Components and Operation

The MRCP Connector requires an MRCP V2 compliant client, which sends speech recognition and TTS requests to the MRCP Connector. The MRCP Connector converts MRCP V2 operations into Microsoft Speech Server API calls. From Microsoft Speech Server perspective, the Connector runs as a Microsoft Speech Server application.

The MRCP Connector itself and its components are named using ARC (Aumtech Responsive Communications) as a prefix. As shown in figure 1, the main components of ARC MRCP Connector solution are:

1. Generally, a part of the IVR
  - a. MRCP 2.0 client
  - b. Media Manager
2. Generally resident on the OCS
  - a. The ArcSipSessionManager - also known as the SIP Proxy
  - b. The ArcMrpcConnector - the component responsible for translating MRCP requests and responses from an MRCP 2.0 Client into MSS API calls and interacting with the MSS.
  - c. Microsoft OCS – TAP (SIP stack) and the MS Speech Server engine

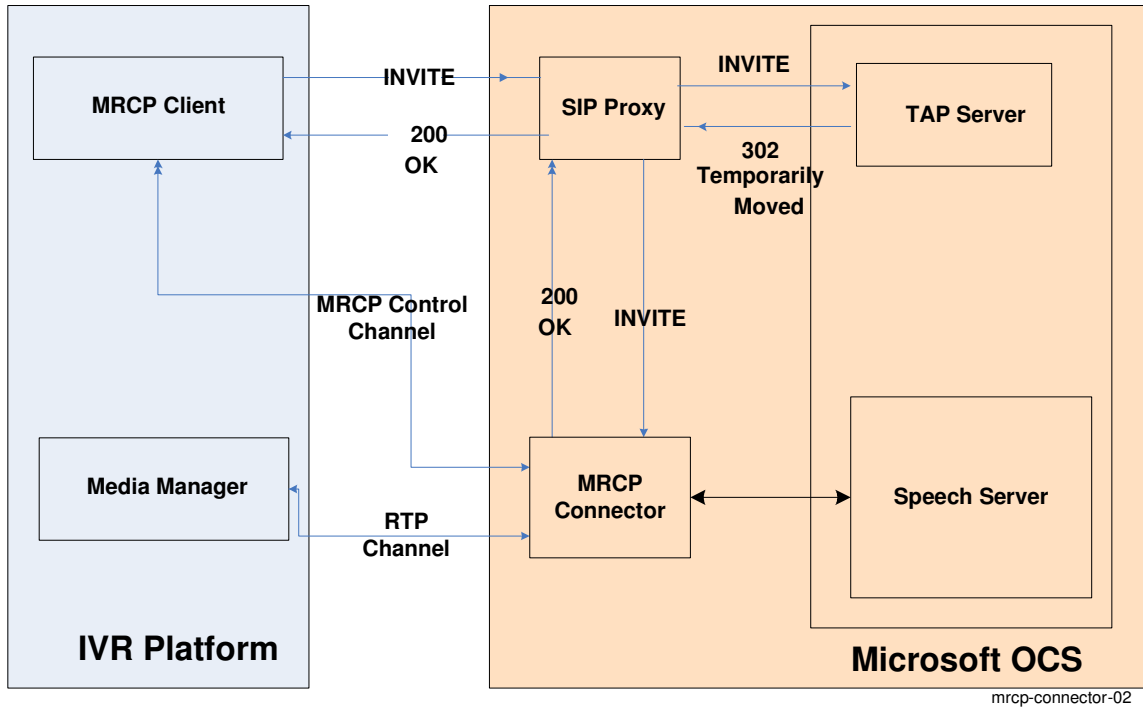


Figure 1: MRCP Connector Components and Operation

Figure 1 illustrates establishment of communications between an MRCP Client, Media Manager, and the MRCP Connector.

1. The MRCP Client Sends an INVITE to the SIP Proxy
2. The SIP Proxy sends an INVITE to the Microsoft TAP Server (SIP Stack)
3. The TAP Server sends a 302 to the Proxy
4. The SIP Proxy redirects the call to the Microsoft Speech Server (MRCP Connector)
5. The connector responds to the Proxy telling it where the MRCP Control and RTP channel ports are located.
6. The MRCP Client establishes an MRCP Control channel to the Connector.
7. The Media Manager establishes an RTP channel to the Connector.

### 3. Software and Hardware requirements

#### 3.1. Software

The following Microsoft software is required with the ARC MRCP Connector:

Name	Version
Microsoft Windows Server	2003 Service Pack 1
Microsoft Speech Server (MSS)	2007 Beta (build 2.0.60717.44)

Please see the document “Release Notes for Microsoft Speech Server 2007 Beta Release” for detailed information on the required software for MSS.

#### 3.2. Hardware

The Aumtech MRCP Connector runs on the standard hardware configuration recommended by Microsoft for the Microsoft OCS. Please see Microsoft OCS documentation for details.

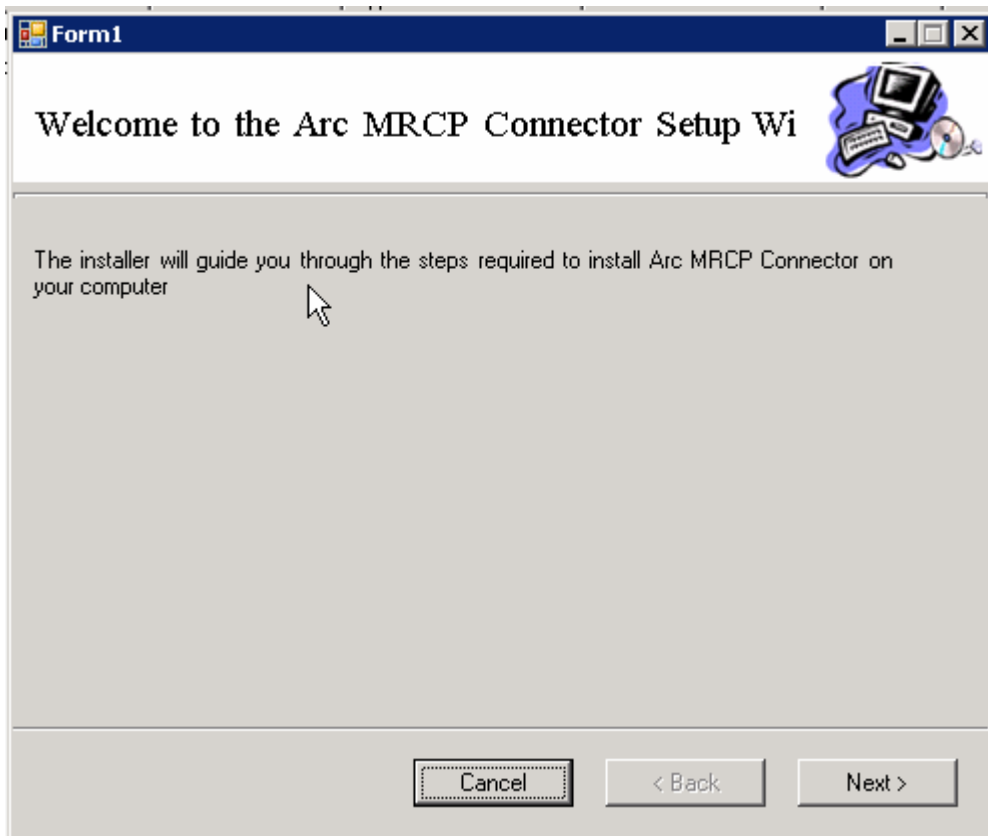
## 4. Installation

### 4.1. Remove Previous Versions

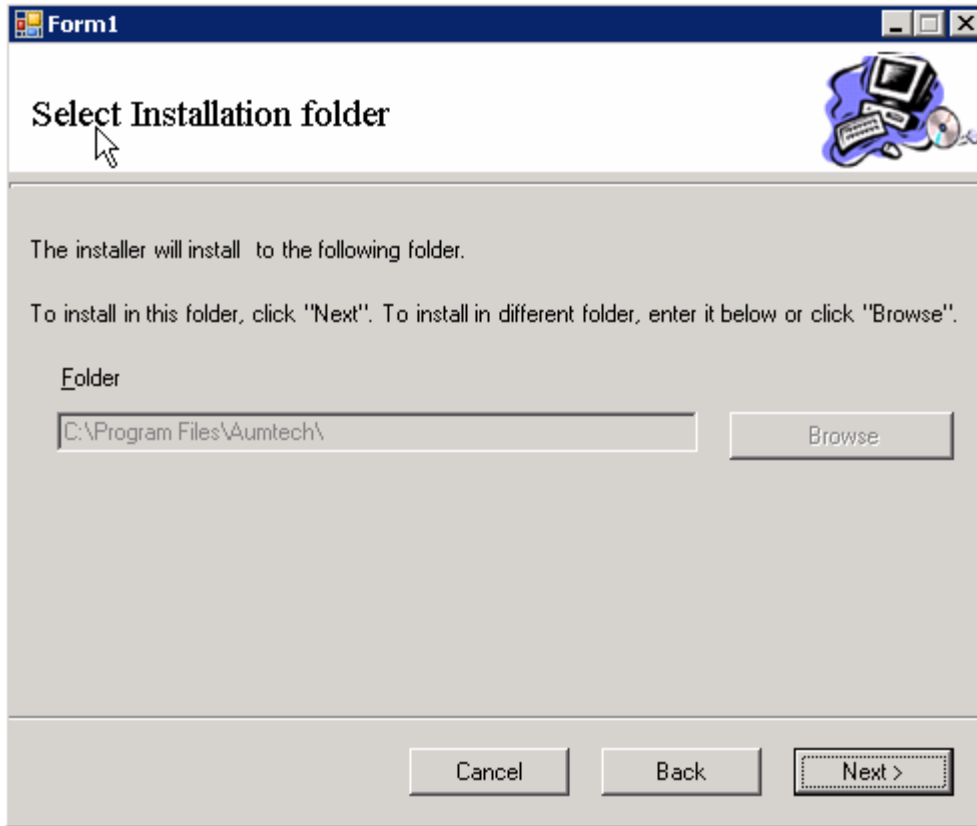
Before installing the ARC MRCP Connector solution please be sure that any and all previous versions of the ARC MRCP Connector solution have been removed. Please refer to the "Removal" section of this document for details on removing the ARC MRCP Connector solution.

### 4.2. Install MRCP Connector

To install the ARC MRCP Connector solution, insert the CD and log in as the Administrator and unzip the package ZIP file into the %SYSTEM ROOT% (usually C:\) directory. Then run the "Setup.exe" file from the installation directory created. You will be presented with the following screen.



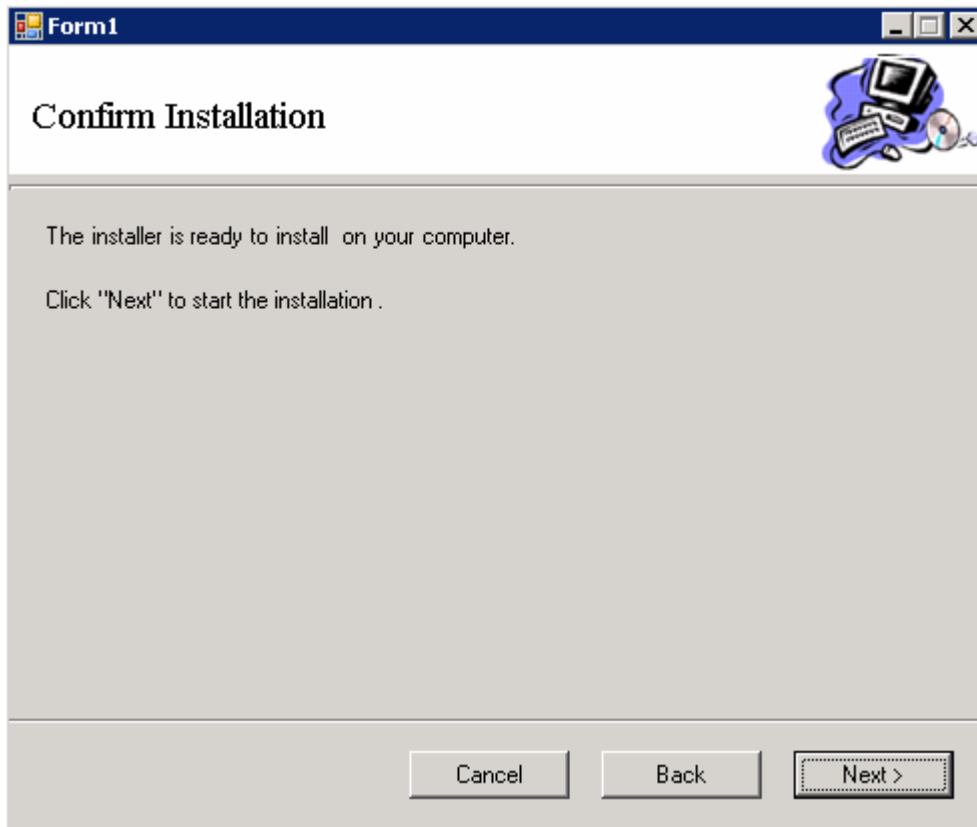
Click on "Next" to begin the installation.



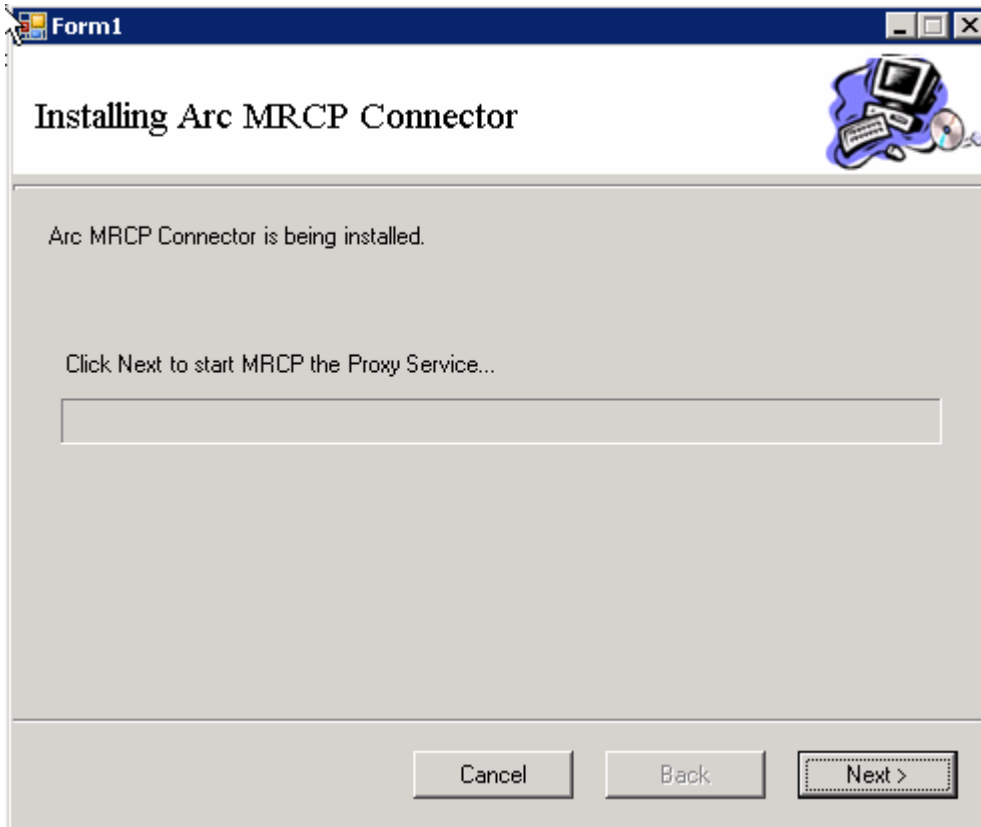
This screen allows you to select the installation directory. The default should not be changed.

Click on "Next" to continue.

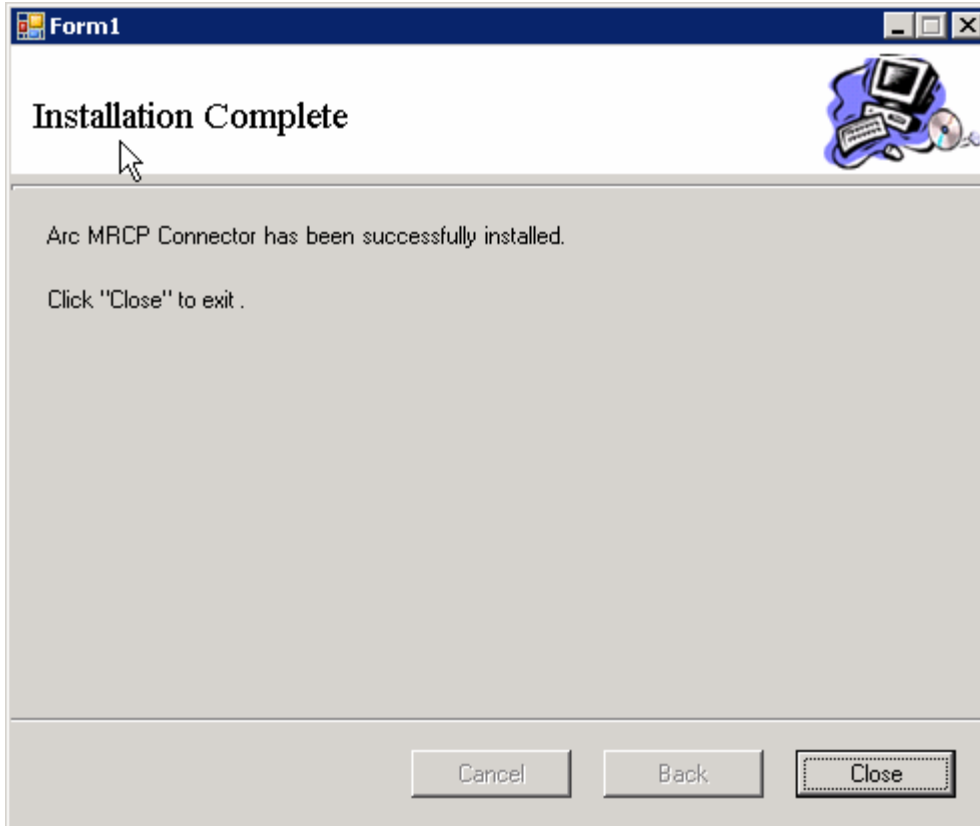




The installer is ready to begin installing the necessary components Click on "Next" to continue. When a DOS window pops up minimize it.



The installation is ready to start the ARC MRCP Proxy service. Click "Next" to continue.



Installation complete, click “Close” to exit.

#### 4.2.1 Change permissions

After the installation of the ARC MRCP Connector is complete the permissions on the C:\Program Files folder must be changed to Full Control for Users in the Properties for the folder.

## 5. Configuration

The only configuration parameter outside of the standard Microsoft Speech Server configuration for an application (see Microsoft Speech Server documentation for details on configuring an application) is for the ARC SIP Session Manager.

Edit the file: C:\Documents and Settings\Administrator\Desktop\Exec\TEL.cfg and change the following parameter:

```
SIP_MS2007IP=10.0.0.120
```

To read:

```
SIP_MS2007IP=<your IP address>
```

The ARC MRCP Connector has the following log file:

```
%Program Files%\Microsoft Office Communications Server 2007 Speech  
Server\Applications\ArcMrpcConnector\ArcMrpcConnector\conf
```

It has the following parameters:

Name	Description	Default Value
Logging Level	The primary level of the logs produced by the ARC MRCP Connector	NORMAL
SrResultParamName	The name of the return parameter for all built in grammars used in speech recognition events.	ARC_NONE
Days To Keep Logs	The number of days to retain the logs created by the ARC MRCP Connector	10

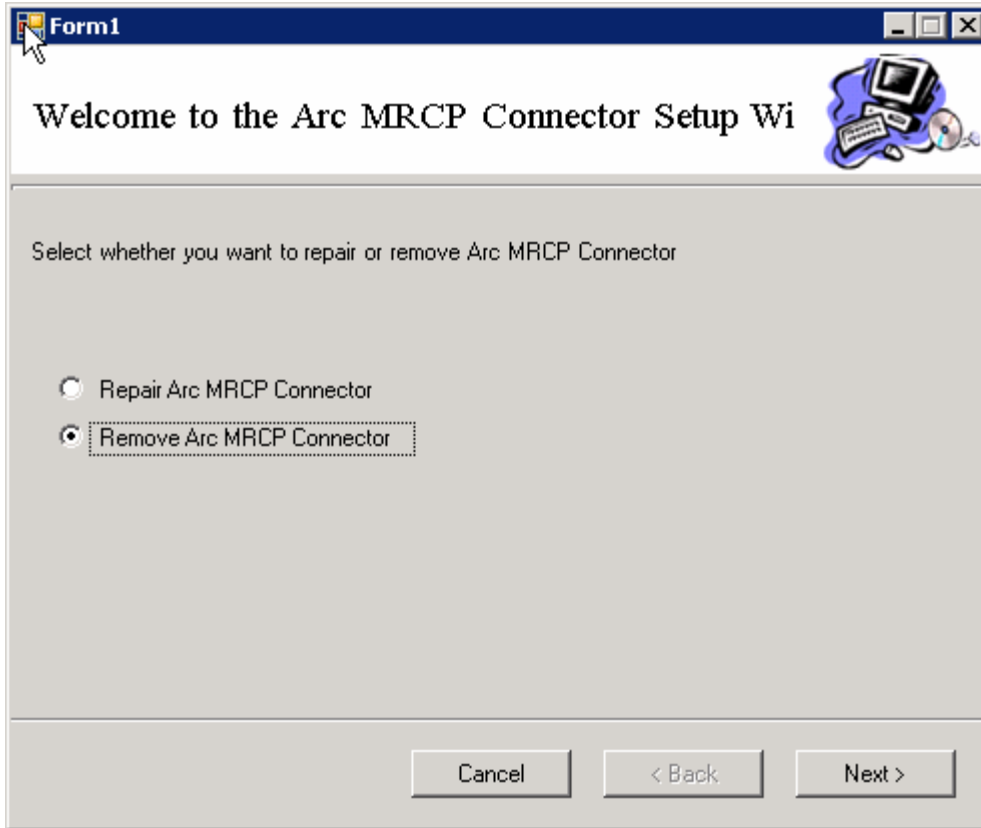
## 6. Removal

Before removing the ARC MRCP Connector solution, please be sure that the Microsoft Speech Server Service has been shut down and that the ArcSipSessionMgr.exe process is not running. The removal tool will not work if either of these is still running.

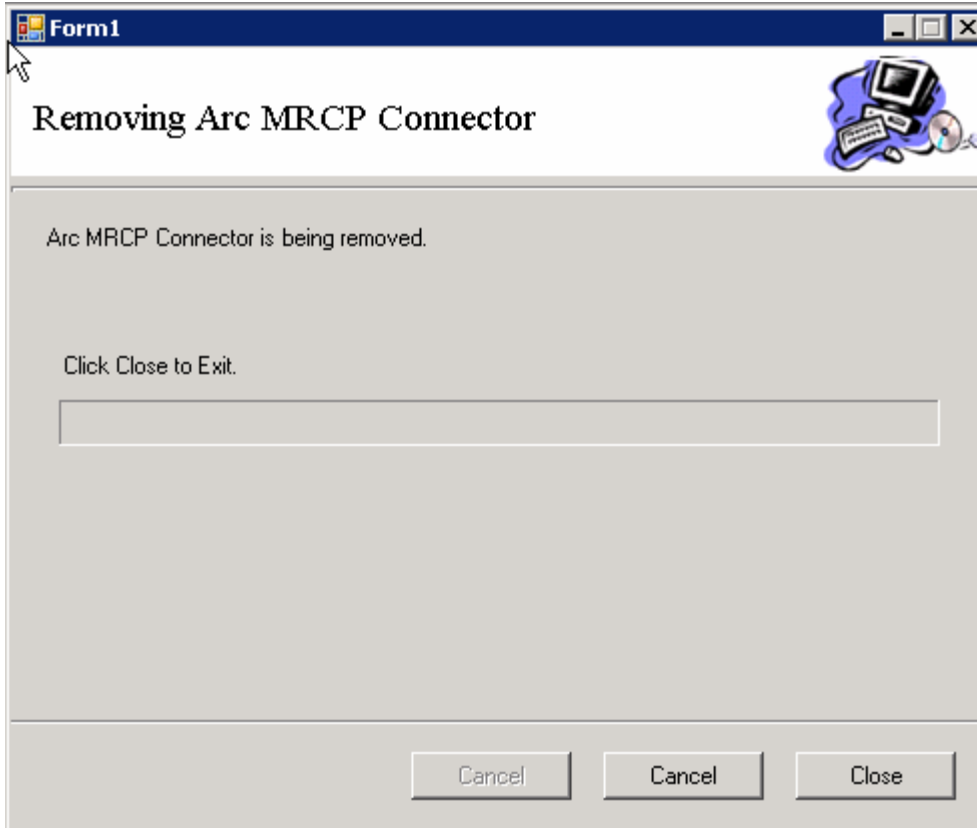
It is recommended that you back up the following files and directories before removing the ARC MRCP Connector Solution:

- %PROGRAM FILES%/Aumtech
- %PROGRAM FILES%\Microsoft Office Communications Server 2007 Speech Server\Applications\ArcMrpcConnector

To uninstall the ARC MRCP Connector solution, log in as the Administrator and go to the folder that was created in 4.1 in the %SYSTEM ROOT% (usually C:\) directory. Then run the "Setup.exe" file from the installation directory. You will be presented with the following screen.



Select "Remove Arc MRCP Connector" and click "Next" to continue.



Removal complete. Click "Close" to exit.

## 7. Grammar Changes for the Microsoft Speech Server

MSS has a few specific requirements for speech grammars as listed below. All applications must be changed to comply with this syntax.

1. Grammar Tag
  - add xmlns=<http://www.w3.org/2001/06/grammar>
  - if there are <tag> in the <item> then add tag-format="semantics-ms/1.0" in the grammar tag
  - if it's a voice grammar then add xml:lang="en-US"

Example of <grammar>

```
<grammar xmlns="http://www.w3.org/2001/06/grammar" xml:lang="en-US"
version="1.0"
tag-format="semantics-ms/1.0" root="rlAirline" mode="voice">
```

2. item with <tag>
  - change the following tag format
  - Alternate format:: <item tag = "returnvalue='PHX'">Phoenix</item>
  - MSS format:: <item><tag>\$.returnvalue="PHX"</tag>Phoenix</item>

## 8. MRCP 2.0 Operations Supported

The MRCP Connector supports the following MRCP V2 operations:

Client to Server	Server to Client
DEFINE GRAMMAR	RECOGNITION-COMPLETE
RECOGNIZE	IN-PROGRESS
SET-PARAMS	COMPLETE
GET-PARAMS	START-OF-INPUT
START-INPUT-TIMERS	

## 9. An Illustrative Sequence between MRCP 2.0 Client and MRCP Connector – Speech Recognition

MRCP 2.0 Client		MRCP Connector
		1. Connector starts listening on the next designated port
2. Sends DEFINE-GRAMMAR	---- >	2. Loads grammar
	< ----	3. 200 COMPLETE (if load successful) or 4xx error if load grammar fails. (Repeated 'n' times for 'n' grammars)
3. Sends RECOGNIZE with grammar list	--- >	4. Goes through grammar list to check if already loaded, responds with IN PROGRESS or 4xx
	< ---	IN PROGRESS or 4xx
6. Recognition timers	--- >	5. Start recognition – speech or DTMF
	< ---	7. Sets up timers 200 COMPLETE
		8. Logs START-OF-INPUT
		9. Waits for grammar match
	< ---	10. Sends recognition result – success or nomatch
7. Forwards results to application		

## 10. Illustrative Sequence between MRCP 2.0 Client and MRCP Connector from Aumtech Telecom Server

1. MRCP 2.0 Client (“Client”) send SIP INVITE to Connector.
2. Client sends DEFINE-GRAMMAR to Connector.

3. Client receives the 200 COMPLETE (or error) from Connector.

The above process repeats for "n" grammars.

T1, C1, T2, C2, C3, T3

4. Client sends RECOGNIZE (for starting the recog.) with the grammars.
5. Client sends START-INPUT-TIMERS to start the timer.

Wrote (MRCP/2.0 71 START-INPUT-TIMERS 3^M

Channel-Identifier:12@speechrecog^M

^M

) to socket fd 13: 71 bytes.

ISP|V|03:02:2007

11:21:51:066|SRC|3000|winsys.aumtechinc.com|1769|0|readMrcpSocket|mrpcClient2|INF: [SRCommon.cpp:536] Read 58 bytes:(MRCP/2.0 58 3 200 COMPLETE^M Completion-Cause:000 success^M)

6. Receives START-OF-INPUT. Sends a DMOP\_SPEECHDETECTED to SipMediaMgr. Read 72 bytes:(MRCP/2.0 72 START-OF-INPUT 6 IN-PROGRESS^M Completion-Cause:000 success^M)

ISP|V|03:02:2007 11:22:15:301|SRC|3000|winsys.aumtechinc.com|1769|-1|readMrcpSocket|mrpcClient2|INF: [SRCommon.cpp:621] received event(START-OF-INPUT).

ISP|V|03:02:2007

11:22:15:301|SRC|3000|winsys.aumtechinc.com|1769|0|sCheckForMrcpEvt|mrpcClient2|INF: [SRRecognizeV2.cpp:814] MRCP event response: rc=1; eventName=(START-OF-INPUT), completionCause=0; statusCode=0; serverState=(IN-PROGRESS).

ISP|V|03:02:2007

11:22:15:302|SRC|3000|winsys.aumtechinc.com|1769|0|sendSpeechDetected|mrpcClient2|INF: [SRCommon.cpp:957] Sent 256 bytes to dynmgr fifo.

msg={op:104,c#:0,pid:1811,ref:34,pw:0}

ISP|D|03:02:2007

11:22:15:310|DYN|1|winsys.aumtechinc.com|1749|0|readAndProcessAppRequests|ArcIPDynMgr|INF: [6271]Received 256 bytes.

msg={op:104<DMOP\_SPEECHDETECTED>,c#:0,pid:1811,ref:34,pw:0}

ISP|V|03:02:2007 11:22:15:311|DYN|1|winsys.aumtechinc.com|1749|-1|readAndProcessAppRequests|ArcIPDynMgr|INF: [6952]Waiting for app

requests.

ISP|D|03:02:2007

11:22:15:311|DYN|1|winsys.aumtechinc.com|1750|0|readAndProcessShmData|ArcSipMediaMgr|INF: [13710]Processing

op:104<DMOP\_SPEECHDETECTED>,call:0,ref:34,pid:1811:pid=1750

7. Receives RECOGNITION-COMPLETE with result (noinput / nomatch / good result).

ISP|V|03:02:2007

11:22:16:266|SRC|3000|winsys.aumtechinc.com|1769|0|readMrcpSocket|mrpcClient2|INF: [SRCommon.cpp:536] Read 367 bytes:(MRCP/2.0 367 RECOGNITION-COMPLETE 6 COMPLETE^M

Content-Type:application/mrcp^M

Completion-Cause:000 success^M



Content-Length:238^M

^M

```
<?xml version="1.0" ?><result><interpretation
grammar="grm_1811_13@winsys.aumtechinc.com" confidence="0.786522">
<input>Honolulu</input><instance><returnvalue confidence="0.786522">
HNL</returnvalue></instance></interpretation></result>
```

T4, C4, T5, C5, C6, T6, C7, T7