

Powered by Universal Speech Solutions LLC



Google Dialogflow Plugin

Usage Guide

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1 Overview

This guide describes how to configure and use the Google Dialogflow (GDF) plugin to the UniMRCP server. The document is intended for users having a certain knowledge of Google Dialogflow and UniMRCP.



1.1 Installation

For installation instructions, use one of the guides below.

- RPM Package Installation (Red Hat / Cent OS)
- Deb Package Installation (Debian / Ubuntu)

1.2 Applicable Versions

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



UniMRCP 1.5.0 and above
UniMRCP GDF Plugin 1.0.0 and above

2 Supported Features

This is a brief check list of the features currently supported by the UniMRCP server running with the GDF plugin.

2.1 MRCP Methods

- ✓ DEFINE-GRAMMAR
- ✓ RECOGNIZE
- ✓ START-INPUT-TIMERS
- ✓ STOP
- ✓ SET-PARAMS
- ✓ GET-PARAMS

2.2 MRCP Events

- ✓ RECOGNITION-COMPLETE
- ✓ START-OF-INPUT

2.3 MRCP Header Fields

- ✓ Input-Type
- ✓ No-Input-Timeout
- ✓ Recognition-Timeout
- ✓ Waveform-URI
- ✓ Media-Type
- ✓ Completion-Cause
- ✓ Confidence-Threshold
- ✓ Start-Input-Timers
- ✓ DTMF-Interdigit-Timeout
- ✓ DTMF-Term-Timeout
- ✓ DTMF-Term-Char
- ✓ Save-Waveform
- ✓ Speech-Language
- ✓ Cancel-If-Queue
- ✓ Sensitivity-Level

2.4 Grammars

- ✓ Built-in speech, event and DTMF grammars

2.5 Results

- ✓ NLSML
- ✓ JSON

3 Configuration Format

The configuration file of the GDF plugin is located in `/opt/unimrcp/conf/umsgdf.xml`. The configuration file is written in XML.

3.1 Document

The root element of the XML document must be `<umsgdf>`.

Attributes

Name	Unit	Description
license-file	File path	Specifies the license file. File name may include patterns containing '*' sign. If multiple files match the pattern, the most recent one gets used.
gapp-credentials-file	File path	Specifies the Google Application Credentials file to use. File name may include patterns containing '*' sign. If multiple files match the pattern, the most recent one gets used.

Parent

None.

Children

Name	Unit	Description
<streaming-recognition>	String	Specifies parameters of streaming recognition employed via gRPC.
<results>	String	Specifies parameters of recognition results set in RECOGNITION-COMPLETE events.
<builtin-grammars>	String	Contains a list of built-in grammars.
<speech-contexts>	String	Contains a list of speech contexts.
<speech-dtmf-input-detector>	String	Specifies parameters of the speech and DTMF input detector.
<utterance-manager>	String	Specifies parameters of the utterance manager.

<rdr-manager>	String	Specifies parameters of the Recognition Details Record (RDR) manager.
<monitoring-agent>	String	Specifies parameters of the monitoring manager.
<license-server>	String	Specifies parameters used to connect to the license server. The use of the license server is optional.

Example

This is an example of a bare document.

```
< umsgdf license-file="umsgdf_*.lic" gapp-credentials-file="*.json">
</ umsgdf>
```

3.2 Streaming Recognition

This element specifies parameters of streaming recognition.

Attributes

Name	Unit	Description
language	String	Specifies the default language to use, if not set by the client. For a list of supported languages, visit https://cloud.google.com/speech/docs/languages
interim-results	Boolean	Specifies whether to request interim results or not.
max-alternatives	Integer	Specifies the maximum number of speech recognition result alternatives to be returned. Can be overridden by client by means of the header field <i>N-Best-List-Length</i> .
project-id	String	Specifies a project ID associated to the corresponding Dialogflow agent.

Parent

<umsgdf>

Children

None.

Example

This is an example of streaming recognition element.

```
<streaming-recognition
  interim-results="false"
  language="en-US"
  max-alternatives="1"
  project-id=""
/>
```

3.3 Results

This element specifies parameters of recognition results set in RECOGNITION-COMPLETE events.

Availability

>= GDF 1.1.0.

Attributes

Name	Unit	Description
format	String	Specifies the format of results to be returned to the client (use "standard" for NLSML and "json" for JSON).
indent	Integer	Specifies the indent to use while composing the results.
replace-dots	Boolean	Specifies whether to replace '.' with '_' in the parameter names, used while composing an XML content.

Parent

<umsgdf>

Children

None.

Example

This is an example of results element.

```
<results
  format="standard"
  indent="0"
  replace-dots="true"
```

```
</>
```

3.4 Built-in Grammars

This element specifies a list of built-in grammars.

Availability

>= GDF 1.1.0.

Attributes

None.

Parent

<umsgdf>

Children

<builtin-grammar>

Example

The example below defines built-in boolean speech and DTMF grammars.

```
<builtin-grammars>  
  <builtin-grammar mode="speech" name="boolean" action="builtin.boolean" parameter-  
name="option" project-id=""/>  
  <builtin-grammar mode="dtmf" name="boolean" action="builtin.boolean" parameter-  
name="option" project-id="" length="1" input="event"/>  
</builtin-grammars>
```

3.5 Built-in Grammar

This element specifies a built-in grammar.

Availability

>= GDF 1.1.0.

Attributes

Name	Unit	Description
enable	Boolean	Specifies whether the speech context is enabled or disabled.

mode	String	Specifies the mode of the grammar: either "speech" or "dtmf".
name	String	Specifies the name of the grammar being referenced in MRCP requests.
action	String	Specifies the action name to be triggered by Dialogflow.
parameter-name	String	Specifies the parameter name to be set by Dialogflow.
project-id	String	Specifies an optional project ID associated to the corresponding Dialogflow agent. If not specified, the default one is used.

Parent

<builtin-grammars>

Children

None.

Example

This is an example of built-in Boolean speech grammar.

```
<builtin-grammar enable="false" mode="speech" name="boolean"
action="builtin.boolean" parameter-name="option" project-id=""/>
```

3.6 Speech Contexts

This element specifies a list of speech contexts.

Attributes

None.

Parent

<umsgdf>

Children

<speech-context>

Example

The example below defines a speech context *booking*.

```

<speech-contexts>
  <speech-context id="booking" enable="true">
    <phrase>I would like to book a flight from New York to Rome with a ticket eligible for
free cancellation</phrase>
    <phrase>I would like to book a one-way flight from New York to Rome</phrase>
  </speech-context>
</speech-contexts>

```

3.7 Speech Context

This element specifies a speech context.

Attributes

Name	Unit	Description
id	String	Specifies a unique string identifier of the speech context to be referenced by the MRCP client.
enable	Boolean	Specifies whether the speech context is enabled or disabled.

Parent

```
<speech-contexts>
```

Children

None.

Example

This is an example of speech context element.

```

<speech-context id="booking" enable="true">
  <phrase>I would like to book a flight from New York to Rome with a ticket eligible for
free cancellation</phrase>
  <phrase>I would like to book a one-way flight from New York to Rome</phrase>
</speech-context>

```

3.8 Speech and DTMF Input Detector

This element specifies parameters of the speech and DTMF input detector.

Attributes

Name	Unit	Description
vad-mode	Integer	Specifies an operating mode of VAD in the range of [0 ... 3]. Default is 1.
speech-start-timeout	Time interval [msec]	Specifies how long to wait in transition mode before triggering a start of speech input event.
speech-complete-timeout	Time interval [msec]	Specifies how long to wait in transition mode before triggering an end of speech input event.
noinput-timeout	Time interval [msec]	Specifies how long to wait before triggering a no-input event.
input-timeout	Time interval [msec]	Specifies how long to wait for input to complete.
dtmf-interdigit-timeout	Time interval [msec]	Specifies a DTMF inter-digit timeout.
dtmf-term-timeout	Time interval [msec]	Specifies a DTMF input termination timeout.
dtmf-term-char	Character	Specifies a DTMF input termination character.
speech-leading-silence	Time interval [msec]	Specifies desired silence interval preceding spoken input.
speech-trailing-silence	Time interval [msec]	Specifies desired silence interval following spoken input.
speech-output-period	Time interval [msec]	Specifies an interval used to send speech frames to the recognizer.

Parent

<umsgdf>

Children

None.

Example

The example below defines a typical speech and DTMF input detector having the default parameters set.

```

<speech-dtmf-input-detector
  speech-start-timeout="300"
  speech-complete-timeout="1000"
  noinput-timeout="5000"
  input-timeout="10000"
  dtmf-interdigit-timeout="5000"
  dtmf-term-timeout="10000"
  dtmf-term-char=""
  speech-leading-silence="300"
  speech-trailing-silence="300"
  speech-output-period="200"
/>

```

3.9 Utterance Manager

This element specifies parameters of the utterance manager.

Attributes

Name	Unit	Description
save-waveforms	Boolean	Specifies whether to save waveforms or not.
purge-existing	Boolean	Specifies whether to delete existing records on start-up.
max-file-age	Time interval [min]	Specifies a time interval in minutes after expiration of which a waveform is deleted. Set 0 for infinite.
max-file-count	Integer	Specifies the max number of waveforms to store. If reached, the oldest waveform is deleted. Set 0 for infinite.
waveform-base-uri	String	Specifies the base URI used to compose an absolute waveform URI.
waveform-folder	Dir path	Specifies a folder the waveforms should be stored in.

Parent

```
<umsgdf>
```

Children

None.

Example

The example below defines a typical utterance manager having the default parameters set.

```
<utterance-manager
  save-waveforms="false"
  purge-existing="false"
  max-file-age="60"
  max-file-count="100"
  waveform-base-uri="http://localhost/utterances/"
  waveform-folder=""
/>
```

3.10RDR Manager

This element specifies parameters of the Recognition Details Record (RDR) manager.

Attributes

Name	Unit	Description
save-records	Boolean	Specifies whether to save recognition details records or not.
purge-existing	Boolean	Specifies whether to delete existing records on start-up.
max-file-age	Time interval [min]	Specifies a time interval in minutes after expiration of which a record is deleted. Set 0 for infinite.
max-file-count	Integer	Specifies the max number of records to store. If reached, the oldest record is deleted. Set 0 for infinite.
record-folder	Dir path	Specifies a folder to store recognition details records in. Defaults to <code>\${UniMRCPIInstallDir}/var</code> .

Parent

<umsgdf>

Children

None.

Example

The example below defines a typical utterance manager having the default parameters set.

```
<rdr-manager
  save-records="false"
  purge-existing="false"
  max-file-age="60"
  max-file-count="100"
  waveform-folder=""
/>
```

3.11 Monitoring Agent

This element specifies parameters of the monitoring agent.

Attributes

Name	Unit	Description
refresh-period	Time interval [sec]	Specifies a time interval in seconds used to periodically refresh usage details. See <usage-refresh-handler>.

Parent

```
<umsgdf>
```

Children

```
<usage-change-handler>
<usage-refresh-handler>
```

Example

The example below defines a monitoring agent with usage change and refresh handlers.

```
<monitoring-agent refresh-period="60">
  <usage-change-handler>
    <log-usage enable="true" priority="NOTICE"/>
  </usage-change-handler>
  <usage-refresh-handler>
    <dump-channels enable="true" status-file="umsgdf-channels.status"/>
  </usage-refresh-handler >
```



```
</monitoring-agent>
```

3.12 Usage Change Handler

This element specifies an event handler called on every usage change.

Attributes

None.

Parent

```
<monitoring-agent>
```

Children

```
<log-usage>  
<update-usage>  
<dump-channels>
```

Example

This is an example of the usage change event handler.

```
<usage-change-handler>  
  <log-usage enable="true" priority="NOTICE"/>  
  <update-usage enable="false" status-file="umsgdf-usage.status"/>  
  <dump-channels enable="false" status-file="umsgdf-channels.status"/>  
</usage-change-handler>
```

3.13 Usage Refresh Handler

This element specifies an event handler called periodically to update usage details.

Attributes

None.

Parent

```
<monitoring-agent>
```

Children

```
<log-usage>  
<update-usage>  
<dump-channels>
```

Example

This is an example of the usage change event handler.

```
<usage-refresh-handler>
  <log-usage enable="true" priority="NOTICE"/>
  <update-usage enable="false" status-file="umsgdf-usage.status"/>
  <dump-channels enable="false" status-file="umsgdf-channels.status"/>
</usage-refresh-handler>
```

3.14 License Server

This element specifies parameters used to connect to the license server.

Attributes

Name	Unit	Description
enable	Boolean	Specifies whether the use of license server is enabled or not. If enabled, the license-file attribute is not honored.
server-address	String	Specifies the IP address or host name of the license server.
certificate-file	File path	Specifies the client certificate used to connect to the license server. File name may include patterns containing a '*' sign. If multiple files match the pattern, the most recent one gets used.
ca-file	File path	Specifies the certificate authority used to validate the license server.
channel-count	Integer	Specifies the number of channels to check out from the license server. If not specified or set to 0, either all available channels or a pool of channels will be checked based on the configuration of the license server.

Parent

<umsgdf>

Children

None.

Example

The example below defines a typical configuration which can be used to connect to a license server located, for example, at 10.0.0.1.

```
<license-server
  enable="true"
  server-address="10.0.0.1"
  certificate-file="unilic_client_*.cert"
  ca-file="unilic_ca.crt"
/>
```

For further reference to the license server, visit

<http://unimrcp.org/licserver>

4 Configuration Steps

This section outlines common configuration steps.

4.1 Using Default Configuration

The default configuration should be sufficient for the general use.

4.2 Specifying Dialogflow Agent

A Dialogflow agent is associated by the corresponding Google Project ID.

<https://dialogflow.com/docs/agents#settings>

The Project ID is specified in the configuration file *umsgdf.xml* by the parameter *project-id* in the element `<streaming-recognition>`. For example:

```
<streaming-recognition
  interim-results="false"
  language="en-US"
  max-alternatives="1"
  project-id="abcdefgh-ijklmn-123456"
/>
```

The Project ID can also be specified per individual MRCP RECOGNIZE request as a query input attribute to the built-in speech grammar.

```
builtin:speech/transcribe?projectid= abcdefgh-ijklmn-123456
```

4.3 Specifying Recognition Language

Recognition language can be specified by the client per MRCP session by means of the header field *Speech-Language* set in a *SET-PARAMS* or *RECOGNIZE* request. Otherwise, the parameter *language* set in the configuration file *umsgdf.xml* is used. The parameter defaults to *en-US*.

For supported languages and their corresponding codes, visit the following link.

<https://cloud.google.com/speech/docs/languages>

4.4 Specifying Sampling Rate

Sampling rate is determined based on the SDP negotiation. Refer to the configuration guide of the

UniMRCP server on how to specify supported encodings and sampling rates to be used in communication between the client and server.

The native sampling rate with the linear16 audio encoding is used in gRPC streaming to the Google Dialogflow service.

4.5 Specifying Speech Input Parameters

While the default parameters specified for the speech input detector are sufficient for the general use, various parameters can be adjusted to better suit a particular requirement.

- `speech-start-timeout`

This parameter is used to trigger a start of speech input. The shorter is the timeout, the sooner a *START-OF-INPUT* event is delivered to the client. However, a short timeout may also lead to a false positive.

- `speech-complete-timeout`

This parameter is used to trigger an end of speech input. The shorter is the timeout, the shorter is the response time. However, a short timeout may also lead to a false positive.

Note that both events, an expiration of the speech complete timeout and an *END-OF-SINGLE-UTTERANCE* response delivered from the Google Dialogflow service, are monitored to trigger an end of speech input, on whichever comes first basis. In order to rely solely on an event delivered from the speech service, the parameter *speech-complete-timeout* needs to be set to a higher value.

- `vad-mode`

This parameter is used to specify an operating mode of the Voice Activity Detector (VAD) within an integer range of [0 ... 3]. A higher mode is more aggressive and, as a result, is more restrictive in reporting speech. The parameter can be overridden per MRCP session by setting the header field *Sensitivity-Level* in a *SET-PARAMS* or *RECOGNIZE* request. The following table shows how the *Sensitivity-Level* is mapped to the *vad-mode*.

Sensitivity-Level	Vad-Mode
[0.00 ... 0.25)	0
[0.25 ... 0.50)	1
[0.50 ... 0.75)	2
[0.75 ... 1.00]	3

4.6 Specifying DTMF Input Parameters

While the default parameters specified for the DTMF input detector are sufficient for the general use, various parameters can be adjusted to better suit a particular requirement.

- `dtmf-interdigit-timeout`

This parameter is used to set an inter-digit timeout on DTMF input. The parameter can be overridden per MRCP session by setting the header field *DTMF-Interdigit-Timeout* in a *SET-PARAMS* or

RECOGNIZE request.

- dtmf-term-timeout

This parameter is used to set a termination timeout on DTMF input and is in effect when dtmf-term-char is set and there is a match for an input grammar. The parameter can be overridden per MRCP session by setting the header field *DTMF-Term-Timeout* in a *SET-PARAMS* or *RECOGNIZE* request.

- dtmf-term-char

This parameter is used to set a character terminating DTMF input. The parameter can be overridden per MRCP session by setting the header field *DTMF-Term-Char* in a *SET-PARAMS* or *RECOGNIZE* request.

4.7 Specifying No-Input and Recognition Timeouts

- noinput-timeout

This parameter is used to trigger a no-input event. The parameter can be overridden per MRCP session by setting the header field *No-Input-Timeout* in a *SET-PARAMS* or *RECOGNIZE* request.

- input-timeout

This parameter is used to limit input (recognition) time. The parameter can be overridden per MRCP session by setting the header field *Recognition-Timeout* in a *SET-PARAMS* or *RECOGNIZE* request.

4.8 Maintaining Utterances

Saving of utterances is not required for regular operation and is disabled by default. However, enabling this functionality allows to save utterances sent to the Google Dialogflow service and later listen to them offline.

The relevant settings can be specified via the element *utterance-manager*.

- save-waveforms

Utterances can optionally be recorded and stored if the configuration parameter *save-waveforms* is set to true. The parameter can be overridden per MRCP session by setting the header field *Save-Waveforms* in a *SET-PARAMS* or *RECOGNIZE* request.

- purge-existing

This parameter specifies whether to delete existing waveforms on start-up.

- max-file-age

This parameter specifies a time interval in minutes after expiration of which a waveform is deleted. If set to 0, there is no expiration time specified.

- max-file-count

This parameter specifies the maximum number of waveforms to store. If the specified number is reached, the oldest waveform is deleted. If set to 0, there is no limit specified.

- waveform-base-uri

This parameter specifies the base URI used to compose an absolute waveform URI returned in the header field *Waveform-Uri* in response to a RECOGNIZE request.

- waveform-folder

This parameter specifies a path to the directory used to store waveforms in. The directory defaults to *\${UniMRCPInstallDir}/var*.

4.9 Maintaining Recognition Details Records

Producing of recognition details records (RDR) is not required for regular operation and is disabled by default. However, enabling this functionality allows to store details of each recognition attempt in a separate file and analyze them later offline. The RDRs are stored in the JSON format.

The relevant settings can be specified via the element *rdr-manager*.

- save-records

This parameter specifies whether to save recognition details records or not.

- purge-existing

This parameter specifies whether to delete existing records on start-up.

- max-file-age

This parameter specifies a time interval in minutes after expiration of which a record is deleted. If set to 0, there is no expiration time specified.

- max-file-count

This parameter specifies the maximum number of records to store. If the specified number is reached, the oldest record is deleted. If set to 0, there is no limit specified.

- record-folder

This parameter specifies a path to the directory used to store records in. The directory defaults to *\${UniMRCPInstallDir}/var*.

4.10 Monitoring Usage Details

The number of in-use and total licensed channels can be monitored in several alternate ways. There is a set of actions which can take place on certain events. The behavior is configurable via the element *monitoring-agent*, which contains two event handlers: *usage-change-handler* and *usage-refresh-handler*.

While the *usage-change-handler* is invoked on every acquisition and release of a licensed channel, the *usage-refresh-handler* is invoked periodically on expiration of a timeout specified by the attribute *refresh-period*.

The following actions can be specified for either of the two handlers.

- log-usage

This action logs the number of in-use and total licensed channels. The following is a sample log statement, indicating 0 in-use and 2 total channels.

```
[NOTICE] GDF Usage: 0/2
```

- update-usage

This action writes the number of in-use and total licensed channels to a status file *umsgdf-usage.status*, located by default in the directory *\${UniMRCPInstallDir}/var/status*. The following is a sample content of the status file.

```
in-use channels: 0  
total channels: 2
```

- dump-channels

This action writes the identifiers of in-use channels to a status file *umsgdf-channels.status*, located by default in the directory *\${UniMRCPInstallDir}/var/status*.

5 Recognition Grammars and Results

5.1 Using Built-in Speech Grammar

A pre-set built-in speech grammar can be referenced by the MRCP client in a RECOGNIZE request as follows:

```
builtin:speech/transcribe
```

As a result, the Dialogflow [QueryInput](#) parameter will be initialized to [InputAudioConfig](#).

5.2 Using Built-in Event Grammars

Pre-set built-in event grammars can be referenced by the MRCP client in a RECOGNIZE request as follows:

```
builtin:event/$id
```

As a result, the Dialogflow [QueryInput](#) parameter will be initialized to [EventInput](#), an event that specifies which intent to trigger, where \$id must be replaced with the event name.

5.3 Using Built-in DTMF Grammars

Pre-set built-in DTMF grammars can be referenced by the MRCP client in a RECOGNIZE request as follows:

```
builtin:dtmf/$id
```

As a result, the Dialogflow [QueryInput](#) parameter will be initialized to [EventInput](#), an event that specifies which intent to trigger, where \$id must be replaced with the event name.

5.4 Retrieving Results

Results received from the Google Dialogflow service are transformed to one of the following formats

- NLSML
- JSON

and sent to the MRCP client in a *RECOGNITION-COMplete* event.

Recognition results settings can be specified in the configuration file in the element *results*.

In case of NLSML results, the *<instance>* element contains an XML representation of the QueryResult structure received as a response to StreamingDetectIntent request.

6 Usage Examples

6.1 Room Reservation

This example demonstrates an MRCP message exchange based on a conversation with the sample Dialogflow room reservation agent.

Step 1

Input: book a room

C->S:

```
MRCP/2.0 361 RECOGNIZE 1
Channel-Identifier: 66122953e5be8b4a@speechrecog
Content-Id: request1@form-level
Content-Type: text/uri-list
Cancel-If-Queue: false
No-Input-Timeout: 50000
Recognition-Timeout: 10000
Start-Input-Timers: true
Confidence-Threshold: 0.87
Sensitivity-Level: 0.5
Save-Waveform: true
Content-Length: 25

builtin:speech/transcribe
```

S->C:

```
MRCP/2.0 83 1 200 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
```

S->C:

```
MRCP/2.0 115 START-OF-INPUT 1 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
Input-Type: speech
```

S->C:

MRCP/2.0 3506 RECOGNITION-COMplete 1 COMPLETE
Channel-Identifier: 66122953e5be8b4a@speechrecog
Completion-Cause: 000 success
Waveform-Uri: <http://localhost/utterances/umsgdf-66122953e5be8b4a-1.wav>;size=36480;duration=1140
Content-Type: application/x-nlsml
Content-Length: 3219

```
<?xml version="1.0"?>
<result>
  <interpretation grammar="builtin:speech/transcribe" confidence="1">
    <instance>
      <query_text>book a room</query_text>
      <action>room.reservation</action>
      <parameters>
        <guests></guests>
        <duration></duration>
        <location></location>
        <time></time>
        <date></date>
      </parameters>
      <fulfillment_text>I can help with that. Where would you like to reserve a room?</fulfillment_text>
      <fulfillment_messages>
        <text>
          <text>I can help with that. Where would you like to reserve a room?</text>
        </text>
        <platform>FACEBOOK</platform>
      </fulfillment_messages>
      <fulfillment_messages>
        <text>
          <text>I can help with that. Where would you like to reserve a room?</text>
        </text>
      </fulfillment_messages>
      <output_contexts>
        <name>projects/abcdefgh-igklm-123456/agent/sessions/66122953e5be8b4a/contexts/e8f6a63e-73da-4a1a-8bfc-857183f71228_id_dialog_context</name>
        <lifespan_count>2</lifespan_count>
        <parameters>
          <duration_original></duration_original>
          <time_original></time_original>
          <guests_original></guests_original>
          <location_original></location_original>
          <date_original></date_original>
          <duration></duration>
          <guests></guests>
          <location></location>
          <time></time>
          <date></date>
```

```

    </parameters>
  </output_contexts>
  <output_contexts>
    <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_params_location
</name>
    <lifespan_count>1</lifespan_count>
    <parameters>
      <guests></guests>
      <duration></duration>
      <location></location>
      <time></time>
      <date></date>
      <duration_original></duration_original>
      <time_original></time_original>
      <guests_original></guests_original>
      <location_original></location_original>
      <date_original></date_original>
    </parameters>
  </output_contexts>
  <output_contexts>
    <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_context</name>
    <lifespan_count>2</lifespan_count>
    <parameters>
      <duration_original></duration_original>
      <time_original></time_original>
      <guests_original></guests_original>
      <location_original></location_original>
      <date_original></date_original>
      <guests></guests>
      <duration></duration>
      <location></location>
      <time></time>
      <date></date>
    </parameters>
  </output_contexts>
  <intent>
    <name>projects/abcdefgh-igklm-123456/agent/intents/e8f6a63e-73da-4a1a-8bfc-
857183f71228</name>
    <display_name>room.reservation</display_name>
  </intent>
  <intent_detection_confidence>1</intent_detection_confidence>
  <diagnostic_info>
</diagnostic_info>
  <language_code>en-us</language_code>
</instance>
  <input mode="speech">book a room</input>
</interpretation>
</result>

```

Step 2

Input: Mountain View

C->S:

```
MRCP/2.0 361 RECOGNIZE 2
Channel-Identifier: 66122953e5be8b4a@speechrecog
Content-Id: request1@form-level
Content-Type: text/uri-list
Cancel-If-Queue: false
No-Input-Timeout: 50000
Recognition-Timeout: 10000
Start-Input-Timers: true
Confidence-Threshold: 0.87
Sensitivity-Level: 0.5
Save-Waveform: true
Content-Length: 25

builtin:speech/transcribe
```

S->C:

```
MRCP/2.0 83 2 200 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
```

S->C:

```
MRCP/2.0 115 START-OF-INPUT 2 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
Input-Type: speech
```

S->C:

```
MRCP/2.0 3918 RECOGNITION-COMPLETE 2 COMPLETE
Channel-Identifier: 66122953e5be8b4a@speechrecog
Completion-Cause: 000 success
Waveform-Uri: <http://localhost/utterances/umsgdf-66122953e5be8b4a-
2.wav>;size=39680;duration=1240
Content-Type: application/x-nlsml
```

Content-Length: 3631

```
<?xml version="1.0"?>
<result>
  <interpretation grammar="builtin:speech/transcribe" confidence="1">
    <instance>
      <query_text>Mountain View</query_text>
      <action>room.reservation</action>
      <parameters>
        <guests></guests>
        <duration></duration>
        <location>
          <city>Mountain View</city>
        </location>
        <time></time>
        <date></date>
      </parameters>
      <fulfillment_text>What date?</fulfillment_text>
      <fulfillment_messages>
        <text>
          <text>What date?</text>
        </text>
        <platform>FACEBOOK</platform>
      </fulfillment_messages>
      <fulfillment_messages>
        <text>
          <text>What date?</text>
        </text>
      </fulfillment_messages>
      <output_contexts>
        <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/e8f6a63e-73da-4a1a-8bfc-
857183f71228_id_dialog_context</name>
        <lifespan_count>2</lifespan_count>
        <parameters>
          <duration_original></duration_original>
          <time_original></time_original>
          <guests_original></guests_original>
          <location_original>Mountain View</location_original>
          <date_original></date_original>
          <duration></duration>
          <guests></guests>
          <location>
            <city_object>
              </city_object>
            <city>Mountain View</city>
            <city_original>Mountain View</city_original>
          </location>
          <time></time>
          <date></date>
        </parameters>
```

```

</output_contexts>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_params_date</n
ame>
  <lifespan_count>1</lifespan_count>
  <parameters>
    <duration_original></duration_original>
    <time_original></time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original></date_original>
    <duration></duration>
    <guests></guests>
    <location>
      <city_object>
        </city_object>
        <city>Mountain View</city>
        <city_original>Mountain View</city_original>
      </location>
    <time></time>
    <date></date>
  </parameters>
</output_contexts>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_context</name>
  <lifespan_count>2</lifespan_count>
  <parameters>
    <duration_original></duration_original>
    <time_original></time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original></date_original>
    <guests></guests>
    <duration></duration>
    <location>
      <city_object>
        </city_object>
        <city>Mountain View</city>
        <city_original>Mountain View</city_original>
      </location>
    <time></time>
    <date></date>
  </parameters>
</output_contexts>
<intent>
  <name>projects/abcdefgh-igklm-123456/agent/intents/e8f6a63e-73da-4a1a-8bfc-
857183f71228</name>
  <display_name>room.reservation</display_name>
</intent>

```



```
<intent_detection_confidence>1</intent_detection_confidence>
<diagnostic_info>
</diagnostic_info>
<language_code>en-us</language_code>
</instance>
<input mode="speech">Mountain View</input>
</interpretation>
</result>
```

Step 3

Input: Today

C->S:

```
MRCP/2.0 361 RECOGNIZE 3
Channel-Identifier: 66122953e5be8b4a@speechrecog
Content-Id: request1@form-level
Content-Type: text/uri-list
Cancel-If-Queue: false
No-Input-Timeout: 50000
Recognition-Timeout: 10000
Start-Input-Timers: true
Confidence-Threshold: 0.87
Sensitivity-Level: 0.5
Save-Waveform: true
Content-Length: 25

builtin:speech/transcribe
```

S->C:

```
MRCP/2.0 83 3 200 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
```

S->C:

```
MRCP/2.0 115 START-OF-INPUT 3 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
Input-Type: speech
```

S->C:

MRCP/2.0 4085 RECOGNITION-COMPLETE 3 COMPLETE
Channel-Identifier: 66122953e5be8b4a@speechrecog
Completion-Cause: 000 success
Waveform-Uri: <http://localhost/utterances/umsgdf-66122953e5be8b4a-3.wav>;size=27840;duration=870
Content-Type: application/x-nlsml
Content-Length: 3799

```
<?xml version="1.0"?>
<result>
  <interpretation grammar="builtin:speech/transcribe" confidence="1">
    <instance>
      <query_text>today</query_text>
      <action>room.reservation</action>
      <parameters>
        <guests></guests>
        <duration></duration>
        <location>
          <city>Mountain View</city>
        </location>
        <time></time>
        <date>2017-12-29T12:00:00-05:00</date>
      </parameters>
      <fulfillment_text>What time will the meeting start?</fulfillment_text>
      <fulfillment_messages>
        <text>
          <text>What time will the meeting start?</text>
        </text>
        <platform>FACEBOOK</platform>
      </fulfillment_messages>
      <fulfillment_messages>
        <text>
          <text>What time will the meeting start?</text>
        </text>
      </fulfillment_messages>
      <output_contexts>
        <name>projects/abcdefghijklm-123456/agent/sessions/66122953e5be8b4a/contexts/e8f6a63e-73da-4a1a-8bfc-857183f71228_id_dialog_context</name>
        <lifespan_count>2</lifespan_count>
        <parameters>
          <duration_original></duration_original>
          <time_original></time_original>
          <guests_original></guests_original>
          <location_original>Mountain View</location_original>
          <date_original>today</date_original>
          <guests></guests>
          <duration></duration>
          <location>
```

```

    <city_object>
  </city_object>
  <city>Mountain View</city>
  <city_original>Mountain View</city_original>
</location>
<time></time>
<date>2017-12-29T12:00:00-05:00</date>
</parameters>
</output_contexts>
<output_contexts>
  <name>projects/composed-maxim-
162917/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_context</name>
  <lifespan_count>2</lifespan_count>
  <parameters>
    <duration_original></duration_original>
    <time_original></time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original>today</date_original>
    <guests></guests>
    <duration></duration>
    <location>
      <city_object>
    </city_object>
    <city>Mountain View</city>
    <city_original>Mountain View</city_original>
  </location>
    <time></time>
    <date>2017-12-29T12:00:00-05:00</date>
  </parameters>
</output_contexts>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_params_time</n
ame>
  <lifespan_count>1</lifespan_count>
  <parameters>
    <duration_original></duration_original>
    <time_original></time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original>today</date_original>
    <guests></guests>
    <duration></duration>
    <location>
      <city_object>
    </city_object>
    <city>Mountain View</city>
    <city_original>Mountain View</city_original>
  </location>
    <time></time>

```

```
<date>2017-12-29T12:00:00-05:00</date>
</parameters>
</output_contexts>
<intent>
  <name>projects/abcdefgh-igklm-123456/agent/intents/e8f6a63e-73da-4a1a-8bfc-
857183f71228</name>
  <display_name>room.reservation</display_name>
</intent>
<intent_detection_confidence>1</intent_detection_confidence>
<diagnostic_info>
</diagnostic_info>
<language_code>en-us</language_code>
</instance>
<input mode="speech">today</input>
</interpretation>
</result>
```

Step 4

Input: 2:30 p.m.

C->S:

```
MRCP/2.0 361 RECOGNIZE 4
Channel-Identifier: 66122953e5be8b4a@speechrecog
Content-Id: request1@form-level
Content-Type: text/uri-list
Cancel-If-Queue: false
No-Input-Timeout: 50000
Recognition-Timeout: 10000
Start-Input-Timers: true
Confidence-Threshold: 0.87
Sensitivity-Level: 0.5
Save-Waveform: true
Content-Length: 25

builtin:speech/transcribe
```

S->C:

```
MRCP/2.0 83 4 200 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
```

S->C:

MRCP/2.0 115 START-OF-INPUT 4 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
Input-Type: speech

S->C:

MRCP/2.0 4192 RECOGNITION-COMplete 4 COMPLETE
Channel-Identifier: 66122953e5be8b4a@speechrecog
Completion-Cause: 000 success
Waveform-Uri: <http://localhost/utterances/umsgdf-66122953e5be8b4a-4.wav>;size=60160;duration=1880
Content-Type: application/x-nlsml
Content-Length: 3905

```
<?xml version="1.0"?>
<result>
  <interpretation grammar="builtin:speech/transcribe" confidence="1">
    <instance>
      <query_text>2:30 p.m.</query_text>
      <action>room.reservation</action>
      <parameters>
        <guests></guests>
        <duration></duration>
        <location>
          <city>Mountain View</city>
        </location>
        <time>2017-12-29T14:30:00-05:00</time>
        <date>2017-12-29T12:00:00-05:00</date>
      </parameters>
      <fulfillment_text>How long will it last?</fulfillment_text>
      <fulfillment_messages>
        <text>
          <text>How long will it last?</text>
        </text>
        <platform>FACEBOOK</platform>
      </fulfillment_messages>
      <fulfillment_messages>
        <text>
          <text>How long will it last?</text>
        </text>
      </fulfillment_messages>
      <output_contexts>
        <name>projects/abcdefghijklm-123456/agent/sessions/66122953e5be8b4a/contexts/e8f6a63e-73da-4a1a-8bfc-857183f71228_id_dialog_context</name>
        <lifespan_count>2</lifespan_count>
      </parameters>
    </instance>
  </interpretation>
</result>
```

```

    <duration_original></duration_original>
    <time_original>2:30 p.m.</time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original>today</date_original>
    <guests></guests>
    <duration></duration>
    <location>
      <city_object>
        </city_object>
        <city>Mountain View</city>
        <city_original>Mountain View</city_original>
      </location>
    <time>2017-12-29T14:30:00-05:00</time>
    <date>2017-12-29T12:00:00-05:00</date>
  </parameters>
</output_contexts>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_context</name>
  <lifespan_count>2</lifespan_count>
  <parameters>
    <duration_original></duration_original>
    <time_original>2:30 p.m.</time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original>today</date_original>
    <duration></duration>
    <guests></guests>
    <location>
      <city_object>
        </city_object>
        <city>Mountain View</city>
        <city_original>Mountain View</city_original>
      </location>
    <time>2017-12-29T14:30:00-05:00</time>
    <date>2017-12-29T12:00:00-05:00</date>
  </parameters>
</output_contexts>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_params_duratio
n</name>
  <lifespan_count>1</lifespan_count>
  <parameters>
    <guests></guests>
    <duration></duration>
    <location>
      <city_object>
        </city_object>
        <city>Mountain View</city>

```

```

    <city_original>Mountain View</city_original>
  </location>
  <time>2017-12-29T14:30:00-05:00</time>
  <date>2017-12-29T12:00:00-05:00</date>
  <duration_original></duration_original>
  <time_original>2:30 p.m.</time_original>
  <guests_original></guests_original>
  <location_original>Mountain View</location_original>
  <date_original>today</date_original>
</parameters>
</output_contexts>
<intent>
  <name>projects/abcdefghijklm-123456/agent/intents/e8f6a63e-73da-4a1a-8bfc-
857183f71228</name>
  <display_name>room.reservation</display_name>
</intent>
<intent_detection_confidence>1</intent_detection_confidence>
<diagnostic_info>
</diagnostic_info>
<language_code>en-us</language_code>
</instance>
<input mode="speech">2:30 p.m.</input>
</interpretation>
</result>

```

Step 5

Input: half an hour

C->S:

```

MRCP/2.0 361 RECOGNIZE 5
Channel-Identifier: 66122953e5be8b4a@speechrecog
Content-Id: request1@form-level
Content-Type: text/uri-list
Cancel-If-Queue: false
No-Input-Timeout: 50000
Recognition-Timeout: 10000
Start-Input-Timers: true
Confidence-Threshold: 0.87
Sensitivity-Level: 0.5
Save-Waveform: true
Content-Length: 25

builtin:speech/transcribe

```

S->C:

MRCP/2.0 83 5 200 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog

S->C:

MRCP/2.0 115 START-OF-INPUT 5 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
Input-Type: speech

S->C:

MRCP/2.0 4562 RECOGNITION-COMPLETE 5 COMPLETE
Channel-Identifier: 66122953e5be8b4a@speechrecog
Completion-Cause: 000 success
Waveform-Uri: <http://localhost/utterances/umsgdf-66122953e5be8b4a-5.wav>;size=40960;duration=1280
Content-Type: application/x-nlsml
Content-Length: 4275

```
<?xml version="1.0"?>
<result>
  <interpretation grammar="builtin:speech/transcribe" confidence="1">
    <instance>
      <query_text>half an hour</query_text>
      <action>room.reservation</action>
      <parameters>
        <guests></guests>
        <duration>
          <amount>30</amount>
          <unit>min</unit>
        </duration>
        <location>
          <city>Mountain View</city>
        </location>
        <time>2017-12-29T14:30:00-05:00</time>
        <date>2017-12-29T12:00:00-05:00</date>
      </parameters>
      <fulfillment_text>Thanks. How many people are attending?</fulfillment_text>
      <fulfillment_messages>
        <text>
          <text>Thanks. How many people are attending?</text>
        </text>
        <platform>FACEBOOK</platform>
      </fulfillment_messages>
    </instance>
  </interpretation>
</result>
```



```

<fulfillment_messages>
  <text>
    <text>Thanks. How many people are attending?</text>
  </text>
</fulfillment_messages>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/e8f6a63e-73da-4a1a-8bfc-
857183f71228_id_dialog_context</name>
  <lifespan_count>2</lifespan_count>
  <parameters>
    <guests></guests>
    <duration>
      <amount>30</amount>
      <unit>min</unit>
    </duration>
    <location>
      <city_object>
        </city_object>
      <city>Mountain View</city>
      <city_original>Mountain View</city_original>
    </location>
    <time>2017-12-29T14:30:00-05:00</time>
    <date>2017-12-29T12:00:00-05:00</date>
    <duration_original>half an hour</duration_original>
    <time_original>2:30 p.m.</time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original>today</date_original>
  </parameters>
</output_contexts>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_params_guests<
/name>
  <lifespan_count>1</lifespan_count>
  <parameters>
    <duration_original>half an hour</duration_original>
    <time_original>2:30 p.m.</time_original>
    <guests_original></guests_original>
    <location_original>Mountain View</location_original>
    <date_original>today</date_original>
    <guests></guests>
    <duration>
      <amount>30</amount>
      <unit>min</unit>
    </duration>
    <location>
      <city_object>
        </city_object>
      <city>Mountain View</city>

```

```

    <city_original>Mountain View</city_original>
  </location>
  <time>2017-12-29T14:30:00-05:00</time>
  <date>2017-12-29T12:00:00-05:00</date>
</parameters>
</output_contexts>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/room_reservation_dialog_context</name>
  <lifespan_count>2</lifespan_count>
  <parameters>
    <guests></guests>
    <duration>
      <amount>30</amount>
      <unit>min</unit>
    </duration>
    <location>
      <city_object>
        </city_object>
        <city>Mountain View</city>
        <city_original>Mountain View</city_original>
      </location>
      <time>2017-12-29T14:30:00-05:00</time>
      <date>2017-12-29T12:00:00-05:00</date>
      <duration_original>half an hour</duration_original>
      <time_original>2:30 p.m.</time_original>
      <guests_original></guests_original>
      <location_original>Mountain View</location_original>
      <date_original>today</date_original>
    </parameters>
  </output_contexts>
<intent>
  <name>projects/abcdefgh-igklm-123456/agent/intents/e8f6a63e-73da-4a1a-8bfc-
857183f71228</name>
  <display_name>room.reservation</display_name>
</intent>
  <intent_detection_confidence>1</intent_detection_confidence>
  <diagnostic_info>
</diagnostic_info>
  <language_code>en-us</language_code>
</instance>
  <input mode="speech">half an hour</input>
</interpretation>
</result>

```

Step 6

Input: two people

C->S:

```
MRCP/2.0 361 RECOGNIZE 6
Channel-Identifier: 66122953e5be8b4a@speechrecog
Content-Id: request1@form-level
Content-Type: text/uri-list
Cancel-If-Queue: false
No-Input-Timeout: 50000
Recognition-Timeout: 10000
Start-Input-Timers: true
Confidence-Threshold: 0.87
Sensitivity-Level: 0.5
Save-Waveform: true
Content-Length: 25

builtin:speech/transcribe
```

S->C:

```
MRCP/2.0 83 6 200 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
```

S->C:

```
MRCP/2.0 115 START-OF-INPUT 6 IN-PROGRESS
Channel-Identifier: 66122953e5be8b4a@speechrecog
Input-Type: speech
```

S->C:

```
MRCP/2.0 3043 RECOGNITION-COMPLETE 6 COMPLETE
Channel-Identifier: 66122953e5be8b4a@speechrecog
Completion-Cause: 000 success
Waveform-Uri: <http://localhost/utterances/umsgdf-66122953e5be8b4a-
6.wav>;size=35840;duration=1120
Content-Type: application/x-nlsml
Content-Length: 2756

<?xml version="1.0"?>
<result>
  <interpretation grammar="builtin:speech/transcribe" confidence="1">
    <instance>
      <query_text>two people</query_text>
```

```

<action>room.reservation</action>
<parameters>
  <duration>
    <amount>30</amount>
    <unit>min</unit>
  </duration>
  <guests>2</guests>
  <location>
    <city>Mountain View</city>
  </location>
  <time>2017-12-29T14:30:00-05:00</time>
  <date>2017-12-29T12:00:00-05:00</date>
</parameters>
<all_required_params_present>true</all_required_params_present>
<fulfillment_text>Choose a room please.</fulfillment_text>
<fulfillment_messages>
  <text>
    <text>Choose a room please.</text>
  </text>
  <platform>FACEBOOK</platform>
</fulfillment_messages>
<fulfillment_messages>
  <card>
    <title>I have these room options for you.</title>
    <buttons>
      <text>A</text>
    </buttons>
    <buttons>
      <text>B</text>
    </buttons>
    <buttons>
      <text>C</text>
    </buttons>
  </card>
  <platform>FACEBOOK</platform>
</fulfillment_messages>
<fulfillment_messages>
  <text>
    <text>Choose a room please.</text>
  </text>
</fulfillment_messages>
<output_contexts>
  <name>projects/abcdefgh-igklm-
123456/agent/sessions/66122953e5be8b4a/contexts/roomreservation-followup</name>
  <lifespan_count>2</lifespan_count>
</parameters>
  <duration_original>half an hour</duration_original>
  <time_original>2:30 p.m.</time_original>
  <guests_original>two people</guests_original>
  <location_original>Mountain View</location_original>
  <date_original>today</date_original>

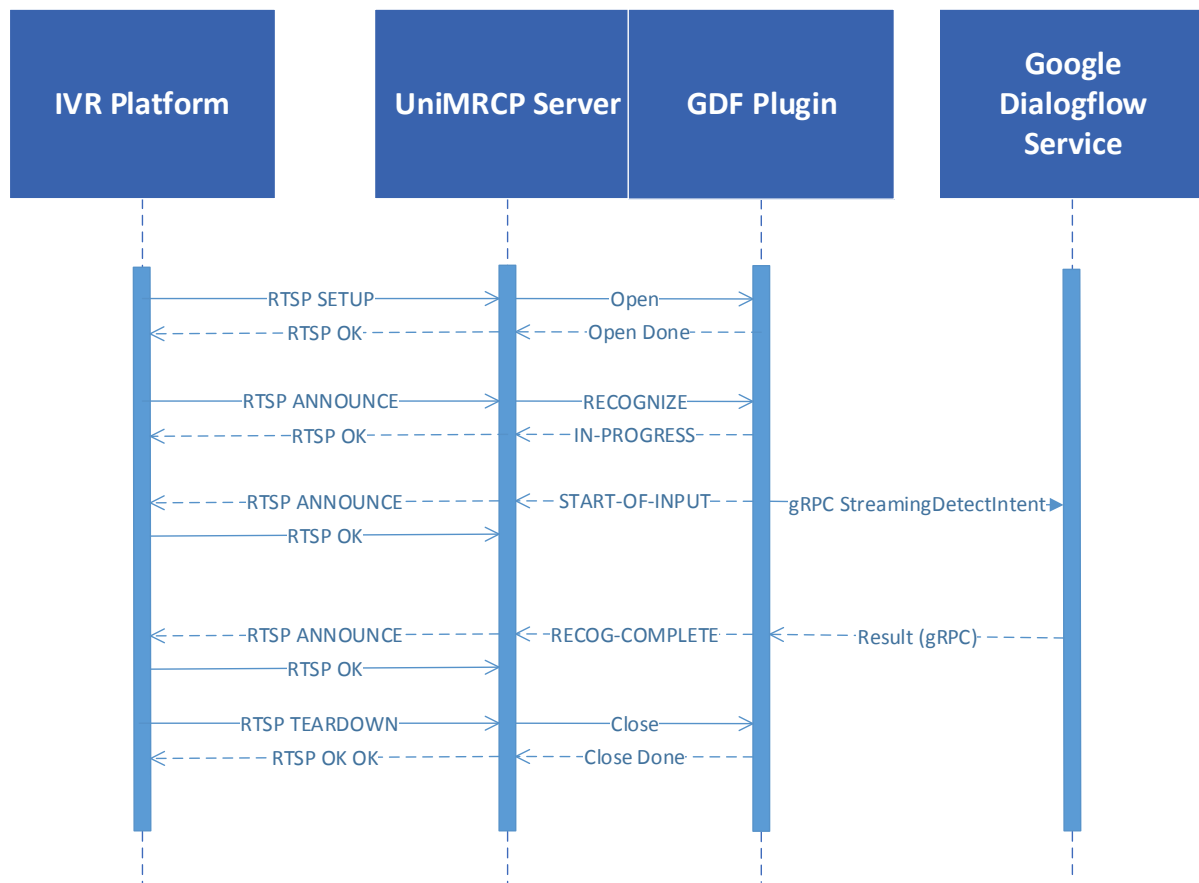
```

```
<guests>2</guests>
<duration>
  <amount>30</amount>
  <unit>min</unit>
</duration>
<location>
  <city_object>
  </city_object>
  <city>Mountain View</city>
  <city_original>Mountain View</city_original>
</location>
<time>2017-12-29T14:30:00-05:00</time>
<date>2017-12-29T12:00:00-05:00</date>
</parameters>
</output_contexts>
<intent>
  <name>projects/abcdefgh-igklm-123456/agent/intents/e8f6a63e-73da-4a1a-8bfc-
857183f71228</name>
  <display_name>room.reservation</display_name>
</intent>
<intent_detection_confidence>1</intent_detection_confidence>
<diagnostic_info>
</diagnostic_info>
<language_code>en-us</language_code>
</instance>
<input mode="speech">two people</input>
</interpretation>
</result>
```

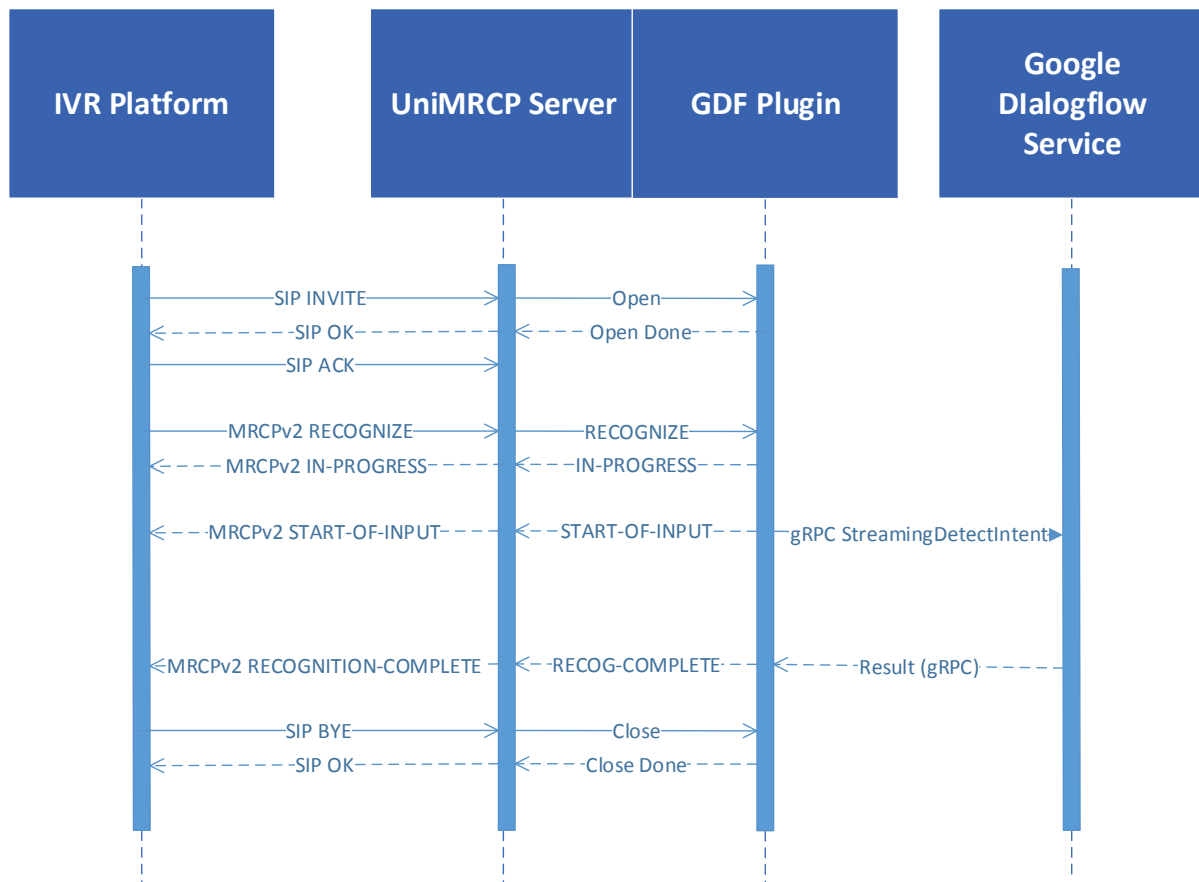
7 Sequence Diagrams

The following sequence diagrams outline common interactions between all the main components involved in a typical recognition session performed over MRCPv1 and MRCPv2 respectively.

7.1 MRCPv1



7.2 MRCPv2



8 Security Considerations

8.1 Network Connection

All the data transmitted to and received from the Google Dialogflow API is carried over a secure TLS v1.2 connection via the gRPC streaming. It is not even allowed to establish an unsecure connection to any of Google Cloud APIs in general.

8.2 Network Port

The standard TLS port 443 is used for the gRPC streaming,

9 References

9.1 Google Dialogflow Platform

- [Dialogflow API](#)
- [Basics](#)
- [Google Project FAQ](#)

9.2 Specifications

- [Speech Recognizer Resource](#)
- [NLSML Results](#)