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APP Interface

VoiceAPP uses the APPinterpreter interface to execute VoiceXML documents. This chapter describes the structure of the APPInterpreter interface and the functions that must be coded to implement the interface.

This chapter contains the following topics:

Introduction

The VoiceAPP VoiceXML engine is implemented in the **APPinterpreter** interface. This interface provides methods for configuring the VoiceXML interpreter and executing a VoiceXML document against the interfaces in the channel.

The APPinterpreter interface uses the APPprompt, APPrec, and APPtel implementations to service VoiceXML document execution. It does not interact with hardware directly.

This interface also provides the functions required to initialize and destroy the VoiceXML interpreter. There is one interpreter interface per thread/line.

The contents of **APPinterpreter.h** are:

Component	Description
APP_BEEP_AUDIO	URI to the beep audio
APP_PLATFORM_DEFAULTS	URI to the platform defaults script
APP_DEFAULT_ACCESS_CONTROL	Defines the behavior of the interpreter when ?access-control? is missing from a fetched document
APP_DOC_MEMORY_CACHE	Size of the cache for XML documents
APPinterpreterResult	Enumeration containing result codes for interface methods
APPresources	Structure containing the interfaces required by VoiceAPP
APPinterpreterInterface	Interface for VoiceXML execution
APPinterpreterInit	Per-process initialization for APPinterpreter
APPinterpreterShutDown	Per-process de-initialization for APPinterpreter
APPinterpreterCreateResource	Function for creating an interface to the VoiceXML interpreter
APPinterpreterDestroyResource	Function for destroying and de-allocating an interface to the APP interpreter

Result Codes

The following result codes are defined in the APPinterpreterResult enumeration that is returned by APPinterpreter functions.

The APPinterp_RESULT_SUCCESS result code (value of zero) indicates the function completed successfully.

Severe Errors

The following result codes (values less than zero) are severe errors, and are likely to indicate platform faults:

Result Code	Description
APPinterp_RESULT_FATAL_ERROR	Fatal error; terminate call
APPinterp_RESULT_INVALID_PROP_VALUE	Property value is not valid
APPinterp_RESULT_INVALID_ARGUMENT	Invalid function argument
APPinterp_RESULT_INVALID_PROP_NAME	Property name is not valid
APPinterp_RESULT_OUT_OF_MEMORY	Out of memory
APPinterp_RESULT_PLATFORM_ERROR	Errors from platform services

Warnings

The following result codes (values greater than zero) are warnings, and are likely to indicate application issues:

Result Code	Description
APPinterp_RESULT_FAILURE	Normal failure, nothing logged
APPinterp_RESULT_FETCH_ERROR	Unable to open or read from URI
APPinterp_RESULT_FETCH_TIMEOUT	Document fetch timeout
APPinterp_RESULT_INVALID_DOCUMENT	Not a VoiceXML document
APPinterp_RESULT_STOPPED	Run call aborted
APPinterp_RESULT_UNSUPPORTED	Operation is not supported

APPresources Structure

Before creating the APP interpreter interface, the APPresources structure must be allocated. All pointers in the structure must be filled with created and initialized resources. The following table describes the contents of the APPresources structure:

Interface	Description
cache	Cache interface
inet	Internet interface
jsi	ECMAScript interface
log	Log interface
object	Object interface
prompt	Prompt interface
rec	Recognizer interface
tel	Telephony interface

APPinterpreterInterface Functions

These functions provide the interface for the VoiceXML interpreter. They are defined as part of the APPinterpreterInterface structure contained in the APPinterpreter interface. This structure includes the Run( ) function for running the interpreter on a document and getting the document result.

The APPinterpreterInterface structure contains the following functions:

- ClearEventQueue
- GetImplementationName
- GetVersion
- InsertEvent
- RequestStop
- Run
- SetProperties
- Validate

ClearEventQueue

Clears the event queue.

```
APPinterpreterResult (*ClearEventQueue)(
    struct APPinterpreterInterface *pThis
);
```

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_INVALID_ARGUMENT

This function is called by the platform when pending events are no longer valid. This avoids a race condition where events are inserted after a run is complete. Platforms should clear the queue at the appropriate time to avoid events meant for previous calls occurring during future calls.

GetImplementationName

Gets the name of the implementation.

```
const APPchar* (*GetImplementationName)(void);
```

Out Parameter	Description
[function result]	The implementation-defined string that must be different from all other implementations

The recommended name uses the interface name prefixed by the implementation Internet address in reverse order. For example, com.xyz.rec for APPrec from xyz.com. This pattern is similar to VoiceXML's recommendation for defining application-specific error types.

GetVersion

Gets the APP interface version.

```
APPint32 (*GetVersion)(void);
```

Out Parameter	Description
[function result]	The version number, where the high word is the major version number and the low word is the minor version number, using the native CPU/OS byte order The current version is APP_CURRENT_VERSION as defined in **APPtypes.h**.

InsertEvent

Triggers an event.

```
APPinterpreterResult (*InsertEvent) (
    struct APPinterpreterInterface *pThis,
    const APPchar *event,
    const APPchar *message
)
```

In Parameter	Description
event	VoiceXML event to generate during Run
message	Corresponding message string. May be NULL

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_INVALID_ARGUMENT

Important: Do not use this function in the integration layer to produce events in response to an interface call.

RequestStop

Makes and cancels stop requests to the interpreter.

```
APPinterpreterResult (*RequestStop) (
    struct APPinterpreterInterface* pThis,
    APPbool doStop
);
```

In Parameter	Description
doStop	TRUE to stop the current Run; FALSE to clear a pending stop request

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_INVALID_ARGUMENT

If the interpreter is running and doStop is set to TRUE, this function causes the Run call to return as soon as possible with the result code APPinterp_RESULT_STOPPED. If doStop is set to FALSE, this function clears a pending stop request.

Note: If the interpreter encounters an error before completing a stop request, the Run function may be return something other than APPinterp_RESULT_STOPPED.

Run

Runs a VoiceXML document.

```
APPinterpreterResult (*Run)(
    struct APPinterpreterInterface* pThis,
    const APPchar* name,
    const APPchar* sessionScript,
    APPValue** result
);
```

In Parameter	Description
name	Name of the VoiceXML document to fetch and execute. May be a URL or a platform-dependent path URLs must always be absolute URLs—any query arguments must be embedded.
sessionScript	A series of ECMAScript expressions to be evaluated by VoiceAPP to populate the session scope in ECMAScript
result	Return value for the VoiceXML document. Optional, pass NULL if not desired.

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_FAILURE ■ APPinterp_RESULT_STOPPED ■ APPinterp_RESULT_FETCH_TIMEOUT ■ APPinterp_RESULT_FETCH_ERROR ■ APPinterp_RESULT_INVALID_DOCUMENT ■ APPinterp_RESULT_FATAL_ERROR ■ APPinterp_RESULT_OUT_OF_MEMORY ■ APPinterp_RESULT_PLATFORM_ERROR ■ APPinterp_RESULT_INVALID_ARGUMENT

Out Parameter	Description
result	Allocated on success when there is an exit value. Otherwise, a NULL pointer is returned. The caller is responsible for destroying the returned value by calling APPValueDestroy( ). If the APPinterp_RESULT_UNCAUGHT_FATAL_EVENT result code is returned, this is a APPString that provides the name of the VoiceXML event that caused the interpreter to exit.

SetProperties

Specifies runtime properties for the VoiceXML interpreter.

```
APPinterpreterResult (*SetProperties)(
    struct APPinterpreterInterface* pThis,
    const APPMap* props
);
```

In Parameter	Description
props	Map containing the following properties: ■ APP_BEEP_AUDIO URI ■ APP_PLATFORM_DEFAULTS URI ■ APP_DEFAULT_ACCESS_CONTROL

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_INVALID_PROP_NAME ■ APPinterp_RESULT_INVALID_PROP_VALUE ■ APPinterp_RESULT_INVALID_ARGUMENT

Validate

Loads, parses, and tests the validity of a VoiceXML document.

```
APPinterpreterResult (*Validate)(
    struct APPinterpreterInterface* pThis,
    const APPchar* name
);
```

In Parameter	Description
name	Name of the VoiceXML document to fetch and execute. Must be a URL or a platform-dependent path. URLs must always be absolute URLs—any query arguments must be embedded.

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_FAILURE ■ APPinterp_RESULT_FETCH_ERROR ■ APPinterp_RESULT_FETCH_TIMEOUT ■ APPinterp_RESULT_INVALID_ARGUMENT ■ APPinterp_RESULT_FATAL_ERROR ■ APPinterp_RESULT_OUT_OF_MEMORY

APPinterpreter Functions

These functions provide the ability to create and destroy the APPinterpreterInterface structure. They are defined as part of the APPinterpreter interface.

The APPinterpreter interface contains the following functions:

- APPinterpreterCreateResource
- APPinterpreterDestroyResource
- APPinterpreterInit
- APPinterpreterShutDown

APPinterpreterCreateResource

Creates a APP interface given an interface structure that contains all the resources required for the APP.

```
APPinterpreterResult APPinterpreterCreateResource(
    APPresources* resource,
    APPinterpreterInterface** pThis
);
```

In Parameter	Description
resource	Pointer to the resources structure that contains the interfaces required by VoiceAPP

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_OUT_OF_MEMORY ■ APPinterp_RESULT_INVALID_ARGUMENT
pThis	Pointer to the created interface. Set if the function call is successful

APPinterpreterDestroyResource

Destroys an interface returned by APPinterpreterCreateResource.

```
void APPinterpreterDestroyResource (
    APPinterpreterInterface** pThis
);
```

In Parameter	Description
pThis	The pointer to the interface to be destroyed

Out Parameter	Description
pThis	Set to NULL on success

APPinterpreterInit

Performs per-process initialization for APPinterpreter. This function should be called once at process startup.

```
APPinterpreterResult APPinterpreterInit(
    APPlogInterface *log,
    APPunsigned diagLogBase,
    const APPMap *props
);
```

In Parameter	Description
log	APP Logging interface used for error/diagnostic logging. Only used for the duration of the function call
diagLogBase	Base tag number for diagnostic logging purposes. Diagnostic tag IDs for the interpreter start at this ID and increment upwards
props	Map containing properties that control VoiceXML document caching. Pass NULL Company partners should contact technical support for help with caching optimization.

Out Parameter	Description
[function result]	Describes the success or failure of the function call. Valid values are: ■ APPinterp_RESULT_SUCCESS ■ APPinterp_RESULT_FAILURE

APPinterpreterShutDown

Performs per-process de-initialization. This function should be called once per process shutdown after all the interfaces for the process are destroyed.

```
void APPinterpreterShutDown (
    APPlogInterface* log
);
```

In Parameter	Description
log	APP logging interface used for error/diagnostic logging. Only used for the duration of the function call