



Smart TV[®]
Alliance

Widevine API Mapping
Version 1.0

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1. Change history

Version	Date	Changes
0.1	2012-10-20	First draft version 0.1
0.9	2012-11-30	Draft for Google Review
1.0	2012-12-12	Approved

2. Introduction

2.1. Overview

This document specifies the mapping from Widevine APIs to OIPFAgent APIs. The goal is to provide a standardized method for application developers and TV manufacturers to support Widevine DRM.

Note that this specification is optional for compliance with Smart TV Alliance version 2.0.

2.2. Definitions

API	Application Programming Interface
DRM	Digital Rights Management
OIPF	Open IPTV Forum
URL	Uniform Resource Locator
XML	Extensible Markup Language

References

[1] Widevine Technologies, Inc, "Widevine Playback API"

[2] Open IPTV Forum Release 1 specification, volume 5 (V1.1): "Declarative Application Environment".

2.3. Trademarks and copyrights

All trademarks and copyrights are the property of their respective owners.

3. Widevine APIs overview

3.1. Description

Applications interface with Widevine via the following interfaces:

- HTML5 video object
 - The *src* element shall be set to the URL of the Widevine-encrypted content.
 - In case of an error, the error attribute of the HTML5 video object shall be set to *MEDIA_ERR_DECODE*.

- OIPF DRM Agent
 - Applications shall use the OIPF DRM Agent API [2] applied to Widevine as described in this document. The *oipfDrmAgent.sendDRMMessage* method is used to pass requests to Widevine, and results are returned via *onDRMMessageResult*.

4. OIPF DRMAgent APIs

4.1. Description

OIPF DRMAgent is a standardized API that can help vendors to implement a single architecture and apply it to any DRM solution.

4.2. OIPF DRMAgent Methods and Events

4.2.1. OIPF DRMAgent Methods

Table 1: String sendDRMMessage(String msgType, String msg, String DRMSystemID)

String sendDRMMessage(String msgType, String msg, String DRMSystemID)		
Description	Send message to the DRM agent using a message type as defined by the DRM system. Returns a unique ID to identify the message, which is subsequently passed as the msgID argument by the onDRMMessageResult callback function. This is an asynchronous method. Applications will be notified of the results of the operation via events dispatched to onDRMMessageResult and corresponding DOM level 2 events.	
Arguments	msgType	A globally unique message type as defined by the DRM system, for example: application/smarttv-alliance.widevine+xml'l
	msg	The message to be provided to the underlying DRM agent formatted according to the message type as indicated by attribute msgType.
	DRMSystemID	For example, for Widevine, the DRMSystemID value is “urn:dvb:casystemid:19156”.

4.2.2. OIPF DRMAgent Events

Table 2: function onDRMMessageResult(String msgID, String resultMsg,Integer resultCode)

function onDRMMessageResult(String msgID, String resultMsg,Integer resultCode)		
The function that is called when the underlying DRM agent has a result message to report to the current HTML document as a consequence of a call to sendDRMMessage. The specified function is called with three arguments msgID, resultMsg and resultCode which are defined as follows:		
<ul style="list-style-type: none"> ● String msgID – identifies the original message which has led to this resulting message. ● String resultMsg – DRM system specific result message. ● Integer resultCode – result code. Valid values include: 		
Result Code	Description	Semantics
0	Successful	The action(s) requested by sendDRMMessage() completed successfully.
1	Unknown error	sendDRMMessage() failed because an unspecified error occurred.
2	Cannot process request	sendDRMMessage() failed because the DRM agent was unable to complete the request.
3	Unknown	sendDRMMessage() failed, because the specified Mime Type is

	MIME type	unknown for the specified DRM system indicated in the DRMSystemId.
4	User consent needed	sendDRMMessage() failed because user consent is needed for that action.

5. Widevine WVPlayback APIs

Please refer to [1].

6. How Widevine APIs Map to the OIPF DRM Agent APIs

6.1. Description

In the chapter, we will introduce how to map Widevine APIs to the OIPF DRM Agent APIs.

6.2. Use of the OIPF DRM Agent for Widevine

6.2.1. Credentials Information

Before receiving streaming data, this instance of Widevine needs to be configured with credentials information. The credentials information and required parameters are sent via the `oipfDrmAgent.sendDRMMessage` method according to the XML schema described by this specification below:

Table 3: Credentials Information

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs=http://www.w3.org/2001/XMLSchema>
  <xs:element name="WidevineCredentialsInfo">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="ContentURL" type="xs:string" minOccurs="1" maxOccurs="1"/>
        <xs:element name="DeviceID" type="xs:string"/>
        <xs:element name="StreamID" type="xs:string"/>
        <xs:element name="ClientIP" type="xs:string"/>
        <xs:element name="DRMServerURL" type="xs:string" minOccurs="1" maxOccurs="1" />
        <xs:element name="DRMAckServerURL" type="xs:string"/>
        <xs:element name="DRMHeartBeatURL" type="xs:string"/>
        <xs:element name="DRMHeartBeatPeriod" type="xs:string"/>
        <xs:element name="UserData" type="xs:string"/>
        <xs:element name="Portal" type="xs:string"/>
        <xs:element name="StoreFront" type="xs:string"/>
        <xs:element name="BandwidthCheckURL" type="xs:string"/>
        <xs:element name="BandwidthCheckInterval" type="xs:string"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

```
String sendDRMMessage(msgType = "application/widevine+xml",
msg = "
```

```
<?xml version="1.0" encoding="utf-8"?>
<WidevineCredentialsInfo xmlns="http://www.smarttv-alliance.org/DRM/widevine/2012/protocols/" >
  <ContentURL>$(ContentURL)</ContentURL>
  <DeviceID>$(DeviceID)</DeviceID>
  <StreamID>$(StreamID)</StreamID>
  <ClientIP>$(Client)</ClientIP>
  <DRMServerURL>$(DRMServerURL)</DRMServerURL>
  <DRMAckServerURL>$(DRMSAckerverURL)</DRMAckServerURL>
  <DRMHeartBeatURL>$( HeartbeatServerURL)</DRMHeartBeatURL>
  <DRMHeartBeatPeriod>$(DRMHeartBeatPeriod)</DRMHeartBeatPeriod>
  <UserData>$(UserData) </UserData>
```

```

<Portal>$(Portal)</Portal>
<StoreFront>$(Portal)</StoreFront>
<BandwidthCheckURL>$(BandwidthCheckURL) </BandwidthCheckURL>
<BandwidthCheckInterval>$(BandwidthCheckInterval)</BandwidthCheckInterval>
</WidevineCredentialsInfo >
”, DRMSystemID = “urn:dvb:casystemid:19156”);
  
```

Table 4: Element descriptions.

Element	Support by CSP	Description
ContentURL	Mandatory	Content URL
DRMServerURL	Mandatory	The URL for the Widevine DRM key server
DeviceID	Optional	Identifier of device.
ClientIP	Optional	Client IP address
StreamID	Optional	Identifier of stream being requested in the entitlement request.
DRMAckServerURL	Optional	The URL for entitlement delivery acknowledgements.
DRMHeartBeatURL	Optional	The URL of a server that handles a heartbeat request.
DRMHeartBeatPeriod	Optional	Duration between consecutive heartbeats (in seconds).
UserData	Optional	User data
Portal	Optional	Portal URL
StoreFront	Optional	StoreFront URL
BandwidthCheckURL	Optional	The URL for bandwidth check server.
BandwidthCheckInterval	Optional	An interval of bandwidth check.

6.2.2. DRM Agent Result

The method `oipfDrmAgent.sendDRMMessage` is asynchronous (that is, a non blocking function). Once the underlying DRM agent has a result message to report to the current HTML document, the DRM agent will invoke an event to notify the result via OIPF function `onDRMMessageResult`. This specification provides the XML schema to describe the `resultMsg` and also defines the `resultCode` below:

Table 5: onDRMMessageResult parameter description

msgID	identifies the original message which has lead to this resulting message. returned value of <code>sendDRMMessage()</code> .
resultMsg	<pre> <?xml version="1.0" encoding="utf-8"?> <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"> <xs:element name="WidevineResultMsg"> <xs:complexType> <xs:element name="WV_Status" minOccurs="1" maxOccurs="1"/> </xs:complexType> </xs:element> </xs:schema> </pre>

	<pre> <WidevineResultMsg> <WV_Status> \$(WV_Status Code, please refer WV_Status.h) </WV_Status> </WidevineResultMsg> </pre>
resultCode	<ul style="list-style-type: none"> 0 :Successful 1 :Unknown error 2. Cannot process request 3. Unknow MIME type 4. User Consent Needed

6.2.3. Playback Error

In case of an error during playback, the error attribute of the HTML5 video object shall be set to MEDIA_ERR_DECODE.

6.3. Playback sequences

Figure 1 shows an example of a playback sequence. It depicts the sequence between the CSP application of client side, the Browser and the OIPF DRMAgent. Detailed sequences between the Widevine Library and the Player are omitted. (They are described in reference document [1].)

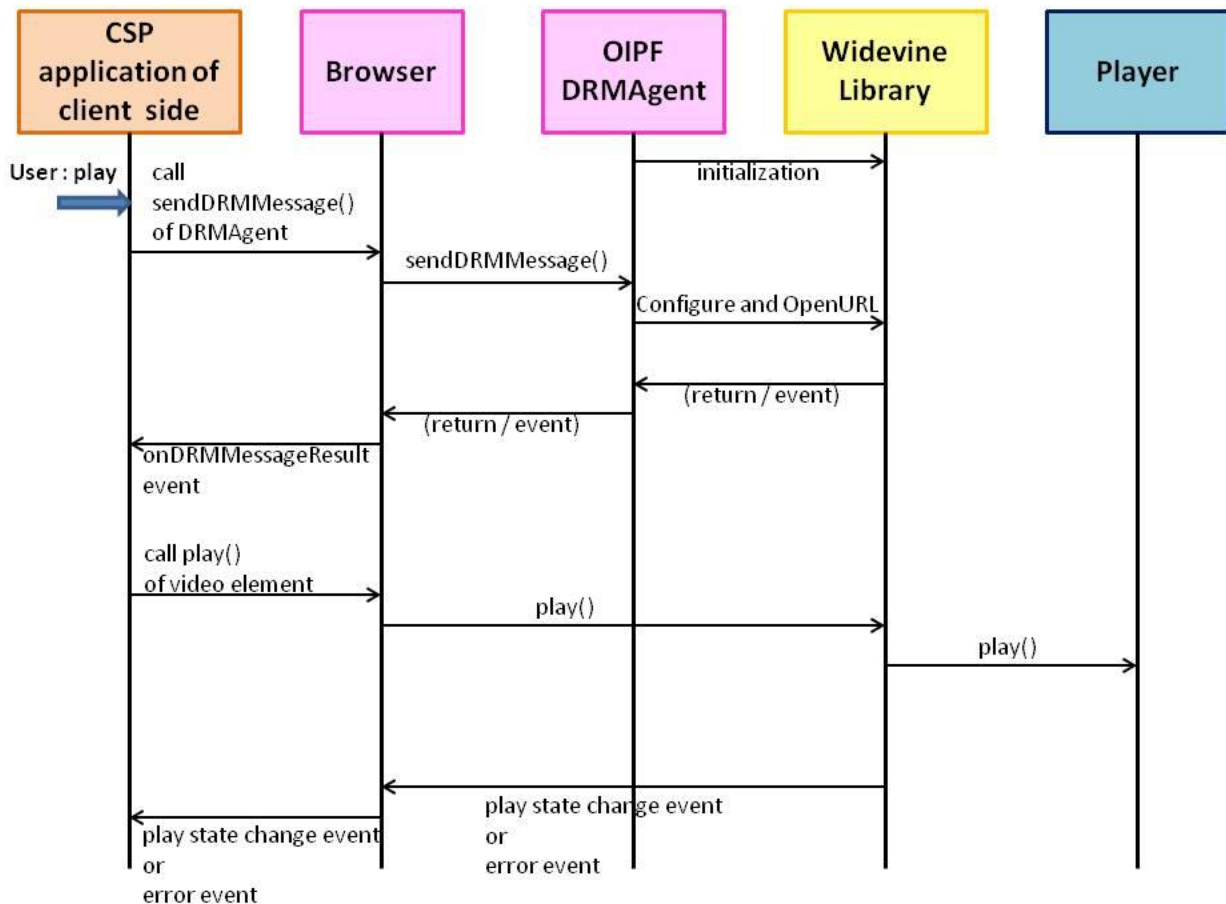


Fig. 1: Playback sequence