

# AAMP - Native Video Engine Player API

## 1.0 Overview

This document defines the Native Video engine (AAMP) APIs for embedded devices.

Table of key web links

Web Resource	Owner	Description
W3C MSE Specifications	W3C	HTML5 specs for Media Source Extensions

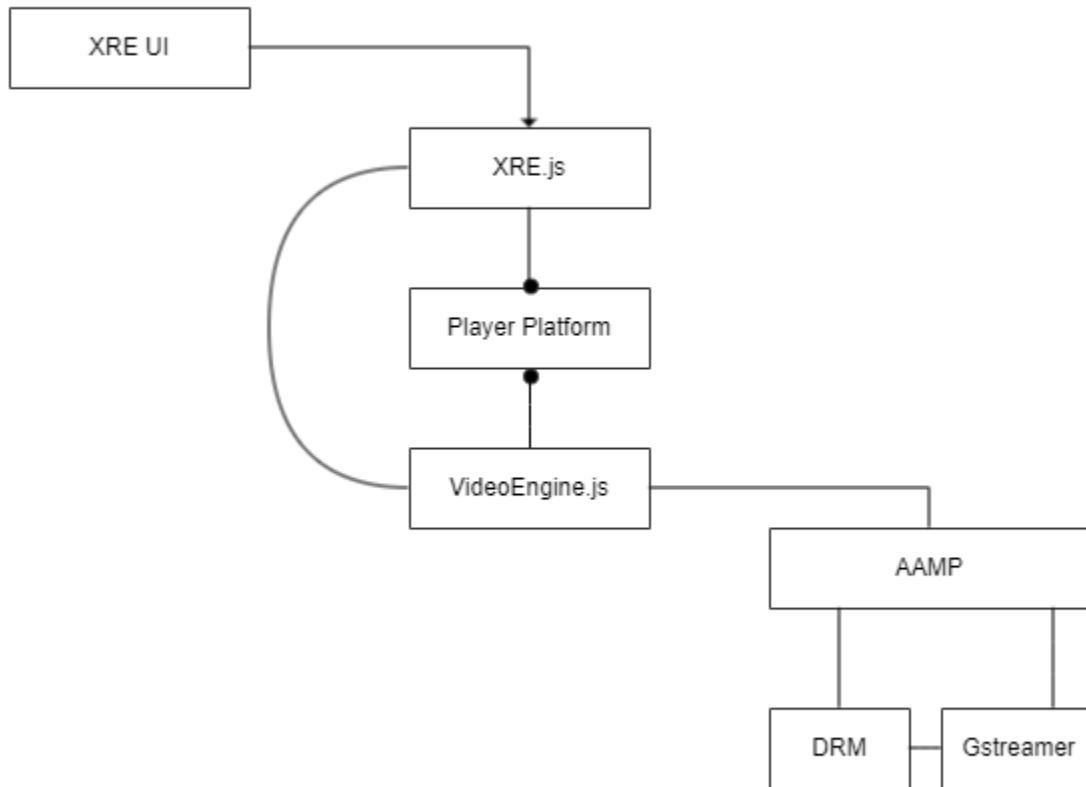
## 2.0 Architecture

This section provides a high level architecture

## 3.0 AAMP Video Engine APIs

This section defines the properties, methods and events for the AAMP Video Engine

## RDK Video Player



RDKPlayer.js will be hosted by RDK that will manage to release and ensure that north bound interface does not change without proper change control process

### 3.1 Core Video Engine Functionality

#### Class

**AAMPVideoEngine**

#### Properties

Name	Data Type	Read or Write	Description
PlayerVersion	String	r	Version of the player available as a string
MediaType	Number	r	Type of media enum { LIVE =1, VOD=2, cDVR=3 }  Note: may be implied by manifest contents (open/live vs. closed), but in some cases media type (EAS, CDVR) may be knowable only by Player.

PlayerState	Number	r	Player State Enum.  IDLE, // initial state of player  INITIALIZING, // drm individualization, etc.  INITIALIZED, // TBR?  PREPARING, // manifest request in progress - TBR?  PREPARED, // have knowledge about stream contents, language availability, etc.  BUFFERING, // collecting a/v fragments - not currently presenting; could happen if run dry during playback  PAUSED, // player-initiated pause  SEEKING, // seek-in-progress - variant of buffering  PLAYING, // a/v actively streaming/presenting  STOPPING, // reflects async state - needed?  STOPPED, // playback stopped at end of asset  COMPLETE, // ?  ERROR, // fatal video engine state  RELEASED
CurrentPosition	Number	r	Current media play position (milliseconds or seconds?)
MediaInfo	Object	r	Information about the Media being played by the Player  totalDuration – Total duration of the Media  startPosition – Media Start Position  endPosition – Media End Position
currentPlaybackSpeed	Number	r	Current speed (play rate); 0 if paused, negative if rewinding
getSupportedSpeed	Number[ ]	r	Array of supported speeds;  [-64, -32, -16, -4, -1, 0, 1, 4, 16, 32, 64];  Needed? An ip video player can present iframe track at arbitrary speeds  This set changes during trick mode restrictions; subset may be used during ad.
timeline	Timeline	r	Timeline for tracking dynamic ad insertion (DAI)
Volume	Number	r	Current volume (only mute/unmute is actually used)
drm	Drm	r	interface to Drm specific properties and methods

## Methods

Name	Return Value	Arguments	Description
setURI	errorcode	String	URI of the content
initParam	errorcode	String	JSON string of key value pair of all the properties to be set.
play	errorcode	none	starts video playback
pause	errorcode	none	pauses video playback. Equivalent to speed = 1
stop	void	none	stops video playback. Video is not expected to resume.
seek	errorcode	Msec – Number	Desired Playback position in milliseconds
seekToLive	errorcode	Void	Seek to live stream
setSpeed	errorcode	speed - Number  overshootCorrection - Number (milliseconds)	sets the speed and adjusts the position of the video by the number of milliseconds specified by overshootCorrection

setRect	errorcode	OffsetX – number OffsetY – number Width – number Height - number	Method to set the rectangular coordinates for video display
setAutoPlay	errorcode	autoPlay - Boolean	when true, video starts playing immediately; when false, playback must be manually started.
setZoom	errorcode	Setting – number	Desired zoom setting enum – { FULL = 0; NONE=1 }
addEventListener	errorcode	eventName – String listener - Function	Method to add an event listener corresponding to an event TODO: list of event names and semantics
removeEventListener	errorcode	eventName – String	Method to remove an event listener corresponding to an event
getAvailableLanguages	Object	None	Returns a collection of available of audio languages as enums currently polled - why?
setLanguage	errorcode	Language – Number	Desired audio language. Default is Eng. {ENG=0; SPANISH = 1; FRENCH=2; ITALIAN=3; ..... } enum or iso language code?
setVideoMute	errorcode	Mute – Boolean	True if mute or false otherwise.
setAudioVolume	errorcode	Volume - Number	Preferred audio volume to set.
getProperty	Object	Property – String	Returns the property value or a null object if error - TBR?
setProperty	errorcode	Property – String Value – object	Sets the value for the specified property - TBR?

## 3.2 DAI APIs

### Classes

**AAMPVideoEngine.TimedMetadata**  
**AAMPVideoEngine.Timeline**  
**AAMPVideoEngine.AdBreak**  
**AAMPVideoEngine.Ad**  
**AAMPVideoEngine.TrickModeRestrictions**  
**AAMPVideoEngine.AdOpportunity**

### Timeline Properties

Name	Data Type	Read or Write	Description
adBreaks	AdBreak[ ]	r	Array of Ad breaks
adOpportunities	AdOpportunity[]	r	Array of Ad opportunities
start	Number	r	Time (ms) of earliest content
duration	Number	r	Time (ms) of content + placed ads
position	Number	r	Time (ms) of current playback position
restrictions	TrickModeRestrictions	r	Trickmode restrictions on the entire timeline.
timedMetadata	TimedMetadata[]	r	Array of TimedMetadata

### Timeline Methods

Name	Return Value	Arguments	Description
------	--------------	-----------	-------------

addEventListener	errorcode	eventType – String listener – Function	Method to add an event listener corresponding to an event type.
removeEventListener	errorcode	eventType – String listener – Function	Method to remove an event listener corresponding to an event type.
placeAdBreak	bool	position – Number adBreak - Object	Places the specified AdBreak at the specified position in the timeline. Return true if successful.
subscribeTimedMetadata	errorcode	tags - String []	Sets array of HLS tags to monitor while parsing the manifest. Fire "timedMetadata" event when timedMetadata[] is updated.;

## Timeline Events

Name	Payload	Description
timedMetadata	timedMetadata - TimedMetadata	Fired when new TimedMetadata has been parsed, or modified.
timelineUpdated	seekableRangeChanged - bool adBreaks - AdBreak[] - array of modified AdBreaks adOpportunities - AdOpportunity[] - array of inserted AdOpportunities duration - Number - duration of entire timeline (milliseconds) start - Number - earliest seekable position in the timeline (milliseconds)	Fired when the timeline is updated. An update occurs when the timeline start/duration changes, or new AdOpportunity has been inserted, or an AdBreak / Ad has been placed.
adBreakStart	adBreak - AdBreak - the adBreak being started speed - Number - current playback rate seenCount - Number - number of times Ad break was played (in full).	Fired when player starts playing an AdBreak.
adBreakComplete	adBreak - AdBreak - the adBreak being finished progress - Number - percentage of Ads played ads - Ad[] - array of Ad including played progress of each Ad.	Fired when player finishes playing an AdBreak.
adBreakSkipped	adBreak - AdBreak - the adBreak being skipped or exited progress - Number - percentage of Ads played	Fired when player skips over an AdBreak.
adStart	ad - Ad - the Ad being started speed - Number - current playback rate seenCount - Number - number of times Ad was played (in full).	Fired when player start playing an Ad.
adProgress	ad - Ad - the Ad being played progress - Number - percentage of Ad played	Reports the player's progress as it plays an Ad.
adComplete	ad - Ad - the Ad that finished begin played progress - Number - percentage of Ad played	Fired when player finishes playing an Ad.

## TimedMetadata Properties

Name	Data Type	Read or Write	Description
METADATA_TYPE_TAG	0	static const	Indicates metadata is from the manifest.
METADATA_TYPE_ID3	1	static const	Indicates metadata was embedded in the content.
METADATA_TYPE_DASH	2	static const	Indicates metadata was generated from DASH MPD.
type	Number	r	Specified the metadata type: manifest vs. embedded.
time	Number	r	Time (in milliseconds) of the metadata.
name	String	r	Name of the metadata. E.g., #EXT-X-CUE, #EXT-X-SCTE35.
content	String	r	Value of the metadata.
id	String	r	Unique identifier associated with the metadata.
metadata	Object	r	Additional name / value pairs obtained from the metadata content string.

## AdBreak Properties

Name	Data Type	Read or Write	Description
ADBREAK_TYPE_INSERT	0	static const	Indicates adBreak was inserted.
ADBREAK_TYPE_REPLACED	1	static const	Indicates adBreak was replaced.
type	Number	r	Type of adBreak (inserted or replaced).
id	String	r	Unique identifier associated with the ad break.
start	Number	r	Starting position (milliseconds) of the ad break in the timeline.
duration	Number	r	Duration (milliseconds) of the ad break.
ads	Ad[]	r	Array of Ad objects (sorted by time). Contains the ads that will be played during the ad break.

## AdBreak Methods

Name	Return Value	Arguments	Description
placeAds	bool	position - Number, ads - Object[]	Place the specified Ad objects in the AdBreak. Return true if successful.

## Ad Properties

Name	Data Type	Read or Write	Description
id	String	r	Unique identifier associated with the Ad.
url	String	r	URL specifying the location of the ad's manifest..
duration	Number	r	Duration (milliseconds) of the ad.
restrictions	TrickModeRestrictions	r	Trickmode restrictions applying to the Ad.
seenCount	Number	r	Number of time AdBreak was played (in full).
metadata	Object	r	Additional metadata associated with the ad.

## TrickModeRestrictions Properties

Name	Data Type	Read or Write	Description
TRICKMODE_RESTRICTED_ALWAYS	-1	static const	Indicates restriciton applies always.
TRICKMODE_RESTRICTED_NEVER	0	static const	Indicates restriciton does not apply.
pause	Number	r	Specifies if pause is restricted during Ad playback. Values greater than 0 apply while less than seenCount.
rewind	Number	r	Specifies if rewind is restricted during Ad playback.
fastForward	Number	r	Specified if fastForward / seek is restricted during Ad playback.

## AdOpportunity Properties

Name	Data Type	Read or Write	Description
AD_PLACEMENT_TYPE_PREROLL	0	static const	Indicates opportunity places ad before the main content.
AD_PLACEMENT_TYPE_MIDROLL	1	static const	Indicates opportunity places ad in the main content.
AD_PLACEMENT_TYPE_POSTROLL	2	static const	Indicates opportunity places ad after the main content.
AD_PLACEMENT_MODE_INSERT	0	static const	Indicates restriciton applies always.
AD_PLACEMENT_MODE_REPLACE	1	static const	Indicates restriciton does not apply.

id	String	r	Unique identifier associated with the ad opportunity.
placement	Number	r	Indicates placement type: preroll vs. midroll vs. postroll.
mode	Number	r	Indicates placement mode: insertion vs. replacement.
start	Number	r	Starting position (milliseconds) of the ad opportunity.
duration	Number	r	Duration (milliseconds) of the ad.
metadata	Object	r	Additional metadata associated with the ad opportunity.

### 3.3 DRM APIs

These apis are modeled using the open CDMI framework

## Classes

#### AAMPVideoEngine.Drm

##### DRM Properties

Name	Data Type	Read or Write	Description
supportedKeySystems	string[]	r	array of supported DRM keysystems

##### DRM Methods

Name	Return Value	Arguments	Description
setPreferredKeySystem	errorcode	string	sets the preferred DRM Key system AAMP player will use. Ex: "com.microsoft.playready"
setLicenseServerURL	errorcode	string	sets the URL used for license acquisition
setAnonymousRequest	errorcode	bool	if true, don't use session token in MDS license request (anonymous mode) if false, use session token in MDS license request

##### DRM Events

Name	Payload	Description
drmReady	none	fired when license is acquired and content is ready to play
drmError	code - Number description - String	fired when license acquisition fails

## Appendix: JavaScript Player Generated Events

TODO: call out how VE supports these

Name	Payload	Description
------	---------	-------------

onMediaOpened	mediaType - String - has one of the following values: live, recorded  width - Number  height - Number  availableSpeeds - Number  availableAudioLanguages - String [ ]  availableClosedCaptionsLanguages - String [ ]  customProperties - Object  mediaSegments - Object	Gathered in JS from VE  Fired when video content has been opened (in "PREPARED" state)
onClosed	none	fired when the video stream is closed
onPlayerInitialized	none	fired when the video player is initialized
onBuffering	none	fired when video starts buffering. playback is not possible at this time.
onPlaying	none	fired when video starts playing for the first time.
onPaused	none	fired when video is paused (or speed is set to 0)
onComplete	none	fired when video is reaches its end, VOD or cDVR for example.
onIndividualizing	none	fired when player is individualizing. Playback is not possible. Not all instances will fire this event.
onAcquiringLicense	none	fired when player is acquiring a license. Playback is not yet possible. Not all instances will fire this event.  Technically not needed, but potentially useful for troubleshooting/profiling
onProgress	position - Number - current position in milliseconds  duration - Number - length of content in milliseconds (recorded video only)  speed - Number - current playback speed	fired periodically when player progresses
onWarning	code - Number  description - String	fired when a warning occurs. video playback will likely continue.
onError	code - Number  description - String	fired when an error occurs. video playback will terminate.
onSpeedChange	speed - Number	fired when playback speed changes
onDRMMetadata	props - Object	fired when DRM metadata is acquired. Contains DRM related properties.
onSegmentStarted	segmentType - String  duration - Number  segmentId - String  segment - Object	fired when a new segment is started.
onSegmentCompleted	segmentType - String  duration - Number  segmentId - String  segment - Object	fired when a segment is has completed
onSegmentWatched	segmentType - String  duration - Number  segmentId - String  segment - Object	fired when a segment has been started and completed.



onBufferWarning	warningType - String - one of BUFFER_UNDERFLOW or BUFFER_OVERFLOW  bufferSize - Number - total size of buffer  bufferFillSize - Number - current filled size of buffer	
onPlaybackSpeedsChanged	availableSpeeds - String [ ]	fired when playback speeds have changed. This may happen when the video switches from one segment to the next.
onAdditionalAuthRequired	locator - String  eventId - String	fired when video needs additional auth to continue playback