YouTube RTMP Cue Point Message Format

Version: 0.1

Date: 2014/10/14

Introduction

This document specifies Adobe's Real Time Messaging Protocol (RTMP) cue point message format supported by the YouTube live platform. This allows automatic ad cue point insertions to live broadcasts that use RTMP ingestion. Every cue point message indicates an opportunity to insert an ad in the stream. This document also gives suggestions on what [SCTE-35] messages should be converted to the YouTube [RTMP] cue point messages. Two types of [SCTE-35] messages are considered: the splice insert command and the time signal command.

Definitions

AMF0: A compact binary format that is used to serialize ActionScript object graphs. AMF0 is one of the two versions: AMF0 and AMF3.

Cue point: A marker to trigger a specific event in the video stream. Although the definition of an event can be general, the scope of the document limits it to an ad related event.

RTMP: Adobe's Real Time Messaging Protocol.

SCTE-35: The Society of Cable Telecommunications Engineers standard that specifies the technique for carrying notification of upcoming cue points and other timing information in the transport stream.

RTMP Cue Point Message Format

A RTMP message has two parts, a header and a payload. They MUST follow the format specified below to be considered a valid cue point message supported by the YouTube live platform.

Message Header

Message Type: MUST be 18 (Data Message). This also indicates that the payload MUST be in Adobe [AMF0] format.

Message Payload

Payload MUST be in [AMF0] format.

The payload MUST have 2 [AMF0] data instances according to Table 1.

Index	**AFM0 Data Type**	**Value**
0	String	“onCuePoint”
1	Object	Key value pairs

Table 1 Payload data format.

The second data instance (index 1) in the payload MUST be an [AMF0] Object type (**typecode 3**) that contains key value pairs to specify the parameters of the cue point message. Each key value pair follows the `object-property` format defined by [AMF0]. Table 2 shows the specification for the key value pairs. All string type data are case sensitive.

Key	**AMF0 Data Type for Value**	**Value**	**Required / Optional**
“type”	String	“com.youtube.cuepoint”	Required
“version”	String	Version of the specification. Current version is “0.1”.	Required
“pre_roll_time_sec”	Number	Time in **seconds** from now to the time the cue point should be inserted.	Required
“break_duration_sec”	Number	The length of the ad break in **seconds**. Note: The duration in break_duration() specified in [SCTE-35] is terms of ticks of	Optional (if not present, a default duration will

		the program's 90 kHz clock. If using break_duration() from [SCTE-35], care must be taken to do unit conversion properly.	be used)
"splice_event_id"	Number	As specified by SCTE-35 splice_insert().	Optional

Table 2 Key value pairs for the cue point parameters.

Conversion from SCTE-35 messages

The [SCTE-35] messages have flags to indicate both the start of an advertisement and an end of the advertisement. For example, in the `splice_insert()` command, the `out_of_network_indicator` being `True` indicates switching from the network program to an advertisement, while `False` indicates switching back to the network program.

The YouTube RTMP cue point message does not support end of advertisement notifications, so a YouTube RTMP cue point message MUST only be sent to indicate the start of an advertisement. Below are suggestions[1] on what [SCTE-35] messages should be converted to YouTube RTMP cue point messages:

- `splice_insert()` command: suggest to create a YouTube RTMP cue point message if `out_of_network_indicator == True`.
- `time_signal()` command: suggest to create a YouTube RTMP cue point message if `!delivery_not_restricted_flag && (!web_delivery_allowed_flag || !no_regional_blackout_flag) == True` in `segmentation_descriptor()`.

Ad cancellation is not supported either.

Example

Below is an example of the payload of a valid RTMP cue point message. This cue point message indicates the start of an ad break. The markers are defined in the [AMF0] specification.

`string-marker` "onCuePoint"
`object-marker`
"type" `string-marker` "com.youtube.cuepoint"
"version" `string-marker` "0.1"
"pre_roll_time_sec" `number-marker` 2.56
"cue_point_start" `boolean-marker` 1
"break_duration_sec" `number-marker` 30
"splice_event_id" `number-marker` 0

[1] These are only suggestions. The encoders can do the conversion based on their customers needs, but the important note is that an YouTube RTMP cue point message MUST only be sent to indicate the start of an advertisement.

`UTF-8-empty object-end-marker`

References

[AMF0] Adobe Systems, Inc., "Action Message Format -- AMF 0", December 2007
[RTMP] Adobe's Real Time Messaging Protocol
[SCTE-35] ANSI/SCTE 35 2019a Digital Program Insertion Cueing Message for Cable

Document History

Date	Author	Changes
2014/10/23	yingyin	"pre_roll_time" -> "pre_roll_time_sec" "break_duraiton" -> "break_duration_sec"
2014/10/23	yingyin	Removed "cuepoint_start" parameter.