

# **ADOBE PRIMETIME**

## **Validation HLS Certification**

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## About the Document

This document provides test cases to test the validity of streams for playback with the Adobe Primetime player. Adobe Primetime supports HDS and HLS streaming, along with features like ad insertion, DRM protection, trick play, closed captions, multi-lingual audio support, and so on. The document details various test cases for the HLS streams and the respective features.

This certification document is compliant with HTTP Live Streaming draft-pantos-http-live-streaming-11.

## Abbreviations Used in the Document

- Adobe DPI: Adobe Digital Program Insertion
- Adobe DRM: Adobe Digital Rights Management
- CDN: Content Delivery Network
- FRT: Fragment Run Table
- HDS: HTTP Dynamic Streaming
- HLS: HTTP Live Streaming
- MBR: Multi Bitrate
- PMT: Program Map Table
- SRT: Segment Run Table

## About HLS Validations

HTTP Live Streaming (HLS) is a method to send audio and video over HTTP, from a web server to a client on a desktop or on an iOS-based device. HLS sends audio and video as a series of small files called media segment files, which are typically of about 10 seconds duration. An index file, or a playlist, provides the URLs of the media segment files to the client. This index file or playlist is periodically refreshed to accommodate live broadcasts, during which the media segment files are constantly being produced.

## Media Playlist Tag Validation

### Tags Specific Validation

The tag-level validations are covered in the following table. For example, a check whether a given tag is valid for a given HLS playlist version or not or a validation of the data values given inside tags like the validity of the value mentioned in the EXT-X-PROGRAM-DATE-TIME tag. The list covers the generic test cases regarding validity of the tags.

Description	Result	Category	Corrective Action
Check that the tags or tag values are not compatible with the playlist version defined.  Refer <a href="#">here</a> for test cases for protocol version compatibility.	Error code 50001 is generated in the report.	Warning	Modify the playlist to correct the value of EXT-X-VERSION tag. The value indicates the compatibility version of the Playlist file. Use the lowest protocol version with which the server, the playlist file, and the associated media segments comply.
Verify the placement of tags	Error code 50100 is	Error	Rectify the invalid tag at the correct

<p>in the manifest.</p> <ul style="list-style-type: none"> <li>EXT3MU is the first tag.</li> <li>EXT-X-MEDIA-SEQUENCE is a header tag.</li> <li>EXT-X-TARGET-DURATION is a header tag.</li> <li>EXT-X-PLAYLIST-TYPE is a header tag.</li> <li>EXT-X-ALLOW-CACHE is a header tag.</li> <li>EXT-X-I-FRAME-ONLY is a header tag.</li> <li>EXT-X-VERSION is a header tag.</li> </ul>	<p>generated in the report.</p>		<p>position.</p>
<p>Check the data type of tag values.</p> <ul style="list-style-type: none"> <li>EXT-X-TARGETDURATION is an integer</li> <li>EXT-X-MEDIA-SEQUENCE is an integer</li> <li>EXT-X-PROGRAM-DATE-TIME has date format as per Pantos draft</li> <li>EXT-X-VERSION is an integer</li> </ul>	<p>Error code 50102 is generated in the report. The tag has an invalid value or a value that cannot be parsed.</p>	<p>Error</p>	<p>Modify the playlist to correct the value of tags, as suggested by the specification.</p>
<p>Check for missing mandatory tags in playlist.</p> <ul style="list-style-type: none"> <li>Missing EXT3MU</li> <li>Missing EXT-X-ENDLIST if playlist type is VOD</li> <li>Missing EXT-X-</li> </ul>	<p>Error code 50107 is generated in the report. Missing a mandatory tag with respect to the playlist type.</p>	<p>Error</p>	<p>Modify the playlist to include the mandatory elements, as suggested by the specification.</p>

TARGETDURATION			
<p>Check that tags are not repeated incorrectly in playlist.</p> <ul style="list-style-type: none"> <li>EXT-X-TARGETDURATION repeated with a different value</li> <li>EXT-X-VERSION repeated with a different value</li> <li>EXT-X-PLAYLIST-TYPE repeated with a different value</li> </ul>	Error code 50108 is generated in the report. A duplicate tag is present with a different value or a tag is placed incorrectly.	Error	Remove the multiple occurrences of a tag with a unique occurrence. Correctly place the tag in the playlist.
Check that EXT-X-ENDLIST is the last tag, if it appears	Error code 50002 is seen in the report. Extra tags appeared after #EXT-X-END tag	Warning	Remove the tags appearing after tag #EXT-X-ENDLIST.

### Tags Attribute Validation

This section covers the values of the extended M3U tags, which contain Attribute Lists. An Attribute List is a comma-separated list of attribute and value pairs with no whitespaces. An attribute and value pair follows this syntax: `Attribute Name = Attribute Value`

For example, if KEYFORMAT and KEYFORMATVERSIONS attributes are present, specify the version tag EXT-X-VERSION in the playlist and set its value as greater than or equal to 5.

Description	Result	Category	Corrective Action
Verifies that attributes of tags in a playlist are valid and conform to the <a href="#">standards</a> .	Error code 50101 is generated in the report. An attribute of the tag is either unrecognized or is invalid.	Error	Update the tag attribute in the playlist, as recommended in the specification.
<p>Verifies the value of the attributes of tags in a playlist.</p> <ul style="list-style-type: none"> <li>Verify the attribute data types for EXT-X-FAXS-CM, EXT-X-KEY, and EXT-X-MAP.</li> <li>Verify that the values</li> </ul>	Error code 50103 is generated in the report. The tag has an invalid value or a value that cannot be parsed.	Error	Update the tag attribute, as recommended in the specification.

of the attributes conform to the <a href="#">standards</a> .			
<p>Check for a repeated attribute in a tag.</p> <ul style="list-style-type: none"> <li>For all media playlist tag that can have an attribute list.</li> </ul>	Error code 50104 is generated in the report. A duplicate attribute is present in the attribute list of the tag.	Error	Remove the multiple occurrences of an attribute of tag with a single occurrence.
<p>Missing mandatory attribute in a tag</p> <ul style="list-style-type: none"> <li>Refer mandatory attributes for media playlist tags that can have an attribute list.</li> </ul>	Error code 50109 is generated in the report. A mandatory attribute of a tag is missing.	Error	Include the mandatory attribute, as recommended in the specification.
Incompatibility between attributes of tags and the playlist version. Refer to the test cases for protocol version compatibility <a href="#">here</a> .	Error code 50001 is generated in the report.	Warning	Update the value of EXT-X-VERSION tag as it indicates the compatibility version of the playlist. Use the lowest protocol version with which the server, the playlist file, and the associated media segments comply.
Check for invalid white space between attribute list and the values.	<p>Error code 50101 is generated in the report if the attribute is invalid.</p> <p>Error code 50103 is generated in the report if the attribute value is invalid.</p>	Warning	Modify the tag and remove the invalid white spaces.

### Media Playlist Miscellaneous Validations

This section covers certain miscellaneous M3U tags that are commonly used in playlist creation and other suggested checks while using these tags.

Description	Result	Category	Corrective Action
Check for time discontinuity in the media file.	Error code 50302 is generated in the report. It indicates unspecified discontinuity between consecutive media files.	Warning	Modify the playlist and add an EXT-X-DISCONTINUITY tag before the media file discontinuity. For more details, see the <a href="#">specifications</a> .

Check the synchronization of Program-Date-Time. It should map consistently with the media file.	Error code 50305 is generated in the report. The value of #EXT-X-PROGRAM-DATE-TIME is not consistent throughout playlist with the media file start time.	Error	Modify the playlist and correct the value of the tag as suggested by the specification.
Check for the tag Date-Time presence after discontinuity in a stream, if it appears once.	Error code 50307 is generated in the report. If playlist contains #EXT-X-PROGRAM-DATE-TIME tag, it should reappear with updated value before every segment with #EXT-X-DISCONTINUITY tag applied to it.	Warning	Add an EXT-X-PROGRAM-DATE-TIME tag, before a segment with #EXT-X-DISCONTINUITY tag applied to it. For more details, see the <a href="#">specification</a> .
Check for the duration of the media segments <ul style="list-style-type: none"> <li>Invalid duration in playlist.</li> <li>Mismatch between the duration specified in the playlist and the actual duration of the media.</li> </ul>	<ul style="list-style-type: none"> <li>Error code 50308 is generated in the report. The media file duration in media playlist is invalid or greater than the target duration.</li> <li>Error code 50301 is generated in the report. It indicates a mismatch between the actual duration and the specified duration of the media file.</li> </ul>	Error	<p>Modify the playlist to:</p> <ul style="list-style-type: none"> <li>Correct the duration value.</li> <li>Ensure that the actual duration of the media file is specified as the value of the EXTINF tag.</li> </ul> <p>For more details, see the <a href="#">specification</a>.</p>
Check for incomplete media file information. For example, a missing duration or a missing URL.	Error code 50106 is generated in the report. Mandatory information for a media, such as duration, is either missing or incomplete.	Error	Add the mandatory information.
Check for incomplete media segments.	Error code 50303 is generated in the report. It indicates that the received media file is incomplete.	Error	This is a validation notification and no action is required.
Validate the bandwidth specified in the master playlist.	Error code 50306 is generated in the report. The bandwidth of the received stream data does not match with the bandwidth specified in the master playlist.	Warning	Modify the stream attribute in the master playlist to reflect the correct bandwidth.

## Master Playlist Tags Validation

### Tags Validation

The following table contains validation guidelines for generic tags and issues related to master playlist.

Description	Result	Category	Corrective Action
Check for compatibility of playlist tags and tag's values with the playlist version. Refer test cases for protocol version compatibility <a href="#">here</a> .	Error code 50001 is generated in the report.	Warning	Modify the playlist to correct the value of EXT-X-VERSION tag. The value indicates the compatibility version of the Playlist file. Use the lowest protocol version with which the server, the playlist file, and the associated media segments comply.
Check for tags that are not meant to be present in master playlist or unrecognized tags	Error code 50100 is generated in the report. Missing a mandatory tag with respect to the playlist type.	Error	Modify the playlist to exclude media playlist tags or be assured about the significance of these tags.
Check no tags are repeated incorrectly in the master playlist. <ul style="list-style-type: none"> <li>EXT-X-STREAM-INF with the same attributes repeated in the playlist</li> <li>EXT-X-MEDIA with the same attributes repeated in the playlist</li> </ul>	Error code 50401 is generated in the report. A duplicate tag present with similar attributes and values in master playlist.	Error	Remove the multiple occurrence of tag with a single definition.
Check for presence of valid MBR external media file tags	Error code 50404 is generated in the report. Could not identify a valid multi bit rate set in the master playlist.	Warning	Add at least a single valid external media file tag

### Tags Attribute Validation

The following table contains validation guidelines for all generic tag attributes and issues related to master playlist.



Description	Result	Category	Corrective Action
<ul style="list-style-type: none"> <li>Verify the validity of tag attributes in playlist and conformity with the standards mention <a href="#">here</a>.</li> <li>Verify the attributes for EXT-X-MEDIA and EXT-X-STREAM-INF tags.</li> </ul>	Error code 50101 is generated in the report. An attribute of the tag is either unrecognized or invalid.	Error	Modify the playlist and correct the attribute of the tag, as recommended in the specification.
<ul style="list-style-type: none"> <li>Verify the attributes' data types for EXT-X-MEDIA and EXT-X-STREAM-INF tags.</li> <li>Verify that the attribute values conform to standard mentioned <a href="#">here</a></li> </ul>	Error code 50103 is generated in the report. It indicates that the tag has an invalid value or a value that cannot be parsed.	Error	Correct the value of tag attribute, as recommended in the specification.
Check for the missing mandatory attribute in a tag. To know about the mandatory attributes, see <a href="#">this</a> and <a href="#">this</a> specification.	Error code 50109 is generated in the report. It indicates that a mandatory tag attribute is missing.	Error	Include the mandatory attributes in the playlist, as recommended in the specification.
Check for multiple occurrences of an attribute in a tag.	Error code 50104 is generated in the report. It indicates that a duplicate attribute is present in the attribute list of the tag.	Error	Replace the multiple occurrences of the tag attribute with a single instance.

### External Media Playlist Validation

The following table contains validation guidelines for tags, attributes, and other suggested checks, associated with the usage of these tags.

Description	Result	Category	Corrective Action
Check for invalid stream in a MBR set.	Error code 50403 is generated in the report. The attribute values of the #EXT-X-STREAM-INF tag contain an invalid playlist.	Error	Correct the value of the tag to contain a valid playlist. For more details, see this <a href="#">specification</a> .
Verification for the following codec-related checks: <ul style="list-style-type: none"> <li>Mandatory attribute codec is mentioned in</li> </ul>	Error code to be registered in the report. <ul style="list-style-type: none"> <li>Error code 50405 is generated. It indicates that no valid audio or video</li> </ul>	Warning	Modify the playlist as mentioned below: <ul style="list-style-type: none"> <li>Add attribute codec to all streams in the master playlist. Include a CODECS attribute for</li> </ul>

<p>master playlist for all streams.</p> <ul style="list-style-type: none"> <li>• Validate the codec value.</li> <li>• Validate the codec value as per content type.</li> </ul>	<p>codec is defined for the external playlist.</p> <ul style="list-style-type: none"> <li>• Error code 50406 is generated. It indicates that the audio or video codec specified does not conform to the standards.</li> <li>• Error code 50412 is generated. It indicates that codecs specified with the attribute of the primary stream tag EXT-X-STREAM-INF, do not match the content type.</li> </ul>		<p>every EXT-X-STREAM-INF tag.</p> <ul style="list-style-type: none"> <li>• Correct the value of the codec to contain a valid value, as recommended in the specification.</li> <li>• Include in the CODECS attribute value, every format that is present in any media segment that appears in the associated Media Playlist file.</li> </ul> <p>To know about valid codecs, see this <a href="#">specification</a>.</p>
<p>Check for multiple program-Id associations, with different EXT-X-STREAM-INF tags.</p>	<p>Error code 50411 is generated in the report. Multiple PROGRAM-ID representing different presentations found. Not a valid playable playlist.</p>	<p>Error</p>	<p>A master playlist file can contain multiple EXT-X-STREAM-INF tags with the same PROGRAM-ID to identify different encoding of the same presentation. But only a single PROGRAM-ID is supported.</p>

### Alternate Media Playlist Validation

The following table contains validation guidelines for tags, attributes and other suggested checks for alternative renditions and playback of variant playlists.

This feature allows a provider to specify one playlist from amongst a set of variant playlists as an override of the main presentation. In this case, the client plays media from only the override playlist and suppresses any media of the same type from the main presentation, if latter is present. This functionality allows a presentation to offer multiple versions of the media without requiring the provider to store duplicate media or requiring the client to download all variants when it only needs one. It also allows additional media to be offered subsequently without re-mastering the original content.

Description	Result	Category	Corrective Action
<p>Check for inter-dependency in the media tag attributes. For attributes inter-dependency, see these <a href="#">specifications</a>.</p>	<p>Error code 50402 is generated in the report. It indicates that the values of the multiple attributes of a particular tag are not</p>	<p>Error</p>	<p>Modify the playlist to contain valid attributes that are compatible with each other.</p>

	compatible with each other.		
Check for missing alternate audio or video rendition group. Refer only the valid and presented groups in #EXT-X-STREAM-INF tag.	Error code 50407 for audio and 50408 for video is generated in the report. It indicates that an alternate audio or video renditions group is not found for the group ID associated with an external playlist.	Error	Add valid audio or video renditions to the playlist with EXT-X-MEDIA tag. Define renditions-groups before use.
Check for consistency across all the media groups in a master playlist.	Error code 50410 is generated in the report. It indicates that the multiple groups associated with a multi-bit rate set are not consistent with each other.	Error	An EXT-X-STREAM-INF tag contains an AUDIO, a VIDEO, or a SUBTITLE attribute. It indicates that alternative renditions of the content are available for playback of that variant. For more details, see these <a href="#">specifications</a> .
Check for the media rendition group in a master playlist. A set of EXT-X-MEDIA tags with the same GROUP-ID value forms a group of renditions. For more details, see these <a href="#">specifications</a> .	Error code 50409 is generated in the report. It indicates that the renditions within a group have inconsistent or invalid attribute values.	Error	Modify the playlist to contain valid rendition groups. For more details, see these <a href="#">specifications</a> .

## Live Media Playlist Tags Validation

### Media Playlist Updates

The following table lists the suggested checks for smooth playback of media playlists.

Description	Result	Category	Corrective Action
Check for continuity in the media files.	Error code 50604 for video and 50605 for audio is generated in the report. It indicates that the media file either contains discontinuous video or is missing video or audio packets.	Error	Split the media file at the discontinuity into two separate media files in a playlist and mark the discontinuity.
Check for regular update of the live streams playlist. Validate if live stream is updating within three	Error code 50004 is generated in the report. It indicates that a playlist does not update or updates with changed static	Information	Check the configuration of the packager producing the stream; modify parameters to

times of the target duration time.	parameters, like version, target duration, and so on.		correct the issue.
Check for stream rollover	Error code 50304 is generated in the report. It indicates that a stream time roll-over is observed. Media file time represented in error or warnings after this is offset by 2 <sup>33</sup> .	Error	This is a validation notification and no action is required.

### Media Playlist Sliding Window

For live sessions, the index file is updated by removing media URIs from the file as new media files are created and made available. This is called Sliding Window and the following table lists the validation checks for Sliding Window.

Description	Result	Category	Corrective Action
<p>Check the Sliding Window of the playlist.</p> <ul style="list-style-type: none"> <li>The updated Sliding Window is incremental.</li> <li>The updated Sliding Window does not go backward with respect to first or last media file sequence number.</li> <li>The updated Sliding Window media file information should match with previous</li> <li>If playlist type is EVENT, Sliding Window must not be implemented</li> </ul>	Error code 50003 is generated in the report. It indicates inconsistent sliding view of playlist, with respect to the previous Sliding Window received.	Error	<ul style="list-style-type: none"> <li>Make sure the delivery server is providing the incremented changes in the next update.</li> <li>Make sure the delivery server or the caching server is not serving the old playlist when new update is delivered.</li> <li>If media file is being served from multiple servers, make sure they provide the same view of the media file.</li> </ul>
Check for the static attributes of the playlist in the Sliding Window.	Error code 50004 is generated in the report. It indicates that a playlist does not update or updates with changed static parameters like version, target duration, and so on.	Error	Do not change the static parameters after finalizing the parameters.

## Media File Validation

The table below lists the checks for the validity of the MPEG-2 Transport Stream (TS) packets contained in a media stream.

Description	Result	Category	Corrective Action
Check the format of media file against the TS specification.	Error code 50601 is generated in the report. It indicates an inability to validate the media file.	Error	Check the format of the media file.
Check for the presence of key frame in media file—at least one key frame is required in each media file.	Error code 50602 is generated in the report. It indicates that no IDR is found in the media file.	Error	Modify the playlist and define at least one key frame in each media file, preferably as the first video frame.
Validate that the TS packets in the media file are well formed.	Error code 50603 is generated in the report. It indicates that the media file has one or more invalid TS packets.	Error	Use a TS inspector tool to check the media file.
Check for video or audio discontinuity in the media file.	Error code 50604 for video and 50605 for audio is generated in the report. It indicates that the media file either contains discontinuous video or is missing video or audio packets.	Error	Split the media file at the discontinuity into two separate media files in playlist and mark the discontinuity.
Check the validity of the PAT/PMT and warn against inconsistent changes in PAT/PMT. For example, prog-id is changed. Check if PAT/PMT is the first packet.	Error code 50606 is generated in the report. It indicates that the program map table is either undefined or has been changed inconsistently.	Error	Add PAT/PMT as first TS packets in the media segments or specify the MAP file. Ensure that PAT/PMT program-id changes are valid.
Verify in the AAC audio stream that ADTS appears and ADTS information about the sampling frequency, channels, and other parameters do not change within the media file.	Error code 50607 is generated in the report. It indicates that the audio stream information, say ADTS header in AAC streams, is either undefined or is changed inconsistently.	Error	Place ADTS headers in the AAC packets. Ensure that the ADTS headers in each packet represent the same sample sampling frequency, channels, and other parameters.
Validate the H.264 specific video information for the presence of SPS/PPS before each key frame and validate against change in SPS/PPS	Error code 50608 is generated in the report, if the video stream information, say SPS/PPS header in H.264 streams, is either undefined or	Error	Add SPS/PPS NALU before the key frame packets are received. Do not change SPS/PPS within a media file.

within a media file.	is changed inconsistently.  Error code 50609 is generated in the report, if multiple video elementary streams are present in the transport media file.		
Check for video gaps in the audio and video stream.	Error code 50610 is generated in the report, if a particular media file of the audio and the video stream has a video gap.	Warning	Avoid video gaps in the audio and video stream.
Validate audio only or video only streams.	Error code 50611 is generated in the report, if a stream identified as audio only from master playlist contains data other than just audio.  Error code 50612 is generated in the report, if a stream identified as video only from master playlist, contains data other than just video.	Error	You can either modify the master playlist to tag the streams properly or remove the audio or the video from a stream specified as video-only or audio-only, respectively.
Check the stream type as specified in playlist against the received data.  <ul style="list-style-type: none"> <li>MIME type or file extension of transport streams matches the data.</li> <li>MIME type or file extension of AAC and MP3 streams conforms with the data.</li> </ul>	Error code 50613 is generated in the report. It indicates that a media file has data packets that are inconsistent as per media file URL extension or MIME type. For example, if a media file with AAC extension has MP3 packets.	Error	Package the streams as per their MIME type and extensions.
Check in an IFrame only playlist that PAT/PMT is received as a MAP tag if media file is represented as byte range.	Error code 50615 is generated in the report. It indicates that the byte range of an IFrame segment with an #EXT-X-BYTERANGE tag applied to it includes a PAT/PMT.	Error	Notify the PAT/PMT using the #EXT-X-MAP tag introduced in version 5.
Check for encrypted media files.	Error code 50616 is generated in the report. It indicates that a media file is encrypted as per playlist tags, so its contents cannot be validated.	Error	This is a validation notification that required no action.

## Media Playlist Multi-bit Rate Validations

HTTP Live Streaming (HLS) supports both live broadcasts, pre-recorded content (Video On Demand, VOD), and multiple alternate streams at different bit rates and resolutions. HLS allows for a client to dynamically switch between these streams depending on the bandwidth availability.

Description	Result	Category	Corrective Action
Check for MBR stream synchronization, with respect to, the location of Discontinuity, Key Frame, Program Date Time, and DPI tags in different streams	<p>The following error codes are generated in the report:</p> <ul style="list-style-type: none"> <li>50902 for Discontinuity.</li> <li>50903 for Key Frame.</li> <li>50907 for Program Date Time. Streams in the multi-bit rate set are not synchronized, with respect to, #EXT-X-PROGRAM-DATE-TIME tag value and media file time association.</li> </ul>	Error	Ensure that the streams in multi-bit rate set are synchronized with respect to the mentioned parameters.
Check for MBR stream synchronization for the values of Target Duration, Playlist Type, and Encryption tags.	<p>The following error codes are generated in the report:</p> <ul style="list-style-type: none"> <li>50904 if The Target Duration of the stream is different than other streams in a multi-bit rate set.</li> <li>50906 for Playlist Type. Streams in the multi-bit rate set have different playlist property (Live/VOD).</li> <li>50911 for Encryption. One or more streams in the multi-bit rate set are not encrypted, while others are encrypted.</li> </ul>	Error	Ensure that the streams in multi-bit rate set are synchronized, with respect to, the mentioned parameters.
Check for lag in a stream in MBR set.	Error code 50905 is generated in the report. It indicates that a particular multi-bit rate stream is lagging in time, with respect to, the other streams.	Error	This is a validation notification and no action is required.
Check for synchronization between anIframe and the	Error code 50908 is generated in the report. It indicates that Iframe	Error	Synchronize the IFrame stream with the primary

primary streams.	only streams do not have their key frames aligned with the primary streams.		stream.
Check for validating the start time for all streams in VOD.	Error code 50910 is generated in the report. It indicates that VOD streams in the multi-bit rate set have late start time than other streams.	Error	Ensure that the start time of all VOD streams in multi-bit rate set are the same. The error can result from the truncation of the recording of VOD streams.
Check for synchronization between IFrame and the primary streams, with respect to, discontinuity.	Error code 50909 is generated in the report. It indicates that IFrame only streams have discontinuity that are not aligned with the primary streams	Error	Synchronize the IFrame stream with the primary stream.

## Map File Validations

The EXT-X-MAP tag specifies how to obtain the Transport Stream Program Association Table (PAT) or the Program Map Table (PMT), for the applicable media segment. It is recommended to use EXT-X-MAP tag for segments whose resource does not start with a PAT/PMT.

Description	Result	Category	Corrective Action
Validate the MAP data and check for invalid PMT in the MAP.	<p>The following error codes are generated in the report:</p> <ul style="list-style-type: none"> <li>50650 if the media map file has audio or video data other than PAT/PMT.</li> <li>50652 if the media map file does not contain a valid program map table.</li> </ul>	Error	Specify a proper BYTERANGE that only includes PAT/PMT information. Verify the map tag reference.
Check for unnecessary use of MAP tag.	Error code 50651 is generated in the report. It indicates that the media file has unnecessary external map file association. Media file already contains PAT/PMT	Warning	Modify the stream by removing the unnecessary map file association.
Check for unused map tags.	Error code 50653 is generated in the report. It indicates that a #EXT-X-MAP tag is not associated with any media file because of its placement.	Error	Ensure #EXT-X-MAP is placed after the #EXT-X-DISCONTINUITY tag.



## Primetime DPI Validations

Adobe Primetime Digital Program Insertion (DPI): Primetime DPI capabilities include ad insertion or ad replacement, and blackout and insertion of alternate content. To know more about the EXT-X-CUE tag and to resolve any issues, see the [DPI specifications](#).

Description	Result	Category	Corrective Action
Validate the attributes values of the cue tag.	Error code 50701 is generated in the report. It indicates an invalid value of the Cue tag attributes.	Error	Modify the attribute of the cue tag.
Check for changing value of cue attributes with respect to the same ID. <ul style="list-style-type: none"> <li>Simple Mode: TIME and DURATION</li> <li>SCTE-35: TIME and DURATION value changes constantly</li> </ul>	Error code 50702 is generated in the report. It indicates that the value of the Cue tag attribute is changed in the repeated tag with same ID.	Error	Modify the value of the attribute of the cue tag. Change in value of this attribute is not allowed.
Check for missing elapsed attribute in case of repeating tag with same ID.	Error code 50703 is generated in the report. It indicates that the elapsed attribute is missing in the repeated cue of the same ID.	Error	Modify the playlist and add the ELAPSED attribute to the tag.
Check for overlapping cue tags.	Error code 50704 is generated in the report. It indicates that the specified cue is overlapping with another cue.	Error	Modify the playlist to change the attribute TIME for one of the overlapping cue tags.
Validate ELAPSED and TIME attributes.	The following error codes are generated in the report: <ul style="list-style-type: none"> <li>50705 if the cue elapsed time is reduced or is greater than the cue duration in case of Simple mode.</li> <li>50706 if the value of the attribute TIME of the tag is less than the stream's current time.</li> </ul>	Error	Update the value of the ELAPSED attribute of the cue tag or update the value of the TIME attribute of the cue tag. The Cue appear before the corresponding stream time has elapsed.
Check for unsupported cue tags.	Error code 50707 is generated in the report. Validation of CUE of type #EXT-X-CUE-CONT is not supported. Only the DPI specifications are supported.	Error	Only DPI specifications are supported. The legacy DPI tags are not supported.

Check that the TIME attribute in the tag and the media file segment are aligned.	Error code 50706 is generated in the report. It indicates that the cue with an ID does not have TIME attribute value equal to or approximately the same as the corresponding media file start time.	Warning	Modify the playlist and add the cue tag before the correct media segment.
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## IFrame Validations

iOS 5 supports fast forward and reverse playback. Using Intra-Frames (IFrames), you can create content that can be fast forwarded and reversed. IFrames are encoded video frames, the encoding of which does not depend on any other frame. To specify the placement of IFrames, iOS 5 introduces a new IFrame only playlist, which is similar to a regular playlist. The only difference between the two playlists is that IFrame playlists do not have an intrinsic duration.

Description	Result	Category	Corrective Action
Check for a mismatch in the master playlist and the definition of the media stream.	<p>The following error codes are generated in the report:</p> <ul style="list-style-type: none"> <li>50801 if #EXT-X-I-FRAMES-ONLY tag is missing from an IFrame only stream in the master playlist.</li> <li>50803 if no valid IFrame only tags are found in the master playlist.</li> </ul>	Error	<ul style="list-style-type: none"> <li>Add the #EXT-X-I-FRAMES-ONLY tag to the media stream in the playlist.</li> <li>Add a #EXT-X-I-FRAMES-ONLY tag in the master playlist.</li> </ul>
Check for multiple keyframes.	Error code 50802 is generated in the report. It indicates that a media file in IFrame only stream has multiple key frames, data other than key frames like audio, or data messages, and so on.	Error	Check the configuration of the packager producing the stream; modify parameters to correct the issue.
Check for an audio codec in IFrame tag in the master playlist.	Error code 50804 is generated in the report. It indicates that an audio codec cannot be specified in the CODECS attribute of the IFrame only tag in the master playlist.	Error	Modify the playlist and remove the audio CODECS attribute from the IFrame tag definition.

## Encrypted Data Validations

### Simple AES

Media files may be encrypted to control access. To do so, first encrypt the media and then tag the encrypted media segments in the playlist with the EXT-X-KEY tag. The EXT-X-KEY tag provides the necessary information to decrypt the media files that follow it. It supports two different encryption methods, namely NONE and AES-128.

Description	Result	Category	Corrective Action
Validate the attributes of tag #EXT-X-KEY for NONE method.	Error code 51002 is generated in the report. It indicates the presence of invalid #EXT-X-KEY attributes like URI, IV, KEYFORMAT, and KEYFORMATVERSION for NONE method.	Error	Do not specify the attributes URI, IV, KEYFORMAT, and KEYFORMATVERSIONS if the method is NONE.
Validate the value of the attribute IV.	Error code 51003 is generated in the report. It indicates that IV attribute is either not 16 byte long or is corrupt.	Error	Modify the values of IV attribute.
Validate the value of the attribute URI.	Error code 51005 is generated in the report. It indicates that the URI of #EXT-X-KEY URI attribute is not secure.	Error	Modify the values of URI attribute.

## Primetime DRM

An AAXS segment is an encrypted media segment that can be decrypted using the AAXS DRM system. A playlist can utilize Adobe Access (AAXS) Digital Rights Management (DRM) to encrypt content.

Adobe Access is a digital rights management platform that makes it possible to protect and securely deliver video and audio content for playback on consumer devices such as personal computers. Adobe Access is a flexible platform that enables content owners to protect their content and maintain control over distribution. Content owners create licenses for each digital media file, ensuring that a wide variety of the highest-quality content is made available to consumers. Adobe Access lets content owners and distributors control how and where their content can be distributed and experienced, providing end-to-end protection throughout the content lifecycle.

Description	Result	Category	Corrective Action
Validate the value of EXT-X-FAXS-CM tag	The following error codes are generated in the report: <ul style="list-style-type: none"> <li>51001 if the DRM metadata is invalid base 64 string or is corrupt and cannot be parsed.</li> <li>51004 if a valid URI or Base64 metadata is not defined with the #EXT-X-FAXS-CM tag.</li> </ul>	Error	Modify the stream DRM metadata to a valid value.
Check for any generic issues in DRM.	Error code 60100 is generated in the report. It indicates an unspecified error relating to the DRM tags and information within the playlist.	Error	This is a validation notification and no action is required.
Check for synchronization between master playlist and media playlist.	Error code 51022 is generated in the report. It indicates that a #EXT-X-FAXS-CM tag present in the media playlist(s) is	Warning	Modify the master playlist to add EXT-X-FAXS-CM tag.

	missing in the Master playlist.		
Validate the transport certificate in DRM metadata.	Error code 51019 is generated in the report. It indicates that an expired transport certificate is found in the DRM Metadata.	Error	Recreate DRM data with valid transport certificate.
Validate DRM metadata encoding.	Error code 51015 is generated in the report. It indicates invalid DRM encoding or corrupted file. Unable to decode ASN1 encoding.	Error	Regenerate the stream meta data.
Check for mandatory fields in DRM metadata.	Error code 51011 is generated in the report. It indicates that the DRM metadata does not have all the required fields.	Error	DRM metadata is incomplete.
Check for parsing error in various sections of DRM metadata.	<p>The following error codes are generated in the report:</p> <ul style="list-style-type: none"> <li>• 51012 if transport certificates' information in DRM metadata is not encoded properly.</li> <li>• 51013 if policies information in DRM metadata is not encoded properly.</li> <li>• 51014 if license information in DRM metadata is not encoded properly.</li> </ul>	Error	Ensure the correctness of the DRM metadata.
Invalid policy version for DRM content.	Error code 51018 is generated in the report. It indicates an invalid policy version for one or all of the policies embedded inside the DRM metadata.	Error	Ensure the correctness of the version numbers for all policies.

## HTTP Header Validations

HTTP header fields are components of the header section of request and response messages in the Hypertext Transfer Protocol (HTTP). The header defines the operating parameters of an HTTP transaction. The follow table contains checks for the validity of HTTP header information.

Description	Result	Category	Corrective Action
Check the validity and accessibility of the file location.	<p>The following error codes are generated in the report:</p> <ul style="list-style-type: none"> <li>• 50200 if the URL or file path of a media file, external playlist, or any external content is either invalid</li> </ul>	Error	Modify the URL to contain valid file path. Ensure that the manifest URL is accessible to the service by making the manifest publicly accessible.

	<p>or cannot be resolved.</p> <ul style="list-style-type: none"> <li>• 50201 if the tool is unable to read or fetch data of a media file, external playlist, or any external content.</li> </ul>		
Check for TTL in HTTP response header.	Error code 50501 is generated in the report. It indicates that the Time To Live (TTL) information is missing from the downloaded external content, such as playlist or media file.	Warning	Modify the configuration for the hosting server to provide the TTL information in the HTTP header.
Check the MIME type in the HTTP response header.	Error code 50502 is generated in the report. It indicates an incorrect content type in the downloaded external content, such as playlist or media file.	Error	Modify the configuration for the hosting server to provide the correct MIME type in the HTTP response.
Validate the content type.	Error code 50614 is generated in the report. It indicates that the media file content type is either unsupported or unknown. HTTP content type or file extensions are used to identify the content type.	Error	This is a validation notification and no action is required.

## References

To know more about the various specifications used in this document and about HLS validation, refer to the following resources:

- [Apple HLS Specification](#)
- [HLS Validator Quick Start Guide](#)
- [Primetime DPI Specification](#)