ATSC Standard:
A/344:2019 Amendment No. 3, Redistribution Use Case

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Revision History

Version	Date
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1. OVERVIEW

1.1 Definition

An Amendment is generated to document an enhancement, an addition or a deletion of functionality to previously agreed technical provisions in an existing ATSC document. Amendments shall be published as attachments to the original ATSC document. Distribution by ATSC of existing documents shall include any approved Amendments.

1.2 Scope

This document describes changes to informative language in Section 7 of A/344 to explicitly draw attention to the redistribution use case, whereby an ATSC 3.0 service is delivered to a Receiver via a protocol other than ATSC 3.0, such as HDMI.

This document also adds an error code to indicate that changing RMP playback from the current source is not supported.

Finally, this document clarifies the description of `startDate` and `currentTime` values when presenting DASH content, and that the recovered descriptors returned by the Query Recovered Component Info API are only available for the components identified by watermarks or fingerprints.

1.3 Rationale for Changes

The changes described in this document are being proposed because the lack of discussion regarding the redistribution use case in the informative language in Section 7 of the current specification has led to uncertainty regarding support for this use case. The new text provides context for APIs, such as the Content Recovery APIs, that support the redistribution case.

The new error code provides information regarding the reason that the change to the requested content source was unsuccessful. This information will allow the Broadcaster Application to alter its request rather than continue requesting a content source change that will not be successful, which could be the case if the Broadcaster Application was not aware of the reason for the failure.

The description of `startDate` and `currentTime` values when presenting DASH content has confused several readers, leading them to believe that the `startDate` and `currentTime` values should be the same as each other (e.g., `startDate` = `currentTime`) rather than matching the values of the same name in the live version of the recorded content.

Another misunderstanding has arisen as some readers have assumed that descriptors are recovered for all components of a service, rather than for only the component(s) identified by watermarks or fingerprints.

1.4 Compatibility Considerations

Most of the changes described in this document are changes to informative text and are backward-compatible relative to the currently published version of the standard to which this Amendment pertains and any previously approved Amendments for that standard.

The only change that may appear not to be backward-compatible is the addition of a new Error Code to support the Redistribution use case. However, since Broadcaster Applications are expected to gracefully ignore unknown error codes per Section 9.1, and a Receiver that does not

provide this Error Code could return a different Error Code (e.g., -12, meaning the content cannot be played), this change should not have significant impact on existing implementations.

2. LIST OF CHANGES

Change instructions are given below in *italics*. Unless otherwise noted, inserted text, tables, and drawings are shown in blue; deletions of existing text are shown in ~~red strikeout~~. The text "[ref]" indicates that a cross reference to a cited referenced document should be inserted.

2.1 Normative References

No changes.

2.2 Informative References

No changes.

2.3 Acronyms and Abbreviations

No changes.

2.4 Terms

Redistribution – A use case wherein an ATSC 3.0 service is delivered to a Receiver via a protocol other than ATSC 3.0; e.g. HDMI.

2.5 Change Instructions

In the introductory text of Section 7, change the text to include the redistribution use case.

In the ATSC 3.0 Receiver environment, there are two software components that can play out media content delivered via either broadcast, ~~or~~ broadband, or redistribution. For the purposes of this specification, these two logical components are referred to as Application Media Player (AMP) and Receiver Media Player (RMP), and these are described further in this section. The AMP is JavaScript code (e.g., DASH.js), which is part of an HTML5 Broadcaster Application, while the RMP is receiver-specific implementation. The AMP uses the video tag and MSE to play out media content regardless of the content origination or delivery path. Details of the RMP design and implementation are out of scope for this specification and any design descriptions provided in this specification are only as informative reference. Whether AMP or RMP is used to play out a media content, there are several use cases:

- **Broadcast or Hybrid Broadband / Broadcast Live Streaming** – The content segments arrive either via broadband or broadcast.
- **Broadband Media Streaming** – Media content streaming over broadband (on-demand or linear service).
- **Downloaded Media Content** – Media content downloaded over broadcast or broadband ahead of time. Details of how media content is downloaded over broadband or broadcast is described in Section 9.3.11 of this specification.

The type of media streams played depends on signaling in the MPD of live broadcast streams, or specific Broadcaster Application logic.

The DASH Client specification [ref] provides the expectations for behavior of such players and is not further described here.

In redistribution scenarios, media content arrives using a method that does not employ ATSC 3.0 protocols (e.g. HDMI). Redistribution services are presented by an RMP.

At the end of Section 7.1, add a new subsection to describe the redistribution use case.

7.1.4 Redistribution

Interactive content can be supported in redistribution scenarios. The Receiver can obtain the ATSC 3.0 service from a redistribution source, present the service using an RMP, acquire service and application signaling as described in A/336 [ref A/336], and acquire the application package via broadband as described in Section [ref 6.4].

In Section 8.3.1, Table 8.2, add a new error code to the Error Codes table.

Table 8.2 JSON-RPC ATSC Error Codes

Code	Message	Meaning
-1	Unauthorized	Request cannot be honored due to domain restrictions.
-2	Not enough resources	No resources available to honor the request.
-3	System in standby	System is in standby. Request cannot be honored.
-4	Content not found	Requested content cannot be found. For example, invalid URL.
-5	No broadband connection	No broadband connection available to honor the request.
-6	Service not found	The requested Service cannot be located.
-7	Service not authorized	The requested Service was acquired but is not authorized for viewing due to conditional access restrictions.
-8	Video scaling/position failed	The request to scale and/or position the video did not succeed.
-9	XLink cannot be resolved	The request to resolve an XLink has failed.
-10	Track cannot be selected	The media track identified in the Media Track Selection API cannot be found or selected.
-11	The indicated MPD cannot be accessed	In response to the Set RMP URL API, the MPD referenced in the URL provided cannot be accessed.
-12	The content cannot be played	In response to the Set RMP URL API, the requested content cannot be played.
-13	The requested MPD Anchor cannot be reached	In response to the Set RMP URL API, the MPD Anchor indicated cannot be reached (e.g. beyond the end of the file).
-14	Unsupported Content Protection System	The specified content protection system is not supported by the Receiver.
-15	Illegal URL Format	The URL format specified in `sourceURL` or `targetURL` of the request is illegal.
-16	Illegal URL Format	The URL format specified in one or more URLs in the requested list is illegal.
-17	Malformed DASH Period	The format of the MPEG DASH fragment specified in the Period is illegal.
-18	MPD not found	The referenced MPD file cannot be found.
-19	The synchronization specified by rmpSyncTime cannot be achieved	In response to the Set RMP URL API with rmpSyncTime, the synchronization indicated by rmpSyncTime cannot be achieved.
-21	Changing RMP playback from the current source is not supported	In response to the Set RMP URL API, the Receiver does not support changing playback from the current source to an alternate source (e.g., broadband or locally cached content).

In Section 9.7.3, add a new error code to the list of error codes that may be returned.

Response:

result: A null object upon success.

error: The following error codes may be returned:

- -11: The indicated MPD cannot be accessed
- -12: The content cannot be played
- -13: The requested MPD Anchor cannot be reached
- -19: The synchronization specified by rmpSyncTime cannot be achieved
- -21: Changing RMP playback from the current source is not supported

In Section 9.10.3, modify the informative text in the second paragraph to clarify that the recovered descriptors are only available for the identified components.

When content recovery via watermarking or fingerprinting is employed, it is useful for the Broadcaster Application to be able to determine which video or audio components of a service are being received by the Receiver (e.g. as a result of selection by the user on an upstream device). This can enable the Broadcaster Application to modify the on-screen placement or the language of overlaid graphics or audio to conform to the characteristics of the received component.

During content recovery via watermarking or fingerprinting, the Receiver receives component descriptors in a recovery file specified in Ssection 5.4.2 of A/336 [ref A/336]. This API provides a means for the Broadcaster Application to access descriptors that were recovered for components that were identified using watermarks or fingerprintsto be accessed by the Broadcaster Application.

In Section 9.14.1, modify the informative text in the second bullet describing startDate and currentTime to clarify that the two values are the same as the values in the live presentation, not the same as each other.

When the RMP is presenting content compliant with [ref DASH ATSC IOP], the following requirements apply to the reported values of startDate and currentTime:

- The value of startDate represents the sum of MPD@availablilityStartTime in the MPD that was in use by the RMP when it began playing or recording the presentation and the time offset on the DASH Media Presentation timeline at which the RMP began playing or recording the presentation. When content delivered via broadband allows the RMP to seek to a position in the presentation earlier than the time at which RMP began playing or recording the content (e.g. live time-shift), the time offset on the DASH Media Presentation timeline shall be the earliest seek-able time offset in the content. Note that the media format of the recorded content is receiver specific.
- When recorded content is being presented, both the startDate and the currentTime values shall have the same respective values as the startDate and currentTime values applied toduring presentation of the live version of the recorded content.

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