

## **Infringement Contentions for U.S. Patent No. 11,463,768 v. Hulu**

Plaintiff Piranha Media Distribution, LLC (“Piranha”) accuses Defendant Hulu LLC (“Hulu”) of making, using, offering for sale, selling in (including licensing) and/or importing into the United States Hulu’s platform on any Hulu supported devices, including, but not limited to, Hulu.com on any supported web browsers like Chrome, Explorer, Firefox; the Hulu mobile application available for Apple iOS devices (including Apple TV, iPads, iPhones and iPod Touch) on Apple’s App Store and Android devices (including phones and tablets) on Google Play; set-top boxes (e.g., Apple TV and Android TV); smart TVs (e.g., Samsung, Vizio, LG); Nintendo Playstation; Nintendo Switch; Xbox; Xfinity Flex and X1 TV Boxes; Xumo TV and XiOne Box; Chromecast; Echo Show; Contour 2 and Stream Player Boxes; and/or other client devices as well and related server-side software and servers, that include Hulu’s ad insertion technology (collectively, the “Accused Instrumentalities”). See, e.g., “Hulu Supported Devices,” available at <https://help.hulu.com/article/hulu-supported-devices> (last visited June 27, 2024).

Hulu directly infringes the asserted claims of the ’768 patent by performing each and every step of the claims, as shown below. Hulu also directly infringes the asserted claims of the ’768 patent to the extent Hulu contracted with or directed a third-party to perform any of the steps of the asserted claims. Hulu also directly infringes the asserted claims to the extent it conditions participation in an activity or receipt of a benefit upon performance of a step or steps of a patented method and establishes the manner or timing of that performance.

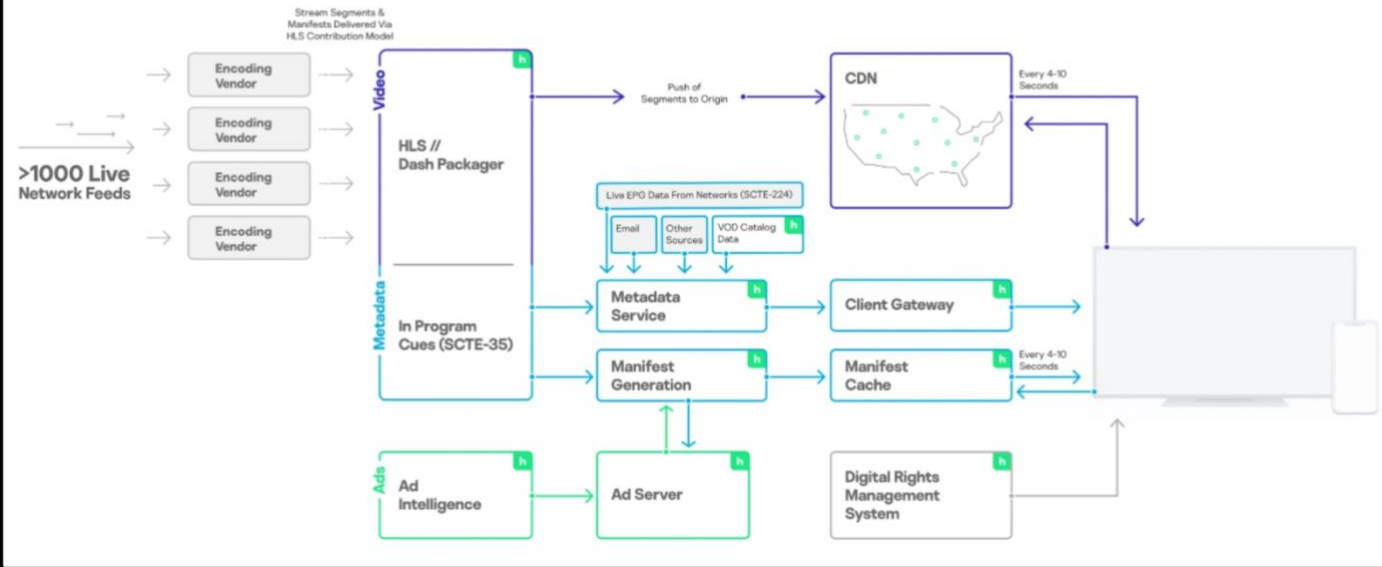
In addition, Hulu induces infringement of the asserted claims of the ’768 patent by actively providing Hulu’s clients, customers, and end users with access to the Accused Instrumentality and directing them to use the Accused Instrumentality in an infringing manner. For example, Hulu provides support services for the Accused Products, including providing instructions, guides, and online materials. See, e.g., “Ads on Hulu” available at <https://help.hulu.com/article/hulu-ads-on-hulu> (last visited June 27, 2024). Hulu’s clients, customers, and end users direct or otherwise cause the performance each and every element of the claims, as shown below. For example, as demonstrated in connection with claims 1, 10, 19, and 27 and their dependent claims, Hulu clients, customers, and end users exercise control over and benefit from the use of Hulu’s ad insertion technology by using Hulu’s technology. Hulu is thereby liable for induced infringement of the asserted claims of the ’768 patent under 35 U.S.C. § 271(b).

Hulu also contributes to infringement of the ’768 patent by offering to sell, selling (including licensing) and importing into the United States the Accused Instrumentality, which is especially made or adapted for use in an infringement of the ’768 patent. The Accused Instrumentality is a material component for use in practicing the ’768 patent and is not a staple article of commerce suitable for substantial non-infringing use. For example, Hulu’s platform, including Hulu.com, the Hulu mobile application, and related software and servers constitute a material portion of the invention and has no substantial non-infringing uses. Hulu’s clients, customers, and end users direct or otherwise cause the performance each and every element of the claims, as shown below. For example, as demonstrated in connection with claim 1, Hulu clients, customers and end users exercise control over and benefit from the use of Hulu’s ad insertion technology. Hulu is thereby liable for contributory infringement of the asserted claims of the ’768 patent under 35 U.S.C. § 271(c).

An analysis of Hulu’s documentation and/or source code may be necessary to fully and accurately describe all infringing features and functionality of the Accused Products and, accordingly, Plaintiff reserves the right to supplement these contentions once such information is made available to Plaintiff. Furthermore, Plaintiff reserves the right to revise these contentions, including as discovery in the case progresses, in view of any non-infringement arguments Hulu may make (e.g., to allege infringement under the doctrine of equivalents), in view of the Court’s final claim construction in this action and in connection with the provision of expert reports.

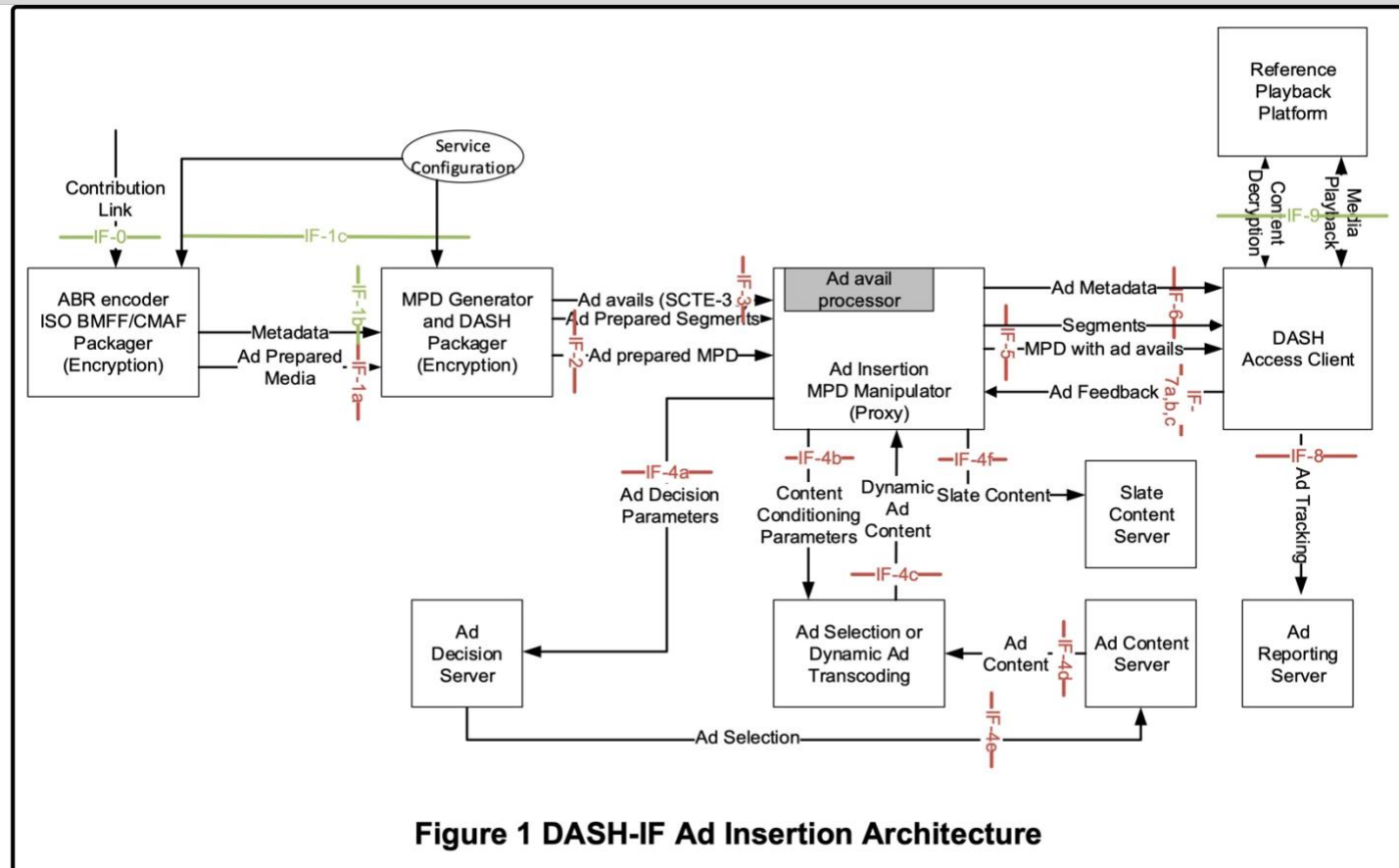
| U.S. Patent No.<br>11,463,768           | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1a] A digital media system comprising: | <p>The Accused Instrumentalities are digital media systems.</p> <p>For example, Hulu’s system for providing ad-supported streaming service is an Over-The-Top (“OTT”) system that is distributed over the server-side and client-side. Among other things, it is a digital media player device for controlling digital media presentations. Hulu’s OTT system controls the real-world experience for an end user, based on user interaction with the digital media presentation, through adaptively selecting alternative sequenced insertion points for presenting the data blocks of the digital media content and digital advertising content. Hulu’s system for providing ad-supported streaming service is an OTT system that is distributed over the server-side and client-side.</p> <p>Hulu’s system for providing ad-supported streaming service is implemented based on DASH interoperability guidelines and the MPEG-DASH streaming standard (“DASH Standard”), which it helped to write. (See Kelly Capizzi, <i>Hulu Migrates to DASH</i>, InterDigital (July 9, 2015), <a href="https://www.interdigital.com/post/hulu-migrates-to-dash">https://www.interdigital.com/post/hulu-migrates-to-dash</a> (last visited January 6, 2024)). For example, in a presentation given at the Demuxed 2019 Conference, Zachary Cava, who was Video Platform Architect at Hulu at that time, stated, “In our [Hulu’s] service, we primarily use DASH streaming.” Zachary Cava, <i>Scalable Per-User Ad Insertion in Live OTT</i>, YouTube (Dec. 12, 2019), <a href="https://www.youtube.com/watch?v=LFHEko3vC98">https://www.youtube.com/watch?v=LFHEko3vC98</a> (“Demuxed Presentation”) at the 00:42 to 00:46 mark (last visited July 9, 2024).</p> <p>The diagram below from the Hulu Tech Blog shows Hulu’s digital media system.</p> |

## Live OTT Service on Hulu



*The Anatomy of a Live OTT Service*, Hulu Tech blog, Medium (Sept. 18, 2018), <https://medium.com/hulu-tech-blog/the-anatomy-of-a-live-ott-service-c8f6078b24d3>, (last visited July 1, 2024) (“Hulu Tech Blog”). The manifest generation block in the Hulu Tech Blog diagram above controls digital media presentations.

Figure 1 of the DASH Standard further depicts the configuration of Hulu’s digital media system for controlling digital media presentations:

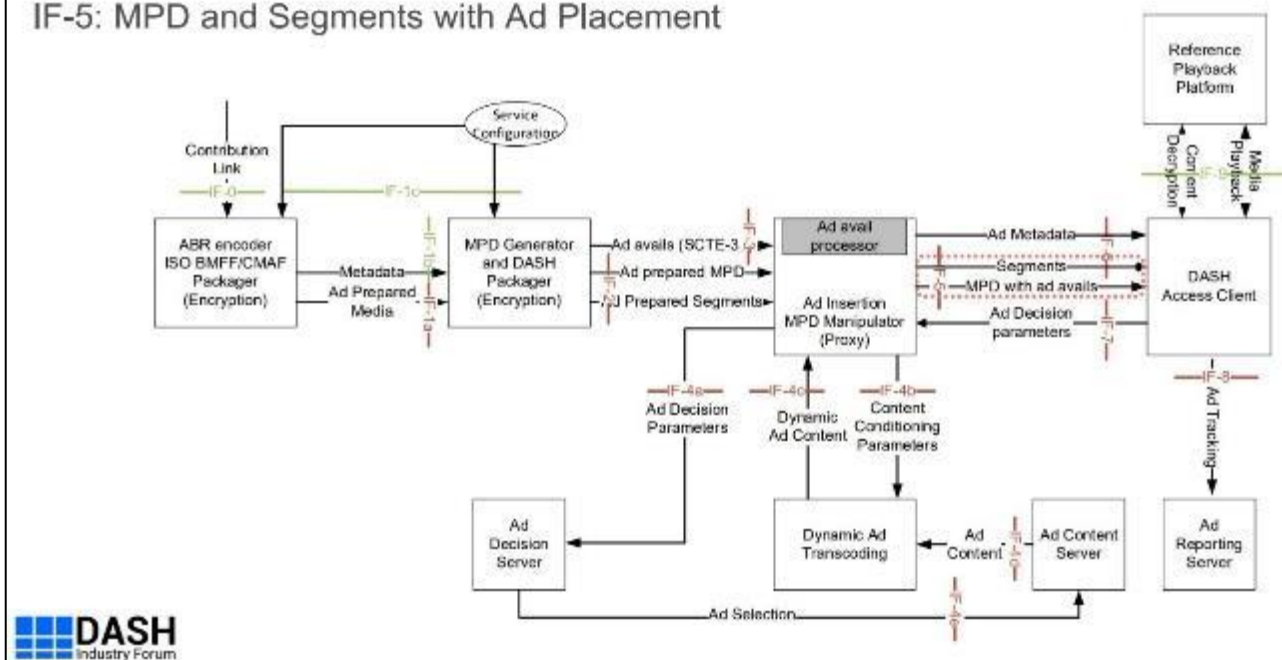


DASH-IF IOP-5 V5.0.0, DASH-IF Interoperability Points; Part 5: Ad Insertion in DASH (Nov. 29, 2021), <https://dashif.org/docs/IOP-Guidelines/DASH-IF-IOP-Part5-v5.0.0.pdf> (“DASH Part 5”) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

In a March 31, 2020 presentation as part of the DVB World Webinar, Zachary Cava, Video Platform Architect at Hulu, explained how OTT systems, like Hulu’s, control digital media presentations through a series of Interfaces (abbreviated to “IF”) from DASH Part 5.

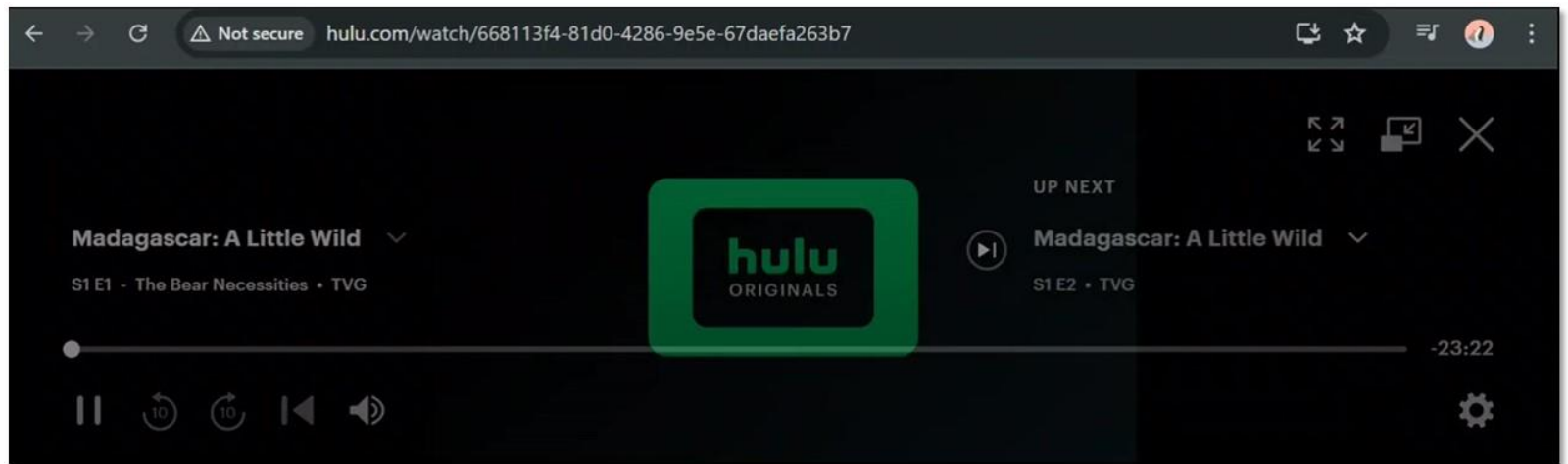
# DASH-IF Ad Insertion Architecture

## IF-5: MPD and Segments with Ad Placement

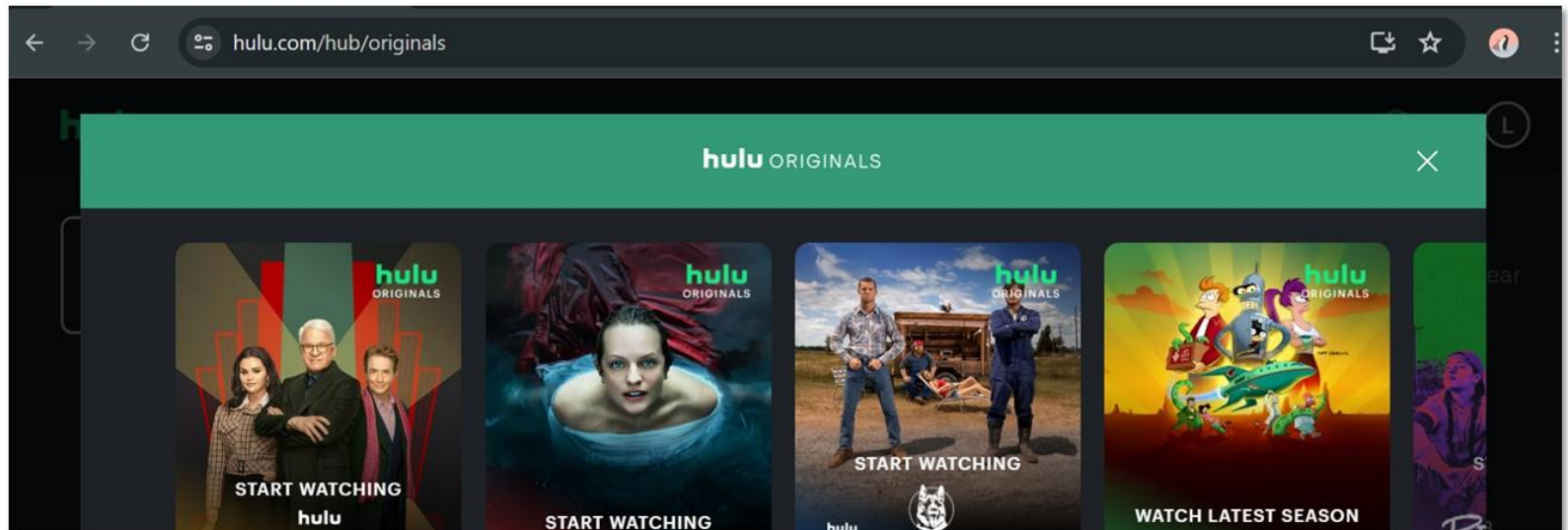


DVB webinar: DASH – from on-demand to large scale live for premium services, (Mar. 31, 2020), <https://www.youtube.com/watch?v=1EWqPZF9LDk> (“Ad Insertion in Live Content” presentation by Zachary Cava (“Cava Presentation”) at the 28:10 mark to the 43:20 mark) (last visited July 7, 2024).

Hulu's digital media system for controlling digital media presentations is visible to an end user through interaction with the Hulu user interface displayed on the end user's personal device. Hulu's OTT system controls the presentation of the digital media content presented in the user interface.



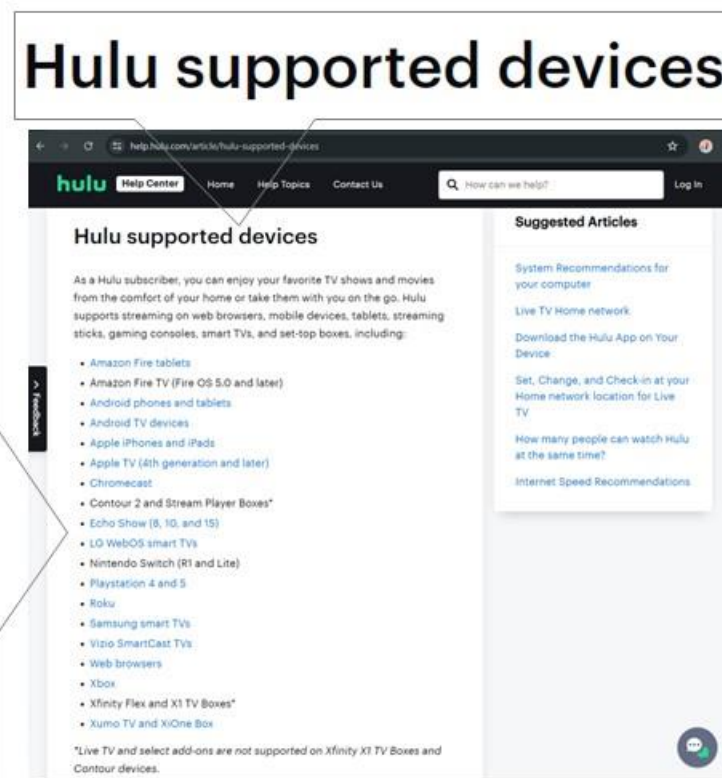
Screenshot of Hulu user interface on web browser, hulu.com.



Screenshot of Hulu user interface on web browser, hulu.com. When an end user selects a thumbnail representing digital media content they want to watch, the Hulu OTT system controls the presentation of that digital media through the Hulu user interface.

Hulu’s website identifies “Hulu supported devices” that support the Hulu OTT system and are part of the claimed “digital media player device”:

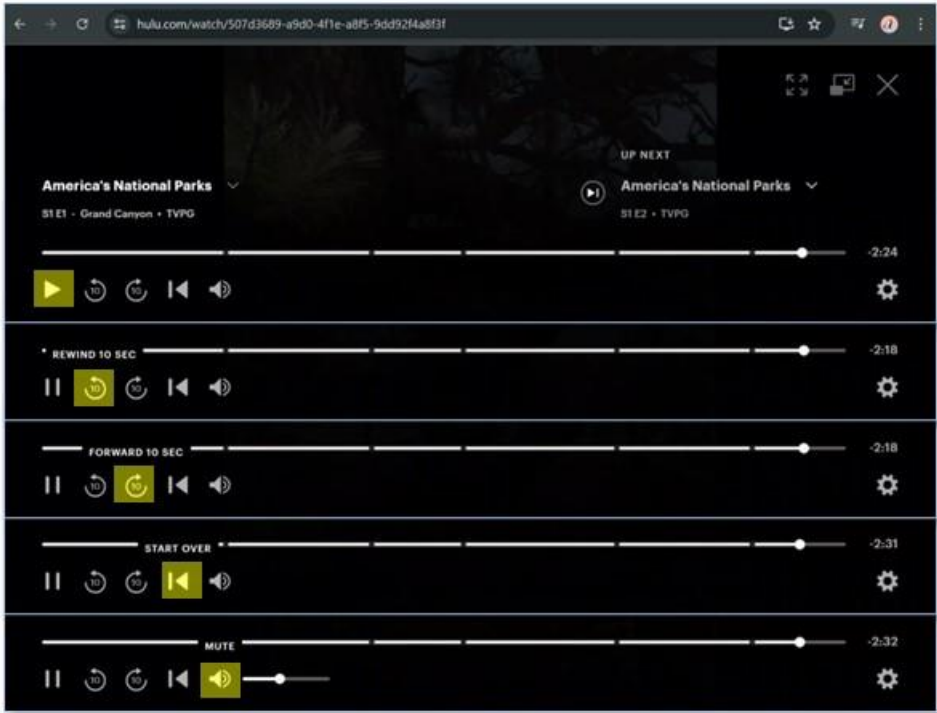
Amazon Fire tablets  
Amazon Fire TV (Fire OS 5.0 and later)  
Android phones and tablets  
Android TV devices  
Apple iPhones and iPads  
Apple TV (4th generation and later)  
Chromecast  
Contour 2 and Stream Player Boxes\*  
Echo Show (8, 10, and 15)  
LG WebOS smart TVs  
Nintendo Switch (R1 and Lite)  
Playstation 4 and 5  
Roku  
Samsung smart TVs  
Vizio SmartCast TVs  
Web browsers  
Xbox  
Xfinity Flex and X1 TV Boxes\*  
Xumo TV and XiOne Box



*Hulu supported devices*, HULU, <https://help.hulu.com/article/hulu-supported-devices> (last visited July 10, 2024).

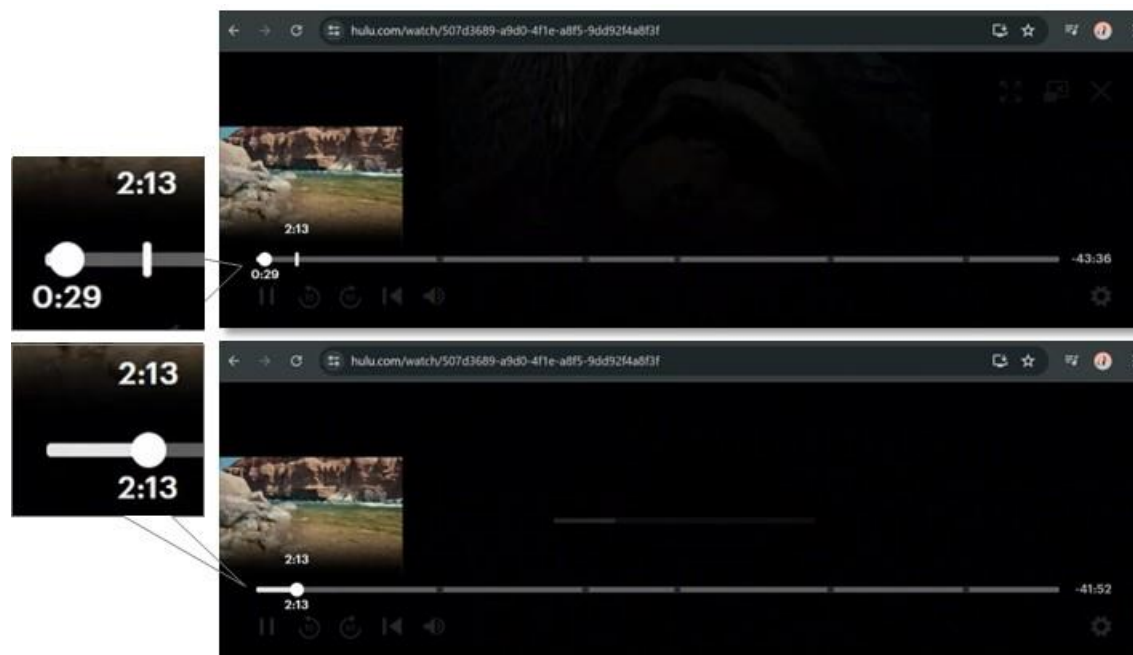
Each of these devices implements Hulu’s Accused Instrumentalities in a substantially identical manner for purposes of these infringement contentions, such that proof of infringement with respect to one listed device applies equally to all listed devices.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these

| U.S. Patent No.<br>11,463,768                                                                                            | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[1b] a user interface for receiving user input for controlling a course of presentation of digital media content;</p> | <p>infringement contentions once such information is made available to Plaintiff.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                          | <p>The Accused Instrumentalities have a user interface for receiving user input for controlling a course of presentation of digital media content.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                          | <p>For example, the Hulu client, which is part of Hulu’s digital media player system, has a user interface configured to allow a user to control a course of presentation of the digital media content received. The Hulu user interface allows user control of content by, among other things, playing, pausing, and moving the playback position in the time bar to jump back and forward through content.</p> <div>A screenshot of the Hulu web player interface. The browser address bar shows 'hulu.com/watch/507d3689-a9d0-4f1e-a8f5-9dd92f4a8f3f'. The video player displays 'America's National Parks' with a progress bar at 2:24. Below the video are five control rows: 1) Play/Pause, Rewind 10s, Playhead, Forward 10s, and Mute. 2) 'REWIND TO SEC' slider at -2:18. 3) 'FORWARD TO SEC' slider at -2:18. 4) 'START OVER' button and slider at -2:31. 5) 'MUTE' slider at -2:32. Each row has a settings gear icon on the right.</div> <p>Screenshot of Hulu user interface on web browser, hulu.com.</p> <p>For example, the  user interface input allows the user to move the play position forward in the content if it has been paused. Pressing this toggles between playing and pausing content. The  user interface input allows the user to move the play position backward 10 seconds from the current position. The  user interface input allows the user to move the play position forward 10</p> |

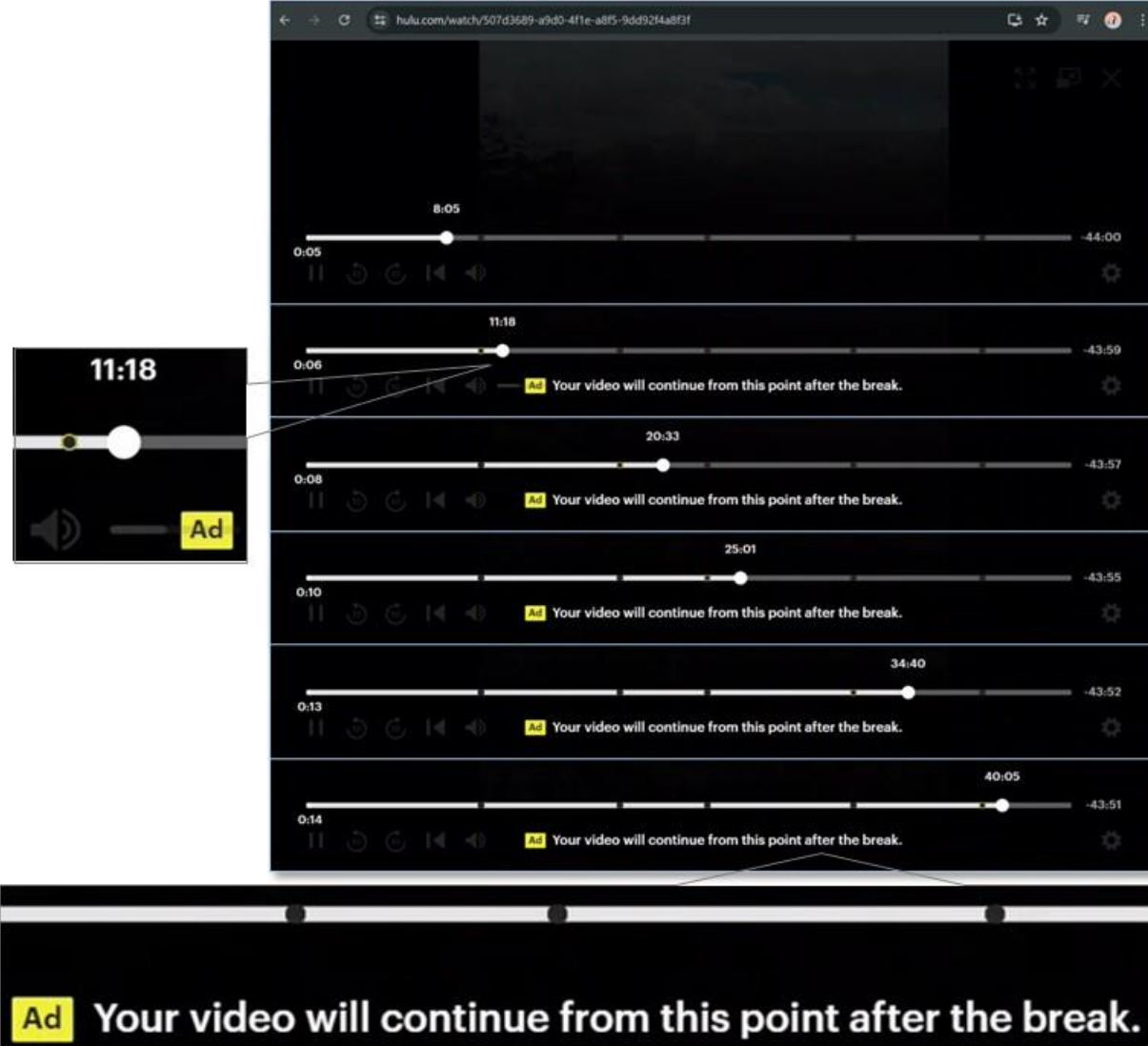
seconds from the current position. The  user interface input allows the user to move the play position back to the beginning of the content. The  user interface input allows the user to increase or decrease the volume or mute the audio.

Another user interface input that allows a user to control the course of presentation of digital media content is the ability to drag the play position (the white dot on the timeline) forward or backward along the timeline. In the example below, the user jumps from 0:29 to 2:13.



Screenshot of Hulu user interface on web browser, hulu.com.

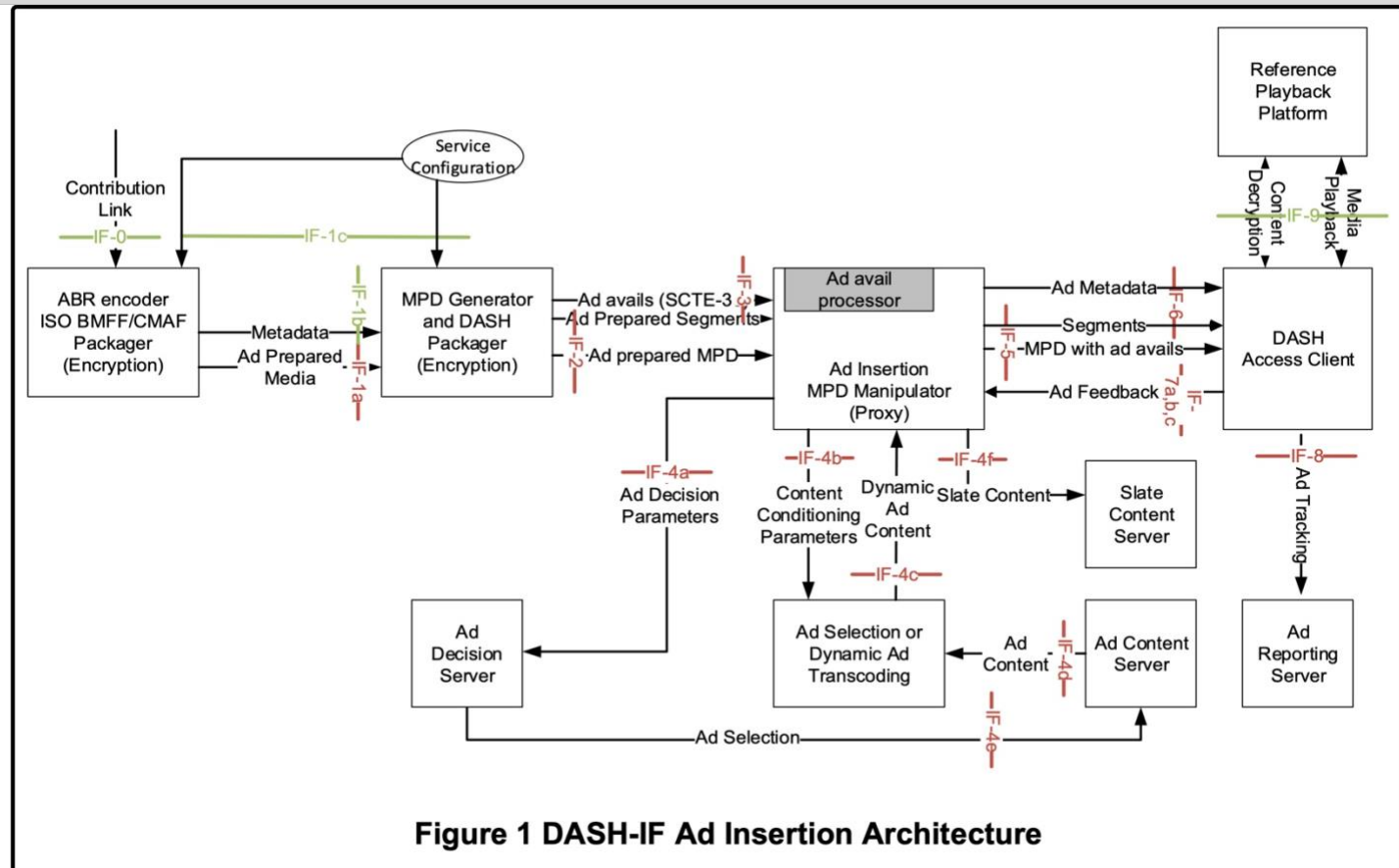
If the user advances far enough in advance on the timeline, Hulu may require the user to watch ads before the content continues, for example, at predetermined ad break points (shown as small yellow circles in the timeline).



Screenshot of Hulu user interface on web browser, hulu.com.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these

| U.S. Patent No.<br>11,463,768                                                                                                                                                                          | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| [1c] an advertisement rotator for managing one or more requests for advertising content to be presented during the course of presentation of the digital media content either visually or audibly; and | <p>infringement contentions once such information is made available to Plaintiff.</p> <p>The Accused Instrumentalities have an advertisement rotator for managing one or more requests for advertising content to be presented during the course of presentation of the digital media content either visually or audibly.</p> <p>For example, in Figure 1 of the DASH Standard, when the DASH Access Client needs advertising content at one or more times during the course of presentation of the digital media content, each time it sends “Ad Feedback” to the Ad Insertion MPD Manipulator intersplicer, which passes this request on, in the form of Ad Decision Parameters, to the Ad Decision Server (and related structures), which performs the advertisement decisioning that will ultimately provide the requested advertisements back to the DASH Access Client. For example, the Ad Decision Server (and related structures) act as an advertisement rotator that manages one or more request for advertising content to be presented during the course of presentation of the digital media content either visually or audibly.</p> |



[DASH Part 5](#) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

The DASH Standard explains that Ad Decision Parameters help the Ad Decisioning Server (and related structures) rotate through the available advertisements to determine which will be displayed.

## 5.6.2 IF-4a: Ad Decision request parameters

### 5.6.2.1 Decisioning Parameters

This document does not specify a specific format, but only discusses some principle approaches. Additional details on specific formats are for further study.

*A decisioning parameter* is a piece of information about the content stream, consumption medium, or end user that is used by the Ad Decisioning Server as part of the advertisement qualification and selection process. The Ad Insertion MPD Manipulator collects and sends this information to the Ad Decisioning Server as part of IF-4a.

DASH Part 5 at § 5.6.2.

The DASH Standard also explains what the Ad Decision and Ad Content Servers do with this information:

## 5.6 IF-4: Ad Decisioning and Exchange Interfaces

### 5.6.1 Introduction

Information about ad content to insert into a presentation is retrieved from the Ad Decision and Ad Content server(s) via the IF-4 interfaces. The request from the Ad Insertion MPD Manipulator for ad content provides all the information needed to perform ad decisioning, including content metadata and opportunity descriptions. The response is then translated by the Ad Insertion MPD Manipulator into the DASH structures detailed in IF-5.

DASH Part 5 at § 5.6.1, Introduction.

Once the Ad Decision Server identifies which advertisements, the Ad Content Server provides the actual ad content to the Ad Insertion MPD Manipulator.

5.6.4.1 Overview

The response of the Ad Decision Server identifies the advertisements decisioned by the server and provides information associated with the advertisement such as general metadata, viewability requirements, media files, mezzanines, and tracking events. The actual ad content is provided by the Ad Content Server, preferably following the DASH-IF Ad Content format as defined in clause 5.6.7. Depending on the decisioning mode, the decision response may optionally contain the placement and ordering of advertisements as well.

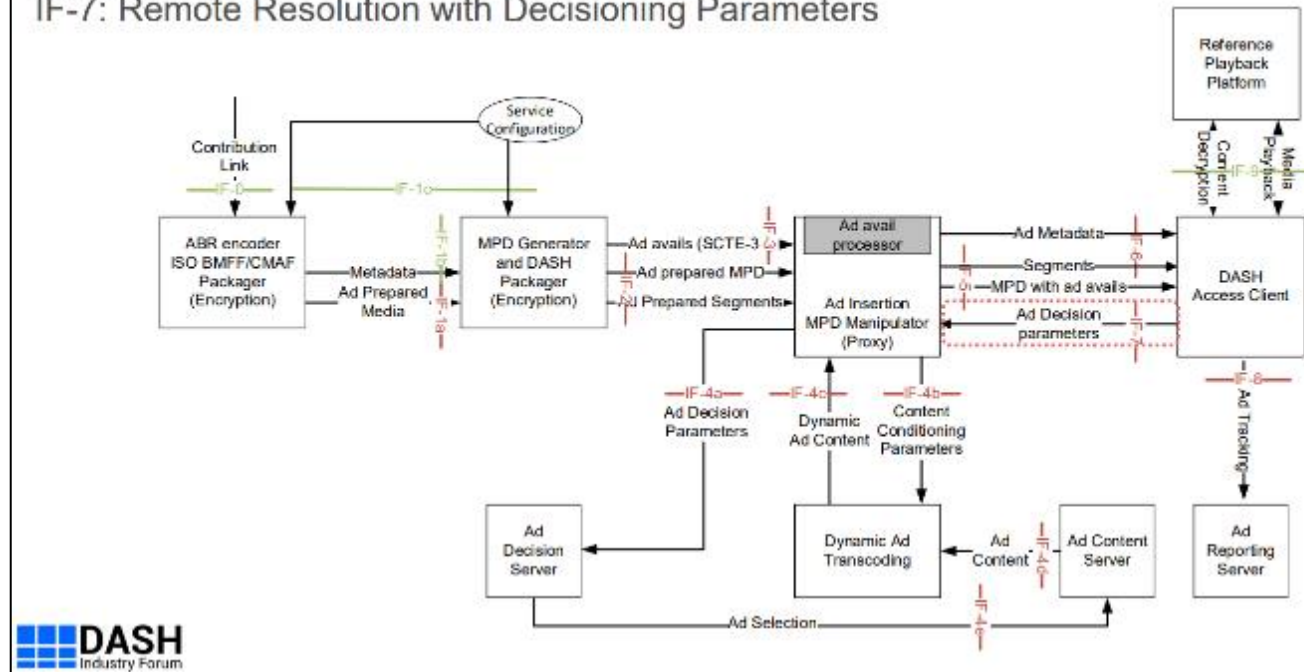
*Id.* at § 5.6.4.1, Overview.

Zachary Cava, Video Platform Architect at Hulu, gave a presentation at the March 31, 2020 DVB World Webinar entitled, “Ad Insertion in Live Content.” [Cava Presentation](#) at the 28:10 mark to the 43:20 mark) (last visited July 7, 2024).

In that presentation, as part of his explanation of IF-7 in the DASH Standard, Mr. Cava stated, “IF-7 is actually part of what we consider the Server Guided Ad Insertion and this is where instead of the MPD Proxy replacing the ads before they reach the client, it’s actually annotating the stream with enough information such that the client can come back to the proxy when it needs that ad replacement to occur and the ad proxy can provide it then with the appropriate information.”

## DASH-IF Ad Insertion Architecture

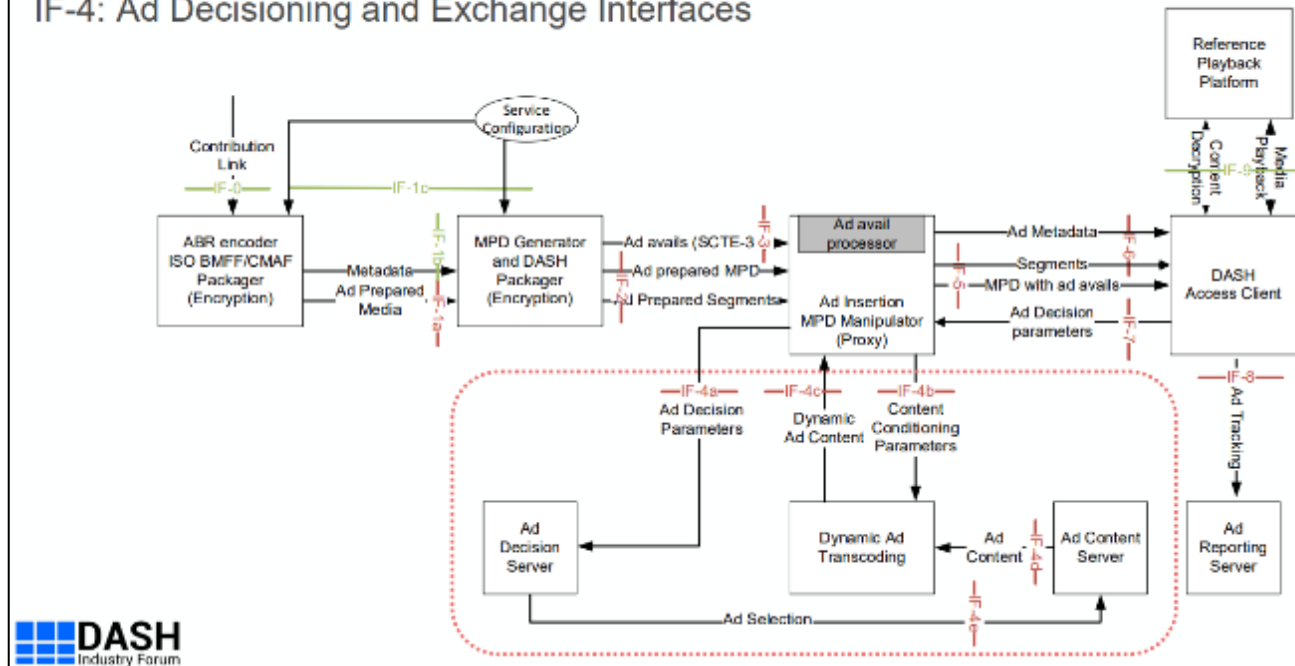
### IF-7: Remote Resolution with Decisioning Parameters



[Cava Presentation](#) at 35:33 to 35:58 mark. Mr. Cava also explained, as part of his discussion of IF-4, that, “The prepared content [from the DASH Packager] is then consumed by an Ad Insertion MPD Manipulator, or an Ad Proxy, and that is the mechanism that communicates with an ad decisioning exchange service that will take parameters for decisioning and internally perform decisioning.” The Ad Decision Server (and related structures) is an example of an advertisement rotator for managing one or more requests for advertising content to be presented during the course of presentation of the digital media content either visually or audibly.

## DASH-IF Ad Insertion Architecture

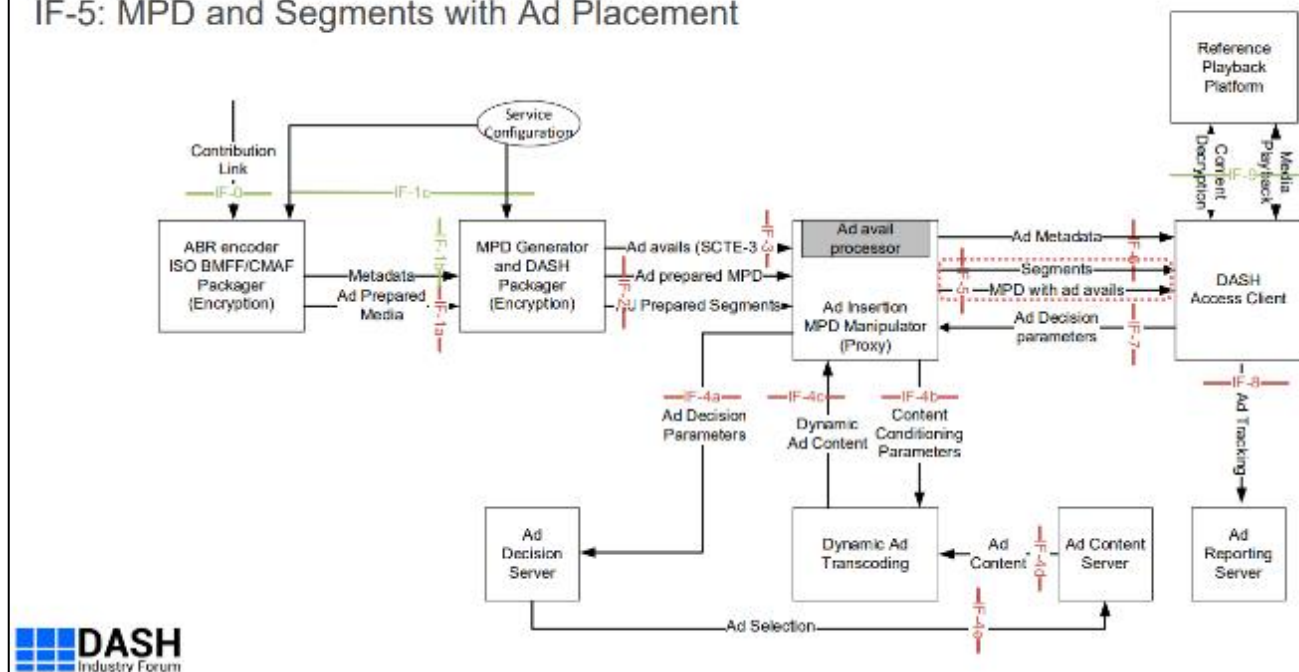
### IF-4: Ad Decisioning and Exchange Interfaces



[Cava Presentation](#) at 33:33 to 33:56. Finally, Mr. Cava explained, “From there we’ll go ahead and provide well-formed ad insertion content that the MPD Manipulator can go ahead and combine with the original content to produce a[n] interleaved stream of content and advertisements. And this stream is communicated again with a DASH down to the clients.”

## DASH-IF Ad Insertion Architecture

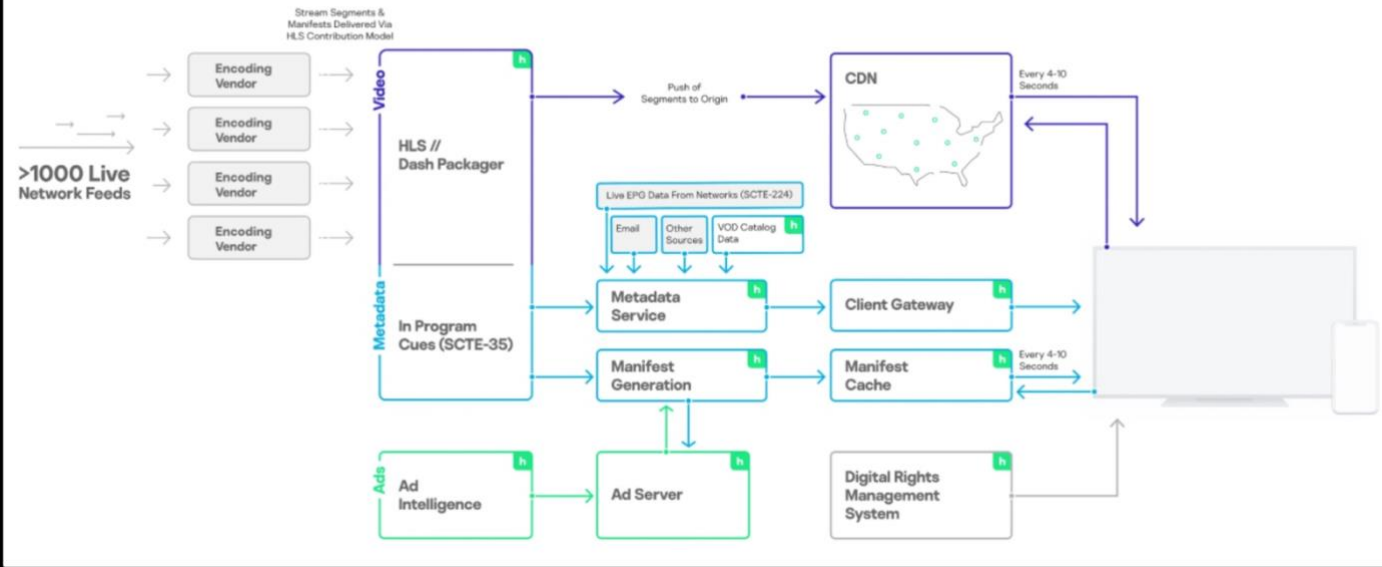
### IF-5: MPD and Segments with Ad Placement



[Cava Presentation](#) at 34:00 to 34:25.

Similarly, in the Hulu Tech Blog post “The Anatomy of a Live OTT Service,” the “Ad Server” and “Ad Intelligence” correspond to the Ad Decision Server and Ad Content Server in the DASH Standard.

## Live OTT Service on Hulu

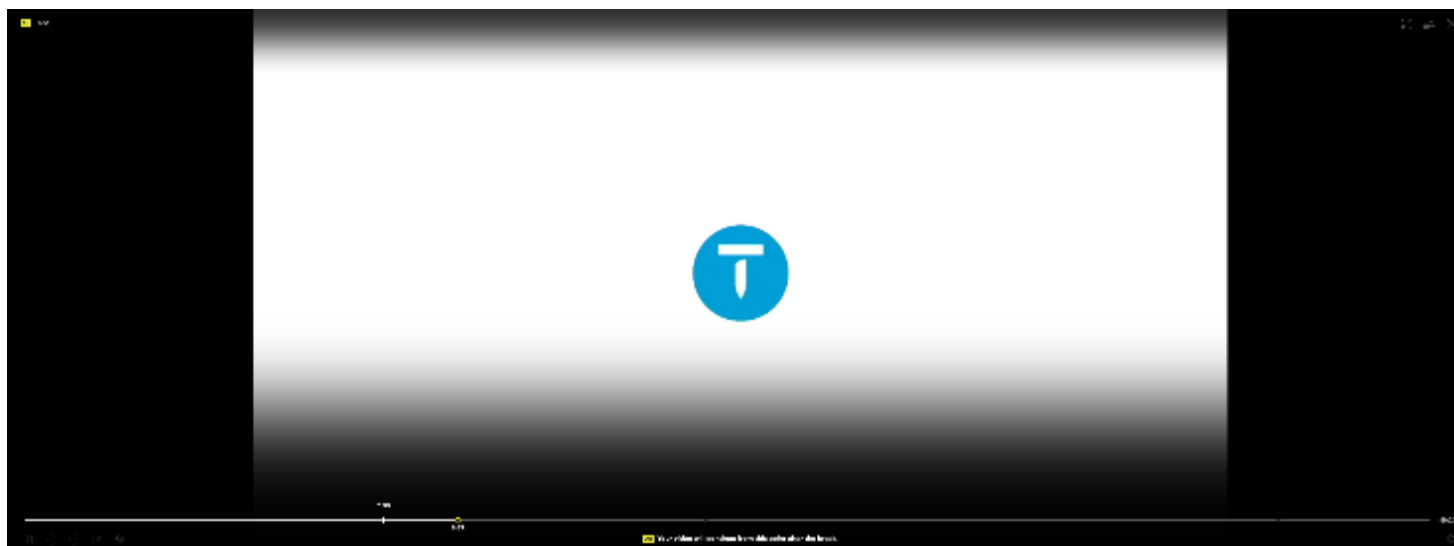


### [Hulu Tech Blog](#)

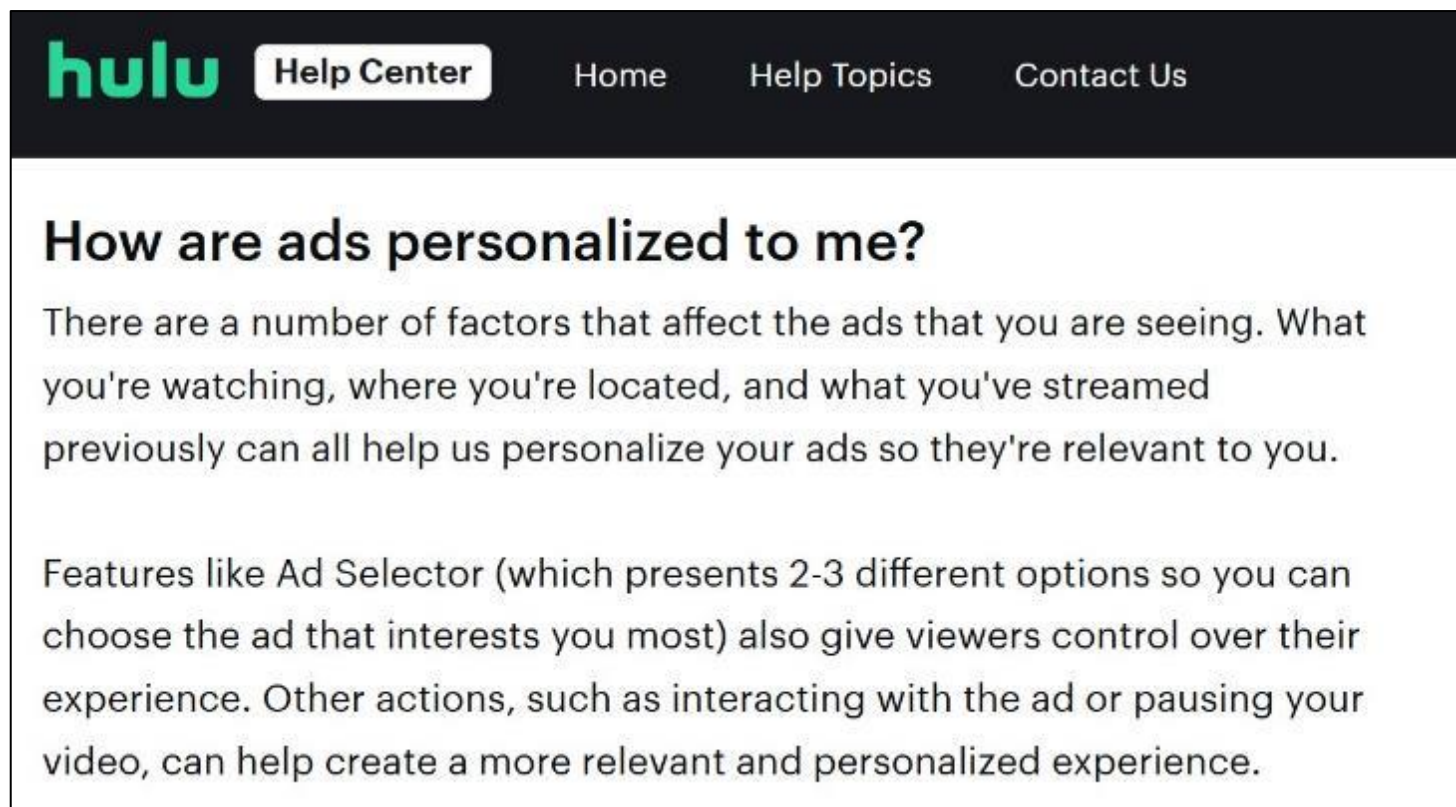
The Hulu user interface confirms that the Ad Decision Server, and related structure, act to rotate advertisements. In the screenshot below, a user has paused playback in the Hulu user interface during an advertisement for a hotel chain.



As shown in the screenshot below, if the user keeps the advertisement paused for several minutes and then resumes playing the digital advertising content, the Hulu digital media player's advertisement rotator automatically rotates to new advertising content, this time switching to an advertisement for Thumbtack.



Furthermore, the Hulu Help Center, available to users through the Hulu user interface, indicates that the Accused Instrumentalities rotate advertisements based on user preferences. In the screenshot below, the Hulu Help Center indicates that an Ad Selector rotates advertisements shown to a user based on the user's input.

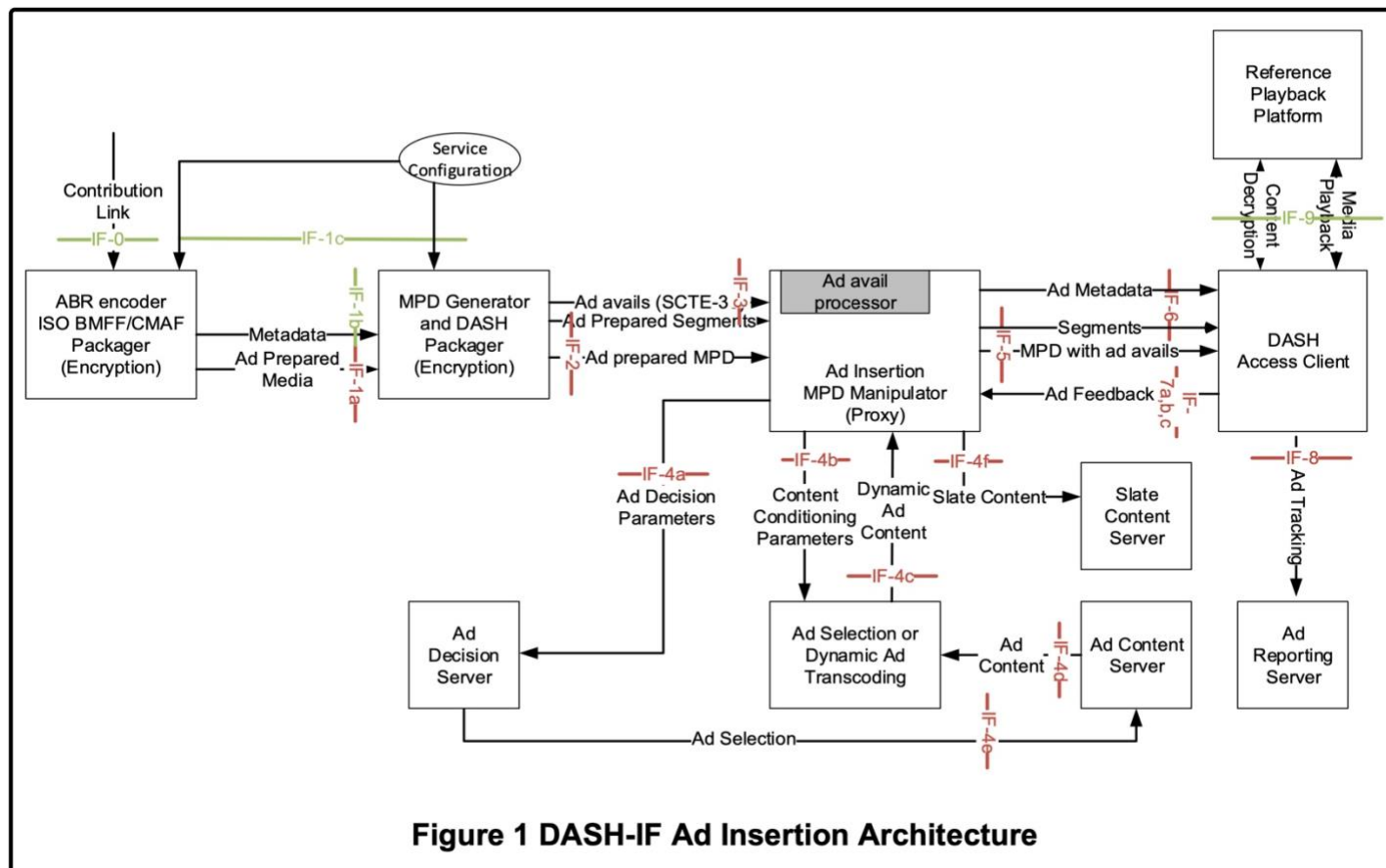


*Ads on Hulu*, Hulu Help Center, <https://help.hulu.com/article/hulu-ads-on-hulu>, (last visited July 1, 2024) (“Hulu Help Center”).

Another example of the Accused Instrumentalities using an advertisement rotator for managing one or more requests for advertising content, is pod level decisioning, where the client sends requests for advertisement content to the Ad Insertion MPD Manipulator as the content streams. The Ad Insertion MPD sends these requests to the Ad Decision Server which then returns (via the Ad Content Server via the Ad Selection or Dynamic Ad Transcoding) the advertisements to be played. In this way, the Accused Instrumentalities rotate advertisements depending on user input.

| U.S. Patent No.<br>11,463,768                                                                           | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                         | <div style="border: 1px solid black; padding: 10px;"> <p>With <i>pod level decisioning</i>, advertisement opportunities are decided just as the DASH client reaches the opportunity within the stream. A SGAI architecture accomplishes by having the Ad Insertion MPD Manipulator use the IF-3 supplied opportunity metadata to generate an IF-5 manifest with a mixture of content and remote entities that represent opportunities. As the client reaches remote entities during playout, the client utilizes IF-7 to return the opportunity metadata to the Ad Insertion MPD Manipulator which then sends the data to the Ad Decision server via IF-4a. The result of the ad decision request will contain advertisements for this single opportunity which the Ad Insertion MPD Manipulator transforms into an IF-7 response for the client to consume.</p> <p>After a DASH client receives a stream produced from an SGAI architecture, the stream can continue to change for the duration of the playback session, e.g. the advertisements can be re-decided should the user choose to rewind the stream.</p> </div> <p>DASH Part 5 at § 5.6.2.2.</p> <p>As a result, the Accused Instrumentalities include an advertisement rotator for managing one or more requests for advertising content to be presented during the course of presentation of the digital media content either visually or audibly.</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| [1d.1] an intersplicer in communication with the advertisement rotator, the intersplicer configured to: | <p>The Accused Instrumentalities include an intersplicer in communication with the advertisement rotator.</p> <p>For example, the functional block Ad Insertion MPD Manipulator is an intersplicer for controlling one or more insertion points of the digital advertising content into the digital media content. The DASH Standard’s definition of the “ad insertion MPD manipulator” confirms that it can change a DASH MPD by controlling where advertisements are inserted into digital media content.</p> <div style="border: 1px solid black; padding: 10px;"> <p><b>ad insertion MPD manipulator</b> – functional entity that proxies a DASH MPD and may change it to insert the ad creative in the streaming presentation. It may also embed other ad related metadata, or remove ad related metadata in the MPD</p> </div> <p>DASH Standard at § 3.1.</p> <p>The MPD generated by the Ad Insertion MPD Manipulator is a manifest that sets forth the sequence in which the digital media content is played.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Likewise, Figure 1 from the DASH Standard shows that the “Ad Insertion MPD Manipulator” is an intersplicer for controlling one or more insertion points of digital advertising content into the digital media content by showing that the Ad Insertion MPD Manipulator receives inputs from, among others, the “DASH Packager” and “Ad Content Server” and outputs, among other things, an “MPD with ad avails” to the DASH Access Client.



The DASH Standard explains Figure 1 further by stating that the “Ad Insertion MPD Manipulator uses the inputs IF-2 and IF-3 to generate a DASH presentation that is a mixture of content and advertisements.” Thus, the Ad Insertion MPD Manipulator orders data blocks of the digital media content into a content stream for the user.

## 4.3 Overview on Interfaces and Functions

The Ad Insertion architectures start with the ingest of an input stream over IF-0 which is processed by an ABR Encoder and output as well-formed CMAF content over the IF-1 interface. A DASH Packager / MPD Generator uses IF-1 input to generate a conformant DASH content presentation that is sent over IF-2 and additional opportunity metadata that is sent (IF-3).

### *DASH-IF*

13

DASH-IF IOP-5 V5.0.0 (2021-11)

An Ad Insertion MPD Manipulator uses the inputs of IF-2 and IF-3 to generate a DASH presentation that is a mixture of content and advertisements. In the SSAI architecture, the manipulator uses IF-4 to ask an Ad Decisioning / Content Server to provide advertisement placements for the content stream, possibly utilizing client sourced parameters from IF-7, before generating the final DASH MPD for IF-5 which contains metadata about the inserted ads via IF-6. In the SGAI architecture, the manipulator does not immediately use IF-4, instead it embeds opportunity information from IF-3 into the DASH MPD IF-5 output so that the DASH Client may later use IF-7 to retrieve the proper ad placements by sending this opportunity information along with client source parameters to the manipulator.

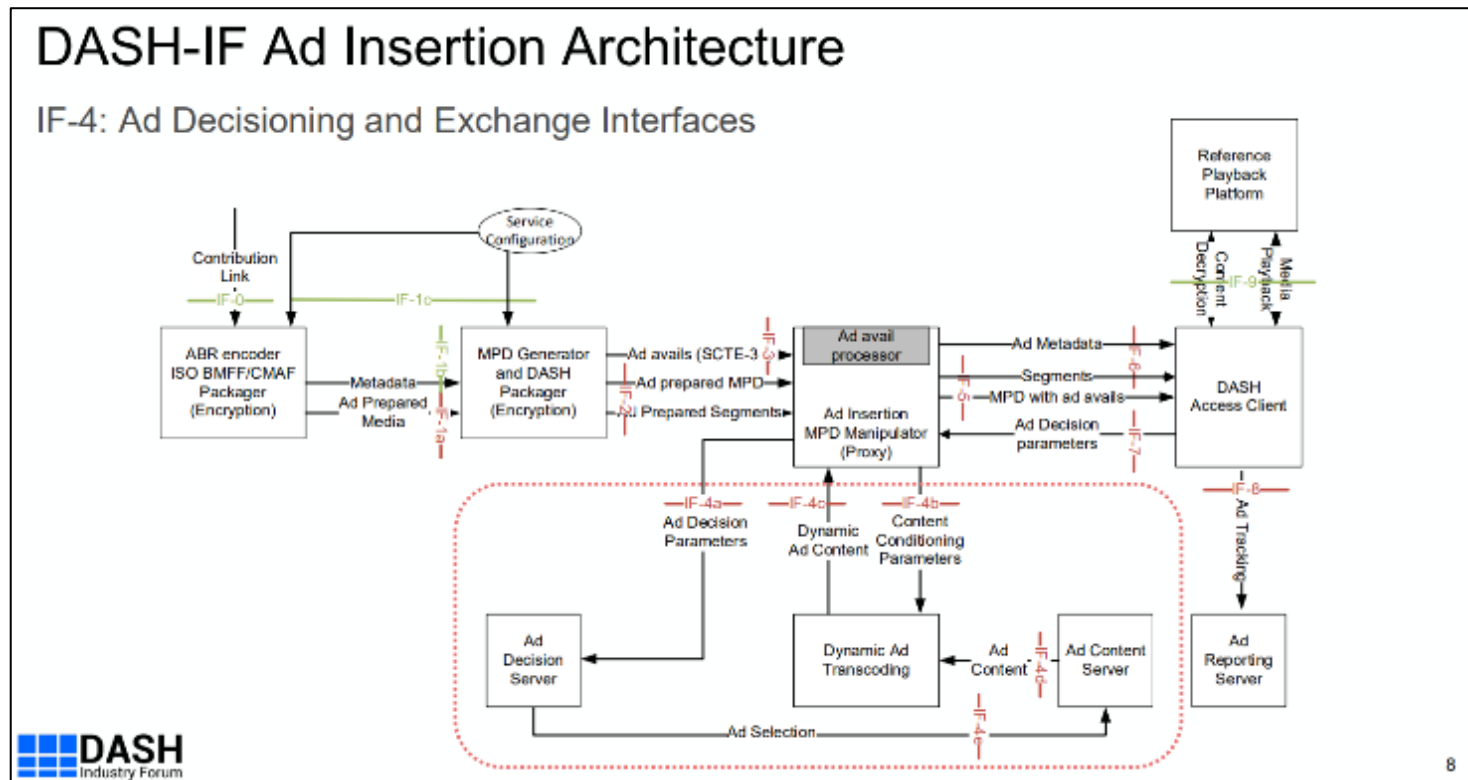
The DASH Client utilizes the reference media pipeline provided by IF-9 to perform seamless playout of the mixed content and ad presentation obtained via IF-5. Ad measurement and tracking is enabled in the client by IF-8 utilizing the ad metadata embedded as part of IF-6.

In Table 1 the interfaces defined are detailed with clause references and some example instantiations. Each interface clause will provide an informative overview of said interface and where aspects of the interface fall within the scope of this document, normative requirements will be provided.

DASH Standard at § 4.3.

Zachary Cava, Video Platform Architect at Hulu, gave a presentation at the March 31, 2020 DVB World Webinar entitled, “Ad Insertion in Live Content.” [Cava Presentation](#) at the 28:10 mark to the 43:20 mark.

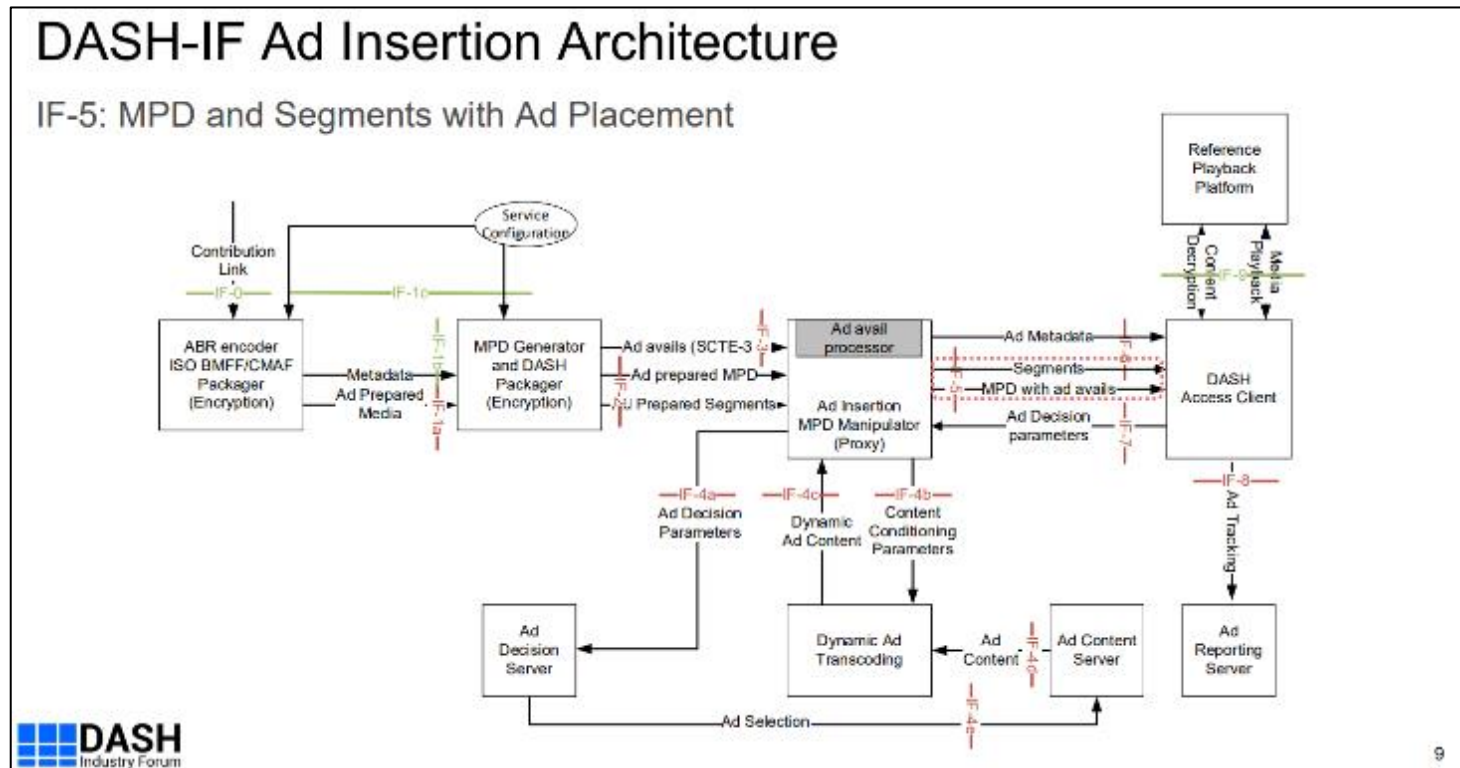
In that presentation, as part of his explanation of IF-4 in the DASH Standard, Mr. Cava stated, “The prepared content [from the DASH Packager] is then consumed by an Ad Insertion MPD Manipulator, or an Ad Proxy, and that is the mechanism that communicates with an ad decisioning exchange service that will take parameters for decisioning and internally perform decisioning.”



Cava Presentation at 33:33 to 33:56 mark.

Mr. Cava further explained, in the context of IF-5, “From there we’ll go ahead and provide well-formed ad insertion content that the MPD Manipulator can go ahead and combine with the original content to produce a[n] interleaved stream of content and

advertisements. And this stream is communicated again with a DASH down to the clients.”

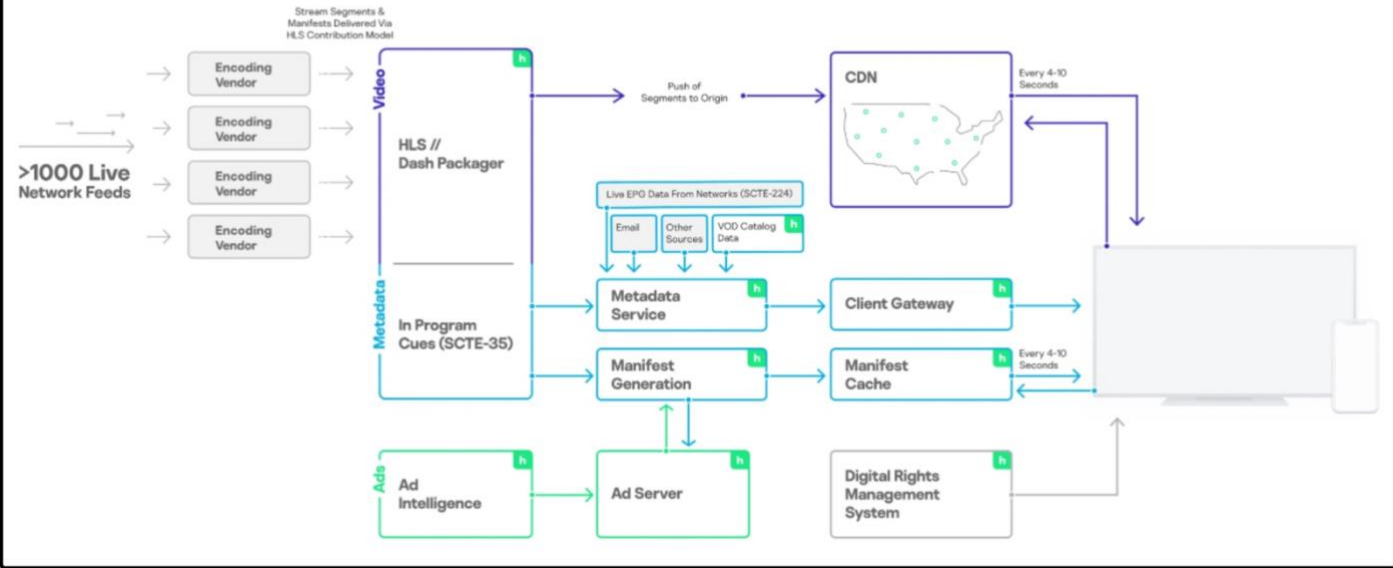


Cava Presentation at 34:00 to 34:25 mark.

Thus, Mr. Cava demonstrates that the Ad Insertion MPD Manipulator is an intersplicer for controlling one or more insertion points of the digital advertising content into the digital media content thereby sequencing the digital media content and the digital advertising content and is in communication with the advertisement rotator.

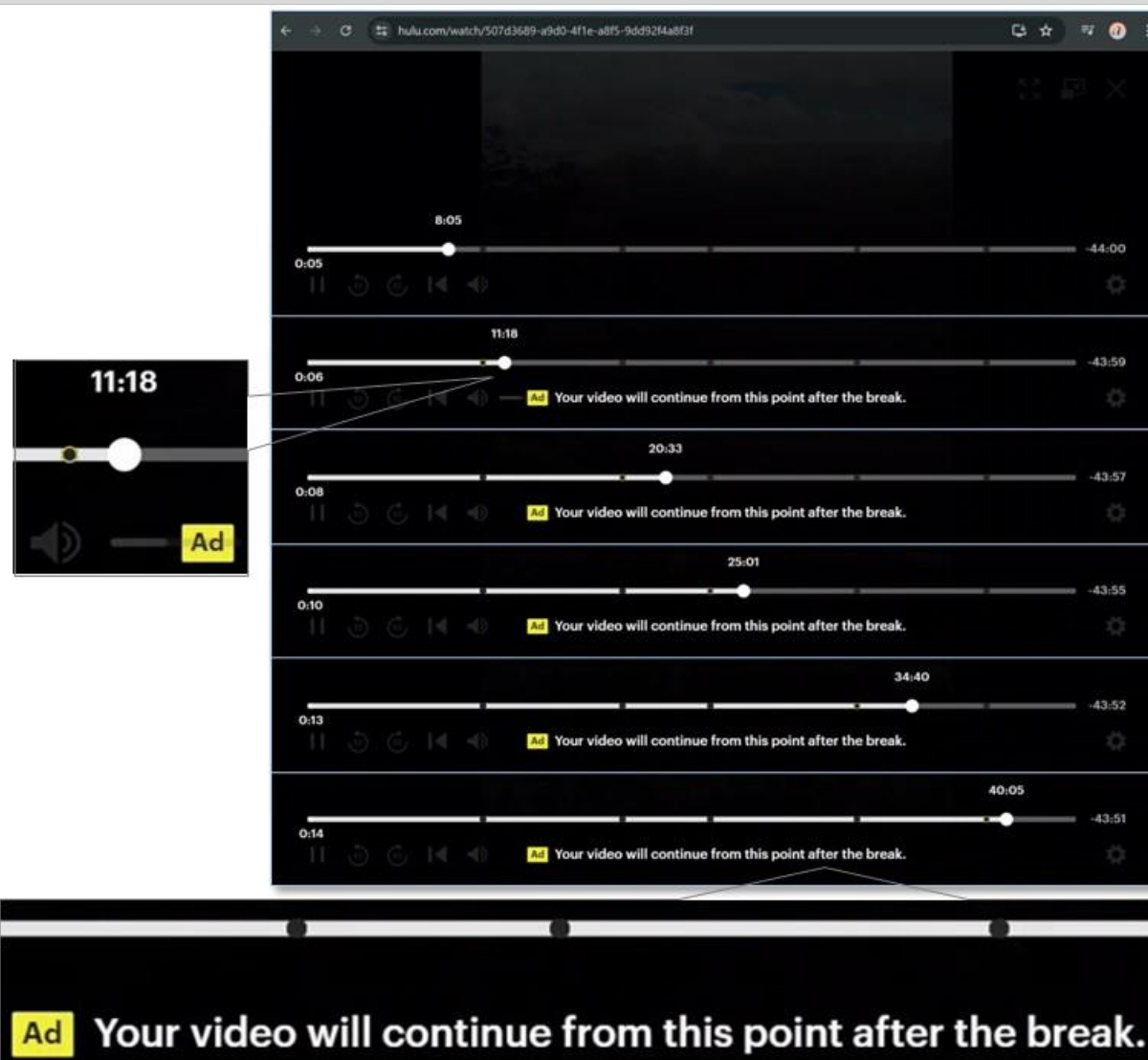
Likewise, the Hulu Tech Blog confirms that the Accused Instrumentalities include an intersplicer in communication with the advertisement rotator. For example, the “Manifest Generation” in the figure below is an intersplicer that controls the insertion points of digital advertising content and is in communication with, for example, the Ad Intelligence and Ad Server.

## Live OTT Service on Hulu



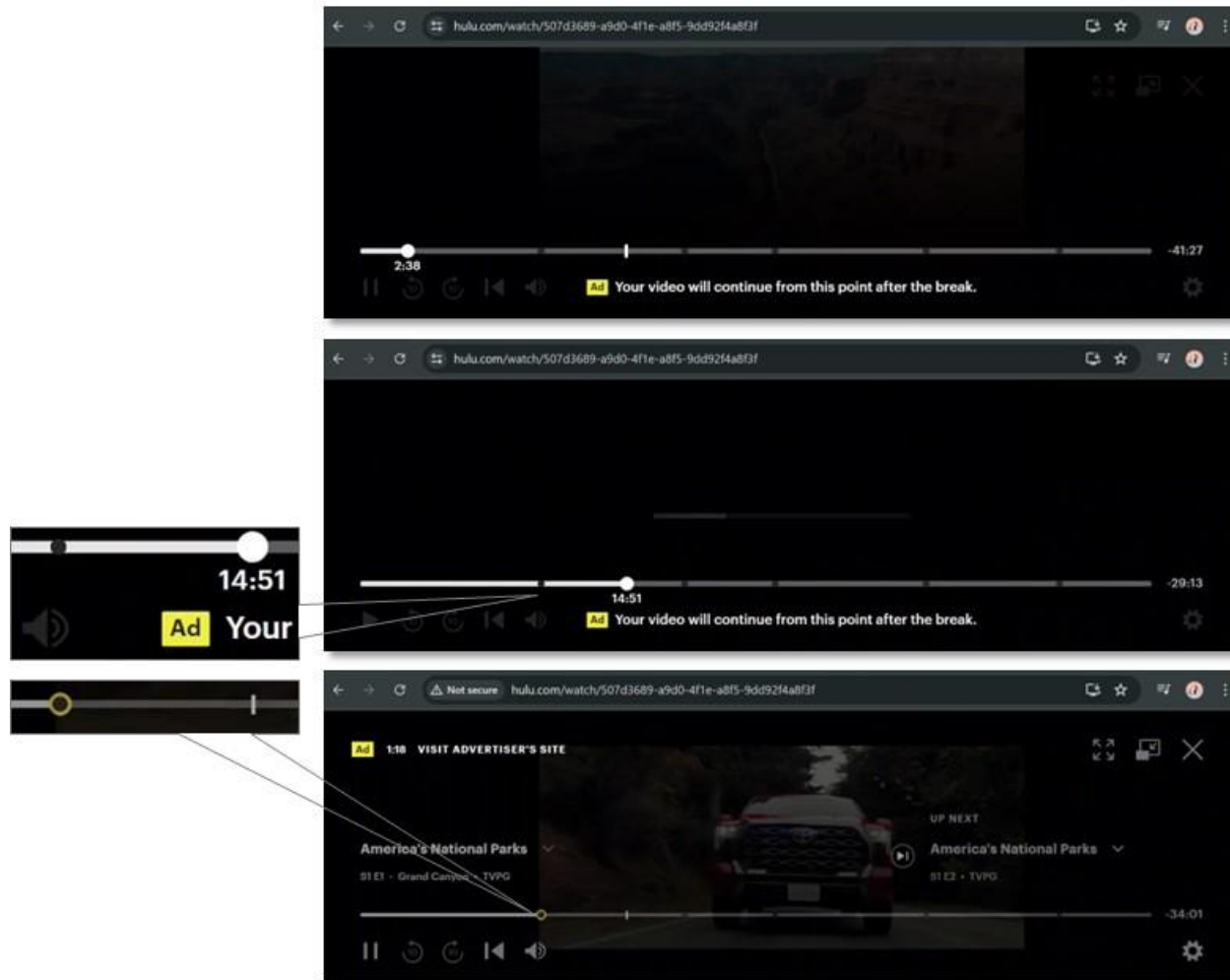
### [Hulu Tech Blog](#)

For example, Hulu presents content with predetermined ad insertion points. Those ad insertion points may be shown on the timeline bar, as in the example shown below.



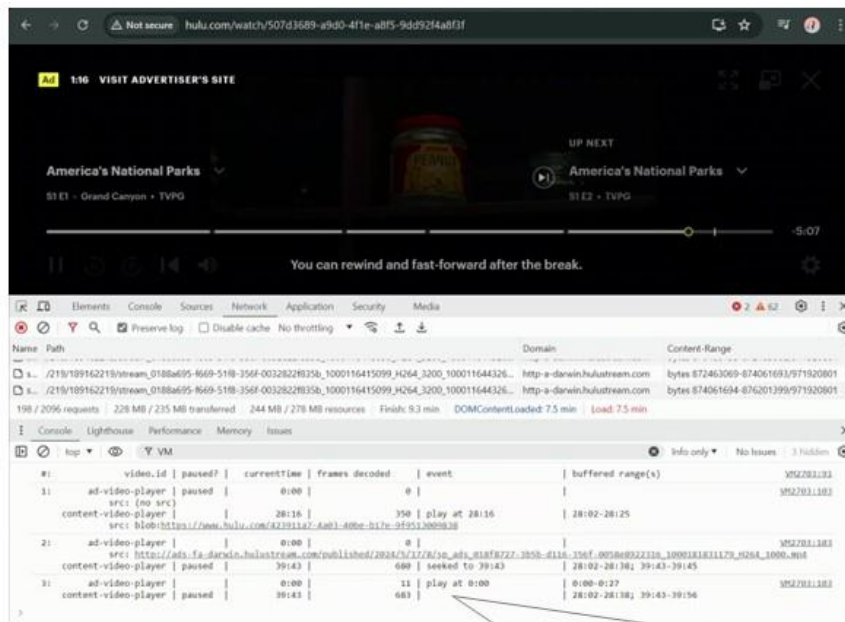
Screenshot of Hulu user interface on web browser, hulu.com.

The Hulu client presents content, and presents advertisements, by displaying different video files, and sequences video from content files and advertisement files. For example, if a user plays content up to an ad insertion point, or skips past an ad insertion point, Hulu may pause the main content and play one or more advertisements instead.



Screenshot of Hulu user interface on web browser, hulu.com.

In the example below from a web browser, Hulu uses what it calls “ad-video-player” to present advertising content, and “content-video-player” to present content. When the “ad-video-player” is playing, the “content-video-player” is paused, and vice versa. Both players can be paused at the same time. In this example, the “content-video-player” played content starting from 28 minutes and 16 seconds into the content, then paused as the “ad-video-player” loaded an advertisement file and began playing at the start (0:00) of that advertisement file.

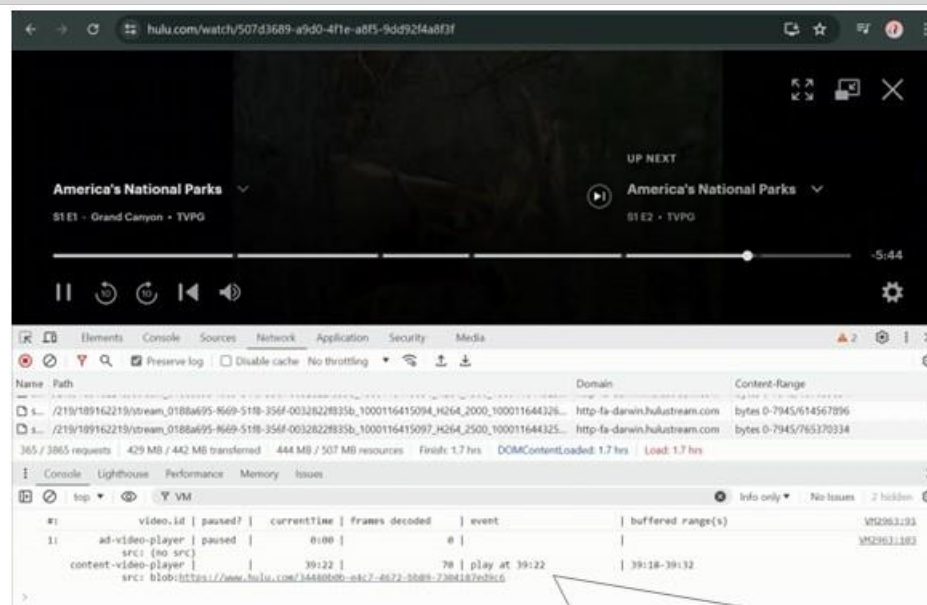


| #: | video.id                                                                      | paused? | currentTime | frames decoded | event           |
|----|-------------------------------------------------------------------------------|---------|-------------|----------------|-----------------|
| 1: | ad-video-player                                                               | paused  | 0:00        | 0              |                 |
|    | src: (no src)                                                                 |         |             |                |                 |
|    | content-video-player                                                          |         | 28:16       | 350            | play at 28:16   |
|    | src: blob:https://www.hulu.com/423911a7-4a03-40be-b17e-9f9513009838           |         |             |                |                 |
| 2: | ad-video-player                                                               |         | 0:00        | 0              |                 |
|    | src: http://ads-fa-darwin.hulustream.com/published/2024/5/17/8/sp_ads_018f872 |         |             |                |                 |
|    | content-video-player                                                          | paused  | 39:43       | 680            | seeked to 39:43 |
| 3: | ad-video-player                                                               |         | 0:00        | 11             | play at 0:00    |
|    | content-video-player                                                          | paused  | 39:43       | 683            |                 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running

| U.S. Patent No.<br>11,463,768 | Hulu                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | <p>JavaScript reporting out video-related events.</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

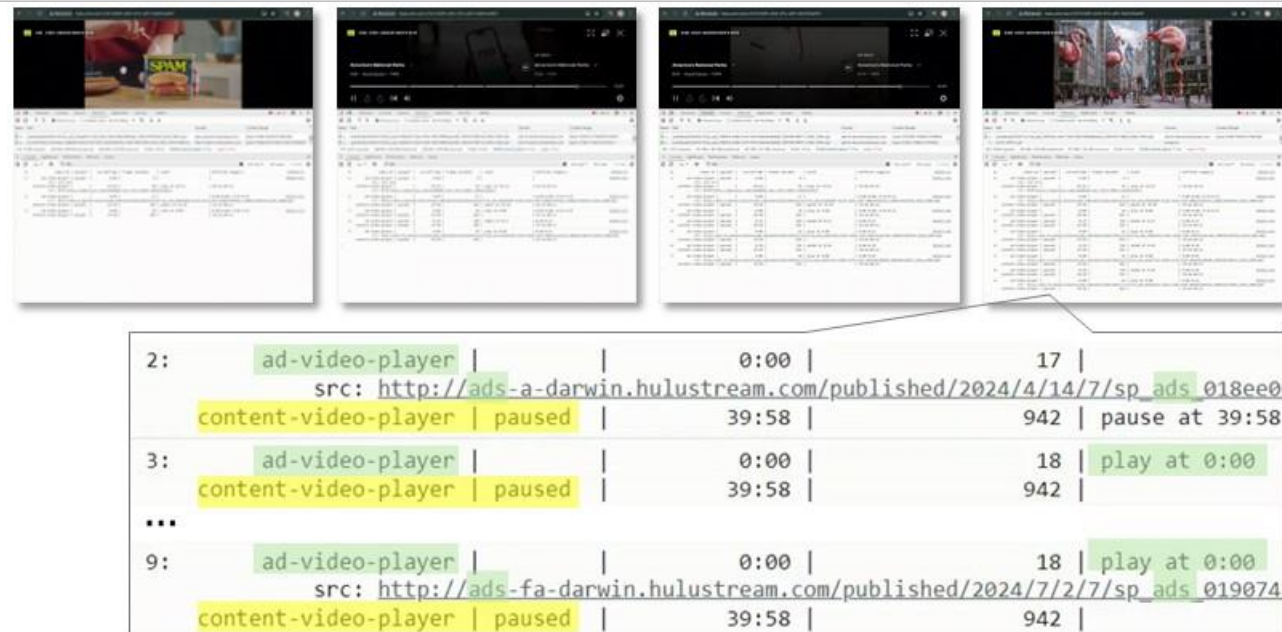
| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[1d.2] change a predetermined advertisement insertion point in the digital media content to an adapted advertisement insertion point in the digital media content, in response to receiving a user input to update a current play position in the digital media content to a new play position in the digital media content, the adapted advertisement insertion point determined by an adaptive preference rule based on an advertisement requirement that applies to the digital media system;</p> | <p>The intersplicer of the Accused Instrumentalities is configured to change a predetermined advertisement insertion point in the digital media content to an adapted advertisement insertion point in the digital media content, in response to receiving a user input to update a current play position in the digital media content to a new play position in the digital media content, the adapted advertisement insertion point determined by an adaptive preference rule based on an advertisement requirement that applies to the digital media system.</p> <p>For example, when Hulu controls digital media presentations, it performs the step of adaptively re-sequencing the content stream into a modified content stream to reflect user input.</p> <p>In response to a user attempting to jump past an advertisement insertion point in a stream, Hulu will adaptively re-sequence the content stream to force the user to watch an advertisement, as required by the adaptive preference rules, even if the play position is in a media section of the time bar in the user interface. The resequencing step is performed by the Hulu system, e.g., by Hulu’s Ad Insertion MPD Manipulator and/or the Hulu client.</p> <p>Hulu’s adaptive re-sequencing includes updating a current play position to a new play position in the digital media content detected at the digital media player system. When the user attempts to play media content after jumping forward past an ad, the new play position in the media content is reflected in the time bar.</p> <p>The updating step is performed by the Hulu system, e.g., by Hulu’s Ad Insertion MPD Manipulator and/or the Hulu client.</p> <p>The following screen shots show an example of [1] a user playing content without skipping ahead, followed by [2] an example of a user skipping ahead past two ad insertion points, which shows an example of changing a predetermined advertisement insertion point in response to user input.</p> <p>In the example below, Hulu has predetermined advertisement insertion points. As the Hulu client reaches those insertion points, it plays advertisements. Specifically, the Hulu “content-video-player” pauses and the Hulu “ad-video-player” plays advertisements, then the “ad-video-player” pauses and the “content-video-player” resumes playing content. In the example below, at event # 1, the “content-video-player” plays content starting at the 39:22 mark.</p> |



| #: | video.id                                                            | paused? | currentTime | frames decoded | event         | buffered range(s) |
|----|---------------------------------------------------------------------|---------|-------------|----------------|---------------|-------------------|
| 1: | ad-video-player                                                     | paused  | 0:00        | 0              |               |                   |
|    | src: (no src)                                                       |         |             |                |               |                   |
|    | content-video-player                                                |         | 39:22       | 70             | play at 39:22 | 39:18-39:32       |
|    | src: blob:https://www.hulu.com/34480b0b-e4c7-4672-bb89-7304187ed9c6 |         |             |                |               |                   |

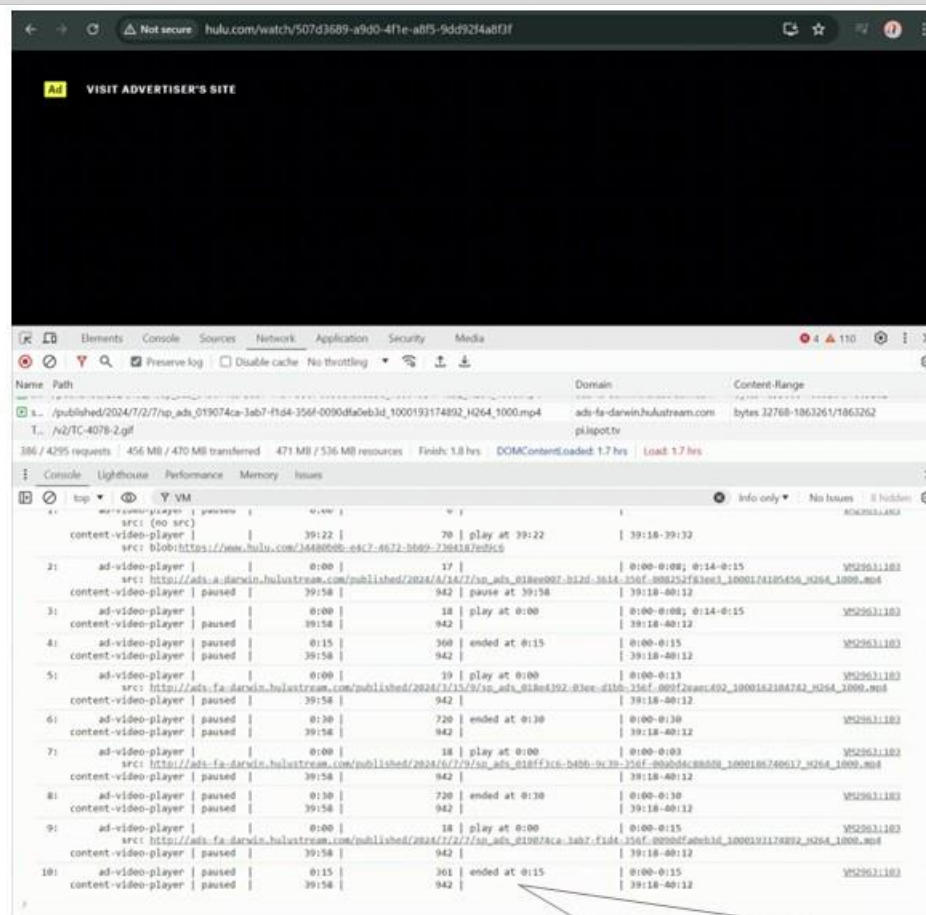
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, at event # 2, the “content-video-player” pauses at 39:58, and at event #s 3-9 the “ad-video-player” plays multiple advertisements while the “content-video-player” remains paused.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

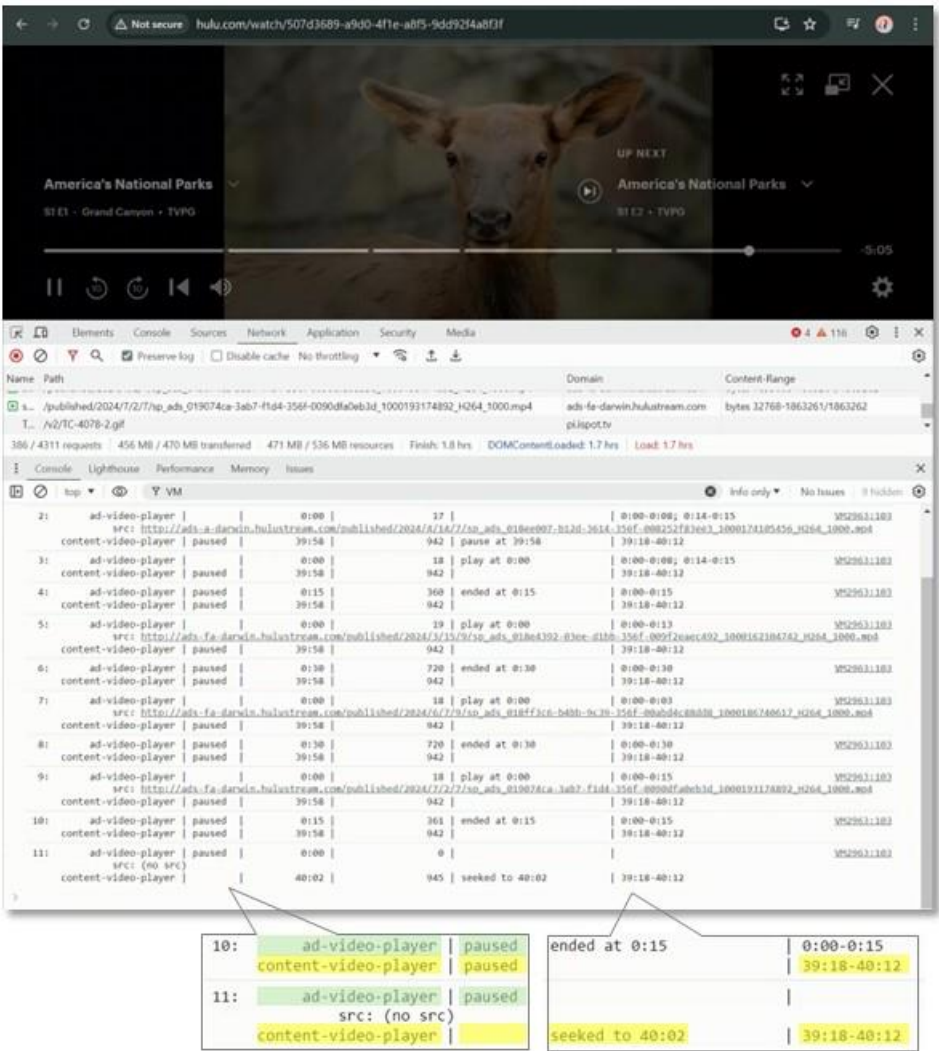
In the example below, at event #10, the last advertisement for the advertisement break has ended, and both “ad-video-player” and “content-video-player” are paused.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

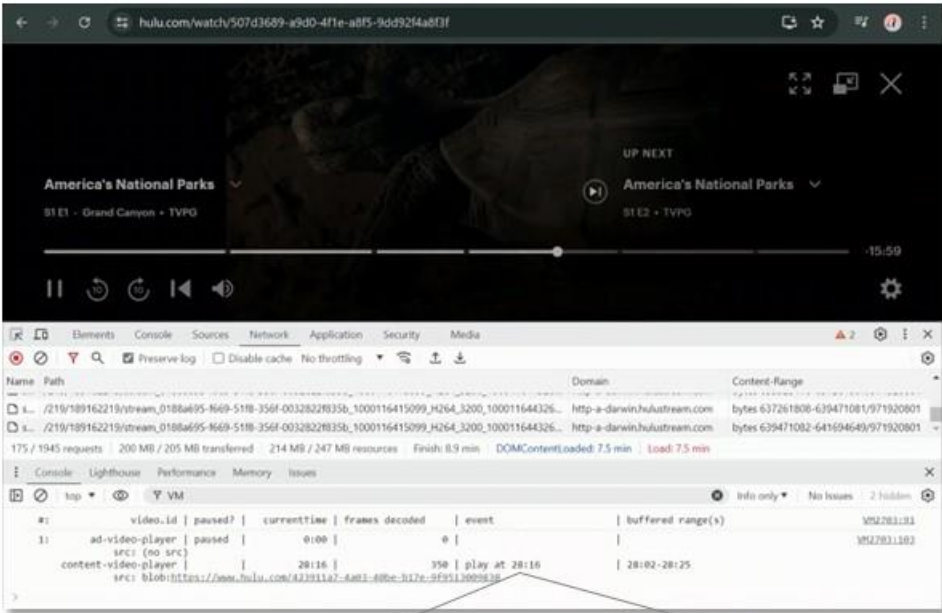
In the example below, at event # 11, the “ad-video-player” remains paused, and “content-video-player” resumes playing content after the ad break. More specifically, the “content-video-player” jumps forward by less than 1 minute (“seeked to 40:02”) and then

plays content. The “content-video-player” then has the video content from 39:18 to 40:12 buffered, that is, a continuous range of video content from before and after the ad break (recall that the “content-video-player” started playing at 39:22 at event #1 shown above).



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, the user skips ahead past two ad insertion points. At event #1, the Hulu client plays content starting at 28:16.

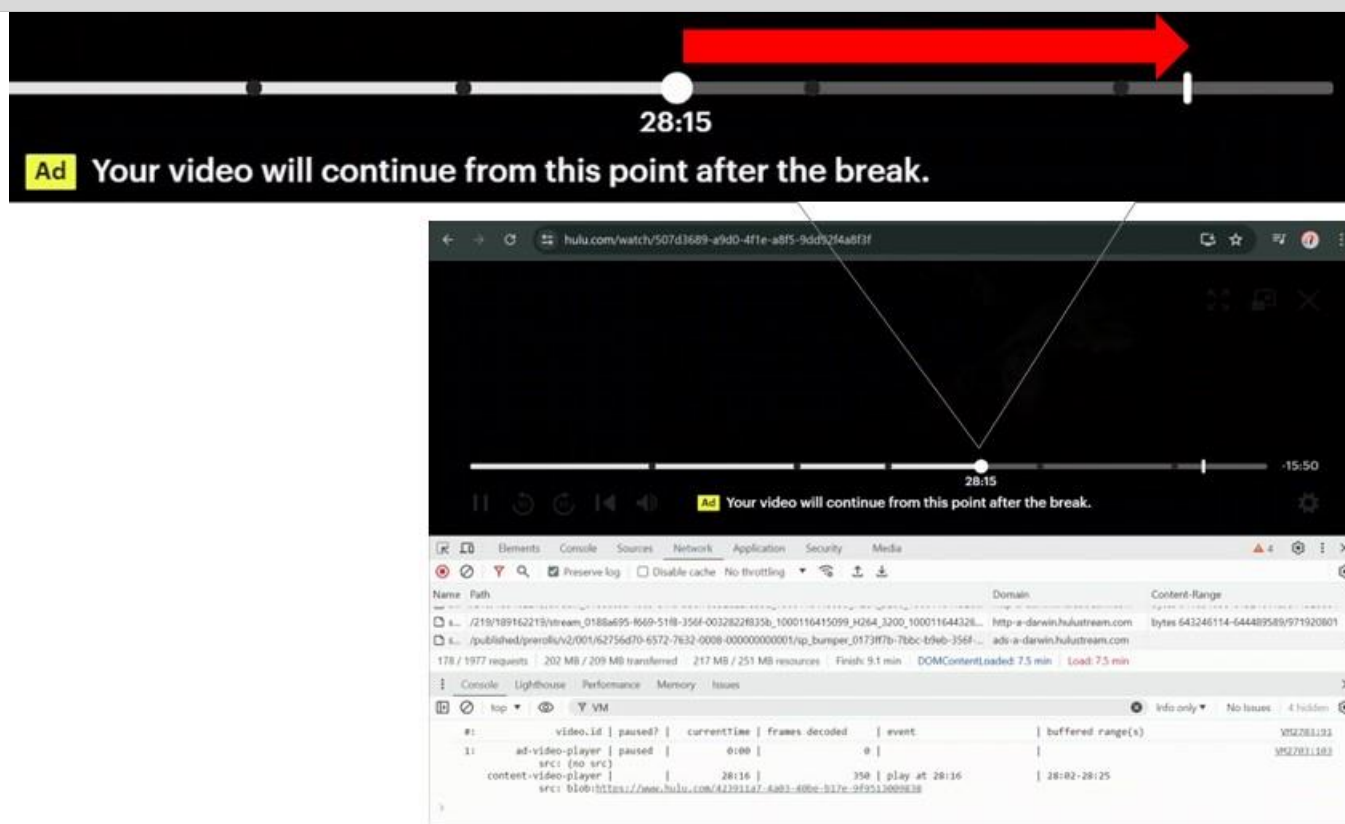


The screenshot shows the Hulu player interface for 'America's National Parks' with a progress bar at 15:59. Below the player, the Chrome DevTools console is open, displaying a log of video-related events. The console shows two entries: an 'ad-video-player' event at 0:00 and a 'content-video-player' event at 28:16. The 'content-video-player' event is highlighted, showing a 'play at 28:16' event and a buffered range of 28:02-28:25. A line connects this event to a table below.

| #: | video.id                                                            | paused? | currentTime | frames decoded | event         | buffered range(s) |
|----|---------------------------------------------------------------------|---------|-------------|----------------|---------------|-------------------|
| 1: | ad-video-player                                                     | paused  | 0:00        | 0              |               |                   |
|    | src: (no src)                                                       |         |             |                |               |                   |
|    | content-video-player                                                |         | 28:16       | 350            | play at 28:16 | 28:02-28:25       |
|    | src: blob:https://www.hulu.com/423911a7-4a03-40be-b17e-9f9513009838 |         |             |                |               |                   |

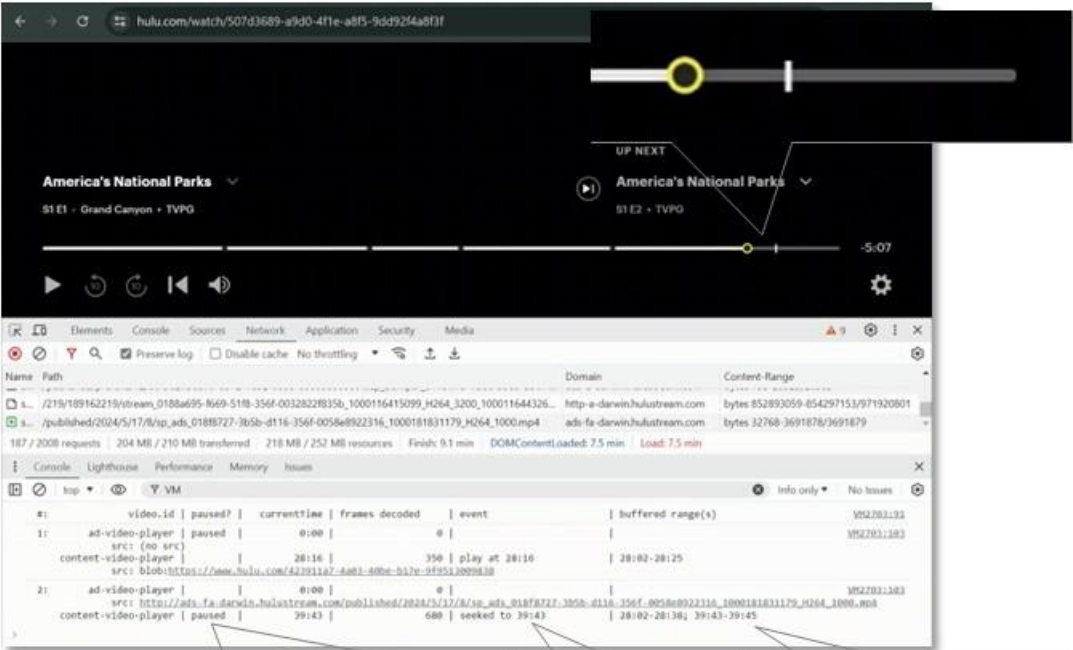
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, the user moves the slide bar to jump forward, past two of the original ad insertion points.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

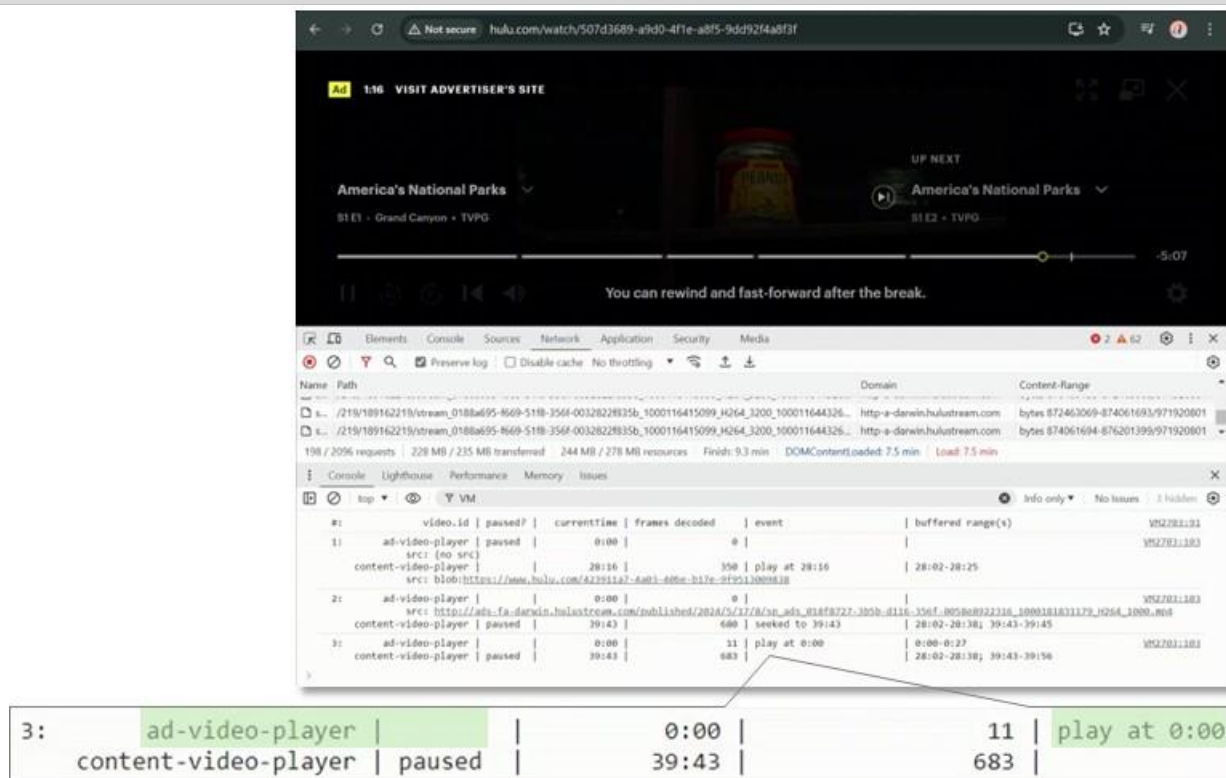
In the example below, at event # 2, the “ad-video-player” is no longer paused, and has a source (“src”) that is an advertisement video file; “content-video-player” has paused, and has jumped ahead (“seeked”) to 39:43. In response to the user input updating a current play position in the content stream to a new play position in the content stream that attempts to jump one or more ad insertion points, the processors adaptively modify a presentation position of the advertising content from the initially sequenced insertion point (before the red arrow) to the alternatively sequenced insertion points (after the red arrow). Here, the adaptive preference rules employed by Hulu will force the immediate presentation of the ad when the user selects a play position in the content.



| #: | video.id                                                                                                                               | paused? | currentTime | event           | buffered range(s)        |
|----|----------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------|--------------------------|
| 1: | ad-video-player                                                                                                                        | paused  | 0:00        |                 |                          |
|    | src: (no src)                                                                                                                          |         |             |                 |                          |
|    | content-video-player                                                                                                                   |         | 28:16       | play at 28:16   | 28:02-28:25              |
|    | src: blob:https://www.hulu.com/423911a7-8a01-800e-517e-5f9513009438                                                                    |         |             |                 |                          |
| 2: | ad-video-player                                                                                                                        |         | 0:00        |                 |                          |
|    | src: http://ads-fa-darwin.hulustream.com/published/2024/5/17/8/sp_ads_018f8727_3050-d116-356f-0058e8922316_1000181831179_H264_1000.mp4 |         |             |                 |                          |
|    | content-video-player                                                                                                                   | paused  | 39:43       | seeked to 39:43 | 28:02-28:38; 39:43-39:45 |

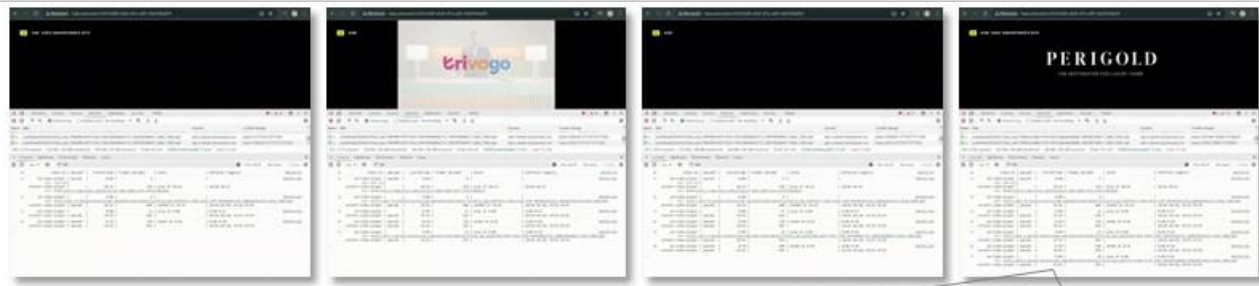
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, at event #3, the “ad-video-player” starts playing an advertisement at 0:00, while the “content-video-player” remains paused.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

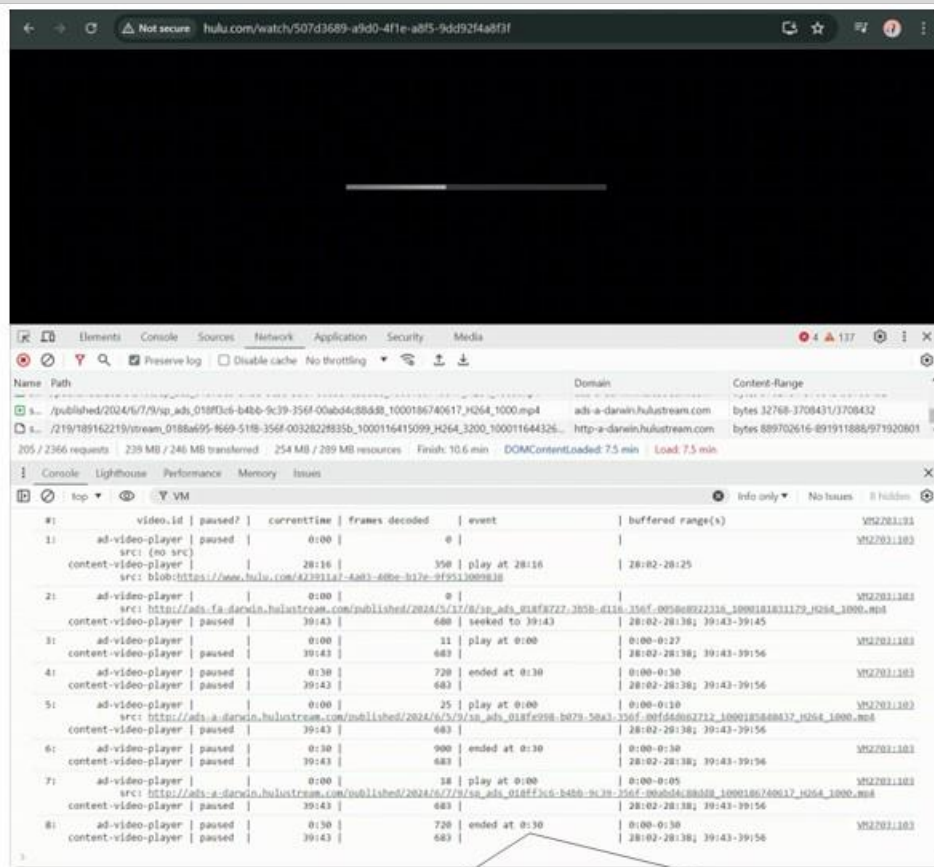
In the example below, at event #4 through #7, the “content-video-player” remains paused while the “ad-video-player” plays video advertisements from each advertisement’s start to end.



|    |                                                                                                                                                                |        |       |     |               |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|-----|---------------|
| 4: | ad-video-player                                                                                                                                                | paused | 0:30  | 720 | ended at 0:30 |
|    | content-video-player                                                                                                                                           | paused | 39:43 | 683 |               |
| 5: | ad-video-player                                                                                                                                                |        | 0:00  | 25  | play at 0:00  |
|    | src: <a href="http://ads-a-darwin.hulustream.com/published/2024/6/5/9/sp_ads_018fe9">http://ads-a-darwin.hulustream.com/published/2024/6/5/9/sp_ads_018fe9</a> |        |       |     |               |
|    | content-video-player                                                                                                                                           | paused | 39:43 | 683 |               |
| 6: | ad-video-player                                                                                                                                                | paused | 0:30  | 900 | ended at 0:30 |
|    | content-video-player                                                                                                                                           | paused | 39:43 | 683 |               |
| 7: | ad-video-player                                                                                                                                                |        | 0:00  | 18  | play at 0:00  |
|    | src: <a href="http://ads-a-darwin.hulustream.com/published/2024/6/7/9/sp_ads_018ff3">http://ads-a-darwin.hulustream.com/published/2024/6/7/9/sp_ads_018ff3</a> |        |       |     |               |
|    | content-video-player                                                                                                                                           | paused | 39:43 | 683 |               |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

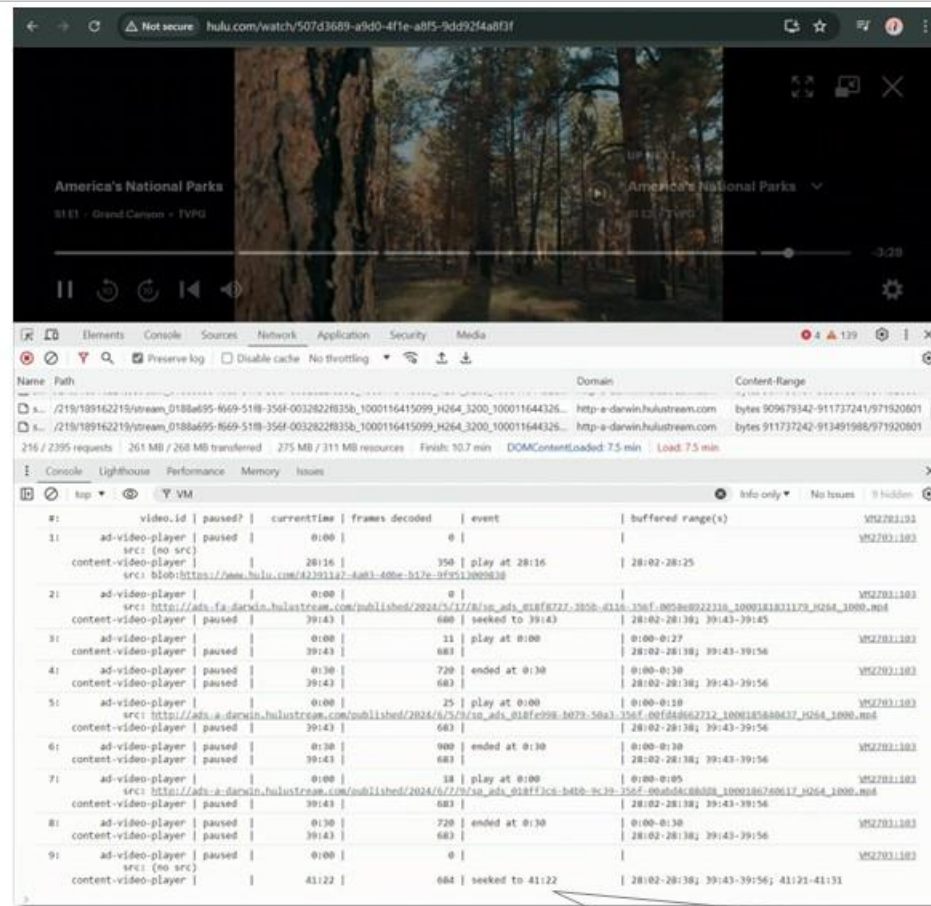
In the example below, at event # 8, the last advertisement for the current ad break has ended, and both “ad-video-player” and “content-video-player” are paused.



8: ad-video-player | paused | 0:30 | 720 | ended at 0:30  
content-video-player | paused | 39:43 | 683 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, at event #9, the “ad video-player” remains paused as “content-video-player” jumps (“seeked”) to 41:22, ahead of where the player was paused (at 39:43 at event #8) in order to resume playing content at the user’s desired new play position.

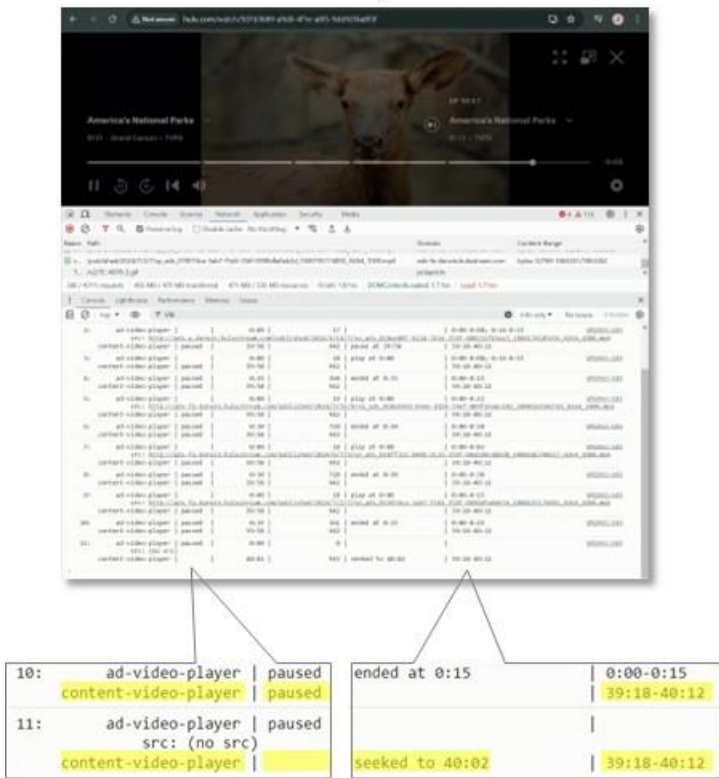


| #:  | video.id             | paused? | currentTime | frames decoded | event           | buffered range(s)                     |
|-----|----------------------|---------|-------------|----------------|-----------------|---------------------------------------|
| ... |                      |         |             |                |                 |                                       |
| 8:  | ad-video-player      | paused  | 0:30        | 720            | ended at 0:30   | 0:00-0:30                             |
|     | content-video-player | paused  | 39:43       | 683            |                 | 28:02-28:38; 39:43-39:56              |
| 9:  | ad-video-player      | paused  | 0:00        | 0              |                 |                                       |
|     | content-video-player |         | 41:22       | 684            | seeked to 41:22 | 28:02-28:38; 39:43-39:56; 41:21-41:31 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

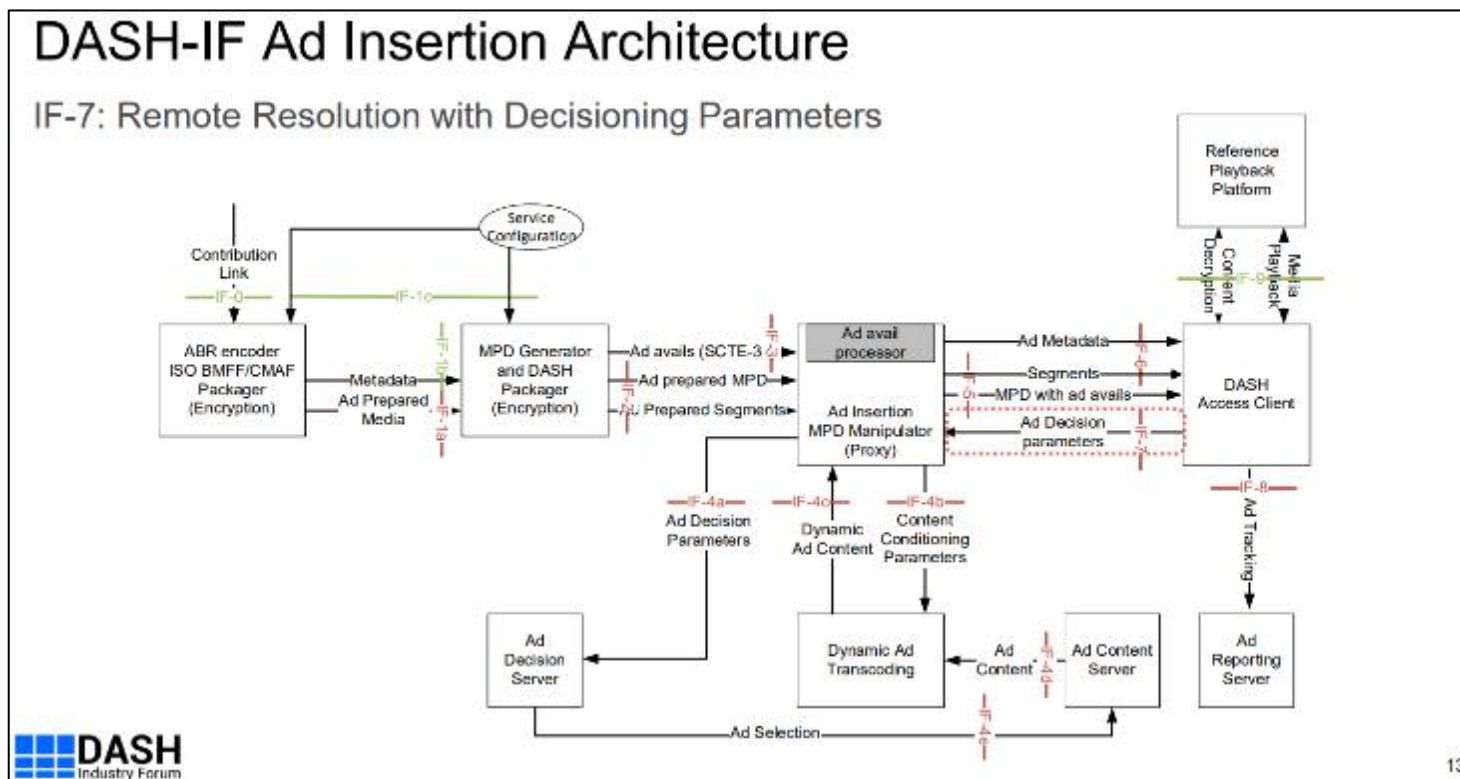
In contrast to the example shown above where the user does not skip ahead, when the user skips ahead past the ad break, the “content-video-player” has disjointed time ranges of content buffered. When the user does not skip ahead, the player has a continuous range of content buffered, from before and after the ad break. The Hulu client played content up to the ad insertion point, then played ad files while the content was paused, then resumed playing content. In contrast, when the user skips ahead, the “content-video-player” stops playing content and the Hulu client switches to displaying an advertisement video file. The “content-video-player” then plays content at the user’s desired starting position. The “content-video-player” buffers, but does not play, a small amount (13 seconds from 39:43-39:56 in the example below) of content from the original ad insertion point, then buffers content as needed for playing content starting from the new play position.

Did not skip ahead



| U.S. Patent No.<br>11,463,768                                                                                                                 | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                               | <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>[1d.3] modify the adapted insertion point of digital advertising content based on the advertisement requirement; and</p>                   | <p>The intersplicer of the Accused Instrumentalities is configured to modify the adapted insertion point of digital advertising content based on the advertisement requirement.</p> <p>For example, the Hulu system adaptively changes the advertisement insertion point in the digital media content to force the user to watch the ad, even if the play position is in a media section of the time bar in the user interface.</p> <p>The new play position becomes the adapted insertion point for the ad, with the adapted insertion point replacing the predetermined insertion point that the user skipped. The adapted insertion point is modified based on an advertising requirement, for example, that no user of Hulu’s ad-supported subscription can skip an ad, unless, for example, certain conditions are satisfied to allow a user to skip an ad one or more times upon starting a new streamed program, or when a user has very recently watched ads. As an additional example, Hulu may modify the adapted insertion point based on advertising requirements associated with the advertisements played in associated with the adapted insertion point, for example if Hulu changes the ads and the substitute ads have different advertiseent requirements.</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| <p>[1d.4] request, from the advertisement rotator, digital advertising content to be played at the adapted advertisement insertion point.</p> | <p>The intersplicer of the Accused Instrumentalities is configured to request, from the advertisement rotator, digital advertising content to be played at the adapted advertisement insertion point.</p> <p>“The request from the Ad Insertion MPD Manipulator for ad content provides all the information needed to perform ad decisioning, including content metadata and opportunity descriptions.” DASH Part 5 at § 5.6.1, Introduction. “There exists an Ad Content entity that accepts conditioning parameters of the form described by IF-4b and [] Provides the ad content of the form described by IF-4c ....” <i>Id.</i> “The actual ad content is provided by the Ad Content Server.” <i>Id.</i> at § 5.6.4.1, Overview.</p> <p>Zachary Cava, Video Platform Architect at Hulu, gave a presentation at the March 31, 2020 DVB World Webinar entitled, “Ad Insertion in Live Content.” <a href="#">Cava Presentation</a> at the 28:10 mark to the 43:20 mark) (last visited July 7, 2024).</p> <p>In that presentation, as part of his explanation of IF-7, Mr. Cava stated, “IF-7 is actually part of what we consider the Server Guided Ad Insertion and this is where instead of the MPD Proxy replacing the ads before they reach the client, it’s actually annotating the stream with enough information such that the client can come back to the proxy when it needs that ad replacement to occur and the</p>                                                                                                                                                                                                              |

ad proxy can provide it then with the appropriate information.”



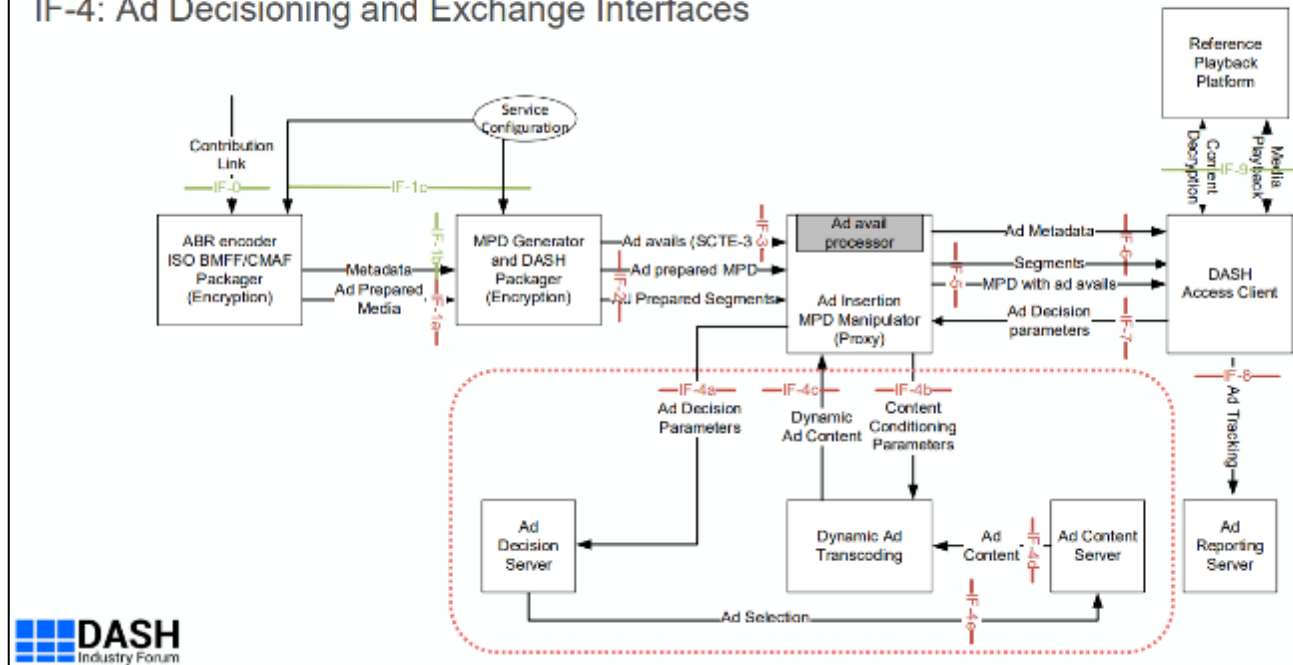
[Cava Presentation](#) at 35:33 to 35:58 mark.

When the DASH Access Client needs an ad replacement to occur, for example at an adapted advertisement insertion point, it sends Ad Decision Parameters to the Ad Insertion MPD Manipulator intersplicer.

Mr. Cava went on to explain, with respect to IF-4, “The prepared content [from the DASH Packager] is then consumed by an Ad Insertion MPD Manipulator, or an Ad Proxy, and that is the mechanism that communicates with an ad decisioning exchange service that will take parameters for decisioning and internally perform decisioning.”

## DASH-IF Ad Insertion Architecture

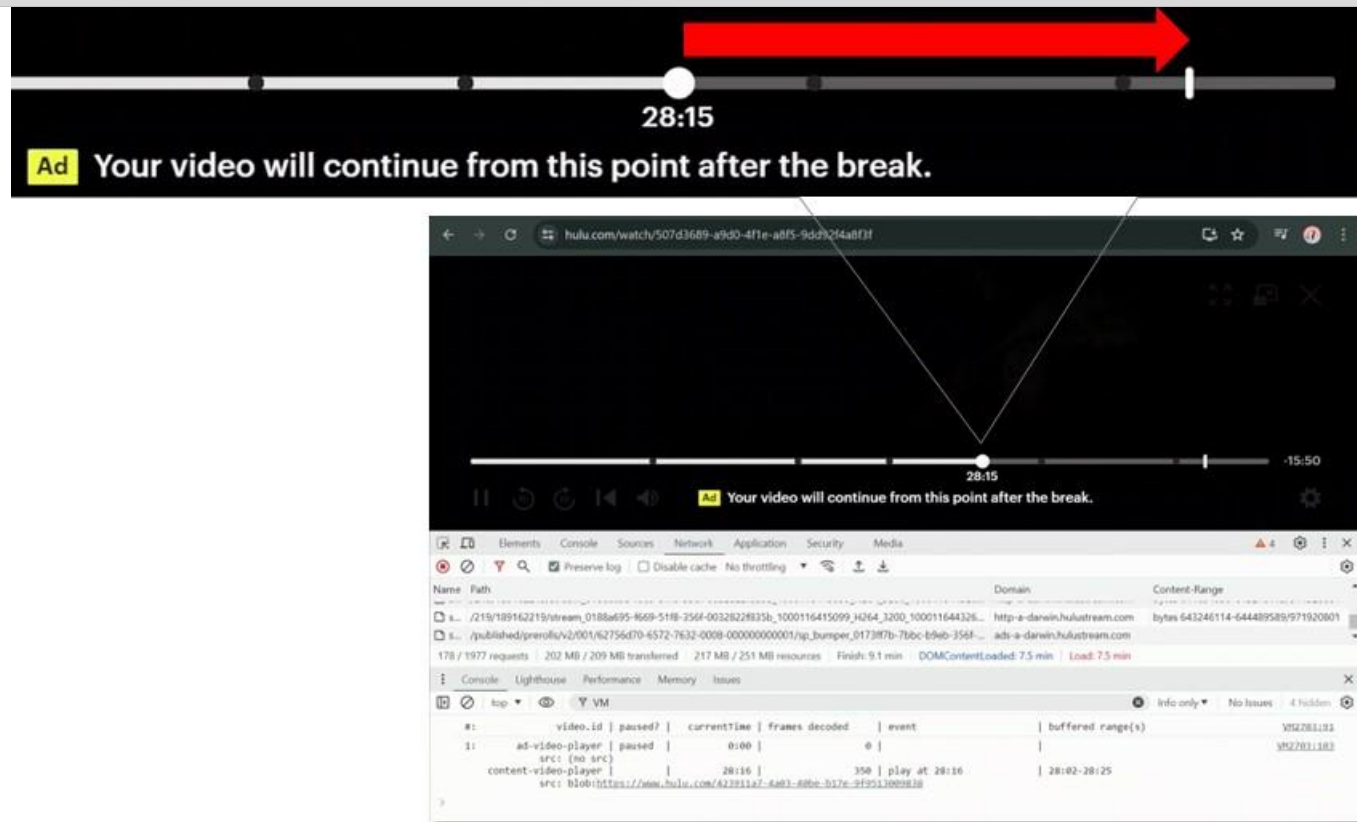
### IF-4: Ad Decisioning and Exchange Interfaces



[Cava Presentation](#) at 33:33 to 33:56 mark.

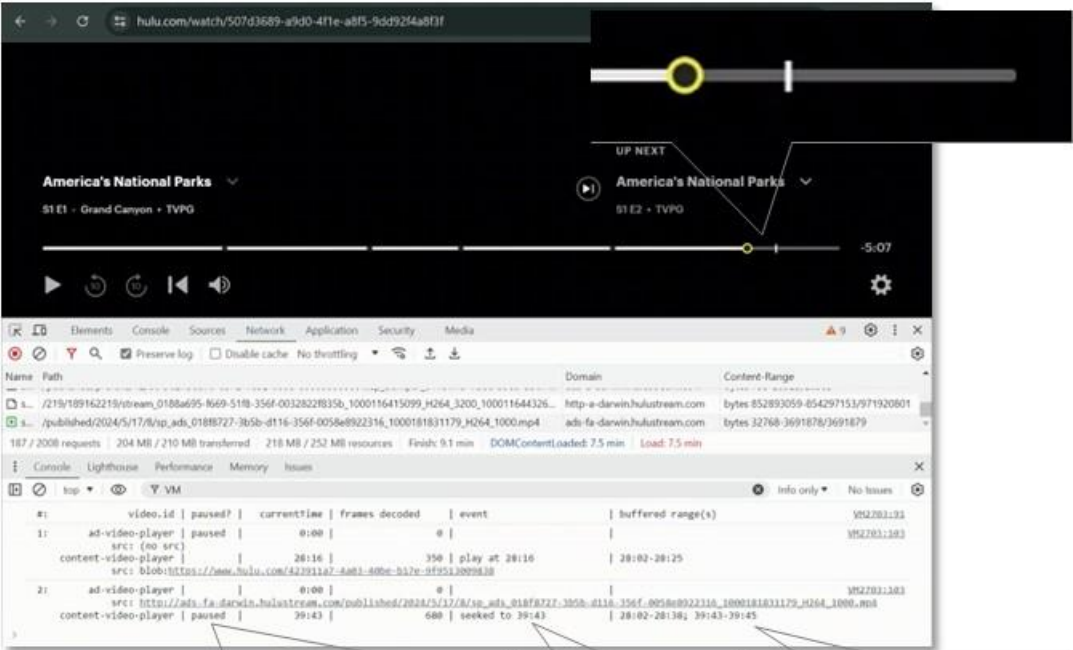
Thus, the Ad Insertion MPD Manipulator intersplicer passes the Ad Decision Parameters from the DASH Access Client on to the Ad Decision Server (and related structures) as requests to provide digital advertising content to be played at the adapted advertisement insertion point.

In the example below, after the user skips past the initial advertisement insertion points, the Hulu client requests advertisement video files to play at the adapted advertisement insertion point. For example, the Hulu requests the last ad played in this ad break from a URL for a video advertisement that is publicly available.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

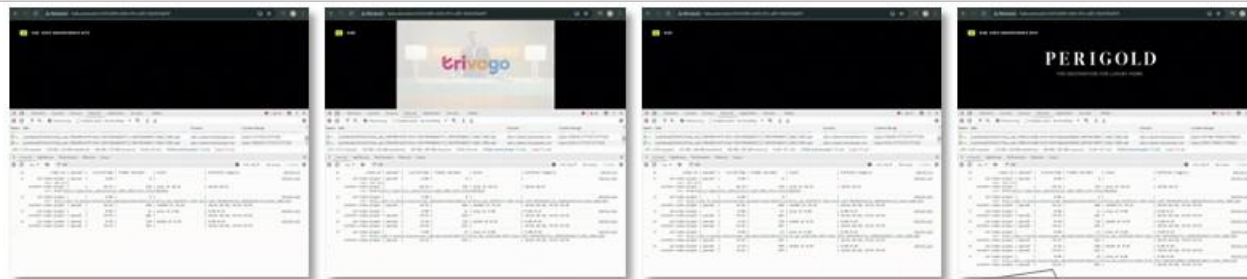
In the example below, at event # 2, the “content-video-player” pauses.



| #: | video.id                                                                                                                              | paused? | currentTime | event           | buffered range(s)        |
|----|---------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------|--------------------------|
| 1: | ad-video-player                                                                                                                       | paused  | 0:00        |                 |                          |
|    | src: (no src)                                                                                                                         |         |             |                 |                          |
|    | content-video-player                                                                                                                  |         | 28:16       | play at 28:16   | 28:02-28:25              |
|    | src: blob:https://www.hulu.com/423911a7-8a01-800e-517e-3f9513009838                                                                   |         |             |                 |                          |
| 2: | ad-video-player                                                                                                                       |         | 0:00        |                 |                          |
|    | src: http://ads-fa-darwin.hulustream.com/published/2024/5/17/8/sp_ads_018f8727_355b-d116-356f-0058e8922316_1000181831179_H264_1000.m4 |         |             |                 |                          |
|    | content-video-player                                                                                                                  | paused  | 39:43       | seeked to 39:43 | 28:02-28:38; 39:43-39:45 |

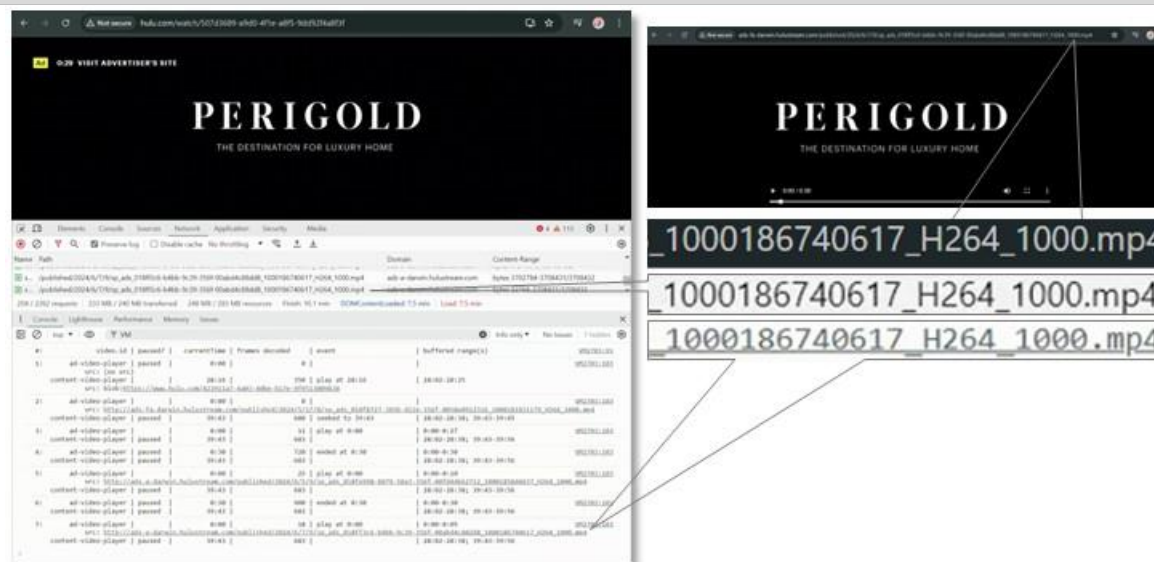
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, at event #5 through event # 7, the “ad-video-player” plays advertisements at the adapted advertisement insertion point.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

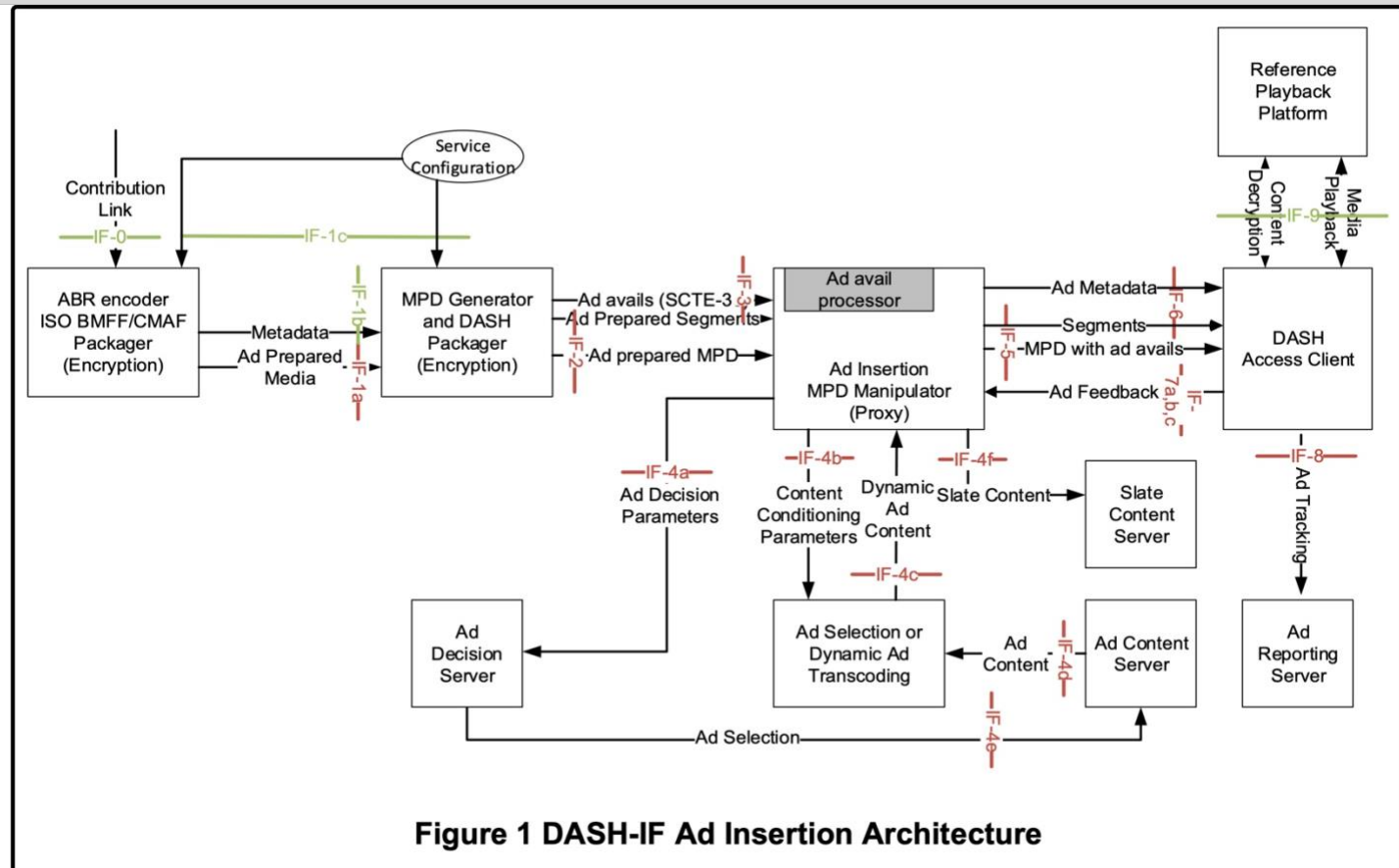
In the example below, the Hulu client requests the last of the ads played in this ad break from a URL ending in \_1000.mp4. The request for the file is in the browser's network traffic history and is shown as the source ("src") of the "ad-video-player".



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                     | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[2] The digital media system of claim 1, wherein the digital advertising content is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point.</p> | <p>The Accused Instrumentalities use digital advertising content at the adapted advertisement insertion point that is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point.</p> <p>For example, the examples discussed in [1c] include examples of advertising content that is different from a predetermined advertisement selected to be played.</p> <p>As an additional example, in Figure 1 of the DASH Standard, via the client user interface, when a user's actions cause the creation of an adapted advertisement insertion point, they set into motion a chain of events that ultimately results in the intersplicer digital advertising content at the adapted insertion point is different from the predetermined advertisement content to be played at the predetermined advertisement insertion point. First, the DASH Access Client sends Ad Feedback to the Ad Insertion MPD Manipulator intersplicer via IF-7. Next, the Ad Insertion MPD Manipulator intersplicer sends Ad Decision Parameters to the Ad Decision Server via IF-4. The Ad Decision Server decides which ads to display and the Ad Content Server retrieves those ads and the Ad Selection or Dynamic Ad Transcoding sends them, with instructions, back to the Ad Insertion MPD Manipulator intersplicer. Finally, the Ad Insertion MPD Manipulator intersplicer sends the advertisements and instructions back to the DASH Access Client. These advertisements and instructions are different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point.</p> |



[DASH Part 5](#) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

For example, if a user is watching content through the Hulu user interface, and the play position is located before an initially sequenced insertion point, when the user moves the play position to after the insertion point (i.e., attempts to jump the advertisements at the insertion point) the client may send Ad Feedback to the Ad Insertion MPD Manipulator via IF-7. The DASH Standard explains that the Ad Insertion MPD Manipulator may then send Ad Decision Parameters to the Ad Decision Server (via IF-4) to help it decide which advertisements to display.

## 5.6.2 IF-4a: Ad Decision request parameters

### 5.6.2.1 Decisioning Parameters

This document does not specify a specific format, but only discusses some principle approaches. Additional details on specific formats are for further study.

A *decisioning parameter* is a piece of information about the content stream, consumption medium, or end user that is used by the Ad Decisioning Server as part of the advertisement qualification and selection process. The Ad Insertion MPD Manipulator collects and sends this information to the Ad Decisioning Server as part of IF-4a.

DASH Part 5 at § 5.6.2.

When the Ad Decision Server receives Ad Decision Parameters, it selects advertisements to display from a collection of available digital advertising content.

## 5.6 IF-4: Ad Decisioning and Exchange Interfaces

### 5.6.1 Introduction

Information about ad content to insert into a presentation is retrieved from the Ad Decision and Ad Content server(s) via the IF-4 interfaces. The request from the Ad Insertion MPD Manipulator for ad content provides all the information needed to perform ad decisioning, including content metadata and opportunity descriptions. The response is then translated by the Ad Insertion MPD Manipulator into the DASH structures detailed in IF-5.

DASH Part 5 at § 5.6.1, Introduction.

Once the Ad Decision Server identifies which advertisements, the Ad Content Server provides the actual ad content to the Ad Insertion MPD Manipulator. As noted in the above citation, the advertisements are “then translated by the Ad Insertion MPD Manipulator into the DASH structures” sent to the client device for display.

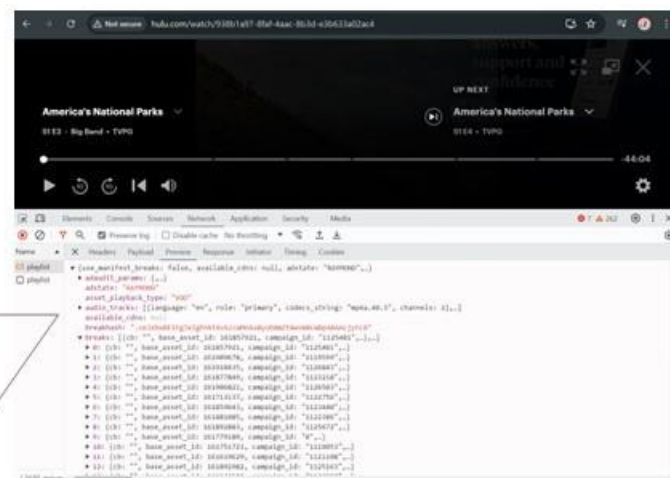
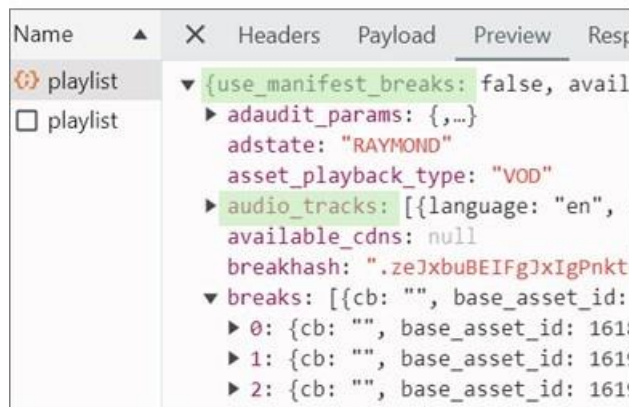
### 5.6.4.1 Overview

The response of the Ad Decision Server identifies the advertisements decided on by the server and provides information associated with the advertisement such as general metadata, viewability requirements, media files, mezzanines, and tracking events. The actual ad content is provided by the Ad Content Server, preferably following the DASH-IF Ad Content format as defined in clause 5.6.7. Depending on the decisioning mode, the decision response may optionally contain the placement and ordering of advertisements as well.

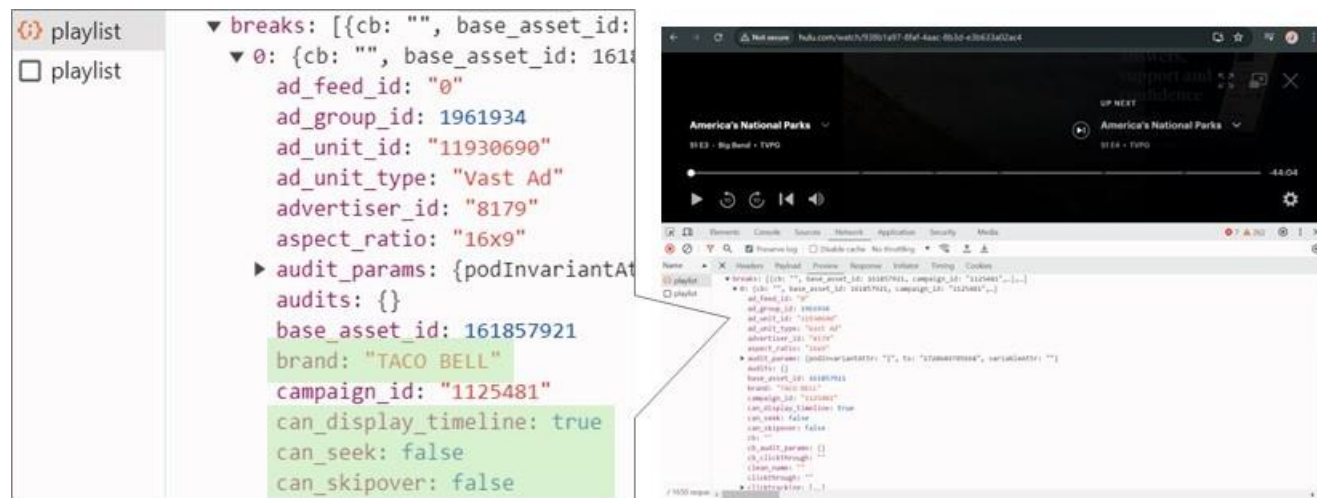
DASH Part 5 at § 5.6.4.1, Overview.

The Accused Instrumentalities use digital advertising content at the adapted advertisement insertion point that is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point.

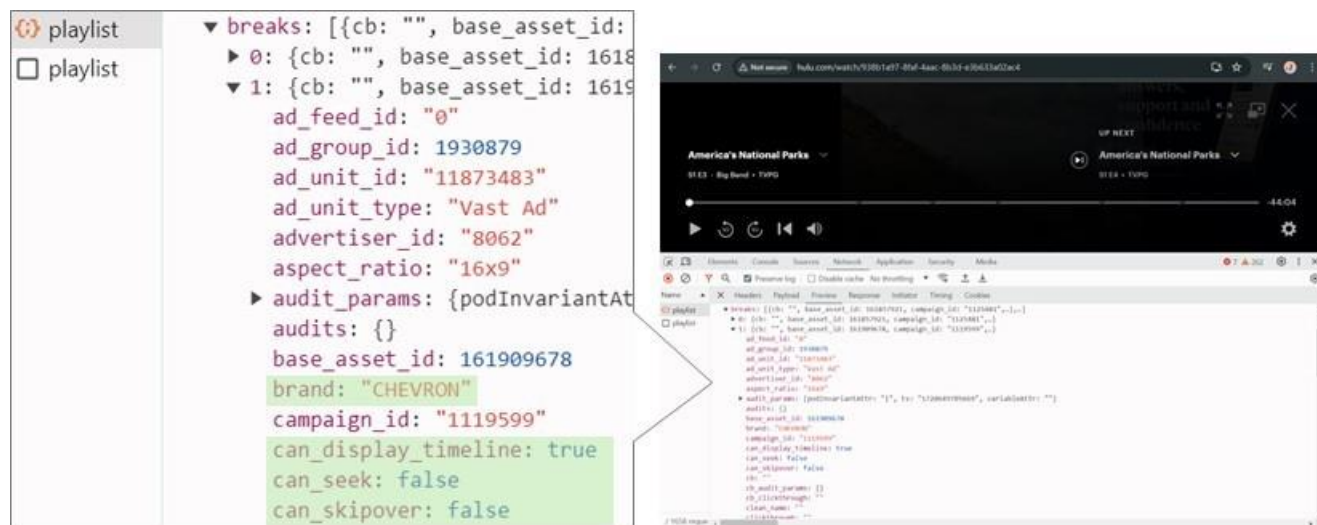
For example, the Hulu client retrieves “playlist” data that includes “segments” information, which lists the time positions in the content timeline that are predetermined advertisement insertion points, as well as data regarding whether to “use\_manifest\_breaks”, and a “breaks” section that includes information about advertisements. As an example, if a user skips one or more predetermined advertisement insertion points, at the adapted advertisement insertion point, Hulu may play advertisements that are associated with a later predetermined advertisement insertion point, instead of advertisements that are associated with one of the predetermined advertisement insertion points that the user skipped. As another example, at the adapted advertisement insertion point, Hulu may play advertisements that are not associated with any of the predetermined advertisement insertion points.

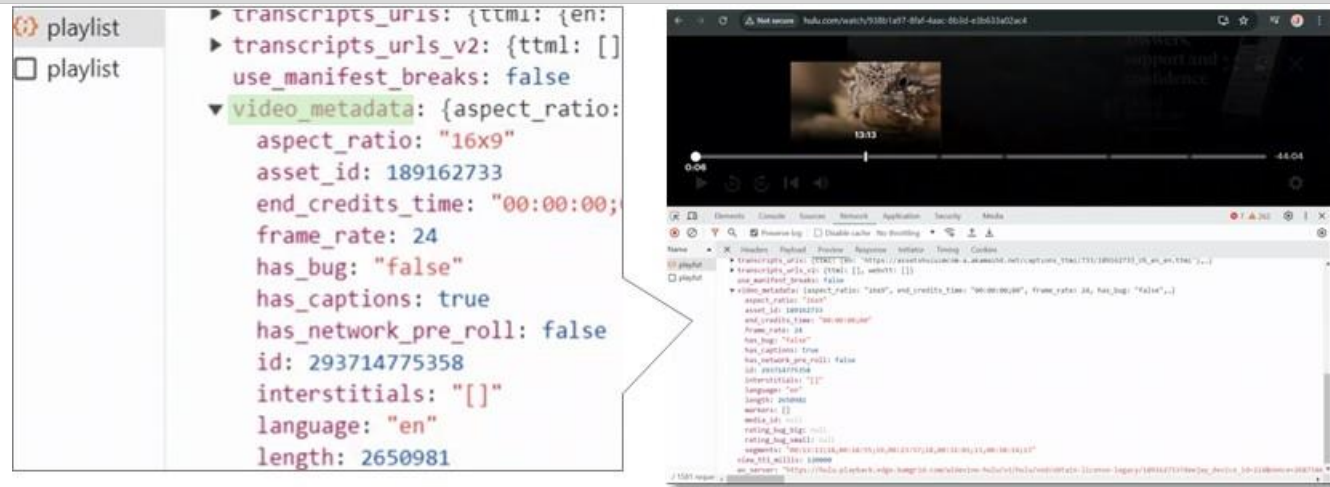


Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.

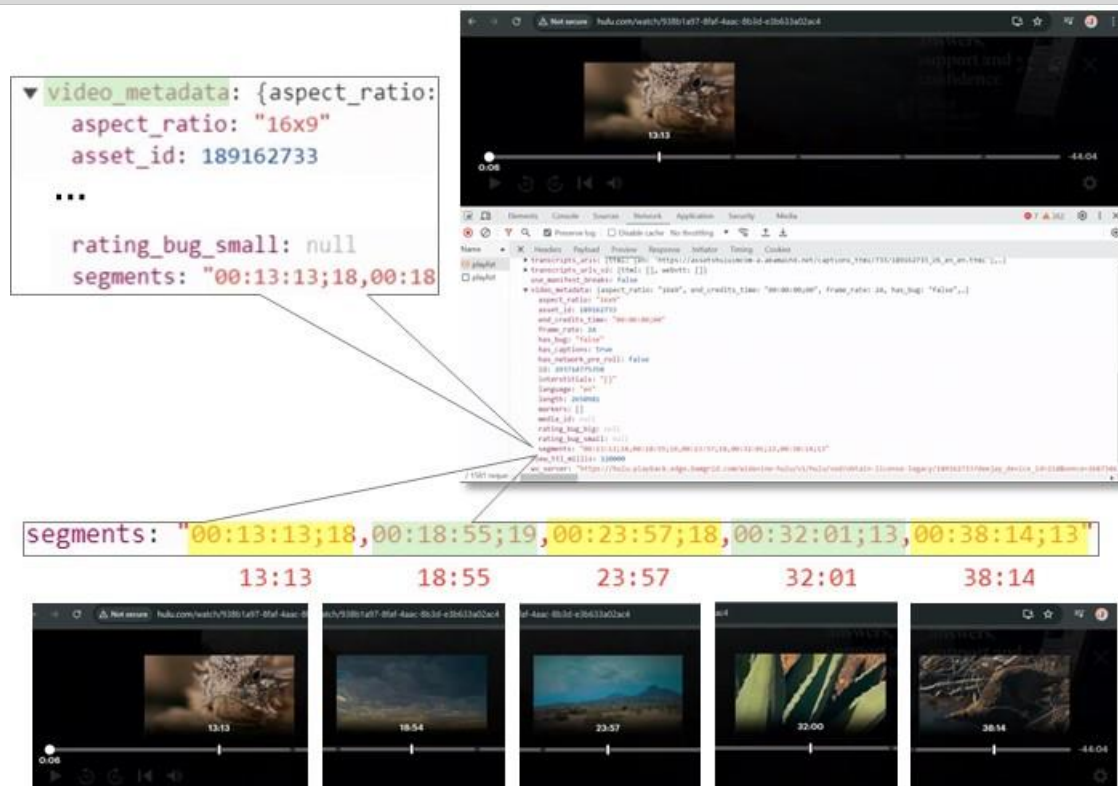


Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.



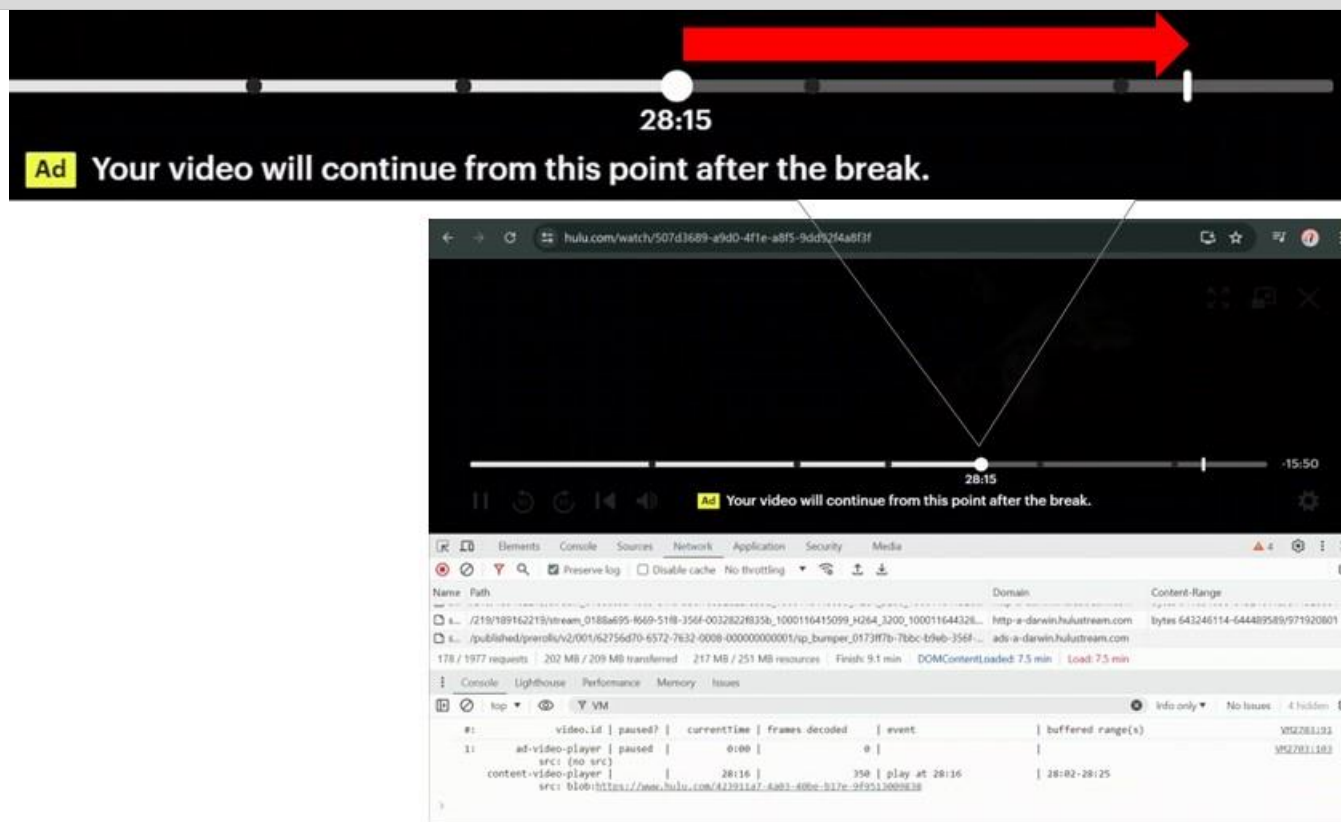


Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.



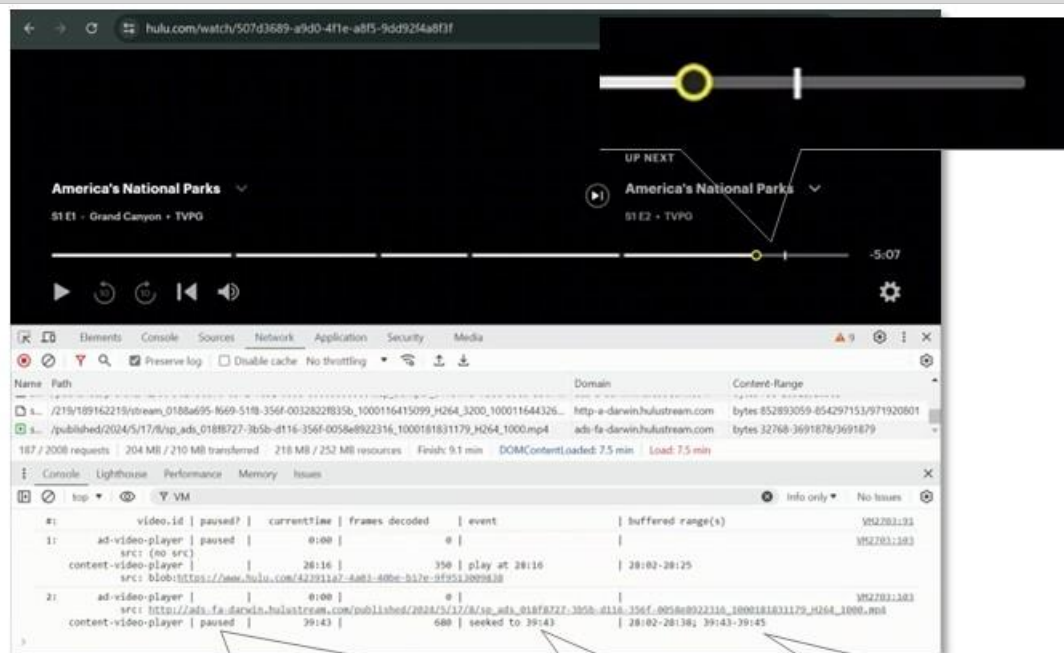
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.

In the example shown below, when the user skips ahead, the “content-video-player” does not play content up to the original, predetermined ad insertion point at 39:58. Instead, in this example, the “content-video-player” plays content up until shortly after 28:15, then pauses.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

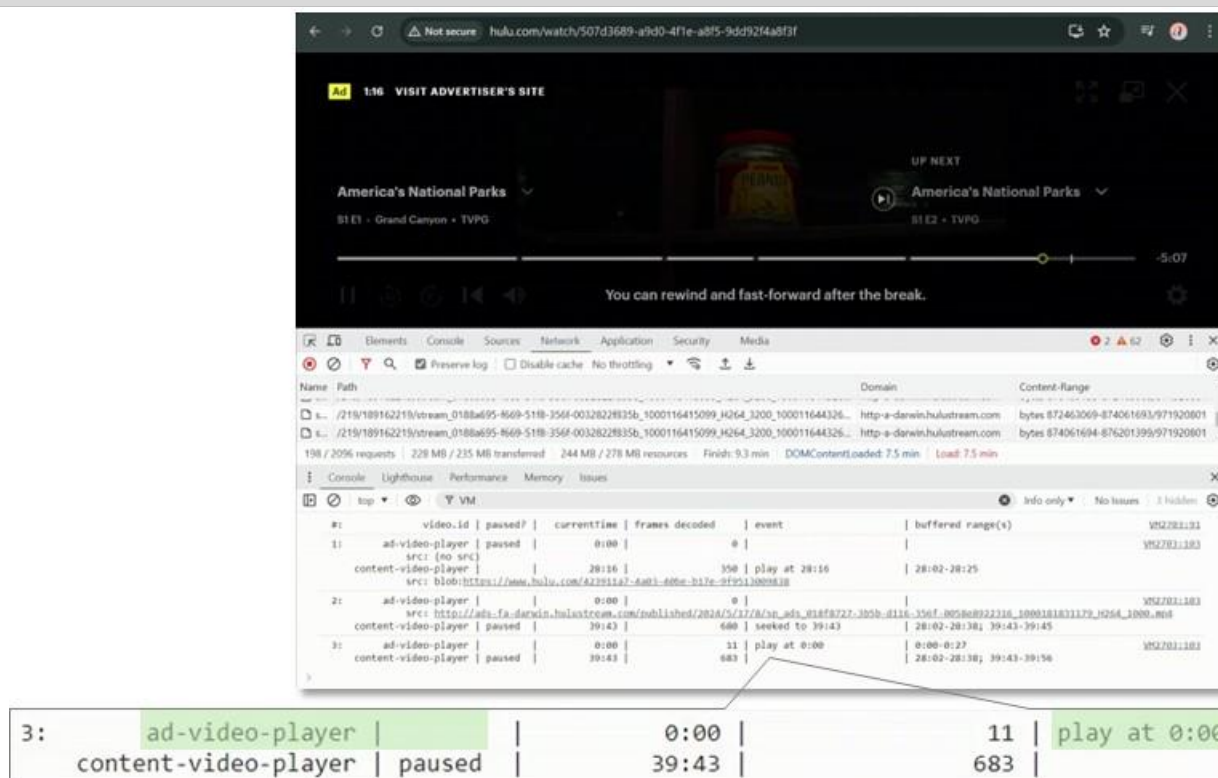
In the example below, at event # 2, the “ad-video-player” is no longer paused, and has a source (“src”) that is an advertisement video file; “content-video-player” has paused, and has jumped ahead (“seeked”) to 39:43, but does not play any content at 39:43.



| #: | video.id                                                                                                                              | paused? | currentTime | event           | buffered range(s)        |
|----|---------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------|--------------------------|
| 1: | ad-video-player                                                                                                                       | paused  | 0:00        |                 |                          |
|    | src: (no src)                                                                                                                         |         |             |                 |                          |
|    | content-video-player                                                                                                                  |         | 28:16       | play at 28:16   | 28:02-28:25              |
|    | src: blob:https://www.hulu.com/423911a7-8a01-800e-937e-9f9513009838                                                                   |         |             |                 |                          |
| 2: | ad-video-player                                                                                                                       |         | 0:00        |                 |                          |
|    | src: http://ads-fa-darwin.hulustream.com/published/2024/5/17/8/sp_ads_018f8727_3050-d116-356f-0058e8922316_1000181831179_H264_1000.m4 |         |             |                 |                          |
|    | content-video-player                                                                                                                  | paused  | 39:43       | seeked to 39:43 | 28:02-28:38; 39:43-39:45 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, at event #3, the “ad-video-player” starts playing an advertisement at 0:00, while the “content-video-player” remains paused.



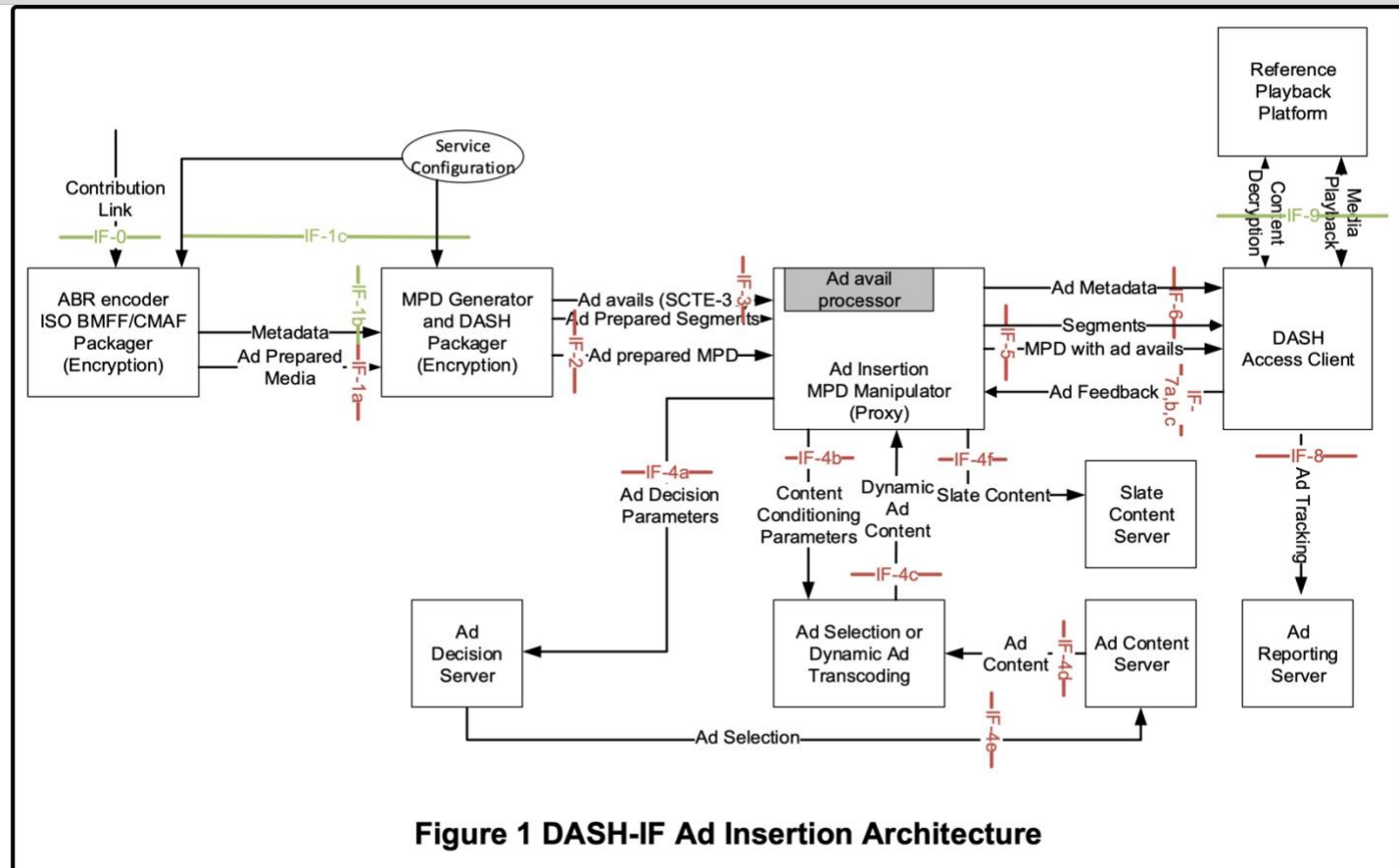
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

[3] The digital media system of claim 1, wherein the intersplicer is further configured to change the predetermined advertisement insertion point to the adapted advertisement insertion point by adaptively modifying a presentation position of a predetermined advertisement from the predetermined advertisement insertion point to the adapted advertisement insertion point in the digital media content, the adapted advertisement insertion point being different than the predetermined advertisement insertion point.

The intersplicer of the Accused Instrumentalities is further configured to change the predetermined advertisement insertion point to the adapted advertisement insertion point by adaptively modifying a presentation position of a predetermined advertisement from the predetermined advertisement insertion point to the adapted advertisement insertion point in the digital media content, the adapted advertisement insertion point being different than the predetermined advertisement insertion point.

For example, in Figure 1 of the DASH Standard, via the client user interface, when a user's actions cause the creation of an adapted advertisement insertion point, they set into motion a chain of events that ultimately results in the intersplicer changing the predetermined advertisement insertion point to the adapted advertisement insertion point in the digital media content. First, the DASH Access Client sends Ad Feedback to the Ad Insertion MPD Manipulator intersplicer via IF-7. Next, the Ad Insertion MPD Manipulator intersplicer sends Ad Decision Parameters to the Ad Decision Server via IF-4. The Ad Decision Server decides which ads to display, the Ad Content Server retrieves those ads, and the Ad Selection or Dynamic Ad Transcoding sends them, with instructions, back to the Ad Insertion MPD Manipulator intersplicer. Finally, the Ad Insertion MPD Manipulator intersplicer sends the advertisements and instructions back to the DASH Access Client so that the presentation position of a predetermined advertisement from the predetermined advertisement insertion point is modified to the adapted advertisement insertion point in the digital media content.



[DASH Part 5](#) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

For example, if a user is watching content through the Hulu user interface, and the play position is located before an initially sequenced insertion point, when the user moves the play position to after the insertion point (i.e., attempts to jump the advertisements at the insertion point) the client may send Ad Feedback to the Ad Insertion MPD Manipulator via IF-7. The DASH Standard explains that the Ad Insertion MPD Manipulator may then send Ad Decision Parameters to the Ad Decision Server (via IF-4) to help it decide which advertisements to display.

## 5.6.2 IF-4a: Ad Decision request parameters

### 5.6.2.1 Decisioning Parameters

This document does not specify a specific format, but only discusses some principle approaches. Additional details on specific formats are for further study.

A *decisioning parameter* is a piece of information about the content stream, consumption medium, or end user that is used by the Ad Decisioning Server as part of the advertisement qualification and selection process. The Ad Insertion MPD Manipulator collects and sends this information to the Ad Decisioning Server as part of IF-4a.

DASH Part 5 at § 5.6.2.

When the Ad Decision Server receives Ad Decision Parameters, it selects advertisements to display from a collection of available digital advertising content.

## 5.6 IF-4: Ad Decisioning and Exchange Interfaces

### 5.6.1 Introduction

Information about ad content to insert into a presentation is retrieved from the Ad Decision and Ad Content server(s) via the IF-4 interfaces. The request from the Ad Insertion MPD Manipulator for ad content provides all the information needed to perform ad decisioning, including content metadata and opportunity descriptions. The response is then translated by the Ad Insertion MPD Manipulator into the DASH structures detailed in IF-5.

DASH Part 5 at § 5.6.1, Introduction.

Once the Ad Decision Server identifies which advertisements, the Ad Content Server provides the actual ad content to the Ad Insertion MPD Manipulator. As noted in the above citation, the advertisements are “then translated by the Ad Insertion MPD Manipulator into the DASH structures” sent to the client device for display.

#### 5.6.4.1 Overview

The response of the Ad Decision Server identifies the advertisements decisioned by the server and provides information associated with the advertisement such as general metadata, viewability requirements, media files, mezzanines, and tracking events. The actual ad content is provided by the Ad Content Server, preferably following the DASH-IF Ad Content format as defined in clause 5.6.7. Depending on the decisioning mode, the decision response may optionally contain the placement and ordering of advertisements as well.

DASH Part 5 at § 5.6.4.1, Overview.

The intersplicer of the Accused Instrumentalities is capable of adaptively modifying a presentation position of a predetermined advertisement from the predetermined advertisement insertion point to the adapted advertisement insertion point.

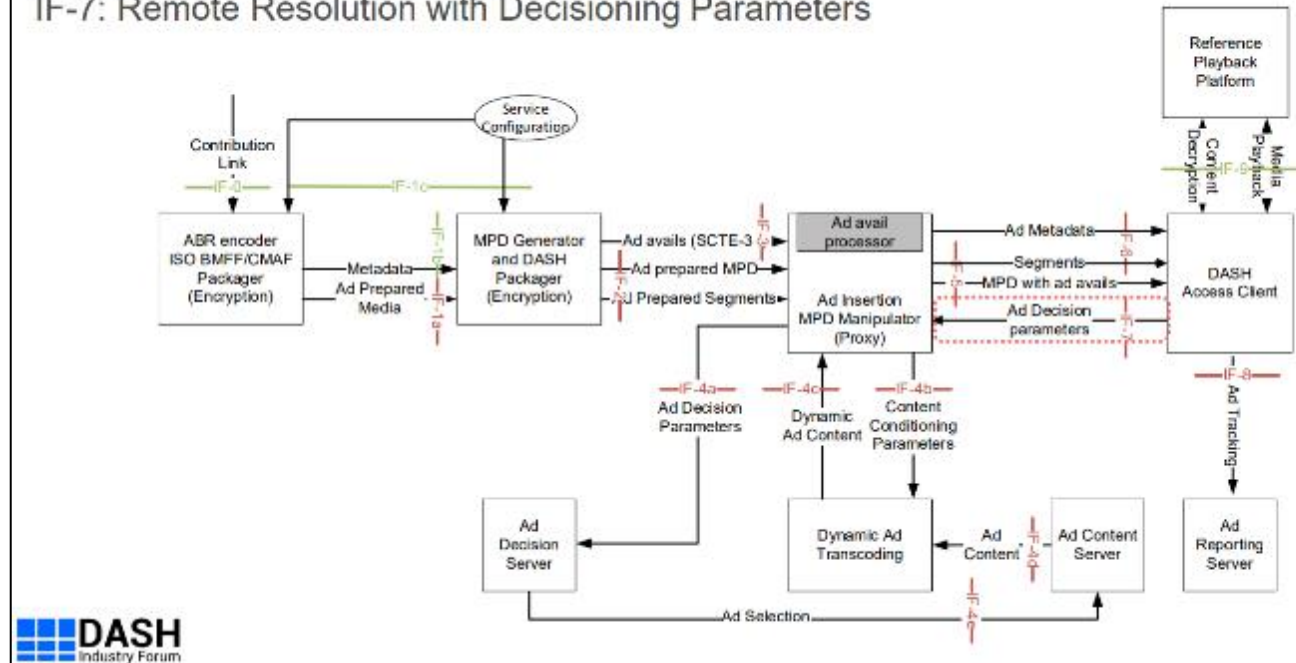
In this way, the intersplicer of the Accused Instrumentalities is configured to change the predetermined advertisement insertion point to the adapted advertisement insertion point by adaptively modifying a presentation position of a predetermined advertisement from the predetermined advertisement insertion point to the adapted advertisement insertion point in the digital media content, the adapted advertisement insertion point being different than the pre-determined advertisement insertion point.

Zachary Cava, Video Platform Architect at Hulu, gave a presentation at the March 31, 2020 DVB World Webinar entitled, “Ad Insertion in Live Content.” [Cava Presentation](#) at the 28:10 mark to the 43:20 mark.

In that presentation, as part of his explanation of IF-7 in the DASH Standard, Mr. Cava stated, “IF-7 is actually part of what we consider the Server Guided Ad Insertion and this is where instead of the MPD Proxy replacing the ads before they reach the client, it’s actually annotating the stream with enough information such that the client can come back to the proxy when it needs that ad replacement to occur and the ad proxy can provide it then with the appropriate information.”

## DASH-IF Ad Insertion Architecture

### IF-7: Remote Resolution with Decisioning Parameters

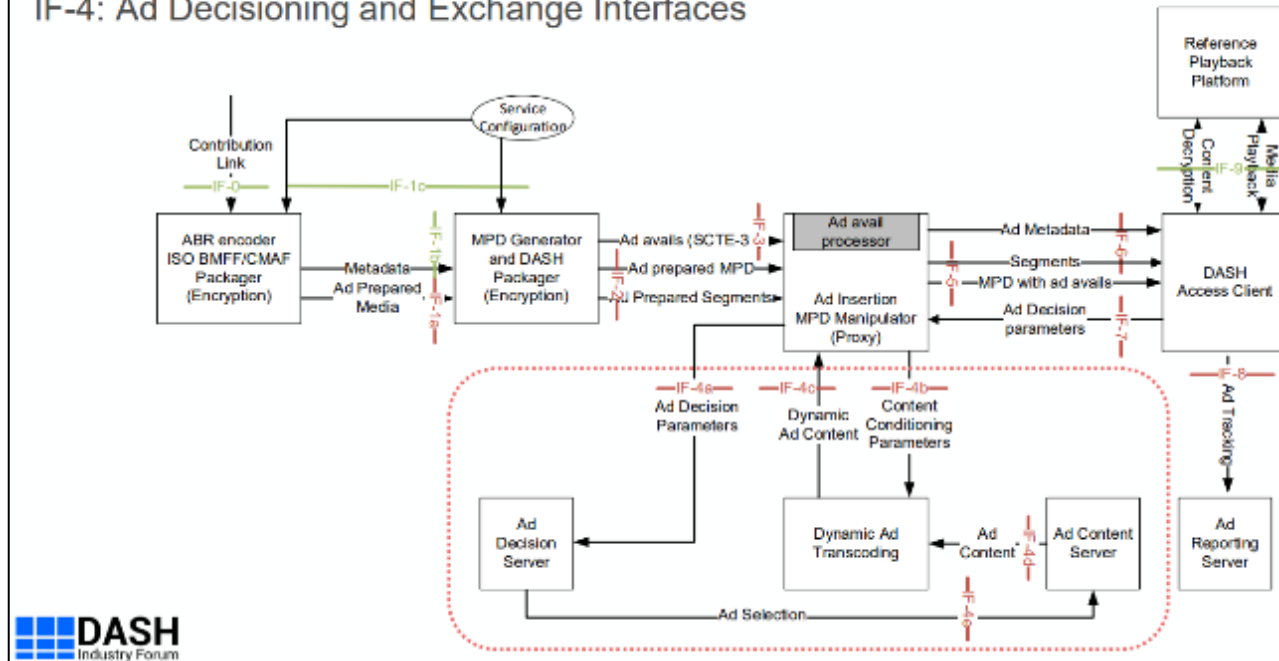


Cava Presentation at 35:33 to 35:58 mark. Consequently, when the DASH Access Client needs an ad replacement (for example, when the user input necessitates an adapted advertisement insertion point), it requests this information by sending Ad Decision parameters to the Ad Insertion MPD Manipulator intersplicer.

Mr. Cava also explained, in the context of IF-4, that the Ad Insertion MPD Manipulator “is the mechanism that communicates with an ad decisioning exchange service that will take parameters for decisioning and internally perform decisioning.”

## DASH-IF Ad Insertion Architecture

### IF-4: Ad Decisioning and Exchange Interfaces



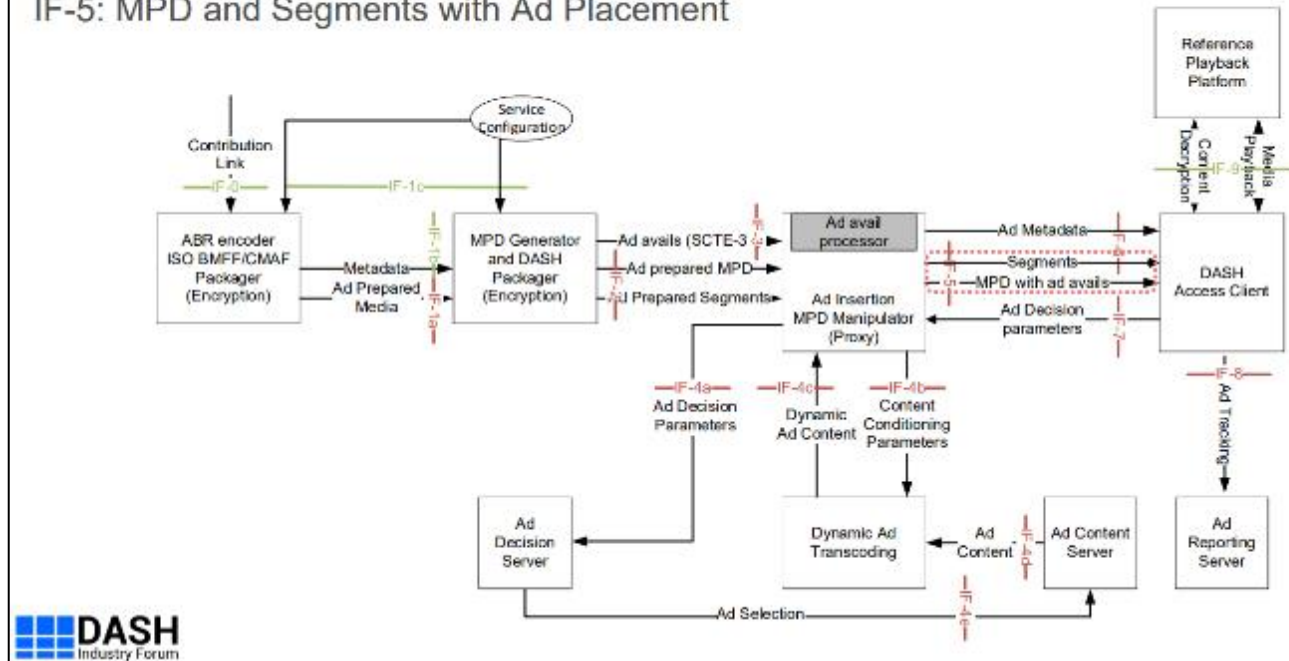
8

[Cava Presentation](#) at 33:33 to 33:55 mark.

Finally, Mr. Cava indicated that, “From there we’ll go ahead and provide well-formed ad insertion content that the MPD Manipulator can go ahead and combine with the original content to produce a[n] interleaved stream of content and advertisements. And this stream is communicated again with a DASH down to the clients.”

## DASH-IF Ad Insertion Architecture

### IF-5: MPD and Segments with Ad Placement



Cava Presentation at 34:00 to 34:25 mark.

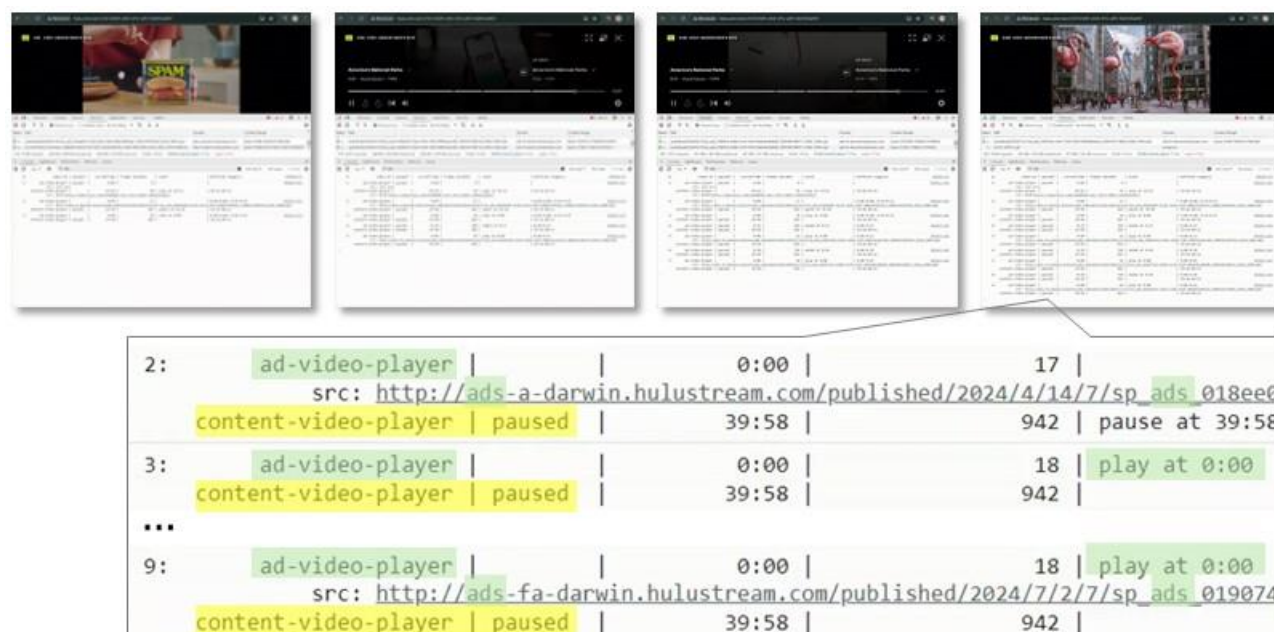
As a result, the Ad Insertion MPD Manipulator intersplicer is configured to change the predetermined advertisement insertion point to the adapted advertisement insertion point by adaptively modifying a presentation position of a predetermined advertisement from the predetermined advertisement insertion point to the adapted advertisement insertion point in the digital media content.

The Hulu user interface confirms that the intersplicer of the Accused Instrumentalities is configured to change the predetermined advertisement insertion point to the adapted advertisement insertion point by adaptively modifying a presentation position of a predetermined advertisement from the predetermined advertisement insertion point to the adapted advertisement insertion point in the digital media content.

For example, in the example shown in [1d.2], when the user does not jump ahead and the player uses the initially sequenced insertion points, the “content-video-player” plays content right up until the ad insertion point (39:58 in the example below), then pauses

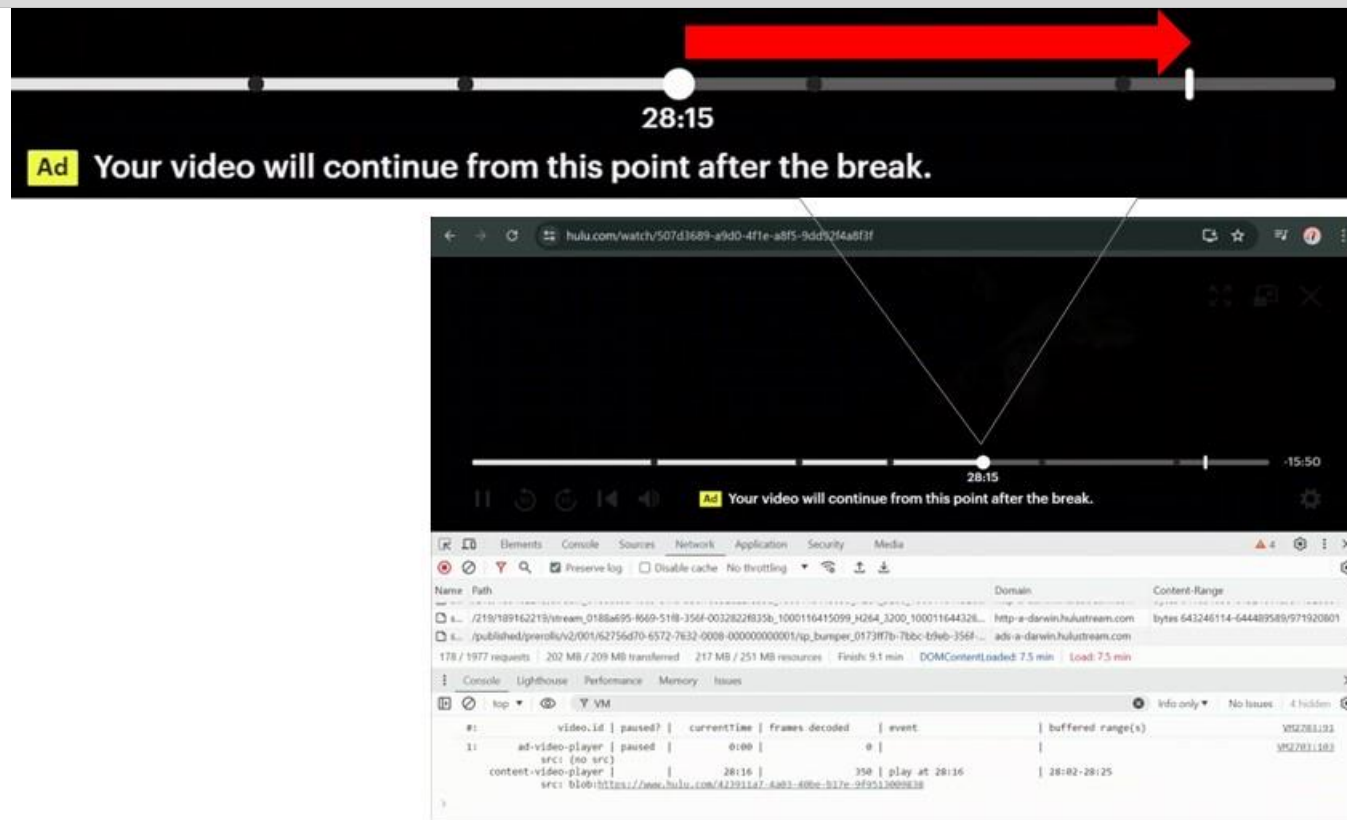
while “ad-video-player” plays advertisements, then resumes. In contrast, when the user skips ahead, the alternatively sequenced insertion points are different relative to the digital media content because, for example, the “content-video-player” plays content only until the user selects a new play position (shortly after the timeline shows 28:15 in the example below), and does not play content in the time range before the initially sequenced insertion point, then pauses while the “ad-video-player” plays advertisements, then plays content from the users’ desired starting point.

In the example below, at event # 2, the “content-video-player” pauses at 39:58, and at event #s 3-9 the “ad-video-player” plays multiple ads while the “content-video-player” remains paused.



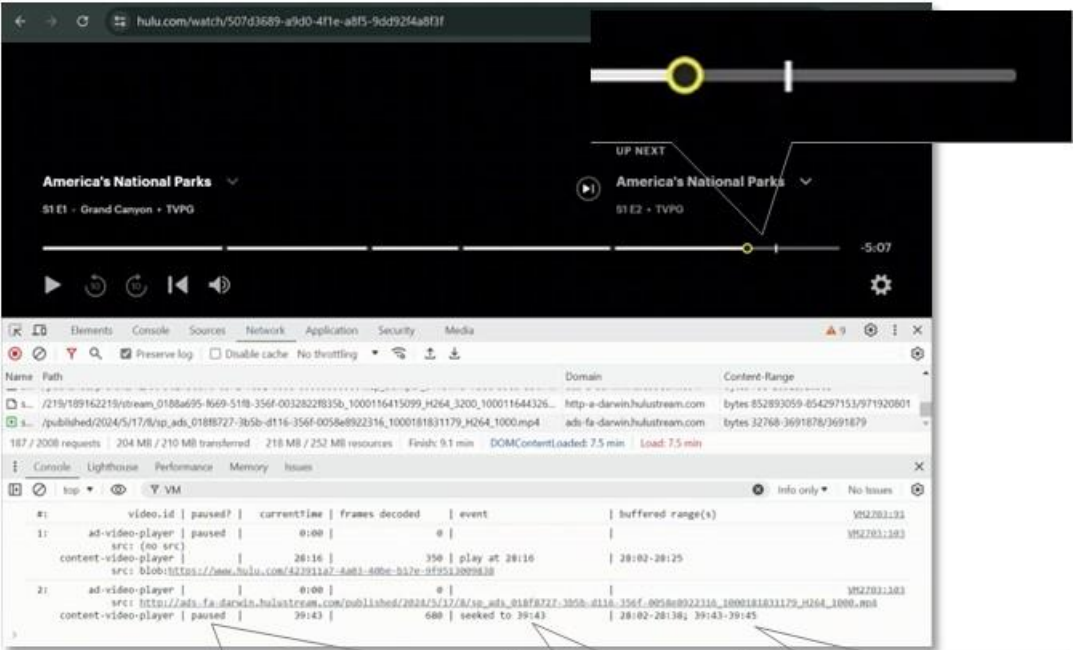
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In contrast, when the user skips ahead, the “content-video-player” does not play content up to the original ad insertion point at 39:58. Instead, at this example, the “content-video-player” plays content up until shortly after 28:15, then pauses.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

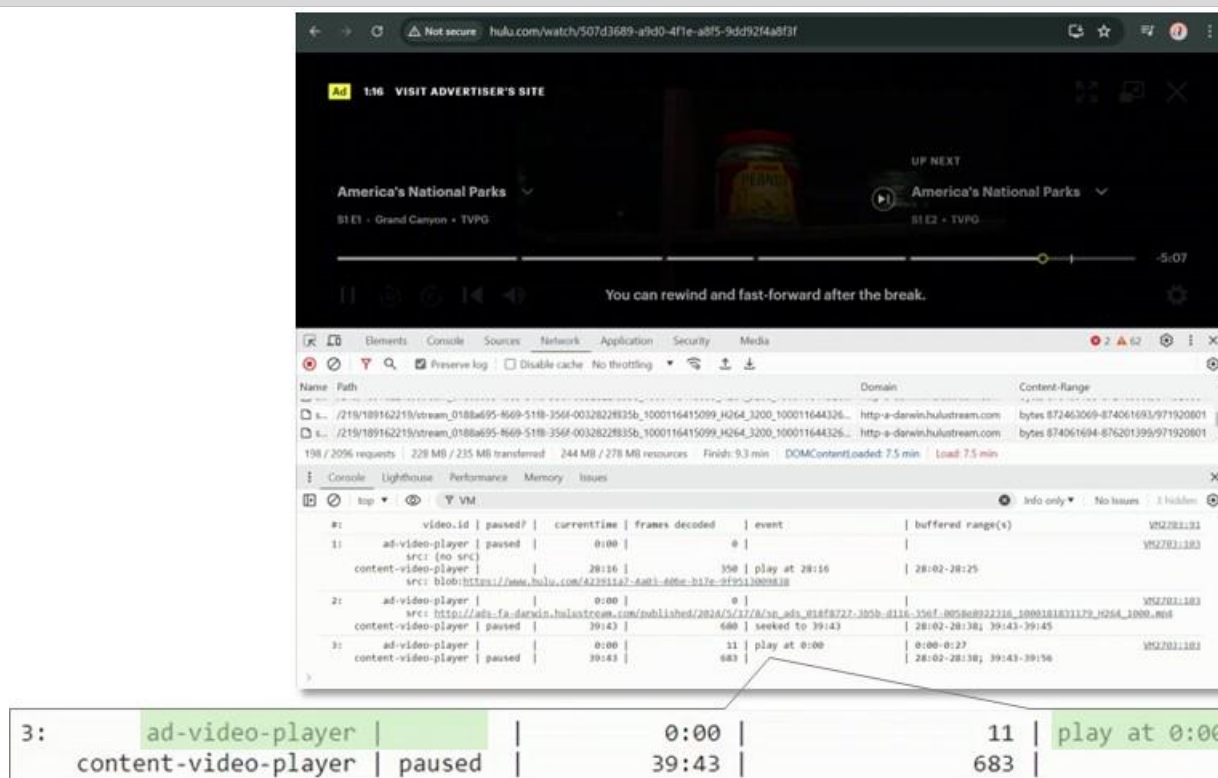
In the example below, at event # 2, the “ad-video-player” is no longer paused, and has a source (“src”) that is an advertisement video file; “content-video-player” has paused, and has jumped ahead (“seeked”) to 39:43, but does not play any content at 39:43.



| #: | video.id                                                                                                                            | paused? | currentTime | event           | buffered range(s)        |
|----|-------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------|--------------------------|
| 1: | ad-video-player                                                                                                                     | paused  | 0:00        |                 |                          |
|    | src: (no src)                                                                                                                       |         |             |                 |                          |
|    | content-video-player                                                                                                                |         | 28:16       | play at 28:16   | 28:02-28:25              |
|    | src: blob:https://www.hulu.com/423911a7-8a01-800e-937e-9f9513009838                                                                 |         |             |                 |                          |
| 2: | ad-video-player                                                                                                                     |         | 0:00        |                 |                          |
|    | src: http://ads-fa-darwin.hulustream.com/published/2024/5/17/8/sp_ads_018f8727_3050-d116-356f-0058e8922316_1000181179_H264_1000.mp4 |         |             |                 |                          |
|    | content-video-player                                                                                                                | paused  | 39:43       | seeked to 39:43 | 28:02-28:38; 39:43-39:45 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

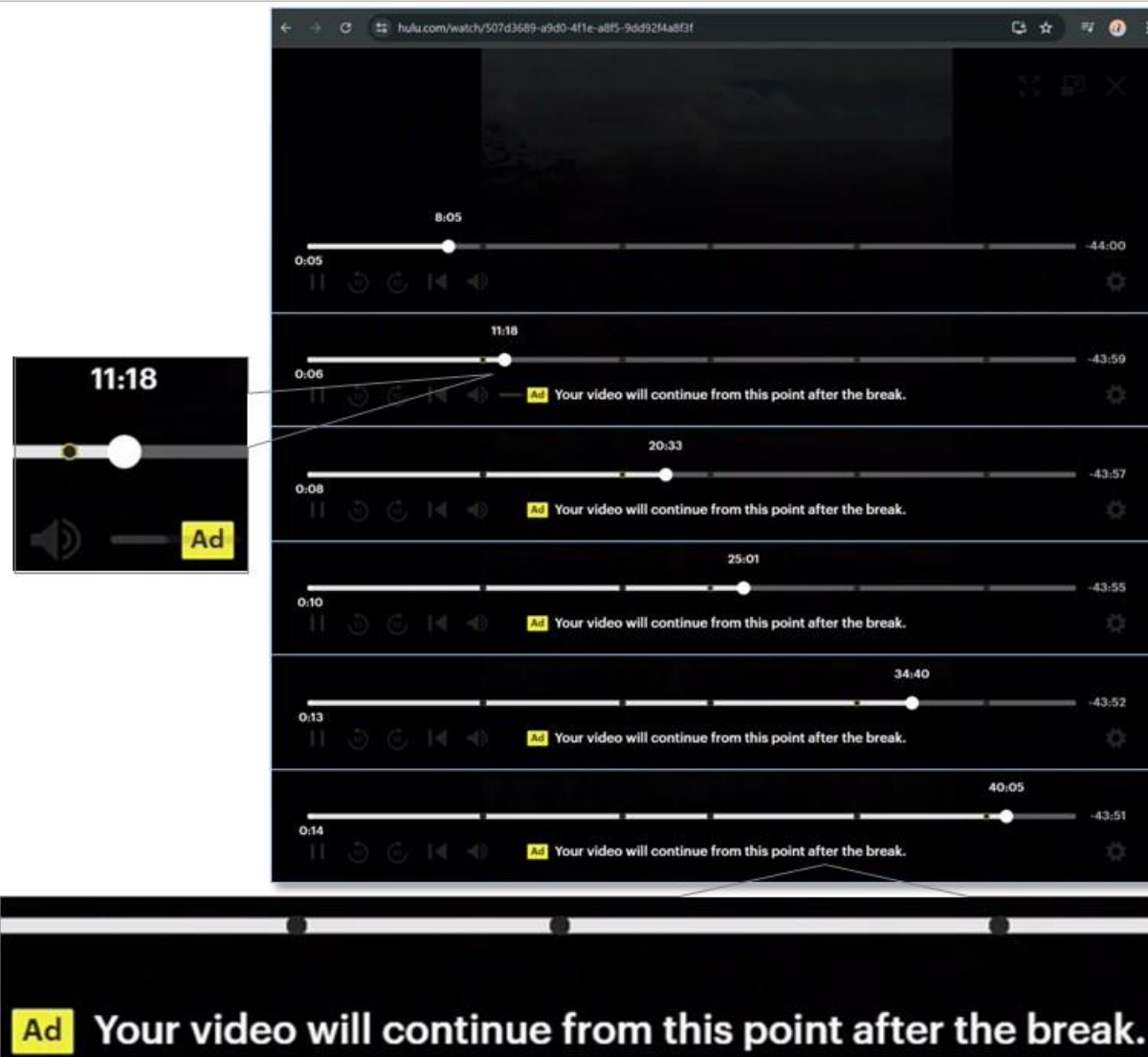
In the example below, at event #3, the “ad-video-player” starts playing an advertisement at 0:00, while the “content-video-player” remains paused.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                     | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[5] The digital media system of claim 1, wherein the adaptive preference rule is based on at least one of a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement.</p> | <p>The adaptive preference rule of the Accused Instrumentalities is based on at least one of a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement.</p> <p>The adaptive preference placement rules of the Accused Instrumentalities can be observed during playback of digital media content on the Hulu user interface.</p> <p>In the example below, Hulu’s adaptive placement preference rules select which of the original ad insertion points will be adjusted for an alternate insertion position based on the media that has been played (an example of “a length of time associated with playing the digital media content”), and a point in time the media is to be played (an example of “content to be played”). Specifically, the preference rules select the original ad insertion point that is both after the current content play position and closest to the end of the content.</p> |

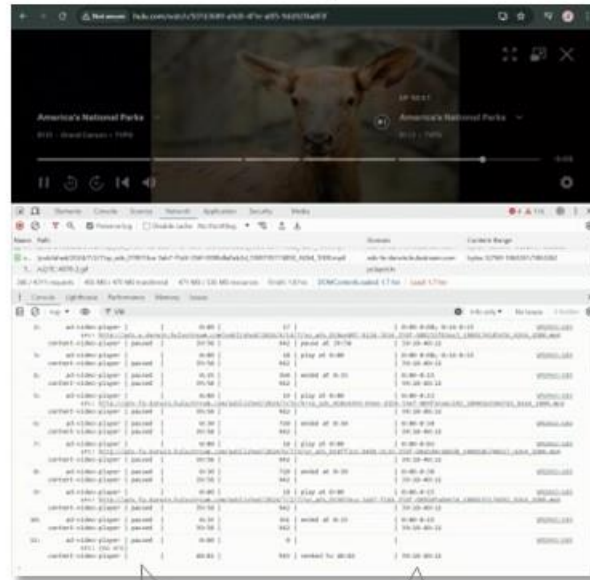


Screenshot of Hulu user interface on web browser, hulu.com.

As shown in [1d.2], changing a predetermined advertisement insertion point result in advertisement files being played immediately after a pre-designated time in the content's timeline (39:58 in the example shown in [1d.2], but the alternatively sequenced insertion

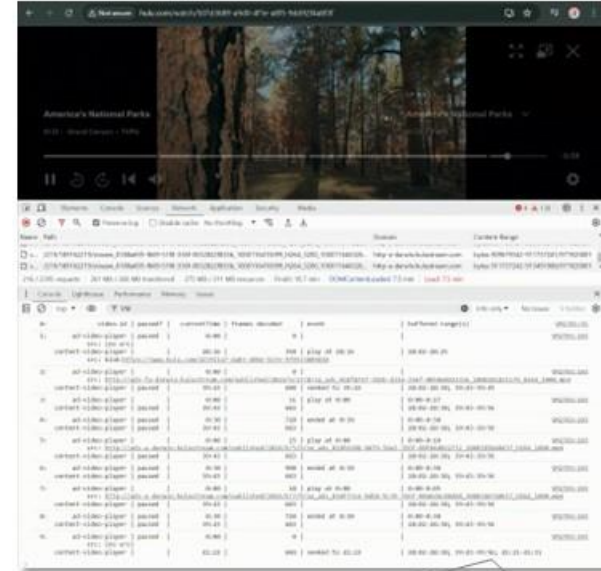
points result in advertisement files being played immediately after a different time in the content's timeline (for example, immediately after the new play position, in the example shown in [1d.2]). *See, e.g.*, [1d.2].

Did not skip ahead



|     |                      |        |                 |             |
|-----|----------------------|--------|-----------------|-------------|
| 10: | ad-video-player      | paused | ended at 0:15   | 0:00-0:15   |
|     | content-video-player | paused |                 | 39:18-40:12 |
| 11: | ad-video-player      | paused |                 |             |
|     | src: (no src)        |        |                 |             |
|     | content-video-player |        | seeked to 40:02 | 39:18-40:12 |

Skipped ahead to 41:22



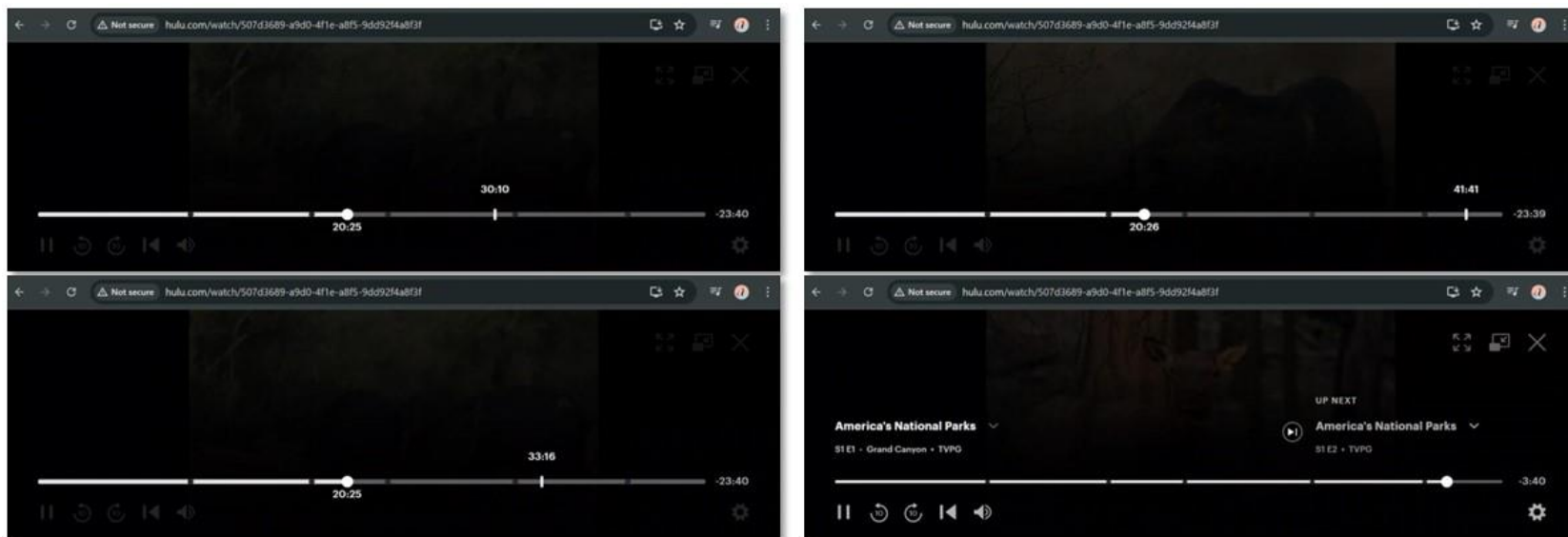
|                 |                                       |
|-----------------|---------------------------------------|
| event           | buffered range(s)                     |
| ...             |                                       |
| ended at 0:30   | 0:00-0:30                             |
|                 | 28:02-28:38; 39:43-39:56              |
| seeked to 41:22 | 28:02-28:38; 39:43-39:56; 41:21-41:31 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

Another adaptive preference rule of the Accused Instrumentalities allows a user to jump an initially sequenced insertion point if the jump is made a few seconds after watching the advertisements from another insertion point (and example of “a number of digital media data blocks played since the previous digital advertisement”). If the user moves the play position from before to after an initially sequenced insertion point, the Hulu user interface requires the user to watch advertisements at the new play position.

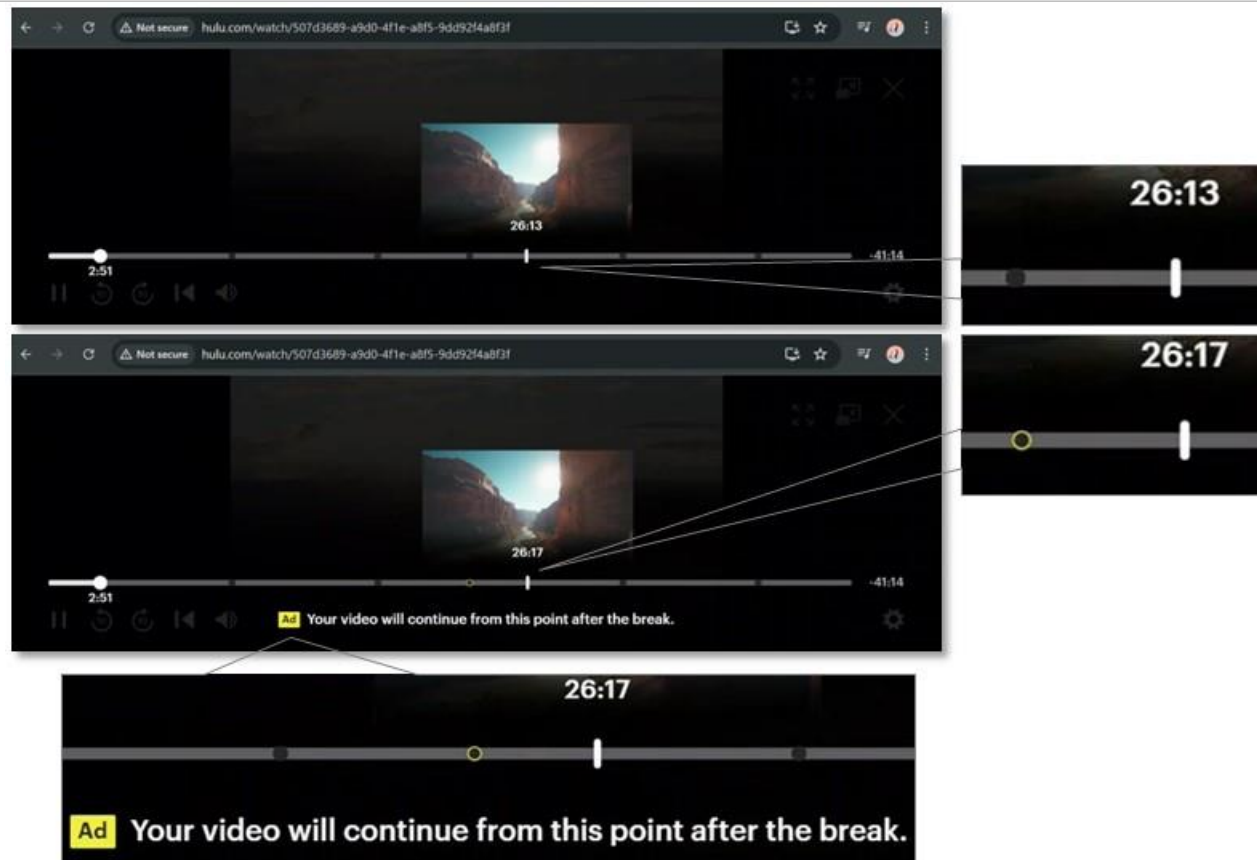
However, if the user, immediately after the block of advertisements ends, jumps past the second initially sequenced insertion point, rather than requiring the user to watch another advertising block, which is usually what happens when a user jumps an insertion point, the Accused Instrumentalities allow the user to continue watching digital media content from the new play position.

In the example below, for a limited time after a user has watched a block of ads, Hulu's adaptive placement preference rules allow a user to jump past an initial ad insertion point without watching additional ads. In the example below, the user is able to jump to anywhere in the content without watching additional ads.



Screenshot of Hulu user interface on web browser, hulu.com.

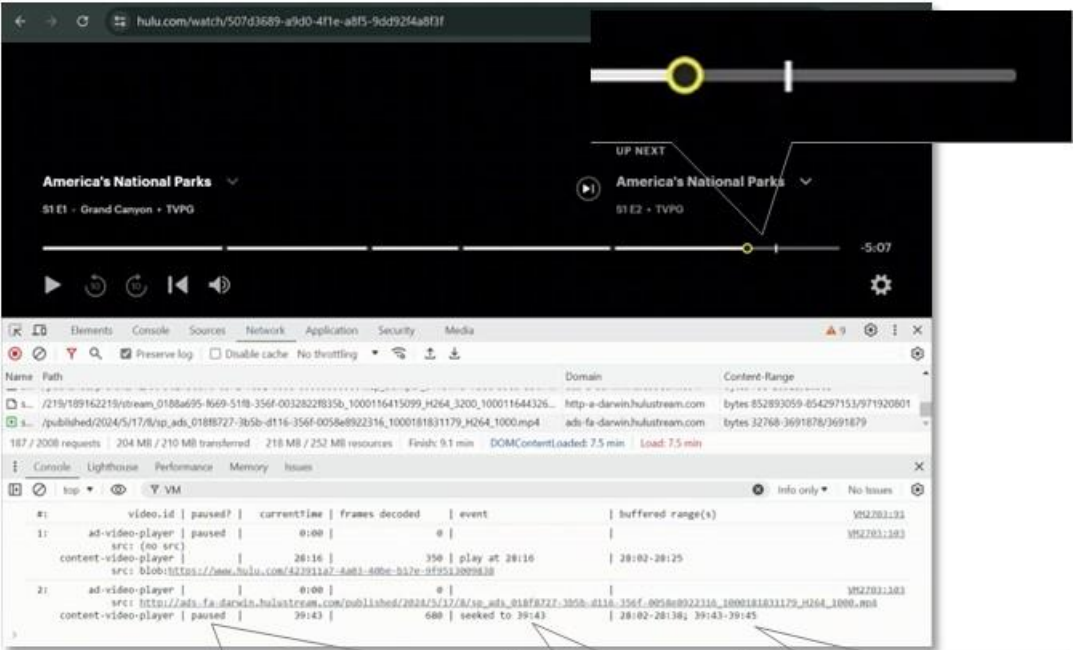
In the example below, the limited time for jumping anywhere in the content without watching additional ads expires. Specifically, it expires between the time the user selected 26:13 in the time bar and the user selected 26:17 in the time bar a moment later. The expiration is flagged by the circle for the ad break becoming yellow and a message appearing with a yellow rectangle highlighting the word “Ad”.



Screenshot of Hulu user interface on web browser, hulu.com.

The intersplicer implemented an adaptive preference rule for the second jump that exempted the user from having to watch another set of ads. This adaptive preference rule is based on the claimed “length of time associated with playing the digital media content,” since a user can only be exempted from watching another advertising block if they make the second jump within a few seconds of finishing the advertising content. Similarly, this adaptive preference rule is based on the claimed “number of digital media data blocks of the digital media content played since the previous digital advertisement,” since a user can only be exempted from watching another set of advertisements if they make the second jump within a few blocks of finishing the advertising content. This adaptive preference rule is based on the claimed “a number of tracks played since a previous digital advertisement,” since a user can only be exempted if the jump is made within a few tracks playing since a previous advertisement.

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                          | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                        | <p>The Accused Instrumentalities determine the alternate insertion position using an adaptive preference placement rules based on one or more of a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement.</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| <p>[6] The digital media system of claim 1, wherein the intersplicer is configured to generate a control signal configured to interrupt a course of presentation of the digital media content with a presentation of the digital advertising content at the adapted advertisement insertion point.</p> | <p>In the Accused Instrumentalities, the intersplicer is configured to generate a control signal configured to interrupt a course of presentation of the digital media content with a presentation of the digital advertising content at the adapted advertisement insertion point. <i>See, e.g.</i>, [1.d.2].</p> <p>For example, a control signal instructs the Hulu client to interrupt the course of presentation of digital media content by pausing the “content-video-player” to pause the content, and making the “ad-video-player” play advertising content instead.</p>                                                                                                                                                                 |



| #: | video.id                                                                                                                               | paused? | currentTime | event           | buffered range(s)        |
|----|----------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------|--------------------------|
| 1: | ad-video-player                                                                                                                        | paused  | 0:00        |                 |                          |
|    | src: (no src)                                                                                                                          |         |             |                 |                          |
|    | content-video-player                                                                                                                   |         | 28:16       | play at 28:16   | 28:02-28:25              |
|    | src: blob:https://www.hulu.com/423911a7-8a01-80be-517e-5f9513009a38                                                                    |         |             |                 |                          |
| 2: | ad-video-player                                                                                                                        |         | 0:00        |                 |                          |
|    | src: http://ads-fa-darwin.hulustream.com/published/2024/5/17/8/sp_ads_018f8727_305b-d116-356f-0058e8922316_1000181831179_H264_1000.mp4 |         |             |                 |                          |
|    | content-video-player                                                                                                                   | paused  | 39:43       | seeked to 39:43 | 28:02-28:38; 39:43-39:45 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

[7] The digital media system of claim 1, wherein the advertisement rotator selects the digital advertising content based on the advertisement requirement that applies to the digital media system.

The advertisement rotator of the Accused Instrumentalities selects the digital advertising content based on the advertisement requirement that applies to the digital media system.

For example, in Figure 1 of the DASH Standard, when the DASH Access Client needs advertising content, it sends Ad Feedback to the Ad Insertion MPD Manipulator intersplicer on IF-7. The Ad Insertion MPD Manipulator intersplicer then sends Ad Decision Parameters, which identify system parameters the new advertising content must satisfy, to the advertisement rotator on IF-4. The advertisement rotator uses the Ad Decision Parameters to determine which advertisements to play on the DASH Access Client. As a result, the advertisement rotator (for example, the Ad Decision Server and related structure) selects the digital advertising content to return to the DASH Access Client based on the advertisement requirements (Ad Decision Parameters) that apply to the digital media system.

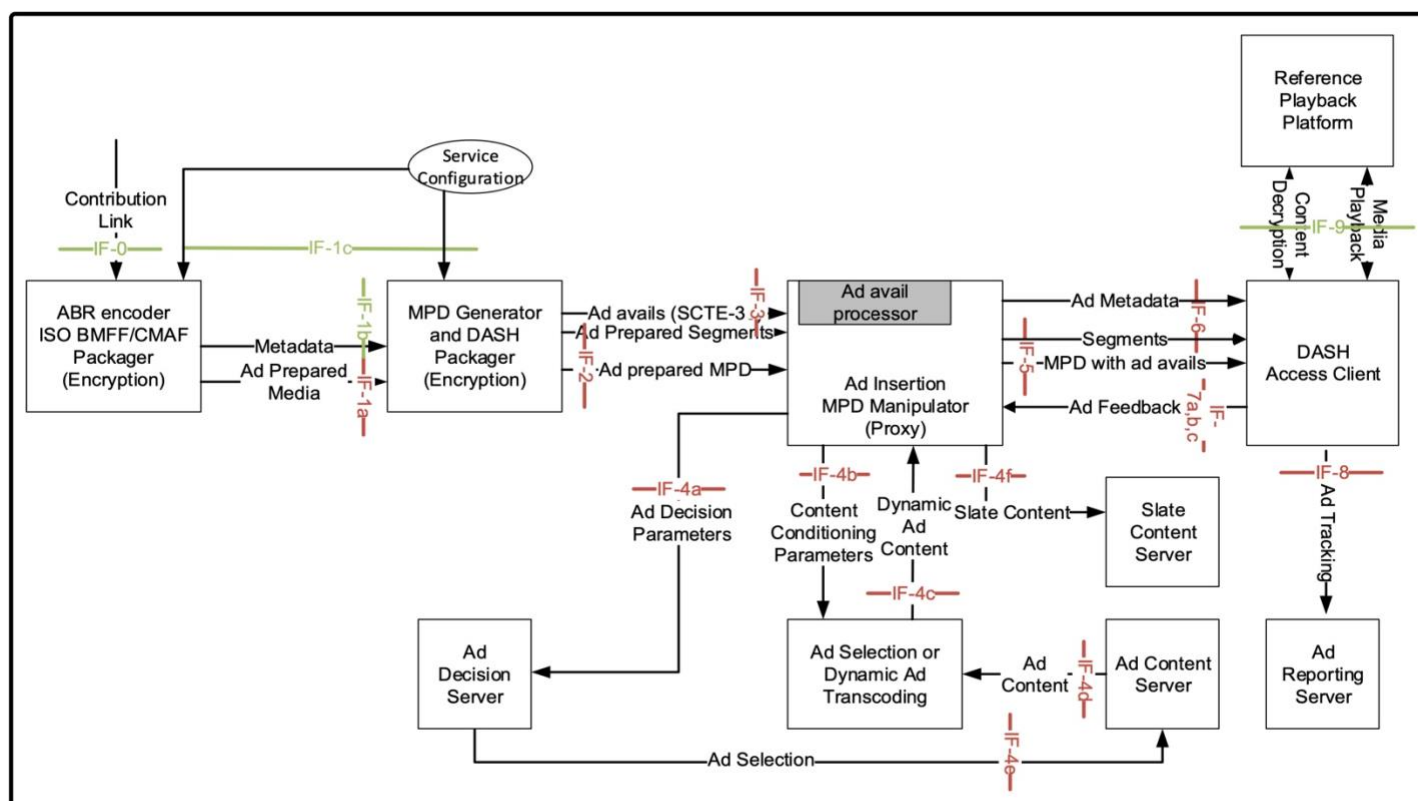


**Figure 1 DASH-IF Ad Insertion Architecture**

[DASH Part 5](#) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

For example, if a user is watching content through the Hulu user interface, and the play position is located before an initially sequenced insertion point, when the user moves the play position to after the insertion point (i.e., attempts to jump the advertisements at the insertion point) the client may send Ad Feedback to the Ad Insertion MPD Manipulator via IF-7. The DASH Standard explains that the Ad Insertion MPD Manipulator may then send Ad Decision Parameters to the Ad Decision Server (via IF-4) to help it decide which advertisements to display.

## 5.6.2 IF-4a: Ad Decision request parameters

### 5.6.2.1 Decisioning Parameters

This document does not specify a specific format, but only discusses some principle approaches. Additional details on specific formats are for further study.

A *decisioning parameter* is a piece of information about the content stream, consumption medium, or end user that is used by the Ad Decisioning Server as part of the advertisement qualification and selection process. The Ad Insertion MPD Manipulator collects and sends this information to the Ad Decisioning Server as part of IF-4a.

DASH Part 5 at § 5.6.2.

When the Ad Decision Server receives Ad Decision Parameters, it selects advertisements to display from a collection of available digital advertising content.

## 5.6 IF-4: Ad Decisioning and Exchange Interfaces

### 5.6.1 Introduction

Information about ad content to insert into a presentation is retrieved from the Ad Decision and Ad Content server(s) via the IF-4 interfaces. The request from the Ad Insertion MPD Manipulator for ad content provides all the information needed to perform ad decisioning, including content metadata and opportunity descriptions. The response is then translated by the Ad Insertion MPD Manipulator into the DASH structures detailed in IF-5.

DASH Part 5 at § 5.6.1, Introduction.

Once the Ad Decision Server identifies which advertisements, the Ad Content Server provides the actual ad content to the Ad Insertion MPD Manipulator. As noted in the above citation, the advertisements are “then translated by the Ad Insertion MPD Manipulator into the DASH structures” sent to the client device for display.

#### 5.6.4.1 Overview

The response of the Ad Decision Server identifies the advertisements decisioned by the server and provides information associated with the advertisement such as general metadata, viewability requirements, media files, mezzanines, and tracking events. The actual ad content is provided by the Ad Content Server, preferably following the DASH-IF Ad Content format as defined in clause 5.6.7. Depending on the decisioning mode, the decision response may optionally contain the placement and ordering of advertisements as well.

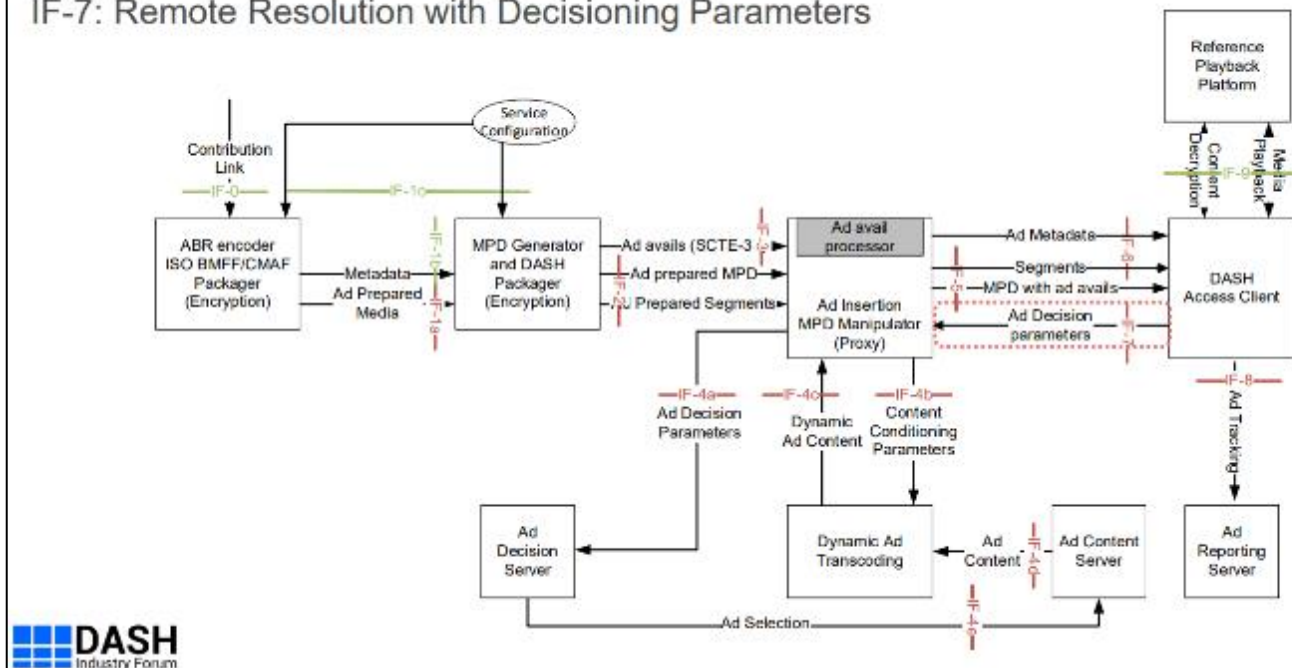
DASH Part 5 at § 5.6.4.1, Overview.

Zachary Cava, Video Platform Architect at Hulu, gave a presentation at the March 31, 2020 DVB World Webinar entitled, “Ad Insertion in Live Content.” [Cava Presentation](#) at the 28:10 mark to the 43:20 mark) (last visited July 7, 2024).

In that presentation, as part of his explanation of IF-7 in the DASH Standard, Mr. Cava stated, “IF-7 is actually part of what we consider the Server Guided Ad Insertion and this is where instead of the MPD Proxy replacing the ads before they reach the client, it’s actually annotating the stream with enough information such that the client can come back to the proxy when it needs that ad replacement to occur and the ad proxy can provide it then with the appropriate information.”

## DASH-IF Ad Insertion Architecture

### IF-7: Remote Resolution with Decisioning Parameters

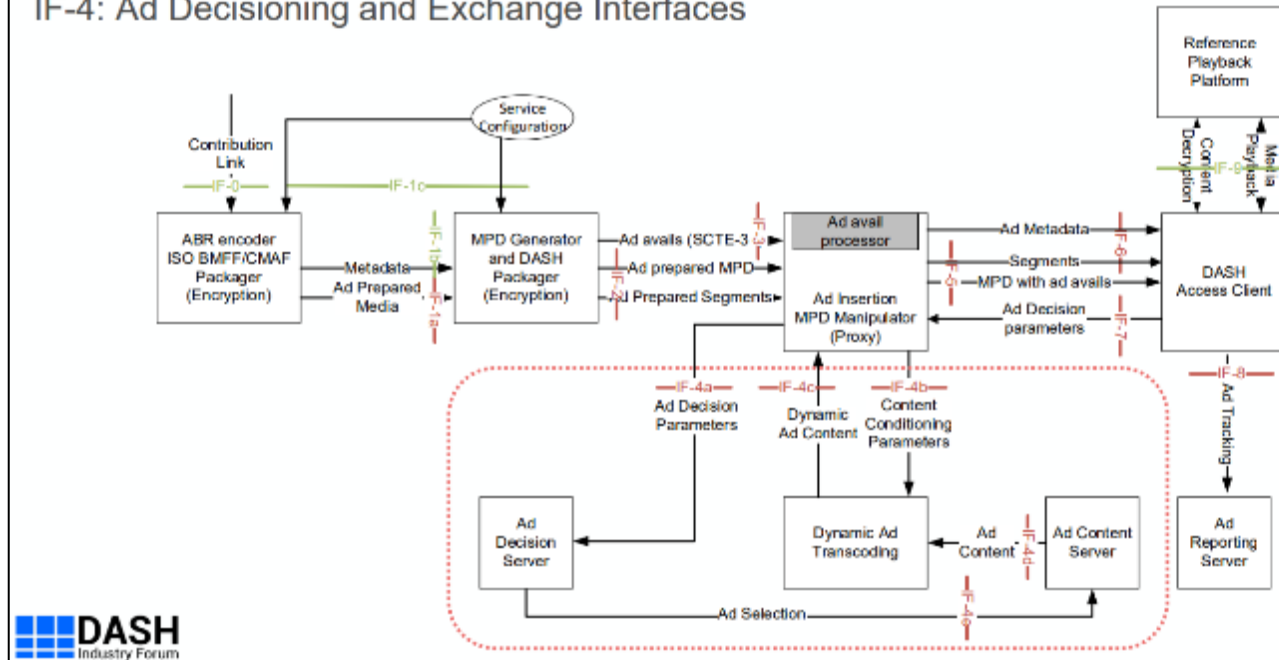


[Cava Presentation](#) at 35:33 to 35:58 mark. Thus, when the DASH Access Client needs an ad replacement, it sends “advertisement requirements that apply to the digital media system” in the form of Ad Decision parameters to the Ad Insertion MPD Manipulator.

Mr. Cava went on to explain, that the Ad Insertion MPD Manipulator “communicates with an ad decisioning exchange service that will take parameters for decisioning and internally perform decisioning.”

# DASH-IF Ad Insertion Architecture

## IF-4: Ad Decisioning and Exchange Interfaces



[Cava Presentation](#) at 33:33 to 33:56 mark. The Ad Insertion MPD Manipulator sends the Ad Decision Parameters advertisement requirements generated by the DASH Access Client on to the advertisement rotator. These Ad Decision Parameters are what the advertisement rotator uses to decide which advertisements to return to the DASH Access Client.

As a result, the Accused Instrumentalities have an advertisement rotator that selects the digital advertising content based on the Ad Decision Parameters advertisement requirement that applies to the digital media system.

Furthermore, the Hulu Help Center, available to users through the Hulu user interface, indicates that the Accused Instrumentalities rotate advertisements based on user preferences. In the screenshot below, the Hulu Help Center indicates that an Ad Selector rotates advertisements shown to a user based on the user's input.



Help Center

Home

Help Topics

Contact Us

## How are ads personalized to me?

There are a number of factors that affect the ads that you are seeing. What you're watching, where you're located, and what you've streamed previously can all help us personalize your ads so they're relevant to you.

Features like Ad Selector (which presents 2-3 different options so you can choose the ad that interests you most) also give viewers control over their experience. Other actions, such as interacting with the ad or pausing your video, can help create a more relevant and personalized experience.

[Hulu Help Center](#)

Another example of the Accused Instrumentalities using an advertisement rotator selects the digital advertising content based on the advertisement requirement that applies to the digital media system, is pod level decisioning, where the client sends requests for advertisement content to the Ad Insertion MPD Manipulator as the content streams. The Ad Insertion MPD sends these requests to the Ad Decision Server which then returns (via the Ad Content Server and Ad Selection or Dynamic Ad Transcoding) the advertisements to be played. In this way, the Accused Instrumentalities rotate advertisements depending on user input.

With *pod level decisioning*, advertisement opportunities are decided just as the DASH client reaches the opportunity within the stream. A SGAI architecture accomplishes by having the Ad Insertion MPD Manipulator use the IF-3 supplied opportunity metadata to generate an IF-5 manifest with a mixture of content and remote entities that represent opportunities. As the client reaches remote entities during playout, the client utilizes IF-7 to return the opportunity metadata to the Ad Insertion MPD Manipulator which then sends the data to the Ad Decision server via IF-4a. The result of the ad decision request will contain advertisements for this single opportunity which the Ad Insertion MPD Manipulator transforms into an IF-7 response for the client to consume.

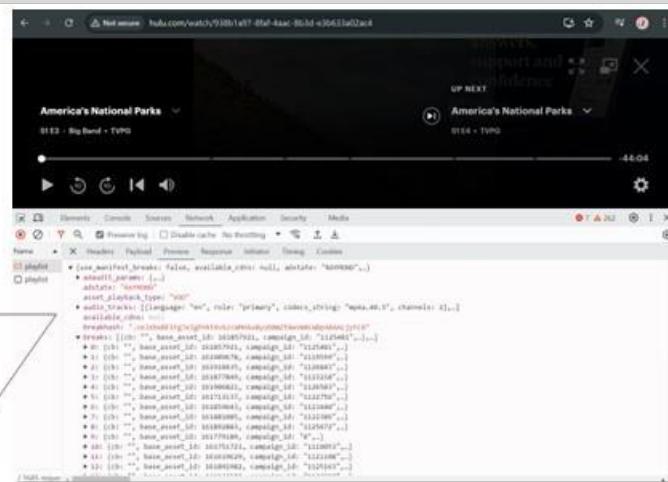
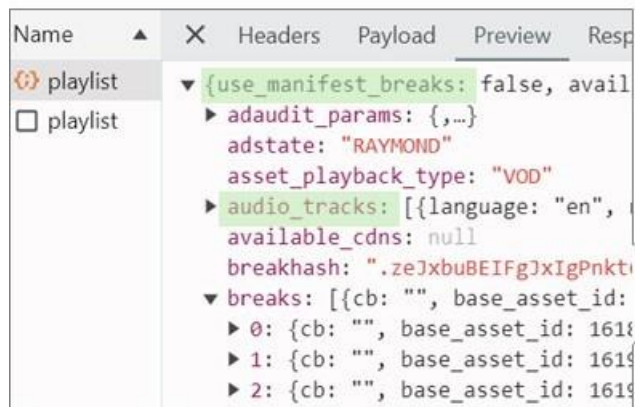
After a DASH client receives a stream produced from an SGAI architecture, the stream can continue to change for the duration of the playback session, e.g. the advertisements can be re-decided should the user choose to rewind the stream.

DASH Part 5 at § 5.6.2.2.

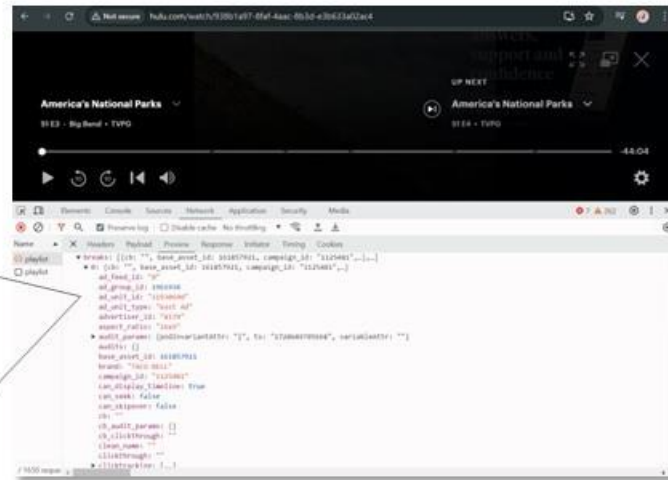
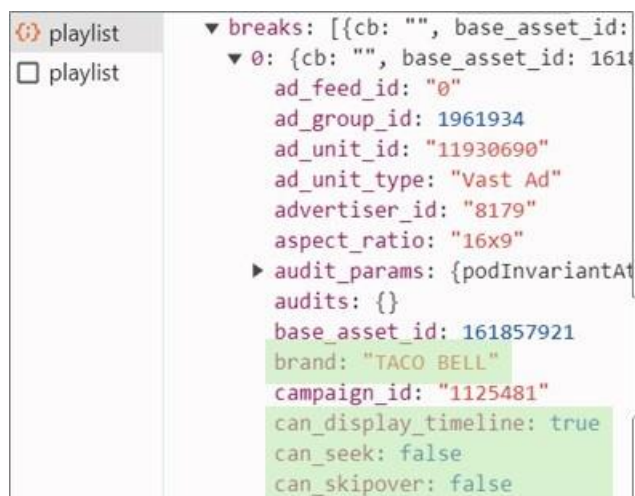
For example, the Hulu client receives a “manifest” and “playlist” that each include advertising requirements that apply to the digital media system, including particular content and advertisements presented in the digital media system.

For example, the Hulu client retrieves a “playlist” that includes information about the content to be played, advertisements to be played, and advertisement requirements such as whether the ad can be skipped.

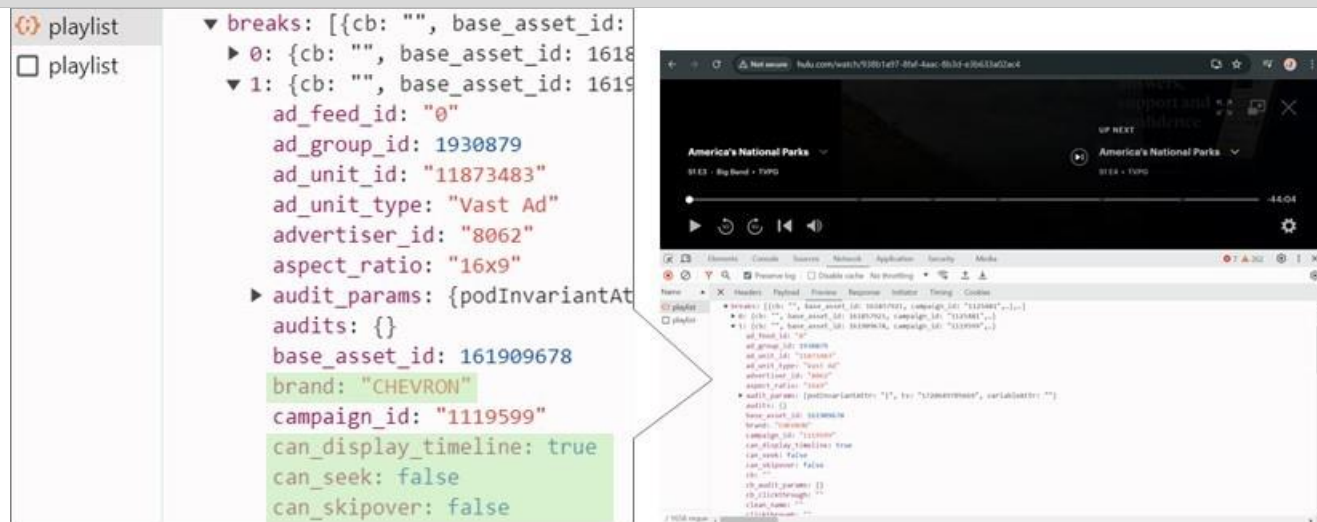
In the example below, the “playlist” includes video metadata including multiple items in “video\_metadata,” what audio tracks are available for the video file, whether to “use\_manifest\_breaks”, the time for each initial advertisement insertion point, and a “breaks” section that includes information about advertisements, including advertisement requirements for each advertisement (e.g., whether the ad can be skipped).



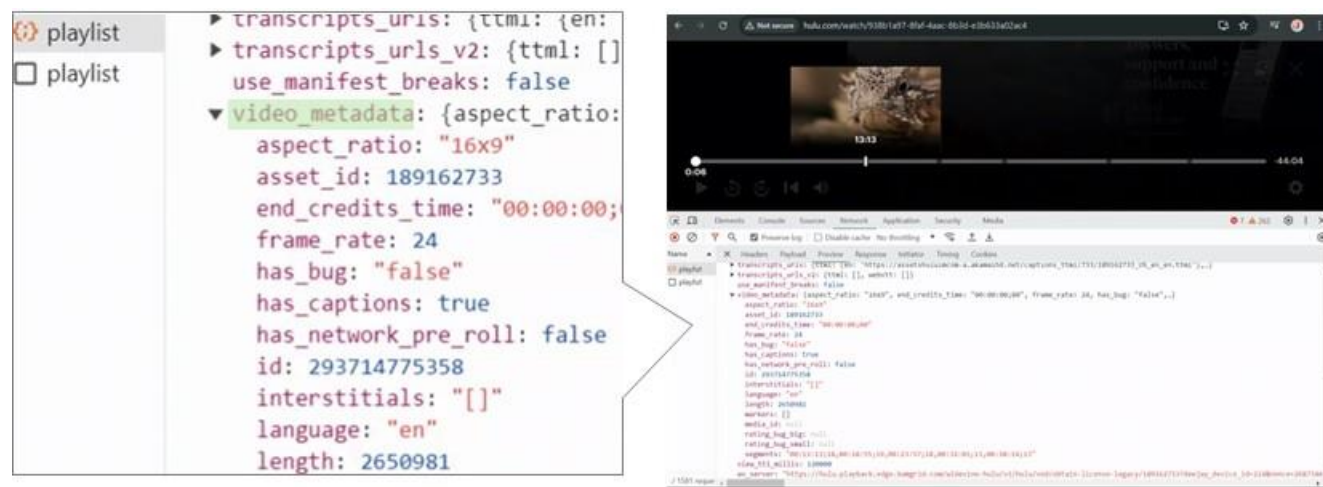
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.



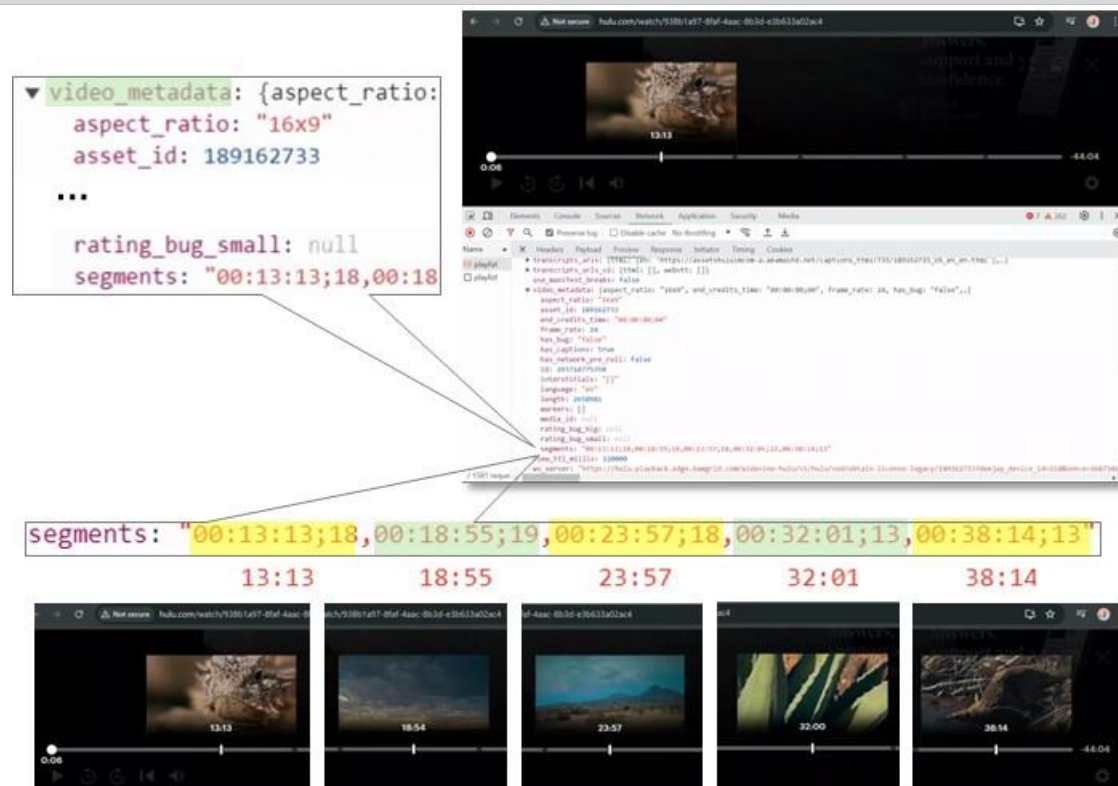
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.

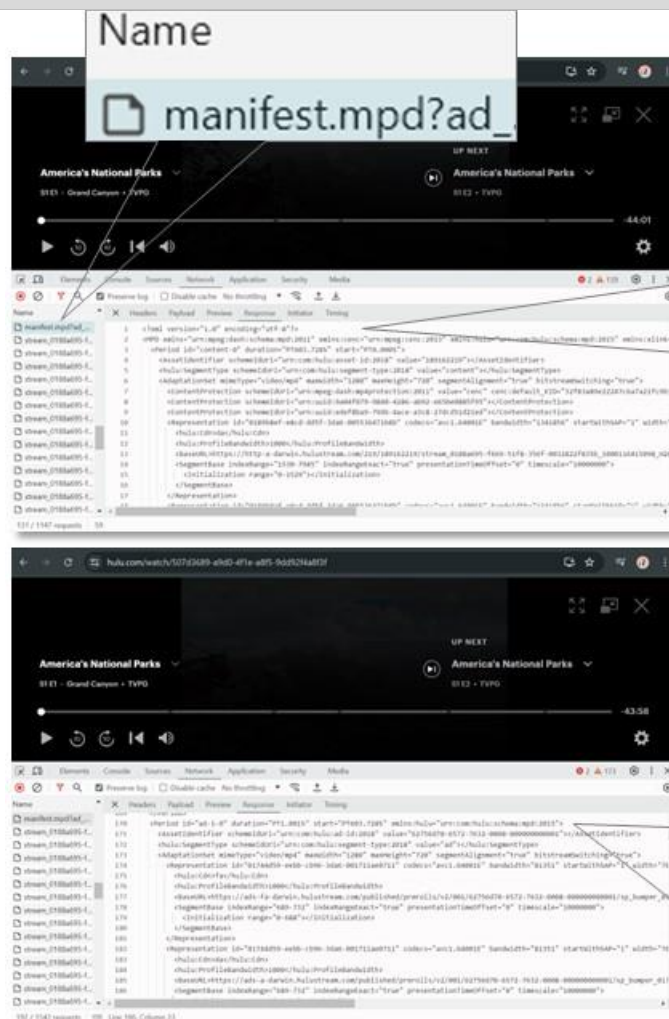


Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.

As another example, the Hulu client retrieves a manifest that includes information about content to be played, and information about advertisements including advertising requirements.



```

X Headers Payload Preview Response Initiator Timing
1  <?xml version="1.0" encoding="utf-8"?>
2  <MPD xmlns="urn:mpeg:dash:schema:mpd:2011" xmlns:cenc="u
3    <Period id="content-0" duration="PT603.728S" start="PT
4    <AssetIdentifier schemeIdUri="urn:com:hulu:asset-id:
5    <hulu:SegmentType schemeIdUri="urn:com:hulu:segment-
6    <AdaptationSet mimeType="video/mp4" maxWidth="1280"
7    <ContentProtection schemeIdUri="urn:mpeg:dash:mp4p

```

```

X Headers Payload Preview Response Initiator Timing
109  </Period>
170  <Period id="ad-1-0" duration="PT1.001S" start="PT603.7
171  <AssetIdentifier schemeIdUri="urn:com:hulu:ad-id:20
172  <hulu:SegmentType schemeIdUri="urn:com:hulu:segment-
173  <AdaptationSet mimeType="video/mp4" maxWidth="1280"
174  <Representation id="01744d59-eebb-cb96-3da6-00171
175  <hulu:Cdn>fac</hulu:Cdn>
176  <hulu:ProfileBandwidth>1000</hulu:ProfileBandwid
177  <BaseURL>https://ads-fa-darwin.hulustream.com/p
178  <SegmentBase indexRange="689-732" indexRangeExa

```

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

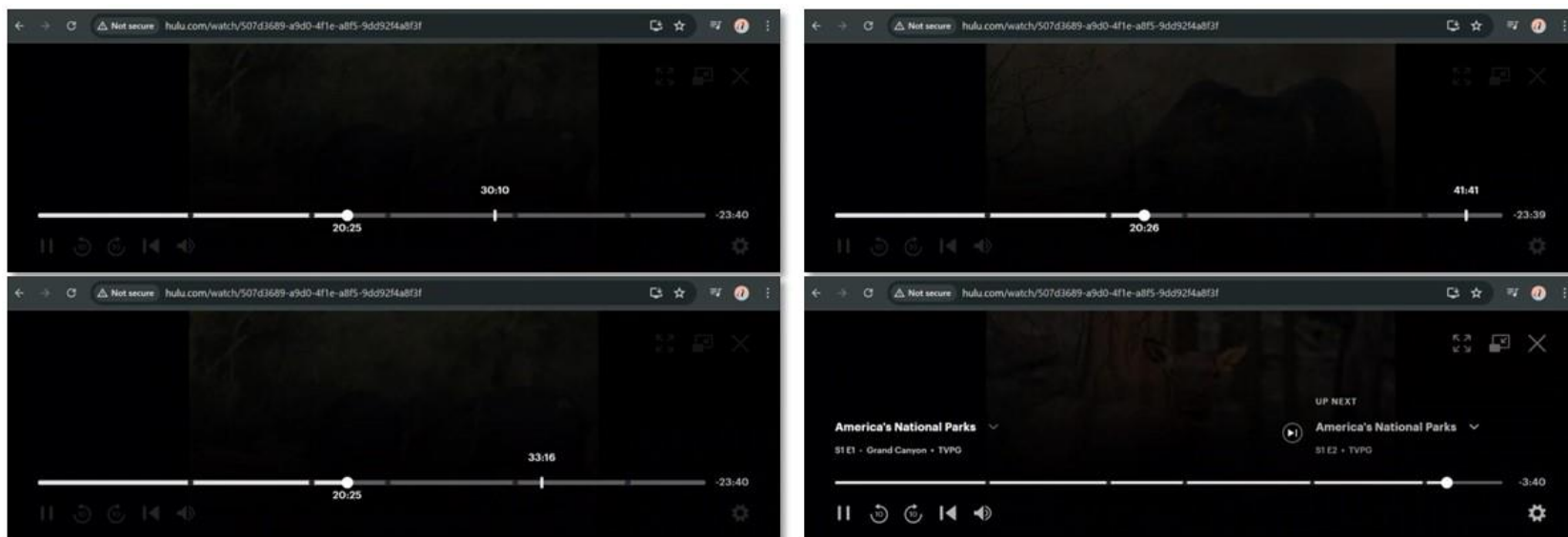
**U.S. Patent No.  
11,463,768**

[8] The digital media system of claim 1, wherein the intersplicer eliminates the advertisement requirement, in response to presenting the digital advertising content at the adapted insertion point of digital advertising content.

**Hulu**

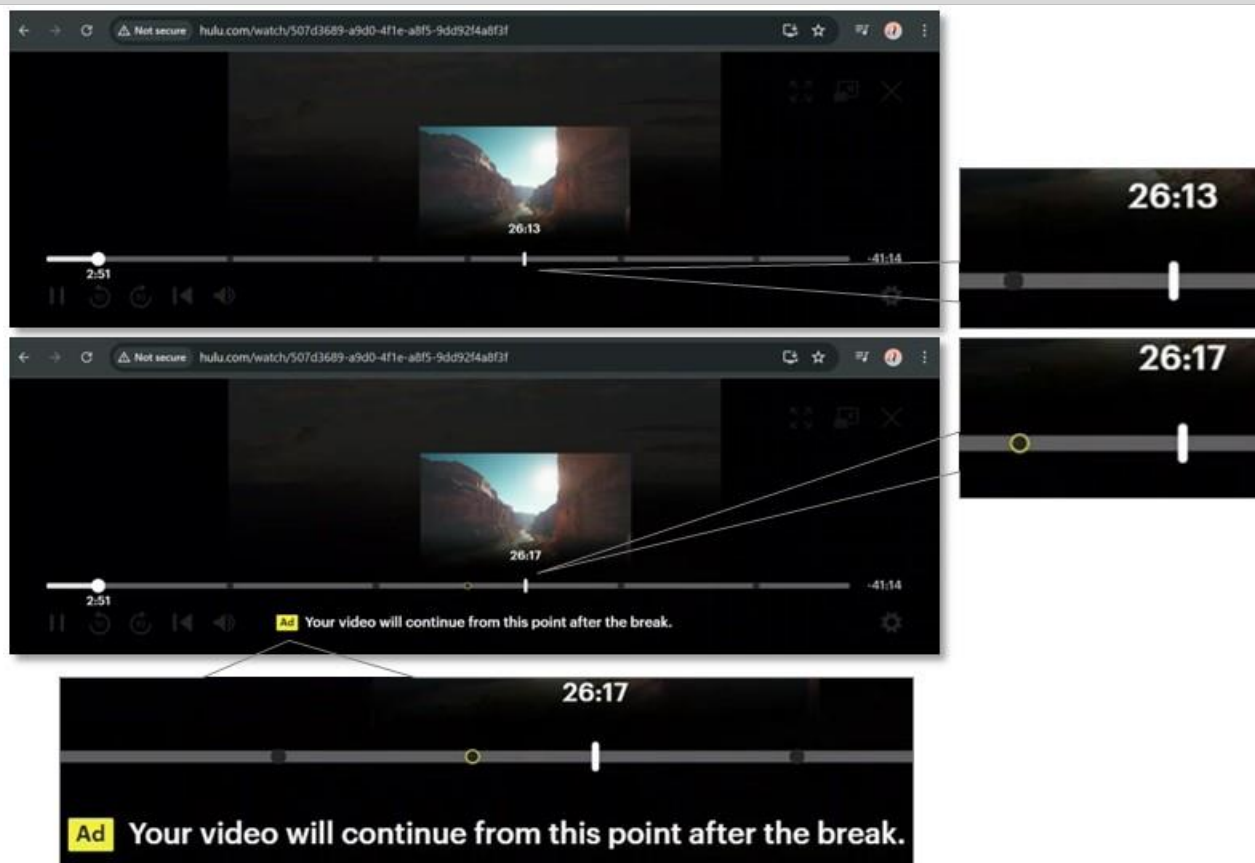
The intersplicer of the Accused Instrumentalities eliminates the advertisement requirement, in response to presenting the digital advertising content at the adapted insertion point of digital advertising content.

For example, in the example below, for a limited time after a user has watched a block of ads, Hulu's adaptive placement preference rules allow a user to jump past an initial ad insertion point without watching additional ads. In the example below, the user is able to jump to anywhere in the content without watching additional ads.



Screenshot of Hulu user interface on web browser, hulu.com.

In the example below, the limited time for jumping anywhere in the content without watching additional ads expires. Specifically, it expired between the time the user selected 26:13 in the time bar and the user selected 26:17 in the time bar a moment later.



Screenshot of Hulu user interface on web browser, hulu.com.

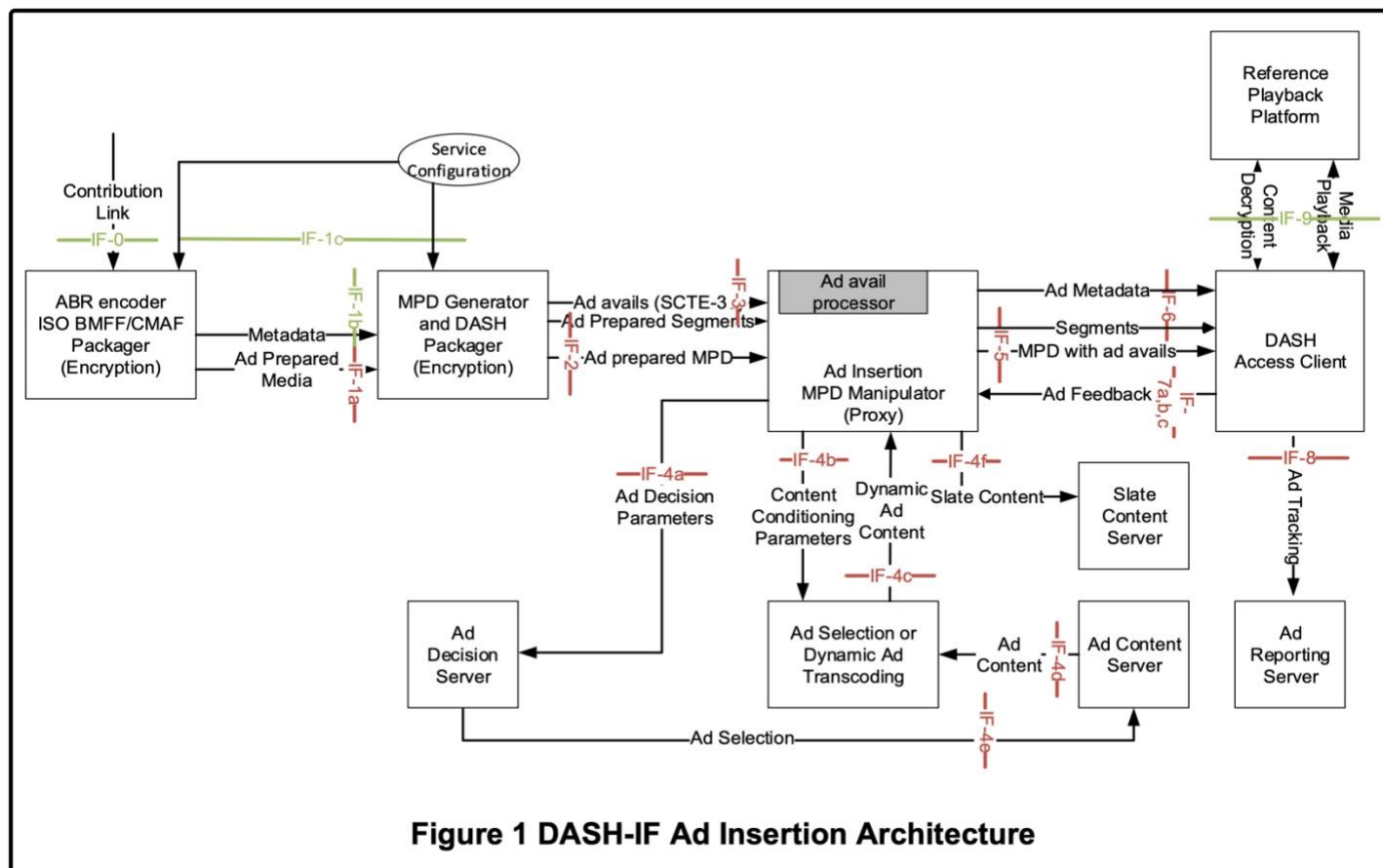
The intersplicer eliminated the advertisement requirement that the user watch a second set of advertisements because they made the second jump within a few seconds of watching the first set of advertisements. As a result, the intersplicer of the Accused Instrumentalities eliminates the advertisement requirement, in response to presenting the digital advertising content at the adapted insertion point of digital advertising content.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

[9] The digital media system of claim 2, wherein the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point, and wherein the advertisement rotator is configured to manage one or more requests to replace the predetermined advertisement.

In the Accused Instrumentalities, the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point, and the advertisement rotator is configured to manage one or more requests to replace the predetermined advertisement.

For example, in Figure 1 of the DASH Standard, the Ad Insertion MPD Manipulator intersplicer sends “Segments” and “MPD with ad avails” to the DASH Access Client on IF-5. By sending this information to the DASH Access Client, the Ad Insertion MPD Manipulator intersplicer prescribes when and how the predetermined advertisements will be shown at the predetermined advertisement insertion point.



[DASH Part 5](#) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

Figure 1 of the DASH Standard also demonstrates how the advertisement rotator is configured to manage one or more requests to replace the predetermined advertisement. For example, if a user is watching content through the Hulu user interface, and the play position is located before a predetermined advertisement insertion point, when the user moves the play position to after the insertion point (i.e., attempts to jump the advertisements at the insertion point) the client may send Ad Feedback to the Ad Insertion MPD Manipulator intersplicer via IF-7. The DASH Standard explains that the Ad Insertion MPD Manipulator may then send Ad Decision Parameters to the advertisement rotator (via IF-4) to help it decide which advertisements to return in response to the request from the DASH Access Client.

## 5.6.2 IF-4a: Ad Decision request parameters

### 5.6.2.1 Decisioning Parameters

This document does not specify a specific format, but only discusses some principle approaches. Additional details on specific formats are for further study.

A *decisioning parameter* is a piece of information about the content stream, consumption medium, or end user that is used by the Ad Decisioning Server as part of the advertisement qualification and selection process. The Ad Insertion MPD Manipulator collects and sends this information to the Ad Decisioning Server as part of IF-4a.

DASH Part 5 at § 5.6.2.

When the Ad Decision Server receives Ad Decision Parameters, it selects advertisements to display from a collection of available digital advertising content.

## 5.6 IF-4: Ad Decisioning and Exchange Interfaces

### 5.6.1 Introduction

Information about ad content to insert into a presentation is retrieved from the Ad Decision and Ad Content server(s) via the IF-4 interfaces. The request from the Ad Insertion MPD Manipulator for ad content provides all the information needed to perform ad decisioning, including content metadata and opportunity descriptions. The response is then translated by the Ad Insertion MPD Manipulator into the DASH structures detailed in IF-5.

DASH Part 5 at § 5.6.1, Introduction.

Once the Ad Decision Server identifies which advertisements, the Ad Content Server provides the actual ad content to the Ad Insertion MPD Manipulator. As noted in the above citation, the advertisements are “then translated by the Ad Insertion MPD Manipulator into the DASH structures” sent to the client device for display.

#### 5.6.4.1 Overview

The response of the Ad Decision Server identifies the advertisements decisioned by the server and provides information associated with the advertisement such as general metadata, viewability requirements, media files, mezzanines, and tracking events. The actual ad content is provided by the Ad Content Server, preferably following the DASH-IF Ad Content format as defined in clause 5.6.7. Depending on the decisioning mode, the decision response may optionally contain the placement and ordering of advertisements as well.

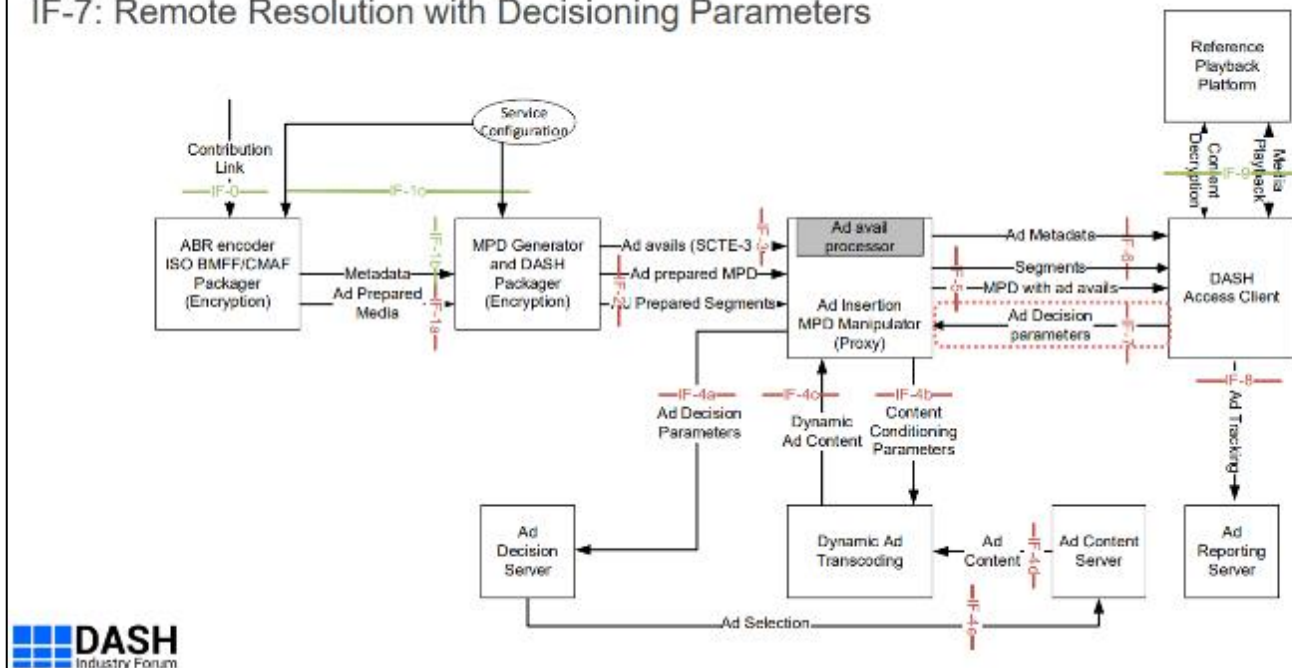
DASH Part 5 at § 5.6.4.1, Overview.

Zachary Cava, Video Platform Architect at Hulu, gave a presentation at the March 31, 2020 DVB World Webinar entitled, “Ad Insertion in Live Content.” [Cava Presentation](#) at the 28:10 mark to the 43:20 mark) (last visited July 7, 2024).

In that presentation, as part of his explanation of IF-7 in the DASH Standard, Mr. Cava stated, “IF-7 is actually part of what we consider the Server Guided Ad Insertion and this is where instead of the MPD Proxy replacing the ads before they reach the client, it’s actually annotating the stream with enough information such that the client can come back to the proxy when it needs that ad replacement to occur and the ad proxy can provide it then with the appropriate information.”

## DASH-IF Ad Insertion Architecture

### IF-7: Remote Resolution with Decisioning Parameters

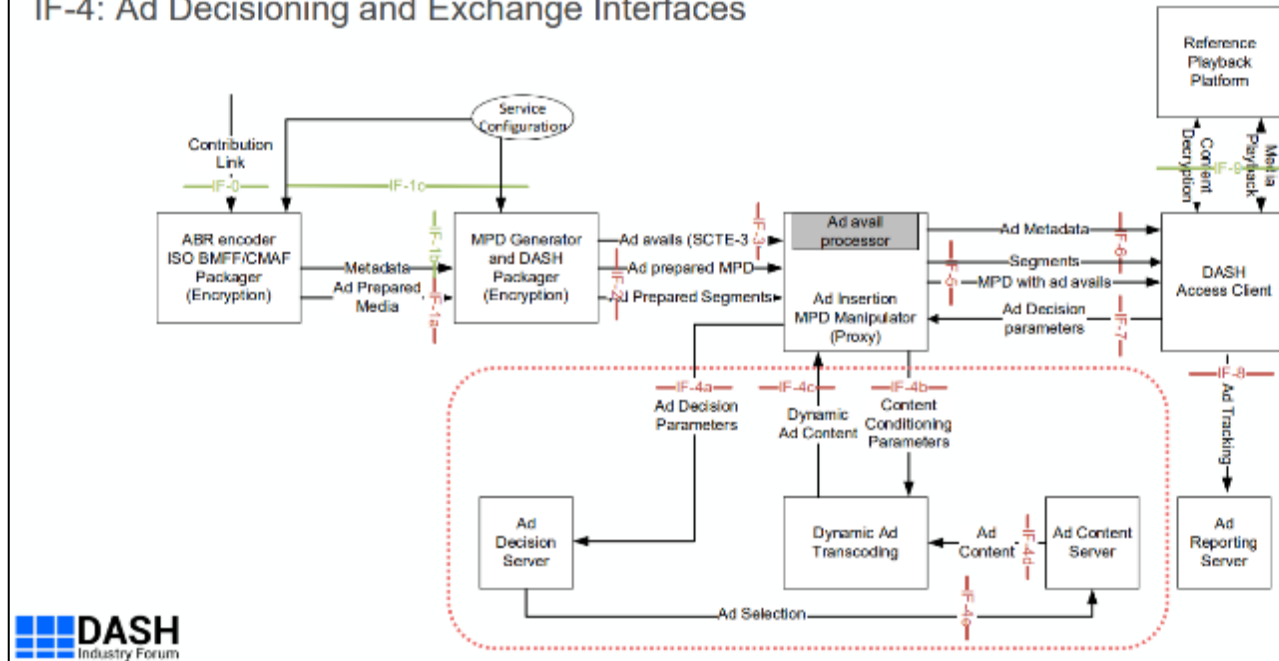


Cava Presentation at 35:33 to 35:58 mark. Thus, when the DASH Access Client needs an ad replacement, it sends “advertisement requirements that apply to the digital media system” in the form of Ad Decision parameters to the Ad Insertion MPD Manipulator.

Mr. Cava went on to explain, that the Ad Insertion MPD Manipulator “communicates with an ad decisioning exchange service that will take parameters for decisioning and internally perform decisioning.”

# DASH-IF Ad Insertion Architecture

## IF-4: Ad Decisioning and Exchange Interfaces



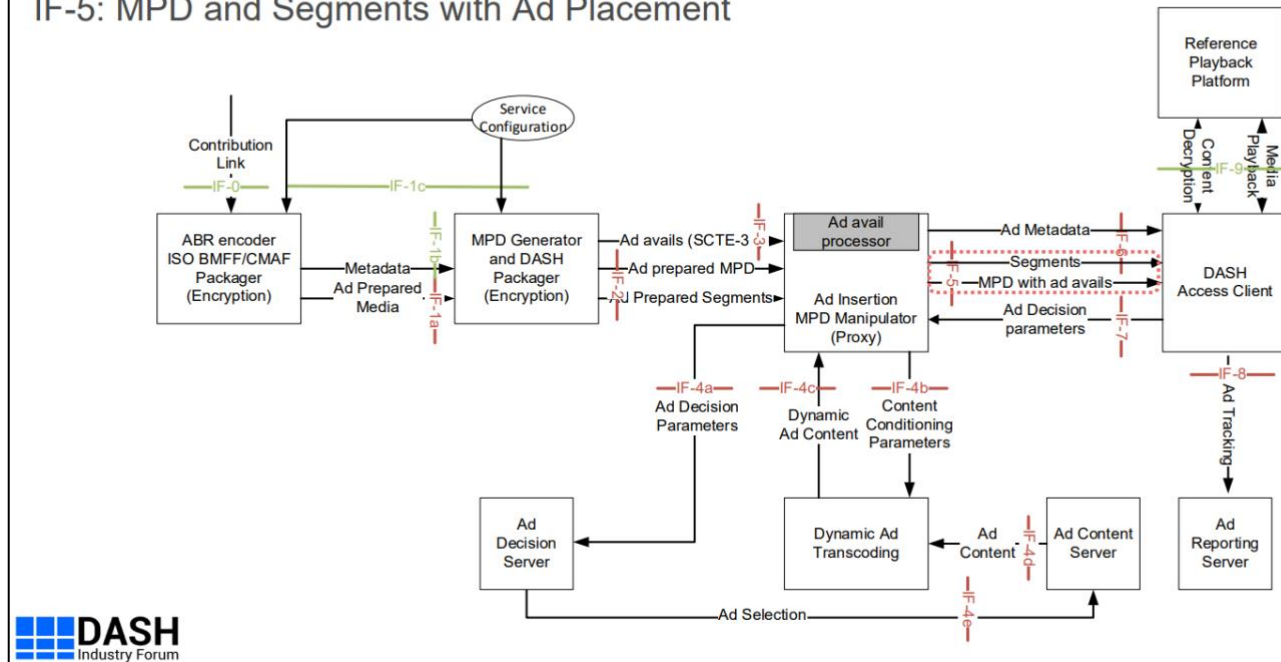
8

Cava Presentation at 33:33 to 33:56 mark. The Ad Insertion MPD Manipulator sends the Ad Decision Parameters advertisement requirements generated by the DASH Access Client on to the advertisement rotator. These Ad Decision Parameters are what the advertisement rotator uses to decide which advertisements to return to the DASH Access Client.

Finally, Mr. Cava explained, in the context of IF-5, “From there we’ll go ahead and provide well-formed ad insertion content that the MPD Manipulator can go ahead and combine with the original content to produce a[n] interleaved stream of content and advertisements. And this stream is communicated again with a DASH down to the clients.”

## DASH-IF Ad Insertion Architecture

### IF-5: MPD and Segments with Ad Placement



Cava Presentation at 34:00 to 34:25 mark. Thus, the advertisement rotator is configured to manage one or more requests to replace the predetermined advertisement by the DASH Access Client.

Furthermore, the Hulu Help Center, available to users through the Hulu user interface, indicates that the Accused Instrumentalities rotate advertisements based on user preferences. In the screenshot below, the Hulu Help Center indicates that an Ad Selector rotates advertisements shown to a user based on the user's input.



Help Center

Home

Help Topics

Contact Us

## How are ads personalized to me?

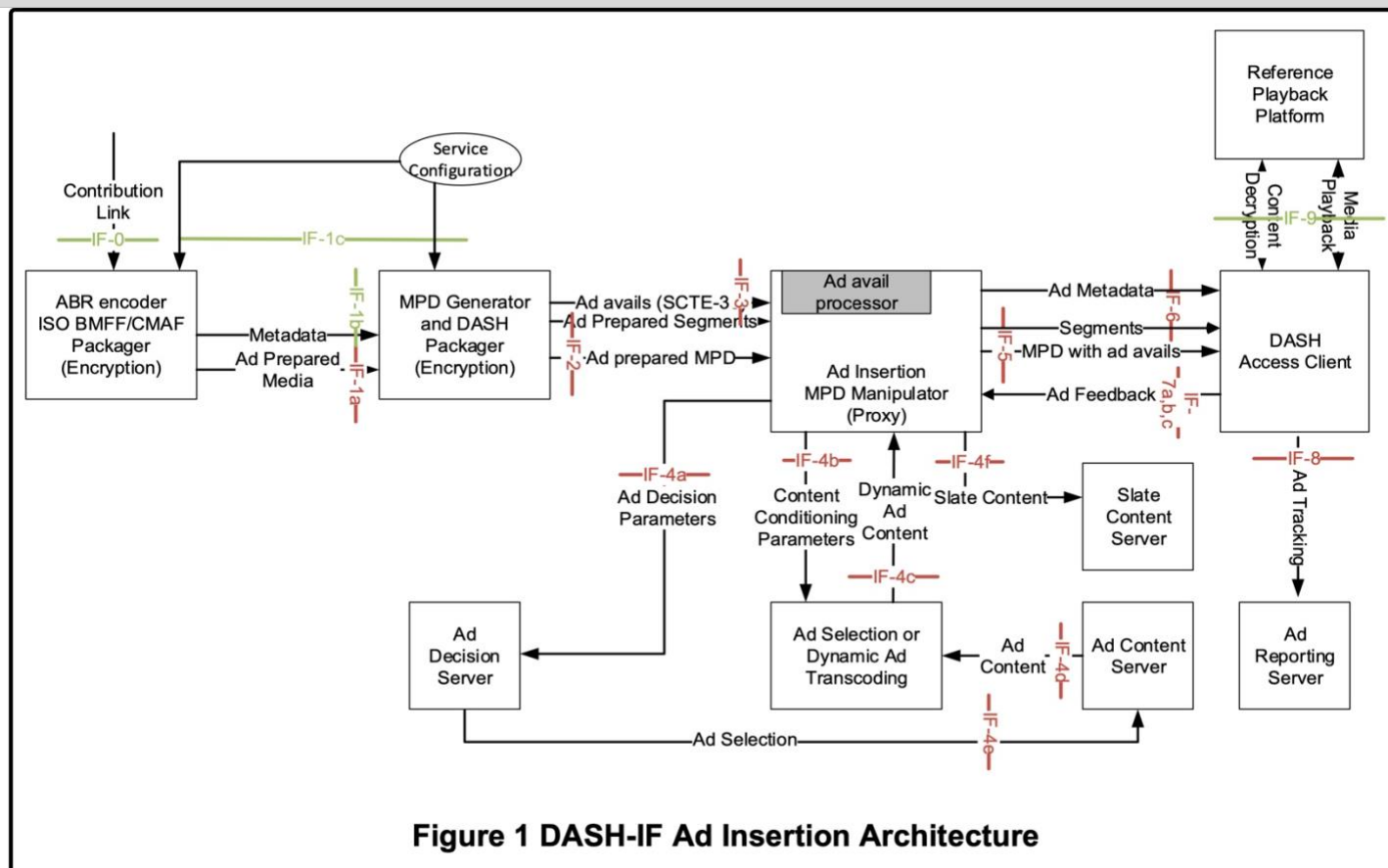
There are a number of factors that affect the ads that you are seeing. What you're watching, where you're located, and what you've streamed previously can all help us personalize your ads so they're relevant to you.

Features like Ad Selector (which presents 2-3 different options so you can choose the ad that interests you most) also give viewers control over their experience. Other actions, such as interacting with the ad or pausing your video, can help create a more relevant and personalized experience.

[Hulu Help Center](#)

Another example of the Accused Instrumentalities using an advertisement rotator for managing one or more requests for advertising content, is pod level decisioning, where the client sends requests for advertisement content to the Ad Insertion MPD Manipulator as the content streams. The Ad Insertion MPD sends these requests to the Ad Decision Server which then returns (via the Ad Content Server and Ad Selection or Dynamic Ad Transcoding) the advertisements to be played. In this way, the Accused Instrumentalities rotate advertisements depending on user input.

| U.S. Patent No.<br>11,463,768                                               | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                                             | <div style="border: 1px solid black; padding: 10px;"> <p>With <i>pod level decisioning</i>, advertisement opportunities are decided just as the DASH client reaches the opportunity within the stream. A SGAI architecture accomplishes by having the Ad Insertion MPD Manipulator use the IF-3 supplied opportunity metadata to generate an IF-5 manifest with a mixture of content and remote entities that represent opportunities. As the client reaches remote entities during playout, the client utilizes IF-7 to return the opportunity metadata to the Ad Insertion MPD Manipulator which then sends the data to the Ad Decision server via IF-4a. The result of the ad decision request will contain advertisements for this single opportunity which the Ad Insertion MPD Manipulator transforms into an IF-7 response for the client to consume.</p> <p>After a DASH client receives a stream produced from an SGAI architecture, the stream can continue to change for the duration of the playback session, e.g. the advertisements can be re-decided should the user choose to rewind the stream.</p> </div> <p>DASH Part 5 at § 5.6.2.2.</p> <p>As a result, the Accused Instrumentalities have predetermined advertisements scheduled to play at the predetermined advertisement insertion point, and an advertisement rotator configured to manage one or more requests to replace the predetermined advertisement.</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| [10a] A digital media advertisement presentation control system comprising: | <p>The Accused Instrumentalities are a digital media advertisement presentation control system. <i>See, e.g.</i>, [1a].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| [10b] at least one processor;                                               | <p>The Accused Instrumentalities include at least one processor.</p> <p>Hulu’s digital media advertisement presentation control system includes one or more processors. For example, Figure 1 of the DASH Standard identifies an “Ad Insertion MPD Manipulator” that is part of a digital media player system on the server side. Figure 1 includes multiple servers, for example, each of which includes at least one processor.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



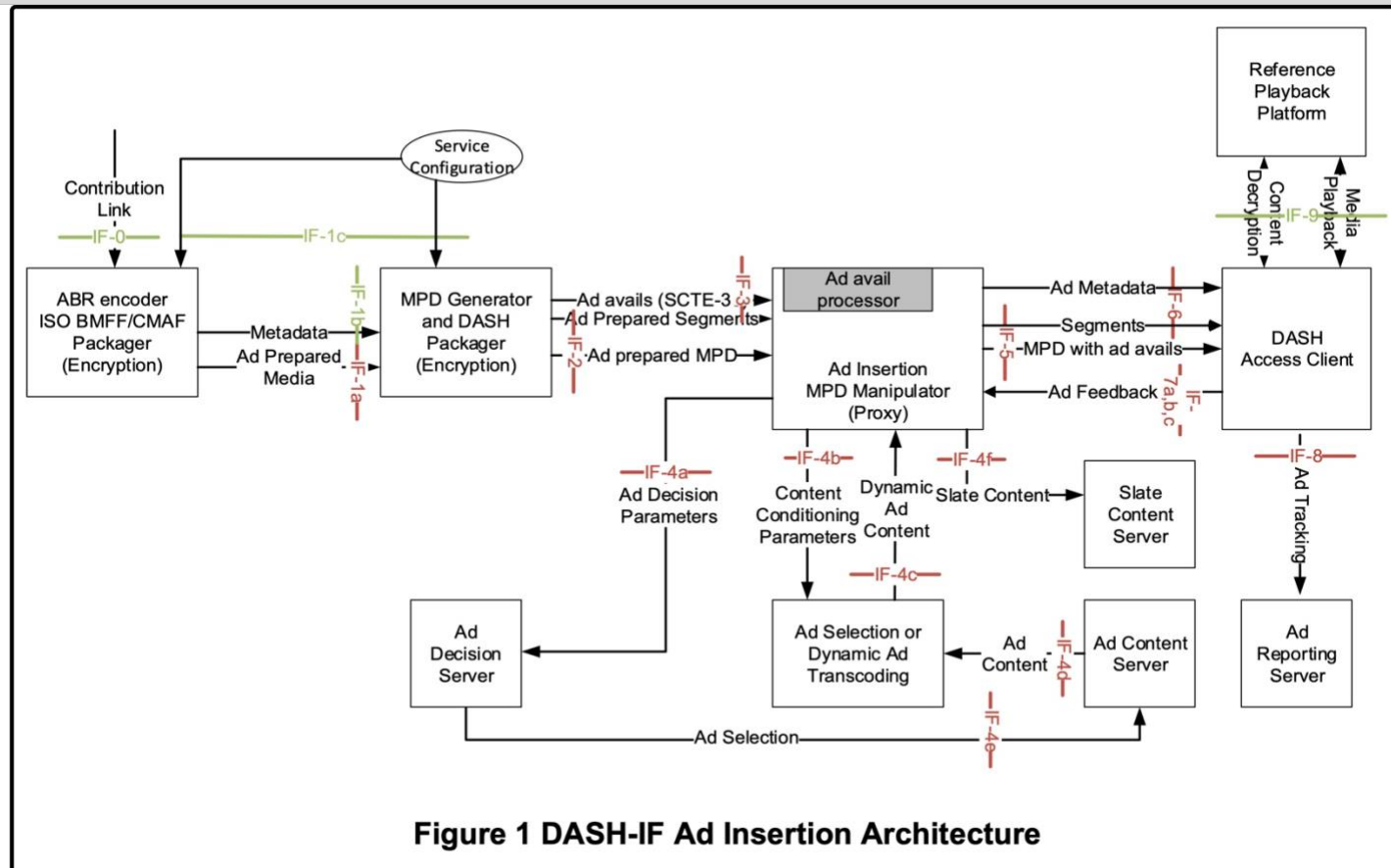
[DASH Part 5](#) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

Within the “Ad Insertion MPD Manipulator (Proxy),” Figure 1 of the DASH Standard identifies an “Ad avail processor.” The DASH Standard defines the “ad avail processor” as:

**ad avail processor** – logical service that, given cue data, determines the placement of advertisement content within a stream and describes the necessary ad decision service communications

DASH Standard at § 3.1.

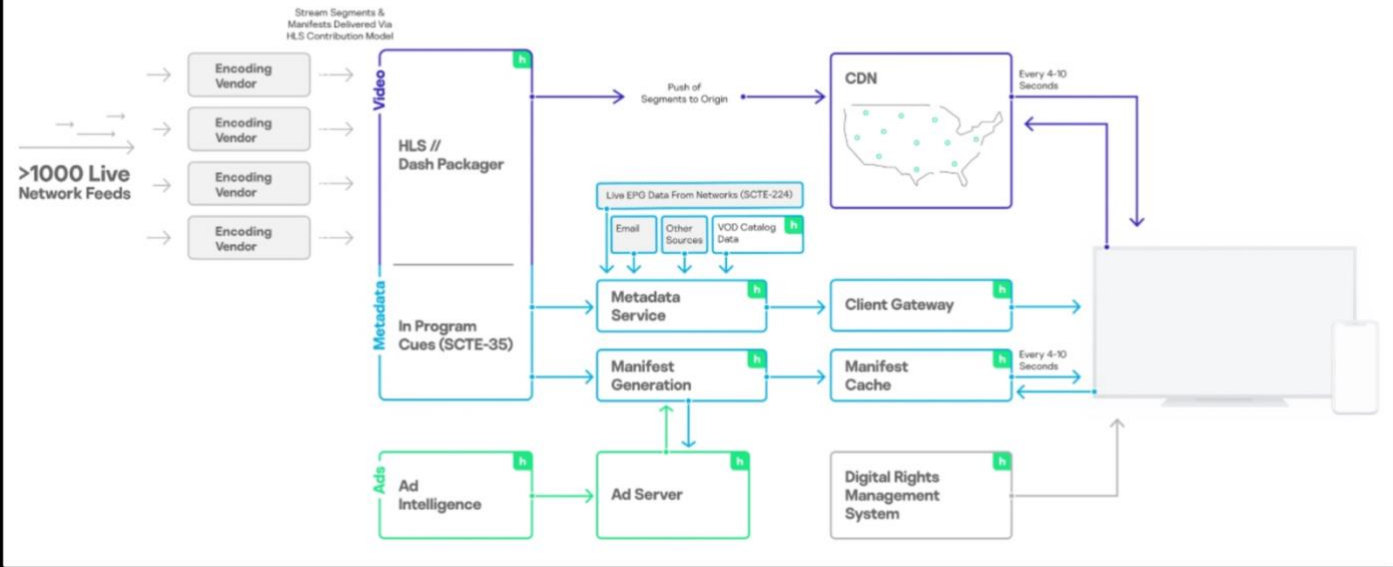
| U.S. Patent No.<br>11,463,768                                                                                                                                            | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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|                                                                                                                                                                          | <p>As a result, Hulu’s digital media player device for controlling digital media presentations includes at least one processor.</p> <p>The DASH Standard identifies additional structures that utilize one or more processors. For example, in Figure 1 presented above, the “MPD Generator and DASH Packager (Encryption)” and “Ad Content Server” are part of a remote system that transmits media content and digital advertising content, which would, necessarily, require the use of one or more processors.</p> <p>As set forth above, the Accused Instrumentalities include additional processors that they use to control digital media presentations.</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| [10c] a non-transitory computer-readable storage medium storing instructions that, when executed by the processor, cause the processor to perform operations comprising: | <p>The Accused Instrumentalities include a non-transitory computer-readable storage medium for storing instructions that, when executed by the processor, cause the processor to perform operations.</p> <p>For example, Hulu’s servers and systems make, store, and transmit server-side and client-side software for providing ad-supported streaming service to Hulu’s subscribers. This, necessarily, requires one or more computer-readable storage mediums for storing instructions. Functions, interrelationships, and interfaces of the embedded method are shown in Figure 1 of the DASH Standard.</p>                                                                                                                                                                                                                                                                                                                                                                                                                 |



[DASH Part 5](#) at Figure 1 DASH-IF Ad Insertion Architecture (“DASH diagram”).

The Hulu Tech Blog further shows how Hulu’s system for providing ad-supported streaming service utilizes a computer-readable medium storing executable instructions to cause a processor to perform control over digital media content.

## Live OTT Service on Hulu



### [Hulu Tech Blog](#)

Among other things, the “Manifest Cache” shown in the figure above is a machine-readable medium storing executable instructions to cause at least one programmable processor to perform operations that implement Hulu’s system for providing ad-supported streaming service.

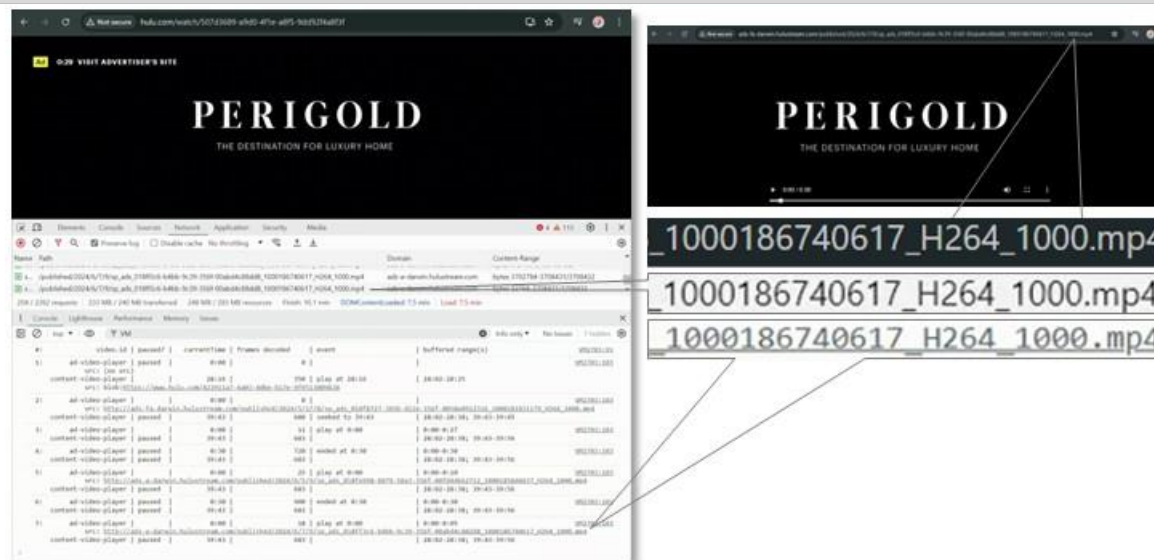
As set forth above, the Accused Instrumentalities include additional non-transitory computer-readable storage medium for storing instructions that they use to control digital media presentations.

The Accused Instrumentalities’ computer-readable storage medium storing instructions is non-transitory.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

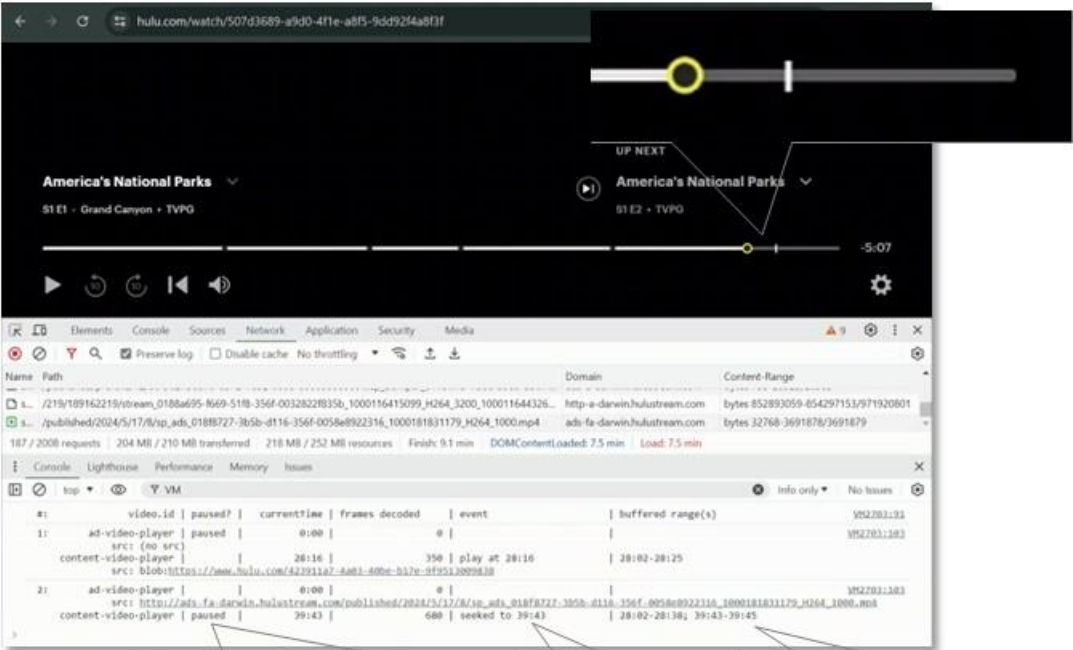
| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                                                                                                                | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p>[10d] replacing a predetermined advertisement insertion point in digital media content with an adapted insertion point for digital advertising content, in response to receiving a request to update a current play position in the digital media content to a new play position in the digital media content, the adapted insertion point determined by an adaptive preference rule based on one or more advertisement requirements;</p> | <p>When the processor of the Accused Instrumentalities reads the instructions stored in the non-transitory computer-readable storage medium, it replaces a predetermined advertisement insertion point in digital media content with an adapted insertion point for digital advertising content, in response to receiving a request to update a current play position in the digital media content to a new play position in the digital media content, the adapted insertion point determined by an adaptive preference rule based on one or more advertisement requirements. <i>See, e.g.</i>, [1d.2].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| [10e] requesting digital advertising content to be played at the adapted insertion point of digital advertising content; and | <p>When the processor of the Accused Instrumentalities reads the instructions stored in the non-transitory computer-readable storage medium, it requests digital advertising content to be played at the adapted insertion point of digital advertising content. <i>See, e.g.,</i> [1d.4].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| [10f] presenting the digital advertising content at the adapted insertion point of digital advertising content.              | <p>When the processor of the Accused Instrumentalities reads the instructions stored in the non-transitory computer-readable storage medium, it presents the digital advertising content at the adapted insertion point of digital advertising content.</p> <p>The Accused Instrumentalities present the digital advertising content at the adapted insertion point of digital advertising content.</p> <p>Hulu’s system performs the step of presenting the digital advertising content at the adapted insertion point of digital advertising content. Hulu’s software presents the digital advertising content to the user at the adapted insertion point. “[T]he client ... will present the decisioned advertisement.” <i>Id.</i> at § 5.9.1.</p> <p>The Hulu user interface also demonstrates the Accused Instrumentalities present the digital advertising content at the adapted insertion point of digital advertising content. Users can slide the play position in the content stream to some point after the first ad insertion point thereby attempting to jump the insertion point and avoid advertisements. However, the Accused Instrumentalities present the digital advertising content at the adapted insertion point rather than the initially sequence insertion point.</p> <p>For example, the Hulu “ad-video-player” plays the requested advertisement file at the adapted insertion point. In the example shown below, the Hulu client requests an advertisement .mp4 file that is publicly available.</p> |



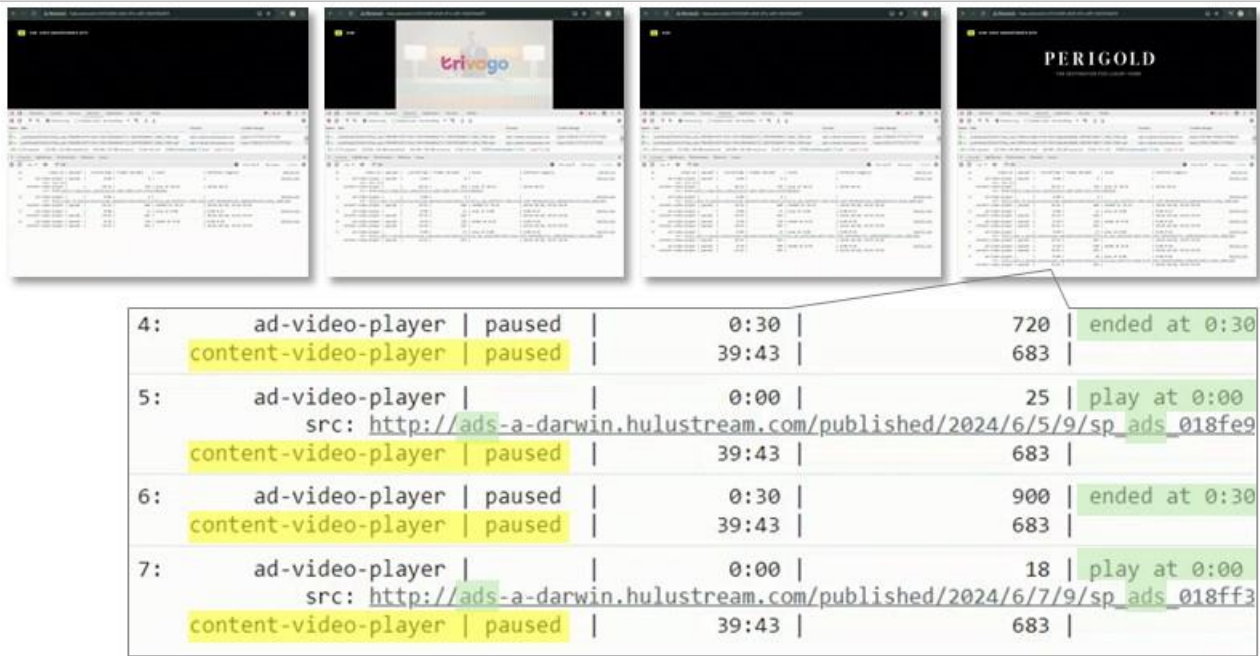
Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

In the example below, the Hulu client presents advertisements, including the “Perigold” advertisement that the Hulu client requested (see previous screen shot), at the adapted insertion point, instead of the original insertion point that is shown as a yellow circle on the timeline.



| #: | video.id                                                                                                                              | paused? | currentTime | event           | buffered range(s)        |
|----|---------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|-----------------|--------------------------|
| 1: | ad-video-player                                                                                                                       | paused  | 0:00        |                 |                          |
|    | src: (no src)                                                                                                                         |         |             |                 |                          |
|    | content-video-player                                                                                                                  |         | 28:16       | play at 28:16   | 28:02-28:25              |
|    | src: blob:https://www.hulu.com/423911a7-8a01-80be-517e-5f9513009838                                                                   |         |             |                 |                          |
| 2: | ad-video-player                                                                                                                       |         | 0:00        |                 |                          |
|    | src: http://ads-fa-darwin.hulustream.com/published/2024/5/17/8/sp_ads_018f8727_305b-d116-356f-0058e8922316_1000181831179_H264_1000.m4 |         |             |                 |                          |
|    | content-video-player                                                                                                                  | paused  | 39:43       | seeked to 39:43 | 28:02-28:38; 39:43-39:45 |

Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.



Screenshot of Hulu user interface on web browser, hulu.com, with debugger tool showing network traffic and console running JavaScript reporting out video-related events.

An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.

| U.S. Patent No.<br>11,463,768                                                                                                                                                                         | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p>[11] The system of claim 10, wherein the digital advertising content is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point.</p> | <p>In the Accused Instrumentalities, the digital advertising content is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point. <i>See, e.g.</i>, [2].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                         | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p>[12] The system of claim 10, wherein the replacing the predetermined advertisement insertion point with the adapted insertion point includes adaptively modifying a presentation position of the predetermined advertisement from the predetermined advertisement insertion point to the adapted insertion point in the digital media content.</p> | <p>In the Accused Instrumentalities, replacing the predetermined advertisement insertion point with the adapted insertion point includes adaptively modifying a presentation position of the predetermined advertisement from the predetermined advertisement insertion point to the adapted insertion point in the digital media content. <i>See, e.g.</i>, [3].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                         | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p>[14] The system of claim 10, wherein the adaptive preference rule is based on at least one of a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement.</p> | <p>In the Accused Instrumentalities, the adaptive preference rule is based on at least one of a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement. <i>See, e.g.</i>, [5].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                      | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| [15] The system of claim 10, wherein the course of presentation of the digital media content is interrupted with a presentation of the digital advertising content at the adapted insertion point. | <p>In the Accused Instrumentalities, the course of presentation of the digital media content is interrupted with a presentation of the digital advertising content at the adapted insertion point. <i>See, e.g.</i>, [6].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| [16] The system of claim 10, wherein the digital advertising content is selected based on one or more advertisement requirements that apply to a user device.                                      | <p>In the Accused Instrumentalities, the digital advertising content is selected based on one or more advertisement requirements that apply to a user device. <i>See, e.g.</i>, [7].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                      |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                     | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p>[17] The system of claim 11, wherein the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point.</p>                                                                                              | <p>In the Accused Instrumentalities, the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point. <i>See, e.g.</i>, [9].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                                                              |
| <p>[18] The system of claim 16, wherein the advertisement one or more requirements are eliminated in response to presenting the digital advertising content to the user device at the adapted insertion point of digital advertising content.</p> | <p>In the Accused Instrumentalities, the advertisement one or more requirements are eliminated in response to presenting the digital advertising content to the user device at the adapted insertion point of digital advertising content. <i>See, e.g.</i>, [8].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                          | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| [19a] A method embedded in a machine-readable medium in form of executable instructions to cause at least one programmable processor to perform operations comprising: | <p>The Accused Instrumentalities perform method that is embedded in a machine-readable medium in form of executable instructions to cause at least one programmable processor to perform operations. <i>See, e.g.</i>, [10b] and [10c].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                                                                                                                | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p>[19b] replacing a predetermined advertisement insertion point in digital media content with an adapted insertion point for digital advertising content, in response to receiving a request to update a current play position in the digital media content to a new play position in the digital media content, the adapted insertion point determined by an adaptive preference rule based on one or more advertisement requirements;</p> | <p>The Accused Instrumentalities replace a predetermined advertisement insertion point in digital media content with an adapted insertion point for digital advertising content, in response to receiving a request to update a current play position in the digital media content to a new play position in the digital media content, the adapted insertion point determined by an adaptive preference rule based on one or more advertisement requirements. <i>See, e.g.</i>, [1d.2].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                  | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| [19c] requesting digital advertising content to be played at the adapted insertion point of digital advertising content; and                                                                   | <p>The Accused Instrumentalities request digital advertising content to be played at the adapted insertion point of digital advertising content. <i>See, e.g.</i>, [1d.4].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                            |
| [19d] presenting the digital advertising content at the adapted insertion point of digital advertising content.                                                                                | <p>The Accused Instrumentalities present the digital advertising content at the adapted insertion point of digital advertising content. <i>See, e.g.</i>, [10f].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                      |
| [20] The method of claim 19, wherein the digital advertising content is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point. | <p>In the Accused Instrumentalities, the digital advertising content is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point. <i>See, e.g.</i>, [2].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                         | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p>[21] The method of claim 19, wherein the replacing the predetermined advertisement insertion point with the adapted insertion point includes adaptively modifying a presentation position of the predetermined advertisement from the predetermined advertisement insertion point to the adapted insertion point in the digital media content.</p> | <p>In the Accused Instrumentalities, the replacing the predetermined advertisement insertion point with the adapted insertion point includes adaptively modifying a presentation position of the predetermined advertisement from the predetermined advertisement insertion point to the adapted insertion point in the digital media content. <i>See, e.g.</i>, [3].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                          | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <p>[23] The method of claim 19, wherein the adaptive preference rule is based on at least one of: a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement.</p> | <p>In the Accused Instrumentalities, the adaptive preference rule is based on at least one of: a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement. <i>See, e.g.</i>, [5].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                      | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| [24] The method of claim 19, wherein the course of presentation of the digital media content is interrupted with a presentation of the digital advertising content at the adapted insertion point. | <p>In the Accused Instrumentalities, the course of presentation of the digital media content is interrupted with a presentation of the digital advertising content at the adapted insertion point. <i>See, e.g.</i>, [6].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| [25] The method of claim 20, wherein the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point.                                                      | <p>In the Accused Instrumentalities, the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point. <i>See, e.g.</i>, [9].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                      |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p>[27a] A computer program product comprising a non-transitory machine-readable medium storing instructions that, when executed by at least one programmable processor, cause the at least one programmable processor to perform operations comprising:</p> | <p>The Accused Instrumentalities are a computer program product comprising a non-transitory machine-readable medium storing instructions that, when executed by at least one programmable processor, cause the at least one programmable processor to perform operations. <i>See, e.g.</i>, [10b] and [10c].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                                                                                                                | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p>[27b] replacing a predetermined advertisement insertion point in digital media content with an adapted insertion point for digital advertising content, in response to receiving a request to update a current play position in the digital media content to a new play position in the digital media content, the adapted insertion point determined by an adaptive preference rule based on one or more advertisement requirements;</p> | <p>The Accused Instrumentalities replace a predetermined advertisement insertion point in digital media content with an adapted insertion point for digital advertising content, in response to receiving a request to update a current play position in the digital media content to a new play position in the digital media content, the adapted insertion point determined by an adaptive preference rule based on one or more advertisement requirements. <i>See, e.g.</i>, [1d.2].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                    | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| [27c] requesting digital advertising content to be played at the adapted insertion point of digital advertising content; and                                                                                     | <p>The Accused Instrumentalities request digital advertising content to be played at the adapted insertion point of digital advertising content. <i>See, e.g.</i>, [1d.4].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                            |
| [27d] presenting the digital advertising content at the adapted insertion point of digital advertising content.                                                                                                  | <p>The Accused Instrumentalities present the digital advertising content at the adapted insertion point of digital advertising content. <i>See, e.g.</i>, [10f].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                      |
| [28] The computer program product of claim 27, wherein the digital advertising content is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point. | <p>In the Accused Instrumentalities, the digital advertising content is different from a predetermined advertisement selected to be played at the predetermined advertisement insertion point. <i>See, e.g.</i>, [2].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                                           | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p>[29] The computer program product of claim 27, wherein the replacing the predetermined advertisement insertion point with the adapted insertion point includes adaptively modifying a presentation position of the predetermined advertisement from the predetermined advertisement insertion point to the adapted insertion point in the digital media content.</p> | <p>In the Accused Instrumentalities, the replacing the predetermined advertisement insertion point with the adapted insertion point includes adaptively modifying a presentation position of the predetermined advertisement from the predetermined advertisement insertion point to the adapted insertion point in the digital media content. <i>See, e.g.</i>, [3].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                                                                                                                                                            | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[31] The computer program product of claim 27, wherein the adaptive preference rule is based on at least one of: a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement.</p> | <p>In the Accused Instrumentalities, the adaptive preference rule is based on at least one of: a number of tracks played since a previous digital advertisement, a length of time associated with playing the digital media content, and a number of digital media data blocks played since the previous digital advertisement. <i>See, e.g.</i>, [5].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |

| U.S. Patent No.<br>11,463,768                                                                                                                                                                                               | Hulu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>[32] The computer program product of claim 27, wherein the course of presentation of the digital media content is interrupted with a presentation of the digital advertising content at the adapted insertion point.</p> | <p>In the Accused Instrumentalities, the course of presentation of the digital media content is interrupted with a presentation of the digital advertising content at the adapted insertion point. <i>See, e.g.</i>, [6].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p> |
| <p>[33] The computer program product of claim 28, wherein the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point.</p>                                                      | <p>In the Accused Instrumentalities, the predetermined advertisement is scheduled to play at the predetermined advertisement insertion point. <i>See, e.g.</i>, [9].</p> <p>An analysis of proprietary backend systems and/or source code may be necessary to fully and accurately describe the functionality of the Accused Instrumentalities with respect to this limitation and, accordingly, Plaintiff reserves the right to supplement these infringement contentions once such information is made available to Plaintiff.</p>                                                      |