Ad Insertion in Live Content

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DASH + Ad Insertion

- Ad Insertion is important and complex
  - Revenue for online video
  - Part of a product experience
  - Requires personalization and reporting

- DASH-IF: Advanced Ad Insertion in DASH
  - Defines relevant use cases and architectures
  - Requirements and recommendations for content authoring
  - Carriage and tracking of advertisement data
  - 2\textsuperscript{nd} Community Review Available: https://dashif.org/guidelines/#ad-insertion-in-dash

- Initial Focus
  - Server-Side Ad Insertion Architecture
  - Live with in-stream opportunities
  - Transition between Main Content and Ads
DASH-IF Ad Insertion Architecture

ABR encoder
ISO BMFF/CMAF Packager (Encryption)

MPD Generator and DASH Packager (Encryption)

Service Configuration

Contribution Link

Metadata

Ad Prepared Media

Ad avails (SCTE-35)

Ad prepared MPD

Ad Decision Processing

Dynamic Ad Content

Content Conditioning Parameters

Ad Selection

Ad Decision Server

Dynamic Ad Transcoding

Ad Content Server

Ad Reporting Server

Reference Playback Platform

DASH Access Client

Ad Metadata

Segments

MPD with ad avails

Ad Decision parameters
DASH-IF Ad Insertion Architecture

IF-0: ABR Stream Source
DASH-IF Ad Insertion Architecture

IF-1: Packager Ingest
DASH-IF Ad Insertion Architecture

IF-2: Content Preparation
DASH-IF Ad Insertion Architecture

IF-3: Ad Avail Signaling
DASH-IF Ad Insertion Architecture

IF-4: Ad Decisioning and Exchange Interfaces

- ABR encoder
  - ISO BMFF/CMAF Packager (Encryption)
- MPD Generator and DASH Packager (Encryption)
- Service Configuration
- Metadata
- Ad Prepared Media
- Ad avails (SCTE-35)
- Ad prepared MPD
- Ad Insertion MPD Manipulator (Proxy)
- Ad Insertion MPD
- Ad Decision parameters
- Ad Metadata
- Segments
- MPD with ad avails
- Ad Decision parameters
- Ad Metadata
- Ad Tracking
- Ad Selection
- Ad Reporting Server
- Reference Playback Platform
- DASH Access Client
- Dynamic Ad Transcoding
- Dynamic Ad Content Conditioning Parameters
- Ad Content Server
- Ad Content
DASH-IF Ad Insertion Architecture

IF-5: MPD and Segments with Ad Placement
DASH-IF Ad Insertion Architecture

IF-6: MPD and Segments with Ad Placement
DASH-IF Ad Insertion Architecture

IF-9: MPD and Segments with Ad Placement
DASH-IF Ad Insertion Architecture

IF-8: MPD and Segments with Ad Placement
DASH-IF Ad Insertion Architecture

IF-7: Remote Resolution with Decisioning Parameters
Content Splice Conditioning

- Conditioning drives complexity and experience

- Three options identified
  - Splice-Conditioned Packaging
    - CMAF Fragment boundary at splice point
  - Splice-Conditioned Encoding
    - SAP type 1 or 2 at splice point
  - Splice Point Signaling
    - Just signal, no specific encoding or packaging

- Recommended: Splice-Conditioned Packaging
  - Simplified MPD Manipulator
  - Broader seamless player experience
Prepared Content and Ad Avails

- Recommended: Multi-Period DASH for Content
  - Period boundaries at splice points
  - Period replacement by MPD Manipulator
  - DASH-IF Main Live Content Profile

- Opportunity Metadata Requirements
  - Presentation time of splice point that starts opportunity
  - And either
    - Guaranteed accurate duration
    - Identifier for later event that will declare duration
  - Example: SCTE-35

- Recommended: MPD Events for Opportunity Metadata

```
<EventStream
  schemeIdUri="urn:scte:scte35:2014:xml+bin"
  timescale="1">
  <Event
    presentationTime="1540809120"
    id="1999">
    <Signal
      xmlns="http://www.scte.org/schemas/35/2016">
      /DAhAAAAAAAAAP/wEAUAAAfPf+9/fgAg9YDAAAAAAAA/APOv</Binary>
    </Signal>
  </Event>
</EventStream>
```
Ad Metadata and Tracking

- Ad metadata carriage mechanisms
  - DASH MPD Events
  - DASH Inband Event Messages

- Data presentation time aligned to media
  - Direct measurement with DASH Callback
  - Third-party measurement with common data surfacing

- Recommended: DASH MPD Events
  - Avoids ad segment modification
Conclusions

• DASH + Ad Insertion
  – Ad Insertion is a first-class feature of DASH
  – DASH-IF defined requirements simplify workflows and aim to ensure the highest quality experience

• Advanced Ad Insertion in DASH
  – Feedback and comments welcome!

• Only the First Step
  – Remaining use case details need work
  – Server-Guided Ad Insertion mechanisms need study
Thank you