

AD-INSERTION

MEDIA STREAMING MEETS 5G

WORKSHOP

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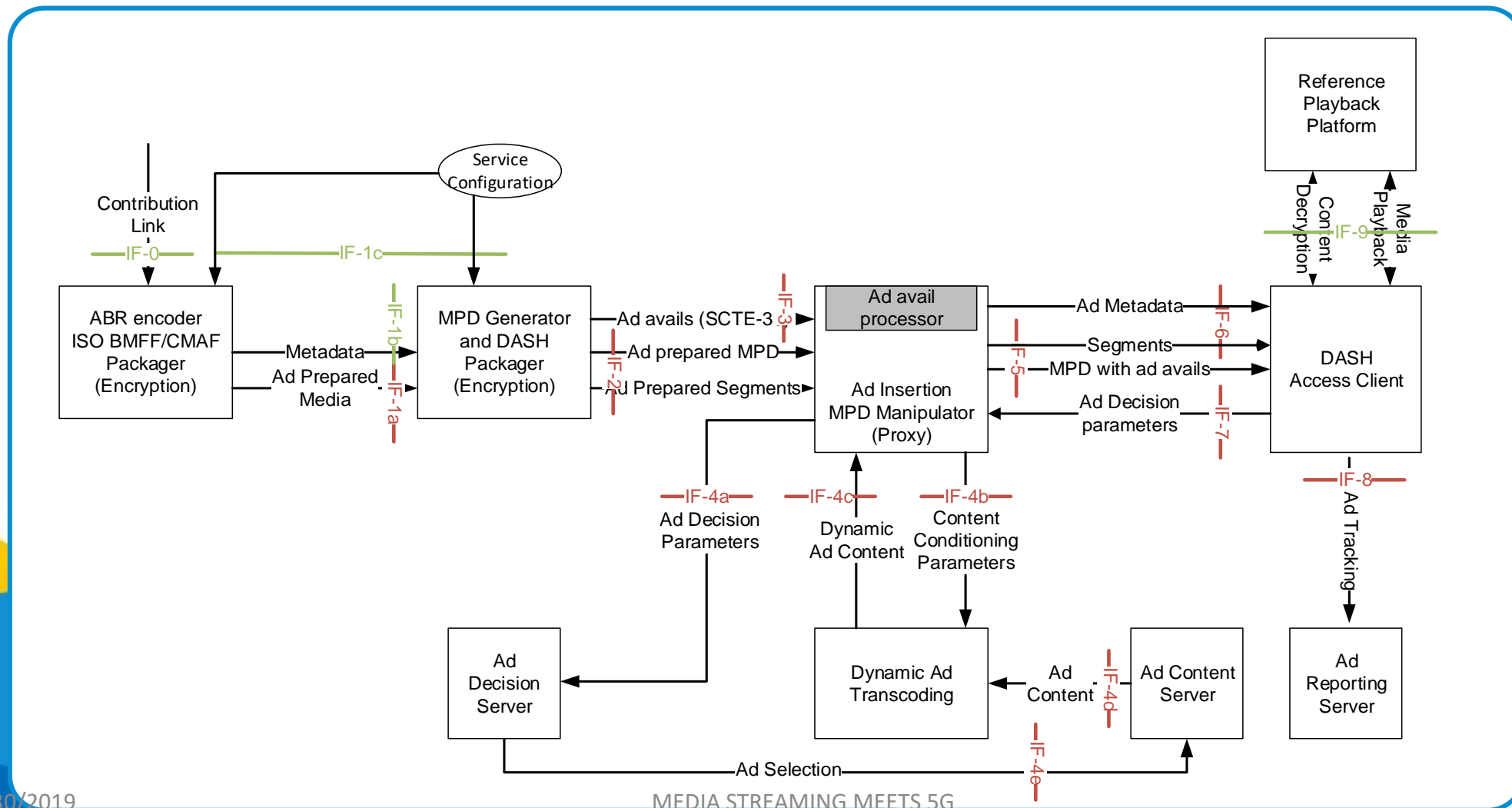
DASH-IF President

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Ad Insertion Use-cases

1. Pre-roll ad for live
 - Pre-roll ad playback before joining the live program
 - Single MPD
 - Targeted with variable duration per client
2. Live program with (possibly) early terminating ads
 - Dynamic ad-insertion during live
 - Ad duration may be cut short during playback of the ad
 - Single MPD with targeted ad
3. Switching between different live feeds
 - Single MPD
 - Content is published as live program with independent MPDs/Periods


DASH-IF's General Ad Architecture



Desirable Requirements

1. Backward compatibility:
 1. the old content still can be played by new client
 2. The new content can be played by old client gracefully
2. Complexity:
 1. Content creation
 2. Client implementation
3. Allow integration of live services and ad services
4. Scalability: publication of single manifest and content
5. Cachability
6. Seamless switching or graceful playback during transition between live and ad content
7. Simple manipulation of MPD and no reauthoring of the media segments
8. Archiving the presentation: the final MPD should preserve the experience
9. Compatible with CMAF content
10. Highly desirable to work in low latency services
11. Targetability: different class of clients play different ads
12. Desirable to fit in server-side ad insertion architecture

Proposed Solutions To MPEG

1. MPD chaining (in 4th edition)
 2. Preroll element
 3. Preroll replacement event
 4. Mixed MPD
 5. Existing tools (Xlink + MPD update) with additional signaling
 6. Content replacement event
 7. LivePeriods: Period level independent timeline
 8. MPD stack chaining
 9. MPD events at MPD element level
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Questions for Service Providers

Use-case/Feature	Not needed	Good to have	Must have
• Client-side ad-insertion?			
• Pre-roll ads			
• Variable ad-duration per client?			
• Can ad be terminated shortly by the client?			
• Early terminating ads			
• Any advanced notice duration by live server?			
• Any minimum playback duration of ad?			
• Can ad be terminated in the middle of ad (@ any arbitrary point?)			
• Seamless transition during switching back to live content?			
• Standard signaling between live server and ad-server for ad selection/preparation?			

How Deep DO We Need to Standardize in each of the following aspects?

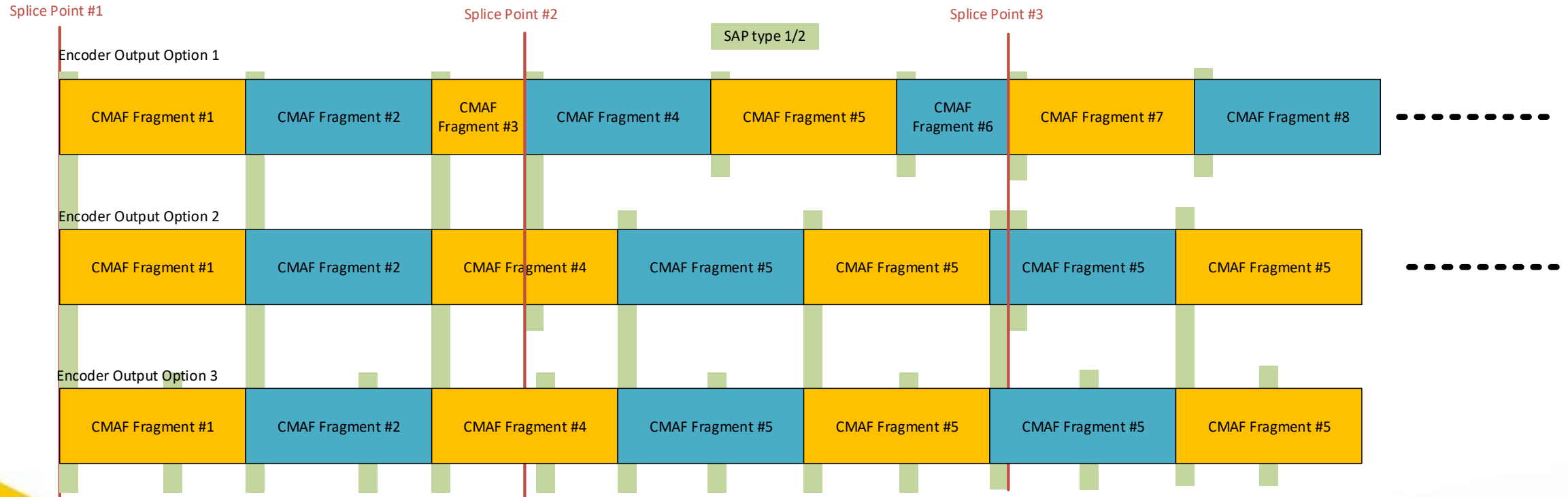
- Content format requirement
 - Content splicing requirement
- Meta-data signaling, formats and carriage
 - SCTE-35/215, VAST
 - DASH events & timed metadata tracks
- Encryption requirements
- Client implementations challenges
- 5G APIs

Back-ups

Questions

1. Is client-side ad-insertion a big paradigm?
2. Are we looking at the right use-cases? Or are we making the world more difficult as it is?
3. Maturity of client implementation?
4. Is there any additional requirements for ad-insertion in 5G?
5. Are there new opportunities for ad-insertion in 5G?
6. How to converge in the design?
 - Service providers vs client implementations

DASH-IF: Content Transition possibilities



Current DASH Constraints & Challenges

- Single timeline for periods
- Events are tied to Periods/Representations
 - MPD events are period dependent
 - Inband events are stream dependent
- Confusion on how to use and handle Xlink:
 - MPD update constraints
 - Continuity of timeline
 - Xlink resolution timing and consistency
- Client implementations do not want to support MPD chaining

MPEG's DASH Events & Timed Metadata

1. MPD events
 - Included in manifest
 - Can be updated with manifest update
 2. Inband events
 - Inserted in real-time at the beginning of media segments
 - Supports MPD update events and Application events
 3. Sparse timed metadata
 - Separate tracks than media
 - Metadata samples carry the payload
- All three mechanism can be dispatched to Application with the same API

MPEG's Criteria for choosing a solution

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MPEG's Current Approach

- Wall clock time events that do not tie to period
- We need a processing model for resolution of a hyperlink
- The hyperlink should point to a valid playable MPD
- We will study how a new period is introduced to the client and the client/ad ins/live can consistently work with this new period
- We will study the processing model of preroll at client
- Not every period is a replacement opportunity. We study on how we need to carry splice point info to the client for client side ad insertion.