

DASH Dynamic Video Ad Insertion



Rohit Wagle

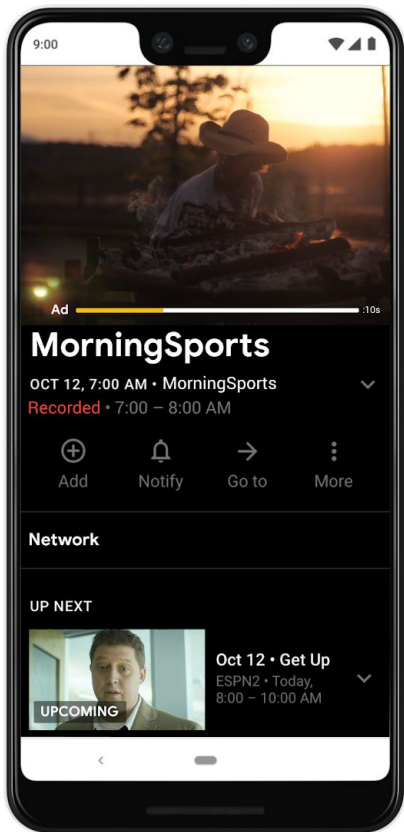
rohitsu@google.com

Agenda

- What is DAI in Ad Manager?
- What did we learn about Ad Insertion with DASH?

DAI Overview

Enable a TV-like experience with SSAI



Screen size

Mobile



PC



Tablet



Connected TV



Streaming format

HLS

Smooth

DASH

HDS

Content type

Live event



Linear



On-demand

Ad Type

Preroll



Midroll



Postroll



Rich Media



Companion Ads



Operating system



iOS



Roku



HTML



Connection Speed

Edge

3G

4G LTE



DSL

Cable

Fiber

Device type

HTC

Pixel 3

iPhone

Xperia XZ2

iPad

Samsung Galaxy S9

Security

Authentication

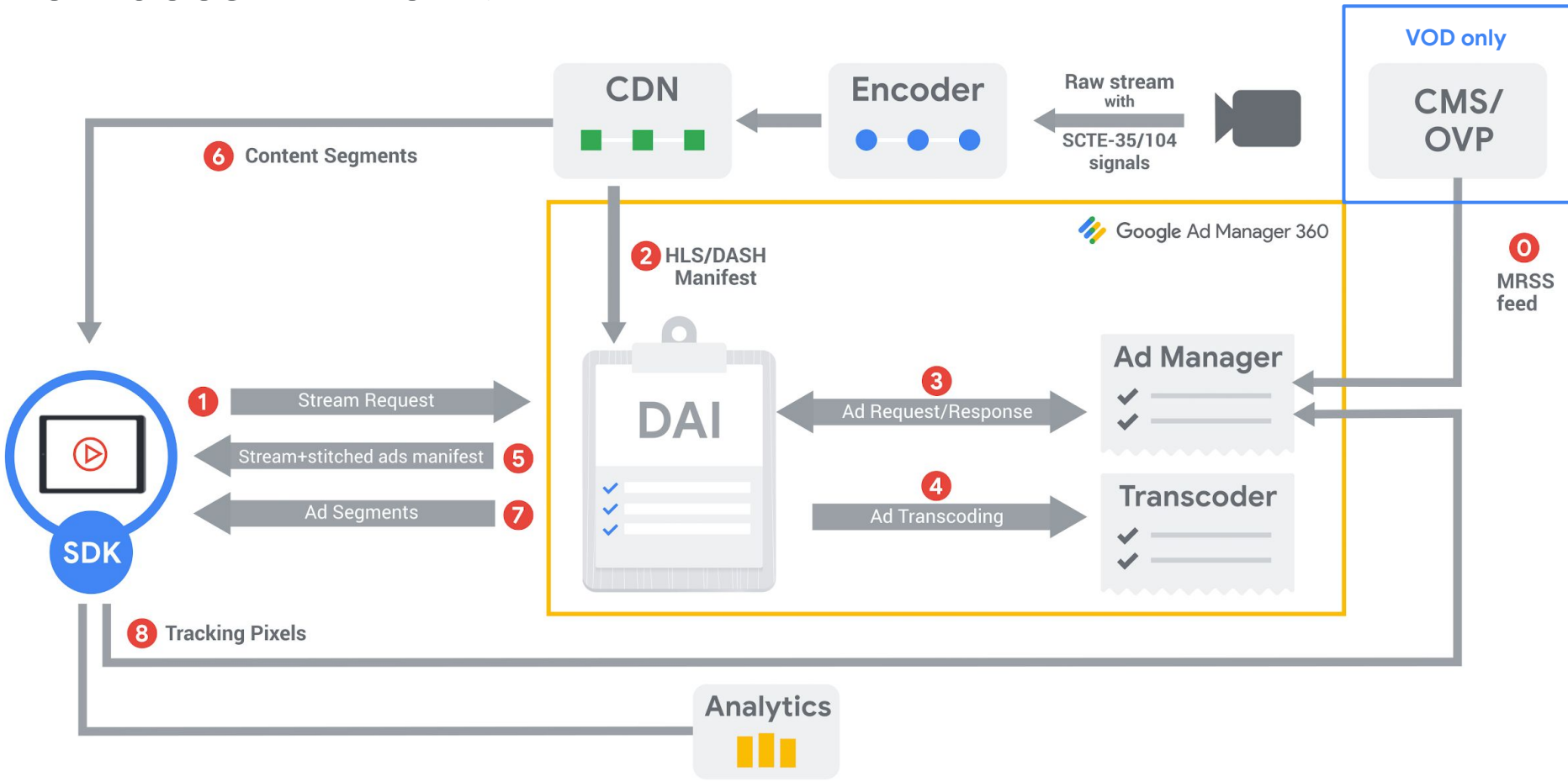


Encryption



How does DAI work?

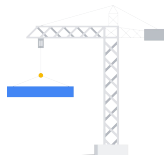
Proprietary + Confidential



Features



Live to
VOD



Built for
scale



Broad **Codec** Support
Audio **Normalization**



Dynamic **CDN** Selection
Variant Filtering
Flexible Ad **Tracking** Modes

.. and more

Troubleshooting Tools

Live streams >
Live stream: **Sample Stream**
Status: **Active**

Settings | Live stream monitor

Feb 9, 2018 | 3:00 PM | NOW | < PREVIOUS HOUR | NEXT HOUR >

Time	Variants	Variant count	Serving status	Activity type
Feb 9 3:07:48 PM		8	●	Ad break cue out (30s)
Feb 9 3:07:38 PM		8	●	Variant
Feb 9 3:06:47 PM		8	●	-

video/sam?networkCode=51636543&authuser=0#

7e7f6-4535-4e0b-969b-48ba39580424

[Debug session](#)

b2LHg

X 10_11_6) AppleWebKit/602.1.50 (KHTML,
.50.zip(gfe)
hQW5Gu7f1Kb2LHg/master.m3u8

- ✓ **Content Activity Monitor:** view active live stream video status
- ✓ **Stream Activity Monitor:** monitor and troubleshoot ads inserted into live & VOD streams for individual user sessions in real time

Session start time: 11:08 AM EDT 10/13/2016

Session duration: 15 mins 10 secs

Event start time: 3:40 PM EDT 10/12/2016

Event end time: 3:00 AM EST 1/1/2037

Filled ad break time: ● > 95% ● between 50 - 95% ● < 50%

Select columns

Ad break	Streaming time	Number of ads	Ad break duration	Filled duration	Served duration	Served percentage
2	11:20:32	5 ads	120s	120s	120s	● 100%
1	11:12:32	3 ads	120s	120s	120s	● 100%

Rows per page: 20 | 1-2 of 2 | < >

Reliably powering TV's biggest live events

2x

Growth on live ad impressions served in the past 6 months
(YoY)

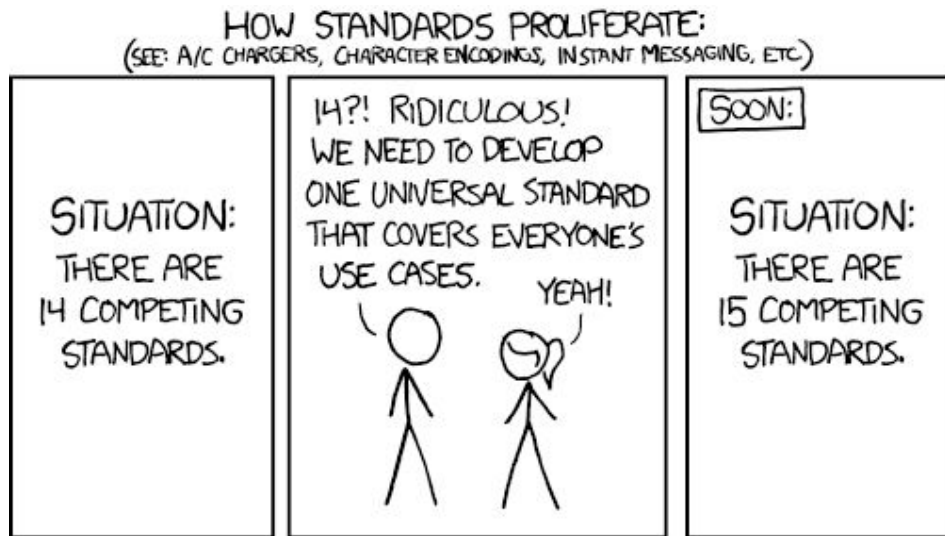
680+

Live events served in 2017

DAI DASH

Why DASH?

- DRM
- Industry standard allows access to more devices e.g. Smart TV, Hbb TV etc
- Multi-Period allows mixing of content from different sources



<https://xkcd.com/927/>

DASH Ad Insertion - VOD Example

Packaged MPD

```
<MPD ..>
  <Period duration="PT60S" id="1"> </Period>
  <Period duration="PT60S" id="2"> </Period>
  <Period duration="PT60S" id="3"> </Period>
</MPD>
```




DAI Generated MPD

```
<MPD ..>
  <Period duration="PT15S" id="preroll"> </Period>
  <Period duration="PT60S" id="1"> </Period>
  <Period duration="PT15S" id="midroll-1"> </Period>
  <Period duration="PT60S" id="2"> </Period>
  <Period duration="PT10S" id="midroll-2-1"> </Period>
  <Period duration="PT20S" id="midroll-2-2"> </Period>
  <Period duration="PT60S" id="3"> </Period>
  <Period duration="PT15S" id="postroll"> </Period>
</MPD>
```

- Content is Packaged for Ad Insertion.
- Ads are inserted between content periods.

Linear CUE Marker

```
<Period start="PT15S">  
  <EventStream schemeldUri="urn:scte:scte35:2014:xml+bin">  
    <Event duration="0" id="1">  
      <Signal xmlns="urn:scte:scte35:2014:xml+bin">  
        <Binary>/DAIBBBBBBBQAAZ/IOVniQAQAgBDVUVJQAAAAH+xxx==</Binary>  
      </Signal>  
    </Event>  
  </EventStream>  
<AdaptationSet contentType="audio" mimeType="audio/mp4">  
</Period>
```



Cue to SSAI for ad break opportunity

DASH Ad Insertion - Live Example

Encoder Generated MPD

```
<MPD ..>
  <Period start="PT0S" id="1"> </Period>
  <Period start="PT60S" id="2"> </Period>
  <Period start="PT120S" id="3"> </Period>
</MPD>
```



DAI Generated MPD

```
<MPD ..>
  <Period start="PT0S" id="1"> </Period>
  <Period start="PT60S" id="ad-1"> </Period>
  <Period start="PT80S" id="ad-2"> </Period>
  <Period start="PT100S" id="ad-3"> </Period>
  <Period start="PT120S" id="3"> </Period>
</MPD>
```

- Encoder creates Periods at Ad Break boundaries.
- Ad Break Period fully replaced with Ad Periods.
- Total duration of Ads may slightly different than Ad Break.

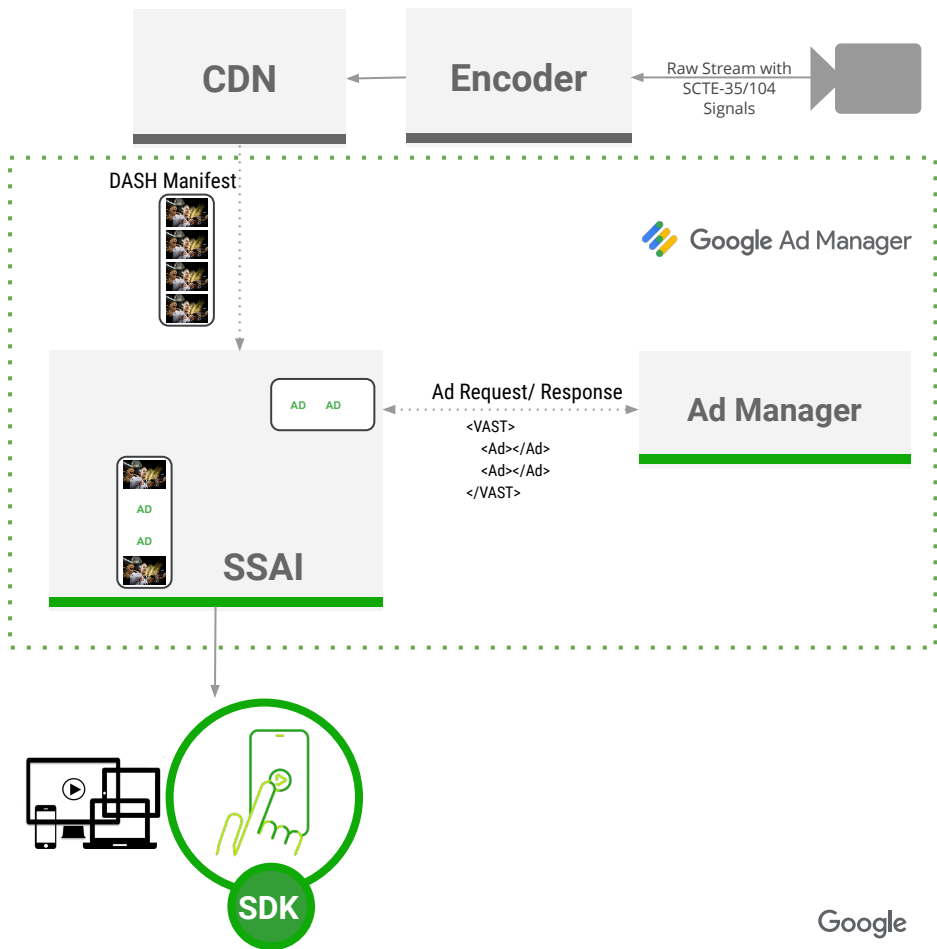
DAI DASH Ad Insertion

Proprietary + Confidential

- Asynchronous Ads Decisioning
- Manifest clues help determine if ads can be inserted in time.

MPD:suggestedPresDelay

MPD:minUpdatePeriod



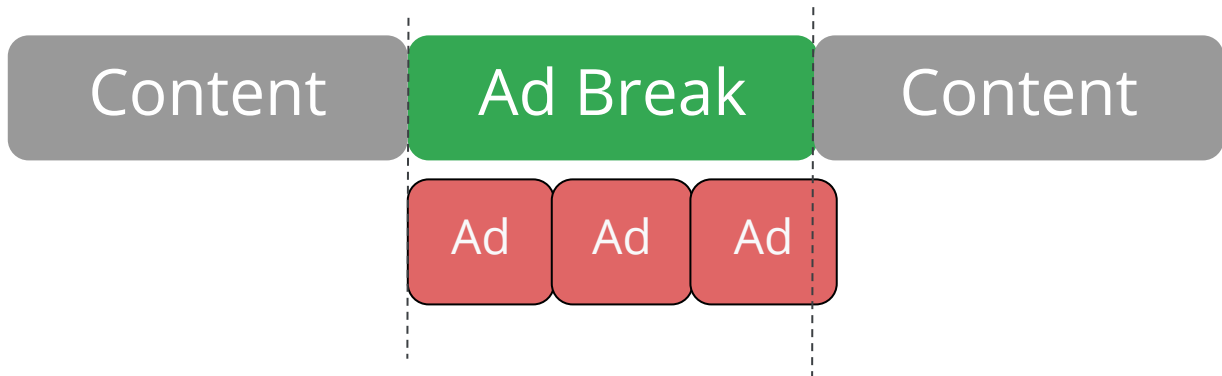
A View From The Field #1 - Packaging / Encoding

Proprietary + Confidential

- Multi-Period support
- CUE point accuracy
- Many ways to package the same content

A View From The Field #2- Period Transitioning

Proprietary + Confidential



- Especially among older devices
- When ad content is slightly longer than underlying content
- When transitioning between un-encrypted and encrypted periods

A View From The Field #3

- Scaling for high-concurrency events
 - Short interval to decision Ads
 - Remote Periods / XLinks can help late binding of Ad periods
- Standardizing Timed Events
 - E.g. Use ID3 as a recognized format in *emsg* boxes

One last thing

- Very excited about future of Ad Insertion in DASH
- Focus on Ecosystem and Interoperability to unlock seamless playback on more platforms