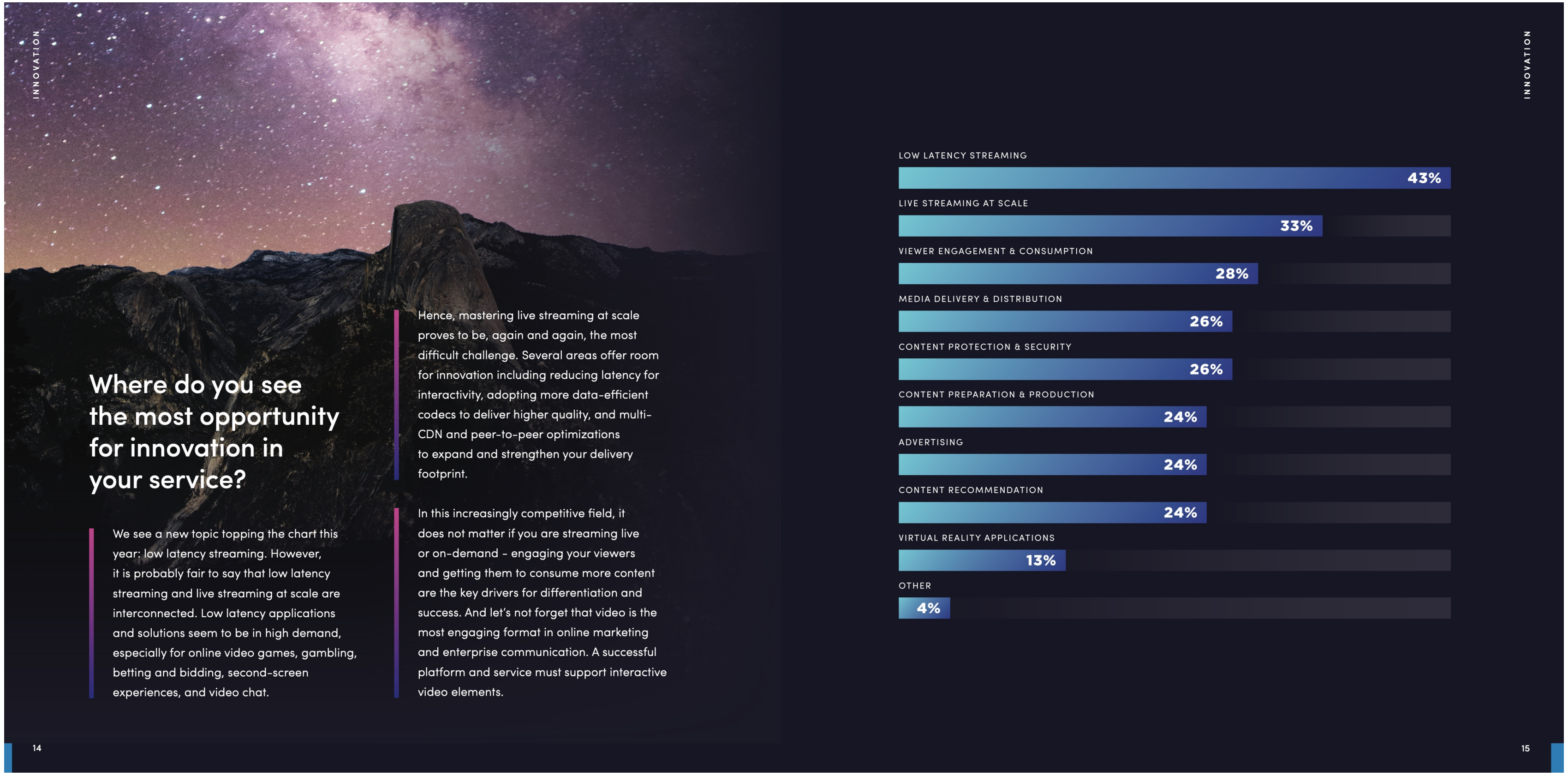
DASH Industry Forum

dash.js – Priorities 2022

Daniel Silhavy

Additional Information (BM Developer Report)



Where do you see the most opportunity for innovation in your service?

We see a new topic topping the chart this year: low latency streaming. However, it is probably fair to say that low latency streaming and live streaming at scale are interconnected. Low latency applications and solutions seem to be in high demand, especially for online video games, gambling, betting and bidding, second-screen experiences, and video chat.

Hence, mastering live streaming at scale proves to be, again and again, the most difficult challenge. Several areas offer room for innovation including reducing latency for interactivity, adopting more data-efficient codecs to deliver higher quality, and multi-CDN and peer-to-peer optimizations to expand and strengthen your delivery footprint.

In this increasingly competitive field, it does not matter if you are streaming live or on-demand - engaging your viewers and getting them to consume more content are the key drivers for differentiation and success. And let's not forget that video is the most engaging format in online marketing and enterprise communication. A successful platform and service must support interactive video elements.

LOW LATENCY STREAMING 43%
LIVE STREAMING AT SCALE 33%
VIEWER ENGAGEMENT & CONSUMPTION 28%
MEDIA DELIVERY & DISTRIBUTION 26%
CONTENT PROTECTION & SECURITY 26%
CONTENT PREPARATION & PRODUCTION 24%
ADVERTISING 24%
CONTENT RECOMMENDATION 24%
VIRTUAL REALITY APPLICATIONS 13%
OTHER 4%

DASH Industry Forum

https://go.bitmovin.com/video-developer-report

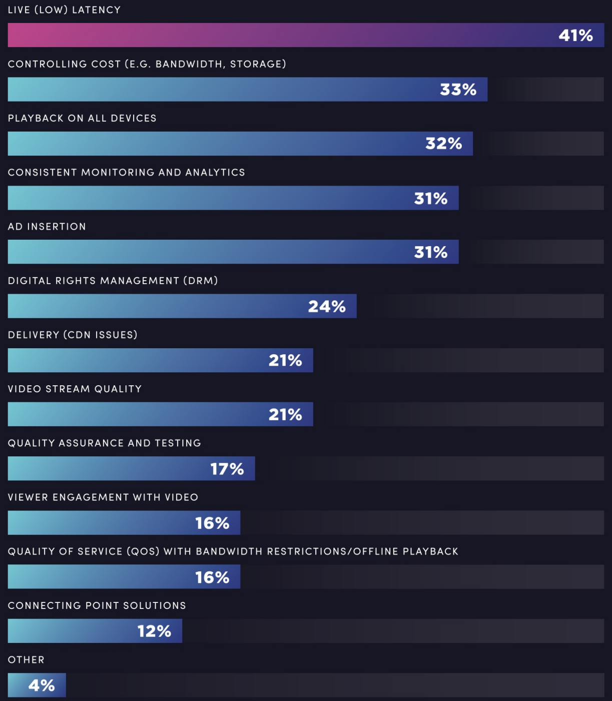
Additional Information (BM Developer Report)

What are the biggest challenges you are experiencing with video technology today?

This is our traditional warm-up question, getting the pulse of what's top of the mind for our survey participants. 'Live Low Latency' is back on top and we dedicated a deeper dive to it on page 26.

'Controlling Cost' is still very high up on the list and has not lost its importance. Overall, the percentages are more evenly distributed – meaning lots of challenges need to be solved simultaneously. This adds complexity, especially when trying to address competing goals, such as achieving playback on all devices while controlling the cost of storing multiple file types.

Playback on all devices is a constant challenge with new devices and platforms entering the market on a consistent basis. With local differences and preferences, the question is not if, but when you are able to support them to maximize your audience.



LIVE (LOW) LATENCY	41%
CONTROLLING COST (E.G. BANDWIDTH, STORAGE)	33%
PLAYBACK ON ALL DEVICES	32%
CONSISTENT MONITORING AND ANALYTICS	31%
AD INSERTION	31%
DIGITAL RIGHTS MANAGEMENT (DRM)	24%
DELIVERY (CDN ISSUES)	21%
VIDEO STREAM QUALITY	21%
QUALITY ASSURANCE AND TESTING	17%
VIEWER ENGAGEMENT WITH VIDEO	16%
QUALITY OF SERVICE (QOS) WITH BANDWIDTH RESTRICTIONS/OFFLINE PLAYBACK	16%
CONNECTING POINT SOLUTIONS	12%
OTHER	4%

DASH Industry Forum

https://go.bitmovin.com/video-developer-report

Live & Low latency streaming TF

- Improving the existing low latency catchup logic
  - In progress, please provide feedback in the Live TF call on Friday
- PRFT support
  - Parsing of Producer Reference Time in MPD and prft box in segments
  - Which uses cases to cover?
- Improved scheduling logic for low latency as discussed in DASH-IF
  - https://github.com/Dash-Industry-Forum/dash.js/issues/3259
- Content Steering
  - https://github.com/Dash-Industry-Forum/DASH-IF-IOP/issues/406
- Fast joining
  - What to do here?
- Resync element
  - Related to fast joining close to live edge?
- MPD patching
  - Server-side implementation for testing

DASH Industry Forum

Ad-Insertion TF

- Align with v5, what is missing in dash.js?
- Pre-roll element?
- SCTE35 based content replacement
  - Align with v5

DRM & Content Protection TF

- Support for multiple PlayReady System strings
  - com.microsoft.playready.recommendation
  - com.microsoft.playready
  - See
    - https://github.com/Dash-Industry-Forum/dash.js/issues/3852
    - https://github.com/Dash-Industry-Forum/dash.js/pull/3859
- Align with v5, what is missing in dash.js?
- Session based DASH?
  - A/B watermarking?
- Support for <dashif:Authzurl>

Event TF

- Align with v5, what is missing in dash.js?
- dash.js should be compliant with the event specification, not aware of any missing features or bugs.

ABR & Throughput Estimation

- Cleanup and refactor code
  - In progress
- Addition of new APIs such as Resource Timing API
- Additional throughput estimation options
  - such as harmonic mean.
  - Assigning higher weight on most recent throughput values
  - Different API endpoints for the different mean calculations
- Evaluate current ABR algorithms in different environments. Compare to other players. What can be improved?
- Problem with very high bitrates (100 Mbit/s)
  - https://github.com/Dash-Industry-Forum/dash.js/issues/3853

DASH Industry Forum

New reference UI

- Replace the existing reference UI with a new one
- Not necessarily major design changes but better usability and additional functions such as settings export

Enhancements

- CMCD enhancements
  - Whitelisting specific parameters
  - Custom key/value pairs
- CMSD?
- webRTC
  - Switch between webRTC and standard MSE based streaming?

Optimizations

- Improved XML parsing: New parsing library
  - https://github.com/Dash-Industry-Forum/dash.js/pull/3412
- MSE in webworkers
  - In progress
- Virtual buffer for devices with a single decoder
  - Helps with HbbTV ad-insertion
- Selection of audio/text tracks
  - Role specific handling
  - Accessibility features
  - Two character vs. three character syntax

Proposed workflow

1. Feature defined and discussed in DASH-IF / MPEG
2. Create test content issue
   - https://github.com/Dash-Industry-Forum/Test-Content
3. Create test content
4. Validate test content
   - http://conformance.dashif.org/
5. Development in dash.js
6. Validation of the dash.js implementation by DASH-IF?

DASH Industry Forum

Proposed priorities (old)

1. Throughput calculation improvements (Medium effort)
   - Finish code cleanup
   - Additional throughput estimation options
   - Addition of new APIs such as Resource Timing API
2. Improving the existing low latency catchup logic (Medium effort)
   1. Already in progress
3. PRFT support (Effort depends on concrete use case)
   1. Support for parsing of MPD and segment parameters
4. Improved scheduling logic as discussed in DASH-IF (Medium effort)
5. New reference UI (High effort)
6. Improved XML parsing (High effort)
7. MSE in webworkers (Medium effort)
   1. In progress

DASH Industry Forum

Proposed priorities 1/3 (updated)

Rank	Item	Description	Effort	Type
In Progress	• Improving the existing low latency catchup logic	• Based on discussion in DASH-IF • Remove “minDrift” • Improve scheduling logic for LL • Code cleanup • https://github.com/Dash-Industry-Forum/dash.js/pull/3831	Medium/High, already changed 43 files	Improvement
1	• Throughput estimation improvements	• Finish code cleanup • Additional throughput estimation options • Addition of new APIs such as Resource Timing API • Probably large benefits for existing ABR algorithms and research of future ABR algorithms	Medium (already started)	Improvement
2	• PRFT support	• Parsing of PRFT in segments and MPD • Using PRFT for use case to be defined	Medium (depends on concrete use case)	New feature
3	• Documentation	• Improve documentation for developers • Core concept illustration • EventBus • Factory Pattern • Object diagram • Data flow/Conceptual model	Medium	Improvement

Proposed priorities 2/3 (updated)

Rank	Item	Description	Effort	Type
4	• MSE in webworkers	• Reduce load on the main thread by performing MSE operations in webworkers	Medium	Improvement
5	• New reference UI	• Provide a new reference UI based on up-to-date JS framework including new useful features such as settings export	High	Improvement / New feature
6	• DASH Events	• Verification of correct MPD & inband event processing/dispatch mode/API • Adding support for alternative MPD event (for support of preroll/midroll)	Medium / High	New feature
/	• Minor tasks to be done in parallel	• Support for multiple PlayReady System strings • Optimizations of existing reference UI • CMCD optimizations • Bugfixes, Community support, etc.	Medium	/

DASH Industry Forum

Proposed priorities 3/3 (updated)

Rank	Item	Description	Effort	Type
tbd	• Xlink onRequest	• Basic support • verification of correct resolution (one-time resolution and condition for re-resolving with MPD update, etc.)	High	New feature
tbd	• Selection of audio/text tracks	• The client processing model for audio and text track selection is not well understood in the industry. I'm not sure I would characterize this as an "optimization" since there is only very basic support today. Both audio and text processing is based on several client user preference settings (including language and role, accessibility, etc) applied to the AdaptationSet @lang and Role (including Accessibility) values. In the case of language, it is further complicated by BCP47 syntax variants (e.g. "en", "eng", "en-US"	Medium / High	Improvement
tbd	• Configuration workflow between the application, the MPD and the dash client	• Identify gaps in the interface between application and dash.js client • Implement missing features	Depends on the concrete use case	Improvement / New features

DASH Industry Forum