



# DASH-IF livesim2

## a test ground for live DASH streaming



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Proud organizer of  
STREAMING TECH SWEDEN

# About me



Torbjörn Einarsson  
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- Expert on Video codecs and protocols
  - Ericsson Research, MobiTV, Edgeware, Agile Content, Eyevinn
- Relevant open source projects
  - **DASH-IF livesim2 (Go)**
  - mp4ff – mp4 library and tools (Go)
  - dash-mpd – DASH MPD library (Go)
  - ...

*“HLS is easy,  
why is DASH so hard?”*

coworker of mine

AvailabilityStartTime

Period Start Time

PresentationTimeOffset

MediaTime

UTCTiming methods

AvailabilityTimeOffset



Timescales

Average segment duration  
mediaPresentationDuration

period duration

Time or number-based segment addressing  
SegmentTemplate

1. \$Number\$
2. SegmentTimeline with \$Time\$
3. SegmentTimeline

# DASH Live Timing is complex

- Calculations of availability times
- Synchronized clocks
- Absolute media time
- Low-delay
- Availability Time Offset
- ...
- Multiple MPD formats, SegmentTimeline with Number and Time, ...
- How make sure that you do the same, and how test combinations?



# Livesim to the rescue

- Reference and testbed for live DASH timing tests and experiments
- Rewrites VoD assets to become "live"
  - "Perfect" output
  - Synchronized with NTP
    - The loop restarts is a multiple of "asset duration"
- Generates everything on the fly
  - Lots of parameters/variations
  - Stable
  - Green, much less power needed compared to live encoder
- Important as "live" test source for dash.js, shaka-player, HbbTV ...
- Livesim2 development sponsored by



# livesim2

- New livesim platform written in Go based on livesim1 experience
- Much easier to deploy locally and in the cloud
- Supports more general content like CTA-WAVE test content (29.97fps)
- Reproducible timing experiments by specifying time in query string
- Low-latency DASH by refragmenting segments to desired chunk duration
- Auto-generate subtitles showing absolute time
- Resegments audio to match video start/end time
- Includes negative test cases (losses, delay etc)
- Interactive UI for setting parameters and starting dash.js
- Available source code including short test content at <https://github.com/Dash-Industry-Forum/livesim2>
- Live at <https://livesim2.dashif.org> (limited to 10000 requests/24h/IP)

# URL generator – test it yourself

## Livesim2 URL generator

host=<https://livesim2.dashif.org>

Asset

testpic\_2s

MPDs

cea608\_and\_segs.mpd

SegmentTemplate variant

- ☒ \$Number\$  
☐ SegmentTimeline with \$Time\$  
☐ SegmentTimeline with \$Number\$

General timing ...

Multi-period ...

Low latency...

SCTE-35...

Start and stop...

Generate time subtitles...

Negative test cases...

Submit

Reset

URL= [https://livesim2.dashif.org/livesim2/testpic\\_2s/stpp\\_two\\_regions\\_multi\\_color.mpd](https://livesim2.dashif.org/livesim2/testpic_2s/stpp_two_regions_multi_color.mpd)

Copy

Play

Reset

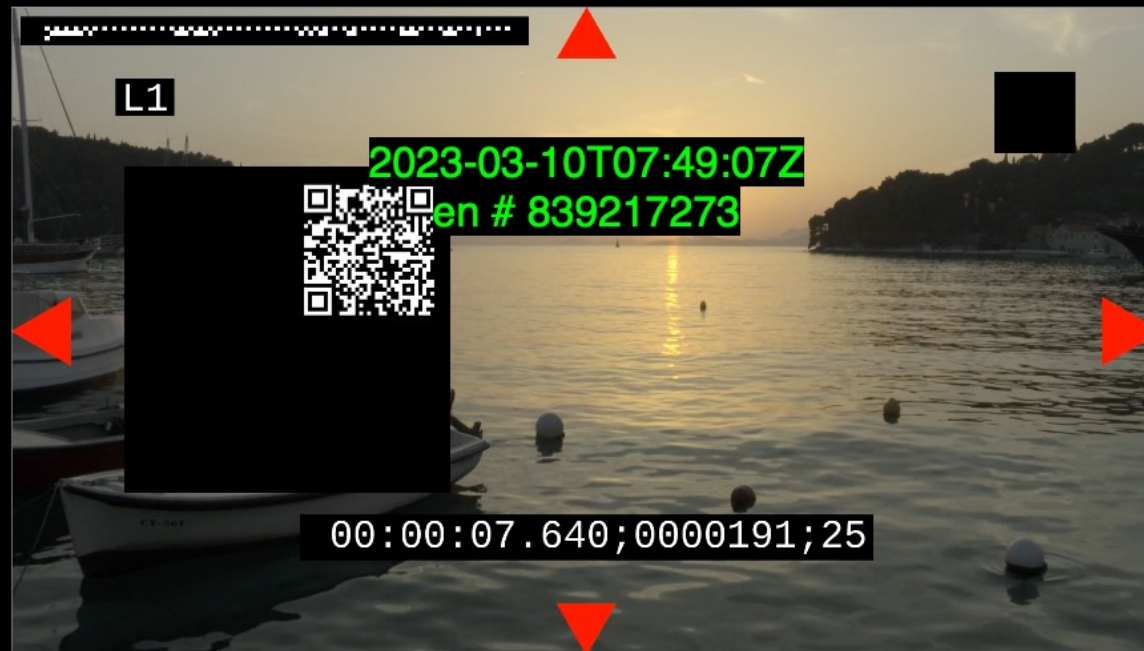


<https://livesim2.dashif.org/genurl>



# Absolute time subtitles

- Issue: short video loops, for example every 8s (bundled test content)
- Livesim2 optionally generates subtitle tracks with absolute time
- `/timesubstpp_en,sv,dk` => three subtitle tracks with time and seg #



Both stpp and wvtt formats

# Low latency

## Asset

testpic4\_8s

## MPDs

Manifest.mpd

## SegmentTemplate variant

- ☒ \$Number\$
- ☐ SegmentTimeline with \$Time\$
- ☐ SegmentTimeline with \$Number\$

## General timing ...

## Multi-period ...

## Low latency...

availabilityTimeOffset (float in seconds or inf)

7.5

chunk duration for low-latency (float in seconds)

0.5

low-latency target (milliseconds)

2500


URL= [https://livesim2.dashif.org/livesim2/ato\\_7.5/chunkdur\\_0.5/ltgt\\_2500/testpic4\\_8s/Manifest.mpd](https://livesim2.dashif.org/livesim2/ato_7.5/chunkdur_0.5/ltgt_2500/testpic4_8s/Manifest.mpd)

Copy

Play

Reset

Stream [https://livesim2.dashif.org/livesim2/ato\\_7.5/chunkdur\\_0.5/ltgt\\_2500/testpic4\\_8s/Manifest.mpd](https://livesim2.dashif.org/livesim2/ato_7.5/chunkdur_0.5/ltgt_2500/testpic4_8s/Manifest.mpd) Show Options Stop Load Copy Setting



Updated Export settings

Our export settings feature creates shorter URLs now. Click on "Copy Settings URL" on the top right and paste the URL in the address bar of your browser. The current settings are compared to the default settings and the difference is stored using query parameters.

Additional samples can be found in the [Sample Section](#).

Video Audio

- ☒ Buffer Length : 2.674
- ☒ Bitrate Downloading : 604 kbps
- ☐ Index Downloading : 2 / 3
- ☐ Index playing : 2 / 3
- ☐ Dropped Frames : 1
- ☐ Latency (min|avg|max) : 0.04 | 0.04 | 0.04
- ☐ Download (min|avg|max) : 7.28 | 7.34 | 7.45
- ☐ Ratio (min|avg|max) : 1.07 | 1.09 | 1.10
- ☐ Live Latency: 3.06
- ☐ Playback rate: 1

# Potential future features ...

- Ad insertion with periods
- Ad insertion with xlink
- DRM and encryption on the fly
- MPD Patch
- Event streams
- ...?
- Sponsoring would help (DASH-IF, ...?)

# Conclusion

- Livesim is a playground to experiment with and troubleshoot DASH timing
- **Livesim2:**
  - much easier to deploy
  - can handle much more content
  - has time subtitles and other new features
  - Important for testing dash.js, shaka-player, and HbbTV
- **Try it directly in your browser at <https://livesim2.dashif.org!>**

THANK YOU!