Content Steering: a Standard for Multi-CDN Streaming

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Alex Giladi, Alex Balk (Comcast), Ali Begen (Ozyegin University)
Will Law (Akamai)

About us

Yuriy Reznik
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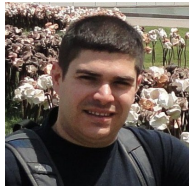

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PRESENTER_PRIORITY:
[“Daniel”, “Yuriy”]

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Presenter Steering Server

Content steering is a bit of a misnomer

We're not actually steering the content.

In fact, there is only one version of the content.

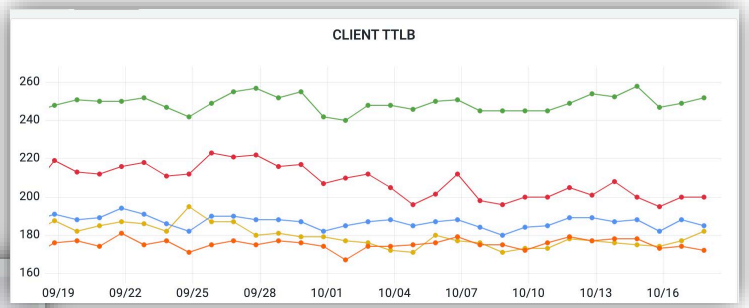
We are steering between **CDNs**

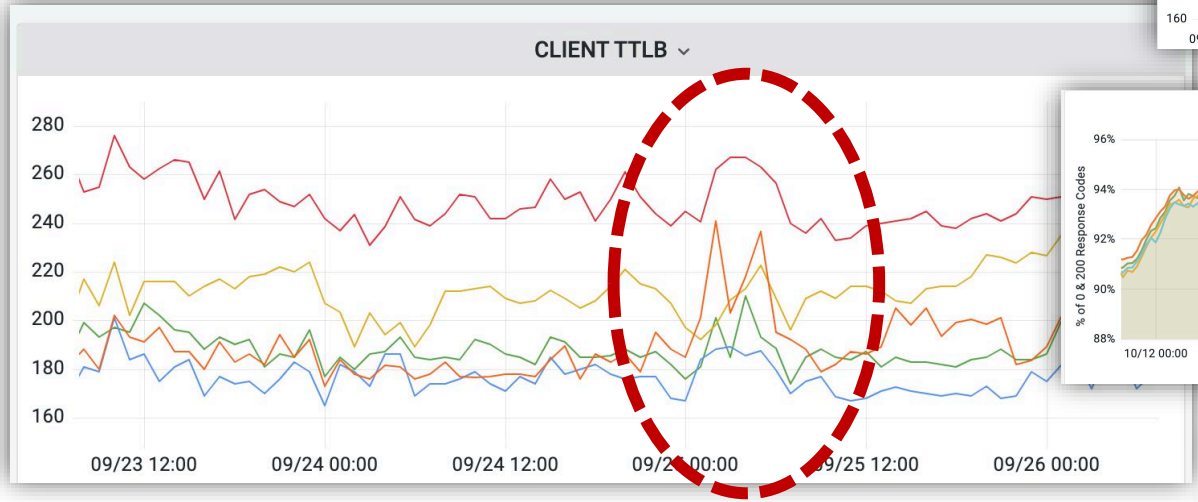
So content steering **is the art and science of switching CDNs**

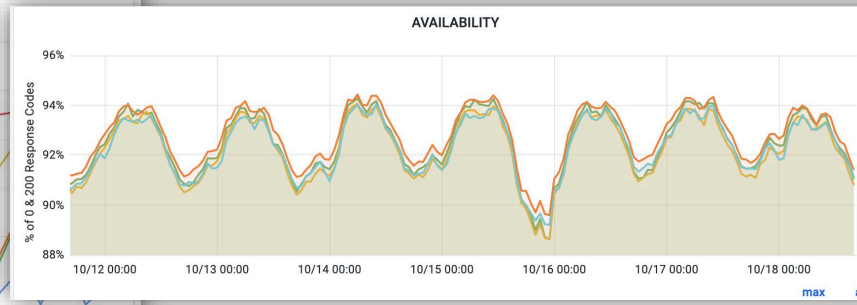
Why do we need to switch CDNs?

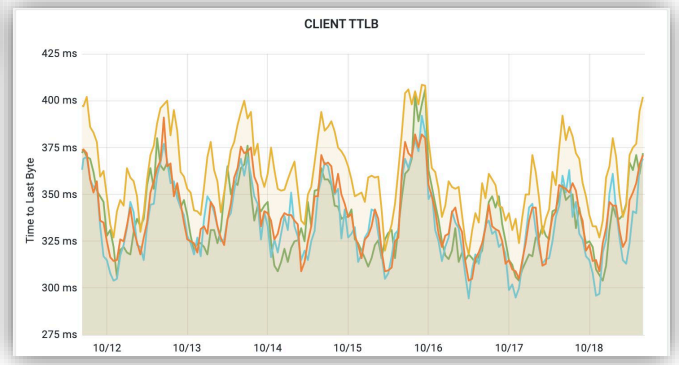
- **Performance**
  - CDN performance and capacity varies dramatically with AS and time.
  - Don't start new users and don’t keep existing users on a poorly performing CDN
- **Capacity**
  - Switch users away midstream if a CDN is developing capacity problems due to competing traffic.
- Volumetric **contractual commits**
  - CDN A gets 35% of traffic
  - CND B gets 65% of traffic
- **Cost**
  - Price can vary by region and even time of day.

Example: CDN performance does vary by time





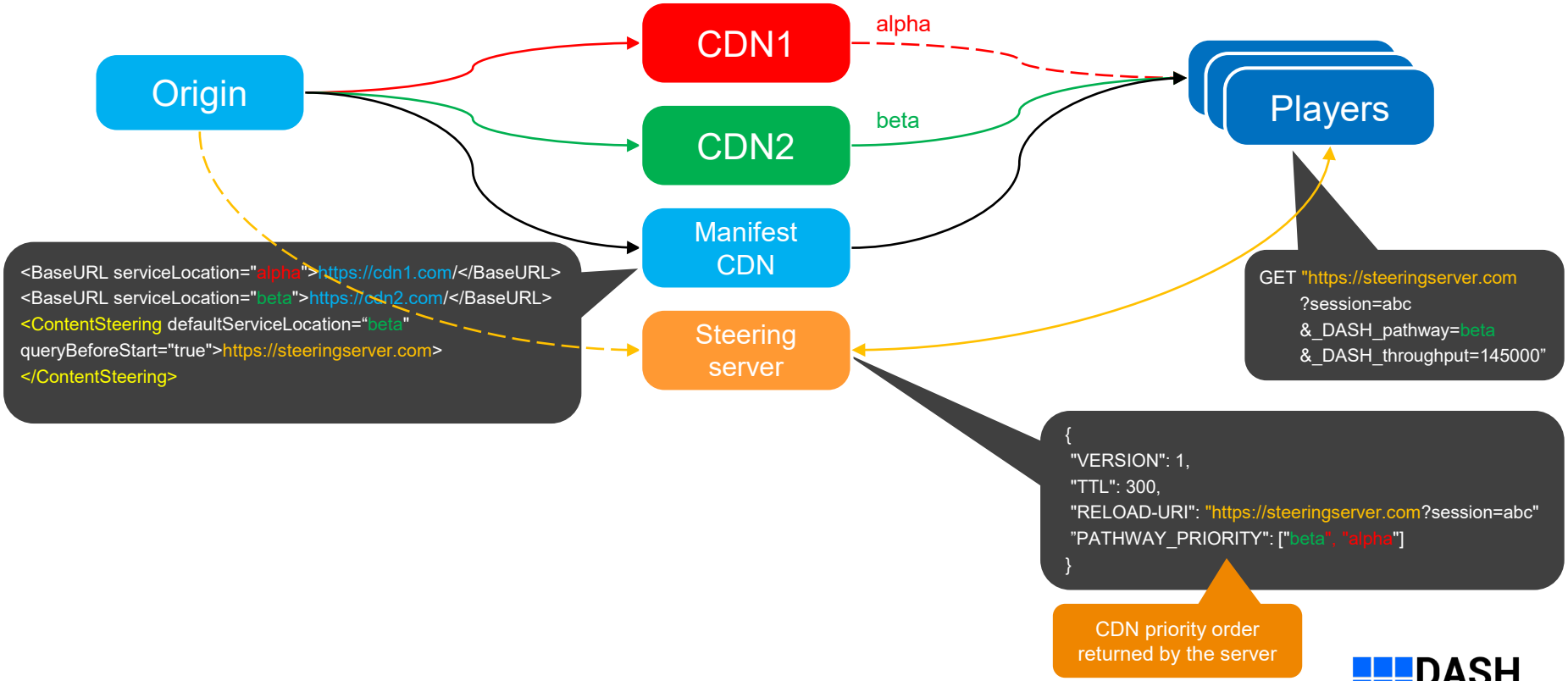




[Image data courtesy of Paramount]

For best performance during this 10-minute window, switch to blue CDN and away from orange

Content Steering – Principle of Operation



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Advantages of Content Steering

- ✓ **Standards based**
  - Soon to be published as an ETSI specification
- ✓ **Interoperable**
  - The same steering protocol and steering server can be used for both DASH and HLS
- ✓ **Backwards compatible**
  - Clients not supporting content steering will simply ignore the corresponding elements in the manifest
- ✓ **Easy integration**
  - Content steering is already supported by many media players

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Content Steering – Client Implementations

Media Player	DASH Content Steering	HLS Content Steering
dash.js	since version 4.5.0	
VIDEO.JS	since version 8.8.0	since version 8.8.0
Shaka Player	since version 4.6.0	since version 4.6.0
ExoPlayer	planned for 2024	planned for 2024
hls.js		since version 1.4.0
AVPlayer		since iOS version 15.0

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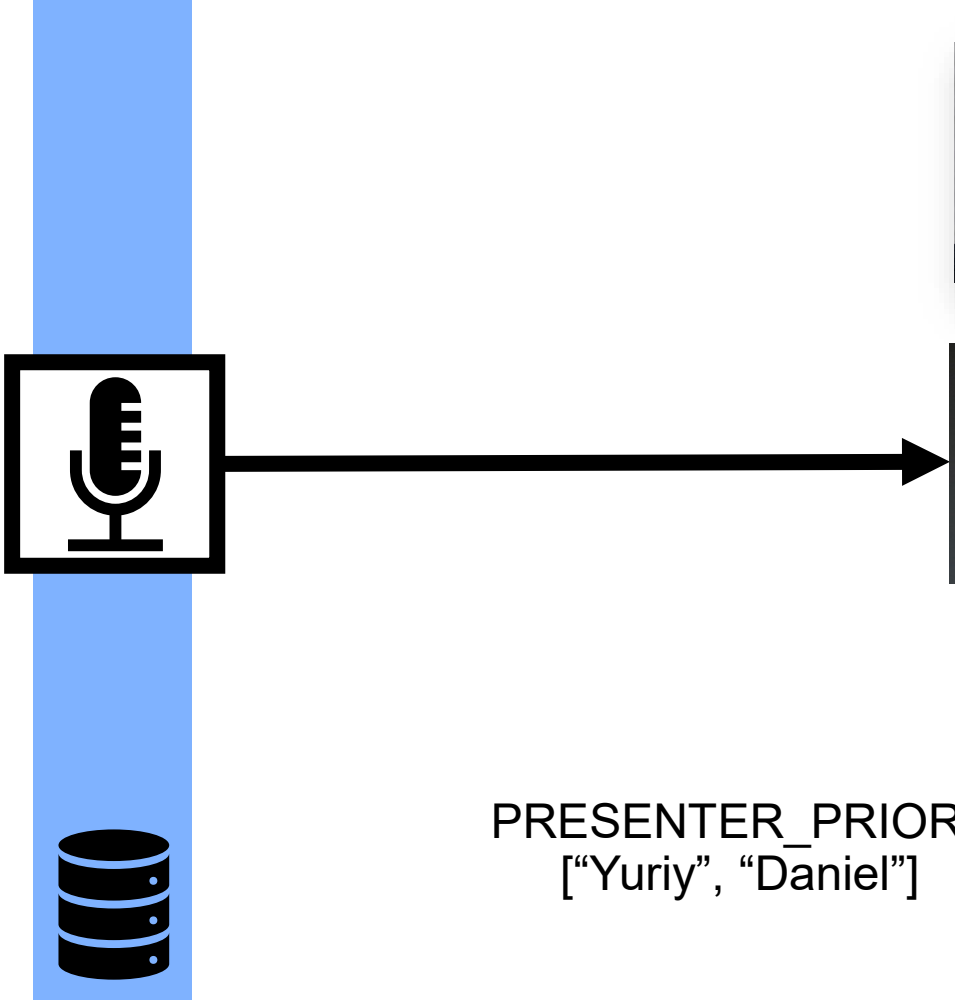

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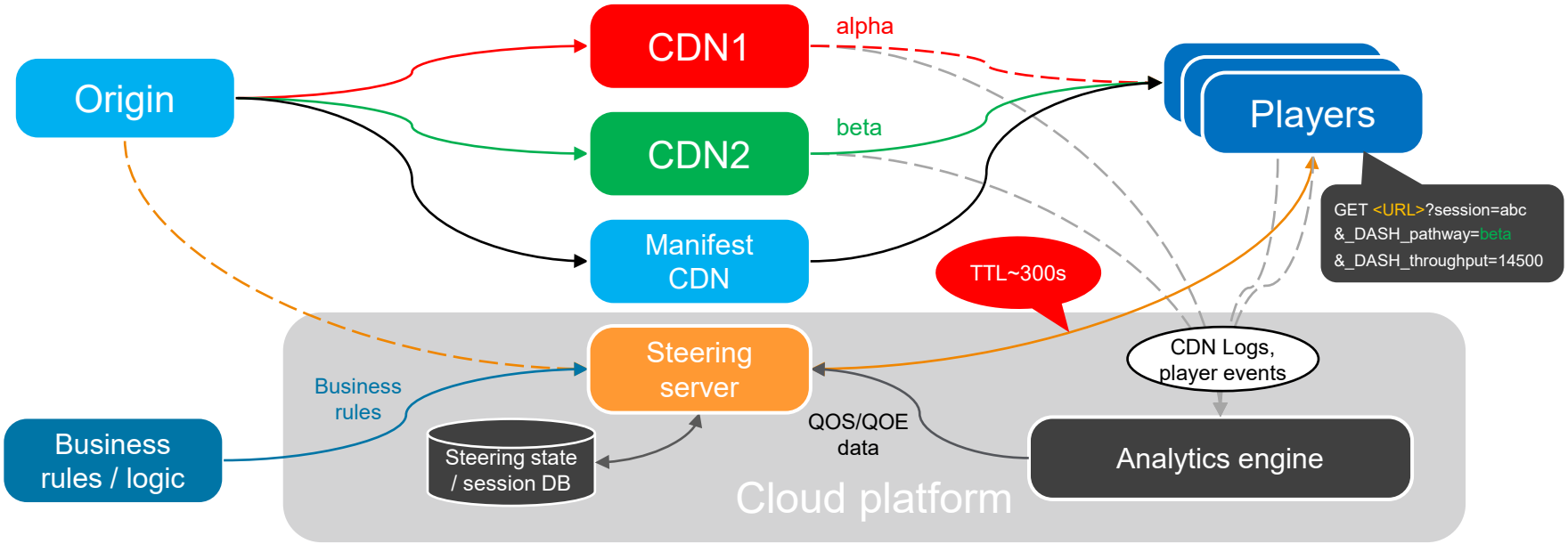
Content Steering – Server Implementation



Challenges / Tradeoffs

- **TTL time**: 300s default is just too long! Suitable for basic CDN load balancing. Not suitable for QOE optimizations!
- **Scalability**: the steering server should be at least as scalable as manifest CDN!
- **Costs**: reducing TTL will increase number of requests and traffic to the steering server!

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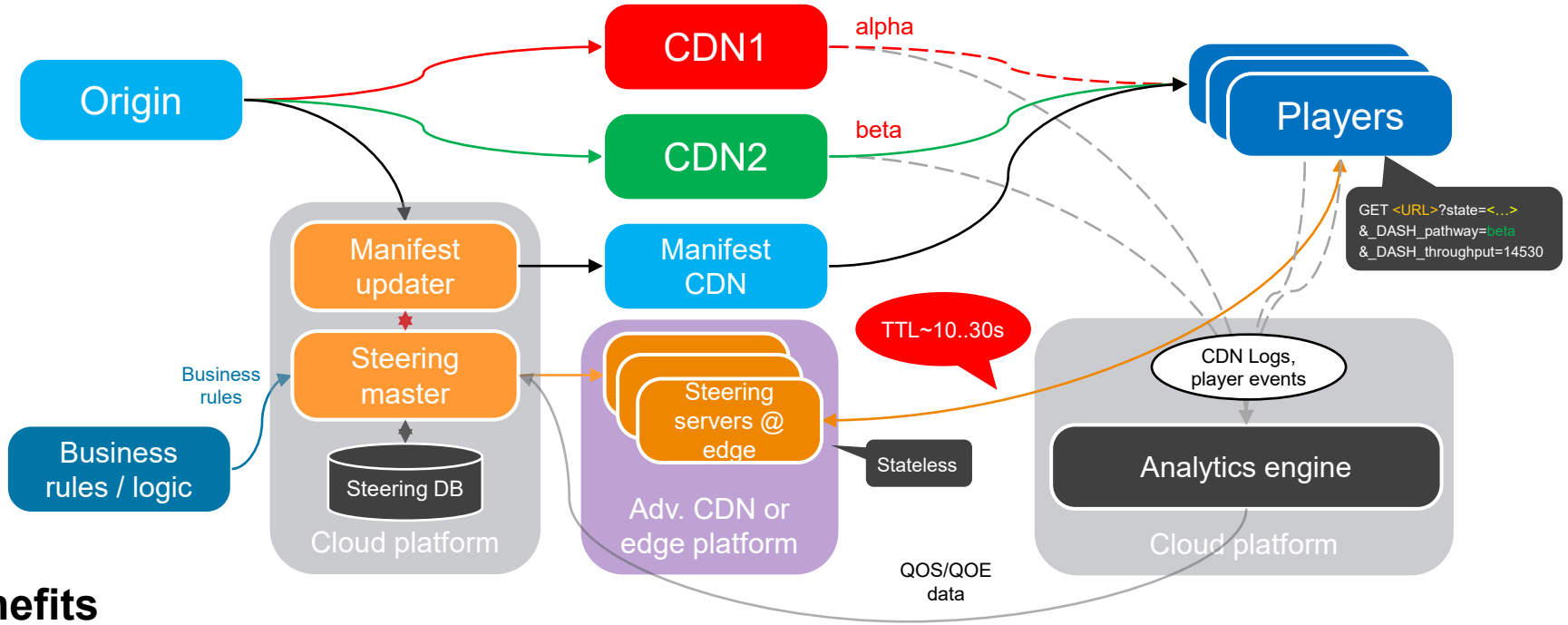
Brightcove's Content Steering @ Edge



Benefits

- **TTL** can be much smaller; comparable to player buffer delay
- Can be used to optimize **QoE**. With shorter TTLs smart switch decisions can minimize buffering!
- **Scales** as CDN or edge platform allows. Multiple CDNs or platforms can be used for redundancy.

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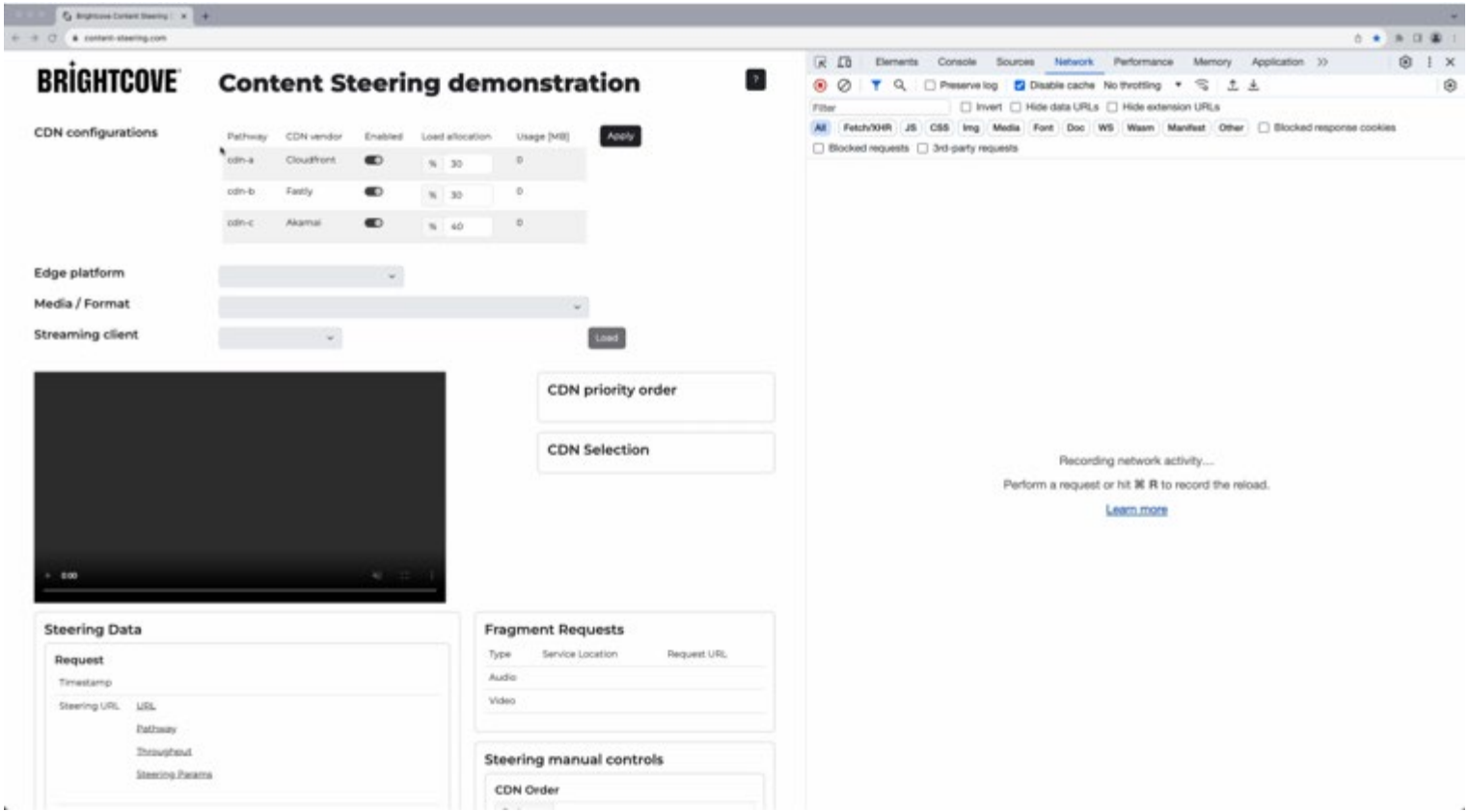
Content Steering - Demonstration



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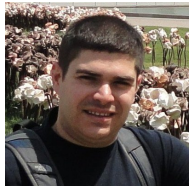

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