Marrying WebRTC and DASH for Interactive Streaming

IETF 113, 21 March 2022

DASH + WebRTC Use Cases
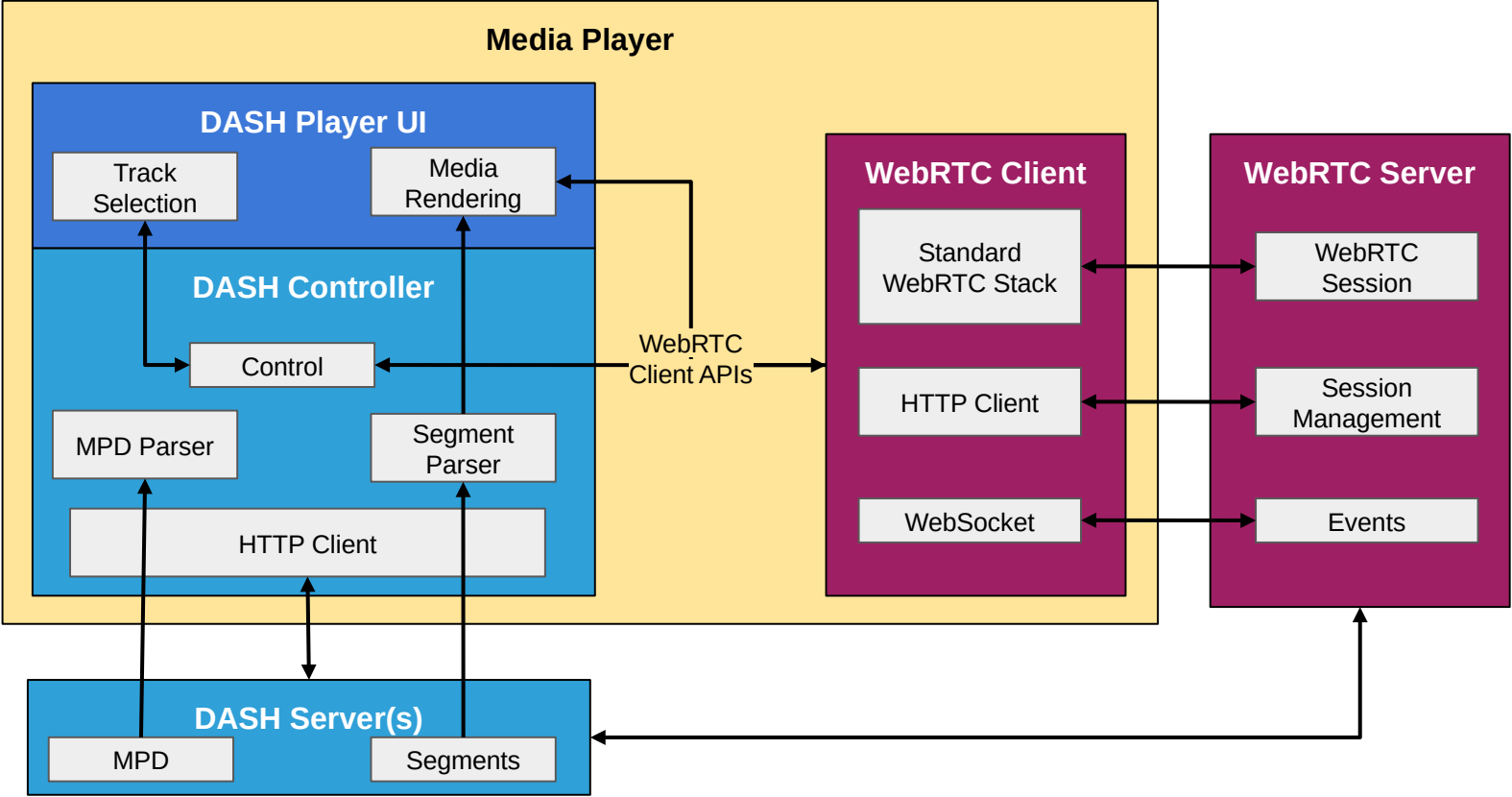
Fallback
Real-time WebRTC with fallback to DASH

Device doesn't support WebRTC.

Network connection is not good enough to sustain a very low latency stream.

Premium real-time experience using WebRTC not enabled for this user.

Interleaved
Real-time WebRTC interleaved with DASH

A real-time live event using WebRTC while the ad periods are delivered with DASH.

Main content delivered via DASH and periods for interactive programs delivered via WebRTC.

Concurrent
Real-time WebRTC concurrent with DASH

A real-time event using WebRTC with supplemental pre-recorded content delivered with DASH.

Pre-recorded DASH content delivered with supplemental live WebRTC streams.

Co-watching synchronized streams with audio/video/text chat.

Comparing DASH and WebRTC

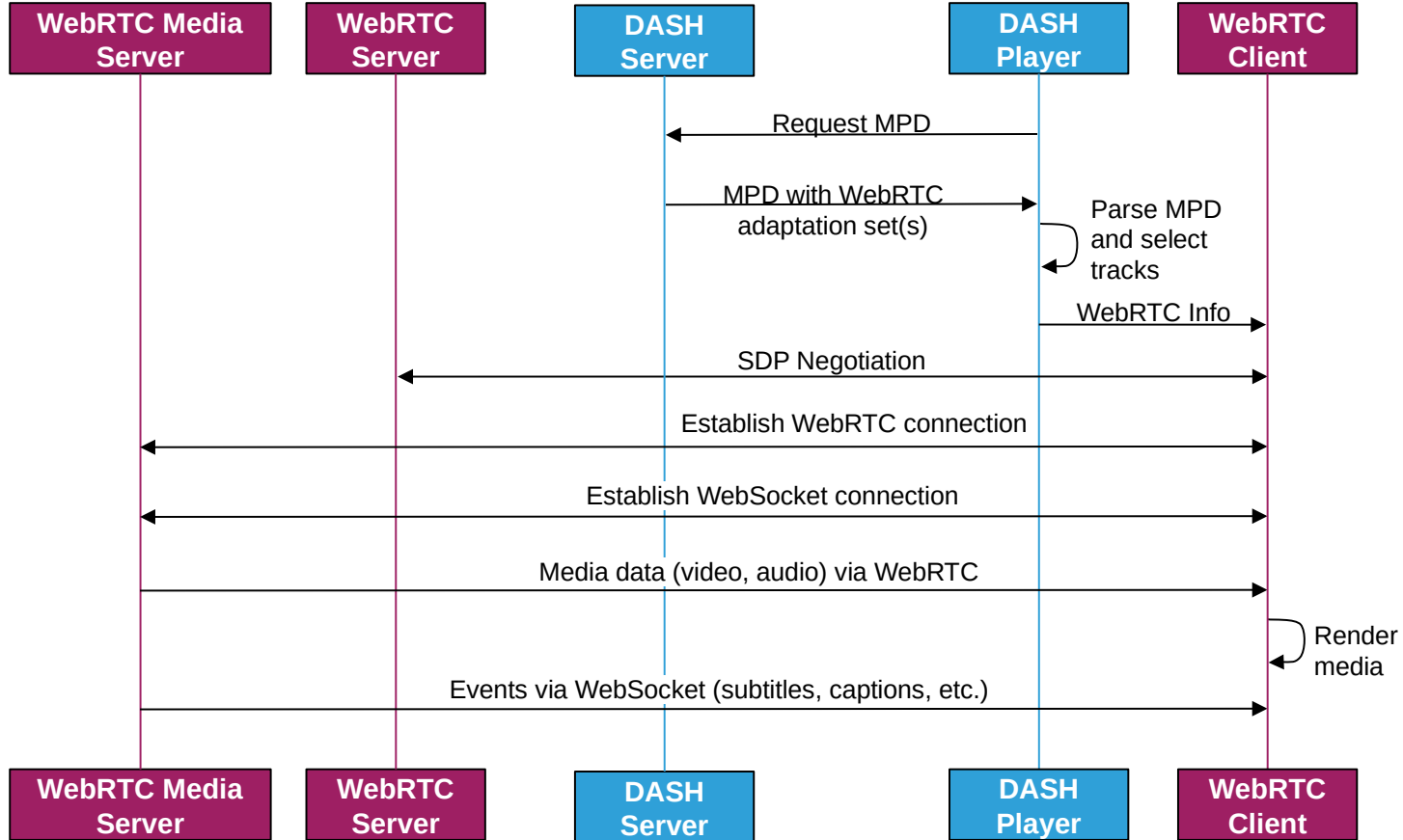| Feature	DASH	WebRTC
Content Description	MPD: Same for all users, describes all available content	SDP: Unique for each client, typically with a single audio and a single video.
Media Selection	Client selects media, bitrate, and codecs.	Codecs negotiated between the server and client, server selects or adapts bitrate.
Subtitles/Captions	Standardized	Proprietary
Timing	Buffered and time synched	Immediately rendered
End-to-end Latency	~ 3-5 seconds for LL-DASH	< 1 second, often less than 0.5 second
Distribution	CDN: low-cost, widely available	WebRTC servers: proprietary implementations of standards
Playback	JavaScript libraries	Direct support in all modern browsers

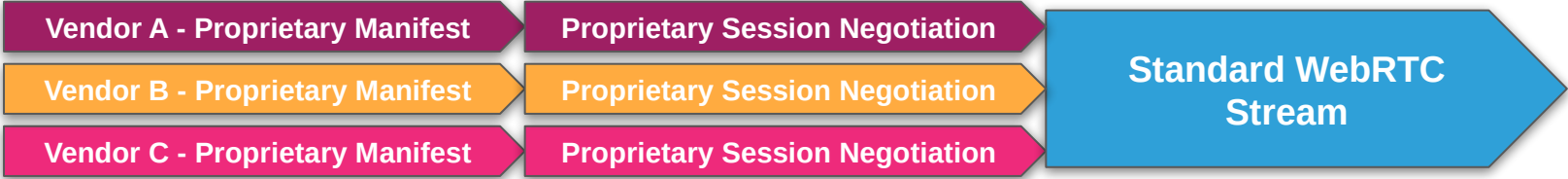# Hybrid Delivery
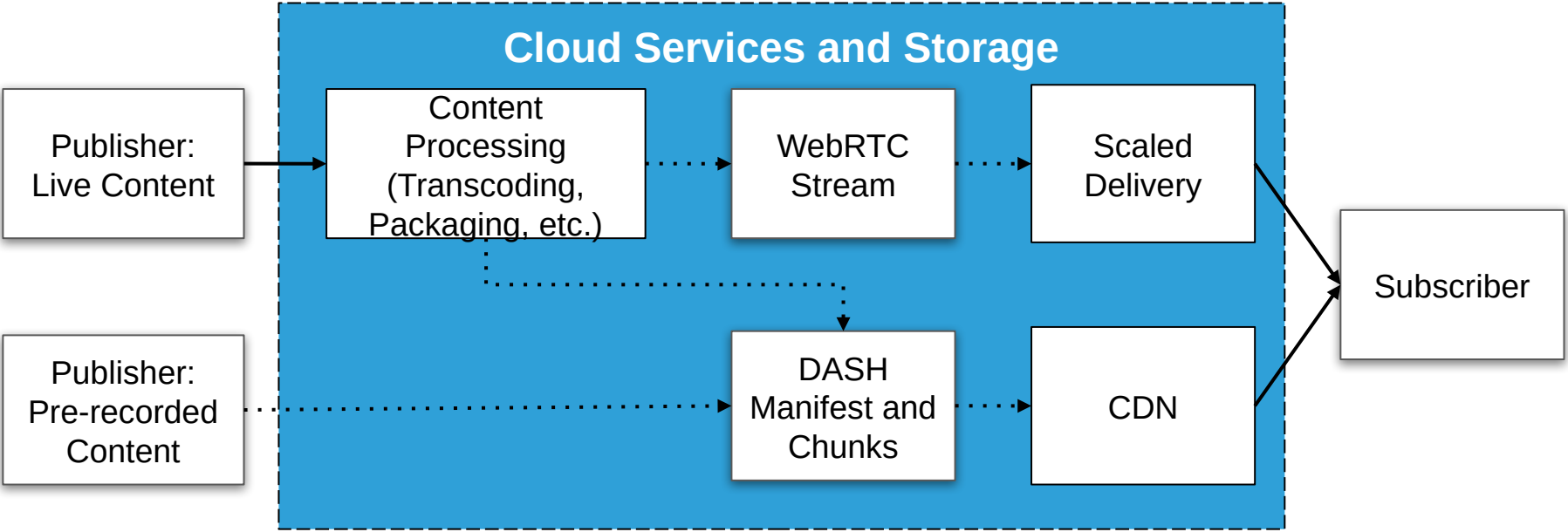
Example Hybrid Client Architecture

Workflow

From Discovery to Streaming

Current state of Real-Time Streaming

Vendor A - Proprietary Manifest	Proprietary Session Negotiation	
Vendor B - Proprietary Manifest	Proprietary Session Negotiation	Standard WebRTC Stream
Vendor C - Proprietary Manifest	Proprietary Session Negotiation	

Goal for Real-Time Streaming

Standard Manifest	Standard Session Negotiation	Standard WebRTC Stream

Work for WebRTC Extensions

- Define and select appropriate session management/signaling protocol
- Define control protocol for dynamic stream switching that does not require SDP renegotiation
- Continue development of methods for additional security of streams
- Define a standardized means to deliver subtitles, closed captions, and other events
- Continue development of a mechanism for time synchronization of timed metadata and DASH periods
- Collection of metrics and client metadata for WebRTC sessions and translation to existing metrics and client metadata, transmission via APIs

Work for DASH

- Determine APIs to be used between WebRTC clients and DASH clients
- Define how WebRTC information is represented in MPDs
- Determine whether DASH and WebRTC can both render to a single browser video element or switch between two video elements
- Support hybrid operations with WebRTC and DASH HTTP-based operations

Further Reading

DASH-IF Report Summary: https://dashif.org/webRTC/

Full Report: https://dashif.org/webRTC/report

Interest survey: https://forms.gle/Yy89GGeMsXYQixBZ6