

Streaming Player Anatomy Cheatsheet

The seven sub-systems of a modern streaming player, and which file owns each one in hls.js, Shaka Player, dash.js, and Video.js v10.

Sub-system	What it owns	hls.js (file)	Shaka Player	dash.js	Video.js v10
1. Manifest fetcher	Downloads and parses the .m3u8 playlist or .mpd manifest. Refetches at the live edge.	playlist-loader.ts	ManifestParser	ManifestLoader	VHS / playlistLoader
2. Segment fetcher	Downloads media chunks over HTTPS. Keeps 2-3 in flight. Attaches CMCD headers.	fragment-loader.ts	SegmentFetcher	FragmentLoader	VHS / segmentLoader
3. ABR controller	Picks the next rendition: throughput-based, buffer-based (BOLA), hybrid (MPC), or neural.	abr-controller.ts	AbrManager	ABRRules / DYNAMIC	ABR algorithm hook
4. Buffer manager	Calls SourceBuffer.appendBuffer(). Handles gap-jumps and evictions. Uses MSE or MMS.	buffer-controller.ts	MediaSourceEngine	BufferController	VHS / sourceUpdater
5. Decoder pipeline	Browser-native demux, decode, render, A/V sync. Player code is largely a passenger here.	(native — browser)	(native — browser)	(native — browser)	(native — browser)
6. DRM bridge (EME)	Talks to Widevine / FairPlay / PlayReady CDM. Relays license messages to your server.	eme-controller.ts	DrmEngine	ProtectionController	videojs-contrib-eme
7. Telemetry	Emits startup time, rebuffer ratio, failure rate. Forwards to Mux Data / Conviva / etc.	events + logger.ts	Player.Listener	MetricsModel	videojs.analytics

Five things every player team should remember

- MSE = W3C Working Draft 4 November 2025 (latest Recommendation 17 November 2016). MSE-in-Workers is stable since Chrome 108.
- EME is not DRM. It is the messaging channel to the browser CDM. Three CDMs to support: Widevine, FairPlay, PlayReady.
- iOS Safari 17.1+ ships Managed Media Source instead of classic MSE. Feature-detect MMS first, fall back to MSE.
- Target rebuffer ratio < 1%; below 0.5% on tuned products; over 3% is a production incident.
- CMCD (CTA-5004) and CMCDv2 (CTA-5004-A, Feb 2026) attach per-request context to every segment GET. Cheapest reliability upgrade.