

MSE Engineer's Quick Reference

Media Source Extensions — object model, lifecycle, pitfalls, and the 2026 additions.

Four objects you actually use

- **MediaSource** root proxy; created with new MediaSource(); attached via video.src = URL.createObjectURL(ms).
- **SourceBuffer** per-track buffer; appendBuffer, remove, changeType.
- **MediaSourceHandle** transferable bridge; used with video.srcObject = handle for MSE-in-Worker.
- **ManagedMediaSource** Safari 17+; adds startstreaming / endstreaming events; only path on iPhone.

Top pitfalls in production

- Appending while sb.updating === true → InvalidStateError. Always queue.
- QuotaExceededError → call remove(0, currentTime - 5), await updateend, retry.
- Calling addSourceBuffer before sourceopen → InvalidStateError.
- Switching codecs without changeType() → silent decode failure.
- Calling endOfStream('decode') on every error → player permanently stuck in "ended" state.
- Mixing MPEG-TS with fMP4 in the same buffer → format registry rejects TS in Safari.

Six-step lifecycle

1. const ms = new MediaSource()
2. video.src = URL.createObjectURL(ms)
3. Wait for 'sourceopen' (state "open").
4. const sb = ms.addSourceBuffer(mime)
5. Append init segment, then media segments; wait for 'updateend' between calls.
6. ms.endOfStream() when finished (skip for live; use setLiveSeekableRange).

ManagedMediaSource (iPhone Safari 17.1+)

- **startstreaming** browser tells player to resume fetching (~10 s ahead).
- **endstreaming** browser tells player to stop fetching (~30 s ahead).
- **bufferedchange** browser evicted data; refill if needed.
- **quality** "low"/"medium"/"high"; cap rendition under cellular or Low Power Mode.

Feature-detect: window.ManagedMediaSource ??
window.MediaSource.

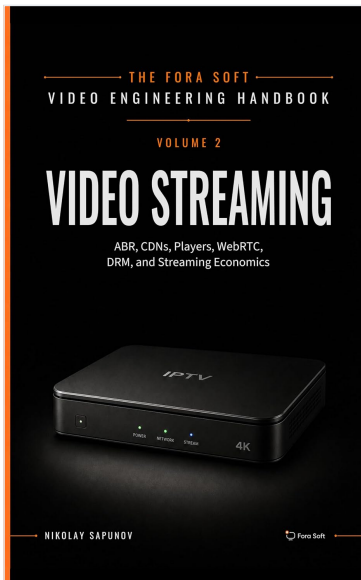
Browser support matrix (May 2026)

Browser / runtime	MSE	MSE-in-Worker	ManagedMediaSource
Chrome / Edge / Opera (desktop)	Yes (Chrome 23, 2013)	Yes (Chrome 108, 2022-11)	No (uses plain MSE)
Firefox desktop	Yes (FF 42, 2015)	Not yet (May 2026)	Not yet (May 2026)
Safari macOS	Yes (Safari 8, 2014)	Not yet	Yes (Safari 17.0, 2023-09)
Safari iPadOS	Yes (iPadOS 13, 2019)	Not yet	Yes (Safari 17.0, 2023-09)
Safari iPhone	No — never	No	Yes (Safari 17.1, 2023-10)
Tizen / webOS / Android TV	Yes (Chromium-based)	Yes on recent builds	Limited; vendor-specific
Roku	No (BrightScript only)	—	—

Codec strings most players carry in 2026

H.264 + AAC	video/mp4; codecs="avc1.640028,mp4a.40.2"
HEVC + AAC	video/mp4; codecs="hvc1.1.6.L93.B0,mp4a.40.2"
VP9 + Opus	video/webm; codecs="vp09.02.10.10.01.09.16.09.01,opus"
AV1 + Opus	video/mp4; codecs="av01.0.05M.08,opus"

Companion to: 'Media Source Extensions (MSE): How Every Web Player Works Under the Hood'
www.forasoft.com/learn/video-streaming/articles-streaming/media-source-extensions-mse



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This reference covers MSE objects, the lifecycle, common pitfalls and 2026 browser support. Volume 3 covers the player around it: ABR rung selection, buffer-based and throughput-based logic, recovery from stalls, DRM, trick play and QoE monitoring in production.

WHAT YOU WILL FIND INSIDE

- ABR algorithms: buffer-based, throughput-based, hybrid
- Player recovery from stalls and errors
- DRM with EME on top of MSE
- QoE metrics collected at the player

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