

EME Multi-DRM Cheat Sheet

Encrypted Media Extensions — key system strings, schemes, security tiers, statuses, pitfalls.

Five objects you actually use

- **MediaKeySystemAccess** — result of `navigator.requestMediaKeySystemAccess()`; carries the negotiated configuration.
- **MediaKeys** — per-origin CDM proxy; attach with `video.setMediaKeys()`.
- **MediaKeySession** — one conversation per license; types: temporary, persistent-license, persistent-usage-record.
- **MediaKeyMessageEvent** — CDM bytes for the license server; forward verbatim, never parse.
- **'encrypted' on video** — demuxer hit unknown PSSH; starts the whole flow.

Top pitfalls in production

- Packaging only for cenc → Safari/FairPlay refuses to play. Use cbcs.
- Sharing one license server URL across CDMs → wire formats are not interchangeable.
- Using `com.microsoft.playready` on Edge → SL3000 / 4K never unlocks; use `com.microsoft.playready.recommendation`.
- Ignoring output-downscaled → user gets 540p silently, churns.
- Parsing or logging message bytes → leaks per-device identifiers; never touch them.
- Mixing up 'encrypted' (on <video>) and 'message' (on MediaKeySession) → sessions open but no license fetched.

Nine-step license flow

1. `navigator.requestMediaKeySystemAccess(ks, cfg)`
2. `access.createMediaKeys()`
3. `video.setMediaKeys(keys)`
4. 'encrypted' fires → collect initData
5. `keys.createSession('temporary')`
6. `session.generateRequest(initDataType, initData)`
7. 'message' → HTTPS POST to license server
8. license response → `session.update(resp)`
9. 'keystatuseschange' → check 'usable', surface downscale/restrict.

Key statuses (W3C WD 2026-05-20)

- **usable** — key ready; continue playback.
- **expired** — license window passed; re-request.
- **released** — persistent session removed the key.
- **output-restricted** — no playback: output not secure (HDCP).
- **output-downscaled** — lower-rendition keys only; cap ABR.
- **status-pending** — CDM not done evaluating; wait.
- **internal-error** — CDM crash; close + recreate session.
- **usable-in-future** — rental window not open yet (new in 2026).

Three CDMs that matter in 2026

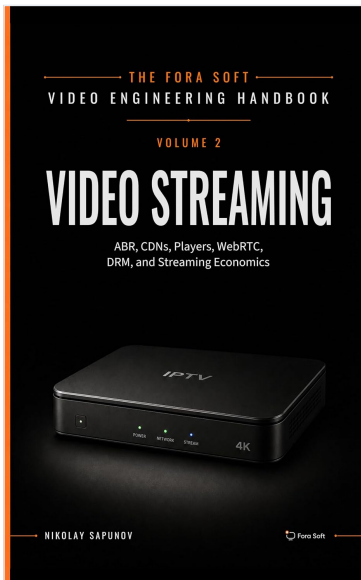
CDM	Key system string	Browsers / platforms	Schemes	Security tiers
Widevine	<code>com.widevine.alpha</code>	Chrome, Edge, Firefox, Android, ChromeOS, Chromecast	cenc, cbcs	L1 / L2 / L3
FairPlay	<code>com.apple.fps</code>	Safari (macOS, iOS, iPadOS), Apple TV, tvOS	cbcs only	HW (Secure Enclave) / SW
PlayReady	<code>com.microsoft.playready.recommendation</code>	Edge on Windows, Xbox, Tizen, webOS, Vidaa, STBs	cenc, cbcs	SL150 / SL2000 / SL3000
Clear Key	<code>org.w3.clearkey</code>	Every conformant EME browser (testing only)	cenc (plain)	none

Robustness ladder for Widevine (Shaka / hls.js pattern)

```
videoCapabilities: [
  { contentType: 'video/mp4; codecs="avc1.640028"', encryptionScheme: 'cbcs', robustness: 'HW_SECURE_ALL' },
  { contentType: 'video/mp4; codecs="avc1.640028"', encryptionScheme: 'cbcs', robustness: 'HW_SECURE_DECODE' },
  { contentType: 'video/mp4; codecs="avc1.640028"', encryptionScheme: 'cbcs', robustness: 'SW_SECURE_DECODE' },
]
```

Companion to: 'Encrypted Media Extensions (EME): How DRM Lives in a Browser'

www.forasoft.com/learn/video-streaming/articles-streaming/encrypted-media-extensions-eme



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Video Streaming: A Complete Guide to Video Delivery

From ABR and CDNs to Players, WebRTC, DRM, and the Economics of Streaming

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This cheat sheet keeps key system strings, schemes, security levels and key statuses on one page while you wire EME. Volume 3 covers the full picture behind it: DRM in the browser and on devices, how players handle licenses and recover from errors, CDN delivery of encrypted segments, and what protection costs per viewer.

WHAT YOU WILL FIND INSIDE

- Multi-DRM with Widevine, FairPlay and PlayReady
- Delivering encrypted segments through CDNs
- Player license handling and error recovery
- Economics of protected streaming

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