Encryption for content protection in streaming

SFrame WG - IETF 110

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Two use cases - Two trust models

- Video Conference
  - Client trusted (special case of web apps, see youenn slides)
  - KMS trusted

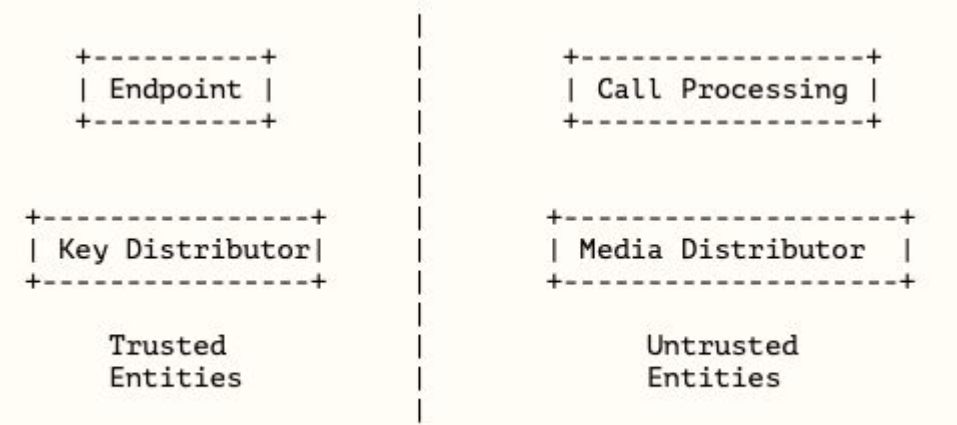


Figure 1: Trusted and Untrusted Entities in PERC

Two use cases - Two trust models

- Streaming
  - Clients trusted (special case of webapp, see next slide)
  - KMS trusted

  - Ingest link trusted
  - Media platform trusted (need raw access for transcoding)

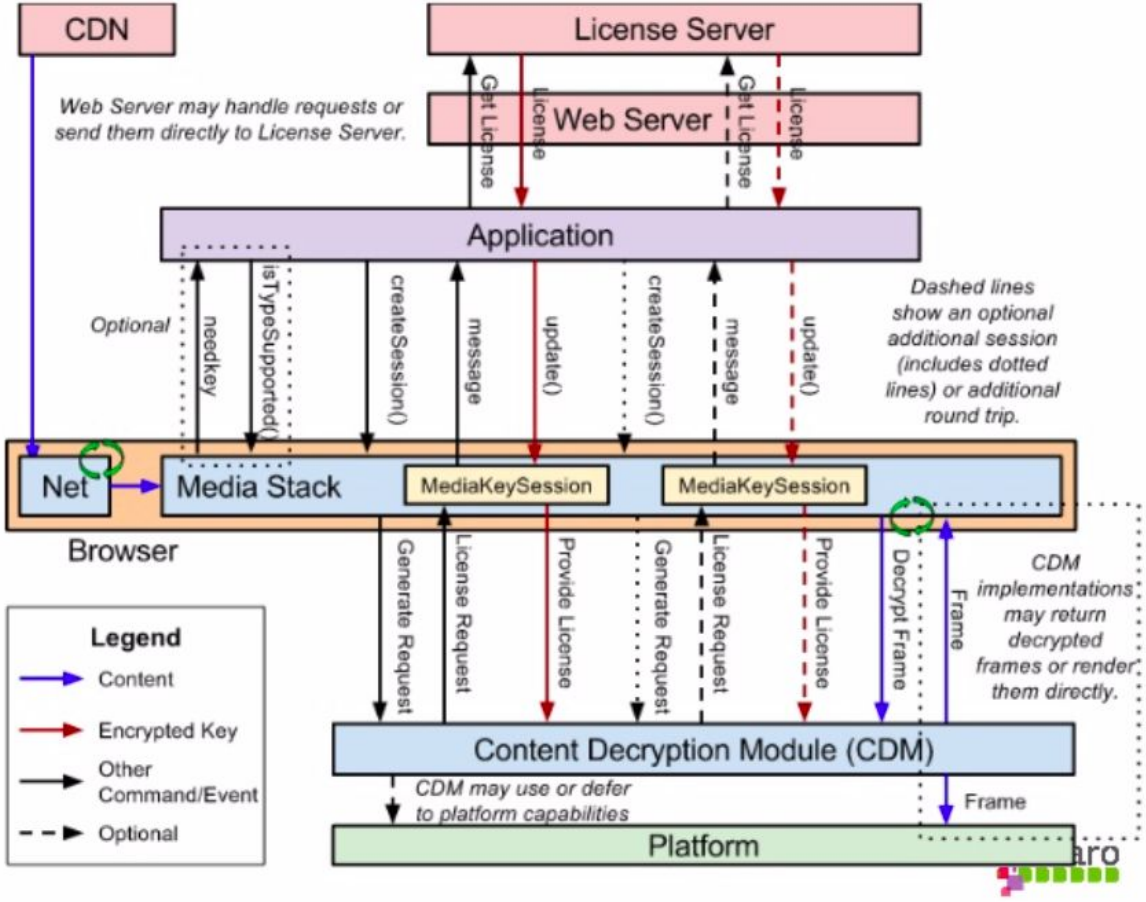
  - Only delivery is encrypted (DRM)
  - Encryption is media transport protocol specific.

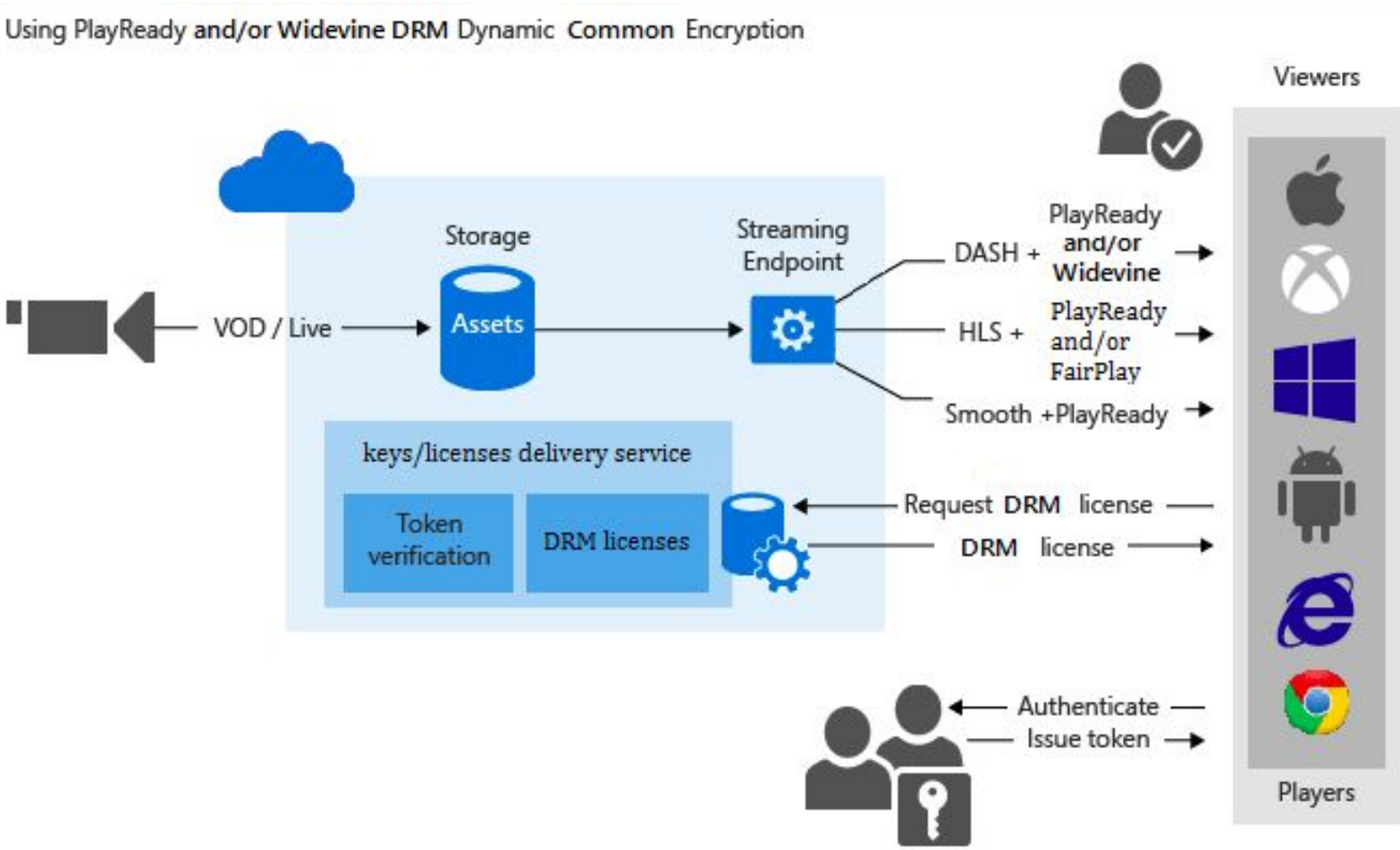
Encrypted Media Extensions

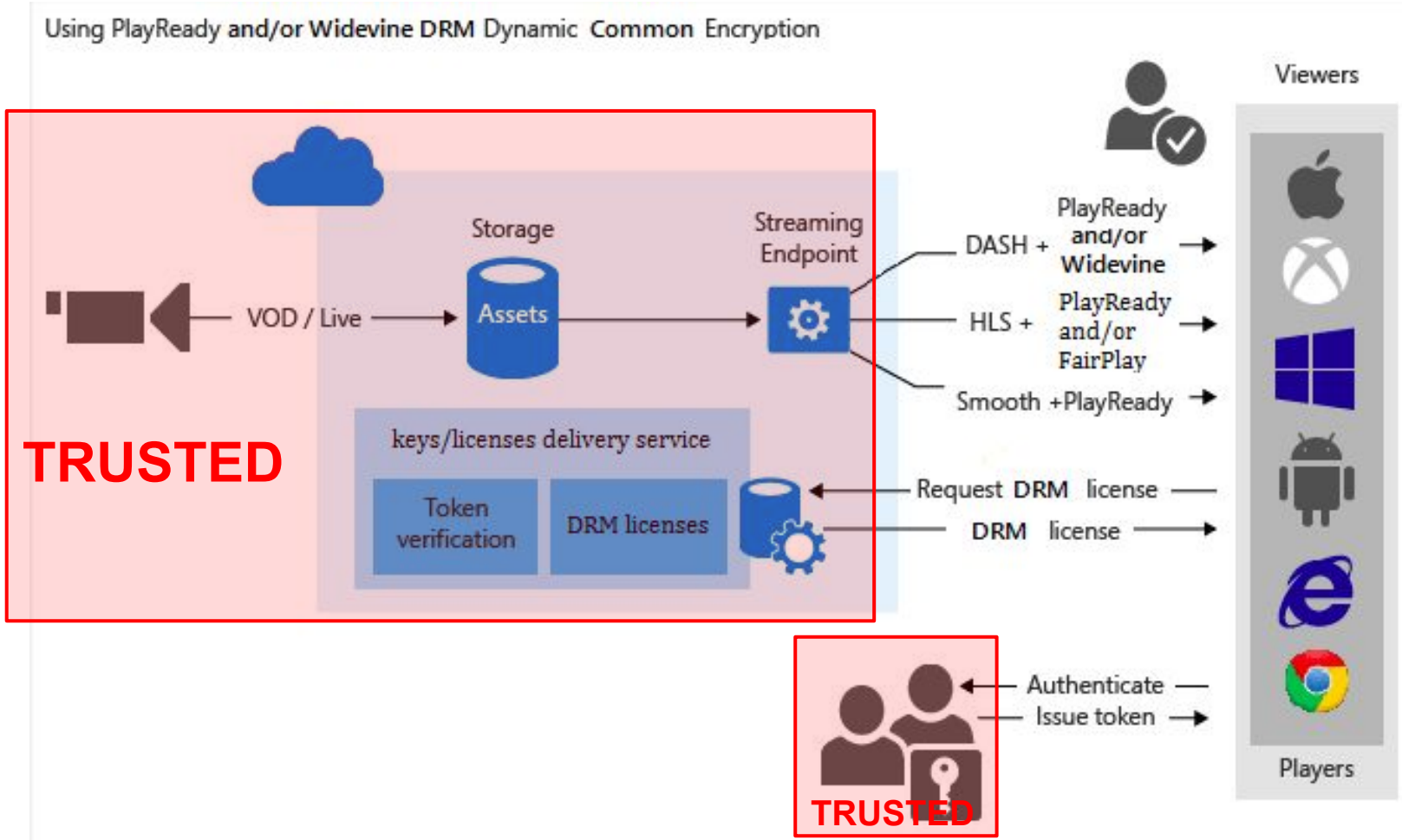
W3C draft for playback protected content using the **HTMLMediaElement**.

The standard doesn't specify the DRM subsystem itself but provides a API to interface/select a DRM subsystem.

Supported by almost all browsers using various DRM platforms: Widewine, Adobe DRM, PlayReady




Using PlayReady and/or Widevine DRM Dynamic Common Encryption
Viewers
Storage
Streaming Endpoint
VOD / Live
Assets
DASH +
PlayReady and/or Widevine
HLS +
PlayReady and/or FairPlay
Smooth +PlayReady
keys/licenses delivery service
Token verification
DRM licenses
Request DRM license
DRM license
Authenticate
Issue token
Players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TRUSTED
keys/licenses delivery service
Token verification
DRM licenses
Request DRM license
DRM license
Authenticate
Issue token
TRUSTED
Players

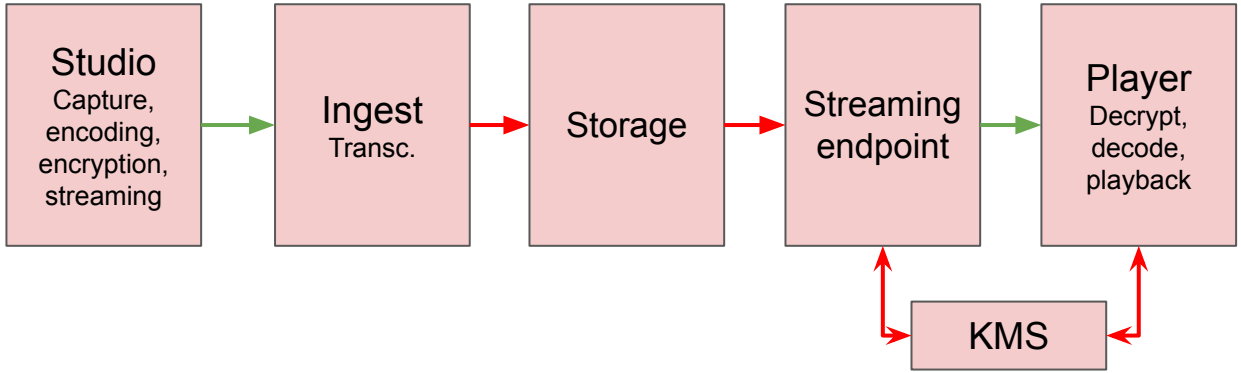
Two use cases - Two trust models

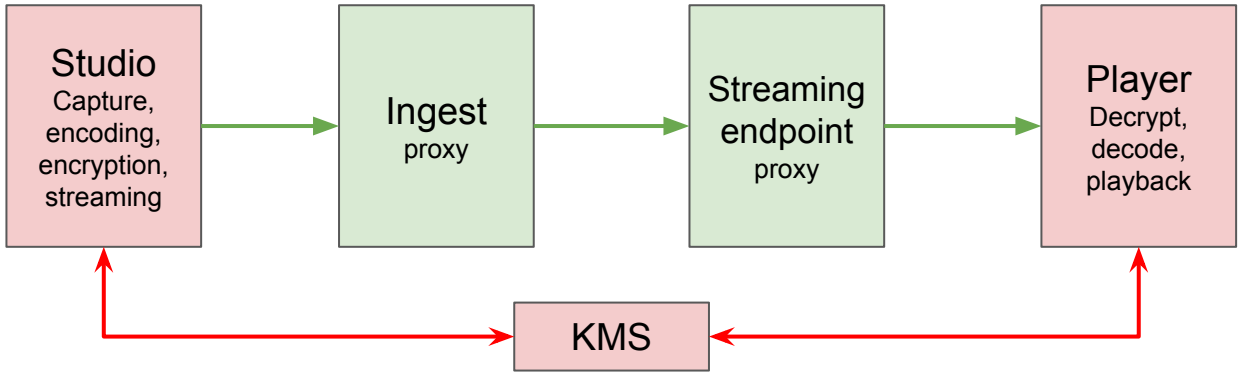
- Streaming
  - Ingest link trusted
    => this is changing, many social platforms have moved to RTMP**S.** It still requires that you trust the platform.

  - Media platform trusted (need raw access for transcoding)
    => many real-time platforms have a no-transcoding main path, and use simulcast or SVC codecs for adaptation.

Question 1: What if I do not trust the platform, and want to use my own keys?

Question 2: What if I want to use current DRM infrastructures with a different media transport, like webrtc?





From the sender perspective, with the current system, the platform must be trusted.

In the real time case, where ABR is done sender side, reusing the proposed SFrame + insertable frame + Native Key Management proposed by Apple would achieve the same content protection (as far as delivery is concerned) without needing to trust the platform.

Devil is in the detail

It’s likely more complicated than it seems.

There is the question of secure playback.

But there is something doable, and we will spend some time investigate anyway.

If anybody is interested, please join the effort.