

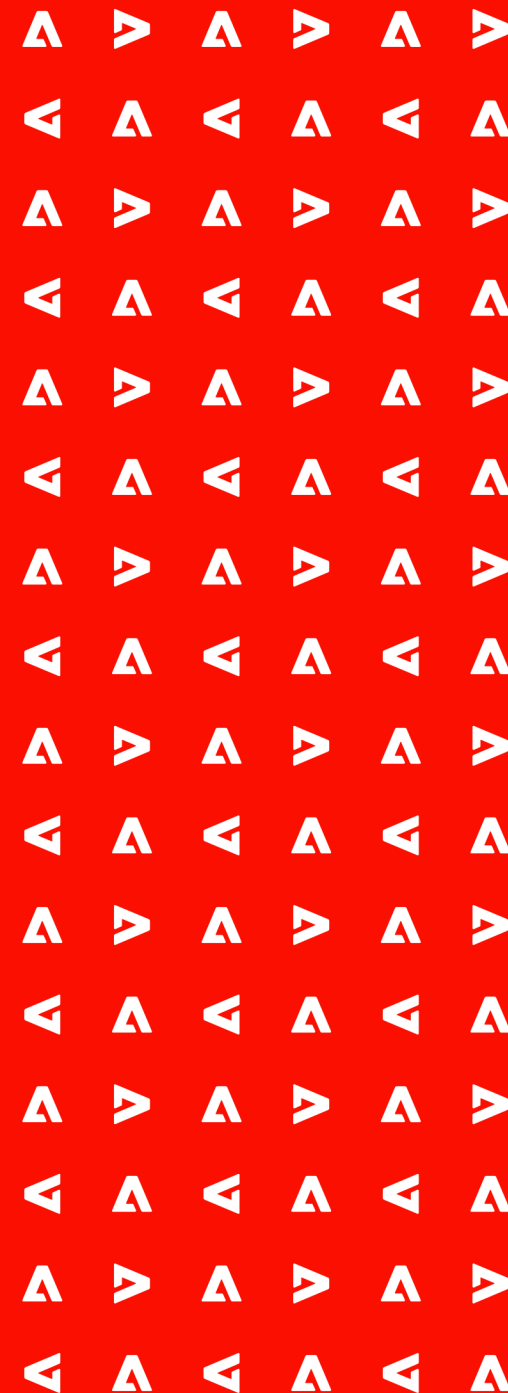


Integrating Content Authenticity with DASH Video Streaming

Stefano Petrangeli, Haoliang Wang - *Adobe Research*

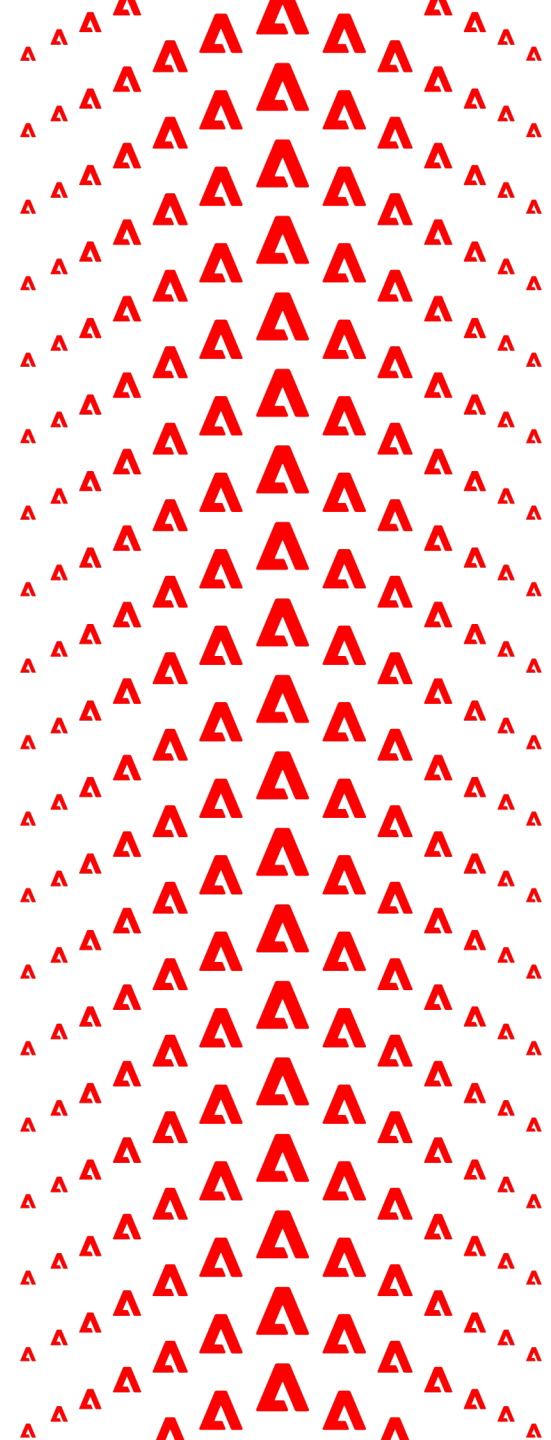
**Maurice Fisher, Dave Kozma, Massy Mahamli, Pia Blumenthal,
Andy Parsons – *Adobe Content Authenticity Initiative***

June 07, 2024



Overview

- Introduction
- Design
 - C2PA Verification
 - DASH Integration
- Implementation
 - Plugin
 - Native
- UI and Demo



Introduction

content
credentials

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dash.js

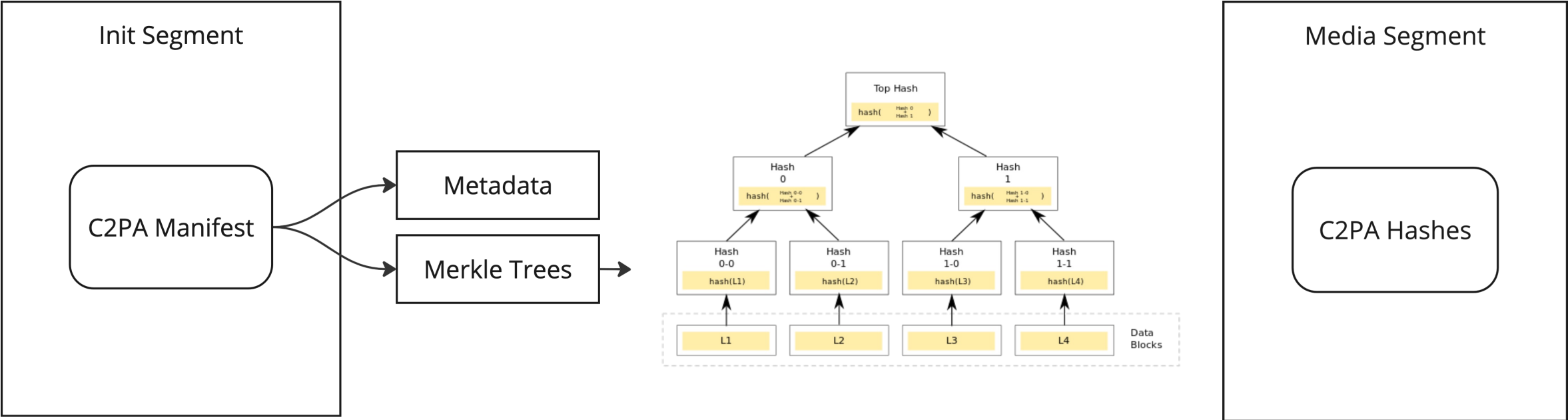
Design



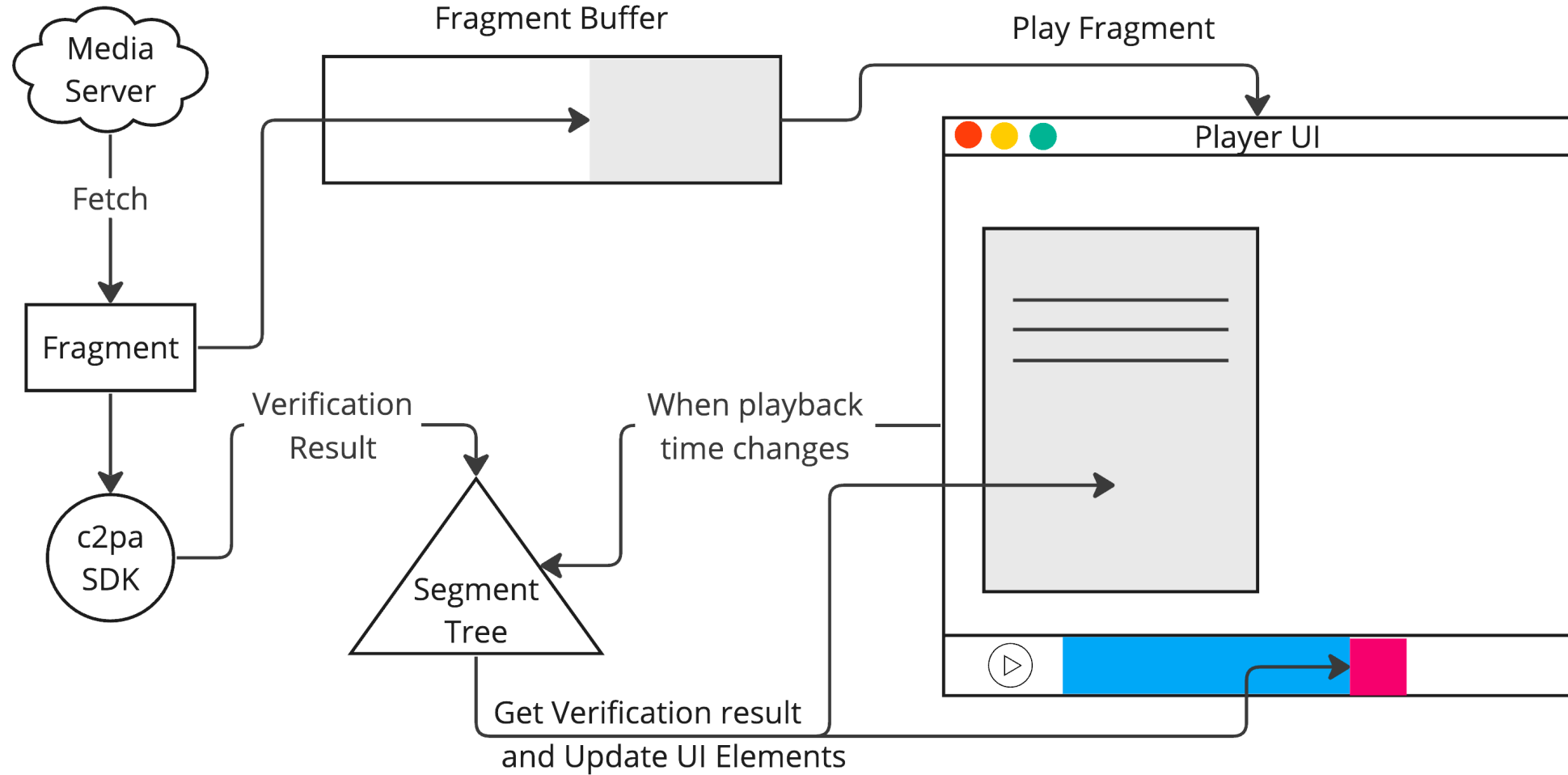
Design

- How does C2PA organize the manifest and verify fMP4
- How segment verification can be done with DASH.js
- How the verification result is surfaced to the user

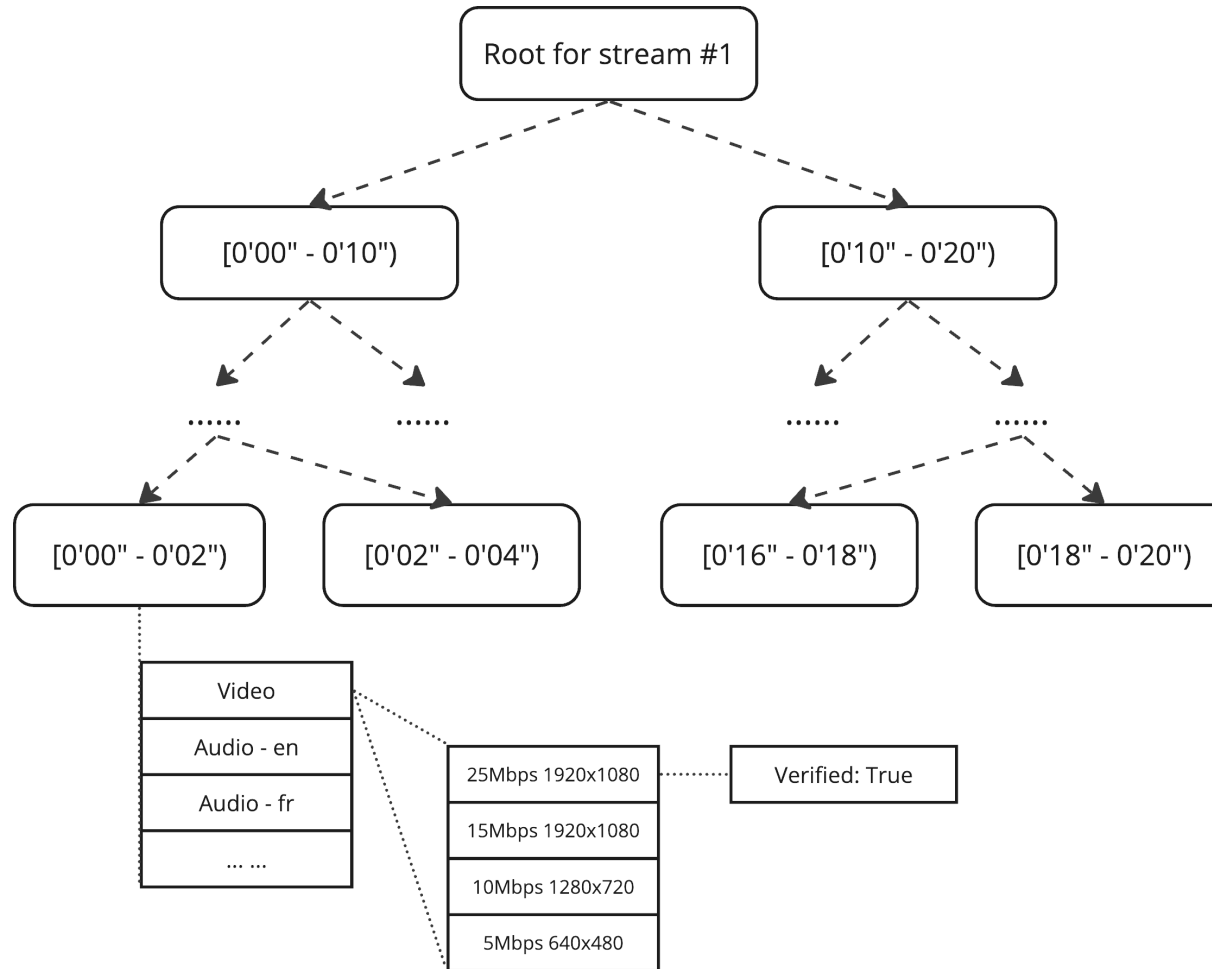
Verification



DASH Integration



DASH Integration



UI/UX Design

Goal



Clear view of validation status during streaming session

Challenges

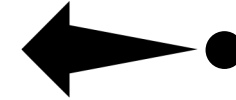


Impossible to determine complete validation status beforehand



Multiple bitrates available

Choices



Past and current validation status only



Validation status only for displayed bitrate representation



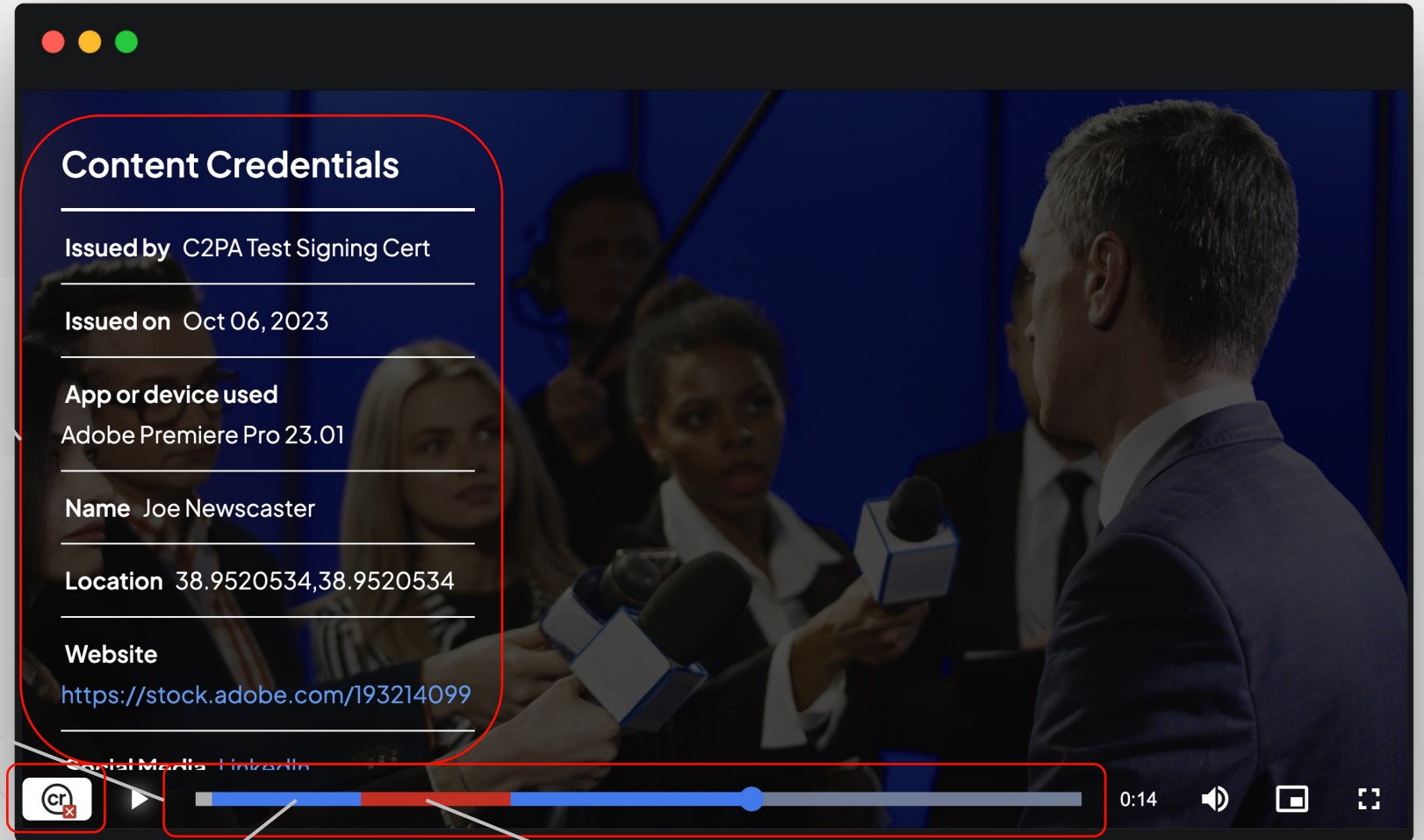
Recompute validation during seek

UI/UX Design

Content credentials menu for deeper insight

Content credential icon (for valid and invalid content)

Peek into validation status via color-coded timeline



Successful validation

Failed validation

Implementation



Implementation



Video segments signing and verification



Streaming, playback and video segments verification (plugin and native)



Extended to support C2PA timeline and menu

Plugin Implementation

- No modifications to `dash.js`
- `SegmentResponseModifier`
 - Intercept segment
 - Perform C2PA validation
 - Save result in segment tree
- `PLAYBACK_TIME_UPDATED`
 - Navigate segment tree
 - Obtain validation status
 - Pass info to UI

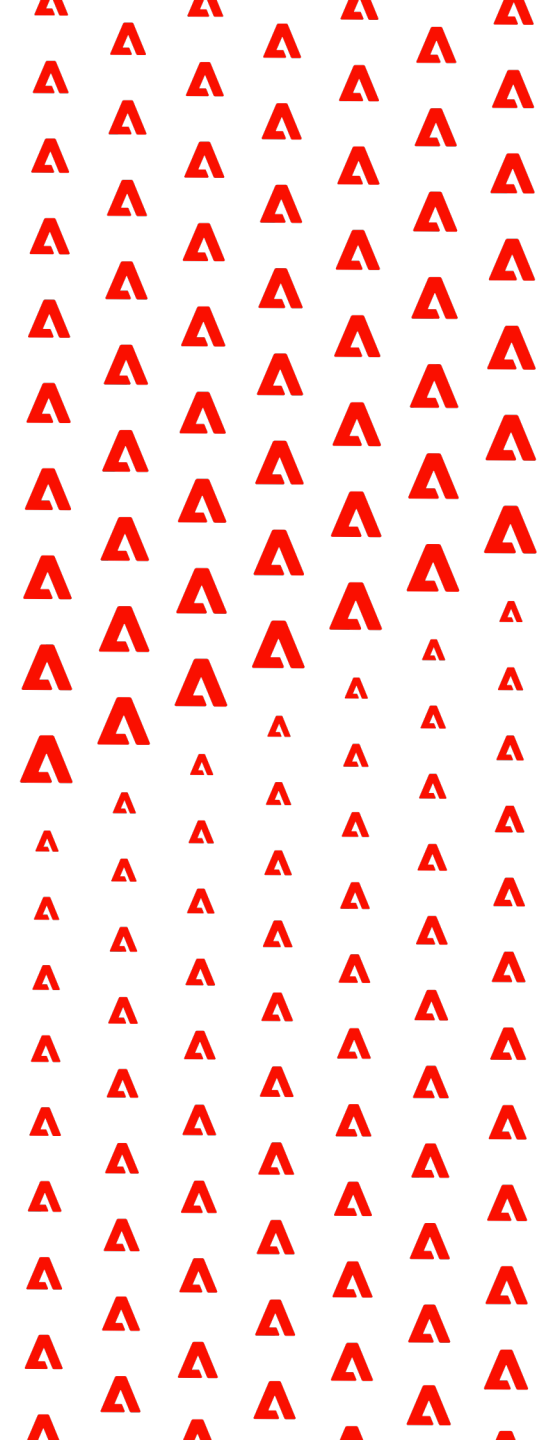
Native Implementation

- C2PA class for validation and segment tree navigation
 - Managed in `StreamController`
- `FRAGMENT_LOADING_COMPLETED`
 - Intercept segment
 - Perform C2PA validation
 - Save result in segment tree
- Playback time changes for UI updates
 - Managed in `PlaybackController` and `StreamController`
 - New `c2pa_status` structure in `PLAYBACK_TIME_UPDATED` return structure

API for UI Updates

- `playbackUpdate` called from player
- `c2pa_status` structure
 - `verified: bool`
 - `manifest: c2pa-specific structure`
 - `error: string`

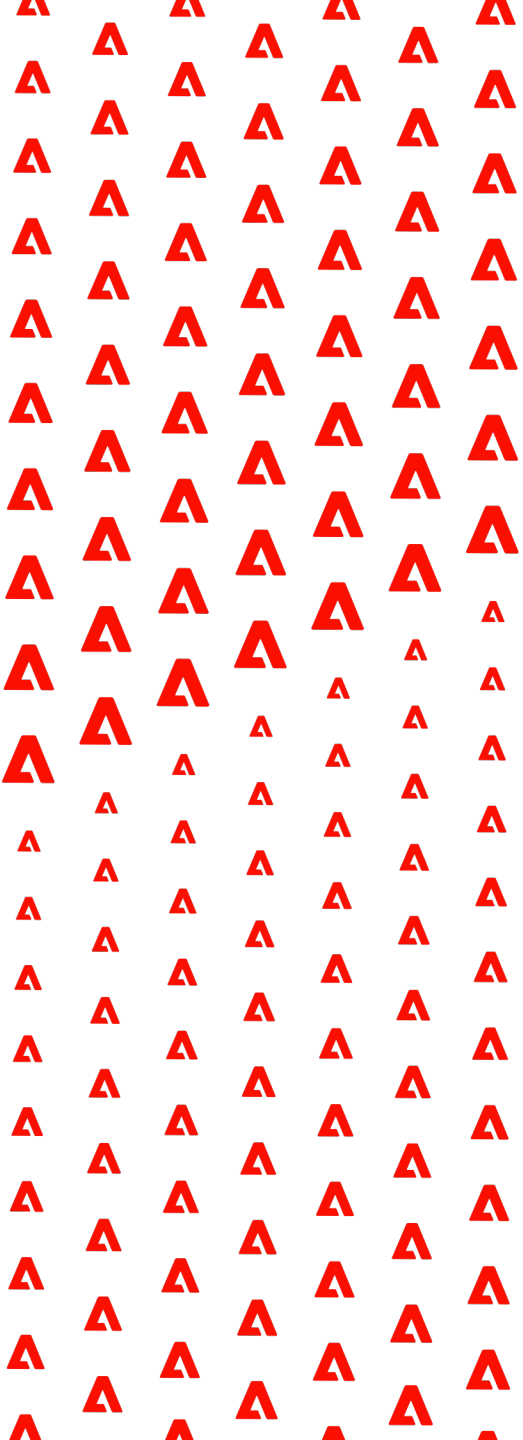
Demo



Demo

- <https://contentcredentials-player.netlify.app/>

Questions?



Thank you!

- Stefano Petrangeli (petrange@adobe.com)
- Haoliang Wang (hawang@adobe.com)
- Our MMSys paper for more details
(<https://dl.acm.org/doi/abs/10.1145/3625468.3652198>)
- Source code <https://github.com/contentauth/dash.js/tree/c2pa-dash>
- Demo <https://contentcredentials-player.netlify.app/>
- Content Credentials website (<https://contentcredentials.org/>)
- C2PA Specification
(<https://c2pa.org/specifications/specifications/2.0/index.html>)
- C2PA SDK (<https://github.com/contentauth/>)

