eluv.io

A Case Study for a Post-Cloud Supply Chain

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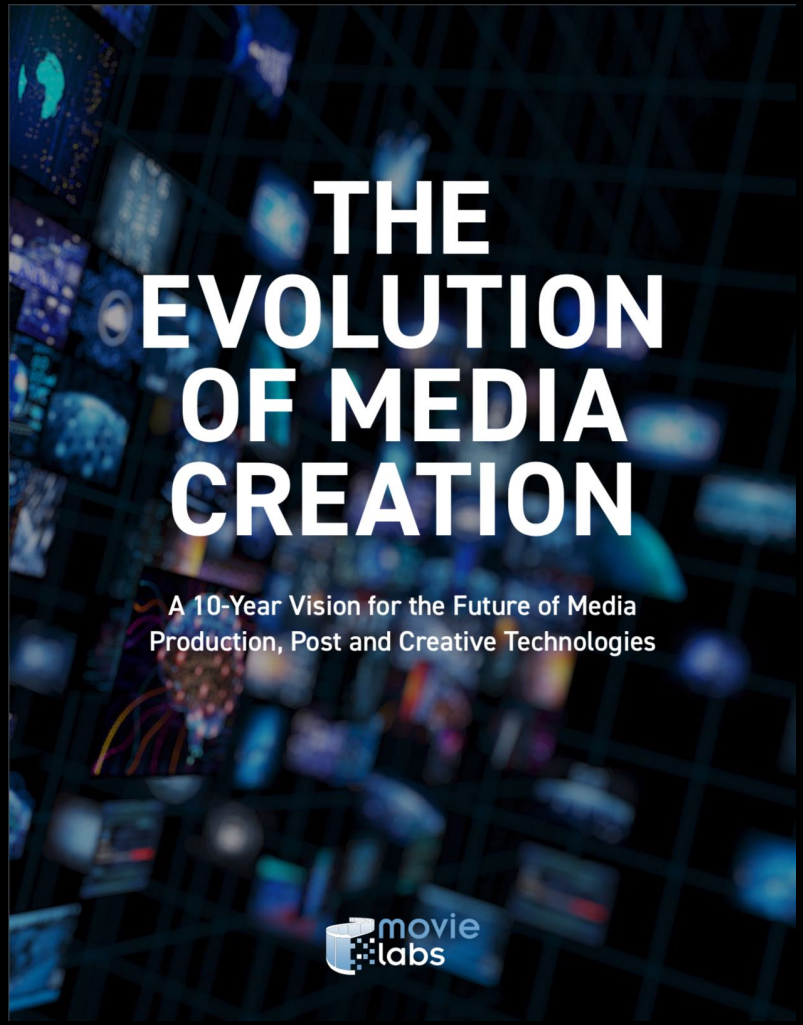
HPA Tech Retreat 2020



>>Assets created/ingested to cloud and not moved

>>Applications come to the media

>>Propagation and distribution is “publish”

>>Archive re capabilities, economics of cloud.

>>Preservation includes means to access and edit.

>>Individual user ids, access correlates & efficient.

>>Creation is secure; adapts to changing threats.

>>Individual media interrelated with universal linking.

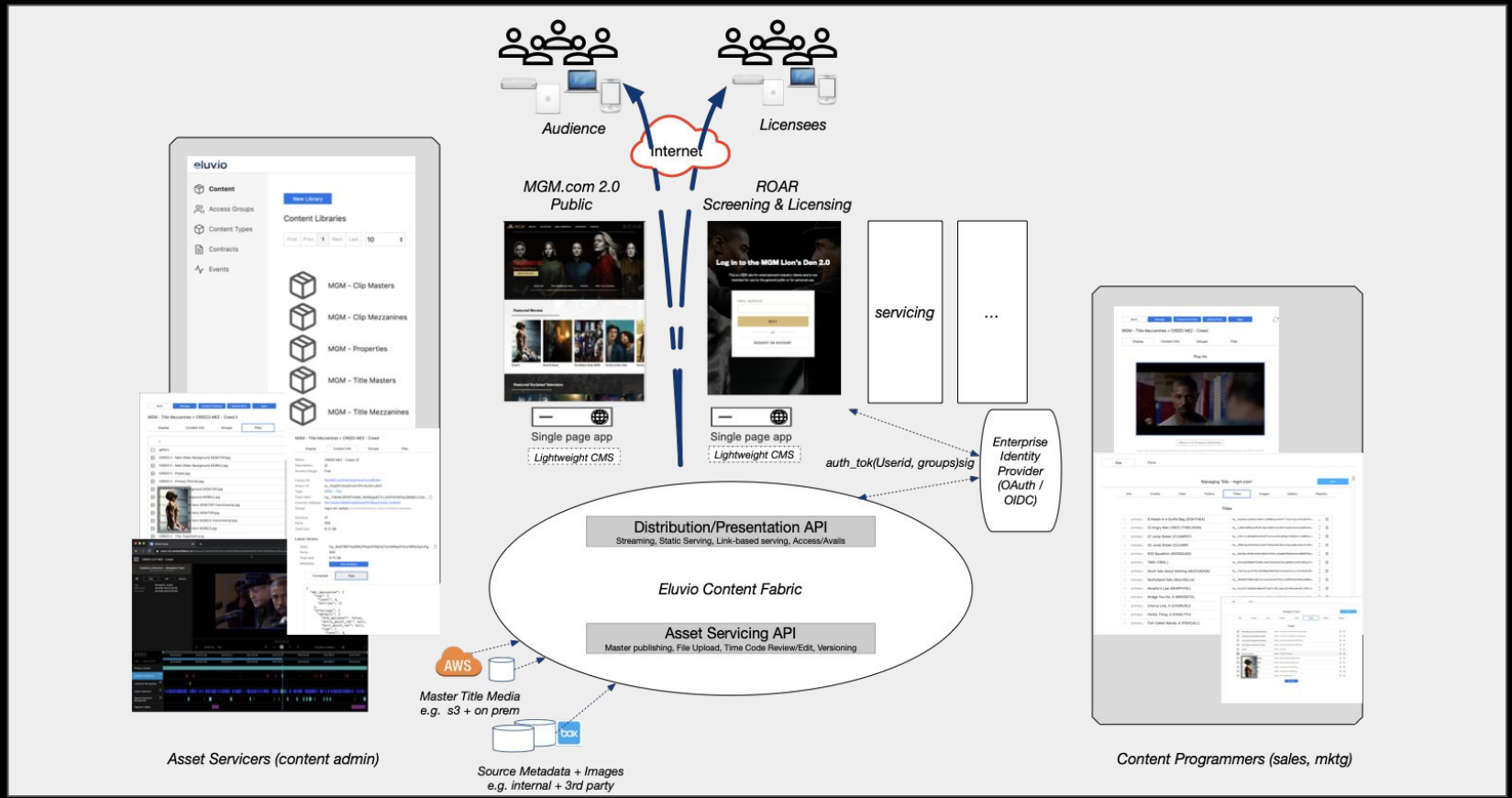
>>Workflows dynamic from data formats, metadata.

>>Workflows have real-time iteration and feedback.

Agenda

- Background
  - MGM Supply Chain Architecture
  - Eluvio Content Fabric
- Single Substrate of Active Content (Media, Metadata, Code linked)
- Streaming/Servicing from Source, Just-in-Time (Highest Quality)
- Re-use/re-versioning of Source without File Copies
- Inter-object Linking for Static and Dynamic Presentation
- Content Security does not trust the infrastructure
- Access and Rights control built-in

MGM Architecture



Eluvio Content Fabric

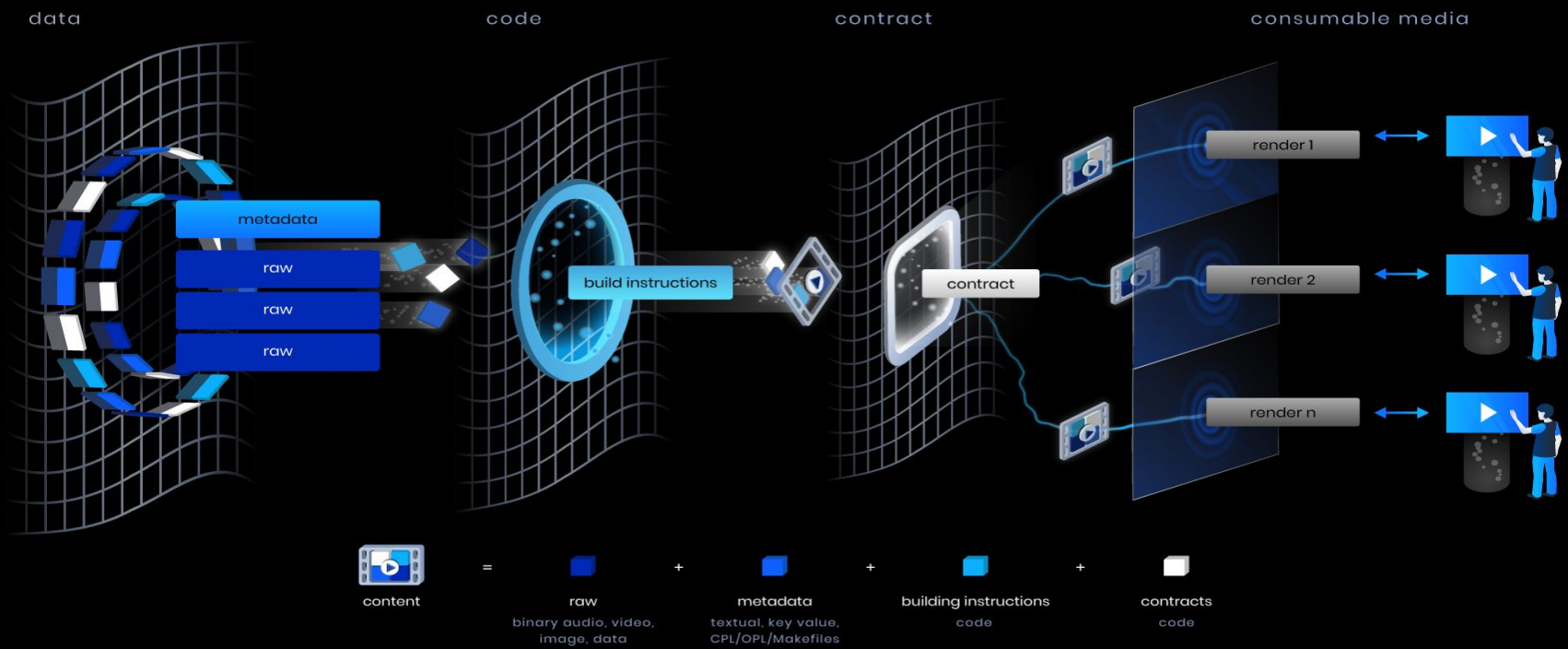
- New Global Substrate
  - Neither Cloud nor CDN
  - Premium Video from Master to Consumable
- Eliminates need for transcoding, databases, microservices, CDN
- Single Software Stack
  - Decentralized Data Distribution & Storage Protocol
  - BW/Storage Efficient
  - Ultra Fast Routing and Video, Just in Time
  - Versioned and Access Controlled (blockchain)
  - ML Tagged Content
  - Monetizable
- Network of Nodes @ Inet Xchange Points

Fabric Technology

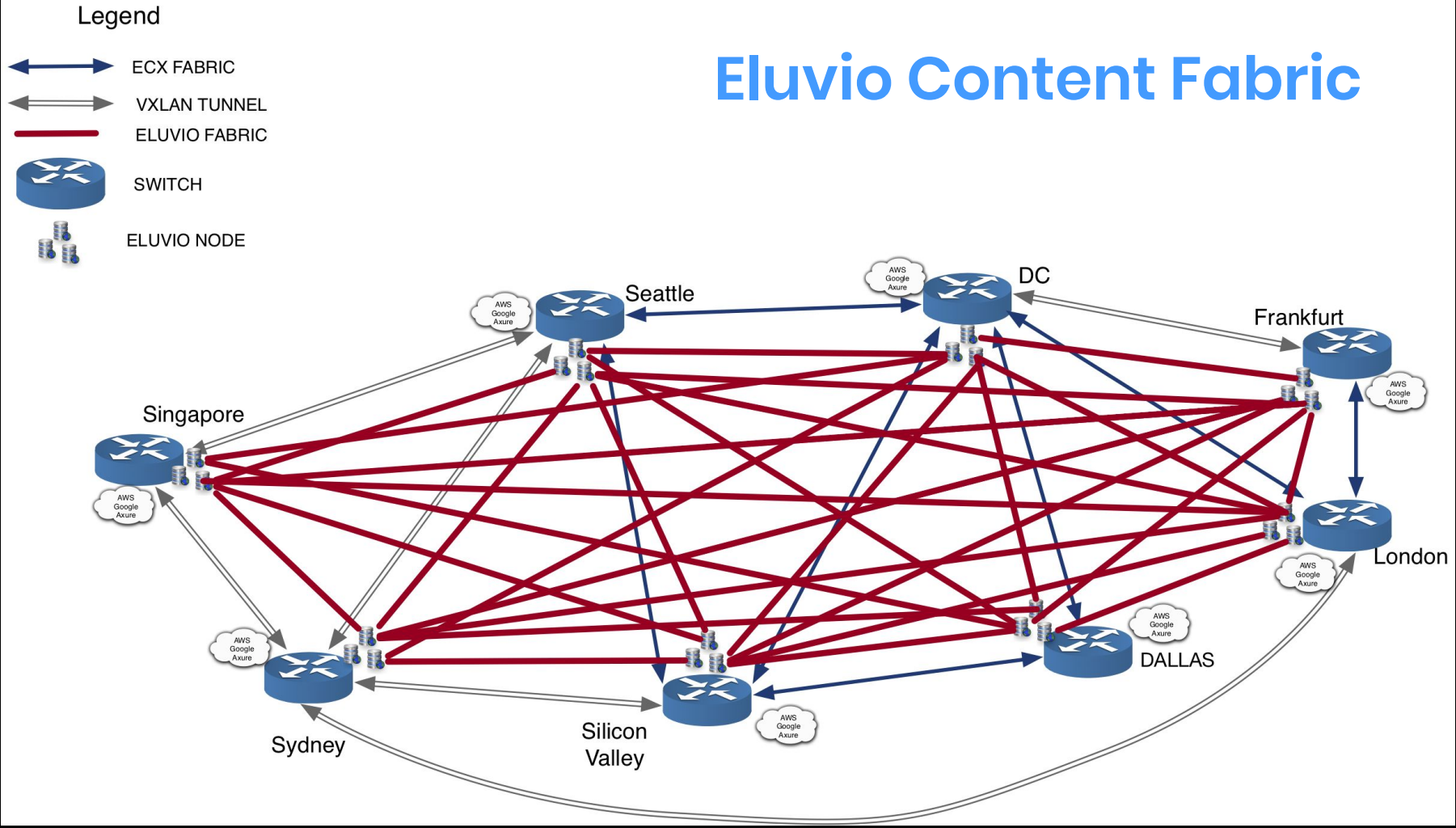
Stores and manages large form content

Transforms and delivers consumable media

Controls access, protects and proves content



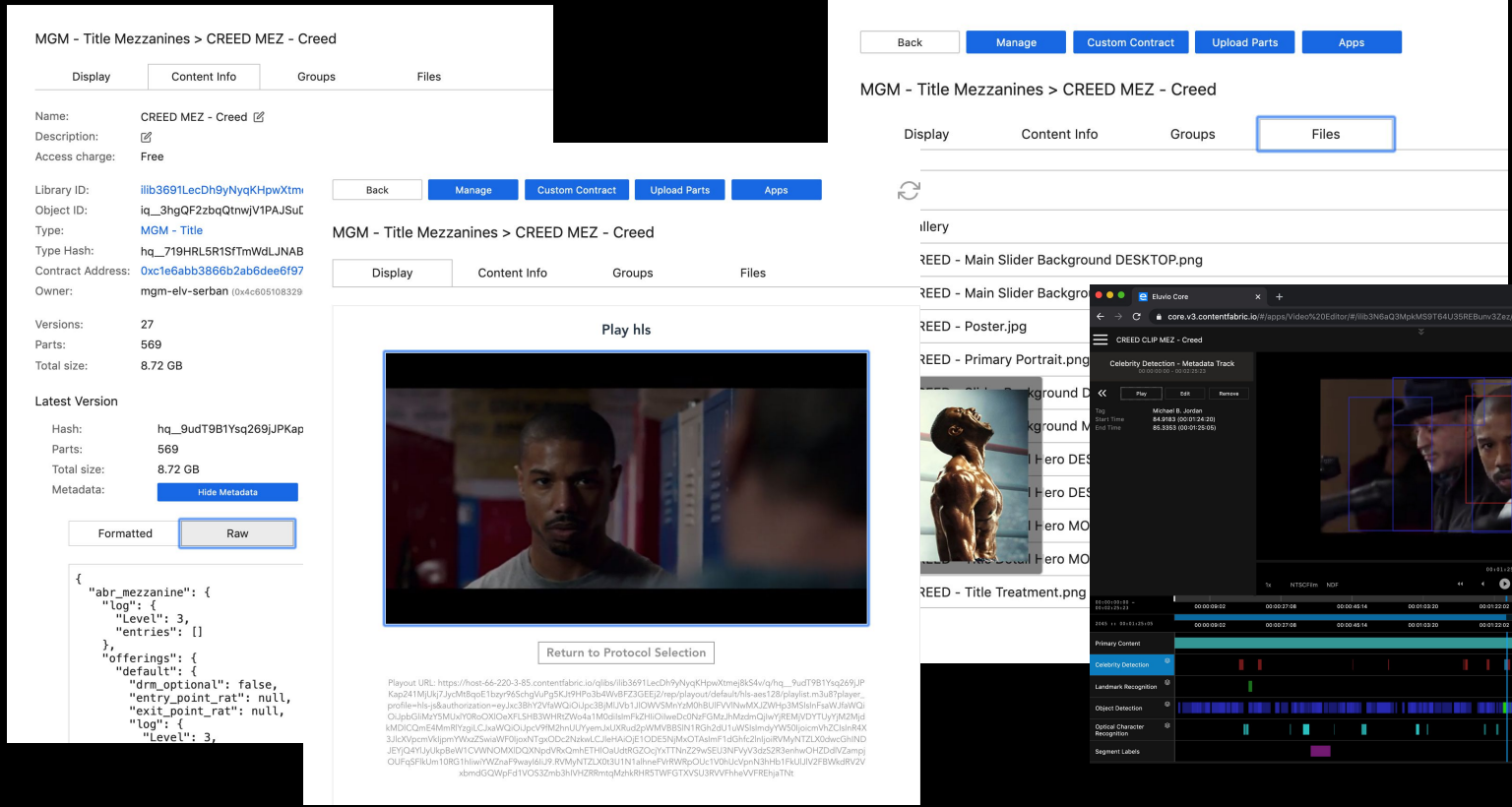
Eluvio Content Fabric



Single Substrate of Active Content

- Single object for Active Servicing & Streamable on Ingest
- *Media*, *metadata*, *static content/image*, and *code* linked and versioned
- Ingest by reference (no movement of Master)
  - Cloud & Local Storage
- Metadata and static content added from many sources
- Flat and Timeline based review & (light) edit control
- Automatic ML tagging built-in for video understanding
  - People, place, objects and automation

Example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Display
Content Info
Groups
Files
Name: CREED MEZ - Creed
Description:
Access charge: Free
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Object ID: iq__3hgQF2zbqQtnwjV1PAJSuL
Type: MGM - Title
Type Hash: hq__719HRL5R1SfTmWdLJNAB
Contract Address: 0xc1e6abb3866b2ab6dee6f97
Owner: mgm-elv-serban (0x4c605108329
Versions: 27
Parts: 569
Total size: 8.72 GB
Latest Version
Hash: hq__9udT9B1Ysq269jJPKap
Parts: 569
Total size: 8.72 GB
Metadata:
Hide Metadata
Formatted
Raw
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"log": {
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Back
Manage
Custom Contract
Upload Parts
Apps
MGM - Title Mezzanines > CREED MEZ - Creed
Display
Content Info
Groups
Files
Play hls
Return to Protocol Selection
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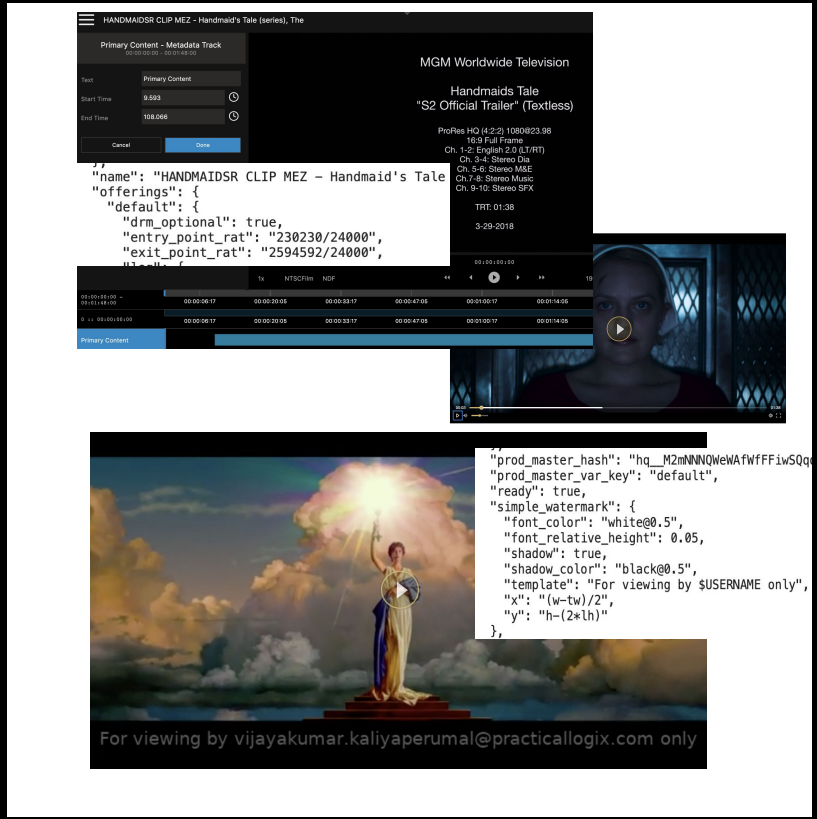
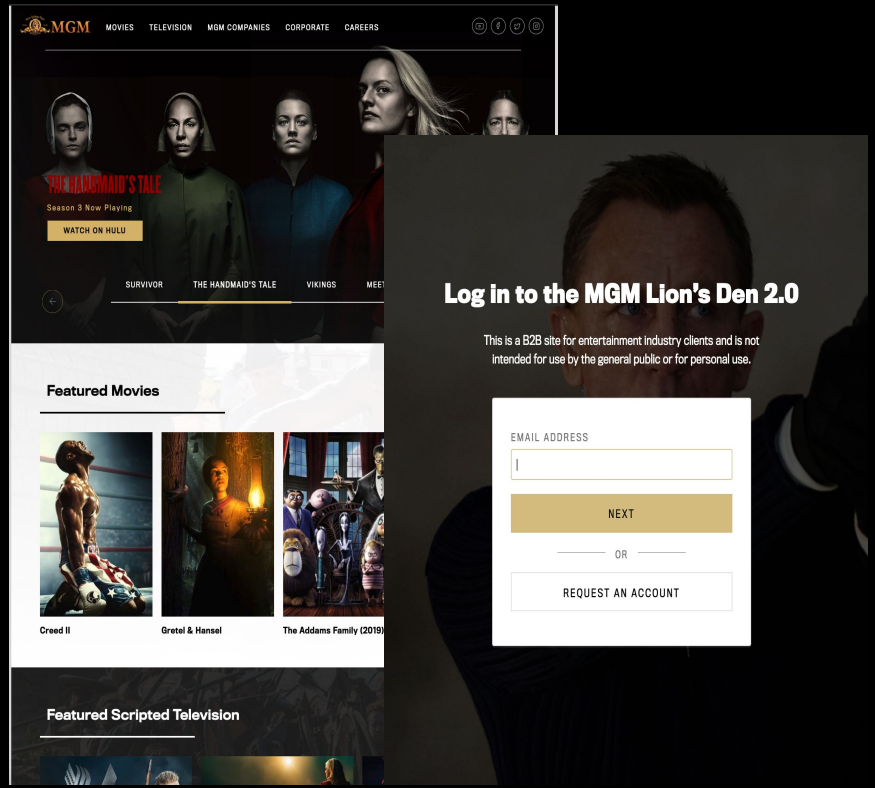
Streaming/Serving from Source Just-in Time

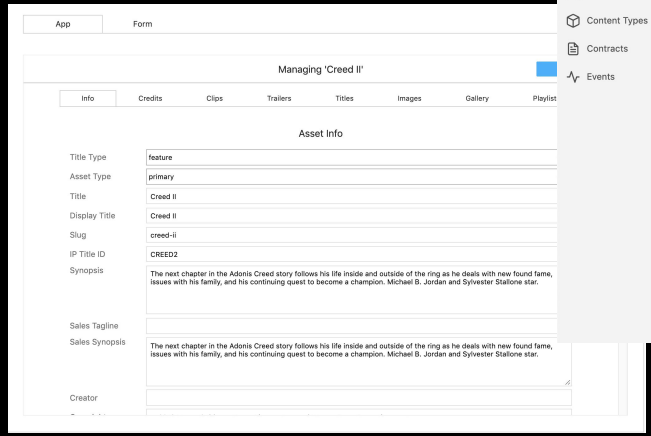
- Video, Imagery, Metadata
- Ultra fast start, highest quality/no rebuffer (no CDN - video or static)
- Standard Multi-format ABR Streaming (HLS, DASH) w/ DRM
- All players/platforms (elv-client-js)
- Playable on ingest with configurable output offerings/dynamic content
  - Set start points without editing
  - Visible watermarking with user id from Okta auth token & metadata directive

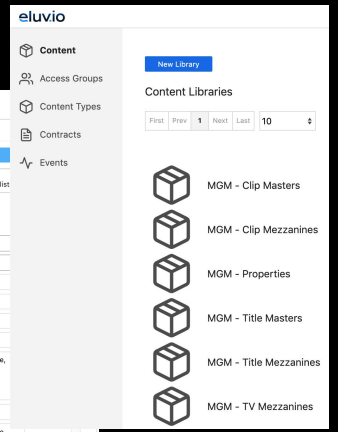


ReUse/ReVersioning without File Copies



- Same content, two properties
- "Pop up" w/out re-do !
- Alternative Metadata/UX per property





Inter Object Linking for Presentation

- Simple API with static/dynamic URLs
  - Content hash with Human friendly static URL (slug)

    `GET .../q/hq__0123/rep/playout/default/options.json`

    `.../seasons/1/titles/the-first-episode-title/rep/playout/default/options.json`

  - Dynamic bitcode functions on objects, e.g. playout options, image resize at run time

    `GET  .../q/hq__0123/rep/playout/default/options.json`

    `.../seasons/1/titles/the-first-episode-title/sources/default`

    `.../rep/images/files/MyPoster.jpg?height=120  or`
    `.../images/poster/thumbnail?height=120`

    `...images/poster/thumbnail`

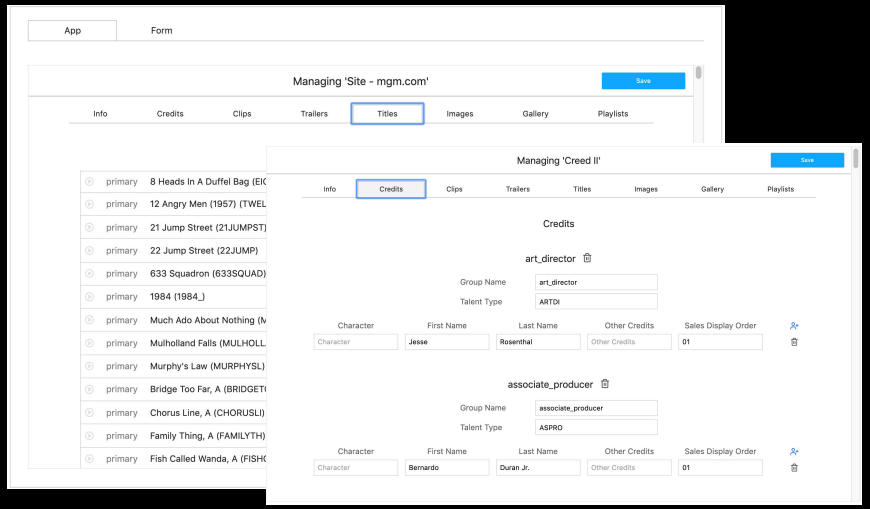
Inter Object Linking for Presentation (cont)

- **Simple API with static/dynamic URLs**
  - Links between objects with traversal from “site” down

```
GET .../q/hq__0123/rep/playout/default/options.json
```

```
.../q/iq__abcd/.../seasons/1/titles/the-first-episode-title/sources/default
```

- Published versions with controlled updates
- Automatic dependency resolution
- No Syncing with CMS, Minimal CMS
- Simple Tools

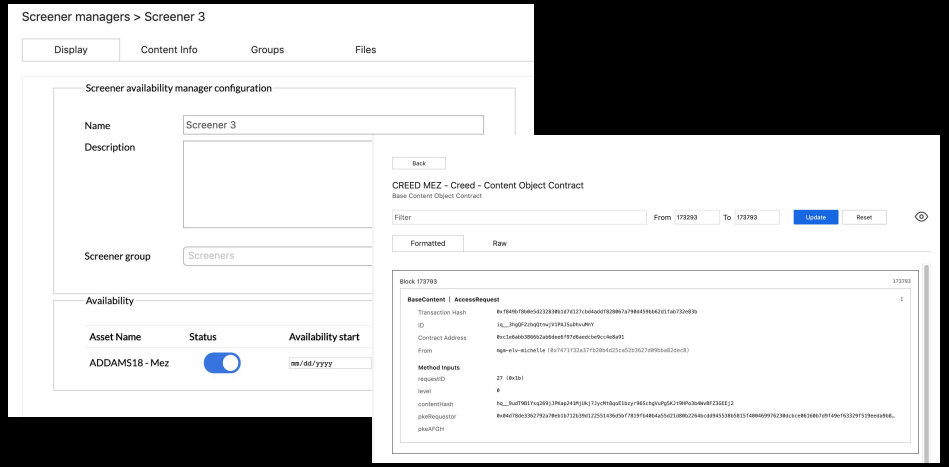


Content Security Does not Trust Infrastructure

- Instead of Isolating Content in “Secured” Infrastructure …
- Content object backed by contract
- Parts encrypted with Content (AES) and Owner (AFGH) keys
- Proxy re-encryption on access
  - New cryptographic primitive
  - Multiple ‘access windows’ for multiple portals (or people) operating on same content
  - Re-encryption to DRM keyspace for consumer
- Public versus private metadata enforced through authorization

Access Control and Rights Built In

- Custom Smart contract + re-encryption = “Avails”
  - Okta group, time range, geo etc.
- Fabric auth int. with Enterprise OAuth
- Public access via fast state channel
- Blockchain record of all events
- Provable audience streaming data
  - per 2 sec
- Secured per-user wallet
  - favorite content, watch history, etc.



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Q&A / Thanks