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Introduction to CAI & C2PA

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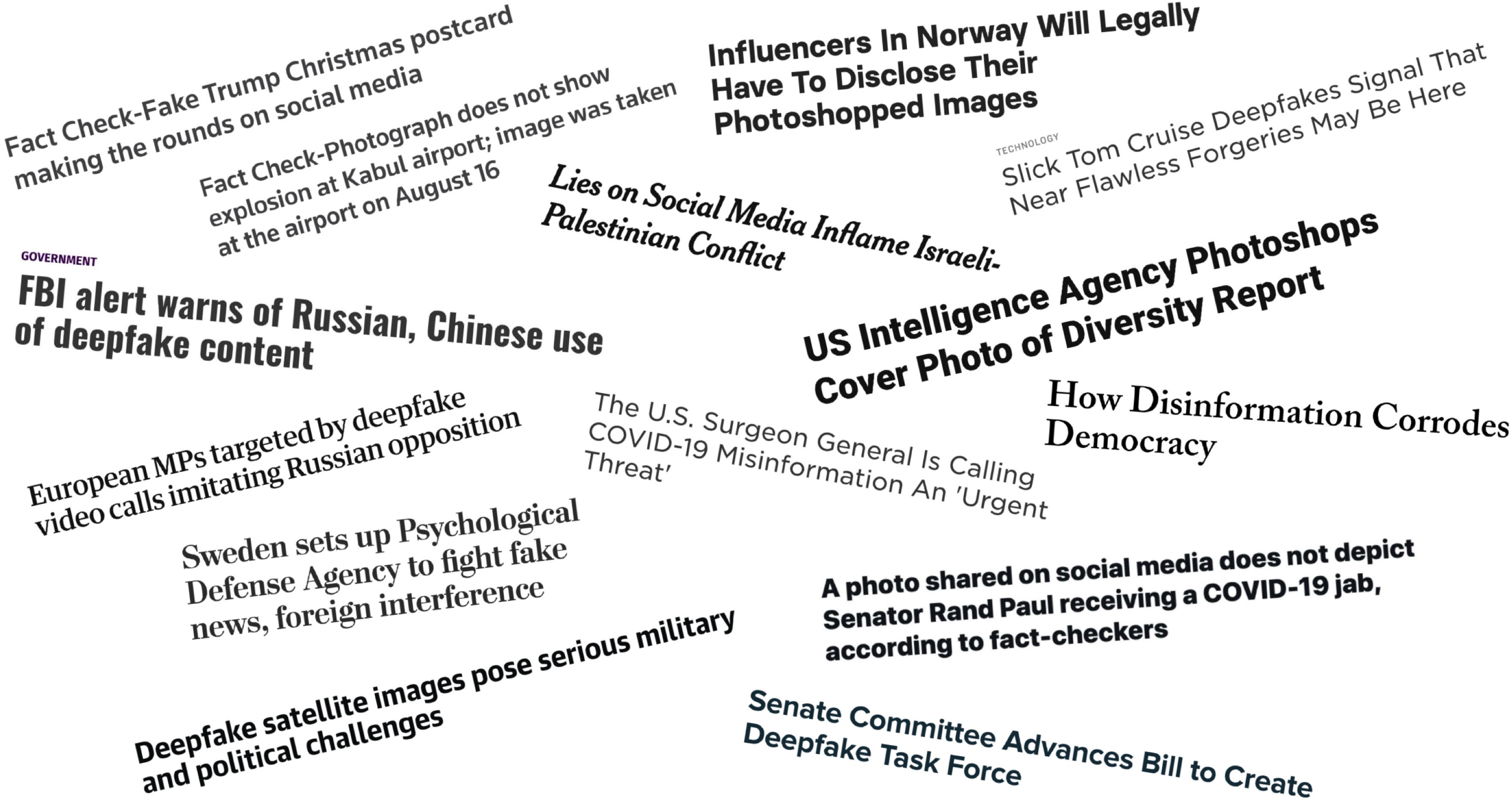


Fact Check-Fake Trump Christmas postcard making the rounds on social media

Influencers In Norway Will Legally Have To Disclose Their Photoshopped Images

Fact Check-Photograph does not show explosion at Kabul airport; image was taken at the airport on August 16

TECHNOLOGY

Slick Tom Cruise Deepfakes Signal That Near Flawless Forgeries May Be Here

Lies on Social Media Inflame Israeli-Palestinian Conflict

GOVERNMENT

FBI alert warns of Russian, Chinese use of deepfake content

US Intelligence Agency Photoshops Cover Photo of Diversity Report

How Disinformation Corrodes Democracy

European MPs targeted by deepfake video calls imitating Russian opposition

The U.S. Surgeon General Is Calling COVID-19 Misinformation An 'Urgent Threat'

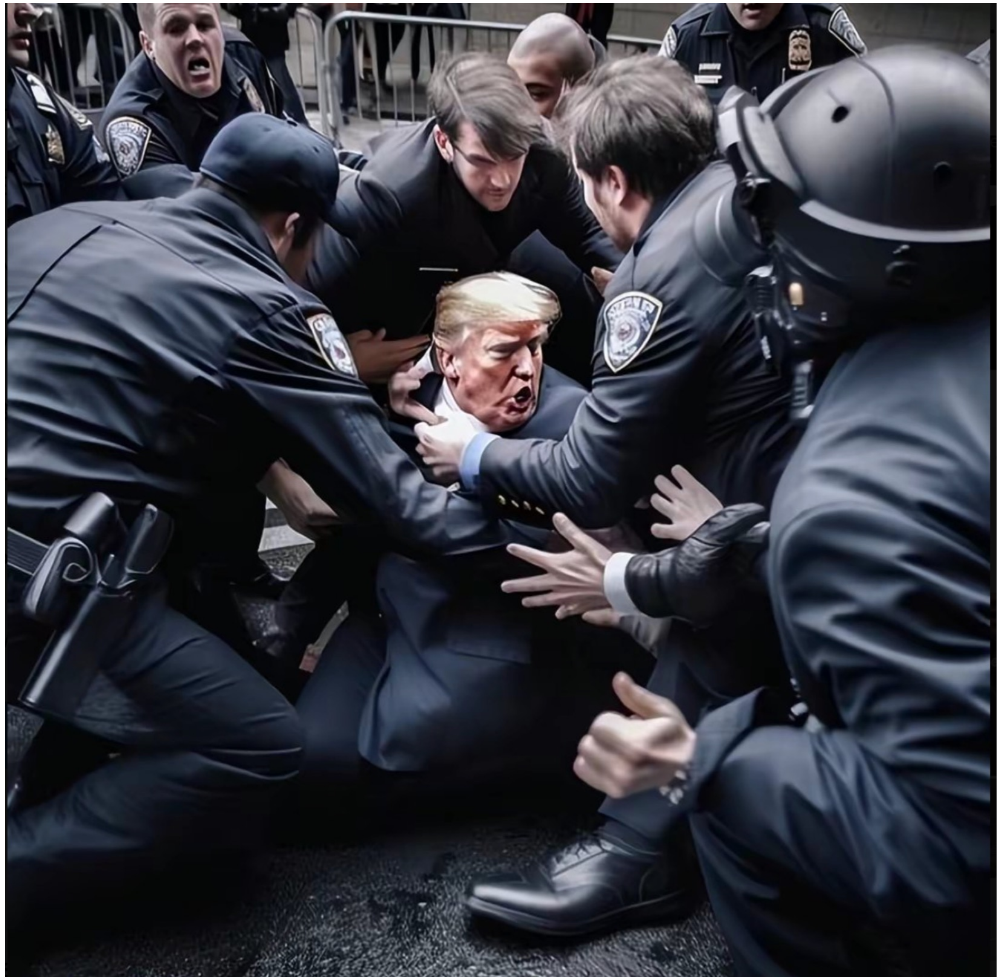
Sweden sets up Psychological Defense Agency to fight fake news, foreign interference

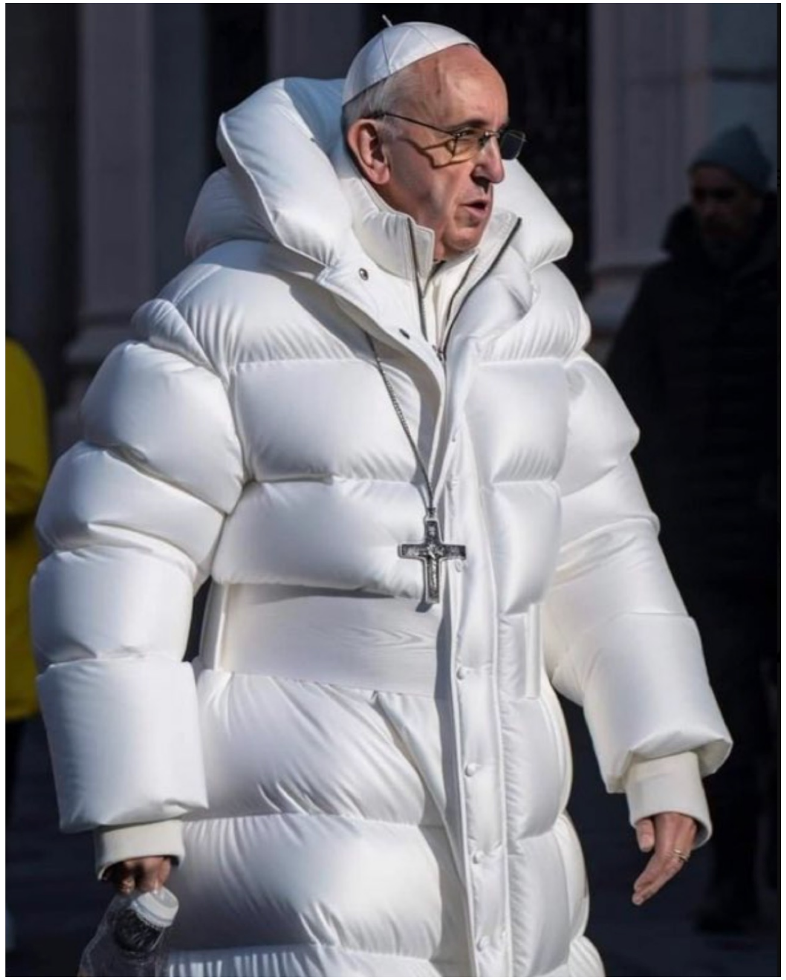
A photo shared on social media does not depict Senator Rand Paul receiving a COVID-19 jab, according to fact-checkers

Deepfake satellite images pose serious military and political challenges

Senate Committee Advances Bill to Create Deepfake Task Force

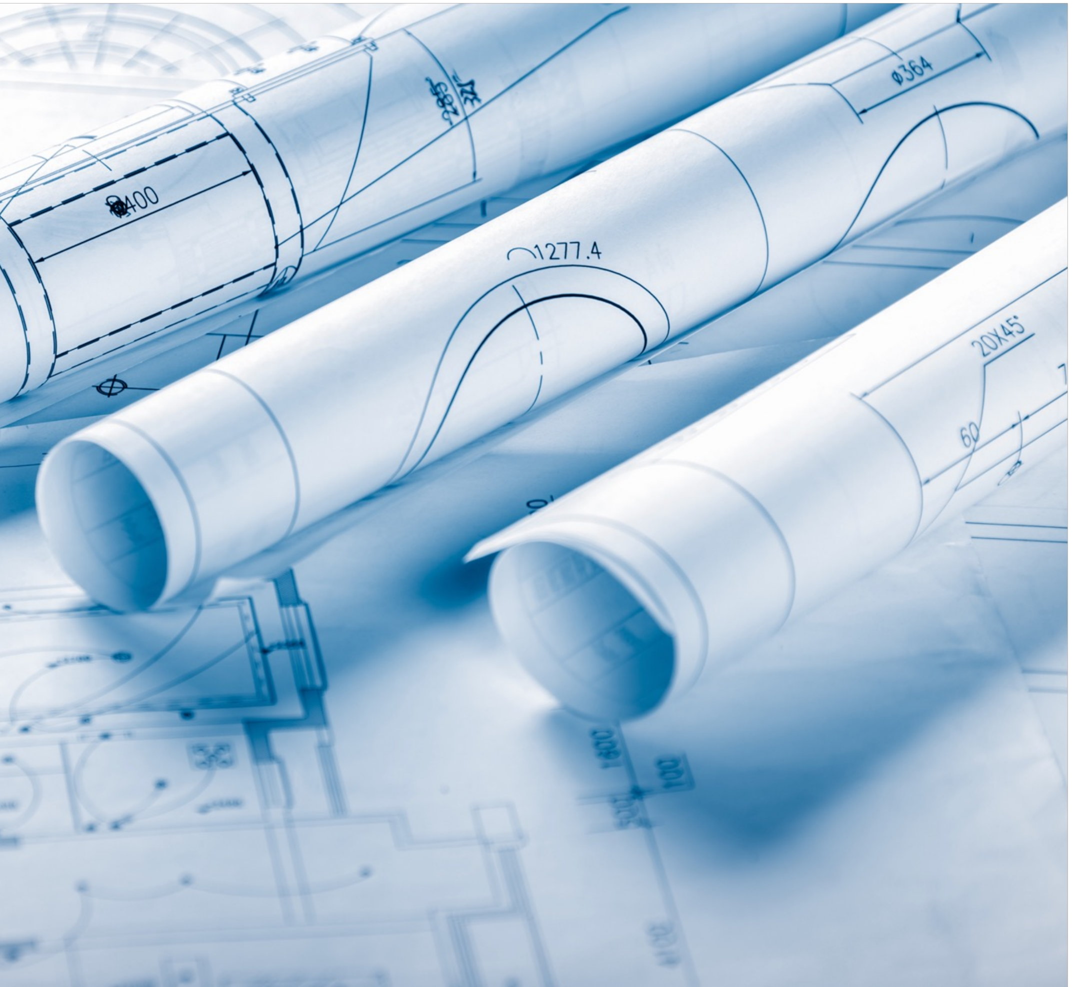
AI Generated Media





C2PA

Content Authenticity Initiative



Who are we?

- The C2PA is an LF Joint Development Foundation project whose **mission is to develop technical specifications that can establish content provenance and authenticity at scale** to give publishers, creators, and consumers the ability to trace the origin of media.

C2PA Membership

Steering Committee Members

- Adobe
- BBC
- intel
- Microsoft
- PUBLICIS GROUPE
- SONY
- truepic

General Members

- arm
- ATEME Captivate your audience
- Canon
- digicert
- FUTUREWEI Technologies
- identity
- KEYFACTOR
- Nikon
- Numbers
- RIAA FOR MUSIC
- THE SOCIETY LIBRARY
- WITNESS SEE IT FILM IT CHANGE IT

Contributor Members

- Akamai
- BANK OF AMERICA
- Blockcast
- CBC Radio-Canada
- CLink
- COMFACT
- dalet
- dpa
- DIGIMARC
- EZDRM
- fastly
- france•tv
- ISCC Foundation
- JOURNALISM.DESIGN
- MEDEX FORENSICS
- MELCHER SYSTEM CONSULTING
- is
- METAPYXL
- Panasonic
- PARTNERSHIP ON AI
- PIXELSTREAM
- Ravnur
- SafeCast
- sedicii
- SequenceKey.com
- SERELAY TRUSTED MEDIA CAPTURE
- SERUM TRUTH COUNTER FAKE NEWS
- SMARTFRAME
- steg.ai
- THE DAILY EDIT
- Tractiv
- Truefy
- Verisk
- Web Commodore
- WOPLLI TECHNOLOGIES WORK. PLAY. LEARN. LIVE
- WRAPT

Liaisons

- ISO
- IPTC
- ETSI
- PDF Association

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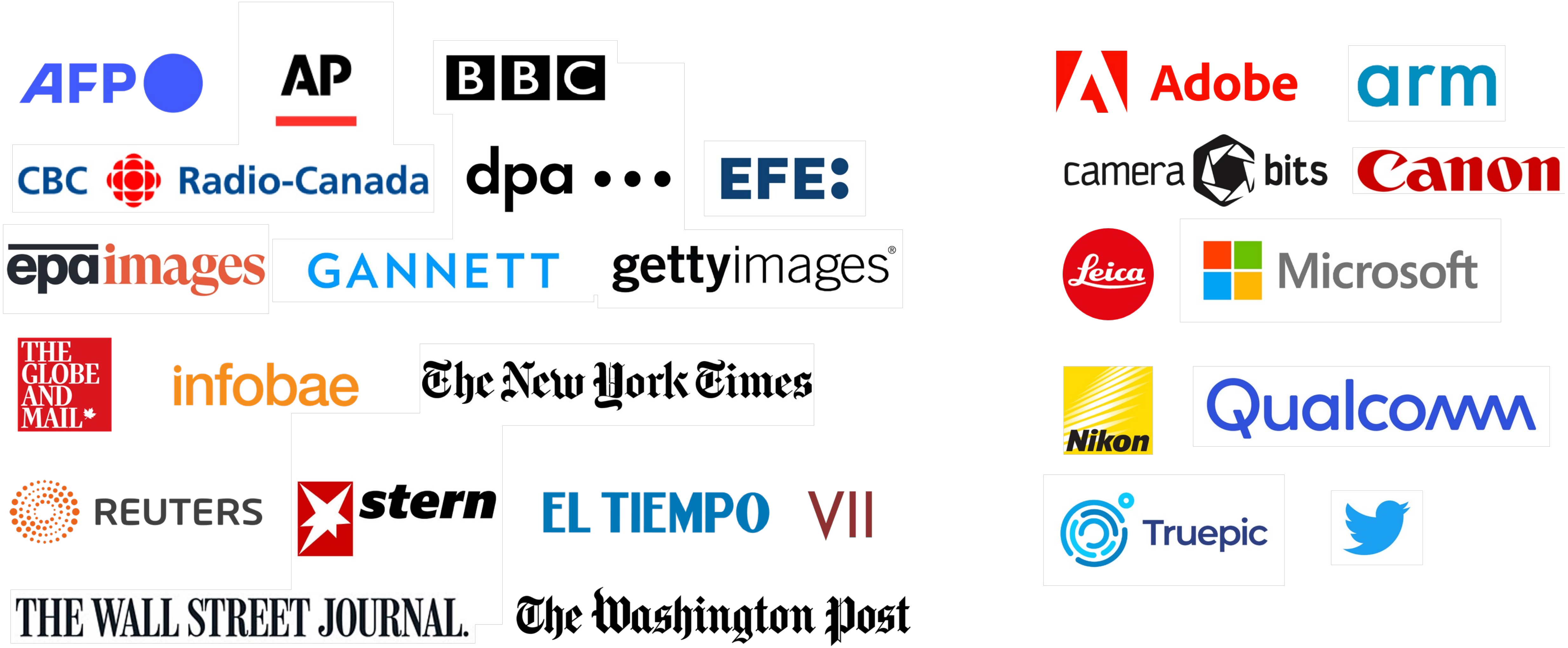
Content Authenticity Initiative

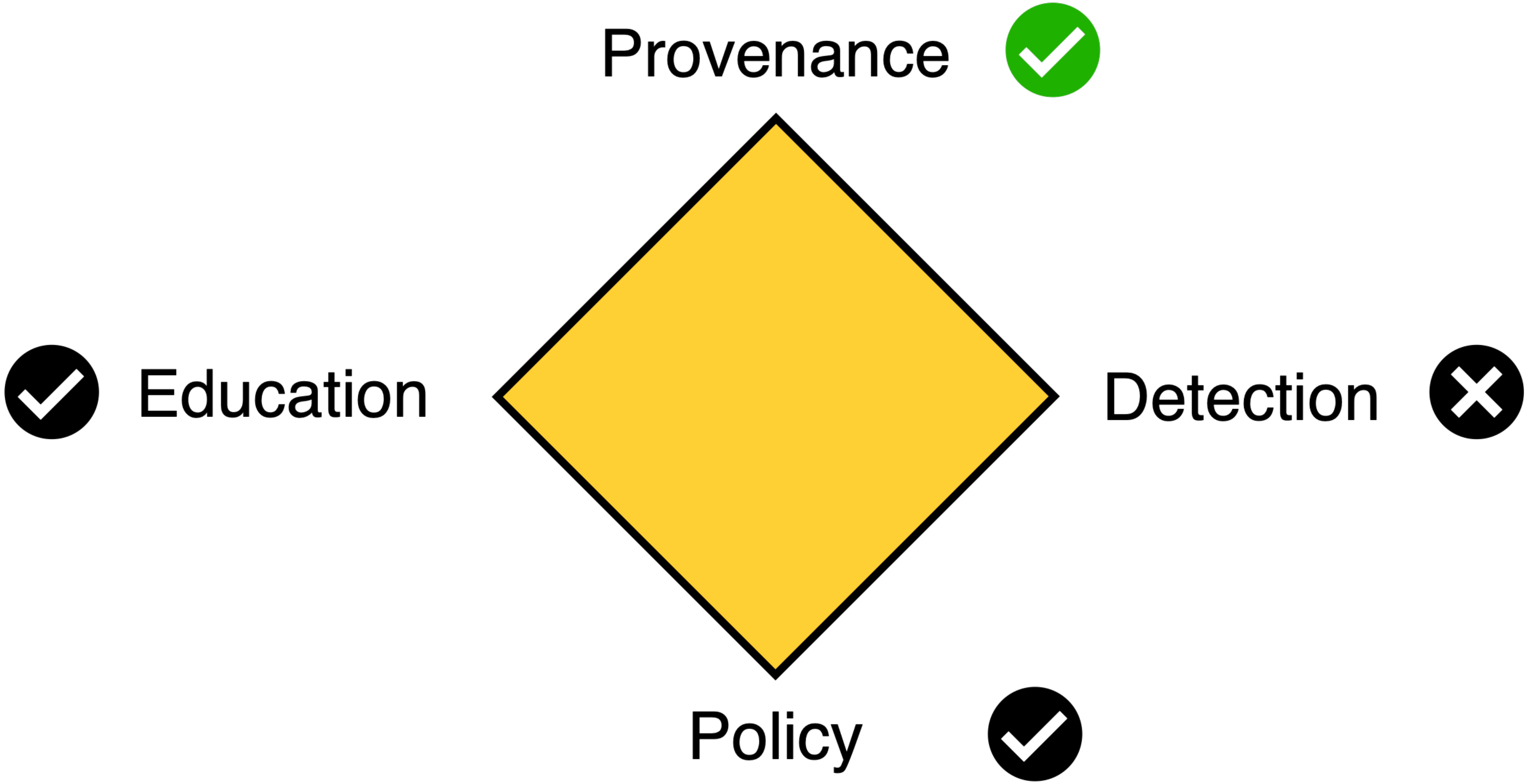
A community of media and tech companies, NGOs, academics, and others working to promote adoption of an open industry standard for content authenticity and provenance.

Content
Authenticity
Initiative

Membership 1500+



Standing on three pillars



Provenance ✓

✓ Education

Detection ✗

Policy ✓

Why Provenance?

Instead of guessing what is fake,
we can provide information about truth.

- It’s not an arms race
- Edits are good!
- It’s another signal for detection

(Some of our) Design Goals

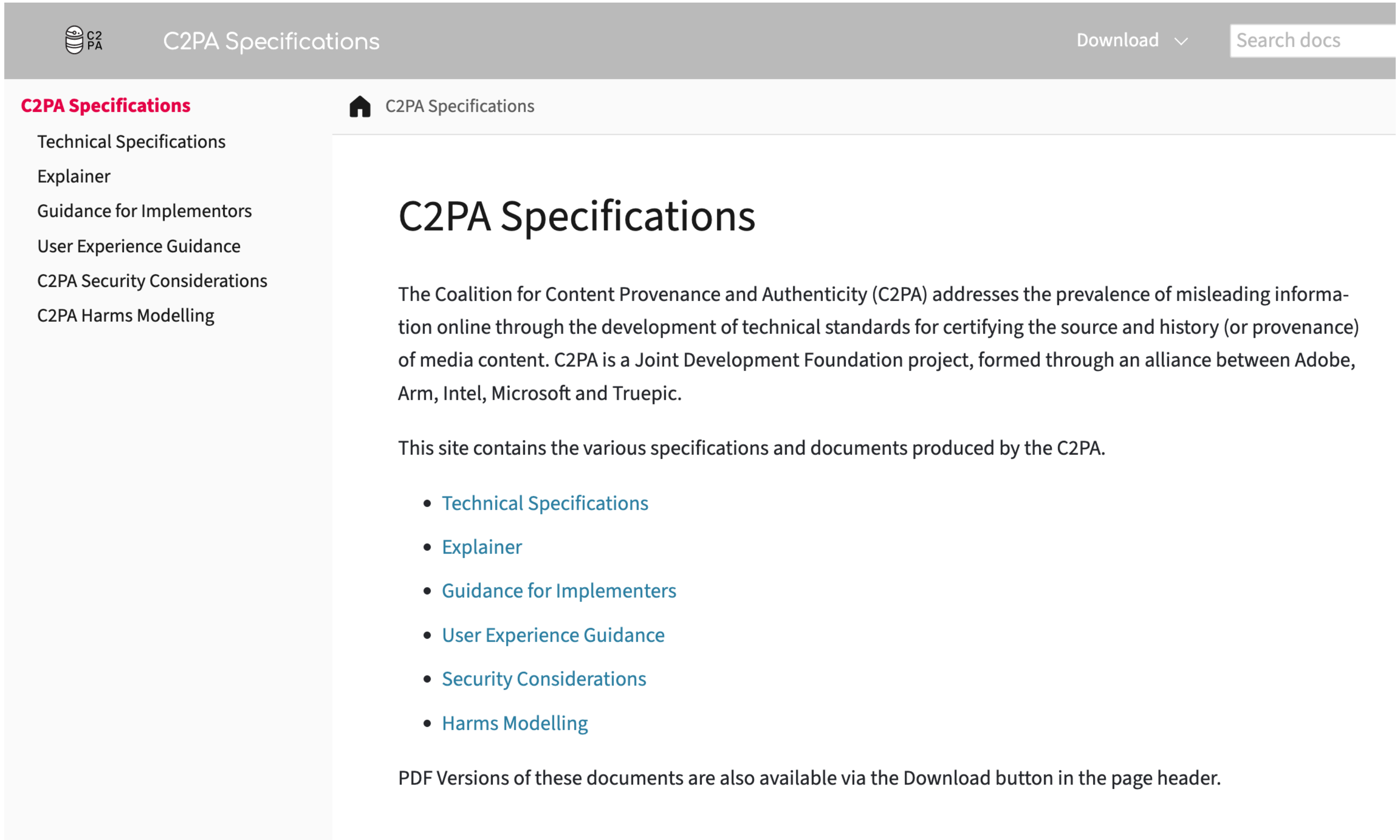
- Create only the minimum required novel technology by relying on prior, battle-tested techniques.

- Do not require cloud storage or distributed ledgers/blockchain but allow for it.

- Maintain an audit trail of claims across multiple tools, from asset creation through all subsequent modification and publication/distribution.

- Support all standard asset formats supported by common authoring tools, across media types such as images, videos, audio, and documents.

Specification (v1.3) Available - https://c2pa.org/specifications/



C2PA Specifications

The Coalition for Content Provenance and Authenticity (C2PA) addresses the prevalence of misleading information online through the development of technical standards for certifying the source and history (or provenance) of media content. C2PA is a Joint Development Foundation project, formed through an alliance between Adobe, Arm, Intel, Microsoft and Truepic.

This site contains the various specifications and documents produced by the C2PA.

- Technical Specifications
- Explainer
- Guidance for Implementers
- User Experience Guidance
- Security Considerations
- Harms Modelling

PDF Versions of these documents are also available via the Download button in the page header.

CAI Open Source

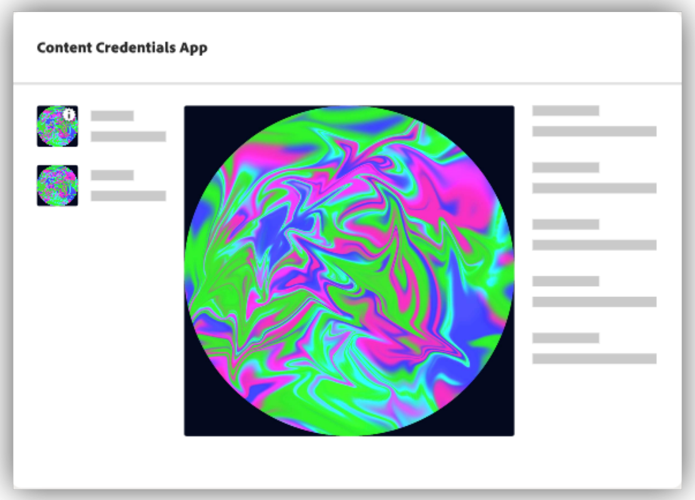
- Used by many companies
  - Adobe
  - Microsoft
  - Truepic
  - Smartframe
  - Nikon
  - Sony
  - ….

Full SDK

Develop custom applications across desktop, mobile, and services that create, verify, and display content credentials via our powerful Rust library.

Implementors will use to:

- Display Content Credentials on your site or app
- Link Content Credentials displayed on your site or app to Verify
- Write Content Credentials data into files
- Quickly create and inspect Content Credentials data
- Customize displaying and creating Content Credentials data, with the full power of the specification
- Deploy on Web, mobile, and desktop

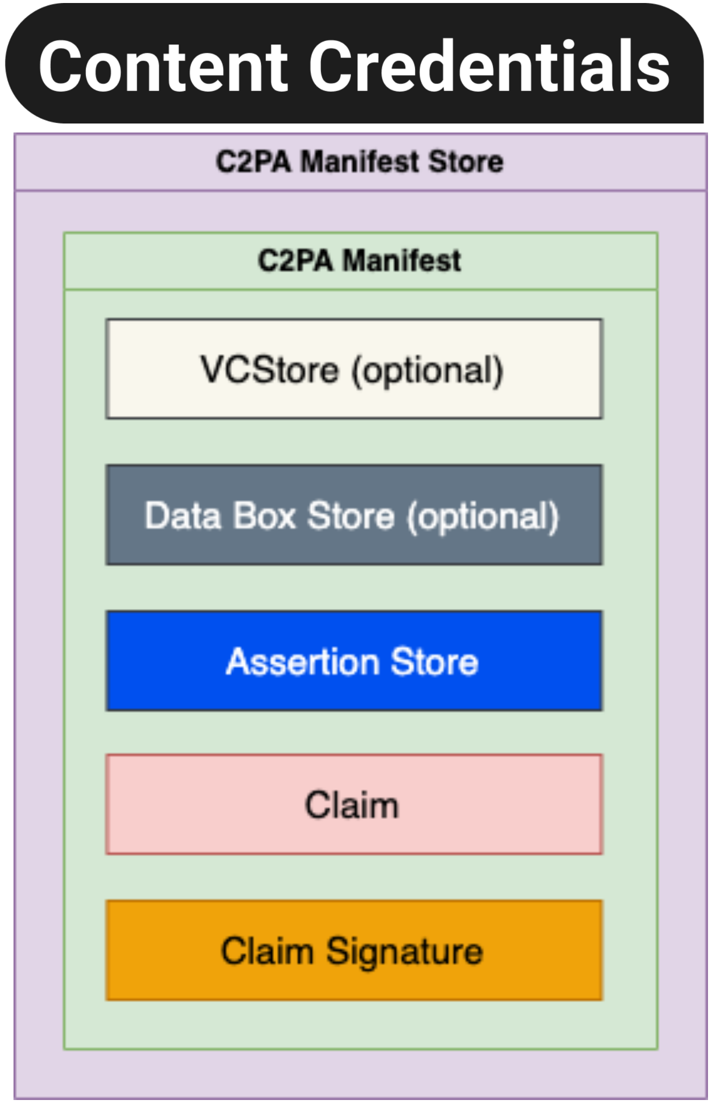


What is the C2PA Specification?

A model for storing and accessing cryptographically verifiable and tamper-evident information whose trustworthiness can be assessed based on a defined trust model.

Core Components to C2PA

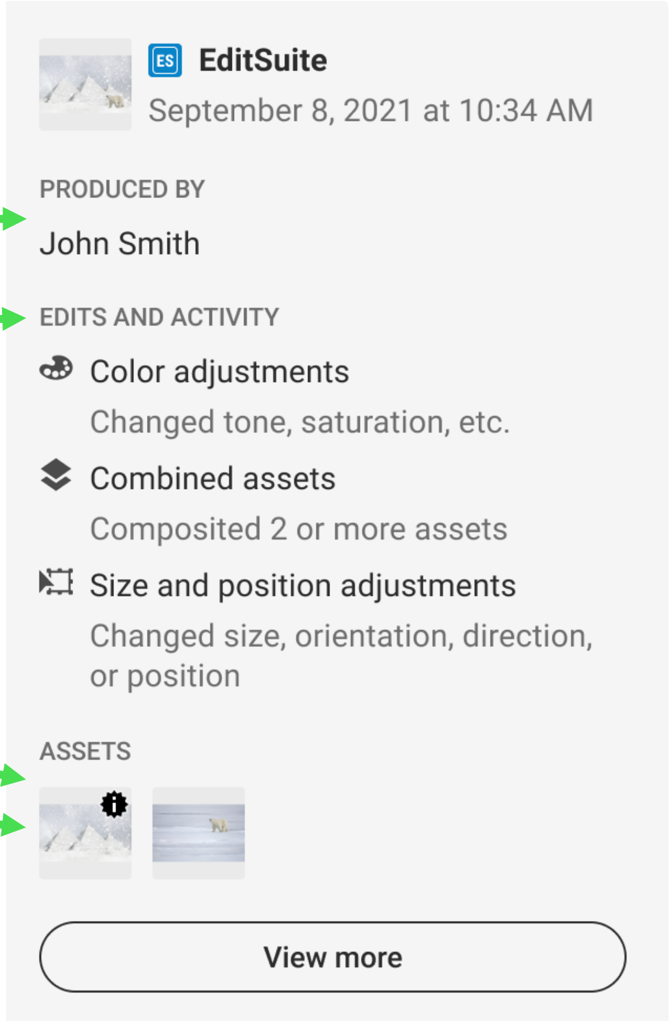
- Assertions
  - A series of statements that cover areas such as asset creation, authorship, edit actions, capture device details, bindings to content and many other subjects.
- Credentials
  - W3C Verifiable Credentials for any actor involved with an assertion.
- Data Boxes
  - Additional information about an assertion such as a GenAI prompt or thumbnail.
- Claim
  - A digitally signed entity, created by a Claim Generator, that lists the assertions being made by the Signer.
- Claim signature
  - The digital signature on the claim using the private key of an actor. This data is a part of the manifest.
- Manifest
  - A verifiable unit into which assertions, claims, credentials and signatures are all bound together. The set of manifests, as stored in the asset's Manifest Store, represent its provenance data.



Some types of Assertions

- Content Bindings
- Creative Work
- Actions
- Ingredients
- Thumbnails
- Cloud Data
- IPTC, Exif, Schema.org

https://verify.contentauthenticity.org/



EditSuite
September 8, 2021 at 10:34 AM

PRODUCED BY

John Smith

EDITS AND ACTIVITY

Color adjustments
Changed tone, saturation, etc.

Combined assets
Composited 2 or more assets

Size and position adjustments
Changed size, orientation, direction, or position

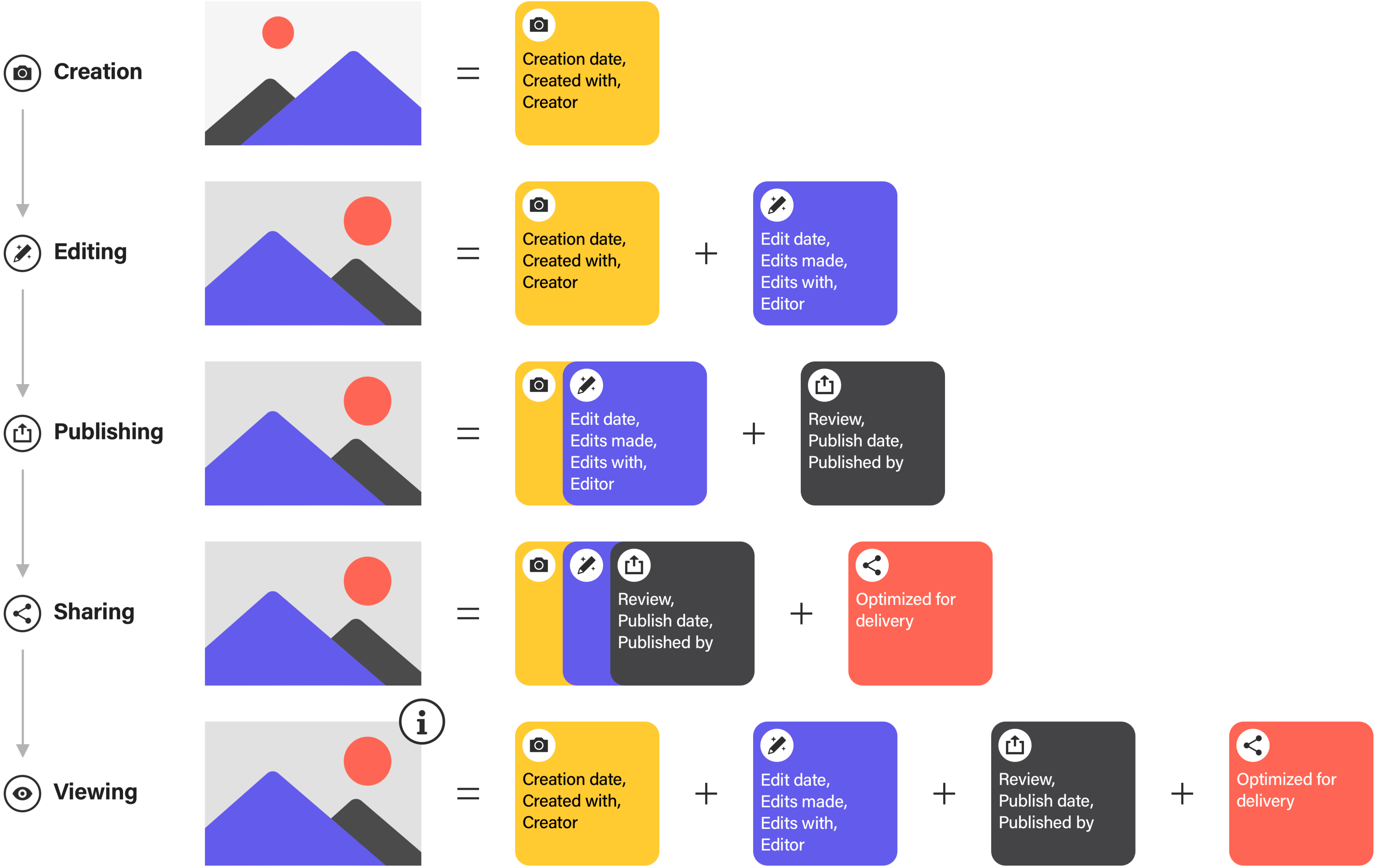
ASSETS

Manifests can reference external assets & data

- Asset Reference Assertion
    - For use in providing a link from the Manifest to the asset that it refers to
    - Designed for providing provenance for RAW images & AI/ML models
        - But can be used for any external use case
- External Ingredient Assertions & Cloud Data Assertions
    - For use when some piece of information exists externally
    - Designed for referencing original data, cloud hosted info, etc.

Manifests can be embedded or referenced

- C2PA Manifests can be embedded into
  - **Images** (JPEG, PNG, GIF, WebP, AVIF, HEIC/HEIF, TIFF, DNG, SVG)
  - **Videos** (MP4, MOV, AVI, BMFF)
  - **Audio** (FLAC, MP3, WAV, BWF)
  - **Documents** (PDF)
- They can be stored separately in file systems, the cloud, DLT/Blockchains & referenced by URL, HTTP headers, file system paths and more.



Creation = Creation date, Created with, Creator

Editing = Creation date, Created with, Creator + Edit date, Edits made, Edits with, Editor

Publishing = Edit date, Edits made, Edits with, Editor + Review, Publish date, Published by

Sharing = Review, Publish date, Published by + Optimized for delivery

Viewing = Creation date, Created with, Creator + Edit date, Edits made, Edits with, Editor + Review, Publish date, Published by + Optimized for delivery

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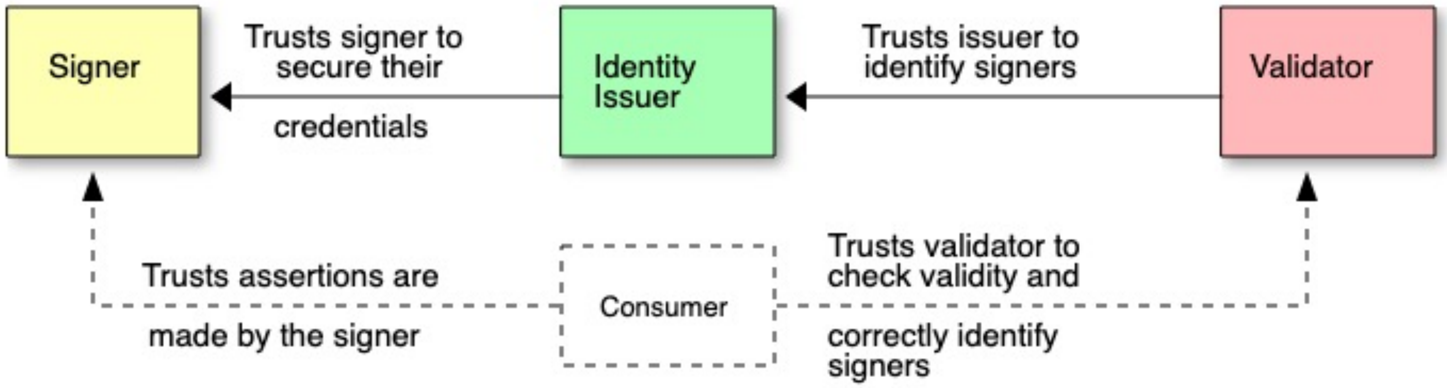
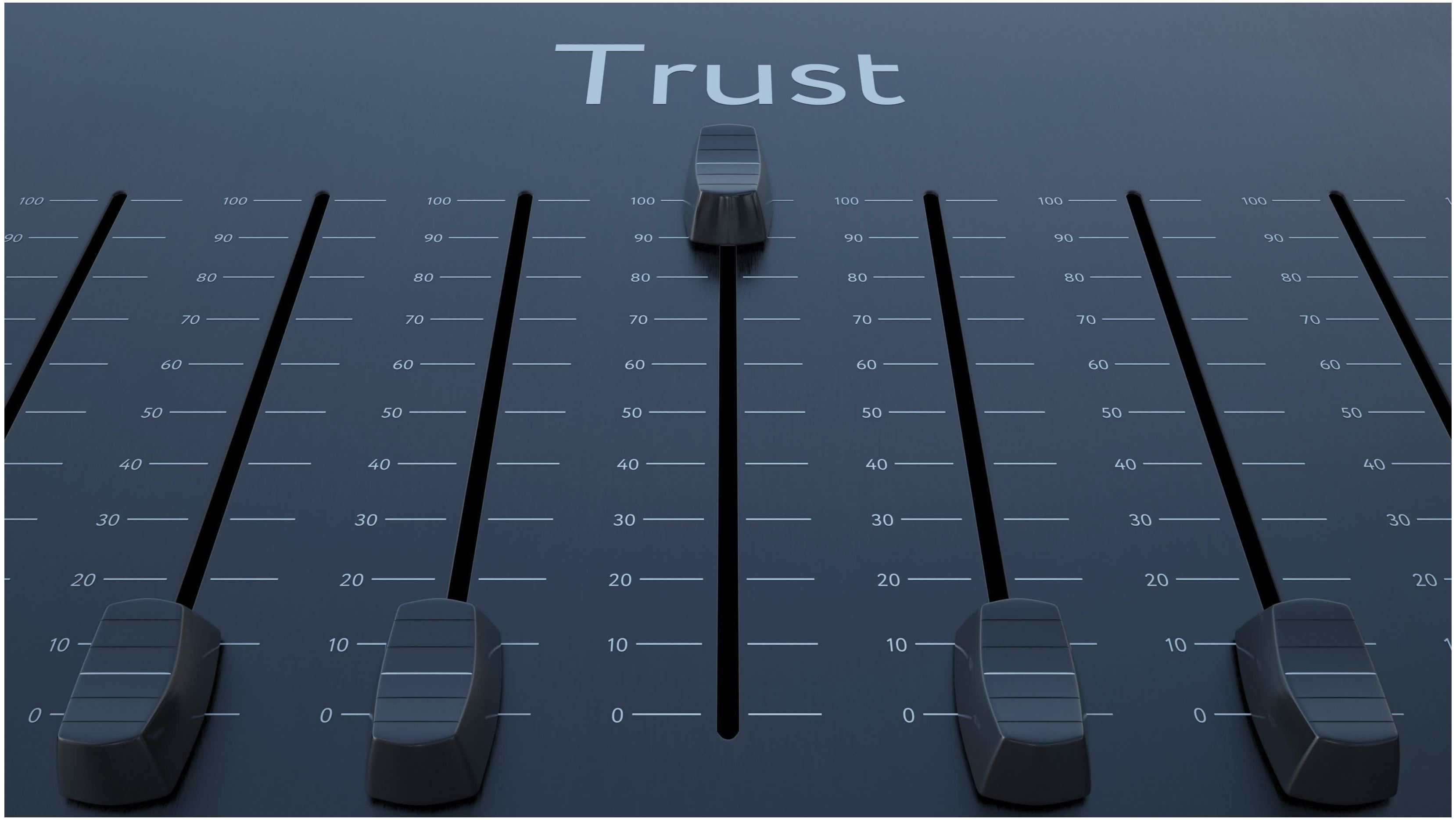
Establishing a Trust Model

- Modelled on the same approach to trust as PDF and the Web
  - X.509 Certificates
  - Certificate Authorities
  - Trust Lists


Signer
Trusts signer to secure their credentials
Identity Issuer
Trusts issuer to identify signers
Validator
Trusts assertions are made by the signer
Consumer
Trusts validator to check validity and correctly identify signers

Enhancing Trust with Trust Signals

- Trust isn't binary (true|false)
  - Determined by a human, not a machine!
- Based on a series of "signals" that aid in the decision-making process



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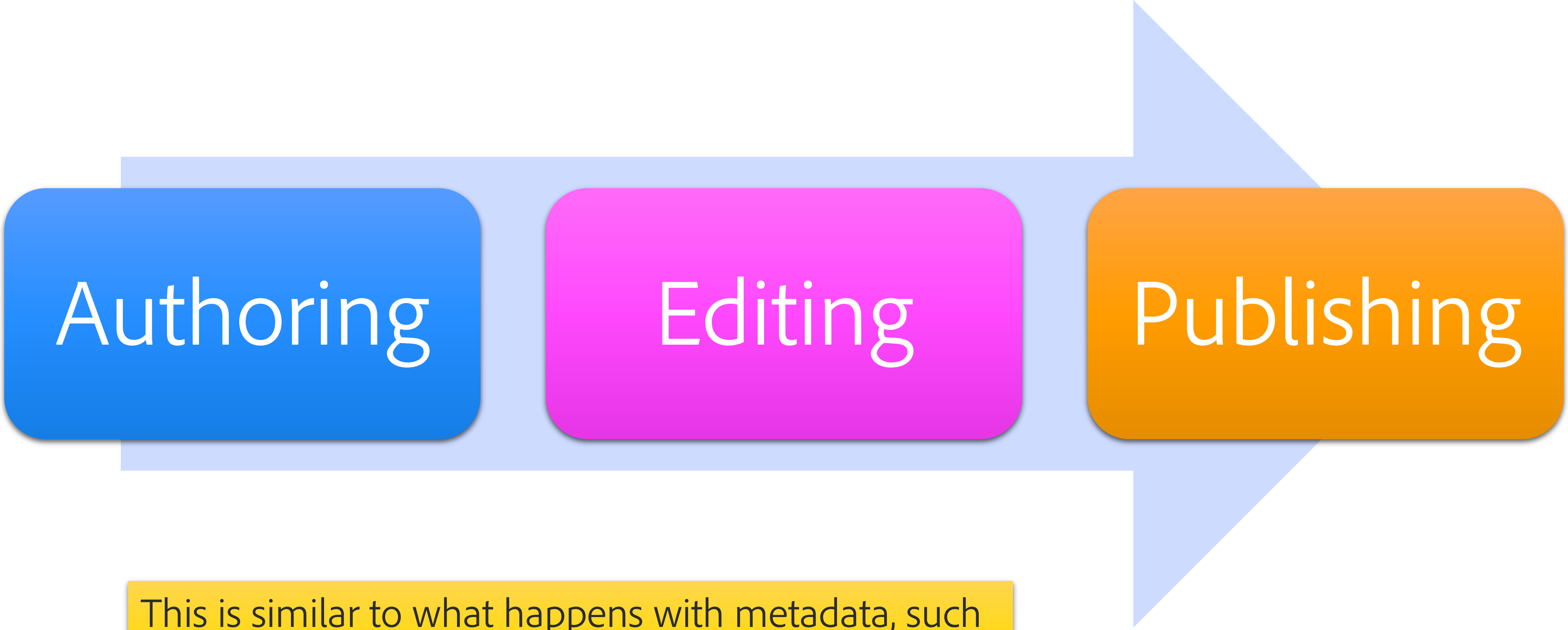
Credentials == Provenance



This is similar to what happens with metadata, such as XMP, where it needs to flow between applications

In Closing

- The C2PA **does not prescribe** a unified single platform for authenticity, but instead **presents a set of standards** that can be used to create and reveal provenance for images, documents, time-based media (video, audio) and streaming content.
- **Provenance has to be maintained/updated** from creation through to consumption

Thank you!

Questions

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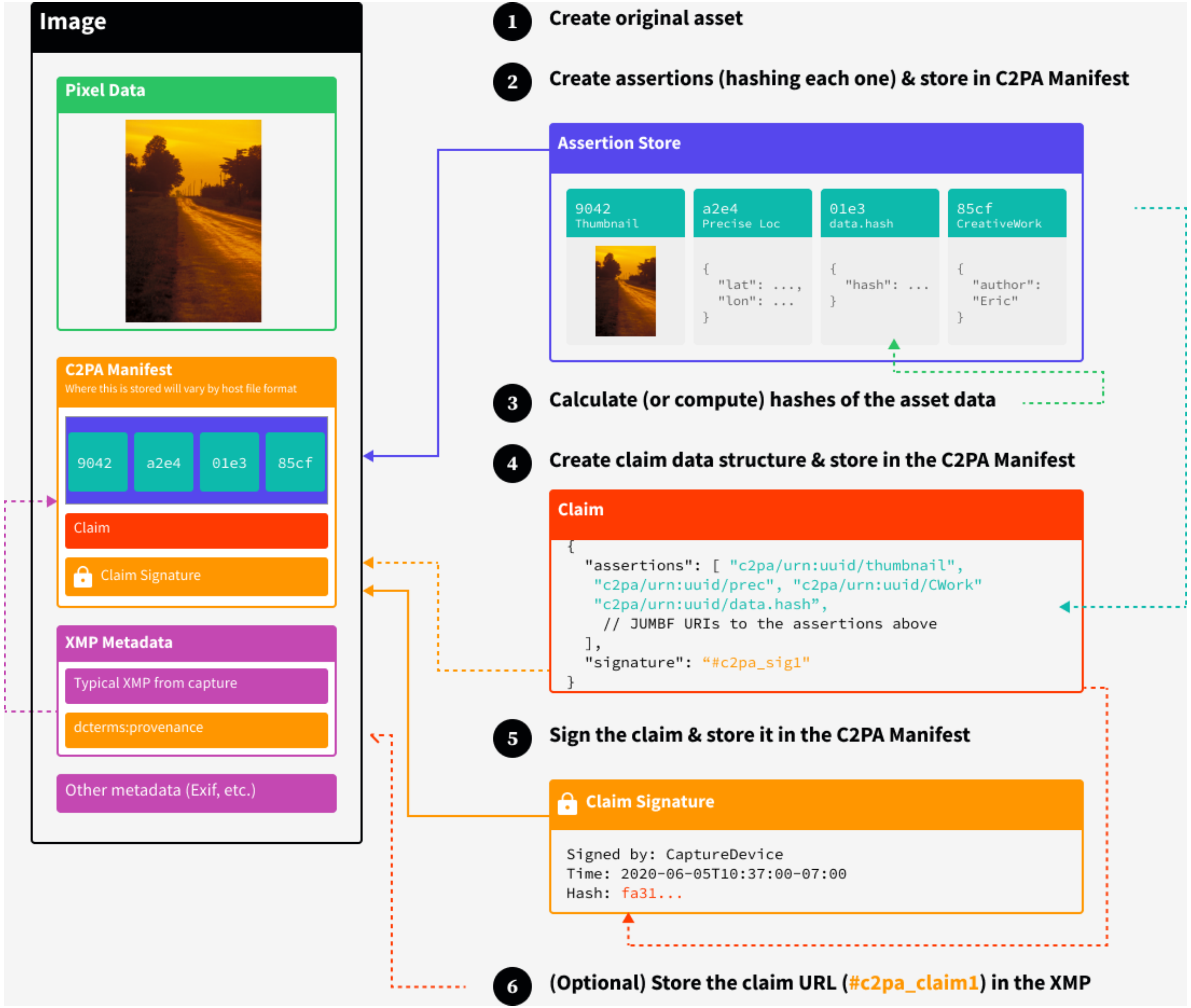

1 Create original asset

2 Create assertions (hashing each one) & store in C2PA Manifest

```
{
  "lat": ...,
  "lon": ...
}
```

```
{
  "hash": ...
}
```

```
{
  "author":
  "Eric"
}
```

3 Calculate (or compute) hashes of the asset data

4 Create claim data structure & store in the C2PA Manifest

```
{
  "assertions": [ "c2pa/urn:uuid/thumbnail",
   "c2pa/urn:uuid/prec", "c2pa/urn:uuid/CWork"
   "c2pa/urn:uuid/data.hash",
    // JUMBF URIs to the assertions above
  ],
  "signature": "#c2pa_sig1"
}
```

5 Sign the claim & store it in the C2PA Manifest

```
Signed by: CaptureDevice
Time: 2020-06-05T10:37:00-07:00
Hash: fa31...
```

6 (Optional) Store the claim URL (#c2pa_claim1) in the XMP