C2PA and Identity
Technical overview for Trust Over IP Foundation
CAI vs C2PA

Overview of C2PA data model

What’s new in C2PA 2.0?

Identity “2.0” assertion

Questions: At end, please
“We are 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.”
“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 data model
C2PA data model

Overview

An asset is any piece of digital media that we wish to describe.

Currently supported asset types include:

- photo
- video
- audio
- documents
- fonts
C2PA data model

Overview

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It is described by a manifest.
C2PA data model

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The collection of manifests is referred to as a **manifest store**.
C2PA data model

Assertions

**Assertions** are opt-in statements that cover areas such as:

- hard binding to asset’s binary content *(required – provides tamper evidence)*
- capture device details
- identity of the content creator(s) *(see later discussion)*
- edit actions
- thumbnail of the content
- other content (ingredients) that were incorporated into this content
C2PA data model

Assertions, part 2

Assertions can be redacted (overwritten by zeros) by future manifest producers.

Assertions are typically serialized in CBOR.
C2PA data model

Claim

Every manifest has exactly one claim, which contains:

- a list of its assertions (via hashed JUMBF URI)
- information about who created the claim (typically tool vendor)
- assertions from ingredients that were redacted
C2PA data model

Claim signature

A **claim signature** is a COSE signature that binds the claim data structure to an X.509 certificate holder.
C2PA data model

Manifest

A **manifest** is a JUMBF data structure which contains the claim signature, claim, and assertions.
C2PA 2.0

Released January 2024
C2PA 2.0

Narrowing scope

C2PA 1.4 spec is a 217 page PDF. How to make it smaller?

- C2PA 2.0 now only describes metadata that is **machine-attestable** and relies on extensibility (custom assertion types) to permit human-generated statements to be made.

- Strong guidance (but not requirement) that manifest signature should be issued by the tool implementation (hardware or software), not the individual or organisation content producer.

- Several assertion types were **deleted** from C2PA 2.0. These will be taken up outside of C2PA – see next section.
C2PA 2.0

New concepts – manifests

A well-formed manifest is:

- Structurally valid
- Has a valid signature (may or may not be on trust list)
- Unmodified since signature was issued

A trusted manifest is also:

- Signed by a certificate holder that is on verifier’s trust list
- Trust list should include a C2PA trust list (not yet implemented)
C2PA 2.0
New concepts - claim

A version 2 claim now distinguishes between:

- **Created assertions**, which are directly created by the claim generator (i.e. machine-attestable)

- **Gathered assertions**, which are provided by some other part of the workflow (i.e. human-provided content)
Identity “2.0” assertion

Current work in progress
Identity “2.0” assertion

Why?

- Ensure that identity is securely bound to content.
  - The CreativeWork assertion in the C2PA 1.x specification did not provide this assurance and was deprecated for that reason.

- Provide new home for identity given new C2PA 2.0 core spec focus on machine-attestable content.
Identity “2.0” assertion

What?

“This specification aims to allow an actor to document their relationship to a C2PA asset produced by them or on their behalf independently from the C2PA claim generator, and to allow consumers of a C2PA asset to independently verify that the received asset was in fact produced by the named actor and has not been tampered with.”

- Identity assertion specification “Design goals” section
Identity “2.0” assertion

What?

“This specification aims to allow an actor to document their relationship to a C2PA asset produced by them or on their behalf independently from the C2PA claim generator, and to allow consumers of a C2PA asset to independently verify that the received asset was in fact produced by the named actor and has not been tampered with.”

actor: A human or non-human (hardware or software) that is participating in the C2PA ecosystem.

For purposes of identity 2.0 spec, this typically means an individual or organization that is creating content.
Identity “2.0” assertion

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C2PA asset: Defined in identity 2.0 spec as any asset containing a C2PA manifest.
Identity “2.0” assertion
What?

“This specification aims to allow an actor to document their relationship to a C2PA asset produced by them or on their behalf independently from the C2PA claim generator, and to allow consumers of a C2PA asset to independently verify that the received asset was in fact produced by the named actor and has not been tampered with.”

The identity 2.0 spec defines a new trust signal for content creators (“actors”) that is independent from and in addition to the signature defined in the C2PA 2.0 spec for claim generators.
Identity “2.0” assertion

What?

“This specification aims to allow an actor to document their relationship to a C2PA asset produced by them or on their behalf independently from the C2PA claim generator, and to allow consumers of a C2PA asset to independently verify that the received asset was in fact produced by the named actor and has not been tampered with.”

Similar to the signature mechanism for claim generators in the core C2PA spec, the identity 2.0 spec encourages independent verification of relevant credentials.
Identity “2.0” assertion

What?

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The identity 2.0 spec encourages the use of credentials that include attestation from independent sources (employers, professional organizations, KYC/KYB vendors, etc.).
Identity “2.0” assertion
What?

“This specification aims to allow an actor to document their relationship to a C2PA asset produced by them or on their behalf independently from the C2PA claim generator, and to allow consumers of a C2PA asset to independently verify that the received asset was in fact produced by the named actor and has not been tampered with.”

The identity 2.0 spec requires a reference to the same tamper-evident, hard-binding assertion as the C2PA claim that includes it, thus ensuring that the named actor has given their consent to be identified with this specific content and ensuring that the signature will be invalidated if the content is modified after their signature was issued.
Identity “2.0” assertion

Technical overview

Identity assertion allows one credential subject to sign a list of assertions.

Meant to imply subject's authorization or active participation in production of the asset.

Additional trust signal over and above the C2PA claim generator signal.
Identity “2.0” assertion

Technical overview

Credential and signature can be:

- X.509 certificate ➤ COSE signature
- W3C verifiable credential ➤ another VC *(maybe VP?)*
Identity “2.0” assertion

Technical overview

Identity assertion is **optional**.

Identity assertion may be **repeated any number of times** for multiple content producers (for example, interactive multi-author app).

Identity assertion can be **redacted** if needed for privacy/safety reasons.
Identity “2.0” assertion

Who’s building this? Me 😄 and …

- Discussions at Internet Identity Workshop last year (I’ll be back this April!)
- Became my full-time job in November 2023, private drafts circulated since then
  - Several ToIP members have provided feedback – thank you!
- Previewed at CAI Summit in December 2023
- Going public …
Identity “2.0” assertion
Introducing the Creator Assertions Working Group

- https://creator-assertions.github.io

- Governed under Community Specification License process

- Will also take up the following assertions deleted from C2PA 2.0
  - Training and data mining
  - Endorsements
  - Metadata
Identity “2.0” assertion
Please join and guide this implementation!

- https://creator-assertions.github.io

- Weekly meetings
  - Typically on Mondays at 0830 Pacific / 1130 Eastern / 1630 UTC
    (will change to 1530 UTC with US Daylight Savings time in March)
  - Contact me for invitation
Questions and discussion …