



**Content  
Authenticity  
Initiative**

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# Content Authenticity 101

Content Authenticity: Who? What? Why?

C2PA data model overview

CAWG identity assertion overview

*Tomorrow: Working session on identity assertion*





# Why content provenance?







# Why content provenance?



***Making Deepfakes Gets Cheaper and Easier Thanks to A.I.***

**Forbes**

**The Battle Against Fake News Enters The Age Of Deepfakes**



**Puffer coat Pope. Musk on a date with GM CEO. Fake AI 'news' images are fooling social media users**



**Elections in UK and US at risk from AI-driven disinformation, say experts**

**TIME**

**From Scams to Music, AI Voice Cloning Is on the Rise**



**NEWS**

**With rise of AI-generated images, distinguishing real from fake is about to get a lot harder**





# Why content provenance?

**We can't uninvent this.**

What we *can* do is ...

provide a mechanism for well-intentioned  
content creators to stand apart from misinformation.



## Our goals

Allow **content creators** to make tamper-evident, digitally-signed statements about what they've created.

Allow **content consumers** to evaluate those statements and use them to make trust decisions.





## Our non-goals

Content Authenticity is **not**:

- fact-checking
- fake image detection
- politically opinionated

# Demo: How it works in Photoshop





# Who's who?



**Content  
Authenticity  
Initiative**



**Coalition for  
Content  
Provenance  
and Authenticity**



**Creator  
Assertions  
Working Group**



## Who's who?



Content  
Authenticity  
Initiative

Outreach · Advocacy · Open Source

*\* also name of Adobe's team*



C2  
PA

Coalition for  
Content  
Provenance  
and Authenticity

Technical Standards: **What / How**



Creator  
Assertions  
Working Group

Technical Standards: **Who**





## Who's who?



Content  
Authenticity  
Initiative

[contentauthenticity.org](https://contentauthenticity.org)



Coalition for  
Content  
Provenance  
and Authenticity

[c2pa.org](https://c2pa.org)



Creator  
Assertions  
Working Group

[creator-assertions.github.io](https://creator-assertions.github.io)



# Who's in?

~2500 members, including ...

CBC  Radio-Canada

EFE

dpa ...

GANNETT

gettyimages<sup>®</sup>

THE  
GLOBE  
AND  
MAIL

The New York Times

THE WALL STREET JOURNAL.

The Washington Post

infobae

shutterstock

 REUTERS

epaimages

 **stern**

EL TIEMPO

BBC

axel springer

AP

AFP 

 NATIONAL  
GEOGRAPHIC  
SOCIETY

npr

dentsu

  
PUBLICIS  
GROUPE

OmnicomGroup

 truepic

arm

camera  bits

Canon

 Microsoft

Qualcomm

 Nikon

 Leica

 Adobe





# Who's in?

## Major camera manufacturers



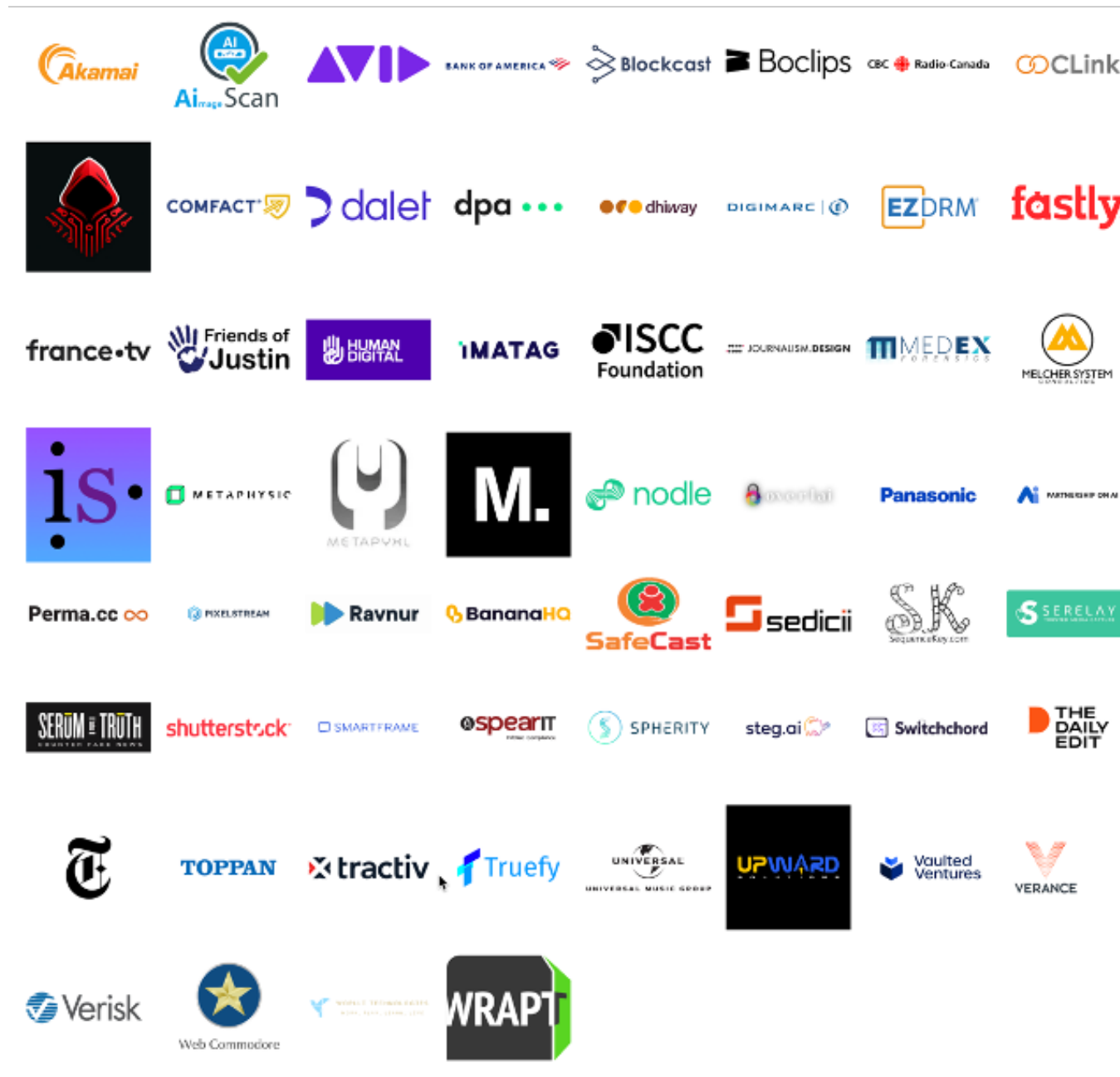
# SONY





# Who's in?

## ~100 members, including ...





# C2PA data model





# C2PA data model

## Overview

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

### asset

Currently supported  
asset types include:

photo

video

audio

documents

fonts



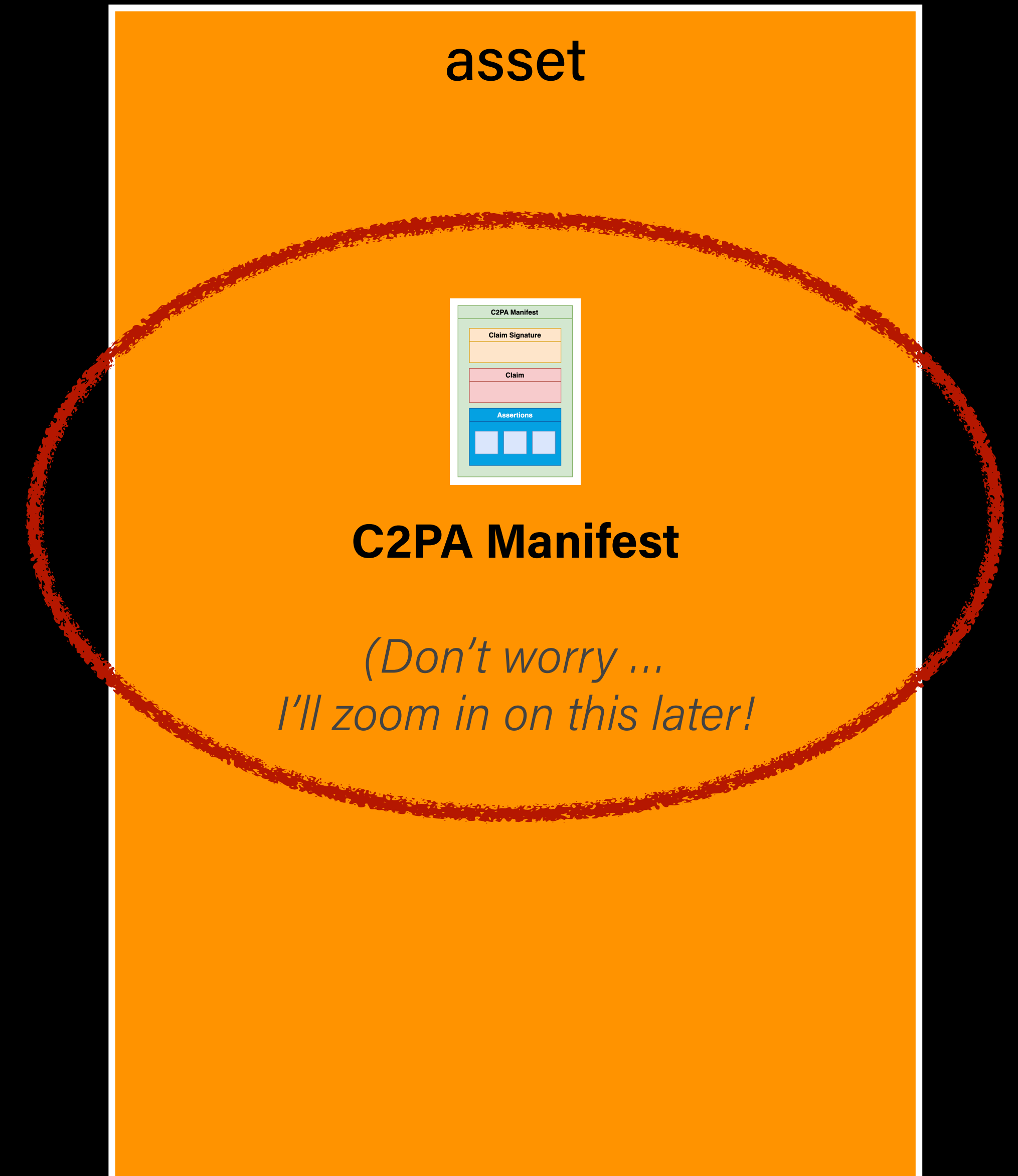


# C2PA data model

## Overview

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

It is described by a **C2PA Manifest**.





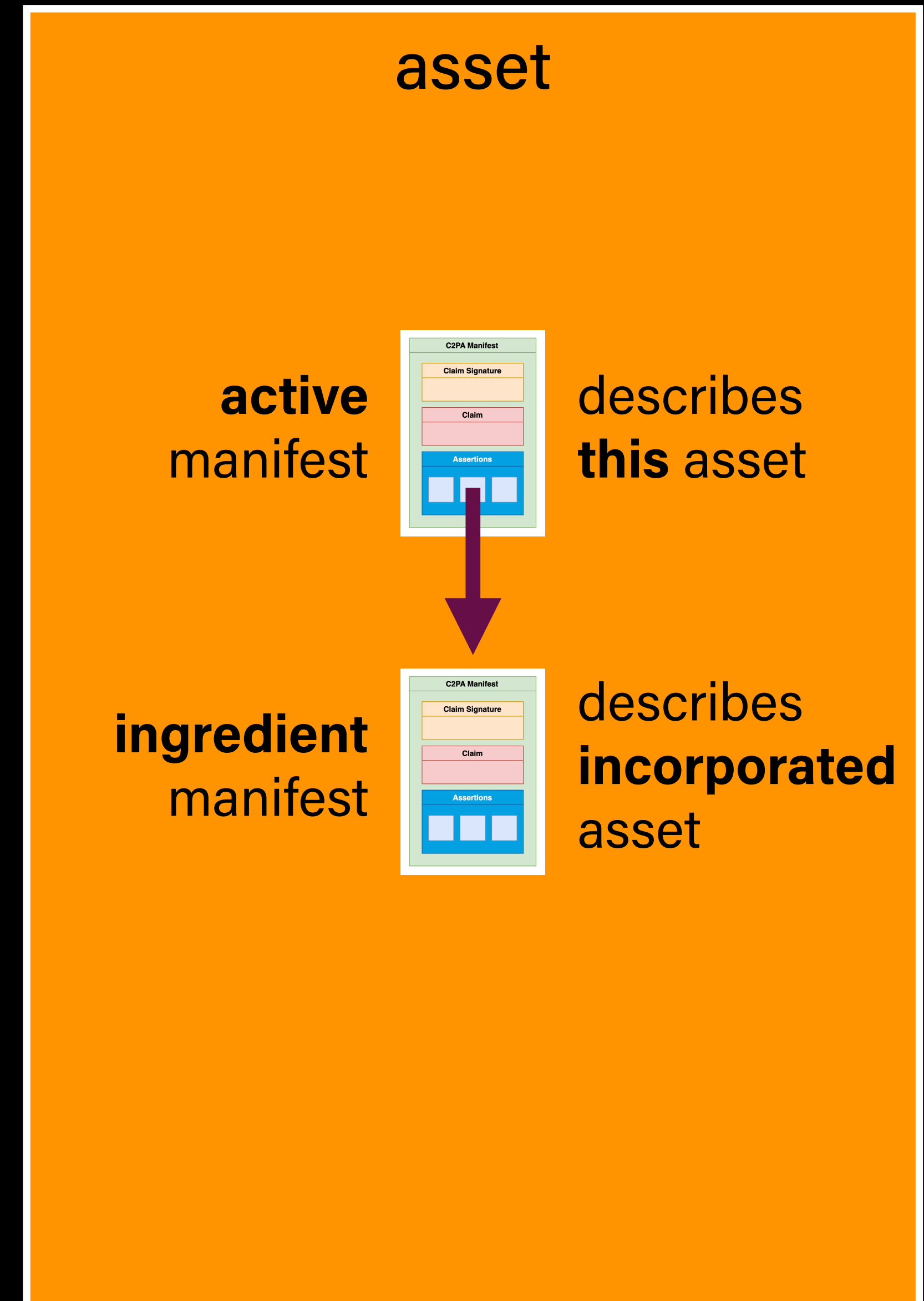
# C2PA data model

## Overview

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

It is described by a **C2PA Manifest**. Each asset in C2PA has an *active manifest* which describes the current asset.

That C2PA Manifest may refer to *ingredient manifests* when earlier content is incorporated.





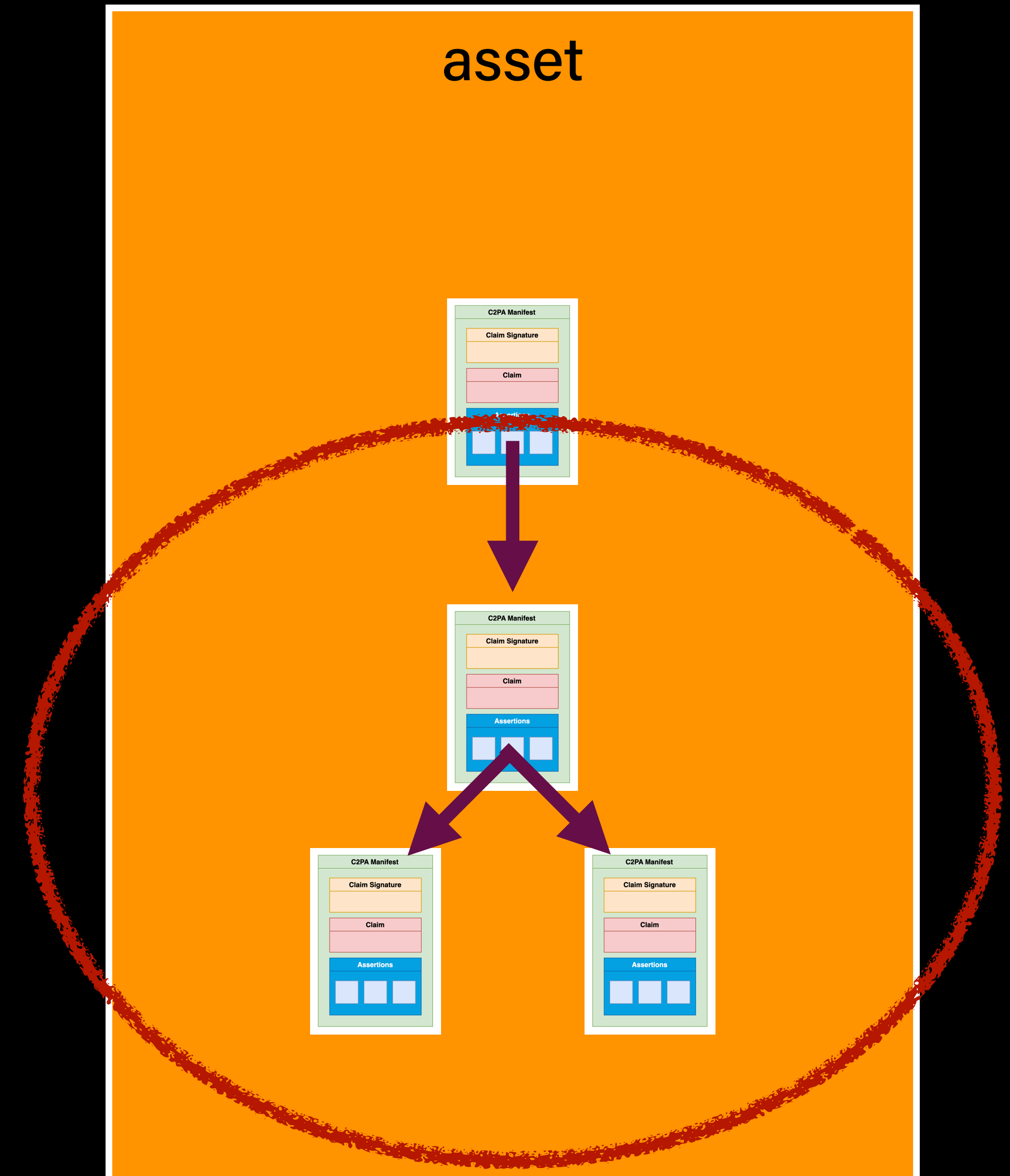
# C2PA data model

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# C2PA data model

## Overview

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

It is described by a **C2PA Manifest**. Each asset in C2PA has an *active manifest* which describes the current asset.

That C2PA Manifest may refer to *ingredient manifests* when earlier content is incorporated.

The collection of C2PA Manifests is referred to as a **C2PA Manifest Store**.





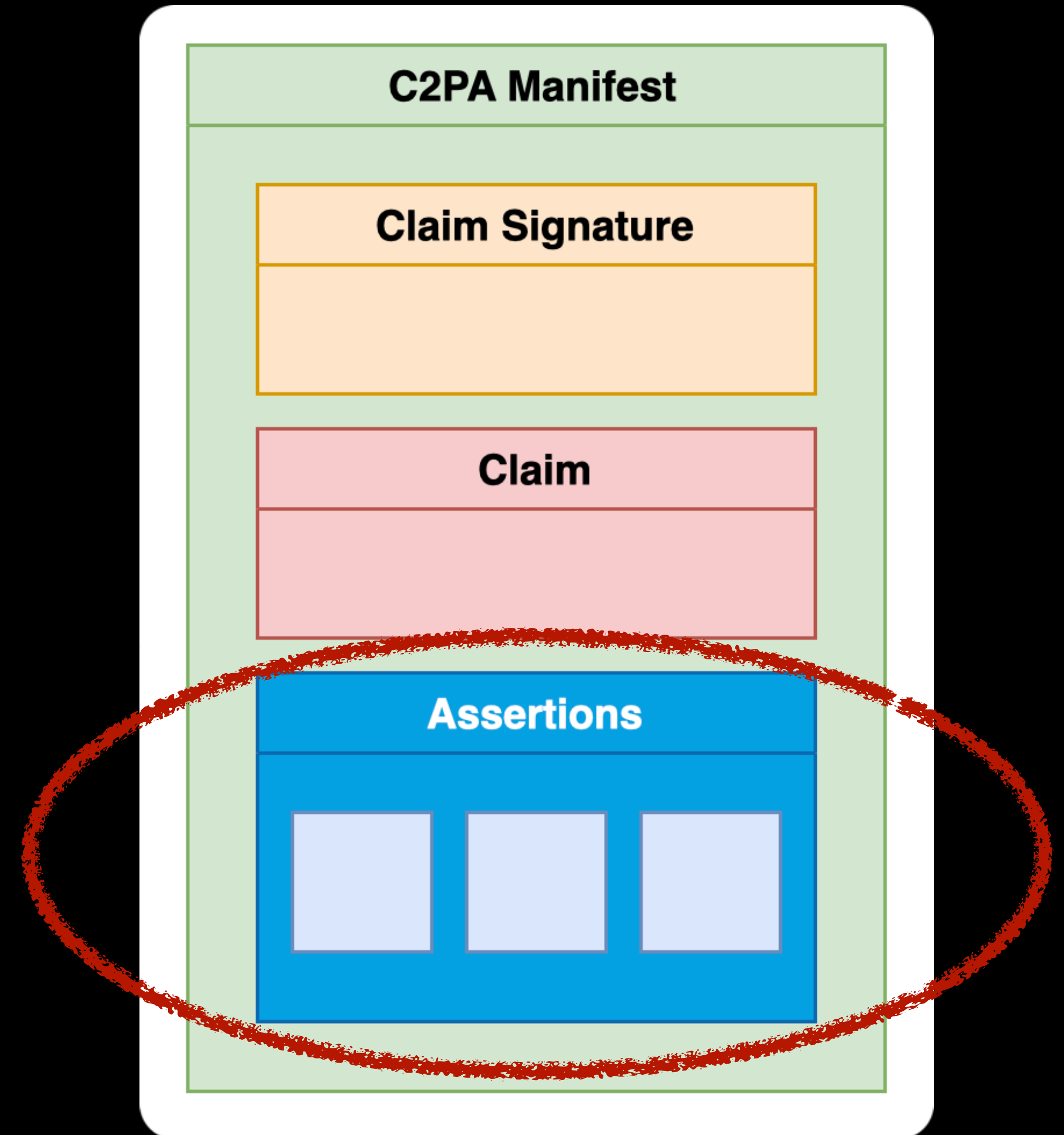


# C2PA data model

## 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
- edit actions
- thumbnail of the content
- other content (ingredients) that were incorporated into this content





# C2PA data model

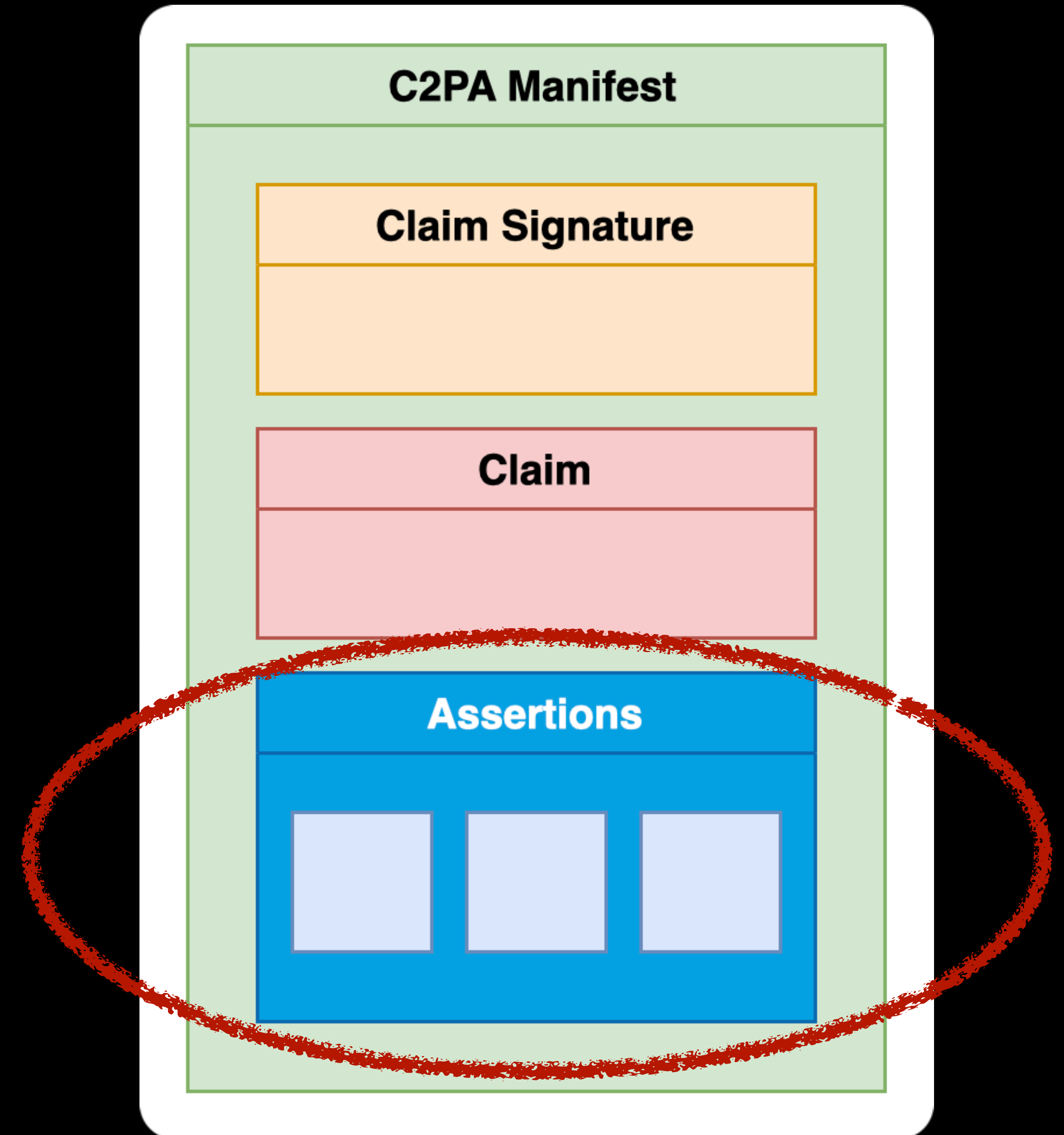
## Assertions, part 2

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

Assertions are typically serialized in CBOR.

Assertions defined by C2PA *only* describe machine-attestable content.  
(New in C2PA 2.0.)

**Assertions are labeled and can be defined by other organizations.**



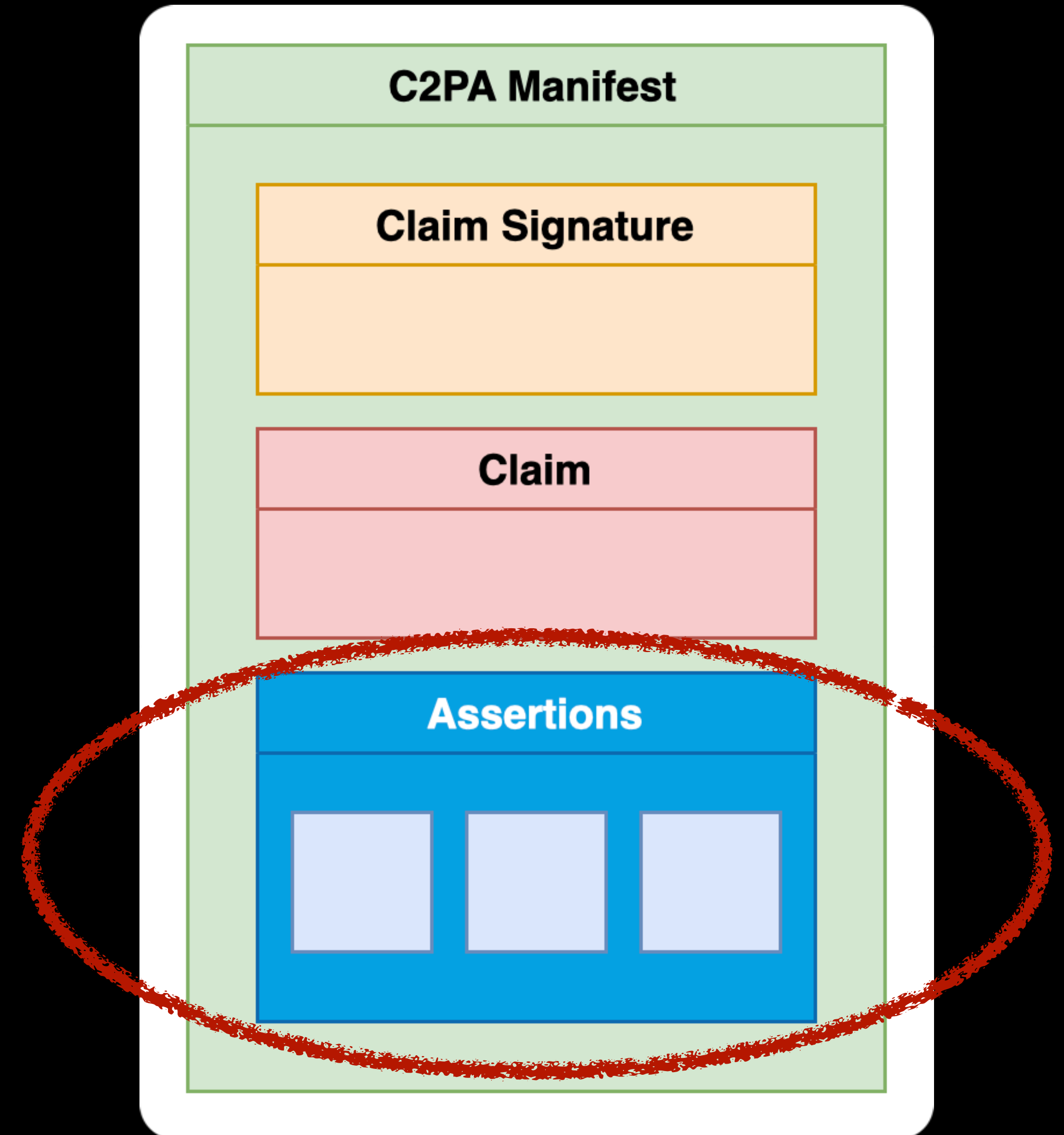


# C2PA data model

## Assertions, part 3

Some examples of non-C2PA assertions:

- identity of the content creator(s)  
(see *later CAWG discussion*)
- training and data mining intent



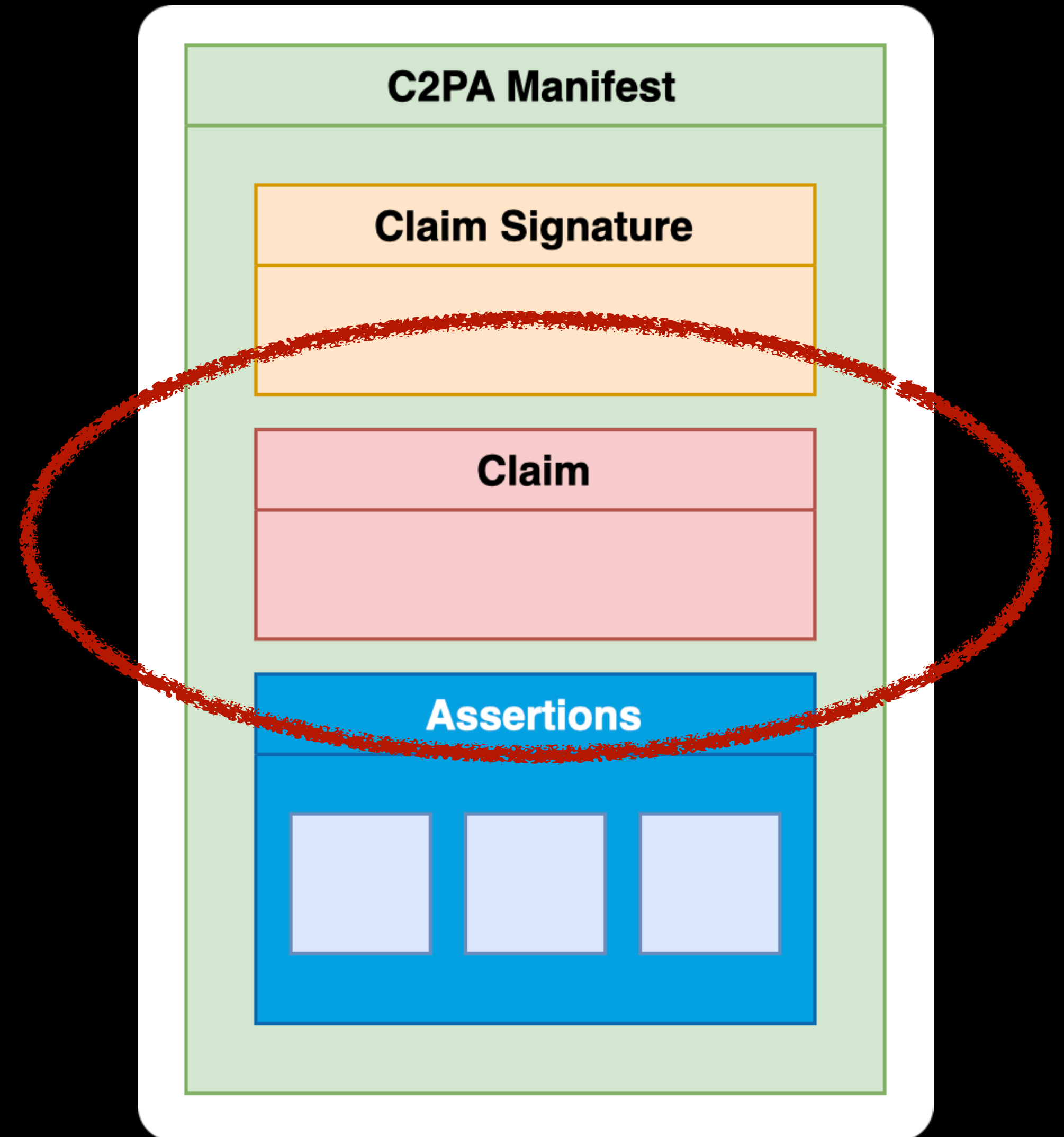


# C2PA data model

## Claim

Every C2PA 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





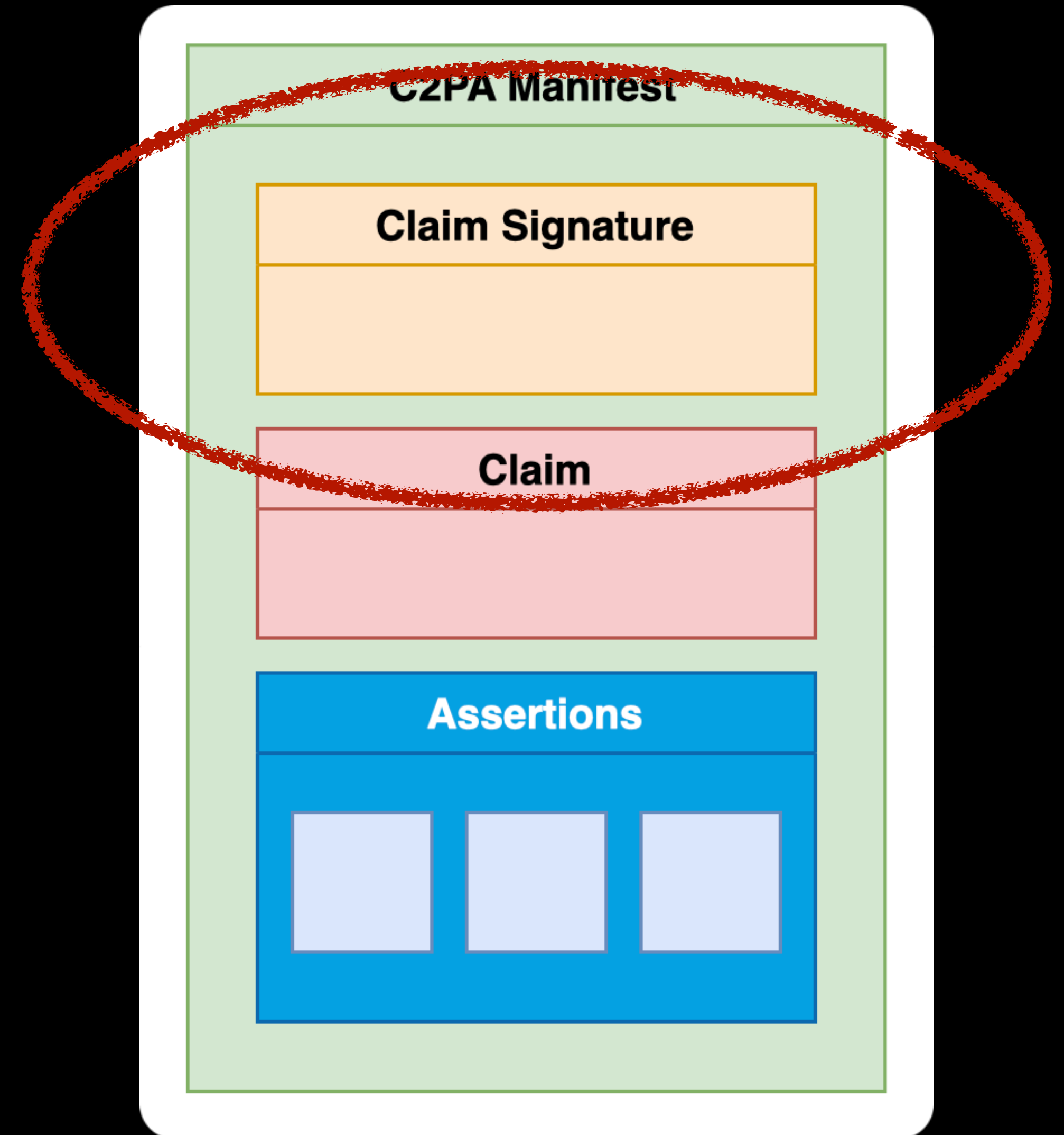


# C2PA data model

## Claim signature

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

The X.509 certificate typically identifies the *implementation* of C2PA (hardware or software), **not** the content author.

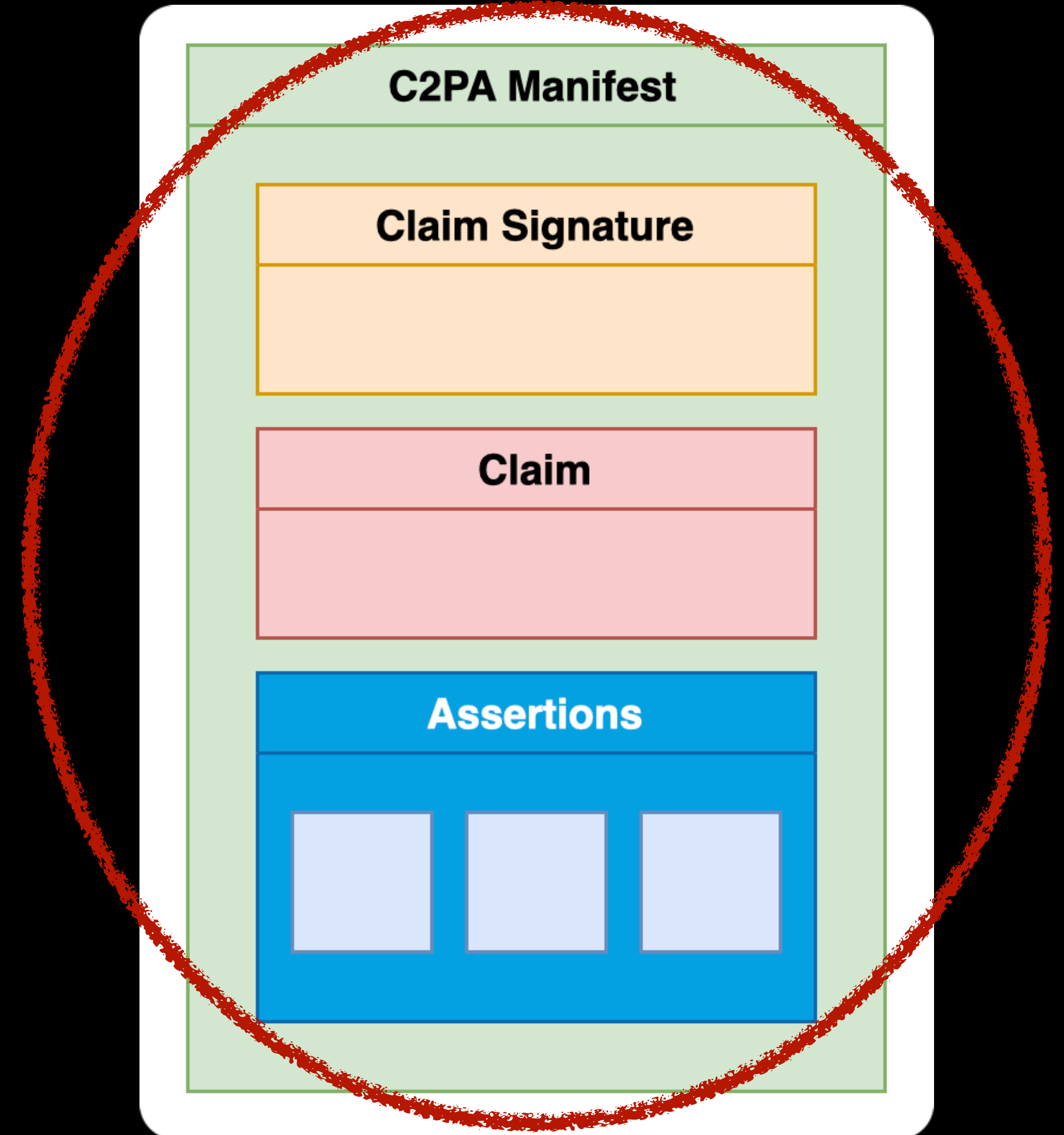




# C2PA data model

## C2PA Manifest

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





# C2PA data model

## Sample user experience

### Content Credentials



See  
[contentcredentials.org/verify](https://contentcredentials.org/verify)  
for a production version.

A sample user interface for Content Credentials, showing a post from EditSuite dated September 8, 2021, at 10:34 AM. The post includes a "PRODUCED BY" section listing John Smith, an "EDITS AND ACTIVITY" section listing color adjustments, combined assets, and size/position adjustments, and an "ASSETS" section showing two images. A "View more" button is at the bottom.

**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

[View more](#)



# **CAWG identity assertion**





## Identity 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 assertion: Why?

“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

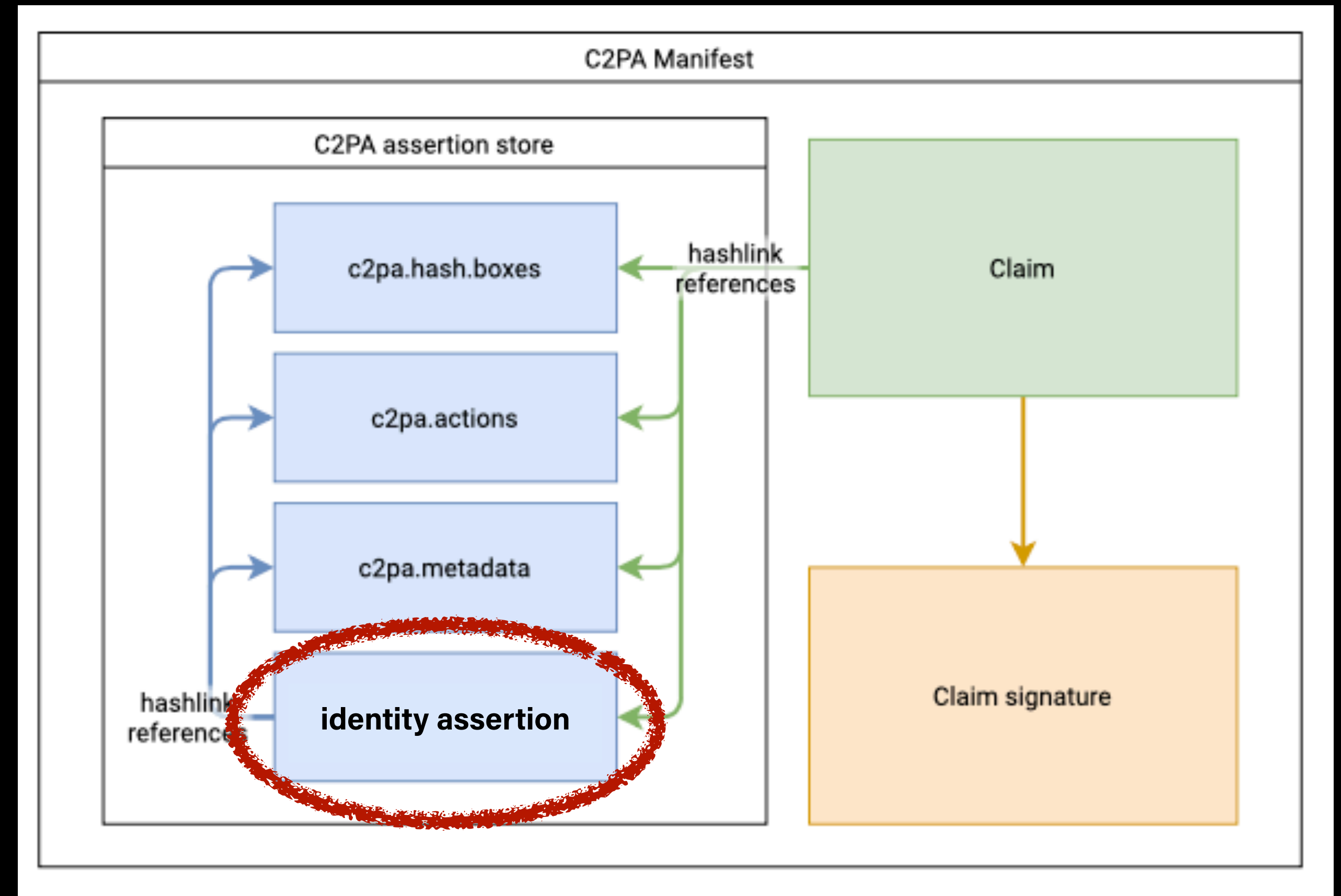


# Identity assertion

## Overview

Identity assertion allows a credential holder to sign a data structure we call `signer_payload`, which contains:

- Tamper-evident references to one or more other assertions in the same C2PA Manifest (including hard-binding assertion)
- Role of credential subject with regard to the content
- Other items TBD ...



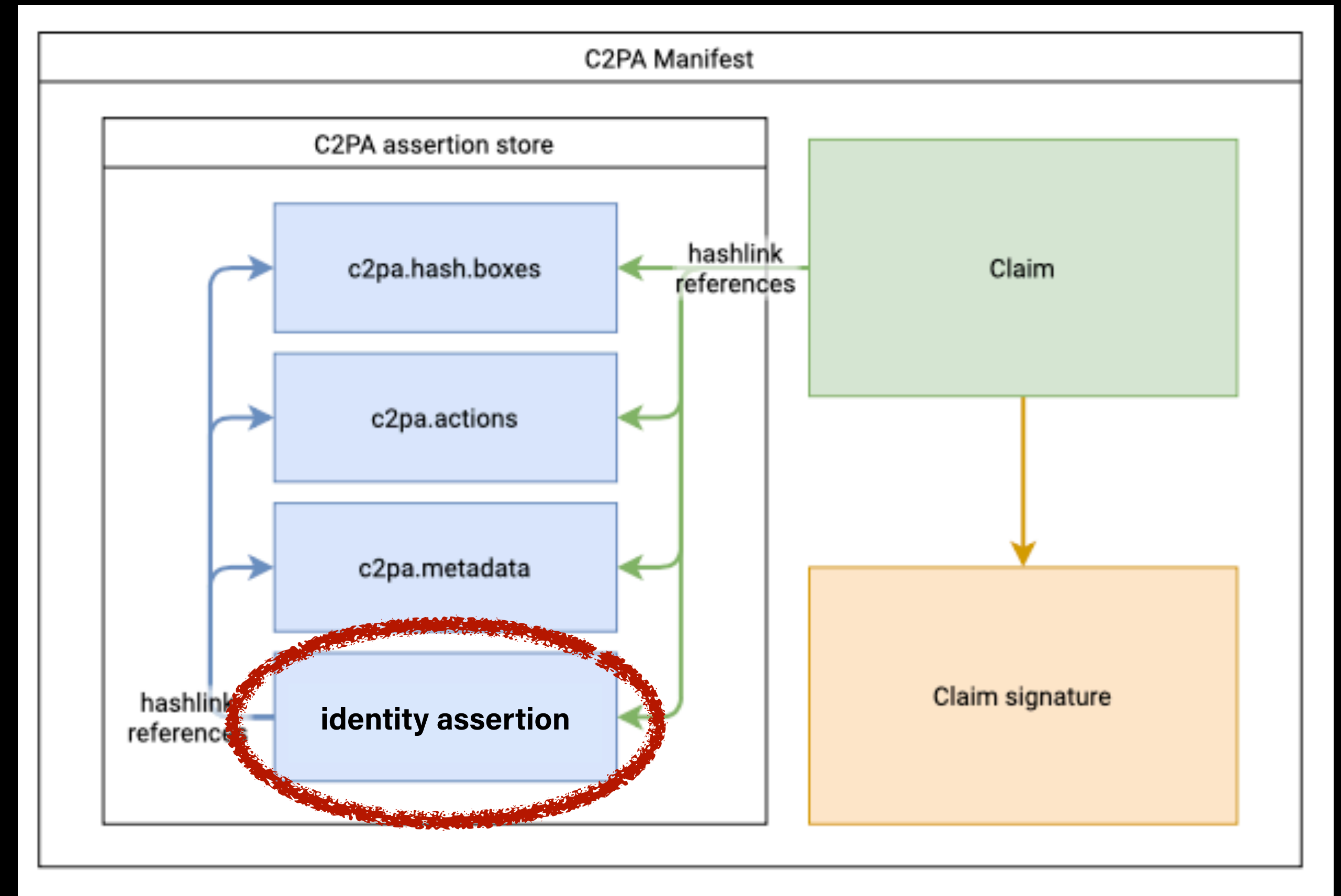


# Identity assertion

## Overview

New and separate trust signal over and above the C2PA claim generator signal.

Typically meant to indicate **subject's authorization or active participation** in production of the asset.





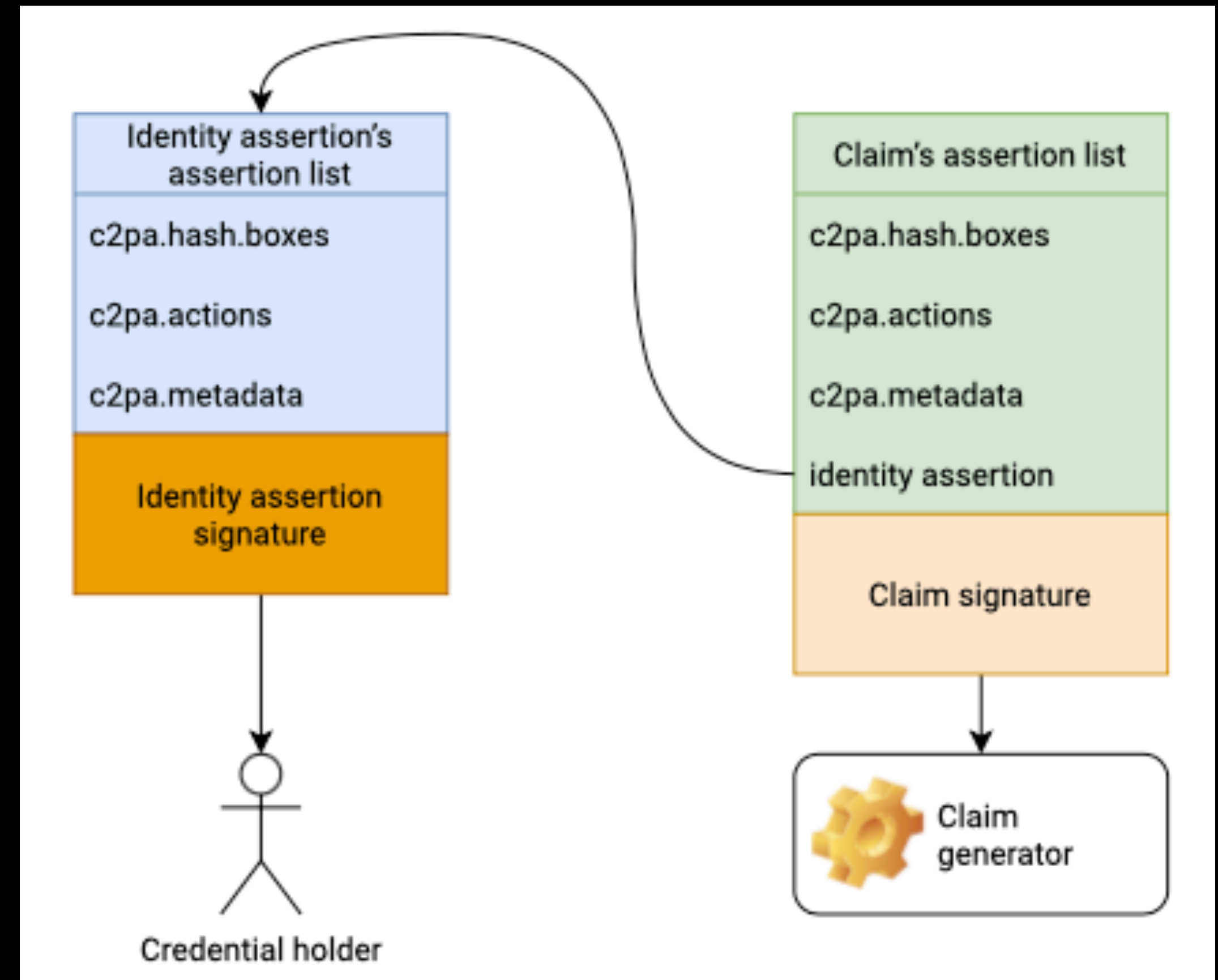


# Identity assertion

## Overview

Credential and signature can be:

- X.509 certificate ➤ COSE signature
- W3C verifiable credential ➤ another VC
- *Extensible ... others may be added by CAWG in future or by others i*





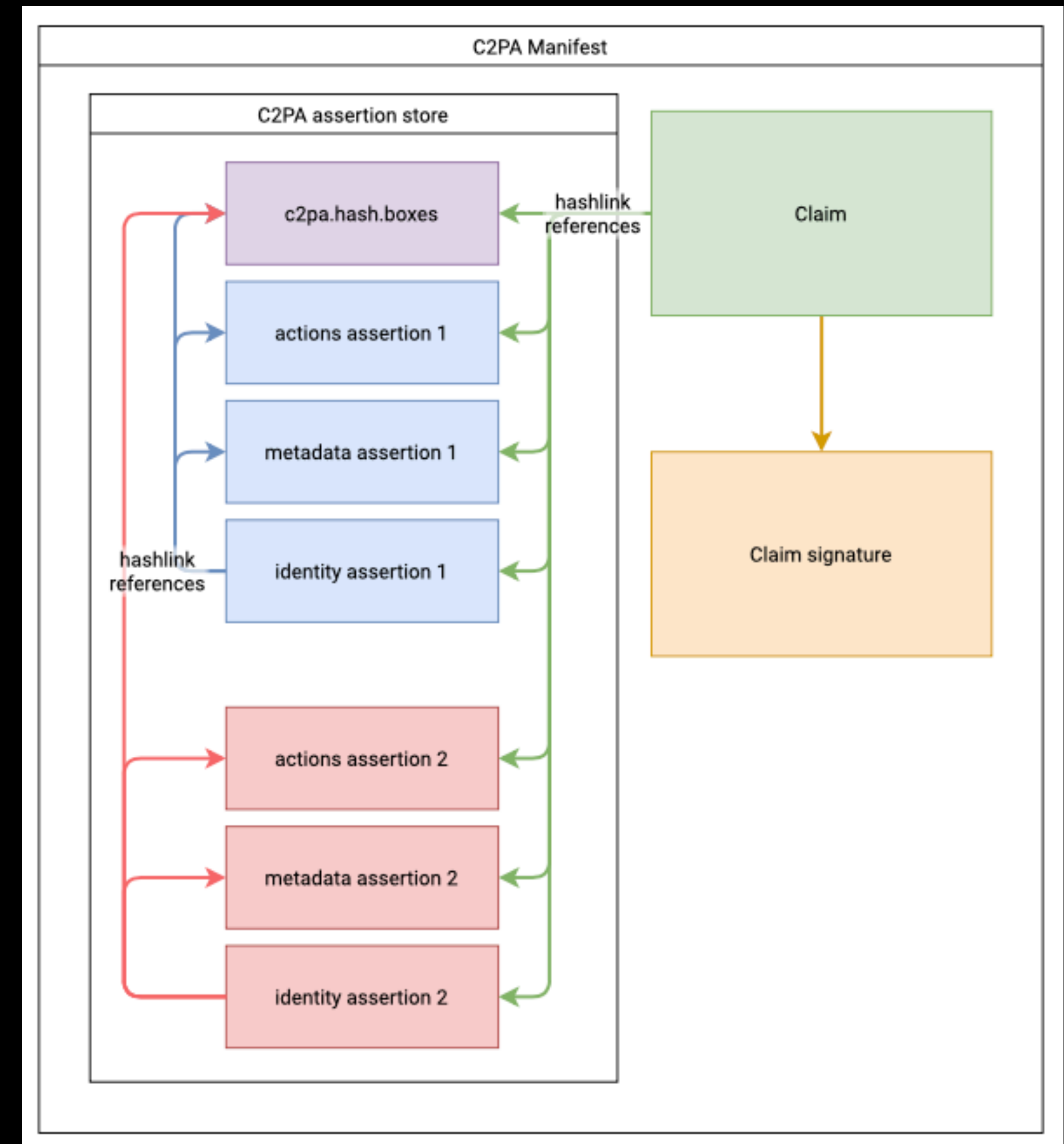
# Identity assertion

## 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 assertion

Help us build it!

- <https://creator-assertions.github.io>
- Weekly meetings:
  - Typically on Mondays at 0830 Pacific / 1130 Eastern / 1530 UTC
  - Contact me for invitation
- Working session **tomorrow (pithy title to be determined)**





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# Questions and discussion

[contentauthenticity.org](https://contentauthenticity.org)





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# Thank you!

[contentauthenticity.org](https://contentauthenticity.org)

Stansbury Island, Utah, 2022  
Eric Scouten





Content  
Authenticity  
Initiative

# Thank you!

[contentauthenticity.org](https://contentauthenticity.org)

Stansbury Island, Utah, 2022

Eric Scouten

*(yes, really!)*