



Content
Authenticity
Initiative

X



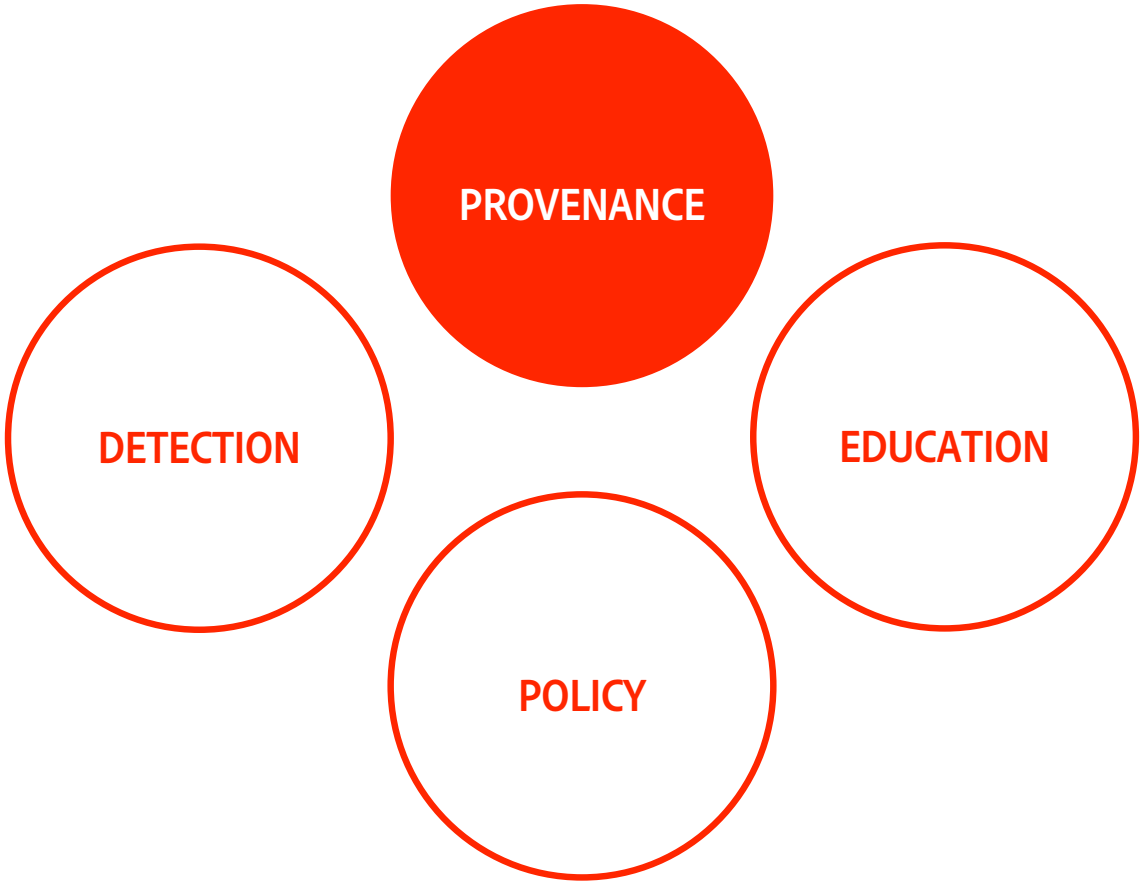
Adobe



CAI and Creating Trust in Media

WENDY A. DINOVA-WIMMER
OFFICE OF THE PUBLIC SECTOR CTO | ADOBE

WHAT DOES IT TAKE TO FIGHT MANIPULATED AND SYNTHETIC MEDIA



PHOTOS AND FAMILY HISTORY

Use this tool because it is very hard to get access to a Google account after death.

<https://support.google.com/accounts/answer/3036546?hl=en>

Follow the link to see how to set up your legacy person today. This is part of estate planning.

<https://www.facebook.com/help/1568013990080948?ref=shareable>



CONTENT AUTHENTICITY INITIATIVE

Provenance refers to the basic, trustworthy facts about the origins of a piece of digital content (image, video, audio recording, document).

Provenance: The records describing the possession of, and changes to, components, component processes, information, systems, organization, and organizational processes. Provenance enables all changes to the baselines of components, component processes, information, systems, organizations, and organizational processes, to be reported to specific actors, functions, locales, or activities.

Source(s):

[NISTIR 7622](#) under Provenance

<https://contentauthenticity.org/>

CAI & C2PA



Content Authenticity Initiative (CAI)

<https://contentauthenticity.org/>

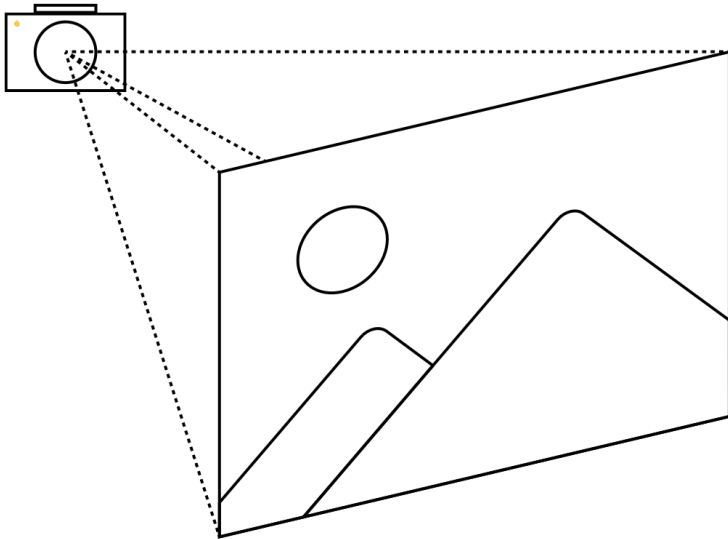


Coalition for Content Provenance and Authenticity (C2PA)

<https://c2pa.org/>

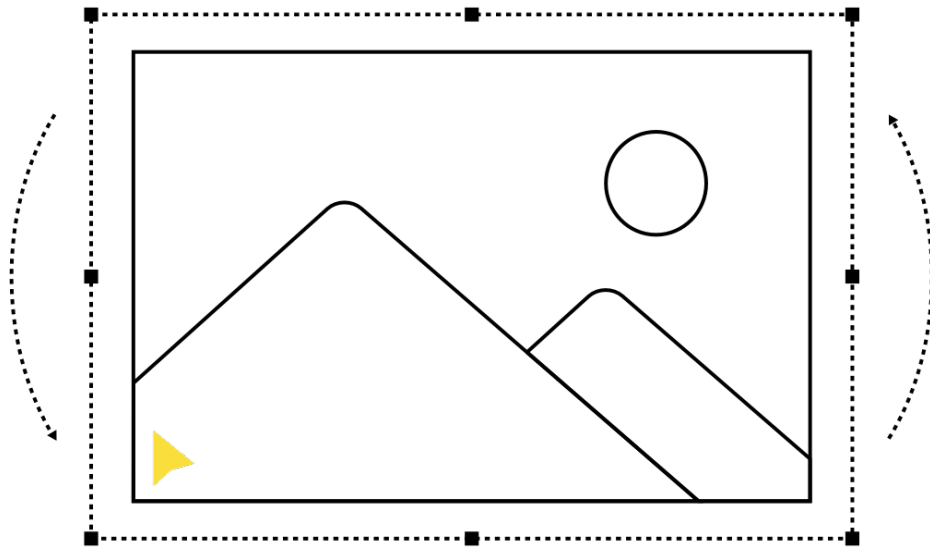


1-CREATE



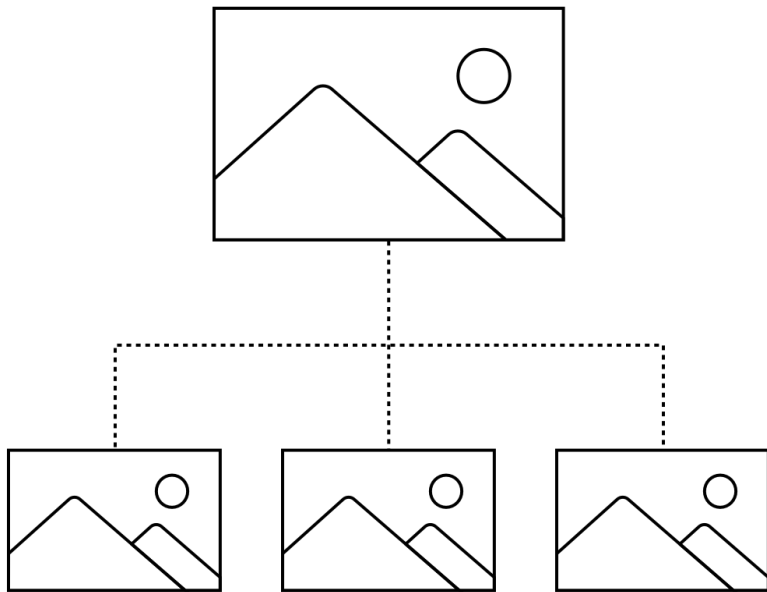
We use cryptographic asset hashing to provide verifiable, tamper-evident signatures that the image and metadata hasn't been unknowingly altered. At creation, choose what information to attach to the content being created. Throughout this process, the creator of content can choose to preserve attribution or to remain anonymous. Privacy and security of photojournalists and other creators are of the utmost consideration in our work.

2-EDITING



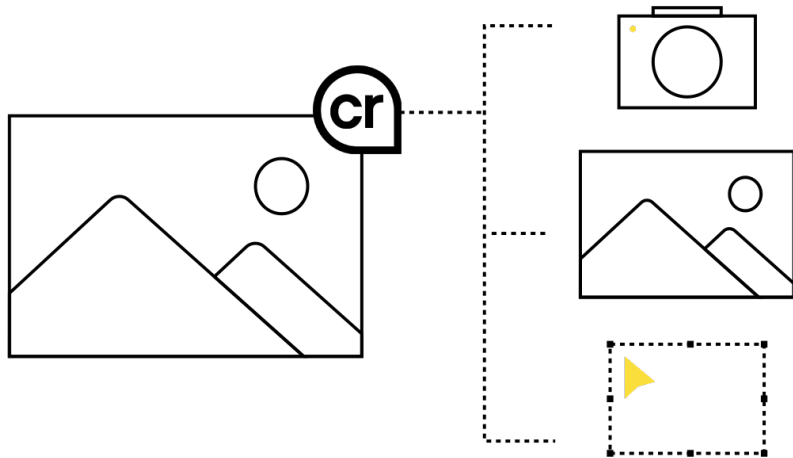
Using tools like Photoshop, secure capture metadata will be preserved and amended with history data of any alterations to content.

3-PUBLISHING AND SHARING

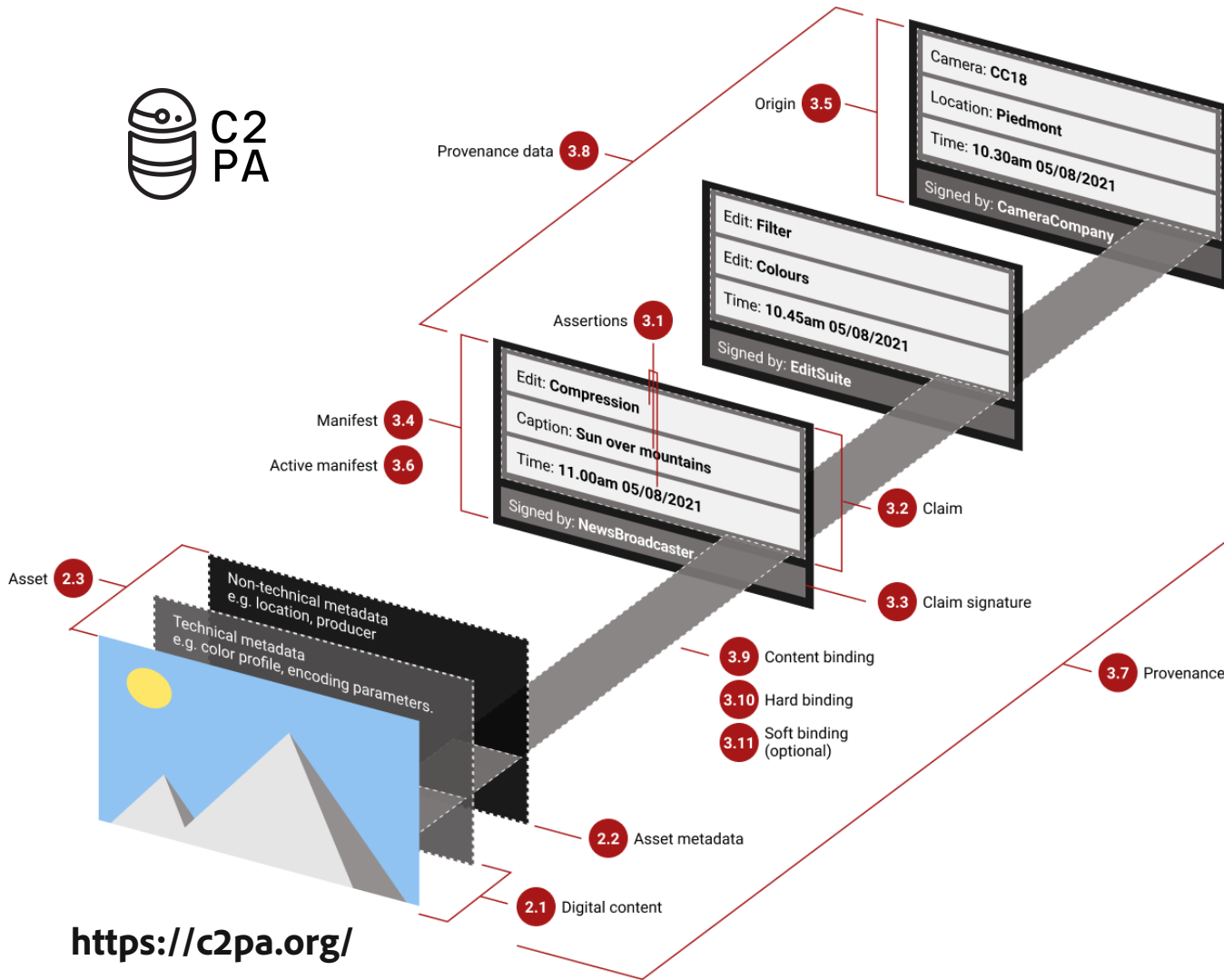


Through partnerships with news organizations, we secure capture information and any relevant content edits preserved through the publishing process, through integration with publishers' CMS. When content is shared on social networks, the product flow will preserve CAI metadata.

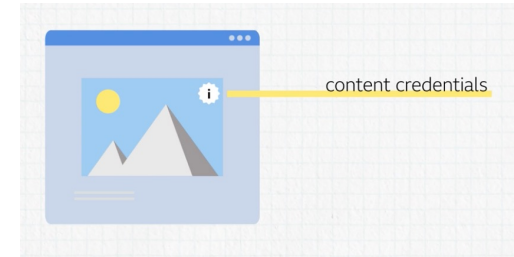
4-VIEWING



As a consumer of digital content, anyone can view historical information about content with CAI metadata through the [Verify](#) site.



<https://c2pa.org/>



Permanently binding provenance securely to media involves:

Assertions - What was done to an image, by whom, when etc.

Manifest - Package of assertions, asset hashes & signatures

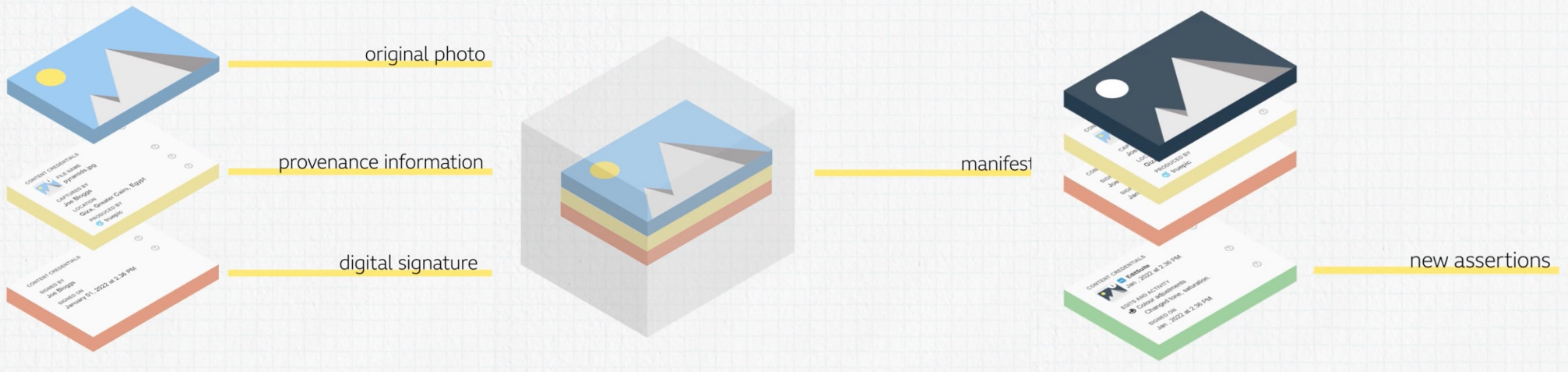
Asset Bindings - Cryptographically connect manifests to media and support recovery

Provenance - chain(s) of Manifests

Verification - protocol for ensuring nothing has been altered



COALITION FOR CONTENT PROVENANCE AND AUTHENTICITY (C2PA)



Signing C2PA manifests requires an end-entity certificate that complies with the [C2PA Trust Model](#). C2PA follows the Public Key Infrastructure (PKI) using your private key and public certificates in the signing process.

<https://c2pa.org/>



C2PA Specifications

Technical Specifications

Explainer

Guidance for Implementors

User Experience Guidance

C2PA Security Considerations

C2PA Harms Modelling

C2PA Technical Specification

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 - 2.1. Introductory terms
 - 2.2. Assets and Content
 - 2.3. Core Aspects of C2PA
 - 2.4. Additional Terms
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Stored Data

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.

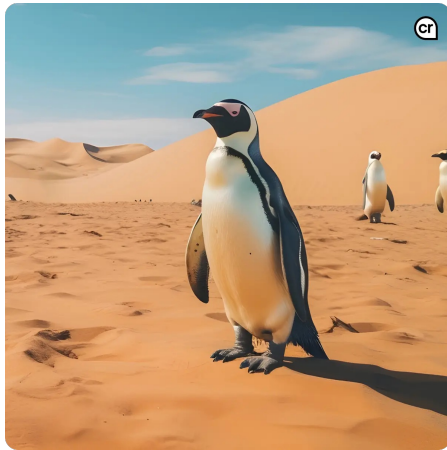
This site contains the various specifications and documents produced by the C2PA.

- [Technical Specifications](#)
- [Explainer](#)
- [Guidance for Implementers](#)
- [User Experience Guidance](#)
- [Security Considerations](#)
- [Harms Modelling](#)
- [Guidance for Artificial Intelligence and Machine Learning](#)

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



Official Content Credentials “[icon of transparency](#),” a symbol that will become the ultimate signal of transparency in digital content.



<https://contentcredentials.org/>

ICON OF TRANSPARENCY

Truly Open Standards

Content Credentials are based on an open technical specification developed and maintained by the C2PA, a cross-industry standards development organization. You can review the specification anytime.

Clear Tampering Detection

Content Credentials use technology that makes it clear if content has been altered since its Content Credentials were created. Up-to-date context travels with the content, wherever it goes.

Accountability

Devices, software, and organizations that issue Content Credentials identify themselves in the Content Credentials they issue. Issuers therefore stake their reputations on their ability to record information accurately.

VERIFY

CONTENT CREDENTIALS



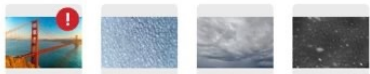
SIGNED BY

 **Adobe Inc.**
August 26, 2022 at 1:18 PM

PRODUCED WITH

 **Adobe Photoshop 23.4.2**
Content Credentials (Beta)

ASSETS USED



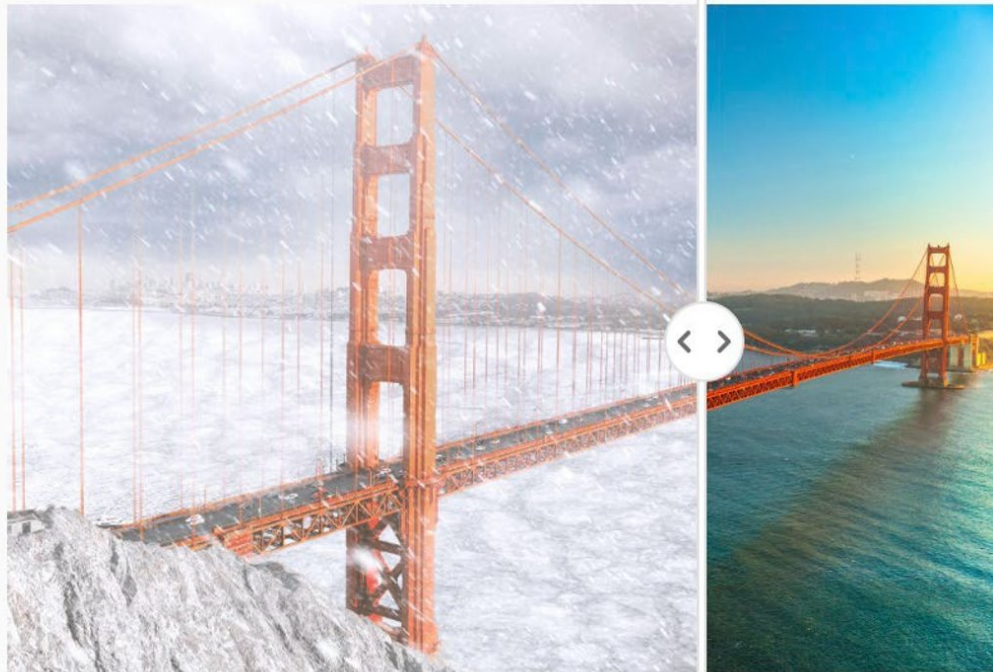
PRODUCED BY







Pia Blumenthal

SOCIAL MEDIA

 [@Pia Blumenthal](#)

 [@pia_b](#)



-  **AI tools**
Edited with artificial intelligence or machine learning tools
-  **Color adjustments**
Changed tone, saturation, etc.
-  **Combined assets**
Composited 2 or more assets
-  **Imported assets**
Added images, videos, etc.
-  **Paint tools**
Edited with brushes or eraser tools
-  **Size and position adjustments**
Changed size, orientation, direction, or position

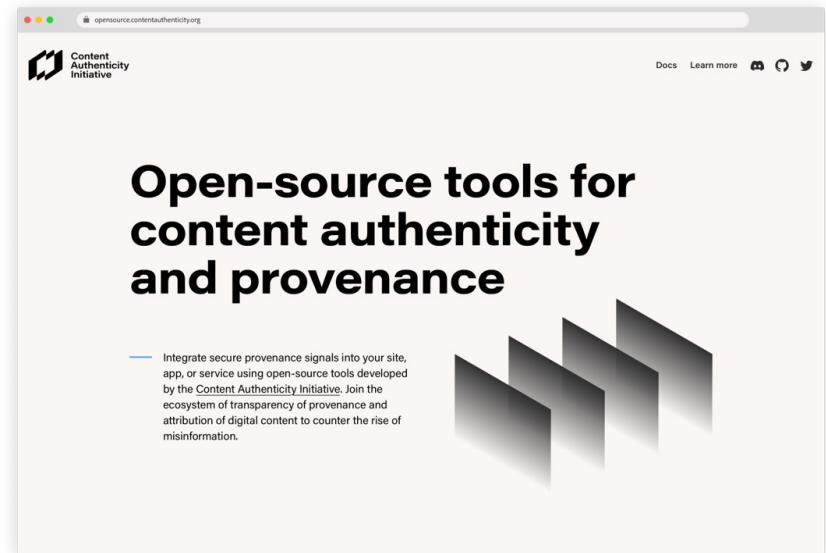
verify.contentauthenticity.org/

CAI OPEN SOURCE TOOLS

C2PA Tool -- Install this tool to create, verify and explore content credentials on the command line.

JavaScript SDK -- Everything you need to develop rich, browser-based experiences with content credentials.

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



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

CAI OPEN SOURCE TOOLS

Implementation	JavaScript SDK	C2PA Tool	Rust SDK
Display C2PA data on your site or app	✓	✓	✓
Link C2PA data displayed on your site to Verify	✓	✓	✓
Write C2PA data into files		✓	✓
Quickly create and inspect C2PA data		✓	✓
Customize displaying and creating C2PA data			✓
Deploy on Web, mobile, and desktop			✓

- **Creation and signing of C2PA manifests**
- **Embedding manifests in media**
- **Cloud and sidecar manifests**
- **Parsing and validation of manifests**
- **Building trees of ingredient manifests**

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



Content Authenticity Initiative

27 followers United States of America https://contentauthenticity.org/ @contentauth team@contentauthenticity.org

- Overview Repositories 6 Discussions Projects Packages People

Pinned

c2pa-js Public JavaScript SDK for displaying and validating C2PA data TypeScript 34 stars 5 forks

c2pa-rs Public Rust SDK for the core C2PA (Coalition for Content Provenance and Authenticity) specification Rust 32 stars 11 forks

c2patool Public Command line tool for displaying and adding C2PA manifests Rust 22 stars 7 forks

People

This organization has no public members. You must be a member to see who's a part of this organization.

Top languages

Rust TypeScript Ruby

Most used topics

c2pa metadata

Repositories

- Find a repository... Type Language Sort
c2pa-rs Public Rust SDK for the core C2PA (Coalition for Content Provenance and Authenticity) specification Rust 32 stars 11 forks 3 issues 10 discussions Updated 17 hours ago
c2pa-js Public JavaScript SDK for displaying and validating C2PA data


```

13 Makefile
...
@@ -35,7 +35,6 @@ c2patool-package:
35 35 cp README.md target/c2patool/README.md
36 36 cp sample/* target/c2patool/sample
37 37 cp CHANGELOG.md target/c2patool/CHANGELOG.md
38 - cp tests/fixtures/IMG_0003.jpg target/c2patool/image.jpg
39 38
40 39 # These are for building the c2patool release bin on various platforms
41 40 build-release-win:
@@ -57,14 +56,14 @@ build-release-linux:
57 56
58 57 # Builds and packages a zip for c2patool for each platform
59 58 ifeq ($(PLATFORM), mac)
60 - c2patool-release: build-release-mac-universal c2patool-package
61 - cd target && zip -r c2patool_mac.zip c2patool && cd ..
62 + release: build-release-mac-universal c2patool-package
63 + cd target && zip -r c2patool_mac_universal.zip c2patool && cd ..
64 endif
65 ifeq ($(PLATFORM), win)
66 - c2patool-release: build-release-win c2patool-package
67 - cd target && tar.exe -a -c -f c2patool_win.zip c2patool && cd ..
68 + release: build-release-win c2patool-package
69 + cd target && tar.exe -a -c -f c2patool_win_intel.zip c2patool && cd ..
70 endif
71 ifeq ($(PLATFORM), linux)
72 - c2patool-release: build-release-linux c2patool-package
73 - cd target && tar -czvf c2patool_linux.tar.gz c2patool && cd ..
74 + release: build-release-linux c2patool-package
75 + cd target && tar -czvf c2patool_linux_intel.tar.gz c2patool && cd ..
76 endif

```

<https://github.com/contentauth/c2patool>

Content Authenticity I... # c2patool

October 25, 2022

@Yurko > It should be the binary of the jpeg file. > As far as i know JSON cannot include a raw binary fine, and it needs to be encoded some ...

Gavin 10/25/2022

The c2pa-rs SDK provides a way to set your own thumbnails, but I haven't exposed that in c2patool yet.

I could add a thumbnail field to the claim definition that gives a path to a binary file that contains an image that would become the claim thumbnail. Correct handling of thumbnails is more complicated than just adding a thumbnail assertion, so that's probably the best approach for this. I'm working on a more detailed way to add ingredients, which also have thumbnails.

I could also allow you to pass a file path for binary assertions and read the binary data directly from the file. (edited)

October 26, 2022

Yurko 10/26/2022

Any sample code how to do it in rust or turnaround for this feature

makeworld | @ me to respond 10/26/2022

Discussed further in #rust-sdk

@Yurko Any sample code how to do it in rust or turnaround for this feature

Gavin 10/26/2022

I posted on how to set thumbnails in #rust-sdk

👍 1

<https://discord.com/invite/CAI>

CONTENT CREDENTIALS-ENABLED DEVICES



Leica M11-P

Available



SONY

α9iii

Sony a9iii

Preorder...



Nikon z9

**Announced
In 2022**



TRUEPIC LENS

Build your apps on content authenticity
Seamlessly integrate Truepic's secure camera
technology directly into your existing iOS,
Android, or mobile web applications with the
Truepic Lens software development kit (SDK).

C2PA Partner

Truepic Unveils Watershed Gen-
AI Transparency Directly on
Devices Powered by Snapdragon
Mobile Platform

Microsoft announced [Content Credentials as a service](#), part of a sweeping announcement on the company's commitment to protecting elections.

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< Text to image



Prompt
steampunk Rottweiler dog in a business suit sitting in a hot air balloon flying over a gothic city at sunset; retro vintage style

Clear style

Suggestions

Model version

Firefly Image 2 (beta) NEW >

Aspect ratio

Square (1:1) v

Content type

Auto

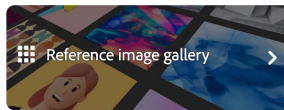
Photo Art

Visual intensity

Style

Strength

Match



Upload your image

Match the style from your own reference image

Effects

ADOBE FIREFLY



content credentials

Select another file from your device or drag and drop anywhere

Generated image
Nov 10, 2023

[Search for possible matches](#)



Generated image
Nov 10, 2023

Generated image

Nov 10, 2023



Content summary

This image was generated with an AI tool.

Process

The app or device used to produce this content recorded the following info:

App or device used

Adobe Firefly

AI tool used

Adobe Firefly

Actions

Created
Created a new file or content

About this Content Credential

Issued by

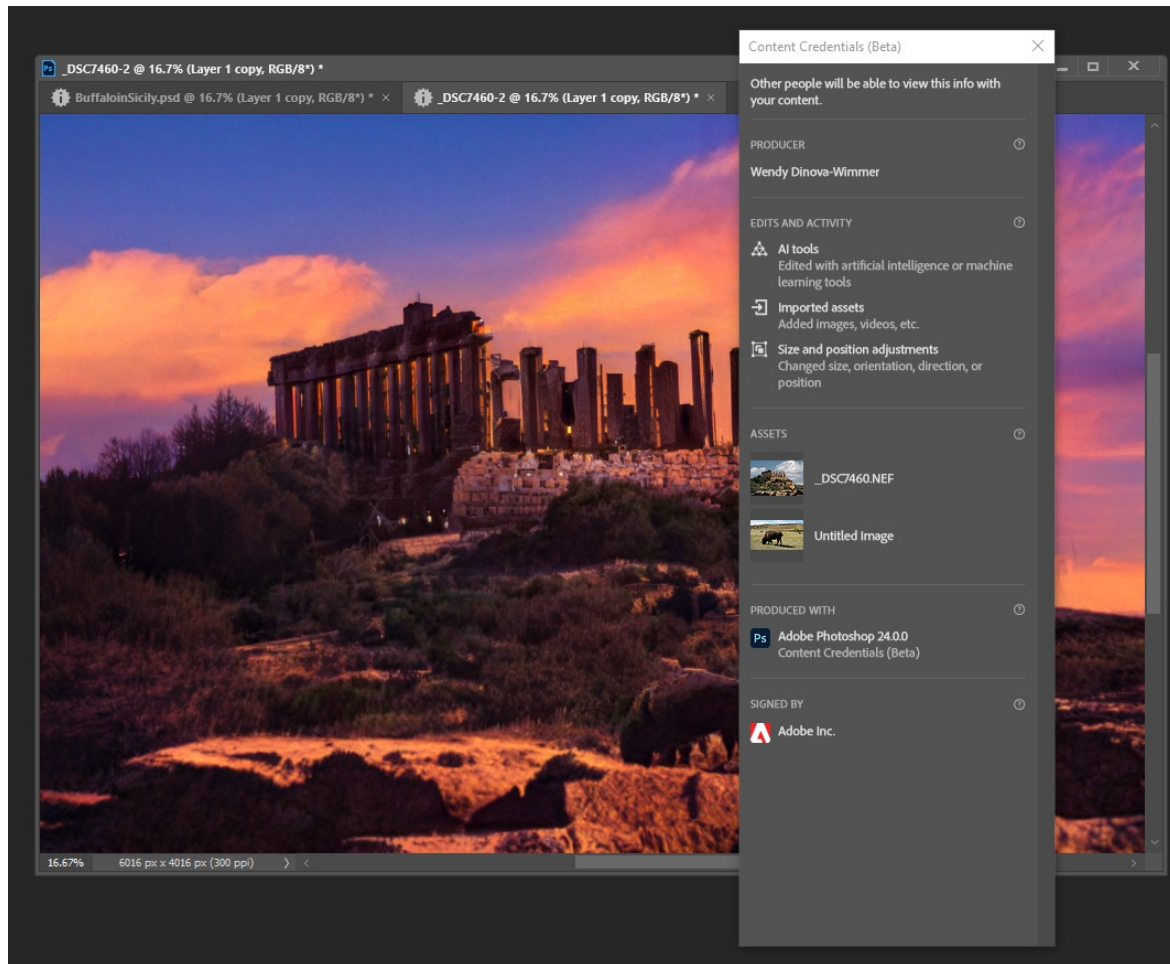
Adobe Inc.

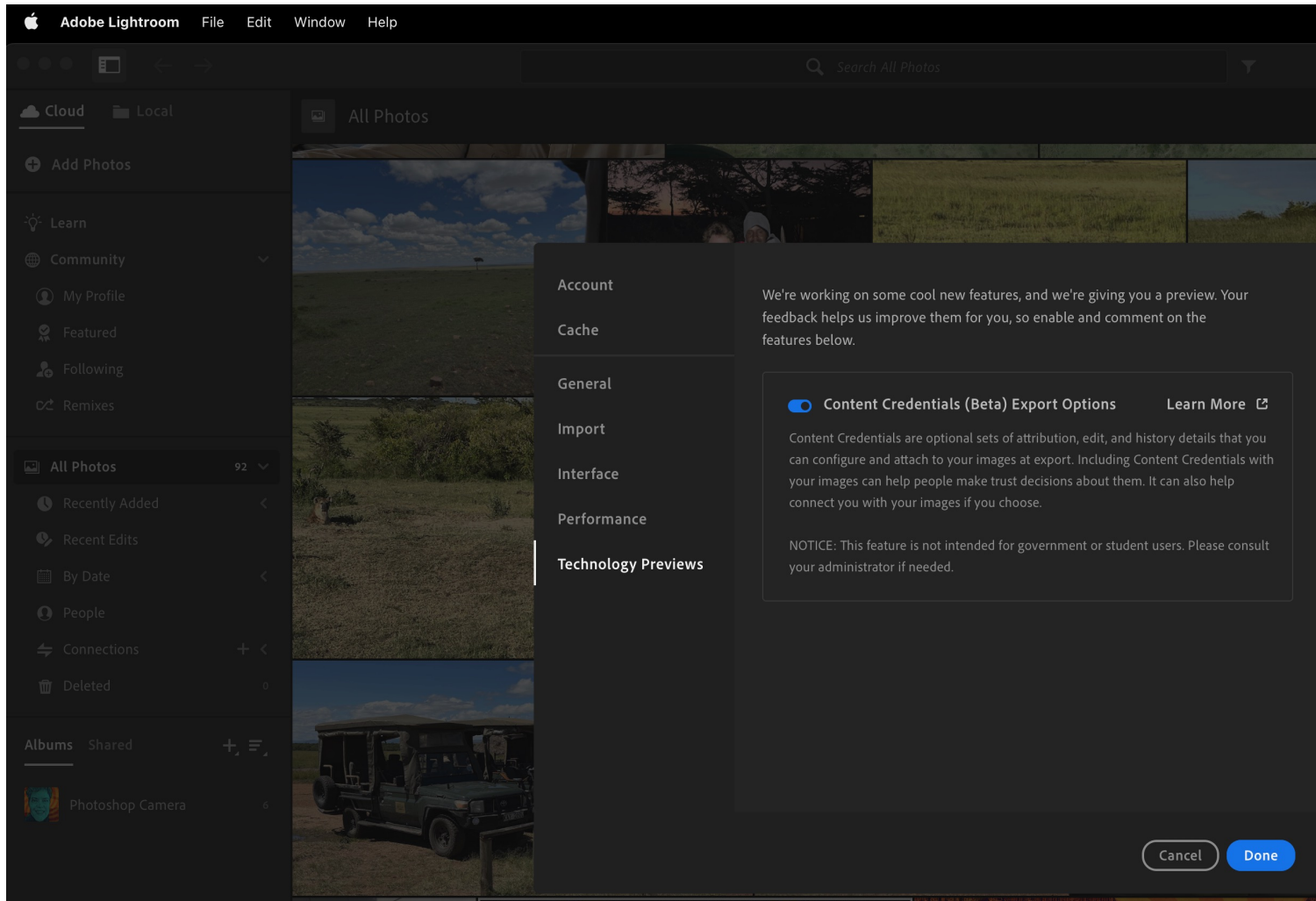
Issued on

Nov 10, 2023 at 10:21 AM EST

FIREFLY IMAGE IN VERIFY

PHOTOSHOP CONTENT CREDENTIALS (BETA)





LIGHTROOM

Note: To add RAW files, import our images as DNG. DNG is in the specification

Check out the K-12 resource hub!



Teach media literacy with the Content Authenticity Initiative

Developed by the Adobe for Education and Content Authenticity Initiative teams

DIGITAL LITERACY



CAI Media Literacy Curriculum

The Content Authenticity Initiative (CAI) is an Adobe-led community of major media and technology companies (and others) working to combat mis/disinformation by establishing the open-source industry standard for digital content provenance.

<https://edex.adobe.com/cai>

<https://contentauthenticity.org/media-literacy>



Standards

About us

News

Taking part

Store

Search



ISO/IEC AWI 21617-1

JPEG Trust

Part 1: Core Foundation

Status : **Under development**

General information

Status : Under development

Stage : New project registered in
TC/SC work programme [20.00]

Edition : 1

Technical Committee :
ISO/IEC JTC 1/SC 29

 [RSS updates](#)

ISO: JPG
FRAMEWORK

<https://www.iso.org/standard/86831.html>

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AI at Adobe ▾

Sensei

Generative AI

Firefly

In Products ▾

Innovations & Research



Home / Adobe Sensei / Adobe Sensei powers Creative Cloud

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- Color Service
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- Dimension
- Fonts
- Fresco
- Illustrator
- InDesign
- Photoshop
- Photoshop Lightroom
- Premiere Pro and Premiere Rush
- Spark
- Stock

Adobe After Effects

Create even better videos with AI in After Effects.

Adobe Sensei is a part of After Effects, making it even easier for you to transition between screens, or any screen in-between.

[Go to After Effects](#)

Content Aware Fill

Quickly remove unwanted objects like boom mics, logos, or background elements. Product of the Year Award.

<https://www.adobe.com/sensei/creative-cloud-artificial-intelligence.html>

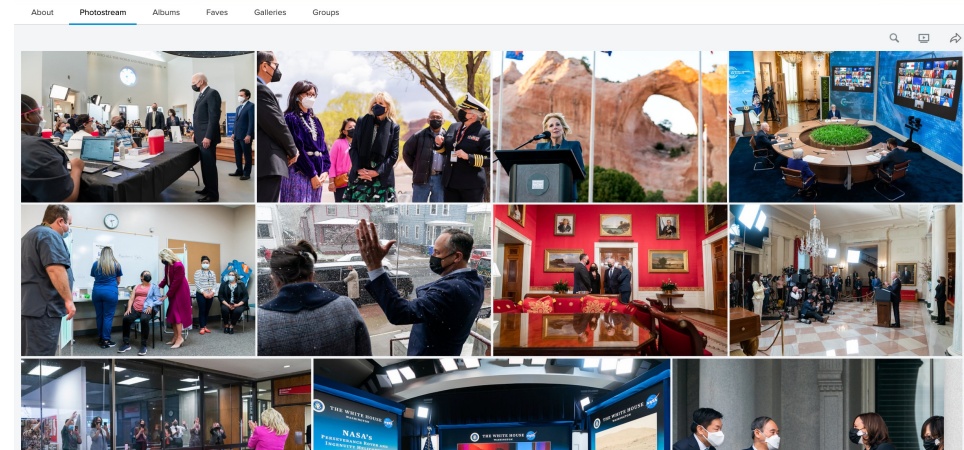
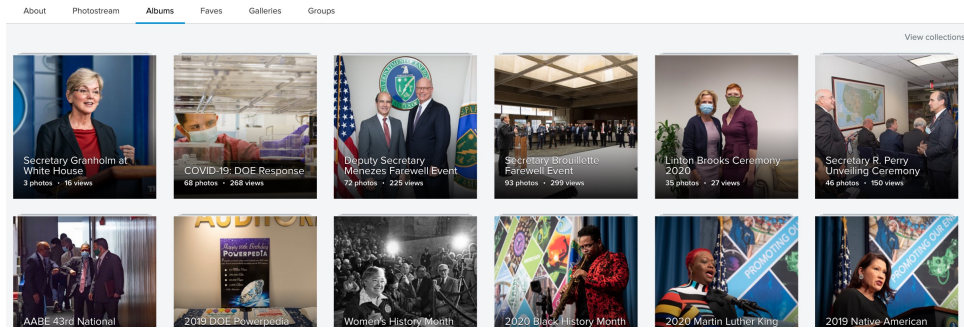
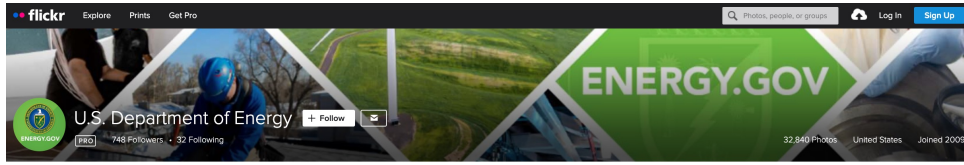
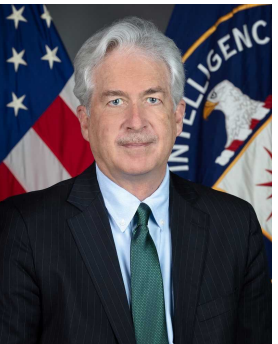
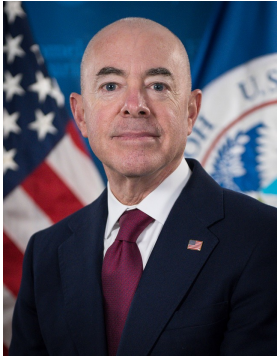


THIS IS WHERE WE WANT CAI CONTENT CREDENTIALS

- Provenance starts at the sensor
- But we also have synthetic media—
Provenance starts at creations includes
training data, 3d objects or other sources
- What about the metaverse?
—can CAI be used in a virtual world

PUBLIC SECTOR AREAS OF INTEREST

- **Official Photography**
- **Forensics/Crime Photography**
- **Archival and Historical Collections**
- **Scientific/Research Integrity**
- **Artificial Intelligence Training Data**
- **Overhead Imagery**



OFFICIAL PHOTOGRAPHY





**FORENSICS/CRIME SCENE
PHOTOGRAPHY**

Explore the Collections >

Image Gallery

HIDE FILTERS SORT BY

Topic

- Mars
- Solar System
- Earth
- Stars and Galaxies
- Climate Change

IMAGE

Hargraves Crater - False Color

Jun 2, 2021

Date

- 2021
- ...

IMAGE

Utopia Planitia - False Color

About Our Collections



Prints & Photographs

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Paintings & Sculpture

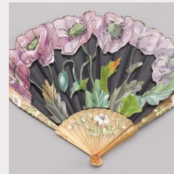
[Learn More](#)



Theater Collection

Explore treasures from the theater collection online.

[Learn More](#)



Costume & Textiles

[Learn More](#)

ARCHIVAL AND HISTORICAL COLLECTIONS

- National Archives
- Library of Congress
- Agency Libraries
- Smithsonian
- Federal, State and Local Museums

The Library of Congress >> Researchers



Prints & Photographs Reading Room

PRINTS AND PHOTOGRAPHS DIVISION

[Home](#) >> [Resource Lists & Bibliographies](#)

Find

in

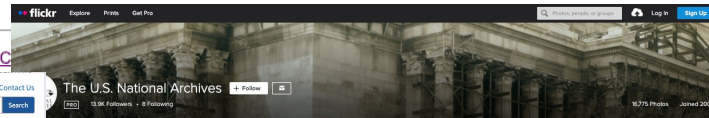
Resource Lists

go

Sources of U.S. Military Images: Major Repositories

PRINTS AND PHOTOGRAPHS DIVISION

Jump to: [General Sources \(multiple military branches\)](#) | [Army](#) | [Coast Guard](#)



NATIONAL ARCHIVES

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VETERANS' SERVICE RECORDS

EDUCATOR RESOURCES

VISIT US

AMERICA'S FOUNDING DOCUMENTS

Archives News

Caribbean American Heritage Month

LGBTQ Pride Month

Featured Document: Remembering the Tulsa Race Massacre

Remembering the Tulsa Race Massacre

The U.S. National Archives

Photo Stream

Albums

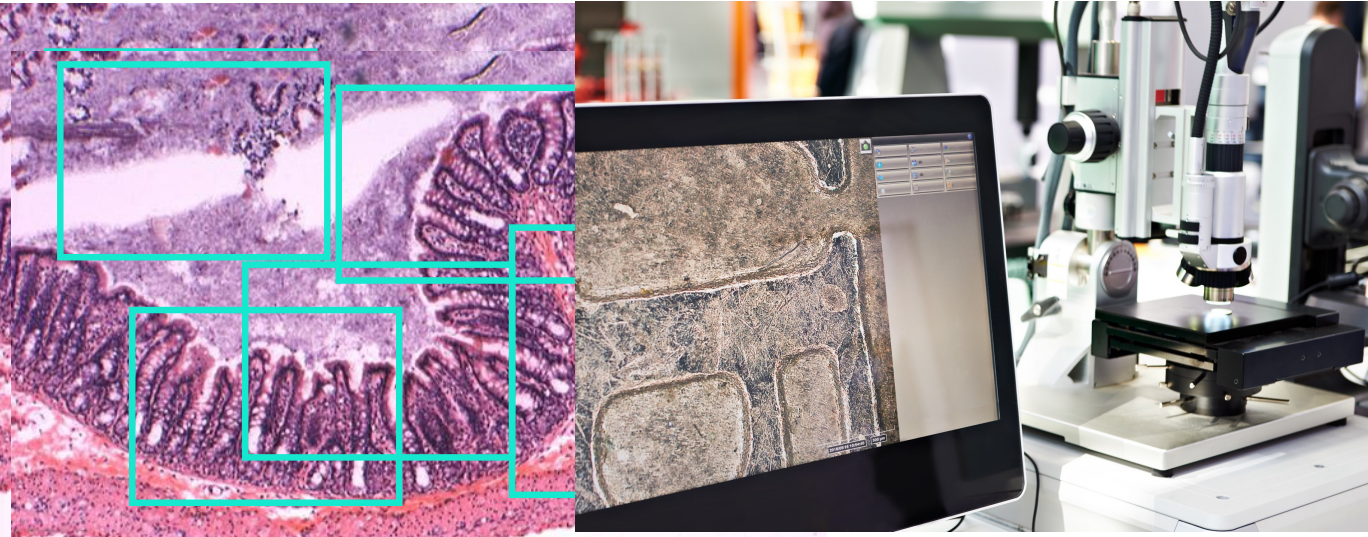
Faves

Galleries

Groups

View collections

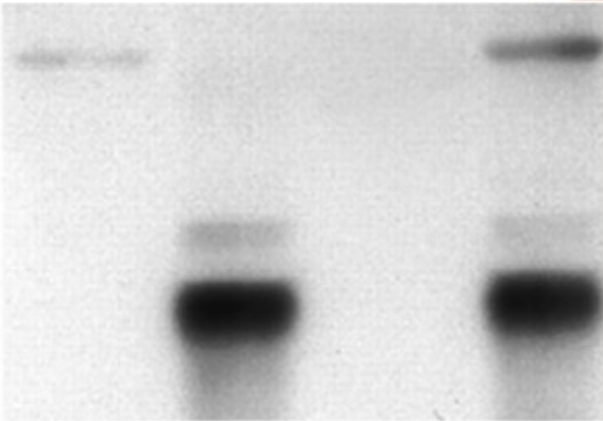
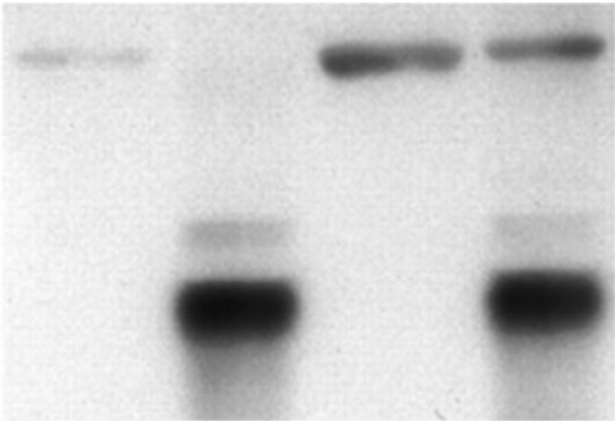
- World Events
- Visiting Dignitaries
- Washington D.C.
- Presidential Libraries
- National Archives Staff
- Declaration of Independence
- 48 Regional
- Master Plans
- 50th Anniversary
- Slavery
- Favorites from the Alaska Digitization Project
- The Refugee Act of 1980
- Vice President Cheney
- Vice President Cheney with Dennis Austin
- Vice President Cheney with David A. ...
- Vice President Cheney with Bruce R. ...
- Vice President Cheney with President George W.



SCIENTIFIC/RESEARCH INTEGRITY

A Original image

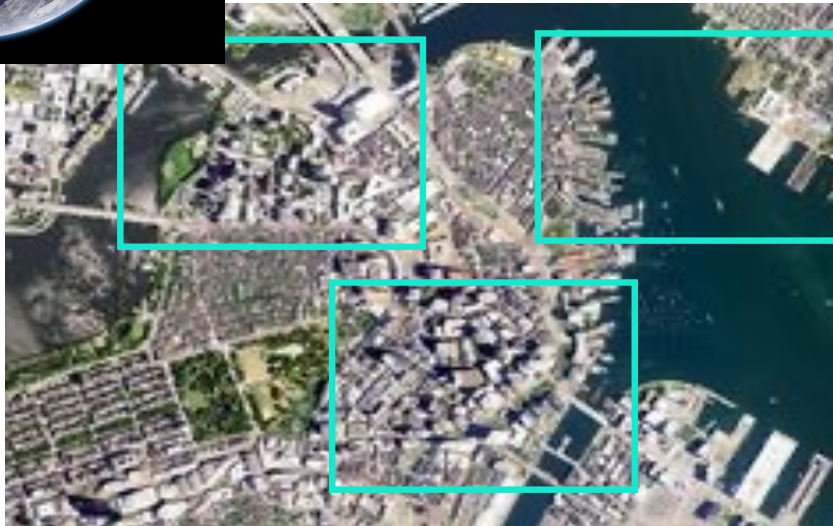
Manipulated image 

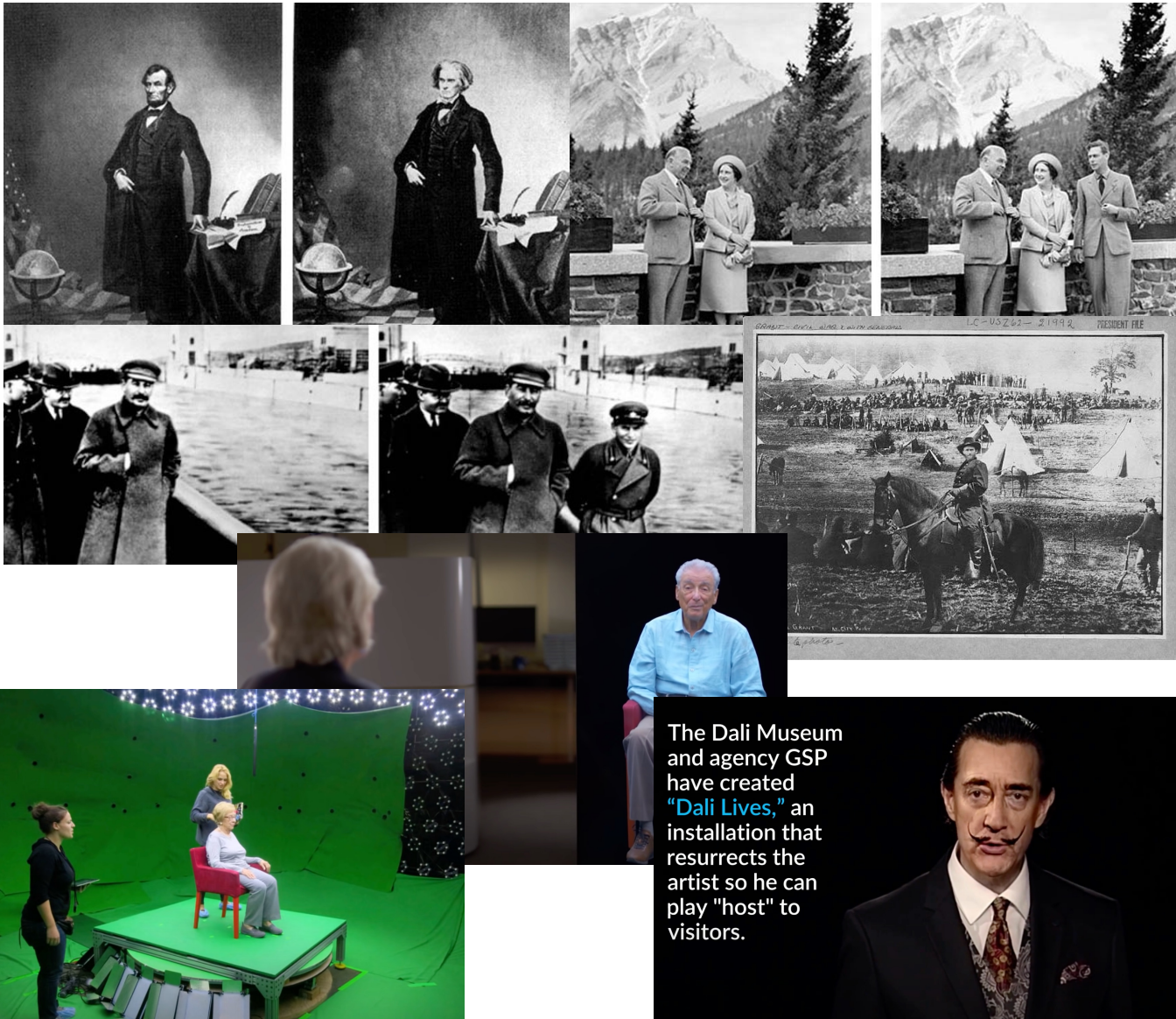


1 2 3 4 1 2 3 4



OVERHEAD IMAGERY

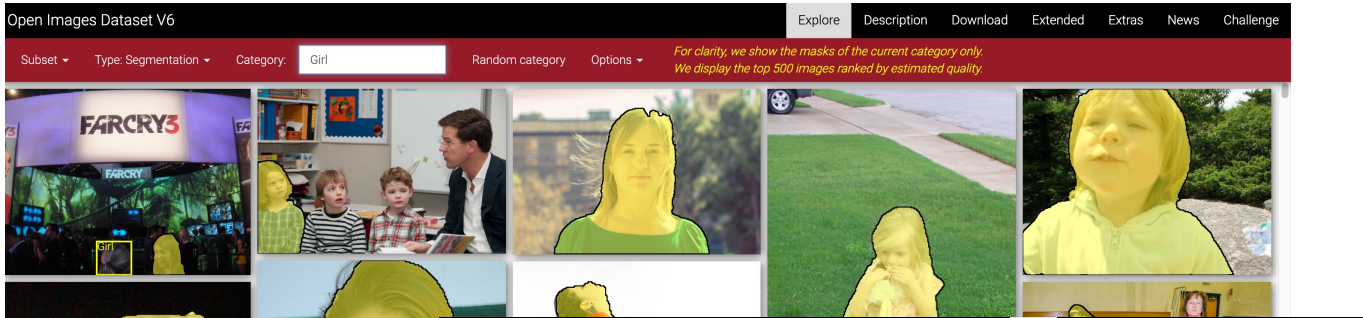




SPECIAL COLLECTIONS

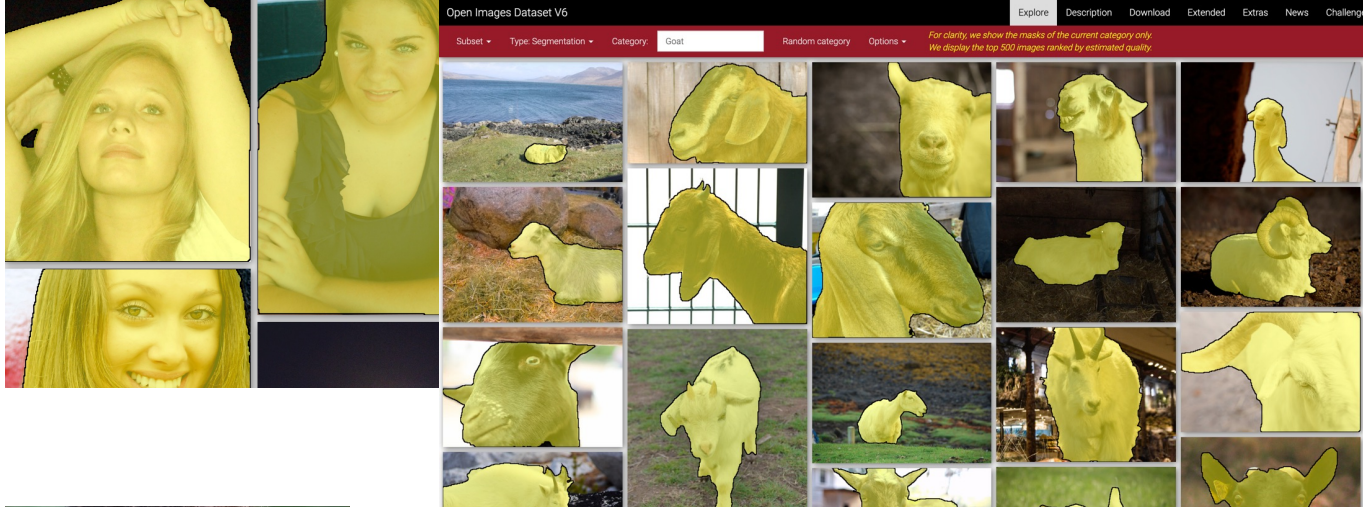
What type of attribution should be used for manipulated images, audio and videos?

The Dali Museum and agency GSP have created "Dali Lives," an installation that resurrects the artist so he can play "host" to visitors.



ARTIFICIAL INTELLIGENCE TRAINING DATA

- All Levels of Government
- Universities/Researchers



These faces are from <https://thispersondoesnotexist.com/>

YOUR ROLE—BUILD OR ANALYZE TRANSPARENCY



Do you own the images?



Are you analyzing the images?



CAI/C2PA References *(as of 11 November 2023)*

Important CAI/C2PA Websites

<https://contentauthenticity.org/>

<https://contentcredentials.org/>

<https://c2pa.org>

<https://contentauthenticity.org/media-literacy>

<https://blog.adobe.com/en/publish/2023/10/10/new-content-credentials-icon-transparency>

<https://edex.adobe.com/cai>

<https://helpx.adobe.com/photoshop/using/content-credentials.html>

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REFERENCE PDF

EXCERCISE

Grab a slip a paper and answer these questions them put away.

Original question:

What do you think synthetic media will be in 5 years?

2 years, 1 year, 6 months or 3 months?



THANK YOU

<https://contentauthenticity.org/>

<https://c2pa.org/>

<https://contentcredentials.org/>

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