Building Trust in the AI Era:
CBC's Content Credentials Journey

Implementing C2PA in News Media Workflows at CBC/Radio-Canada

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The Authenticity Imperative: Navigating AI, Misinformation, and Disinformation

CBC/Radio-Canada's Mandate: Provide reliable, verified information to Canadians as a public media organization.

The AI Era Challenge:
- Widespread availability of **hyper-realistic AI-generated content** (audio, video, images).
- **Erosion of public trust** in media.
- The "**Liar's Dividend**": AI's existence allows denial of real events, making it harder to discern truth; C2PA helps identify authentic records.
- AI detection tools are **not always 100% effective**.
- Recognizing a "collapse of trust" requires robust authenticity technologies.

Our Response: Building Trust with Provenance.

CBC's Policy on AI-Generated Content:
- No AI-generated text or images for audiences without full disclosure and advance approval from the standards office.
- Generative AI-edits will be flagged to end users.
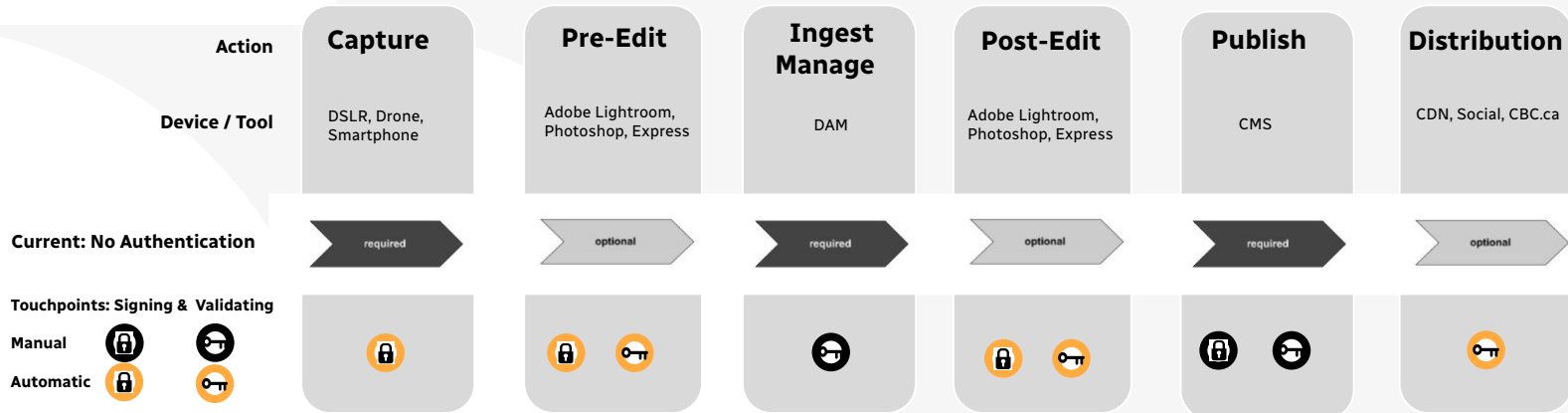
CBC's Current Still Image Workflows

Capture: Images captured via DSLRs, drones, or smartphones.
Ingest to DAM: Images typically go into the Digital Asset Management (DAM) system.
Manual authentication by librarians for CBC photographers' images.
Production & Editing: Use of photo editing software like Adobe Lightroom and Photoshop.
Publishing & Distribution: Images move to the Content Management System (CMS), and are published
to platforms like cbc.ca and social media.

	Capture	Pre-Edit	Ingest Manage	Post-Edit	Publish	Distribution
Action	Capture	Pre-Edit	Ingest Manage	Post-Edit	Publish	Distribution
Device / Tool	DSLR, Drone, Smartphone	Adobe Lightroom, Photoshop, Express	DAM	Adobe Lightroom, Photoshop, Express	CMS	CDN, Social, CBC.ca
Current: No Authentication	required	optional	required	optional	required	optional

Touchpoints: Signing & Validating
Manual 🔒 🔑
Automatic 🔒 🔑

CBC's Current Still Image Workflows

Challenges in Current Workflow:

- **Metadata Retention Issues:** Content Credentials, IPTC and other metadata frequently **lose information or fail verification** after passing through the DAM or being published to the web.

- **Manual Processes:** Many C2PA implementations are still manual, requiring significant human effort for authentication and signing.

- **Interoperability:** Different verification tools do not consistently display the full history of certificates.

- **CDN Metadata Loss:** Content Delivery Networks often strip C2PA, IPTC and other metadata, especially during resizing.

Opportunities: Replacement of our DAM and CMS offers a chance to **embed C2PA natively**.

CBC's Image Provenance Strategy: A Chain of Custody Approach

Core Strategy: Establish a cryptographic **"chain of custody"** for digital content using Content Credentials (C2PA).

- **Purpose:** To verify the **authenticity and provenance** of content from its origin to distribution.

- **Ultimate Goal: Automate Content Credentials** into new DAM and CMS systems.

- **Codifying Journalistic Verification Data:** Integrating journalistic data throughout newsgathering and production processes to attest to content origins and authenticity.

- **Expansion:** This strategy for images will eventually **extend to video and audio** content.

Identifying Workflow Touchpoints for Signing

CBC has been rigorously **reviewing current workflows** to identify optimal points for C2PA signing.

Key Touchpoints Identified:
- **Capture:** Original content creation (hardware).
- **Ingest:** When content enters our DAM system (software + middleware).
- **Edit:** During modifications in production software (software + middleware).
- **Publish:** When content is released through our CMS and other platforms.

Process: Includes mapping how Content Credentials metadata moves (or breaks) across existing systems.

Data Collection: Meticulously identifying specific data attributes to be collected and added at each touchpoint to enhance provenance records.
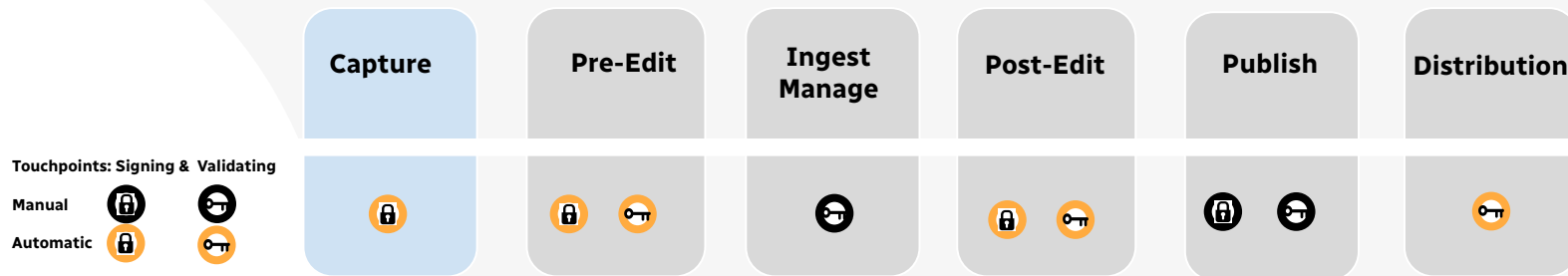
Future Integration: Setting requirements for new DAM and CMS to **natively embed C2PA functionality**.

Strategic Consideration: Aiming for **fewer workflow touchpoints for re-signing** where possible, as this requires significant change management.

Testing Approaches: At Point of Capture (Hardware & Mobile Apps)

Importance: Best practices for initial authentication, providing the earliest and most reliable assertion of origin.

	Capture	Pre-Edit	Ingest Manage	Post-Edit	Publish	Distribution

Touchpoints: Signing & Validating

Manual 🔒 🔑

Automatic 🔒 🔑

C2PA-enabled cameras tested for direct in-camera signing.
◦ **Benefits:** Provides the earliest and most reliable assertion of an image's origin.
◦ **Challenges:** Certificate recognition issues by other tools, incompatibility with camera vendor's own validation after re-signing, and secure distribution/management of CBC certificates for multiple users.
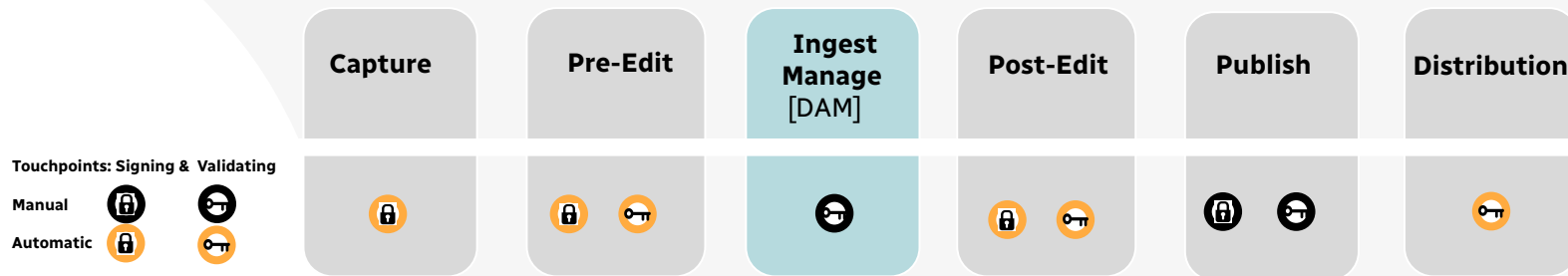
C2PA-enabled mobile camera app tested for in-camera signing on mobile devices (iPhone/Android).
◦ **Benefits:** Enables signing for mobile-first content creators.
◦ **Challenges:** Loss of Content Credentials during workflow transitions (e.g., saving from web, downloading from DAM), reliance on external storage of keys/manifests.

Testing Approaches: During Ingest to Digital Asset Management (DAM) System

Importance: Crucial for asserting CBC's custody, especially for unsigned assets (wire services, freelancers).

Capture	Pre-Edit	Ingest Manage [DAM]	Post-Edit	Publish	Distribution

Touchpoints: Signing & Validating

Manual 🔒 🔑

Automatic 🔒 🔑

In-house CBC-RC Authenticator Signing Tool manually authenticates and signs images at ingest to the DAM
◦ **Benefits:** Establishes CBC's custody, particularly for unsigned external assets. Manual process will inform future automated solutions.
◦ **Challenge:** Ensuring metadata is preserved and not stripped during this process remains a challenge.

Third-party DAM Integration Tool: Piloted for C2PA signing and blockchain-secured fingerprinting within the DAM
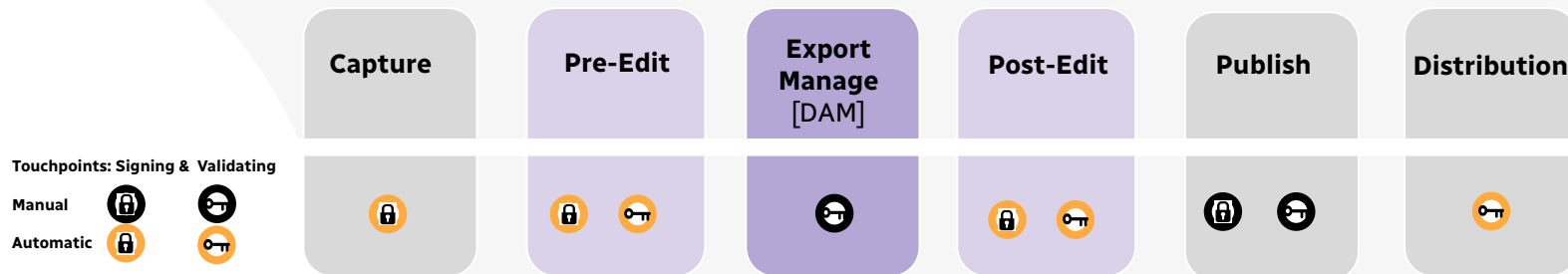◦ **Benefits:** Addresses content not signed in-camera. Focus on fingerprinting for "durable provenance".
◦ **Challenges:** Incomplete provenance data (missing creation date, AI-edit disclosure), issues with manifest retention and overwriting previous C2PA info, relies on third-party, external storage.

Testing Approaches: During Production (Editing Software) & Export

Importance: Essential for tracking all modifications, especially AI-generated edits, which form part of the content's provenance.

Capture	Pre-Edit	Export Manage [DAM]	Post-Edit	Publish	Distribution

Touchpoints: Signing & Validating

Manual 🔒 🗝️

Automatic 🔒 🗝️

Adobe Photoshop, Lightroom, and Express Integration: editing and re-signing within Adobe products, including declarations for AI-driven edits (e.g., Adobe Firefly).
◦ **Benefits:** Tracks modifications, flags AI usage. Informs CBC workflows that will require signing when exporting modified images, and guidelines on permissible edits with an Adobe certificate upon export.
◦ **Challenges:** During tests with C2PA-enabled camera, Content Credentials verification sometimes showed "Other edits" instead of "Firefly edits". Can't assign CBC certificate. Adobe Express does not include C2PA signing.

In-house CBC-RC Authenticator Signing Tool developed to re-sign images at export from the DAM.
◦ **Benefits:** Workflows being developed to ensure credentials are retained or re-signed upon export from the DAM. Manual process will inform future automated solutions.
◦ **Challenge:** Ensuring metadata is preserved and not stripped during export.

Guidance on Image Edits

Creating clear, department-specific **"Image Editing: Guidance"** addressing permissible edits, AI tool usage, and flagging AI-generated content.
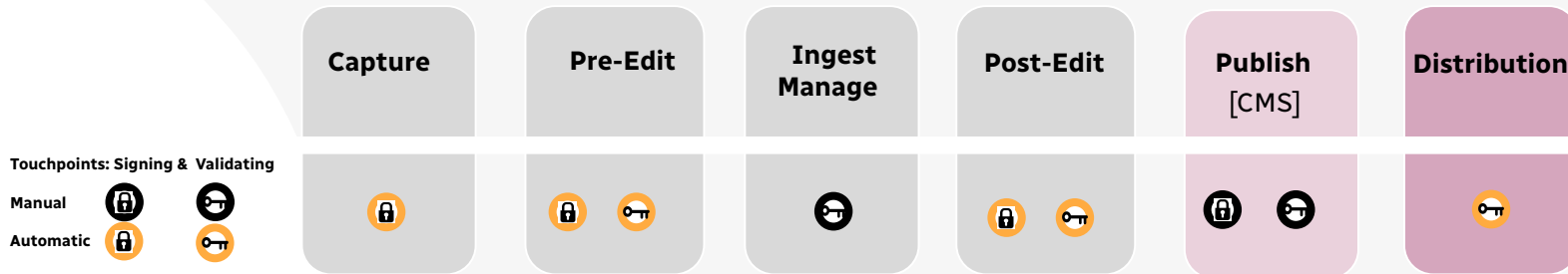

CBC Image Editing: Guidance

Image Edits	Action	Intended Use	Considerations

Minimal Image Processing, no AI
Crop
Crop for Collage or Video
Resize
	✅	**Journalistic** News Story
		Journalistic News Story (Confidential Sources)
		Journalistic News Story (Supplied Content)
		Promotional (News)
		Promotional Marketing (EFS Scripted & Unscripted)
		Entertainment (Unscripted)
		Factual (Unscripted)
		Sports (Unscripted)
			• Ensure cropping and resizing does not
			  ○ remove important details
			  ○ cause significant compression or file size reduction
			• Save all metadata when exporting edited versions so systems and others are aware of source and modifications
			• Flag sensitive content to prevent its reuse out of context

Some Image Processing Exposure Straighten White Balance Blurred-Confidentiality	⚠️ (red)	**Journalistic** News Story **Journalistic** News Story (Confidential Sources) **Journalistic** News Story (Supplied Content)	• Minor to moderate edit functions could become AI-driven. Export with Content Credentials and review if in doubt • Unblurring is possible using AI-powered tools • Avoid unnecessary stylizing of news and other realistic content since it could be perceived as biased, interpretive, or non-realistic • Save all metadata when exporting promotional news content to prevent its reuse out of context
Some to More Image Processing Exposure Straighten White Balance Blurred-Confidentiality Sharpen Add Text, Graphics or Logos Vignette-Framing	⚠️ (orange)	**Promotional** (News) **Promotional** Marketing (EFS Scripted & Unscripted) **Entertainment** (Unscripted) **Factual** (Unscripted) **Sports** (Unscripted)	
More Image Processing Blurred-Stylistic Compositing Images		**Journalistic** News Story	• Some minor to moderate edit functions may be or become AI-driven

Testing Approaches: At Publication (CMS and Distribution Platforms)

Importance: Maintaining Content Credentials through the CMS and displaying them effectively to audiences.

Capture	Pre-Edit	Ingest Manage	Post-Edit	Publish [CMS]	Distribution

Touchpoints: Signing & Validating

Manual

Automatic

In-house CBC-RC Authenticator Signing Tool manually authenticates and signs images at ingest to the CMS.
◦ **Benefits:** New CMS provides an opportunity for native C2PA integration. Manual process will inform future automated solutions.
◦ **Challenge:** Preserving C2PA, IPTC and other metadata through CMS and distribution platforms.

Distribution Platforms (cbc.ca, social media)
◦ **Challenges**: Content Delivery Networks (CDNs) tend to erase C2PA, IPTC and other metadata, especially during resizing. Content Credentials can still "break" or be lost when published to the web or social media platforms.
◦ **Considerations:** Defining what information is relevant and permissible for public view. UI/UX exploration to make Credentials audience-facing on select images. Watermarking and fingerprinting are being considered as complementary approaches to address metadata loss by CDNs and distribution platforms.
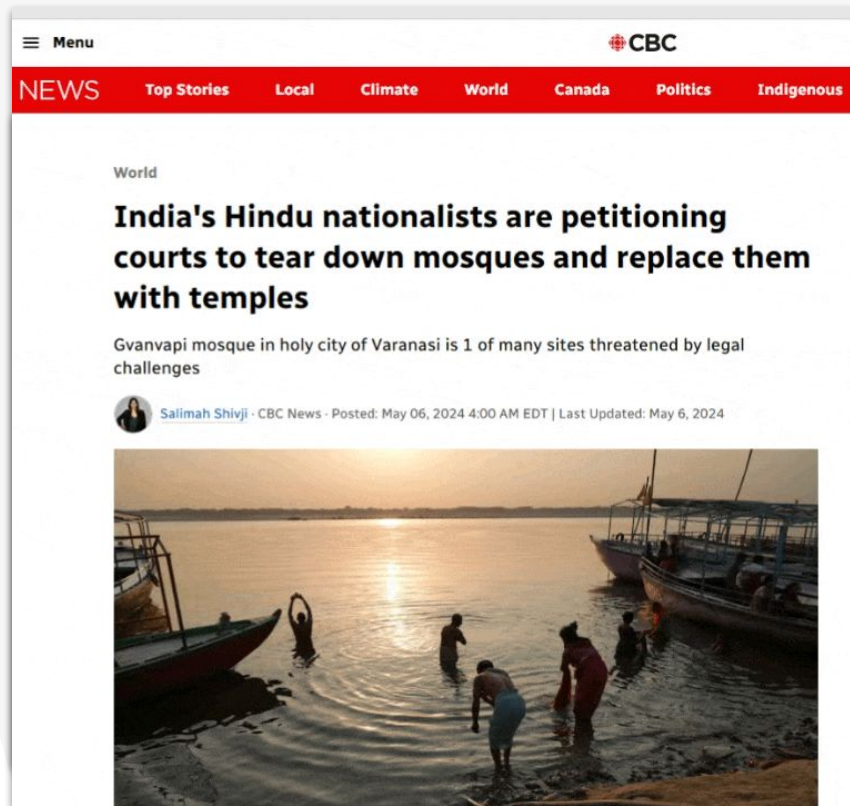
Displaying Content Credentials to Audiences on cbc.ca

Current Implementation (Phase 1):
CBC has published its first images with a link to its CBC-signed Content Credentials on cbc.ca

Initial Display: Embedded links in photo captions or body text lead to verification tools.

Future Plans (Phase 2):
Explore an info icon overlay for a richer display of provenance.
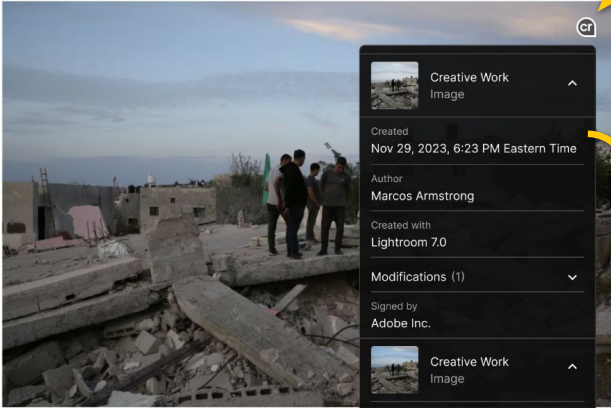
Future Plans (Phase 3):
Define what information is relevant and permissible for public view.

CBCNEWS

The day after the Oct. 7 attack, Saleh al Arouri, the de-facto leader of the Hamas military wing in the West Bank, called on Palestinians outside of Gaza to escalate attacks against Israel. The Israel Defence Forces (IDF) blew up his former family home in the West Bank village of Arura on Oct. 31.

Creative Work
Image

Created
Nov 29, 2023, 6:23 PM Eastern Time

Author
Marcos Armstrong

Created with
Lightroom 7.0

Modifications (1)

Signed by
Adobe Inc.

Creative Work
Image

Created
Oct 31, 2023, 3:41 PM Israel Eastern European Time

Creator
Corinne Seminof

Rubble is all that remains of Saleh al Arouri's former family home. The de-facto leader of the Hamas military wing in the West Bank had called on Palestinians to escalate attacks against Israel. (Corinne Seminoff/CBC)

Local children have already placed a Hamas flag on the rubble

"This will not make us weaker," said Saad Dagher, an agronomist from a neighbouring village who went to school with al Arouri as a child. "On the contrary it makes us, as Palestinians, even stronger."

Dagher had just been made mayor of his village because the previous incumbent, a Hamas supporter, was arrested by Israeli soldiers, he said.

- LISTEN Canadian-Israeli peace activist Vivian Silver's son thinks she's been kidnapped by Hamas

- His 1st trip to Gaza in 56 years ended in a harrowing escape to Egypt

Phase 2: Display, UI options: icon overlay, expandable banner below caption

Phase 3 Decide level of detail to include, based on story

Phase 1: Embed a link to the Verify site in photo caption

CBC's Current Developments & Next Steps

Workflow Development: Actively developing short-term and long-term workflows for C2PA signing and verification across all stages of content lifecycle.

Guidance on Image Edits: Creating clear, department-specific **"Image Editing: Guidance"** for News and Marketing, addressing permissible edits, AI tool usage, and flagging AI-generated content.

Building Awareness:
◦ **Internal:** Socializing C2PA learnings through presentations and training for various internal groups, and involving pilot groups (journalists) to test functionality.
◦ **External:** Participating in international workshops (e.g., Project Origin, German Marshall Fund), collaborating with media organizations (e.g., BBC on training data and workflow analysis), and representing CBC in IPTC Media Provenance Committees.
◦ **Public-facing:** Continuing to publish C2PA-signed content on cbc.ca and developing communications to inform viewers about content authenticity.

CBC's Current Developments & Next Steps

Deciding on Best Approaches: The ongoing testing, evaluation of benefits and pitfalls, and DAM and CMS platform replacements are informing our decisions on the best and most automated approaches to C2PA implementation.

Automation Focus: Objective to automate C2PA at capture, ingest, edit export, and DAM export.

Addressing critical **security challenges** such as unrecognized certificates, pervasive metadata loss, and secure certificate management.

Exploring **hybrid solutions** like watermarking and fingerprinting to overcome CDN-induced metadata stripping.

Audience-Facing Implementation: Prioritizing making Content Credentials audience-facing on select images (e.g., from elections), initially via embedded links, with future UI/UX exploration.

Sustained **industry collaboration** with partners like BBC and IPTC is vital for broad, end-to-end adoption of C2PA standards.

Join Us

We will resolve this faster and more efficiently if we unite and agree on industry standards and how we implement them.

The C2PA standard will only work if it is broadly adopted as a standard from end-to-end.

Let's keep connected on content provenance technologies and C2PA implementation – and feel free to connect us with any of your colleagues or industry partners who are interested in content provenance.

Learn more...

Sources: Content Provenance, Content Credentials (C2PA)

A collection of reference material related to C2PA / Content Credentials.

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