

Federal Register Notice 87 FR 15274, <https://www.federalregister.gov/documents/2022/03/17/2022-05683/request-for-information-on-federal-priorities-for-information-integrity-research-and-development>, May 15, 2022

## **Request for Information on Federal Priorities for Information Integrity Research and Development**

### **Coalition for Content Provenance and Authenticity (C2PA)**

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VIA ELECTRONIC FILING

**Re: C2PA RFI Response: Information Integrity R&D (Docket Number NSF - 2022-05683)**

The [Coalition for Content Provenance & Authenticity \(C2PA\)](#) appreciates the opportunity to respond to the Networking and Information Technology Research and Development (NITRD) National Coordination Office (NCO) and National Science Foundation (NSF) Request for Information (RFI) on Federal Priorities for Information Integrity Research and Development. The [Coalition for Content Provenance and Authenticity \(C2PA\)](#) is an open standards organization created by members of the [Content Authenticity Initiative \(CAI\)](#), [Project Origin](#), and others through the Joint Development Foundation under the Linux Foundation. The C2PA is collectively building an open technical standard to provide provenance and attribution for all forms of digital media. C2PA envisions these open standards will be adopted by content publishers, authors, and creators to build trust in the information ecosystem and ensure interoperability across the internet.

The C2PA is encouraged that NITRD NCO and NSF have dedicated time and resources to understanding ways in which the Federal Government might enable research and development activities to advance the trustworthiness of information, mitigate the effects of information manipulation, and foster an environment of trust and resilience in which individuals can better discern information online. While we are sure NSF has identified a number of potential areas for funding, C2PA recommends NSF dedicate funds to prioritize putting into the public's hands tools for determining whether

content has been altered or manipulated, or is entirely synthetic, as well as educational tools for utilization of those digital and media provenance tools. We believe investment in fundamental research around the adoption of digital and media provenance standards will help to build trust and restore trust online.

1. *Understanding the information ecosystem:* There are many components, interactions, incentives, social, psychological, physiological, and technological aspects, in addition to other considerations that can be used to effectively characterize the information ecosystem. What are the key research challenges in providing a common foundation for understanding information manipulation within this complex information ecosystem?

### C2PA Response

Research on visual information manipulation and the necessary trust indicators for digital content provenance are symbiotic and incredibly helpful to consumers of online information. Such research has been a challenge for the Coalition for Content Provenance and Authenticity (C2PA) due to the organization's limited bandwidth. We propose that the National Science Foundation (NSF) consider funding such research in two separate phases that each deserve time and attention. We propose that NSF distribute resources out in two phases with the results of the first round of research informing the second round of research grants.

- **Scale:** First, NSF should fund research on the prevalence of digital content fraud - specifically content created with the intent to visually deceive. This remains a significant challenge today. For content consumers, is there a quantifiable benchmark which will help explain how trustworthy digital content is? How does a consumer's level of trust in a piece of content affect their perception and understanding of it, and how does this translate to behavioral decision-making?

Similarly, for social media platforms or browsers, what percentage of digital content inside the US is manipulated and used on their platforms for the purposes of deception or disinformation? For private industry, what is the dollar amount of visual content deception and fraud currently affecting their business or end-users? Is it possible to establish what software/AI has been used to create this content? How has the user acquired this software?

This type of research is nuanced and challenging because it places *visual* deception at the heart of the study, rather than general disinformation, bots, or fraud studies, which are all encompassing. It remains unclear to many just how prevalent image deception is in personal, financial, national security and trust transactions taking place online. Quantifiable benchmarks could help increase

awareness and preparation for countermeasures to counter this deception across society, governments, and private industry.

- **Provenance Indicators:** Building on the first proposed round of research, another research challenge for the C2PA is how to present provenance content to reassure those interacting with it online. What trust indicators would enable content consumers to accurately distinguish authenticated from standard unvetted digital content? Like the Secure Sockets Layer (SSL) in most browsers today, design affordances and UX indicators may provide trust signals to consumers of authenticated content.

From an efficacy perspective, what visual indicators would best communicate the relevant information to consumers in a manner that they are willing and able to interpret? How do consumers respond to these indicators: do they exhibit any behavioral change when indicators are present? Are they able to accurately interpret them? How do they react to having access to this information? How do we ensure provenance indicators avoid being interpreted as a binary judgment on the content itself? What do consumers need/want to know about “truthful” content compared to content intended to deceive? Such research will help inform larger educational efforts to raise awareness of digital content provenance and how to interact with it online.

- **Privacy:** Another area of research NSF could focus on is ensuring that any digital content provenance open standard can be leveraged in ways that respect privacy and personal control of data. How willing are creators to share provenance data and how do they understand the provenance standard to make use of the data they share?

## *2. Preserving information integrity and mitigating the effects of information manipulation:*

Strategies for protecting information integrity must integrate the best technical, social, behavioral, cultural, and equitable approaches. These strategies should accomplish a range of objectives including detecting information manipulation, discerning the influence mechanisms and the targets of the influence activities, mitigating information manipulation, assessing how individuals and organizations are likely to respond, and building resiliency against information manipulation. What are the key gaps in knowledge or capabilities that research should focus on, in order to advance these objectives? What are the gaps in knowledge regarding the differential impact of information manipulation and mitigations on different demographic groups?

## C2PA Response

Research should focus on analyzing what demographic groups would leverage digital provenance to mitigate information manipulation. This research could also look at what factors would limit different demographic groups from leveraging digital content provenance, as well as examining how to make provenance accessible to lower-income, global majority groups. How can we avoid creating power imbalances based on provenance accessibility to creators and consumers?

3. *Information awareness and education:* A key element of information integrity is to foster resilient and empowered individuals and institutions that can identify and abate manipulated information and create and utilize trustworthy information. What issues should research focus on to understand the barriers to greater public awareness of information manipulation? What challenges should research focus on to support the development of effective educational pathways?

## C2PA Response

- **Education/Awareness:** The C2PA and its members recognize that raising awareness and educating the public on digital content provenance is challenging. Most audiences expect binary decision making on existing digital content, which is not possible in real-time and/or scale. Educating on the utility of a new digital content ecosystem starting with capture to editing to display is nuanced and can involve complex concepts. Identifying the best and most feasible ways to educate society, business, government, and other facets of society on its utility will be paramount, and is, therefore, an important subject that merits substantial research funding.

Equally important will be education and awareness campaigns on what digital content provenance does not do; (*i.e.*, binary outcomes) so as to mitigate misuse and misunderstanding of the technology and approach. The C2PA envisions various levels of educational programs targeting the many facets of the digital ecosystem. We envision three different audiences, and we recommend research that will identify best how to educate each of these three audiences:

- *Content Consumers:* Arguably the most important audience, how can we best educate the general public on how to interact with digital content provenance when viewed online. Why it is helpful and what should be considered before making a decision of consequence based on digital content. What does the marker indicate, how to read it, and what to infer (or not) from the technology.

- Government: What are the benefits of digital content provenance? How can it be used to drive increased trust, reduced fraud, and other desirable outcomes for the health of our online ecosystem. What are the threats, misuse possibilities and how can the government help to educate the public? Further, how can digital content provenance undergird the future of trust in the growing digital economy and ecosystem?
  - Government education will also need to include federal, state, and local initiatives that can be combined with existing media and online literacy efforts across the country.
- Business: The private sector will need similar, but customized messaging to explain why they will need to engage, understand and adopt digital content provenance standards. While digital marketplaces and social media platforms will need to adopt the standard to help protect consumers from fraud, other industries will be able to leverage digital content provenance to deliver sustainable, accelerated, and greener services to clients and customers through trusted digital transformation. We must clarify the gaps in our understanding of business stakeholders through research.

4. *Barriers for research*: Information integrity is a complex and multidisciplinary problem with many technical, social, and policy challenges that require the sharing of expertise, data, and practices across the full spectrum of stakeholders, both domestically and internationally. What are the key barriers for conducting information integrity R&D? How could those barriers be remedied?

### C2PA Response

- As noted earlier in the response, the C2PA lacks the resources and bandwidth to conduct the research necessary to drive educational and awareness raising at scale on digital content provenance. Furthermore, research funded directly by C2PA and its members may be regarded as biased or self-serving. Our barriers are similar to those of others in this field and we think that NSF research funding grants can help researchers overcome these challenges. Specifically, we assess this will require experienced research institutions with a track record of developing efficient and effective programs to help inform the rollout of new technology and standards. Also, the research is highly interdisciplinary and will require the involvement of researchers across various departments. Access to data will also be critical and has been a notable challenge to our initial efforts. It will be difficult to assess the prevalence of visual deception on social media

platforms, peer-to-peer marketplaces, and other popular online sites without access to company data.

5. *Transition to practice*: How can the Federal government foster the rapid transfer of information integrity R&D insights and results into practice, for the timely benefit of stakeholders and society?

### C2PA Response

We agree that the rapid transfer of information integrity into practice will be critical. Even as proof of concept to demonstrate the future of high-integrity digital content, the NSF can help the United States Federal government become one of the first implementers of the C2PA open standard. We envision a variety of federal government agencies, programs, or agency bureaus adopting the open standard and serving constituents' digital content provenance media for consumption, information, and decision making. Agencies that often interact with the general public could issue communications or media with official content provenance standards, which can be viewed on a site with the adopted standard. The following agencies could also implement digital content provenance and/or empower the public to submit provenance-enabled information as part of their online experience:

- Internal Revenue Service (IRS)
- United States Patent and Trademark Office
- Department of Commerce
- Department of State (Passport, Visas, etc.)
- Department of Homeland Security
- Department of Motor Vehicles (State)

Implementing pilot programs at these agencies with NSF support would not only prove the concept, and familiarize millions of Americans with these tools but dramatically increase the trust in digital content and ease interaction with federal agencies or state governments. For example, the U.S. Government Printing Office (GPO) has been publishing provenance-enabled (certified) PDFs on their site for almost two decades.

6. *Relevant activities*: What other research and development strategies, plans, or activities, domestic or in other countries, including in multi-lateral organizations and within the private sector, should inform the U.S. Federal information integrity R&D strategic plan?

## C2PA Response

The NSF could fund different research projects studying how users' perceptions of media content change upon interacting with the different C2PA digital content provenance levels of information disclosure.

*7. Support for technological advancement:* How can the Federal information integrity R&D strategic plan support the White House Office of Science and Technology Policy's mission:

## C2PA Response

We believe that information integrity and the adoption of media and digital provenance standards directly supports the White House OSTP's mission because it:

- Ensures the United States leads the world in technologies that are critical to our economic prosperity and national security; and
- Maintains the core values behind America's scientific leadership, including openness, transparency, honesty, equity, fair competition, objectivity, and democratic values;
- Further, as detailed in the recent Declaration for the Future of the Internet, the White House, in coordination with 60 countries, announced their interest to protect consumers and promote transparency and authenticity online. Informational integrity is the best way to do this.