Network Working Group
Internet-Draft
Intended status: Informational
Expires: 5 January 2026

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4 July 2025

Digital Emblem (DIEM) Use Cases
draft-diem-fainchtein-use-cases-00

Abstract

International law defines a number of emblems, such as the blue helmets of United Nations peacekeeping forces, the blue and white shield of UNESCO, and the Red Cross of the International Committee of the Red Cross, as indicative of special protections under the Geneva Conventions. Similar protections attach to journalists who wear "Press" protective emblems on the battlefield, under Article 79 of Protocol I of the Geneva Conventions and Resolution 2222 of the United Nations Security Council. The emblems of national governments and inter-governmental organizations protect diplomatic pouches, couriers, and envoys under the Vienna Convention on Diplomatic Relations. Other marks enjoy protections against mis-use under the Paris Convention, the Madrid Protocol, and the Trade-Related Aspects of Intellectual Property Rights.

This document provides an initial summary of problems placing emblems into digital use cases and documents identified requirements from a number of stakeholders with active or potential interests in digital emblems. TODO align abstract and document with the WG charter.

About This Document

This note is to be removed before publishing as an RFC.

The latest revision of this draft can be found at https://rahelFain.github.io/diem-uses-and-requirements/draft-diem-fainchtein-use-cases.html. Status information for this document may be found at https://datatracker.ietf.org/doc/draft-diem-fainchtein-use-cases/.

Source for this draft and an issue tracker can be found at https://github.com/rahelFain/diem-uses-and-requirements.

Status of This Memo

This Internet-Draft will expire on 5 January 2026.

Copyright Notice

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1. Introduction

International law defines a number of emblems, such as the blue helmets of United Nations (UN) peacekeeping forces [BLUEHELMET], the blue and white shield of UNESCO [BLUESHIELD], and the Red Cross of the International Committee of the Red Cross (ICRC) [REDCROSS], as indicative of special protections under international law. Similar protections attach to journalists who wear "Press" protective emblems on the battlefield [PRESS]. The emblems of national governments and inter-governmental organizations protect diplomatic pouches, couriers, and envoys [DIPLOMAT], and international law protects certain marks against counterfeiting.

2. Conventions and Definitions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. Notional Requirements for Digital Emblems

Physical emblems have served a number of key functions over hundreds of years and continue to do so to this day. Traditional uses of physical emblems include processes and conventional use to mitigate potential misuse. The contextual protections of physical emblems largely do not apply in the digital world. The following describes a number of characteristics that are either required or desirable for digital emblems. In some cases, a digital emblem could accompany a physical emblem to provide these additional properties.

Because there are multiple use cases for digital emblems, some of which are fundamentally different from one another, it is not presumed that any one use of a digital emblem would necessarily have all or most of these requirements for a given implementation. In this vein, the working group will identify a core set of baseline requirements for digital emblems. Additional use cases will require further extensions. TODO move potential requirements which are outside the initial scope of the WG to a separate section.

3.1. Potential Identification Requirements

A digital emblem capable of acting as an official marking of legal significance needs to be identifiable by its intended purpose and what assets it applies to. To do this, digital emblems may have these requirements (identified in relation to diverse use cases). Requirements of particular use cases will vary.

* Provide a clearly detectable and unambiguous marking mappable to enable verification,

* Be machine-readable to enable automated verification,

* Be capable of carrying a visual representation of the physical emblem it represents,

* Carry an unambiguous indication of the international law, laws or agreement pertaining to the entity marked with the emblem,

* Be possible to associate with a range or specific quantity of persons or items,

* Be possible to associate with online services (e.g., websites, email servers, databases),

* Be possible to associate with data in transit or at rest,

* Be possible to associate with network-addressable equipment (e.g., routers, servers, laptops, IoT devices),

* Be possible to associate with a physical object (e.g., building, vehicle, container),

* Be possible to associate with a person or group of people

3.2. Potential Distribution Requirements

A digital emblem applicable to a variety of physical and digital assets will need to support discovery mechanisms to ensure emblem verification is a practical process. Practicality can mean multiple things, including minimizing the risk that verifying emblems will disclose verifier presence or behavior, minimizing the cost of verifying digital emblems, and ensuring universal access to emblem-bearing for legally entitled assets.

To accomplish practical emblem distribution, digital emblems can have requirements to...

* Not impose an undue cost to verify,

* Not impose an undue cost to apply to or remove from an asset,

* Not impose an undue cost to acquire authority to deploy,

* Not require verifiers of the emblem to reveal to the emblem bearer that existence checking is occurring,

* Make it possible to view an emblem via a communications network,

* Make it possible to view an emblem optically (e.g. QR code), or wirelessly (e.g. RFID) ToDo: this is an example of a potential requirement that will be outside the initial scope of the working group.

3.3. Potential Trust model requirements

A digital emblem needs to be trustworthy in order to provide any value. This means that parties verifying the presence of emblems need to know that the asset bearing an emblem is entitled to do so for the declared asset, time frame, and other scopes.

* Be authorized by a party that has the legal authority to issue it,

* Identify the authorizing party that issued it to ensure accountability of emblem use,

* Carry an unambiguous indication of the international law or laws conferring protection upon the entity marked with the emblem,

* Be capable of providing a reference to additional relevant information (e.g., photographs, unique identifiers) which can be used to corroborate the association of the digital emblem with the entity bearing it,

* Be revocable when they are no longer valid,

* Be restrictable by temporal scope,

* Be restrictable by geographic scope,

* Be robust against being replayed by invalid bearers,

* Be robust against forgery of its various properties.

4. Use Cases for Digital Emblems

Digital emblems are verifiable labels that can be associated with an entity so that a verifier can prove that the entity (person, place, or thing) has some property the digital emblem represents. This is a collection of brief use cases that necessitate the creation of one or more standards for digital emblems to be used to express some status of the entity bearing them. Each use case contains a list of potential attributes to associate with the entity as a part of the emblem. It is assumed that each use case would contain a link or reference to the law, regulation, or policy that governs the protections granted under the emblem.

These use cases come from discussions with the organizations identified. This is a representative (not exhaustive) list of use cases for digital emblems.

4.1. International Committee of the Red Cross (ICRC)

The ICRC is responsible for the visual Red Cross, Red Crescent, and Red Crystal emblems used to label physical assets such as buildings and vehicles so that wartime combatants know that International Humanitarian Law (IHL) forbids attacking that asset. The ICRC has been challenging private industry and academic researchers to create a digital equivalent to these visual emblems that can be used to label digital assets as protected under IHL the same way they can label physical assets today.

* Indication of location

* Textual description

The ICRC has shared the following concrete use cases as part of their industry and academic research engagement.

4.1.1. Labeling web servers

Ensuring that attackers targeting a server hosting websites the attacker wishes to compromise know that the server hosting those sites is IHL protected.

4.1.2. Labeling personal-use devices

Doctors use laptops to process IHL protected data both on hospital premises and on the move.

4.1.3. Labeling power-constrained devices

IoT devices are used to manage various equipment within hospitals, and their power constraints may pose unique limitations on digital emblem solutions.

4.1.4. Labeling networks from within

A device on a network that was compromised by a non-network path (such as malware loaded from a USB device) needs to discover that it compromised a network that is IHL protected (distinct from discovering the compromised device is protected).

4.1.5. Labeling networks from without

Attackers trying to compromise a network through a network path can discover an emblem for an IP address for a NAT or gateway behind which are IHL protected assets.

4.1.6. Miscellaneous

Other valuable use cases may exist across the following areas: protections of buildings (e.g., hospitals), people (e.g., aid workers), vehicles (e.g., ambulances), objects (e.g., medical devices), digital services (e.g., family reunification services), and data at-rest & in-transit. Permission to use an emblem is delegated to each UN member nation.

4.2. United Nations

UN Peacekeepers may require protective markings in theater as well as facilities associated with the mission.

4.3. United Nations Educational, Scientific, and Cultural Organization (UNESCO)

Requires protections for items of cultural heritage, both physical and digital. Priority is on buildings and physical artworks. These can be denoted with location information, descriptions, and linked images. There is a special concern with repatriating stolen works, which would benefit from a provenance trail via an emblem. Their is also an interest in ensuring that a physical instantiation of an emblem accompany each artwork and leverage the digital emblem to track the current location and any special handling needed.

* Indication of location
* Image(s)
* Textual description
* Chain-of-custody / provenance

4.4. Organization for the Prohibition of Chemical Weapons (OPCW)

Requires protection of Schedule 1 chemicals in transit between signatory countries for research, medical, pharmaceutical, or protective purposes. Emblem would identify place, date, and volume of production. Also a need to encrypt the description/ characteristics of the items for access only by the receiving customs agencies and material handlers. This encryption precludes other actors from determining the contents being transported.

* Indication of location (dynamic as materials are moved)
* Indication of quantity
* Textual description

4.5. International Atomic Energy Agency (IAEA)

IAEA administers several treaties, especially related to the controlled shipment of atomic fuels and wastes across borders. Similar use case as OPCW.

4.6. Basel Convention

Regulates the trans-boundary movement of hazardous wastes. Use cases are functionally identical to OPCW and IAEA.

4.7. Press

Journalists in conflict zones require protective markings that indicate their status as a non-combatant.

4.8. Ramsar Convention on the Wetlands (UNESCO)

The Convention on Wetlands of International Importance especially as Waterfowl Habitat "providees the single most global framework for intergovernmental cooperation on wetland issues" and it features a list of geographic areas designated by Member States. A digital emblem for the geographic areas potentially requires * Indication of location * Access to presence or absence of Ramsar designation of a specified location * Textual description * Ability to validate the presence or absence of Ramsar designation

4.9. World Intellectual Property Organization (WIPO)

WIPO administers 26+ treaties with different protections for different things. Brands that are protected under international law (e.g., Madrid Protocol) can mark their shipments with an emblem allowing customs agents to positively identify legitimate products.

* Copyright/Brand image

* Textual description

* Chain-of-custody / provenance

4.10. International Civil Aviation Organization (ICAO)

Requires protection of civil aviation flights and the ability to assert that they are not dual-use (i.e., not carrying military cargo). Digital emblem would carry a geographic description of the flight plan, its current location, and an indicator of its identity (i.e., tail number). Potential need for the emblem to reference a flight manifest.

* Indication of location

  - Flight plan is static

  - Current location is dynamic

* Textual description (i.e., manifest, identifying characteristics such as tail number)

4.11. World Health Organization (WHO)

Similar use case as the ICRC.

4.12. United Nations Food and Agriculture Organization (FAO)

Among other things is responsible for the International Plant Protection Convention (IPPC) and International Standards for Phytosanitary Measures standards including ISPM 15 [ISPM15] that requires wood packaging materials (pallets, crates, dunnages) to be debarked, heat-treated or fumigated with methyl-bromide, and stamped or branded with a compliance mark known as a "wheat stamp."

4.13. United Nations Economic and Social Council (ECOSOC)

UN Model Regulations [UNMODELREGS] includes "Recommendations on the Transport of Dangerous Goods." This includes labeling of items with a four digit "UN Number" that indicates the comounds contained within, such as chemicals, explosives, flammable liquids, etc. For example, items containing lithium-based batteries are labeled with 3480 or 3481 and accompanied by a specific "battery mark" emblem.

4.14. World Customs Organization (WCO)

Specifies "Harmonized Systems" codes [HARMONIZED] that classify items such as livestock, arms and ammunition, chemicals, plastics, machinery, foodstuffs, etc. They also provide a system for labeling origin of items and valuation of items, all enforced by numerous international trade agreements between individual nations and groups of nations.

5. Security Considerations

Technical implementations of digital emblems will undoubtedly incur their own security considerations. However, this document does not propose technical solutions; it enumerates use cases that justify creating technical solutions and potential requirements. Many of the potential requirements pertain to possible security and privacy directions.

6. IANA Considerations

This document has no IANA actions.

7. References

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7.2. Informative References

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Appendix A. Contributors

Tony DeSimone, Kerstin Vignard, and Erin Hahn provided insight into the legal and policy issues surrounding emblems. Tommy Jensen, Felix Linker and Mauro Vignati provided many of the requirements that derive from digital asset use cases.

Acknowledgments

Rohan Mahy provided insightful review.

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