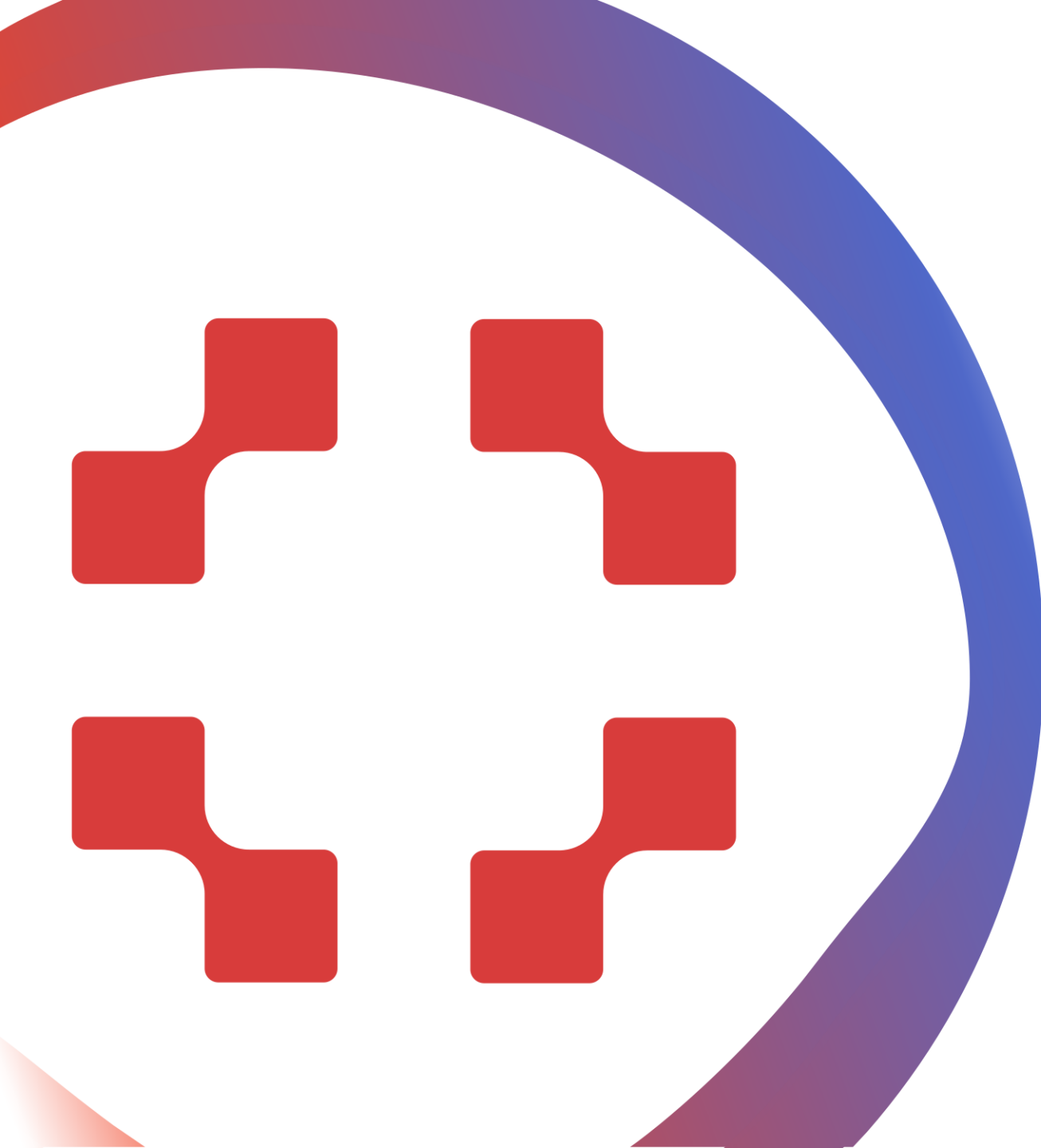




ETH zürich

in collaboration with



ICRC

Signaling Legal Protection in Cyber Space

The Digital Emblem

Felix Linker

Department of Computer Science, ETH Zurich

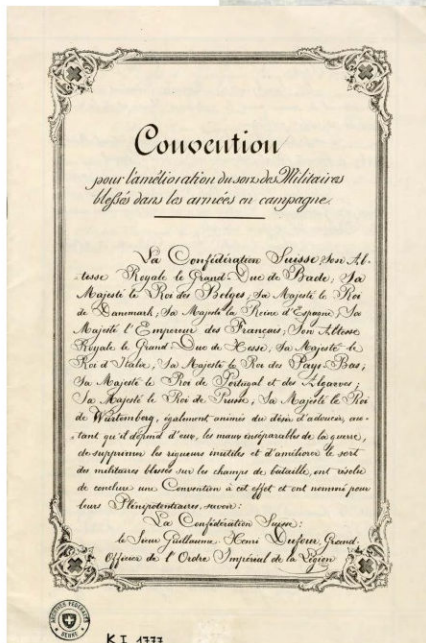
The Rules of War

Henry Dunant



The Battle of Solferino 1859

The Rules of War

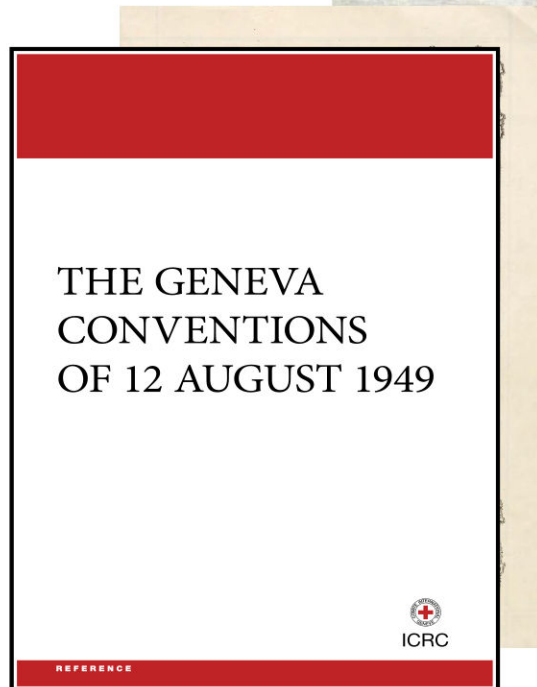


1864



The Battle of Solferino 1859

The Rules of War

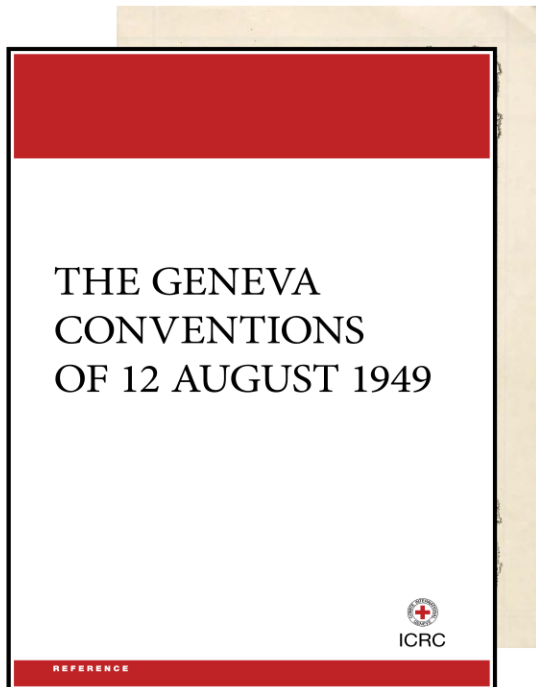


The Battle of Solferino 1859

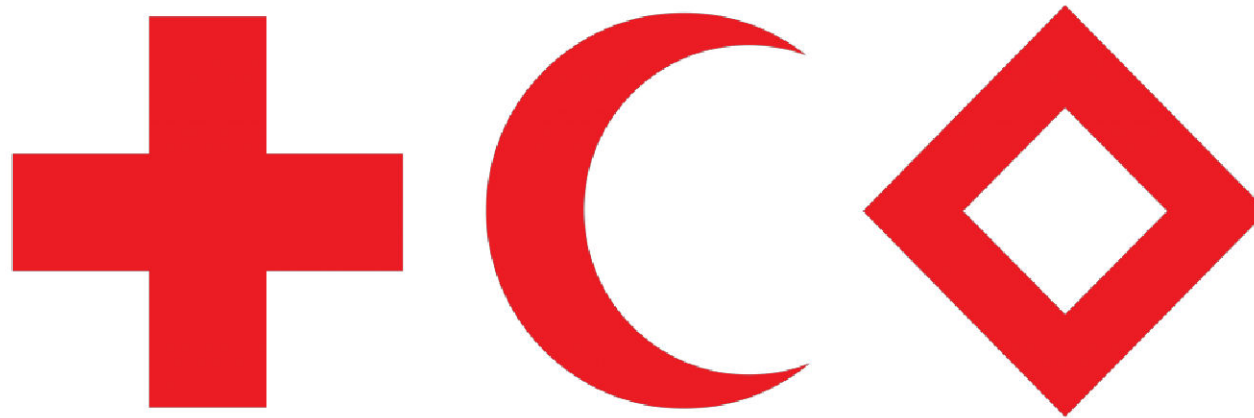
The Rules of War

Reduce human suffering

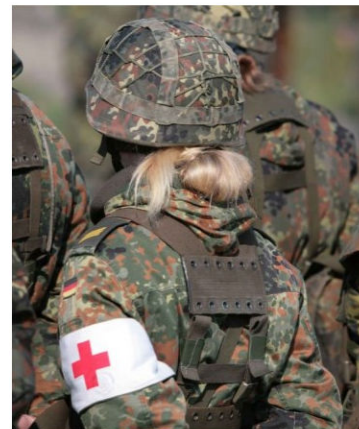
Respect and protect those
providing care



The Distinctive Emblems



The Distinctive Emblems



The Distinctive Emblems



New Signals



Blue Light



Radio Signals



Radar
Transponders

Conflict has Changed Again

World

Iran says major U.S. tech firms are targets in the Middle East, with drone and cyberattacks already underway

By Emmet Lyons

March 13, 2026 / 10:52 AM EDT / CBS News

Conflict has Changed Again

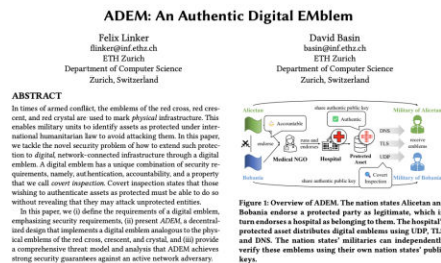
Medical and humanitarian infrastructure relies on digital services

Conflict has Changed Again

Can there be a Digital Emblem to signal protection in cyber space?

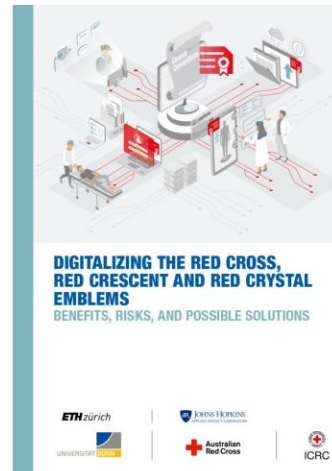
Pursuing the Digital Emblem

A Research Project...



2020

...a potential solution...



2022

...towards standardization...



2024-...

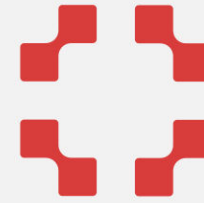
...a tested solution



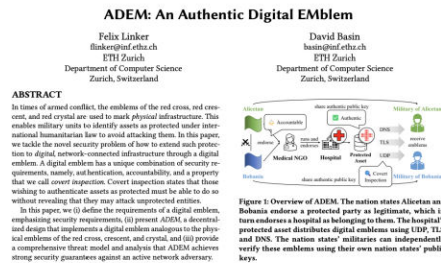
2025-...

Pursuing the Digital Emblem

ADEM An Authentic Digital Emblem

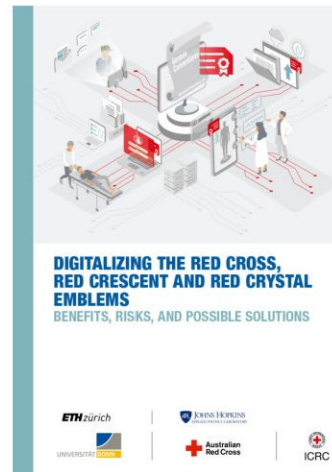


A Research Project...



2020

...a potential solution...



2022

...towards standardization...



2024-...

...a tested solution

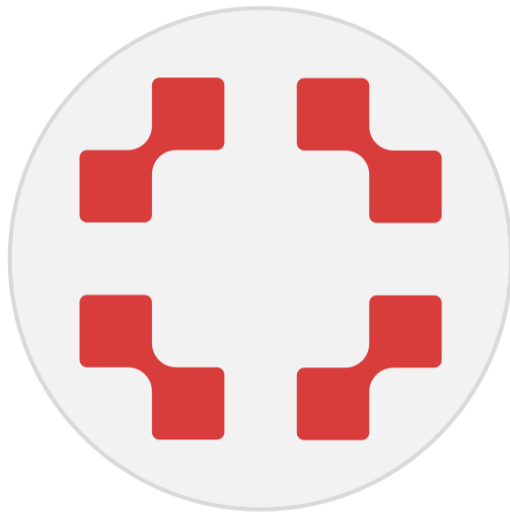


2025-...

1. What is the purpose of a Digital Emblem?
2. How would a Digital Emblem look like?

What is the Purpose of a Digital Emblem?

What is the Purpose of a Digital Emblem?



Purpose:
Reduce human suffering



...by stopping attacks



Undertake malicious
ICT activities

The Digital Emblem requires **respect**

Why Respect the Emblem?



1. Self-interest

- Targeting the wounded serves no purpose
- Benefit from the adversary's respect

2. Compliance

- Many states want to adhere to IHL
- Digital Emblem querying can be monitored internally

3. Inherent Motivation

- IHL enjoys respect in general
- Some ransomware groups have code of conducts

What is the Purpose of a Digital Emblem?



Purpose:
Reduce human suffering



...by stopping attacks



Undertake malicious
ICT activities

The Digital Emblem requires **respect**

What is the Purpose of a Digital Emblem?



Purpose:
Reduce human suffering

The Digital Emblem requires **respect**

...must not introduce new risks

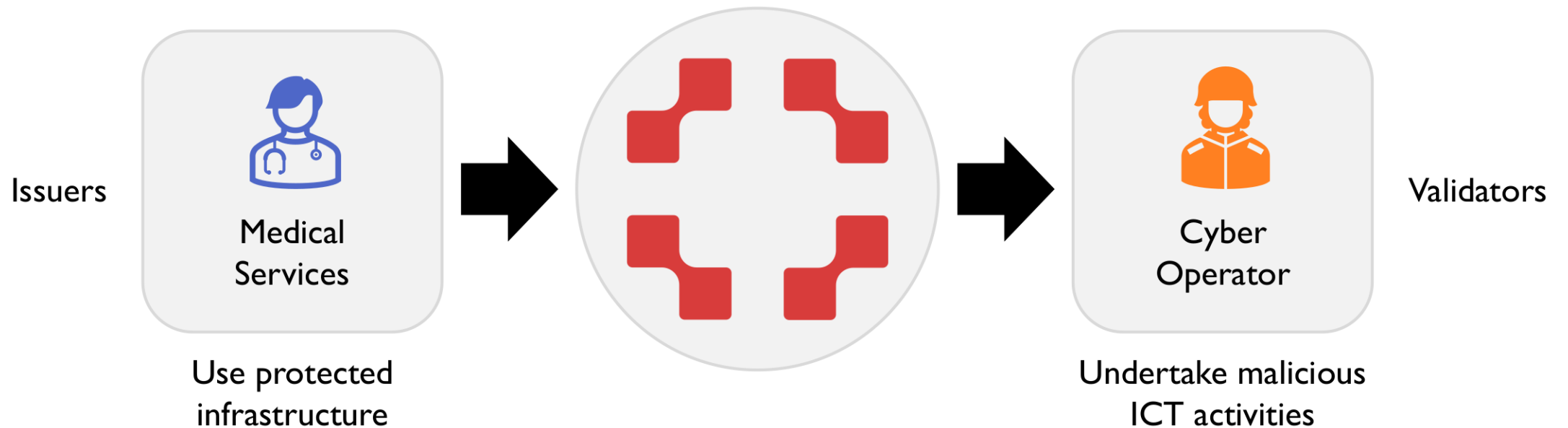
...must be adopted

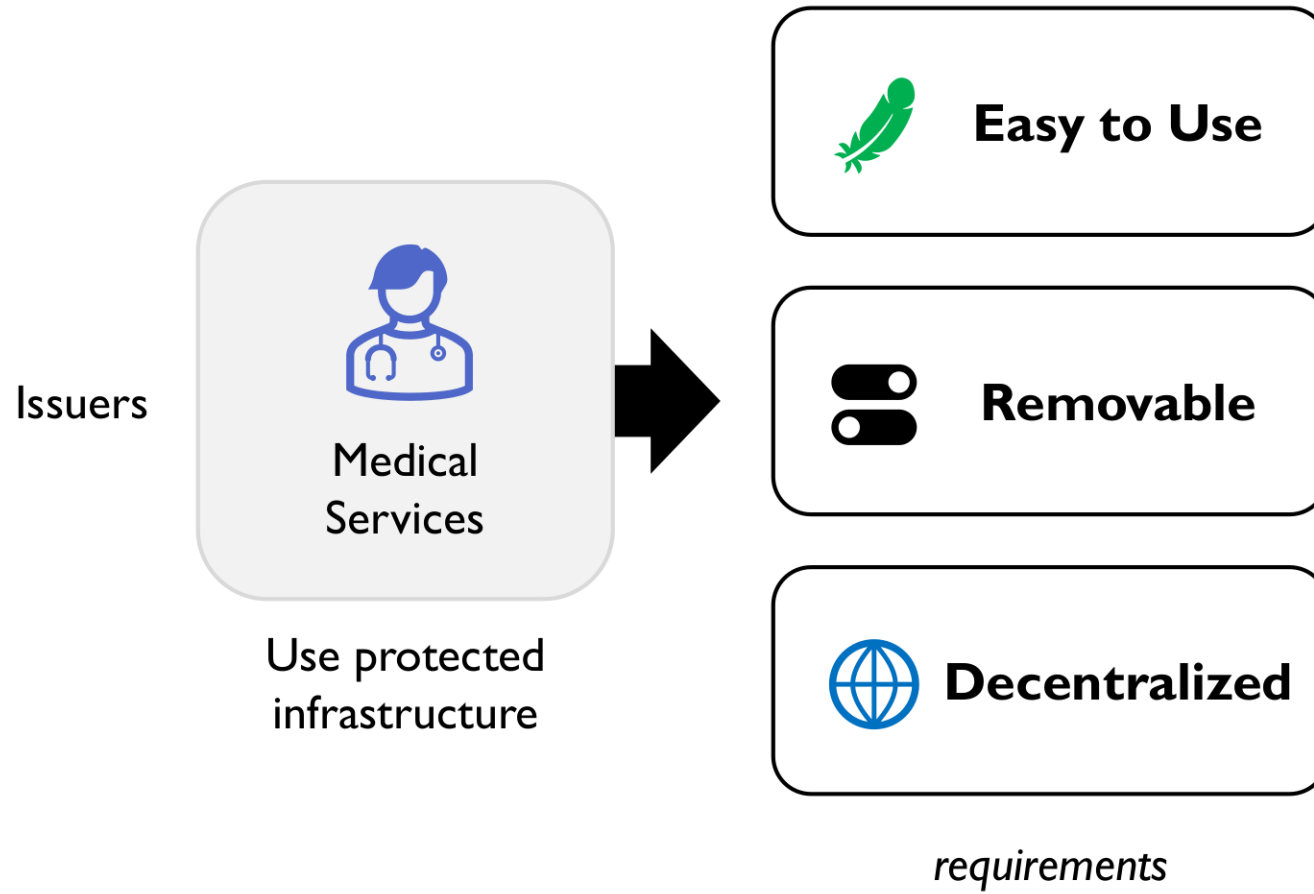
What would a Digital Emblem
look like?

ADEM: An Authentic Digital Emblem



Who is the Digital Emblem for?



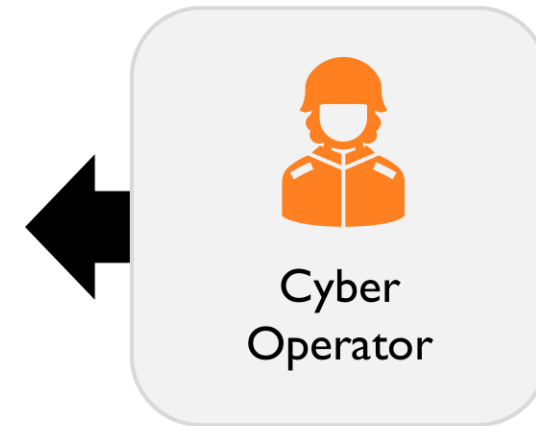


 **Emblems are Authentic**

 **Misuse can be attributed**

 **Validation is undetectable**

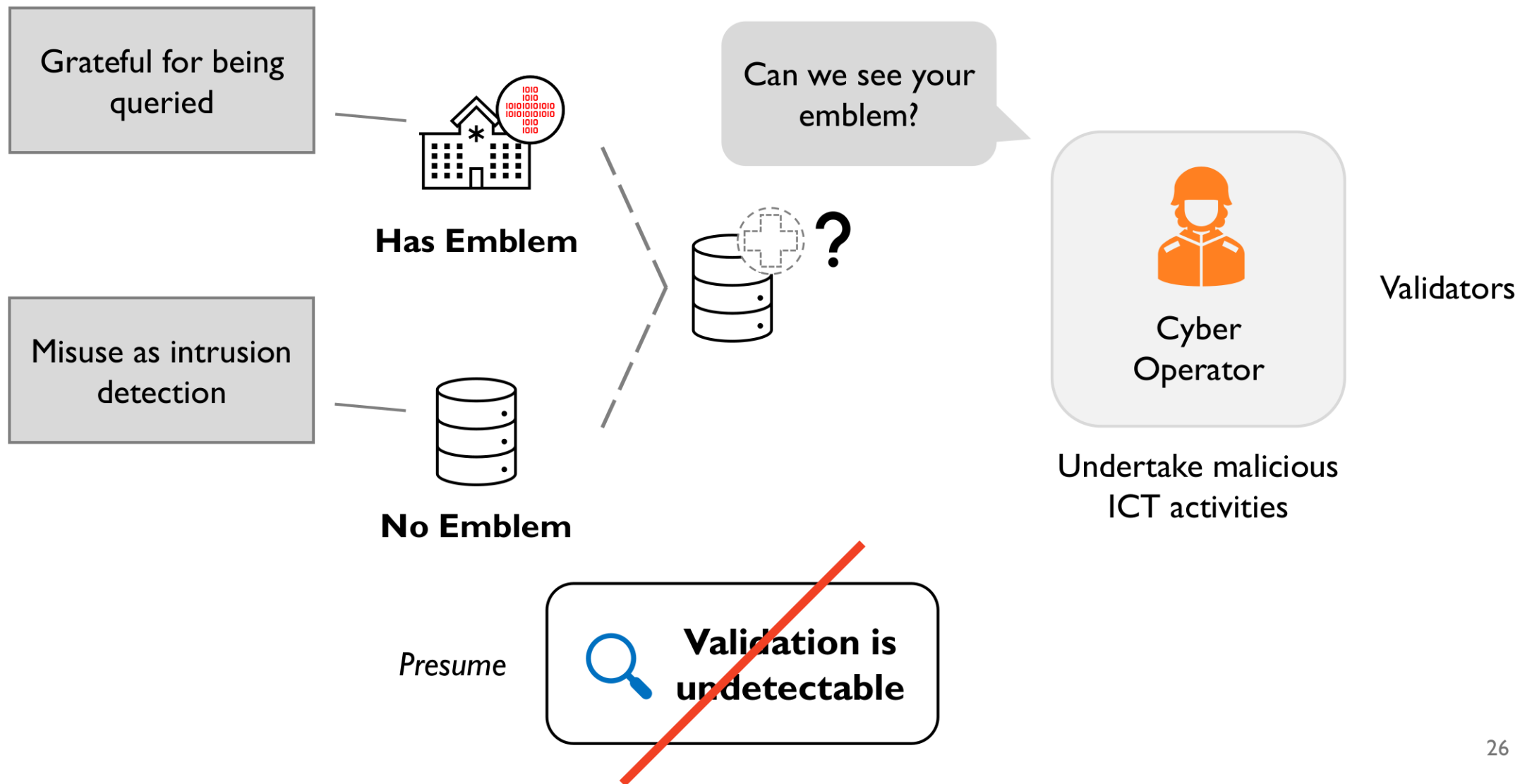
requirements



Undertake malicious
ICT activities

Validators

~~Emblems can be misused as honey pot~~

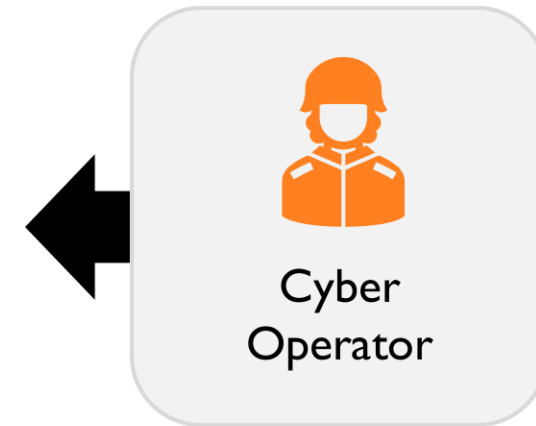


 **Emblems are Authentic**

 **Misuse can be attributed**

 **Validation is undetectable**

requirements



Undertake malicious
ICT activities

Validators

Digital Emblem Requirements



Easy to Use



**Emblems are
Authentic**



Removable



**Misuse can be
attributed**



Decentralized

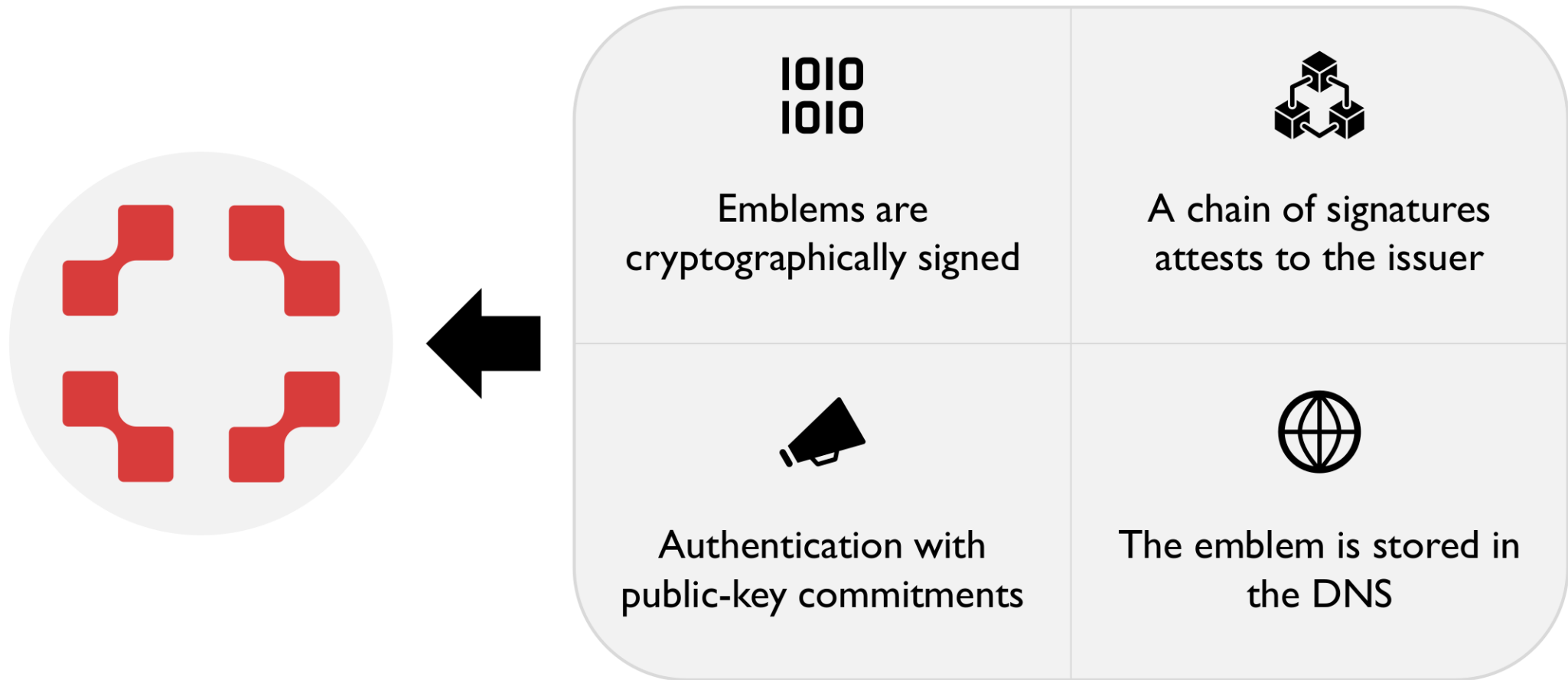


**Validation is
undetectable**

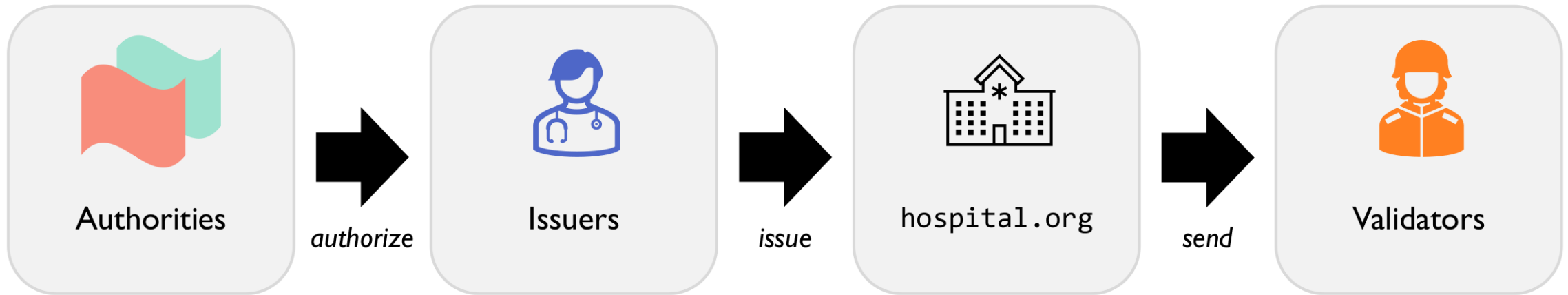
for issuers

for validators

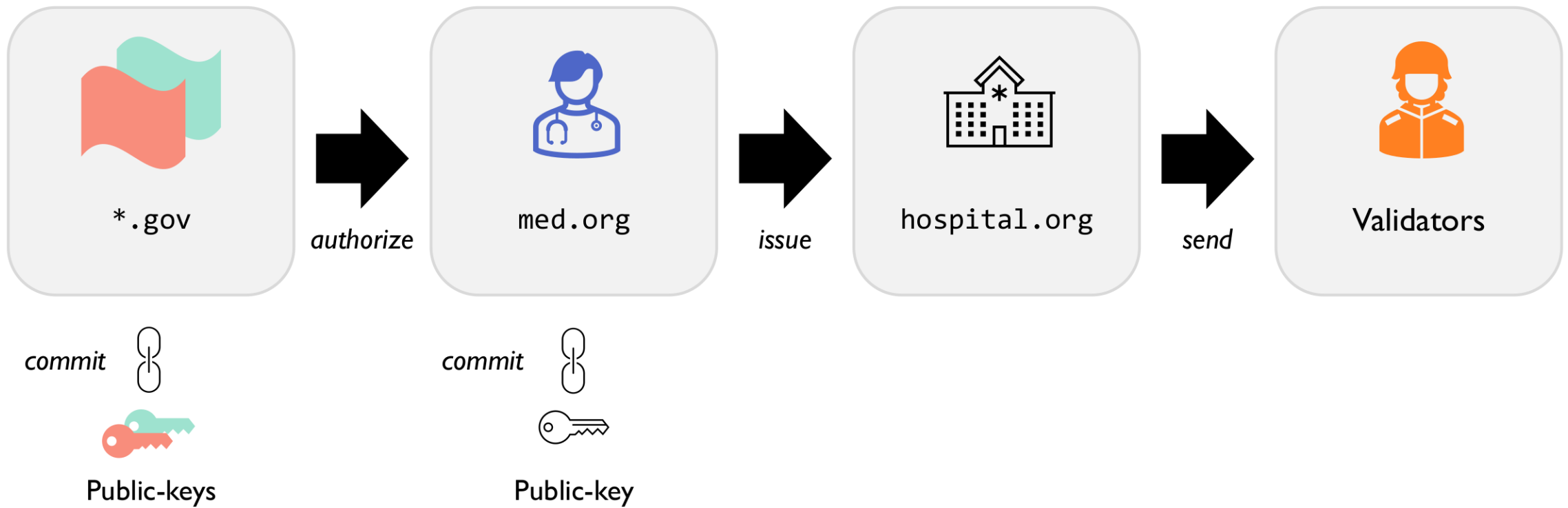
ADEM – An Authentic Digital Emblem



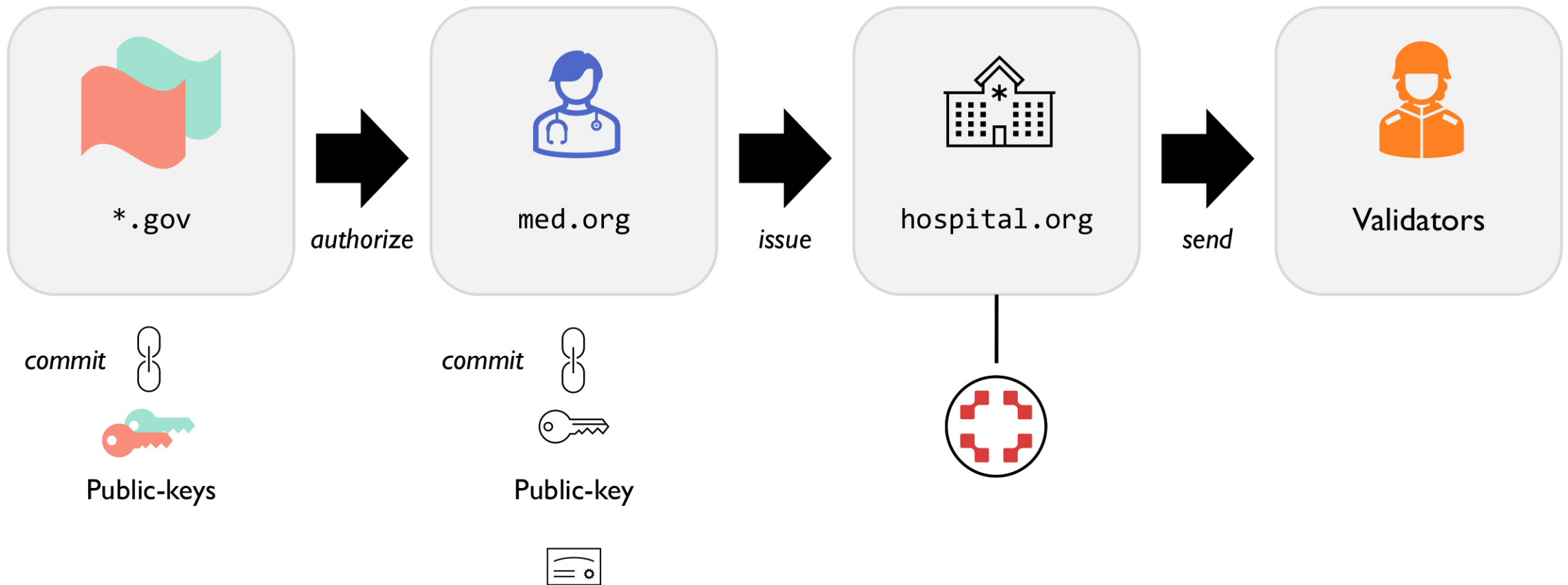
ADEM – An Authentic Digital Emblem



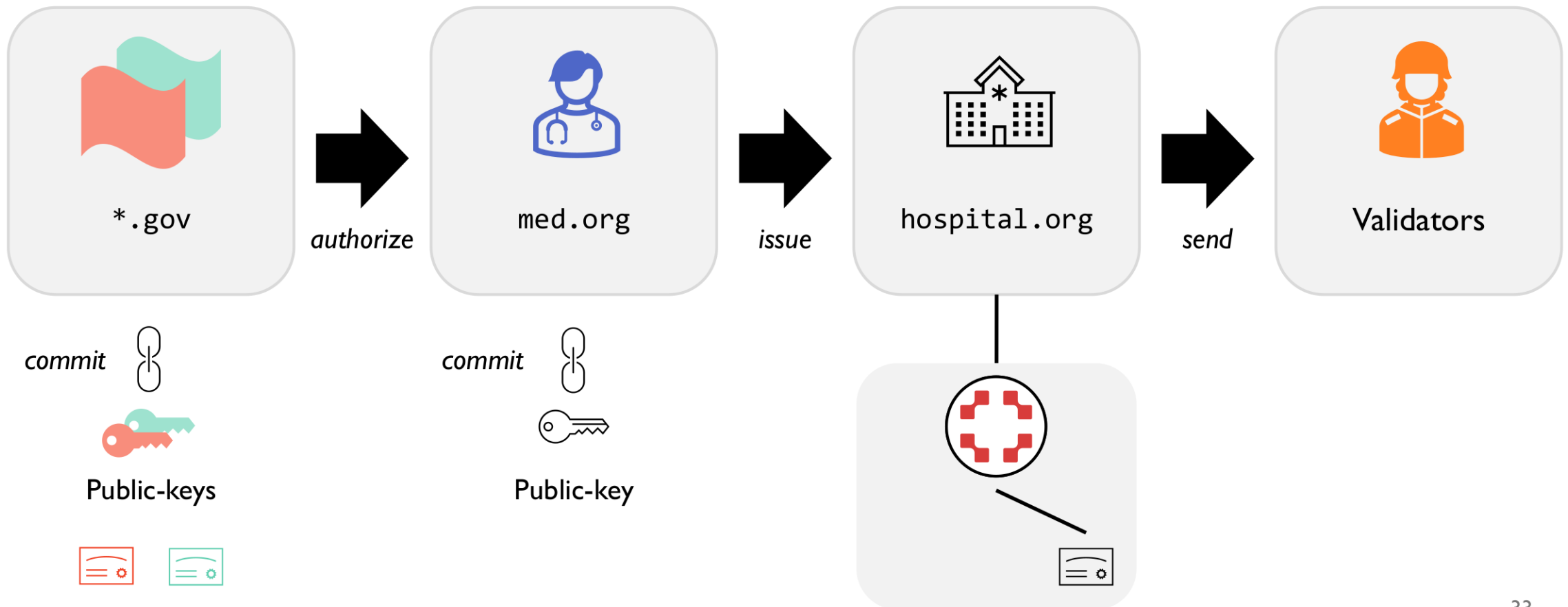
ADEM – An Authentic Digital Emblem



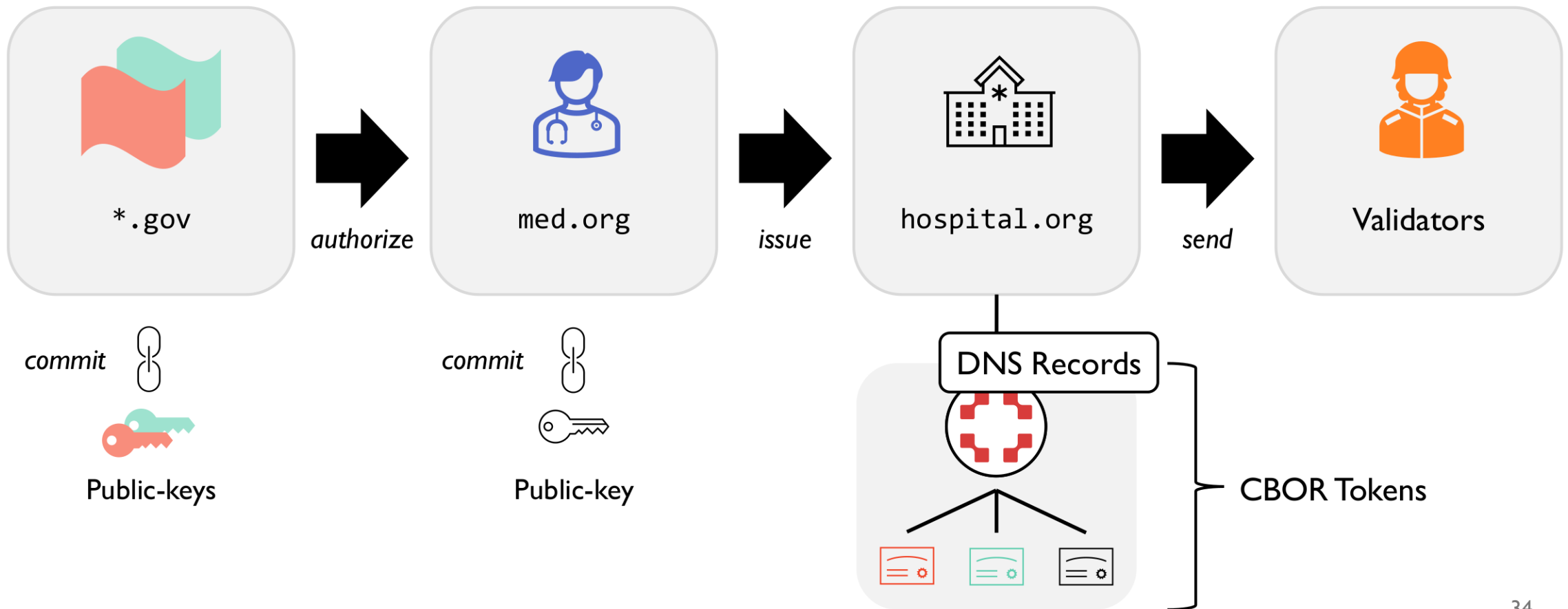
ADEM – An Authentic Digital Emblem



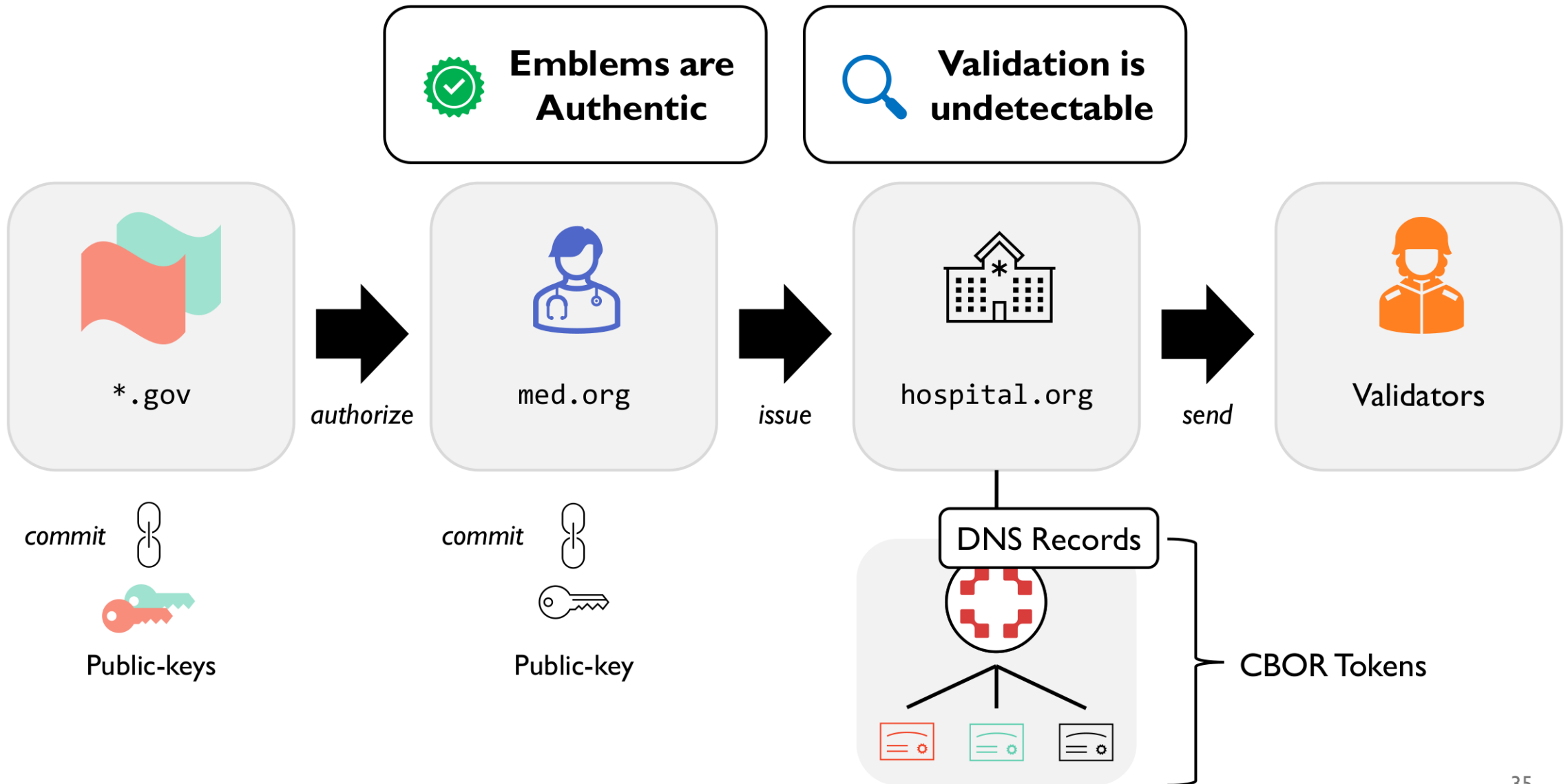
ADEM – An Authentic Digital Emblem



ADEM – An Authentic Digital Emblem



ADEM – An Authentic Digital Emblem



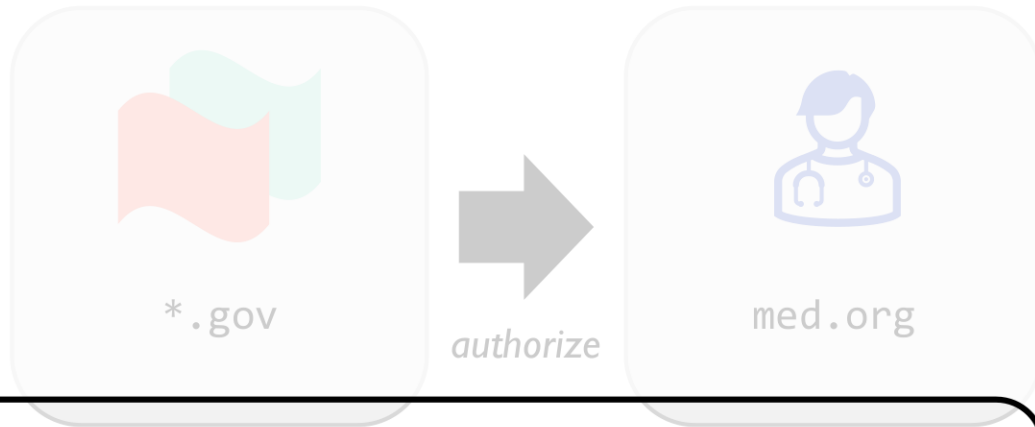
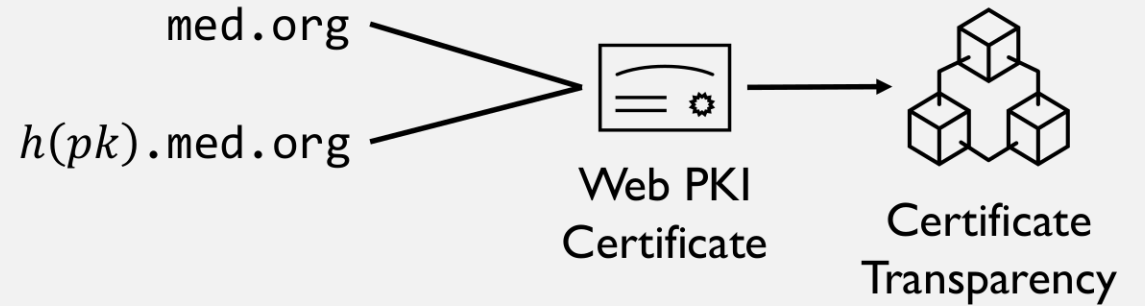
ADEM – An Authentic Digital Emblem



Misuse can be attributed



Decentralized



Public Key Commitment Mechanism

commit 
Public-keys

commit 
Public-key

ADEM is Open-Source

The screenshot displays the Datatracker website interface for the ADEM Core Specification document. The browser address bar shows `datatracker.ietf.org`. The navigation bar includes the IETF logo, 'Datatracker', and dropdown menus for 'Groups', 'Documents', 'Meetings', 'Other', and 'User'. On the right, there are links for 'Report a bug', a 'Sign in' button, and a 'Document search' input field.

ADEM - Distribution and Discovery over DNS

ADEM Core Specification

draft-linker-diem-adem-core-00

Status | [Email expansions](#) | [History](#)

Versions:

[00](#)

This document is an Internet-Draft (I-D). Anyone may submit an I-D to the IETF. This I-D is **not endorsed by the IETF** and has **no formal standing** in the [IETF standards process](#).

draft-linker-diem-adem-core [00](#)

Jan 2026

Document	Type	Active Internet-Draft (individual)
	Author	Felix Linker ✉
	Last updated	2026-01-15
	RFC stream	(None)
	Intended RFC status	(None)
Formats		txt html xml htmlized bibtex bibxml
	Stream	
	Stream state	(No stream defined)

ADEM is Open-Source

The screenshot shows the GitHub repository page for `adem-wg/adem-proto`. The repository is public and has 2 forks and 5 stars. The navigation bar includes links to Platform, Solutions, Resources, Open Source, Enterprise, and Pricing. The repository page shows the release list with the following releases:

- v0.3.4 (Latest)
- v0.3.3
- v0.3.2
- v0.3.1
- v0.3.0
- v0.2.1
- v0.2.0
- v0.1.0
- v0.0.3
- Initial Test Release

The details for the latest release, v0.3.4, are shown. It was released by `felixlinker` on May 7. The release includes a fix: "Fix: Do not reject endorsements during parsing that contain `"end": false`". The release also includes 4 assets:

Asset	SHA256	Size	Date
emblemcheck-Darwin-arm64	sha256:d4e6ad8fbc062...	16.3 MB	May 7
emblemcheck-Linux-x86_64	sha256:ceb997c48e48cd...	13.5 MB	May 7
Source code (zip)			May 7
Source code (tar.gz)			May 7

Design Philosophy



Reuse existing technology

- CBOR
- DNS
- CT



Place the emblem where
validators look anyway

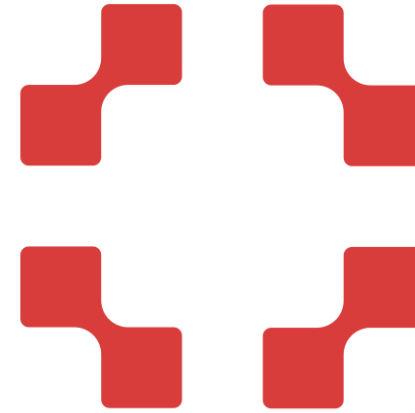
- DNS



Give issuers full control

- Decentralized
- Removable
- No "emblem registry"

There can be a Digital Emblem



Requirements



Easy to Use



Emblems are Authentic



Removable



Misuse can be attributed



Decentralized



Validation is undetectable

for issuers

for validators



Design



Cryptographic Signatures



Cryptographic Authorization

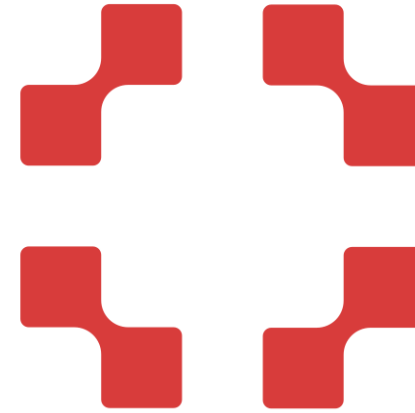


Public-Key Commitments



Use the DNS

There can be a Digital Emblem



Blue Shield



for cultural property

Dangerous Forces



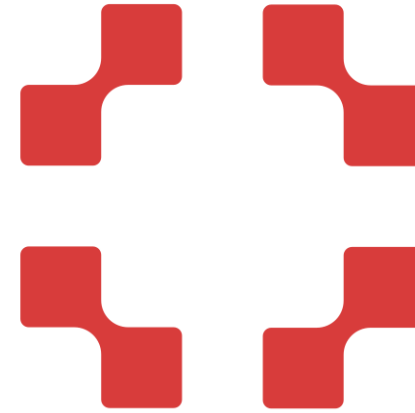
for dams, dykes, and nuclear plants

Civil Defense



for civil protection

There can be a Digital Emblem



Get in touch!

felixlinker.de/contact



Try it out!

adem-wg.github.io/adem-web



Provide input!

github.com/adem-wg

