GCCN Trust Registry Network POC Demo

May 10, 2022

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- GCCN Trust Registry Network Proof-of-Concept and Demo
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Speakers

Executive Director

Linux Foundation Public Health

Project Lead

Global COVID Certificate Network, LFPH

Sr. Technical Architect

Global COVID Certificate Network, LFPH

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Global COVID Certificate Network

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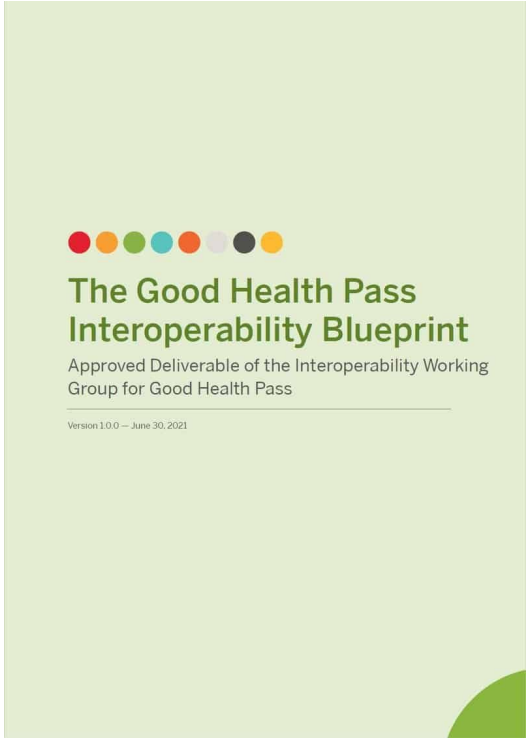
Origin of Global COVID Certificate Network (GCCN)

- **From** Good Health Pass Interoperability Blueprint, published in June 2021 with nine sets of recommendations to address interoperability challenges of COVID certificates for travel reopening:
  - Design principles
  - Creating a consistent user experience
  - Standard data models and elements
  - Credential formats, signatures, and exchange protocols
  - Security, privacy, and data protection
  - Trust registries
  - Rules engines
  - Identity binding (ensuring the authenticity of the holder)
  - Governance
- **To Global COVID Certificate Network (GCCN),** launched in June 2021, implementing the Blueprint to help governments reopen borders - develop technical specifications and open source code



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Scope of GCCN and Initial Focus

The Global COVID Certificate Network (GCCN) is to enable interoperable and trustworthy verification of COVID certificates between jurisdictions for safe border reopening.

- GCCN Trust Registry Network - A **global trust architecture** that will allow the various COVID certificate systems in every jurisdiction to find each other and decide whether to accept each other's certificates.
- A complete toolkit to build COVID certificate ecosystems, which includes a governance framework template, schema definitions and minimum datasets, technical specifications, implementation guides, and open source reference implementations.
- A vendor network for GCCN, who can competently work on these kinds of projects, so that governments and institutions can easily get running.

GCCN Trust Registry Network

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Context

- There are no established trust chains for COVID certificates as opposed to the issuance of documents like ePassport (learn more here)
- There are no universal/dominant standards and policies (governance) that most authorities are following (learn more here)
- Global reopening rates are diverging, and a new type of inequality may be being entrenched
- Countries are having to pursue convergence on a bilateral basis, agreeing to the interoperability of COVID certificates individually

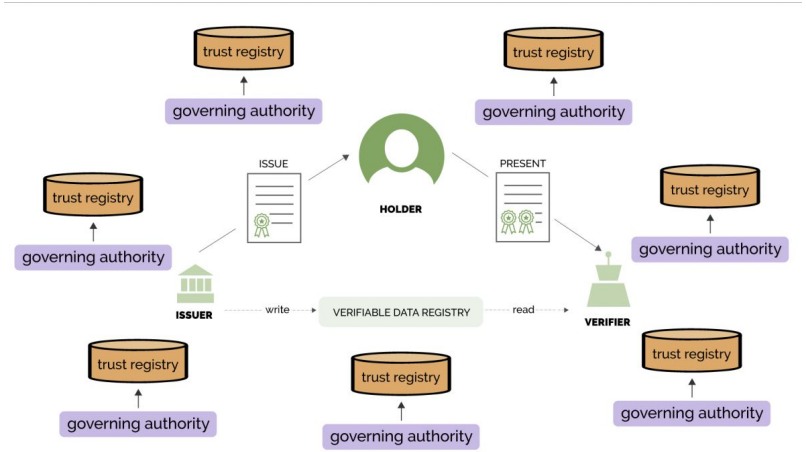

Figure 14: The peer trust architecture of the GHP decentralized PKI

Source: Good Health Pass Interoperability Blueprint

To enable an inclusive global reopening, we need a global trust architecture, to bring all these disparate centralized ecosystems together.

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Starting Definition

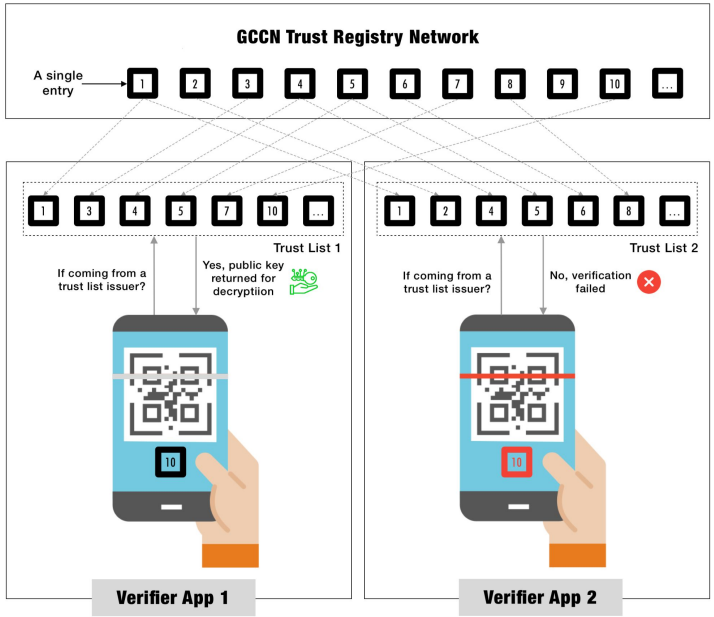
The GCCN Trust Registry Network is an online resource that provides human and machine readable information pertaining to it's entries. Network participants consist of public and private sector entities and consortiums providing the issuance and/or verification of digital or digitized paper COVID Certificates (collectively "COVID certificate issuers") required for use by jurisdictions and entities (collectively "COVID certificate verifiers") to allow free and safe movement within or across locales.

The GCCN Trust Registry Network supports the vetted meta information providing the definition of each entry and the complete lifecycle, from service inception to deprecation, for Trust Service Providers, participating entries on the GCCN Trust Registry Network providing a service, and Trust Service Verifiers, any parties using the GCCN Trust Registry Network for verifications.

Targeted Functionalities

Allows different COVID certificate issuers to find each other on a multi-stakeholder network while providing a way for COVID certificate verifiers to:

- Discover existing COVID certificate issuers
- Validate their COVID certificate policies and decide whether to accept their certificates/whose certificates to accept, and
- Build a list of COVID certificate issuers and access their public keys for certificate verifications



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Value Proposition

The GCCN Trust Registry Network

- Provides higher quality vetted definitions of Trust Service Providers as opposed to only their public key information which has been a common practice of existing systems

- Is ‘Root of Trust’ agnostic, providing Trust Service Providers with a globally accessible vehicle to publish the definition of their trusted services
  - Support for X.509 PKI or Verifiable Credential / Decentralized Identifier based
- Publishes Trust Service definitions based on existing accepted standards
  - The ETSI standard, which has been implemented in eIDAS 1.0 by the European Union

TRAIN – the Underlying Technology

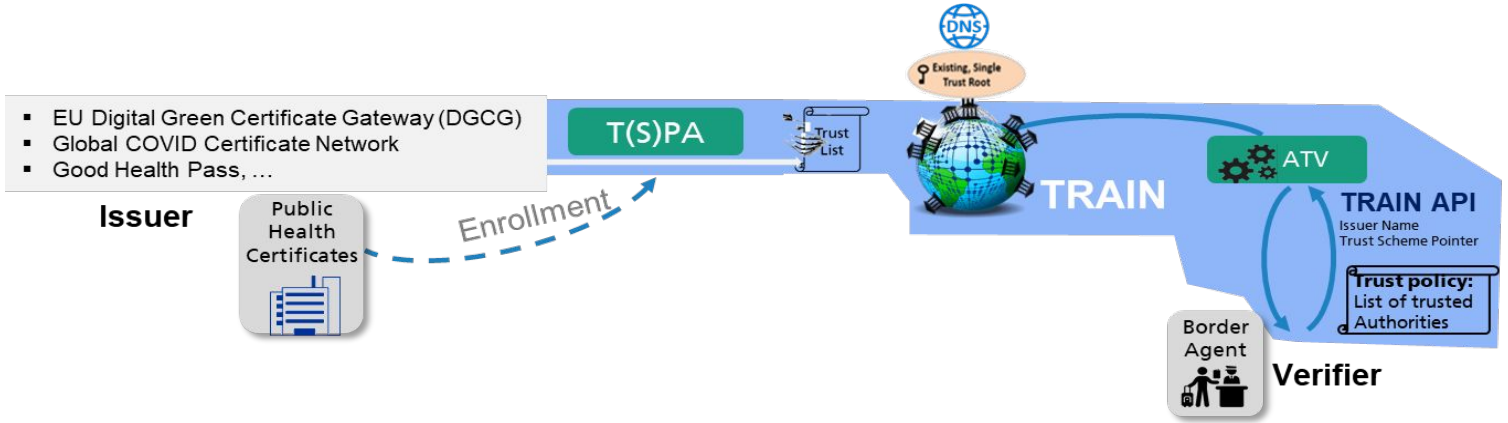
The GCCN Trust Registry Network is built on TRust mAnagement INfrastructure (TRAIN) for the European Self Sovereign Identity Framework (ESSIF) Lab Architecture.

"*...TRAIN enables secure, trustable digital interactions. A classical hierarchical Certificate Authority (CA)-type structure is avoided - so is fraud, chaos and the pure dominance of the economically strongest actors in the system…TRAIN will provide a decentralized framework for the publication and querying of trust information…*"

Highlighted features that are aligned with targeted functionalities and value proposition:

- Provides agnostic support for all types of 'Root of Trust' architecture
- Supports self-defined "Trust Schemes" and trust policies
- Supports Trust Standards and Trust Schemes such as eIDAS, Pan Canadian Trust Framework
- Adopts pattern from the ETSI 119 612 TS scheme for trust lists
- Can use DNSSEC (Domain Name System Security Extensions) to secure the the chain of authenticity for Trust Service Providers
- Provides an API for discovery and verification of trusted endpoints

TRAIN – Logical Architecture



- **Trust Scheme:** comprises the organizational, regulatory/legal, and technical measures to assert trust-relevant attributes about enrolled entities (COVID certificate issuers) in a given domain of trust
- **Trust Scheme Publication Authority (TSPA):** higher-level component to publish different trust schemes
- **Trust Service Provider:** a participating entity on the GCCN Trust Registry Network providing a service as defined by a TSPA
- **Trust Service Verifier:** any party using the GCCN Trust Registry Network for verifications
- **Automated Trust Verifier (ATV):** verification of trust scheme a service endpoint according to self-defined policy, API for Trust Service Verifiers
- **Trust Scheme Pointer:** DNS hostname of the claimed trust scheme

GCCN Trust Registry Network POC and Demo

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Overview and Scope

The GCCN Trust Registry Network PoC is composed of two parts, **Network Onboarding for Trust Service Providers** and **Discovery and Use for Trust Service Verifiers**.The PoC wouldn't have been a success without the contributions of these partners and the ongoing support of the LFPH community.

Fraunhofer IAO

Fraunhofer IAO, the German research organization that developed the TRAIN Infrastructure, supported the effort throughout.

symsoft

Symsoft, a US-based enterprise web solutions provider, built the initial demo web application of the Network and web interface for the onboarding process of the POC.

FINEMA

Finema, a Thai company specializing in decentralized identity solutions, developed the verifier app for the POC that demonstrates how a verifier can leverage the Network for verifications.

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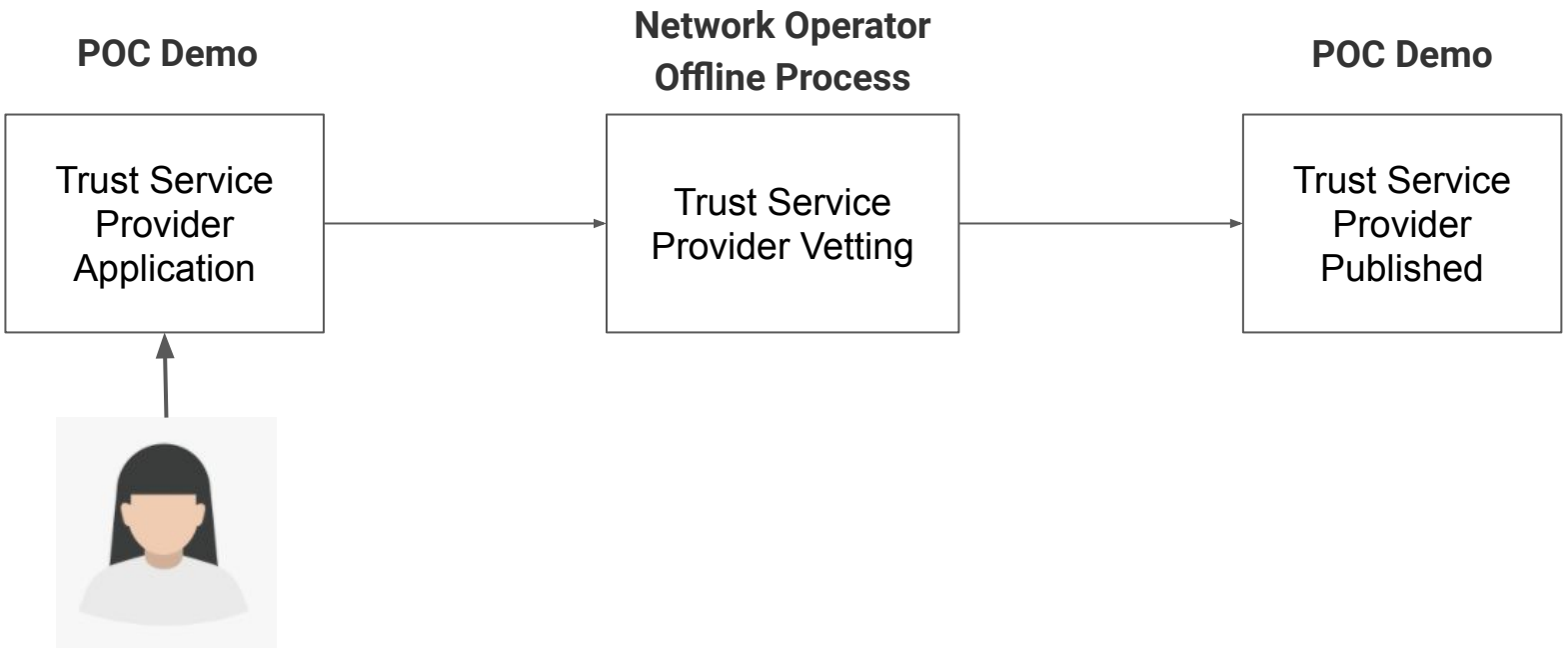
Network Onboarding for Trust Service Providers



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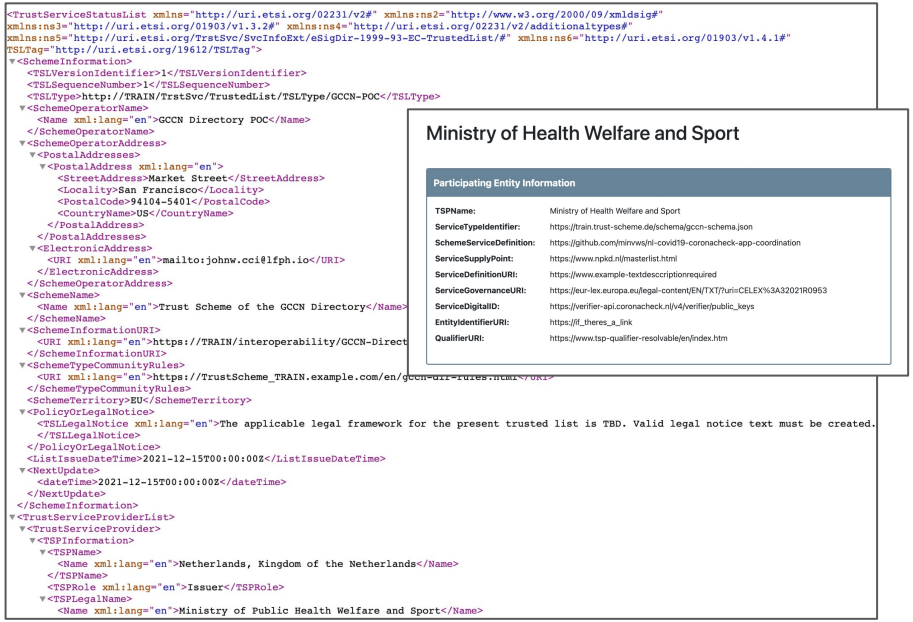
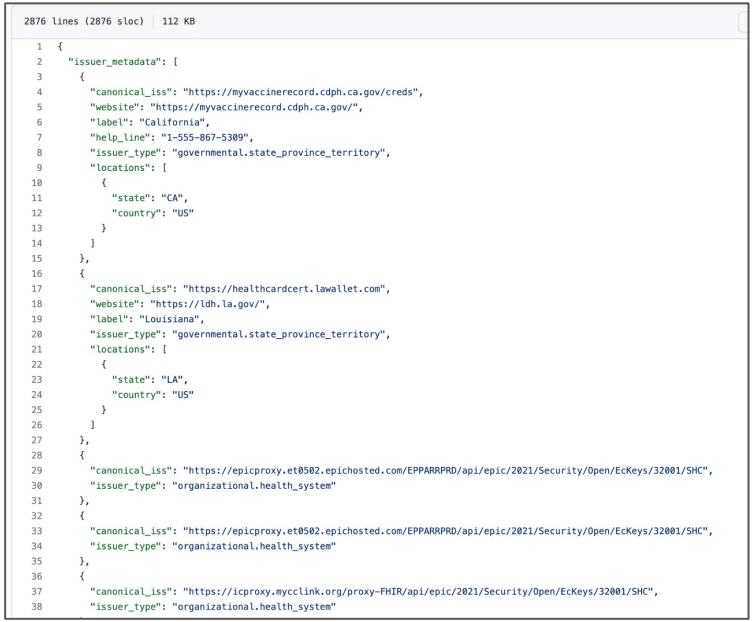
Example: Metadata Comparison



An example of GCCN Trust Service Provider Metadata



Source: VCI Directory Issuer Metadata

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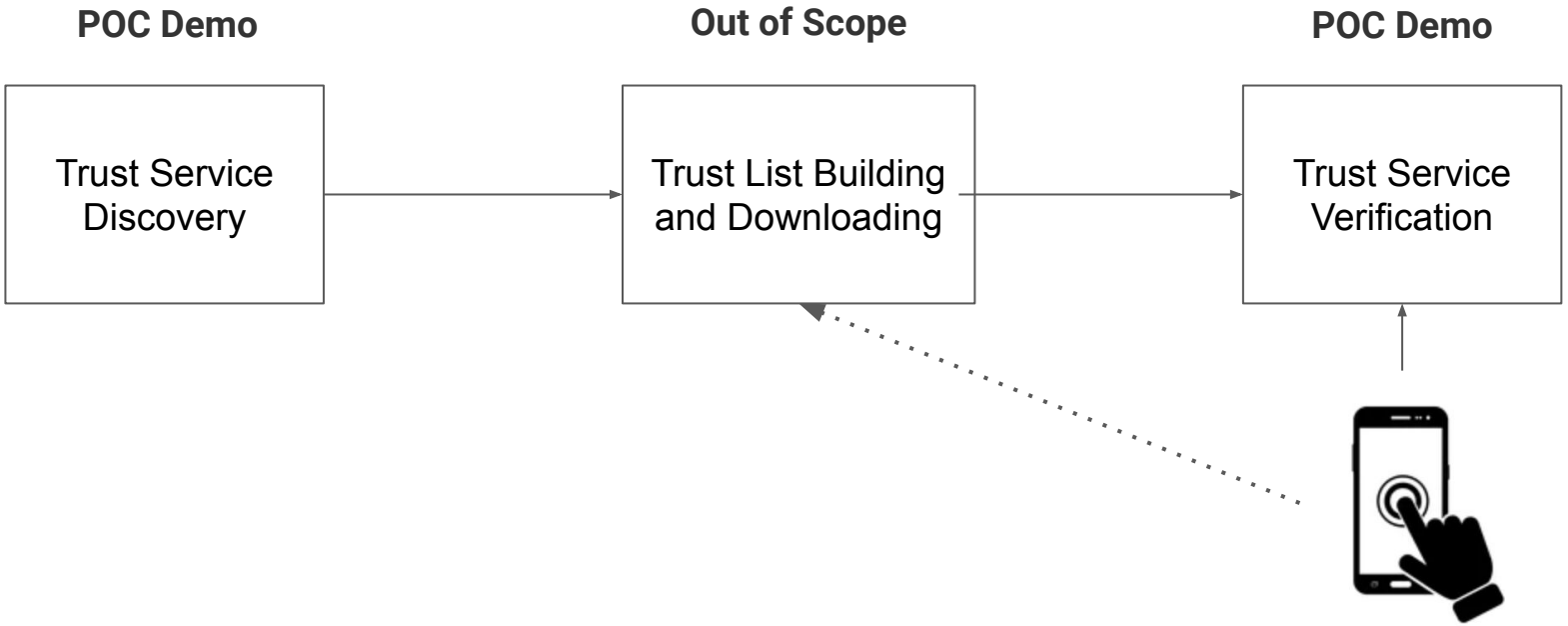
Discovery and Use for Trust Service Verifiers



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POC Demo

Technical Documentation

- GCCN Trust List Schema - example schema supported
  - https://tspa.trust-scheme.de/tspa_train_domain/api/v1/scheme/registry-scheme.gccn.train.trust-scheme.de
- GCCN Train Swagger API Endpoint: https://essif.trust-scheme.de/swagger_train_gccn_v2/#/
- GET Method examples
  - https://essif.trust-scheme.de/train/api/v1/gccn/trustregistry/gccn-registry.train.trust-scheme.de/
  - https://essif.trust-scheme.de/train/api/v1/gccn/trustlist/individual/netherland.gccn.train.trust-scheme.de/
- GCCN POC Client
  - POC Front-End Interface: https://gccn.azurewebsites.net/
  - Trust Scheme attribute mapping complete: https://docs.google.com/spreadsheets/d/1gw22QOk8jYtl_VZVS9NH2AsmexvoEc_sa-_lFYxb9ek/edit#gid=0
- TRAIN Project Link: https://gitlab.grnet.gr/essif-lab/infrastructure/fraunhofer/train_project_summary
- GCCN Project Link: https://github.com/lfph/GCCN-POC

Next Steps and Future Vision

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Pilots and Trust Infrastructure Beyond COVID

- April 2022 onward – Collaboration with partners to fund real-world pilots of the GCCN Trust Registry Network, founded on priorities of network governance and operations; inclusion of key stakeholders and influencers; and standardisation and scaling of core components.

- 2022-2023 – Seeking interest and implementations outside COVID. This trust architecture can be used broadly to handle trust management among disparate credential systems in areas beyond health and allow them to define their own trust policies, manage and publish them.

Q&A

Get involved and Contact

Join the GCCN mailing list and LFPH Slack
#gccn-trust-registry-network to get updates and participate in community activities

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