APPARATUS AND METHODS FOR HEALTHCARE INTEROPERABILITY AND TRUST OPERATIONS

INVENTORS:

STEVEN J. GOERINGER
BRIAN A. SCRIBER

Description

This invention describes an apparatus (the platform) for delivery of healthcare in a multi-stakeholder ecosystem. The platform allows establishment of a healthcare delivery and orchestration market place.

A framework of APIs, processes, information models, and data models that provide a path to providing holistic patient and outcome centric care experiences. The framework provides a specification to implement a centralized or distributed architecture for a multi-stakeholder health care delivery system.

Characteristics/requirements

Semantically interoperable, syntactically interoperable, secure by design, mobile patient experiences, portable patient experiences, trust based (strong identity management), orchestrated complex (multi-stakeholder) courses of care, flexible (support episodic and whole health care delivery), equitable value change engagements, sufficient transparency, privacy by design

The platform enables operations that create a healthcare market place which is:

A vehicle used to facilitate orchestrated deliver of care that ensures equitable stakeholder participation

It allows creation of dynamic value chains to provide both episodic and holistic care

Catalogue of care

A method of identifying approved episodic and courses of care

Consumable (experienced) by patients as prescribed by authorized caregivers and approved by stakeholders (including payor)

Healthcare B2B: Virtualization of care delivery; hospitals without walls

We can adopt ideas from Internet interconnection

Transit – formal approach for outsourcing care on an episodic basis

Settlement based

Non-settle based

Bi- or multi-lateral agreements for care delivery

The platform may be implemented (manifested) in a centralized, decentralized, or distributed and virtualized architecture. Trust is strongly asserted using identity management implemented in an ecosystem wide context either using centralized trust management (aka PKI or symmetric key distribution akin to mobile trust operations in 3GPP) or distributed trust using a digital ledger. The same ledger can be implemented to provide self-sovereign privacy management to ensure strong privacy. A key enabler is use of a healthcare smart wallet on mobile, portable devices such as a smart phone. Trust and care synchronizing is orchestrated using a registration authority or alternatively a distributed ledger. Any digital ledgers used to support methods of this invention are permissions using the ecosystem context identities.

Two use cases illustrate how this apparatus can be used. Patient specific care delivery and stakeholder equity.

Healthcare Interoperability and Trust Platform and Market Place

CableLabs

Steve Goeringer, Brian Scriber

Security Technologies

CableLabs®

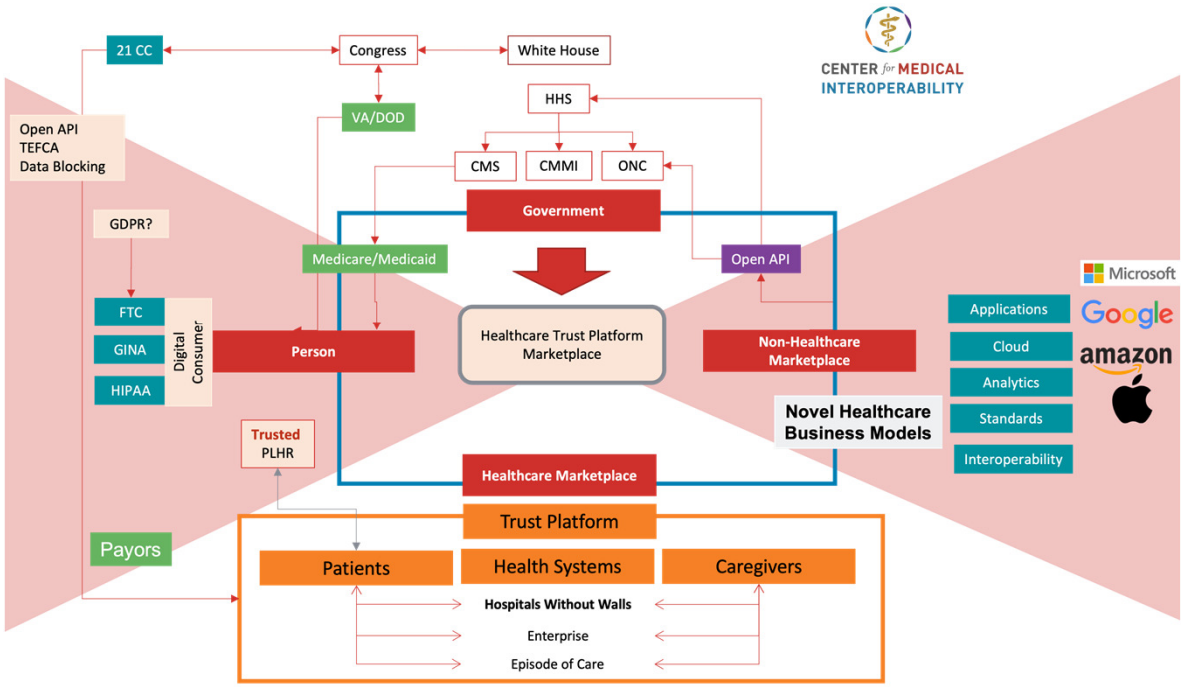
© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Security Technologies
CableLabs

This picture is relationship focused…

What is the architecture that facilitates care delivery?

Market ForcesOpportunity



©2021 Center for Medical Interoperability

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Outline

- What is the healthcare trust platform?
  - Description
  - Characteristics/requirements
  - Functional framework
  - Architecture
    - Centralized
    - Decentralized
    - Synchronized
- What is the marketplace?
  - Catalogue of care
  - Peering
    - Settlement vs non-settlement
    - Transit agreements
  - Not mutually exclusive

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Healthcare trust platform

- Description
  - A framework of APIs, processes, information models, and data models that provide a path to providing holistic patient and outcome centric care experiences. The framework provides a specification to implement a centralized or distributed architecture for a multi-stakeholder health care delivery system.
- Characteristics/requirements (what buzzwords to we address?)
  - Semantically interoperable, syntactically interoperable, secure by design, mobile patient experiences, portable patient experiences, trust based (strong identity management), orchestrated complex (multi-stakeholder) courses of care, flexible (support episodic and whole health care delivery), equitable value change engagements, sufficient transparency, privacy by design

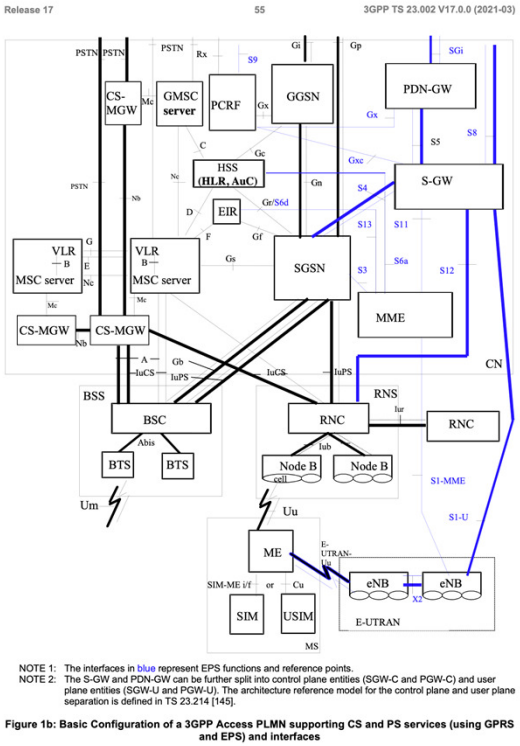
© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

What is the marketplace?

- A vehicle used to facilitate orchestrated deliver of care that ensures equitable stakeholder participation
  - It allows creation of dynamic value chains to provide both episodic and holistic care
- Catalogue of care
  - A method of identifying approved episodic and courses of care
  - Consumable (experienced) by patients as prescribed by authorized caregivers and approved by stakeholders (including payor)
- Healthcare B2B: Virtualization of care delivery; hospitals without walls
  - We can adopt ideas from Internet interconnection
  - Transit – formal approach for outsourcing care on an episodic basis
  - Settlement based
  - Non-settle based
  - Bi- or multi-lateral agreements for care delivery

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Lessons from 3GPP



NOTE 1: The interfaces in blue represent EPS functions and reference points.
NOTE 2: The S-GW and PDN-GW can be further split into control plane entities (SGW-C and PGW-C) and user plane entities (SGW-U and PGW-U). The architecture reference model for the control plane and user plane separation is defined in TS 23.214 [145].

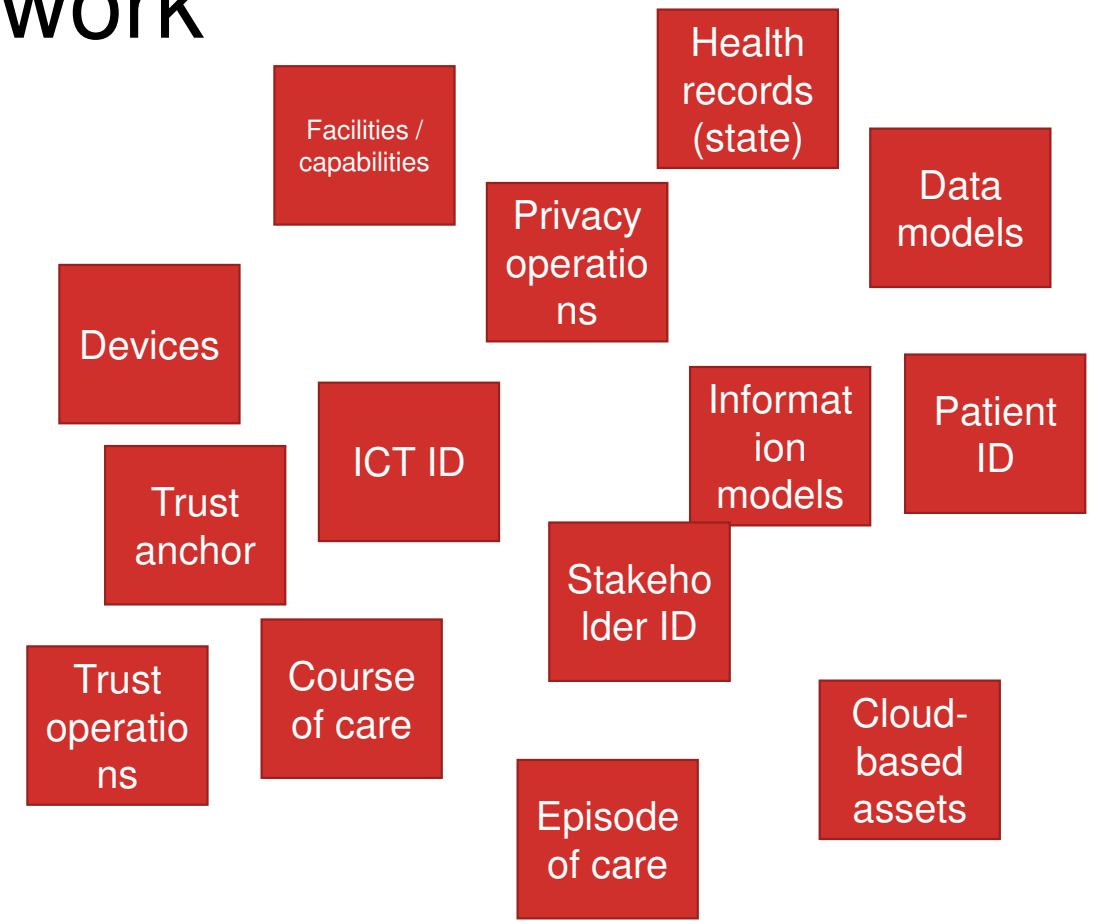
Figure 1b: Basic Configuration of a 3GPP Access PLMN supporting CS and PS services (using GPRS and EPS) and interfaces

- Some key ideas
- HSS
- VLR
- Mobility management
- Access vs core functions
- RAN
- Slicing

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Functional framework

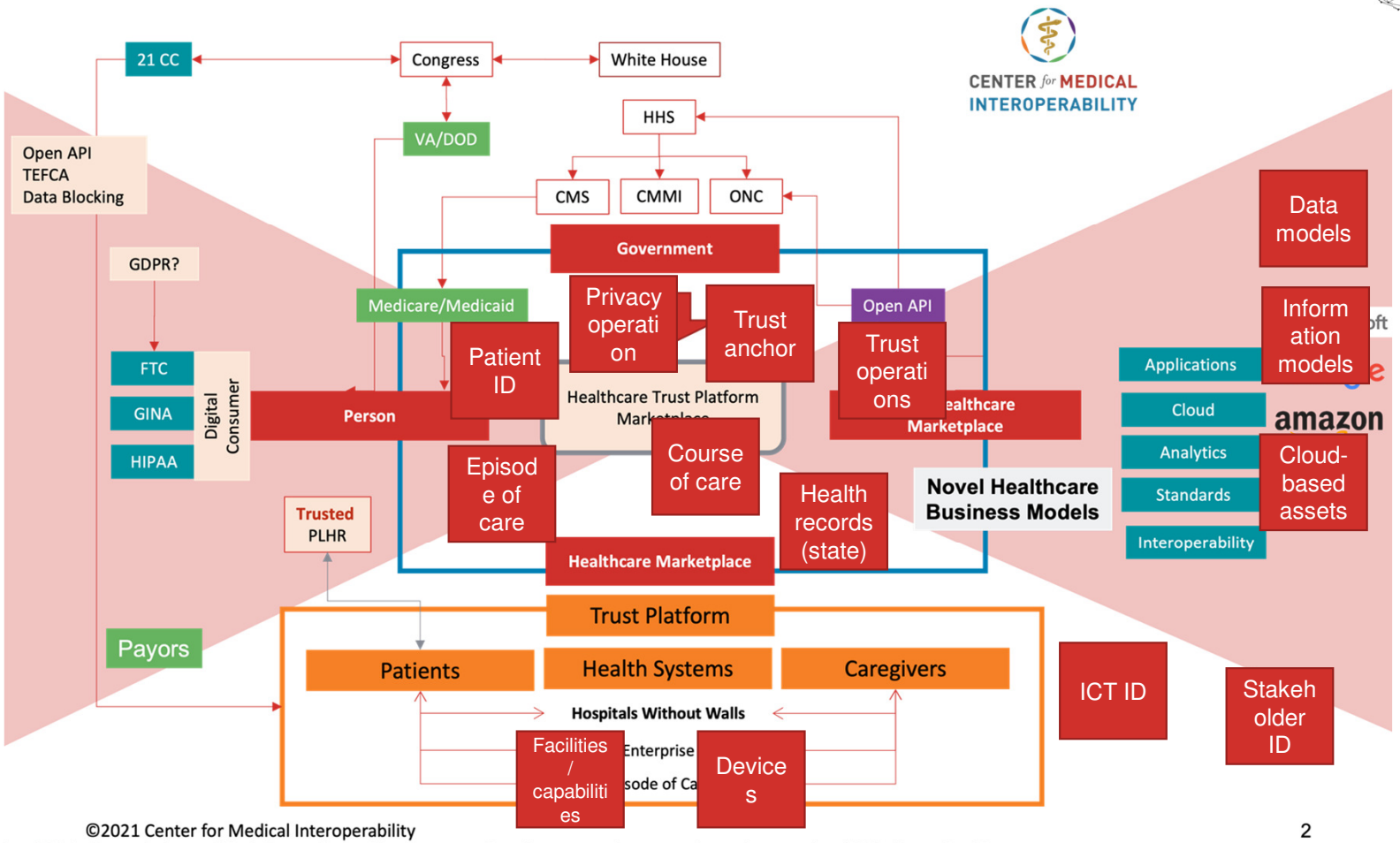
- Trust
  - Patient consumer
    - Patient centric
    - Episodic centric
    - Payor centric
    - Rights vs control vs ownership
  - Stakeholder
  - ICT/Medical Device
- Care Events
  - Episodic care
  - Courses of care
  - Holistic/whole-life/continuum of care
- Data models
  - Semantic definitions
  - Case specific element mappings
- Information models
  - Processes



© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Market ForcesOpportunity

Security Technologies
CableLabs



©2021 Center for Medical Interoperability

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Architecture Concepts

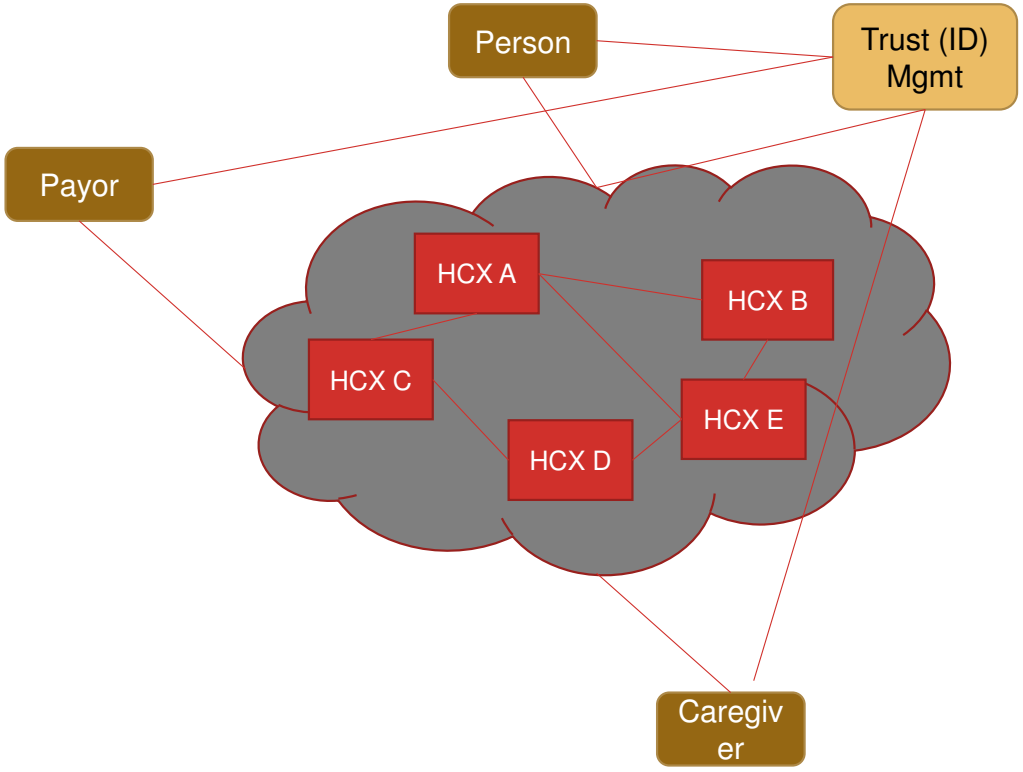
- Trust
  - Pervasive ID management of patient, stakeholders, and infrastructure
- Mobility
  - Ability to leverage trust anywhere, anytime
- Privacy
  - Self-sovereignty of consumer patient
  - Easy portability of health records
- Portability
  - The ability to access data, processes, and identity in any facility (hospital, patient, home)

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Security Technologies
CableLabs

Centralized Architecture

- A federation of healthcare exchanges (HCX)
  - Akin to how mobile operators support roaming
  - Enabled by a set of APIs to enable patient mobility and payor authorization
  - Each exchange is a complex functional network secured as its own autonomous trust domain/enclave
  - Federated by virtue of ID management akin to VLR and HSS in 3GPP
- This is a server/processor centric model
- Business/governance of exchanges is flexible

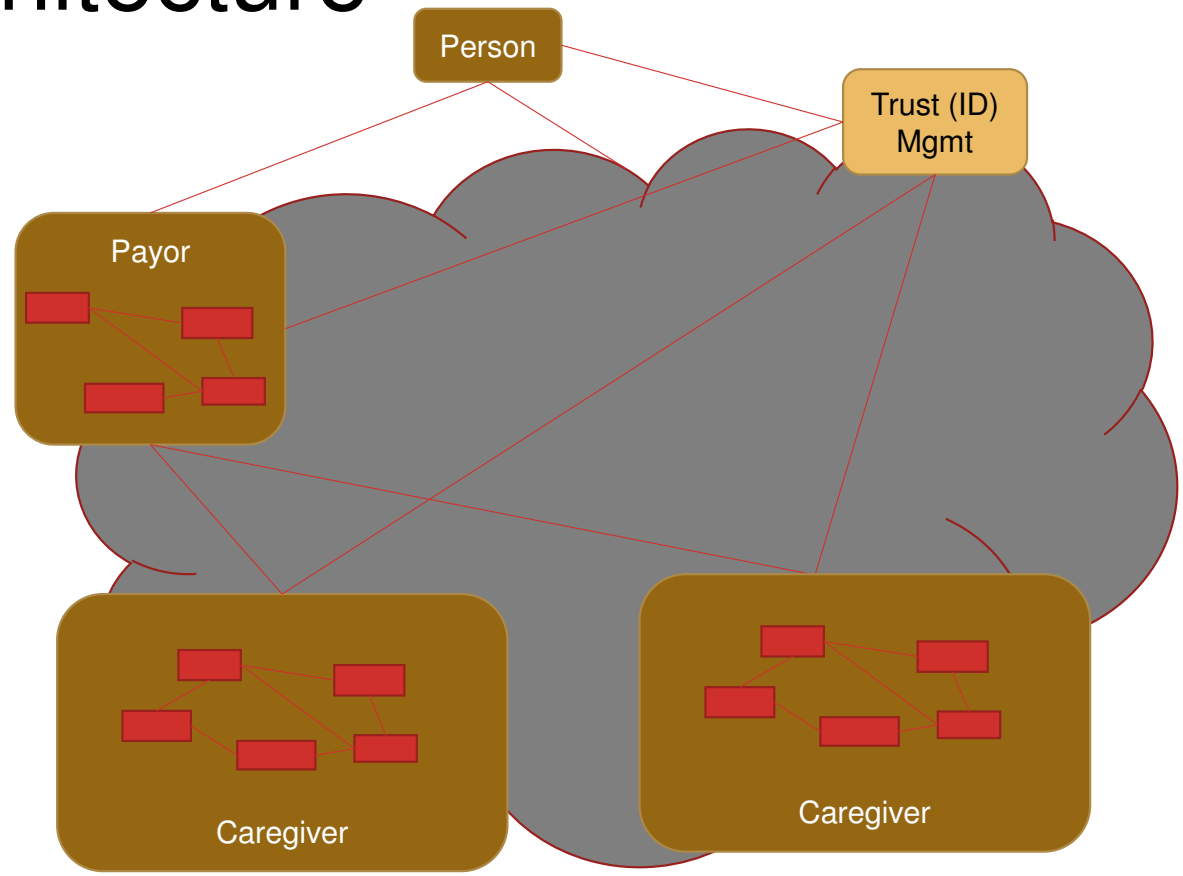


© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Security Technologies
CableLabs

Decentralized Architecture

- Functional interconnectivity
- Stakeholder implement one or more functional capabilities
- Interconnection is provided by a defined set of APIs between stakeholders using common binding agreements
- Some functions may require a centralized governance body – such as trust management



© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

Distributed and Virtualized Decentralized

- Distributed autonomous organization
  - Yes… that means something like blockchains and smart contracts
- Code reigns king
- Problems
  - Securable?
  - Liability management?
  - Whole care delivery?

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.

The Heathcare Wallet

- Smart phones are key
- Most commonly available, must highly secure device available to most consumer patients
- Allow pay and scanning capabilities that can streamline experience
- They are probably the key to bridging the Digital Divide – everybody needs to have one

© CableLabs 2021. Do not share this information with anyone other than members, and vendors under NDA if applicable.
The information herein may be subject to U.S. Export Laws: do not transfer this document to any non-U.S. person, wherever located, unless authorized by U.S. Export Laws.