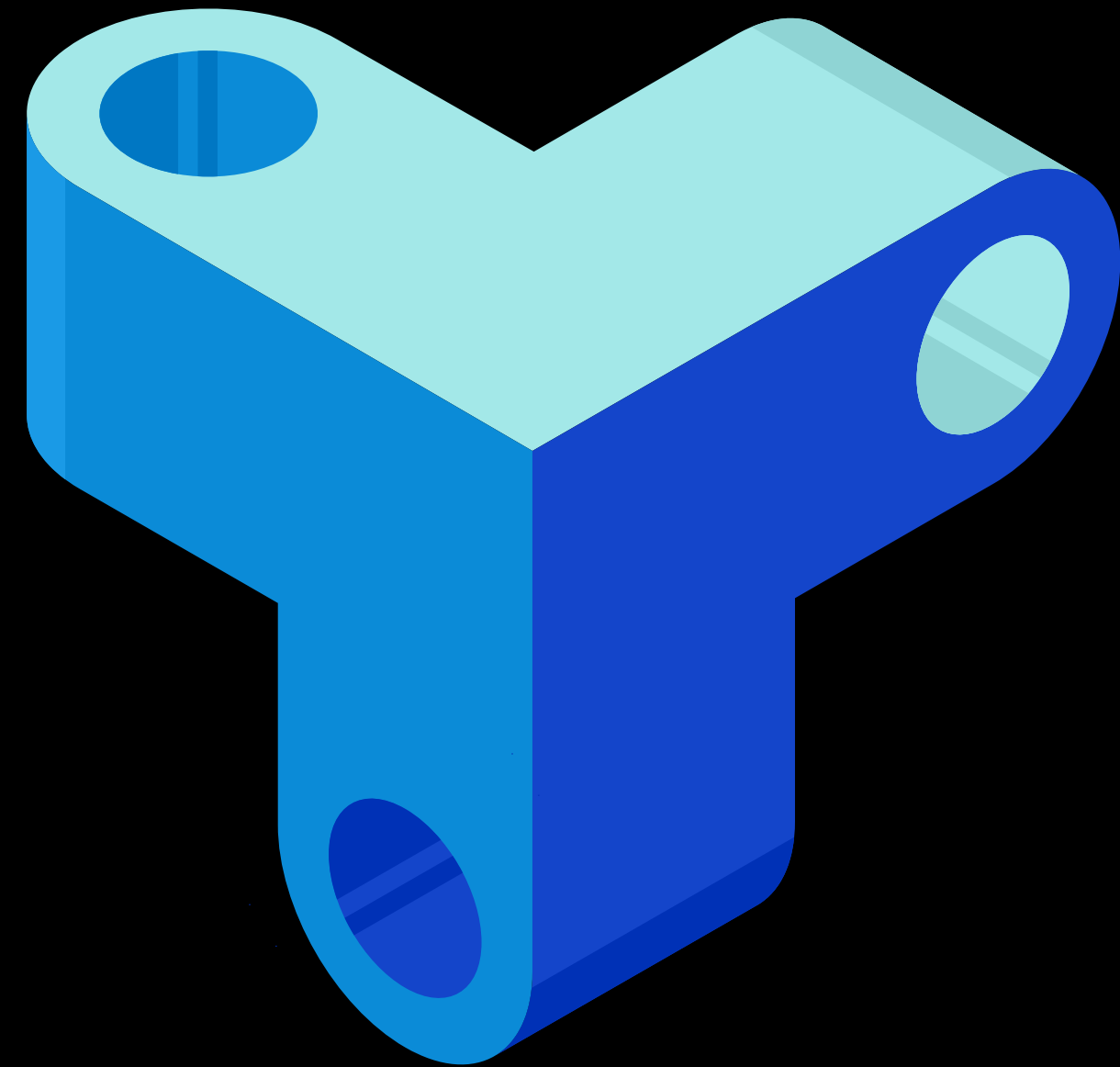




TRUST
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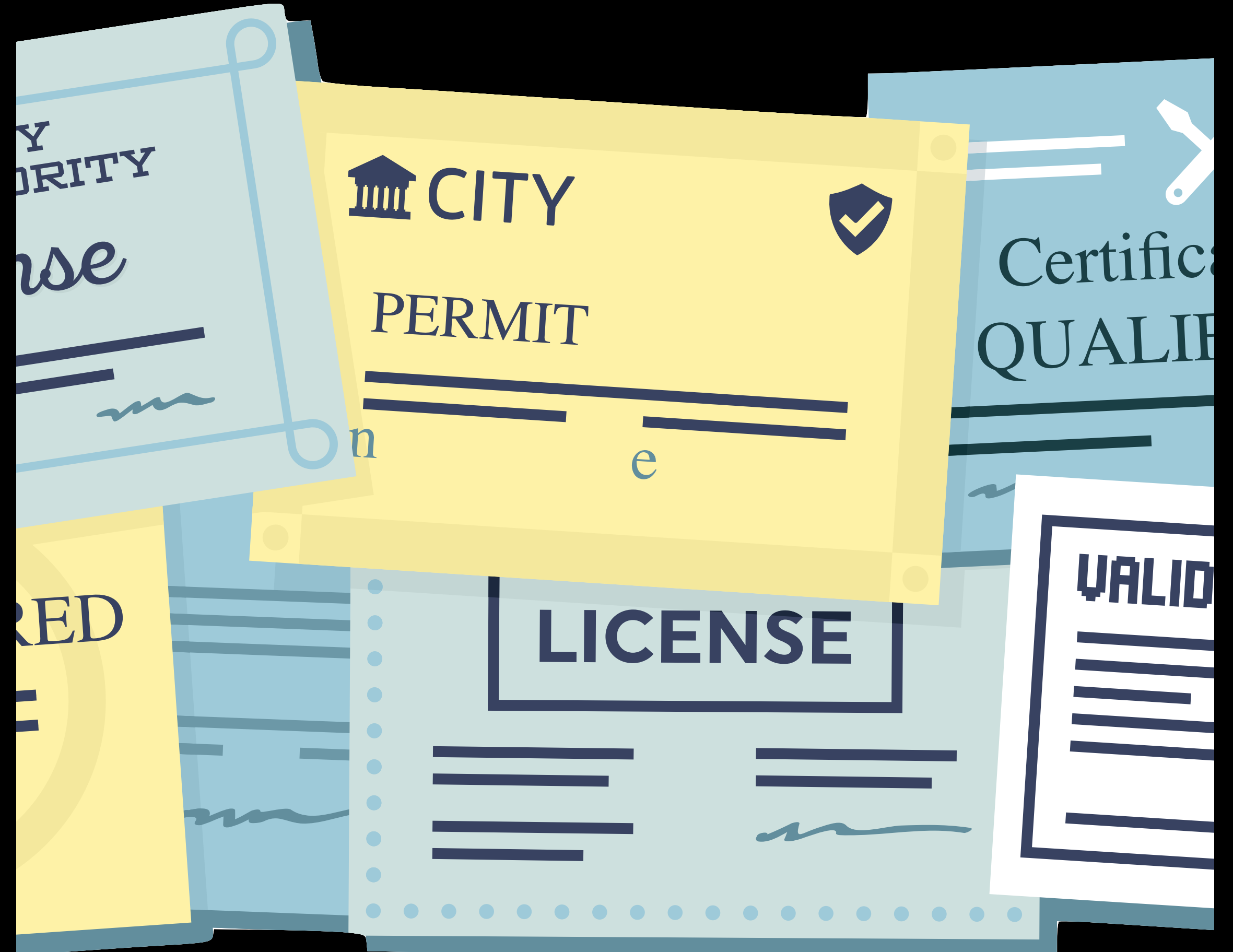
Digital Trust

A Trust over IP Foundation Primer

Chapter 1: Pre-Internet Era

In-Person Credentials

- Have worked for centuries
- Institutions and technologies are well understood



Understanding Trust

How we make trust decisions

Technology

- Is it a legitimate representation?

Governance

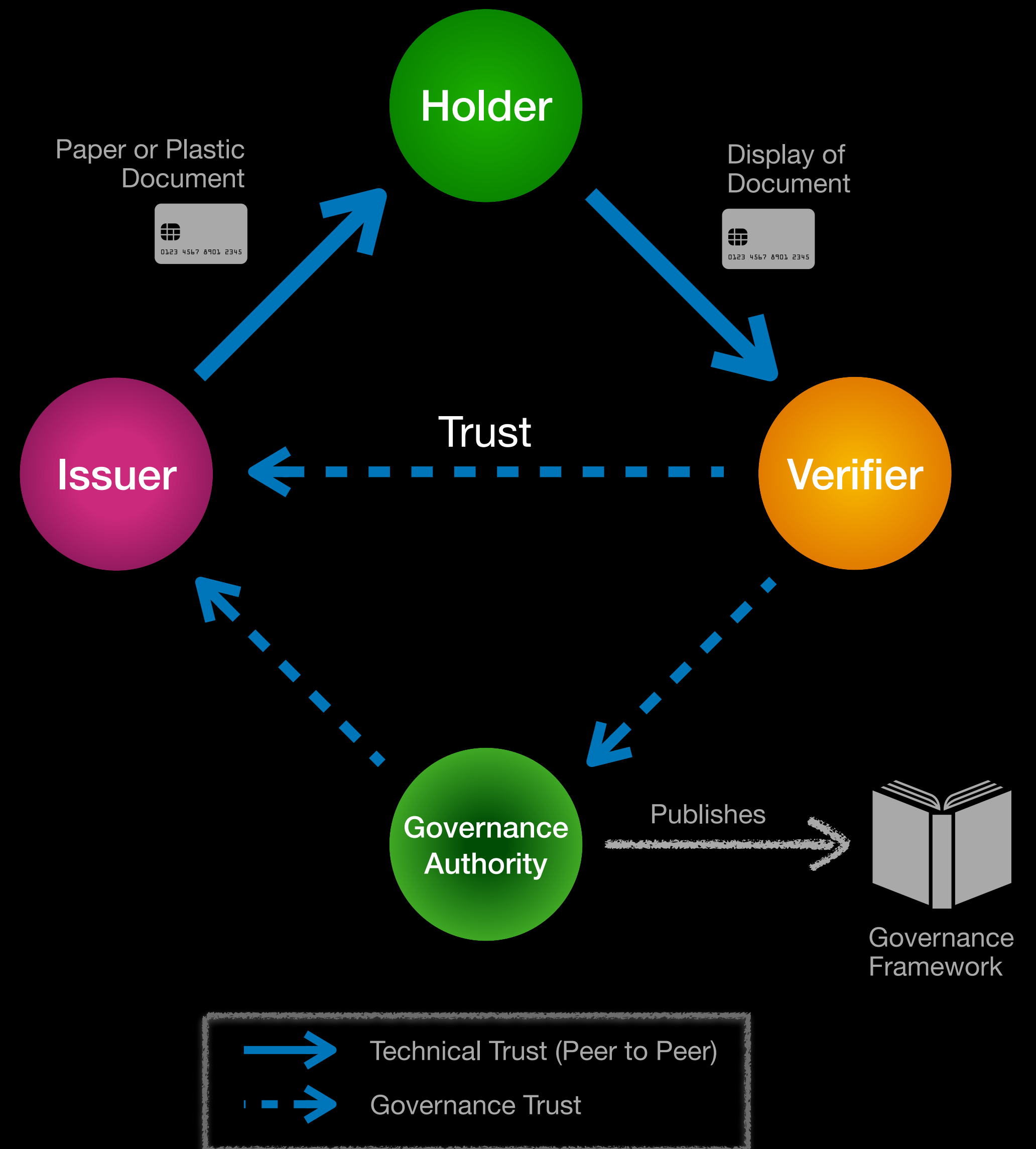
- Is the source of the representation trustworthy?
- Where does their authority come from?
- Do they have trusted processes?



In-Person Trust

A familiar model

- Each role in this model operates independently (Issuer, Holder, Verifier)
- Governance is the basis for trust decisions
 - Legislation, Policy, Regulations, Process, Reputation
- Issuers create physical representation of permission
 - Can't replicate when needed (sharing)
 - Can't prevent replication when you don't want (fraud)
- Verifiers carry a good amount of risk
 - Fraudulent documents
 - Expense of paper
 - Biological viruses live on paper and plastic credentials (puts law enforcement at risk)



In-Person Ceremonies

Wax through to Fax

- Signatures on written transactions originates in the 6th century as a means to validate an agreement
- Came into broader use in England with the 1677 Statute of Frauds which stipulated that contracts must exist in writing and bear a signature.
- This general practice continues on to the present day.
- Fundamentally, this is an action taken between the parties directly involved in the transaction, sometimes witnessed by a third party that also provides a signature



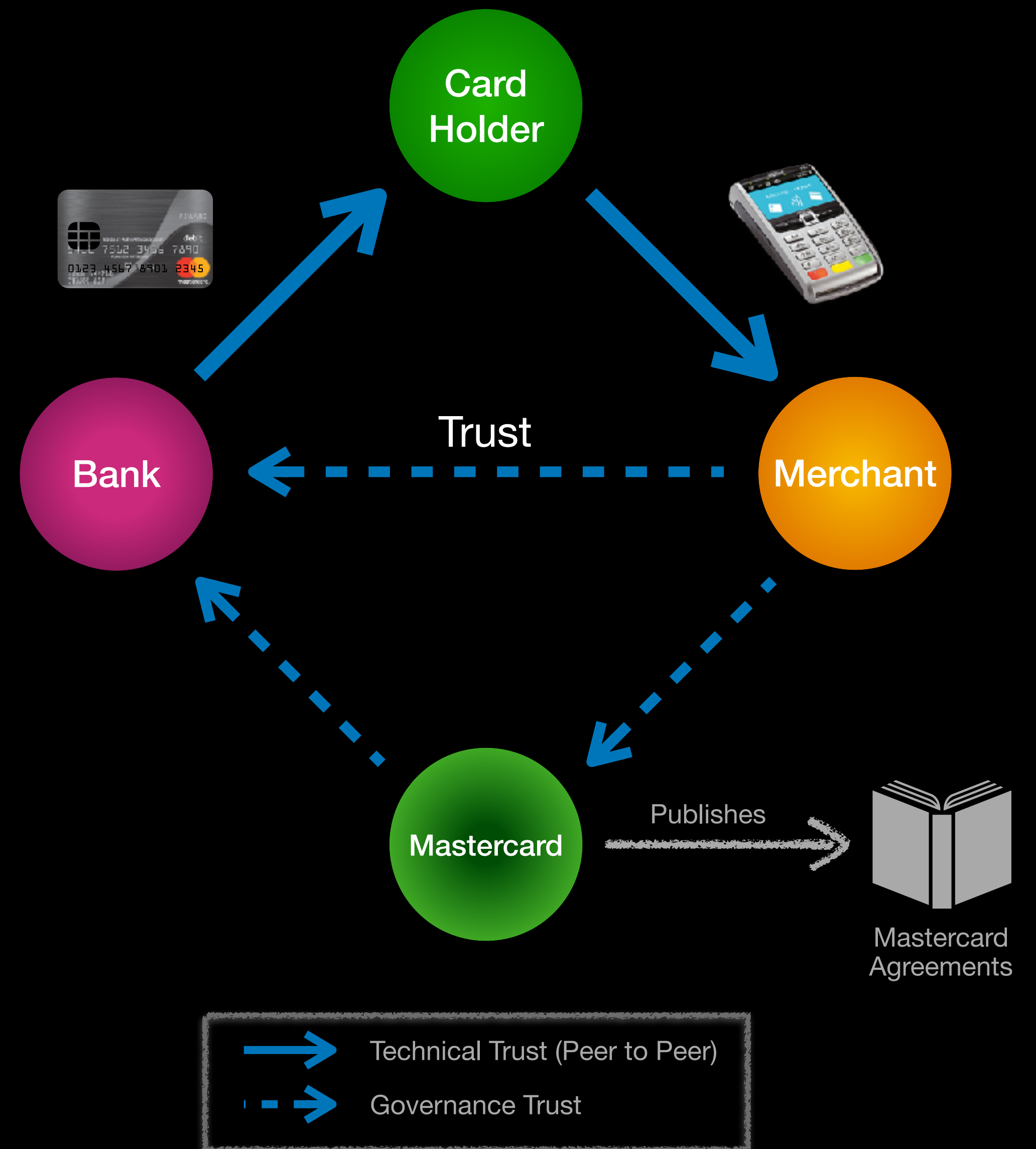
John Hancock



Financial Services

Case study

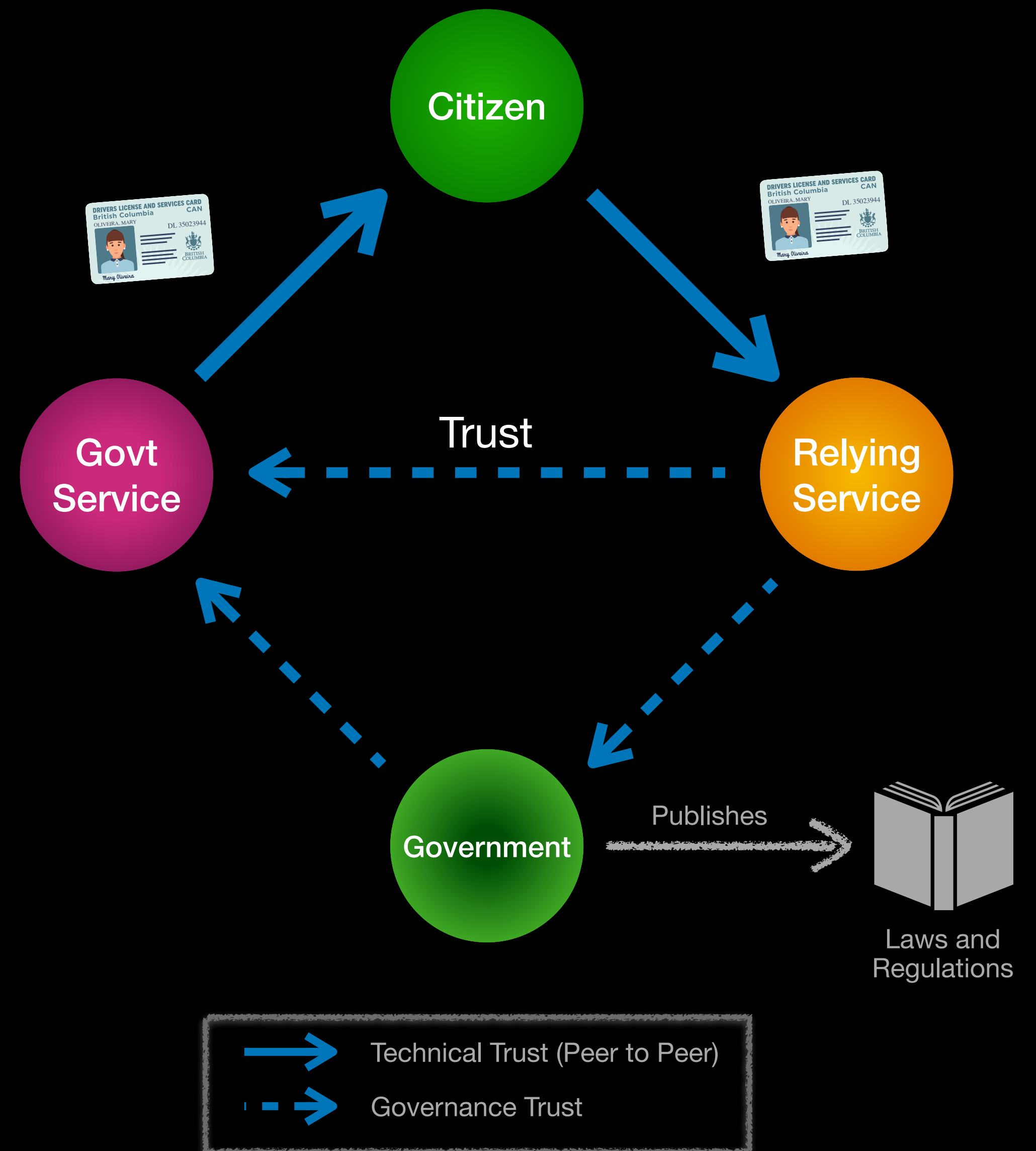
- Governance
 - Mastercard is the authority for their payment processing network
 - Issuers: Banks (~25,000)
 - Holders: Cards (~926 M)
 - Verifiers: Merchants (~50 M)
- Technology
 - Physical Card has distinctive design and embedded security measures
 - Fraud risks mitigated by various techniques including PIN, transaction monitoring, merchant behaviour



Government

Case study

- Government issues many types of permissions and authorizations
- Foundational Issuances
 - Birth, Death Certificates
 - Legal Entities Registrations
 - Land Registration
- Hundreds of others grounded in foundational credentials
 - Health, Drivers Licences, Education, Social Services, etc.
 - Business licencing, Natural Resources, Climate, etc.
- Economy is underpinned by Government



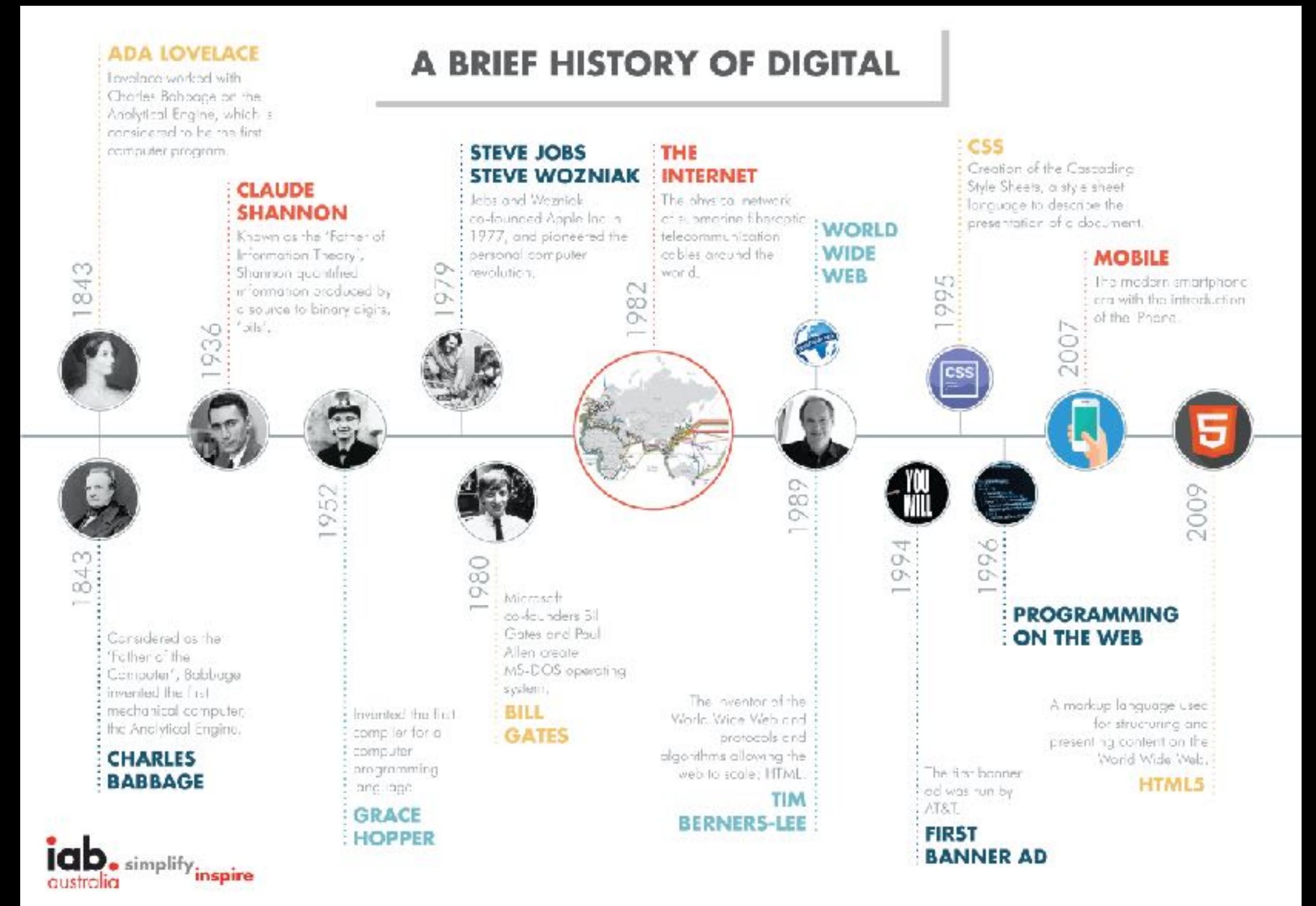
Chapter 2: Internet Era

Benefits and Gaps

- Benefits to production efficiencies are clear
- Markets and jobs created

However there is a “Trust Gap”

- Internet is primary driven by E-Commerce and Online Advertising
- Large gap when it comes to “High Value” / “High Risk” transactions ... those that we know well how to do In-Person

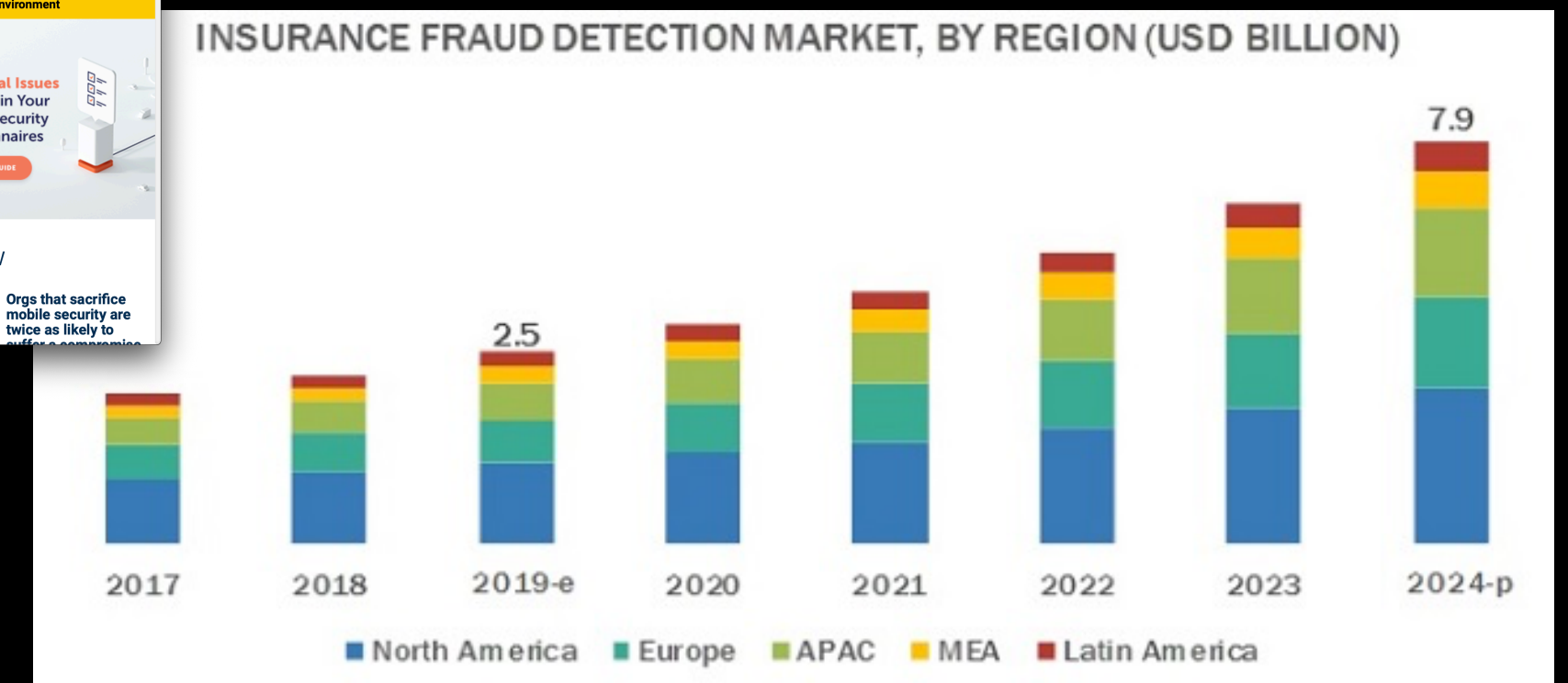
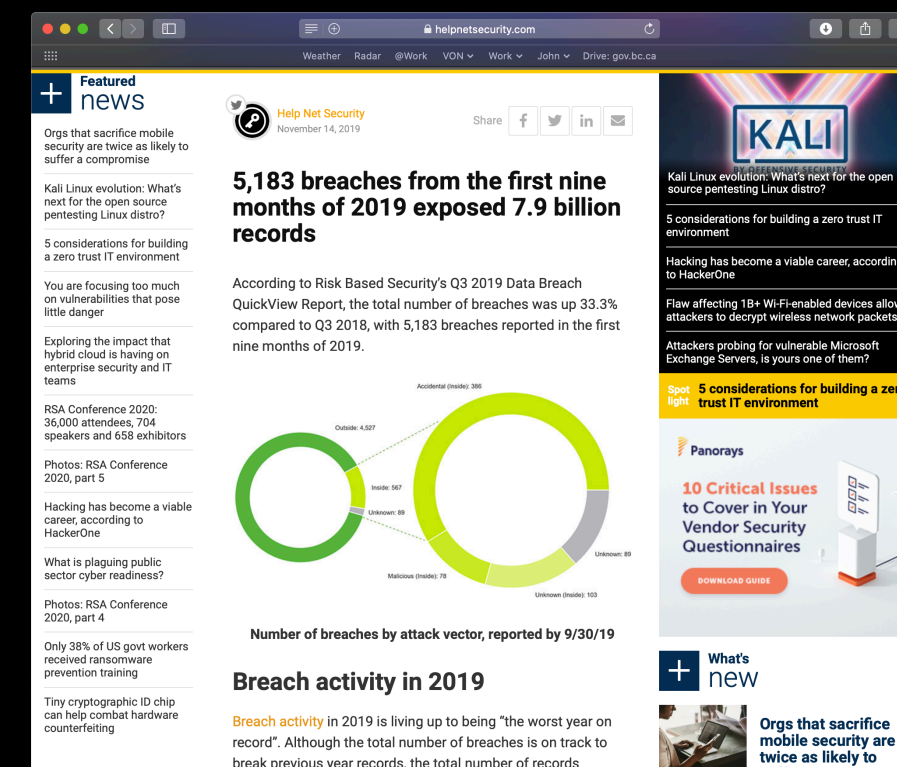


<https://www.iabaustralia.com.au/iab-blog/blog-articles/entry/a-brief-history-of-digital-it-s-always-good-to-reflect>

New Risks

Global Scale Computing

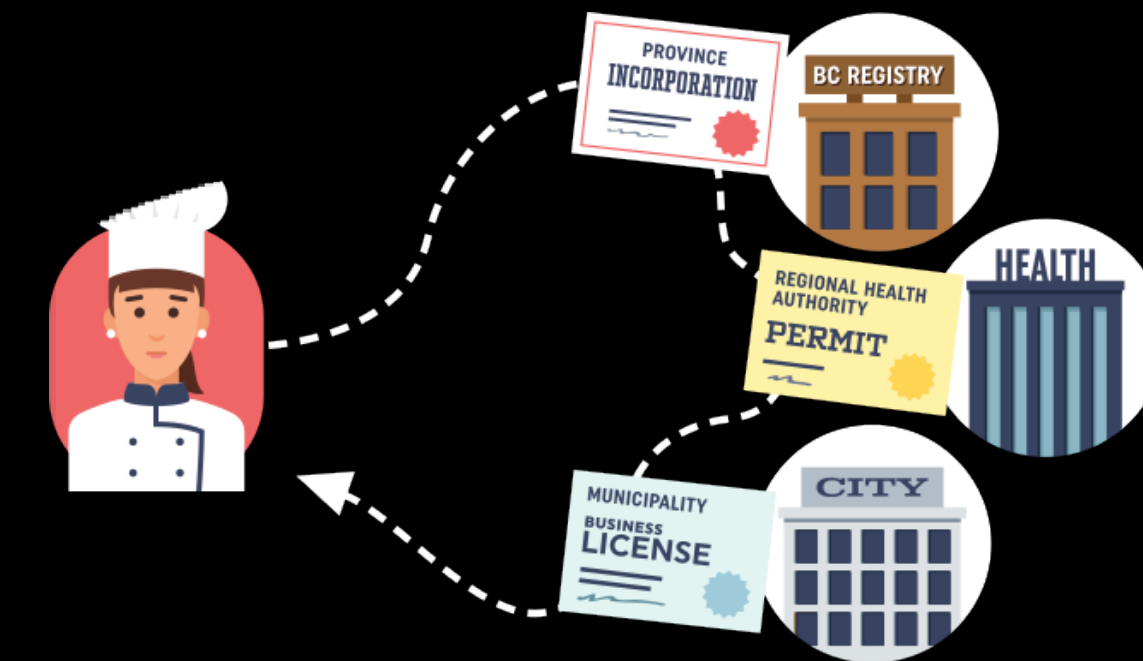
- Unprecedented scale and global connectivity comes with some new concerns
- Usability challenges with so many passwords
- Identity theft risks due to duplication of personal data ... everywhere
- Unintended side effects of large scale surveillance



Old Challenges

Government Service Delivery

- Many efforts, over the years, to find a way to deliver a simple approach for businesses faced with a multi-service/jursidiction journey
 - None have succeeded at any scale (more than a few services)
 - Economy and Government services are constantly changing
 - Our governance model is aligned to In-Person trust
- All these services have one thing in common ...



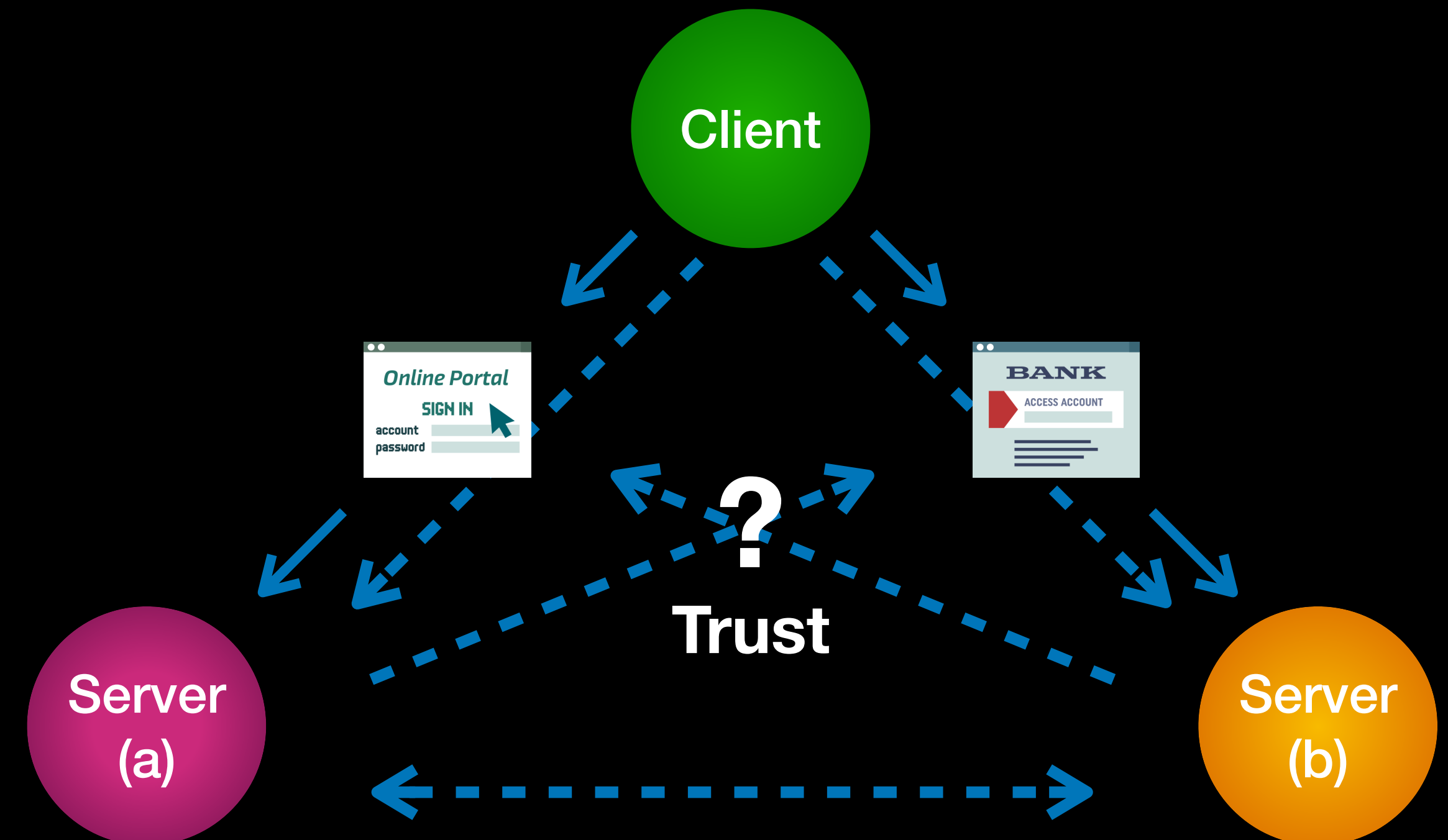
The Accidental Actor

Login Account Service

- The operator of the Login Account provider is implicitly part the trust model
- We have no way to systemic means to evaluate the trustworthiness of Login Account providers

Why?

- Originally computers were large, expensive and could only be accessed on-premise and therefore relied on In-Person trust - e.g. physical access control to the “login” terminals
- As remote off-premise “login” to the computer become possible, no solution to the assumption of trusted in-person access to the login terminal arose introducing a “trust gap”
- As computing and networking scaled to global levels new problems and risks emerged as a result of never solving this trust gap



Internet Ceremonies

Frustration and Risk

- We simply don't have a comparable ceremony to the In-Person signing ceremony
- All kinds different approaches to trying to create "trusted" interaction but they all involve an intermediary
- The intermediary is strongly incented to monetize these previously private interactions thus creating the risks identified earlier
- A common term used to describe these intermediaries is "platform"

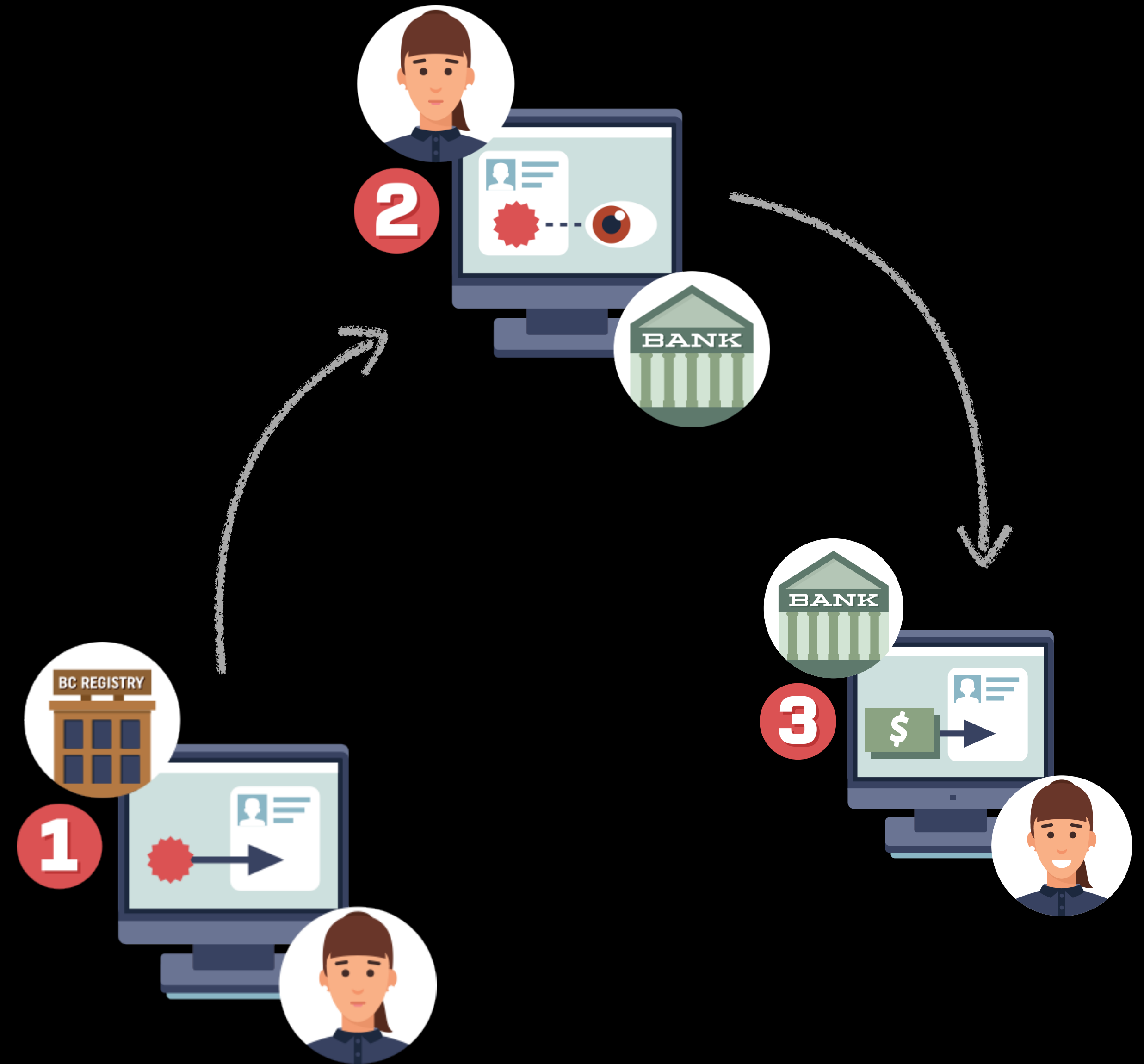


Chapter 3: The Digital Trust Era

A New Approach

Back to the Future

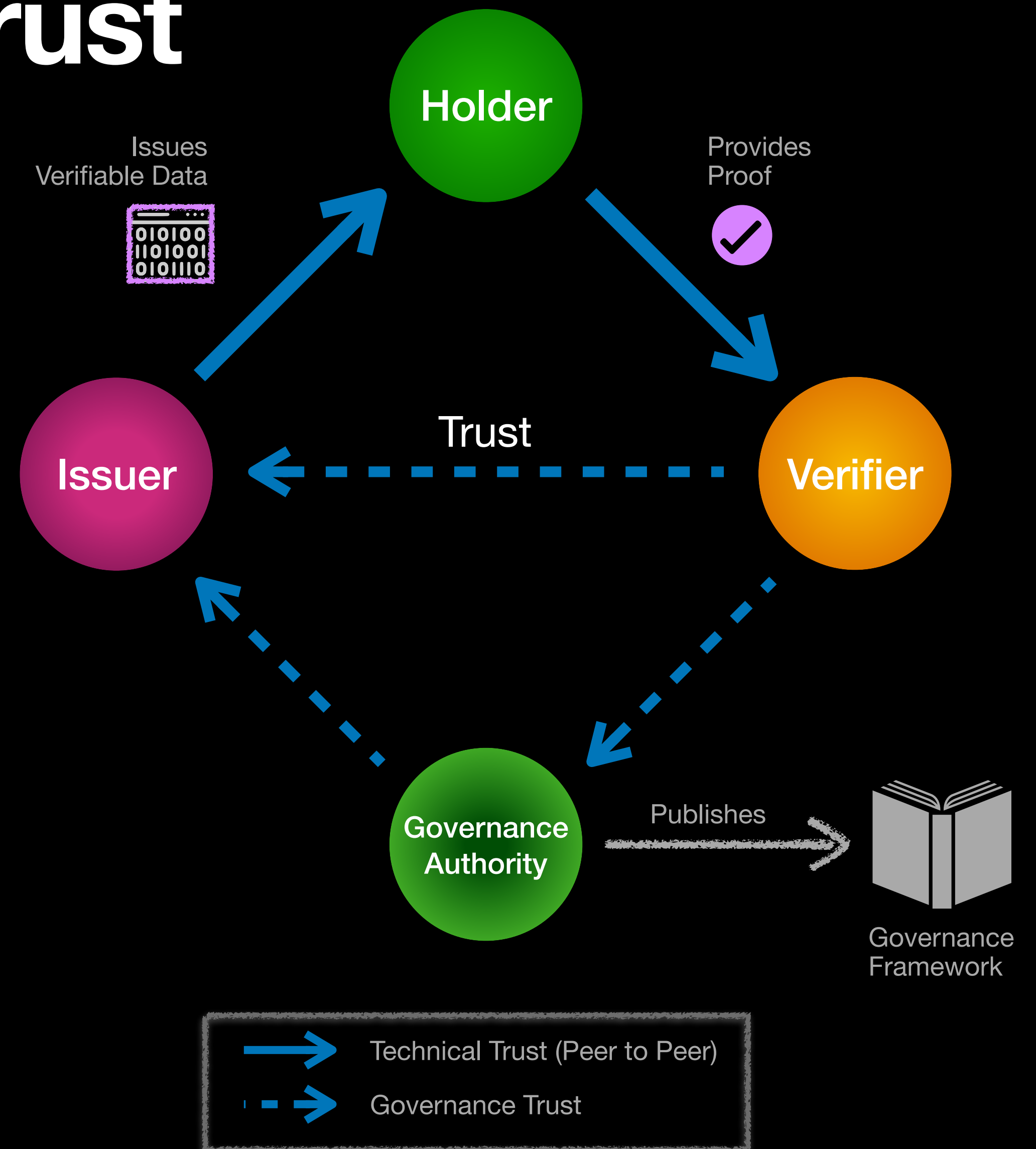
- Quite simply ... solutions to digital trust, at scale, and over the Internet are not addressable with the technology approaches we have currently at hand
- “Paper-based” solutions clearly aren’t going to work (faxing medical test requisitions is still the policy and norm)
- Applying more effort towards existing Internet-era technology models is a dead-end
 - Centralized login account models often runs afoul of our legislative and policy governance models
 - Can’t span jurisdiction, legislative, sector and other boundaries people and businesses regularly traverse very easily
 - Can’t scale to global levels without massive privacy issues
- What if we had a digital means to allow a person to receive and carry their data to the next stage of their journey?



Economy-scale Digital Trust

Trust over IP (the Internet)

- Same end-user mental model as we have with physical wallets, licences, reports and cards
- Each role in this model operates independently (Issuer, Holder, Verifier)
- Governance is the basis for trust decisions
 - Legislation, Policy, Regulations, Process, Reputation
- Privacy preserved, security enhanced, via open standards which enables independence and scale
 - Private cryptographic peer to peer connections (surveillance resistant)
 - Standard cryptographic data exchange protocols between peers (impersonation resistant)
 - Holder is in control of providing verifier with proof of data (privacy preserving)
 - Verifier verifies data from holder without contacting issuer (surveillance resistant)
 - Verifier determines what data they need to verify from what set of issuers (fraud resistant)



Trust over IP Foundation

Driving global adoption

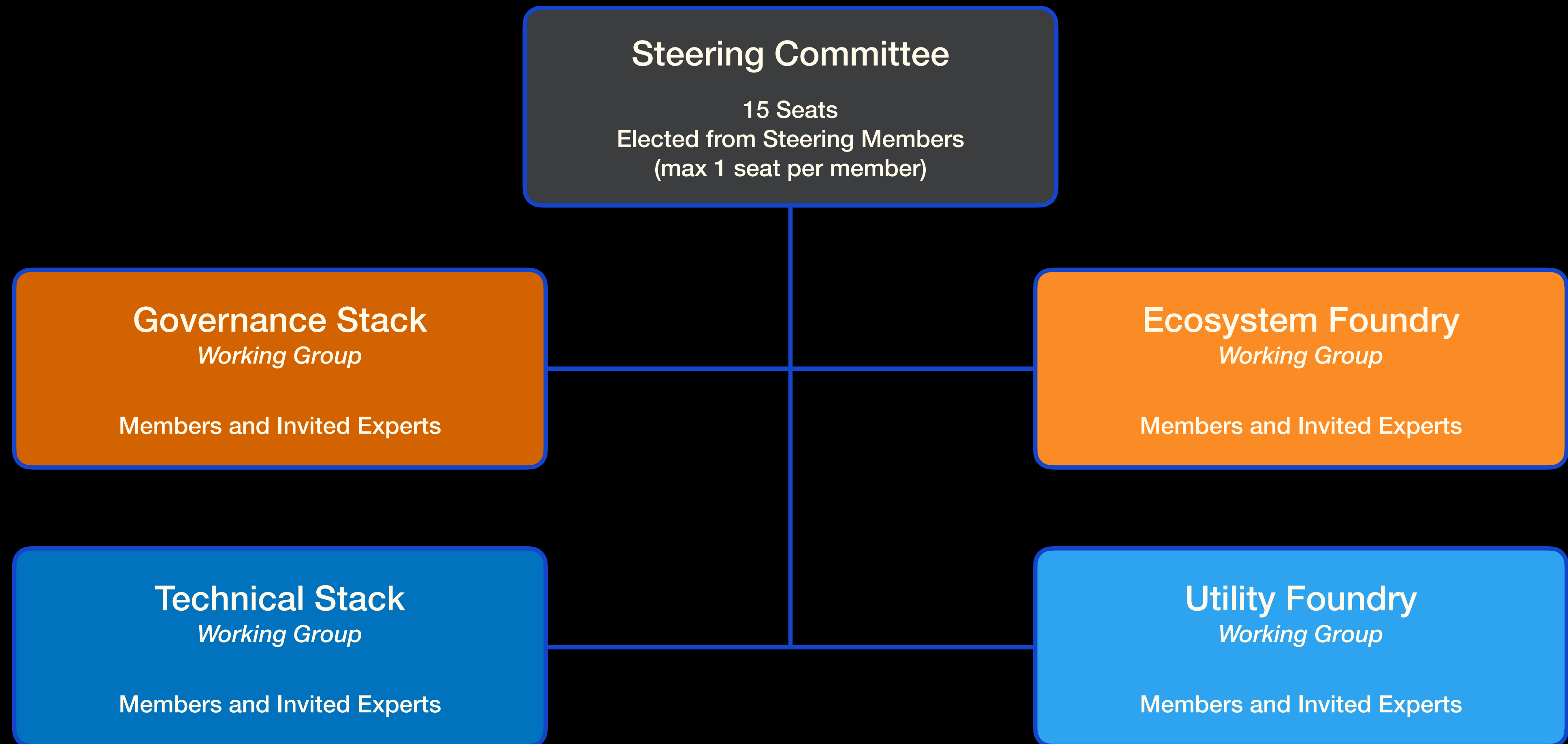
- The purpose of the Trust over IP Foundation is to define a complete architecture for Internet-scale digital trust that combines both cryptographic trust at the machine layer and human trust at the business, legal, and social layers.
- Part of the over 200 projects governed by the Linux Foundation the Trust over IP Foundation provides the market signal need to drive global adoption



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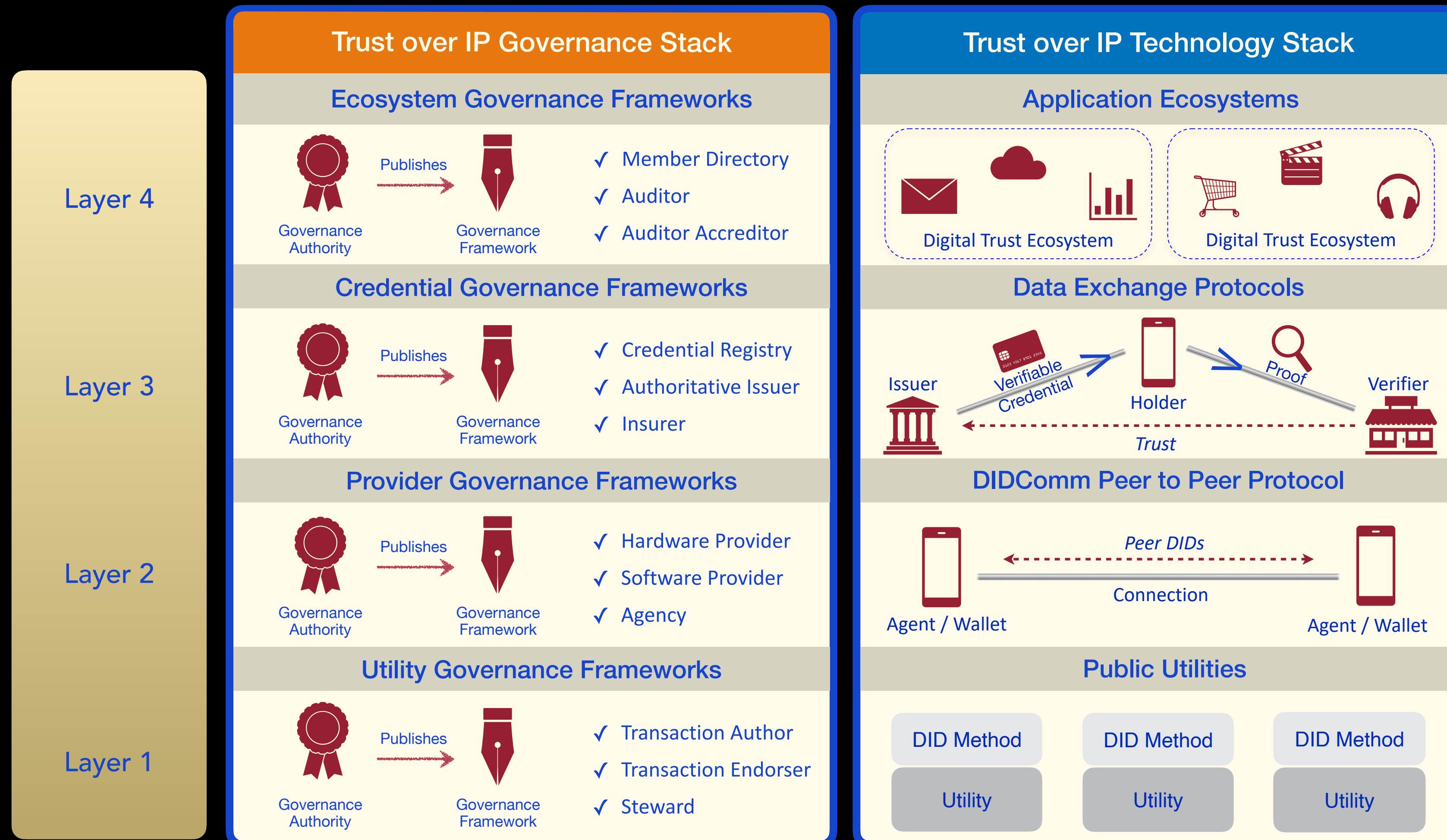
Trust over IP Foundation

Working Groups: getting it done



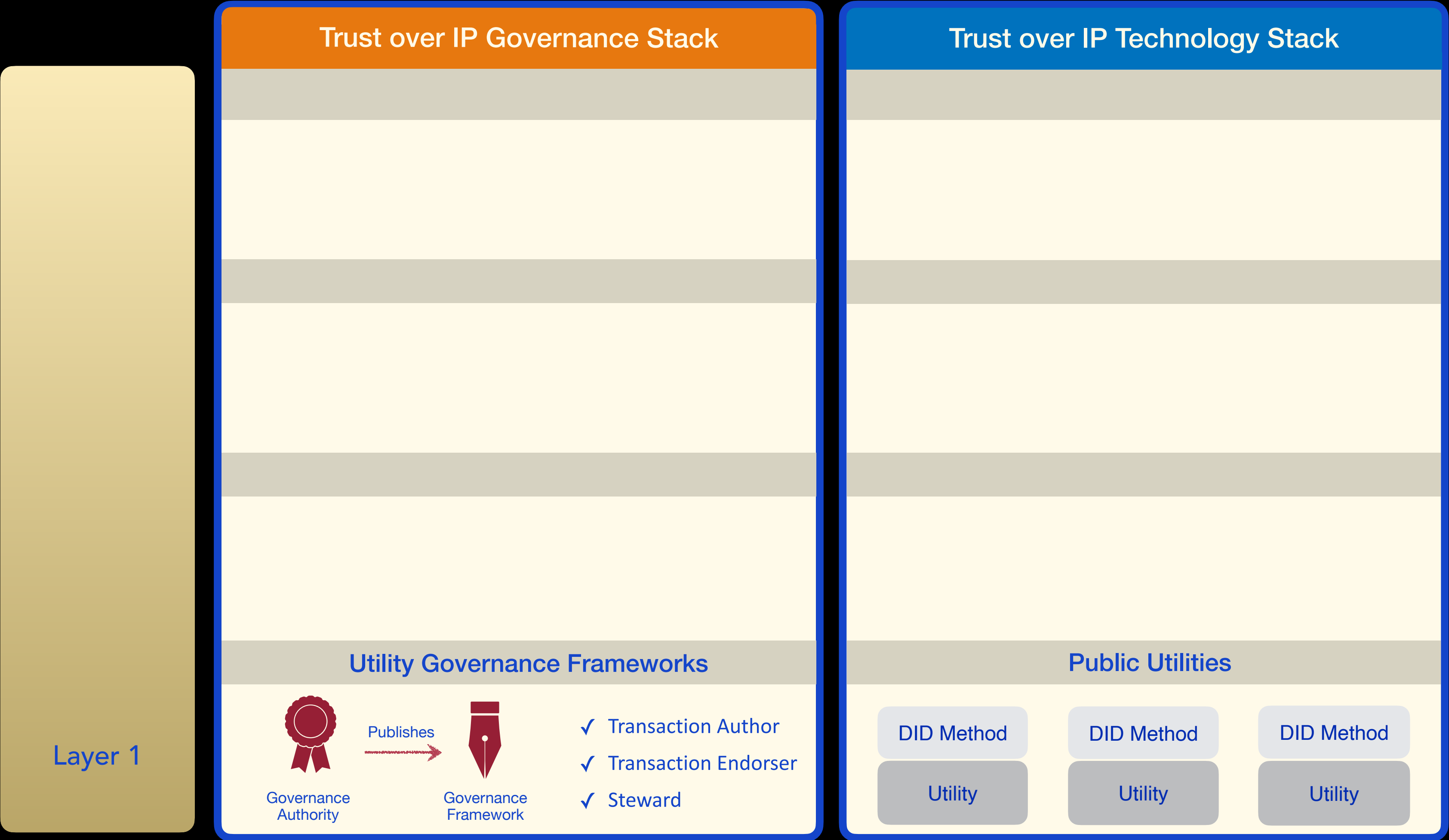
Trust over IP Stack

The Lens for Digital Trust



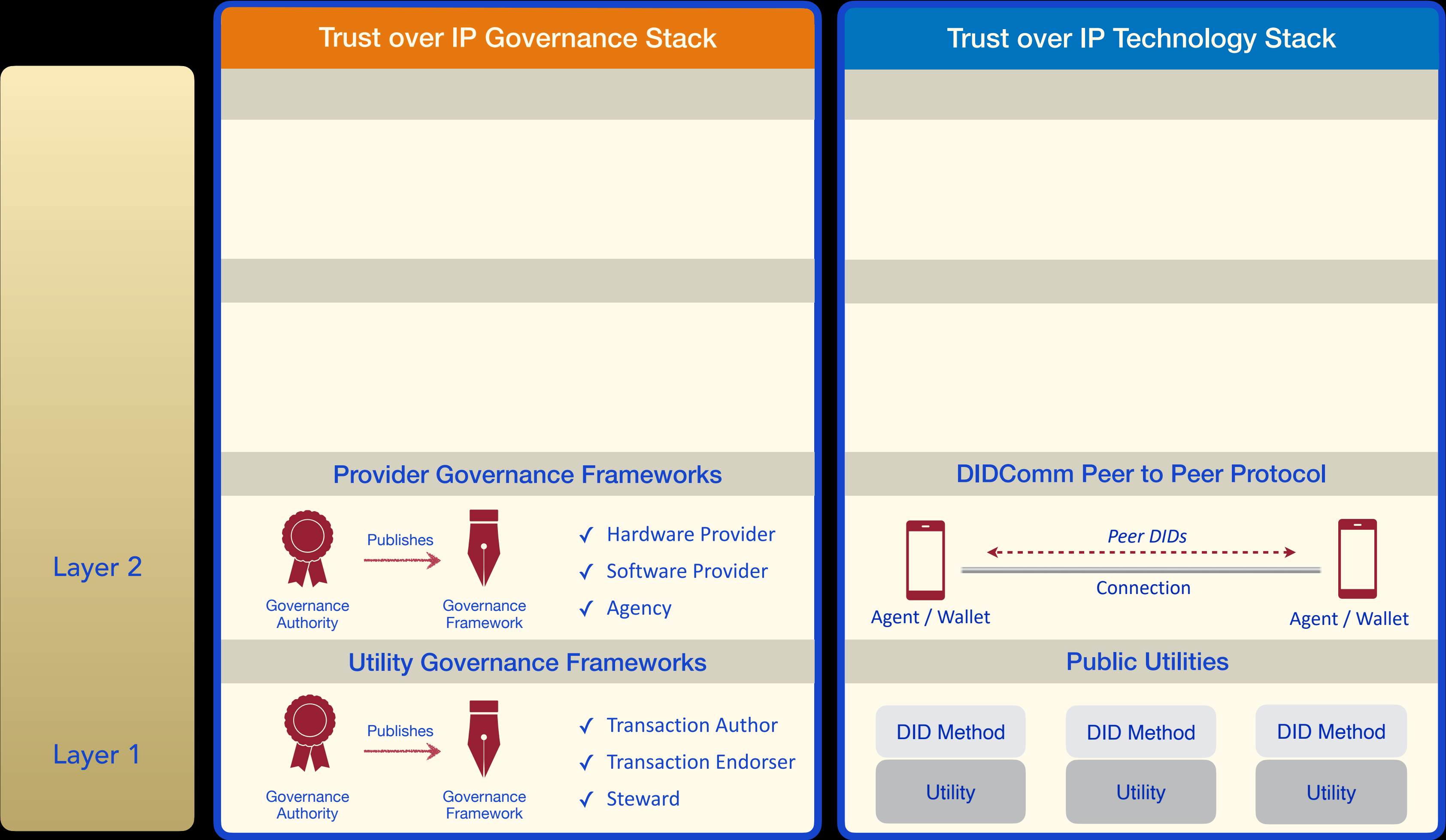
Trust over IP Stack

Layer 1 - Rooting Trust



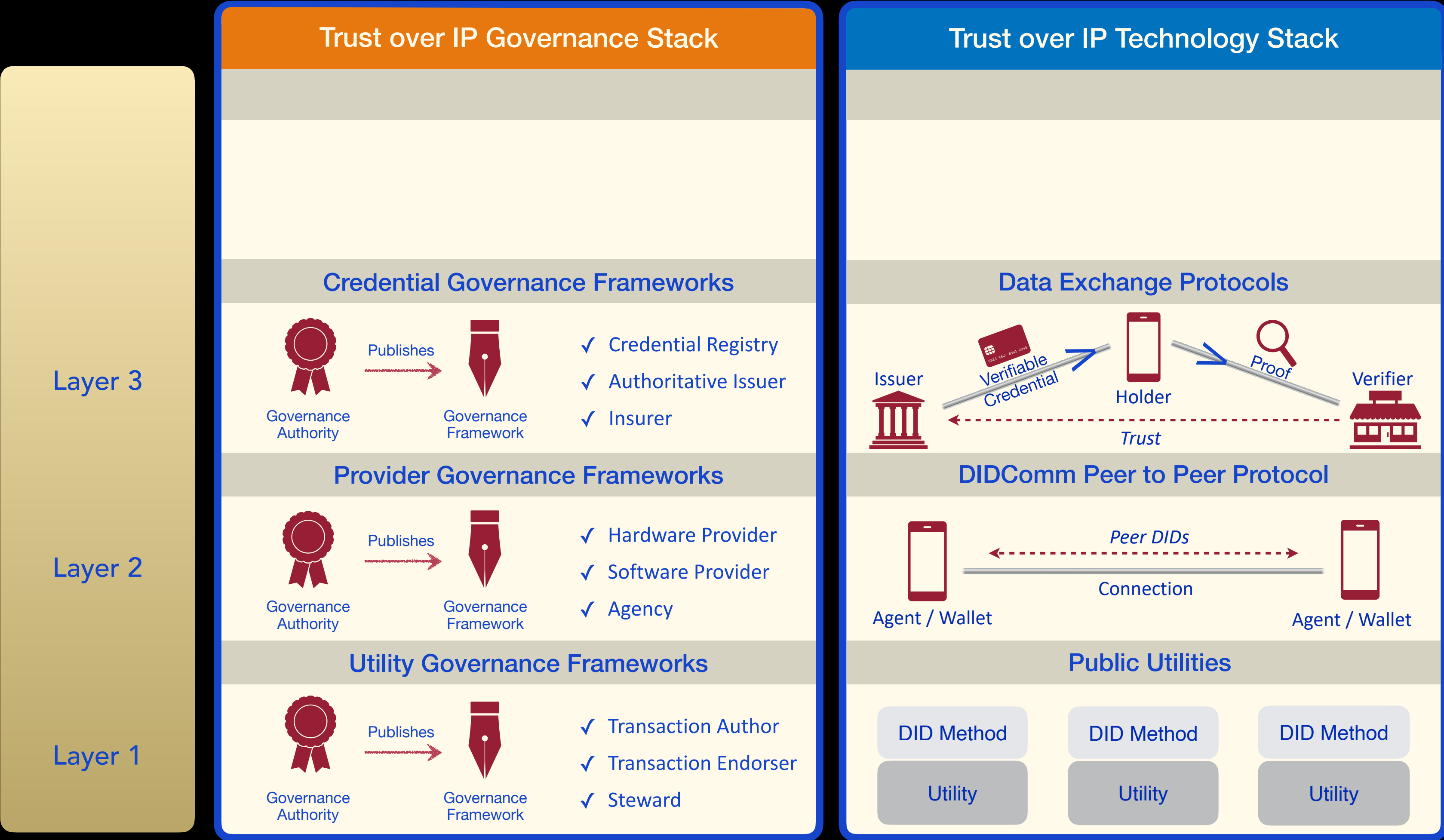
Trust over IP Stack

Layer 2 - Trusted Peer to Peer Communications



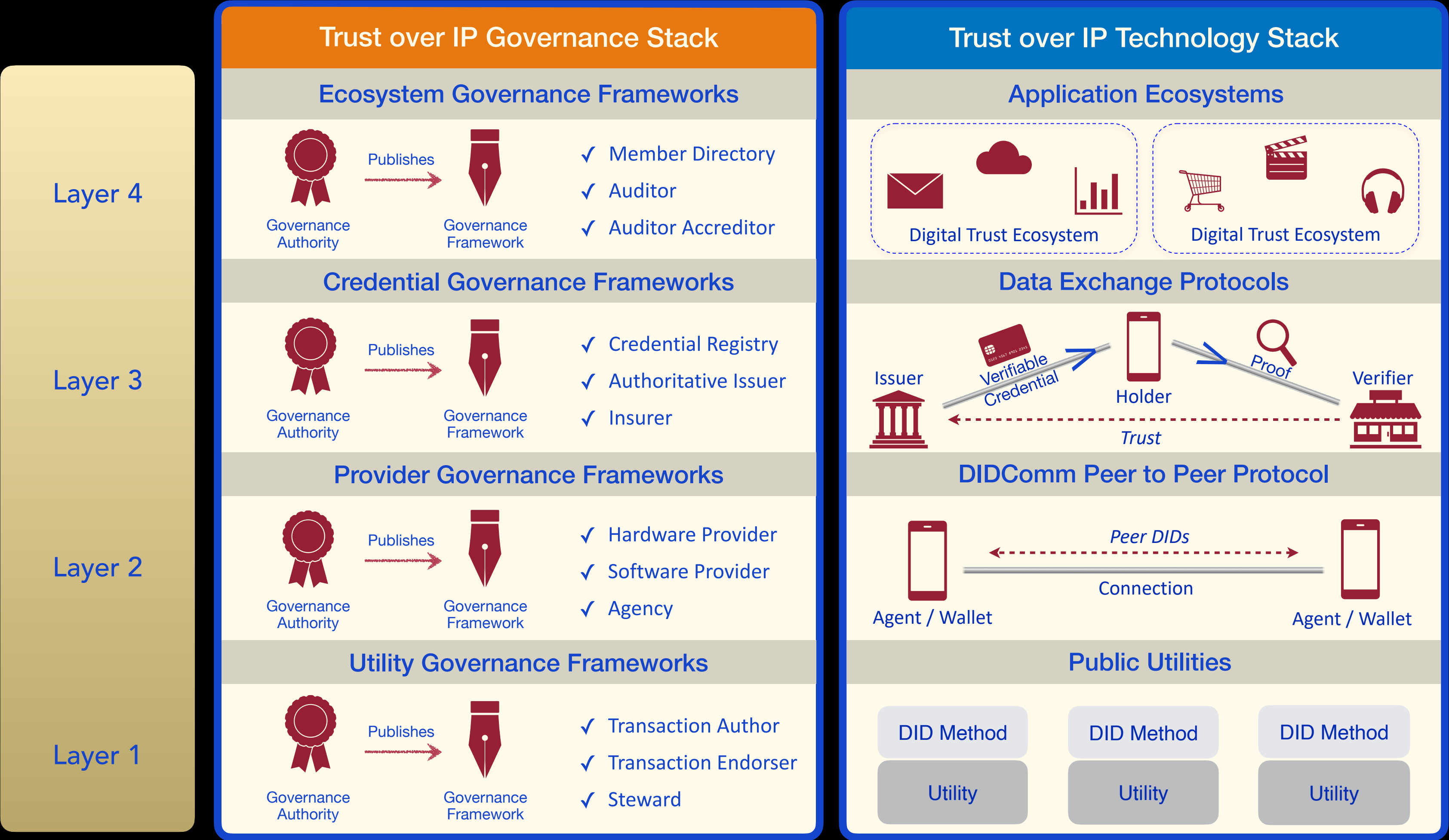
Trust over IP Stack

Layer 3 - Trusted Exchanges



Trust over IP Stack

Layer 4 - Trusted Services





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