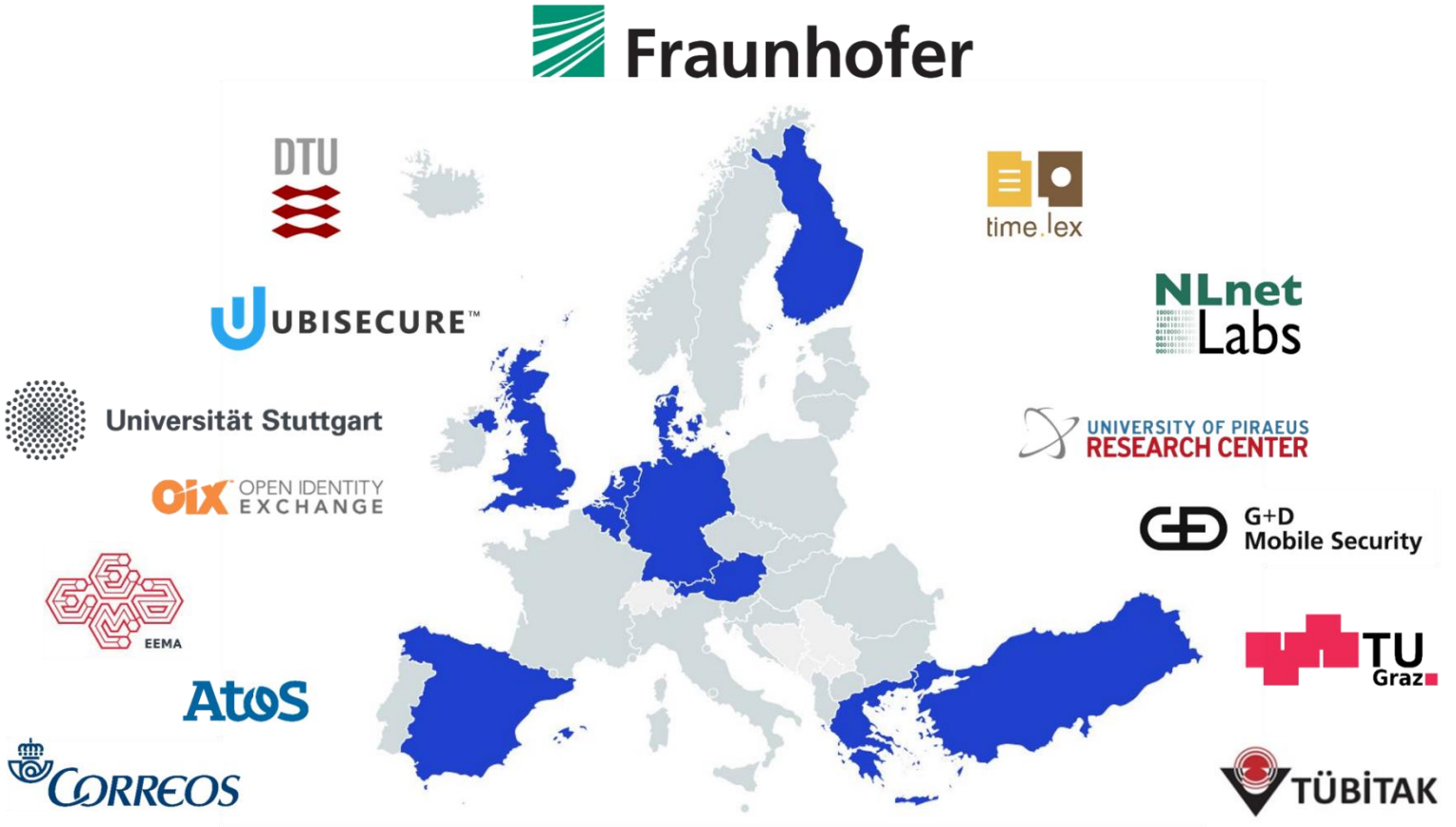
LIGHTest State of Play

April 30th 2019



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Trust in a changing world

In the old days

- our world was smaller
- we knew our business partners
- Deals were sealed in personal contact

Increasingly

- we operate Europe- or World-wide
- we don’t know our business partners
- Deals are sealed remotely through Cyberspace

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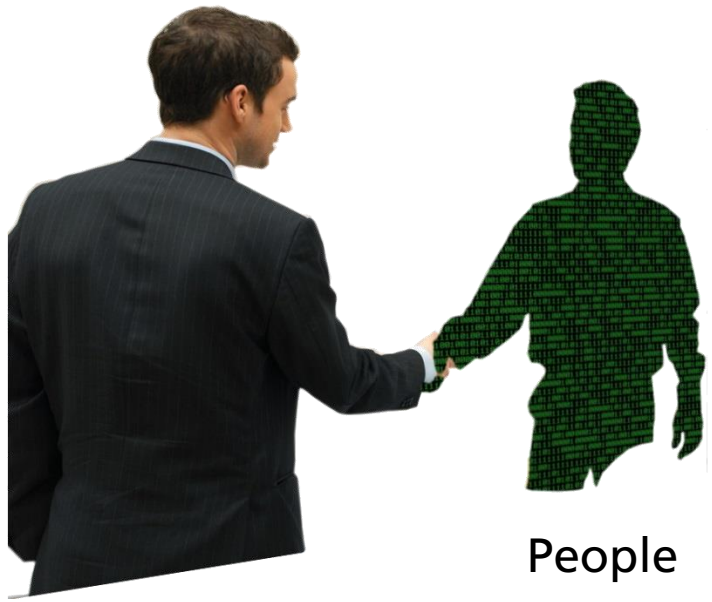
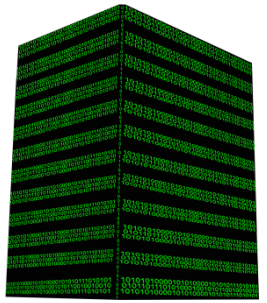
Transactions are increasingly conducted virtually

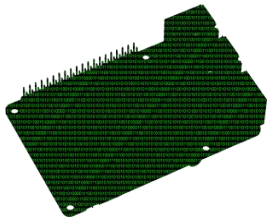
We have virtual transactions with..



People



Organizations



Devices/Things

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But who is really behind the electronic identity?

As expected from the appearance:
Trustworthy -- legitimate

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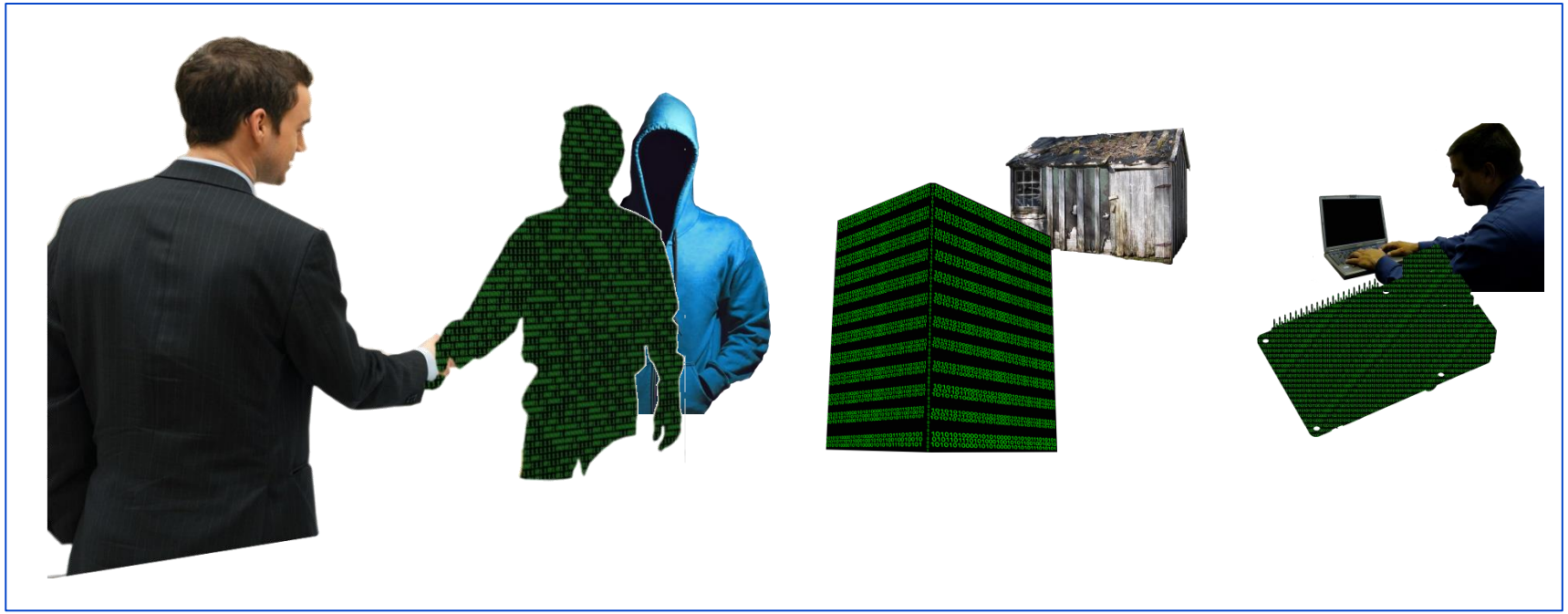
But who is really behind the electronic identity?

Not what we expect!!!
Untrustworthy -- fraud



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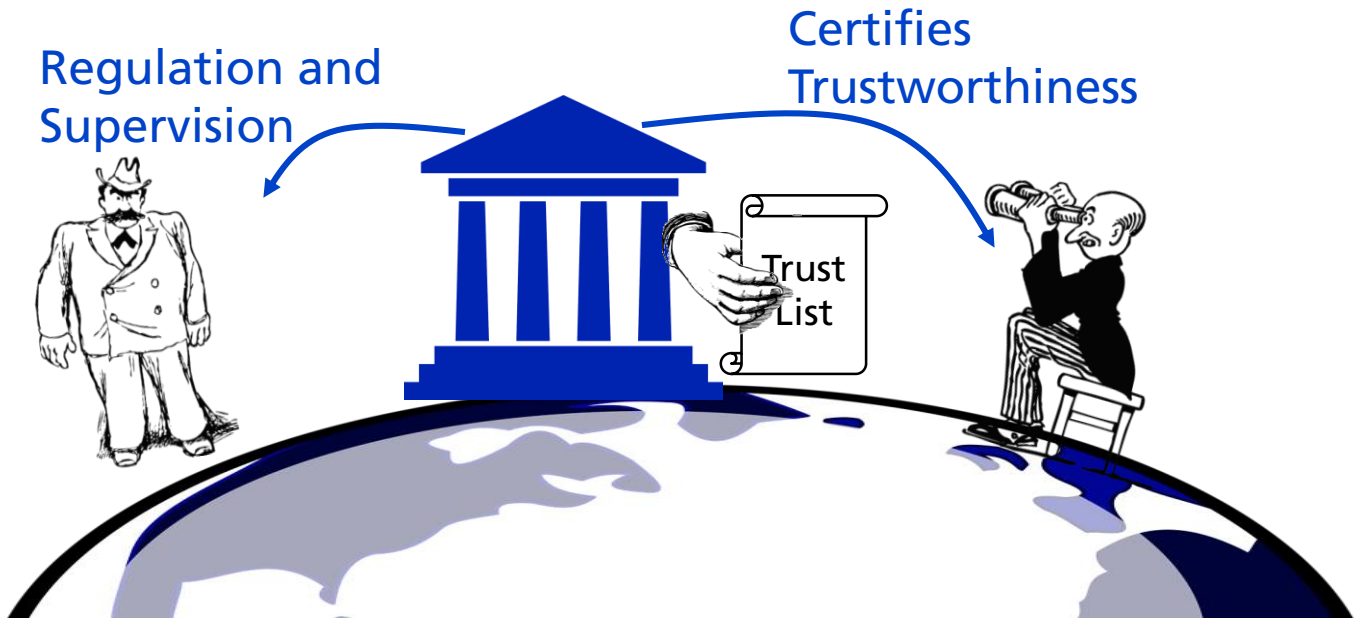
How can we know whether a remote someone/something is trustworthy?

We need Help:

- Trusted **Authorities**
- Trusted Third Parties that publish **Reputation** Ratings



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Trust Domains

- Verification is done by following the chain of trust (certificate chain) until you reach the trust anchor (root certificate)
  - Works well within a single trust domain

- But what about transactions between entities from different trust domains?
  - Different root certificates
  - Trust has to be established
  - Could be done with a trust list containing the root certificates or a list of lists

➢ **A global trust list would solve this problem**

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How realistic is a global trust list?

- Who would operate and control that trust list?
  - US?, EU?, Russia?, China?
  - UN?, FIFA?
  - Facebook?, Google?
- What about the entries?
  - How is it ensured that they are genuine?
  - Do I have to trust them?
  - Are they being trusted automatically?
  - What about Levels of Assurance?

➢ **We need a better approach**

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What does LIGHT*est* do?

Infrastructure for Publication and Querying of Trust Schemes

- **Create a global Standard Way for publishing Trust Lists..**
- **..on a global Trust Infrastructure**

- Across domains
- Accommodate diverse perceptions of trust
  - No global agreement needed

Authorities:

- EC and MS for qualified signature and trust services
- Business registers
- Professional registers (health, justice, law-enforcement, ..)
- Corporate internal registers
- …

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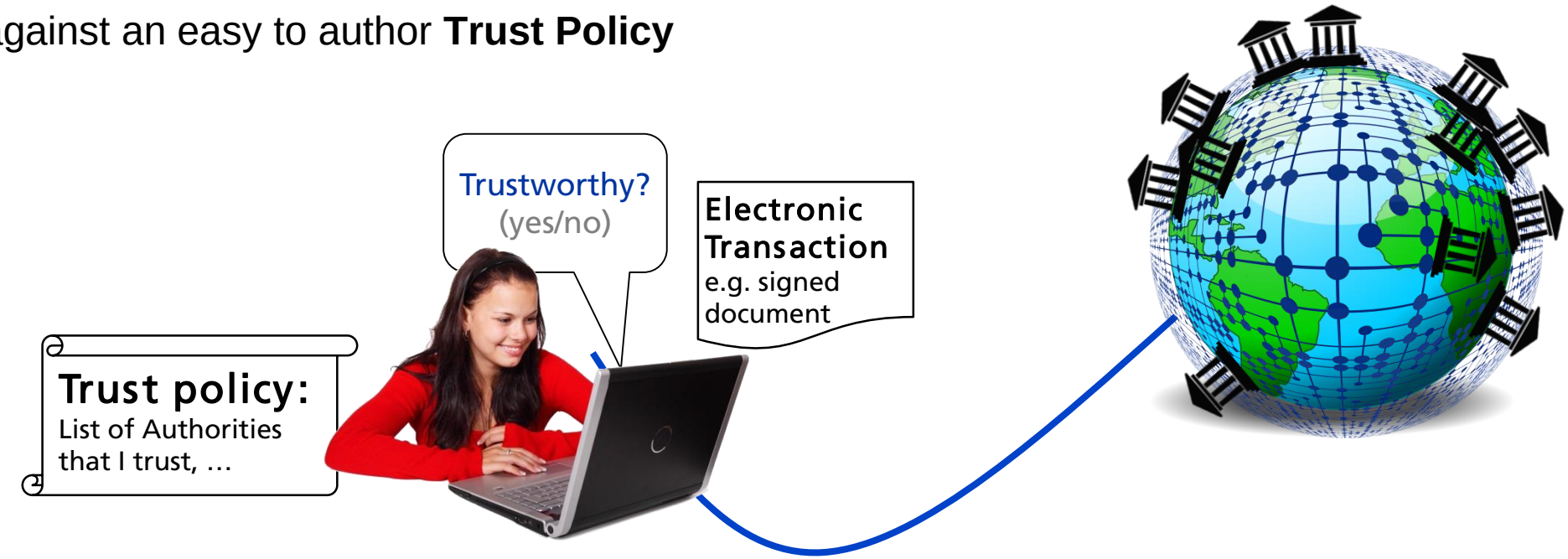
What does LIGHT^{est} do? Trust Policy and Automatic Trust Decisions

- Make it automatic for Verifiers to **query Trust Lists**
- Combine multiple queries to **validate**
  - an **Electronic Transaction**
  - against an easy to author **Trust Policy**



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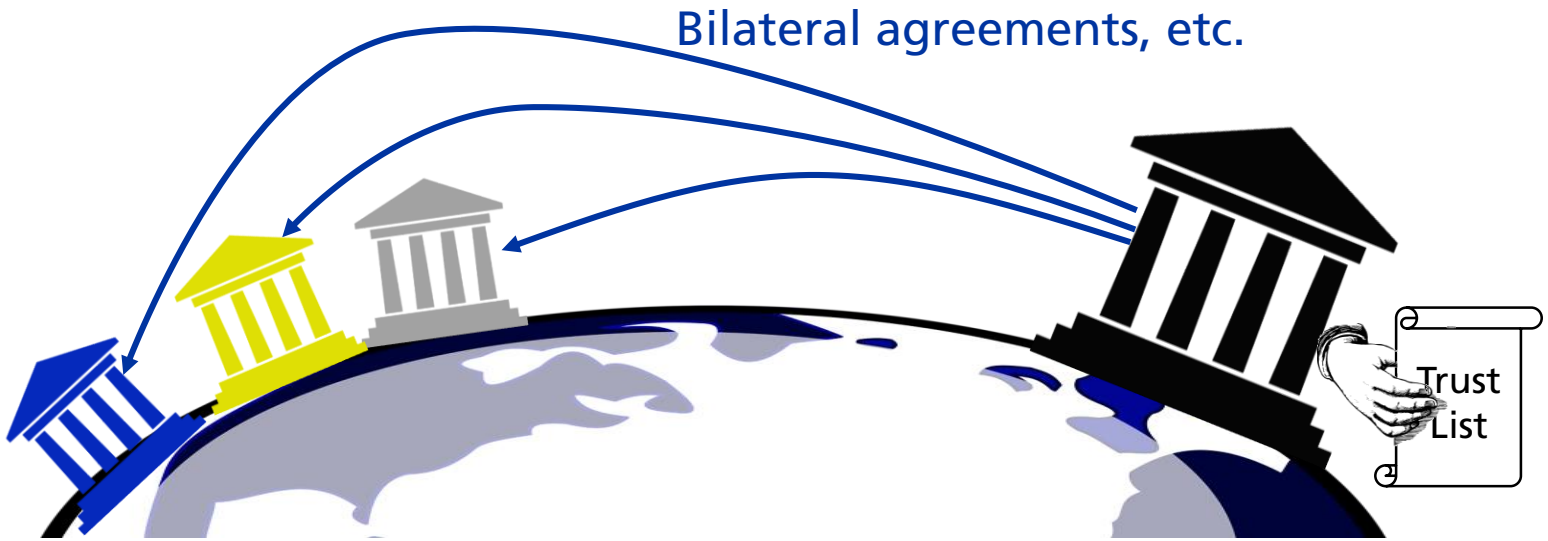
What does LIGHT*est* do?

Infrastructure for the Translation across Trust Domains

Authority publishes Trust List on..

- ..which authorities from other trust domains are trustworthy
- ..how to translate foreign into native trust schemes
  - NIST: Level “3” == EC eIDAS: Level “substantial”



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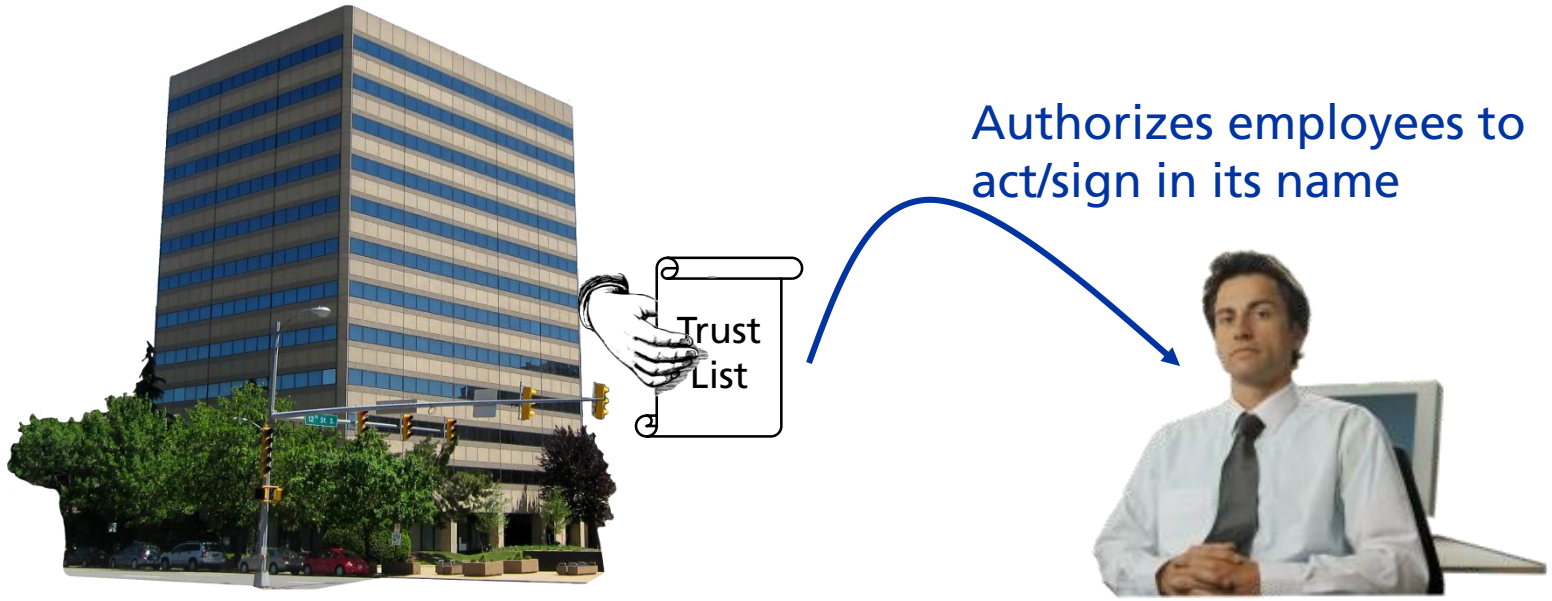
What does LIGHT*est* do?

Infrastructure for the Publication and Querying of Delegations

Delegation:

- Organization publishes Trust List on..
- ..who can sign/act in its name for which purposes



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What does LIGHT^{est} do? Trust Propagation of Derived Mobile IDs

- Trustworthy through secure enrollment
  - Birth and population registers
  - in person issuance
- Often unfit for mobile use

- Derive mobile identities from eIDs
- How does trust propagate???

- Currently lacks highly trusted electronic identities

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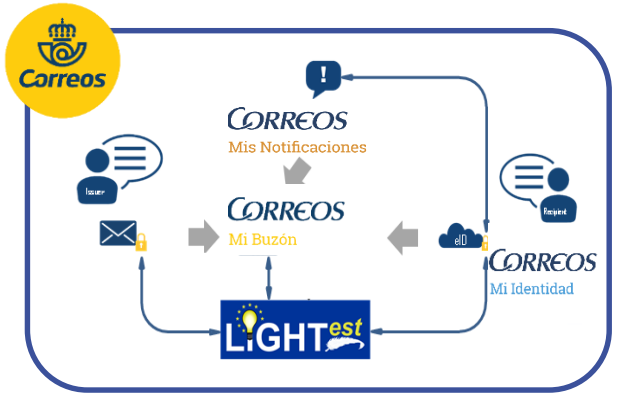
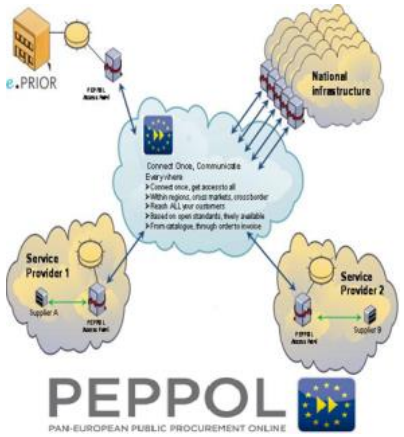
What does LIGHT*est* do? Pilot Demonstrations





Trustworthy communications (by Correos)

- Spanish Postal Service, one of largest world-wide
- Verified identities of users
- Trustworthy communications between different users (companies, individuals etc)
- Citizens and businesses receive official notifications from several administrations

PEPPOL e-Procurement (by UPRC)

- Approach applicable to other PEPPOL applications
- Demonstrates easy of integration of LIGHT*est* in existing product
  - SHA1 to SHA2 Pilot Scenario: key exchange of root certificates
  - e-Tendering Pilot Scenario

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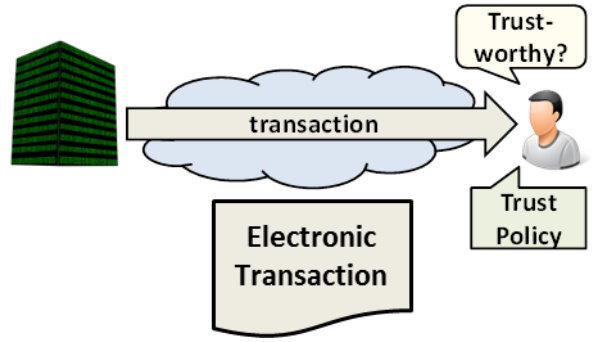
LIGHT^{est} *in a nutshell: Goal*

provide parties of electronic transactions with **automatic validation of trust** based on their **individual trust policies**



- Development of a lightweight, global trust infrastructure for
  - publication,
  - querying, and
  - cross-jurisdiction translation

  } of relevant information (e.g. trust scheme, level of assurance)
- using the existing global Domain Name System (DNS)

- ➢ Enables retrieval & discovery of ID information
- ➢ Facilitates your own decision making

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What LIGHT*est* is and what LIGHT*est* is NOT

- LIGHTest is not an alternative to eIDs or business registers
- LIGHTest does not allow you to outsource trust decisions
- LIGHTest does allow you to use a global, known and trusted infrastructure to:
  - Retrieve ID information
  - Verify ID information
  - Determine trust assurances behind it
  - Facilitate your own decision making
- While also providing a growth path for future European ID policy!

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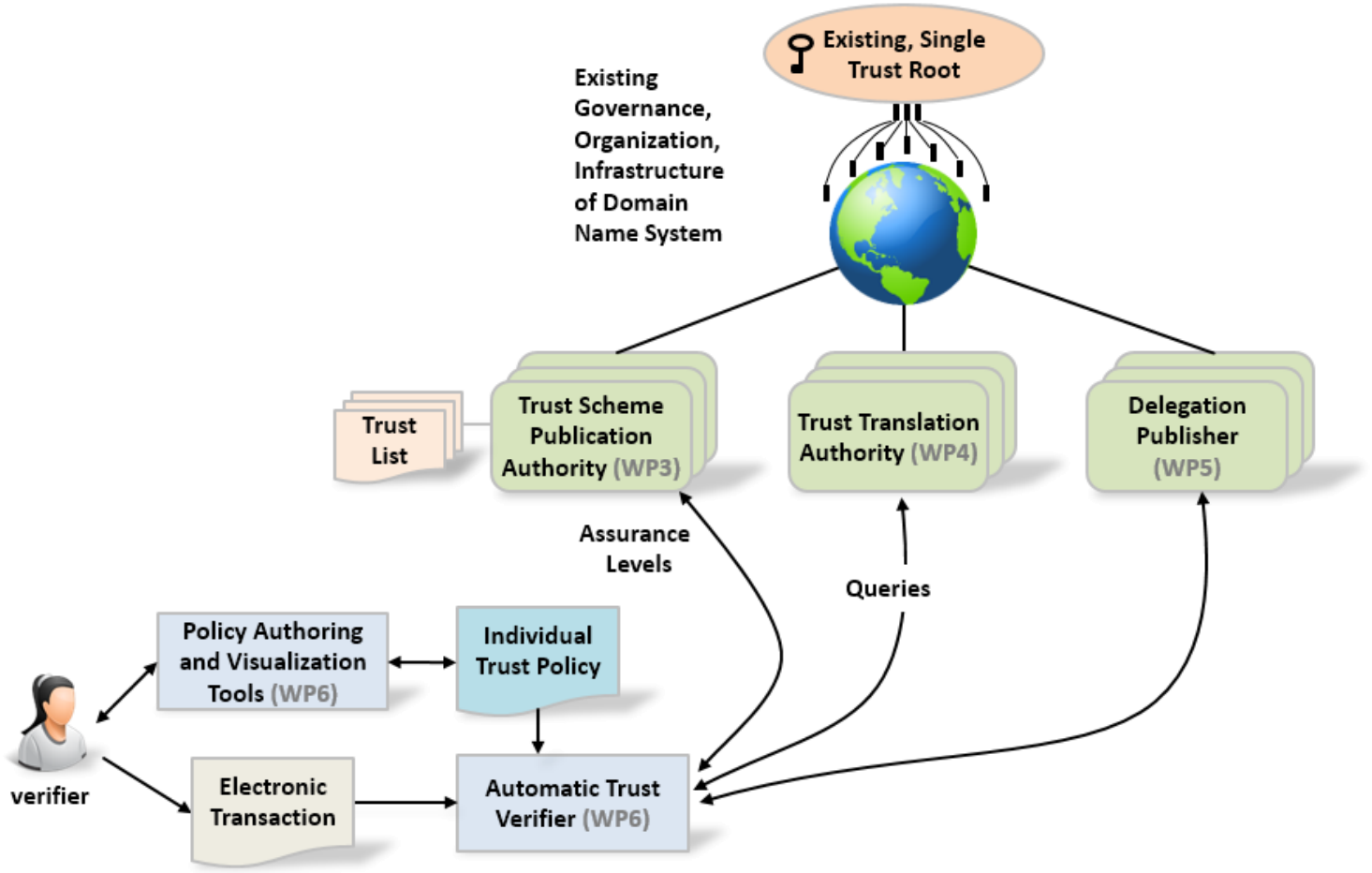
The LIGHT*est* Architecture



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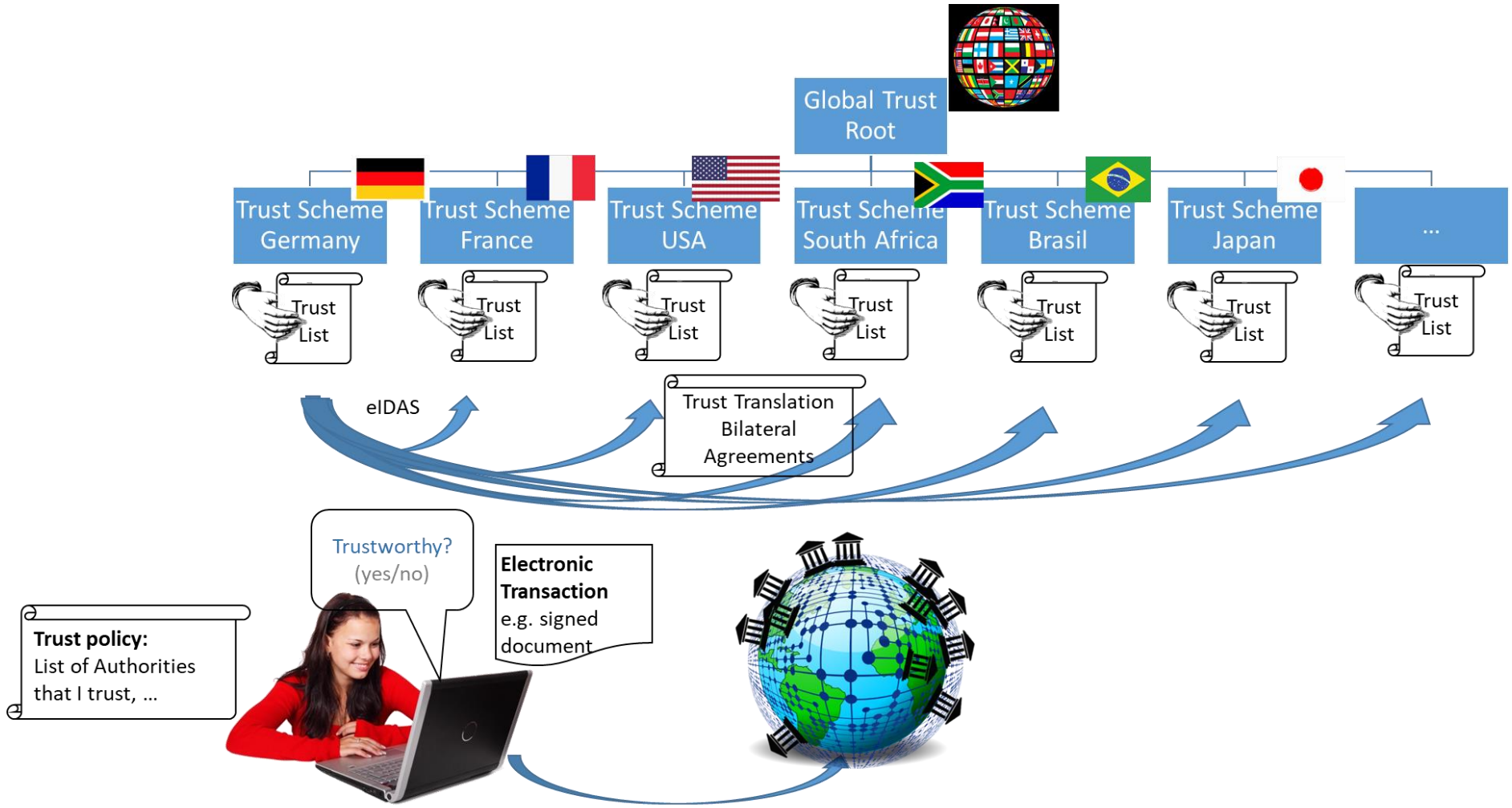
Control remains locally – Source can be verified



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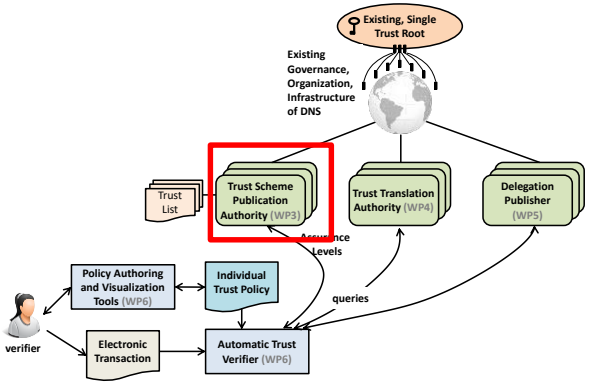
TSPA: Infrastructure for Publication and Querying of Trust Schemes

Publication of Trust Schemes

Type of Trust Scheme Publication	Example	Verifiable Information
Boolean	ETSI_EN_319_401	Compliance of an entity to a trust scheme
Ordinal	LoA4.ISO29115	Compliance of an entity to an ordinal value of a trust scheme
Tuple-Based	{(authentication:2Factor), (identityProofing:inPerson)}	Requirements of a trust scheme



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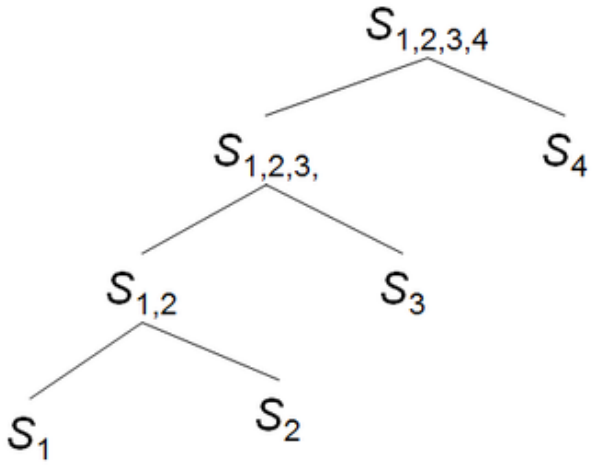
Tuple-Based Trust Scheme Publication: Methodology

- Development of Unified Data Model for Tuple-Based Trust Scheme Publication
  - Bottom-up modelling approach for identification of requirements
- Consolidation using existing trust schemes
  - identify requirements of selected trust schemes
  - consolidate towards a unified data model
- Development of the Data model
  - structure requirements in hierarchical form of abstract concepts
  - transfer concepts into tuples (attribute_name, attribute_value)
  - publish tuples as a sequence of attributes



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Examined Trust Schemes

Input Scheme 1	Input Scheme 2	Consolidation Result	Saturation ΔS (min ΔS)
ISO/IEC 29115	PCTF	Data Model v0.2	n.a.
Data Model v0.2	FIDO	Data Model v0.4	3
Data Model v0.4	QAA/AQAA, eIDAS	Data Model v0.6	9
Data Model v0.6	Chinese Electronic Signature Law	Data Model v 0.6 (Data model of D3.1)	0
Data Model v0.6	Turkey eSig Law	Data Model v0.8	1
Data Model v0.8	MTF	Data Model	1
Data Model	Trust Scheme of Azerbaijan	Data Model	0
Data Model	UICC	Data Model (see Sections 7.2.7 and 7.4)	0

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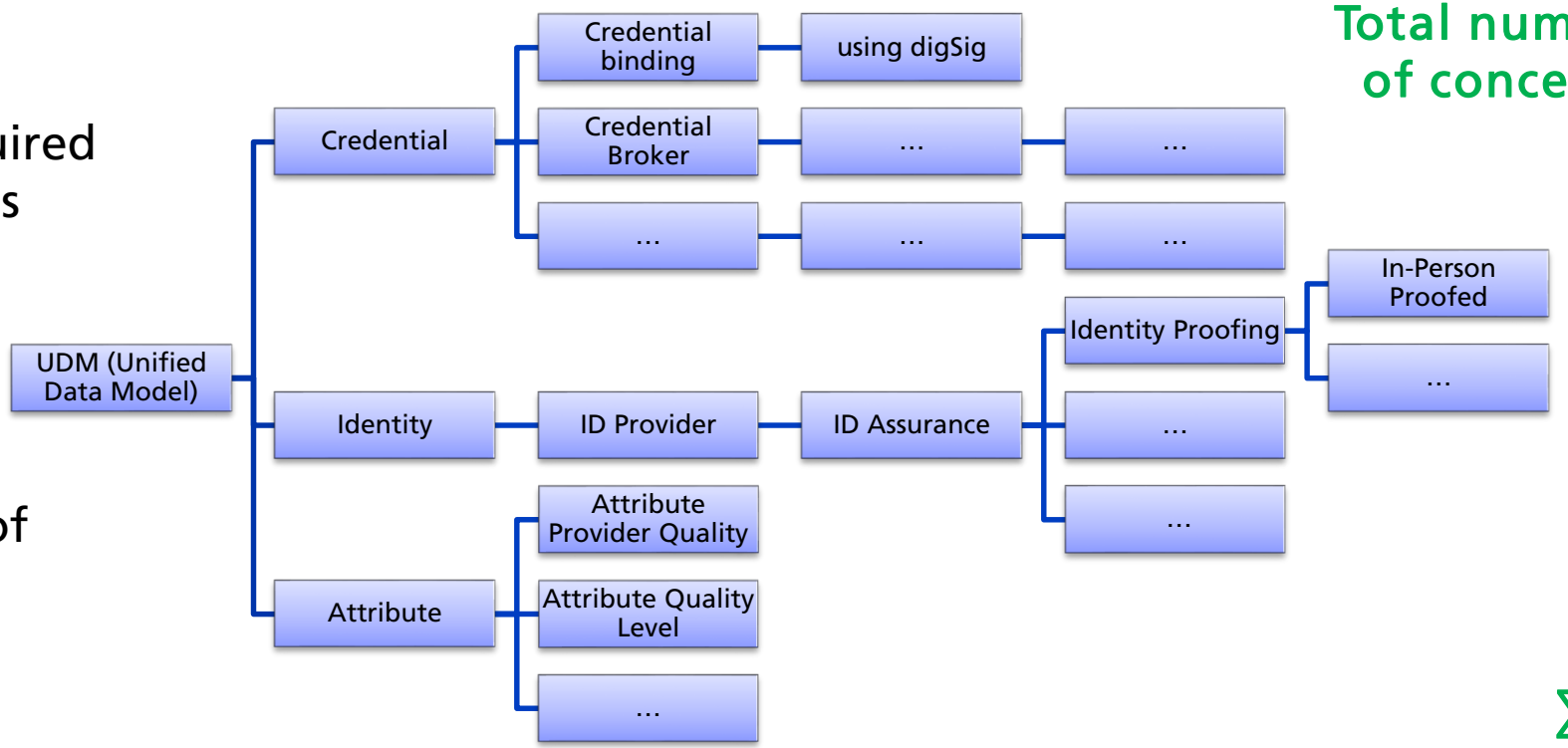
Data Model for Tuple-Based Trust Schemes: Development -1

- Conceptualization of data model
  - structure identified requirements of consolidation in hierarchical form of concepts

➢ Result: 3 abstract concepts required for description of Trust Schemes
  - Credential
  - Identity
  - Attributes
- each of them contains list of concepts involved



Total number of concepts:
62
27
9
∑ 98

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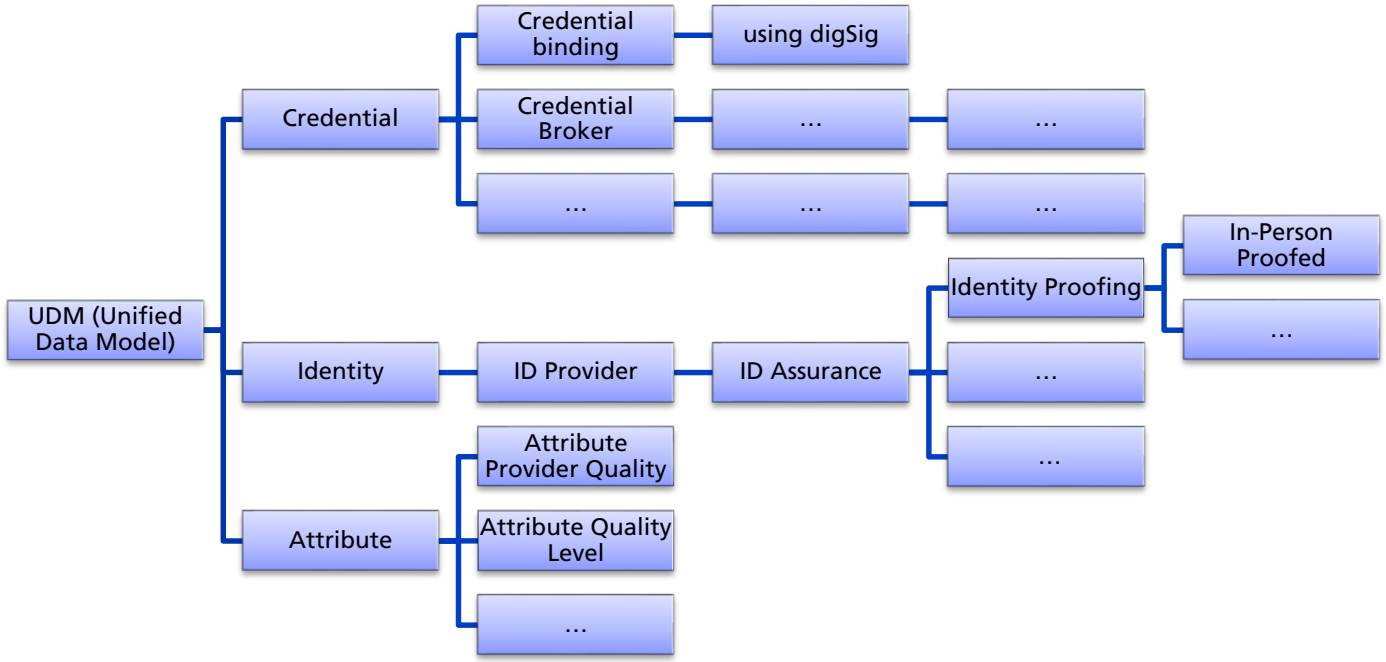
Data Model for Tuple-Based Trust Schemes: Development -2

- Development of the data model
  - Concepts are reviewed regarding their attribute domains
  - Each concept is transferred into tuples:

  data pair (attribute_name, attribute_value)

- Attribute values:
  - Boolean: e.g. In-Person Proofed
  - Integer: e.g. Time Limits
  - String: e.g. Credential Broker

  →Most concepts (85 of 98) are boolean



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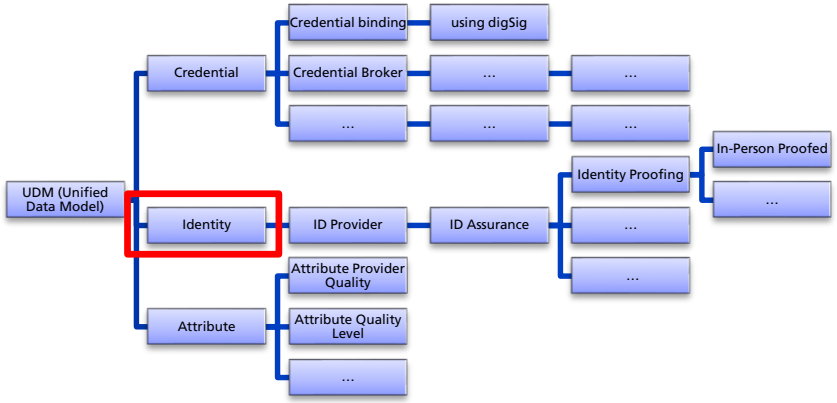
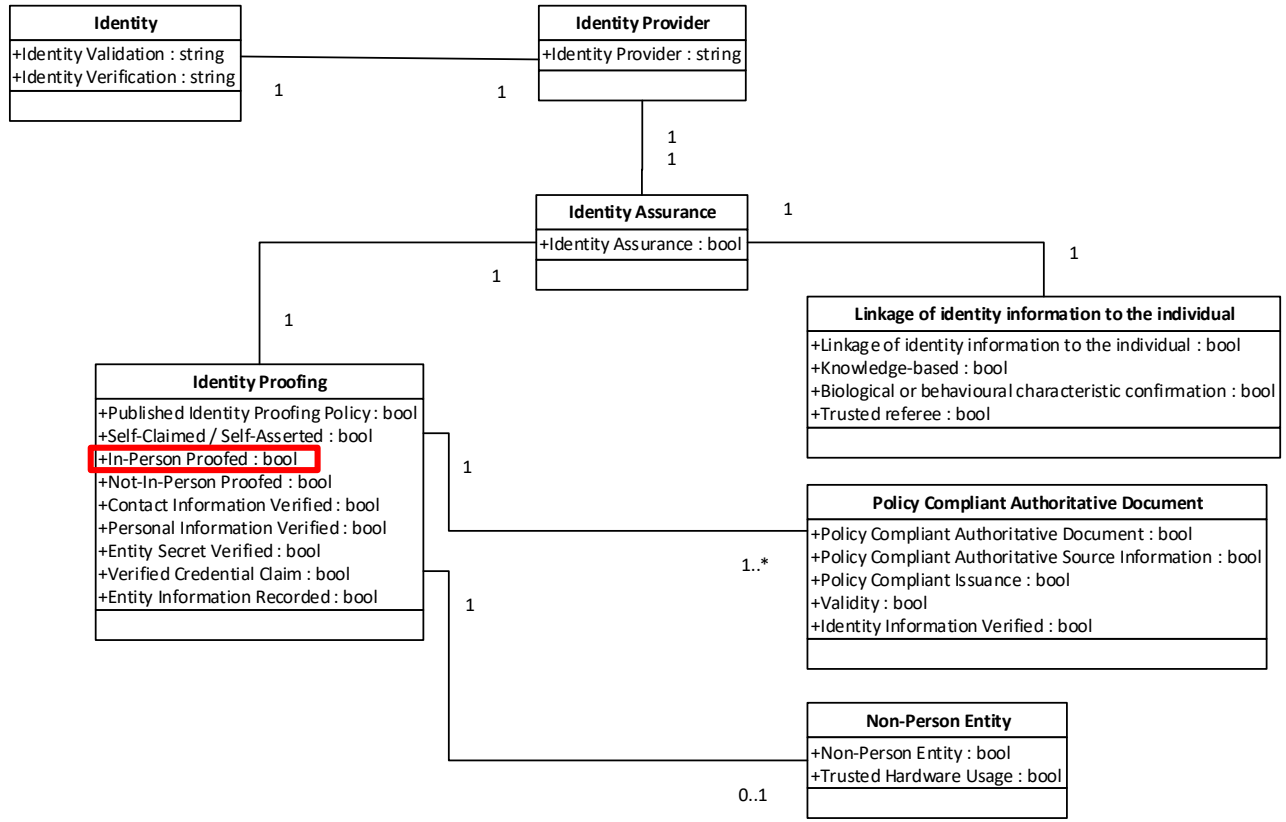
Data Model for Tuple-Based Trust Schemes: Identity





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UNHCR Workshops

- **Joint Workshop on Digital Identity related to ID2020**, Munich, Germany, 16 November 2017
- **UNHCR Workshop- LIGHTest collaboration**, Copenhagen, Denmark, 13 February 2018
- **UNHCR/LIGHTest Workshop**, Amman, Jordan, 9-10 July, 2018
- **Workshop Meeting** regarding UNHCR Trust Scheme Development, Copenhagen, Denmark, 05 Feburary 2019

DAFI

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Some recent publications

Open Identity Summit – Garmisch-Partenkirchen

- Georg Wagner, Stefan More, Sven Wagner and Martin Hoffmann
  - DNS-based Trust Scheme Publication and Discovery
- Sven Wagner, Sebastian Kurowski and Heiko Roßnagel
  - Unified Data Model for Tuple-Based Trust Scheme Publication
- Sebastian A. Mödersheim and Bihang Ni
  - GTPL: A Graphical Trust Policy Language
- Stephanie Weinhardt and Doreen St.Pierre
  - Lessons learned – Conducting a User Experience evaluation of a Trust Policy Authoring Tool
- Isaac Henderson Johnson Jeyakumar, Sven Wagner and Heiko Roßnagel
  - Implementation of Distributed Light weight trust infrastructure for automatic validation of faults in an IOT sensor network

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