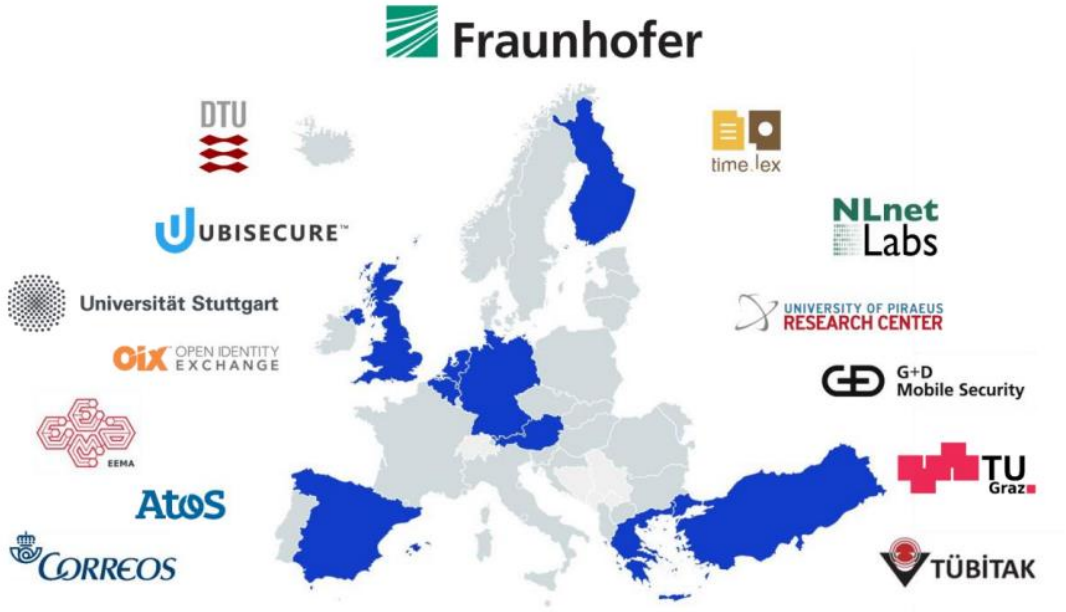
LIGHT*est*

A Lightweight Infrastructure for Global Heterogeneous Trust Management



LIGHT*est* Automated Trust Verification

LIGHT*est* has received funding from the European Union's Horizon 2020 research and innovation programme under G.A. No. 700321

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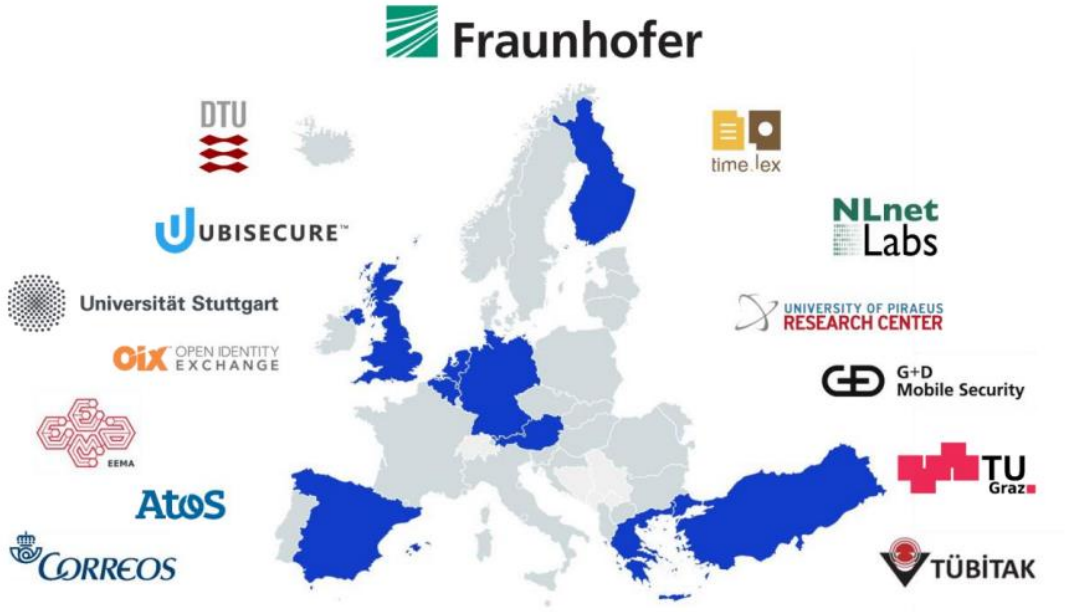

Why do you need LIGHT*est*?

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

- It's about knowing the counterparty's policies and rules, so you can make a decision to trust them or not…….
  - Enrollment
  - Authentication
  - Biometrics
  - Authorisations
  - Delegations
  - ……..

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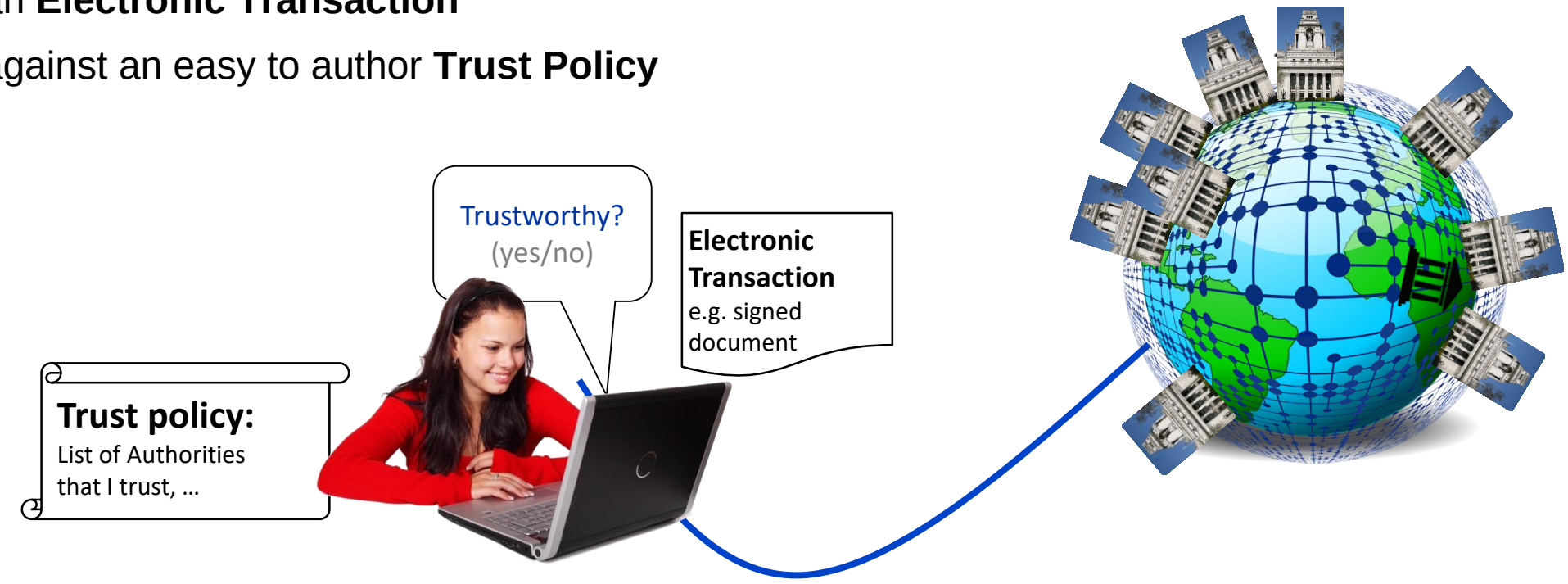
What does LIGHT^{est} do? Trust Policy and Automatic Trust Decisions

- 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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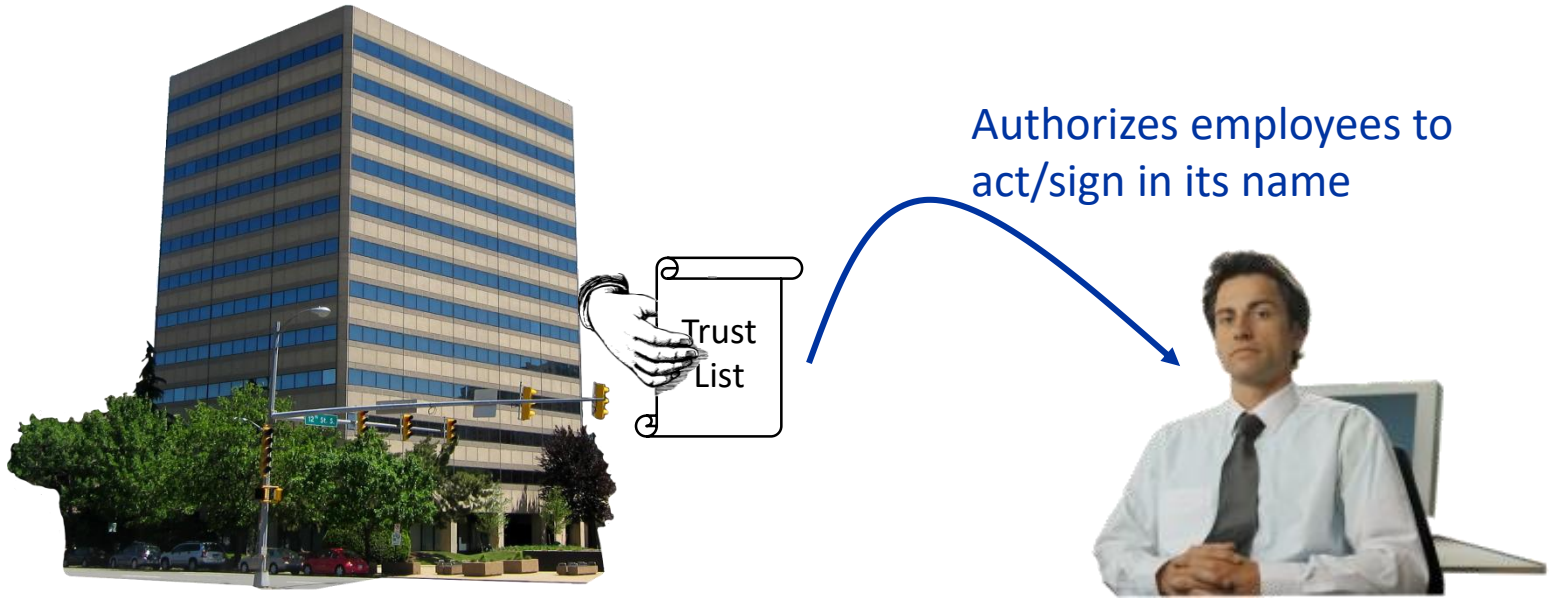
What does LIGHT^{est} do?

Infrastructure for the 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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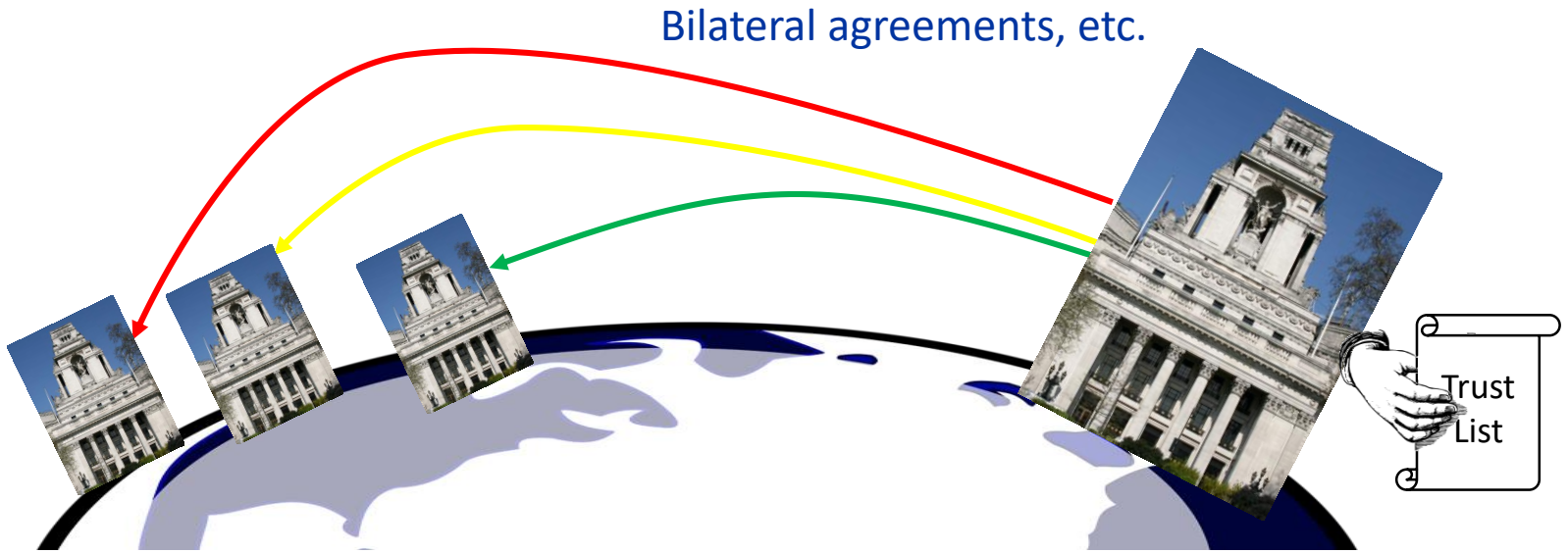
What does LIGHT*est* do?

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? 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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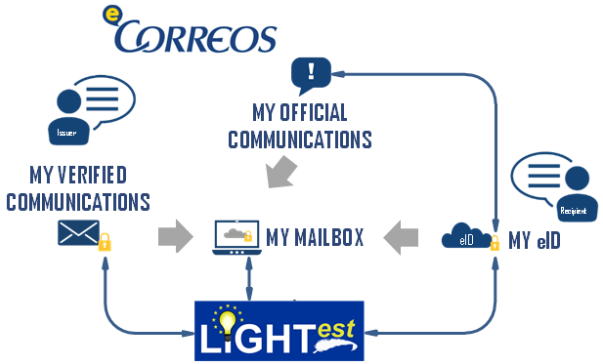
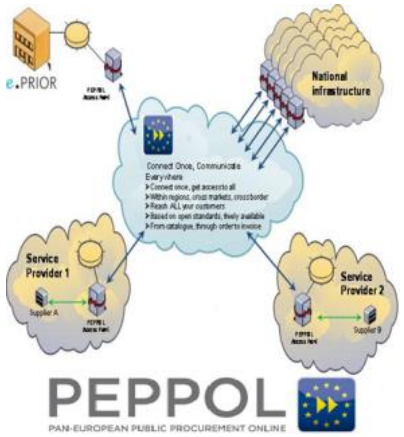
What does LIGHT*est* do? Pilot Demonstrations



e-Correos (by Correos)

- Spanish Postal Service, one of largest world-wide
- electronic registered delivery service
- Identities of users
- Citizens and businesses receive official notifications from various administrations



PEPPOL e-Invoicing

- e-Invoicing in OpenPEPPOL environment
- Approach applicable to other PEPPOL applications
- Demonstrates easy of integration of LIGHT*est* in existing product
- Demonstrates “delegation-enabling” an application with LIGHT*est*.

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LIGHT*est*

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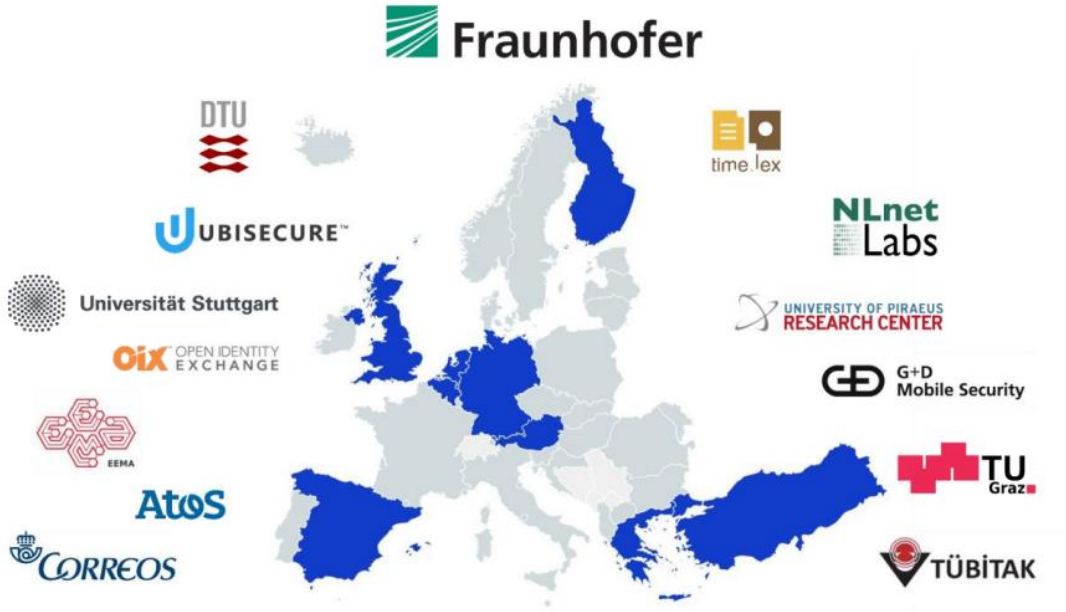

LIGHT*est* Architecture

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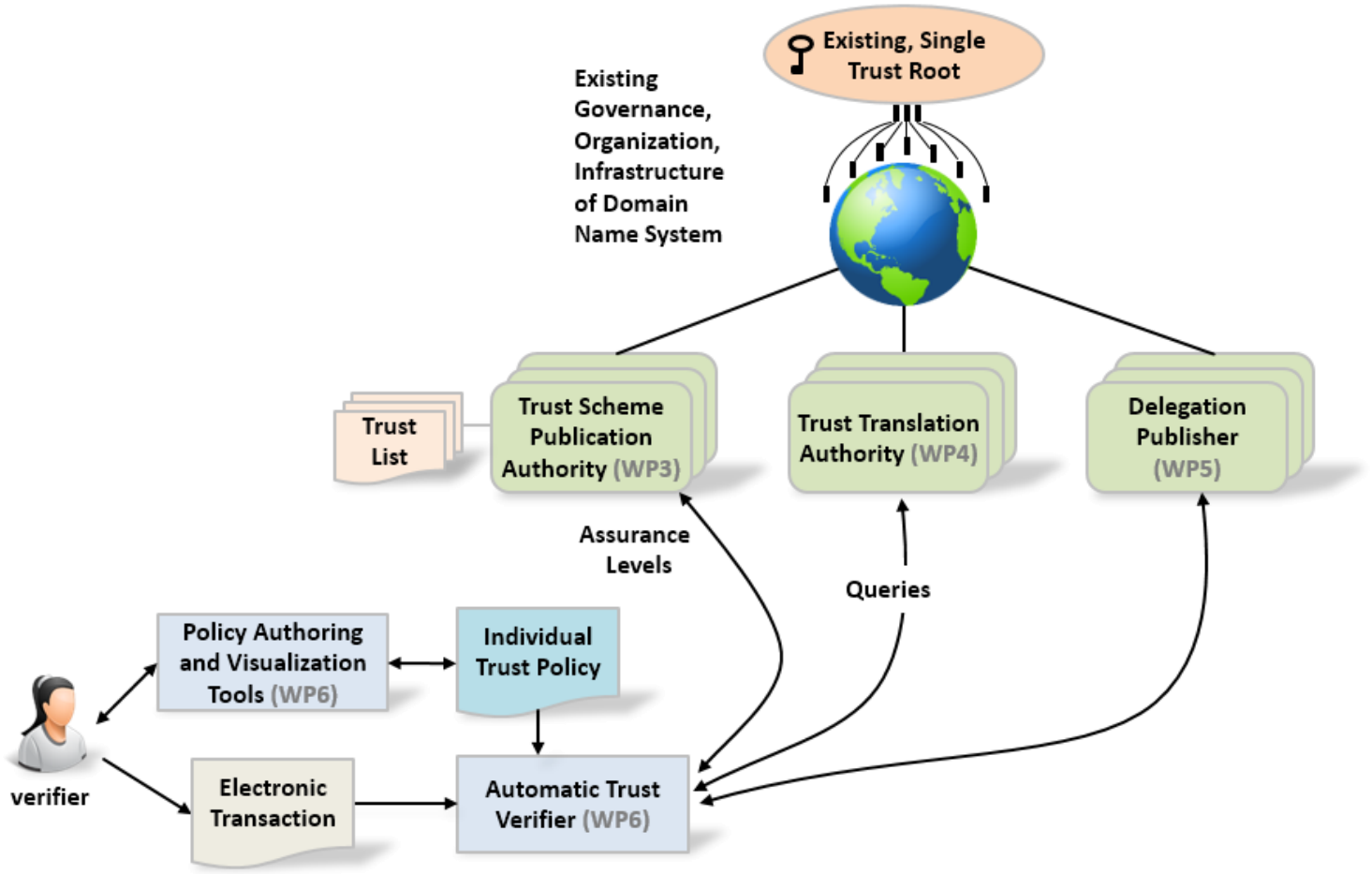
LIGHTest Architecture



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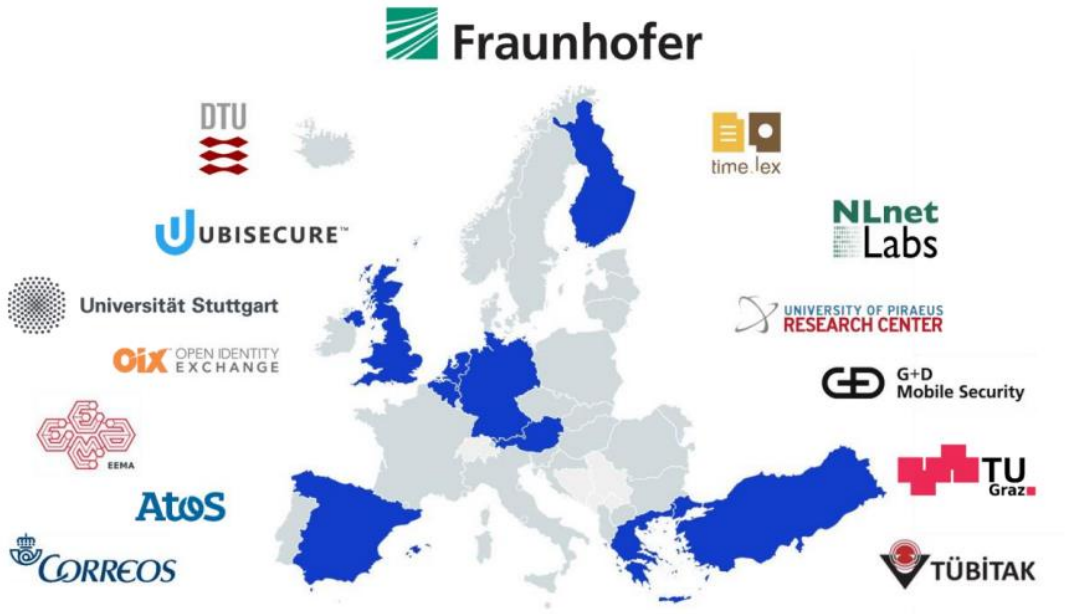

LIGHT*est*
Automated Trust Verification

2019

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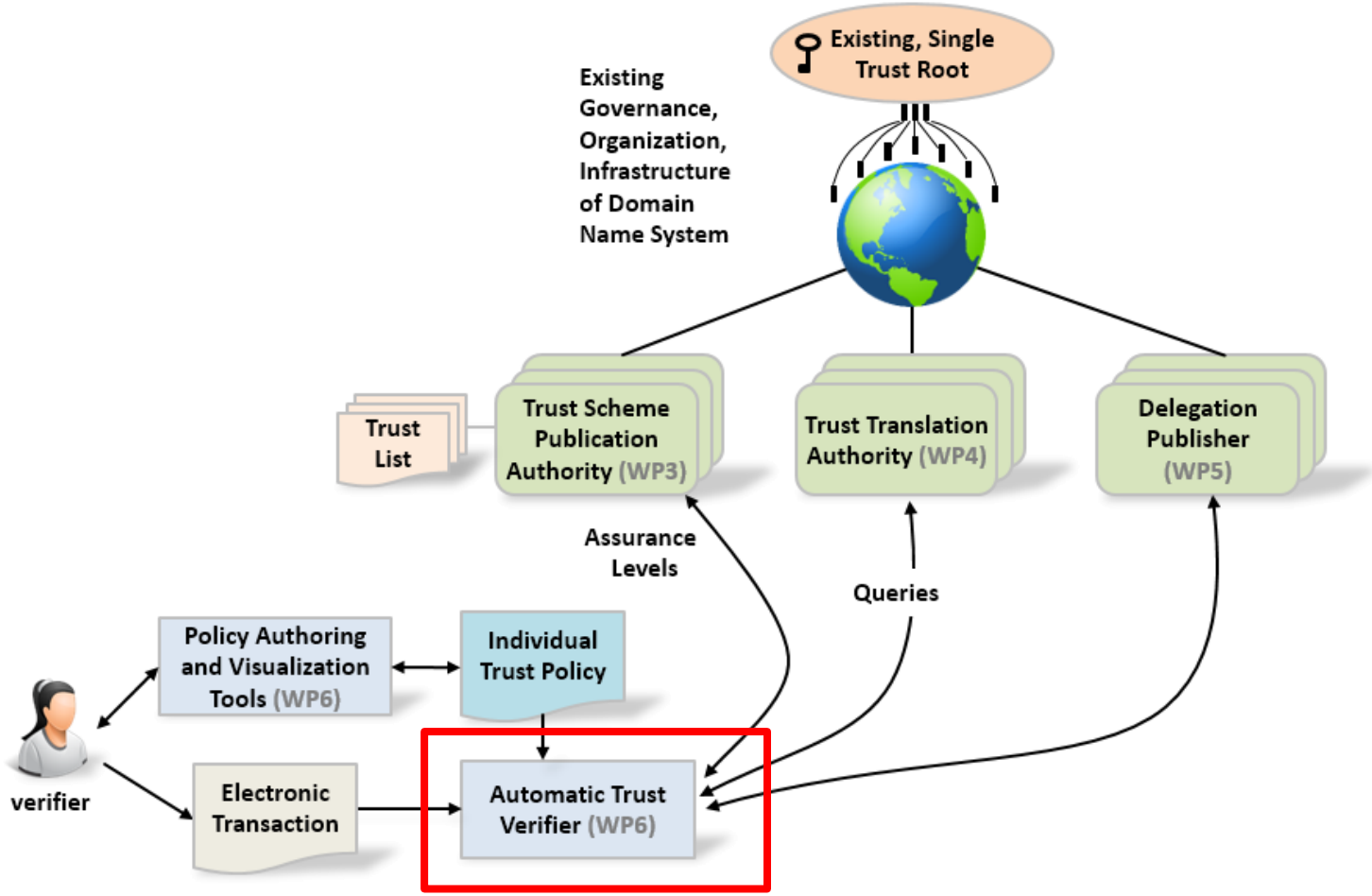
Architecture and Automated Trust Verifier

Automatic Trust Verification relies on 2 items:

- Individual Trust policy,
- Electronic Transaction



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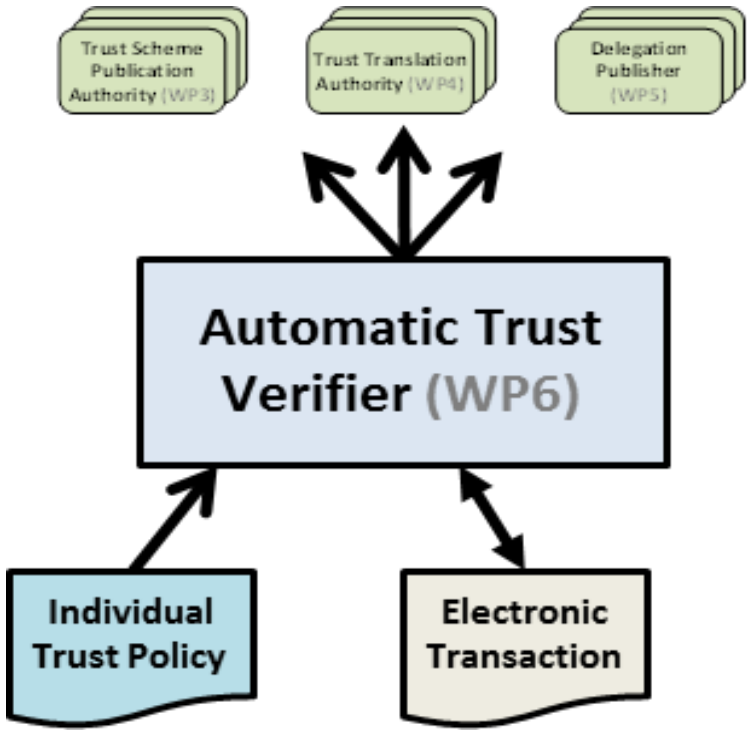
Automated Trust Verification

- Automatic Trust Verification relies on 2 items: The individual Trust policy, and the Electronic Transaction itself



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Trust Policy Authoring Tool

- *This tool is used for creating and editing Trust Policies*
- *The trust policy takes an Electronic Transaction and potentially multiple Trust Schemes as input and creates a single Boolean value (trusted [yes/no]) as output.*
- ***A Trust Policy can optionally return a documentation of the result which for example is an explanation why the Electronic Transaction is not trustworthy**.*

2019

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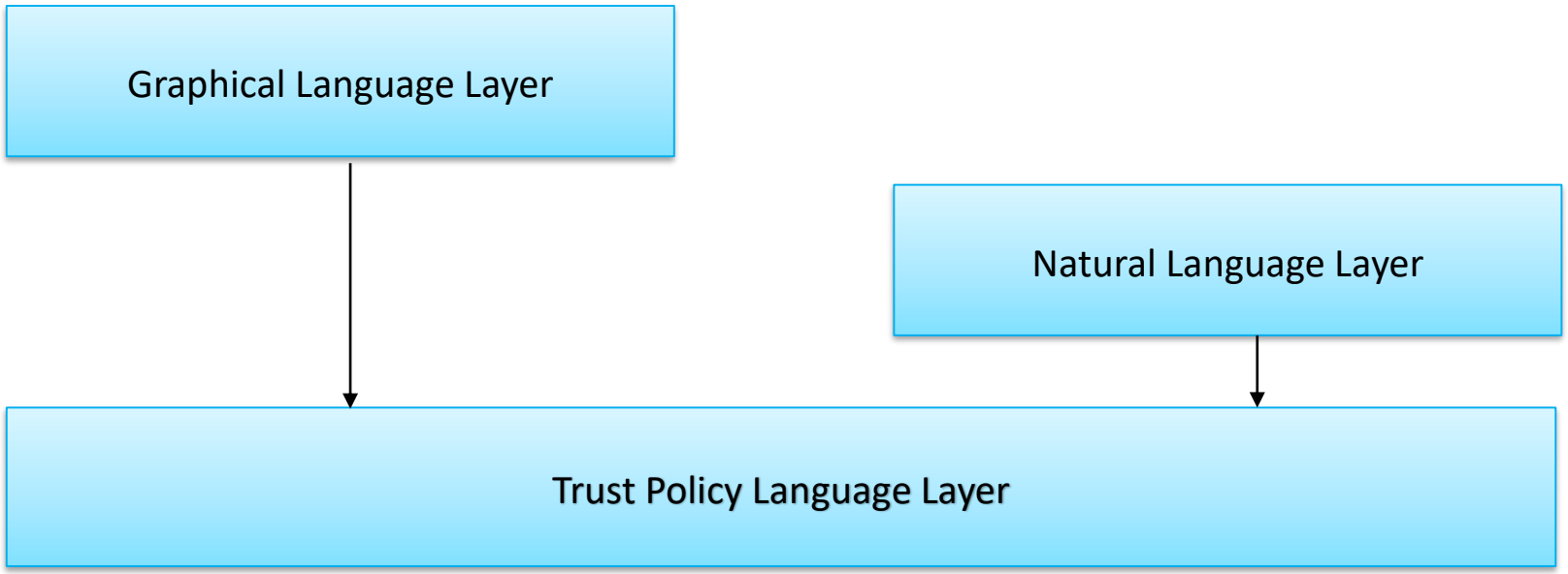
Trust Policy Authoring Tool

- The structure of the Trust Policy Authoring Tool has been designed in such a way as to make it user friendly and easy to use by non-technical users



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Trust Policy Authoring Tool

- A policy use case:

Yale University, USA needs to verify if Student Alice Schmidt from Germany has a **valid Diploma** from **University of Berlin, Germany**.

Student Alice Schmidt provides Yale University with a Diploma certificate document.

Yale University, USA verifies that University of Berlin is on the trusted list of Accredited Universities published by Germany.

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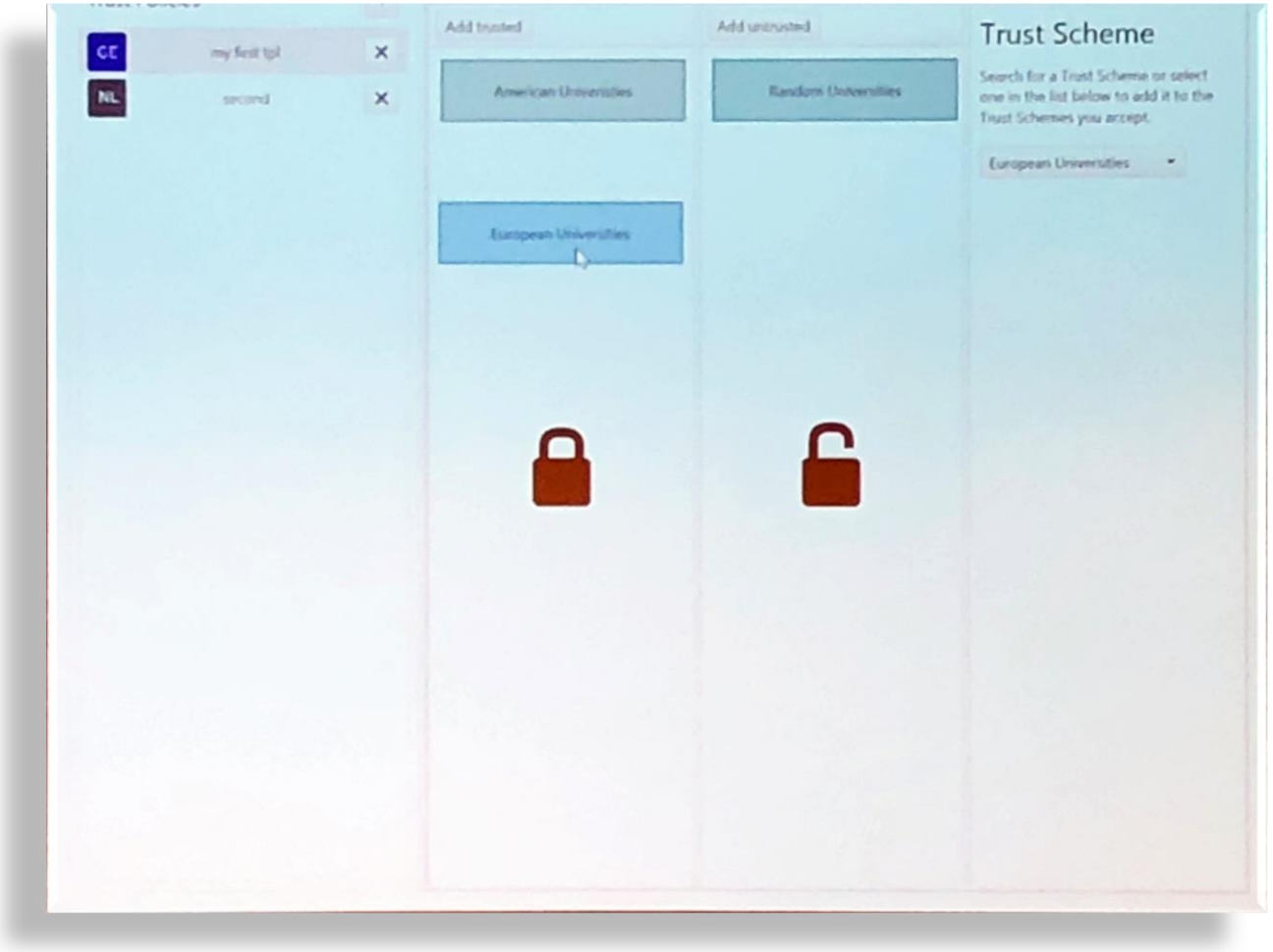
Trust Policy Authoring Tool

- Graphical Language



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Trust Policy Authoring Tool

- Natural Language:

if **<U_NameofUniversity>** is listed on **<trusted list of accredited universities>** published by **<U_Residence>**

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Trust Policy Authoring Tool

- TPL:

valid_university(***Certificate***) :-

extract(***Certificate***,format,university_cert_format),

extract(***Certificate***, trust_list, ***SubDomain***),

lookup(***SubDomain***,"university.trust.de",***TrustListEntry***),

extract(***TrustListEntry***, format, university_entry),

extract(***Certificate***, issuer, ***University***),

extract(***TrustListEntry***, entity, ***University***),

extract(***Certificate***, country, ***Country***),

extract(***TrustListEntry***, country, ***Country***),

extract(***TrustListEntry***, pub_key, ***PK***),

verify_signature(***Certificate***, ***PK***).

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Trust Policy Authoring Tool

lookup (***SD***,***TrustList***,***TrustListEntry***) :-

encode (***SD***,***TrustList***,***URL***),

query(***URL***,***TrustListEntry***)

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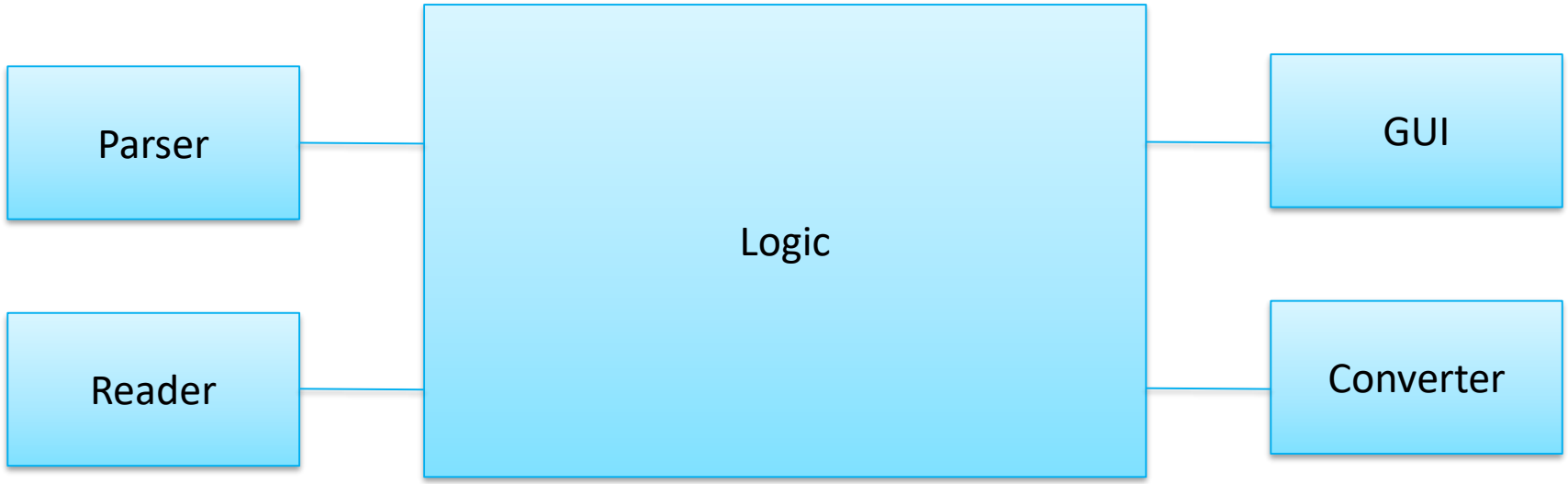

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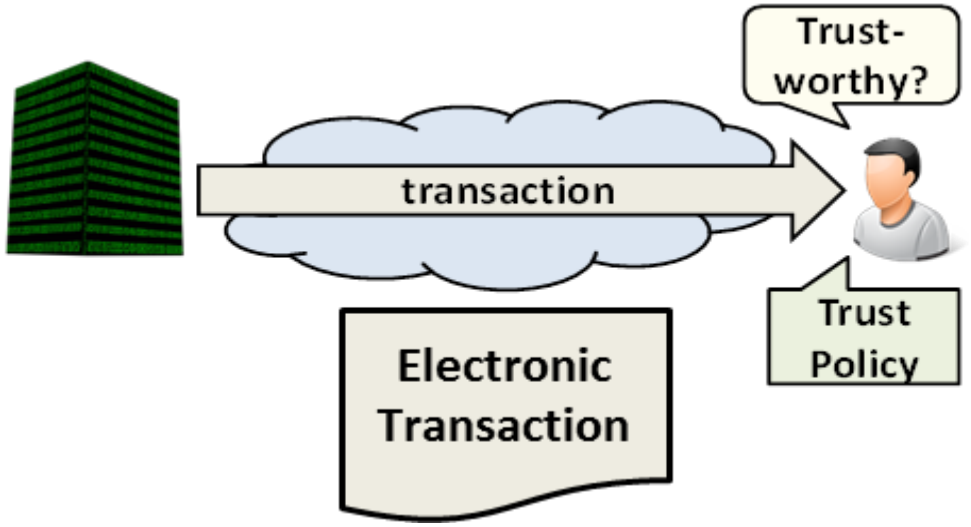
The Electronic Transaction

- An electronic transaction is a container (of a given format) that contains several documents or sub-containers. Optionally, documents and containers are associated with an electronic identity, e.g., via electronic signature



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The Electronic Transaction

- Components of an electronic transaction are:
  - Electronic Signatures: An electronic signature is the electronic equivalent of a traditional manual signature placed on a piece of paper.
  - Electronic Transaction Data: This are other necessary information sent apart from the signature in the process of the transaction which are necessary to understand the transaction

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The Electronic Transaction

- Associated Signature Container provides a standard for container types for packaging and associating the data and cryptographic parts of an electronic transaction.

- Internal structure of an ASiC container

  - A **root** folder for all the container content, including folders that reflect the structure of the content

  - A "**META-INF**" folder inside the above mentioned root folder that holds files that contain metadata about the content, including the associated signature/and or time assertion files

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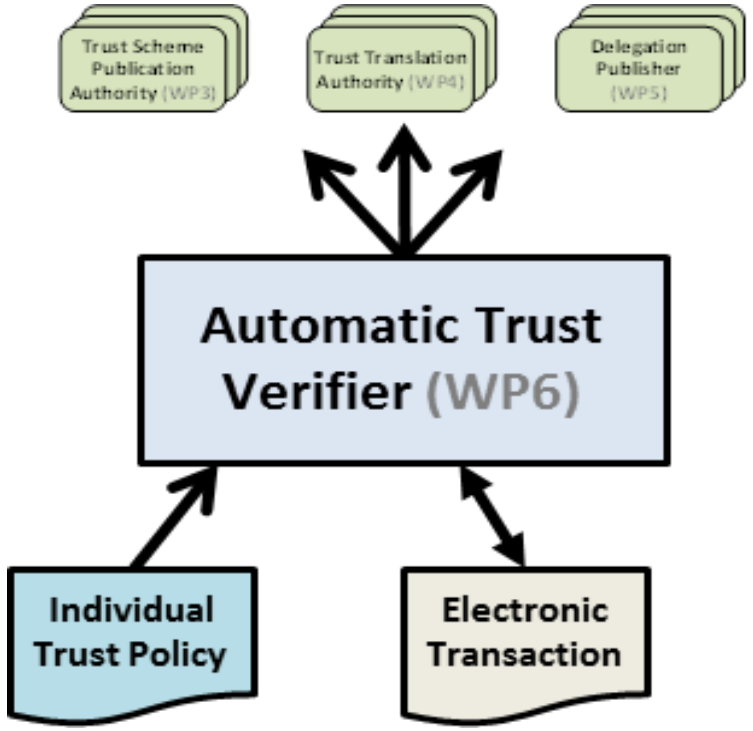
Automated Trust Verification



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Automated Trust Verification

- The process of verification is as follows:
  - The ATV receives the transaction and the trust policy
  - It verifies the signature on the transaction
  - It extracts the delegation from the document if it is available
  - It verifies the delegation from the DP
  - It retrieves the trust scheme based on the specifications of the trust policy
  - It retrieves the trust translation list based on the specifications in the trust policy
  - It verifies the transaction with all the input from the trust scheme, trust policy, trust tranlsation and trust delegation.

- The process of retrieving the trust scheme, trust translation and trust delegation is presented in the following slides.

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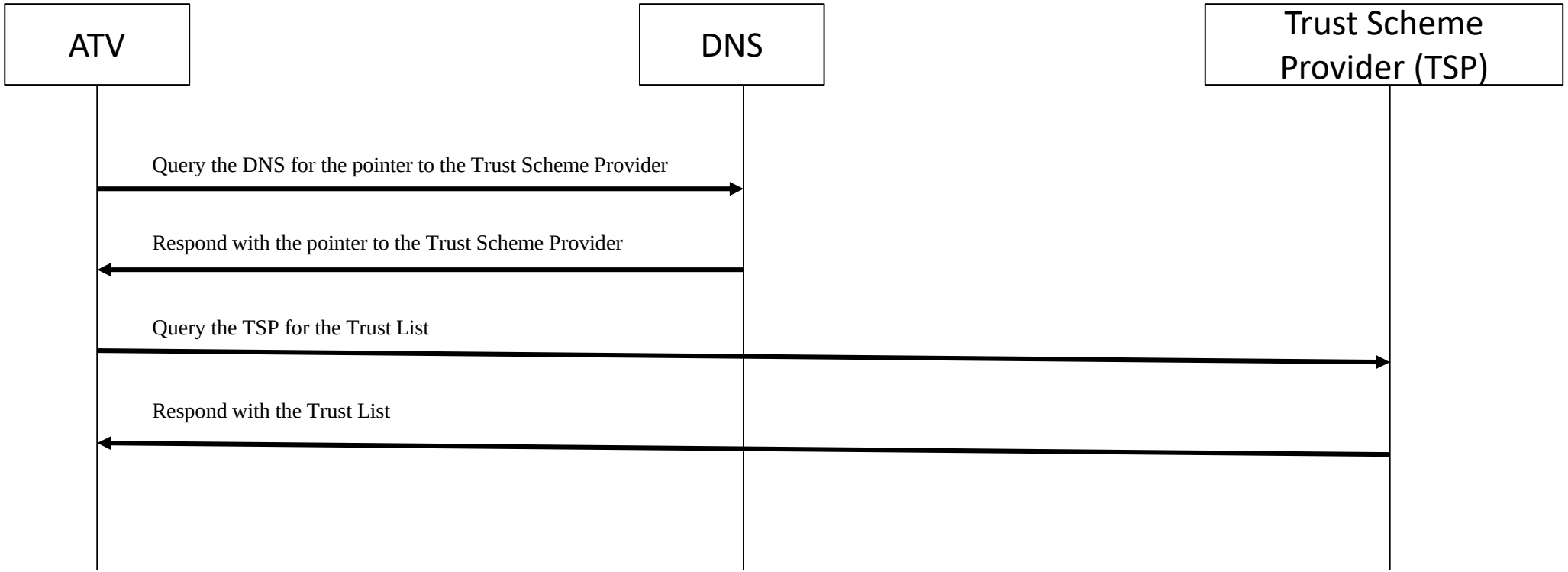
Automated Trust Verification



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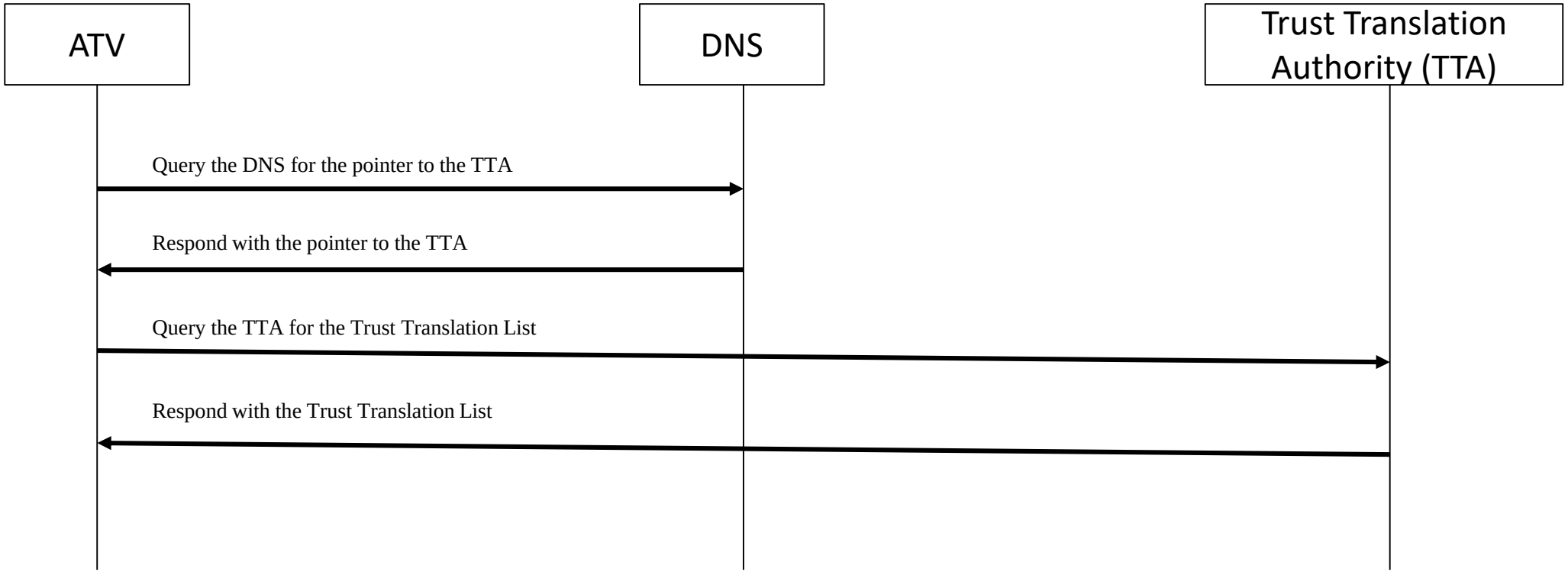

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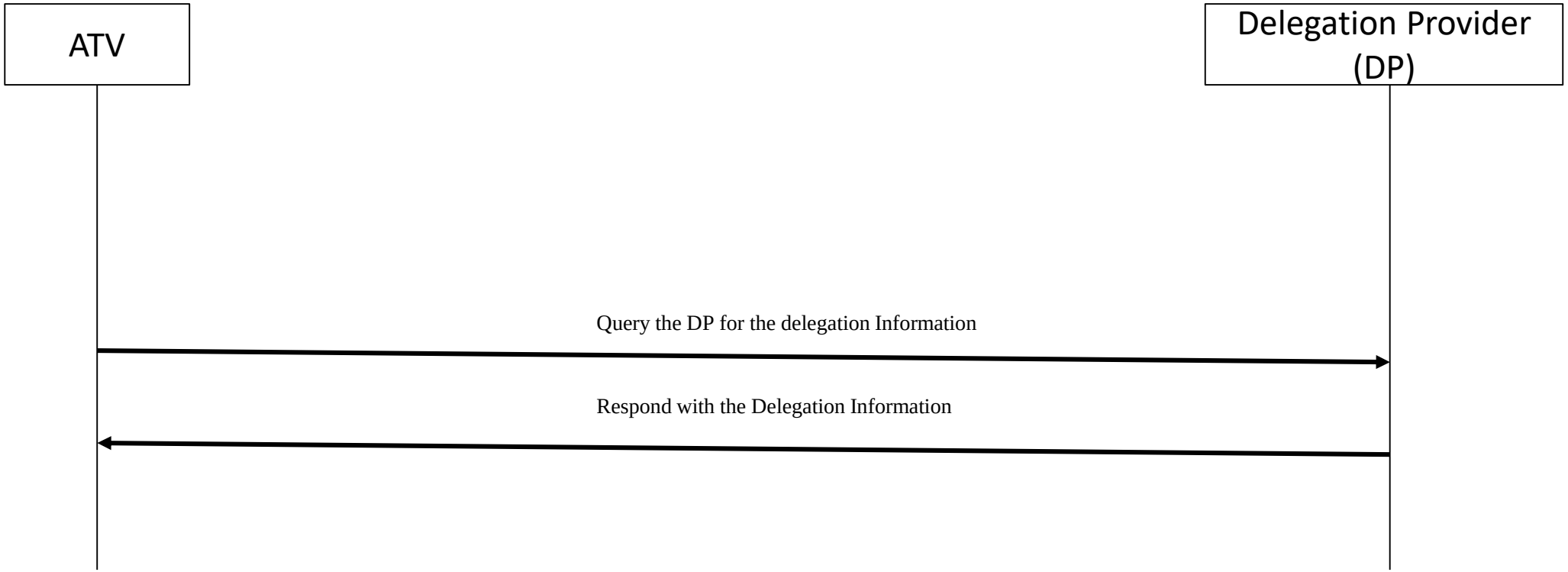

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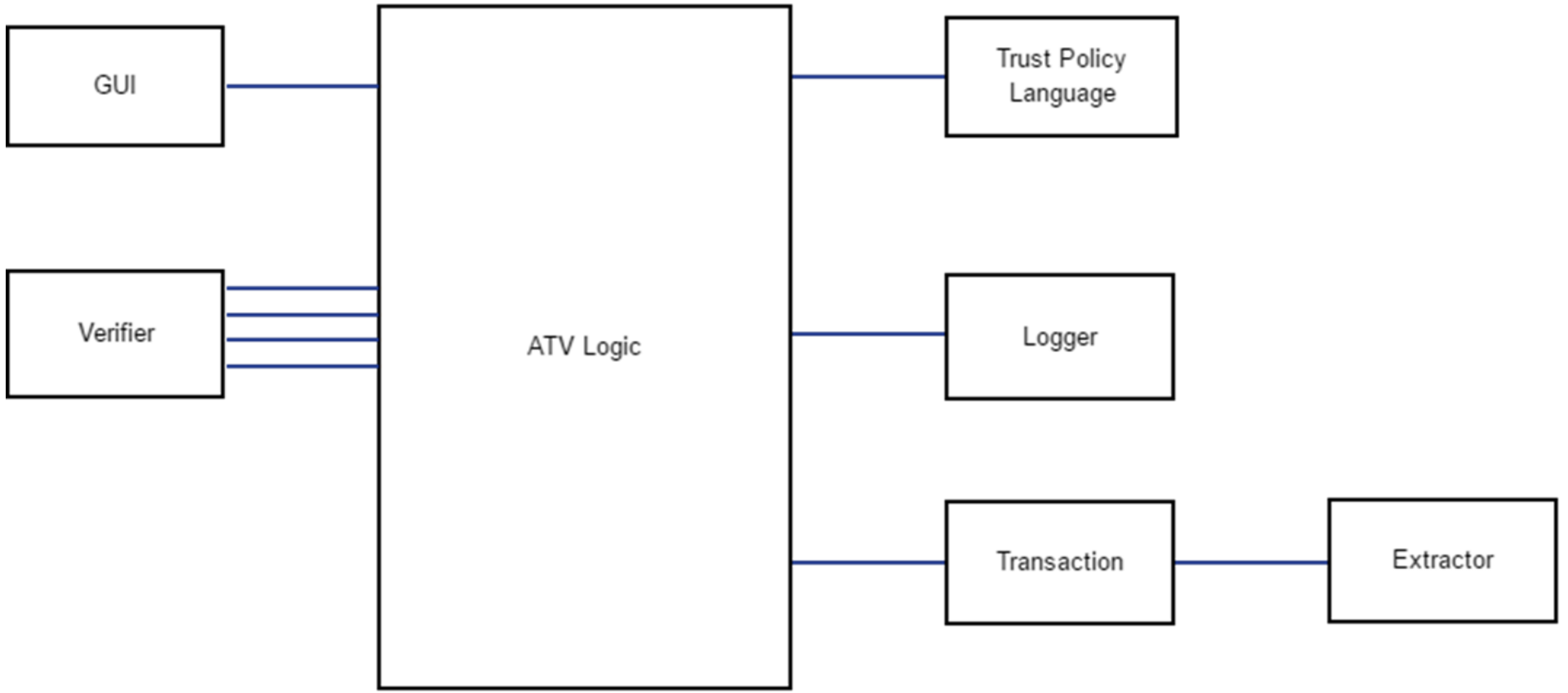
Automated Trust Verification - Components



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Automated Trust Verification

- Provides comparison of different Trust Policies
- Can be automated to block or pass a transaction, or use manual intervention for subjective decision making.

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LIGHT*est* is an ongoing project

- Project completion in December 2019
- On-Going activities being planned including
  - continuing development
  - support
  - consulting
- Many ways to become involved…
  - Community
  - International Forum
- https://lightest-community.org

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Thank You

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@LIGHTest_trust
www.linkedin.com/groups/12017516

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