CREDENTIAL

Secure Cloud Identity Wallet

You are what you keep!

CREDENTIAL's PSbD approach

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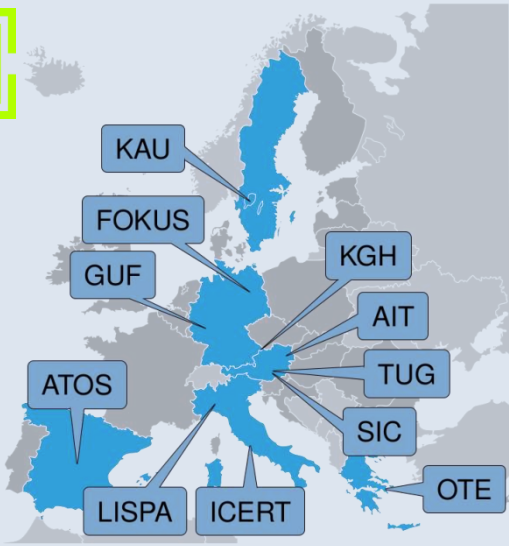
Summary

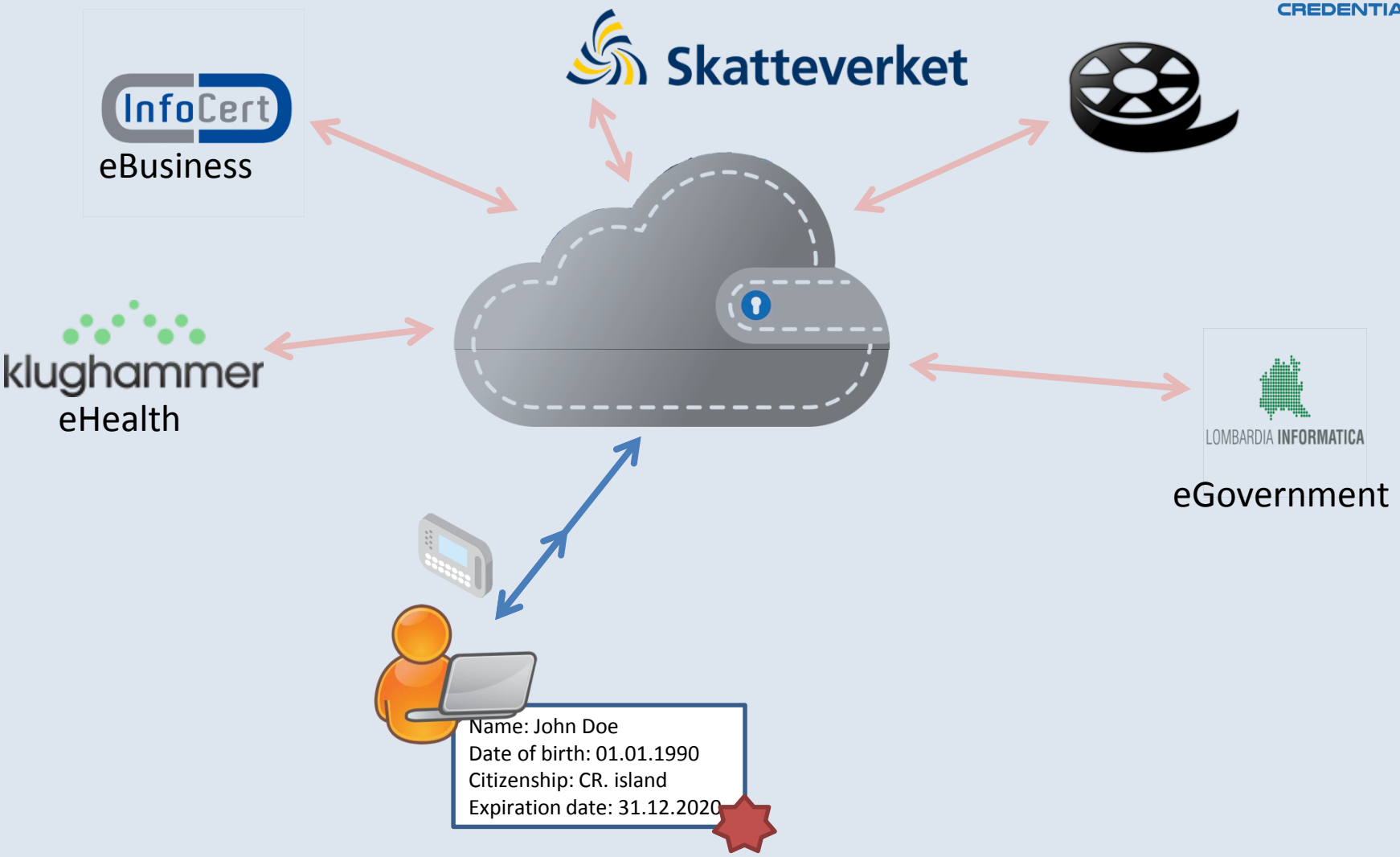
- CREDENTIAL
  - Summary
  - PbD Technologies
    - Re-encryption
    - Redactable signatures
    - 2Factor authentications
  - PbD Process
    - PRIPARE
    - Outcomes

CREDENTIAL

- **Duration**: Oct 2015 – Sept 2018
- **Estimated Project Cost**: 6‘645‘185.00€
- **Call:** DS-02-2014: Access Control
- **Consortium**:
  - 6 Industry partners
  - 3 Universities
  - 2 Applied research institutions



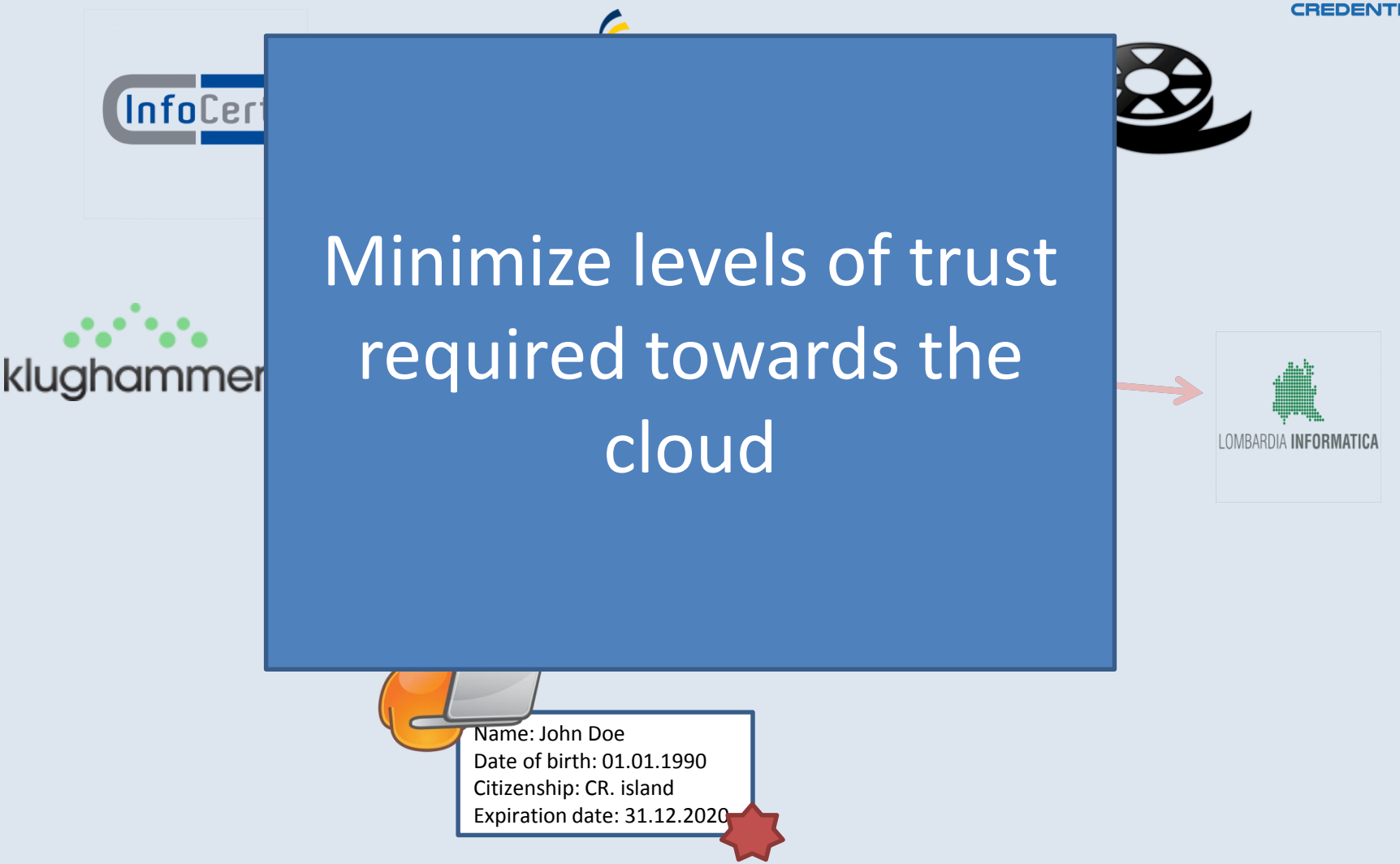
CREDENTIAL


InfoCert
eBusiness
Skatteverket
klughammer
eHealth
LOMBARDIA INFORMATICA
eGovernment
Name: John Doe
Date of birth: 01.01.1990
Citizenship: CR. island
Expiration date: 31.12.2020

CREDENTIAL & PbD

- CREDENTIAL is a privacy/security-oriented project
- PbD in the core technologies
- PbD at process level

CREDENTIAL


InfoCert
klughammer
Minimize levels of trust required towards the cloud
LOMBARDIA INFORMATICA
Name: John Doe
Date of birth: 01.01.1990
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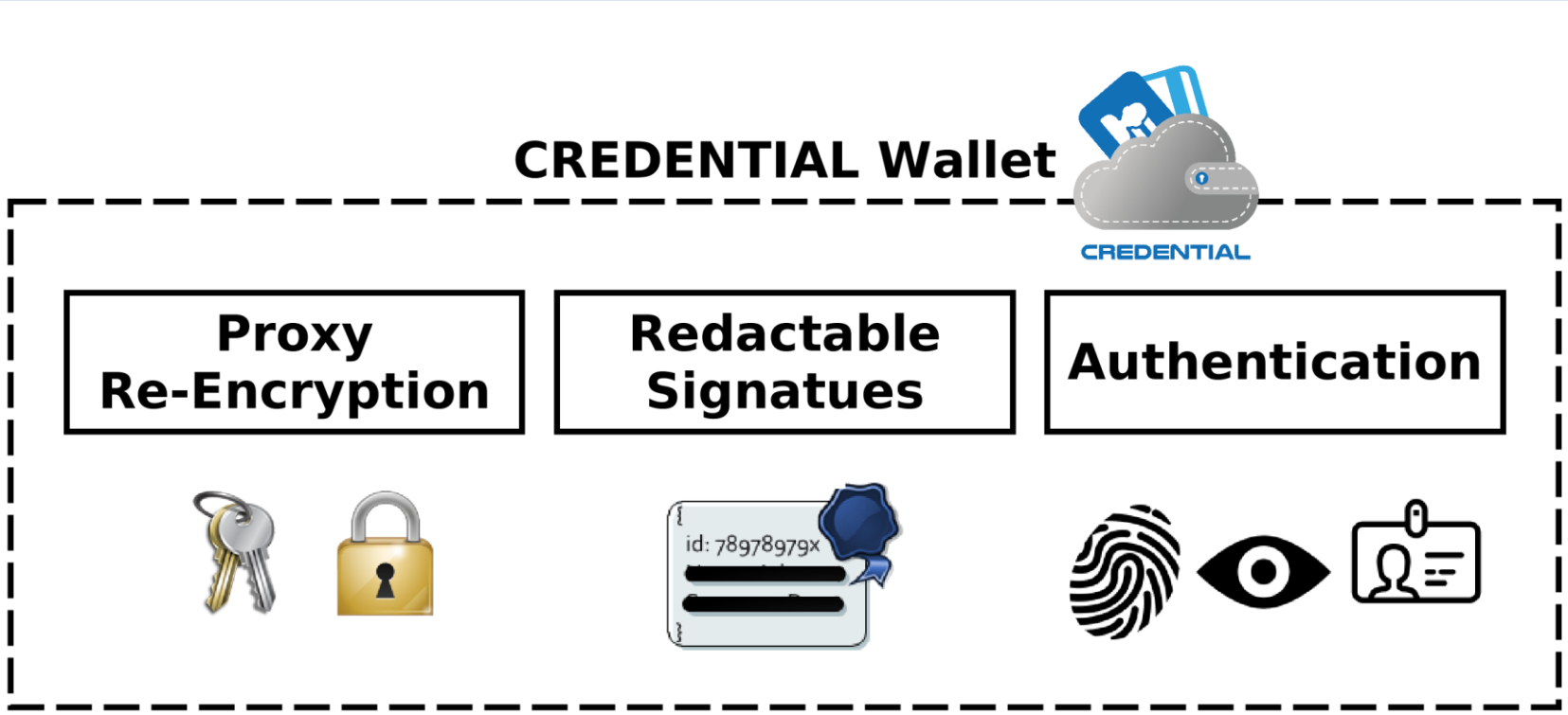
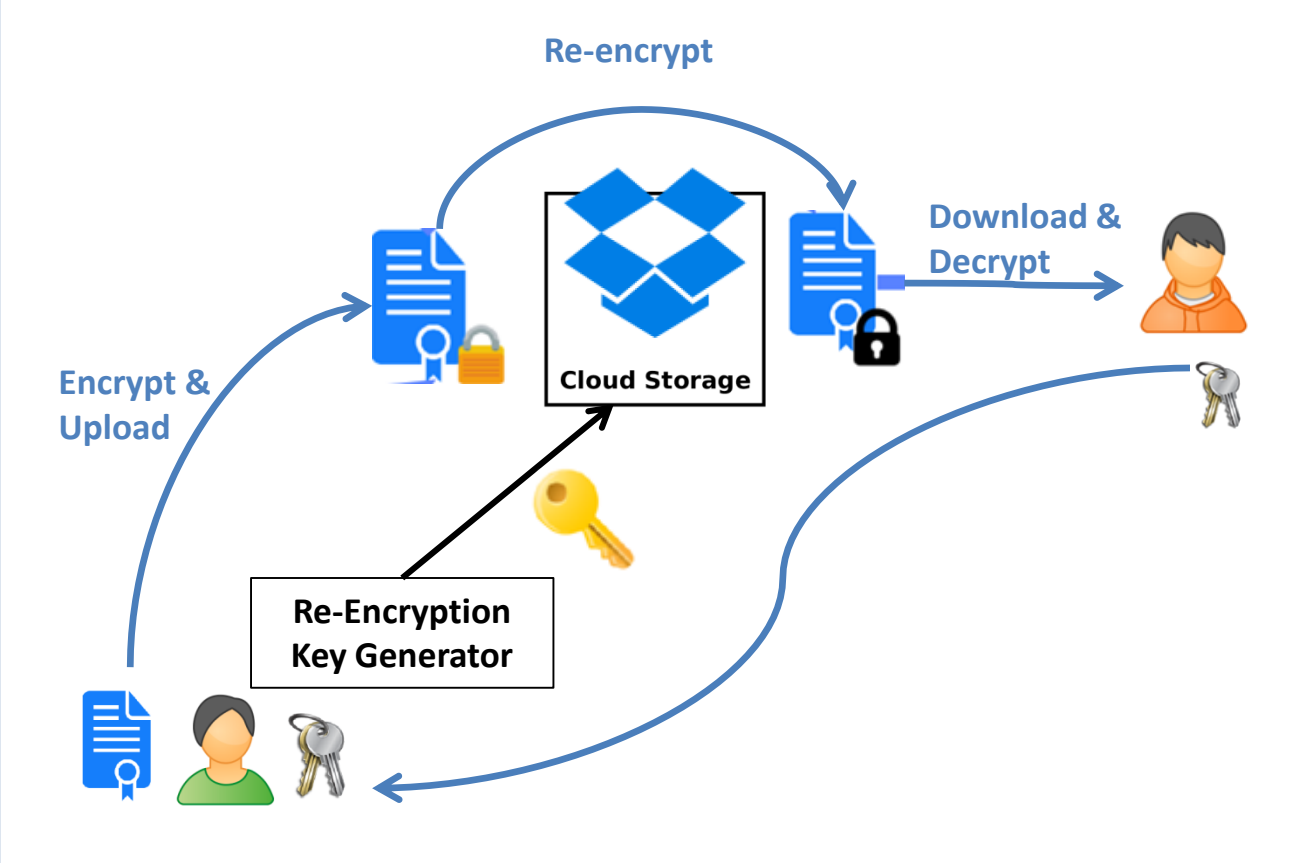
Technology Pillars



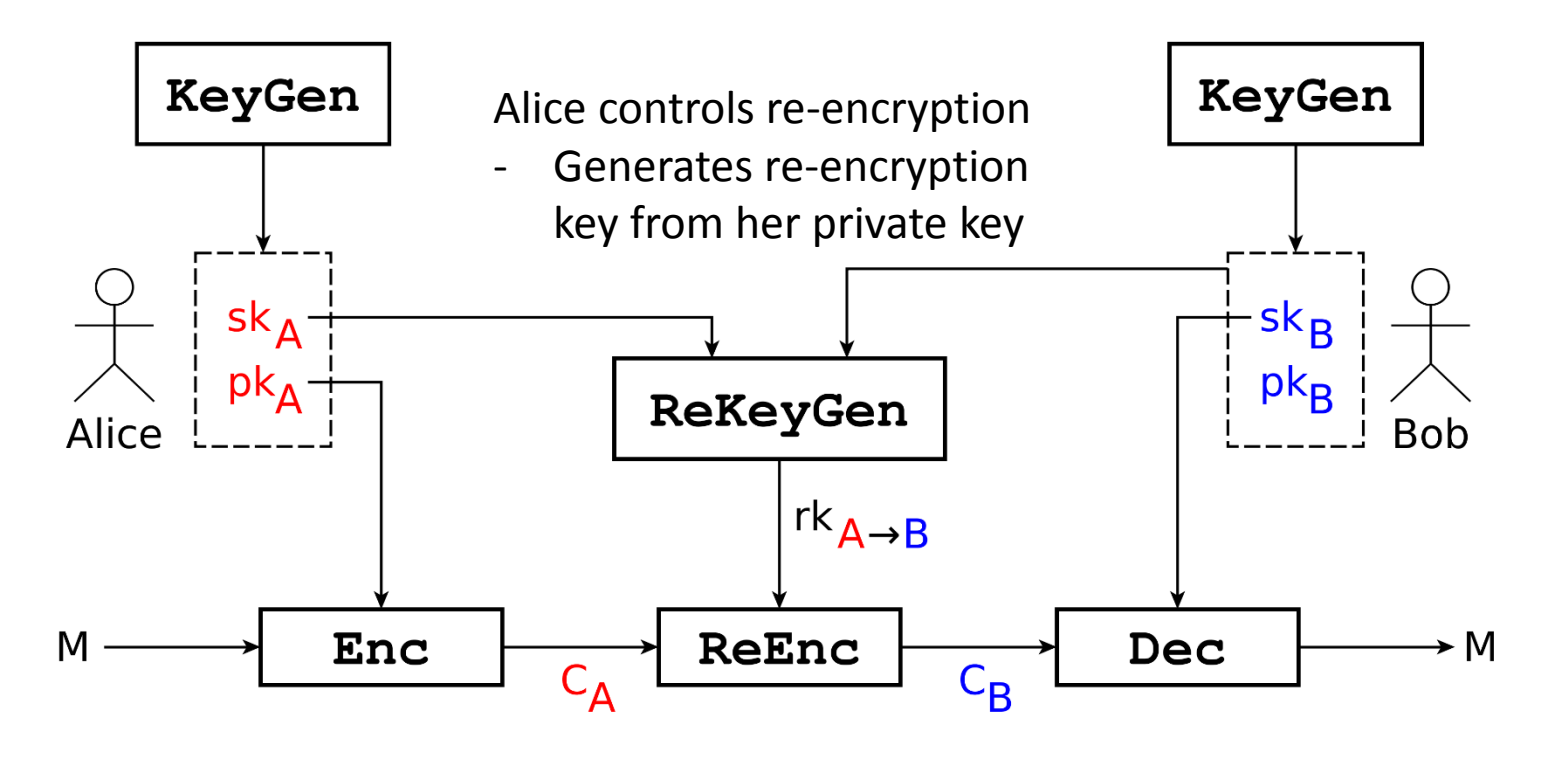
Proxy Re-Encryption

- Example Application: Data Sharing



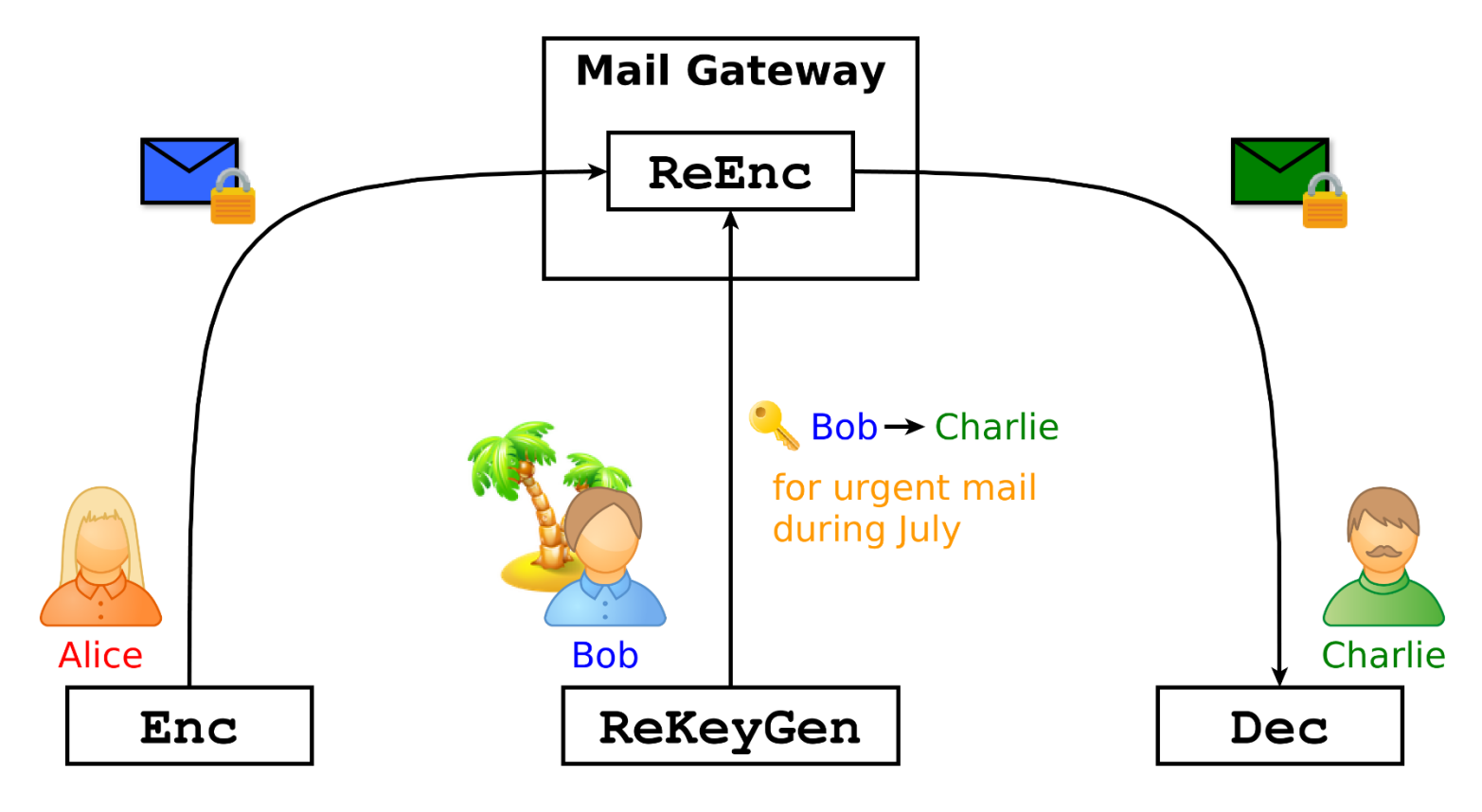
Proxy Re-Encryption

- Extends public key encryption
- Allows to transform ciphertext for user A to ciphertext for user B
  → Secure end-to-end encryption



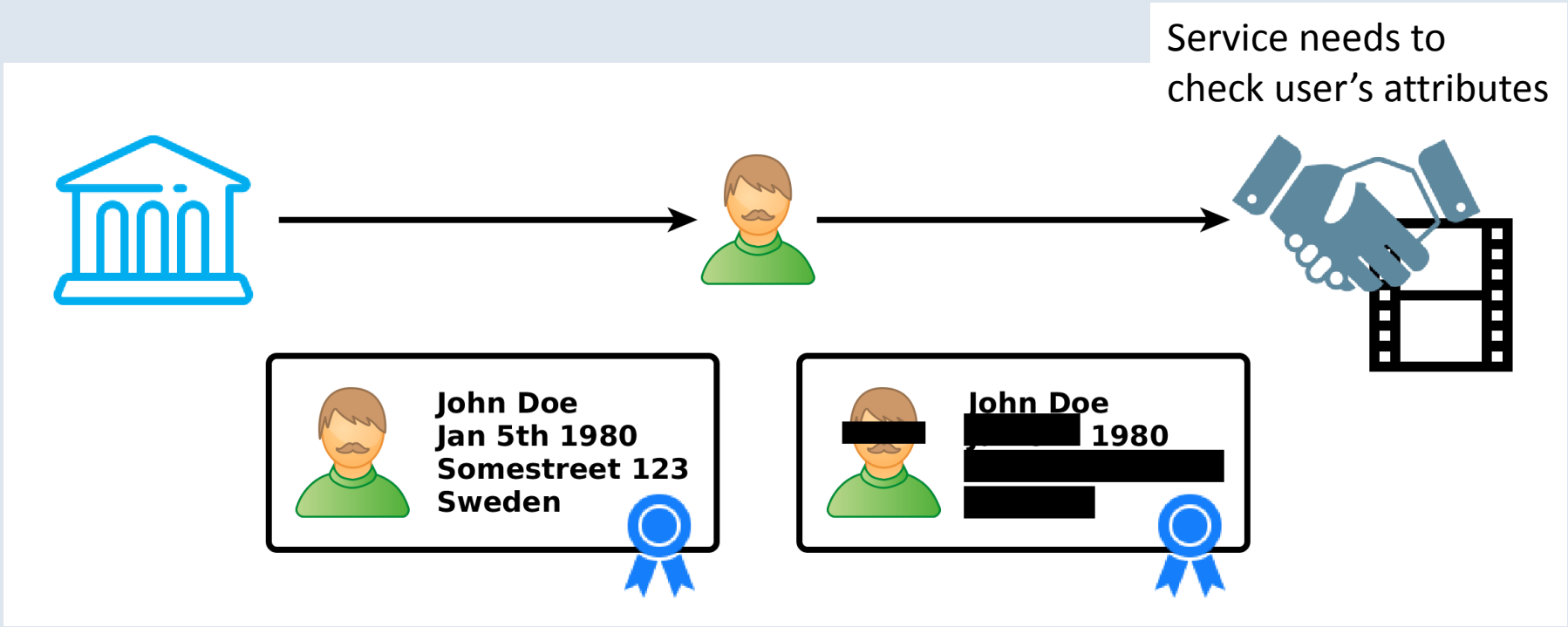
Conditional Proxy Re-Encryption

Example: Email forwarding



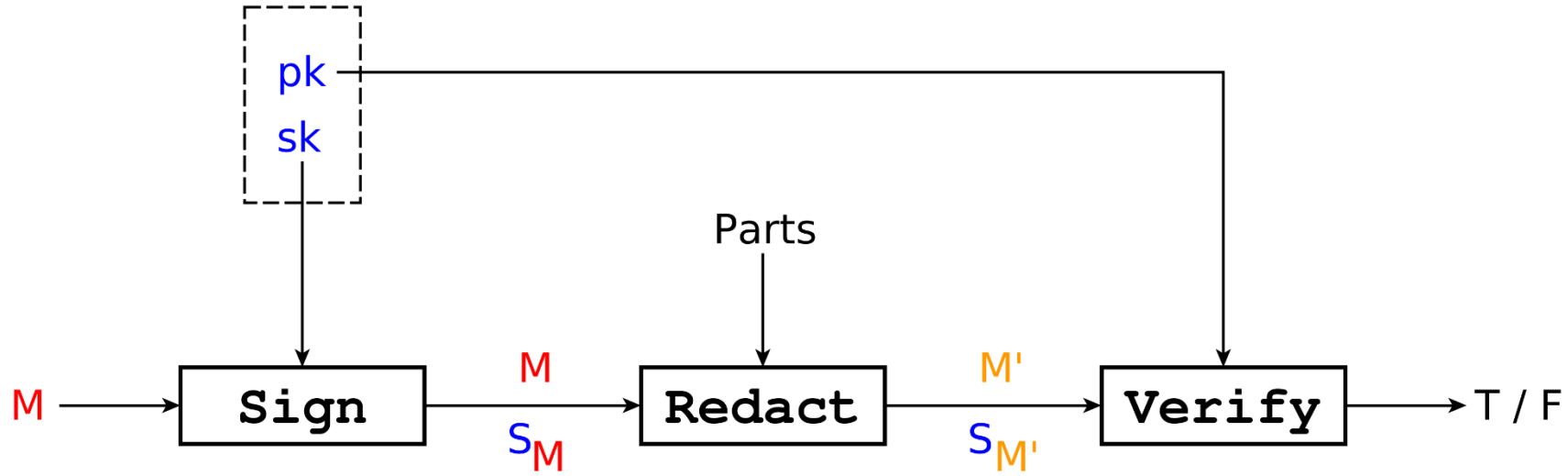
Redactable Signatures

- Example Application: Selective Disclosure



Redactable Signatures

- Black-out parts of a signed document
- Signature stays valid for remaining parts
  → Selective Disclosure



Two Factor Authentication

- Hardware-based authentication
- With two different factors of:
  - Knowledge, Possession, Inherence

- FIDO specification (local authenticators)
  - supported by many OSs and hardware
- Focus on
  - Biometrics, National eID solutions

PbD at a methodological level

- Map existing CREDENTIAL work structure with PRIPARE
- Recommend practices identified by PRIPARE as tools for CREDENTIAL tasks
- Ensure CREDENTIAL has a solid approach to PSbD ensuring that all processes considerd by PRIPARE as essential are present

PRIPARE project and its objectives

- PRIPARE (http://prepareproject.eu)was a 2-year FP7 Coordination and support Action which ended in October 2015
- Objectives
  - facilitate the application of a privacy and security-by-design methodology
  - foster risk management culture
- Outcomes
  - Methodology Handbook
  - Educational material
  - Gaps and recommendations on privacy and security-by-design practices
- PRIPARE is one of the seeds of recently approved ISO 21879 Work Item “privacy engineering"

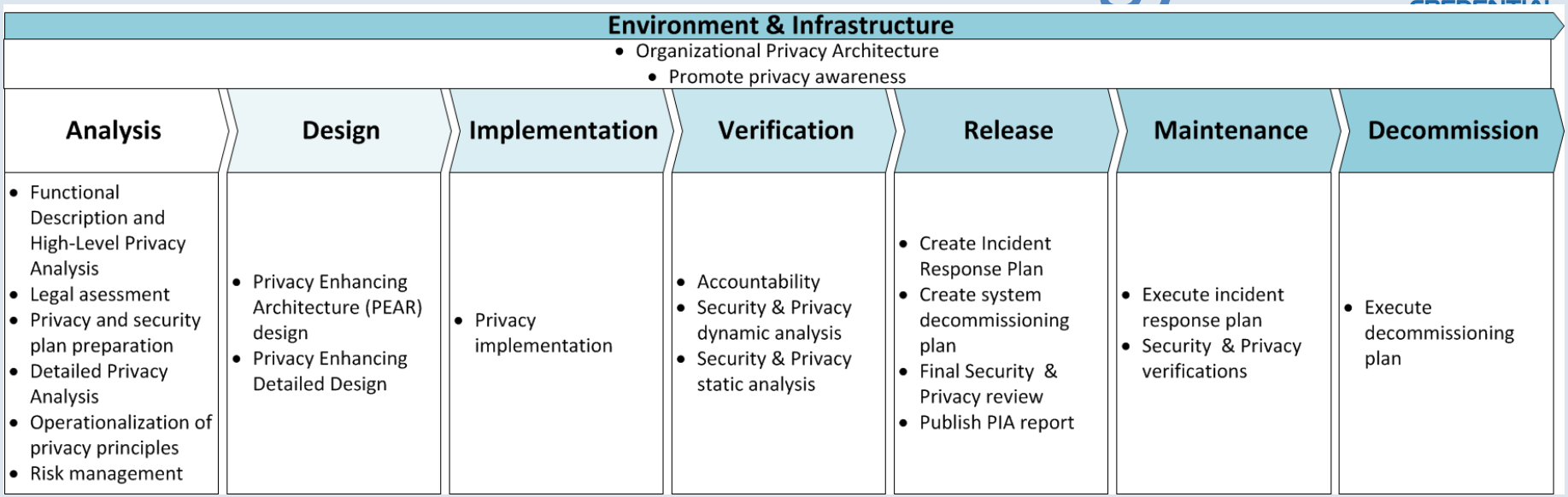
PRIPARE methodology sources

- Ontario IPC PbD principles
  - Full Functionality – Positive-Sum, not Zero-Sum
- Privacy Impact Assessments
  - More than a compliance check
- Privacy Management Reference Model (PMRM)
  - Understanding and analyzing privacy policies and their management requirements; selecting technical services which must be implemented to support privacy controls
- Microsoft Security Development Lifecycle
  - Build more secure software and address security compliance requirements
- Risk management (CNIL, BSI, STRIDE, EBIOS…)
  - Remove, minimise, transfer or accept identified risks
- Privacy Enhancing Architectures
  - Making the right architectural choices
- ISO Standards (29100, 29101, 24760, 29140)

PRIPARE Methodology Features

- Easy-to-understand and easy-to-use;
- Integrated with risk assessment standards;
- Designed to cover the whole system lifecycle;
- Flexible so it can adapt depending on the nature of the project and the information collected;
- Useful for different stakeholders;
- Engaged with engineering practices.
- Principles-based;

Process based methodology



Each process is described using a standard SIPOC notation

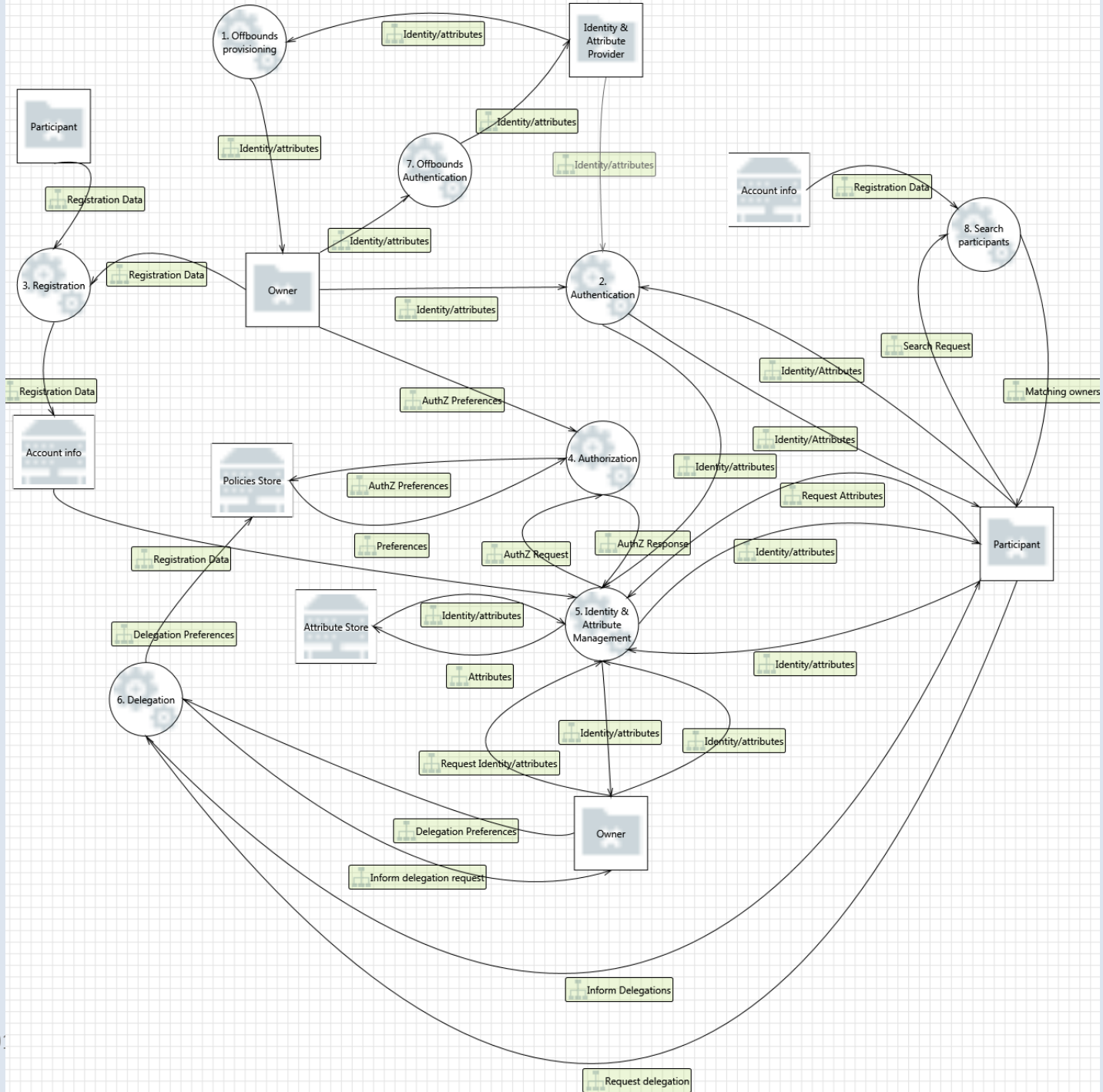
Process name				
Suppliers	Inputs	Process	Outputs	Customers
Tools & Techniques				
Knowledge				
Responsible				

CREDENTIAL – PRIPARE mapping

- High level privacy analysis as part of the requirement elicitation phase
- Legal analysis integrated with the requirement elicitation phase
- Detailed privacy analysis
- Risk analisys (privacy and security)
- Privacy requirements operationalization
- Privacy enhancing architecture
- Privacy enhancing detailed design

PbD process outcomes

- For now… requirements, ideas and discussions
  - Multiple accounts
  - Server-side vs client-side document index
  - Log information
  - SAML improvement to carry encrypted data with re-encryption scheme
  - Mix FIDO local authenticator approach with identity federation concepts
  - Metadata encryption/recryption
    - Do we need/want the cloud to know that the encrypted value are medical data or identity data?


1. Offbounds provisioning
Identity/attributes
Identity & Attribute Provider
Participant
Identity/attributes
Identity/attributes
7. Offbounds Authentication
Identity/attributes
Account info
Registration Data
Registration Data
8. Search participants
Identity/attributes
3. Registration
Registration Data
Owner
2. Authentication
Identity/attributes
Search Request
Identity/Attributes
Registration Data
AuthZ Preferences
Matching owners
Account info
Identity/Attributes
4. Authorization
Policies Store
AuthZ Preferences
Identity/attributes
Request Attributes
Participant
Preferences
AuthZ Request
AuthZ Response
Identity/attributes
Registration Data
Attribute Store
Identity/attributes
5. Identity & Attribute Management
Delegation Preferences
Identity/attributes
Attributes
6. Delegation
Identity/attributes
Identity/attributes
Request Identity/attributes
Owner
Delegation Preferences
Inform delegation request
Inform Delegations
Request delegation

Privacy and Usability Requirements I

- What privacy issues do you observe that might concern users, and thereby affecting the adoption of the CREDENTIAL technology?
- What usability issues do you observe that might create hurdles for users to operate CREDENTIAL technology?

Privacy and Usability Requirements II

- Are you concerned that the wallet may be a privacy risk to the user?
- Is having multiple accounts a good idea ? or rather a usability and privacy challenge?

Credential Partners

Contact

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Further Information

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Thank you very much for your attention!