tnc23
DIGITAL GENERATIONS
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Verifiable credentials, sovereignty, decentralization and lifelong learning: a new paradigm for education

My digital backpack

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Tirana

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GÉANT

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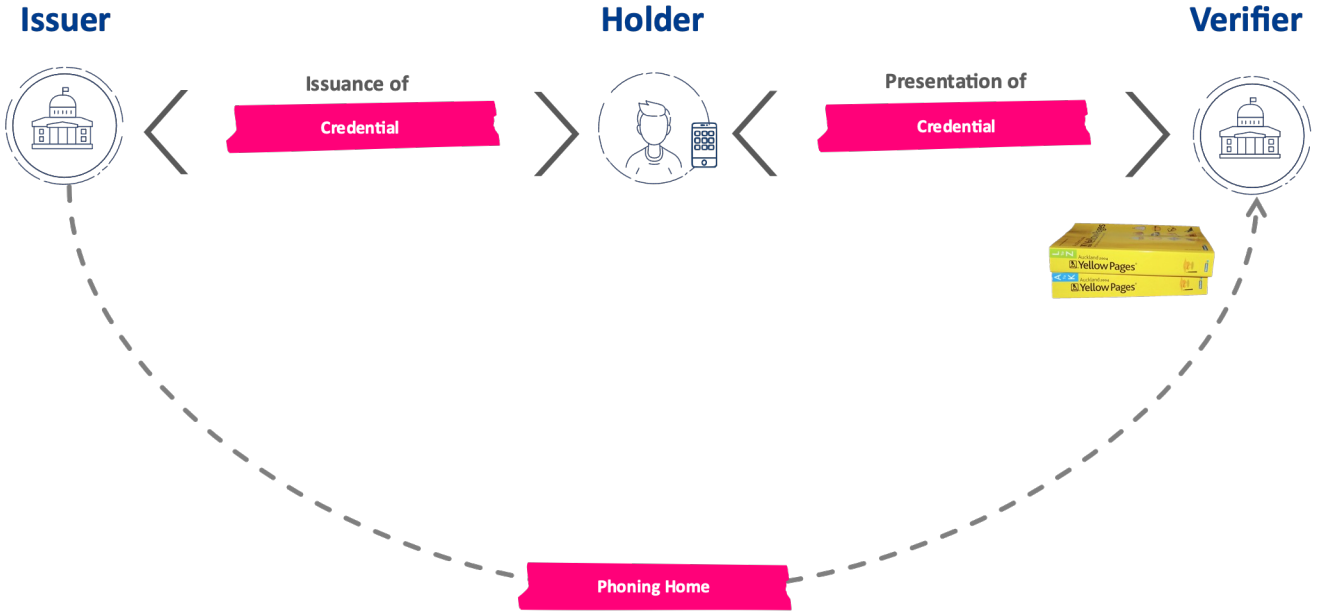
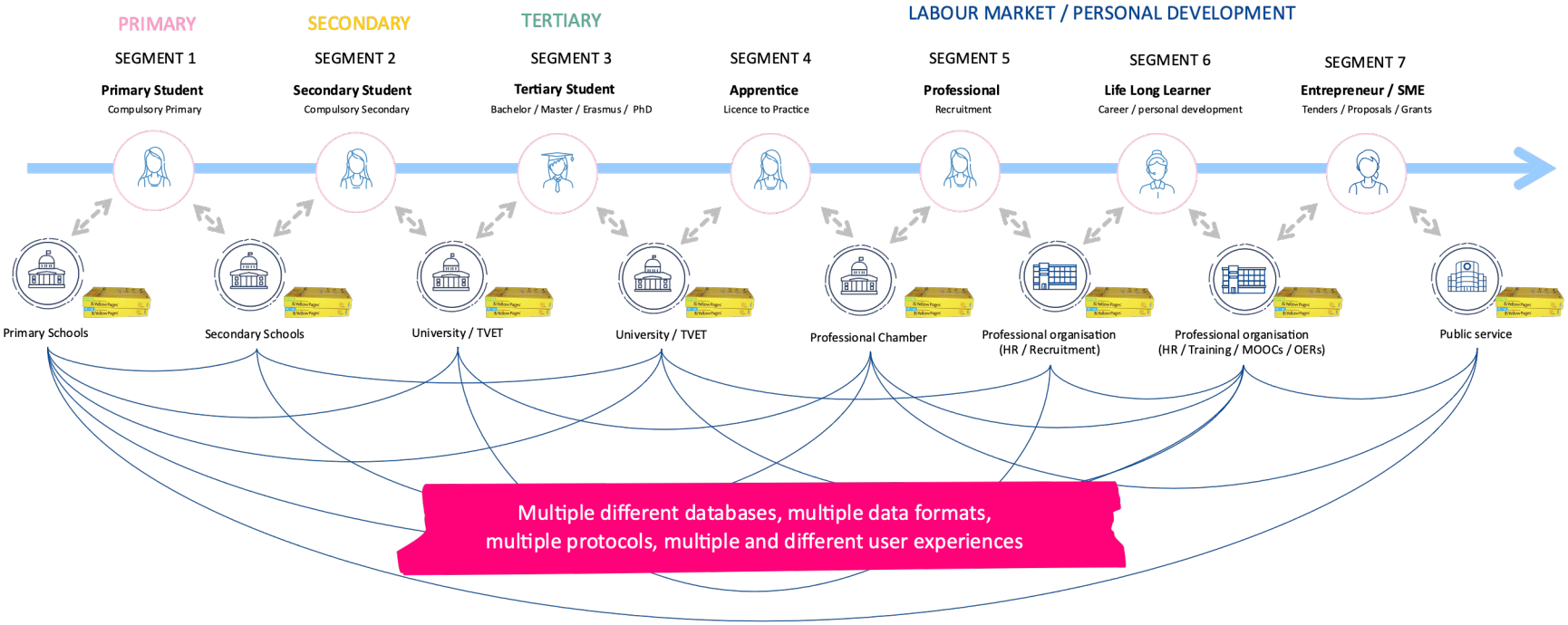
Classical issuers trust models

Classic solutions often require Verifiers to contact Issuers in order to ensure that the information they receive from Holders can be trusted. This pattern is called “phoning home”.

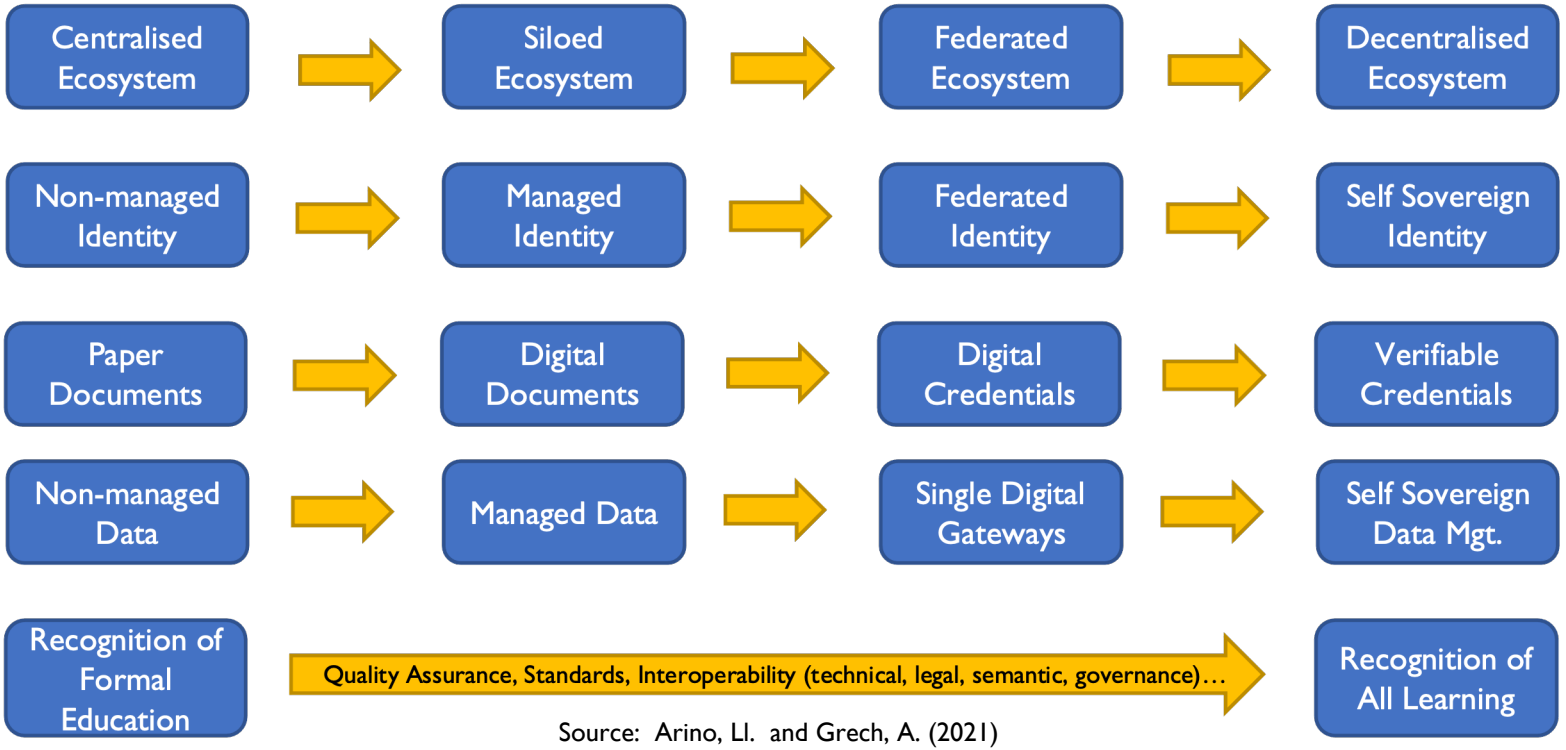


- **Issuer** needs to create and maintain APIs available to Verifiers and ensure that connectivity is available 24x7
- **Verifier** needs to create and maintain calls to all those APIs from every credential Issuer
- Non-privacy preserving: a way for issuers and Verifiers to correlate an identity holder’s usage of a credential

The verification of credentials across the entire education ecosystem remains a complex, laborious exercise



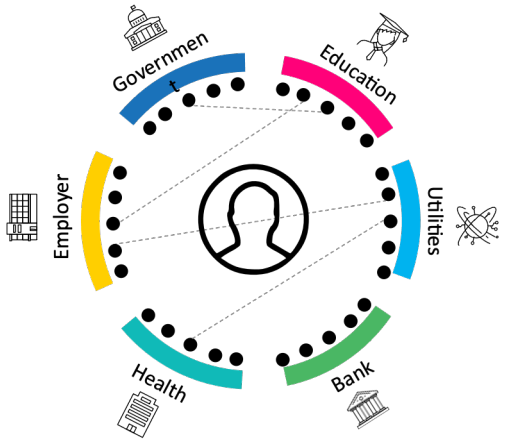
Decentralisation and sovereignty: a new paradigm



Source: Arino, Ll. and Grech, A. (2021)

Decentralisation and sovereignty: putting learners and citizens in control of their data!

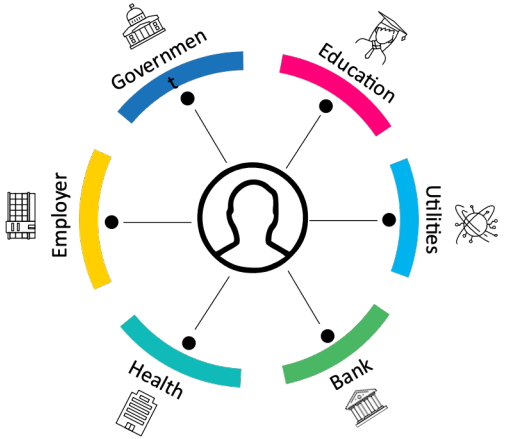
Centralised and federated models



- The user is not in control
- The user experience is on the context of each domain (often also different within the same domain)
- There are few crossdomain information exchanges
- Verification is costly

From 'Trust by law...'

Decentralised models



- The user is fully in control
- The user experience remains the same across domains and within the same domain
- There are multiple crossdomain information exchanges
- Verification is easy and fast

.to 'Trust by Design'

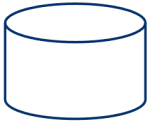
Conceptual Trust Models of Issuers that avoid “phoning home”

Scalability, flexibility and interoperability

Centralised Trust Model

For example:

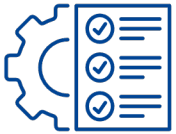
Certificatese.g. managed PKI



Federated Trust Model

For example:

Trusted Lists (*)



Distributed Trust Model

For example:

ebsi European Blockchain Ledger

- Public Keys of Issuers
- Registry of Issuers
- Trusted Schemas Registry

Three basic Trust Models of Issuers of Verifiable Credentials (models can be combined)

3 key technologies for citizen's sovereignty

Information is easy to verify, almost impossible to fake and controlled by citizens

Blockchain / Ledger

Don't Trust, Verify

Digital Wallet

Not your keys, not your digital asset

Verifiable Credentials

A new way of expressing and automating information

Metadata | Claims | Proofs (signatures)

Advantages that highlight the transformative potential of verifiable credentials based on electronic ledgers

Trust and Authenticity:

Verifiable credentials leverage cryptographic techniques to ensure authenticity and integrity.

They provide a **higher level of trust compared to non-verifiable digital credentials**, as they are tamper-resistant and can be easily verified.

Security and Immutability:

Verifiable credentials are stored in decentralized systems, such as blockchain or distributed ledgers.

This **distributed nature enhances security** and makes the credentials immutable, **preventing unauthorized changes or fraud**.

Privacy and Data Control:

Verifiable credentials enable individuals to have more control over their personal data.

They **allow selective disclosure**, meaning individuals can share only the necessary information without revealing their entire credential or identity.

Efficient Verification:

Verifiable credentials streamline the verification process, reducing reliance on manual checks.

Relying parties can **quickly verify the authenticity of a credential by validating it against the distributed ledger,** saving time and effort.

Interoperability and Portability:

Verifiable credentials adhere to standardized formats and protocols, ensuring interoperability across different systems and platforms.

They can be **easily shared and transferred** between individuals, organizations (public and private), or services, making them **highly portable**.

Reduction of Fraud and Counterfeiting:

Verifiable credentials, with their built-in trust mechanisms, significantly reduce the risk of fraud and counterfeiting.

The cryptographic techniques used in verifiable credentials make it **extremely difficult** for malicious actors **to forge or tamper** with the information.

Future-proof and Scalable:

Verifiable credentials offer a forward-looking solution that can adapt to evolving technological advancements.

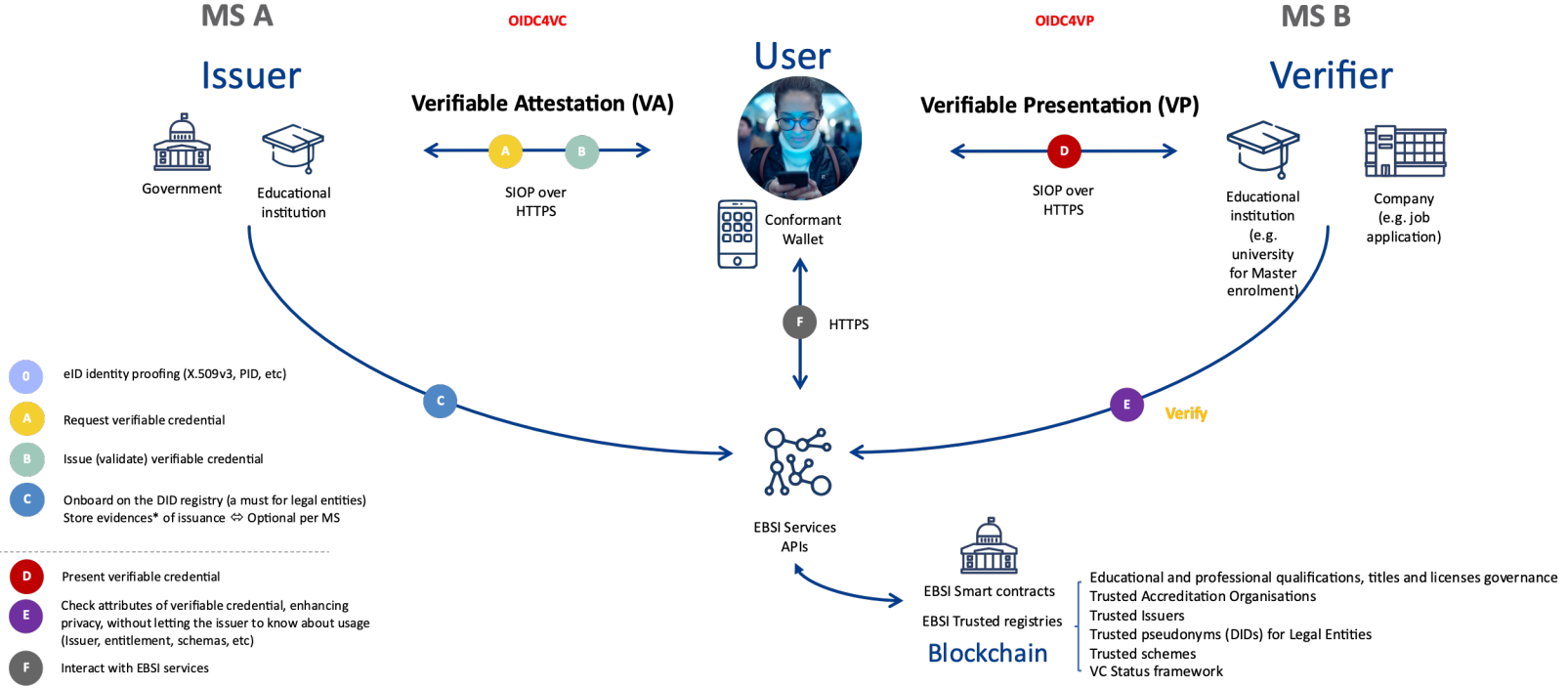
The decentralized nature of electronic ledgers provides **scalability**, allowing for a large number of credentials to be managed efficiently.

Enhanced Transparency and Auditability:

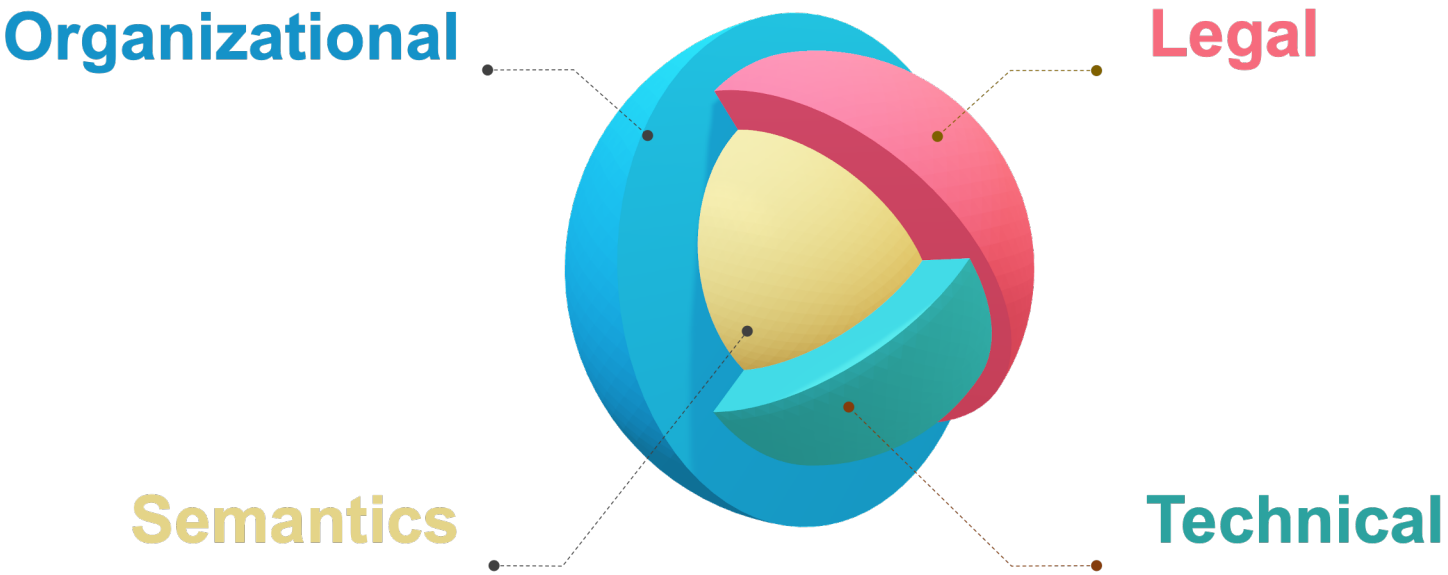
Verifiable credentials recorded on electronic ledgers enable greater transparency and auditability.

The **transaction history and verification records can be traced back, providing a verifiable and immutable audit trail**.

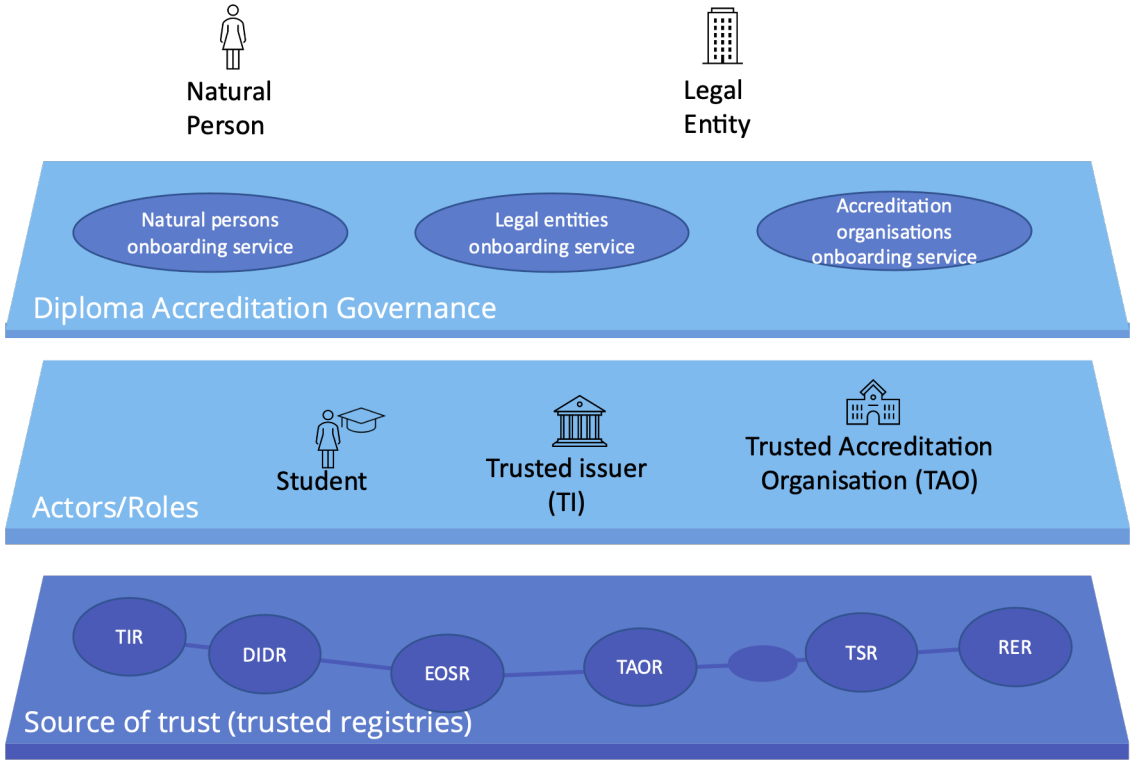
3 elements enable a new paradigm to exchange data between parties in a sovereign way



Interoperability dimensions



Interoperability dimensions: Governance



eqar
European Quality Assurance Register for Higher Education

EQAVET
European Quality Assurance in Vocational Education and Training

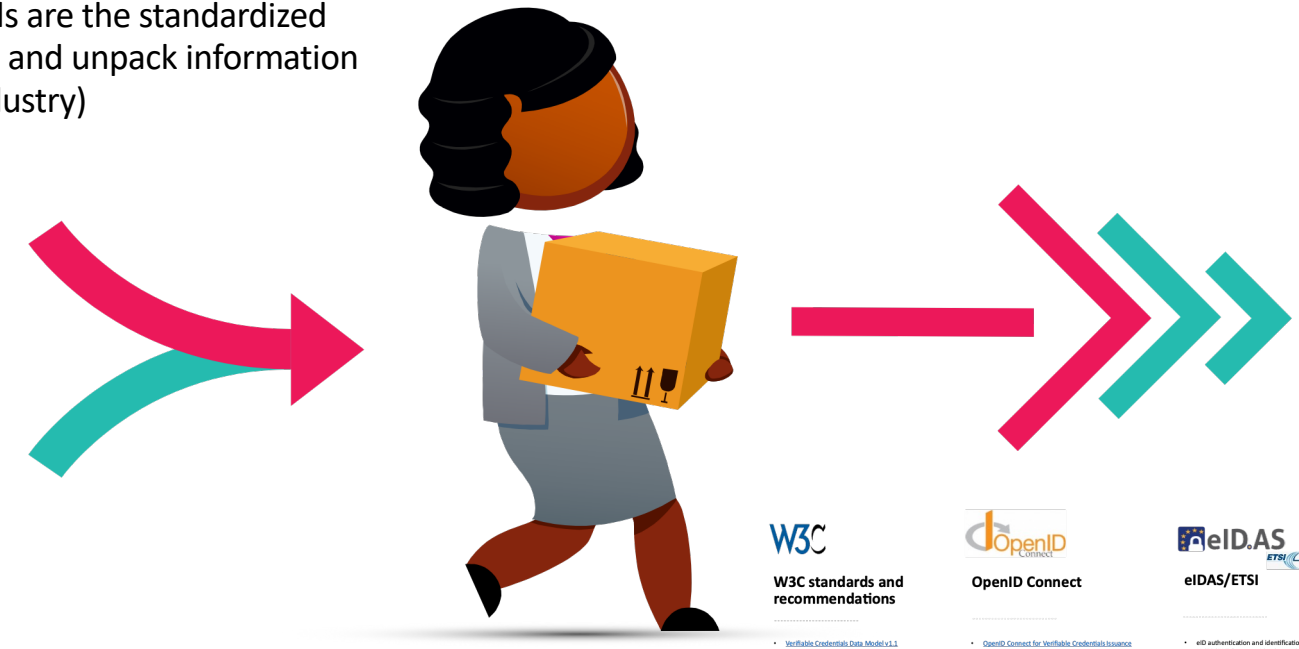
Interoperability dimensions: Legal

- Identity
  - The eIDAS trust framework: the common language for cross-border
  - Current eIDAS only defines “levels of assurance” for Verifiable IDs: Only IDs with substantial or high LoA must be accepted by Member States
  - but … IDs with others LoA low may also be accepted on a voluntary basis, according to the corresponding national legislation applicable to e-Government processes

- Data
  - Privacy - GDPR
  - Data typically embody juridical acts, such as certifying acts by public authorities and other authoritative sources (including private sector bodies with respect to data they’re authoritative for).
  - Therefore, in the logic of eIDAS, they constitute legally binding electronic documents, that should be authenticated according to the national legislation (so national legislation/rules applies for cross-border mobility data)

Interoperability dimensions: Technical

Verifiable credentials are the standardized way to pack, deliver and unpack information (for any domain/industry)



W3C standards and recommendations

- Verifiable Credentials Data Model v1.1
- Decentralized Identifiers v1
- Presentation Exchange v2

OpenID Connect

- OpenID Connect for Verifiable Credentials Issuance
- OpenID Connect for Verifiable Presentations
- OpenID Connect SIOP v2

eIDAS/ETSI

- eID authentication and identification
- JAdES (JWT format, with advanced electronic seal based on qualified certificate using JAdES according to ETSI TS 119 182-1 B-LT, or with advanced electronic seal based on decentralized registry of EBSI trusted issuer)

JWT RFC family

- SD-JWT
- IETF RFC 7515-7520

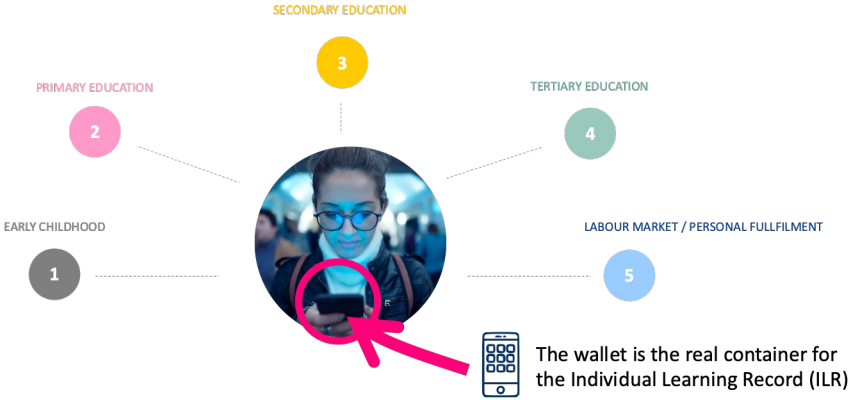
Interoperability dimensions: Semantic

- An unique opportunity at EU level (… and abroad?)

- (Only) EBSI exists at EU level in the verifiable credentials space aligned to the European Self-Sovereign Identity Framework (eSSIF)
  - And, of course, aligned to W3C, OpenID, eIDAS, ETSI

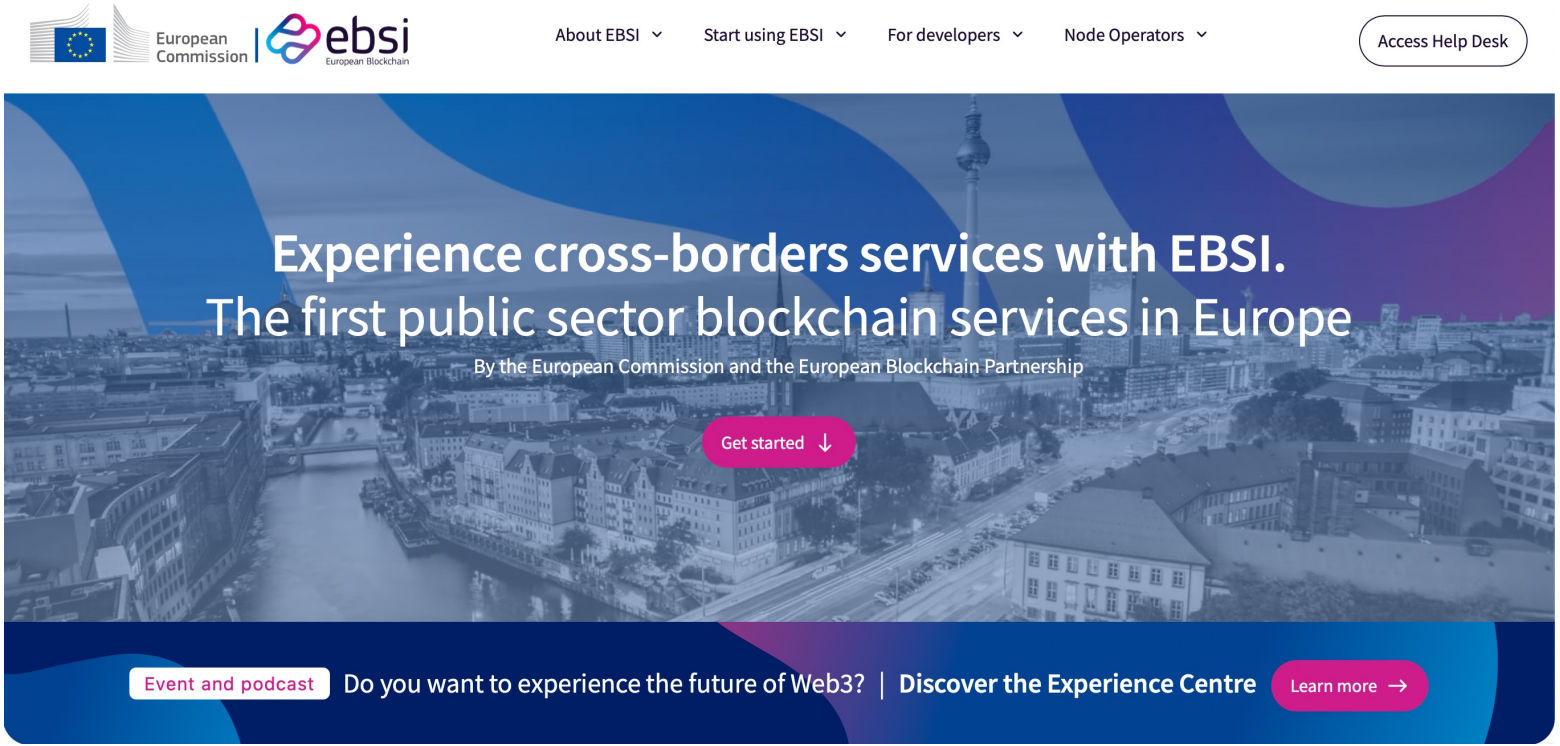
- Some agreements reached (27MS+LI+No)
  - European Learning Model – ELM: an opportunity
    - Only for learning (formal, non-formal, informal)
    - Proper governance must be established (not only DG-EMPL)
  - MyAcademicID
    - Partial schema in EBSI Wave2
    - GEANT will enter EBSI Wave 3 – full schema serialization will be available
      - MyAID governance will be established
      - Schema ownership
      - Review/approval eduPerson
      - Review/approval ESI
  - MyEUAID?

New paradigm achievements: focusing on citizen, breaking educational SILOs, enabling LLL, PLP, SC



- Aligned to (EBSI VALUE FOR EDUCATION):
- EU Digital Strategy
- EU Data Strategy
- EU digital credentials action plan
- EU Digital action plan
- Europass decision
- Europass Digital Credentials
- European education area
- European research area
- European universities initiative
- European skills agenda
- Individual Learning Record
- eIDas trust framework
- GDPR
- Once only principle (enabling the citizens perspective)
- State of the Union address (091620) and European Council Conclusions (100220) for both, identity and data
- European Declaration on Digital Rights and Principles for the Digital Decade

It’s not the future, it’s already available:



More than 100 HEIs and 7 European Universities Alliances have/are entering in the new paradigm

Currently, in Wave 3

More than 15 conformant wallets (also open source ones)

Are you a wallet provider?
Interested to join this ecosystem and accelerate its development and adoption?

Become conformant →

Challenges for educational institutions, citizens, and private sector

- Citizens
  - State of the Union address (091620)
  - European Council Conclusions (100220)
  - eIDas 2

Citizens in full control of both, their
Identity & Data

- Education
  - EU Digital Strategy
  - EU Data Strategy
  - EU Digital action plan
  - EU Digital credentials action plan
  - Europass decision
  - Europass Digital Credentials
  - European education area
  - European research area
  - European universities initiative
  - European skills agenda

Needed:
A more flexible education ecosystem
Embracing LLL, PLP, 21st Century Skills
(Up+Re)skilling of the workforce

eIDAS review (eIDAS2)

- eIDAS 1: **inherent limitations** to the public sector; limited possibilities and complexity for online private providers to connect to the system; insufficient availability of notified eID solutions in all Member States; citizens identity non-mandatory in all Member States; lack of flexibility to support a variety of use cases.
- **Identity solutions falling outside the scope of eIDAS** (social media providers and financial institutions), raise privacy and data protection concerns, and do not have cross-border recognition.

- A new environment where the **focus** has shifted from the provision and use of rigid digital identities to the provision and reliance on **specific attributes related to those identities**.
- An increased demand for electronic identity solutions that can deliver these capabilities providing efficiency gains and a **high level of trust** across the EU, both in the private and the public sector, relying on the need to identify and authenticate users with a high level of assurance.
- A new approach to ensure that both, citizens and companies, can **trust on digital services** of the digital decade.
- A new approach to **citizen's** privacy and **sovereignty** on their identity and data.

eIDAS2 key highlights

- **Natural** and **legal persons**.
- **All MS** are mandated to issue EUDIW (including PID)
- That these solutions are linked to a variety of attributes and allow for the targeted **sharing** of identity data **limited to the needs** of the specific service requested.
- The user shall be **in full control** of their identity(es) and data.
- The issuer of the EUDIW shall **not collect information about the use** of the wallet
- Obligation of admission
  - by **public sector entities** and by **private providers**.
  - by **very large online platforms that require authentication**.
- **Cross border recognition principle**:
  - A qualified electronic attestation of attributes issued in one Member State shall be recognised as a qualified electronic attestation of attributes in any other Member State.
  - An attestation of attributes issued by or on behalf of a public sector body responsible for an authentic source shall be recognised as an attestation of attributes issued by or on behalf of a public sector body responsible for an authentic source in all Member States.

Large Scale Pilots

20 countries

56 public and 80+ private entities

Use cases:

Electronic Government services, Bank Account opening, SIM registration, mobile driving licence, Remote Qualified Electronic Signature and ePrescription.

22 countries

36 public and 40+ private entities

Use cases:

Educational credentials and professional qualifications, Portable Document A1 (PDA1), European Health Insurance Card (EHIC).

POTENTIAL
European Consortium for Digital Identity

EWC

DC4EU

NOBID CONSORTIUM

19 countries

18 public and 40+ private entities

Use cases:

Digital Travel Credentials, Payments, Legal persons

8 countries

6 private and 15 private entities

Use cases:

payments use-cases at both a cross-country and cross-sector level with partners coming from both private and public sector

Total budget: >90 Million (50% EU contribution), >250 Participants,

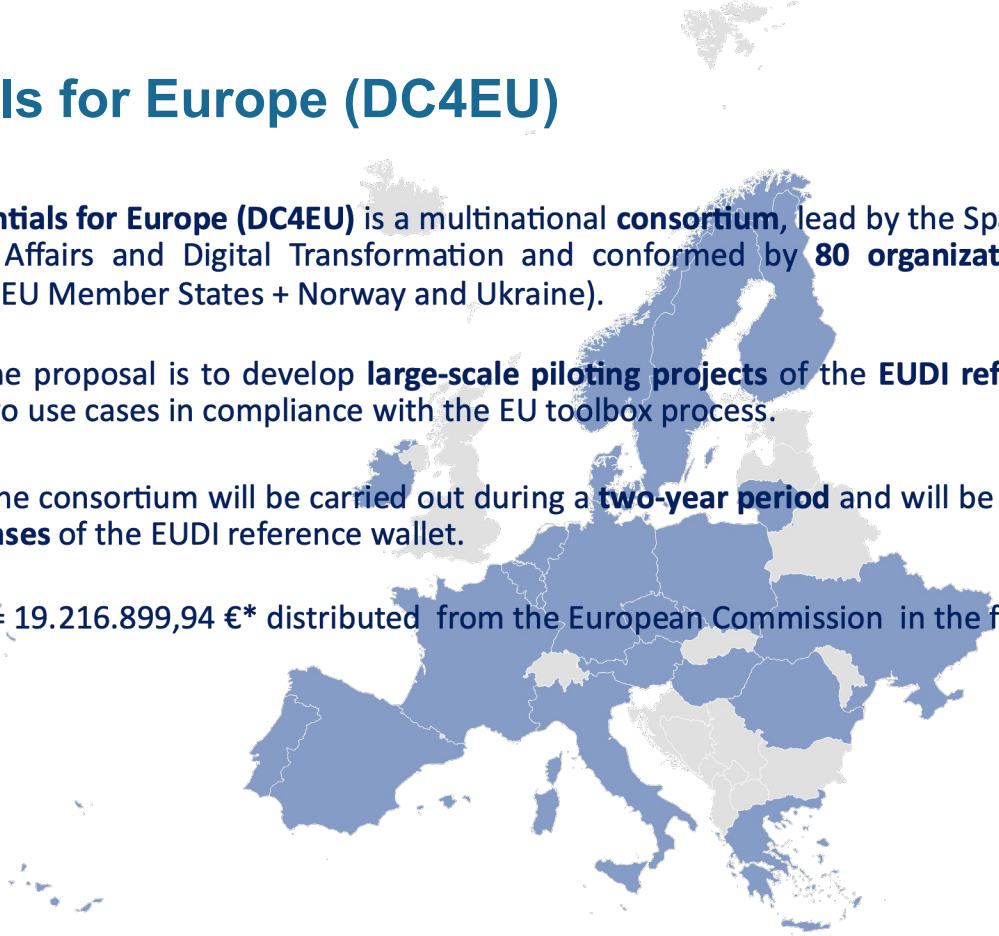
Digital Credentials for Europe (DC4EU)

Digital Credentials for Europe (DC4EU) is a multinational **consortium**, lead by the Spanish Ministry of Economic Affairs and Digital Transformation and conformed by **80 organizations** from **22 countries** (20 EU Member States + Norway and Ukraine).

The **aim** of the proposal is to develop **large-scale piloting projects** of the **EUDI reference wallet** addressing two use cases in compliance with the EU toolbox process.

The work of the consortium will be carried out during a **two-year period** and will be guided by the **iterative releases** of the EUDI reference wallet.

Total budget = 19.216.899,94 €* distributed from the European Commission in the form of 2 payments

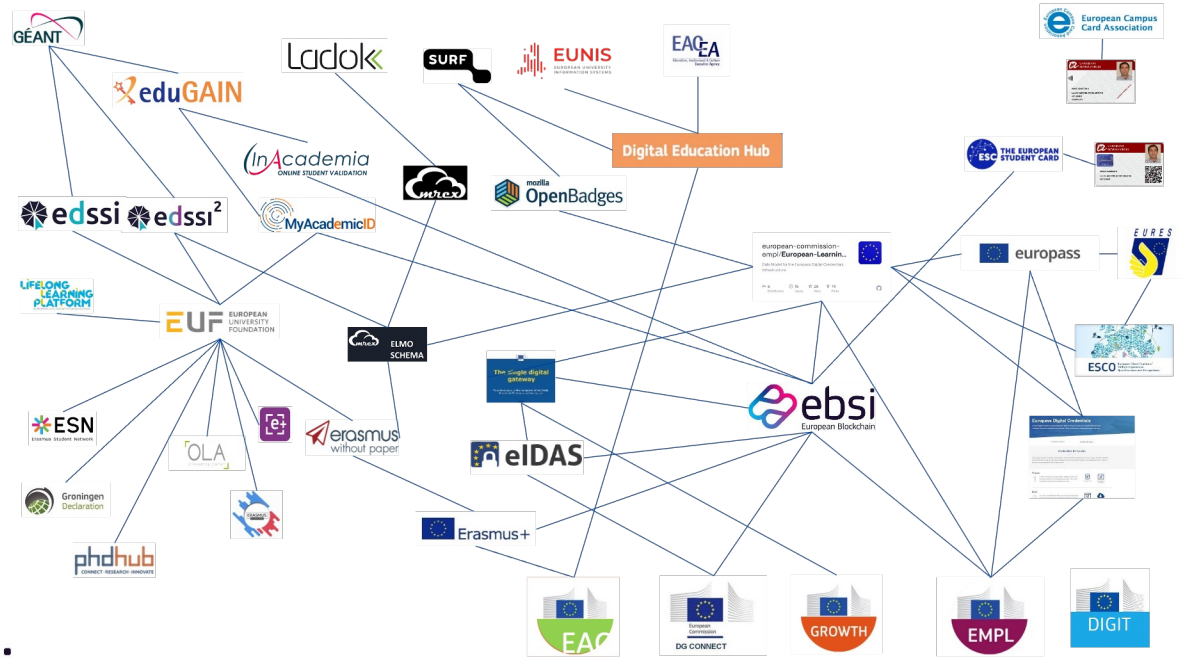


DC4EU: building bridges

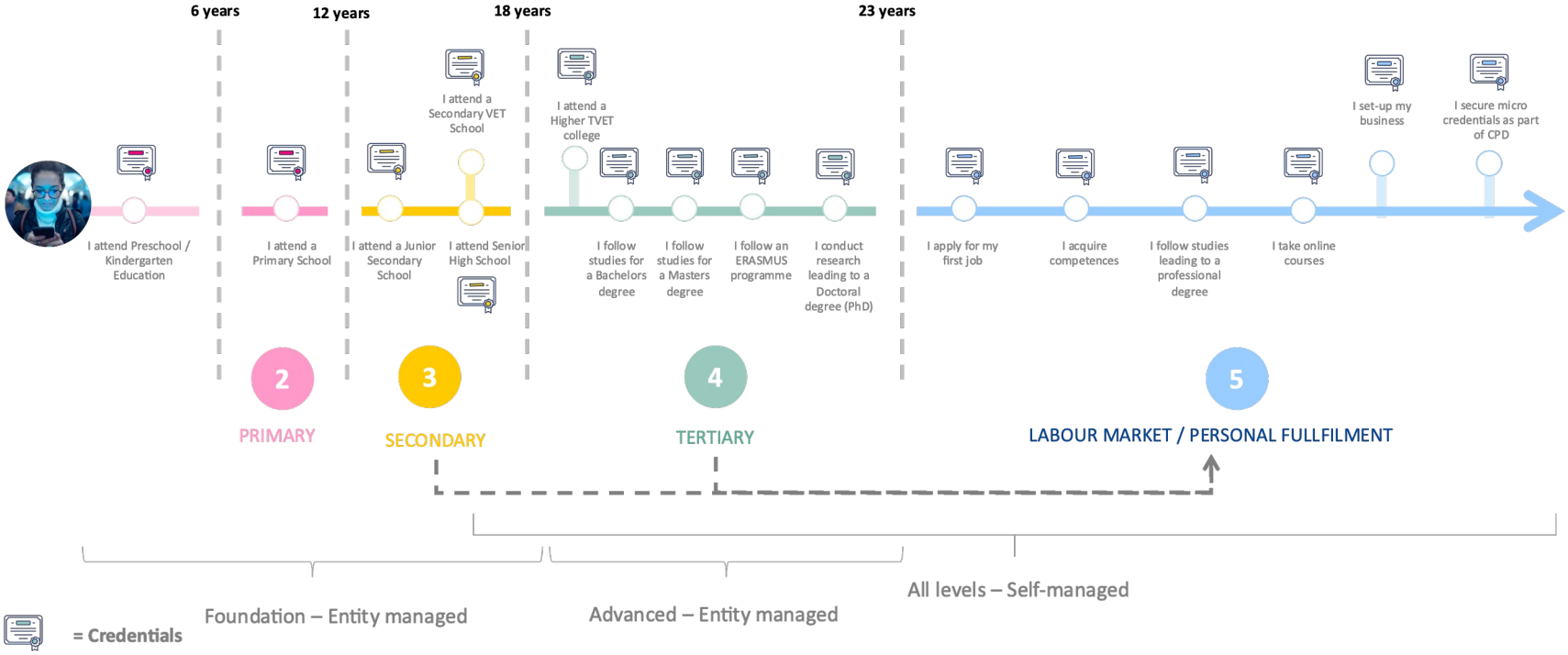
The EUDI wallet is the real container for the Individual Learning Record (ILR)

eIDAS

ebsi
European Blockchain



Different models, different paradigms: it's not one or the other



Cross-border mobility programs are accelerators of the change from a managed to a self-managed/sovereign model (Erasmus+, etc.)

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Thank you

Any questions?

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