

New paradigm for educational credentials and accreditation

EBSI presentation for EQAR's member's dialog meeting
Granada - November'23

PRESENTER



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- Digital Strategist at Universitat Rovira i Virgili
- International coordinator of CRUE-Digitalización
- Member of the EUA Digital Transformation Steering Committee
- National expert on eIDAS ToolBox Process (ARF and EUDI Wallet)
- Convenor Educational credentials and professional qualifications use case at eIDAS Toolbox working group
- Convenor Educational credentials use case at European Blockchain Partnership (EBP - EBSI)
- AB member of the Digital Space for Skills project (DS4Skills)
- AB member of Erasmus Without Papers project (EWP)
- Leader of the Digital Credentials for Europe (DC4EU) eIDAS Large Scale Pilot WP5 (Educational credentials and professional qualifications, titles and licenses)

Agenda



[European Blockchain Partnership \(EBP\)](#) 01

[Digital credentials, a reality check](#) 02

[New paradigm in education & 4 key elements](#) 03

[It's a reality and EQAR is onboarded](#) 04

[How it look like from a citizens' perspective?](#) 05

[Key takeaways](#) 06

Chapter 01.

EBP & EBSI

European Blockchain Partnership (EBP)

The European Blockchain Services Infrastructure (EBSI) was born from a need to invest into blockchain technologies supported by the European Commission and 30 participating countries forming the European Blockchain Partnership (EBP)

2017

-
Tallinn declaration on eGovernment

In 2017, Member States and EFTA countries signed the Tallinn declaration on eGovernment outlining the importance of having efficient and secure digital public services in order to achieve the full potential of the Digital Single Market.



2018

-
European Blockchain Partnership declaration

In 2018, 27 EU Member States, Norway and Liechtenstein signed a declaration creating the European Blockchain Partnership (EBP) with the ambition to provide digital public services matching the required level of digital security and maturity of today's society.



2019

-
European Blockchain Services Infrastructure

On 14 February 2019, the European Commission published the 2019 Telecommunications Work Programme of the Connecting Europe Facility (CEF) creating initial funding conditions for EBSI.

European Blockchain Services Infrastructure

01.

Provide decentralised services that Citizens can trust.

Privacy Preserving (self-sovereignty)

No personal data stored on chain

03.

Run European nodes in line with EU values and regulations.

EU governed, sovereign infrastructure

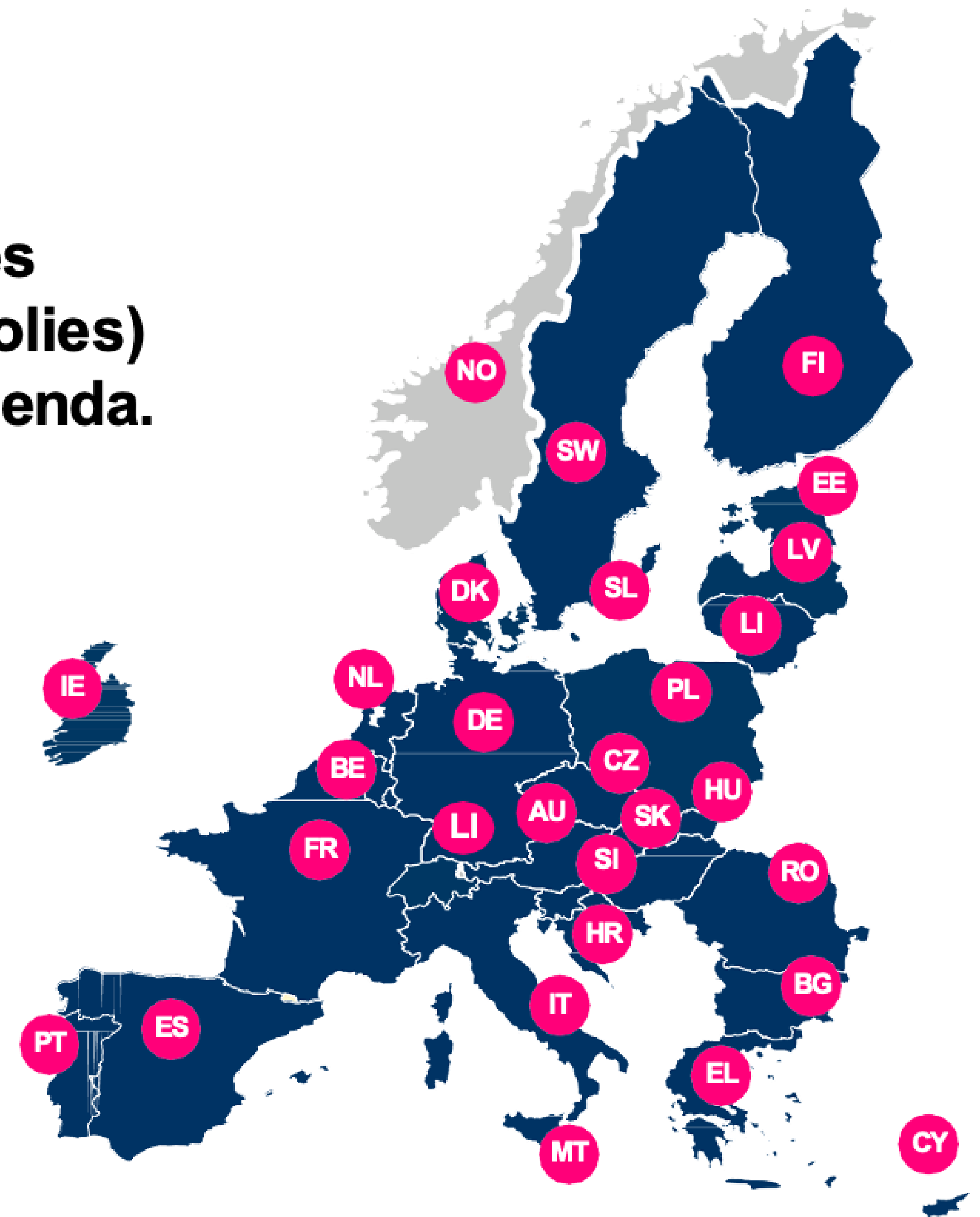
A permissioned blockchain -information can be *read* by all – however, only selected actors are allowed to *write*

02.

Contribute to data spaces (discourage data monopolies) and support the green agenda.

Eco-friendly

Proof of Authority requires almost no computing power, and therefore almost no electricity for its operation.



European Blockchain Services Infrastructure

EBSI is based on open standards



W3C standards and recommendations

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



OpenID Connect

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



eIDAS

- 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)

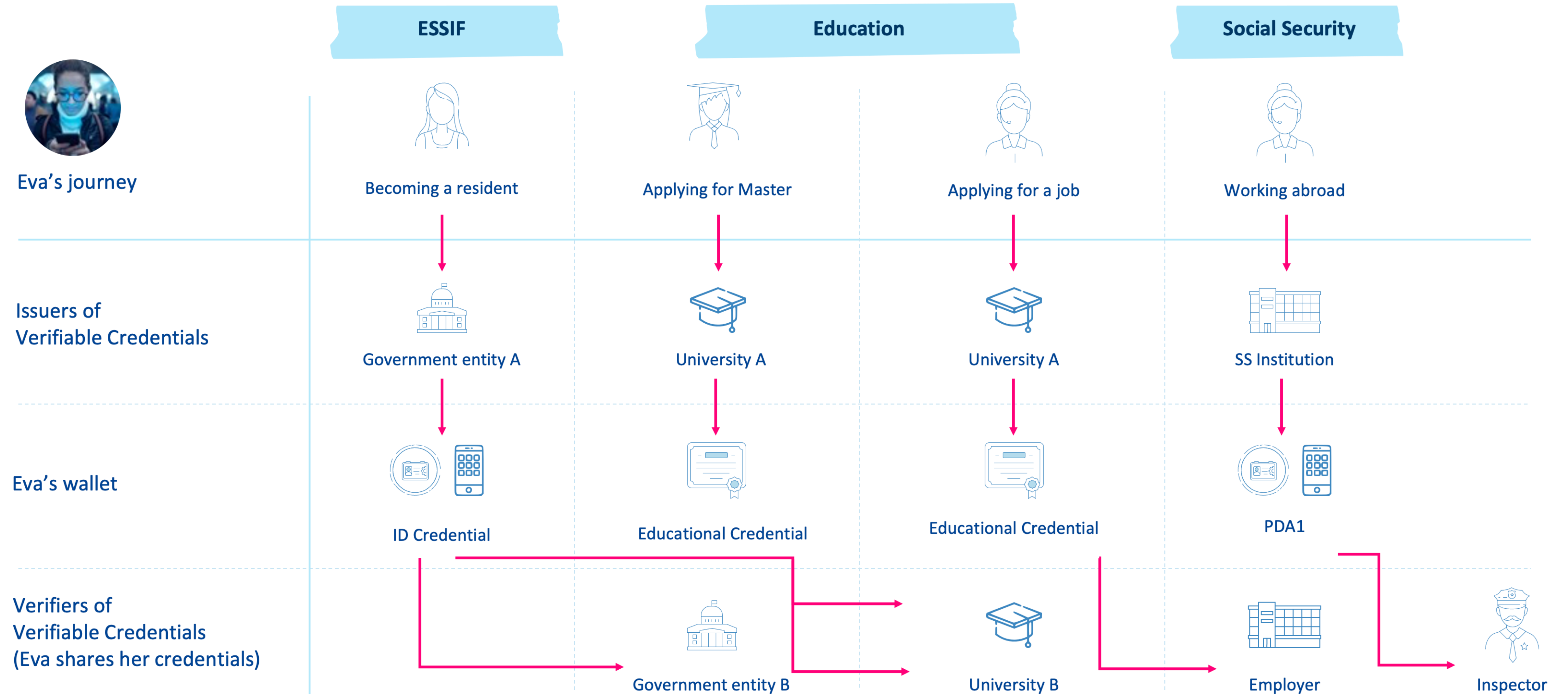


JWT RFC family

- IETF RFC 7515-7520

Designed for citizens, benefits for issuers and verifiers

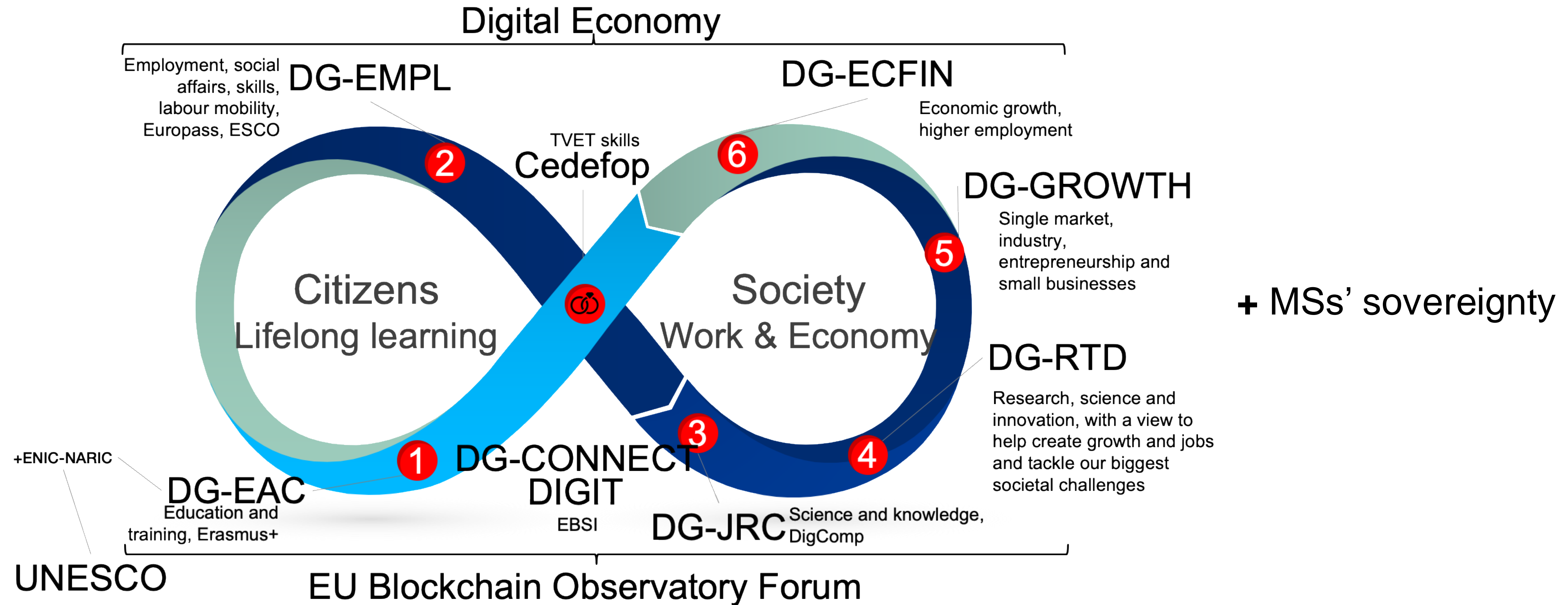
Same user experience across domains



Chapter 02.

Digital credentials: quick
reality check

EC, Europe, Education is complex



We learn throughout the course of our life.

SECONDARY EDUCATION



PRIMARY EDUCATION



TERTIARY EDUCATION



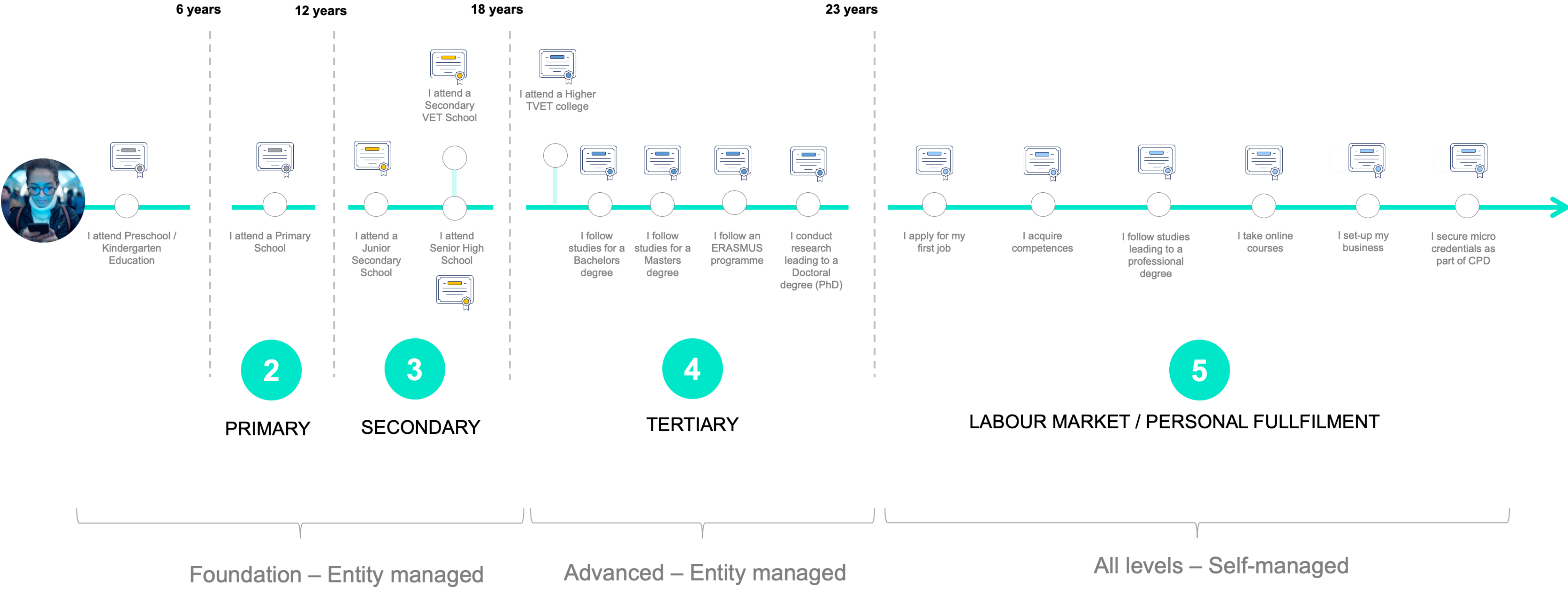
EARLY CHILDHOOD



LABOUR MARKET / PERSONAL FULLFILMENT



Credentials are part of our daily life.



 = Credentials

When someone claims something, we want to verify it.

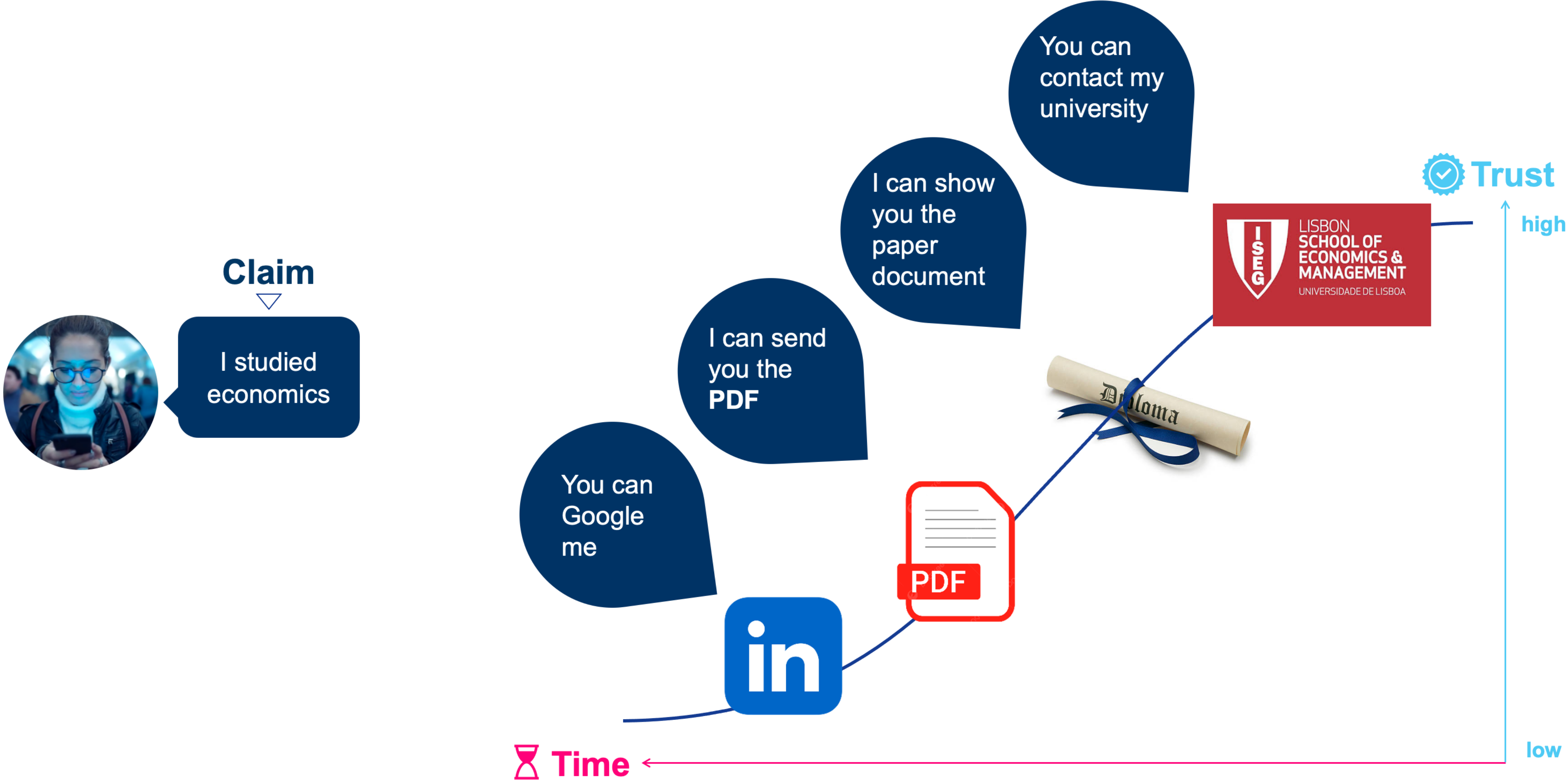
Claim



I studied
economics
in a university
accredited by
National Agency

True or **False** ?

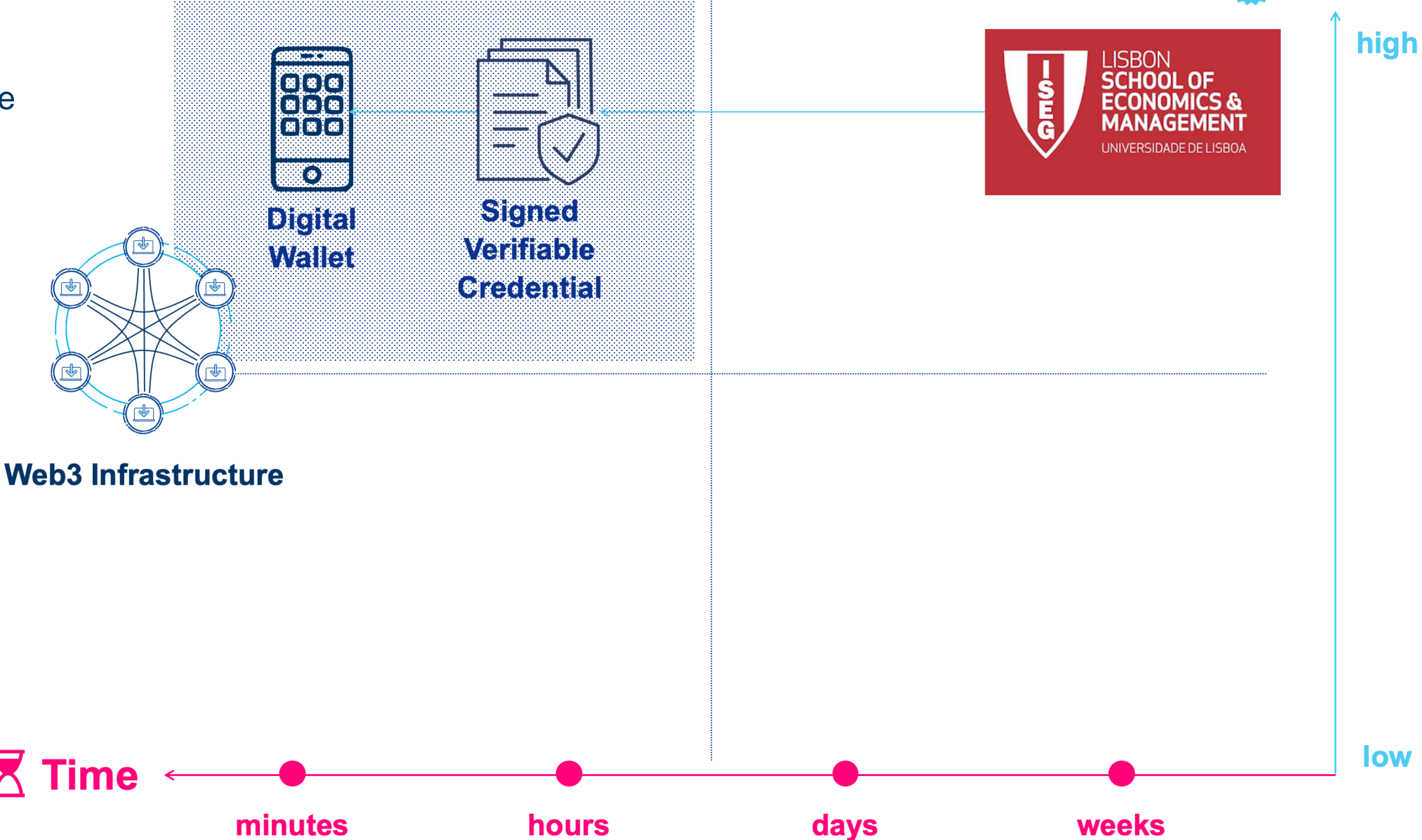
The verification, today.



As per today it is costly, uses the “phone home” method ... non-convenient for anyone

Imagine, we can do this today without giving our data to a platform

We can use Web3 technologies such as Digital Wallets, Verifiable Credentials and Electronic Ledgers (Blockchain) to achieve the same



Chapter 03.

New paradigm for
education & 4 key
elements

A young woman with glasses is looking at her smartphone in a crowd. The image is overlaid with a teal gradient. The text "Do you believe that the learning belongs to the learner?" is centered over the image.

Do you believe that the learning belongs to the learner?

... I do!

We're entering a new information age

Platform centric services

Truly Decentralised Services

Thanks to Verification

Web 1.0

Website & directories

Web 2.0

The Web of Platforms & content-creation



Web 3.0

Fair, privacy-preserving & decentralised web of services



We're entering a new skills age

- The European Commission is proposing a Pact for Skills as a new engagement model for skills that will help meet COVID-19 challenges and deliver on the ambitions of the recovery pathway, the EU Industrial Strategy and the green and digital transitions.
- Skills are key for the future. There is a growing need to learn and keep on learning in order to thrive
- HEIs can (and MUST) play a key role
 - Value current offering (mostly based on full programmes)
 - Up/Re-skilling the workforce (due to Digital transition and Green deal)

Different trends/challenges bring opportunities for educational institutions (and citizens)

- **Citizens**

- State of the Union address (091620)
- European Council Conclusions (100220)
- eIDAS 2
- European Declaration on Digital Rights and Principles for the Digital Decade



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

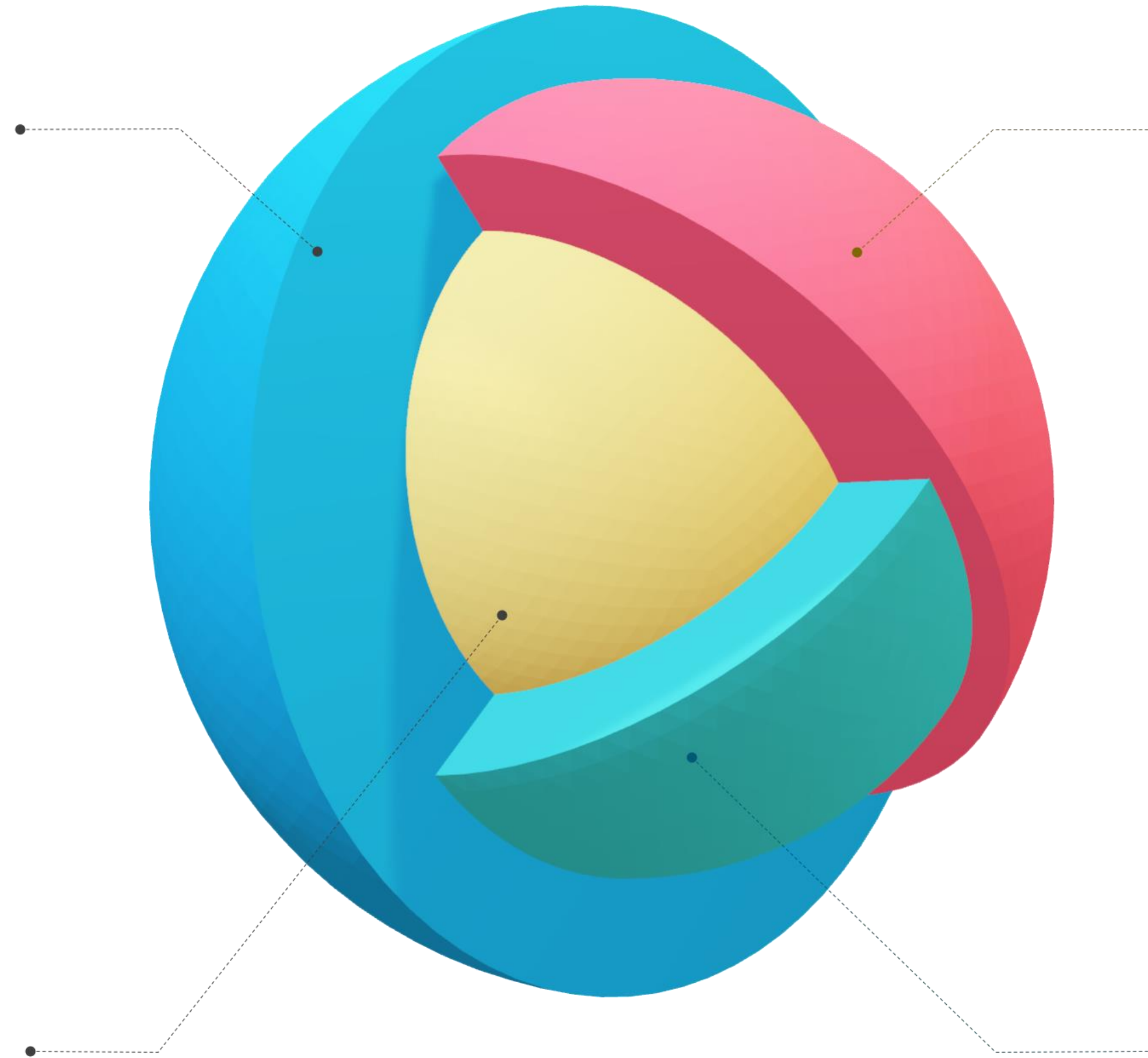
EBSI since 2019 worked on 4 interoperability dimensions (educational domain)

Organizational

Legal

Semantics

Technical



Interoperability: Legal dimension



SSI legal aspects

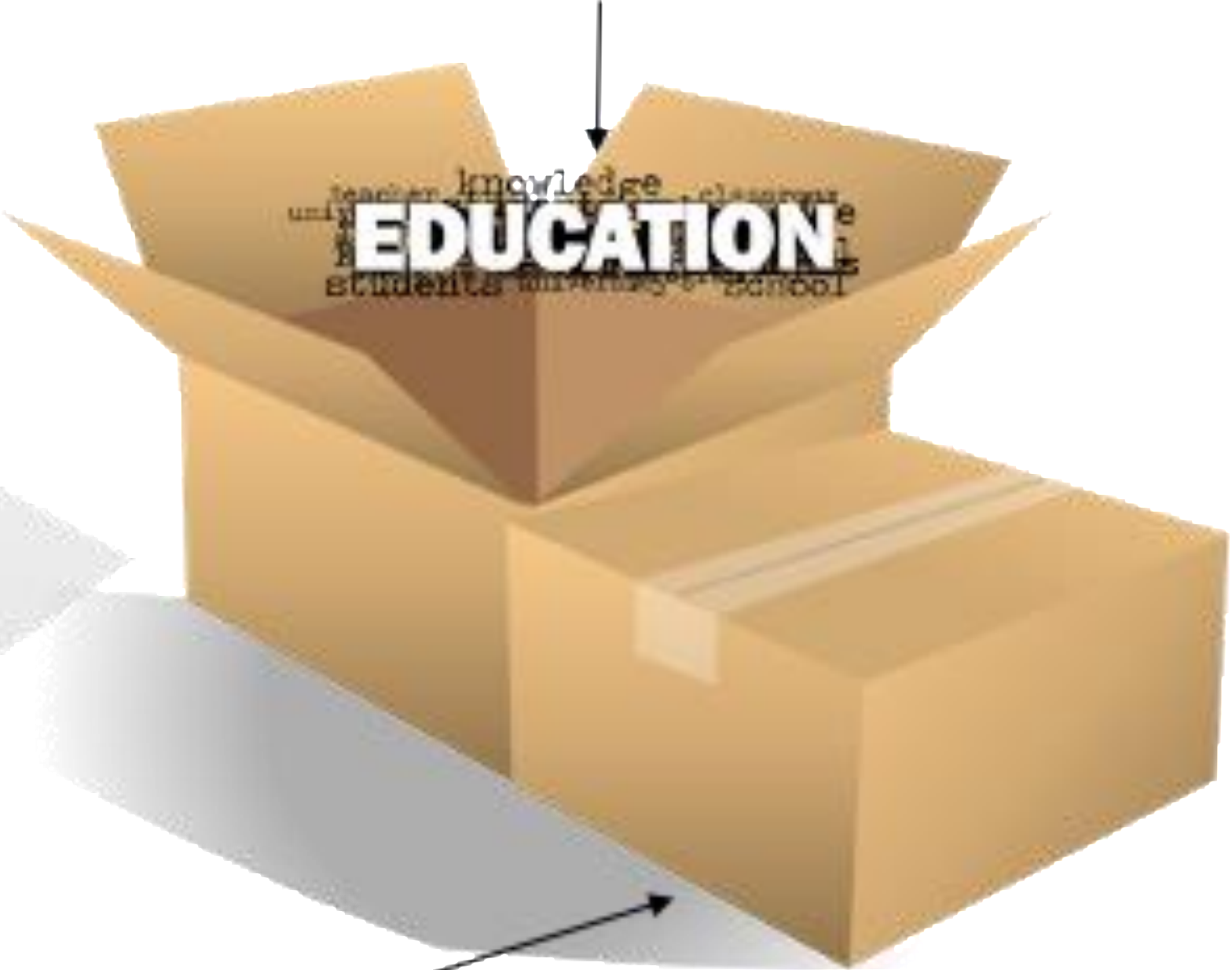
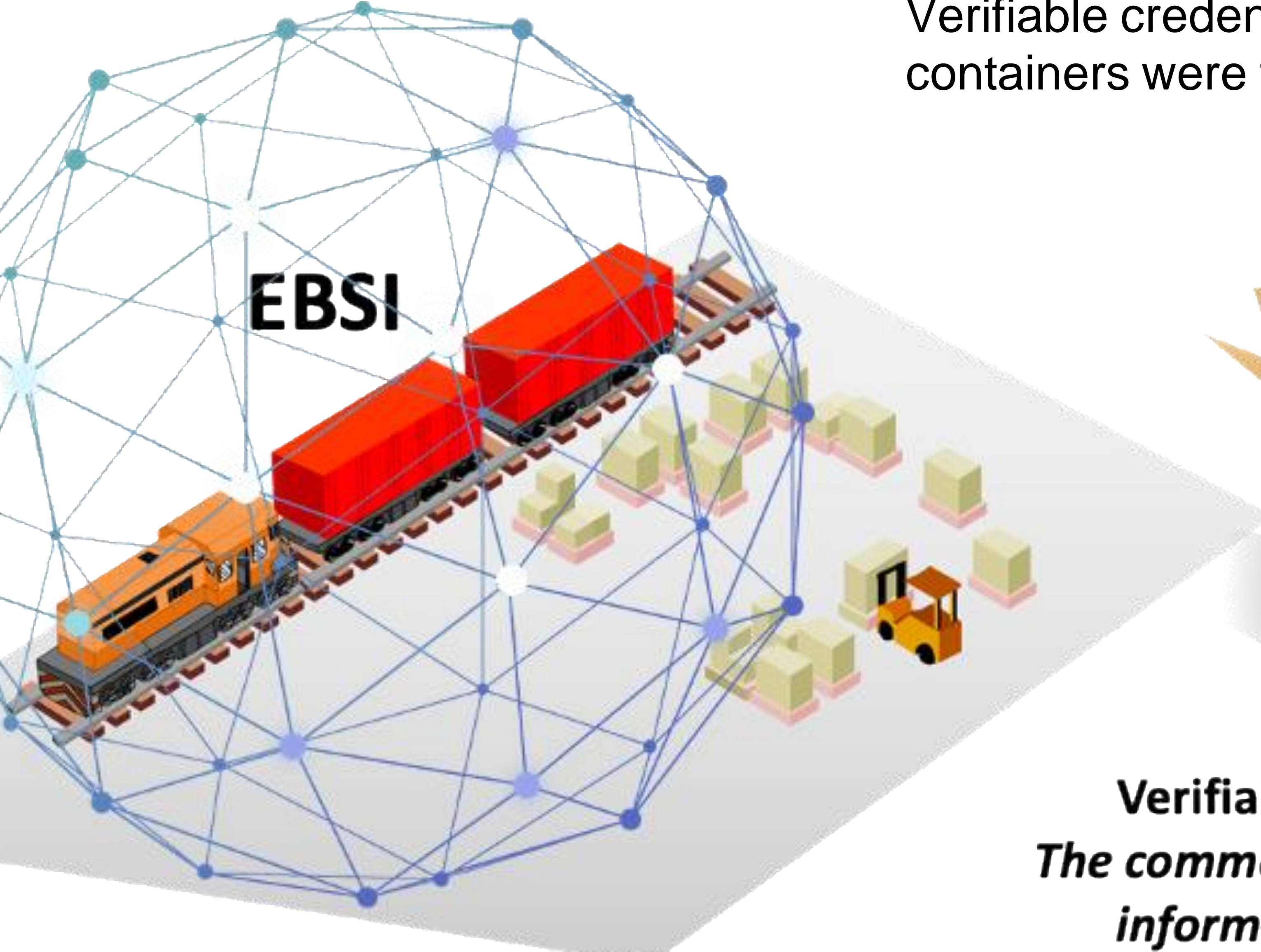
- EBSlv1 legal report [available](#) (SSI eIDAS & GDPR)

Ongoing dedicated Educational UC' assessment:

- Legal
- Privacy/GDPR
- Special focus on 2 key points
 - Identity ⇔ eIDAS LoA
 - Data as legal binding act ⇔ National legislation applies

Interoperability: Technical dimension

Verifiable credentials will be for information as containers were for maritime sector

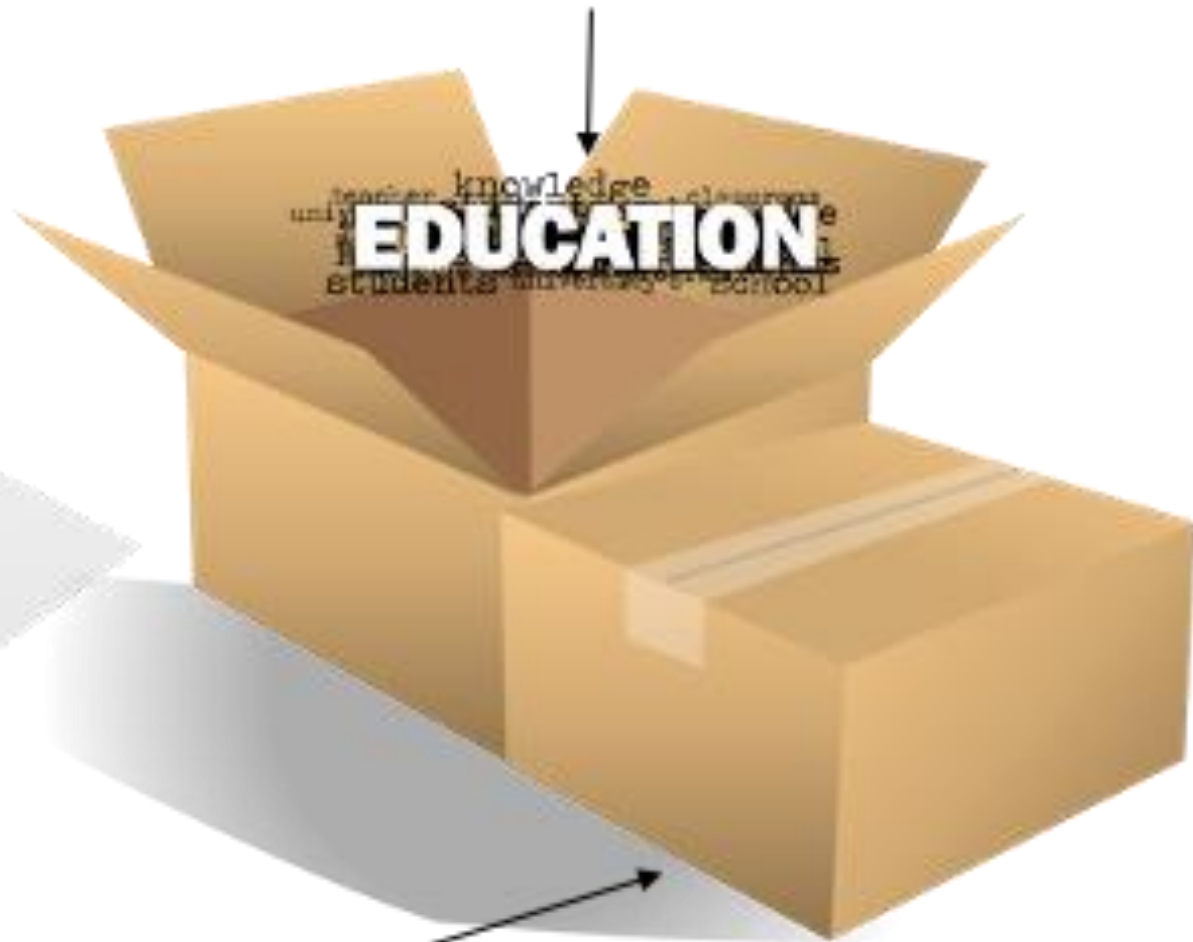


Verifiable Credentials
The common way to package information (content)

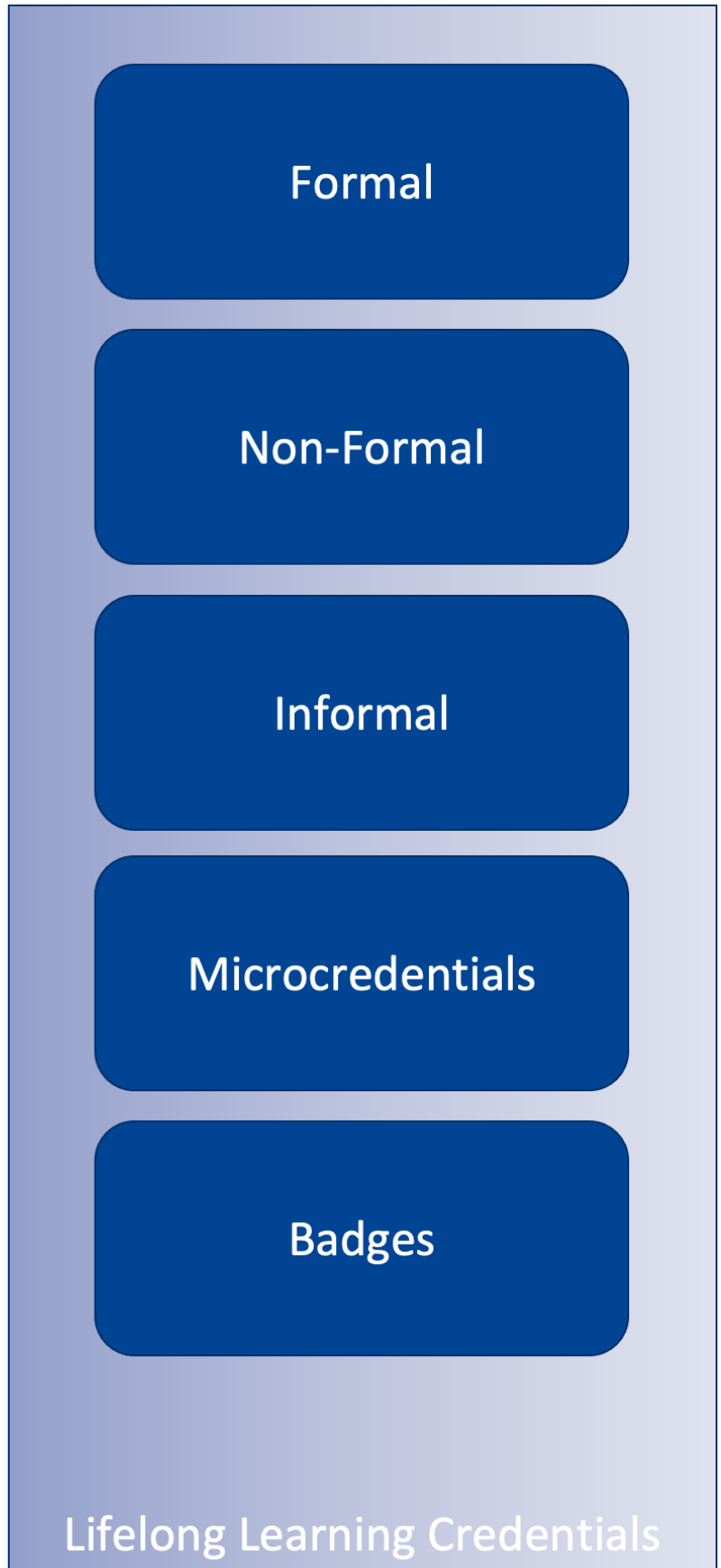
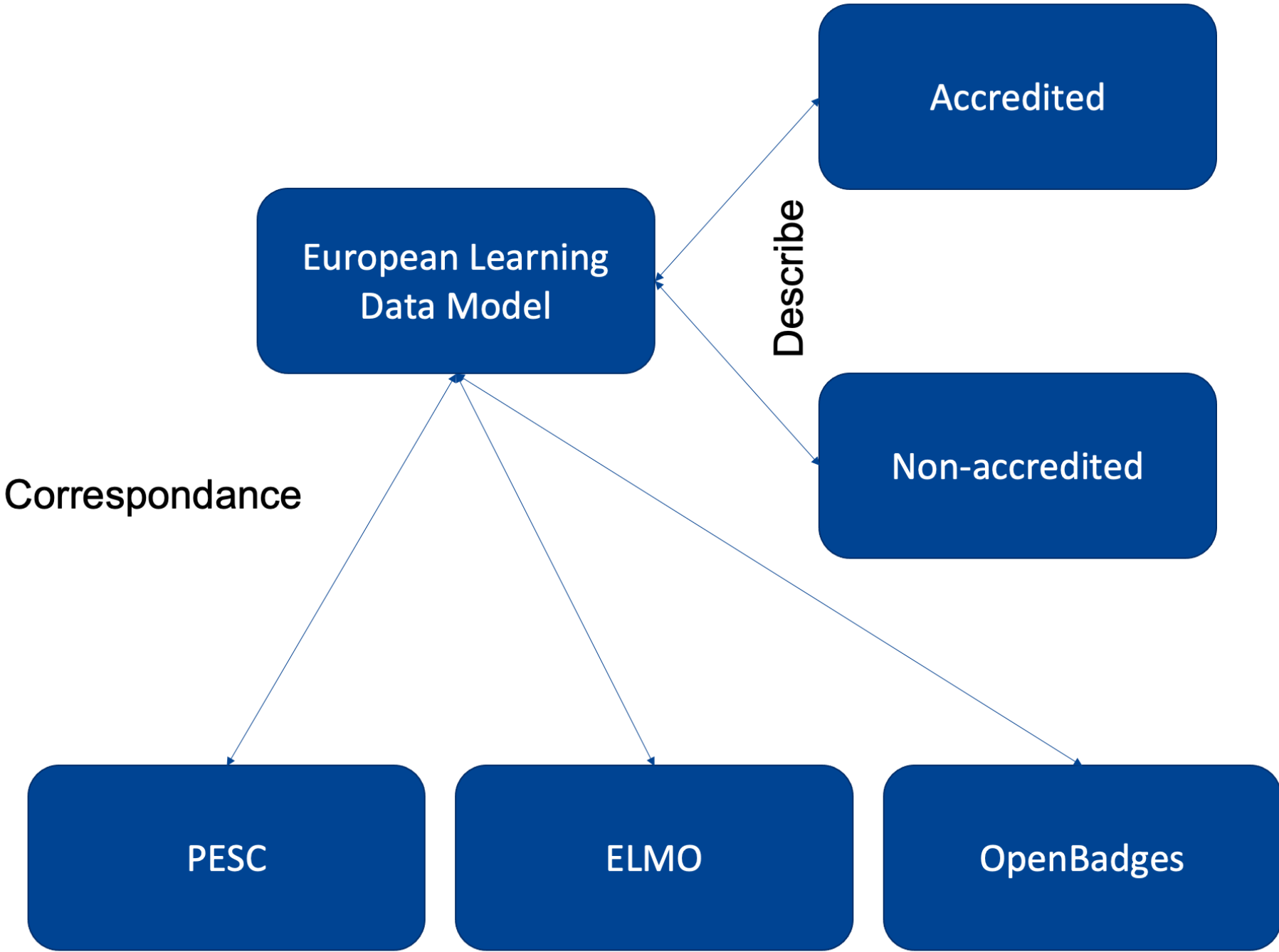
Interoperability: Semantic dimension

- Unique opportunity at EU level: European Learning Model, but proper governance must be in place (DG-EAC, MSs, EQAR, EMREX shall be in the ELM board)

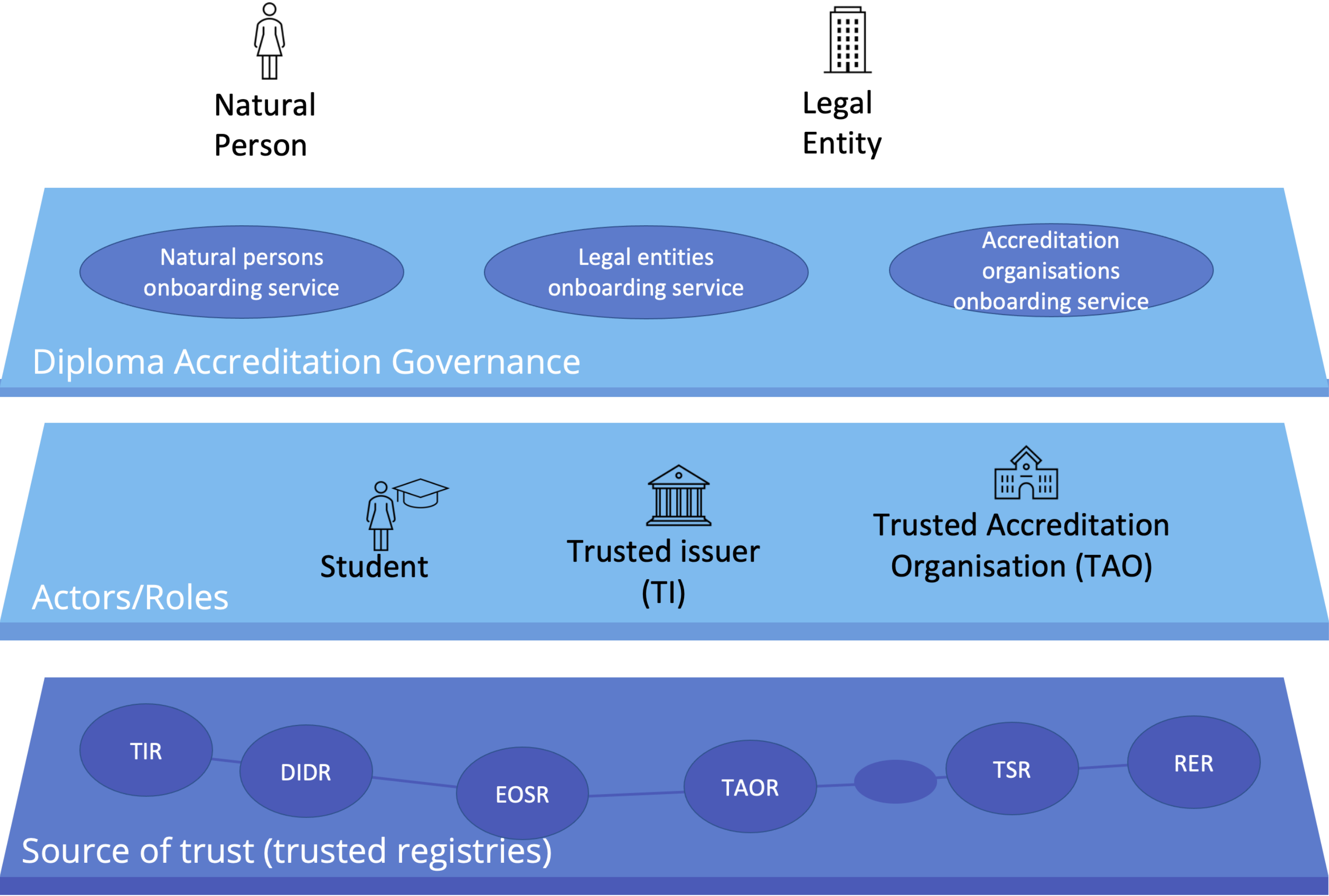
Common Data Model
The common way to describe educational credentials (contents)



Verifiable Credentials
The common way to package information (content)



Interoperability: Educational governance



To do not go deeper into technicalities, current governance (actors, roles, information systems) can be seamlessly integrated to fill the trusted lists (registries) that will allow anyone to check provenance, entitlement, authorization to act, accreditation, etc.

2020 MS' agreement for EQAR to provide Quality assurance accreditations based on DEQAR

The 4 key elements that enable a new paradigm where information is easy to verify, almost impossible to fake and controlled by citizens.



New regulation

eIDAS

European trust framework:

eIDAS1 – Identity

eIDAS2 – Identity & data



Digital Wallet

EUDIW

EBSI Conformant Test

Effective control point over digital credentials on the citizen's device (under their sole control)



Verifiable Credentials

W3C standard

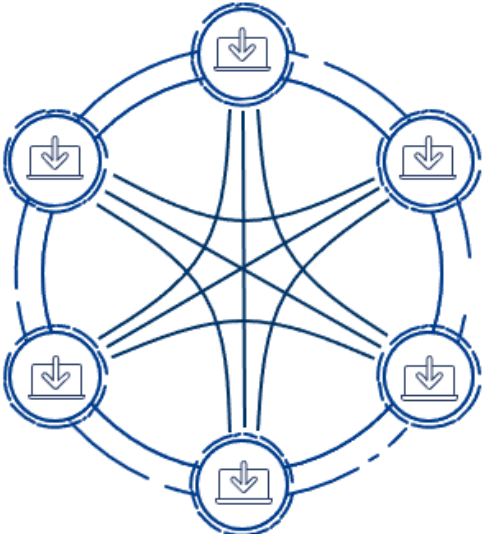
EBSI Profile

A new way of expressing information

Metadata

Claims

Proofs (signatures)



Electronic Ledgers

EBSI

An open/transparent infrastructure providing services able to support educational governance including quality assurance regimes

1. New eIDAS Regulation

Legislative Process

- Negotiation of the proposal for the revision of the **eIDAS regulation** underpinning the EUDI Framework

Wallet Technical Specifications

- Member States and the Commission are in the process of establishing a **common toolbox** consisting of an **architecture and reference framework**, common standards and specifications and guidelines and best practices for the EUDIW

Large-scale Pilots

- **Grants** under the Digital Europe Programme for **large-scale pilots around use-cases** for the EUDIW including mobile driver licences, ePayments, eHealth and educational/professional qualifications

Wallet Reference Implementation

- Procurement of a **reference implementation** of the EUDIW based on the technical specifications agreed by the toolbox.

Latest news! => 8 November 2023

The Commission welcomes the final agreement reached today by the European Parliament and the Council of the EU at the final trilogue on the Regulation introducing **European Digital Identity Wallets**

1. New eIDAS Regulation – Highlights I

- **Natural and legal persons**
- **Public and private sector**
- **All MS are mandated to issue** compliant European Digital Identity Wallets (**EUDIW**), up to the citizens to use it
- **All MS are mandated to issue** Personal identification data (**PID**) to EUDIW
- 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

1. New eIDAS Regulation – Highlights II

- **Obligation of admission**

- by **public sector bodies** and by **private providers**

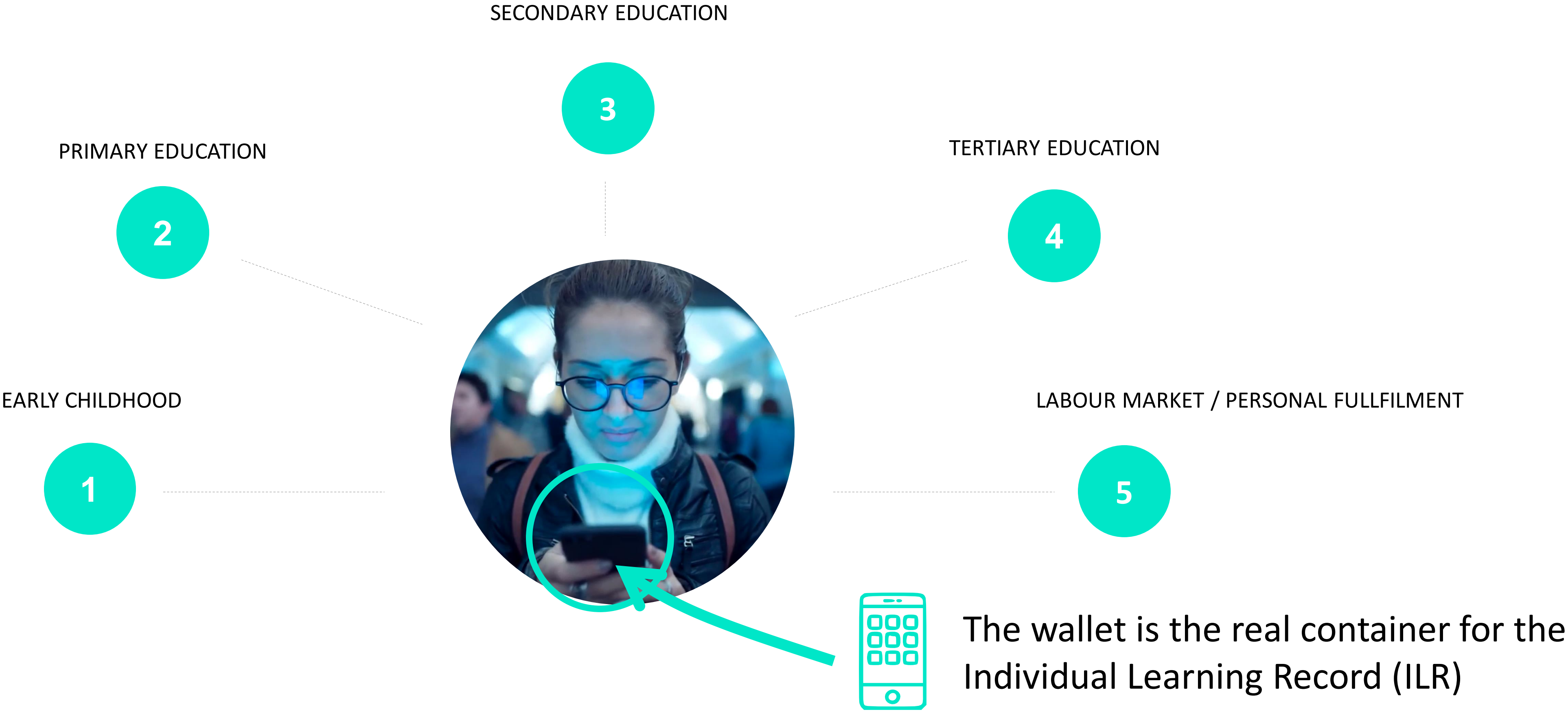
- by **very large online platforms that require authentication for access**

- **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.

2. The Wallet as the “de facto” container of the Individual's Learning Record



3. The Role of Verifiable Credentials (VCs) in Education

Almost impossible to fake but easy to verify

Verifiable Credentials are becoming the “*de facto*” standard because...

- ✓ High level of certainty that the issuer is trusted alongside the time of issuance, expiry date, etc.
- ✓ High level of certainty that the holder is the one that the Verifiable Credential was issued to.
- ✓ Verifiers have easy access to information, but the holder keeps data control and ownership with possibility of partial disclosure of information.

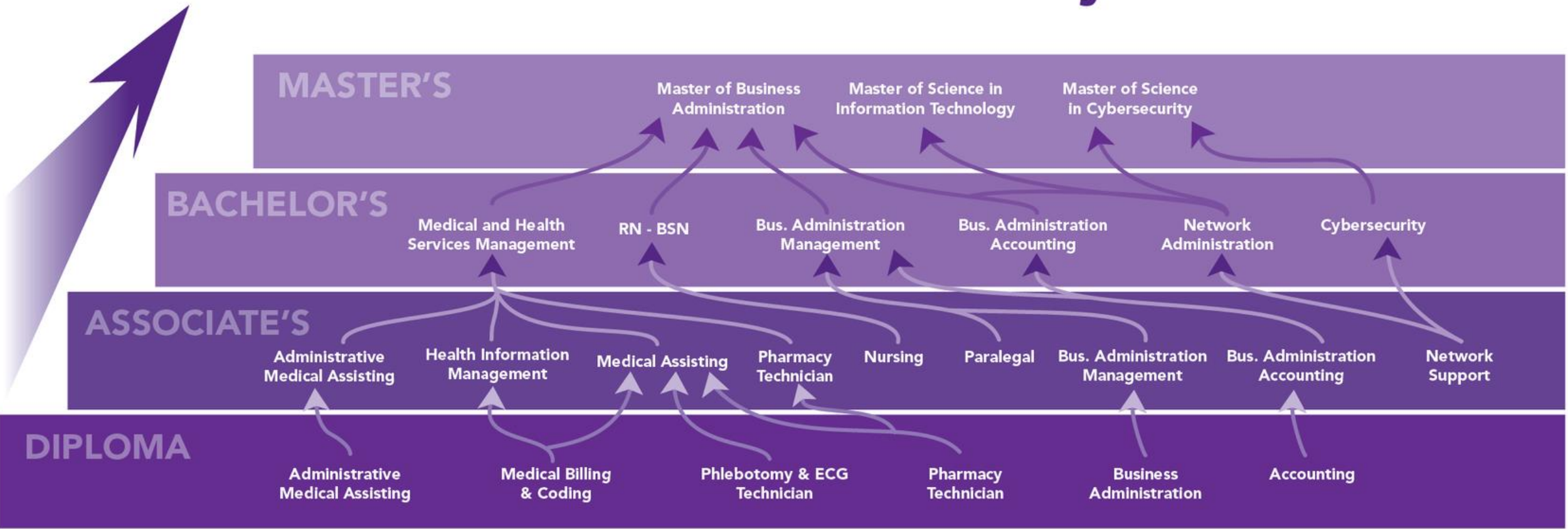
What does it contain?

Credential Metadata
Claim(s)
Proof (signature of Issuer)

Verifiable credentials are the standardized way on how to pack, transport and unpack the information

3. VC's enable a more flexible education ecosystem

ANU Educational Pathways



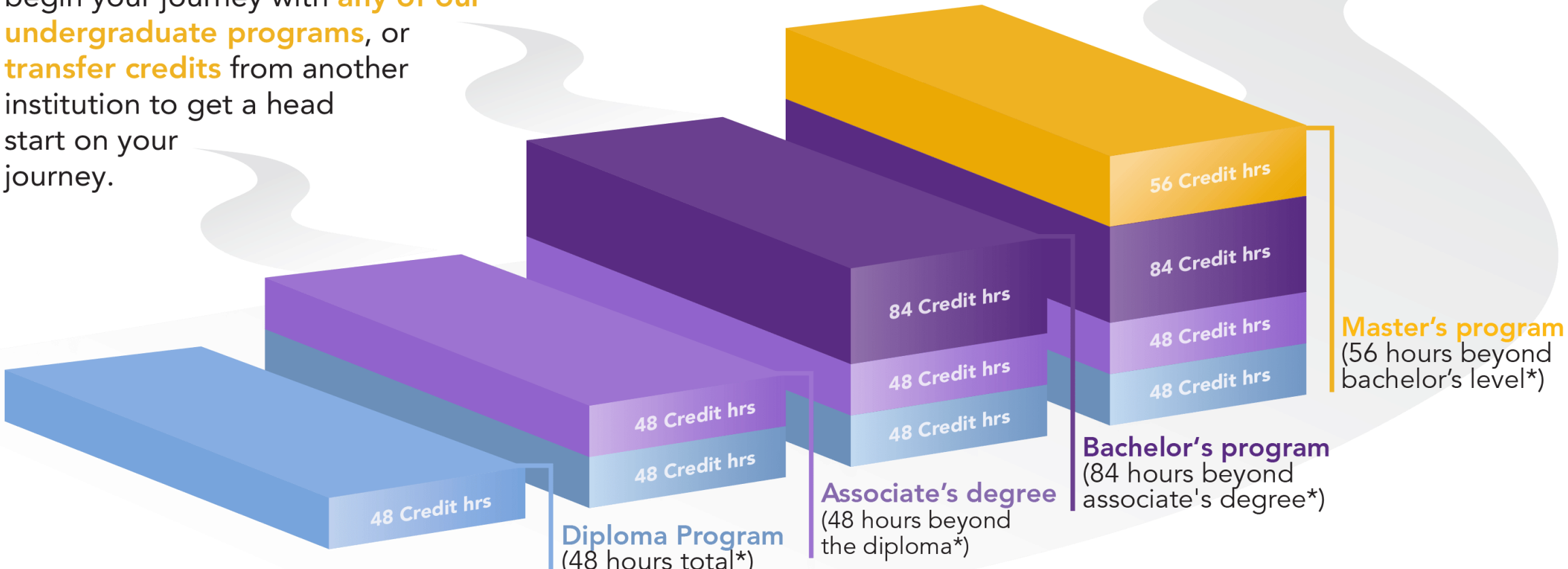
*The chart above represents some, but not all, of the possibilities for degree advancement available at ANU

START YOUR JOURNEY FROM ANY LEVEL
 You **don't have to start at the bottom**. You can begin your journey with **any of our undergraduate programs**, or **transfer credits** from another institution to get a head start on your journey.



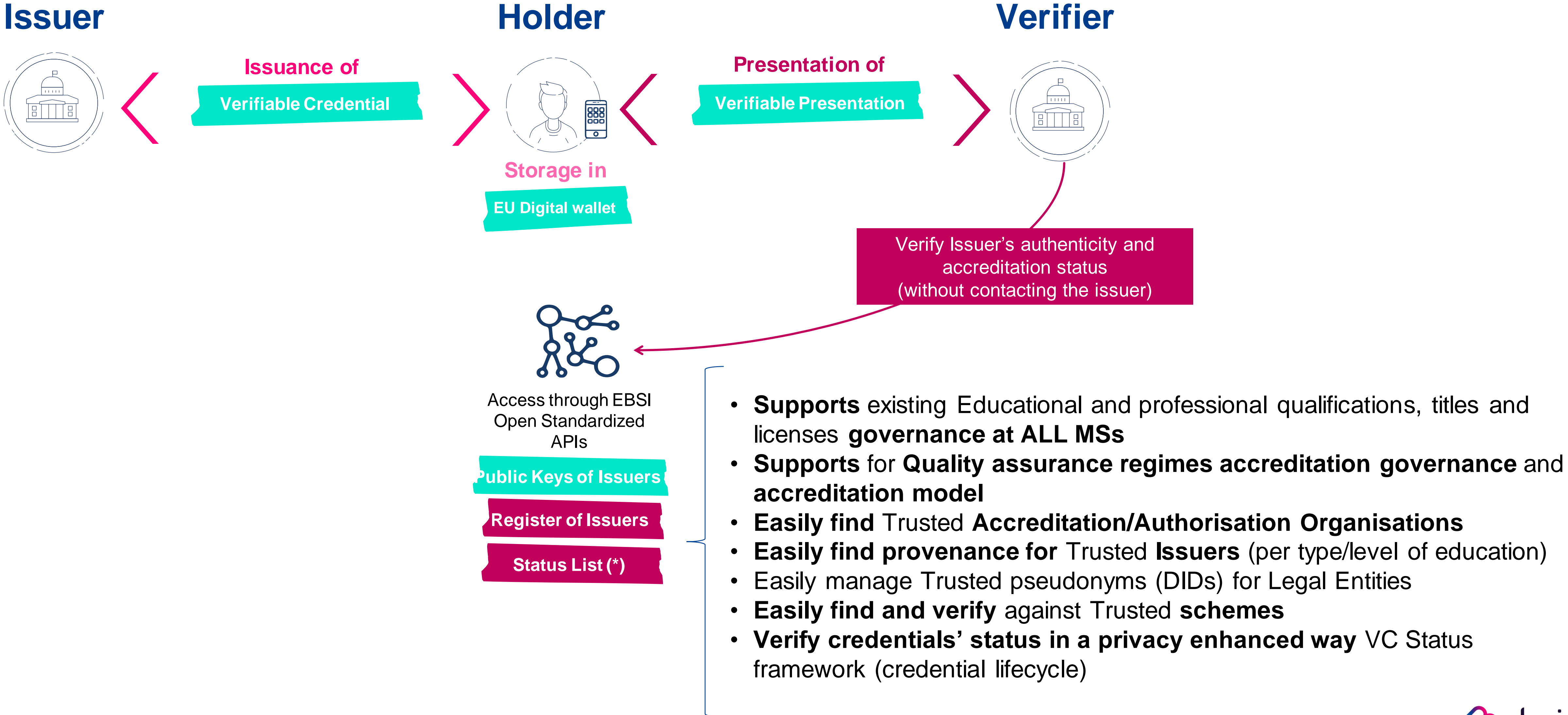
*Credit hours may differ depending on transfer credits and program.

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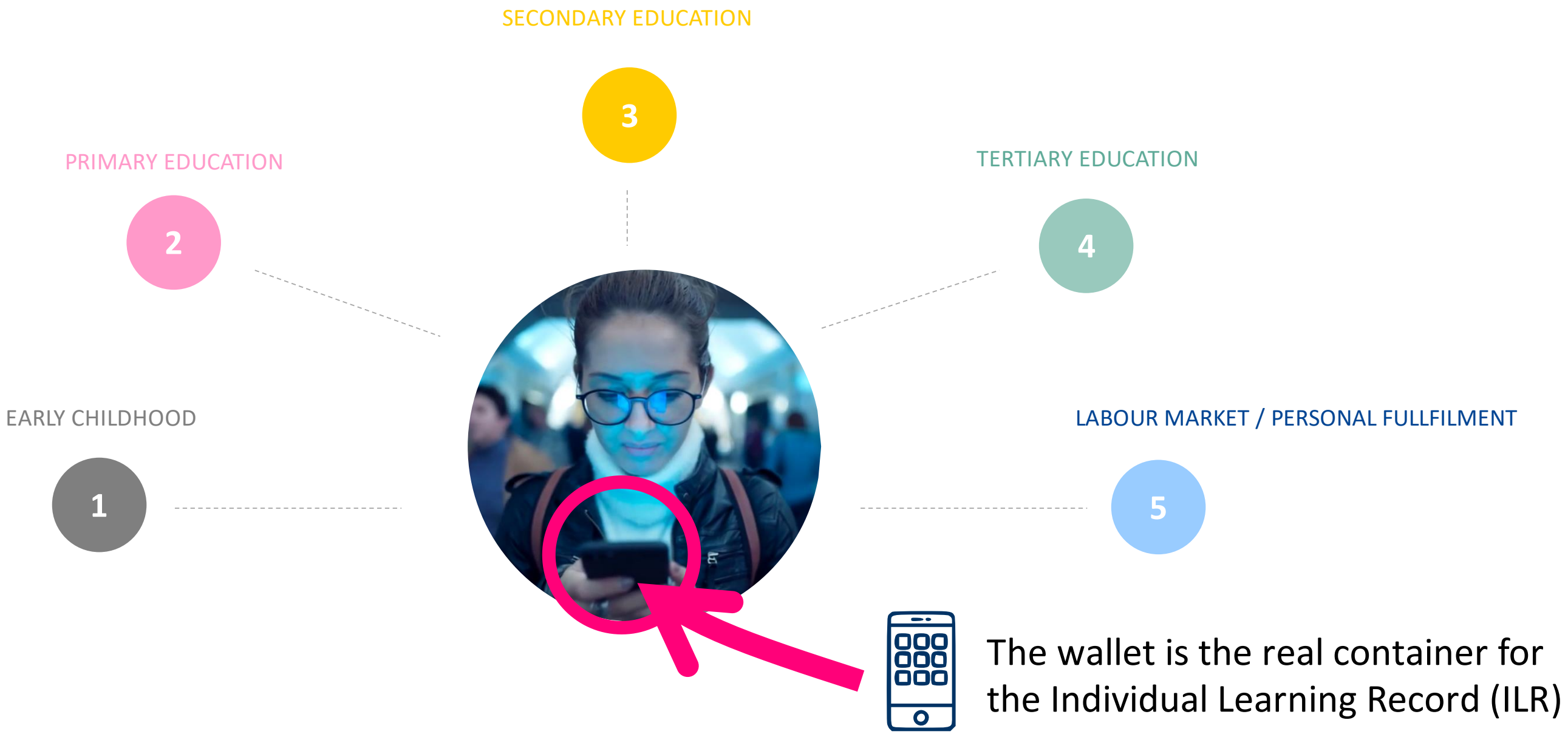


*Credit hours may differ depending on transfer credits and program.

4. The role of the Electronic Ledger



Collective impact of legislation, trusted ledgers (EBSI), Wallets, and verifiable credentials on European education.



Aligned to (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
- eIDAS 2

Chapter 04.

It's a reality, it's being used
and EQAR is contributing
to it



EQAR's contribution I

- European Blockchain Partnership representatives (All MS+LI+NO+UA) agreed for EQAR to act on behalf of National Agencies as proposed by EBSI' Educational Use Case
- Each university creates and manages its own pseudonym (decentralized identifier - DID) and shares it to EQAR (that manages its own DID)
- EQAR, based on DEQAR records, generates Verifiable Accreditations either at institutional and/or programme level
- Universities can include related accreditation inside the credentials
- Programme' credential is issued to the citizen that, later, can share it with third parties (when applying for job, on enrolment processes, ...)

EQAR's contribution II – How does it look like for EQAR?

EQAR's pseudonym and DEQAR

1. EQAR created a pseudonym (owned and managed by EQAR) stored in the Electronic Ledger. Any accreditation or authorisation is linked to that pseudonym (DID), and anyone can check for provenance and entitlement

"issuer": "did:ebsi:zk4bhCepWSYp9RhZkRPiwUL"

2. DEQAR takes advantage of DEQAR to:

- Accredite national quality assurance agencies to recognize regional ones
- Accredite national or regional quality assurance agencies to issue quality accreditations to HEIs
- Issue, on behalf of national or regional agencies, quality assurance accreditations to HEIs

EQAR's contribution III – How does it look like for HEIs?

URV pseudonym at EQAR's DEQAR

eqar.eu > Database > Search > By institution > Rovira i Virgili University

Rovira i Virgili University

Universitat Rovira i Virgili

Basic information

Identifiers

- DEQARINST0792
- ILLIETER ES0022
- ERASMUS: E TARRAG001
- ERASMUS-CHARTER: E10208977
- SCHAC: URV.CAT
- DID-EBSI: DID:EBSI:ZIBBPGHRMXMPAKMW1TCM9CJ**
- EU-PIC: 999880560
- EU-VAT: ESQ9350003A
- WHED: IAU-019365

Legal seat(s) Tarragona, [Spain](#)

Further location(s) Barcelona, [Spain](#)

Website <http://www.urv.cat>

Founding year 1992

DID-EBSI: DID:EBSI:ZIBBPGHRMXMPAKMW1TCM9CJ

URV's pseudonym

EQAR's contribution IV – How does it look like for HEIs?

Programme accreditation

EQAR's Decentralized Identifier

```
{
  "issuer": "did:ebasi:zk4bhCepWSYp9RhZkRPiwUL",
  "issued": "2022-03-01T00:00:00Z",
  "credentialSubject": {
    "authorizationClaims": {
      "accreditationType": "http://data.europa.eu/snb/accreditation/e57dddfcf3",
      "decision": "positive",
      "report": [
        "http://backend.deqar.eu/reports/AQU/20220623_0840_MU%2BCiencia%2Bde%2BDatos%2BBiom%C3%A9dicos%2B(URV)%2B21v3.pdf"
      ],
      "limitQualification": [
        {
          "title": "Biomedical Data Science",
          "alternativeLabel": [
            "Ciència de Dades Biomèdiques",
            "Ciencia de Datos Biomédicos"
          ],
          "EQFLevel": "http://data.europa.eu/snb/eqf/7"
        }
      ],
      "id": "https://data.deqar.eu/report/77573#subject=did:ebasi:ziBBPgHRMxmPaKmW1TCm9Cj",
      "limitJurisdiction": [
        "http://publications.europa.eu/resource/authority/atu/ESP"
      ]
    },
    "id": "did:ebasi:ziBBPgHRMxmPaKmW1TCm9Cj"
  },
  "issuanceDate": "2022-03-01T00:00:00Z",
  "validFrom": "2022-03-01T00:00:00Z",
  "expirationDate": "2026-03-01T00:00:00Z",
  "credentialSchema": {
    "id": "https://api.preprod.ebasi.eu/trusted-schemas-registry/v1/schemas/0x13d597f8495e6b6e3d0c072218756a1bcc3ea50ebeb3ab4c3944bd400e0c3c6a",
    "type": "FullJsonSchemaValidator2021"
  }
}
```

Programme description including
“positive” decision based on
DEQAR

URV's Decentralized Identifier

It's a reality: MS & organisations are already working on it

A growing ecosystem of +350 organisations
 From private and public sector (9 different types)
 from +30 countries
 Mobilised through 9 different "programs"



- 5 University Alliance
- 67 University
- 18 Research Institute
- 106 Public Administration
- 20 Private company
- 2 Non-profit
- 109 IT Provider
- 14 Association
- 7



+106 EA PROGRAMME

+77 DC4EU

+61 EWC

+54 EBSI VECTOR

+22 TRACE4EU

+24 Conformant wallets

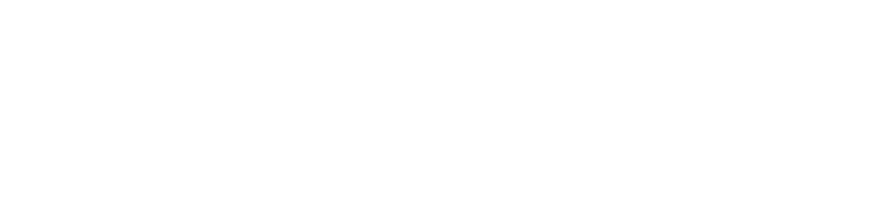
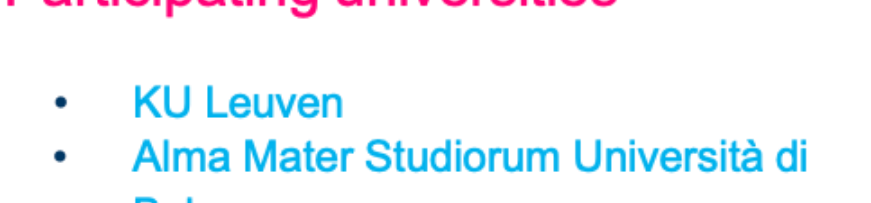
+35 Node operators

+13 ONEPASS

+25 EBSI-NE

Sum of ONEPASS Sum of EBSI-NE Sum of EBSI VECTOR Sum of TRACE4EU Sum of DC4EU Sum of EWC Sum of EA PROGRAMME Sum of CONFORMANT WALLET Sum of NODE OPERATORS

It's a reality: focus on European University Alliances



Una Europa Alliance

Participating universities

- [KU Leuven](#)
- [Alma Mater Studiorum Università di Bologna](#)
- [Freie Universität Berlin](#)
- [Uniwersytet Jagielloński w Krakowie](#)

FILMEU - the European Universities Alliance for Film and Media Arts

Participating universities

- [Lusófona University](#)
- [IADT - Institute of Art, Design and Technology](#)
- [LUCA - Ku leuven](#)
- [BFM - Baltic Film, Media and Arts School | Tallinn University](#)

ERUA – European Reform University Alliance

Participating universities

- [University of the Aegean](#)
- [University of Paris 8](#)
- [Roskilde University](#)
- [New Bulgarian University](#)
- [University of Konstanz](#)



UNITA Universitas Montium

Participating universities

- [Universidade de Beira Interior](#)
- [Universidad de Zaragoza](#)
- [Université de Pau et des Pays de l'Adour](#)
- [Université Savoie Mont Blanc](#)
- [Università di Torino](#)
- [Universitatea de Vest din Timișoara](#)

EELISA European University

Participating universities

- [Politécnica de Madrid](#)
- [Budapesti Műszaki és Gazdaságtudományi Egyetem](#)
- [École des Ponts ParisTech](#)
- [Friedrich-Alexander-Universität Erlangen-Nürnberg](#)
- [İstanbul Teknik Üniversitesi](#)
- [Scuola Normale Superiore](#)
- [Scuola Superiore Sant'Anna](#)
- [Universitatea Politehnica din București](#)
- [Université Paris Sciences et Lettres](#)
- [Zürcher Hochschule für Angewandte Wissenschaften](#)



It's a reality: focus on Spanish universities

CERTIDIGITAL Project



CAMINS Project



CREDENCIALES Project



Projects funded by Spanish Ministry of Universities

Chapter 05.

How does it look like from a citizens' perspective?

Live demo

Reminder => What's behind the scenes? EBSI a public infrastructure for the public good

01.

**Provide
decentralised
services that
Citizens can trust.**

**Privacy Preserving
(self-sovereignty)**

No personal data stored on chain

03.

**Run European nodes in line
with EU values and
regulations.**

EU governed, sovereign infrastructure

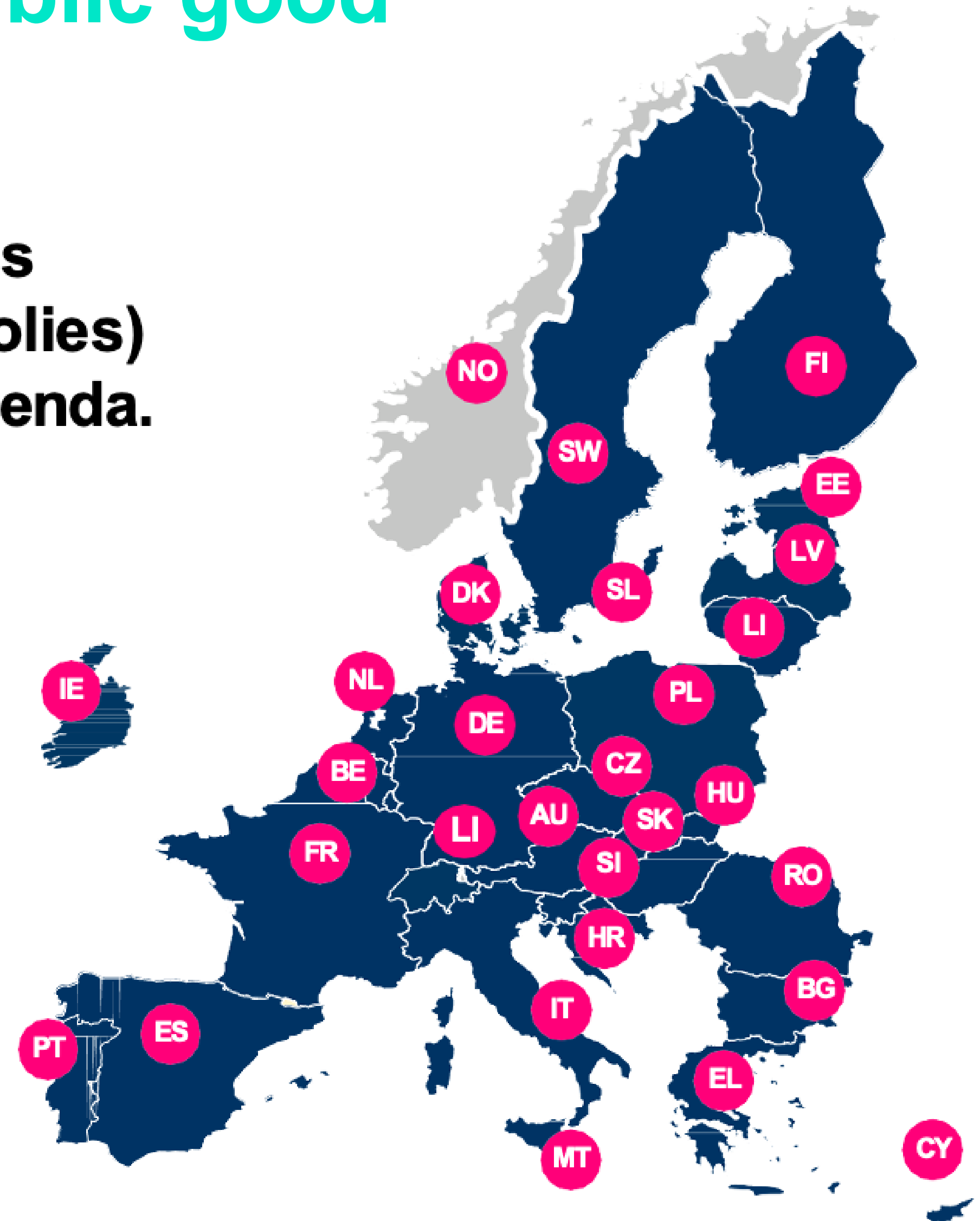
A permissioned blockchain -information can be *read* by all –
however, only selected actors are allowed to *write*

02.

**Contribute to data spaces
(discourage data monopolies)
and support the green agenda.**

Eco-friendly

Proof of Authority requires almost no
computing power, and therefore almost no
electricity for its operation.



Chapter 06.

Key takeaways

Key takeaways - I

- Need to provide more flexibility for education
 - from degrees to including skills
 - open education (transparency) will be key, open accreditation will play a key role
 - empowered citizens must be the focus
- What **EBSI** provides?
 - a **service infrastructure** led by public sector fully aligned to EU values, principles, laws, strategies and actions plans, **for the public good**
 - an **open technical stack** that provides **flexibility for education**, and capacity to to issues, manage and verify **digital credentials' lifecycle** including **credential stackability**
 - an **open framework** to deploy existing **educational governance**, including **quality assurance** regimes
 - an open/**common source for trust** (provenance, entitlement, accreditation, ..)
 - a common **standardized way** on how to **exchange data** with **citizens in full control of their identity and data**
 - a natural way to **verify** credentials **in the past** (thanks to ledger capabilities)

Key takeaways - II

- What **EBSI is not**
 - A **crypto blockchain**: uses low power algorithms and only authorised entities can write on-chain
 - A storage for issued credentials: **no personal data is stored on-chain**
- **Why does it matter?**
 - Evolve exiting services to focus on citizens is a **MUST** for all HEIs: HEIs need to evolve/adapt their services to be consumed as citizens expect (their choose, their times)
 - **eIDAS** review
 - Extends from identity to electronic attestations of attributes (**EAA**s)
 - **Public** and **private sector**, **natural** and **legal entities**, ALL MS mandated to provide **national wallets** and Personal Information Data (**PID**) to citizens
 - includes **electronic ledgers** (EBSI supported)
 - **Annex 6** identifies explicitly **educational credentials and professional qualifications, titles and licenses**
 - legal agreement (reached on November 8th, 2023) **MSs are mandated to apply eIDAS by 1Q' 2026**
 - **Digital Credentials for Europe** (DC4EU), eIDAS Large Scale Pilot (**LSP**) for *Educational credentials, professional qualifications titles and licenses*, **re-uses all work and knowledge done by MS in EBSI**
 - **Wallet** is a **killing application** and the natural way for **digital natives** to interact to **digital services**
- EQAR is more than well positioned: EQAR's vision has put them (**EQAR and all agencies**) on the front line, more than **well prepared for the new paradigm**

FAQs (based on Granada's meeting interactions)

1. Do an organization/member state need to host a node to start using EBSI?
 - Answer: No, any organization/Member state can start using EBSI without hosting a node
2. Are credential stored on chain?
 - Answer: No, new paradigm provides a new model fully empowering citizens that own, control and host its digital credentials. Digital credentials are directly issued to citizen's wallets.
3. Does EBSI contains personal data?
 - Answer: No, no personal data is stored on-chain (EBSI is fully aligned by design to GDPR)
4. Can national agencies issue quality assurance accreditations to its related organisations?
 - Answer: Sure, governance model allows also national agencies to issue quality assurance accreditations (both, at institutional and programme level). Just be aware that EQAR can provide the service on your behalf as it is using the DEQAR database and developed the required integrations (so no need to develop/maintain on your side)
5. Why do we need an electronic ledger?
 - Answer: Using an electronic ledger adds added value to digital credentials lifecycle like, for example, be able to verify in the past even if the signing certificate/key has expired. It also provides an open and transparent way to provide/check provenance and entitlement for issuers. Detailed list can be provided
6. Should EQAR be onboarded in DC4EU?
 - Answer: Using an electronic ledger adds added value to digital credentials lifecycle like, for example, be able to verify in the past even if the signing certificate/key has expired. It also provides an open and transparent way to provide/check provenance and entitlement for issuers. Detailed list can be provided

Relevant references

- Contact information [lluisalfons.arino # urv.cat](#)

- Relevant references

European identity landing page

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-digital-identity_en

EBSI website

<https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/Home>

EBSI YouTube demo day

<https://youtu.be/DDkhnK202z4?si=llLaZaVhnc31llyyGT>

DC4EU landing page

<https://www.dc4eu.eu>

T H A N K



Y O U