# Digital Credentials Validation in Blockchain

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Timisoara, December 12, 2025

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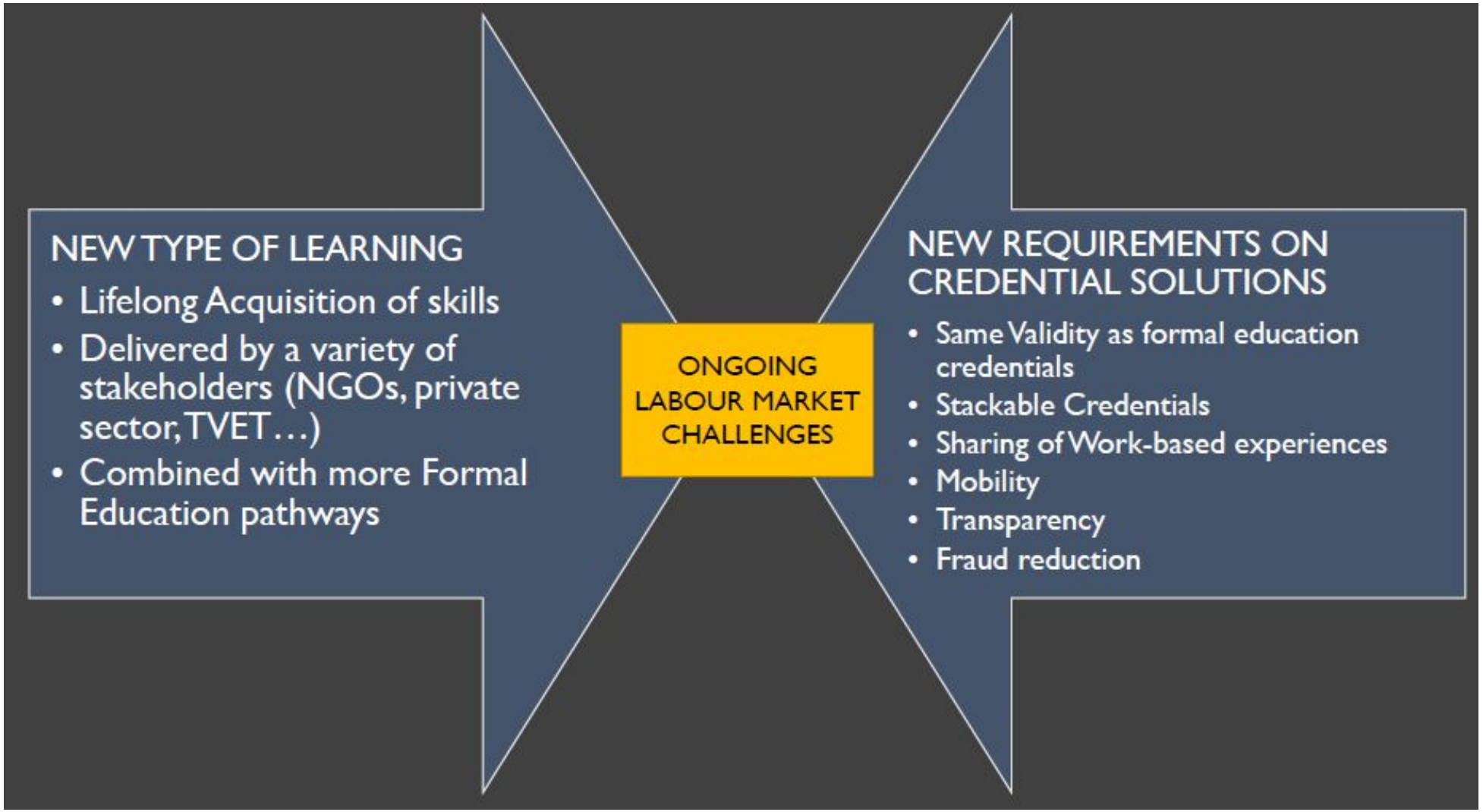
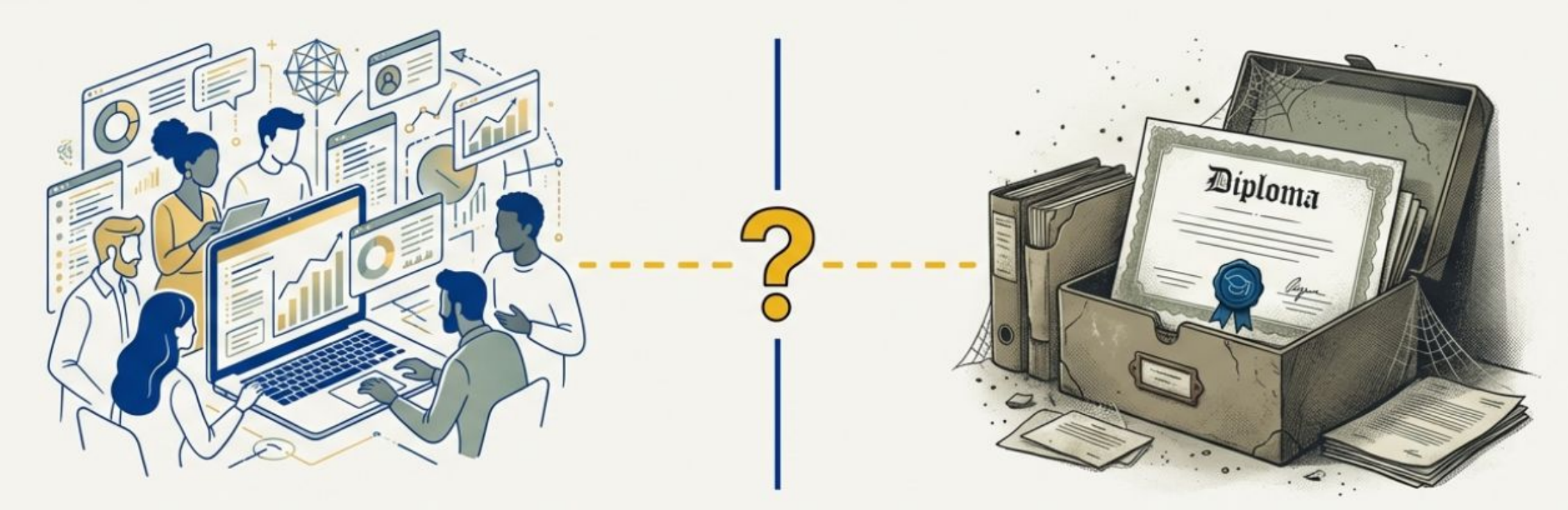
   - EBSI Early Adopters Programme – wave 2 and 3
   - EBSI Projects: DC4EU, Vector and EBSI-NE

# Challenges for Education in EU




From Alex Grech - Blockchain, Self-Sovereign Identity and Credentials, March, 2021 – https://www.slideshare.net/alexgrech/blockchain-selfsovereign-identity-and-credentials

# Challenges for Education in EU




Our credentials are stuck in the 20th century - our learners and workforce aren’t.

- Diplomas, transcripts, and certificates are still mostly paper-based.
- Verification is slow, costly, and prone to fraud.
- Learners don’t fully own or control their academic records.

We need to rethink how credentials are **issued, stored, shared, and verified**,
to support **mobility**, **lifelong learning**, and **trusted recognition** across borders.

# European Digital Credentials for Learning


The European Commission is developing the Europass Digital Credentials Infrastructure (EDCI) to support efficiency and security in how credentials such as qualifications and other learning achievements can be recognised across Europe.

Work is ongoing on the development of the Europass Digital Credentials Infrastructure (EDCI). The EDCI will support authentication services for any digital documents or representations of information on skills and qualifications as outlined in Article 4 (8) of the Europass Decision.

A credential is a documented statement containing claims about a person issued by an educational organisation following a learning experience.

Europass Digital Credentials describe a learning achievement. They can describe:

- activities (e.g. classes attended),
- assessments (e.g. projects),
- achievements (e.g. skills developed),
- professional entitlements (e.g. registration as a medical doctor) and
- qualifications.

*European Digital Credentials for Learning* respond to the need of the citizens to easily share their diplomas, transcripts of records, and other certificates of learning achievements in formal, informal, and non-formal settings, in a secure and digital way, when applying for a job or for further studies and training in any Member State

Oct 25, 2021 - https://europa.eu/europass/en/what-are-digital-credentials

# Micro-credentials


Certifying the learning outcomes of short-term learning experiences, the micro-credentials could offer a flexible and targeted way to help people acquire new knowledge, upskill and reskill the competences needed for their personal and professional development.

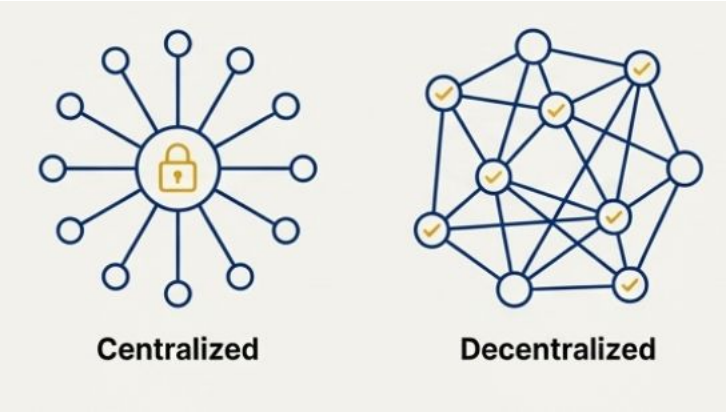
Dec 14, 2020 - A European approach to micro-credentials
June 2022 - Council of the European Union: Recommendation on a European approach to micro-credentials for lifelong learning and employability
https://ec.europa.eu/education/education-in-the-eu/european-education-area/a-european-approach-to-micro-credentials_en

# A new foundation for Trust: the Blockchain

**Think of blockchain as a shared digital notary:**

A **decentralized ledger of transactions**, maintained by a network of **independent nodes** that each hold the same copy.

It is **transparent, tamper-resistant**, and **not controlled by any single organization**.




**You Own Your Data (Self-Sovereignty):** Users control their own identity and data.

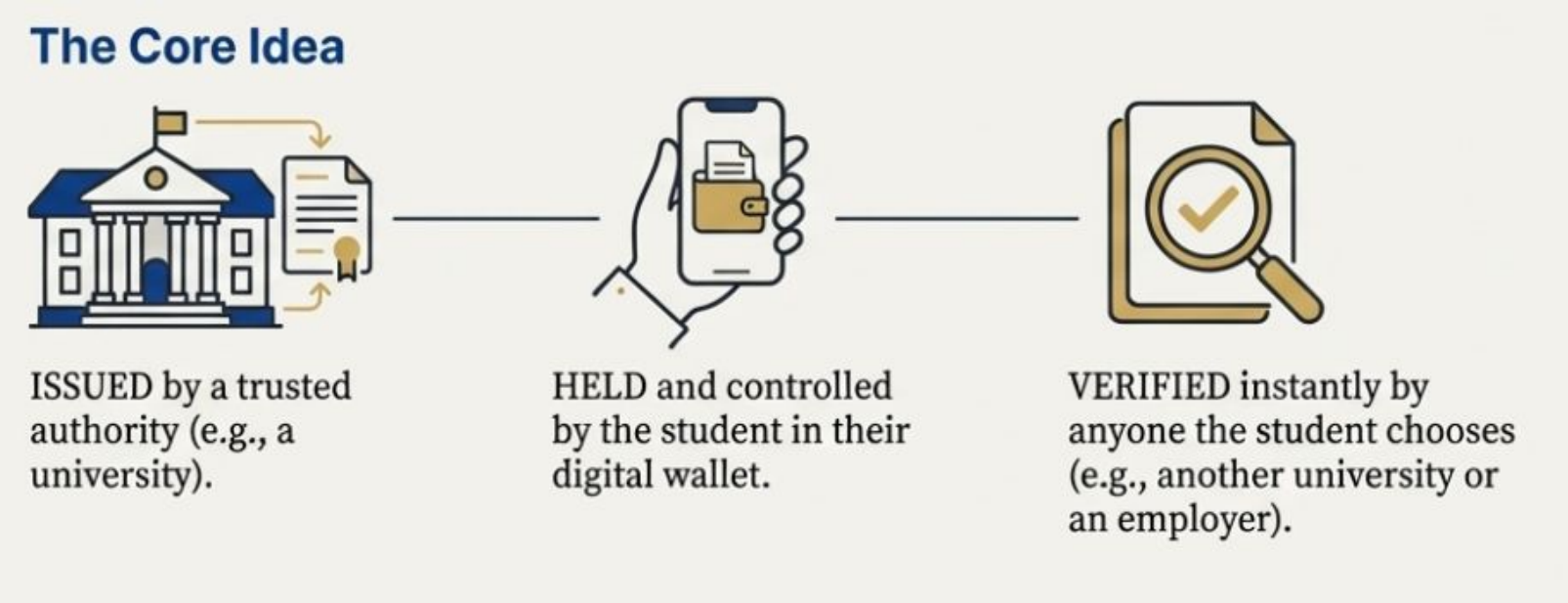
**Unforgeable Proof (Immutability):** Records, once written, cannot be altered or deleted.

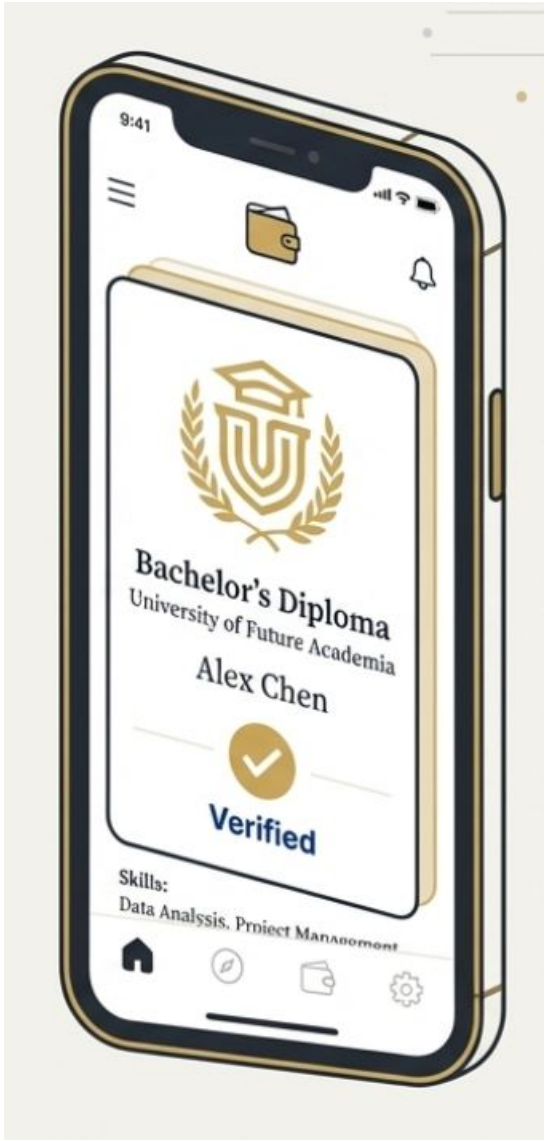
**Built-in Confidence (Trust & Transparency):** The system's rules ensure all parties can trust the transaction.

**No More Middlemen (Disintermediation):** Enables direct interaction without relying on a central authority to validate.

# A new format of achievement: Verifiable Credential

- Think of it as a digital passport for your skills and diplomas. It lives in a secure wallet on your phone, not in a university's filing cabinet.
- A Verifiable Credential (VC) is a tamper-evident and privacy-respecting credential, with specific Metadata and Proofs, requested by the Holder and issued by a competent authority, called Trusted Issuer, and where the authorship can be cryptographically verified (W3C, DCC, 2020)

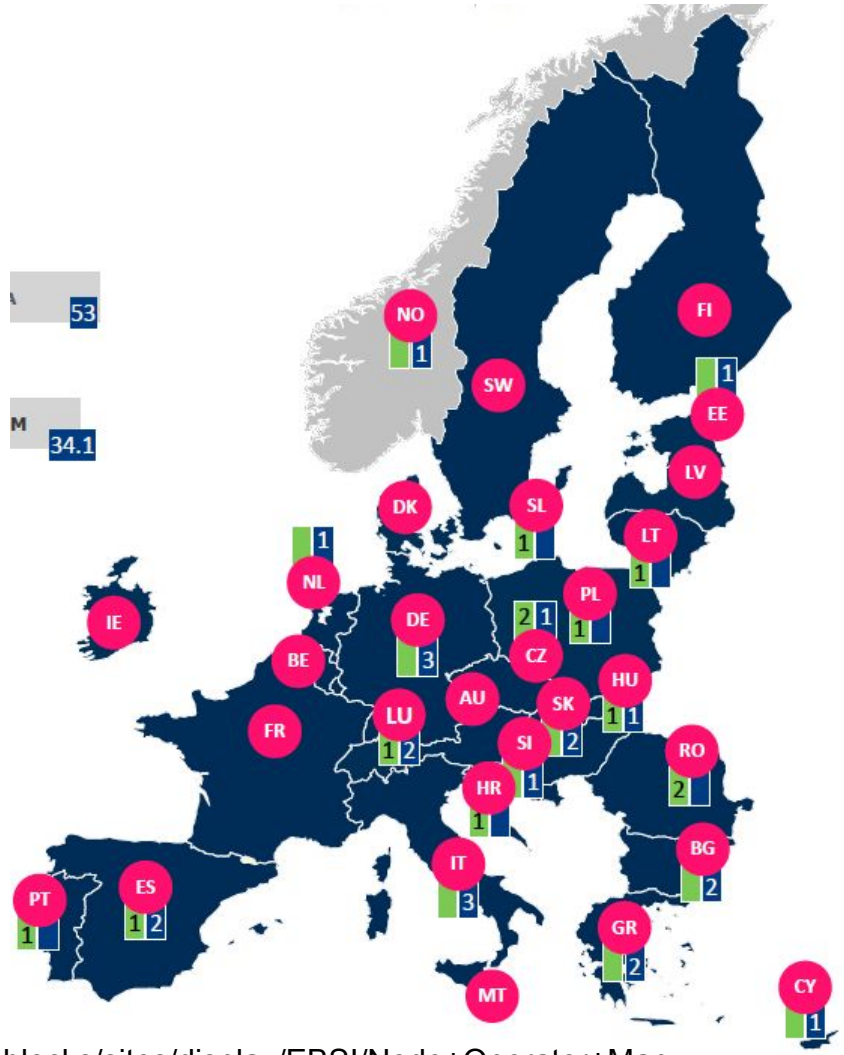


# From Vision to Reality: the European Blockchain Services Infrastructure

- The European Blockchain Services Infrastructure (EBSI) was launched in 2019, as a project of EC and EBP;
- EBSI is a network currently consisting of 41 nodes out of which 27 are validators; secured through 9 distinct initiatives;
- EBSI consists of a growing ecosystem of more than 350 organizations from private and public sectors, from more than 30 countries;
- Through its Diploma use case, represents a cross-border decentralized credentialing ecosystem for issuing Verifiable Credentials.

4 EBSI nodes in Romania: ICI (Dec 2020), UEFISCDI (June 2021), STS (Dec 2021); UPT (EBSI-NE Project – June 2024)




https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Node+Operator+Map

# Verifiable Credentials on EBSI


**Digital wallets**

**Functionalities**
Authenticate, Store, Share, Sign

**Stores**

Identities
- *Represented by:*
  Set of asymmetric keys
  DID – Decentralized Identifiers

Verifiable Credentials*
- Verifiable IDs
- Verifiable Accreditations
- Europass etc.

**Example of EBSI Conformant Wallets**
Walt.Id, Gataca, Altme

**Development Libraries & Samples**
The EU Digital Identity Wallet Toolbox

EU Digital Identity Wallet

**Trusted Data Registries**

**Contains**

DID Registries
Trusted Issuer Registries
Revocation Lists

**In the form of**
Smart Contracts on EBSI Ledger

# Exploring Blockchain Projects implemented by UPT

**Team**

- Prof.dr.ing.Radu Vasiu
- Dr.ing. Diana Andone
- Prof.dr.ing.Carmen Holotescu
- Drd.Victor Holotescu
- S.l.dr.Andrei Ternauciuc

# EBSI4RO Connecting Romania through Blockchain

Central scope: to create an extendable and sustainable ecosystem to facilitate and accelerate the awareness, knowledge and adoption of the Blockchain technologies and European Blockchain Services Infrastructure (EBSI) by the Romanian citizens, businesses, institutions and administration; proposals for Blockchain policies in education.


**Partners:**

1. **Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI)**
   - Dr.Cosmin Cioranu
   - Elena Stefania Nicolaescu
2. **Politehnica University of Timisoara (UPT)**
   - Prof.dr.ing.Radu Vasiu
   - Dr.ing. Diana Andone
   - Prof.dr.ing.Carmen Holotescu
   - Drd.Victor Holotescu
   - S.l.dr.Andrei Ternauciuc
   - Conf.dr.Gabriela Grosseck

April 2021 – March 2023

https://ebsi4ro.ro
https://www.facebook.com/ebsi4ro
https://twitter.com/ebsi4ro

# Objectives and Outcomes of the project

01

## Setup and operation of an EBSI node

Node operational from July 2021

02

## Credentialing System for issuing Verifiable Credentials on EBSI for university diplomas and micro-credentials

Integrated with the National Student Enrolment Registry (Registrul Matricol Unic RMU) operated by UEFISCDI, and with UPT Unicampus platform

03

## 5 miniMOOCs on Unicampus and 6 workshops

04

## Communication and Blockchain community strengthening in Romania, with the aim to raise awareness of Blockchain / EBSI

# EBSI Early Adopters: Multi-University Pilot

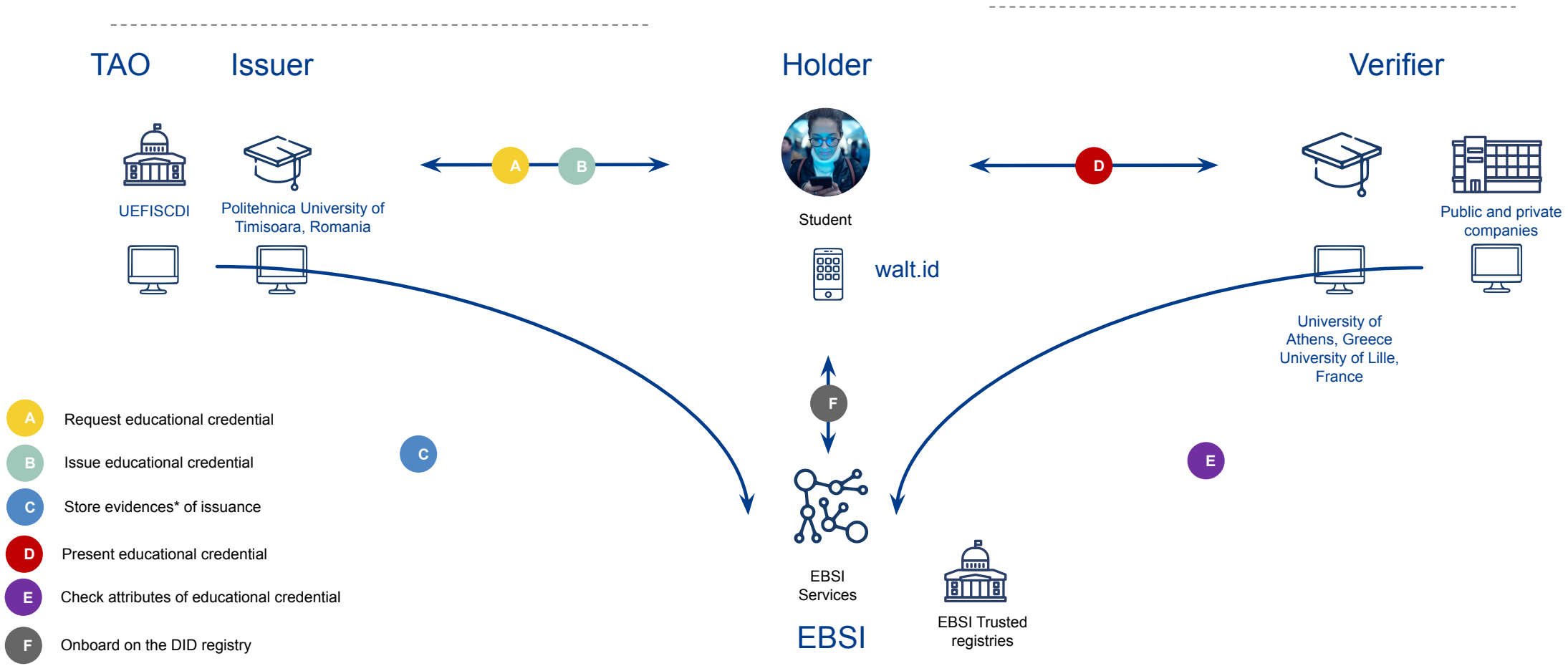
2 European universities alliances, +20 universities from +15 countries

EBSI4RO participated in the EA Programme  Wave 2 – July 2021 – May 2022

https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/Early+Adopters+Programme

# Verifiable Credentials workflow

Diploma use case



## TAO (Trusted Accreditation Organisation)

The ministry

Reduce friction in interactions, increase trust (transparency) and security in shared data.

Ministry of Education, UEFISCDI, Romania
Ministry of Education, Ministry of Digital Governance,GRNET Greece
Ministry of National Education, France

**Build a new trust paradigm**

## Issuer

The university A

Position your university as a pioneer brand, reduce friction in interactions, increase trust (transparency) and security in shared data. At scale, decrease administrative costs.

Politehnica University of Timisoara, Romania
University of Athens, Greece
University of Lille, France

**Lead the change**

## Holder

The student

Take control of their own data in a secure way and easily move with their own credentials across Europe.

**Enjoy mobility across borders**

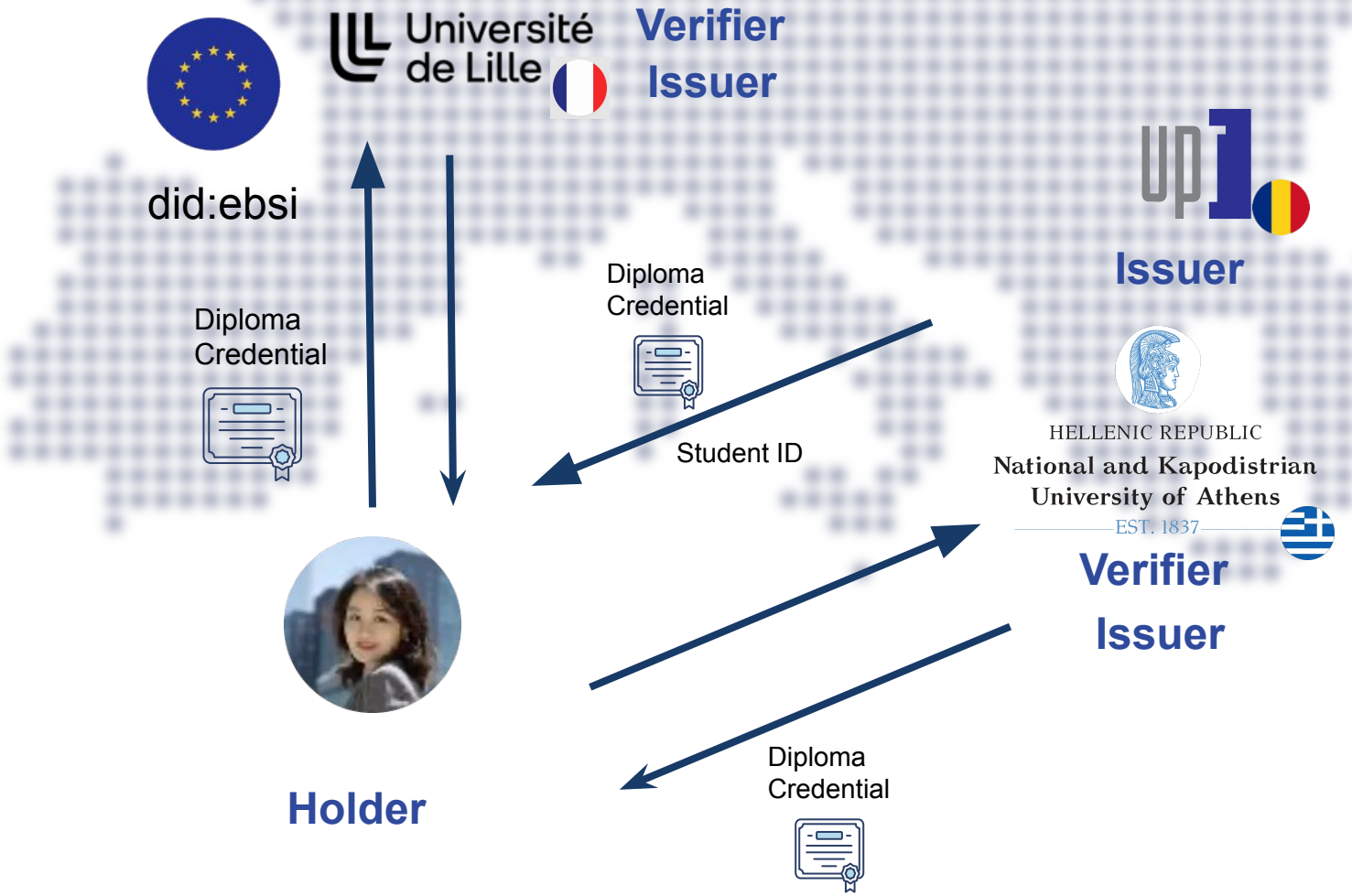
## Verifier

The company / university B

Reduce mistakes and protect against fraud, effortlessly interact with government agencies as well as reduce friction and reduce verification costs.

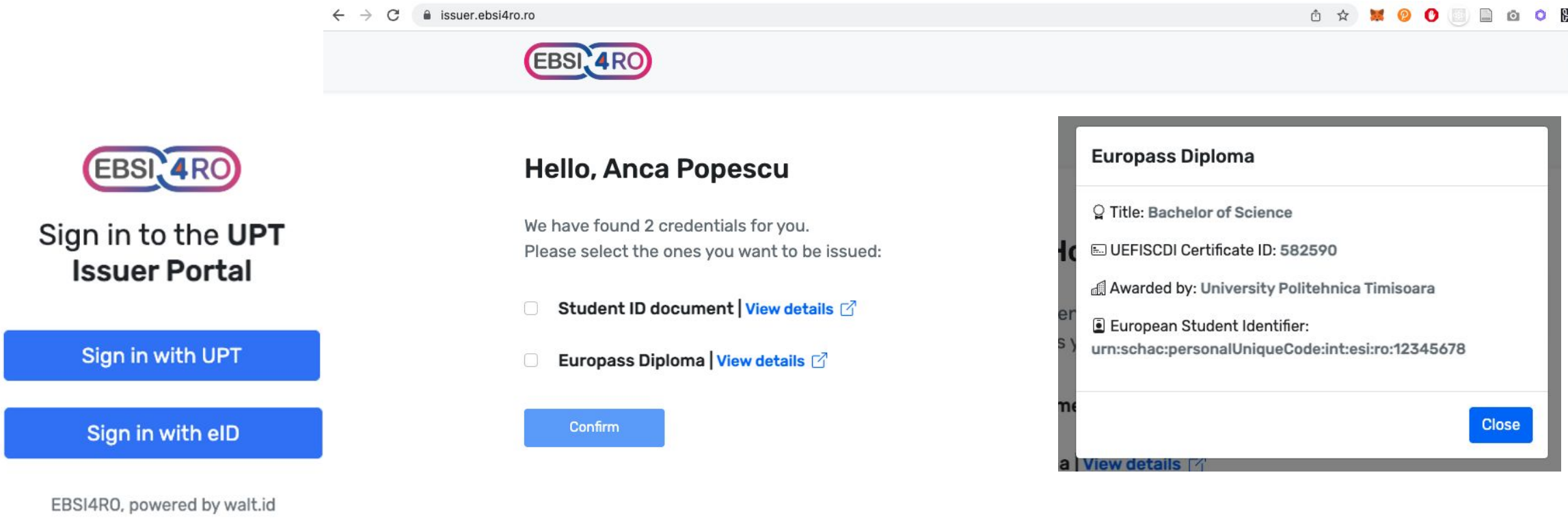
**Reduce costs**

# The implemented cross-border scenario



# Current Scenario for issuing and verifying VCs at UPT (1)

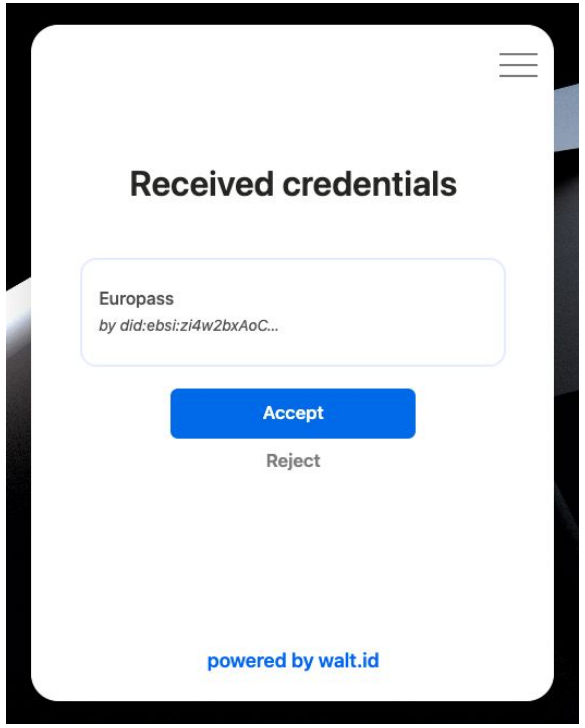
Issuing Diploma Credentials on EBSI4RO Demo Issuer

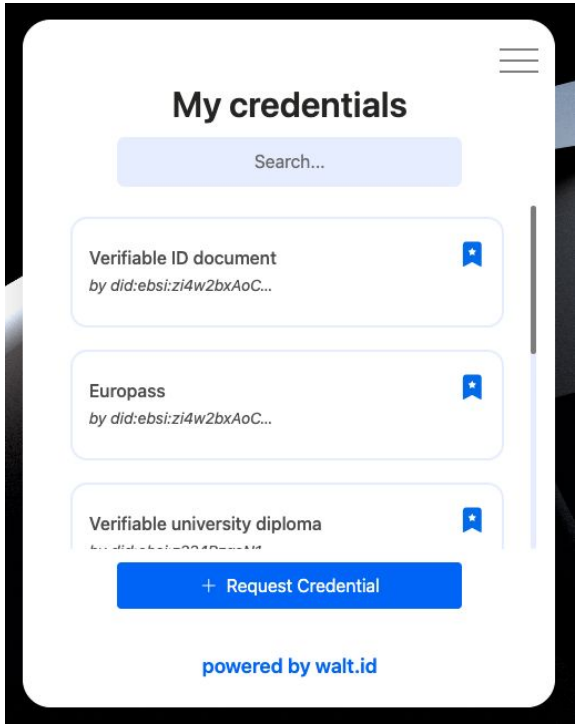


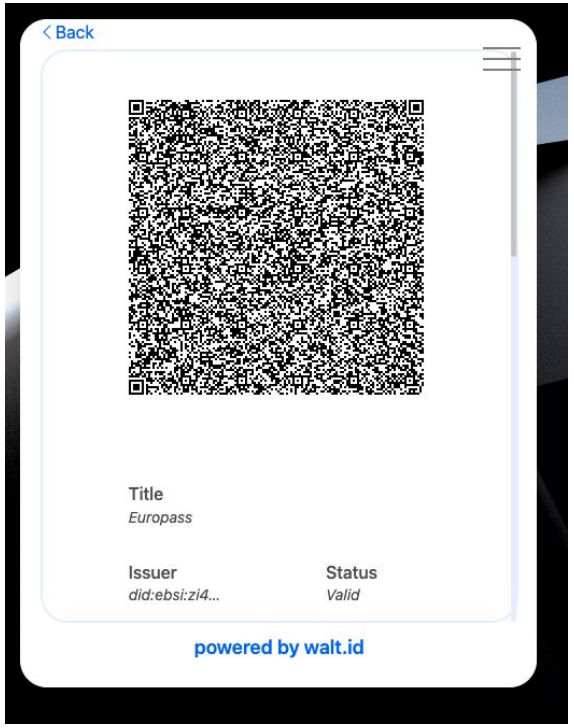

https://issuer.ebsi4ro.ro

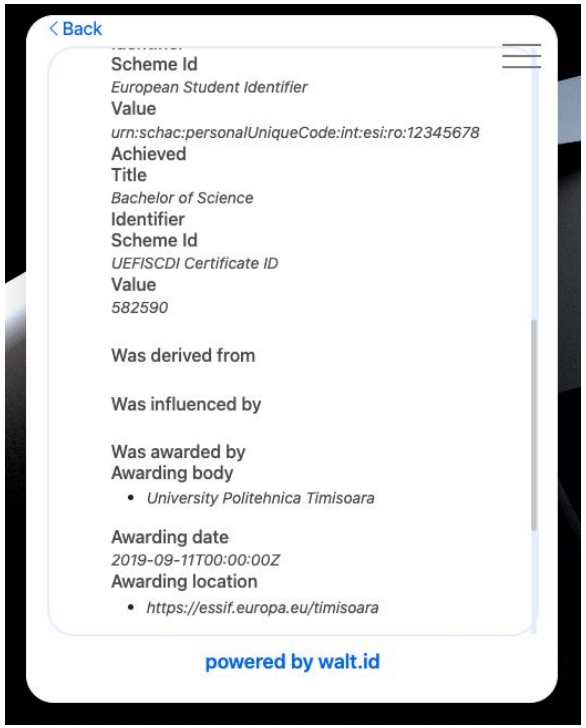
# Current Scenario for issuing and verifying VCs at UPT (2)

Receiving credentials in an Open-Source Wallet (walt.id)



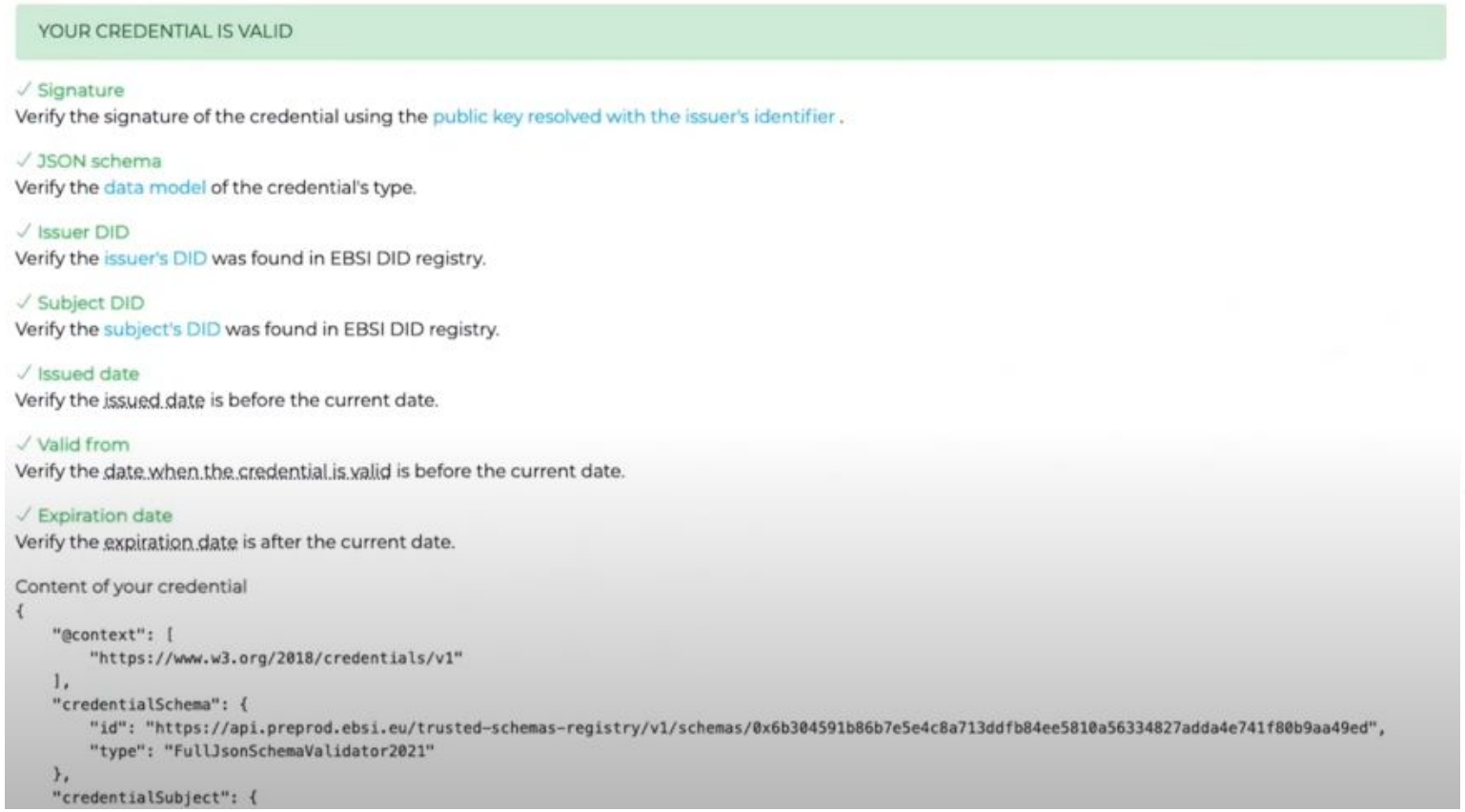



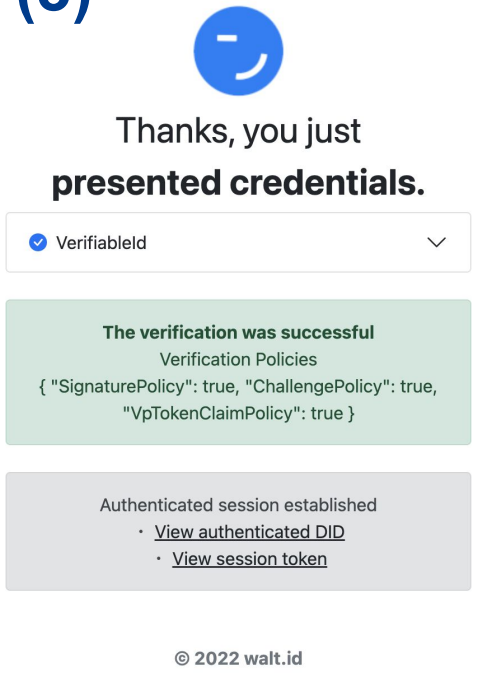



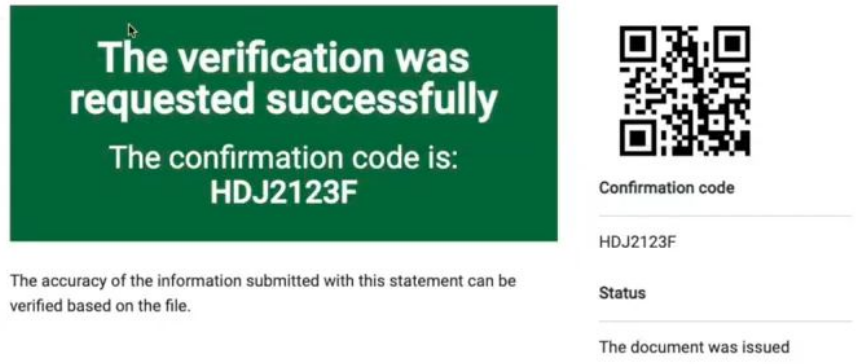



# Current Scenario for issuing and verifying VCs at UPT (3)

Verifying credentials by 3rd party



# Current Scenario for issuing and verifying VCs at UPT (4)

Verifying credentials by 3rd party

# Addressing the challenge of student mobility in Europe

For services requiring student identity or degree verification

01

## Using the same personal student wallet in 3 countries and 3 universities

The WaltID wallet (walt.id) used for this project has been used successfully

- Thanks to walt.id support, and
- Using a DID and Verifiable Identity Attributes issued by Politehnica University of Timisoara, Romania.

02

## Issuing EBSI compliant credentials recognized in other countries

The 3 participating countries have issued Europass diplomas valid on EBSI

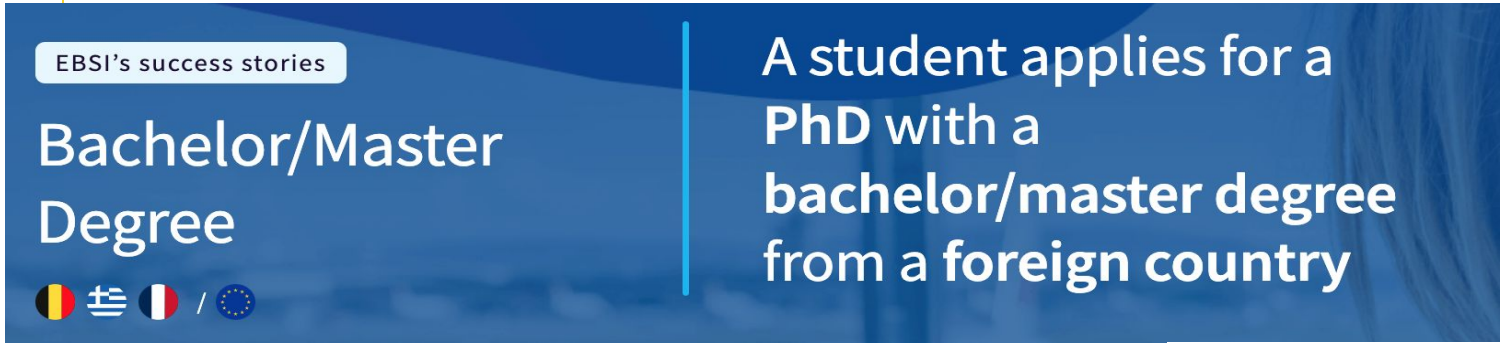
- Thanks to a successful collaboration between the 3 teams involved, and
- The constant and professional support of the EBSI team.

03

## Allowing a university department or recruiter to verify a credential submitted by a student

The open source verification service is online

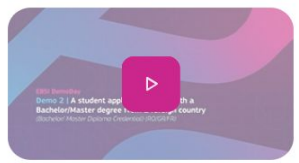
- Provided by the fr.EBSI project team,
- Thanks to walt.id SSI kit libraries.






Short Demo Story 2


Interview of Actors


Full Demo

Scenario

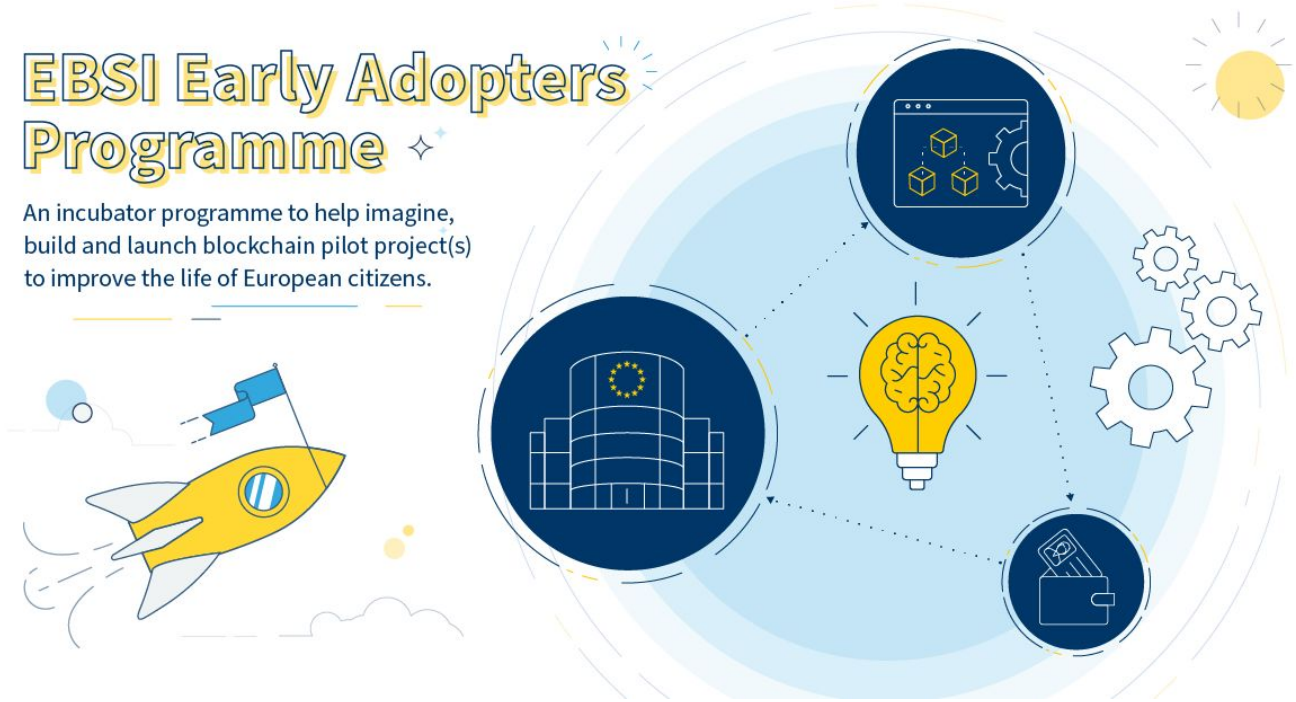
https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Bachelor+-+Master+Degree

https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Verifiable+Credentials+Success+Stories

# Participation in EBSI Early Adopters Wave 3

**UEFISCDI, UPT,** “Ioan Slavici” University of Timisoara, Lideea Ltd, OncoGen, “Vasile Goldis” University of Arad, UVT & UNITA – December 2022 – May 2024 – Micro-credentials cluster

https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Micro+-+Credentials



Micro-credentials

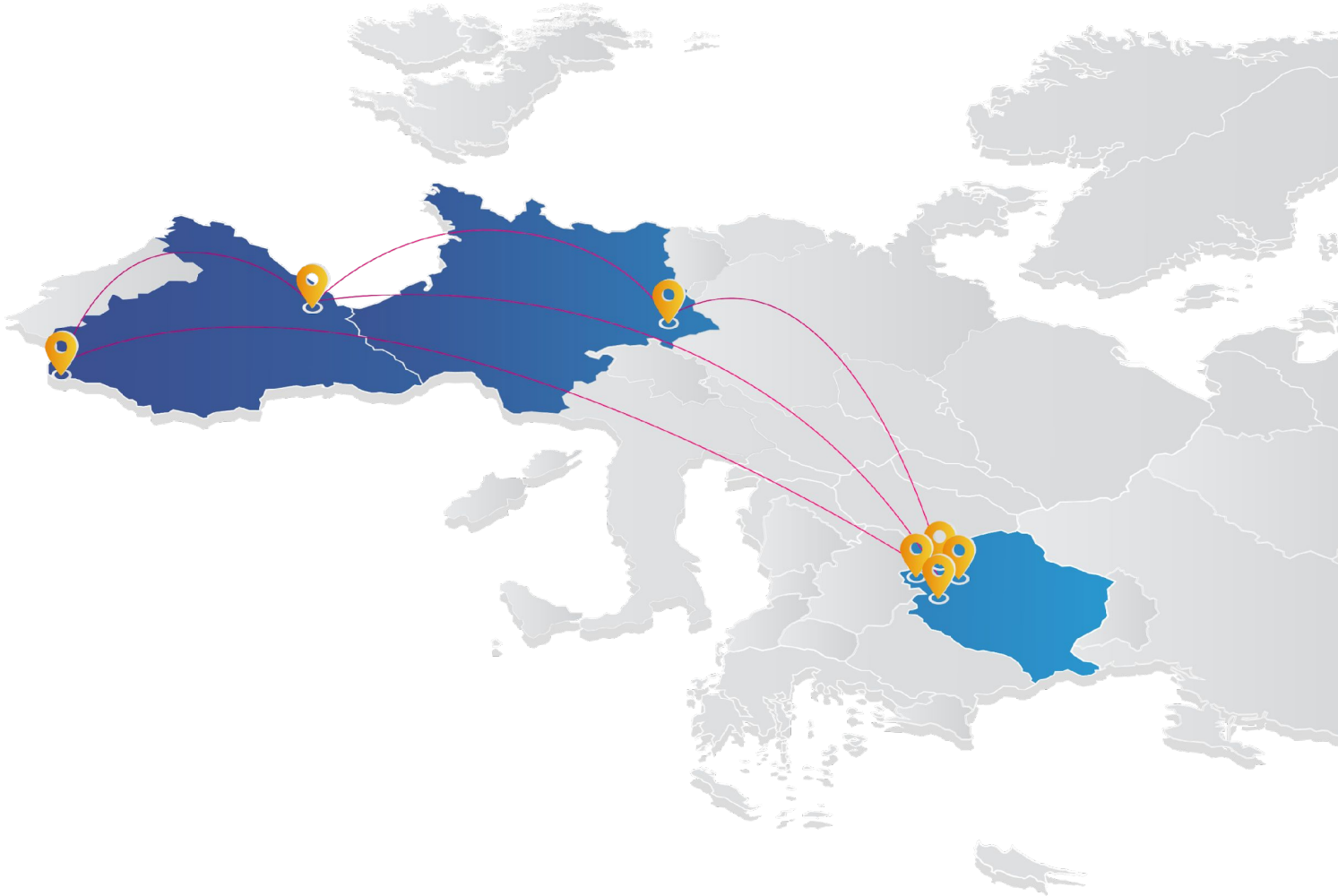
Participating countries:

Government ministries:

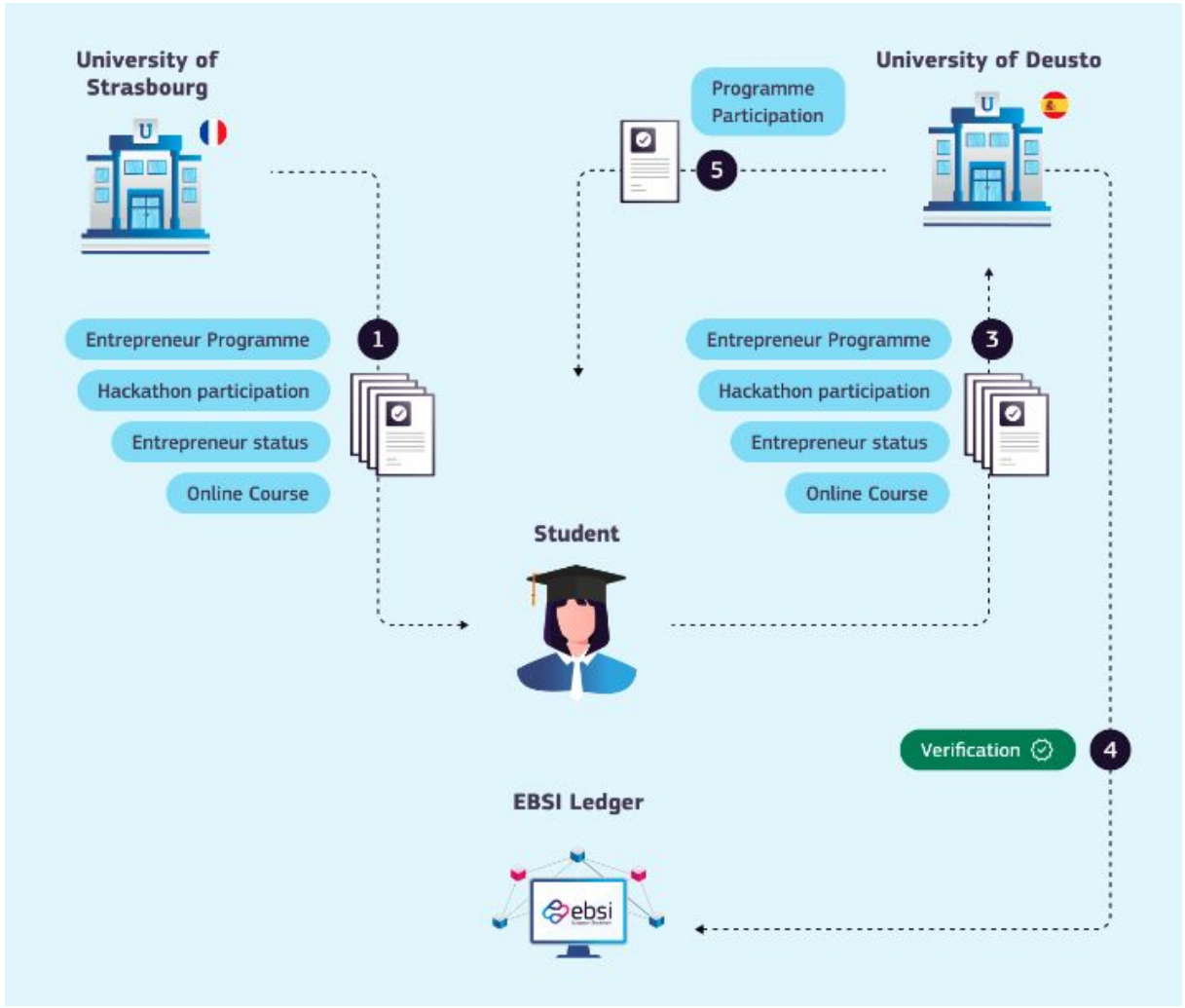
Universities: (Issuers of educational credentials)

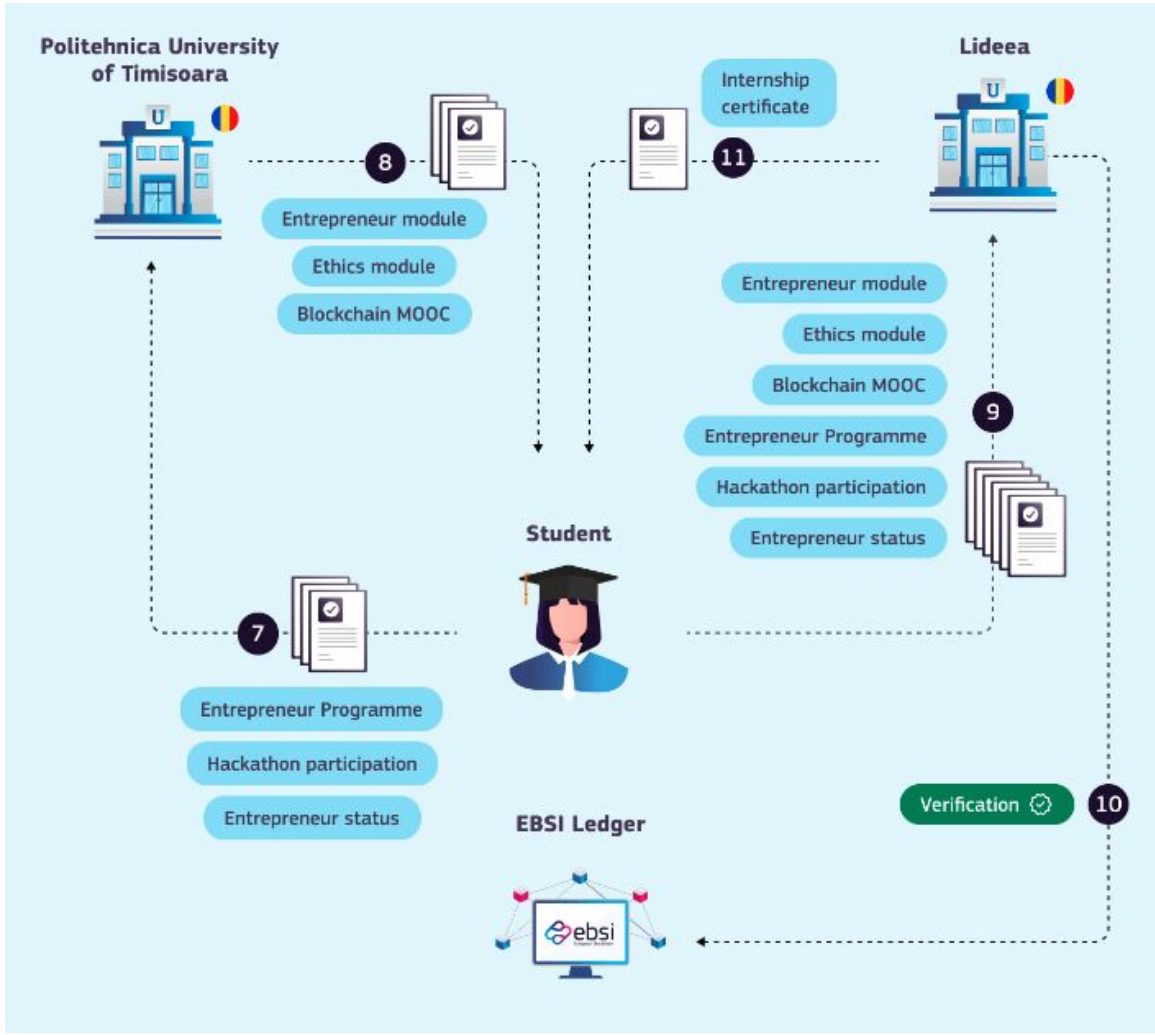
IT providers:

Others:



https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Micro+-+Credentials




https://ec.europa.eu/digital-building-blocks/sites/display/EBSI/Micro+-+Credentials

# UPT completed the participation in 3 new EBSI projects

- UPT participated in 3 new projects related to EBSI (2023-2025)

01

Increase/enhance existing EBSI capabilities

Revocation, Suspension, Mandates, Consent, ZKP

02

Educational credentials, professional qualifications and Social Security

Combining the best of identity and signature provided by the eID, with the potential and flexibility of verifiable credentials and the increased privacy provided by the EBSI ledger

03

Enhance EBSI nodes requirements

EBSI to become a Trust Anchor (ISO27001, etc.)

**EBSI -VECTOR**

EBSI-enabled Verifiable Credentials and Trusted Registries

UEFISCDI
UPT
ICI
certSign

https://www.ebsi-vector.eu

**DC4EU**

Digital Credentials for Europe

UEFISCDI
UPT.
ICI
certSign

https://www.dc4eu.eu

**EBSI-NE**

Node Expansion

UEFISCDI
UPT

https://ebsi-ne.com/

# VCs on EBSI: more than Diplomas - a Pedagogical Shift

What if we could recognize and validate skills learned anywhere—at work, online, or in the community?

*Enabler: Micro-credentials

What if learning itself became a portable, verifiable asset that students accumulate throughout their lives?

*Enabler: Tokenization of Learning

What if we could build new, more flexible learning pathways and even entirely decentralized universities?

*Enabler: Decentralized Science & Education

**Thank you!**