EUROPEAN TRAINING FOUNDATION

Guidelines for establishing National Databases using Open Architecture

14/06/2023

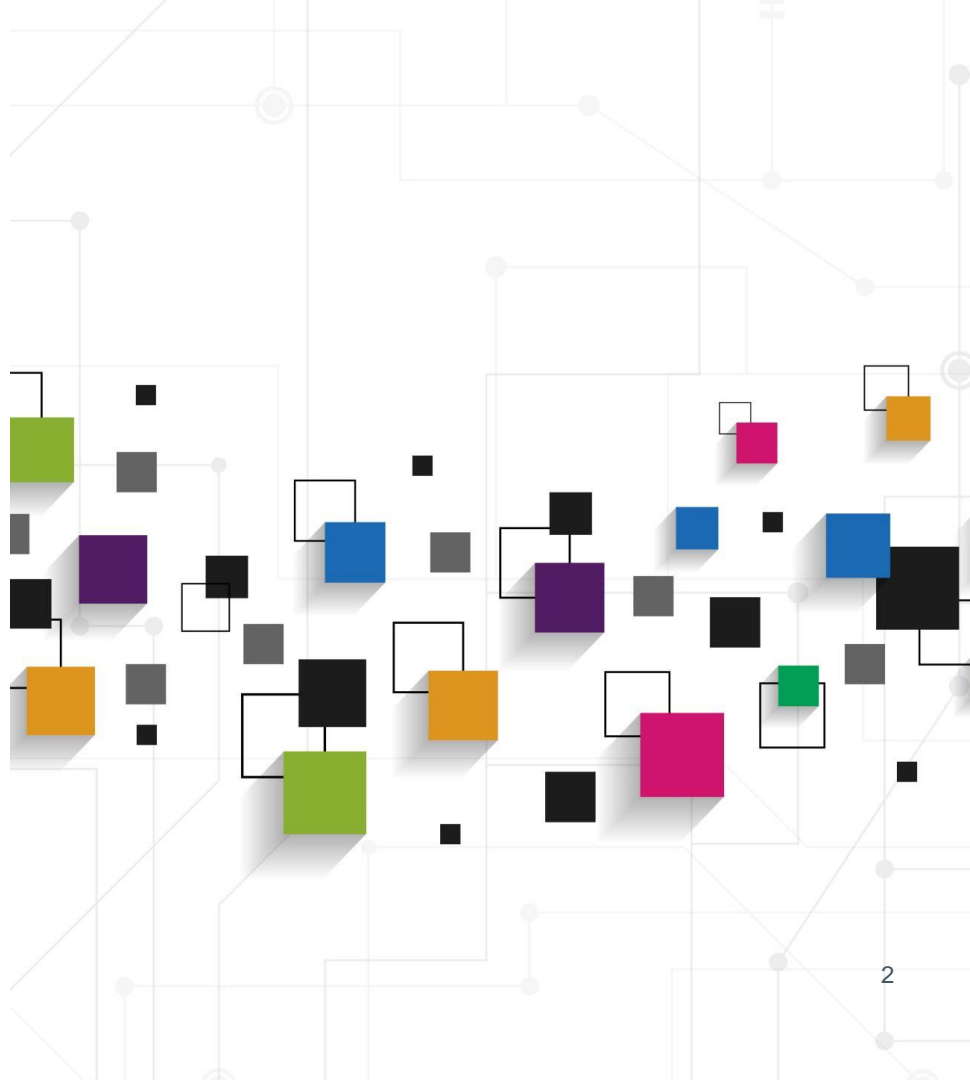# Agenda

Open architecture
Guidelines for establishing National Qualifications Databases

Semantic interoperability
European Learning Model, Digital Credentials and the link with the ESCO

Demonstration
Proof of Concept

ETF
Working together
Learning for life

European Training Foundation

01

Context

Role of the Qualifications Databases

➔ Key Role of Qualifications Databases:
  ◆ Navigating through various qualifications
  ◆ Comparing qualifications for suitability and relevance
  ◆ Tracking changes and evolution in a qualification system over time
  ◆ Assessing recognition and accreditation of qualifications

➔ Advanced Services Facilitated by Databases:
  ◆ Automating guidance systems to help navigate qualifications
 ◆ Implementing digital credentialing systems for secure and transparent qualifications recognition

ETF
Working together
Learning for life

European Training Foundation

➜ Objectives
  ◆ Provide clear guidelines for partner countries to establish robust national qualifications databases

➜ Framework Leveraged:
  ◆ Utilize the European Interoperability Framework (EIF) to guide the establishment process

➜ Considerations

| Regulatory	Organisational	Semantic	Technical
➡	➡	➡	➡
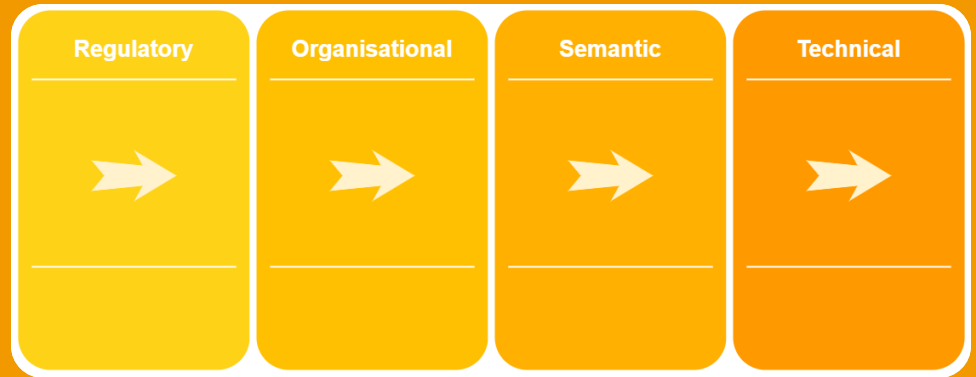
02

Interoperability model

European Interoperability Framework (EIF)

➔ Framework developed to ensure interoperability among various digital systems
➔ Objectives:
  ◆ Enhance the effectiveness of **digitally-connected public services**
  ◆ Enable citizens, businesses, and public administrations to **interact seamlessly across borders**
  ◆ Promote the use of **open standards** and specifications, and reuse of digital resources
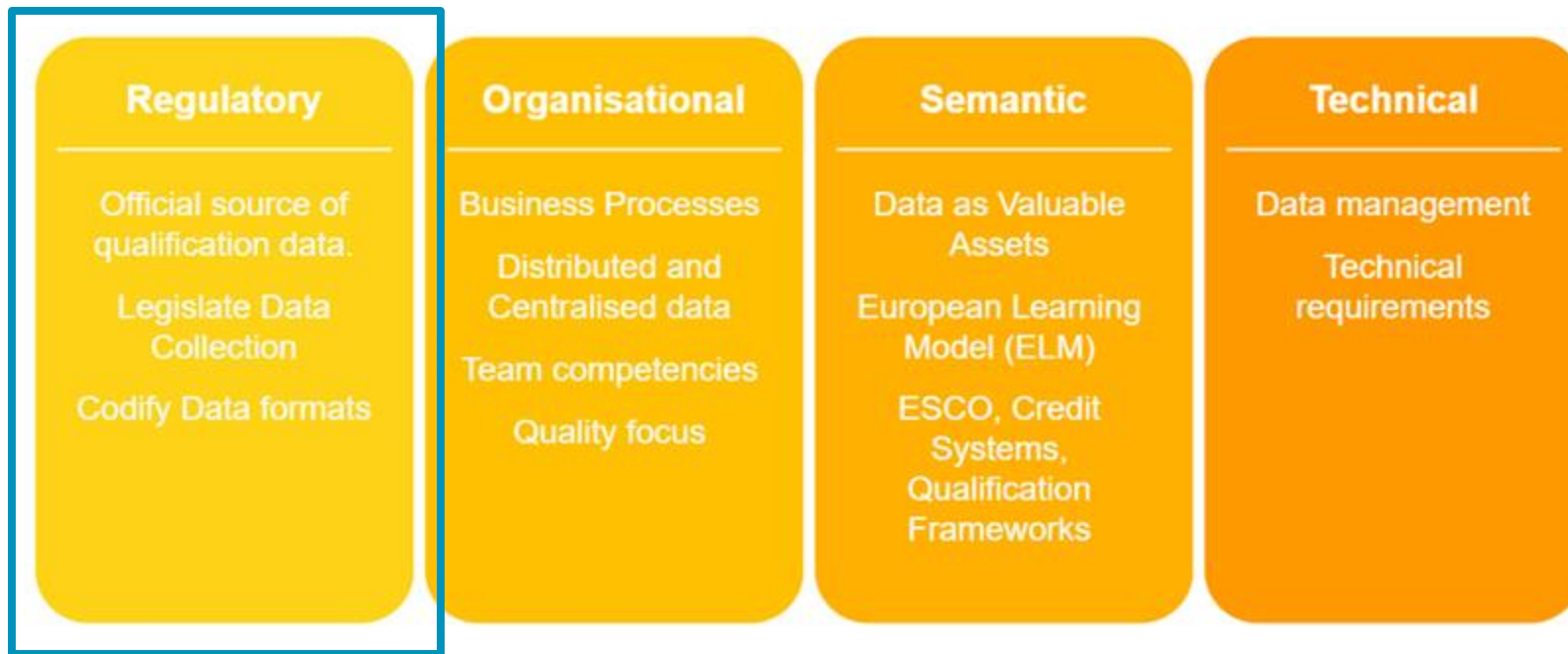 ◆ Advocate for **user-centric design** and inclusive decision-making processes

European Interoperability Framework (EIF)
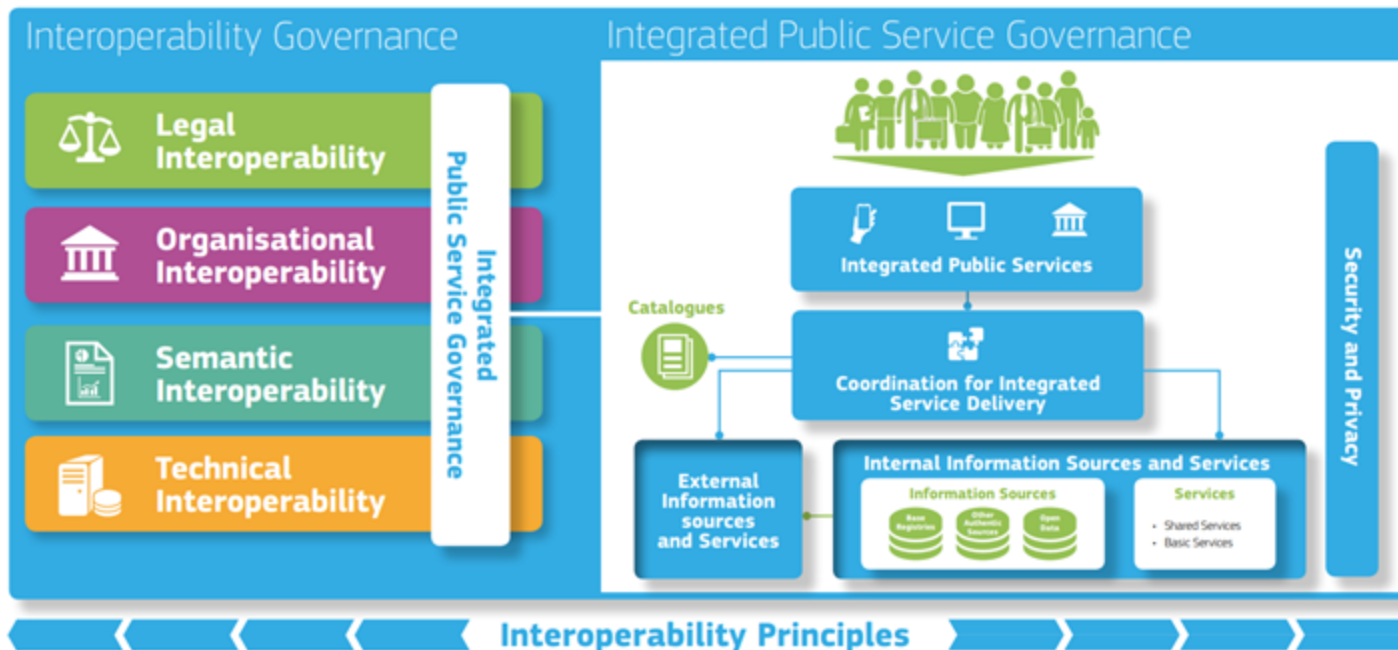
03

Building a qualifications database: key considerations

Regulatory considerations

Regulatory	Organisational	Semantic	Technical
Official source of qualification data.	Business Processes	Data as Valuable Assets	Data management
Legislate Data Collection	Distributed and Centralised data	European Learning Model (ELM)	Technical requirements
Codify Data formats	Team competencies	ESCO, Credit Systems, Qualification Frameworks	
	Quality focus		

Regulatory considerations

➜ Official source of qualification data
 ◆ **Action:** Establish regulations for the national qualifications database
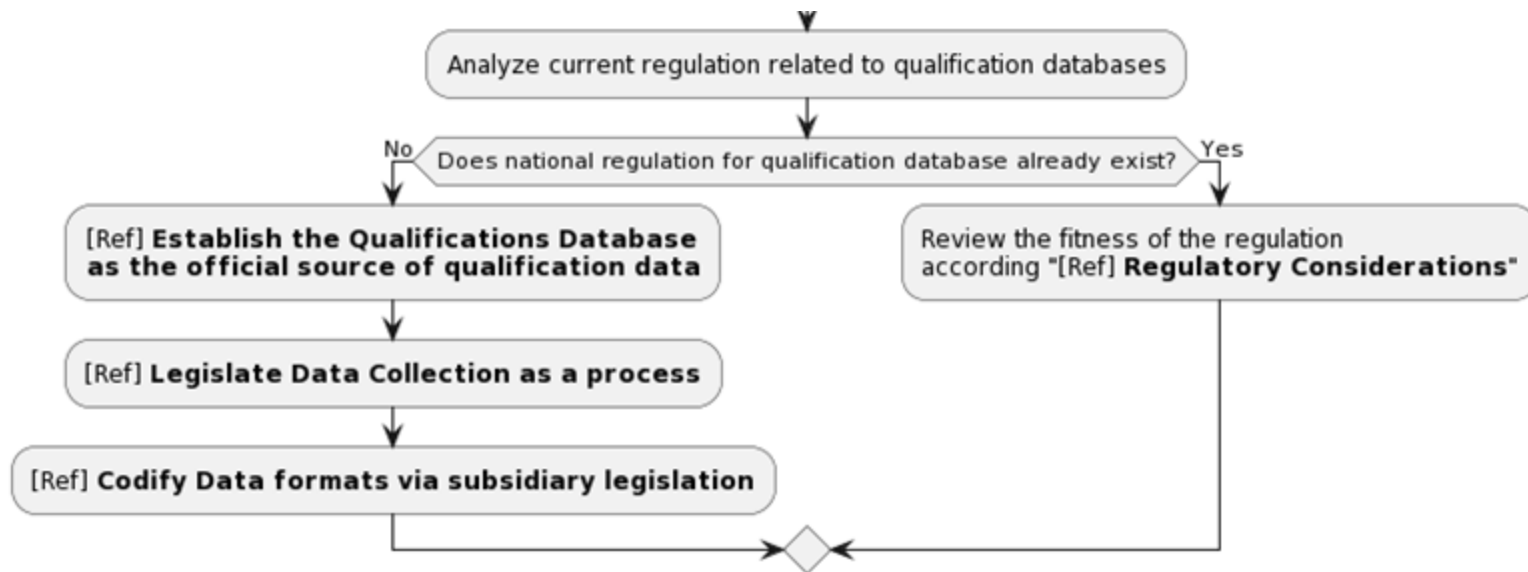 ◆ **Objective:** Singular, transparent and reliable source for stakeholders

➜ Legislate Data Collection
 ◆ **Action:** Implement regulation on qualification data management, providing clarity on roles, responsibilities, and standards in databases
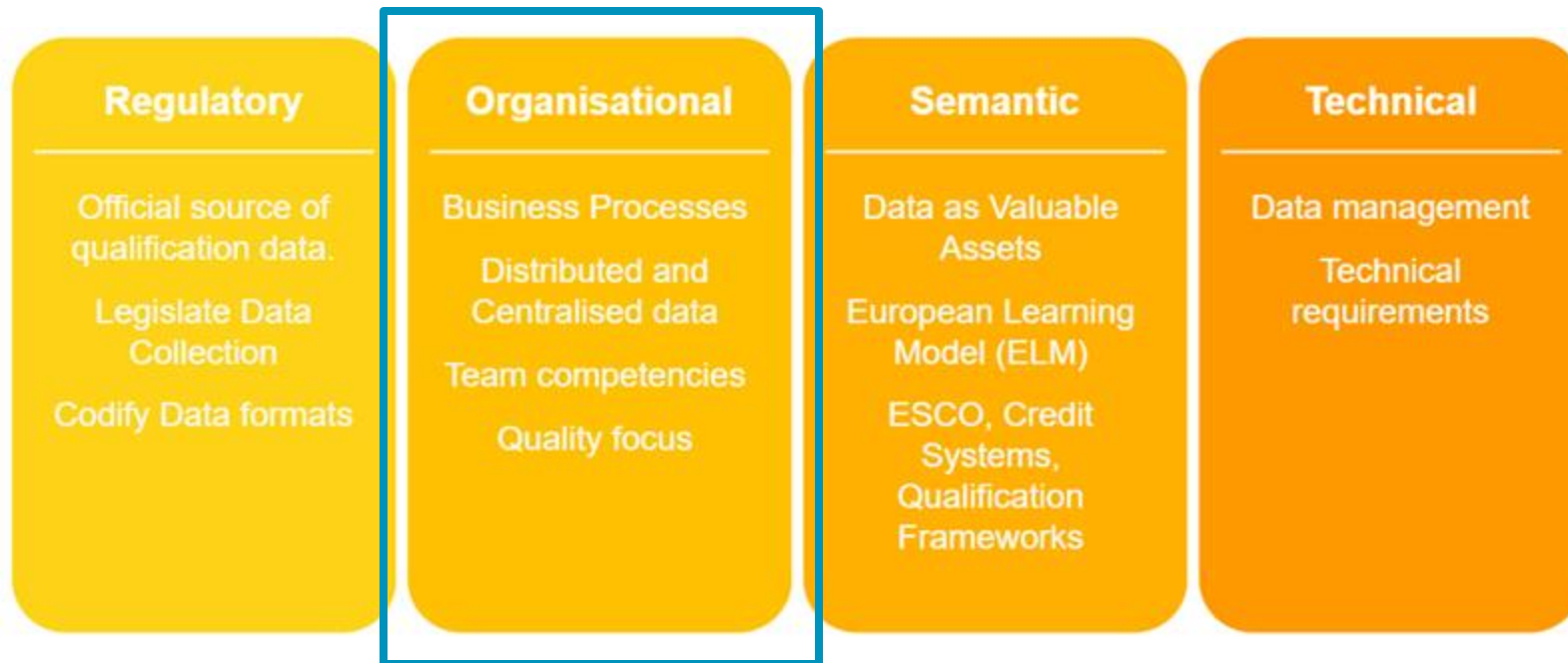 ◆ **Objective:** Efficiency in data handling through regulatory oversight

➜ Codify Data formats
 ◆ **Action:** Define data formats inside regulation, ensuring their use across entities
 ◆ **Objective:** Improve data quality by standardising data formats

Regulatory considerations

Analyze current regulation related to qualification databases

No — Does national regulation for qualification database already exist? — Yes

[Ref] **Establish the Qualifications Database as the official source of qualification data**

Review the fitness of the regulation according "[Ref] **Regulatory Considerations**"

[Ref] **Legislate Data Collection as a process**

[Ref] **Codify Data formats via subsidiary legislation**

Organisational considerations

Regulatory

Official source of qualification data.

Legislate Data Collection

Codify Data formats

Organisational

Business Processes

Distributed and Centralised data

Team competencies

Quality focus

Semantic

Data as Valuable Assets

European Learning Model (ELM)

ESCO, Credit Systems, Qualification Frameworks

Technical

Data management

Technical requirements

Organisational considerations

➔ Business Processes
  - **Action:** Agree on aligned business processes for managing qualifications and related data
  - **Objective:** Introduce the qualification collection and interoperability into the existing processes

➔ Quality focus
  - **Action:** Maintain accuracy and up-to-dateness of the qualifications database
  - **Objective:** Evolutive increases of interoperability and alignment with organisational goals for the qualification database

Model Business Processes for a Qualifications Database

Qualifications Design
- Authoring of qualifications and description in terms of learning outcomes / skills

Standardisation & Documentation
- Description using a common template and reference taxonomies

Approval of Qualifications
- Award of an official or approved status on qualifications

Quality Control
- Checking that metadata is complete, correct, unique and approved

Publication
- Listing of Qualifications in a Public Database

Issue-Management
- Management of Changes and Errors

Technical Maintenance
- Ensuring continuous availability of technical systems

Evaluation & Review
- Periodic check to ensure objectives are met

ETF
Working together
Learning for life

European Training Foundation

Organisational considerations

➜ Team competencies
  ◆ **Action:** Ensure data management skills for effective handling of the qualification database
  ◆ **Objective:** Capacity-building to operate all aspects of the qualification interoperability

➜ Distributed and Centralised data
  ◆ **Action:** Decide on a distributed or centralised approach for qualification data collection.
  ◆ **Objective:** Analyze the trade-offs between:
    ● autonomy/control (distributed model) and
    ● streamlined implementation/maintenance (centralised model)

Organisational considerations: Roles

Role	Abilities
Database Administrator	- Create Dataset Administrators - Delete Dataset administrators. - Delete a Dataset
Dataset Administrator	- Create a Dataset - Delete a Dataset - Create and delete dataset users. - (Optional) Approve dataset user actions. - All functionalities below
Dataset User	- Add qualifications to a dataset. - Edit qualifications in a dataset. - Delete qualifications from a dataset. - All functionalities below
Public User	- Search for qualifications - View qualifications
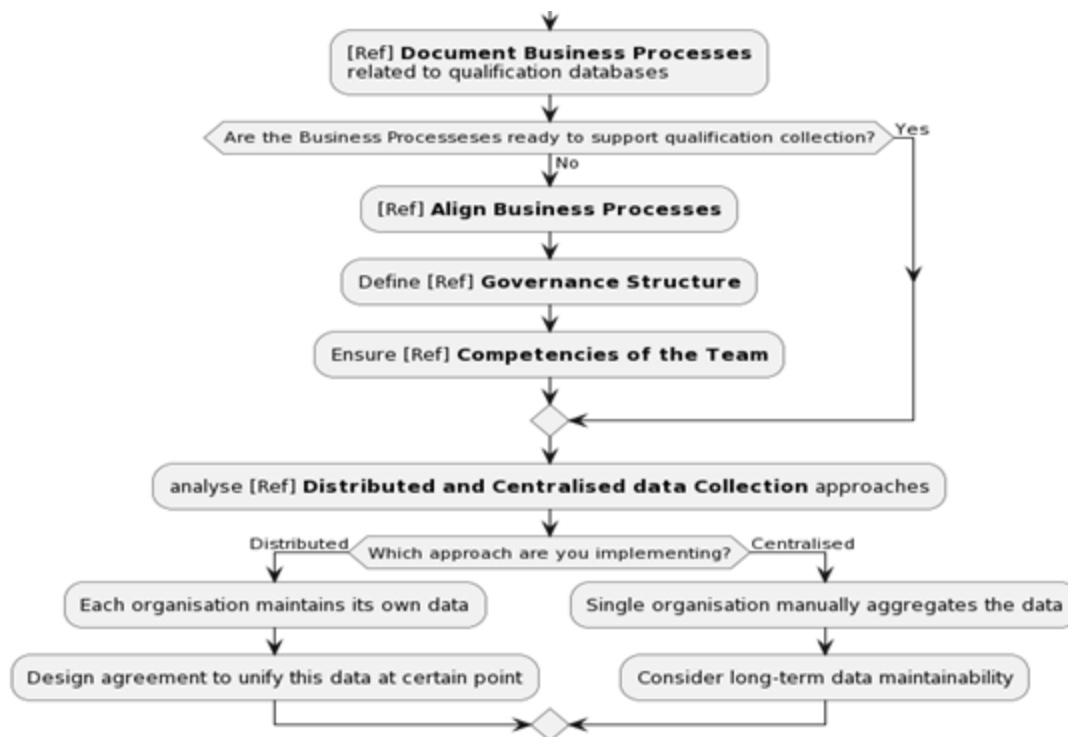
Organisational considerations

Semantic considerations

Regulatory

Official source of qualification data.

Legislate Data Collection

Codify Data formats

Organisational

Business Processes

Distributed and Centralised data

Team competencies

Quality focus

Semantic

Data as Valuable Assets

European Learning Model (ELM)

ESCO, Credit Systems, Qualification Frameworks

Technical

Data management

Technical requirements
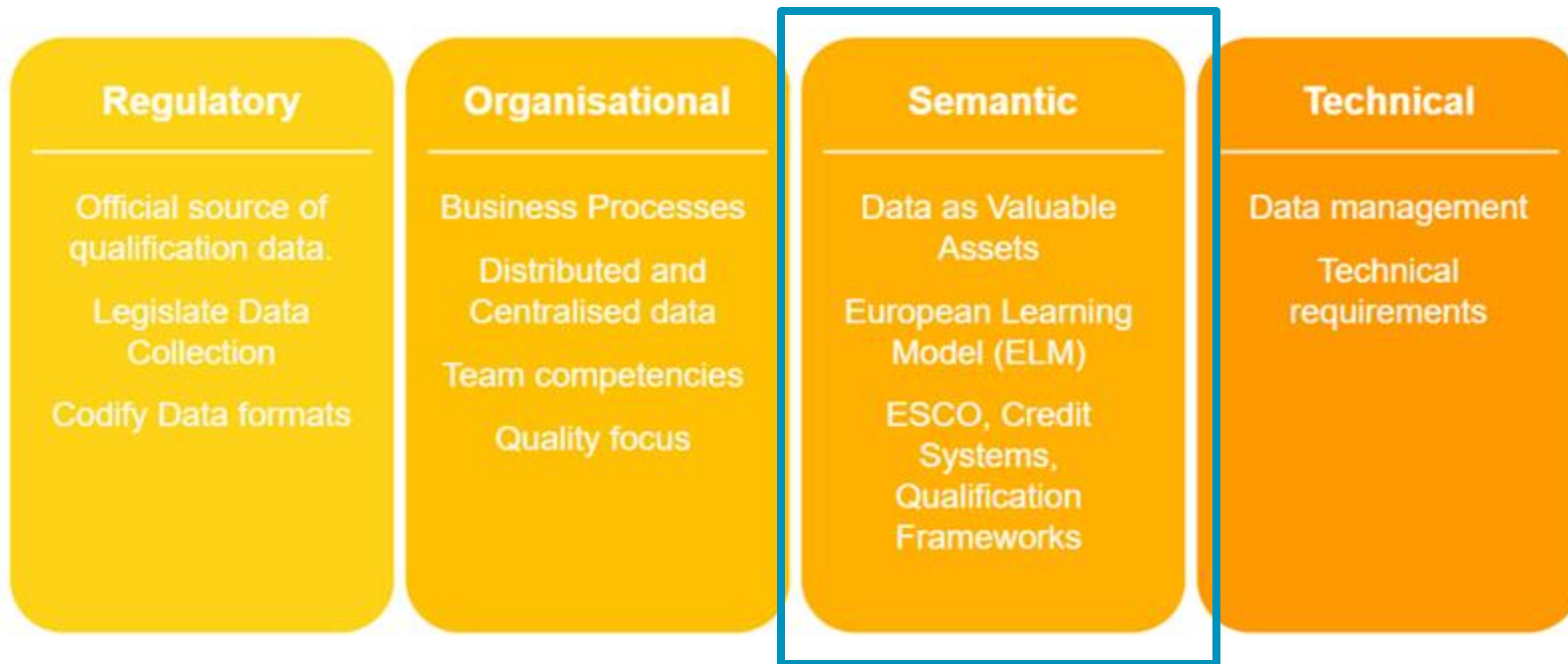
Semantic considerations

➔ Data as Valuable Assets
  ◆ **Action:** Implement a management strategy for qualification data formats, ensuring their use across entities
  ◆ **Objective:** Enhance semantic interoperability and foster common understanding among stakeholders

➔ European Learning Model (ELM)
  ◆ **Action:** Develop a common data model for qualification data (consider adopting the ELM)
  ◆ **Objective:** Validate that data is appropriately generated, and improve and reduce international barriers to mobility by adopting ELM

ETF Working together
Learning for life

European Training Foundation

Semantic considerations

➔ ESCO, Credit Systems, Qualification Frameworks
- ◆ **Action:** Evaluate which further international initiatives to implement
- ◆ **Objective:**
  - Increase comparability by using ESCO as a reference
  - Enhance recognition and mobility of qualifications by leveraging European frameworks.
  - Support lifelong learning by using credit systems and qualification frameworks.

Semantic considerations

Analyse current data models

Are the used semantics, syntactics aligned nationally?

No → Consider to [Ref] **Treat Data as Valuable Assets**

Yes → Potentially [Ref] **Use the European Learning Model (ELM)** for further international alignment

Consider to [Ref] **Use the European Learning Model (ELM)**

Define requirements for new data models

Design new data models

Validate: [Ref] **Support Cross-Sectoral Communities**

Technical considerations

Regulatory	Organisational	Semantic	Technical
Official source of qualification data.	Business Processes	Data as Valuable Assets	Data management
Legislate Data Collection	Distributed and Centralised data	European Learning Model (ELM)	Technical requirements
Codify Data formats	Team competencies	ESCO, Credit Systems, Qualification Frameworks	
	Quality focus		

ETF
Working together
Learning for life
European Training Foundation

Knowledge
Innovation
Centre

Cogni zone

Technical considerations

➔ Data Management
- ◆ **Action:** Ensure data intake and reusability using Persistent qualification identifiers and public endpoints
- ◆ **Objective:** Enhance user satisfaction and longevity of the solution

➔ Technical Requirements
- ◆ **Action:** Implement basic functionalities of the qualifications database (and select further advanced features)
- ◆ **Objective:** Ensure operational efficiency and fitness for the users
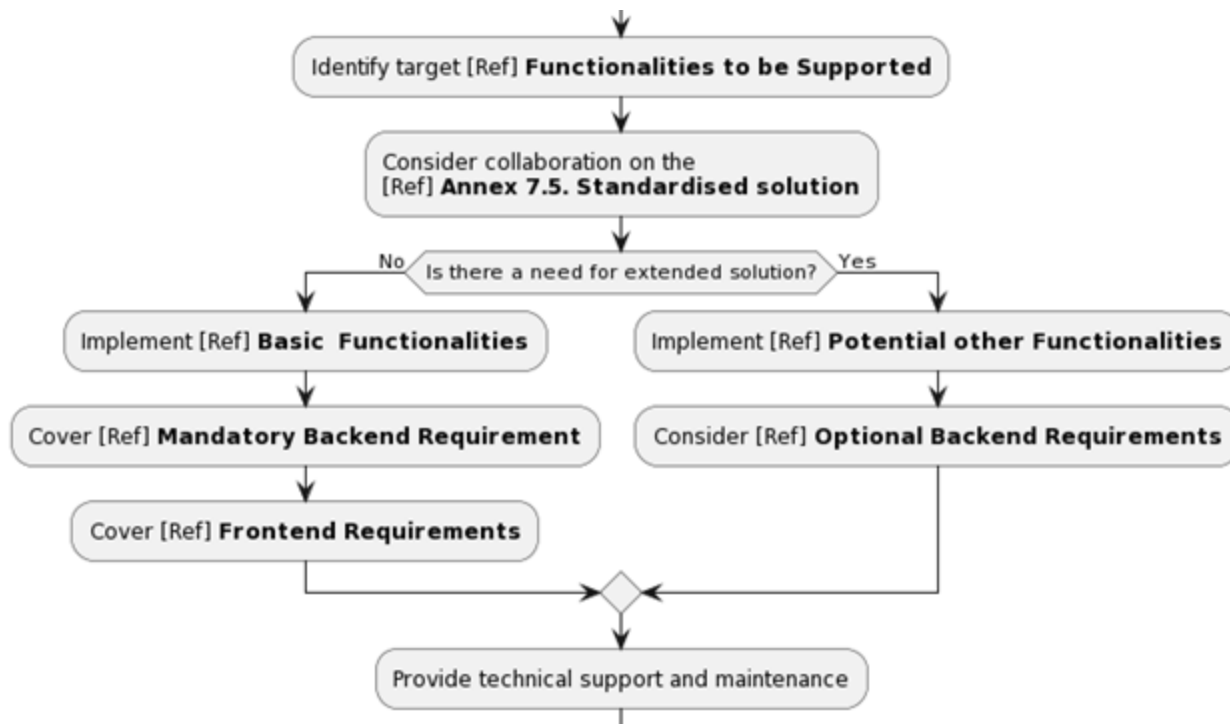
ETF
Working together
Learning for life
European Training Foundation

Technical considerations

Summary
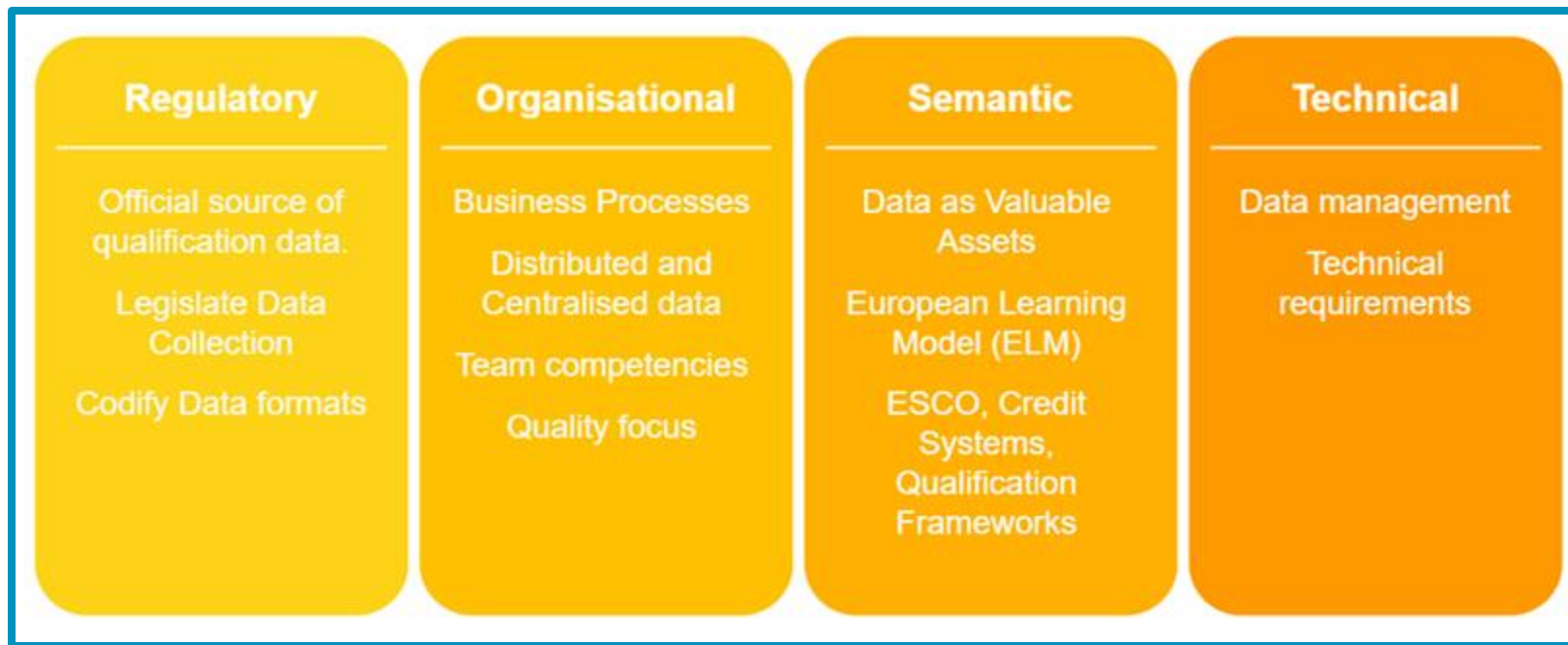
Regulatory	Organisational	Semantic	Technical
Official source of qualification data.	Business Processes	Data as Valuable Assets	Data management
Legislate Data Collection	Distributed and Centralised data	European Learning Model (ELM)	Technical requirements
Codify Data formats	Team competencies	ESCO, Credit Systems, Qualification Frameworks	
	Quality focus		

Semantic interoperability

European Learning Model, Digital Credentials and the link with the ESCO

The European Learning Model is intended to

Power Skills Intelligence

Reduce Market Fragmentation
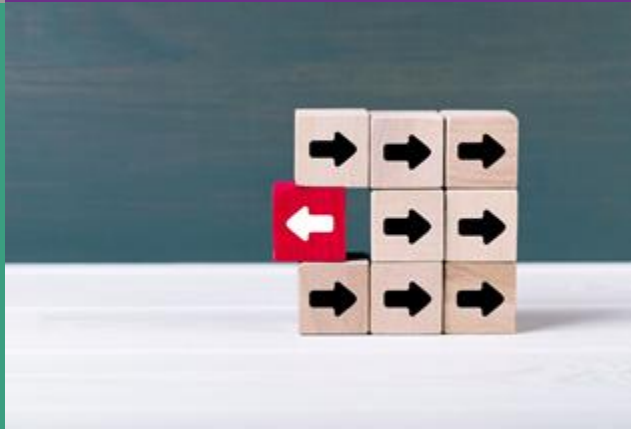
Remove barriers to recognition

Beneficiaries of the European Learning Model

Learner

I want to **find** the most appropriate **course** for me

Learning Provider

I have several **courses** in my course catalogue and want to make them **visible on the Europass** platform by using the ELM

ELM

Employer

I want to check if a **qualification is valid** in my country and what the **level** is of that specific qualification

Credential evaluator

I want to understand what a qualification represents. Using one single data model, i.e. the ELM, to describe them, **qualifications and credentials are transparent and comparable**

Benefits ELM 3.0 (I)

- Model addressing all levels and forms of learning

- Data providers **can** use ELM within national context, but they are **not obliged**

- Built on open standards and linked open data

- Native in all 29 Europass languages

- Uses familiar frameworks, classifications and taxonomies (e.g. EQF, NQF, ESCO and ISCED-f)

- Allowing for rich data – 400+ property fields (without restriction – only a few properties are compulsory)

- Supports data exchange and credential recognition

- Long-term support version

Users of the ELM

Implementers

Beneficiaries

Data providers

Learners

Data platforms

Learning providers

Public institutions

Employers

ELM
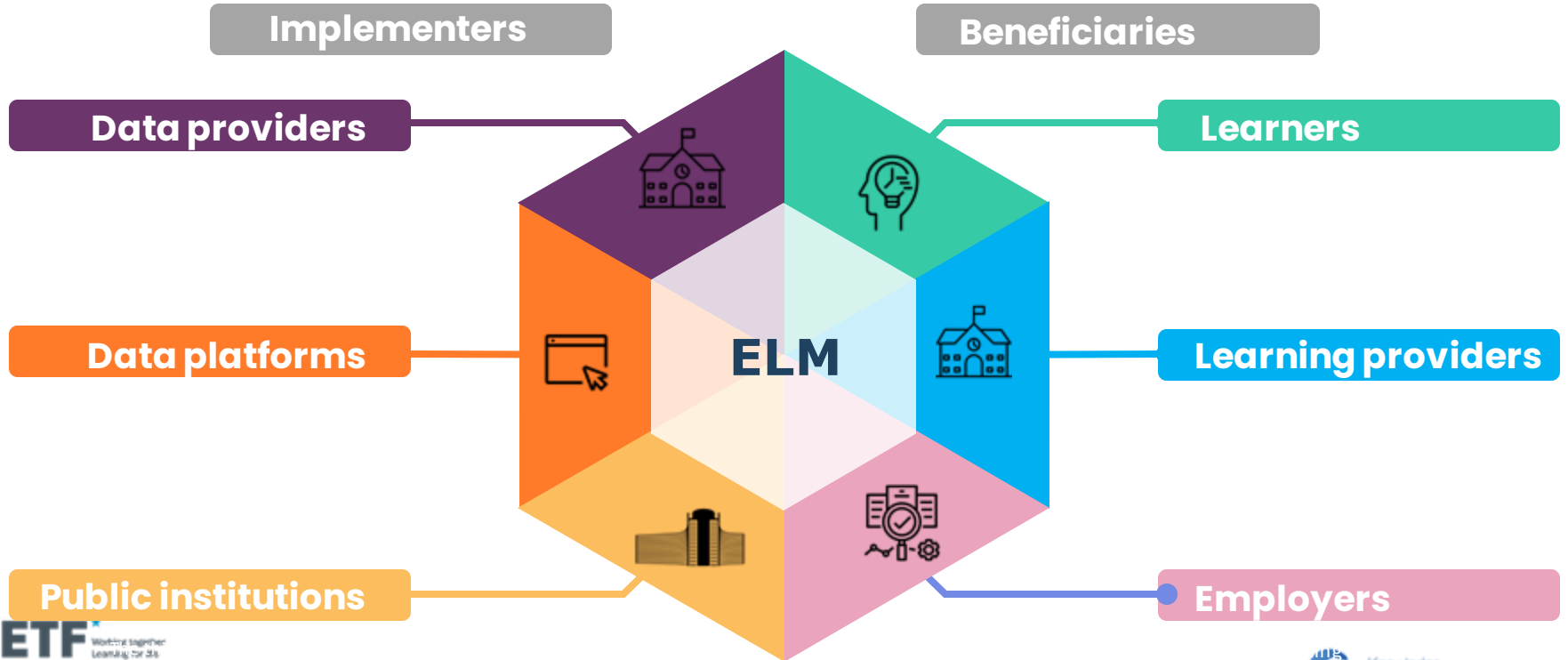
"The European Learning Model is the connective tissue for skills and qualifications data in Europe"

European Learning Model

European Information Model

Definitions and Standards in EQF Recommendation, Diploma Supplement, Europass Recommendation etc supplemented by glossaries for additional terms

Application Profiles

Specific sets of rules for publishing learning opportuinities, qualifications, accreditations and credentials in Europass
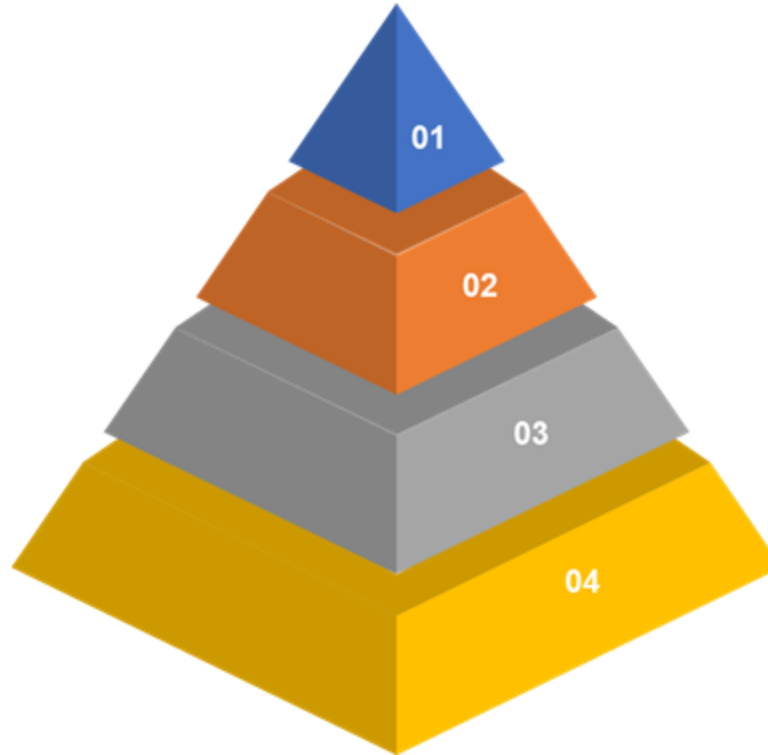
European Data Model

A Linked Open Data publication of concepts to be used in educational and employment use cases **throughout Europe**.

Extensions

National, Regional or Sectoral extensions of the data model & application profiles to deal with specific use cases

Learning outcomes in the ELM: important to know

The user will be able to

VERB, at **LEVEL OF ACHIEVEMENT**, in a **CONTEXT**

Linked to a skills taxonomy

Linked to a competence framework

Linked to an occupational framework

Learning outcomes in the ELM: important to know

The user will be able to

Speak English, at **proficiency level B2**, as an **engineer.**

Linked to a skills taxonomy

Linked to a competence framework

Linked to an occupational framework

ESCO skill

Common European Reference Framework For Languages

ESCO occupation/ category

Left sidebar:
- 😀 Ana Andromeda
- 🏛 University Great
- 📍 Master of Science in Civil Engineering ▾
- 🏃 Applied mathematics course ▾
- 🏃 Applied mathematics Study visit ▾
- 🏃 Concrete structures I course ▾
- 🏃 Dynamics of structures and earthquake engineering course ▾
- 🏃 Geotechnical engineering course ▾
- 🏃 Stability of structures course ▾
- 📖 Postgraduate doctoral study
- 📖 Civil engineer
- 📖 Recognition for credit

Main panel (left):

Influenced by: Applied mathematics course, Applied mathematics Study visit, Concrete structures I course, Dynamics of structures and earthquake engineering course, Geotechnical engineering course, Stability of structures course

Entities Owner to: Postgraduate doctoral study , Civil engineer , Recognition for credit

Sub-Achievements

Applied mathematics, Concrete structures I, Dynamics of structures and earthquake engineering, Geotechnical engineering, Stability of structures

Specification 🔗

Ach-Spec-ID-Scheme Identifier: AchSpecID-T2

Learning Outcomes:

LO1 related to applied mathematics ⌃

LOID-Scheme Identifier: LOID-73a

To formulate equations of mathematical physics for engineering problems, and to solve them analytically or with numerical methods.

Type: knowledge

Reusability Level: cross-sector skills and competences

Related ESCO Skills: use mathematical tools and equipment, execute analytical mathematical calculations, geodesy

Related Skills: applied mathematics, perform engineering calculations, construct earthquake resistant structures

LO2 related to applied mathematics ▾

LO related to concrete structures I ▾

LO related to dynamics of structures and earthquake engineering ▾

LO related to geotechnical engineering ▾

LO related to stability of structures ▾

Language(s) of Instruction: English, Croatian, French

Volume of Learning: 1440 hours   Maximum Duration: 21 months

Middle panel:

How to apply

💶 **Tuition fee**
The tuition fees depend on the course you're studying

📅 **Dates**
Start: 12/01/2021
End: 31/01/2021

Admission procedure
University of Malta

Entry requirements
Applicants must possess a bachelor's degree in Aeronautical Engineering / Aerospace Engineering / Mechanical Engineering / Manufacturing Engineering / Engineering Management / Materials Science and Engineering / Electrical and Electronic Engineering / Civil Engineering / Environmental Engineering, or a related field with second class honors or above, or an equivalent qualification from a recognized university or tertiary institution.

Learning schedule
Days: Tuesdays and Thursdays
Time: 9:00 to 13:00

Grading scheme
You must have finished all your courses as stated in your approved IEP before you can present and defend your thesis.

Right panel:

- Incident and Accident Investigation

Credit points
30 Microsoft credits

Who is this course for?
A specific target group or category for which this specification is designed

ECTS points
7.5

Workload
150h of classwork, 150h of self-study and 50h of groupwork

How you will learn
Presential

For updated info, visit the course homepage via the apply to this course button.

What you will learn

On successful completion of the program, graduates will be able to:

- Select and apply appropriate advanced mathematical and numerical methods to effectively address real world aeronautical engineering problems.
- Analyze and design complex mechanics, material/structure and/or control systems.
- Analyze existing aeronautical engineering problems in depth.
- Design and operate complex systems from a conceptual design perspective.
- Carry out logistic management and quality control strategies for aviation related projects.

▾ Related ESCO skills

▾ Related digital skills

Career opportunities

After graduating with an Aerospace Engineering MSc you will be in a strong position to seek employment with companies such as: Airbus, Rolls Royce, GE Aviation, Airbus, Bombardier Transportation, BAE Systems, MBDA, SAFRAN, GKN Aerospace, Spirit, Finmeccanica, EDF, BP, Schlumberger, etc.

ETF *Working together*

Knowledge Innovation Centre   Cogni zone

An end to end Infrastructure

Standards

1. European learning model
2. Interoperability standards

Services

1. Issuer
2. Wallet
3. Viewer
4. Accreditation DB
5. Course & Qualification Search
6. Open Data Services

Software & support

1. eIdas & Europass code libraries
2. docker' images
3. Qualifications Dataset Register
4. Playground
5. API libraries
6. Helpdesk

Live showcase