

European Open Science Cloud (EOSC)

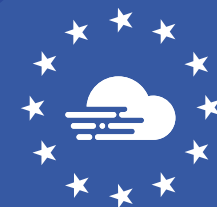
Karel Luyben

President of the EOSC Association

April 20, 2021

CESNET e-infrastructure conference

25 years of CESNET



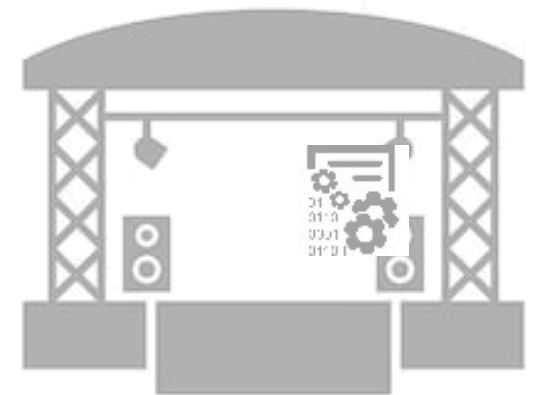
**EUROPEAN OPEN
SCIENCE CLOUD**

Content

1. What is EOSC?
2. The EOSC ecosystem and the EOSC Association.
3. Example of what it brings.
4. EOSC on the global stage.

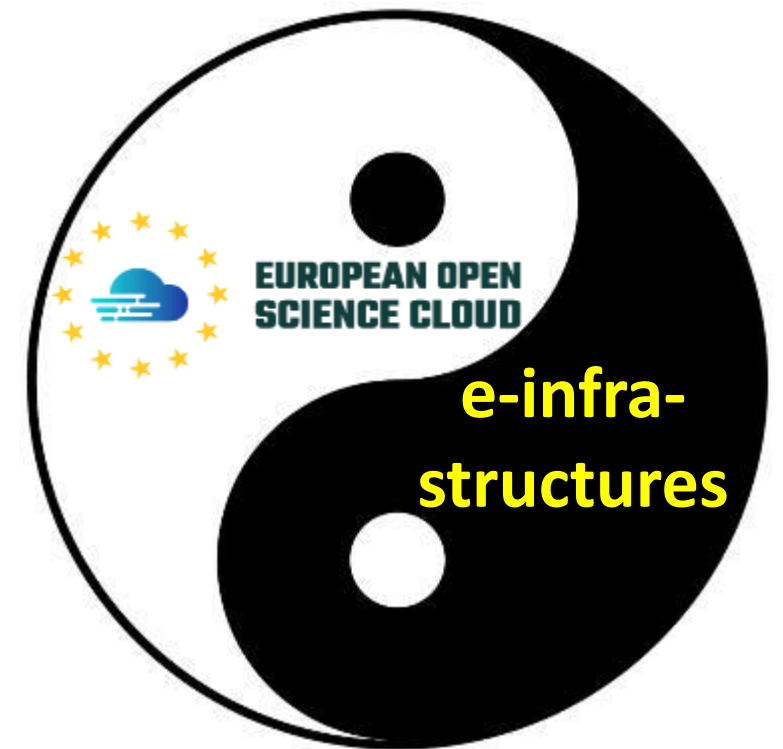
“A web of scientific insight”

- ❖ **Web of FAIR data and related services**
- ❖ **Federation of relevant existing and future data sources**
- ❖ **Virtual space where science producers and consumers come together**
- ❖ **An open-ended range of content and services**
- ❖ **Meeting all European data requirements**
- ❖ **In interaction with other regions of the world**



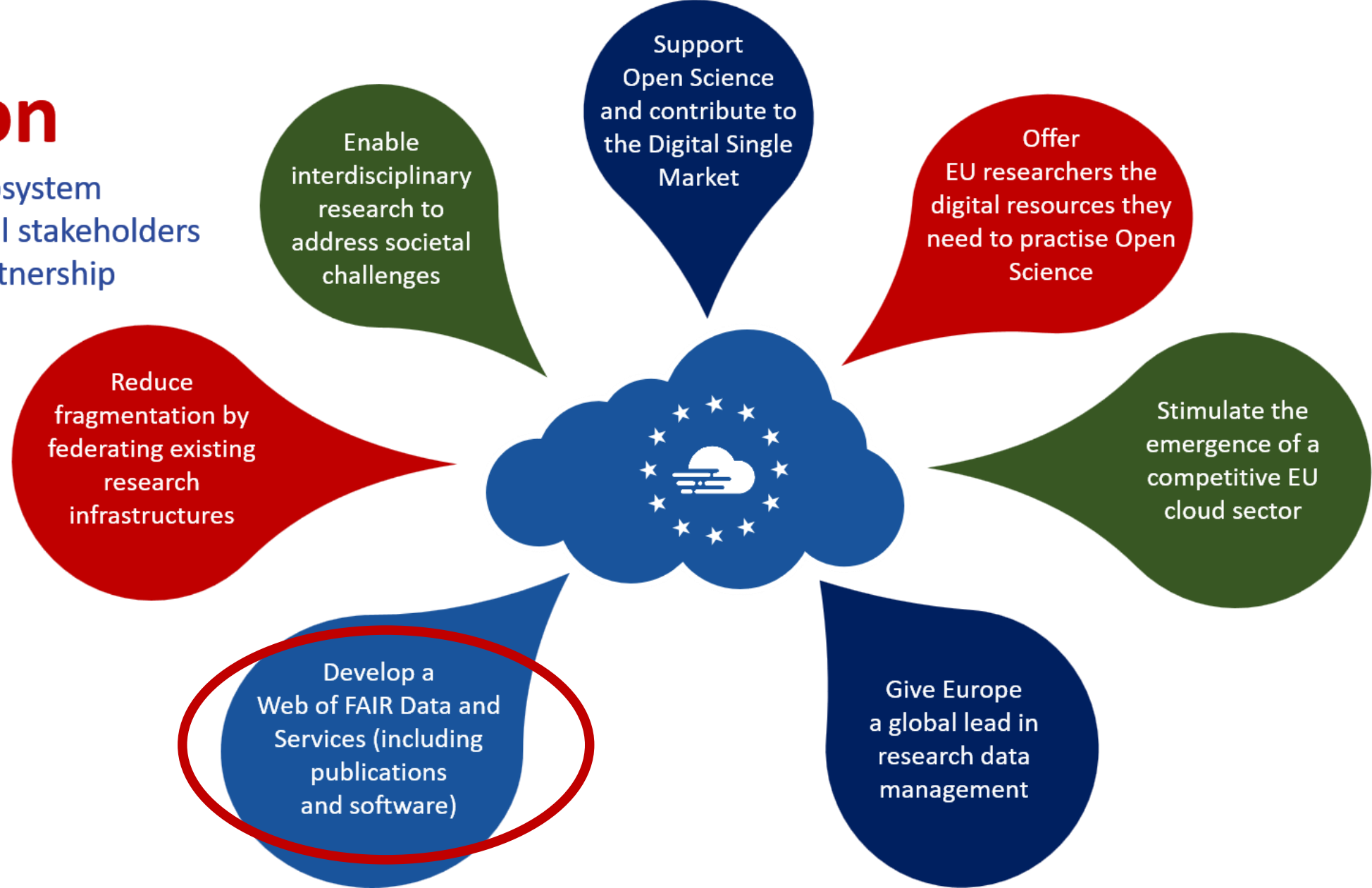
Twinning the data- to the e-infrastructure

EOSC is a data-infrastructure and could be seen as a twin sister (or brother) of the European e-infrastructure organisations. The last offering the store, compute and connect services used by EOSC to offer the of servicing data and creating interoperability.



The Vision

Building the EOSC ecosystem collaboratively with all stakeholders through the EOSC Partnership

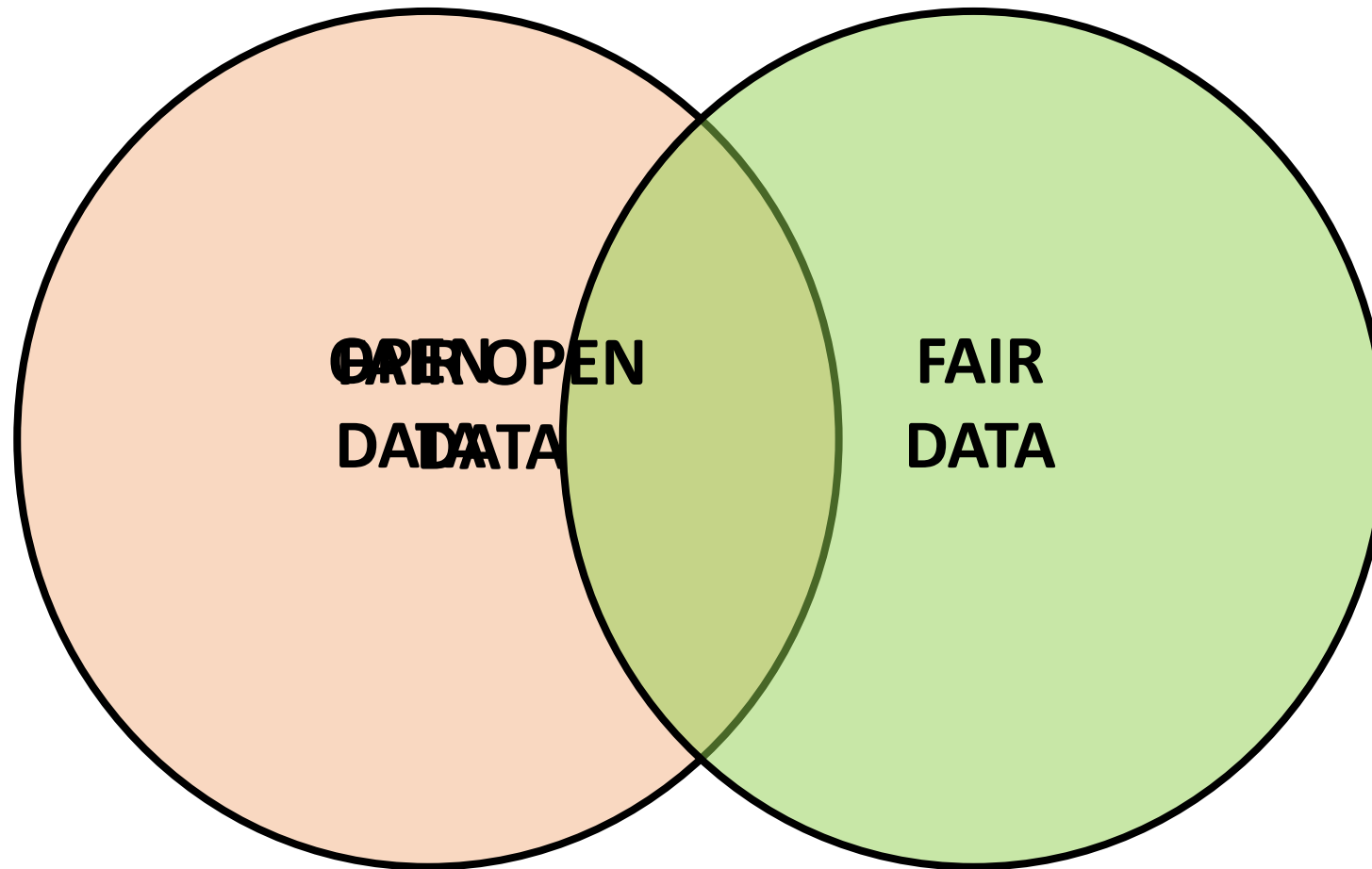


Guiding principles for EOSC

The **overarching** principle for developing EOSC is that research has to be at the centre of the EOSC initiative.

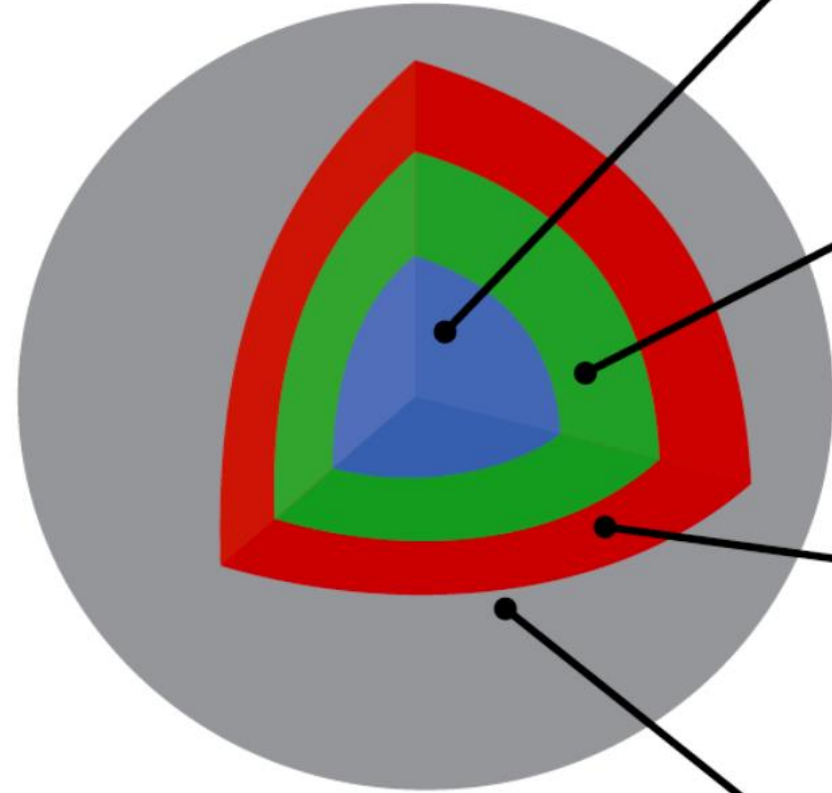
- **Multi-stakeholderism**
EOSC will succeed if and only if it follows a multi-stakeholder approach;
- **Openness**
EOSC will ensure research artefacts be ‘as open as possible, as closed as necessary’;
- **FAIR principles**
EOSC research artefacts need to be findable, accessible, interoperable and reusable;
- **Federation of infrastructures**
EOSC will federate existing and upcoming data- and e-infrastructures;
- **Machine-actionable**
EOSC will strike the right balance between machines and people in delivering the services that will serve the needs of European scientists.

OPEN DATA and/or FAIR DATA



FAIR ≡
Findable
Accessible
Interoperable
Reusable

Towards “as FAIR as possible” and “as open as possible”



DIGITAL OBJECT

Data, code and other research outputs

At its most basic level, data or code is a bitstream or binary sequence. For this to have meaning and to be FAIR, it needs to be represented in standard formats and be accompanied by Persistent Identifiers (PIDs), metadata and documentation. These layers of meaning enrich the object and enable reuse.

IDENTIFIERS

Persistent and unique (PIDs)

Digital Objects should be assigned a unique and persistent identifier such as a DOI or URN. This enables stable links to the object and supports citation and reuse to be tracked. Identifiers should also be applied to other related concepts such as the data authors (ORCIDs), projects (RAIDs), funders and associated research resources (RRIDs).

STANDARDS & CODE

Open, documented formats

Digital Objects should be represented in common and ideally open file formats. This enables others to reuse them as the format is in widespread use and software is available to read the files. Open and well-documented formats are easier to preserve. Data also need to be accompanied by the code use to process and analyse the data.

METADATA

Contextual documentation

In order for Digital Objects to be assessable and reusable, they should be accompanied by sufficient metadata and documentation. Basic metadata will enable data discovery, but much richer information and provenance is required to understand how, why, when and by whom the objects were created. To enable the broadest reuse, they should be accompanied by a plurality of relevant attributes and a clear and accessible usage license.

The EOSC Association

Mission: *Advancing the European Open Science Cloud to accelerate the creation of new knowledge, inspire education, spur innovation and promote accessibility and transparency*

- To provide a single voice for advocacy and representation for the broader EOSC stakeholder community in Europe
- To promote the alignment of European Union research policy and priorities with activities coordinated by the Association (SRIA)
- To ultimately enable seamless access to data through interoperable services that address the entire research data life cycle, from discovery to storage, management, analysis and re-use across borders and scientific disciplines

Status: AISBL*

- Formed in July 2020 by founding members CESAER, GÉANT, CSIC and GARR
- Members are relevant national, regional and European stakeholders in the EOSC ecosystem: Research performing organisations; Research funding organisations; Research service providing organisations
- **A European Co-programmed Partnership, between the EC and the EOSC Association, is set to begin from early 2021**

*international non-profit association under Belgian law

Board of Directors

Karel Luyben, CESAER (President)

Klaus Tochtermann, ZBW; 3-year

Marialuisa Lavitrano, University Milano – Bicocca; 3-year

Suzanne Dumouchel, CNRS; 3-year

Sarah Jones, GÉANT; 2-year

Ignacio Blanquer, UPV; 2-year

Ronan Byrne, HEAnet; 1-year

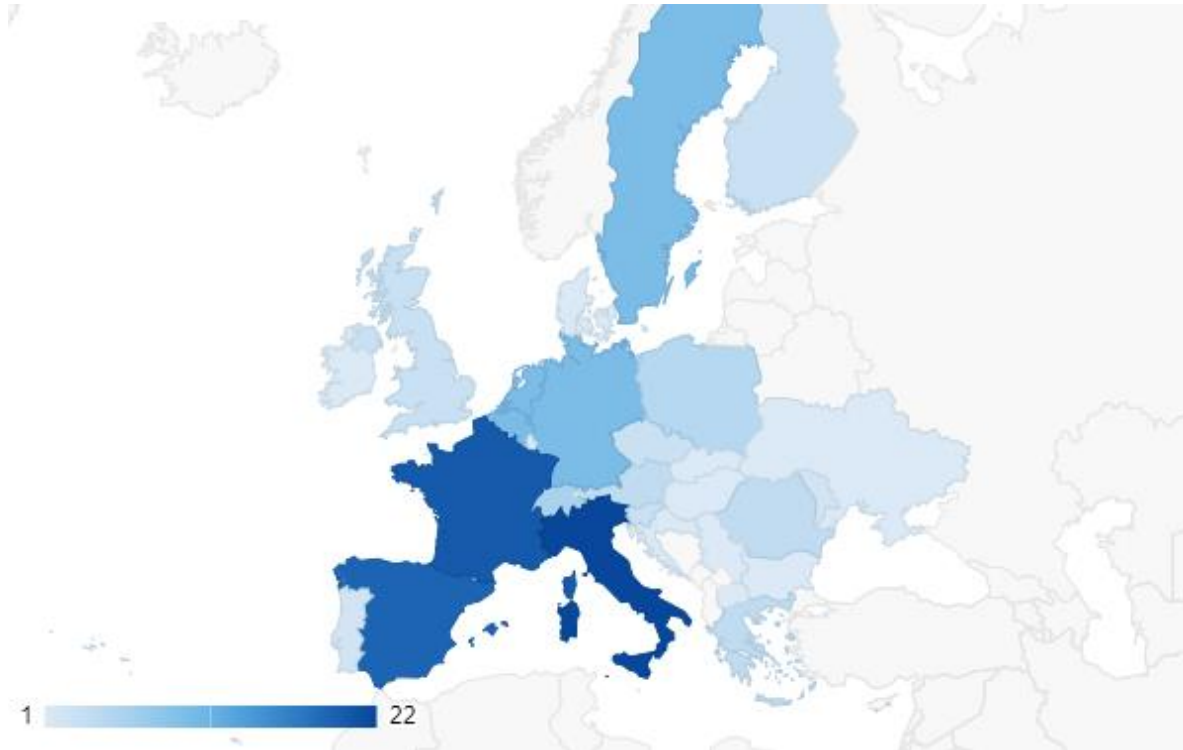
Bob Jones, CERN; 1-year

Wilhelm Widmark, University of Stockholm; 1-year

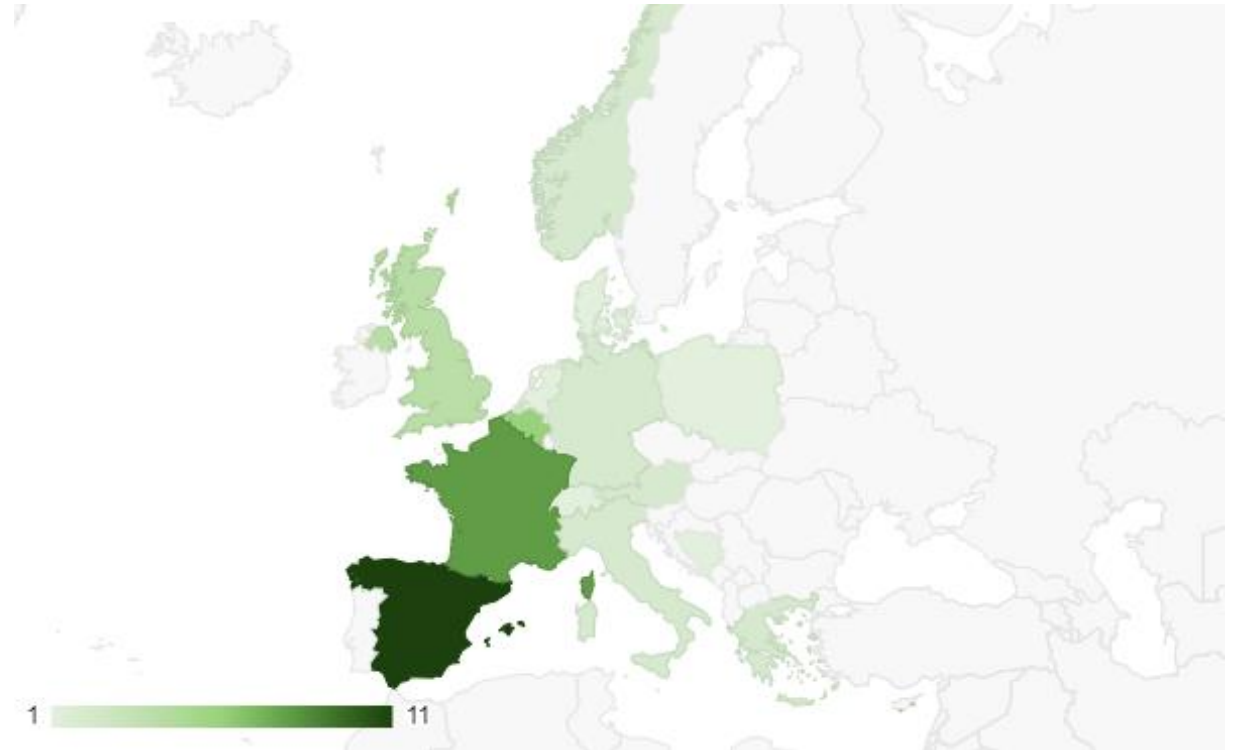


EOSC membership by geographical spread

~ 150 Members



~60 Observers



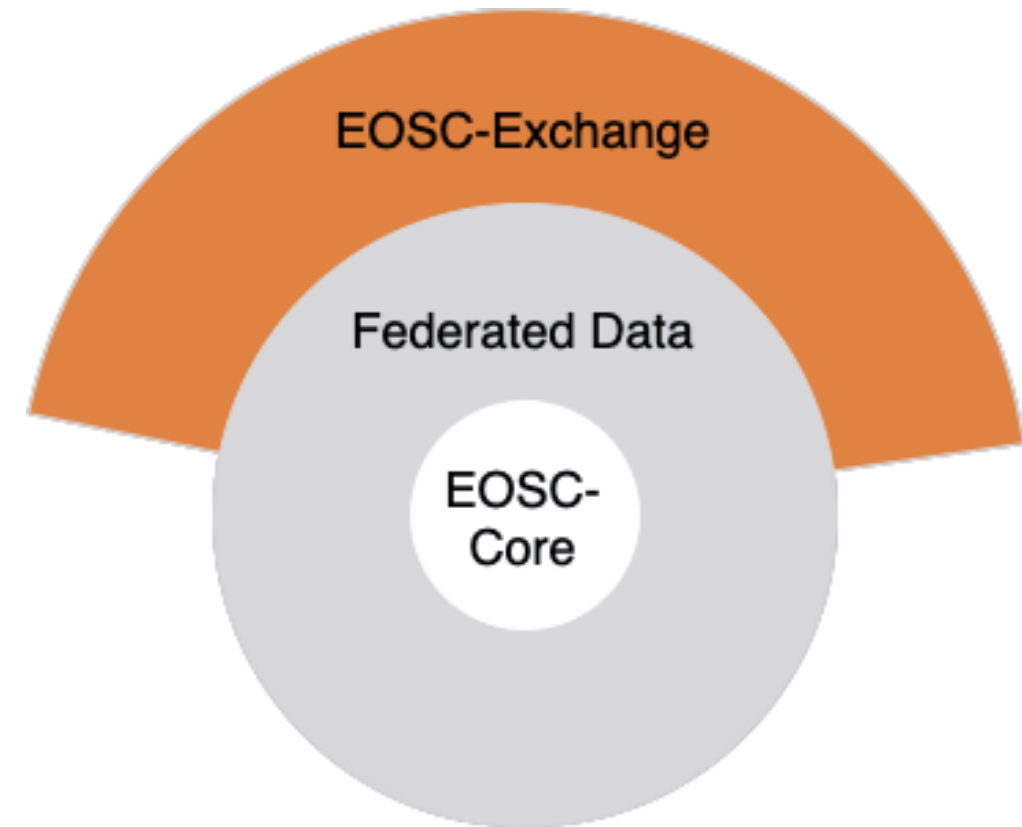
How to join the Association: <https://www.eosc.eu/join-association>

Rules of Participation (RoP)

- Minimal set of rules that specify the rights, obligations and accountability governing EOSC activities
- RoP are set at a level to encourage wide participation, including from less advanced research communities
- Many of the Rules will need to provide encouragement rather than impose strict requirements, but can develop over time to include more stringent conditions
- The EOSC Association will be responsible for the RoP
 - Guidelines on ownership and evolution of RoP: <https://doi.org/10.2777/67118>

First iteration-minimum viable EOSC (MVE)

- ❖ The MVE includes EOSC-Core and EOSC-Exchange which work with federated FAIR datasets
- ❖ MVE must enable the federation of existing and planned research **data** infrastructures
- ❖ Begin with simple use cases – FAIR open data not sensitive or closed



Functions for EOSC Association 2020+



- **Develop and govern federating core**
- **Manage compliance framework**
- **Manage trusted certification**
- **Manage the AAI**
- **Manage PID policies**
- **Outreach to stakeholders**
- **Monitor services and transactions**
- **Manage 'EOSC' trademark(s)**
- **Contribute to Horizon EU policy**



health RI

enabling data driven health

Wiro Niessen – CTO Health-RI

Erasmus MC, University Medical Center Rotterdam

Delft University of Technology



Bottlenecks for data-driven research and innovation

- Fragmentation of data, images, and samples in healthcare and clinical research
- Lack of standardisation in care and research
- Reliability, quality and re-usability of data is problematic
- Ethical and legal framework unclear and sometimes obstructive

Health-RI: towards national health data infrastructure

Aim

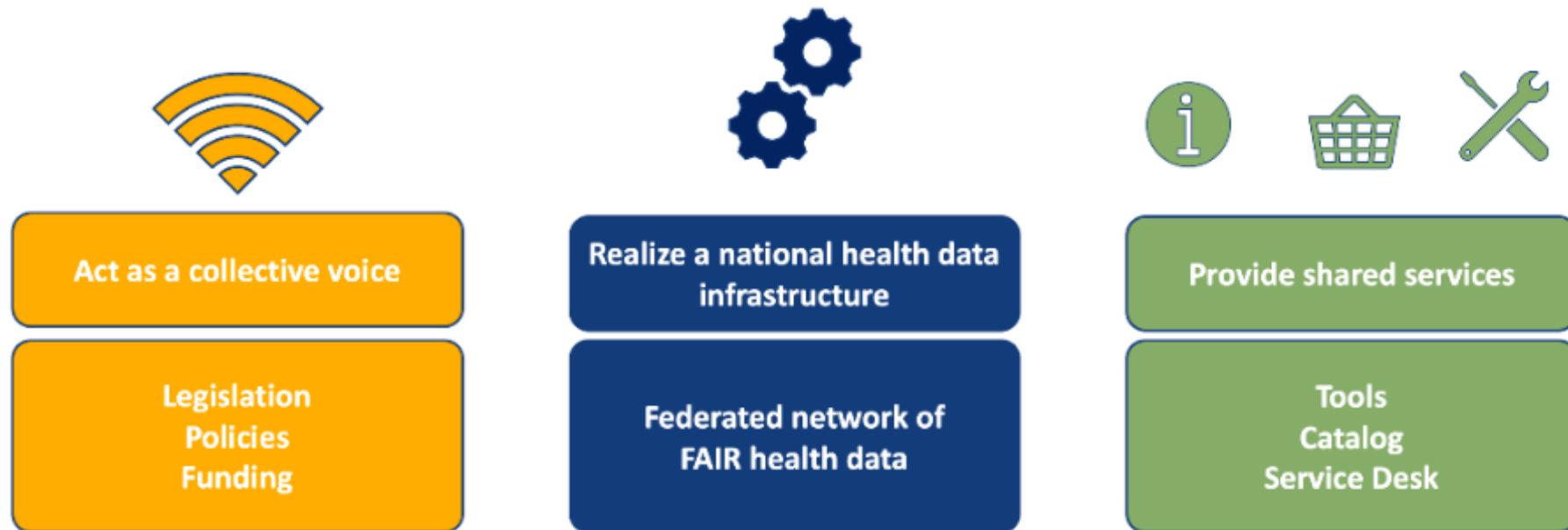
To build a National Health Research Infrastructure for optimal access to knowledge, tools, facilities, health data and samples. For sustainable and affordable personalized medicine and health.

Three Pillars

I: Collective voice

II: National health data infrastructure

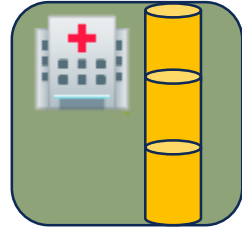
III: Platform for shared services



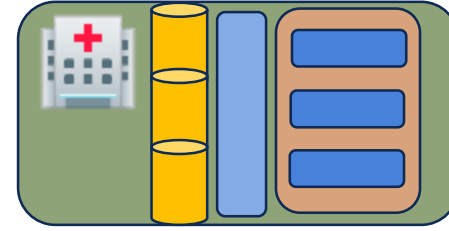
Organization of local Health-RI node



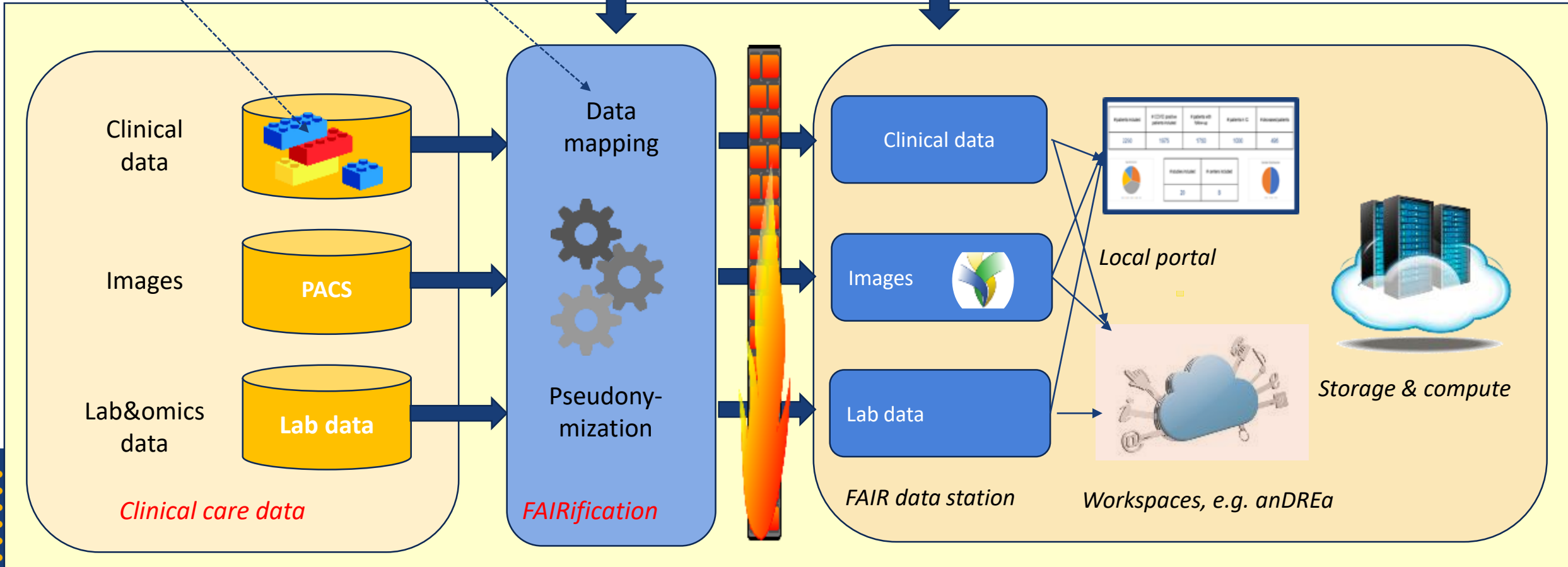
National data harmonisation



Standard building blocks



Other hospitals & care givers in region
(regional node role)



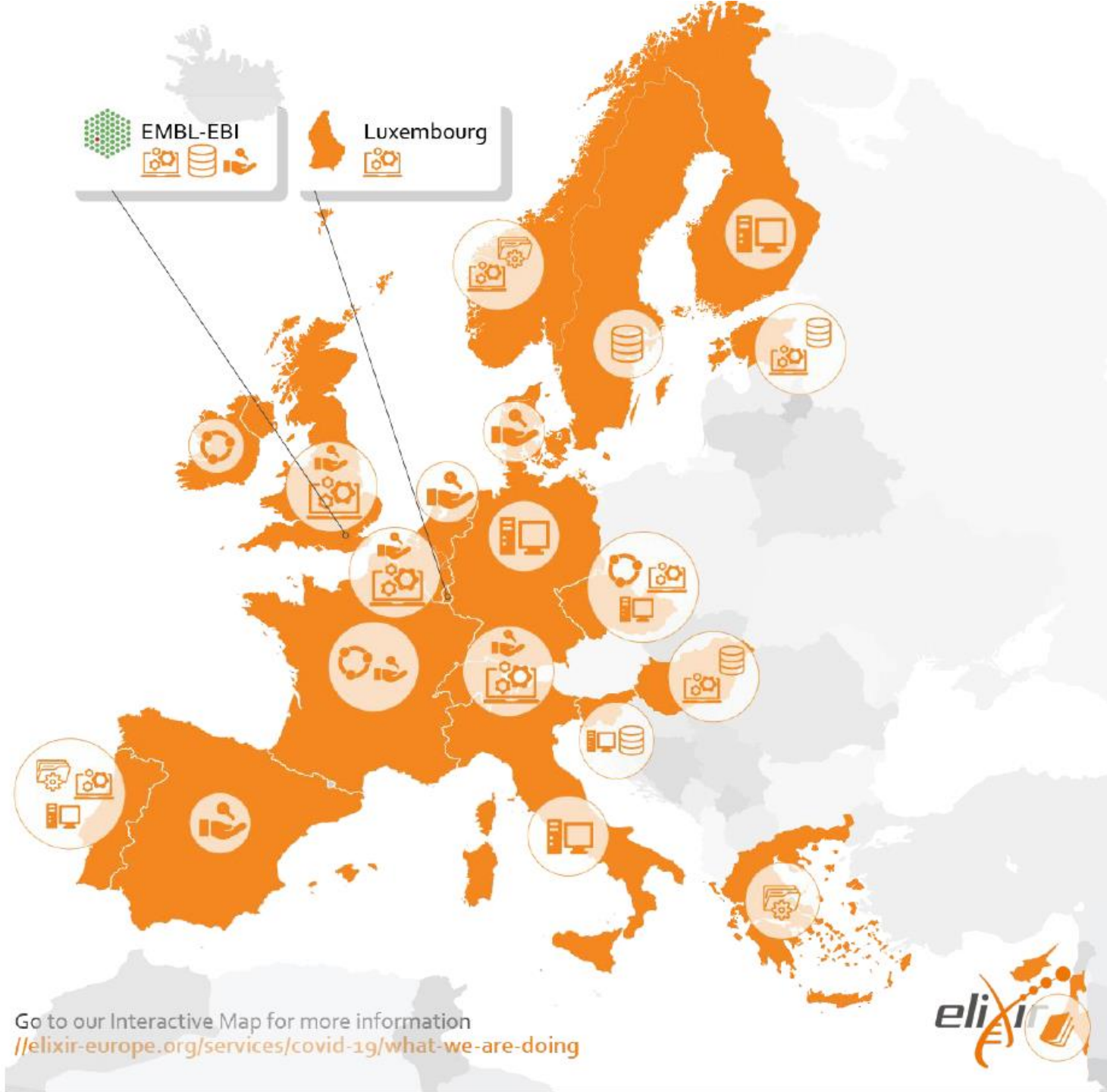
Dutch COVID-19 Data Support Programme

Health-RI launched the Dutch COVID-19 Data Support Programme. To support investigators and health care professionals with tools and services in their search for ways to overcome the pandemic and its health consequences.



- The outcome of tomorrow's COVID-19 patient is strongly determined by having access to the data of today's patient
- To collect and find the right data, to make them accessible, and to reuse them is non-trivial
- Currently many data collection initiatives worldwide
- Health-RI provides overview of initiatives and provides services & tools
- Health-RI works towards national portal for observational Covid-19 studies

- Open and rapid access to data, tools and workflows
- build on open standards
- alignment of national infrastructures and European research infrastructures
- aligned with developing EOSC



Go to our Interactive Map for more information
[//elixir-europe.org/services/covid-19/what-we-are-doing](https://elixir-europe.org/services/covid-19/what-we-are-doing)

EOSC on a global stage

- Service providers from third countries can participate in EOSC
 - Adhere to EOSC Rules of Participation and applicable legislation
- EOSC will work with other regional initiatives towards common goals for Open Science, driving global convergence on standards in support of the implementation of an open science commons



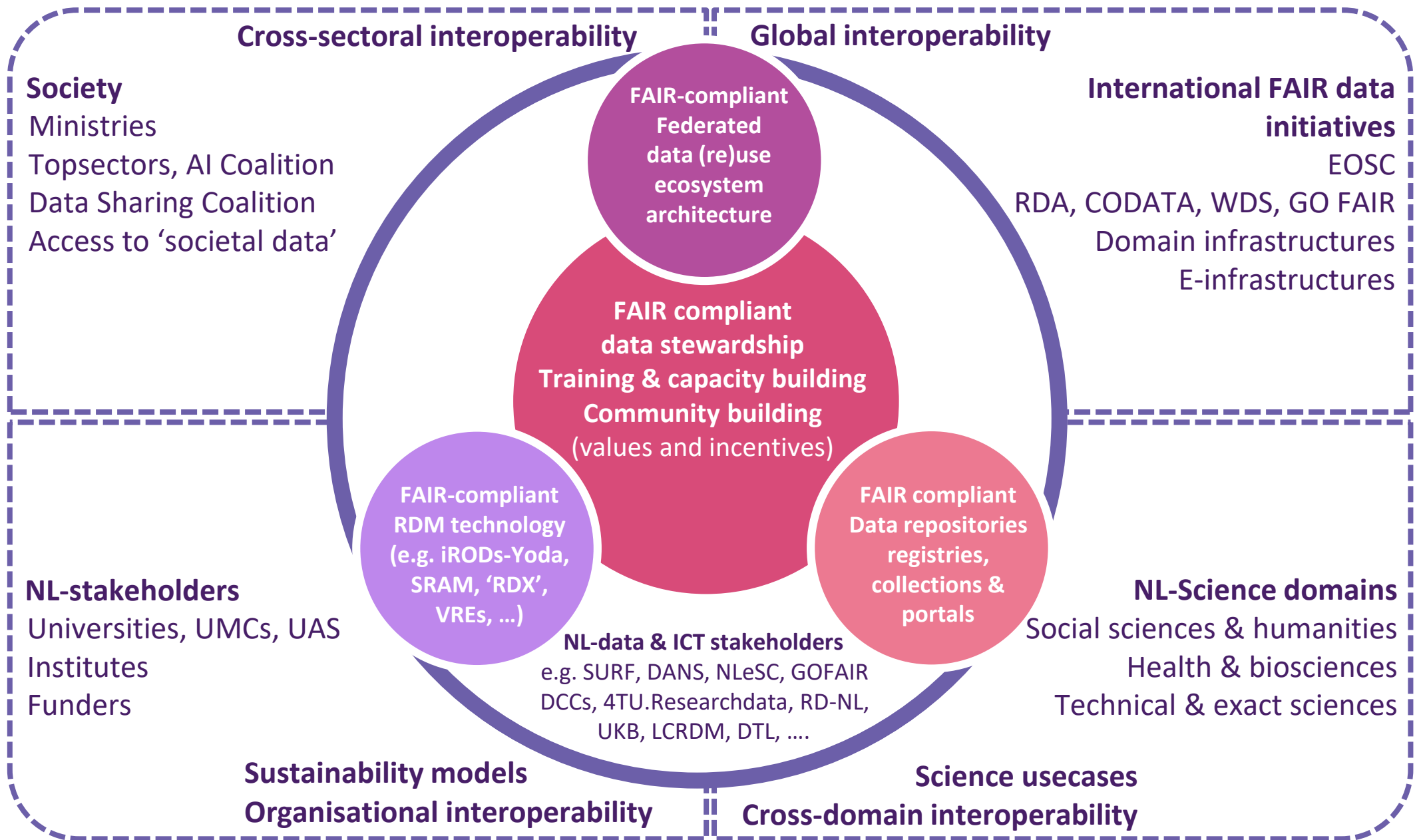


Let's co-create EOOSC

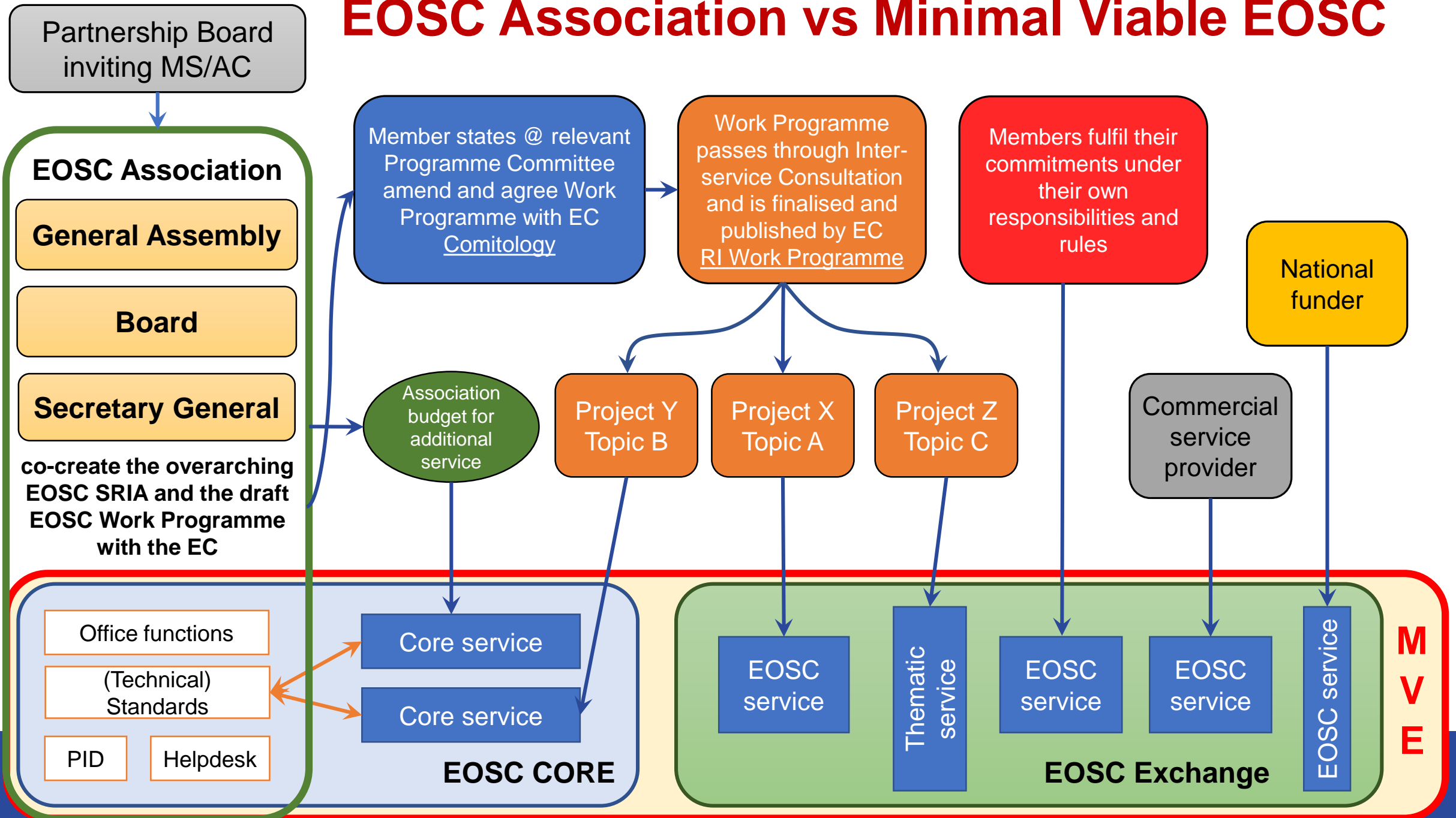
THANK YOU



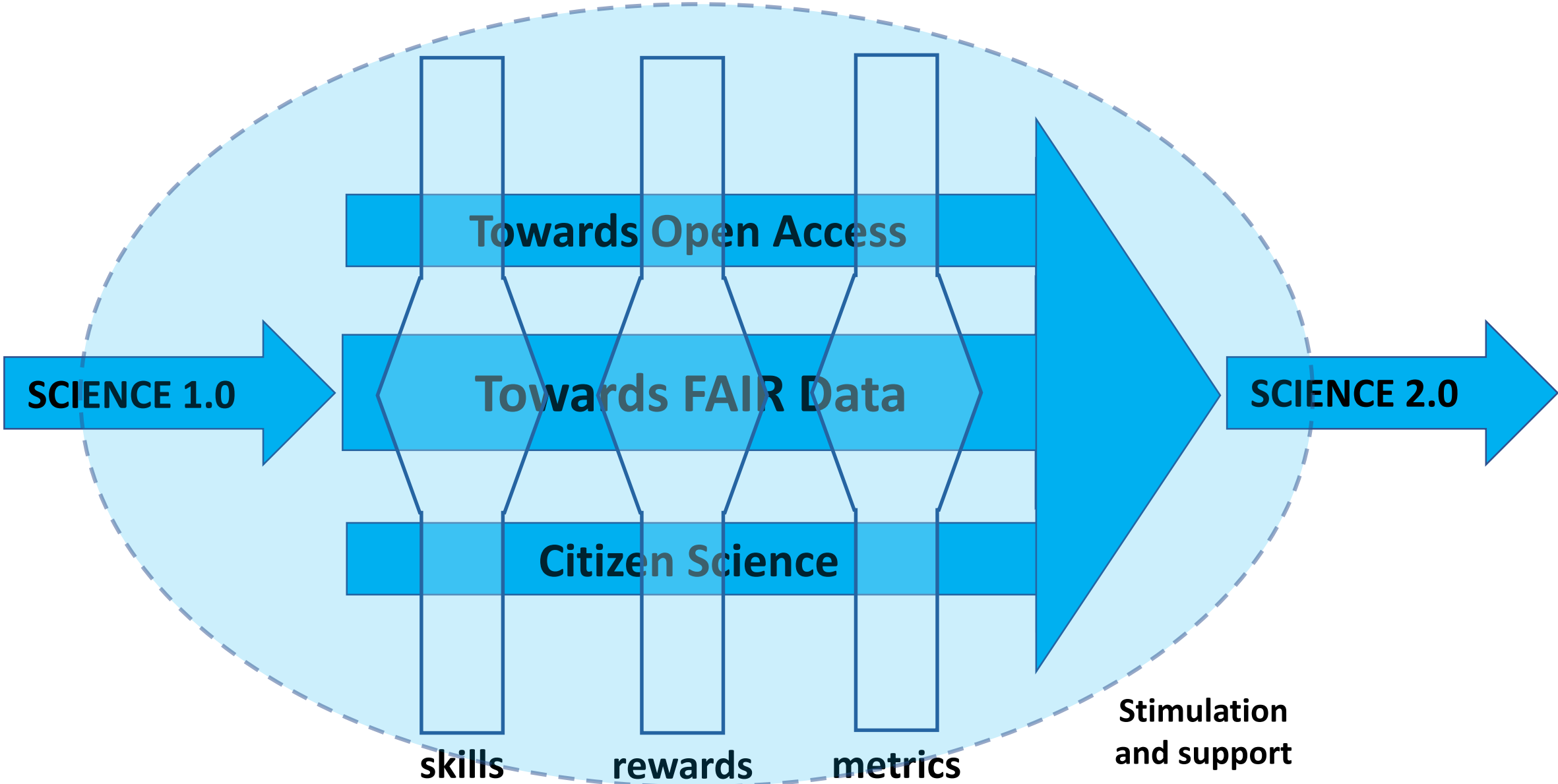
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EOSC Association vs Minimal Viable EOSC



OPEN SCIENCE



SCIENCE 1.0

Towards Open Access

Towards FAIR Data

Citizen Science

SCIENCE 2.0

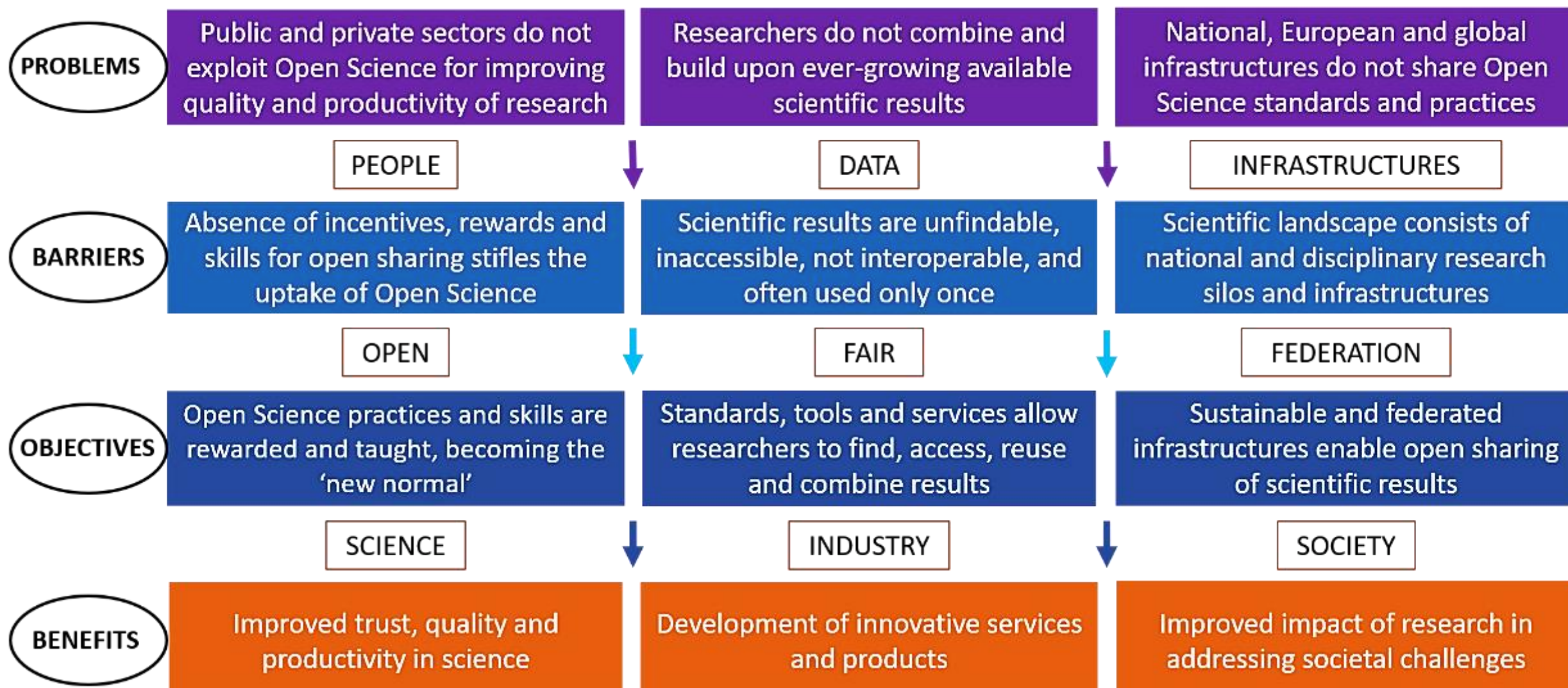
skills

rewards

metrics

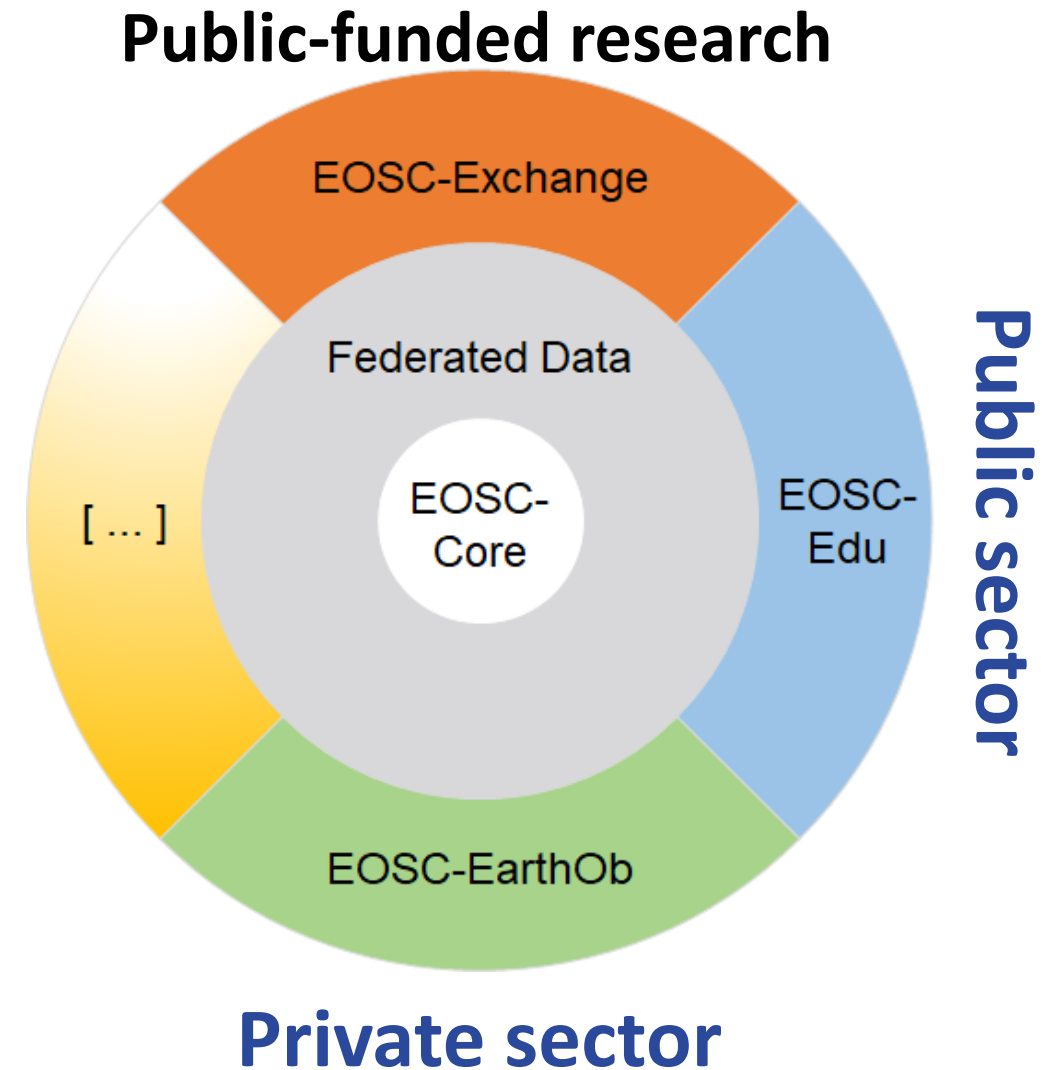
Stimulation
and support

EOSC-ecosystem objectives tree

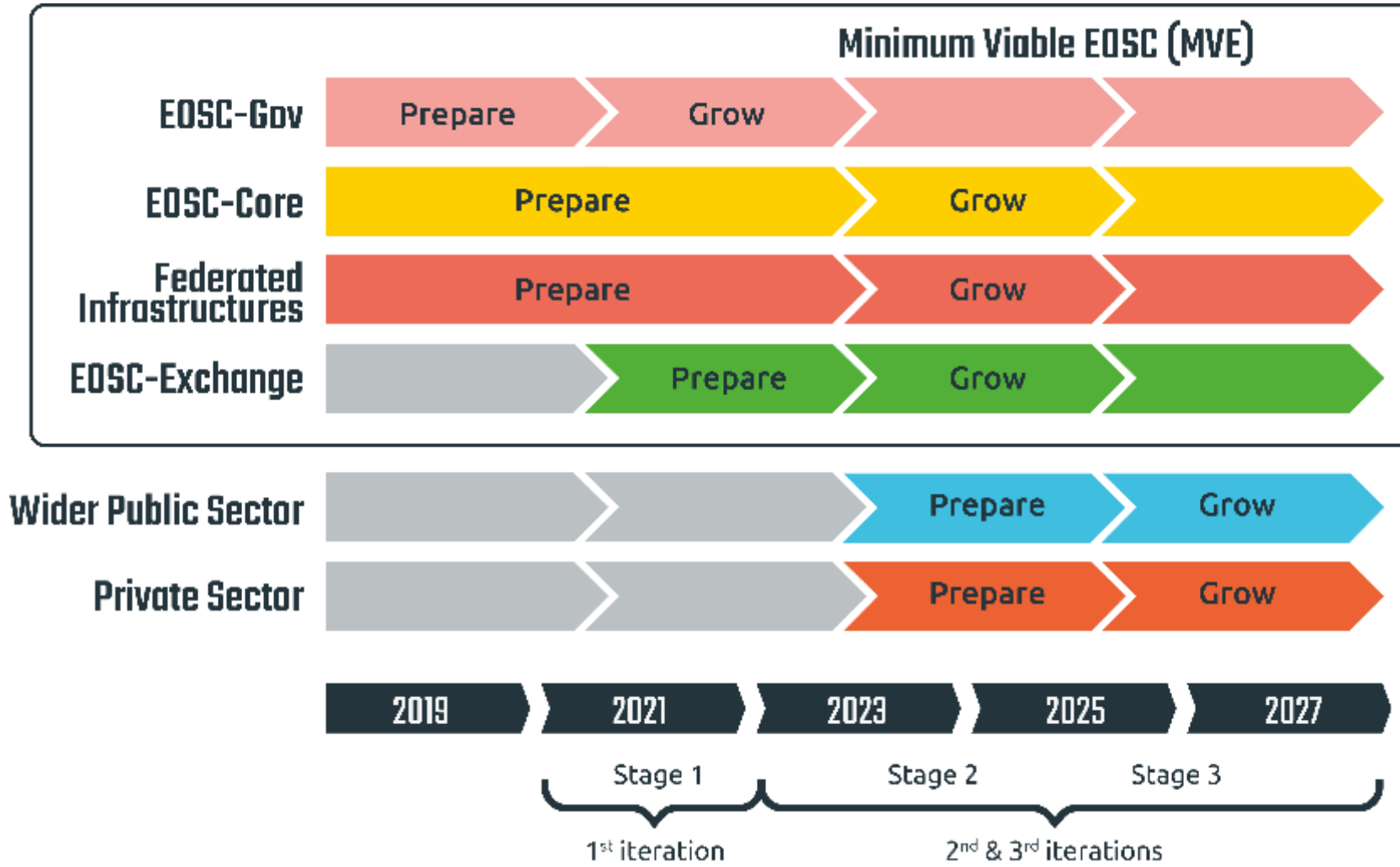


Proposed second and third iterations

- ★ Extensions to serve public sector and industry
- ★ These are not completely new users as some public sector and industrial partners will already be involved in MVE
- ★ Would ideally be one 'marketplace' but differing requirements and legislation may require linked but alternately governed spaces



Timeline



(EO SC Strategic Research Innovation Agenda v1)
<https://eosc.eu/documents>

EOSC Association

- Four founding members (CESAER, GEANT, GARR, CSIC)
- Was incorporated as AISBL on Wednesday 29th July 2020
- Obtained Royal Decree on Friday 11th September 2020
- First General Assembly on 17-12-2020 elected President and Board
- Research Performing; Research Funding and Service Proving organisations
- Now 142 members and 49 observers (62% - 8% - 30%)
- A European Co-programmed Partnership, between the EC and the EOSC Association, is set to begin from early 2021
- Joining the EOSC Association = Joining the EOSC Partnership!



RoP (v2.2) – The Rules (1 of 2)

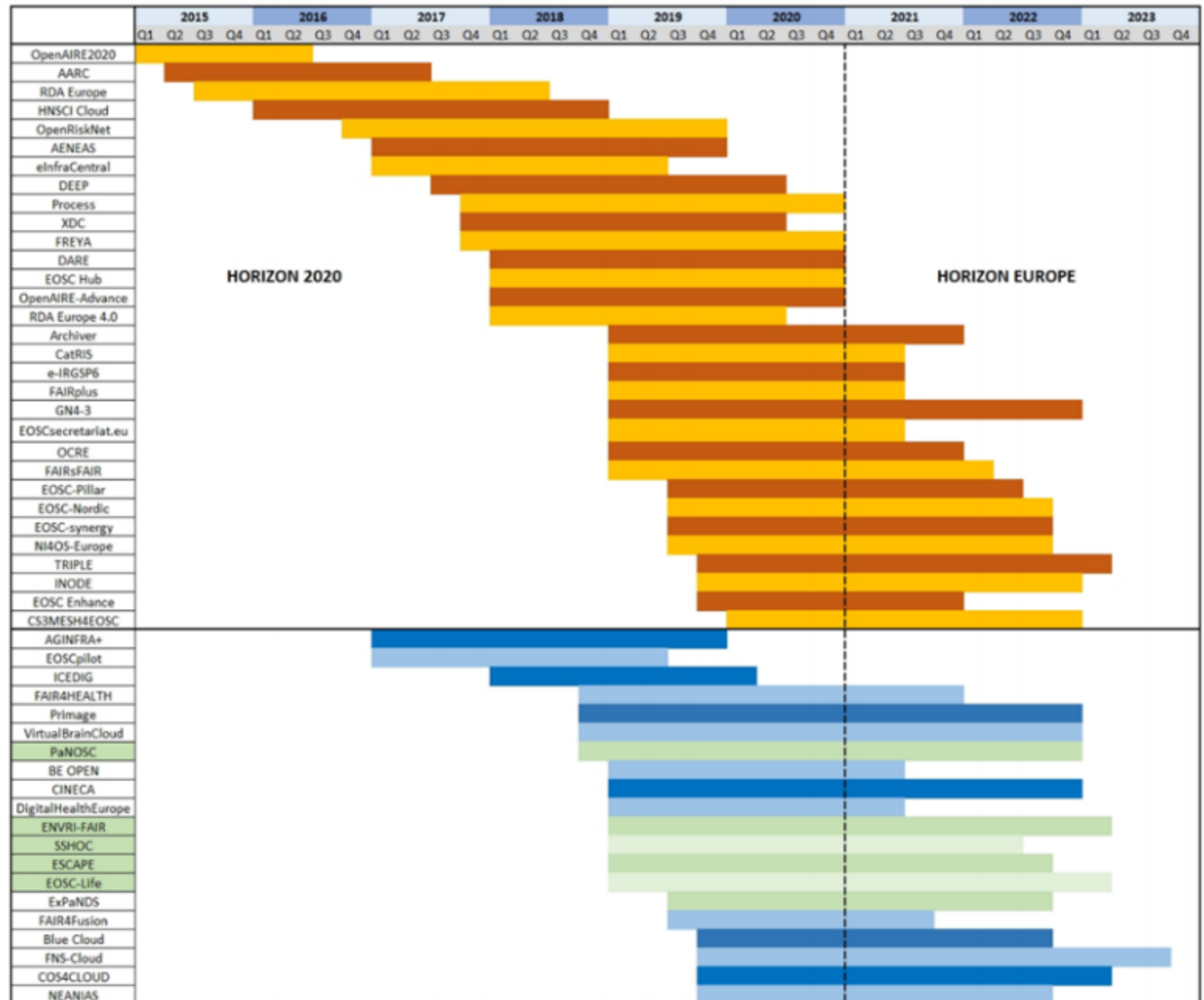
- *EOSC is open to all*
 - As open as possible as closed as necessary
 - Resources and Participants
- *EOSC resources are registered in an EOSC recognised catalogue*
 - Really a definition, but important to include
 - Not a single catalogue, but a catalogue of catalogues (recursively)
- *EOSC participants adhere to principles of proper research conduct*
 - EOSC participants agree to adhere to the Rules of Participation
- *EOSC participants agree to their use of EOSC being monitored and analysed*
 - Quality through transparency
- *Participation in EOSC is subject to the policy and legislation of EU*

RoP (v2.2) – The Rules (2 of 2)

- *EOSC Users adhere to the terms of use of the resources they use*
- *EOSC Users reference the resources they use in their work*
- *EOSC Resources are freely discoverable*
 - *Ownership of resources does not change when they are made available via EOSC*
 - *Access to EOSC resources should be as simple as possible*
 - *Any charges which may apply are stated clearly*
- *EOSC Data align with FAIR principles*
- *EOSC Services align with EOSC architecture & interoperability guidelines*

Projects

Many projects have been / are contributing to the establishment of EOSC



Key: Orange shades indicate coordination, best practice or technology projects. Blue shades indicate thematic science-based projects. Green shades indicate ESFRI cluster projects.

Content of the draft MoU (I)

- ❑ The MoU is established between the Partners
 - ✓ The EU represented by the Commission
 - ✓ The EOSC Association (“Partners other than the Union”), including its constituent entities (members)
- ❑ The MoU is a contractual arrangement, not legally binding
- ❑ Scope & objectives
 - ✓ Expected financial and in-kind commitments by the partners
 - ✓ KPI’s
- ❑ Governance: Partnership Board
 - ✓ Composition: Representatives appointed by the Partners other than the Union, Commission officials and Representatives of the Steering Board*
 - ✓ Rules of Procedure of the Partnership Board to be drafted based on a proposal by the Commission
- ❑ Duration: from signature date until 31.12.2030

Content of the draft MoU (II)

- ❑ Activities and commitments of the Commission
 - ✓ Take into account the input and advice from the Partners other than the Union when identifying & defining call topics for R&I activities to be included in the Work Programmes
 - ✓ Contribute through the Work Programmes
- ❑ Activities and commitments of the Partners other than the Union
 - ✓ Provide input and advice to the Commission
 - ✓ In-kind contributions in Horizon Europe actions
 - ✓ In-kind contributions in additional activities
 - ✓ Investments in operational activities
- ❑ Openness and Transparency, Dissemination, Coordination
- ❑ Monitoring and reporting
 - ✓ The partners will set up and implement an effective reporting and monitoring system, using
 - ✓ A list of Key Performance Indicators