# EOSC - Landscape report / Landscape analysis

- ***Landscape of EOSC Related Infrastructures and Initiatives***
  1th Validation WKS (27/28. 4. 2020) (EC 14. Sept 2020)

- ***Landscape analysis*** (DCC)
  2nd Validation WKS (28/29. 9. 2020) (EC Nov/Dec 2020)

- ***Country sheets -*** Survey of the Landscape 2019 and 2020
  47 countries - EU MS (27), AC (16), OC (4) and 50 projects
  - ➤ **Current state of affairs**, OS policies, EOSC readiness
  - ➤ Infrastructures (roadmaps and funding).
  - ➤ Majority of countries planning for Open Science.
  - ➤ Fairly high degree of readiness and awareness of EOSC
  - ➤ Mumber IS considered : DE (986), UK (909), FR (516), NL (306), PL (172), PT (170), …
  - ➤ All Countries reported at **least one infrastructure** that could be made available (federated) through EOSC.
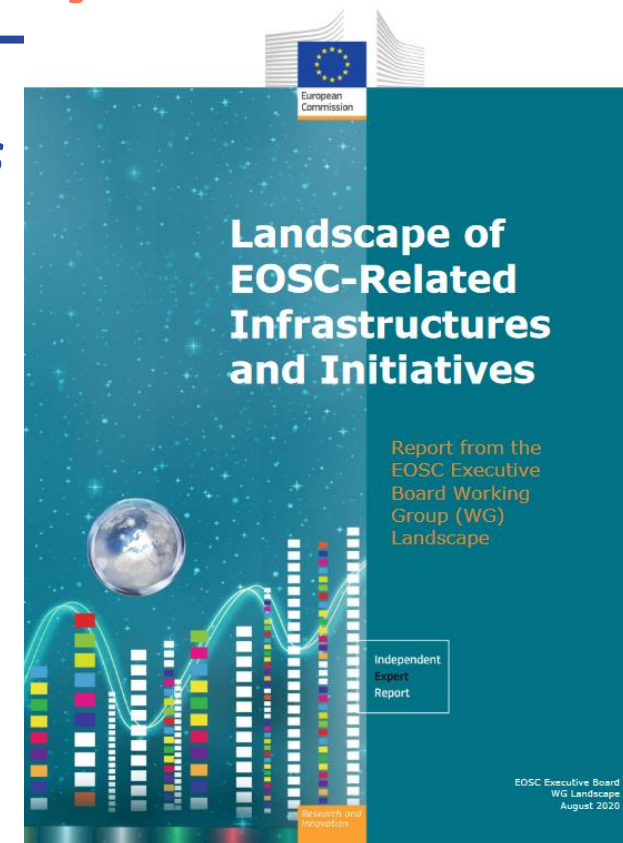
EUROPEAN EOSC LANDSCAPE IS VERY DIVERSE

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Infrastructures as key success factor for EOSC
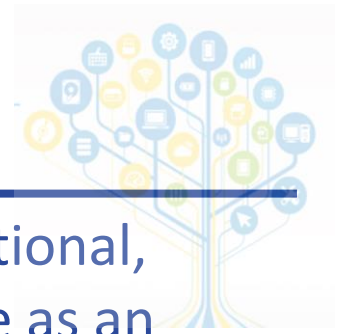
- **Infrastructures (IS) – data, e-infras, computing, networking, and RIs** (institutional, regional, national, global) serve as major promoters of Open Science, and are as an integrated **IS system at equal level fundamental for the creation of EOSC**.

- IS form **critical part of a coherent research ecosystem** capable of addressing the major, interdisciplinary challenges (e.g. COVID-19 data platform / dedicated ESFRI WEB pages over 100 RI *anti*-COVID-actions)

- Though the IS ecosystem faces huge diversity across the disciplines and countries, it is **horizontally (cross-disciplinary) and vertically interlinked**.

- The **bulk of the EOSC funding** (ISs, data and users) will come from nationally supported funders rather than the EC – **EOSC Sustainability critical depends on national strategies**

- **Changing National priorities** - significant impact on e-Is and RIs – Need for coordination in policies and financial support. **Standards** for policy, processes and procedures

- **Diversification of IS portfolio** to minimize impact on EOSC federation.

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RIs as pivotal for EOSC – link to users

Role of RIs in EOSC – 2nd EOSC – ESFRI workshop / ESFRI`s WP "Making science happen"

- producers of huge amount **of high-quality data - Key factor for EOSC`s early stage success**, inclusiveness, small new communities, long tail of science …
- keeping **multidisciplinary community aligned - Building an Open science community**, developing collaborative and co-creation culture
- stimulating **interoperability and collaboration** across domains – Developing and **respecting disciplinary standards**
- **readiness and early response to current crises and challenges** – **developing cross-disciplinary** understanding, metadata framework
- **several service layers are not well defined** – e-services, services directly supporting data driven sciences, software and software archives, but **also science driven services**, and many others.
- definition of a **minimum viable national infrastructure** will help to **ensure that all the relevant IS and components are included** (national and EU)

RIs ARE CRITAL FOR EOSC IMPLEMENTATION

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Establishing a framework for future collaboration

- **MS support the domain specific Is and RIs** to develop their data repositories and encourage their federation – **a backbone EOSC infrastructure** at national level

- **Sharing best practices** (of current projects, clusters and pan European infrastructures) will trigger cooperation of IS's repositories in all areas (data quality, tracking system, metadata standards, technical standards, policy requirements, existing mechanisms and networks, certification mechanisms, etc.)

- **Self-organization / Cluster projects** could provide existing datasets and associated science domain specific data services developed by RIs to EOSC - **Coordination of stakeholders / users**

- **Monitoring of IS** will help EOSC implementation and development => **KPIs** adjusted to the domain, particular IS => assessment of EOSC readiness and participation. Following **RACER** criteria = **R**elevant**, A**ccepted, **C**redible, **E**asy to monitor**, R**obust

- **Monitoring of national OS and data policies development** will help the long terms EOSC development and sustainability

- **Visibility of Open Science and Open Data outputs** => good practice examples

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Thank you for your attention.

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Research ecosystem

- **The EOSC** = open, trusted, secure, transparent virtual, federated environment in Europe, where data and services can be made available

- **The aim:** to collect, store, share and re-use data across borders and disciplines in environment of trust
  - => building an Open science community
  - => developing collaborative and co-creation culture
  - => developing and respecting disciplinary standards
  - => stimulating interoperability and collaboration across domains

- **Concept of viable EOSC**
  1. Maximal benefit of research expenditure
  2. Maximal benefits of research data produced (=> data mining brings new outcomes)
  3. Lessons learnt out of experience of research community regarding sharing data

- **Precondition: Integration of all key players to make EOSC useful tool meeting needs of its users**

Research ecosystem (2)

- **DATA for EASIER INTEGRANTION OF THE KEY PLAYERS**
  - researcher infrastructures as high-quality data producers
  - small new communities etc. should be involved
  - => lessons learnt what has been already in use
  - => use their experience with data sharing and current tools for communication between Is and advanced them
- **Objective: EOSC as a useful tool that researchers want to use**
  - encouraging users to pursue the scientific challenges and generate new knowledge
- **Social benefits:** Readiness and early response to current and future crises and challenges across disciplines
  - RIs support the competitiveness of European industries and addressing the socioeconomic challenges
  - rapid sharing of research efforts, findings, and data
  - timeliness versus precision
  - "pre-approved" data sharing agreements

Reserach ecosystem – the importance of RIs

The new emphasis on the socioeconomic goals

1. digitization of European industry
2. preservation of biodiversity
3. securing water supply and healthy food production
4. ensuring of energy security

5. mitigation of climate change
6. facing aging or societal inequalities
7. development of innovative medicines and treatments against infectious diseases

RIs are of importance for the development of excellent science in the EU

- Strategic work of MS, AC and EC within a framework of ESFRI and ESFRI Roadmap foster mutual **collaboration and networking among scientists and innovators**
  - **50 European RIs** => reinforcing Europe's strong research performance
  - mobilizing **investments of approx. €20 billion** across the whole EU
  - enabling user communities to conduct **top-class fundamental and applied research**
  - development of the **advanced technologies and introduce breakthrough innovations**

Research ecosystem – current gaps

- **Top-down approach** to build up EOSC ecosystems => proper communication
- Services in accordance with needs of researchers
- **Harmonization of standards**
  - => data governance mode, data management and access procedures, FAIR data principles
- **Different service layers** are not well defined
  - e-services, services directly supporting data driven sciences, software and software archives
  - => introduction science driven services
- Definition of a **minimum viable national infrastructure**
  - => will help to ensure that all the relevant Is and components are included
- Improvement of **science environment and conditions for researchers**
 - => uniformity in research carrier system

Research ecosystem – current gaps (2)

- **Implementation of policy standards at national level**
    - => important for facilitating a culture shift in a proper speed
- **Fragmentation of the ecosystems** (decentralized processing locations)
    - other initiatives such as GAIA-X => integration?
- Rules at political level should respect science logic
- **Rules** for marketplace model, sharing scientific data should be defined
- **Standards** for policy, processes and procedures
- **Community standards**
    - => currently a huge diversity across the disciplines and countries
- **Stakeholders should provide feedback** to the system
- **Ethics** is currently still unclear

Research ecosystem - architecture

- **EOSC-Core** *„as small as possible, as enabling as necessary"*
  - Minimum architecture elements to enable the Federation
  - Initial version will be delivered by H2020 projects
  - Enables - naming and Locating; Discovery and Access and Managing identity
- **EOSC-Exchange**
  - Evolving Federation to serve the needs of research communities
  - Widening to the general public and the private sector
- **Minimal Viable EOSC (MVE)**
  - Minimum Federation to bring value to users
  - **The MVE must bring value to users beyond their current use of infrastructures**
  - The MVE must enable the federation of existing and future research data infrastructures
  - Federate disciplinary clusters and regional projects is a critical step

EOSC-Exchange
Federated Data
EOSC-Core
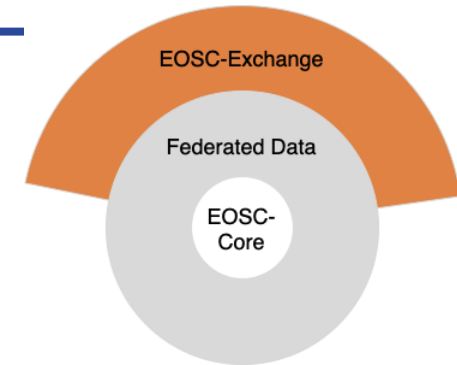
MVE will enable the FEDERATION of RIs for the benefit of publicly funded researchers accessing openly available data

Research Infrastructures
European data spaces
e-Infrastructures
Federation of Infrastructures
Thematic Infrastructures
National Infrastructures
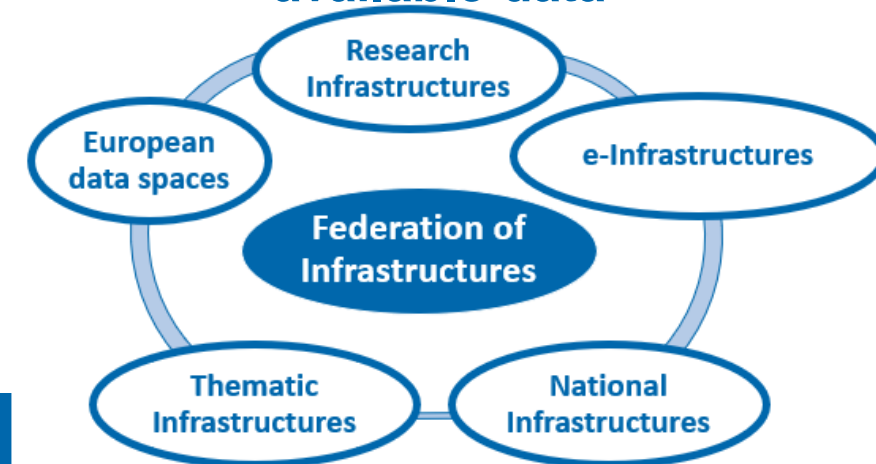
EOSC Association vs. Minimal Viable EOSC