Challenges of Creating Networks of National and Trans-national Digital Infrastructures: European Experiences

A Decade of Digital Innovation: Celebrating 10 years of CEPAL's Digital Repository
United Nations Economic Commission for Latin America and the Caribbean
Santiago de Chile – 14 May 2024

Apresentation of: Paolo Budroni, Vienna University of Technology

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EULiST University Alliance Local Coordinator
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Acknowledgements

This presentation is the fruit of the experience of working and collaborating with the colleagues listed below, who made their slides available. Their e-mail addresses are listed in the respective sections of this presentation.

In order of appearance:
e-IRG Support Project: Fotis Karayannis, Greece, Jan Wiebelitz, Germany
e-IRG Chair: Stefan Hanslik, Austria
E-IRG National Delegates: Ron Augustus, Netherlands, Malin Sandstrom, Sweden, Jan Meijer, Norway, Alexander van den Hill, Netherlands, Panos Argyrakis, Greece, Ignacio Blanquer, Spain, Arūnas Stašionis, Lithuania
E-Infrastracture Assembly: Serge Bogaerts/Managing Director, PRACE, Tiziana Ferrari/Director, EGI Foundation, Cathrin Stöver/Chief Collaboration Officer, GÉANT, Natalia Manola/CEO, OpenAIRE, J. v. Wezel /Executive Board, EUDAT
FAIR Digital Object Forum: Peter Wittenburg

Challenges of Creating Networks of National and Trans-national Digital Infrastructures: European Experiences

1. Trans-national digital infrastructures and European experience: The current 7 grand challenges
2. The Sorbonne Speech of Emmanuel Macron and the European Universities Initiative
2. The Common European Data Spaces
3. Transversal action: the EOSC and its position in the pan-european context
4. Member State bodies, an example: the e-Infrastructure Reflection Group (e-IRG)
5. e-IRG and the „Recommendations on European e-Infrastructures for Research and Education"
6. The European "e-Infrastructure Assembly"
7. Infrastructures and data: the FAIR digital Object Forum

Closing remarks

1
Trans-national digital infrastructures and European experience: The current 9 grand challenges

Grand challenges

Regarding digital infrastructures:

- Scattered landscape
- separate components
- lack of coordination
- sustainability of funding

Regarding data, services and infrastructures:

- maintain the legal compliancy
- enable, exercise and retain data sovereignty on Research Data and Educational Resources
- develop sustainable discovery strategies
- implement measures against digital dementia at istitutions
- define and enable data obsolescence (right to be “forgotten”) and deletion procedures

2.
The Sorbonne Speech of Emmanuel Macron and the European Universities Initiative (26 SEP 2017)

https://international.blogs.ouest-france.fr/archive/2017/09/29/macron-sorbonne-verbatim-europe-18583.html

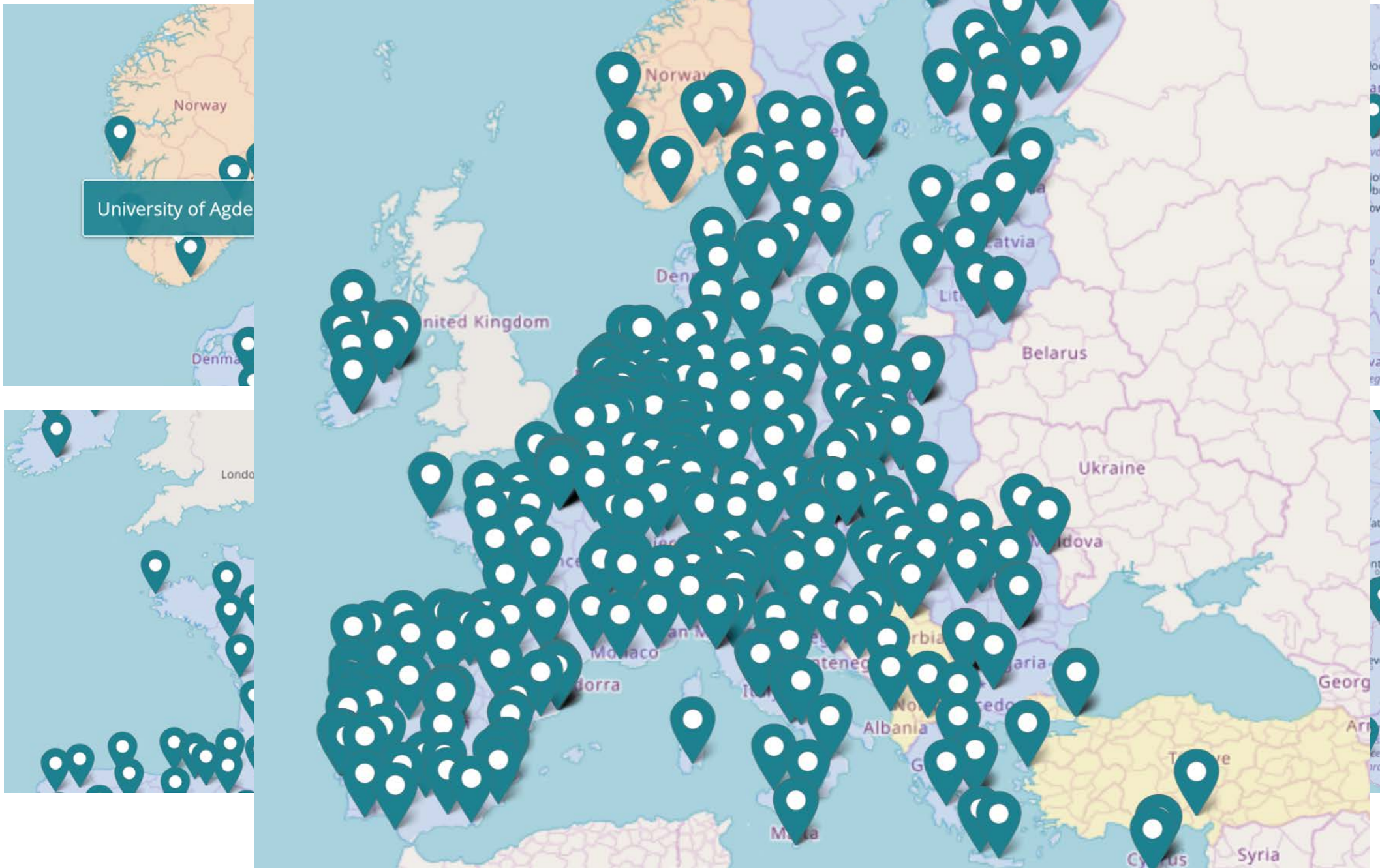
Challenges of Creating Networks of National and Trans-national Digital Infrastructures: European Experiences

The initiative aims to
- improve the international competitiveness of **higher education institutions** in Europe
- promote European values and identity.

Through these alliances students can get a degree by **combining studies** in several European countries.

The initiative has the potential to bring **greater benefits** to higher education institutions **than any previous cooperation projects.**

These can include **all types of higher education institutions from** all across Europe, such as
- research universities
- university colleges
- universities of applied sciences
- universities of technology
- universities of arts


Zoom level:
University of Agde
Norway
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Syria
Warsaw
Biała Podlaska
Radom
Lublin Voivodeship
Zamość
Lesser Poland Voivodeship
Subcarpathian Voivodeship
Uzhhorod
Brasov
Buzău
Craiova
Alexandria
Ruse
Pleven
Targovishte
Bulgaria
Sofia
Dimitrovgrad
Burgas
Kardzhali
Kirklareli
Smolyan
Orestiada
Xanthi
Alexandroupoli
Tekirdağ

The European Universities alliances are a flagship initiative of the European strategy for universities. The initiative sets the ambition to expand to 60 European Universities alliances involving more than 500 higher education institutions by mid-2024.
Funding through "ERASMUS+" programmes

3.
The Common European Data Spaces

Common European data spaces

Rich pool of data (varying degree of accessibility)

Free flow of data across sectors and countries

Full respect of GDPR

Horizontal framework for data governance and data access

- Technical tools for data pooling and sharing
- Standards & interoperability (technical, semantic)
- Sectoral Data Governance (contracts, licenses, access rights, usage rights)
- IT capacity, including cloud storage, processing and services

https://dataspaces.info/common-european-data-spaces/#page-content

Position of EOSC according to the European Commission

Taken from EC slides

"**EOSC** is the basis for a science, research and innovation data space that will bring together data resulting for research and deployment programmes and will be connected and articulated with the sectoral data spaces"

(European Data Strategy, COM(2020) 66 final)

Credits: Karel Luyben, EOSC A

EOSC Lustrum Event (October 2023)

The 2023 statement on the future of the European Open Science Cloud (EOSC):

To ensure a swift and effective implementation, the signatories proposed a three-phase approach:

1. FAIR Digital Objects: This initial phase focuses on making digital objects FAIR (Findable, Accessible, Interoperable, and Reusable) in a manner that is both achievable and readily machine-implementable. This approach would enable the inclusion of all structured legacy data, setting a strong foundation for EOSC.

1. FAIR4Humans: As a transitional step, the signatories acknowledge the importance of metadata integration. While this phase demands metadata improvements, it recognizes that not all legacy systems can be transformed immediately. This approach strikes a balance between immediate progress and accommodating legacy setups.

1. FAIR4Machines: The long-term objective is to make EOSC truly FAIR for machines, paving the way for advanced automation and data-driven processes. This aspirational phase underscores the commitment to continually evolve EOSC to meet the changing needs of the research community.

By adopting these phased strategies, Europe can advance towards the EOSC vision using a clear roadmap, ensuring that research data and resources are not only accessible but also optimized for both human and machine processing. This approach will clearly help the whole European scientific sector to create a more open, collaborative, and data-driven scientific landscape.

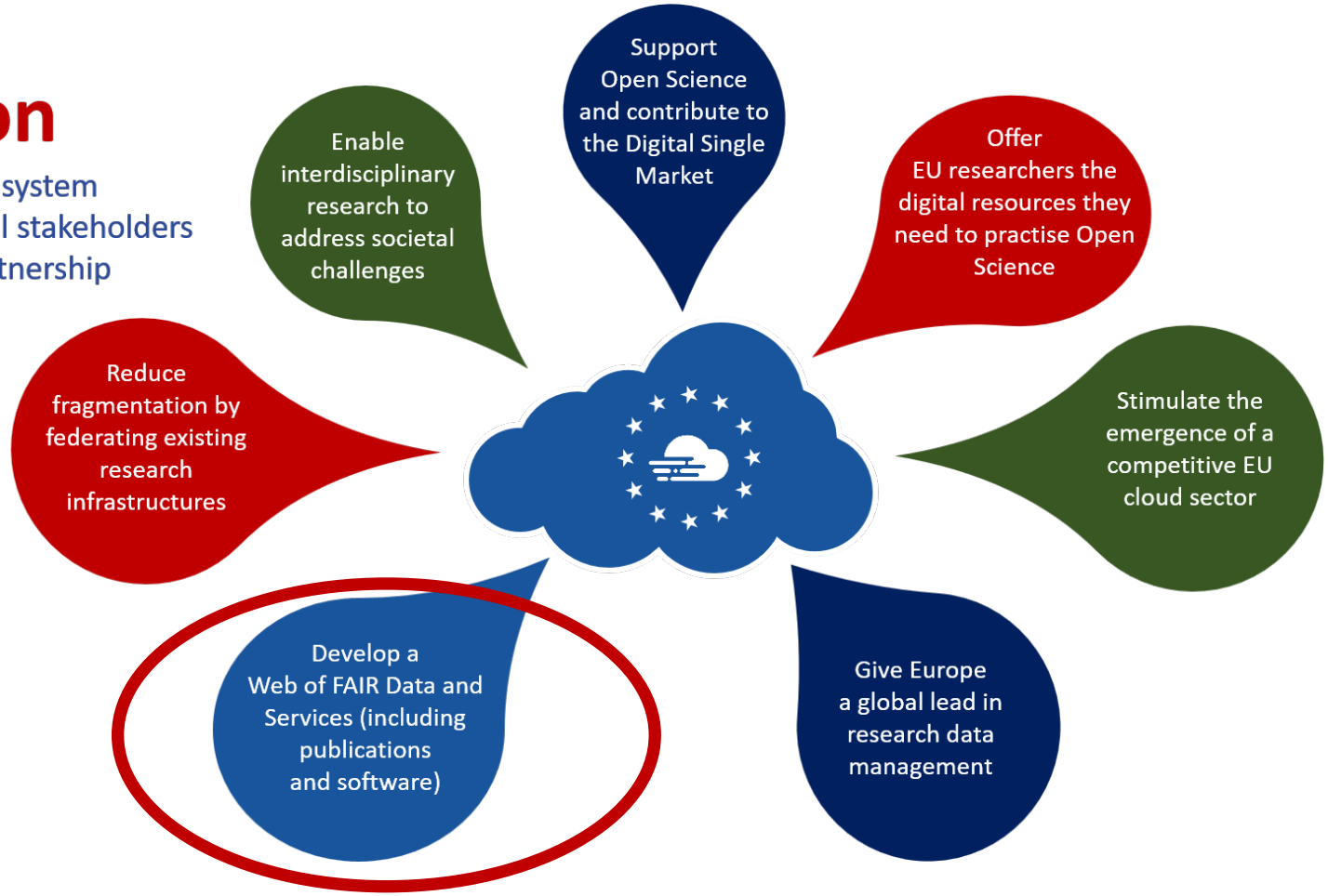
The document was proposed by (alphabetically listed): Paolo Budroni, Jean-Claude Burgelman, Stefan Hanslik, Karel Luyben, Michel Schouppe, Peter Wittenburg - https://eosclustrum.eu/fileadmin/user_upload/k_eosc_lust/Statement_regardingthe_future_of_EOSC.pdf

4.
Transversal action: the EOSC and its position in the pan-european context

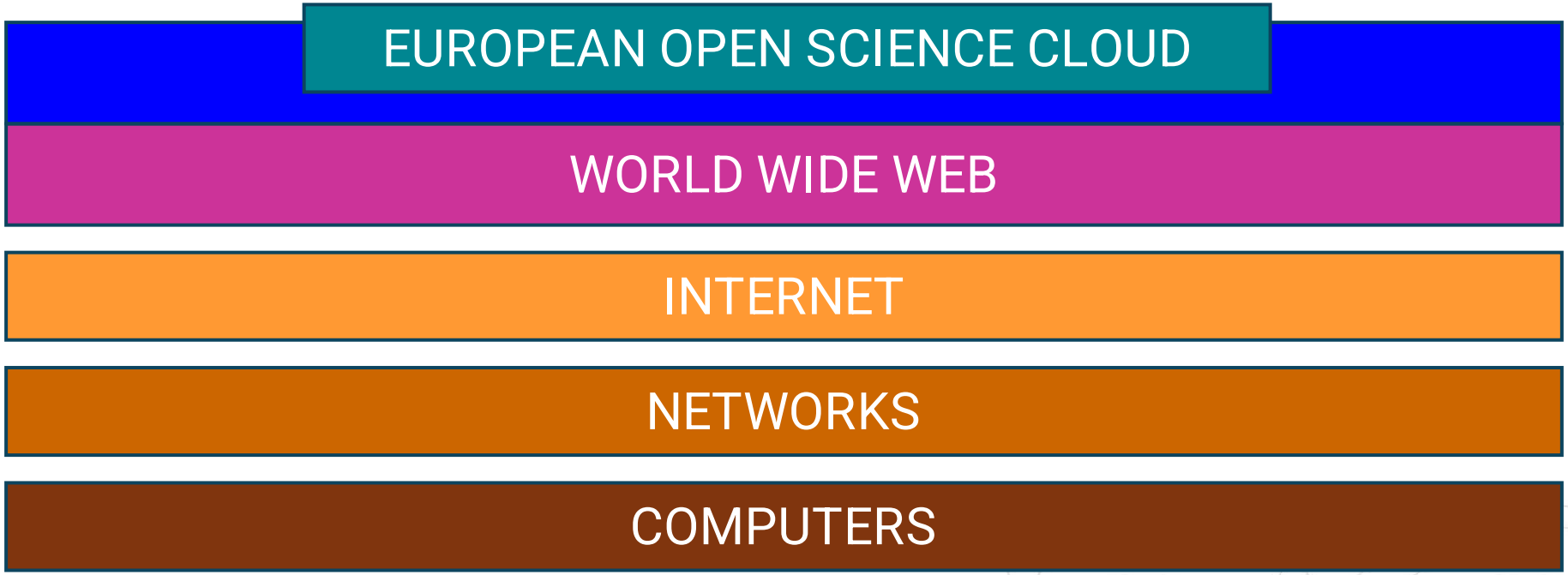
European Open Science Cloud

The Vision

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



EOSC – additionality to the web of FAIR data

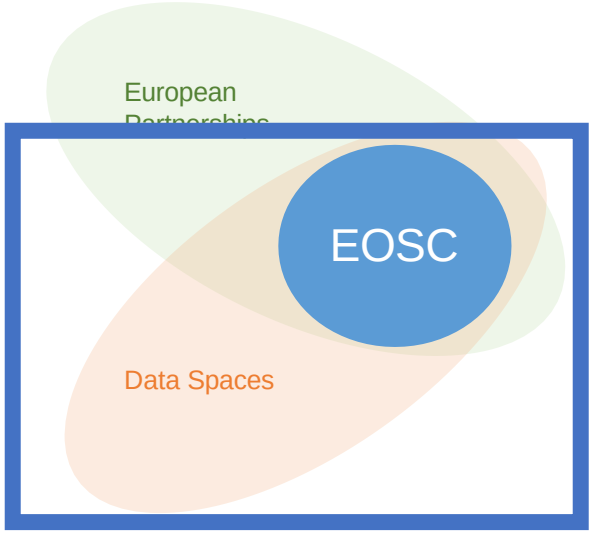


Modelled after: World Wide Web - Wikipedia

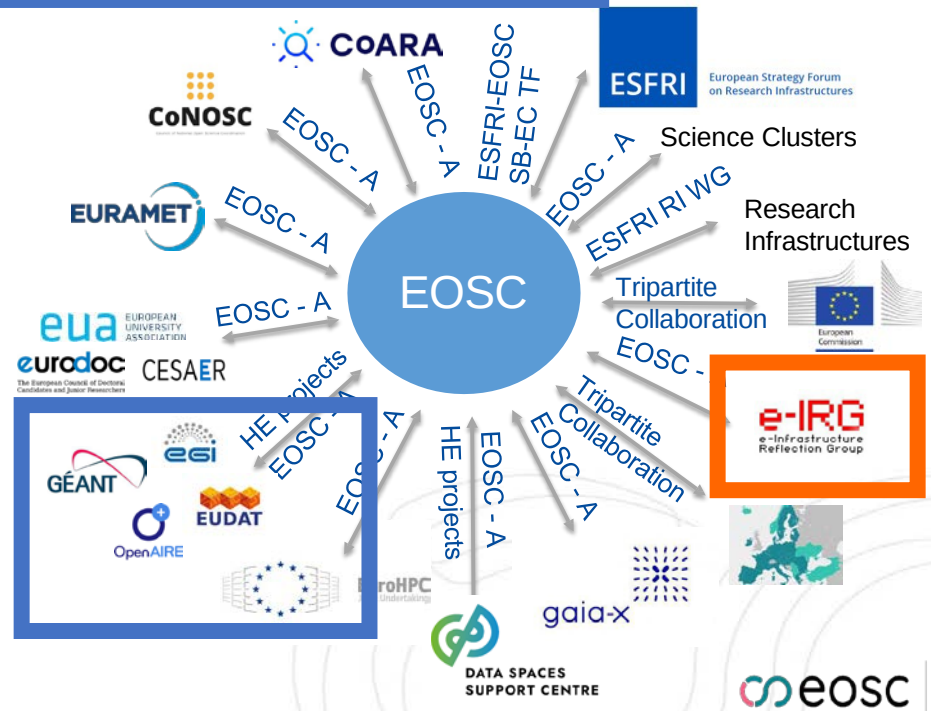
EOSC in the broader context

- EOSC is one of the Horizon Europe Partnerships:

EOSC is one of the emerging Data Spaces



EOSC in the European Data Strategy landscape



eosc Focus

Funded by the European Union

Credits: Karel Luyben, EOSC A

4.
Members States bodies, an example:
The e-Infrastructure Reflection Group (e-IRG)

e-IRG – a member State body

Since 20 years the e-Infrastructure Reflection Group (e-IRG https://e-irg.eu) is a recognised advisory body in the area of e-infrastructures to the European Commission, Member States and Associated Countries.

e-IRG consists of national representatives nominated by the responsible ministries in the Member States and Associated Countries. e-IRG produces policy documents, which include recommendations to the various stakeholders. The concept of the e-Infrastructure Commons introduced in the e-IRG Roadmap 2012 and taken up further in the e-IRG White Paper 2013 and the document "National Nodes - Getting organised; how far are we?", is recognised as the foundation of the European Open Science Cloud (EOSC). The e-IRG White Paper 2021 identified some good practices in terms of coordination on institutional, national and regional level to further the implementation of the e-Infrastructure Commons. The most recent publication, the e-IRG White Paper 2022, took the topic of coordination and collaboration further by addressing the European e-Infrastructures and their interconnections.

e-IRG – a member State body

Contact:

Stefan Hanslik, Chair <stefan.hanslik@bmbwf.gv.at>

Secretariat: Fotis Karayannis, Jan Wiebelitz - both:

secretariat@e-irg.eu

http://e-irg.eu/about https://zenodo.org/record/5567014

5.
e-IRG and the „Recommendations on European e-Infrastructures for Research and Education”

March 2024 - Recommendations on European e-Infrastructures for Research and Education

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Co-authors: Panos Argyrakis, Arūnas Stašionis, Ignacio Blanquer

E-infra’s: The public foundation serving Research and Education

- European e-infrastructures are:
  - Geant : European NREN
  - EGI: European Grid Infrastructure
  - PRACE: HPC connectivity
  - EUDAT: Data infrastructure
  - OpenAire: Open Science infratructure
- The collective of e-Infrastructures forms a ‘public foundation’ for solutions tailored to the research sector's needs.
- This is achieved through a combination of federated infrastructures, a rich set of digital skills, and consensus on standards.

E-infra’s: The challenges

- The European Commission's approach of procurement tenders for elements similar to existing e-Infrastructures.
- e-Infrastructures, naturally playing on the demand-side market, are now in competition with commercial entities prioritizing profit
- The European Commission does not always speak with a unified voice, which contributes to the ambiguity surrounding the roles of DG-CNECT/DG-RTD in managing e-Infrastructures.

eIRG recommendation:

The e-Infrastructure Reflection Group (e-IRG) advises the member states, the associated countries and the EC:

1. *To direct R&E initiatives towards utilizing established e-Infrastructures rather than acquiring separate components*

2. *to devise financing strategies that support the sustainability of public foundations integral to these e-Infrastructures.*

6.
The European “e-Infrastructure Assembly”

e-Infrastructures

Working in e-Infrastructures since year 2000

(@fkarayan)

e-Infrastructure Assembly

Apresentation of:

Serge Bogaerts/Managing Director, PRACE
Tiziana Ferrari/Director, EGI Foundation
Cathrin Stöver/Chief Collaboration Officer, GÉANT
Natalia Manola/CEO, OpenAIRE
J. v. Wezel /Executive Board, EUDAT CDI

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About the e-Infrastructure Assembly

The group of e-Infrastructures delivering advanced digital services for the European research and education community in support to open science

EGI Federation, EUDAT CDI, GÉANT, OpenAIRE, PRACE

e-Infrastructure Assembly Objectives

- Promote e-infrastructure activities in Europe to EC and MSs increasing awareness and visibility.
- Seek dialogue and foster interaction with new e-infrastructure players, the ESFRI and Research Infrastructure ecosystem, as well as projects funded through CEF, DEP and HE relevant to the Research and Education community, with the aim of increasing collaboration and avoiding duplication of efforts and fragmentation.
- Align and coordinate activities in areas of work of common interest.
- Improve the e-Infrastructure interface towards international initiatives of pan-European and international relevance, complementing existing individual collaborations and aligning individual efforts and contributions.

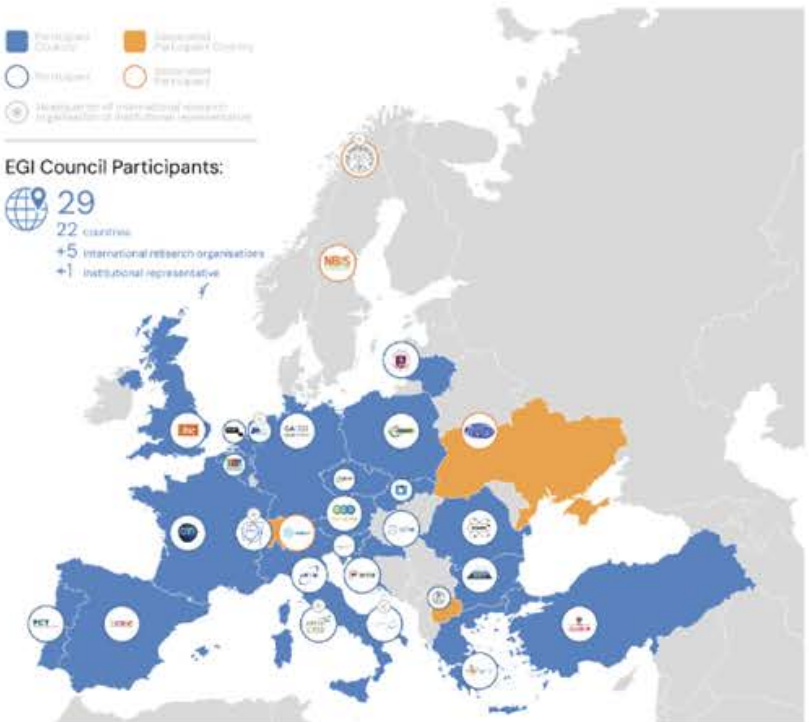
The e-Infrastructure Assembly will connect its participants with international initiatives of pan-European and international relevance complementing existing individual collaborations and aligning individual efforts and contributions.

EGI in a Nutshell

www.egi.eu

EGI Federation

A European flagship digital infrastructure for data-intensive scientific computing



EGI in numbers[1]

Why a federation?

- Support science at international scale
- Build an hyperscale facility for research
- Invest nationally, access globally
- Bring computing to the data

EGI Services

EGI delivers advanced computing services to support scientists, international projects, research infrastructures and businesses.

EGI services for research

1 the key numbers are correct as of April 2024.

Leveraging Data Services from European Scientific Institutes

- Consolidated collaboration of large research institutions and providers
- Close to research and researchers
- Long term commitment to data management operations and development
- Offering integrated data services and data resources
- Transnational and cross discipline data management and data sharing
- Collaboration and integration with e-Infrastructures incl. EOSC and EOSC node
- € 25 M EU grants invested in services development since (2016)
    - EUDAT, EUDAT2020, EOSC Hub, EOSC Future, FAIRCORE4EOSC, EOSC Beyond, . . .

EUDAT aims to:

Extent co-operation in the development, support and provision of data services with and for research infrastructures as part of the group of e-Infrastructures

A (Very) Brief GÉANT Overview

GÉANT is the collaboration of European National Research and Education Networks (NRENs). Together we deliver a dedicated information ecosystem of infrastructure and services to advance research, education, and innovation on a global scale.

Cathrin Stöver, GÉANT, April 2024

OpenAIRE AMKE

52 members

36 countries

- Non-profit organisation, established Oct 2018
- Mission: Shift scholarly communication towards openness and transparency and facilitate innovative ways to communicate and monitor research
- A Scholarly Communication e-Infrastructure that brings together human capital and advanced ICT services
- A network of experts from major national organisations (National Open Access Desks) in operation since 2009

Global Collaborations: Latin America, US, Canada, Japan, Korea, …

PRACE new role in the HPC ecosystem

- PRACE is the European HPC User and HPC Centre Association - EuroHPC JU providing HPC resources on European scale
- PRACE focus on user services
  - HPC-HPDA-AI-QC Scientific and Innovation Case
  - Recommendations for the EU HPC ecosystem
  - Promote Excellence and Achievements in HPC
  - Serve as single point of information/library, e.g. performance benchmarking of codes
  - Networking Platform for users and HPC centres
  - Peer Review Service in collaboration with EuroHPC, FENIX
  - High quality training
  - Defining & designing demonstrators and testing of new technologies (TNA)
- PRACE welcomes the cooperation with EOSC Nodes and aims for facilitating the use of HPC resources (national and EU)
  - E.g. application scaling, access to new architectures for testing, access channel to nodes

7.
Infrastructures and data: the FAIR digital Object Forum (FDO Forum)

FAIR Digital Object Forum

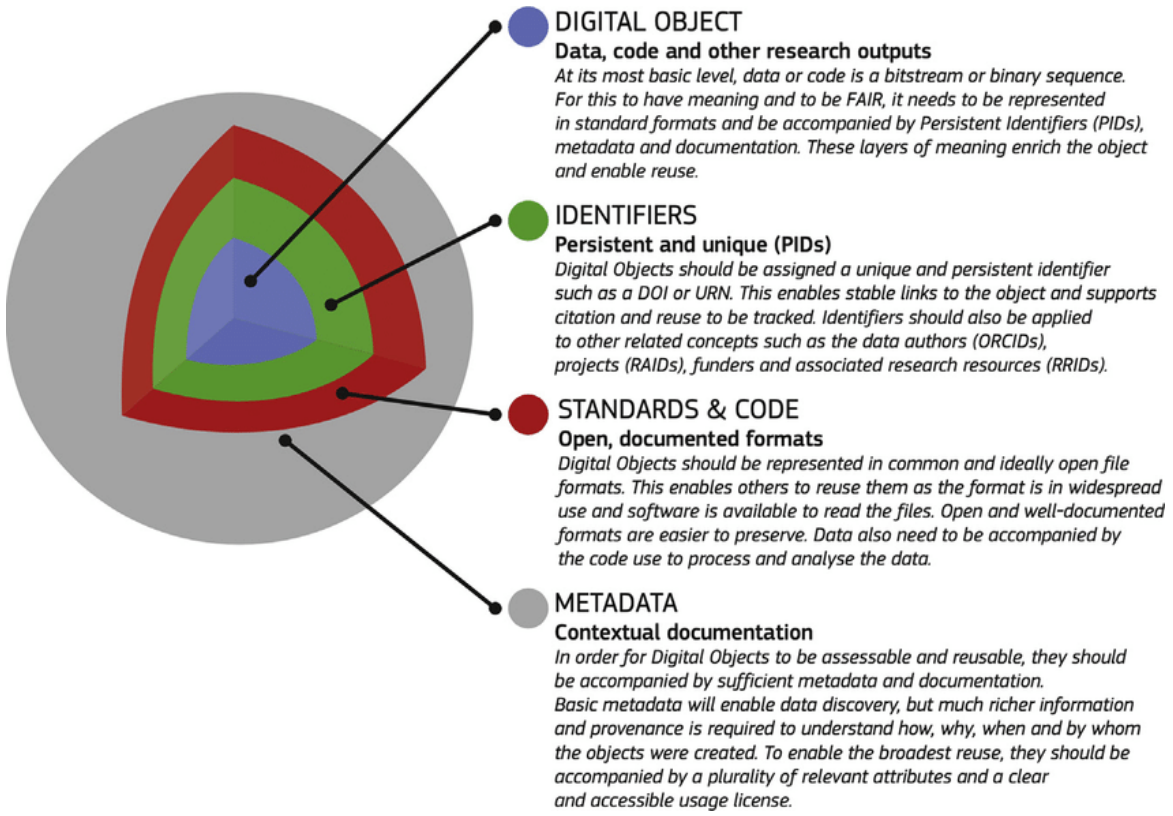
Contact for this presentation: Peter Wittenburg
Peter.Wittenburg@mpi.nl

VISION

The global integrated data space will be populated by **standardized, autonomous and persistent entities**, which contain the information needed about different kinds of digital objects (data, metadata, documents, software, semantic assertions, etc.), to enable both humans and machines to Find, Access, Interoperate, and Reuse (FAIR) these digital objects in highly efficient and cost-effective ways. **These entities are independent of continuously changing technologies and the many different ways that are and in future will be organized and structured. In addition, they have built-in mechanisms to support data sovereignty.** All of this will help to manage data in a more sustainable and secure way.

https://fairdo.org/1316-2/

FAIR Digital Objects



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Internet pioneer George Strawn expects that by 2030 we will have built **one global integrated data space**, all of which will efficiently support those data driven projects in industry, research, and public services that require data to be seamlessly integrated from different sources.

Globally harmonized data infrastructures based on FDO standards will allow the extraction of new knowledge from large data collections, supporting efforts to maintain a stable society,

https://fairdo.org/1316-2/

Challenges of Creating Networks of National and Trans-national Digital Infrastructures: European Experiences

In October 2022, the International FDO Forum organized its first International FDO Conference (Leiden) which was structured and informed by the workshops held in the months before.

In March 2024 the international FDO Forum organized a second event (Summit in Berlin)

https://fairdo.org/1316-2/

Closing remarks

Points of discussions:

Align and cordinate activities of digital infrastructures

introduce the FAIR principles for data management (FAIR: = Findable Accessible Interoperable, Reusable)

Introduce the FDOs

maintain and offer a legal compliancy/ (i.e. clarify copyright issues, clarify exploitation law issues, take usage licences into account)

enable, exercise and retain data sovereignty

develop effective measures against the volatility of digital data (this includes Introduce guidelines that apply to all organisational units /LL; provide effective tools (hardware and software in the archive; engage in skills development)

implement measures against digital dementia

develop discovery strategies

ensure traceability (including show and record the provenance of the data and retain it in the metadata record)

define and enable data obsolescence (when should data be deleted; who is authorised to delete; introduce deletion protocols)

Apresentation of: Paolo Budroni, Vienna University of Technology

Head of EOSC and International Liaison Office at University Library
EULiST University Alliance Local Coordinator
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Member of CLARIN SAB
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THANKS !

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