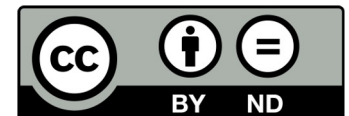


EOSC Interoperability

Mark van de Sanden (SURF/EUDAT)

The EOSC Future project is co-funded by the European Union Horizon Programme call INFRAEOSC-03-2020, Grant Agreement 101017536

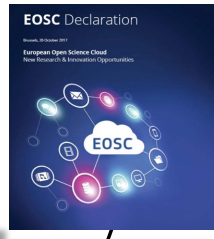




EUROPEAN OPEN SCIENCE CLOUD

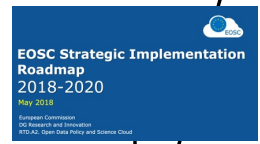
BLOG POST | By Günther Oettinger | 22 June 2015

Open science for a knowledge and data-driven economy



EOOSC Association in Numbers

184 Applications	100 Membership applications 41 Observer applications 13 Mandated members
4 Organisation types	154 Research performing organisations 24 Service providing organisations 10 Research Funding organisations 2 Other organisations
15 Countries with mandated members	Belgium Denmark Germany Italy Luxembourg Malta Poland Portugal Romania Slovakia Spain Switzerland Ukraine



Advisory Group & Task Force topics

1. Implementation of EOOSC	4. Sustaining EOOSC
1.1. EOOSC policy and implementation	4.1. Funding EOOSC models for EOOSC
1.2. Researcher engagement and education	4.2. Long-term sustainability
1.3. Role of Participant (SME) companies in EOOSC	
2. Metadata and data quality	3. Technical challenges on EOOSC
2.1. EOOSC metadata data quality	3.1. API Architecture
2.2. Metadata interoperability	3.2. Interoperability to quality research outputs
3. Research careers and curricula	3.3. Technical interoperability of data and services
3.1. Data interoperability: curricula and career paths	
3.2. Research careers, engagement, and impact	
3.3. Interdisciplinary research in EOOSC	



EUROPEAN COMMISSION

Brussels, 19.4.2016
COM(2016) 178 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

European Cloud Initiative - Building a competitive data and knowledge economy in Europe

(SWD(2016) 106 final)
(SWD(2016) 107 final)



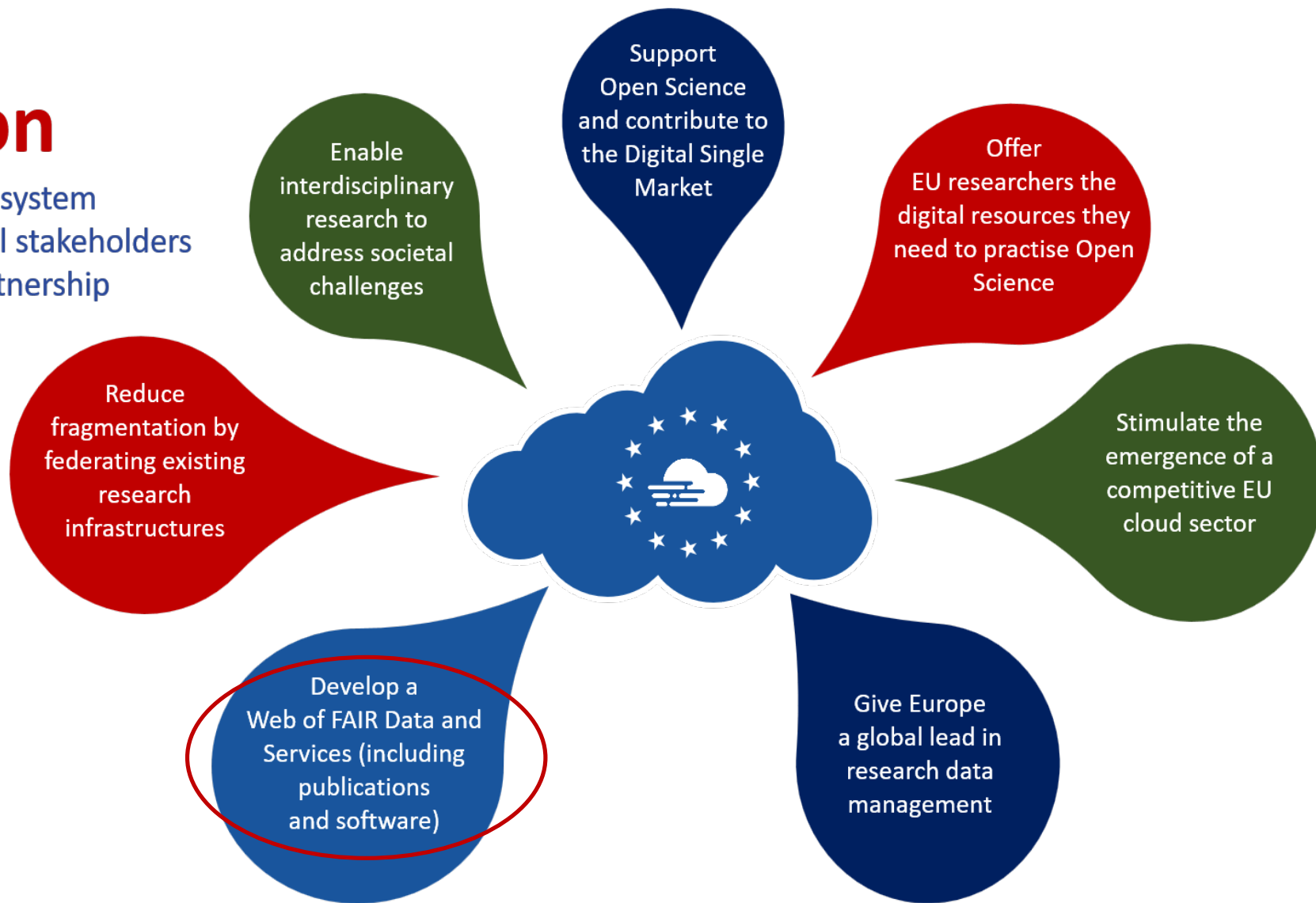
+12
(INFRAEOSC-01-2018,
INFRAEOSC-04-2018,
INFRAEOSC-05-2018-2019)



(Selection of events, outputs & projects)

The Vision

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



EOSC Executive Board WGs (2019 – 2020)

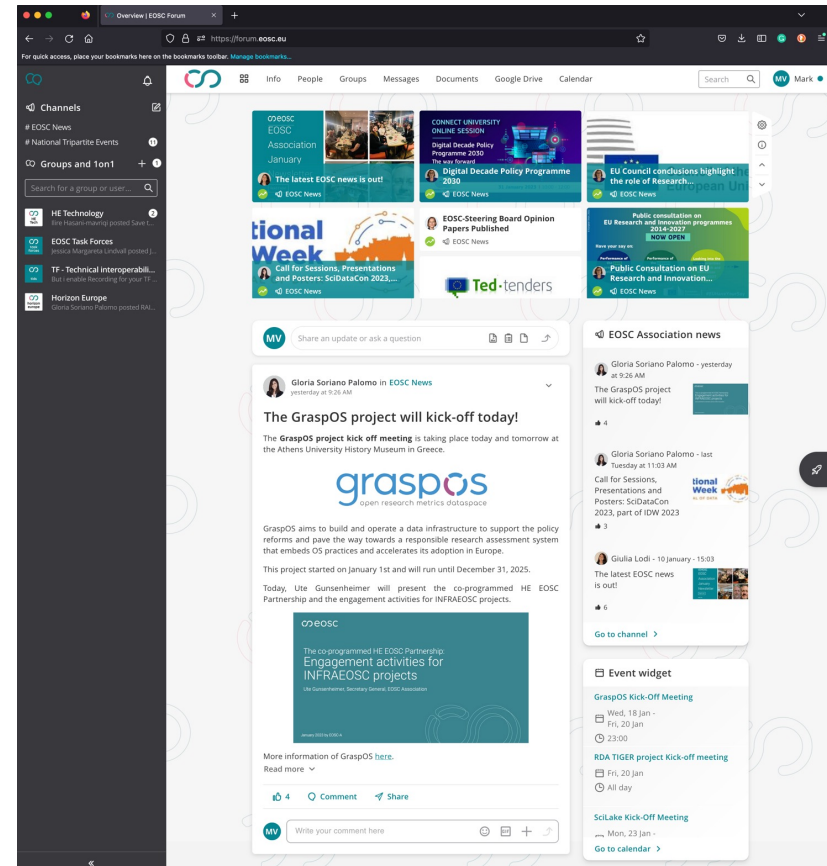
- Architecture
- FAIR
- Landscape
- Rules of Participation
- Skills & Training
- Sustainability



In total 20 outputs, see <https://www.eoscsecretariat.eu/eosc-governance/eosc-executive-board-outputs>

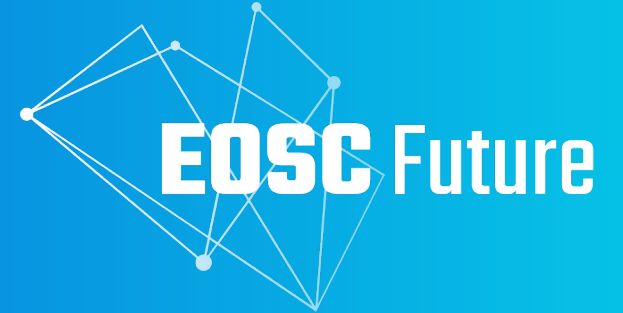
EOSC Association Task forces

- AG Implementation of EOSC
 - TF PID Policy and Implementation
 - TF Researcher Engagement and Adoption
 - TF Rules of Participation Compliance Monitoring
- AG Metadata and Data Quality
 - TF FAIR Metrics and Data Quality
 - TF Semantic Interoperability
- AG Research Careers and Curricula
 - TF Data Stewardship Curricula and Career Paths
 - TF Research Careers, Recognition, and Credit
 - TF Upskilling Countries to Engage in EOSC
- AG Sustaining EOSC
 - TF Defining Funding Models for EOSC
 - TF Long-Term Data Preservation
- AG Technical Challenges on EOSC
 - TF AAI Architecture
 - TF Infrastructure for Quality Research Software
 - TF Technical Interoperability of Data and Services



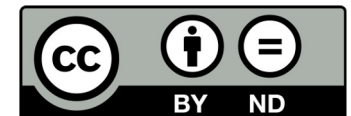
<https://www.eosc.eu/task-force-faq>

<https://forum.eosc.eu/>

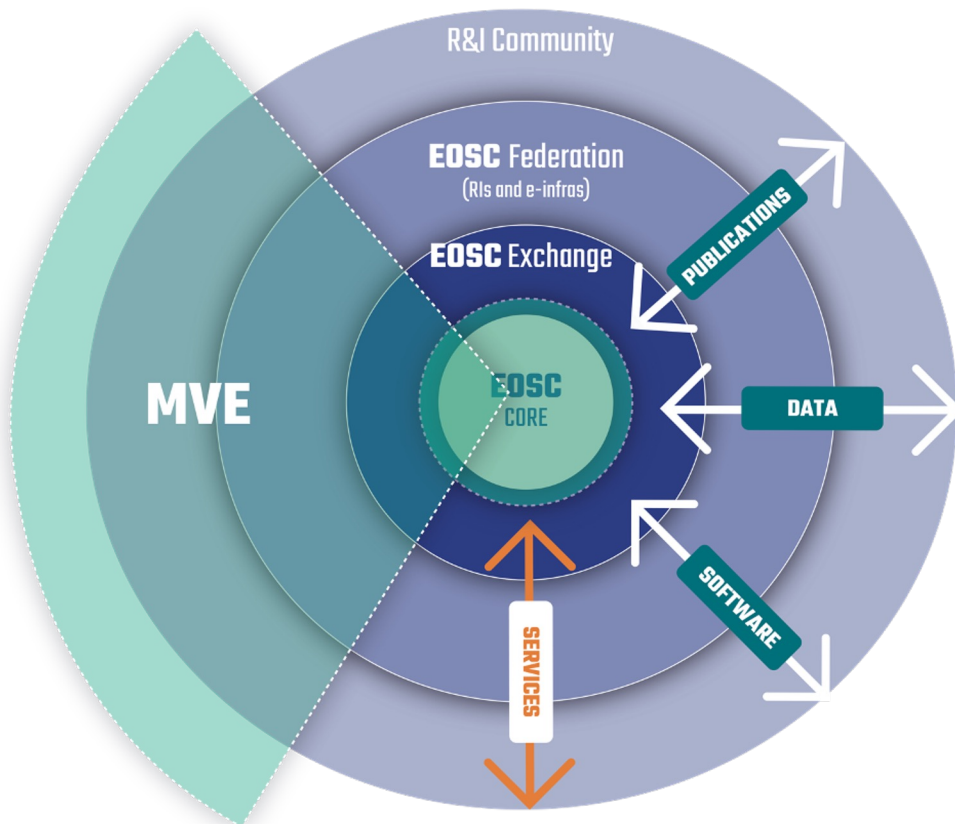


Developing the EOSC Platform

The EOSC Future project is co-funded by the
European Union Horizon Programme call
INFRAEOSC-03-2020, Grant Agreement 101017536



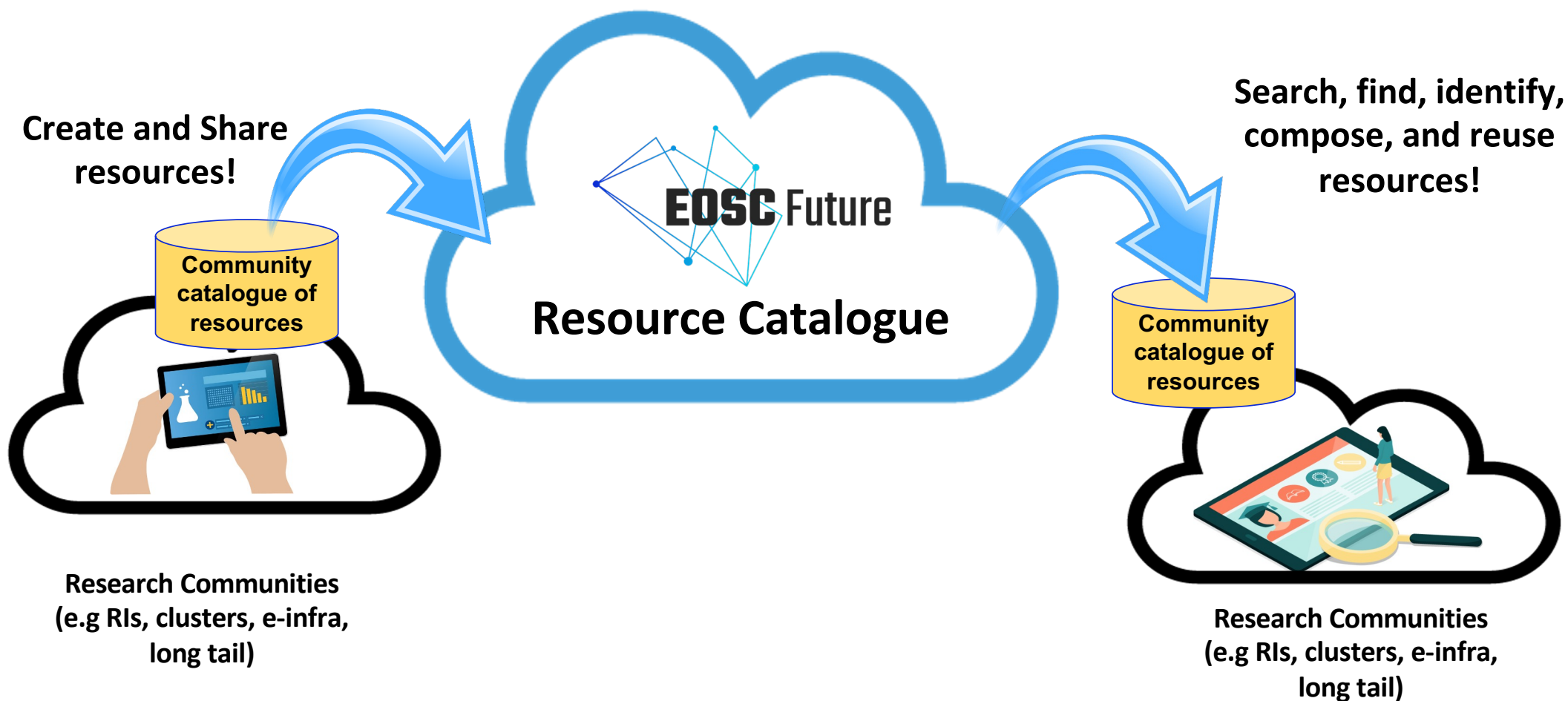
Minimal Viable EOOSC



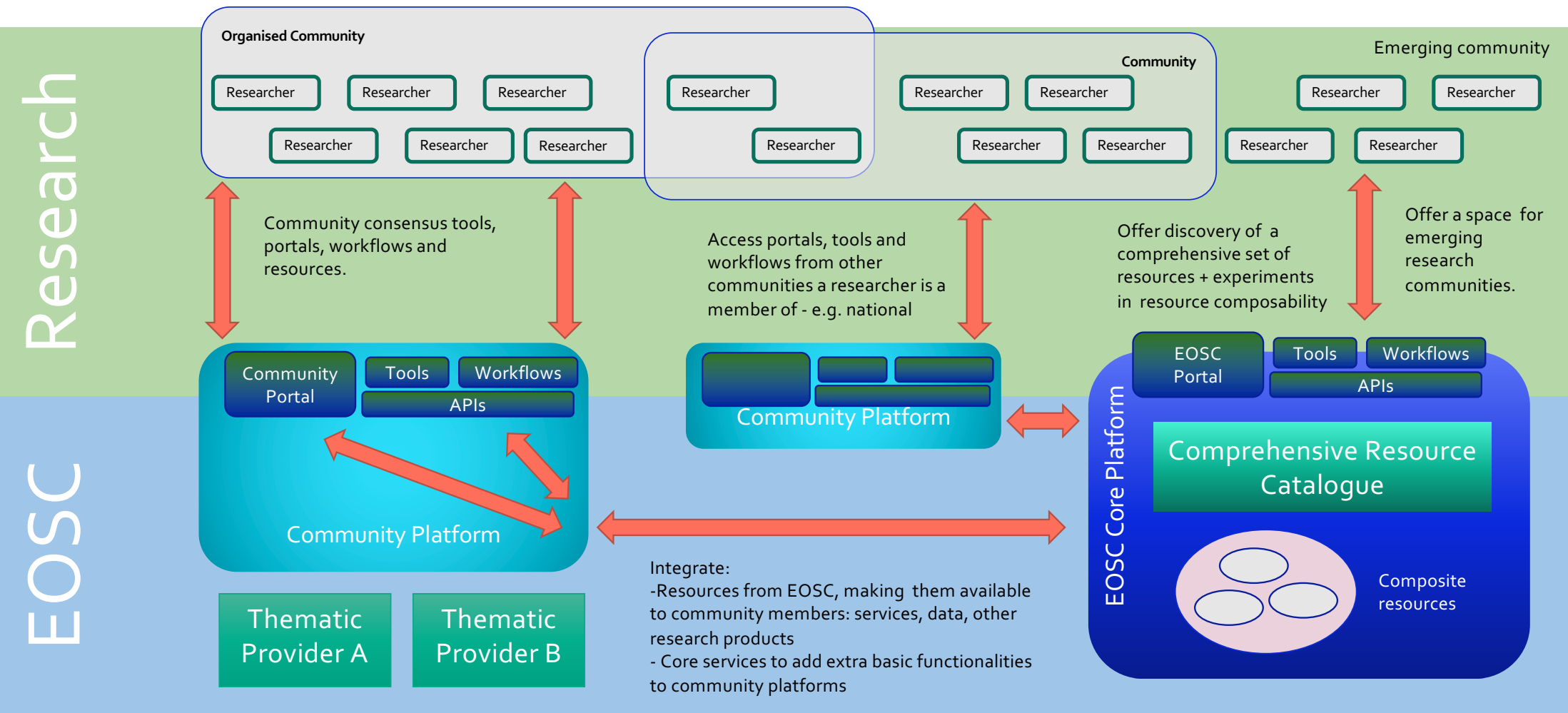
MVE includes:

- EOOSC Core and subsets of EOOSC Exchange, Federation
- EOOSC resources (services, research products) required to “market” the EOOSC
- Subset of the R&I community (showcases, e.g., COVID-19)

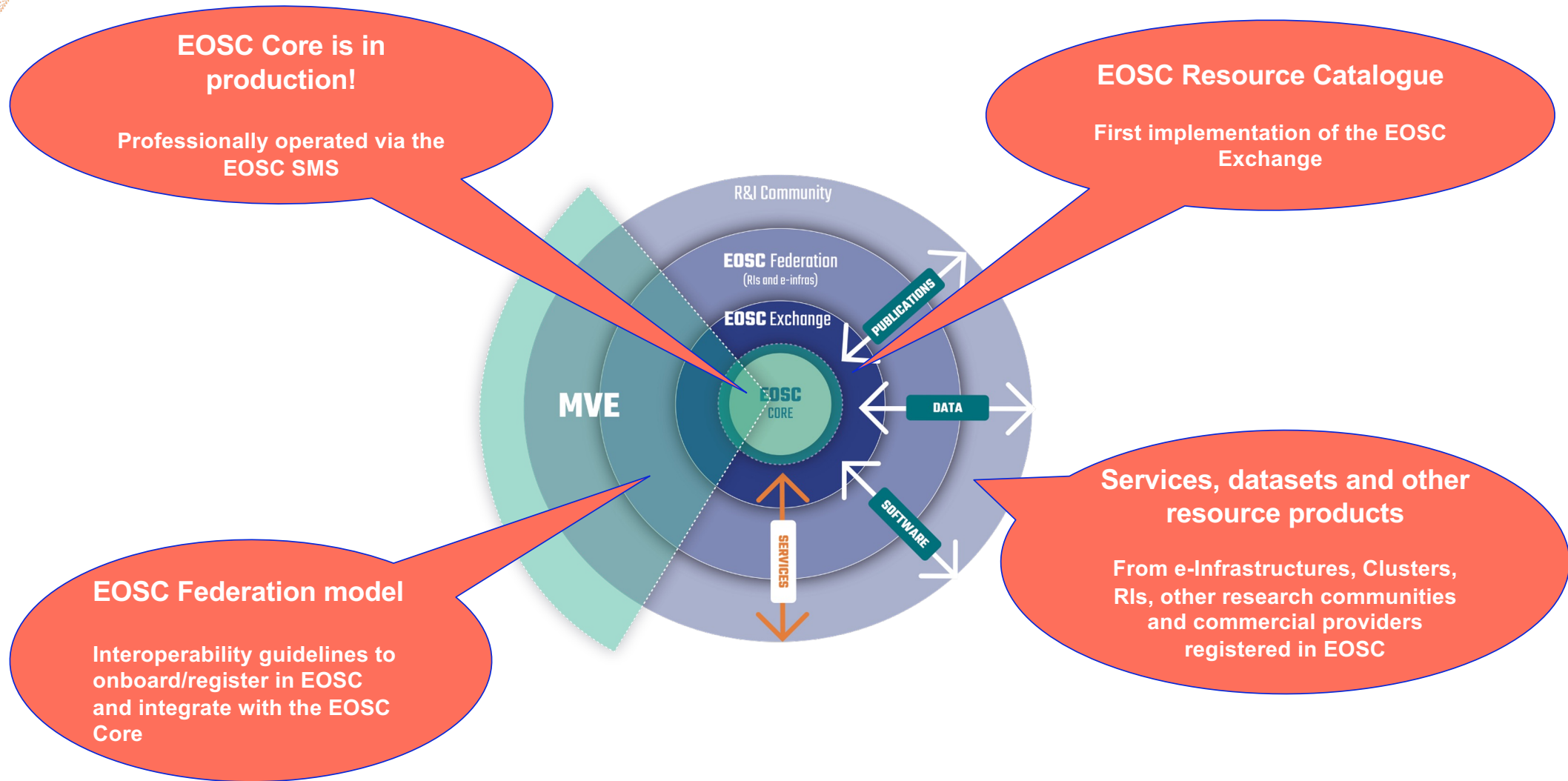
Sharing resources beyond community boundaries



Researcher view: different benefits

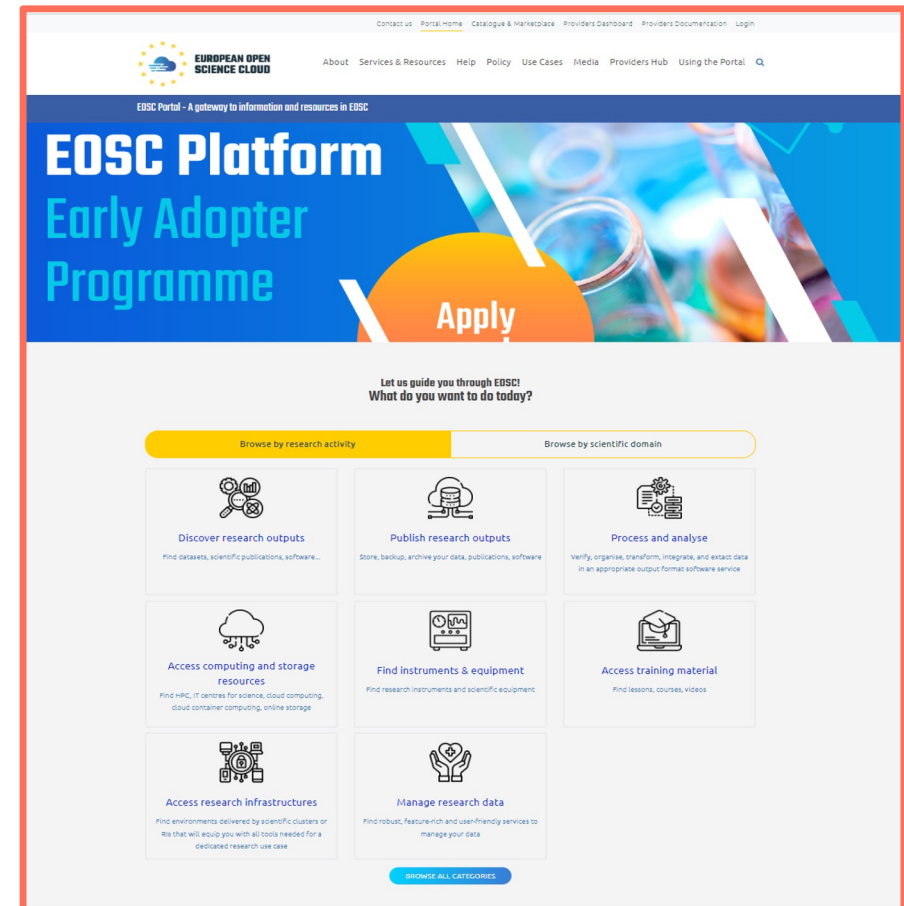


How the EOSC Platform delivers the MVE



The EOSC Platform - Main Features

1. Integrated Catalogue of services, datasets and other research products
2. AI-based Advanced Search Engine
3. Access and order services, download research products, create projects with multiple resources
4. Service, Catalogue & Data Source onboarding
5. Integration on-demand with EOSC Core services:
 - AAI Federation (beta)
 - EOSC Helpdesk on demand (Helpdesk aaS)
 - EOSC Monitoring on demand (Monitoring aaS)
 - Order Management
 - Accounting for research products
6. Rich EOSC Exchange:
 - Discover & Access Research Outputs, Access Compute and Storage Resources, Find Instruments, Access Training Material, Access RIs and Manage Research Data



<https://eosc-portal.eu/>

EOSC Platform - Main new features

Integrated catalogue of services and research products

Different types of EOSC Resources

Search engine over all catalogues

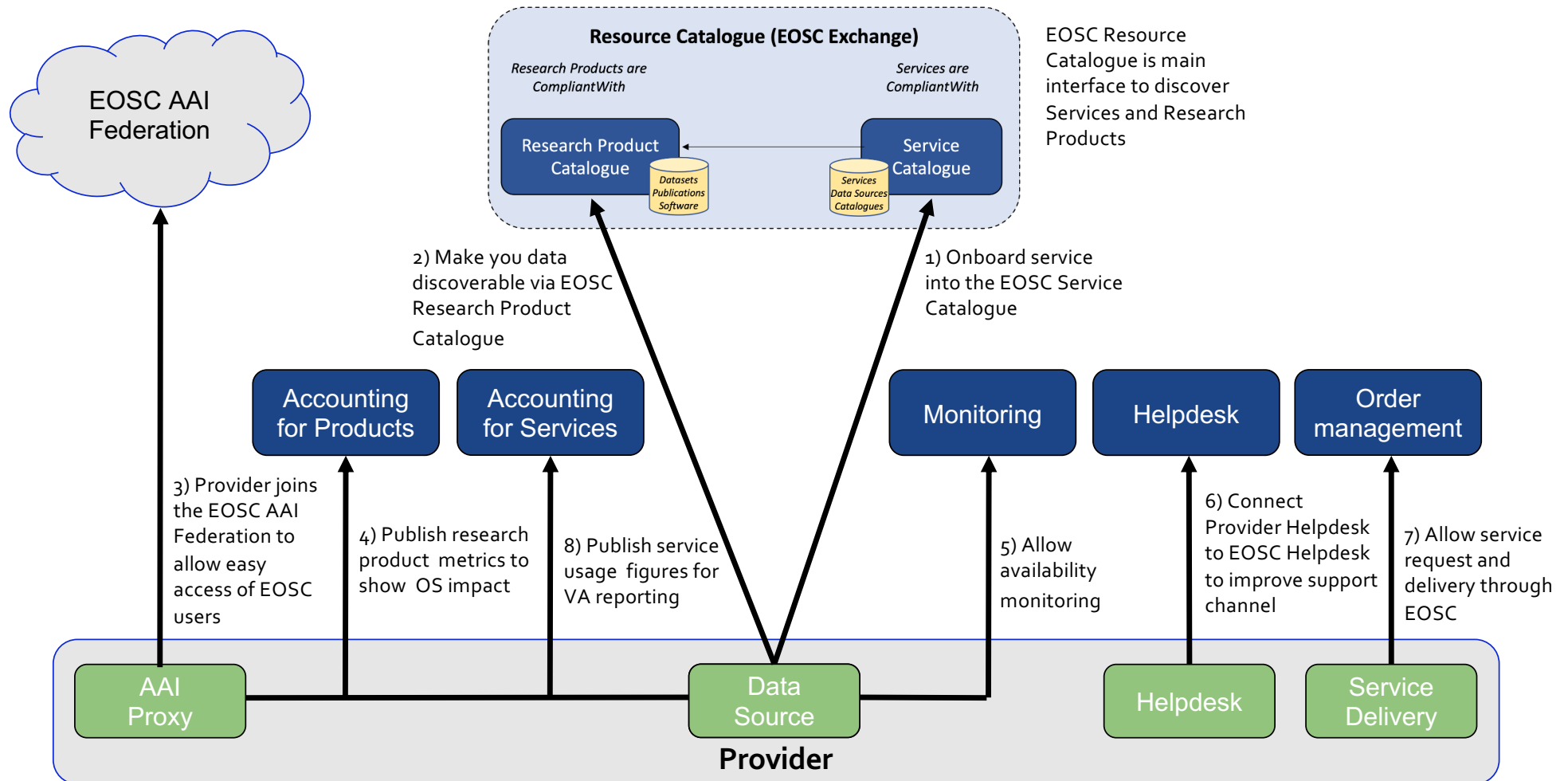
Filter per catalogue

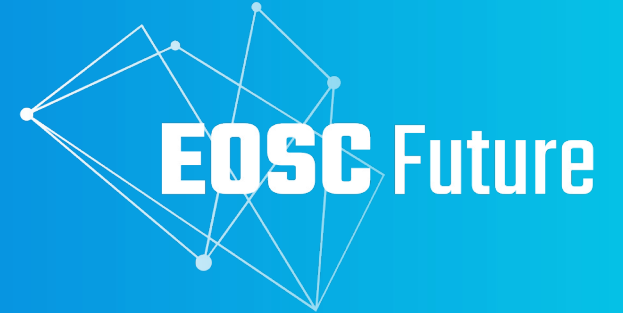
The screenshot shows the EOSC Platform search interface. At the top, there is a navigation bar with links: Contact us, Portal Home, Catalogue & Metadata, Providers Documentation, Monitoring, EOSC Core Status, and Login. Below this is a blue header with the European Science Cloud logo and a search bar containing the text "Search in catalogs". To the right of the search bar is a dropdown menu labeled "All catalogs" with a search icon. The dropdown menu is open, showing a list of categories: All catalogs (highlighted), Publications, Data, Software, Services, Data sources, Trainings, and Other. Below the search bar is a row of icons representing different resource types: ALL CATALOGS (underlined), PUBLICATIONS, DATA, SOFTWARE, SERVICES, DATA SOURCES, and OTHER. At the bottom of the search results area, there are three sections: "Filters", "3339935 search results in All catalogs", and "Suggested".

More than 3 million of Resources

<https://search.eosc-portal.eu/>

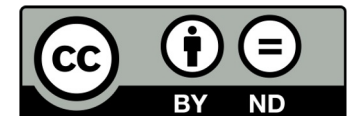
Different levels of integration with the EOSC Platform





EOSC Interoperability Framework

The EOSC Future project is co-funded by the European Union Horizon Programme call INFRAEOSC-03-2020, Grant Agreement 101017536





EOSC Interoperability Framework

Why

- EOSC is a federated infrastructure of data and services.
- Interoperability is essential to deliver services to users.
- Adoption of standards is not sufficient...
- we need more to enable resource interoperability.

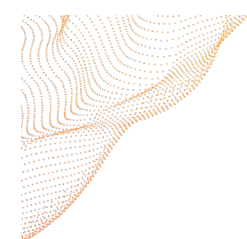
What

- Set of **guidelines*** that:
 - Facilitate interoperation with EOSC-Core
 - Promote standards and community best practices within the EOSC
- **Governance** to manage EOSC promoted guidelines
- A **registry** to list the guidelines and help tag resources that support them

Who

For Providers operating resources, facilities, catalogues, etc and for users with an interoperability requirement

<https://eosc-portal.eu/eosc-interoperability-framework>



The EOSC IF must be built, promoted and maintained with structure, fairness and transparency.

It does not seek to replace existing community guidelines with its own versions

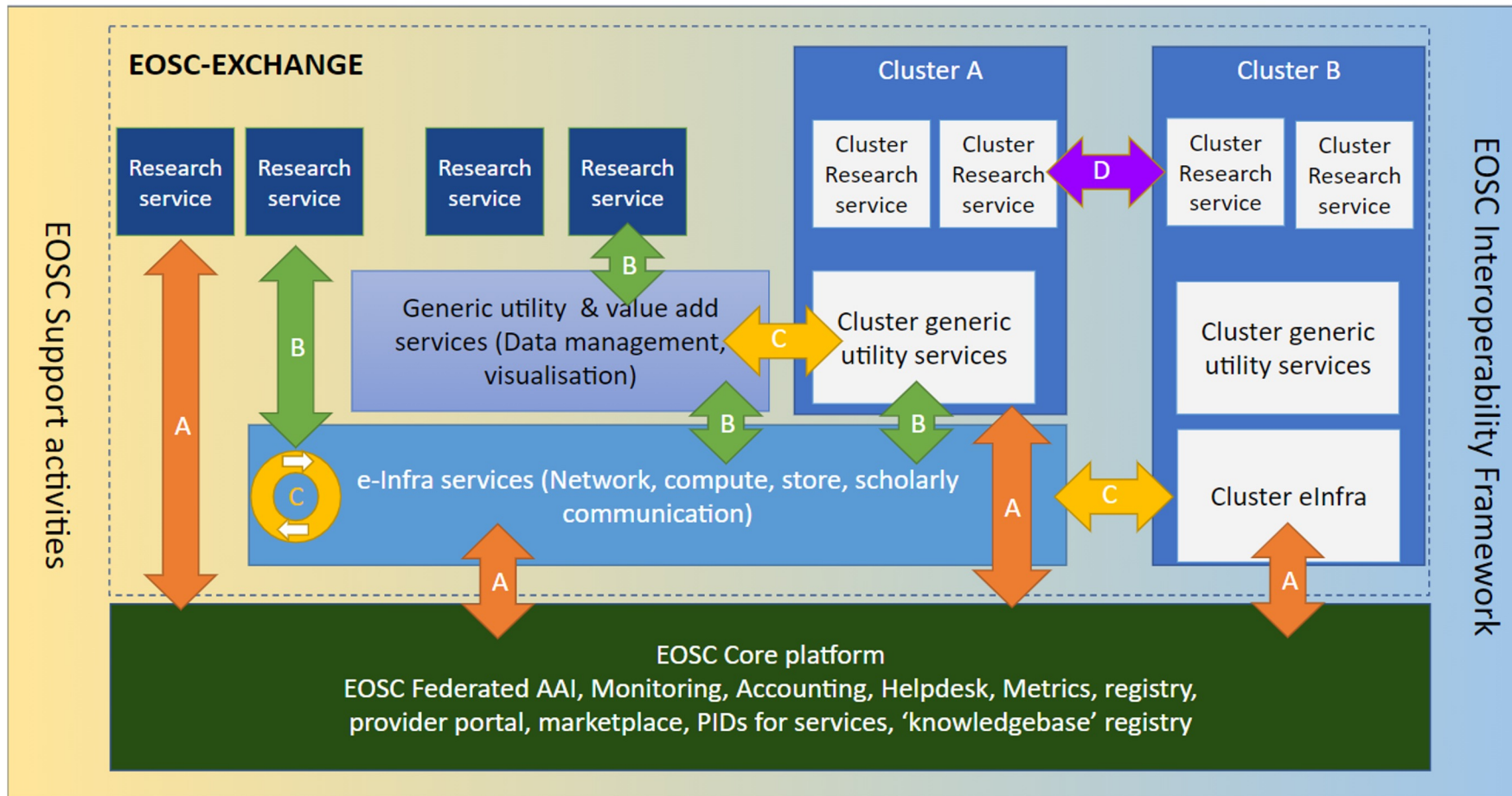
It will not reinvent existing 'ISO-style' certification models

EOSC channels will be used to announce newly adopted/deprecated guidelines to the research community at large

It will support the identification of gaps in interoperability solutions, and will assist with technical interoperability in the future

It intends to confirm the readiness of each proposed interoperability artifact

EOSC Interoperability guidelines for EOSC Core services





Governing bodies

"An overarching, independent group that will assess whether requests for inclusion into the EOSC IF are compliant with a minimum set of requirements"

Body	Responsibility	People
EOSC Interoperability Advisory Board (EIAB)	<ul style="list-style-type: none">• overseeing the EOSC IF;• endorsing guidelines, based on the recommendations of the EIAC.	EOSC Future Technical Coordination Board
EOSC Interoperability Area Chairs (EIAC)	<ul style="list-style-type: none">• performing the initial assessment of the proposed guidelines• making recommendations for inclusion to the EIAB.	EOSC Future WP3 task leads supported by editorial board (calling in community experts to help with the review process as needed).

See EOSC-Portal for more info
<https://eosc-portal.eu/eosc-interoperability-framework/eiab-and-eiac-charter>

EOSC IG for EOSC Core Monitoring: The Guinea pig!

The screenshot shows the Zenodo interface for a record titled "EOSC Monitoring: Architecture and Interoperability Guidelines". The page includes a search bar, navigation links for "Upload" and "Communities", and user options for "Log in" and "Sign up". The record is dated September 28, 2022, and is marked as "Open Access". It shows 0 views and 0 downloads. The authors listed are Koumantaros, Konstantinos; Themis Zamani; Kagkeldis Konstantinos; Thermolia Chrysa; Emir Imamagic; Daniel Vrcic; Katarina Zailac; -IN2P3. The abstract describes the monitoring service and its integration options. A preview of the document is shown, featuring a blue background with the text "EOSC Future" and a network diagram. The metadata section includes the publication date (September 28, 2022), DOI (10.5281/zenodo.7118591), keyword(s) (EOSC, Guidelines, Monitoring, ARGO), grants (European Commission), and license (Creative Commons Attribution 4.0 International). The versions section shows Version 0.9 from Sep 28, 2022.

- EOSC Monitoring: Architecture and Interoperability Guidelines has been used in order to help us through the decision making process for:
 - EOSC-IG Data Model
 - EOSC-IG template
- This will be used to trial the submission/proposal process.
- Intends to help us to apply lessons learned throughout to further iterations of the documentation and processes.
- <https://zenodo.org/record/7118591#.YzQQjezP0UQ>

Actions:

- Use published version to trial the submission/proposal process.
- Apply template to all other EOSC-Core Interoperability Guidelines
- Progress all EOSC-Core Interoperability Guidelines through the submission process.



FAIRCORE4EOSC

Core Components Supporting a FAIR EOSC

FAIRCORE4EOSC

Developing EOSC-Core components to
enable a FAIR EOSC ecosystem



Funded by
the European Union



Extending the EOSC Core

With components supporting FAIR

The EOSC-Core development has been initiated in the Horizon 2020 calls, but some of the challenges that require to be addressed are:

- **Identifiers:** Introducing new resource types; machine-actionable persistent identifiers (PIDs); establishing a PID meta-resolver; standardising PID graphs; PID compliance framework to ensure compliance to the EOSC PID policy and to ensure quality of service for PIDs;
- **Metadata and Ontologies:** Provide or embrace/stimulate existing registries of metadata schemas, ontologies and crosswalks, develop services that build on metadata registries and can facilitate the creation and sharing of crosswalks;
- **Interoperability:** Enable discovery of data sources available in different formats, making search tools available; Provide tools for quality validation of metadata records and of digital objects; Implement EOSC PID Policy;
- **Research Software:** metadata description standards for research software, automated deposit of new releases into a scholarly repository and Software Heritage.



The 9 FAIRCORE4EOSC components



EOSC Research Discovery Graph (RDGraph) to deliver advanced discovery tools across EOSC resources and communities.



EOSC PID Graph (PIDGraph) to improve the way of interlinking research entities across domains and data sources on the basis of PIDs.



EOSC Metadata Schema and Crosswalk Registry (MSCR) to support publishing, discovery and access of metadata schemas and provide functions to operationalise metadata conversions by combining crosswalks.



EOSC Data Type Registry (DTR) to provide user friendly APIs for metadata imports and access to different data types and metadata mappings.



EOSC PID Meta Resolver (PIDMR) to offer users a single PID resolving API in which any kind of PID can be resolved through a single, scalable PID resolving infrastructure.



EOSC Compliance Assessment Toolkit (CAT) to support the EOSC PID policy compliance and implementation.



EOSC Research Activity Identifier Service (RAiD) to mint PIDs for research projects, allowing to manage and track project related activities.



EOSC Research Software APIs and Connectors (RSAC) to ensure the long-term preservation of research software in different disciplines.



EOSC Software Heritage Mirror (SWHM) to equip EOSC with a mirror of the Software Heritage universal source code archive.

The 5 FAIRCORE4EOSC use cases

Social Sciences and Humanities

CLARIN
This case-study will focus on improving the discoverability of CLARIN data through the integration of the Digital Object Gateway (DOG), a crucial component for the interoperability of the CLARIN infrastructure, Language Resource Switchboard and Virtual Collection Registry tools.

Adopted components DTR MSCR PIDGraph PIDMR RDGraph

Climate Change

DKRZ
ENES supports climate modellers in their work, in particular in the area of data management. In this case study we demonstrate how the developed EOSC-Core components can improve the discoverability and re-use of research results from the ENES community.

Adopted components DTR MSCR PIDGraph RAiD RDGraph

Mathematics

FIZ Karlsruhe
Leibniz Institute for Information Infrastructure
zbMATH Open & swMATH projects aggregate significant scientific advances in mathematics and related disciplines supporting researchers in finding relevant publications and data. The case study will increase the discoverability of the zbMATH Open and swMATH data and services in the mathematical and EOSC community.

Adopted components MSCR PIDGraph PIDMR RDGraph RSAC

European Integration of National-level Services

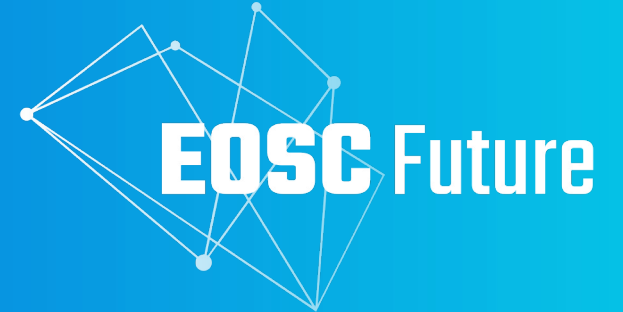
The case study will showcase how the developed components can enrich the content of the national research information systems displaying international connections to research objects and improve their interoperability.

Adopted components DTR MSCR PIDGraph RAiD RDGraph RSAC SWHM

EOSC Service Providers

EUDAT Collaborative Data Infrastructure
Data shared and preserved across borders and disciplines
The case study aims to meet domain-specific requirements of research communities for common data services that improve discovery, access and reusability of research data. Leveraging the EUDAT services, the case study will act as a rule model for other service providers to increase the adoption of the developed components.

Adopted components CAT DTR MSCR PIDGraph RAiD RDGraph



Thank You

Q&A

Mark van de Sanden (SURF/EUDAT)
mark.vandesanden@surf.nl

The EOSC Future project is co-funded by the
European Union Horizon Programme call
INFRAEOSC-03-2020, Grant Agreement 101017536

