

The CNRS logo, consisting of the lowercase letters 'cnrs' in white, is centered within a dark blue circular background. The logo is positioned in the upper right quadrant of the slide, overlapping the yellow background and the blue abstract graphic.

cnrs

Dimension technique : Architecture et Structure de l'EOSC

1^{ère} Journée EOSC au CNRS

Jérôme Pansanel & Olivier Rouchon

→ 06/02/2024

EOSC Definition

Three complementary aspects



A process

- Accelerate Open Science, FAIR data management and use of digital methods and services
- Stimulate co-operation in science and research, new insights and innovations, higher research productivity and improved reproducibility in science.

An open, trusted, federation of infrastructures

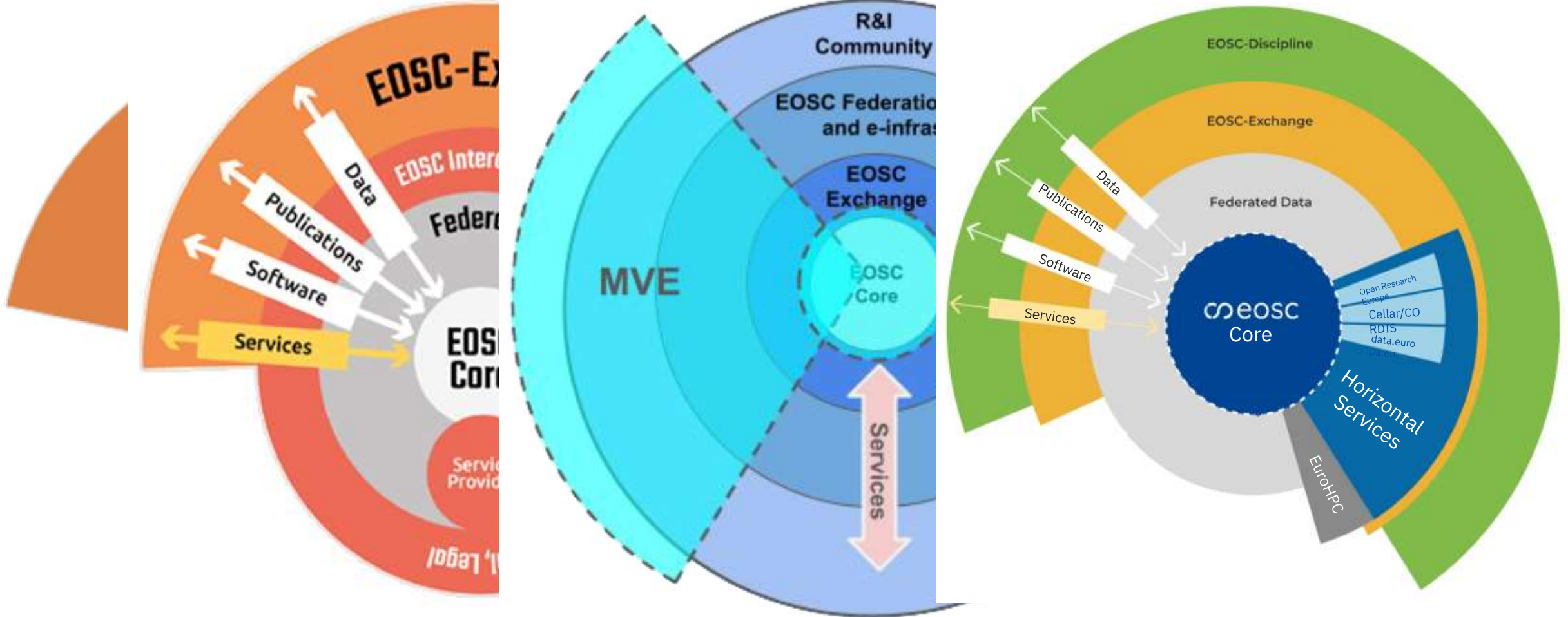
- Access existing Research Infrastructures in Europe;
- Enable circa 2 million European researchers to store, share, process, analyze, and reuse research digital objects (e.g. data, publications and software)

An evolving ecosystem

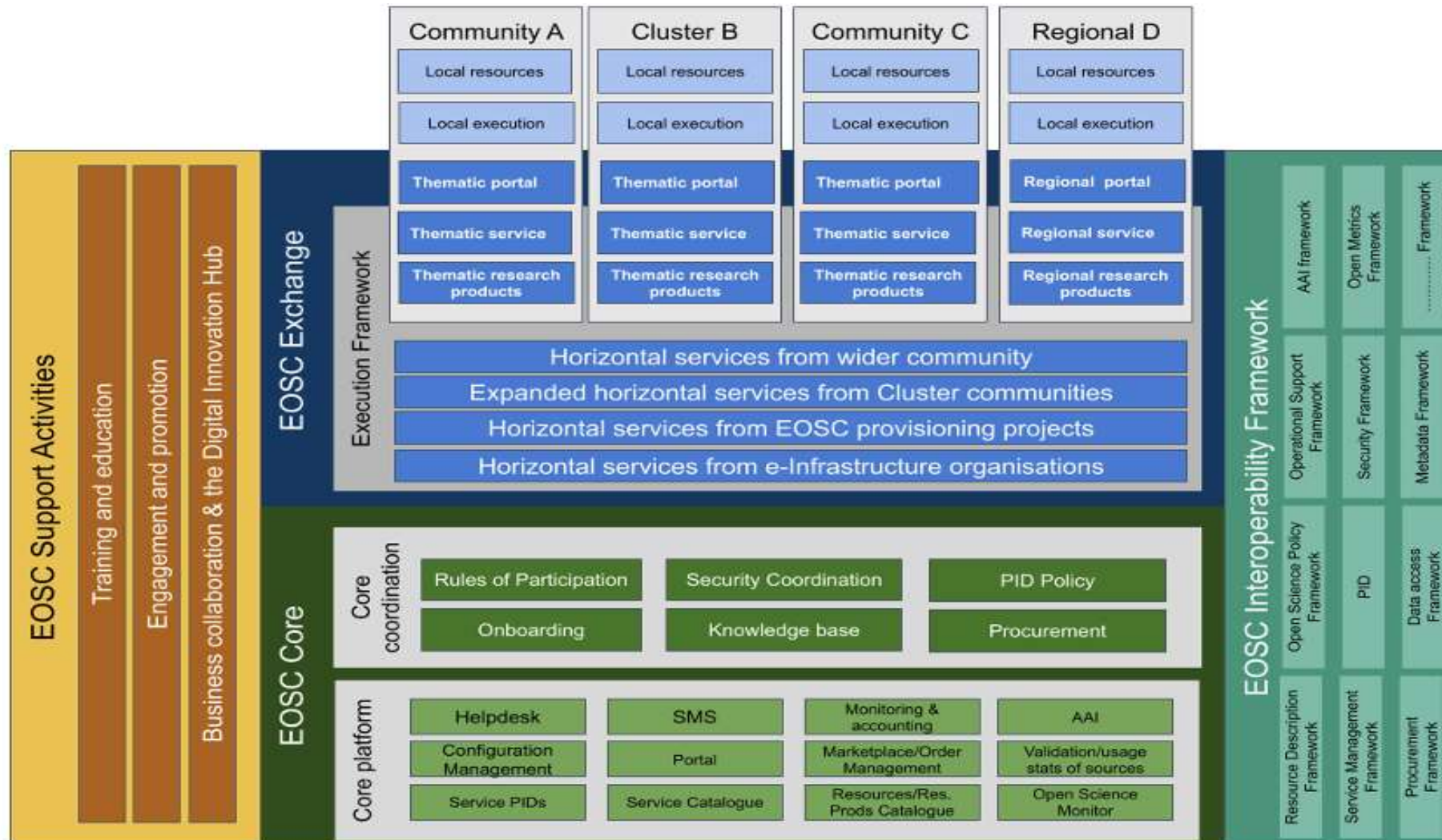
- Bringing together the European Commission, the governments and the many R&I stakeholders involved in the European Research Area
- Co-created across European, national, and institutional levels



EOSC Architecture Evolution

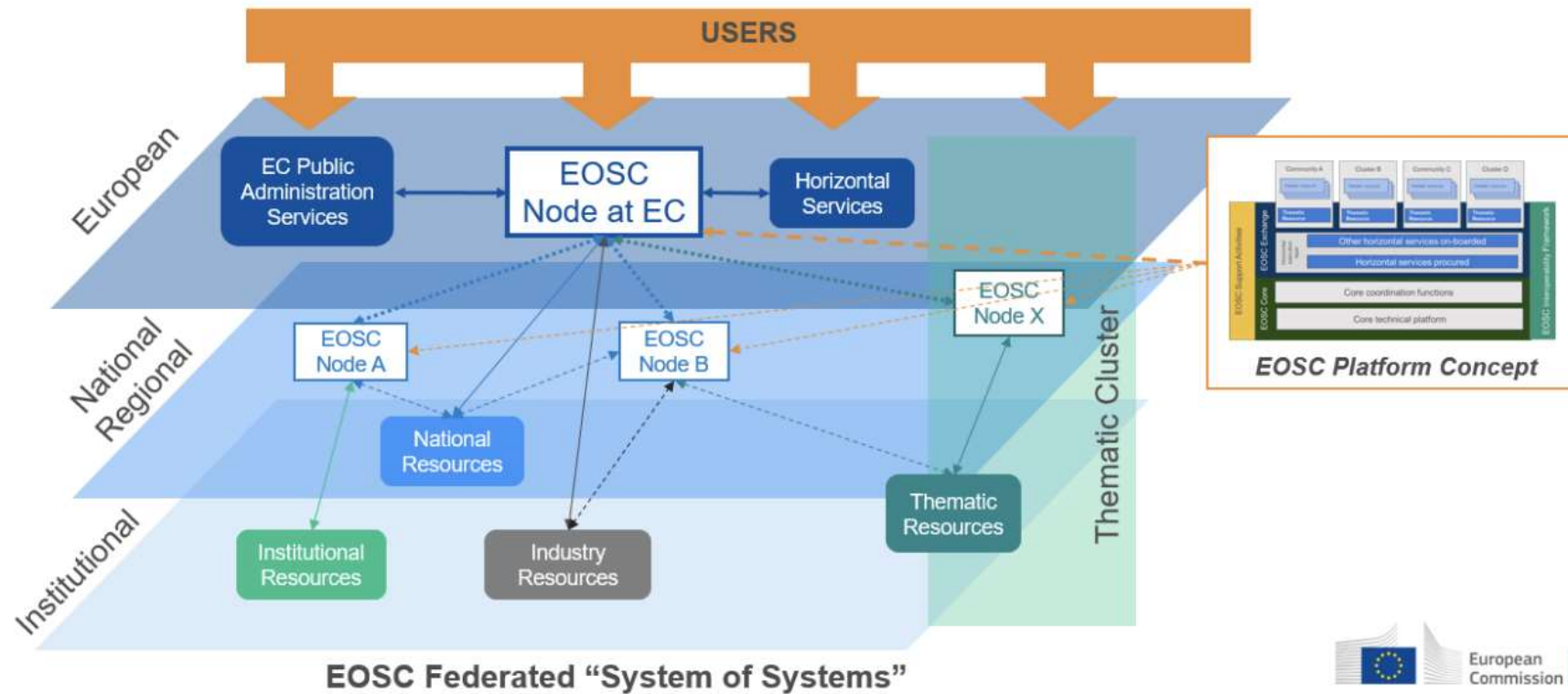


EOSC Architecture Today

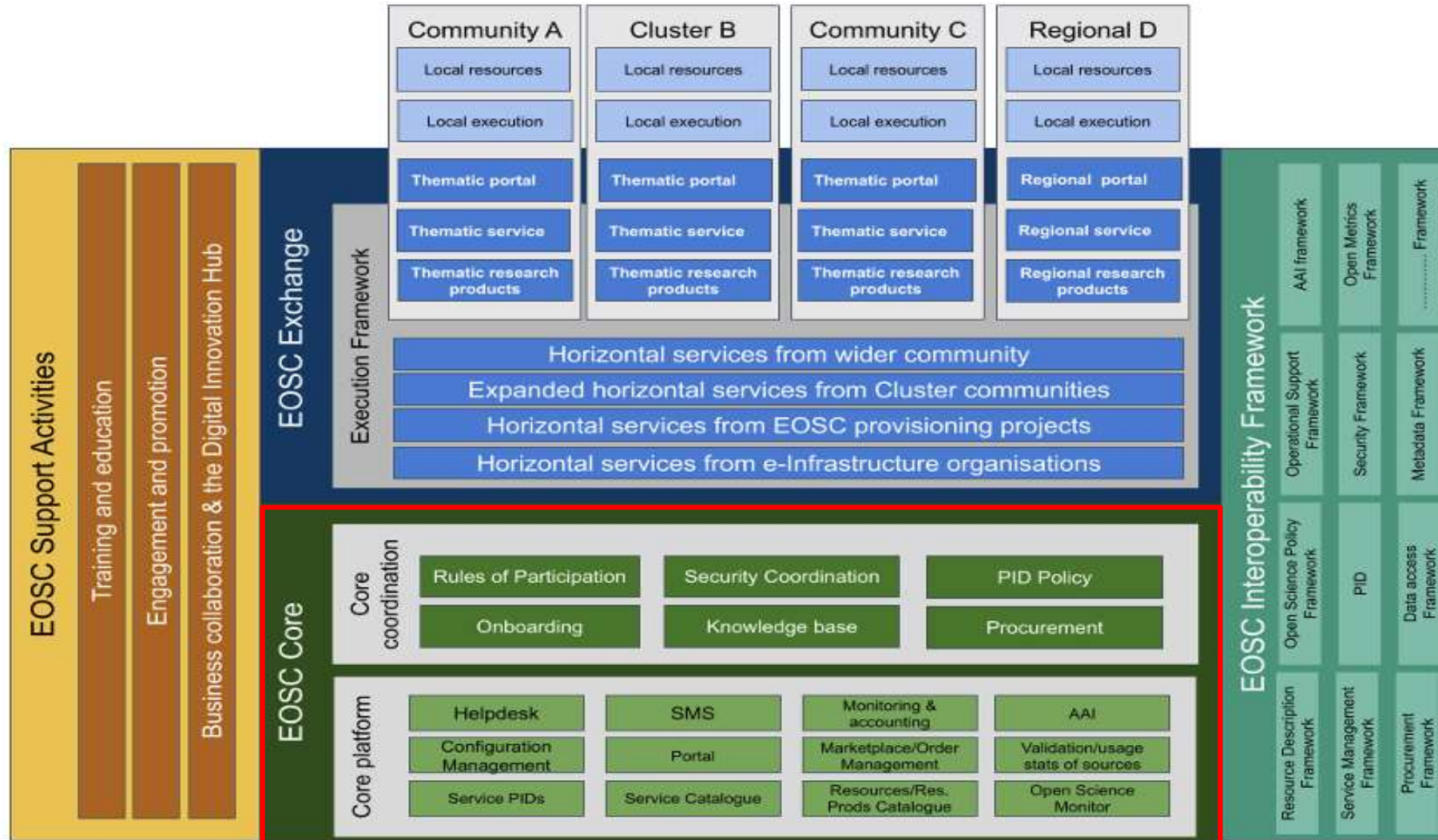


EOSC Architecture Today

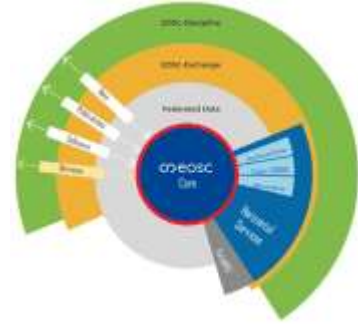
EOSC as a network of federated EOSC Nodes



EOSC Core



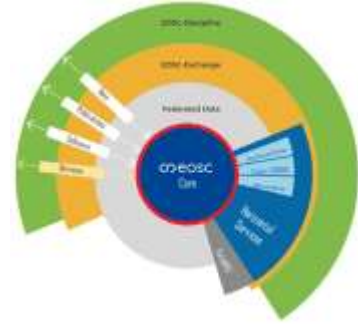
EOSC Core



Core services for scientific research infrastructures to federate

- Based on the widely used production quality components already deployed by the EOSC-related projects and communities to provide the following functionality
 - Authentication and Authorization Interoperability: AARC guideline to make interoperable AAls belonging to different research/e-infrastructures.
 - Resource Catalogue: Describes the main integration and usage use cases for the EOSC Resource Catalogue, regarding resource publishing and management, Resource Catalogue onboarding and synchronisation, resource graph maintenance.
 - Helpdesk: Describe the three integration paths offered by the EOSC Helpdesk to providers and communities onboarding services in EOSC (full integration, ticket redirection, direct usage).
 - EOSC Profiles: Metadata schemas for consistently describing EOSC Resources (services, research products, data sources, IGs, etc), so that they are accurately described and easily found in the EOSC Catalogue and Marketplace.
 - PID: Describe how providers can associate PIDs to their resources.

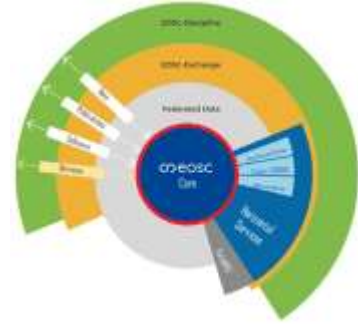
EOSC Core



Core services for scientific research infrastructures to federate

- Monitoring: Describe the five integration paths offered by the EOSC Monitoring (monitor an onboarded service, monitor an infrastructure, integrate external monitoring service, combine monitoring results of multiple infrastructures, third-party services exploiting EOSC Monitoring data).
- Research Product Accounting: Describe how a data source can use the EOSC Research product Accounting to collect usage activity from events related to its research products.
- Service Accounting: Describe how a service provider can use the EOSC Service Accounting to publish accounting information of its services.
- Order Management: Describe how service providers can integrate their ordering and provisioning processes with EOSC in a federated system of systems architecture and, consequently, facilitating the access to their services.
- Messaging: Describe how a service provider can integrate their services to the EOSC Messaging system to exchange messages with other connected services.

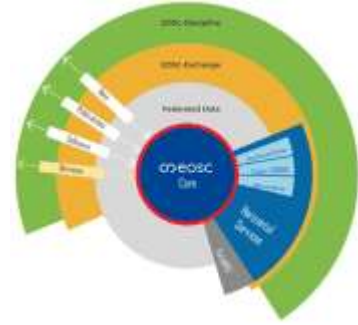
EOSC Core



Core services for scientific research infrastructures to federate

- Provides the functionality required to enable open science practices to occur across domains and countries according to the EOSC interoperability framework.
- Based on FAIR data principles to facilitate long-term sustainability
- Is and includes the minimum set of components necessary to provide the means to discover, share, access and re-use data and services.
- Its contents promote the adoption of an open research culture and must be maintained over the long term. Specifically:
 - A standard mechanism for naming and locating data and services
 - A mechanism for discovery of and access to data and services across the federated EOSC ecosystem.
 - A common framework for managing user identity and access

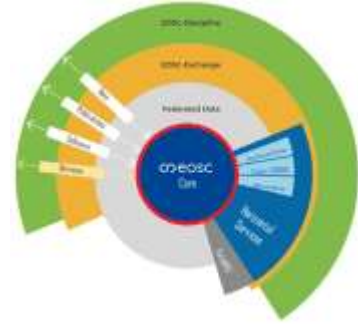
EOSC Core



Core services for scientific research infrastructures to federate

- Data access framework, whose primary role is to offer data as a service. It enables open interfaces where data consumers (users and machines) are able to discover and use data.
- Service management and access framework, whose role it is to provide a consistent and agreed upon understanding of e-science services: what they offer, which science problem they address, what is their operational capacity, how they are accessed, who pays for them.
- An open metrics framework, which sets the rules (usage, performance, value for money, user satisfaction) for the assessment of EOSC elements, i.e., policies, access framework, services, data, business, funding and usage models. This should include elements to facilitate the incentives and awards mechanism for researchers, as recommended by the EC HLEG on Next Generation Metrics and the EOSC Pilot policy group.
- Security policies and procedures to ensure consistent and coordinated security operations across the federated services. This will include incident response policies and a service request and problem management scheme.

EOSC Core

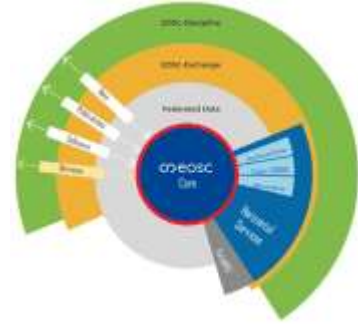


Core services for scientific research infrastructures to federate

- Operational support services for EOSC-Core and made available to those federating services connecting to the EOSC-Core. Support services related to the individual services accessible via EOSC-Exchange or related to disciplinary data centres are not part of EOSC-Core.
- Web-portal with data and contents in multiple formats as well as supply and demand facing services providing for accessing the EOSC resources. It is expected that other web-portals will also exist and be developed outside of the EOSC-Core.

Building on the items listed above, EOSC-Core will provide the means to operate EOSC-Exchange as a digital marketplace of resources for publicly funded researchers. It will also include a collaboration and communication service (organisational) and a messaging service (technical) that facilitate the interoperability of Core services.

EOSC Core



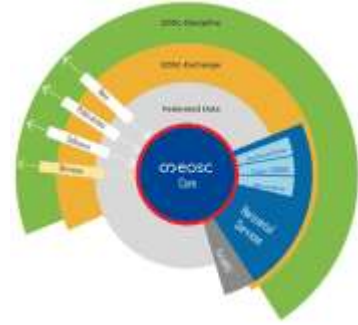
EOSC Authentication and Authorization Infrastructure (AAI)

- Science Clusters, Research Infrastructures and e-Infrastructure Providers have been implementing their AAIs using the AARC Blueprint Architecture in order to manage their users and the access rights to resources.
- The goal for the EOSC AAI is to provide the trust mortar with which we join the many bricks of the current set of scientific communities, collaborations and infrastructures together.
- EOS AAI is a set of principles and governance structures for how the architecture evolves and grows over time.
- The EOSC AAI is comprised of the AAIs of the Science Clusters, Research Infrastructures and e-Infrastructure Providers, which are being brought together through the EOSC AAI Federation

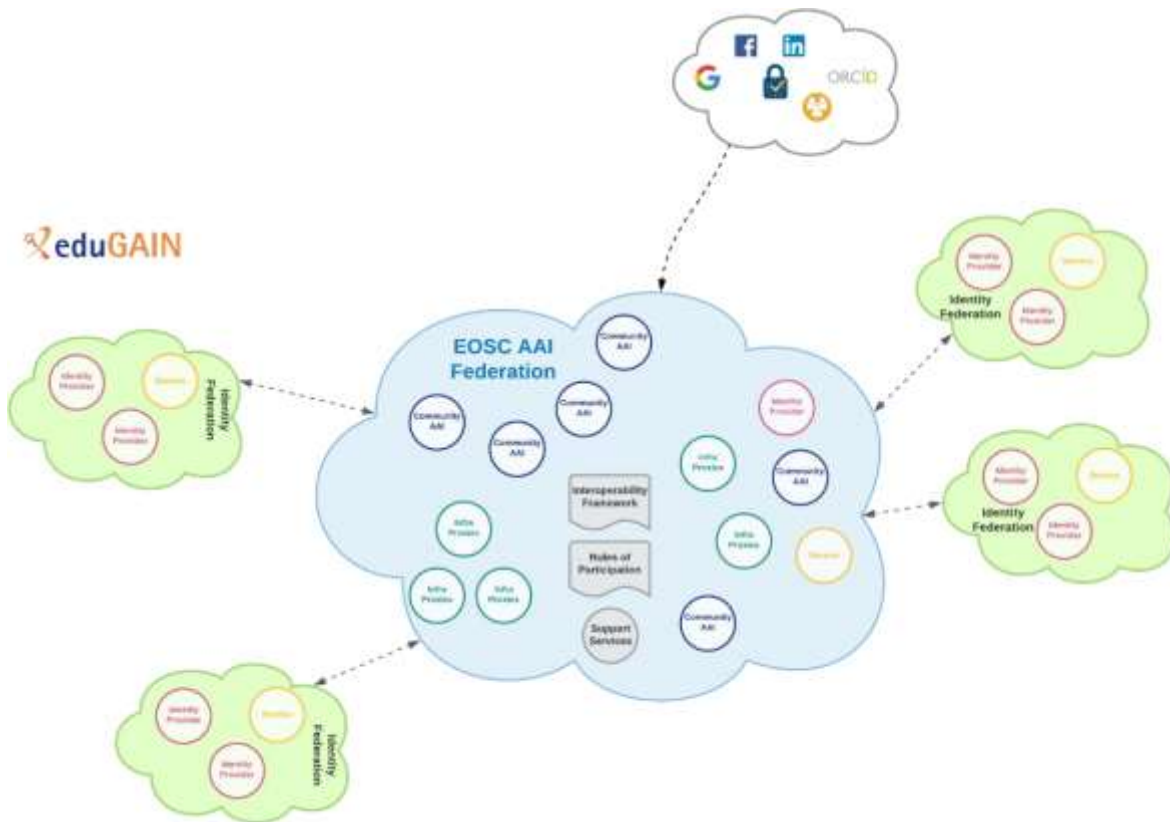
The process of establishing trust relationships between the AAI services within EOSC is streamlined through the EOSC AAI Federation. This enables AAI services to trust each other without the need for bilateral agreements, which simplifies the process of sharing services and resources within EOSC.

Report of the EOSC AAI TF: <https://zenodo.org/doi/10.5281/zenodo.10379292>

EOSC Core

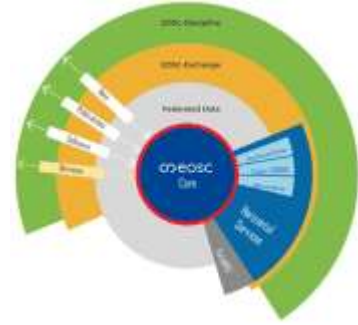


EOSC Authentication and Authorization Infrastructure (AAI)



- Community AAI and Infrastructure Proxies connect once with the EOSC AAI Federation (register metadata, URN namespaces, policies etc).
- Technical interoperability conformance tested and monitored by the EOSC AAI Federation.
- GDPR and Security Policy conformance (Policy Notices, Acceptable Use Policy etc) assessed by the EOSC AAI Federation.
- The EOSC AAI Federation participates in the eduGAIN Inter-Federation to discovery and establish trust with Identity Providers and Services Providers that the EOSC AAI Federation requirements.

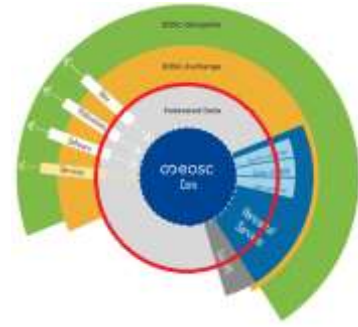
EOSC Core



Current status of EOSC Core

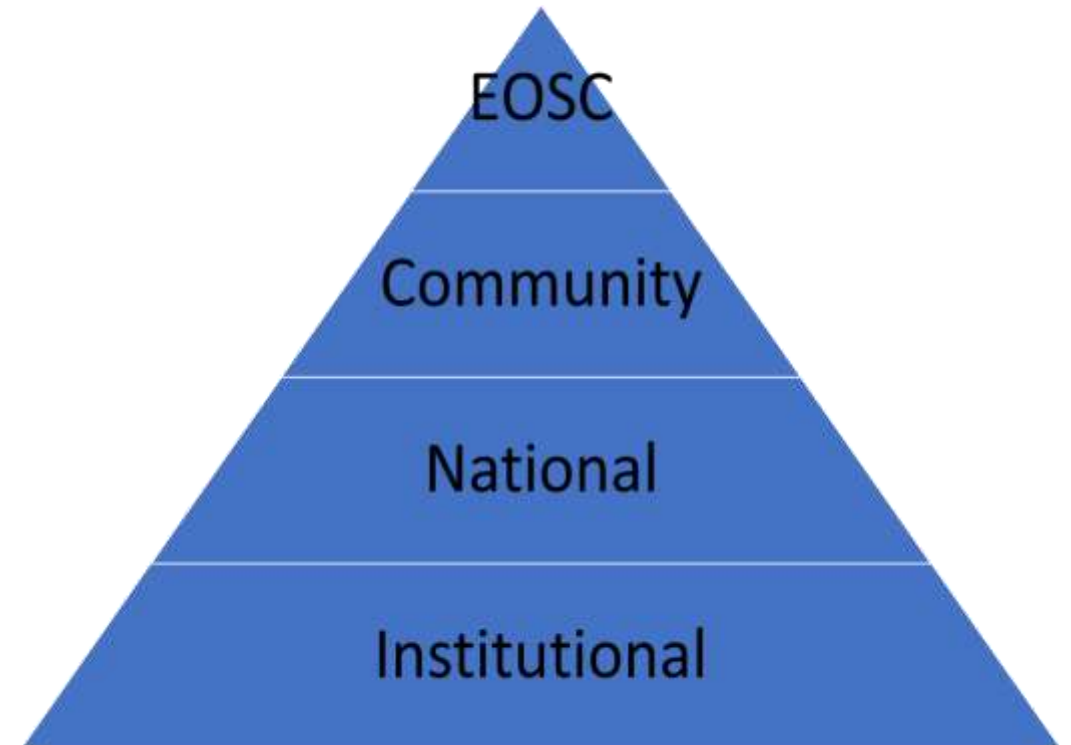
- Many EOSC Core services are available and funded through the new procurement process
- Nine PID-related services are developed by the FAIRCore4EOSC project:
<https://faircore4eosc.eu/>
- HORIZON-INFRA-2023-EOSC-01-04 Next generation services for operational and sustainable EOSC Core Infrastructure:
 - Improve the EOSC Core execution framework by enhanced composability and interoperability
 - Design and develop components to support seamless integration and composability of applications, tools and services
 - Provide open API registry, management, development and testing platform and tools for EOSC Core service user
 - Support custom-made front-end portal development environment for various scientific communities and personalization and AI-driven recommendation software for user experience
 - Facilitate an independent EOSC service incubator and technology development environment to act as a ‘testbed’
 - Ensure financial sustainability and readiness assessment for the next-generation of EOSC Core and horizontal services
 - Funded project: EOSC-Beyond - <https://www.openaire.eu/eosc-beyond>

Federated Data

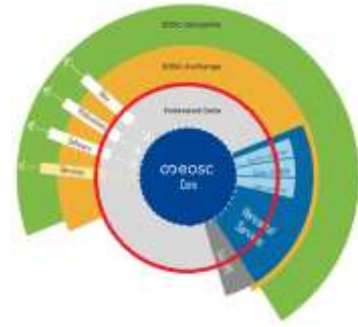


Aggregated data resources provided by Research Infrastructures and Science Clusters to their respective communities

- EOOSC level
 - Federating to EOOSC
 - Legal, regulatory and ethical issues
- Community/National/Institutional level
 - Making data FAIR
 - Making experiments reproducible
 - Ensuring long-term access to data



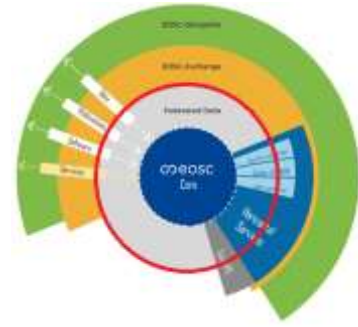
Federated Data



Aggregated data resources provided by Research Infrastructures and Science Clusters to their respective communities

- Federating data imply interoperability between 5 levels of aggregation Federating to EOSC
 - Institutional
 - National
 - Community
 - EOSC
 - International (beyond EOSC)

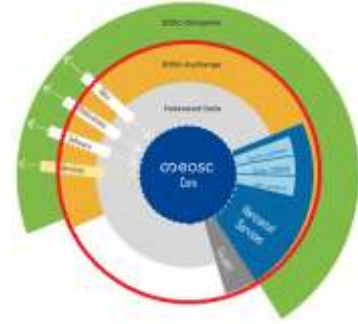
Federated Data



Examples of clusters or RIs



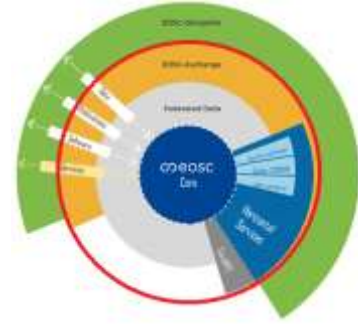
EOSC Exchange



Horizontal services for end-users to benefit from

- EOSC's pan-European marketplace for research services
- Enables the brokering of horizontal and thematic services between providers and researchers.
- Builds on the EOSC-Core to offer a progressively growing set of services exploiting FAIR data and encouraging its reuse by publicly funded researchers
- Provides services such as compute, containers, data transfer, notebooks, file sharing, open research data

EOSC Exchange



Horizontal services for end-users to benefit from

- Participation in *EOSC-Exchange* as a service provider is without registration fee
- Service providers will be required to conform to predefined Rules of Participation
- While the technical requirements for participation in *EOSC-Exchange* will be the same for all services, there may be differences in the legal and policy requirements for freely available and payment-based services
- The process for provisioning services from publicly funded operators will differ from the process of provisioning services from commercial providers.

EOSC Exchange

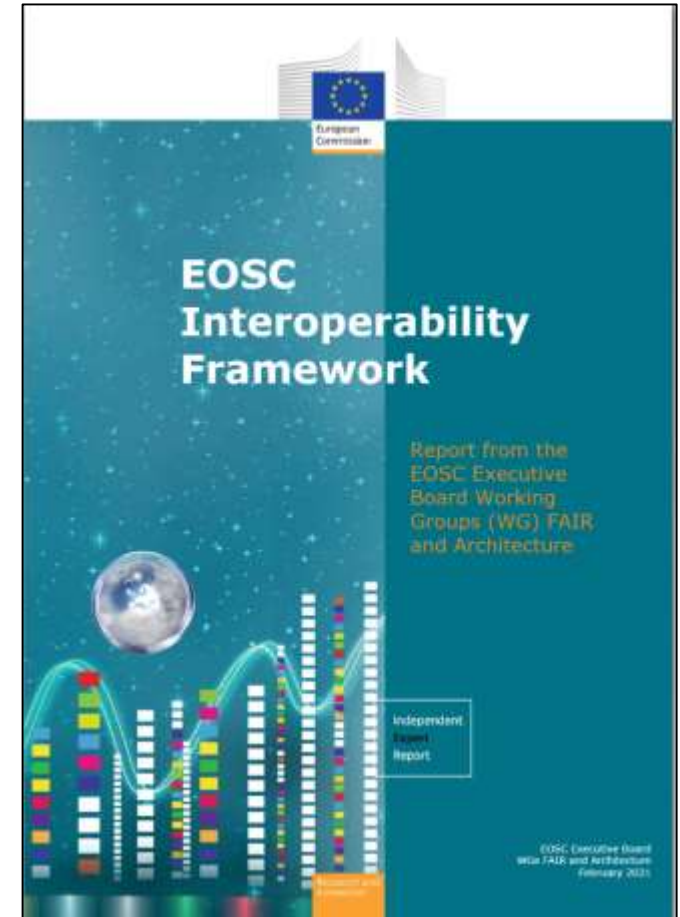
Examples of available Exchange services



EOSC Interoperability Framework

Published february 2021

- Developed by the Interoperability Task Force of the EOSC Executive Board FAIR Working Group
- Recommendations on Legal, Organisational, Semantic & Technical (LOST) interoperability
- Analysis of minimal metadata models and crosswalks among them
- Recommendation of minimum metadata set to describe metadata records for FAIR digital objects
- Definition of the *pathway and blueprint* for other potential EOSC (node) operators to join the federation



EOSC Interoperability Framework

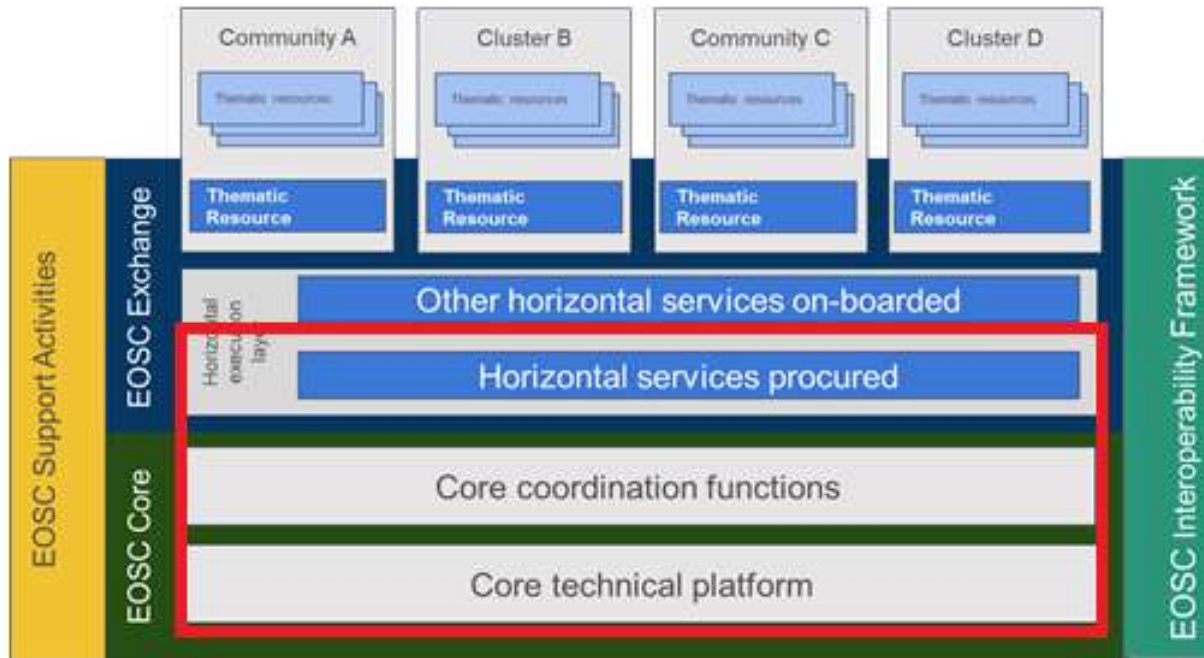
- [EOSC Architecture and Interoperability Framework](#) (12/2021)
- [Final evaluation of the European Interoperability Framework](#) (11/2022)
- [A landscape overview of the EOSC Interoperability Framework Capabilities and Gaps](#) (10/2023)



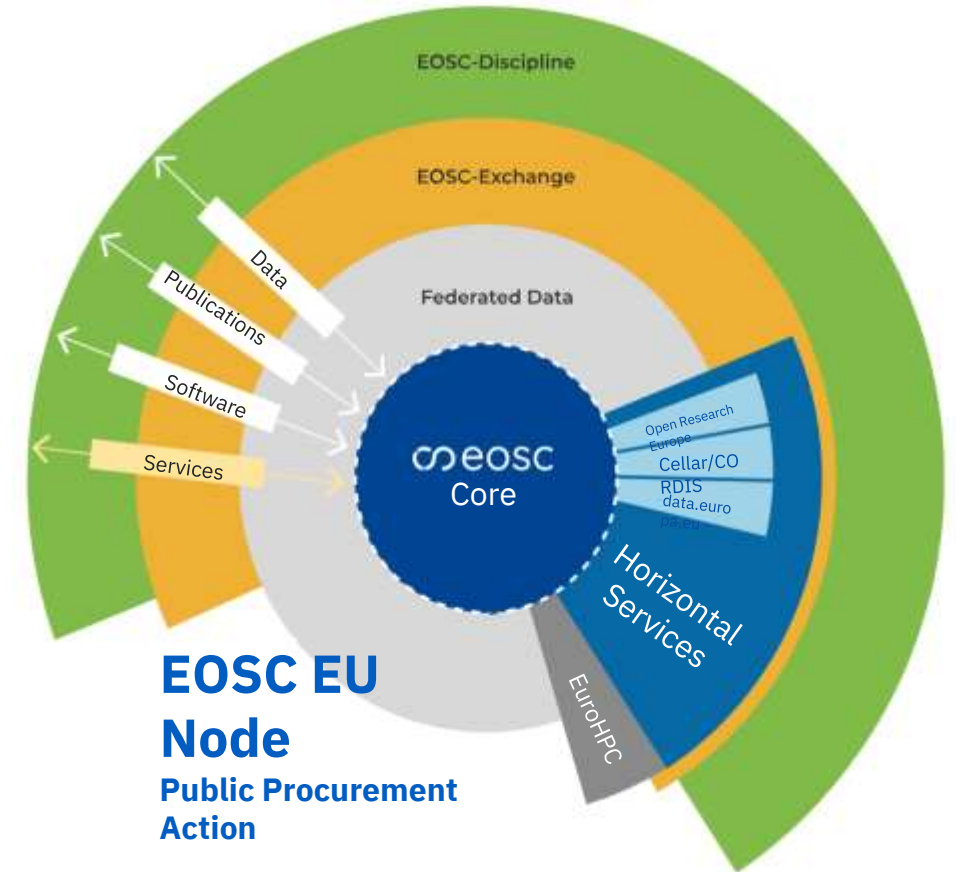
**EUROPEAN OPEN
SCIENCE CLOUD**

EOSC EU Node Procurement Action

Procurement Scope



EU Procurement scope



EOSC EU Node Public Procurement Action

EOSC EU Node Procurement Action

Procurement Process

- 2021: announcement that core services will be financed by a procurement mechanism.
- First semester 2022: European stakeholders involved in EOSC take concrete actions about procurement.
- At the same time, numerous discussions with the CNRS legal department to find out whether we can contribute to the response. Questions are relayed to the European Commission
- 13th February 2023: deadline for the expression of interest submission
- 11th April 2023: publication of the results of the first selection round. Starting of the negotiation period.
- September 2023: Submission deadline.
- 24th November 2023: publication of the final results
<https://ted.europa.eu/EN/notice/-/detail/712679-2023>

EOSC EU Node Procurement Action

Procurement Process Feedback

- Spoiler: Neither CNRS, nor any other French institutes, are member of any winning tender.
- Possibility to join through:
 - Joint bidding agreement
 - Sub-contract agreement
 - Joining later (unidentified partner)
- Issues with the two first agreements
- Issue with service certification requirements (ISO 9001 & ISO 27001)
- 24/24 7/7 support and high availability criteria
- EC would like to keep full IP
- All documents related to exclusion criteria & Profit & Loss account for 2020 & 2021 unavailable

EOSC EU Node Procurement Action

On-going procurement by DG Connect to procure the EOSC EC-node (32M€)

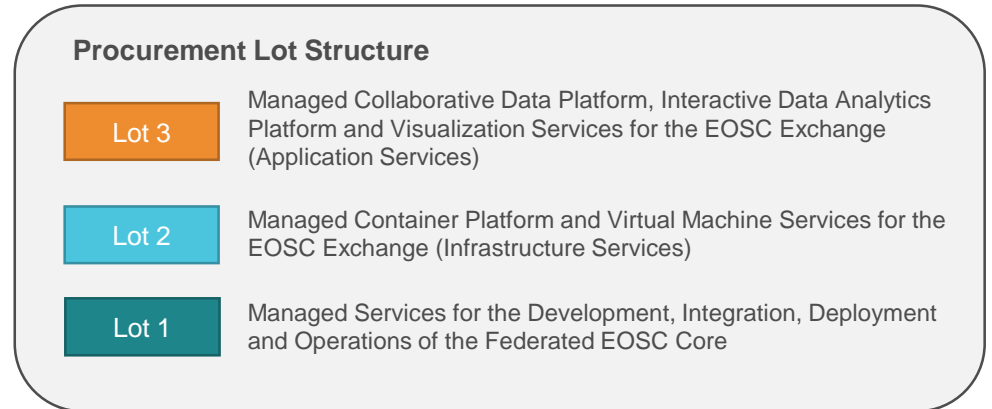
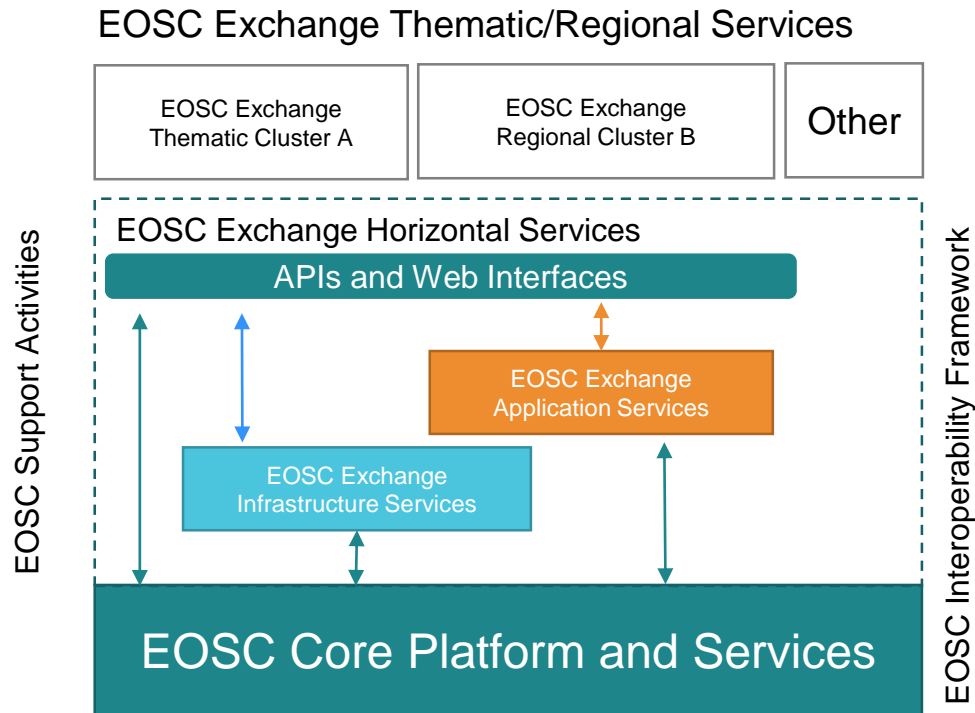
Tender:

- Available on: <https://etendering.ted.europa.eu/cft/cft-display.html?cftId=12087>
- Lot 1: Managed EOSC core services (16 M€)
- Lot 2: Managed Container Platform and Virtual machine Service for EOSC Exchange (10M€)
- Lot 3: Managed Collaborative data Platform, Interactive Data Analytics Platform and Virtualization Services for EOSC Exchange (9 M€)

3 years of operation starting by Q1 2024

EOSC EU Node Procurement Action

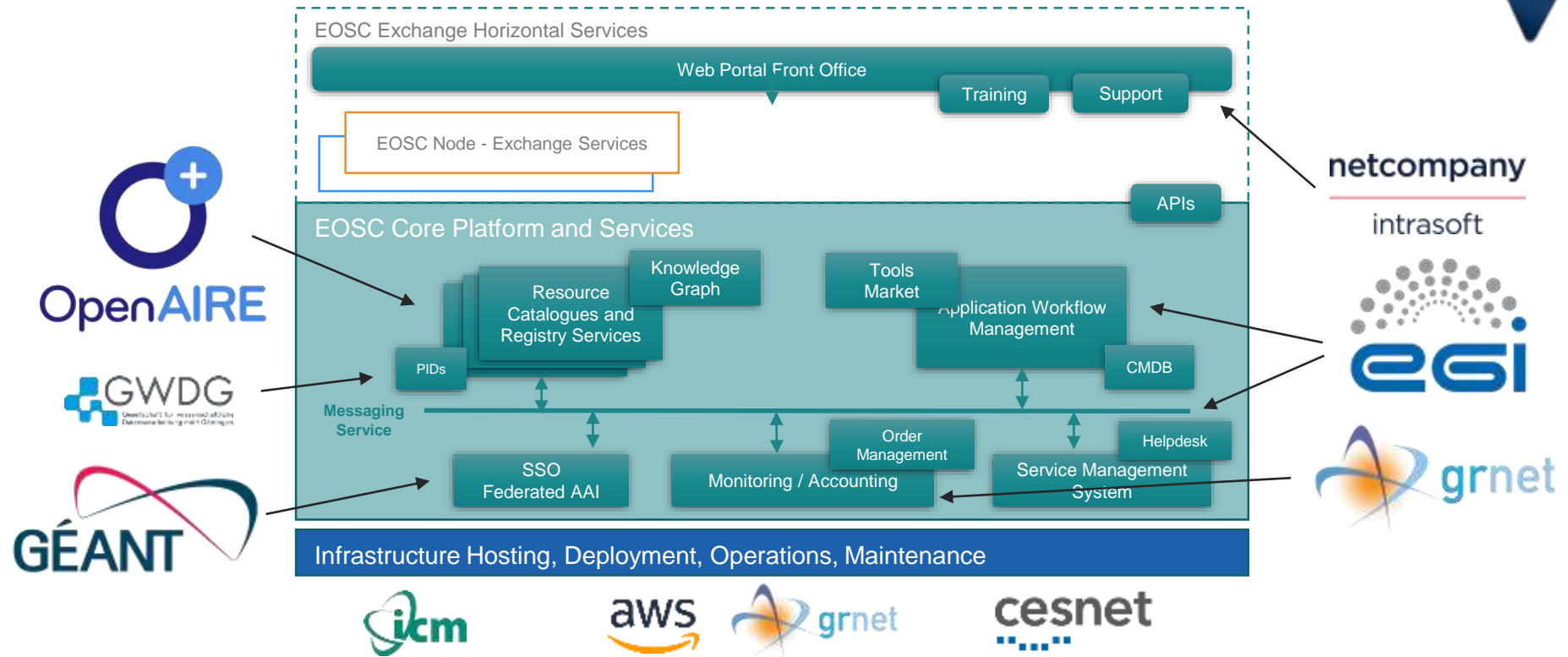
Procurement Lot Structure



Procurement Lot 1

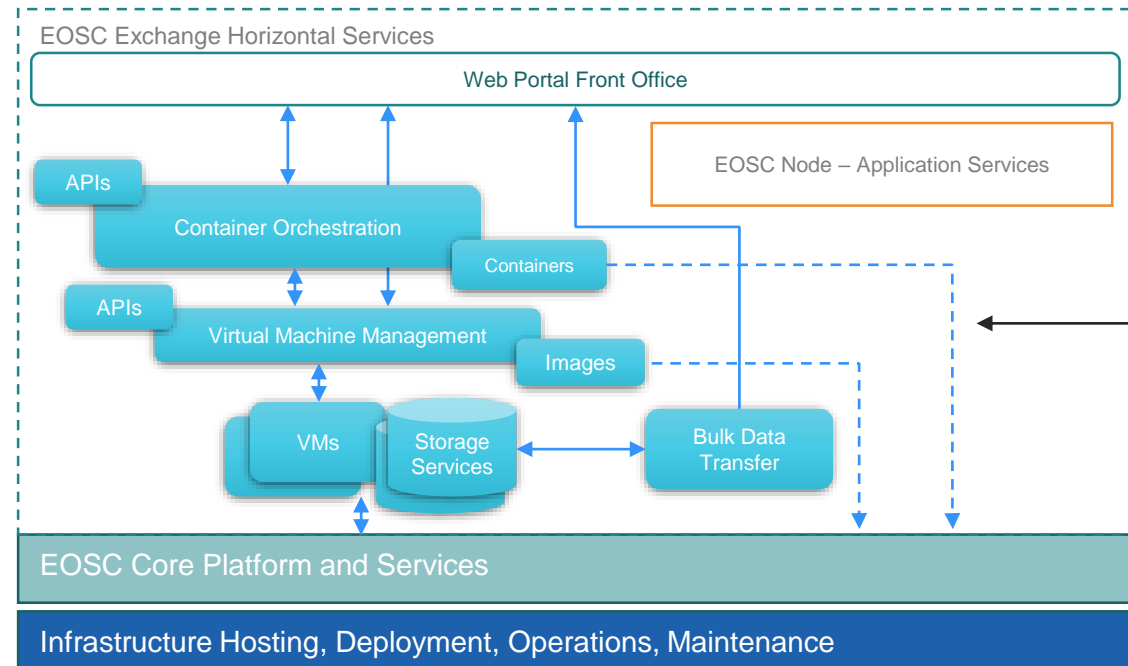


EOSC Core Platform Services



Procurement Lot 2

EOSC Exchange Infrastructure Services



Procurement Lot 3

EOSC Exchange Application Services

