InfraEOSC07 contributions to the MVE implementation

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EOSC Future with C-SCALE DICE Data Infrastructure Capacity for EOSC EGI-ACE OpenAIRE NEXUS Reliance

The EOSC Future, C-SCALE, DICE, EGI-ACE, OpenAIRE-Nexus and Reliance projects are funded by the European Union Horizon Programme calls INFRAEOSC-03-2020 and INFRAEOSC-07-2020.

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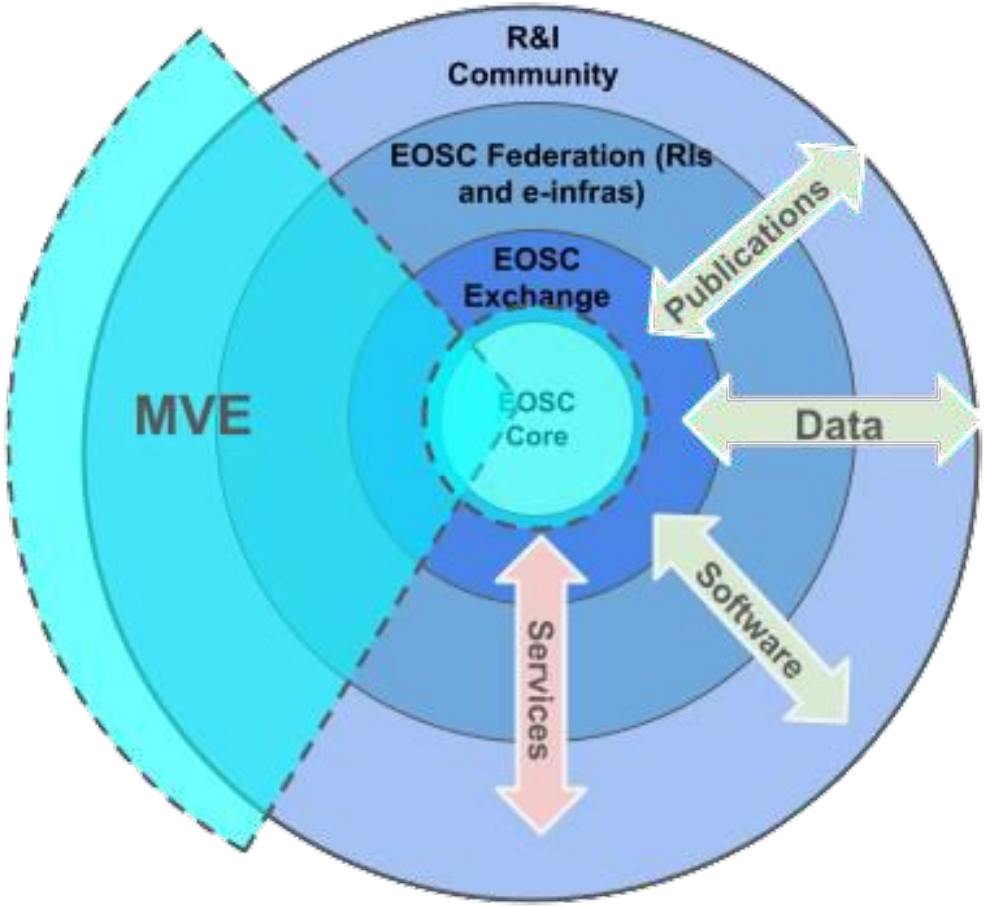
InfraEOSC07 overview

- The specific challenge of the topic "Increasing the service offer of the EOSC Portal" was to **grow the offering available** in the EOSC portal with state-of-the-art **research enabling services** useful to diverse **thematic research communities** for embracing **Open Science practices** at the different stages of their research workflows
  - Copernicus - eoSC AnaLytics Engine (C-SCALE)
  - Data infrastructure capacity for the European Open Science Cloud (DICE)
  - EGI Advanced Computing for EOSC (EGI-ACE)
  - OpenAIRE Nexus Scholarly Communication Services for EOSC users (OpenAIRE-Nexus)
  - REsearch LIfecycle mAnagemeNt for Earth Science Communities and CopErnicus users in EOSC (RELIANCE)

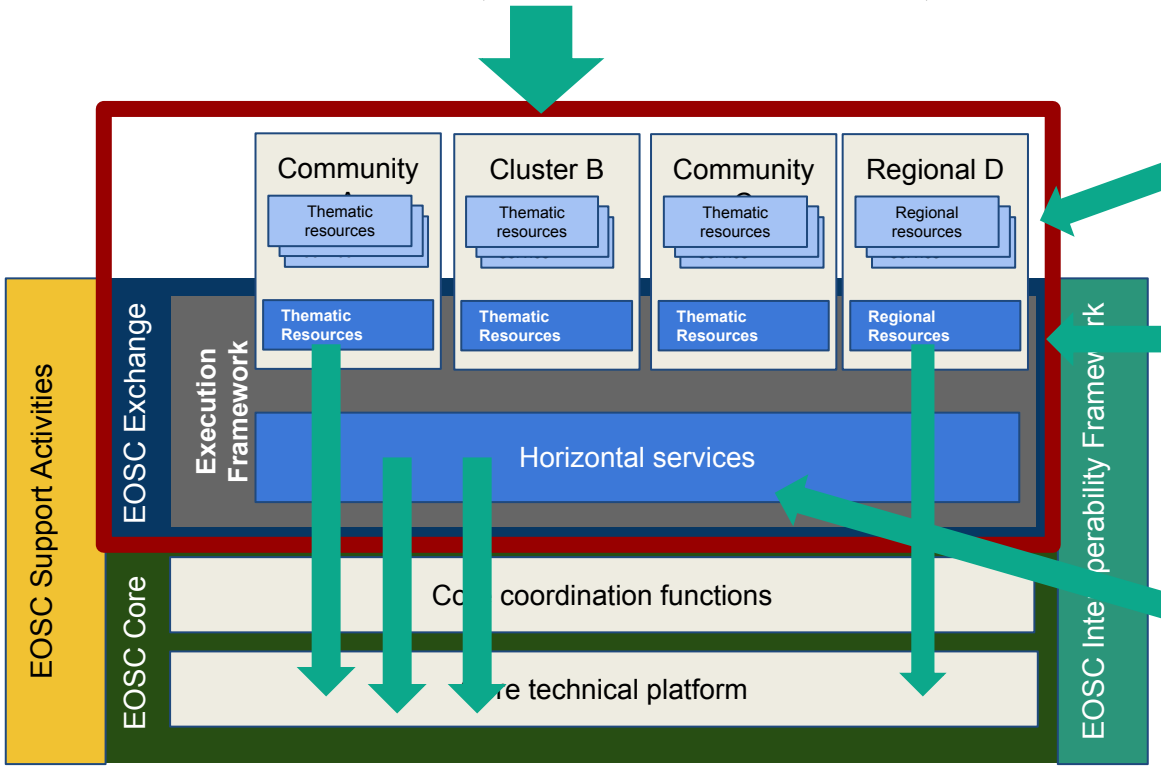
InfraEOSC07 services in MVE



- EOSC Future is implementing the backbone of EOSC, while the 07 projects are enriching the EOSC-Exchange with key services, IT resources via VA

Increasing the EOSC exchange service offer

365 Resources onboarded in EOSC as of end of October 2022 (source EOSC Metrics Portal)



Thematic clusters

Cluster services onboarded

Regional clusters

Horizontal services and resources from 07 projects and e-infras onboarded

INFRAEOSC-07
EOSC provisioning / expansion

eInfrastructures

EOSC Horizontal services are delivered (e.g. data, compute and other research enabling services)

Ability to **create thematic execution environments / VREs** based on integration of compliant thematic, horizontal, and core resources

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MVE - InfraEOSC07 functions

- EOSC-Core Coordination Functions
  - EOSC Security Coordination
  - EOSC Service Management System
  - PID Policy Compliance Assessment Framework
- EOSC-Core Platform Functions
  - EOSC AAI Federation
  - Connecting EOSC-Core Components to the EOSC AAI
  - EOSC Accounting
  - EOSC Collaboration Systems
  - EOSC Configuration Management System
  - EOSC-Core Helpdesk
  - EOSC Monitoring
  - EOSC Order Management System
  - EOSC Resource Registry and Catalogue: Services and Data Sources
  - EOSC Resource Registry: Research Products
  - PIDs for EOSC Services
- EOSC Interoperability Framework Functions
- EOSC-Exchange MVE Functions
  - EOSC Data Transfer
  - EOSC Helpdesk as a Service
  - EOSC Research Data as a Service
- EOSC-Exchange Added-value Cross-disciplinary Functions (DICE, EGI-ACE, OA-NEXUS)
  - Compute Infrastructure
  - Compute Platforms
  - Compute Services for Multidisciplinary Science
  - Data Archive
  - Data Discovery
  - Data Repository
  - EOSC Anonymisation Tools
  - EOSC APC Monitoring
  - EOSC Catch-All Repository
  - EOSC Citation Index Service
  - EOSC Community Dashboard
  - EOSC Data Management Plan Service
  - EOSC Monitor Dashboard
  - EOSC Overlay Journal Platform
- EOSC-Exchange Added-value Earth Observation Functions (C-SCALE, RELIANCE)
  - Copernicus Data Pipelines
  - Earth Observation Analytics
  - Earth Observation Compute Federation
  - Earth Observation Data Federation
  - EOSC Earth Observation Data Cubes Management
  - EOSC Research Object Management Platform
  - EOSC Semantic Recommendation
  - EOSC Semantic Search
  - EOSC Text Enrichment
- EOSC Support Activities
  - EOSC-Core Support
  - EOSC DIH
  - EOSC Knowledge Hub
  - EOSC Observatory
  - EOSC Open Science Help Desk and Collaborative Tools
  - EOSC Open Science Metrics

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DICE – EOSC Exchange

- DICE service providers are contributing to the **EOSC exchange** by
- Offering services to support the whole research data lifecycle
  - Services are horizontal and can be used in any scientific domain
  - Back-end resources are offered free-at-the point-of-use for the project duration
  - Support is provided to users for customised solutions
  - Services are available via the EOSC marketplace

Services categories

Data Discovery
Making research data findable
Data source harvestable and to make data widely discoverable

Data Repository
Long-term data resources preservation and sharing
To store non-active FAIR data

Policies based Data Archive
Mid-long term data resources, accessible from computing facilities to store long-term non-active research data
Value-added services (integrity checks, replications, ..)

Data Archive
Mid term storage resources after/between projects,
Accessible from computing facilities to store non-active research data, bitwise preservation

Personal and/or Project workspace
Mid-term storage during project,
Good connection to computing facilities,
To store active resource data

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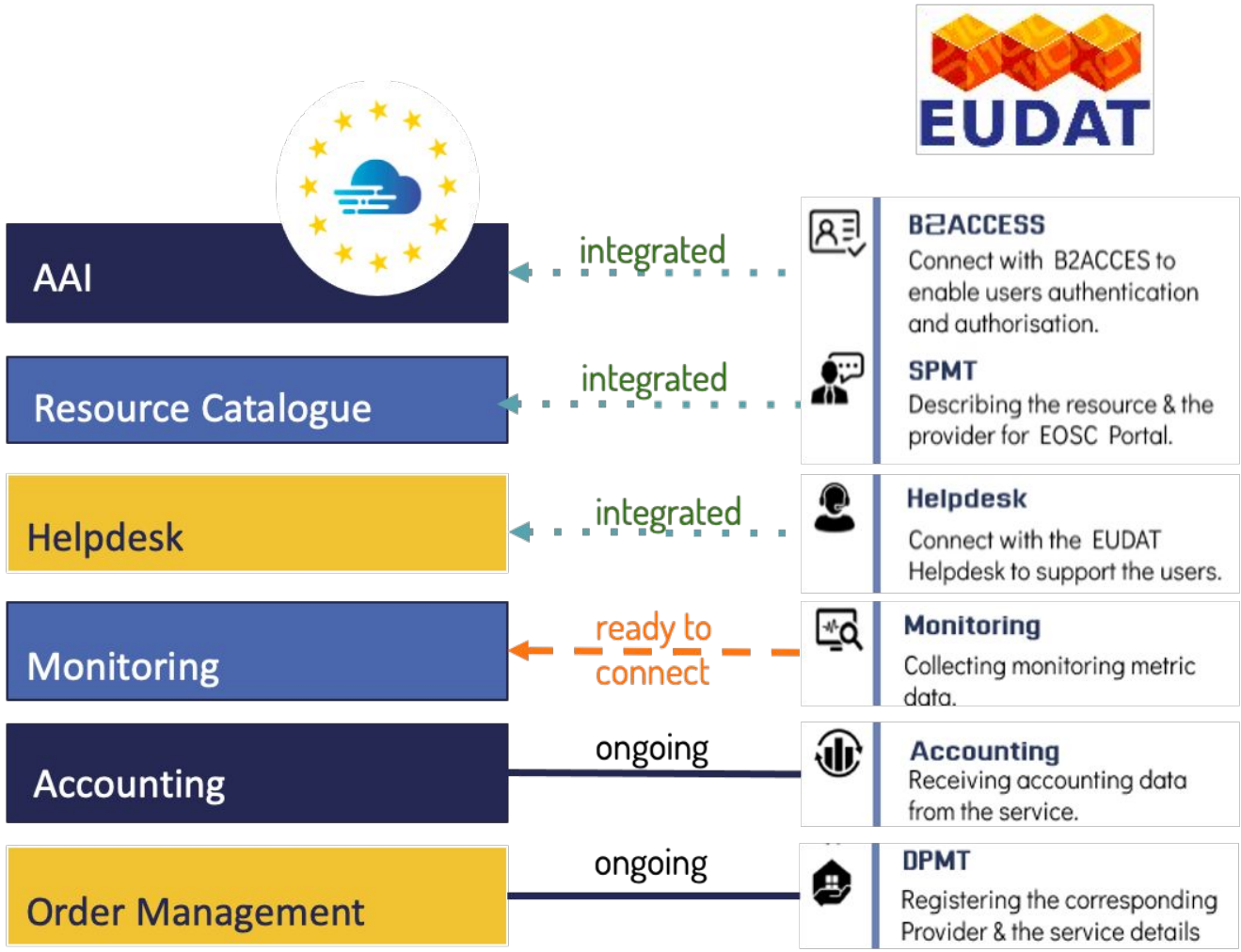
DICE – EOSC Core

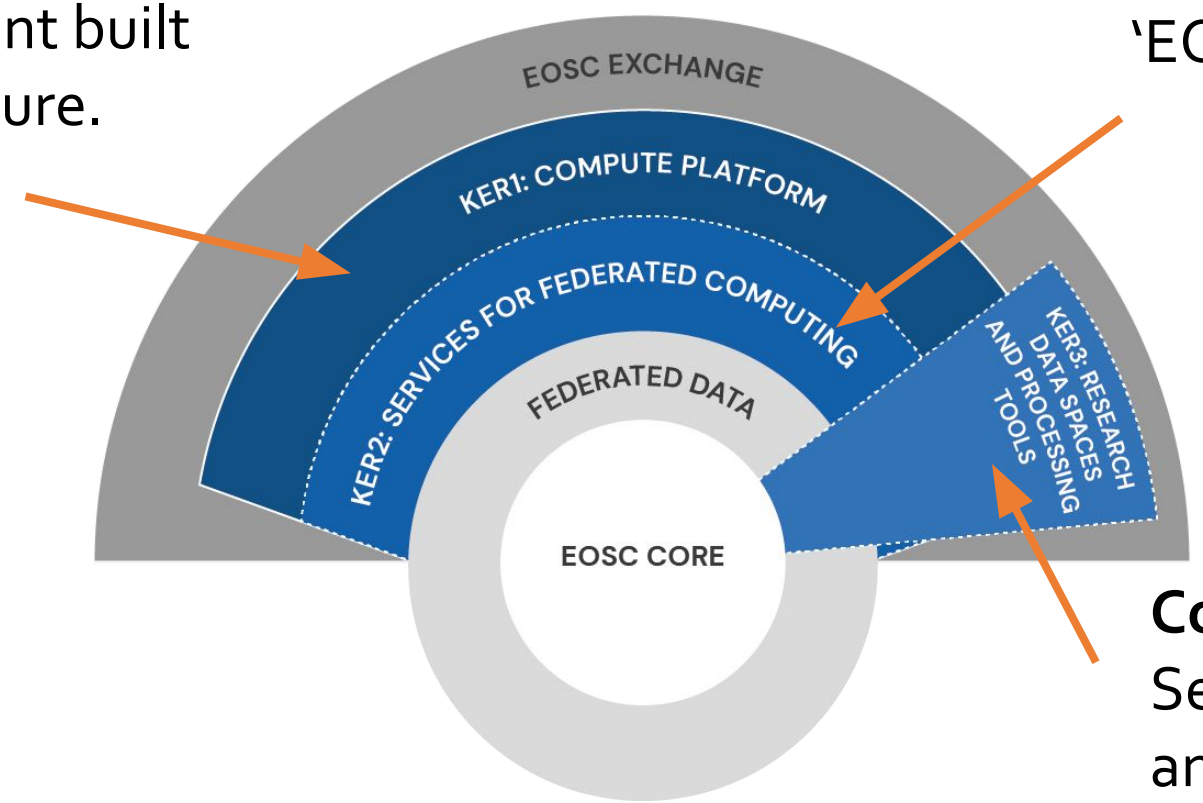
- DICE is not developing elements of the EOSC Core
- The project is integrating the EUDAT CDI Operations and Collaboration tools with the EOSC Core; in particular, acting as pilot use case for
  - Accounting of resources provided under the Virtual Access mechanism
  - Onboarding of external services catalogues in the marketplace



EGI-ACE - Contributions to Minimum Viable EOSC

Contribution 1: A distributed computing environment built on a hybrid infrastructure.

Contribution 2: Services and support to deliver compute services in the 'EOSC Compute Platform'.



Contribution 3: Thematic Services for scalable data analytics.

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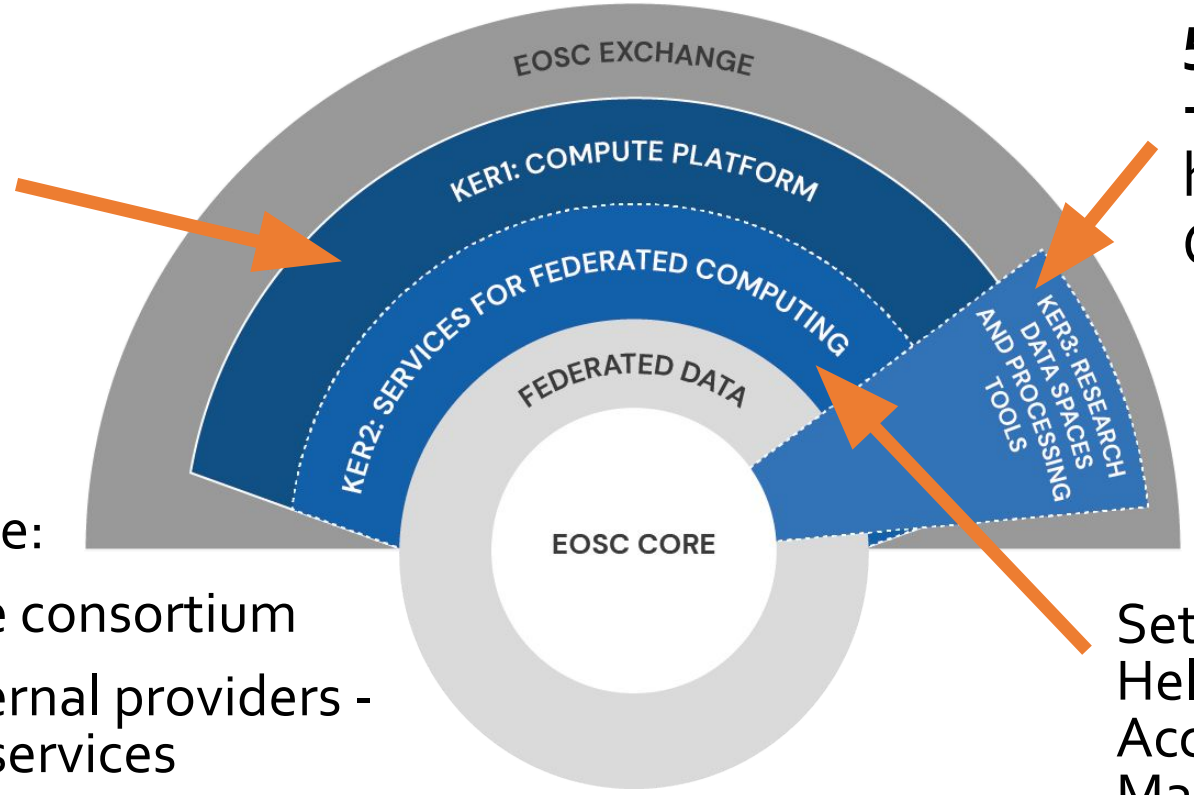
EGI-ACE - Contributions to Minimum Viable EOSC

27 Cloud, 200 HTC, 4 HPC providers

14 additional compute and data management services and platforms

Mixed funding (VA, local, Pay for use)



15 Thematic Services and growing

78,100 users served

5 data spaces delivering **+20PB** of data hosted/cached at EGI Compute Platform

In EOSC Marketplace:

35 services from the consortium

8 services from external providers - empowered by our services

Set of EOSC compliant AAI, Helpdesk, Monitoring, Accounting and Service Management System

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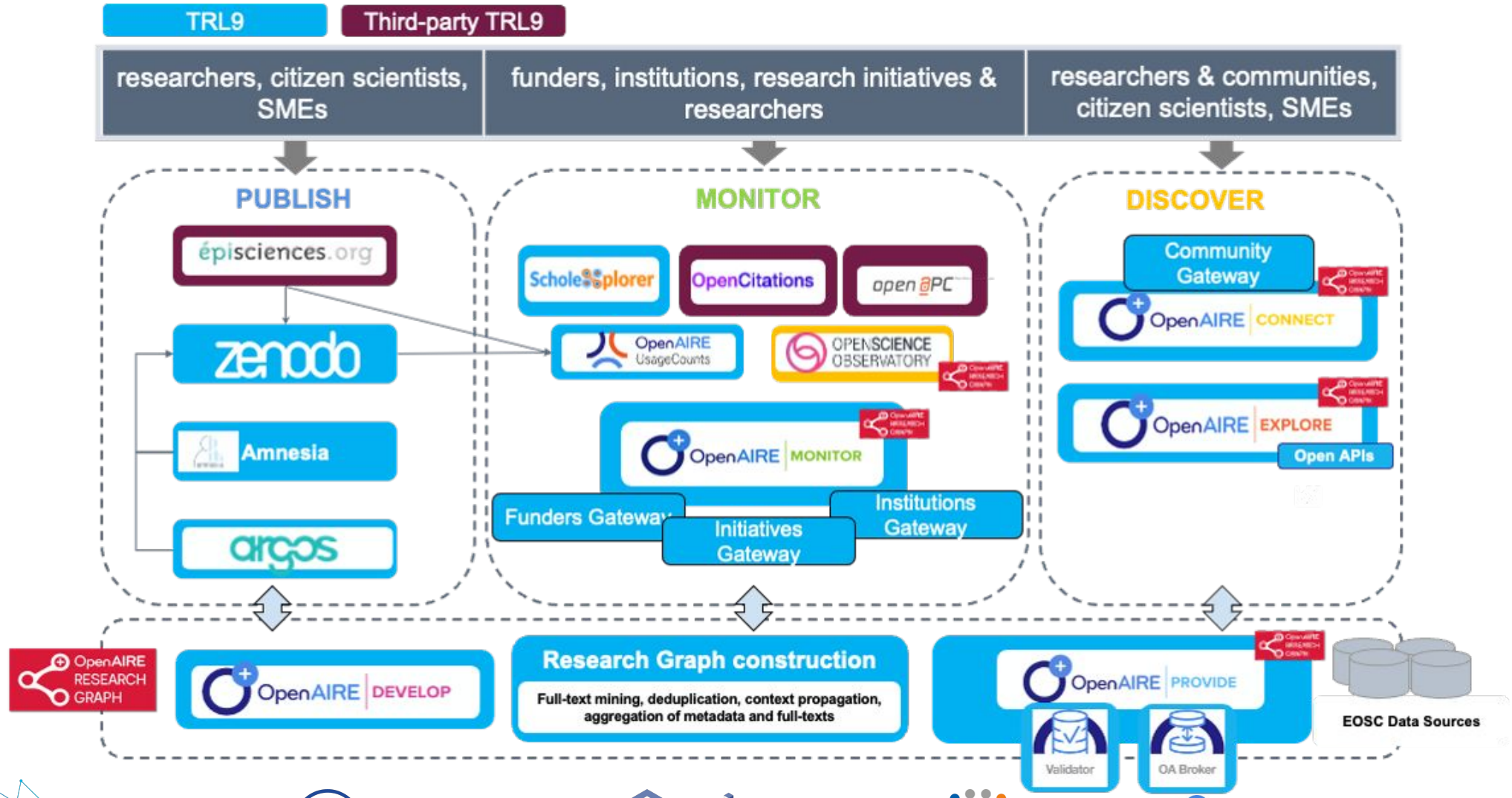
OpenAIRE-Nexus services in the EOSC Exchange



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OpenAIRE-Nexus services in the EOSC Core

EOSC Explore
Discover and navigate EOSC resources

EOSC IF guidelines for Research Products
OpenAIRE Guidelines, community defined

PROVIDE

EOSC Dashboard for Research Products Providers
Register data source & Validate compatibility to EOSC guidelines

Data Source

Archive, repository, catalogue, database, etc.

OpenAIRE RESEARCH GRAPH

EOSC Resource Catalogue
Knowledge Graph of interlinked EOSC resources

EOSC Accounting for Research Products
Collect and share download and views statistics for PIDs

OpenAIRE UsageCounts

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C-SCALE Contributions to EOSC Core and Exchange

EOSC Core

C-SCALE does not contribute directly to the EOSC Core. However:

- It has enabled EOSC Core-relevant technologies (such as OIDC) at additional providers who did not support them
- Its services are integrated and rely on EOSC Core components

EOSC AAI	C-SCALE uses EGI Check-in and SURF SRAM, both EOSC AAI implementations
EOSC Helpdesk	C-SCALE is currently testing EOSC Helpdesk as the Helpdesk solution for its services
Resource Catalogue and Order Management	C-SCALE services will rely on existing EOSC order management tools (SOMBO) as the services will be registered in EOSC
Accounting & Monitoring	C-SCALE uses EGI's implementation of accounting and monitoring that are already interoperable with EOSC Core counterparts

EOSC Exchange

C-SCALE contributes to the EOSC Exchange by offering federated data and computing infrastructure services for Copernicus

FedEarthData
Uniform access to a **federation of computing and data providers** to execute Copernicus and Earth Observation workloads.

openEO Platform
Versatile cloud-based processing and analytics environment for Earth Observation data on infrastructures supporting openEO API

Metadata Query Service
One-step discovery of Copernicus data in data archives across the C-SCALE Data Federation and across Europe

Workflow solutions
Easy deployment of workflows supporting monitoring, modelling and forecasting of the Earth system

- The services will be available in the EOSC Marketplace by the end of the project.
- Compute resources are offered free-at-the-point-of-use during the project lifetime.
- End users receive support for the development of scalable cloud-agnostic and interoperable solutions.

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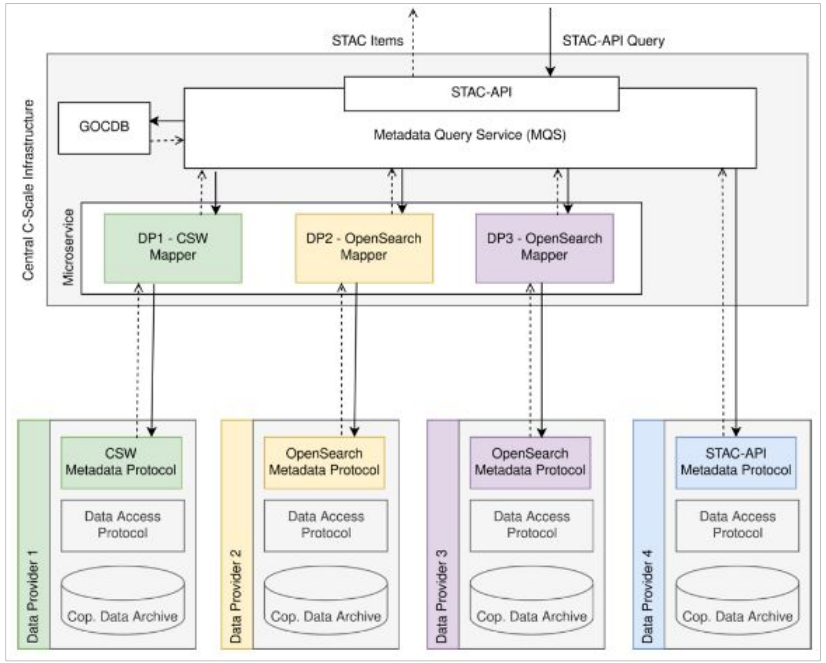
C-SCALE Contributions to the Data Federation

C-SCALE contributes to the EOSC Data Federation by bringing together and federating the datasets of Copernicus providers (including Copernicus DIAS platforms and Collaborative Ground Segment nodes) and making them available through EOSC using a **metadata service** and **common data access protocols**

Discoverability

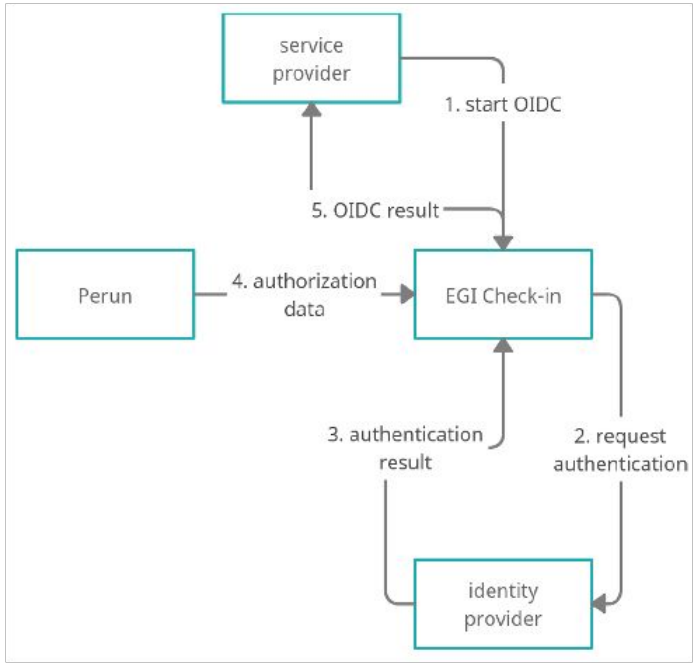
- find data in a uniform way – Support **Spatio-Temporal Assets Catalogue (STAC)** at all partners
- deploy a **Metadata Query Service** (MQS) on the EOSC portal to enable federation-wide discovery



MQS diagram

Accessibility

- Access data in a uniform way, supporting **federated identities** recognized in the EOSC ecosystem
- **Seamless access** to Earth Observation data from C-SCALE compute resources of all types (Cloud, HPC, interactive notebooks, managed/self-deployed OpenEO platforms)



OIDC diagram

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RELIANCE Contributions to EOSC Exchange

- RELIANCE contribute to EOSC Exchange by
- Bringing advanced research enabling services into EOSC for the open, efficient, and cross-disciplinary management of the research lifecycle in support of FAIR and Open Science, enabling to
  - enhance the discovery of and access to research data, including large EO datasets (Copernicus)
  - extract relevant knowledge from scientific text
  - manage the research lifecycle as a first-class entity

RELIANCE Services

Research Object Management Platform

RoHub

RO-Crate

Advanced Geospatial Data Management platform

Text Mining Services

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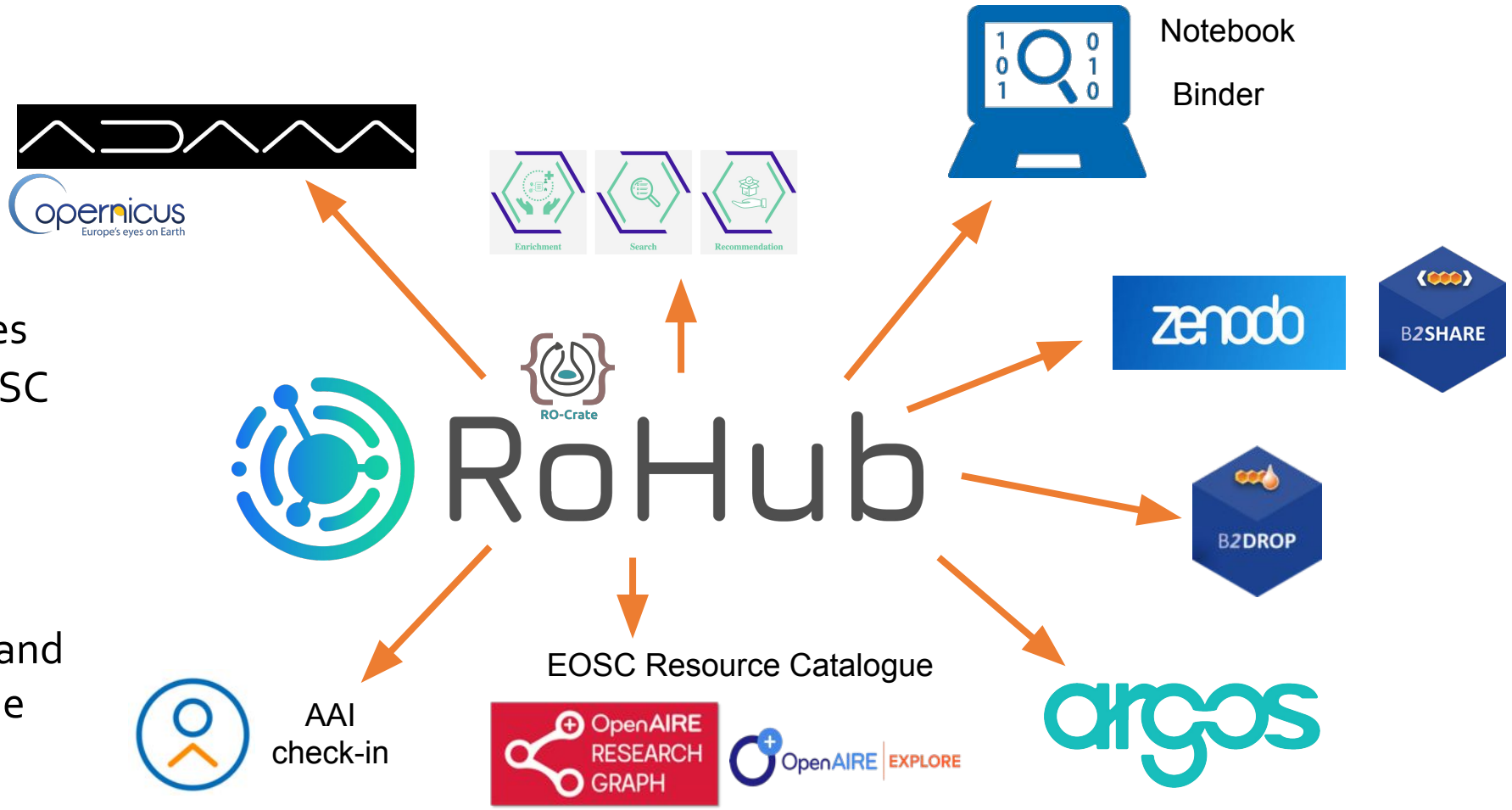
RELIANCE connections with EOSC Core and other Exchange services

- All RELIANCE services are onboarded in EOSC marketplace
- RELIANCE services integrate and rely on different EOSC core and other EOSC Exchange services



InfraEOSC07 sustainability

- To **preserve** the achievements of EOSC and **continue to deliver** an operational environment, it is necessary the support (and funding) of **providers** of EOSC core and relevant EOSC-Exchange services and IT resources from the 07 projects to guarantee their free-at-the-point-of-use access (including coordination and support activities)
- Funding EOSC functions requires **different types of instruments** to support mature services/IT resources but also innovation, e.g., procurements, project calls and community coordination activities.

See you next time!

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