



Define the EOSC Technical Architecture

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eosc-hub.eu



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- Defining the EOSC Technical Architecture
 - Agenda and aim of the technical workshop
 - Landscape
 - The EOSC Portfolios and EOSC Federating Core
 - Service Composability
 - Approach to define the technical architecture
 - An open approach

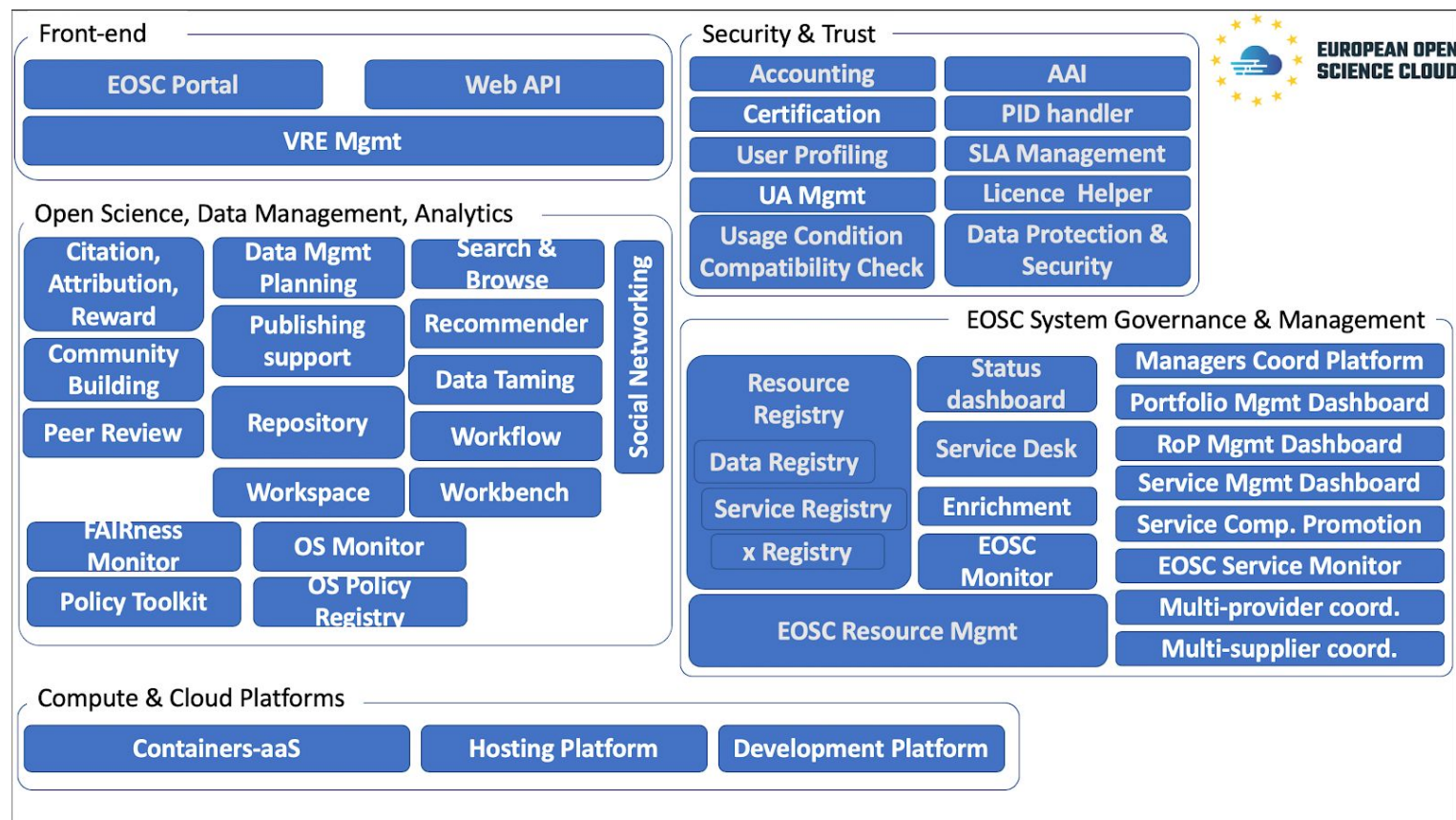
Agenda of the Tech WS

- Introduction on the EOSC-Hub Architecture
- Use case in the EOSC-Hub
- Open Discussion on the approach to follow during the workshop
- Session for macro-categories of tech areas
 - An each session we will have a small part dedicated to the presentation of the output of the work done
 - The biggest part should be dedicated to open and interactive discussion
- We will also have session about already started and possible future collaborations

- We should use this time:
 - *To improve the description of the macro-features*
 - *To provide ideas in order to add macro-features*
 - *To provide initial proposal for the guidelines for each of the macro-feature*

Previous Technical Architecture works

- We have already:
 - EOSC-Hub “D10.3 EOSC Hub Technical Architecture and standards roadmap v1”
 - EOSC-Pilot Service Architecture

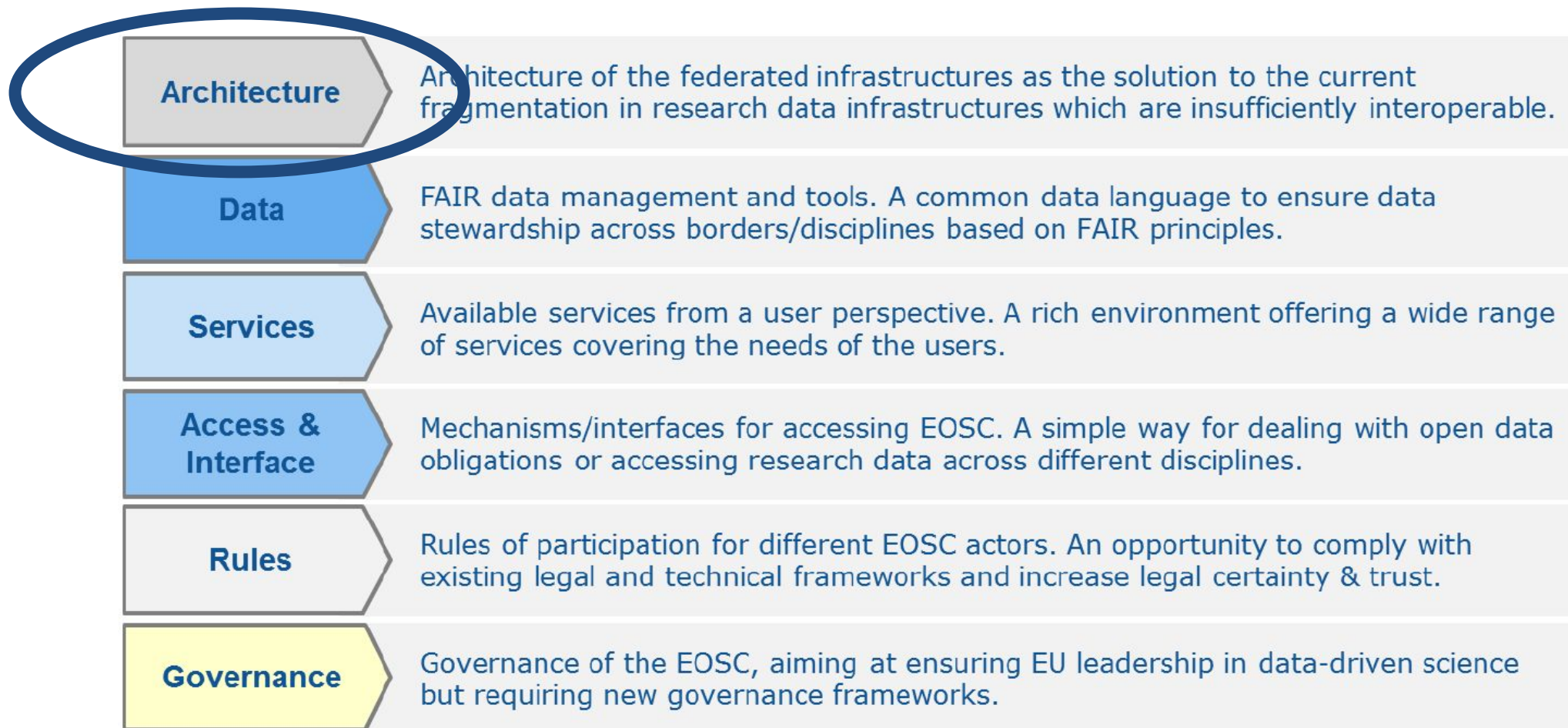


Defining the EOSC Technical Architecture

Landscape

EC Implementation Roadmap
EOSC Architecture Working Group

COMMISSION STAFF WORKING DOCUMENT



- One of the WG setup by the EOSC Governance
- Main objective:
 - *Review of the current offering and the required evolution of the EOSC technical architecture, its standards and best practices*

The EOSC Architecture Working Group will describe and/or define:

1. EOSC core services and their interfaces
2. EOSC open source APIs for reuse by thematic services
3. EOSC portal components and federated catalogues of service offerings
4. the EOSC data description standards
5. Standards and best practices necessary to ensure the evolution of EOSC and the widening of its user base to the industry and the public sectors.

Defining the EOSC Technical Architecture

EOSC Portfolios and the EOSC Federating Core

The Hub Portfolio

The EOSC Portfolio

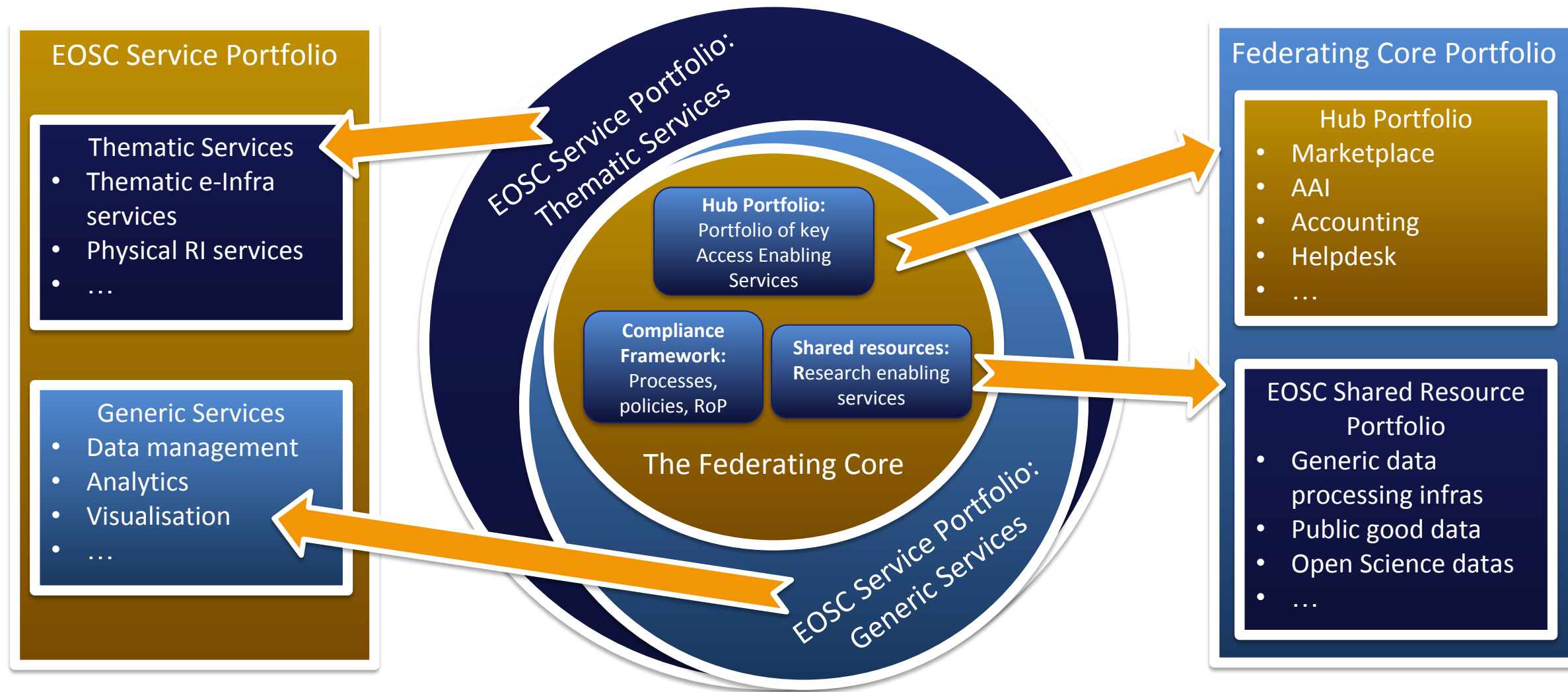
Compliance framework

Shared resources

The **EOSC portfolio** will include three key initial elements

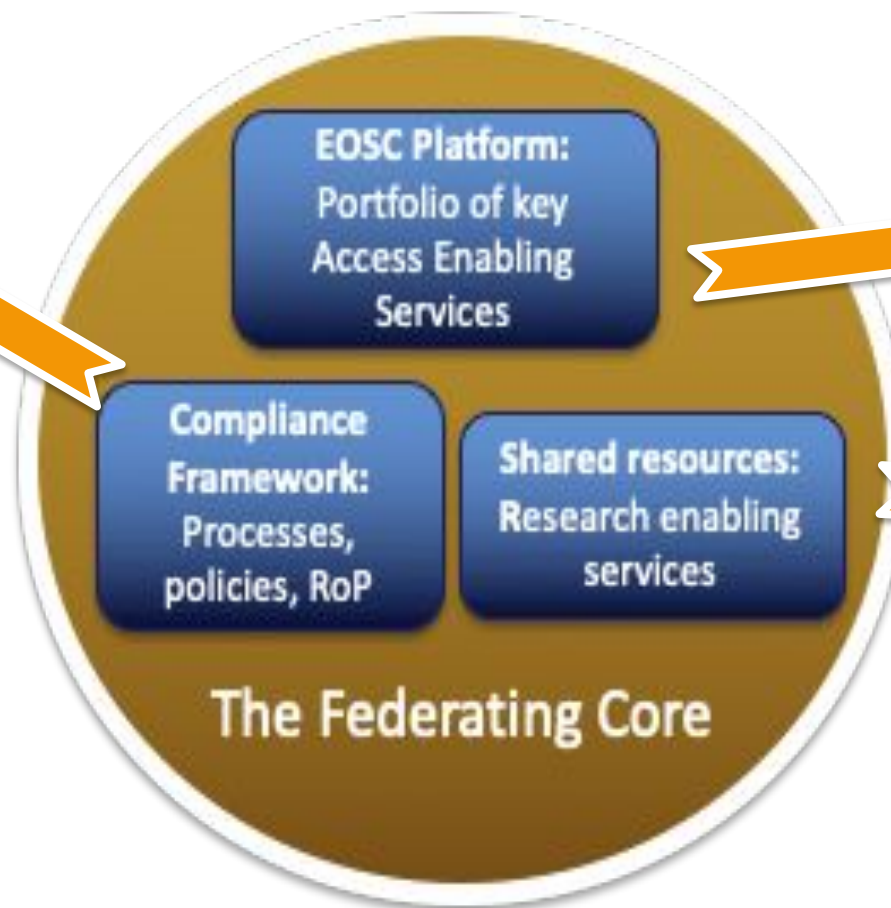
1. **Thematic Services**: coming from a specific scientific or research domain, that provide value to researchers in that area ⇒ Providers: Research communities and Infrastructures
2. **Generic Services**: address focussed technical needs that are common to multiple research areas ⇒ Providers: e-Infrastructures
3. **Federating Core of EOSC**: enabling the other elements to deliver (greater) value to researchers across Europe. It adds this value by delivering ⇒ Providers: e-Infrastructures
 - a. **Access-enabling services** in the EOSC multi-supplier environment (e.g. for discovery, ordering and workflow enabling)
 - b. **Federation services** that allow EOSC to integrate services from multiple suppliers (e.g. a common helpdesk, accounting information gathering, monitoring)
 - c. **Shared resources as a service** (e.g. research data, software, tools) and service capacity (storage and computing) for the resource exploitation in EOSC.

EOSC Service Portfolios & the Federating Core



The Federating Core in detail

Compliance Framework
organizational, human
and policy entities
needed to operate the
EOSC Federating Core



Federating Core Portfolio

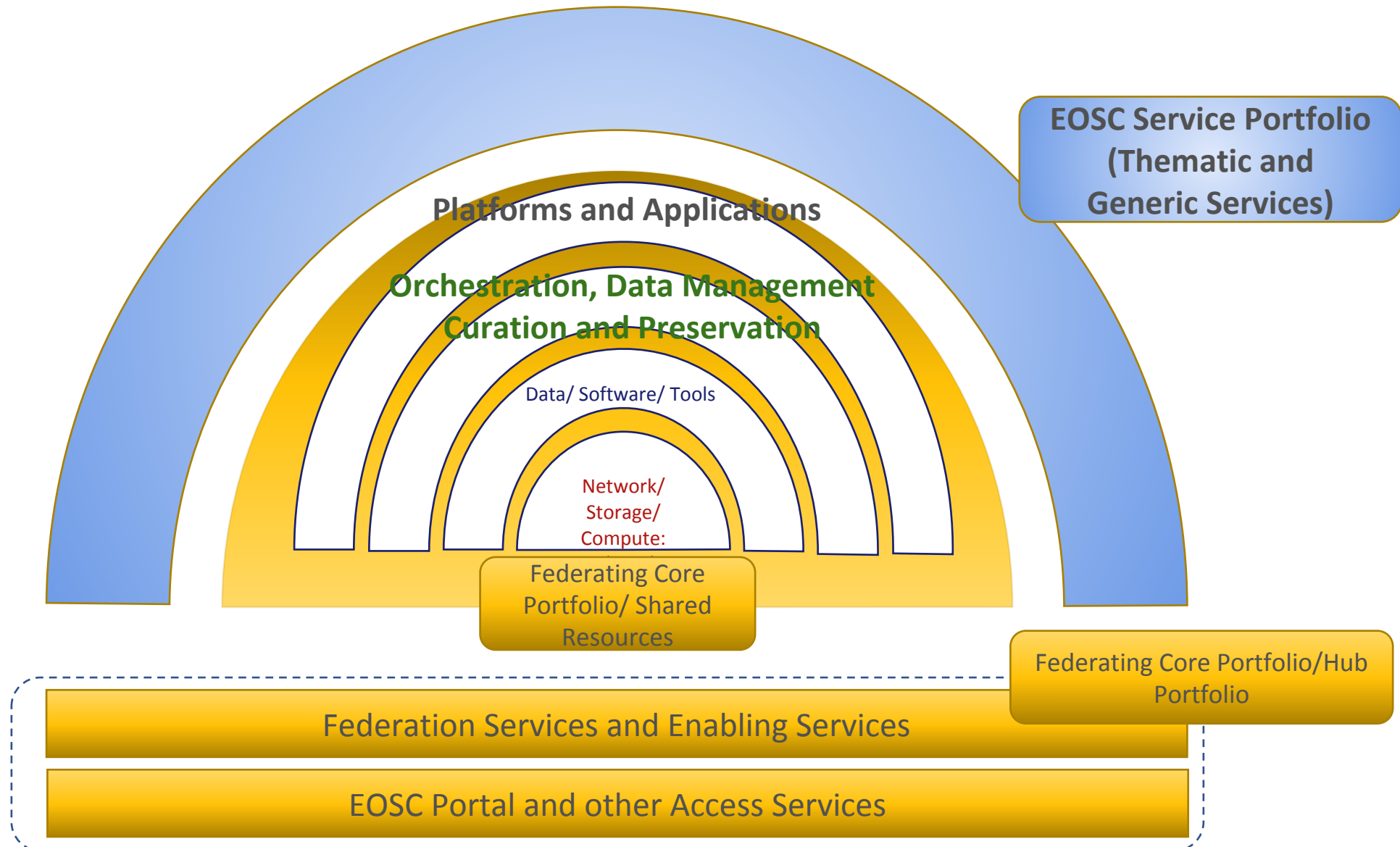
Hub Portfolio

- Marketplace
- AAI
- Accounting
- Helpdesk
- ...

EOSC Shared Resource Portfolio

- Generic data processing infras
- Public good data
- Open Science datas
- ...

EOSC-hub Federating Core and EOSC Service Portfolios



Service	Description	Service component
AAI	An AAI platform for federated authentication to services. Needed to access Federating Core elements but also can be offered to EOSC Portfolio service owners to mediate access to their services if they do not have their own AAI options.	<ul style="list-style-type: none"> • EGI Check-in • B2ACCESS • RC AUTH • IAM
Accounting	The service stores and reports on accounting records from the services.	<ul style="list-style-type: none"> • Accounting portal • Messaging brokers network • Accounting repository
Configuration management	Service for tracking the configuration items (assets) needed to operate the Federating Core and support the EOSC Service Portfolio. Provide sufficient configuration information for federated change management and service operation.	<ul style="list-style-type: none"> • GOCDB • DPMT
EOSC Portal	A user-facing platform where EOSC services can be promoted, discovered, ordered and accessed.	<ul style="list-style-type: none"> • Marketplace for providers • Marketplace for researchers

Collaboration tools	The set of integrated internal collaboration software platforms, such as wikis, task tracking, meeting management and other tools needed to coordinate a geographically distributed and organisationally federated service landscape.	<ul style="list-style-type: none"> • EGI Jira • EGI Confluence
Helpdesk	A central point for Incident Management and issue tracking for Federating Core components. Can integrate support functions for EOSC Portfolios services if needed and agreed.	<ul style="list-style-type: none"> • xGUS (federated helpdesk) • TTS • GGUS
Monitoring	Monitoring infrastructure to track services status and the deployed service versions.	<ul style="list-style-type: none"> • SVMON • ARGO
Operations tools	A portal supporting Service level management and Service reporting management.	<ul style="list-style-type: none"> • EGI operations portal
Service portfolio management tool	A tool which facilitates the management of service definitions during the full lifecycle.	<ul style="list-style-type: none"> • Service portfolio management tool

Extracted from EOSC-hub DoA

The Compliance framework comprises the organizational, human and policy entities needed to operate the EOSC Federating Core.

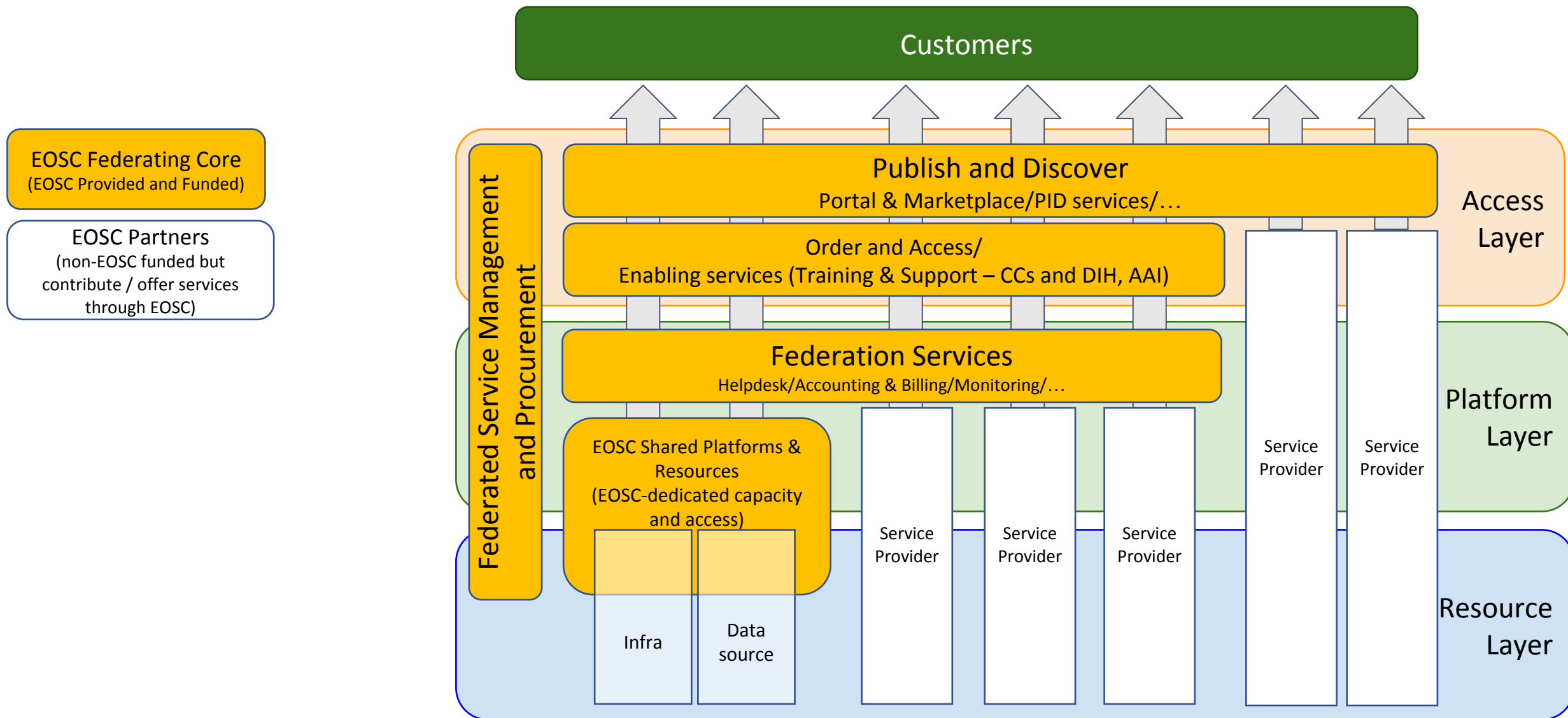
- **Rules of Participation:** set out the policies to be adhered to in order to provide thematic or generic services through the EOSC Service Portfolio.
 - Not to limit access to services to the research market, but rather to ensure that the services provided can be understood, ordered, assessed and reported on in a coherent way.
 - RoP sets out and oversees the ‘on-boarding’ process for thematic and horizontal services
 - RoP manages exceptions or new developments that require changes to policies and procedures.
- **The EOSC Service Management System**
 - Set of policies, processes and procedures that interact to generate managed services.

EOSC Service Management System (SMS)

IT Service Management Process	Typical activities
Service Portfolio Management	Consider future services (to be under the control of EOSC-hub, in the Federating Core), plan and implement these services, given the strategic position of EOSC-hub. Manage the onboarding of thematic and generic services to the EOSC Service Portfolio
Service Level Management	Define, agree and monitor Service Level Agreements and their fulfilment for EOSC Platform services in the federating core. Assist EOSC Service Portfolio services in defining their own SLAs
Service Reporting Management	Define, agree and produce service reports for customers and other groups, reporting on the degree of fulfilment of SLAs.
Service Order and Customer Relationship Management	Handle customer orders and manage relationships with customers, monitoring satisfaction, ensuring clear communication and that we are responsive to customer needs.
Supplier and Federation Member Relationship Management	Identifies suppliers and federation members and ensures that there is a designated contact responsible for managing the relationship and communication with each supplier and federation member. Monitors the performance of suppliers and federation members.
Service Availability and Continuity Management	Monitor and manage the availability of services in the Federating Core EOSC Platform. Ensure suitable continuity plans are in place to deal with serious service failures.
Continual Service Improvement	Collect, prioritise, agree and plan improvements to services and the service management system.

Capacity management	Ensure sufficient capacity is available (human and technical) to meet agreed service levels (from SLAs) for the EOSC Platform services.
Configuration Management	Manage collection and storage of information about all the assets (configuration items), technical and otherwise, that must be controlled in order to manage services effectively. Populate and manage the CMDB
Incident and Service Request Management	Respond to incidents where agreed service levels are not met, to restore agreed services, largely through a helpdesk support function.
Problem Management	Investigate incidents to understand underlying sources of service failure and degradation, maintain listing of temporary workarounds, while also seeking to remedy the underlying problems.
Information Security Management	Manage information security through setting Information Security policies, managing security risks and implementing security controls, whether they are technical or organisational.
Change Management	Manage changes to all configuration items needed to deliver agreed EOSC Platform services are appropriate service levels.
Release and Deployment management	Bundles agreed changes into releases, which can be tested together before deployment into production environments

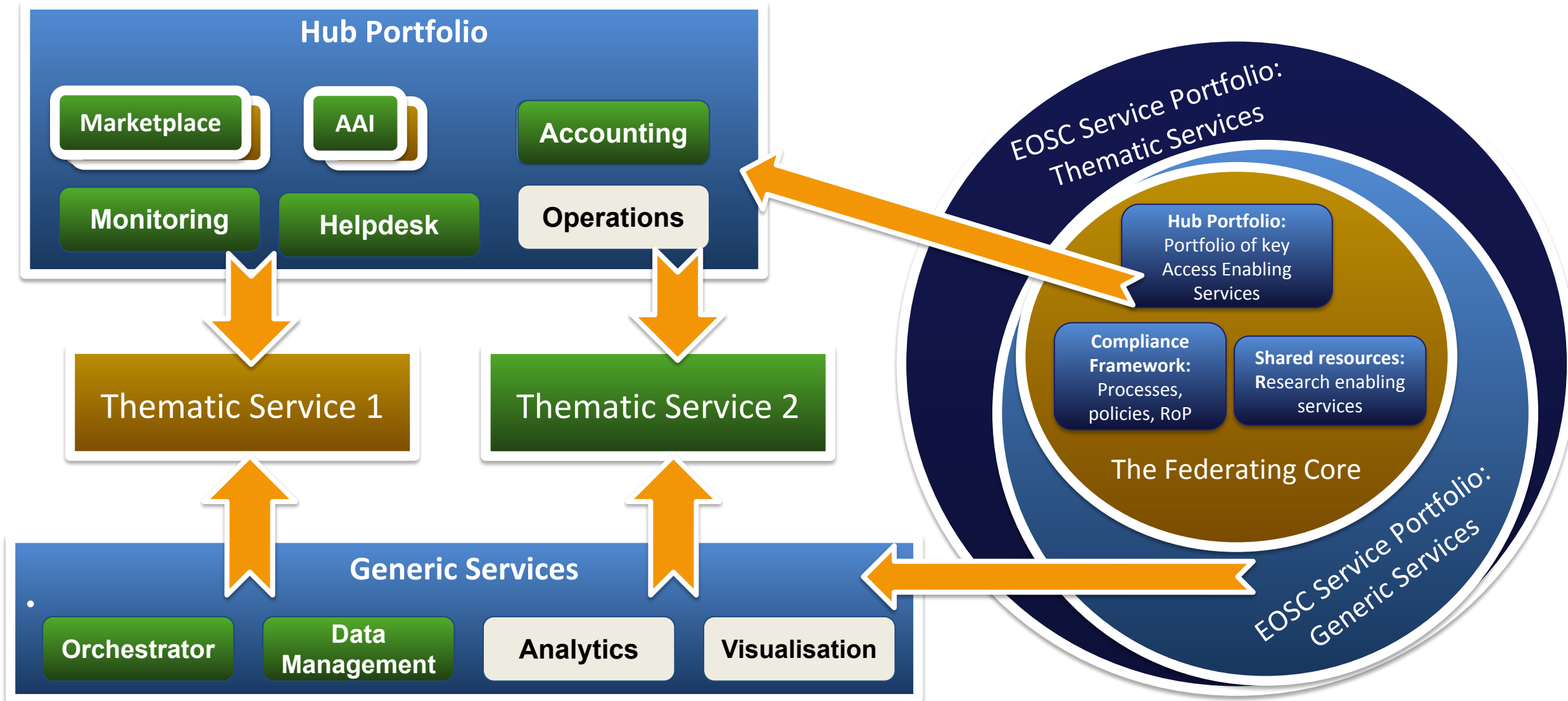
Federating core and integration levels





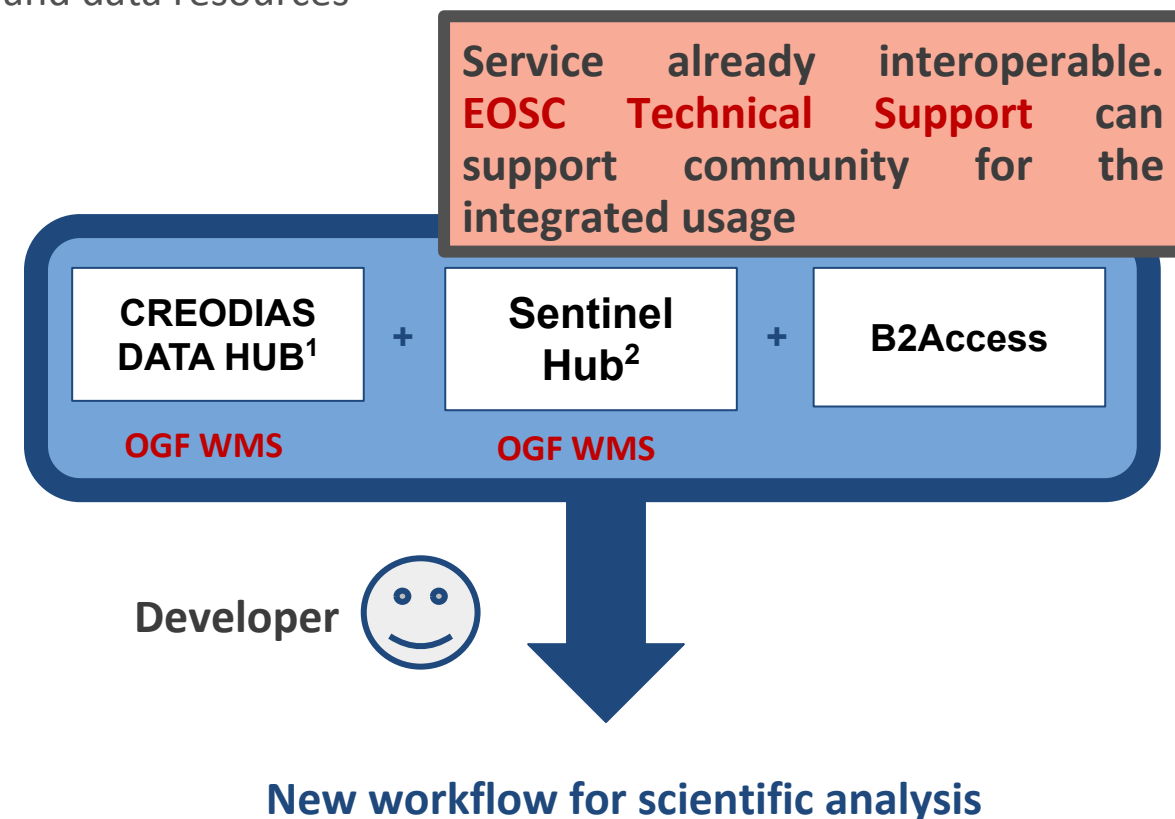
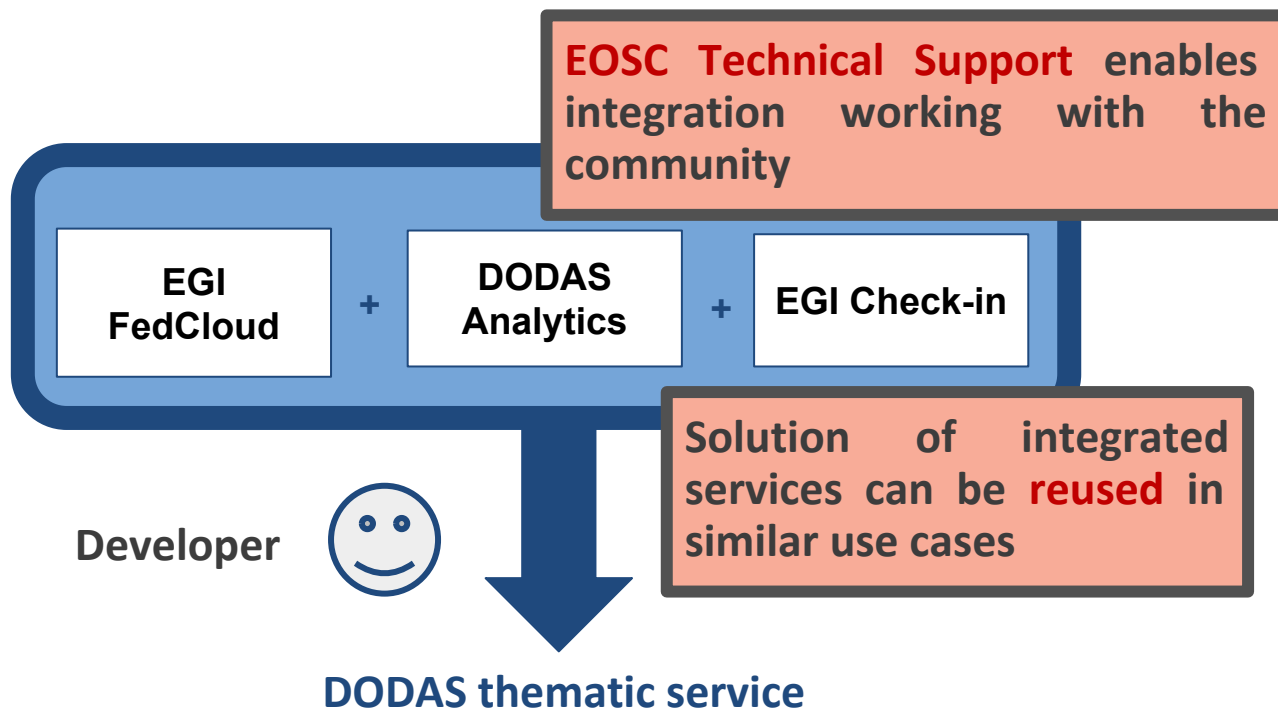
Defining the EOSC Technical Architecture


Service Composability



- **Service composability**

- Ability for the EOSC user to compose different **interoperable** services
 - Sub-classes of interoperable services being identified and extended (with integration activities)
- Typical service combinations
 - Re-using federation services to implement basic features (AAI, monitoring, accounting)
 - Adopt common services to better exploit compute, storage and data resources
 - Create new scientific workflows





EOSC-hub Composable services

The ground to build EOSC technical architecture

Interoperability is the key to make services composable!

- Identify services that can work together
 - Adopting compatible standards/interfaces
- Make **selected** services interoperable
 - Integration activities **driven by use cases**
 - Easier if we have **interoperability guidelines**
- Reusable Integrated/Composable services
 - Provide technical support to enable the combined usage

Defining the EOSC Technical Architecture

The approach

Reference architecture

Access Enabling and Federation Tools

Macro-features

Interoperability guidelines

Reference Architecture

- A **reference architecture** in the field of software architecture or enterprise architecture provides a template solution for an architecture for a particular domain.
- It provides a common vocabulary with which to discuss implementations, often with the aim to stress commonality.
- A reference architecture often consists of a list of functions and some indication of their interfaces (or APIs) and interactions with each other and with functions located outside of the scope of the reference architecture.
- Reference architectures can be defined at different levels of abstraction.

Definition according to Wikipedia (https://en.wikipedia.org/wiki/Reference_architecture)

Building blocks, macro-features and interoperability guidelines

- We have to work at: Infrastructure/technical level
- Define: Functions, interfaces, APIs and standard as technical concepts
- Define a Common vocabulary usable to define not only already available services, but also the ones will be joining EOSC catalogue in the future

EOSC-hub Approach to define the EOSC Technical Architecture

• Federating Core

Identify the EOSC Access Enabling and Federation services

- Define technical specification for each:

- Reference architecture

Interoperability guidelines (standard interfaces and API)

• Generic services

Identify (most relevant) macro-features for technical area

- IaaS VM/Container management, Cloud Orchestration, metadata mgmt, making scientific artefacts FAIR, etc

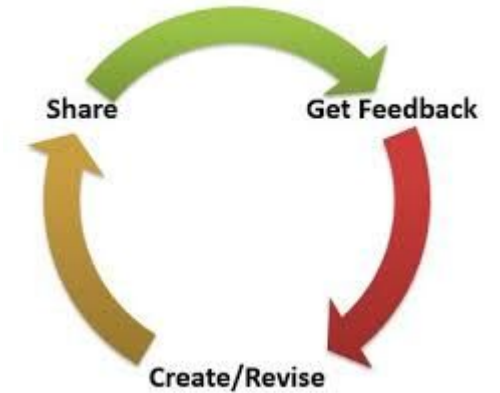
- For each macro-features identify reference architecture, interoperability guidelines (standards, protocols, API, etc.)

• Thematic services

- Extend the set also involving communities with expertise in given areas / new tech areas

• Portal

- Leverage on the work already done by EOSC-hub, eIC and OpenAIRE
- EOSC Portal Collaboration Agreement
- EOSC-Enhance project proposal



Iterative approach



Thematic services

Std interfaces

Feature 5

Scholarly
Communication

Std interfaces

Feature 6

Std interfaces

Feature 7

Workflow
Management

Std interfaces

Feature 8

Generic services

Std interfaces

Feature 1

Comp

Std interfaces

Feature 2

Std interfaces

Feature 4

Data
Management

Std interfaces

Feature 3

Data/Compute/Storage **Resources**

EOSC Portal

Other Portals and Marketplace

Federated Discovery and Brokerin./supporting (Federated AAI)

Federations tools
AAI, Accounting, monitoring, Helpdesk, etc.

Thematic services

APIs and std interfaces
**Workflow
Management**
APIs and std interfaces
APIs and std interfaces
**Big Data
Analytics**
APIs and std interfaces
APIs and std interfaces
**Data
Annotation**
APIs and std interfaces
APIs and std interfaces
**Making science
products FAIR**
APIs and std interfaces

Generic services

APIs and std interfaces
Cloud IaaS
APIs and std interfaces
APIs and std interfaces
**Cloud
Orchestrator**
APIs and std interfaces
APIs and std interfaces
Data Discovery
APIs and std interfaces
APIs and std interfaces
**Metadata
management**
APIs and std interfaces
Data/Compute/Storage Resources
EOSC Portal
Other Portals and Marketplace

Federated Discovery and Brokerin./supporting (Federated AAI)



AAI, Accounting, monitoring, Helpdesk, etc.

Federations tools

Thematic services

APIs and std interfaces

Workflow Management

APIs and std interface

APIs and std interfaces

Big Data Analytics

APIs and std interfaces

APIs and std interfaces

Data Annotation

APIs and std interfaces

APIs and std interfaces

Making science products FAIR

APIs and std interfaces

Generic services

APIs and std interfaces

Cloud IaaS

APIs and std interfaces

APIs and std interfaces

Cloud Orchestrator

APIs and std interfaces

APIs and std interfaces

Data Discovery

APIs and std interfaces

APIs and std interfaces

Metadata management

APIs and std interfaces

Data/Compute/Storage Resources

Thematic services

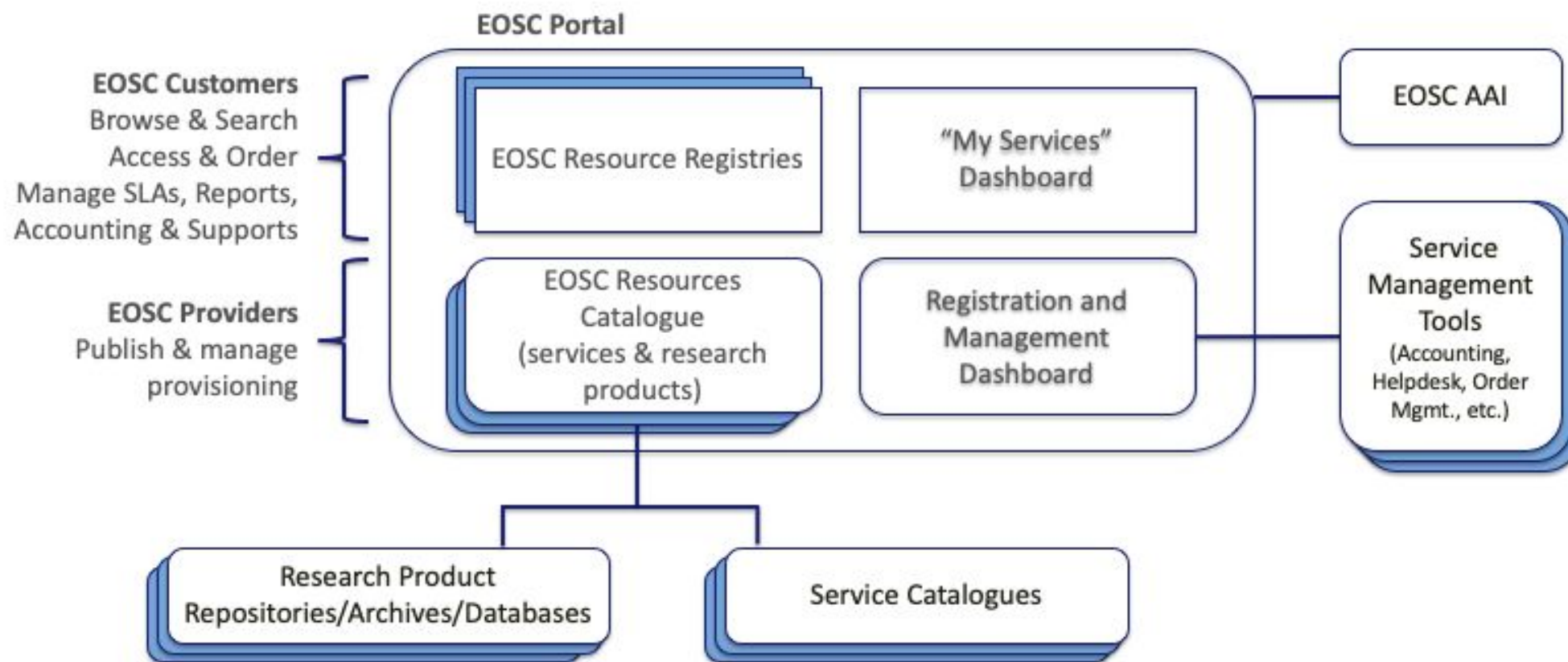
APIs and std interfaces
**Discipline
feature 1**
APIs and std interfaces
APIs and std interfaces
**Discipline
feature 2**
APIs and std interfaces
APIs and std interfaces
**Discipline
feature 3**
APIs and std interfaces
APIs and std interfaces
**Discipline
feature 4**
APIs and std interfaces

Generic services

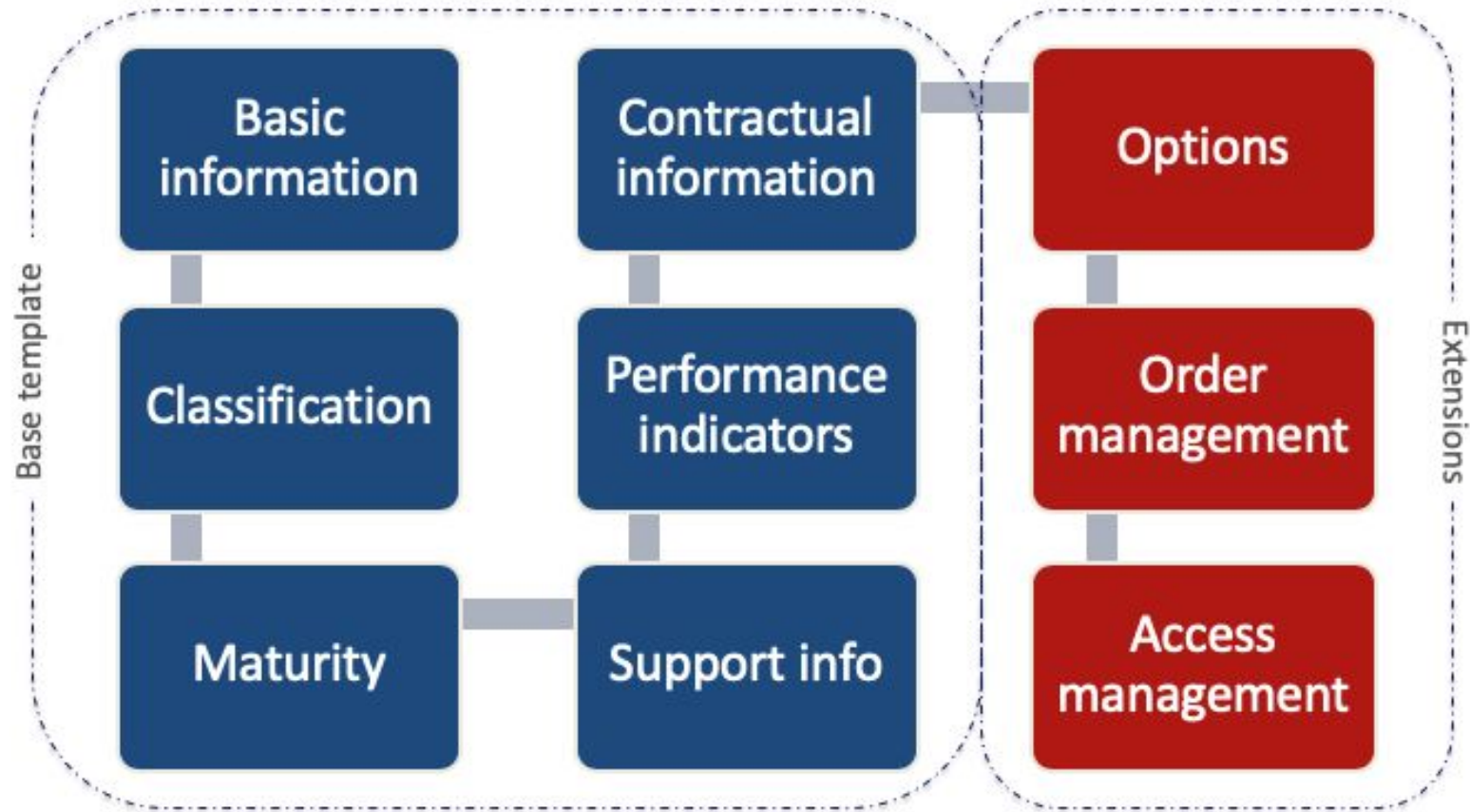
APIs and std interfaces
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APIs and std interfaces
**Cloud
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EOSC Portal
Other Portals and Marketplace
Federated Discovery and Brokerin./supporting (Federated AAI)

- To be filled in for access enabling and federation tools and for macro-features
- Draft specifications to be ready by the end of this WS
- Template available [here](#)
- Shared google folder to store the specifications:
 - https://drive.google.com/drive/u/1/folders/1_C-r7LSa8epZwfMUv05s9VDibXiljz0Z
 - We have a sub-folder per Tech Area, in order to better organize the documents

- Introduction
 - *Short description of the service/macro-feature highlighting its main functions*
- Adopted Standard
 - *List with references of the main standards and protocols/APIs adopted by this core service*
- High-level Service Architecture
 - *Describe the reference architecture (commented diagram) of the service/macro-feature highlighting the interfaces towards the other services.*
 - *The architecture should be generic. Please, do not refer to specific service*
- Interoperability guidelines
 - *Describe how similar services can be made interoperable with this service/macro-feature*
- Examples of solutions implementing this specification



- Collaboration agreement between EOSC-hub, OpenAIRE Advance & EIC (to Dec 2020)
- Project funded in INFRAEOSC06 from January 2020 (EOSC Enhance?)



EOSC Architecture WG objectives

1. EOSC core services and their interfaces
2. EOSC open source APIs for reuse by thematic services
3. EOSC portal components and federated catalogues of service offerings
4. the EOSC data description standards
5. Standards and best practices necessary to ensure the evolution of EOSC and the widening of its user base to the industry and the public sectors.

Objectives of this work

Definition of the EOSC Access Enabling and Federation services and interfaces

Interoperability guidelines for Generic services (interfaces)

Interoperability guidelines for Discipline specific services (interfaces)

EOSC Portal and EOSC service portfolios

Defining the EOSC Technical Architecture

An open approach

EOSC-hub proposal for the EOSC technical architecture – An open approach

- June 2019: [Technical WS in Amsterdam](#) with participation of the main European e-infrastructures (EGI, EUDAT, GEANT, OpenAIRE)
 - Expected output: EOSC-hub/OpenAIRE-Advance/GEANT recommendation for the EOSC tech architecture, reference architecture, guidelines and principles
- Summer/Autumn 2019: [Collecting feedback and suggestions](#)
 - Sharing the documents with a broader set of stakeholders (e.g. RIs, Clusters, EOSC service providers and implementation projects)
 - Organise webinars to present the proposal and to gather feedback

EOSC-hub proposal for the EOSC technical architecture – An open approach

- Autumn 2019:
 - [EOSC Architecture Workshop](#): an open event co-organised by EOSC-hub in collaboration with the EOSC Architecture Working Group
 - Expected output: a proposal for the EOSC tech architecture as outcome of the consultations with the largest expected EOSC user groups.
- By end of 2019:
 - Proposal for the EOSC tech architecture shared with the EOSC architecture WG

Thank you for your attention!

Questions?



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Contact

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