EOSC Future & ESCAPE TSPs

Ian Bird, CNRS-LAPP
ESCAPE General TSP Meeting, 21/07/22
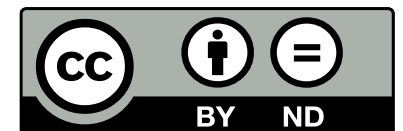
European Landscape

Five thematic Science Clusters (80% of ESFRI RIs)

Making FAIR data a reality at Photon and Neutron facilities

Particle Physics

Astrophysics

ESCAPE

European Science Cluster at Astronomy & Particle physics ESFRI research infrastructures

ENVRI FAIR

SSHOC

EOSC-Life
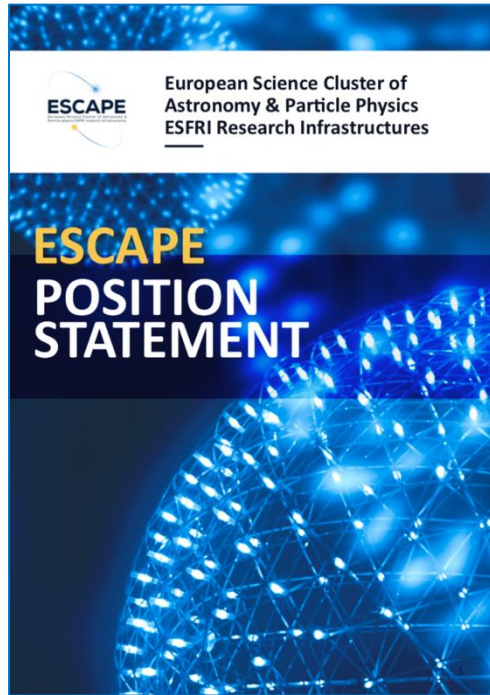
ESCAPE

panosc
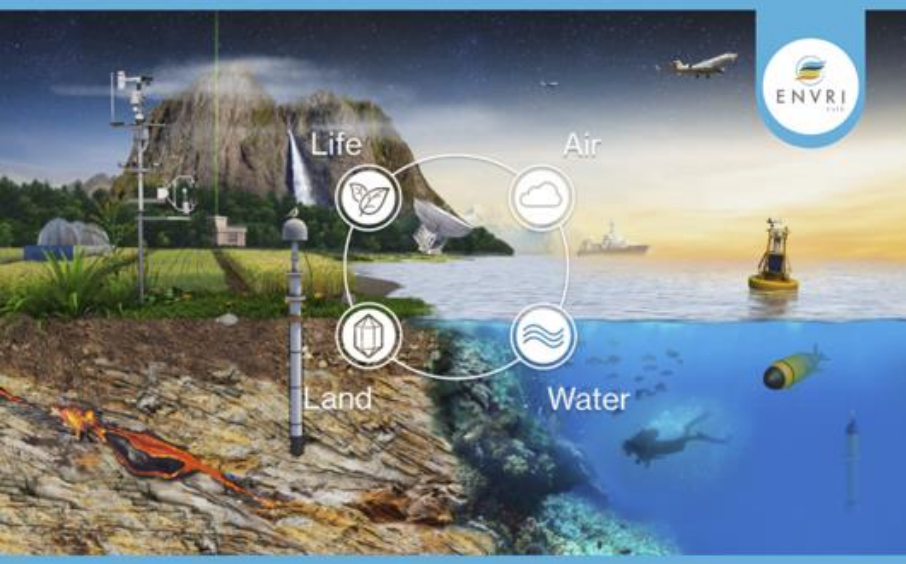
Five thematic Science Clusters

More than 80% of ESFRI RIs, plus other world-class RIs and new emerging ones.
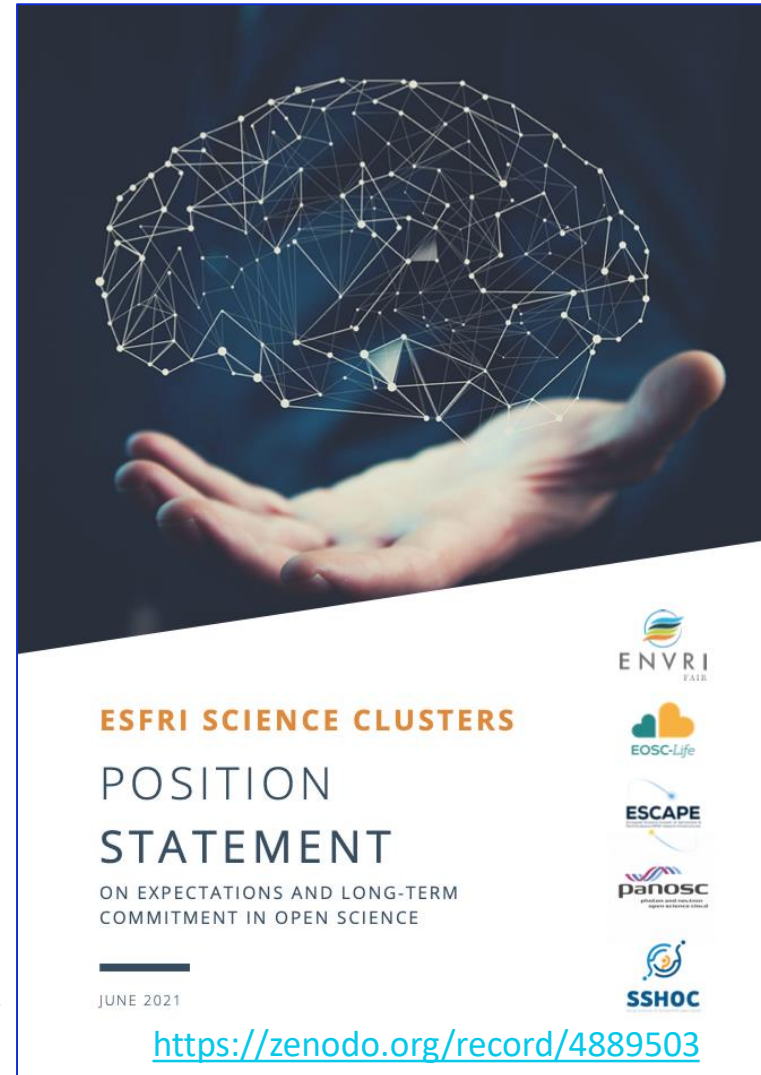
EUROPEAN OPEN SCIENCE CLOUD

Broad synergies between research clusters

https://www.projectesca
pe.eu/sites/default/files/
Escape_position_stateme
nt_web.pdf

https://zenodo.org/record/3675081 - .X2R2PJNLhTY

ESFRI SCIENCE CLUSTERS

POSITION

STATEMENT

ON EXPECTATIONS AND LONG-TERM
COMMITMENT IN OPEN SCIENCE

JUNE 2021

https://zenodo.org/record/4889503

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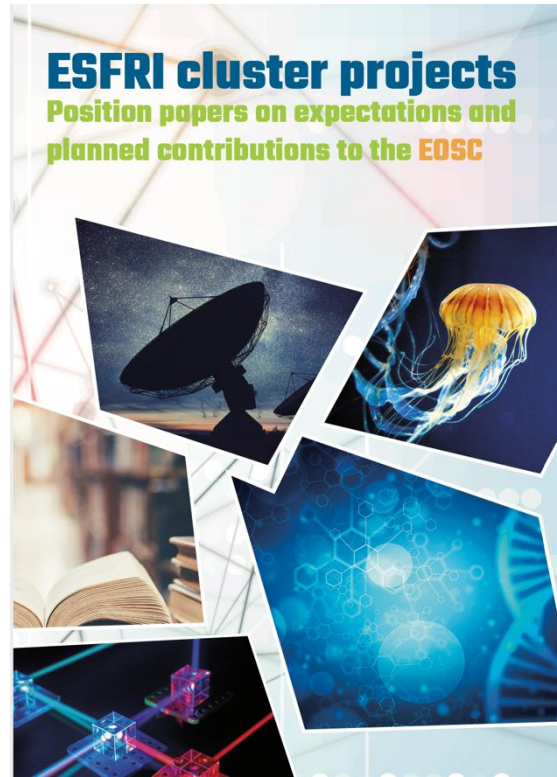
EOSC Future

EOSC-Future

❑ Started 1st April 2021

❑ Responding to EU H2020 funding call, (INFRAEOSC-03-2020): 30 months, 40 M euros

➢ **EOSC-Future is a prototype of an integrated EOSC**

INFRAEOSC-04 - ESFRI science clusters
- 5 thematic clusters of 52 world-class RIs to implement FAIR data and connect to EOSC
- Develop standards, approaches, requirements, tools
- Create thematic catalogues of resources
- Provide data, services and innovation to the EOSC
- Provide a coordinated requirements and feedback

INFRAEOSC-05b - Regional projects
- 5 regional nodes to implement FAIR data and connect to EOSC
- Provide a link to national resources, programmes, priorities
- Develop standards, approaches, requirements, tools
- Create thematic catalogues of resources
- Provide data and services to the EOSC

EOSC Governance
- Inclusive participation from academia, industry, and member states
- Deliver the EOSC partnership
- Maintain the SRIA
- Work on specific EOSC policies
- Oversee the EOSC landscape

- Provide **EOSC Core** to enable basic EOSC operation, including capacity, service evolution, deployment and operation
- Create and maintain **EOSC Exchange**, including onboarding services from communities, offering them via the Portal and offering integration
- Deliver **EOSC Interoperability Frameworks** to allow integration, harmonisation and composability of resources across the EOSC landscape through the **EOSC Execution Framework**
- Deliver **support activities** including training, engagement and commercial liaison.

Other RIs, thematic, regional and national research communities
- Access and provide resources via the Exchange
- Integrate and benefit from EOSC Core services
- Strengthen and extend new communities

INFRAEOSC-07 - EOSC provisioning projects
- Provide horizontal resources and capacity through EOSC Exchange for data processing, storage, management
- Provide services for Open Science and Copernicus data
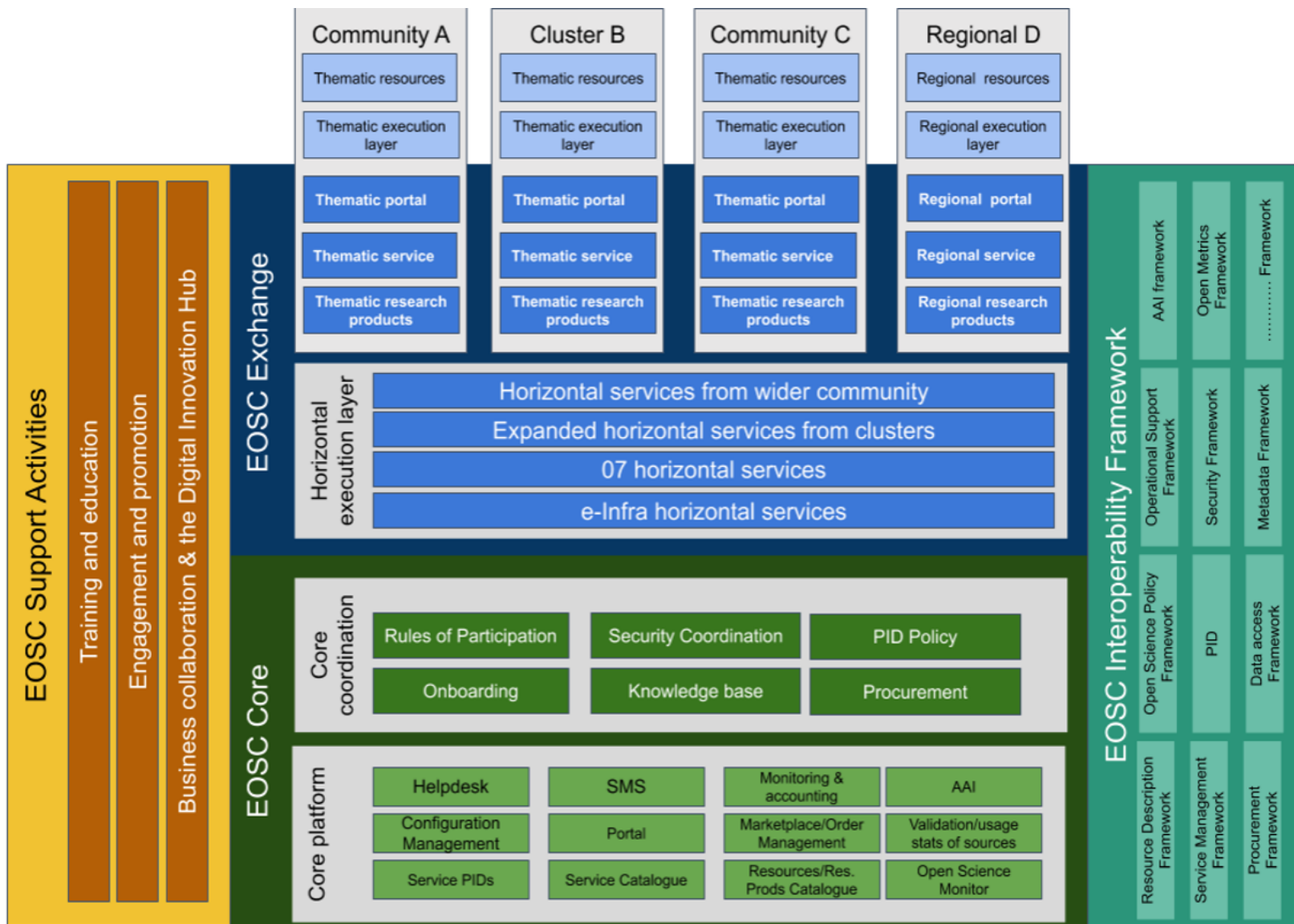- Provide a basis for building PaaS and SaaS services on top of services and capacity from EOSC Exchange
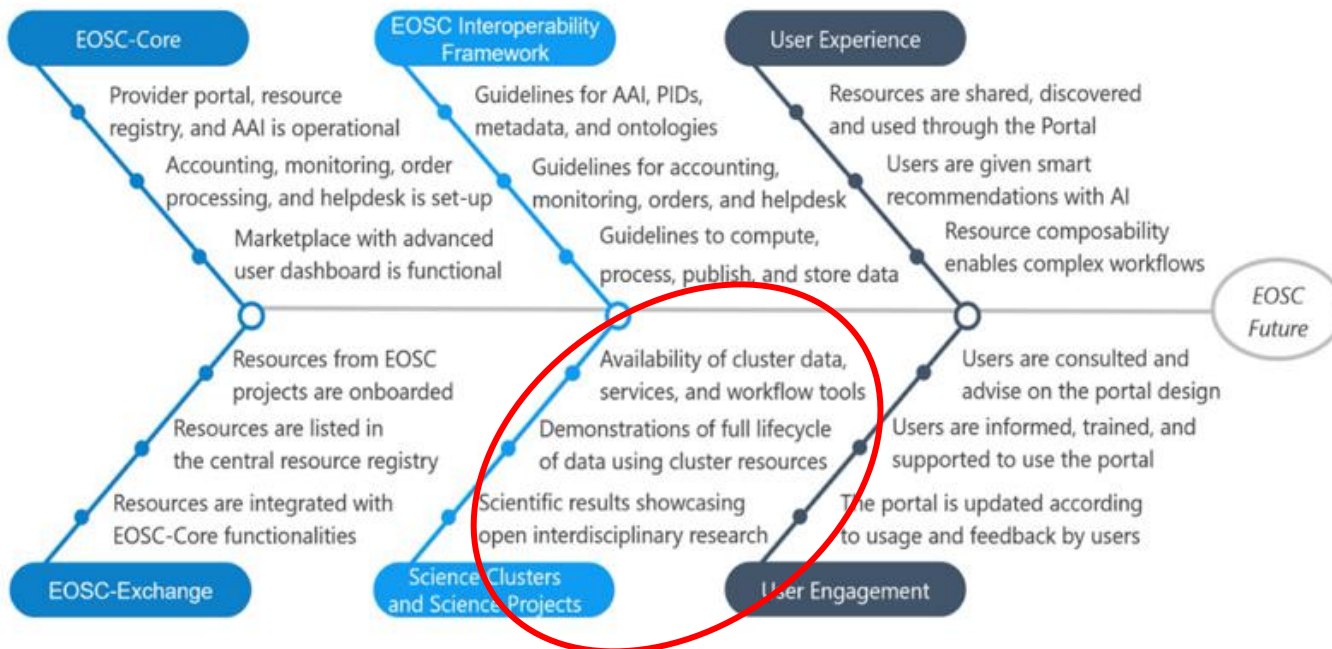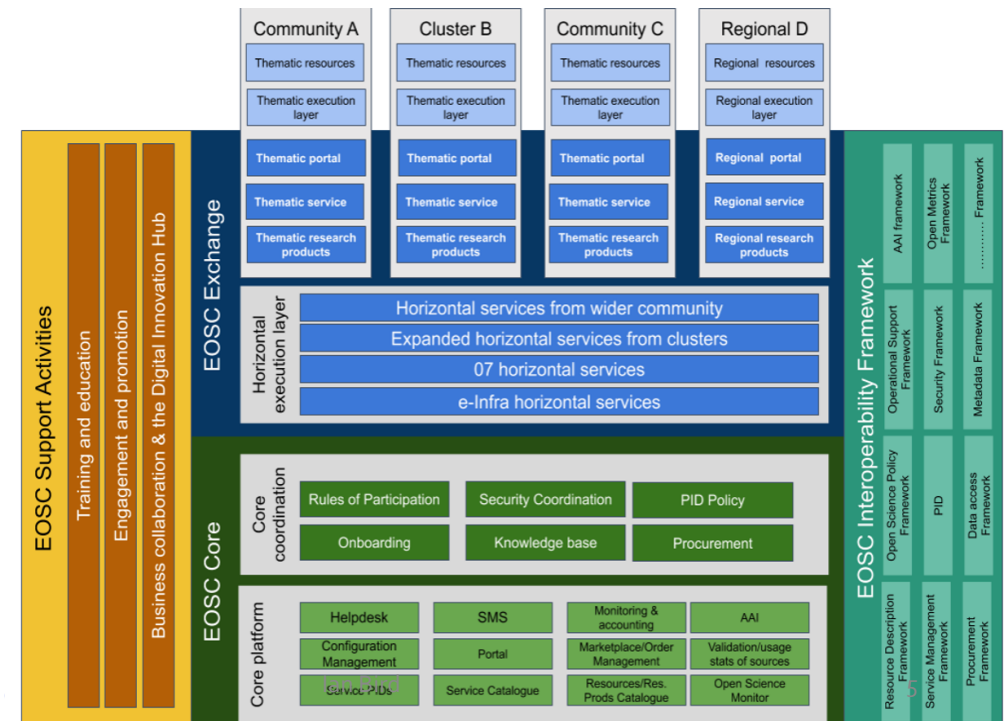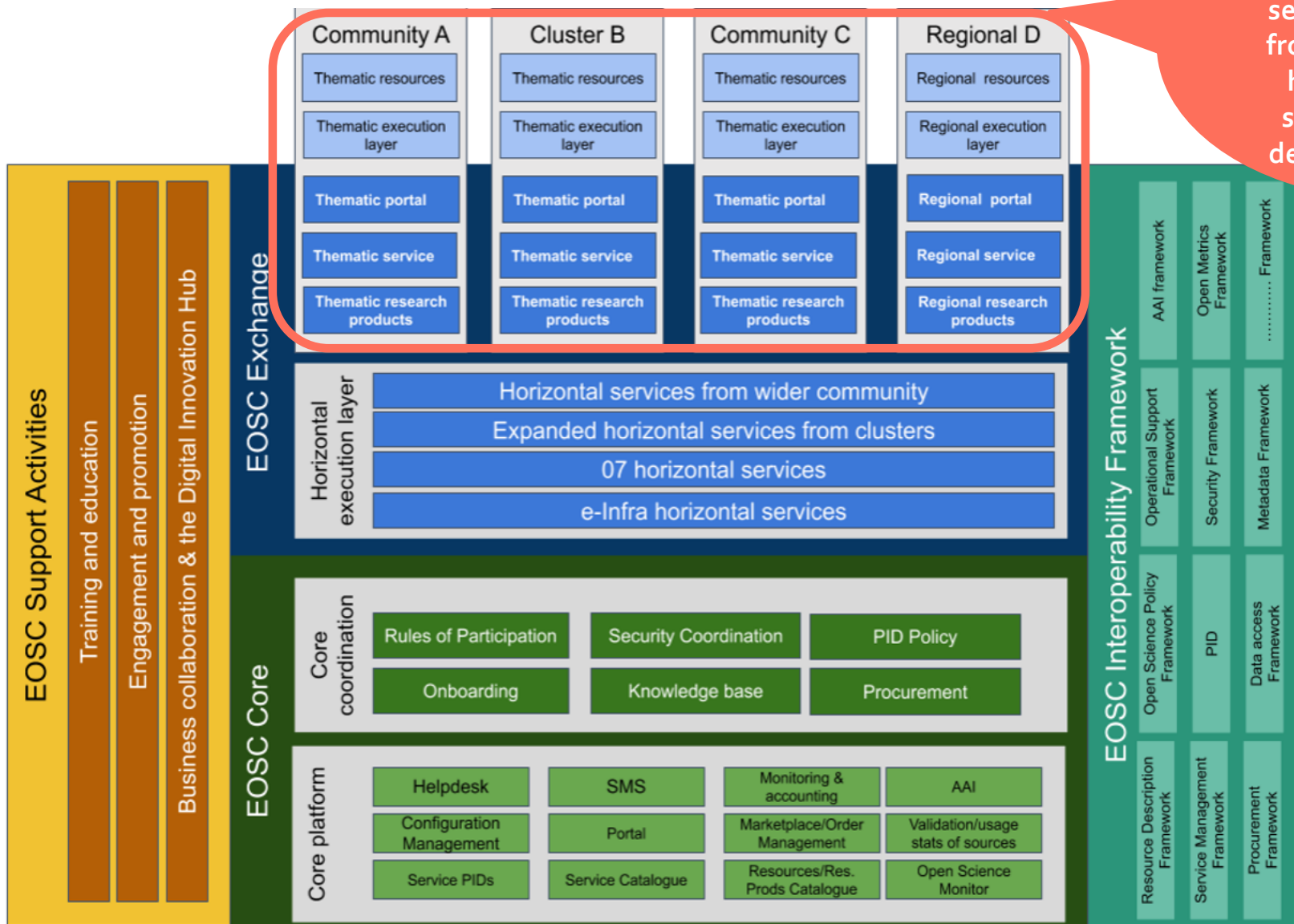
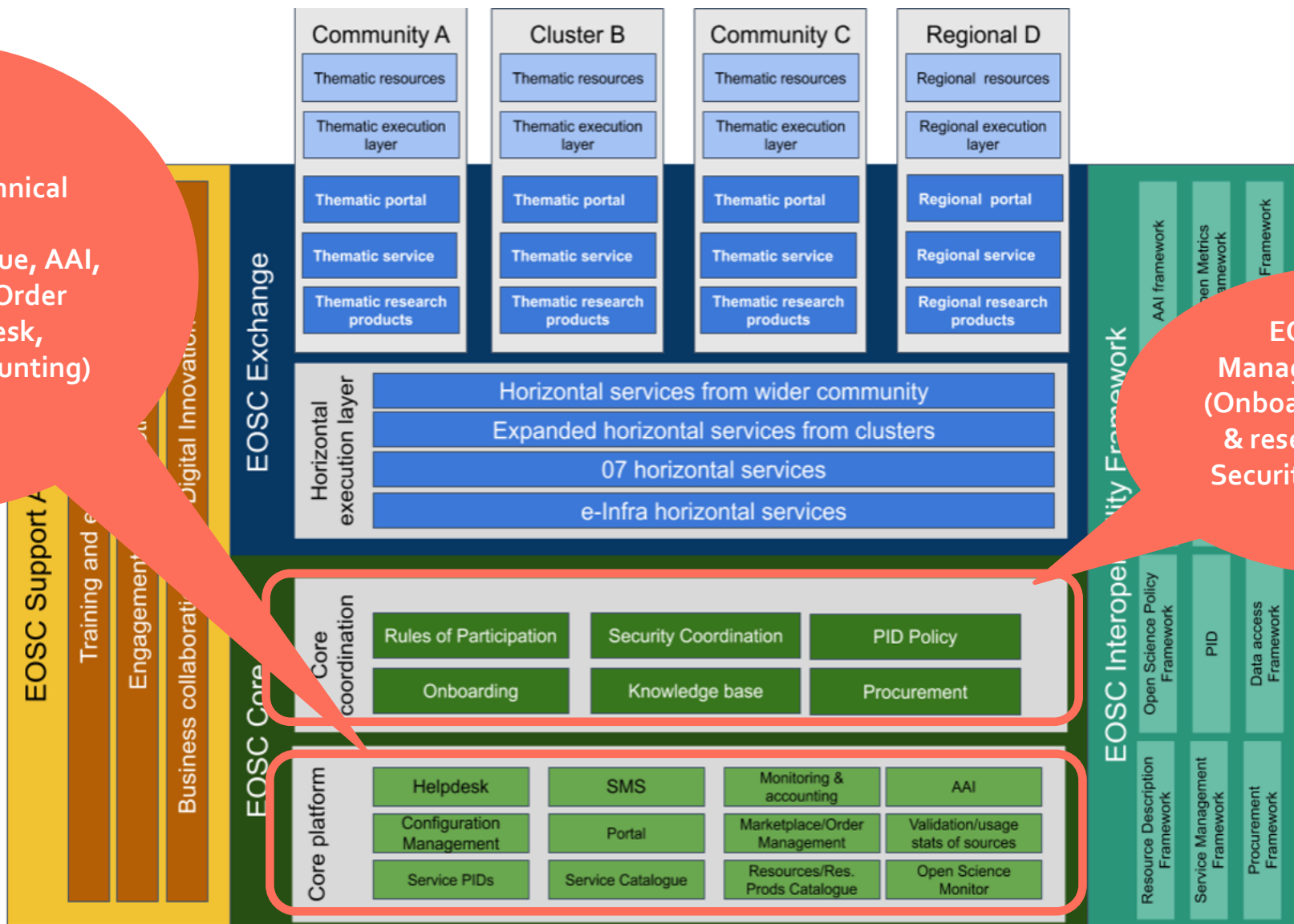# EOSC Architecture – Federation model

EOSC Architecture – Federation model

Science communities & researchers, use services & resources from EOSC, but also have higher level specific services & dedicated resources
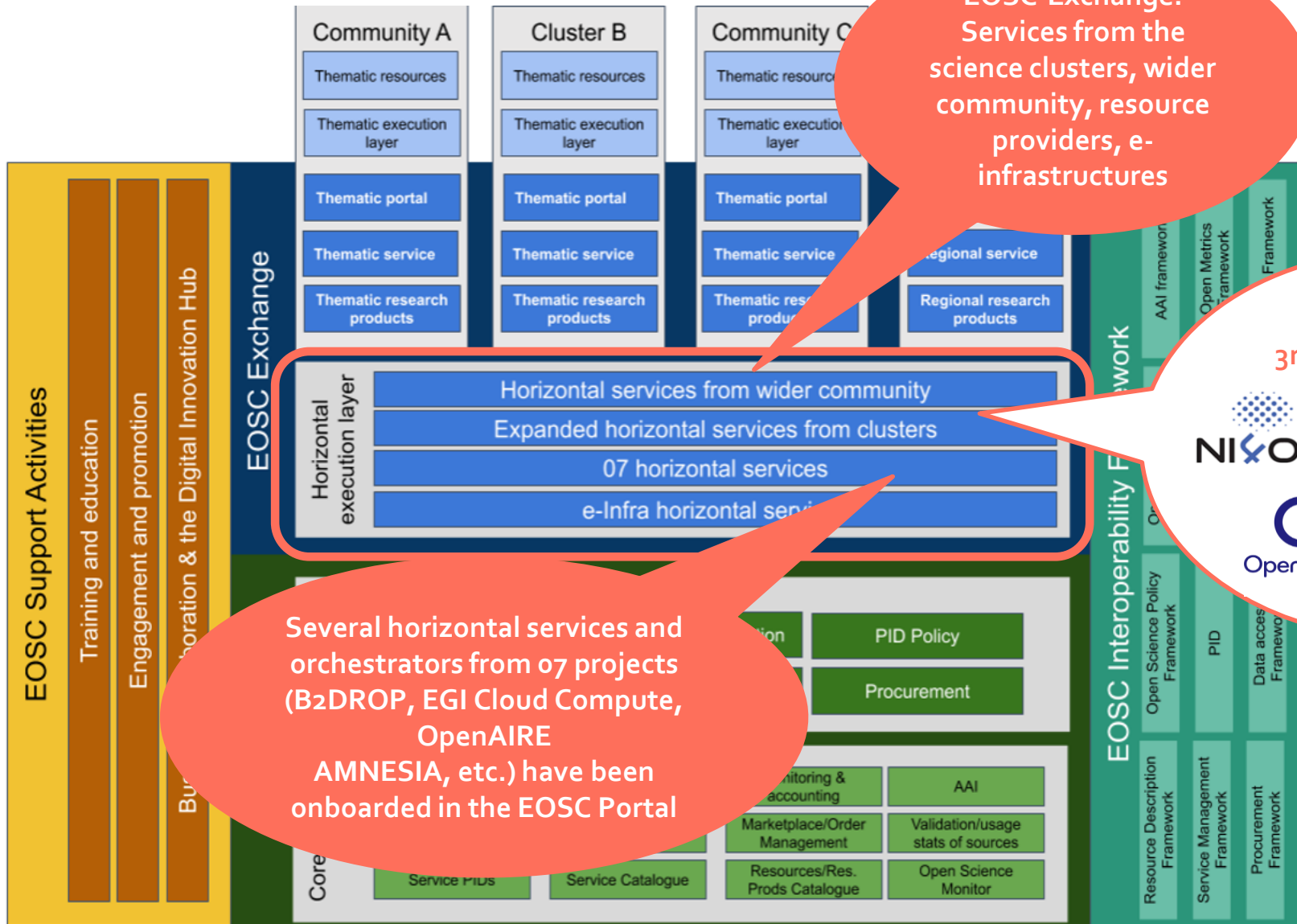
Community A
- Thematic resources
- Thematic execution layer
- Thematic portal
- Thematic service
- Thematic research products

Cluster B
- Thematic resources
- Thematic execution layer
- Thematic portal
- Thematic service
- Thematic research products

Community C
- Thematic resources
- Thematic execution layer
- Thematic portal
- Thematic service
- Thematic research products

Regional D
- Regional resources
- Regional execution layer
- Regional portal
- Regional service
- Regional research products

EOSC Support Activities
- Training and education
- Engagement and promotion
- Business collaboration & the Digital Innovation Hub

EOSC Exchange

Horizontal execution layer
- Horizontal services from wider community
- Expanded horizontal services from clusters
- 07 horizontal services
- e-Infra horizontal services

EOSC Core

Core coordination
- Rules of Participation
- Security Coordination
- PID Policy
- Onboarding
- Knowledge base
- Procurement

Core platform
- Helpdesk
- SMS
- Monitoring & accounting
- AAI
- Configuration Management
- Portal
- Marketplace/Order Management
- Validation/usage stats of sources
- Service PIDs
- Service Catalogue
- Resources/Res. Prods Catalogue
- Open Science Monitor

EOSC Interoperability Framework
- AAI framework
- Open Metrics Framework
- .... Framework
- Operational Support Framework
- Security Framework
- Metadata Framework
- Open Science Policy Framework
- PID
- Data access Framework
- Resource Description Framework
- Service Management Framework
- Procurement Framework

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EOSC Future

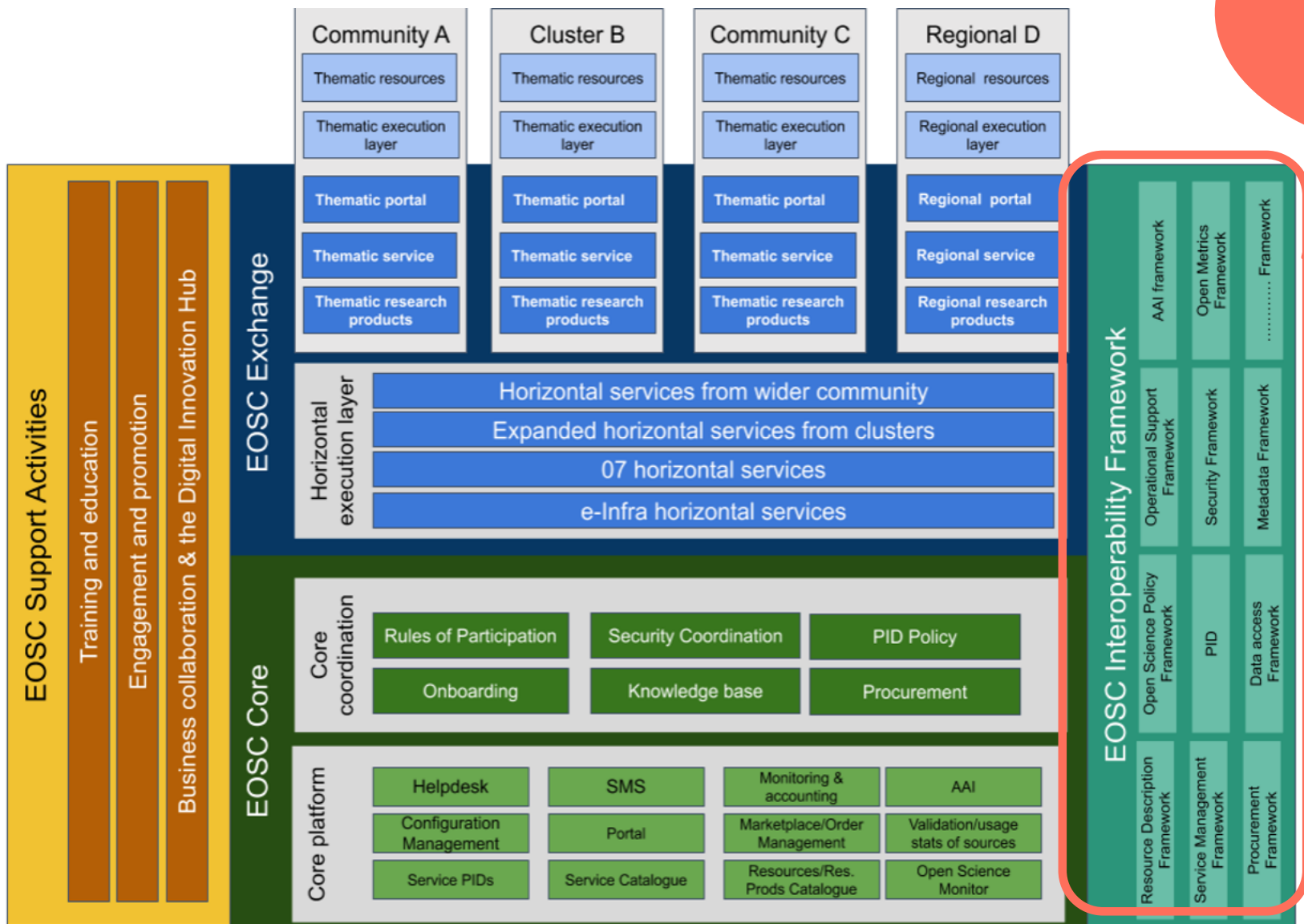# EOSC Architecture – Federation model

EOSC Architecture – Federation model

EOSC Architecture – Federation model

EOSC-Core Interoperability Guidelines available (Resource Catalogue, AAI, Monitoring, etc.)

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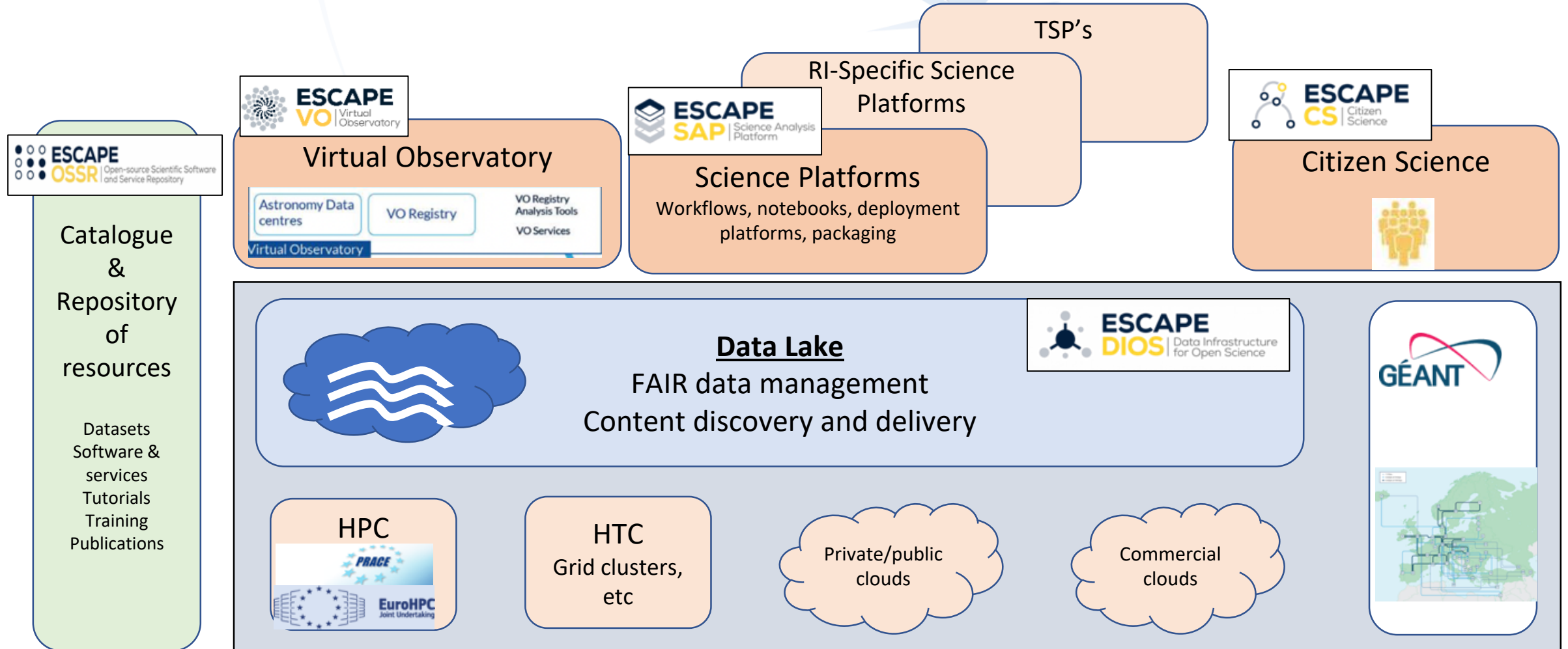EOSC Future

Other projects associated with EOSC-Future

- Projects funded (INFRAEOSC-07) in parallel with EOSC-Future to provide specific resources or functions

- EGI-ACE (Advanced Computing for EOSC)
  - Building a compute platform, and federated services; hybrid (HTC, HPC) & free-at-the-point-of-use

- OpenAire Nexus
  - Portfolio of tools for Open Science
    - FAIR data, publishing, access, exploitation, …

- Others (DICE, C-Scale, …)
  - Funded for specific communities

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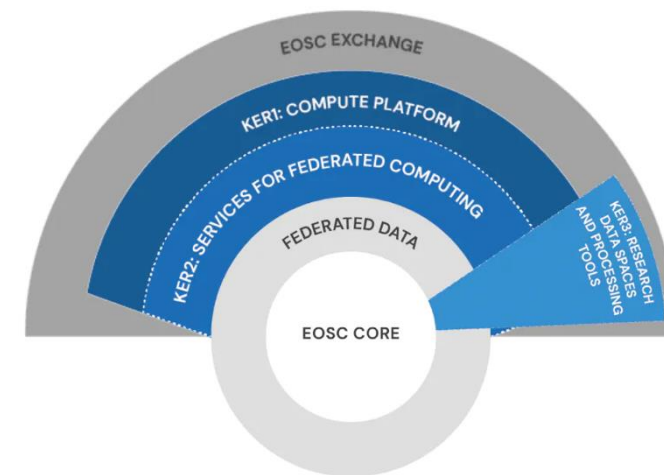
Promoting, implementing and committing to *Open Science*

- Envisage ESCAPE services moving into the EOSC-Exchange layer, and connections to the Interoperability Framework.
- Rely on EOSC-Core for underpinning aspects, e.g. AAI

ESCAPE EOSC cell

TSP's

RI-Specific Science Platforms

Virtual Observatory

Science Platforms
Workflows, notebooks, deployment platforms, packaging

Citizen Science

Catalogue & Repository of resources

Datasets
Software & services
Tutorials
Training
Publications

Data Lake
FAIR data management
Content discovery and delivery

HPC

HTC
Grid clusters, etc

Private/public clouds

Commercial clouds

Integrators: Cross-cutting Science Projects

* **Dark Matter:**
  * understand the nature of dark matter by collecting data, analysis pipelines and results from complementary astronomy, particle and nuclear physics sources on a broad platform that will be ultimately be hosted on the EOSC Portal
  * exploit synergies and complementarities across different communities, creating a unique link between dark matter as a fundamental science question and the ESCAPE Open Science services needed to answer it

* **Extreme Universe:**
  * do 'frontier' multi-messenger science to understand extreme matter and particle processes in strongly curved space-time
  * combine astronomy and e-infrastructures and focus on data organisation
  * organise data from different wavelengths/messengers - and different types of extreme astrophysical transients (SNe, GRBs, FRBs, TDEs) - so that they can be easily gathered, analysed and modelled holistically, and not remain fragmented as present

*Linked to two corresponding JENAA EoIs
(with already about 1000 subscribed scientists)*

Connecting to EOSC... a work in progress

Data Lake
Software Repository

ESCAPE

Science Analysis Platform

Virtual Observatory services, ESFRI workflows

Citizen Science

+ Science Projects
to enhance the researcher participation in EOSC

Generic services, e.g. notebook service, citizen science frameworks, ...

Funded compute & storage resources

IVOA and other existing standards

AAI integration with Data Infrastructure
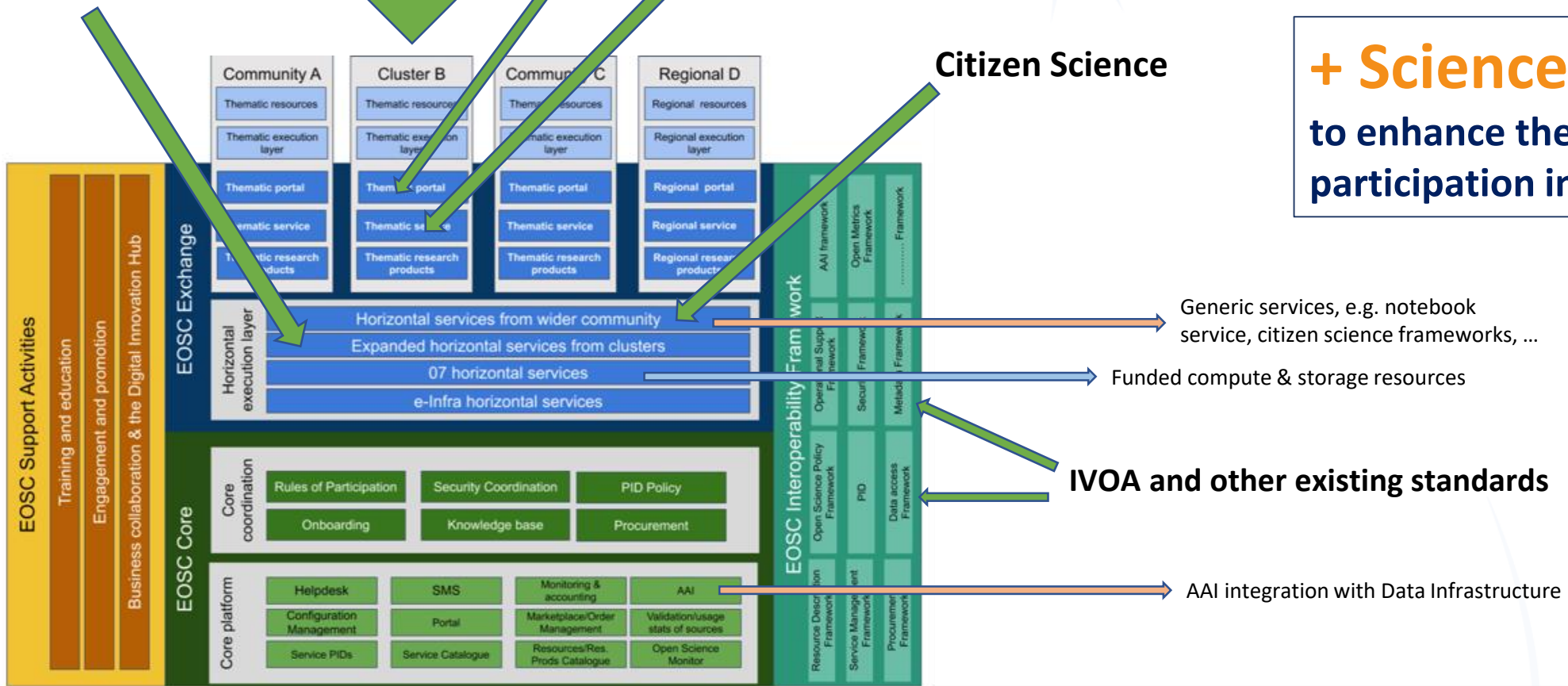
ESCAPE in EOSC-Future

❑ Tasks for ESCAPE as part of EOSC-Future (WP6):

■ Integrate ESCAPE (& ESCAPE RI) services and tools into EOSC

■ Make use of EOSC core facilities & services in ESCAPE

■ Deploy the TSPs, using the ESCAPE infrastructure integrated with EOSC-Future services
  • Demonstration of the integrations
  • Avoid big-bang integration – proceed incrementally

ESCAPE integrations into EOSC

❑ Catalogue of software and services – OSSR

   ❑ Intention - we onboard the OSSR into EOSC, making it visible & searchable from EOSC-portal

      ❑ Consequently all ESCAPE tools, sw, services, training material can just be published via OSSR, and automatically visible in EOSC

      ❑ Contents of OSSR will be ESCAPE (RI) contributions to EOSC-Exchange

   ❑ Status – onboarded into OpenAire, waiting for OpenAire connection to EOSC-portal

❑ Data catalogues – HEP Open Data portal & Virtual Observatory

   ❑ Intention - make these catalogues & repositories visible from EOSC-portal

      ❑ No intention to move or re-catalogue data

   ❑ Assumes that all of ESCAPE Open Data will be published via these catalogues

   ❑ Status – not started yet, but both use recommended metadata schema & common technologies

❑ Open questions:

   ❑ What integrations with core services are needed?

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EOSC Future

Use of EOSC core services in ESCAPE (for TSP)

- ❑ AAI:
  - ❑ IAM – emerged that IAM not fully conformant to AARC blueprint arch. – a proxy has been written – under test; EOSC federation "soon"
  - ❑ Eventually we expect each ESCAPE RI to manage its own AAI & federate directly to EOSC
- ❑ Helpdesk:
  - ❑ Some ESCAPE RI's have one, simply connect to EOSC to ensure ticket exchange
  - ❑ RI's without, can use EOSC helpdesk
- ❑ Monitoring & Accounting:
  - ❑ Some RI's have full mon.&acc. –
    - ❑ What should be published towards EOSC & why? (obv. Use of EOSC-funded resources)
  - ❑ New RI's could implement their own or use EOSC core service?

- ❑ Resources – compute & storage
  - ❑ Made available via EGI-ACE, but want to use EOSC AAI to access
  - ❑ need to combine use of ESCAPE/RI resources and "EOSC" resources
  - ❑ Want to e.g. use cloud storage as part of DL too
- ❑ We would welcome a common notebook service, that integrates backend compute and storage

TSP Deployment in EOSC-Future

- ❏ Ideally would like to use the EOSC AAI federation as prerequisite (at least ESCAPE ↔ EGI)
    - ❏ I think we are close to being able to test this
    - ❏ Later move to full federation will be transparent for us

- ❏ Start to deploy some parts of sub-TSP projects on EOSC resources
    - ❏ Example:
        - ❏ data in the ESCAPE data lake, run compute on EGI-ACE cloud resources; move data between DL and compute transparently with single credential
        - ❏ Integrate use of HPC (with FENIX) to relevant workflows
    - ❏ Demonstrate full workflows combining ESCAPE and EOSC services and resources, including use of appropriate core services
    - ❏ Publish scientific outputs (software, algorithms, data, publications) into EOSC (via ESCAPE services like OSSR, data portals, Zenodo, etc.)

EOSC Future

Some comments & open questions

❑ "Services"; term is overloaded & misused

  ❑ We can use EOSC core (& Exchange) services

  ❑ We run our own (ESCAPE) services

  ❑ By publishing software into EOSC-Exchange, we are not offering a service

    ❑ BUT – in a procurement process, one of our institutes may tender to run an EOSC service based on software ESCAPE has built

❑ Long term funding model of EOSC resources is unclear

  ❑ Within ESCAPE we should agree how we fund cross-RI analyses (outside of project funding)

❑ Processes like Rules of Participation; registrations, onboarding, etc. seem heavy

  ❑ Concern among science clusters and EOSC-Association

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EOSC Future

Summary

❑ EOSC-Future WP6 is onboarding science cluster infrastructures with EOSC services

    ❑ But it is slow, and delayed by lack of AAI federation still

❑ We should be ready ~now to deploy first TSP workflows onto EOSC resources

❑ There is a milestone at EOSC-Future M18 (Sept 2022) to have sustantial parts of this integration done

    ❑ We need to show progress
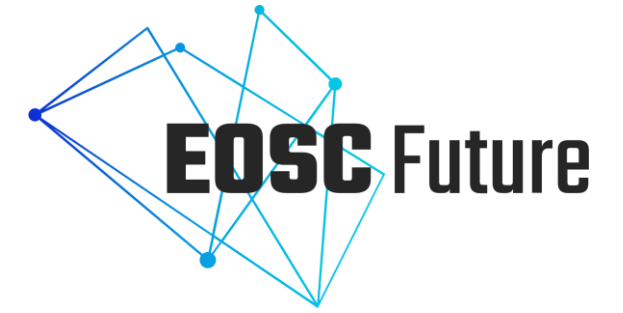
Backup material

ESCAPE IAM integration with EOSC AAI federation

- The EOSC AAI federation is initially based on Security Assertion Markup Language (SAML) technology

  - OpenID Connect does not support federations yet

- INDIGO IAM is an OpenId Connect Provider and an OAuth2 Authorization Server

  - it can also act as a SAML Service Provider, but not as a SAML Identity Provider

- An OIDC-to-SAML proxy is needed to integrate the ESCAPE IAM as a Community AAI for EOSC

  - a SATOSA Proxy has been chosen to satisfy this use-case
  - it is provided by GÉANT within the EOSC-Future project
  - the ESCAPE IAM integration is ongoing
  - a successful integration of the ESCAPE IAM as Community AAI with FENIX AAI federation (1:1) has been demonstrated