EOSCpilot
The European Open Science Cloud for Research Pilot Project
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The European Open Science Cloud and the EOSCpilot project

Simone Sacchi*

EOSCpilot/OpenAIRE workshop

"Future Open Science services for scientific communities"

Berlin, October 23, 2017

*The content of this slide deck has been contributed by the partners of the EOSCpilot project and adapted for this presentation

Why Europe is not yet fully tapping into the potential of data?

- *Data coming from publicly funded research is not always **open** due to lack of clear incentives*
- *Lack of general framework for the **reuse** of data*
- *Frequent lack of data interoperability*
- *Still some **fragmentation** of data infrastructures (geographic, thematic, technological, governance)*
- *Offer does not match yet demand in storage and world-class High Performance Computing (**HPC**) infrastructures*

Slide adapted from Lorenza Saracco, European Commission, presented at the EOSCpilot kickoff meeting

The European Open Science Cloud for Research pilot project is funded by the European Commission, DG Research & Innovation under contract no. 739563

EOSC Political drivers

"We must create infrastructure. Europe's final transition must be one from fragmented datasets to an integrated European Open Science Cloud. By 2020, we want all European researchers to be able to deposit, access and analyse European scientific data through a European Open Science Cloud"
Commissioner Carlos Moedas, Amsterdam, 4 April 2016

EC Communication "European Cloud Initiative" of 19/4/16

Three pillars:

- EOSC: the European Open Science Cloud
- EDI: the European Data Infrastructure (Development and deployment of large-scale EU HPC, data and network infrastructure)
- Widening access & building trust (SMEs, Industry, Government)

Slide adapted from Lorenza Saracco, European Commission, presented at the EOSCpilot kickoff meeting

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European Open Science Cloud(EOSC)

- The *EOSC* will provide all EU researchers a **trusted** virtual environment with free, **open and seamless services** for data storage, management, analysis, sharing, and re-use, across disciplines.
- The *EOSC* will **integrate** and **consolidate** horizontal **e-infrastructures.**
- The *EOSC* will **federate** existing and emerging thematic **data infrastructures** and **scientific clouds**, effectively bridging todays fragmentation and ad-hoc solutions.
- The *EOSC* will add value (scale, data-driven science, inter-disciplinarity, data to knowledge to innovation) and **leverage** current & past infrastructure **investment** (10b per year by MS).

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here comes

The EOSCpilot project

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EOSCpilot: High Level Aims

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The EOSCpilot project will support the first phase in the development of the EOSC.

- Propose and trial a governance framework for the EOSC
- Contribute to policy and best practice in open science
- Develop a number of demonstrators functioning as high-profile pilots that integrate services and infrastructures to show interoperability and its benefits in a number of scientific domains
- Engage with a broad range of stakeholders, crossing borders and communities, to build the trust and skills required for adoption of an open approach to scientific research.

WP1

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EOSCpilot: Partners

33 Partners, 15 Third Parties (+ now more)

- Domain specific research infrastructures providers, projects and clusters
  - STFC, EMBL, MPG, INFN, INGV, DESY, DANS, ICOS, INAF, BBMRI, ESS, BGS, XFEL, ERCIN and CERN.
- Horizontal e-Infrastructure providers
  - CSC, SURF, CNRS, JISC, PRACE, BSC, GEANT, CEA, CINECA, EGI and LIBER.
    - (Projects EUDat, Indigo-DataCloud, EGI-Engage, AARC, and OPENAire+)
- Research performing and support organisations
  - EGI, UEDIN-DCC, LIBER, TRUST-IT, ARC, CNR, DANS, KIT, UEDIN, UGOE, UMAN, PIN and BGS
- Research Funding Organisations
  - STFC, SURF, CNRS and CNR

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EOSCpilot: Challenges

Scientific Challenges are really *Opportunities*

Scientific Challenges: deploying the EOSC to deliver Open Science

Technical Challenges are *Barriers to overcome*

Technical Challenges: developing technical solutions that meet the scientific needs

Cultural Challenges are also *Barriers*

Cultural Challenges: adopting new, more open ways of working

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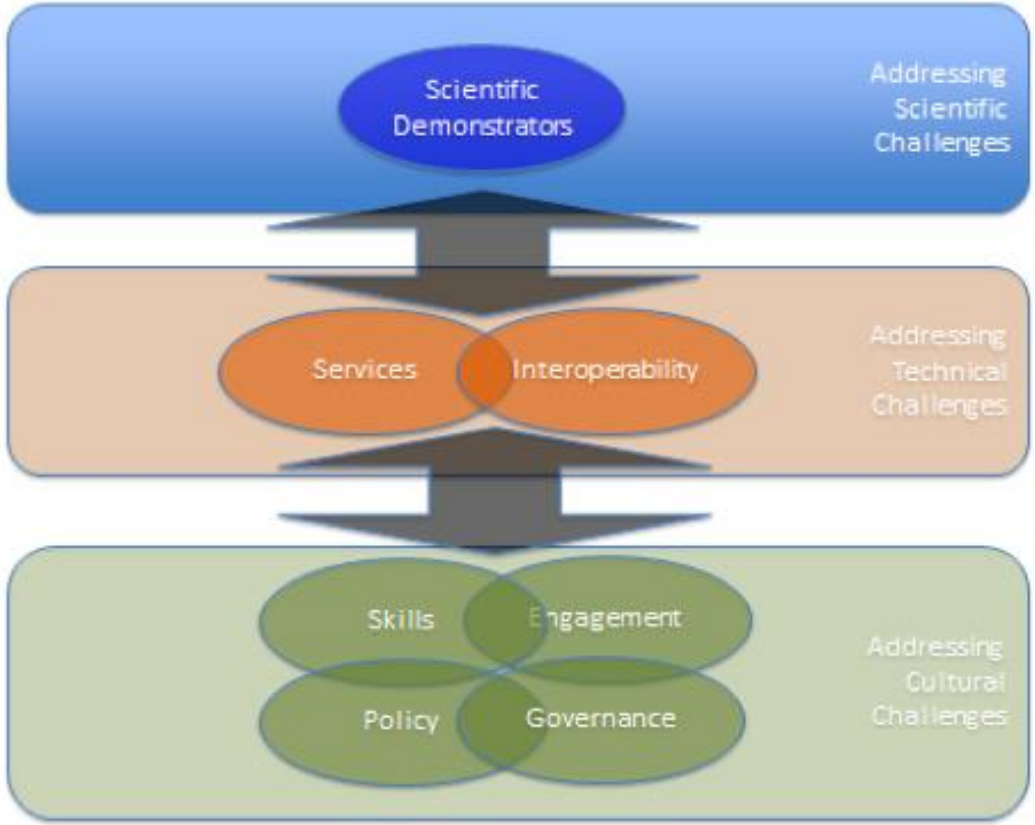
EOSCpilot: WP Challenges



WP1

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EOSCpilot: WP Level Objectives

- **WP2 Governance**: to design and trial a stakeholder-driven governance framework …
- **WP3 Policy**: to establish the policy environment required for the effective operation…
- **WP4 Science Demonstrators**: to develop a number of Science Demonstrators … to drive the development of the EOSC.
- **WP5 Services**: to create a number of EOSC pilot services that federate data, infrastructure and services …
- **WP6 Interoperability**: to define and implement specifications, interfaces, standards and processes that …underpin interoperability and sharing …
- **WP7 Skills**: to develop common standards and assessment frameworks to ensure …
- **WP8 Community Engagement**: to identify and bring together … the major groups of stakeholders …

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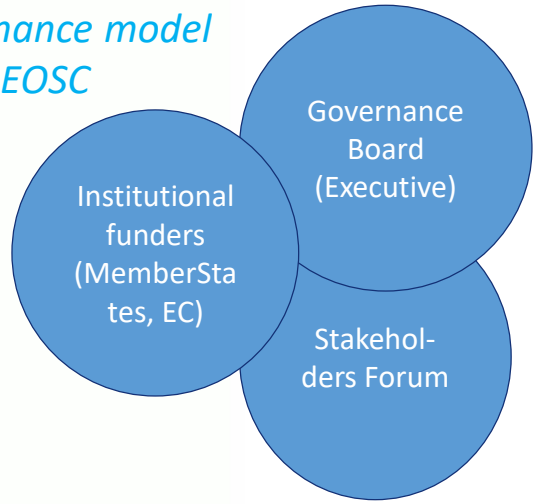
EOSC Governance

Three level governance model introduced in the EOSC declaration



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PRACE
CNR
BSC
ICOS ERIC
GEANT

EOSCPilot's vision on EOSC

- Capable of supporting the definition, management and coordination of EOSC components and service providers without imposing a strict hierarchical model or supply chain
- Define organisational, operational and managerial interoperability, whilst recognising the System-of-Systems will evolve and adapt over time.
- A rich ecosystem consisting of many different stakeholders and a heterogeneity of services and technologies which will need to operate across a wide range of organisational, community and national borders.
- Same principles of openness, transparency and inclusion that EOSC seeks to encourage amongst the research community

WP2

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EOSC Governance (EOSCpilot)

Partners

ARC, CSC, MPG, Elixir, PRACE, STFC, BSC, CNR, Jisc, CNRS, ICOS RI, EGI.eu

- Stakeholder scoping
  - Engage stakeholder through **Governance development forum**
- Federated governance framework for the EOSC
  - Governance framework piloting process
- Preparatory work for business models to underpin EOSC sustainability
  - Investigation and analysis of organisational principles of engagement
  - Leverage of member states investments
  - Creation of "EOSC Funders Summit"

WP2

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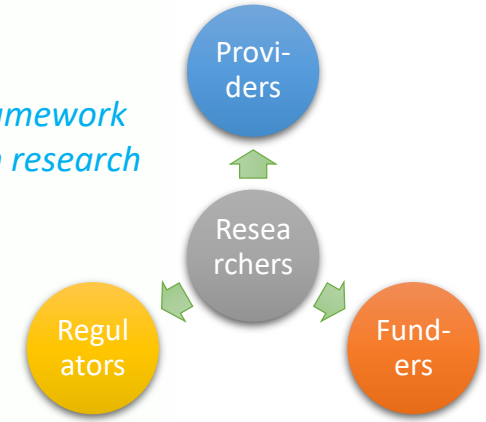
Governance and Policy

Example of governance framework topics – decision flow from research point of view



- Analyse principles of engagement (from already established ones)
- Seek consensus from a broad community of expertise to identify policy drivers and constraints and evidence-based ways to address these
  - focus: open science, open scholarship, data protection and assurance, procurement, and ethics
- Analyse and recommend different funding and business models
- Consolidate the above with input from the technical, service and interoperability demonstrators (to form a governance framework)
- Work closely with the European Commission to pilot, trial, build an evidence base and establish consensus on the governance framework with a broad community

Get involved:

- ✓ EOSC governance development forum monthly webinars, next Nov 9, 14 CET
- ✓ Thematic workshops tergeting different stakeholders
- ✓ More info at https://eoscpilot.eu/about/governance-framework

WP2/WP3

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Policy Framework

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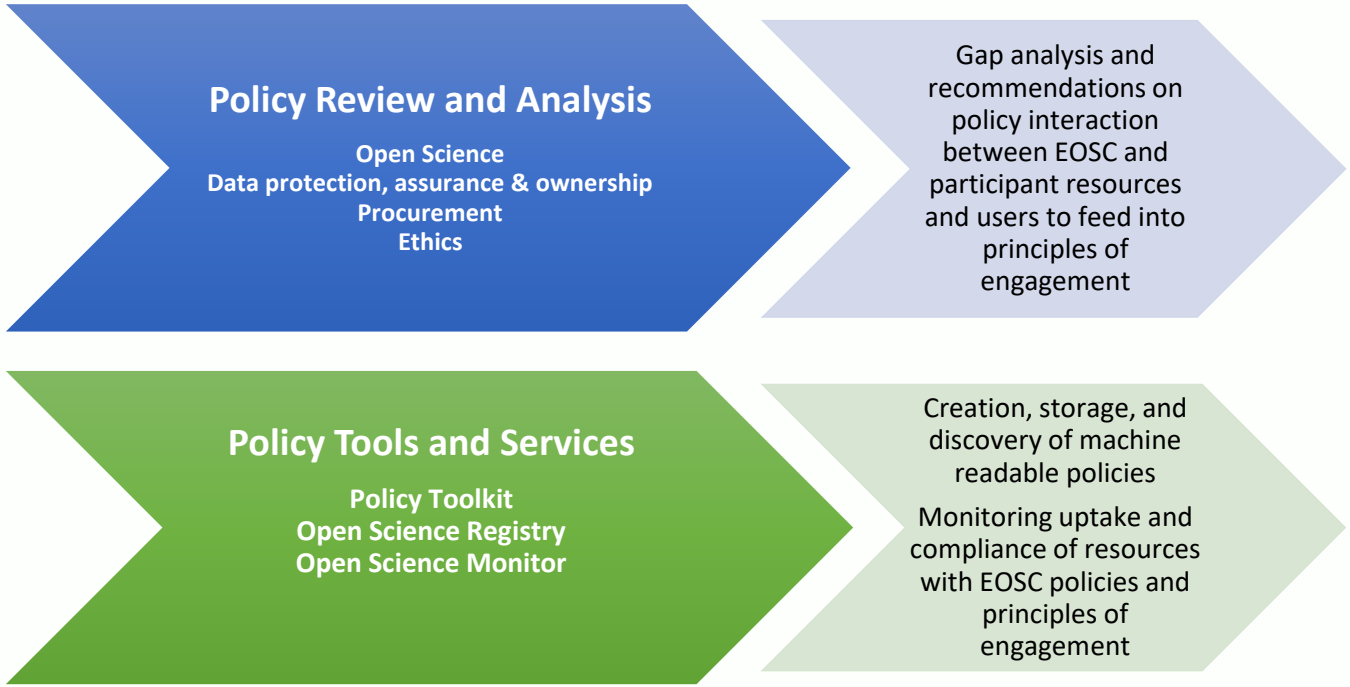
ECRIN
Géant
CSC
DANS
STFC
CNR
ICOS
INGV
LIBER



"Policy will go hand in hand with the implementation of technical and human resources, and a social infrastructure including education and training."

EOSC Declaration

WP3

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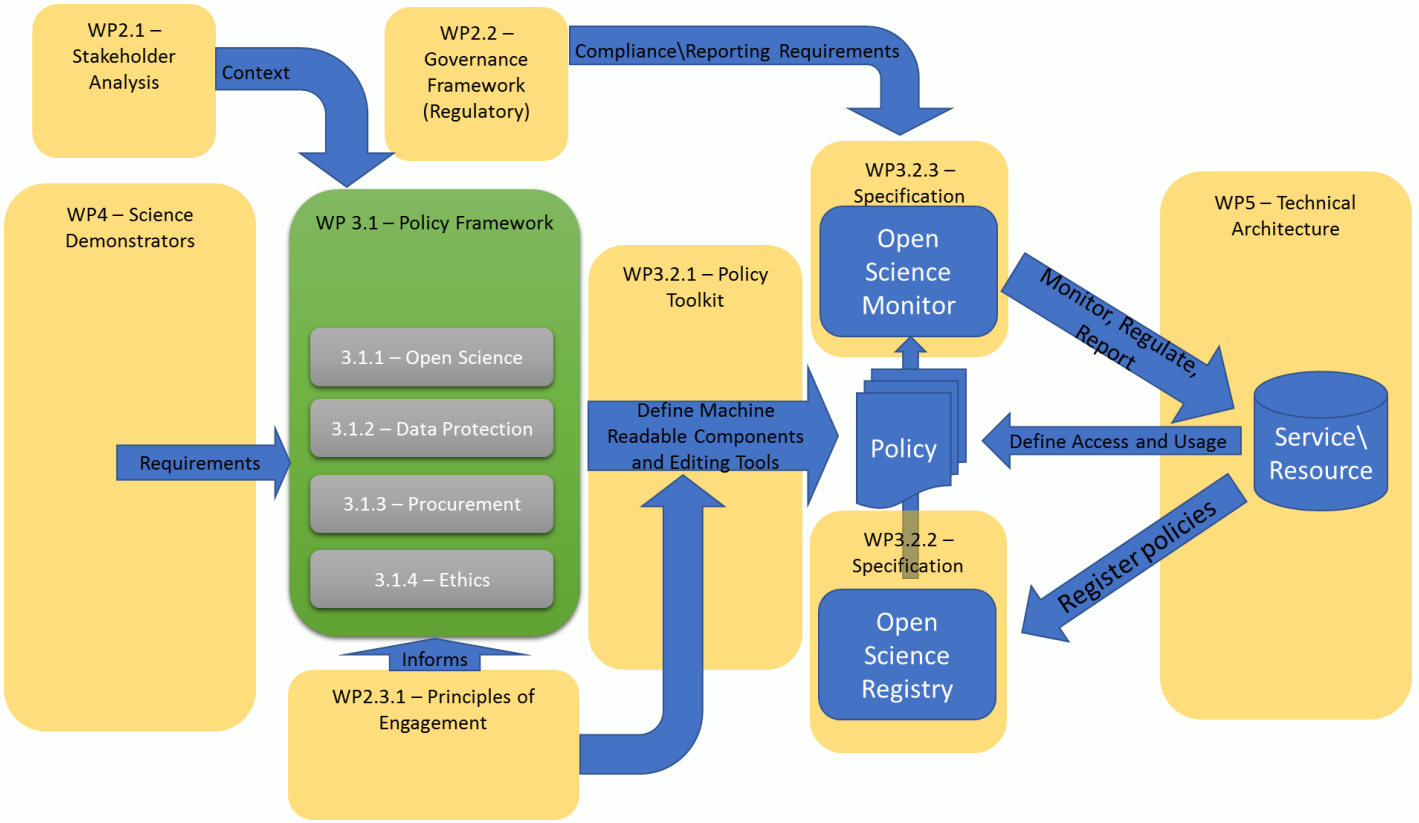
Policy Framework relationships



WP3

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First five Science Demonstrators in EOSCpilot

- **Environmental & Earth Sciences** - ENVRI Radiative Forcing Integration to enable comparable data access across multiple research communities by working on data integration and harmonised access
- **High Energy Physics** – DPHEP/WLCG: large-scale, long-term data preservation and re-use of physics data through the deployment of HEP data in the EOSC open to other research communities
- **Social Sciences** – TEXTCROWD: Collaborative semantic enrichment of text-based datasets by developing new software to enable a semantic enrichment of text sources and make it available on the EOSC.
- **Life Sciences** - Pan-Cancer Analyses & Cloud Computing within the EOSC to accelerate genomic analysis on the EOSC and reuse solutions in other areas (e.g. for cardiovascular & neuro-degenerative diseases)
- **Physics** - The photon-neutron community to improve the community's computing facilities by creating a virtual platform for all users (e.g., for users with no storage facilities at their home institutes)

Partners
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DESY
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EU XFEL
PIN SCRL

WP4

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Second five Science Demonstrators in EOSCpilot

- **Energy Research – PROMINENCE**: HPCaaS for Fusion - Access to HPC class nodes for the Fusion Research community through a cloud interface
- **Earth Sciences – EPOS/VERCE**: Virtual Earthquake and Computational Earth Science e-science environment in Europe
- **Life Sciences / Genome Research**: Life Sciences Datasets: Leveraging EOSC to offload updating and standardizing life sciences datasets and to improve studies reproducibility, reusability and interoperability
- **Life Sciences / Structural Biology**: CryoEM Workflows: Linking distributed data and data analysis resources as workflows in Structural Biology with cryo Electron Microscopy: Interoperability and reuse
- **Physical Sciences / Astronomy**: LOFAR Data: Easy access to LOFAR data and knowledge extraction through Open Science Cloud

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EOSC Overall Architecture

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STFC
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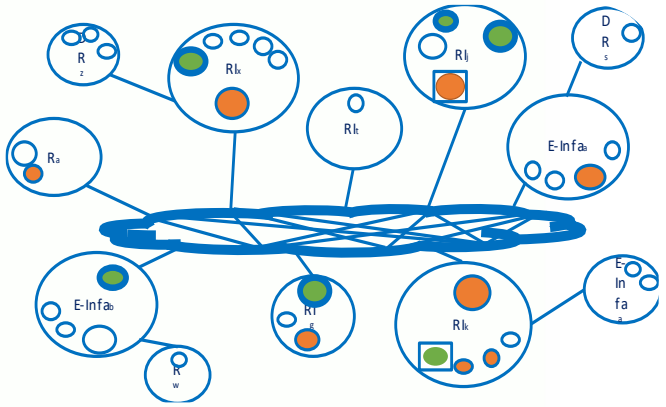
MPG
EMBL
ATHENA RC
INFN
INGV
BSC
GEANT
INAF
ESS
EU XFEL
PIN SCRL

WHAT
Open Science

"Open Science represents a new approach to the scientific process **based on cooperative work and new ways of diffusing knowledge by using digital technologies and new collaborative tools**. The idea captures a systemic change to the way science and research have been carried out for the last fifty years: shifting from the standard practices of publishing research results in scientific publications **towards sharing and using all available knowledge at an earlier stage in the research process**."

"Open Science **has an impact on the entire research cycle**, from the inception of research to its publication, and on how this cycle is organised."

HOW
System of Systems



Components:
Exiting and emerging RIs, e-Infras, data repositories, registries,…

WP5

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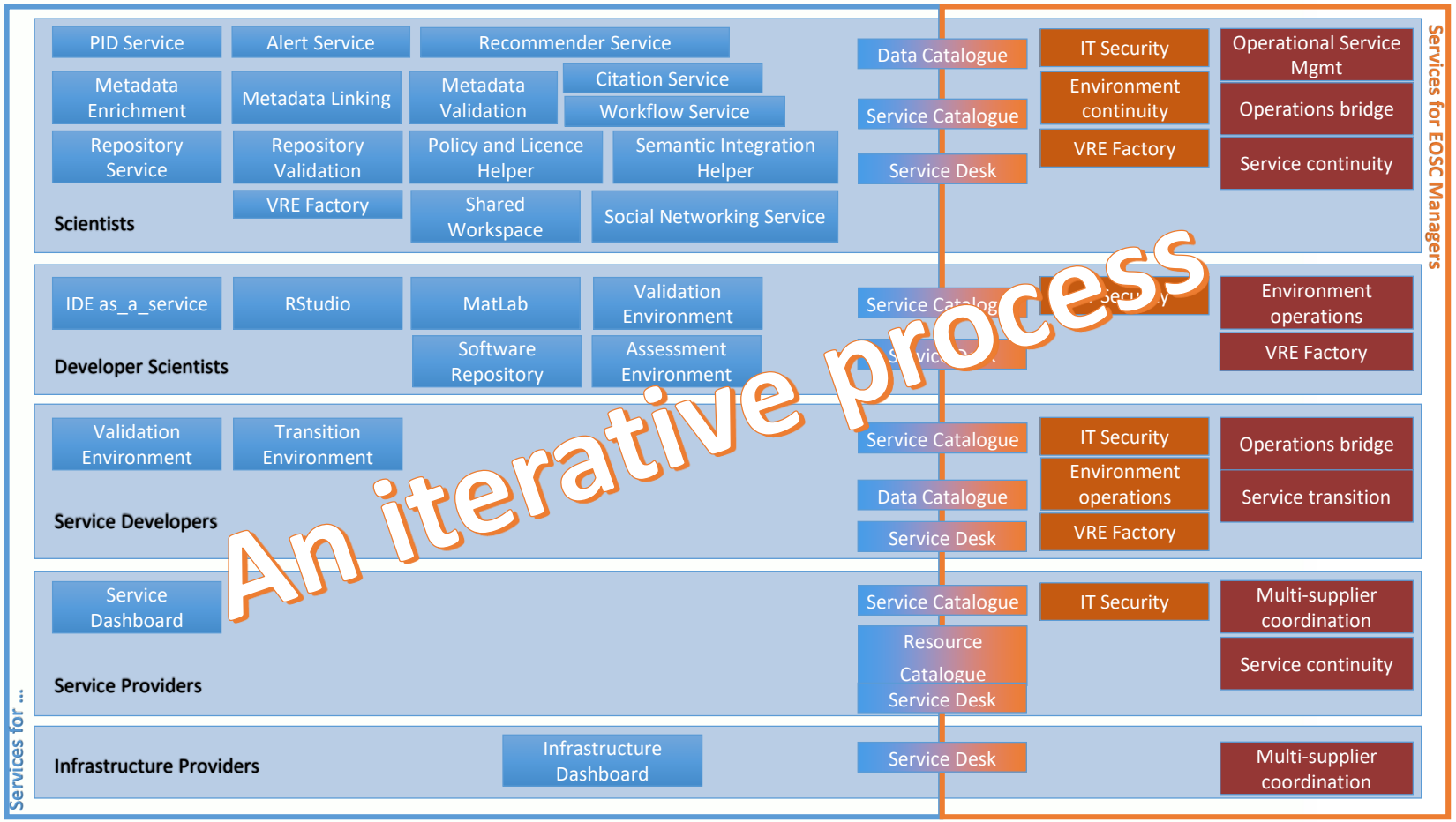
EOSC Services



WP5

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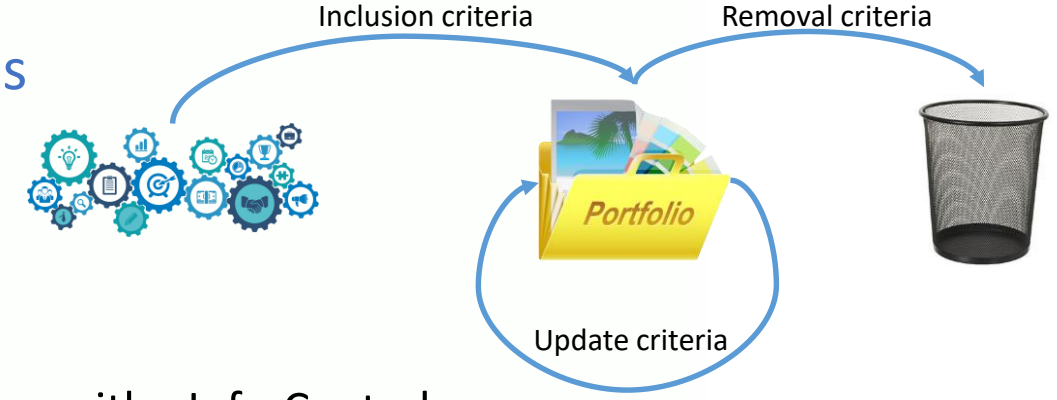
EOSC Service Portfolio

The purpose of a Service Portfolio is to understand, both internally and externally, what services an organisation provides.



- Service description template in collaboration with eInfraCentral
- Collection of service descriptions from a variety of stakeholders
- Identification and analysis of service portfolio methodologies
- Identification of stakeholder needs and wants (under which conditions do service providers want to offer or consume services from the EOSC?)
- Creating a minimal set of service requirements that works for most service providers and ensures compliance with EOSC goals
- Creating a set of sane default requirements to elaborate on the minimal set and improve service quality

WP5

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EOSC Service Management Framework

EOSC Principles of Engagement for Service Providers: an EOSC service provider is an organisation which provides a specific service under the EOSC framework, in compliance with the EOSC rules of engagement which must be followed by all service providers, including:

- A series of principles (EOSC principles)
- A set of technical requirements (EOSC technical requirements)

→These rules of engagement are defined in collaboration with other work packages and shall be discussed & supported by the community

EOSC Service Management Framework: the EOSC Service Management Framework (SMF) describes the implementation of principles, policies and structured processes of the EOSC and comprises guidelines and policies for the collaborative management of all services provided by and within the EOSC.

→ The task has started to look at the various SMF in place within existing e-Infrastructures and research infrastructures, looking at commonalities & differences of practices

Why is a Service Management Framework needed for EOSC?

Having a SMF adopted by all the EOSC service providers will contribute to harmonising service provision across the EOSC and better define roles and responsibilities from service providers. It would also foster trust between service providers and research infrastructures / data providers, and contribute to the sustainability of the EOSC services beyond projects.

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EOSCpilot Service Pilots

- Assisting all Science Demonstrators (SDs) in fulfilling their initial aims and providing expertise from WP5 partners. Level of success will be measured by input provided by each SD at the end of their funded period
- Extracting useful information from each SD to contribute to the evolution of EOSC architecture, service and portfolio management
- The final report “Evaluation report of service pilot” will include input from each of the completed SDs over the course of the project.

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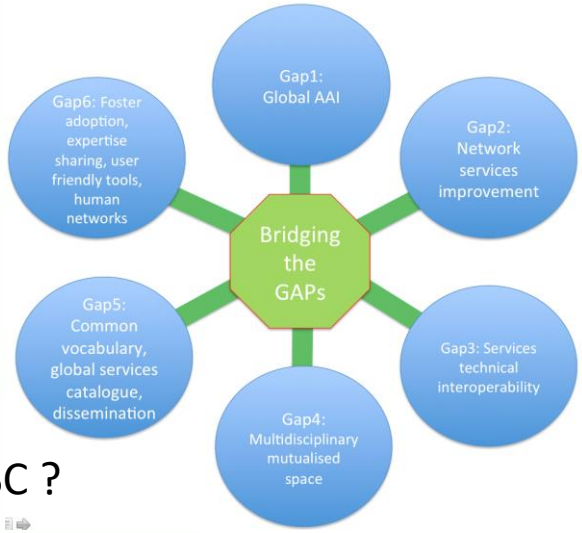
CEA
CINECA

WP6

Interoperability Demonstrators



Key points:

- How do we make sure to connect our e-infrastructures in the EOSC ?
- How ensure a FAIR data landscape in the EOSC ?
- Point out barriers, present and demonstrate solution

- Gap analysis & interoperability architecture
  - Gap analysis and first EOSC e-infrastructure architecture delivered
- EOSC Research and Data interoperability
  - FAIR principle: start working on findability and accessibility
  - Report in December, based on the results of several workshops and dedicated meetings
- Interoperability pilots
  - Working closely with the Science Demonstrators
  - Getting requirements in order to put the pilots into action

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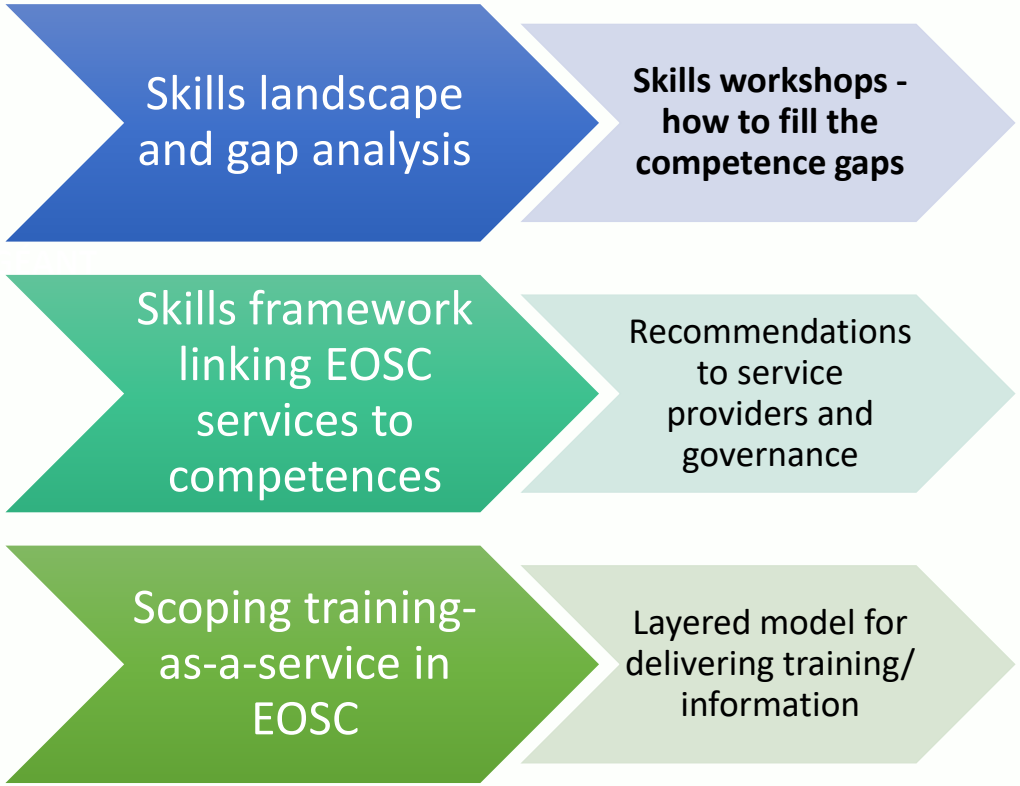
Skills and Training



Partners
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DANS
EGI.ue
KIT
LIBER

"An important aspect of the EOSC is… professional data management and long term data stewardship."

A Cloud on the 2020 Horizon, EOSC HLEG

WP7

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Engagement and Communication

Manage the communication and engagement with groups of stakeholders to raise awareness of EOSCpilot outputs to gather input for future requirements

Partners
TRUST-IT
LIBER
CSC
UEDIN
ATHENA
RC
UGOE
KNAW

- How? Engage with the **broader scientific communities, funders, policy makers, intermediaries and industry**
  - Identify major groups of stakeholders and bring them together
  - Build trust and broaden the EOSC user-base
  - Collect user and provider needs to feed the EOSC roadmap
  - Promote the EOSCpilot outputs through targeted engagement activities and communication campaigns
  - Liaise with other WPs and project partners

WP8

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