EOSC-hub

MAGAZINE

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EOSC-hub Magazine

The EOSC-hub Magazine is a publication of the EOSC-hub project, edited to showcase major results and achievements of the project, collaborations ongoing with other initiatives and updates from the communities. The magazine also provides an overview of the latest highlights from the European Open Science Cloud (EOSC) landscape.

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About EOSC-hub

The EOSC-hub project brings together multiple service providers to create the Hub: a single contact point for European researchers and innovators to discover, access, use and reuse a broad spectrum of resources for advanced data-driven research.

For researchers, this will mean a broader access to services supporting their scientific discovery and collaboration across disciplinary and geographical boundaries.

The project mobilises providers from the EGI Federation, EUDAT CDI, INDIGO-DataCloud and other major European research infrastructures to deliver a common catalogue of research data, services and software for research.

EOSC-hub is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement 777536.

Start: January 2018

End: December 2020

Total budget: €33 million

100 Partners

EOSC-hub with 9 spokes: the structure of the digital innovation wheel

Matti Heikkurinen gives an overview of the EOSC-hub key exploitable results

There is a temptation to define major projects like EOSC-hub using large, impressive numbers: 100 partners, thousands of person-months, more than 50 countries. However, the most impressive number is probably one: the project is focused on contributing to a single vision: EOSC as the shared space for research and innovation in Europe.

However, neither one innovation space nor 100 partners are ideal answers to the question "What does EOSC-hub do?". Thus, one of the roles of the Key Exploitable Results (KER) is to make the cornucopia of project outputs and activities easier to grasp. KERs do not automatically cover everything of value, but they are deemed to be the best starting points for uptake and future developments.

EOSC-hub project has identified the following 9 KERs as its "showcases", listed and summarised as follows:

EOSC Marketplace and EOSC-hub contribution to the EOSC Portal

> Being able to find the services that are available as EOSC services is a crucial part of building the critical mass for the new innovation ecosystem. EOSC-hub, OpenAIRE and eInfraCentral partnered to create a permanent entry point - the EOSC Portal - to ensure that the current and future services can be promoted, discovered and taken into use by the EOSC users and service providers.

Internal Services provided in the Hub Portfolio

> Internal Services support integrating services (e.g. the External Services) to the EOSC Portal and making it possible to provide users with more uniform experience when combining services from different providers.

External Services for research in the EOSC Service Portfolio

> Most of the EOSC-hub users are also developing tools and solutions, and most of these solutions are potentially useful for other users. The EOSC Service Portfolio covers the tasks needed to add these new services to the marketplace and the EOSC Portal.

Service Management System (SMS)

> A mature service is usually noticed only when it fails: flipping a switch and staying in the dark, opening the tap and having to leave the house with shampoo in the hair or waiting for a bus and giving up after half an hour. The goal of the SMS is to keep EOSC-hub users from noticing the key services. The EOSC-hub environment poses some additional challenges: services need to link new, non-standard voltages and water pressures from different sources, and the "commuters" usually carry backpacks that are the size of a house.

Digital Innovation Hub: Platform for industrial collaborations with EOSC

Industrial R&D and academic research share tools and services - despite the big differences in goals and constraints between the sectors. The Digital Innovation Hub consolidates the knowledge, skills and approaches the project uses to increase the reuse of tools and services and to make EOSC-hub services suitable and relevant for the industrial partners.

Business and sustainability models for services and the Hub

To achieve its goals as a shared innovation space, EOSC services need to be persistent in a sustainable manner. This means that all of the participants in the EOSC service ecosystem need to be financially sustainable. The diversity of the ways to achieve this adds to the challenge. Some of the services are accessible against a fee, but many of the EOSC-hub ones need to be similar to library resources: free at the point of use and not financed by advertisement or other methods used by the commercial "free" services. The business and sustainability models KER summarises the identified viable approaches to the sustainability of the EOSC-hub services.

Rules of Participation

To ensure uniform user experience for the users of the services that they access through the marketplace, it is necessary to understand the quality and maturity of both internal and external services. The Rules of Participation include criteria that are used to determine in what way the service could and should be included in the EOSC Service Portfolios and therefore in the marketplace.

Integration and interoperability guidelines

This KER contains a set of technical specifications that allow developers to gain full benefits from the Internal Services in the Hub Portfolio and ensure interoperability with other services accessible through the marketplace.

Training courses and material

The numerous services provided by the EOSC-hub community and the project need to be supported by an extensive and consistently curated collection of training and education material and services. This service ensures that it is possible to identify the courses and material that is most relevant for each of the members and groups in the diverse user community.

Matti Heikkurinen is Senior Strategy and Innovation Officer at the EGI Foundation and part of the EOSC-hub Innovation Management Team.

The EOSC-hub proposal for the EOSC technical architecture

Diego Scardaci outlines EOSC-hub's recommendation for the EOSC technical architecture

Back in June 2019, EOSC-hub organised a "Technical Workshop" to gather input onto the design of the EOSC technical architecture.

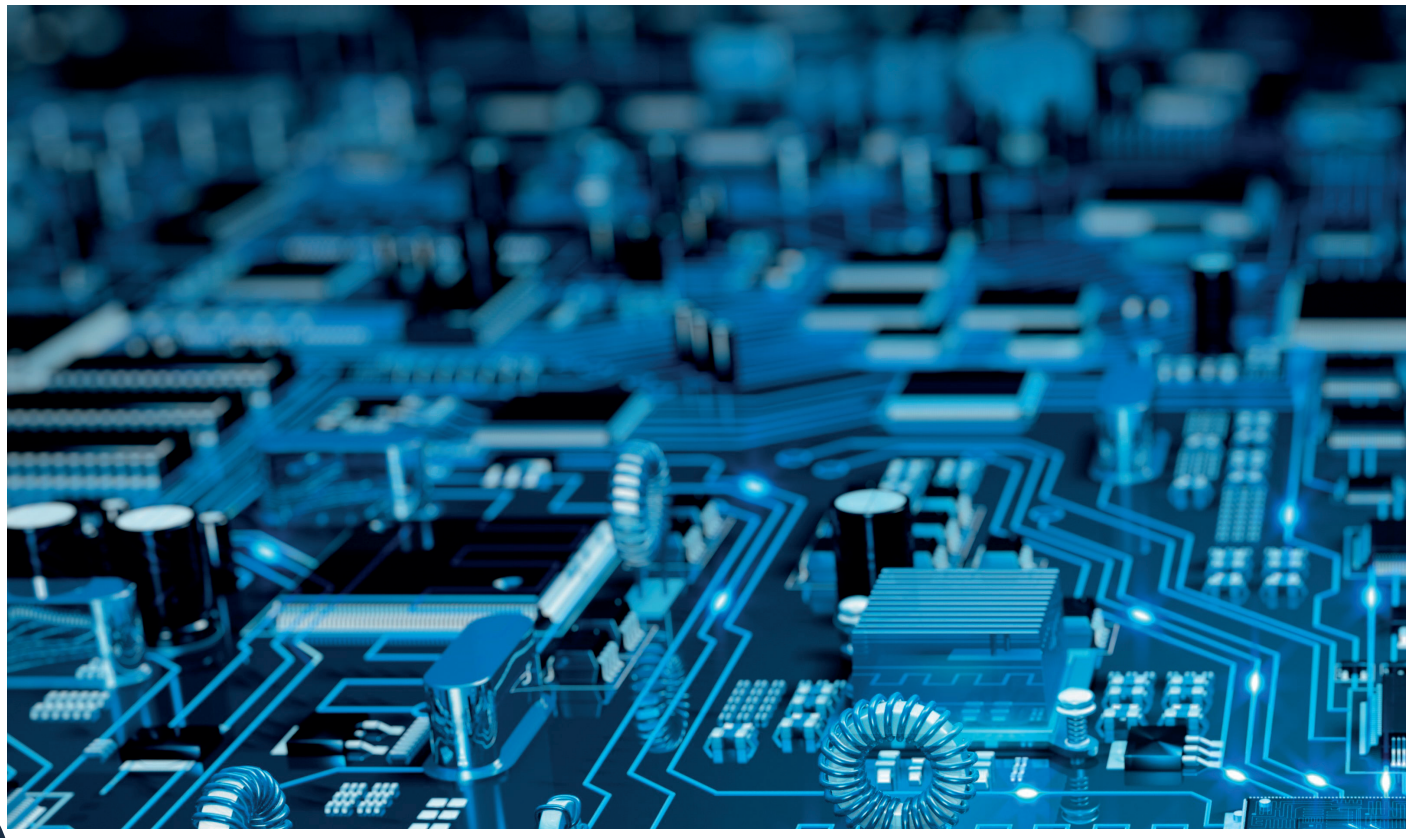
The discussion was around the technical capabilities that EOSC services should provide and related EOSC use cases, taking into consideration the main recommendations from the EOSC pilot scientific demonstrators and other EOSC-hub use cases, notably the PanCancer initiative, the Photon and Neutron experiments, the ELIXIR and EPOS research infrastructures.

The workshop gathered around 40 participants from EOSC-hub and collaborating projects such as OpenAIRE-Advance and GNT4-3. After an introductory session where user requirements were presented and the overall strategy to define a technical architecture was discussed, participants worked on identifying key features EOSC should deliver for the technical area.

Finally, the workshop led to a proposal of an EOSC Technical Architecture.

The envisaged Technical Architecture for EOSC would facilitate access to services, lower barriers to address complex digital needs, integrate data and services from multiple suppliers, support FAIR data and enable cross-infrastructure interoperability. The architecture includes functions, interfaces, APIs and standards as technical concepts, with the final aim of fostering interoperability and, ultimately, service composability. It is based on a hierarchical structure with three levels:

- Service categories.
- Functional categories within the main category.



- Individual building blocks usable in fulfilling these functions.

The subdivision in categories allows differentiating services according to their function within EOSC:

- Federation & Access Enabling: services to support the EOSC Operations (e.g. the EOSC Portal, AAI, the monitoring or the accounting).
- Common: generic services that offer add-value features on top of EOSC resources (computing, storage, data, etc).
- Thematic: implement discipline specific features.

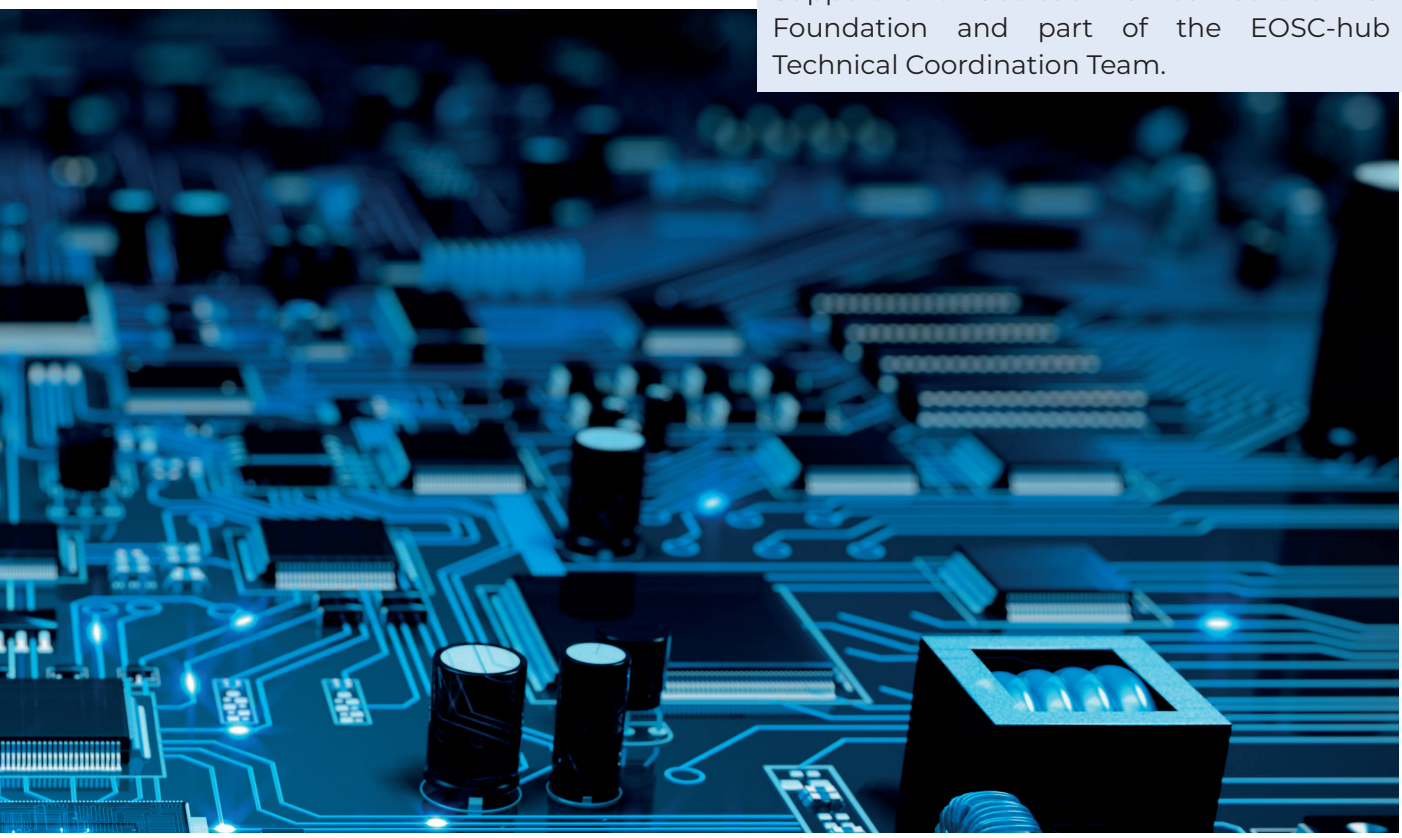
The second level of the hierarchy introduces the functional categories that groups technical functions to facilitate their identification. Beneath this, we see the individual building blocks that implement technical functions. Examples or function categories are Authentication and Authorisation or Monitoring, while an example of building block is the AAI.

EOSC-hub is working on implementing this reference architecture following a common approach that foresees the identification of key building blocks in each service category and, for each of those, the definition of a technical and interoperability specification that includes a series of distinguishing information, notably an high-level architecture, suggested EOSC standards and APIs and interoperability guidelines. In this way, EOSC 'compliant' services will offer documented interfaces for usage and integration, based on well-known standard or APIs, facilitating:

- their exploitation from user communities willing to create new scientific services.
- the combined usage of EOSC services: the adoption of well-known standards and interfaces will very likely reduce the cost to integrate services.
- the support of FAIR data: technical specifications will provide clear instructions for service providers for the use of FAIR data in support of open research.

The proposal was put forward for discussion in the wider EOSC environment. A webinar was organised during the summer to present it to a large set of user communities, feedback collection was launched in September and the work was discussed within the EOSC Architecture WG for its adoption. Initial feedback was positive and the official results from the survey will be presented at the EOSC Symposium in Budapest.

Diego Scardaci is Senior User Community Support and Outreach Officer at the EGI Foundation and part of the EOSC-hub Technical Coordination Team.



Success Stories from the EOSC Digital Innovation Hub

The EOSC Digital Innovation Hub (DIH) works as a tool for private companies to collaborate with public institutions within the European Open Science Cloud to access technical services, research data and human capital. The EOSC DIH supports these companies in their digitalization and growing process.

Over the last 18 months, an initial set of six business pilots have worked to mature their service offering and achieved incredible success, demonstrating the tangible value that the EOSC DIH can bring to the private sector industry, especially start-ups and SMEs.

In addition, four new business pilots have recently joined the EOSC DIH teams and started their collaboration with the EOSC-hub project.

Business pilot achievements

CyberHAB: using data cloud services to manage harmful algae blooms

CyberHAB is the first cyberinfrastructure of its kind – a versatile platform powered by cloud computing able to combine large volumes of data for the management of harmful algal blooms. CyberHAB was developed by Ecohydros as part of the SME's collaboration with EOSC-hub. CyberHAB uses EGI Notebooks as an interface and processes analysis with the EGI Cloud Compute service. The platform can be used to extract information from monitoring data, converting hundreds of variables and parameters into visualizations to support decision-making.

VAMOS: analysing sports performance through a cloud hosted platform

VAMOS is a web-application where users can analyze and monitor the performance of an athletic gesture. VAMOS was developed by the Moxoff SME in a quest for a smart video processing tool able to extract KPIs in a data-driven and automated way and allow coaches and athletes to save time and increase their efficiency. Working with EOSC-hub gave Moxoff the possibility to increase its computational capacity and to reach an active network working on mathematical modelling, data science and optimization.

ACTION Seaport: smart-port technologies for improved safety and operations

ACTION Seaport is a mobile-friendly platform designed by Bentley Systems with a purpose to support decision-making for port authorities and boost seaport performance in the long-term. ACTION Seaport helps port authorities and operators to improve maritime situational awareness, provides early-warning notifications for adverse conditions, and delivers piloting and navigation support. Via EOSC-hub, Bentley Systems got the cloud computing resources needed to deploy the platform.

Guardomic: securing online services from botnet attacks

As part of their collaboration with EOSC-hub, Koma Nord and Idego designed and developed Guardomic – a tool suite to protect online services from botnets attacks. EOSC-hub allowed the two companies to use cloud and storage resources needed to develop, configure and manage Guardomic. As part of the EOSC Digital Innovation Hub, they are also now part of a large European consortia of science institutes and other organisations.

DS-DRACO: a cloud framework for state-of-the-art Space Weather data

DRACO aims to establish a network of observatories generating high-resolution cosmic ray Space Weather data with an unprecedented level of detail. The DS-DRACO pilot was developed by Hidronav as an EOSC DIH business pilot to build a cloud infrastructure that can manage the distribution and ensure the availability of this Space Weather data. Joining forces with EOSC-hub allowed DS-DRACO to access the cloud computing resources needed to meet their processing and storing requirements.

DataFurn: platform-as-a-service data analytics for the furniture industry

AIDIMME designed and deployed DataFurn – a platform to provide intelligence and insight into furniture industry trends. DataFurn uses EGI Cloud Compute resources via the EOSC-hub project to deploy its architecture. Fifteen companies are currently in the process of testing the platform.

Four new business pilots joining the EOSC DIH club

Kampal Data Solutions: Artificial Intelligence for rare disease diagnosis

Kampal Data Solutions is working with EOSC-hub to develop an Artificial Intelligence model that can help to predict the probability of developing Gaucher disease. Opening its sample to healthy patients increases the sample size (from hundreds to millions) and potentially the model's complexity. This implies the need of advanced computational resources such as the cloud platform provided by EOSC. The developed solution could be adapted in the future to other diseases databases.

NetService: blockchain for university certificates

The aim of this pilot is to address the possibility for public institutions to issue valid official documents in a digital form, on the blockchain. In a blockchain-based system, paper-based documents are replaced with digital documents on an immutable ledger. This blockchain can be obtained via an authentication service from a Certification Authority of the EUTSL list, or the AAI service provided by EOSC-hub project such as Check-In or B2Access. The pilot will look to demonstrate that the solution can be deployed on a federated infrastructure such as the EOSC along with cloud service support.

DCP: dynamic resource allocation and accounting in a digital marketplace

This business pilot is aiming to create a cross-platform solution that aggregates computing resources from arbitrary devices and digital infrastructure - from smartphones to enterprise servers and makes it available to researchers and innovators on-demand. DCP would allow both individual institutions as well as federated infrastructures, such as the EOSC, to recapture and allocate underutilised resources, while providing a credit-based accounting system to quantify usage of processing, bandwidth, and storage resources.

BBC R&D: transforming video content through compression and large-scale processing

The video coding team within BBC R&D focuses on multiple aspects of video technology, with the general goal of supporting the delivery of high-quality content to all BBC audiences. Audiences are consuming more and more video, demanding increasingly higher quality, using a variety of devices. This is why video compression standards are needed, which allow compressed content to be distributed and then decoded by anyone. This pilot tests the use of large-scale processing resources, which have the capabilities to transform how content providers obtain, produce and deliver content in challenging scenarios.

More information:

An in-depth publication on the EOSC-DIH success stories is available at www.eosc-hub.eu/publications.

EOSC DIH: www.eosc-hub.eu/digital-innovation-hub

EOSC Portal: One Year On

A look back as the prototype achieves its first year live

More than €400 million has been invested by the European Commission since 2017 in the European Open Science Cloud (EOSC) initiative and the launch of the EOSC Portal as a prototype of the EOSC in November last year provided a glimpse on what the finished product could look like by the end of 2020.

EOSC Marketplace

An integral part of the EOSC Portal is the EOSC Marketplace, powered by EOSC-hub, piloting an integrated platform that allows to order services and resources for various research domains along with easy access to integrated data analytics tools.

As of September 2019, the EOSC Marketplace has received a total of **160 service orders.** On average, the portal receives **10,000 page views** every month from almost **2,400 monthly visitors.**

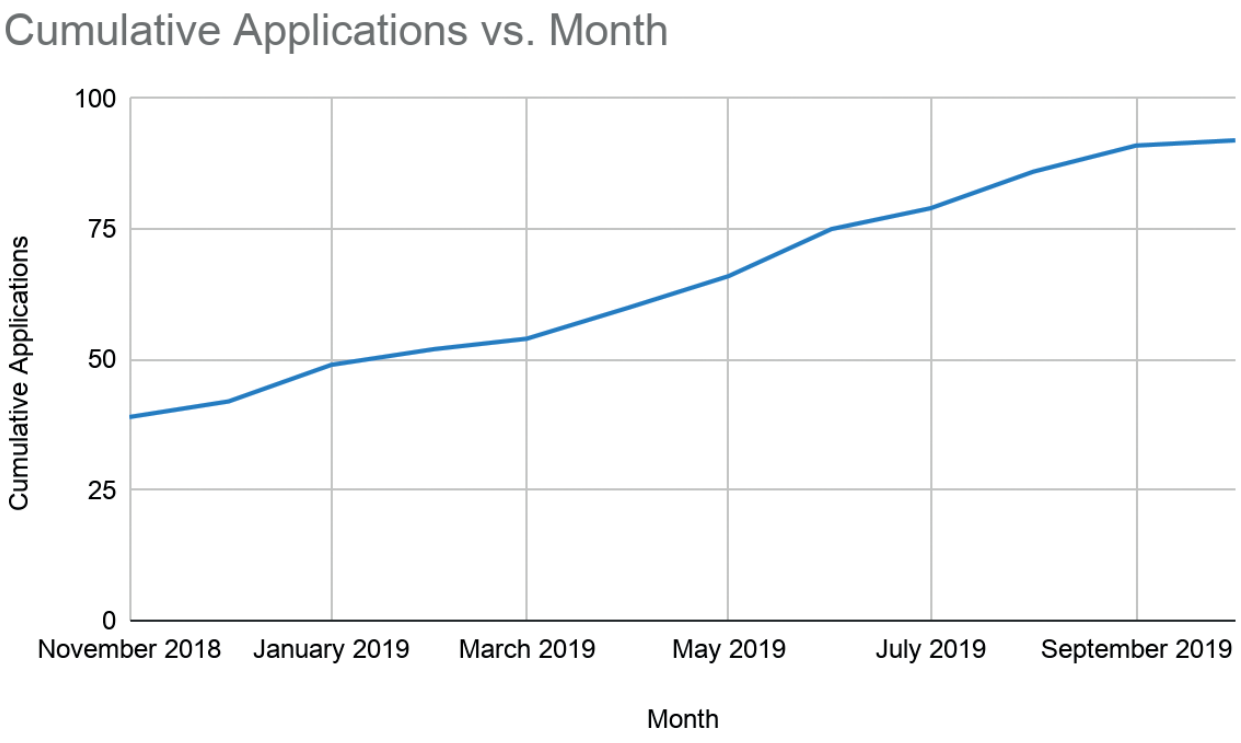
Service Onboarding

The EOSC Portal has received almost 100 applications from service providers for their services to be included in EOSC resulting in 87 total services from 99 service providers.

92 Requests received for inclusion to the EOSC Marketplace (as of 24 October)

87 Total services available in the EOSC Marketplace (as of 24 October)

99 Service providers in the EOSC Marketplace (as of 24 October)



Diversity of Offering

True to its essence, the EOSC Portal provides a diverse service offering spanning multiple service types and research areas.

Types of services

Compute Services: 23

Data Management Services: 22

Networking Services: 2

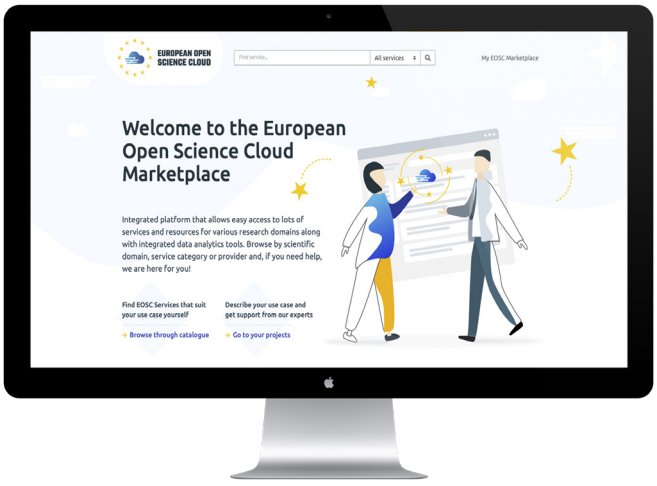
Processing and Analysis Services:36

Security and Operations Services: 6

Sharing and Discovery Services: 19

Storage Services: 17

Training and Support Services: 8



Services and Research Areas

Interdisciplinary Services: 50

Humanities services: 17

Social Sciences services: 25

Engineering and Technology services:7

Support Activities services: 5

Medical and Health Sciences services: 4

Natural Sciences services: 32

What's next?

From this year, a new project, EOSC Enhance, has been funded to enhance the EOSC Portal and connect existing thematic clouds to the portal. Together with the existing EOSC implementation projects and the recently funded regional EOSC projects (EOSC-Pillar, EOSC Nordic, EOSCsynergy and NI4OS-Europe) we expect the next year of the EOSC Portal to be marked by further improvements to the marketplace and an improvement to the service offering of EOSC and the overall usability of the portal.

Disclaimer: The data shown in this article, particularly regarding the types of services and research areas pertain only to the EOSC Portal Marketplace and does not include services included in the EOSC Portal Catalogue.

EOSC-hub and OCRE to Collaborate for Driving Cloud Adoption in European Research

As part of their efforts to drive usage of cloud computing in the European Open Science Cloud (EOSC), the EOSC-hub and OCRE projects have signed a Memorandum of Understanding (MoU) to collaborate on a number of fronts.Among the key outcomes of this MoU is that the Open Clouds for Research Environments project (OCRE), will be a participating partner in the EOSC-hub Early Adopter Programme (EAP). In this programme, selected researchers can benefit from free commercial IaaS resources, made available through vouchers in the OCRE project.

EOSC-hub Early Adopter Programme

The EOSC-hub Early Adopter Programme will provide expertise and resources to help researchers become active users of the EOSC. While providing this to the users, the programme also allows the EOSC service providers to gain insight into user needs and EOSC use cases.

The EAP is oriented to communities whose research activities have complex digital needs, involving multiple state-of-the-art technologies, research infrastructures and services that are not available in their current research environment.

OCRE's Role

The OCRE project enriches the European Open Science Cloud with offerings from commercial cloud and Earth Observation service providers. OCRE aggregates requirements and demand of the research community into a public procurement (tender), to establish agreements with capable service providers.

OCRE also stimulates cloud adoption by researchers, through an EC cloud adoption fund. As part of these efforts, OCRE will make available €100,000 to researchers in the Early Adopter Programme. Researchers will receive ready-to-use vouchers, for using resources at commercial cloud suppliers.

Introducing Commercial Services in the EOSC

The MoU also foresees the collaboration of EOSC-hub and OCRE in OCRE's tender process and outcomes. EOSC-hub will provide input to OCRE for developing its tender particularly on cloud interoperability requirements and guidelines, as well as procurement and business models.

Resulting services from the OCRE tender will also be added to the EOSC-hub service catalogue from the 2nd quarter of 2020 onwards.

To learn more, visit the EOSC Early Adopter Programme page (eosc-hub.eu/eosc-early-adopter-programme) and OCRE cloud adoption web page (ocre-project.eu/cloud-vouchers).

SAVE THE DATE

EOSC-hub Week 2020

18-20 May 2020
Karlsruhe, Germany

Don't miss the chance to become part of EOSC-hub's final flagship event!

Register to the EOSC-hub newsletter to be informed once registration is open.

www.eosc-hub.eu

Catch EOSC-hub's talks at the EOSC Symposium!

26th November 2019 - EOSC Symposium - Day 1

14:30 - 16:00: Breakout 2: Service Onboarding

14:30 - 16:00: Breakout 2: Business Models

27th November 2019 - EOSC Symposium - Day 2

11:30 - 13:00: Breakout 3: Impact of Requirements of FAIR on Technical Architecture

11:30 - 13:00: Breakout 3: EOSC Skills & Training (Part I)

11:30 - 13:00: Breakout 3: EOSC Key Exploitable Results

14:30 - 16:00: Breakout 4: Authentication and Authorisation Infrastructure (AAI)

14:30 - 16:00: Breakout 4: EOSC Skills & Training (Part II)

28th November 2019 - EOSC Symposium - Day 3

09:00 - 11:00: Breakout 5: Life and Environmental Science

Don't forget to check out EOSC-hub's poster in the poster area!

To see the most up-to-date rooms for these sessions, visit the EOSC Symposium online programme: eoscsecretariat.eu/eosc-symposium-programme

EOSC-hub

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