eInfra Central

"The eInfra How-to-Guide"
A guide for users of eInfraCentral

eInfraCentral received funding from the European Union's Horizon 2020 research and innovation programme (grant agreement No 731049). The project – delivered by a consortium of nine organisations across Europe – ran from January 2017 until June 2019.

eInfraCentral goals

The mission of eInfraCentral is to ensure that, by 2020, a broader and more varied set of users, from research to industry, can discover and access Europe's growing e-infrastructure capacity. End-users – researchers, innovators, industry actors – are often unaware of the e-infrastructure services available in Europe that could help them in their work. Similarly, service providers and data producers sometimes have difficulty reaching potential users because of the lack of coordination and harmonisation across the e-infrastructure organisations. Even if users can discover the existence of a certain service, it can be difficult to gather further information, or compare it with other existing services. Service providers also lack user feedback on ways they could improve their offerings. Taken together, this leads to fragmented or overlapping efforts as well as slower rates of open innovation. eInfraCentral was designed to address this challenge of fragmentation and help research community to discover services and resources for research.

eInfraCentral achievements

In design, eInfraCentral predates the European Open Science Cloud (EOSC) and the portfolio of EOSC-related projects. As the EOSC scene evolved, so did the project, in particular turning eInfraCentral's all-inclusive catalogue of e-services and resources into the heart of the EOSC Portal. The European Commission described eInfraCentral in the Implementation Roadmap for the European Open Science Cloud as one of the key building blocks of the EOSC Portal (alongside other H2020 funded projects EOSC-hub and OpenAIRE-Advance). The focus of the other three major outcomes of eInfraCentral – a harmonised service description template, a catalogue of services and a set of APIs – stayed unchanged.
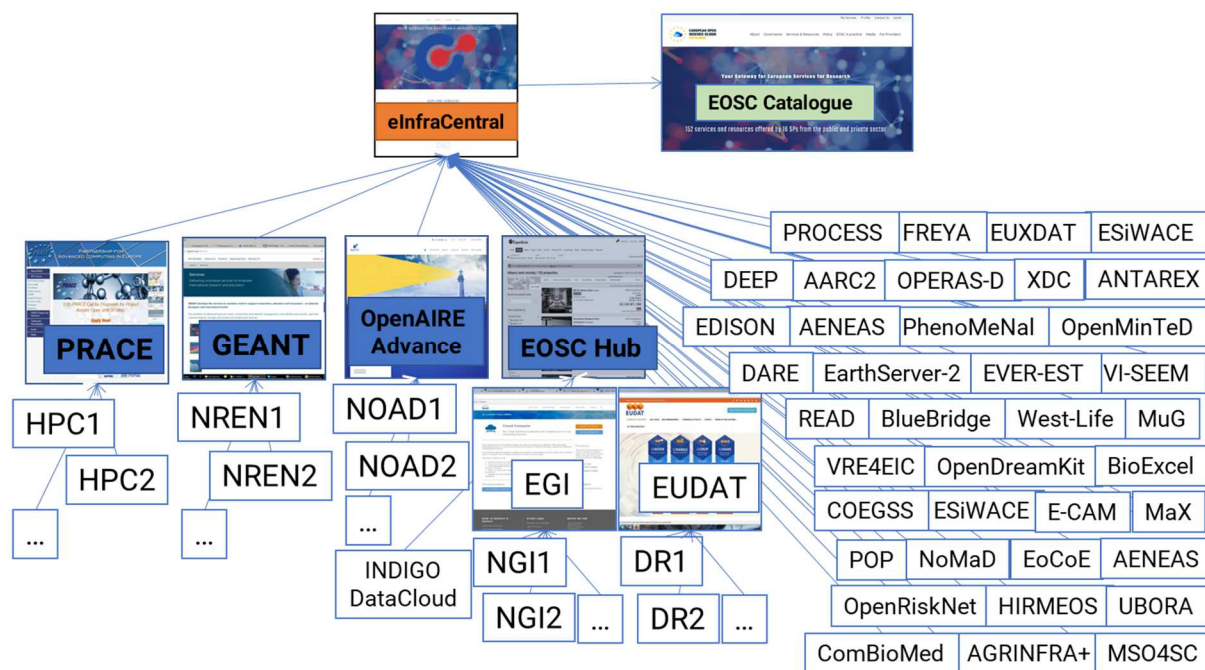
Who should use this document?

This e-publication is aimed at three target groups of eInfraCentral: end users (researchers), service providers and funders/policy-makers.

A harmonised service catalogue for EOSC:
A joint effort between five major e-infrastructures

One of the major challenges that EOSC aims to address is the historical lack of a single online service catalogue that potential users could explore across Europe. Some e-Infrastructure organisations have had their own public catalogues for a number of years; many others were at very early stages of developing their service catalogue; all were following different standards and approaches. Some described their services with varying level of detail and complexity, while others had no discoverable or accessible paths to their service offerings.

In partnership with five key e-infrastructures, GÉANT, OPENAIRE, PRACE, EGI and EUDAT, eInfraCentral has worked on harmonising this landscape. *Our approach to the EOSC Catalogue has been to promote and extend the best practices already followed by some of the e-Infrastructures, and to enable the harmonisation of service descriptions in a single, common catalogue.* The targeted ecosystem for the EOSC Catalogue included the main e-infrastructures alongside the rich diversity of other research infrastructures and projects. More than 20 service providers offering more than 300 resources and services are now part of the common Catalogue, which continues its efforts in reaching out to and engaging a wider community, including clusters and thematic services offered by research infrastructures.

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A common Service Description Template: Why? What? How?

The e-Infrastructure community now recognises that **a common approach to both describing and exchanging service-related information is the way forward** to improve discoverability and hence potential uptake. The eInfraCentral *Service Description Template* (SDT) addressed this goal, leading to its adoption as the standard scheme for representing service-related information in the EOSC Catalogue. The SDT is based on existing modelling efforts and is now the EOSC Catalogue baseline for:

- a common service management scheme applicable to different service providers from the public and private sector; and,
- a common representation format for the exchange of service-related information between different service catalogues.

The SDT organises service-related information into blocks to allow service providers to conceptualise the service management processes and move progressively from basic to more complex functions:

- **Basic Service Information**: basic information about a service such as the unique service identifier in the catalogue, the name, the provider, the description and links to the provider's page for accessing the service.
- **Service Classification Information**: information about the classification of the service in the EOSC Catalogue, such as thematic categories and subcategories, the Technology Readiness level and the lifecycle status.
- **Service Support Information**: support information for users to access a service, such as links to the providers' site to order the service or gain access to training material and helpdesk support.
- **Service Contractual Information**: information about the contractual parts of a service, such as pricing schemes, service level agreements (SLAs) and terms of use.
- **Service Performance Information**: performance indicators relevant to the service, as reported by the provider, including its availability (e.g. uptime), usage (e.g. number of users) or delivery time.

The SDT provides definitions of the services' features and attributes, example values and their specific format, as well as notes on whether the attribute is mandatory or optional for the implementation of a number of features in the EOSC Catalogue.

The current version of the SDT, endorsed by the flagship e-Infrastructures, is available online at https://github.com/eInfraCentral/docs. It is an evolving standard, which will incorporate new features from incoming e-infrastructures and research infrastructures in the EOSC ecosystem as they emerge.
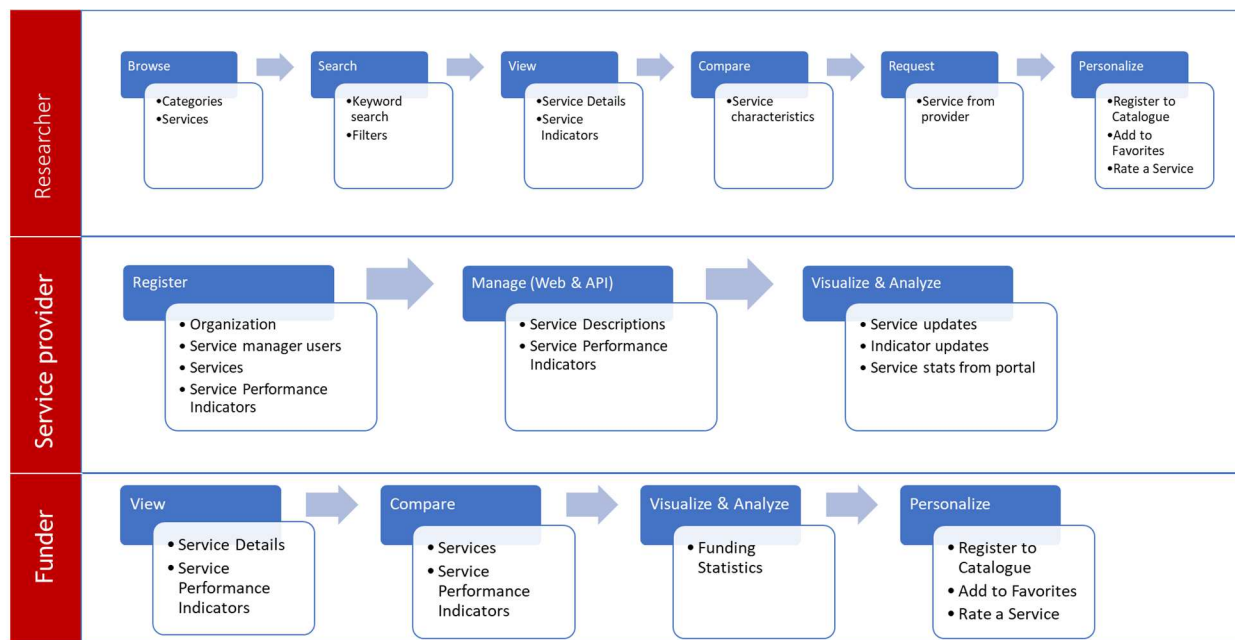
How to use the EOSC Catalogue

As part of the EOSC Portal, the EOSC Catalogue aims to accommodate a range of stakeholders, including users of e-services, from research and industry, e-infrastructure providers and other groups like policy makers and funding bodies.

Researchers and **Research Managers** are the main target group of the Catalogue: stakeholders with different interests that need access to e-services for their work or research. They can *browse* and *search* the Catalogue for services related to their needs and select specific ones to *view details* about their characteristics. They can also *compare* services with similar ones of the same category and finally *access the service* at the provider's site.

Registration at the EOSC Portal gives users access to additional functionality, notably profiling, personalisation and rating. Registered users can access personalised content by selecting services or service categories of interest, adding them to *favourite lists* or *rating* them along multiple quality characteristics.

Service providers can access the same advanced functionality as registered users. In addition, they can *register* their organization and *add* its services to the catalogue. They can also manage all service information in the Catalogue, either manually (via the Web) or automatically (via APIs), assign edit privileges to other users and view and visualise rich usage statistics for their services.

Funders can evaluate the status of the EOSC service landscape and make specific decisions on policy and funding. They can *view* and *access* service-related information, *compare* services, *get insights* about funding-related information and *personalise* their experience by registering with the EOSC Portal.

How to find and access services in the EOSC Catalogue

The EOSC Catalogue landing page offers intuitive ways to the users to access and start browsing the service catalogue.

**1.** A free text search box is available for the users to *quickly start browsing* the catalogue.
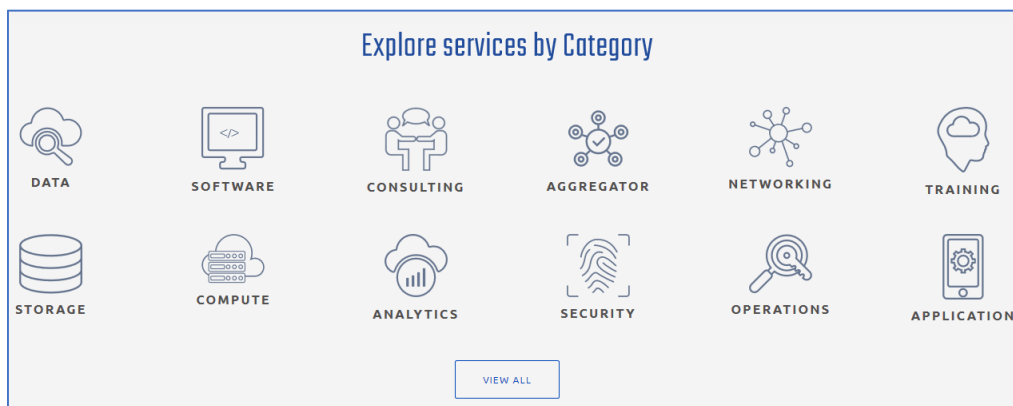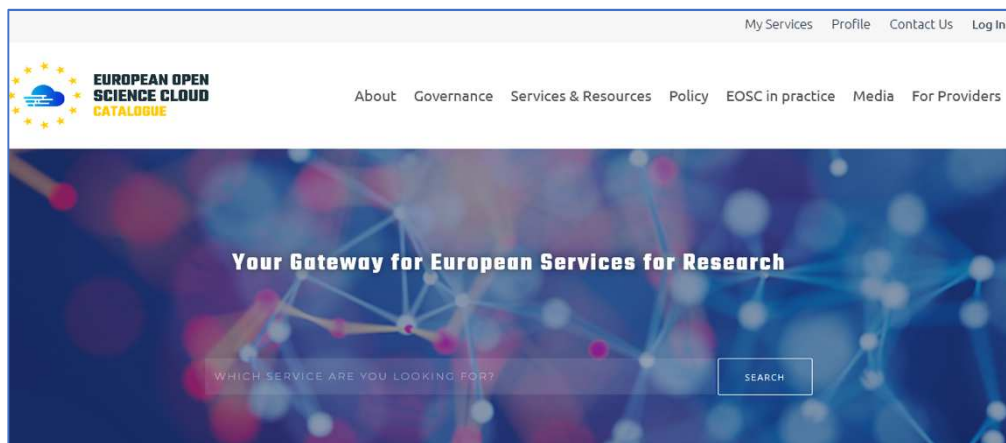
2. The Catalogue *groups all services into high level categories*, so users can *easily browse services* belonging to a specific category of their interest. .


BROWSE SERVICE CATEGORIES

AGGREGATOR	NETWORKING	STORAGE
CLARIN OpenAIRE Dashboard	eduPERT	EGI Archive Storage
CompBioMed Software Hub	GÉANT IP	EGI Online Storage
EGI Applications on Demand	GÉANT L3VPN	Secure File Sharing and Storage
EGI Marketplace	GÉANT Lambda	
EGI Validated Software and Repository	GÉANT MDVPN	TRAINING
European Cloud Hosting	GÉANT Open	CompBioMed Training Portal
European Marine Science OpenAIRE Dashboard	GÉANT Plus	EGI FitSM Training
Fisheries and Aquaculture Management OpenAIRE Dashboard	GÉANT Testbeds Service	EGI Training Infrastructure
		ISO 27001 Training
Greek Sustainable Development Solutions Network (SDSN) OpenAIRE Dashboard	OPERATIONS	Open Science Training
	EGI Accounting	OpenMinTeD Support and Training
Neuroinformatics OpenAIRE Dashboard	EGI Configuration Database	PRACE Advanced Training Centres
Open Telekom Cloud	EGI Helpdesk	PRACE MOOC

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3. Users can *select their role and navigate* to the services and functionality available for each role.
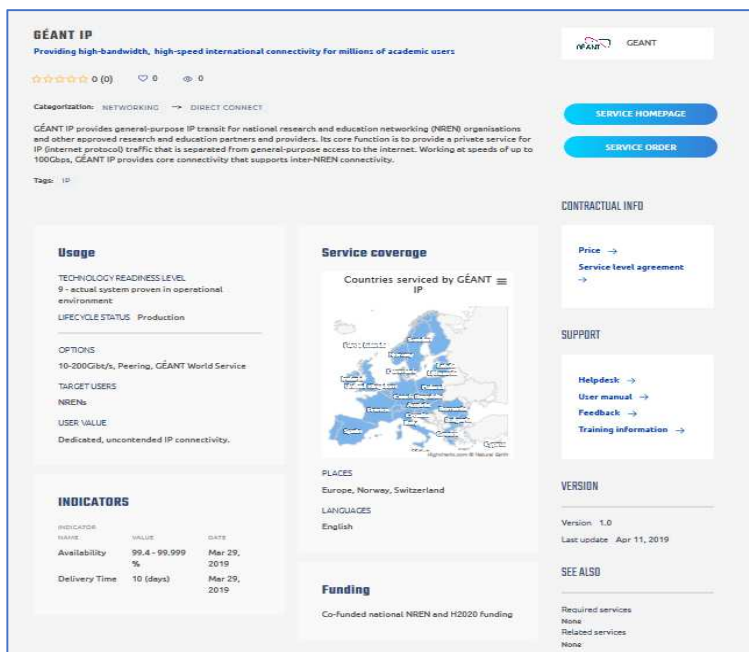
The resulting page lists service overviews and shows the main interface for service filtering and search.
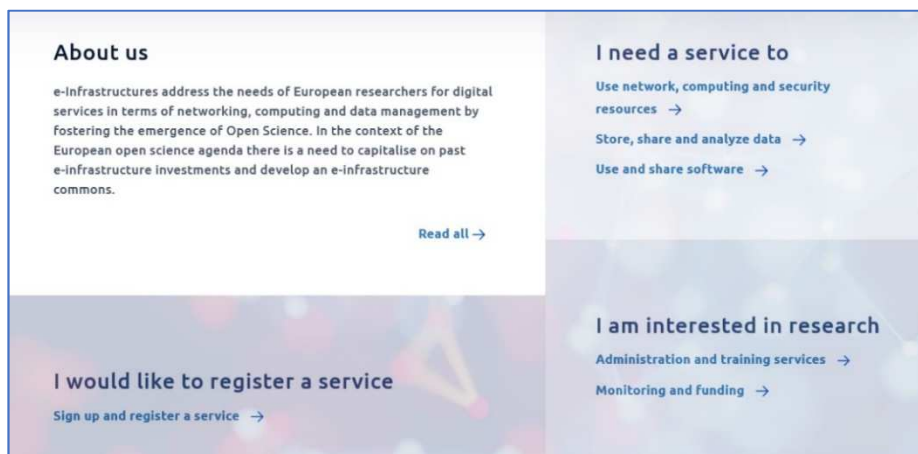
Users can enter search criteria in the form of free text in the *search area*. The results are presented in the main panel in the form of service overviews, from where the user can apply filters on the Category, Language, Provider, TRL and the Lifecycle status of a service. The user can also set the presentation of the service overviews in either list or tile form by clicking the corresponding buttons on the right.
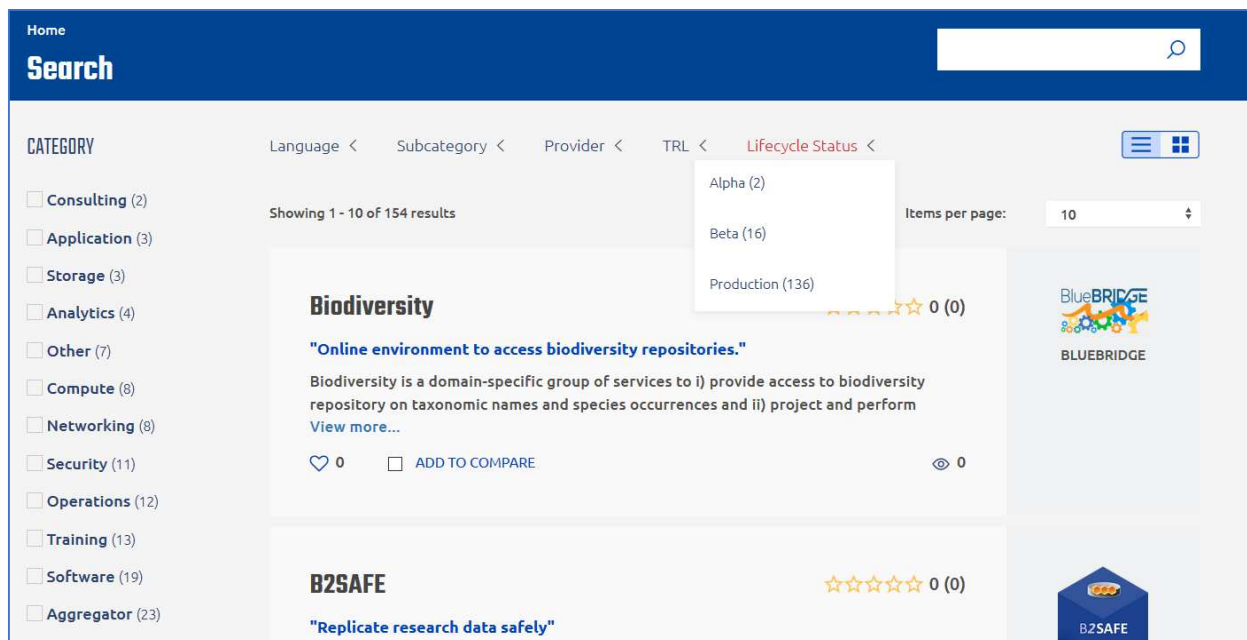
When the user clicks on a service they see a *detailed description of that service,* including all the information included in the SDT about the usage of a service, its coverage, contractual and support info, etc., organised in thematic areas. Access to the provider's service page and ordering information for the service are highlighted as links next to the service description. Other information such as training material and user manuals, or contractual information for the price of the service or its SLAs are also clickable links that take users to the provider's site.

Also from the service results page users can *select one or more services and compare their characteristics*. The service comparison page presents selected services in a table, with each comparable attribute in a row. The user can scroll down to see more details on the comparable attributes.

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Authenticated users can click on the stars to *rate a service* or to the heart icon to add a service in their favourite list. Authentication for the EOSC Catalogue is performed by logging in to the EOSC Portal, where a user can select either an academic or a social login.
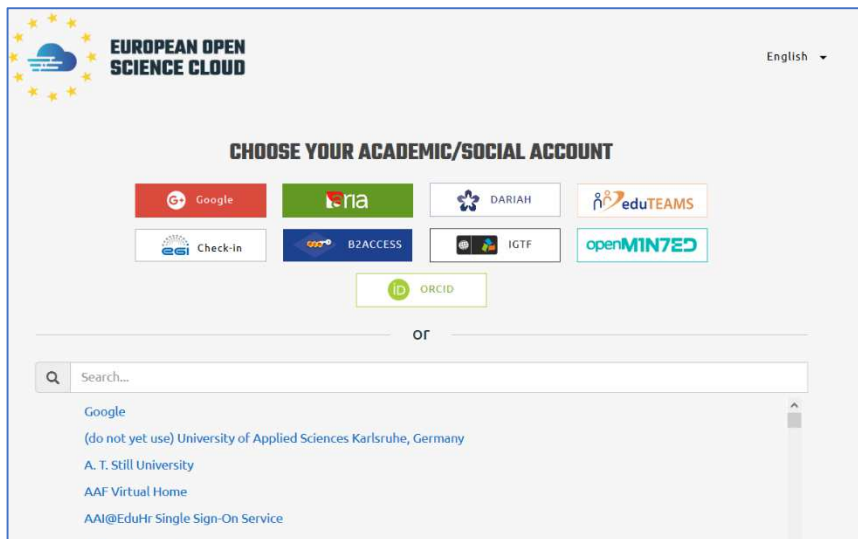
How to register and manage services in the EOSC Catalogue

Service providers *log in to the EOSC Catalogue* and follow the onboarding process for registering their organisation and its services in the Catalogue by clicking the "For providers" menu and selecting the option "Become a Provider".
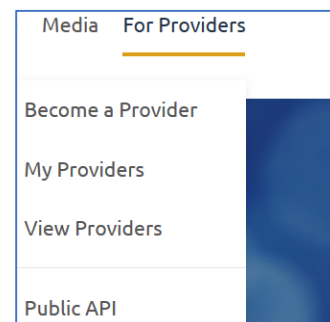
The onboarding process has two steps:

1. The user first *applies for their organisation to become a service provider in the EOSC Catalogue* by filling in a list of questions regarding the catalogue of services they offer.

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2. If the offered service catalogue is relevant to the EOSC Catalogue, *the provider is asked to complete a copy of the EOSC Catalogue service description template*. The EOSC Catalogue team assesses and validates the relevance and maturity of service and proceeds with the registration of the provider.

At each step the Catalogue will email the user, notifying them about progress with registration.

After validation of the service description, the provider can go on to add more services, either through the Web or the APIs offered by the Catalogue. Each new service added in the Catalogue is validated against quality characteristics related to the service description and a quality report is prepared for the provider.

How to gain insights about the EOSC service landscape?

The EOSC Catalogue offers analysis services to service providers and funders so they can *analyse and gain insights into the service landscape*. Service-related information gathered by service providers, along with usage statistics from user interaction, are available to advanced users through rich statistics and visualisations.

For service providers **the providers' dashboard** offers users from a provider organisation to:

- view the list of services offered by a service provider;
- create a new or update an existing service;
- visualise and analyse service statistics, such as
    - How many times a service details page has been visited;
    - How many times a service page at the provider's site has been accessed;
    - How many users have added a service in their favourite list;
    - What is the service coverage in the EU;
- view the versions and the history of actions applied on a service (updates, etc.).
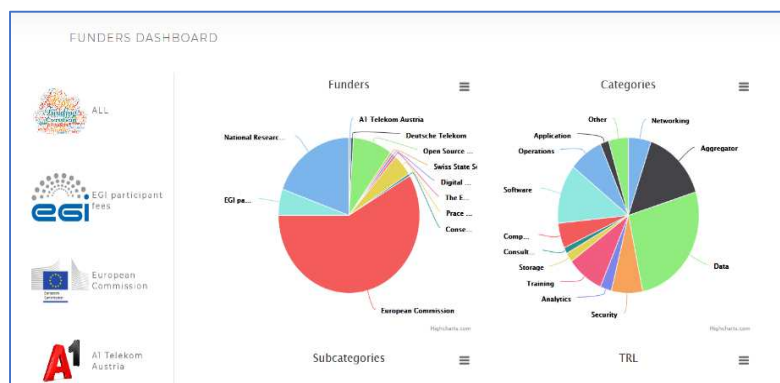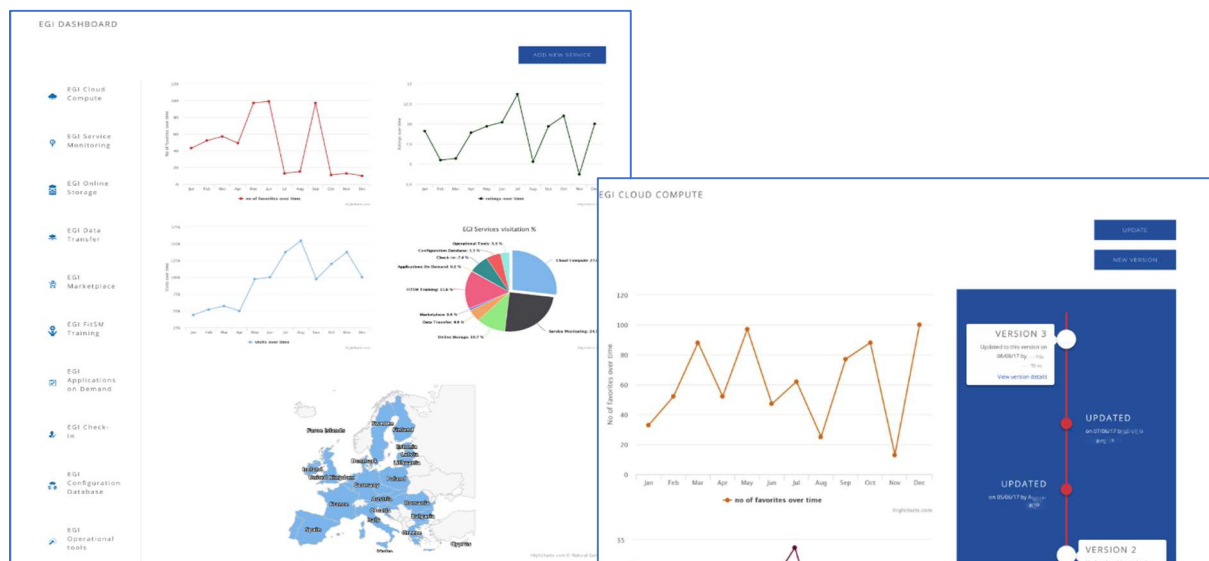
For funders, the EOSC Catalogue offers **the funders' dashboard** which displays summaries and KPIs for the service landscape related to the funding organization of each service. It organizes services by funding bodies, and for each presents valuable insights, such as what are the most funded thematic categories, etc.

How to automate working with the EOSC Catalogue

The EOSC Catalogue offers a rich set of REST API methods for the exchange of information between service providers and the Catalogue itself, as well as its provisioning to third party applications. Through the API, authorised users can add and update services programmatically, as well as read, search and retrieve the contents of the Catalogue, such as services, service providers, service performance indicators, usage statistics collected, and terms and vocabularies used for service classification.
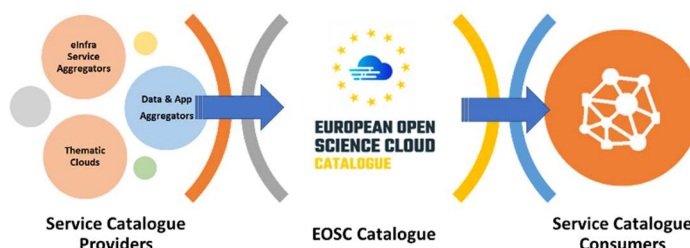
Below is *a step-by-step guide for a service provider* to start using the API for adding and updating service information in the EOSC Catalogue.

The APIs are available at https://catalogue.eosc-portal.eu/openapi

Using the API to add a new Service

- ◎ Step 1. Start from the documentation, i.e. https://www.einfracentral.eu/developers and https://catalogue.eosc-portal.eu/openapi.
- ◎ Step 2. Register your organisation in the Catalogue:
    - o sign up as a new service provider and receive login credentials, following the registration process.
- ◎ Step 3. Export one or more services to JSON using the Service Description Template.
    - o a reference JSON example and documentation for the SDT is available at https://github.com/eInfraCentral/docs.
- ◎ Step 4. Obtain an API Key from the EOSC Portal AAI https://www.einfracentral.eu/developers.
    - o the obtained token can be used in a bearer authorization for using all API methods.
- ◎ Step 5. Validate the service description:
    - o validate that the service is well formed by calling the **POST/service/validate** method.
- ◎ Step 6. Make a POST/service call to add the new service in the catalogue:
    - o upon success you get a new service ID.
- ◎ Step 7. The new service is registered and visible in the Catalogue. You may validate the addition by calling the **GET/service/{id}** and providing the service id.

Using the API to update a Service

- Repeat Steps 1-5.
- Step 6. Make **a PUT/Service** call to update the service in the Catalogue:
  - o upon success you get the service ID
- Step 7. The service is updated and visible in the Catalogue. You may validate the update by calling the **GET/service/{id}** and providing the service id.

Using the API to Get Service Information

- No authentication is required.
- **https://catalogue.eosc-portal.eu/api/service/{serviceID}/** gets the service with a Service ID as {ProviderId.serviceTitle}, e.g. https://catalogue.eosc-portal.eu/api/service/geant.geant_l3vpn retrieves the Service titled "GÉANT L3VPN" by GÉANT Provider.
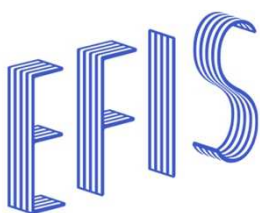

Each *service description* can be easily *retrieved either through the Web or the API in the form of JSON*.

Acknowledgements

The project was delivered by a Consortium of nine organisations across Europe – EFIS Centre (Project Coordinator), JNP, University of Athens, University of Hannover and five leading e-infrastructures GÉANT, EGI, EUDAT, OpenAIRE and PRACE.

European Future Innovation Systems (EFIS) Centre is a not for profit policy research lab and think tank. Our mission is to promote an enhanced understanding of the performance and future development perspectives of European, national and regional innovation systems, particularly in response to societal challenges (climate change, energy security, resource efficiency, ageing, etc.).

JNP is a technology and innovation management consulting company committed to delivering professional services in the area of Information Communication Technologies, Electronic Infrastructures and related disciplines. We offer a diverse, global perspective in scientific and innovation policies, as well as a highly-professional approach in dealing with complex, large-scale development initiatives and regional specialisation strategies.

The University of Athens (UoA) is one of the major higher degree public educational institutions in Greece. The Department of Informatics and Telecommunications belongs to the Faculty of Applied Sciences. The research and development activities within the Department cover a wide spectrum of Information and Communication technologies. The faculty and the department is involved in a number of European funded projects (ERC Research Grants, ICT research and development projects, Horizon2020) as well as the Operational Program for Education and Initial Vocational Training funded by the Greek Ministry of Education. UoA is involved in Open Science by coordinating OpenAIRE, the Open Access Infrastructure for Research in Europe.

Leibniz University of Hanover (LUH) is one of the first science and technology institutes in Germany. They are members of T9, the association of the oldest and biggest technical higher education institutions in Germany, and CESAER, a consortium of the most dominant European engineering schools. The project is co-located at the L3S research Center (LUH), which is a joint research institute of several groups in Germany. LUH holds the chair of e-IRG, a strategic body to facilitate integration in the area of European e-Infrastructures and connected services, within and between member states, at the European level and globally.

EGI Stichting is a federated e-Infrastructure set up to provide advanced computing services for research and innovation. The EGI e-infrastructure is publicly funded and comprises over 300 data centres and cloud providers spread across Europe and worldwide. The mission is to create and deliver open solutions for science and research infrastructures by federating digital capabilities, resources and expertise between communities and across national boundaries.

EUDAT, the European data infrastructure (https://eudat.eu), is building a Europe-wide Collaborative Data Infrastructure as part of the European Open Science Cloud. **EPCC,** the supercomputing centre at the University of Edinburgh, has an international reputation in the support of computational and data science and houses an exceptional range of novel computer and data systems. EPCC represented EUDAT in the eInfraCentral project.
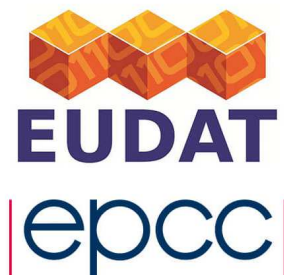
GÉANT Association is a fundamental element of Europe's e-infrastructure, delivering the pan-European GÉANT network for scientific excellence, research, education and innovation. Through its integrated catalogue of connectivity, collaboration and identity services, GÉANT provides users with highly reliable, unconstrained access to computing, analysis, storage, applications and other resources, to ensure that Europe remains at the forefront of research. GÉANT is a network of 38 National Research and Education Networks (NREN) connecting over 50 million users at 10,000 institutions across Europe and supporting all scientific disciplines.

CNR is the largest public research institution in Italy with a mission is to perform research in its own Institutes, to promote innovation and competitiveness of the national industrial system, to promote the internationalisation of the national research system, to provide technologies and solutions to emerging public and private needs, to advice Government and other public bodies, and to contribute to the qualification of human resources.

PRACE (Partnership for Advanced Computing in Europe AISBL) is an international not-for-profit association in Brussels. It has 24 member countries whose representative organisations create a pan-European supercomputing infrastructure, providing access to computing and data management resources and services for large-scale scientific and engineering applications at the highest performance level.

For more information about eInfraCentral please visit:

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