

EOSC SYNERGY

KEY EXPLOITABLE RESULTS



TABLE OF CONTENTS

EOSC Synergy Key Exploitable Results (KERs)	
Intro	03
Handbook for Integration of Services	04
SQAAS	06
WORSICA - Water Monitoring Sentinel Cloud Platform	08
G-CORE - Earth observation data processing software	10
SAPS - Surface energy balance Automated Processing Service	12
SCIPION - Cryo em image processing framework	14
OpenEBench - Benchmarking service for Bioinformatics	16
LAGO - Latin American Giant Observatory	18
SDS-WAS - Sand and Dust Storms Warning Advisory and Assessment System	20
UMSA - Untargeted Mass-spectrometry Analysis	22
MSWSS - Modeling and Analysis of Water Supply Systems	24
O3AS - Ozone Assessment Service	26
Policy Recommendations	28
Training Platform	30
Hackathon Manager	32
List of Acronyms	34



EOSC SYNERGY

Extending EOSC coordination at the National level.

Expanding the capacity and capabilities of EOSC by leveraging the experience, effort and resources of national publicly-funded digital infrastructures..

Key Exploitable Results

As the EOSC Synergy project comes to an end, this brochure collects the Key Exploitable Results (KERs) as delivered by the project. They are also accessible online on <https://www.eosc-synergy.eu/results>.

We want to thank all project partners, consortium partners and external advisors who have made this work possible.



HANDBOOK FOR INTEGRATION OF SERVICES WITH EOSC

HANDBOOK FOR INTEGRATION OF SERVICES

WHAT:

Quick reference guide providing a blueprint for scalable and efficient cloud integration.

FOR WHO:

Service Developers; Service administrators and Managers; Cloud Users; VO integrators; Site admins; related projects; industry; and e-infrastructures.

ACCESS:

<https://www.eosc-synergy.eu/results/handbook-infrastructure-integration>

HANDBOOK FOR INTEGRATION OF SERVICES WITH EOSC

Description

The handbook for integration of services with EOSC is a document for quick reference for different types of EOSC users, with relevant information about technical management of infrastructures (integration, security procedures), usage (VO creation, usability) and the accounting of the services.

The Handbook provides a blueprint for scalable and efficient Cloud service integration, which is based on the principles of separation of concerns, clearly defined roles and clear communication between them. The topics covered in the Handbook include open-source cloud infrastructure support, custom extensions and tools to bridge gaps. Different entry levels for different users' knowledge levels are supported via IM / IM-Dashboard, OpenStack Dashboard, fedcloudclient. Finally, the handbook describes targeted extensions and tools to address general use-case needs, specific monitoring and accounting.

Target audience/beneficiaries

The customers of this KER belong to community developers of thematic (disciplinespecific) services, those community services admins and managers, VO integrators and site admins, as well as related projects in the EOSC environment, and infrastructures.

Benefits

The main benefit of the Service Integration Notebook is the provision of information, specifications and tools for easy and scalable solutions to integrate the relevant services in the EOSC federated cloud for the intended customers. This document provides a central reference point for clear and customercentred information about innovative services and the infrastructure management/ access, with clear definition of roles to maximise the time management of the end users, admins or managers.

Use and Impact after EOSC Synergy

The Handbook is publicly available at <https://handbook.eosc-synergy.eu> and is being distributed by technical mailing lists, available for the GIT community and accessible via https. Starting from summer 2022 the handbook is expected to be presented at various conferences and workshops.



SQAAS

SQAAS (SOFTWARE AND SERVICE QUALITY ASSESSMENT AS A SERVICE)

WHAT:

Improving the software development life cycle through the fulfilment of a specific set of good practices.

FOR WHO:

EOSC developers; EOSC users.

ACCESS:

<https://www.eosc-synergy.eu/results/sqaaas-platform>

SQAAS

Description

The SQAaaS is a Software and Services Quality Assessment (SQA) platform for on-demand automated software and services validation, offered through the EOSC portal.

The SQAaaS aims at contributing to the realisation of Open Science principles by putting the focus on improving the software development life cycle through the fulfilment of a specific set of good practices. The adoption of these quality practices is incentivized through an awarding mechanism that assesses the software and provides digital badges according to the quality achievements.

Target audience/beneficiaries

The target audiences for the SQAaaS are the EOSC developers and the EOSC users.

Benefits

Key benefits for EOSC developers who adopt the SQAaaS are the improvement of the quality of their services and the certification of the quality achievements through digital badges, which will provide quality recognition, promote trust and contribute to increase the services adoption.

Key benefits for EOSC users are the added quality of the software and services improved with the assistance of the SQAaaS and easy access to quality information made visible through the digital badges. In addition the quality information provided by the SQAaaS will be also useful to the EOSC coordination layer managing the ecosystem of EOSC services.

Use and Impact after EOSC Synergy

The main key exploitable result is the SQAaaS platform itself with its two main modules, namely the Pipeline as a Service and the Quality Assessment and Awarding. The SQAaaS platform will be delivered and exploited via two channels, first as a cloud service making it easily available to EOSC developers, second as a private deployable platform for private use and higher scalability.

An independently exploitable result is the Jenkins Pipeline Library (JePL) to build and execute automated software quality verification pipelines using the Jenkins CI system. JePL is a core component of the SQAaaS platform but can also be used in standalone mode.

Finally, the quality baselines for software and services that guided the implementation of the SQAaaS are themselves very important exploitable results. They constitute a set of good practices that can be adopted and used to guide the development of software and services regardless of the SQAaaS.



WorSiCa

WorSiCa

WHAT:

One-stop shop for several services focused on water detection using remote sensin.

FOR WHO:

Researchers; Policy Makers; Emergency workers and Private consultancy/industry.

ACCESS:

<https://www.eosc-synergy.eu/results/worsica>

WorSiCa

Description

WorSiCa is a Europe-wide service for the detection of coastline changes, coastal inundation areas and water detection in inland water bodies.

One-stop shop for several services focused on water detection using remote sensing, WorSiCa provides its users with the following specific services:

- Coastline and Inundation areas detection;
- In-land water bodies detection, and
- Leak detections in irrigation networks.

The WorSiCa service is entirely free of charge for the European research community. The service detects water, using public satellite imagery sources and private satellite or drone surveys provided by the users themselves, whilst maintaining their privacy. The service takes advantage of the robust and reliable EOSC IT services and computational infrastructures, considering an open-source software approach and also the FAIR principles for the processed data.

The EOSC integration boosts the usage of WorSiCa at the European level. This enables research communities to generate maps of water presence and water delimitation lines in coastal and inland regions. These products are useful for emergency and prevention methodologies in case of inundations or reservoir leaks. In particular, the service promotes

- the preservation of lives during an emergency, supporting emergency rescue operations of people in dangerously inundated areas;
- the efficient management of water resources targeting water saving in drought-prone areas.

Target audience/beneficiaries

The primary users of the WORSICA service are researchers in coastal processes such as oceanographers, geologists, environmental and hydrology engineers, policymakers, and private consultancy companies in coastal area analysis. On the other hand, its potential impact in emergency prevention and mitigation makes it a valuable service for policy makers, emergency/rescue bodies, and private consultancy companies in coastal area analysis.

EOSC Services

The benefits of the WorSiCa service are:

- By using the EOSC infrastructure services, the costs of maintenance and acquisition of computational power are no longer attributed to the research communities.
- The products delivered by the service will be widely used by the research communities and private companies in many distinct applications, that can range from inundation to inland water bodies characterization, or even to extreme events such as rain flows or dam ruptures.
- Avoid water loss and reduce water mains operation cost.
- Provide an early detection of water leakages in difficult-to-access water transportation networks, promoting their fast repair.

Use and Impact after EOSC Synergy

WorSiCa is available through the access point <https://worsica.incd.pt>. The main dissemination actions are carried out via web interface, courses, workshops, conferences, and scientific publications from the development team and service users.

The provision of fast access to inundated areas to support emergency rescue operations of assets, the support for management decisions on hydraulic infrastructures operation to minimise damage downstream, has a very high economic impact potential

In November 2021 the WorSiCa team established a collaboration with G-Core to mitigate the problem related to the downloads of Sentinel satellite imagery from the ESA mirror servers.



G-CORE

G-CORE

WHAT:

Data Manager and Processing Framework for Earth Observation (EO) services.

FOR WHO:

Researchers.

ACCESS:

<https://www.eosc-synergy.eu/results/g-core>

G-CORE

Description

G-CORE addresses the lack of capability and products for Earth Observation (EO) services. It provides two main functionalities:

- A Data Manager for spatial and non-spatial purposes.
- A Processing framework to host external processors developed by third parties to generate added-value products based on Satellite imageries.

By creating such added-value products through the integration of G-CORE as a data manager, this thematic service can explore the sustainability of the EO services exposed. It will ultimately establish itself as a service with additional channels to use EO products.

Target audience/beneficiaries

European scientists on Earth Observation, as well as other research fields in the context of EOSC, even beyond the EO. Other EOSC-SYNERGY Thematic Services could also leverage the bridge that INDRA could provide

Benefits

The main benefit of G-CORE is its potential to widen the usage of EO data beyond the scope of nominal fields. The EO data could be considered as little fish in a big pond in order to provide additional information in a great variety of added value services.

G-CORE provides a simple and comprehensive interface to EO services for the user communities

Use and Impact after EOSC Synergy

G-CORE consists of a set of common components that are able to deploy different instances each one offering the functionality required by the elements that compose a Ground Segment. A typical GCORE structure resides in a marketplace where different services are offered from third parties. Each user can request a specific service that

implies the deployment of a GCORE Instance to perform the activities for the services.

The primary dissemination and exploitation path consists of collaboration with additional public & private infrastructure to use the EO service. Availability of data in the current INDRA infrastructure. Strong links with ESA and strong background in the area. The influential positioning of INDRA, the company owning G-CORE, in different markets will be an asset.

Beyond the EOSC Synergy project, the expectation is to create new types of business models, defining new products and services mixing Earth Observation data with other types of data for scientific and social environments.



SAPS

SAPS (SEB AUTOMATED PROCESSING SERVICE)

WHAT:

SAPS will help exploit the evapotranspiration estimation services from remote sensing imagery.

FOR WHO:

Researchers.

ACCESS:

<https://www.eosc-synergy.eu/results/saps>

SAPS

Description

SAPS (SEB Automated Processing Service) integrates Energy Balance algorithms and Simplified Surface Energy Balance (SSEB) to estimate Evapotranspiration and other environmental data. Such estimations can be applied in various environmental areas, such as water management or the analysis of forest masses and crop evolution. Thanks to the integration with EOSC and the availability of relevant EOSC resources, the service can be deployed on demand.

Target audience/beneficiaries

The target beneficiaries of SAPS are European scientists on Earth Observation, researchers in Agriculture Engineering and Environment, as well as Environmental and Agricultural agencies. SAPS will help European scientists to exploit the evapotranspiration estimation services from remote sensing imagery.

Benefits

The algorithms supported by SAPS have the potential to increase the knowledge about the impact of human and environmental actions on vegetation, as well as to improve forest management and preservation and early detection of risk conditions.

For the end users it is not easy to access a computing infrastructure to apply the algorithms analysing satellite images. SAPS provides a self-managed environment where users can apply well-known algorithms (like SSEB or SEBAL) to satellite data.

Use and Impact after EOSC Synergy

During the EOSC-Synergy project, SAPS has restructured its architecture to adapt it to a more convenient way of distribution: micro-services running on an elastic Kubernetes cluster. This allows the automatic management of the service, and facilitates the access to the computing resources needed, according to the workload.

The key exploitation path consists of the measurement of the evapotranspiration as a key indicator for evaluating soil degradation and the selection of the most adequate species for harvesting and crops. This could lead to increased production and to achieve a more sustainable agriculture. By providing a massive access the accuracy of the studies can be increased.

SAPS will be promoted through collaboration with related research groups, dissemination at conferences & workshops, and training courses. It was demonstrated in November 2020 during the EGI Conference. In October 2021, the service owners applied to the EGI ACE call for use cases, to improve the SAPS service and help on the sustainability of the service after EOSC Synergy.



SCIPION

SCIPION

WHAT:

Application Framework to help the Structural Biology community to process Cryo Electron Microscopy (Cryo-EM) data.

FOR WHO:

Researchers; Pharma Industry.

ACCESS:

<https://www.eosc-synergy.eu/results/2384>

SCIPION

Description

Scipion is an application framework to help the Structural Biology community to process Cryo Electron Microscopy (Cryo-EM) data.

The Scipion on demand service provides researchers with a ready to use installation where they can continue processing data acquired at a microscope facility. The service is initially offered to ESFRI INSTRUMENT users, however, the transparent use of EOSC computing services makes it possible to scale the service to wider communities.

Target audience/beneficiaries

Researchers in Structural Biology, including users of the ESFRI INSTRUMENT community, other Cryo-EM collaborations, pharma partners.

Benefits

Thanks to this innovative service, which can be deployed both on powerful hardware resources or on elastic clusters making efficient use of resource allocation, users with no computational background or lacking powerful hardware resources will have access to the latest tools for Cryo-EM through easy to use IaaS as well as to powerful computational resources. The advantage of Scipion is that no other web tool offers all the same functionality and that the service can be deployed seamlessly on the EOSC as well as on public clouds.

Use and Impact after EOSC Synergy

Cryo-EM is already having a deep impact in basic science; more recently it's started moving, in a limited manner, to work directly with human samples so that structural analysis applied to specific pathologies can be performed. This will open up new possibilities to biotech and pharma companies.

Scipion is a desktop application providing access to IaaS and is promoted through ESFRI INSTRUMENT mailings, tailored courses, and web sites. The service can additionally be used as a training tool.

During the EOSC Synergy project, Scipion was presented to community events in Autumn 2020 (Presentation on EGI Conference 2020 - Towards FAIR CryoEM workflows in EOSC) and spring 2021 (Presentation on Instruct-EOSC Forum).



OpenEBench

OpenEBench

WHAT:

Benchmarking across different domains in Life Sciences allowing scientific communities to provide evidence about the software tools they produce.

FOR WHO:

Researchers.

ACCESS:

<https://www.eosc-synergy.eu/results/openebench>

OpenEBench

Description

Researchers have limited means to easily provide evidence about the quality of the software tools they produce. The OpenEBench platform supports scientific community-led benchmarking efforts across different domains in Life Sciences.

OpenEBench (<https://openebench.bsc.es>) is the ELIXIR benchmarking and technical monitoring platform for bioinformatics tools, web servers and workflows. The service includes a data element and provides a benchmarking tool for evaluating the quality of the results of research tools. OpenEBench also provides an automatic research software quality evaluator based on concrete metrics.

Target audience/beneficiaries

Researchers in Genomics Tools

Benefits

The main added value of OpenEBench for researchers in the Genomic domain is the provision of a benchmarking tool to evaluate software research tools in the field of Bioinformatics. Its strength lies in its Interdisciplinary scope (software engineers, biologists, data engineers, bioinformatics).

Use and Impact after EOSC Synergy

The OpenEBench service and tools will be accessible to research projects (National, European). Results will be promoted and shared via papers (journals, conferences,...) and other types of publications, including social media. Dedicated workshops and online courses are also available.

The key exploitation path is to generate a mechanism to have the most up-to-date collection of analytical genomics workflows which can be deployed across heterogeneous systems in Europe taking into account their scientific and technical performance. The use and extension of OpenEBench will facilitate the deployment of the most accurate workflows optimising human and resources allocation to ensure using the most accurate workflows in any situation putting the focus on the interpretation of results for better health outcomes.



LAGO

LATIN AMERICAN GIANT OBSERVATORY (LAGO)

WHAT:

integration of LAGO computing frameworks into the EOSC portfolio of services enhancing the scientific and social impact of LAGO.

FOR WHO:

Researchers.

ACCESS:

<https://www.eosc-synergy.eu/results/lago>

LAGO

Description

Integration of the Latin American Giant Observatory (LAGO) data within EOSC. Given the peculiar characteristics of LAGO, working as a distributed observatory operating in very different countries, LAGO had been affected by the lack of computing resources for simulation, data analysis and storage since its creation. So, thanks to the integration of their computing frameworks into the EOSC portfolio of services will largely enhance the scientific and social impact of LAGO.

Target audience/beneficiaries

LAGO is an international collaboration composed of more than 11 Latin American countries. It targets primarily the Astroparticle and high-energy physics community, aerospace and mining industries, but enables application to societal problems such as Space weather and irradiation (to be suffered by air plane travellers and crews), Volcanology and extreme climate phenomena, etc.

Benefits

One of the main issues in Astrophysics and High Energy Physics studies is detailed calculation of space radiation at ground level. LAGO calculates the signals originated by cosmic radiation at any place in the World in a very precise way under realistic atmospheric and geomagnetic time-evolving conditions. The service enables the standardised simulation of radiation on a cloud infrastructure making use of FAIR data.

LAGO is a large collaboration spanning applications in several scientific and societal domains. In addition, it supports training activities for BSc and PhD students to develop their skills in a mix of technological and scientific areas related to the detectors development. Access to open source and open access repositories integrated in EOSC will further enhance their impact and the collaborations with external institutions on the aforementioned S&T and training goals.

Use and Impact after EOSC Synergy

By making available their data in a transparent and standardised way will result in collaborations with world wide institutions as well as on new opportunities for hosting LAGO scholars and BSc/MSc/PhD students in European institutions and vice versa.

Key exploitation channels will include scientific papers, industrial workshops, as well as institutional (catalogue of resources, scientific weeks, courses) channels. During the EOSC Synergy project the Thematic Service has been presented and demonstrated several times to physics and astrophysics communities at various venues in European and in Latin American countries.



SDS-WAS

SDS-WAS

WHAT:

Integration of SDS-WAS into EOSC, to increase the volume of data hosted and processed, reach a wider set of end-users, improve the compliance to FAIR principles and robustness of the whole service infrastructure.

FOR WHO:

Researchers; meteorology services; policy makers; industry.

ACCESS:

<https://www.eosc-synergy.eu/results/sds-was>

SDS-WAS

Description

SDS-WAS provides a set of services related to the mineral dust forecast. It collects numerical model outputs and observational data from a wide set of worldwide partners plus internally developed. A wide set of post-processed analysis and statistics are generated, and results in the form of plots, tables or numerical (binary) data are disseminated to a variety of users (public institutions, researchers, etc). Finally, SDS-WAS also organises training courses on dust related research, to give capabilities for generated products usages and other kinds of events (seminars, workshops) related to dust research. The aim is to give support to institutional entities (e.g. National Meteorological Agencies) to warn about possible dust events and to foster the study of dust-related phenomena into the academic and research communities. The EOSC infrastructure will give the possibility to increase the volume of data hosted and processed, reach a wider set of end-users, improve the compliance to FAIR principles and robustness of the whole service infrastructure.

Target audience/beneficiaries

Researchers in Climate and Weather Forecast, national meteorological services, international meteorological organisations, policy makers and (sometimes) industry.

Benefits

In terms of amount, mineral dust is the second aerosol present in the atmosphere, and dust storms have a huge variety of implications on human health and many economical fields (aviation, transports, agriculture). The WMO (World Meteorological Organisation) favoured the creation of various Regional Nodes for dust storms forecast; the SDS-WAS - Barcelona Dust Regional Centre, is the one in charge of Northern Africa, Middle East and Europe.

SDS-WAS:

- provides real- time dust forecast products from an ensemble of numerical models outputs provided by partners or developed in-house;
- produces derived products of data analysis (skill scores, statistics - quantitative) and data evaluation of forecast vs observations (in-situ and satellite - qualitative);
- provides an interactive platform to visualise maps, time-series and numerical tables;
- provides a data download service of numerical model outputs;
- disseminates numerical data and images through international channels like GAW (WMO) and EUMETCAST (EUMETSAT);
- organises training courses and workshops to current or potential users and partners on dust products and services.

Use and Impact after EOSC Synergy

Work on the service started in 2010 with a research & development infrastructure, becoming an international reference for dust forecast, and became operational in 2016 with the official recognition by WMO. We are the first operational centre on sand and dust storms forecast recognised by the WMO.

Collaboration is ongoing with african research centres to provide them with forecasts to study the impact and prevention on meningitis epidemics (<https://sds-was.aemet.es/materials/meningitis>)

The portal nowadays serves industry users, such as: Gas Natural Fenosa; NCAR; Meteoplay; the Dubai Intl. Airport; and Meteo Services and Universities of almost all countries of the domain (Northern Africa-Middle East-Europe). Dissemination is done via targeted newsletters, webinars, workshops and training courses.



UMSA

UMSA

WHAT:

By integrating the service with the EOSC Federated Cloud Backend, uniform access to data and computing resources are provided, scaling it to the target European-wide user community.

FOR WHO:

Researchers.

ACCESS:

<https://www.eosc-synergy.eu/results/umsa>

UMSA

Description

UMSA is an untargeted mass-spectrometry analysis service from RECETOX (Research Centre for Toxic Compounds in the Environment at Masaryk University) in the Czech Republic. The service is evolving to a key component of the emerging EIRENE ESFRI. By integrating the service with the EOSC Federated Cloud Backend, uniform, access to data and computing resources are provided, scaling it to the target European-wide user community.

Typically, mass spectrometry is done in a targeted way to confirm or disprove the presence of a specific compound in a sample. On the contrary, this service supports data processing to correlate the whole spectra (ie. all the present compounds) with other data (social, medical, other sample analyses, etc.) to work with more complex hypotheses of environmental impacts on human health.

Target audience/beneficiaries

Researchers in Environmental studies, namely the European Humane Exposome Network (EHEN), the world's largest project network studying the impact of environmental exposure on health.

Benefits

The UMSA service supports a reliable and reproducible approach to processing mass spectrometry data. It is a component of a large array of data processing services in complex exposome research.

One of the main challenges addressed by UMSA is the current inability to detect low abundant pollutants and their metabolites. UMSA solves the current limitations by implementing LC&GC/MS pipelines including advanced tools. It integrates all tools and workflows users need.

Use and Impact after EOSC Synergy

The individual tools available in UMSA can be composed of numerous workflows to process various types of mass spectrometry data. The focus is on untargeted experiments and search for evidence of low-abundant environmental pollutants and their metabolites in various environment and human samples (dust, water, food, blood, urine, ...).

The main exploitation route is to promote use of the service by the community, and publishing relevant software tools. Various scientific papers and presentations were illustrated at conferences throughout 2022.



MODELING AND ANALYSIS OF WATER SUPPLY SYSTEMS (MSWSS)

MODELLING AND ANALYSIS OF WATER SUPPLY SYSTEMS (MSWSS)

WHAT:

Online Water service for analysis of water supply networks integrated with EOSC Cloud computing services and EGI Check-in.

FOR WHO:

Water supply network operators and researchers.

ACCESS:

<https://www.eosc-synergy.eu/results/mswss>

MODELING AND ANALYSIS OF WATER SUPPLY SYSTEMS (MSWSS)

Description

The “Modelling and Analysis of Water Supply Systems (MSWSS)” on-line service integrates the analysis of toxins in drinking-water supply networks with water distribution networks simulation (EPANET). The MSWSS service allows water infrastructure operators and researchers to analyse hazardous events (e.g. toxics propagation within a pipe system) and may be used in risk management and risk mitigation planning for water utilities. Its integration with the EOSC computing infrastructure and data sharing services enables more complex modelling of water supply systems thereby increasing the number of scenarios that can be analysed.

Target audience/beneficiaries

The target beneficiaries of MSWSS are water supply/distribution network operators and researchers on water transportation and environment.

Benefits

By providing a user friendly collaborative web portal with elastic computing backend, MSWSS is going to enhance the exploitation of relevant technology, into an easy-to-use service which can help water distribution network operators and crisis management and prevention authorities (civil protection, national health authorities, police, etc.) to make their intervention more effective in the case of drinking water contamination incidents.

Use and Impact after EOSC Synergy

The MSWSS service endpoint main interface is based on a customised Galaxy portal integrated with EGI Check-in service to make the access easier for EOSC users. Thanks to EOSC integration it integrates EC3 (Infrastructure Manager, CLUES) for creation and management of computational backend based on elastic virtual clusters built from EOSC Cloud computing resources.

With regard to the protection of drinking water, the economic impact of the MSWSS service will be very high, as the risk of drinking water can have an incalculable financial impact.

MSWSS is being promoted through direct contacts, publications and participation in conferences and events. It was presented on various occasions starting from autumn 2021.



O3AS

O3AS

WHAT:

The Ozone assessment service, O3AS aims to assist scientists to visualise ozone time series and estimates of ozone recovery from ozone depletion data from large climate models.

FOR WHO:

Researchers; Policy makers; General public.

ACCESS:

<https://www.eosc-synergy.eu/results/o3as>

O3AS

Description

Identifying and monitoring the recovery of the stratospheric ozone layer is key in Climate and Environmental studies because the ozone layer plays an essential important role for the protection from harmful UV radiation. The Ozone assessment service, O3AS aims to assist scientists to visualise ozone time series and estimates of ozone recovery from ozone depletion data from large climate models.

O3AS integrates the following services listed in the EOSC marketplace:

- EOSC OIDC providers, e.g. EGI Check-In: to access certain functionalities of the Service.
- Infrastructure Manager: To deploy service components on EOSC cloud resources.
- EOSC cloud resources: to offer O3AS service for users in a timely manner.

Target audience/beneficiaries

Researchers in Climate and Environment domains; Educators, general public, i.e. anyone interested in the ozone assessment. O3AS produces relevant key metrics, which can also help policy makers to judge the effectiveness of measures implemented to protect the stratospheric ozone layer.

Benefits

Stratospheric ozone protects life on Earth from harmful UV radiation. Uncontrolled CFC releases have eroded the ozone layer in the past. Thus the Montreal Protocol (MP) was established to protect the ozone layer. Ozone Assessments are part of the MP requirements to track the health of the ozone layer. Providing robust results of ozone projections allows impact studies to predict and mitigate potential damage.

Ozone assessment is a time- and computing-consuming task with similar tasks reappearing periodically, such as large datasets analysis, dispersal of different model data, inconsistencies of reappearing analyses.

The O3AS workflow includes novel analysis tools that access Climate Data Archives for monitoring stratospheric ozone and providing access to ozone time series from various climate models, by reducing large data sets, providing easily interpretable viewgraphs and an easy-to-use API/Web Api.

O3as is flexible and can be extended to include visualisation of other climate data (atmospheric trace gases, temperature) as well as to present spatial data (latitude, longitude, height).

Use and Impact after EOSC Synergy

O3AS will be promoted and exploited by means of publications, presentations and conferences and personal contacts. During EOSC Synergy it has been presented at almost regular quarterly intervals at several relevant events.



POLICY RECOMMEN- DATIONS

POLICY RECOMMENDATIONS

WHAT:

Recommendations for the alignment of national policies related to EOSC.

FOR WHO:

Policy makers; EOSC Bodies; Research funders; Research performing organisations.

ACCESS:

<http://hdl.handle.net/10261/246111>

POLICY RECOMMENDATIONS

Description

Recommendations for the alignment of national policies related to the EOSC. The recommendations are based on the EOSC policy landscape and gap analysis in the countries covered by the EOSC Synergy project: Czech Republic, the Netherlands, Slovakia, Spain, Poland, Portugal and the United Kingdom. The recommendations, which focus on four key policy areas, Open Science Strategies, PIDs, Access Provisioning and Funding, are published in a document that targets national and international stakeholders on the measures to align and harmonise policies to facilitate the implementation of the EOSC.

Target audience/beneficiaries

- National policy makers
- International (EU and global) EOSC bodies
- Research funding bodies
- Research Performing Organisations

Benefits

The policy landscape and gap analysis show the existence of policy fragmentation in different countries and domains, in some cases, even lack of policies related to EOSC or the lack of clear benchmark references to compare policies across countries. Policies are also implemented with different, independent, timeframes, making harmonisation and alignment an issue.

The EOSC Synergy recommendations provide a solution by fostering harmonisation of national policies on resource provisioning, access and allocation, as well as alignment on defining and implementing policies. These are based on national landscape studies/reports on the status of EOSC-relevant policies, especially focus on key policy areas where “gaps” exist (lack of policy or low levels of alignment of policies between countries).

The recommendations are articulated in a single report listing the gaps and matching recommendations. Due to the diversity of the EOSC Synergy countries the recommendations can be applicable in small or large countries, finding themselves in various stages of EOSC development.

Use and Impact after EOSC Synergy

The recommendations are made available to policy makers nationally in the EOSC Synergy countries, through online and face-to-face meetings, dissemination events and direct contribution to policy and national development projects. Some of them are general enough and also interesting to countries who are not part of the project, as well as to international bodies such as the e-IRG. In the wider context the recommendations have been shared with EINFRA-EOSC5 projects as input for their work. This has been done primarily through an international policy event organised by EOSC Synergy in collaboration with those projects on 4 May 2022 in Strasbourg. Although the recommendations are the result of a one-off exercise, it is expected that mandated EOSC organisations in the countries concerned will maintain them and continue making use of them in supporting the EOSC deployment in their countries.



TRAINING PLATFORM

EOSC SYNERGY TRAINING PLATFORM

WHAT:

Virtual space with a set of tools, including procedures and best practices, for the creation and delivery of EOSC related training courses.

FOR WHO:

Service providers; Academic staff; Training and Service providers.

ACCESS:

<https://www.eosc-synergy.eu/results/eosc-training-platform>

TRAINING PLATFORM

Description

The training platform is a virtual space with a set of tools, including procedures and best practices, for the creation and delivery of EOSC related training courses. It facilitates cloud related courses providing tools for interactive computing. The platform is modular and is based on the container's technologies that allow for combining together in a suitable learning setup for students/training participants. It allows for dynamic creation of the infrastructure for tutorials for trainers.

The platform provides fully fledged capabilities for training. It can support online training by providing the services that facilitate it (from content creation, to delivery), database with the tutorials, and access to computing resources to support the practical exercises when needed.

Target audience/beneficiaries

EOSC is still under development and there is fragmentation of resources and at the same time some overload of information, resulting on a lack of knowledge. The training platform is oriented to Service providers from within EOSC-Synergy, University staff delivering academic courses (academics, librarians, data stewards), Trainers and service providers from other EOSC and open science related projects and initiatives.

Benefits

The EOSC Synergy learning platform offers multiple users access to learning resources and guidelines on how to design, create and deliver effective training materials to develop EOSC skills. The train-the-trainer programme develops skills of trainers and service providers who want to encourage open science and the use of EOSC by delivering training online, supporting those who deliver training, rather than directly training end-users, and providing a scalable solution to develop skills for EOSC.

Use and Impact after EOSC Synergy

EOSC Synergy Learning platform is accessible via <https://learn.eosc-synergy.eu/>.

The service is mainly devoted to EOSC Synergy technical work packages and other INFRA-EOSC 5b projects as well as other research communities and related initiatives. After the project, the learning platform will keep on being shared through the EOSC related projects and events, through EOSC working groups and contacts at Academy, being also promoted at policy level.

The platform is free of charge for research communities and open source to facilitate future developments.



HACKATHON MANAGER

HACKATHON MANAGER

WHAT:

Virtual space with a set of tools, including procedures and best practices, for the creation and delivery of EOSC related training courses.

FOR WHO:

Service providers; Academic staff; Training and Service providers.

ACCESS:

<https://learn.eosc-synergy.eu/hackathon-as-a-service>

HACKATHON MANAGER

Description

The Hackathon manager is a platform created to facilitate the organisation of hackathons taking advantage of the EOSC infrastructure. The role of the HaaS platform is to provide infrastructure and a ready-to-work environment for each participant in a hackathon, allowing them to focus on their ideas and improvements and not worry about anything related to installing or configuring software.

Target audience/beneficiaries

Hackathon manager is a tool that makes life easier to organizers and participants for events in which infrastructure usage is needed. Organisers are able to create a new event in a few minutes, just specifying the minimum details (how many resources you want to provide to each event participant) You don't have to worry about anything else. Each time a new participant joins your events, his infrastructure will be automatically deployed and he will be able to download his credentials to access.

As a participant, you will be able to request participation to open events, and you will get directly invited by managers to closed events. To access your assigned infrastructure, you don't have to worry about complex instructions, you only need to download the credentials from the hackathon screen and start using it.

Benefits

Organisers are able to create a new event in a few minutes, just specifying some minimum details and the resources to be provided.

Participants are able to request participation to open events. Participants will get directly invited by managers to closed events. Participants don't have to worry about complex instructions, they only need to click on one button, wait for the assigned infrastructure to be deployed, and download the credentials from the hackathon screen to start using it.

Use and Impact after EOSC Synergy

The Hackathon manager is accessible through the EOSC Portal and at <https://hackathon-manager.bifi.es/>

Several engagement activities have been carried out for getting new users, find new target groups, and validate the ideas towards the market uptake. A business plan has been defined with different plans and prices so the service can be offered globally. New contacts are being made to show the tool to potential users and institutions, and to find new collaboration possibilities and running new events.

BIFI-Unizar team is in touch with Kampal Data Solution company, a spin-off of the University of Zaragoza (Spain), to license the exploitation of the platform as it showed interest in the tool commercialization.

LIST OF ACRONYMS

Acronym	Description
AAI	Authentication and Authorisation Infrastructure
AEMET	Spanish State Meteorological Agency
AERONET	AErosol RObotic NETwork
B2FIND	EuDat Discovery service based on Metadata
B2SAFE	EuDat Service for distributing and storing large volumes of data
B2STAGE	EuDat service for data ingestion
CCMI	Chemistry-Climate Model Initiative
CEDA	Natural Environment Research Council's Data Repository for Atmospheric Science and Earth Observation
CF	Climate and Forecast
CORSIKA	COsmic Ray Simulations for KAscade
CS	Consortium Spatial Information
CSW	Catalog Service Web
DEM	Digital Elevation Model
DIRAC4EGI	Distributed Infrastructure with Remote Agent Control for the European Grid Initiative
DMP	Data Management Plans
DOI	Digital Object Identifier
DREAM	Dialogue on Reverse Engineering Assessment and Methods
DYNAFED	Dynamic Federations system
ebRIM	Registry Information Model
EC3	Elastic Compute Clusters in the Cloud
EGI	European Grid Initiative
EIRENE	European Environmental Exposure Assessment Network
ELIXIR	Life Sciences ESFRI
EMODNET	The European Marine Observation and Data Network
EMPIAR	Electron Microscopy Public Image Archive
EOSC	European Open Science Cloud
EPA	Environmental Protection Agency's
EPANET	Water distribution system modeling software package from the United States EPA
ERIC	European Research Infrastructure Consortium
ESFRI	European Strategy Forum on Research and Innovation
EuDat	Collaborative Data Infrastructure for Data Preservation
FAIR	Findable, Accessible, Interoperable, Reusable
G-CORE	Earth observation data processing software from INDRA
GA4GH	Global Alliance for Genomics and Health
GEANT4	Toolkit for the simulation of the passage of particles through matter
GEE	Google Earth Engine
GPU	Graphics Processing Unit
HDF	Hierarchical Data Format
I2PC	Instruct Image Processing Center
IdP	Identity Providers
IGAC	International Global Atmospheric Chemistry
IM	Infrastructure Manager
INGENIO	Spanish Earth Observation Satellite
INSTRUCT	Integrated Structural Biology Infrastructure
JSON	JavaScript Object Notation
LAGO	Latin American Giant Observatory
LANDSAT	Earth Resources Technology Satellite
LSDF	Large Scale Data Facility
LSDMA	Large-Scale Data Management and Analysis
MODIS	Moderate Resolution Imaging Spectroradiometer
MSWSS	Modelling Service for Water Supply Systems
NAMEE	Northern Africa, Middle East and Europe
NASA	National Aeronautics and Space Administration



Acronym	Description
NCEI	National Centers for Environment Information
netCDF	Network Common Data Form
netCDF	Network Common Data Form
NWP	Numerical Weather Prediction
O3AS	Ozone (O3) Assessment
OGC	Open Geospatial Consortium
OGC SOS	Open Geospatial Consortium Sensor Observation Service
OneData	Distributed Data Management solution from Cyfronet
OPENCoastS	Coastal circulation on-demand forecast
OpenEBench	Benchmarking service for Bioinformatics from ELIXIR
PAZ	Spanish Earth observation and reconnaissance satellite
PDGS	Payload Data Ground Segment
POSIX	Portable Operating System Interface for X
QFO	Quest for Orthologs
RECETOX	Research Centre for Toxic Compounds in the Environment at Masaryk University
ROOT	Data Analysis Framework from CERN
SAPS	Serviço Automático de Processamento do SEBAL
Scipion	Cryo em image processing framework. Integration, traceability and analysis
SDS-WAS	Sand and Dust Storms Warning Advisory and Assessment System
SEBAL	Surface Energy Balance Algorithm for Land
SGE	Sun Grid Engine
SIC	Satellite Imaging Corporation
SMOS	Soil Moisture Ocean Salinity
SPARC	Stratosphere-troposphere Processes and their Role in Climate
TCGA	Cancer Genome Atlas
UAV	Unmanned Aerial Vehicles
UMSA	Untargeted Mass-spectrometry Analysis
UNEP	United Nations Environment Programme
UN	United Nations
WCD	water-Cherenkov detectors
WebDav	Web Distributed Authoring and Versioning
WMO	World Meteorological Organisation
WORSICA	Water mOnitoRing Sentinel Cloud plAtform
ZBGIS	Basic Slovak database for GIS
Zenodo	OpenAIRE repository for Open Science

Partners



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