Fuelling open science with a pan-European cloud infrastructure federation

Experiences from the Eastern Partnership region

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EaPEC 2022

TLP: WHITE Public

Outline

- Who we are
- What we do
- Our services & technologies
- Experiences from the Eastern Partnership region
- Get in touch with us

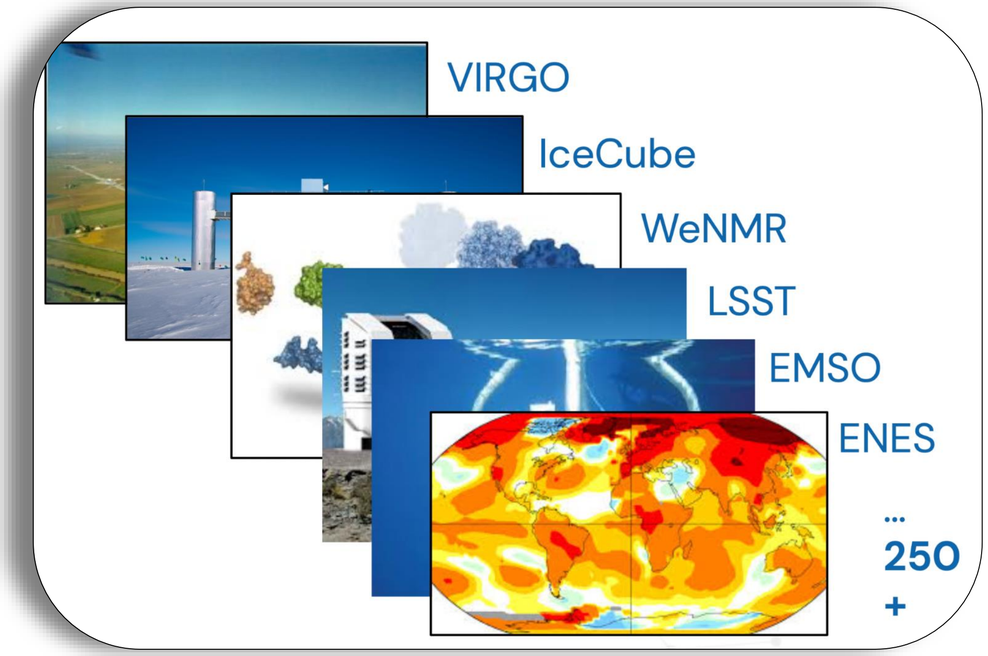
Section 1

Who we are

The EGI Federation is an international e-infrastructure

2010

From the high-energy physics compute grid (WLCG)



2022

To a multi-disciplinary, multi-technology infrastructure

EGI: Vision & Mission

Vision

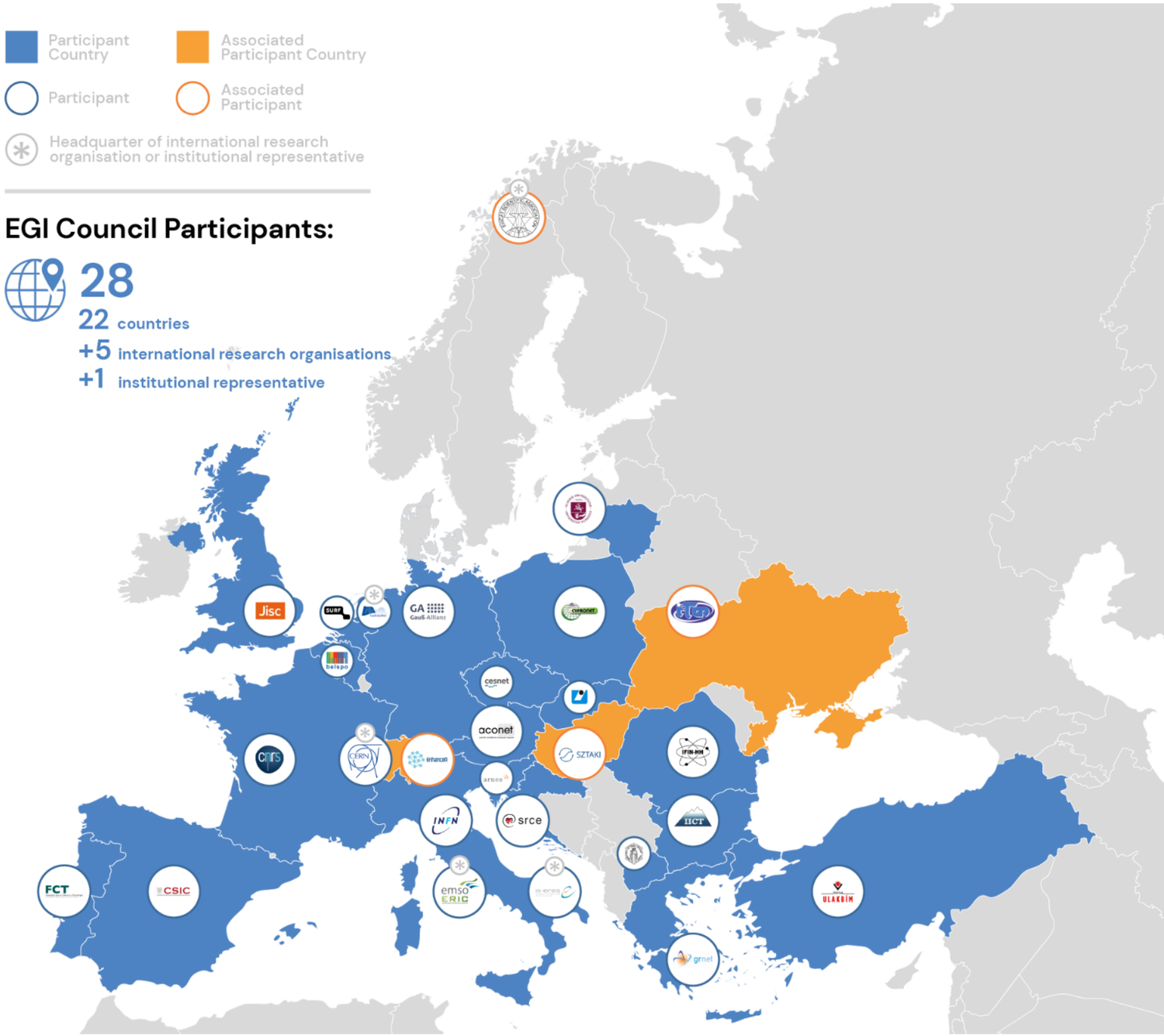
All researchers have seamless access to services, resources and expertise to collaborate and conduct world-class research and innovation

EGI Federation

The Mission: deliver open solutions for advanced computing and data analytics in research and innovation

EGI Foundation

The Mission: enable the EGI Federation to serve international research and innovation together



Section 2

What we do

EOSC

A multi-disciplinary environment where researchers can publish, find and re-use data, tools and services, enabling them to better conduct their work

EUROPEAN OPEN SCIENCE CLOUD

EGI-ACE project

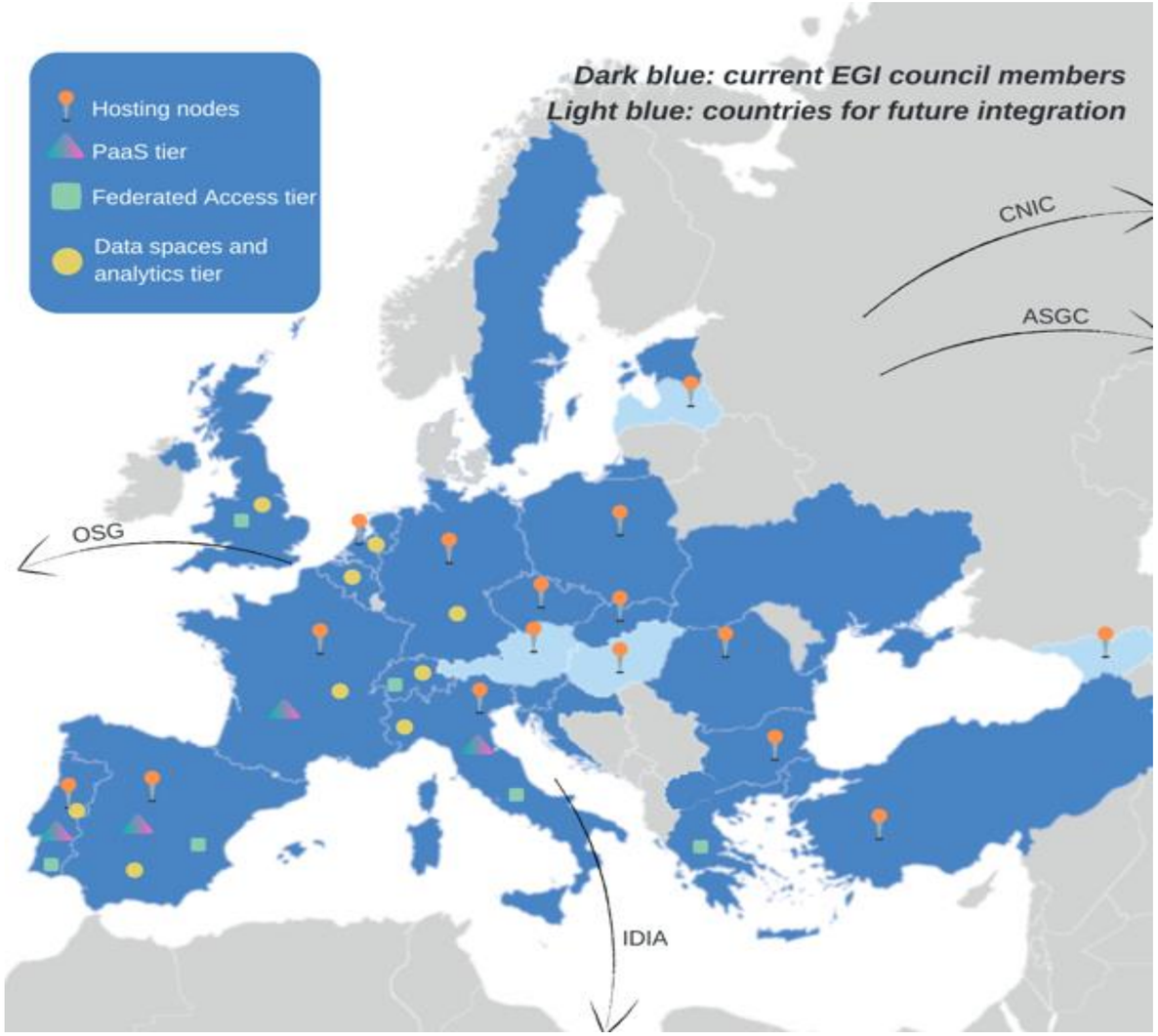
Mission:

Implement the **Compute Platform** of the **European Open Science Cloud** and contribute to the **EOSC Data Commons** by delivering integrated computing, platforms, data spaces and tools as an integrated solution that is **aligned with major European cloud federation projects and HPC initiatives**

- **Start**: January 2021
- **Duration**: 30 months
- **Budget**: 12 Million EUR

EGI-ACE

EGI's flagship project because



Consortium:

- Coordinator – Stichting EGI
- 33 Partners, 23 third parties
- Most of EGI council members + Several Research Infrastructures (~ERICs)

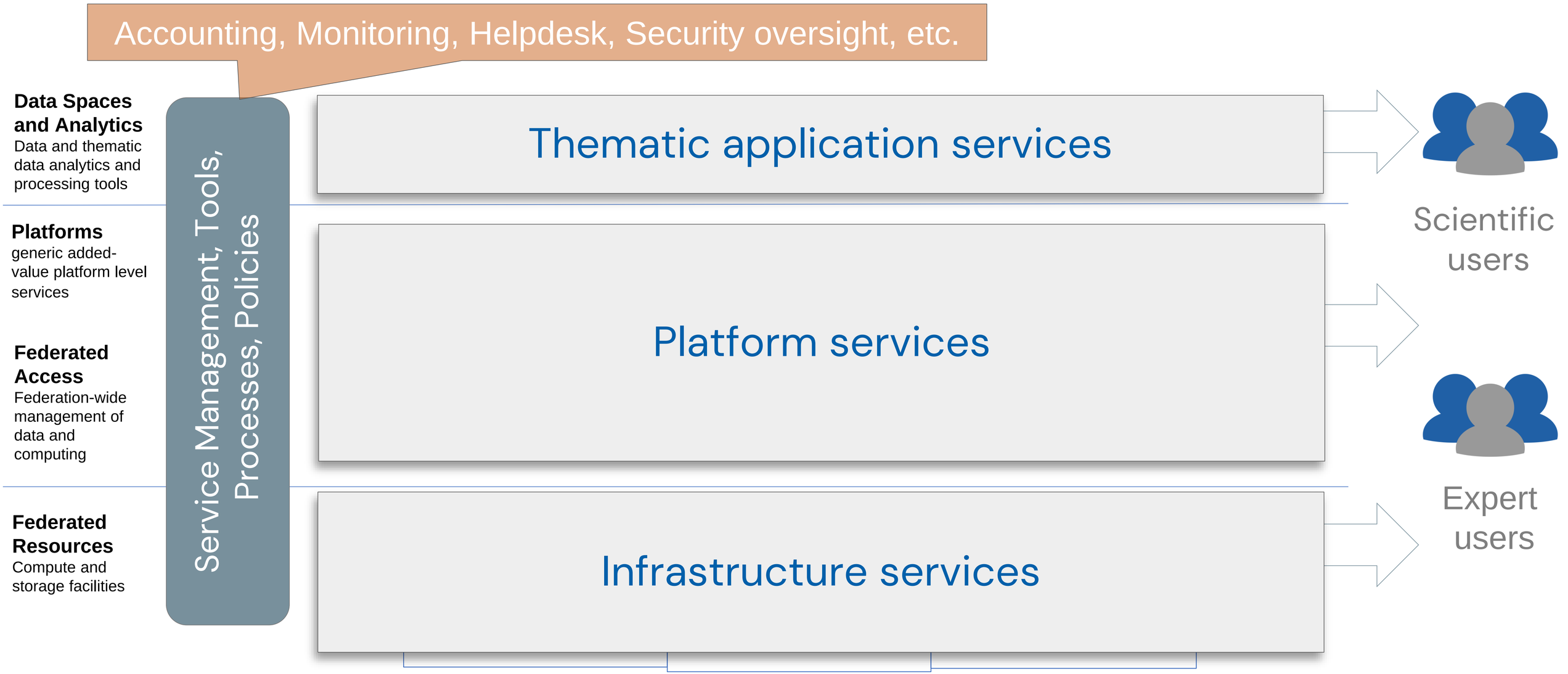
Scope:

- **49% service delivery**
- Co-development of services with research communities

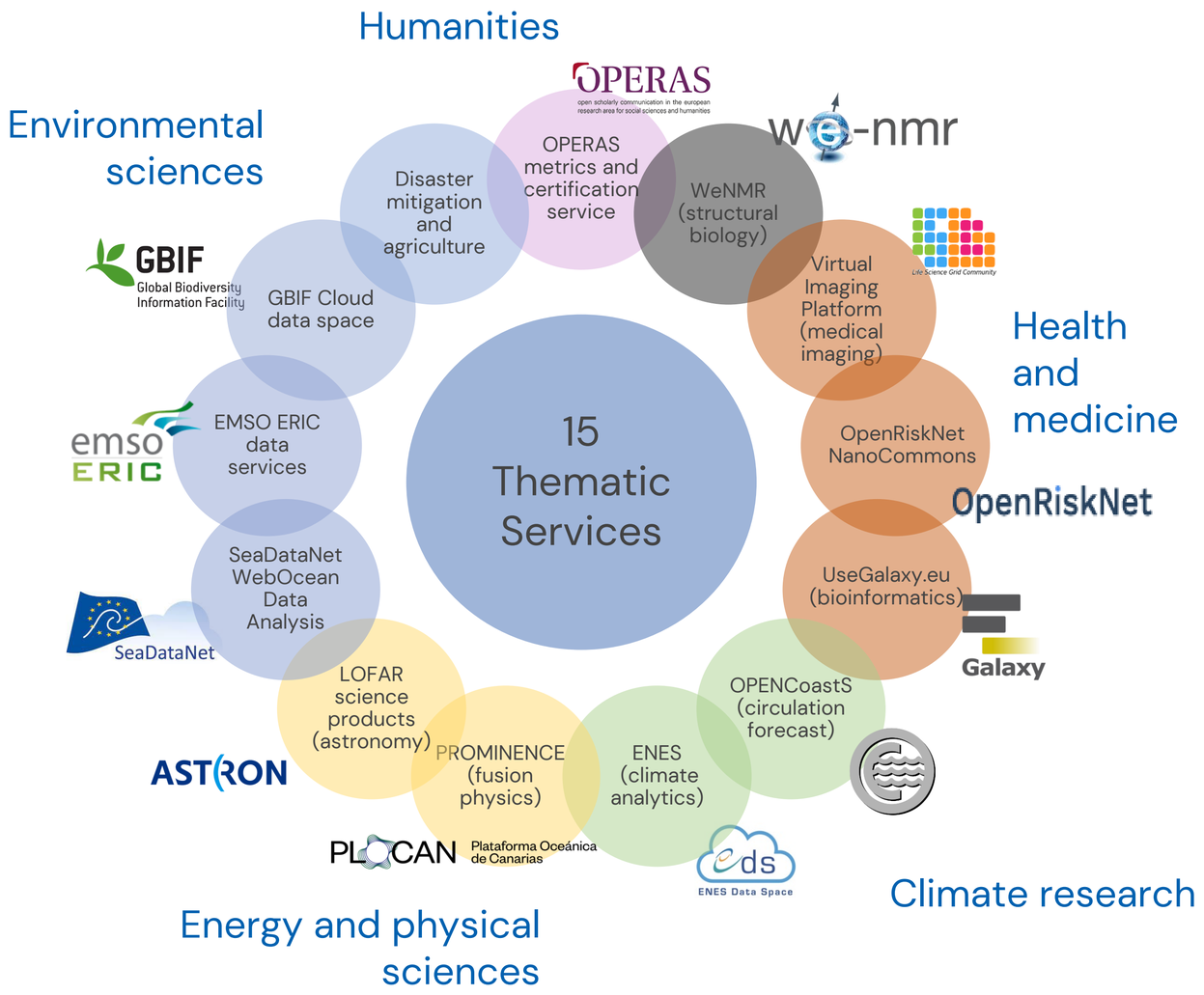
Common partners with **Eastern Partnership**:

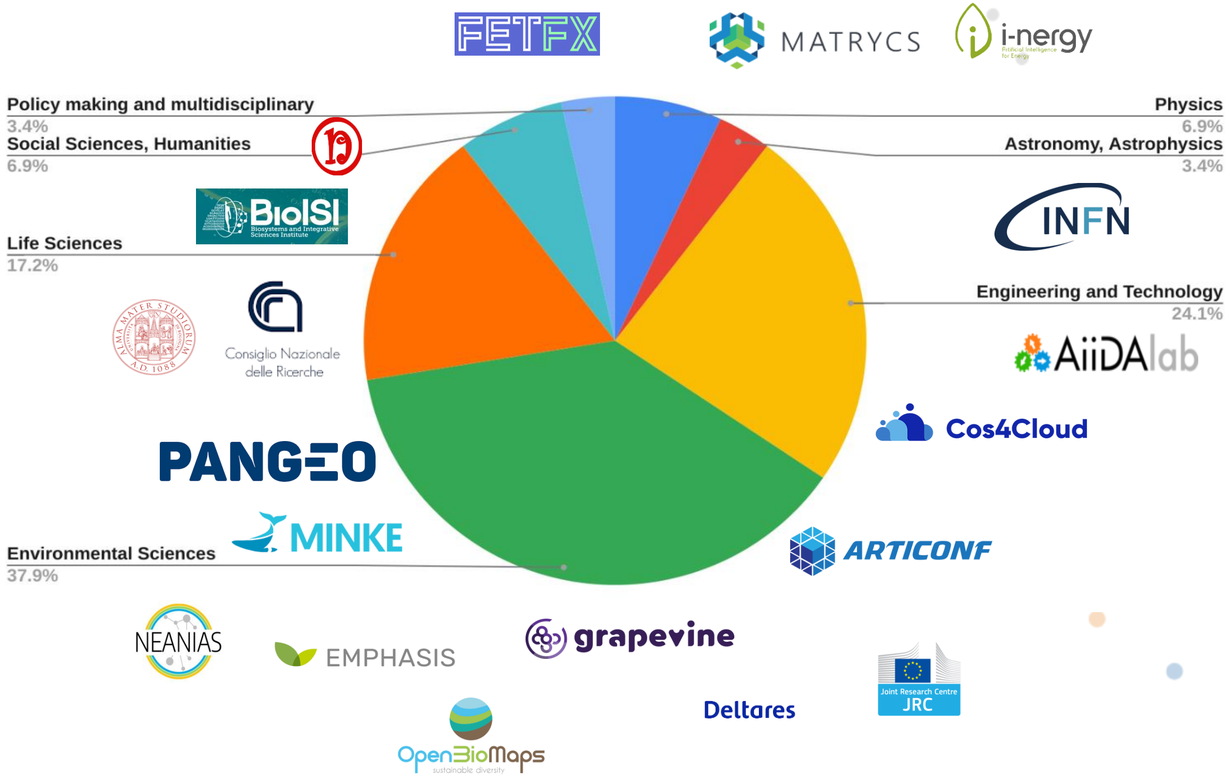
- RENAM (MD), GRENA (GE), IIAP (AM), UA-BITP (UA)

EGI-ACE tiered service architecture



EGI-ACE communities, our clients



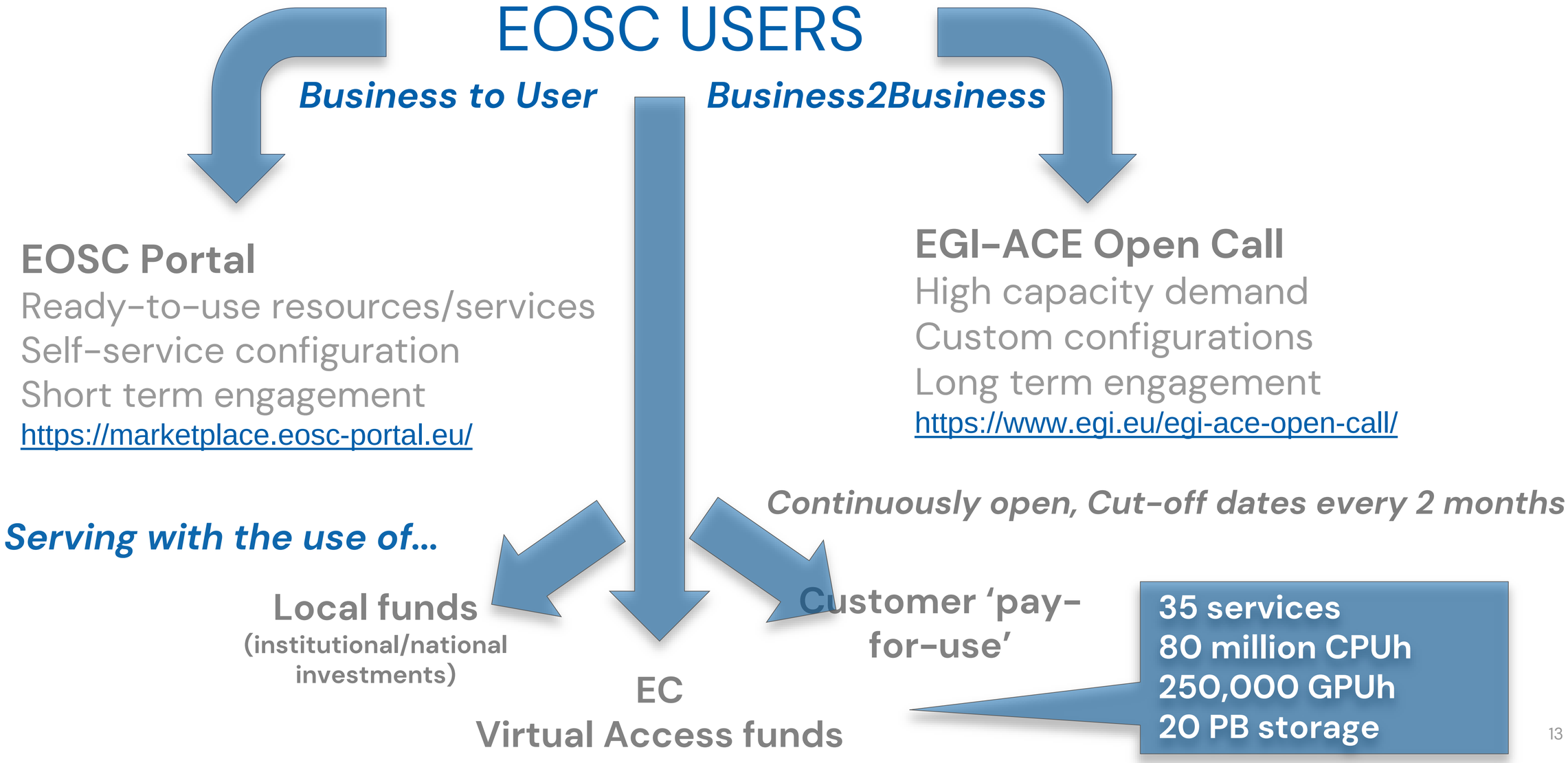


Supporting use cases

- EOSC Portal for single users & small groups users
  - Quick access to ready-to-use resources/services with predefined allocations
  - Training material webinar and docs for self-service

- EGI-ACE Open Call for International projects, multinational communities
  - Custom setup with “Competence Centres”: dedicated support groups consisting of service and resource providers, technical experts and other interested parties providing assistance for a Use Case

Sustainable Open Science environments



Orders and use cases supported by EGI-ACE

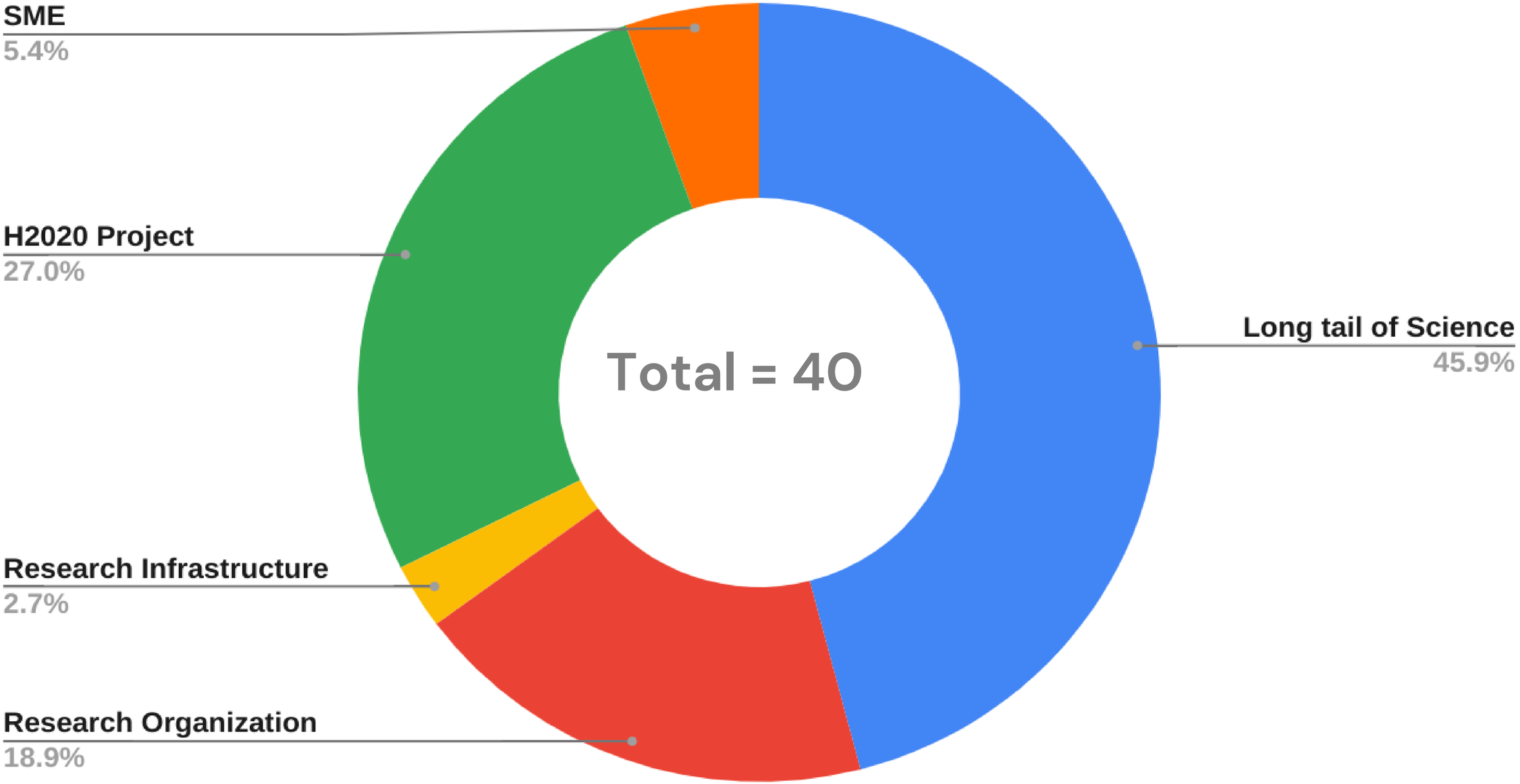
110 orders
(EOSC Marketplace)

40 applications
(EGI-ACE Open Call)

EUROPEAN OPEN SCIENCE CLOUD

EGI-ACE

Respondents to our Open Call

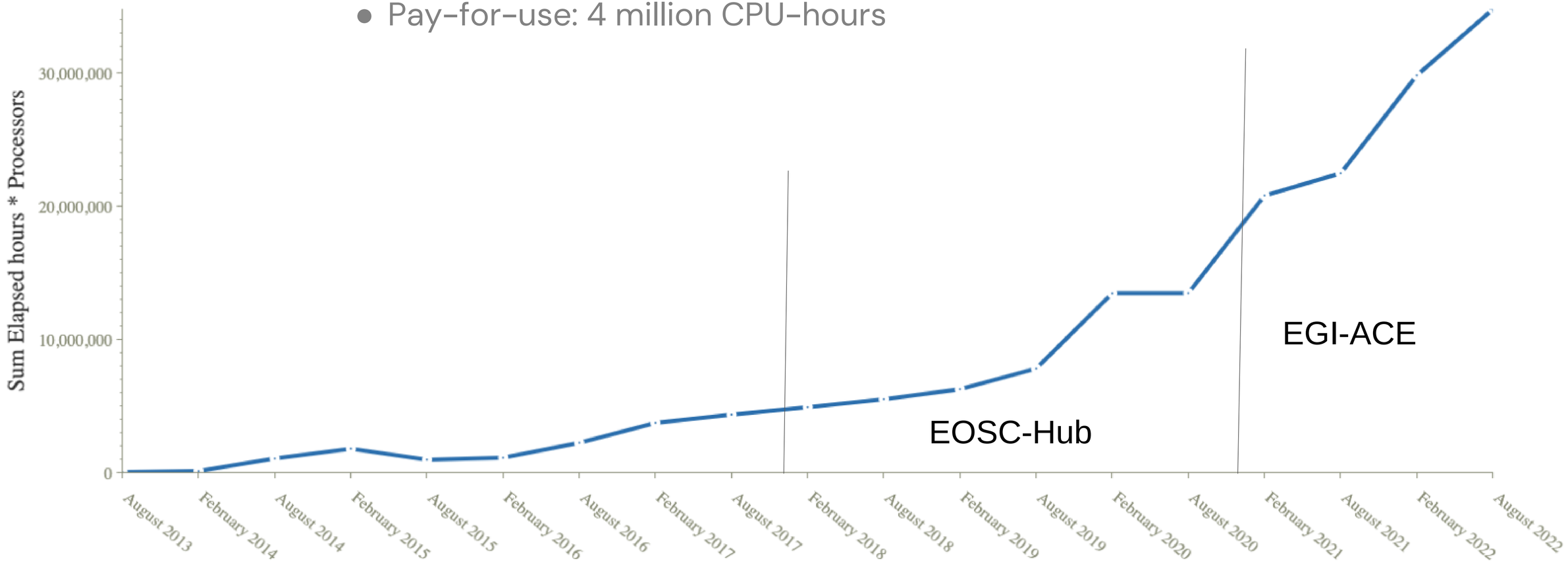


Most demanded services

Cloud uptake

97 million CPU-hours delivered since Jan 2021

- Local funds: 50 million CPU-hours ← **Doubling The Ec Funding!**
- Virtual Access: 43 million CPU-hours
- Pay-for-use: 4 million CPU-hours



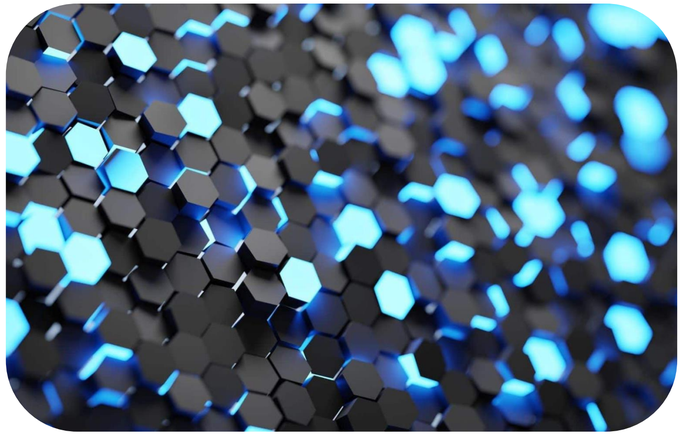
Section 3

Our services & technologies

EGI Value Propositions

Services for Research

Our large-scale computing and data analytics services are helping scientists to accelerate the process leading to research outputs.



Services for Federation

Our internal services are primarily serving the EGI Council members and affiliated organisations.

Services for Business

EGI is open for business. We help companies to exploit services and resources for compute- and data-intensive research and innovation.

Services for research

Workload manager

High throughput compute

Data transfer

Datahub

Online storage

Cloud Compute

Cloud Container Compute

Training infrastructure

Fitsm training

ISO 27001 Training

Check in

Notebooks

Read about our services for research:
https://www.egi.eu/services/research/

Section 4

Experiences from the Eastern Partnership region

Underlying requirement: Portability

Portability of user identities

Portability of scientific datasets

Portability of scientific applications

…across compute providers
…among ‘EOSC’ and the compute providers

Portability

https://go.egi.eu/intl-cloud-integration

Check-in

'ARC-compliant' Au
and Authorization s

DataHub

Remote access to
datasets

AppDB, CV

For community-bas
and executable coo

EGI-ACE

EGI-ACE Guideline for cloud integration

Contact: Enol Fernandez (enol.fernandez@egi.eu), Cloud Solutions Manager, EGI Foundation

Abstract. This document is an integration guideline for OpenStack cloud providers who want to participate in the infrastructure layer of the EOSC Compute Platform (ECP). The EOSC Compute Platform is provided by the EGI-ACE project as an ecosystem of services for a broad spectrum of scientific computing use cases. By following this guideline, the OpenStack provider can integrate with the Check-in, DataHub and AppDB services of the ECP, and as a result, will be able to exchange virtualised applications and scientific datasets between their cloud and the rest of EGI-ACE, increasing the value of their cloud for both national users, and international communities with national footprint.

1. The EGI-ACE Context

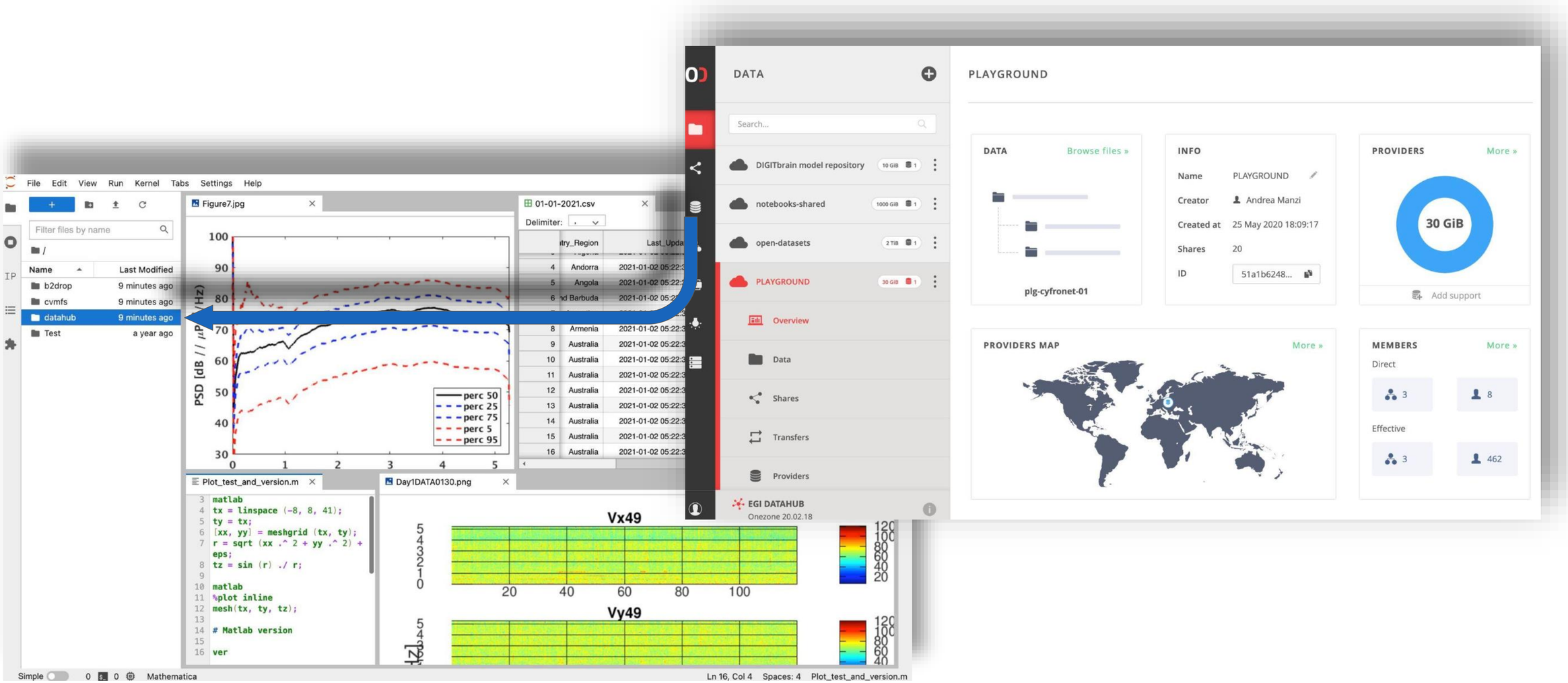
By building on the EGI federation and providers from research communities, EGI-ACE delivers the **EOSC Compute Platform (ECP)**, a federated system of compute and storage infrastructure extended with platform services to support diverse types of data processing and data analytics cases (see KER 1 in Figure 1). The ECP currently includes **High Throughput Compute (HTC) and OpenStack Cloud Compute facilities in its infrastructure layer, and will broaden its scope with High Performance Compute services later in 2022**. The platform layer of the ECP provides assistance for single sign-on, data transfer and data federation, interactive computing, management of large numbers of jobs, orchestration of compute clusters, artificial intelligence and machine learning tasks.

The EOSC Compute Platform relies on a set of 'Services for Federated Computing' that enable the integration and reliable delivery of compute platform services to user communities. (see KER 2 in Figure 1).

The EGI-ACE consortium also delivers **18 thematic services** (data spaces and processing platforms) that integrate data and applications from different scientific disciplines into the ECP for the scalable analysis and exploitation of scientific datasets. Moreover, a growing number of additional thematic services from outside the consortium also rely on EGI-ACE services and integration support, and offer themselves for new users in EOSC.

EGI-ACE receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101017567.
https://www.egi.eu/projects/egi-ace/

Jupyter + DataHub VM



Current activities

Country (Cloud provider)	Lightweight integration			Full integration			
	Check-in	Datahub	Notebook	Monitoring	Accounting	Common policies	Other federation services
Armenia	Yes	No	No	No			
China	Yes	Yes	Yes	Yes			
Georgia	Test ongoing	No	No	No			
Hungary	Yes	Test ongoing	Test ongoing	No			
Moldova	Yes	No	No	No			
South Africa	Yes	Yes	Yes	Yes			
Ukraine	TBD	No	No	No			
Open Telekom Cloud	Yes	No	No	No			
CloudFerro	Yes	No	No	No			

Support for the Ukrainian research community

Input

- Discussions with Ukrainian representative in the EGI council Sergiy Svistunov
- Organisation of the EGI 2022 conference session “Support for Ukraine”

Support

- EGI will open its infrastructure for use by the Ukrainian research community
  - We will collect information on specific needs of the scientific community in Ukraine
  - We will enable a pool of resources from our providers
  - The community can utilise EGI-ACE call for use cases
- EGI will help the Ukrainian community with the use of our resources
  - We create Case studies / science stories demonstrating the use of infrastructure in different science fields
  - We create tailored webinars and trainings on how to use the infrastructure
  - We will contribute to national events in Ukraine
- EGI will collaborate with its peers and projects supporting Ukraine
  - EURIZON project (TBD - possible information platform/discussion forum about the current situation, most recent needs, state of infrastructure, etc)
  - GEANT – contribution to specific Task force set up for support

BSUN Summer School 22

Federated digital infrastructures in:
education, scientific research and innovation

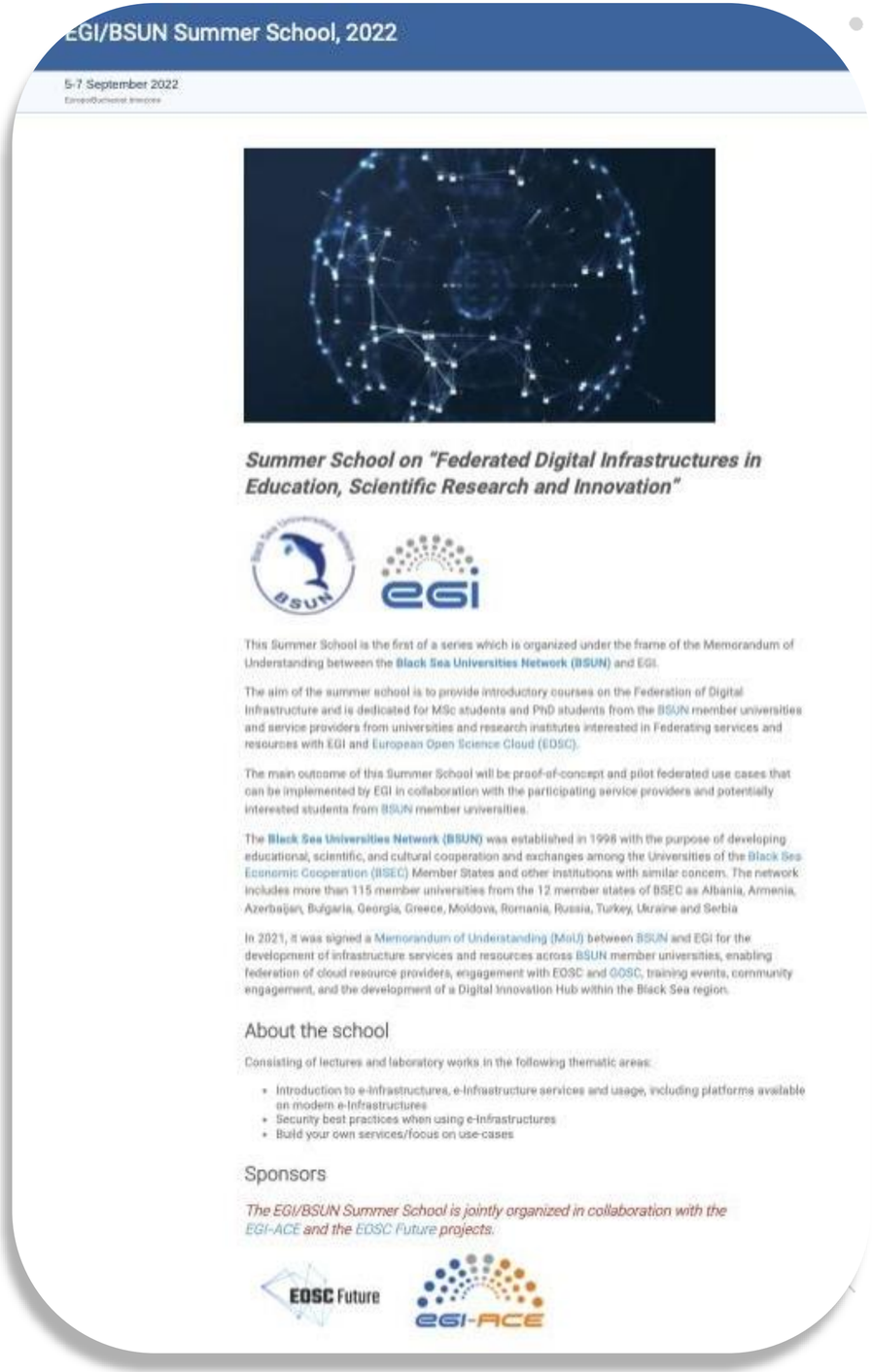
Courses on the Federation of Digital Infrastructure

Services and usage
Security best practices
Build your own service

5 new proof-of-concepts discussed

Teaching quantum computing
3D learning platform
Sustainable Mobility
IoT Cloud & Fog
Fluid flows modeling & simulations

Black Sun University Network: Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Serbia, Turkey, Ukraine


EGI/BSUN Summer School, 2022

5-7 September 2022

Summer School on "Federated Digital Infrastructures in Education, Scientific Research and Innovation"

This Summer School is the first of a series which is organized under the frame of the Memorandum of Understanding between the **Black Sea Universities Network (BSUN)** and EGI.

The aim of the summer school is to provide introductory courses on the Federation of Digital Infrastructure and is dedicated for MSc students and PhD students from the BSUN member universities and service providers from universities and research institutes interested in Federating services and resources with EGI and European Open Science Cloud (EOSC).

The main outcome of this Summer School will be proof-of-concept and pilot federated use cases that can be implemented by EGI in collaboration with the participating service providers and potentially interested students from BSUN member universities.

The **Black Sea Universities Network (BSUN)** was established in 1998 with the purpose of developing educational, scientific, and cultural cooperation and exchanges among the Universities of the Black Sea Economic Cooperation (BSEC) Member States and other institutions with similar concern. The network includes more than 115 member universities from the 12 member states of BSEC as Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Turkey, Ukraine and Serbia

In 2021, it was signed a Memorandum of Understanding (MoU) between BSUN and EGI for the development of infrastructure services and resources across BSUN member universities, enabling federation of cloud resource providers, engagement with EOSC and GOSC, training events, community engagement, and the development of a Digital Innovation Hub within the Black Sea region.

About the school

Consisting of lectures and laboratory works in the following thematic areas:

- Introduction to e-Infrastructures, e-Infrastructure services and usage, including platforms available on modern e-Infrastructures
- Security best practices when using e-Infrastructures
- Build your own services/focus on use-cases

Sponsors

The EGI/BSUN Summer School is jointly organized in collaboration with the EGI-ACE and the EOSC Future projects.

Benefits for users and providers

- More user can benefit of the services
- Long term Sustainability
- Impact for national investment
- New local cloud & services
- Minimize EC founds' reliance

Next steps

How to further collaborate?

The whole is more than the sum of its parts.

Aristotle

Section 5

Get in in touch with us

Contact us

Let's talk. Or meet in person

Get in touch with us

contact@egi.eu

https://www.egi.eu/
https://twitter.com/EGI_eInfra
https://www.linkedin.com/company/egi-foundation

Thank you

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