



Enabling open science in Europe with data, software and the compute continuum

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Open Science Day 2022, Ljubljana

Open Science practices in international scientific collaborations

1. Open infrastructures – EGI A worldwide scientific computing infrastructure for research

Why a federation?

- Support science at international scale
- Build an hyperscale compute facility for research
- Invest nationally, access globally
- Bring computing to the data



Slovenia/SLING (National Supercomputing Network Consortium)

- ARNES
- SiGNET (Jozef Stefan Institute)



EGI council participants

2021 – 4 new members

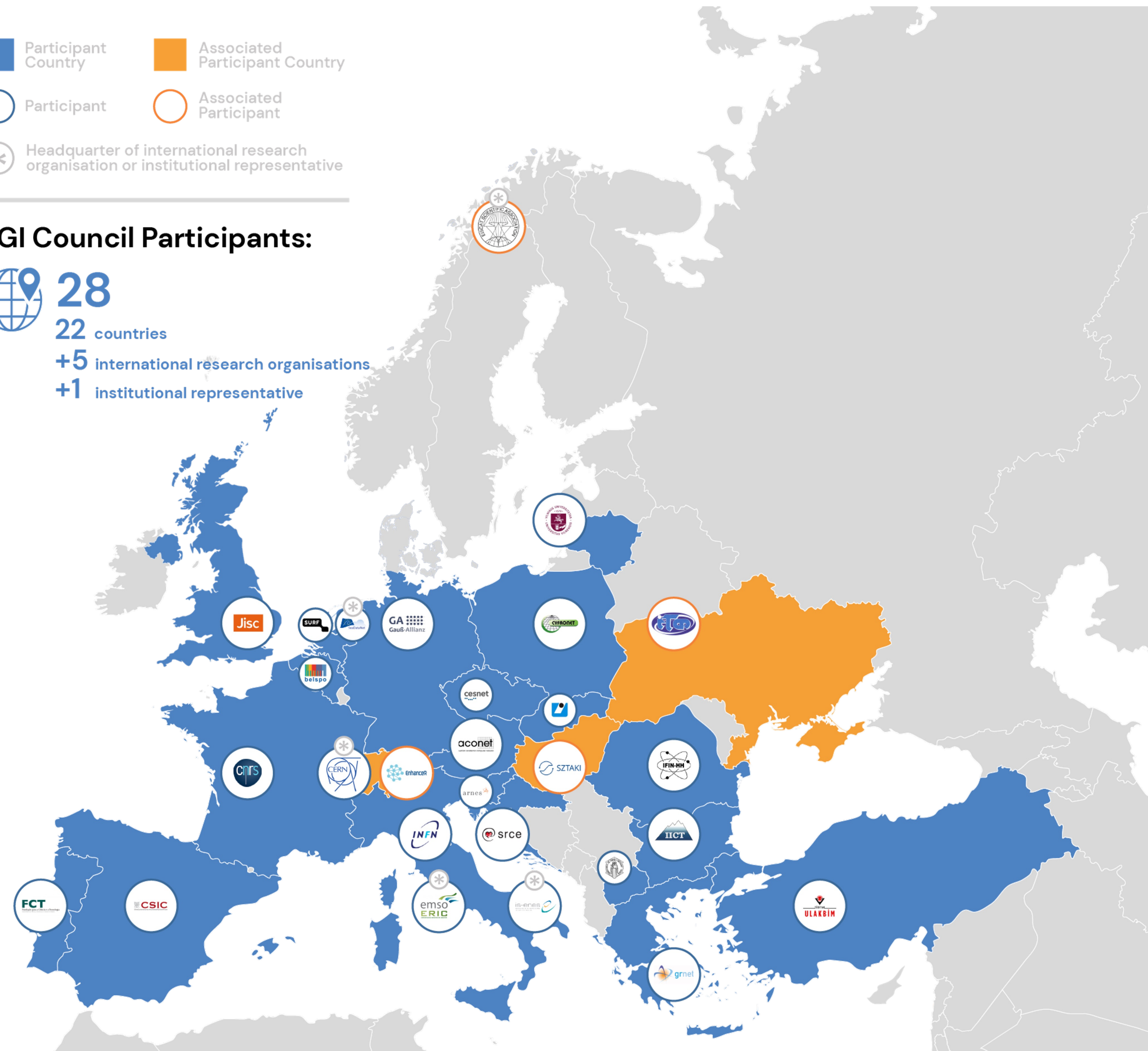
2022 – 2 new members



- Participant Country
- Associated Participant Country
- Participant
- Associated Participant
- Headquarter of international research organisation or institutional representative

EGI Council Participants:

 **28**
22 countries
+5 international research organisations
+1 institutional representative



EGI Infrastructure and Slovenia (2021)

> 1.2 Million CPUs,
1.3 Exabyte of
data

10 Research
Infrastructures

with Slovenian participation (e.g. Astronomy,
High Energy Physics, Linguistics, biodiversity,
marine science, struct biology)

200+

Resource data
centers

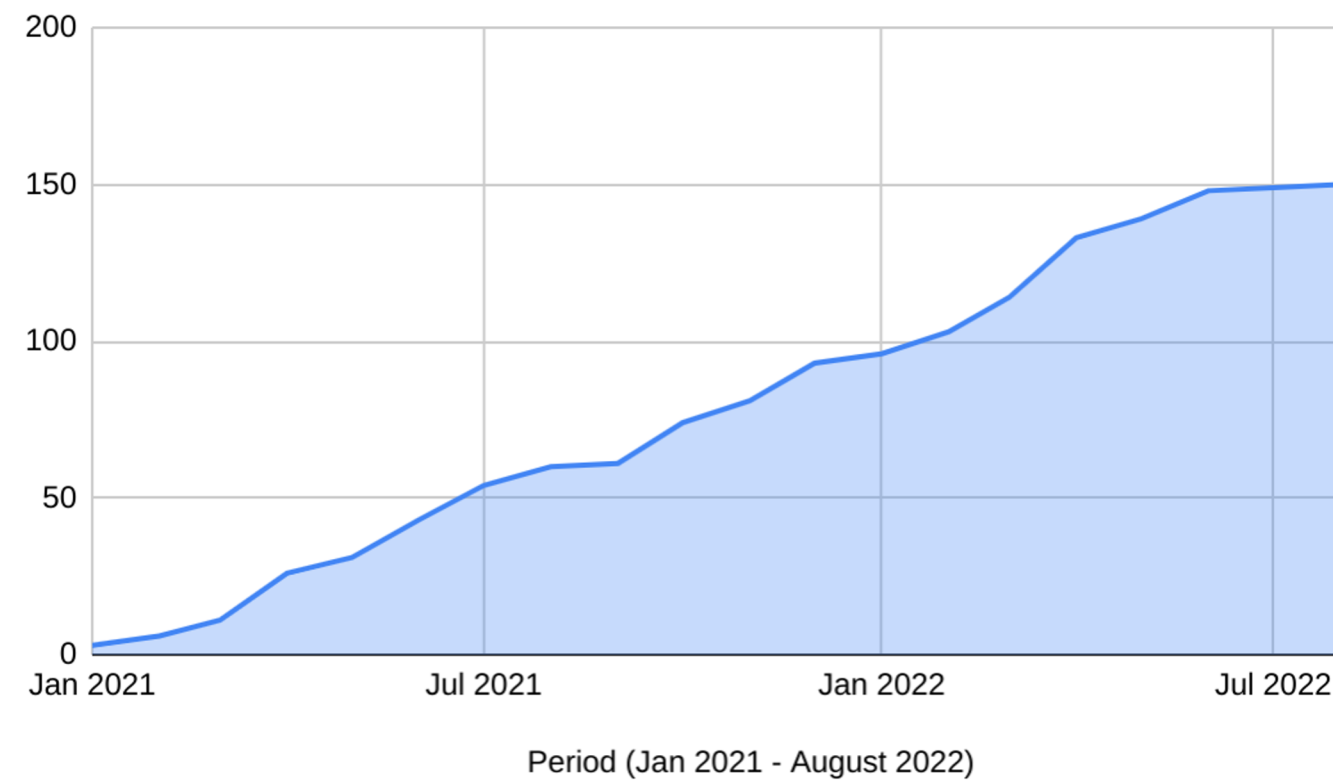
82.000+

Scientists

~370

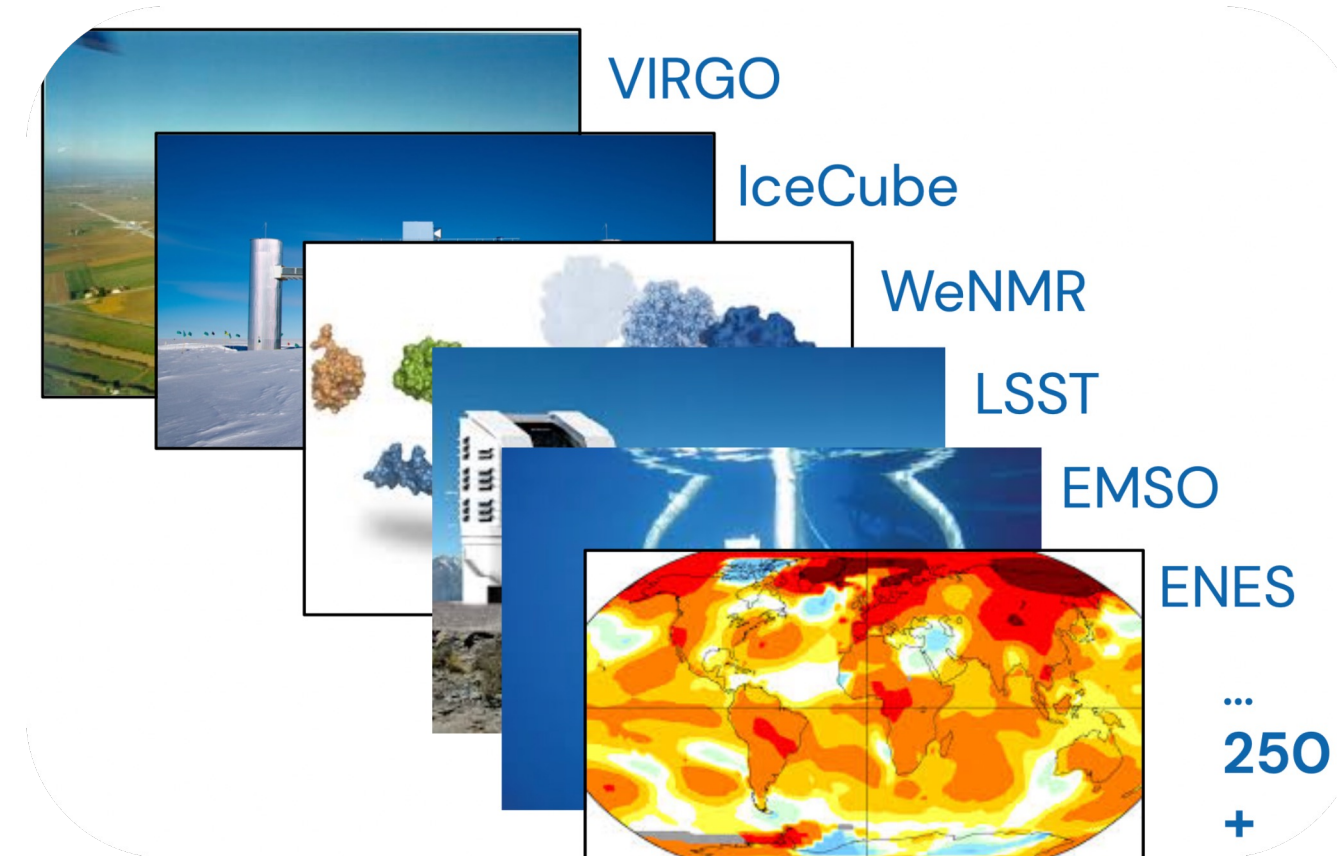
Peer reviewed publications
with Slovenian authors

EGI Federation in figures



+82,000 users

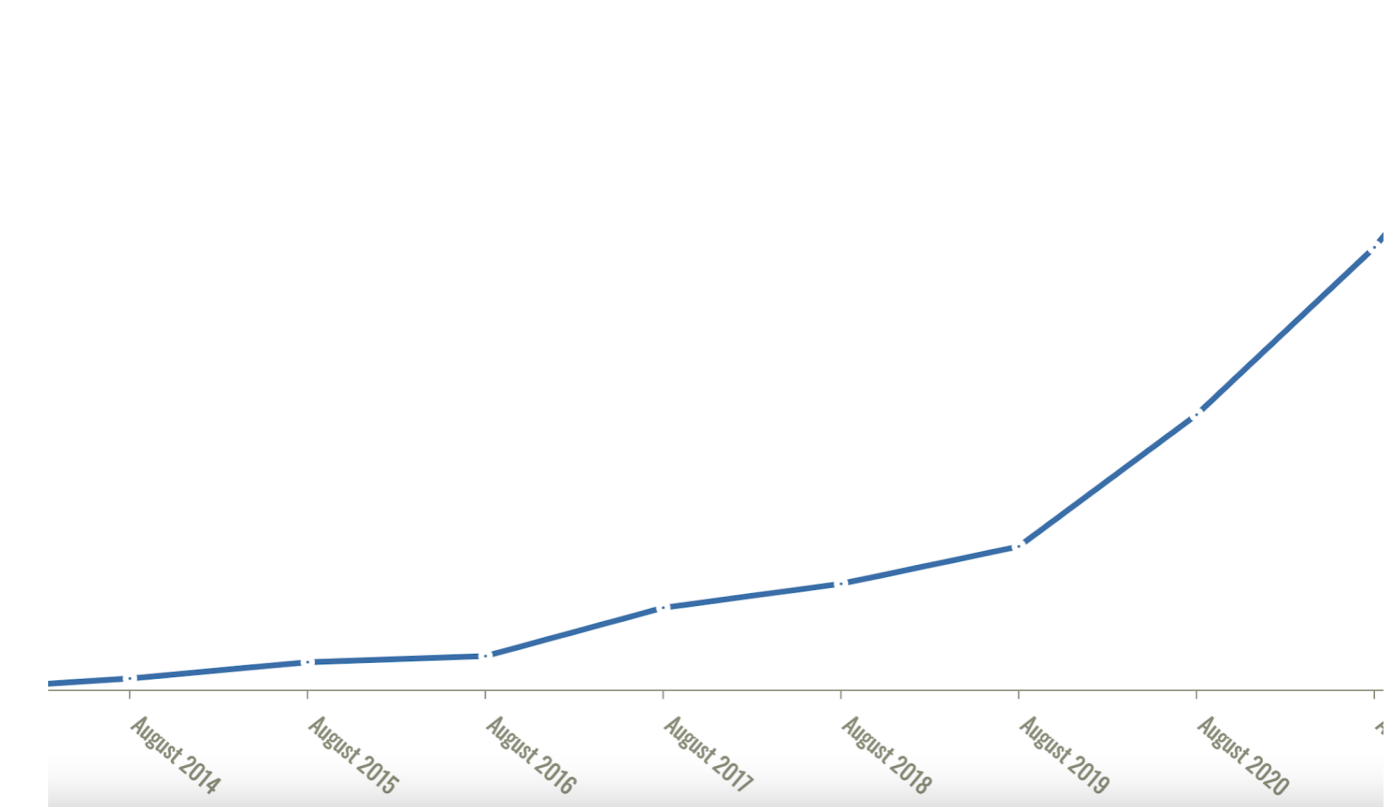
+150 support applications received in 2021–2022 via EOSC–funded projects



~7 Billion CPU
h*processors/year

14 Research Infrastructures supported on the ESFRI roadmap

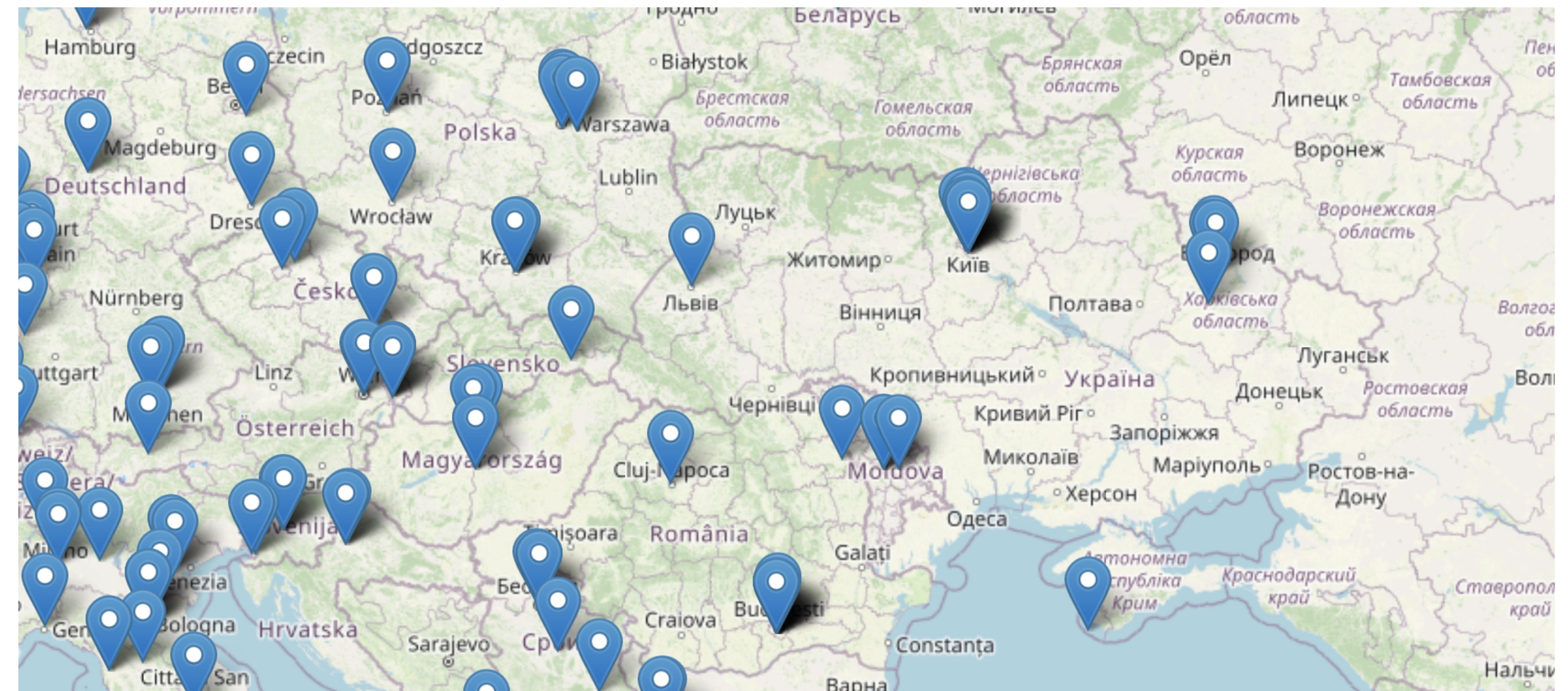
EGI Sum Elapsed hours * Processors in 12 months periods



EGI Federated Cloud

1 new user community per week!

Opening infrastructures to support scientists during times of war



Open Science practices in international scientific collaborations

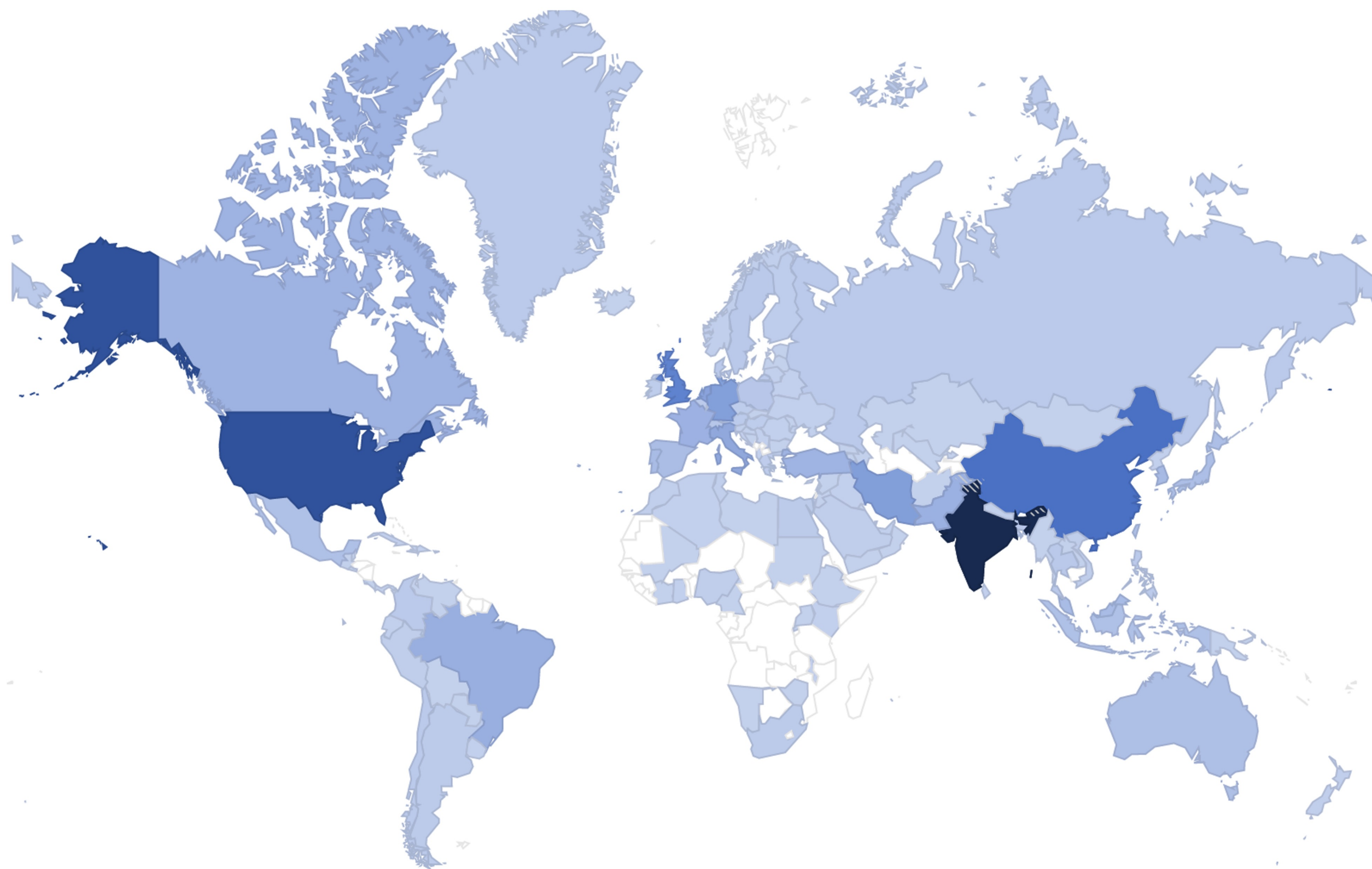
2. Open research software

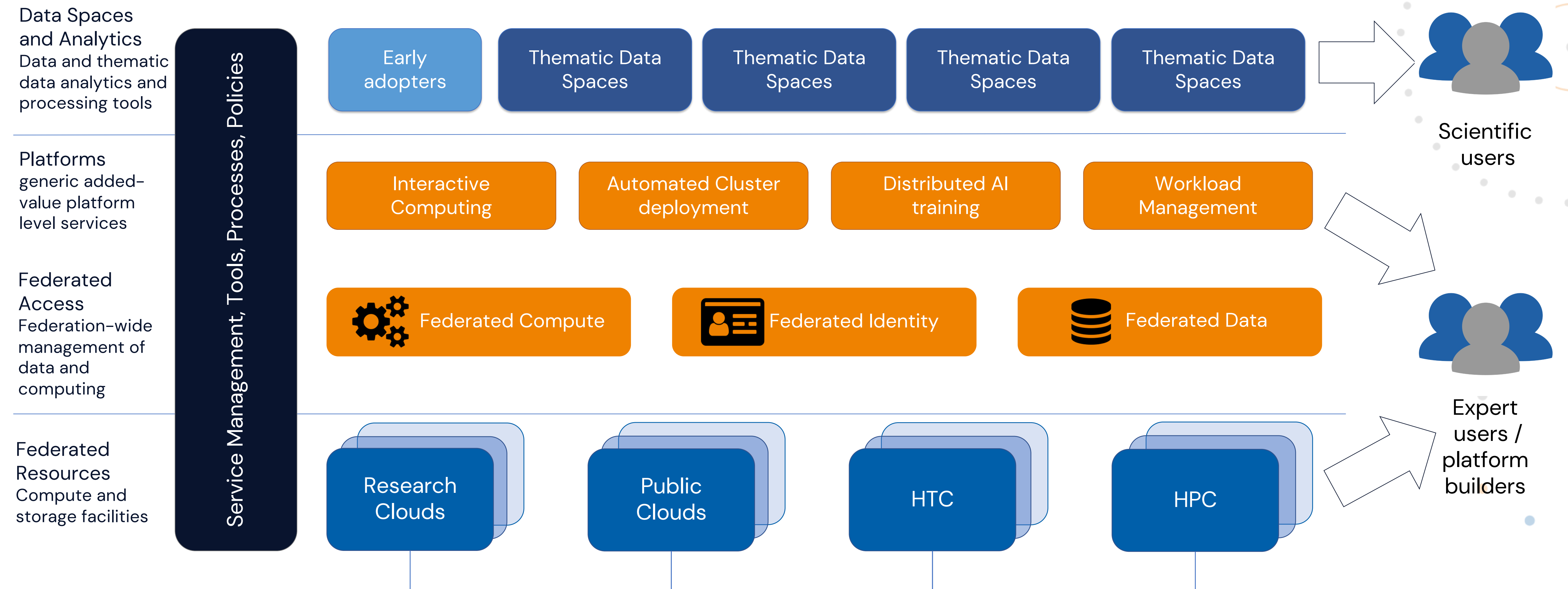
Open tools for simulation addressing the COVID-19 pandemic

A joint effort of WeNMR, EGI Federation (Europe),
Open Science Grid (USA) and CBPF (Brazil): +100% capacity during
2020-2022

Worldwide User Map

The HADDOCK web portal is being used by **31748 users** accross **136 countries**!





Integrating HPC access in EGI and EOSC

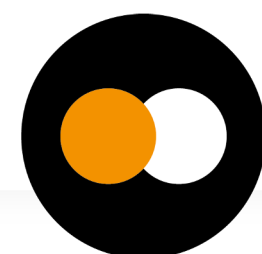
Use cases

- **Climate research** use case from ENES (CMCC, Italy)
- **High Energy Physics** simulations for the High Luminosity run of the Large Hadron Collider (CERN) HEP
- **Cross platform fusion** workflows (UK Atomic Energy Authority) PROMINENCE
- **Photon and neutron science** use case from the ELI-NP Research Infrastructure (IFIN-HH, Romania)

Providers

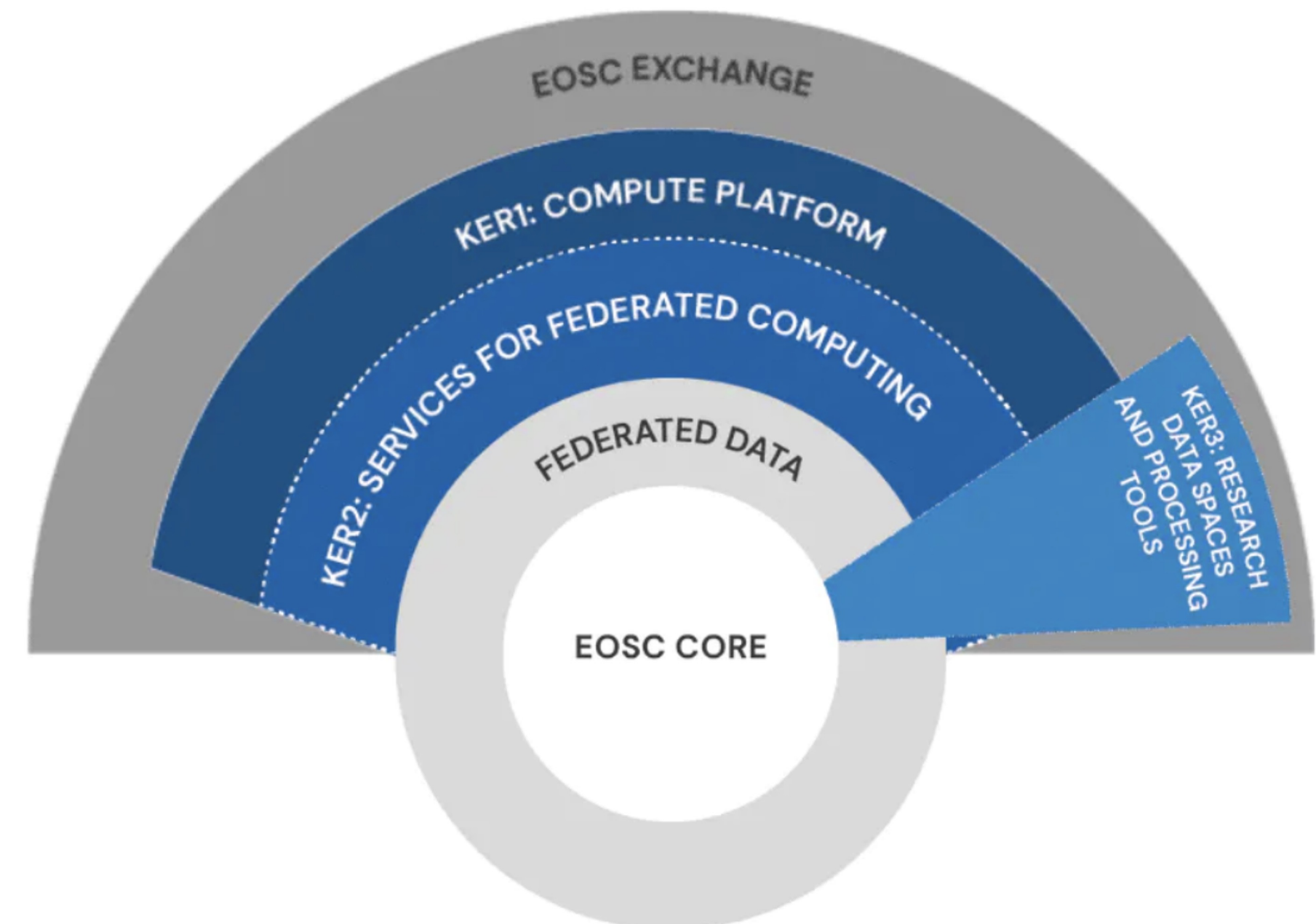
- CESGA (Spain)
- IICT BAS (Bulgaria)
- LIP/INCD (Portugal)
- TUBITAK (Turkey)

HPC Integration [Handbook](#)



interTwin

EOSC Compute Platform



Open Science practices in international scientific collaborations

3. Open data

The Nobel Prize in Physics 2013



© Nobel Media AB. Photo: A. Mahmoud

François Englert

Prize share: 1/2



© Nobel Media AB. Photo: A. Mahmoud

Peter W. Higgs

Prize share: 1/2

The Nobel Prize in Physics 2013 was awarded jointly to François Englert and Peter W. Higgs "for the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass of subatomic particles, and which recently was confirmed through the discovery of the predicted fundamental particle, by the ATLAS and CMS experiments at CERN's Large Hadron Collider."

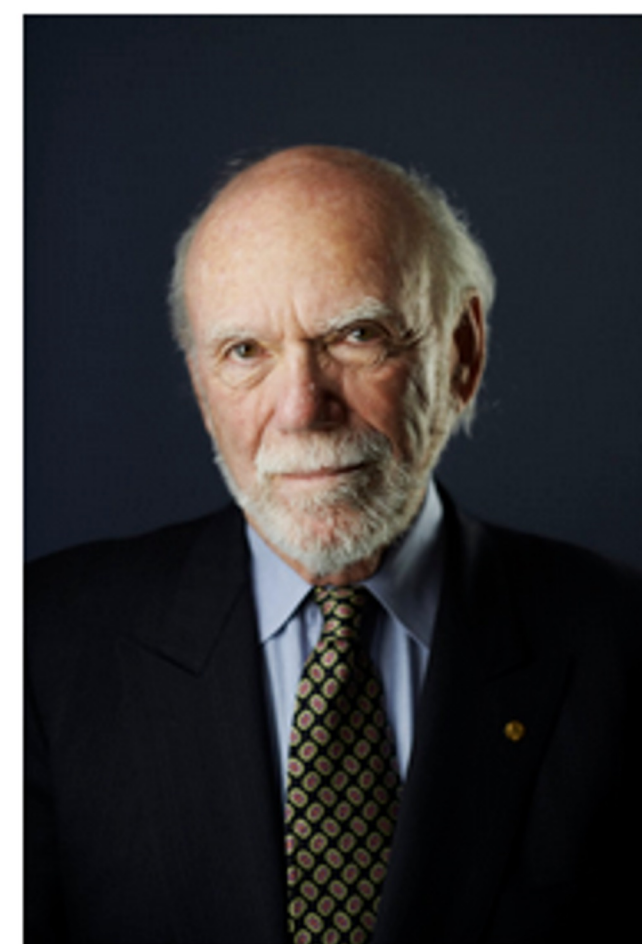
The Nobel Prize in Physics 2017



© Nobel Media AB. Photo: A. Mahmoud

Rainer Weiss

Prize share: 1/2



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Barry C. Barish

Prize share: 1/4

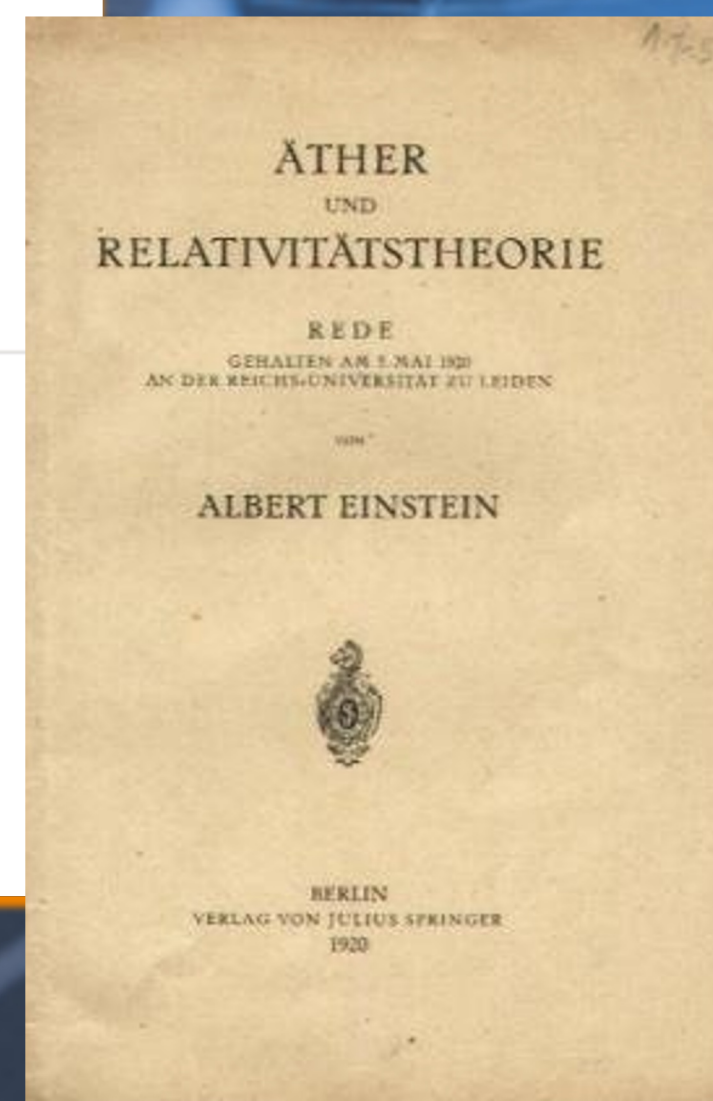


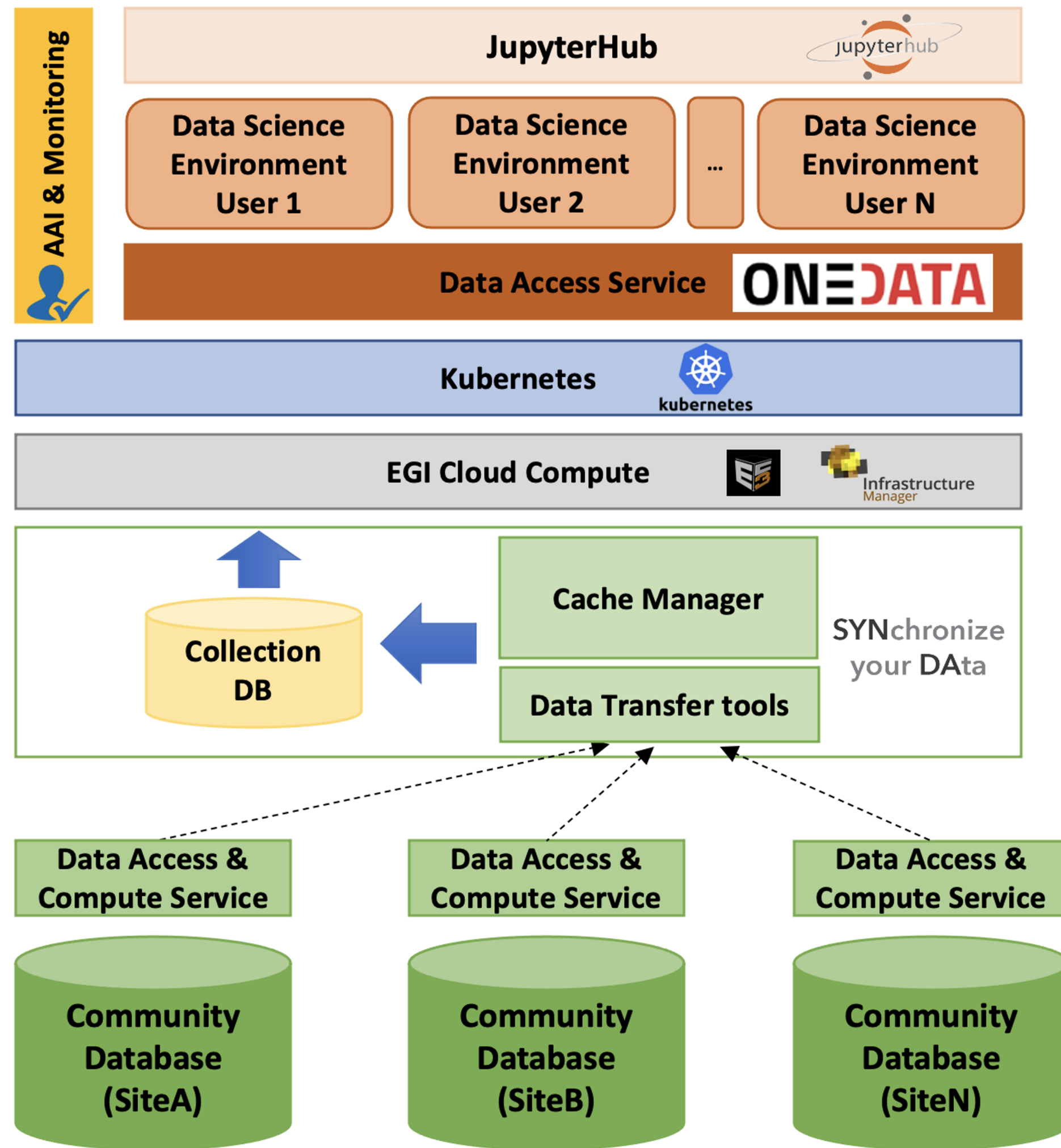
© Nobel Media AB. Photo: A. Mahmoud

Kip S. Thorne

Prize share: 1/4

The Nobel Prize in Physics 2017 was divided, one half awarded to Rainer Weiss, the other half jointly to Barry C. Barish and Kip S. Thorne "for decisive contributions to the LIGO detector and the observation of gravitational waves."





EOSC compute services & interfaces

EOSC data access services & interfaces

Infrastructure as a Service (IaaS) Clouds

Data collector and Cache Service

Community (legacy) Infrastructure

is-enes
INFRASTRUCTURE FOR THE EUROPEAN NETWORK
FOR EARTH SYSTEM MODELLING

<http://is.enes.org/>

ESGF
Earth System Grid Federation

ENES delivers an open, scalable and cloud-enabled data science environment for climate data analysis on top of the EGI Federation

Single entry point for:

- Datasets
- Storage & Compute resources
- Data Science Software Stack
- IDE & Applications
- SaaS/PaaS approach

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

- › Builds on existing infrastructures and services supported by the European Commission, Member States and research communities.
- › Brings these together in a federated 'system of systems'

Openness in science has been successfully adopted to enable breakthrough discoveries

**Science has no borders.
With open science we can tackle the
scientific challenges of tomorrow**