www.egi.eu
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Scientific Computing 2021-2030

Achievements and future opportunities for Europe-Asia collaboration

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Collaborations for Excellence in Science

Science is borderless and so are infrastructures for advanced computing

The EGI Federation

The European infrastructure for advanced Computing for Research

Vision

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

Mission of the EGI Federation

Deliver open solutions for advanced computing and data analytics

EGI HTC Federation & Cloud Federation

Memorandum of Understanding
between
EGI.eu and ASGC

Resource Infrastructure Provider MoU

April 2013

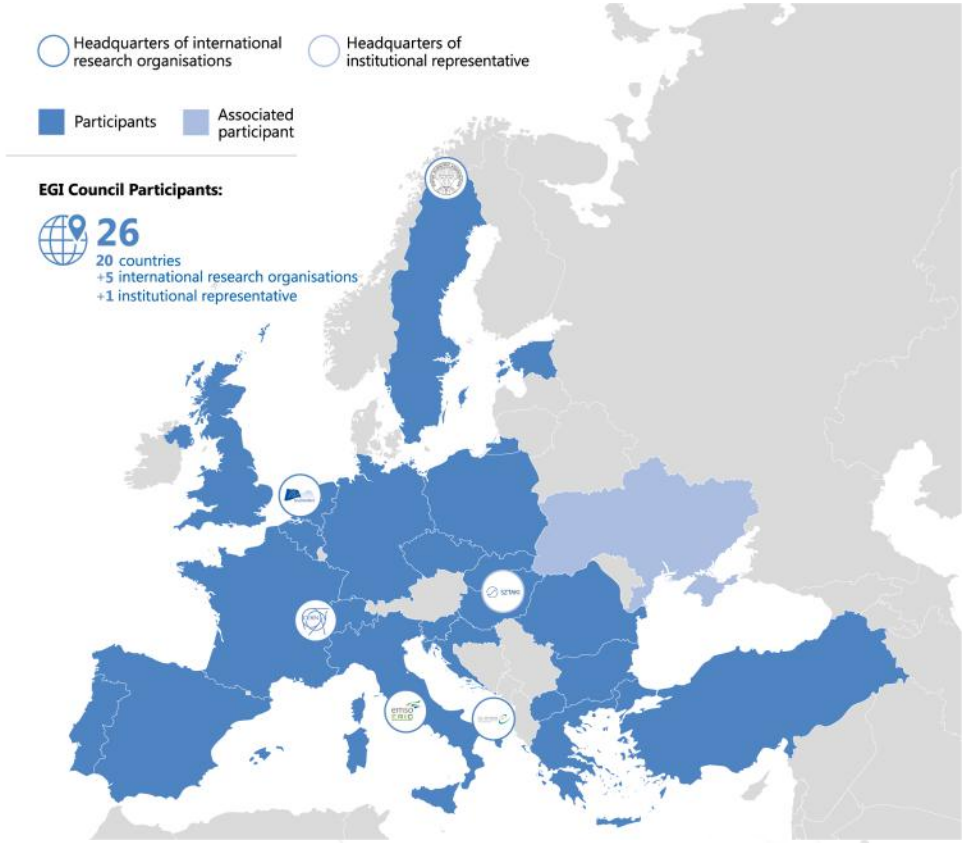
>1.3 Million computing cores

> 1 Exabyte Data

Facilities from 5 Continents

EGI Council participants

Belgium	BELSPO's website	Bulgaria	IICT's website	Croatia	SRCE's website
Czech Republic	Metacentrum's website	Estonia	EENet's website	France	France Grilles' website
Greece	GRNET's website	Germany	NGI-DE's website	Republic of North Macedonia	MARGI's website
Italy	INFN's website	Netherlands	SURF's website	Poland	Cyfronet's website
Portugal	FCT's website	Romania	IFIN-HH's website	Slovakia	IISAS' website
Slovenia	ARNES's website	Spain	CSIC's website	Switzerland	EnhanceR's website
Turkey	ULAKBIM's website	United Kingdom	Jisc's website	International	CERN's website
International	EISCAT's website	International	EMSO's website	International	IS-ENES website
International	SeaDataNet website	Organisation	SZTAKI's website		



www.egi.eu/about/egi-council

Federation services

Security

- **Check-in**: Login with your own credentials
- **Attribute Management**: Manage memberships and groups in communities and virtual organisations

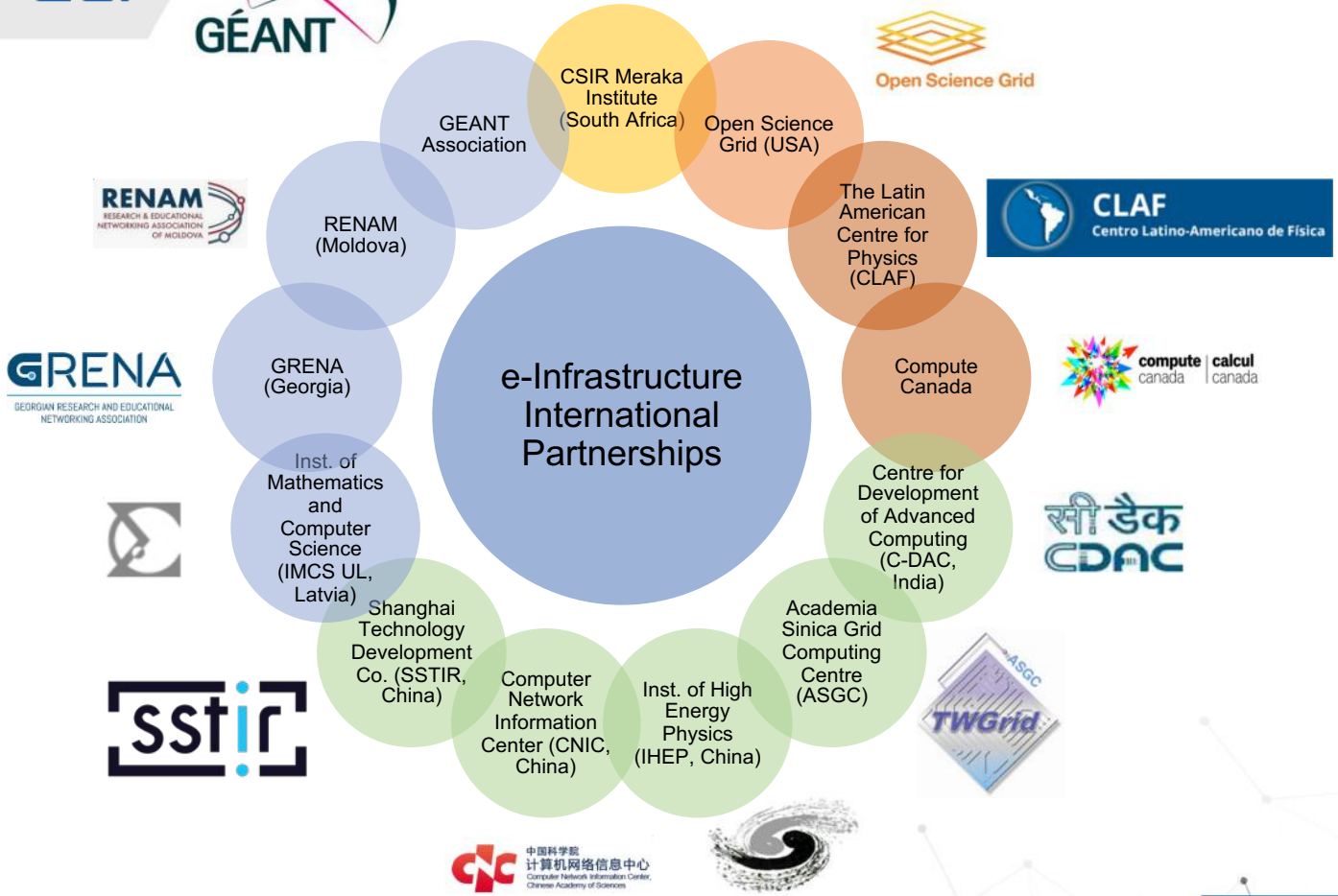
Coordination

- **Operations Coordination and support**: Coordinate activities to ensure seamless operations
- **Community Coordination**: A joint approach to user engagement
- **ITSM Coordination**: Ensures professional service management for EGI IT services
- **Technical Coordination**: Progress and innovation through collaboration
- **Strategy and Policy Development**: One federation, one vision, one strategy
- **Project Managment and Planning**: A joint approach to planning and management
- **Security Coordination**: Enhance local security for a safer global infrastructure
- **Communications**: Share your successes at a larger scale

Operations

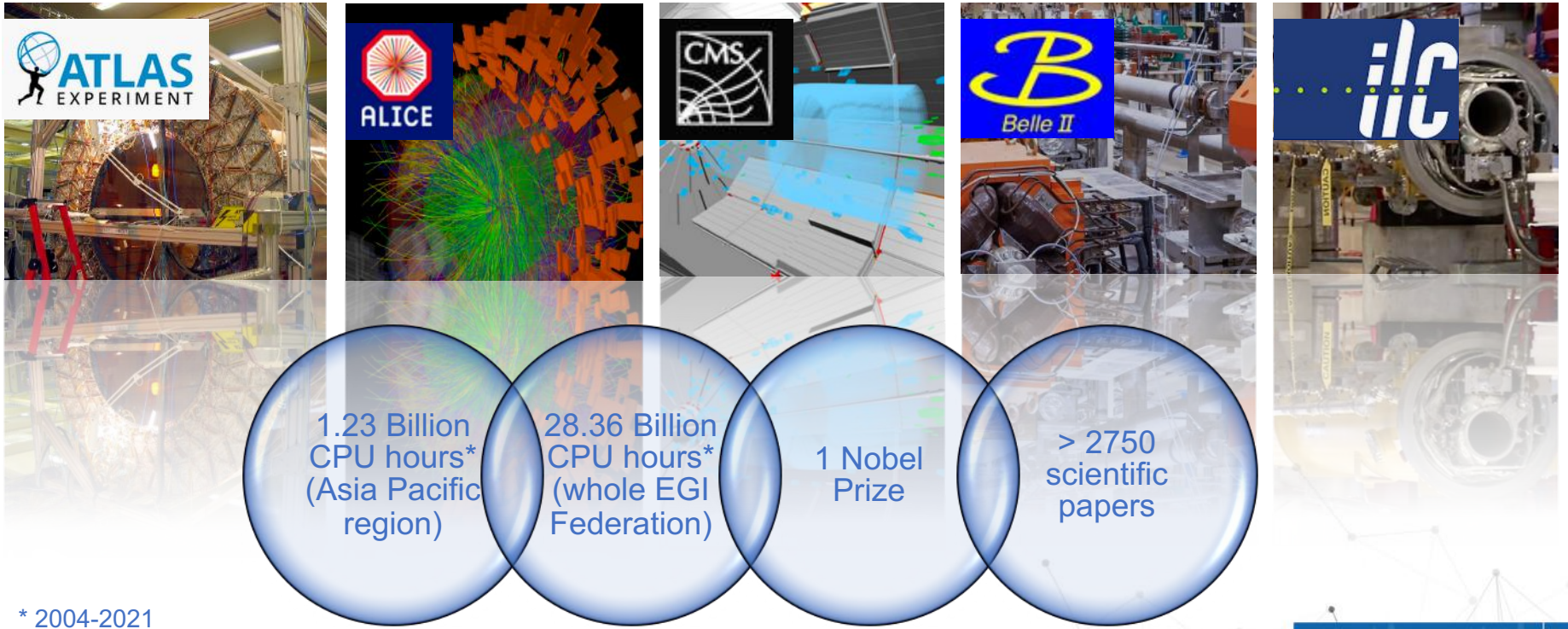
- **Marketplace**: Expose your services to a broader audience
- **Accounting**: Track and report the usage of your services
- **Collaboration Tools**: IT tools for better coordination
- **Configuration Database**: Manage the configuration information of federated e-infrastructure assets and their functional relations
- **Operational Tools**: Integrate resources and operations in a federated ecosystem
- **Validated Software and Repository**: Benefit from a repository of high-quality software validated for the EGI infrastructure
- **Service Monitoring**: Monitor the performance of IT services
- **Helpdesk**: Your point of contact to ask for support at EGI

International Partnerships



Advanced computing for international science

From High energy physics - a strong foundation of European-Asian collaboration since 2004



* 2004-2021

Advanced computing for international science

… to Photon and Neutron Science, Astronomy, Astrophysics, Space Science and Biology

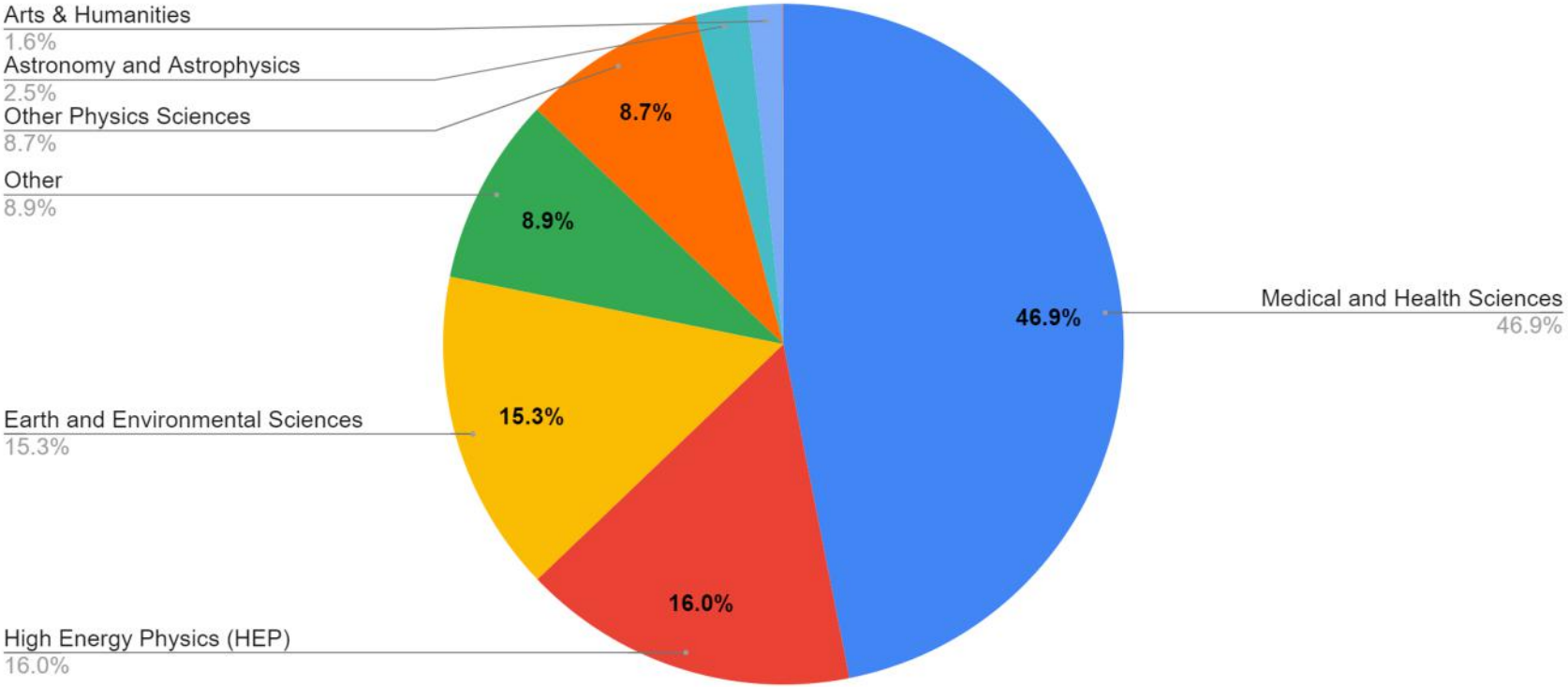
600,000 CPU hours* (Asia Pacific region)

239 Million CPU hours* (whole EGI Federation)

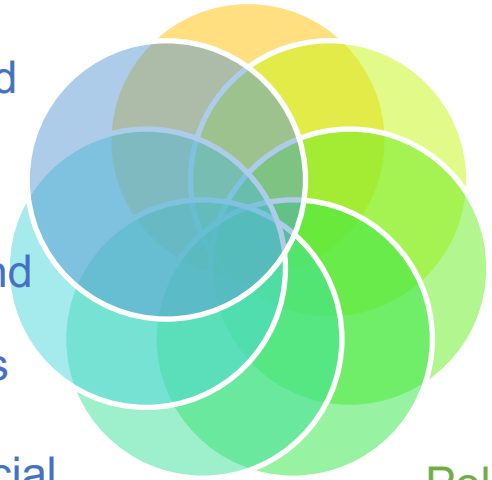
An expanding portfolio of scientific communities

* 2004-2021

EGI scientific disciplines (2020)



EGI Community project portfolio 2020-2021



Data-driven innovation and AI

Health and Medicine

Energy and Manufacturing

Photon and Neutron Sciences

Earth Observation

Social Sciences

Policy management

EOSC-Life

ethe

HEALTHYCLOUD
Health Research & Innovation Cloud

panosc
photon and neutron open science cloud

ExPaNDS
European Open Science Cloud Photon and Neutron Data Services

Social Mining & Big Data Ecosystem
SoBigData
RESEARCH INFRASTRUCTURE

OPERAS-P

Triple

StarwAI

BD4NRG

DIGITBRAIN

openEO
PLATFORM

NEXTGEOSS

SCALE

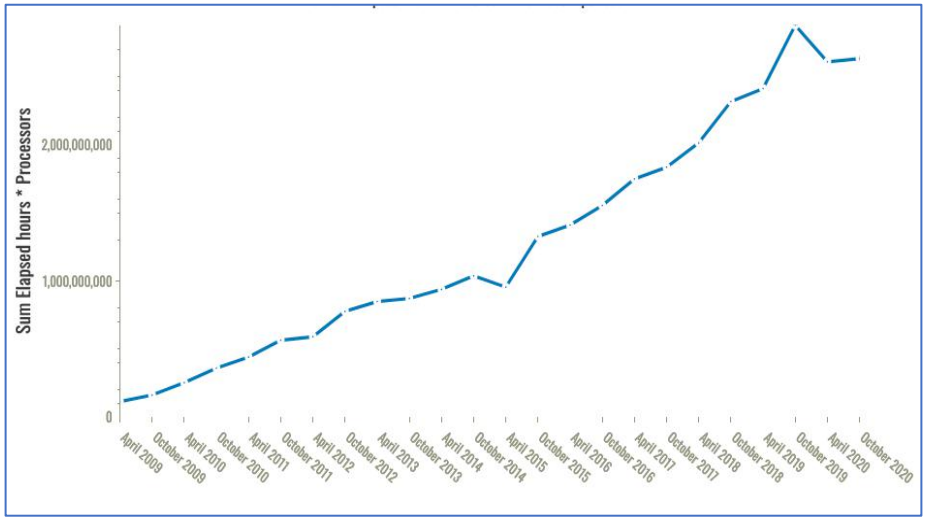
Policy Cloud
Cloud for Data-Driven Policy Management

DECIDO

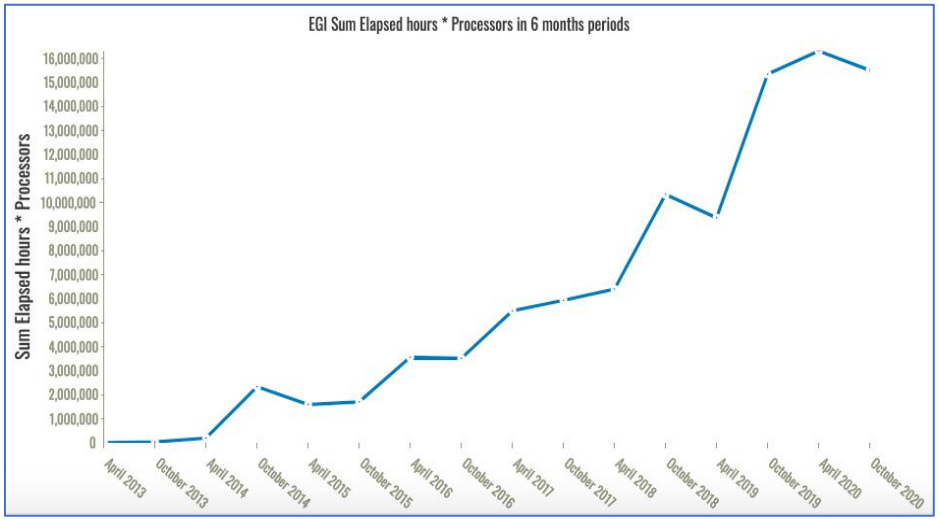
AI4PublicPolicy

EGI Federation – Usage trends (2020)

High Throughput Computing



Cloud Computing



4 HTC major providers:

HTC: 5.2 Billion CPU h/year

HTC: +24%/year

Cloud: 32 Million CPU h/year

Cloud: +80%/year

4 Cloud major providers:

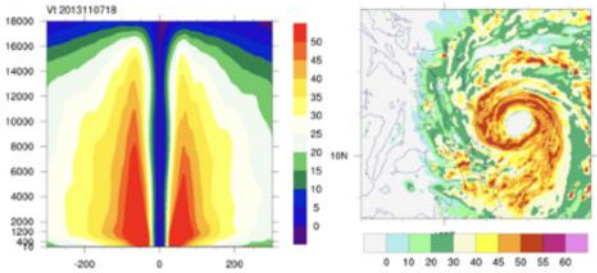
From Open infrastructures to Open Science

Innovation to expand from to new scientific collaborations and address societal challenges

(1) Scientific software as a service

Use case: Environmental science and disaster mitigation

Disaster Mitigation & Agriculture



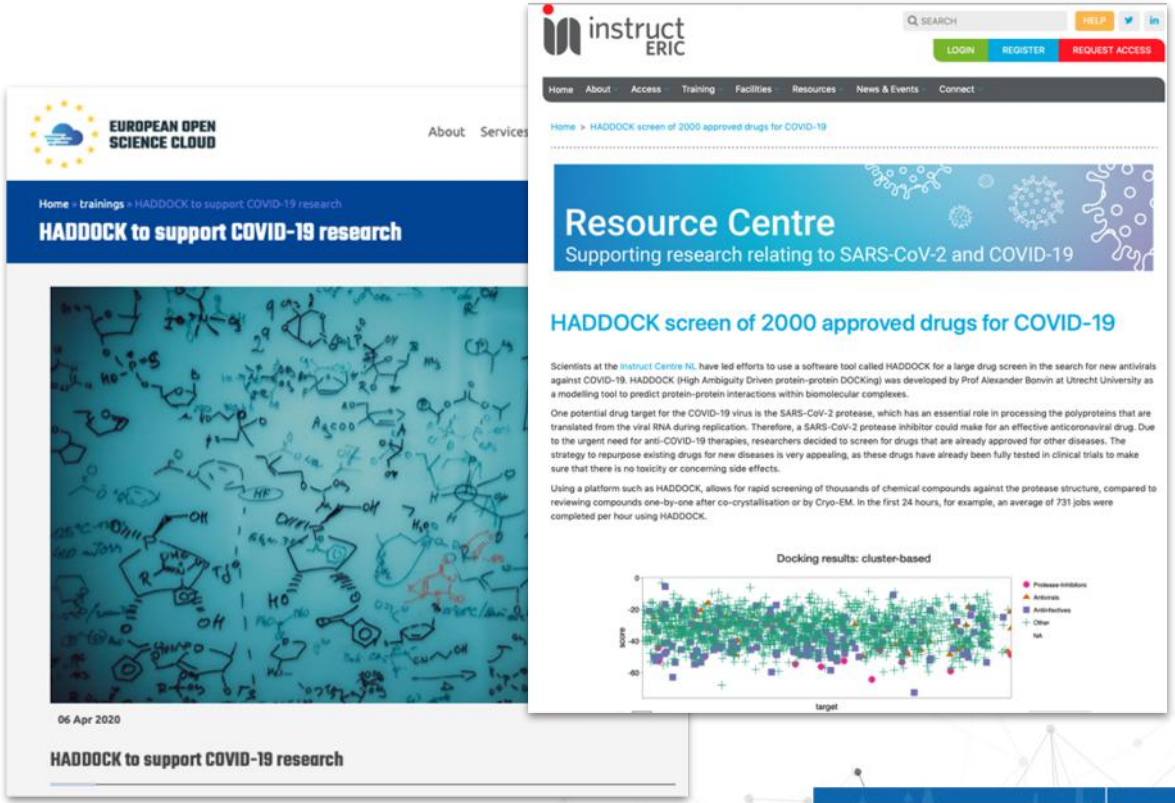
- *Goals*
  - Capacity building for hazard risk analysis
  - Enhance the knowledge of hazard risk reduction
  - Improve accuracy and efficiency of hazard risk simulation
- *Provide scientific applications as a service*
  - iCOMCOT portal for tsunami simulations
  - WRF portal for weather prediction
- *Implement scientific case studies*
  - 18 case studies of 6 types of hazards in 8 partner countries
  - Collaborations with data providers (e.g. Sentinel Asia, Himawari Satellite Mirror Sites)
- *Exploit federated capacity and resources*
  - Infrastructure federation: Use distributed compute resources for simulations
  - Semantic/data federation: Share data based on FAIR principles
- *Organise events*
  - CRADR Workshops in Feb, Mar, May 2021; Training in April (TH)
  - Joint workshop or APAN WG meetings: Aug/Sep 2021 @APAN52 (ID)

(1) Scientific software as a service (cont)

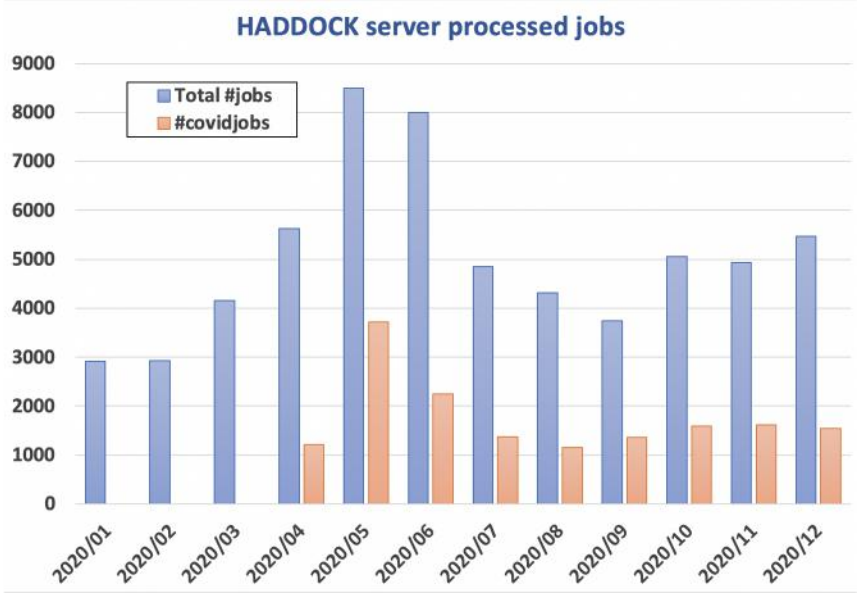
Use case: Modelling of various Sars-Cov2 - human protein interactions

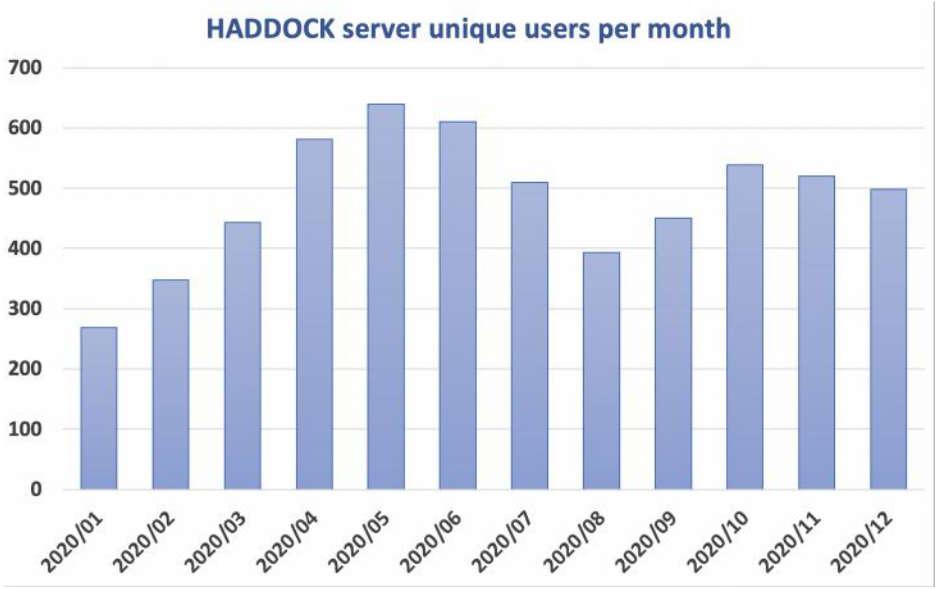
https://wenmr.science.uu.nl/

- Screening of approved drugs against the protease with HADDOCK
- Docking of ~2,000 approved drugs run on EGI Federation/OSG HTC resources in ~3 ½ days



(1) Scientific software as a service (cont)





On average **~550 active users per months, 11,000 simulations related to COVID-19 (the equivalent of ~1.5 million HTC jobs, ~2.7 million CPU hours)** on the EGI and OSC grid resources over the months of April to Sept. 2020

(1) Scientific software as a service (cont)

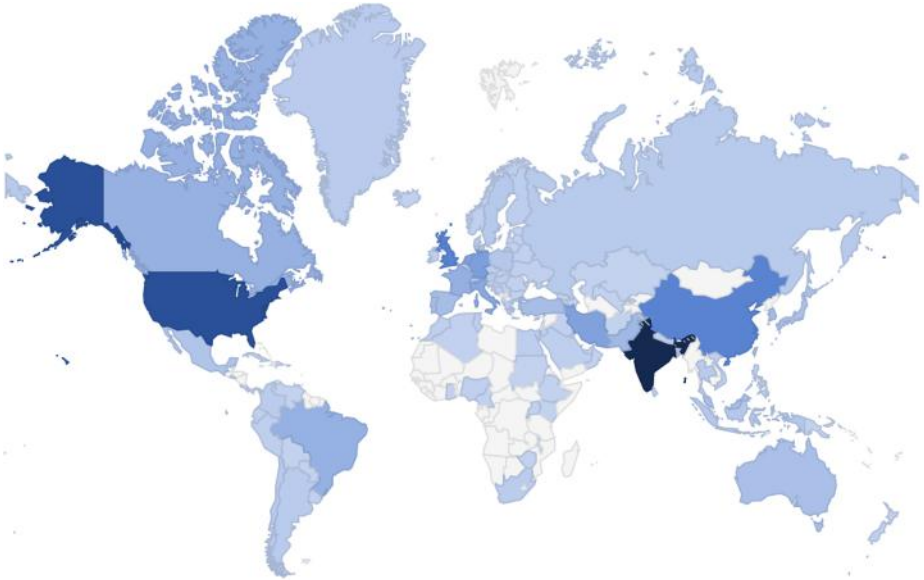
International user community

> **21,000** Registered users

> **110** Countries reached

Both researchers and students

Sustained growth of the communities



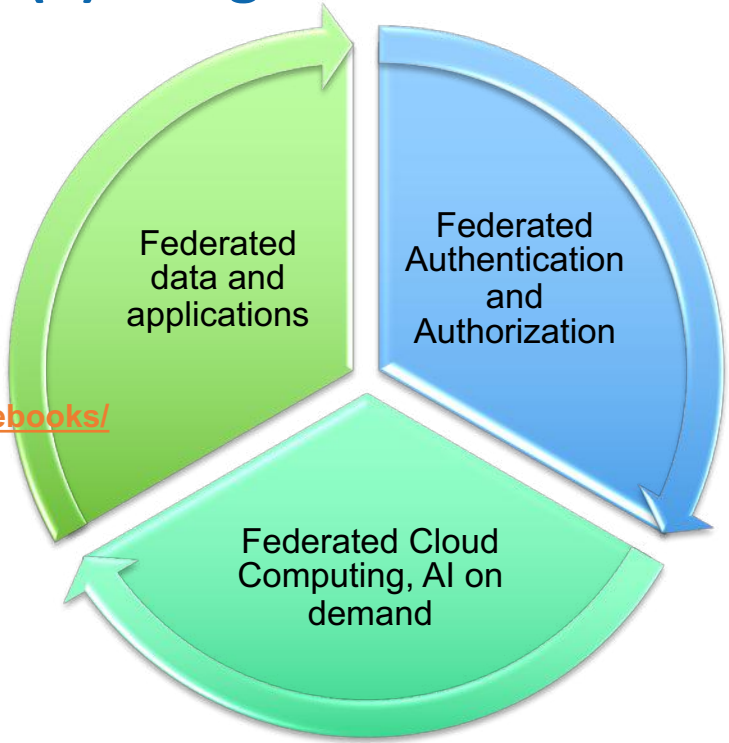
	Country	All_Users	HADDOCK	DISVIS	POWERFIT	SPOTON
1	Total Users	21,306	20,526	2,934	2,324	2,668
2	India	4,444	4,345	577	507	575
3	EU Users	4,432	4,191	628	437	482
4	United States	3,109	2,992	407	283	356
5	United Kingdom	1,277	1,222	138	115	117

(2) Bring new solutions to common users

Applications

Notebooks — Create interactive documents with live code, visualisations and text

https://www.egi.eu/services/notebooks/



Check-in — Login with your own credentials

https://www.egi.eu/services/check-in/

Cloud Compute — Run virtual machines on demand with complete control over computing resources

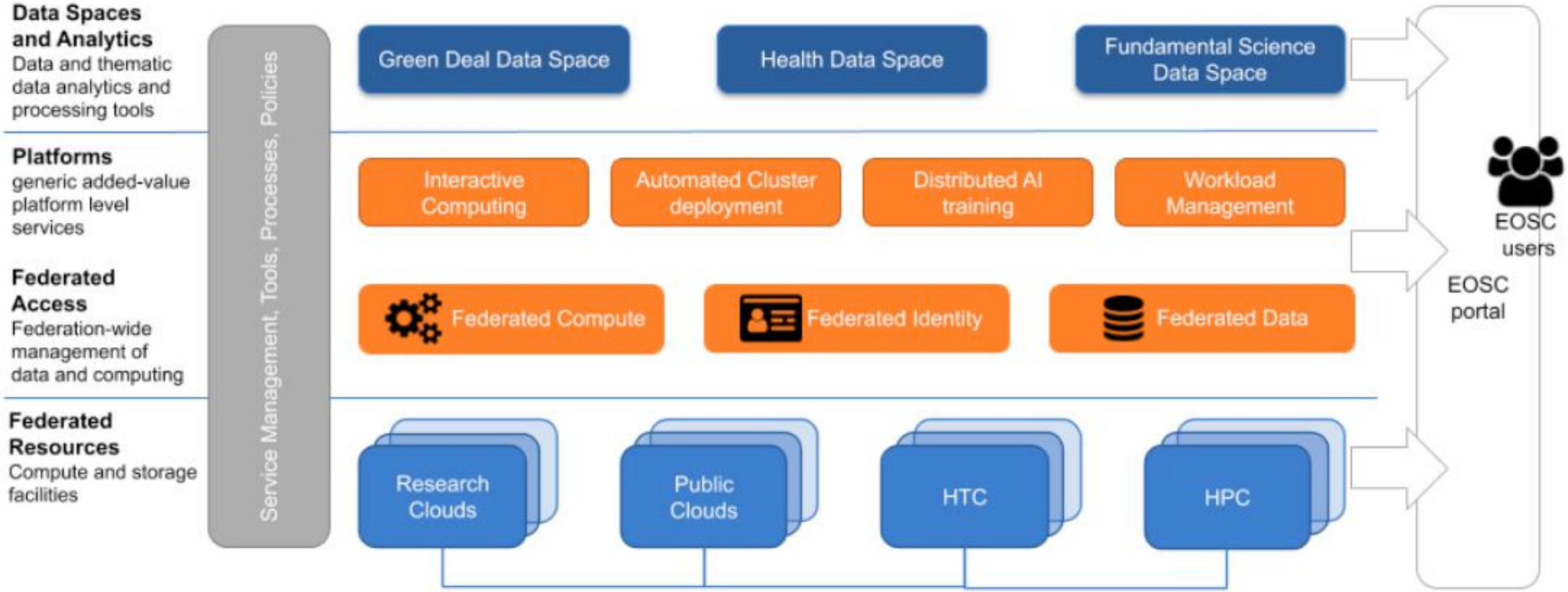
Cloud Container Compute — Run Docker containers in a lightweight virtualised environment

High-Throughput Compute — Execute thousands of computational tasks to analyse large datasets

Workload Manager — Manage computing workloads in an efficient way

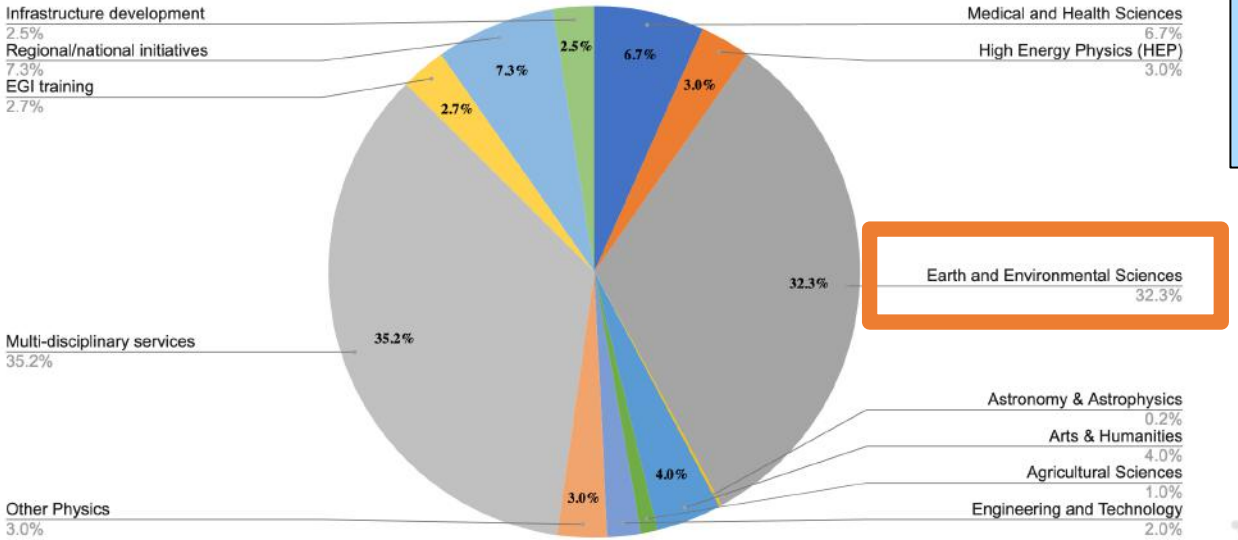
https://www.egi.eu/services/cloud-compute/

Service Portfolio



A success story: Federated Cloud Computing

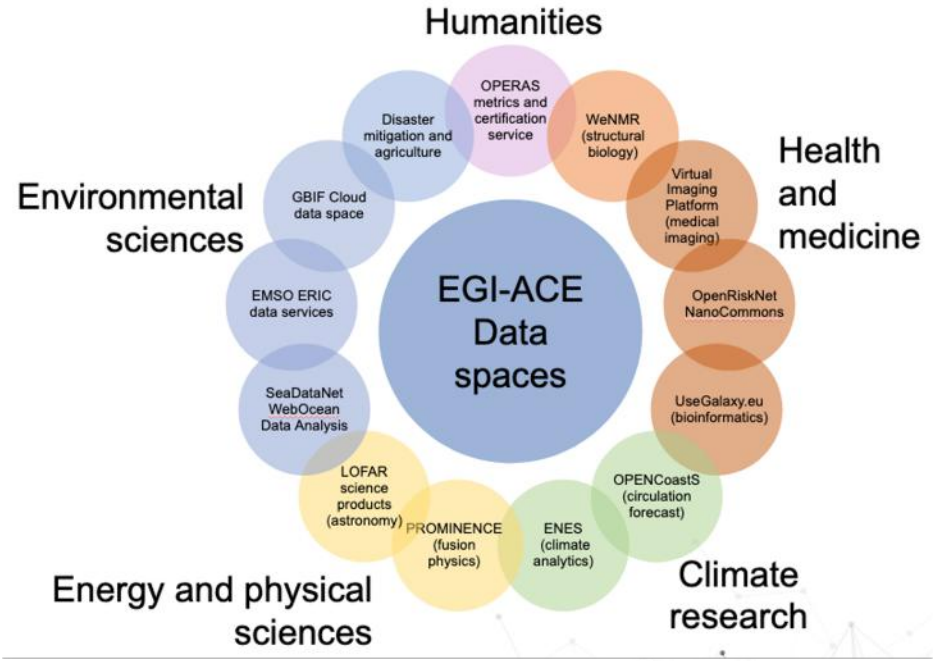
Users by discipline (2020)



Cloud providers

(3) Deliver Data as a Service

Data Spaces of the EGI-ACE project



1st Call for international use cases

Deadline: 15th of April

http://go.egi.eu/open-call

EGI-ACE Call for Use Cases

The EGI-ACE Horizon 2020 project delivers the 'EOSC Compute Platform', a distributed federated compute infrastructure that serves users of the European Open Science Cloud (EOSC). EGI-ACE (EGI Advanced Computing for EOSC) builds on the pan-european EGI e-infrastructure federation and provides various types of infrastructures, platforms and software services from publicly funded compute centres, commercial service providers and research communities with pan-European relevance.

With this call for use cases the EGI-ACE project offers access to infrastructure and platform services, dedicated user support and training. The services, support and training are sponsored by the European Commission and various national funding agencies and are free to access to the use cases that will be selected through the call.

Who should apply

The target audience of this call are international researchers, research projects, communities and infrastructures, as well as national research groups who need services and support for:

- Large-scale data processing, scientific analysis, visualisation
- Hosting data analysis platforms and applications in the cloud to offer them for international use cases
- Federate and make accessible community-specific compute services in EOSC

Applications for the call are welcomed from academic or industrial researchers at any level, from postgraduate students to the most senior researchers, who are working on or support non-proprietary research in any discipline where access to compute facilities is beneficial. Projects and research infrastructures that do not have access to similar facilities are particularly encouraged to apply. Applicants must be working in a research institute based in an eligible country (i.e. any EU member state or Associated State), OR must be submitted on behalf of a research project/experiment/collaboration that includes partners from eligible countries.

Note that applicants are NOT eligible for visits to the centres involved in this action.

The offering

Timeline

Submit use case

Contact

- International collaborations in scientific computing are key enablers of scientific excellence
  - Human networks for coordinated support, training consultancy
  - Access to shared compute and storage infrastructures
- Demand for innovative scientific computing services is increasing
  - Opportunities for joint innovation
  - Many opportunities to increase collaboration in domains such as Health and Medicine and Environmental Science
- Scientific computing needs integrated infrastructure, data and scientific software provisioning
- Submit your scientific use case! http://go.egi.eu/open-call