



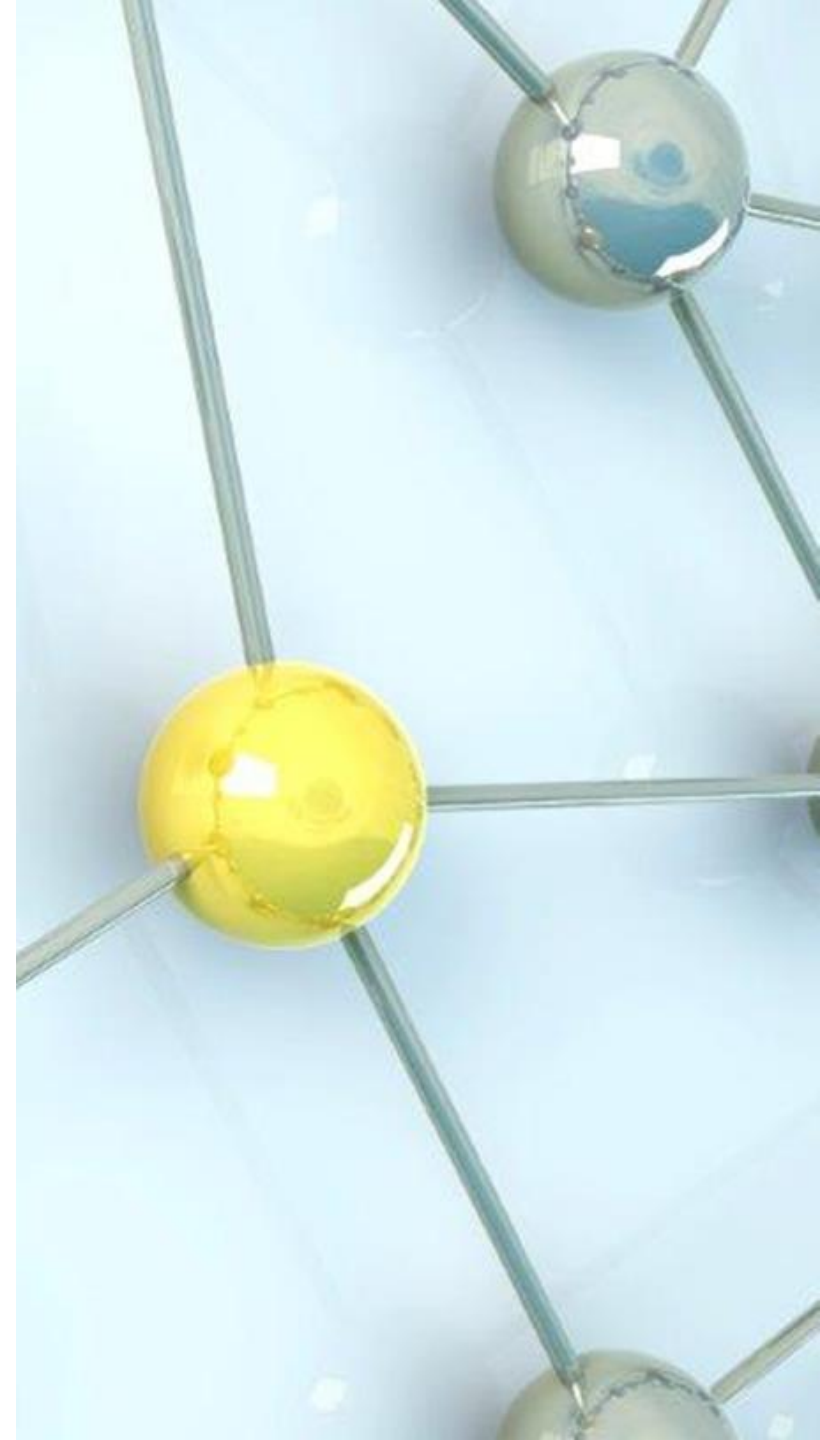
Developing sustainable regional infrastructures in Southeast Europe

Dr. Ognjen Prnjat

Director, European infrastructures and projects

GRNET – National Infrastructures for Research and Technology

On behalf of 1000+ wonderful people involved



The region

- Various pieces of a larger puzzle
 - EU members (Greece, Cyprus, Bulgaria, Romania, Hungary, Croatia, Slovenia)
 - Western Balkans
 - Eastern Mediterranean, Turkey
 - Eastern Partnership countries (incl. Southern Caucasus)
- Regional service platform of various technologies built over the last 20 years with a number of projects
- Regional collaboration, but also as a springboard for joining wider EC initiatives + being more inclusive

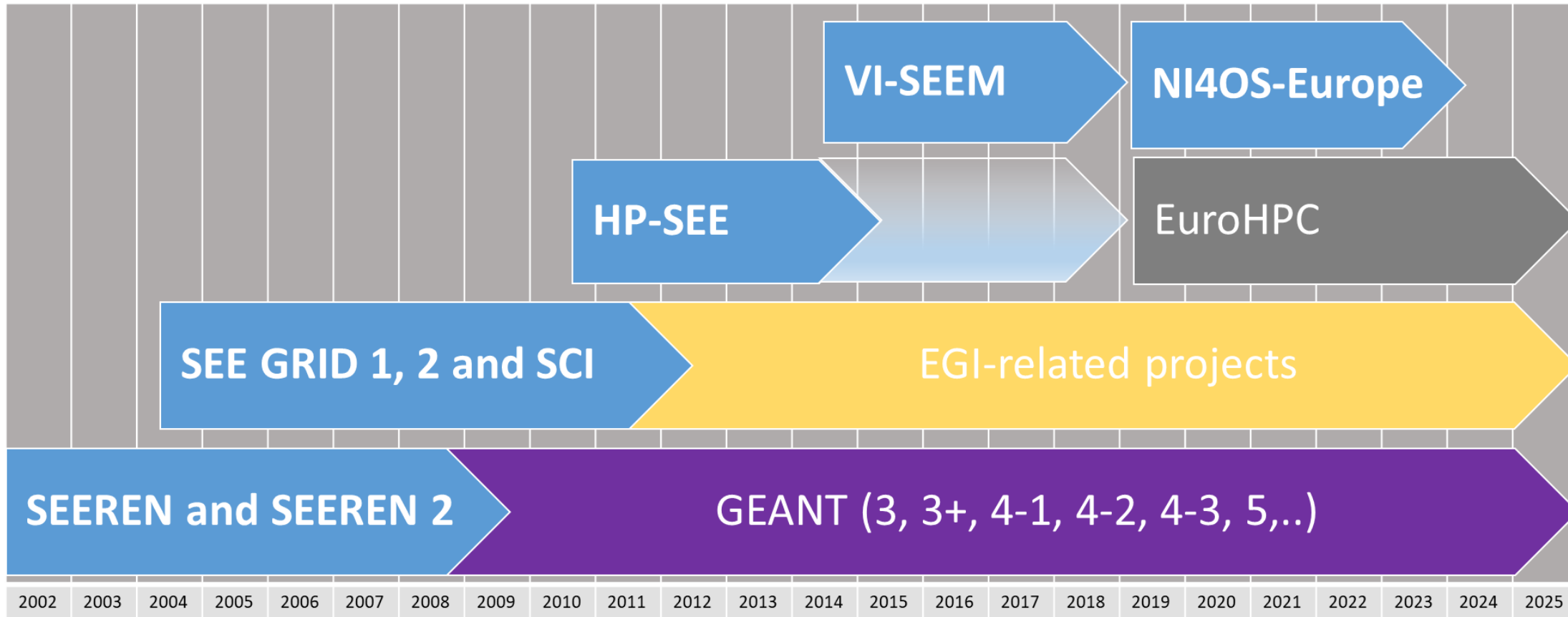


A close and wide partnership

- Service provider partners
 - National Research and Education Networks
 - Different forms of national computing initiatives (cloud, grid, HPC) – consortia of providers per country
- OS communities, research institutes, universities
- Policy makers
 - Ministries, research councils



Timeline: 2 decades



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- ❑ SEEREN1/2: regional inter-NREN connectivity and GEANT links [DGINFSO]
- ❑ BSI: Southern Caucasus links [DGINFSO]
- ❑ SEELIGHT: lambda facility in SEE [Greek HiperB]
- ❑ *Result: sustainable national networks, all countries in GEANT, some crossborder fibers*

- ❑ SEEGRID1/2: regional Grid infrastructure, building NGIs and user communities
- ❑ SEE-GRID-SCI: eInfrastructure for large-scale environmental science user communities. Inclusion of Southern Caucasus. [DGINFSO]
- ❑ *Result: national Grids, regional coordination, all countries within EGI*

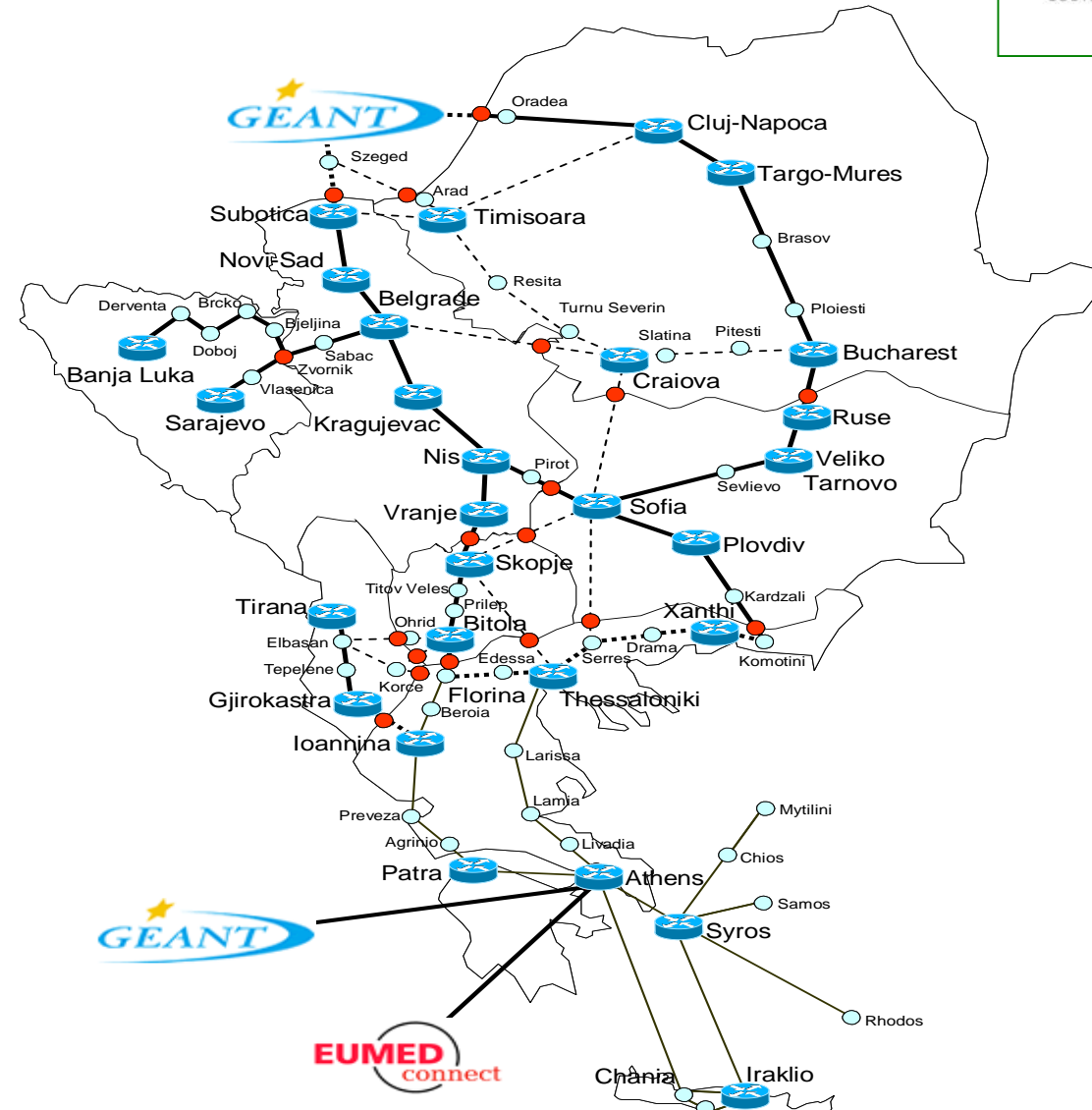
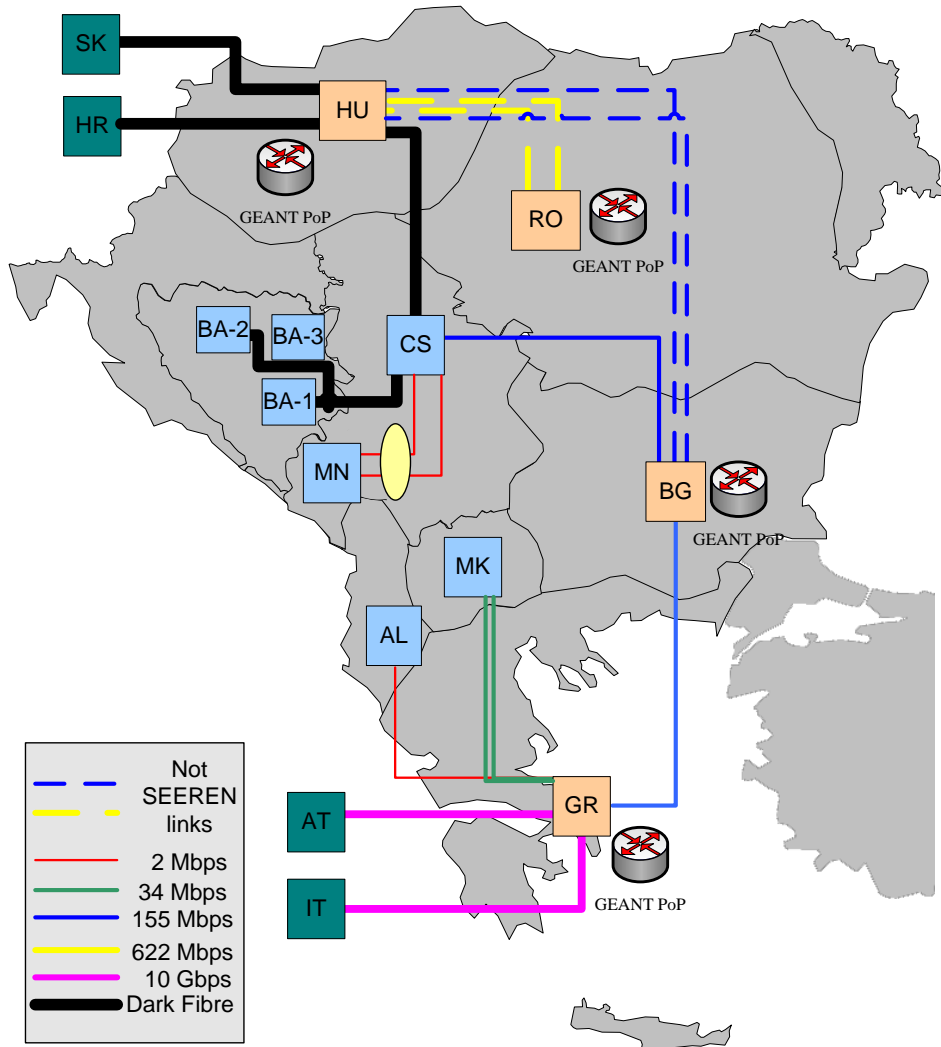
Timeline: 2 decades

- ❑ HP-SEE: regional HPC interconnection (+2nd generation Caucasus link)
❑ *Result: stable national HPC centers, regional HPC sharing*

- ❑ SEERA-EI: regional programme managers collaboration towards common e-Infrastructure vision, strategy and regional funds [DGRTD]
❑ *Result: influencing national agendas, setting common regional policy*

- ❑ VI-SEEM: integrated platform of HPC, cloud, grid, data management, application-level services [DGCNCT]
❑ *Result: regional integrated platform, regional resource sharing*

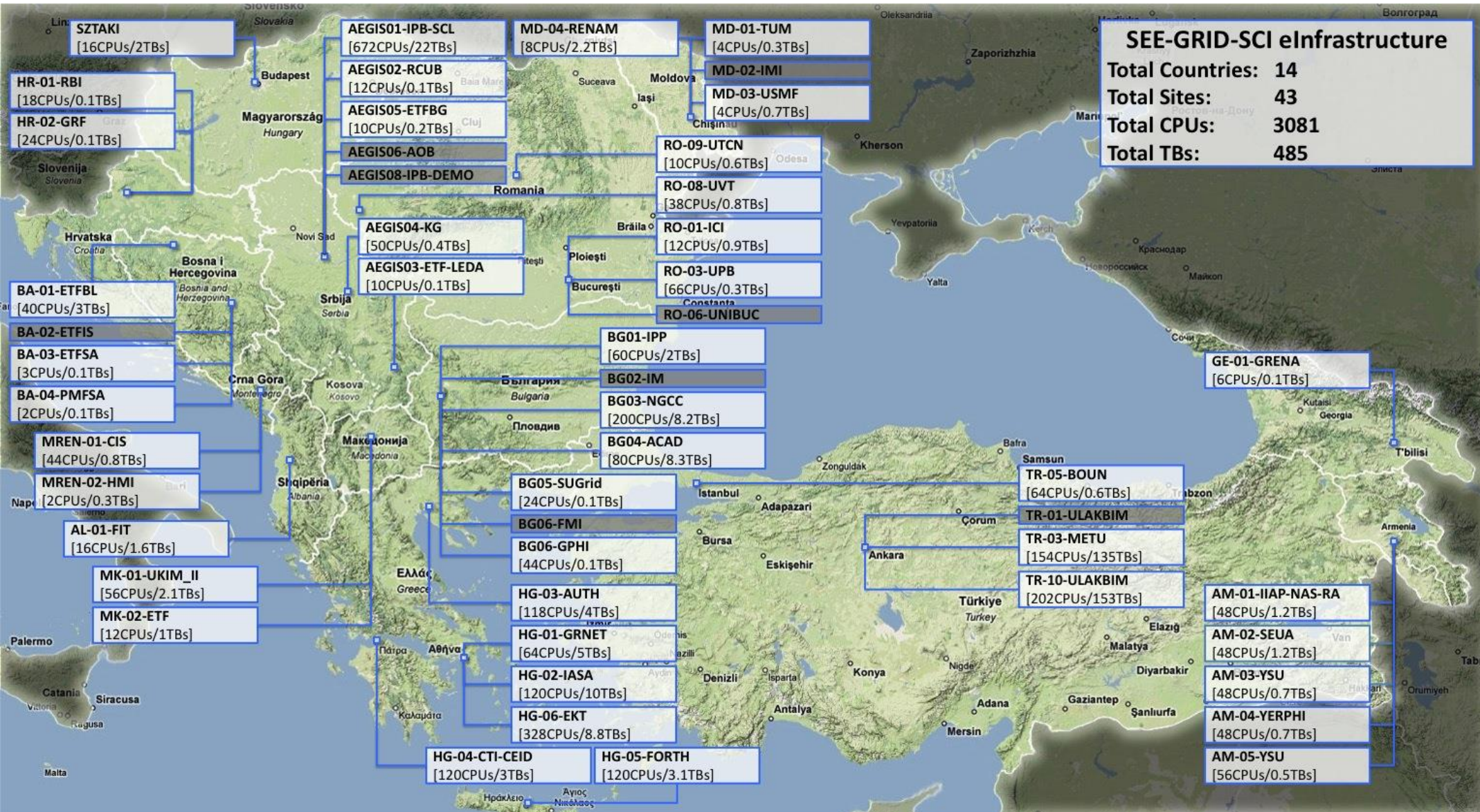
Network



High Throughput Computing Grid



SEE-GRID
South Eastern European Grid-enabled
eInfrastructure Development



High Performance Computing



HP-SEE

High-Performance Computing Infrastructure
for South East Europe's Research Communities



ARIS



IMAN1

3 top-500 machines at the time



ICAM



NIIFI SC



FINKI



Cy-Tera



PARADOX



Leo



BA-HPC

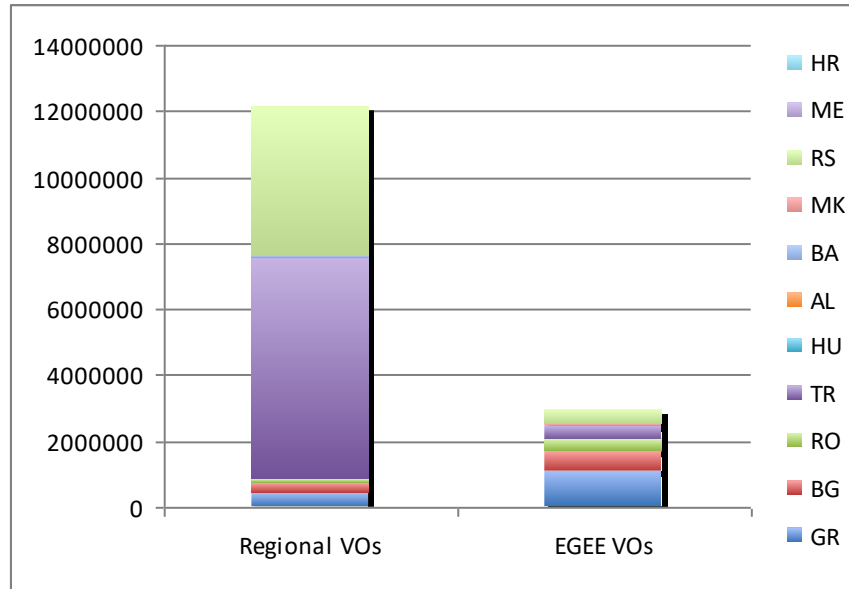


Avitohol

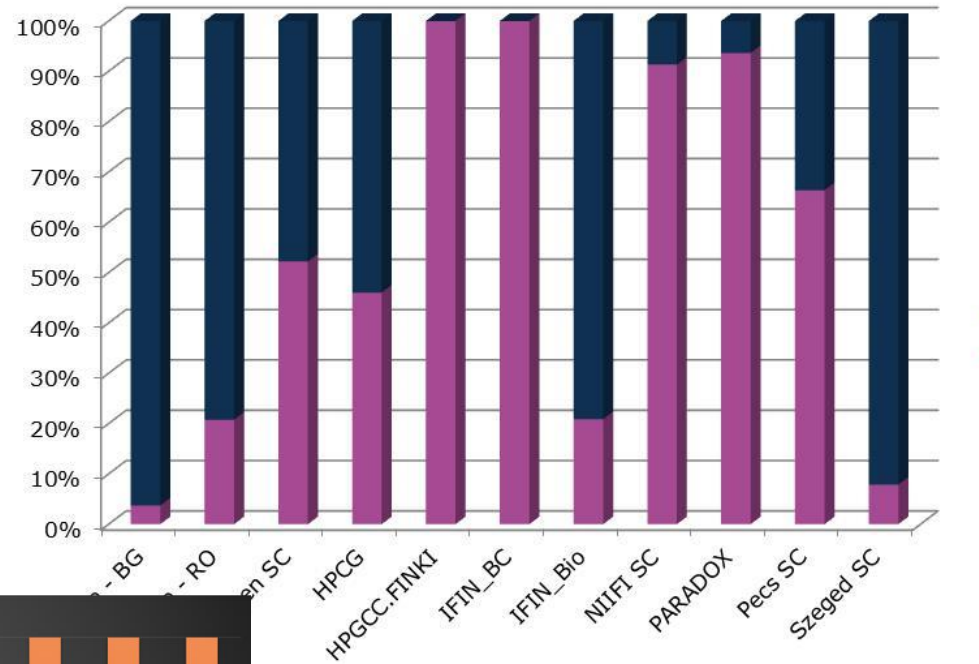
Regional cross-border communities and usage



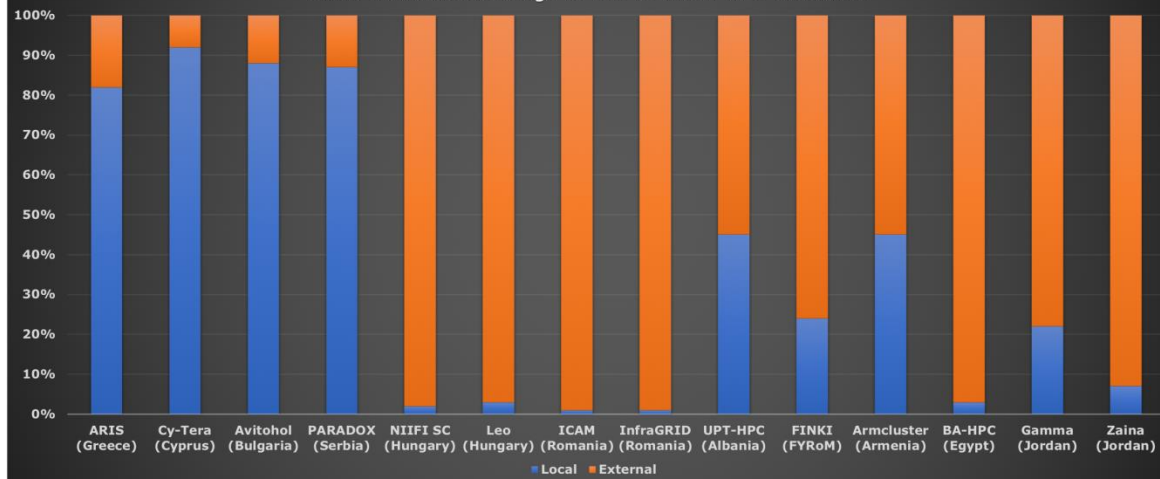
Regional vs pan-EU HTC Grid usage



Local vs. External HP-SEE usage



Local vs. external usage of the VI-SEEM HPC resources



Looking ahead: EuroHPC and DAEDALUS



- DAEDALUS, Southeast European EuroHPC petascale collaboration with GRNET-GR, Cyprus Institute - CY, UKIM - MK, UDG – ME
- Other installations in BG, SI, HU



Current activity:
NI4OS-Europe

Current activity: NI4OS-Europe

15 Member States and Associated Countries | 22 Partners



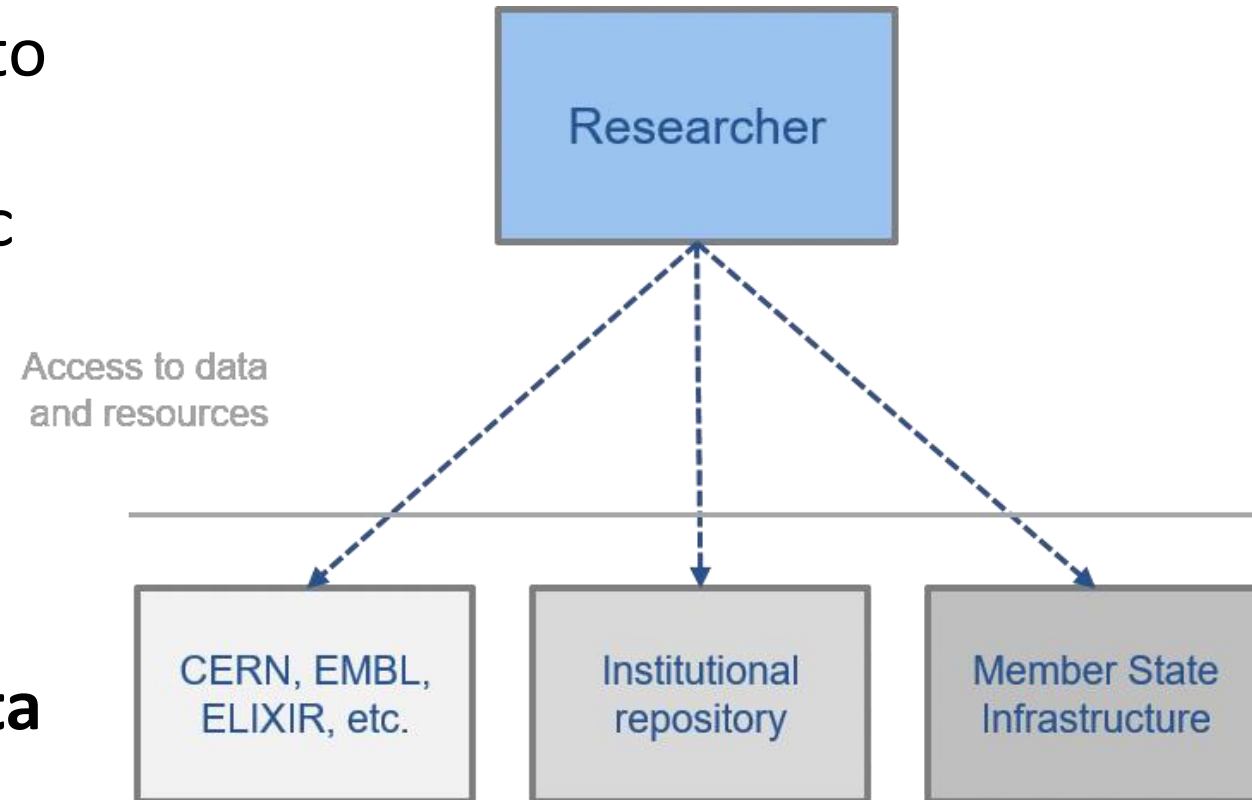
Participating countries

Greece	Hungary	Albania	Republic of Moldova
Cyprus	Romania	Bosnia-Herzegovina	Armenia
Bulgaria	Slovenia	North Macedonia	Georgia
Croatia	Serbia	Montenegro	



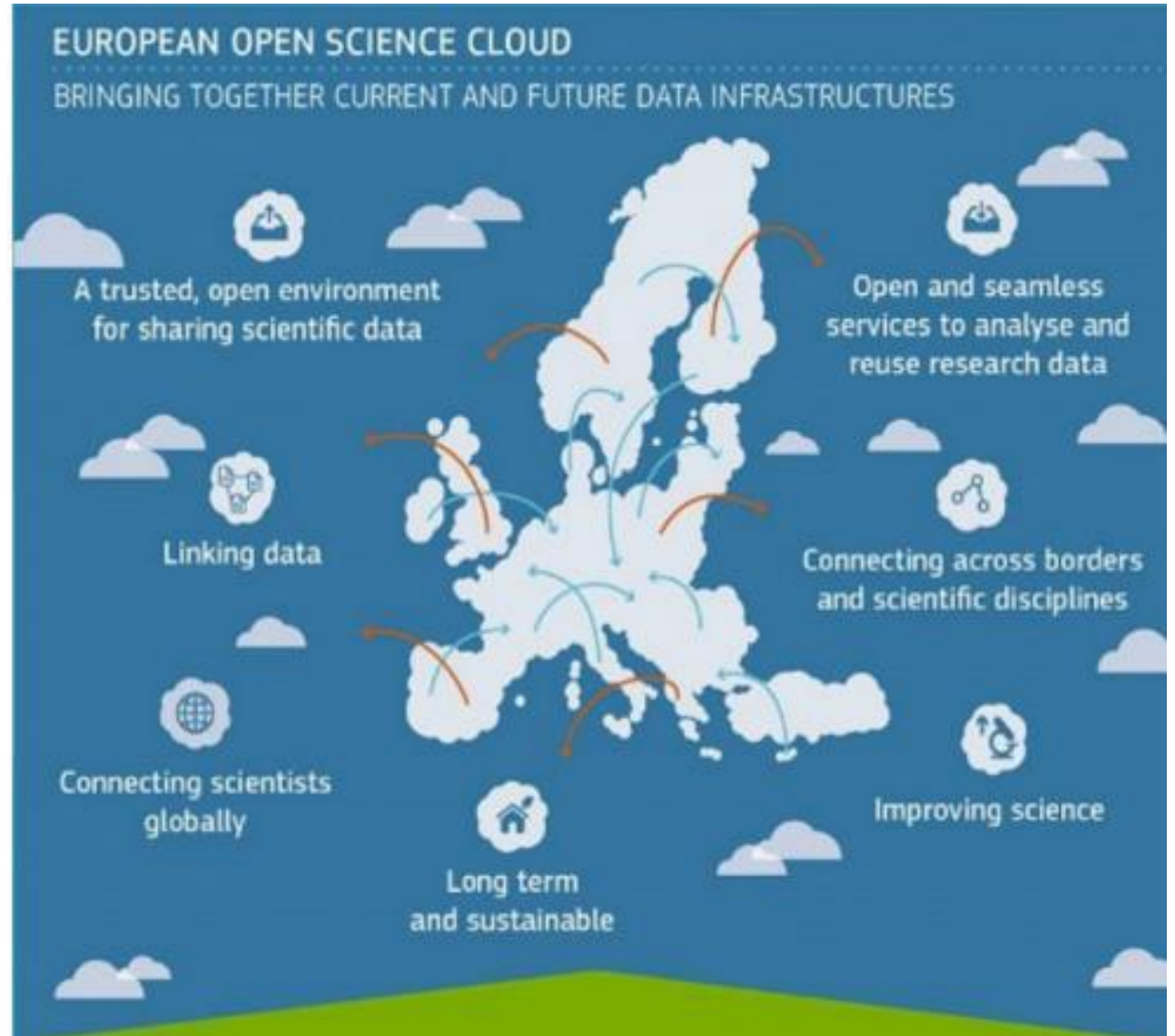
Motives for EC's EOSC initiative

- European researchers face **data fragmentation** and unequal access to quality information sets
- **Fragmented access** (across scientific domains, countries and governance models; varying access policies)
- **Limited cross-disciplinary access** to data sets (i.e. interdisciplinary research)
- **Non-interoperable services and data**
- **Closed data**



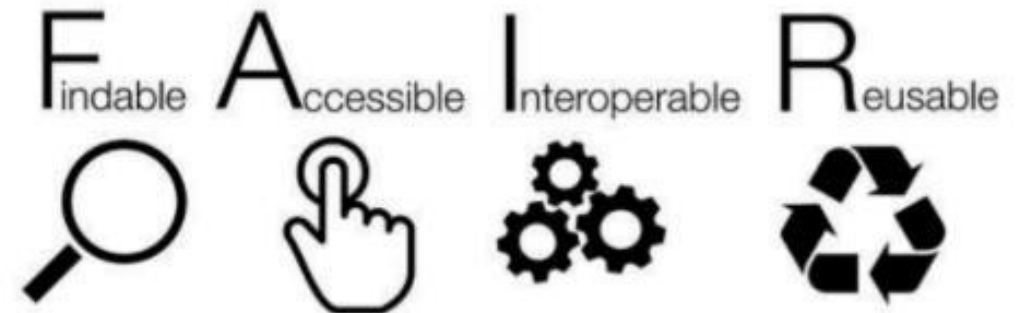
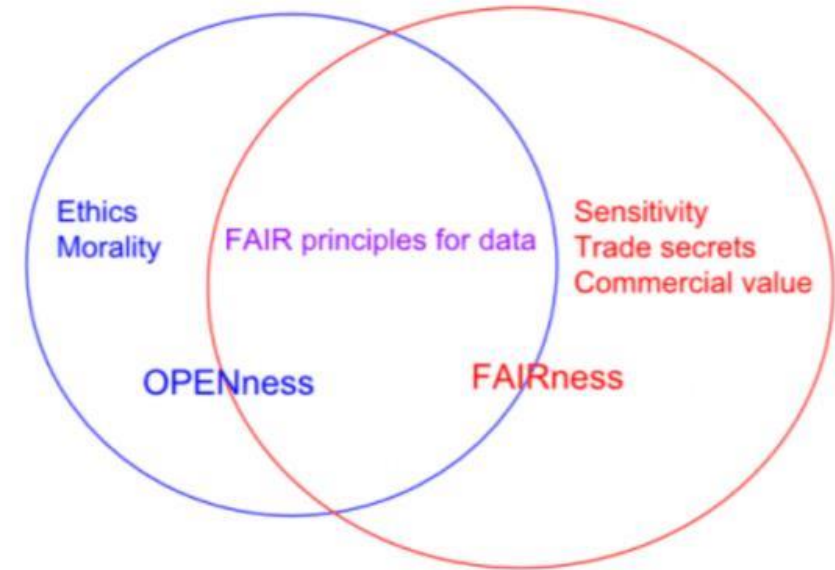
European Open Science Cloud EOSC

- EOSC has the ambition to be a virtual environment for Europe's 2 million researchers and 70 million science and technology professionals from every research, innovation and educational area.
- EOSC will provide researchers an environment with open services for data storage, management, analysis and re-use across disciplines.
- EOSC will join existing thematic data Infrastructures.
- EOSC will add value and leverage past infrastructure investment.



EOSC, new level playing field for EU researchers

- The EOSC will allow universal access to data, as a universal access point for ALL European researchers
- Cross-disciplinary access to data and services unleashes potential of interdisciplinary research
- Services and data are interoperable (Findable, Accessible, Interoperable and Reusable-FAIR)
- Data funded with public money is in principle open (as open as possible, as closed as necessary)
- EOSC will help increase recognition of data intensive research and data science



EOSC Vision



Current model of European data infrastructures

From fragmentation and uneven access to information to a federated model, where access to data would be universal, building on a strong legacy



Future EOSC model: federation of data infrastructures

Source: EOSC Strategic Implementation Roadmap 2018-2020, May 2018, European Commission

NI4OS-Europe in the EOSC landscape

- One of 4 regional/geographical projects
- Call: INFRAEOSC-05 (b) Coordination of EOSC-relevant national initiatives across Europe and support to prospective EOSC service providers



Support development of the **National Open Science Cloud Initiatives** in the overall scheme of EOSC governance



Spread **EOSC and FAIR principles** in the community and train it



Provide technical and policy support in **on-boarding of service providers into EOSC**

Key results: National Open Science Initiatives

Set-up approach

Top-down



Cyprus
Slovenia

Bottom-up



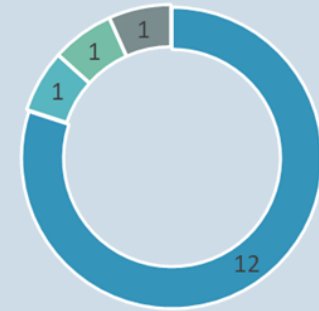
Armenia, Georgia
Greece, Montenegro

Hybrid



Albania, Bosnia-Herzegovina,
Bulgaria, Croatia, Hungary, Moldova,
North Macedonia, Romania, Serbia

Governance model

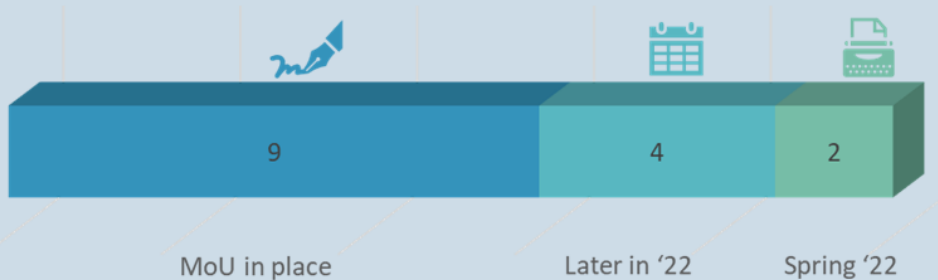


■ Consortium ■ Single organisation ■ Other ■ N/A

> 150 official members (organisations)

> 300 attendees in national events

MoU status



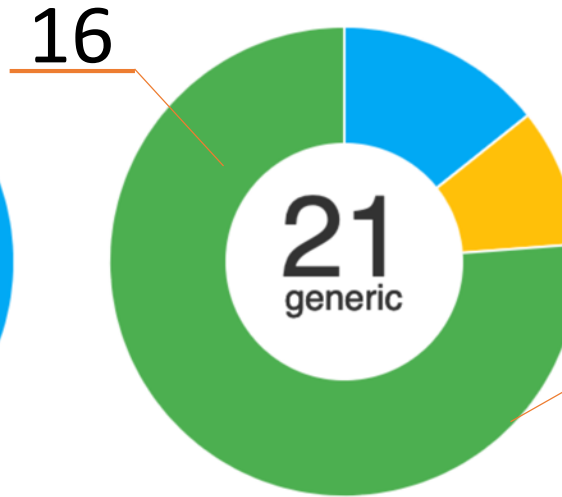
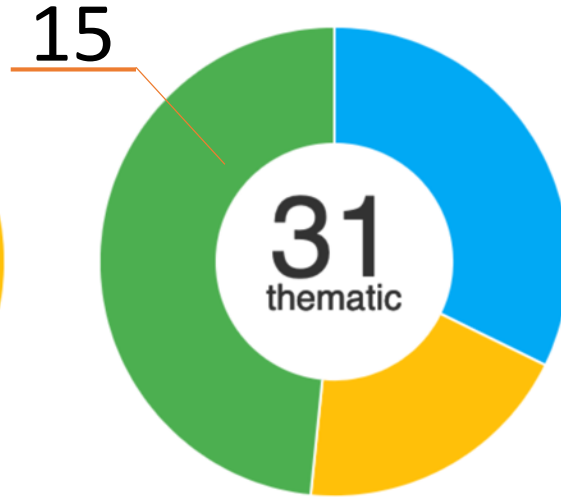
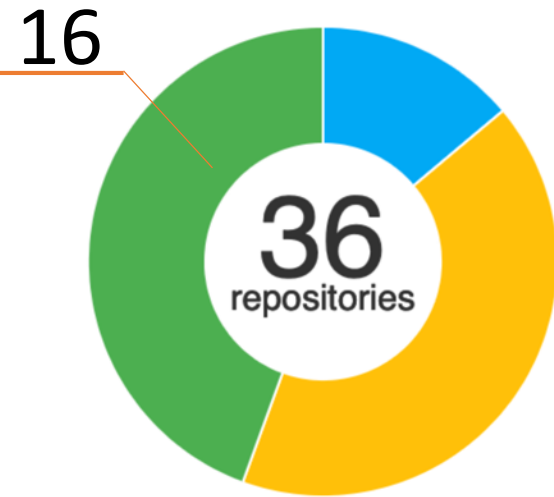
NI4OS-Europe region in EOSC-A

6 Mandated organisations

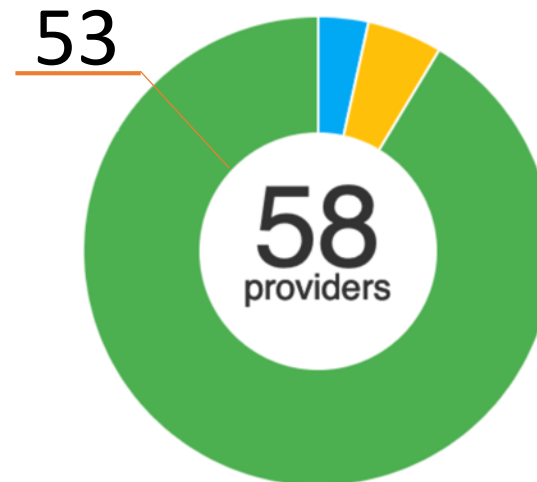
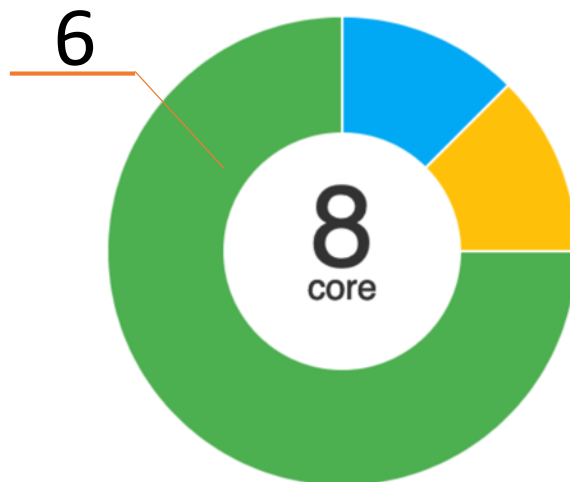
12 Members

6 Observers

Services onboarded via pre-production platform: 1/3 of EOSC catalogue

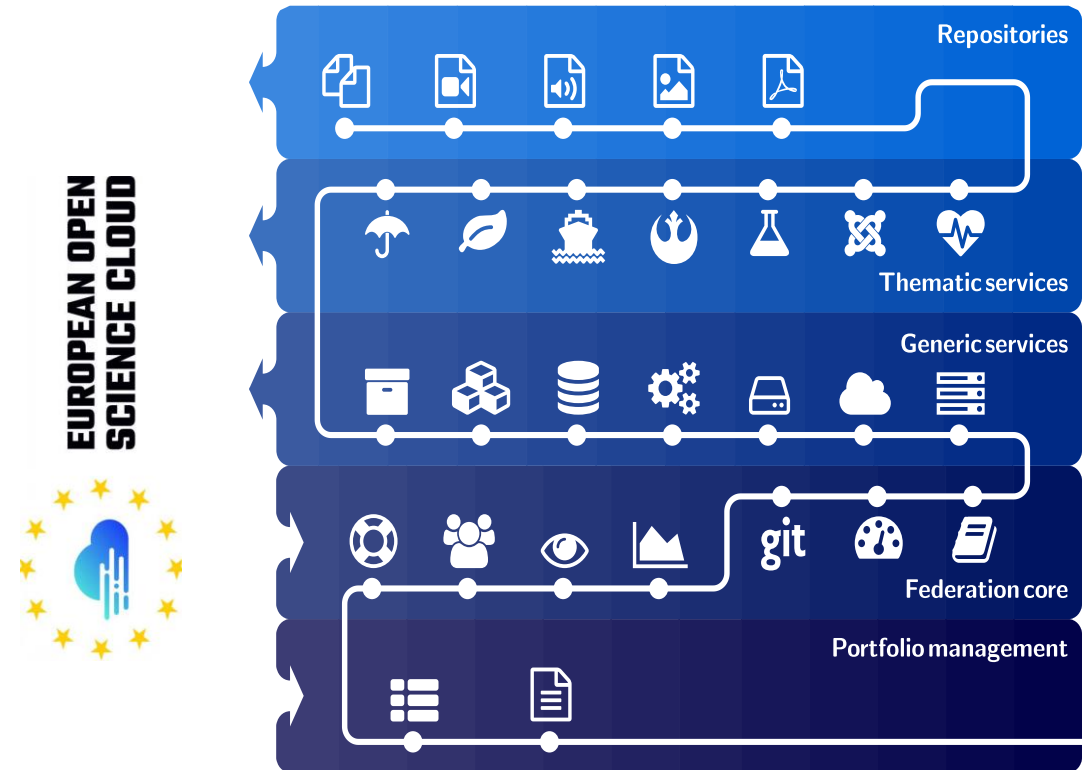


- HPC resources: CPU, GPU, Xeon Phi
- Cloud Virtual Machines
- Generic Storage
- Data management services



Service integration and onboarding

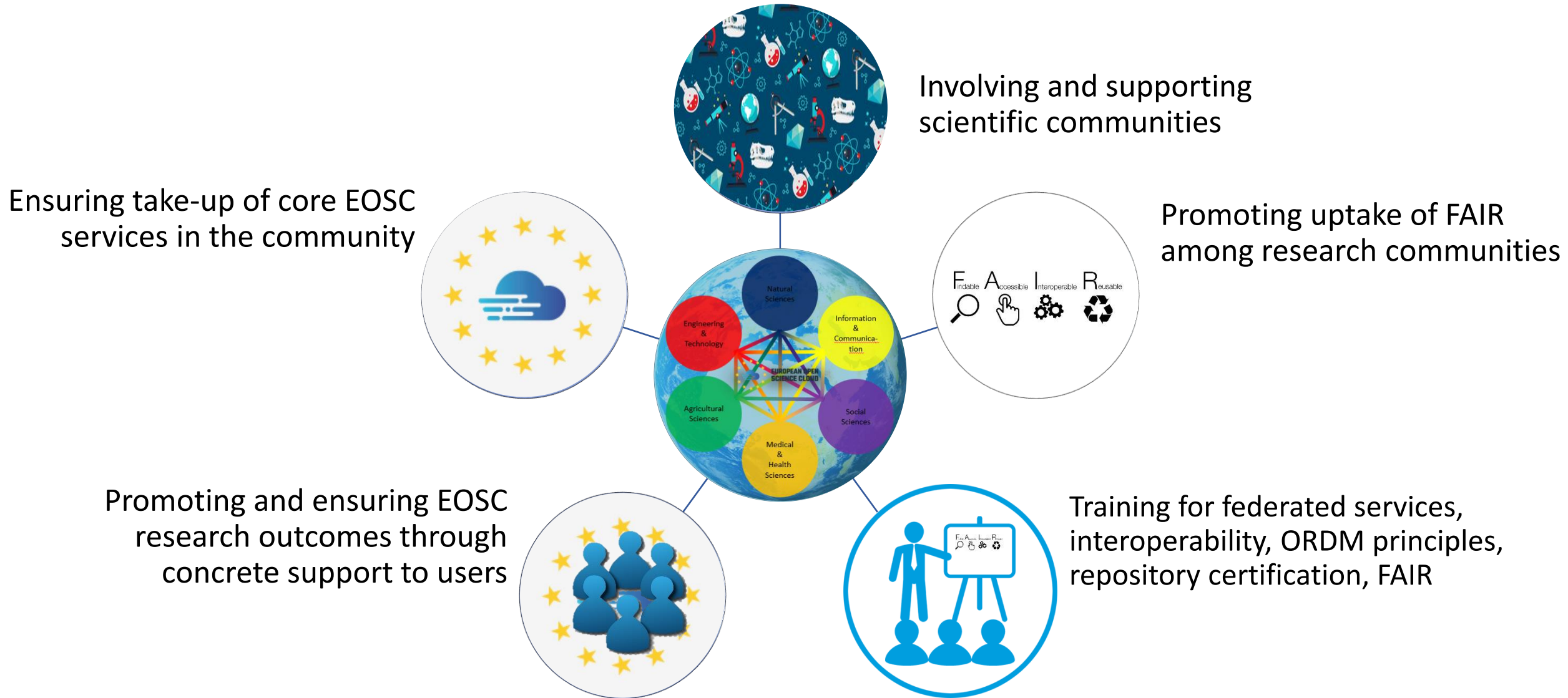
- Pre-production environment – validate readiness and maturity level for EOSC onboarding
- Service portfolio management system based on the EOSC provider and service profile
- Integration with federation core services
- Service categorization
- Onboarding of
 - generic services
 - thematic services
 - repositories



ORDM / FAIR tools and certification schemes

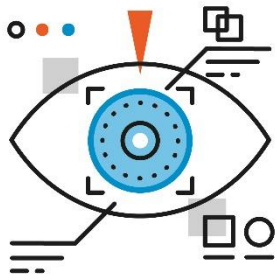
- Implementation and adoption of **tools, standards** and **guidelines**
- **Analysis of guidelines** for OS and fostering of ORDM and FAIR
- Analysis and **categorization of existing tools** supporting FAIR and ORDM
- Selection and delivery of new tools
- **Harmonization and interoperability** across communities and with core initiatives
- Development and application of **certification schemes**
- **Analysis of the incentives** and **rewards** that can be employed to improve the uptake of ORDM and FAIR (also summarized in a brochure)
- Examining the relationship and synergy between open science and open source
- 3 specific tools developed

User engagement, training and demonstrators

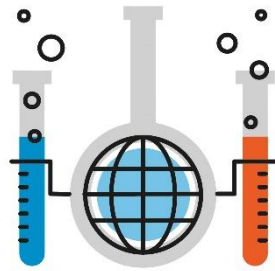


User engagement, training and demonstrators

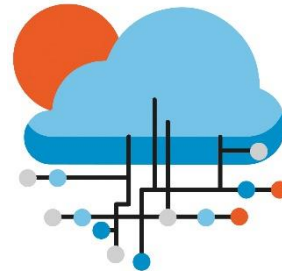
- Training and dissemination material on FAIR and EOSC is translated in all different languages of the NI4OS-Europe area
- Definition of use cases in various scientific fields:



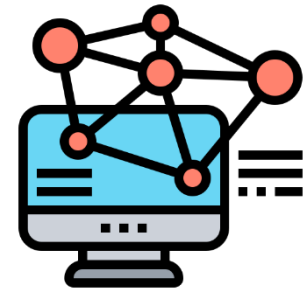
Digital
Cultural Heritage



Life Sciences



Climate Science



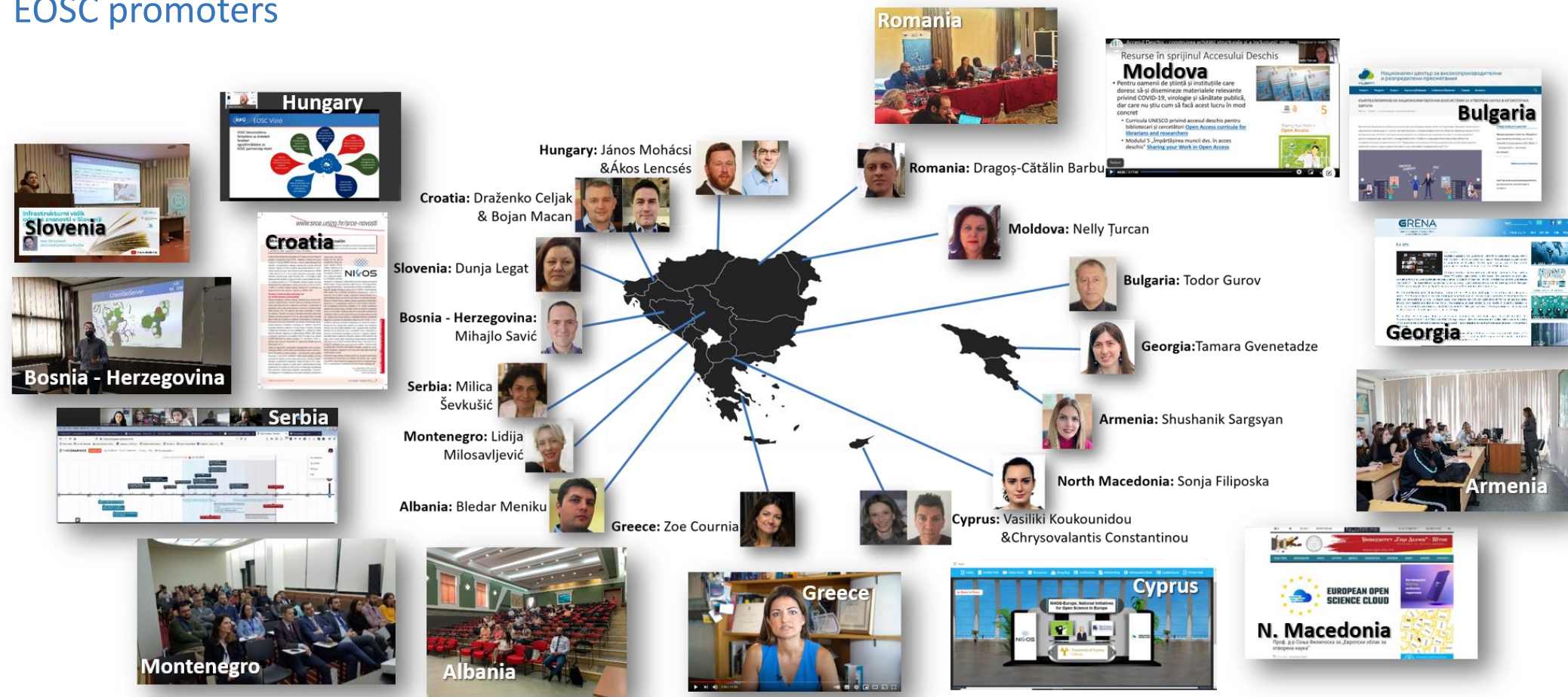
Computational Physics

Open call for applications

- 21 applications received / 20 applications accepted (after technical and scientific review)
- Disciplines: Climate (2), Cultural Heritage (4), Computational Physics (8), Life Sciences (5), Other (2)
- 14 countries including non-SEE Spain, Switzerland, Germany
- Resource allocation: 3,2m CPU-hours, 115k GPU-hours, 50TB storage, 120 VM cores

NI4OS-Europe EOOSC promoters

Ambassadors from each country assigned as EOOSC promoters



NI4OS-Europe training platform

Training material on various FAIR & ORDM topics available on the training platform for self-paced learning



Over 800
users



Over 100
courses



5 Learning
Paths



Learning Paths



Open Science Fundamentals

Learning path for Open Science Fundamentals that will take you on a training journey across the main topics related to Open Science. Complete the material and pass the final quiz to get the Open Science badge.



EOOSC/FAIR promotion

This learning path is the starting point for anyone who is interested to understand what EOOSC is and how it can help researchers achieve their goals. It also provides all the necessary material for a better knowledge of FAIR principles.



ITSM & Service On-boarding

Learning path that takes you through all the necessary information and topics related to IT Service Management and the process of service on-boarding so that you are able to understand how to successfully prepare for the on-boarding...

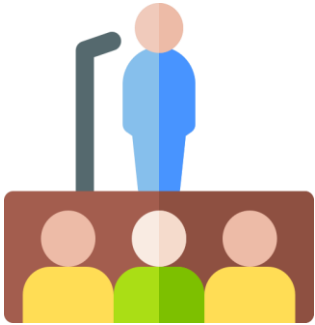
Communication and marketing

- Strong digital presence
 - [Website](#)
 - [Calendar](#)
 - [Agenda tool](#)
- Events and networking
 - Webinars
 - Workshops
 - Dissemination events
- [Collaboration](#) with the EOSC-5b projects
- [Support](#) the global efforts on [COVID-19](#)



- [Sustainability](#) and [innovation](#)
 - Find solutions for sustainable and long-term impact of project results
 - Manage knowledge and results so as to create added value for different stakeholders

Dissemination events



23 national events in native language
more than 1300 participants

Multiple other events held
and planned

More than 70 presentations
at national and international
conferences on ORDM,
FAIR, EOSC, OS

Reached ~7000 people

NOSCI events

EOSC Governance
Workshop, Landscaping



Beyond the platform

Beyond the platform: Setting national and regional agendas



- Very close relationship with governments to secure national support for electronic services and buy-in for EC initiatives
- National contributions to pan-EU initiatives (GEANT, PRACE, EuroHPC, etc)
- Support for National-level projects
- National policy best practices, programme guidelines, organizational aspects of NRENs, NGIs, national HPC initiatives, NOSCs
- Joint regional collaboration strategies and agendas
 - Long-term regional cooperation MoUs signed in different fields
 - Long-term strategy MoU between Ministries

Beyond the platform: Setting national and regional agendas



- Synergy and complementarity between national, regional and EU actions and funds
- Regional dimension is important to keep it on par with EU efforts, to support countries on the path to EU accession and to prevent brain drain from the region
- National and EC support for the countries of the region to join pan-EU initiatives such as EuroHPC and EOSC initiatives are needed
- Continued EC funding for the region (matching the national funding) is crucial to keep the momentum and to prevent 2-speed Europe

Conclusion

- Regional technical cooperation built a state of the art e-Infrastructure and services, used by cross-border communities
- Also as a platform for joining wider EC initiatives + being more inclusive
- More focused and efficient for the region than large pan-EU initiatives where smaller countries lose their voice
- These initiatives are pieces of the puzzle to sustain regional R&D, R&E, ICT development
 - Increasing the retention of talented scientists and engineers in the region
 - Easing the digital divide between the region and rest of EC
 - Making available the benefits of Information Society and Open Science for all citizens
 - Pursuing joint R&D efforts among countries in the region
 - Regional political stability and cohesiveness

We cherish our human network and want to enlarge it!



Thanks!



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Join NI4OS-Europe community:

<https://ni4os.eu/contact-us>