

# Greek e-Infrastructures

## Short report

Panos Argyrakis  
eIRG , Sofia

@ education

@ research



@ health

@ culture

- Greece implements a visionary **National Roadmap for Research Infrastructures** which especially supports **e-Infrastructures** addressing the increasing horizontal 'big computing/networking' and 'big data' needs of the Greek academic & research community. The roadmap is published as part of the ESFRI National maps

# Greek RI National Roadmap initiatives

- **HELIX** National Digital Infrastructures for Research (**PRACE, OpenAIRE, ICT**)
- **ELIXIR-GR** Managing and analyzing biological data (**ELIXIR Health, ICT**)
- Other e-Infra related projects in the roadmap:
- **Biolmaging-GR** A Greek Research Infrastructure for visualizing and monitoring fundamental biological processes (**EURO-Biolmaging**)
- **pMED-GR** The Greek Research Infrastructure for Personalised Medicine Towards more accurate and cost-effective health management for the Greek citizen
- **APOLLONIS** Infrastructure for Digital Arts, Humanities and Language Research and Innovation (**CLARIN, DARIAH**)

# Participation in HORIZON2020

Active role in all:

- EOSC-hub
- OpenAIRE-Advance
- EOSCPilot



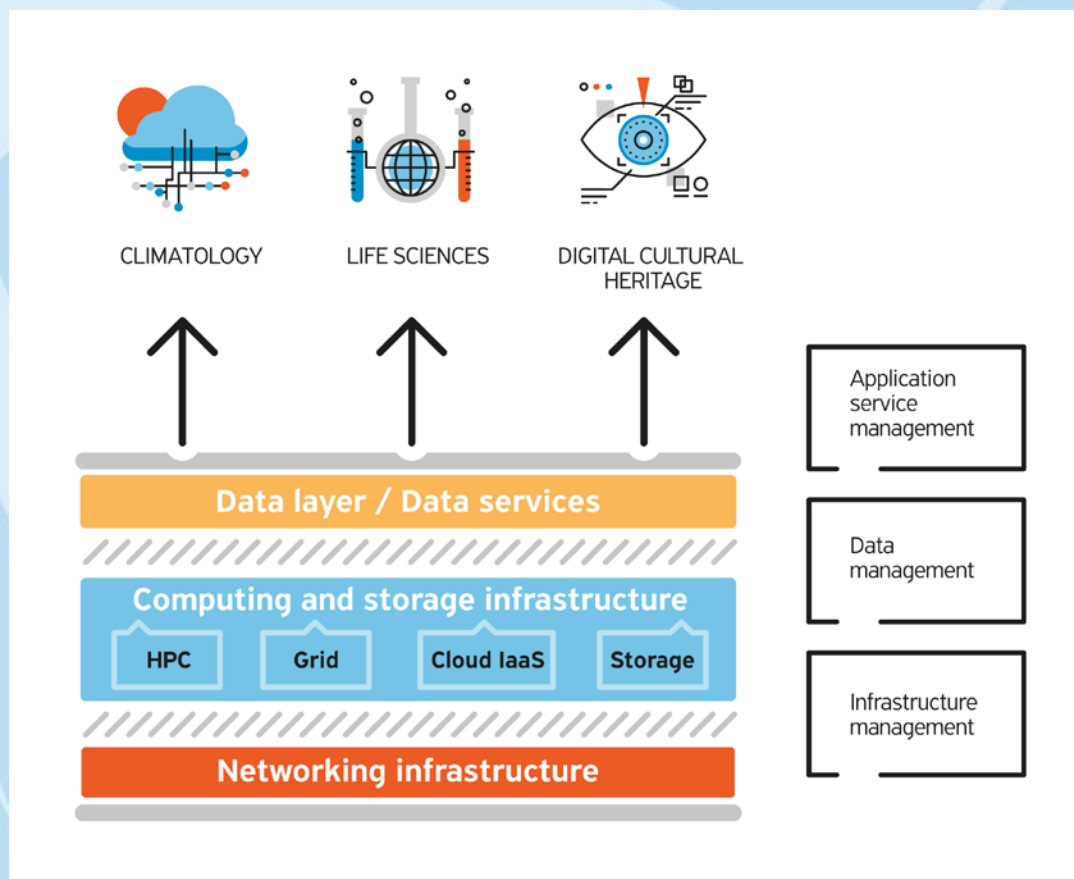
- GÉANT



- Participation in several INFRAEOSC calls

# Active in regional Interdisciplinary communities in Southeast Europe and the Eastern Mediterranean

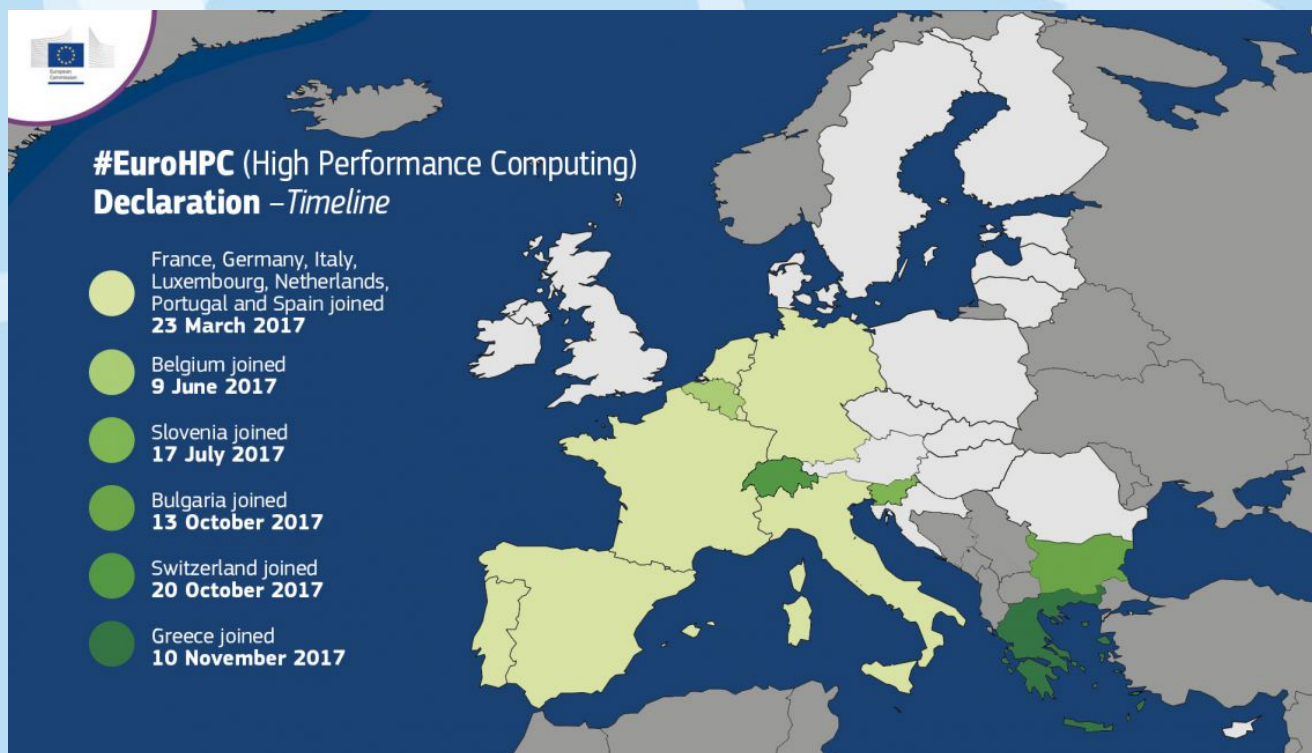
- VI-SEEM - VRE





# Greece in EuroHPC

Greece is the 12th country to sign the European declaration on high-performance computing (HPC). With this signature, Greece agreed to join the European effort to build the next generation of computing and data infrastructures.





## Greek Research and Technology Network

[www.grnet.gr](http://www.grnet.gr)



 [grnet.gr](https://www.facebook.com/grnet.gr)

 [grnet\\_gr](https://twitter.com/grnet_gr)

 [GRNET SA](https://www.linkedin.com/company/grnet-sa)

 [GRNET EDET](https://www.youtube.com/channel/UCGRNET)



GRNET presentation backup slides



- State-owned company (SA) under GSRT established in 1998
- Provide advanced e-infrastructures/services to the Greek academic and research institutions:
  - National and international connectivity
  - Infrastructures/services (network, computing, storage) to the community
- Promotion and dissemination of ICT in the academic community

Greek Research and Technology Network

Our vision is the development of Research and Education in our country along with the equal involvement of our communities in the Pan European society of Knowledge.

**31.234**

☁ Active vm's

**213**

👤 connected members

**261**

📍 points of presence

**2.563**

🖨 servers

# The role of GRNET

- Develops and administers integrated electronic infrastructure (e-infrastructures)
- Operates, in 24/7 operational basis, horizontal infrastructure and electronic services for the whole of educational and research community (infrastructure services)
- Creates open communities of knowledge about technologies (community building)
- Supports massive actions for spreading of ICT in education community
- Advises and supports the State in advanced ICT topics (network, computational and storage infrastructure)

# Infrastructure and Services

## Infrastructure

- Nationwide Optical Network Ultra High Speed
- Computer Data Centers
- Computational and Storage infrastructure
- Supercomputing Platforms
- Interconnection Provider GRIX
- Interface with international Internet / GEANT
- Backbone network for the School Network
- Fiber optic connections to 31 hospitals, wifi access

## Services

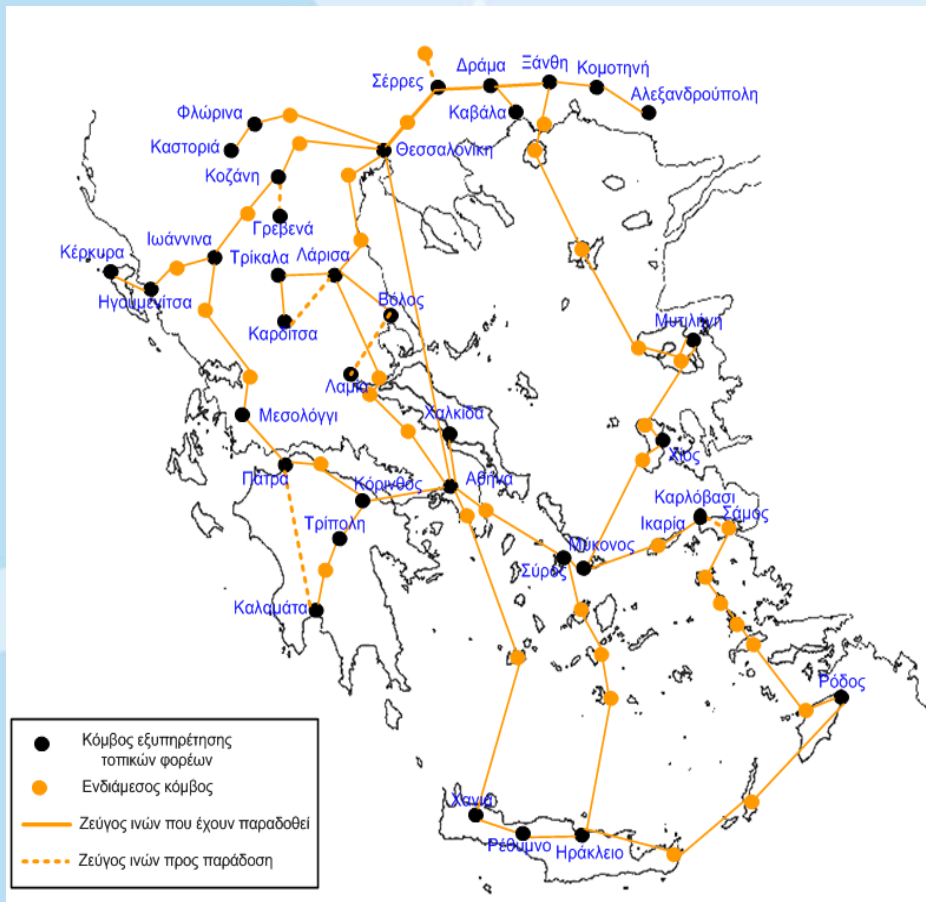
- Cloud Computing (Okeanos)
- PITHOS (Storage Service)
- University Books (EUDOXUS)
- Academic Identity Card
- Faculty Elections
- ePresence / Teleconference
- Web Casting - Live streaming scientific & cultural events
- Hospital Services – imaging backup service, eduroam/edugain access to publications

# GRNET in numbers

- Connects all universities, research centers, academic organizations
- Dark fiber backbone (Nx10 Gbps) + Access 1 || 10 Gbps per institution
- International connectivity through GEANT network multiple 10 Gbps
- Operates the Greek Internet Exchange (GRIX) node (*as trusted third party*) – peering all Greek ISPs and SPs up to multiple 10Gbps (*open, neutral*)
- HPC: 180 TFlops HPC Tier–1 centre, + fat + GPU nodes, PRACE member
- GRID services: HellasGrid, with more than 1700 CPUs and 200 TB
- Storage Services
  - e.g. Online Storage-Pithos, 50 or 100 GB/user – tens thousands users per day
- VPS VM provisioning (>400 VMs)
- Public Cloud (~oceanos - over 400,000 virtual machines spawned)
- 4 DataCenters (EKT, Ypepith-Marousi, Louros Arta, Heraklio Crete)
  - hosting: 84 racks, 1200+ servers, 10s thousands Virtual Machines, 9 PB of raw disk storage and 5PB tape

# GRNET FIBER FOOTPRINT

- 35 PoPs
- 9000km fibers (IRU)
  - MANs Attiki & Thessaloniki
  - DF loops 33 cities
- Single-mode fiber pair
- 15-years IRUs
- Availability >> 99%







## GRNET cloud services oceanos, pithos+, e-Science, GREEN DC

*~oceanos is our IaaS Service. "IaaS" stands for  
"Infrastructure as a Service".*

*It means that you can build your own computer, always  
connected to the Internet.*

*With ~oceanos you are one click away from your own  
Virtual Machines and Virtual Networks.*



## National Supercomputer Infrastructure HPC (High-Performance Computing Services) ARIS

*HPC services to the Greek R&E community*



## ViMa Virtual Machines

*GRNET ViMa service aims to provide to the Greek  
educational and academic community access to shared  
computing and network resources that can be used for  
production purposes.*

# key role in major European Funded projects



## GN4-2 – GÉANT

<http://www.geant.org>

GN4-2 - Accelerating research, driving innovation and enriching education

## Infrastructure as a Service (IaaS)

<https://clouds.geant.org/>

Through a unique pan-European collaboration, GÉANT and 36 NRENs around Europe offer Higher Education and Research Institutions a range of attractive Infrastructure as a Service (IaaS) cloud computing solutions, tailor-made, and priced, for academia.

Watch a short video: <https://youtu.be/wujP8WFKXlo>



## OPENMINTED

<http://openminded.eu>

OpenMinTeD brings together, content providers and scientific communities, text mining and infrastructure builders, legal experts, data and computing centres, industrial players, and SMEs

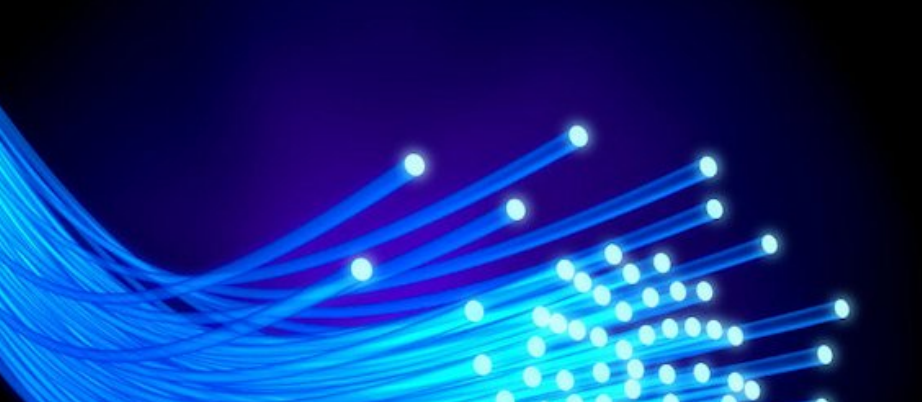
## PRACE

[www.prace-project.eu](http://www.prace-project.eu)



PRACE (Partnership for Advanced Computing in Europe), is to enable high impact scientific discovery and engineering research and development across all disciplines to enhance European competitiveness for the benefit of society, strengthen the European users of HPC





## Hospitals get connected on the GRNET fiber optics network, 1/10Gbps

*Secure and fast processing of medical and research data*



## wi-fi

Remote access service in all hospitals

*Fast access to all hospital services for staff and customers*



## New Data Center for the Health Sector

*Effective, fast, secure storage and retrieval of medical data*



## Central Electronic Management Services for the National Blood Donors Registry

*Managing the registry and issuing volunteer donor IDs through modern, credible and friendly procedures for blood donors, donation services and blood centers in the country.*

A photograph of server racks in a data center, with various components and cables visible.

## Harmoni

### High-Performance Archiving and Retrieval of Medical On-line Imaging Data.

Effective and flexible management of large amounts of imaging data, enabling hospitals to manage the long-term storage and retrieval of the large amount of imaging data effectively, providing a centralized repository, based on the DICOM standard (Digital Imaging and Communication in Medicine).

A collage of digital security and network icons, including a hand pointing at a screen, a padlock, a magnifying glass, a target, a bar chart, a person icon, a globe, and a Wi-Fi symbol.

## Central Staff Directory Service- DELOS for Hospitals

*GRNET "Delos" Authentication and Authorization Infrastructure enables cross-institutional services by providing federated authentication and authorization among participating organizations.*

A photograph of laboratory glassware, including a test tube with purple liquid and a beaker, with a person's hand visible in the foreground.

## DIADOSIS

*Inter-loan online library. Is an electronic system which provides access to all research and medical publication papers via the DELOS- Authentication & Authorization Infrastructure service, to all hospital staff*

A close-up photograph of a laptop keyboard, showing the keys and the trackpad area.

## eduroam

*eduroam (education roaming) is the secure, world-wide roaming access service developed for the international research and education community. It allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening their laptop.*