

# The European Grid Infrastructure

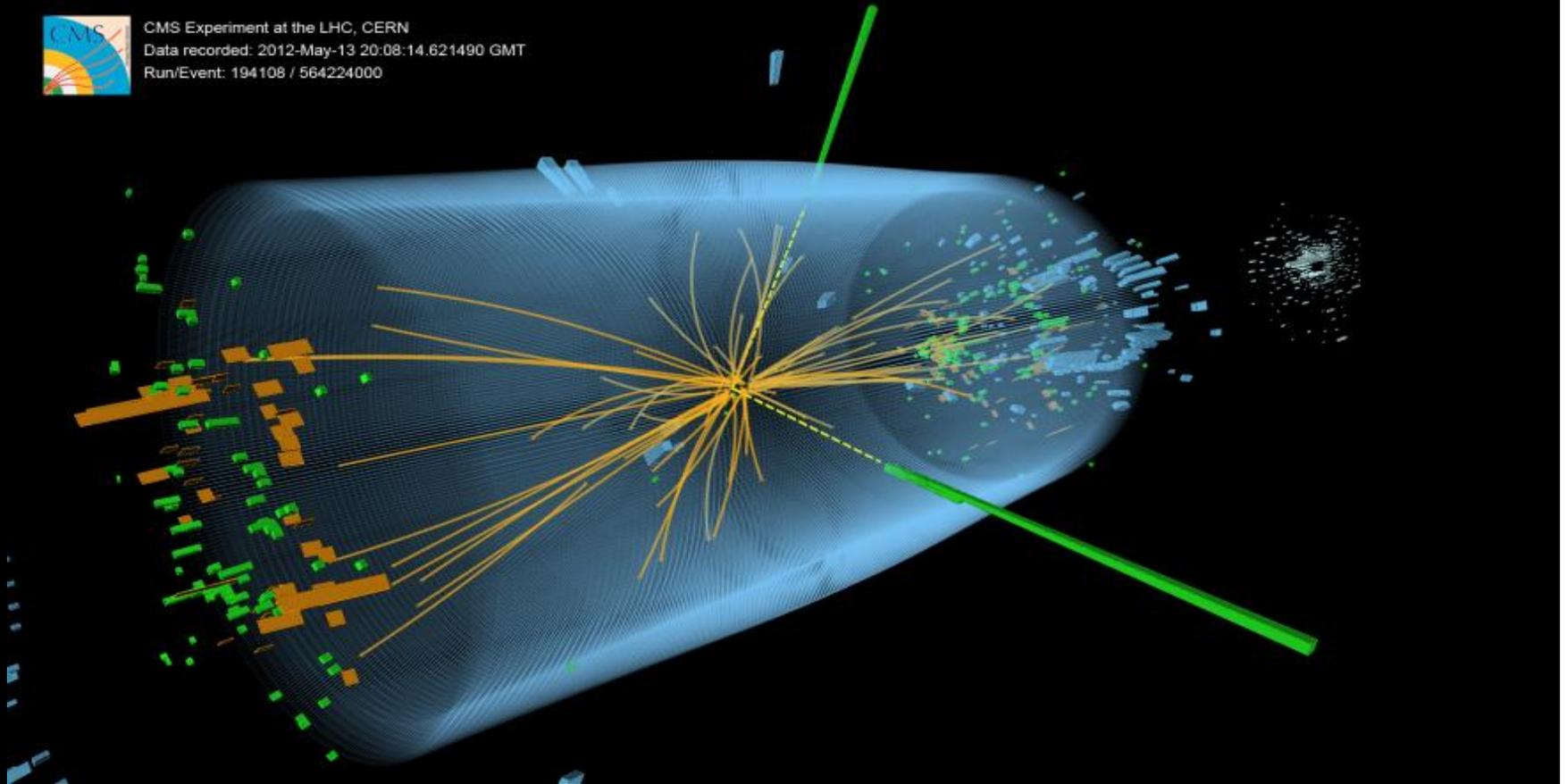
Catherine Gater, EGI.eu



# Where have we come from?



CMS Experiment at the LHC, CERN  
Data recorded: 2012-May-13 20:08:14.621490 GMT  
Run/Event: 194108 / 564224000

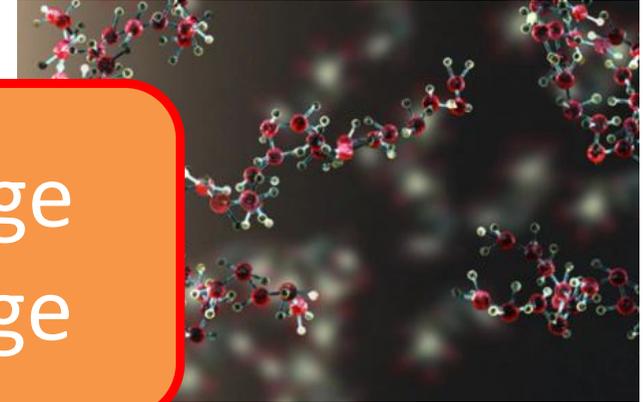
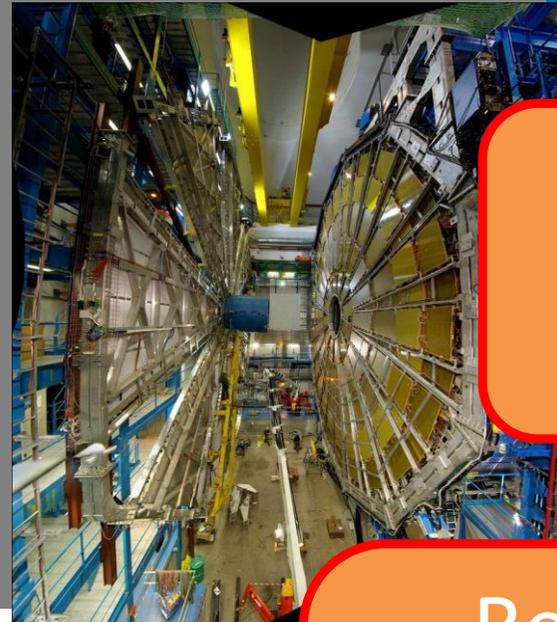


- 2012: Discover
- 2013+: What's



- **E**uropean
  - Over 35 countries
- **G**rid
  - Secure sharing
- **I**nfrastructure
  - Computers
  - Disk and tapes
  - Data Archives
  - Digital Libraries
  - ....
- **EGI.eu @ Amsterdam**
  - Dedicated organisation
  - Coordination for Europe
  - 26 staff





Extracting Knowledge from the Data Deluge

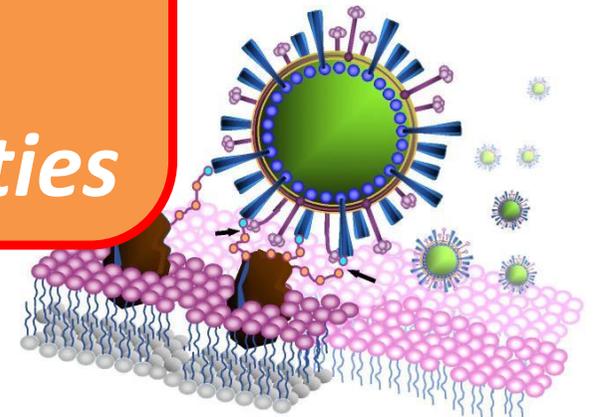
Requires a *digital research infrastructure* to share services and tools *personalised* to *individual research communities*

## High-Energy Physics

- Large Hadron Collider: World's largest particle accelerator
- Supports 8,000 researchers
- 1 billion CPU hours per year (12 months)
- 15Pb of data created annually

## Life Science

- Structural Biology: provide data
- Bioinformatics: tools for data analysis
- Modelling: tools for simulation
- Spectroscopy: S techniques



See: <http://www.egi.eu/case-studies/>



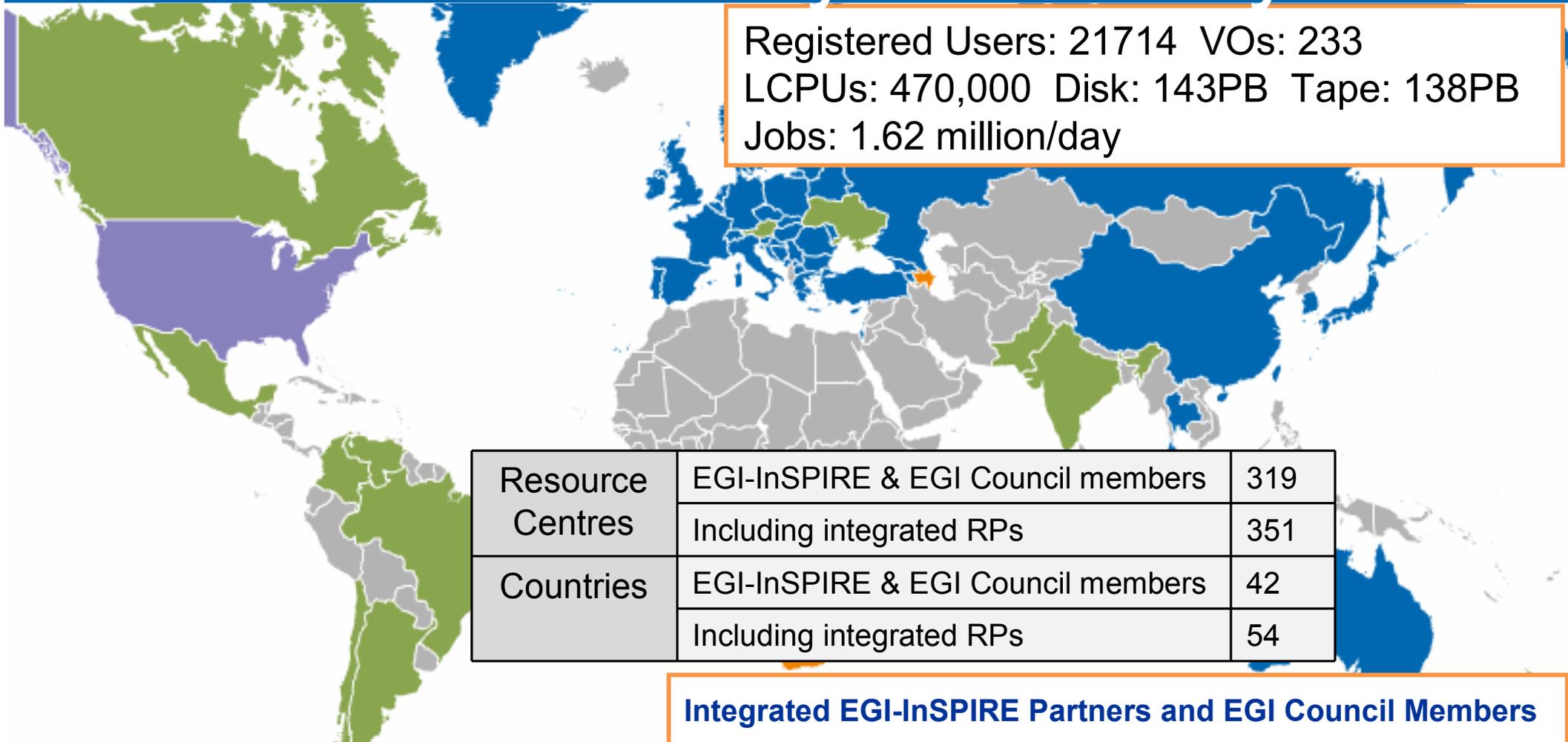
Alina Frolova, Institute of Molecular Biology and Genetics, National Academy of Sciences of Ukraine.

*“Grid computing gives me the power of thousands of computers, so I can reconstruct a 10,000-gene network in only half a month. What seemed to be unbelievable is now possible.”*

<http://www.egi.eu/case-studies/grn.html>

- High-Throughput Data Analysis Facility
  - Integrate your resource centres
- Europe-wide Infrastructure as a Service
  - Help develop a federated cloud
- Growing our Community Networks
  - Work with experts across Europe
- Tackling Community Issues
  - Work to solve critical community issues

# High Throughput Data Analysis Facility



Registered Users: 21714 VOs: 233  
 LCPUs: 470,000 Disk: 143PB Tape: 138PB  
 Jobs: 1.62 million/day

Resource Centres	EGI-InSPIRE & EGI Council members	319
	Including integrated RPs	351
Countries	EGI-InSPIRE & EGI Council members	42
	Including integrated RPs	54

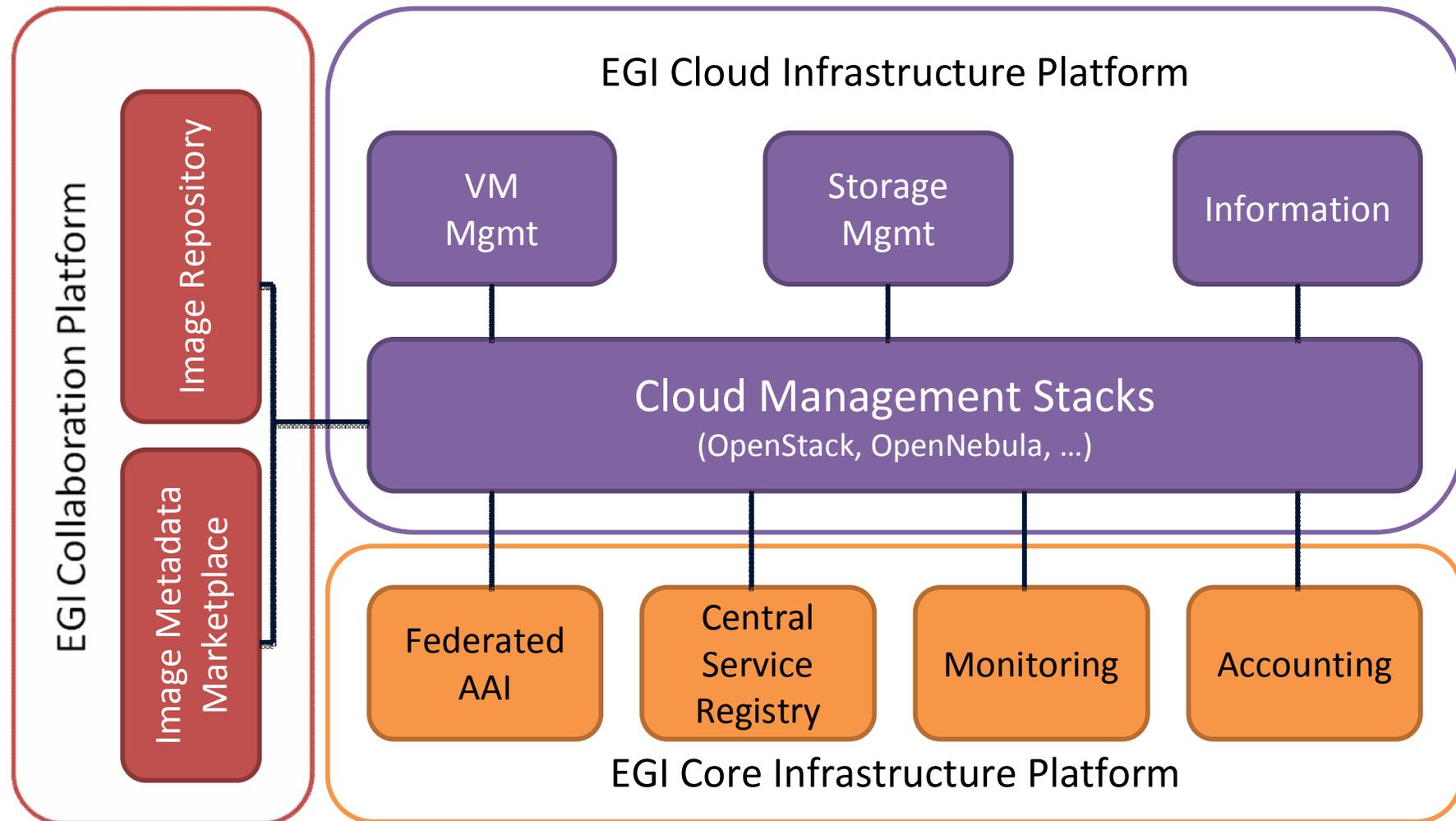
Resources exposed through:

- EMI & IGE
- Desktop Grids, Clouds, ...

**Integrated EGI-InSPIRE Partners and EGI Council Members**  
**External Resource Providers (integrated)**  
**Internal/External Resource Providers (being integrated)**  
**Peer Resource Providers**

- Requested by User Communities
  - Each has different needs
  - Each uses a different Virtual Research Environment
- Remove deployment bottlenecks
  - Remote deployment onto local cloud
  - Uniform interface through EGI's Federated Cloud
- Improve flexibility, efficiency and openness of EGI
  - Support the long-tail of researchers in new communities
  - Attract more of ERA's 1.8M+ publicly funded researchers

## Enable an open ecosystem of services



- **Structural biology** – We-NMR:  
Gromacs training environments.
- **Linguistics** – CLARIN:  
scalable 'British National Corpus' service (BNCWeb).
- **Ecology** – BioVel:  
remote hosting of OpenModeller service.
- **Software Engineering** – SCI-BUS:  
simulated environments for portal testing.
- **Musicology** – Peachnote project:  
music score search engine and analysis platform.
- **Space science** – ASTRA-GAIA:  
data integration with scalable workflows.
- **Software Engineering** – DIRAC:  
deploying ready-to-use distributed computing systems.



- **NGI Operations Coordination**
  - National operational infrastructures
  - Existing user support activities
- **EGI Champions**
  - Applied researchers using/developing on EGI
  - Support their promotion of EGI in their community



**Afonso Duarte**  
Biophysics &  
Structural biology



**Fotis Psomopoulos**  
Bioinformatics &  
Computer science



**Silvio Pardi**  
Mathematics &  
Computer science



**Ashiq Anjum**  
Biomedical  
sciences & Security



**Joeri van Leeuwen**  
Astronomy



**Stella Arnaouti**  
Civil engineering



**Eleni Katragkou**  
Climatology &  
Climate science



**Mark Santcroos**  
Biomedical  
sciences

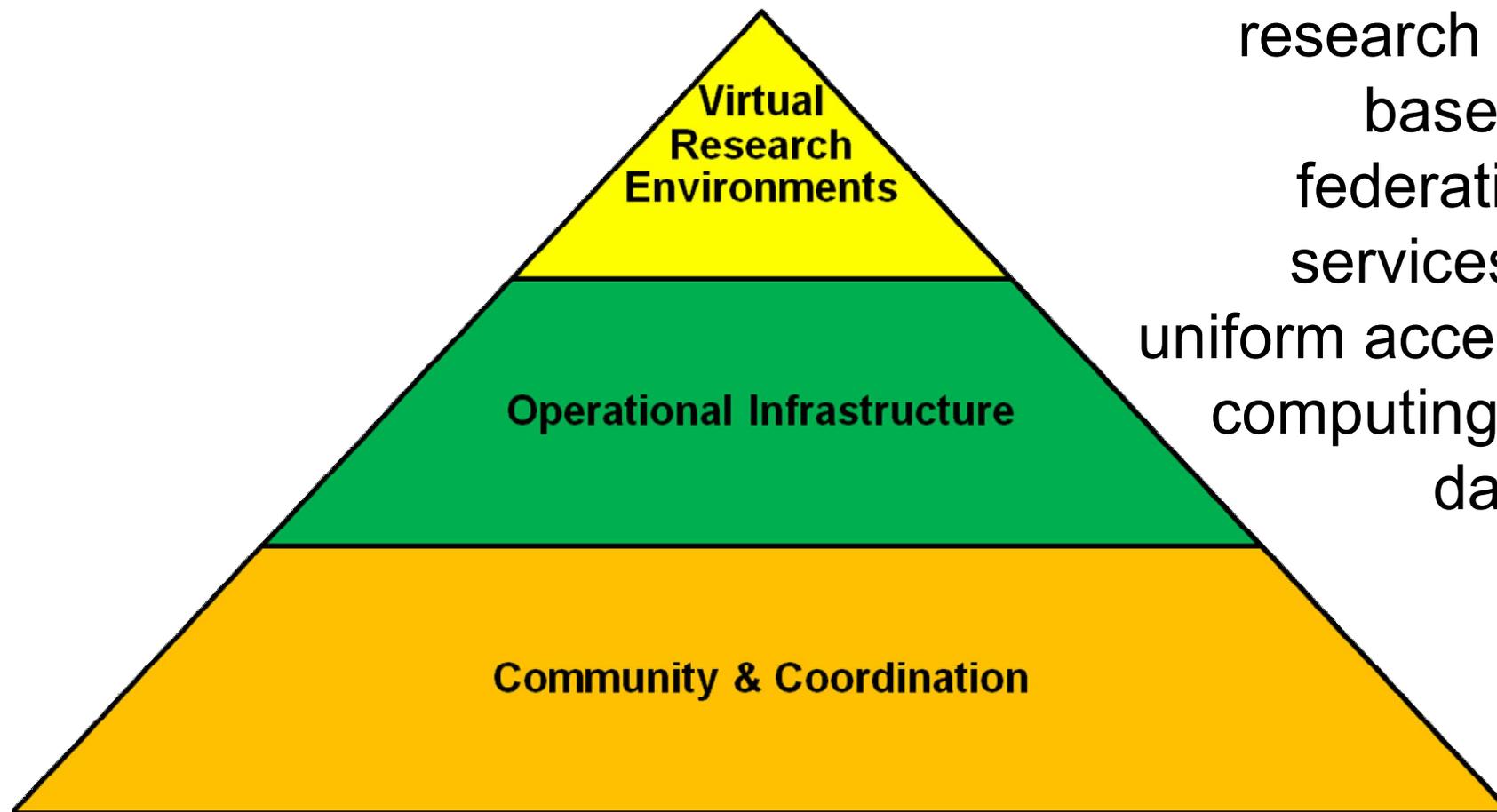


**Tomáš Kulhánek**  
Computational  
physiology

- NGI Operations Coordination
  - National operational infrastructures
  - Existing user support activities
- EGI Champions
  - Applied researchers using/developing on EGI
  - Support their promotion of EGI in their community
- NGI International Liaisons
  - Human network of national contact points
  - Virtual Team (VT) coordinators & participants

- Leverage and exploit Community Networks
  - Operations
  - Non-operations
  - Research communities
  - Technologies
- Help identify issues and opportunities
  - Solved by funded/unfunded virtual teams

EGI 2020 Strategy:  
<http://go.egi.eu/EGI2020>



To support the digital European Research Area through a pan-European research infrastructure based on an open federation of reliable services that provide uniform access to national computing, storage and data resources.

## ERA needs an open ecosystem of VREs & services

**Collaboration Platform**

*“& Services enabling cross-community collaboration”*

**Community Platform (VRE)**

**Community Platform (VRE)**

**Community Platform (VRE)**

**EGI Cloud Infrastructure Platform**  
*“A federated infrastructure”*

**EGI Core Infrastructure Platform**

*“Operational services necessary for the management of federated DCIs”*

**E-Infrastructures are key to ‘Excellent Science’**



- Focus on:
  - Community & Coordination
  - Operational Infrastructure
  - Virtual Research Environments
- Collaborative opportunities!
- More at [www.egi.eu](http://www.egi.eu)
  - Contact: [director@egi.eu](mailto:director@egi.eu)
  - EGI Strategy: <http://go.egi.eu/EGI2020>
  - EGI Use Cases: <http://www.egi.eu/case-studies/>