

# EGI Applications

## On Demand (AoD) service – Catering for the computational needs of the long tail of science

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Technical Outreach Expert



Service: <http://access.egi.eu>

Documentation: <https://wiki.egi.eu/wiki/AoD>

Scientific publication: <https://documents.egi.eu/document/3132>

Contact email: [support@egi.eu](mailto:support@egi.eu)

- Introduction about EGI
- Some driving considerations and motivations
- Overview of the EGI Applications on Demand (AoD) service
  - List of Service Components
  - Available Science Gateways
  - Value propositions
- List of “Applications as a Service”
- How to get involved ?

A rocket launch at night, with a bright orange arc in the sky. The background is a dark night sky filled with stars. The rocket is launching from the bottom left, and its trail is a bright orange arc that curves upwards and to the right. The launch is reflected in the water at the bottom of the image.

# EGI: advanced computing for research

EGI is a federation of over 300 computing and data centres spread across 56 countries in Europe and worldwide

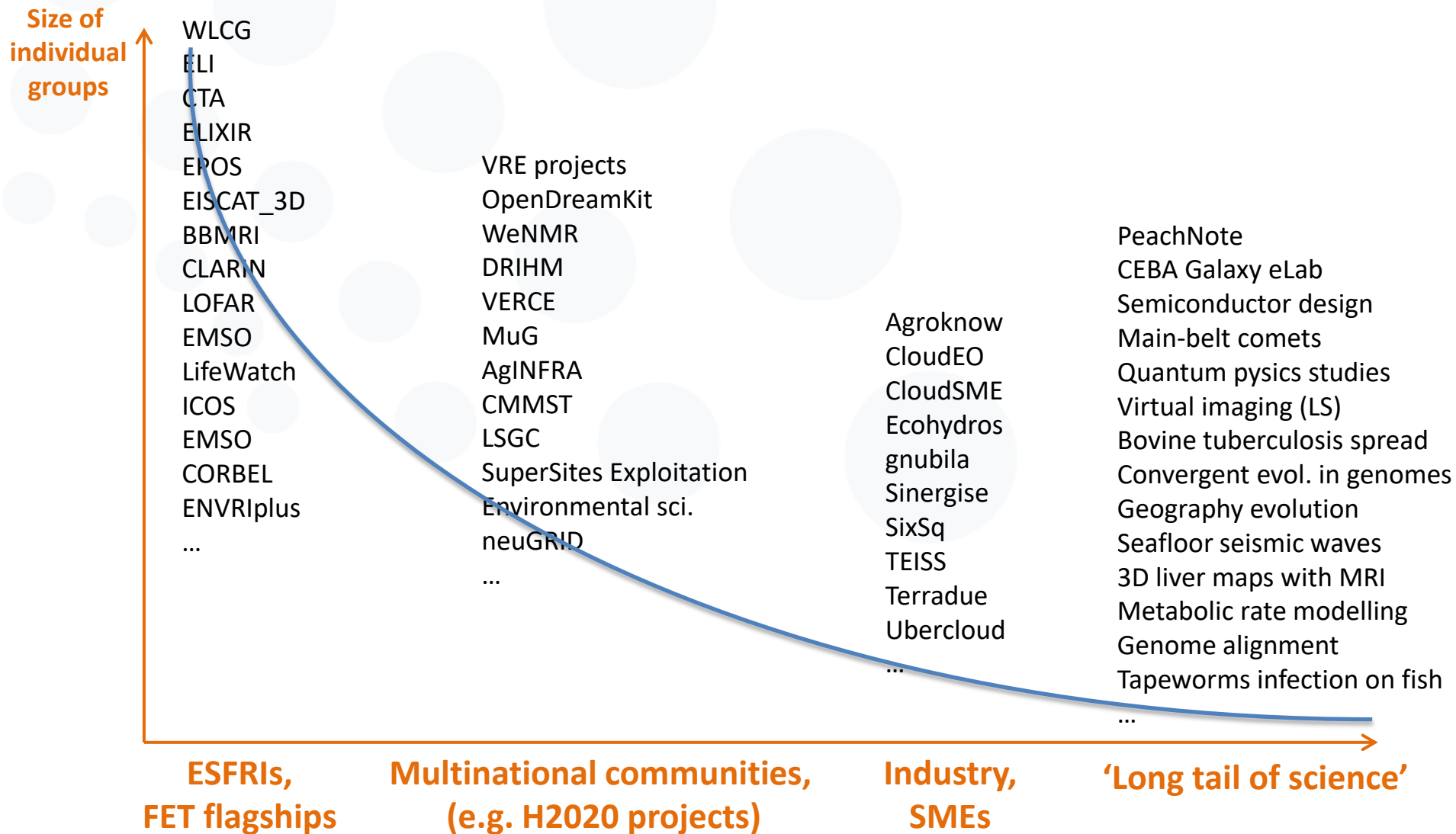
EGI delivers services to support scientists, multinational projects and research infrastructures

[www.egi.eu](http://www.egi.eu)





# EGI serves researchers and innovators



# ***The EGI Applications on Demand service – Motivations***



# Barriers of application access and reuse

- Fragmented landscape of ‘catch-all Virtual Organisation’ services (35 VOs at the moment)
  - Barrier for broad adoption
- Abandoned/un-sustained services in some of these VOs
  - Barrier for use
- ‘Reinventing the wheel’ (same applications, frameworks in several VOs)
  - Waste of effort
- Complicated access (X.509)
  - Barrier for usability

# Main design requirements for the service

- **100% coverage:** anyone with internet access can become a user (no X509 certificate; no NGI/VO affiliation)
- **Secure:** provide high level of traceability of user's activities
- **Open and scalable:** can scale up to support large number of application providers, resource providers, technology providers and users
  - Resource providers can join with their own resources
  - Science Gateways/VRE providers can join with custom tools
- **Reuse** existing technological building blocks as much as possible
- **User-friendly:** intuitive GUI, local user support



Webinar: EGI Application X

← → ↻ 🏠 🔒 Sicuro | <https://indico.egi.eu/indico/event/3378/> 🔍 ☆ 🗲

## Webinar: EGI Applications On Demand Service

chaired by Giuseppe La Rocca (EGI.eu), Gergely Sipos (EGI.eu)

Tuesday, 13 June 2017 from 14:00 to 15:00 (Europe/Amsterdam)

**Description** This 1-hour webinar will provide an overview of the EGI Applications on Demand (AoD) service. The service was specifically designed for individual researchers, small research teams and early phase research infrastructures who do not have access to dedicated computational and storage resources, online applications and science gateways to perform scientific data analysis.

The service is available at <http://access.egi.eu> and through a lightweight registration and user identity vetting process allows user-friendly access to a growing number of scientific applications (currently 17) and application hosting frameworks (science gateways, VREs) that are configured to use the dedicated pool of cloud computing and HTC clusters from EGI.

The service operates as an open and extensible 'hub' for EGI-related providers and e-user support teams who can use the service to share and make available applications, services and/or compute-storage capacity at the European level.

**The target audience of the webinar is:**

- **NGIs and National User Support Teams:** They can use the service to serve national users, OR they can use this European service to promote and make available their national applications and gateways/VREs to foreign users.
- **Representatives of research infrastructures or scientific communities/projects:** They can use the service to serve their long-tail users with generic or domain specific applications, before/without committing to long-term resource allocation through EGI.
- **Researchers and small research teams (the long tail of science):** They can learn about the applications and tools that are available for them in this service.

**Further information:**

- Service: <http://access.egi.eu>
- Documentation: <https://wiki.egi.eu/wiki/AoD>
- Scientific paper describing the service: <https://documents.egi.eu/document/3132>
- Support: [support@egi.eu](mailto:support@egi.eu)

**Webinar details:**

Date: Tue 13 June 2017  
Time: 14:00 – 15:00 (CEST)

Agenda: <https://indico.egi.eu/indico/event/3378/>

# ***The EGI Applications on Demand (AoD) service***



## What does the Service offer ?

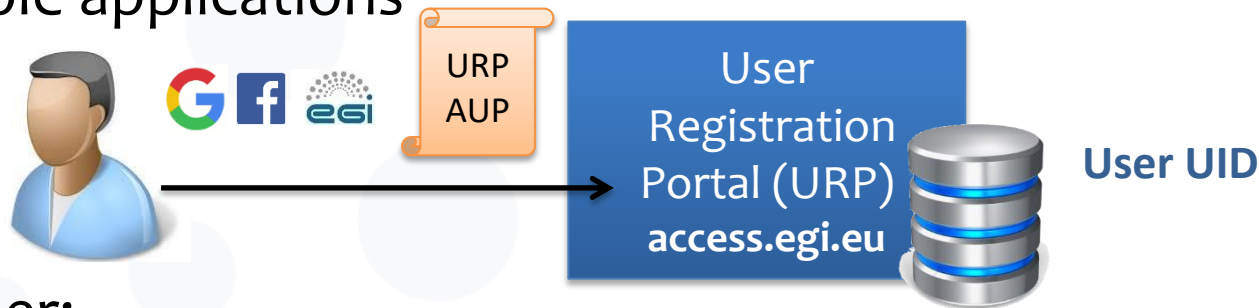
- **Scientific applications** that are offered “as a services” through online graphical environments
- **Science Gateways** and **Virtual Research Environments** that offer integrated development environments to port custom applications with High-throughput computing and cloud resources
- **Cloud** and **High-throughput compute resources** suited for both compute/data intensive applications and for hosting of scientific services
- **Online storage resources** for storing scientific data that serve as input and output for computational jobs
- **Access management** system and a network of **Consultants** who can provide guidance on the use of the service

The service is **NOT** here to replace any national services  
**BUT** to facilitate sharing, reuse and standardisation

- The **User Registration Portal (URP)**
- **Application portals, science Gateways, VREs**
  - Catania Science Gateway (CSG)
  - WS-PGRADE/gUSE
  - Elastic Cloud Computing Cluster (EC3)
- **Scientific applications** (hosted in the gateways/portals/VREs)
  - **R, GNU Octave, The Semantic Search Engine, Chipster, ClustalW2, Galaxy, AutoDock Vina, NAMD, Jupyter**
- **A pool of resources** that the applications can use
  - Cloud
  - HTC (batch computing)
- **A Credentials Management System**

# The User Registration Portal (URP)

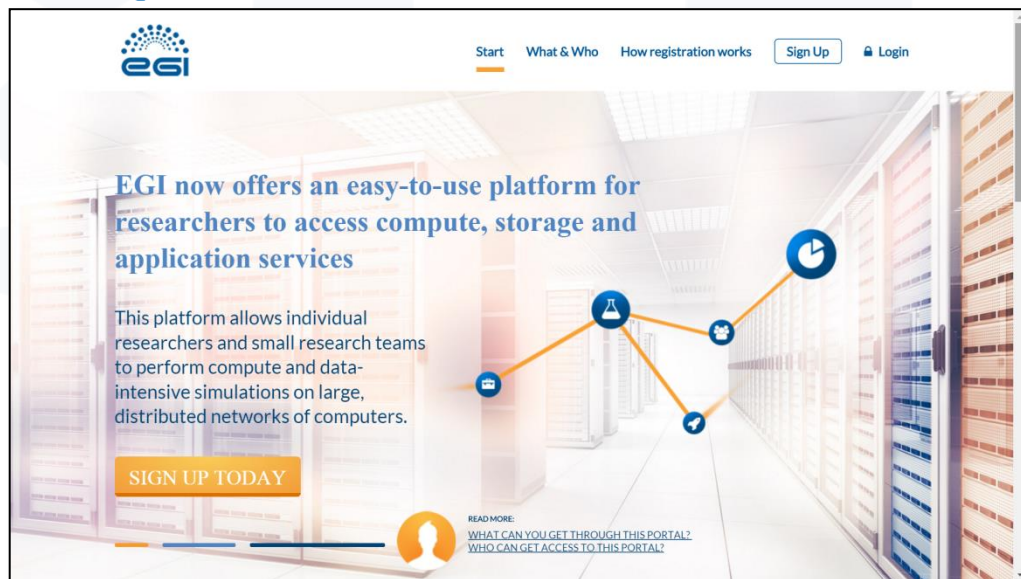
- The **URP** is the entry point to access the Service and uses the available applications



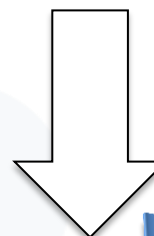
- The user:
  - Logs in using his/her social accounts OR with EGI SSO accounts
  - Provides background information (affiliation, research use case, links)
  - Submits a request for application access with resource allocation
- EGI.eu and resource providers:
  - Approves the user request (remote identity vetting whenever possible)
  - Monitors application/resource usage
- After the user's request is approved, an **unique UID** is assigned to uniquely identify the user across all the service components

# How to access the AoD service ?

<http://access.egi.eu>



Approval by distributed Support Team



**1.  
Register  
with social  
or EGI SSO  
account**

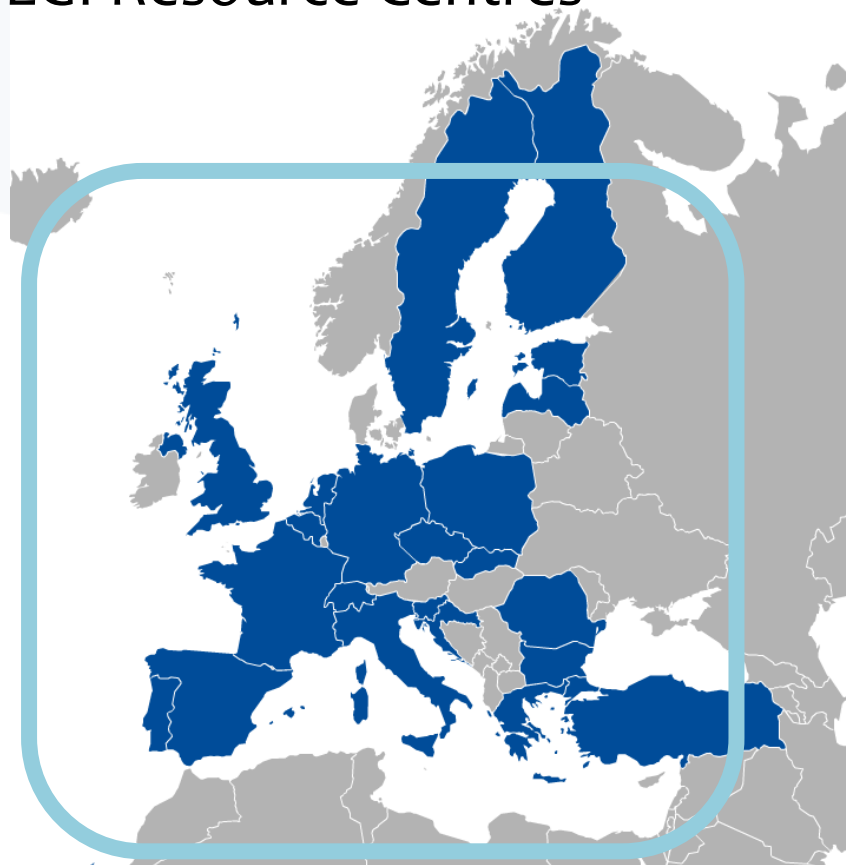
**2.  
Complete  
user profile  
and submit  
access  
request**

**3.  
Access or  
develop  
applications**



# Compute and storage resources

- The **pre-allocated, open pool of resources** is operated by various geographically distributed EGI Resource Centres
  - both cloud and HTC resource centres have accepted to enable the `vo.access.egi.eu` VO on their resources.



# Science Gateways/portals/VREs

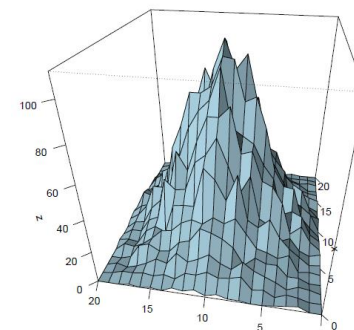
1. To access and use pre-defined applications
2. To port additional applications, such as
  - Computational workflows or parameter sweeps → WS-PGRADE
  - Applications with rich GUI → Catania Science Gateway
  - Cloud applications → EC3

# How to join a new Science Gateways/portals/VREs in the Service

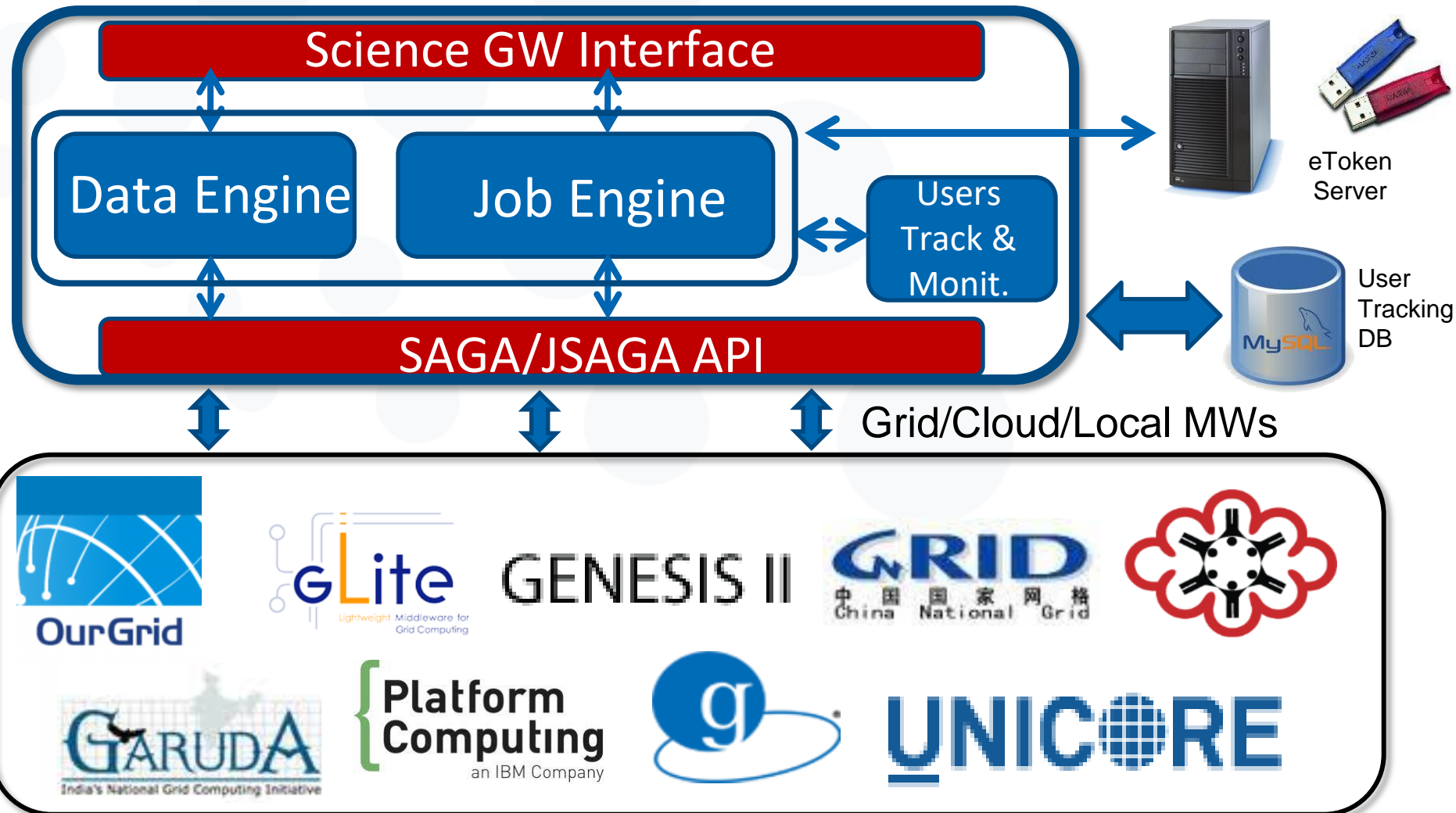
- Science Gateways/Portals are configured to:
  - **Register** the SG as new provider in the URP
    - Get a *secretID* and *secretKey* to secure the communication.
  - **Register** the SG in the GOCDB to enable the monitoring based on the EGI ARGO service.
  - **Create** a specific Support Unit in EGI Helpdesk
  - **Consume** authorization information from the User Registration Portal (user UID) and,
  - **Generate** short-term proxies from robot certificates
- For the traceability of user identities proxies have been extended creating **Per-User Sub-Proxies (PUSP)** (see next slide)

**ClustalW2**

```
***      * :   * : * *****  
TWTISPEKMEKKLHAVPA  
TWTISPEKMEKKLHAVPA  
TWTISPEKMEKKLHAVPA  
TWINTTEKMEKRLHAVPA  
TWINTTEKMEKRLHAVPA  
VWINTTEKXEKRLHAVPA  
TWNTTEKXEKRLHAVPA  
VWTRPERMDKKLLAVPA
```

[illegible]

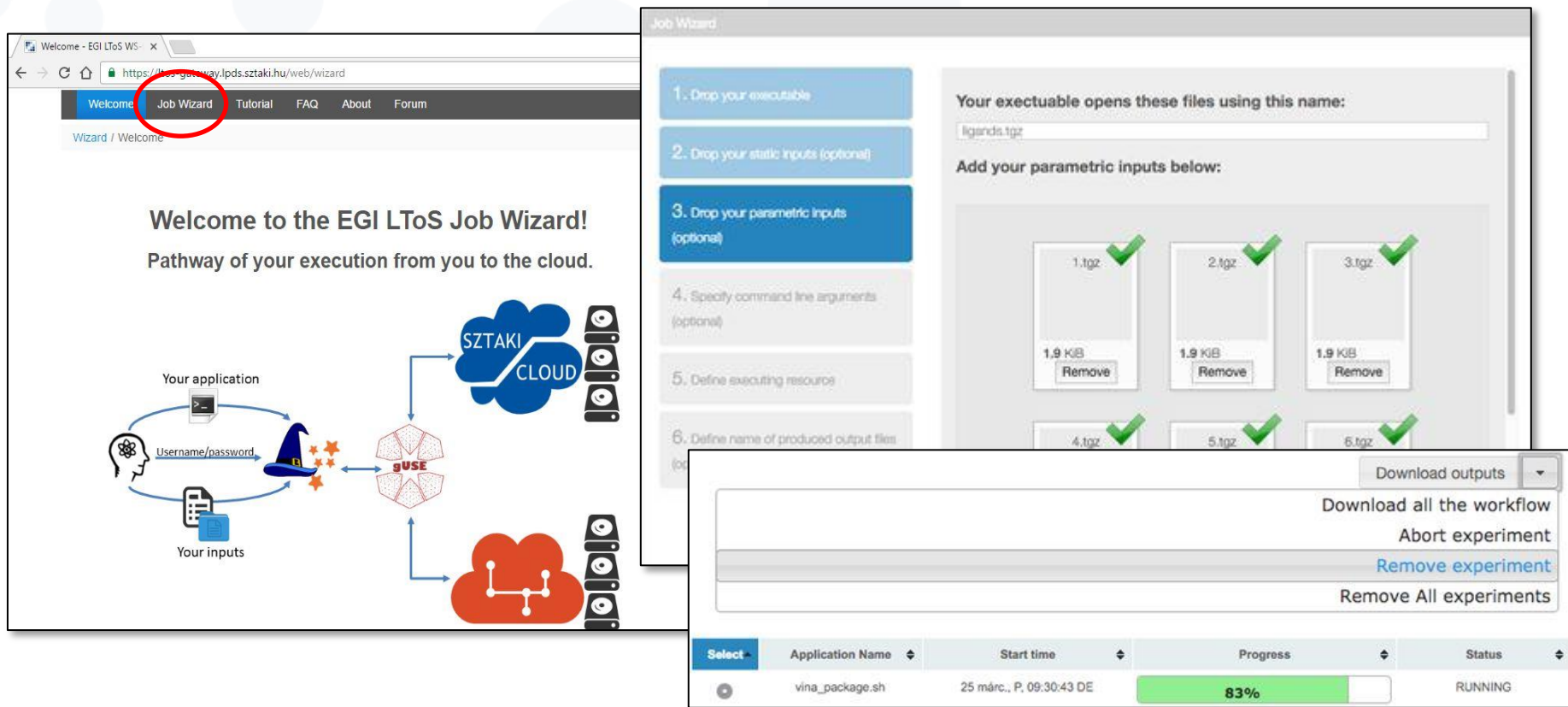
# The Catania Science Gateway Framework



# Science Gateway/WS-PGRADE

The **WS-PGRADE** Science Gateway offers a workflow-oriented Science Gateway framework with different customization methodologies.

- Developed by MTA SZTAKI and released under the Apache 2.0 license.

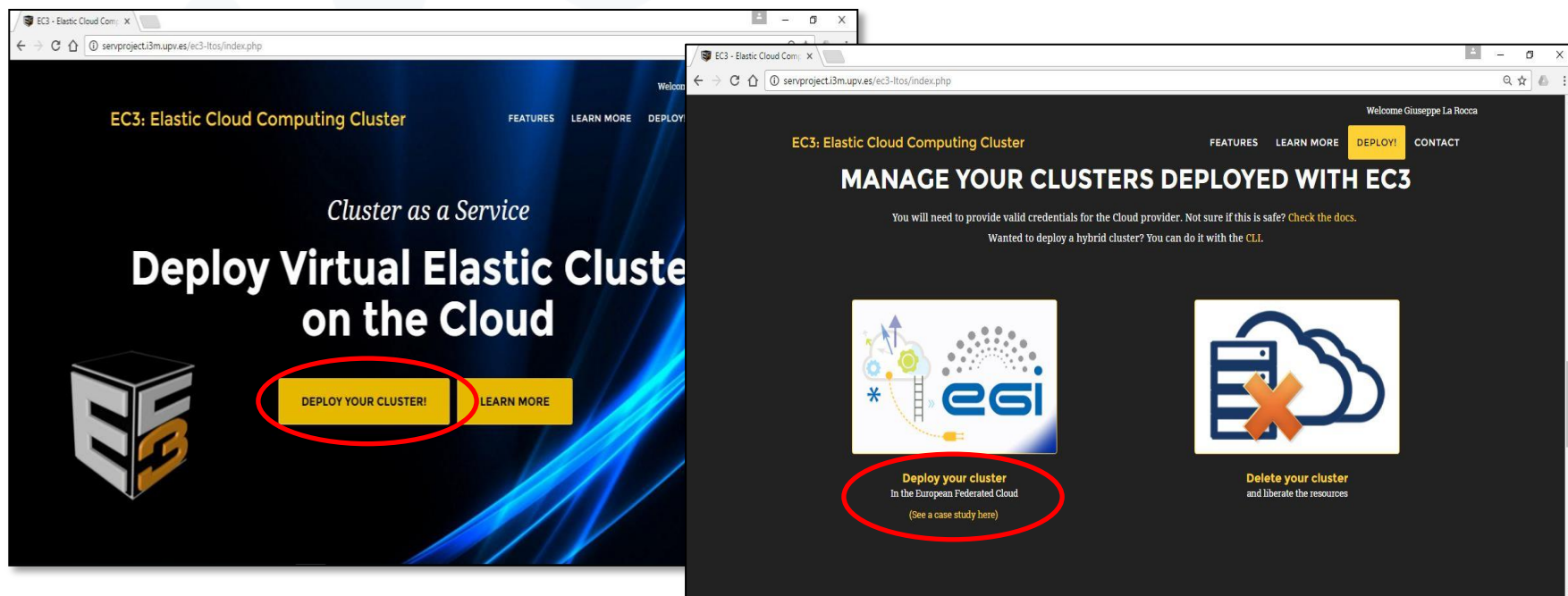


The screenshot displays the EGI LToS Job Wizard interface. The top navigation bar includes links for Welcome, Job Wizard (highlighted with a red circle), Tutorial, FAQ, About, and Forum. The main content area features a welcome message and a diagram illustrating the workflow: 'Your application' (represented by a brain icon) leads to 'Your inputs' (represented by a document icon), which then connects to the 'gUSE' (Grid User Service Environment) component. The gUSE component is shown interacting with the 'SZTAKI CLOUD' (represented by a cloud icon) and a 'Your application' icon. The interface also includes a 'Job Wizard' section with steps: 1. Drop your executable, 2. Drop your static inputs (optional), 3. Drop your parametric inputs (optional), 4. Specify command line arguments (optional), 5. Define executing resources, and 6. Define name of produced output files. A table shows the status of various input files (1.tgz, 2.tgz, 3.tgz, 4.tgz, 5.tgz, 6.tgz) with their sizes (1.9 KB) and a 'Remove' button. A 'Download outputs' dropdown menu is visible, offering options: 'Download all the workflow', 'Abort experiment', 'Remove experiment' (highlighted in blue), and 'Remove All experiments'. At the bottom, a table displays the execution progress for the 'vina\_package.sh' application, showing a start time of '25 márc., P, 09:30:43 DE', a progress bar at 83%, and a status of 'RUNNING'.



The **Elastic Cloud Computing Cluster (EC3)** is an open-source software platform to dynamically deploy complex scientific virtual computing infrastructures on top of Infrastructure as a Service Clouds

- Developed by the **Polytechnic University of Valencia (UPV)**



- The **Infrastructure Manager (IM)** is a tool that eases the access and the usability of IaaS clouds by automating the VMI selection, deployment, configuration, software installation, monitoring and update of Virtual Appliances.
- The main purpose of the **Resource and Application description Language (RADL)** is to specify the requirements of the resources where the scientific applications will be executed.
- **CLUES** is an energy management system for High Performance Computing (HPC) Clusters and Cloud infrastructures.
  - The main function of the system is to power off internal cluster nodes when they are not being used, and conversely to power them on when they are needed.

# OLA agreements with resource providers

- OLA agreements with cloud resource providers

Cloud Provider	Resources	OLA Status
INFN-CATANIA	20 vCPU cores, 50GB RAM, 1TB storage	<a href="#">Signed</a>
INFN-BARI	15 vCPU cores, 30GB RAM, 1TB storage	<a href="#">Signed</a>
CESGA	32 vCPU cores, 64GB RAM, 2TB of storage	<a href="#">Signed</a>
BIFI	100 vCPU cores, 100GB RAM, 2TB of storage	<a href="#">Signed</a>

- OLA agreements with HTC resource providers

HTC Provider	Resources	OLA Status
INFN-CATANIA	1M HEPSPEC, 1GB RAM per core, 100GB storage	<a href="#">Signed</a>
INFN-BARI	0.5M HEPSPEC, 2GB RAM per core, 100GB storage	<a href="#">Signed</a>
CESGA	1M HEPSPEC, 1GB RAM per core, 2TB storage	<a href="#">Signed</a>
CYFRONET-LCG2	5M HEPSPEC, 3GB RAM per core, 500GB storage	<a href="#">Signed</a>
BEgrid-ULB-VUB	5M HEPSPEC, 2GB RAM per core, 500GB storage	<a href="#">Signed</a>

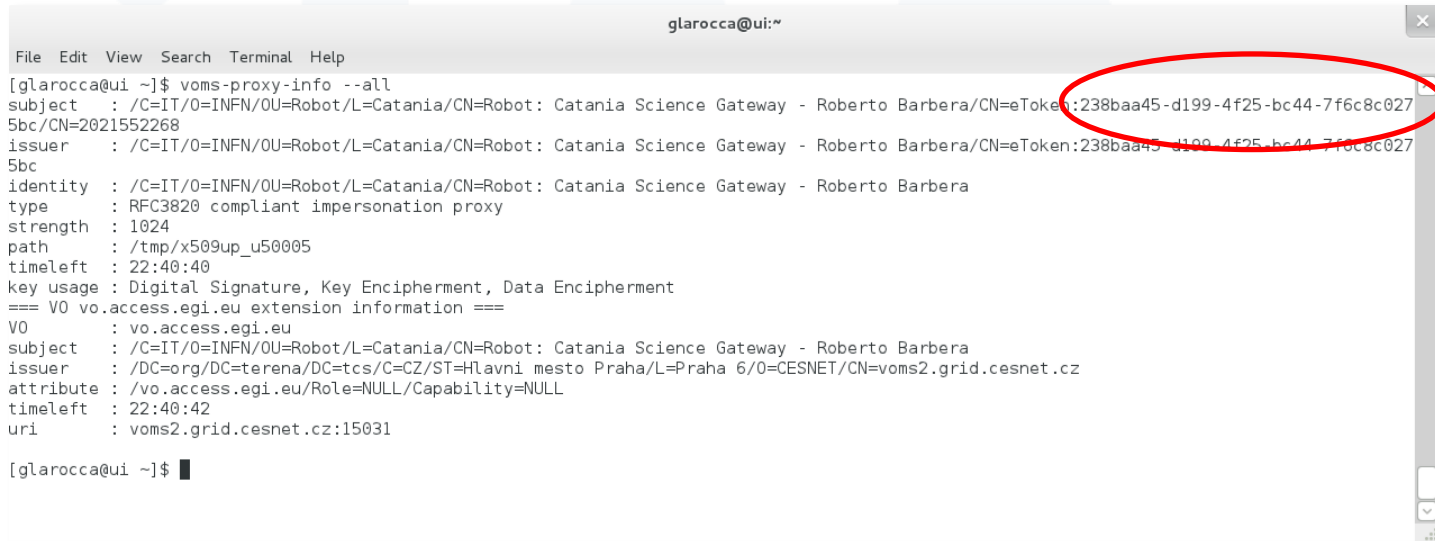
# OLA agreements with technology providers

- OLA agreements with technology providers

Service	GOCDB registration	OLA Status	Monitor in ARGO	GGUS Support Unit
User Registration Portal (URP)	<a href="#">Registered</a>	<a href="#">Signed</a>	<a href="#">Active</a>	<a href="#">Created</a>
Catania Science Gateway (CSG)	<a href="#">Registered</a>	<a href="#">Signed</a>	<a href="#">Active</a>	<a href="#">Created</a>
WS-PGRADE/gUSE	<a href="#">Registered</a>	<a href="#">Signed</a>	<a href="#">Active</a>	<a href="#">Created</a>
Elastic Cloud Computing Cluster (EC3)	<a href="#">Registered</a>	<a href="#">Signed</a>	<a href="#">Active</a>	<a href="#">Created</a>

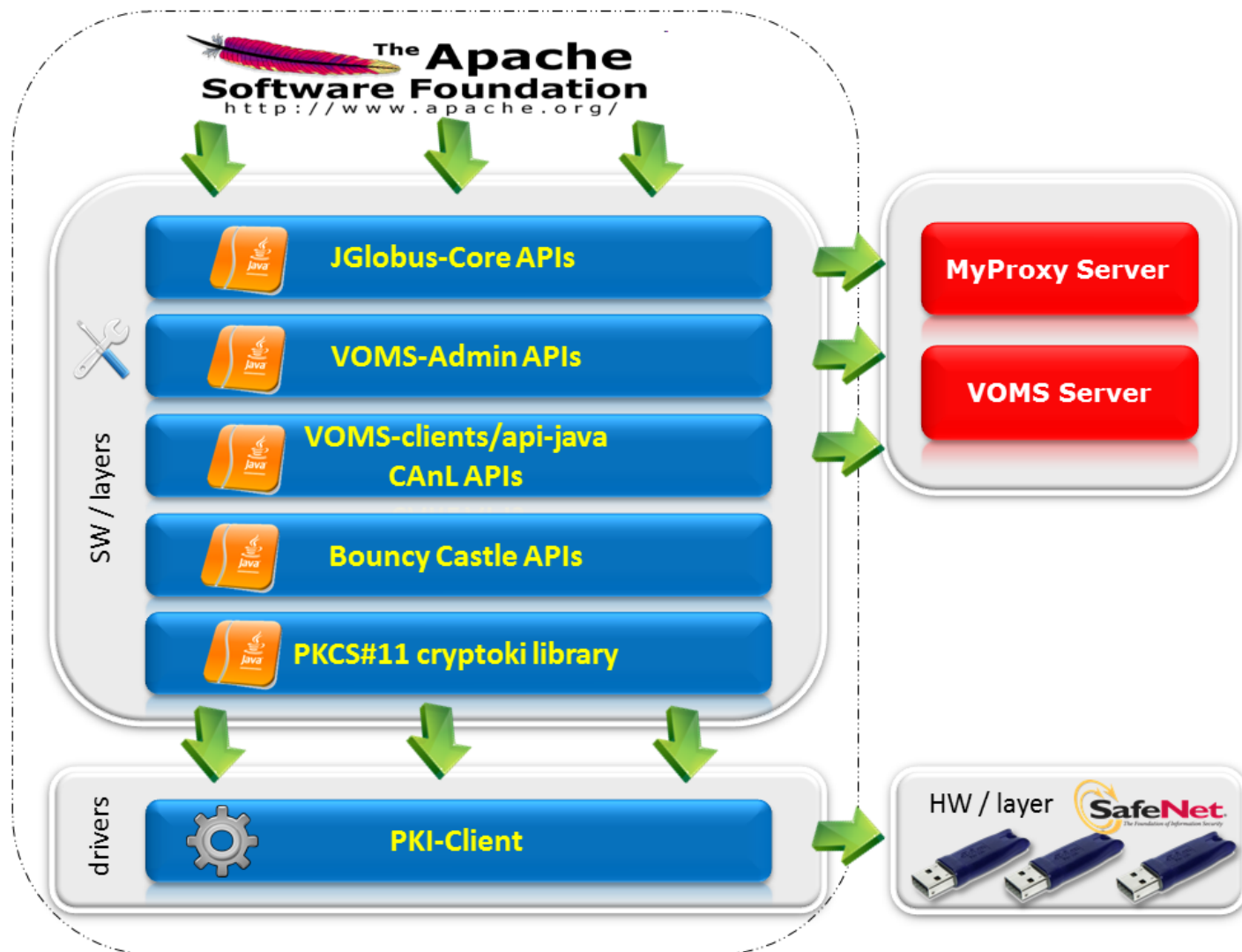
# Credential Management System

- In the back-end there is still X509, but this is transparent for the users
- **Credentials Management System** generates a per-user-sub-proxy (PUSP) from an X509 robot certificate.
- **Per-User Sub-Proxy (PUSP)** identifies the user
  - Proxy CN includes the user ID
  - Accounting information can be grouped by this ID
  - Users can be suspended by the ID



```
glarocca@ui:~  
File Edit View Search Terminal Help  
[glarocca@ui ~]$ voms-proxy-info --all  
subject : /C=IT/O=INFN/OU=Robot/L=Catania/CN=Robot: Catania Science Gateway - Roberto Barbera/CN=eToken:238baa45-d199-4f25-bc44-7f6c8c0275bc/CN=2021552268  
issuer : /C=IT/O=INFN/OU=Robot/L=Catania/CN=Robot: Catania Science Gateway - Roberto Barbera/CN=eToken:238baa45-d199-4f25-bc44-7f6c8c0275bc  
identity : /C=IT/O=INFN/OU=Robot/L=Catania/CN=Robot: Catania Science Gateway - Roberto Barbera  
type : RFC3820 compliant impersonation proxy  
strength : 1024  
path : /tmp/x509up_u50005  
timeleft : 22:40:40  
key usage : Digital Signature, Key Encipherment, Data Encipherment  
=== V0 vo.access.esi.eu extension information ===  
V0 : vo.access.esi.eu  
subject : /C=IT/O=INFN/OU=Robot/L=Catania/CN=Robot: Catania Science Gateway - Roberto Barbera  
issuer : /DC=org/DC=terena/DC=tcs/C=CZ/ST=Hlavni mesto Praha/L=Praha 6/O=CESNET/CN=voms2.grid.cesnet.cz  
attribute : /vo.access.esi.eu/Role=NULL/Capability=NULL  
timeleft : 22:40:42  
uri : voms2.grid.cesnet.cz:15031  
[glarocca@ui ~]$
```

# X.509 Credential Management System (cont.)

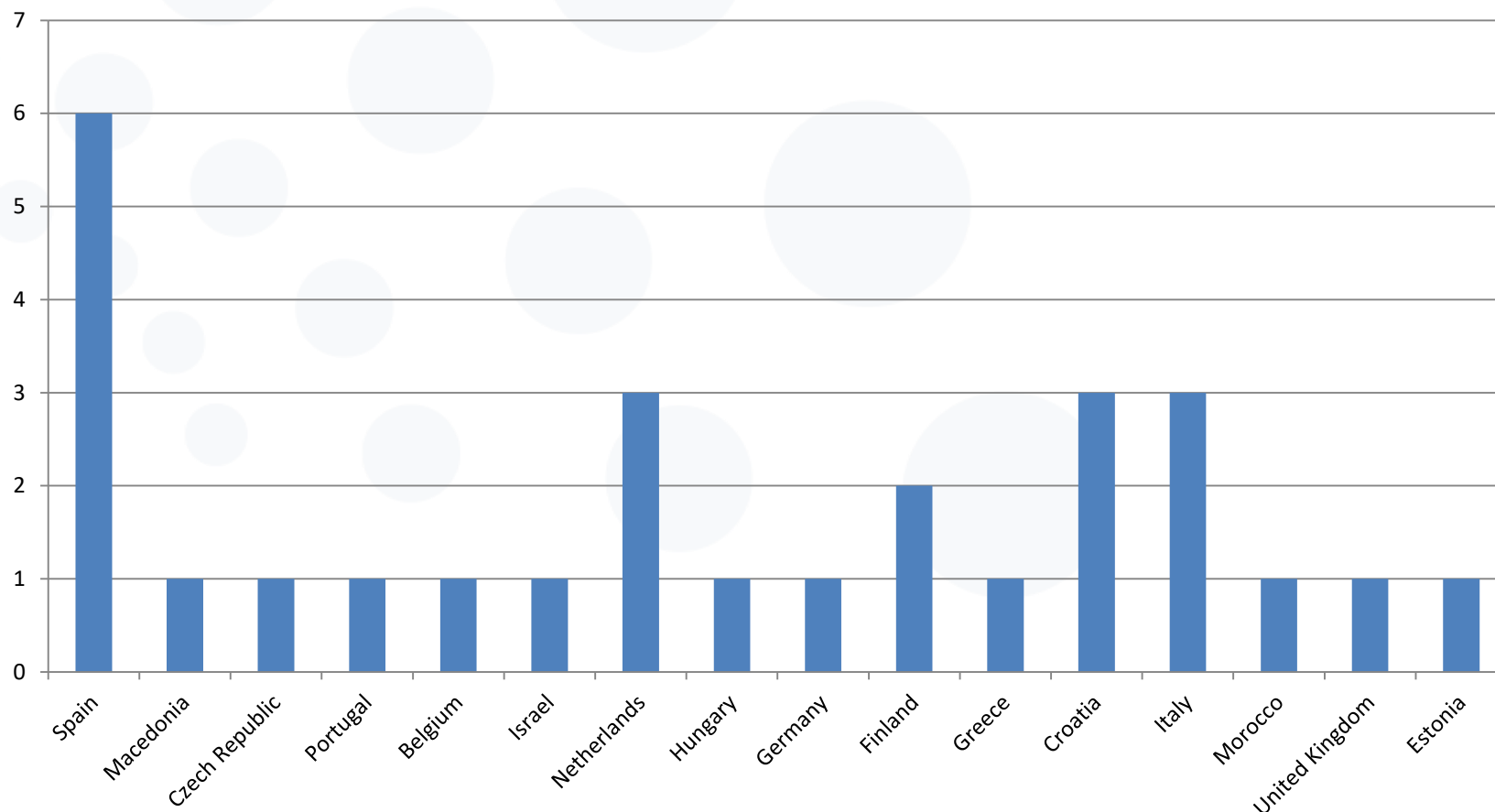




# Applications/tools integrated so far



# User requests so far

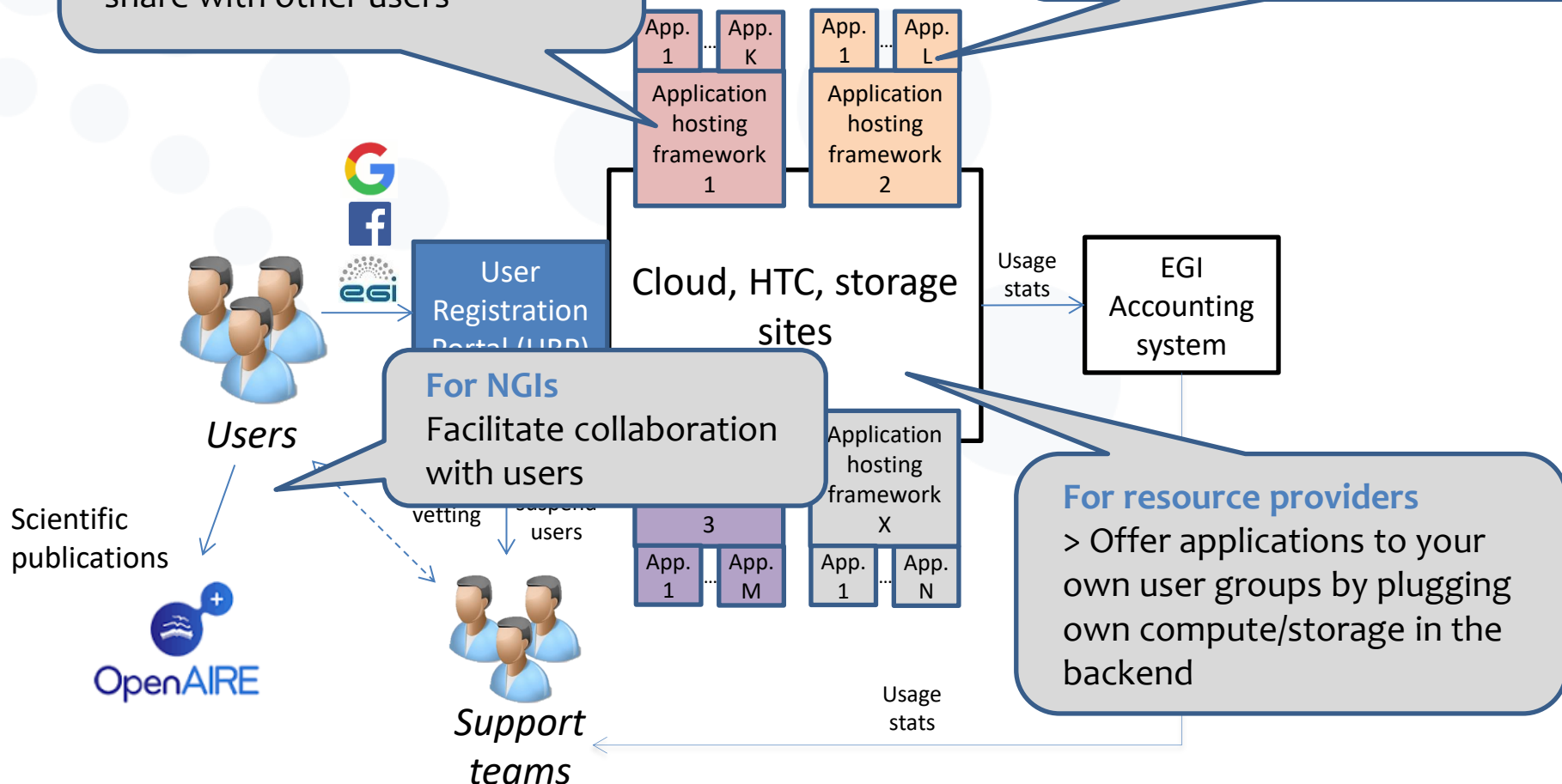


NIL contact: Macedonia, Croatia, Netherlands and Czech Republic.

**29** requests from **16** countries  
*Last updates June 13, 2017*

> Add application to Science Gateway/hosting framework and share with other users

- > Use applications from provided library



## Benefits (for SGs developers)

- Reaching international user base
- Benefiting from EGI's service promotion
- Belonging to a community of like-minded service providers
- Working towards the EOSC with EGI (incl. bidding together for future grants)

## How did we get here ?

Designed  
in late  
2014

Demonstrated  
in Nov. 2015

Reached  
Alpha in  
Jan. 2017

Opened in  
Beta in  
May 2017

Webinar  
Jun 2017

## What's coming next ?

- Promote the Applications on Demand service to NGIs
- Improve the list of scientific applications available:
  - JupyterHub aaS, Galaxy aaS
- Add AppDB VMOps as another 'gateway'
- Present the service to the EGI council (by the end of June)

# How to get involved ?

How can You participate:

- Apply for access as a user
- Join the user vetting and support team
- Integrate additional applications
- Connect a portal/VRE/gateway
- Join with cloud or HTC resources

Contact us at [support@egi.eu](mailto:support@egi.eu)





# Thank you for your attention.

*Questions?*



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[www.esi.eu](http://www.esi.eu)