Supporting Open Science with the EGI Federated Cloud Experiences, success stories, lessons learnt

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EGI Foundation, NL

www.egi.eu

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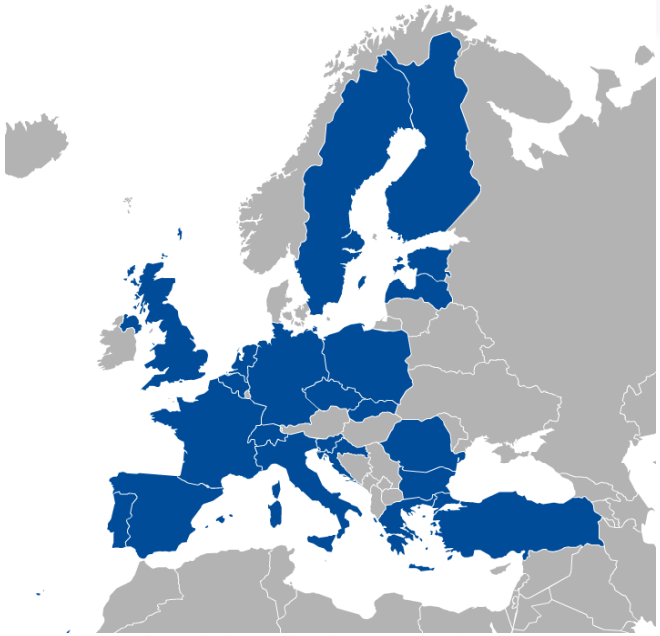
EGI is a federation of over 300 computing and data centres spread across 56 countries in Europe and worldwide

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

EGI is supported by the EGI-Engage project, co-funded by the European Union (EU) Horizon 2020 program under grant number 654142

EGI’s mission is to create and deliver
open solutions for science and research
by federating digital capabilities,
resources and expertise
between communities and
across national boundaries.

- 22 national e-Infrastructure providers
- Two EIROs: CERN and EMBL-EBI
- EGI Foundation



www.egi.eu/about/egi-foundation/

International Partnerships

Canada

USA

Africa and Arabia
Council for Scientific and Industrial Research, South Africa

Latin America
Universidade Federal do Rio de Janeiro

China Inst. of HEP Chinese Academy of Sciences

India Centre for Development of Advanced Comp.

Asia Pacific Region
Academia Sinica at Taiwan

Ukraine
Ukrainian National Grid

EGI Service Catalogue

Compute

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

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

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

Storage and Data

Online Storage : Store, share and access your files and their metadata on a global scale

Archive Storage : Back-ups for long term and future use in a secure environment

Data Transfer : Transfer large sets of data from one place to another

Training

FitSM training : Learn how to manage IT services with a pragmatic and lightweight standard

Training infrastructure : Dedicated computing and storage for training and education

ISO 9001 Certificate

ZERTIFIKAT ■ CERTIFICATE ■ 認證證書 ■ СЕРТИФИКАТ ■ CERTIFICADO ■ CERTIFICAT

Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

EGI Foundation / EGI.eu
Science Park 140
1098 XG Amsterdam
Netherlands

has established and applies
a Quality Management System for

The management system implemented to
plan, implement, monitor and continually improve
all business processes under responsibility and to deliver
all services covered by the service catalogue of EGI Foundation.

An audit was performed, Report No. **707067543**.
Proof has been furnished that the requirements
according to

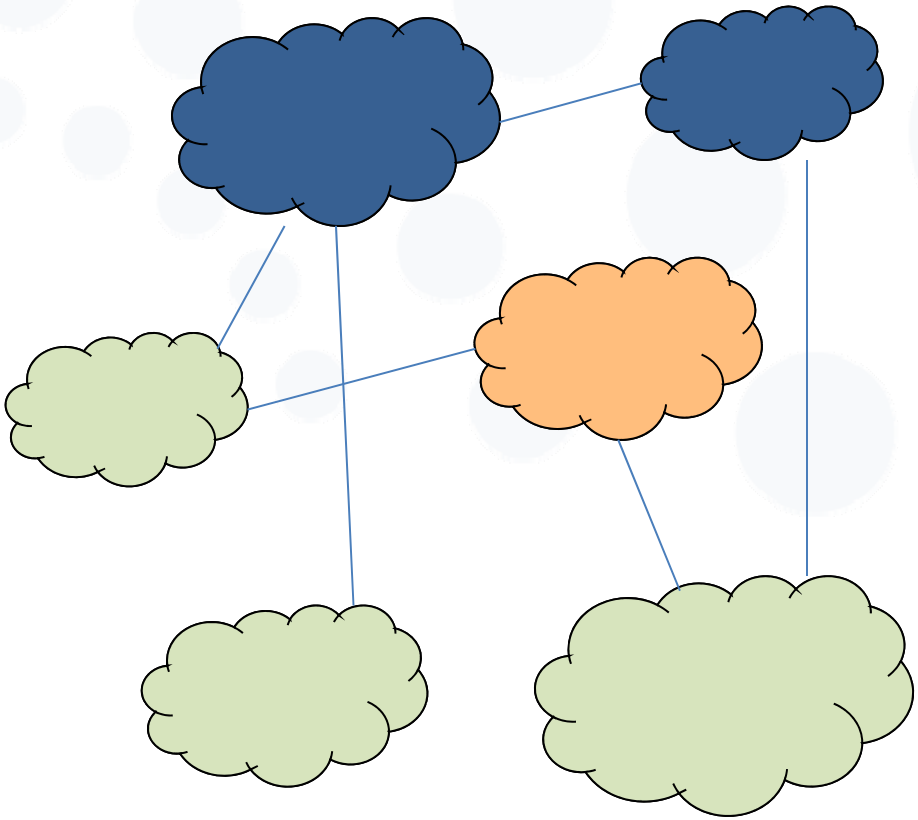
ISO 9001:2015

are fulfilled.
The certificate is valid from **2017-03-07** until **2020-03-06**.
Certificate Registration No.: **12 100 53643 TMS**.

Product Compliance Management
Munich, 2017-03-08

TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstraße 65 • 80339 München • Germany
www.tuev-sued.de/certificate-validity-check

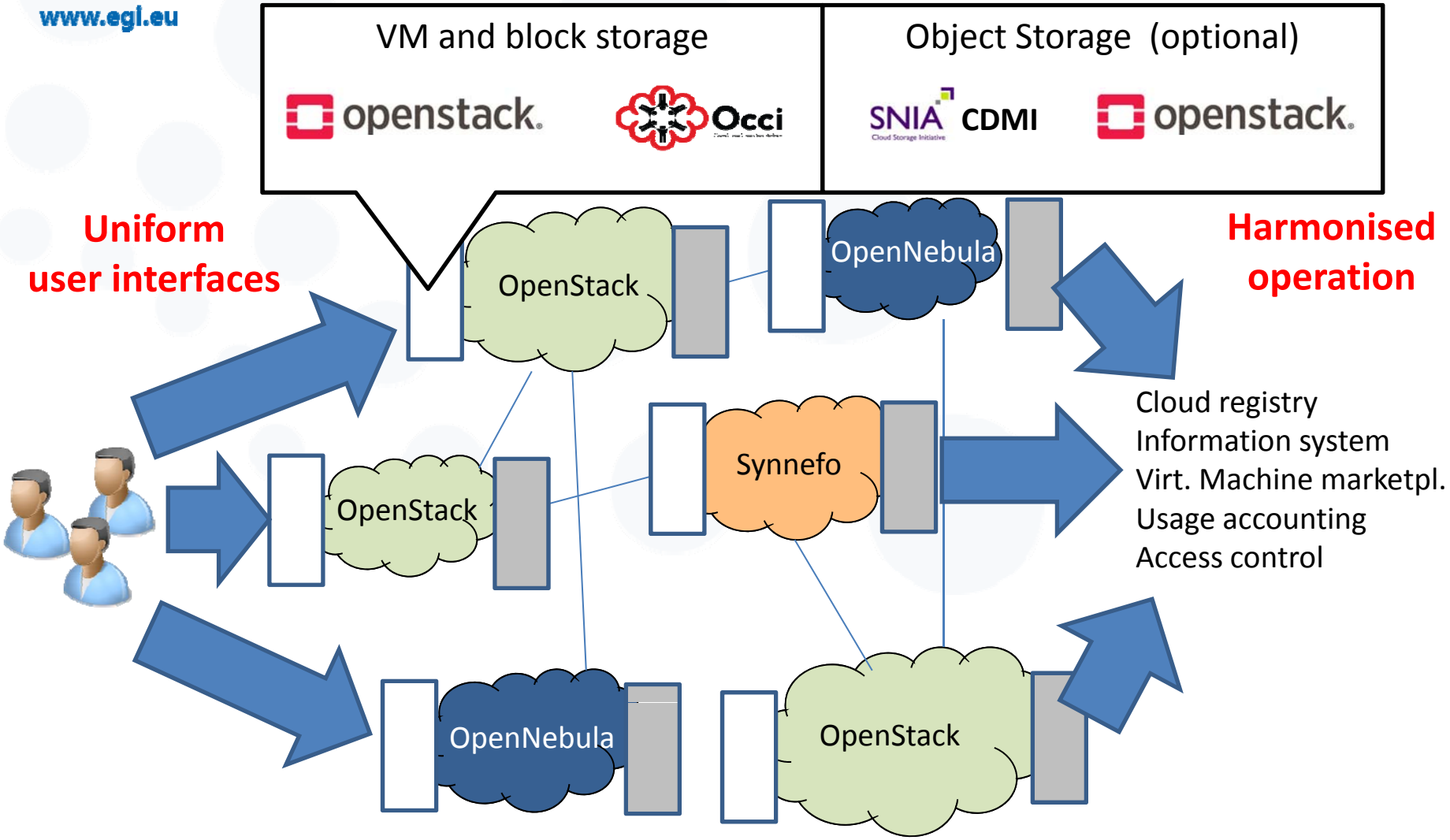
EGI Federated Cloud



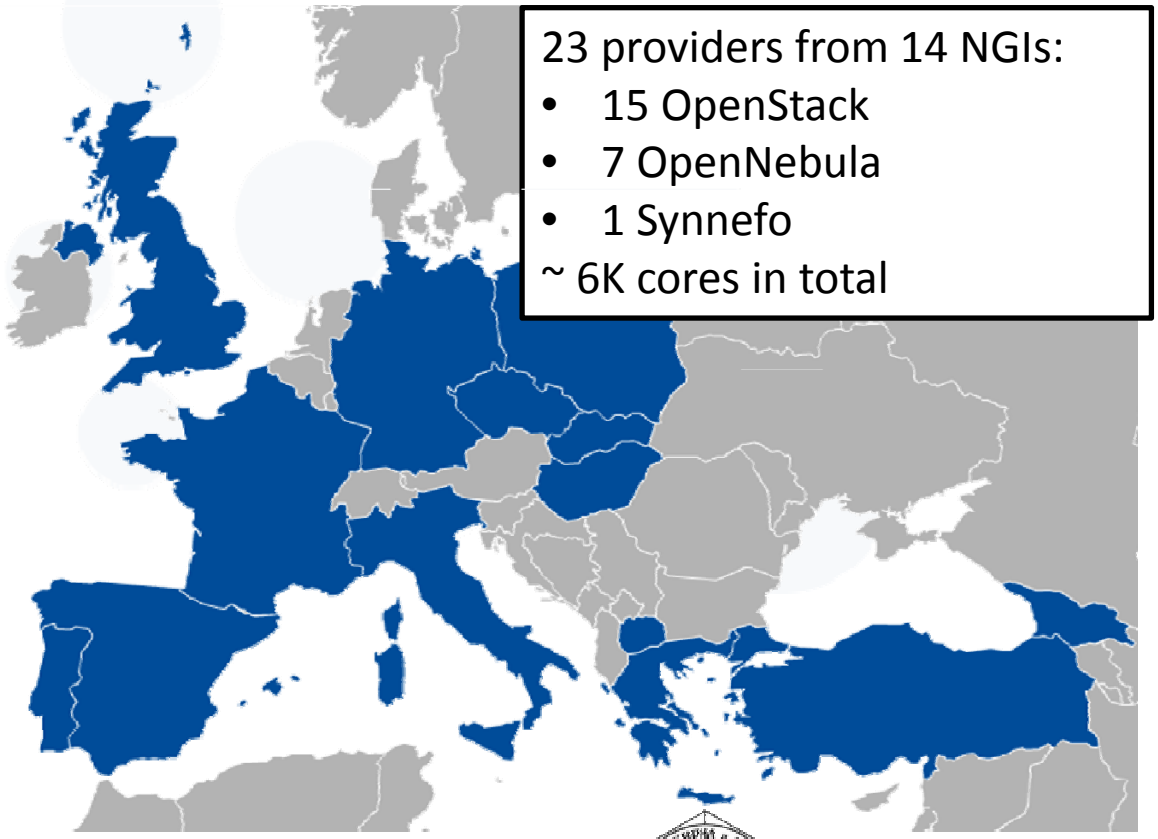
- Grid of clouds
- Unified user interfaces
- Harmonised operational behaviour
- Clouds and their interconnections are based on open standards, open technologies

- Infrastructure → Access online AND
  technology → Deploy at your site

Benefits, technologies



EGI Federated Cloud

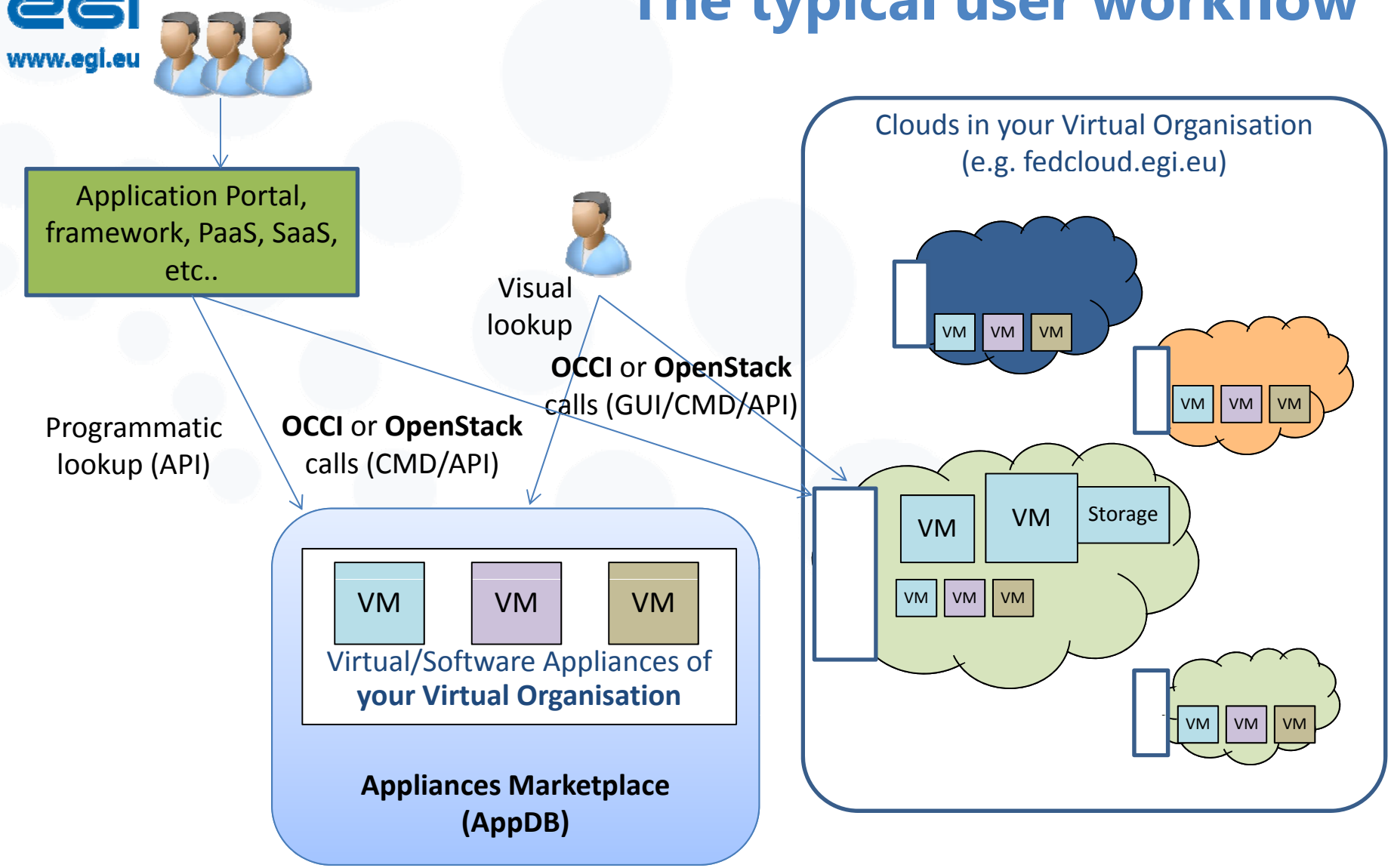


23 providers from 14 NGIs:

- 15 OpenStack
- 7 OpenNebula
- 1 Synnefo

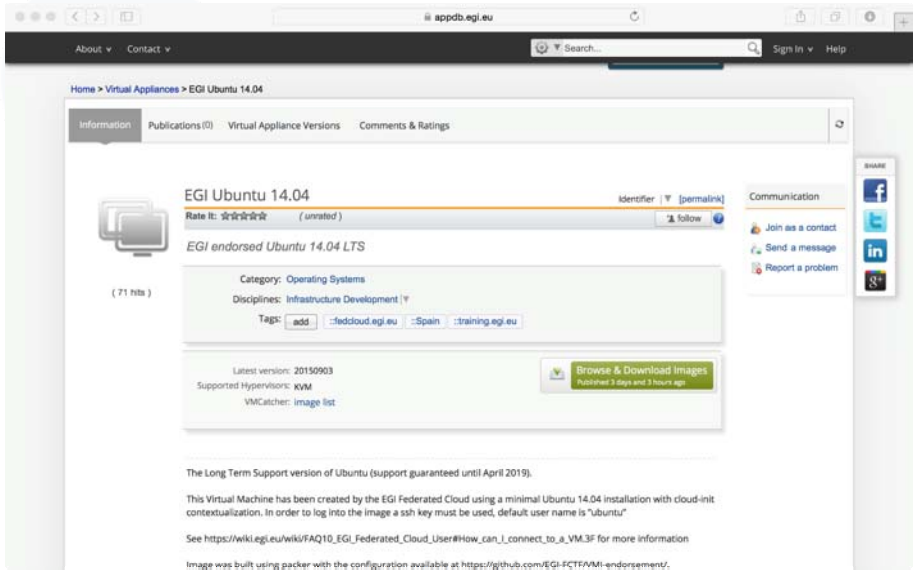
~ 6K cores in total

The typical user workflow



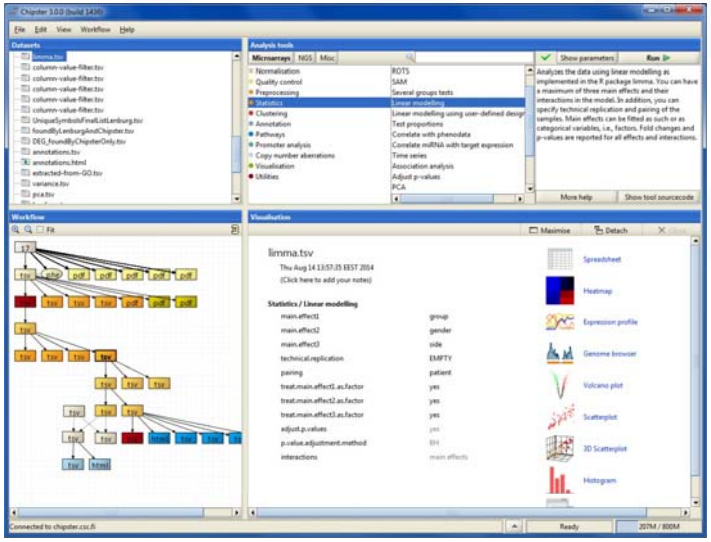
AppDB Cloud MarketPlace

- Open Library of Virtual Appliances
  - Use on clouds or for personal download
  - Re-use, share, associate contextualization
- EGI endorsed VM images, securely configured and tested
- Community curated sets of images
  - Automatic distribution of sets to cloud providers



Use cases: Chipster

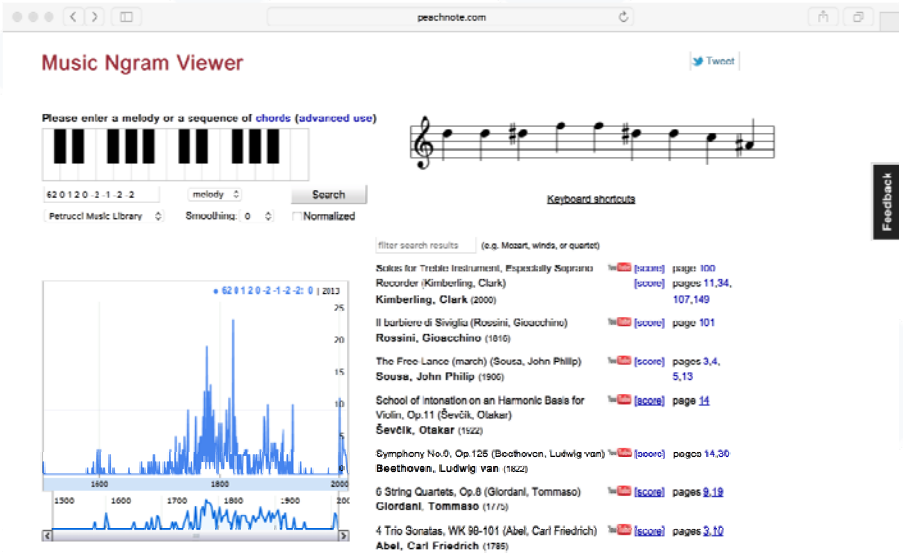
Chipster
Open source platform for data analysis



- BioInformatics application for genomic analysis
- A user-friendly analysis software for high-throughput data with over 350 analysis tools and a large collection of reference genomes
- Users can save and share automatic analysis workflows, and visualize data interactively

Research story: http://go.egi.eu/BIBD
http://chipster.csc.fi/

Use cases: PeachNote



- Search Engine and Analysis Platform for music scores. Music Ngram Viewer
- Peachnote is relies on EGI services to give their users access to a generous amount of music data.
  - Visited by tens of thousands of users every day from all over the world.
- Uses both VMs for processing requests and Object Storage for storing data.

http://www.peachnote.com/

Use case: ELIXIR (European Life Sciences Infrastructure for Biological Information)

- ELIXIR is building their Compute Platform
  - ELIXIR-CC seeks demonstration of ELIXIR workflows implemented in the EGI Federated Cloud
- Federated Cloud ready:
  - vo.elixir-europe.org VO configured and available at ELIXIR sites integrated into EGI: CESNET, EBI, IN2P3
  - Users identified via ELIXIR AAI + CILogon for management of proxies (hidden to users by gateways)
  - OCCI, native OpenStack and Terraform for resource access
- Now starting piloting phase of workflows into resources

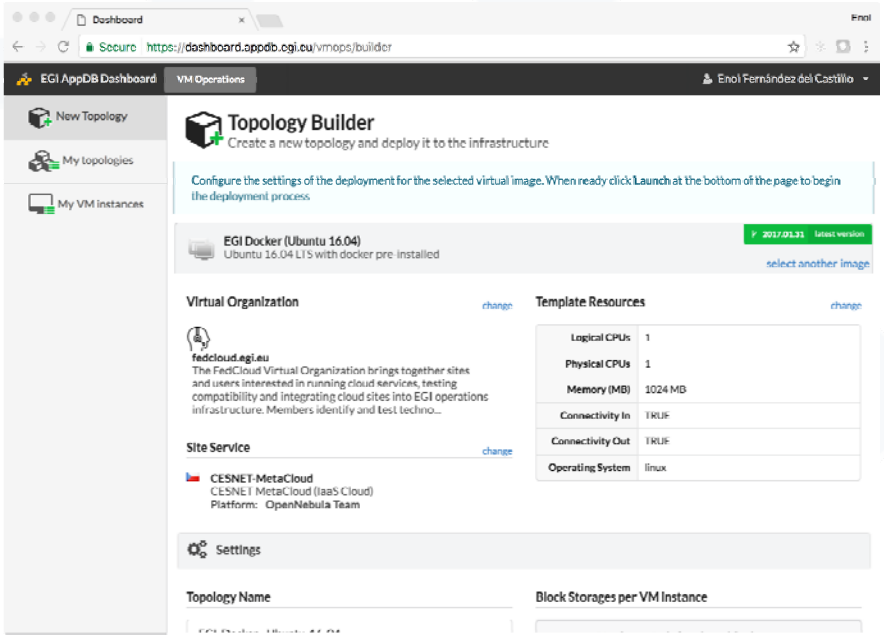
What's coming

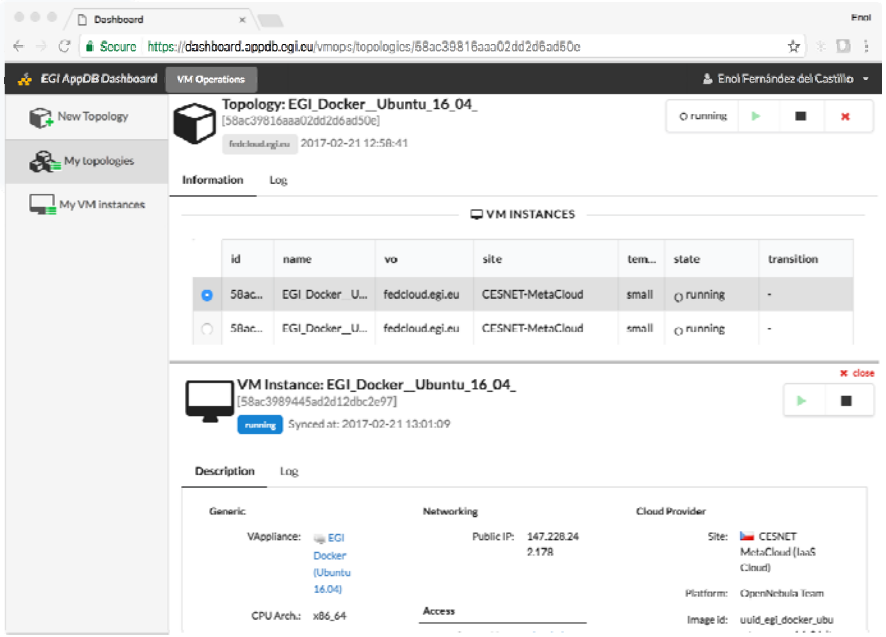
- Improved user experience
  - Certificate-less access with new EGI CheckIn
  - AppDB VMOps (see next slides)
  - IaaS orchestration guides
  - OCCI1.2
- Providers integration:
  - New probes for improved reliability
  - VO-level monitoring
  - Federated authentication (OpenID Connect) via EGI CheckIn
- Go beyond simple IaaS
  - Better orchestration support with ready to use configurations for common applications (Hadoop, Docker Swarm, Kubernetes)
  - PaaS and SaaS

AppDB VMOps

- User friendly web dashboard to manage VMs
  - Integration with AppDB MarketPlace
  - Contextualization/User Management
  - Attached Volumes management
- Support for hybrid clouds via Infrastructure Manager
  - OpenStack, OpenNebula and Synnefo providers accessible via a single interface
- Single-Sign-On with the rest of the AppDB sub-services
  - No need for X.509 certificate for final user
- Currently under heavy testing
  - Beta access expected early April

AppDB VMOps


Dashboard
Secure https://dashboard.appdb.egi.eu/vmops/builder
EGI AppDB Dashboard
VM Operations
Enol Fernández del Castillo
New Topology
My topologies
My VM instances
Topology Builder
Create a new topology and deploy it to the infrastructure
Configure the settings of the deployment for the selected virtual image. When ready click Launch at the bottom of the page to begin the deployment process
EGI Docker (Ubuntu 16.04)
Ubuntu 16.04 LTS with docker pre installed
select another image
Virtual Organization
change
fedcloud.egi.eu
The FedCloud Virtual Organization brings together sites and users interested in running cloud services, testing compatibility and integrating cloud sites into EGI operations infrastructure. Members identify and test techno...
Template Resources
Logical CPUs 1
Physical CPUs 1
Memory (MB) 1024 MB
Connectivity In TRUE
Connectivity Out TRUE
Operating System linux
Site Service
CESNET-MetaCloud
CESNET MetaCloud (IaaS Cloud)
Platform: OpenNebula Team
Settings
Topology Name
Block Storages per VM Instance

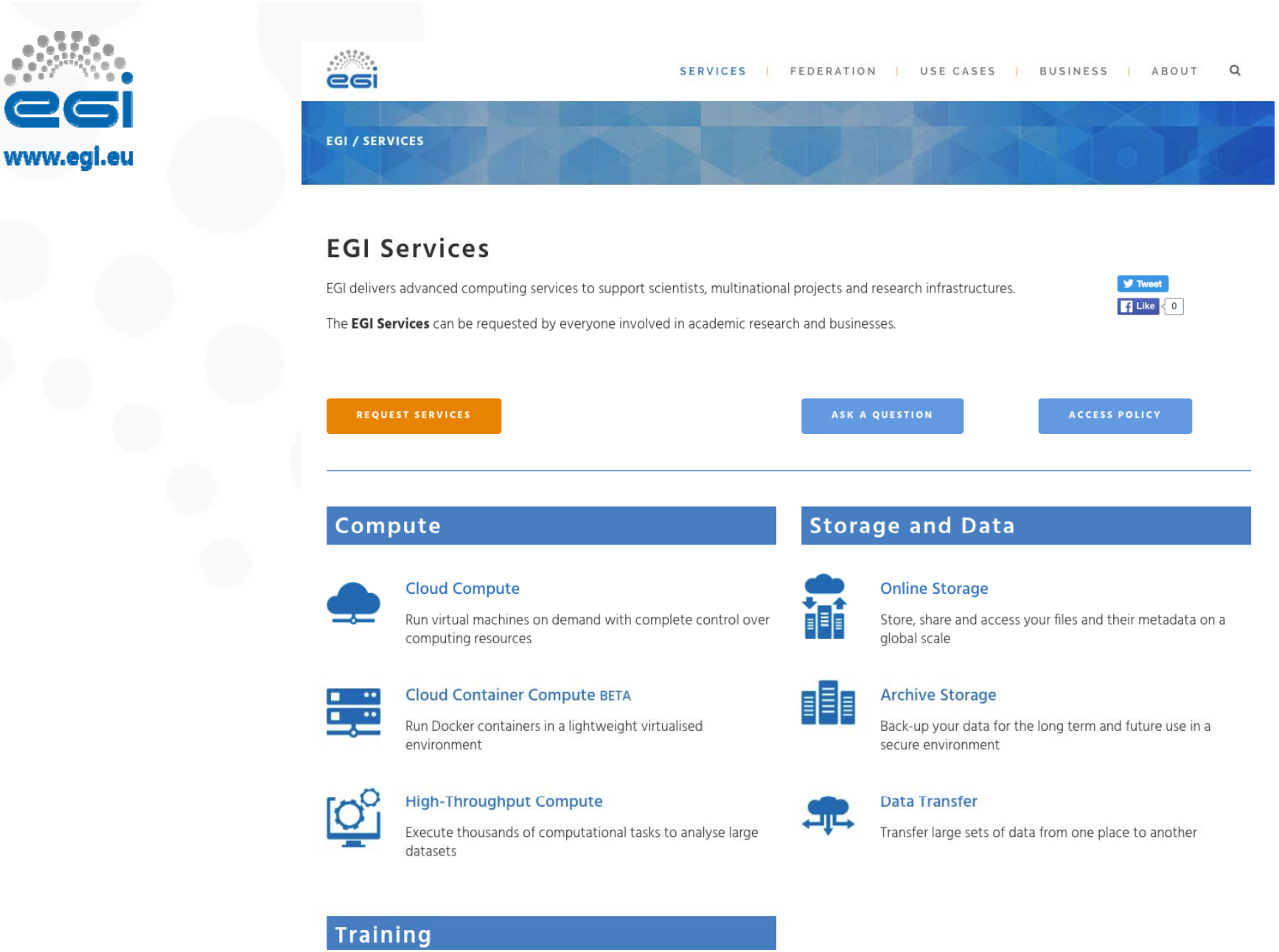

Dashboard
Secure https://dashboard.appdb.egi.eu/vmops/topologies/58ac39816aaa02dd2d6ad50e
EGI AppDB Dashboard
VM Operations
Enol Fernández del Castillo
New Topology
My topologies
My VM instances
Topology: EGI_Docker__Ubuntu_16_04_
[58ac39816aaa02dd2d6ad50e]
fedcloud.egi.eu 2017-02-21 12:58:41
running
Information
Log
VM INSTANCES
id name vo site tem... state transition
58ac... EGI Docker U... fedcloud.egi.eu CESNET-MetaCloud small running -
58ac... EGI_Docker__U... fedcloud.egi.eu CESNET-MetaCloud small running -
VM Instance: EGI_Docker__Ubuntu_16_04_
[58ac3989445ad2d12dbc2e97]
running Synced at: 2017-02-21 13:01:09
close
Description
Log
Generic
VAppliance: EGI Docker (Ubuntu 16.04)
CPU Arch.: x86_64
Networking
Public IP: 147.228.24 2.178
Access
Cloud Provider
Site: CESNET MetaCloud (IaaS Cloud)
Platform: OpenNebula Team
Image Id: uuid_egi_docker_ubu

Next Steps: become a provider

- Providers keep complete control over their resources
  - Agree SLA with communities with pledged or opportunistic resources
- Set of software components to hook into EGI Federation
  - Minimal intrusion into provider's operations by using public APIs of Cloud Management Frameworks
    - Virtual Appliance with all components (but AAI) for integration, just configure and run
  - Support for OpenStack from Juno onwards (including just released Ocata)
- Integration Manual at https://wiki.egi.eu/wiki/MAN10

Next Steps: support for users

- Support through national partners
- Central allocations
  - EGI Federated Cloud: fedcloud.egi.eu Virtual Organisation
    - https://wiki.egi.eu/wiki/Federated_Cloud_user_support
  - To be opened soon: Easy Access platform
- Community-specific allocations
    - https://operations-portal.egi.eu/vo/search → E.g. search by discipline
    - You can request a new allocation too! (Through www.egi.eu website)
- Community-specific applications:
    - Browse the EGI Applications Database: http://appdb.egi.eu → E.g. search for 'monte carlo'
- Webinars:
    - https://wiki.egi.eu/wiki/EGI_Webinar_Programme → See past recordings
- In case of questions:
  - Contact the User Community Support Team: support@egi.eu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Cloud Container Compute BETA
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High-Throughput Compute
Execute thousands of computational tasks to analyse large datasets
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Transfer large sets of data from one place to another
Training

Some references

- EGI: http://www.egi.eu
- Federated Cloud at EGI wiki: https://wiki.egi.eu/wiki/EGI_Federated_Cloud
- EGI Federated Cloud list: fedcloud-tf@mailman.egi.eu
- FedCloud roadmap: http://go.egi.eu/fedcloud-roadmap

Thank you for your attention.

Questions?

www.egi.eu

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