A European Cloud federation

EGI’s Cloud strategy for 2020

EGI position paper:

https://documents.egi.eu/document/2050
EGI Federated Cloud

From Pilot to Production

EGI’s Cloud strategy for 2020

Data, Sharing, Innovation: Safe infrastructures for the ERA
Outline

EGI Federated Cloud

From Pilot to Production

EGI’s Cloud strategy for 2020

Data, Sharing, Innovation: Safe infrastructures for the ERA
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.

EGI Council vision for the federated Cloud:

- 10M cores Cloud compute
- 1 EB Cloud storage
From Pilot to Production

• **Objectives:**
  – Identify and investigate the capabilities needed to federate private clouds
  – Identify the technical solutions, deploy proof of concepts in a pre production testbed, test the solutions with real use cases

• **Capabilities**
  1. Manage VM instances
  2. Data access/transfer interface
  3. Cloud service information federation
  4. Resource consumption management
  5. Cloud service availability
  6. Notification & Automation
  7. Federated AAI
  8. VM Image Management
  9. Brokering
  10. Contextualisation
  11. Service Agreements & Management

Setup 09.2011
Integration 03.2013
Production 05.2014
Consolidation 09.2012
Preproduction 09.2013
Participation – Nov 2013

Members
- ~70 individuals
- ~40 institutions
- >13 countries

Stakeholders
- 23 Resource Providers
  - 10 production
- 10 Technology Providers
- 8 User Communities
- 4 Liaisons

Technologies
- OpenNebula
- StratusLab
- OpenStack
- Synnefo
- WNoDeS
- PERUN
- SlipStream
1. **Service architecture with Cloud characteristics** *(NIST SP 800-145)*
   - On-demand self-service
   - Broad network access
   - Resource pooling
   - Rapid elasticity
   - Measured service

2. **Extensive federation expertise in EGI**

3. **Extend EGI’s service portfolio**

4. **Embrace Resource Provider heterogeneity**

5. **Thin federation layer lowers barriers to adoption**
   - Interface-level integration
   - Open Standards: Consistency through control
EGI cloud ecosystem

- Gateways
- Brokers
- Portals
- Token pools
- Registries
- Federation Layer
- Physical Infrastructure

- OpenNebula
- OpenStack
- Synnefo
- WNoDeS

- TONC
- UCB
- UCST
- TCB
- URT
- Operational Security

28 January 2013
Cloud Infrastructure Platform

EGI Federated IaaS Cloud Infrastructure

- OCCI
  Cloud Compute
- CDMI
  Cloud Storage
- GLUE2+
  Information Discovery

Cloud Management Stacks
(OpenStack, OpenNebula, CloudStack, Stratuslab, ...)

EGI Core Infrastructure Platform

- Service Registry
- GLUE2
  Information Discovery
- SAML
  Federated AAI
- Monitoring
- Accounting

28 January 2013
Example:
Service Availability Monitoring (SAM)

Framework for resource centres and service operators
- Based on Nagios
- Service-specific probes
- Database to store service topology
- Connected to a messaging network
- Aggregate and browse results:
  - Operations Dashboard, MyEGI, etc.
Helpdesk: GGUS
Accounting and regionalization

Accounting Portal

EGI
APEL accounting DB

Message broker network

Other resource Infrastructure
ACCOUNTING DB

Regional
APEL accounting DB +
Regional Accounting Portal

Publisher

Publisher
### VM accounting

#### Cloud View --> Production

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Service Registry
## Cloud service registry

### Services

#### All Services in GOCDB

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EGI Federated Cloud
From Pilot to Production

EGI’s Cloud strategy for 2020
Data, Sharing, Innovation: Safe infrastructures for the ERA
Business Models

1. Free
   a. Spot Market
2. Pay As You Go
3. Wholesale
4. Wholesale with Bursting
Each role has different implications in the functions and structure of EGI.eu
SLA governed services

• **Basic**
  – Managed through EGI OLA framework
  – Available at all Cloud service providers
  – “Free at the point of use” billing plan and higher

• **Advanced**
  – Available on all Cloud service providers
  – “Pay-as-you-go” plan or higher

• **Custom/Premier**
  – Tailored to community requirements
  – Advanced SLAs subject to research and innovation
  – Applicable to subset of providers
Technology innovation

- Broader support for open standards in Cloud management frameworks
- Federated Network as a Service (incl. SDN)
- Messaging network as a Service
- Improve Application Database to App Marketplace
  - Stable market for cloud services, cloud products and applications between providers and consumers from the academia, public sector and enterprise
- Engaging in PoCs
- Strategic EC project proposals
Technology innovation

- Use federated IaaS Cloud as EGIs backbone
- Open standards for open platforms
- Innovate and deploy PaaS & SaaS on top
  - Innovate on EGI service tiers 2, 3 and 4
- Engaging in PoCs
- Strategic EC project proposals

Value added services for VRCs
Marketplace(s) for Cloud Services

Standardisation of Cloud interfaces empowers freedom of choice for customers, better competition among providers and emergence of cloud marketplaces

- **EGI Marketplace**
  - Rich and diverse set of individual offerings
  - Application/VM Image repository
  - User community choice of provider at all levels
  - Academic and commercial resource & service providers
  - Extend to a service marketplace

- **Helix Nebula Marketplace**
  - EGI Federated Cloud as service provider
  - “Hidden” behind a single technical and policy broker

- **EU Cloud for Europe marketplace**
  - Integrate EGI’s solution and service portfolio
  - Provide services for academia, government and business
Value proposition

• **Open standards, open technologies**
  – Use of Open Standards is key to the establishment of an effective, fair and transparent cloud market in Europe
  – Open Source components raise the barrier for hidden backdoors, thus lead to more trusted services

• **Firmly rooted in Europe**
  – Strong public sector involvement through NRENs, NGIs, EIROs are EGI’s members
  – European commercial Cloud resource providers, including SME

• **A single cross-border market**
  – Reaching out for research, government & business sectors
  – Level playing field for innovation and services on multi-service tiers
Fit for the Digital Agenda

**Action 1:** Interoperable, federated IaaS Cloud infrastructure

**Action 2:** Public sector Cloud federation for Cloud for Europe marketplace

**Action 3:** Engage in and lead H2020 e-Infrastructure, ICT LEIT & CEF projects to boost Cloud service market

**Action 4:** Transparent, accounting, billing & SLAs; common T&Cs

**Action 5:** EGI maintains close relationships with policy makers through strategic partnerships (e.g. SIENA, CloudWATCH projects, e-IRG) and concertation meetings (e.g. ICT, Cloudscape series)

Neelie Kroes: “A Cloud for Europe”
14 Nov 2013, Cloud4Europe Berlin

Conclusion

• **EGI**: Community of resource providers with long-term tradition in providing federated ICT services for research

• **EGI Federated Cloud**: Paving the way for a federated cloud in Europe
  – Open standards, open technology
  – Open membership, open processes

• **Driver for innovation in Europe**

• **International perspective**: Although EGI activity, a global federation is in scope, with global concrete interest
  – Korea, South Africa, Canada, Taiwan, Australia
  – large public Cloud providers
Thank you!

Questions?