The EGI Federated Cloud, using standards to create a fair and open European Cloud marketplace

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Chair, EGI Federated Cloud

Brief introduction to EGI

EGI Federated Cloud

EGI's Cloud strategy for the future & H2020
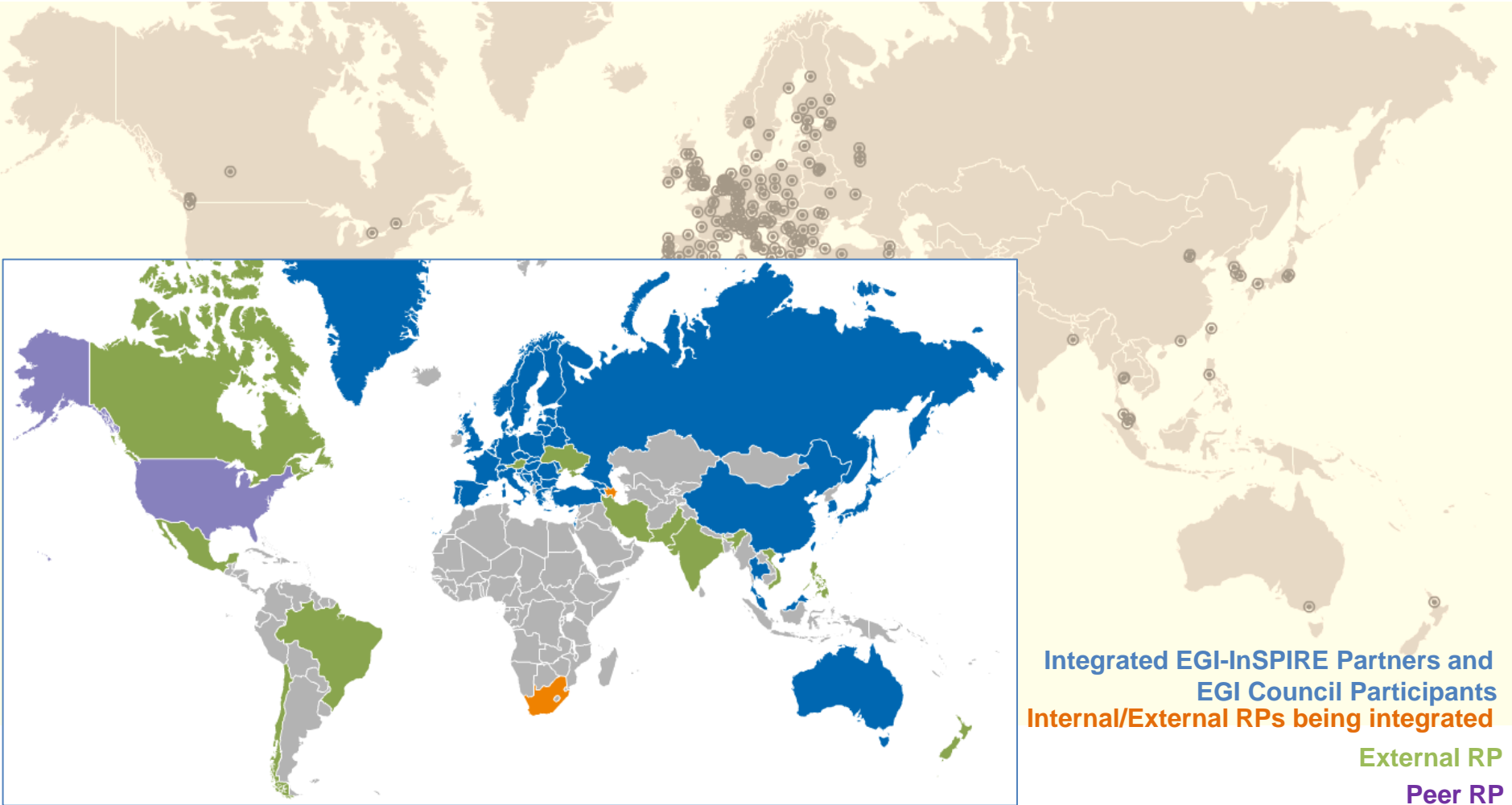
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European Grid Infrastructure (EGI)

337 Resource Centres in 34 National Grid Initiatives/EIROs
430,000 logical CPU cores
190 PB disk, 180 PB tape
1.2 M job/day, EGI-InSPIRE PY3: +44.7% increase of
CPU wall clock time used (HS-06 h)
53 High activity projects supported by EGI

EGI-InSPIRE EC Project (2010-2014) supporting
• EGI and NGI operations
• Outreach and policy development
• Software validation and verification
• Federated cloud

European Grid Infrastructure 2013

Integrated EGI-InSPIRE Partners and EGI Council Participants
Internal/External RPs being integrated

External RP

Peer RP

Brief introduction to EGI
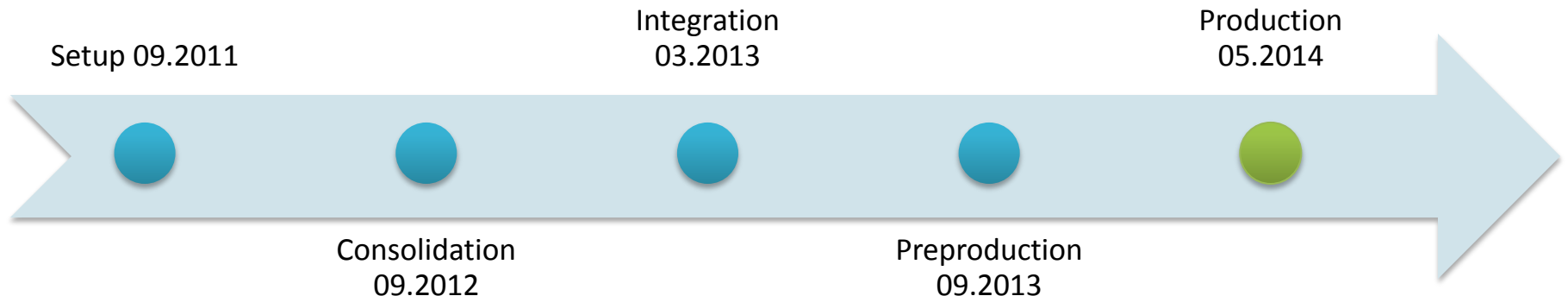
EGI Federated Cloud

EGI's Cloud strategy for the future & H2020

- **Objectives:**
  - Identify and investigate the capabilities needed to federate private clouds
    - Promote adoption of defined open standard interfaces (OCCI,CDMI)
  - Identify the technical solutions, deploy proof of concepts in a pre production testbed, test the solutions with real use cases
    - Integrate the cloud services with the EGI core platform

- **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. SLA & Business Models

Setup 09.2011

Consolidation 09.2012

Integration 03.2013

Preproduction 09.2013

Production 05.2014

Members

- ~72 individuals
- ~34 institutions
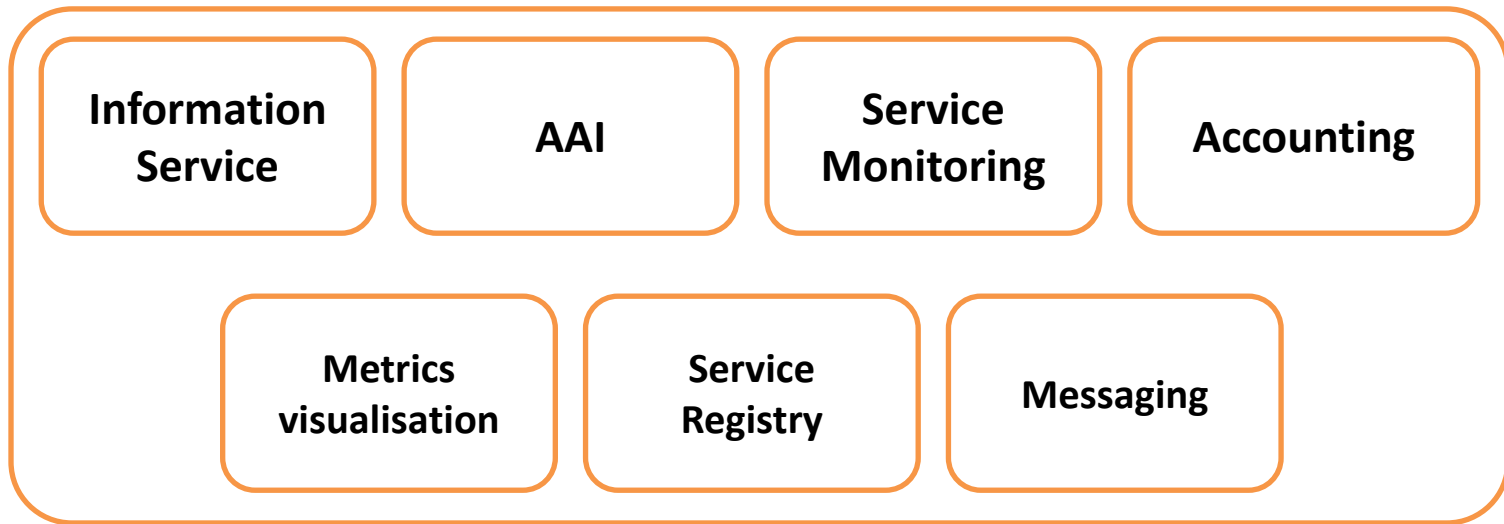- >14 countries

Stakeholders

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

Technologies

- OpenNebula,
- StratusLab,
- OpenStack,
- Synnefo,
- WNoDeS,
- Cloudstack,*
- PERUN,
- SlipStream.

Cyfronet | FZJ | OeRC | EGI.eu | CESNET | GWDG | BIFI | INFN-BARI

CNRS | IN2P3

KTH | Masaryk

FCTSG | INFN-CNAF

CETA | CESGA

IGI | SARA

RADICAL | IFCA

STFC | SZTAKI

BSC | GRNET

ISRGrid | DANTE

LMU | IPHC | IISAS | SixSq | 100%IT | CSC | IFAE | SRCE

Core Infrastructure
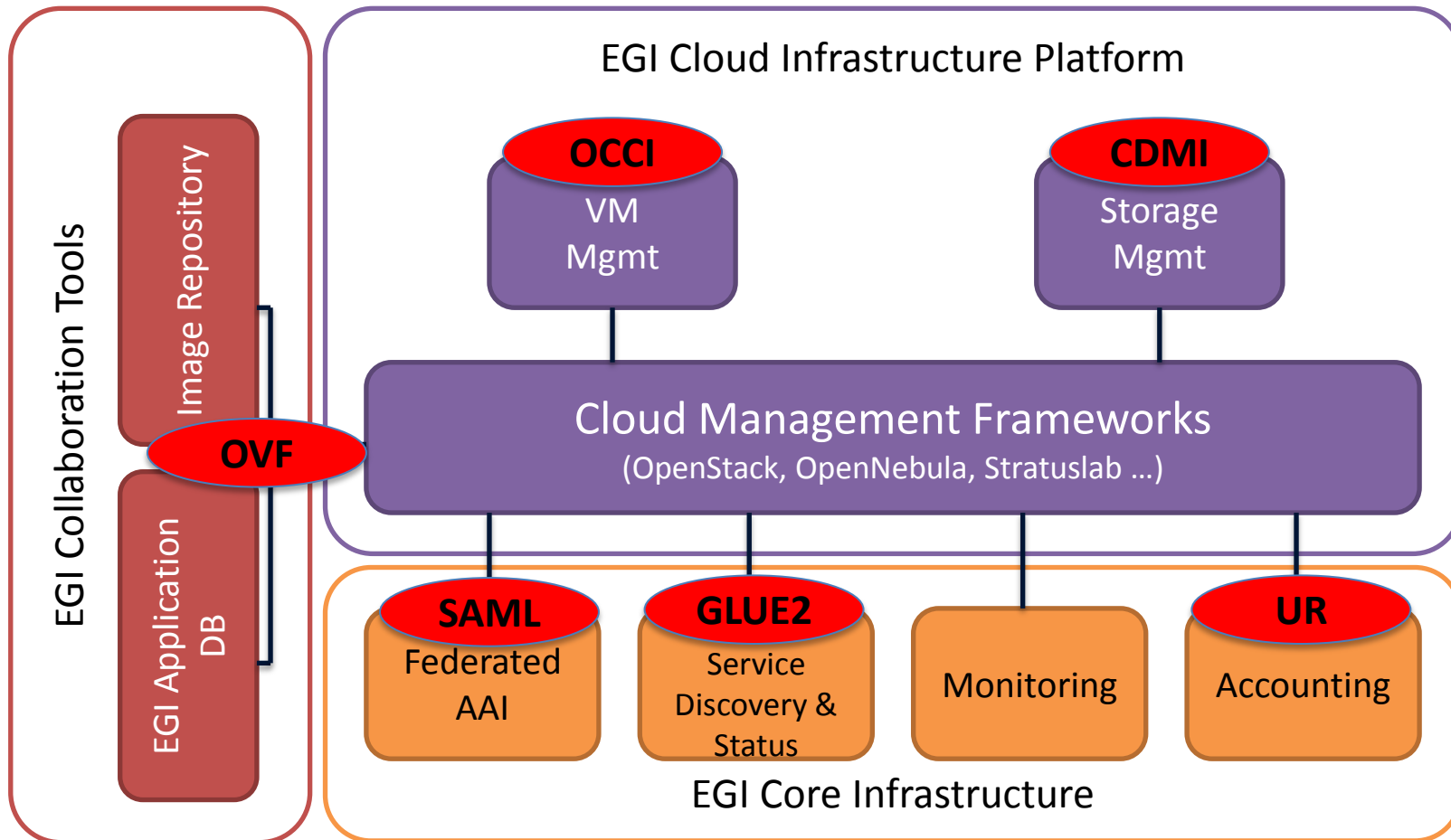
Services that federate and integrate the functional services deployed in the **production infrastructure**

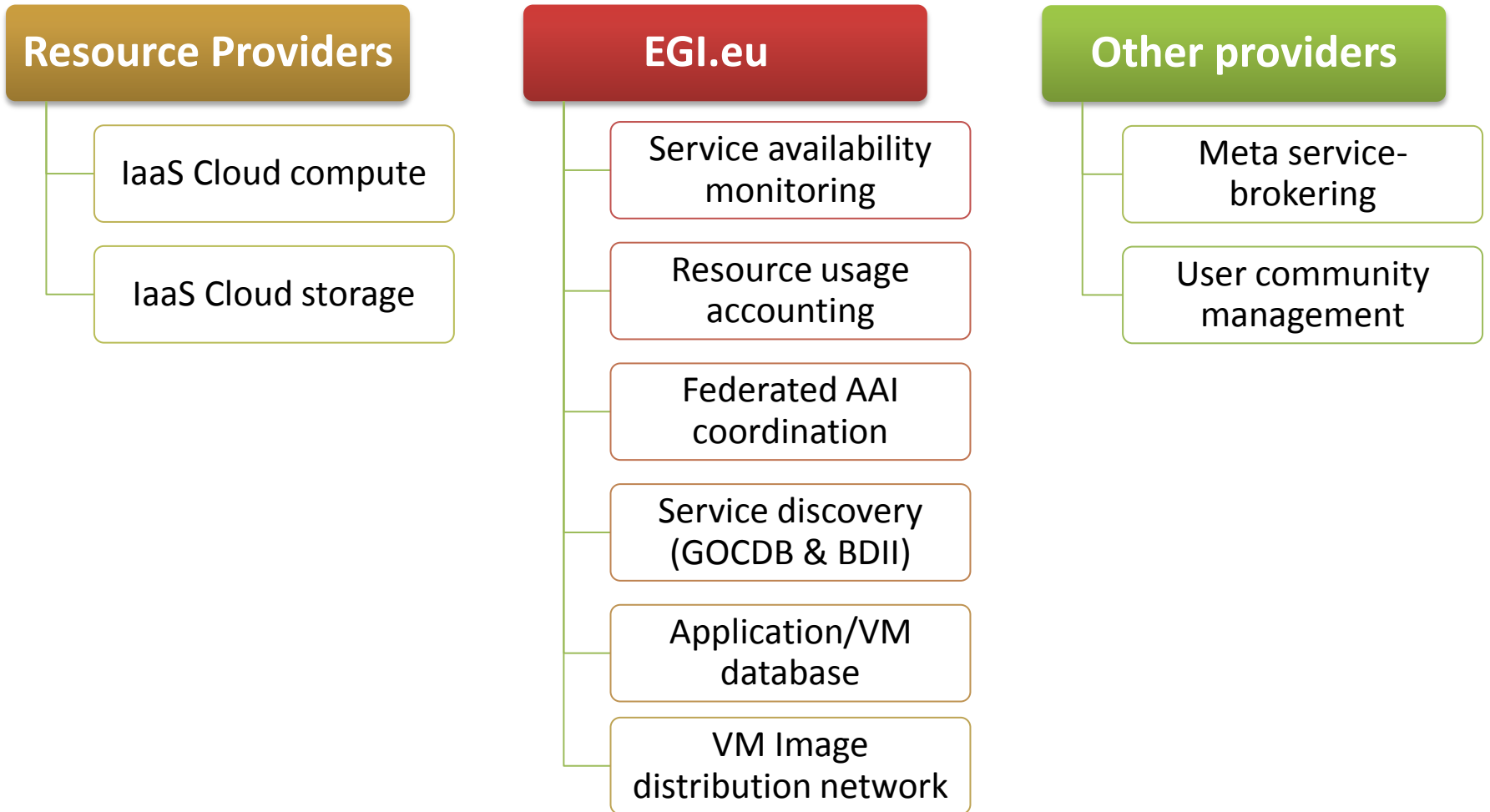| Information Service	AAI	Service Monitoring	Accounting
	Metrics visualisation	Service Registry	Messaging

For e-Infrastructures & Research Infrastructures
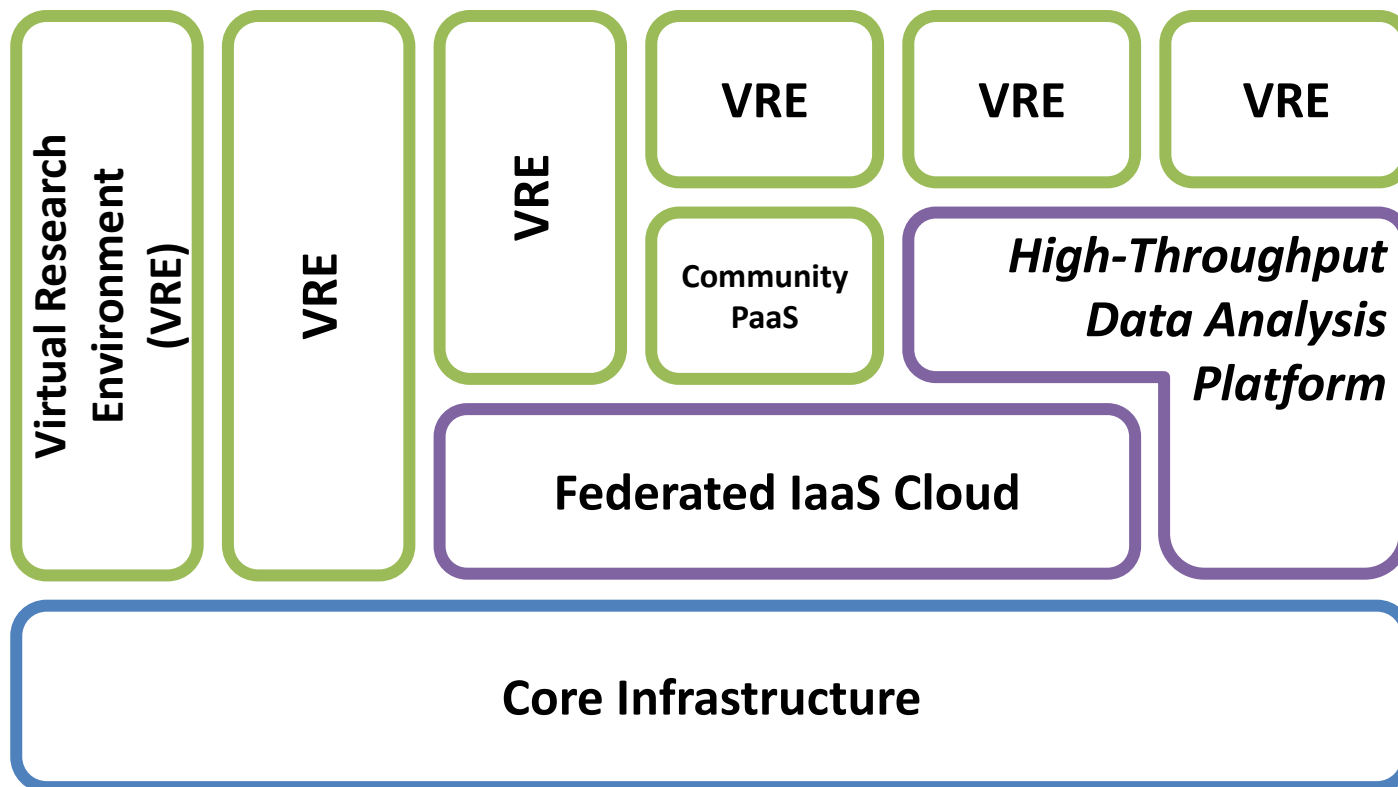
Enable an open ecosystem of services

EGI Collaboration Tools
- Image Repository
- **OVF**
- EGI Application DB

EGI Cloud Infrastructure Platform

OCCI — VM Mgmt

CDMI — Storage Mgmt

Cloud Management Frameworks
(OpenStack, OpenNebula, Stratuslab …)

EGI Core Infrastructure

- **SAML** — Federated AAI
- **GLUE2** — Service Discovery & Status
- Monitoring
- **UR** — Accounting

Cloud service provisions

Resource Providers

- IaaS Cloud compute
- IaaS Cloud storage

EGI.eu

- Service availability monitoring
- Resource usage accounting
- Federated AAI coordination
- Service discovery (GOCDB & BDII)
- Application/VM database
- VM Image distribution network

Other providers

- Meta service-brokering
- User community management

Federated Cloud Users

- New services to meet user demand
  - Use case driven

- Proof of concepts being successfully demonstrated (http://go.egi.eu/PoC)
  - Hosting of services for data dissemination (SaaS) – ENVRI, EISCAT_3D, BNCWeb/CLARIN
  - Digital Libraries and Digital Preservation services for memory institutions and human science - DCH-RP
  - Integrated Cloud Iaas-SaaS services to avoid large data transfers (ESA)
  - Virtual laboratories (PaaS and IaaS) – BioVel, LifeWatch
  - Hadoop clusters on demand (PaaS) – Peachnote, BioVel
  - Researcher training in safe, low cost environments on community tools – WeNMR
  - Repeatable and controllable software development and build environments – SCI-BUS
  - Science gateway hosting and access to resources – CSGF
  - …

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EGI Federated Cloud

EGI's Cloud strategy for the future & H2020

Technology Evolution

- Broader support for open standards in Cloud management frameworks

- Federated Network as a Service / Software defined networks

- 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

Strengthening the underpinning platform

Technology Innovation

Value added services for VRCs

- Use federated IaaS Cloud as EGIs backbone

- Open standards for open platforms

- Innovate and deploy PaaS & SaaS on top

- Engaging in PoCs & EC projects with EGI customers

EGI Cloud service tiers

1. **Reliable IaaS services**
   - Expose federated IaaS Clouds to customers
   - User driven choice of provider depending on high level criteria

2. **General purpose platform services**
   - Expose platform services as individual service offerings
   - Customer mixes and matches according to need

3. **Platform as a Service**
   - Consistent platforms comprising of individual platform services
   - Platform services integrated/configured in meaningful way
   - Targets customer segments (e.g. CH) or usage scenarios (data preservation)

4. **Zero ICT infrastructures**
   - Specific customer infrastructures delivered as SaaS
   - Extends beyond ICT into complete VRE supply (e.g. lab facility management)

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

- **Helix Nebula Marketplace**
  - EGI Federated Cloud as service provider
  - "Hidden" behind Slipstream/CGI broker

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

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)

- **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
  - Full production, May 2014

Questions?