Cloud standards: Ready for Prime Time

Part 1: 9 June 2015

Part 2: 18 June 2015

CSA CloudBytes

Agenda

13:00 – Welcome & Introduction

13:05 – OCCI: The Open Cloud Computing Interface – flexible, portable, interoperable, extensible and innovative
Alan Sill, Texas Tech University

13:20 – CDMI – the Cloud Data Management Interface, an ISO/IEC standard that offers end users simplicity and data storage interoperability across a wide range of cloud solutions.
Alex McDonald, CTO Office, NetApp

13:35 – EGI Federated Cloud: A seamless grid of academic private clouds and virtualised resources, built around open standards and focusing on the requirements of the scientific community.
David Wallom, Associate Professor at Oxford e-Research Centre

13:50 – Discussion and next steps

Making CloudWATCH more service oriented

Needs

- Greater trust in cloud services
- More options for interoperability & portability
- Monitoring, management & transparency
- Integration, open APIs, open source
- Business cases and proof

Output

- SME guides & tools to the cloud
  - Legal tips on data protection
  - Recommendations for security & privacy certifications
  - Use cases & best practices
  - http://www.CloudWATCHhub.eu/tools-and-guides-smes-cloud
- Testing cloud standards & interoperability
- Cloud standard profiles based on real user stories & analysis of 52 R&I intiatives
- Market facing portfolio of cloud services from EU R&I

- EU-funded FP7 project (CS action)
  - September 2013 – August 2015
- Main activity hub: http://CloudWATCHhub.eu
- Partners
  - Trust-IT, UOXF, EGI.eu, CSA, Fraunhofer FOKUS, DigitalEurope

CloudWATCH technical activities

- Use case collection & cluster analysis
  - Elicit and collate Cloud use cases
  - Produce Cloud requirements document
  - Cluster results from polling for prime needed Cloud characteristics
- Common standards profiles
  - Ingest WP2's Cloud requirements document
  - Match with Cluster results and suitable Cloud-related standards
  - Develop profile specifications for clusters

Contributing to IEEE P2301 - Guide for Cloud Portability and Interoperability Profiles

Speakers

Alan Sill
Director NSF Cloud
Computing Center at TTU

David Wallom
Associate Professor at
Oxford e-Research Centre

The Open Cloud Computing Interface (OCCI): Flexible, Portable, Interoperable, Extensible and Innovative

Alan Sill
Open Grid Forum

On behalf of the OCCI Working Group

About the Open Grid Forum:

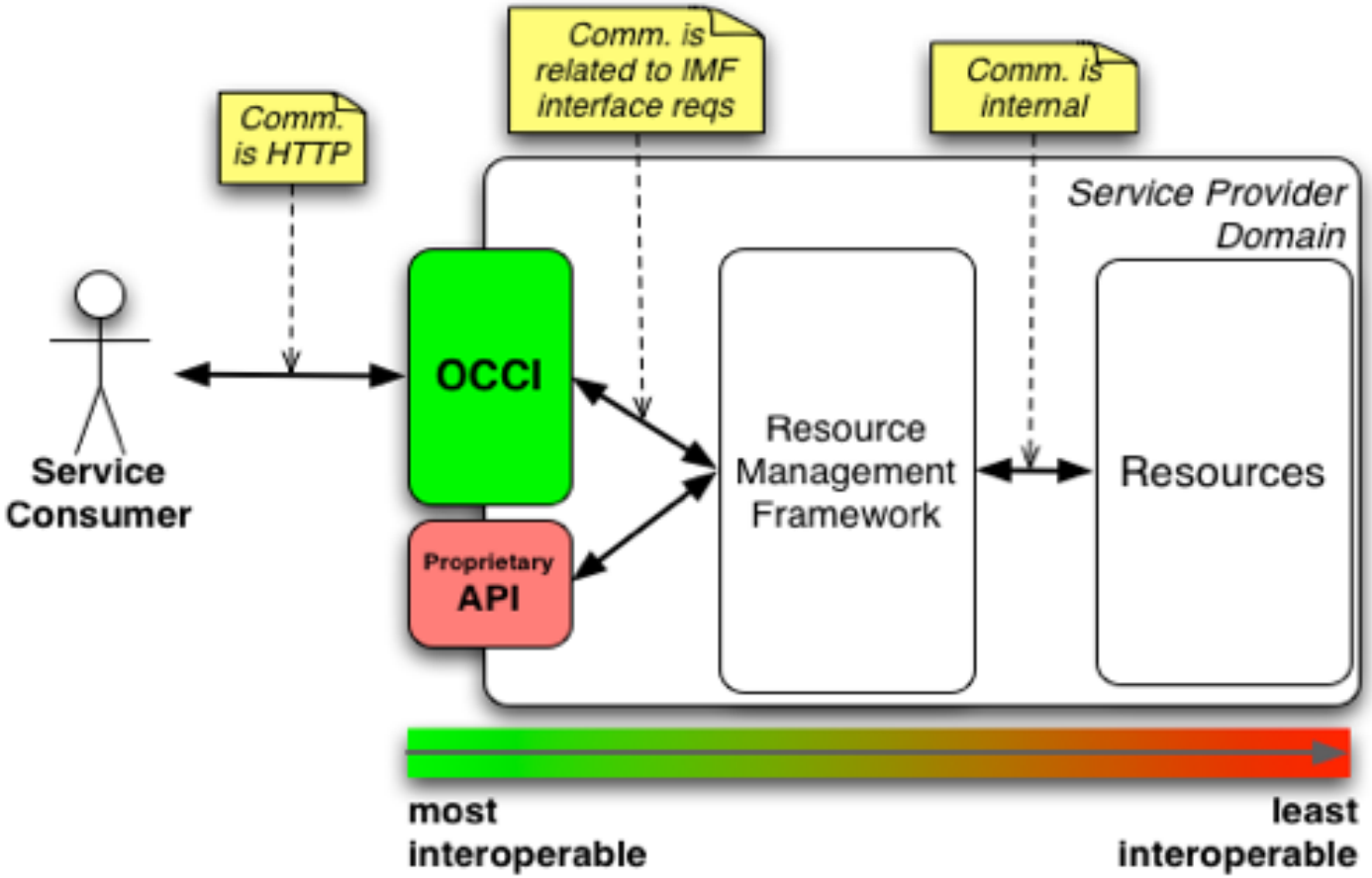
Open Grid Forum (OGF) is a global organization operating in the areas of **cloud, grid and** related forms of **advanced distributed computing**.

The OGF community pursues these topics through an **open process** for development, creation and promotion of relevant specifications and use cases.

OGF actively engages partners and participants throughout the international arena through an **open forum with open processes** to champion architectural blueprints related to cloud and grid computing.

The resulting specifications and standards enable **pervasive adoption of advanced distributed computing techniques** for business and research worldwide.

The Open Cloud Computing Interface



OCCI is a boundary-layer protocol and API suitable for any type of cloud control and operation at any level.

OCCI version 1.1

OpenGridForum

- Base documents originally published in **2011**.
- Initial documents include: *Core (GFD.183)*, *Infrastructure (GFD.184)*, *RESTful HTTP Rendering (GFD.185)*.
- Very stable standard set.
- Implemented very extensively since then.
- As per the established (IETF-like) OGF process, these are *Proposed Recommendations* awaiting experience documentation and refinement for the group to advance them to full recommendations.

OCCI version 1.2

OpenGridForum

- Derived from extensive experience in the field following OGF Recommendations-track process.
- Backwards compatible. Aim: Better completeness.
- Changes & new documents in public comment as a complete set. Publication: 3Q to 4Q 2015.
- Updated/new proposed-rec. documents include: *Core*, *Infrastructure*, *HTTP Protocol*, *Compute Resource Templates Profile*, *JSON Rendering*, *Text Rendering*, *Platform*, *Service Level Agreements*, and a new *Monitoring* informational document.

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Big growth in OCCI community implementation activities, and OCCIware project announced

Posted February 15th, 2015 in News by AlanSill

A recent search through GitHub shows that there is a tremendous amount of activity taking place in various portions of the developer community to implement the OCCI standards, which currently stand as a set of Proposed Recommendations in OGF.

Here's a quick run-down of recent active work:

- jOCCI-api: A java library implementing transport functions for rendered OCCI (Open Cloud Computing Interface) queries
- occi-os OCCI standards-based interface for OpenStack, used in several projects including the EGI Federated Cloud
- snf-occi implements the OCCI specification and maps it to the @Synnefo OpenStack API
- rOCCI – A Ruby OCCI Framework consisting of rOCCI-core, rOCCI-api,

Search

Pages

- Home
- About
  - Specification
  - Legal
- Community
  - Contribute & Communicate
  - Implementations
  - Resources
  - Tools
- Blog

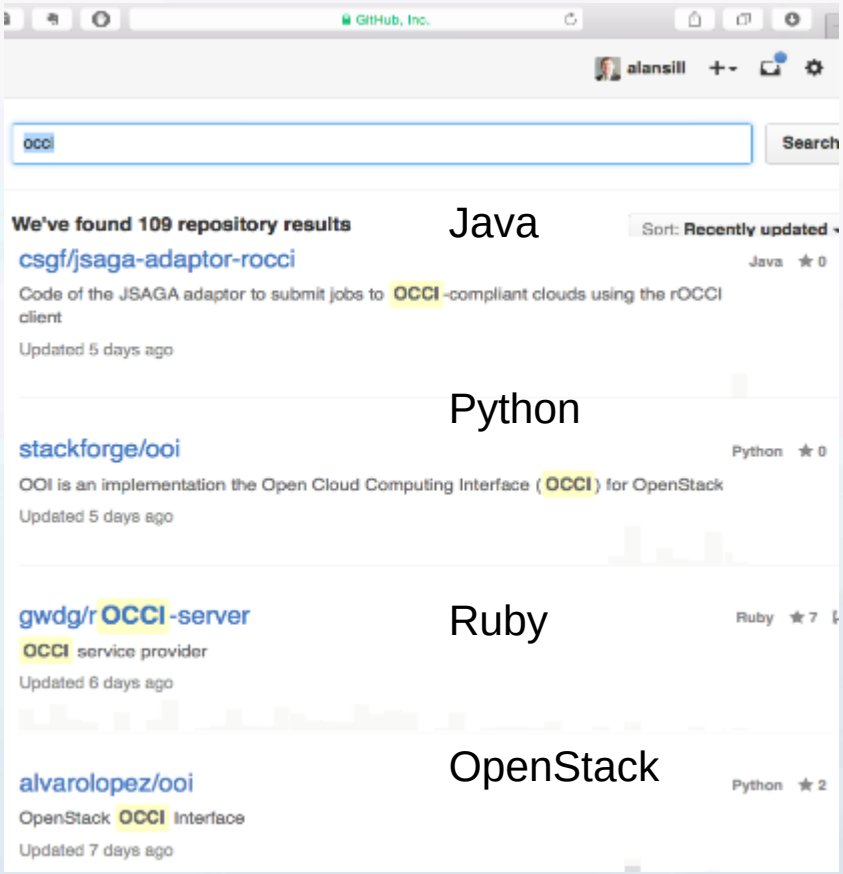
Tags

1.1 api cdmi client cloud community compatibleone compliance dmtf dortmund egi eucalyptus event federation FRZ government Grails IaaS

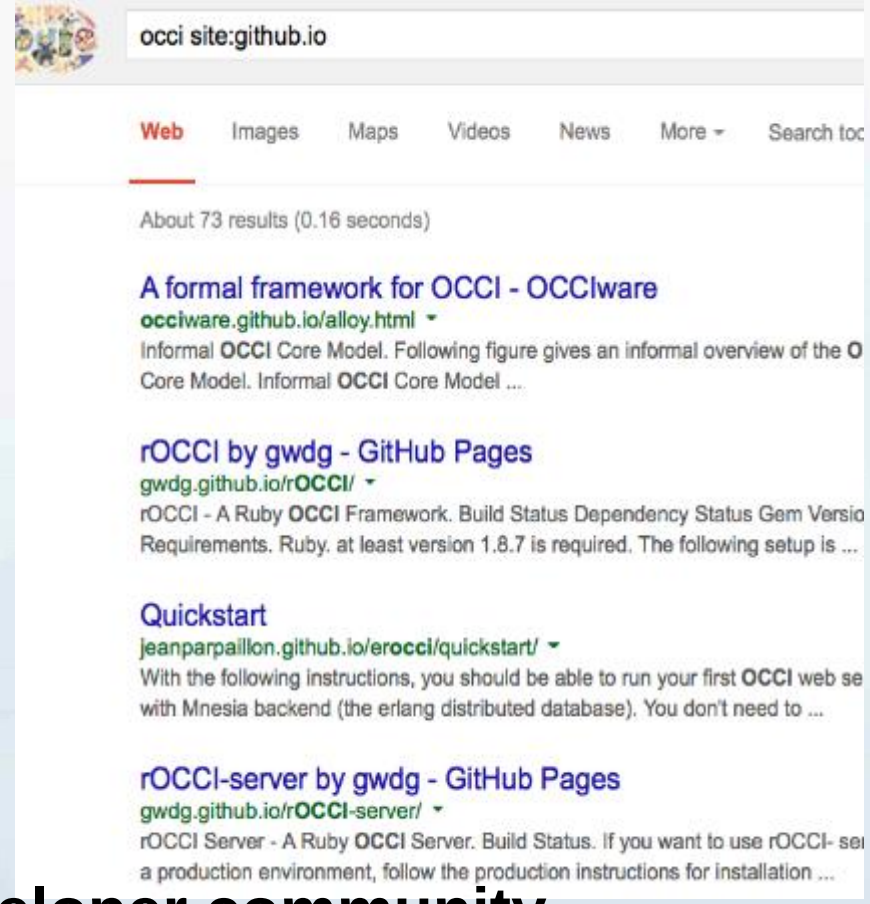
OCCI: Extensively Implemented
(e.g.: *Dozens* of repositories in GitHub)

OpenGridForum
OPEN FORUM | OPEN STANDARDS

GitHub search



Google search



Popular in the developer community.

OCCI implementations in regular use on a production basis.

OCCI: Extensively Implemented!

OpenGridForum

- Languages:
  - Java
  - Ruby
  - Python
  - Javascript
  - Erlang
  - Perl
- Implementations:
  - rOCCI
  - OpenNebula
  - OCCIware
  - OpenStack (occi-os)
  - Cloudstack
  - CompatibleOne
  - ACCORDS
  - FogBow
  - EGI Federated Cloud
  - etc…
- Projects:

Source: occi-wg.org

Dozens of independent projects.

Example: EGI Federated Cloud

OpenGridForum

Selection of new Communities since launch

EGI FedCloud Communities 9/2014

- **Ecology** – BioVeL: Biodiversity Virtual e-Laboratory
- **Structural biology** – WeNMR: a worldwide e-Infrastructure for NMR and structural biology
- **Linguistics** – CLARIN: 'British National Corpus' service (BNCWeb)
- **Earth Observation** – SS… volcano and earthquakes
- **Software Engineering** -
- **Software Engineering** -
- **Software Engineering** -
- **Musicology** – Peachnot
- **Earth Observation** – EN… infrastructures (collabora…
- **Geology** – VERCE: Virtu…
- **Ecology** – LifeWatch: E-Science European Infrastructure for Biodiversity and Ecosystem Research
- **High Energy Physics** – CERN ATLAS: ATLAS processing cluster via HelixNebula

Production multi-technology cloud with approximately 20 resource providers supporting over 2 dozen research communities!

…is … loud … for … data … eu/wiki/Fedcloud-tf:Users

More info: https://wiki.egi.eu/wiki/Fedcloud-tf:Users

Source: User Engagement in the EGI Federated Cloud, David Wallom, OeRC / UCC 2014

Contact us…

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EGI Federated Cloud:
A seamless grid of academic private clouds and virtualised resources, built around open standards and focusing on the requirements of the research community.

David Wallom

University of Oxford

Rationale

Growth of Providers

- High Throughput Platform
  - Academic resource providers
- Federated Cloud Platform
  - Diversity of resource providers

Growth of Research Communities

Tens of 1000's

Few related use cases
Single application model

Millions

Many diverse use cases
& application models

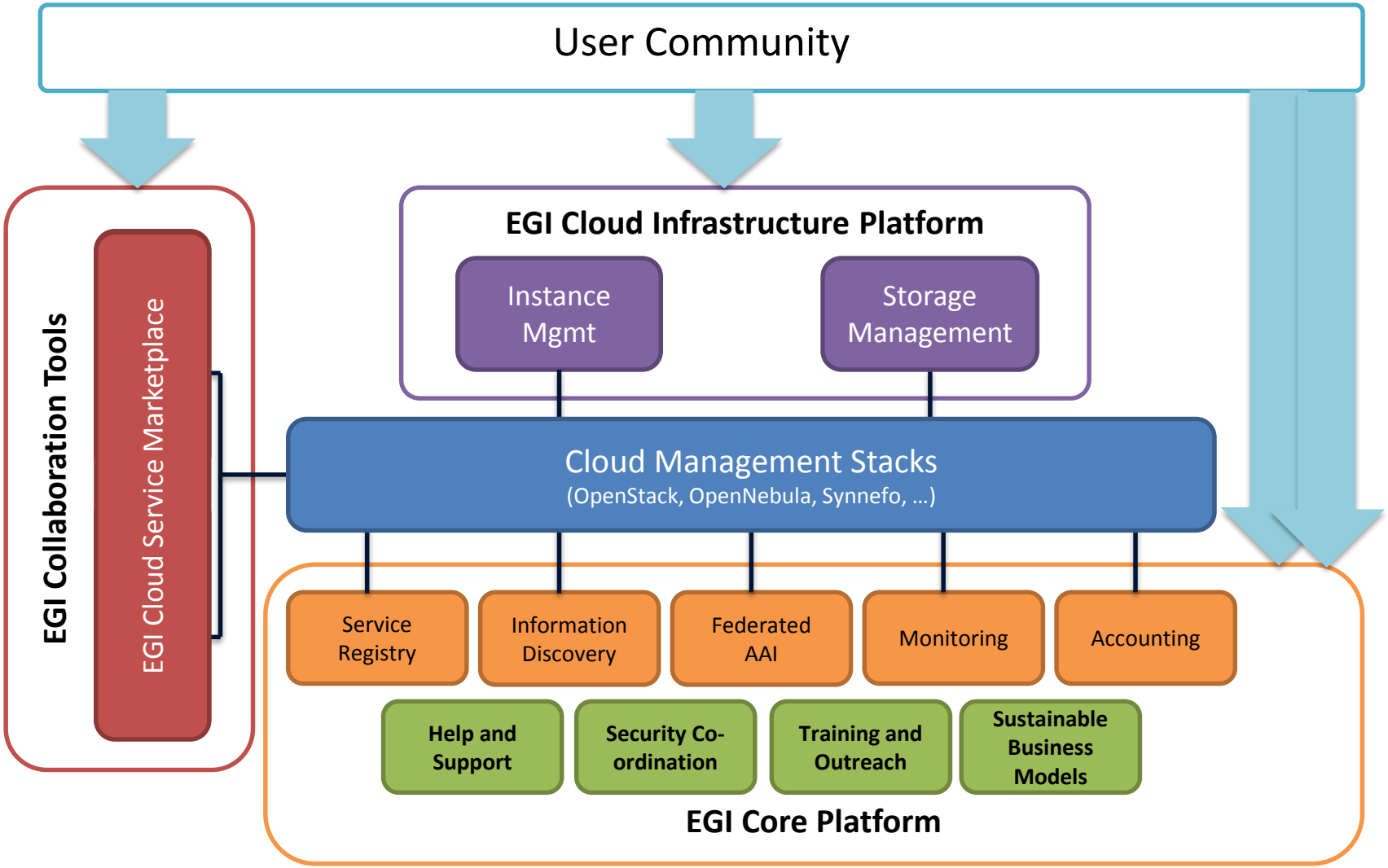
User Model

- **We offer our users:**
  - **Total control** over deployed applications
  - **Elastic resource consumption** based on real needs
  - **Workloads** processed on-demand
  - **Endorsed and accredited applications** available from multiple different communities shared
  - **Single sign-on** at multiple, independent providers
  - **Centralised access** to service information across multiple providers

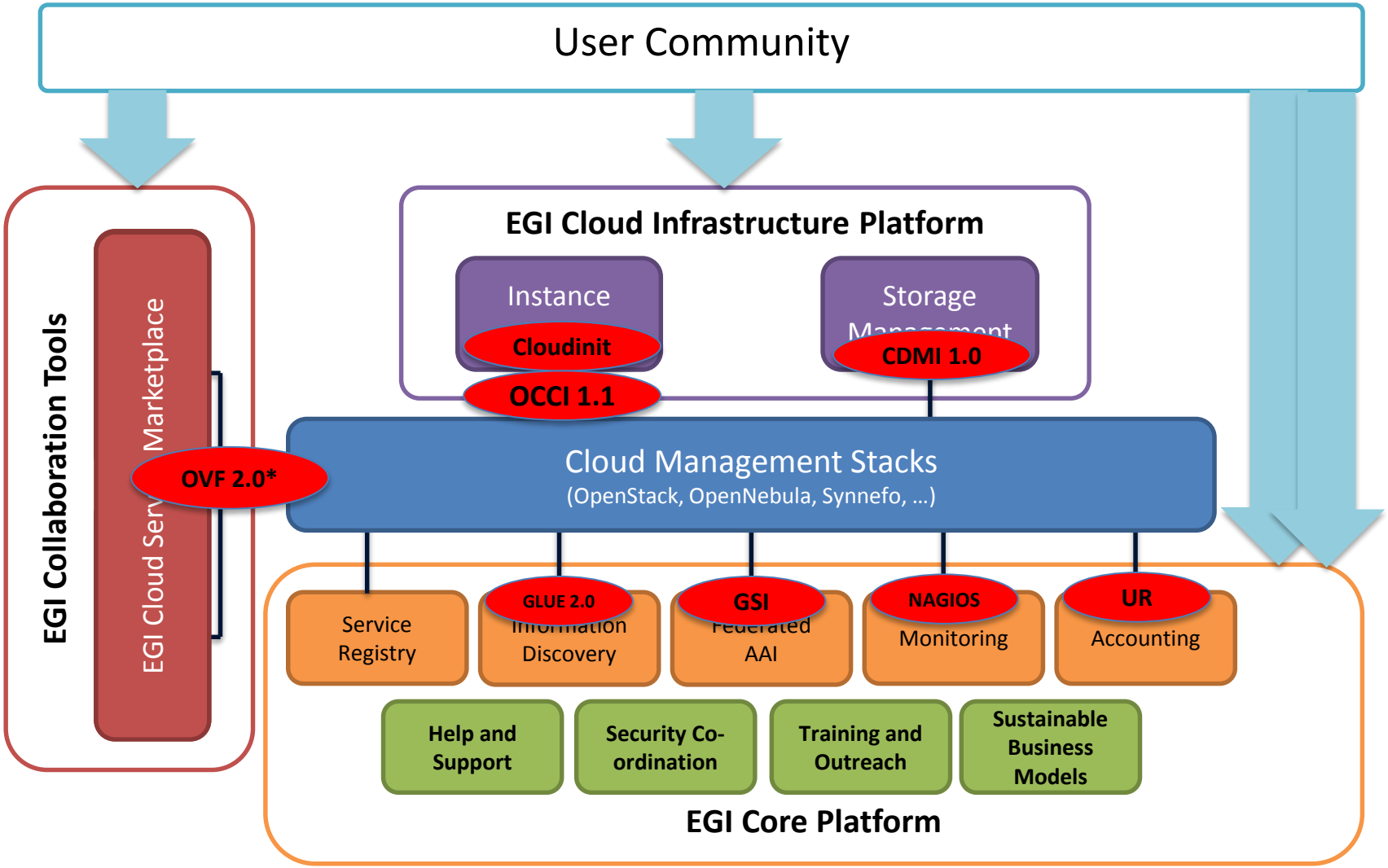
Principles of Federation

- **Standards and validation**: Recommended and common open standards for the interfaces and images – OCCI, CDMI, OVF, GLUE2, AAI
- **Resource integration**: Cloud Computing to be integrated into the existing production infrastructure.
- **Heterogeneous implementation**: no mandate on the cloud technology.
- **Provider agnosticism**: the only condition to federate resources is to expose the chosen interfaces and services.

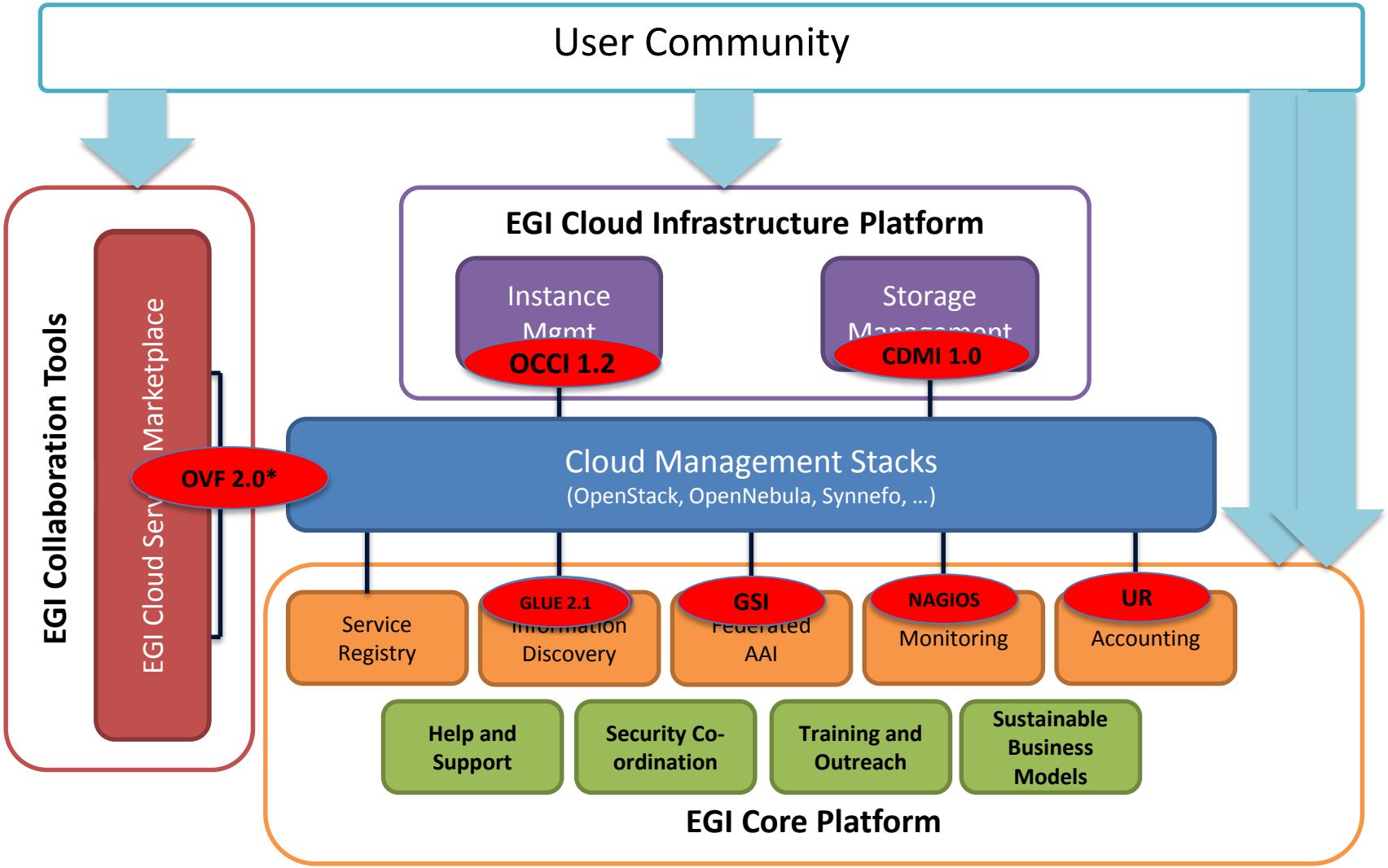
EGI Cloud Infrastructure



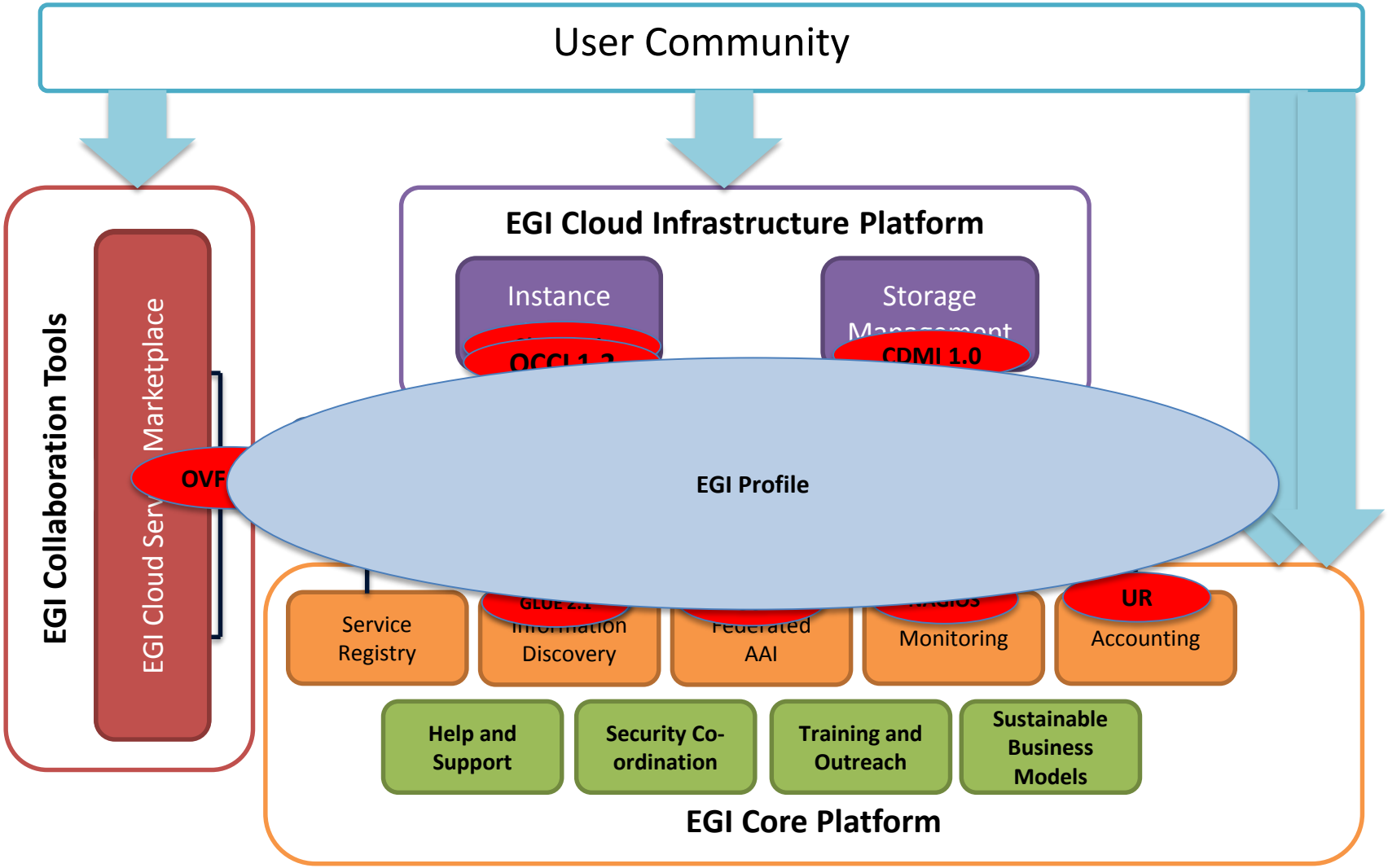
EGI Cloud Infrastructure



EGI Cloud Infrastructure



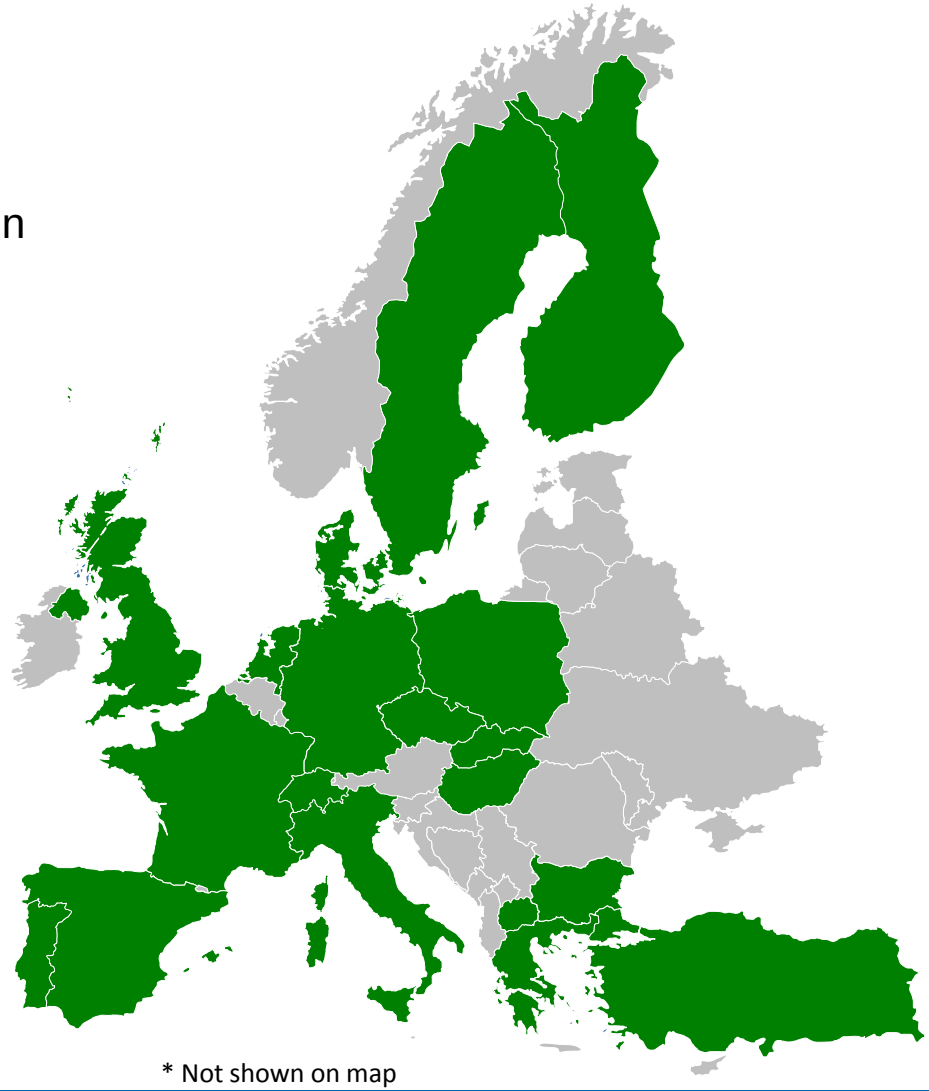
EGI Cloud Infrastructure



Partnership

Resources

- **21 providers from 14 NGIs**
  - 55% OpenStack, 42% OpenNebula, 3% Synnefo
- 17 providers from 7 new NGIs interested in joining
- Worldwide interest & integration
  - Australia* (NeCTAR)
  - South Africa* (SAGrid)
  - South Korea* (KISTI)
  - United States* (NIST, NSF A.C. Centres)

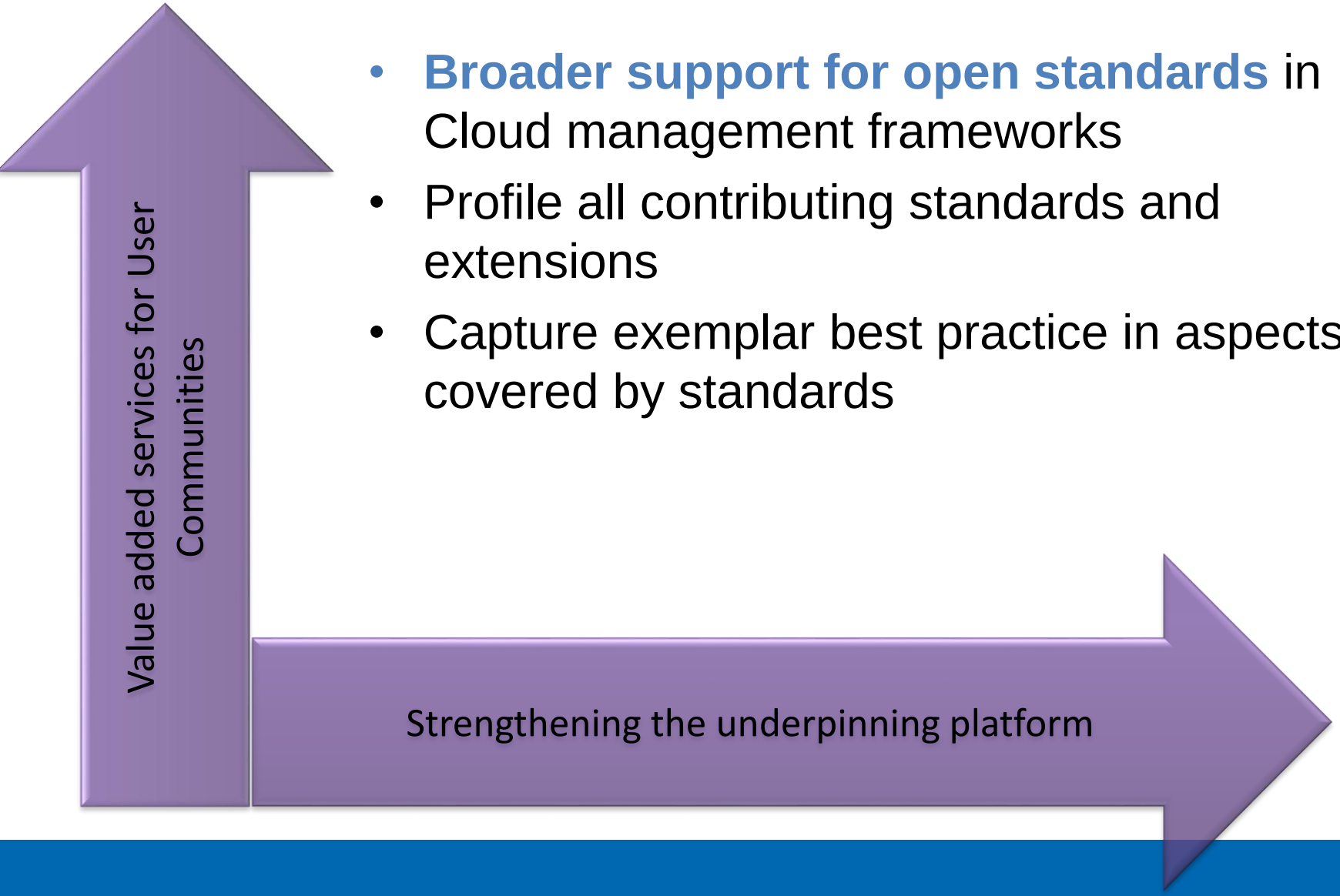


* Not shown on map

Usage since launch

- 700k VM instantiations
- 9M CPU hours of research work
- 76 use cases including 11 production
  - 36% Biosciences, 21% physical sciences, 11% Earth Sciences, 22% other (including Maths -> Art & Hums)

Continuing a Technology Evolution



- **Broader support for open standards** in Cloud management frameworks
- Profile all contributing standards and extensions
- Capture exemplar best practice in aspects not covered by standards

Questions & Answers

THANK YOU!

Cloud Standards - Ready for Prime-time (part 2)

Date: Thursday, 18 June
Time: 14:00 – 15:00 (CEST)

Moderator:
Michel Drescher, Technical Manager, EGI & CloudWATCH

Speakers:
Mark Carlson, Principal Engineer, Industry Standards at Toshiba
DMTF OVF, DMTF CIMI
John Messina, NIST Cloud Computing Program, Chair of the IEEE P2301 CPIP Working Group Chair
Peter Deussen, Fraunhofer FOKUS
ISO/IEC JTC 1/SC 38 Distributed Application Platforms and Services

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