

SVM 2011

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Systems and Virtualization Management
Standards and the Cloud
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OpenNebula Interoperability and Portability

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OpenNebula.org

Acknowledgments







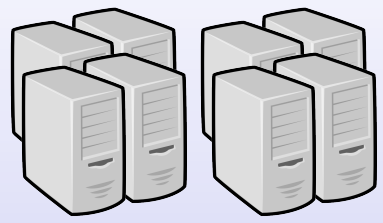






The research leading to these results has received funding from the *Ministerio de Ciencia e Innovación* of Spain through research grant TIN2009-07146.

OpenNebula Interoperability and Portability

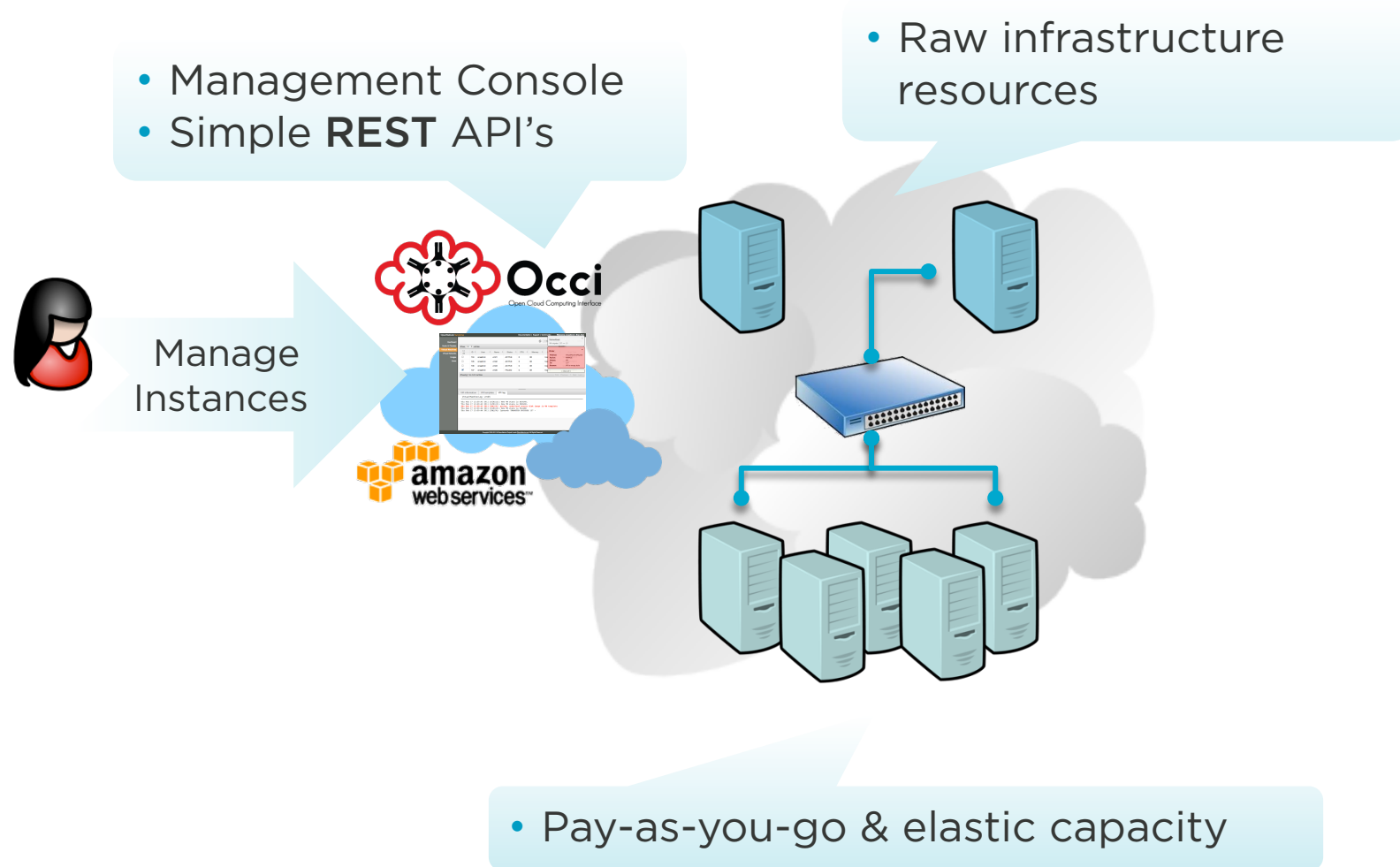
- What is Cloud Computing?
- What is OpenNebula?
- Who Use OpenNebula?
- Challenges for Portability and Interoperability?
- Our Approach for Interoperability and Portability
- Some Examples of Community Collaborations

Types of Cloud Services for Provision of IT Capabilities as a Service

	What	Who
<div style="background-color: #0056b3; color: white; padding: 10px; border-radius: 15px; text-align: center;"> <h2>Software as a Service</h2> </div>	<p>On-demand access to any application</p>	<p>End-user (does not care about hw or sw)</p> <div style="display: flex; justify-content: space-around; align-items: center;">    </div>
<div style="background-color: #e1f5fe; padding: 10px; border-radius: 15px; text-align: center;"> <h2>Platform as a Service</h2> </div>	<p>Platform for building and delivering web applications</p>	<p>Developer (no managing of the underlying hw & sw layers)</p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;">  <p>Windows Azure</p>  <p>force.com platform as a service</p> </div> </div>
<div style="background-color: #e1f5fe; padding: 10px; border-radius: 15px; text-align: center;"> <h2>Infrastructure as a Service</h2> <div style="display: flex; justify-content: center; align-items: center; margin: 10px 0;">  </div> <p>Physical Infrastructure</p> </div>	<p>Raw computer infrastructure</p>	<p>System Administrator (complete management of the computer infrastructure)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">   </div> <div style="text-align: center;">   </div> </div>

What is Cloud Computing?

Provision of Virtualized Resources as a Service



What is OpenNebula?

IaaS Cloud Computing Tool for Managing a Data Center's Virtual Infrastructure

Adaptable

- Customizable and Extensible

Proven

- Many Massive Scale Production Deployments

Powerful and Innovative

- Advanced Enterprise-class Functionality

No Lock-in

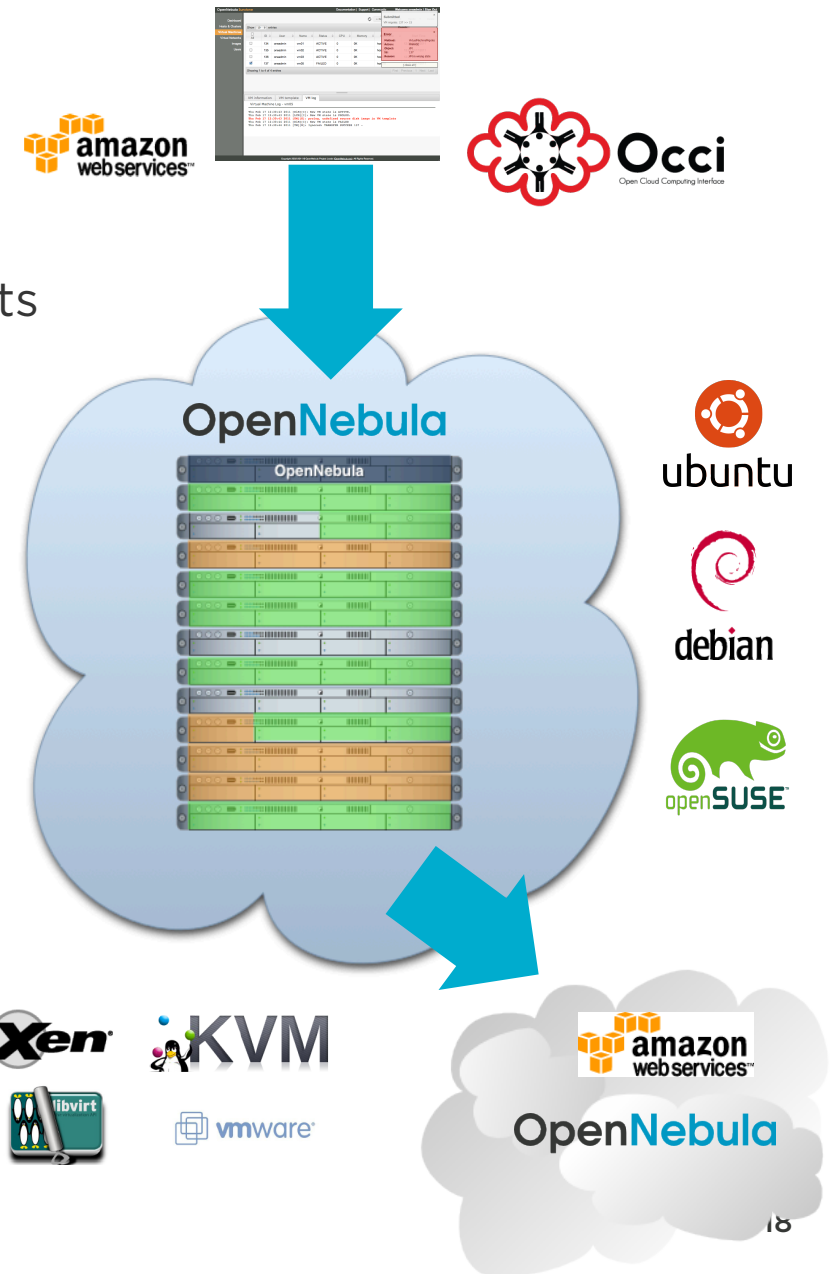
- Platform Independent and Interoperable

Interoperable

- Popular cloud APIs and standard based

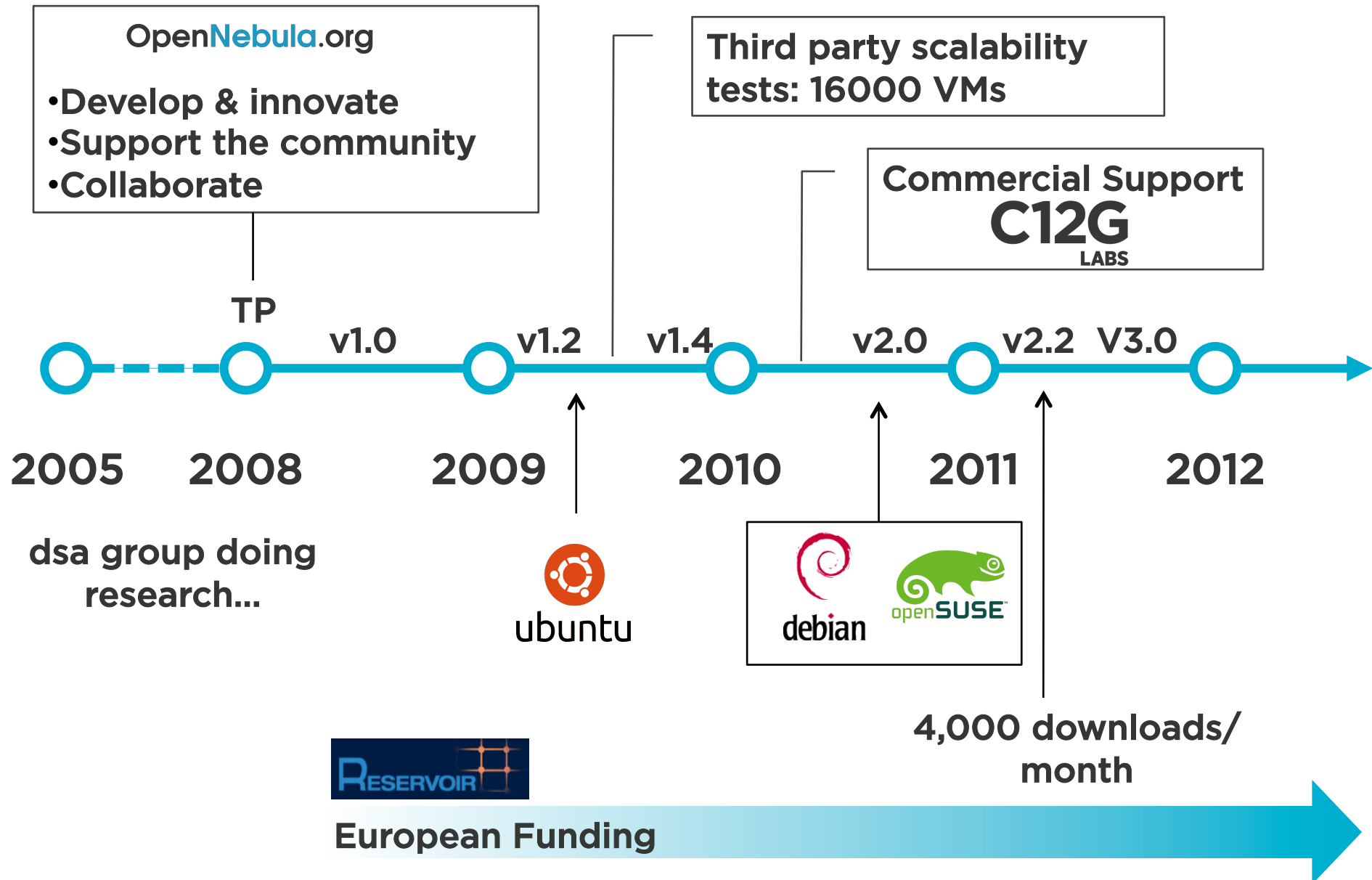
Openness

- Fully open-source
- Apache license



What is OpenNebula?

Building the Industry Standard Open Source Cloud Computing Tool



Organizations Building Clouds and Innovative Projects

Organizations Building Clouds for Development, Testing and Production



Projects Building an Open Cloud Ecosystem Around OpenNebula



Different Models of Deployment

Model	Definition	Cloud Cases
Private	Infrastructure is owned by a single organization and made available only to the organization	<ul style="list-style-type: none">• Optimize and simplify internal operation• SaaS/PaaS support• IT consolidation within large organizations (Government Clouds, University Clouds...)
Public	Infrastructure is owned by a single organization and made available to other organizations over the Internet	<ul style="list-style-type: none">• Commercial cloud providers, mostly hosting providers to offer low cost solutions with limited control/configuration and security/reliability good enough• Science public clouds to enable scientific and educational projects or to experiment with cloud computing
Virtual Private	Infrastructure is owned by a single organization and made available to other organization over a dedicated private network	<ul style="list-style-type: none">• Telecom cloud providers to offer premium solutions with additional control/configuration and security/reliability

Leveraging Existing Standards and Implementing Interoperation

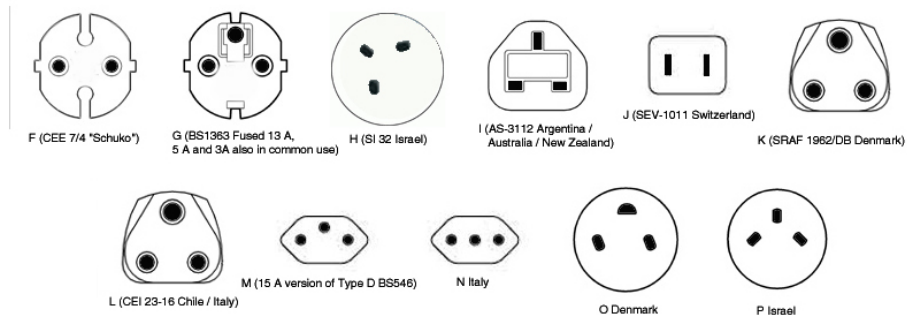
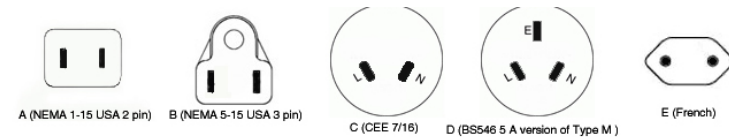
Standardization

- Implement standards
- Integrate with standards



Which Standard?

- Different *de jure* standards
- Several *de facto* standards

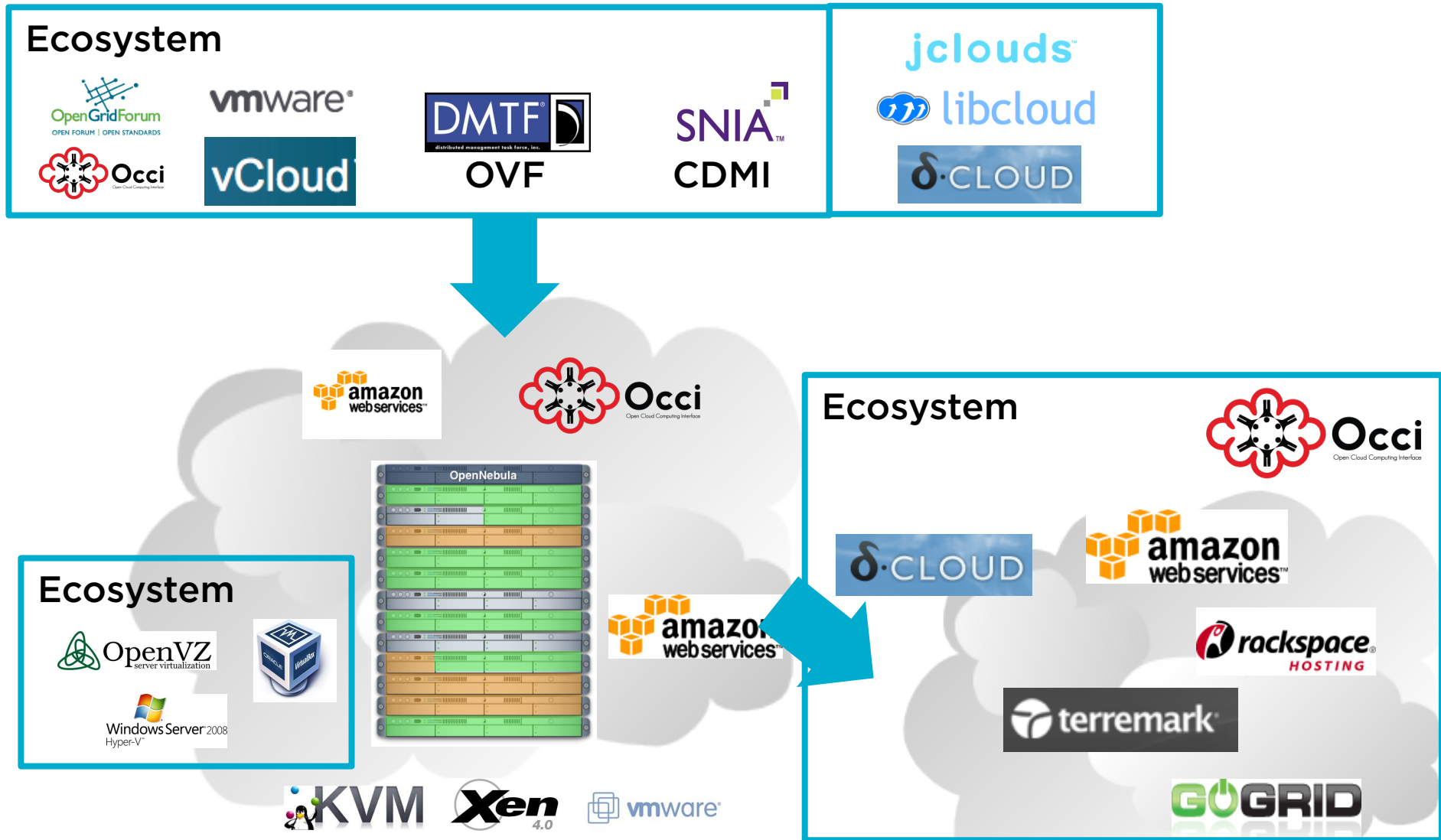


Interoperation

- Implement adaptors
- Use transformers



A Quickly Growing Ecosystem for Interoperability and Portability



New OpenNebula Working Group!
OpenNebula Interoperability and Portability

OCCI & CDMI for OpenNebula by GWDG

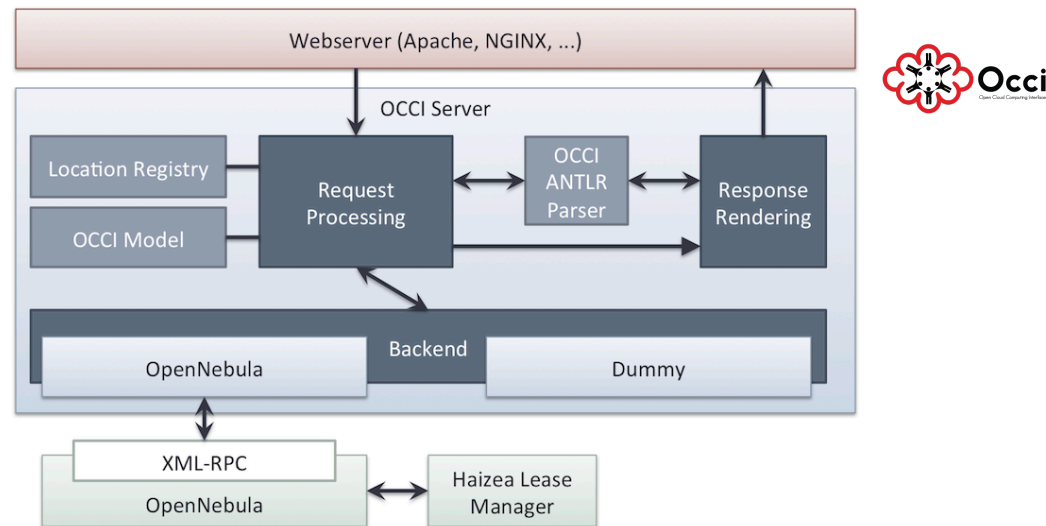
Development of OCCI 1.1 Framework for OpenNebula 3.0

- Advanced integration of CDMI into OpenNebula
- Participation in OGF OCCI WG and in DMTF CMWG



Upcoming features

- Rewrite in Ruby on Rails with focus on quality, scalability and extensibility
- Advanced authentication (X.509, Shibboleth, OpenID)
- Sync up with Conrail project to support OVF
- Support for SLAs based on SLA@SOI project



<http://dev.opennebula.org/projects/ogf-occi>

Some Examples of Community Collaborations

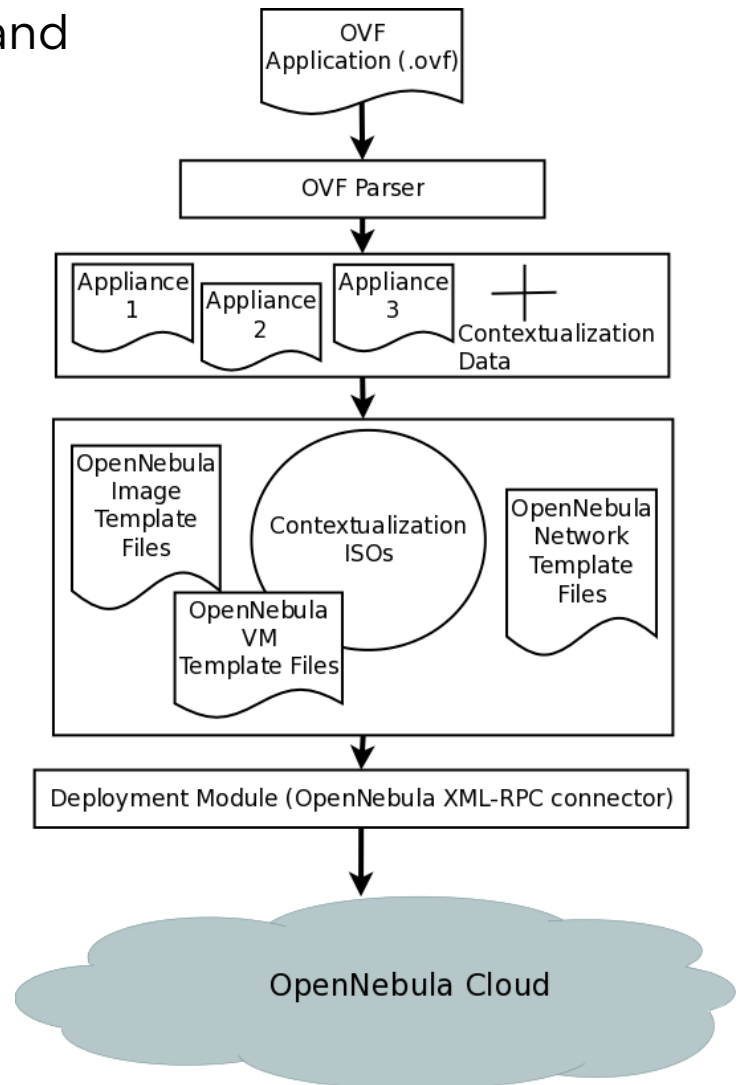
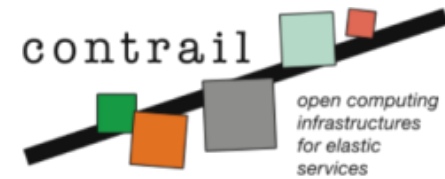
Contrail - Open Computing Infrastructure for Elastic Services

Development of OVF 1.1.0 for OpenNebula 3.0

- The Contrail project aims to develop tools for creating and managing a federation of private and public clouds
- Contrail uses OVF for distributed applications

Contributions to OpenNebula

- OVF translation tool enabling deployment of applications over OpenNebula IaaS clouds



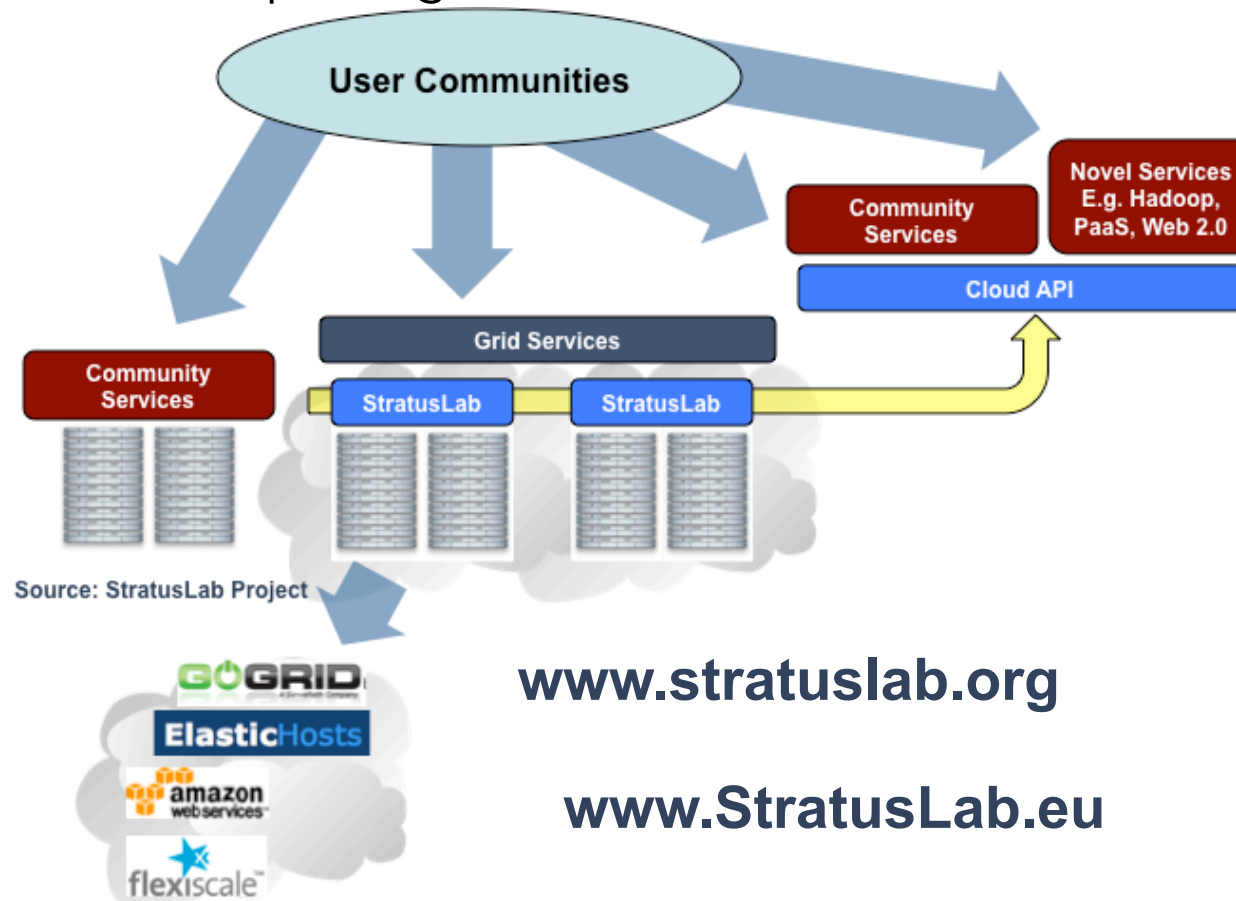
<http://contrail-project.eu>

StratusLab - Enhancing Grid Infrastructures with Cloud Computing



Using OCCI for Federation and Developing jclouds

- Simplify and optimize its use and operation, providing a more flexible, dynamic environment for scientists; and enhance existing computing infrastructures with “IaaS” paradigms



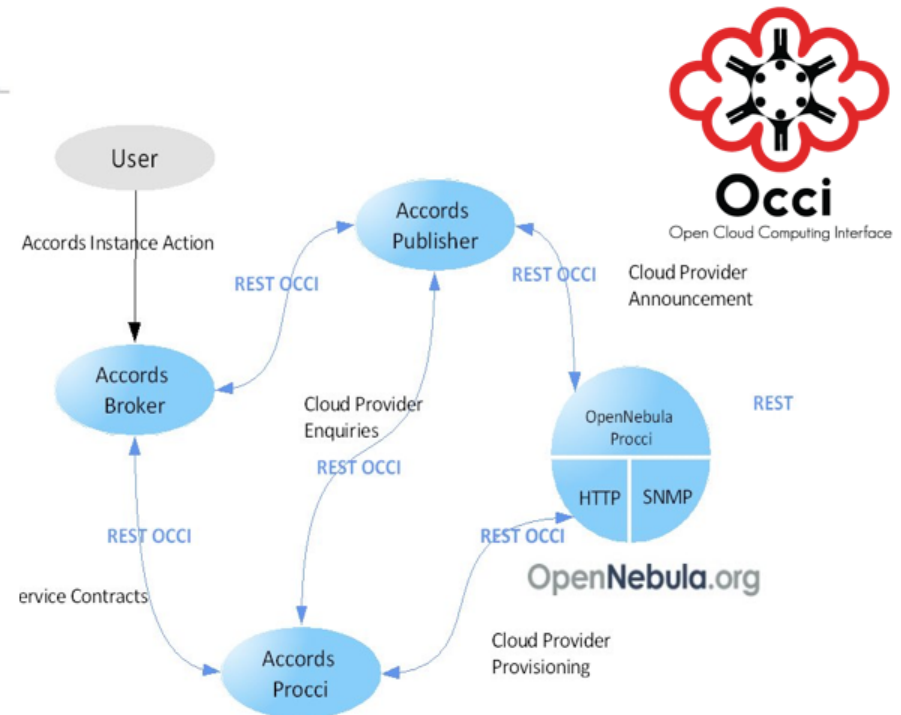
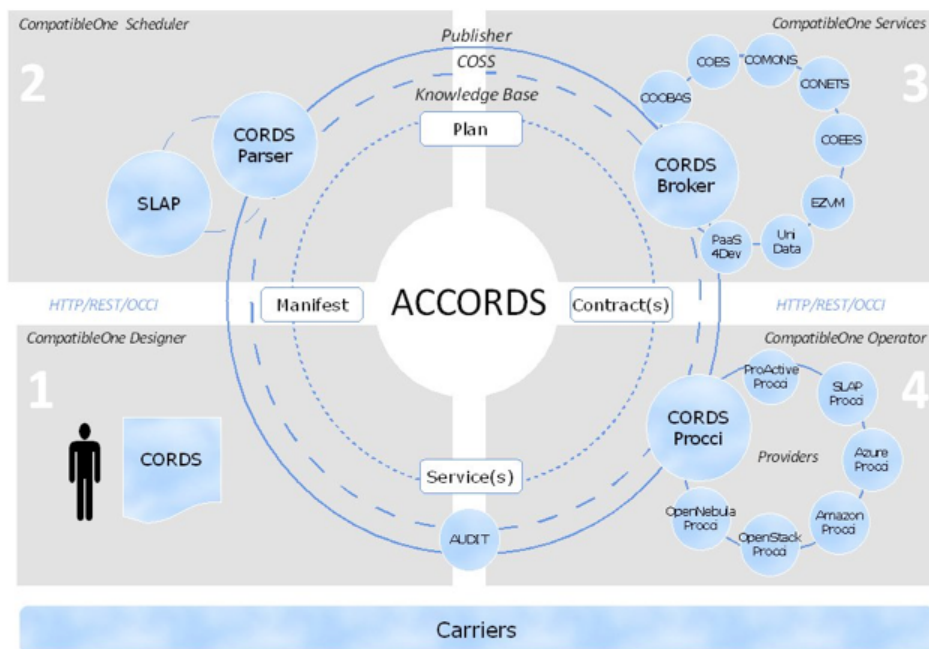
CompatibleOne - Cloud Brokering Service

Using OCCI for Federation



ActiveEon, Bull, CityPassenger, Enovance, Eureka
INRIA, Institut Télécom, Mandriva, Nexedi, Nuxeo
OW2, Prologue, Xwiki

compatibleone ARCHITECTURE V2.6



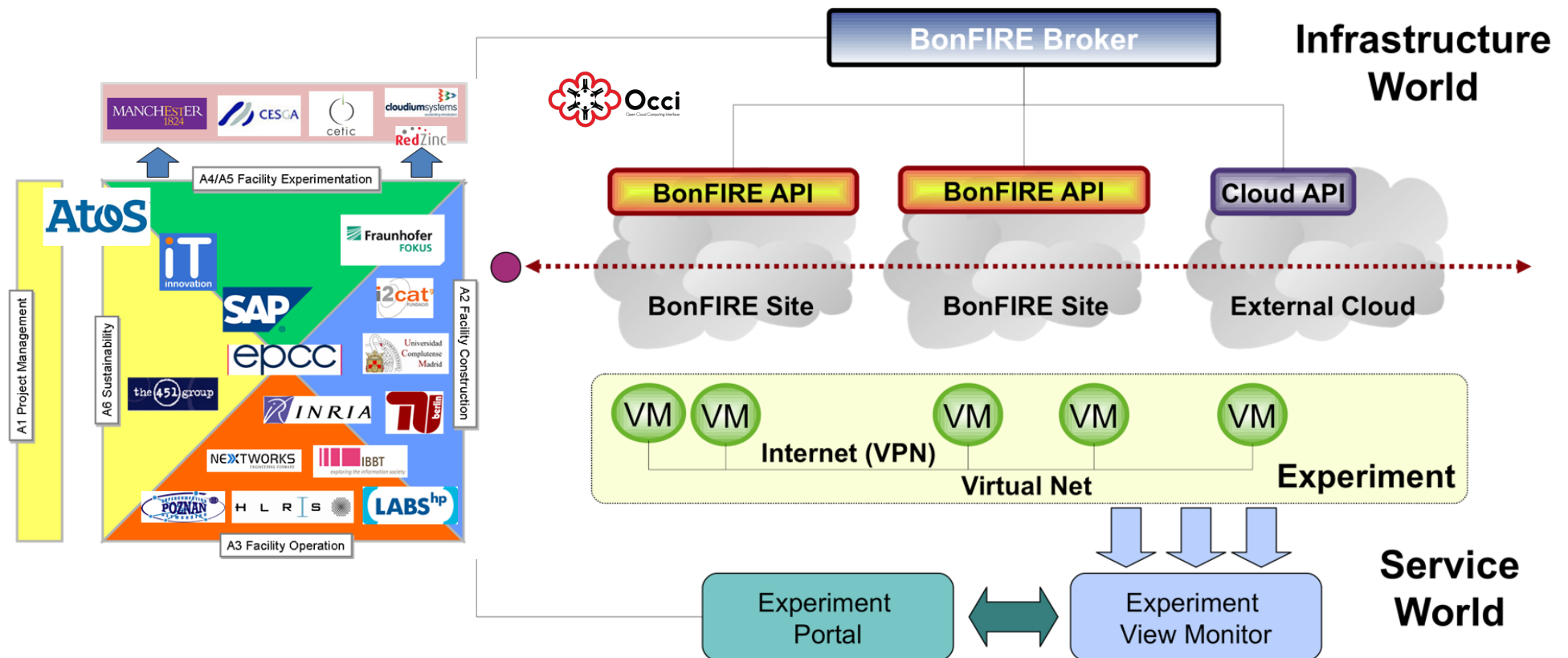
More info on <http://www.compatibleone.org>

BonFIRE - Building Service Testbeds on FIRE



Using OCCI for Federation

- Design, build and operate a multi-site cloud-based facility to support research across applications, services and systems targeting services research community on Future Internet



www.BonFIRE-Project.eu

MEGHA- Spanish R&E Intercloud Initiative

Using OCCI for Federation

- Interoperable federated clouds platform to streamline the use of cloud technologies among R&E services centers and provide support to integrate new technologies and infrastructures over cloud

Infrastructure

- 3 OpenNebula geographical dispersed instances
- +300 distributed cores +25TB
- Network, security and identity support



<http://wiki.rediris.es/megha/MainPage>

We Will Be Happy to Answer Any Question



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