

Enabling cloud for e-Science with OpenNebula

cloud-devroom@Fosdem'13

Zeeshan Ali Shah
System Administrator , PDC-HPC
KTH, Stockholm
zashah@pdc.kth.se



disclaimer: opinions expressed in this talk are solely those of the presenter and do not reflect of KTH or any other institute.

Agenda

- eScience users !! customer segmentation
- Projects
 - NEON
 - Venus-C
 - SNIC Cloud
- Challenges
- Federation
 - EGI Fed cloud project
- QA

eScience users

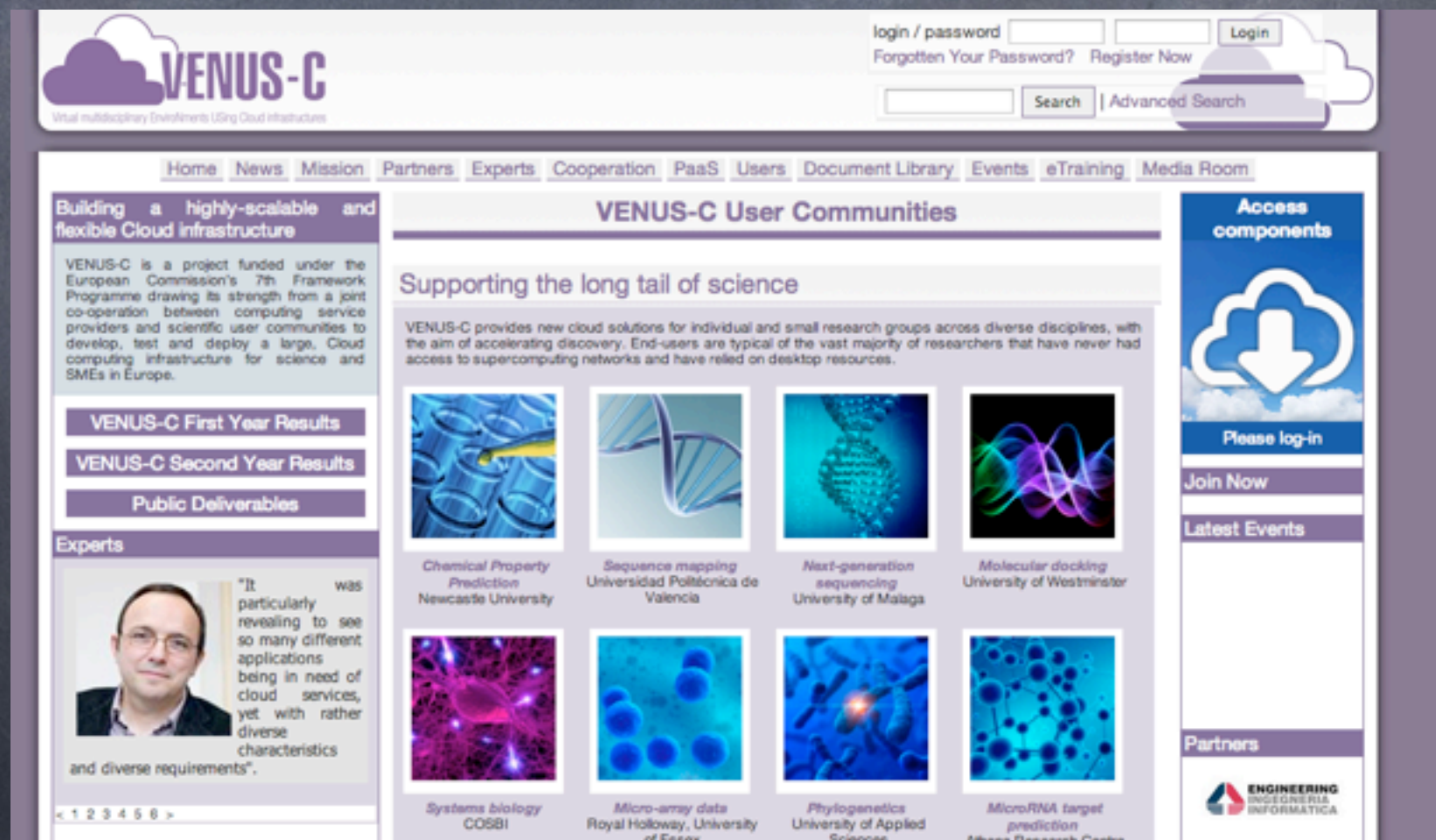
- Initially we focused on bioinformatics
- Currently running on HPC machines
 - That was an issue
- Think in HPC, but an elastic way
 - That was a challenge
- Not all, but some need bursty peaks(longtail users)
 - That was a core proposition

NEON Project

- Northern europe cloud initiative , 2009–2010
- Eucalyptus 2.0
- Federated with other centre

Venus-C Project

- Finished May 2012
- OpenNebula with CDMI, OVF



SNIC cloud Project

- Currently running
- Started with Public cloud Amazon AWS.
 - Why ?
 - Prebuilt images, App stacks, Trainings, Workshops ..
- Planning to connect with Private Cloud (**with new challenges**)

Challenges @ Private Cloud

- Non-Technical (changing hearts n minds)
- Technical (Using minds to solve issues)

Non-Technical

- Myth of security
- Living in HPC world.
- It is hard to digest elasticity , self provisioning , on demand and other cloud benefits.
- But Private cloud has to live with other computer/network admins ... or may be configure by same sysadmin

more cloud = jobless sysadmins !
is this true ?



Same Role (Driver)
Different styles
(Choose yours !)

Technical

- Network Latency
 - Infiniband
 - Multiple NICs
- Storage
 - Image repository
 - EBS style (for application data)
 - CDMI

Technical (more)

- Public IPs
 - For Cluster deployment limit to 1 master and X private ips
- We want more ...
 - (hybrid cloud)
- Sharing of images (but be careful about private data)
 - Hooking mechanisms in Open Nebula

Technical (more)

- Usage
 - UI based on Sunstone
 - command line with OCA client
 - For Programmers , use SDK (Java n Ruby)

agile developer vs static administrator



```
// Check if the user is logged in  
if (newPassword != null)  
{  
    _Username = newPassword;  
    _Password = newPassword;  
    return true;  
}  
else {  
    return false;  
}
```



SDK

NoDep on
sysadmin

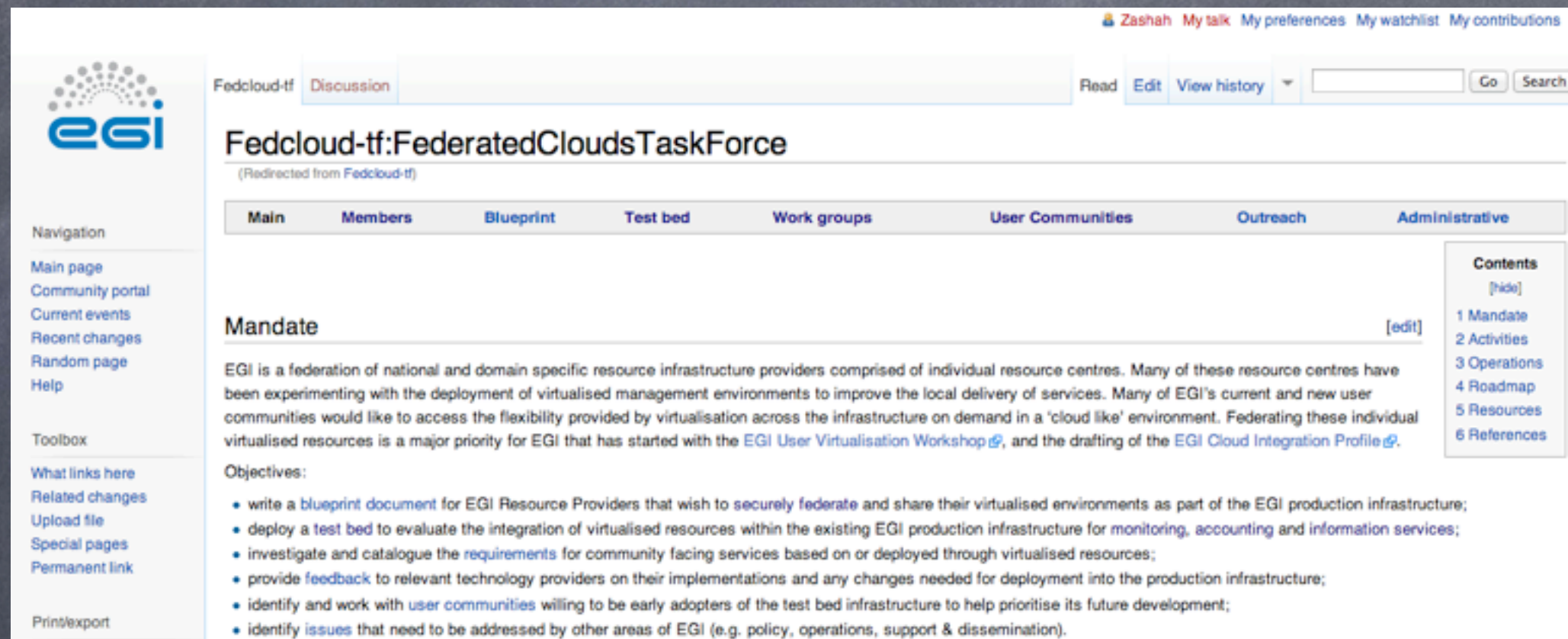
Think compute and storage as an object
(Create/Operate/Destroy whenever you want)

```
VirtualMachine vm = new VirtualMachine
.....
Spark sp = new Spark(4);  # spark with 1 master 4 slaves
.....
if load increase 90% launch more #(just an e.g.)
...
PlainDebian pd = new PlainDebian();
....
#Expand as you want :)
```


Technical (more)

- Security
 - VLANs
 - Bridge firewalls
 - Network auditing and other traditional tools
 - Q: What if legitimate user install legal software but left its mgt panel opened , e.g. tomcat

EGI Cloud Federation



The screenshot shows the EGI Cloud Federation Wiki page for the 'Fedcloud-tf: Federated Clouds Task Force'. The page is titled 'Fedcloud-tf: Federated Clouds Task Force' and is redirected from 'Fedcloud-tf'. The page has a navigation bar with tabs: Main, Members, Blueprint, Test bed, Work groups, User Communities, Outreach, and Administrative. The 'Mandate' section is currently selected. The page content describes the EGI federation and its goals, including a list of objectives. The page also features a sidebar with navigation links and a search bar.

Navigation: Main page, Community portal, Current events, Recent changes, Random page, Help

Toolbox: What links here, Related changes, Upload file, Special pages, Permanent link

Print/export

Fedcloud-tf Discussion

Read Edit View history

Fedcloud-tf: Federated Clouds Task Force

(Redirected from Fedcloud-tf)

Main Members Blueprint Test bed Work groups User Communities Outreach Administrative

Mandate [edit]

EGI is a federation of national and domain specific resource infrastructure providers comprised of individual resource centres. Many of these resource centres have been experimenting with the deployment of virtualised management environments to improve the local delivery of services. Many of EGI's current and new user communities would like to access the flexibility provided by virtualisation across the infrastructure on demand in a 'cloud like' environment. Federating these individual virtualised resources is a major priority for EGI that has started with the [EGI User Virtualisation Workshop](#), and the drafting of the [EGI Cloud Integration Profile](#).

Objectives:

- write a [blueprint](#) document for EGI Resource Providers that wish to [securely federate](#) and share their virtualised environments as part of the EGI production infrastructure;
- deploy a [test bed](#) to evaluate the integration of virtualised resources within the existing EGI production infrastructure for [monitoring](#), [accounting](#) and [information services](#);
- investigate and catalogue the [requirements](#) for community facing services based on or deployed through virtualised resources;
- provide [feedback](#) to relevant technology providers on their implementations and any changes needed for deployment into the production infrastructure;
- identify and work with [user communities](#) willing to be early adopters of the test bed infrastructure to help prioritise its future development;
- identify [issues](#) that need to be addressed by other areas of EGI (e.g. policy, operations, support & dissemination).

Contents [hide]

- 1 Mandate
- 2 Activities
- 3 Operations
- 4 Roadmap
- 5 Resources
- 6 References



<https://wiki.egi.eu/wiki/Fedcloud-tf>

Areas

VM Management	<ul style="list-style-type: none">. OCCI 1.1 proxy for multiple IaaS
Data Management	<ul style="list-style-type: none">. CDMI proxy for multiple IaaS. OVF
Information Systems	<ul style="list-style-type: none">. Extended GLUE2 schema. LDAP server
Accounting	<ul style="list-style-type: none">. Cloud Usage Record (UR) schema. UR server. UR client for each IaaS
Monitoring	<ul style="list-style-type: none">. Nagios with cloud probes
Federated AAI	<ul style="list-style-type: none">. X509 certificates. Support for Virtual Organisations (Vos)
Image catalogue	<ul style="list-style-type: none">. StratusLab marketplace

Consolidation



Federation

- OCCI/CDMI deployment



Notification

- Review available implementations.

x.509

Federated AAI

- RP account integration
- VOMS?

Information System

- GLUE2 extension
- upload from the RPs

Accounting

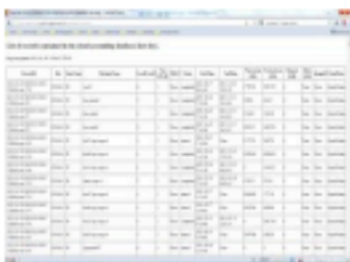
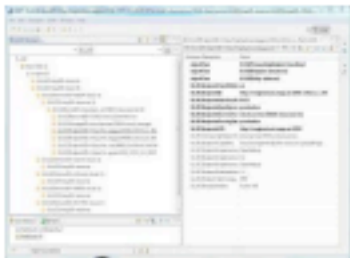
- OGF UR extension
- upload clients

Image management

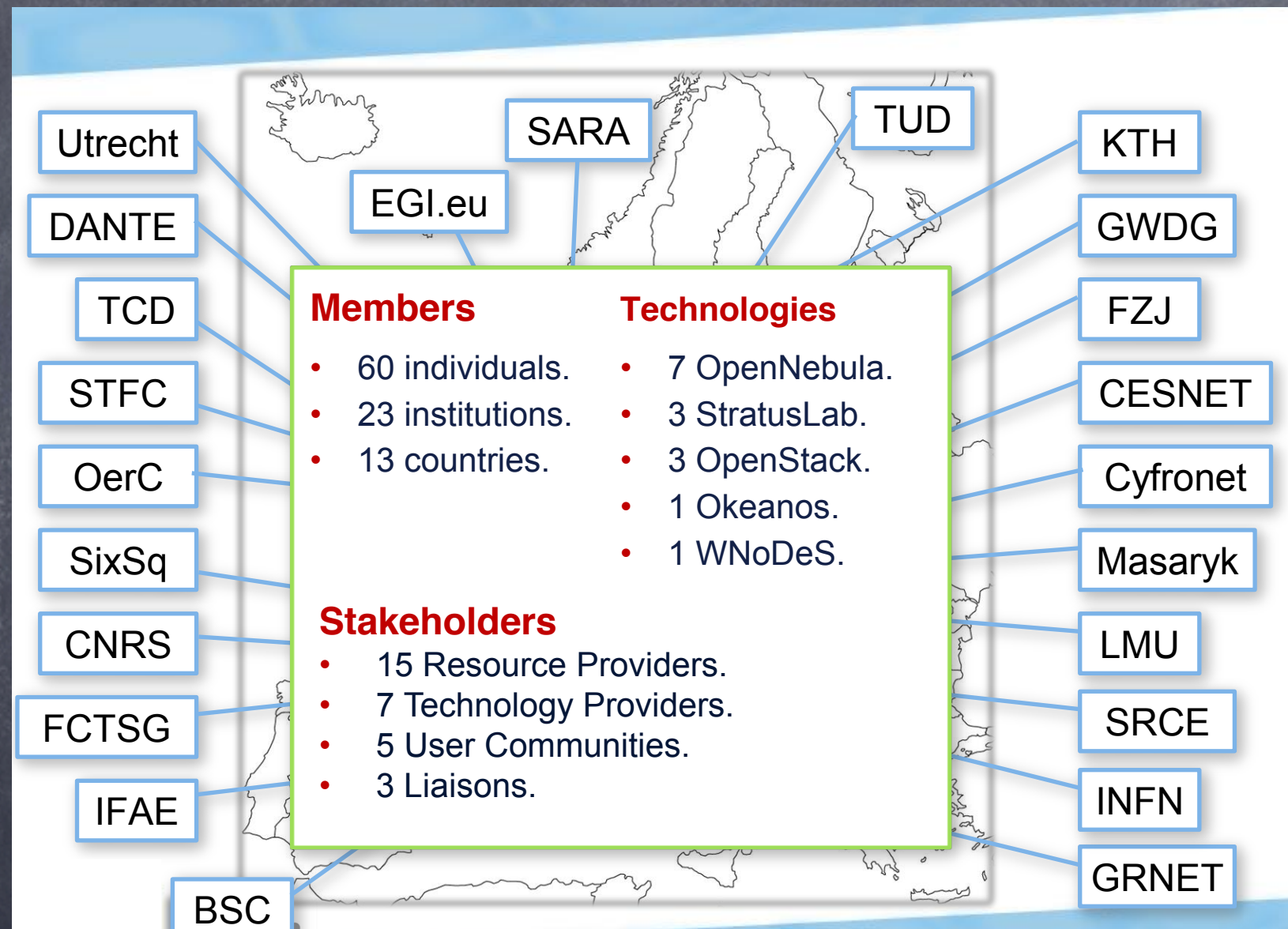
- Multiple storage model

Monitoring

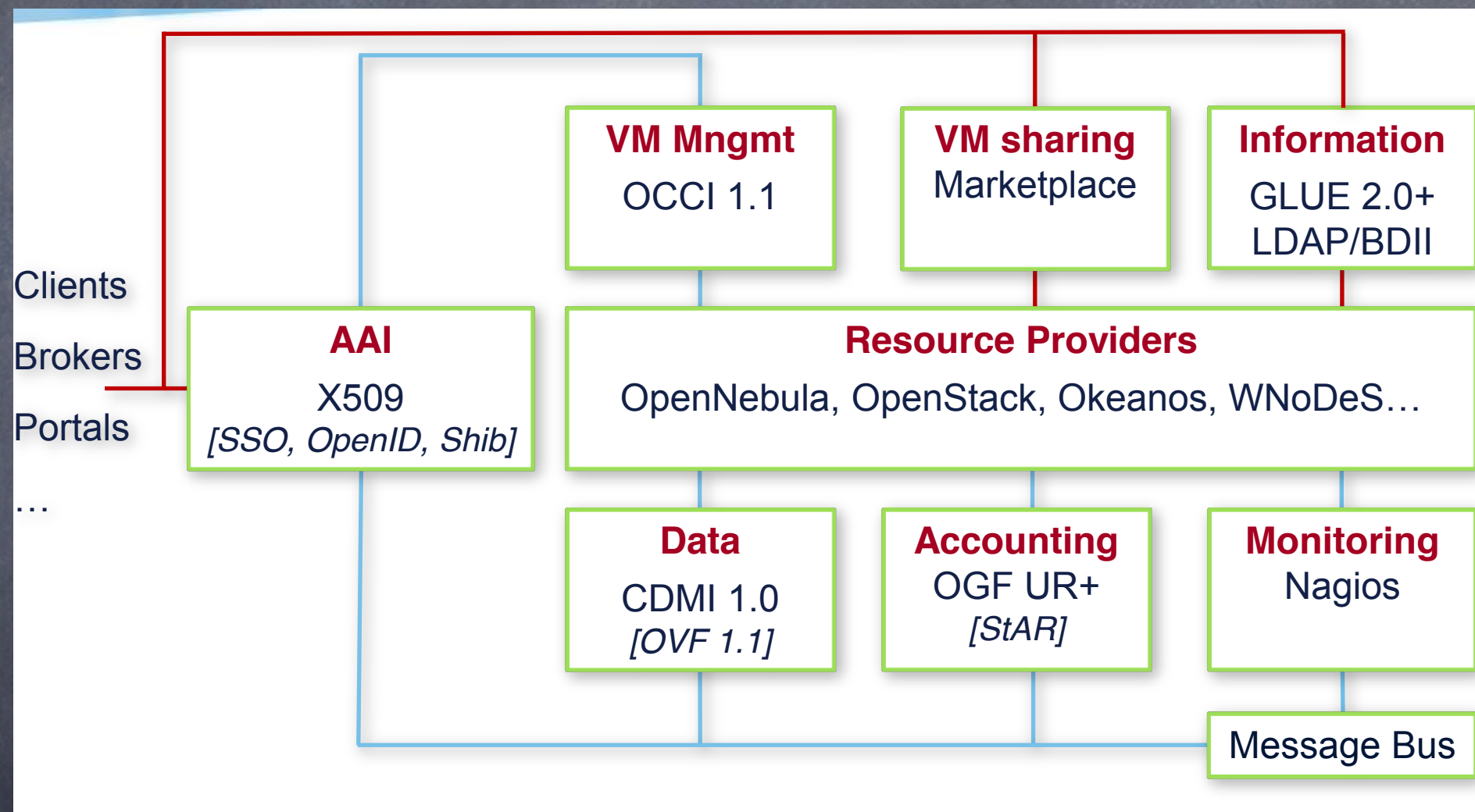
- Metrics
- Availability -> performance



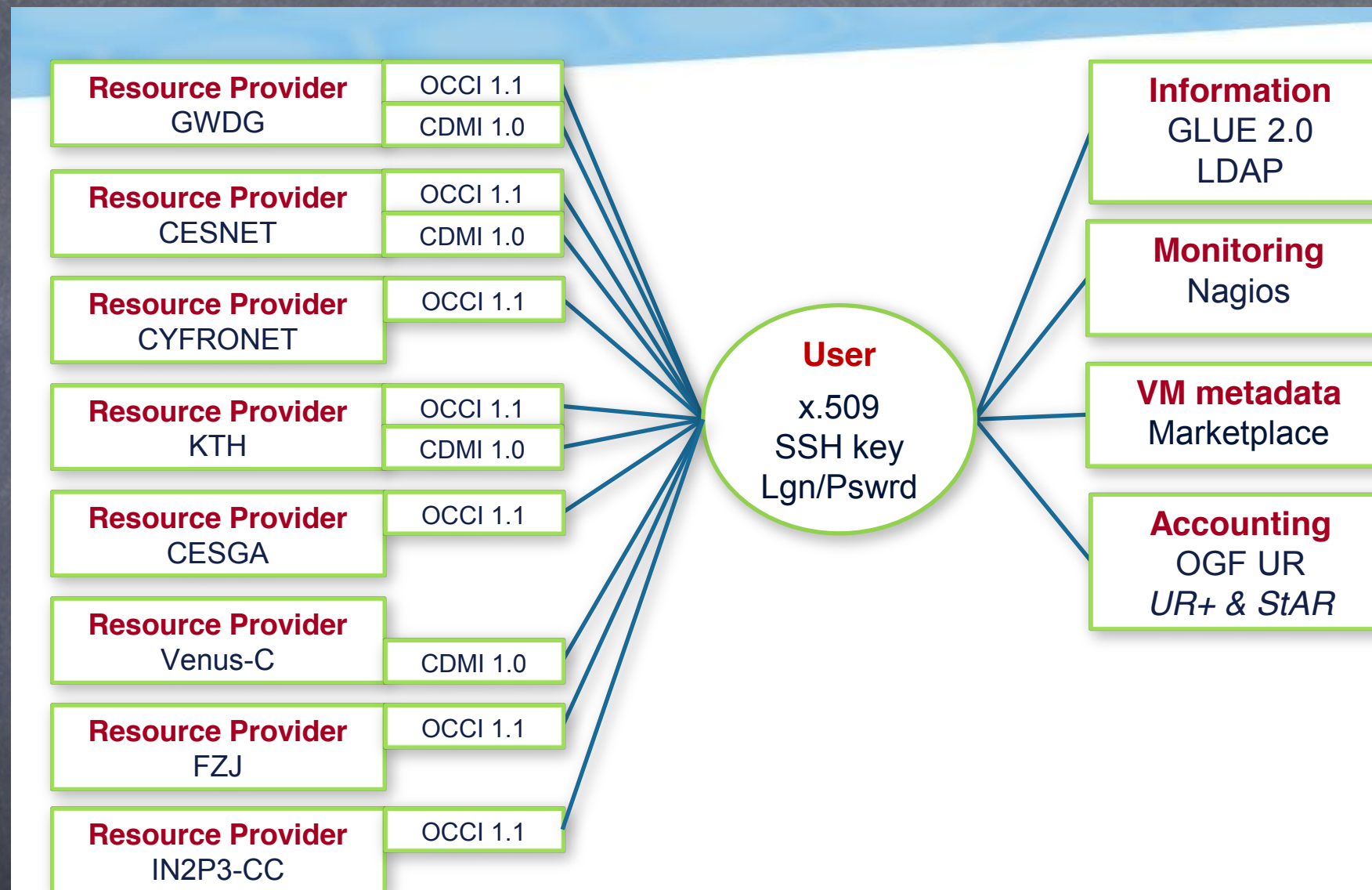
EGI Cloud Federation



Components



Architecture



Issues @ Hands

- Workflow (like SWF of Amazon AWS)
- Orchestration service, Scale up/down (like cloudwatch of AWS)
- Auditing VM from inside! should we ?
- Bare metal IaaS to apps. (Galaxy, Mapreduce , Spark ...)
 - **But platform security is even harder !**

Thanks

QA

@zeeshanalishah
zashah@pdc.kth.se