Enabling cloud for e-Science with OpenNebula

cloud-devroom@Fosdem'13

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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

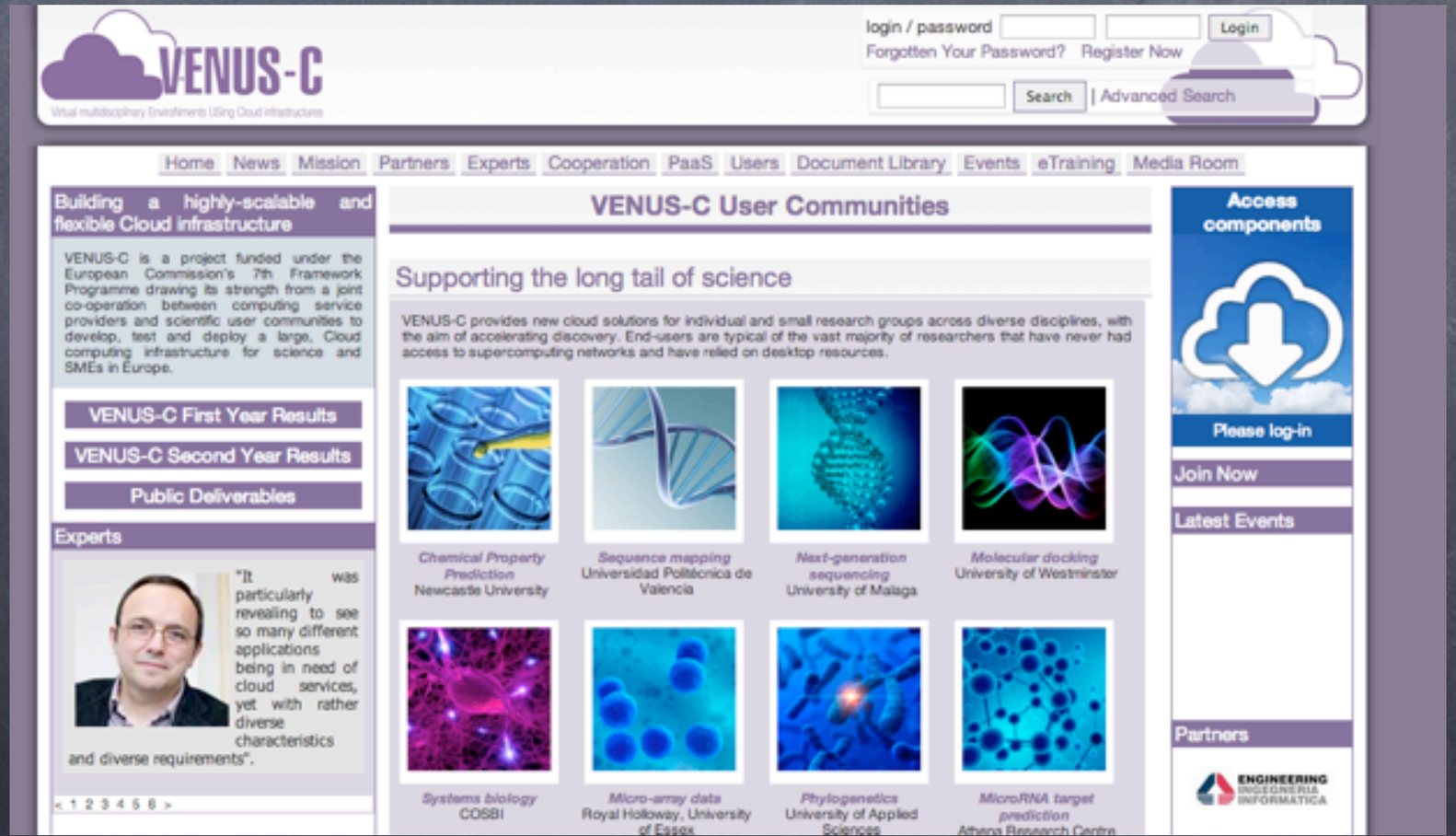
- Initially we focused on bioinformatics
- Currently running on HPC machines
  - That was an issue
- Think in HPC, but an elastic way
  - That was a challenge
- Not all, but some need bursty peaks(longtail users)
  - That was a core proposition

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

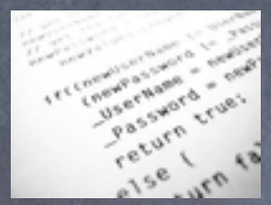
Technical (more)

- 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



bottleneck

SDK

NoDep on sysadmin

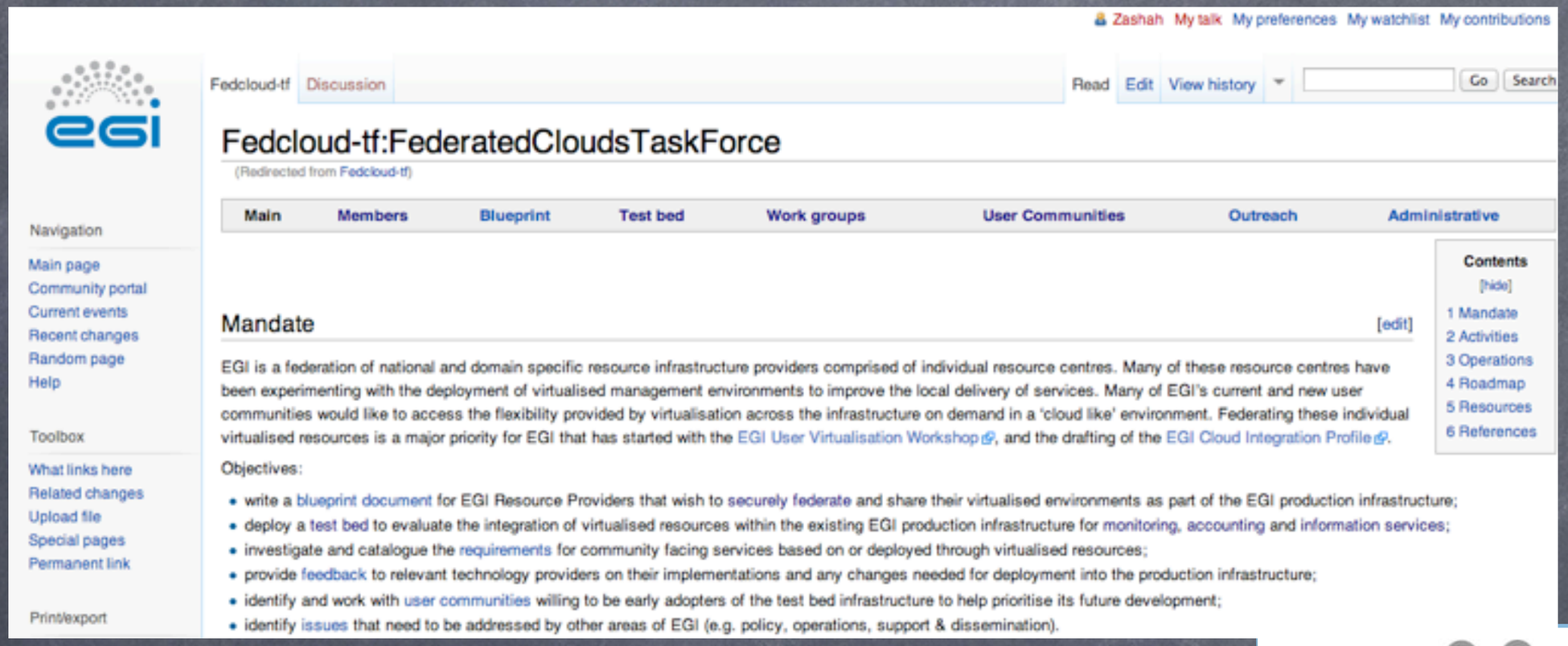
Think compute and storage as an object
(Create/Operate/Destroy whenever you want)

```
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



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

Areas

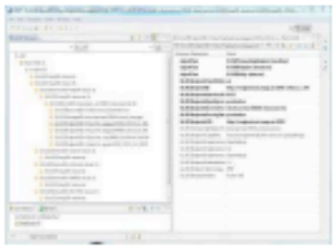
VM Management	. OCCI 1.1 proxy for multiple IaaS
Data Management	. CDMI proxy for multiple IaaS . OVF
Information Systems	. Extended GLUE2 schema . LDAP server
Accounting	. Cloud Usage Record (UR) schema . UR server . UR client for each IaaS
Monitoring	. Nagios with cloud probes
Federated AAI	. X509 certificates . Support for Virtual Organisations (Vos)
Image catalogue	. StratusLab marketplace

Consolidation

Federation
- OCCI/CDMI deployment

?

Notification
- Review available implementations.



Information System
- GLUE2 extension
- upload from the RPs

x.509

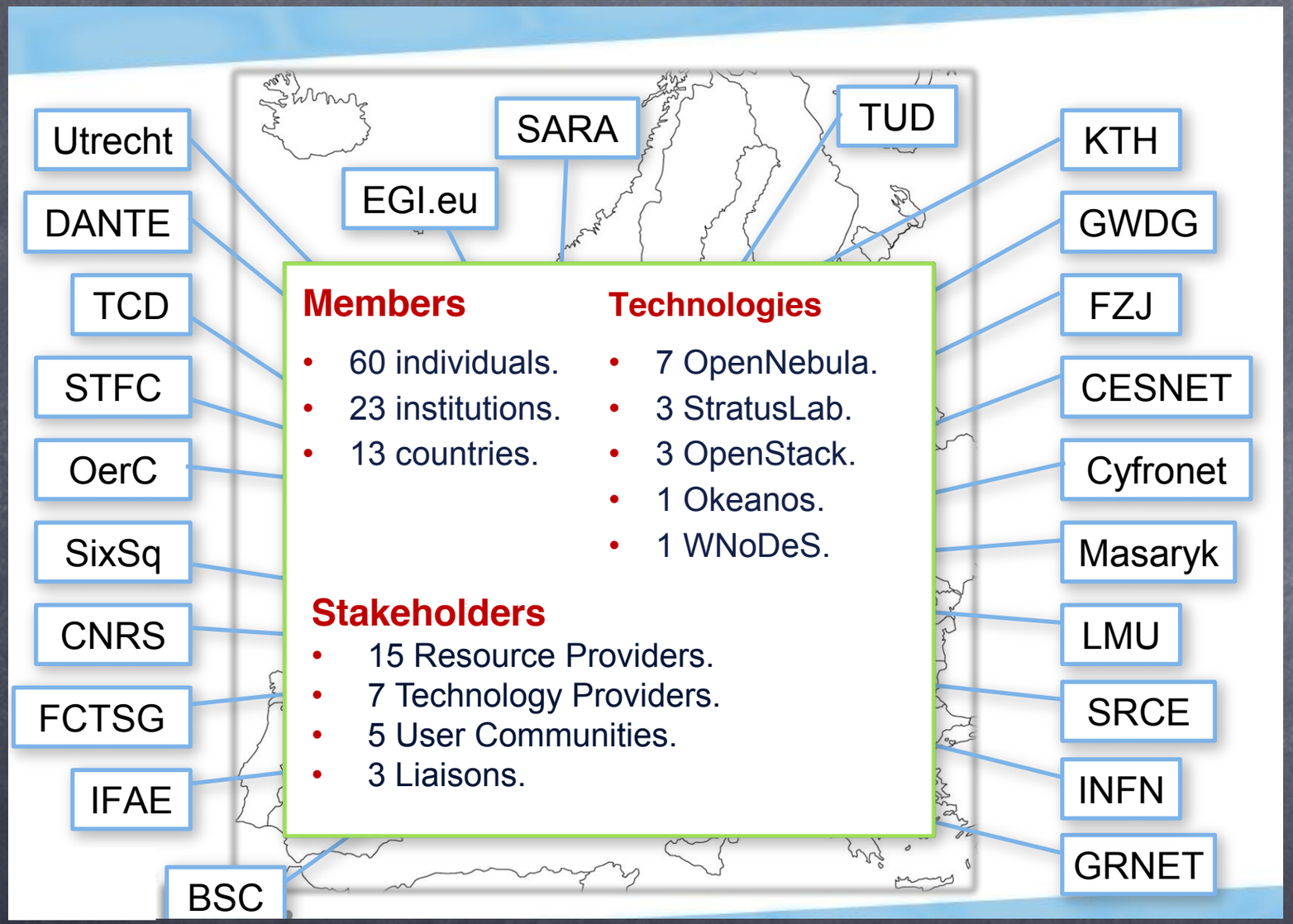
Federated AAI
- RP account integration
- VOMS?

Accounting
- OGF UR extension
- upload clients

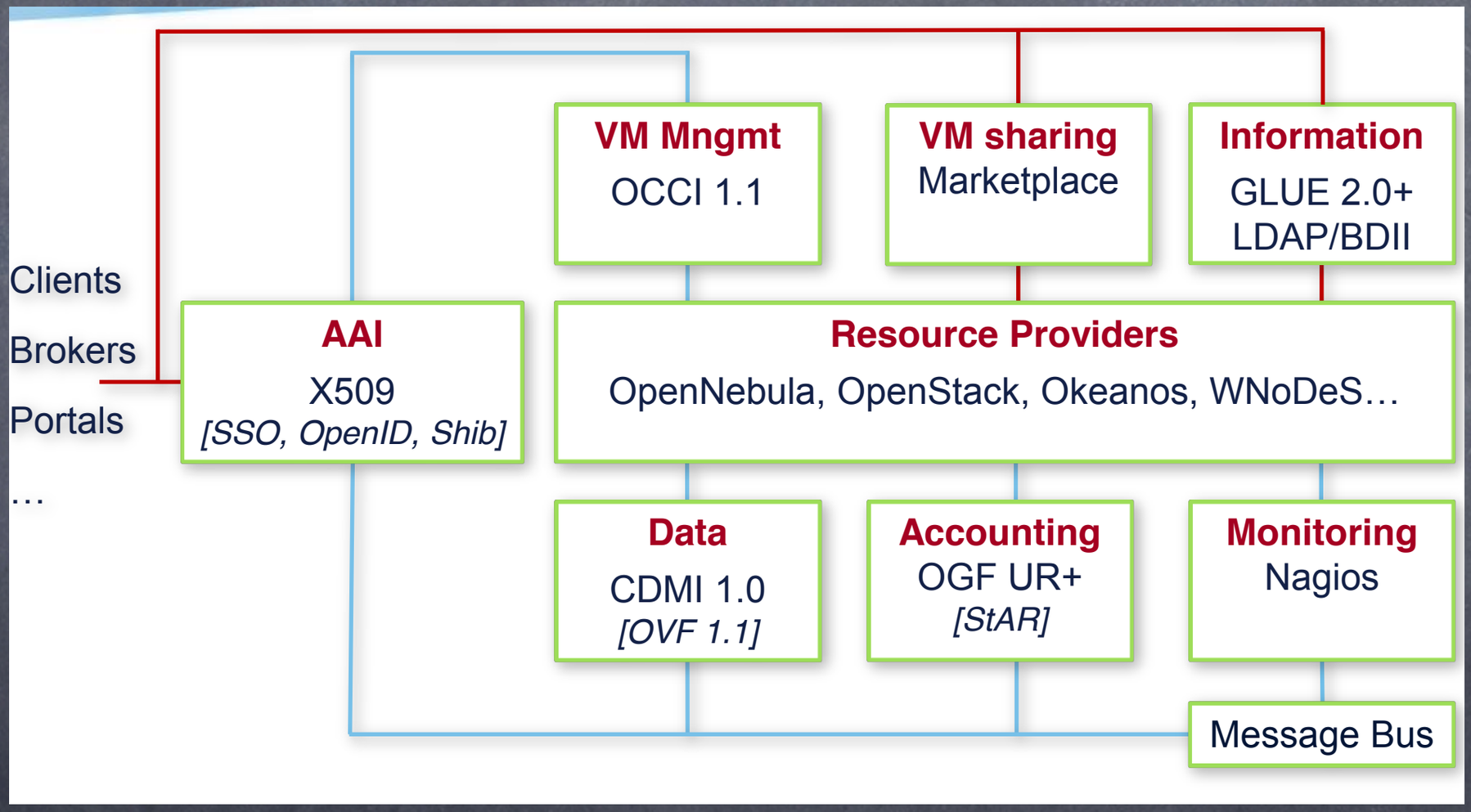
Image management
- Multiple storage model

Monitoring
- Metrics
- Availability -> performance

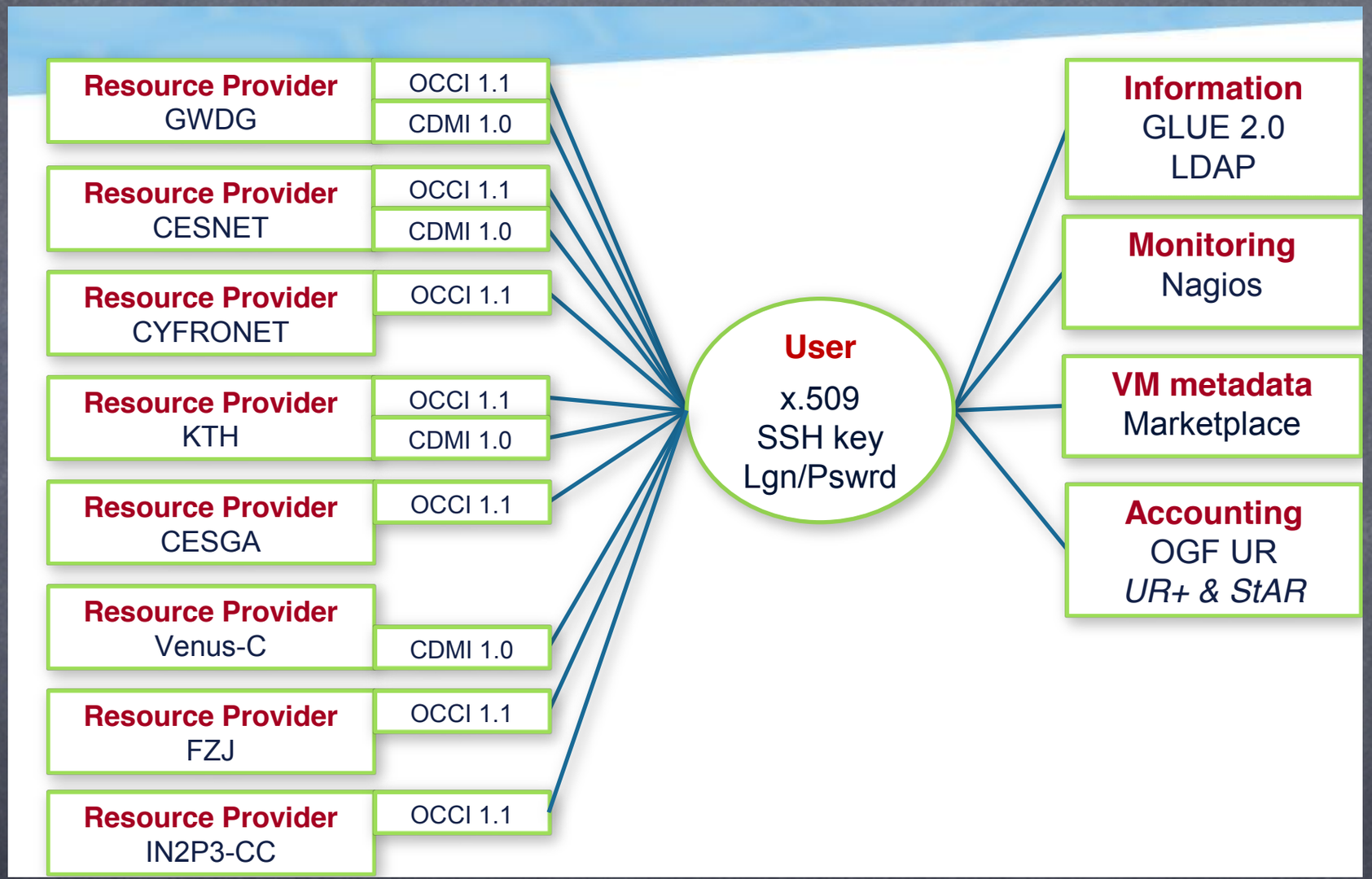
EGI Cloud Federation



Components


Clients
Brokers
Portals
…
VM Mngmt
OCCI 1.1
VM sharing
Marketplace
Information
GLUE 2.0+
LDAP/BDII
AAI
X509
[SSO, OpenID, Shib]
Resource Providers
OpenNebula, OpenStack, Okeanos, WNoDeS…
Data
CDMI 1.0
[OVF 1.1]
Accounting
OGF UR+
[StAR]
Monitoring
Nagios
Message Bus

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

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