CC-IN2P3 cloud computing (IAAS) status

Journées informatiques IN2P3/IRFU
Mattieu Puel – Sept 2012

Agenda

1. Software selection : Openstack

2. Current/incoming features

3. Infrastructure deployment in the cloud

4. Federation aspects (EGI FCTF...)

5. Open questions

1. Software selection :

State of the art

Solution	Presented	Tested	Short-list
OSS solutions			
OpenNebula	🟥	🟩	🟩
Stratuslab	🟩	🟥	🟥
Openstack	🟩	🟩	🟩
Nimbus	🟩	🟥	🟥
Eucalyptus	🟥	🟥	🟥
Cloudstack	🟥	🟥	🟥
Proprietary solutions			
Redhat cloudforms	🟩	🟥	🟥
Canonical Openstack	🟩	🟥	🟥
IBM solutions	🟩	🟥	🟥
VMware vCloud	🟩	🟩	🟩
Oracle VM	🟩	🟥	🟥
Cisco CIAC	🟩	🟥	🟥

1. Openstack (selection process)

Selection criteria :

- 58 criterias (31 judged important, 20 average, 7 low)

- 9 themas : integration (6), storage (5), networking (6), security (2), VMM features (6), cloud manager features (21), availability (3), performance (1), costs (1)

- Examples :
  - Supported interfaces (EC2/OCCI...)
  - Community deployment
  - VLAN tagging
  - Variety of supported storage backends
  - Cost

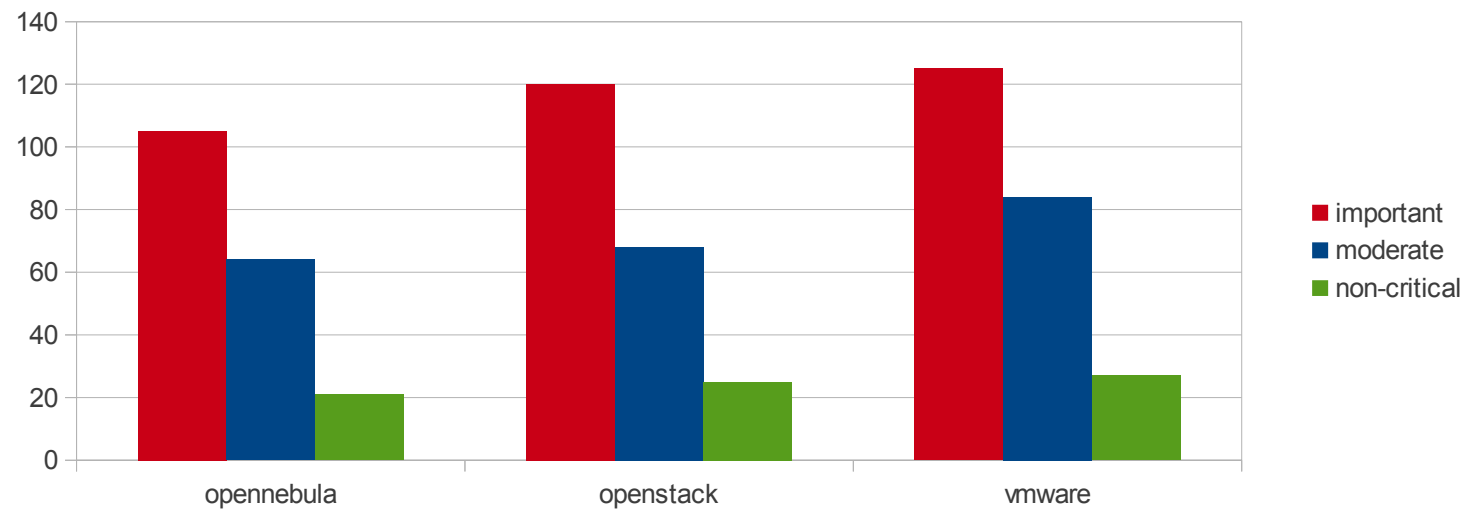- Complete list on EDMS at : CMP evaluation criteria list

1. Openstack (selection process)

Short-list: notation

Type	weight	#	Total	OpenNebula	Openstack	Vmware vCloud
🔴	important	31	155	105 (68%)	120 (77%)	125 (85%)
🔵	moderate	20	100	64 (64%)	68 (68%)	84 (84%)
🟢	non-critical	7	35	21 (60%)	25 (71%)	27 (77%)

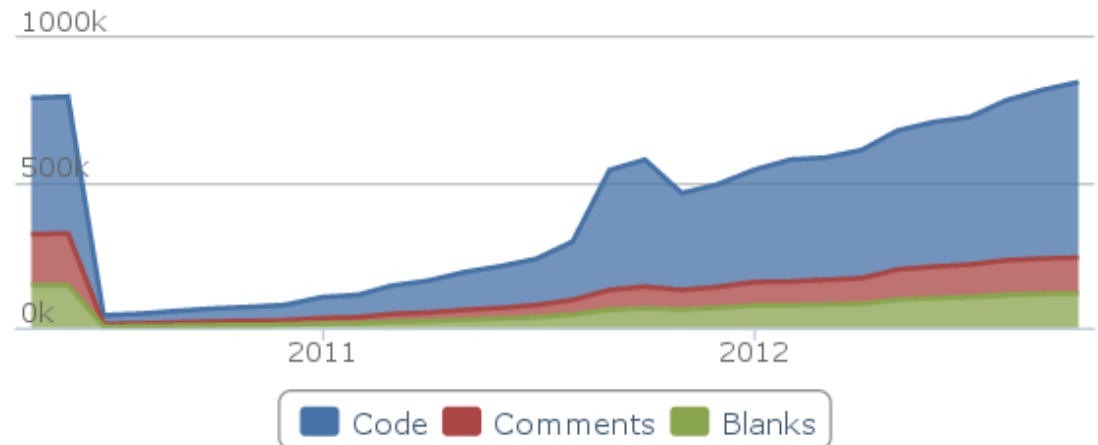## 1- development

- OSS
- Development rate
- Highly modular
- Large ecosystem
- Designed for scaling
- Well organised community

http://www.ohloh.net/p/openstack

Lines of Code

1000k

500k

0k

2011   2012

■ Code   ■ Comments   ■ Blanks

2- strong governance (Openstack foundation)

- **Platinum sponsors :** AT&T, Canonical, HP, IBM, Nebula, Rackspace, RedHat, SUSE
- **Gold sponsors :** Cisco, ClearPath Networks, Cloudscaling, Dell, DreamHost, ITRI, Mirantis, Morphlabs, NetApp, Piston Cloud Computing and Yahoo!

Developers by Employer

Legend:
- Rackspace
- HP
- Red Hat
- Citrix
- Nebula
- Cisco Systems
- Canonical
- Piston Cloud
- Dreamhost
- SUSE
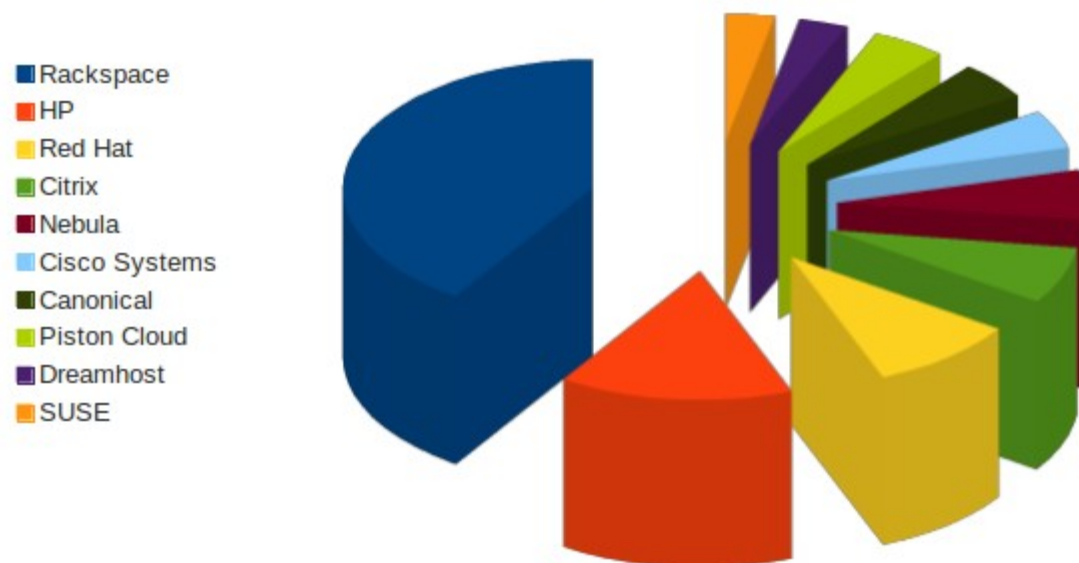
→ Corporate strategy aligned with OpenStack Mission

→ Provide dedicated resources (e.g. developers, legal ressources)

→ Appoint member to the Board of Directors, who must adhere to a code of conduct

→ Provide substantial funding for ongoing activities

3- interoperability

- Standard interfaces (EC2/OCCI) and specifics (Nova API)
- Large image/container format support (vhd, vmdk, qcow2, ami, ovf...)

→ ease federations integration

4- advanced features

- Web dashboard
- EC2/OCCI/Nova interfaces
- Storage cloud (swift)
- Advanced networking features (VLAN tagging, floating Ips...)
- Multiples hypervisors support
- Multi Images format support
- Fine grained privileges management (keystone)
- Fine grained quotas management
- Sub clusters management (cells)
- Block storage provisionning àla EBS, VSA.

5- cost
- TCO = licences fee + FTEs
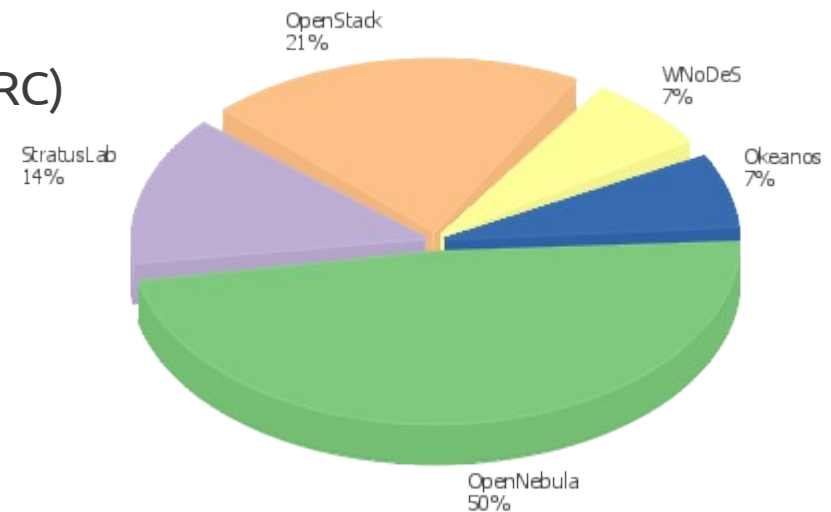- Vmware > Openstack Canonical > Openstack

6- deployment

HEP and academic (GWDG, FZ Juelich, OERC)

- 3 of 14 FCTF sites
- Spreading to detriment of OpenNebula, Eucalyptus, Nimbus...
- Nectar
- CERN

Au sein de la FCTF
(CESGA, CESNET...)

Industry

- Rackspace (2nd largest public cloud provider after AWS)
- HP, AT&T...

7- cloud momentum

- Leverage expérience of previous solutions
- Crystallizing industry and OSS community efforts

→   consequences : EC2/S3 original native support...

2. Current / incoming features

Current platform (hardware)

16 DELL Poweredge C6100 hosts :
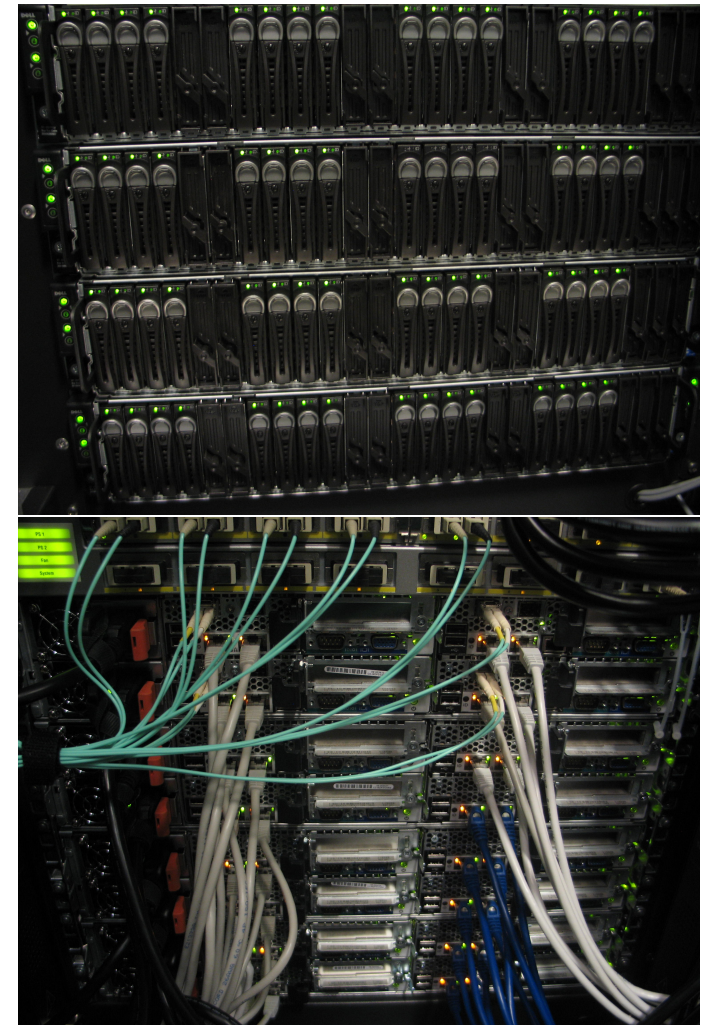 2 Xeon 24cores X5675 @ 3.07GHz
  96GB RAM
  2TB raid 10 local storage (4 SAS 7.2krpm)

Total of 400 cores : **~400 VMs m1.medium**

10Gbps NICS with NPAR/SR-IOv technologies

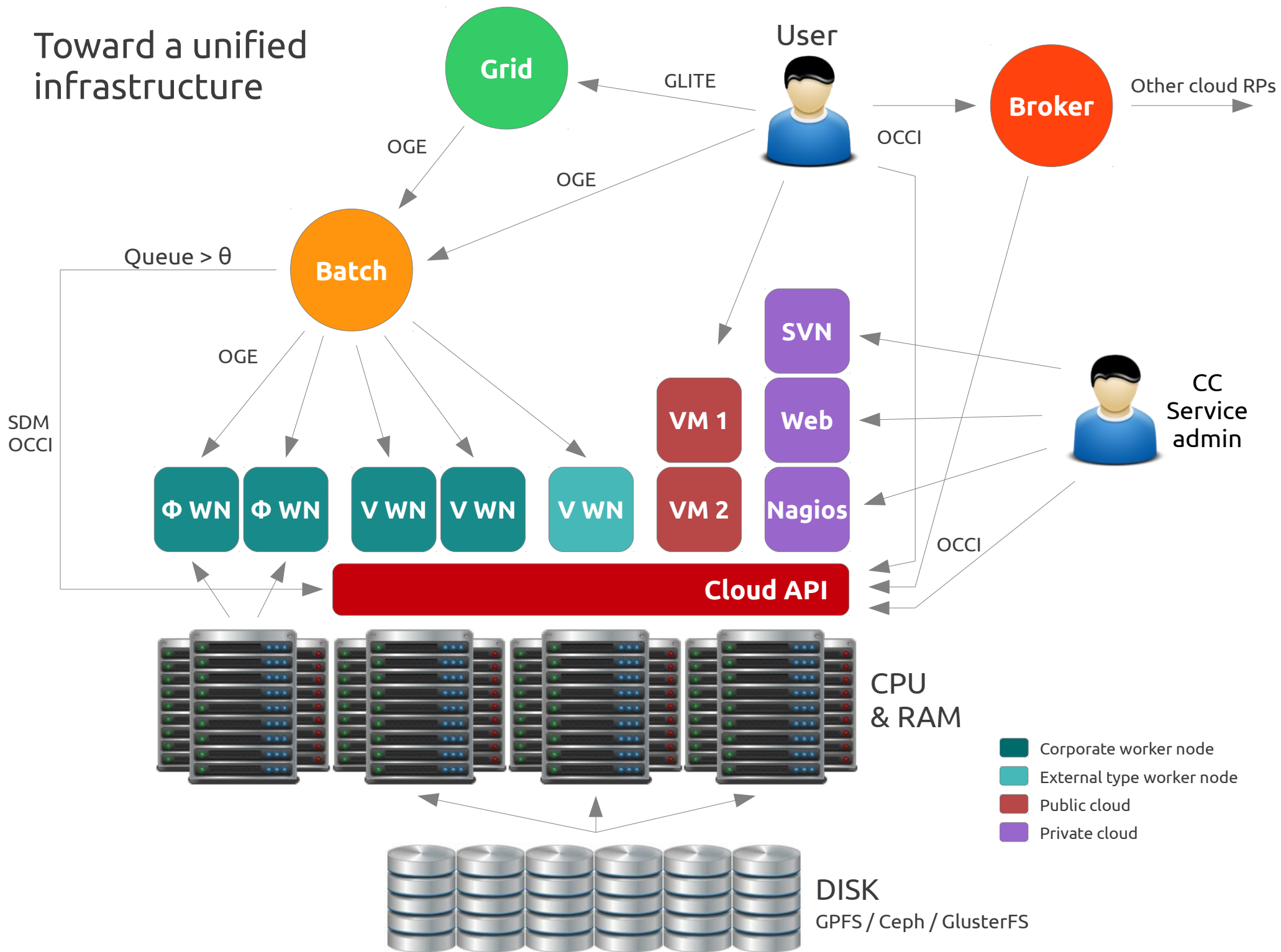VLAN isolation

Features

Current features:

- EC2/Nova API/OCCI
- Access keys injection
- Network access policies (aka secgroups, aka network acls)
- Start/stop/pause/suspend instances
- Snapshots
- Floating (public) IPs

Incoming :

- Dynamic block assignment
- VNC graphic console access
- Live migration
- Storage cloud
- Batch integration

3. Infrastructure deployment in the cloud

Toward a unified infrastructure

Grid

User

Broker — Other cloud RPs

GLITE

OGE

OCCI

OGE

Batch

Queue > θ

OGE

SDM
OCCI

SVN

VM 1

Web

CC
Service
admin

Φ WN   Φ WN   V WN   V WN   V WN   VM 2   Nagios

OCCI

Cloud API

CPU
& RAM

DISK
GPFS / Ceph / GlusterFS

Corporate worker node
External type worker node
Public cloud
Private cloud

4. Federation aspects
(EGI FCTF)

Federation aspects
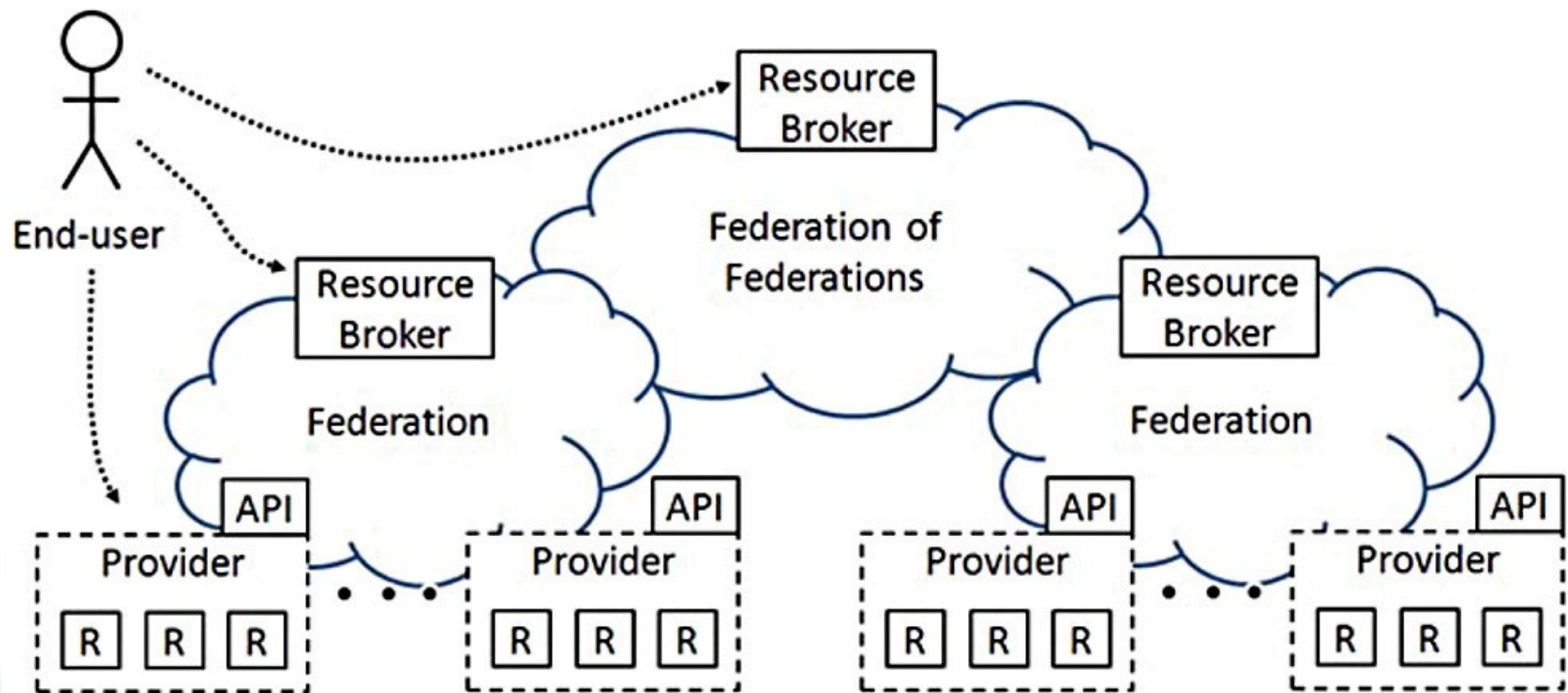
Federation aspects

EGI Fedcloud Taskforce

- **14 RPs:** (BSC, CC-IN2P3, CESGA, CESNET, Cyfronet, FZ Jülich, GRIF, GRNET, GWDG, INFN, KTH, SARA, TCD, OeRC, STFC, SZTAKI)
- Current work/choices:

resources advertisement	**BDII**
unified authN/authZ	**VOMS**
unified interface	**OCCI**
placement policies	**ø**
images sharing	**Stratuslab Marketplace**
aggregated accounting	**APEL/SSM**
brokering	**CompatibleOne**

5. Open questions

Open questions

- ## Responsibility transfer
  - Loss of expertise, added value ? (hoster model)
  - Worldwide competition
  - What kind of support ?

- ## Flexibility plays for/against users ?
  - Different kind of users

- ## New HTC paradigm vs grid ?
  - Scalability/elasticity

- ## Impact on security policies
  - Root access
  - Image upload
  - Respect for contractual best practices

Thanks !

Project	CC-IN2P3 IAAS cloud
Contact	ccloud-tech-l@in2p3.fr
Project leaders	Hélène Cordier Mattieu Puel
Cloud admins	Pierre-Emmanuel Brinette Rémi Ferrand Adrien Georget Jacques Garnier Aurélien Gounon Alvaro Lopez Garcia
Other involved people	Jérôme Bernier Laurent Caillat-Vallet Benoît Delaunay Loïc Tortay
Support team	Yonny Cardenas Sébastien Gadrat Rachid Lemrani Sinikka Loikkanen Aresh Vedae