Dziedzinowo zorientowane
usługi i zasoby infrastruktury
PL-Grid dla wspomagania
Polskiej Nauki w Europejskiej
Przestrzeni Badawczej

Cloud services in PL-Grid and EGI Infrastructures

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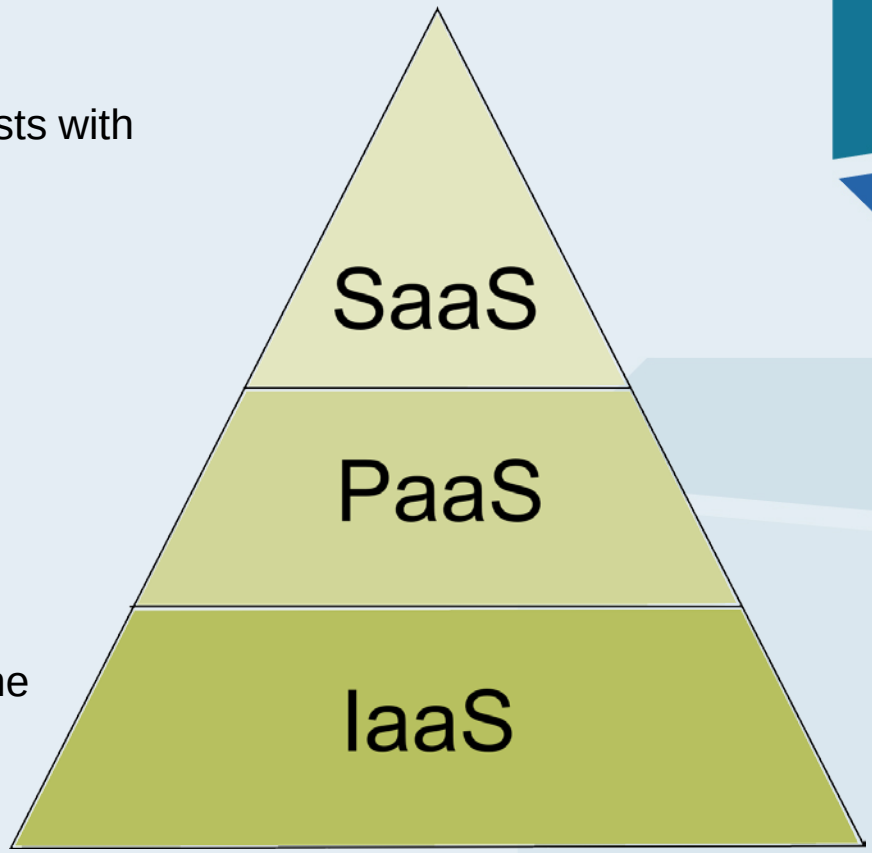
Overview

- Different types of Compute Clouds
- Clouds vs. EGI and NGIs
- General concept of the Cloud Federations
- EGI Federated Clouds Task Force
- Cyfronet’s Cloud Platform
- Conclusions

IaaS vs. PaaS vs. SaaS

Different types of Clouds – different use cases and users

- Infrastructure as a Service (IaaS)
  - The most basic one
  - Offer full flexibility to build custom platform
  - Requires most effort to maintain
  - Well suited for so-called “power users” such as scientists with the need to build platform upwards from bare OS level
- Platform as a Service (PasS)
  - Enforces specific development environment(s)
  - Considerably less maintenance effort
  - Well suited for regular software developers
- Software as a Service (SaaS)
  - Fixed functionality
  - No maintenance effort
  - Well suited for anyone whose needs are satisfied by the provided functionality



Role of the EGI and NGIs

EGI is responsible for coordinating NGIs efforts to provide homogenous and accessible e-Infrastructure for the European scientists.

This clearly includes encouraging NGIs to provide Cloud Services such as the IaaS – but we need to go beyond single provider…

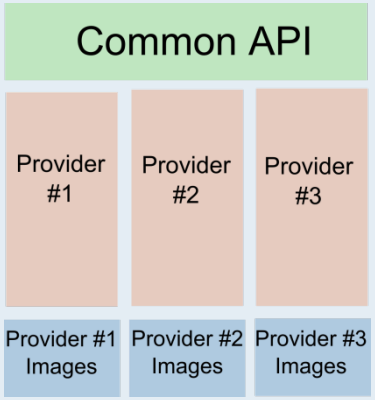
Cloud Federations

- Formed by a group of cooperating Cloud providers
- Providers are independent
- Cloud middleware don’t have to be enforced
- Requires interoperability mechanisms
- Users may choose most suitable offer
- Depending on integration level federation could be classified as “loose” or “tight”

Loose vs. Tight Cloud Federation

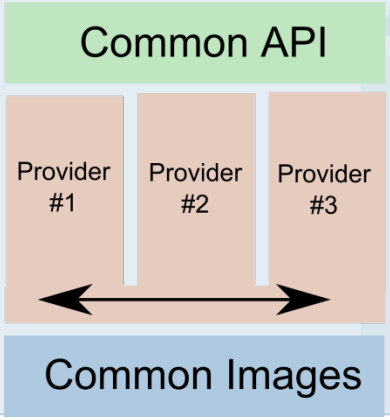
Loose Federation

- Common API and client software
- VMs may be instantiated on any provider but cannot be migrated between providers
- OS Images and Templates are independently stored and provided by each provider
- No need to enforce common cloud middleware or provide on-the-fly image conversions
- No specific QOS requirements on WAN connection between providers



Tight Federation

- Common API and client software
- VMs may be instantiated and migrated between on/between providers
- Common set of Images/Templates is stored in centralized location or synchronized
- Common middleware must be used or complex interoperability mechanisms
- WAN connection bandwidth between providers must be sufficient to allow image synchronization and block/VM live migration in reasonable time



EGI Federated Clouds Task Force Overview

- Is aiming for creation of the Loose Federation of Cloud Providers

- Has joined together multiple:
  - Resources Providers
  - Technology Providers
  - Users Communities

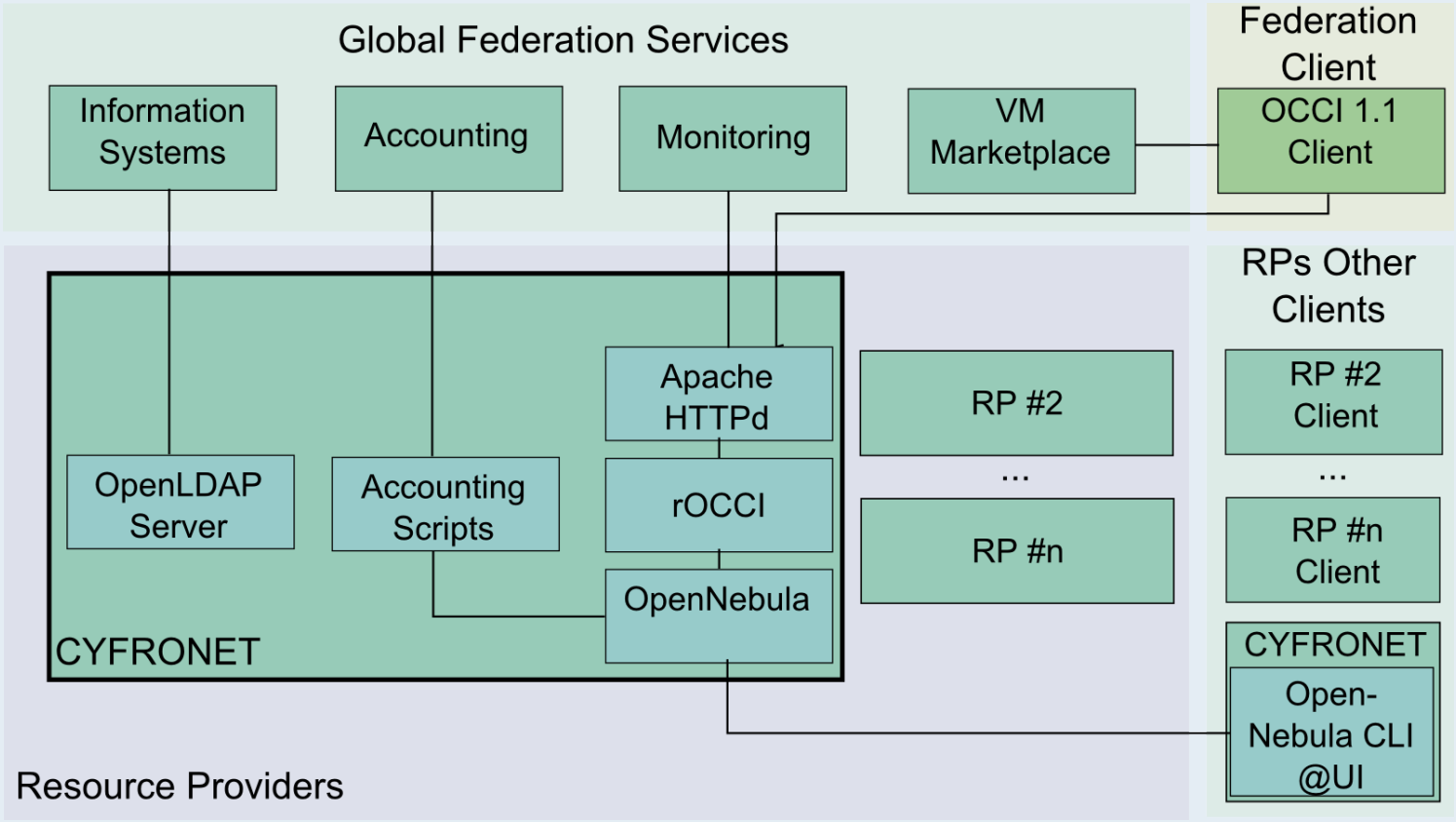
- Provides:
  - Document describing Federated Cloud usage scenario (Blueprint)
  - Test bed – a working federated Cloud system for usage by scientific communities

EGI Federated Clouds Task Force Requirements

Each Resource Provider needs to fulfill a set of requirements:

- Provide at least OCCI 1.1 API
- No middleware is enforced if the mentioned API is supported
- Provide integration mechanism with Information Systems (BDII), Accounting and Monitoring
- Secure the endpoint with X.509
- Provide a set of OS images (stored locally)
- Publish metadata describing images to central repository – EGI VM Marketplace

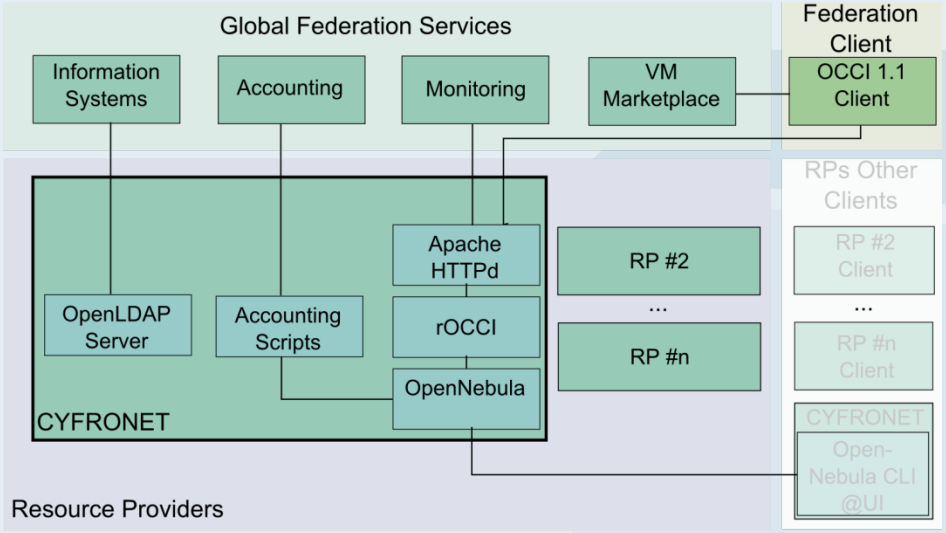
EGI Federated Clouds Task Force Architecture



Cyfronet's Test Bed (Services For EGI)

Cyfronet as Polish NGI has created cloud test bed in compliance with the requirements of the EGI Federated Clouds TF:

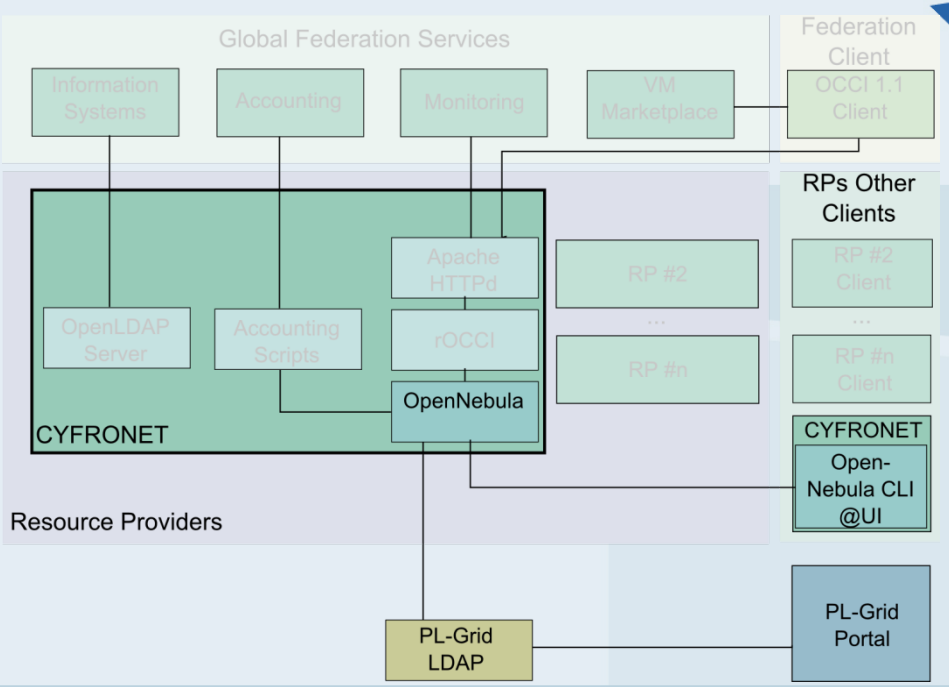
- OCCI 1.1 – provided by rOCCI server for OpenNebula
- Information Systems – Local OpenLDAP - data aggregated by Top-BDII
- Accounting – Usage records extracted and sent to central accounting subsytem
- Monitoring – Instalation is monitored through Federation's Nagios
- AuthNZ (X.509) – provided by Apache HTTPd and rOCCI
- VM Marketplace – two images' metadata available



Cyfronet's Test Bed (Extra Services For PL-Grid)

In addition we're also working on providing additional services just for the users of the PL-Grid infrastructure:

- Integration with the PL-Grid Portal
- AuthNZ based on the PL-Grid Accounts (plg* users)
- CLI on the Cyfronet's UI node
- Network configuration solution for TCP/UDP port redirection as well as providing VPN based remote access



EGI and PL-Grid PLUS Use Cases

We've already been working on some real-life use cases:

- EGI Federated Clouds:
  - Instantiation of plain (Debian) VM using OCCI 1.1
  - Service for processing the British National Corpus (BNCweb)
- PL-Grid PLUS:
  - Instantiation of plain (Ubuntu) VM using native OpenNebula CLI
  - Initial work on supporting SynchroGrid community

Conclusions and future work

- We have already:
  - Created OpenNebula based Cloud test bed
  - Integrate the test bed with the EGI Cloud Federation and the PL-Grid Portal
  - Take active part in the FedCloud Demos by running it’s use cases
  - Start working with PL-Grid PLUS domain scientists

- In the near future we plan to:
  - Extend the test bed as well as provide fully tested production grade infrastructure for both projects.
  - Continue to work toward full EGI Federation.
  - Seek optimal ways for creation of the PL-Grid Federation with other project partners.
  - Work with users of both projects to support their use cases.

Thank you for your time !

Questions ?