Cloud Services in PL-Grid and EGI Infrastructures

Jan Meizner, Marcin Radecki, Maciej Pawlik, Tomasz Szepieniec

AGH University of Science and Technology, ACC Cyfronet AGH,
ul. Nawojki 11, 30-950, Krakow, Poland
emails: {j.meizner,m.radecki}@cyfronet.pl

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1. Introduction

Goal of this paper is to describe Federated Clouds Infrastructure created for the EGI with particular focus on the platform deployed at CYFRONET in the scope of the PLGrid Plus project. The concept of Clouds is a highly important one in all branches of the IT. IaaSes like Amazon Web Services [1] are well suited for building low-level solution, PaaSes like Google App Engine [2] offers programmers way of manageable deployment and hosting of their applications. Finally SaaSes like Gmail [3] are commonly used by regular people. Moreover computer centers are providing Cloud for scientists (private, community). Going beyond clouds operated by a single entity is possible with the creation of the cloud federations such as the one described in this paper.

2. Description

One of the most important roles of the EGI is to coordinate individual NGIs efforts to provide homogenous and accessible e-Infrastructure for Europe which includes federating Cloud systems through the EGI Federated Clouds Task Force [4]. It joined together multiple Resource Providers (RP), Technology Providers and User Communities. The Task Force (EGI TF) created concept of a "Loose Cloud Federation", which overall concept is shown in Fig. 1.

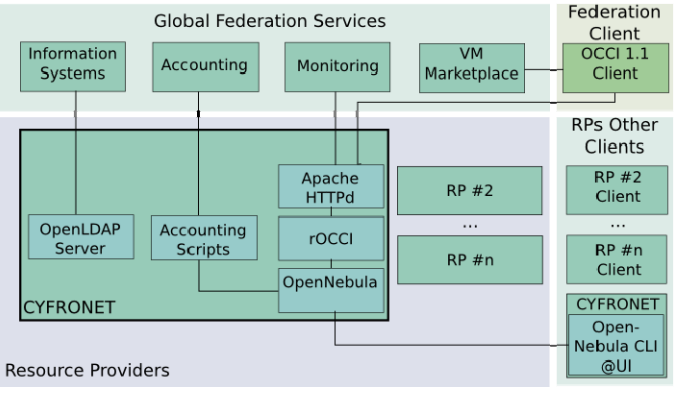

Fig. 1. EGI Loose Federation overview with highlight on CYFRONETs services.

There are a few basic rules for each RP being part of the federation:

- The RP needs to provide at least OCCI 1.1 based endpoint, other may be provided if needed (e.g., CLI on the access node in case of PLGrid Plus).
- No Cloud middleware is enforced as long as the required API is supported.

- The RP needs to provide solutions for integration with certain Global Federation Services such as Information Systems (BDII), Accounting or Monitoring.
- The OCCI endpoint must be secured with the X.509 based mechanism.
- There is no centralized OS image repository – each RP stores them locally, but metadata describing each image for the EGI TF are registered in special registry called EGI VM Marketplace [5].

3. Results

Based on requirements described in previous section we created a cloud testbed that is used both for the EGI TF as well as for the PL-Grid Plus. The Tab. 1 shows how we have fulfilled all current requirements of the EGI Federation.

Tab. 1. Requirements of the EGI Federation and their fulfillment by the platform.

Requirement	CYFRONET Cloud Platform Solution
OCCI 1.1	Provided by rOCCI server for OpenNebula 3.4
Information System	Local OpenLDAP server provides data for aggregation by the federation's Top-BDII LDAP
Accounting	Usage Records are extracted from OpenNebula's database and sent to the federation's accounting subsystem
Monitoring	Installation is monitored by the federation's Nagios
AuthNZ (X.509)	Is provided by the Apache HTTPd and rOCCI
VM Marketplace	Two images' metadata are available at the VM Marketplace

We have also provided additional functionality required for supporting the PLGrid Plus. As a result any Polish scientist could request Cloud access via the PL-Grid Portal. Then he/she may control instances through a client installed on the access node (UI) using his standard user name and password. CYFRONET Cloud was used during EGI live demos (plain Debian image and service for processing the British National Corpus – BNCweb). We're also supporting the PLGrid Plus SynchroGrid use-case.

4. Conclusions and future work

In conclusions we would like to say that in our opinion we have achieved our goal. Cloud platform has been successfully integrated with the EGI Federation. Additionally in the scope of the PLGrid Plus project we have started to work with the domain scientists. Moreover intensive testing by the EGI TF has proven the stability of the solution. In future we plan to continue our work to provide continues Cloud support and extensions for the both projects.

References

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