Contribution ID: **57**   Type: **Presentation**

Atmosphere: A Platform for Development, Execution and Sharing of Applications in Federated Clouds

Wednesday, 11 November 2015 14:50 (20 minutes)

The advent of cloud computing offers new opportunities for developers and users of scientific applications [1]. This paper presents results of research on efficient development, federation, execution and sharing of cloud computational services.

We have investigated methods for integration of heterogeneous public cloud infrastructures into a unified computational environment, cost optimization of application deployment in a heterogeneous cloud environment (choosing optimal resources given the available funds), federated data storage mechanisms with extensions for public storage services, and dealing with resource demand spikes (optimization of platform middleware and user interfaces).

This research was undertaken as a part of the EU VPH-Share project [2] and resulted in a platform called Atmosphere [2, 3] Recently, Atmosphere which has also become a part of the PLGrid e-infrastructure [4].

Atmosphere supports an iterative service development process. Computational software is exposed as a set of so-called Atomic Services (virtual machines (VMs) that can be created on demand from VM templates) which can be used either as standalone tools or as building blocks for larger workflows. Developers may iteratively construct new services which may be published, shared, or subjected to further development. Once published, services can be instantiated (executed) and made available on the Web for the community. In this way, with the help of a Web-based user interface, the platform provides an integrated tool supporting development and publishing of services for the entire VPH community.

Atmosphere provides a full middleware stack, complete with end-user interfaces and APIs, enabling service developers to create, register and share cloud services, and end users to instantiate and invoke their features. Atmosphere federates 5 cloud IaaS technologies (OpenStack, EC2, MS Azure, RackSpace, Google Compute), 7 distinct cloud sites are registered with the VPH-Share infrastructure, there are over 250 Atomic Services available, and about 100 service instances are operating on a daily basis.

Atmosphere has been used to host complex applications from several projects of the VPH community [5]: VPH-Share, MySpine, ARTreat, VPH-DARE and pMedicine as well as for medical students trainings at the University of Sheffield, the Jagiellonian University Medical College, and Karolinska Institutet [2, 3].

The platform is being improved in collaboration with application developers in order to ensure that their software can be easily ported to the cloud and provisioned in the PLGrid e-infrastructure.

Links, references, publications, etc.

[1] Strategic Plan for a Scientific Cloud Computing infrastructure for Europe, published by CERN/ESA, CERN-OPEN-2011-036; available at http://helixnebula.commpla.com/uploads/11/CERN-OPEN-2011-036-pdf.html

[2] The VPH-Share project website; http://www.vph-share.eu/

[3] The DICE Team website; http://dice.cyfronet.pl/projects/ and http://dice-cyfronet.github.io

[4] M. Bubak, J. Kitowski, K. Wiatr (Eds.): eScience on Distributed Computing Infrastructure, LNCS, Vol. 8500. Springer, 2014

[5] VPH Institute website: http://www.vph-institute.org/

Additional information

Primary author: Dr BUBAK, Marian (ACC Cyfronet and Department of Computer Science, AGH University of Science and Technology, Krakow, Poland)

Co-authors: WILK, Bartosz (ACC Cyfronet AGH, Krakow, Poland); HAREZLAK, Daniel (ACC Cyfronet AGH, Krakow, Poland); MEIZNER, Jan (ACC Cyfronet AGH, Krakow, Poland); Dr MALAWSKI, Maciej (ACC Cyfronet AGH and Department of Computer Science, AGH Krakow, Poland); KASZTELNIK, Marek (ACC Cyfronet AGH, Krakow, Poland); NOWAKOWSKI, Piotr (ACC Cyfronet AGH, Krakow, Poland); BARTYNSKI, Tomasz (ACC Cyfronet AGH, Krakow, Poland); GUBALA, Tomasz (ACC Cyfronet AGH, Krakow, Poland)

Presenter: Dr BUBAK, Marian (ACC Cyfronet and Department of Computer Science, AGH University of Science and Technology, Krakow, Poland)

Session Classification: Exploiting the EGI Federated clouds - Paas & SaaS workshop