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Science Gateways and Clouds

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Printable Summary

Science gateways enable researchers to use domain applications and workflows on DCIs (Distributed Computing Infrastructures) without detailed knowledge of the underlying computer resources. They may be seen as the highest level of cloud services that can be provided to scientific end users. However, the service-oriented approach of clouds also allows assembling the underlying building blocks from the cloud, providing all the associated flexibility, modularity and scalability advantages. This talk gives an introduction to using clouds for scientific computing and to constructing science gateways from cloud building blocks. In particular, the approach of the SCI-BUS (SCIentific gateway Based User Support) EU FP7 project is described in detail. Here, WS-PGRADE / gUSE from MTA SZTAKI provides the scientific gateway layer, the CloudBroker Platform the SaaS (Software as a Service) layer and different public or private cloud providers the IaaS (Infrastructure as a Service) layer.

Description of the work

SCI-BUS is a European project supported by the FP7 Capacities Programme under contract no. RI-283481. It aims at developing gateway technology and community gateways to provide researchers with seamless access to major computing, data and networking infrastructures and services, with focus on scientific workflows. SCI-BUS is a collaboration of 15 academic and commercial consortium members and six subcontractors, supporting gateways in various disciplines, such as proteomics, molecular science, seismology, business processes, medicine, rendering, astrophysics, SMEs, software testing, citizen web and heliophysics. SCI-BUS' major generic-purpose gateway technology building blocks are WS-PGRADE / gUSE and the CloudBroker Platform. gUSE is a framework of high-level services to achieve interoperation between DCIs and user communities. Its WS-PGRADE web portal provides scientific workflow management for both application developers and end users, and supports various DCIs including clusters, service grids, desktop grids and cloud. The CloudBroker Platform is a SaaS application store that allows easily offering and using compute-intensive applications on different cloud infrastructures. It can be accessed via a web browser or programmatically, and is available in public pay-per-use as well as hosted or in-house versions. Within the SCI-BUS project, recently an interface to the CloudBroker Platform has been integrated in WS-PGRADE / gUSE, which now allows to easily submit scientific workflow jobs to the cloud. Furthermore, the CloudBroker Platform is being extended to permit users also registering their own public or private cloud resources, giving the freedom to choose IaaS from different providers and tools, such as Amazon Web Services, IBM SmartCloud Enterprise, Eucalyptus and OpenStack.

Link for further information

http://www.sci-bus.eu; http://www.cloudbroker.com; https://platform.cloudbroker.com

Wider impact of this work

Clouds fundamentally change two aspects of computing: 1. the interface between providers and users, and 2. the underlying business model. Science gateways are a way to offer high-level computing services to domain application users, and thus themselves can be designed as cloud services. When also the underlying software and infrastructure resources are obtained from the cloud, a fully modular building and operation of such services is possible, either in-house or outsourced or in a hybrid fashion. This talk will help to better understand how cloud computing impacts computational science and what the SCI-BUS project and the CloudBroker Platform do to ease this transformation.

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