



World Class Standards

Grids, Clouds & Service Infrastructure Interoperability Demonstrations

Summary

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About the Interoperability Demonstration

- ❑ **Format of this Plugtest differs from previous ETSI Grid Plugtests**
 - **Not a grid programming contest but a demo of state-of-the-art products that implement grid, cloud, cluster or related technologies**
 - **Open for anyone to visit**
- ❑ **Goal is to evaluate resource reservation and application deployment onto different infrastructures**
 - **First unbiased evaluation by ETSI of state-of-the-art commercial products and first standard implementations**
 - **Unique opportunity for standardization experts, operators, IT service providers, telecom equipment vendors to see available products**

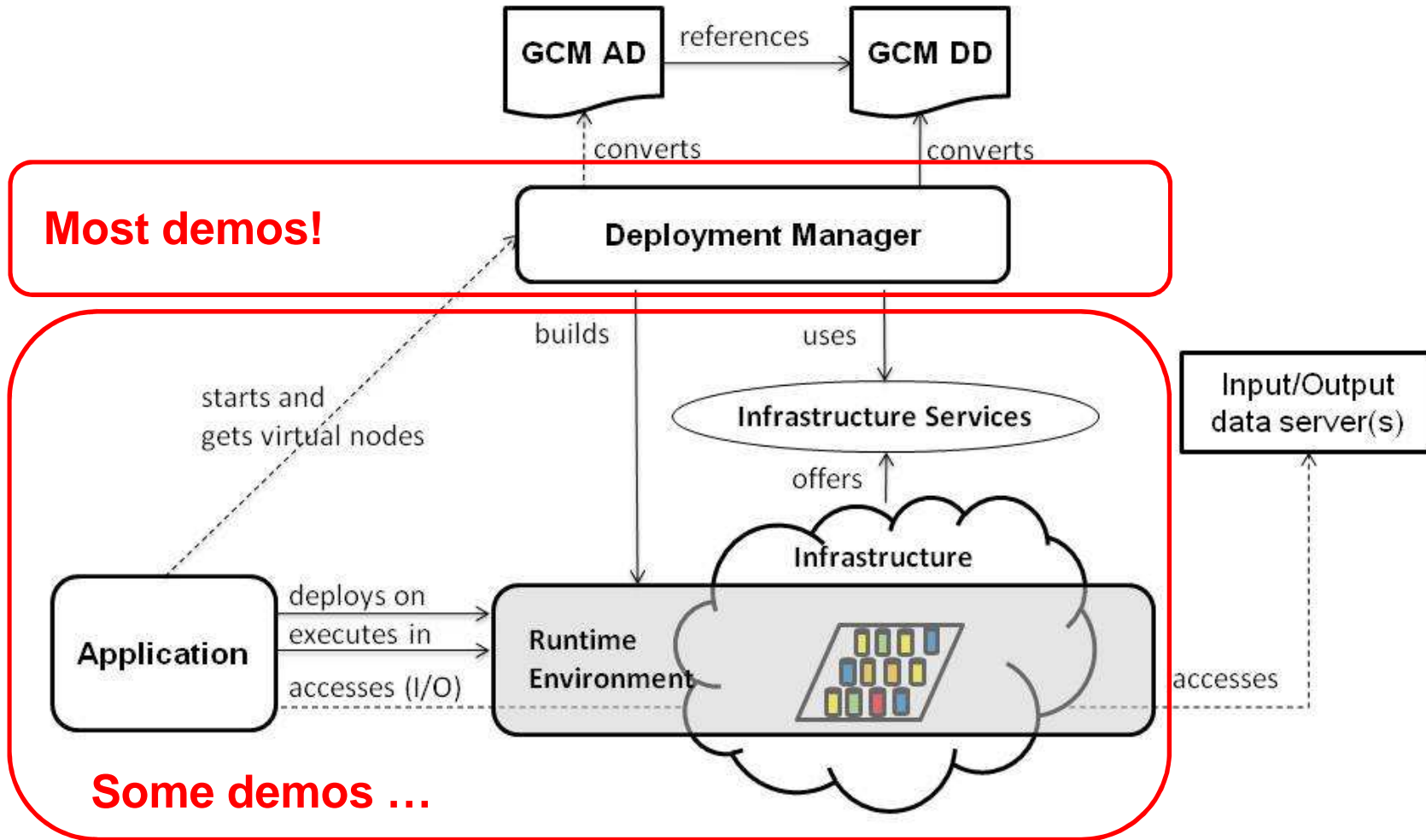


About Demonstration Setup & Evaluation

- ❑ Demonstrations with local as well as remote infrastructures
- ❑ Basis for demo evaluation were a questionnaire as well as use scenarios defined in the ETSI GCM test specification
 - Evaluation performed by independent ETSI team
 - Questionnaire assesses interfaces for resource reservation and preparation of infrastructure as well as standard support
 - Test specification includes use scenarios for infrastructures offering direct and indirect access
<http://www.etsi.org/plugtests/GRID09/Technical.htm>
 - Infrastructures were not required to support ETSI GCM standards and may use their own interfaces for application deployment
- ❑ Vendors also free to show capabilities beyond the requirements of the ETSI use cases



Relation of ETSI GCM and infrastructures



About the products & implementations

❑ 5 commercial products including

- Cloud computing with Sun Grid Engine by Sun Microsystems
 - ETSI GCM with Proactive / LSF / Amazon / Sun Grid Engine / MS HPC Cluster by INRIA
 - IMOD with Amazon / Rackspace / Eucalyptus by Kaavo
 - Cloud computing with tivoli / cloudburst by IBM
- Note that only 4 out of these 5 were evaluated

❑ 3 standard implementations

- ETSI GCM with Proactive
- OGF OCCl with OpenNebula by Universidad Complutense de Madrid
- OGF HPC Basic Profile with Platform Computing / UNICORE / GridSAM / KnowARC by Open Grid Forum

Summary - General

- ❑ **Products mainly deployment managers for IaaS**
 - 1 deployment manager for PaaS
 - 1 cloud management system
- ❑ **About the user interface for resource reservation**
 - Portal or GUI support by all commercial products
 - Either RESTful WS, CLI, or java + XML based API for automated use
 - In general products shield user well from nasty details of reservation
- ❑ **Usually separate handling of resource provision and requests for resources**
- ❑ **Handling of data transfer to/from the computing node is mostly left to the application/user**
 - SSH, FTP, etc

Summary – Resource Provision

- ❑ **Commonly concept of plug-in used to integrate use of different hypervisor and infrastructures**
 - **Monitoring, management and transfer of disk images to virtual machine**
 - **Deployment managers dependent on what concepts API of infrastructure provides (which can vary)**
- ❑ **Usually support for definition of resource specific SLA**
 - **Metrics user defined**

Summary – Resource Request & Access

- ❑ **Concepts used for resource requests & provision**
 - **Computing resource, e.g., nodes, VM, CPU, application “type” / performance requirements**
 - **Storage**
 - **Network**
 - **Service level agreements or objective**
- ❑ **No fixed or common concepts between products but lots of extensibility**
 - **Detailed spec of resource requirement versus class**
- ❑ **Generally automatic setup of computing node once accessible**
 - **Install, start, stop & monitor appliance**
 - **Level of transparency of resource management is product dependent**
 - **Often support for rule based handling of major execution events**
 - **Unsolved problem: Appliance independence of hypervisor**

Summary – Standard Support

- ❑ **Little standard support in commercial cloud products**
 - In cloud domain standard is arguably still in the making
 - Proprietary RESTful WS & XML clearly preferred technologies by products to describe provisioned as well as requested resource
 - Simple basis & extensibility seems very useful
- ❑ **What is used? (excluding standard demos)**
 - ETSI GCM, OGF DRMAA
 - DMTF OVF is evaluated by most vendors – seems that most products use non compliant default configuration but allow adaptation to OVF
- ❑ **Weak points of existing standards**
 - Too many options (OGF JDSL)
 - Require to fix location of resource
- ❑ **Most desired**
 - Standardized API for virtual machine management

Reflections

- ❑ **Key areas for standards, i.e., clear product boundaries**
 - **API for provision of resource**
 - **API for request of resource**
 - **API for management of hypervisors**
- ❑ **Open issues**
 - **How to achieve portability of appliances?**
- ❑ **Some concerns ...**
 - **Lack of agreed terminology**
 - **Freedom to do anything you want**

 - **Need for a strong common denominator**



Thank you!

Comments?

Questions?