Inter-Cloud Architecture for Interoperability and Integration

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Intercloud Infrastructure/Services Provisioning
(General use case: Enterprise/Scientific Workflow deployment on heterogeneous cloud infrastructure)

Multi-layer Cloud Service Models (CSM)

Cloud Services Model Layers
Layer 1 - Physical platform (PC hardware, network, and network infrastructure)
Layer 2 - Cloud virtualisation layer (e.g. represented by VMware, Xen or KVM as virtualisation platforms)
Layer 3 - Cloud virtual resources composition and orchestration layer that is represented by the Cloud Management Software (such as OpenNebula, OpenStack, or others)
Layer 4 - IaaS provided as infrastructure or used for hosting cloud platforms or applications
Layer 5 - PaaS provided as a service or used as a platform for hosting cloud applications
Layer 6 - Saas (or cloud applications) as a top cloud layer that represents cloud applications
Layer 7 - User client or application

CSM is compatible with the NIST Cloud Computing Reference Architecture (CCRA, NIST SP 800-282)

Abstract Model for Infrastructure Services Provisioning

Virtual Infrastructure Composition and Management (VICM) Layer
VCM includes the following layers and components
- Logical Abstraction Layer and the V/VAR Adaptation Layer (facilitating lower level cloud and upper application layer)
- VCM middleware - defined by CSA and implemented as GEMBus as an extended ESB platform for multi-domain applications
- VI Composition Service supporting SAML
- VI Control and Management plane supporting SOF

Main actors involved in provisioning process
- Physical Infrastructure Provider (PIP)
- Can also be a Cloud resources provider
- Virtual Infrastructure Provider (VIP)
- Virtual Infrastructure Operator (VIO)
- Optionally inter-VIP network connectivity for VIO can be provided by Virtual Network Infrastructure Provider (VIPV)

Related links

Basic Use Cases for Intercloud Interoperability and Integration
Use Case 1: Enterprise IT infrastructure migration to cloud and its evolution
- Integration of the cloud based components and legacy infrastructure
- Evolution from general cloud infrastructure services to specialised propriety cloud platform services
Use Case 2: Large project-oriented scientific infrastructures including dedicated transport network infrastructure that need to be provisioned on-demand
Use Case 3: IT Infrastructure disaster recovery that should include both data and supporting infrastructure backup and recovery on possibly new computer/cloud platform

Contributing Projects
GEYSERS - Generalised Architecture for Infrastructure services - http://www.geysers.eu/
GEANT3 JRA3 Task 3 - Composable services (GEMBus) - http://www.geant.net/
COMMIT P3D - e-infrastructures and virtualisation for e-science applications - http://www.commit.nl

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