Intercloud Architecture Framework (ICAF): Federation Infrastructure Components and Open Cloud eXchange (OCX)

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Intercloud Federation Infrastructure
- Part of the Intercloud Access and Delivery Infrastructure (ICADI) (CSM Layer C5)
- Federation Infrastructure services can be a part of the Open Cloud eXchange (OCX) defined to support multi-provider services integration and delivery

Intercloud Infrastructure/Services Provisioning
(Enterprise Workflow deployment on heterogeneous cloud infrastructure)

The Intercloud Architecture Framework components
- Multi-layer Cloud Services Model (CSM) for vertical cloud services interaction, integration and compatibility that defines both relations between cloud service models (such as IaaS, PaaS, SaaS) and other required functional layers and components of the general cloud based services infrastructure, including Intercloud Access and Delivery Infrastructure (ICADI)
- Intercloud Control and Management Plane (ICMP) for Intercloud applications infrastructure control and management, including inter-applications signaling, synchronization and session management, configuration, monitoring, run time infrastructure optimization including VM migration, resources scaling, and jobs/policies routing
- Intercloud Federation Framework (ICFF) to allow independent clouds and related infrastructure components federation of independently managed cloud based infrastructure components belonging to different cloud providers and/or administrative domains; this should support federation at the level of services, business applications, semantics, and namespaces, assuming necessary gateway or federation services.
- Intercloud Operation and Management Framework (ICOMF) includes functionalities to support multi-provider infrastructure operation including business workflow, SLA management, accounting, ICOMF defines the basic rules, actors and their relations in sense of resources operation, management and ownership. ICOMF requires support from and interacts with both ICMP and ICFF.

General Model and Actors in (Inter)Cloud Federations

Main Actors in Cloud/Intercloud Federation
- Cloud Service Provider (CSP) is an entity providing cloud based services to customers, on their request and based on the business agreement or SLA, with high degree of self-service and self-management
- Customer is an entity that requests, creates, deploys and manages cloud based services
- User or consumer is an end-user consuming cloud based services
- Cloud Broker is an entity that plays a role of the third party in offering cloud service, adding value of negotiating with CSPs, optionally operating complex multi-provider services
- Identity Provider (IDP) is an entity providing information about identities of all actors in cloud services provisioning,
  - IDP-IO - by User Home Organisation
  - IDP-CSP by Cloud Service Provider

Open Cloud eXchange (OCX) Definition, Design and Operational Principles
- Direct service/inter-member peering
  - Re-use and leverage Internet eXchange
  - Open collocation services
  - Scalability for growing number of members
  - Controlled network parameters/quotas
- No third party (intermediary/broker) services
  - Transparency for cloud based services
  - No involvement into peering or mutual business relations
- Trusted Third Party (TTP) services
  - To support dynamic service agreements and/or federation establishment
  - SLA Repository and Clearinghouse
  - Trusted Introducer for dynamic trust establishment
- May include other special services to support smooth services delivery and integration between CSP and Customer
  - Local policies, service registry and discovery
  - Trust policies information exchange (I/P/S) or (I/P/S)
- QoS parameter: bandwidth, speed, latency

Intercloud Infrastructure/Services Provisioning

Intercloud Federation Infrastructure

Intercloud Implementation: Hierarchical Topology Model

Related Links
  http://draftintercloud.org/docs/intercloud-architecture-draftV07.pdf
- Cloud Federation Framework. Internal Draft, version 0.1, 2 January 2014.
  http://www.geant.net/ociworth/cloud-federation-framework-v01.pdf

Contributing Projects
GEANT3plus IRAS Task 2 – Network Architectures for Cloud Services
- http://www.geant.net/EBrazil/CloudConnectProject/ebrazilcloudconnect.html

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