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

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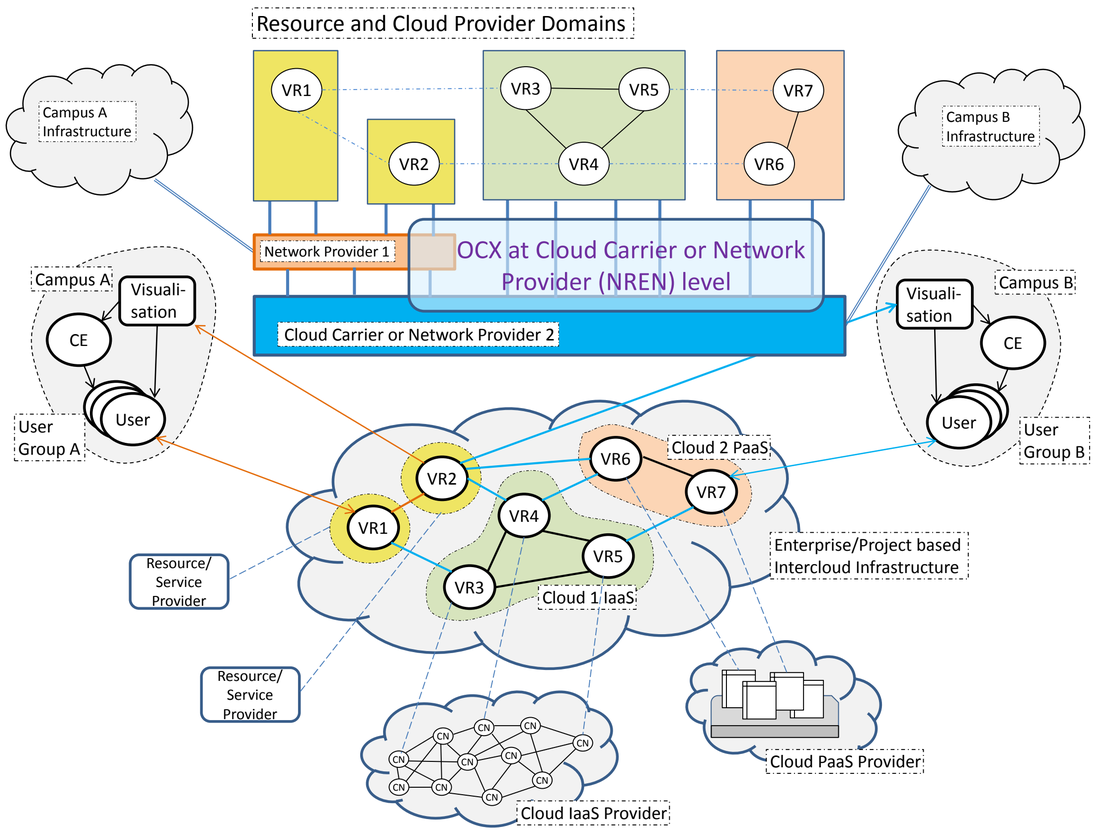
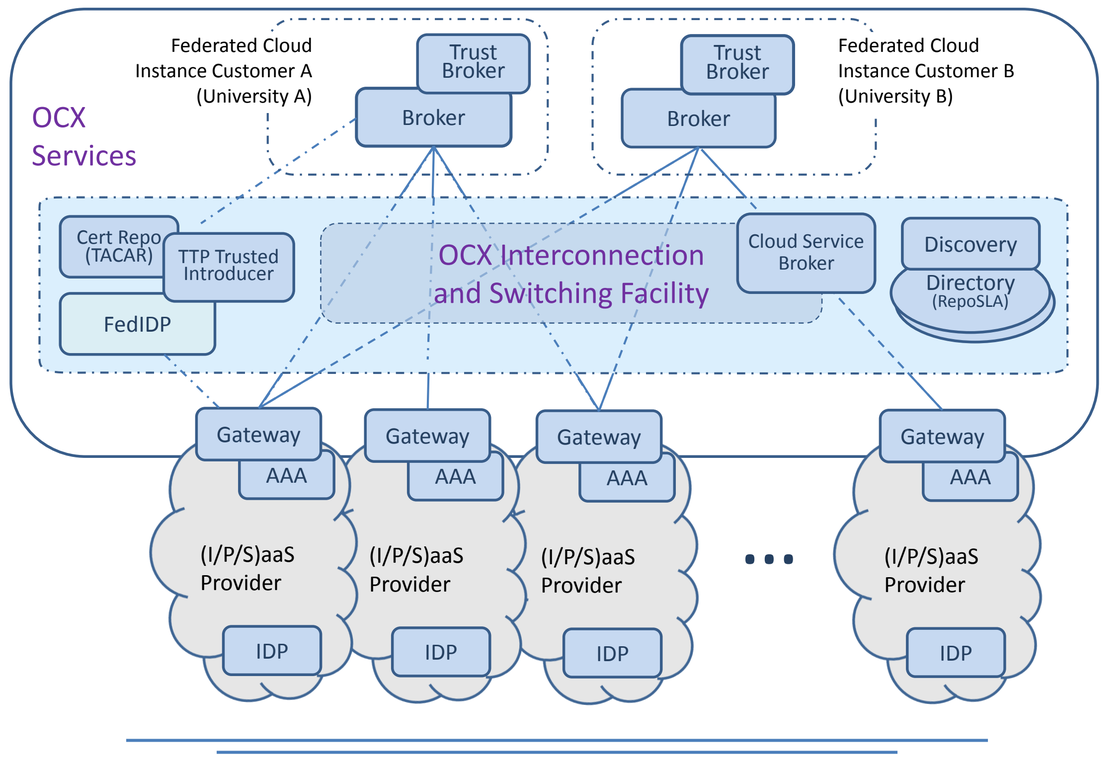
Intercloud Infrastructure/Services Provisioning

(Enterprise Workflow deployment on heterogeneous cloud infrastructure)



Intercloud Federation Infrastructure

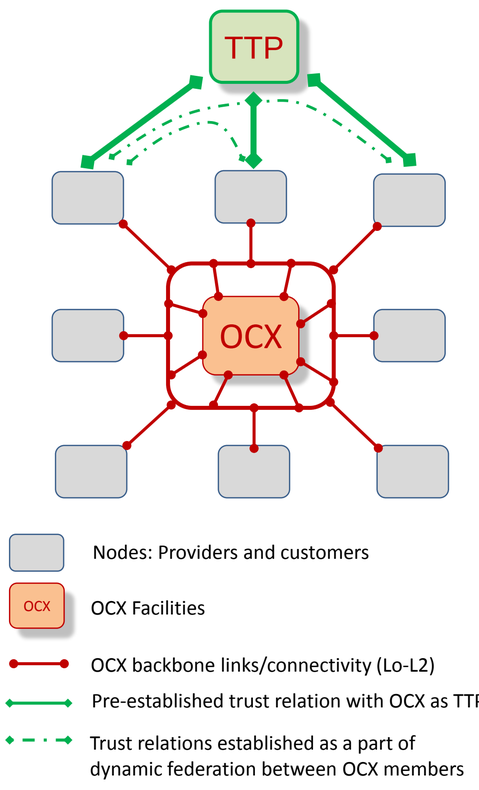
- Part of the Intercloud Access and Delivery Infrastructure ICADI (CSM Layer C5)
- Federation Infrastructure services can be a part of the Open Cloud eXchange (OCX) defined to support multi-provider services integration and delivery



The Intercloud Architecture Framework components

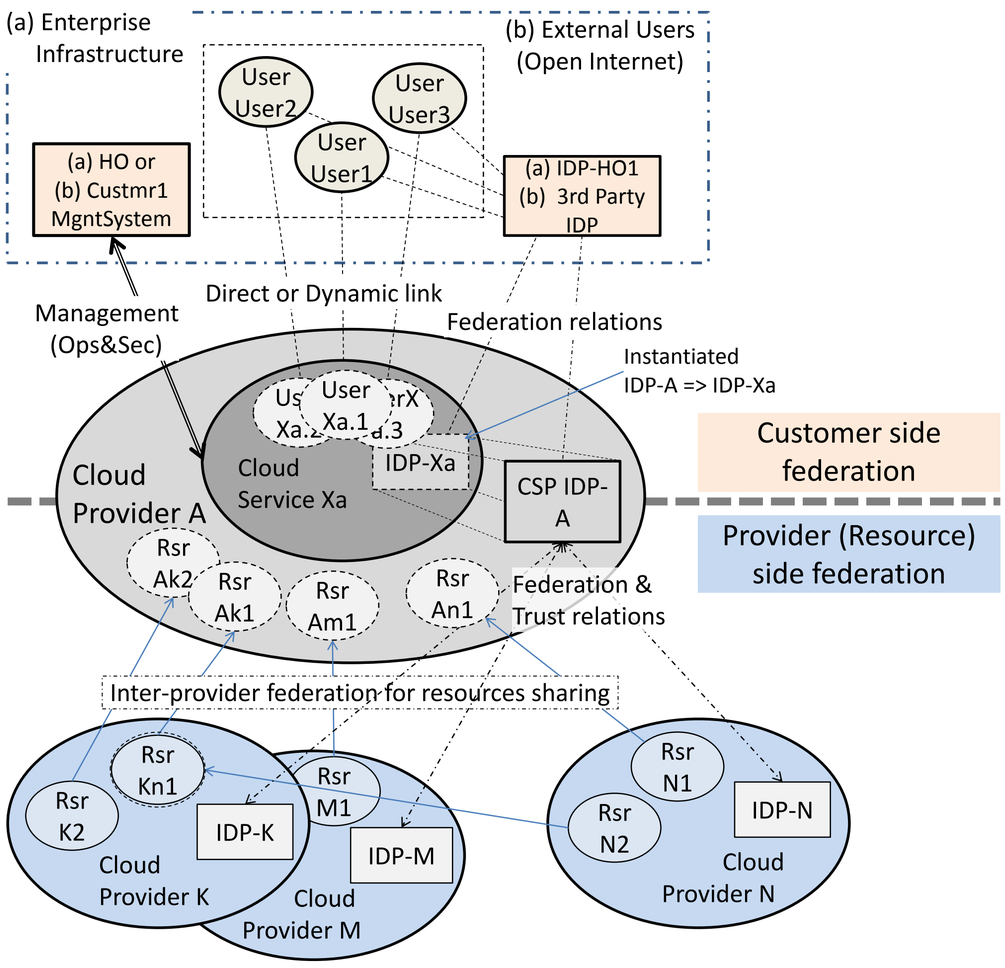
- Multilayer Cloud Services Model (CSM) for vertical cloud services interaction, integration and compatibility that defines both relations between cloud service models (such as IaaS, PaaS, SaaS) and other required functional layers and components of the general cloud based services infrastructure, including Intercloud Access and Delivery Infrastructure/Layer (ICADI).
- Intercloud Control and Management Plane (ICCMP) 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/objects 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 roles, actors and their relations in sense of resources operation, management and ownership. ICOMF requires support from and interacts with both ICCMP and ICFF.

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/QoS
- ***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
  - Topology information exchange L0-L2 (L3)
- QoS parameter: bandwidth, speed, latency

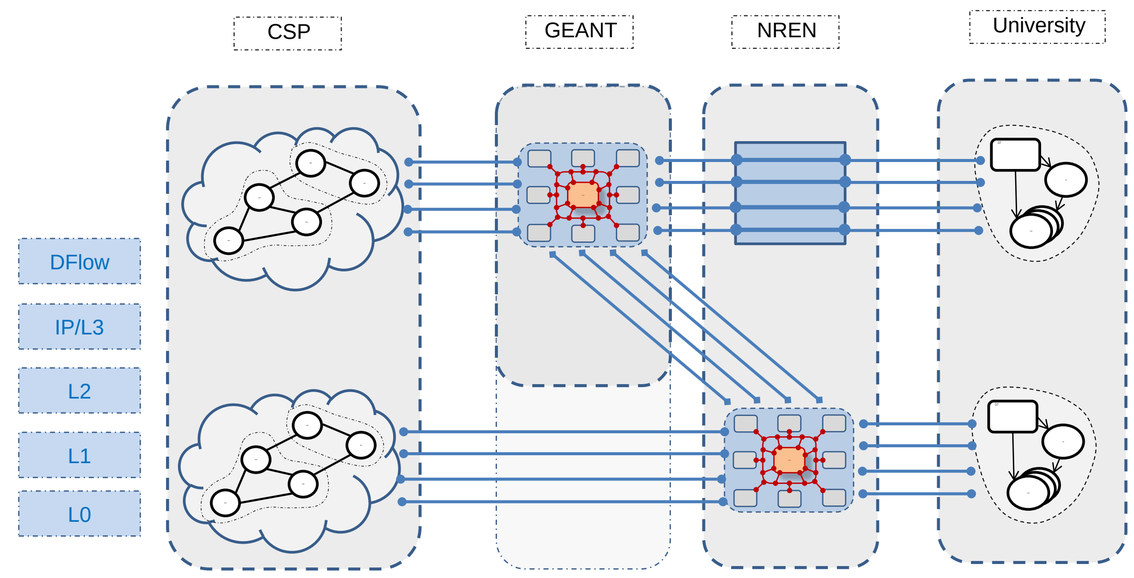
General Model and Actors in (Inter)Cloud Federations



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-HO – by User Home Organisation
  - IDP-CSP by Cloud Service Provider

OCX Implementation: Hierarchical Topology Model



Related links

Intercloud Architecture Framework for Interoperability and Integration, Draft version 0.7, 1 July 2013. SNE Technical Report.
http://staff.science.uva.nl/~demch/worksinprogress/sne2012-techreport-12-05-intercloud-architecture-draft07.pdf
Cloud Reference Framework. Internet-Draft, version 0.6, January 2, 2014.
http://www.ietf.org/id/draft-khasnabish-cloud-reference-framework-06.txt
Open Cloud eXchange (OCX): Architecture and Functional Components. Proc. The 3rd workshop on Network Infrastructure Services as part of Cloud Computing (NetCloud 2013), 2-5 December 2013, Bristol, UK

Contributing Projects

GEANT3plus JRA1 Task 2 – Network Architectures for Cloud Services - http://www.geant.net/
EUBrazil Cloud Connect Project - http://eubrazilcc-rm.i3m.upv.es/projects/eubrazilcc

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