

Introduction and Goals

Cloud computing is a new design pattern for large, distributed data centers. Cloud computing offers end consumers a “pay as you go” model - a powerful shift for computing, towards a utility model like the electricity system, the telephone system, or more recently the Internet.

However, unlike those utilities, clouds cannot yet federate and interoperate. Such federation is called the “Intercloud”. The concept of a cloud operated by one service provider or enterprise interoperating with a cloud operated by another is powerful.

IEEE is creating technical standards (IEEE P2032) for this Interoperability. The IEEE Intercloud Testbed (“Testbed” for short) creates a global lab - to prove and improve the Intercloud.

What Participants will Do

1. Volunteer to re-use existing cloud implementations, or construct a new cloud, of their choice in a well-connected data center in a geography;
2. Join the engineering project to code, test, re-engineer, and contribute to an open source implementation of the Intercloud protocol suite;
3. Adapt protocols to the various cloud platforms and resource types in use in the Testbed;
4. Connect to the reference Intercloud Root and Exchange IEEE which are running;
5. Explore the overall interoperability and applicability of the NSF GENI Project , in particular the trust and governance mechanisms of the GENI-ABAC project.

6. Experiment with cloud federation through, further develop protocols, ontologies, explore topology issues for scalability;
7. Feed results to the IEEE Standard project;
8. Publish Papers on their research and implementation experience to constituencies;
9. Create Reference Implementations of:
 - An Intercloud root cloud including messaging, trust, and semantic directory
 - An Intercloud exchange cloud
 - An Operational multi-cloud Intercloud protocol suite
 - Open Source projects of Reference Implementation, perhaps hosted with OpenStack Foundation.

Organization of the Testbed

The Testbed is an activity of the IEEE Cloud Computing Initiative (CCI), operating as an activity of the IEEE “Industry Connections” program.

The Testbed is governed by an Executive Committee, called the IEEE Intercloud Testbed Advisory Committee (ITAC), which includes CCI representatives and selected activity participants.

The ITAC and the Testbed activity are overseen by the IEEE Cloud Computing Standards Committee (CCSC) and the IEEE-SA Board of Governors (BOG).

The ITAC provides the strategic direction for the activity, manages the growth of participation and directs the development of all deliverables.

Any company or university lab can join the Testbed with the approval of a Simple Majority of the ITAC members.

Technology

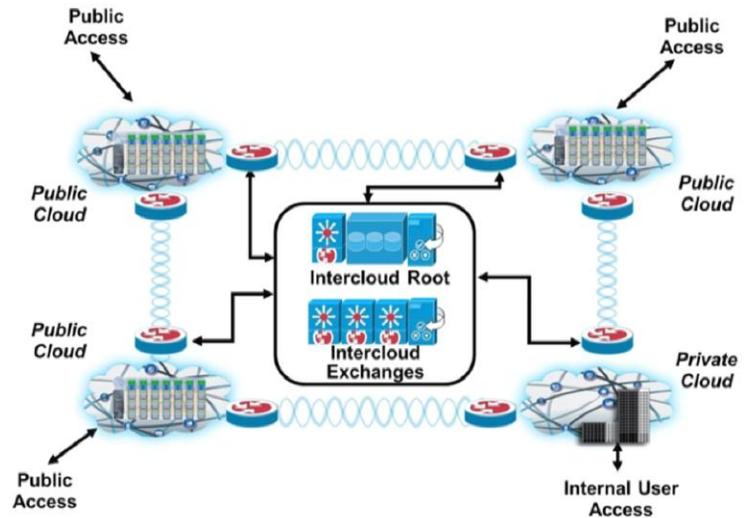
The architecture is analogous to the Internet architecture. There are Public Clouds, which are analogous to ISP's. There are Private Clouds which is a Cloud where an organization builds to serve itself, analogous to an Intranet. The Intercloud will tie all of these clouds together.

Architecture

Several Intercloud Gateways: analogous to the Internet Router which connects an Intranet to the Internet.

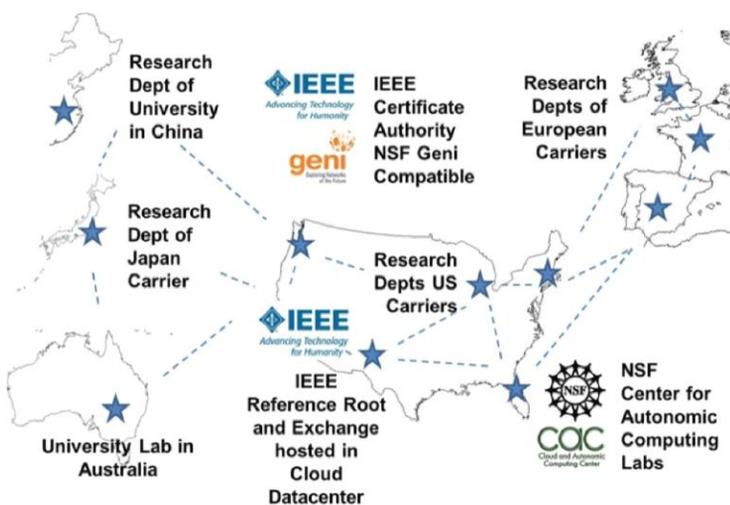
Several Intercloud Exchanges: analogous to Internet Exchanges and Peering Points – called Brokers in the NIST Reference Architecture where clouds can interoperate.

Intercloud Roots: containing services such as Naming Authority, Trust Authority, Messaging, Semantic Directory Services, and other “root” capabilities. The Intercloud root is not a single entity – it's a globally replicating and hierarchical system.



Topology

A stable reference set of cloud implementations of all kinds is the first need of the Testbed. Having these in well connected labs with the ability to add code and configure them to join the Intercloud as needed is key.



Envisioned Participants

Industry and University labs are invited to participate as such, not only for the clouds themselves but the for the Intercloud Root and Exchange systems as well.

The map details organizations who have expressed interest in participating in the Testbed. The project is now seeking membership commitments.

Global Call for Participation

Visit the Cloud Computing Web Portal for more information, cloudcomputing.ieee.org