Cloud Deployment Models

Dr. Amit Praseed

How to host the Cloud?

- Remember Bob from ABC Corporation?
- He has decided to outsource their business to the cloud!!
- But he faces some difficult decisions!
  - Should he approach a third party?
  - Should he ask his IT team to build a cloud infrastructure on their company premises?

- At its core, the cloud is simply a datacentre, with software capable of managing virtualized resources according to user demand
- While choosing a cloud solution, consider
  - Where will the datacentre reside?
  - Who owns the datacentre?
  - Who can use resources within the datacentre?
  - Who operates and manages the datacentre?

Public vs Private Cloud

Public Cloud

- Provisioned for open use by general public
- Owned, managed and operated by business, academic or government organizations
- Exists on the premises of the cloud provider
- Eg: Gmail, Microsoft Azure, Dropbox etc.

Private Cloud

- Exclusively used by an organization
- Usually managed, operated and owned by the organization
- Usually resides on the organization premises
- Open source tools like OpenStack and Eucalyptus can be used to build private clouds

Here are the facts!

- ABC Corp. website has a significant user base right now, and is expected to grow over time
- The data maintained by the company is related to product details, and no financial details are maintained (assume)
- Which cloud model – private or public – would you recommend?

Here are the facts!

- What would be the case where there is also sensitive data that has to be maintained?
  - Credit card details
  - Company expansion plans
  - Other customer and employee data

Public Cloud Features

- Scalable
- Affordable
- Always available
- Stringent SLAs
- Less secure

When should one opt for Public Clouds?

- Larger user base
- Varying resource usage
- Lack of infrastructure
- Financial constraints

Private Cloud Features

- Secure
- More control available
- Weak SLAs

When should one opt for Private Clouds?

- Sufficient Funds
- Security and autonomy is paramount
- Few users
- Sufficient resources are available

Hybrid Cloud

- Organization manages both private and public clouds
- Services can be used from either cloud, depending on organizational policies
- Sometimes, a private cloud could be used be used till its capacity is met, after which the workload spills over to the public cloud – **Cloud Bursting**

Community Cloud

- Infrastructure is shared between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.)
- Managed internally or by a third-party and hosted internally or externally
- Eg: IBM SoftLayer cloud for federal agencies

Features of Community Cloud

- Collaborative effort
- No party has full control
- Partially secure
- Cost effective

When should one opt for Community Clouds?

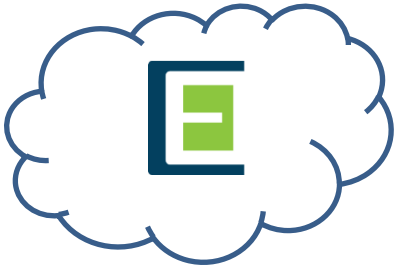
- Need for collaboration
- Financial constraints
- Less maintenance costs

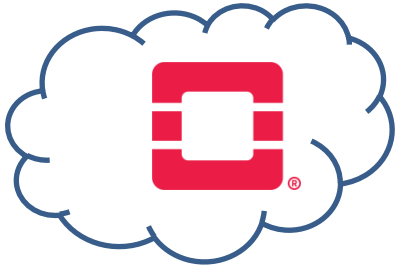
Cloud Deployment Models - Summary

- Depending on who owns and operates the cloud, and who can access the cloud, there are 4 deployment models
  - Public Cloud
  - Private Cloud
  - Community Cloud
  - Hybrid Cloud

Can a cloud run out of resources?

Can we connect the Clouds?





Intercloud

- Intercloud – “Cloud of Clouds”
- Mesh of clouds unified based on open standard protocols to provide interoperability
- Interconnects multiple cloud providers’ infrastructures.
  - Focus is on direct interoperability between public cloud service providers

Need for Intercloud

- Scalability + wider resource availability
- Interoperability + avoiding vendor lock-in
- Availability and disaster recovery
- Geographic distribution and low latency access
- Legal and regulatory issues

Types of Interclouds

- **Federation Clouds**: A set of cloud providers willingly interconnect their cloud infrastructures in order to share resources
  - Voluntary contribution
  - Suitable for collaboration of governmental clouds or private cloud portfolios
  - Types of federation clouds are Peer to Peer and Centralized clouds.
- **Multi-Cloud**: A client or service uses multiple independent clouds
  - No voluntary interconnection and sharing
  - Managing resource provisioning and scheduling is the responsibility of client or their representatives.
  - Used to utilize resources from both governmental clouds and private cloud portfolios.

Types of Federated Clouds

- **Peer to peer Inter-Cloud federation**
  - Clouds collaborate directly with each other but may use distributed entities for directories or brokering.
  - Eg: RESERVOIR (Resources and Services Virtualization without Barriers Project), Open Cirrus etc
- **Centralized Inter-Cloud federation**
  - Clouds use a central entity to perform or facilitate resource sharing.
  - The central entity acts as a storehouse where the available cloud resources are registered.
  - Eg: Contrail, Dynamic Cloud Collaboration (DCC) and Federated Cloud Management.

Types of Multi Clouds

- **Multicloud Service**
  - Clients access multiple clouds through a service.
  - A service is hosted by the cloud client either externally or in-house.
  - Eg: OPTIMIS, mOSAIC, STRATOS and Commercial Cloud Management Systems
- **Multicloud Libraries**
  - Clients develop their own brokers by using a unified cloud API as a library
  - Facilitate the usage of clouds in a uniform
  - Eg: Java library JClouds, Python library Apache LibClouds, Ruby library, Apache DeltaCloud, PHP library SimpleCloud, Apache Nuvem