OpenNebula
Open Source Solution for DC Virtualization

C12G Labs

Online Webinar
What is OpenNebula?

Multi-tenancy, Elasticity and Automatic Provision on Virtualized Environments

I’m using virtualization/cloud, and plan a private Cloud (BUT’s)

- Where do/did I put my web server VM?
- How do I provision a new VM?
- How do I create a new disk?
- How do I set up networking for a multitier service?
- Can I use hypervisor X?

Monitoring & Scheduling

Image Management & Context

Storage

User & Role Management

Network & VLANs

Virtualization

Interfaces & APIs

Uniform management layer that orchestrates multiple technologies

OpenNebula
What is OpenNebula?

Open Cloud Solution for Building and Managing Virtualized Data Centers

- Public
- Interoperable
- Adaptable
- Infrastructure Agnostic
- Fully Open-source
- Flexible
- Proven

OpenNebula
What is OpenNebula?

A Project Aimed at Building the Industry Standard Open Cloud Management Tool

OpenNebula.org

- Develop & innovate
- Support the community
- Collaborate

Third party scalability tests: 16,000 VMs

Commercial Support

TP
v1.0
v1.2
v1.4
v2.0
v2.2
v3.0
v3.2
v3.4

2005
2008
2009
2010
2011
2012

da group doing research...

ubuntu
debian
openSUSE
fedora

4,000 downloads/month

European Funding

OpenNebula – Architecture for Cloud Data Centers
Different Perspectives of the Cloud

Different Aims and Needs

Cloud Consumer

Cloud Provider

Cloud Integrator

OpenNebula

OpenNebula – Architecture for Cloud Data Centers
The Cloud Consumer Perspective

Setting up and Managing Virtual Infrastructure

**Network Management**
- Network catalog management
- Public & elastic IPs
- Private isolated networks
- Simple firewall rules

**Storage Management**
- Image catalog management
- Prepared on-site & uploaded
- Pre-defined appliances
- OS and Data types (persistent)

**Remote Connection**
- SSH
- VNC
- Remote desktop

**Usage Data**
- Accounting info

**VM Management**
- VM template catalog
- Life-cycle management
- Contextualization
How Can I Manage my Virtual Infrastructure?

... standards (*de facto* and *de jure*) Cloud APIs to leverage existing ecosystems and ensure portability across providers and self-service portal ....
The Cloud Provider Perspective

What are the Main Components to Build a Cloud Infrastructure?

Instance Networks
- Public networks
- Private networks

Instance Networks

Front-end
- Authentication
- Authorization
- ACLs, groups...
- Accounting
- Logging
- Resource quotas

Service Networks
- Monitoring, control...
- Live migration...
- Storage access...

Datastores
- VM image storage
- Multiple datastores
- Heterogeneous configurations
- Shared or non-shared

Hosts
- Multiple hypervisors
- Up to 500 hosts
- Automatic failover and HA
- Resource pools
- Automatic resource allocation
The Cloud Provider Perspective

Broad Commodity and Enterprise Platform Support

Instance Network
- VLAN per user (layer2)
- Open vSwitch, 802.1q
- Ebtables

Front-end
- X509, LDAP, ssh keys
- ACLs, roles, groups...

Service Network
- Ganglia/Nagios
- Additional monitor agents

Internet

Hosts
- VMware,
- Xen
- KVM

Datastores
- DFS: NFS, Gluster, GlusterFS...
- SAN: Fibre Channel, iSCSI, LVM...
- Bit Torrent, ssh...

OpenNebula – Architecture for Cloud Data Centers
The Cloud Provider Perspective

Clustering the Physical Resources

Clusters

- Pools of hosts that share datastores and networks
- Used for load balancing, high availability, and high performance computing

Multiple Datastores per Cluster

- Balance I/O operations between storage servers
- Define different SLA policies (e.g. backup) and performance features for different VM types or users
The Cloud Provider Perspective

Centralized Management of Multiple OpenNebula Instances (Zones)

- Cloud Consumer
- oZones Server
  - Portal
  - Cloud API (EC2, OCCI)
  - Global AuthN
- Federation of Clouds
  - Multi-tier architecture
  - Scalability
  - Isolation
  - Multiple-site support

OpenNebula – Architecture for Cloud Data Centers
The Cloud Provider Perspective

On-demand Provision of Virtual Data Centers

Virtual Private Cloud Computing
- Typical scenario in large organizations and cloud providers
- On-demand provision of fully-configurable and isolated VDC with full control and capacity to administer its users and resources

OpenNebula – Architecture for Cloud Data Centers
Hybrid Cloud Computing

- Extension of the local private infrastructure with resources from remote clouds
- Cloudbursting to meet peak or fluctuating demands
The Cloud Provider Perspective

How Can I Operate my Cloud Infrastructure?

... programming APIs (create new tools and integrate), web interfaces (simplify operation), and command line interface (create scripts)...
... truly open (fully open-source, Apache license) and adaptable (modular and extensible)... because no two data centers are the same
The Cloud Integrator Perspective

Seamless Integration with Existing Applications and Services

Virtualization & Monitoring
- Tune hypervisor interaction
- New hypervisors
- Hybrid configurations
- Information systems
- Monitoring probes

Image & Storage
- Integrate with SAN/NAS solutions
- Tune storage operations
- Use of external repositories

Custom Applications
- Accounting & Billing
- New self-service portal

Interfaces
- CLI (local/remote)
- REST APIs
- API (java, ruby bindings)
- Plug-ins

Users & Roles
- Integrate with Active Directory
- Tune ACL
- Custom authentication
Questions?

We Will Be Happy to Answer Any Question