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The OpenNebula Virtual Infrastructure Engine

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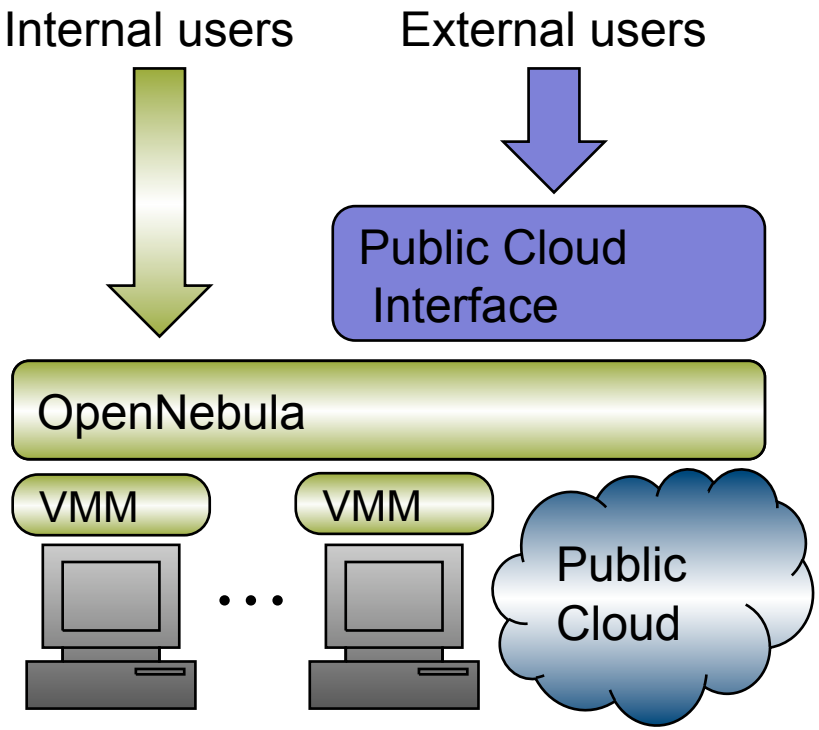
What is OpenNebula?

The OpenNebula Virtual Infrastructure Engine

Extending the Benefits of Virtualization to Clusters

- Dynamic deployment and re-placement of virtual machines on a pool of physical resources
- Transform a rigid distributed physical infrastructure into a flexible and agile virtual infrastructure



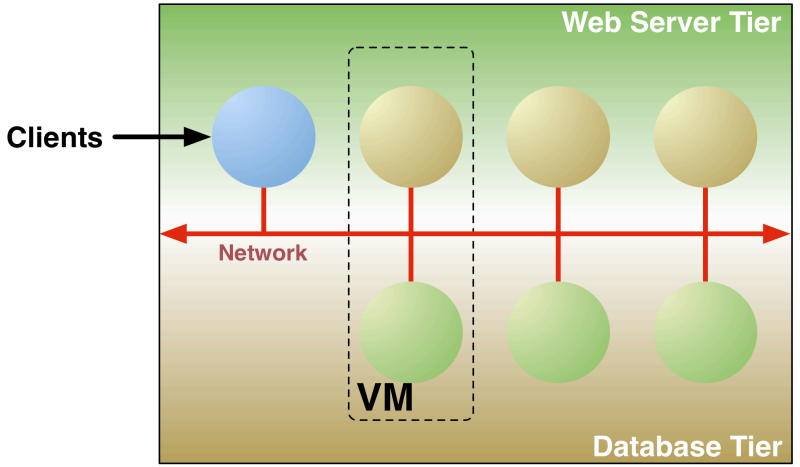
- Backend of Public Cloud: Internal management of the infrastructure
- Private Cloud: Virtualization of cluster or data-center for internal users
- Cloud Interoperation: On-demand access to public clouds

Virtual Machine Management Model

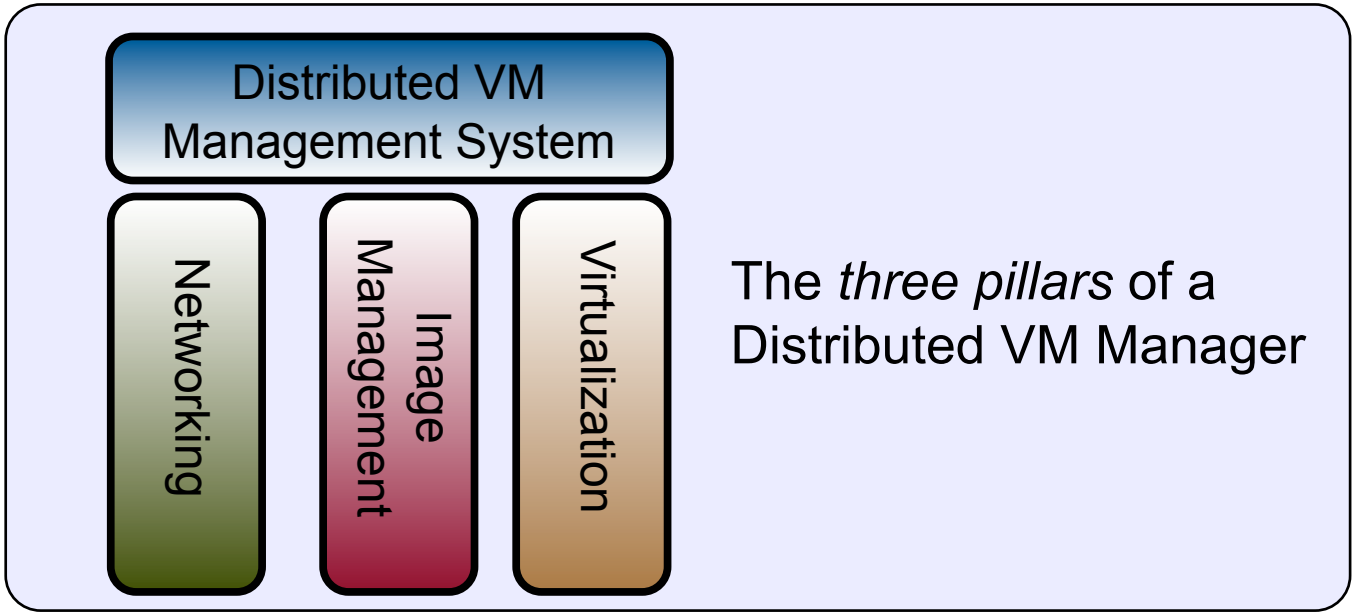
The OpenNebula Virtual Infrastructure Engine

Service as Management Entity

- Service structure
  - Service components run in VMs
  - Inter-connection relationship
  - Placement constraints
- The VM Manager is service agnostic
- Provide infrastructure context



Distributed VM Management Model



The *three pillars* of a Distributed VM Manager

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Benefits

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System Manager

- Centralized management of VM workload and distributed infrastructures
- Support for VM placement policies: balance of workload, server consolidation…
- Dynamic resizing of the infrastructure
- Dynamic partition and isolation of clusters
- Support for heterogeneous workload
- Dynamic scaling of private infrastructure to meet fluctuating demands

Service Manager

- On-demand provision of virtual machines

System Integrators

- Open and flexible architecture and interfaces, open source software
- Integration with any component in the virtualization/cloud ecosystem, such as cloud providers, hypervisors, cloud-like interfaces, virtual image managers, service managers, schedulers…

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Features

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Feature	Function
User Interface	• Unix-like CLI to manage VM life-cycle and physical boxes • XML-RPC API and libvirt interface
Scheduler	• Requirement/rank matchmaker • Generic framework to build any scheduler
Virtualization Management	• Xen, KVM and libvirt connectors • Amazon EC2
Image Management	• General mechanisms to transfer and clone VM images
Network Management	• Definition of virtual networks to interconnect VMs
Fault Tolerance	• Persistent database backend to store host and VM information
Scalability	• Tested in the management of hundreds of VMs
Installation	• Installation on a UNIX cluster front-end without requiring new services in the remote resources • Distributed in Ubuntu 9.04 (Jaunty Jackalope), due in April 2009

Open and Flexible Architecture

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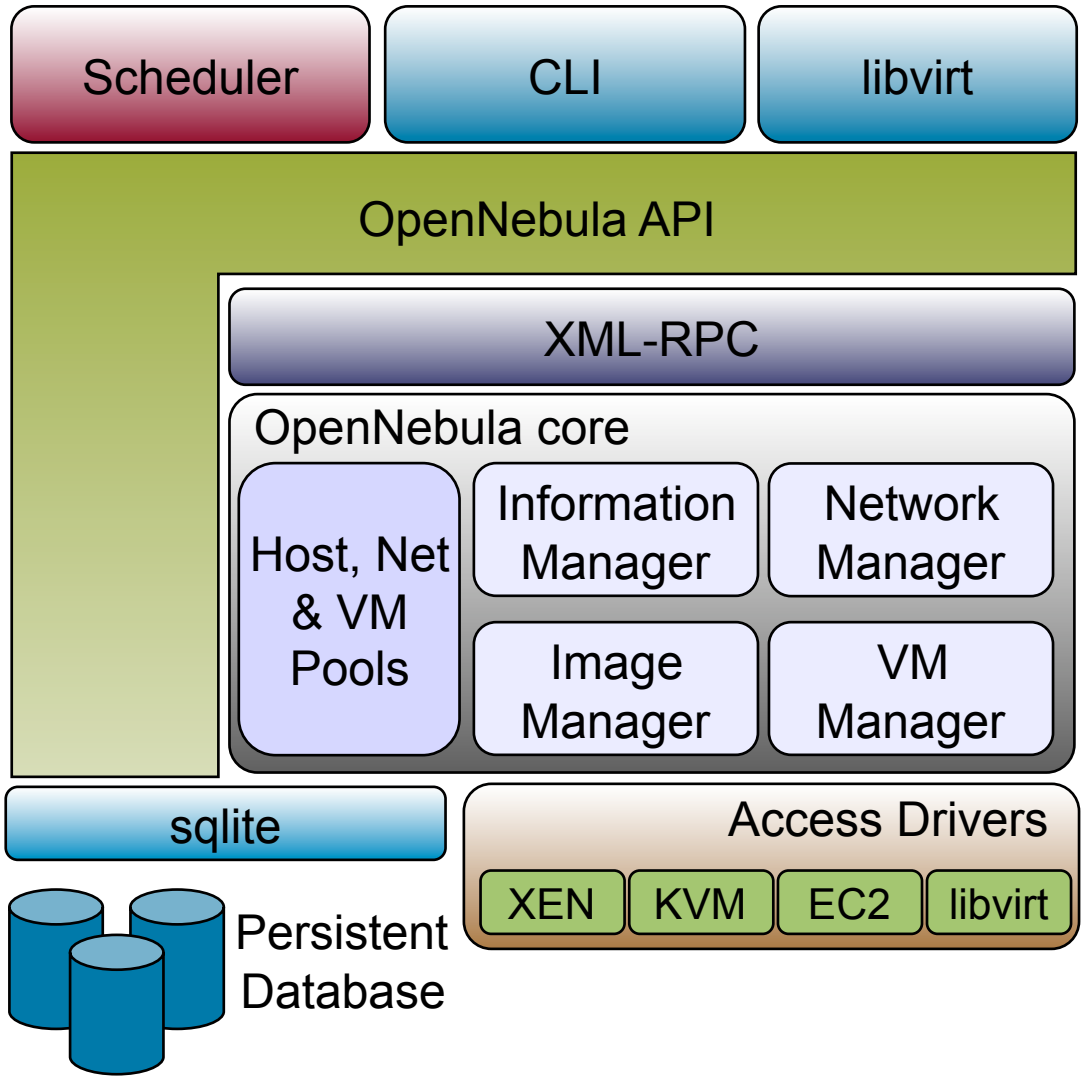

Use Cases

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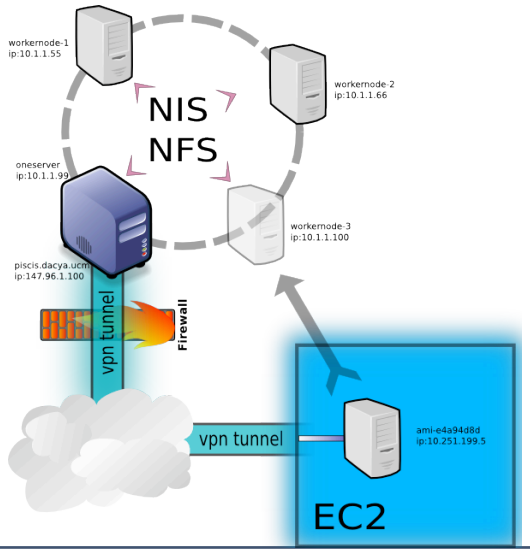
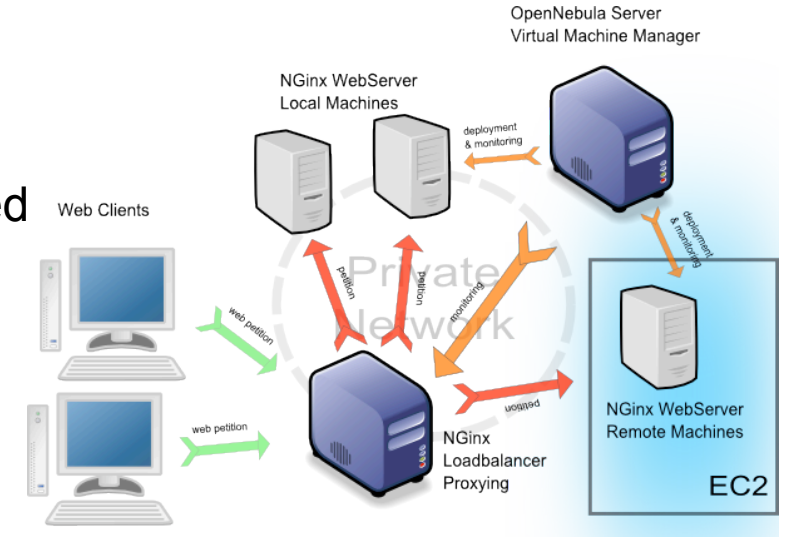
On-demand Scaling of Computing Clusters

- Elastic execution of a SGE computing cluster
- Dynamic growth of the number of worker nodes to meet demands using EC2
- Private network with NIS and NFS
- EC2 worker nodes connect via VPN



On-demand Scaling of Web Servers

- Elastic execution of the NGinx web server
- The capacity of the elastic web application can be dynamically increased or decreased by adding or removing NGinx instances



Ecosystem

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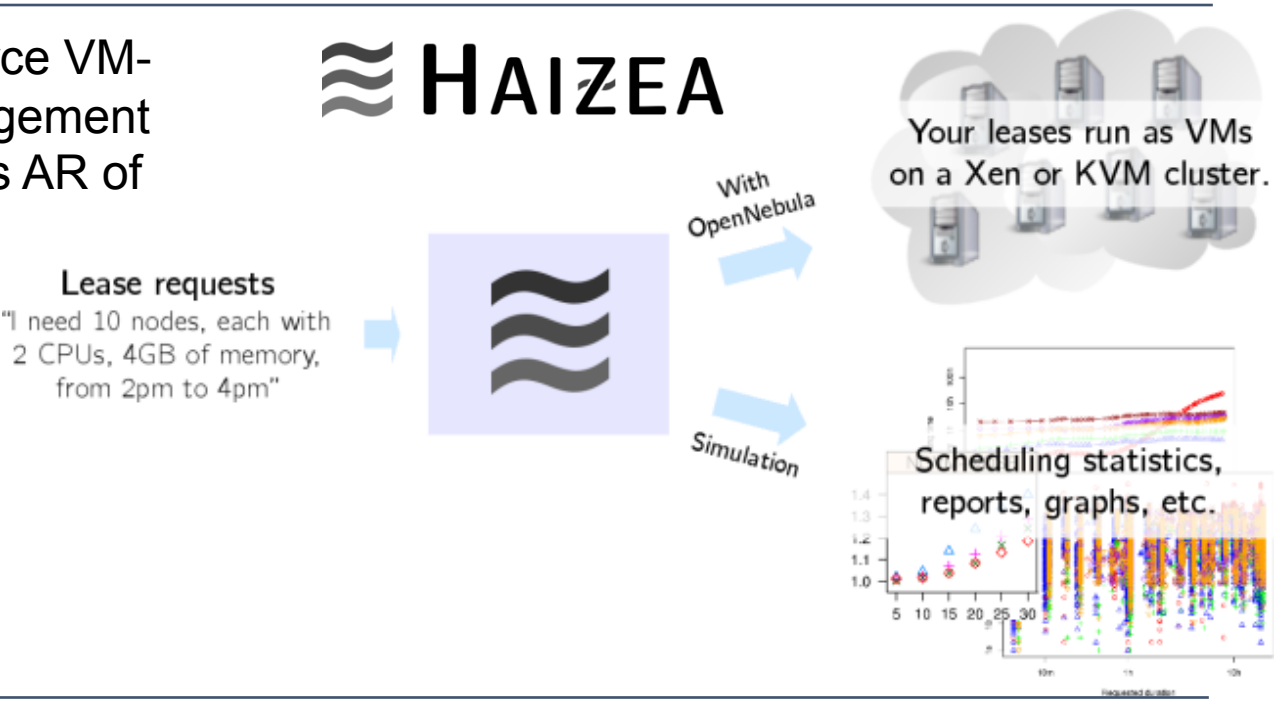
Schedulers

- Haizea: Open-source VM-based lease management architecture (allows AR of capacity).



Interfaces

- Libvirt: Provides an abstraction of a whole cluster of resources as one host, hiding specific hypervisor details.
- Nimbus: Can be used as a WSRF or EC2 front-end.

Plug-Ins

- ElasticHosts: Enables the dynamically increase capacity of your virtualized infrastructure to meet fluctuating peak demands using a cloud provider.

THANK YOU FOR YOUR ATTENTION!!!
More info, downloads, mailing lists at
www.OpenNebula.org

Live Demo in Booth 4

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www.reservoir-fp7.eu/

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