

EGITF-OGF 2011

Lyon, France, September 21th, 2011

Next Generation IaaS Cloud Computing with OpenNebula 3.0

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IaaS Cloud Computing Tool for Managing a Data Center's Virtual Infrastructure

Adaptable

- Customizable and Extensible

Proven

- Many Massive Scale Production Deployments

Powerful and Innovative

- Advanced Enterprise-class Functionality

No Lock-in

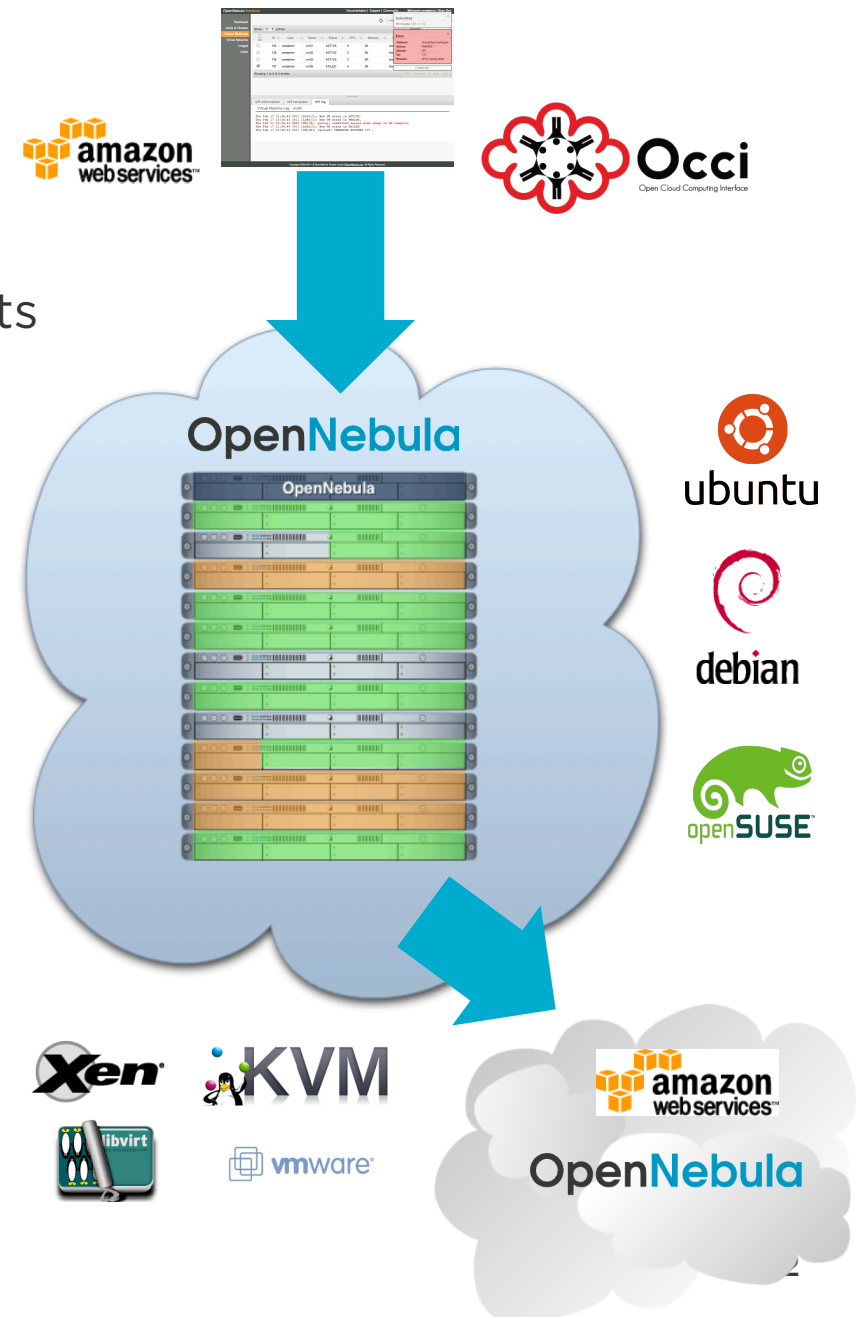
- Platform Independent and Interoperable

Interoperable

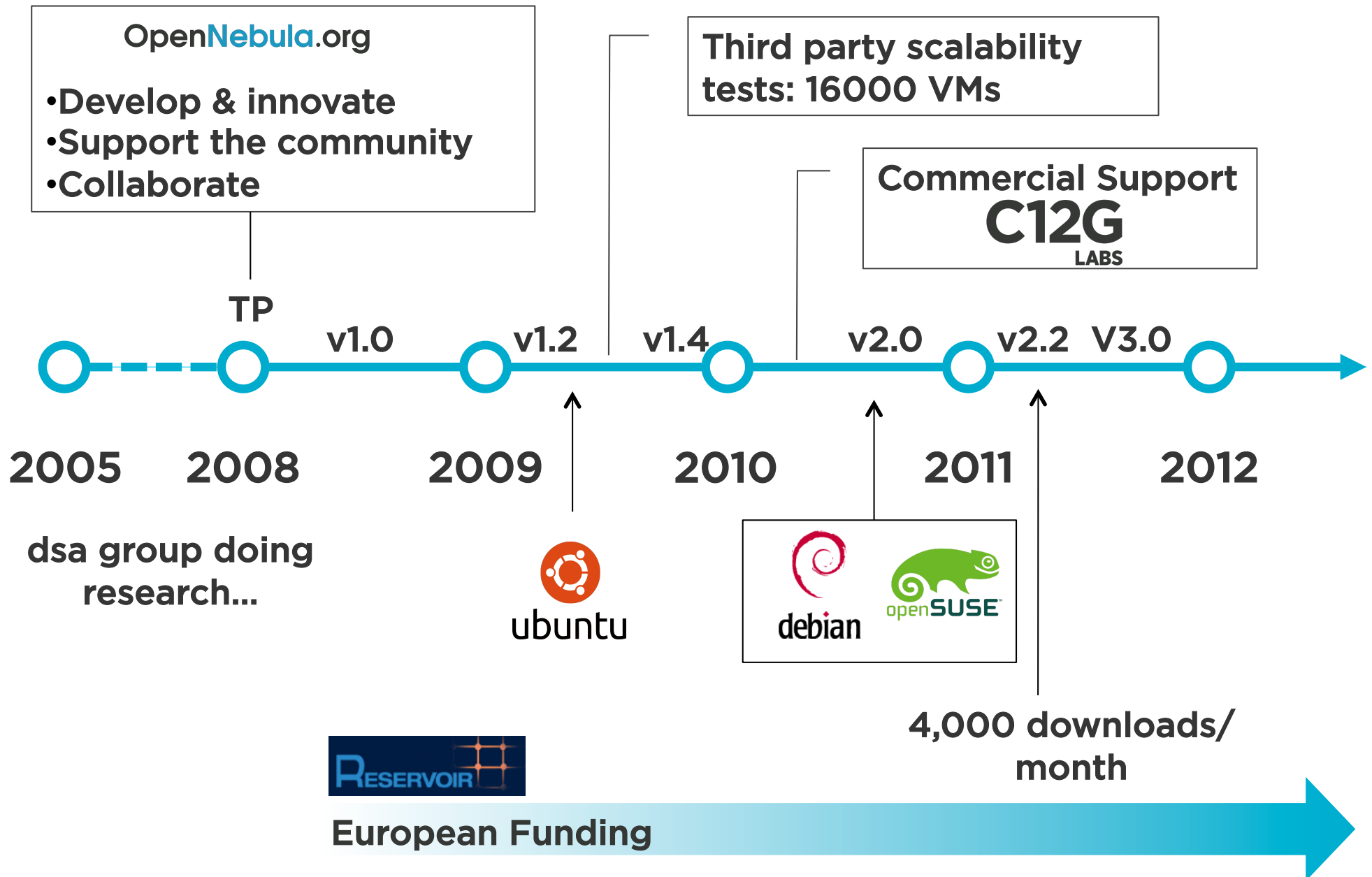
- Popular cloud APIs and standard based

Openness

- Fully open-source
- Apache license



Building the Industry Standard Open Source Cloud Computing Tool



Organizations Building Clouds and Innovative Projects

Organizations Building Clouds for Development, Testing and Production



Projects Building an Open Cloud Ecosystem Around OpenNebula



- **Pluggable AuthN/AuthZ modules:**
 - **SSH keys**
 - **X509 keys (Fermilab contribution)**
 - **User/Password**
- **Support for VLAN tagging + simple firewall**
- **Pluggable drivers for Image repository**
- **Template repository**
- **Monitoring and Accounting collector**
- **Sunstone Enhancements**
- **Groups + ACLs**
- **oZones**

- VNC (noVNC)
- Monitoring Graphs
- Plugins

The screenshot displays the OpenNebula Sunstone dashboard interface. At the top, it says 'OpenNebula Sunstone' and 'Welcome oneadmin | Sign Out'. The left sidebar contains navigation links: Dashboard, Hosts, Virtual Machines, Templates, Virtual Networks, Images, Users, and Groups. The main content area is divided into several sections:

- Summary of resources:** A table showing system metrics:

Hosts (total/active)	2 / 2
Groups	2
VM Templates (total/public)	1 / 0
VM Instances (total/running/failed)	5 / 5 / 0
Virtual Networks (total/public)	0 / 0
Images (total/public)	0 / 0
Users	3
- Historical monitoring information:** Four line graphs showing performance over time:
 - Hosts CPU:** Tracks used_cpu (yellow), cpu_usage (light blue), and max_cpu (red) from 15:35:55 to 15:36:35.
 - Hosts memory:** Tracks mem_usage (yellow), max_mem (light blue), and used_mem (red) from 15:35:55 to 15:36:35.
 - Total VM count:** Tracks total (yellow), active (light blue), and error (red) counts from 15:36:00 to 15:36:45.
 - VM Network stats:** Tracks net_rx (yellow) and net_tx (light blue) from 15:36:00 to 15:36:40.
- Quickstart:** A section with the heading 'New:' and a list of resource types with radio buttons: Host, Group, VM Template, VM Instance, Virtual Network, Image, and User.

New Features in 3.0 (Groups and ACLs)

- All objects are in a group
- Automatic ACLs per group
- ACLs can be overridden by the AuthZ system
- Sunstone WEB interface can manage this

```
$ oneacl list
  ID  USER RES_VHNIUTG  RID OPE_CDUMIPpTWY
  0   @1   V-NI-T-      *   C-----p---
  1   @1   -H-----    *   --U-----
  2   #5   --NI-T-     @104 --U-I--T--
  3   *    ---I---     #31  --U-I-----
```

This rule applies to:

Affected resources:

- Hosts
- Virtual Machines
- Virtual Networks
- Images
- Templates
- Users
- Groups

Resource subset:

- All
- Specific ID
- Owned by group

Resource ID:

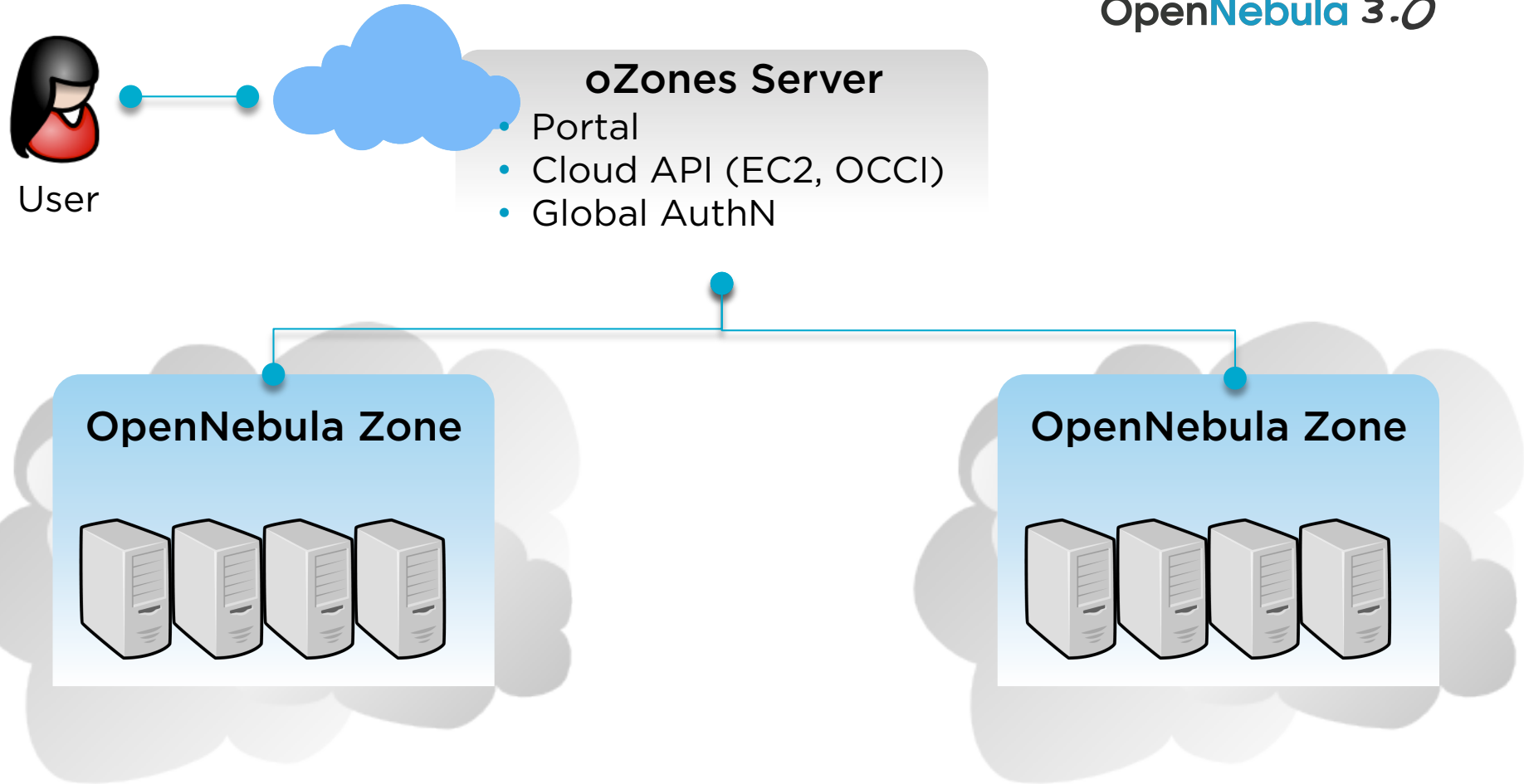
Group:

Allowed operations:

- Create
- Delete
- Use
- Manage
- Get Information
- Get Pool of resources
- Get Pool of my/group's resources
- Change owner
- Deploy

Multi-tier Cloud Architecture

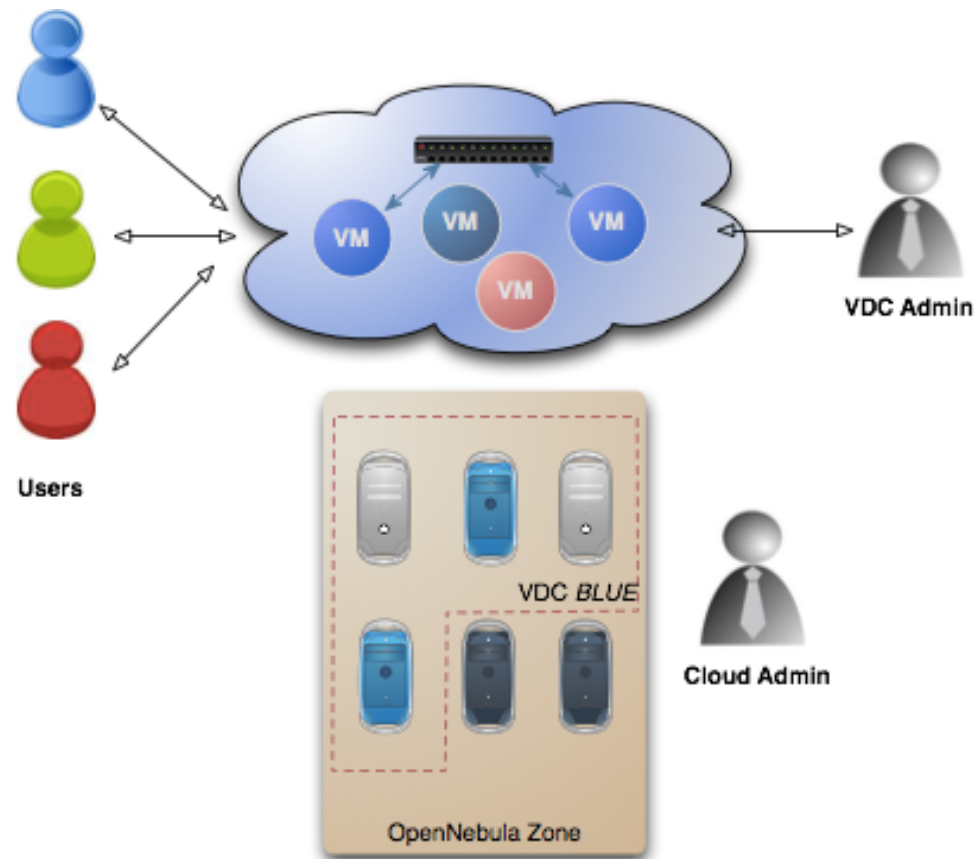
OpenNebula 3.0



*Multi-tier Cloud Architecture***Advanced Multi-Tenancy within each Zone**

OpenNebula 3.0

- 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



Thank you

<http://opennebla.org>