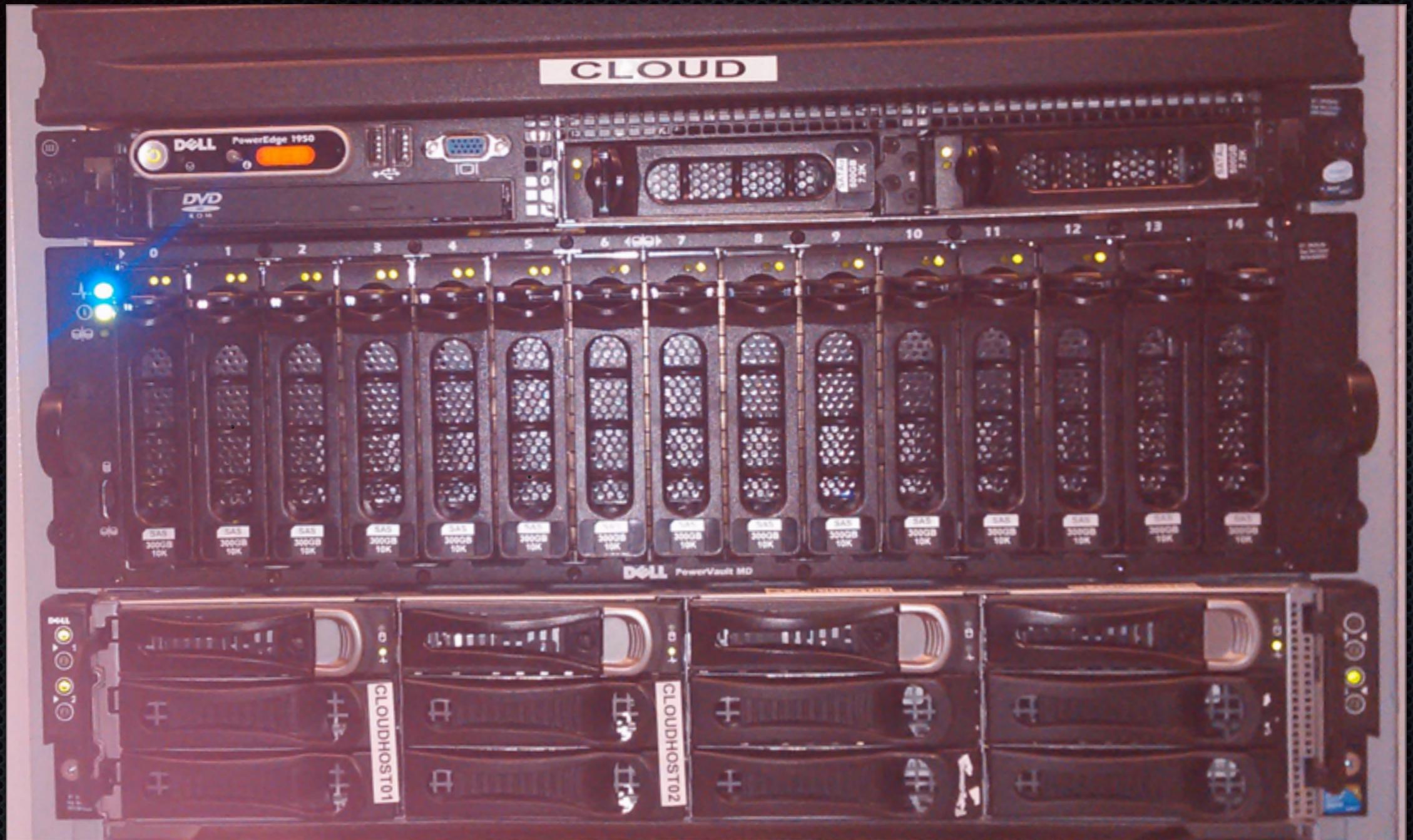


Cludstack@QMUL

Daniel Traynor, GRIDPP, QMUL
HEPSYSMAN June 2014, RAL



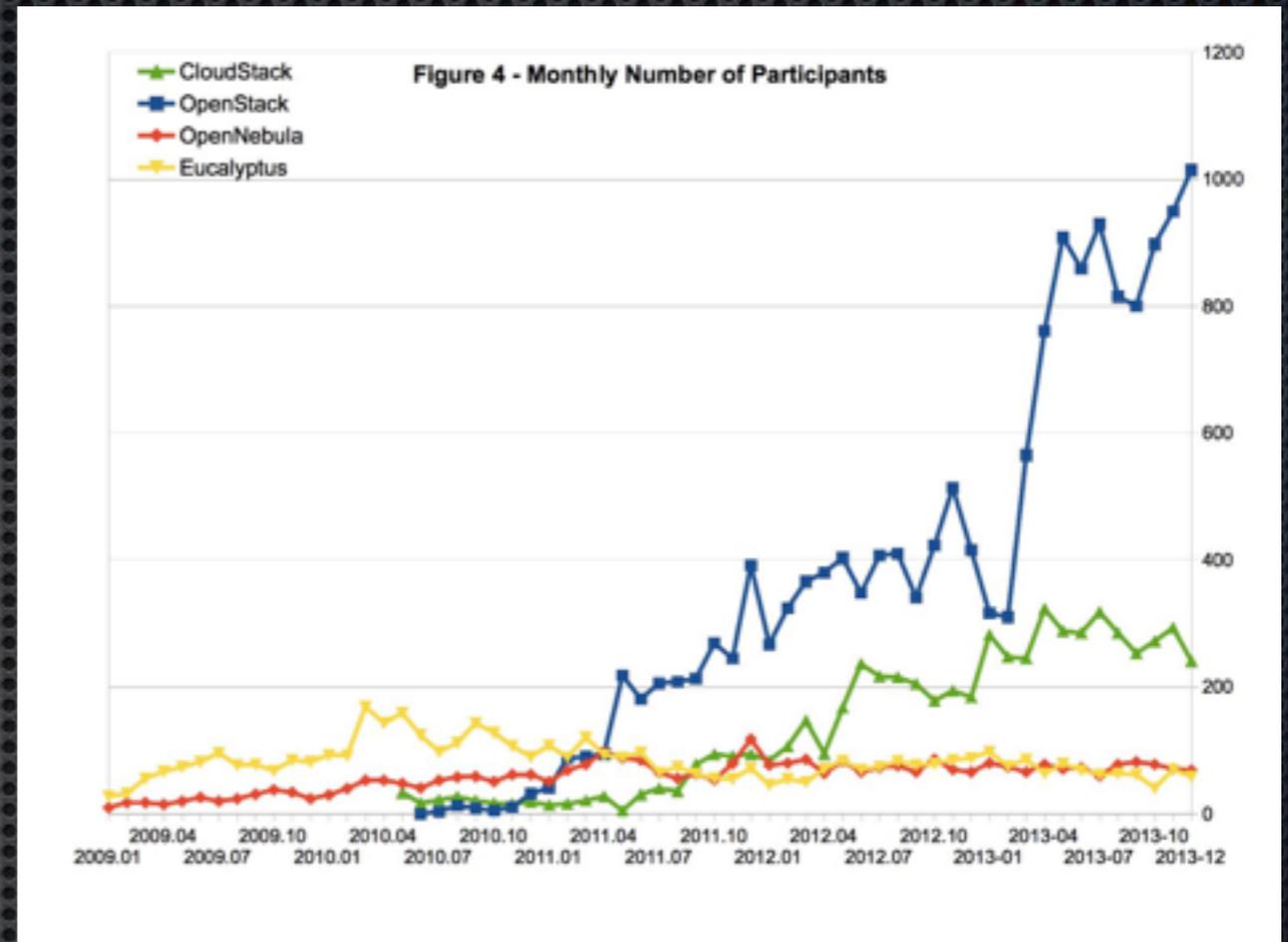
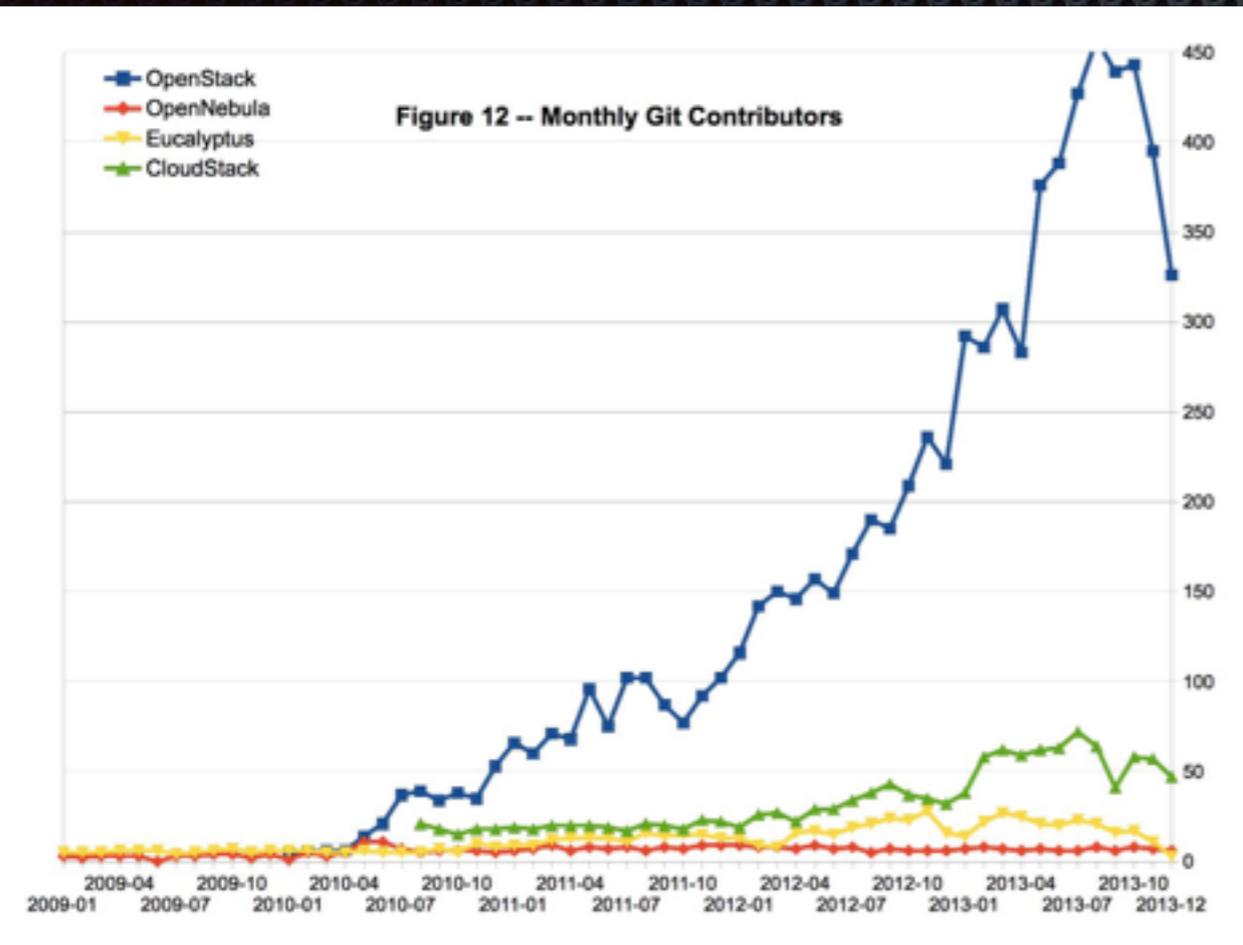
Cludstack@QMUL

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Cloudstack

- ✦ Why cloudstack and not openstack like the rest of the world?
- ✦ What people say
 - ✦ CloudStack follows the Apache meritocracy rules for development, mostly developed by Citrix and friends, Monolithic architecture, battle tested and scalable, deploy straight from developers, lacks mindshare.
 - ✦ OpenStack Foundation with board of directors providing strategic oversight, development by large number of vendors, fragmented architecture, difficult to deploy and configure, use “vendor” configured stack, has mindshare.

Cloudstack

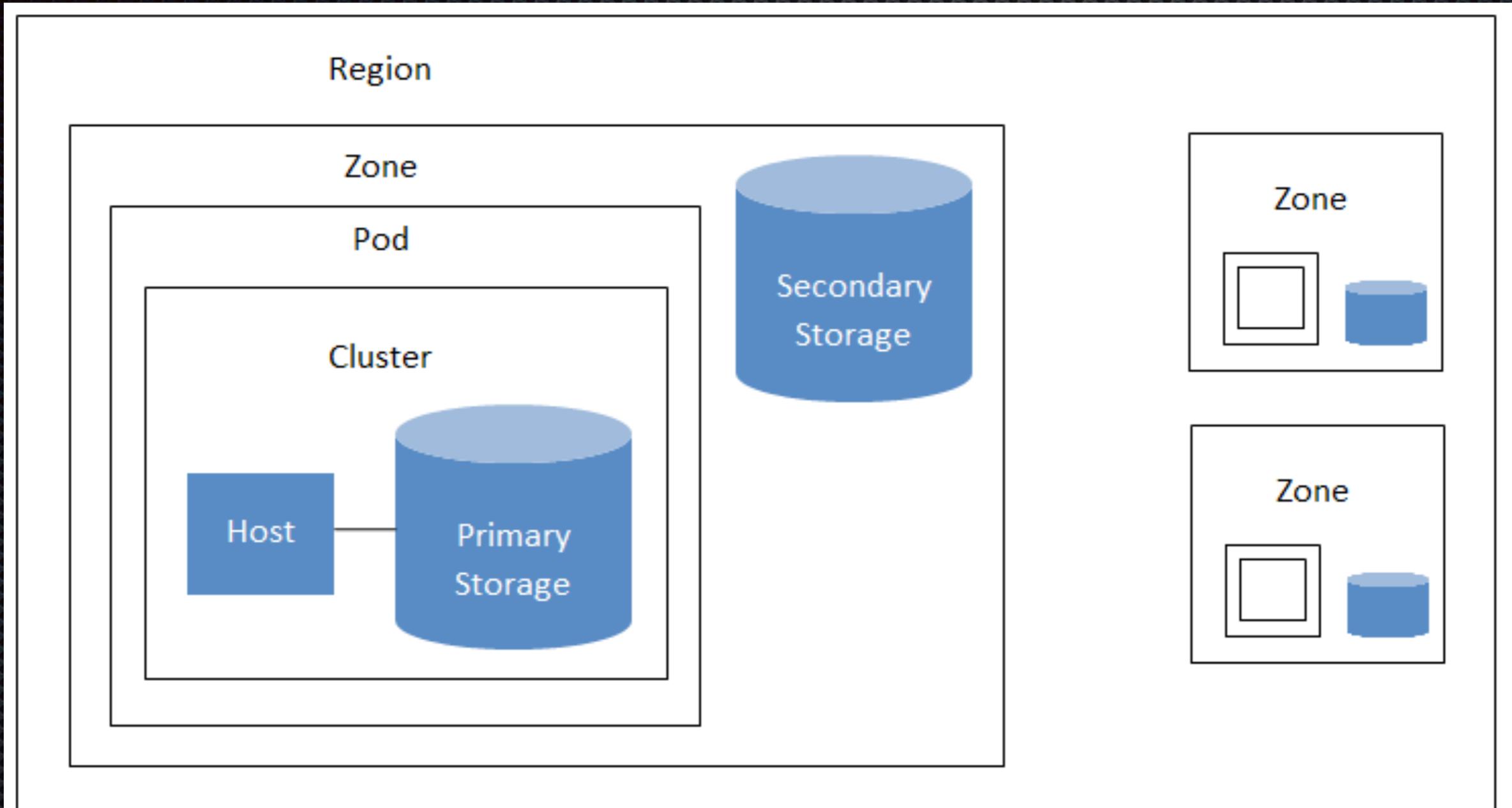


<http://www.qyjohn.net/?p=3432>

What is Cloudstack

- Apache CloudStack is a Java-based project that provides a management server and agents (if needed) for hypervisor hosts so that you can run an IaaS cloud. Some, but not all, of the features and functionality provided by CloudStack:
- Works with hosts running XenServer/XCP, KVM, Hyper-V, and/or VMware ESXi with vSphere, BareMetal (via IPMI)
- Provides a friendly Web-based UI for managing the cloud
- Provides a native API and may provide an Amazon S3/EC2 compatible API (optional)
- Manages storage for instances running on the hypervisors (primary storage) as well as templates, snapshots, and ISO images (secondary storage)
- Orchestrates network services from the data link layer (L2) to some application layer (L7) services, such as DHCP, NAT, firewall, VPN, and so on
- Accounting of network, compute, and storage resources
- Multi-tenancy/account separation, user management.

Cloudstack - Infrastructure



A region with multiple zones

Cloudstack - Infrastructure

Resources within the cloud are managed as follows:

Regions: A collection of one or more geographically proximate zones managed by one or more management servers.

Zones: Typically, a zone is equivalent to a single datacenter. A zone consists of one or more pods and secondary storage.

Secondary Storage: A zone-wide resource which stores disk templates, ISO images, and snapshots.

Pods: A pod is usually a rack, or row of racks that includes a layer-2 switch and one or more clusters.

Clusters: A cluster consists of one or more homogenous hosts and primary storage.

Primary Storage: A storage resource typically provided to a single cluster for the actual running of instance disk images. (Zone-wide primary storage is an option, though not typically used.)

Host: A single compute node within a cluster; often a hypervisor.

Cloudstack - Management

The management server:

Provides the web interface for both the administrator and end user.

Provides the API interfaces for both the CloudStack API as well as the EC2 interface.

Manages the assignment of guest VMs to a specific compute resource

Manages the assignment of public and private IP addresses.

Allocates storage during the VM instantiation process.

Manages snapshots, disk images (templates), and ISO images.

Provides a single point of configuration for your cloud.

Cloudstack - Management

1. Need standard server with ntp and fqdn.

2. Setup cloudstack repo and install software.

```
“yum install cloudstack-management”
```

3. instal mysql and setup database.

```
“cloudstack-setup-databases cloud:<dbpassword>@localhost --  
deploy-as=root:<password> “
```

4. “cloudstack-setup-management”.

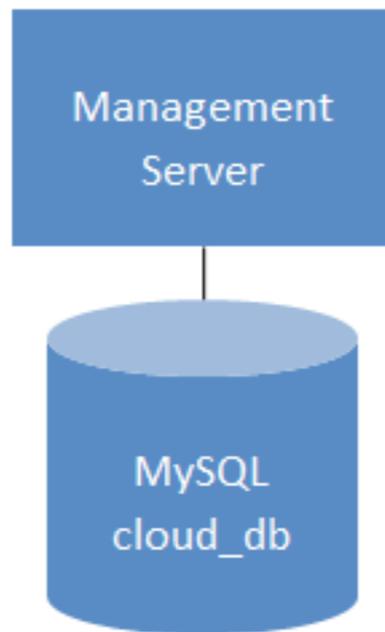
5. Setup nfs shares for storage (easy solution).

6. Setup iptables.

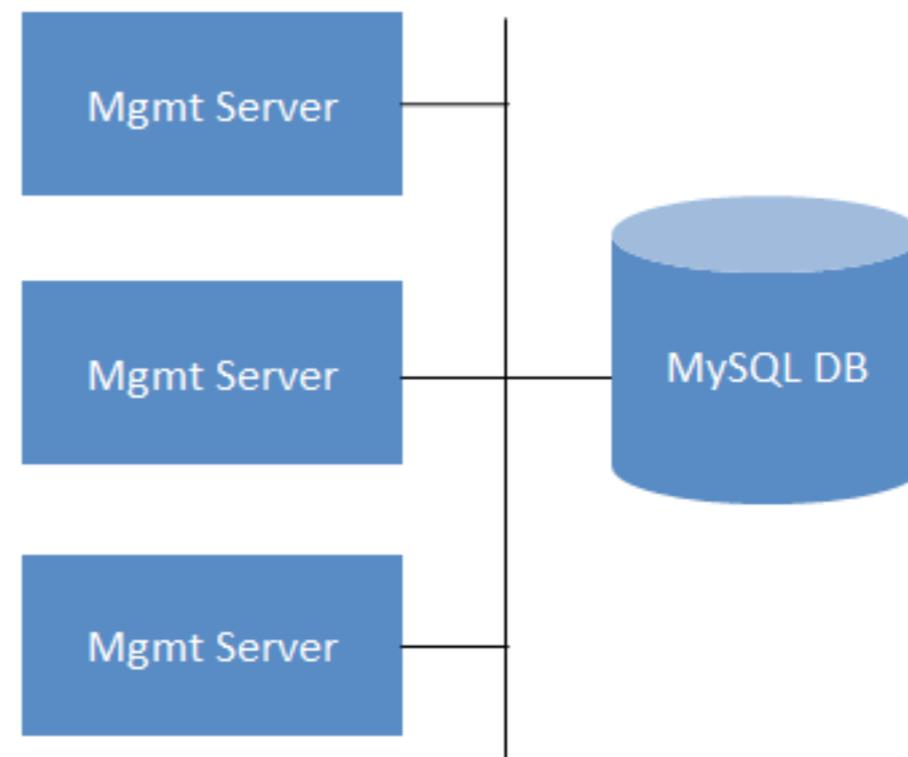
7. Download cloudstack system templates.

Cloudstack - Management

**Single Management Server:
Installation Complete!**



**Multiple Management Servers:
Installation Complete!**



Cloudstack - Storage

- Primary storage -
 - Primary storage is associated with a cluster and it stores the disk volumes for all the VMs running on hosts.
 - Shared mount point, local disk, NFS.
- Secondary storage -
 - Templates, ISO images, Disk volume snapshots.
 - NFS protocol required, S3 and swift supported (via NFS).
- For NFS allow cloudstack to add/remove NFS mounts.
- GlusterFS / Ceph support in development

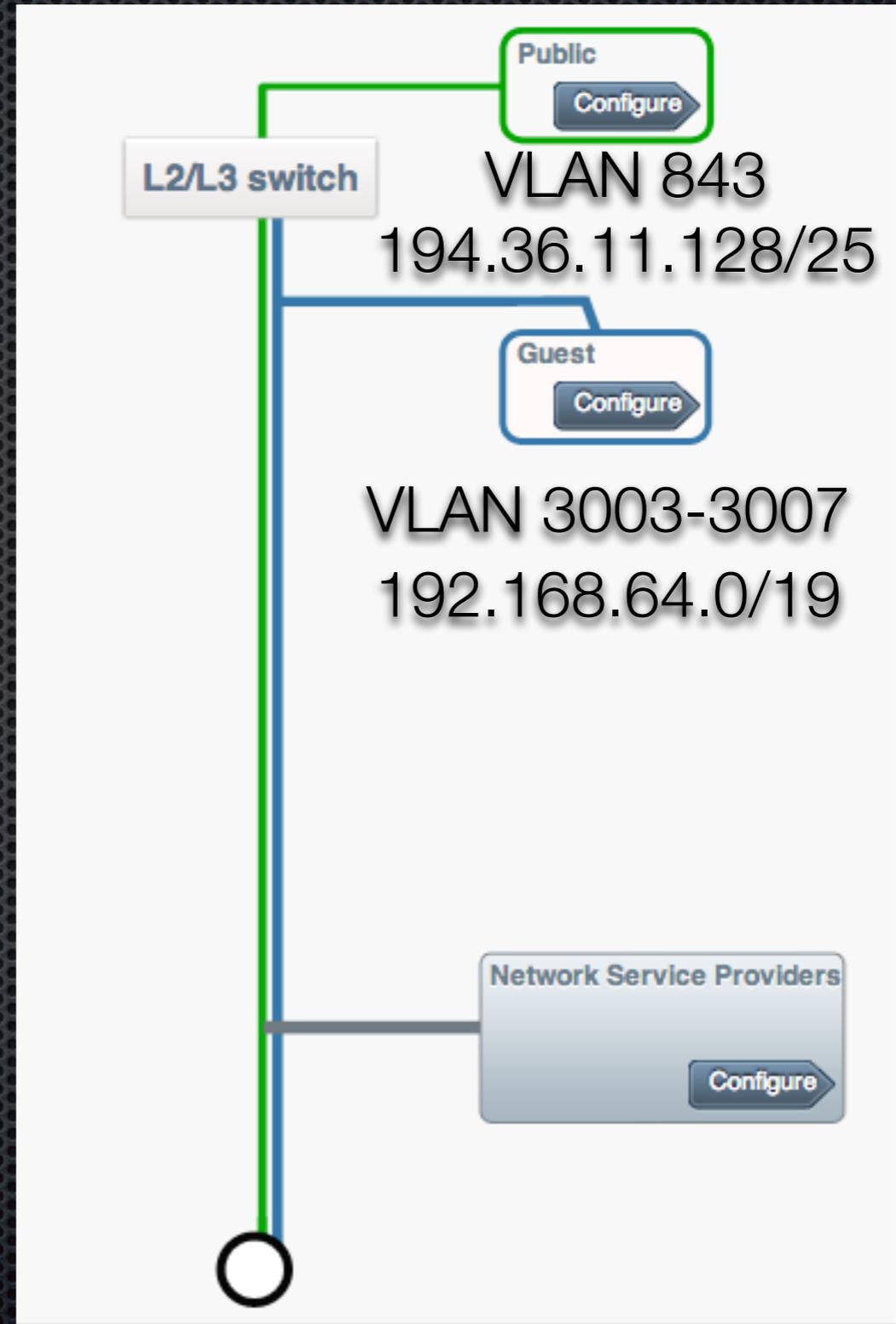
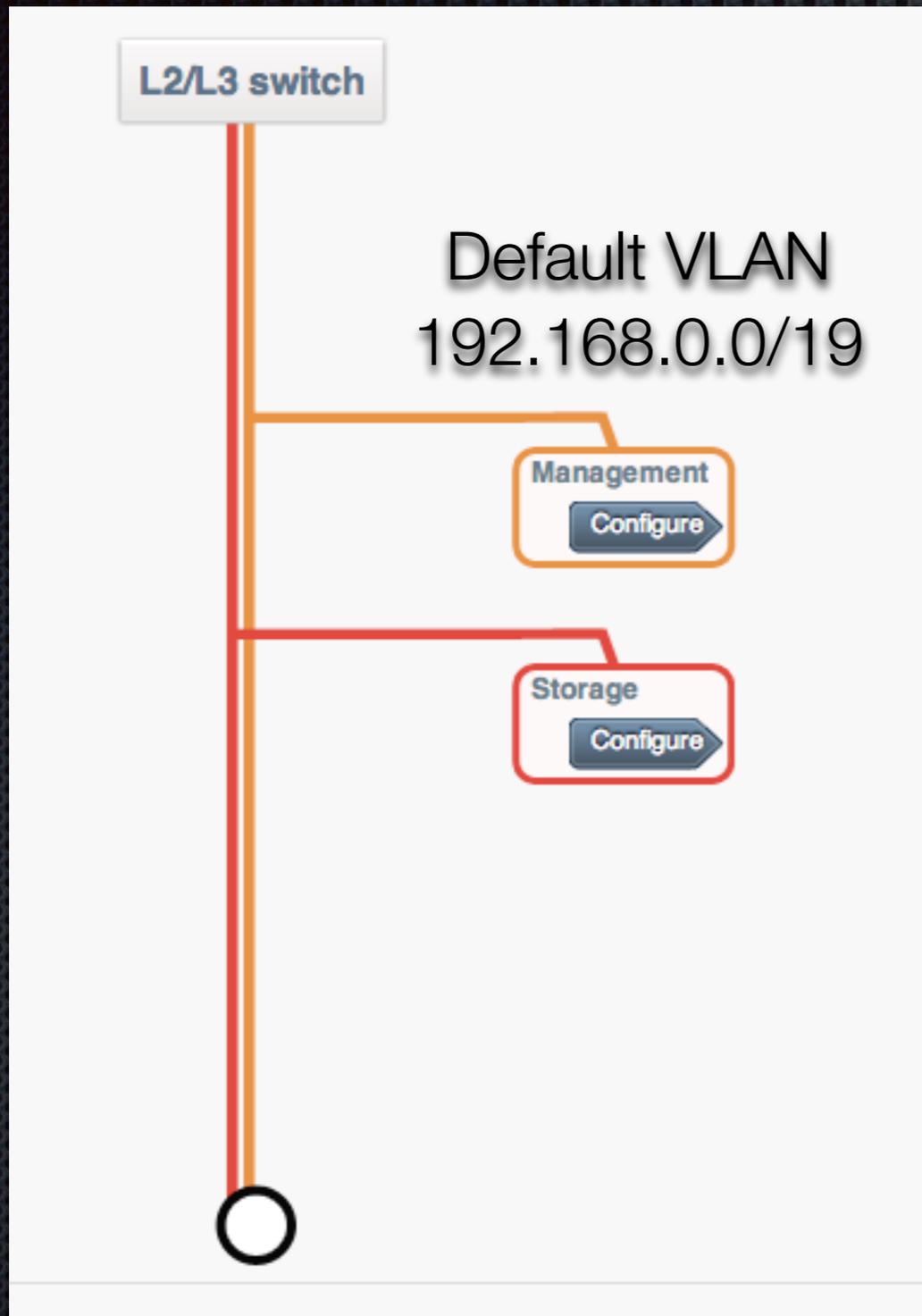
Cloudstack - Networking

CloudStack offers many types of networking, but they typically fall into one of two scenarios:

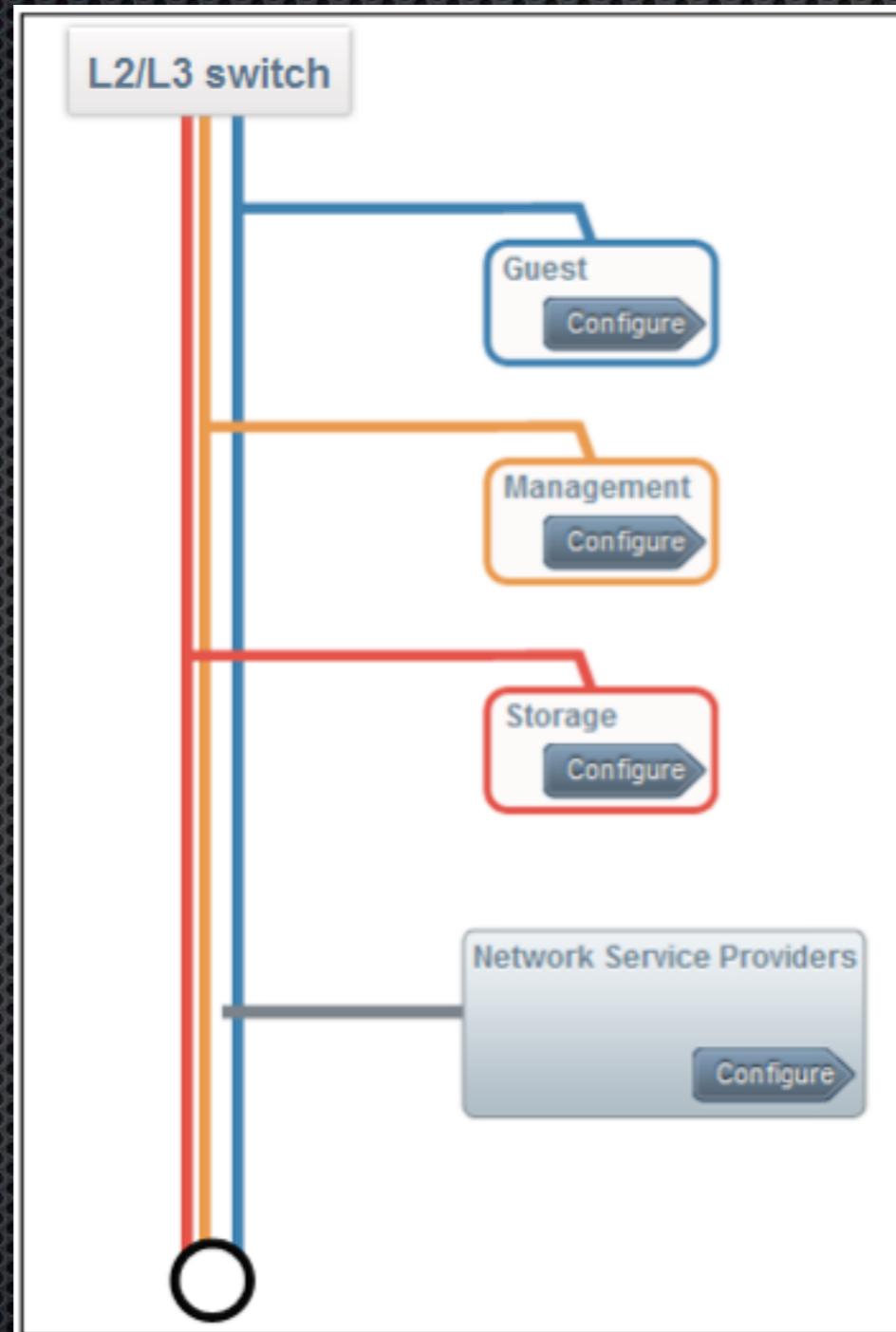
Basic: Most analogous to AWS-classic style networking. Provides a single flat layer-2 network where guest isolation is provided at layer-3 by the hypervisors bridge device.

Advanced: This typically uses layer-2 isolation such as VLANs, though this category also includes SDN technologies such as Nicira NVP.

Cloudstack - Advanced



Cloudstack - Basic



Cloudstack - Agent

- Standard VMhost with ntp, fqdn, KVM (libvirt), network bridges.
- Configure network for you chosen design (hardest part of cloudstack deployment).
- Configure iptables.
- Make sure VMhost can access storage.
- `yum install cloudstack-agent`.
- Then setup zone /pod /cluster /host/ storage/ network via web interface.

Project: Default view



Home >

- Dashboard**
- Instances
- Affinity Groups
- Storage
- Network
- Templates
- Events
- Projects
- Accounts
- Domains
- Regions
- Infrastructure
- Global Settings
- Service Offerings

General Alerts View all

Management Server
Management server node 192.168.0.5 is up
Tue27 May 2014 13:48:54 GMT

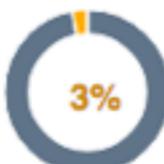
Management Server
Management server node 192.168.0.5 is up
Tue27 May 2014 12:47:09 GMT

Management Server
Management server node 192.168.0.5 is up

Host Alerts

Fetch latest

System Capacity

<p>Zone: gridppzone1</p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  <p>3%</p> </div> <div> <p>Memory 1.50 GB / 46.91 GB</p> </div> </div>	<p>Zone: gridppzone1</p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  <p>3%</p> </div> <div> <p>Management IP Addresses 3 / 100</p> </div> </div>
<p>Zone: gridppzone1</p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  <p>3%</p> </div> <div> <p>Public IP Addresses 3 / 100</p> </div> </div>	<p>Zone: gridppzone1</p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  <p>0%</p> </div> <div> <p>CPU 1.00 GHz / 128.06 GHz</p> </div> </div>
<p>Zone: gridppzone1</p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  <p>0%</p> </div> <div> <p>Secondary Storage 6.84 GB / 1.34 TB</p> </div> </div>	<p>Zone: gridppzone1</p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  <p>0%</p> </div> <div> <p>Primary Storage 283.46 MB / 2.68 TB</p> </div> </div>
<p>Zone: gridppzone1</p> <div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">  <p>0%</p> </div> <div> <p>VLAN/VNI / 5</p> </div> </div>	



Dashboard



Instances



Affinity Groups



Storage



Network



Templates



Events



Projects



Accounts



Domains



Regions



Infrastructure



Global Settings



Service Offerings

Infrastructure

Zones

2

[View all](#)

Pods

2

[View all](#)

Clusters

2

[View all](#)

Hosts

3

[View all](#)

Primary Storage

1

[View all](#)

Secondary Storage

1

[View all](#)

System VMs

2

[View all](#)

Virtual Routers

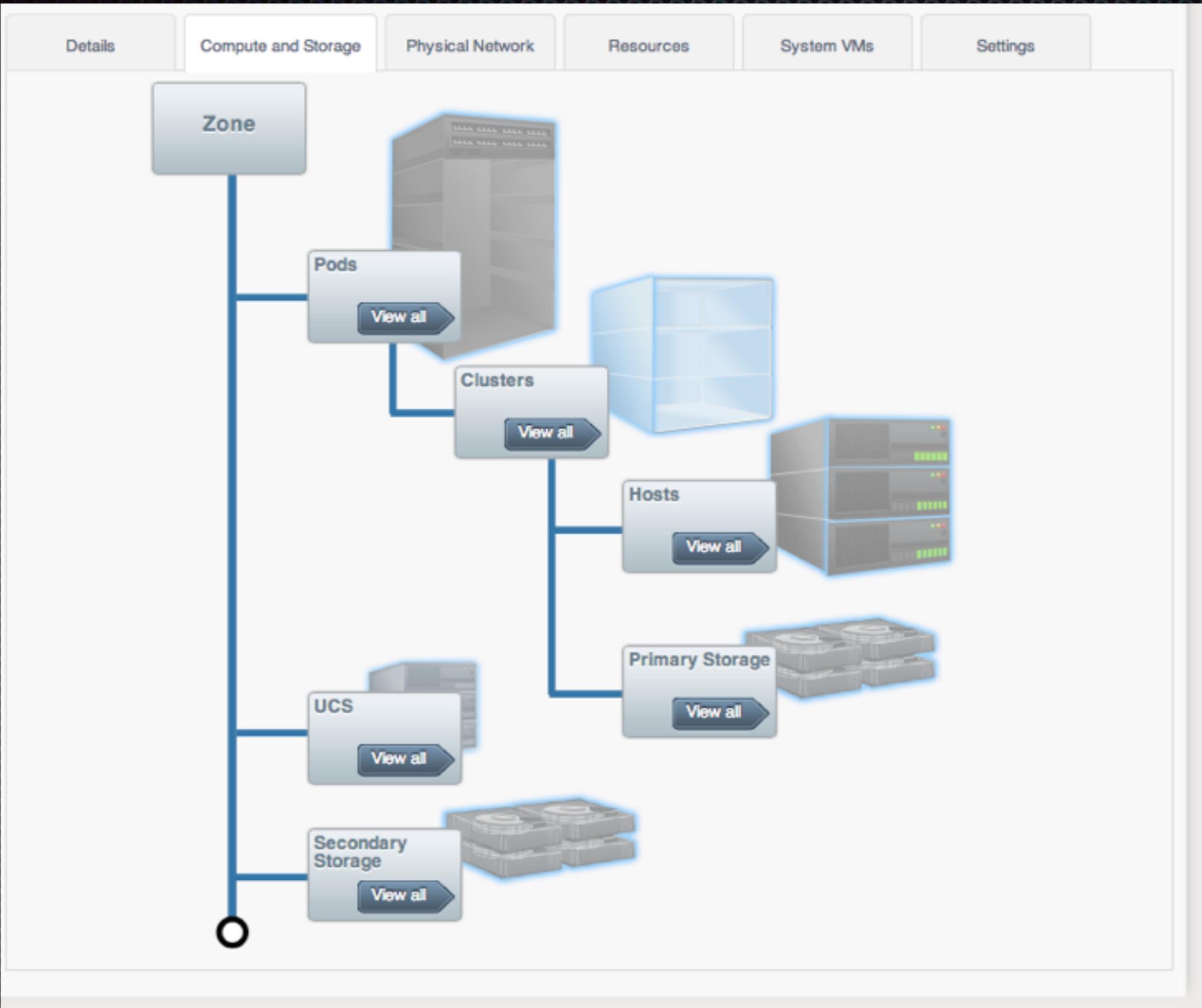
1

[View all](#)

Sockets

3

[View all](#)



Project: Default view

- Dashboard
- Instances**
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- Service Offerings

Home > Instances >

Filter by All

+ Add Instance

<input type="checkbox"/>	Name	Internal name	Display name	Zone name	State	Quickview
<input type="checkbox"/>	VM-9ac48667-d55f-40a3-bdd7-05f8b241c818	i-2-74-VM		gridppzone1	● Running	+

```
VM-9ac48667-d55f-40a3-bdd7-05f8b241c818  
https://gridppcloud.esc.qmul.ac.uk/client/console?cmd=access&vm=9ac48667-d55f-40a3-bdd7-05f8b241c818  
Ctrl-Alt-Del Ctrl-Esc Keyboard  
CentOS release 5.5 (Final)  
Kernel 2.6.18-194.el5 on an x86_64  
INIT: version 2.86 reloading5f8b241c818 login:
```



Refresh

Dashboard

Instances

Affinity Groups

Storage

Network

Templates

Events

Projects

Accounts

Domains

Regions

Infrastructure

Global Settings

Service Offerings

Details

Configuration

Static NAT Enabled

VM: VM-9ac48667-
d55f40a3-bdd7-
05f8b241c818



Cloudstack

- Have deployed a prototype Cloudstack cloud at QMUL using the advanced network configuration (layer 2/ VLAN isolation).
- TODO
 - CERNVM and home made templates.
 - CLI
 - Cloudmonky API.
 - Basic networking zone. AWS EC2 API Support.
 - OCCl interface using rOCCl. EGI federated cloud.
 - Dirac server.
 - IPV6.
 - Lower priority - High Availability, LDAP, Ceph/Glusterfs storage