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OpenNebula

The Opensource Solution for Datacenter Virtualization

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Aims

What is OpenNebula?

Features to build your cloud?

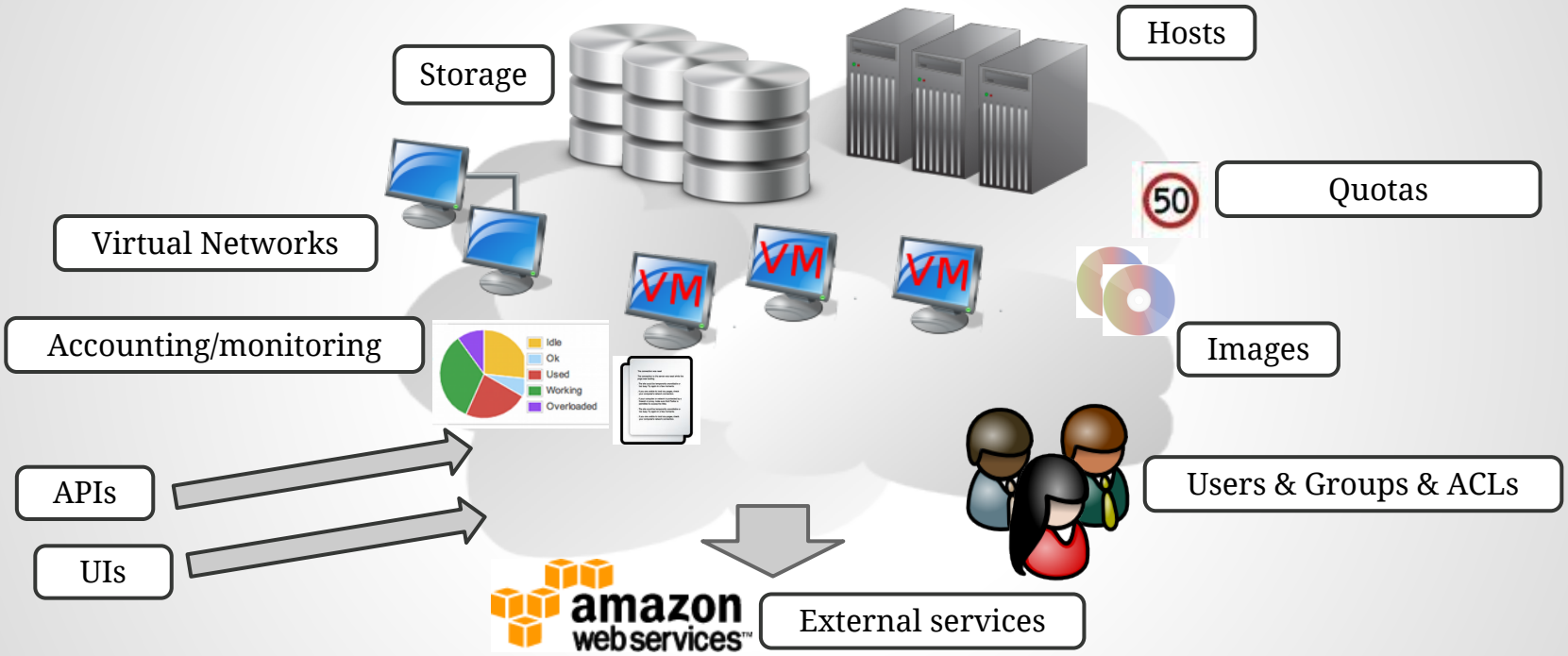
Features to operate your cloud?

Features to integrate your cloud?

What is OpenNebula?

Full cloud infrastructure solution

What is OpenNebula?



Make all this work together

[in a reliable, efficient, scalable way]

OpenNebula principles

Fully open-source

Apache 2 License (not open core)

OpenNebula principles

Flexible & adaptable

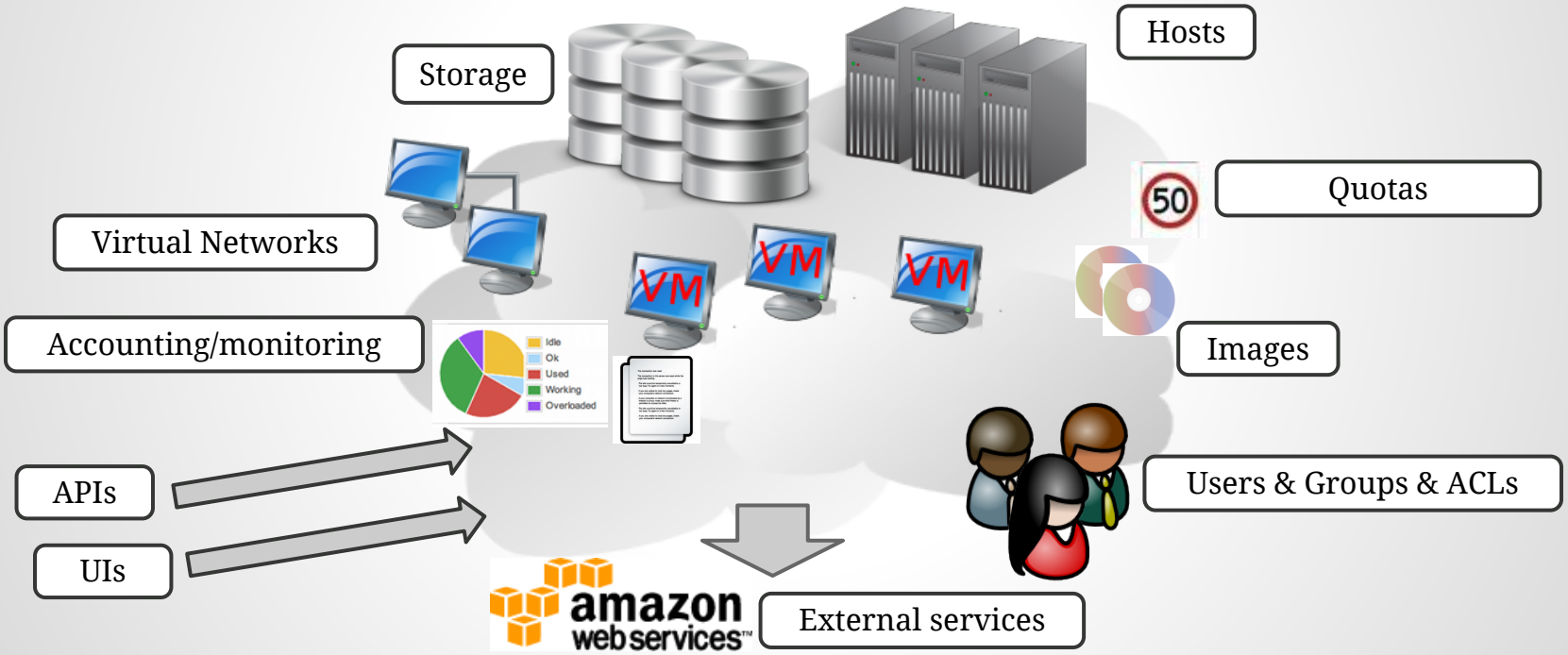
Modular design
Custom plugins

OpenNebula principles

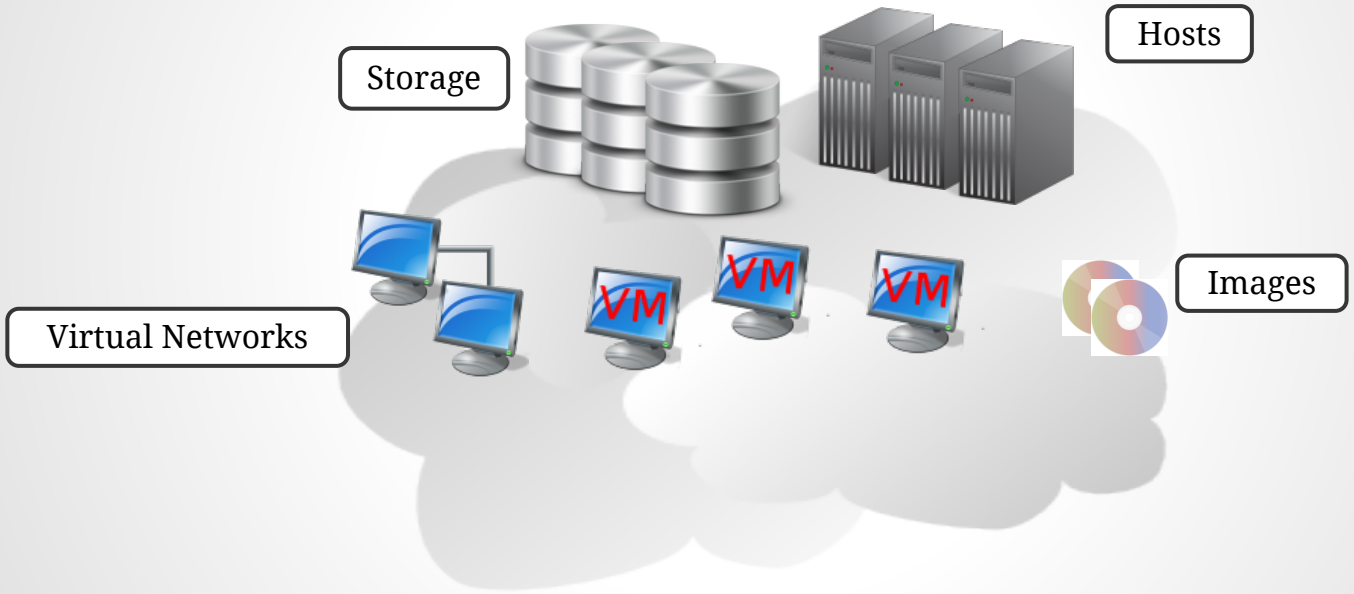
Interoperable / No lock-in

Infraestructure agnostic
Multiple Hypervisors (VMware, XEN, KVM)
Several APIs (AWS, OCCI)

Getting it sorted out



Setting up the infraestructure



Physical hosts - Hypervisors

VMware

KVM

Xen

EC2 -> Deploy VMs to Amazon host

Hyper-V (Ecosystem)
OpenVZ (Ecosystem)
VirtualBox (Ecosystem)

Physical hosts - Monitoring

Monitoring drivers for the different hypervisors

Ganglia

Physical hosts - Networking

Defined per host:

802.1Q

ebtables

Open vSwitch

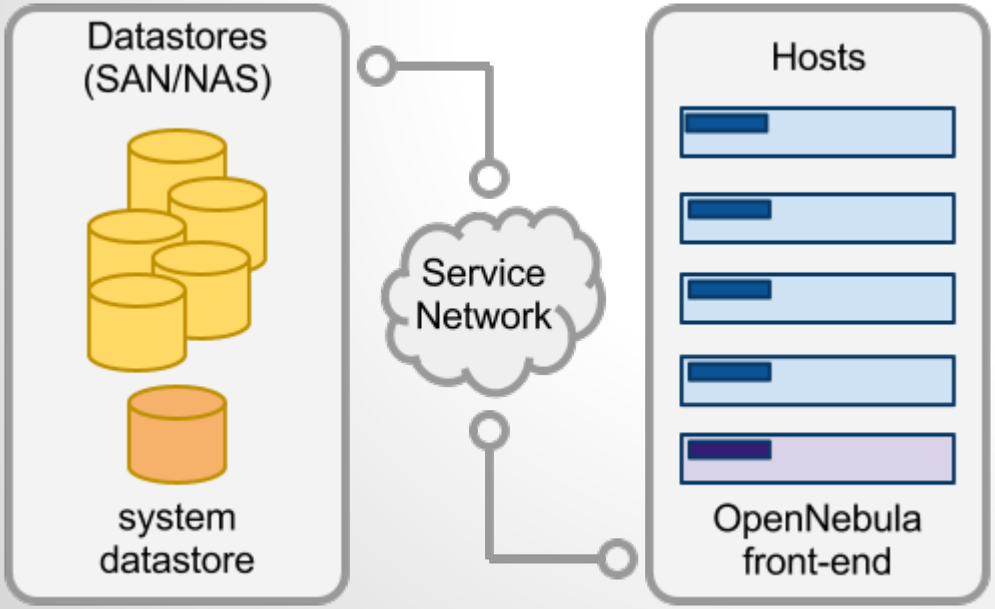
VMware - native networks

Firewall - rules via iptables - no isolation

Dummy

Storage - Datastores

"A Datastore is any storage medium used to store disk images for VMs. Typically, a datastore will be backed by SAN/NAS servers"



Types:
- Filesystem
- iSCSI / LVM
- VMware
- System

Transfer drivers:
- SSH
- Shared
- iSCSI
- VMware
- qcow

Storage - Images

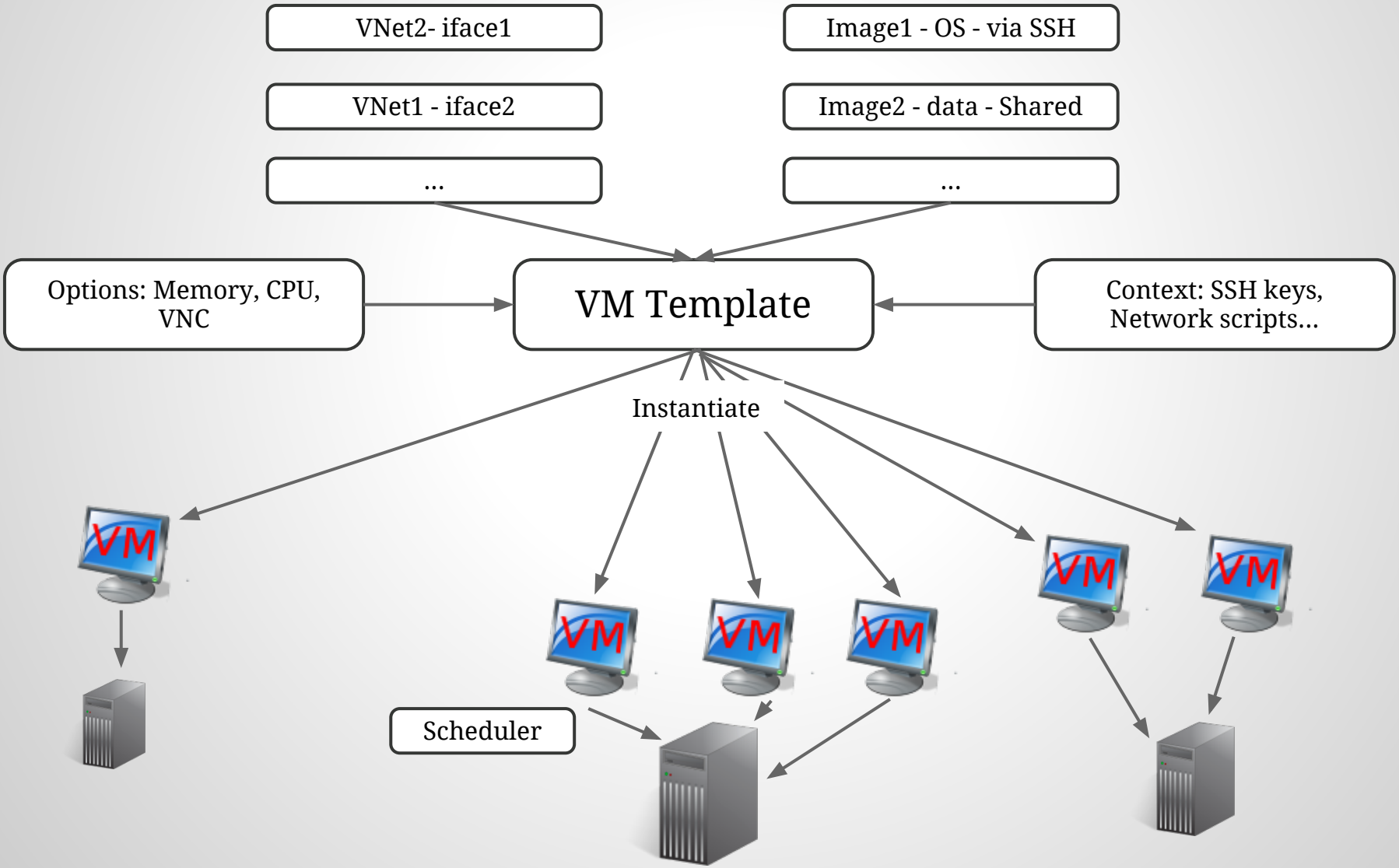
- Placed in a datastore
- Type:
  - OS
  - CDROM (read-only)
  - Datablock
- Path
  - Filesystem
  - Download
  - Upload (via UI, OCCI)
  -
- Persistent / Non-persistent

Networking - Virtual Networks

- Set of leases (IP:MAC) - defined via ranged, fixed

- Deploy: MAC is assigned to network iface with the IP

Virtual Machines



Virtual Machines - operations

Deploy
hold/release
suspend/stop/resume
restart/reboot/reset
resubmit
cancel
shutdown

Migrate
Live-migrate

New: Disk hotplugging

Operating the cloud

Groups

Set of users

Quota-enabled: Group usage limits for VMs, Storage…

Accounting: Group resource usage is monitored and stored

Users

Quota-enabled: Usage limits for VMs, Storage…

Accounting: resource usage is monitored and stored

Authentication: Core, SSH, LDAP, x509… custom

Permissions & ACLs

Permissions:

Resources (Images, Networks, VMs, Templates) have owner/group and Unix-like permissions:

user/group/other : use/manage/admin

ACLs:

Rules in the style:

```
"Group testers can use templates from group developers"
"User Bob can administrate all Virtual Networks"
```

Command line interface

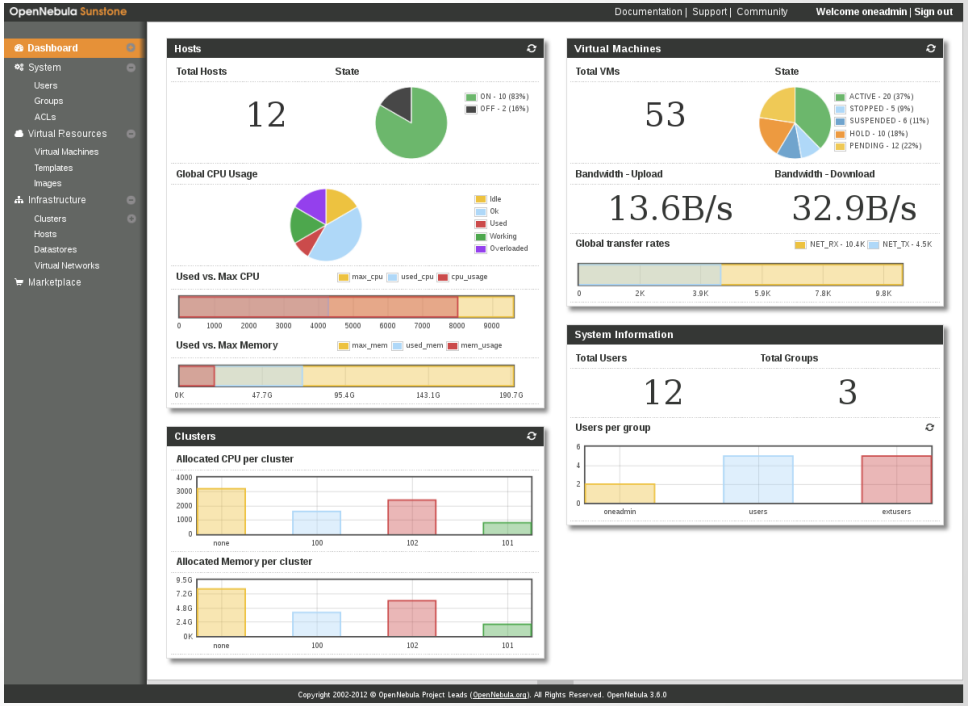
Set of command line utilities

```
onevm          [list|create|delete]...
onehost        [list|create|delete]...
onetemplate    [list|create|delete]...
onevnet        [list|create|delete]...
oneimage       [list|create|delete]...
onedatastore   [list|create|delete]...
                        ...
```

(options to produce raw XML output)

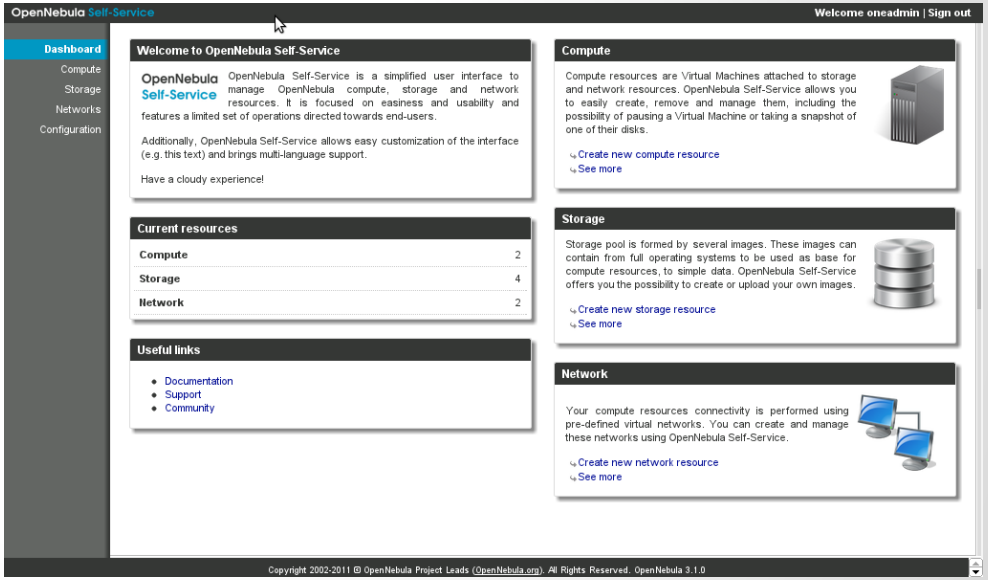
OpenNebula Sunstone

- Fully featured administration interface
- Integrated web VNC console
- Monitoring, accounting, usage plots
- VM creation wizards, i18n...
- Custom plugins



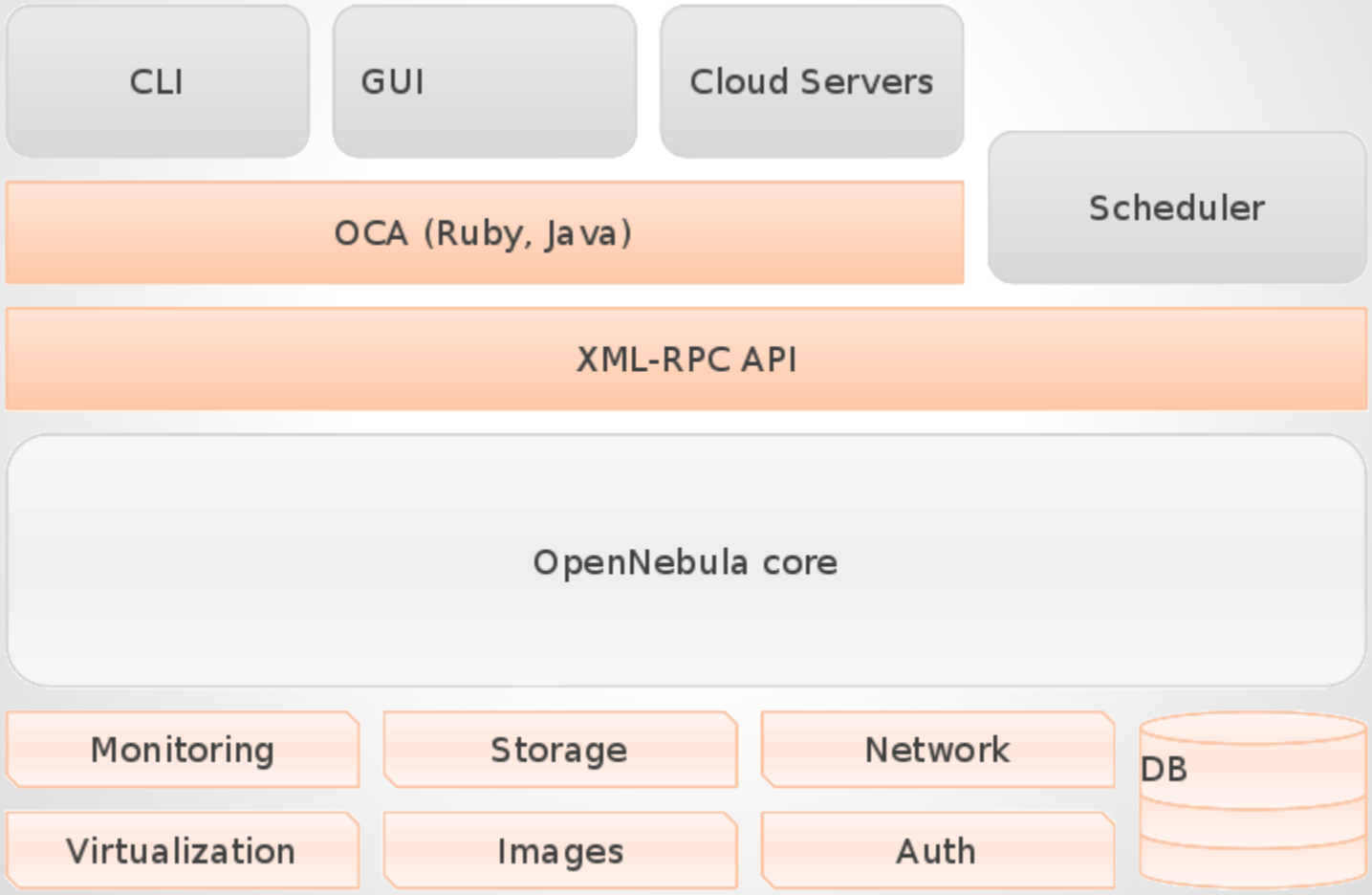
OpenNebula Self-Service

- End-user oriented interface, simple, multi-language
- Manage virtual resources: Nets, VMs, Images
- Easily brandable, customizable
- Built on OCCI API



APIs

Integrating the cloud



System interfaces - OCA

Ruby OCA

Java OCA

Python OCA (Ecosystem)

XML-RPC API

Drivers & Plugins

Small scripts performing defined operations

Monitoring, virtualization, storage, network, auth...

Easy to write, easy to tweak

There's more...

Cool things that come with OpenNebula

Core tuning - Hooks

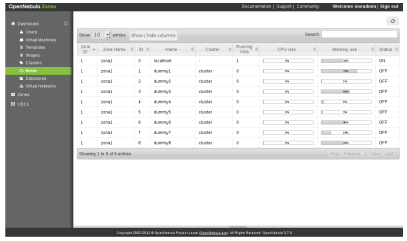
Scripts triggered on certain events

- Local or remote
- Hooks for Hosts:
  - Triggered on CREATE, ERROR, DISABLE
- Hooks for VMs:
  - Triggered on CREATE, RUNNING, SHUTDOWN, STOP, FAILED, DONE…

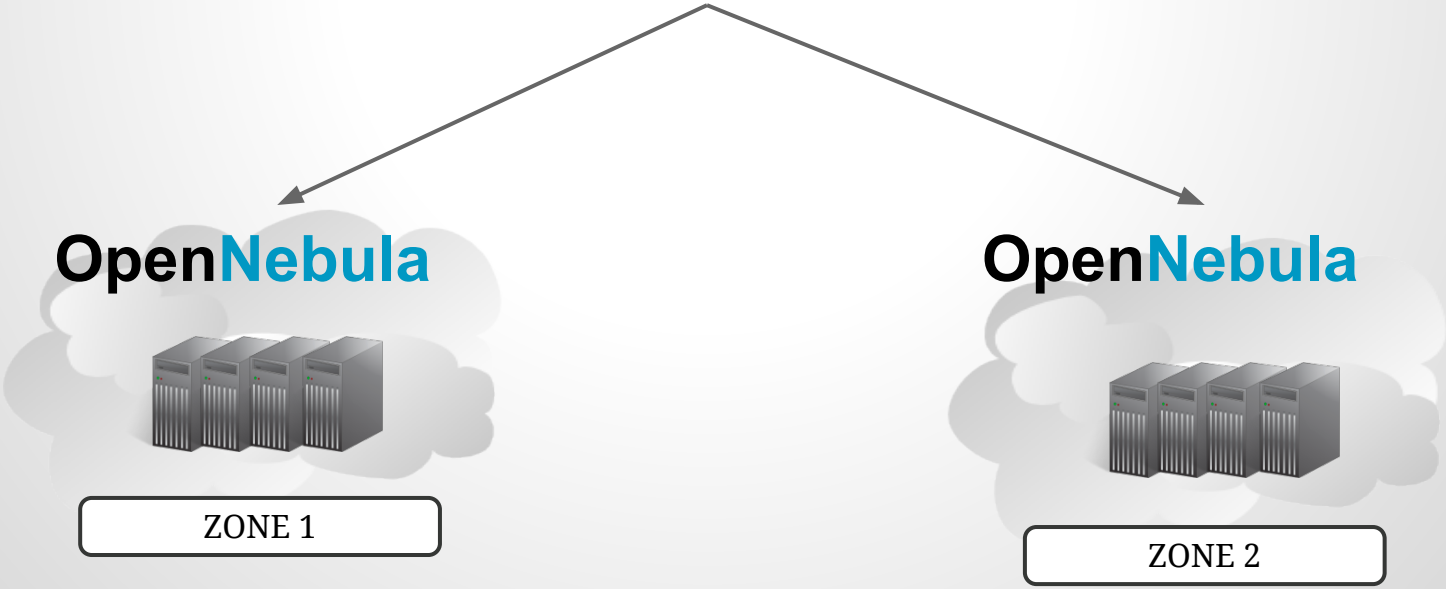
Fault tolerance

OpenNebula Zones

Multi-tier deployments with oZones



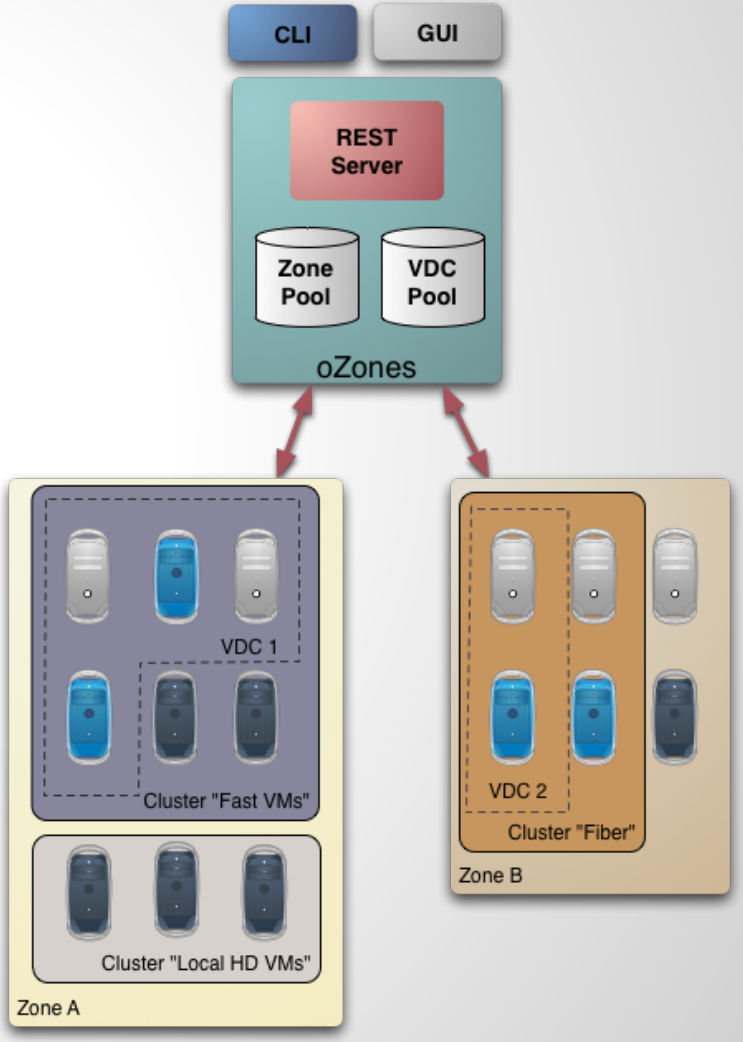
UI + CLI + Ruby API



OpenNebula Zones

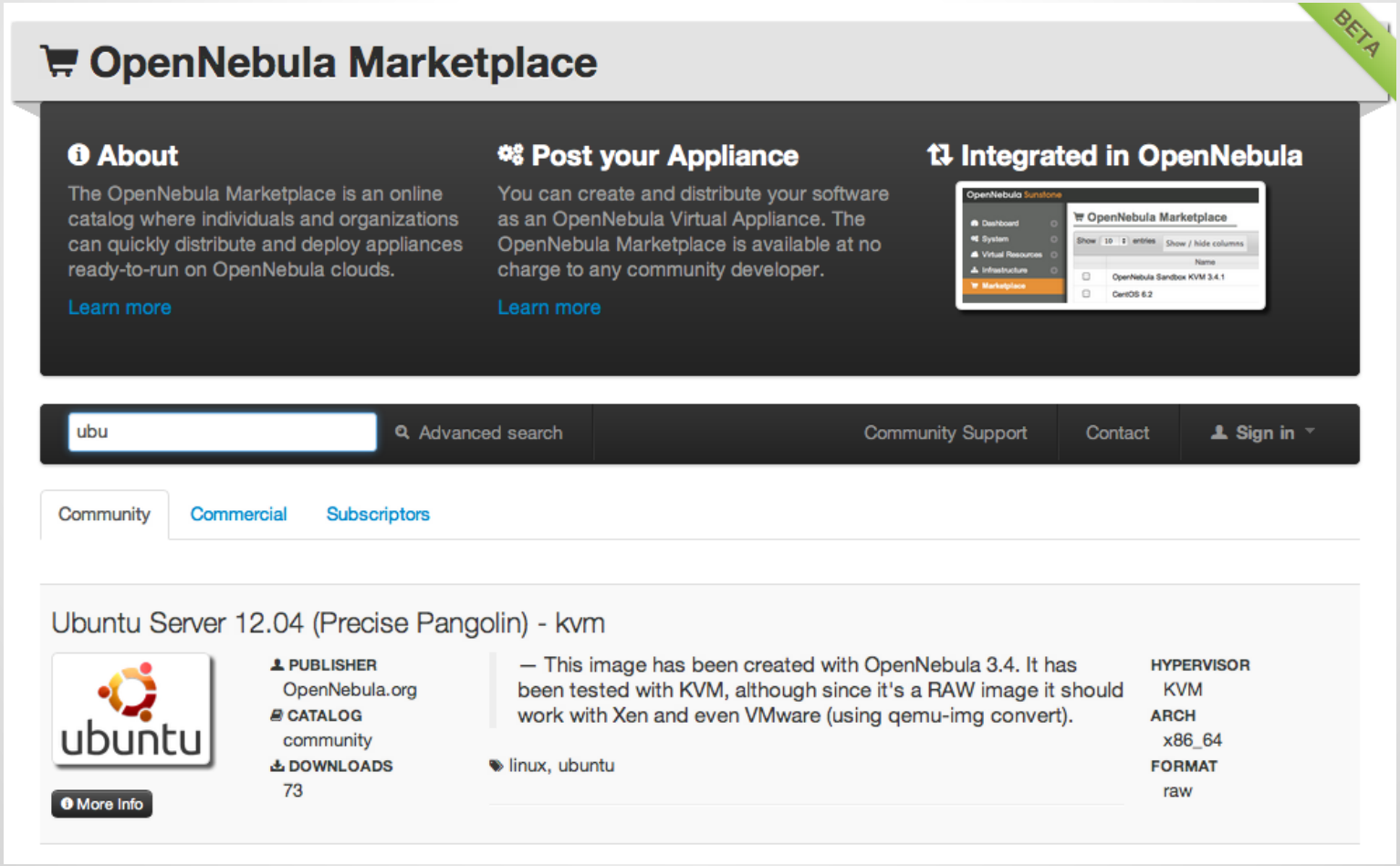
Virtual Data Center (VDC)

- Group of
  - Hosts
  - Datastores
  - Virtual Networks
- Managed by (ACL rules)
  - VDC Admin user
  - VDC group
- ONE / UIs accessible from oZones frontend
  - `http://ozones:6121/sunstone_vdc1`



OpenNebula Marketplace

Hosted by C12G labs | Integrated in Sunstone



OpenNebula sandboxes

Easiest way to try out OpenNebula

Available: KVM, VMware

`http://opennebula.org/cloud:sandbox:[vmware|kvm]`

OpenNebula public cloud

Public Users

amazon web services

Occi

OpenNebula Self-Service

Demo ONE

Test OpenNebula UIs and APIs

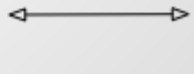
Over 1000+ users

Request an account:

`opennebula.org/cloud:tryout`

OpenNebula.org

OpenNebula Sunstone

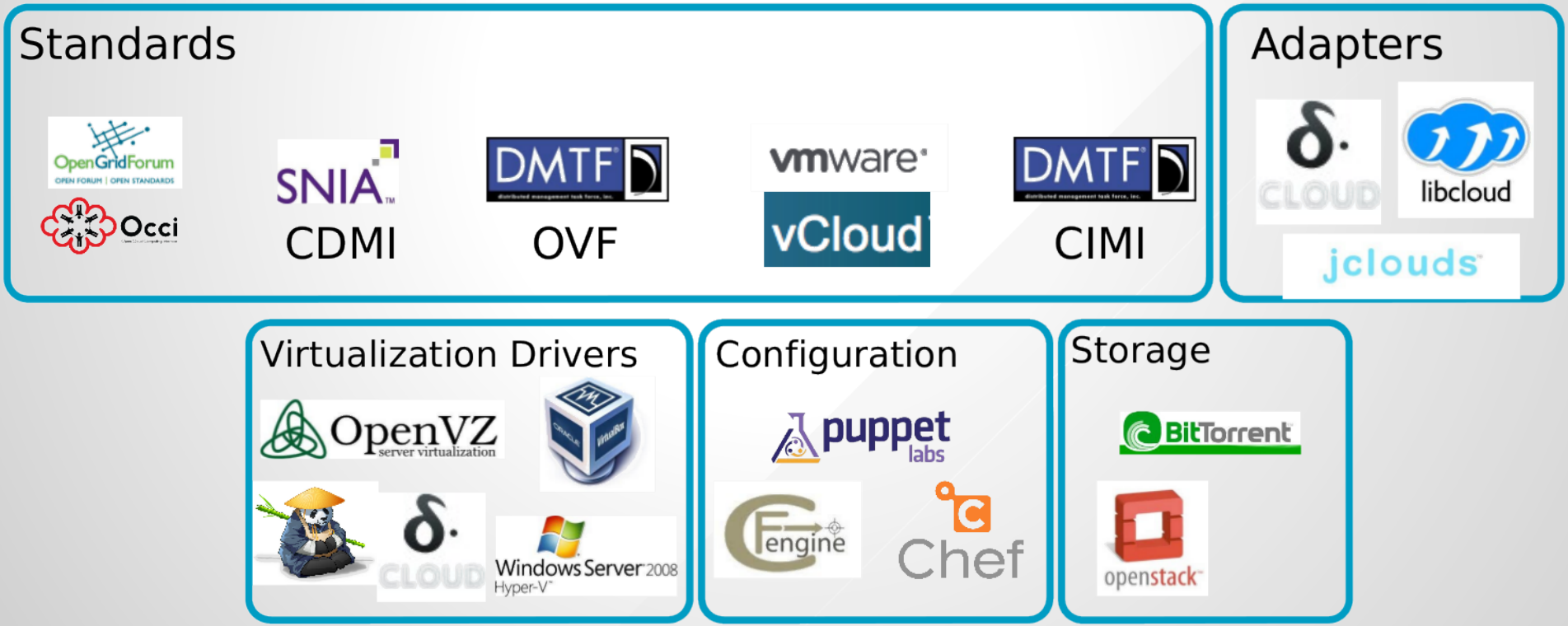


Administrator

Ecosystem

Community contributions

Some examples:



Final keys

- Soon celebrating 5th birthday
- FOSS project:
  - Mailing lists and IRC channel in Freenode
  - Extensive, up-to-date documentation
  - Packages for major Linux distros
  - `blog.opennebula.org` with news, tutorials...
  - Development site: `dev.opennebula.org`

Github mirror: `github.com/OpenNebula/one`

- Commercial support via C12G LABS `.com`
- Fast release cycle every 3 months: Currently v3.6.0

Final keys

Featured users and contributors

Contributors

Users

Projects

OpenNebula.org

Twitter: `@opennebula`
Freenode: `#opennebula`

Thanks!

Questions

?