



# **UltiCloud**

## **Infrastructure-as-a-Service on the OpenStack platform**

<http://www.ulticloud.com>

<http://www.openstack.org>



# Introduction to OpenStack

1. What OpenStack is and is not
2. History & Background
3. OpenStack development

# What OpenStack is and is not



- virtualized infrastructure
- virtualized networking
- authentication & authorization management
- web-based dashboard & API user access
- **Open Source**



- simple virtualization
- anything else (higher level)
  - (for now)

## History & Background OpenStacku

Rackspace's  
Cloud Files  
platform

2010



NASA's Nebula platform

2014



YAHOO!

PayPal®



## OpenStack development



- 6-months development cycle (new versions of core projects)
- organization structure + support of “big players”
- frequent developers & users meetings

# OpenStack Architecture

1. Components from User perspective
  - Components overview
  - Live demo – tutorial
2. Components from Admin perspective - Stack
3. OpenStack deployment – quick overview

## OpenStack Architecture

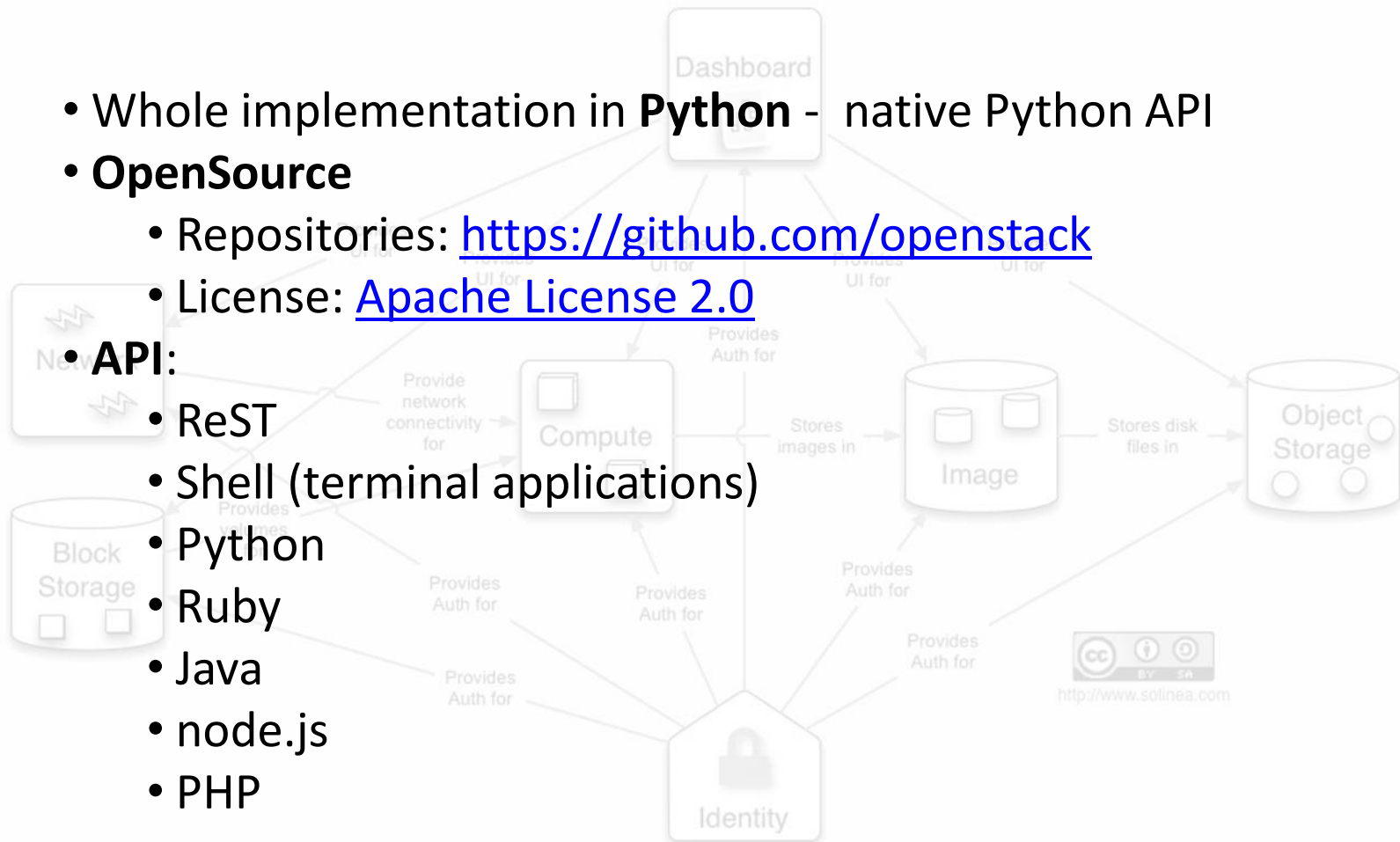
- Whole implementation in **Python** - native Python API
- **OpenSource**

- Repositories: <https://github.com/openstack>

- License: [Apache License 2.0](#)

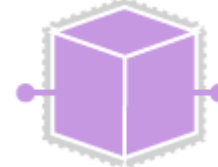
- **API:**

- ReST
- Shell (terminal applications)
- Python
- Ruby
- Java
- node.js
- PHP



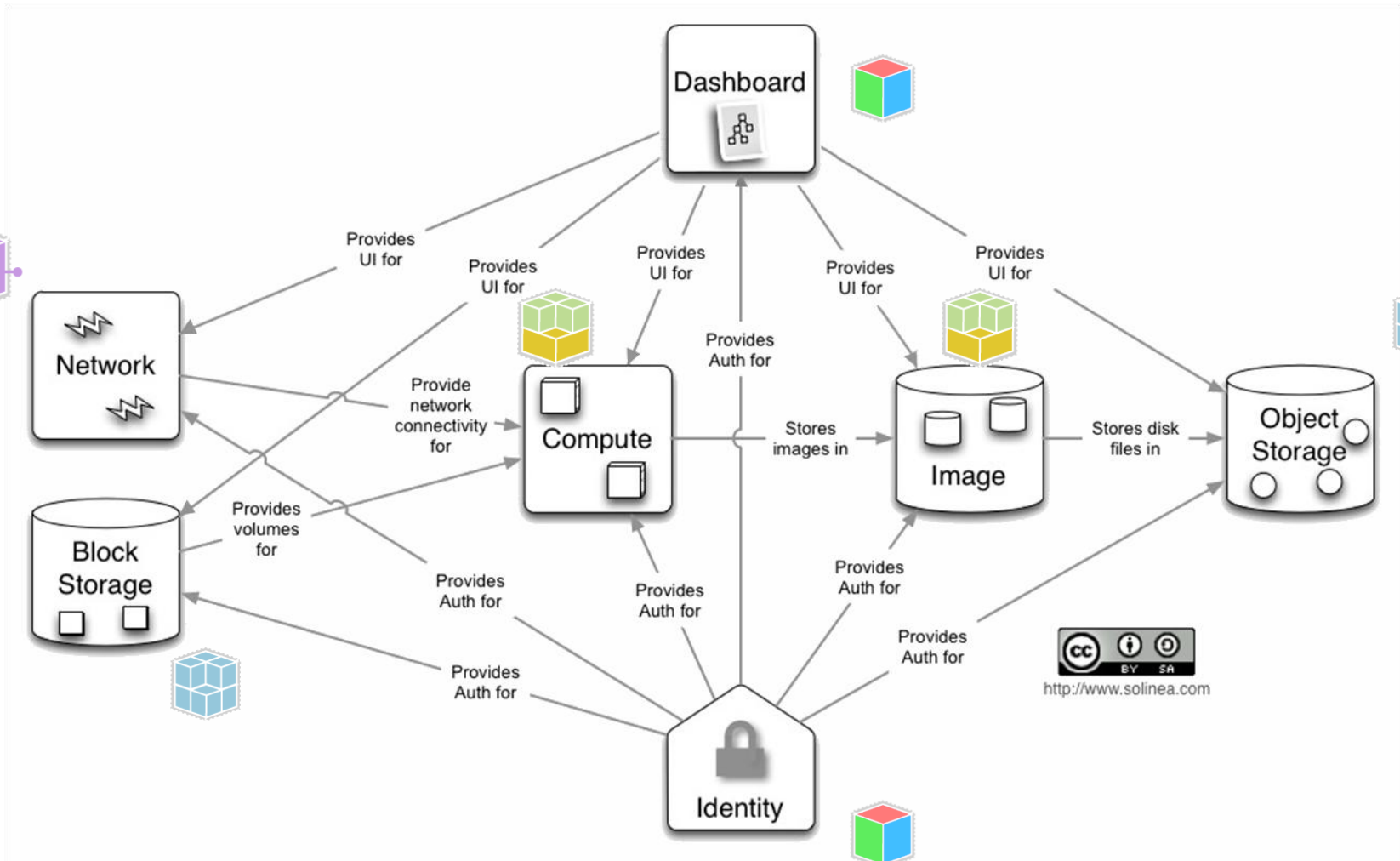
## OpenStack components user perspective

1. **Computing**
  - i. Compute – virtual servers
  - ii. Image –virtual disks management
2. **Networking**
  - i. Network – virtualized network
3. **Storing**
  - i. Object Storage
  - ii. Block Storage
4. **Others (support)**
  - i. Identity
  - ii. Dashboard, Orchestration, ...

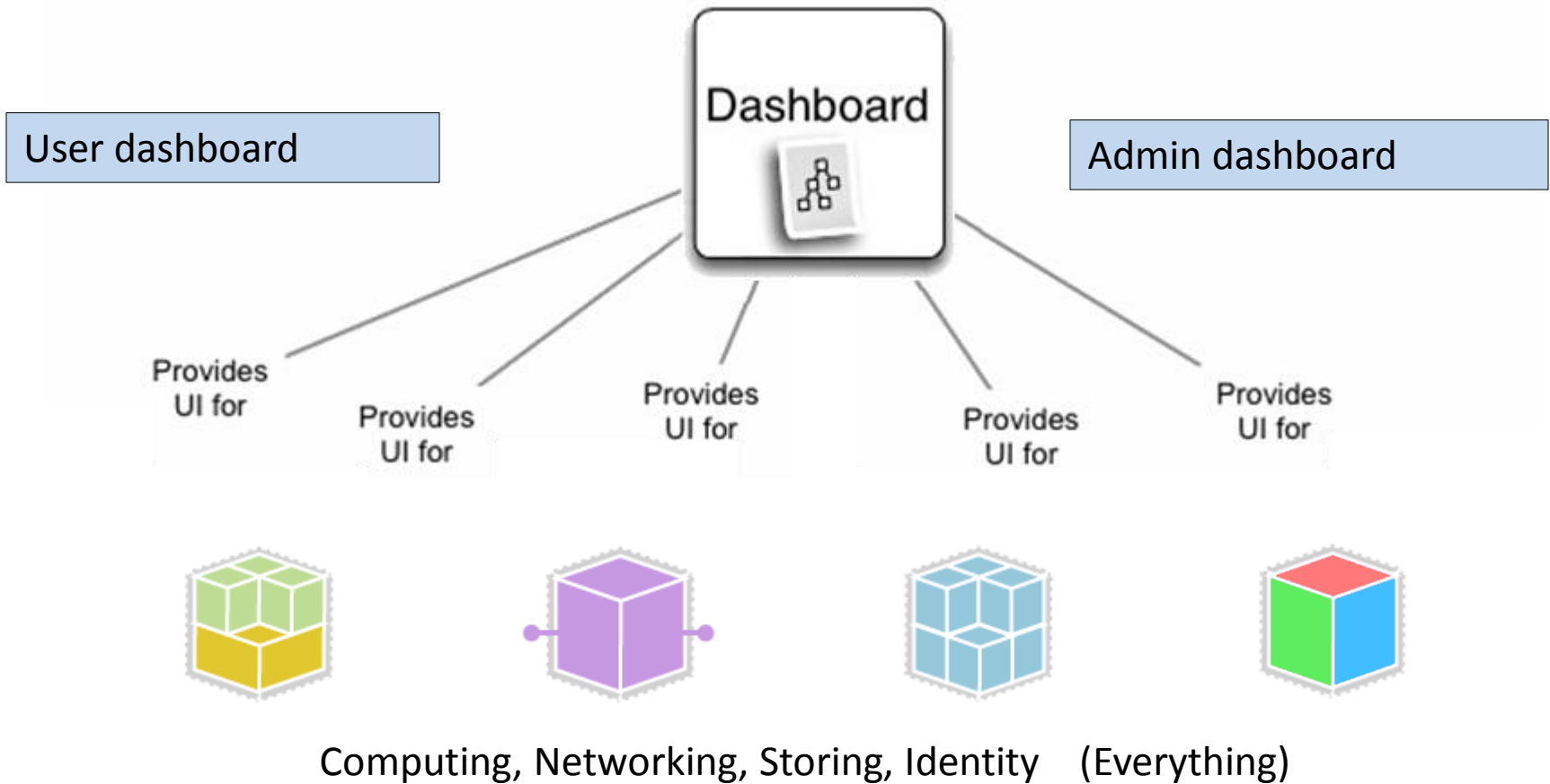




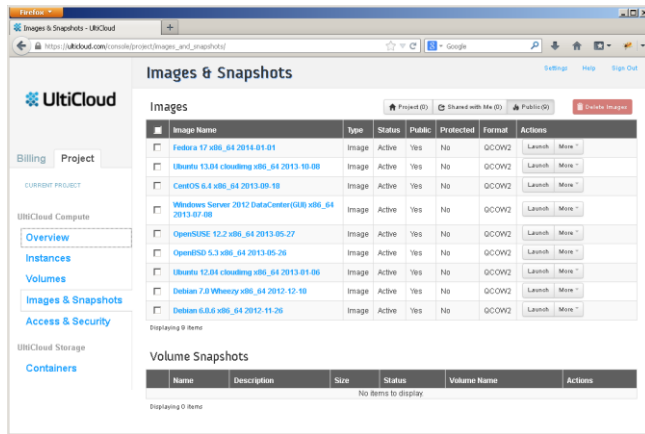
## OpenStack components



## OpenStack components - Dashboard



## OpenStack components - Dashboard

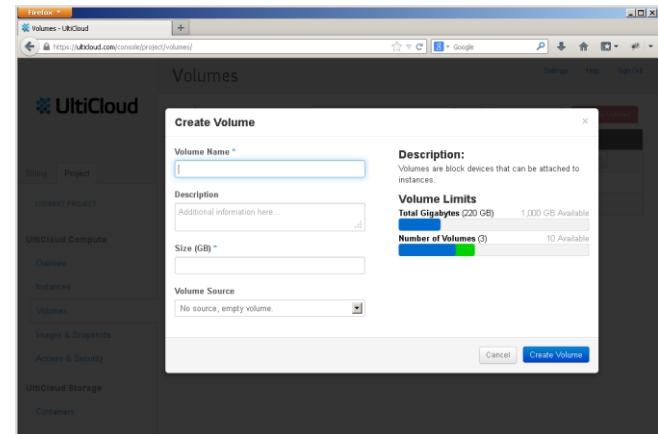
**Images & Snapshots**

Image Name	Type	Status	Public	Protected	Format	Actions
Febora 17 x86_64 2014-01-01	Image	Active	Yes	No	QCOW2	Launch More
Ubuntu 13.04 cloudimg x86_64 2013-10-08	Image	Active	Yes	No	QCOW2	Launch More
CentOS 6.4 x86_64 2013-08-18	Image	Active	Yes	No	QCOW2	Launch More
Windows Server 2012 DataCenter (GUI) x86_64 2013-07-09	Image	Active	Yes	No	QCOW2	Launch More
OpenSUSE 12.2 x86_64 2013-05-27	Image	Active	Yes	No	QCOW2	Launch More
OpenBSD 5.3 x86_64 2013-05-26	Image	Active	Yes	No	QCOW2	Launch More
Ubuntu 12.04 cloudimg x86_64 2013-01-06	Image	Active	Yes	No	QCOW2	Launch More
Debian 7.0 Wheezy x86_64 2012-12-18	Image	Active	Yes	No	QCOW2	Launch More
Debian 6.0.6 x86_64 2012-11-26	Image	Active	Yes	No	QCOW2	Launch More

Volume Snapshots

Name	Description	Size	Status	Volume Name	Actions
No items to display					

List of available VDDs

**Volumes**

**Create Volume**

Volume Name \*

Description

Size (GB) \*

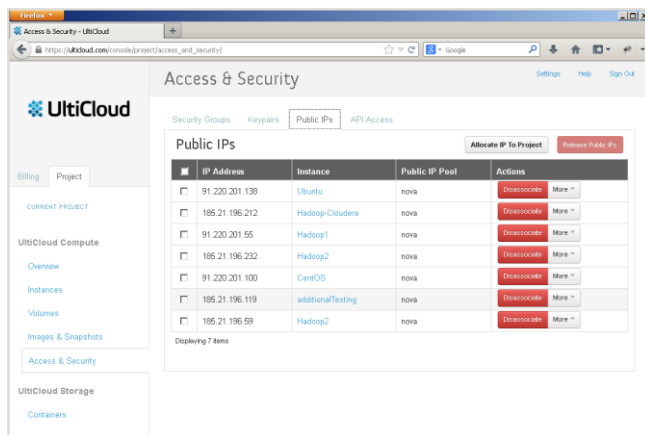
Volume Source

**Description:**  
Volumes are block devices that can be attached to instances.

**Volume Limits**  
Total Gigabytes (220 GB) 1,000 GB Available  
Number of Volumes (0) 10 Available

Cancel Create Volumes

Volume creation

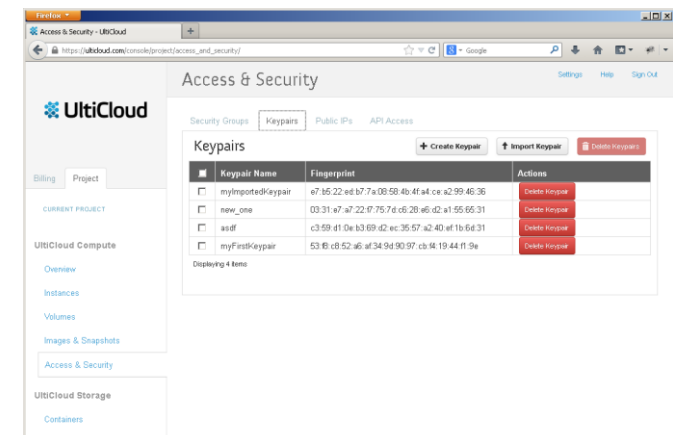



**Access & Security**

Public IPs

IP Address	Instance	Public IP Pool	Actions
91.220.201.138	Ubuntu	nova	Deassociate More
185.21.196.212	Hadoop-Clouders	nova	Deassociate More
91.220.201.55	Hadoop1	nova	Deassociate More
185.21.196.232	Hadoop2	nova	Deassociate More
91.220.201.100	CentOS	nova	Deassociate More
185.21.196.119	additionalTesting	nova	Deassociate More
185.21.196.59	Hadoop2	nova	Deassociate More

Public IP addressed assignment

**Access & Security**

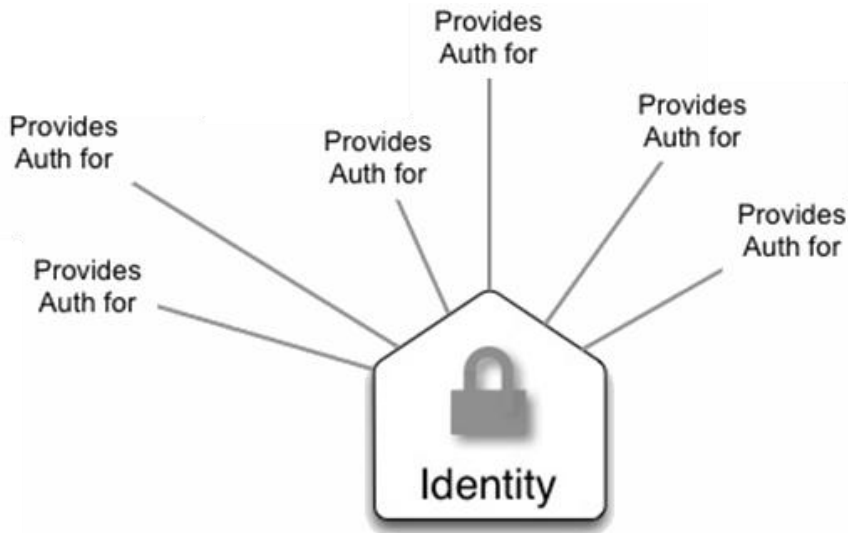
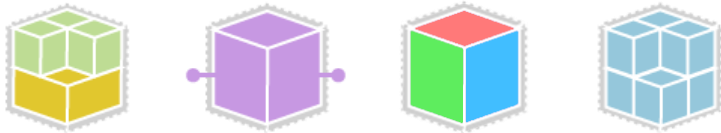
Keypairs

Keypair Name	Fingerprint	Actions
myImportedKeypair	e7:35:22:ed:b7:7a:08:58:4b:4f:a4:c4:e2:99:46:3b	Delete Keypair
new_one	03:31:a7:a7:22:07:75:76:c6:28:a6:d2:a1:55:66:31	Delete Keypair
asdf	c3:59:d1:0e:b3:69:d2:ec:35:57:a2:40:af:1b:6d:31	Delete Keypair
myFastKeypair	53:6:c8:52:a6:af:34:94:90:97:cb:94:19:44:f1:9e	Delete Keypair

SSH keypairs management

## OpenStack components - Identity

Whole architecture



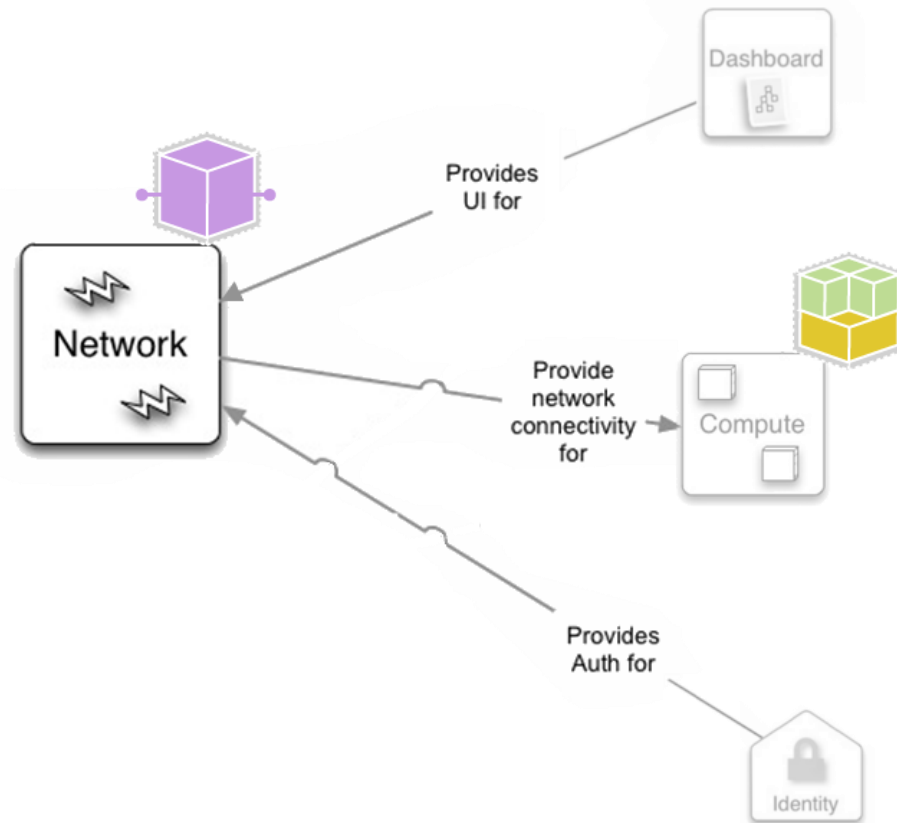
Authentication, Authorization, Catalogs

- Handling incoming API requests
- Central phone book, catalog
  - Users
  - Services
  - Machines (Endpoints)
- Authentication management(username-password | token-based, ...)
- Provides all authentication in the whole OpenStack cloud

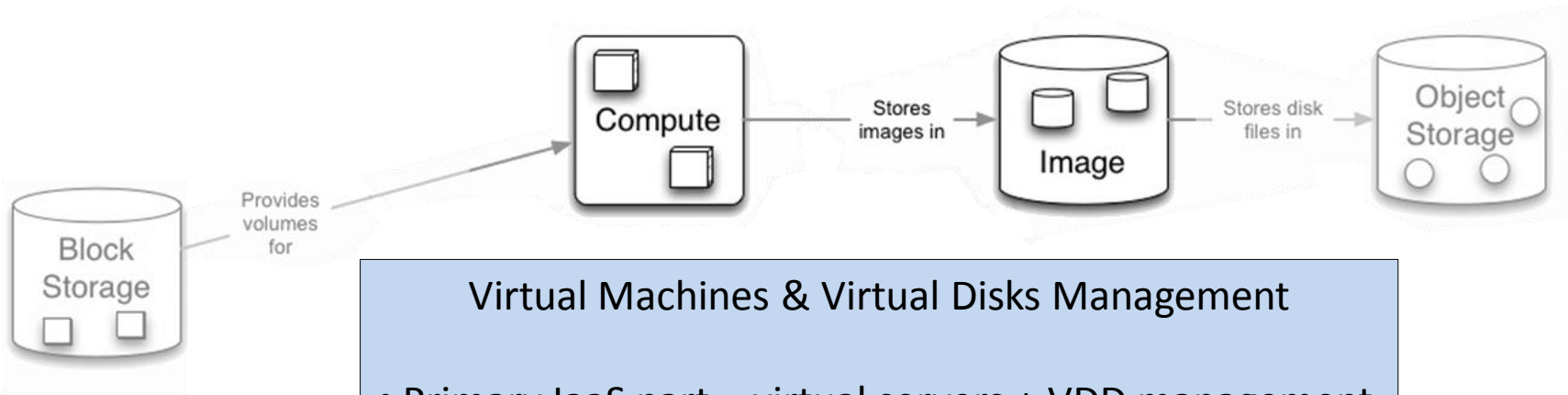
## OpenStack components - Networking

### Networking

- Virtualized network infrastructure
  - flat network
  - VLAN
- Public IP addresses management
  - DHCP
  - Floating IP addresses
- User creation of subnets, moving VMs between subnets, ...
- User managed:
  - Load Balancing
  - Firewall
  - VPN



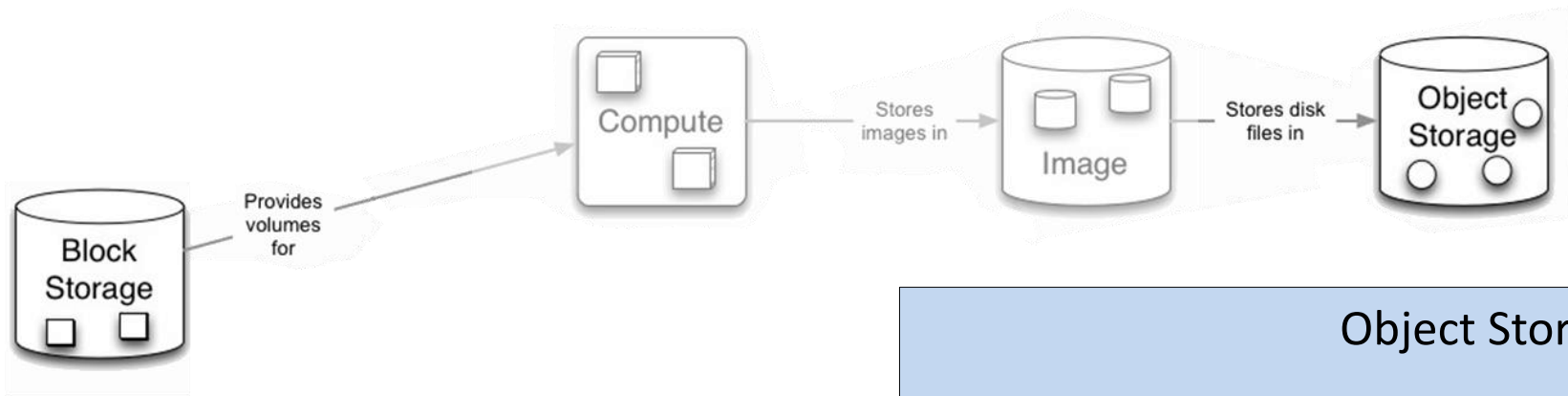
## OpenStack components - Computing



### Virtual Machines & Virtual Disks Management

- Primary IaaS part – virtual servers + VDD management
- Designed for massive scaling (horizontal)
- Management and automatization of VMs
- Supported virtualization:
  - KVM
  - XenServer
  - Hyper-V
  - LXC etc.

## OpenStack components - Storing



Block Storage  
persistent block-level storage

- HDDs for virtual servers
- abstraction: plenty of actual platforms for backend: Gluster FS, IBM Storage, Coraid, ...
- 3x replicated data

### Object Storage

- scalable replicated storage
- management and distribution to independent zones
- only put / get operations
- typical usage: storing VDDs
- software control of data integrity
- 3x replication

# Live Dashboard demo - tutorial

Tutorial - running **Windows** instances:

<https://ulticloud.com/getting-started/first-steps-with-the-ulticloud-console-windows/>

Tutorial - running **Linux (Ubuntu)** instances :

<https://ulticloud.com/getting-started/first-steps-with-the-ulticloud-console-linux/>





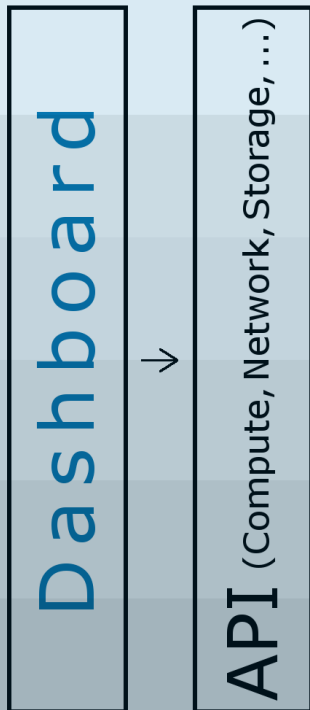
Infrastructure-as-a-Service on the OpenStack platform

# Components from Admin perspective - Stack

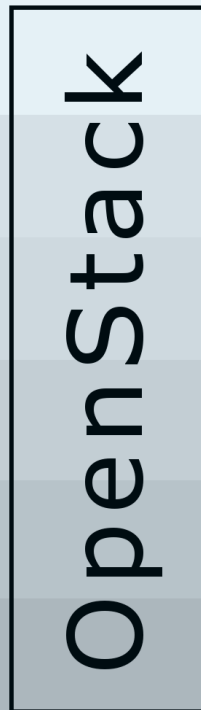
## Components from Admin perspective – Stack

### Front-end

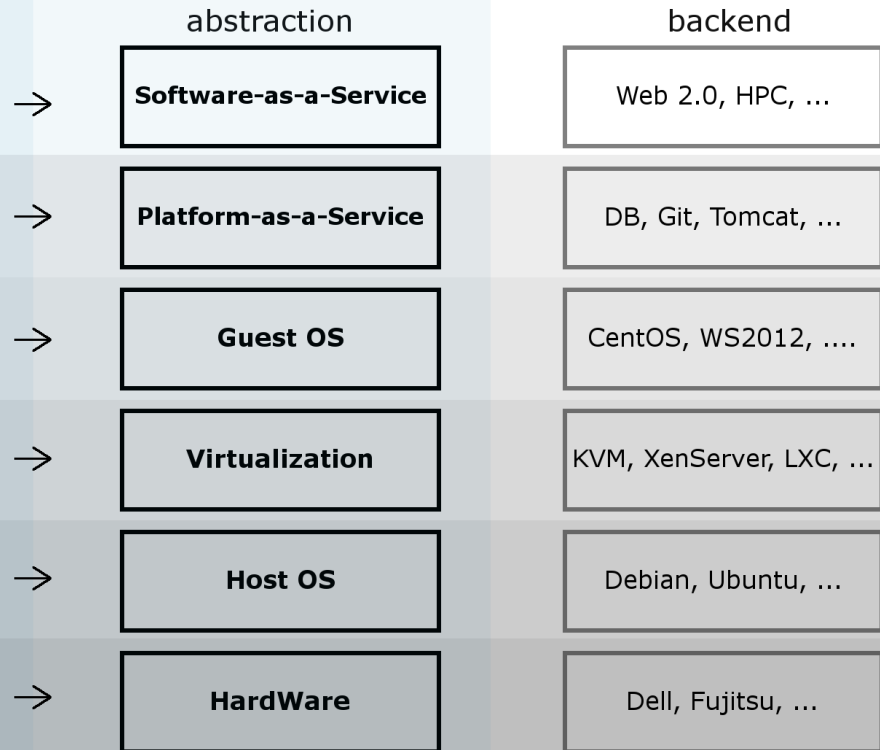
optional



### Control



### Core



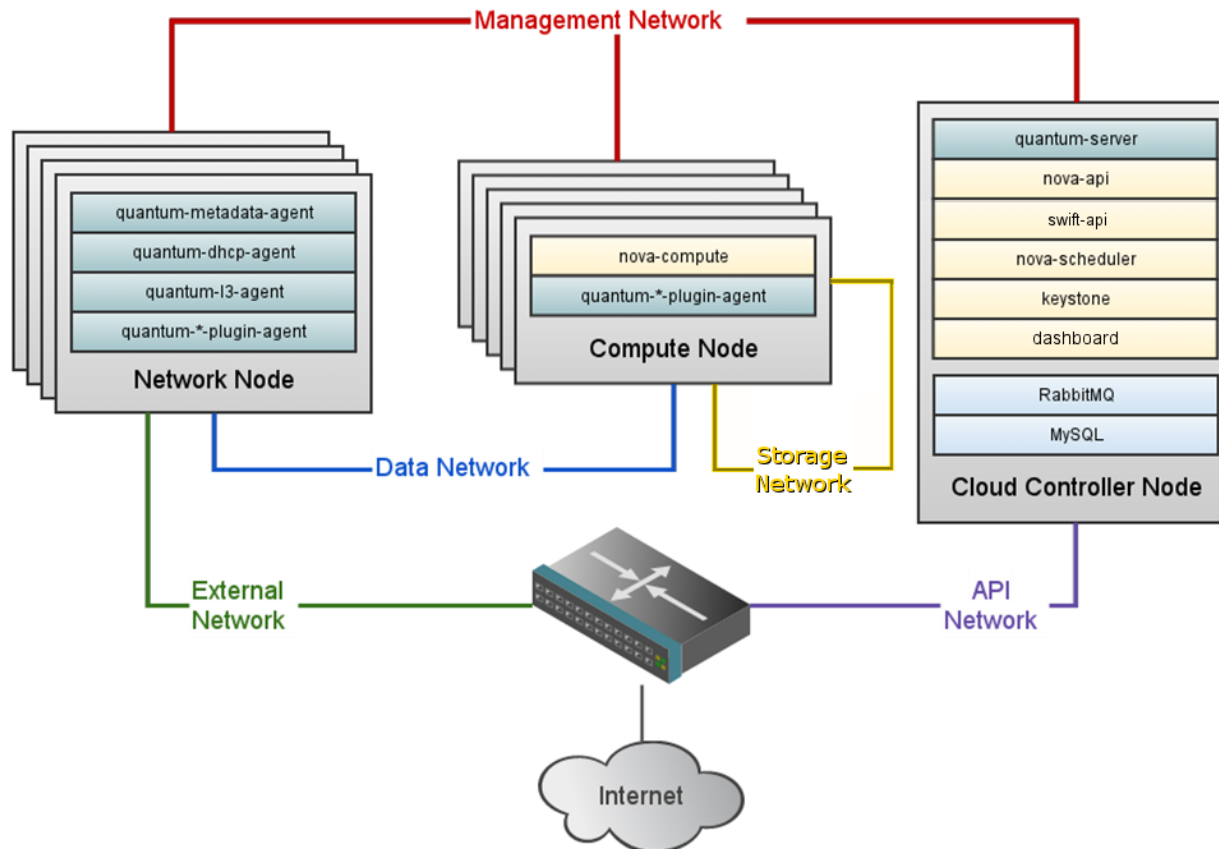
# OpenStack deployment

## Quick overview

1. Local / testing / development
  - DevStack – complete bootstrap script creating a complete OpenStack cloud on a single machine for development / testing purposes
  - <http://devstack.org/>
2. **Basic “production” deployment**
  - **3-node setup**
3. Production HA deployment
  - MySQL – all persistent relation data of the whole OpenStack cloud
  - RabbitMQ – backend for message passing (message broker)

# OpenStack deployment

Basic “production” deployment : 3-node setup



# Thank you for your attention

Used sources:

<http://www.openstack.org>

<http://en.wikipedia.org/>