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

2010

Rackspace's Cloud Files platform

NASA's Nebula platform

2014

OpenStack development

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

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OpenStack Architecture

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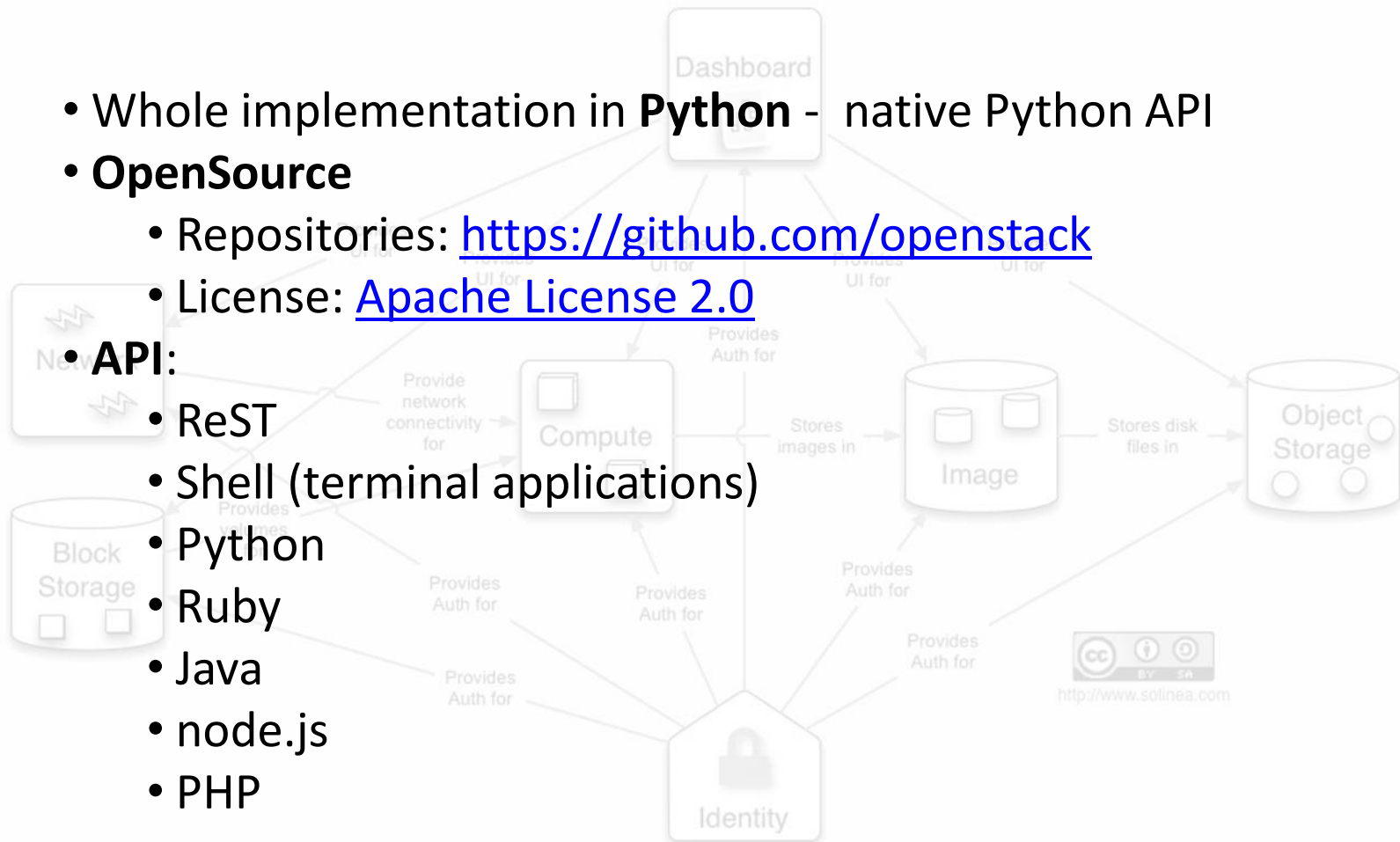3. OpenStack deployment – quick overview

OpenStack Architecture

- Whole implementation in **Python** - native Python API
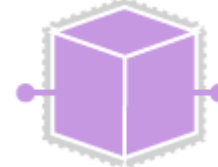- **OpenSource**
  - Repositories: https://github.com/openstack
  - License: Apache License 2.0
- **API**:
  - ReST
  - Shell (terminal applications)
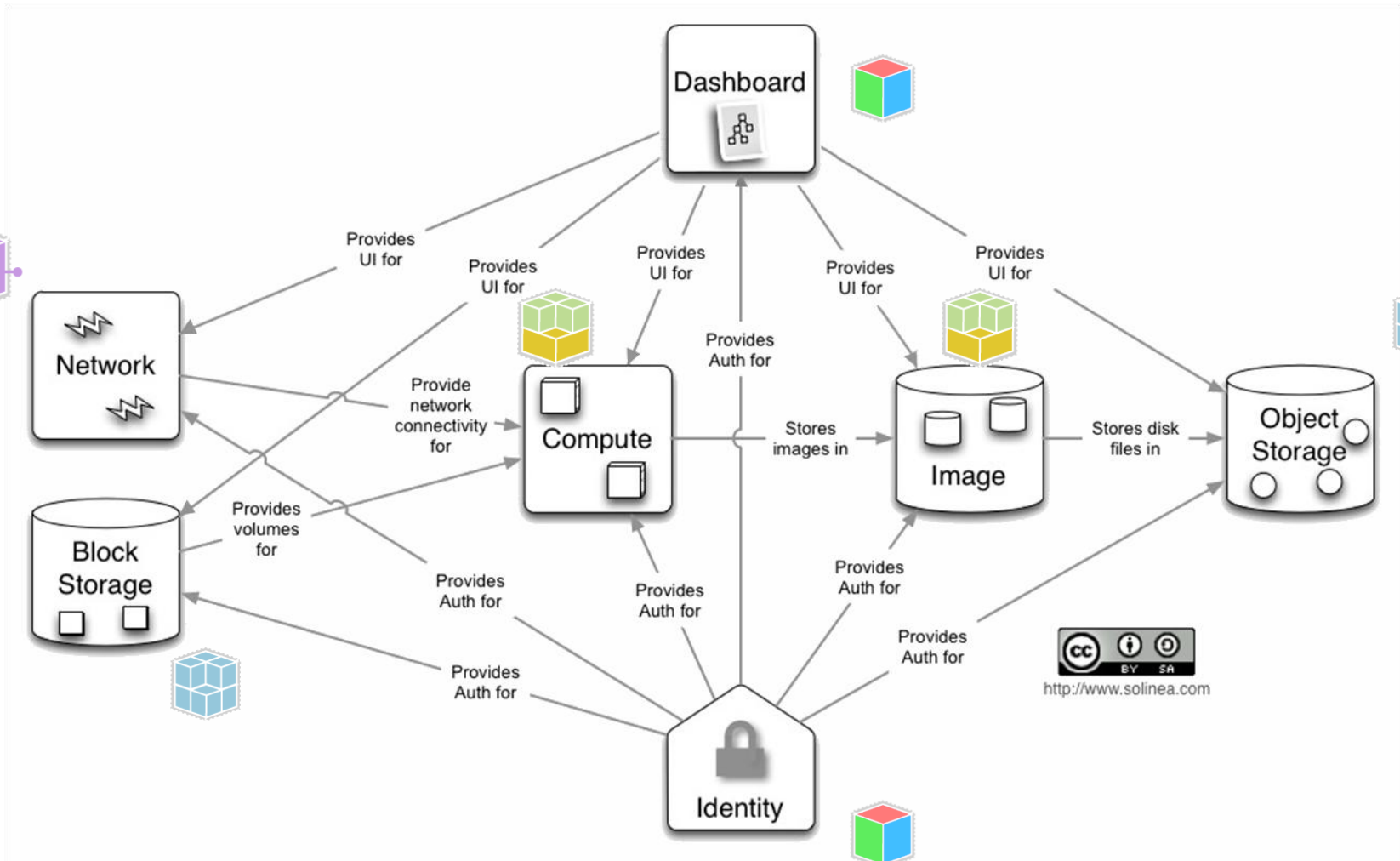 - Python
  - Ruby
  - Java
  - node.js
  - PHP

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)
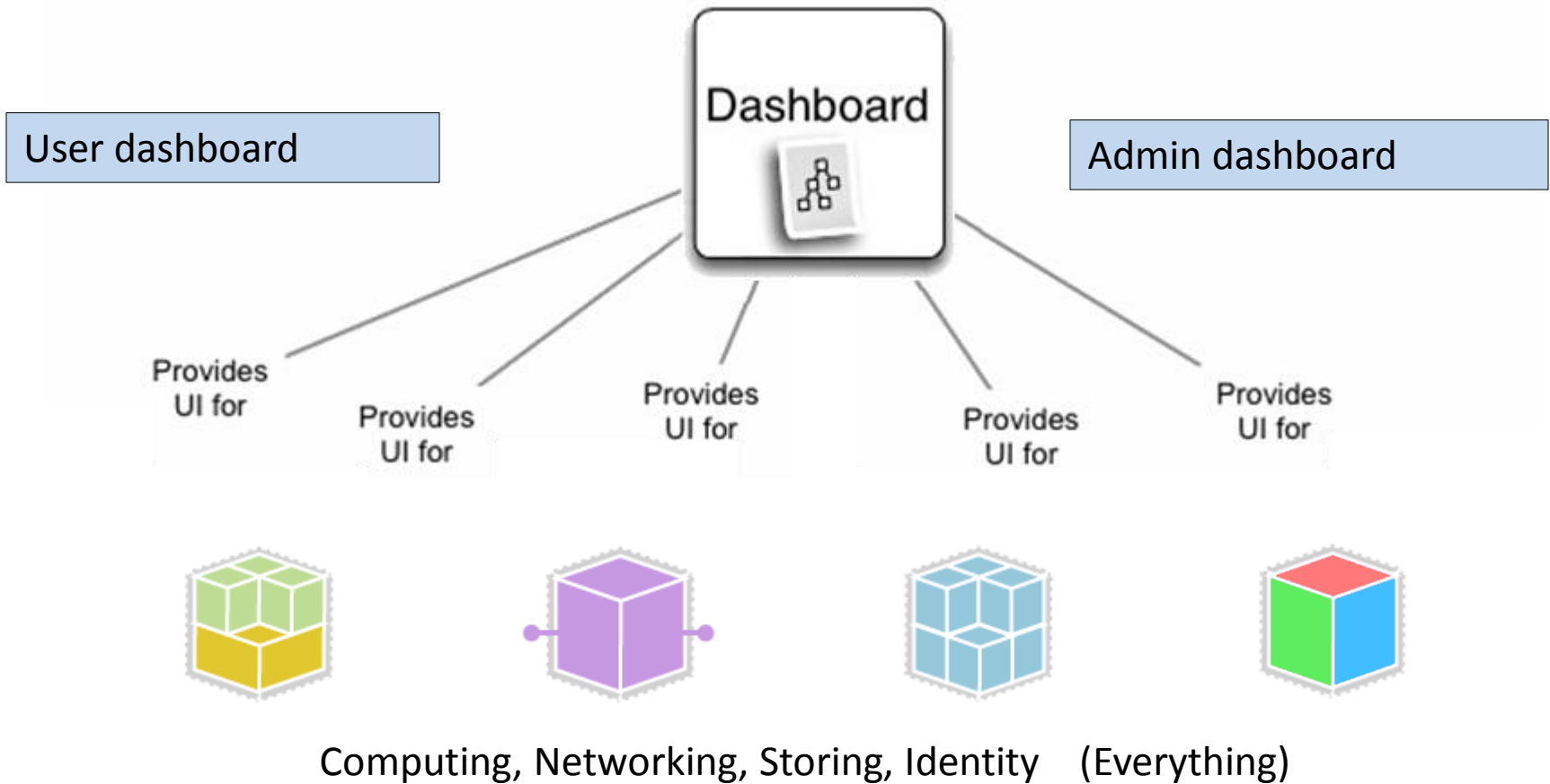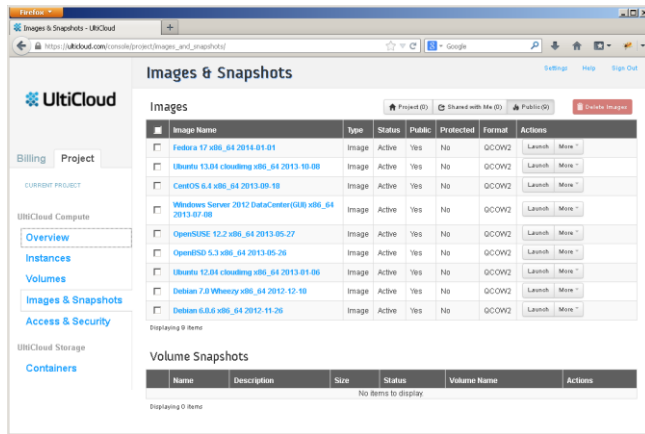   i. Identity
   ii. Dashboard, Orchestration, …

OpenStack components
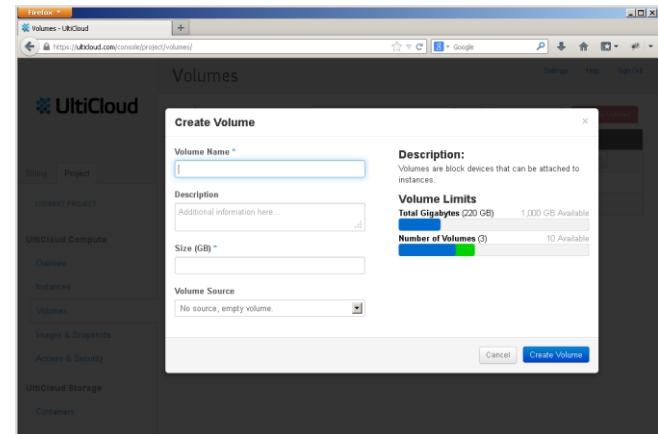
OpenStack components - Dashboard

User dashboard

Dashboard

Admin dashboard

Provides UI for

Provides UI for

Provides UI for

Provides UI for

Provides UI for

Computing, Networking, Storing, Identity   (Everything)

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OpenStack components - Dashboard

List of available VDDs

Volume creation
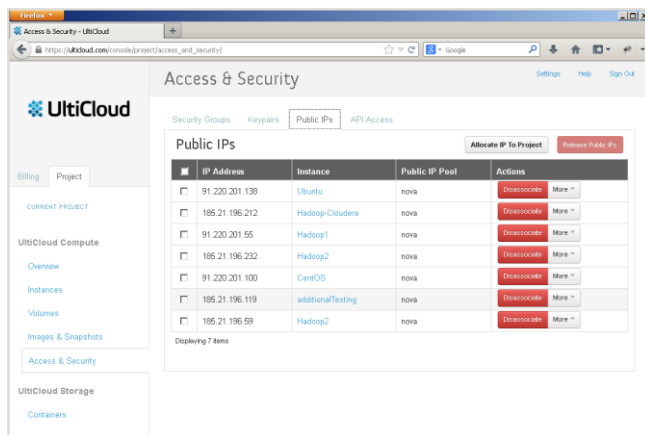
Public IP addressed assignment

SSH keypairs management

OpenStack components - Identity

Whole architecture
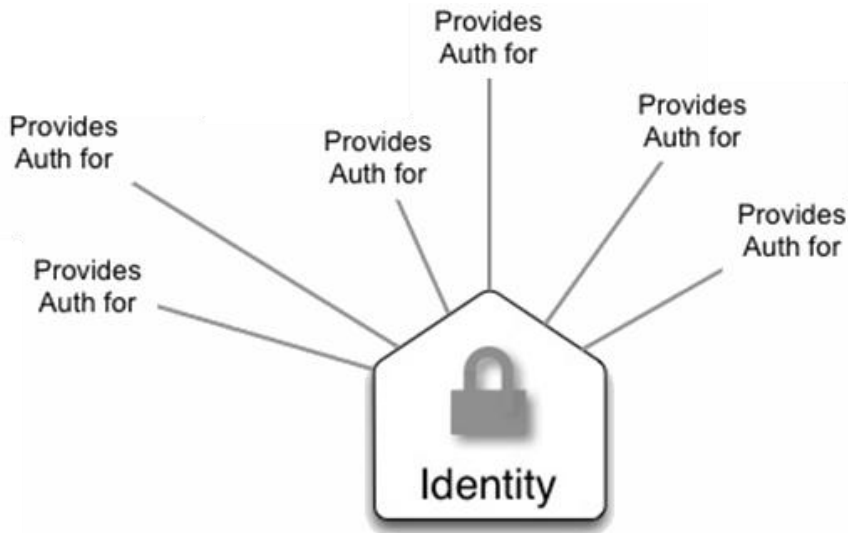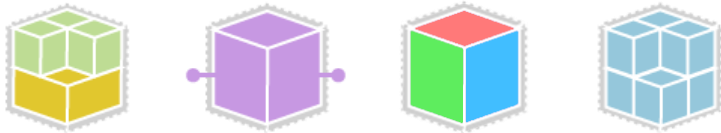
Authentication, Authorization, Catalogs

• Handling incoming API requests

• Central phone book, catalog
  • Users
  • Services
  • Machines (Endpoints)

• Autenthication 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

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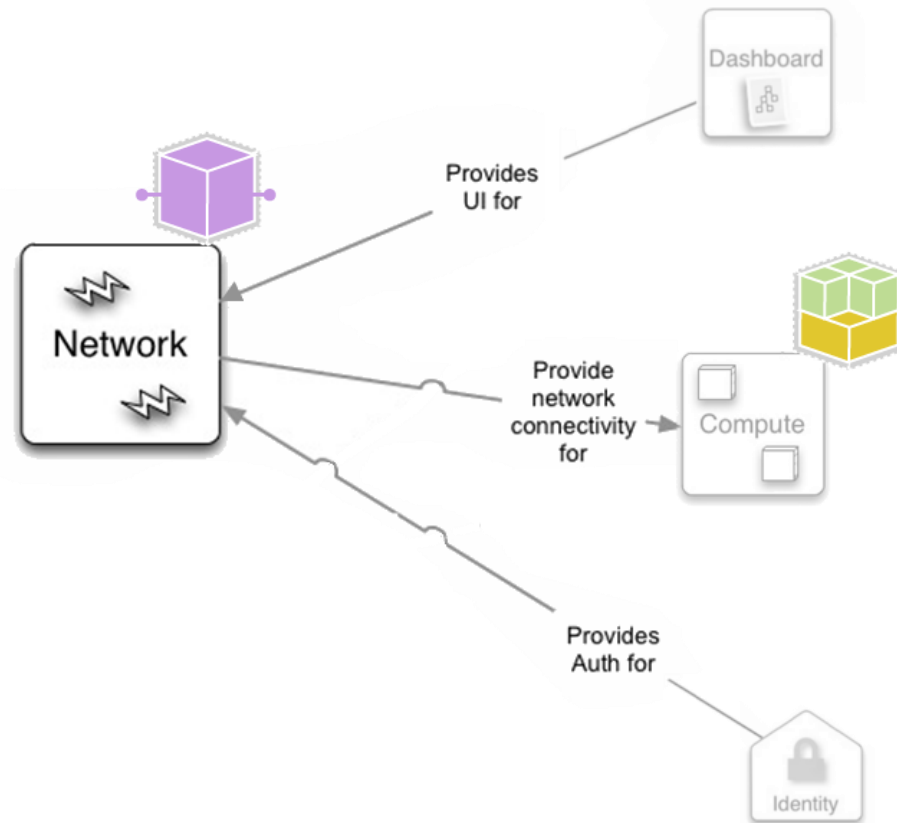
OpenStack components - Computing
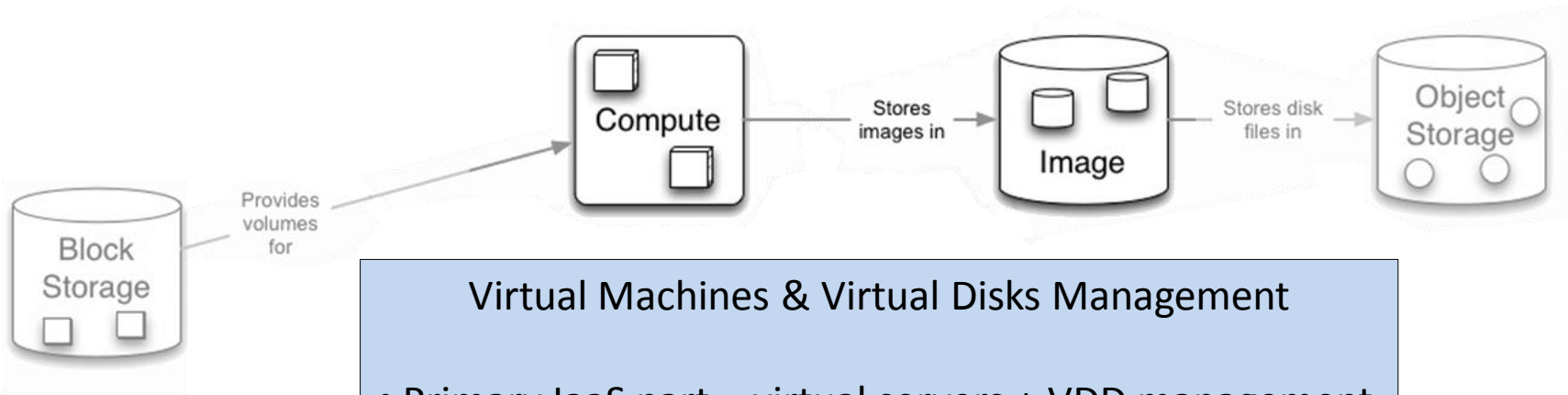
Virtual Machines & Virtual Disks Management

• 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
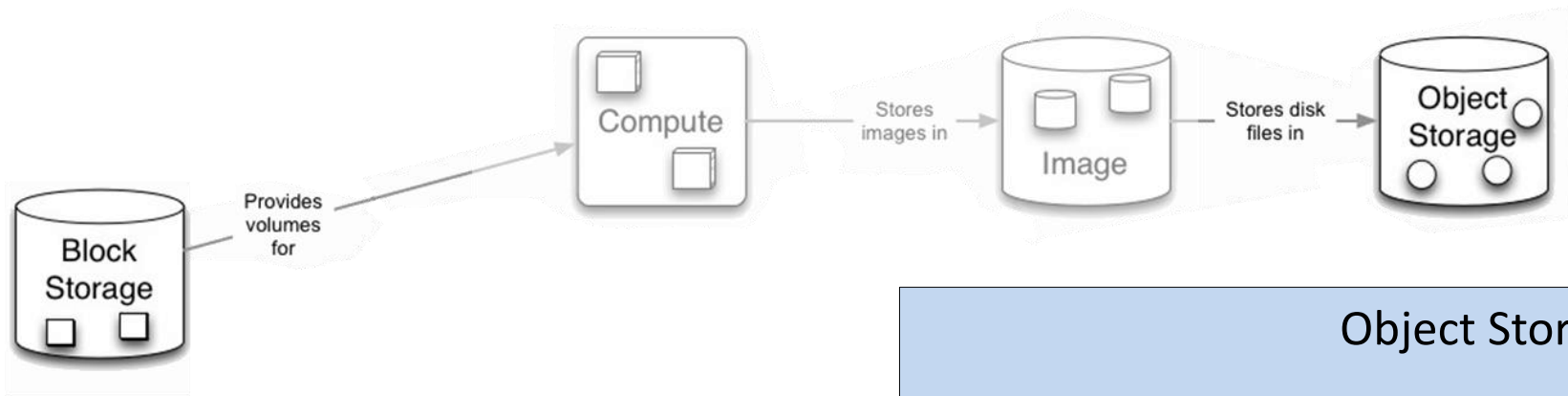
Block Storage
persistent block-level storage

• 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

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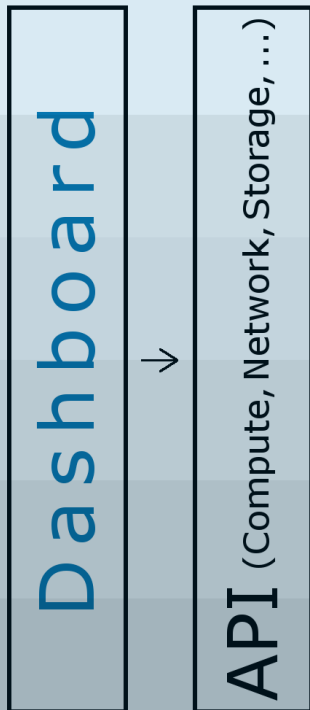https://ulticloud.com/getting-started/first-steps-with-the-ulticloud-console-linux/

Components from Admin perspective - Stack

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Components from Admin perspective – Stack

Front-end		Control	Core	
			abstraction	backend

Front-end
- optional
- **Dashboard**
- **API** (Compute, Network, Storage, …)

Control
- **OpenStack**

Core

abstraction	backend
Software-as-a-Service	Web 2.0, HPC, …
Platform-as-a-Service	DB, Git, Tomcat, …
Guest OS	CentOS, WS2012, ….
Virtualization	KVM, XenServer, LXC, …
Host OS	Debian, Ubuntu, …
HardWare	Dell, Fujitsu, …
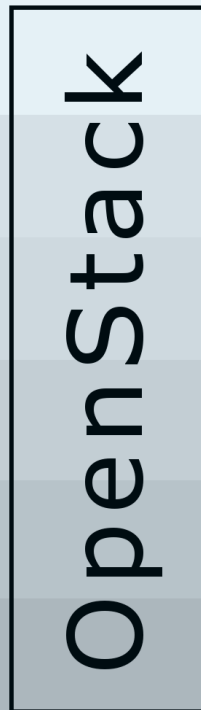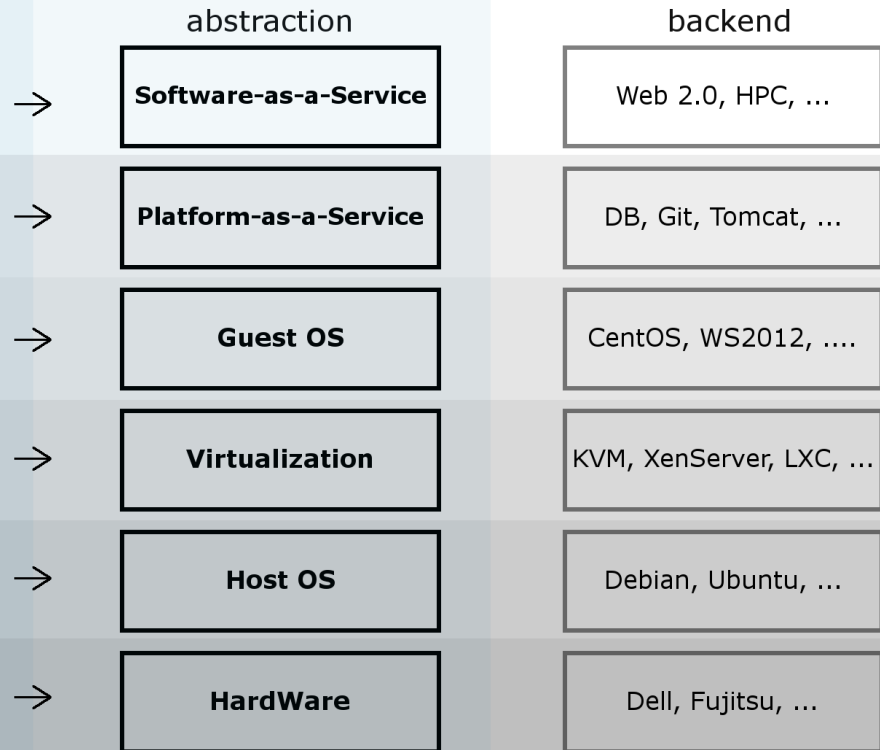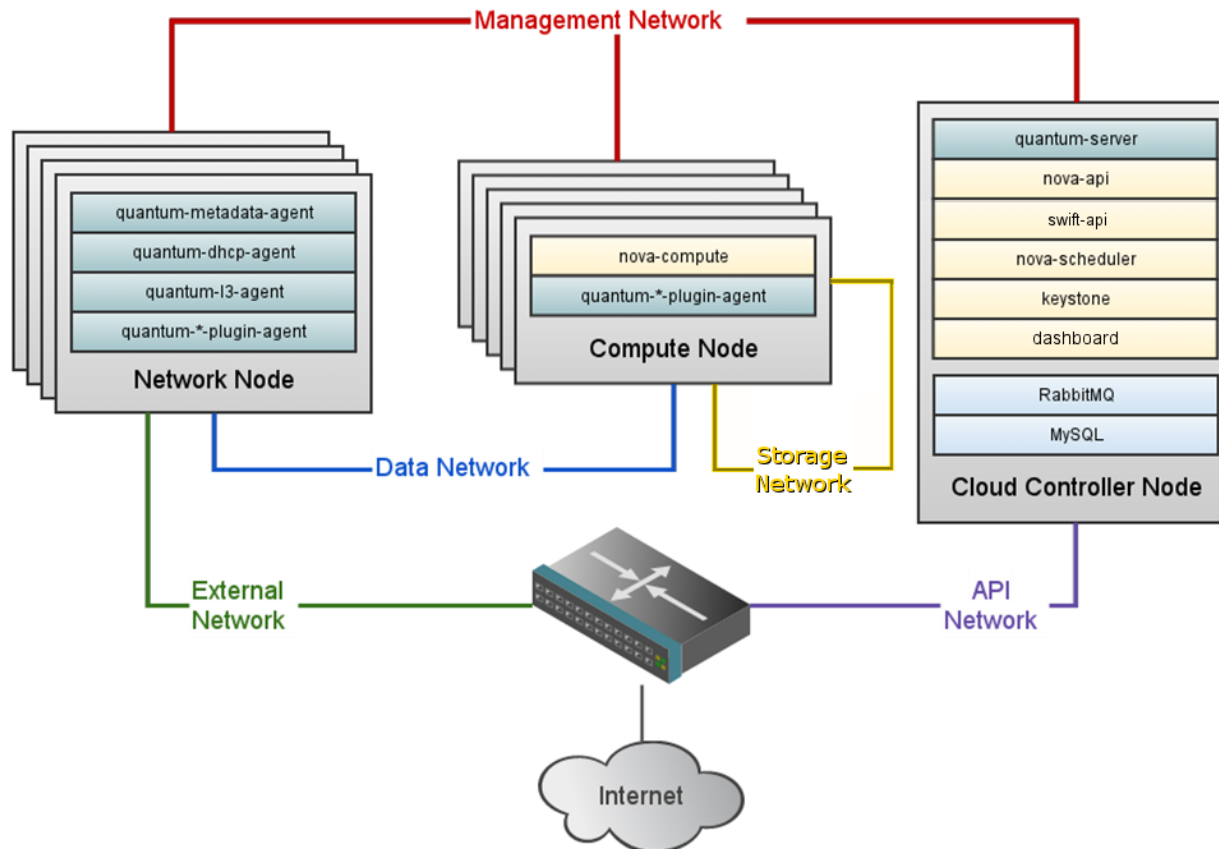
OpenStack deployment

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/