

A BRIEF INTRODUCTION TO
OPENSTACK

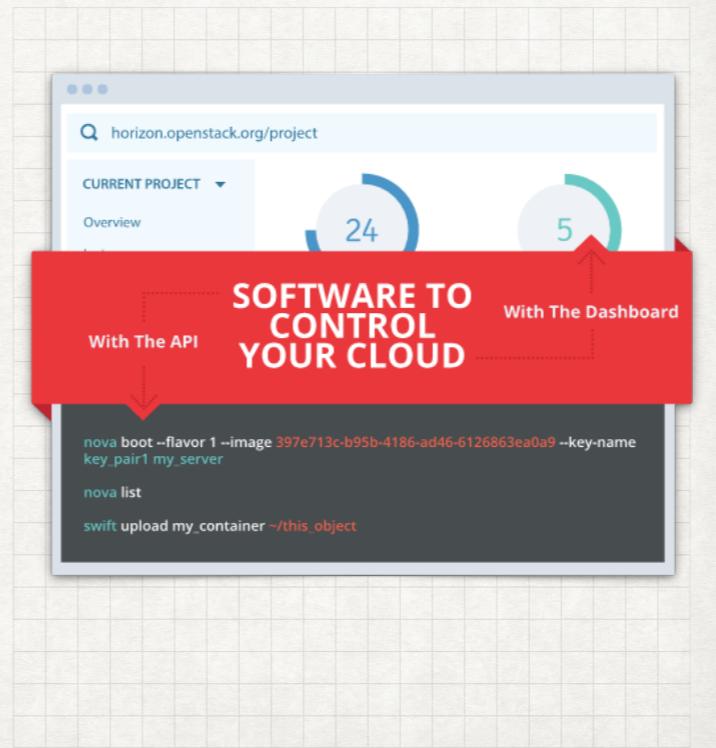
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OPENSTACK

WHAT IS IT?

- Open source software for creating private and public clouds.
- OpenStack software controls large pools of compute, storage, and networking resources throughout a datacenter, managed through a dashboard or via the OpenStack API. OpenStack works with popular enterprise and open source technologies making it ideal for heterogeneous infrastructure.

openstack.org



- Compute: Servers/compute nodes - doing actual work
- Storage: Hard drives
- Networking: Network hardware

OPENSTACK HISTORY

- 2010 - NASA & Rackspace Hosting joint project
 - Release: Austin
 - Included Services: Nova & Swift
- 2016 - 500+ companies have joined project
 - Latest Release: Mitaka
 - Included Services: Nova, Glance, Swift, Horizon, Keystone, Neutron, Cinder, Heat, Ceilometer, Trove, Sahara, Ironic, Zaqar, Manila, Designate, Barbican, Searchlight

For reference AWS launched in 2006

OPENSTACK INCLUDED COMPONENTS

- Nova (Compute)
- Glance (Image)
- Swift (Object Storage)
- Horizon (Dashboard)
- Keystone (Identity)
- Neutron (Networking)
- Cinder (Block Storage)
- Heat (Orchestration)
- Ceilometer (Telemetry)
- Trove (Database)
- Sahara (Elastic Map Reduce)
- Ironic (Bare Metal)
- Zaqar (Messaging)
- Manila (Shared File System)
- Designate (DNS)
- Barbican (Key Manager)
- Searchlight (Search)

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BASIC DESIGN TENETS

1. Scalability and elasticity are our main goals
2. Any feature that limits our main goals must be optional
3. Everything should be asynchronous
4. All required components must be horizontally scalable
5. Always use shared nothing architecture (SN) or sharing
6. Distribute everything
7. Accept eventual consistency and use it where it is appropriate
8. Test everything

(<https://wiki.openstack.org/wiki/BasicDesignTenets>)

1. “Scalability is the capability of a system, network, or process to handle a growing amount of work, or its potential to be enlarged in order to accommodate that growth.” - <https://en.wikipedia.org/wiki/Scalability>. Elasticity is defined as “the degree to which a system is able to adapt to workload changes by provisioning and de-provisioning resources in an autonomic manner, such that at each point in time the available resources match the current demand as closely as possible” - [https://en.wikipedia.org/wiki/Elasticity_\(cloud_computing\)](https://en.wikipedia.org/wiki/Elasticity_(cloud_computing))
3. a) If you can't do something asynchronously, see #2
5. a) If you can't Share nothing/shard, see #2
6. a) Especially logic. Move logic to where state naturally exists.
8. a) We require tests with submitted code. (We will help you if you need it)

OPENSTACK DEPLOYMENT MODELS

1. OpenStack-based Public Cloud
2. On-premises distribution
3. Hosted OpenStack Private Cloud
4. OpenStack-as-a-Service
5. Appliance based OpenStack

(https://en.wikipedia.org/wiki/OpenStack#Deployment_models)

1. A vendor provides a public cloud computing system based on the OpenStack project.
2. In this model, a customer downloads and installs an OpenStack distribution within their internal network.
3. A vendor hosts an OpenStack-based private cloud: including the underlying hardware and the OpenStack software.
4. A vendor hosts OpenStack management software (without any hardware) as a service. Customers sign up for the service and pair it with their internal servers, storage and networks to get a fully operational private cloud.
5. Nebula was a vendor that sold appliances that could be plugged into a network which spawned an OpenStack deployment.

OPENSTACK

HOW TO GET STARTED

1. Public Clouds
2. Local Dev Environment

(<http://www.openstack.org/software/start/>)

1. Rackspace, Dreamhost, etc.
2. [devstack.org](#)

OPENSTACK

YOUR FIRST APPLICATION

Demo

(See <http://www.openstack.org/appdev/>)

OPENSTACK

LINKS

- Home: openstack.org
- Wikipedia: en.wikipedia.org/wiki/OpenStack
- Basic design tenets: wiki.openstack.org/wiki/BasicDesignTenets
- Overview of components: openstack.org/software/
- How to get started: openstack.org/software/start/
- Your first application: openstack.org/appdev/
- Apache Libcloud: libcloud.apache.org/getting-started.html
- Dreamhost Compute: dreamhost.com/cloud/computing/

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