

# OpenStack

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Clusters, Grids, Clouds course @ ITMO  
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ITMO University, St. Petersburg  
June 5th, 2018

# Agenda

- Cloud Computing
- Scaling
- Virtualization
- History of Openstack
- What is Openstack
- Architecture
- Compute, Networking, Storage, Dashboard, Telemetry, Authorization,
- Demo time!



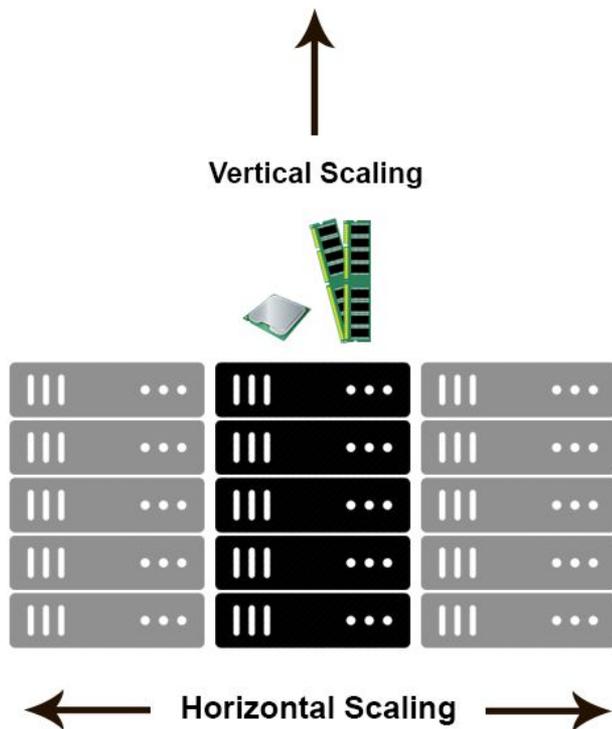
# Virtualization

Virtualization is creation of virtual  
--rather than actual-- version of  
Something, such as OS, Storage,  
Network Resource.

*Citrix, VMWare*



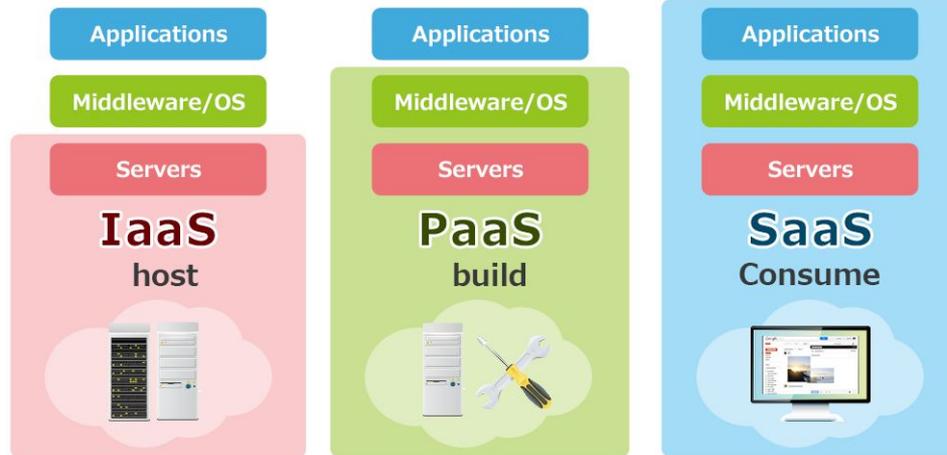
# Horizontal Scaling vs Vertical Scaling



# Cloud Computing

- Resources are shared
- On demand access

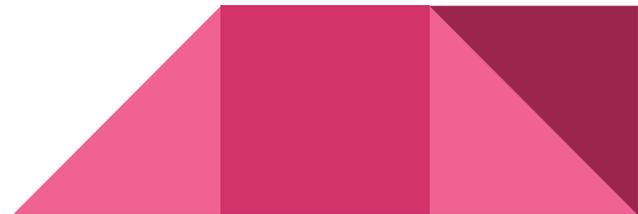
Everything should become a service



# Cloud Computing

## Main Rules

- Massive Scale
- Agility
- Abstraction
- Automation
- Infinite capacity
- Converged API
- Metering
- Pay as you go



# History of Openstack

Begun in 2010 as a joint project of Rackspace hosting and NASA to build Cloud based OS.

Merged Swift (Object Storage) of Rackspace with Nebula (Compute platform) of NASA.

FOSS under Apache license.

Actively driven by strong open source community with more than 500 companies that contribute to the project: IBM, RedHat, HP, Cisco, Intel, Google, Oracle, Dell, EMC, VMWare, ...

More than \$10million in funding.



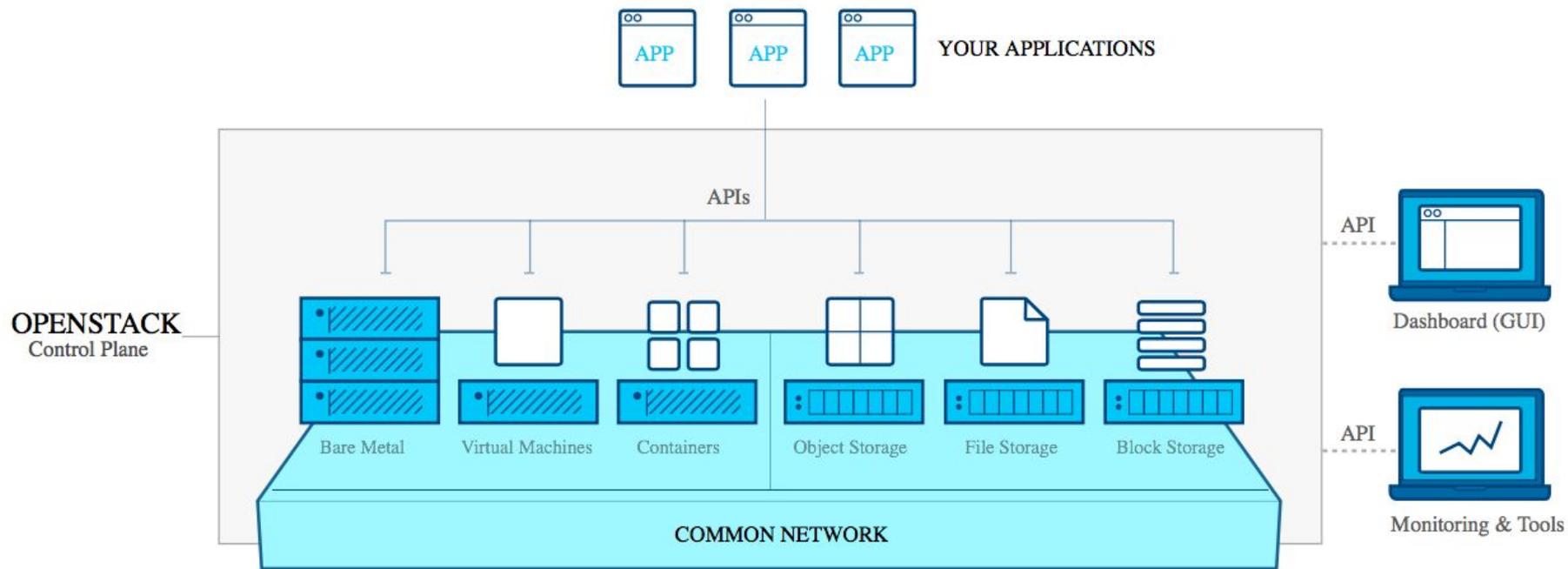
# What is Openstack?

Openstack is a cloud Operating system that controls large pools of compute, storage, networking resources throughout a datacenter.

Everything is managed by a dashboard (Horizon) and can be managed through Rest API calls.

All services authenticate through a common source.



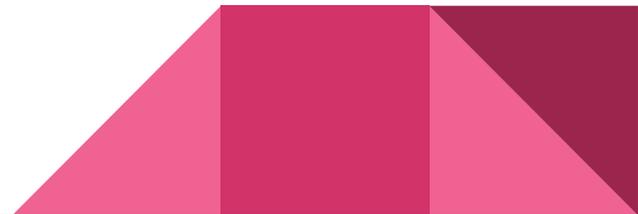


# Compute (Nova)

The core: Providing Virtual machines on demand.

It schedules virtual machines to run on a set of nodes by defining drivers that interact with underlying virtualization mechanisms.

Interacts with identity service to authenticate instance.



# Networking (Neutron)

A system for managing networks and IP addresses.

- VLANs
- DHCP
- Floating IP, Load Balancing
- SDN
- OpenFlow
- IDS, VPN, Firewall



# Storage (Cinder-Swift)

## Cinder

- Block level storage for compute instances.
- The block storage system manages the creation, attaching and detaching of the block devices to servers.

## Swift

- Scalable redundant storage system: Object Storage.
  - Replication, Scale Horizontally, API
- 

# Dashboard (Horizon)

The screenshot shows the OpenStack Horizon dashboard for the 'admin' user. The main content area displays the 'Instances' page with a table listing one instance. The table has columns for Project, Host, Name, Image Name, IP Address, Size, Status, Task, and Power State. The instance listed is 'CentOS\_7' with IP address '10.1.0.2' and status 'Shutoff'. A search bar at the top right of the table is set to 'Project ='. Below the table, it says 'Displaying 1 item'. The left sidebar contains navigation links for Overview, Hypervisors, Host Aggregates, Instances (highlighted), Flavors, Images, Defaults, Metadata Definitions, System Information, and Identity.

Project	Host	Name	Image Name	IP Address	Size	Status	Task	Power State
admin	dlp.server.world	CentOS_7	CentOS7	10.1.0.2	m1.small	Shutoff	None	Shut Down

The screenshot shows the 'Instance Console' for the 'CentOS\_7' instance. The console is connected to a QEMU instance. A message at the top states: 'If console is not responding to keyboard input: click the grey status bar below. Click here to show only console. To exit the fullscreen mode, click the browser's back button.' Below this, the console shows a desktop environment with a blue sky background and a white cloud. A file manager window is open, showing a sidebar with 'Applications' and 'Places' tabs. The 'Places' tab is active, showing a list of locations: Home, Documents, Downloads, Music, Pictures, Videos, Computer, and Browse Network. The desktop also shows icons for 'home', 'Trash', and 'Computer'.

# Telemetry (Ceilometer)

Single point of Contact for Billing system.

Traceable, auditable.

Data collection is independent of the overall system.



# KeyStone-Magnum

## Identity Management (KeyStone)

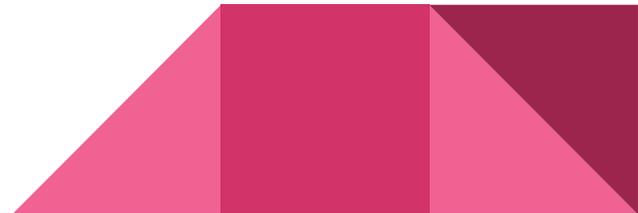
Authentication and authorization.

user/pass, token based

Account management

## Container Orchestration (Magnum)

Magnum uses Heat to orchestrate an OS image which contains Docker and Kubernetes and manages it.



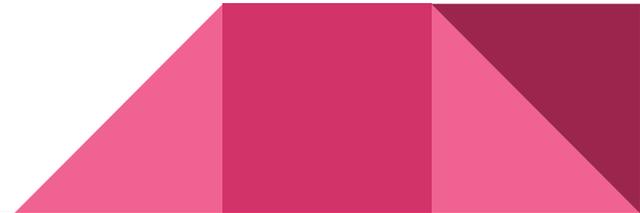
# Why it is good

Community

Vendor support

Mature

But it is not a suitable solution for every organization!



# Thank you for your attention

Demo time.

<https://openstack.homeatcloud.cz/>

## References:

<https://www.slideshare.net/openstack/intro-grizzlyarchy1-19109550>

<https://www.slideshare.net/kamesh001/open-stack-101>

<https://www.openstack.org/>

<https://en.wikipedia.org/wiki/OpenStack>

