

Cloud Computing

OpenStack

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Agenda

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Cloud Service Type

Components

Packstack

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Why use OpenStack

- Open source
- Infinite scaling
- Several ways of deploying a network
- Allows abstraction layers between the network and the end-user application
- Option to deploy third party devices
- Has accessible Web-GUI

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Cloud Types

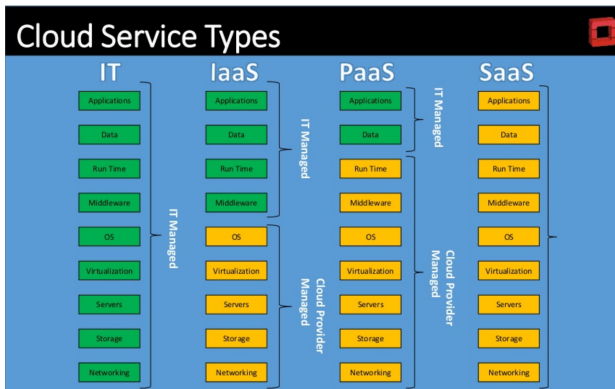


Figure: Different types of cloud services - OpenStack: IaaS

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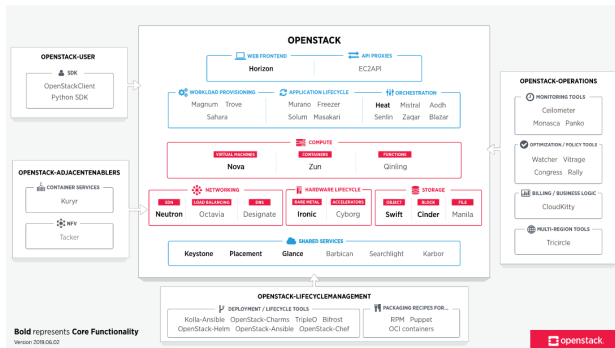


Figure: <https://www.openstack.org/software/>

Components

- Compute
- Storage
- Networking
- Image Service
- Identity Service
- Dashboard

Compute: Nova

- Provides virtual devices on demand
- Schedules virtual devices
- Interacts with the identity service for authentication

Storage types

- Ephemeral storage (Nova):
Used for small applications with small data
- Object storage (Swift):
Accessible binary files via REST API
Allows bigger data to be managed
- Block storage (Cinder):
Persistent modules -> detachment and re-attaching doesn't cause data loss
Recommendable for very big amount data

Networking: Neutron

- Handles management of the virtual network
- Provides flexible network models
- Allows a user to create networks, control traffic and connect devices or servers to the networks
- Support for FWaaS (Firewall), VPNaaS (Virtual Private Network), LBaaS (Load Balancer)

Image Service: Glance

- Manages the virtual machines within the cloud
- Component based architecture
- Scalable to big workloads
- Recoverable when failing

Identity Service: Keystone

- Provides credential validation and data about users and groups
- User = API consumer
- Groups = Container of users
- Data about projects and domains is fetched via the resource service

Dashboard: Horizon

- Web based user interface for OpenStack modules
- Allows managing cloud components without using the terminal
- Allows interaction with other OpenStack services
- Has lists and pie charts for the graphical representation of modules
- Is extendable by users

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Packstack

- Tool to deploy several OpenStack parts by one
- Open source project
- Usable only on CentOS or RHEL (Red Hat Enterprise Linux)
- Simplifies the installation process of OpenStack modules
- Caution: Doesn't guarantee to set up a safe cloud service

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```
$ sudo systemctl disable firewalld
$ sudo systemctl stop firewalld
$ sudo systemctl disable NetworkManager
$ sudo systemctl stop NetworkManager
$ sudo systemctl enable network
$ sudo systemctl start network
```

Figure: Prerequisites for setting up OpenStack via Packstack on CentOS to avoid problems caused by Neutron

Deployment

```
$ sudo yum update -y
$ sudo yum install -y centos-release-openstack-stein
$ sudo yum update -y
$ sudo yum install -y openstack-packstack
$ sudo packstack --allinone
```

Figure: Downloading Packstack and installing the all in one version

Deployment

- If you don't want to have the whole installation you can also type in: `$ packstack --gen-answer-file=answer.txt`
- Then access the file via: `$ vi answer.txt`
- Change every entry as desired
- Allows us to set up a cloud with only Glance, Nova and Neutron

Deployment

```
CONFIG_MARIADB_INSTALL=y

# Specify 'y' to install OpenStack Image Service (glance). ['y', 'n']
CONFIG_GLANCE_INSTALL=y

# Specify 'y' to install OpenStack Block Storage (cinder). ['y', 'n']
CONFIG_CINDER_INSTALL=n

# Specify 'y' to install OpenStack Shared File System (manila). ['y',
# 'n']
CONFIG_MANILA_INSTALL=n

# Specify 'y' to install OpenStack Compute (nova). ['y', 'n']
CONFIG_NOVA_INSTALL=y

# Specify 'y' to install OpenStack Networking (neutron) ['y']
CONFIG_NEUTRON_INSTALL=y

# Specify 'y' to install OpenStack Dashboard (horizon). ['y', 'n']
CONFIG_HORIZON_INSTALL=y

# Specify 'y' to install OpenStack Object Storage (swift). ['y', 'n']
CONFIG_SWIFT_INSTALL=n

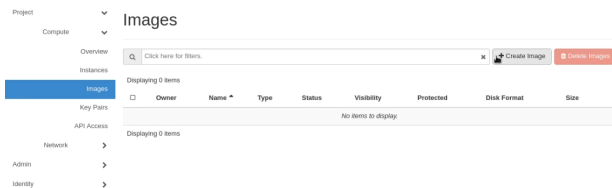
# Specify 'y' to install OpenStack Metering (ceilometer). ['y', 'n']
```

Figure: Example settings for a setup with only Glance, Nova and Neutron

Deployment

- After installing the components retrieve the credentials for logging in on Horizon
- `$ cat keystoneadmin` will display the login data
- Navigate to the IP used by the external bridge (differs from user to user - depending on settings)
- Login with the credentials fetched from keystone

Deployment



Project

Compute

Overview

Instances

Images

Key Pairs

API Access

Network

Admin

Identity

Images

Click here for filters.

+ Create Image

Delete Images

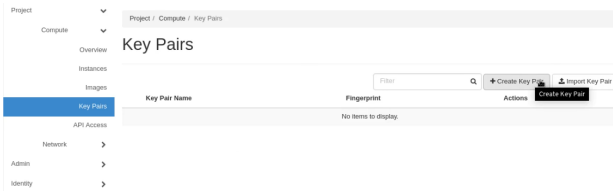
Displaying 0 items

<input type="checkbox"/>	Owner	Name *	Type	Status	Visibility	Protected	Disk Format	Size
No items to display								

Displaying 0 items

Figure: Overview over the images tab in Horizon

Deployment



Project / Compute / Key Pairs

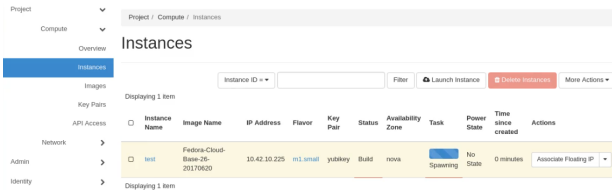
Key Pairs

Filter

Key Pair Name	Fingerprint	Actions
No items to display.		

Figure: Overview over the keypair tab

Deployment



Project / Compute / Instances

Instances

Instance ID = Filter [Launch Instance](#) [Delete Instances](#) [More Actions](#)

Displaying 1 item

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	test	Fedora-Cloud-Base-26-20170620	10.42.10.225	m1.small	yubikey	Build	nova	Spawning	No State	0 minutes	Associate Floating IP

Displaying 1 item

Figure: Overview after adding an instance

Deployment

```
[fedora@test ~]$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether fa:16:3e:9e:e9:5b brd ff:ff:ff:ff:ff:ff
    inet 10.42.10.225/24 brd 10.42.10.255 scope global dynamic eth0
        valid_lft 86431sec preferred_lft 86431sec
[fedora@test ~]$ ping google.com
PING google.com (172.217.9.174) 56(84) bytes of data:
64 bytes from dfw25s27-in-f14.1e100.net (172.217.9.174): icmp_seq=1 ttl=52 time=9.23 ms
64 bytes from dfw25s27-in-f14.1e100.net (172.217.9.174): icmp_seq=2 ttl=52 time=9.25 ms
```

Figure: Accessible instance

Thank you for your attention!

(If you were paying attention...)

- References

- <https://www.openstack.com>

- <https://www.rdoproject.org/install/packstack/>