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Introduction to OpenStack

How to create cloud in 5 minutes

Content of presentation

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About me

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Lukasz Zajaczkowski team member of CLC (Cloud Load Control) group in R&D Fujitsu Lodz.

CLC is an out-of-the-box solution for companies that are looking for a preassembled and enterprise-ready distribution of tools for provisioning and managing clusters and containers on top of OpenStack-based cloud computing platforms.
CLC automates the setup and operation of a workload management system in OpenStack based on modern Linux container and clustering technology: Kubernetes and Docker
CLC contributes to the Kubernetes open source project initiated by Google. It helps improve this powerful system for managing containerized applications in a cluster environment

Why cloud computing is so important

New data from Synergy Research Group shows that across six key cloud services and infrastructure market segments, operator and vendor revenues for the four quarters ending September reached $110 billion, having grown by 28% on an annualized basis.

https://www.srgresearch.com/articles/2015-review-shows-110-billion-cloud-market-growing-28-annually

Why cloud computing is so important

In Poland in 2015 it was **130,3 mln dol.**

According to IDC forecasts, in 2019 years, the market value of cloud services, private and public in Poland exceeds 450 million dollars

http://www.money.pl/gospodarka/wiadomosci/artykul/chmura-obliczeniowa---popyt-na-uslugi-rosnie,141,0,1963149.html

What is cloud computing

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Cloud computing is a modern computing paradigm that delivers resources such as processing, storage, network and software are abstractions that are provided as services over the Internet in a remotely accessible fashion

What is cloud computing

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Services within the cloud are typically provided under the following three catagories:

a. Infrastructure as a Service (IaaS).

b. Platform as a Service (PaaS).

c. Software as a Service (Saas)

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IaaS is the most basic cloud service model under which virtual machines, raw block storage, firewalls, load balancers and networking services are provided.

In the PaaS model, a computing platform or solution stack including operating system, programming language execution environment, database and web server are typically provided.

Within the SaaS model, cloud providers install and operate application software in the cloud, which users access using cloud clients on computers, mobile devices, browsers and etc.

What is cloud computing - SaaS

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- There are no setup costs with SaaS, as there often are with other applications
- SaaS is scalable with upgrades available on demand
- Access to Software as a Service is compatible across all internet enabled devices
- As long as there is an internet connection, applications are accessible from any location

Office software is the best example of businesses utilising SaaS. Tasks related to accounting, invoicing, sales and planning can all be performed through Software as a Service. Businesses may wish to use one piece of software that performs all of these tasks or several that each perform different tasks

What is cloud computing - PaaS

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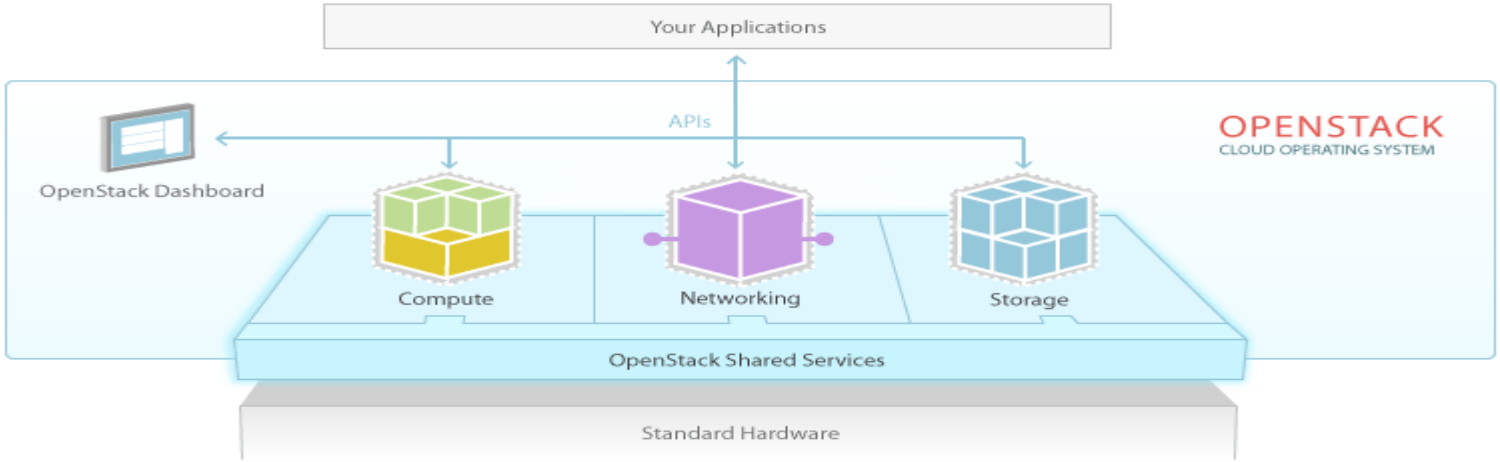
Provides a platform and environment to allow developers to build applications and services over the internet. PaaS services are hosted in the cloud and accessed by users simply via their web browser.

PaaS offering:

- Operating system
- Server-side scripting environment
- Database management system
- Server Software
- Support
- Storage
- Network access
- Tools for design and development
- Hosting

Example: https://docs.jelastic.com/getting-started

What is OpenStack



The OpenStack project was created with the goal of developing reliable, scalable and easily deployable cloud infrastructure software

What is OpenStack - compute

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Nova

Manages the lifecycle of compute instances in an OpenStack environment. Responsibilities include spawning, scheduling and decomissioning of machines on demand.

OpenStack Compute (Nova) is a cloud computing fabric controller, which is the main part of an IaaS system. It is designed to manage and automate pools of computer resources and can work with widely available virtualization technologies, as well as bare metal and high-performance computing (HPC) configurations. KVM, VMware, and Xen are available choices for hypervisor technology (virtual machine monitor), together with Hyper-V and Linux container technology such as LXC

What is OpenStack - storage

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Image Service (Glance)

OpenStack Image Service (Glance) provides discovery, registration, and delivery services for disk and server images. Stored images can be used as a template. It can also be used to store and catalog an unlimited number of backups. The Image Service can store disk and server images in a variety of back-ends, including OpenStack Object Storage. The Image Service API provides a standard REST interface for querying information about disk images and lets clients stream the images to new servers.

What is OpenStack - storage

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Object Storage (Swift)

OpenStack Object Storage (Swift) is a scalable redundant storage system. Objects and files are written to multiple disk drives spread throughout servers in the data center, with the OpenStack software responsible for ensuring data replication and integrity across the cluster.

What is OpenStack - networking

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Networking (Neutron)

OpenStack Networking is a system for managing networks and IP addresses. OpenStack Networking ensures the network is not a bottleneck or limiting factor in a cloud deployment, and gives users self-service ability, even over network configurations.

OpenStack Networking provides networking models for different applications or user groups. Standard models include flat networks or VLANs that separate servers and traffic. OpenStack Networking manages IP addresses, allowing for dedicated static IP addresses or DHCP. Floating IP addresses let traffic be dynamically rerouted to any resources in the IT infrastructure, so users can redirect traffic during maintenance or in case of a failure.

What is OpenStack - identity

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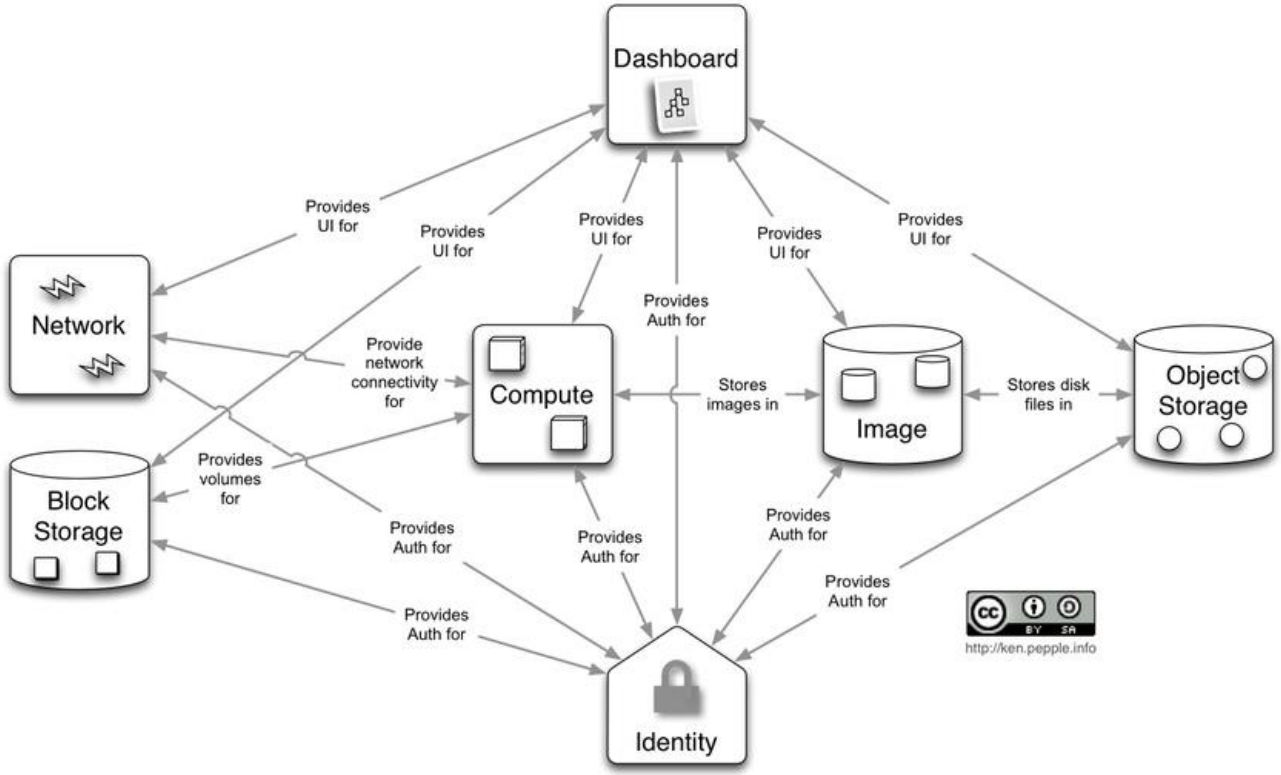
Keystone (Identity)

Keystone handles API requests as well as providing single point of integration for policy, configurable catalog, token and authentication (identity services)

Every Keystone function has a pluggable backend which allows different ways to use the particular service. It supports standard backends like LDAP or SQL, and KVS (Key-Value Stores).

What is OpenStack



Installation process

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How To Get Started With OpenStack

- **Public Clouds on the Marketplace**

To see how an OpenStack Cloud operates, you can quickly try one of the many OpenStack public clouds in production across the world with the swipe of a credit card. Find the list of public clouds on the OpenStack Marketplace.

- **Local Dev Environment: devstack.org**

With some technical skills, DevStack is a great option to install and run an OpenStack cloud on your laptop (or even inside the VM on a cloud)

Installation process - devstack

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DevStack's mission is to provide and maintain tools used for the installation of the central OpenStack services from source (git repository master, or specific branches) suitable for development and operational testing. It also demonstrates and documents examples of configuring and running services as well as command line client usage.

GitHub https://github.com/openstack-dev/devstack

Installation process - devstack

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git clone https://github.com/openstack-dev/devstack.git

The DevStack master branch generally points to trunk versions of OpenStack components. For older, stable versions, look for branches named stable/[release] in the DevStack repo.

git checkout stable/juno

./stack.sh

Vagrant + Ansible = Isolated enviroment

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Vagrant is a tool to manage virtual machine environments, and allows you to configure and use reproducible work environments on top of various virtualization and cloud platforms. It also has integration with Ansible as a provisioner for these virtual machines, and the two tools work together well.

Vagrant + Ansible = Isolated enviroment

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The major difference between other Configuration Management tools and Anisble, is that underneath Ansible is just SSH. Chef and Puppet both have dependencies that must be installed on the server before you can use them, Ansible does not. It runs on your machine and uses SSH to connect to the servers and run the required commands.

Devstack with Vagrant

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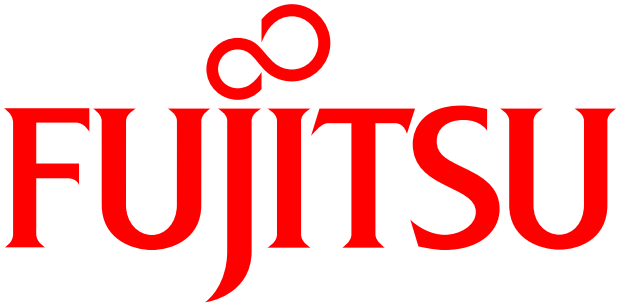
You need an isolated environment to install Devstack - a vm, a container or a separate hard drive - an environment that can be set up, taken down, over written and reinstalled without affecting the rest of your development environment.

https://github.com/FujitsuEnablingSoftwareTechnologyGmbH/devstack-vagrant



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