



Cross-organizational distributed systems and Clouds

Solution for Exercise 1

Christopher B. Hauser

Institute of Information Resource Management

2018-05-03

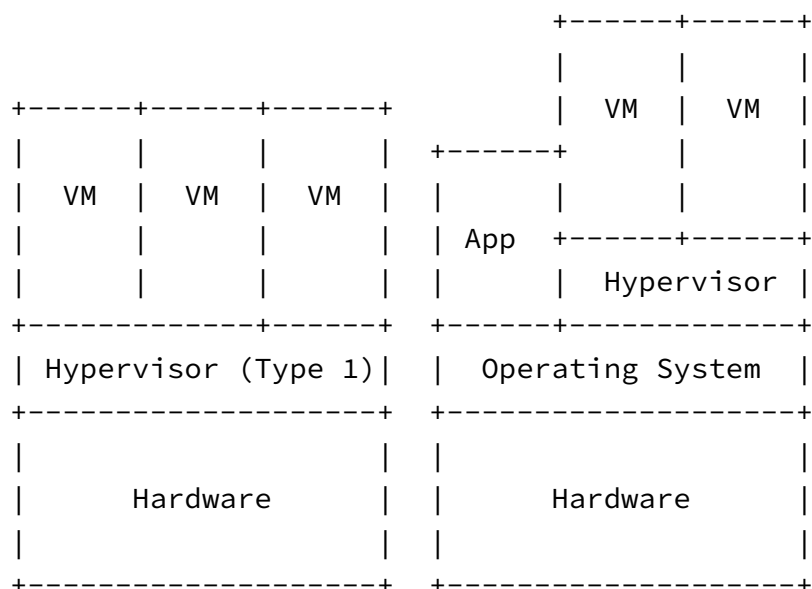
Answers to questions

Lesson 1: OpenStack Basics

Question: Hypervisors and Virtual Machines

What are the basic tasks of a hypervisor?

A hypervisor (sometimes “virtual machine monitor” or VMM) manages physical hardware and divides it into usually smaller virtual hardware, used by virtual machines. Type-1 and Type-2 hypervisors differ in their location (Type 1 runs on bare metal, Type 2 runs on top of an operating system). Examples: XEN (Type 1), KVM (Type 2 but since part of operating system close to Type 1), VirtualBox (Type 2).



What are benefits / drawbacks of using virtual machines compared to physical servers?

- Drawback: Virtualisation costs performance and may lead to resource interference when more than one VM is hosted
- Benefit: virtual machine is abstracted from hardware and can be freely moved between hardware

Lesson 2: First Steps with Omistack

Task: Launch your first Instance

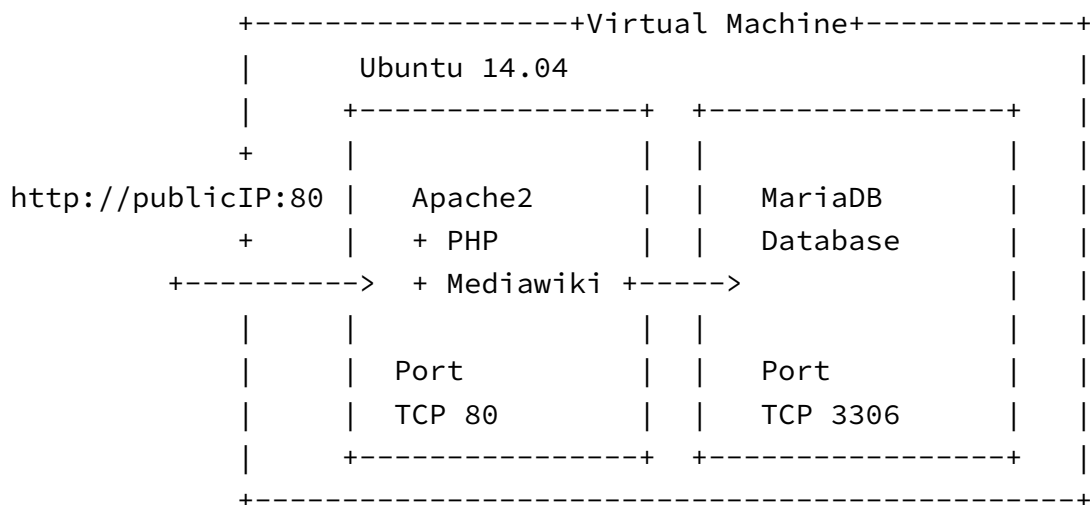
Your first instance in Openstack should look like follows:

The screenshot shows the OpenStack dashboard interface. The 'Instances' tab is selected in the sidebar. The main content area displays a table of instances. One instance, 'main_server', is listed with details: Image Name 'Ubuntu Server 14.04.2 AMD64 LTS', IP Address '192.168.0.3' and '134.60.64.95', Flavor 'small', Key Pair 'christopher-uulm', Status 'Active', Availability Zone 'nova', Task 'None', Power State 'Running', and Time since created '1 hour, 1 minute'. The table also includes a 'Create Snapshot' button in the Actions column.

Figure 1: First instance in Openstack

Lesson 3: Install Mediawiki Application

The setup looks as follows at the moment: one virtual machine, based on an Ubuntu 14.04 operating system, with an Apache2 web server and a MariaDB database server.



The ready Mediawiki installation looks like follows:

Question: One Instance for Database and Application

Pro:

- connection via 127.0.0.1 is fast
- Traffic does not leave the host
- high bandwidth, low latency

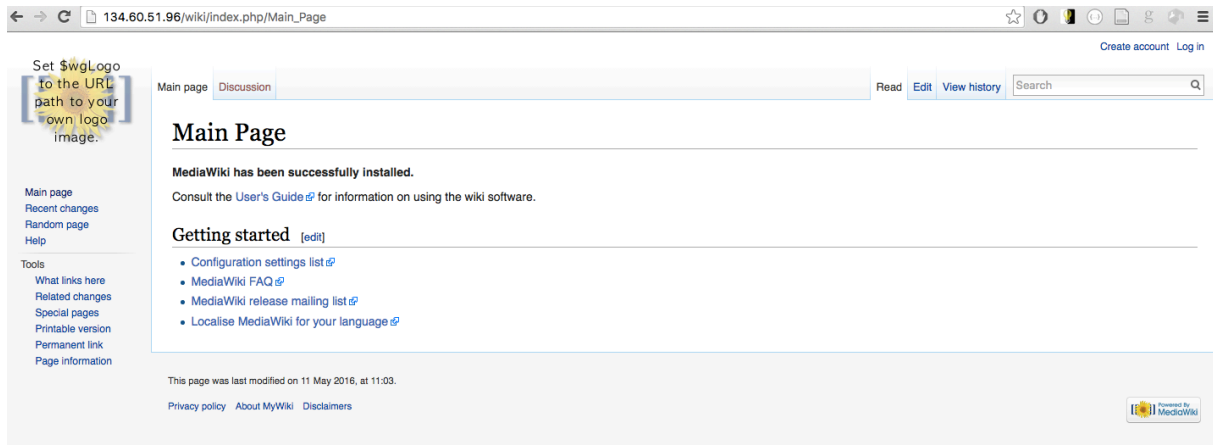


Figure 2: Mediawiki Installation

Con:

- Scalability is limited, since database is bound to application
- Apache2 and mariaDB have to run on the same node
- DB and Web server have different resource demand (CPU vs Memory/Disk)

Alternative:

- Move database to separate host
- Connect apache2 via TCP
- Scale horizontally by adding more web servers