



# **Cross-organizational distributed systems and Clouds**

Solution for Exercise 1

Christopher B. Hauser

Institute of Information Resource Management

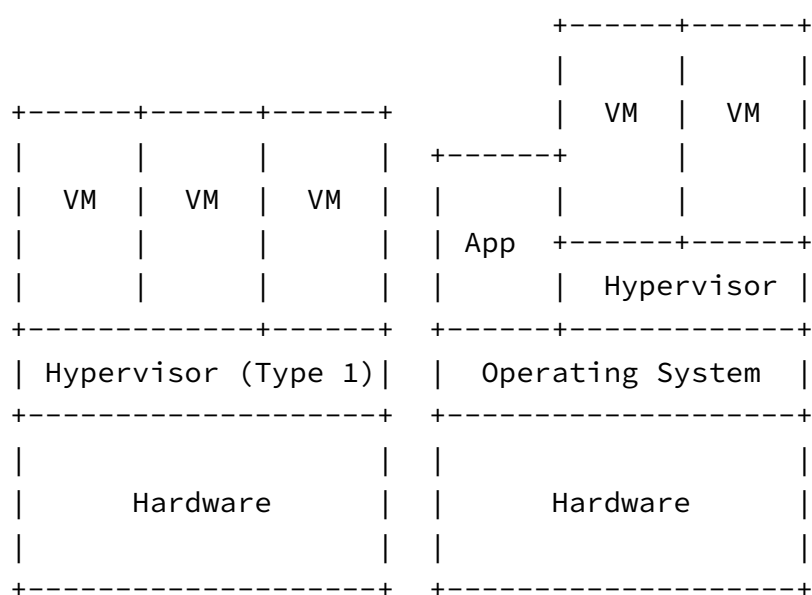
2018-05-03

## 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:

Figure 1: *First instance in Openstack*

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.



**Pro:**

- ## Solution for Exercise 1

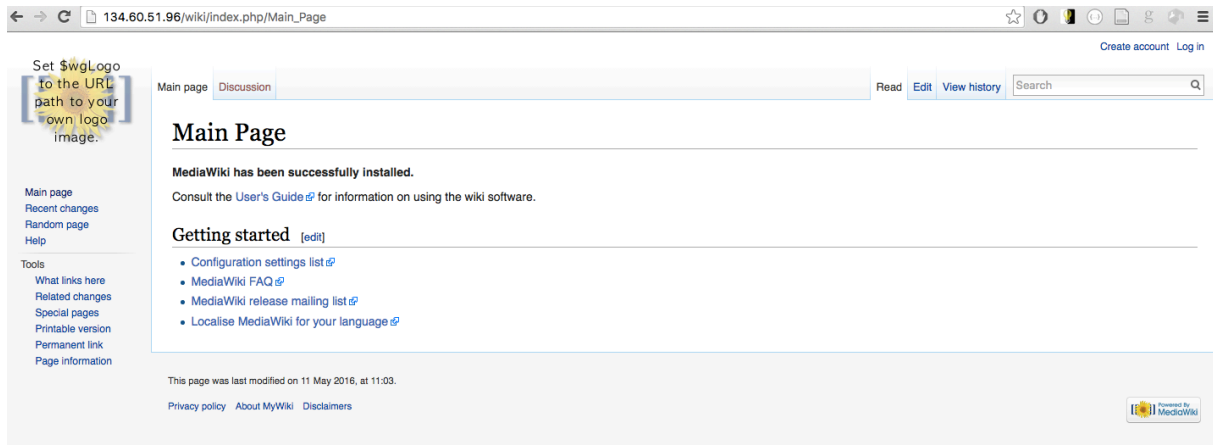


Figure 2: Mediawiki Installation

**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