--- title: ”Tools & Concepts for (Cloud) Deployments” author: [”Christopher B. Hauser”] institute: [”Institute of Information Resource Management, Ulm University”] subject: ”Markdown” tags: [Markdown, Example] titlepage: true graphics: true mainfont: Open Sans mainfontoptions: BoldFont=Open Sans Bold mainfontoptions: ItalicFont=Open Sans Italic mainfontoptions: BoldItalicFont=Open Sans Bold Italic

date: 2018-05-03 subtitle: ”Solution for Exercise 1” --- # 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).

“‘ +------+------+ | | | +------+------+------+ | VM | VM | | | | | +------+ | | | VM | VM | VM | | | | | | | | | | | App +------+------+ | | | | | | Hypervisor | +------------+------+ +------+------------+ | Hypervisor (Type 1)| | Operating System | +--------------------+ +--------------------+ | | | | | Hardware | | Hardware | | | | | +--------------------+ +--------------------+

“‘

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:

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.

“‘ +-----------------+Virtual Machine+------------+ | Ubuntu 14.04 | | +---------------+ +----------+ | + | | | | | | http://publicIP:80 | Apache2 | | MariaDB | | + | + PHP | | Database | | +----------> + Mediawiki +-----> | | | | | | | | | | Port | | Port | | | | TCP 80 | | TCP 3306 | | | +---------------+ +----------------+ | +---+ “‘

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

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