Server Virtualisation with VMware

Virtualisation

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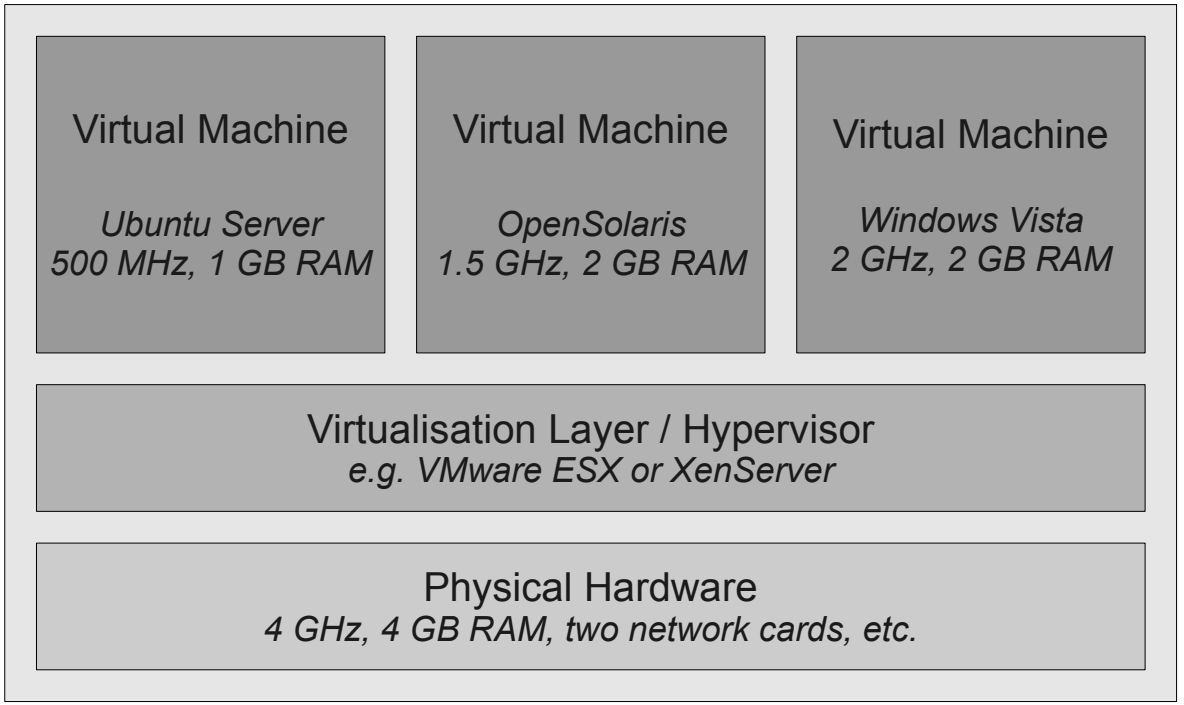
1. Virtualisation Overview

Defining Virtualisation



- Virtualisation is a technology to run multiple virtual computers on the same physical hardware
- Virtualisation is the separation of a resource or request for a service from the underlying physical delivery of that service.

- Expensive and underutilised data centres
- Complex heterogeneous IT infrastructure
- High IT dependence
- Downtimes are business critical

→ Stable and flexible data centre desired

2. Impact on Service Providers

Advantages of Virtualisation for SaaS Providers

- Reduces costs
  - Less physical hardware (e.g. servers)
  - Less cooling and power costs
- Simplifies manageability
  - Easy provision of new servers
  - Flexibly distribute available resources
  - Improved service level control
- Increase hardware utilisation

→ Virtualisation can have a major impact on profitability

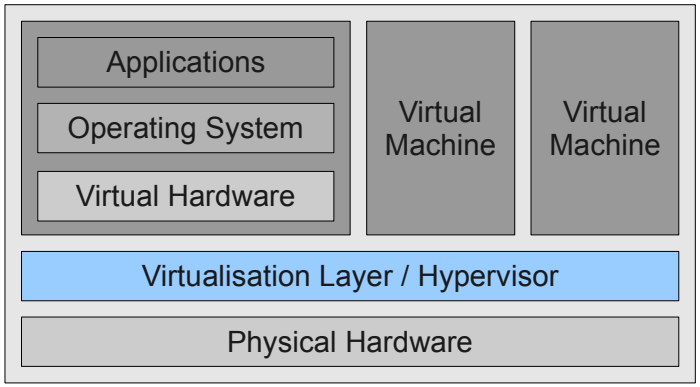
3. Virtualisation Technology

Types of Virtualisation

Full Virtualisation	Paravirtualisation	Hardware-assisted Virtualisation
• Complete simulation of the underlying hardware	• Only required instructions are handled by the virtualisation software	• Newer processors provide virtualisation modes
• Unmodified guest OS	• Modified guest OS	• Unmodifed guest OS
• Unmodified hardware	• Unmodified hardware	• Special CPUs required

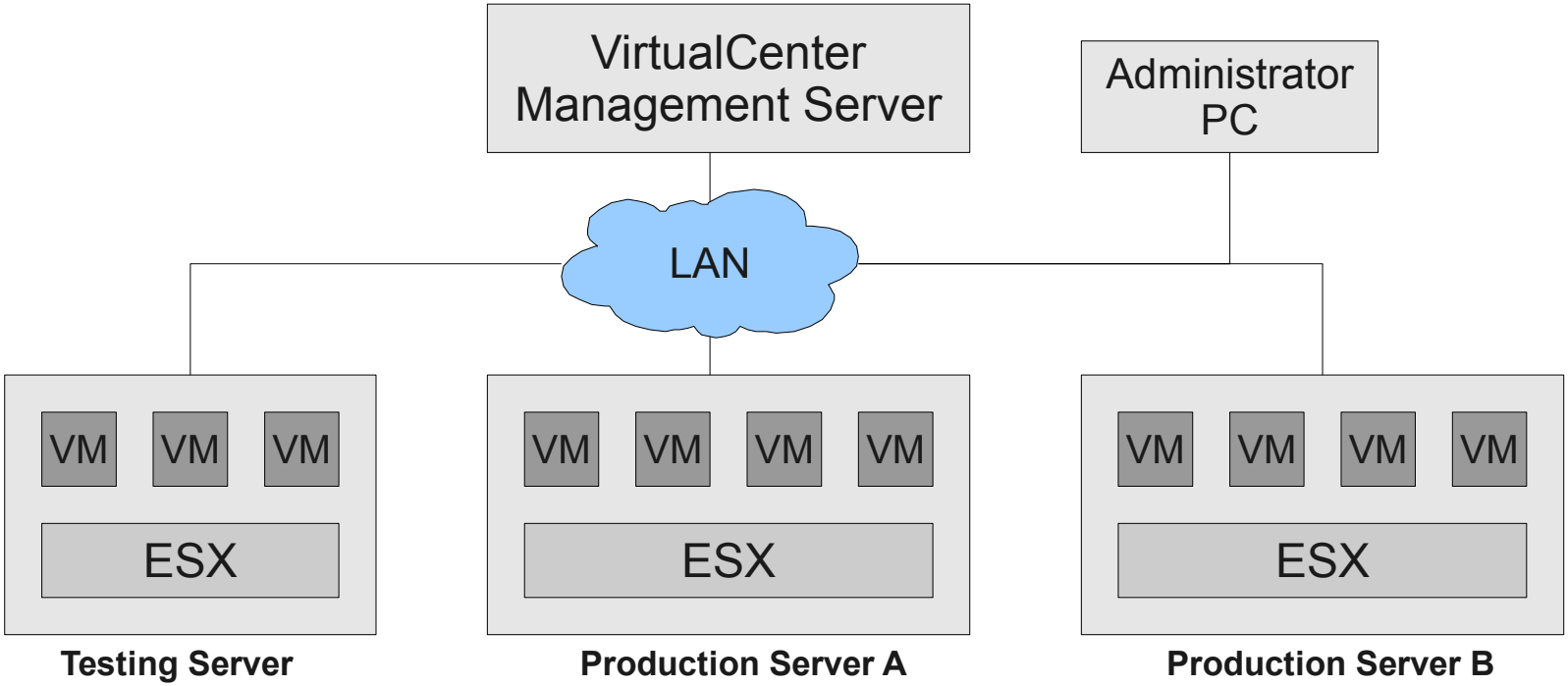
3. Virtualisation Technology

Abstraction Layer: The Hypervisor



- Abstraction layer
- Manages physical hardware like a normal operating system
- Responsible for executing and isolating VMs
- Partitioning of available resources
- VMware ESX/ESXi:
  - Full virtualisation solution with paravirtualisation elements

- Create a virtual cluster by connecting many ESX hosts via LAN
- Automated live migration with VMotion and DRS
- Failsafe environment with VMware HA



5. Challenges and Limitations

Technical Limitations and Business Aspects

- Technical limitations
  - No compatibility between virtualisation solutions
  - Live migration only works for selected hardware
  - Less performance than physical machines

- Business aspects
  - New expensive hardware required
    - Servers, storage, network infrastructure, etc.
  - New trained specialists are necessary
  - Higher licensing costs possible

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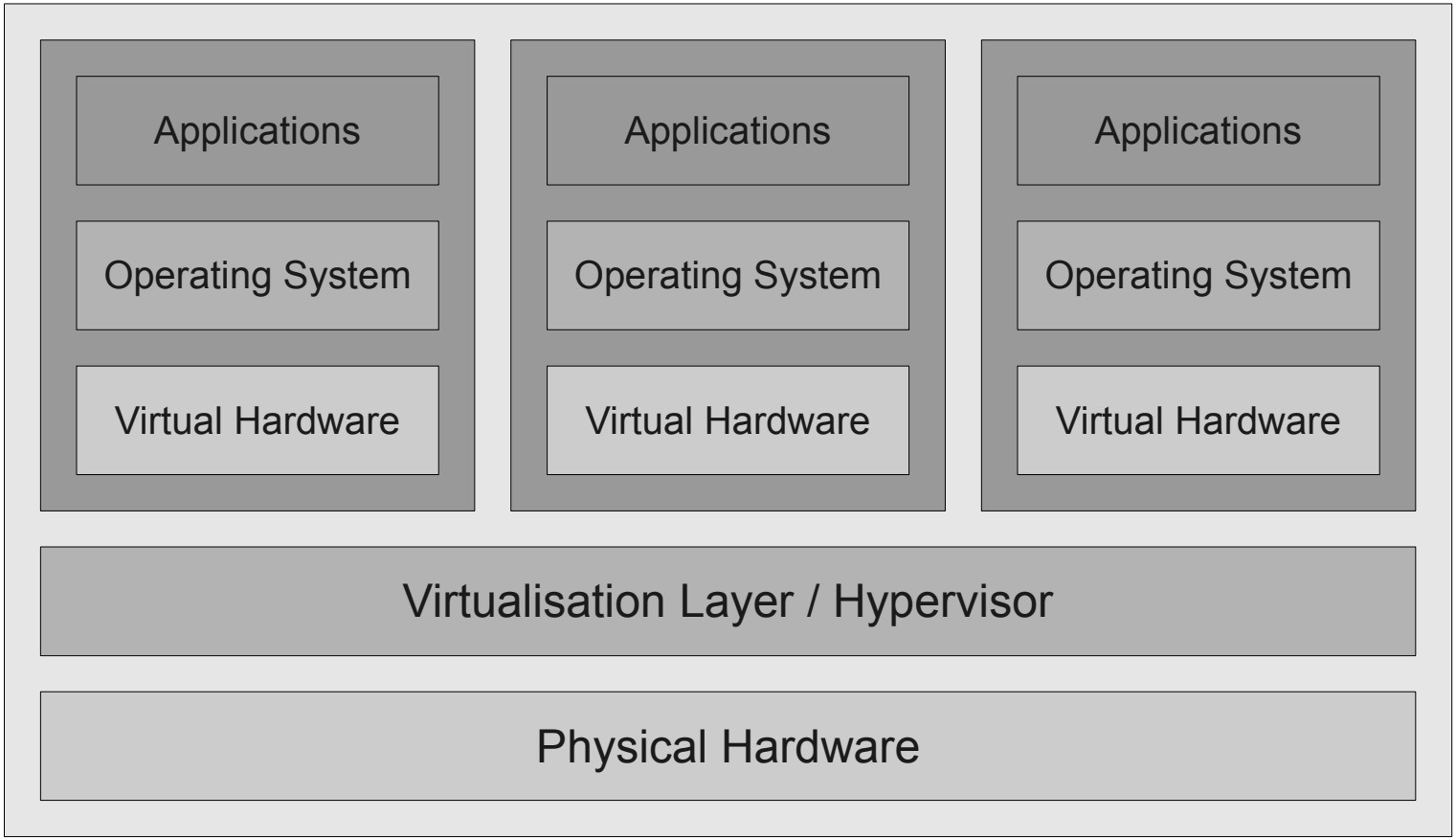
- Microsoft
  - Windows Server 2008 / Hyper-V
- Citrix
  - XenServer 5
  - Based on the Xen virtualisation layer
- VMware
  - Infrastructure 3
  - Based on the ESX virtualisation layer

3. Virtualisation Technology

Main Components



3. Virtualisation Technology

Virtual Machine: Processors, Memory and Network Interface Cards

- A virtual machine is a complete computer system
- It is just a set of normal files
- It has its own freely configurable virtual hardware
  - Virtual Processors
  - Virtual Memory
  - Virtual Network Interface Cards
  - etc.