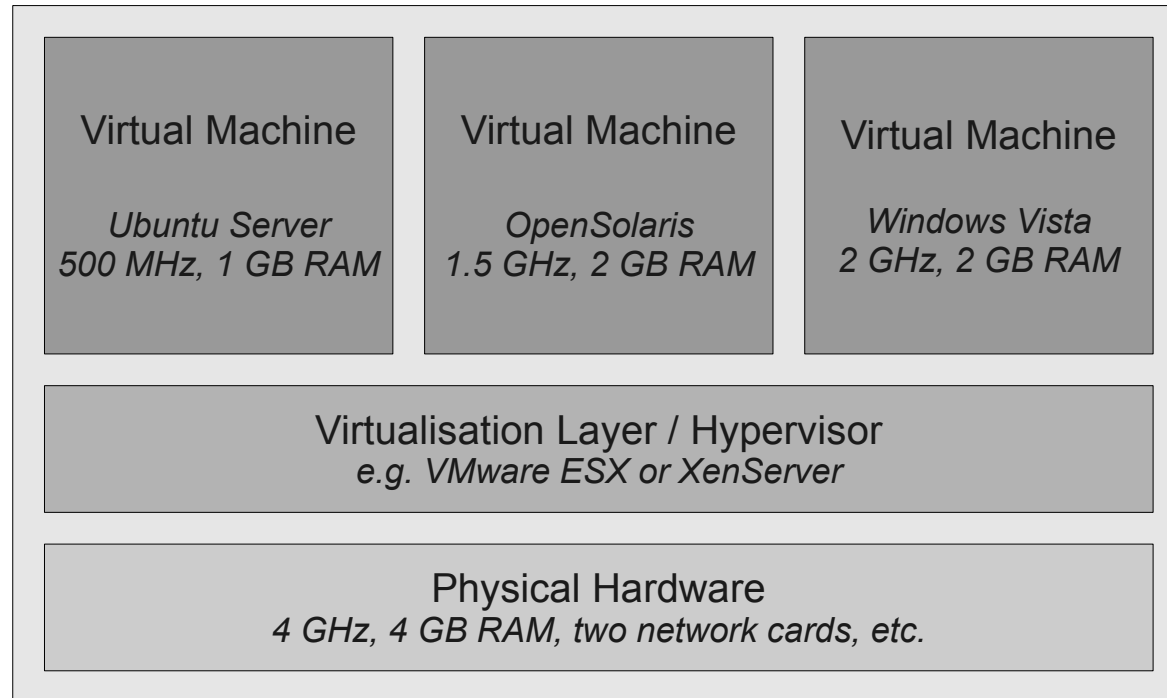


Server Virtualisation with VMware

1. Virtualisation Overview
2. Impact on Service Providers
3. Virtualisation Technology
4. VMware Infrastructure
5. Challenges and Limitations

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.

1. Virtualisation Overview

Motivation: Why virtualise?

- 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

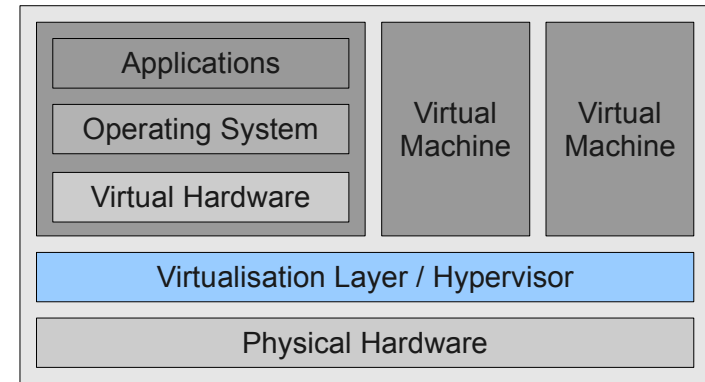
Types of Virtualisation

Full Virtualisation	Paravirtualisation	Hardware-assisted Virtualisation
<ul style="list-style-type: none">• Complete simulation of the underlying hardware• Unmodified guest OS• Unmodified hardware	<ul style="list-style-type: none">• Only required instructions are handled by the virtualisation software• Modified guest OS• Unmodified hardware	<ul style="list-style-type: none">• Newer processors provide virtualisation modes• Unmodified guest OS• Special CPUs required

3. Virtualisation Technology

Abstraction Layer: The Hypervisor

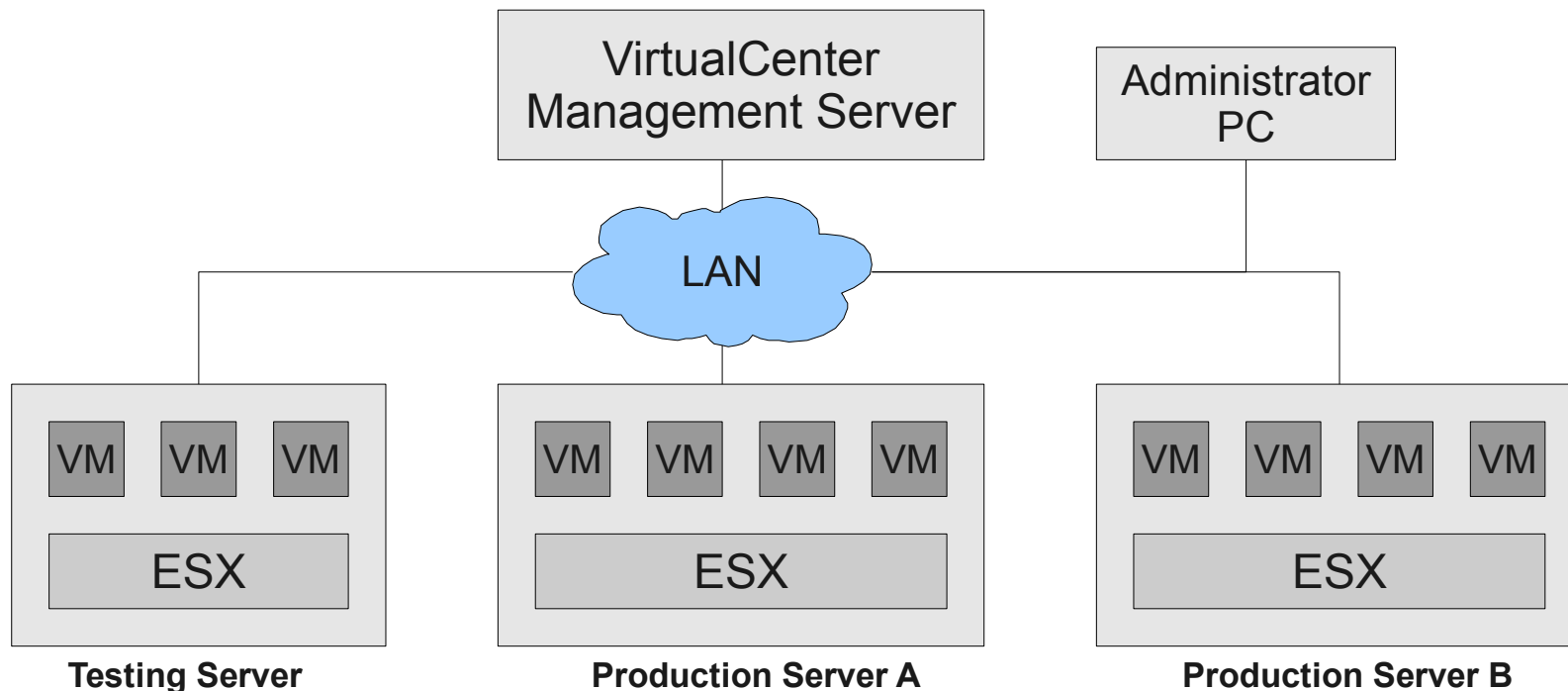
- Abstraction layer
- Manages physical hardware like a normal operating system
- Responsible for executing and isolating VMs
- Partitioning of available resources
- VMware ESX/ESXi:
 - Full virtualisation solution with paravirtualisation elements



4. VMware Infrastructure

VMware's Data Centre Virtualisation Solution

- 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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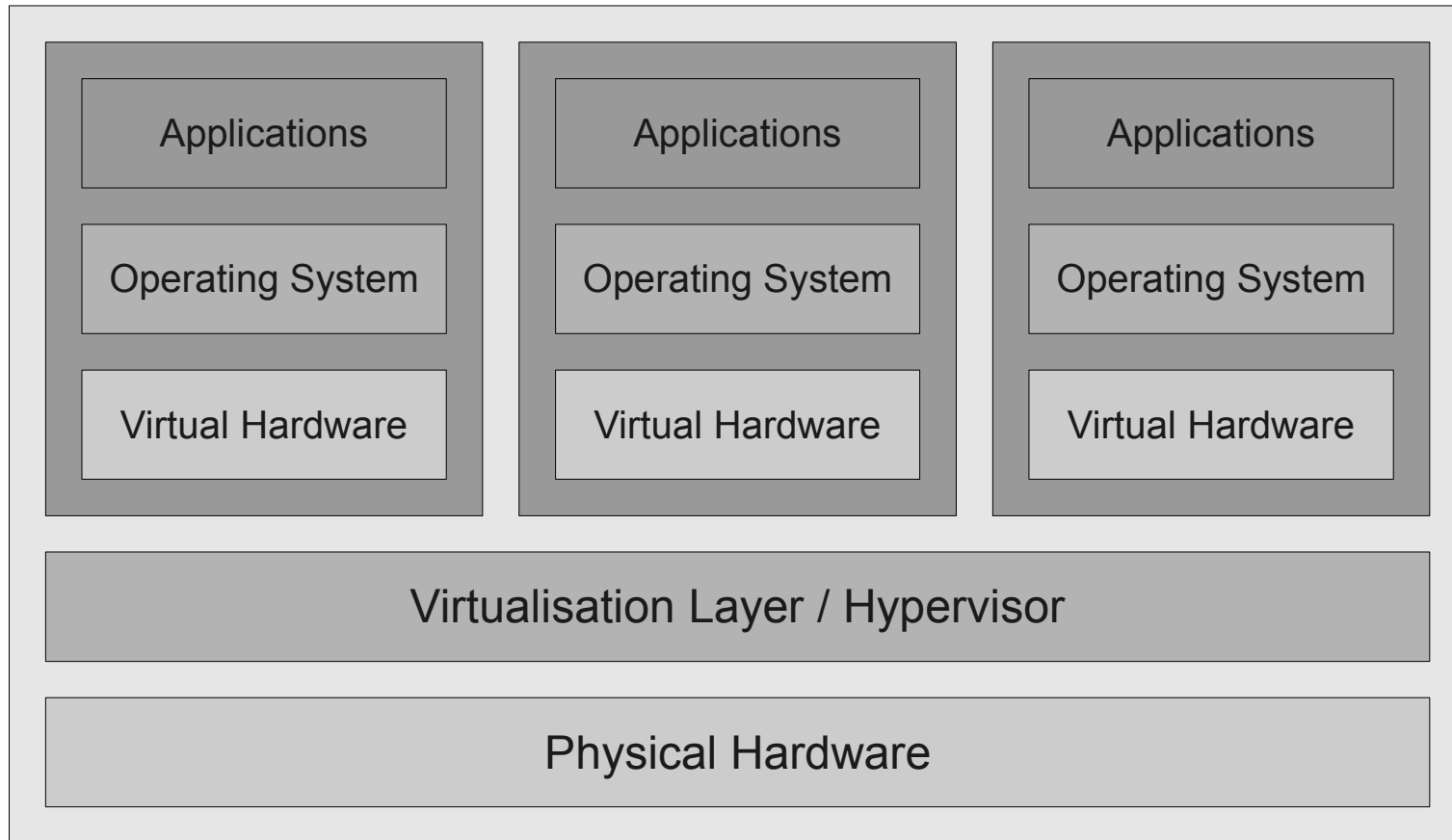
1. Virtualisation Overview

Market Overview

- 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.

