Linux Administration

Installing and hosting a Linux system

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Choosing a Linux distribution

- Multiple factors should be considered when choosing a Linux distribution:
  - hardware compatibility
  - available packages and software compatibility
  - technical support
  - cost
  - management, team and personal preferences
- You may need to change your choice later on, and migrate all your systems.

Installation overview

- Most Linux distributions will provide a wizard to help you during the installation process.
- Some steps may be simplified for you, others may not be available.
- Test multiple times to be comfortable with your choices; check the documentation.

Installation process

- Download and validate the ISO image for the distribution.
- Setup the computer to boot from the ISO image.
- Follow the installer process; validate all information used for the configuration (usernames/passwords, network configuration, …).
- Reboot and complete any post-install configuration.

Creating a template

- Except in rare circumstances, you will need to deploy the same system to multiple machines.
- Create a base template (aka “Gold Image”) either with a minimum base or as close as possible from the final product, depending how homogeneous your deployment is.
- Use scripts and deployment and configuration tools to configure each system individually.

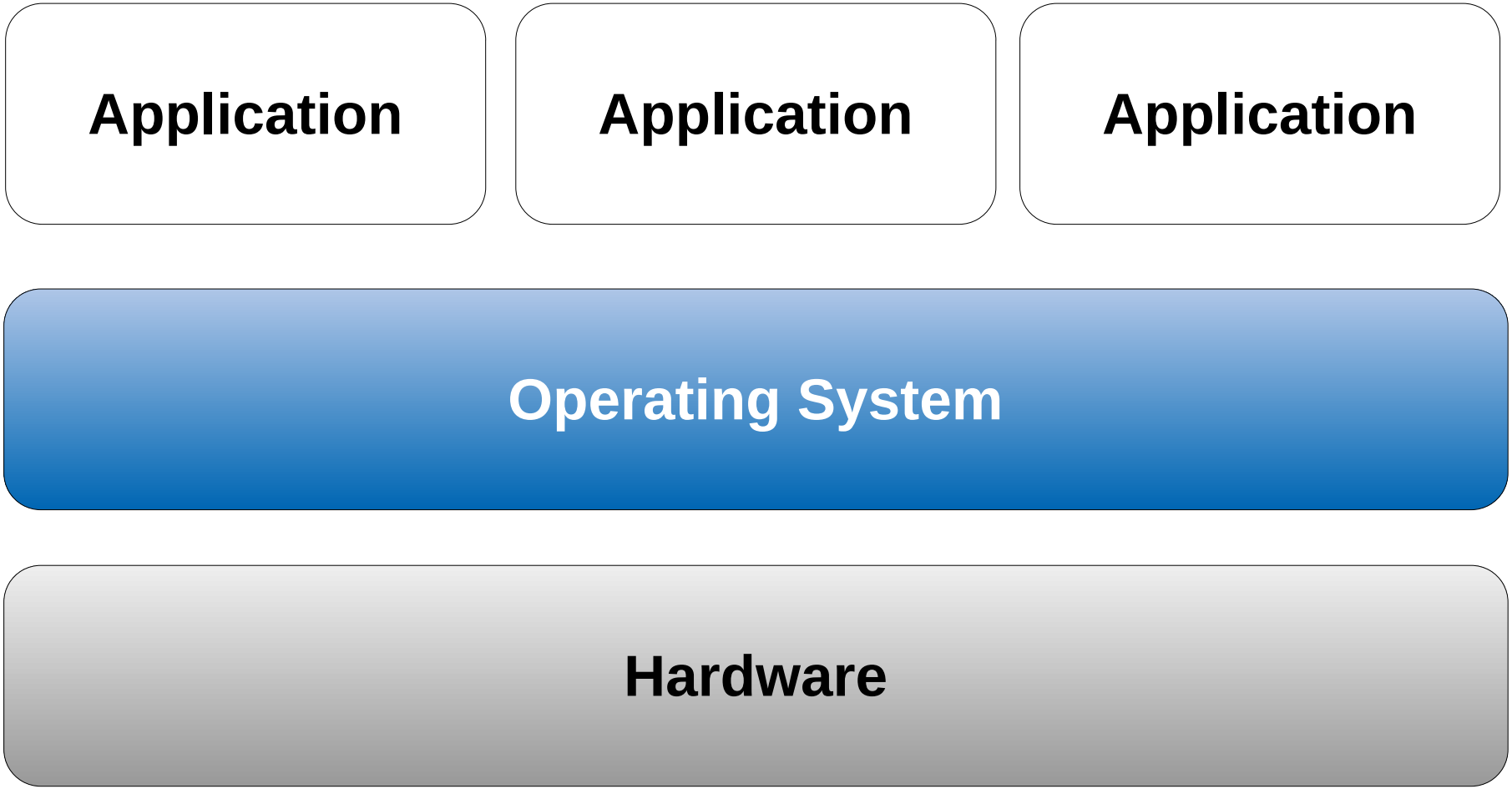
Choosing a platform

Multiple options are available to deploy new systems:

- physical hardware (aka “bare metal”)
- virtual machine
- cloud hosted machine
- container

Physical hardware

- Expensive.
- Require hardware maintenance and support contracts.
- Can be hosted on premises, or in a data center (colocation).
- Less and less common.

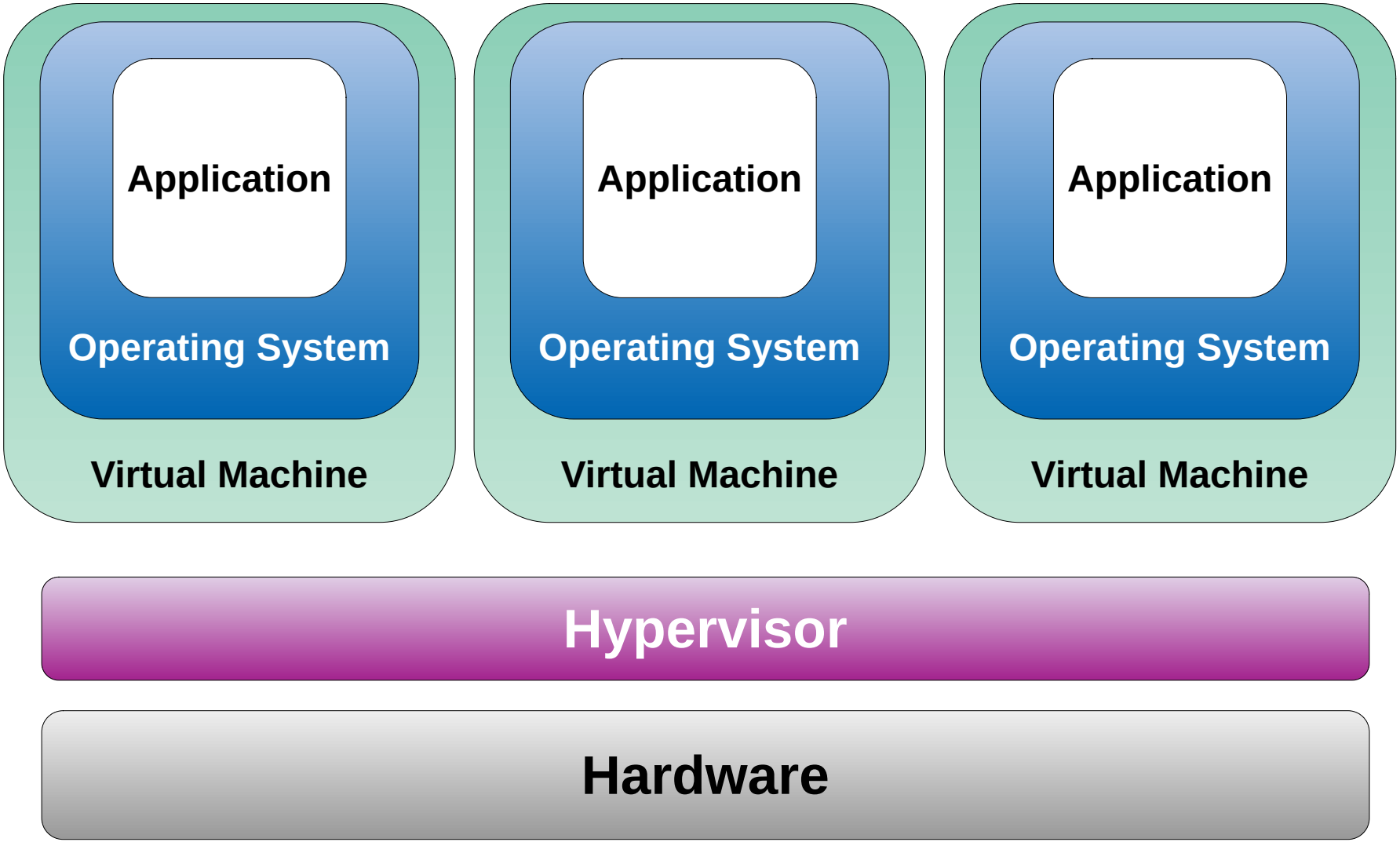

Application
Application
Application
Operating System
Hardware

Virtual machine

- Probably the most common solution as of today.
- Can be used as a simple “standalone” system or as a complex, redundant hosting architecture.
- Provides special additional features: snapshots, migration, fail-over.
- A physical server can be converted to a virtual machine.
- A virtual machine can be cloned to create similar systems.
- Vendors: VMware vCenter/ESXi, Microsoft Hyper-V, Xen Project/Citrix Hypervisor, XCP-ng, Proxmox, OpenStack.

Hypervisors

- An hypervisor is the the application that controls and runs virtual machines.
- Two types are available:
  - Type I: running directly on hardware
  - Type II: running on top of a regular operating system
- Hypervisors are responsible for keeping each guest VM isolated (performance, security).


Application
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Virtual Machine
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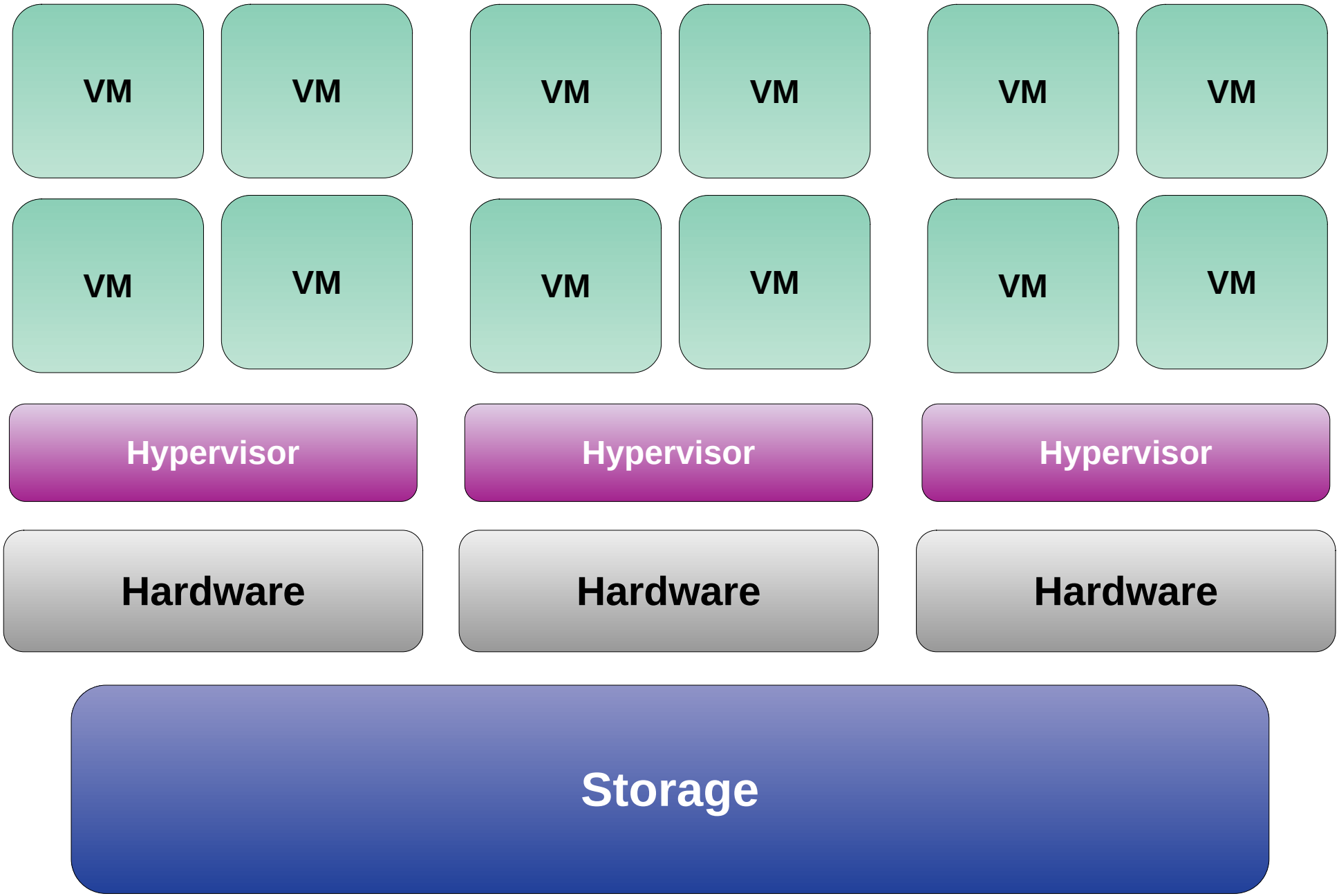
Virtual Machine
Hypervisor
Hardware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Hardware
Hardware
Storage

Cloud hosted machine

- A cloud machine is a virtual machine running on hardware that you don’t manage.
- Multiple solutions are available, and can be combined.
- Hourly, monthly or yearly billing cycle.
- Major vendors:
  - Amazon Web Services (AWS)
  - Google Cloud Platform (GCP)
  - Microsoft Azure
  - Oracle Cloud Infrastructure (OCI)

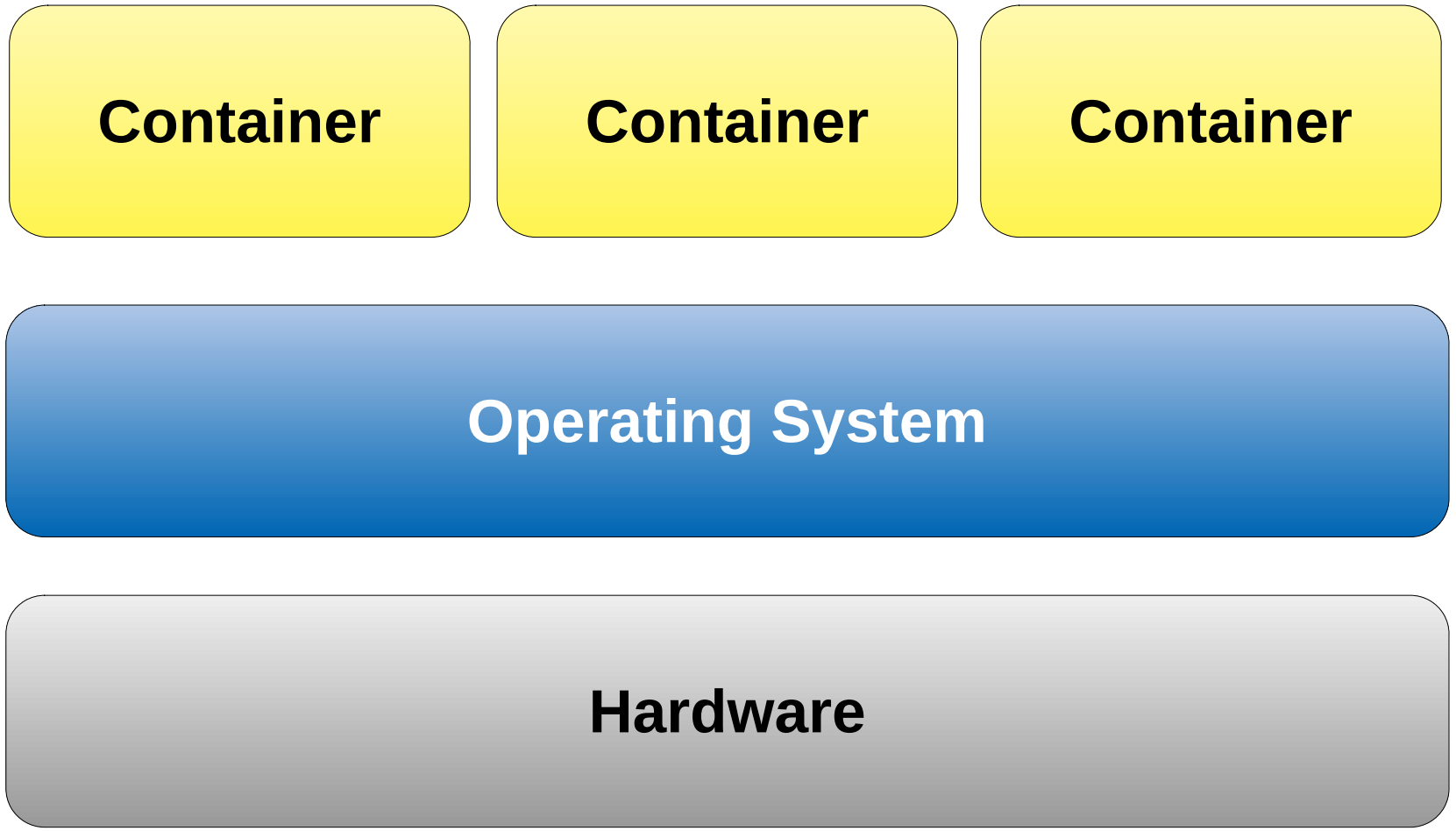
Cloud shared responsibilities

Depending on the vendor that you are working with, you must pay attention on who is responsible for:

- System upgrades and patching
- Network access and security
- Application upgrades
- Data security and backups
- User access and permissions (identity management)
- Monitoring and logging

Container

- Used mostly for a specific, limited tasks (micro-services).
- Containers are often used in numbers.
- Disposable.
- Vendors: Docker/Kubernetes, Podman, Singularity


Container
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Hardware

Managing hardware

- Multiple commands are available to check on the hardware components detected by the system:
  - lspci - listing PCI devices
  - lsusb - listing USB devices
  - lsblk - listing block (disk) devices
  - lshw - list hardware
  - dmidecode - collect hardware information from the BIOS
- Other pieces of information could be recorded in the kernel log.