
Wel-Come to the Presentation

By

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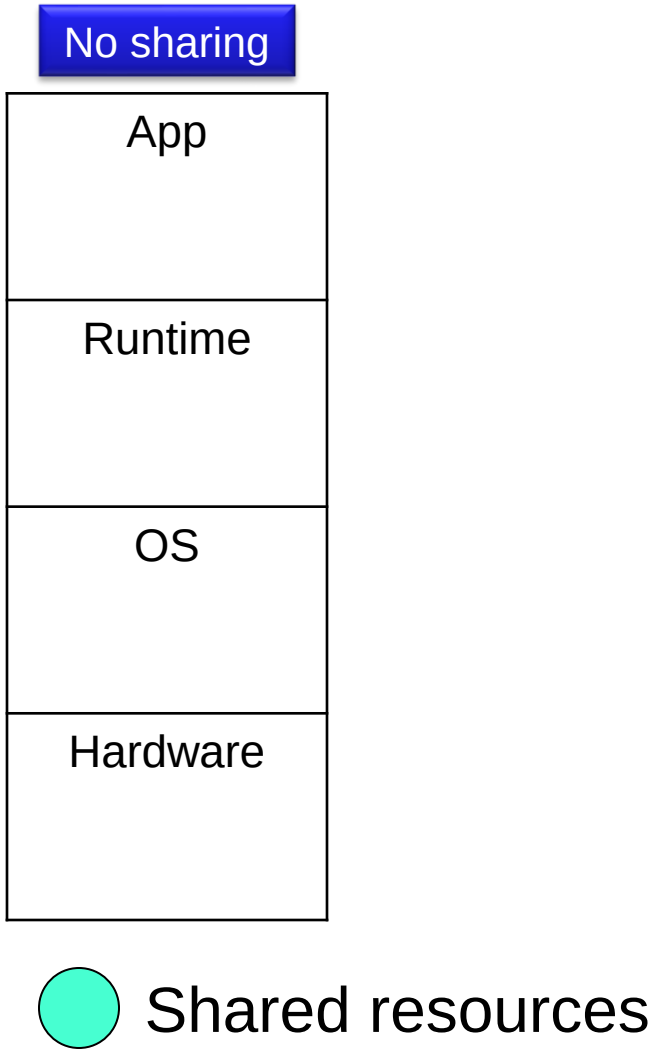
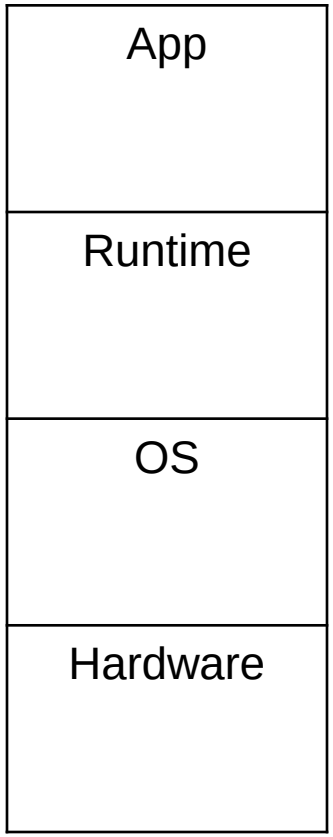
Computing in early years of evaluation

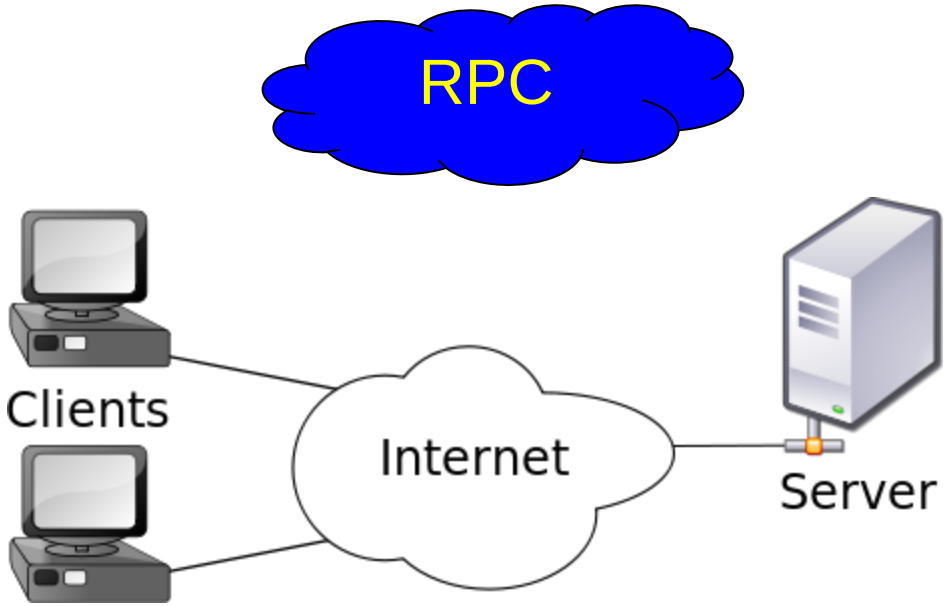


Computing in early years of evaluation

No sharing



Bruce Jay Nelson (January 19, 1952 – September 19, 1999) was an American computer scientist best known as the inventor of the remote procedure call concept



Shared resources

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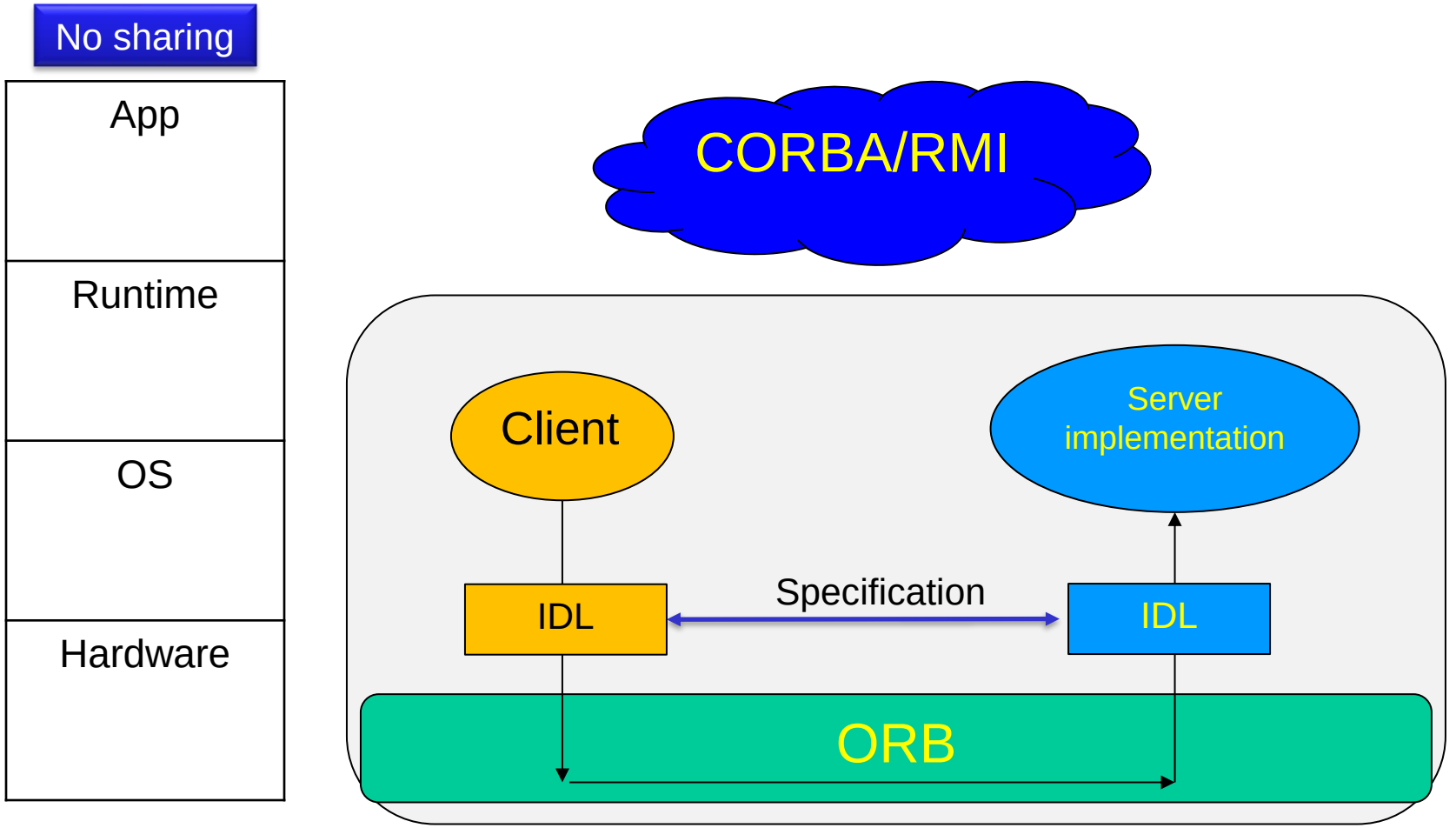

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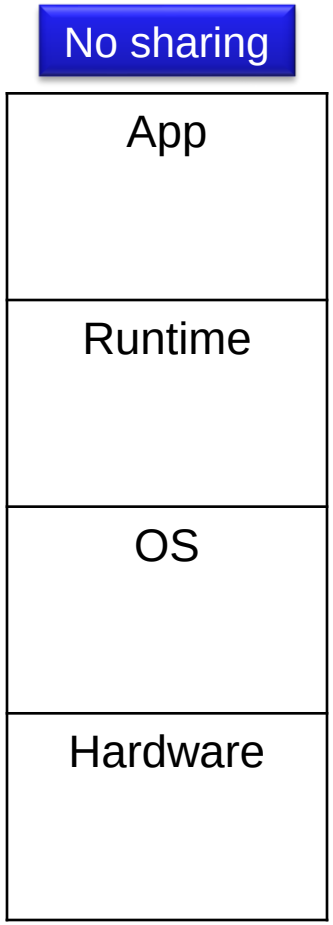
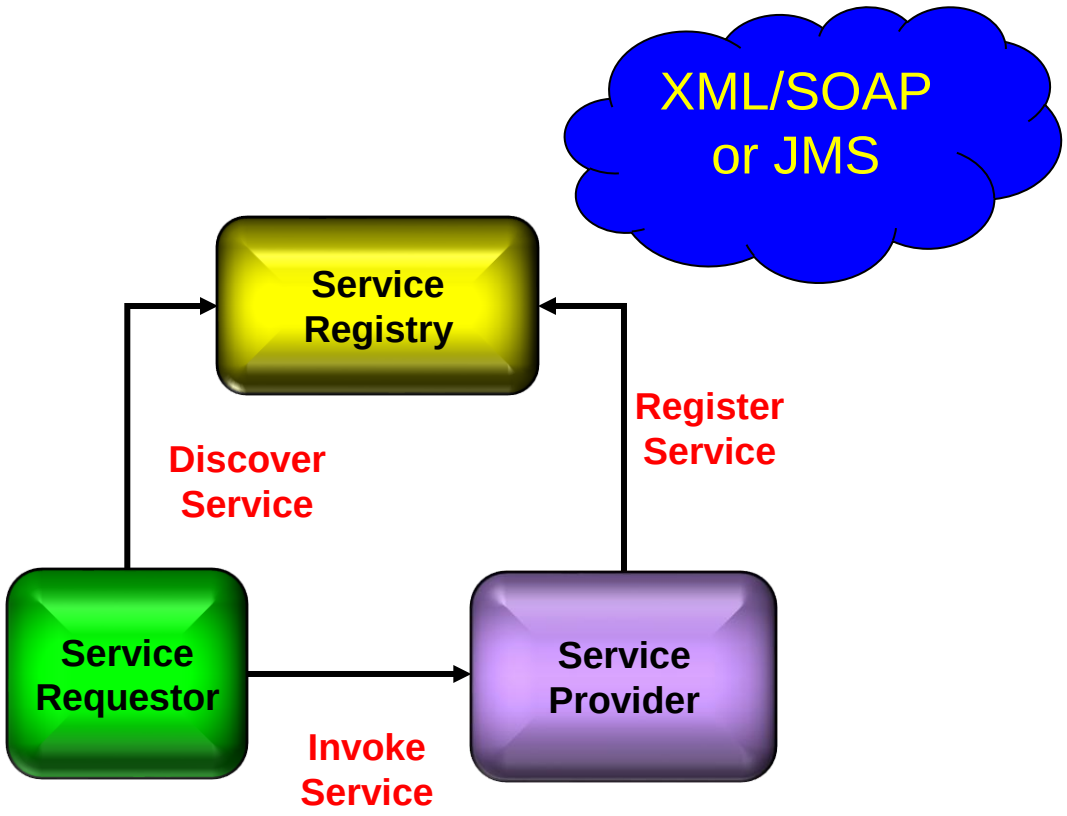
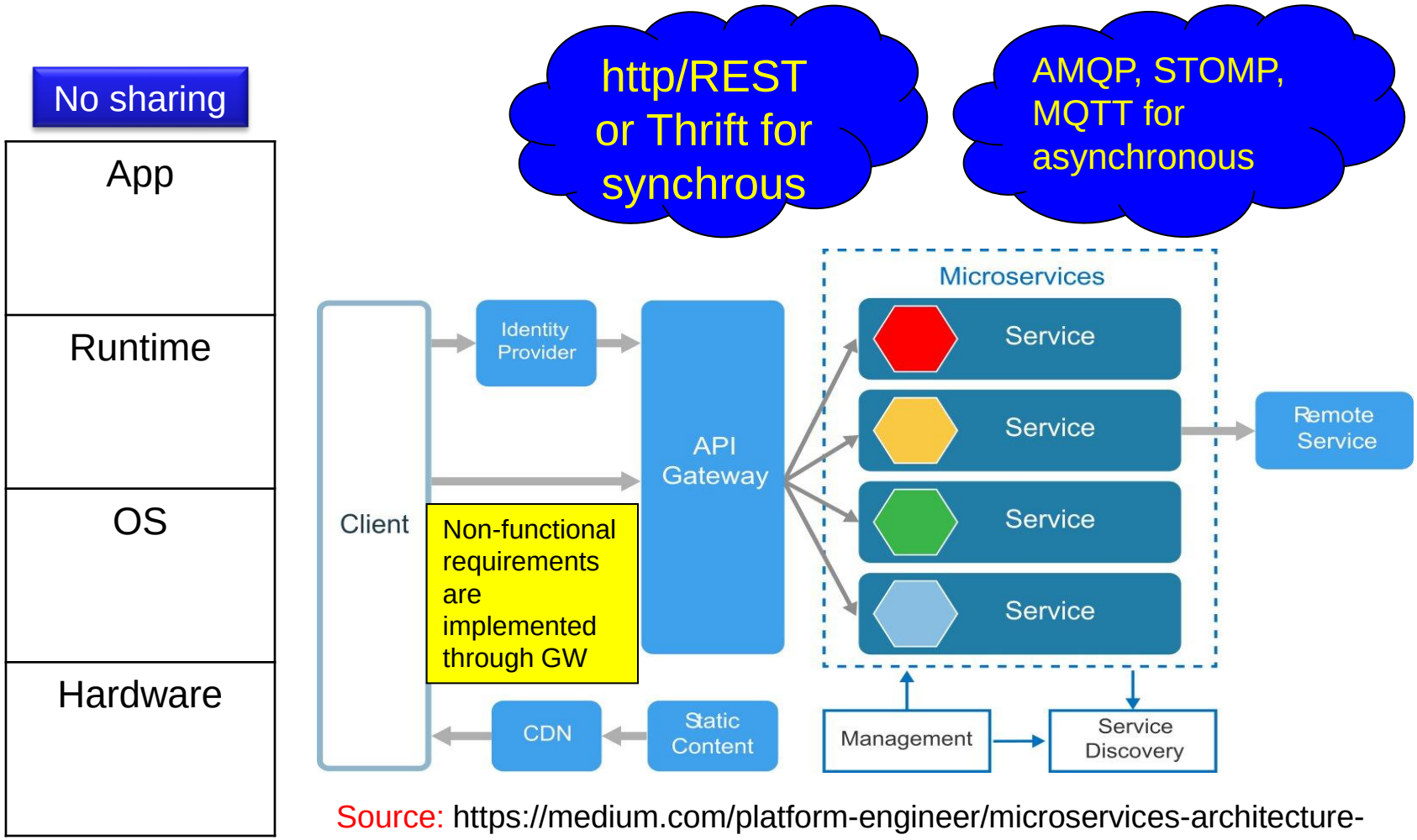




Service Oriented Architecture

Shared resources

Computing in early years of evaluation

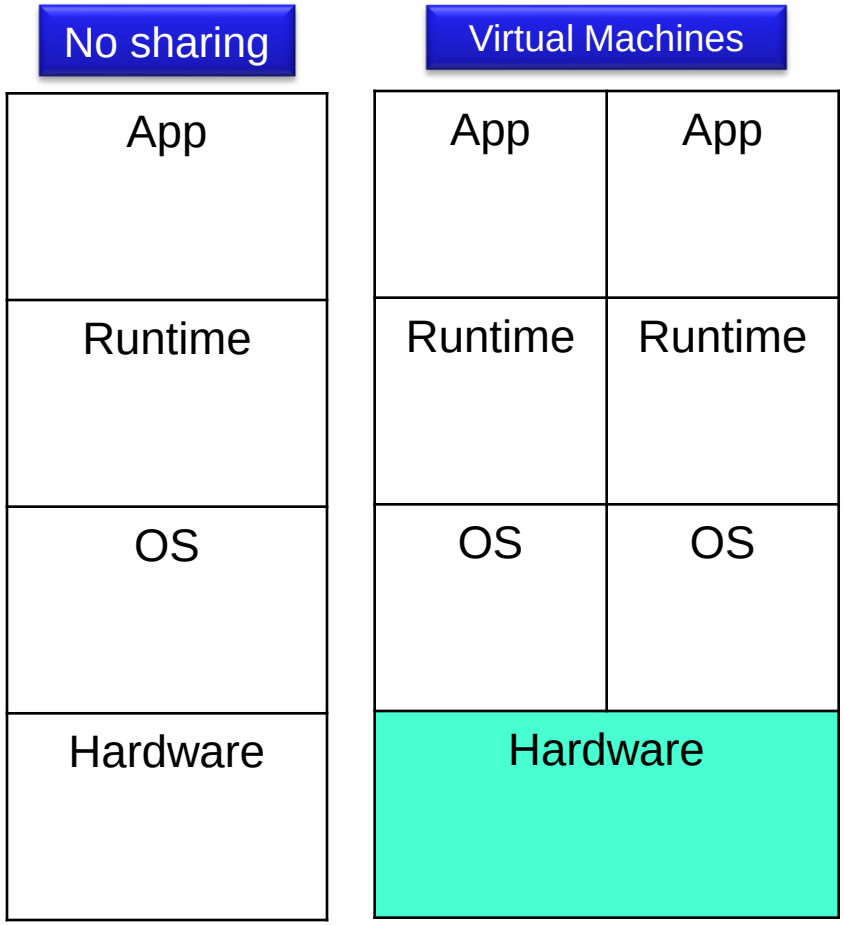


Source: https://medium.com/platform-engineer/microservices-architecture-8bb5a4f46da0

Shared resources

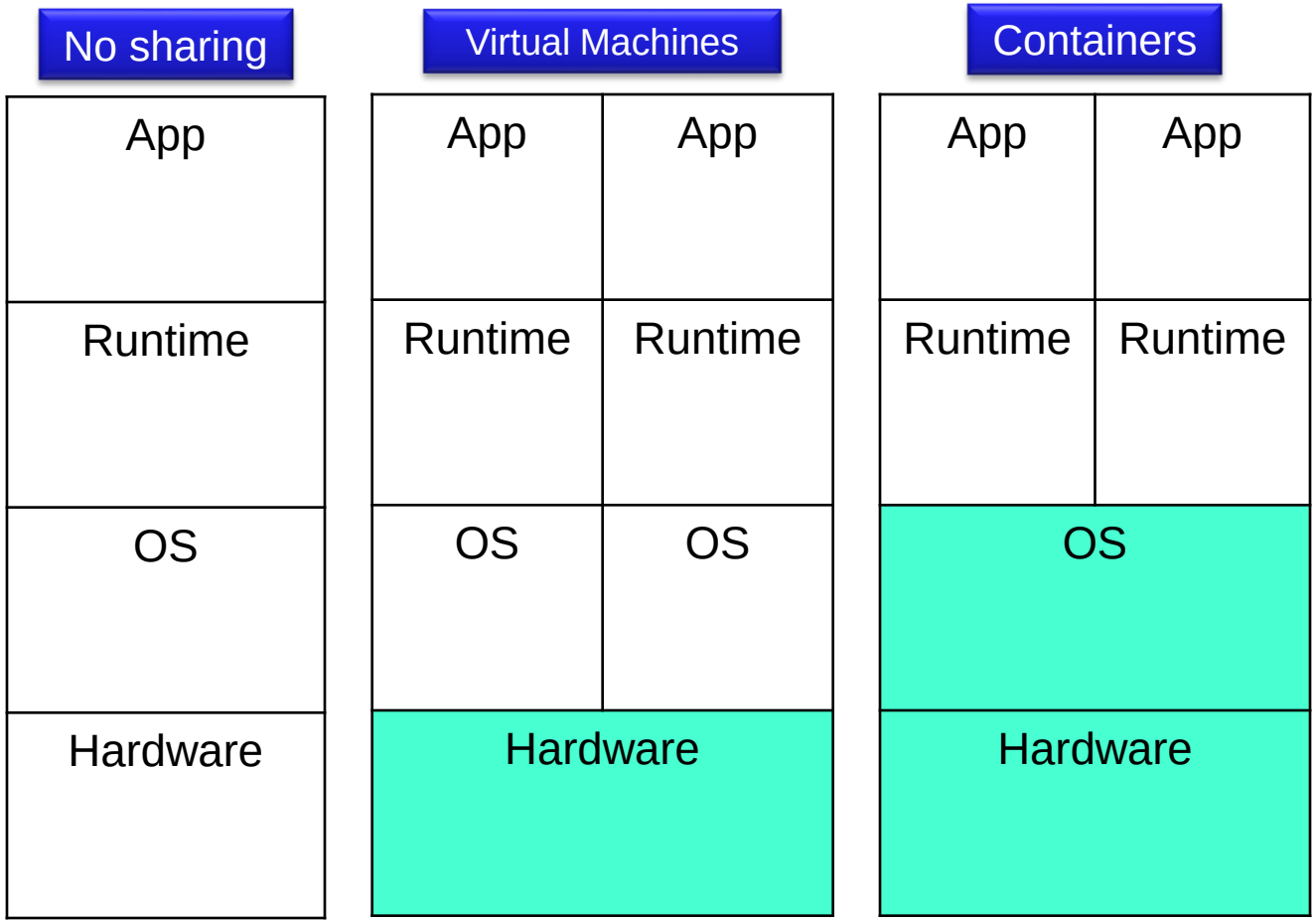
https://kasunpanorama.blogspot.com/2015/11/microservices-in-practice.html

VM based computing

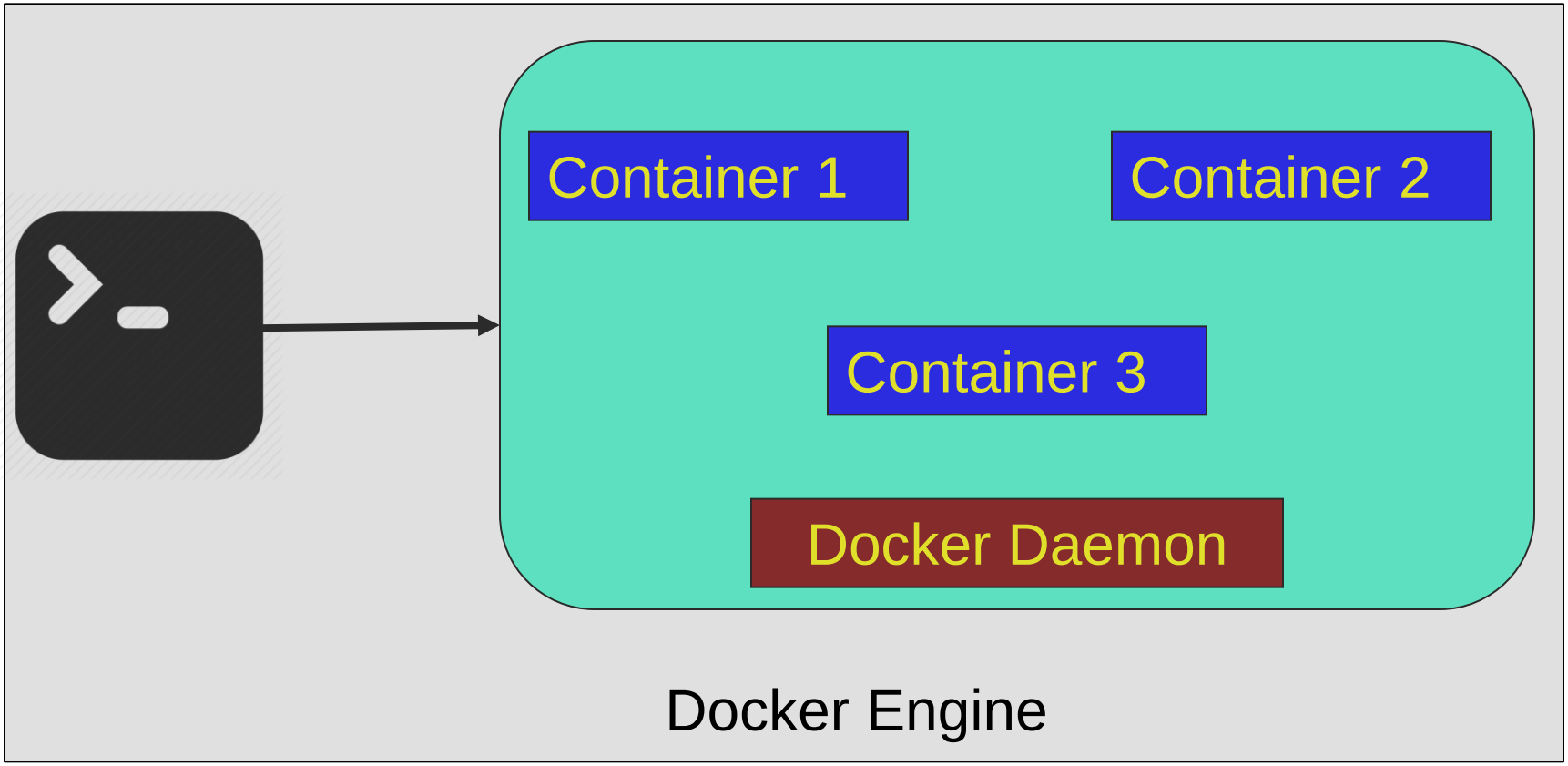


Shared resources

Container based computing

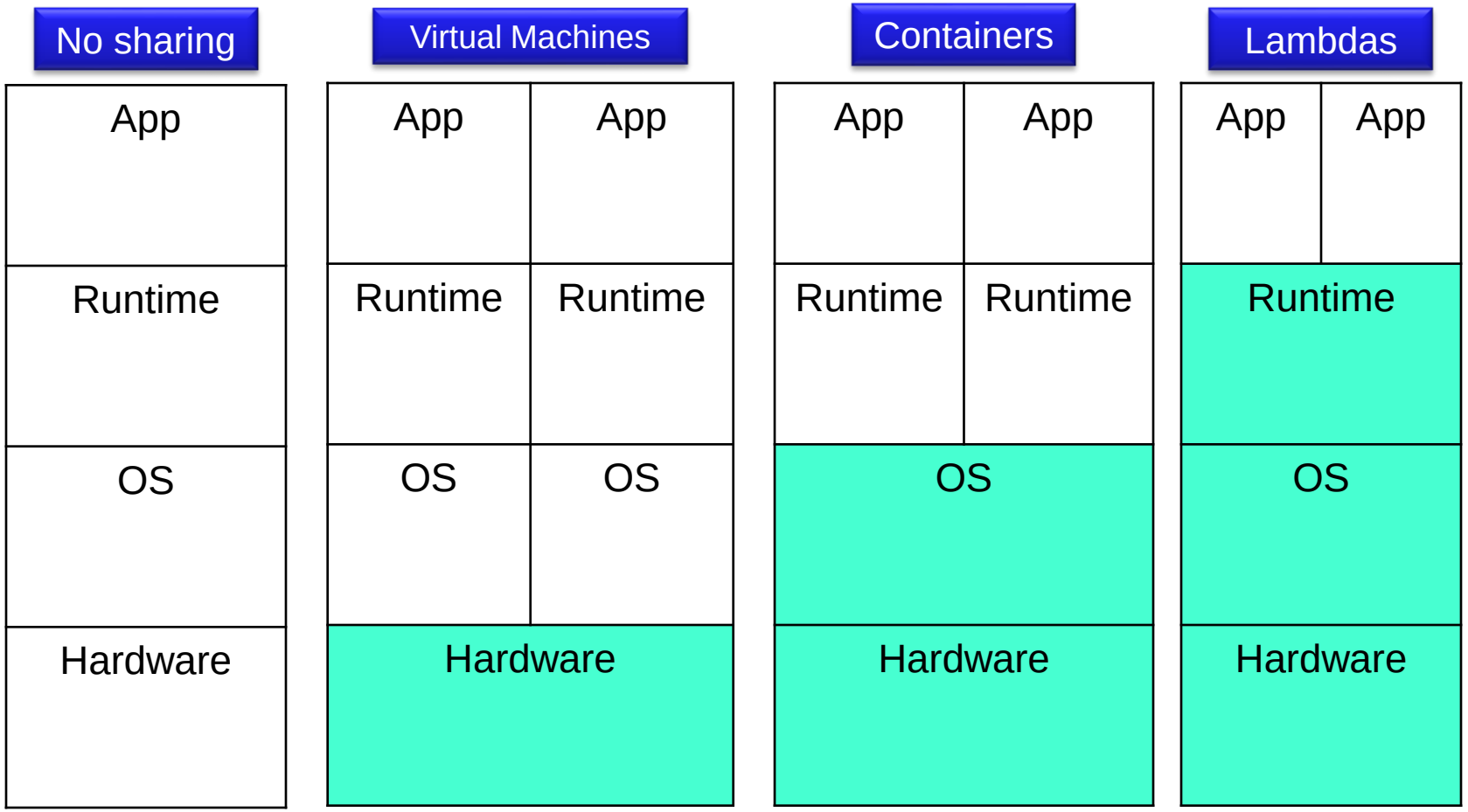


Shared resources



Docker Client sends command through the CLI or REST API to Docker Server

Serverless computing



Shared resources

What to learn?

- Introduction to Virtualization
- Types of Virtualization
- Virtualization Architecture
- Hypervisors and Virtual Machines
- OS, Network, and Storage Virtualization
- Containers and Virtualization
- Virtualization in Cloud Computing

What to know?

- **Syllabus**
  - Download from the course web site
  - Will be flexible
- **Books**
  - Matthew Portnoy (2012), Virtualization Essentials, by John Wiley Sons, Inc., Indianapolis, Indiana, ISBN: 978-1-118-17671-9.
  - James E. Smith and Ravi Nair (2005), Virtual Machines, Versatile Platforms for Systems and Processes, ISBN: 978-1-55860-910-5, 2005 Morgan Kaufman

What to know?

- **Books (Cont…)**
  - Latifa Boursas (Editor), Mark Carlson (Editor), Wolfgang Hommel (Editor), Michelle Sibilla (Editor), KesWold (Editor) (2008), “Systems and Virtualization Management: Standards and New Technologies.
  - Kai Hwang, Geoffrey C Fox, Jack J Dongarra (2012) , Distributed and Cloud Computing-From Parallel Processing to the Internet of Things, Elsevier, Morgan Kaufmann Publishers. USA
  - 5. K. Chandrasekaran (2015), Essentials of Cloud Computing, CRC press, USA.

Announcements: Course Roadmap

- The course will cover topics in the following order:
  - **Introduction to Virtualization**
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Syllabus

UNIT- I: Introduction to Virtualization:

Basics of Virtualization, Why virtualization, Physical and virtual machines Virtual Machine Basics – Process Virtual Machines, System Virtual Machines, Hypervisors-Types of Hypervisors, Hypervisor tools, Types of Virtualization- Server, Storage, Processor, Memory, Network, I/O and Application virtualization.

Syllabus

UNIT- II: Server Virtualization

Server consolidation, Privileged instructions, Emulation, Binary translation, Full Virtualization, Para Virtualization, Hardware Assisted Virtualization, Implementation of Server Virtualization: CPU virtualization, Memory virtualization and I/O virtualization. VM migrations Migration types and process, Challenges.

Syllabus

UNIT- III: Network Virtualization:

IP addressing, Virtual LAN, VPN, Software Defined Networks (SDN), Network Function Virtualization (NFV), Virtual switch, Virtual bridge, Virtual router, Virtual Firewall, VNIC, Implementation of Network Virtualization-Device level, Network level, Packet level and Interface level. Design of Virtual Data Centre (VDC).

Syllabus

UNIT- IV: Storage Virtualization:

RAID, SCSI, Fiber Channel, iSCSI, Direct attached storage, Network Attached storage, Storage Area network, block vs file storage, SNIA Shared Storage Model, Implementation of storage virtualization – Host based Approach – Storage based Approach-Network based Approach-In-band-Out-of-band virtualization, Fault tolerance.

Syllabus

UNIT- V: Virtualization Security:

Hypervisor vulnerabilities, Hypervisor attacks, VM attacks, VM migration attacks, Security solutions for VMs and Hypervisor

OR

UNIT- V: OS Virtualization:

OS-level virtualization: concepts, architecture, and isolation mechanisms, Container technology: Docker architecture, images, containers, and namespaces, Container resource management: cgroups, storage, and container networking, Container orchestration: Kubernetes architecture, pods, services, and scaling