BCSE355L – CLOUD ARCHITECTURE DESIGN

Textbook and references

Textbooks:

- Saurabh Shrivastava, Neelanjali Srivastav, Alberto Artasanchez, “AWS for Solutions Architects - Second Edition: The definitive guide to AWS Solutions Architecture for migrating to, building, scaling, and succeeding in the cloud”, 28 April 2023, Packt Publishing
- Alberto Artasanchez, “AWS for Solutions Architects: Design your cloud infrastructure by implementing DevOps, containers, and Amazon Web Services”, 19 February 2021, Packt Publishing

References

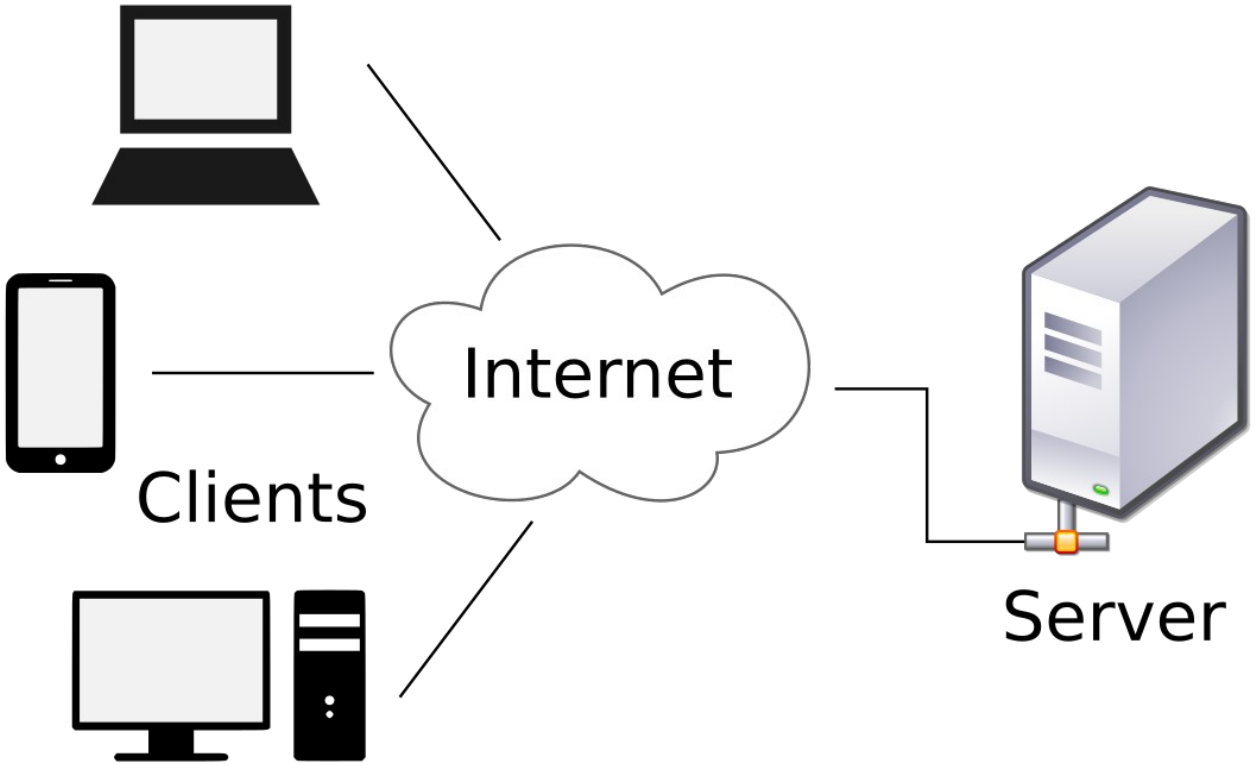
https://docs.aws.amazon.com/whitepapers/latest/aws-overview/introduction.html?did=wp_card&trk=wp_card

EVALUATION

- Assessments – Quiz/Seminar/Case study
- CAT I & CAT II
- FAT

Cloud basics

Types of Host



Workstations?

CENTRALIZED SYSTEMS

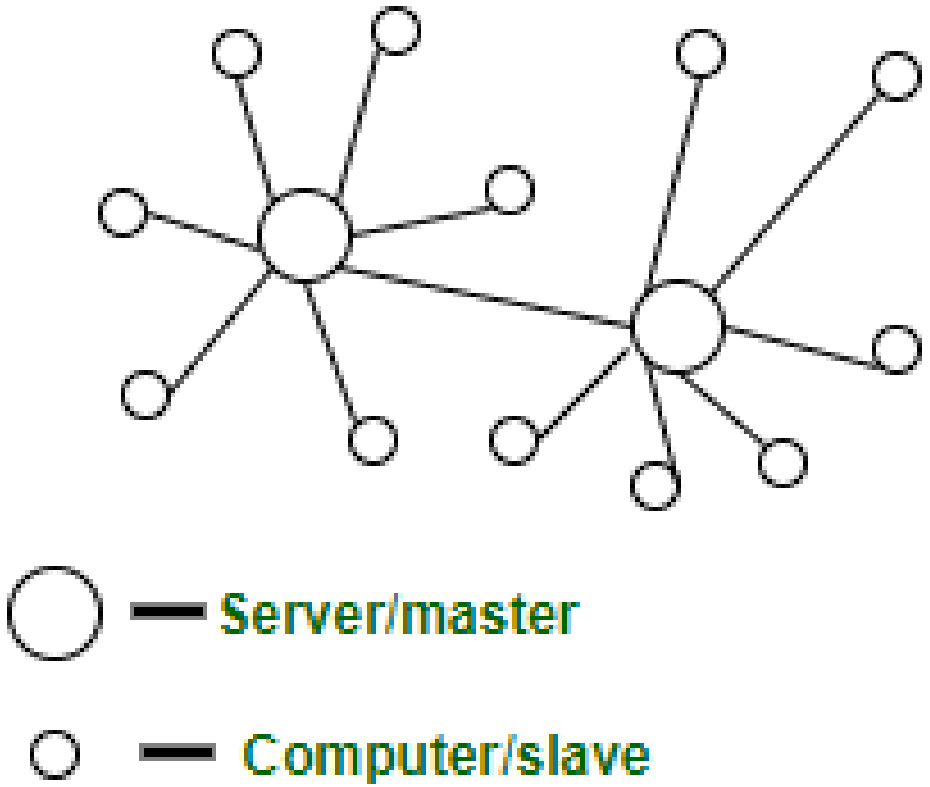
Centralized systems are systems that use client/server architecture where one or more client nodes are directly connected to a central server.

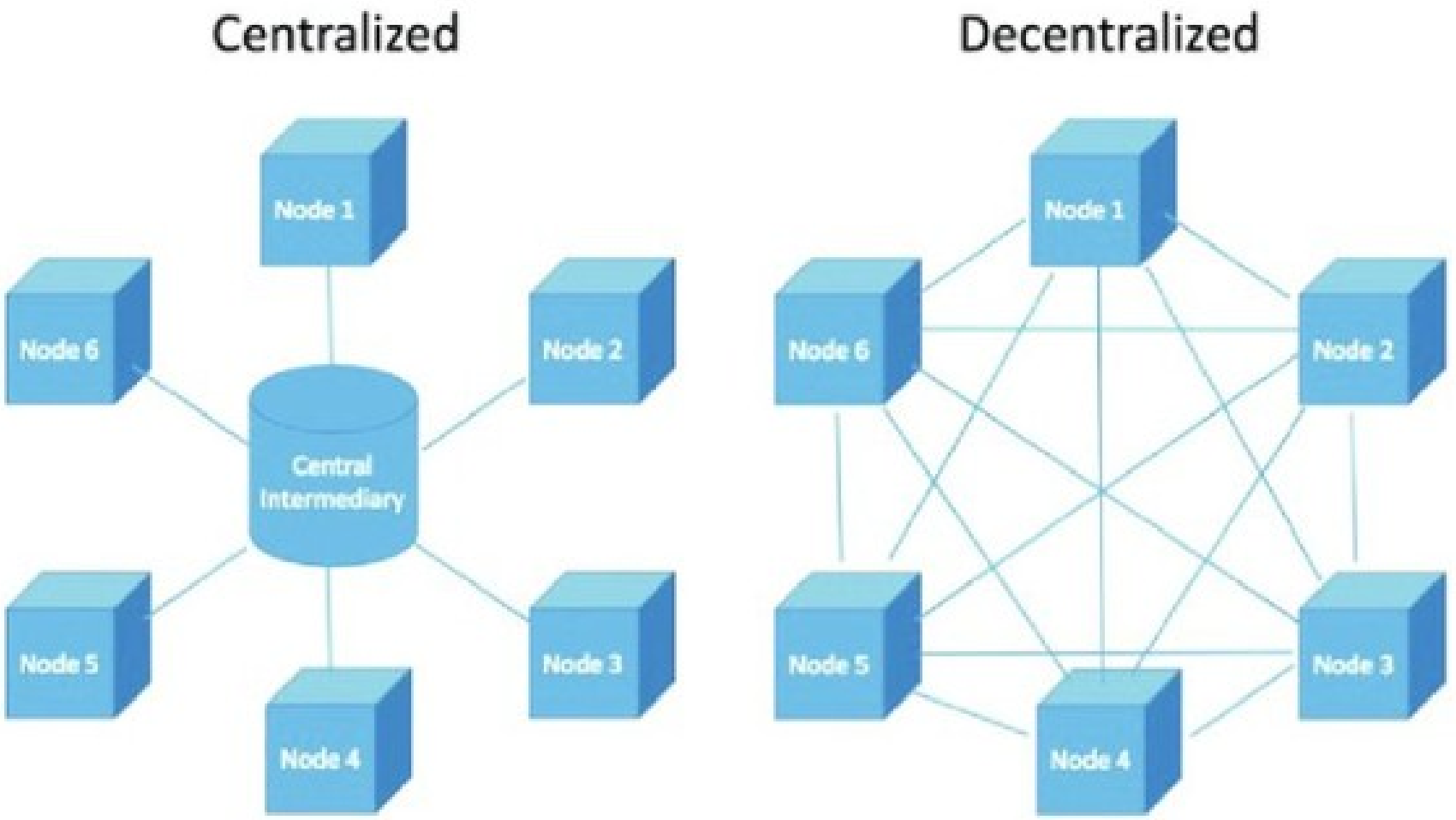
Components of Centralized System are:

- Node (Computer, Mobile, etc.).
- Server.
- Communication link (Cables, Wi-Fi, etc.).

DECENTRALIZED SYSTEMS

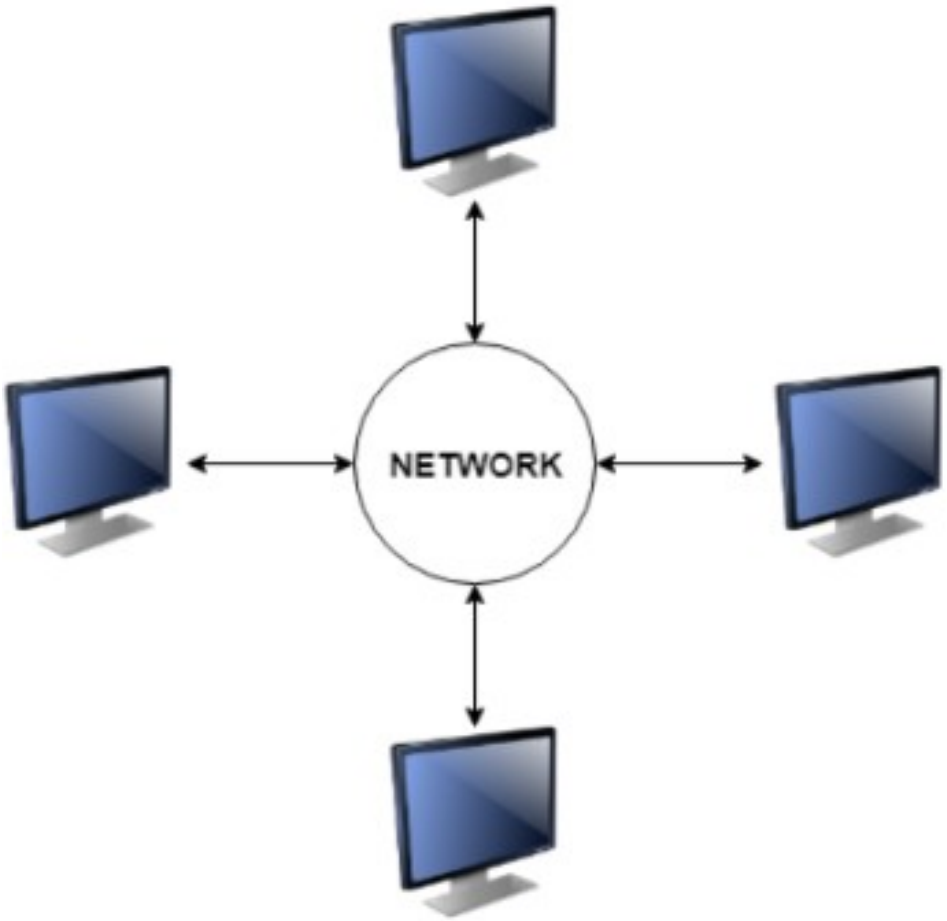
In decentralized systems, every node makes its own decision. The final behavior of the system is the aggregate of the decisions of the individual nodes.



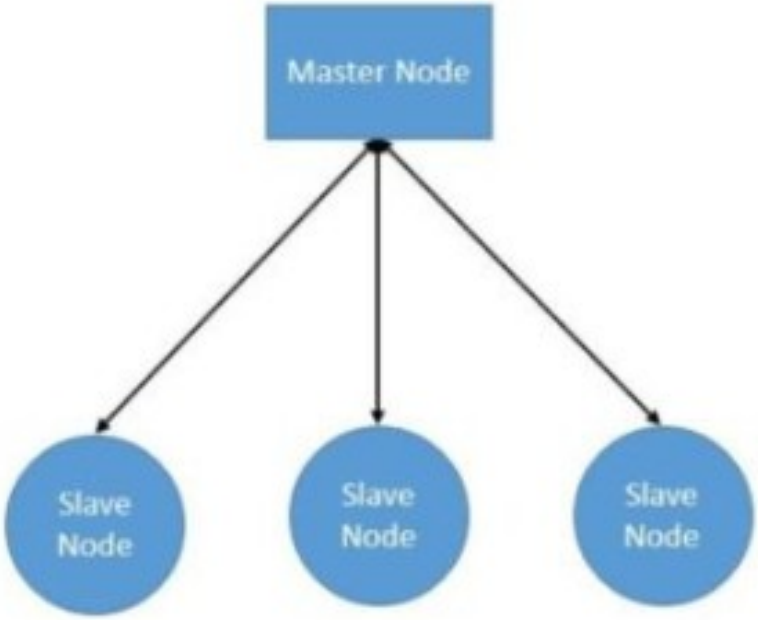

Centralized
Node 1
Node 6
Node 2
Central Intermediary
Node 5
Node 3
Node 4
Decentralized
Node 1
Node 6
Node 2
Node 5
Node 3
Node 4

Distributed Systems

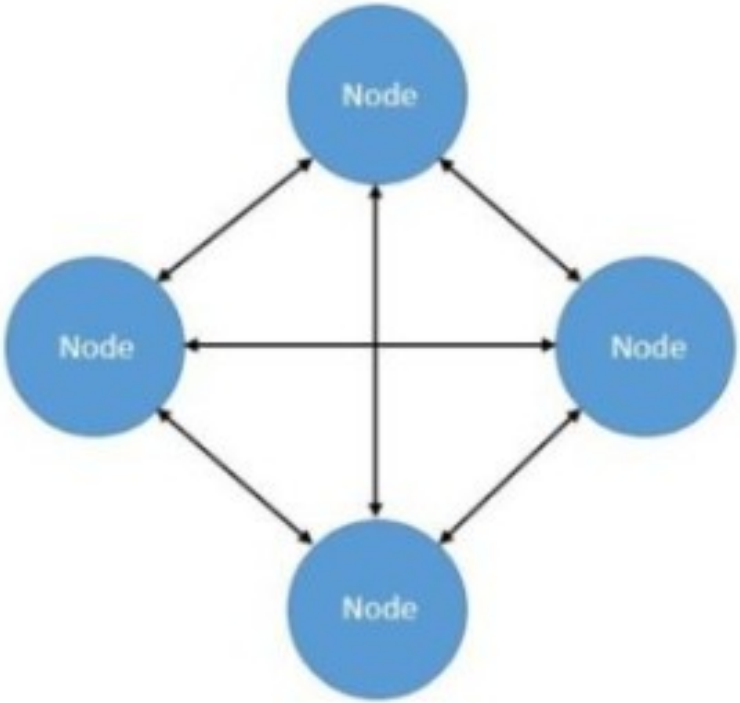
A distributed system contains multiple nodes that are physically separate but linked together using the network.



Distributed System Architecture



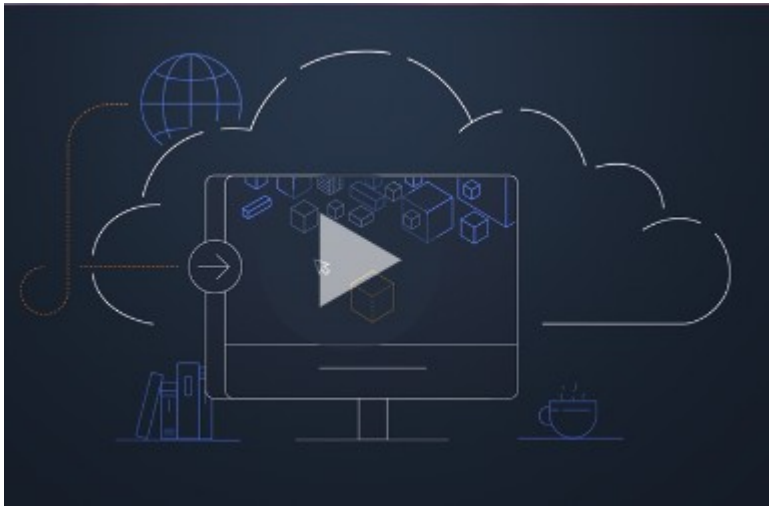
Master-Slave Model



Peer-to-Peer Model

What is Cloud?

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS).



Who is using cloud computing?

- Organizations of every type, size, and industry are using the cloud for a wide variety of use cases, such as data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web applications.

- For example, healthcare companies are using the cloud to develop more personalized treatments for patients.

- Financial services companies are using the cloud to power real-time fraud detection and prevention. **Any eg?**

- And video game makers are using the cloud to deliver online games to millions of players around the world. **Any eg?**

Benefits of cloud computing

Agility

The cloud gives you easy access to a broad range of technologies so that you can innovate faster and build nearly anything that you can imagine. You can quickly spin up resources as you need them–from infrastructure services, such as compute, storage, and databases, to Internet of Things, machine learning, data lakes and analytics, and much more.

Elasticity

With cloud computing, you don't have to over-provision resources up front to handle peak levels of business activity in the future. Instead, you provision the amount of resources that you actually need. You can scale these resources up or down to instantly grow and shrink capacity as your business needs change.

Benefits of cloud computing

Cost savings

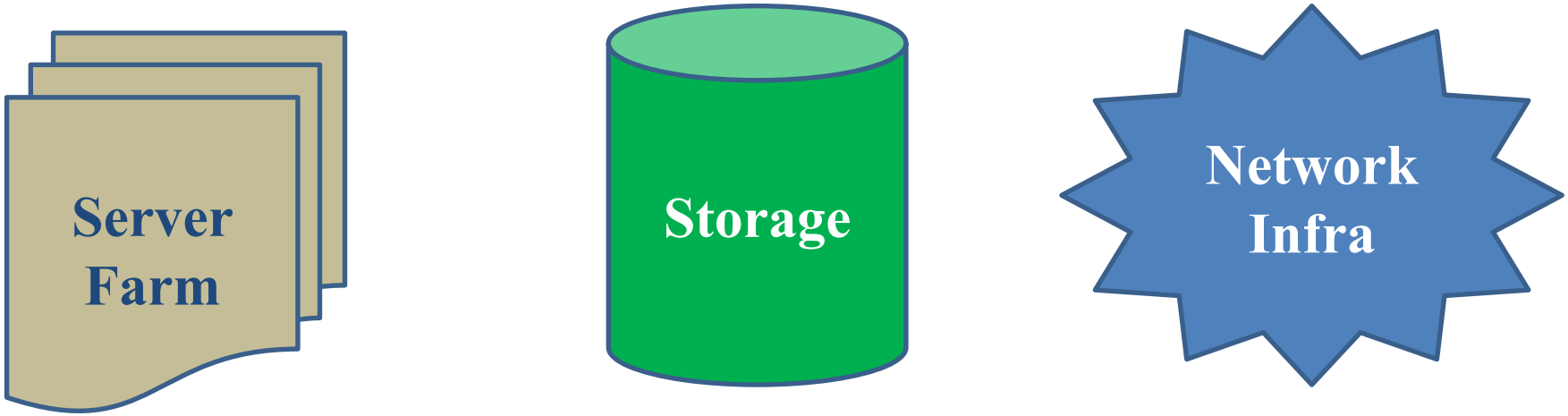
The cloud allows you to trade fixed expenses (such as data centers and physical servers) for variable expenses, and only pay for IT as you consume it. Plus, the variable expenses are much lower than what you would pay to do it yourself because of the economies of scale.

Deploy globally in minutes

With the cloud, you can expand to new geographic regions and deploy globally in minutes. For example, AWS has infrastructure all over the world, so you can deploy your application in multiple physical locations with just a few clicks. Putting applications in closer proximity to end users reduces latency and improves their experience.

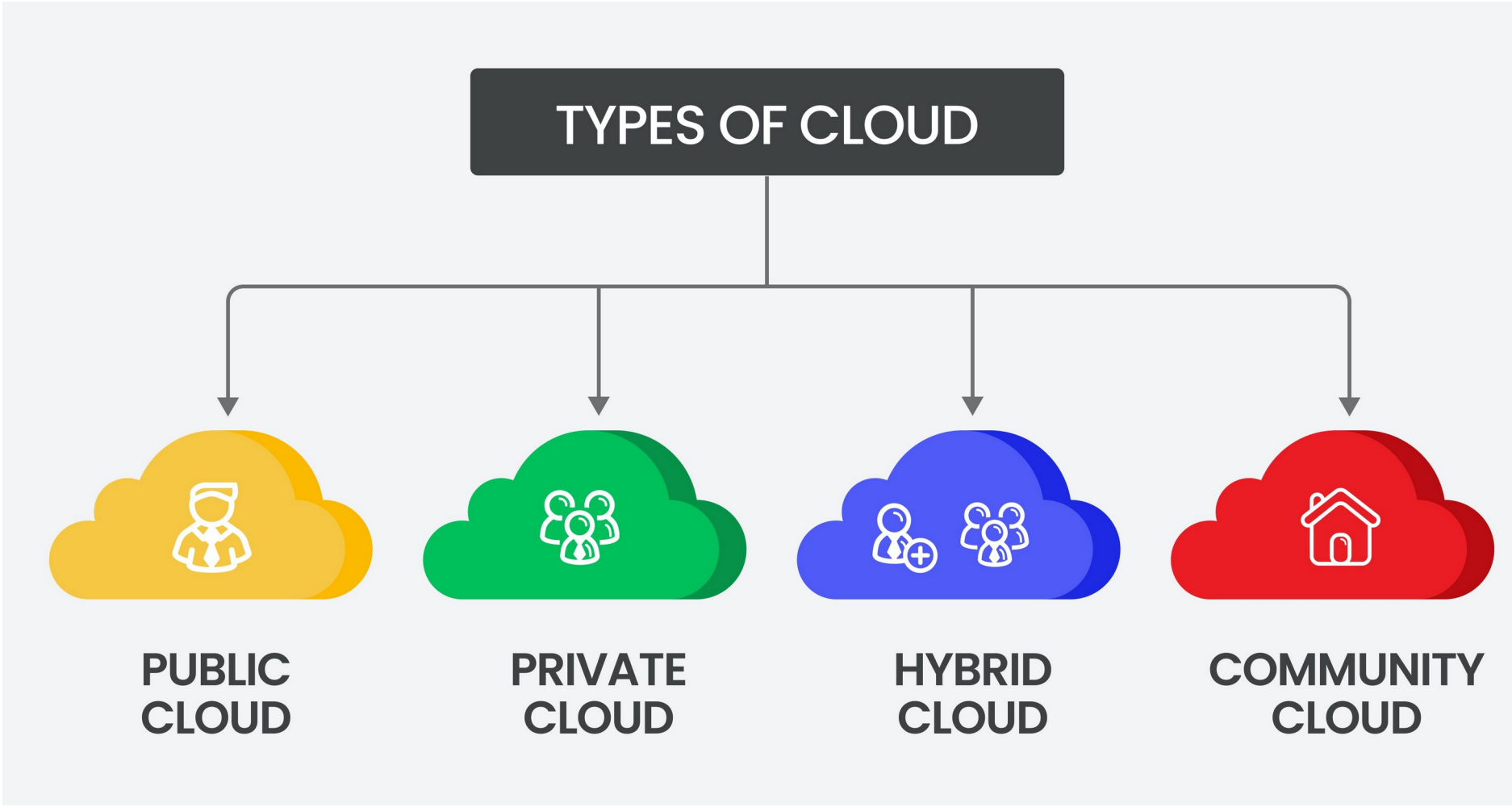
Data Center

A **data center** is a centralized physical facility that stores businesses' critical applications and data. A common data center definition is a location where computing and networking equipment is used to collect, process, and store data, as well as to distribute and enable access to resources.

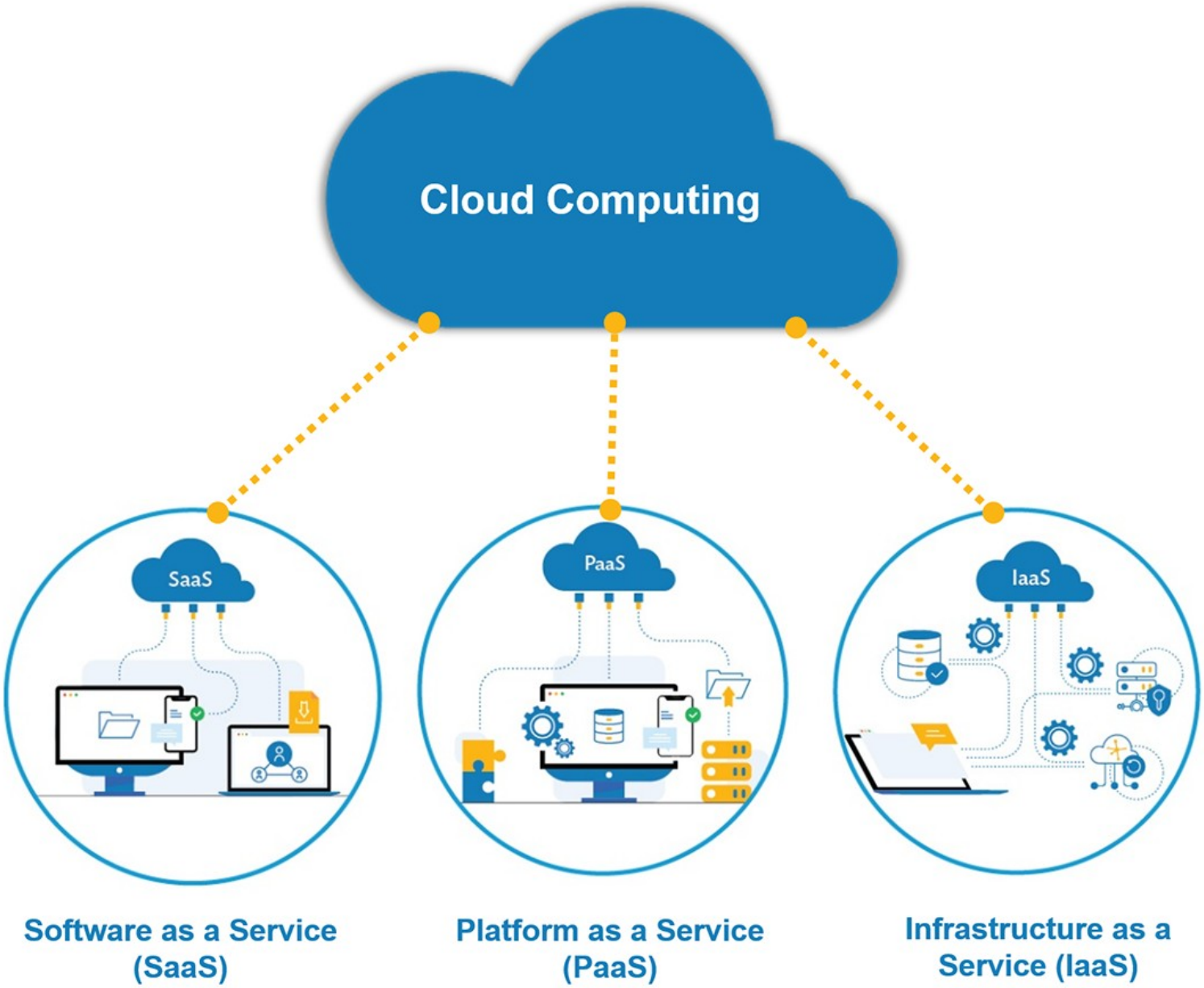


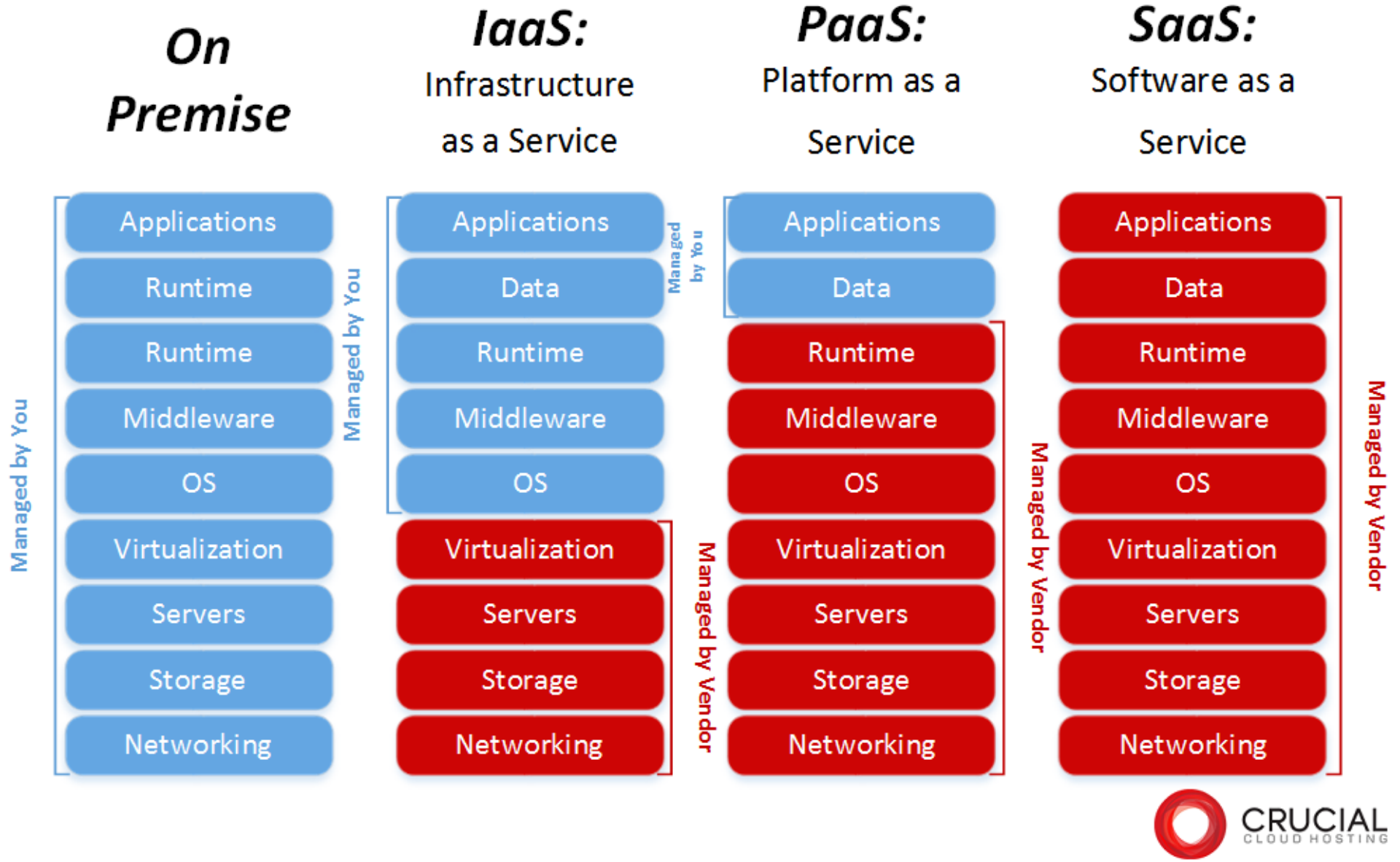

EMC²


EMC²
SYMMETRIX
VMAX


TYPES OF CLOUD
PUBLIC CLOUD
PRIVATE CLOUD
HYBRID CLOUD
COMMUNITY CLOUD

Cloud Services




On Premise
IaaS: Infrastructure as a Service
PaaS: Platform as a Service
SaaS: Software as a Service
Applications
Runtime
Runtime
Middleware
OS
Virtualization
Servers
Storage
Networking
Data
Managed by You
Managed by Vendor
CRUCIAL
CLOUD HOSTING