NETWORKING – PART 2

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NETWORKING HARDWARE

- Network hardware refers to the physical devices that facilitate communication between hardware running on a computer network.

FUNDAMENTAL DEVICES OF A COMPUTER NETWORK

- Modems: A modem enables a computer to connect to the internet via a telephone line.
- Routers: A router connects two or more networks. One common use of the router is to connect a home or office network (LAN) to the internet (WAN).
- Hubs, bridges, and switches: Hubs, bridges, and switches are connecting units that allow multiple devices to connect to the router and enable data transfer to all devices on a network.

FUNDAMENTAL DEVICES OF A COMPUTER NETWORK

- Network interface cards: A network interface card (NIC) is a hardware unit installed on a computer, which allows it to connect to a network.
- Network cables: Cables connect different devices on a network.
- Firewall: A firewall is a hardware or software device between a computer and the rest of the network open to attackers or hackers.

TYPES OF COMPUTER NETWORKS

Personal Area Network (PAN)

Local Area Network (LAN)

Campus Area Network (CAN)

Metropolitan Area Network (MAN)

Wide Area Network (WAN)

USES OF COMPUTER NETWORKS

ommunicating using email, video, instant messaging, etc.

Sharing devices such as printers, scanners, etc.

Sharing files.

Sharing software and operating programs on remote systems.

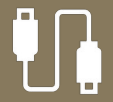
Allowing network users to easily access and maintain information.

PERSONAL AREA NETWORK (PAN)

PAN is the most basic type of computer network.

PAN offers a network range of 1 to 100 meters from person to device providing communication.

Its transmission speed is very high with very easy maintenance and very low cost.



Examples of PAN are USB, computer, phone, tablet, printer, PDA, etc.

LOCAL AREA NETWORK (LAN)

A LAN comprises cables, access points, switches, routers, and other components that enable devices to connect to internal servers, web servers, and other LANs via wide area networks.

LANs cover a smaller geographical area and are privately owned.

LAN is easy to design and maintain.

LAN has a range up to 2km.

METROPOLITAN AREA NETWORK (MAN)

- covers a larger area than that covered by a LAN and a smaller area as compared to WAN.
- MAN has a range of 5-50km.
- It connects two or more computers that are apart but reside in the same or different cities.
- It covers a large geographical area and may serve as an ISP (Internet Service Provider).
- MAN is designed for customers who need high-speed connectivity
- It's hard to design and maintain a Metropolitan Area Network.

WIDE AREA NETWORK (WAN)

- a computer network that extends over a large geographical area.
- WAN has a range of above 50 km.
- A WAN could be a connection of LAN connecting to other LANs via telephone lines and radio waves.
- There is two type of WAN: Switched WAN and Point-to-Point WAN.
- WAN is difficult to design and maintain.

ACTIVITY-1 (THERE ARE OTHER TYPES OF COMPUTER NETWORKS ALSO, WHAT IS THE DIFFERENCE BETWEEN THESE THREE TYPE ?)

SAN (STORAGE AREA NETWORK)

EPN (ENTERPRISE PRIVATE NETWORK)

VPN (VIRTUAL PRIVATE NETWORK)

ACTIVITY-2 (COMPARE BY LISTING 3 ADVANTAGE AND DISADVANTAGE FOR THE FOLLOWING:)

PERSONAL AREA NETWORK (PAN)

LOCAL AREA NETWORK (LAN)

METROPOLITAN AREA NETWORK (MAN)

WIDE AREA NETWORK (WAN)

	PAN	LAN	MAN	WAN
advantages	Allows for easy communication between personal devices in close proximity.	Provides fast data transfer rates and high-speed communication.	Provides high-speed connectivity over a larger geographical area than LAN.	Covers large geographical areas and can connect remote locations.
	Can be set up easily and quickly.	Easy to set up and manage.	Can be used as an ISP for multiple customers.	Provides connectivity to the internet.
	Uses wireless technology, which eliminates the need for wires and cables.	Provides increased security compared to WANs.	Offers higher data transfer rates than WAN in some cases.	Offers remote access to resources and applications.
Disadvantages	Limited coverage area.	Limited geographical coverage.	May have limited f security compared to LANs.	Can be expensive to set up and maintain.
	May not be suitable for large-scale data transfer.	Limited scalability and may require significant infrastructure upgrades to accommodate growth.	May experience congestion and network performance issues with increased usage.	Offers slower data transfer rates than LAN or MAN.
	May experience interference from other wireless devices.	May experience congestion and network performance issues with increased usage.	Can be expensive to set up and maintain.	have lower security compared to LANs.

INTERNET OF THINGS (IOT)

It is a network of physical devices.

can transfer data to one another without human intervention.

can include anything with a sensor that is assigned a unique identifier (UID).

The primary goal of the IoT is to create self-reporting devices that can communicate with each other (and users) in real time.

INTERNET OF THINGS EXAMPLES

Smart home devices.

Wearable technologies.

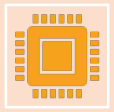
Personal medical devices.

Autonomous vehicles.

TYPES OF IOT APPLICATIONS

Consumer IoT : refers to personal and wearable devices that connect to the internet. These devices are often referred to as smart devices.

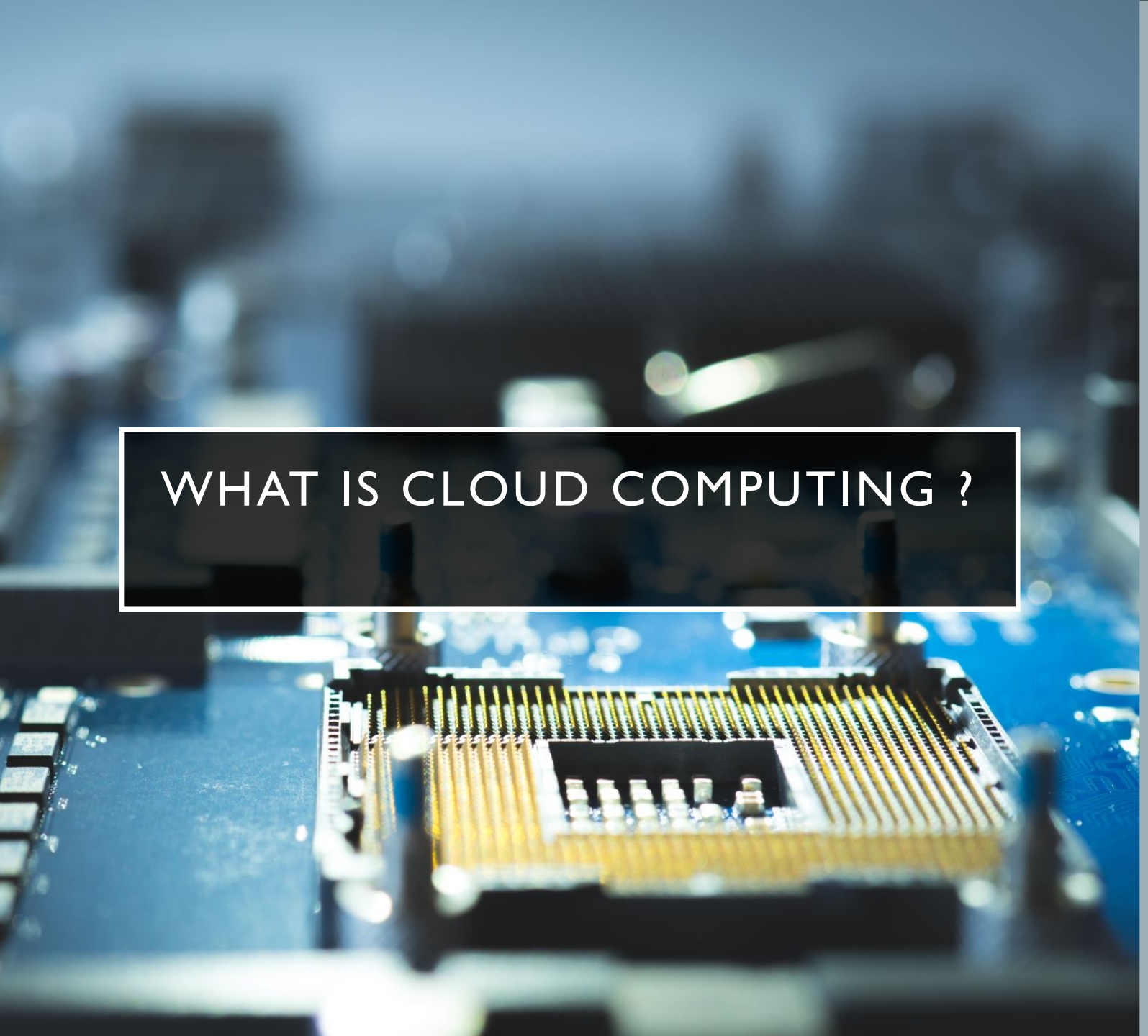
Industrial Internet of Things (IIoT) : system of interconnected devices in the industrial sector.



Commercial IoT : refers to the tools and systems used outside of the home. For example, businesses and health care organizations leverage commercial IoT for auditable data trails and consumer management.

BENEFITS OF THE INTERNET OF THINGS

- Automation
- Conservation
- Big data analytics



WHAT IS CLOUD COMPUTING ?

storing and accessing the data and programs on remote servers that are hosted on the internet instead of the computer's hard drive or local server.

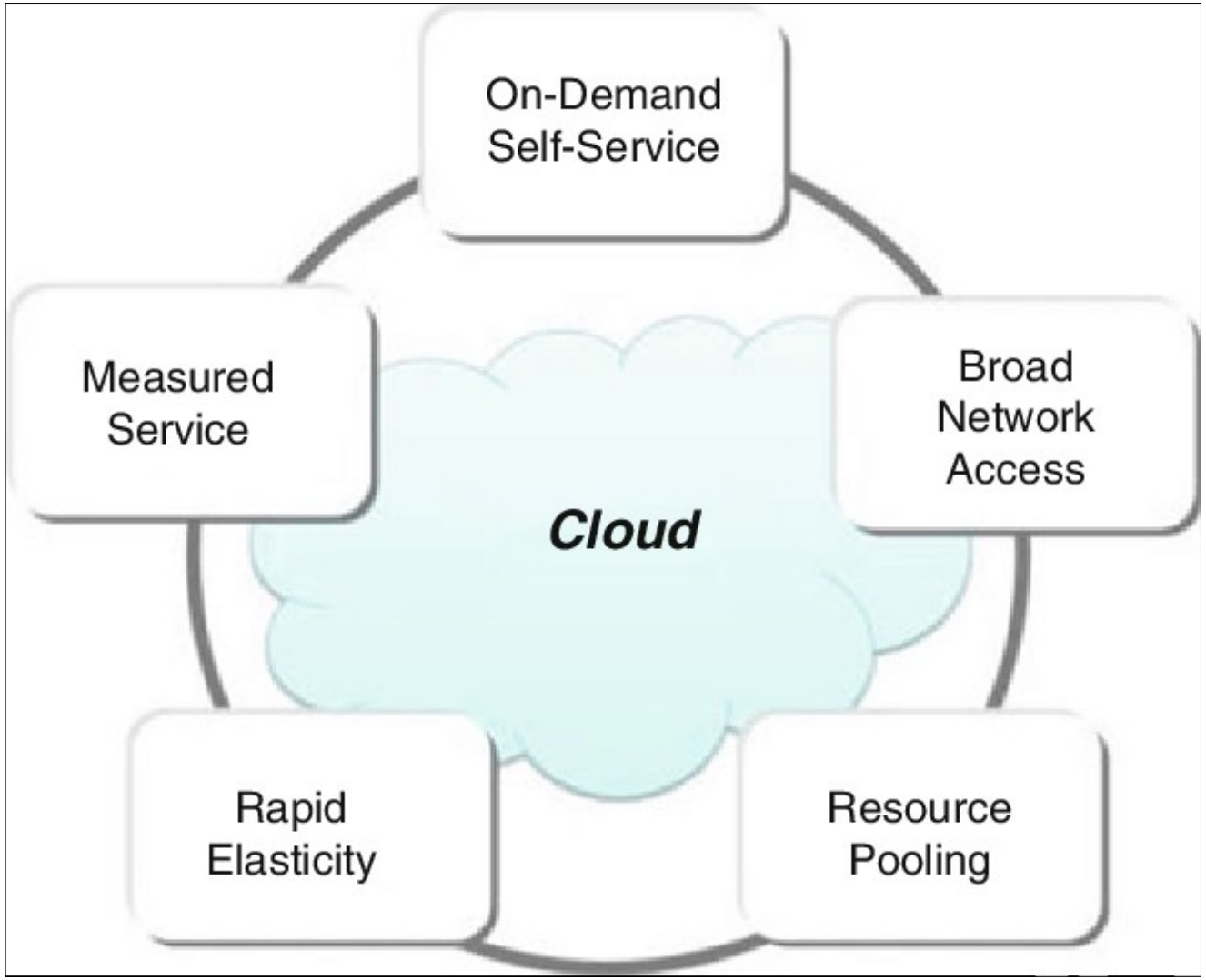
REASONS WHY TO SWITCH TO CLOUD COMPUTING INSTEAD OF OWNING A DATABASE SERVER

Reduces cost

More storage

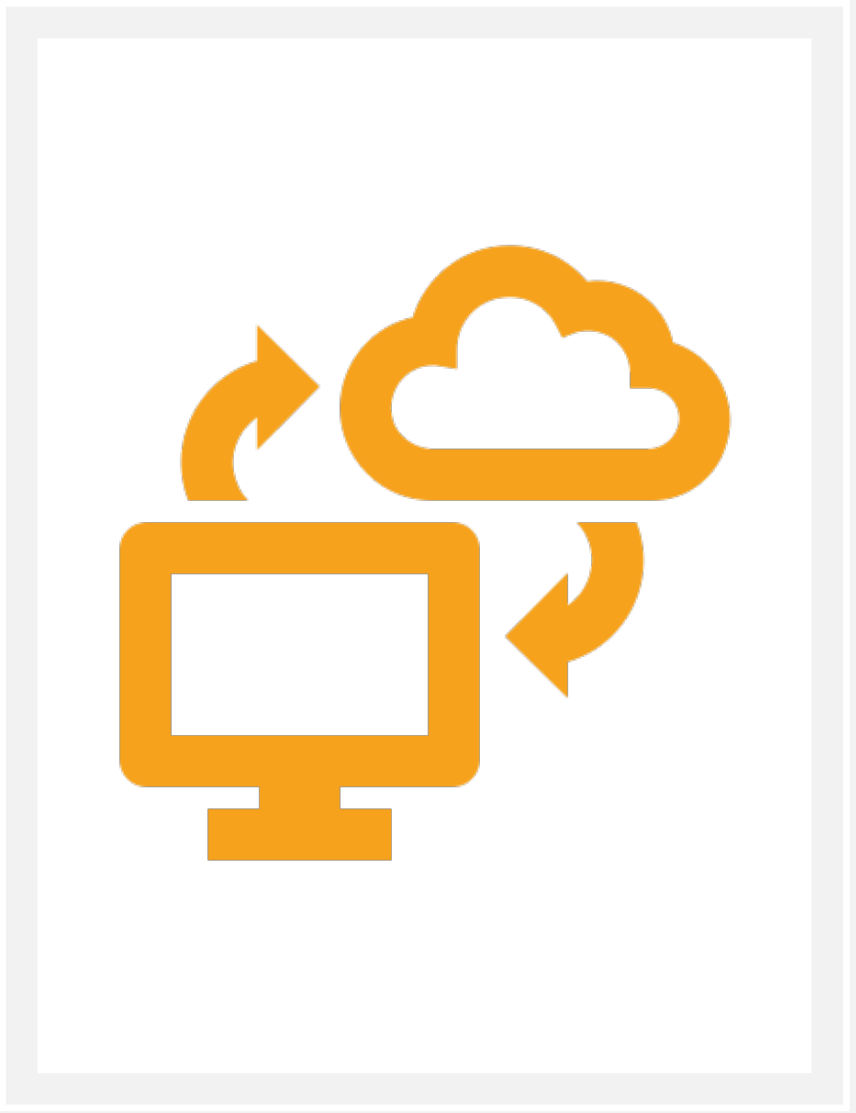
Employees using cloud computing have better work-life balance

CHARACTERISTICS OF CLOUD COMPUTING



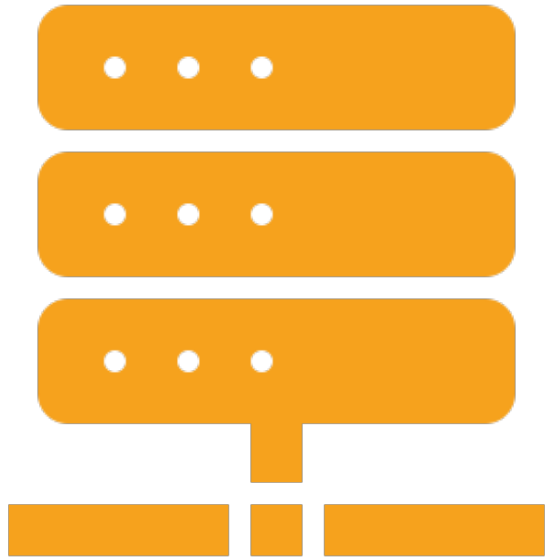
ON-DEMAND SELF-SERVICES

The Cloud computing services does not require any human administrators, user themselves are able to provision, monitor and manage computing resources as needed.



BROAD NETWORK ACCESS

The Computing services are generally provided over standard networks and heterogeneous devices.



RAPID ELASTICITY

The Computing services should have IT resources that are able to scale.

Whenever the user require services it is provided to him and it is scale out as soon as its requirement gets over.

RESOURCE POOLING

The IT resource (e.g., networks, servers, storage, applications, and services) present are shared across multiple applications and occupant in an uncommitted manner.

Multiple clients are provided service from a same physical resource.

FLEXIBLE PRICING MODELS

Cloud providers offer a variety of pricing models, including pay-per-use, subscription-based, and spot pricing, allowing users to choose the option that best suits their needs.

SECURITY

Cloud providers invest heavily in security measures to protect their users' data and ensure the privacy of sensitive information.

SUSTAINABILITY

Cloud providers are increasingly focused on sustainable practices, such as energy-efficient data centers and the use of renewable energy sources, to reduce their environmental impact.

WHAT IS CLOUD STORAGE?

Cloud Storage is a mode of computer data storage in which digital data is stored on servers in off-site locations.

the servers are maintained by a third-party provider who is responsible for hosting, managing, and securing data stored on its infrastructure.

The provider ensures that data on its servers is always accessible via public or private internet connections.

CLOUD STORAGE IS AVAILABLE IN FOUR DIFFERENT MODELS

Public : is a model where an organization stores data in a service provider's data centers that are also utilized by other companies.

Private : is a model where an organization utilizes its own servers and data centers to store data within their own network.

hybrid : is a mix of private and public cloud storage models. A hybrid cloud storage model allows organizations to decide which data it wants to store in which cloud.

multicloud : is when an organization sets up more than one cloud model from more than one cloud service provider (public or private).

ADVANTAGES OF CLOUD STORAGE

Total cost of ownership

Elasticity

Flexibility

Security

Sustainability

Redundancy

DISADVANTAGES OF CLOUD STORAGE

Compliance

Latency

Control

Outages

NETWORKING - PART 2 END