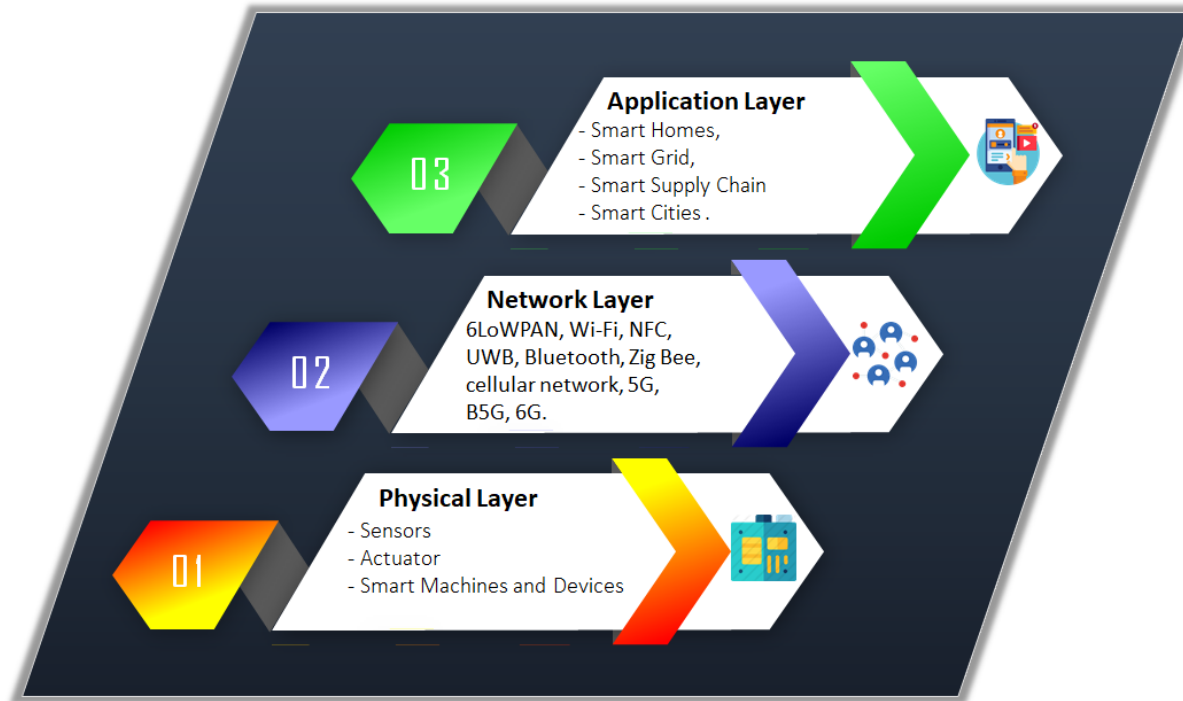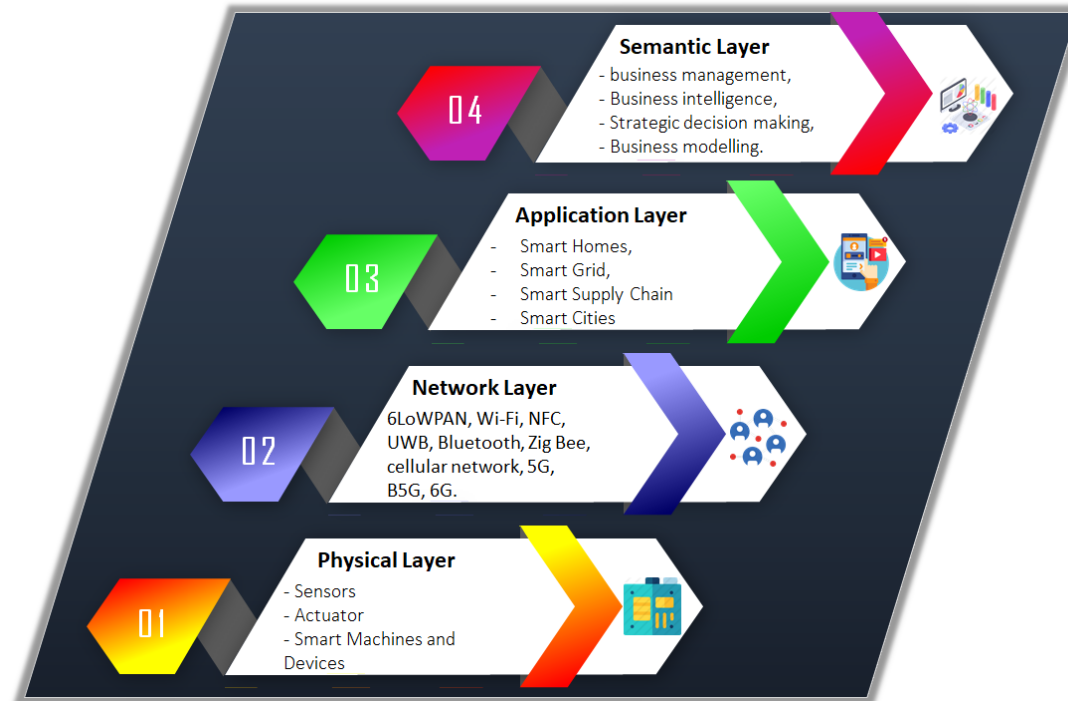# CHAPTER 2

Internet of Things, Preliminaries and Foundations
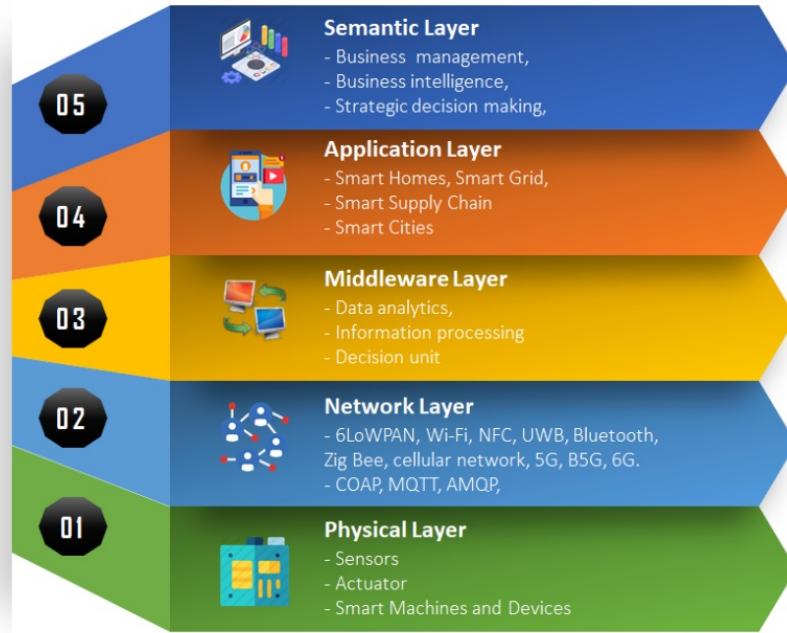
THE ARCHITECTURE OF IOT SYSTEM

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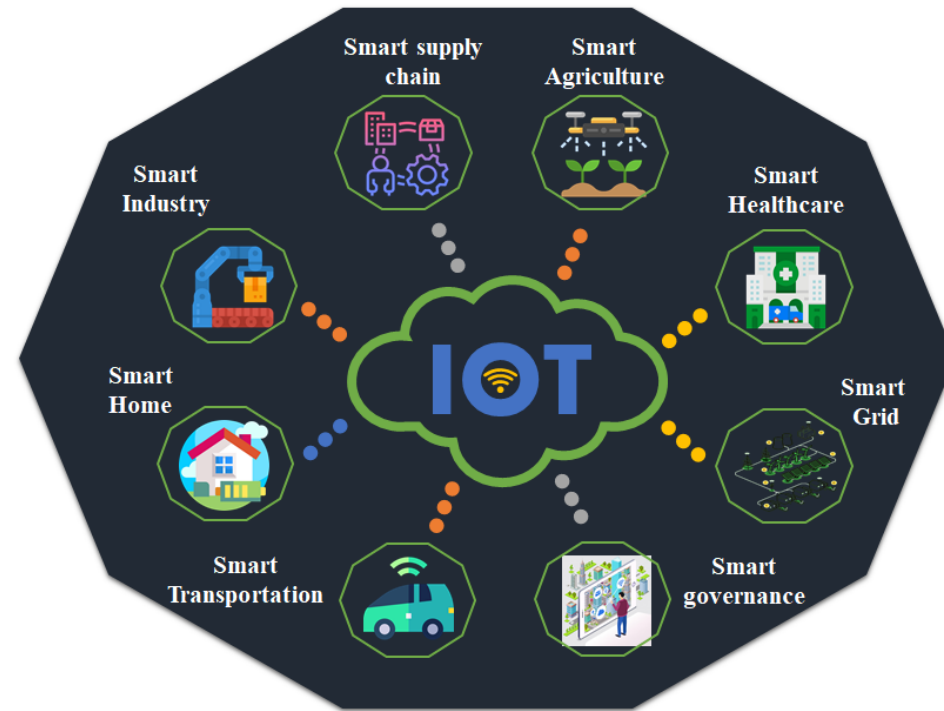
Security Layer
- Device and data security
- Connection security

7

Business service Layer
- Business management, modeling, intelligence,
- Strategic decision making

6

Application Layer
- Smart Homes, Smart Grid,
- Smart Supply Chain, Smart Cities

5

Middleware Layer
- Data analytics, Information processing
- Decision unit

4

Fog/Edge Layer
Your text here write
your text here Your text here write your text

3

Network/ Connectivity Layer
- 6LoWPAN, Wi-Fi, NFC, UWB, Bluetooth, Zig Bee, cellular network, 5G, B5G, 6G.

2

Physical/Perception Layer
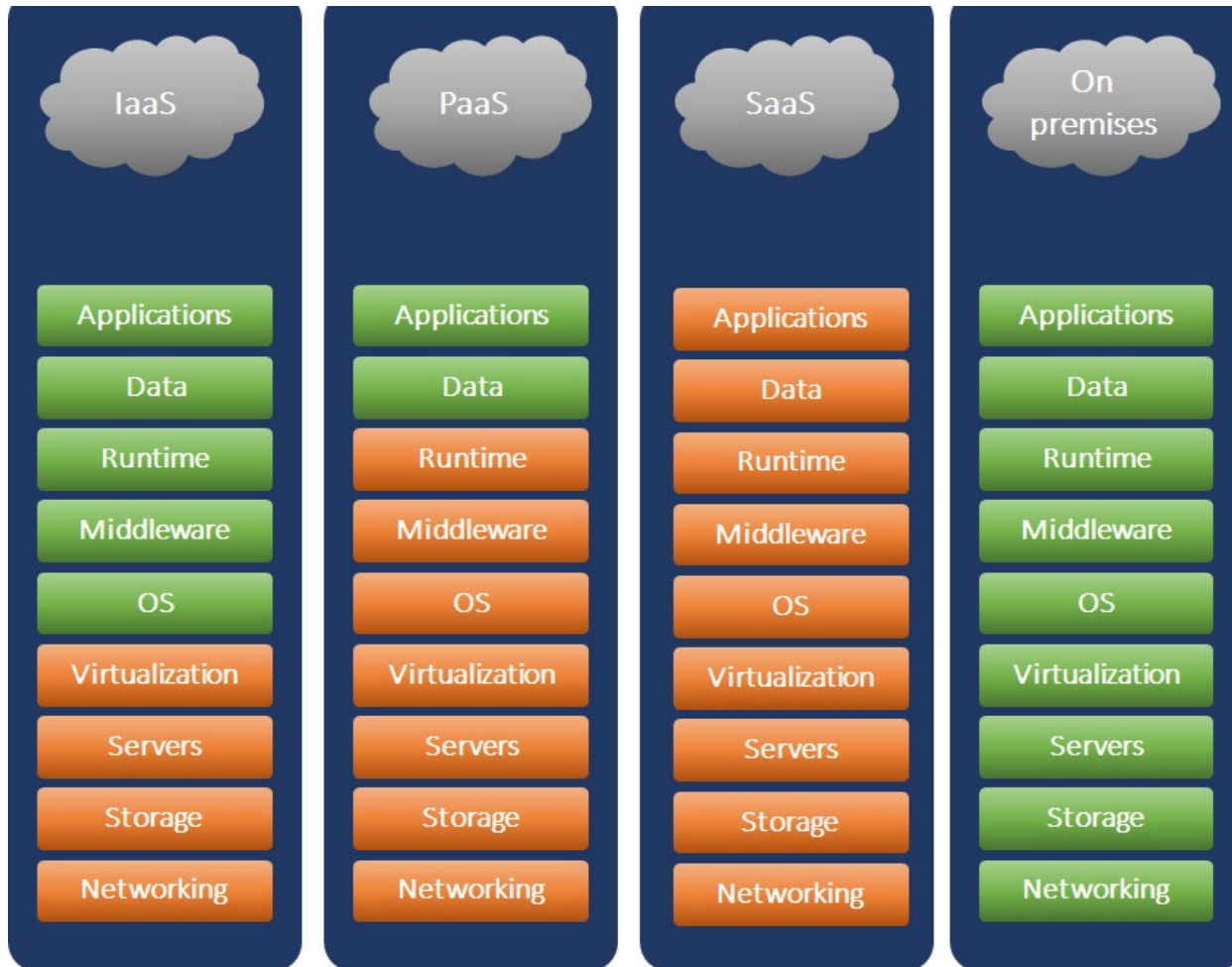- Sensors, Actuator
- Smart Machines and Devices

1

THE ARCHITECTURE OF IOT SYSTEM

IOT APPLICATION

THE CLOUD COMPUTING BASED IOT SYSTEM

THE FOG COMPUTING BASED IOT SYSTEM

- A system-level horizontal architecture that distributes resources and services of computing, storage, control, and networking anywhere along the continuum from cloud to Thing.

- fog computing considered as a modern computing model that transfers responsibilities from the cloud servers/datacenters to a lighter set of servers geographically close to network edges that collectively constitute a fog layer to be deployed, which consists of some servers deployed between the cloud backend and local IoT devices.

THE EDGE COMPUTING BASED IOT SYSTEM

- The fundamental concept behind edge computing is to transfer some demands and responsibilities from the core network to the access network, reaching the effective consumption of storage, computing, and communication capabilities.

- This thought profoundly combines the conventional cellular network with the Internet facility, seeking to lessen the end-to-end latency of provision of mobile service .

Features	Cloud Computing	Fog Computing	Edge Computing
Network Access	WLAN	Mostly LAN	LAN/WLAN
Mobility Support	Low	Low	High
Scalability of Servers	Very low	Distributed and low	Low or very low, depending on layers
Computing Power Location	Centralized	Distributed	Widely distributed
Reliability		High	Low
Deployment cost	Very High	Very Low	Low
Maintenance	Cloud Experts	Experts of enterprise	Expert, engineers, and employees of enterprise
Standardization	Yes	Yes	No
Operation Mode	Standalone	Standalone/ edge-cloud cooperation	Fog-cloud cooperation
Service Coverage	Global	Local	Local
Service Coverage	High	Low	Low
Virtualization	VM & containers	VM & containers	VM & containers
Constitutive Elements	IoT devices, cloud servers	IoT devices, edge servers, cloud servers	IoT devices, fog nodes, cloud servers

CLOUD VS FOG VS EDGE