SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

19EET304/ IOT for Electrical Sciences

III YEAR VI SEM

UNIT 1 – INTRODUCTION

TOPIC 4 – Structure of IoT, IoT Map

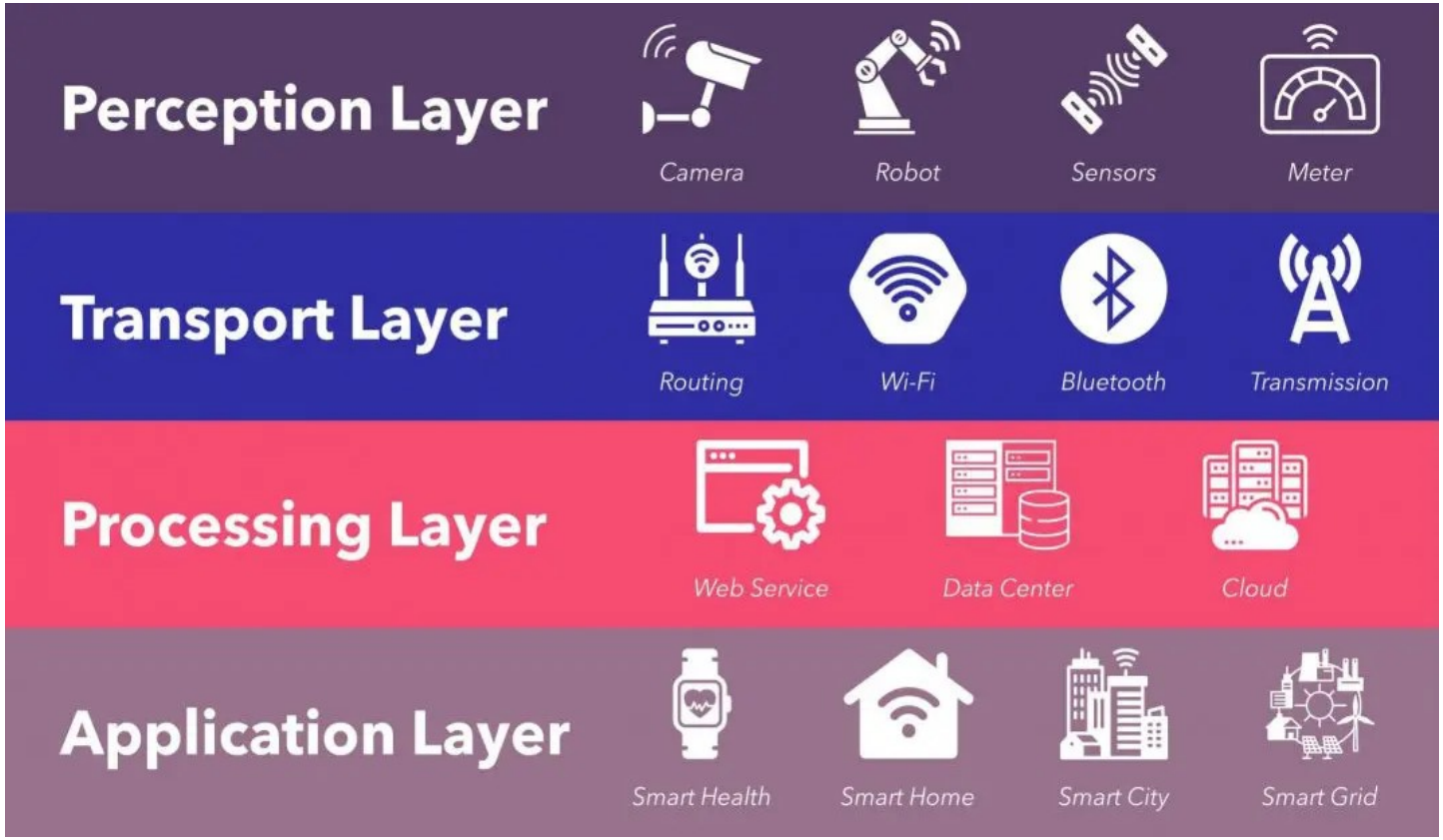
WHAT IS THE ARCHITECTURE OF INTERNET OF THINGS (IOT)?

•IoT sensors are pieces of hardware that detect changes in an environment and collect data.

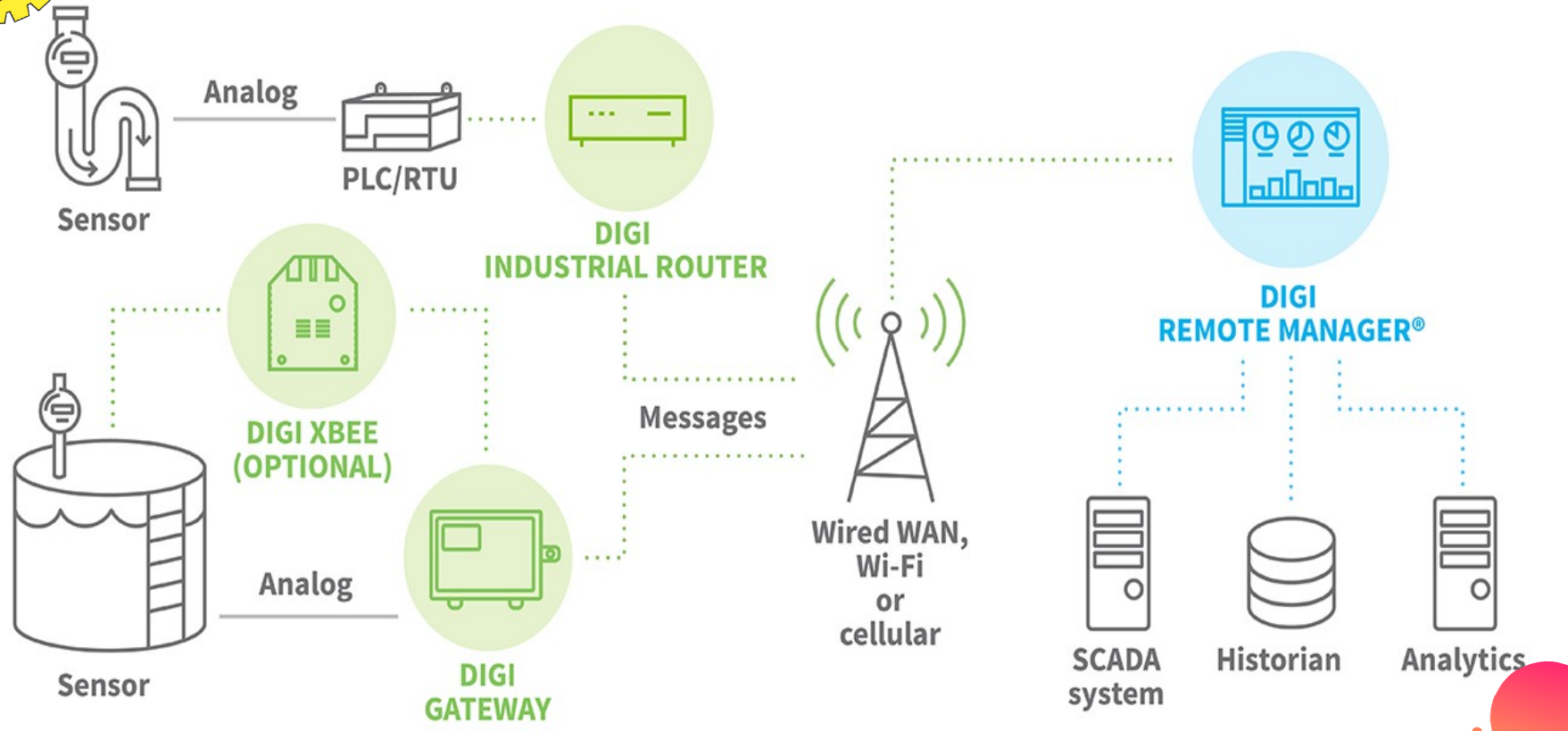
•They're the pieces of an IoT ecosystem that bridge the digital world to the physical world.

•IoT sensors may detect things like temperature, pressure, and motion, and if they are connected to a network, they share data with the network.

ARCHITECTURE OF IOT



DATA FLOW: FROM THE EDGE TO THE SERVER/CLOUD



DATA FLOW: FROM THE EDGE TO THE SERVER/CLOUD

STAGE 1: Sensors and Actuators

STAGE 2: Internet Gateways and Data Acquisition Systems

STAGE 3: Pre-processing: Analytics at the Edge

STAGE 4: In-depth Analysis in the Cloud or Data Center

IOT ARCHITECTURE

•The Internet of Things (IoT) has revolutionized the way we interact with technology, enabling seamless connectivity and communication between devices and systems.

•Behind the scenes, IoT architecture plays a crucial role in making this interconnectedness possible.

Components of IoT Architecture

Devices and Sensors

•At the heart of the IoT architecture are the physical devices and sensors that gather data from the physical environment.

•These devices can range from simple sensors to complex machinery, each equipped with the ability to sense, collect, and transmit data.

Connectivity

•Connectivity is a vital component that enables devices to communicate with each other and the wider network.

•It encompasses various communication technologies such as Wi-Fi, Bluetooth, cellular networks, and even satellite connections.

•The choice of connectivity depends on factors like range, bandwidth requirements, power consumption, and deployment environment.

Gateways

•Gateways serve as intermediaries between devices/sensors and the central IoT network.

•They aggregate data from multiple devices, perform local data processing, and establish secure communication channels. Gateways often act as protocol translators, enabling devices that use different communication protocols to communicate seamlessly with the network.

Cloud Infrastructure

•The cloud infrastructure forms the backbone of IoT architecture, providing storage, computing power, and scalable resources for processing and analyzing the vast amounts of data generated by IoT devices.

•Cloud platforms facilitate data storage, real-time analytics, machine learning algorithms, and remote device management.

Perception Layer

•The perception layer comprises the physical devices, sensors, actuators, and gateways. It involves data collection, device management, and local processing.

•This layer is responsible for sensing the physical environment, converting analog signals to digital data, and transmitting it to the next layer.

Network Layer

•The network layer establishes communication between devices, gateways, and cloud infrastructure. It manages the connectivity, routing, and data transmission across the IoT network.

•Protocols like MQTT, CoAP, and HTTP govern the interactions between devices, gateways, and cloud servers in this layer.

Middleware Layer

•The middleware layer provides essential services for interoperability, data transformation, and protocol translation.

•It ensures seamless communication between different devices, platforms, and applications within the IoT ecosystem.

•This layer handles tasks such as data normalization, security, and identity management.

Application Layer

•The application layer represents the user-facing part of the IoT architecture. It includes applications, dashboards, and interfaces that enable users to interact with and control IoT devices and access the insights generated from data analysis.

•These applications can range from consumer-oriented mobile apps to enterprise-level management systems