BASICS OF IOT

Introduction to Internet of Things (IoT)

The Internet of Things (IoT) is a phenomenon that connects a variety of physical objects, enabling them to communicate with each other through the internet. While the traditional internet connects people and is often referred to as the *Internet of People*, IoT connects everyday objects and devices, hence the name *Internet of Things*. With IoT, connectivity is no longer limited to anyone, anytime, and any place, but is extended to anything, enabling smart and automated interactions.

Definition of IoT

The Internet of Things (IoT) is an advanced automation and analytics system that uses networking, sensing, big data, and artificial intelligence technologies to deliver complete and intelligent systems for products and services. IoT improves transparency, control, and performance across various industries by allowing devices to sense, collect, and exchange data without human intervention.

Internet of Things – Overview

IoT refers to a system of interrelated, internet-connected objects that can collect and transfer data over wireless networks without requiring direct human involvement. Examples of IoT applications include smart fitness bands and watches, smart homes controlled through smartphones, driverless cars, drones, and intelligent vehicles. These systems make daily life more efficient, safe, and convenient.

Architecture of IoT

The IoT architecture defines how data flows from physical devices to the cloud and back for execution. Although the architecture may vary depending on the application, it is generally divided into four major phases.
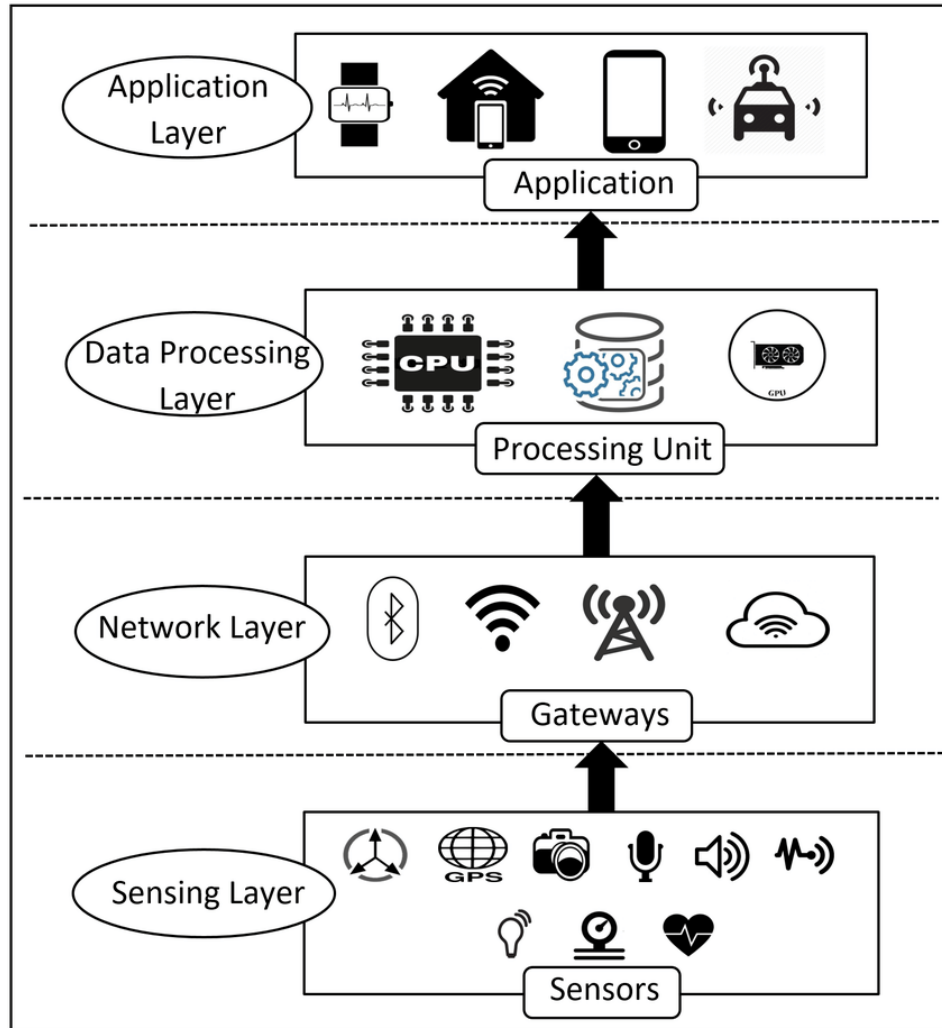
Four Phases of IoT Architecture

Phase 1: Networked Devices

This phase consists of physical devices such as sensors, actuators, and transducers. These devices are responsible for collecting real-time data from the environment. Sensors convert physical parameters such as temperature, pressure, or motion into electrical signals that can be transmitted through a communication network.

Phase 2: Data Aggregation

Data aggregation is a crucial stage where raw data collected from sensors is converted into meaningful information. This phase includes data acquisition systems and internet gateways.

Analog signals received from sensors are converted into digital signals, filtered, and prepared for further processing.

Phase 3: Final Analysis

In this phase, edge IT analytics and data processing techniques are applied to improve the efficiency and usability of the data. It involves analyzing data closer to the source, managing connected devices, and ensuring accurate identification and localization of IoT devices.

Phase 4: Cloud Analysis

Cloud analysis is the final stage of IoT architecture. The processed data is sent to cloud data centers, where it is analyzed in detail. The data is cleaned to remove errors and missing values, making it reliable for decision-making. After analysis, the data is sent back to devices or systems to perform the required actions.

Advantages of IoT

IoT offers several advantages across different sectors:

- **Business Opportunities:** IoT provides advanced analytics and smart utility systems that help businesses deliver better services and create value for customers.
- **Improved Customer Experience:** IoT enhances customer experience by enabling automation and remote control of devices. For example, in home automation systems, users can control appliances using mobile phones, improving convenience and efficiency.