KOLHAPUR INSTITUTE OF TECHNOLOGY'S COLLEGE OF ENGINEERING (AUTONOMOUS), KOLHAPUR

Department of Artificial Intelligence & Machine Learning

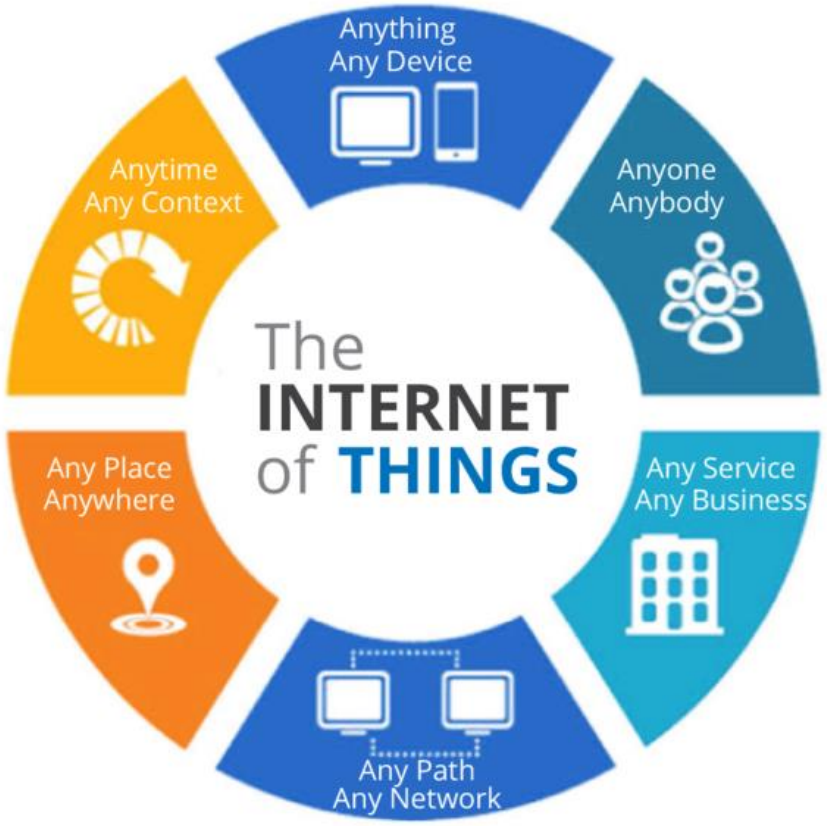
PE - 1 : Internet of Things Analytics UAME0524

Unit – I

Introduction To Internet Of Things

TOPICS COVERED

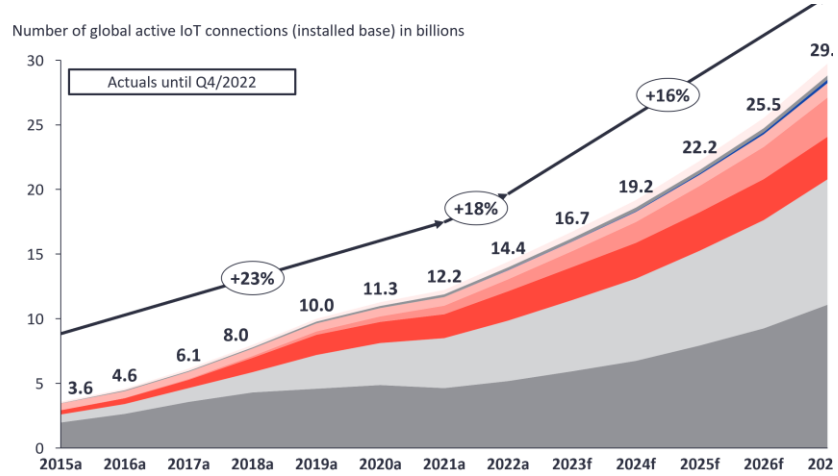
1. Introduction
2. Physical Design of IoT
3. Logical Design of IoT
4. Working with IoT Devices
5. IoT Templates
6. Applications of IoT



What is IoT?

Internet of Things (IoT) is a system of devices connected to the **internet** with the ability to collect and exchange data from users and environment with **no human intervention**.

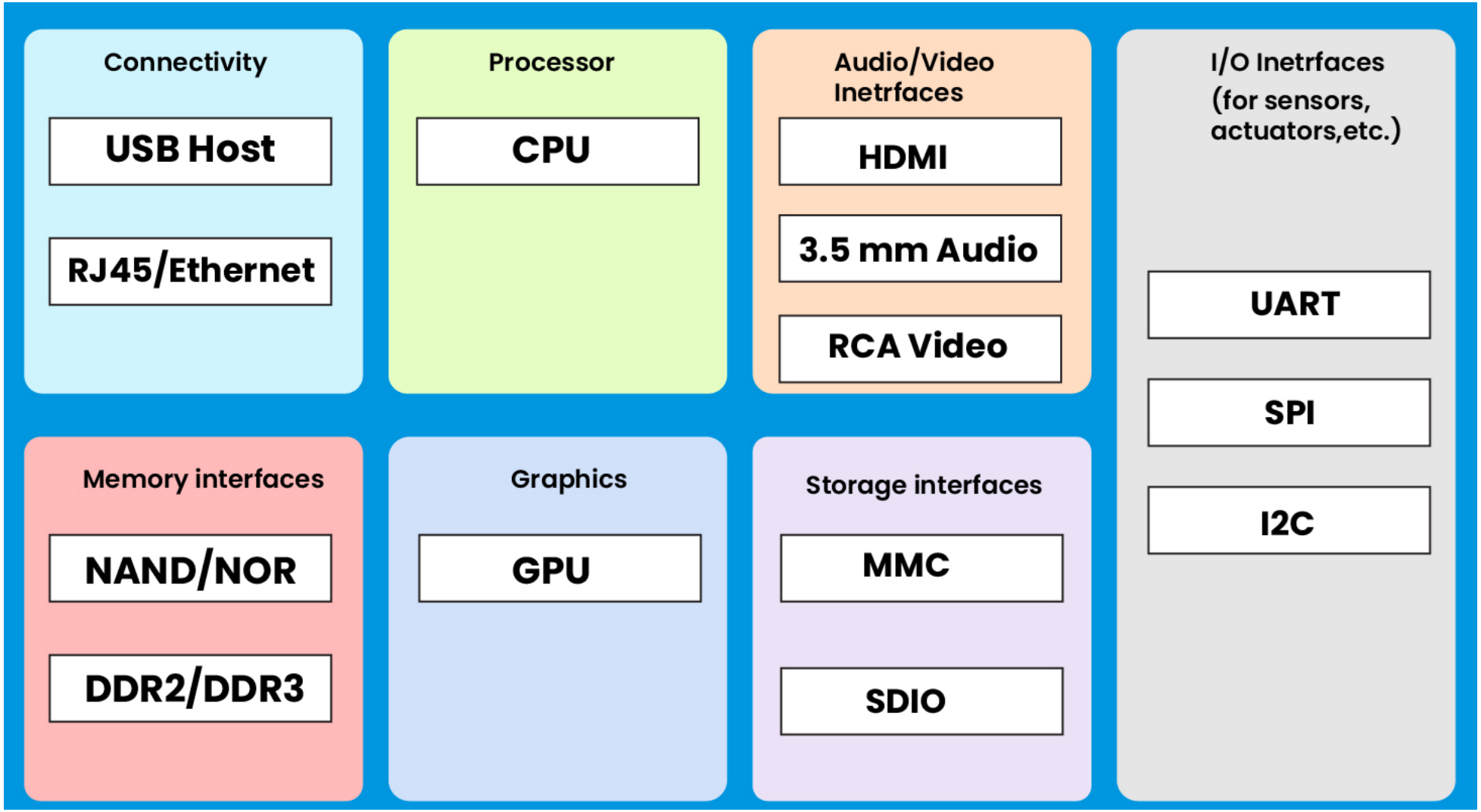
The global Internet of Things (IoT) Market size was valued at **USD 330.3 billion in 2021** and is expected to grow at a **CAGR of 16.7%** from 2021 to 2026. The revenue forecast for **2026 is projected to reach $650.5 billion.**



Characteristics of IoT

Dynamic & Self Adapting	Self Configuring	Interoperable Communication Protocol	Unique Identity
Surveillance Cameras resolution adjustment based on whether or movement	• Configure themselves with IoT infrastructure • Setup networking • Fetch latest software updates	802.3 Ethernet 802.11 Wi-Fi 802.16 Wi-Max 802.15.4 LR-WPAN 2G/3G/4G Mobile communication	To identify Prevent unauthorized access

Physical Design of IoT



Physical Design of IoT

- **Connectivity:** Devices like **USB hosts** and **ETHERNET** provides connectivity between the devices and the server.
- **Processor: Processors** like **CPU** and other units process the data. This is used to improve the decision quality of an IoT system.
- **Audio/Video Interfaces:** System interfaces like **HDMI** and **RCA** devices record audio and videos.
- **Input/Output interface:** Devices like **UART, SPI, CAN,** etc give input and output signals to sensors and actuators.
- **Storage Interfaces:** IoT devices like **SD, MMC,** and **SDIO** generate data**.** Storage interfaces store those data.
- **Controlling of activity:** Devices like **DDR** and **GPU** control the activity of an IoT system.

Logical Design of IoT

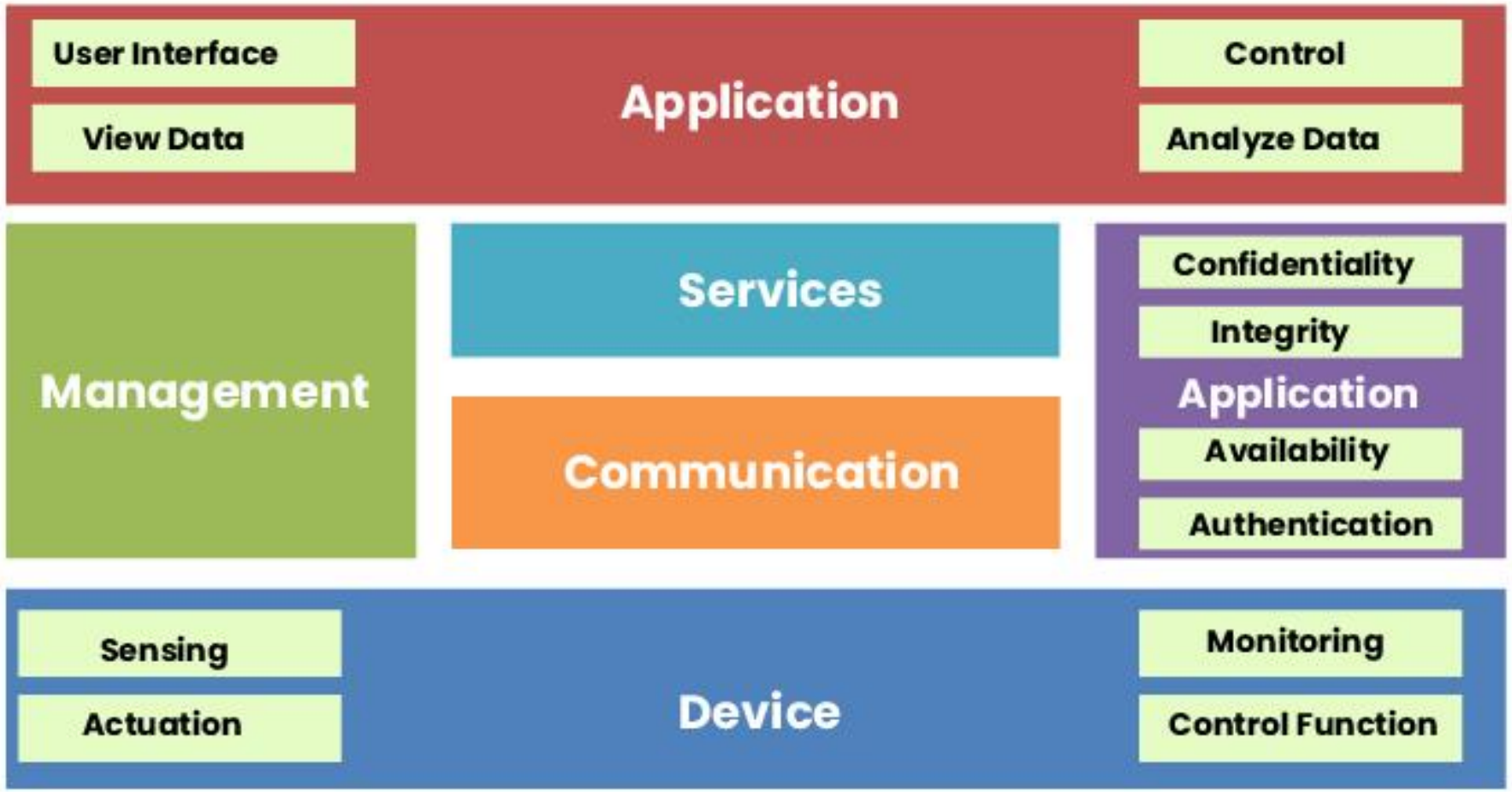
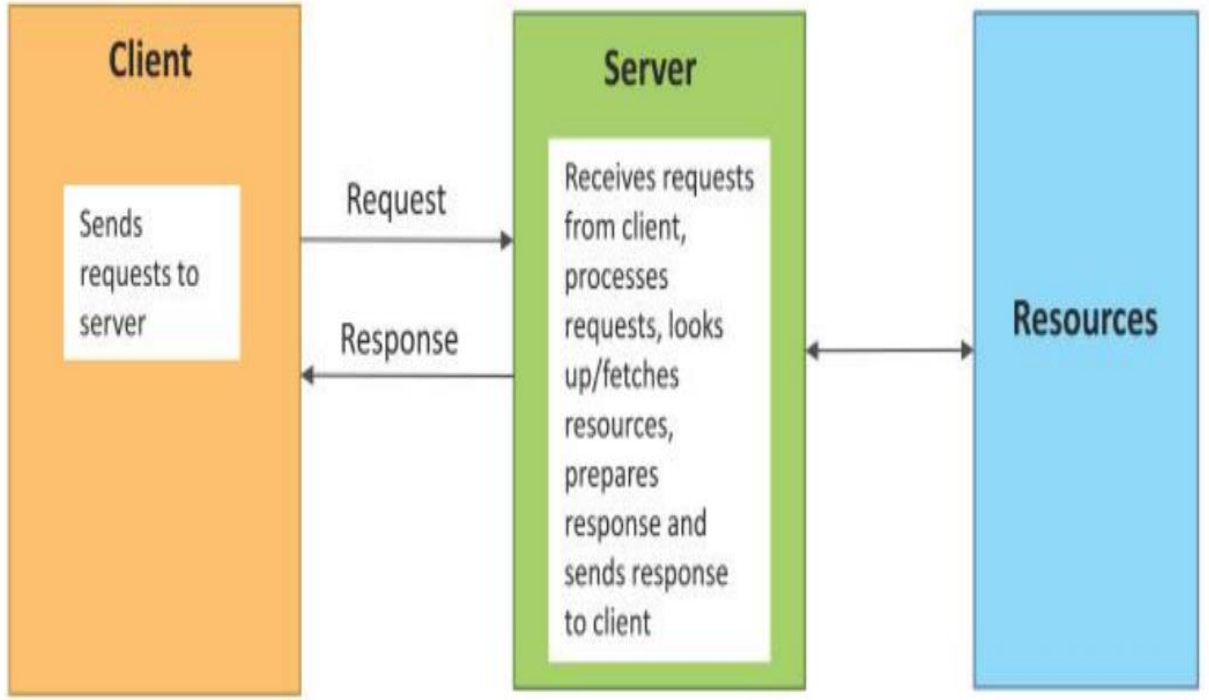


Fig. 1.2. Functional Block Diagram Internet Of Things

Request-Response communication model

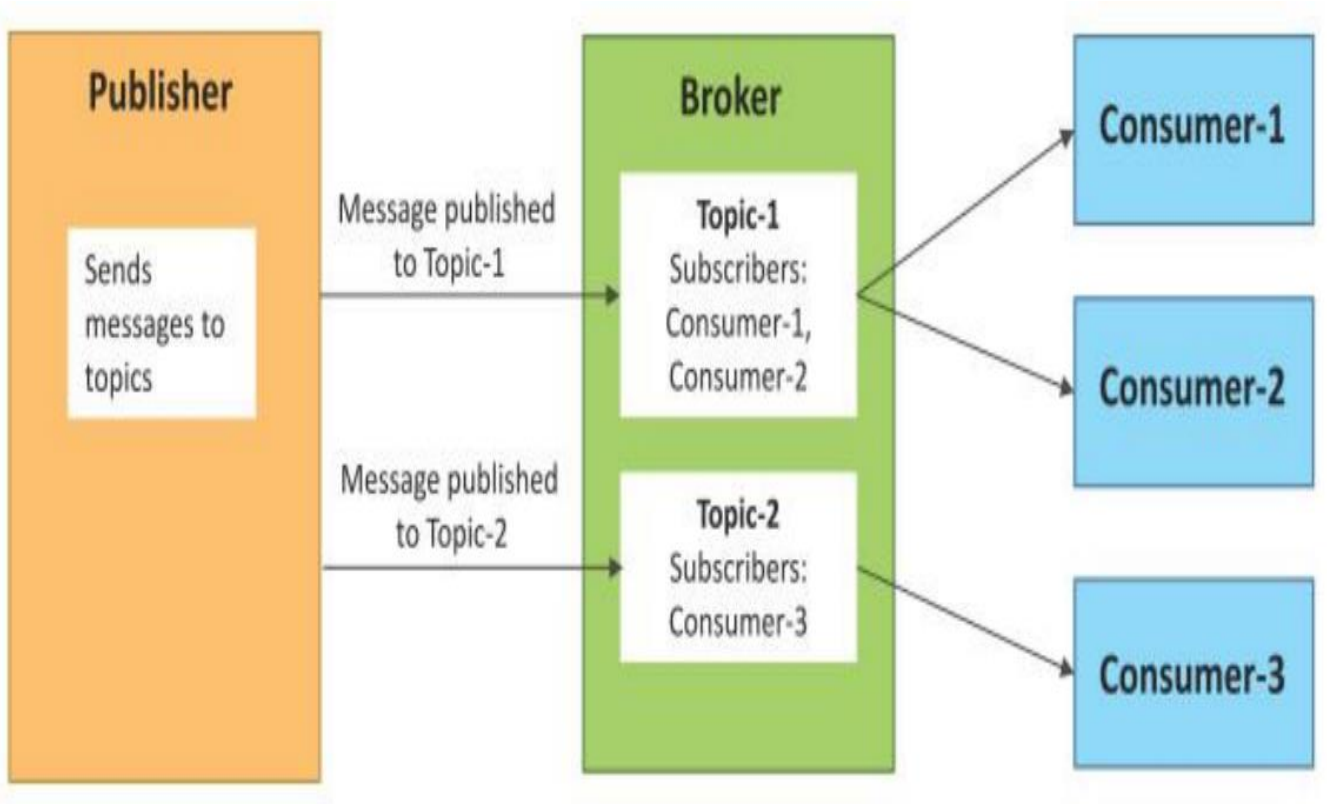
- Request-Response is a communication model in which the client sends requests to the server and the server responds to the requests.

- When the server receives a request, it decides how to respond, fetches the data, retrieves resource representations, prepares the response, and then sends the response to the client.



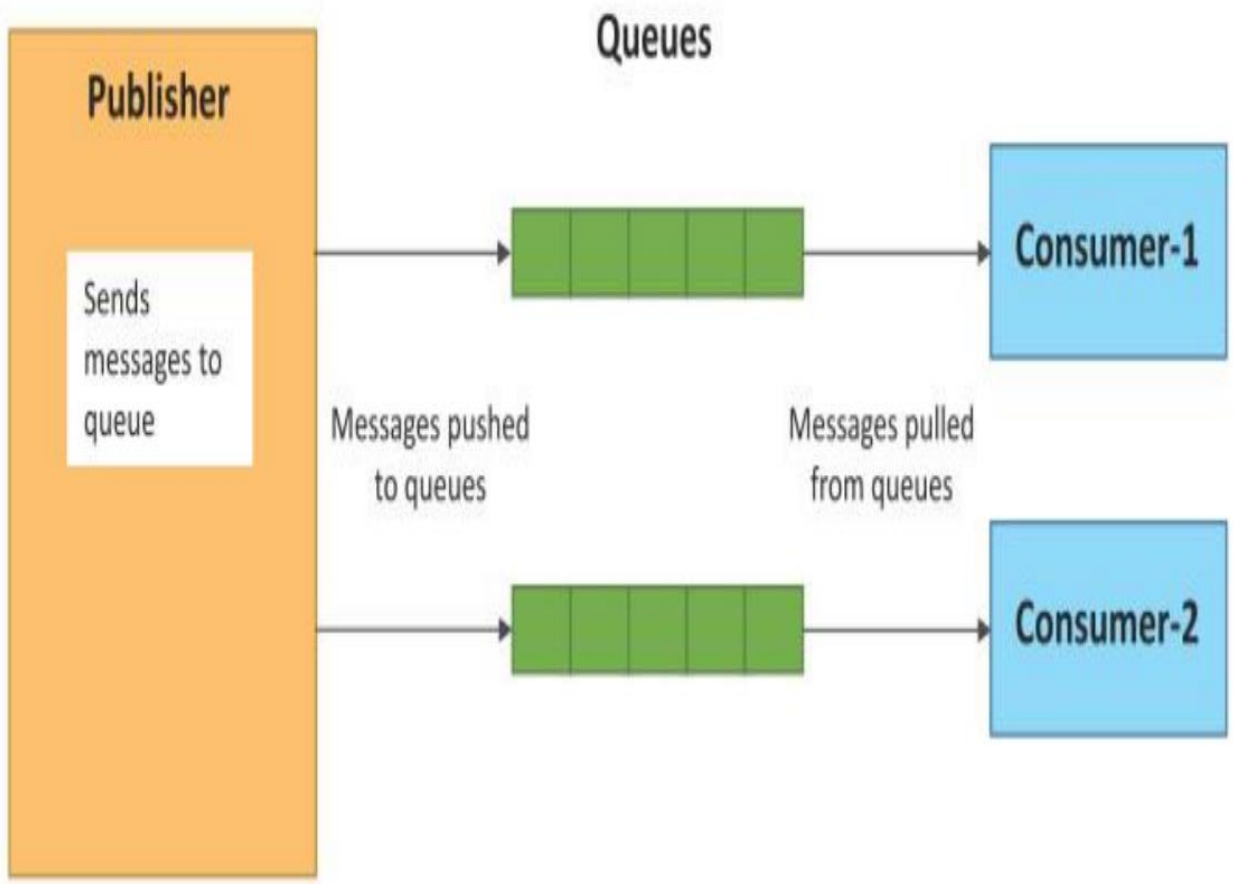
Publish-Subscribe communication model

- Publish-Subscribe is a communication model that involves publishers, brokers and consumers.
- Publishers are the source of data. Publishers send the data to the topics which are managed by the broker. Publishers are not aware of the consumers.
- Consumers subscribe to the topics which are managed by the broker.
- When the broker receives data for a topic from the publisher, it sends the data to all the subscribed consumers.



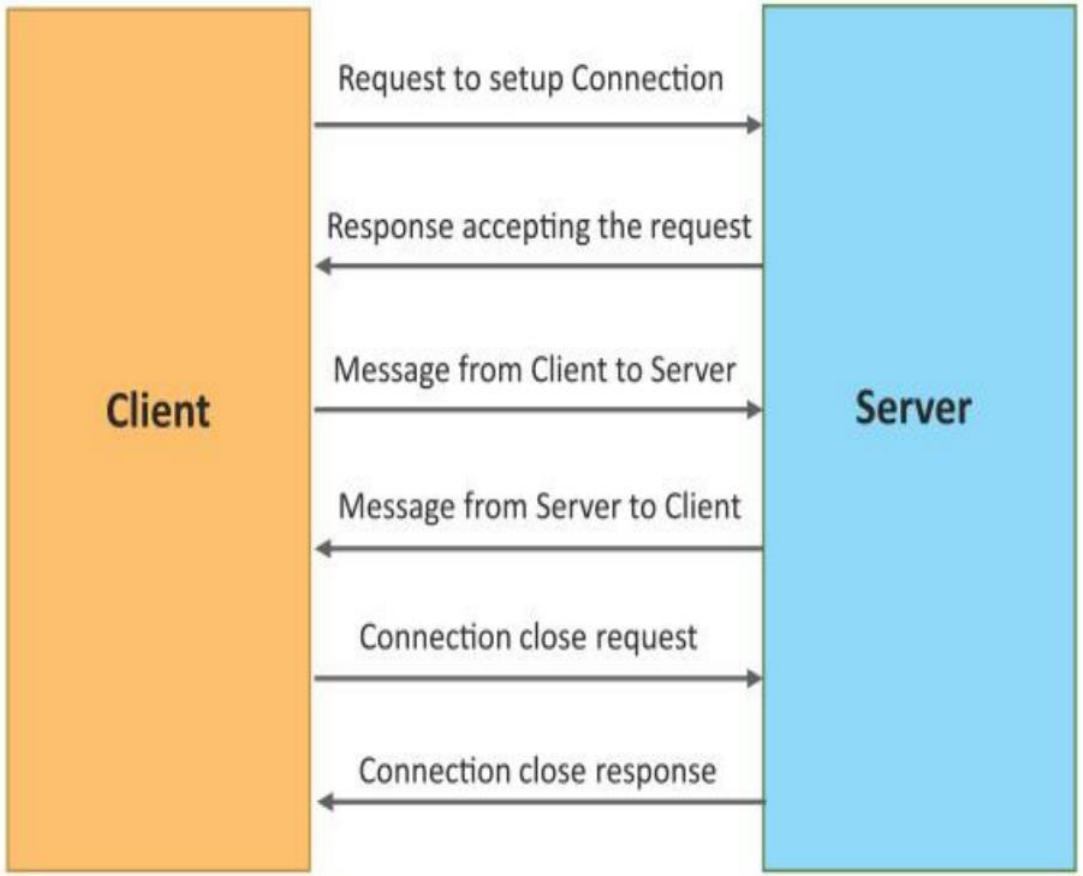
Push-Pull communication model

- Push-Pull is a communication model in which the data producers push the data to queues and the consumers pull the data from the queues.
- Producers do not need to be aware of the consumers.
- Queues help in decoupling the messaging between the producers and consumers.
- Queues also act as a buffer which helps in situations when there is a mismatch between the rate at which the producers push data and the rate at which the consumers pull data.



Exclusive Pair communication model

- Exclusive Pair is a bidirectional, fully duplex communication model that uses a persistent connection between the client and server.
- Once the connection is setup it remains open until the client sends a request to close the connection.
- Client and server can send messages to each other after connection setup.



Applications Areas of IoT

Thank You