

IOT unit 3 imp notes

1] Four Pillars of IOT

→ The four pillars of IOT are M2M, SCADA, WSN, RFID. They establish seamless connectivity and contribute overall efficiency of IOT.

1. M2M

- Machine to machine
- Devices communicate with each other without human involvement
- enables automated exchange of data between devices

2. SCADA

- Supervisory control and data acquisition
- Allows industries to monitor processes from distance
- Gathers data in real time from sensors and equipment and provides up to the minute information

3. WSN

- Wireless sensor deployment
- Utilizes wireless sensors for data collection
- It eliminates the use of wired connections
- Provides scalable and adaptable infrastructure for gathering information from physical world.

4. RFID

- Radio Frequency Identification
- Utilizes radio frequency signals for the unique identification of objects which improves accuracy
- RFID technology enhance supply chain management, inventory tracking in several IOT application.

2] Steps of IOT design methodology ? example - weather forecasting system.

→

1 Define objective and Requirements

Clearly outline the goals of weather forecasting system

2 Understands the ecosystem

Analyze entire IOT ecosystem for weather forecasting including sensors, communication networks etc

3 Device Selection

Choose appropriate devices and sensors based on project requirement.

4 connectivity and communication protocols

Select suitable communication protocols

5 Data management

Develop strategies for data collection, storage

6 Testing and validation

Performs testing in real world conditions to check the system whether it is working as per the requirements or not.

7. Lifecycle management
 establish procedure for maintaining and
 updating the system over its lifecycle.

D Steps for designing IOT Design methodology
 for smart irrigation system

Follow same format as above only
 replace "weather forecasting system" with
 smart irrigation system.

D For home automation system
 use same answer only replace "weather
 forecasting system" with home automation
 system.

3] communication model [Learn diagram also]

→ The communication model of IOT involves the exchange of data between devices, sensors, systems

1. Publish - Subscribe

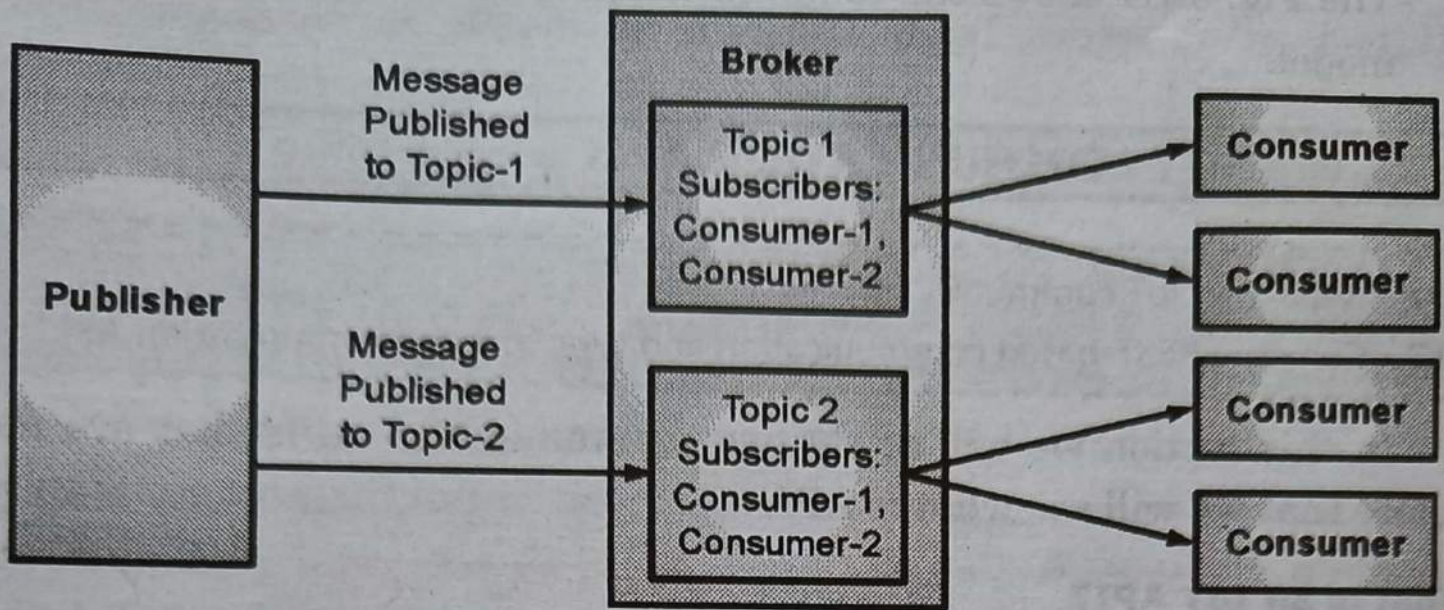
- Devices (publishers) send data to central hub categorized by topics
- other devices (subscribers) express interest in specific topics facilitated by message broker.
- Application - Smart Home automation (prepare diagram)

2. Push - Pull

- Devices (publishers) send data (push) and other devices (subscribers) request data (pull)
- Supports real time interaction
- Application - Traffic management System

3. Request - response

- Devices initiate communication by sending a request to another device
- The receiving device processes request and sends back a response
- Application - web-browser



(1C11) Fig. 3.7.2 : Publish-Subscribe Communication Model

ure of Publish- Subscribe communication model

ication Model

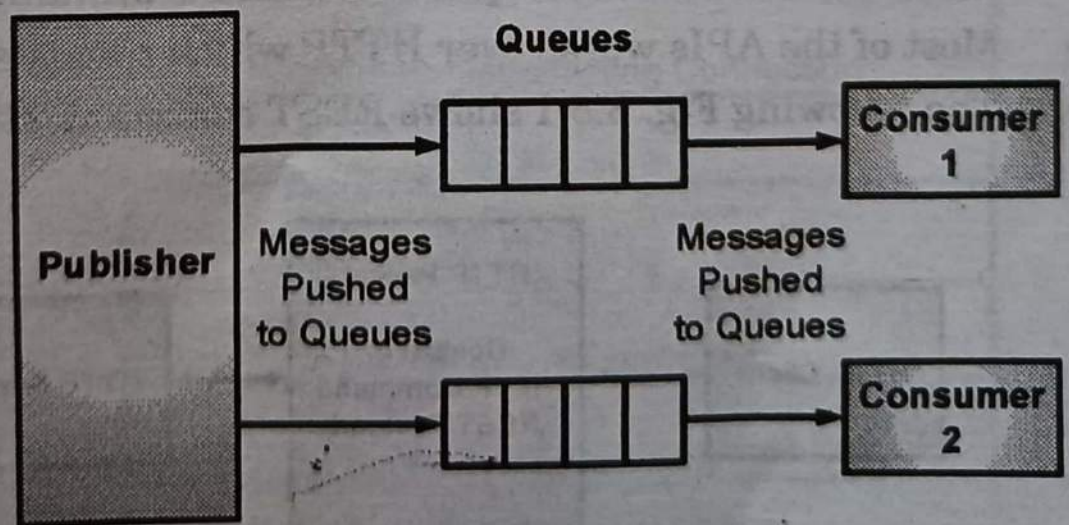
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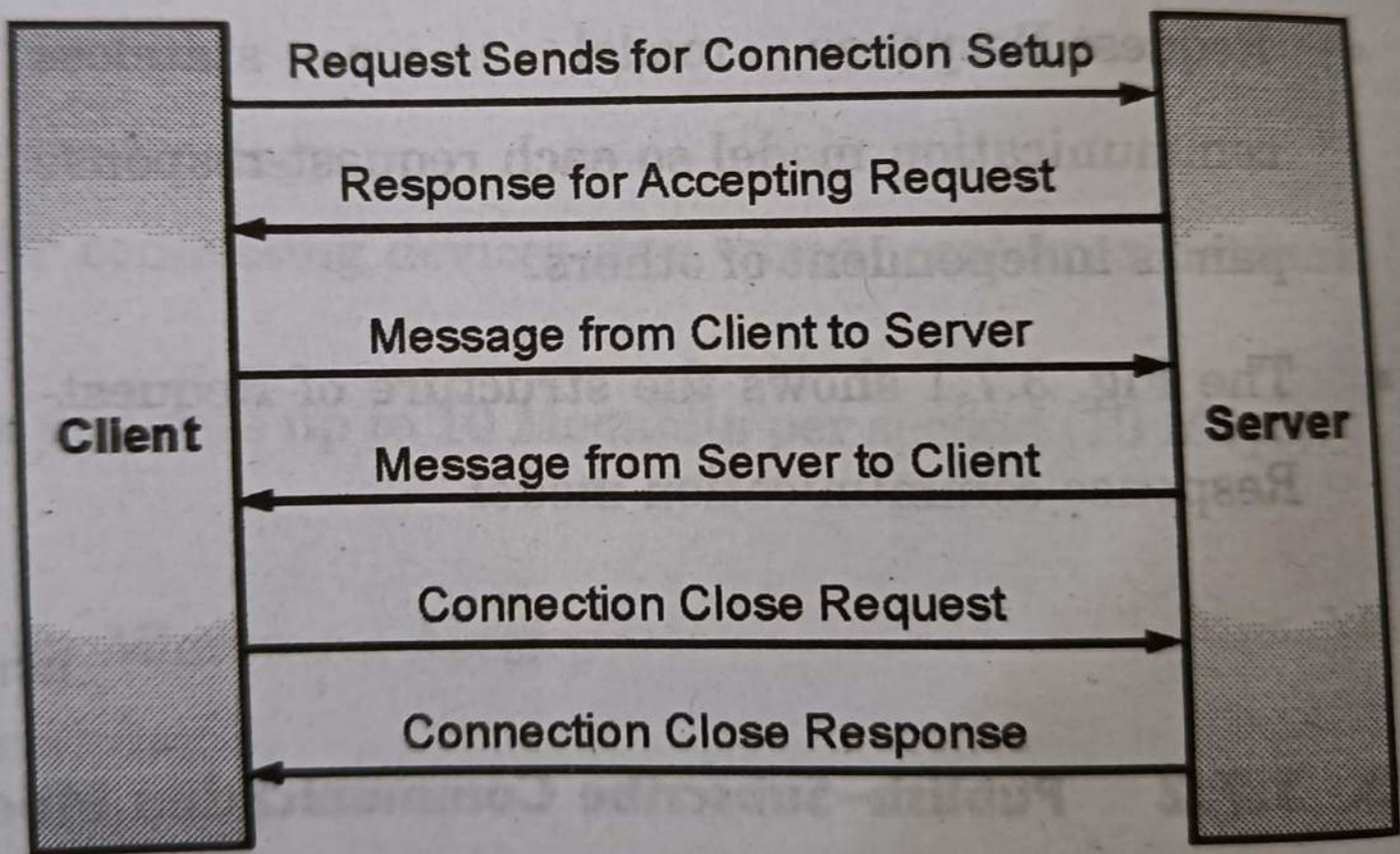
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(1C12) Fig. 3.7.3 : Push Pull Communication Model

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(1c13) Fig. 3.7.4 : Exclusive Pair Communication Model

between client and server using exclusive pair communication

4] IOT Communication APIs

→ IOT systems depends on various communication APIs to facilitate data exchange between devices, sensors and applications.

1. REST based communication APIs

- Representational State Transfer APIs use standard HTTP methods for communication
- REST APIs are stateless and depends on resource
- Suitable IOT System - Smart home Automation
- REST APIs allow mobile to send HTTP request to smart home server

2. Web socket communication APIs

- Web sockets enables full duplex communication between client and server - over a single connection
- Suitable IOT System - Real time Asset tracking
- Tracking the location of moving assets (vehicles) etc.
- improved accuracy and responsiveness

5] Categorize different connectivity technologies required for IOT system development and explain any one in detail.

→ 1. Short Range wireless technologies

- example - Bluetooth, Zigbee, Z-Wave
- Used for communication within limited range suitable for smart home device

2. Long Range wireless technologies

example: LoRa, Narrowband IOT

- Suitable for long range

3. Wired technologies

- example ethernet.
- Reliable and high bandwidth communication over wired connections

Detailed explanation Long Range wireless technology (LoRa)

- LoRa (Long Range) is a long range wireless communication technology used in IOT application
- Capable of covering several km, suitable for application requiring wide area coverage.

Supports bidirectional communication
allows both device both to send and
receive data and optimized for low
data rate application.

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