

Physical Design of IoT

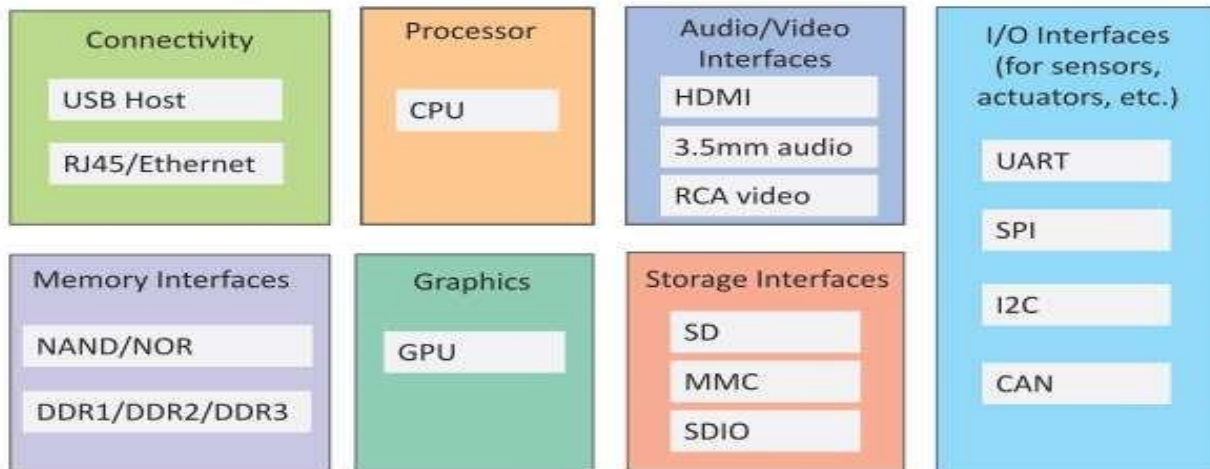
Things in IoT

1. Refers to IoT devices which have unique identities that can perform sensing, actuating and monitoring capabilities.
2. IoT devices can exchange data with other connected devices or collect data from other devices and process the data either locally or send the data to centralized servers or cloud – based application back-ends for processing the data.

Generic Block Diagram of an IoT Device:

An IoT device may consist of several interfaces for connections to other devices, both wired and wireless. The below Fig shows the block diagram of an IoT Device.

- I/O interfaces for sensors
- Interfaces for internet connectivity
- Memory and storage interfaces
- Audio/video interfaces

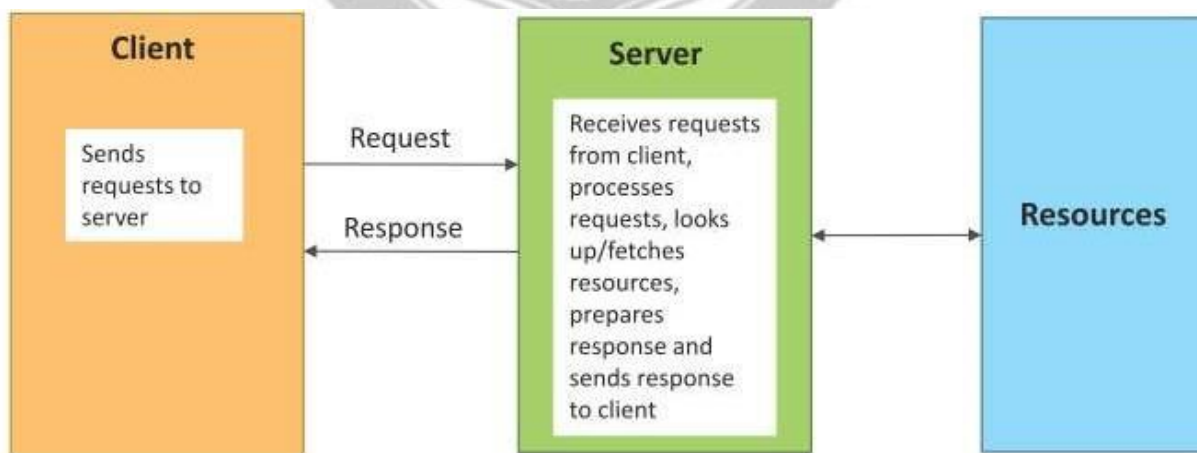


Block Diagram of an IoT Device

IoT Communication Modules:

1. Request–Response Communication Model:

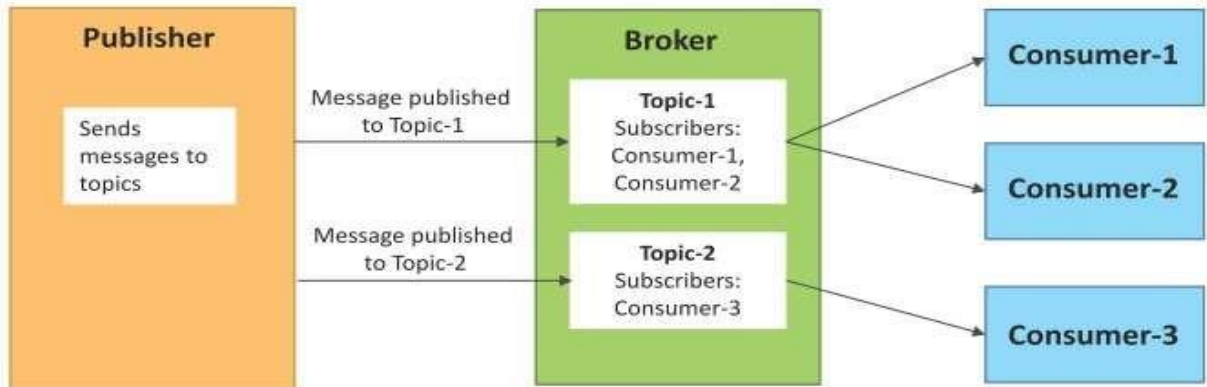
- Request–Response is a communication model in which the client sends requests to the server and the server responds to the requests.
- When the server receives a request, it decides how to respond, fetches the data, retrieves resource representations, prepares the response and then sends the response to the client.
- Stateless communication model, Fig 1.5 shows the block diagram of Request-Response Communication Model.



Request–Response Communication Model

2. 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.
- Fig shows the block diagram of Publish-Subscribe Communication Model.

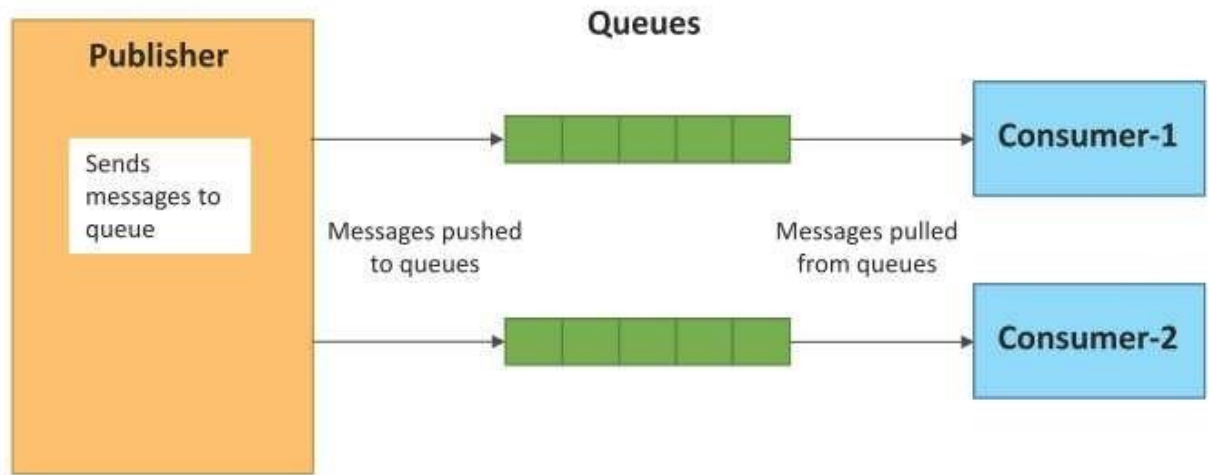


Publish–Subscribe Communication Model.

3. 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.

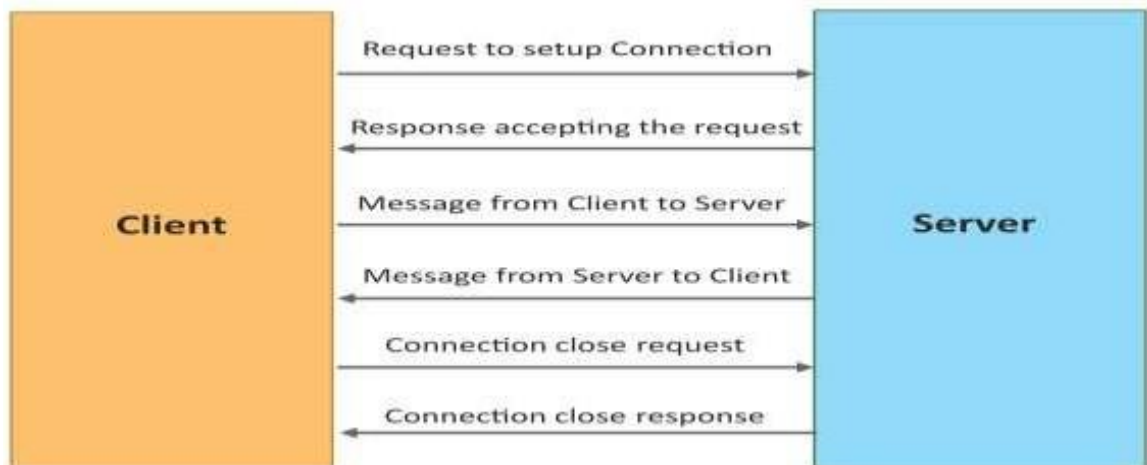
Fig shows the block diagram of Push-Pull Communication Model.



Push-Pull Communication Model.

4. Exclusive Pair Communication Model:

- Exclusive Pair is a bidirectional, fully duplex communication model that uses a persistent connection between the client and the server.
- Once the connection is set up 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. Fig shows the block diagram of Exclusive Pair Communication Model



Exclusive Pair Communication Model.