

IoT Functional Block and Communication Model

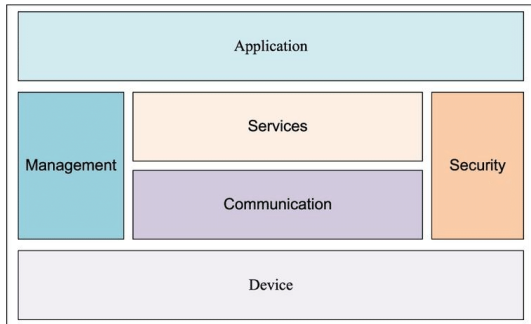
Internet of Things (Lecture:5)

Rahul Shandiya

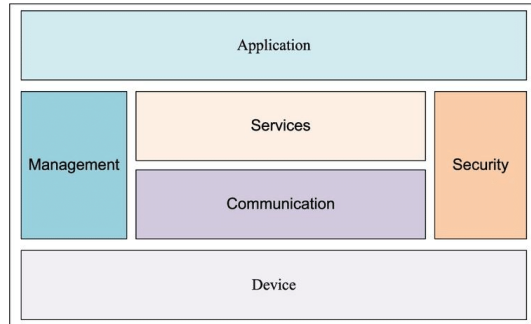
IoT Functional Block

An IoT system comprises of a number of functional blocks that provide the system the capabilities for identification, sensing, actuation, communication, and management.

- ▶ **Device:** An IoT system comprises of devices that provide sensing, actuation, monitoring and control functions.
- ▶ **Communication:** The communication block handles the communication for the IoT system.
- ▶ **Services:** An IoT system uses various types of IoT services such as services for device monitoring, device control services, data publishing services and services for device discovery.



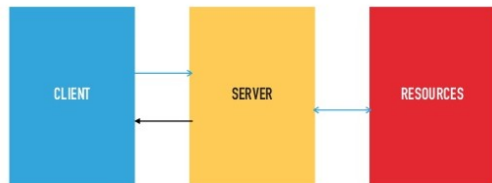
- ▶ **Management:** Management functional block provides various functions to govern the IoT system.
- ▶ **Security:** Security functional block secures the IoT system and by providing functions such as authentication, authorization, message and content integrity, and data security.
- ▶ **Application:** IoT applications provide an interface that the users can use to control and monitor various aspects of the IoT system. Applications also allow users to view the system status and view or analyze the processed data.



IoT Communication Model

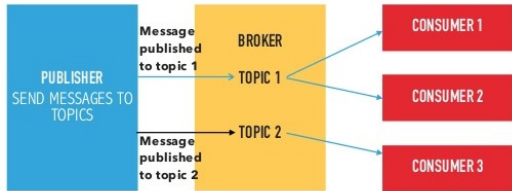
Request Response Model

- ▶ 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.
- ▶ Request-Response model is a stateless communication model and each request-response pair is independent of others.



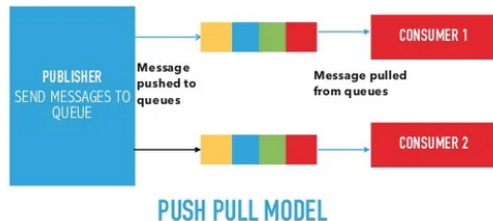
Publish-Subscribe

- ▶ 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

- ▶ 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

- ▶ Exclusive Pair is a bi-directional, 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.
- ▶ Exclusive pair is a stateful communication model and the server is aware of all the open connections.

