

SESSION 1

Theory, 30 minutes [Getting started with basics]

*** Introduction to IoT**

- 1.1 What is IoT?
- 1.2 Why do we need IoT?
- 1.3 Definition of IoT
- 1.4 History of IoT
- 1.5 Applications
- 1.6 Market Study

Practical challenges or requirements to make IoT possible.

Theory and Practical, 30 minutes [Basic IoT Architecture]

*** Three Stages of IoT**

- 1.2.1 How to fetch The real world Data Or Unique Identity Data
- 1.2.2 How to store these In a Gateway Buffer or How to hold Data
- 1.2.3 How to Pass the Data on to the network for controlling via App or any remote Device

*** Three How to Decide IoT gateway? (Intel/Raspberry-Pi/Beagle-bone/Arduino/TI/Arm)**

- 1.3.1 What is Gateway ? why its needed ? Difference between IoT gateway and WSN Device?
- 1.3.2 Difference between IoT gateway protocols and WSN protocols.
- 1.3.3 Design consideration of IoT Hardware/SoC in terms of Power consumption,Data memory, Range/connectivity, Protocols constraints on Soc, Run-time etc.

SESSION 2

Practical, 1 hour 30 minutes [Hands on Training]

Let's start with fetching the data and store it On to the gateway

*** The Arduino Platform**

2.1.1 The Arduino Open-Microcontroller Platform

2.1.2 Arduino Basics

2.1.3 Arduino Board Layout & Architecture

*** Programming fundamentals (C language)**

*** Arduino Programming & Interface of Sensors**

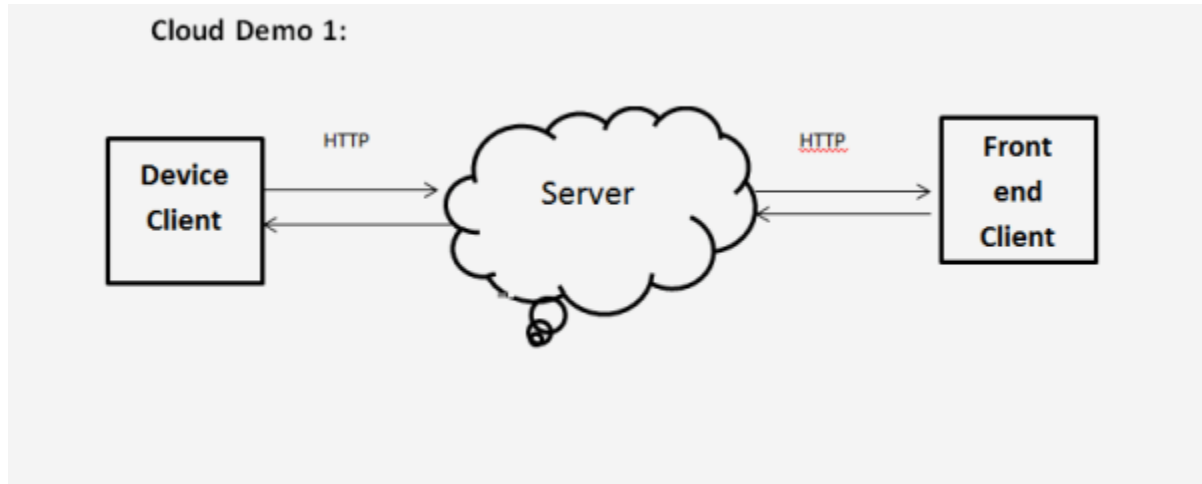
2.3.1 Interfacing sensors with Arduino

2.3.2 Programming Arduino

2.3.3 Reading from Sensors (real world data)

SESSION 3

Theory & Cloud Practical Demo1 : 45 minutes



[Why MQTT or COAP not HTTP]

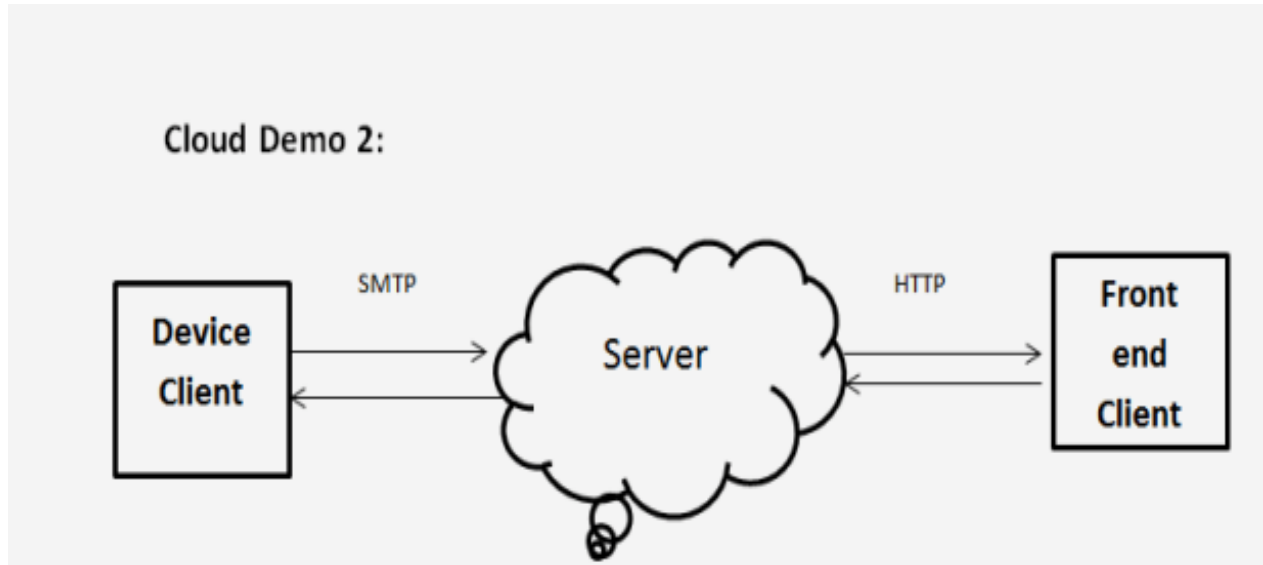
***UPLOAD DATA ON IOT CLOUD RUNNING ON HTTP &SMTP PROTOCOL AND MONITOR GRAPHICALLY**

All issues will be discussed with HTTP/SMTP protocol in covered cloud service.

- 3.1 Network & connectivity
- 3.2 Broker Theory and comparison
- 3.3 Run-times
- 3.4 Power & complexity
- 3.5 Security
- 3.6 Upgrades & maintenance

SESSION 4

Theory & Cloud Practical Demo 2 : 45 minutes



***Access Devices Through IOT Cloud Platform**

4.1 Data Latency

4.2 Scalability

4.3 Security

4.4 Bandwidth efficiency

4.5 Power efficiency

4.6 Quality of service

All these factors or issues will be discussed while Message publishing or subscribing.

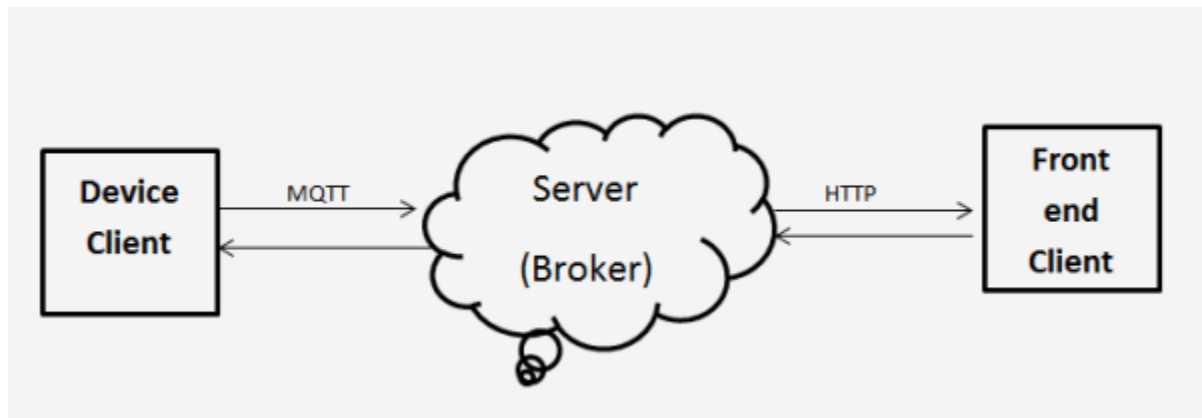
SESSION 5

Theory,30 minutes

*** IoT NETWORK PROTOCOL STACK MODEL**

- 5.1 Send data on to server through ethernet (W5100) and IoT protocols: MQTT/MQTTS, CoAP, 6LoWPAN, like TCP, UDP, HTTP/S.
- 5.2 Why MQTT protocol for IOT (why companies like amazon, Tata Motors, Telemetry etc have selected)
- 7.3 MQTT protocol for their web service for IOT.
- 5.3 IPV4 addressing problem for IOT and introduction to IPv6 is required to address more devices.

SESSION 6



Practical, 45 minutes [Two way communication code]

*** MQTT Functions and working**

6.1.1 Learn How to publish or subscribe Topics through Mosquito Broker
6.1.2 Why broker needed and Comparison between different Brokers for MQTT

*** MQTT complete Two Way Communication code build & explanation**

*** End to end IOT device two way communication@McKEN platform**

SESSION 7

Practical, 45 minutes

*** Create Local IoT server platform using MQTT broker**

- 7.1 Comparison Between Different IOT Message Brokers.**
- 7.2 Complete Broker Setup on Amazon Web services cloud.**
- 7.3 Running an IOT Broker on AWS Demo using MQTTfx and MQTT lens Clients.**
- 7.4 Create Alarm,Alert or Notification based on specific threshold values.**

SESSION 8

Project 2 Hours 15 minutes [Practical's and Project Ideas Implementation on IOT]

In the Project session, the key concept behind the McKEN 1st product [Home wave McKEN's smart switches in Collaborations' with TATA] which can be controlled via m's Android App From any remote location will be taught.

These are the list of the Ideas in which this key concept can be implemented.

- **Smart Home**
- **Smart Grid**
- **Smart Watches**
- **Smart Lightening**
- **Tank Level**
- **Water Flow**
- **Gas FlowEnergy and Water**
- **Indoor Air Quality**
- **Temperature Monitoring**
- **Ozone Presence**
- **Forest Fire Detection**
- **Air Pollution**
- **Snow Level Monitoring Landslide and Avalanche Prevention**
- **Smart Water level Indicator**
- **Smart A.C.**
- **Smart Gas Flow Indicator**
- **Earth Quake early Detection**