Corporate End to End
Internet
Of
Things (IOT)

## 45 Hours Deep Diving(Start from scratch) Online/Offline Complete IoT training Brochure

What exactly is the Internet of Things?

The Internet of Things (IoT) is the next wave, world is going to witness. Today, we live in an era of connected devices (mobile phones, computers etc.), the future is of connected things (Things mean: home appliances, vehicles, lamp-posts, personal accessories, your pets, industrial equipment's and everything which you use in day-to-day life). Internet of Things is a term given to the attempt of connecting objects to the internet and also to each other - allowing people and objects themselves to analyze data from various sources in real-time and take necessary actions in an intelligent fashion.

Many big technology industries like apple, Intel, ARM, Google, IBM, and Microsoft have welcomed IoT and are putting huge investments and R&D efforts in this domain. Cisco's Internet Business Solutions Group (IBSG) predicts some 25 billion devices will be connected by 2015, and 50 billion by 2020 and the market size, as predicted by GE is 10-20 trillion USD. The Internet of Things is the next revolution for users and brands.

Why IOT (Opportunities and application in IoT)?
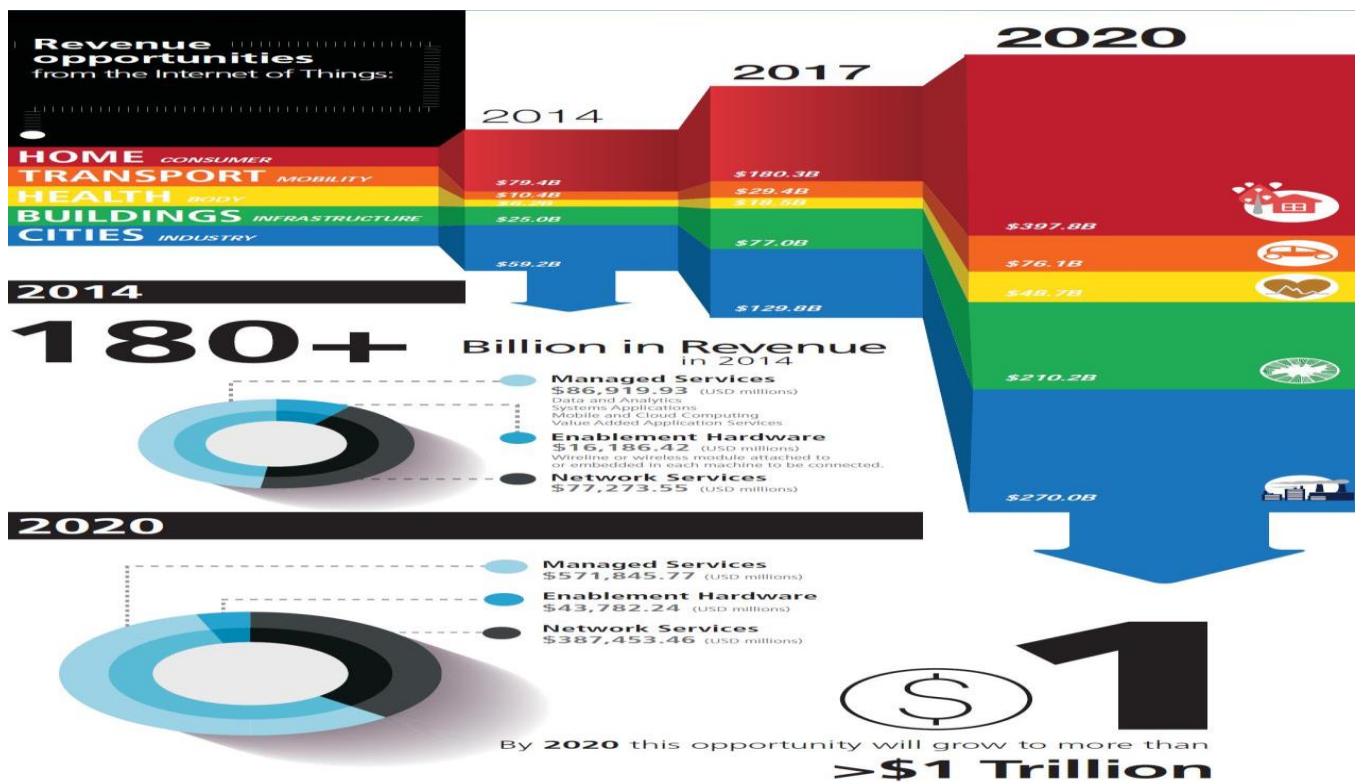
1. **4.5 Million Jobs to be generated for IOT's trained professionals in top companies by 2017 (27 billion objects will be connected 2017).**

2. **90 % of Top electronics products companies like (Intel, Qualcomm, apple, IBM, Microsoft, Samsung, wurl-pool, L.G., Amazon,Daikin) are going to be smart.**

3. **And the concepts behind Smart Homes, Smart watches, Smart cities etc are nothing but IoT (Internet of Things) Which can be controlled or monitored via any remote location through mobile or web].**

4. **Our country is moving towards the 'Smart City'. We want to contribute in the "Make in India" campaign of our Prime Minister Shri NarendraModiji.**

5. **Government of India has allocated 7,060 crore for 100 new smart cities in Budget 2015-16.**

Top Most Internet of Things Influential Companies

At Hitron we have always looked at sharing new and advanced technologies with engineers in industries and in colleges alike. This led us to creation of Deep Diving Training on IOT.

- Starting from September 2013 Hitron has conducted workshop on IOT based on (Arduino, Raspberry Pi,Beagle Bone Black, CC3200 TI, Intel Galileo) for engineers from **TTL (TATA Technologies Limited), PSL(Persistence Systems Limited), Wipro** and Deployed Hi-Gate (IOT based smart energy metering system) in TTL Pune
- But we believe one of our biggest achievements is we have **trained more than 5000 engineering students**

  And 3500 working professionals on topic **Internet of Things (IOT)**

- During this IOT Deep Diving Training the participants learn to create End to end IOT Device solution and understand and perform hands on each major paradigms of IOT such as Device to Device, Device to Server and Server to Server communication in deep extent.
- They will also perform various hands on experiments on the GPIO pins (general purpose I/O and also learn about interfacing sensor as well as controlling a various devices over the Internet along with the REST API solution.

45 Hours Training is Divided into 3 Major Modules (M1, M2& M3) [Total 15 Sessions : Each session 3 hours]

Module 1: Total 3 sessions (IoT Introduction and Technical challenges)

2 Session: [IOT introductory Arduino sensors interfacing and General Automation application Implementation]
2 Sessions: Network Theory [Network Demo with Ethernet and Esp8266 wifi (As an individual controller or End wifi node]

Module 2 : Total 4 sessions (Hands on Practice with readymade Cloud platforms)

1 session on AWS Cloud Demo using Raspberry-Pi (Hands on AWS cloud Platform and understand the importance of MQTT protocol)
1 session MQTT End to end Demo on Arduino [With MQTT theory and Client demo]
2 Session RPI [Basic Installation, Interfacing GPIO, zigbee communication]

Module 3: Total 8 sessions (Implantation of End to end IoT Device as well as server)

3 session IOT [Broker, Nodejs, Mongodb, express, Sokcet.io (A web-socket Framework) Angularjs, REST API (PUT/GET/DELETE/POST)]
3 sessions Final RPI end to end application [Smart car parking, Smart automation]
1 Final session [RPI (GAteway)+ Arduino (Subgateway)+Zegbee (End Node)]

Module 1:Session 1 (IOT end to end Depth Explanation with basic IoT architecture &Three levels of communications)Duration 3 Hours

Theory, 30 Minutes [Getting started with basics]

- ✓ Introduction to IOT
- ✓ IOT end to end Depth Explanation
- ✓ IOT Applications in Different Domain
- ✓ How large is the IOT Market in Different   Domain?

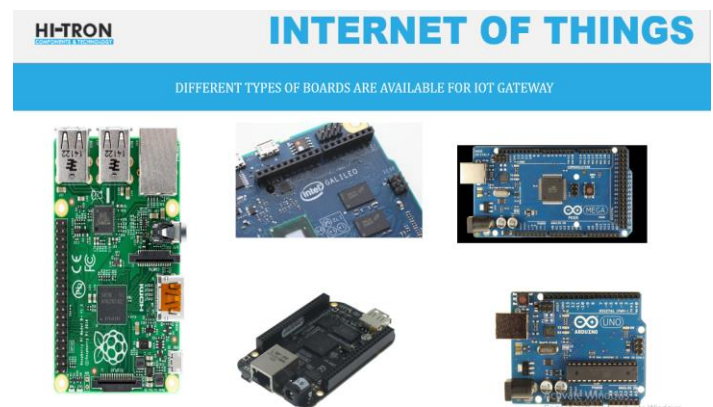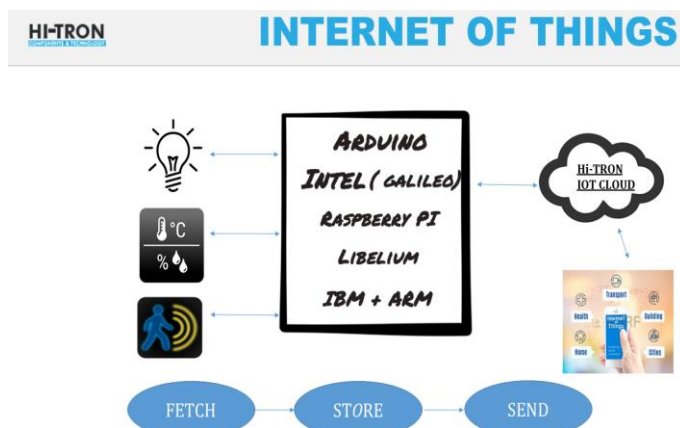## Theory and Practical, 30 Minutes, [Basic IOT Architecture]

Three Stages of IOT

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

Theory and Hardware Demonstration, 30 Minutes

How to decide the Gateway? [Arm/Raspberry Pi/Intel Galileo / BBB]

- ✓ IOT Hardware and SOC's [Selection of Gateway for specific IOT application]
- ✓ Advantages and Disadvantages of each and what exactly can be select for respective use case.
- ✓ Hardware Design Consideration in terms of Power consumption, Security, Memory requirement, Data-rate, run-time and protocols constraint's.

Theory and Practical Demonstration, 1 Hour30 Minutes [Three levels of communications]

High level technical Explanation about three basic IoT (Internet of Things) communication levels with live Industrial use case demo.

(1) Device to Device communications:
- ✓ How sensors data can be fetched from sensors and integrated with the IoT gateway or WSN device.
- ✓ Why IoT gateway needed?
- ✓ Difference between IoT gateway and WSN device?
- ✓ Difference Between [804.15.2/Wifi/Bluetooth/IPV6LOWPAN] in terms of Power consumption, memory, device run-time and energy harvesting.

(2) Device to server communications:
- ✓ How IoT gateway can be connected with cloud via network and network issues such as Network Interoperability,scalability,Latency, Routing, Forwarding, Security.
- ✓ Network & connectivity, Protocols [MQTT/HTTP/COAP], Why MQTT or COAP not HTTP.

(3) Server to server communications:
- ✓ How to bind hardware data with cloud using Ethernet /Wi-fi(ESP8266/GSM).
- ✓ Broker Theory for Creating MQTT IoT platform and comparison (Which one is best For creating IoT platform).
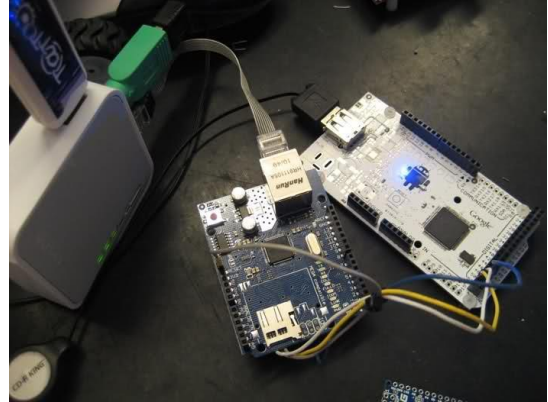- ✓ Why node.js and socket.io for IoT Server.
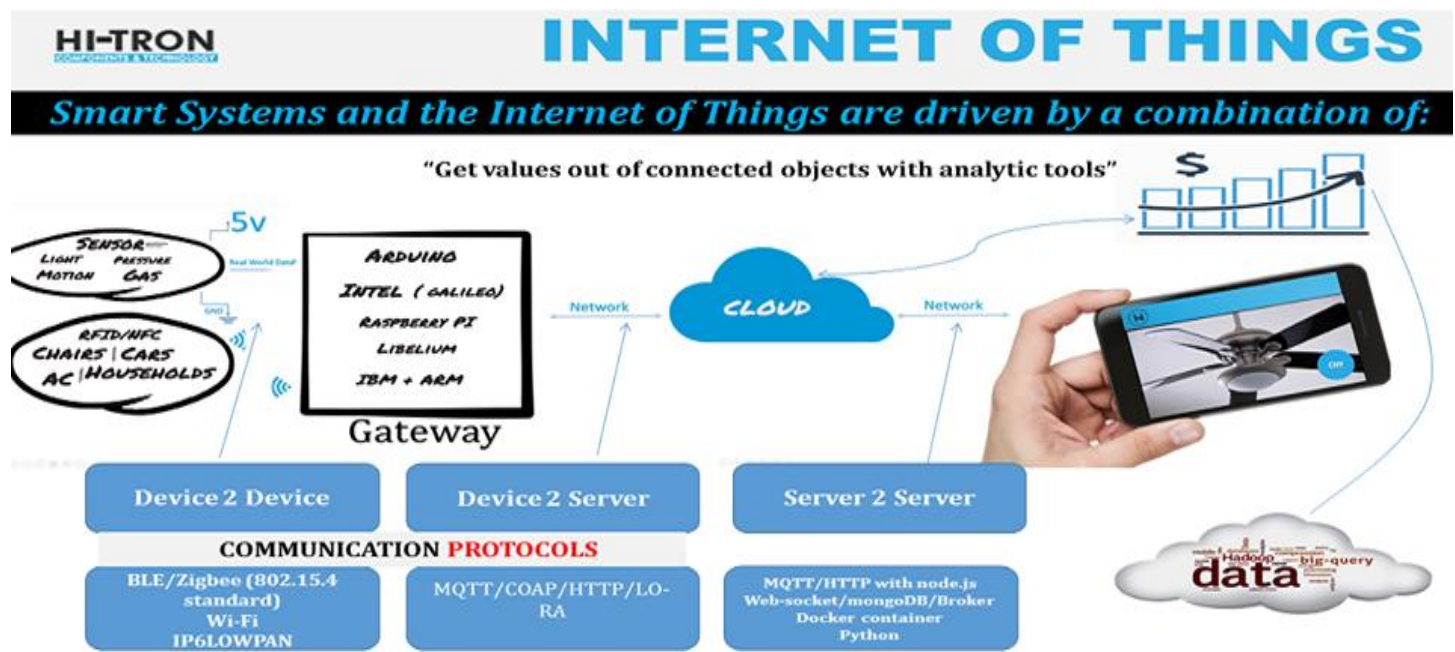
Module 1:Session 2 (Hardware Design and Sensor Interfacing)Duration 3 Hours

Practical, 3 Hours,Hands on Training

1. **Arduino Hardware Overview**

   ✓ The Arduino Open-Source Microcontroller Platform
   ✓ Schematics, PCB Design Tools and prototype steps
   ✓ Arduino Board Layout & Architecture
   ✓ Arduino Basics (Why Arduino?)

2. **Arduino Programming fundamentals**

   ✓ How to program your Arduino from variables to arrays, for loops and if statements
   ✓ How to make your Arduino respond to sensors and acutators
   ✓ digitalRead() and Serial Port Communication Part
   ✓ How to use led and sensors to make things happen
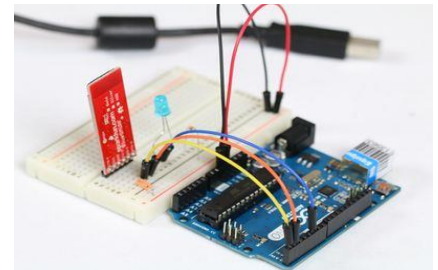
3. **Introdcution to embedded system/Arduino Programming Interfacing of Sensors**

   ✓ Interfacing sensors with Arduino
   ✓ Reading from analog and digital Sensors
   ✓ (Real world data)
   ✓ Interfacing of actuators and single or two channel   channel
   ✓ Relays for controlling real
   ✓ devices like fan, light, motors.

Embedded Project or An Automated System implementation

Module 1:Session 3 (Communication & Networking overview)
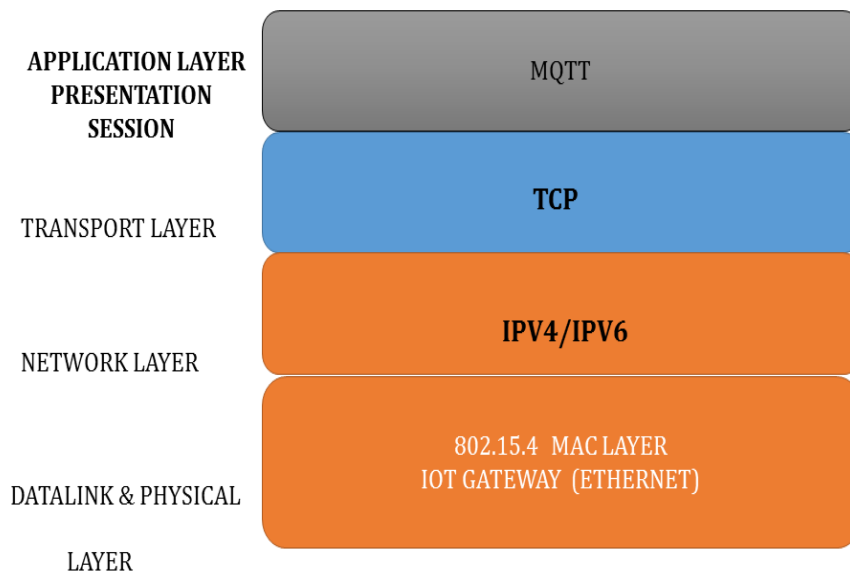# *Duration 3 Hours*

Networking Theory, 1 Hour 30 minutes (Communication & Networking Theory)

- ✓ OSI Layer model
- ✓ Protocol stack Model
- ✓ IOT Protocols
- ✓ Importance of Brokers
- ✓ Packet size (Header length)/payload tracing using Wireshark network analyzer tool

IOT Network Protocol Stack Model

Introduction to communication architecture, 1 Hour 30 minutes

- ✓ **Different IoT protocols**
- ✓ **RF: ZigBee, Blue Tooth, BLE, Zwave, Mesh network.**
- ✓ **Communication Channels: GSM/GPRS, 2G, 3G, LTE, WiFi, PLC**
- ✓ **IoT protocols: MQTT/MQTTS, CoAP, 6LoWPAN, like TCP, UDP, HTTP/s.**
- ✓ **Comparison of the different IOT protocols, advantages and disadvantages (limitations) of these IOT protocols.**
- ✓ **IPv4 addressing problem for IOT and introduction to IPv6. OR Why IPv6 is required to address more devices?**
- ✓ **Application issues with RF protocol - power consumption, LOS, reliability. Security aspects. Showcase the GSM module.**
- ✓ **Send data on to server through ehternet (W5100) and IoT protocols: MQTT/MQTTS, CoAP, 6LoWPAN, like TCP, UDP, HTTP/S**
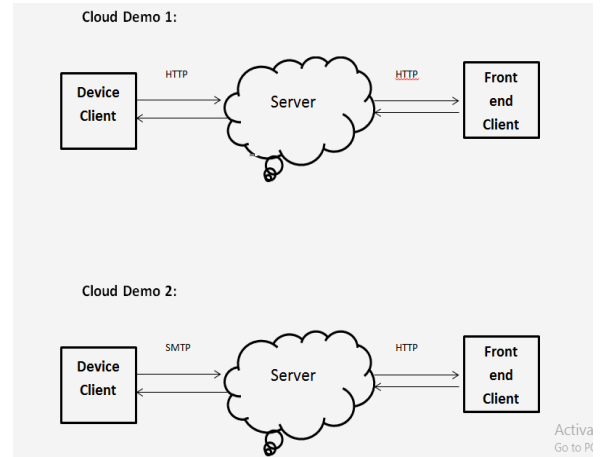
Theory & Practical, 3 hours

- ✓ **Cloud Demo1 through HTTP and its Drawbacks**
- ✓ **Cloud Demo2 through SMTP and its Drawbacks**

Upload data on cloud & monitor graphically

- Network & connectivity
- Protocols
- Runtimes
- Power consumptions & complexity
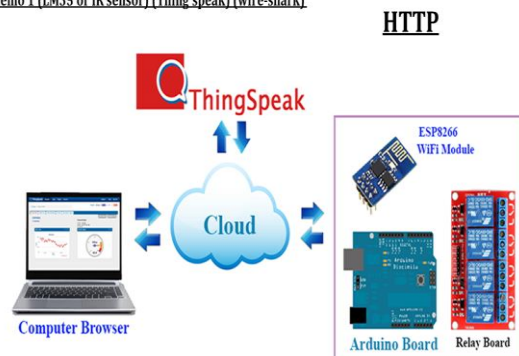- Data Security
- Interoperability
- Upgrades & maintenance

All above issues using (HTTP & SMTP) will be discussed in covered cloud platform.
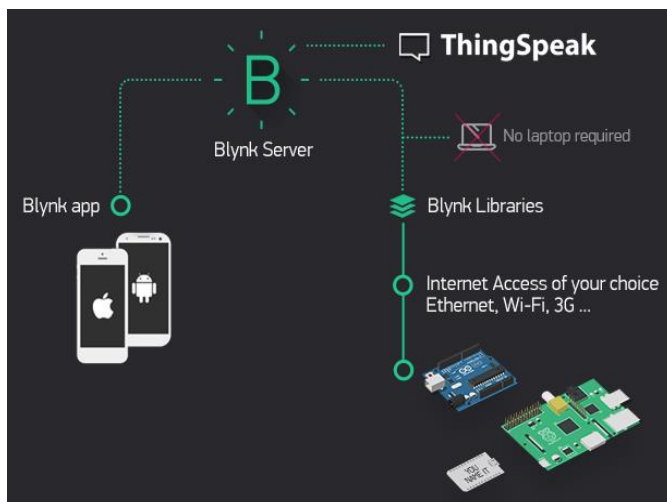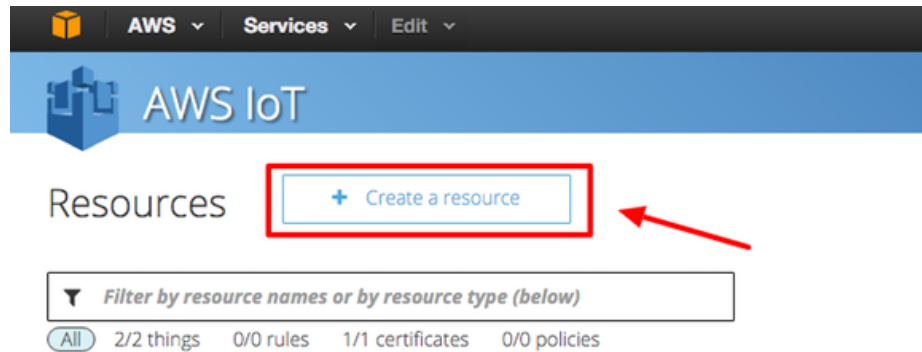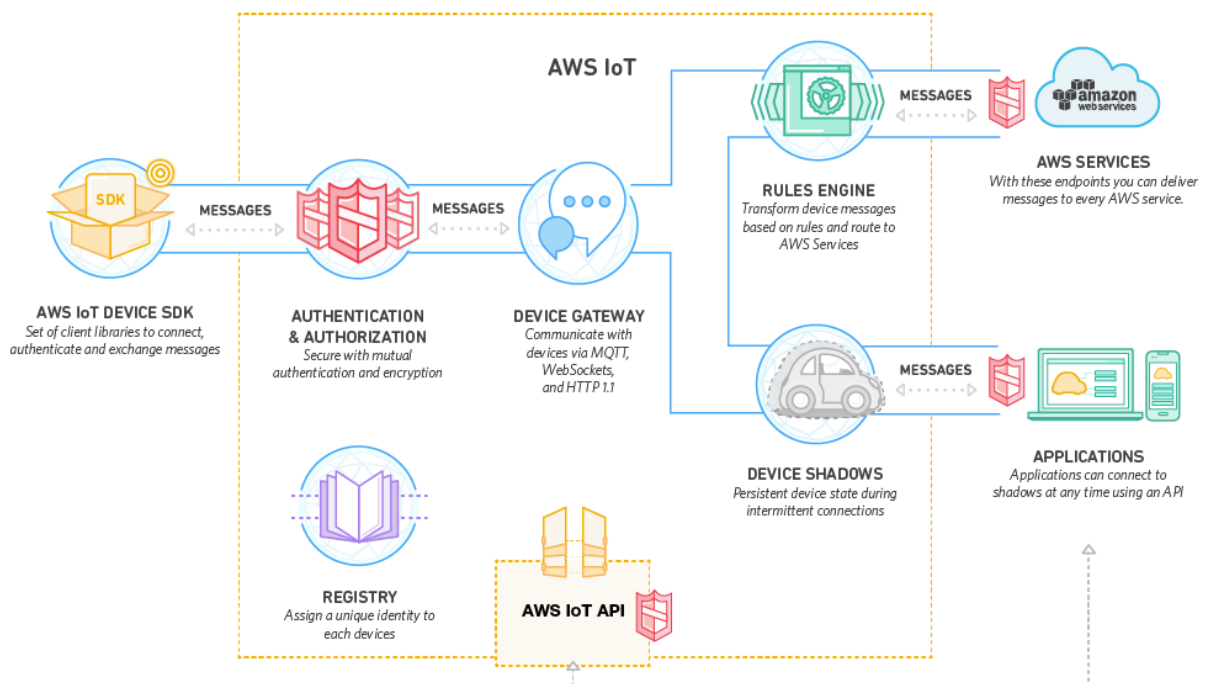
Module2:Session 5 [AWS IOT CLOUD DEMO USING RASPBERRY PI BASED ON MQTT And HTTP PROTOCOL]Duration 3 Hours

- ✓ **Understand what AWS IoT is ?**
- ✓ **Understand connecting a Raspberry-PI Device with a live example.**
- ✓ **Understand using the Device Gateway, Rules Engine, Registry, Device Shadows.**

In this Session, we will perform hands on how constrained devices can leverage AWS IoT to send data to the cloud and receive commands back to the device from the cloud using the protocol of their choice. We will also see how devices can securely connect using MQTT and HTTP protocols, and how developers and businesses can leverage features of AWS IoT like Device Shadows, a JSON document used to store and retrieve current state information for device, app and so on, and Rules Engine, which provides message processing and integration with other AWS services, to build a real connected product.
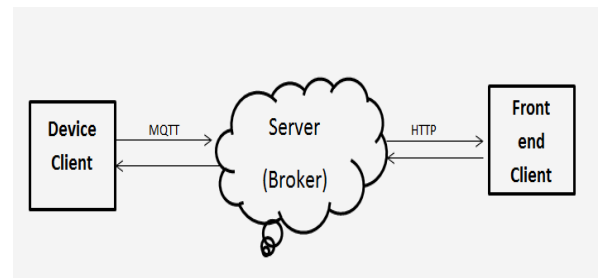
Theory, 30 minutes

- ✓ **Why MQTT?**
- ✓ **What is MQTT?**
- ✓ **Publish / Subscribe**
- ✓ **MQTT Message Types**
- ✓ **Topics**
- ✓ **QoS Levels and more...**

Broker Theory and practical, 30 minutes

- ✓ **Why Broker needed?**
- ✓ **Its advantages ?**
- ✓ **Clustering of Devices**
- ✓ **Websocket Theory [Real time communication]**

INTERNET OF THINGS

Broker Implementations

	QoS 0	QoS 1	QoS 2	Auth	Bridge	$SYS	SSL	dynamic topics	cluster	websockets	plugins
HiveMQ	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
mosquitto	✔	✔	✔	✔	✔	✔	✔	✔	✘	✘	✔
RSMB	✔	✔	✔	✔	✔	✔	✘	✔	✘	✘	✘
RabbitMQ	✔	✔	✘	✔	✘	✘	✔	✔	?	?	?
ActiveMQ	✔	✔	✔	?	✘	✘	?	?	?	✔	?

Practical, 1 Hour 20 minutes [Virtual client to client communication via port MQTT 1883]
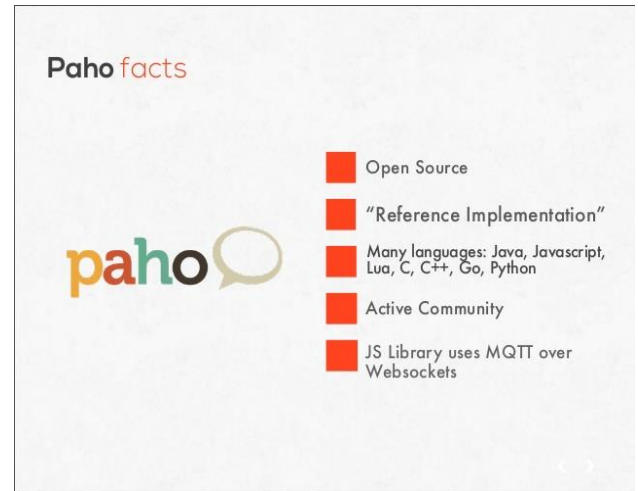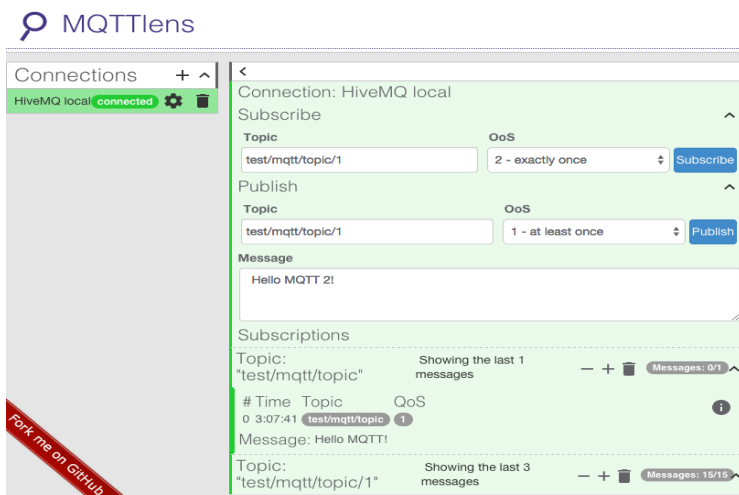
- **Analyze the size of the MQTT payload through network protocol analyzer tools**

Practical, 3 Hours

- **Create your first end to end IoT sketch on Arduino IDE using MQTT Protocol**

- ✓ **Create Alerts or notifications**
- ✓ **Control devices**
- ✓ **Monitor real world Data**

  **This can be happen through MQTT lens or Paho eclipse mqtt client plugin
  or Mymqtt Android App.**
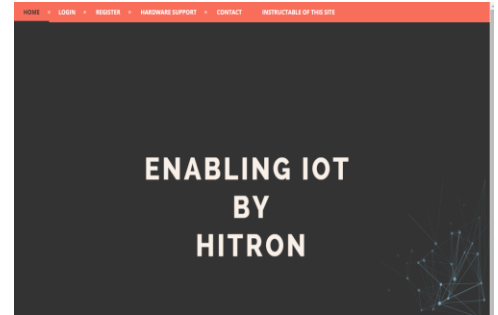
Get an App for above MQTT code to control all the Equipment at your home. Click a button on your smartphone to put on the tube Light based on LDR value or turn on or off fan or AC based on LM35 value.

MODULE- 2

Hit-R🍓-Pi

[Create your end to end IOT Hardware using Raspberry-pi]

Raspberry Pi: A new sensation in the world of electronics. This ultra-low cost and smallest form factor Linux based computer is expected to revolutionize the computing world. Pi can be used as a main IOT gateway tool in which Broker for MQTT environment can be installed unlike Arduino controller and run as a standalone IOT device and it can also use to play games or control robots or act as a media centre with AirPlay. The board is a great educational tool. While it was originally designed for being employed in schools to teach programing, today it is part of countless engineering projects.

About Raspberry Pi

This is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of stimulating the teaching of basic computer science in schools. The Raspberry Pi has a Broadcom BCM2836 system on a chip (SOC), which includes an ARM11 900 MHz processor, Video Core IV GPU, 1GB of RAM. It uses an SD card for booting and long-term storage.

Module 3:Session 8 (Create your First End to end IOT Product   on Raspberry-Pi)Duration 3 Hours

Theory,1 Hour 30 minutes (Getting Started with Basics)

- ✓ Introduction to Raspberry Pi
- ✓ Hardware Description & Interfacing Components
- ✓ Setting up
- ✓ ARM 11 Micro-controller
- ✓ GPIO

Theory & Practical, 1 Hour 30 minutes

(Accessing the Pi)

- ✓ A little bit about Linux Operating System.
- ✓ Installing the OS on SD card for Pi
- ✓ Logging in to Raspberry Pi- Linux LX-Terminal
- ✓ SSH: Secure Shell Network
- ✓ Executing commands over SSH
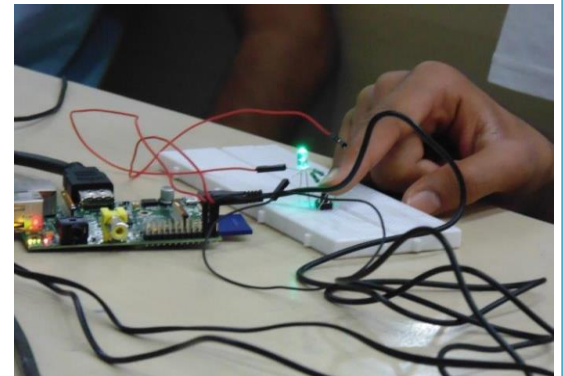
Note: Hands on session with Raspberry Pi to be conducted over SSH

SSH is secure shell which runs on windows over a client "putty". This allows a user to get a command line interface of Raspberry Pi or any Unix based system on his/her windows system as if it is directly connected. Thus a single Pi can be shared by multiple users over a network. The SSH tunnel thus established allows a complete hardware access to the user through the local network. This ensures that every participant to gets a hands on experience.
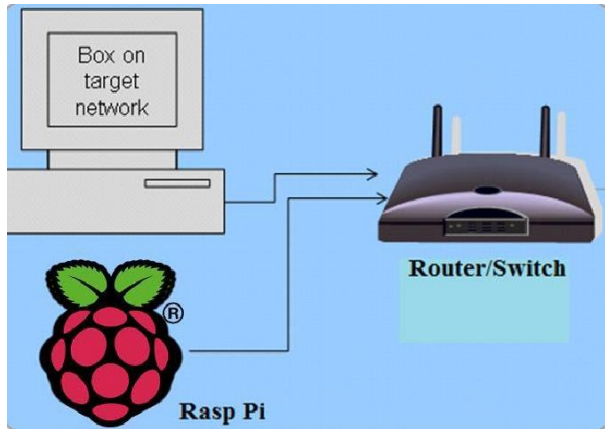
SSH on a windows device   **Putty**
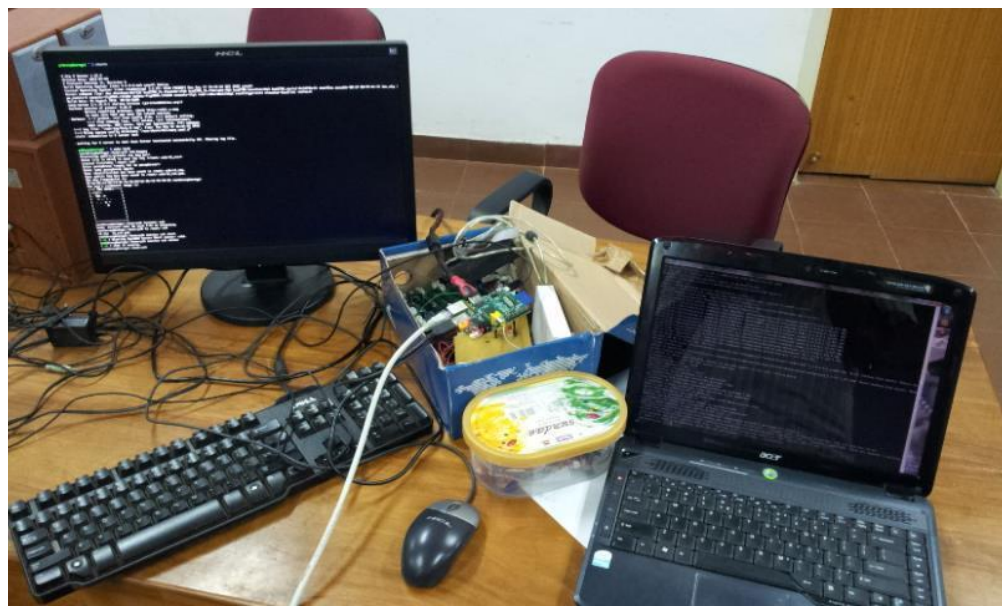
SSH tunnel in action @ Htron Lab's
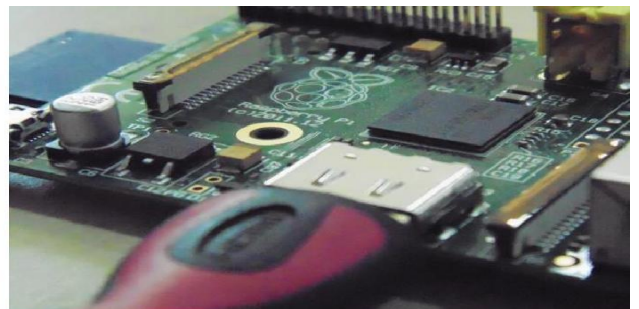
Module 3:Session 9 (Play with python/sensor interfacing with R-PI GPIO pins)Duration 3 Hours

Playing with Python

- ✓ Introduction
- ✓ Hello World
- ✓ Arithmetic
- ✓ Conditions
- ✓ Loops
- ✓ Functions
- ✓ Running python on Raspberry Pi
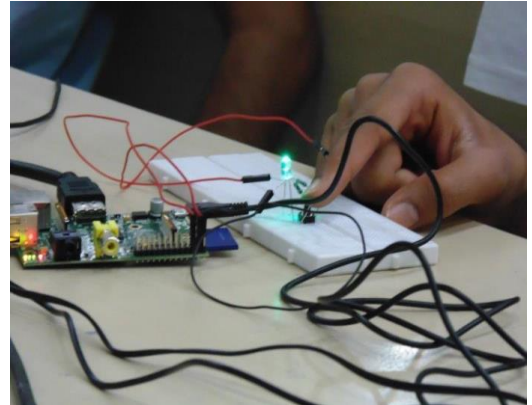
The power of Shell: Command Line

- ✓ Secure Copy or SCP
- ✓ Getting to know the command Line Interface
- ✓ Debian Linux Basic & Useful commands
- ✓ Editing system files, changing system hostname, changing log-In Info
- ✓ Installing software on Debian – Installing VNC server
- ✓ VNC Server: GUI of Pi on your smartphone

Fun with GPIOs: Part 1 – Input Device

- ✓ Interfacing a switch
- ✓ Understanding Circuitry: Pull up and pull down resistors
- ✓ Interfacing Digital and Analogue Sensor (ADC Conversion Sensors)
    1. Proximity Sensor
    2. Fire Sensor
    3. LDR (Luminance sensor)
    4. LM35 (Temperature sensor)

Module 3: Session 10 (Embedded coding with python/wireless communication with xbee rf Module)Duration 3 Hours

Fun with GPIOs: Part 1 – Input Devices

- ✓ GPIO in Python
- ✓ Board Mode and BCM Mode
- ✓ Circuit connections
- ✓ Python Dev and Time Libraries
- ✓ Interfacing sensors [Led,Ultrasonics,DHt11,IR sensor]
- ✓ Let there be light: Glowing the LED
- ✓ Pulse Width Modulation: PWM

Fun with GPIOs: Part 2-Output Devices

- ✓ Interfacing DC Motors
- ✓ Interfacing Buzzers
- ✓ Control real devices (Fan, Bulb etc.) using relay circuitry.

Wireless communication Demo: Part 3

- ▪ **Interfacing Raspberry-Pi with (802.15.4 Standard) X-bee and blue-tooth module (Demo)**
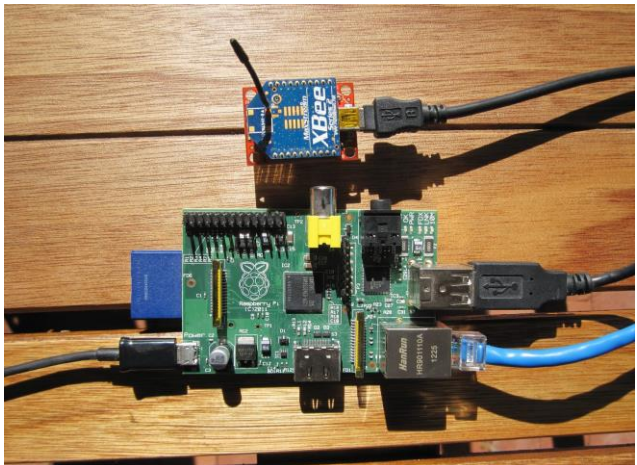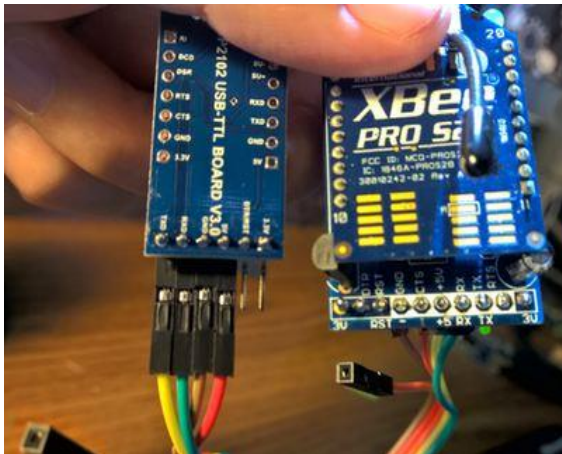
Module 3: Session 11 (Build your own IOT server on R-PI)
Duration 3 Hours

Set up a simple MQTT Broker

- Install Raspbian on the Raspberry Pi
- Install MQTT on the Raspberry Pi
- Test subscribing and publishing to the MQTT broker

Set up an MQTT lens or Arduino Uno as a MQTT Client

- Wire up a circuit with a button and an LED
- Write a sketch that will allow the button to control the LED
- Modify the sketch to publish to MQTT when the button is pressed
- Modify the sketch to subscribe the LED control to MQTT

Connect to the MQTT Broker from the internet

- Install Apache on the Raspberry Pi
- Install node.js on the Raspberry Pi
- Install socket.io to allow real-time web communication

[**Note: Why Socket.io and Node.js?**

Web browsers typically operate by pulling data from a server when you click on a link. Servers don't usually keep an open connection to the browsers it has serviced, so if some event happens on the server side, the server cannot push that event to your browser, unless you refresh the page.

That's where Socket.io comes in handy. Socket.io maintains an open connection between the server and the browser, which enables the server to push updates to the browser as they happen. This is useful so you can see changes to your IoT network as they happen, and not have to wait for a page refresh.]

Internet of Things Demo
With a Real-Time Web Interface

Real-Time IO

Socket.io				IoT	
JavaScript	Apache	Node JS	MQTT		PubSub
Ethernet	Ethernet				Ethernet
Browser	Linux				Arduino
Web Client	Raspberry Pi				Appliance
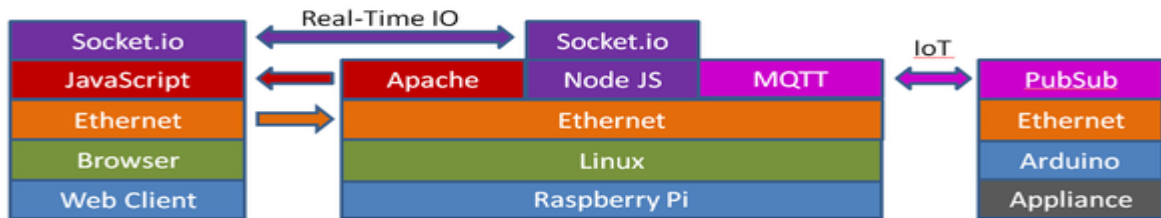
- **Web Client** requests page from **Apache server** running on the **Rpi**
- **Apache** returns HTML with JavaScript implementation of the **Socket.io** library
- **Web Client** opens a real-time socket with the **Node.js socket server** on the **Rpi**
- **Node.js** forwards all communications between the **socket** and the **MQTT broker**
- The **MQTT broker** publishes/receives messages to/from all subscribed clients:
    - The **Node.js socket server**
    - All smart-devices on the your **IoT network**
- **Arduino** uses the **PubSub MQTT library** to receive/send messages to the **IoT network**
- **Arduino** interfaces to your **dumb appliance** through digital/analog IO

MOSQUITTO MQTT BROKER

Apache	Node JS	MQTT
Ethernet		
Linux		

HITRON RASPBERRY-PI

Back end Client   MQTT PUB/SUB   MQTT PUB/SUB   Front end Client
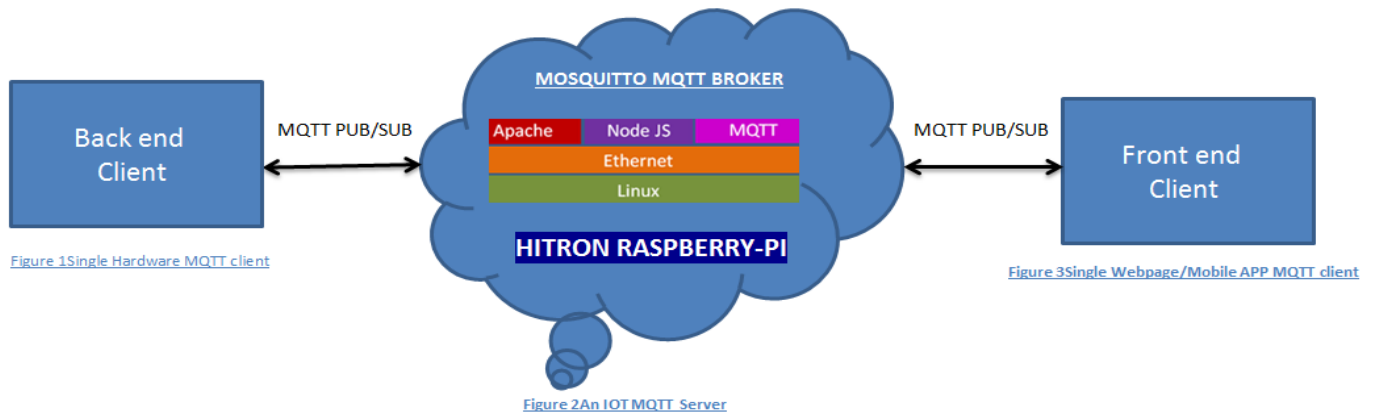
Figure 1Single Hardware MQTT client

Figure 3Single Webpage/Mobile APP MQTT client

Figure 2An IOT MQTT Server

Back End MQTT Client-1

MOSQUITTO MQTT BROKER

Apache	Node JS	MQTT
Ethernet		
Linux		

HITRON RASPBERRY-PI

MQTT PUB/SUB

Back End MQTT Client-2   MQTT PUB/SUB   MQTT PUB/SUB   Front End MQTT Client

MQTT PUB/SUB
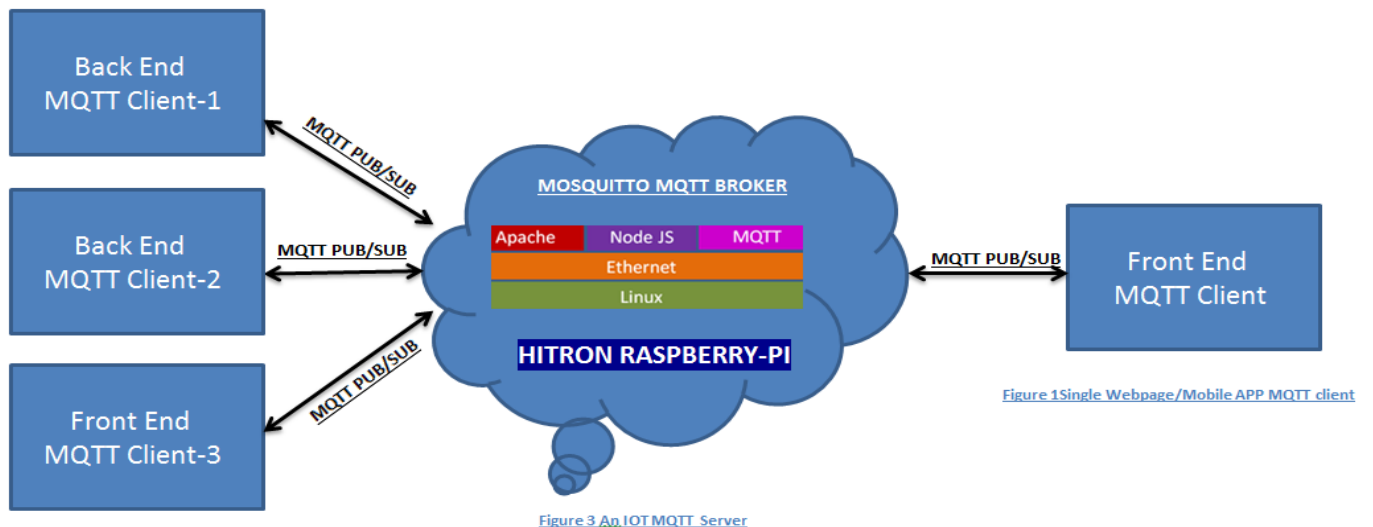
Front End MQTT Client-3

Figure 1Single Webpage/Mobile APP MQTT client

Figure 3 An IOT MQTT Server

Figure 2 Multiple Hardware MQTT client

Module1:Session 12 [CREATE MULTIPLE BACKEND (MQTT) END AND FRONTEND (HTTP)CLIENTS USING rest API's]Duration 3 Hours

REST (Representational state transfer protocol) API from Scratch
Using MEAN STACK

- ✓ **M: Mongo-DB – A NoSQL database powered by JavaScript.**
- ✓ **E: Express.JS – A Node.js application framework.**
- ✓ **A: Angular.JS – A front-end single-page javascript application framework.**
- ✓ **N: Node.JS – A server-side javascript application engine.**

In this session,

- **we will create a full RESTful web API (Application Programming Interface) that will allow multiple front end client to get, post, put and delete JSON data through HTTP requests from webpage/mobile app to backend or hardware device in publish/subscribe format through MQTT Protocol.**

- **We will also store these real time data in MongoDb database either form hardware side or multiple front side.**

Module 3:Session 13 (Build an IOT platform with MQTT&HTTP protocol alon with Hybrid app [Android/IOS/Windows]) Duration 3 Hours

Practical, 3 Hours

- **Get to know the core concept of bridging MQTT and HTTP protocol on Raspberry-pi.**
- **End to end IOT device Two way communication@ Hi-Tron platform on Raspberry- pi IOT Gateway.**
- **Create your own Hybrid App for your own IOT Device.**

Figure 3 End to End IOT, MQTT, Server

Figure 2 Multiple Hardware MQTT client

Figure 1Multiple Webpage/Mobile APP REST HTTP client

Module 3:Session 14 (Build an IOT product end To end Product for Industry with End nodes, sub-gateway and gateway)Duration 3 Hours

Final Industrial End ot End IoT Application

(1)Raspberry Acting As a server
(2)Arduino Hardware client or IOT gateway
(3)Zigbee end node connected to the sensors
(4)Ionic Mobile App (Front end Clinet in Android/IOS/Windows)Webpage in Angular.js
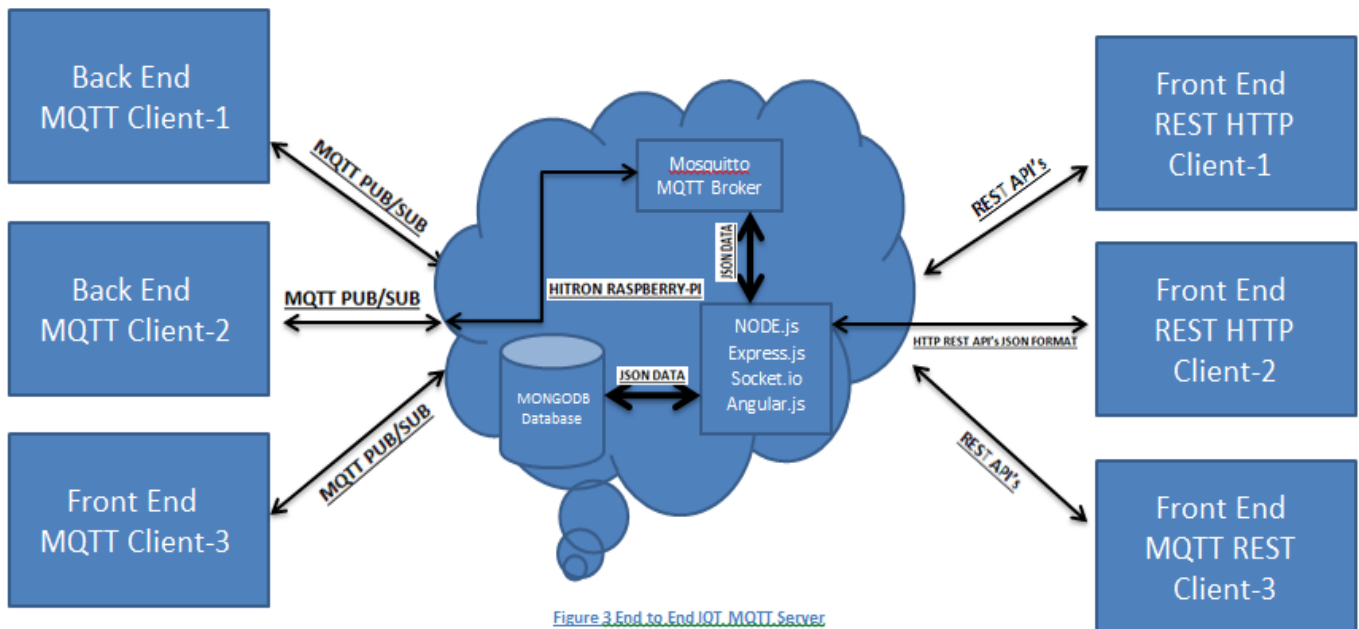

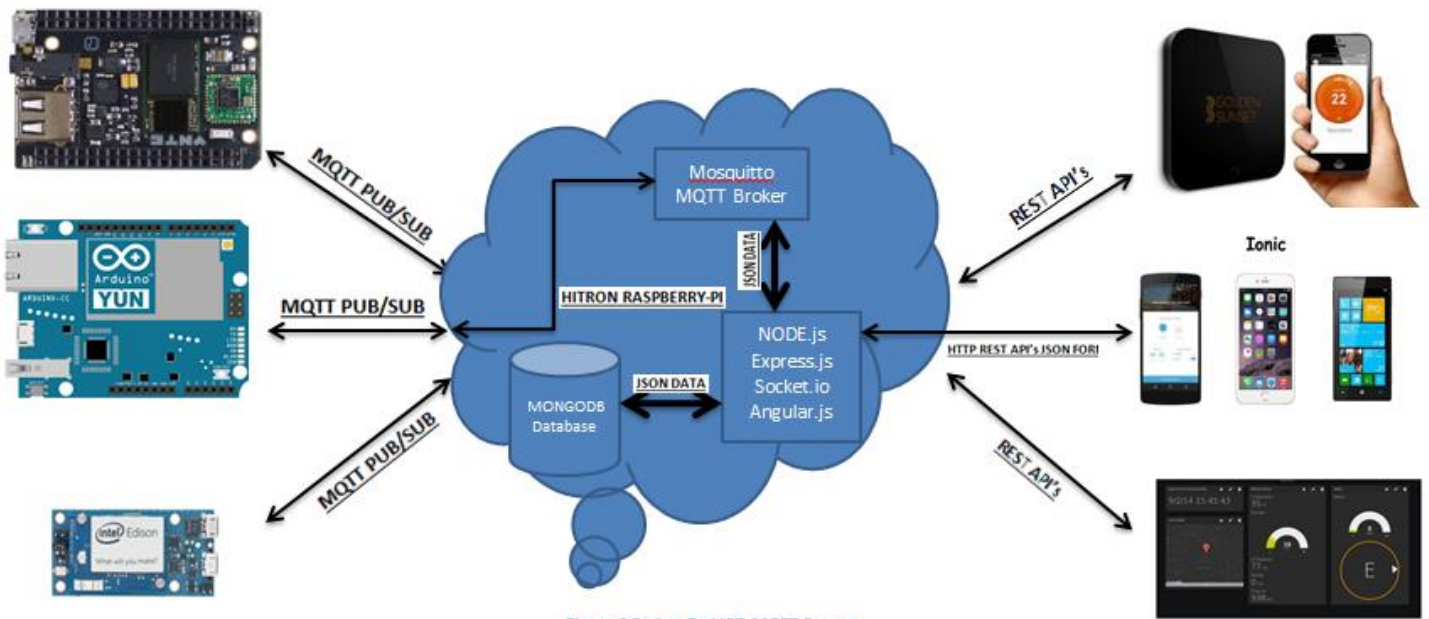Figure 3 End to End IOT MOTT Server

Figure 2 Multiple Hardware MOTT client

Figure 1Multiple Webpage/Mobile APP REST HTTP client

Module 3:Session 15 (Implement any of The End Application listed below with the same concept)Duration 3 Hours

Practical's and Project Ideas Implementation on IOT

These are the list of the Sensor based application ideas in which this key concept can be implemented.

1. **Smart Connected cars**
2. **Smart water Tank Level**
3. **Smart waste management system**
4. **Smart car parking system**
5. **Smart logistic system**
6. **Smart patient monitoring system**
7. **Smart home automation system**
8. **Smart gas detection system**
9. **Smart traffic signals**
10. **Smart Solar tracker**
11. **Smart RTO system**
12. **Smart agriculture system**
13. **Smart transportation**
14. **Smart energy metering system**
15. **Smart logistic system**
16. **Smart Bikes**
17. **Indoor Air Quality**
18. **Smart Automobiles**
19. **Temperature Monitoring**
20. **Ozone Presence**
21. **forest Fire Detection**
22. **Air Pollution**
23. **Smart Water level Indicator**
24. **Smart A.C.**
25. **Earth Quake early Detection**
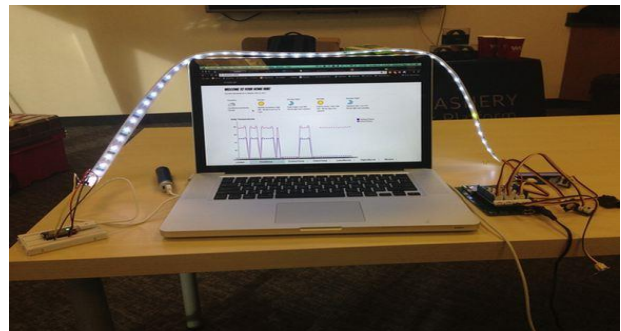
- **Apply the same concept for making your ideas Smart which can be useful from industries point of view as well as academic project point of view for students.**

- **Any Innovative Idea based on IOT will be sponsored for his project immediately during Training by Hitron.**

What are Benefits of Participants

- Build your own IOT Device and get IOT Certified.
- Understanding IOT and its business.
- End to End IOT Architecture.
- Each system, Work-station, Kits will be assigned to each individual for training.
- Sensors and Embedded Systems.
- Hardware & Software Development Platform for IOT.
- All network protocols for IOT (to connect devices).
- Cloud, Web Services, Big Data, Big Data Analytic and Visualization.
- Practical for all above mention topics.
- Get your hands dirty with hardware and create your own IOT Devices.
- Understand the concept behind smart cities, smart wearable's &smart switches.
- Well Trained Faculties from HITRON.
- 100% hands on experience in building, circuit designing as well as programming.

Final outcome of this training program

At the end of the program, attendee will be able to make their own IoT Startup based on projects such as

- Smart home and Smart Agriculture system which can be interacted through their android/laptop or any other devices remotely.

- Smart switches which can control any Appliances [Refrigerator, A.C., Oven, Washing machine, Fan, Lights, Door etc] to turn ON/OFF (Advance switches) through their android/IoS/Windows/laptop or any other devices remotely.

- Smart Hospitals and car parking system that will notify on your android/IOS/Winodws app where exactly car has to be parked.

  And many more projects which can be useful from Industrial point of view as well as academic point of view.

Commitments

- **Based on Participants capability they can be recruited by Hi-Tron components or they will get a chance to work on Hi-Tron's live Industrial Project.**

- **Any Professional or engineering Students will be confident and capable to build their own IOT devices**

- **Participants will be capable of designing any application by integrating multidisciplinary concepts and can understand all the process of smart products like smart switches, smart watches, smart meters etc.**

- **Participants can choose their career in IOT field and can publish their papers in International/ National Journals.**

About Training

- **Hi-Tron Training is 100% hands on experience based.**

- **The workshop will be completely application development based.**

- **Competitive oriented learning methodology of Hi-Tron will help the attendees to think innovative.**

Frequently Asked Question [FAQ's]

Q1. What are the pre-requisites for the Training?

Ans. There is no specific pre-req. Hi-Tron has built the deck and tutorials/practical in a simple and easy way so that anyone can learn from them. During the training our experts will help you understand all aspects. Lots of Finance, HR senior executives have attended our sessions with amazing results.

Q2. Who will be benefited from this program?

 Ans. An Internet of Things is applicable to all verticals and specializations. That's the beauty and attraction of IoT. Some of the people who can make the most from the program are.

Students: Who are looking to build a better career in technology. There is going to be a 4.5 million job vacancies for IOT specialize because 90% top level companies (Apple, IBm, google, Microsoft, Cisco, Qualcomm) are making their product smart or have started working in this domain. This program helps them develop them to create or build end to end IOT device.

Electronics/ECE/E&TC/ExTC engineers: Who are aware that a golden period is coming for them soon and want to reach out beyond their current scope that limits them to just electronics or communication. Getting an understanding of the electronic side of the IoT technologies and standards and also getting an exposure to the cloud / software side of things will enable them to play a key role in time to come when the demand for electronic engineers with IoT experience and knowledge will skyrocket. Even in many universities IOT course got compulsory for students' academics so those who are planning for higher education MS or MBA, this training can be a fruitful for them.

Existing or Budding Entrepreneurs or Startup: Nowadays in every country 7 out of 10 startups are in IOT domain including India so those who have any IoT ideas (e.g. Remote controlled things, home automation, wearable's, tech devices etc. that they would like to bring to a reality. They will get a very good understanding of all technologies and most importantly, how these technologies work together to make it possible. They will also get technical support from Hi-Tron experts.

Industry professionals: Working in pharmaceutical, real estate, manufacturing, electrical, retail, healthcare and a number of other verticals and businesses who are foresighted to see the disruption that it will bring in the way their business operates in the near future and want to be the early adopters or change agents in their respective industries. Through the insight that they build on the working and the possibilities of IoT, they can spearhead the adoption of it in their business areas.

Q3. Do I get any certificate on attending this training?

Ans. Yes. We will be mailing you the certificate on completion of the course, signed by experts and authorized by Hi-Tron. This certificate will be useful to get a position in any company looking to get into IOT. We are available as reference check for you for any IOT related opening worldwide.

Q 4 .Will I get a job after doing this program?

Ans. We are going to cover multiple technologies like Hardware platforms, sensors, Protocols, embedded programming, cloud deployment, analytics, etc. Surely this will provide a window of opportunity in the up and coming tech industry and a huge number of startups coming up in the area. Companies/startups working on wearable tech, etc are looking out for guys trained in IOT as first choice.

Q5. PROFFESIONAL CHARGES & SUPPORT:

Rs.18,000 /- Participant

Q 6 .What will be there in Takeaway Kit?

- **Raspberry- Pi 2 model B**
- **4GB Samsung SD card**
- **Arduino UNO (Atmega 328) Board.**
- **Arduino Ethernet Shield (W5100)**
- **Wi-fi module (Esp8266E-12Version).**
- **Ultrasonic sensor (HCSR04).**
- **Temperature sensor (LM35).**
- **Luminance Sensor (LDR).**
- **IR sensor**
- **Gas Sensor**
- **2 channel relay Board**
- **Bread Board, LED's and few M2M& M2F jumpers.**

About us

- Hi-Tron is an embedded Hardware and Software company which pays attention both to technology and to the people using it. We see strong relations to our collaborators and customers as well as a great Deal with in-depth knowledge of modern embedded systems as our biggest assets. While our main focus is providing embedded Hardware and Software services for the emerging ecosystem of the Internet Of every Things.

- At Hi-Tron we have always looked at sharing new and advanced technologies with engineers in industries and in colleges. Starting from September,2013 Hi-Tron has conducted Corporate and Academic Training on IOT based on (Arduino, Raspberry Pi, Intel Galileo) for engineering students and working professionals from TTL (TATA Technologies Limited), TATA motors, PSL(Persistence Systems Limited), Wipro and Hi-Tron had signed MOU (60hrs) with 32 engineering colleges across India for compulsory IOT training for students during their academics and have continuously received overwhelmingly positive response from the students, hobbyist and researchers alike by means of feedback and testimonials.

- But we believe one of our biggest achievements is we have trained more than 5000 engineering students and 3500+ professionals from different industries as part of this Training.

- We are a passionate team of software, hardware and business nerds hailing from 2 countries and 3 cities, bringing together experts with experience in the diverse disciplines required to bridge the gap between the cloud and devices. Hi-Tron is Development team of Tata Motors and Tata Technologies for IOT embedded solutions. Recently, Hi-Tron Deployed Hi-Gate (IOT based smart energy metering system) in TTL Pune. We help organizations deploy software to remote devices for use in far-ranging scenarios, from smart Home, to drones, to wind turbines and more.

Institutional & Industrial Clients

Technological Tools
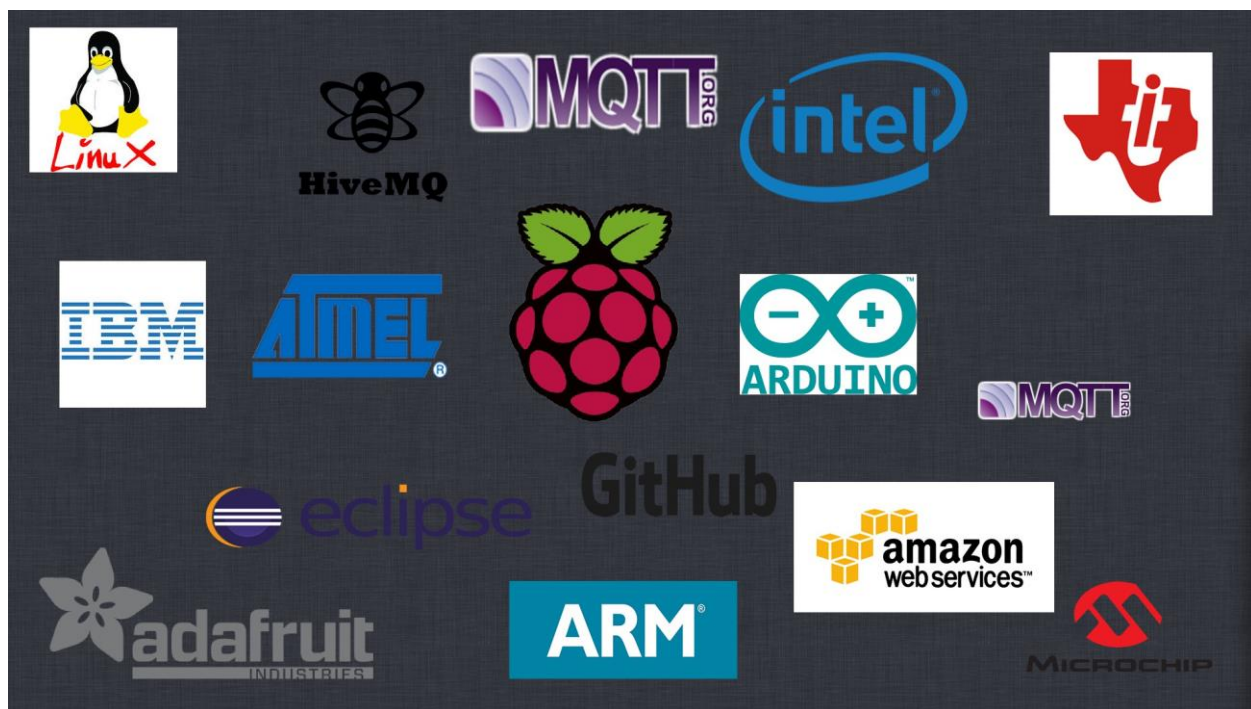
HI-TRON
COMPONENTS

FEW PROTOTYPES

| SMART ENERGY METERING SYSTEM | SMART INVENTORY SYSTEM | SMART SWITCHES |

For more information and to organize a workshop at your institute feel free to write to us at info@hitroncomponents.com

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hitesh@hitroncomponents.com

He is very well familiar with Open source IOT [Arduino /Rasp-bery pi/BBB/Intel Galileo]Platform and having 6+ Years' experience in Hardware Designing and manufacturing and contributed in many IOT communities like Github/ stack overflow/eclipse about all his experience and hands on knowledge on IOT. He has also developed Hi-Gate IoT gateway and many IOT prototypes for industries like Tata technologies limited and Tata motors. He has also conducted free seminars and webinars on IOT for students in almost 450+engineering colleges and 150 + industries in India.

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