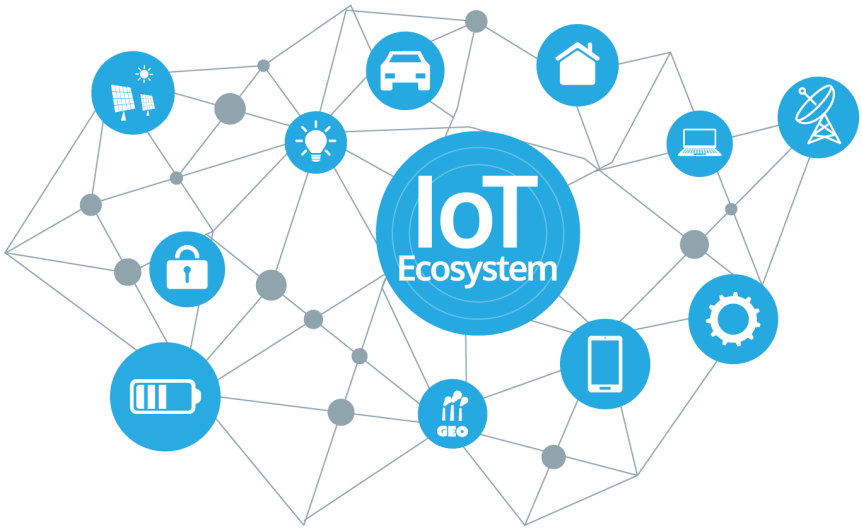
A Guide to the Internet of Things



By:
[Agniswar Paul]
IoT Mentor, Zubi
UC Berkeley '19

For getting started with the **Internet of Things**, firstly you need to understand the basics of electronics, what are microcontrollers, how it works and how you can program it.

1. Start with **Arduino** first, Arduino is a microcontroller which runs on Embedded C and also very easy to use and make basic IoT Projects.

- Start watching Arduino tutorial videos on Youtube by Jeremy Blum , After watching these videos try to program Arduino by yourself.
- Refer to the official website of Arduino , download the Arduino IDE
- In that website go to “Resources” then click on the “Tutorials” also go through the “Getting Started” tab.
- For understanding all the functions, again go to the “Resources” and then click on “References”.
- Download the Arduino Uno Pinout Diagram.
- Understanding Serial Communication.
- Programming Arduino using USB-TTL converter.

2. Once you are done with Arduino, start working with WiFi modules like **ESP-01, ESP-8266**, **ESP-32.**

- Introduction to the ESP-01
- Introduction to the ESP_8266
- ATCommand Mode (using it as a WiFi module for Arduino boards)
- Stand-Alone Mode (Using it as a microcontroller)
- Interfacing with the Cloud.
- Getting Started with the ESP-32.

3. **NodeMCU**. It’s a development board with ESP-8266 chip.

- Introduction to NodeMCU.
- Tutorials on NodeMCU.
- Download the Pinout diagram of NodeMCU.
- LED control using Blynk app and NodeMCU.

4. Intro to **Raspberry Pi**

Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing and to learn how to program in languages like Scratch and Python. First of all setup your Raspberry Pi, here are the steps:

- Download software of choice from this link(raspbian-full version is highly recommended)
- Format the SD card with SD card formatter here.
- Download win32 disk imager, and flash the .iso file(downloaded previously) to the SD card.
- For mac and linux users you can use etcher for flashing the SD card.
- Insert the SD card into the slot(CAREFULLY!!!) and plug the devices and the raspberry pi to the monitor and power source.
- First thing is to connect the pi to the wifi.
- Steps 1-5 are required only for the first time. For later usage connect to the raspberry pi using SSH (highly recommended, this is where your command line skills will come to use). For windows use putty.

Once you are done with this, download the pinout diagram of the raspberry pi 3 and then get started. Go to the official website of the raspberry pi, then click on “projects” and then click on the “Getting Started”.

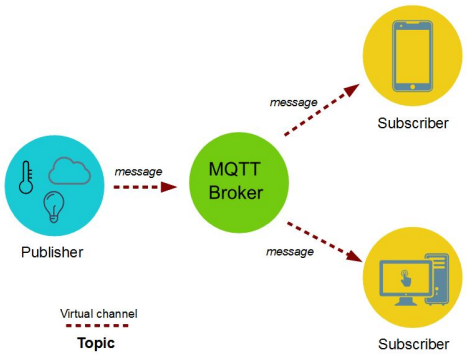
5. Refer to the Instructables, for understanding and making projects using Arduino, NodeMCU, Raspberry Pi etc.

6. Visit the website IFTTT(If This Then That). It is a free web-based service to create chains of simple conditional statements, called applets. An applet is triggered by changes that occur within other web services such as Gmail, Facebook, Telegram, Instagram, or Pinterest.

7. Go to the Adafruit, it is a system that makes data useful. Focusing on ease of use, and allowing simple data connections with little programming required. IO includes client libraries that wrap our REST and MQTT APIs. IO is built on Ruby on Rails and Node.js.

8. Learn the **IoT Protocols**:

- HTTP Protocol.
- MQTT Protocol.
- Other Protocols.
- You can also refer to Youtube to get some more insights about these protocols.



9. Visit the website Thingspeak. ThingSpeak is an open-source Internet of Things application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network.

10. Understanding the I2C Communication. The Inter-integrated Circuit (I2C) Protocol is a protocol intended to allow multiple "slave" digital integrated circuits ("chips") to communicate with one or more "master" chips.

That's all Folks!! I hope now you are pretty much comfortable with the basics of IoT, and you are all set to build cool IoT Hacks. Happy Hacking!!

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