HOME AUTOMATION USING IOT

Wherever you look, the Internet of Things is all about. It's the "following enormous" thing in innovation today. IoT is shaping the way we live our lives.

Imagine you are at work and suddenly you realize that you had left your air conditioner turned on while leaving your home. Instead of traveling back home, what if you could use your smartphone to know the status of your air conditioner and perhaps turn it off…wouldn't that be amazing? Yes, This is where the Internet of Things comes into place. The Internet of Things (IoT) is a scenario in which almost every appliance can be connected to the internet and can be monitored using a remote.

Getting started with the IoT

What is IoT?

The Internet of Things (IoT) refers to a system of internet-connected objects that can collect and transfer data over wireless networks without human interference.

The use of the Internet of Things in our everyday lives include:

- Smart appliances (stoves, refrigerators, washers and dryers, coffee machines, slow cookers)
- Smart security systems, smart locks, and smart doorbells
- Smart home hubs (that control lighting, home heating, and cooling, etc.)
- Smart assistants (like Amazon Alexa or Apple's Siri)
- Fitness trackers, sleep trackers, and smart scales, and many more.

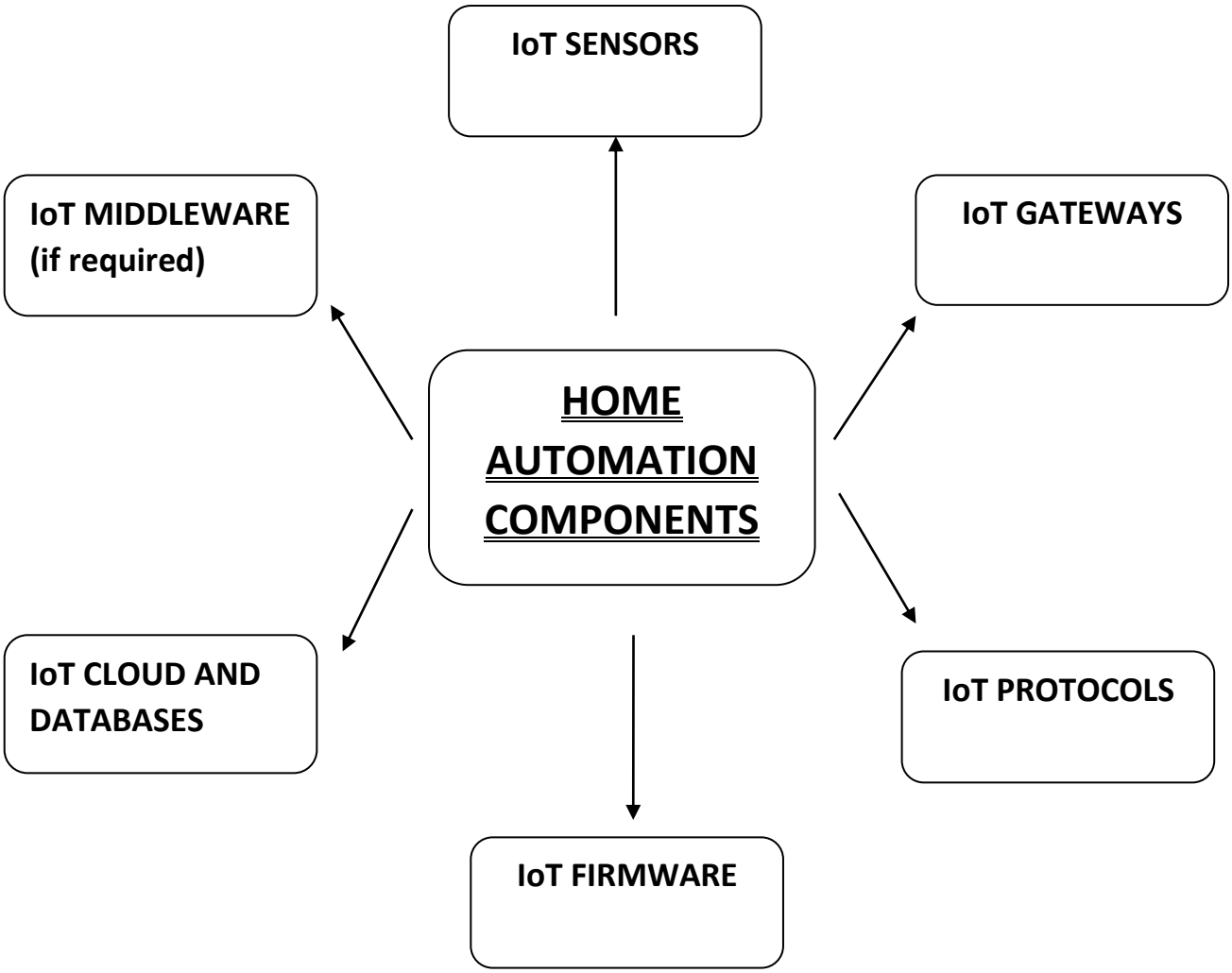
How IoT helps in transferring data over wireless networks?

Just imagine when the morning alarm wakes you up, the curtains drew themselves, and a gentle stirring massage or vibration from your mattress. Once you raise your voice assistant tells the weather for the day, giving you the reminders for the day. The light, the temperature of your home, and the door gets locked all through voice instructions. With face recognition, you enter and exit your home without using a bunch of keys. Once you leave, the Sensor communicates with the Thermostat and resets the room temperature to the inactive state, lights shut off automatically. Isn't this amazing?

There are a lot of things that go on in the background for all these functioning. There is effective communication between the devices and a lot of components are involved in transferring data.

Home Automation

- **HARDWARE**
- **SOFTWARE**
- **COMMUNICATION PROTOCOLS**



Home Automation Sensors:

- Temperature sensors
- Lux sensors
- Water level sensors
- Air composition sensors
- Video cameras for surveillance
- Voice/Sound sensors
- Pressure sensors
- Humidity sensors
- Accelerometers
- Infrared sensors
- Vibrations sensors
- Ultrasonic sensors

Home Automation protocols:

One of the most necessary parts, protocols. Protocols that your device would use to communicate to gateways, servers, and sensors.

When looking at the major home automation protocols, the following tops the list:

- Bluetooth low energy or Bluetooth Smart
- Zigbee
- X10
- Insteon
- Z-wave
- Wifi
- UPB
- Thread
- ANT

Which among these are best??

The commonly preferred protocols are Bluetooth low energy, Z-wave, Zigbee, and Thread. The protocol selection depends on the following factors:

- Ability to perform identity verification
- Quality of sensor networks
- Data transfer rate
- Security level
- Network topology required
- Density of objects around
- Effective Distance to be covered

Home Automation gateways:

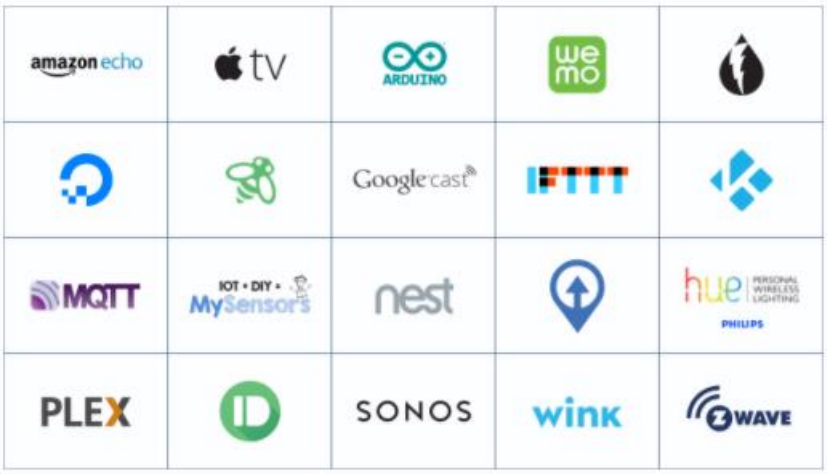
- Communication protocols supported
- Real-time capabilities
- MQTT, CoAP, HTTPS support
- Security and configuration
- Modularity

Home Automation Firmware:

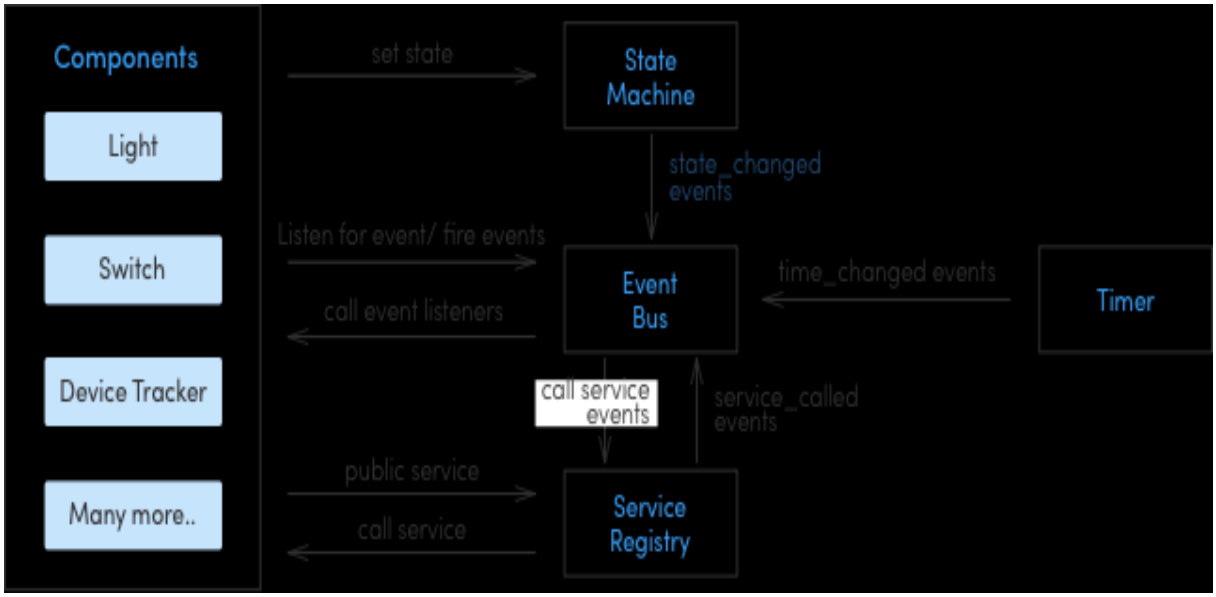
Most of the firmware is in :

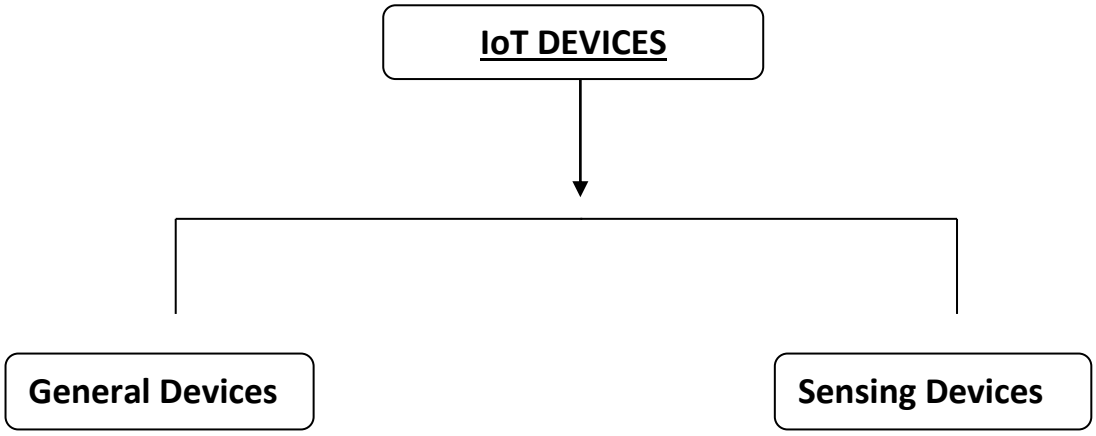
- C
- Python
- Node.Js

Home Assistant

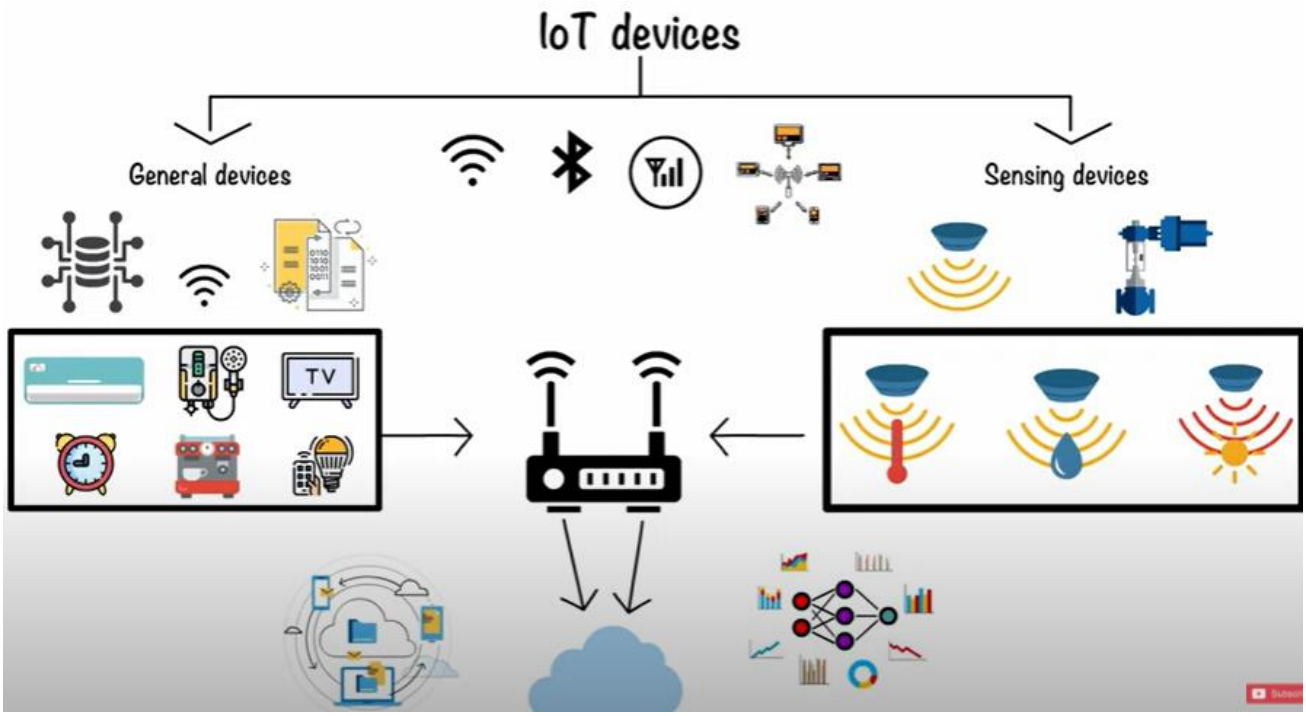


Architecture of home assistant





IoT devices connect to the network with the help of gateways. These gateways then pass the information collected from the sensors and transfer it to the cloud. The cloud access both the storage and processing unit. Actions are performed on the collective data for further inferences. Wired and Wireless interfaces like Wifi, Bluetooth, Zigbee, GSM's helps in providing connectivity.



Where IoT is heading:

The future of IoT looks more promising. In 2018 there were 23 billion connected devices and it is expected by 2025 there will be 80 billion devices.

According to the latest IoT trends 2020, IoT collaborates with a large number of other fields. All fields are nothing without IoT. These industries are going with their pace but with the help of IoT. So, the need for IoT Is Indispensable.