



## A Study on Internet of Things

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**Abstract:** Now a day one of the advance word in the information technology is Internet of Things (IoT). The main goal of IoT is to transform real world objects to the artificial intelligent virtual objects. IoT will provide everything in the real world object to provide common infrastructure to control the things around the state of the things. Recently this study represents IoT concepts by researcher scholars, expert system, corporate white papers and online databases. Moreover this research paper will provide definitions, issues of internet things, basic requirements and characteristics of IoT. The main objective of research paper is to provide a complete overview of technologies associated with their usage of daily life. However new research will provide goal comprehension and facilitate accumulation effectively.

**Keywords:** RFID, Internet of Things, Network, Near Field Communication, Wifi

## I. INTRODUCTION

The Internet of Things (IoT) is a novel paradigm shifted to the information technology. IoT include two words internet and things. The internet follow standard internet protocol suite (TCP/IP).

In the network millions of government networks, public, private and business networks are connected by various networking technologies and broad array electronic data inputs. Today the data is communicated over the countries and it provides local and global data throughout the network. Network consists of various a list of exchange data, linked web application, news and various things on internet. While the another word is “Thing” means that is distinguishable from real world objects. It is defines as any object or person that is distinguished by real world entities. The entities are represent as a things in the IoT (Internet of Things). Every entity has its attributes which represent the characteristics of entity.

For example thing is defined as entity an “Employee” detail which represent as entities. The employee details like employee name, employee age and employee department represents their attributes associated with the employee entity. Another way to defined the things is any object which is living things or non living things the object such as food, flower, landmarks, furniture, material parts, equipments, culture, chair, plants, home appliances, industry equipments, monuments, personal computers and various object that are pointing the real objects in the material and physical world.

Definitions- Internet of Things presently not uniquely defined instead of that various researchers, technocrats, practitioners, developers and corporate people that Internet of Things that is accepted or acceptable by the world based users. Another definition that defines internet means the data is created by the people and the next version is about data that is created by the objects.

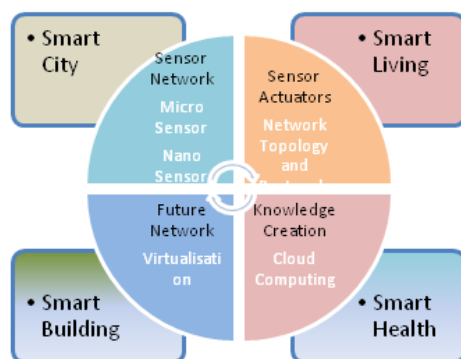


Figure 1 Internet of Things-- Smart Environment Creation

## II. RELATED WORK

The IoT is referred to as connecting the smart devices and building and also includes the sensors, software, and electronic software, actuators which activate these objects to collect and exchange data.

In 2013, the Global Standard initiative on IoT. It defines the IoT as “Infrastructure of the information society” [1]. The IoT permits objects to be sensed and controlled remotely across existing network infrastructure.

In 2016, the scope of the internet of things has evolved due to a convergence of multiple technologies, involving real time analytics, machine learning and commodity sensor etc. The concept of network of smart devices was discussed as early as 1982 with a modified coke machine at Carnegie Mellon

University becoming the first internet connected applier [4]. The term Internet of things was invented by Peter T. Lewis in 1985 speech given at U.S FCC (Federal Communication Commission). [5]

### III. CHARACTERSTICS OF IOT

The various characteristics have been defined for the Internet of Things. These are as follows

#### A. *Intelligence*

Various algorithms and computing technologies will provide to make a product very experience and smart.

#### B. *Connectivity*

Peoples are connected through wi-fi and enable to access the network compatibility. Accessibility means to provide ability to produce and consume data.

#### C. *Sensing*

Trying to understand and senses the ability for the physical world and people around us.

#### D. *Energy*

Energy is used in power efficiency, harvesting and power intelligent that must design.

#### E. *Safty*

Various tools that are used to design safety and security for physical entities.

### IV. PROBLEM WITH IOT

#### A. *Problem with storage of data*

When the IOT will be deployed the data generated from various sources will increase dramatically. This data is need to be stored somewhere for processing and analyzing it in real time. Processing of such a huge amount of data in real time will demand additional data centers which will cause new issues with security, capacity and analytics.

#### B. *Connecting Remote Assets*

The challenge lies in nature of IoT itself. IOT will connect remote devices and systems providing a data stream between devices and decentralized management systems. The data will incorporate the information about the location, activity and functionality of those systems along with the information about the people who own and operate on these systems. This amount and type of information differs in many ways from the big data that is collected from social media.

### V. CHALLENGES ASSOCIATED WITH IoT

#### A. *Security*

With the digitization and automation of millions of devices, providing security will become a challenge for enterprises to protect themselves from the threats. Till now various industry specific platforms have been developed like for air and defense sector. These solutions are aimed at protection of specific devices like smart meters. So security with handling such a huge amount of data is a major challenge associated with IOT.

#### B. *Enterprises*

With increasing amount of data, the requirement for the devices to handle this data will also increase having more security complexities which in turn impact the availability requirements which are also expected to increase. This may put the real time business processes at risk.

#### C. *Consumer Privacy*

As the main motive of internet of things is to improve the services and management of devices. So securing the consumer's personal information is also a challenging issue.

#### D. *Data*

IOT will require to store the two types of data: Personal data (Consumer driven) and big data (Enterprise driven). IT administrators whose job was to keep the data centers running, will now have to figure out how to store, protect and make all the incoming data accessible.

#### E. *Storage Management*

Although the capacity is available, further demands on storage will be made. The economics of storage have been weighted up against the IOT information by the businesses.

#### F. *Server Technologies*

The IOT has affected the server market in a way that now it is more focused on increased investment in key vertical industries where IOT will be more profitable. There exist some companies which collect data from huge array of devices. This may require additional compute capacity and may increase server budget.

#### G. *Data Center Network*

Current data center network uses WAN (Wide Area Network) and the bandwidth is adequate only for the current flow rate of data. Since after deployment of IOT, the amount of data will increase dramatically so the bandwidth of the network need to be modified in such a way that it can handle huge amount of data flow rate. So it is no longer feasible to store data at a single location.

### VI. TECHNOLOGIES

The basic technologies which support the particular functionality required in IOT system as compare to a standard uniform network are as follow.

#### A. *Radio Frequency Identification(RFID)*

Internet of Things permits everyone to be connected anytime and anywhere. Radio Frequency identification dispense a unique identification to the objects. This technology is used as a most secure identification method for locating or we can say tracking objects, vehicles and things. Moreover RFID provide an easy, versatile, low energy option for identification and access token , connection bootstrapping and payments. RFID technology use full duplex radio transmitter receiver to track and identify tags associated with objects. To understand RFID in detail let us consider an example of grocery store where we have to stand in long checkout lines. But now these line will disappear as universal product code (UPC) is replaced by smart labels. These RFID smart tags are intelligent bar code that track every product and communicate product information and price details of items in the cart to a central network system. After that your bank will be notified for bill payment and amount is deducted from your account.

RFID is used in various fields like

- In automotive industry RFID is used to locate and control major assemblies with in production.
- RFID can be used for patient identification in hospitals.
- In aerospace industry and defense RFID is used for authentication of parts and to improve supply chain visibility.

### B. Near Field Communication(NFC)

Near Field Communication (NFC) is a rising wireless short-range communication technology that works with the Radio Frequency Identification (RFID) infrastructure. This technology allows a simple, rapid, instinctive and easily securable communication between two electronic devices or we can say NFC contains a set of communication protocols specifically for mobile device and standard device.

Basically NFC works in three operation modes

- **Reader Writer Mode:** When RFID tag or passive smart card comes in range of NFC enabled device then energy is transferred from magnetic inductive coupling to the passive tag. Then a connectionless communication has been established between charged tag and NFC enabled device. Once the connection is established NFC device can read and write data from passive tag.
- **Peer to Peer mode:** functionality in this mode is similar to Bluetooth. When two NFC enabled device comes in range of each other then information can be exchanged.
- **Card Emulation Mode:** This mode is used in ticketing and payment applications. Here NFC act as a smart card from which other device can access information. Credit card and paper based tickets are replaced by NFC technology.

### C. Wireless Sensor Network(WSN)

One of the famous technology of IoT is wireless A wireless sensor network consisting of distributed independent devices using sensors which monitor physical or environmental conditions, such as temperature, pressure, vibration, sound, motion or pollutants, at different locations. WSN allow us to monitor unobservable things over large temporal scale. WSN based on IoT has established notable attention in various areas like military, forest fire, manufacturing, transportation, civil infrastructure, security, healthcare, agriculture monitoring, habitat monitoring and flood detection etc. Sensors can be used to monitor patient's body responses to the medication, so that doctors can determine the effects of the medicines.[6]

### D. Artificial Intelligence

Artificial Intelligence refers to electronic environment created by human beings which is susceptible and responsive to the activities done by peoples. Artificial Intelligence is explained by following characteristics such as embedded, adaptive, anticipatory, and personalized.

Artificial Intelligence has its application in various areas like gaming, natural language processing, expert system, vision system, speech recognition, handwriting recognition, and intelligent robots etc.

### E. Wifi Direct

Wifi direct is a wifi standard that allow different device to connect to the network without ant access point. As in conventional wifi access points are used which are responsible for routing between different nodes and also support communication between wired and wireless system. But the number of devices are increasing day by day with that overhead is also increasing. Wifi direct allow connection without any access point and moreover facilitate communication between devices from different manufacturer. Wifi direct support all the functionalities like file transfer , communication between different devices and internet browsing etc.

### F. ZigBee

ZigBee is a personal area network standard proposed by the ZigBee Alliance that promote low rate and low power wireless sensor network. The ZigBee protocol stack is defined by IEEE 802.15.4 standard, which defines the Media Access Control (MAC) and physical layers for low-rate wireless personal-area network (LR-WPAN). It is responsible for network security, and application layers.

## VII. CONCLUSION

Internet of Things gradually brings a set of various technologies that brings changes in our daily lives, which help to make our life more comfortable and simpler. Because the various technologies are used based on the applications. The main domain of Internet of Things application includes industrial, transportation, medical, education, manufacturing, mining and commerce etc. We conclude that in this research paper the key observations are meaning and definitions of Internet of Things, their technologies associated with IoT, various confronts related to the IoT and provided characteristics of the internet on things.

## VIII. REFERENCES

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