

ARCHITECTURE AND SECURITY ISSUES ON INTERNET OF THINGS (IoT)

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Abstract: Internet of Things(IoT) is one of the emerging technology nowadays. Internet of Things refers to a concept that integrates large number of smart objects with the internet.It cooperates with the other objects and bring greatest benefits to the society.Basic internet facility is not enough to solve this problem but it needs new algorithms ,new services and neural network environment.ThisIoT requires the expansion of Wireless Sensor Network,Internet and the distributed component.This paper discusses the architecture and security issues in IoT.

Keywords: IoT,SensorNetwork,Smart connectivity, Context Awareness ,RFID , Security

1. Introduction

In IoT most of the objects will be in the network.Sensor technologies and RFID(Radio Frequency IDentification)is mostly used in the IoTtechnology.This requires large amount of data to be processed and stored.RFID is the secured technique for identifying objects and things. Cloud computing technique is also used in IoT which integrates various services and analytical tools.Cloud computing enable the users to access the end-to-end service on demand for their various applications.This is one of the necessary property of mobile devices and it based on location awareness.This property is beyond our traditional mobile computing and can be used in smart phones which connects our daytoday objects to our real time scenario. IoT needs the following 1.Shared Environment 2.Analytical Tool 3.Software Architecture and Pervasive Network. Based on the above requirement IoT achieves the context awareness and smart connectivity[1-5].

IoT is used to connect various devices with out human intervention and generate integrated data from these devices and allow the users to take the decision.

The term IoT (Internet of Things) was first quoted by Kevin Ashton[6-9] and it covers various applications like health care etc.This paper presents the architecture and applications of IoT.IoT allow the persons to be connected from anywhere at anytime.Datacollection,Closed Loop functioning ,Network Resource Preservation based on the network capacity are the main characteristics of IoT. Due to the lightweight OS,development of Internet Protocols such as IPv6 and low power connectivity suitable for sensors leads to IoT growth in a peak level. Ubiquitous Computing,Ubiquitous use of IP and Ubiquitous Connectivity are the major drivers for the growth of IoT[10-15].Constrained Application Protocol (CoAP),Rerouting Protocol for Low-Power and Lossy Networks (RPL) and Internet protocol V6[15-20] are the protocols used by Internet of Things.

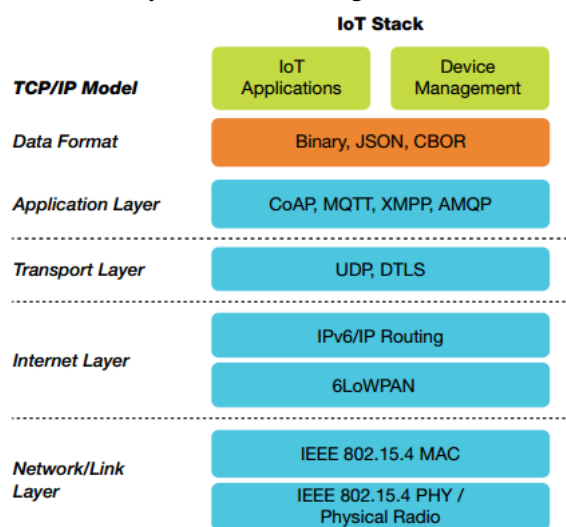


Figure 1. Protocols in IoT stack

Security is one of the main issue in IoT.Security encryption algorithm requires high processing power.

Network layers of IoT architecture:

IoT architecture consists of 4 layers. First layer is the Embedded System Layer which consists of sensors with small inexpensive devices. Multi_Service Edge layer This layer supports various protocols. Core Network layer specifies path in the network. Data center network layer provide services to the user.

2. Related Work

Various works have been proposed in IoT. Paper[18] proposes the architecture and key technology of IoT. This paper also focuses on the use of smart grid on IoT. Paper[17] demonstrates how temperature affects the IoT. Paper[5] describes the software for Internet of Things.

3. Applications of IoT

IoT can be applied in various fields like health care, retail, transport, insurance and home automation[6].

a. Health care:

It is also used to locate Doctor as well as patient inside the Hospital. It has wearable device using sensors and internet to monitor the patient's activity in terms of sugar level, temperature and heart beat and also give alert to the patient and Doctor.

b. Retail

IoT will help in tracking of items in the retail stores. It will help the Shop keeper when to put an order for their company.

c. Transport

IoT monitors traffic jams, screen the luggages and passengers. These IoT application teach safe driving by comparing other user's speed. GPS based car service is used to detect car theft and to record the speed and the acceleration and to inform the insurer.

d. Security of Information

It provides security of critical information using RFID techniques.

e. Environment monitoring

It is used in green computing which prevent from natural disasters. IoT is also used to measure the gas and oil leakage from the containers.

f. Manufacturer

IoT is also used to create smart pharmaceutical packing and storing of products.

g. Home monitoring

Smart metering is used to measure the electric consumption to the customer. IoT is used to measure the temperature and humidity and adjust the room temperature accordingly.

h. Agriculture

IoT is also used in Agriculture to measure the growth of the crops, maturity time, measures the farm land using sensors and RFID technology.

i. Education

IoT is also used in Education for self learning. The system is used to measure the skills of the learners.

J. Telecommunications

IoT is used various to merge various technologies like Blue tooth, GPS (Global Positioning Systems), Sensor Networks to create new services for TeleCommunication.

4. Technologies used in IoT

RFID (Radio Frequency Identification) is used to identify the items which is away from their sight. This is also used in the highway toll collection. To detect physical changes in the environment sensor network is used. It doesn't require internet and can be operated from the remote sites. It can also be used to embed microcontrollers chip in the objects and to take decision on their own. Various protocols such as Zigbee, IPv6, Link layer are used in transmission of data over the internet efficiently which is suitable for IoT things. IoT is also used in biometrics which is used to measure the person using iris, finger print etc. Mission vision technology is used to transfer information instead of RFID technology. Smart component is used to measure and transfer the information. Acuator is used to detect an incoming signal and change the environment accordingly. This is used in heating systems, light illumination and alarming. Location technology is also used to identify the physical location of objects using optic, acoustic and electromagnetic properties. Barcode can be used to read the products using optical in order to increase the speed of the checking out process in Retail stores.

5. Conclusion

In this paper, we have discussed the use of Internet of Things (IoT) and the use of smart connectivity and context awareness in IoT. This paper discusses the

applications of IoT and the various technologies used in IoT. It also discusses security issues and Protocols used in IoT.

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