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A Brief Usage of IOT: Internet of Things

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A Brief Usage of IOT: Internet of Things Approach In: Study of Security and Privacy

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Abstract—In everyday things, attached them with some sensors and software, hardware and connecting them with internet, making them to interchanging information without involvement of human called Internet of thing. Making automatic detecting device with sensors and software embedding with internet and response without intervention of any other or human called internet of things (IOT). In this paper out purpose is to prevent IOT device from hacking and spamming. Security and privacy are most important part of this paper, security requirement and solution are based on some IOT layer-framework, network, sensing layer. There are some IOT devices which are easy to hack so providing security and privacy is first role in IOT. In internet of things detect activity or movement of thing by sensors and signal to control center then control center send command to sprinkler then it decide what result has to respond. In this paper, discussing about awareness of hacking spamming data from hacker or outsider and also discuss that where IOT not used till now.

Keywords: Security of smart device, secured Network Design, Internet of Things.

I Introduction

Internet of Things (IOT) has various type of technology in which multiple of electronic and hardware device connect with internet with the help of sensors and IOT technology and transfer data over a wireless network. In this modern life technology and science has grow up very fast, in technology's life hope any one who does not aware about internet of things or relative devices. Technology and science have made life easy of human, long distance work done in some moment. Internet of things has performed worldwide with high speed of network and smart devices. The process of internet of thing, when things and device embedded sensors and they are interconnected with internet and local area network or wide network, they send request to controller device and respond to device without involvement of human. IOT devices can be controlled remotely with different functionality, and data sharing between device and controller through network which take standard protocol of communication. IOT devices require different security and privacy mechanism, when large amount personal, commercial and government data shared on wide network infrastructure. In this paper we will discuss about security way and technique of sending data with security. In any technology or physical work security is the main issue then functionality and services because if data hacked or alter data by hacker then it causes the loss to that system or company so with adopted this science and new technology all have to aware about spamming, hacking and malicious attack. There are many places where Internet of thing is using like home, company, railway, industry, farming, hospitals, airport, hotels, animal house etc.

II History of Internet of Things

Internet of thing was coined by kevin Ashton, MIT's Executive Director of Auto-ID Labs in 1999. He describes the IOT during presentation for Gamble and Procter but meaning has evolved over time. Carnegie mellon research connect a vending machine to internet with remotely check cold sodas in 1982. First toaster was operated over network in 1990. The LG introduce first smart Fridge in 2000. First smart watch introduced 2004. Apple I phone and wearable fitbit released in 2007. Google starts testing driven cars in 2009. Smart TV is introduced in 2011. Google lens is released in 2013, Echo cause a surge in smart home market in 2014, tesla come out with Auto pilot drive for car in 2015. These are the journey of IOT device used in our environment.

III Application of Internet of Thing

A. Smart Monitoring Device in Healthcare Area

In medical or hospital area internet of things is helping staff member to monitor the patient without touching them. with help of Bio-sensors and wearable device health can be monitored. In healthcare department already some devices are using like Glucose monitoring, Hand hygiene monitoring Heart-rate monitoring also in smart medical room there are smart bed which check activity and update to the controller, smart door lock, face senser entry gate, smart lift, smart fire alarm all are response to controller and resolve the problem Ex. in covid time it was the big issue to treat patient who actually not suffering from covid so at this time IOT devices using perfectly.

B. Device Detector Smart House

Smart house means There are some automations of smart devices are using without involvement of humans, sensors or module detect the activity of human and response to controller then it decides that process should complete or not. Ex. At entry gate detect with some device face sensor, finger print, door closer, smart object sensing light, smart fan, ac, water tank, kitchen etc.

C. Smart Transport System

This system was made to reduce the problem of passenger and their waiting time for bus, cab or train. All system has become smart passenger can track the location, call the driver, and watch the station wise transport. At transport and their station both senser and GPS system interconnected which send their activity to the controller and server then passenger send the request to server to fetch the location or detail of transport, this complete system has to make more secure this all process should work with original id or passenger so if any issue created by someone then system can find easily and prevent it from big accident.

D. Smart Way of Infrastructure Management

The Development of smart city, they adopted the advanced communication technology. One of the most application is used to monitor and access the control of infrastructure like road map, railway track, building it has not range limit for access. This method helping in government for highway to check road accident and high speed of transport. For security camera can be embedded with smart switches and centralized Monitoring.

E. Animal Care System

Inter of thing is used in all over the world, urban and ruler area, each one using new technology and make our surrounding smart but less using animal care system, animals are also part of human journey so to make some device for animal ex. Health monitoring device, hunger device. For safety of animal and road accident. We can make device to cure the without greed.

F. Education System

Before decades IOT is using in education campus. Smart class, electronic attendance, chemical detector. Ex. In school bus or school area when student enter in that then a message can send to their parent and school staff and exit then again send message with time and date with delay or update on ERP id of student.

III Data Processing of Internet of thing.

In the processing stage, usually three stages are there in data process.

A. Input:

In input collect the data from user or client in raw form then send to processing for classification, sorting and calculation. Data Aggregation In this collect the data or information from difference device, such electrical home appliances light, ac, fridge. Collect the data at one place.

B. Processing:

In processing data transfer from raw data into correct information such as: first classification data in different group using some data manipulation techniques.

C. Output:

This is that stage where data out from processing and converted into readable form and receiver to end user. In this stage data is stored in cloud infrastructure for further used.

IV Security Mechanism of Internet of Things

Security and Privacy in IOT means that secure that network where devices are interconnected and prevent that network from malicious attack. Internet of things is risk for all digital ecosystem because internal design IOT has made without built in security. As new smart area is growing as cloud based security is increasing to prevent data from threat or out sider attack. There are

different mechanisms to secure IOT devices from attack and hack.

A. Data Integrity

In Internet of things data integrity is one of the most important security requirements, in this data accuracy between two device is major issue. Data send to the end user without any modification in data. Ex if data transfer between two company and hacker change data then cause of wrong information received all plan and system can be destroyed. For this issue data or information transfer between two devices should be in encrypted form which reduced the outsider attack.

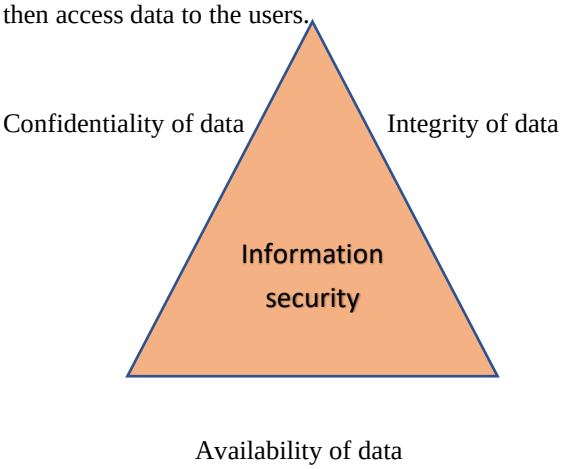
B. Availability of Data

All resources are available to the authorized user, resources are data, hardware, software, memory should be maintained and available to authorized user, authorized with respect to the content or all resources. It is the major issue of security. data is not available on the machine then all important work could delay So for this issue make a backup mechanism which has two key step process to fetch data from backup. If data not found this has rectified soon. Denial of service is the main issue of availability, this attack stop the service.

C. Confidentiality of Data

Data transfer between two user, sender and receiver if sender send data to receiver so only receiver get that data or information not access but third person if it is then security is maintaining and if data read or access by someone else the security has broken.

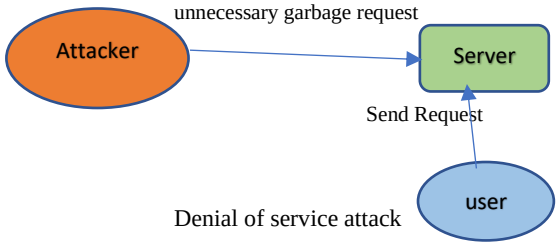
In this Diagram all these security goals surround to Data. These three securities satisfied the right users then access data to the users.



V Security Threats of Internet of Things

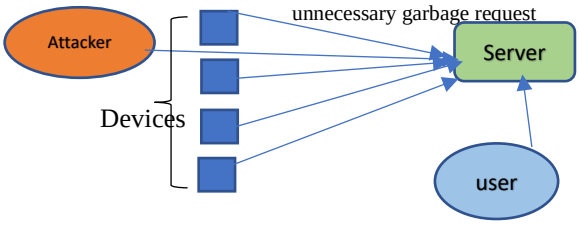
A. Denial of Service

Attacker sends lots of flooded unnecessary garbage request to the server then server hang, user request to server and server denied response to the user cause server has down. This attack is called denial of service attack.



B. Distributed Denial of service (DDOS)

In this attacker adds a virus in server in form of file and if device a download that file then become infected devices so attacker send the flood of unnecessary request to the server by those infected device and hang the server which denied to response to users.



C. Unauthorized Access

Simple attacker is not valid user, it accesses the credential of valid user by any method such as user name and password. With using that credential attacker uses the functionality of system of IOT.

D. Information Manipulation

Attacker which is not valid user access the credential of valid user the it manipulates the information. It can destroy the efficiency and down the performance of system for this take the security measures and authorized authentication or protocol so that attacker is not able to destroy or manipulate the system.

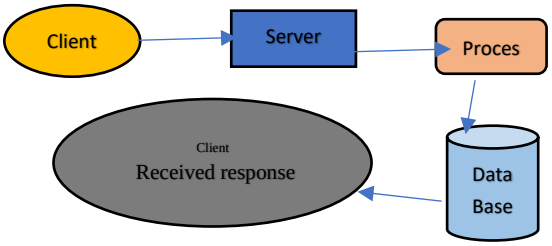
E. Information Discloser System

Sensors gather, collect and share the information it can store in cloud or local database or in same device storage so the main purpose to miss guide the attacker or hide information from attacker so that attack is not able to find the information. If he finds then use that data for wrong way. Ex in health care patient highly confidential data is stored and in this case security is major problem or take authentic protocol to prevent data from attacker.

VI Communication Model in IOT

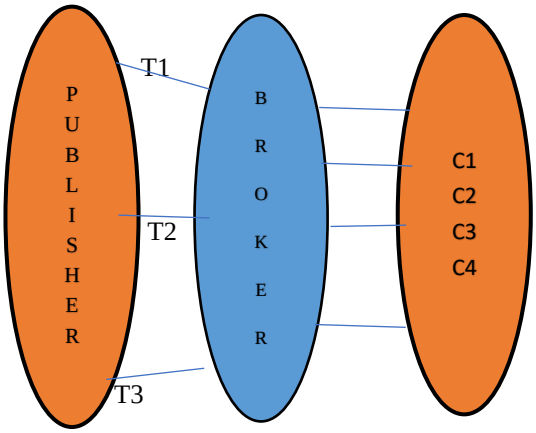
A. Request and Response Model

Client sends the request to the server and server process to categorized and fetch from data base then database prepare response in encoded form then send to client and client received in decoded form. Cause of security.



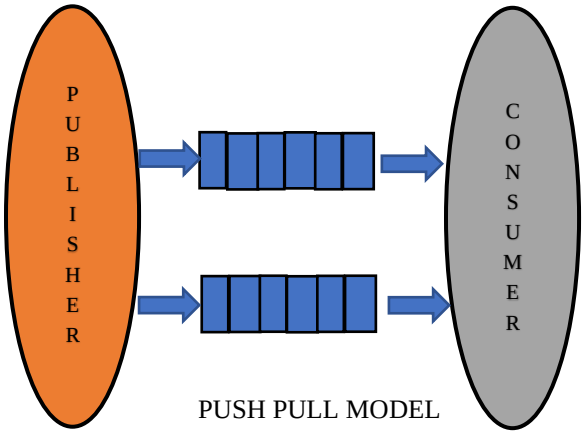
B. Publish Subscriber model

In this publisher which is source of data it sends the topic respectively to broker, and broker stored the subjects by sorting and broker decides to send the topic to which subscriber as required by client.



C Push-Pull Model

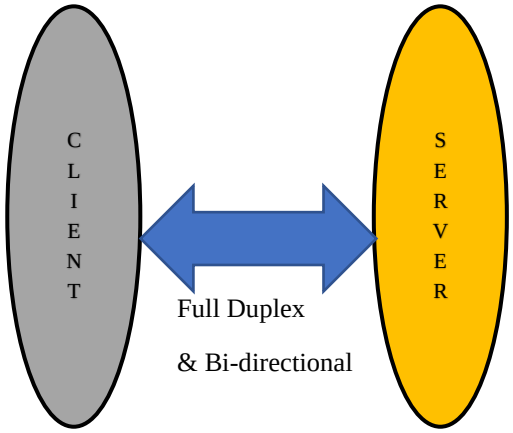
In this publisher push the message in buffer of queue and message pull out from other side by consumer. If there is not queue between them flow cannot be controlled, the weight of transfer data is higher on publisher side than consume so it cannot be controlled to manage this situation buffer or queue is used.



PUSH PULL MODEL

D. Exclusive Pair

This method comes with benefit, between client and server there is exclusive link which is called full duplex and bidirectional communication. Even client wants to contact till that time link is active otherwise disconnect. Only bi directional link work with permission of client then server response



VII Conclusion

Internet of things works with smart system, those devices are interconnected and communicate with relative device, a process is called machine to machine communication. IOT devices work like a human but human not involved, human can only interact with device to set up them and give them instruction to work accordingly to environment with help of sensors, and devices do mostly work own without intervention of human. Internet of thing is emerged as significant technology. without security and privacy all technology is waste and more maintenance is need to make secure technical system.

VIII Reference

[1] Geeksforgeek

[2] Google.com

[3] Youtube.com

[4] Techtarget.com

[5] R Valerdi, S Zhou, P Wang, L Li - Information Systems Frontiers, 2015 - Springer

[6] Z Baig, M Chernyshev, O Bello… - IEEE Internet of Things

[7] M Choi, SE Lee, S Kim - Telecommunications Policy, 2017

[8] TYM Zagloel, M Dachyar, LR Saragih - Heliyon, 2019