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Internet of Things

Praveena Sreevisak

praveena.sreevisak@gmail.com

Syscoms College, Al Ain, United Arab Emirates

ABSTRACT

IoT is an emerging technology which allows intelligent interaction between people and things. It focuses to combine everything in the world under a single infrastructure. So, it means the connection of devices using embedded software, sensors and actuators to communicate with one another. IoT aims to unify everything in our world under a common infrastructure, giving us not only control of things around us but also keep us informed on the state of things. In this Paper, we review a concept of IoT applications and security challenges that facing the implementation of the IoT. IoT is quickly developing across industries all over the globe. There are many success stories that demonstrate the value in every organization but the market has not been able to recognize the benefits of IoT. IoT is expected to be a rapidly developing technology. IoT can improve communications in an organization, bringing innovation in businesses, increase customer engagement and help in assessing the work process. IoT is used to automate data collection, processing, and analysis from various sources.

Keywords— Internet of Things (IoT), Security issues/solutions, RFID, Authentication, Key management, Developments

1. INTRODUCTION

The term IoT was devised by Kevin Ashton, Cofounder and executive director of Auto-ID centre at MIT in 1999. This is the era of IoT, i.e. Machine to Machine (M2M) communication indicates two machines communicating with each other, usually without human involvement.

It is predicted that IoT will consist of 50 billion connected devices by 2020 and that the worldwide IoT market will be more than a \$10 trillion industry. The global leading advisory and research firm on information technology predicted that there will 22 billion IoT devices worldwide by 2020, which is a conservative estimate in comparison to what large multinational companies predict.

According to research in 2003, the number of things connected to the internet exceeded the number of people on earth, by 2020 there will be 50 billion things.

Examples of IoT applications is the traffic lights which changes its colours depending upon the traffic. Windows can be closed automatically when the air condition is turned on. When you are finished shopping, you simply walk out the door, your credit card is charged when you exit the supermarkets' door. Even the idea of IoT is useful for disabled persons (i.e. Google Eye)

An IoT System has four elements: Sensors/ devices, connection, information handling as well as user interface. An IoT System contains Sensors which communicate by Internet connection. IoT continues this connectivity by several tools with the device to device communication. When the data reaches the destination, it processes the software so that the user can handle it.

Technologies are widely used for the deployment of successful IoT-based products and services.

- Radio Frequency Identification (RFID)
- Wireless sensor networks (WSN)
- Middleware
- Cloud computing and
- IoT application software

The key observations about IoT are:

- There is no standard definition in worldwide
- Universal standardizations are required at the architectural level.
- Technologies are varying from vendor-vendor so needs to be interoperable
- For better global governance, we need to build standard protocols.

2. LITERATURE REVIEW

One of the leading Research and advisory company Gartner has estimated some 8.3 billion devices would be connected by the end of 2017, increasing to 11.2 billion by the end of 2018, then nearly doubling to 20.4 billion by 2020. Approximately two-thirds of these projected figures are apportioned to consumer applications. World's highest tech regions Western Europe, North America, and Greater China are the first known drivers of IoT where the three combined represent more than 67% of the concept implementation in 2017. The steady growth in potential and popularity of IoT has, indeed, made it a far-reaching technology today.

The Market Opportunities of IoT are listed below:

- 50 billion connected devices by 2020- Cisco
- 9.5 billion Mobile subscriptions by 2020- Ericsson mobility
- 152 million Connected cars in 2020- IHS Automotive
- 42% of households will have Wi-Fi by 2016- Strategy Analytics

According to Louis Columbus, an enterprise software strategist, IOT has the greatest potential to digitally transform the business to more flexible, customer oriented and efficient. Tech leaders in the U.K. (21%), Japan (20%) and the U.S. (16%) lead all other nations in their plans for IoT digitally transforming their businesses by 2021.

3. SECURITY ISSUES AND SOLUTIONS

Despite these benefits, there are many challenges in IoT, some of them arise now and others will emerge in the future. For example, Security/Privacy is a challenge at levels of the field. Some of the issues are listed below:

3.1 Privacy and Data Protection

Privacy rules about data require any kind of interface to provide policy information about the user's personal information. Any mishandling of personal information can create harm for individuals. The misuse of consumer data such as Cambridge Analytica, in that user's personal data, was used for different political purposes. So IoT should ensure that connected devices should not reach in wrong hands.

3.2 Global misinformation systems

Hyper-connected world enables the speed of information that can be either good or unintentionally misleads peoples. So there should be a set of rules and Framework to address these issues.

3.3 Big data problems

Information arrives by numerous sources for Big Data. The biggest problems that organizations face is how to get value from data. These information's are constantly changing. Also, security and privacy pose risk in Big Data. Necessary changes in Infrastructure may help data stay safe and usable.

3.4 Public attitudes, opinions and behaviour

Although public believe that IoT will benefit them, they are more concerned about data security and Privacy. Trust has been acknowledged as an important factor for technology adoption.

3.5 Tightly coupled systems

The tightly coupled systems have shared memory. So if more data comes these systems can have memory conflicts. Using tightly coupled systems are more challenging nowadays.

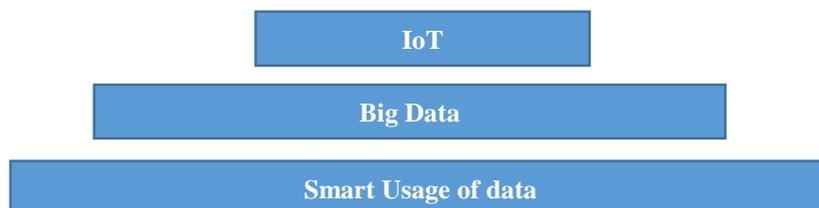
Considerations

To prevent unauthorized use of user's data, strong infrastructures are required. The Security solutions can be classified as:

- **Centralized Approaches:** For IoT applications, data is collected from a large range of devices that communicate to a centralized collection point. So IoT will strongly need a centralized architecture than the distributed/client-server model.
- **Protocol-based Extensions and Optimizations:** The standardization of IoT is very important nowadays. Security, as well as privacy, raises major issues, all these challenges need to be addressed in designing protocols. The success of IoT depends on how it solves real-world problems and create long term benefits. So there should be feasible network optimization techniques to handle huge traffic in the coming years as billions of IoT devices are connected to global networks.
- **Alternative Delegation architectures:** There should be a reference Architecture to cover all the aspects including cloud/server architecture. It should support all the requirements of various use cases and interact with all other IoT devices effectively. In short, delegation architecture should provide a solution for authentication and authorization.

4. IOT ARCHITECTURE AND DEVELOPMENT

In IoT data can be divided into three layers:



The IoT forum says that the IoT Architecture is basically categorized into three types including applications, processors and transportation.



The term IoT was coined by Peter T. Lewis in one of his 1985 speeches given at U.S Federal Communication Commission (FCC). Mr Pete Lewis said, “The IoT is the integration of people, processes and technology with connectable devices and sensors to enable remote monitoring, status, manipulation and evaluation of trends of such devices.”

4.1 Developments in IoT

The most relevant developments of IoT are:

- Google launched “IoT Core”, a cloud service tailored to IoT devices.
- Cryptocurrencies, one of the technology highlights with the biggest one bitcoin.
- Blockchain entered with the rise of digital currencies.

The other trending topics within IoT is edge Analytics. It describes a technology architecture, where intelligent decisions are performed rather in the cloud. Edge Analytics will play an important role in low bandwidth or low latency environments such as oil rigs, mines, or factories.

- The most amazing development of IoT based analytics is Google Waymo. IoT 2017 saw the first (non-driver assisted) fully self-driving car on a normal road. It is also an excellent example of edge analytics in which machine learning functions have been moved to the camera (edge) so that the car can react instantly.
- IT Organizations refine their IoT cloud and data lake creation strategy i.e., some firms have already moved a significant portion of their operations to the cloud.

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6. CONCLUSION

This Paper emphasizes to provide an overview of the Internet of things and security challenges. Though the Internet of things has benefits there are still some drawbacks in the implementation level. By integrating all these drawbacks, future technologies will be developed soon.

7. REFERENCES

- [1] Babu, T., and Swathi, P. (2018). Internet of Things (IoT) & Big Data Analytics for Smart Cities-A Case Study. SSRN Electronic Journal.
- [2] Klein, S. (2017). The World of Big Data and IoT. IoT Solutions in Microsoft's Azure IoT Suite.
- [3] Kumar, R. R. (2017). Internet of Things (IOT) - Privacy Concerns. SSRN Electronic Journal.
- [4] The American University of Sharjah, 20 Sept. 2018, www.aus.edu/media/news/aus-team-wins-international-award-for-research-on-cyber-security-of-the-internet-of.
- [5] IoT Analytics, iot-analytics.com/iot-predictions-2018/.
- [6] PDF, docplayer.net/52803202-A-review-on-internet-of-things-iot-security-and-privacy-requirements-and-the-solution-approaches.html
- [7] Scientific Research Publishing. Journal of Computer and Communications, Scientific Research Publishing, file.scirp.org/Html/56616_56616.htm.
- [8] www.researchgate.net/publication/280527542_Internet_of_Things_IoT_A_Literature_Review.
- [9] www.researchgate.net/publication/315058460_Research_Challenges_for_the_Internet_of_Things_What_Role_Can_OR_Play
- [10] www.researchgate.net/publication/321184539_Exam_Helping_Device.
- [11] IoT Analytics, iot-analytics.com/iot-predictions-2018/.
- [12] Dutton, William H., The Internet of Things (June 20, 2013). SSRN: <https://ssrn.com/abstract=2324902> or <http://dx.doi.org/10.2139/ssrn.2324902>