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Technical Requirements for the Application of Internet of Things

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Abstract - Nowadays, Internet of Things (IOT's) terminology is becoming the most important field of Information and Communication Technologies (ICT). IOT is considered as an important part of our future life. It will require all surrounding life's participators to be adaptive and compatible with IOT concept. In this paper, a review of the basic technical requirements/components those are essential to construct IOT efficiently and effectively. Furthermore, a survey of the challenges of IOT is presented in order to find new solutions. Therefore, our daily life requirements are needed to convert into the Internet of Everything. Hence, after applying the IOT for all organization it can change the way of any company's operation such as giving competitive advantages and also changing its future business strategies, and its business model.

Keywords - *IOT, ICT, Technical Requirements/Components, Challenges, Competitive advantages, Business Strategies*

1. Introduction

There is a difference between Internet of People (IOP) and Internet of things (IOT). Internet of people connects all people but Internet of Things connects all things which things here mean everything that has the ability to communicate. The phrase "IOT" started life in 1999 by Kevin Ashton. IOT refers to wireless network between objects; usually the network will be wireless and self-configuring. Internet of things can be viewed as a network of networks. It allows anything to connect any time at any place either human to human (H2H) or human to things (H2T) or things to things (T2T). There is a recent statistical report about the total connected devices per a person which reach to 7 devices per person. This means that we will treat with electronic and automatic society [1].

Originally, the IOT started with the development of (Radio Frequency Identification) RFID tagged objects that communicate over the Internet. RFID along with the Electronic Product Code (EPC) global framework is one of the key components of the IOT architecture. There are many other communication technologies are involved in IOT, including UUID and Near Field Communication (NFC). Any new technology has great advantages and also many disadvantages/limitation so that we will discuss the technical challenge that meet IOT's application [1-3].

The rest of this paper is organized as follows. IOT technical components are presented in Section 2. In section 3 a summary of the benefits of IOT. Section 4 discusses the IOT challenges and how IOT will change the way of any company operates? In Section 5, we draw some conclusions.

2. Components of IOT

We can represent the concept of IOT as an equation which contains different components as the following equation:

IOT= A. (Sensing) +B. (Communication) + C. (Computation) *(1)*

Table 1 represents the detailed components for every basic component. Furthermore, fig (1) depicts the IOT-Enabled Enterprise. Its technical structure is the base to construct IOT for any enterprise. Fig (2) shows an example of IOT for future shopping application. IOT will automate everything.

Table 1: The Detailed Components of IOT [2-6]

IOT Components			
Basic Components		Detailed Component	
Symbol	*Name*	*Name*	*Examples*
A	**Sensing**	MICRO-SENSORS	Pressure, air quality, Temperature
		TAGS	RFID, NFC, Quick Response codes (QR)
B	**Communication**	ENERGY EFFICIENT COMMUNICATION	Personal Area network (PAN), Bluetooth, ZigBee
		MICRO-COMPUTING	Micro multi-core chips, Raspberry Pi, Intel
C	**Computation**	CLOUD COMPUTING	Little or no local computing (SAAS,etc)
		OPEN/ SMALL OPERATING SYSTEMS	Linux

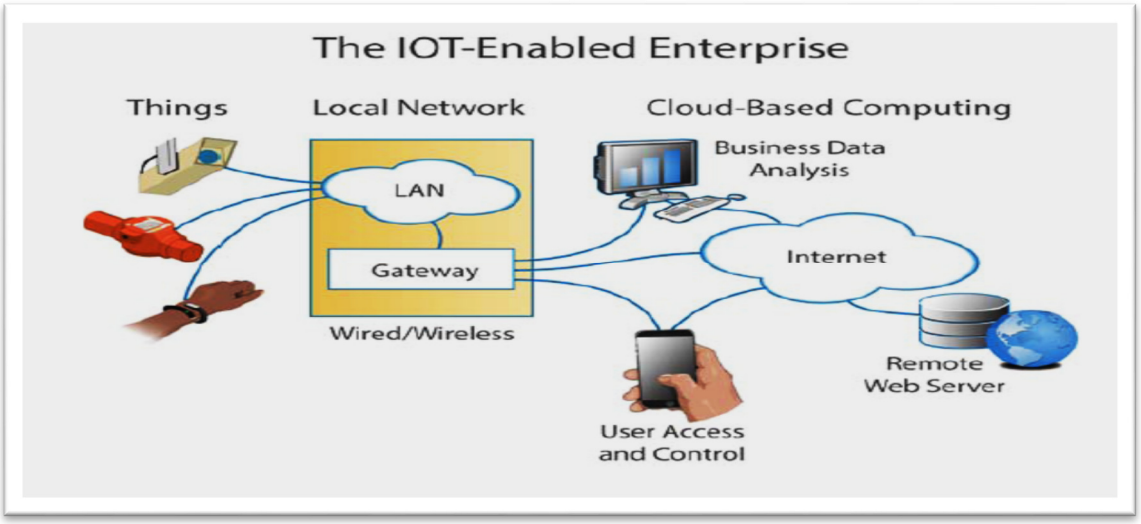

Fig. 1 IOT- Enable Enterprise

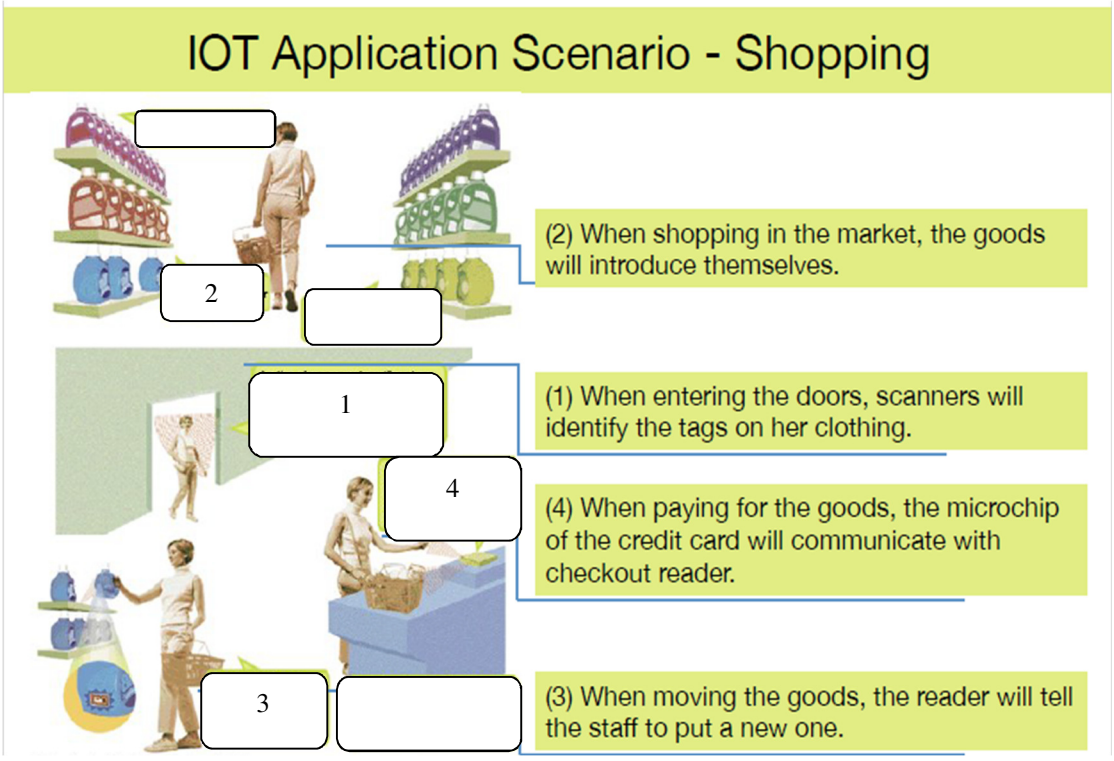

Fig. 2 IOT Application Scenario- Shopping [2]

3. Benefits of IOT

IOT is a hot point in the field of Internet application. IOT has many benefits such as direct advantages for consumers, government sector and business as presented in the following table. Table 2 contains the benefits of the IOT. Furthermore, fig (1) depicts the different applications of IOT those will be touching all sectors.

Table 2: IOT benefits [2-3]

Items	Benefits	Example
1	Dynamic control of industry and daily life	Energy conservation
2	Improve the resource utilization ratio	Resource efficiency
3	Better relationship between human and nature	Pollution and disaster avoidance
4	Forming an intellectual entity	Integrating human society and

		physical systems
5	Reduce Costs	Consumers Government
6	Improve Efficiency	
7	Create Innovative Products	

8	New Revenue Streams	Business

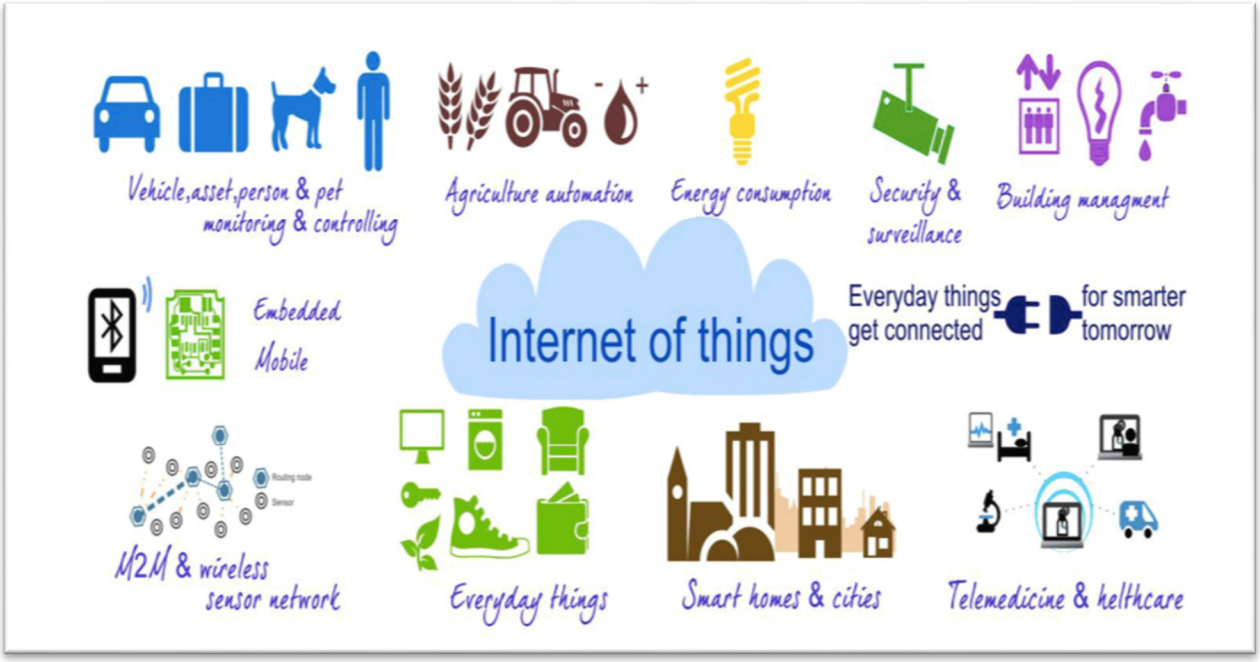

Fig.3 Applications of IOT [5]

4. IOT Challenge

Usually, any new technology has advantages and many challenges that should be handled carefully. IOT is considered as a new modern intelligent service. IOT were widely concerned by network architecture, service offering, and intelligent features. It supports various access of networks domain, therefore, IOT faces many challenges. For example, privacy and security issues are concerned as the big challenge that faces IOT development. Moreover, a big data management is one of the important challenges of IOT that need more effort to facilitate the exchange of a huge amount of datum. Therefore, IOT data is generally produced in trillions of bytes. Furthermore, there is a lack of technological standardization which managing rapid innovation is also a challenge for governments. On the same context, IOT challenges are summarized as follow:

- Legal& Regulatory
- Technical Control
- Social Ethics
- Market Self-Regulation

4.1 How IOT will Change the Way of Any Company Operates?

After applying the IOT technology, all companies must change its existing business model and its business strategy. IOT will unlock the new revenue opportunities from existing products or services. Furthermore, it will allow us to enter the new market and new industries. Therefore, it will encourage greater investment in technology. In general, it will lead to great cooperation with outside competitors [4-6].

5. Conclusion

IOT is a new applied technology that will meet your future requirements and will replace our old life style. IOT is considered as a helpful technology that emerged to facilitate you fast connectivity. We presented a review of the basic components of IOT that essential for constructing any IOT Enabled-organization. We give a mention for the challenge that meet IOT development. The bit of advice, any company should change its business strategy to accept the new era of IOT. IOT is the future of the world connectivity. Finally, we presented a summary of all important things to be IOT-based system.

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