

A Study of Internet of Things in Cloud Computing Era

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ABSTRACT: Now a days people are concentrating on the phrase —Internet of Things which refers to general idea of things specially those things which we are using in our day to day life governable via the Internet. Internet of Things and Cloud Computing are two different technologies, these are playing an important role into our daily life. This paper presents an overview of IOT in cloud computing era. This paper also highlights few applications of IOT with cloud.

KEYWORDS: Internet of things, Cloud computing, Wearable devices, Smart.

I. INTRODUCTION

The “Internet of things” (IoT) is the hot topic of conversation in the IT world. This concept not only has the potential to influence how we work but also how we live. But, what is “Internet of things” and how will it affect us? Technologically, there a lot of complexities around the “Internet of things” but first let us understand what exactly it is? Cisco defines IoT as: “The IoT links smart objects to the Internet. It can enable an exchange of data never available before, and bring users information in a more secure way[5]”.

WE CAN THUS PERCEIVE IOT AS:

IoT=SENSORS(SENSING DEVICES) + INTERNET

OR, TO BE MORE PRECISE,

IoT= THINGS + SENSE & COMMUNICATE

According to the council, Internet of Things is a new beginning. In the current architectures we have three groups of actors: industry/subject matter experts (SMEs); those involved in governance/legal matters[4] and citizens/end-users. IoT is conceived as enabling technology in network coverage to move from “Everyone connected (People)” to “Everything connected (Things)” i.e. instead of network of people, it is network of things. That is why, its name Internet of Things. Here things interact and communicate with each other. IoT heavily relies on Internet data to play its role in data transmission and information interchange. The objects in Internet are connected, and the information is from these objects can be accessed anywhere.

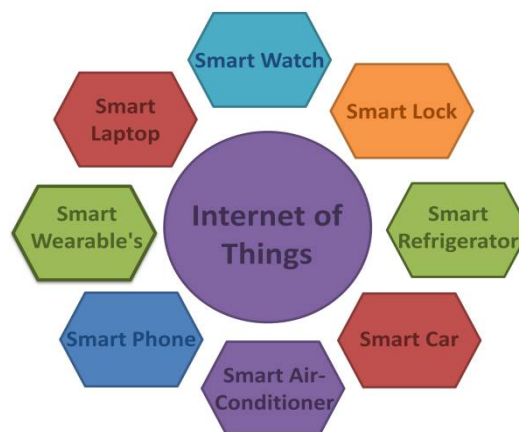


Figure 1: Internet of Things (IoT)

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IoT together with Cloud Computing is referred to as new wave of development in the global IT industry. IoT and Cloud are two comparative challenging technologies as been merged together to change current and future of the Internetworking services [1] [2].

As we have seen, IoT environments consist of loosely connected devices that are connected through heterogeneous networks. Lot of data is generated from these devices, which can be used to perform data mining and detecting patterns, or doing predictive analysis or optimization, and finally make smarter decisions in timely manner.

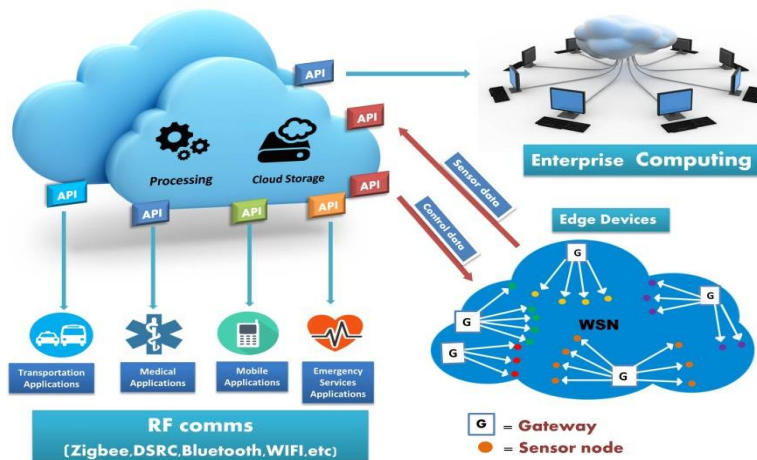


Figure 2: Internet of Things: Another perspective

These “objects” in IoT are more diverse than they appear at first glance. They could be computers, mobile phones, watches, televisions, Air conditioners, cars, air crafts, medical devices and so on. All these objects are terminals to IoT. The sensors attached to these devices are used for data acquisition, data processing and data transfer. The information collected can be synthesized, summarized and analyzed, so as to provide better services to society. Since in most of the objects sensors are producing real time data to ensure timeliness and reliability of information being stored and because of huge number terminals that are producing this data, the data produced by IoT devices is voluminous (Big Data). Some objects/ terminals may additionally require huge amount of computing power, which inevitable becomes very expensive. Looking at huge number of devices, we can very well understand the increase in storage and computing requirements. Before cloud computing platforms, it was difficult to cater to this steep increase in storage and computing requirements.

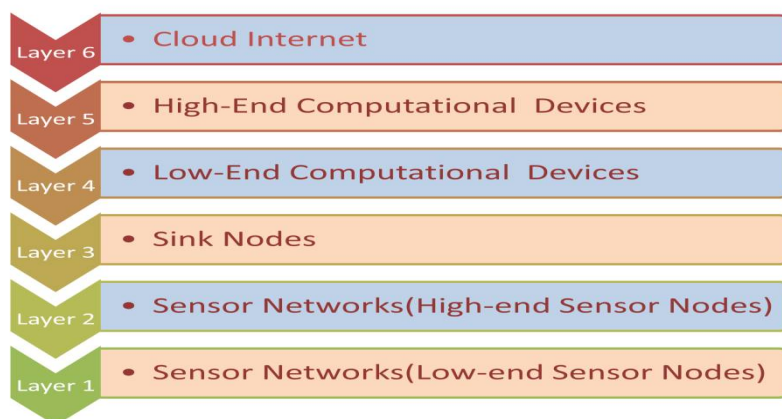


Figure 3: Layered IoT Architecture

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It is the support of cloud computing which has made it possible to exploit the real sense of IoT, else we would be having islands of information. Internet of Things (IoT) and cloud computing are two very different technologies and are already part of our life[6]. In this new pattern where IoT and Cloud are merged is seen as an enabler of a large number of application scenarios[6].



Figure4: Cloud Computing

Cloud computing has mobilized all the computing devices within the network to handle the tasks at hand, while the huge data streams can be stored in the cloud, large scale data processing and storage problems are also handled easily. To realize its ultimate goals, IoT has to rely on cloud computing. Cloud computing also enables the IoT to be intelligent, to help people make better decisions with the emergence and growth of cloud computing, the IoT has become more accurate and reliable.

II. APPLICATIONS OF IOT WITH CLOUD

IoT is sometimes referred as “smart” systems: smart homes, appliances, buildings, mobility, health, cities and many other. Many current-generation wearables are solid which probably has limited their adoption to some degree. But “sensor-rich fabric” and “conductive fiber” technologies are now flowering, meaning that “fabric itself can now become device, allowing wearables to be incorporated into the most stylish clothing. These conductive fibers can be fed into a loom or embroidered directly onto[8] dress that users can wear and washed as normal[8]. With falling cost

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and increasing use, the threads are a rapidly growing business. Developers are trying best to make these wearable devices more attractive and fashionable.

The health related monitoring feature associated with wearable technologies is particularly compelling. Beyond fitness and health applications, wearables can be used to enhance easiness of users. For example, wearables can be used in homes to customize environmental experiences, such as automatically lighting adjustment, entertainment options as users move from one space to another space. Even if these technologies do not catch on as big-market consumer products, wearable technology may come to be more widely used in a variety of business and organizations[7].

Surgeons are already using wearable technology to perform complicated surgeries in better way, and in the future, it is possible that wearable technology might be able to help doctors to perform these complicated procedures from remote locations. Medical ambulances can be well equipped with different IoT devices to diagnose patient's diseases and then provide immediate required treatment after any kind of health emergencies or accidents.

In coming years, these wearable technologies might be used by firefighters to control fires and other different types of emergencies more easily and quickly to get environmental conditions.

Retailers will be able to focus their customers with personalized promotions and facilities. Like retailers, vacation providers, amusement parks, entertainment companies and other business groups will also be able to use these devices to provide services to users who visit their establishments or use their services.

Airlines are also experimenting wearable technologies to provide more personal services to the passengers conferring to their behaviors and preferences. Teams and athletes may use wearables not only to improve their own abilities but also to give fans a new way to see how their favorite players play their games or even.

III. CONCLUSION

The application of wearable devices is now affecting every area of our life whether it is health, enterprise, lifestyle and many more. Wearable devices will change modern way of life and will become the mainstream of the development of mobile smart devices. These objects could be more powerful in terms of storage resources and processing power through the use of cloud computing. This paper discusses Internet of things in cloud computing era. This paper also highlights few IOT applications with cloud.

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