

A Review of Futuristic Technology - Internet of Things (IoT) Technologies

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Abstract

Now in present scenario, it is a demand of time to work on multidisciplinary activities by a multidisciplinary people. Multidisciplinary activities define as the outcome of merging two or more fields for example mechanical with electronic gave a birth to GPS system etc. multidisciplinary people are those persons, who have a basic knowledge of two or more field. These people are able to combine the working concepts and principles of different field and gave a new phenomena, term and technology to the world. These latest terms has been related to or evolved for a futuristic opportunity. The purpose of research based on these terms is to make our lives easier and efficient. The upcoming innovations and research perspective point of view upcoming technologies in the field of engineering for considering futuristic opportunity are based on following terms which are capable of supporting 5G protocols, network devices and communication standards also is Internet of Things (IoT).

Keywords: Cloud RAN, IoT, 5G.

Introduction

Internet of things is a result of parallel evolution take place in the field of bandwidth, processing capacity and memory. In 1941 the size of memory was equal to two or three rooms but storage capacity limited to few bytes but in present scenario small chips or pan drive have a storage capacity in terahertz's but they have very small in size. Same in case of processing take place at present time parallel. We can process multiple applications at a same time without facing problem of hangout. Initially bandwidth are used for one way communication than two way communication but now a day's bandwidth are used to transfer a huge data in sharing as well as tunneling/back tunneling based processes. Finally we can say that the innovations in terms of size, speed and transfer rate gave a birth to IoT, C-RAN and upcoming futuristic technologies. Now IoT and C-RAN support 2G and upper generation devices and telecommunication service providers.

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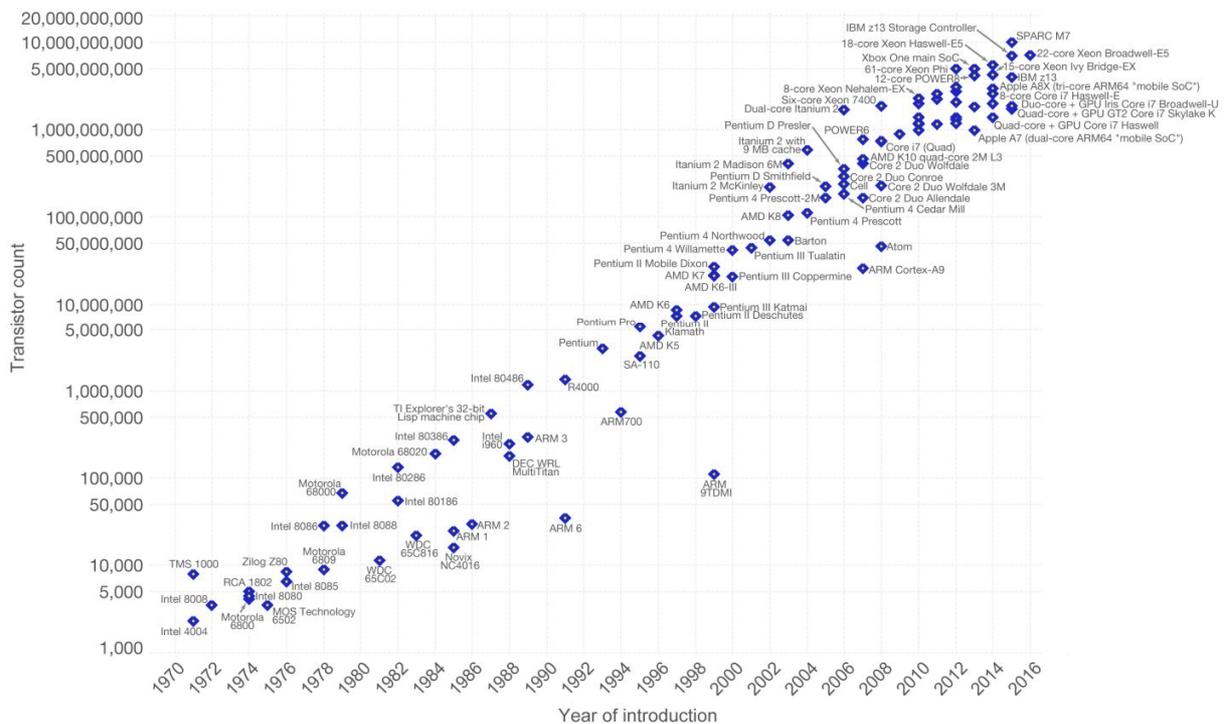
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Here G is a set of rules developed by international forum and followed by a telecommunication service providers as well as mobile manufacturers. These technologies are easily switchable from 4G to upcoming 5G and its higher version without facing any difficulty.

In this article, we show that technological developments in many different respects are growing exponentially not in a linear fashion. Moore's early observation is important as it showed that technological advances do not progress linearly but exponentially. But in and of itself, the doubling of transistors every two years does not directly matter in our lives. Therefore we ask in which ways the exponential growth of technology matters and will give an overview of how the exponential technological advancement is a driver of technological and social change that very much matters for our live now. From figure-1 it's clear that size of components or chips reduced exponentially with the help of Moores law.

Moore's Law – The number of transistors on integrated circuit chips (1971-2016) Our World in Data

Moore's law describes the empirical regularity that the number of transistors on integrated circuits doubles approximately every two years. This advancement is important as other aspects of technological progress – such as processing speed or the price of electronic products – are strongly linked to Moore's law.



Data source: Wikipedia (https://en.wikipedia.org/wiki/Transistor_count)
 The data visualization is available at OurWorldinData.org. There you find more visualizations and research on this topic. Licensed under CC-BY-SA by the author Max Roser.

Fig. 1: number of transistors on IC with respect to time

The internet of things define as the inter connectivity of physical devices, mobile and fixed vehicles, smart devices, buildings, electronic devices, sensors, actuators, different software, embedded systems with electronics, and network connectivity among them, which enables these objects to gather data, to analysis data for decision making and to exchange data shown in figure-2. In simple words IoT is defined as the infrastructure of the information society.

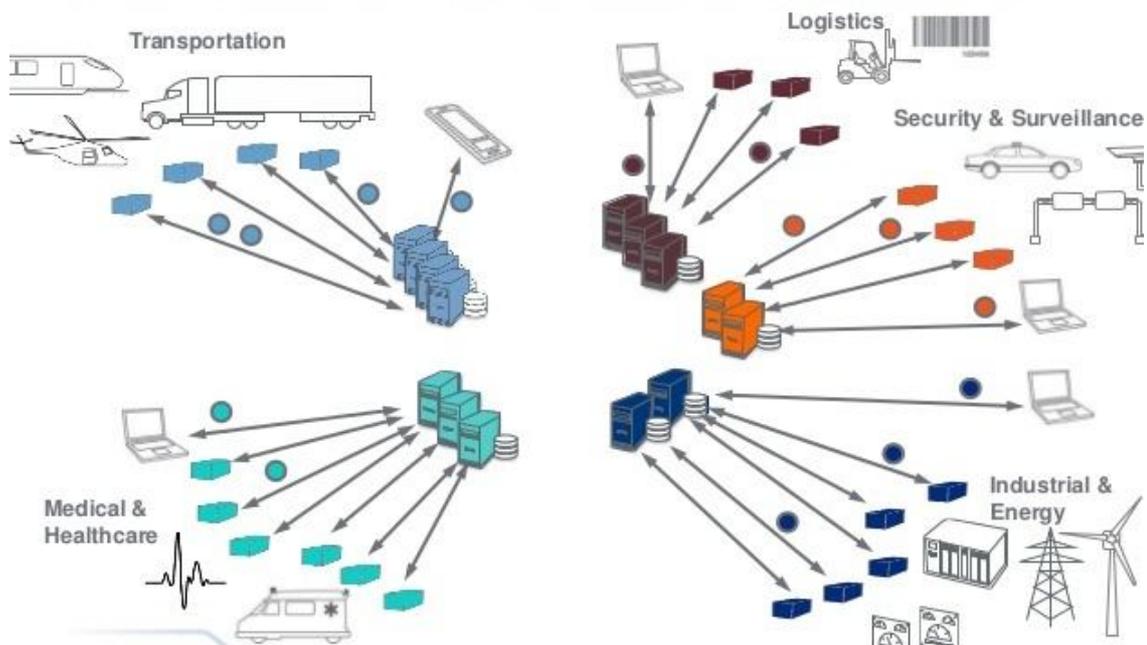


Fig. 2: IoT connected devices

In other words IoT is the concept of everyday objects for examples from industrial machines to wearable devices. This term mainly used to gather information with the help of sensors takes action or decision based on that information across a network. Some examples of IoT use of sensors (1) to automatically adjust heating and lighting, (2) for making smart offices, smart houses and smart cities, (3) predictive and preventive monitoring of industrial equipments.

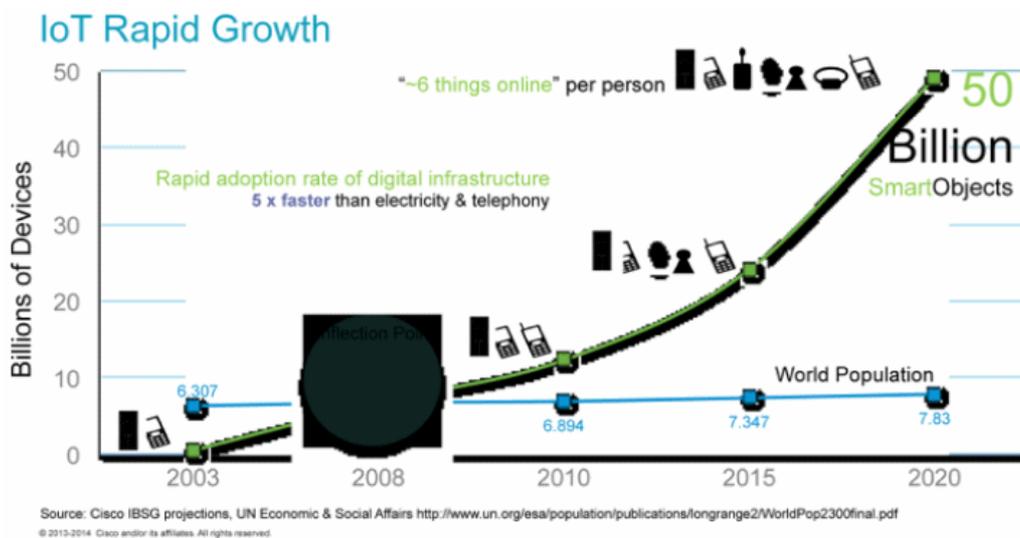


Fig. 3: IoT rapid growth

Figure-3 clearly shows that in 2020 50 million smart objects will be connected to the internet but at that time population of the world become 7.83 billion. After analyzing this data we can say that number of smart device per head in 2020 will be six.

Key Elements of IoT

Key elements of IoT are sensors, data gathering devices, instrumented components, interconnected components and intelligent components shown in figur4.

Components: are used to provide connectivity to a given technology

Endpoints: represent the source and destination of a message from/to a component.

Exchanges: encapsulation of data and Meta coming from end point.

Routes: is used to define the path from input endpoints to output endpoints/ tunneling and back tunneling are also a part of routers.

Processors: are used to execute data or to perform a specific task of execution.

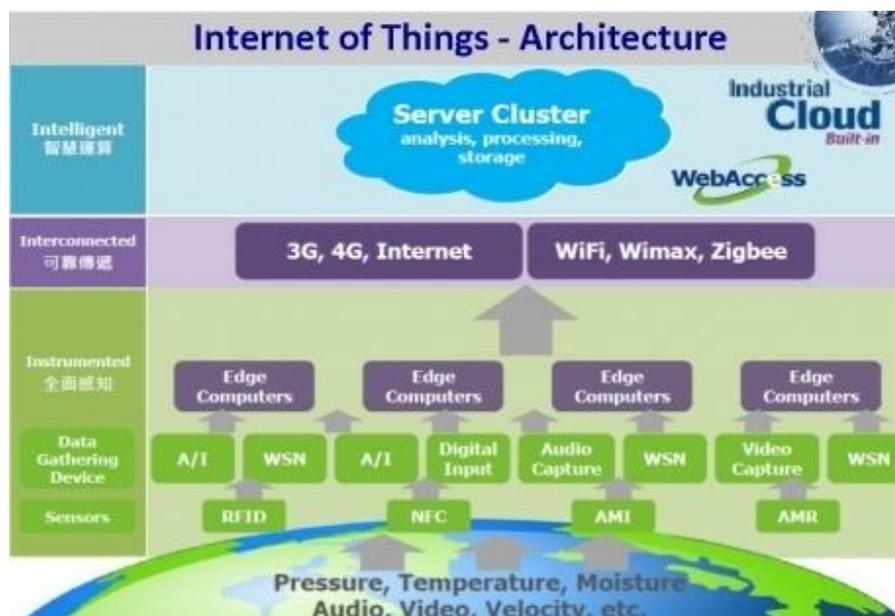


Fig. 4: key elements of IoT

History of the Internet of Things

Electronic gadgets fascinated many functions based on grander scale for last two decades. But from last couple of years we have seen the impact and true potential of IoT. Wireless internet and embedded systems bring this technology as a personal tool as well as professional tool. The term "Internet of Things" was first came in market in late 1990s by entrepreneur Kevin Ashton.

Ashton is a founder of the Auto-ID Center at MIT, and he is also a part of a team that discovered how to link objects to the Internet through radio frequency identification (RFID) tag. He first used the phrase "Internet of Things" in his presentation in 1999 and then this phrase make a boom for upcoming innovations.

Importance of IoT

This technique is used to know the number of things connected to the internet, and economic benefits derive after analyzing data streams. In this write up we m going to explain some example focusing impact of IoT on industries.

- Intelligent transport solutions example red lights. Impacts are to speed up traffic flows, reduce queue length, reduce fuel consumption, prioritize vehicle in case of emergencies and save lives.
- Smart electric grids more efficiently connect renewable resources; impact in terms of system reliability improvement and charge customers based on smaller usage increments.
- In service as well as Machine monitoring sensors diagnose system – focusing on prediction, prioritize maintenance schedules and pending maintenance issues of repair equipment and regional needs.
- Data-driven systems are used to build the infrastructure of smart cities, smart offices and smart houses.
- Suppose if you are moving from office to your home than you get an alert you’ re your refrigerator reminding you to purchase milk for tea.
- Office, vehicles and home security system: enables you to remotely access control for example to open doors and windows remotely, to maintain temperature as well as music sounds etc.

Applications of IoT

The IoT is more than just a convenience for consumers. It offers new sources of data and business operating models that can boost productivity in a variety of industries.

Health Care

Many wearable devices and mobile applications are used to monitor exercise, sleep, number of steps travelled and other health monitoring habits. Portable patient monitoring devices, wirelessly transferable electronic data and other smart accessories can help save lives. In this case both doctor and patient take benefits of IoT.

Retail

Both consumers and stores/provider of services and product can benefit from IoT. Stores, for example, might use IoT for inventory tracking or security for safety purposes. The personalized shopping of customer recorded with the help of cameras and sensors.

Transportation

Driverless cars based on more advanced technologies than ever. Positions are tracked with the help of GPS solutions and roadways can be monitored via sensors to keep them safe as possible while maintain high value of safety factor.

Manufacturing

IoT play important role in data collecting sensors in factory machineries can communicate problem in real time, making easy to work and also optimal in cost.

Telecommunications

Smart phones and other personal devices Assistance must be able to maintain a reliable source to destination connection to the Internet for the IoT to work effectively.

Utilities

Smart meters not only collect data automatically, they make it possible to apply analytics that can track and manage energy use.

Companies working on IoT:

Top most companies of the worldwide are working on IoT. In the upcoming time there are lots of opportunities and vacancies for a fresher have to work on IoT. Figure5 shows most influential internet of thing companies.

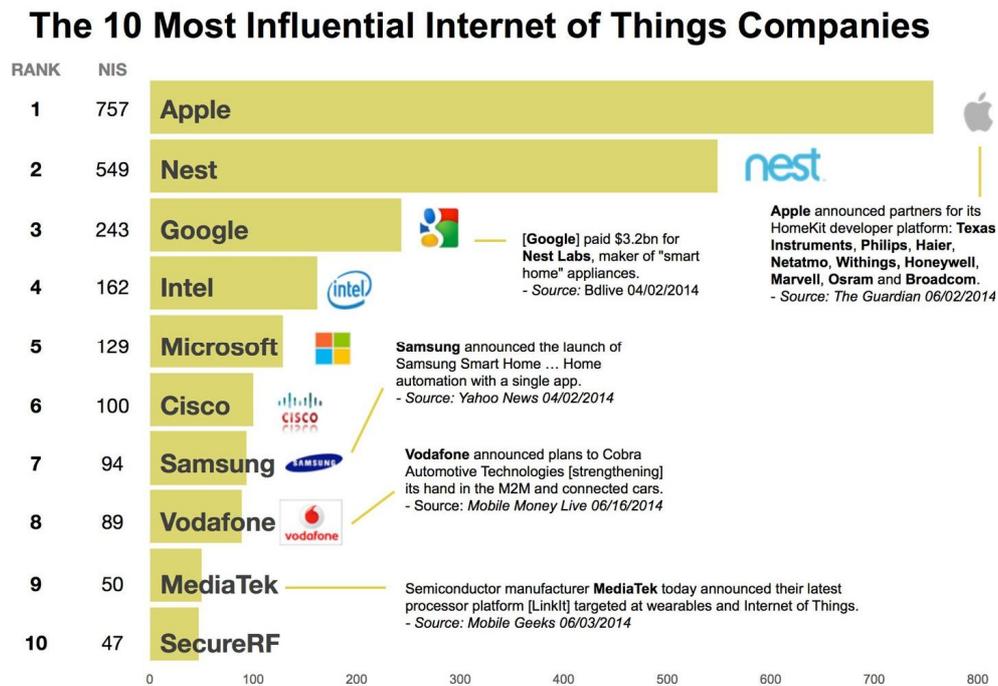


Fig. 5: shows most influential internet of thing companies.

Conclusion

The purpose of writing this article to update researchers and students related to upcoming technologies and spared awareness among them. In the pre campus placement talk by Human resource manager of big companies also focused on lots of vacancies in IoT. Finally we can say that IoT is not a technology it's a complex ecosystem with industry specification implementation.

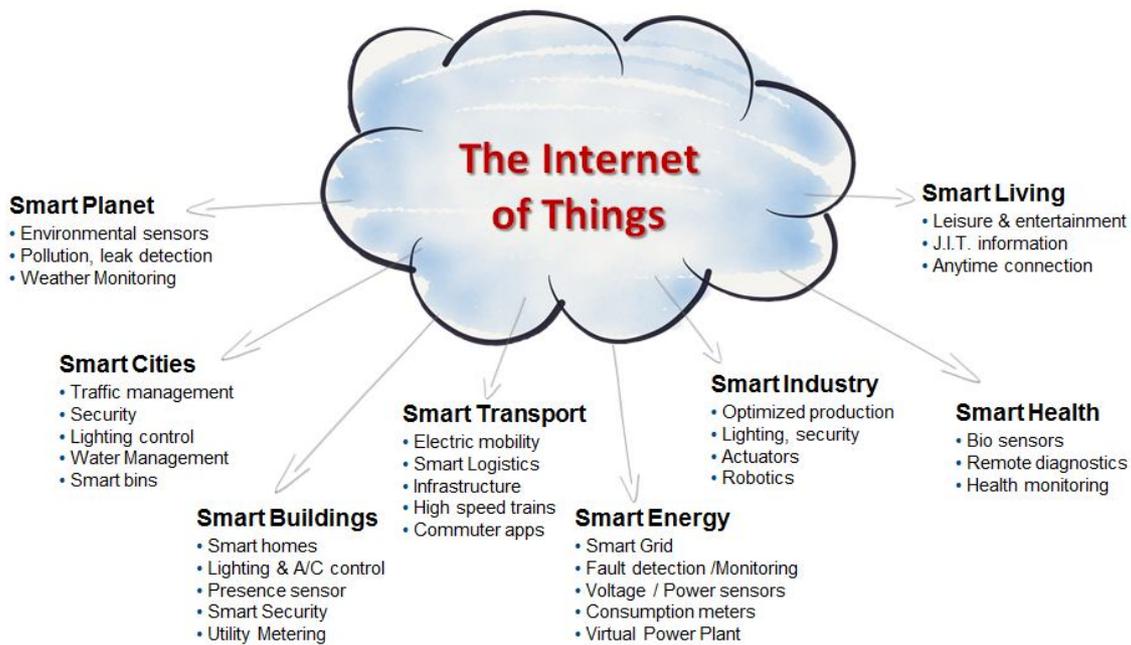


Fig. 6: represent systems of IoT

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