Published in: *Sudhakar, G.P. (2016), "The Growing Internet of Things", **Internet of Things**, IUP Publications, Vol. 1, Issue 2, June 2016, pp. 31-33.*

The Growing Internet of Things (IoT)

Dr. Goparaju Purna Sudhakar, PhD, PMP
Faculty Member, The ICFAI University Group, Hyderabad, India
Email: purna24@hotmail.com

Abstract: Internet of Things (IoT) is entering from concept to commercialization in the industry. The growth of sensors, connected devices, communication technologies and reduction in costs of processing, sensor, and bandwidth technologies are triggering the growth of internet of things industry. By 2020, it is going to surpass 50 billion connected devices in the world and over $1.7 trillion market size (IDC Research). This article highlights the growth of internet of things, drivers, applications, technologies and related industries.

* * *

1. Introduction

Internet of Things (IoT) is the huge networks of devices, wearable devices, things, objects and buildings. Using this technology, mobile devices, washing machines, microwaves, coffeemakers, cellphones, headphones, wearable devices, cars, vehicles, buildings and any other smart devices can be connected. All these devices exchange data and control information over the huge network. According to Gartner, by 2020 there would be 26 million connected devices in the world. According to Cisco research, there will be around 50 billion connected devices in the world by 2020. According to another researcher, there can be over 100 billion connected devices in the world or more by that time. This technology connects people-people, things-things and people-things.

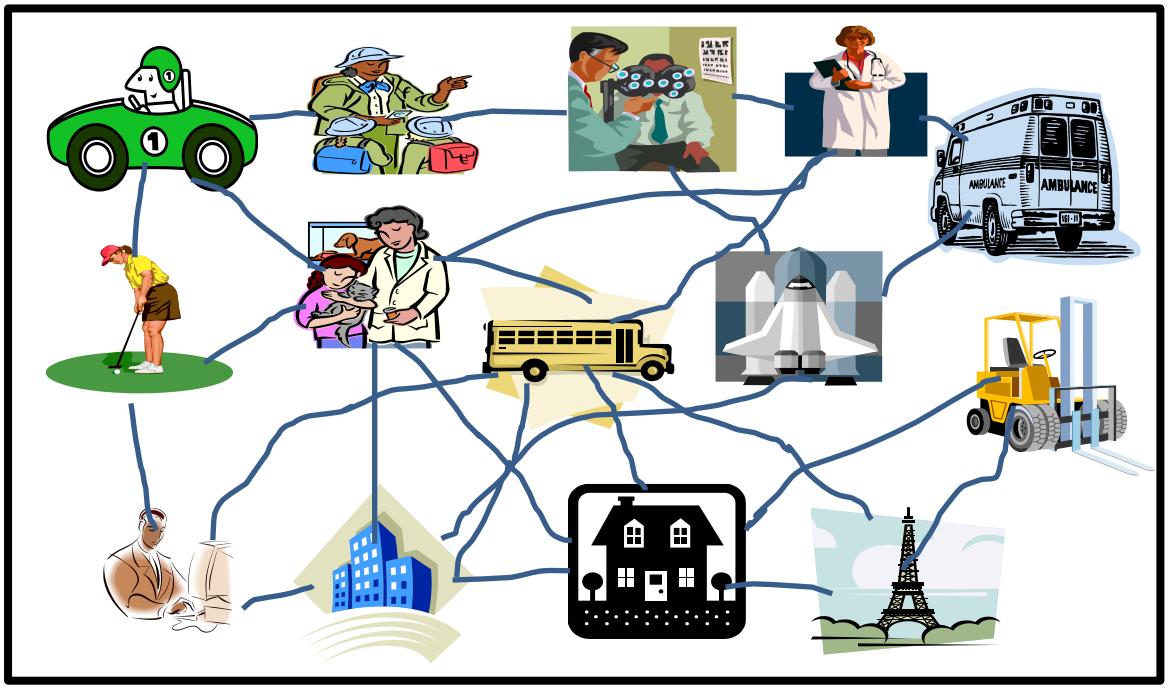

Figure 1: Internet of Things Communication

2. Growth of the IoT Industry

According to IDC Research published in *Information Week*, Internet of Things industry is expected to grow from $655.8 billion in 2014 to $1.7 trillion by 2020 globally. According to i-scoop.eu, By 2020, Internet of things will be around 50 billion devices in the world (Figure 2). In 2015 itself, it was estimated that Internet of things industry is growing at 19% annually across the world. In manufacturing sector itself, According to IDC forecast, IoT Operations will reach $98.8 billion by 2018. According to the Gartner research, around 299 million smart utility units are already installed by utility companies. Connected vehicles is the hottest market in US now, according to IDC research. Manufacturing, utilities, healthcare, retail, automobile, and transportation industries are already started using smart devices, sensors and IoTs.

According to Goldman Sachs research, the main drivers for the growth of IoTs industry are 50% cost reductions in sensors, 40 times cost reductions in bandwidth and 60 times cost reductions in processing over a period of last 10 years in the industry.

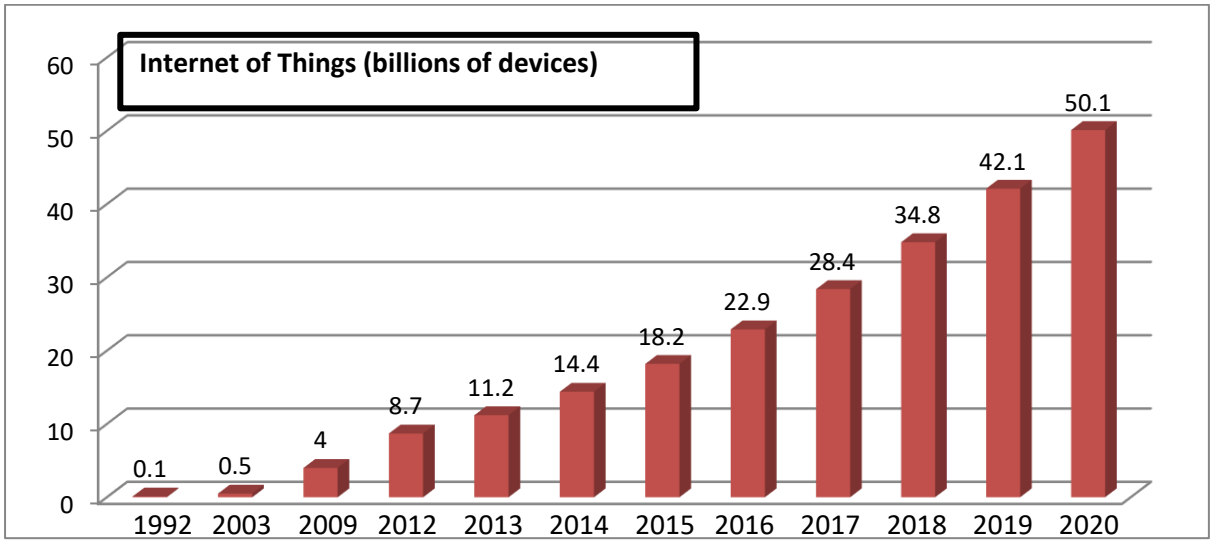

Figure 2: Growth of Internet of Things (Devices)

3. Technologies Used

The origins of Internet of things go back to RFID (Radio Frequency Identification) technology which came up in early 1990s. RFID, sensors, wireless innovations and wireless applications were used in logistics, supply chain, and warehouses in the early days. Further innovations such as tagging, connecting objects, reading objects and tracking drove the industry towards internet of things. Digital ubiquity has also get relationship to internet of things.

According to IC Insights (2015) report, semiconductor industry and sensors industry are driving the internet of things industry. This technology enables machine to machine communication.

4. Applications of Internet of Things

The applications of internet of things include weather forecasting, air pollution checking, forest fire detection, sportsmen care, structural health, smartphone detection, perimeter control, radiation levels, traffic congestion, smart roads, smart lighting, connected cities, connected homes, connected cars, industrial internet, noise urban maps, water leakages, item location, vehicle auto-diagnosis, smart parking, golf courses, water quality and waste management. Intelligent shopping is also possible with internet of things.

Smart office, smart social care, smart cars, smart cities, smart transport, and smart energy are some of the commercial applications of internet of things technology. Definitely, we are going to see and visualize these kinds of technologies in our upcoming Indian smart cities projects.

5. Conclusion

As no individual, group or organization functions in isolation in the world. The same philosophy is going to be applied to devices, things, and objects existing in the real world. The advancements in technologies enable devices to communicate with each other and provide useful information and insights to the human beings. Using IoTs, individuals can turn on their ACs, Owens, Coolers and heaters in the house even when there are in their cars. Vending machines can communicate the stock levels in the store directly to the goods supplier. These technologies reduce the waiting time, processing times and costs and increase organizational and individual productivity. *Internet of things* can make the life better for the human kind.

6. References

1. Burrus D (2014), "The Internet of Things is far bigger than anyone realizes", *Wired Insights*, 2014 November, Available online at http://www.wired.com/insights/2014/11/the-internet-of-things-bigger/.
2. De Clerck, J-P (2014), "The Internet of Things Explained", *i-Scoop*, December 11, 2014, Available online at http://www.i-scoop.eu/internet-of-things/.
3. Eddy N (2015), "Gartner: 21 Billion IoT devices to Invade by 2020", *Information Week*, November 10, 2015, Available online at http://www.informationweek.com/mobile/mobile-devices/gartner-21-billion-iot-devices-to-invade-by-2020/d/d-id/1323081.
4. Morgan J (2014), "A Simple Explanation of Internet of Things", *Forbes*, May 13, 2014, Available online at http://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand/#7060aeda6828
5. "The Internet of Things: The Explosion of Connected Possibility", Available online at http://theconnectivist-img.s3.amazonaws.com/wp-content/uploads/2014/05/Unknown.png

About the Author

Dr. Goparaju Purna Sudhakar *with over a decade of IT industry experience is currently working as Faculty Member in The ICFAI University Group in Hyderabad, India. He has* ***M.Tech. Executive***

MBA, *and* ***PMP****. He has* ***PhD*** *in Business Administration from Aligarh Muslim University (AMU), India. He worked in US, UK, Ireland, Finland and India as software professional. He was consultant to companies such as IBM, Siemens, Interwoven, Wipro, Citicorp, Nokia, Salomon Smith Barney, SIAC, DSET Corporation, IONA Technologies and also visiting faculty. He authored or edited 16 books and published over 70 articles/papers. He is on editorial Board of a Romanian and a Brazilian Journal.* He is author of *Software Development Teams: Performance, Productivity and Innovation* (Prentice-Hall India, 2016), *Project Management FAQ* (Galgotia, 2012), *Elements of Software Project Management (Prentice-Hall, 2010), Project Management: Training Manual (Akansha, 2010),* and *Business Essentials for Software Professionals (*Excel Books, 2008). He can be contacted at purna24@hotmail.com.