

INTRODUCTIVE STUDY OF IOT AND ITS PLATFORM IMPACT OVER APPLICATIONS

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Abstract: Internet has become the most rapidly growing and emerging into another big area as a global platform to admittance information and communicating infrastructure. Due to of big leap it permits to communicate with machines and smart objects (M2M) known as IoT. The applications of IoT has a vast range that are more specific although there is a change in the meaning of Things as per the generation. The interconnection of objects that profound currently and the objects not only gather the information from sensors with a interaction of physical world while delivering the service to transfer information and application. The author have discussed about the platforms that helps to communicate the data over network and its applications.

Keywords: *IoT, IoT platforms, M2M transmission, Applications.*

I INTRODUCTION

Internet has been turned out in past few years to be the most vital thing in the people life and became a necessity need for everyone. Around the billion to trillion of people interdepend with each other or sending and receiving of things (images, social media, large files, etc) via network or internet [16], [3]. Kevin Ashton executive director of Auto-ID centre has familiarized with a term of IoT in the year 1999 [1]. “The virtually dependent such as internet and computers on the human for information that captured the data in form of typing, pressing button, digital picture or scanning a bar code with unevenly of 1024 terabyte and accessible on the internet. The people’s problem was befallen by accuracy, limited time and attention and that means seizing of data information in the real world is not very good. If we had a computer for everything about data gathering without help of peoples or we could track and count the significant of reduce waste, loss and cost”[2].

IoT is an intelligence system that can have a communication and computing ability. There are basic three characteristic: -

Comprehensive awareness: It is due to of RFID, sensors and M2M terminal are used to collect information of object.

Reliable transmission: Real time and high accuracy

Intelligent processing: Meet the user expectation to collect and analyse useful information.

In such a view, “The predictable concept of internet as an infrastructure network that reaches to end user terminal, as universal computation environment is created by smart object” [2]. The global backbone for worldwide information sharing and interconnection of physical world object for a

service and technology is internet infrastructure. The use of embedded electronics into everyday life by developing of internet of thongs which makes the device smarter or assimilating with global resulting cycle infrastructure with new selection for ICT sectors. “The federal trade commission by 2015 believes that via internet 25 billion devices is being interconnected and approximately in 2020 there would be 50 billion devices are interconnected” [3]. The peak of inflation expectation and can be predicted toward reach the plateau of productivity as per the **Gartner’s Hype Cycle 2013** shown below figure 1.

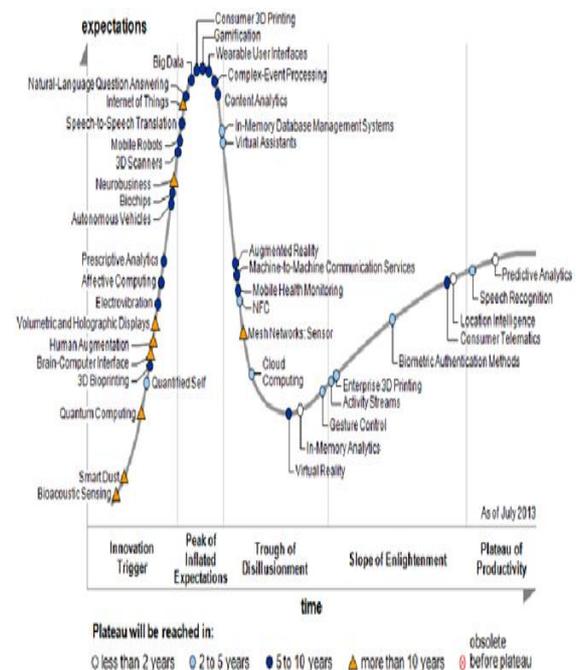


Fig. 1. Gartner’s Hype Cycle 2013

While in the **Gartner's Hype Cycle 2014**, [4] IoT has been reached to the peak of the inflated expectation shown below figure 2.

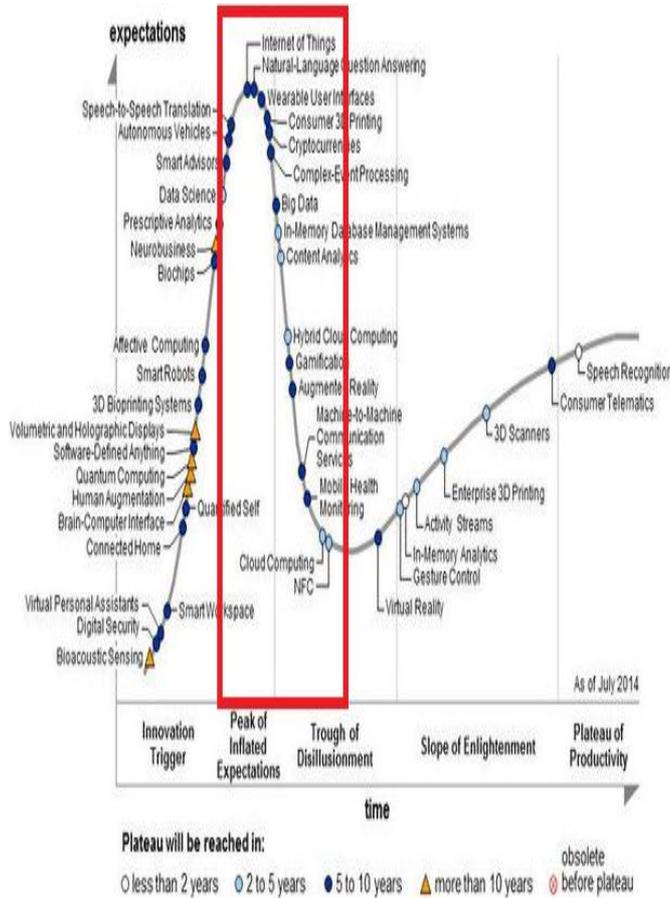


Fig. 2. Gartner's Hype Cycle 2013

IoT not an individual system but as serious as integrated infrastructure where many application and services are being executed. There are many possible reason of IoT in 2015 by K. Rose [4]: -

Ubiquitous interconnection: Everybody is interconnected by the internet due to of low cost and high speed overriding network.

IP network adoption: The networking most common global standard has become Internet protocol (IP) and it is being widely used for implementation of tools, software and technologies with a amalgamated broad range for some devices that are fluently and cheaply.

Economical computation: The industry with an investment in R&D for manufacturing devices where Moore's law helps to provide continuous higher figuring power at less price and computation [5].

Data Analytics: Generating of new algorithms for rapidly increasing in computing power, storage and cloud service that allows to analysis big dataset, aggregate and correlate which helps to extract data and knowledge [9].

Cloud computation storage: we can remotely access the data, manage the data, store data and also allow to interact back-end analytic which can control small and distributed device capabilities [6].

The main problem is occurred by using the Internet of Things is to secure the information while sharing with small business face problem such as storing a vast amount of data, etc. the security and privacy method must be find out to store the information, analyse and track by the attackers. James Lewis, in cybersecurity a centre for strategic and international studies has written a report on IoT that hackers can inflict destruction between the interconnection of various devices. For example: hijacked of the autonomous self-driving car, wi-fi connection, etc [7, 8]. These two privacy and risk management must not be taken frivolously in a new way of sharing information via internet (IoT). Figure 3

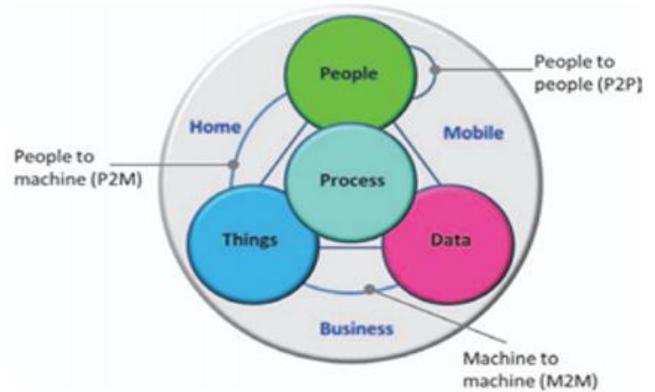


Fig.3. Internet of Things

II HISTORY

Internet of Things not has been about so long because there are the various machines is being in communication with each other since the early 1800s. the direct communication between the machine-like telegraph which was developed in the 1830s and 1840s that describe the wireless telegraph, first radio transmission on June 3, 1900. The main component of IoT is internet itself which evolve out a part of DARAP (Defense Advanced Research Project Agency) in 1962 and also evolved APRANET in 1969. APRANET is open for public for commercial service provider and modern internet in 1980s. The reality of GPS has become by the department of defence provides the stability, highly functioning system for 24 satellite that was followed by private owned commercial being placed in orbit in early 1993. The rudimentary communication for IoT is the landlines and satellite [10-13] .

- An electromagnetic telegraph was invented by Boron Schilling in Russia, 1832. Whereas they introduced or developed own code to communicate over a distance of 1200m by Carl Friedrich and Wilhelm Weber in 1833.

- First telegraphed message was introduced for public was “what hath god wrought” by Samuel Morse in 1844.
- In the collier magazine an interview is out by Nikola tesla in 1926 that whole earth will become a giant brain if the wireless network is applied perfectly and all things were practical and rhythmic, the present thing was telephones.
- In oxford mind journal an article was out “Computer machinery and intelligence” by Alan Turning in 1950 says that it is good to have a computer machinery sense organ that can teach and buy the devices with help of English speaking and also teach to a growing child.
- An electronic media that helps to set up dynamic media to all previous technologies that help to translate information and devices to new cities said by Marshall McLuhan in 1964.
- A German pioneer Karl Steinbuch in 1966 of computer science tell that into every industry product or electronic devices it will be intertwine into every industry product or every electronic device.
- The Americans Leonard Klein, Paul Baran, Lawrence Robert, Donald Davies in 1969 introduced the APRANET (Advance Research Project Agency Network) and first name of APRANET was packet switching network that communicate the data globally from one to another through packets [14-16].
- The department of defense (DoD) is an occasionally known as the internet protocol suite and transmission control protocol suite that was introduced by Robert Kahn, Vint Cerf, Louis Pouzin in 1974. Tcp/Ip was sponsored by DARPA, agency of united state department of defense that provides the end-end data communication with one to another.
- Unix server was firstly familiarized by four students od UC Berkeley Douglas Terry, Mark Painter, David Riggle, Songnian Zhou in 1984 that implemented on internet name domain and commonly denoted by BIND and ported on windows NT platform, and it is being widely distributed on the Unix system and domain name system.
- WWW was a concept of share or communicate the data globally with one to another is introduced by Tim Berners Lee in 1989-1991 and the first web page shown to communicate information through visual coding language as a back end.
- The first IoT device created by Quentin Stafford-Fraser, Paul Jardetzky in 1993 was Toaster that can be turned ON or OFF over an internet and this has become the star placement in floor-wide exhibitory at conference. The connection between toaster and computer is the TCP/IP networking with SNMP MIB is being used to get operated.
- “inTouch” [5] project was developed by the MIT (Scott Brave, Andrew Dahley, Hiroshi Ishii) in 1998 where it harmonized the physical object to a perceptible telephone for haptic long-distance communication.
- The “Internet of Things” named is introduced by Kevin Ashton, auto-ID labs in 1999 and it is a big year of MIT where author says that “he may be incorrect, but the phase of Internet of Things has started his life as a title Proctor & Gamble (P&G) that connects the new ideas of RFID in P&G”.
- The EPC (Electronic Product Code) and RFID (Radio Frequency Identification) has been develop by Kevin Ashton, auto-ID labs in 1999 to intended exchange of UPC bar codes.
- The “Ambient Orb” as monitoring monitor that can help to monitor the portfolios, weather, information’s and the colour’s that based on the dynamic parameter introduced by David Rose, MIT media labs in 2002.
- The UN’s International Telecommunication Union (ITU) in 2005 IoT hits the level and published “In the world new level of measurement is being added for the information and communication technology (ICTs) thus, we can connect from anywhere, anytime and anyone with multiple connections to create the new dynamic interconnected networks as Internet of Things” [17- 19].
- The European organized the first IoT conference after recognizing the technology in 2006 and in 2008 the alliance of IPSO has promoted the internet protocol in network for enabling the internet of things for smart objects. Such as companies google, bosch, cisco and FCC that allows to use the white space spectrum.
- As per the cisco internet business solution group IoT was born in 2009 as a simple point “Things or object” that connects the peoples through internet.
- IoT is a key industry for the china and planned to get major investments said by the chines premier Wen Jiabao in 2010.
- An extension of new protocol from IPv4 to IPv6 that gives a 2^{128} address and launched for the public use

introduced by Steven Leibson in 2011 where every address assigns every atom of the earth surface then also some address is left.

- As per the global standards initiative on IoT said “Information security by global infrastructure that provides the interconnecting of things that are based on the advance service which exist and evolve the information communication technologies [28]” in 2012. In 2013 “A physical world communication that are totally visual and capable of being identified and integrated onto networks [29]”.
- The recent survey in 2014-2015 has come over said by the researcher Pew that IoT is a huge technology and user answered about 83% they agree to accept the new technology with embedded computing and wearable devices spread all over with beneficial effect by 2025 [30].

The recent years 2016-2017 the development of IoT has been to its peak where various range of platforms (Pachube, Thingspeak, VMware, etc.), protocols (6LoWPAN, RPL, CoAP, DEEC, ZIGBEE, etc.), standards, hardware and software (Contiki OS, micro OS, tiny OS, etc.) are being developed for data exchange over a network through M2M or M2P or P2M.

In the year 2017-2018 the IBM has introduced the TjBot that work on the IoT technology they have the Raspberry Pi for the communication

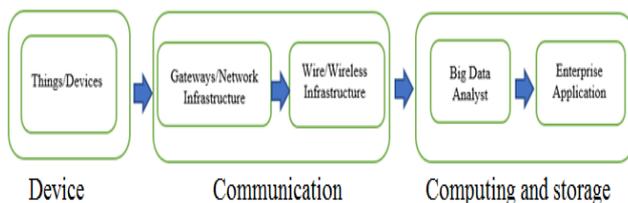


Fig.4. Value Chain Components.

Platform fill the breach between the device sensors and data network by the help of numerous embedded devices or cloud services [24]. The backend application is given by the sensors from data when the network is connected to the platforms. It is classified as wearable, embedded and cloud platforms: -

Wearable platform [21]

In the it helps to collect the data and store on the cloud storage with the help of software’s such as Bluetooth, Wifi, etc. and this done by the use of applications or mobile devices forms a connectivity that work on the android OS or IOS (like smartwatch, etc).

Embedded platform [22]

These are used when we want to build the robot or any use of PCBs (such as Arduino, raspberry pi, etc.). These platform helps to connect the devices through Wifi or USB for uploading the programming that is done on C language or C sharp (C#).

Cloud platform [23]

The real time data or any other information is stored over a cloud service with help of various software such as FireBase, etc and also store in static form while monitoring a device. They are efficient, affordable and scalable for data information handling while storing the data on cloud with security protection. Platforms such as Amazon web service, IBM Watson, Google cloud, Cisco cloud, etc.

III APPLICATION

“Smart spheres” means to obtain the intelligence object to make work comfortable such as office, industry, hospital, etc.

Smart Automations:

As we know now days every work has been so easy whether it would be smart house, wearables and cities by all these we can do collect the information by the help of sensors such as temperatures, distance, heart rates, etc. smart house like we can do any work very easy by clicking one button and that controlled by the internet or we can also make the appliances turn ON/OFF by the smart phones through applications. Smart wearable in this we can do the monitoring or the heart rate, calories, step count, etc. by this we can manage the all-day workout or routine and this is connected to internet that saved the data of monitoring that can be fetched from anywhere, also have the function of notifications, calling number, messages, etc. smart cities can be managed by the IoT application such as the traffic management of the new innovation from Google the self-driving cars that help the peoples for cheap and make this efficient energy work by the electric vehicles. This system can be used in the electricity bills, water management and LPG connections, etc[25, 26].

E-Healthcare:

In this many IoT devices help to monitor the patient’s various instances can be heart rate, calories, blood pressure, etc. but they can also authorize the people identification, automatic collection of data for sensing or diagnosing it [28]. This all has been don’t by the help of RFID technology that maintain or avail the monitoring for the authorized persons and record the data to store on cloud services to fetch at anytime, anywhere. The sensing process is being done over a wireless transmission to convey the data and monitor it on a heterogenous systems with multiple technologies integrated by the bio-signal monitoring for mobility presences.

Social and personal spheres:

The interaction between the users and build a social relationship that enable to trigger the information of any persons or near ones what they like, dislikes, have done past days, etc. this can be happen by the RFID technology. The best platforms to understand is Facebook, twitter, Instagram, etc. the chats, photos, post has been recorded and can be fetch over any of the places [29].

IV CONCLUSION AND FUTURE WORK

IoT is an intelligence system that can have a communication and computing ability. There will be devices which almost have the sensors to collect or gather the data and connect with network. The gathering of information is done by sensors remotely and it is done with full secure connection between the devices. IoT platforms that helps to complete the breach between the communications of two nodes. The applications shows the bridge that has been made by IoT platforms. Further, author can work on the IoT Operating System that is used over network to help the message authenticity.

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