IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
ISO 3297:2007 Certified
Vol. 6, Issue 6, June 2017

A Small Review on Internet of Things (IoT)

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Abstract: The basic study of this paper provides information about one of the buzz word what we are familiarly known and using in our daily use is "Internet". Internet is one of the major resource we can see everywhere. Here, the internet in its daily life is continuously changing and evaluating in all fields and areas. We are mainly focusing on one of the field in the IT (Information Technology) is "Internet of Things (IoT)". The things what we considering by using Internet, is giving all the sources to everyone. The term Internet of Things considered as the future evaluation of internet that has machine to machine learning. IoT is providing a connectivity services to everyone and everything. Here, in this basic review, the paper addresses about the services about the Internet of Things that are most important like Trends, applications, current details about IoT etc. In each and every aspect of how the population, technologies, new fields in IT etc. Growing day by day the Internet of Things is becoming challenging towards every aspect. In the coming years, IoT is expected to bridge technologies with new applications by using physical objects with decision making intelligent system. Because," The sky is not at the Limit. It's just only beginning of Internet of Things (IoT)".

Keywords: IoT; Trends; Challenges; Future IoT.

I. INTRODUCTION TO INTERNET OF THINGS

In the today's environment as we all know one of the major use is Internet. From several years we are using internet which is around us. Here we are considering one the buzz's word is Internet of Things (IoT) is a paradigm in IT area. Internet of Things is shortly coined as IoT. Here the phrases two words "Internet" and second is "Things" are considered as follows: The Internet is gaining more advantages with more evolutions and many of the new technologies are coming into existence [1]. It is globally interconnected with computer networks with standards. There are billion numbers of users who are using Internet of Things today. The network around the internet exists with private, public, government use, schools, and colleges etc. which are linked with wireless and networking optical technology [2]. Currently today 100 countries are lined for exchanging of data, news, opinions etc. through internet. Now considering about the Things, it can be a person, objects which distinguish by real world. Here an object includes not only electronic devices but also encounter's daily useable products with advanced equipment's and gadgets. The Things here don't normally think like electronic at all it's like food, cloths, materials etc. [2]. The main strengths of ideas of IoT are high on several aspects and behaviour of users. At most private users with obvious effect of IoT introducing visible in both working and domestic fields. In this IoT has assisted living, e-health, learning are few examples which are playing lead role and they are nearing to the future things [4]. As the growing number of physical objects and which are being connected to IoT can play remarkable role and improves the quality of life of persons. Figure (1) illustrates here the overall concept of IOT in which every domain specific application is interacting with domain independent services, whereas in each domain sensors and actuators communicate directly with each other.

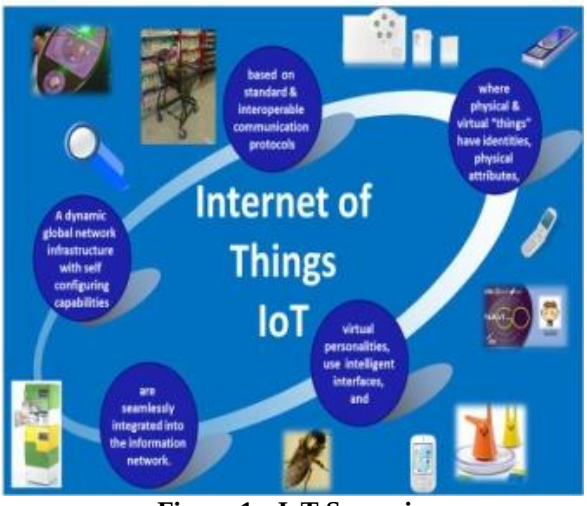

Figure 1:- IoT Scenario

IJARCCE

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The Internet of Things is one of the grounded beliefs that advance in microelectronics, communication and information technologies which have witnessed in recent years continues foreseeable in the future. Due to their size, cut down prize, energy consumption, processors, modules etc. are integrated to every object today. By digitally upgrading objects enhances their physical functionality by adding capabilities of digitalized objects which generates value in the field. Internet of Things which stands for vision outlined by simple way that people use the web today where soon we can communicate with each other with services which generates data and values or can be interpreted by smart things.
Over the time the IoT expects to have significant applications in the quality of life and grows in the world's economy [3]. Example smart homes which enables residents to automatically open their garage, make coffee etc. and other things. In order to realise the potential growth emerging technologies and innovations and services are needed to grow in the market with demands and customer needs. Further devices needed to be developed which fits requirements anywhere and anytime. New protocols require communication compatibility between things (like vehicles, phones, goods etc.). The figure 2 tells about how the Internet of Things connects with all the areas anywhere everyday things get connected is shown.

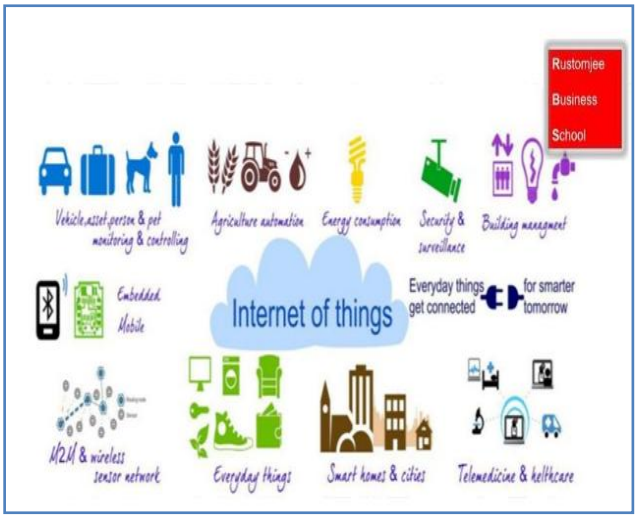

Figure 2: Internet of Things.

II. LITERATURE REVIEW

The author ShashankAgrawal, Dario Vieira [1] the author here addressing about key features where technologies are involved with real time implementations using internet and also details with major application domains where Internet of Things plays major role.
Somayya Mahakam, R. Ramaswamy, SiddharthTripathi [2] in this paper the author provides an overview on internet of things, architecture, technologies and usage in our daily life. This paper provides an good comprehension foe the new researchers who are doing research on internet of things.
Luigi Atzori, Antonio Iera, GiacomoMorabito [3] in this research mainly the author providing information about enabling factors for their paradigm with several technologies and communication solutions. Here the author mentions for the next generation on internet of things most of the smart objects plays an relevant role in the field.
Ala Al-Fuqaha, Mohsen Guizani, Mehdi Mohammadi, Mohammed Aledhari, MoussaAyyash [4] the author here details about some technical things which pertaining the enabling of IoT services. The main objective of this paper is to provide technologies, protocols, and applications to the most relevant which enables researchers to develop and implement new things to speed up on different applications, protocols with standard specifications.
Dave Evans [5] the author specifies here for the next evolution on internet of things which has a huge leap in its analysing, distributing data that turns into information, wisdom etc.

III. IOT ARCHITECTURE

Today's internet has vast and board concepts that doesn't have any uniform architecture. In order to work with the Internet of Things it should mainly [9] has assortment sensors, networking, communication and computing technologies and among others things. IoT connecting billions to millions number of objects which creating huge traffic and raw data which is constantly storing in the data storage systems. Not only storing of data but also IoT is facing one of the top most challenge is privacy and security challenge [10]. The architecture of IoT address many factors like scalability, interoperability, reliability, Qos etc. since it connects everywhere for everything to exchange

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information the traffic and storage in the networks also increases the exponential ways. The IoT development is depending on the technology progresses and designing of new applications and models. In the below figure 3 the major layers of Internet of Things are used in this architecture. Each layer in this architecture provides information about the other fields.

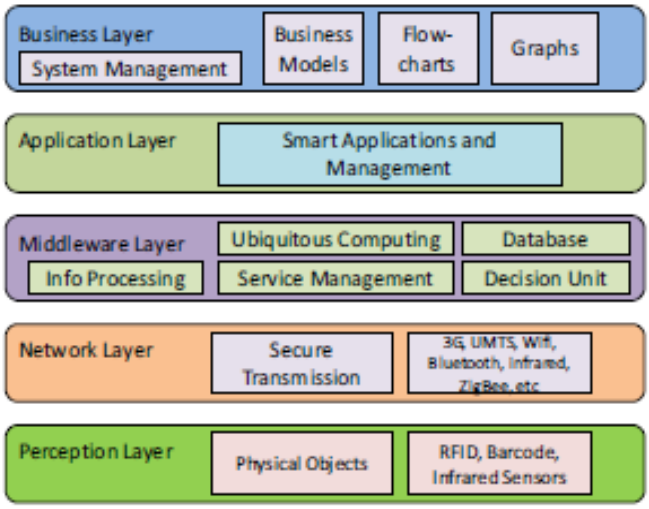

Figure 3: Layers Architecture of IoT

IV. IOT TOOL KIT AND LINKS

Internet of Things is an open source which refers to the implementation of applications and also smart objects with API's with approximate data. Here the tool kit and links of the IoT tells how the connectivity of the tools and with links is done with the things. It mainly provides a middle ware layers virtualization and integration of data in the form of sensors, actuators etc. with other devices. The main focusing of IoT is on model-driven where resources are modelled using collections of semantic hyperlinks.

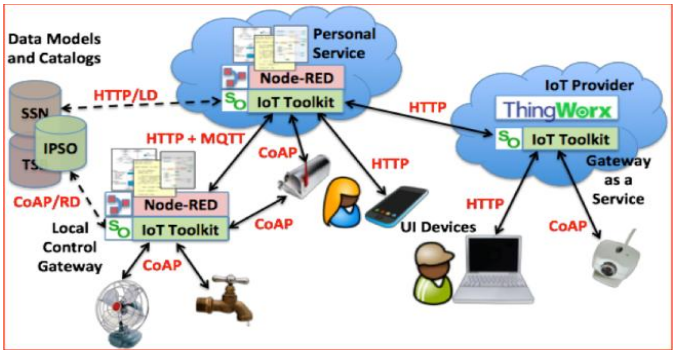

Figure 4 :- IoT tool kit and Links

An IoT toolkit is implemented with HTTP/REST, CoAP and MQTT protocols acts as state of full bridge between different protocols. An even model implements and that allows real time event protocols handling for updates and state changes. The IoT current state is fully implemented by smart objects API. The roadmap of IoT toolkits integrates with node-RED and web IDE which enables features developers to use IoT within modular event-driven software. The smart objects REST API provides a full state component which connects easily to Node-RED. In the future a simple GUI is builds to create dashboards and onscreen control surfaces for smart-objects.

V. MAJOR APPLICATION DOMAINS IN IOT

In this current scenario internet had become major application in all areas. IoT is very huge around the current hyper and seems like every day new products are coming out in the market. Applications had become popular in the Internet of Things right now. Numerous things are connected to internet. In the below Figure 5 we can observe major applications that are connected around IoT shown in the figure.

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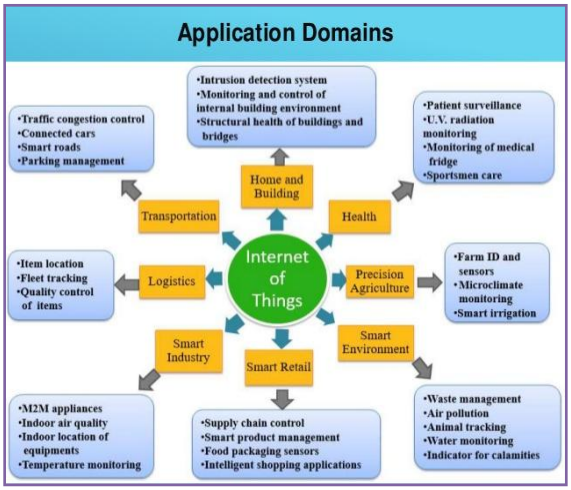

Figure 5: - IoT application

VI. TRENDS IN THE INTERNET OF THINGS (IOT) RIGHT NOW

As the years go on their occurred many changes in the internet of things new things had come into existence. Everywhere the internet services had become most popular. Internet of things had become transform as how a person living in his daily life. It creeps towards mass adaption; trends with new things have started to emerge with spacing. There are more than 500 billion to millions devices will be added to the IoT in during 2016. And with a 38% of outstanding growth from 2015. These devices will be distributed in cites, homes, technologies, vehicles, commercial purposes etc. Here we have 3 main technological fields where the growth of the internet that drives mainly: (1) LPWA technology (2) Big Data (3) Innovation start-ups. Security remains in at the top level in IoT. There are some of the top major trends in the IoT as follows:

- **Smart Cities:** -The Internet of Things (IoT) shall be able to incorporate transparently and seamlessly a large number of different and heterogeneous end systems, while providing open access to selected subsets of data for the development of a plethora of digital services.
- **Retailers:** -The Internet of Things (IoT) in retail has helped retailers in attaining enhanced customer experience and increased revenue. Cloud platform is another factor which considered as an important driver to the IoT market. The software market in IoT in retail is expected to flourish in the coming years owing to the increasing usage of mobile applications.
- **Security is key:** - As more and more devices become connected, the security of those devices, as well as their networks and data, will be of paramount importance for companies within the industry. According to the market information the security will have growth above 7.4% by 2019.
- **New technologies:**-Low power wide area (LPWA) networks will continue to drive the IoT exponentially growth in 2016. By 2023 billion LPWA will dominate M-2-M connections.
- **Big data:** -This field has already come into existence. Major companies or people focusing on Big data with using IoT. Only 1% of data used are used for the IoT environments.
- **Start-ups:**- it excels the exploiting possibilities of untapped and underused areas of the internet of things. Thestart-ups for the IoT will top 7.1$ billion by 2020.
- **Mobile:** - Smart transportation and smart logistics are placed in a separatedomain due to the nature of data sharing and backbone implementationrequired.
- **Cloud Internet of Things:** - The vision of IoT can be seen from two perspectives—'Internet 'centric and 'Thing' centric. The Internet centric architecture will involve internet services being the main focus while data is contributed by the objects.

VII. INTERNETS OF THINGS (IOT) TODAY

Considering about the current condition of the Internet of Things it's playing one of the major role in the present environment field. If we observe present situation in our daily life each second there is a need of Internet of Things. According to thisto this situation, one of top company i.e Cisco Internet Business Solutions Group (CIBSG) points "Things or Objects" were most connected to Internet than the people. In the year 2003 there were approximately 6.3 billion people and 500 million devices connected to the internet. By dividing this we find connected devices in the world's population were less than devices for persons. CIBSG defines in 2003 it didn't exist to the number of connected devices and then the existence of the smart phones had come into existence. In 2010 the growth of smart

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phones and tablet pc's brought 12.5 billion number of devices connected to internet. Meanwhile the human population increased to 6.8 billion made devices that connected for per person is more than 1.87 for the first time in the History. Today's IoT is well situated underway and initiates in all the areas which is continuing till today in progress.

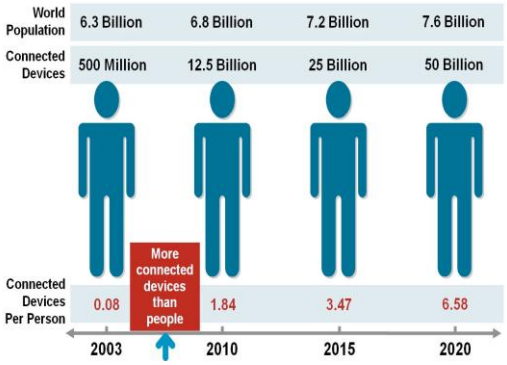

Figure 6 :- IoT growth

IoT today is a leading world's media brand through websites publications, live events, market data services, etc. providing world's premier form for information and business related things. Developers, designers, integrators and end-users enabling the internet services with advance knowledge. As of considering the 2016 trend, the vision of IoT evolved due to convergence multiple technologies, including ubiquitous, wireless communication, real time analysis, machine learning, commodity sensors, artificial intelligent systems, and embedded systems enabling the services of Internet of Things. In all the minds there is one question i.e how do the people use their devices with internet? Here the below figure gives connectivity of devices to internet how they use.

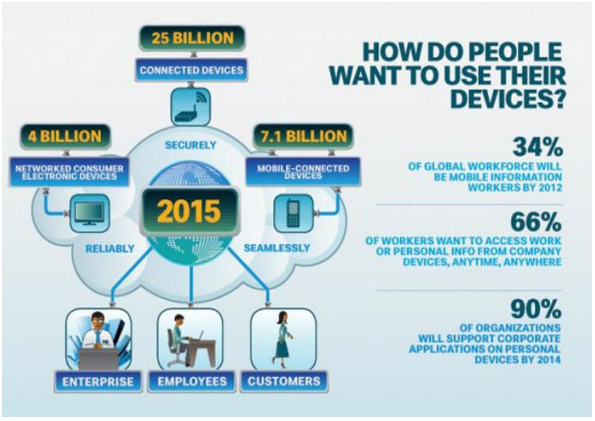

Figure7:- Today's internet connectivity with the things.

Approximately considering currently there are 9 billion devices connected to the Internet of Things. Majorly we have 3 components: (1) Edge connectivity (2) Network connectivity (3) core connectivity. IoT is also connected with cloud and Big data in this current technology. Day to day we are observing lot of changes in the IoT. It's a multitude of things. The below figure shows the clear picture of IoT.

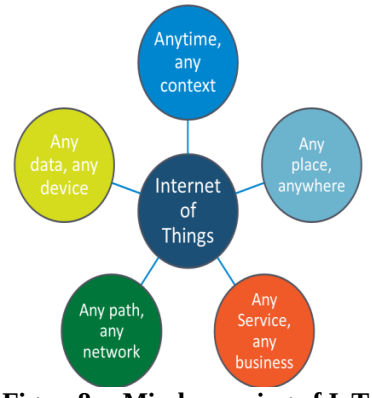

Figure8: - Mind mapping of IoT

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In the above figure if we observe mind mapping things that is connected with the IoT. It gives information about the connectivity is done any place, anytime, anywhere. This is the trend we are seeing in today's environment. IoT used today in areas like automotive, consumer products, energy and utilities, government, health care, home appliances, applications etc. and many others. A lot of research and with new implemented techniques today's internet of things giving a good support in the entire scenario. Comparing the things with previous and present Internet of things we can see there are a lot of changes in it. Internet is making one of the challenging to the things.

VIII. THE FUTURE INTERNET OF THINGS (IOT)

When we are looking today's state of art technologies it gives a clear indication how the internet of things got implemented at the universe levels that aspects need further studied and developing in coming years. Here it first exists significantly to work in governs area without any standardised approaches likely to be profiled for architectures, schemes, protocols etc. will be developed side to side in each and dedicated to the particular use.
This lead to be inevitably fragmented to the Internet of Things which could hamper popularity and becomes major out roll. Inter-tag communications and interoperability's is a necessary for the adoption of IoT which spread widely in all the fields. In the coming years Internet of Things achieves more expertise field in all the areas and there will be ubiquitous network society will be undertaken and it is practically be used. The below figure represents the network society with the activates done through the IoT.

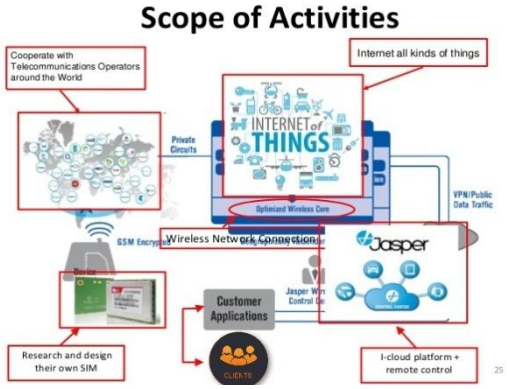

Figure9: - Scope of Activities in IoT

The way how the current internet is setting up, there is and a vast majority of data / information generated in the internet storage. The content can be anything like it can be videos, likes, music etc. There is a lot interesting things that really has order of effects in it for those like internet doesn't have any kind of objectives of the worlds. And at best it has an amalgamated set of subjective views, from which it can make real world like.
IoT gives more objective of gathering data which means that the conclusion will be drawn from Machine learning and Artificial intelligence which is potentially going to be different from what we are expecting. From the current writings, it is pretty clearly saying that exactly how it will look in the next 20yrs is unknown to us. Right now we can't expect what it will mean. The figure below shown gives an approximate scenario how the IoT exits from beginning to next future years.

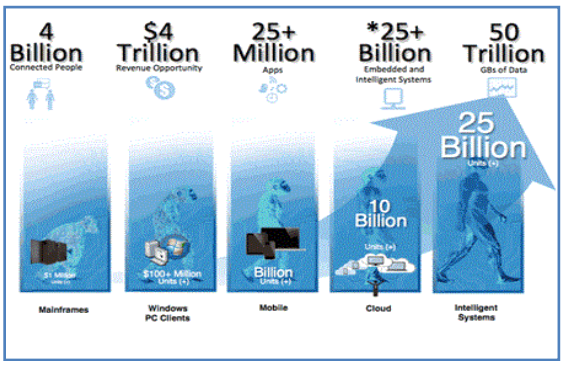

Figure 10 : - Begining of IoT to till Future

Computing and data both are going to become completely ambient. The scale of data and devices around us are likely going to overwhelming. To this point it is very hard to explain the position of "internet" even is. Internet of Things

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literally generated by data, reviews insights and feeding it to back to its environment. Taking into consideration of future IoT lot of things changes and there will be very efficiently usage of things which is related to internet is done and others. Not only saying that future internet, some most popular trends can be discussed in this scenario.

1) Main key success to the internet is "things" which will be getting increasingly in-expensive, connectivity will cost more, applications will be multiplied more than what we use now.
2) IT fields will look completely different than how we are seeing now.
3) All cities will be having smart technologies. More than one half of the population will have innovative new solutions, traffic management, smart packing etc. holds great promise for combating major challenge of rapid urbanization.
4) Business will be the key success to market. Here the adoption of IoT will be much more similar to the traditional IT diffusion model than the consumers led adoption social media and personal mobility.
5) Here it is all about the "Things". The currency of IoT will be here is "Data". This new currency will have masses of storage data can be translated into its sights and information and converted into concrete actions which transforms business, change in people lives, and social changes.
6) The terms like "E-commerce", "The Net", and "WWW" are all quite reminders of how the internet had eased to be an exciting and mysterious of new things that are similar to our part of daily life. One or the other day it's hard to imagine that all things weren't always connected and that the extraordinary benefited of IoT hadn't always been with us.

The below figure gives the information about when the internet of things from 2014 – Till 2020.

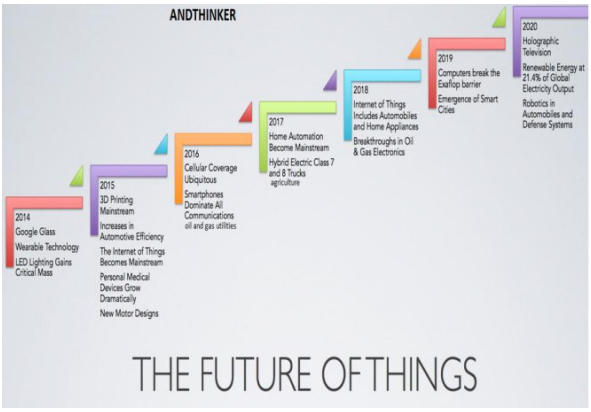

Figure 11 : - Future things in internet.

Internet of Things surely go long with more connectivity devices with different services because of ease of operation it offeres to someone who uses it. we can have an close eye in the things that were beyond our reach like at office, what is gong their etc. the below figure represents a small accessing of the IoT in future how can be used.

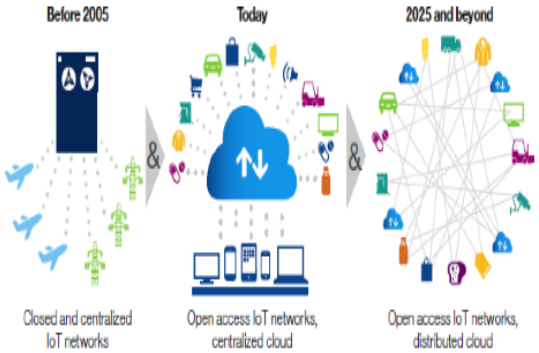

Figure 12 : - Networks accessing

Finally in the future, nearly their will be a morden smart look in all the fields because everything will be connceted to IoT. There will be machine-to-machine interfaces where reather than human speaking machine will be talking. We may see all the wearable devices will be connected to internet. The life style makes a lot of changes and provide early detection for diseases risks. IoT will leads to increases the awarness about environmental and social issues as more population comes online and have more access with new techniques in all the fields.

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IX. CONCLUSION

One of the major issues in our life is internet. Which is changing drastically in the living environment. Internet of things has potential to add new dimensions for enabling communication between objects. In the future the internet is going to be connected everything and everywhere where there will be interacting with devices and has the lot of issues which makes us to slove in the reality. Lot of research is required in this field once the implementation is successfully done the quality of life improves beacuse of the reduction of efforts required in this fields. In this paper we have mentioned major services that are using thorugh internet is considered. This paper gives a small review/ study on IoT. Day by day as how the technologies are rasing in each and every sprectrum same as like Internet of Things are becoming more and more fast forword to every field. In future the Internet of Things (IoT) becomes most popular in every area. Everything will be connected to internet.

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