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A Road Map : Analysis of Internet of Things (IoT) to Smart Telecommunication Industries

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ABSTRACT

In this research paper the researcher focused on a road map in between analysis of internet of things to smart telecommunication industries. The telecommunication industry would be spending more resources in delivering data network as per the data demand for different use cases. While faster data network would be required for connecting cars and other things, a low bandwidth network would work just fine in the use case of smart metering. Low-power WAN networks aka LP-WAN such as Sigfox or LoRa are being rolled out by some of the leading mobile operators to ensure smooth working of the smart devices and applications that require low power consumption and can work perfectly in low bandwidth. The researcher analysed a real case study on Communication service providers (CSPs) would be adopting a more data-centric approach that would enable the smart devices to stay connected with the internet for without any interruption. Moreover, the service providers would also monetize their data and boost profitability by providing data services that would provide full support for the upcoming new devices. The telecom companies would have to invest more resources into providing the highest quality of network in terms of data consumption. A consistent service across different devices would be the key to success in the connected world.

Keywords : IoT, CSP, LP-WAN, RFID

I. INTRODUCTION

The IoT revolution, also known as the fourth industrial revolution would change the way humans interact with machines and, in fact, lead the way to a hi-tech machine-to-machine interaction. Shortly, almost every device around us would be connected to the internet, collecting and exchanging data with other devices on the cloud. A research report by Gartner even stated that there would be more than 21 billion devices connected to the internet by the end of 2020[1].

With the connected devices booming and fuelling the internet market, the consumption of data has seen a radical increase. The Telecommunications s are fine-tuning their strategies and data services to keep in sync with the changing behaviour of the consumer. Not just that, the network providers are also revisiting their infrastructure, partnerships and business models to stay a step ahead of the competitors in the next generation of smart devices. Cutting to the chase, the advent of the internet of things is changing the way telecommunication industry functions and would have a huge impact on it [2].

In order to provide tailored consumer applications, telecom industries can be seen capitalizing on their infrastructure. Faster adoption of cloud technologies would be seen by many companies to deliver impeccable network, platform and solution

functionalities. There is a wide variety of IoT use cases and that's the reason why one-size-fits-all approach would not be applicable in this technologically advanced world. New IoT applications are being rolled out every now and then and the mobile network operators would have to deliver the highest-quality functionalities for the network to connect machines to machines uninterruptedly. The organizations would have to ensure that they have a robust cloud infrastructure that is flexible and agile to acclimatize to the new application scalability and deployment in the world of connected devices. They would have to provide uninterrupted network facilities without any drops at the right time and at the right speed as per the need of the application [3] [4].

Adopting the cloud technologies is critical for the mobile network operators on the data side. The companies are offering innovative pricing models and novel value propositions to meet the preferences of the consumers. Communication service providers (CSPs) would be adopting a more data-centric approach that would enable the smart devices to stay connected with the internet for without any interruption. Moreover, the service providers would also monetize their data and boost profitability by providing data services that would provide full support for the upcoming new devices. The telecom companies would have to invest more resources into providing the highest quality of network in terms of data consumption. A consistent service across different devices would be the key to success in the connected world [5].

Internet of Things would drive the Telecommunications to partner with platform providers to get tailored platforms for their needs. IoT requires data to be stored, processed, managed, aggregated and shared in an effective manner and the telecom companies would partner with platform providers to perform the needful task while reducing the operational expense as well. Hiring best cloud software talent for platform management may pose several challenges like lack of experience in cloud platform operations or cloud development. Keeping these challenges in mind while needing to offer platform solutions would impacting the telecom industry and more Telecommunications would be seen partnering with platform providers instead of finding their own platform solutions[6].

In a nutshell, the impact of the internet of things on the telecom industry is huge. The Telecommunications would be seen adapting to the changing network usage and providing services that would benefit the customers. Monetization of data, better cloud infrastructure, an adaptable data network for the different use case, and partnering with platform providers would be some of the changes that would be visible in the telecommunications industry in the coming years.

II. LITERATURE REVIEW

Vandana Sharma and Ravi Tiwari (2016), we are entering in a new era of computing technology i.e. Internet of Things (IoT). IOT is a sort of "universal global neural network" in the cloud which connects various things. The IoT is an intelligently connected devices and systems which comprised of telecommunication machines interacting and communicating with other machines, environments, objects and infrastructures and the Radio Frequency Identification (RFID) and sensor network technologies will rise to meet this new challenge. As a result, an enormous amount of data are being generated, stored, and that data is being processed into useful actions that can "command and control" the things to make our lives much easier and safer—and to reduce our impact on the environment. Every organization such as companies and civil institutions needs up-to-date information about people. In this

regard, most establishments either use websites, emails or notice boards.

Somayya Madakam (2015), Research study on the Internet of Things and Telecommunication Things has been going on for more than a decade and reaches back to Mark Weiser's original dream of ubiquitous computing. Bruce Sterling recently popularized the idea of Telecommunication Objects and the IoT. Telecommunication Things is another paradigm shift in IT world. Telecommunication Things are the things that are having embedding telecommunication's or intelligence, identification, automation, monitoring and controlling calibre. Telecommunication Things are assisting human life a lot, nowadays without their applications life is becoming cumbersome.

Yuichi Kawamoto (2018), the recent development of communication devices and wireless network technologies continues to advance the new era of the Internet and telecommunications. The various "things", which include not only communication devices but also every other physical object on the planet, are also going to be connected to the Internet, and controlled through wireless networks. This concept, the concept of IoT can be associated with multiple research areas such as body area networks, Device-to-Device (D2D) communications networks, home area networks, Unmanned Aerial Vehicle (UAV) networks, satellite networks, and so forth.

Falguni Jindal and Rishabh Jamar (2018), the world is moving forward at a fast pace, and the credit goes to ever growing technology. One such concept is IOT (Internet of things) with which automation is no longer a virtual reality. IOT connects various non-living objects through the internet and enables them to share information with their community network to automate processes for humans and makes their lives easier.

Friedman Mattern and Christian Floerkemeier (2018), discussed the vision, the challenges, possible usage scenarios and technological building blocks of the "Internet of Things". In particular, we consider RFID and other important technological developments such as IP stacks and web servers for telecommunication everyday objects. The paper concludes with a discussion of social and governance issues that are likely to arise as the vision of the Internet of Things becomes a reality.

John A. Stankovic (2014), many technical communities are vigorously pursuing research topics that contribute to the Internet of Things (IoT). Today, as sensing, actuation, communication, and control become ever more sophisticated and ubiquitous, there is significant overlap in these communities, sometimes from slightly different perspectives. More cooperation between communities is encouraged. To provide a basis for discussing open research problems in IoT, a vision for how IoT could change the world in the distant future is first presented.

J. Sathish Kumar and Dhiren R. Patel (2014), with the rapid development of Internet technology and communications technology, our lives are gradually led into an imaginary space of virtual world. People can chat, work, shopping, keeps pets and plants in the virtual world provided by the network. However, human beings live in a real world, human activities cannot be fully implemented through the services in the imaginary space. It is the limitation of imaginary space that restricts the development of Internet to provide better services. To remove these constraints, a new technology is required to integrate imaginary space and real-world on a same platform which is called as Internet of Things (IoTs).

M.U. Farooq et. al (2015), Internet, a revolutionary invention, is always transforming into some new kind of hardware and software making it unavoidable for anyone. The form of communication that we see

now is either human-human or human-device, but the Internet of Things (IoT) promises a great future for the internet where the type of communication is machine-machine (M2M). This paper aims to provide a comprehensive overview of the IoT scenario and reviews its enabling technologies and the sensor networks. Also, it describes a six-layered architecture of IoT and points out the related key challenges.

Noura Aleisa and Karen Renaud (2017), The Internet of Things' potential for major privacy invasion is a concern. This paper reports on a systematic literature review of privacy-preserving solutions appearing in the research literature and in the media. We analysed proposed solutions in terms of the techniques they deployed and the extent to which they satisfied core privacy principles. We found that very few solutions satisfied all core privacy principles. We also identified a number of key knowledge gaps in the course of the analysis. In particular, we found that most solution providers assumed that end users would be willing to expend effort to preserve their privacy; that they would be motivated to take action to ensure that their privacy was respected.

Peter J. Ryan and Richard B. Watson (2018), The Internet of Things (IoT) is an extension of the Internet in which large numbers of "things", including sensors, actuators and processors, in addition to human users, are networked and able to provide high resolution data on their environment and exercise a degree of control over it. It is still at an early stage of development, and many problems/research challenges must be solved before it is widely adopted. Many of these are technical, including interoperability and scalability, as billions of heterogeneous devices will be connected, but deciding on how to invest in the IoT is a challenge for business, and there are also major social, legal and ethical challenges, including security and privacy of data collection, which must be resolved.

III. PROBLEM STATEMENT

To establish Internet of Things in telecommunication industries is a demand of current situation and time to automate the existing process and resources. The key challenges faced by telecommunication industries today are:

1. Lack of real-time data and disparate data systems.
2. Keeping abreast of regulations and managing compliance,
3. Balancing maintenance with throughput,
4. Ensure customer satisfactions

Dealing with the above challenges, the telecommunications industries are finding it hard to cope with market growth and demands of customers. Whether its recent job stats, periodic report updates or data to monitor operations on the production line, a handy system that can explicitly perform and manage all these tasks, is something that business heads are looking for in their factories. Features like quality control and statistical analysis of a telecommunication telecommunications industries solution are compatible with almost every station of a production line. With a telecommunications industries solution, supervisors get real-time, continuous and standardized task level data to perform a detailed analysis of telecommunications industries performance. With a better knowledge of their production lines, supervisors can easily make out the problematic areas and take informed decisions to meet the dynamic demands of production lines.

IV. RESERCH OBJECTIVES

The researcher stated the some of the research objectives which are significant for the

telecommunication Industries with the help of Internet of Things (IoT).

1. To identify the existing process to automate in telecommunication.
2. To study the components of Internet of Things which are significant for the telecommunication Industries.

To study and develop a simulation model for the telecommunication industries.

V. CONCEPTUAL FRAMEWORK OF THE RESEARCH STUDY

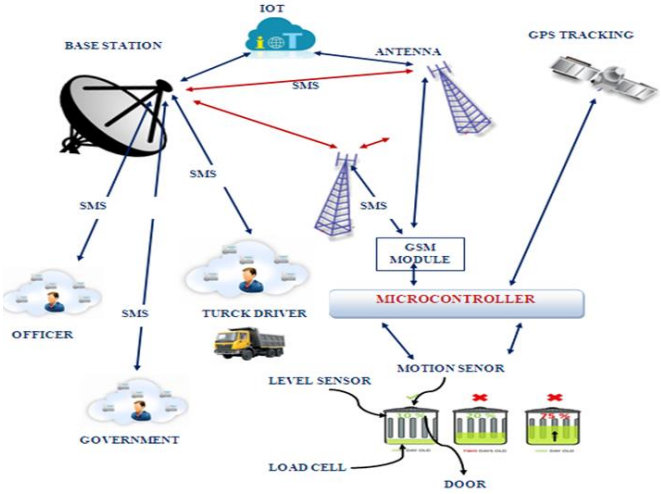

Fig 1 : Conceptual Framework of Telecommunication Industries and Internet of Things

In this researcher focused on Telecommunication manufacturing allows telecommunications industries managers to automatically collect and analyse data to make better-informed decisions and optimize production. The data from sensors and machines is communicated to the Cloud by IoT connectivity solutions deployed in the telecommunications industries. That data is analysed and combined with contextual information and then shared with authorized stakeholders. IoT technology, leveraging both wired and wireless connectivity, enables this flow of data, providing the ability to remotely monitor and manage processes and change production plans quickly, in real time when needed. It greatly improves outcomes of manufacturing reducing waste, speeding production and improving yield and the quality of goods produced.

VI. IoT ADOPTION IN INDIA

According to Vodafone's annual IoT barometer report 2017-18, the percentage of companies with more than 50000 connected devices active has doubled in the last 12 months, with over 84% of IoT adopters saying that their use of IoT has grown in the last year. From the Indian organizations that were part of the study, 81% felt that IoT is key to digital transformation.

According to a study by Deloitte, the current number of IoT devices in India is around 60 million and the number is going to increase to 1.9 billion units by 2020.

The IoT market in India is poised to reach $15 billion by 2020, accounting for 5% of the global market, as per a NASSCOM report.

"Like in the rest of the world, the initial deployments are going to be in the urban or the metropolitan parts of the country. However Smart Cities initiative by the Government means that tier 2 and tier 3 cities are also going to witness deployments of some IoT projects. Consumer IoT is emerging with a specific focus on connected homes and smart lifestyle," said Rajesh Mishra, Founder, President and CTO, Parallel Wireless.

Also, telcos can use IoT solutions to enhance their operational efficiency. For instance, telcos can use Iota to monitor cell towers remotely. Efficient analysis of data can also help them to predict failures and thus to better maintain the network.

"With IoT around, India can look forward to overcoming age old challenges encountered on aspects such as extreme climate calamities, civic issues, efficient farming value chain, healthcare, education to name a few. Moreover, India and its technology competency is driving global innovations and helping realise possibilities that otherwise appear only virtual," said Keshab Panda, CEO & MD, L&T Technology Services.

VII. CASE STUDY

CASE STUDY-1: Patras is Greece's third largest city, and the regional capital of Western Greece. It is also a smart cities pioneer, with a dedicated smart cities hub located in the Patras Science Park. This has led Patras to build a relationship with Deutsche Telekom and their local partners to investigate smart cities and how NB-IoT can help the city deploy new services, including smart parking and smart street lighting. Deutsche Telekom's local affiliate Cosmote has undertaken the first Greek implementation of NB-IoT in Patras along with their partners to prove that Smart Cities powered by NB-IoT are able to help the local municipality become more efficient and cut costs.

The Deutsche Telekom NB-IoT deployments in Patras demonstrates that the communications technology is adaptable to different services, whether they need real-time open communications data to turn around parking spaces quickly, or occasional communications to update lighting schedules, NB-IoT is a capable technology.

NB-IoT can help smart cities by providing a flexible, standards based route to connecting and controlling assets in the field. Mobile operator support around the world means that the use of NB-IoT is a low risk option, and can enable many services with minimal effort.

CASE STUDY-2: Founded in 1890, GLOBAL OMNIUM/Aguas de Valencia manages all aspects of the collection, treatment and distribution of water in the Spanish city of Valencia and the surrounding areas (more than 300 municipalities). Operating in an area with water scarcity, GLOBAL OMNIUM/Aguas de Valencia has positioned themselves as an innovative water company, utilising modern technology and the latest innovations to improve their operations. In this case study, discover how the company is using NB-IoT to vastly improve the management of water.

The initial phases of the proof of concept, demonstrate how NB-IoT can achieve many of the critical technology parameters for GLOBAL OMNIUM/Aguas de Valencia. In this pilot phase, with real meters from different meter manufacturers involved in the NB-IoT trail with Vodafone, the intention will be to prove all the required features, with all water meters in all locations connected and communicating. By supporting a long lifespan, with consistent secure message delivery, NB-IoT is expected to demonstrate that it is a good choice for connecting remote, hard to access water meters and other devices with similar requirements. NB-IoT coverage in place across the region today also means that in the future GLOBAL OMNIUM/Aguas de Valencia can rollout on a large scale and focus on continually working to improve their innovate offerings available to their customers.

VIII. CONCLUSION

In this research paper, the researcher pointed out the some of the significant usage of Internet of Things to develop a telecommunication Industries with the help of software technology and its usage. The software world is continuously innovating and opening up new areas of opportunity and challenge. A decade ago developers were busy with trends such as service-oriented architecture and product-line

architecture still very much around, but now a commoditized part of a larger system-of-systems landscape, and also extended to cloud computing with big data and mobile applications. New software development approaches have accompanied these new trends, The IoT touches everything. What is it then about the IoT that will dramatically change the business model for all industries? Here is an example: Traditionally, a company sells a product and, as long as all goes well, doesn't know what happens to it once it has left the telecommunications industries gate.

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