A Study on Internet of Things and Its Applications

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Abstract - The **Internet of things (IoT)** is the web of various devices, namely, vehicles, physical objects and other things embedded with electronics circuits, like sensors, actuators and software. An essential criterion for IoT is network connectivity between these objects which enable the devices to collect the data and exchange it. The invent of IoT has brought in a paradigm shift in the way we work, saves lot of time and resources, along with introduction of new realm of possibilities for knowledge creation, innovation and growth. The humongous benefits of IoT are unlimited. The internet of Things allows various public and private-sector firms to control assets, performance and build new business models. As a most essential component to interconnect devices, the IoT has greater possibility and potential to support the society, acts as a catalyst to hyper-connected society thereby improves the energy efficacy and economises all kinds of portability. The cloud technologies, big data and future networks like 5G and cyber-physical systems are highly compatible with IoT. The growth of IoT is determined by the integrated development of ecosystem, supported by appropriate environment compliance and a climate of trust, where issues like identification, trust, privacy, security and semantic interoperability are of utmost importance.

Keywords - IoT, hyper-connected society, cyber-physical systems, 5G, semantic interoperability.

I. INTRODUCTION

Internets of Th   ings is a concept whose essential presence in the environment of a variety of objects that through wireless or wired connections and unique schemes of addressing   makes possible the interaction and cooperate with each thing/object to implement new applications and arrive at common goals. The challenge to create small world are enormous in this context the research and development. The convergence of real, digital and the virtual worlds creates smart environments that make relative applications and systems and many other areas more intelligent. The purpose and intent of the internet of the IoT is to enable things to be connected anytime, anyone, with anything and anyplace ideally using any path/network. IoT has undoubtedly created revolution in the world of Internet. In this scenario the Objects have intelligence to recognize themselves by making or executing situational decisions, they also can access information that has been gathered by other things and control the environment.

II. IoT TECHNOLOGY

IoT is the network of physical objects to sense and communicate internally with their states as well with external environment driven by embedded technology and the convergence of efficient wireless protocols, cheaper processors, and a large group of new and old companies. The concept of IoT has become main-stream by the efficient control of application software. For every Internet connected PC or handset there will be 5-10 other types of devices sold, that have local connectivity.

The example applications are the electric vehicle and the smart house, in which appliances and services involve providing notifications, security, entertainment, energy saving and automation telecommunication. These systems are integrated into a single system with a shared user interface. IoT is bound to dispense access to information media and information services, through wired as well as wireless broadband connections. IoT makes use of compatibility generated by the confluence of consumer, Business and industrial Internet consumer, Business and Industrial Internet. The confluence establishes a medium as cloud to connect various intelligent things that transduce and transmit a huge amount of data, helping designing services to scale to this level of connectivity and methodical intelligence. The metamorphic technologies namely cloud, things mobile and software up-gradations drives the optimum use of platforms. The IoT makes it indeed possible to establish networks consisting of the entire manufacturing process that transform companies into smart environment areas.

Figure 1: Internet connected devices

A global infrastructure with new services, allowing any user at any instance to create content and applications for global users is driven by the cloud by the virtue of IoT. Consequently an accessible network of things at global level is generated wherein stake holders especially the users or/and consumers, who are available to start businesses contribute content, create and buy new services.

Fundamental Characteristics of IoT -

A. Interconnectivity: IoT enables the interconnection of whole lot of things with the necessary information and communication infrastructure to control the environment or make an automated system.

B. Things-related services: The IoT's capacity to provide thing-related services within the control or limitations of things, such as safeguarding of privacy and semantic consistency between physical things and their connected virtual things ensures reliability. Both the technologies in actual world and information realm will modify so as to provide thing-related services within the availability range of things.

C. Heterogeneity: The devices are entirely different and the application softwares of these devices and systems come from different platform. Heterogeneity is an important feature IoT, wherein the devices can interact with other devices or service platforms through different networks.

D. Dynamic changes: Various aspects like the state, connectivity and the number of devices change dynamically.

E. Scale of devices: The number of devices connected and managed through IoT and their communication that with each other will be obviously an order of magnitude larger than the devices connected to the current internet in function as well as number.

F. Device triggered communication: The device triggered is an exponential shift when compared to the communication triggered by humans.
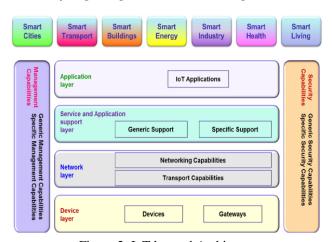

Figure 2: IoT layered Architecture

III. IoT APPLICATIONS

The prospective applications of the IoT are large in number and diverse, seeping into practically all areas of day to day life of people, companies and societal aiding systems as a whole. Some of the domains of application comprise smart communication, smart energy, smart health, smart buildings, smart transport, smart industry and smart city. The list is unending. The vision of ubiquitous IoT requires the efficient usage of technologies, different domains converging to make essential features like security, safety and privacy possible.

IV. CONCLUSIONS AND FUTURE WORK

The IoT organisation is designed to be offered as a complete successful implementation of IoT. Further the need of the hour is to design and install frameworks of horizontal IoT that support on demand access to the established IoT frameworks and finally the cloud infrastructure must communicate with each other for the control of desired operations. Cloud based IoT renders services over multiple infrastructure service providers (such as smart cities, municipalities and private enterprises) as well as for different technologies like mobile, Wi Fi and Internet.

The revolution in the field of IoT is accepted and its authenticity is now considered as a reliable factor.

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