

# A Brief Review of Internet of Things

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**Abstract**— the Internet of Things is a new thought in IT Field. Route scheming is an important part in the field of Internet of Things. Internet of Things is generating an environment of conjunction in the society. This technology environment revenue a paradigm shift in our professional and personal life. As a linked environment, Internet of Things(IoT) adds customer value and liability. These days IoT is being implemented extremely well in certain fields which is of human related that are stylish and smart city, smart environment, security, smart business process, smart agriculture, home automation and wellness. IoT is buildup of layered architecture named application layer, network layer and perception. Each layer has its own mechanisms, security issues and working strategy. The objective of this review is to analyze various routing protocols and energy efficiency issues.

**Keywords:** Internet of Things( IoT), Electronic Product Code (EPC), Mobile ad-hoc Network (MANET), Wireless Sensor Network (WSN), Quality of Service (QoS), Social Internet of Things( SIoT).

## I. INTRODUCTION

The mean is to link things to each other and set up a sequence of command among them, such as connecting Personal Digital Assistant devices to home appliances in a master-slave relationship to make our life simpler including connecting home applications to start coffee machines, adjust car seats, etc. At present there are 9 billion interconnected devices and it is likely to reach 24 billion devices by 2020.

The IoT demands: (1) a collective understanding of the situation of its users and their appliances, (2) software architectures and enveloping communication networks to process and express the contextual information to where it is relevant, and (3) the analytics tools in the Internet of Things that aim for independent and smart behavior [1].

The Internet of Things is, range from an informational network that allow the look-up of information about real-world substance by means of a unique ID called EPC and a resolution mechanism (ONS), to a network of sensors, actuators and autonomous objects interact with each other openly Machine-to-machine (M2M) communication [2].

### 1.1 AOMDV Routing Protocol for IoT:

Many experts are buoyant about the future of Internet of Things, while many of them concentrate on the usage of IOT. Nevertheless, as a vital parts of IOT the routing method designing is still a blank.

There are many similarities between IOT and MANET.

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Both the network structure is horizontal. Each node has the same priority and there is no sink node like wireless

sensor network, so energy consumption is stable and avoiding energy whole effect happen.

- The nodes there can move at random so that the network needs some methods to create connection rapidly and progressively. Moreover, the movement of nodes leads to the routing table updated frequently, therefore, link costs may concern the normal data transportation and some algorithm should be considered to minimize the routing costs[3].

- With the advance of microchip technology, nodes are becoming more and more powerful, so nodes are based on IP address and their foremost compute unit can process more command in a time unit. As a result of that, a more composite routing algorithm to lower the link costs and makes the network more effective.

In some extent, IOT is the evolution of MANET, but there also have lots of differences between them. One of the furthestmost differences is that IOT will connect to the Internet, for IOT is not only a local area network, through the connection to the internet, several internet of things can create a huge IOT [3].

### 1.2 Mobile Internet of Things Based on TD-SCDMA Network

IOT is now extensively used in electric power, transportation, industrial control, retail, public services management, health, oil and other industries. It can accomplish many functions, such as vehicle anti-theft, security monitoring, automatic vending, machine maintenance, public transportation management, and so on. It can develop production efficiency and has a constructive of lower production costs a new era of the application for IOT is opened. TD-SCDMA network enhances the wireless access network bandwidth and provides the necessary access conditions for the mobility development of IOT. The integration of TDSCDMA network and IOT can develop the application of IOT, such as the mobile video surveillance, telemedicine, smart transportation, smart logistics, and smart home applications, and so on. The network combination not only takes benefit of IOT development but also promotes TD-SCDMA application [4].

### 1.3 Innovation of the Technology of Internet of Things in Postal Logistics

IOT uses a range of information sensing identification device and information processing equipment, such as RFID, GPS, GIS, JIT, EDI, and other devices to merge with the Internet to form an widespread network in order to achieve information and intelligence for Entity[5], it can make the link of people and people, people and object, object and people, and object and object, besides, the growth viewpoint is very huge the medium-sized manufacturing

enterprises at home or abroad, which has a good flow of brand-based businesses or e-business; the occupied industry as well as high value-added industry such as e-commerce, e-medicine, high-end consumer goods, tobacco, publishing, and auto parts. The IoT technology and modern postal logistics management information system will create a high-speed procedure of the industrial chain, and connect the link of all logistics activities closely, so as to attain value-added logistics activities, decrease operating costs and create significant economic profit directly, with broad market forecast [5].

#### 1.4 Qos in the Internet of Things

IOT could be conceptually defined as a dynamic global network infrastructure with self-configuring capability based on ordinary and interoperable communication protocols where bodily and practical things have identities, physical attributes, and virtual personalities, use intelligent interfaces, and are effortlessly included into the information network.

Smart objects are lightweight devices with a sensor or actuator and a communication device. These devices are accomplished of sensing various types of incident/parameter and communicating those with other devices. They can be battery-operated, and typically have three components: a CPU (8, 16 or 32-bit microcontroller), memory (a few tens of kilobytes) and a low-power wireless communication device (from a few kilobits/s to a few hundreds of kilobits/s). The size of these devices is very minute. These devices can work together, form for instance a WSN. As a main constituent of the IoT, WSNs become a key factor regarding QoS condition and therefore should be integrated in the IoT in the best possible way [6].

China's power grid information technology degree are increasingly improving, it is still face with some special problems, such as the manufacture of a strong backbone of the electricity network frame, improving the power grid capacity of withstand multiple failures, increase the regional power grid backbone network frame, attractive grid stability level, enhancing the grid process flexibility, improving the power of enterprise information construction, information interaction with the user and fully playing the role of IT in the major decision-making and modern management the existing power grid to reliable, self-healing, economic, compatible, and integrated and secure smart grid. To construct a new generation of information and communication technology (ICT) platform of smart grid is the foundation for building smart grid. Study of smart grid business demand of four major areas of electricity transmission, electricity substation, electricity distribution and electricity usage, and compared the Internet of Things with the accessible electric power communication network performance. On this basis, a kind of application based wireless sensors was planned for the production processes for smart grid [7].

1.5 Social Internet of Things: challenges and possible strategies

The Internet of Things (IoT) integrates a large number of heterogeneous and enveloping objects that continuously create information about the physical world. Most of this

information is accessible through standard Web browsers and several platforms already offer application-programming interfaces (APIs) for access to sensors and actuators. Accordingly, the IoT technologies make possible to offer new services to end-users in dissimilar fields, from the environment monitor to the industrial plants running, from the city management to the house management.

Several approach for real-time search have been proposed. A common attribute is that these engines are based on centralized systems and, as such, cannot range properly with the number of devices or/and the number of queries[8].

A SIoT network is based on the scheme that every object can look for the desired service by using its relationships, query its friends and the friends of its friends in a scattered manner, in order to guarantee a well-organized and scalable discovery of objects and services following the same principles that characterize the social networks for humans. The statement that a SIoT network will be negotiable is based on the principle of the sociologist Stanley Milgram about the small-world occurrence. This paradigm refers to the survival of short chains of associates among individual in societies; starting from Milgram' s experiment, Kleinberg finished that there are structural clue that help people to find a short path competently even without a global knowledge of a network[8]. According to this paradigm, each entity has to store and manage the information related to the friendships, implement the explore functions, and finally employ additional tools such as the trustworthiness relationship module to assess the reliability of each friend. Clearly, the number of relationships affects the memory consumption, the use of computational power and battery, and the efficacy of the service search operations. The friendships usefulness varies from friend to friend and then which object to promote as a friend among the potential candidates is the key aspect for the overall system performance. It results that the collection of the friendships is key for a victorious operation of the SIoT [8].

The possible strategies to be implemented by each node when adding new friends taking into account the collision on the network navigability. The major offerings of the paper are the following:

1) Firstly, the five heuristics which are based on local network properties: neighborhood degree and local clustering. These heuristics are used to position the nodes in decreasing order and prefer the ones that maximize the preferred heuristic. The performance has then been analyzed in terms of global network navigability, i.e., routing is performed by assuming that each entity has a view about the global social network topology. From simulation, it resulted that the approach accomplish the best results is the one when objects select friends (or alternate old friends) so that on average the resulting friends have a low local neighbor degree. 2) Secondly, how the planned strategies behave when the routing is performed by each object only exploit local information about their friends, namely their degree[9].

Ever-present computing is changing our lives with the help of handheld devices, sensor networks and smart phones. The physical atmosphere connected with actuators, sensors, spectacles and computational features, embedded

perfectly in the daily items of human life and linked through a continuous network is termed as smart environment.

A smart object is any object which

i) Has physical essence; (ii) Has well-known links of physical features with nominal and conservative communication capabilities; (iii) Is in a control of distinctive identifier; (iv) Has an connection of one address and name at minimum; (v) Hold some computing competencies; and (vi) Owns properties of sensing physical spectacles and generate measures obligating a conclusion on the physical assurance (actuators).

There are three major requirements for the full integration of these plans/items to IPv6 internet:

(i) Low power communication stack; (ii) Highly consistent communication stack; and (iii) A protected communication stack. information can be processed and communicated [9].

#### 1.7 Semantic Analysis for Internet of Things :

What Internet of Things is. When communities ask what it is for the principle of cognizing a new object, they actually hope to obtain results of three aspects.

(1) The word meaning, what is the semantic meaning of the word that designate the new object. People rely on their language to cognize the world. For accepting a new word, people must explain it by some existing words in their words system, namely examine the semantic meaning of the word. (2) The internal property, what essential prescriptions does the new object have. Any object has its satisfied, the results of analyzing and reorganize this content are properties (3) an external relation, which category the new object belongs to. For accepting a new object, people must set it an appropriate position in the accessible human activity system, namely must identify its superior, inferiors and siblings, and find out the similarities and differences between it and these comparative human activities [10].

#### 1.7 Convergence of the Smart Grid with the Internet of Things

Electric grid is approaching a singularity, a point away from which it will be unrecognizable in terms of the physical[7], institutional and economic principles that communicate today. They forecast that we are imminent a singularity, a point at which technological advances result in computer that independently and willingly have intelligence greater than that of the human brain. They hypothesize a world in which humans use technology to go beyond these boundaries of their biological bodies and brains to the point that there will be no distinction, between human and machine [11].

#### 1.8 Development of Smart Cities with Data Management & Privacy

The Internet of Things primes the digital world and the physical world by bringing unusual innovations and technical components mutually trimness of devices, portable communication, and new models for business management. The Internet of Things authorizes people and goods to be connected Anytime, Anywhere, with anything and anyone, preferably using any media and any service. Result implies[12].

Addressing elements such as Union, Content, Anthology,

Computing, Communication, and Connectivity in the background where there is perfect interconnection between people and things. Internet of Energy require web based architectures to eagerly guarantee information liberation on demand and to modify the conventional power system into a networked Smart web that is mainly automated, by applying superior intelligence to operate, create obligatory policies, monitor and self-heal when necessary. This require the incorporation and interfacing of the power grid to the network of data represented by the Internet, implementation energy generation, diffusion, liberation, substations, distribution be in command of, metering and billing, diagnostics, and information systems to work perfectly and consistently. Rapid development of city borders, passionate by increase in population and infrastructure development, would power city borders to enlarge outward and overwhelm the surrounding daughter cities to form extra-large cities, each with a population of more than 10 million.

This will through to the evolution of smart cities with eight smart features, including Smart Economic growth, Smart Building planning, Smart Mobility (ability to move freely), Smart Energy, Smart Information Communication Technology, elegant Planning, Smart Citizen and Smart domination [12].

#### 1.9 Usage and Impact of the Internet of Things through the Use of Big Data Analytics

Big data analytics is currently generate marvelous fascination worldwide. In 2012, Gartner distinct big data as “high volume, high velocity, and/or high diversity in sequence resources that require new forms of processing to enable superior decision making[13], imminent detection and process optimization”. Watson notes that companies that wish to become analytics-based organization face seven important factors needed to achieve success. These are;

(1) An apparent business need, (2) Strong, committed sponsorship, (3) Alignment between the business and IT strategy, (4) A fact based, decision-making culture, (5) A strong statistics infrastructure, (6) The right logical tools, and (7) Personnel with superior analytical skills.

Internet of Things (IoT) enabled by radio frequency identification (RFID) and other RF-related tracking and sensor devices. There are assorted definitions of the Internet of Things, but it is generally accepted as defined by the RFID group as “the worldwide network of interconnected objects exclusively addressable based on average communications protocols” [13].

## II. LITERATURE REVIEW

**Vellanki M et al.** , IoT contain connecting all the devices and networks which job based on our setting, and can mould our lives safer, improved and faster. We are going to estimate and give details of energy issues that appear while using Internet of Things. Universal detecting certified by WSN innovation cuts across over limitless territories of existing living[1]. This offers the possible to measure, obtain and comprehend ecological pointers, from sensitive preservation and quality property to urban

conditions. The development of these gadgets in a communicating activating system that makes the IoT exciting, wherein sensors and actuators mix constantly with nature approximately, and the data is shared crosswise over phases to build up a typical working picture. Infused by the late change of a variety of empowering remote promotions, for example, RFID labels and inserted sensor and actuator hub[5], the IoT has progressed out of its early phases and is the subsequent progressive innovation in varying the Internet into a completely coordinated Future Internet. All these advancements in internet of things engage high energy consumption.

**Stephan Haller** , The Internet of Things is a overvalued term and many definitions for it exist. Worse still, it comes with a lot of worried terminology that is not used consistently either, hindering scientific discourse. This paper tries to bring simplicity by defining the most important terms like things, devices, entities of interest, resources, addressing, identity and, more especially, the interaction between them.

**Marie-Aurélie Nef et al.** , With the appearance of the IoT, it is necessary to define service models, which can categorize IoT applications and determine the QoS factors necessary to assure the requirements of those facilities. On the other hand, as WSN[6].

Comprises a main component of the IoT, they become a key factor regarding QoS provision. In this view, we focus our analysis on the feasible WSNs integration approaches in the IoT while presenting QoS and which best practices to accept. Additionally, regarding QoS requirements, we also describe service models for the IoT and reveal their possibility through a categorization of IoT applications.

**Ling Zheng**, According to the business characteristics and functional necessities of the smart grid information and communications technology platform, planned layered architecture of IoT for smart grid and four links of things of transmission of electricity, substation of electricity, distribution of electricity and practice of electricity, and compare it with the conventional electric power communication networks. As one of the most important part of the conclusion of the IoT, wireless sensor networks play an important role in the Internet of Things applications for smart grid. We place forward sensor networks application solution for the manufacture processes of the smart grid. Meanwhile, at the base of interactive demand analysis, Internet of Things solution for smart usage of electricity was projected.

**Irena Pletikosa Cvijikj**, A new standard known as Social Internet of Things (SIoT)[8].

Has been introduced and advise the grouping of social networking concept into the Internet of Things. The base plan is that all objects can look for the perfect service by its friendships, in a isolated manner, with only local information. In the SIoT it is very important to set suitable rules in the objects to select the right friends as these force the concert of services developed on top of this social network. In this work the issue by analyze likely strategies

for the profit of largely network navigability. Firstly, proposed five heuristics which are based on local network properties and that are expected to have an impact on the overall network structure. Suddenly exposed that minimizing the local clustering in the network acceptable for achieving the best outcome in provisions of average path length.

**Muhammad Yousaf**, A standard in which household substances around us with surrounded computational competences and capable of producing and distributing information is referred to IoT. IEEE 802.15.4 presents power competent MAC layer for IoT. For the conservation of privacy and security, IoT desires severe security mechanism so as to end harmful communication inside the IoT structure. For this reason security weakness of the MAC protocol of IEEE 802.15.4 and their most important attacks have to be examined. Also security license of IEEE 802.15.4 is to be analyzed in order to establish their limitations with look upon to IoT. The absent functionalities may be included in the upper layers of IoT Architecture.

**Steven E Collier**, The Electric grid is literally blowing up into a network of things[7]. Many believe it to be the largest example of an Internet of Things. The Enernet will be the predictable meeting of the smart grid with the Internet of Things. Utilities, their clients and non-utility will find it essential to plan, engineer and work in the existence of orders of magnitude more devices and systems (e.g., smart nodes on the service systems and, for consumers, smart thermostats, appliances, PHEVs/EVs, distributed generation / storage, premises monitoring, automation, and EMS, even transactive energy markets)\_finally leading to billions of new points that need monitoring, analysis and administration. In the meantime, the Internet of Things progressively grows more ubiquitous, influential, economical and protected. It is an clearly striking platform for the smart grid or, as Metcalfe has said, the control plane for the smart grid.

**Anup W Burange**, The aim of the Internet of Things is to support “Ubiquity” that allow things to be linked anytime, anywhere, with anything and anyone preferably using any path/network and any service. Over the last few decades, study for the development of market policy and applications along with their economic force & its collision on focusing social and physiological, economical growth, technical existing trends has been distorted severely. Over the past four decades, the meaning of Smart Cities has emerged to mean many things to many people. Meaning of “smart” is utilizing sensitive information and communications technology (ICT) ruins steady with the Internet Technologies to talk to urban challenges.

**Table 1**

S NO.	YEAR	TECHNOLOGY USED	PERFORMANCE ANALYSIS
1.	2016	discrete C++ language as platform, MATLAB	the routing success probability is decreased.

2.	2010	Routing Protocol for IoT	AOMDV-IOT achieves better performance in average end-to-end delay, packet loss and discovery frequency.
3.	2010	OPNET Software	MIoT can realize the mobile information interactivity for the fixed object and the mobile object.
4.	2012	MAC protocols	current QoS-aware MAC protocols in WSNs, and then we summarized the service models and the performance analysis of the IEEE 802.15.4, the feasibility of extension of those service models to the IoT
5.	2014	MAC protocols, IEEE 802.15.4	we investigated the IEEE 802.15.4 MAC Protocol security weaknesses and identified shortcomings present in its security framework
6.	2015	Map-Reduce technique, AAA architecture, Network technologies	proposed the architecture for data management and security, AAA Architecture also can be helpful for privacy purpose of user data, IoT having data management capability and privacy can be apply more effectively for building smart cities.
7.	2013	SIoT Networks,	propose an approach to dynamically adjust the threshold in the number of connections on the basis of the number of hubs in the network

Table 2

ROUTING PROTOCOLS FOR IOT		
TYPE	APPROACH	NAMES OF PROTOCOLS
TABLE DRIVEN PROTOCOL	In Table-driven the node maintains consistent route information in tables from neighbour nodes time to time. This will lead to quick and easy route establishment for the source node to forward packets to the destination.	1. DSDV: Destination-Sequenced Distance Vector. 2.FSR: Fisheye State Routing
ON-DEMAND DRIVEN	In on-demand driven the source node first sends a route request packet which is received by neighbour nodes and it is forwarded to other neighbour nodes to increase the vicinity until a route could be established to the destination node. Once the route is discovered a response packet is sent through the same path used by route request packet	1. DSR: Dynamic Source Routing. 2. AODV: Ad-Hoc On-Demand Distance Vector. 3.AOMDV: Ad-hoc On-demand Multipath Distance Vector 4.EEPR:energy-efficient probabilistic routing 5.NLEE: Node Level Energy Efficiency

### III. CONCLUSION

IOT is an impending technology of conversion but still at its early stage of research and development. New security encounters and application of lightweight cryptographic protocol need to be upgraded. IoT becomes a convenience with increased superiority in sensing, actuation, communications, control, and in generating knowledge from massive amounts of data. Various Routing Protocol for IoT have found better performance in average end-to-end delay, packet loss and discovery frequency. This will result in qualitatively different lifestyles from today. New research problems arise due to the large scale of devices, the connection of the physical and cyber worlds, the openness of the systems of systems, and pursuing problems of privacy and security.

### IV. Future Scope

The main aim of further research in the field of IOT is to improve the energy efficiency by considering expected transmission count, SIoT Networks have proposed an approach to dynamically adjust the threshold in the number of connections on the basis of the number of hubs in the network.

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