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The application of IoT model interoperability standards and segments, as well as M2M communication protocol, to the new business concept

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Abstract

A variety of intelligent devices that share, connect, and monitor data are included in the M2M communications protocol. These devices are capable of making effective decisions without the need for human intervention. A novel idea in protocol communication is machine-to-machine (M2M) communication, wherein various intelligent sensors not only control the battlefield, but also the battlefield itself. M2M will have a significant impact on the market for a range of real-time monitoring and assessment applications, including home automation systems and healthcare., It is compatible with a wide range of features and functions, including industrial automation, data prediction techniques, smart learning, and environmental monitoring. This study examined the various M2M communication viewpoints and proposed a novel application scenario.

Keywords: *M2M Communication, Segments of M2M, M2M vs IoT, M2M Standards, Value Chain*

1. Introduction

The amount of machine-to-machine (M2M) traffic has grown. The idea behind the term "Internet of Things (IoT)" is that networked entities (private, public, wired, and wireless) can reach beyond individuals and their preferred communication devices. It has been nearly a decade since this concept was first put forth.

The original idea was that an increasing number of new, mostly invisible to humans devices would cooperate to expand the reach of end-user services. This leads to the development of new systems and methods for optimising a range of goods and ensuring comfort or safety, such as delivery mechanisms that facilitate effective tracking of persons or vehicles. Like any other vision, before any attempts were made to improve the original concept through testing, some time passed. Creating novel business models, coming up with inventive ways to demonstrate viability, and forecasting the consequences of insufficient interoperability. It has become apparent in recent years that there are fresh, profitable sources of demand that can be met. In order for a device or application to function as the foundation for this information exchange, M2M's job is to ascertain the circumstances in which a device may exchange information with a commercial application via a communications network. The communication network is important in this definition. It is difficult to think of a device and a compiled application as an M2M relationship.

2. M2M Communication: A Vision and Assessment.

Machine-to-machine communication, or M2M, is the term most commonly used in this work. In general, machine-to-machine (M2M) communication refers to the exchange of information with little to no human intervention between computers, integrated processors, smart sensors, actuators, and mobile devices.

A new business idea called M2M, which comes from telemetry technology, uses radio, cable, or other panel devices to transfer automation and measurement data from distant sources. In the realm of contemporary wireless telecommunications, a novel paradigm known as machine-to-machine (M2M) communication is becoming more and more popular. The fundamental idea behind this concept is the autonomy of the machines or gadgets that surround us, utilising special networks and communication schemes that allow them to interact, cooperate, and keep an eye on one another in order to accomplish shared objectives.□

2.1 **Wireless communication types**

Wireless Communication technology can be used for four distinct types of communication. [11]

1. Human-to-Human communication(H2H)
2. Human-to-Machine Communication (H2M)
3. Machine-to-Human communication(M2H)
4. Machine-to-Machine communication(M2M)

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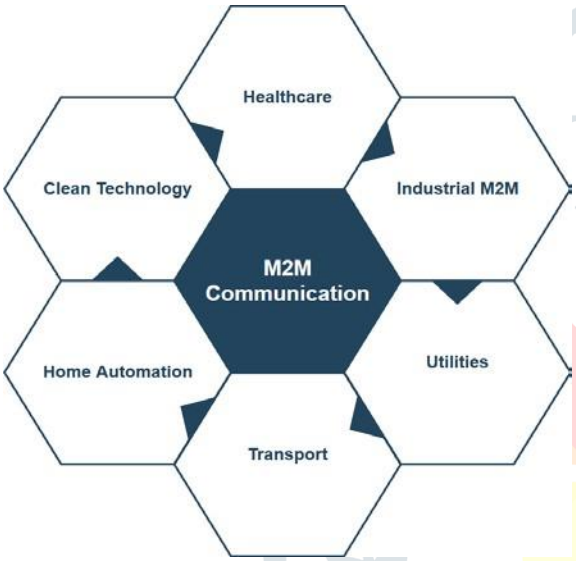

Fig. 1 Evaluation of M2M Communication.

3. Review of literature

In order to propel the development of IoT / M2M applications in a range of vertical markets, such as smart energy, smart transportation, home and industrial automation, electronic health, and connected vehicles, Fuchun Joseph Lin et al. have concentrated on service platforms. To investigate the viability of the idea of a common IoT / M2M service platform and the pressing need for an international standard to define such a platform, the effort will be used as a feasibility study. The study's findings will be used to create a suitable IoT and M2M curriculum for the upcoming generation. [1]

Researchers Yue Gao et al. have examined and assessed the Internet of Things' (IoT) anticipated growth. Numerous technologies

are currently accessible, the industry trend indicates that cellular systems will be crucial to guaranteeing IoT connectivity throughout the world. White Space TV (TVWS) techniques are a promising way to manage the billions of connected devices in a highly flexible, dependable, and scalable manner because the spectrum is typically a bottleneck for 3GPP technologies. [2]

Chen Hongsong and colleagues have examined instances of machine-to-machine (M2M) communication, which has grown in significance in the last few years. Its character and evolution, however, pose a new security risk. The M2M system has serious problems with trust and security. In the M2M system, a safety and trust survey is necessary. They consist of the standard technological advancements in research and safety products. All of this will contribute to understanding the M2M system's safety and confidence. [3]

According to Mahbubul Alam and others, Machine-to-machine (M2M) communication has garnered significant interest from the scientific community and has gained traction from a business standpoint as service providers start offering fleet management, logistics, home automation, and other related services. However, a lot of people consider the broader Internet of Things (IoT) to be an advancement in M2M. We'll examine the difficulties in implementing IoT, concentrating on networks and computing.. [4]

According to Zubair Md. Fadlullah et al., the machine-to-machine market has the most growth potential at the moment due to the smart grid's sophisticated measurement infrastructure. The most dependable technology among them is identified, along with a weakness, for enabling M2M communication in the SG-originated area network. Additionally, a potential remedy is offered to address this flaw and enhance SG communications' scalability. [5]

Yan Zhang et al. have investigated As integrated devices rapidly permeate the home environment, it is anticipated that the machine-to-machine paradigm will replace machine-to-machine communication in the home network. With the growing number of multimedia devices and the increasing visual demands in a domestic area, they focus on the management of QoS in M2M home networks. The proposed approach considers both the resilience of multimedia services and the requirements of Quality of Service. The illustrative results demonstrate that in M2M home networks with limited resources, shared design can intelligently map radio bandwidth based on QoS requirements. [6]

An overview of the pervasive mobile applications on the cloud computing platform, which are growing as a result of the quick advancements in cloud technology, has been provided by DongBum Seo et al. Our system provides a cloud-based and ubiquitous computing architecture that enables a robust mobile application framework that demands high performance. The machine-to-machine (M2M) service layer, the ubiquitous service layer, and the cloud service layer (CSL) make up its three layers. [7]

3GPP offers a narrow-band long-term evolution (LTE) system to support the Internet of Things, which Rapeepat Ratasuk et al. have evaluated. When operating independently, NB-IoT can occupy a 200 kHz GSM channel, but in-band and in-band protection modes make use of an LTE physical resource block (180 kHz). Low-cost devices, long battery life (more than ten years), high range (20 dB improvement over GPRS), and large capacity are among the design objectives of NB-IoT. Although exception messages aim for a 10-second delay target, latency is relaxed. It is anticipated that the NB-IoT specifications will be completed in 2016. [8]

SU Penn H. et al. have investigated In order for the Internet of Things (IoT) to function as a single implementation for eternity, failover for service-oriented distributed networks is required. In order to implement failover mechanisms when devices are replaced or services are unavailable, resource reconfiguration is required. Duplicates can be costly and redundant for application services that involve more than simple end-to-end transfers between versatile or heterogeneous devices. Specifically, another service partner must take over a device with a failed service, and users—including developers and installers—must not be involved. We create a distributed fault tolerance mechanism for the Internet of Things that considers its dynamics. [9]

Internet of Things (IoT) and Machine to Machine (M2M) communication offer tremendous opportunities to connect different devices, such as sensors and actuators, and to collect and process the data collected. Hongkun Li et al. have studied and analysed these technologies. Consequently, this makes it possible for the services that turn smart homes and a reality for smart transportation applications. Interworking and interoperability are now necessary for applications or services in various industries (like Smart Home and Smart Transport) that need to share and reuse information and collaborate. Nevertheless, in the context of M2M / IoT, interoperability and interworking across industries have not been adequately addressed. The best method for establishing a shared understanding for cooperation and communication is semantics. It emphasises data sharing amongst various applications. [10]

4. Standards & Segments for M2M

Certain M2M market segments require stringent standards to guarantee long-term investment protection, in contrast to other ICT segments where operating systems can be implemented in spite of the absence of standards. It is anticipated that the installed devices will be used for more than 20 years in a number of M2M applications, such as smart grids and smart metres. Although this lifestyle might seem unfeasible (or at least uncommon) for traditional TELCO deployment, utility companies' infrastructure has very long delivery cycles, which can have a significant impact on its design and, as a result, the Fourth level of related standards.

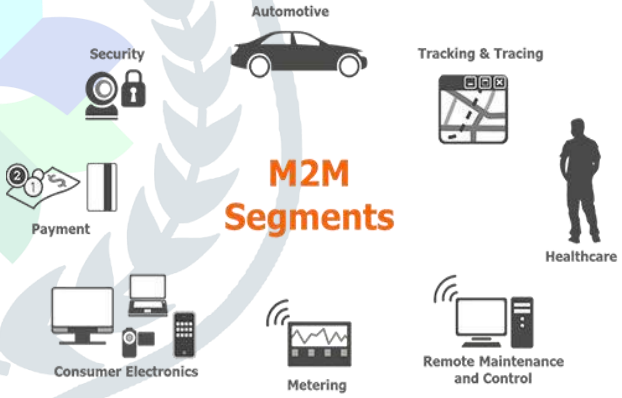

Fig. 2 Segments of M2M Communication. [12]

Table 1: Machine-to-Machine vs. IoT uses parameters difference. [13]

Parameters	M2M	IOT
Short for	Machine to Machine	Internet of Things
Ideology	M2M concept: the ability for two or more machines to communicate and carry out specific tasks without the need for human intervention. In the M2M	The Internet of Things (IoT) is a networked ecosystem of connected devices that allows devices to autonomously gather and send data over a network without human assistance. IoT facilitates object interaction

	model, there is some discernible intelligence.	with an environment, either internal or external, that regulates decision-making.
Connection Type	Point to Point	Through IP network using various communication types
Communication Protocol	Old proprietary protocol and communication techniques	Internet protocols used commonly
Value Chain	Linear	Multi sided
Focus Area	For monitoring and control of 1 or few infrastructure	To address everyday needs of humans.
Device in scope	Limited devices in scope	Large number of device in scope
Scalability	Less scalable then IoT	More scalable due to cloud based architecture
Current uses	Remote monitoring, Fleet control	Smart cities, Smart Agriculture
Business Type	B2B	B2B and B2C
Technology Integration	Vertical	Vertical and Horizontal
Related terms	Sensor, data and Information	End users, devices, wearable, cloud and Big data

The following table describes the real differences between M2M and IoT: The utilisation of multi-shad proposed models is primarily dependent on IoT basis architectures in the current market scenario. The M2M concept connects two models directly, bypassing the need for human intermediaries. Through networks, middle layer communication protocols are used in Internet of Things communication. IoT can also be used to connect a large number of devices that are related to various elements.

5. Conclusion and Future Work

Internet of Things (IoT) and other technologies are required for better operability of interconnection between various resources. In the context of using machine-to-machine device models, this paper discusses the implementation issues and showcases different segment evaluations. A comparison of various models is provided. Security, robustness, response time, user interface, communication, cost, and device orientation are among the comparison criteria. Creating, developing, and executing an Internet of Things (IoT) based model for smart homes, smart grids, smart agricultures, smart classes, smart cities, smart industries, etc. would be the focus of future work.

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