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A Review on Machine To Machine Communications

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***Abstract*:** Machine to Machine are the technologies that permit the wireless and wired systems to communicate with other devices of the same category. Machine to Machine is shortened as M2M. M2M is the essential part of Internet of Things, also shortened as IoT. It has several benefits for example logistics, industrial automation, Smart Grid etc. For the rapid development of Machine to Machine and Internet of Things for big applications, it is essential to adopt IPv6 because it has larger address space. In Internet of Things, sensors are used for communication of devices. These sensors necessitate larger address space for that reason adoption of IPv6 is required. Machine to Machine communication is required for communication between several embedded devices used in Internet of Things.

Keywords: Machine to Machine, Internet of Things, IPv6, Sensors

I. INTRODUCTION

The wordM2M (Machine to Machine communication) describes devices that are connected to the Internet, using a range of stable and wireless networks & communicate with each other and the widespread world. They are active communication devices. The word is slightly specious though as it seems to accept there is no human in the equation, which quite often there is in one way or another.Machine to Machine is all about connecting numerous devices for collecting data from sensors. Machine to Machine is about connecting and communicating with ‘things’ from Internet of Things where things refer to numerous Embedded Devices. Internet of Things refers to communication of things i.e. sensors.

‘Things’

It contains of sensors, machines etc. The term ‘Internet of Things’ is chiefly associated with applications that involve RFID (Radio Frequency Identification), These make use of so called tags, small chips with antennae that start to transmit data when they come in interaction with an electromagnetic field. They are passive communication devices, in contrast to lively devices that can transmit because they have access to a power source similar to a battery.

Machine to Machine capability is used for connecting numerous devices and things. In this paper, Machine to machine communication used in Internet of Things is discussed. The main reason for the focus on M2M is to consider the suggestions for communication infrastructure and services.Smart Living, Cities, Meters, and Grids and so forth, is applications with widereffectsfor economic and social development. The paper is organized as follows:

Firstly Introduction, Machine to Machine, Requirements for M2M Communication, New Business Models, Applications of M2M and lastly Conclusion.

II. MACHINE TO MACHINE (M2M)

It rises to technologies that allow both wireless and wired systems to communicate with other devices of the same type. M2M is a wide term as it does not pinpoint exact wireless or wired networking, information and communications technology,thiswide term is particularly used by business executives [1]. M2M is considered an essential part of the Internet of Things (IoT) and gets several benefits to industry and business in general as it has a wide range of applications such as industrial automation, smart grid, smart cities, logistics, health, field ofdefense etc. frequently for monitoring but also for control resolutions.M2M can include the case of industrial instrumentationincluding a devicesuch as a sensor or meter to detentionof temperature, inventory level, etc.,that is relayed through a network wireless, wired or hybrid to an application that

converts the captured result into meaningfulinformation. Such communication was formerly accomplished by having a remote network of machines transmit information back to a central hub for exploration, which would then be redirected into a system similarto a personal computer.M2M was formerly used for automation and instrumentation but now has been also used to refer to telematics applications.

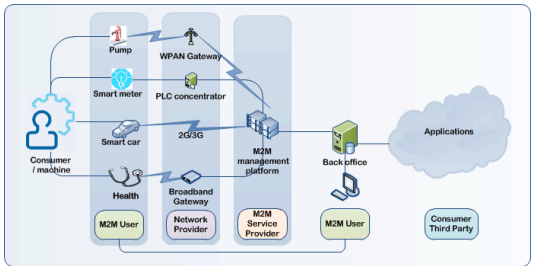

Figure1. Elements Of An M2M Service And Who Controls It

III. OVER 50 BILLION DEVICES CONNECTED BY 2020 ?

It is really difficult to evaluate how many devices will be connected via M2M in the coming of years,by defining M2M as devices that have some kind of two way communication and that are not peripheral to another device.Some types of applications can be excluded. Embedding 3G & 4G wireless capability in laptops, tablets and so may or may not be included depending on the situations. Berg Insight, a market research firm, expected that by the end of 2010 around 80 million devices were connected using mobile networks. They suggest 290 million will be connected in year 2015. And Another company, IMS Research guesses that by 2015, 100 million devices per year will be prepared with mobile wireless connectivity with a 30% compound aggregate growth rate.[2]If these estimates were considered together it would yield roughly one billion devices connected on mobile networks by 2020. Many countries are continuing out smart energy services, containingmetering and investing in eHealth, which may be supported by M2M. All signs are that the capability of M2M to support a range of services will confirm growth in its use by the public sector.

IV. REQUIREMENTS FOR M2M COMMUNICATION TECHNOLOGIES

An ideal M2M communication technology would permit instantaneous safe access tothe Internetanywhere in the world at any speed.[3] It would work similarly well indoors as outdoors.It would havelimitless range, zero latency & unlimited throughput, while estimate virtually nothing and consuming no energy,it would offer access and management to data necessary to use M2M resourcefully while ensuringthe protection of secrecy. Unfortunately this is not the case and therefore all technological choices aretrade-offs. It is these trade-offs that can make the choice of networking technology challenging. Some general necessities and associated trade-offs are:

- Range and penetration
- Power consumption
- Throughput
- Types of network supported
- Ease of roll-out and maintenance.
- User interaction
- Types of applications supported
- Mobility
- Failover capabilities

The method the system canwork; whether it is “future proof” or not and whether it can accommodate changing demand depends uponthese choices. Some M2M projects already fail at the phase of choosing what parameters are important, others when changing demand invalidate past choices. Smart metering for instance has seen a large numberof pilots, but no market consensus on what communication technology is the most optimal. Companieshave found it problematic to find a single technology or group of technologies that fulfils all demands that asmart metering project has.

V. NEW BUSINESS MODELS ENABLED BY M2M COMMUNICATION

M2M communication can permit companies to improve standing processes, by permitting remote monitoring, sensingand real-time updates, whereas before these were based on site visits, calls from customers. This may, for the most part, be incremental innovation, such as by cost

reduction. [4] There will, however, also be new business models, enabled because processes can be implemented in ways neverused before. Some examples of these new business models enabled by M2M are:

- Pay as you drive insurance: The amount of risk associated with driving is a function of distance driven, location, time of day and drivingstyle. In the past there was no reliable way to measure these variables. Now that these variablescan be measured, it is also possible to make insurance products that factor in these variables andincrease or reduce premiums based on use.
- Digital content distribution: First generation eBooks required the transfer of content downloadedto a PC on to an eBook by means of a cable or a memory stick. This was a cumbersome processthat required multiple steps and planning. Some newer eBook models have a 3G mobile phoneembedded. This allows the purchase of content straight from the device and the distribution ofperiodic content (*e.g.* newspapers, magazines and blogs) to the device. The connectivity is providedby the eBook distributor at no cost to stimulate and improve opportunities for sales.
- Products as services: Today's economy is already known as a services economy. M2M will allowthis development to be extended further. Already there are companies delivering light as a serviceor companies that aim to make energy-saving a service, receiving apayment based on the savings they realise. M2M features heavily in these business models.

VI. APPLICATIONS OF M2M COMMUNICATIONS

It's relaxed to see why machine-to-machine communications have so many applications. With improved sensors, wireless networks and increased computing capability, deploying an M2M makes sense for numerous sectors.

- Utility companies, for instance, use M2M communications, both in harvesting energy products, such as oil and gas, and in billing customers. [6] In the field, remote sensors can detect important parameters at an oil drill site. The sensors can send information wirelessly to a computer with specific details about pressure, flow rates and temperatures or even fuel levels in on-site equipment. The computer can automatically adjust on-site equipment to maximize efficiency.
- Traffic control is another dynamic environment that can benefit from M2M communications. In a typical system, sensors monitor variables such as traffic volume and speed. The sensors send this information to computers using specialized software that controls traffic-control devices, like lights and variable informational signs. Using the incoming data, the software manipulates the traffic control devices to maximize traffic flow. Researchers are studying ways to create M2M networks that monitor the status of infrastructure, such as bridges and highways [source: Southern Illinois University News].
- Telemedicine offers another use. For instance, some heart patients wear special monitors that gather information about the way their heart is working. The data is sent to implanted devices that deliver a shock to correct an errant rhythm.
- Business also can use M2M communications for tracking inventory and security. Late in 2007, M2M communications helped break up a heavy equipment theft ring. [5] A rental company noticed sensors on its equipment showed the bulldozers were almost 100 miles from where they were supposed to be. Checking on other equipment rented the same day at different locations showed a similar trend, and the business used its M2M communications to disable the engines on the equipment and contacted law enforcement. Officers found that the company's equipment, along with a dozen other stolen pieces, was headed for the Mexican border.

Machine-to-machine communication appears to have a bright future. It's a flexible technology that uses common equipment in new ways. Every day, businesses, engineers, scientists, doctors and many others are finding new ways to use this new communications tool.

CONCLUSION

Mobile M2M communications are currently receiving attention from the academia due to its potentiality in ubiquitous applications, like telemetry, or in intelligent transport systems, and also due to the emergence of IoT paradigm. In this paper, we reviewed the Machine to Machine Communication, several Business Models and various applications of Machine to Machine. Overall, resource usage efficiency in mobile M2M communications is still an open research area, and further studies on the impact of multitude and diversity of devices and traffic in the performance of communications are necessary.

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