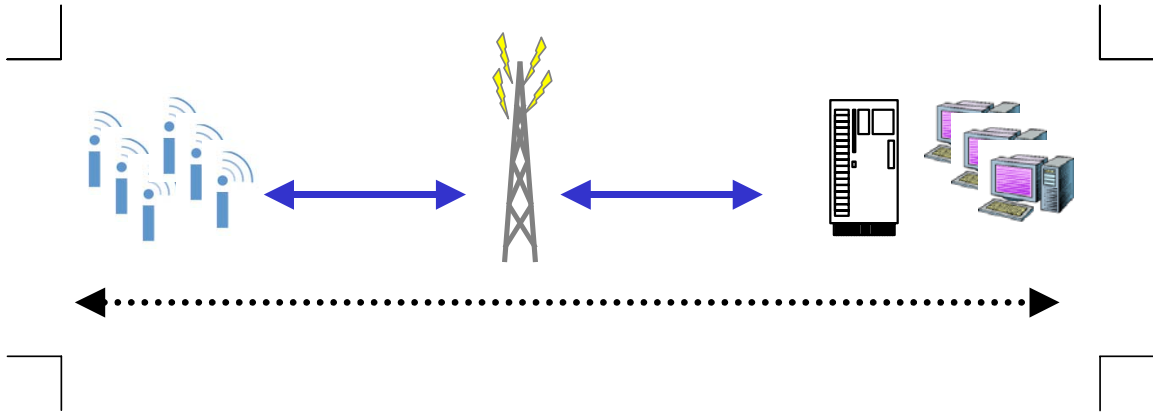


# End-to-End M2M

(Sample/Excerpts Copy Only – Not Full Report)



Conceived and Written  
*By*  
Stephen M. Dye

Signum

Published  
*By*



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## ***About End-to-End M2M***

End-to-End M2M is aimed at a broad audience of business and wireless professionals who desire to understand more about M2M. Regardless of whether the readers are technically savvy or business-oriented, the publication covers both aspects from all levels, giving insight and understanding to determine the next move for their business concerning M2M.

The publication is written in an easy-to-read format. The style adopted allows the reader to initially view a bullet-point listing of a topic's salient points, followed by a closely detailed description of each point. Written for all levels and background, the book touches on technical and business related areas providing the reader with an all-round knowledge of M2M.

The reader is initially introduced to M2M, as it is traditionally known through Telemetry and SCADA. The various characteristics of M2M are discussed to prime the reader on the basics and how they can be translated in to a more commercial scenario. Secondly, the reader is introduced to wireless data and the pertinent aspects of its suitability for M2M. The reader is then introduced to the various technology and business dynamics at play in the world of M2M, advising would-be and current M2M players on the possible directions that can be taken. Finally, a number of case studies and vendors are investigated, illustrating M2M's presence in the market today.

### **Begin Sample/Excerpts – Not Full Report**

#### ***Wireless Transport of M2M Data to and from the Monitoring Facility***

Pivotal to the M2M solution is the application of wireless services to enable the field-collected data be sent back to the monitoring facility and indeed for the monitoring facility to provide control and polling functions back to the field device. M2M in general relies on public networks operated by the common wireless carriers such as Verizon, T-Mobile and Cingular. These networks offer high reliability and excellent coverage in all classes of demographic distribution, i.e., urban, suburban, industrial, arterial highways, and rural. M2M deployments normally cover wide areas; hence PCS (Personal Communication Systems) networks are used as the wireless transport. M2M solutions that are limited to a local area such as a building or a small complex can use their own Wi-Fi or private network.

The choice of wireless data transport is of paramount importance, particularly in the USA market, given the geographical expanse and the wide choice of carriers and technologies. The actual wireless data bearer is further discussed later in this publication. However, at this juncture, as part of the M2M strategy, a solid foundation must be established regarding the wireless access technology used; it should not be a rash decision.

In essence there are four main wide-area wireless-access technologies and two data bearers. The technologies are.....

From these four technologies, a wider choice of protocols or transport bearers opens up.

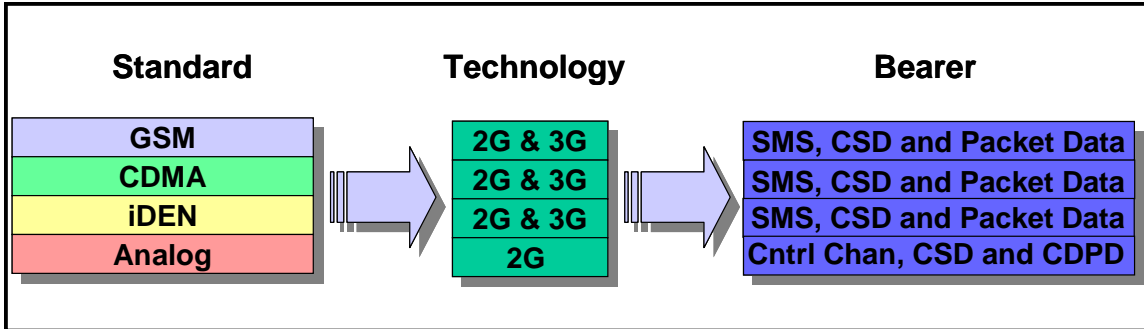


Figure 1. Wide Area Wireless Protocols and Bearers.

### ***The Advantages of SMS***

SMS has several advantages and is highly suited as a medium or bearer for M2M:

- **Interactive two-way.**
- **Simultaneous transmission with voice.**
- **Confirmation of delivery.**
- **Store and forward method.**
- **Use of phone number as the address.**
- **High degree of encrypted.**
- **Transmission at higher power than the voice channel.**

### **Wireless Technology Recommendation for M2M**

The recommended technologies for M2M in the American markets are:

- **GSM–SMS and GPRS.**
- **CDMA–1xRTT.**
- **iDEN Packet.**

### ***GSM–SMS and GPRS***

SMS is a highly suitable bearer given its speed, reliability and integrity. The payload is small, with only 160 bytes of ASCII and 140 8-bit bytes for binary-encoded messages. For most M2M applications, though, this is generally adequate. SMS is globally available, and requires no further external protocols or provisioning since it is a complete, two-way delivery system native to the GSM

protocol. SMS is delivered to a GSM network that will further the message to an Internet-based server.

The table below summarizes the standards, technologies and bearers, indicating their availability and recommendations for deployment.

Standard	GSM			CDMA			iDEN			AMPS		
	GPRS	SMS	CSD	1xRTT	SMS	CSD	Packet	SMS	CSD	CDPD	Ctrl Ch.	CSD
Available (USA)	✓	✓	✓	✓	x	✓	✓	x	✓	✓	✓	✓
Globally Available	✓	✓	✓	x	x	x	x	x	x	✓	✓	✓
Recommended (USA)	✓	✓	x	✓	x	x	✓	x	x	x	x	x

Table 1. Summary of Technology and Bearers for M2M Data Transport.

It is worth noting that CDMA and iDEN are available in some global markets, such as Asia, Latin America and Australasia.

## Technology Strategy

M2M technology strategy takes in to consideration the following main issues:

- **Hardware budget.**
- **Scope of deployment - domestic or international.**
- **Ease of creating the application.**
- **Wireless service options.**
- **Wireless access costs.**

### IP Addresses: Static, Dynamic and Persistent

*Carefully consider the IP address issues in 3G networks. Carriers will provide a fixed IP address only for an additional fee, assuming they are able to provide a fixed IP address at all. Should dynamic IP addresses be used, the firmware in the field-deployed unit will need to be programmed according to the wireless service*

## Part 3: M2M Business Dynamics

**M**achine-to-machine communications brings many benefits to its users—government, commercial or private. M2M as we know it today would not exist unless there was a business case and profit model behind it. Profit models are the driving force behind M2M, which can in many ways be looked upon as commercialized SCADA. Part Three covers the business dynamics of M2M and examines the range of services a company should consider offering, and the strategies and business and revenue models that should be thought-out for implementation. This section also discusses a number of key points

concerning M2M business based on the strategy and profit goals every M2M player should consider. Specifically, the following seven main subjects will be discussed.

## M2M Opportunities: Services Companies Can Offer

The M2M market is very fragmented. A number of companies offer monitoring services, hardware development, wireless access services and hardware interface design. As a result, an M2M customer has to do a lot of footwork, pulling together the many vendors required to provide the essential elements of the classical three-part solution of Device > Wireless Services > Back-End Services.

A wealth of opportunity awaits companies entering the market for M2M services. The following diagram expands on the classical three-part M2M model, to reveal a host of other services that must be made available in order for an M2M solution to be successfully deployed. The diagram below illustrates the range of services that require to be applied to an M2M solution, ideally by the service provider in the blue box above them.

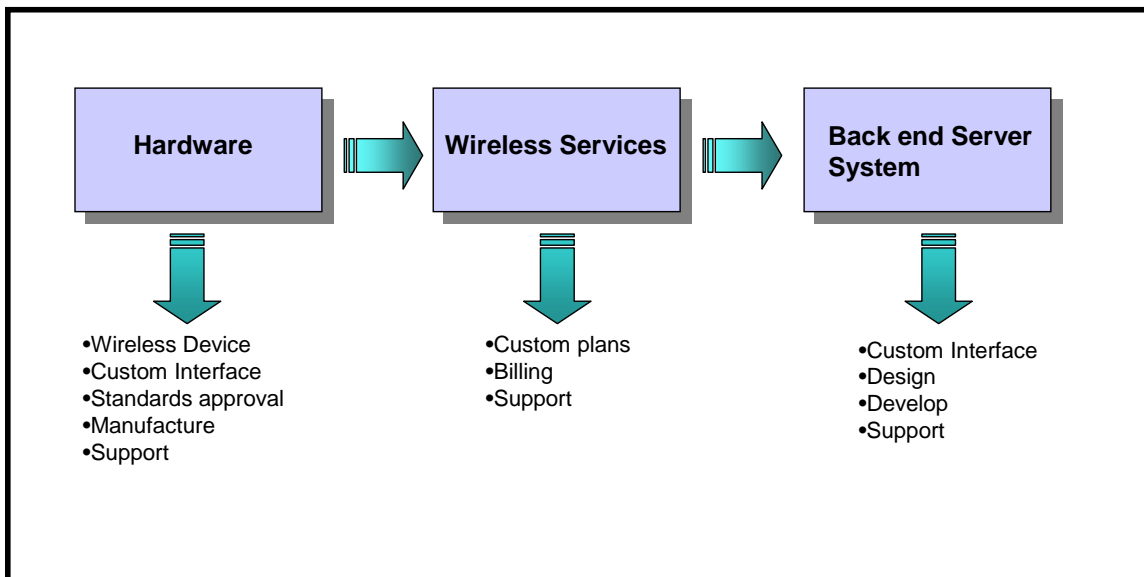


Figure 2. Range of Services M2M Service Providers Can Offer.

Based on the above, in an M2M solution, the service opportunities a provider can offer can be grouped in the following three categories:

## **Business and Technology Strategies**

Choice of technology has been discussed in the previous section, but only looked at from a technology standpoint. This section examines the technology choice from a strategic and operational viewpoint. The technology choice will influence a variety of business decisions that affect the hardware, the areas of geographical operation and actual revenue.

### **Choosing a Wireless Service Provider**

Wireless service is delivered to an M2M solution from either a carrier directly or from a reseller. Ideally, the reseller would be a Value-Added Reseller (VAR). A VAR is by far, the best approach to the matter, since a VAR will aggregate a number of carriers to gain the coverage required, and provide a host of M2M-related additional services such as billing and support.

### **Return on Investment (ROI)**

An M2M solution must offer a return on investment by some means and in some form; otherwise, the solution becomes a liability to the customer. This fact serves to differentiate M2M from Telemetry and SCADA, given its more commercial and consumer-based stance. With the following arguments, vendors and solution providers can apply more convincing reasons why their M2M solution should be adopted. There are several angles to explore ROI from....

## **Part 5: M2M Applications and Case Studies.**

**T**he success of M2M depends on high-volume deployments from a number of service providers and vendors. This can be achieved in part by a multitude of applications that extend across a broad range of industries. M2M success also relies on wireless carriers, which formerly paid little attention to M2M, but which now play an integral role in any M2M solution.

This section discusses a variety of M2M applications and vendors. It details how they achieved success for the business and entities they served. This final part will look at the following areas.

- 1. M2M applications.**
- 2. M2M case studies.**
- 3. M2M service provider profiles.**

### **Vending Machine Business Dynamics**

The business case for M2M and vending machines is a complex one and not readily accepted by many vending machine operators. The chief complaints among vending machine owners are that their employees help themselves to the cash and goods in the vending machines and delivery vehicles. They are also

concerned that some vending machines are broken in to and that other machines use their inventory up in a short space of time and thus no longer produce revenue for that day. Some vending machine operators are very anti M2M, since their cash-based business that generally allows “creative accounting” would have to come under closer scrutiny.

### ***Homeland Security***

The USA and many other countries are under threat from a variety of terrorist attacks. These attacks may use Nuclear, Biological, Chemical (NBC) weapons, explosives or ground-to-air missiles. M2M has the capability of preventing an attack by means of sensors that detect the presence of chemical agents and transmit the location and type of material detected to a monitoring facility. Exploiting the bandwidth capabilities of 3G networks, these sensors could incorporate cameras that send images of the surrounding area at the time the detectors reacted.

## **M2M Case Studies**

M2M has arrived; it is already in the market and serving a host of industries. This section explores some of the success stories that validate the technology, including business and profit models for all players in an M2M solution. The first case study is hypothetical, designed to illustrate how M2M in various forms can be integrated to an enterprise solution. In this case study, M2M appears in three different forms as follows: M2M in the guise of Man to Machine, where wireless instant messaging is used to communicate warehouse supplies to a field-based technician; RFID to track the movements of warehouse and field-based spare parts; and finally, telematics, where a vehicle and its operator are monitored for efficiency and safety.

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