Securing the Growing Sea of Devices

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by Paula Bernier

# Big Data, Little Data, You, Me and We

Cisco expects there to be more than 10 billion mobile-connected devices in 2017, including machine-to-machine modules – exceeding the world's population at that time. Ericsson envisions 50 billion connected devices in 2020. Others offer other prognostications about M2M, while some argue that all the numbers are wrong.

But whatever the forecasts, the point is that the line on the M2M graph is headed north. In any case, the important thing to remember is that it's not really about the number of connected devices out in the world, but rather about the value we can derive from them.

That's why we're starting to hear so much more about the relationship between M2M and big data analysis and actionable intelligence.

Earlier this year wireless network infrastructure giant Ericsson forged a partnership with back office systems giant SAP. This emphasizes the fact that data only has value if it's plugged in to the right systems and is accessible to the appropriate individuals. (It also gives Ericsson a stronger position with large enterprise customers – about 70 percent of which use SAP solutions, says Michael Eslamian, Ericsson's deputy head of portfolio & strategy.)

When asked about what kinds of M2M solutions it helps enable, Telit's CMO Dominikus Hieri talks about everything from smart cities efforts, including a large deployment in Italy involving gas meters, and a transportation effort in London during the Olympics; to a solution called Big Belly Solar, for which solar-powered trash cans send out alerts when they're full to avoid unnecessary truck rolls.

Meanwhile, we're hearing more about the personal side of M2M. The new term for this is wearable technology. (To learn more about this subject, join us at Wearable Tech Expo on July 24-25 in New York.)

Of course, we've all heard about Google Glass, which reports in mid April indicated was just coming off the production line.

Connected watches, which can enable athletes to do things like monitor their heart rates and enable caretakers to track Alzheimer's and autism patients, are also becoming available.

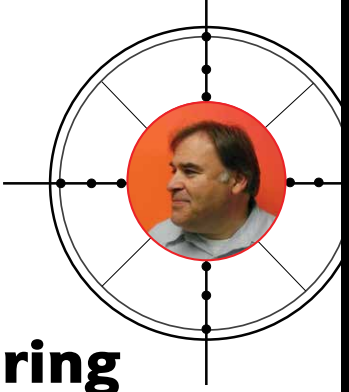
M2M has even made its way down to the humble foot. And none other than Apple has applied for a series of patents designed to be used for a smart shoe to track movement and to leverage the wearer's movement to power itself, according to reports.

Jeff Smith, chief innovation and technology officer and executive vice president of Numerex Corp., made the interesting observation that there's a lot of focus today on wearable devices as they relate to the individual, but that what is really interesting is when wearable devices expand beyond the me and consider the we.

That is already happening in some circles, he notes, explaining that one New York City bike courier outfit has attached sensors to its bikes to collect air quality. It shares that data with other bikers, who can then opt to bike the routes on which they can breathe better. Smith says he expects to see more of this kind of thing as the more socially aware Gen X and Gen Y individuals take over. M2M

CAUGHT IN THE CROSSFIRE

by Carl Ford



# Selling Picks During the Gold Rush

This issue I focused on two things, asset tracking and the social machine.

Asset tracking felt like I was standing at the shore trying to stop a wave. There were so many companies out there providing services, I was trying to get my arms around how many were viable.

We have talked about the fact that M2M has a lot of M&A opportunities. In the case of many of these sites, I think the only roll up that can be done is making them part of a multi-level marketing play. Really there are legions of companies offering barcodes and only a few of them have embraced RFID, NFC or even 3D barcodes.

I want to say that as asset tracking goes, they are the buggy whip manufacturers discussed by Danny DeVito in "Other People's Money". However, I think there is some time left. I say this because the history of barcodes has been a slow adoption curve, and none of the other solutions have the same adoption.

There is a sophistication associated with NFC and GPS that should be noted as compared to barcodes and RFID. The sophistication is involved with identity. As M2M takes advantage of wireless, the passive nature of scanning gets usurped with the possibilities of intervention and transactions.

This is a feature of the social machine concept, and it points to an opportunity for an order of magnitude change in the way systems will work in the future. DARPA is actively engaging the industry to come up with a machine learning language. They call it the Probabilistic Programming for Advanced Machine Learning, and their goal is to give humans a framework to develop programs that will allow machines to think – in other words, developing embedded learning techniques for machines.

For the complexity of our lives today, we often have to apply fuzzy logic to comprehend the proper decisions. The term probabilistic here indicates that humans are not going to be replaced any time soon and, likewise, we will always have assets that are dumb but still need identification for ownership. The intelligence to start will allow machines to have limited autonomy and better diagnostics, but as the language develops it's safe to assume the impact will include better network management diagnostics.

With the focus on language, the impact on M2M will probably be in the aftermath, but it will fundamentally change the value from passive scanning to active addressing. If DARPA succeeds, and maybe even if they don't but the industry continues in this direction (e.g. IBM's Big Blue), we will see a boom in developers becoming experts in shared intelligence. As machines gain this autonomy, networking will provide a distributed intelligence.

Digi International bought Etherios, owners of the social machine, but the stake in the ground should not be considered a game-over strategy. In fact, much of these concepts are proliferating through our dialogues everywhere.

In my humble opinion, the way to be guaranteed you are making money selling the picks and not just picking for gold is to focus on developers not the API. If we teach the machines to learn, the API becomes lower level and will be self-contained. M2M

*Carl Ford is partner, CEO and community developer for Crossfire Media (www.crossfiremedia.com), which stages the M2M Evolution Conference in collaboration with Technology Marketing Corp.*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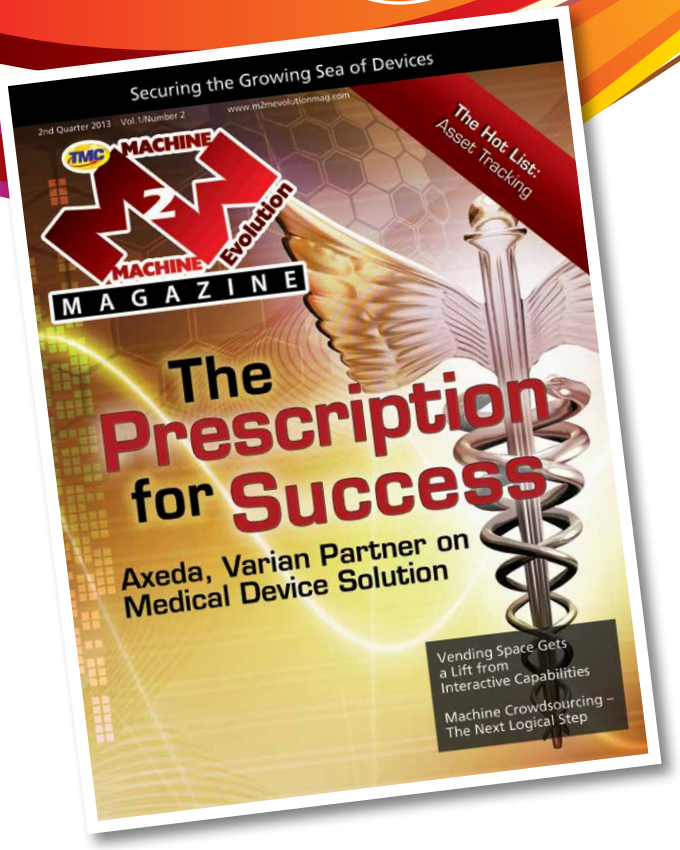


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MultiTech® Systems

by James Brehm


# Operational Mapping in M2M: Challenges in Getting the Most out of Big Data

Machine to machine is the hottest buzz phrase in technology, aside from big data or the cloud, but people still don't know what it is or if they are using it.

If you remember my column from last issue, we did a survey early last year where just more than 7,000 IT decision makers that were utilizing technology responded. Just 6 percent told us they were actually utilizing M2M; 8 percent told us they knew exactly what the term M2M was. But when we asked things another way, 18 percent had deployed some sort of M2M solution. More people thought it was "mobile to market" than "machine to machine". People just didn't know what it is.

It's not like you can just go out and buy a box of M2M. M2M truly isn't a market; it's a market of markets. It includes things as wide ranging as asset tracking, fleet management, connected health care, vending and PoS, personal emergency response systems, home automation, and security. The list is almost endless. And telemetry has been around for years, right?

So if it's been around for years, why hasn't it taken off the way many have predicted in the past?

M2M isn't easy. It isn't like buying a car and learning to drive or getting a smartphone and learning how to text. Enterprises deploying M2M don't all utilize technology the same way, make decisions the same way, or even go to the same vendors or service providers when they are looking for a solution. Some think they have a connectivity issue and go to the wireless carriers, some think they need a new piece of hardware and go to a hardware vendor, while others think it is a problem with legacy applications and the integration of data and look to a systems integrator. All, however, are looking for a trusted partner to help them find a solution.

For an M2M deployment to be successful, companies need to work with partners to look at the deployment process in an end-to-end fashion, taking into account all the pieces that make up a solution.

Every organization is different. And the crux of the challenge in most deployments as we've seen it is in operational mapping. This is complex stuff. This isn't just sticking a radio on something and having it talk to a server, right?

So if you start at the beginning and start mapping every process within an organization and take a look at that, you might even find out the organization needs to be realigned! It's not necessarily collecting a piece of information that's a problem; it could be just a symptom of a greater problem of an organization.

Why is operational mapping and collecting data so important?

We often over estimate the size of and the growth of the market and under estimate the impact that a market is going to have. I think we are greatly under estimating the impact that M2M communication brings to the world.

Today for the most part we are utilizing exception-based data – when something happens we're alerted. But in the future we're going to be utilizing more forms of artificial intelligence and decision-based data.

Sometimes an organization's unwillingness to take a hard look within its own organization and its processes coupled with the pure complexity of deploying M2M and the inability to fully utilize big data and make it actionable can be an obstacle to successful M2M deployment.

These are great challenges, but not insurmountable, and great days are ahead as we meet these obstacles directly.

*James Brehm is senior strategist at Compass Intelligence(www.compassintelligence.com).* M2M

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M2M TRANSCENDENT

by Tony Rizzo

# GainSpan Drives First SoC Combining Wi-Fi and ZigBee IP

Recently I had the opportunity to spend some time with GainSpan, a company that specializes in low-power Wi-Fi and Wi-Fi connectivity for the Internet of Things. The company delivers system-on-chip modules and software to create connected products for health care, smart energy and control/monitoring in industrial, commercial and residential smart device markets.

That Wi-Fi capability is critical for IoT, but recently GainSpan – at least in my humble opinion – significantly raised the IoT bar with the introduction of a next generation SoC, the GS2000, which adds important integrated ZigBee IP support to its communication capabilities. The GS2000 is now available for sampling, and full production of the GS2000 is slated for later this year. It is an accomplishment that, as far as I am concerned, clearly qualifies as an M2M transcendent event.

Without a doubt this is a major advance for our exploding M2M and IoT world in that it greatly expands communications options between numerous devices in a significant manner. As far as I know, it is in fact an industry first.

What's the secret sauce behind the GS2000? GainSpan has gone beyond its Wi-Fi portfolio by bringing together Wi-Fi (802.11b/g/n) and 802.15.4 in a true single silicon die IC – the new SoC contains multi-standard RF and both 802.11b/g/n and 802.15.4 PHY/MAC functionality, dual ARM Cortex-M3 processors, a dual mode IPv4/IPv6 TCP/UDP networking stack along with additional networking services and the large memory size needed to support numerous IoT and other application profiles. Especially important in any machine-to-machine and sensor-driven world, the GS2000 also efficiently addresses managing both line-powered and battery-operated applications and devices.

What's particularly notable to me is that the new GS2000 will accelerate development and market adoption of home-networked devices. This becomes possible because the GS2000 easily extends Internet connectivity across mixed Wi-Fi and ZigBee IP environments, which allows for the easy creation of heterogeneous home networks. The home smart devices market that will take advantage of the GS2000 and that will make up these home networks is exploding, with growth anticipated to reach almost 100 million connected devices by 2018. It is the right product at the tight time.

This all becomes possible because the GS2000 allows for creating applications that will easily combine and leverage both the high data rates and widespread availability of Wi-Fi and the small channelization and meshing capability of ZigBee IP. And with the noted support for both IPv4 and IPv6 a wealth of choices becomes available in terms of the devices and sensors that can now be networked.

This flexibility – both for improving existing networks and for building out new networks – is significant. With the GS2000, smart device and smart appliance manufacturers will no longer need to design for either one or the other protocol. Instead, the same SOC – the GS2000 – will allow them to create designs that support ZigBee IP, Wi-Fi and IPv4/IPv6 all in the same product.

Greg Winner, GainSpan's president and CEO notes that, "While other wireless technologies compete in various applications, only Wi-Fi and ZigBee IP provide for and support IP addressing and methods, extending these proven Internet protocols directly to a device or sensor. To truly deliver on the vision of the Internet of Things, range, power consumption, ease of deployment and network management are often more critical than other factors. By combining both technologies, the GS2000 makes it easy to achieve that vision."

Bernard Aboussouan, GainSpan's vice president of marketing, adds that, "Low-power Wi-Fi is the only wireless technology that combines the IP networking capability required for the Internet of Things with direct connectivity to smartphones. The integration of ZigBee IP allows us to further advance that networking capability across numerous devices and applications."

I completely concur with both viewpoints. The value of combining Wi-Fi and ZigBee IP in a SoC package cannot be understated. Its value manifests itself at different levels of any smart device networking environment – not only in the home and residential market segment, but across all verticals.

From the development of new M2M and IoT devices to the networked applications that become possible and that will use these new Wi-Fi/ZigBee capable devices, innovation – and in truth I mean highly cost-efficient and transcendent innovation – will not only make for great reading in M2M Evolution but will also find its way directly into our everyday lives and homes. M2M

*Tony Rizzo is senior editor at TMCnet, the online entity of M2M Evolution magazine parent TMC.*

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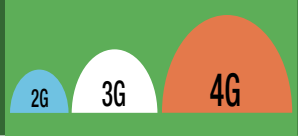


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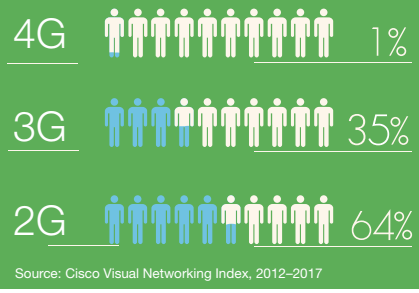


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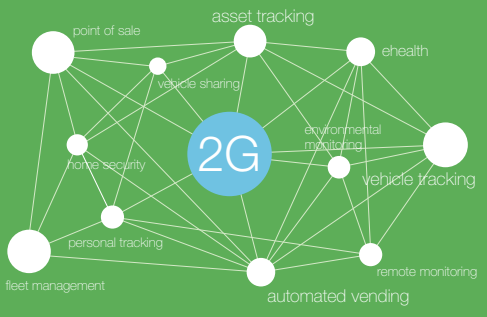


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**Meet Our Advisory Board**
In this, the second issue of M2M Evolution magazine, we'd again like to recognize our advisory board. All advisory board members are listed on our masthead. But on the following pages we'll hear from a subset of these experts.

# Solving the M2M/ IoT Equation

There's been a lot of talk about how large the market is for the Internet of Things and M2M, but there seems to be a shortage of practical and useful information around how one really goes about developing and deploying a winning intelligent system.

Many companies are looking at ways to integrate M2M technology into their products but need guidance and direction how to execute.

Intelligent systems are made up of five basic elements, so whether you are designing a medical product or wind turbine, the five elements shown below will be part of any intelligent system.

**Sensor elements** are the eyes and ears of the system and tell us what is going on with the system and the environment.

**Embedded processing** technology acts as the conductor and orchestrates the coming and going of the data from the sensors to the communication network, manages the other peripherals within the edge device, and brings embedded processing to the edge.

**Secure communications network** includes wired and wireless technologies and is the conduit to move the data. In an intelligent system data can be non-IP based such as an 802.15.4 radio with a proprietary protocol or communication over an IP-based network such as Ethernet, Wi-Fi, or cellular for example.

**Middleware** bridges communication between the embedded processing system and the IT enterprise or cloud. Typically at this level there are processing technology resources to help process and act on the data.

**Enterprise applications** help the user interact with the embedded system, process the data, apply analytics, and help the enterprise visualize the data. M2M billing systems and connections to the existing enterprise systems are additional applications and services at this level.

All businesses, regardless of size, can benefit from adding M2M technology to improve the quality of service they provide their customers and to provide it in a more cost effective manner. Intelligent systems are all about creating operational efficiencies and driving top-line revenue growth based on harvesting and using data from the system.

Here are five questions to determine if your company can benefit from M2M technology:
1. Do I have the need to collect and store data?
2. Could my business benefit by remotely managing devices in the field?
3. Is there a secure wired or wireless connection as part of my system?
4. Within my current processes do I want to increase operational efficiency?
5. Am I interested in creating new service revenue streams based on data I collect?

An example would be a vending business that employs a fleet of vehicles and vending machines. Once the vending machine and fleet are M2M-enabled instant operational efficiencies such as better inventory management, fuel efficiency, asset management, driver safety, and real-time access to the vending machines for repair become available. New revenue streams or top line growth can come from collecting the machine data and bundling it with GPS data, for example, and sold to advertisers and suppliers of the vending company to determine what product to sell where and when.

The question of what business problem is to be solved moving forward. For instance, decisions around the cost of the product, the type of connectivity, whether services offered or sold or will be included in the cost of the product are all considerations. Other logistical issues must be though out, such as site surveys prior to installation, regulatory compliance requirements, whether or not you will be able to get access to your customer's network (or need to provide your own).

Many companies fail because they take on developing technology outside of their core expertise. Know what you are good at, but more importantly know what you are not good at. M2M

*Joseph Zaloker is director of technical marketing at Arrow Electronics (www.arrow.com).*

ADVISORY BOARD

Mobeen Khan

# Your Machines are Talking, Are You Listening?

Machine-to-machine communications are making smart devices even smarter. As companies become more efficient, it's important to understand the real genius behind M2M solutions, which goes beyond devices and network connectivity.

Many companies define M2M simply as connected devices sharing information across a network. But in reality, devices and networks represent just a tip of the iceberg.

As corporations of all sizes strive to maximize efficiency, the key to making the most out of M2M communications is a holistic strategy. In addition to the devices and networks that shape the core of the technology, businesses should consider elements like network services, management platforms, applications and application platforms, and professional services to tie it all together.

Let's take a look at fleet management as an example. When a company needs to track the location of its equipment in transport, fleet managers can use an M2M application to pinpoint the exact position of the company's assets. That's a relatively simple scenario – one that we've seen in practice for years. Today, quite a few businesses with fleets are looking for more complex solutions that can have an even greater impact on their productivity. I've seen examples of M2M applications that make it possible to send alerts to any web-enabled device when assets have traveled outside their designated course. There's a lot more than simple connectivity and devices at play in this kind of scenario.

What supports this type of advanced M2M application? First, you need platforms for managing communication services and for making efficient use of the data.

Ice Energy, a California-based energy storage provider, utilizes AT&T's M2M service platform for its Ice Bear system. In an effort to conserve energy, the Ice Bear unit operates in conjunction with air conditioning units, generating ice in the evening to effectively cool commercial buildings during the day. As temperatures rise or fall, the M2M service platform allows Ice Energy to manage communications with its group of energy-saving units, so performance inefficiencies can be found. The Ice Bear not only works to prepare energy-friendly cooling for the next day, but simultaneously connects to a router with an embedded SIM that communicates real-time status updates.

Although devices, networks, applications, and platforms are all key parts of the machine-to-machine experience, security perhaps plays an even bigger role for organizations that need to transfer proprietary and regulated private data from one device to another. eCardio Diagnostics, a leader in providing arrhythmia monitoring solutions, worked with AT&T to deploy more than 100,000 heart monitoring devices in 2012 alone. Cloud-based security services make it possible for these monitoring devices to send sensitive information through a highly secure path from a patient's location directly to eCardio's 24-hour monitoring center. As the technology continues to improve, network security becomes even more important. Security is a vital component of M2M communications that cannot be ignored when it comes to channeling sensitive data over a cloud-based system.

At a time when businesses around the world are becoming more dependent on machines to run their operations, they need people now more than ever. It sounds contradictory, but it's true.

Each company has its set of industry- and organization-specific needs, and professional service teams can identify and create customized M2M solutions to meet those requirements. Whether it's architectural design or application development, professional services are essential to finding the appropriate solutions for companies in various industries. For example, a shipping company could utilize an M2M application to track assets as opposed to a health care company using an application to transfer confidential patient information. Then, once the professional services teams for each customer have assembled the right M2M solution for each of these different requirements, they can manage and maintain the solution for each customer throughout the entire lifecycle, from start to finish.

Although some might view the many components that shape M2M communications as complex, it's important to note that they all work together to help simplify a business and bring a company new levels of productivity and opportunities for growth. M2M

*Mobeen Khan is executive director of advanced mobility solutions at AT&T Business Solutions (www.att.com).*

Ken Hosac

# The Need for Speed

## 4G LTE Enables a New Wave of M2M Applications

The growing availability of 4G LTE coverage is spurring a major wave of innovation in M2M devices and applications. In North America, the 4G LTE network footprints of multiple carriers are steadily moving towards 100 percent deployment. 4G LTE growth in EMEA and APAC is accelerating as well, driven in some cases by customer demand and in other cases by government initiatives.

Data rates using wireless 4G LTE typically range from 10 to 20mbps for downloads, and 5 to 10mbps for uploads. While this may be overkill for some traditional M2M applications, the availability of high-bandwidth wireless Internet is creating opportunities to not only innovate existing M2M applications, but also to enable new M2M applications that weren't previously possible.

### Kiosks

Wireless connectivity reduces the complexity of deploying, monitoring and managing kiosks. The early innovations for these M2M devices include low-bandwidth features such as inventory monitoring sensors, physical security alarms, and credit card transaction approval. However, high-bandwidth 4G LTE enables more effective marketing programs, such as displaying high-definition movie trailers on the DVD kiosk to help sell more movies or compelling videos of dancing winners to help sell more lottery tickets. Home improvement stores, for example, are beginning to use product information kiosks that use two-way video to connect potential buyers with product experts centrally located at a video call center. These applications require high-bandwidth connectivity and provide a compelling ROI.

### Digital Signage

We've seen many retail chains, quick serve restaurants and financial branch offices begin to deploy video-based digital signage in significant quantities. Many of these distributed enterprises have secure and expensive private networks in place for processing credit cards or handling sensitive customer financial transactions, and are reluctant to use these private networks for applications such as digital signage that aren't considered mission critical. 4G LTE provides a separate, flexible network with the horsepower to deliver large video files without exposing the enterprise's private network to security vulnerabilities.

### Video Surveillance

Many security cameras are currently connected via wired networks, but companies are increasingly discovering significant cost savings from using wireless. Installing a security camera at a location that doesn't already have a wired connection, such as a construction site, parking lot, or storage facility, is costly and time-consuming. It often involves hundreds or thousands of dollars and several weeks of design, permitting, digging trenches, and project management, just to bring the wires to the target location. 4G LTE eliminates much of this time and effort, requires less upfront expense, and can be more cost-effective in the long run.

### Public Transportation

Trains and buses have long used traditional M2M applications to monitor location, vehicle health, and other low-bandwidth telematics. However, two applications in particular are driving the need for higher bandwidth. The first application, passenger Wi-Fi, enables public buses to increase ridership, school buses to extend the study hall, and company commuter shuttles to improve employee productivity, and private charters to improve their customer experience. The second application is video surveillance, which provides more peace-of-mind to the parents of children on school buses, and provides a deterrent to crime and inappropriate behavior on public transportation such as buses, trains and subways. The growing pervasiveness of 4G LTE provides the perfect network for these high-bandwidth applications.

### Industrial Monitoring

Certain industrial processes require data-intensive monitoring applications to keep the lines running with high quality, low scrap and minimal downtime. One of our industrial customers collects 200MB of data on a regular basis from difficult locations, and utilizes 4G LTE to get the job done.

### Business Continuity

After Hurricane Katrina, for example, one of the largest insurance companies in the U.S. deployed CradlePoint's 3G/4G solution in 20,000 of its branch office locations to augment the wired connections. The flooding associated with Katrina took the wired networks down for a very long time, and the company realized that it couldn't afford the downtime to access its cloud-based applications at the one time when customers needed them the most. 3G/4G service providers have portable cellular base stations on trucks that can be quickly deployed to affected areas to restore wireless data service. And branch offices were able to significantly reduce the 1-2 percent downtime associated with intermittent outages from their wired providers. M2M

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Matt Jennings

# The Machine-to-Machine Movement

We are just now beginning to realize the inflection point for machine-to-machine technology adoption. The change in discussion from technology to business impacts has been the catalyst for widespread M2M technology deployment. When establishing an M2M initiative, businesses are no longer focusing on the type of data the equipment can produce. Rather, organizations are considering where the greatest opportunity resides to improve processes and enhance the bottom line. By taking a strategic perspective from the outset, organizations are ensuring that their technology investment is contributing to the bottom line – not diminishing it – and generating strong ROI.

**A Look Back: M2M Technology Enablers**

Sensor, gateway, battery, cloud and cellular network technology are key enablers of M2M solutions, and all have experienced dramatic advancements in recent years. For example, 10 years ago, sensors were the size of a hockey puck and cost as much as $300. Sensors were also connected via landline, if at all, and had limited battery life. Today, sensors are generally the size of a nickel, wireless, offer greater functionality and cost a tenth of their previous price. Today's gateways also optimize battery life because they allow users to transmit data only when necessary. Similarly, batteries have become smaller and offer longer life in more challenging environmental conditions such as colder, warmer and moisture-rich environments.

Cellular technology has also improved and become more economical. Because organizations are optimizing business applications, cellular network cost is decreasing. Companies are transmitting equipment data only when necessary, allowing companies to connect devices more cost effectively.

Finally, cloud computing platforms have enabled greater adoption of M2M technologies. Cloud solutions have become more robust, increasingly scalable and less expensive. The solutions also offer greater data storage and analysis capabilities, allowing organizations to lessen the complexity and maximize the return on investment of their M2M technology deployments.

**Migrating from Data Production to Add Integration and Application**

Organizations now have more data to impact more functions within the enterprise. As more data is produced, enterprises obtain greater value by applying that data across the organization. The information can often be applied to other areas of the business than the data's original intent leading to increased efficiencies, new revenue streams, enhanced customer service and other benefits.

For example, consider a leading provider of commercial refrigeration products. The company originally believed its M2M project would allow it to enhance customer service and improve product development with access to a greater wealth of machine data. However, the data proved far more valuable. With real-time access to equipment data, the company can now offer ongoing service contracts to its customers for trouble-shooting, maintenance and intelligent diagnostics to generate recurring revenue. It can also offer reporting capabilities to end users with compliance needs relative to food safety and Food and Drug Administration regulations. Contractors and re-sellers can also expand their business and benefit from the recurring revenue opportunities, while improving customer service and client satisfaction. This is a great example of how forward-thinking companies are producing equipment data and integrating it successfully.

**Operational Visibility: Integrating the Demand and Supply Chains**

A major benefit of M2M technology is operational visibility. Operational visibility allows organizations to integrate their demand and supply chains. For example, a customer service organization can respond to auto-generated/auto-scheduled service tickets within the Salesforce Service Cloud when a machine goes down (or is close to failure) rather than waiting for a human to recognize an issue and create an alert. This allows an enterprise to reduce labor costs and enhance customer service. Organizations typically manage their businesses using trusted analytical tools like ERP systems, CRM solutions, marketing software, etc. Now companies can manage their equipment in the same way. M2M

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Alex Brisbourne

# M2M Goes Global

Globalization is all the rage in today's business market, and machine-to-machine communications is not immune to this growing trend. And this is a good thing.

The globalization of the M2M network is becoming a pre-requisite for business success. Any business that is built upon ensuring continuous tracking and management of an asset, anywhere on the globe – from microchip manufacturers to commodities specialty companies, must have a global M2M strategy or risk falling behind its competitors.

Through innovative technology developments, including satellite network services, M2M wireless connectivity is served up across international borders, over land and sea. These networks, consisting of cellular, GPS, Wi-Fi and RFID technologies, enable organizations to track products and even the status of their transport mode (truck, boat, plane, etc.) as they travel across the globe.

Going global with M2M means meeting and managing wireless connectivity needs across multiple international networks and tariff jurisdictions. It requires the effective management of a range of wireless technologies to gain real-time visibility into global supply chains, telehealth delivery and value-added customer services, all while becoming more efficient and driving additional revenues.

### Choosing Connectivity

From near-field connectivity to cellular to satellite, the global M2M network can look different from one organization to the next. When investigating global M2M connectivity options, organizations must determine their needs in relation to the application's requirements and cost. For instance, if an application only requires satellite connectivity when cellular is not available, and cellular connectivity when Wi-Fi is not available, then some intelligence and network rules need to be built into the device. It's simply not cost-effective to mandate satellite connectivity when cellular or other more inexpensive methods are available.

When looking at global connectivity options, organizations and application providers must look at where the device will be located throughout its lifecycle, the frequency with which it will need to communicate, and the amount of data it is expected to transmit. If a device, such as one on an airplane for instance, will be located 30,000-plus thousand feet above sea level, or on an ocean freighter, then an investment in satellite connectivity is likely required, along with cellular technologies for when the device is on the ground.

However, for most devices, some combination of cellular network connectivity and near-field communications (Wi-Fi, RFID, etc.) is both operationally efficient and cost effective. For instance, a wireless heart monitor that transmits patient data directly to a physician can connect to a home Wi-Fi network and then seamlessly transition to cellular networks (both GSM and CDMA) when the patient leaves his or her home. And yet for some M2M devices, such as sensors in your refrigerator that tell you when you're out of milk, for example, a dedicated Wi-Fi connection may be all you'll ever need.

### Managing Network Usage and Billing

One of the largest enablers of global M2M applications is the ubiquity and reliability of today's cost-effective cellular networks. Both major cellular technologies, GSM and CDMA, provide reliable coverage at most populated points across the globe. M2M application providers and their customers can pick from a plethora of connectivity options, from 2G to 3G to LTE connectivity (though the lifecycle is shortening in some markets for 2G services).

Carriers also offer different billing rates for M2M applications, helping applications providers and end users select the option that is most ideal for their business needs. However, before jumping into a billing plan, it is important to ensure that you are getting the most appropriate network connectivity for your dollar, as a number of carriers still offer very consumer-focused services that are not as effective as commercial and support models offered by dedicated M2M network service providers.

Before going global with M2M, organizations should determine how much time and resources they are willing to invest in managing multiple carrier relationships, multi-national tariffs and device troubleshooting. Partnering with a single global M2M network provider can often alleviate a number of these tasks, freeing an organization's staff to focus on growing the business and not on calling a carrier in France about a billing discrepancy.

### Global M2M is Now

The ability to globally connect devices from any location is becoming more critical to an increasing number of applications across vertical industries. M2M is often single-handedly a driver of improved efficiencies, enhanced customer service and in some case new revenue streams. Companies must weigh their connectivity options versus the requirements of their applications to obtain the most value from their global M2M strategies. M2M

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Jeff Smith

# Timing the M2M Opportunity

The technology adoption lifecycle made popular by Geoffrey Moore's book "Crossing the Chasm" is really a modern day riff from "Diffusion of Innovations" by Everett Rogers. Moore's improvisation, oft repeated, describes a chasm between the innovators and early adopters versus the early majority, late majority, and laggards.

Even though the underlying enabling technology is the same, the innovations offered are very different and the actors and thus markets are also different. Adoption is therefore a combination of the characteristics of the innovation and the adoptive nature of the actors/market.

The times and rates at which these identifiable groups and thus markets adopt in the technology lifecycle depend on their motivations. These are defined by Rogers as relative advantage, compatibility, complexity, trialability, and observability.

The more general in application, the smoother the adoption lifecycle curve. This curve is best described as an S curve. The curved shape is derived from a normal distribution. Vertical market adoption smooths out this phenomena in M2M because different vertical markets adopt at different times (and rates).

Relative advantage is how much an innovation is perceived as being better than the status quo. An example is the ability to disable (ignition), locate (GPS), and repossess automobiles in the Buy Here Pay Here vehicle recovery market. The market in the U.S. is about 2 million cars per year. In this case, technology has provided a solution to a problem for which there was no alternative.

Trialability is the degree to which an innovation can be experimented with. Trials are not 100 percent deployment; therefore, understanding the value curve of an M2M application is very important. If you use M2M to solve the supply chain problem, there is very little value until a very high, if not 100 percent, share of the machines are telemetered for inventory. But, if you instead decide that it is a marketing problem and you would like to know statistically (think big data) what is selling, where and when, you have an incremental (rather than stepwise) value curve. You get great value in the first vending machines you telemeter (ala trial), and there is marginal utility as the number grows larger. This reduces risk in adoption.

M2M adoption has been very successful in security applications. Initially as backup and now as a wireless alternative, M2M for intrusion monitoring is a $5 million a year opportunity in the U.S. Landline elimination is another driver. With laggards, such as the security market, compatibility is required. Compatibility, as defined in "Diffusion of Innovations", is about values. Innovations that align with current value systems, such as safety and security, are quickly adopted.

This market also lends itself to trialability and observability. Current marketing enables new features and functions enabled through the panel or handset. These features are often demonstrated by early adopters. This drives new sales to laggards with easy adoption and low barriers to entry.

As cable companies and broadband providers continue to pursue the quintuple play the opportunity to incrementally add these services as downloadable apps and "slap and stick" low cost (no cost) wireless sensors provides a good market for both new subscribers and increased ARPU.

So why then has smart grid not been the panacea for M2M once thought? Smart grid utility companies may conventionally be described as laggards on the technology adoption curve, regulation and subsidies overcame this inherent obstacle, but as they say, a leopard cannot change his spots and this unnatural adoption has stalled. In this case there is no pull from the consumer.

Unfortunately this adoption forced a deployment of technologies that are already obsolete, non-standard, incompatible, and will unlikely last the 10 to 15 year lifetime promised (e.g. 2G, Zigbee 1.0, etc.).

A better strategy might have been for utilities to play to opportunities that were much higher in relative advantage and more compatible with current systems, less complex (due to fewer interfaces and less distributed) – ala in the B2B demand side rather than B2C meter reading. The trials would have been easier to manage and ROI would have been more easily observed.

In industries that are very competitive and innovation is required for differentiation, relative advantage will be most important; these tend to be the innovators and early adopters.

People in these industries tend to be less risk averse. Alternatively in more mature markets, such as oil and gas, adoption comes more slowly and the characteristics of trialability, and observability are more predominant. M2M

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Nikki Cuban

# Has Anyone Heard of M2M?

Has anyone heard of M2M? This was the question posed by a standards subgroup of the International Air Transportation Association.

What about the Internet of Things?

After an all-day seminar discussing more than 10 years of challenges deploying asset tracking tests with RFID in airport terminals, the leader of IATA's RFID Work Group suggested perhaps the name of the group should be changed. A new name may allow standards discussions on technologies other than RFID. And one of the names now up for a vote is the Internet of Things.

As people deliberated the question of renaming the group, a separate series of questions began to fly through my mind:
1) Have RFID solutions been viewed here as the only asset tracking technology for more than 10 years?
2) Is the global airline industry just now discovering M2M?
3) Or better yet, is M2M really that undiscovered?
4) Is the proposal for a new group name an admission that the industry needs a better solution?
5) How long was Internet of Things researched before it was thought to be a good name? Was it 2 years or 30 days or less?
6) Is it really 2013?

For starters, I applaud the group leaders for creating a platform that discusses the use of technology to achieve paradigm operating process shifts for an entire industry. Moreover, I high five all of us in M2M that the term may soon be included in the name of a committee that recommends common standards and best practices for commercial airlines everywhere. It's rare that a vertical industry can say out loud and as verbatim as this, "I need an M2M solution."

So who are the members of IATA's RFID Work Group who are now discovering M2M for the first time? IATA was founded in 1945 and now represents more than 240 airlines operating in more than 115 countries. IATA members carry more than 84 percent of the world's air traffic. RFID Work Group members consist of airlines, aircraft manufacturers, terminal operators, ground handlers, airport asset manufacturers, ground support equipment providers, EDI service providers, and technology providers.

More importantly, why is there a proposal for a group name change, which in effect could lead to RIP (rest in peace) RFID? The answer is best illustrated by a major international airline presenting what is considered the first successful active RFID deployment to track pallets across two different cargo terminals. The feasibility test began in 2005. After 8 years of work, the airline can now account for the whereabouts of cargo inside two terminals. When asked the reliability of the solution, the airline responded that after years of tuning, read rates of the RFID tags are now 98 percent or higher. When asked about plans for an airline wide, terminal rollout, the response was that in 2014, the "hope" is to announce that the deployment is no longer in test phases.

That's two cargo terminals in 9 years. With more than 50 terminals to go, the total deployment time could take more than three human lifetimes. And that doesn't account for the time to deploy a common platform by partner airlines so they may track efficiently as a team.

M2M was a budding industry in 2005. Look how much progress has been made in M2M technology, cost, infrastructure, and services during the 8 years of this RFID project. In short, the cost has decreased significantly both in hardware, wireless service, and in the cloud. M2M discussions in this group will likely lead to solutions that solve the need for faster deployment times, significantly reduced infrastructure costs, and minimal visibility gaps across global partnerships and geographic boundaries. New Bluetooth technologies that connect to cellular hardware will further pave the way to RIP RFID and eliminate some of the backhaul communication costs to track less expensive, but not less valued airport assets.

I have had the pleasure of leading the M2M Evolution event as Conference Chair and most recently Co-Chair with esteemed analyst and thought leader James Brehm of Compass Intelligence. During the analyst round-table that kicks off the event, he poses the question, "If M2M were a baseball game, what inning would it be?" Most of the conference attendees shout out the first inning as the answer, while James rackets back, "batting practice" before embarking on a thorough presentation to answer why.

After this recent experience with M2M vs. RFID in aviation, I too vote batting practice. But there's a great season ahead. M2M

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Wayne Ward

# M2M Is A Sticky Value Proposition – And That's Powerfully Good

I often get to meet people who are just getting to know the world of M2M, as I recently did with a group of automotive reporters. It can be a reminder that M2M is a new experience for many, with its own terminology that sometimes needs explaining. But as we talk, I can see eyes opening to the surprising new impacts of M2M in every aspect of life.

I believe M2M can serve as the transparent face of a company for consumers. That may sound like a contradiction in terms, but consider how M2M can transform a product or service. M2M makes the consumer experience instant and remotely accessible and ever changing. Seen in this light, M2M's immediacy and constancy makes it far more powerful than a traditional enablement technology. Often as not, M2M is with consumers whenever they use a connected offering, involving every part of their product experience. This will only grow more universally true as M2M applications proliferate.

So a company's transparent face is a continuously operating M2M touch point, allowing an ongoing dialogue with customers. Managed well, the natural outcome is a fuller understanding of customer preferences. The connection can provide a sensitive barometer of how customer experience and usage are trending. Companies gain a tool for adjusting and adapting in synch with their customers' needs, potentially on an individual-by-individual, even a real-time basis. A better, deeper, more finely tuned and stickier relationship with customers can't be far behind.

This vision is coming into sharper focus across the wide domain of M2M applications. One of the most interesting for me is the automotive industry. Here we have one of the world's seminal industries, which invented much of today's consumer culture. Now automakers are learning fresh ways to build on the love affair people traditionally have had with their cars, based on M2M connectivity. The result is an intensified connection between autos and consumers, both emotionally and literally, through a variety of new connected services. Today consumers engage the world in dramatically new ways via smartphones, tablets and other devices. So it only makes sense to extend that kind of experience into every aspect of their mobile lives, where cars and passenger trucks clearly play a central part.

Automakers and consumers are mutually discovering how the connected experience can work inside the vehicle. This can be a much-enhanced version of the news, sports and entertainment that comes through the dashboard, or the introduction of smartphones and tablets into the auto environment in a smart way, or connected benefits specific to the car's operation, like engine diagnostics, monitoring driver performance to lower insurance costs, remote locking and unlocking for improved security, and so on.

For automobile companies this opportunity to connect in new ways helps refresh the consumer's relationship to their brands, model by model and driver by driver. The implications are huge, not just for market sub-segmentation but for new levels of collaboration with companies like mine, which has created the new category of mobile integrator to advance how M2M expands and transforms the automaker-consumer relationship.

Mobile integration covers a lot of territory. There is the wireless technology platform itself, but that is only one piece. There are also complex vendor ecosystems to manage. There are entirely new mobile applications for autos. There are crucial adaptations to the car, most notably ways to keep drivers focused on their primary driving task. There are new ways to combine the data intelligence and customer relationship management know-how of automakers and wireless companies to supercharge a deeper relationship with consumers.

This cross-pollination of expertise is happening across the spectrum of M2M applications, reaching into hospitals, utilities, retail stores and every other place around the globe where we can imagine an M2M connection. That makes for a tightly interwoven relationship among everyone involved in developing an M2M experience.

And that is translating into healthy long-term business relationships and lasting consumer bonds. The emergence of this sticky value proposition may be the best news of all in our evolving world of M2M. M2M

*Wayne Ward is vice president of M2M at Sprint (www.sprint.com).*

by Paula Bernier

# The Prescription for M2M Success

## Axeda, Varian Partner on Medical Device Solution

The emergence and development of machine-to-machine technology has resonated with medical device manufacturers – a foremost adopter. As an industry, it quickly and expertly leveraged M2M capabilities to improve machine uptime, develop stronger customer relationships, and deliver better service to hospital IT staffs, all while streamlining service and compliance processes. Today, the industry is one of the most mature verticals in M2M, and continues to introduce new, innovative ways to use the technology.

Varian Medical Systems is one of the M2M pioneers in the medical device industry. A leading manufacturer of integrated cancer therapy systems, Varian provides top-notch customer service and ensures machine uptime with SmartConnect – its award-winning, M2M-driven remote monitoring and management solution.

SmartConnect Bridge, powered by the Axeda Machine Cloud and announced at Axeda Connexion 2013, has garnered recognition from both the medical device and M2M communities. The solution was developed by Varian and Axeda to achieve the proper balance between quick diagnosis of machine issues and adequate security and HIPAA compliance.

Axeda is a 12-year-old cloud-based software company that connects machines to the cloud. It processes machine data, and can also store that data when needed. It also offers prepackaged services, a set of APIs and web services to enable the creation of customized applications and allow for the integration of machine data with existing applications such as Salesforce.

Most of Axeda's customers are companies like Varian that manufacture machines. Axeda counts more than 60 medical equipment companies as its customers. It also sells into the high tech space and delivers solutions for other uses, such as connected automated teller machines. Bill Zujewski, Axeda's executive vice president of product strategy and marketing, said that most of the company's customers tend to start off with remote monitoring as their first application but usually move on to leverage machine data for business intelligence.

As for the case study at hand, Varian required a digital audit of service and help desk users' access to workstations and applications as a means to reduce the number of on-site service calls, lower travel costs, and deliver superior customer service. Additionally, the audit trails provided by SmartConnect Bridge enable service and help desk technicians to authenticate the customer and the machine, even if the workstation has never been accessed by a Varian technician. The solution matches the workstation's ID to Varian's database in SAP, allowing the help desk technician to identify the customer.

### The Challenges

To do the job right and reach customers globally, Varian required greater access to its machines – and fast.

The company found that many service trips were inefficient and ineffective when intermittent issues would dissipate or seemingly solve themselves before the technician arrived. This meant the technician remained on site with the machine and waited for the problem to reappear – a costly and time-consuming proposition.

Second, emergency situations would arise when a machine would experience problems as a patient was being treated, meaning that the patient and hospital staff would have to wait for a technician to fix the problem, or reschedule the appointment – both of which would damage the hospital's reputation, as well as Varian's relationship with the hospital, annoying patients and frustrating staff.

### The Solution

To solve these issues, Varian built a tool that would allow instant and direct insight into the affected, problematic machines: the SmartConnect Bridge with Axeda. Leveraging desktop sharing technology provided by Axeda, SmartConnect Bridge enables Varian's help desk staff to directly access a hospital employee's workstation.

With a simple software installation, SmartConnect Bridge enables hospital IT staffs to quickly and easily grant access to their workstation to Varian's help desk – a process which typically takes less than one minute. The desktop sharing enables Varian's service team to see exactly what the hospital staff sees, helping them quickly identify the issue, and, in many cases, remotely fix it.

"In a hospital environment, nobody – not doctors, patients, or staff – has the time or the patience to deal with machine downtime," said Dan DuBeau, program manager at Varian. "With SmartConnect Bridge, we can be a better partner to our customers because we see exactly what they see, and provide feedback and service almost instantaneously."

**Auditability**

While service, customer satisfaction, and efficiency top the list of priorities for Varian and hospital IT staffs, HIPAA compliance remains a constant challenge and top concern.

SmartConnect Bridge tackles this challenge by providing an audit trail, facilitating a fast and easy audit of all machine updates, smoothly satisfying HIPAA requirements.

"We define ourselves by the exceptional customer experience we deliver, and we needed a robust application that addresses all of our customers' most pressing needs," DuBeau said. "With the Axeda Platform, we can access real-time, actionable machine data that enables us to optimize and streamline our service operations."

**Results**

In early pilots, both Varian and hospital IT staffs experienced remarkable success with SmartConnect Bridge, including:

- dramatically reduced on-site service calls, along with lower travel, labor, and maintenance costs;
- increased machine uptime – resulting in higher satisfaction for both the hospital staff and its patients; and
- fast and easy compliance with HIPAA regulations through workstation audits and access to SAP data.

**"SmartConnect Bridge has enabled us to establish an immediate support session with a customer that is exceptionally fast and efficient. It has helped us solve problems when other desktop sharing applications failed."**

– Varian's Steve Johnson

"SmartConnect Bridge has enabled us to establish an immediate support session with a customer that is exceptionally fast and efficient," said Steve Johnson, clinical help desk supervisor at Varian. "It has helped us solve problems when other desktop sharing applications failed."

**Challenges & Solutions Across all Verticals**

Axeda's Zujewski said the greatest challenges in launching and maintaining an M2M deployment tend to involve connecting, managing data, and adoption. Complexity is also considered a key challenge for M2M.

At the moment there are no standards for how to connect machine data to the cloud. That's where Axeda comes in, said Zujewski, explaining that the company's connectivity software (which runs on Linux, Windows, Java, and a C library) converts data into the required format and can store it in a relational database.

Managing data can be a challenge for customers that don't select a cloud-based solution because without the cloud they will need to make an investment on the order of $1 million for gear to collect and filter data. Axeda's cloud-based solution eliminates that capital concern, Zujewski said.

The challenge with adoption, Zujewski said, is that hospitals, banks, factories and other business users may be tentative about leveraging M2M solutions for security reasons. But the Axeda solution is a proven one, and is already in use at more than 700 hospitals, among other customer sites. And Axeda can create private networks for these customers. It can do that by leveraging firewall technology to provide for private Wi-Fi connection, he said, and/or it can create a private network using a secure 3G network between AT&T data centers and Axeda data centers.

"There can be many moving parts involved in the process of launching and extending an M2M initiative, and it's easy to get lost in the technical details," said Zujewski. "The new Axeda Machine Cloud gives customers the freedom to work with any device, and removes the complexity of establishing connectivity and managing devices and SIMs. The integration of SIM, device and asset management gives customers limitless flexibility to refine their go-to-market strategies which allows them to focus on innovation instead of connectivity and machine data management." M2M

by Paula Bernier

# A Holistic Treatment for Better Wi-Fi

Wi-Fi is the connectivity of choice for many devices used in such verticals as the health care space. Yet although some mission-critical apps – including those that can seriously impact the well being of patients – hinge on the performance of these connected devices, the Wi-Fi networks linking them in are not always as reliable as they should be.

That means these devices could fail to work as needed due to Wi-Fi connectivity problems, and that could in turn put patients, health care providers, and medical device providers in jeopardy. That said, there are inherent risks in relying on standard Wi-Fi for M2M applications. However, Ixia is one vendor that has introduced a solution it is prescribing to those seeking a higher level of Wi-Fi connectivity.

Joe Zeto, senior manager of market development at Ixia, explains that his company has expanded its Wi-Fi access point and controller test solution to also test endpoints such as medical devices, printers, scanners, smartphones and tablets. The solution allows interested parties to isolate whether connectivity problems are being caused by the phone or patient care device, or other factors.

Ixia's test solution also can simulate a device so device manufacturers, service providers and/or users can see how devices work in different environments. That's important, Zeto notes, considering that different devices may behave very differently in various network scenarios. For example, he says, two of the top tablets in the market perform vastly different depending on their location relative to an access point. By better understanding how specific endpoints work at various distances and respond to other network parameters, those selecting such devices can make more informed decisions on which endpoints are the most appropriate for the application at hand, Zeto says. M2M

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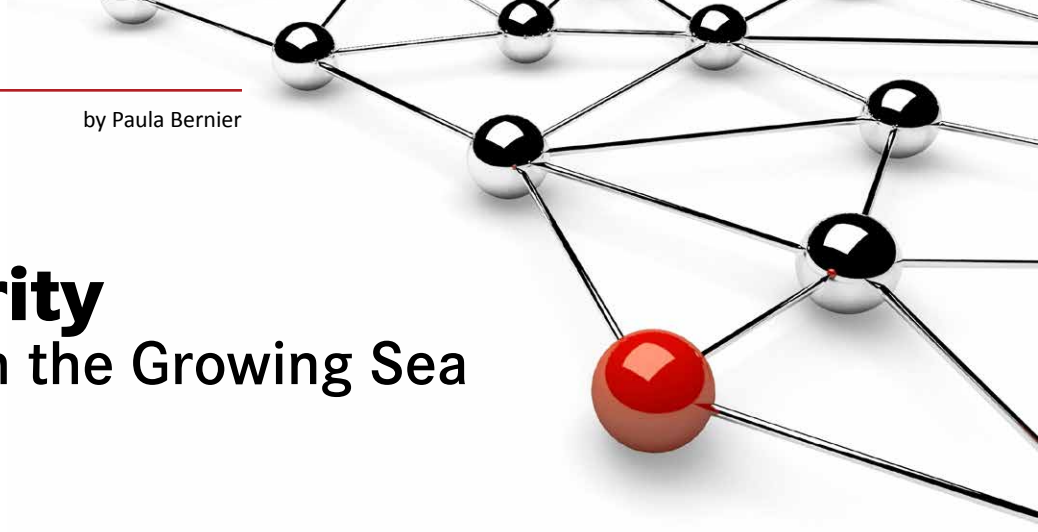
by Paula Bernier



# M2M Security

## Keeping Tabs on the Growing Sea of Devices

Security has become a hot topic of late in M2M circles. ABI Research in February put out an alert about M2M security, saying that "porous security" is exposing vulnerabilities "in a large number of use-case scenarios, including SCADA systems, telemedicine, and telemetry."

Most M2M manufacturers haven't implemented the same kinds of security features that are standard in conventional Internet hardware and software, according to ABI Research. And that could negatively impact expected M2M uptake if it's not corrected, according to the firm.

"The market's ability to respond to these security challenges at the application level is still underdeveloped," said ABI Research analyst Michela Menting earlier this year. "When faced with security requirements, the focus has been to tighten the screws at the network level, often to the detriment of the application, leaving it unpatched and exposed."

The good news, the firm says, is that M2M vendors including Axeda, Gemalto, ILS Technology, Novatel Wireless, and Sierra Wireless are now putting more emphasis on M2M application security.

Beecham Research, meanwhile, indicates that while M2M security is important, some recent reports on the subject may overstate the risk.

"It is certainly the case that many M2M solutions have little or no security, but many are so simple that one can ask whether they truly need much anyway," Beecham analysts Jon Howes and Bill Ingle recently wrote. "How much security is really needed for a low cost, non-critical monitoring application? What would adding layers of security accomplish beyond adding cost, which may make the application non-viable?

"In fact, despite the alarmist tone of some news articles and headlines, a large number of M2M security solutions are already in place, varying considerably from sector to sector and application to application. To the extent that some solutions are required by regulation – or constrained by it – these vary not just by sector and application but from one region to another, as well."

Beecham added that early M2M solutions tended to be within the domain of the service department and commonly involved remote monitoring applications that didn't require much in the way of security.

"However, as M2M moves to a more mission-critical role, security is bound to become more important," said Beechman. "This is a transition happening now, so the real targets for high levels of security are more likely to be future rather than past solutions."

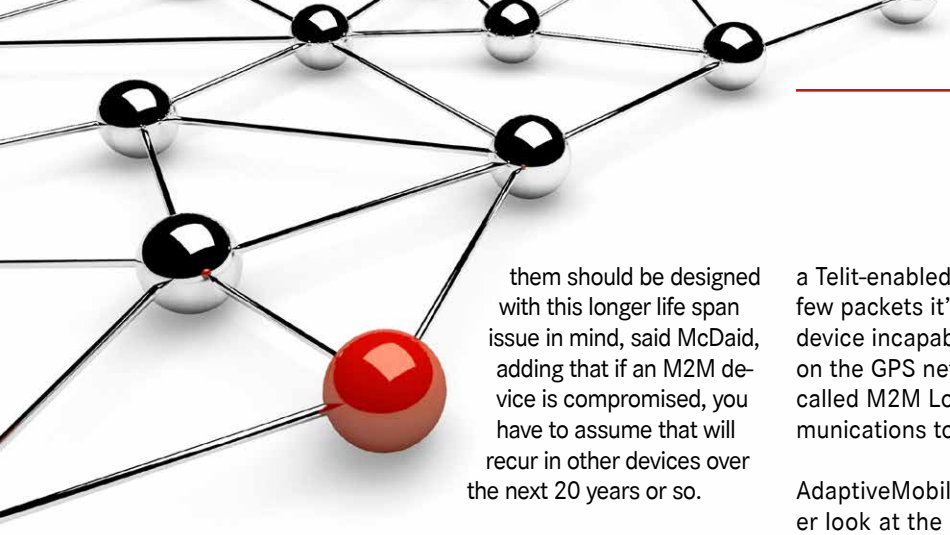
Beecham goes on to offer proof of that point, saying that the National Institute of Standards and Technology has been working with five different security working groups in addition to other standards efforts.

Cathal McDaid, head of security operations at 10-year-old mobile security company AdaptiveMobile, whose solutions protect more than 850 million subscribers, said that while some of the same security technologies already in use can be applied to M2M, machine-to-machine communications are unique because traffic patterns are different than those of smartphones and because they lack the amount of human intervention involved in other types of communications.

If a smartphone goes missing, the owner is likely to notice that and report it, he said. However, an M2M device today won't report if it's broken or stolen, so companies should consider implementing remote monitoring with the ability to detect theft, McDaid said.

McDaid went on to say that M2M devices are trying to be low power, so there's not a whole lot of room for apps on these devices. That means there's less room to embed security on the devices, he said, and more need for network-based security.

M2M devices are also different from cellphones because people tend to replace phones about every 5 years whereas M2M devices tend to have 20-year life spans. That means M2M devices, some of which are located in remote areas, and the networks that connect



them should be designed with this longer life span issue in mind, said McDaid, adding that if an M2M device is compromised, you have to assume that will recur in other devices over the next 20 years or so.

Jeff Smith, chief innovation and technology officer and executive vice president of Numerex Corp., said there tend to be a lot of incremental software uploads to M2M devices after they are in the field, and that every time you have to update code it can open the device to malware. The opportunity for security breaches are further expanded, he added, when updates are done via over-the-air provisioning. And, he said, there is growing interest in over-the-air provisioning.

Because M2M devices increasingly are involved in critical jobs related to medicine, shipping, and transportation, a breach could have serious effects, McDaid added, so these units are typically more important than consumer handsets. Indeed, about two years ago there was a M2M security breach involving traffic lights in Johannesburg, South Africa. Thieves broke open traffic lights, and took the SIM cards out of them. They used the SIM cards to run up several millions of dollars in phone calls, and because the traffic lights were broken, bottlenecks resulted.

Gemalto's Philippe Vallee said that today M2M device manufacturers can do geofencing and remotely enable or disable roaming.

At Mobile World Congress earlier this year, Telit was demonstrating a bill shock prevention solution. Dominikus Hieri, CMO, said that M2M SIM cards are supposed to have a low use rate, so if usage jumps that raises red flags, and Telit's solution can alert users that's happening.

Jamming of wireless devices via GPS or cellular, however, is the biggest security issue for M2M, according to Hieri. As a result, Telit has introduced Jamming Detection and Reporting so devices with its embedded technology can communicate even when jammed. The device itself can detect when it's being jammed, he explained. When cellular jamming occurs, a Telit-enabled device can send a jamming alert with the last few packets it's able to send before jamming renders the device incapable of communicating as intended. If a device is on the GPS network and is jammed, a new feature from Telit called M2M Locate automatically moves that device's communications to a cellular network.

AdaptiveMobile and McDaid recently decided to take a closer look at the level of security in various other M2M devices and applications out there today. They released the results of their investigation in an M2M security study published in the spring of 2012.

A random sample of M2M devices, sold through retail channels, to allow people to open building doors remotely indicated very rudimentary security, according to McDaid, who said the solution was simple to spoof and open a door.

"So this is a security device, but it's not so secure," he said.

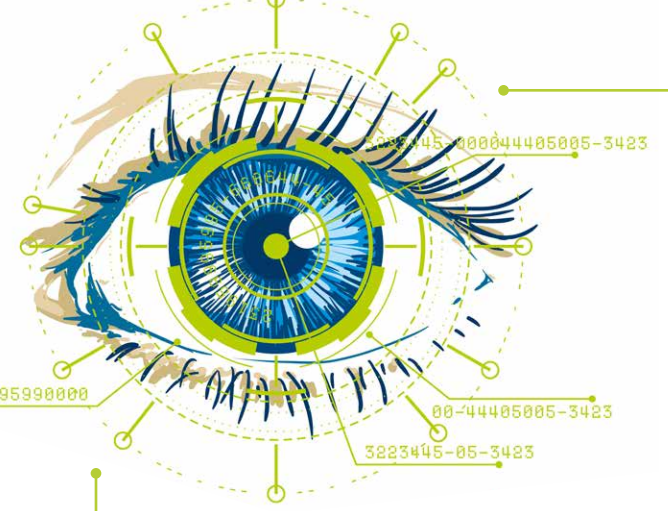
McDaid then referred to SCADA solutions and the ABI Research report referenced above. When SCADA solutions were built, designers didn't expect them to be connected to a wide area network, he said, so when you bring M2M-type SCADA solutions into the mix and connect them to the outside world, you open them up to threats. That means hackers can potentially get access to and reprogram SCADA systems, which were not created with strong security because they were initially designed to be closed systems, McDaid explained.

**Service providers in the M2M space are taking security steps such as restricting M2M devices to text messages only.**

The good news in M2M security is that people are now starting to talk more about it and how to address it and, as a result, there are now fewer "reasonably obvious exploits," said McDaid.

Service providers in the M2M space are taking security steps such as restricting M2M devices to text messages only (and not phone calls). Remote monitoring of M2M assets is also growing.

"Security by design is what we're really aiming for," said McDaid. "Think of security from the start. We have to close all the loopholes." M2M




by Paula Bernier

# Ready for Change

## Vending Space Gets a Lift from Interactive Capabilities

Vending machines have come a long way since my father-in-law took over his father-in- law's vending business in the late 1960s. Heck, they've come a long way since my father-in-law retired and shut down the business eight years ago.

Your 1960s-style vending machines (some of which may still be in the barn at the family farm) were outfitted with mechanical coin accepters and pull levers. Customers yanked on knobs to select their chosen brands of cigarettes, purchase Zagnut or Clark bars, and buy hot or cold beverages.

As the decades passed, vending machines became more sophisticated. Updates included slick push-button customer controls, and digital coin and bill validators.

That was small change compared to what was to come.

Many of the new vending machines on the market today are part automated delivery mechanism and part marketing machine. Not only has digital signage become a key feature of state-of-the-art vending machines, some of these connected units now also have video cameras that can capture and analyze general information (like approximate age and/or gender) about customers and passersby so they can deliver marketing messages targeted to likely interests and appetites.

"People are super suggestible," says Chris Goumas, senior vice president of new business partnerships and interactive solutions at VE Global Vending Inc., a wholly owned subsidiary of VEII.

Women tend to buy more chocolate while men buy more chips from vending machines, so suggesting such purchases could help drive vending sales, he says.

VE Global Vending also offers a variety of built-in tools that enable companies to highlight particular products based on specific brand initiatives.

Interactivity – in the form of games and social media – also has become an integral part of the latest in vending machines, Goumas adds. For example, VE Global Vending offers a whack-a-mole-style game on some of its machines. High scores are posted to leaderboards on the machine and winners can opt to capture a screenshot of their leaderboards and post the screenshot to Facebook.

While one might think that game playing on the vending machines might interfere with the ability for others to make purchases on these units, Goumas says that isn't a major concern. Organizations can opt not to activate this feature or to offer it only at select times. Vending machines are only used 7 to 8 percent of the time, so those who control the machines can enable games only during non-peak sales times or just for select times of day.

"Most of the universities we have machines at have the games turned on, [that's] maybe 90 percent," he says. "In offices it is much more touch and go, only about 20 percent of offices have games turned on."

All of this may seem far afield from where the vending industry, VE Global Vending, and its parent company, VEII, started out. But the industry and companies have continued to evolve as technology has advanced and views on marketing have changed.

For example, several years ago when the U.S. government introduced dollar bills with color ink, existing vending machines couldn't read the new money, so expensive (around $500 each) bill readers were required, explains Goumas. VEII responded to this new development by introducing a bill reading solution for a third of the price of competing options, Goumas says.

A product of that kind of thinking, VE Global Vending is the R&D arm of VEII that looks at the new and coming developments in, and impacts on, the vending space and figures out how to address them. Many vending machines today look similar to the ones that have been around since the 1970s, he adds, but VE Global Vending knew interactivity was coming to this space, so it set out to build an interactive vending solution.

In 1999 the company created an interactive vending machine for M&M, Goumas says, but this solution was too early for the mass market given the screen cost $1200, and

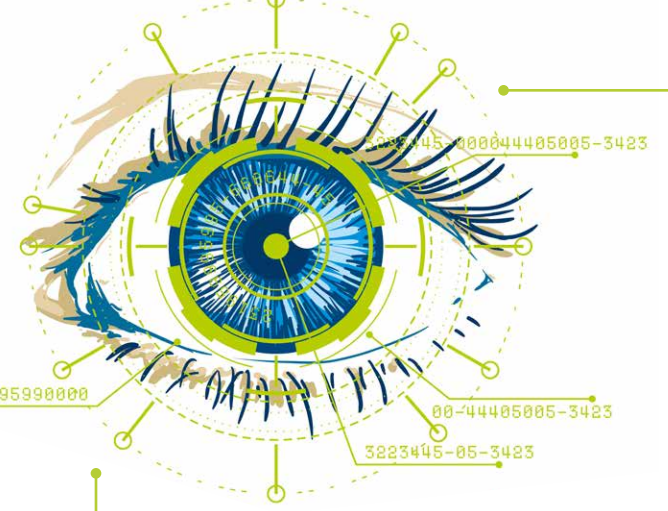
the computer (not even a Pentium platform) cost $2,600. However, he says, about a year ago there was inflection point at which you could build a solution with a 46-inch touch device and actually make money from it.

But rather than reinventing the wheel on the hardware side, VE Global Vending recently created an operating system for interactive vending that can be customized for various applications. The software is used in concert with technology from a company called CradlePoint, which provides vending machines with connectivity via various access technologies like cellular, Ethernet and Wi-Fi so marketing messages, transactions and other vending machine-related data can be uploaded to and download from the machines.

VE Global Vending introduced this interactive vending machine solution about a year ago at the NAMA show. (NAMA stands for National Automatic Merchandising Association.) Units based on the technology have been shipping for a year as of this May. Several hundred units are now deployed with such customers as food service giant Canteen, and the number of units in the field are increasing rapidly, according to Goumas.

Companies are beginning to adopt interactive vending solutions for products beyond just snacks, he adds. Among the products being sold through them are cosmetics, "fancy cupcakes", IT peripherals, and phones, says Goumas, who explains this kind of thing is referred to as automated retail.

Intel is using this distribution and marketing method to sell mice, keyboards, laptop batteries, and Bluetooth headsets, he says. And various companies have used the VE Global Vending platform to build brand experiences for specific product rollouts in Belgium, New York, Paris, and Milan. Those efforts include launches of a new brand of flavored beverages, and a new European T-shirt line, he says. The vending machines in this case can be used as a product distribution mechanism, Goumas says, but they are really more aimed at helping drive people to retail locations or the web, where they can select from a wide array of products. M2M




by Lawrence Gasman

# Opportunities for Sensors in the Internet of Things

In its latest analysis of this market, NanoMarkets has concluded that the market for sensors used in the IoT will be worth $5.1 billion by 2015. Most of that growth will be coming from the building automation and so-called industrial Internet sectors.

Many of the firms benefitting from this new opportunity will be start-ups, but there is an impressive list of large firms that are already tapping into IoT sensors in one way or another. These include AT&T, Federal Express, Freescale, and Rogers.

**Building Automation: Where the Demand Is**

IoT-connected devices in home automation applications monitor changes in the environment for human comfort, safety, convenience and cost savings. Based on the slow take up of home automation systems in the past, NanoMarkets isn't expecting to see much from IoT sensors in the home automation sector until 2017 or so. Nonetheless, we think that the rising cost of energy will drive growth. We see opportunities in IoT sensors for the control of smart lighting, smart hot water heaters and HVAC energy flows, in particular.

There is already a huge volume of sensors installed in commercial and industrial buildings. Upgrading of proprietary sensor networks with new devices to an existing network presents problems today that evolving standards and refined security protocols will eventually diminish. Many of the opportunities for IoT sensors in this space have to do with energy-saving considerations, but also with savings on labor costs and remote reporting of service layers in building complexes maintained by central oversight.

Potential cost savings from the use of IoT sensors in the commercial building sector are more dramatic than in the home automation space, with even greater incentives to retrofit IoT controls as sensor prices continue to fall and systems integration issues ease. In the commercial buildings sector, heat, light and motion sensors will be sales revenue leaders, with HVAC systems control, area lighting, maintenance/surveillance of moving systems and security considerations driving adoption.

**Sensors and the Industrial Internet**

The other sector where NanoMarkets see a significant opportunity is what GE has dubbed the industrial Internet.

Machine-based analytics can control automated processes across and through entire industrial process flows. Today, there are some 7 million networked sensors already in service in an ecosystem of 7 billion installed industrial devices. In this massive addressable market, energy, infrastructure and overhead savings may be too tantalizing to resist, notably in optimizing process controllers across networked factories.

With the industrial Internet, look for the U.S., China and Japan to lead both deployment and data integration near term. But NanoMarkets believes Europe will continue to lag both in R&D, ceding leadership to U.S. and Asian process flow innovation.

**Health and Gaming: Beware the Hype**

We also expect IoT sensors to be used in other sectors. But we caution that there may be less to some of these sectors than might be expected.

Leading game technologists want to bring the human into the machine via immersive technologies. Most planned innovations in this area are essentially sensor related. However, many of the existing sensors used in the gaming are already IoT sensors in that they are Internet connected. While in other sectors, IoT sensor demand will get a boost as new Internet-connected products come on the market, in the gaming space this effect will not be significant.

We don't see much coming for IoT sensors in health care either. There will be interesting applications for IoT sensors for sure with heat, touch/pressure and body chemistry sensors (gas/chemical) leading sales volumes. However, the underlying addressable markets for healthncare sensors are not that big; there are just so many sick people, hospitals, etc.

So when all is said and done, the addressable market for IoT sensors in gaming and health care just can't compare with building automation and the industrial Internet. NanoMarkets' forecasts predict that by 2018, more than 90 percent of the revenues from IoT sensors will come from the market segments mentioned above. M2M

*Lawrence Gasman is the principal analyst for NanoMarkets LC (www.nanomarkets.net).*

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by Carl Ford

# From the Simple to the Complex Asset Tracking

I will warn my readers in advance that I feel like I went into a time warp doing the research on this feature. But, then again, it may be a that barcodes are an accurate reflection of the state of asset tracking. I will also say that as your M2M curator, I think this article will save you a lot of time on the web.

Looking through the web and in discussions with friends, I have decided that asset tracking comes in two flavors, those that just want to know their inventory and those that are actually doing the complex work of managing distribution.

First of all, let me give you some perspective. Barcodes took more than 15 years to get adopted, leaving Bernard Silver and David Collins very frustrated. The patents were sold for peanuts, and implementations were considered not viable economically. Barcodes adopted by the food industry were not understood by the public, and some faithful groups thought they were the devil's symbol. Using barcodes for inventory seemed to have implementation problems. How many times have you seen multiple barcodes adhered to the item? (Often bored, I would pick at the end of the one that looked the oldest.)

Today, the economics and evolution of barcodes have become incremental to your printer, your scanner, and your smartphone. This has given birth to 2D and 3D barcodes. Identification also has expanded to include RFID, NFC and GPS solutions. While RFID and NFC, and for that matter 3D barcodes, all have been implemented, none of them have matched traditional barcodes' universal adoption. It would be nice to suggest that there are real range differences, but the reality is that GPS is the only one that matters for distance assuming ubiquitous coverage.

Larry Bellehumeur. Novotech's executive vice president of marketing and sales, suggested we focus on the more robust, complex implementations.

It's better to segment from the simple internal inventory management system to the complex. I want to point out that the economics can be compelling for both. The ROI on tracking assets, if it results in reduction of theft, can be immediate depending on the price of items and the procedures around security.

The ROI on tracking assets, if it results in reduction of theft, can be immediate depending on the price of items and the procedures around security.

Businesses (e.g warehouses), government (e.g. offices) and medical facilities (e.g. hospitals) can see immediate returns with simple scanners and barcode implementations. I know of several anecdotes about companies buying doubles or triples of things because they did not track the incoming shipments properly. I also don't want to dismiss the mixed use of the


simple asset systems to do complex things. I have a friend who is using RFID to manage dynamic walking tours in a museum so the inventory system has added value (complexity).

It is fairly logical that if companies have trouble managing their assets internally, it has to be even harder when assets leave the premises. These complex systems are often associated with asset utilization, which brings in longer planning cycles and tighter integration.

Leaving the internal environment and still tracking the asset is probably best done with GPS, and with that added complexity comes the management issues of faster notification and efficient decision-making. While it would be easy to think that ROI takes longer for these type of implementations, it is once again based on the value of the assets and the situation. As Chris Swearingen, manager of marketing for vertical market development Fedex's SenseAware, pointed out in the Battle of the Platforms last year, if the system saves a life – bringing a heart, liver, or kidney to someone in need – the ROI is priceless.

At the point of developing complex implementations, many of the horizontal platforms can be used for asset tracking as well. Companies like Axeda, ILS Technology, Omnilink and Spireon have a history of success with asset tracking and supply chain that can add compelling rationale to the business case.

As the complexity grows there is a natural tendency to want to perform a series of requirements tests and trials. While this is the traditional way to do things in IT, we should recognize the entire enterprise environment has changed. Nikki Cuban, OnAsset's vice president of marketing and business development, points out that testing an iPhone has little value in today's environment, because people just know that it works. Carriers are better prepared for off-the-shelf solutions that can be supported. Companies should embrace Agile and Scrum techniques to reduce the lag time between development and trial.

Getting to the where stakeholders are engaged reduces the risk of users rebelling against the adoption of the new solution. After all, if the system is not making workflow more efficient, the system in the end will be a software paperweight.

Here are some things to consider with your team before your implementation.

**Planning**

- Can all elements use the same devices to report?
- What is the footprint associated with the system and who provides services?
- What stakeholders should participate in the planning?

**Prioritization**

- What are the compelling reasons for implementation?
- How can that be monitored and reported?
- How can proof of concept be easily achieved?

**Visibility**

- What are the requirements for information to be updated?
- Who needs to be informed with what machine?
- How should information be represented? Geographically? Route? Project?

**Insight**

- How can you share the information in a way that optimizes decision-making?
- How would grouping data sources impact decisions?
- How does real-time information impact insight?

**Security**

- Are there compliance issues?
- Does information need to be massaged for anonymity?
- What levels of information needs to be shared with what groups?

**Collaboration**

- What systems should be integrated?
- Will groups have to jointly analyze the information?

- What joint meetings should happen and how often?

**Intervention**

- How does escalation impact information flow?
- What options should be integrated into the process?
- How can disaster recovery and asset redistribution be incorporated in the solution?

These are only a few possible questions and if I were to facilitate the meeting, I would want the teams to brainstorm the questions before answering them. I am always amazed at how crowdsourcing improves results.

In conclusion, let me give one word of caution. Whether you have a simple or complex implementation, this market is ripe for consolidation. There are a lot of companies that can sell on price, but in the long run will fail on support. My shortlist is not comprehensive and is here to help you think. Besides case studies and testimonials/recommendations, I would suggest you remind yourself as you are selecting your vendor that the last thing you want your asset management system to be is a stranded investment.

Here is my short list of **Simple Asset Trackers** and why I think they are valuable to visit.

1. **Redbeam (www.redbeam.com)** has an out-of-the-box solution for internal management for those with little in the way of IT resources.

2. **Tracmor (www.tracmor.com)** is a great starting point for any company, particularly one with existing IT staff. Tracmor is designed to let developers extend the system to match their customers' needs and is a partner to Amazon's Web Services.

3. **AssetPulse (www.assetpulse.com)** is a good place to source barcode and RFID solutions for enterprises with a focus on IT and quick inventory management.

**The Horizontal Platform List**

1. **Axeda (www.axeda.com/solutions/asset-tracking)** reminds us that with 38 billion devices capable being of being tracked, a horizontal platform may be the best approach.

2. **Omnilink (www.omnilink.com/omnilink-launches-car-connection-mobile-asset-tracker-mobile-and-comfort-zone-check-in-mobile/)** has a history with telematics and fleet that makes its platform valuable when mobility means more than phones.

3. **ILS Technology (www.ilstechnology.com/platforms/securewise)** has the secure cloud set for companies looking to remotely monitor and manage their assets.

4. **Numerex (www.numerex.com/numerex-products/asset-tracking)** understands how to deliver the information when mobile services are spotty and satellites are included in the mix.

5. **Spireon (www.spireon.com/solutions#business)** focuses on the insights that asset tracking can provide for utilization and innovation when managing M2M/IOT.

And here is the **Complex List**

1. **KeyTone Technologies (www.keytonetech.com)** dives in hard into verticals such as hospitality, oil and gas and even DoD compliance implementations.

2. **TE Connectivity (www.te.com/en/home.html)** is a solutions engineering company that can source a design and take you cradle to grave on your M2M implementation.

3. **Intelleflex (www.intelleflex.com/Solutions.asp)** is one of the most horizontal asset tracking sites I have visited, with information about a host of vertical implementations.

4. **OnAsset (http://onasset.com)** manages GPS and tracking with a flare, allowing you to see the big picture of critical data and the impact on your assets.

5. **Novotech (www.novotech.com)** may be the Ingram Micro of M2M, but it has a strong capacity to support initial design and has been known to solve snafus.

6. **SenseAware powered by Fedex (www.senseaware.com)**. If you are tracking assets that need to travel quickly (and at a steady temperature), start here.

7. **Tyco Integrated Security (www.tycois.com/)** is the place to go when theft is more than simple internal grab and go, and you want to give your security team the tools. M2M

*Carl Ford is partner, CEO and community developer for Crossfire Media (www.crossfiremedia.com), which stages the M2M Evolution Conference in collaboration with Technology Marketing Corp.*

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by Aloke Tusnial

# The Real Carrier Challenge of M2M Lies in IT

As the machine-to-machine wave threatens to add hundreds of millions of devices to carrier networks, the challenge for service providers is often seen in terms of the strain placed on network signaling and capacity. But those devices will largely be aggregated behind a series of residential and business gateways via Wi-Fi, greatly reducing the complexity from the network point of view. The real carrier challenge is in monetizing M2M, which is a low-ARPU, high-volume business that requires a fresh approach to service packages.

In the 3G/4G smart device era, wireless operators are struggling with device numbers on the order of two, three or four per household. Some larger carriers have 100 to 200 million handsets, tablets and laptops connecting to the network, and data consumption is growing at an exponential rate. In M2M, wireless becomes embedded in everything. In the connected home, that means refrigerators, thermostats, lights, televisions, alarm systems and more. In a telematics situation, smart utility meters or warehouse cooling systems will be sending information across the network. And the numbers will multiply exponentially; suddenly, mobile operators will have billions, not millions, of devices on the network.

**The Business Model Challenge**

According to Machina Research, the number of machine-to-machine connections globally will grow from 2.4 billion at the end of 2012 to 18 billion in 2022, led by the consumer electronics and intelligent building sectors. Total market revenue will reach $1.2 trillion in 10 years, compared to just $200 million in 2011.

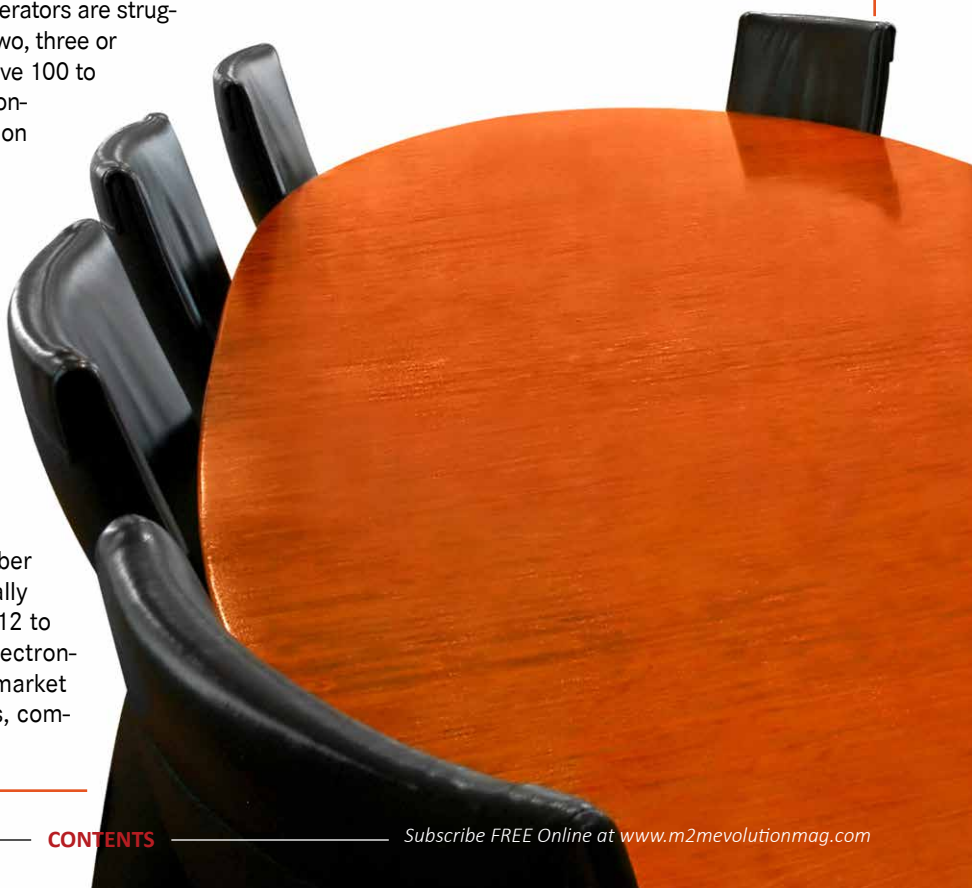
For operators, the revenue opportunity is fairly specific: Two-thirds of the money to be made will come from devices and installation. However, $400 billion of it will come from services – with only 10 percent ($9 billion) of that coming from basic mobile connectivity, according to Machina.

That means that carriers are going to have to reduce the costs associated with delivering M2M across billions of devices, while thinking creatively about how to tap the service opportunity. Like it or not, service providers will bear the cost of M2M. The question is, can they convert it into a profitable business?

**The Exaggerated Effect on the Network**

Many service providers consider their largest challenge to be on the network side of operations, rather than in IT and OSS. In the past, the network was built to support demand, while software was sorted out after the fact. But in M2M, operators should be approaching it in the opposite fashion.

When considering how to support M2M, carriers are first considering how to manage the signaling load and how to scale the network appropriately. But the reality is that the lion's



share of those devices will be things like ovens, microwaves, lights and other electronics that are smart by virtue of being able to talk to each other; not all of them will have SIM cards. More than likely, connected home devices will be linked by some form of short-range protocol to a residential gateway that will aggregate the traffic to the operator WAN. And that means that the number of devices that the cellular network has to worry about suddenly shrinks by a hundredfold or more.

To boot, an iPhone and a fridge are not the same in terms of consumption – an appliance may take up 10KB in one day, if that. In fact, all of the connected home appliance traffic in a household taken together might not add up to the typical consumption of a smartphone in a given day. Thus, M2M's strain on the network will not be the vast hurdle that some may believe.

The picture is dramatically different on the IT side of the house: It is here that operators will find their greatest challenge.

**The Software Imperative**

For operators to make a solid business out of M2M, they have to consider that different devices will have different levels of consumption and different levels of value that the customer associates with it. For service providers to make the most of the opportunity, they must get beyond the basic connectivity approach of volume-based pricing – again, expected to make up only 10 percent of the revenue opportunity – and instead move to value-based pricing. That means gaining visibility behind the gateway, be it residential or business, to differentiate what devices are being used for which actions and purposes.

Traditionally, the network is for reliability and IT is for agility, but in M2M, those lines begin to blur.

Another driver for device-level visibility is the fact that M2M will always be a low-ARPU revenue stream. Operators will not be able to charge the $50-$60 per subscriber per device that handsets command. That means that the cost in onboarding and customer service must be kept low, or commensurate with the revenue the device is bringing in.

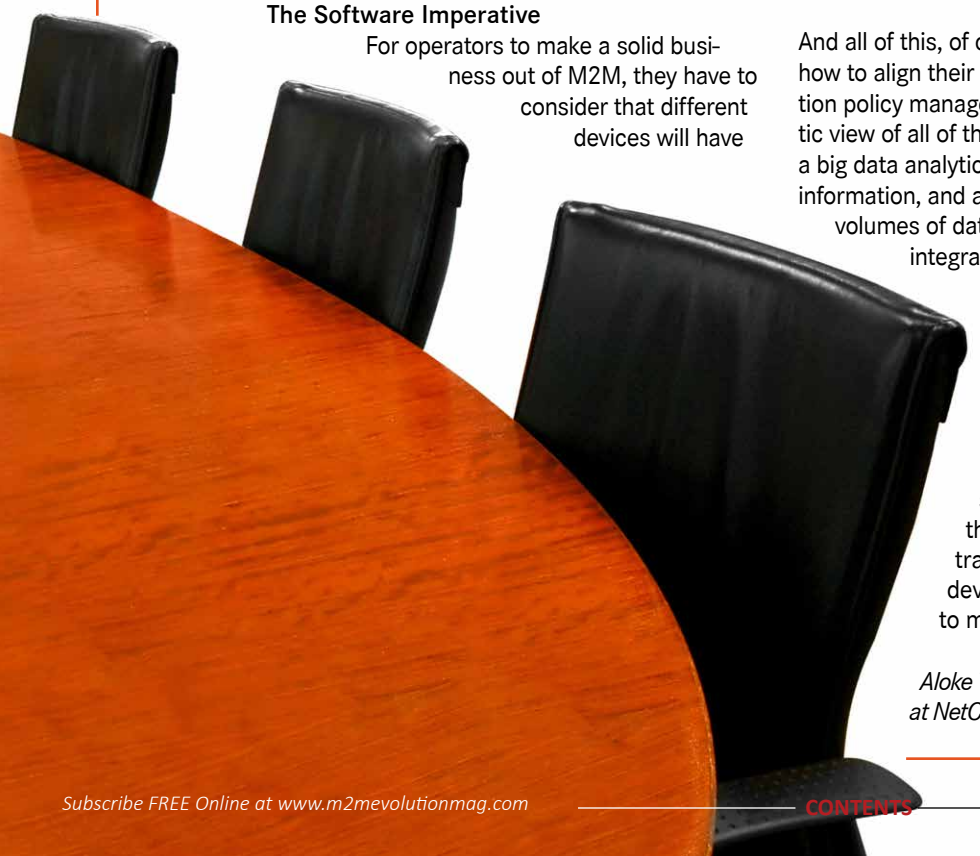
There is also an imperative to support true real-time operations. If a thermometer goes out in a warehouse, an engineer needs to be made aware of it immediately, or else the M2M service value evaporates.

And all of this, of course, means that carriers must consider how to align their IT strategies appropriately. Next-generation policy management is one requirement, to gain a holistic view of all of the devices in the field. They also must have a big data analytics strategy to be able to analyze all of the information, and a smart database strategy to handle such volumes of data in the first place. It also means a tighter integration between the network and IT worlds.

Traditionally, the network is for reliability and IT is for agility, but in M2M, those lines begin to blur.

All in all, operators have a huge opportunity in M2M. But it will require a shift in thinking, and a smart focus on the operational impact, rather than the transport-level impact, of billions of new devices that are expected to make their way to market beginning in 2013. M2M

*Aloke Tusnial is vice president of strategic accounts at NetCracker Technology (www.netcracker.com).*



by Carl Ford

# Machine Crowdsourcing – The Next Logical Step

The term social machine I first heard from Etherios (now acquired by Digi) with regards to its integration with SalesForce at Axeda's Connexion event last year.

You can find my interview with Mike Dannenfeldt at this link: www.tmcnet.com/tmc/videos/default.aspx?vid=6514. The Etherios website also has a nice explanation about the social machine.

In the work that Etherios has been doing matches well with the concepts of better service management with faults and errors being integrated to the workflow of the company for better dispatch and escalation. I bring this up because there was a lot of VC discussion at SXSW about social machines; the viewpoint was there should be a better tie in to the analytics that seem to dominate our social networks and our machine-to-machine reporting. In other words, this has expanded to be more about the analytics that can be integrated and perhaps offered to (and from) outside sources.

Rapidly you are getting a more localized, detailed picture of what environmental conditions are like. Now combine that with social network intelligence and you may get a lot better information as to the why, and not just the what.

Another way to think about this relates to machine crowdsourcing. This may seem like a stretch, but think back on conversations about automotive telematics where the manufacturers said they feel they can deliver better information via their vehicles (with anonymity, of course) – including reporting in the cloud on conditions, delays, and general information. Rapidly you are getting a more localized, detailed picture of what environmental conditions are like. Now combine that with social network intelligence and you may get a lot better information as to the why, and not just the what.

I have talked with a few companies that have been approached on selling the data of their customers from the cloud service. For most of the industry this sounds too invasive, but for the web world this is part and parcel of the service.

Of course, it can be scary, particularly if anonymity is not maintained in the data. For example, recently the NYPD took a picture from Facebook and matched it to a convicted felon in its facial recognition database. Imagine if the video surveillance was linked to Facebook directly.

There are positives you may want as well. Imagine if Facebook's library of APIs included the ability to link your machine's reporting ability to your identity. This could be a better interface for many looking for home automation and monitoring of your family. (I know of a few parties that happened when my kids were younger that would have not warranted police reports.)

Bottom line, the M2M market has venture capital looking to bring the social network business model to the marketplace. Transportation and asset tracking will probably be the first to buy in, but this trend, if managed properly, will be horizontal and a standard feature in the long run.

For social networks, the freemium model has been the standard, with the details of analytics being used buried in the terms and service. It may be that this model will carry over in telematics and home automation. Other models may exist for industries like transportation and medical that will tie into compliance requirements.

Traditionally, this is a service the carriers can't offer to humans because of Customer Proprietary Network Information restrictions. However, these rules, which are so tight on these monopolies, are loose on the web, and M2M may represent a great spot for carriers to partner and invest. Many look at this as the next logical step. M2M

*Carl Ford is partner, CEO and community developer for Crossfire Media (www.crossfiremedia.com), which stages the M2M Evolution Conference in collaboration with Technology Marketing Corp.*

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by Rich Tehrani

# The Rein of M2M

The term M2M is fairly well understood. Machine-to-machine technology is generally any sort of grouping of devices where machines talk to machines.

When your car tells a central computer you need an oil change and the dealer calls to remind you – that's M2M in action.

But M2M means different things to different people and organizations depending on their needs, so when we think of the opportunity for M2M, we can and should be thinking broadly.

M2M has a connection to digital signage; the emerging role of back-office systems in business success; energy management; facilities management; health care; smart buildings, both commercial and residential; mobile workforce management; point-of-sale and vending; safety and security; social machines; and any kind of asset management – even when those assets are trees in the Amazon rainforest.

**M2M means different things to different people and organizations depending on their needs, so when we think of the opportunity for M2M, we can and should be thinking broadly.**

Indeed, M2M has been deployed in the Amazon rainforest in an effort to monitor trees so they are not removed illegally. Gemalto's Cinteron M2M technology is being used in Cargo Tracck for this application. By placing these tracking devices in the tree trunks, authorities are alerted when one reaches within 20 miles of a cellular network.

"The rainforest in Brazil is approximately the size of the United States, so it's impossible to monitor each and every acre," said Ramzi Abdine, general manager of Cinterion M2M at Gemalto Latin America. "The Cargo Tracck solution offers a compelling example of the power of M2M technology in overcoming unique business challenges to extend the reach of traditional tracking and tracing methods."

This is one of the reasons M2M is such a fascinating space for me, because it allows you to do things that you couldn't dream of just a few years ago. Battery technology has improved tremendously in recent years but more importantly, wireless devices are smaller, smarter and can get by on less power. This enables a new generation of devices to go places previously unimaginable.

Speaking of exotic locations, I was in Barcelona earlier this year attending Mobile World Congress, where I met with Telenity. The company leveraged the event to announce m2mConnect, which handles connectivity management of m2m devices.

The idea here is to auto-provision, activate, monitor and diagnose M2M solutions in the lowest-cost way possible. As Dr. Gurol Akman, CTO and executive vice president of R&D, explained to me, M2M customers represent very low ARPU, so it's to minimize support costs.

Telenity also offers a service called m2mEnable, which allows for the collaboration of market players such as those who provide sensors, devices, connectivity, transport of the information over the network, and of course the applications that make use of the data.

As I mentioned, M2M is a very rich technology applying to many markets. But, for now, Telenity is focusing on a few of them such as automotive, smart meters and health care.

To learn more about what's possible with machine-to-machine technology, join us at the M2M Evolution Conference & Expo, Aug. 26-29 at Mandalay Bay in Las Vegas. It's co-located with ITEXPO Vegas 2013. M2M

Here's are a couple links, at which you can find more details:
http://itexpo.tmcnet.com/west13/
http://www.m2mevolution.com/conference/

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