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3rd Quarter 2014 Vol.2/Number 3

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by Paula Bernier



The Value of M2M

Cisco recently came out with its new Visual Networking Index. In this latest report, the company prognosticates that by 2018, there will be 21 billion global network connections, which translates to 2.7 connected devices for every person in the world. The company also expects that by 2018 there will be 7.3 billion machine-to-machine connections – about the same number as there are people on Earth.

The VNI went out to report that Wi-Fi and mobile devices are expected to generate more than 60 percent of IP traffic by 2018, and that connected vehicles – which will have four M2M modules each – will account for some 41 petabytes of monthly traffic by that time.

“Our first Cisco Visual Networking Index nine years ago established the zettabyte as a major milestone for global IP traffic,” said Doug Webster, vice president of products and solutions marketing at Cisco. “Today, we are firmly in the zettabyte era and witnessing incredible innovations and shifts in the industry. The reality of the Internet of Everything, the increasing demand for network mobility, and the emergence of 4K video are among the key trends highlighted in this year’s forecast that represent significant opportunities for service providers today and in the immediate future.”

Indeed.

Infonetics Research also recently published a new M2M report, this one revealing the findings of its new M2M global service provider survey. The research firm said half of the respondents reported they have sizeable M2M businesses that provide at least

one million M2M connections to customers, as reported by Joe Rizzo of TMCnet, the online sister entity of M2M Evolution magazine.

The automotive/transport/logistics and utility segments together account for nearly half of all M2M connections, most of which are 2G-based, according to Infonetics.

While these numbers are interesting, and meaningful, for service providers and the companies on which they rely to get equipment and software, the important numbers pertaining to M2M for businesses and other organizations have to do with how machine-to-machine technology can enable them to lower their losses relative to spoiled or stolen assets, how to increase their productivity by preventing equipment maintenance issues, and how to more efficiently and cost-effectively use resources like energy and water by ensuring their gear is working correctly and people have the information they need to make the most informed decisions about usage.

Dan Shey of ABI Research says predictive maintenance is the top use case for M2M today. M2M platform providers can support some descriptive analytics today, he adds, but predictive analytics is more sophisticated and involves not just the ability to describe behavior, but to predict events, such as the likely failure of a piece of expensive equipment attached to connected sensor. Companies like IBM and SAP, which are already experts in databases, are players in this space, as are a raft of newcomers including Blue Yonder.

German retailer OTTO is using Blue Yonder software to

generate daily forecasts on its inventory based on such variables as brand, price, online placement, stock, and weather. The forecasts help OTTO more easily and quickly identify buying trends, and better plan on how to price, display and inventory goods.

“Using Blue Yonder, our forecast quality constantly improves, and the forecasted sales volumes are becoming more and more accurate,” says Michael Sinn, director of category support at OTTO. “They support us in getting ready for future developments early.”

Blue Yonder’s analytics technology is even being used by CERN to better leverage the massive quantities of data being generated by the Large Hadron Collider.

Not every organization generates that amount of data. In fact, it’s a pretty safe guess that none do. But most organizations and connected devices are certainly capable of collecting and generating a wealth of data. But the word wealth in this context can refer more to amount than to value; that is, if businesses don’t know what they’re looking for and don’t have effective analytics solutions in place to help them find it.

Without clear business cases and tools to carry them out, organizations implementing M2M will find themselves overtaken by what author David Shenk refers to as “Data Smog.” But those that take the time to analyze how they can best leverage their own and other available data to meet specific goals are likely to find the smog around business decision making finally lifting. **M2M**

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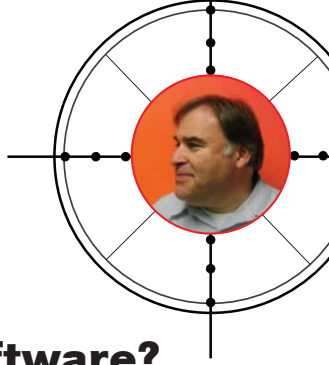
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Specialization: Who Will Maintain My Software?

I used to work with a couple named Charlotte and Ray Valentine. They loved Star Trek, as do I; however, they would point out to me the dilemma of when we would become smart enough to actually run the USS Enterprise. You see, they recognized that everyone on the show was almost interchangeable – Kirk, Spock, and Sulu could all help Scotty in engineering. How was that possible?

They pointed out the world is getting more and more specialized, and it was unlikely that we all could be a master, or even a Jack, of all trades. Now, since Star Trek came out, we have had the benefit of seeing the Matrix. That means we have a new sci-fi answer as to how we get so smart so quickly, but even that does not suggest we will know all the things we need to know all the time.

This brings me to my current obsession. Who is going to maintain my software in the future?

You see, as more and more of our work becomes associated with software, I find it harder and harder to believe that I am going to know the right people to call to support my technical requirements in the future.

First of all let me take a step back so we're on the same page.

Part 1. Developers are not equal.

According to Steve Jobs a great coder is 300 percent more valuable than his peers, while bad coders are a drain

on the rest of the group because they require debugging and can slow a team down.

Recent innovations in team development like Agile and Scrum are designed with the goal of identifying the duds quickly and giving the great coders the freedom they need to move quickly and sprint to the finish line.

Great. So now we have good code, and the project is completed. Except, guess what? The great coders leave. Maintaining code is boring. Rare is the great coder who wants to hang around to defend what he or she wrote. Like a poem or a book, it has a life of its own, and the author moves on.

Likewise, Scrum masters, by their nature, work to a due date. Code maintenance has no due date and therefore is a waste of the Scrum master.

Part 2. So who does that leave?

If you are lucky, that leaves an average coder who is on call. Or perhaps you just have a project manager who is willing to live without due dates.

The bottom line is the potential degradation of service is huge.

Nate Williams of Greenwave Systems, an IoT software and services company, points out that much of the answer will be found in the presentation of information on the dashboard and the training associated with solutions.

Part 3. Beyond the platform on the dashboard

If the goal is to make it so I can manage my own needs and minimize the impact of maintenance, a key ingredient has to be the dashboard and documentation that informs me how to configure and manage my own requirements.

I understand that this is where we are heading, and it represents a great indicator of how customer contacts will be managed in the future. We should expect to see tier 2 help desk support.

Part 4. The IT crowd

If you have ever seen the U.K. comedy The IT Crowd, you can imagine the experience of both the hapless end user and the support engineers as they ask the basic questions Did you turn it on and off? Is it plugged in?

All of these are greatly reduced by generational changes, however. Looking at the dashboard associated with my Wi-Fi gateway, I find myself still wanting to be Neo from the Matrix. After about 10 input areas, I am clueless as to what I want my configuration to be and allow.

As I think about how small business joins the M2M evolution, I am sure that managing the customer is going to require someone who can comprehend the dashboard. My only hope is that he is not the guy Steve Jobs told us would create more work. **M2M**

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by James Brehm



What's Wrong with M2M and IoT

Recently I spoke during the breakfast keynote session at the 2014 Telecommunications Industry Association conference in Dallas. I went freestyle, walking that tightrope without a net – no slides to rely on, so no death by PowerPoint for the audience to endure. The topic of my talk was Let's Get Real and was a discussion of what's really going on in the market, drivers, inhibitors, challenges, and opportunities. And today, I'd like to put pen to paper and share some of that rant with you, the readers. While reading this, please ask yourself, am I part of the solution or part of the problem?

Definitions

First of all, let's talk about definitions for M2M, IoT, loE, smarter planet, smart grid, digital home, connected world, Industrial Internet.

It seems like the number of terms and variety of definitions in the industry are multiplying like rabbits. Can someone please help me out here? Do we need this many terms, acronyms, and definitions?

At last year's TIA conference, I did a panel with two other analysts. The moderator asked what our definitions of M2M and IoT were, and guess what, they all differed.

Numbers

Next is numbers. No one can seem to get a handle on the number of connected devices actually out there. And do you know why? It's because everyone has a different definition.

And because of that, everyone counts something different. And if you wait a few minutes, someone is bound to send a press release out with a new number. Millions, billions, trillions – the numbers get really big, really quick.

But let me share something with you. It's a secret, so don't tell anyone. The estimates that you're reading out there, well, they're all wrong. By definition, estimates and forecasts are wrong. That's why companies can create automated connection counters on their websites that have no real foundation in what's actually being connected in the world.

Platforms and Processes

M2M and IoT meet at the intersection of telecommunications and information technology. And if you ask almost

anyone in telecommunications or IT what the definition of IP, VoIP, VPN, or IPsec is, they'll give you a definition. But what is the definition of platform? There are billing platforms, activation platforms, application enablement platforms, testing platforms, device management platforms, and security platforms, not to mention computing platforms.

So often the discussion becomes about the platform and omits a discussion of an enterprise's business processes or capturing the right information and getting the data to the right people or machines that can use it. If you don't look end to end at an organization's processes and make sure that the right processes are mapped, then the data collected may all be bunk anyway.

Devices and Data

The terms M2M, Internet of Things and connected devices all have the implication that connecting the device is the hard part and when we get all these devices connected, we'll somehow reach nirvana.

Let me give you a scenario. I'm a CIO. I want to manage my connected assets. I have connected devices from five companies that provided connectivity to the device natively and have added gateways to connect devices I've purchased that are either older or non-embedded devices from another 11 or 12 OEMs that don't have a connected device strategy. To me, as CIO, it's not about connecting the endpoints, it's about the data that's pulled from these endpoints. It's about making this data relevant, contextual, and consumable. And since CIOs live in a world where they own and manage heterogeneous devices from multiple manufacturers, we're a long way from that hyper-connected nirvana that we all seek.

If this made you nod your head, scratch your head, or shake your head and throw your hands up in disgust, I'd like to speak with you. I'm always looking for feedback on what I'm thinking, so feel free to reach out and we can continue the discussion I've started here. **M2M**

James Brehm is technology evangelist and founder of James Brehm & Associates LLC (james@jbrehm.com).

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The Next Wave

AT&T Helps Organizations Get More Productive with M2M

AT&T is arguably the best-known name in telecommunications, so when an important new market takes shape on the communications landscape, you can be sure the company is there to lead the way. That said, it should come as no surprise that AT&T is a leading player in the quickly expanding machine-to-machine arena.

Frost & Sullivan last year identified AT&T as the top-rated national carrier among vendors in the cellular M2M industry. AT&T today services more than

17 million M2M endpoints; has certified 18,000 connected devices; and has partnerships with such important companies as multinational conglomer-

ate GE, itself a pioneer in the machine-to-machine movement.

But beyond names and numbers, the real story around M2M has to do with the new benefits and efficiencies it brings to organizations and their customers, explains Mobeen Khan, executive director at AT&T Business Solutions.

"M2M and the Internet of Things is really the next wave of productivity enhancement in our economy," says Khan, who just a day before speaking with M2M Evo-



lution magazine presented at The White House as part of the SmartAmerica effort. "We are connecting not just people, but things, and we are able to make smarter decisions as a result of that."

AT&T helps businesses make smarter solutions by delivering solutions that fall into three general areas: connectivity, platforms, and application-layer offerings.

The connectivity piece leverages AT&T's significant 3G and 4G cellular and Wi-Fi network assets, its back-end network, and a global SIM. The AT&T Global SIM, which takes advantage of the roaming agreements AT&T has signed over the years with 500 networks operators around the world, enables organizations to keep tabs on their connected assets and devices wherever in the world they go. It also allows AT&T to provide those

organizations with a single bill and single interface for all their M2M assets and devices around the world.

That's useful, notes Khan, if for example an organization is using a cargo application to track its assets, which may be manufactured in China, shipped to a warehouse in Germany, and then deployed by a customer in the U.S. Each of those countries have local cellular providers, says Khan, but the AT&T Global SIM can make that infrastructure and cargo solution appear seamless to the organization, which can use AT&T's service delivery platform to set policies that may vary based on where an asset is located at any particular time.

AT&T also addresses organizations' M2M requirements via application delivery and service delivery platforms.

The application delivery platform is the foundation on which AT&T customers and other developers can build their applications. For example, an organization could leverage this platform to create an application that collects pressure and temperature data from heavy equipment such as factory floor or farm machinery, and could implement policy management so if the equipment's temperature reaches a certain threshold, the application triggers an alarm or prompts an action, such as issuing a trouble ticket and dispatching field personnel.

"We hide the complexity from the app developers so they're easily able to extract data from the devices, so developers can build rules around data, as opposed to trying to program to the device," says Khan.

AT&T's service delivery platform, meanwhile, is the means through which organizations can manage their connected assets. Customers can use this platform to check the status of asset connectivity and the amount of data being processed, and to control policy related to geofencing and other parameters, Khan explains.

The carrier also is now in beta with m2x, which Khan describes as a sandbox solution that enables developers to collect data from networks and connected devices and use it via a set of APIs.

The third component of AT&T's M2M offering addresses the application layer. That entails select applications for which AT&T is bringing end-to-end solutions to market.

For example, AT&T has a couple of asset tracking solutions. One of them, AT&T Cargo View, is for tracking assets while in the air, or in transit or in warehouses on land. Keeping tabs on assets such as food and medicine, which can be adversely affected by light, humidity, and temperature, is especially important to avoid spoilage. So AT&T Cargo View is an end-to-end solution – which includes the application, devices, network connectivity, and security features – that the carrier delivers at a fixed price to enable this kind of asset tracking.

AT&T is also readying an asset tracking solution aimed at mid-market insurance companies. This solution involves insurance companies equipping their customers with connected devices that plug in to vehicles to collect statistics on driver behavior. That way, insurance companies can better assess in what risk category to put individual motorists, and customers with good driving habits can potentially get more favorable insurance rates.

"We are offering the complete solution – with transport, device, device logistics, and the software that allows them to score a driver based on the data coming from the device," explains Khan.

Asset tracking and usage-based insurance are just a couple of the areas in which AT&T offers M2M solutions. Other M2M areas of focus for AT&T include agriculture, connected cars, digital life (which involves the implementation of sensors in the home), health care, smart

“M2M and the Internet of Things is really the next wave of productivity enhancement in our economy.”

- Mobeen Khan, executive director at AT&T Business Solutions

city, smart grid/smart meter, oil and gas management and monitoring, and more.

Beyond the networks, and M2M platforms and applications, already discussed, AT&T brings its extensive network expertise, analytics solutions, cloud capabilities, security know-how, and solutions-based selling to bear in delivering machine-to-machine solutions. AT&T has been delivering connected solutions to businesses – ranging from very large to small – for many years, so it is already intimately familiar with enterprise technologies and requirements, says Khan, and the company has a decade of experience in the M2M space in particular.

That expertise and those assets already have won AT&T a very respectable amount of M2M business, including a deal with GE, which in October announced a global alliance agreement with AT&T. That involves GE machines connecting to the AT&T network and cloud to create what the partners are referring to as GE's Industrial Internet. (For more on AT&T's involvement in the Industrial Internet, see AT&T's Edit Series in this issue.)

"GE's collaboration with AT&T validates our shared and common vision for the Industrial Internet," Bill Ruh, vice president and corporate officer at GE Software, said at the time the deal was announced. "Together, we see a future where the intersection of people, data and brilliant machines will have an enormous impact on the productivity and efficiency of industries around the world. By connecting machines to the network and the cloud, we are taking an important step to enable workers all around the world to track, monitor, and operate our machinery wirelessly and remotely through highly secure and machine-to-machine communications."

There's a huge amount of data that is created and can be collected on factory floors and in scenarios in which industrial products operate, says Khan. M2M applications can now allow that to happen to the benefit

of organizations and their customers, enabling businesses like GE to do predictive maintenance and use performance data to inform future product design.

AT&T's prominent position in the M2M market place also led to its invitation to do a presentation on the benefits of connected devices in June at The White House, which held the event as part of the SmartAmerica Challenge posed by a couple of the Presidential Innovation Fellows from the U.S. Department of Commerce's National Institute of Standards

AT&T has a couple of asset tracking solutions. One of them, AT&T Cargo View, is for tracking assets while in the air, or in transit or in warehouses on land.

and Technology. The SmartAmerica effort aims to understand how various stakeholders can collect data from sensors to create smarter cities and towns, and in the process spur economic growth. The government hopes to figure out what policies and funding might make sense to enable that to happen.

AT&T and its partner IBM illustrated the benefits of M2M by presenting a transactional energy solution that can allow utilities to do demand-based planning and real-time load balancing, and a smart cities solution to enable locales to more efficiently manage water resources and more quickly respond to emergencies.

Elsewhere on the M2M frontier, AT&T has been tapped by ShotSpotter to enable its application, which uses connected sensors to capture gunshot sounds in high crime areas. If a sensor detects a gunshot, it triggers a message that automatically deploys police and emergency services to that area, which can potentially save lives and allow for faster apprehension of criminals.

AT&T also provides M2M services to HydroPoint Data Systems Inc., which sells a water conservation application called WeatherTrak. Khan explains that this application leverages cloud based analytics and real-time 2 way communications to eliminate water waste and provide 24/7 leak alert notification. HydroPoint's customers include a wide range of Fortune 100 companies and over 50 cities and municipalities.

While such solutions may sound relatively straightforward, Khan says that building and supporting M2M applications is not as simple as creating applications for smartphones or tablets. There are just a handful of popular operating systems in the world of consumer mobiles, while the M2M arena includes a cornucopia of specialized devices and operating systems. Securely gathering data for an array of dispersed devices requires network expertise. And once the data is collected, organizations need to be able to channel it to the back office systems that know what to do with it.

Beyond the technology side, the M2M space is so new that most organizations are building business models for these efforts from the ground up. And part of the decision-making process for that involves figuring out who owns, and will pay for, these M2M efforts within an organization, and what return on investment metrics are possible and acceptable.

Customers that are exploring M2M deployments will want to engage with AT&T's specialized M2M sales force early in the process to understand what challenges and considerations they should look out for, says Khan, and to learn what AT&T brings to the table in terms of network, platforms, applications, systems integration, partnerships, M2M expertise, and end-to-end solutions to make their implementations successful.

"AT&T has been doing this for 10 years," he says, "and we understand the ecosystem probably better than anybody out there in the world." **M2M**



M2M

from end



to

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Accelerating IoT – Creation of the Industrial Internet Consortium

In March 2014, representatives from AT&T, Cisco, GE, IBM, and Intel formally announced what had been long rumored in the industry. The industry leaders announced the formation of the Industrial Internet Consortium, a non-profit open membership group that brings together the organizations and technologies necessary to accelerate growth of the Industrial Internet by identifying, assembling, and promoting best practices and create innovation through testbed activities. This collaboration seeks to spin out testbeds and use cases, consolidate and recommend standards, define the requirements, and provide best practices for the Industrial Internet to accelerate industrial innovation. Since inception, the IIC group has swelled from the five founding members on March 27, 2014, to over 55 members today, with new members ranging from non-profits like Charles Stark Draper Laboratory and Vanderbilt University, to industry leaders like Accenture, Hewlett-Packard, and Toshiba. So the IIC must be doing the right things and members must be pleased with the efforts.

Why?

The physical and digital worlds are colliding as we've entered an era in which every machine and device can benefit from being connected to other machines and devices, analytics, the Internet, and people at work. This hyper-connectivity is not just being harnessed by individuals with tablets and smartphones.

It is being harnessed by enterprises and

industrial organizations and will enable vast leaps in productivity and innovation while propelling society into new ways of interacting with the world around us.

And as the world is becoming exponentially more connected, new products and solutions are emerging that harness mobile and cloud computing and analytics. Through the standardization of technologies and industry practices, the availability of test beds and use cases, the IIC will help organizations optimize assets, operations, and operational data in most

industries, including energy, utility, health care, manufacturing, transportation industries, and the public sector.

But companies usually develop and use technology individually, so how did this collaboration happen?

The five founding members recognized that each had respective strengths, but to really harness the potential of the Industrial Internet would require forming an independent, open membership group outside of any one member organization.

The Object Management Group, a technology standards organization with 25 years of experience at running non-profit technology programs, was hired to manage the new Industrial Internet Consortium.

How is it organized?

The consortium is governed by a steering company consisting of representatives of the five founding members, which will have permanent seats, four elected members at large who will each serve one-year terms, plus IIC Executive Director Dr. Richard Soley.

Steering Committee members include Mobeen Khan, executive director of advanced mobility solutions at AT&T Business Solutions; Paul Didier, solutions architect manager for the Internet of Things group at Cisco Systems; Dr. Joseph J. Salvo, director of the Industrial Internet Consortium, from General Electric; Ron Ambrosio, distinguished engineer and CTO of Smarter Energy Research at IBM; and Ton Steenman, vice president of the IoT solutions group and general manager of the IoT Strategy and Technology Office at Intel.

The elected member seats will be occupied by two selected members from large enterprise, one member from small enterprise or from a start-up orga-



nization, and someone from academia to fill the final seat.

Huh? A real world scenario.

You might ask yourselves “why?”

Many of today’s industrial process are using technologies that don’t fully harness the power of the Internet. While many things are becoming outfitted with sensors, many of today’s industrial processes rely on processes or technologies that can be more than a hundred years old. And while connectivity of remote assets is becoming more commonplace, remote diagnostics and control and predictive analytics aren’t yet common terms when talking about the industry. But we’re getting smarter as a society, and businesses today are seeing that by connecting the world’s industrial equipment online, it can improve the efficiency and effectiveness of industrial processes through data management, analytics, and automation.

Let’s just think about a scenario in the real world that crosses many industrial boundaries.

There’s a soda machine, remotely placed outside of a business. It has remote connectivity to accept payment by credit card and sensors inside to tell the company when to restock. And the driver who restocks it drives a truck which has a fleet management system installed and tells the fleet manager among other things where the truck is, how fast it is going, and whether or not it needs maintenance.

But does the soda machine communicate with the power company telling it what the environmental conditions are, just how much energy it is consuming, or trigger a wind turbine in remote North Dakota that it needs more electricity sent to it now because the temperature is rising and the refrigeration unit inside is being turned on? Does the fleet management system in the truck alert a tire company to stock a certain size tire because of a blow out? Does the fleet management system tell oil companies or gas stations

that the truck may need fuel at a certain time or location in its route?

And this is just a drop in the bucket.

Another industry group?

So I asked Dr. Soley, “Does the industry need another place for companies to get together and talk?”

“If the answer was no, it would be the end of the conversation,” he replied. “There are standards organizations focused on IoT issues ... but the IIC is quite importantly not just as a standards organization. It’s an organization that brings together players who want to work together to prove out and improve IoT solutions in an industrial setting.”

Remote diagnostics and control and predictive analytics aren’t yet common terms when talking about the industry.

I then talked at great length with Khan at AT&T Business Solutions about why the IIC was formed, what need it fills, and how AT&T can help. I asked Khan if there weren’t too many standards bodies in place already.

His reply was: “We don’t want to be a standards body, we want to provide clarity around existing standards, combine some of the standards already in place, and look for holes where standards may need to be enhanced. Many of the vertical market groups have done a fine job creating their industry-specific standards. Our role is to review standards, combine some of these, simplify the landscape, and accelerate growth in the IoT and M2M commercialization.

“We also want to define and share best practices for IoT, reference architectures, case studies, and standard requirements among our members,” continued Khan. “These activities will greatly reduce the

friction and accelerate the time of bringing new solutions to the marketplace.”

Importance of the IIC

New technologies are being created faster than ever before, such as the ability to track inventory from anywhere in the world, to monitoring sensitive equipment or capital in large quantities, and the advancement of interoperable connectedness between devices.

These developments demand cooperation across the ecosystem.

U.S. federal governmental bodies have committed to invest more than \$100 billion within a year for R&D related to cyberphysical systems and have been partnering with the private sector on a series of test beds in the health care and transportation industries, smart cities, and increasing the security of the electric grid. Solutions need to be found and implemented to bear the weight of the incoming information from all of the connected devices as well as an infrastructure that can support the usage requirements from newly interconnected industries within the Industrial Internet.

Tech leaders, like the IIC members, drive the ecosystem to rapidly develop more reliable access to big data and identify open-interoperability requirements to create architectures capable of connecting smart devices, machines, people, processes, and data. The forward-thinking nature of industry leaders is helping to unlock business value for both public and private sectors.

As smart cities, utility grids, and machines become more interconnected and intelligent, the need for standardized architecture and best practices must be met. It is the role of the IIC to help facilitate those changes; it hopes to accelerate innovation and technology advancement for everyone.

James Brehm is technology evangelist and founder of James Brehm & Associates LLC (james@jbrehm.com). **M2M**



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The GetWireless Advantage

VAD Differentiates with Broad Portfolio of Products, Packaged Solutions & Support

BY PAULA BERNIER

GetWireless is a value-added distributor of cellular-based solutions. It prides itself on its experience, integrity, and knowledge, all of which the company says enables it to provide an unmatched level of customer service. M2M Evolution magazine recently spoke with GetWireless CEO Brian Taney to get the details.

You are both the CEO and the owner of GetWireless. When and why did you start the business?

Like many others with an entrepreneurial spirit, I struggled with not being able to make executive leadership decisions while working for someone else. After writing a business plan and formulating a sound go-to-market strategy in 2001, two friends and I started GetWireless with the vision of providing efficient, customer-friendly wireless ordering systems for the restaurant marketplace.

How has the company evolved since then?

When GetWireless was founded, we were concentrating on Wi-Fi-based solutions, and we were going to market as a value-added reseller. Since then, GetWireless has evolved into a value-added distributor, with our primary focus being cellular-based solutions. Working directly with our manufacturer partners and also being able to build and manage a channel of resellers, integrators, and OEM's has matched our skill set very well.

GetWireless is a master distributor, but the company describes itself as a curator of wireless solutions. Why?

Since GetWireless is ultra-focused on a small suite of cellular data solutions, we are able to provide a level of consultation, expertise, and support rarely found at the distribution level. Our deep understanding of the

products we distribute and the applications in which they are used allows us to recommend turnkey wireless data solutions to our clients.

Who are the key GetWireless equipment partners, and what specific products do you help them bring to market?

GetWireless is the largest North American value-added distributor of cellular data gateways, routers, and terminals manufactured by Sierra Wireless (AirLink), Option NV (CloudGate), and Axesstel Corp. We also are a leading value-added distributor for NETGEAR routers, Xirgo Technologies GPS modems, and Janus RC terminals.

GetWireless has tight relationships with cellular carriers. Explain.

GetWireless has distributed niche-market cellular data solutions for over 10 years, and each of those solutions requires cellular network connectivity to move the data. Based upon that need, there have been hundreds of opportunities for our team and the teams within the cellular carriers to engage jointly on projects.

I understand GetWireless also works with resellers and integrators. What is the nature of those relationships, and how do they bring value to the end customers?

GetWireless goes to market through resellers and integrators rather than direct to the end customer. These resale partners play a critical role in the channel, as they are often local, customer-facing technology companies with expertise and knowledge

in a particular area — like public safety, energy, or health care. Many of our resale partners have integration teams that closely manage project implementation and the customer relationship.

What verticals and applications do GetWireless solutions address?

GetWireless is heavily invested in the mobility and industrial marketplaces. Within the mobility space, our cellular data solutions address applications such as police car connectivity, fleet tracking, school bus safety, and taxi payment systems. Within the industrial space, our cellular data solutions address applications such as smart grid connectivity, automated meter reading, digital sign control, and commercial lighting.

What is The GetWireless Advantage?

The GetWireless Advantage is our team of committed individuals who strive to provide the highest-level of client support, coupled with a strong portfolio of innovative cellular data solutions and in-depth knowledge of each.



**GetWireless CEO
Brian Taney**

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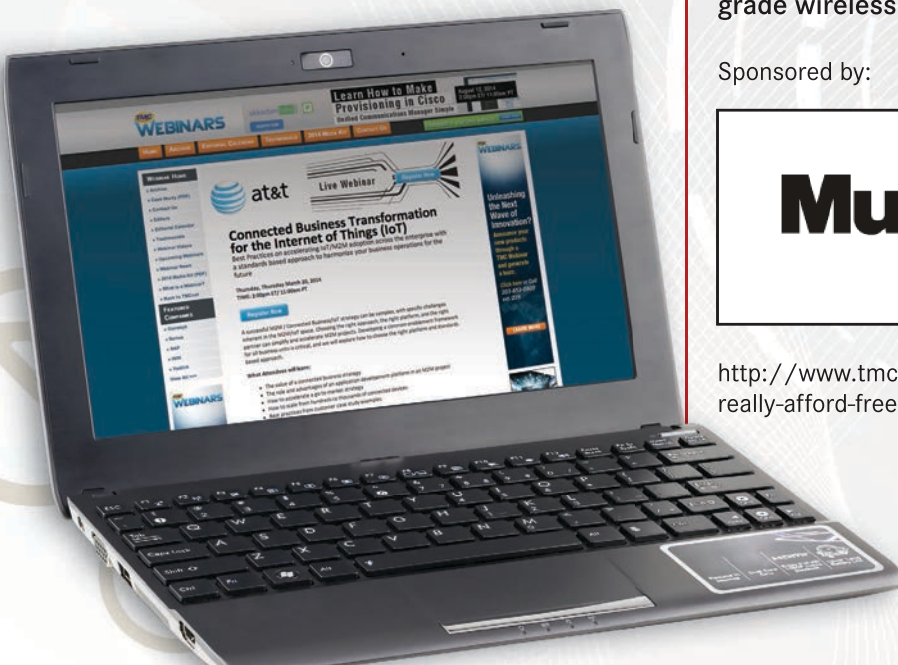
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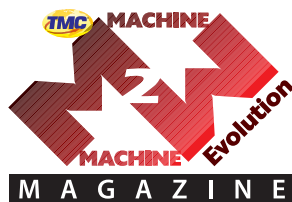
Vodafone Pulls It All Together to Make M2M Work

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The Power of One

Vodafone Pulls It All Together to Make M2M Work

BY PAULA BERNIER

Vodafone, a mobile carrier established in 1984, is now the world's second largest carrier and a leading player in the M2M space. The service provider currently has equity interests in more than 30 countries across five continents, and 20 years experience offering M2M solutions.

M2M is one of Vodafone's key strategic growth initiatives, through which it delivers end-to-end M2M solutions including connectivity, integrated terminals, and applications in partnership with more than 50 M2M ecosystem partners. The success of this strategy seems to be working, as for three consecutive years, Vodafone's M2M services have been atop Analysys Mason's independent M2M annual scorecard, which measured capabilities of global telecommunication service providers.

M2M Evolution recently interviewed Andrew Morawski, Head of M2M Americas at Vodafone, about Vodafone's effort to accelerate M2M adoptions, to learn more.

Where in the world does Vodafone provide M2M solutions?

Morawski: With the largest footprint among telecom carriers, Vodafone offers M2M connectivity services in 30 of its own networks and 50 partner networks. In total, Vodafone also has access to more than 500 networks globally in 196 countries and it is feasible to offer M2M solutions beyond 80 countries. Vodafone M2M solutions are adopted by not only large corporations in the Fortune 500, but also by small and medium corporations globally.

How would you describe Vodafone's M2M strategy?

Morawski: The first element of our strategy is to lead in the managed M2M connectivity market. Vodafone is the global M2M leader among industry players as recognized by the industry analysts. Currently, we have more than 16 million SIM cards that are connected globally with M2M services. The second element to Vodafone's strategy is to deliver connected

M2M products and services. Vodafone offers end-to-end solutions in partnership with M2M ecosystem partners. On top of connectivity, Vodafone offers integrated terminals and specialized solutions such as remote monitoring and control services, and user-based insurance services. Driving consumer-selected M2M services is the third component of our strategy. Vodafone introduced a solution called SOBE, which stands for Simple Out of the Box Experience. With this solution, manufacturing companies can enhance the customer experience for consumers by integrating M2M solutions into their products. And the fourth tenet of the Vodafone M2M strategy involves adding fixed line M2M services. Vodafone acquired Cable & Wireless Worldwide, a fixed line company, so Vodafone has ability to offer fixed line M2M as well to meet a variety of customers' needs.

What other resources does Vodafone bring to the M2M market place?

Morawski: Vodafone's M2M unit has more than 250 dedicated staff members across the world, mainly in customer-facing functions. They are supported by 100 dedicated M2M technology and product development staff members. Vodafone also has a wide range of M2M ecosystem partners across the globe, including such leading companies as Accenture, Alcatel-Lucent, HP, IBM, and SAP.

What does Vodafone see as its key differentiators in the M2M marketplace?

Morawski: Vodafone brings together unrivalled capabilities – the world's largest communications network, an outstanding offering, and vast experience. The combination of Vodafone's fully owned network and strong partner alliances provides customers with the consistency, reliability and service quality that enterprises demand to run their most critical operations. Vodafone also is unique in that it designed and developed its own M2M Connectivity Platform.

Vodafone owns the IP and fully controls the roadmap, which are key competitive advantages and differentiators to MNOs that use a third-party platform. Since we own and operate the platform, it is tightly integrated in with our networks. Our global SIM is also noteworthy. It is available in a range of form factors including industrial grade and one that can be remotely switched over

the air. Vodafone also brings together exactly the right mix of partners across the value chain to ensure that all project components work seamlessly over our global network. Vodafone currently has strong partner relationships with more than 50 leading companies across the M2M value chain, from hardware manufacturers, through software and services developers, to systems integrators and communications resellers. In addition, we offer a single SLA globally. Customers don't have to deal with multiple carriers in multiple different countries.

The key value proposition Vodafone offers to customers is the Power of One, which means a single global contract, global SIM, global price, global interface, global support, and global invoice. With Power of One, Vodafone can simplify planning, deployment, and management of M2M solutions for global customers.



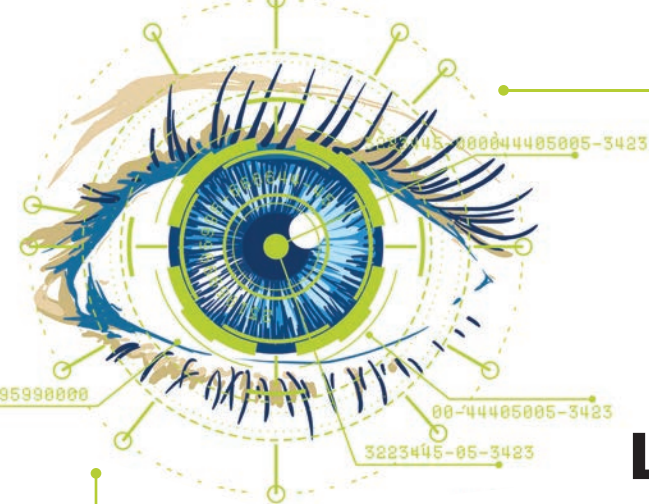
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Fog Rises to Bring More Local Intelligence to M2M

We're all familiar with the rise of cloud computing. Now, a new layer of networking is developing in the form of fog computing.

Fog computing – a middle ground between devices and the cloud – leverages intelligence at the edge for more efficient data handling and faster, local decision making. It collects and aggregates data from multiple sensors, and can do simple data analysis at the edge.

"We think that's a real trend for the future," says John Canosa, chief strategist at ThingWorx, a provider of M2M platforms.

ThingWorx sees M2M not as a bunch of sensors sending data into the cloud, he adds, but rather as a distributed computing solution in which even the sensors have some intelligence that can be leveraged to make decisions.

Cisco Systems is generally credited with introducing the concept of fog computing, which it supports today via a technology called IOx that lives inside its Connected Grid

Router products and will be expanded to other Cisco solutions in the future.

Todd Baker of Cisco explains that the value of fog computing in M2M scenarios is threefold. It acts as a data filter of sorts, making sure only the M2M sensor data that needs to be passed to the cloud is sent there. It serves as a simple control system at the network edge so if, for example, sensors detect an urgent need for adjustment on a remote oil pipeline, action can be taken locally for faster results. This can feature can also save valuable bandwidth. And it converts data sets, which may be based on specialized interfaces and protocols, at the edge so they are cloud ready once they ascend to that next network layer.

"It is getting very clear that the Internet of Things requires a different computing model, one that enables distributed processing of data with the level of resiliency, scale, speed, and mobility that is required to efficiently and effectively deliver the value that the data that is being generated can create when properly processed across the network," Roberto De La Mora, Cisco's senior director of Internet of Things products and solutions marketing, writes in the Cisco blog. "This distributed computing model is called fog."



Like cloud, he writes, fog provides data, compute, storage, and application services to end users.

“The distinguishing characteristics of fog are its proximity to end users, its dense geographical distribution, and its support for mobility,” says De La Mora. “Services are hosted where they’re used: at the network edge or even end devices such as set-top boxes or access points. By hosting services locally, the fog paradigm reduces service latency and improves QoS, resulting in superior user experience.”

Paul Glynn, CEO of Davra Networks, which came out of stealth mode June 17, is also a proponent of fog computing for M2M.

“This is a big play for Cisco, and we are one of their primary partners,” Glynn tells M2M Evolution magazine.

Davra provides the cloud-based RuBAN solution, an application enablement platform on which network VARS and system integrators can build services related to the Internet of Things. Cisco Senior Vice President Barry O’Sullivan joined the Davra board last summer.

“Our customers are using the cloud-based RuBAN platform to turn IoT raw data into usable everyday solutions that are as visual and easy to use as your smartphone,” Glynn says. “We work with our partners to do all the heavy lifting and installing of Cisco IoT Integrated Services routers and sensors on location, then we manage information coming from the IoT environment as well as information from the network itself. We make sure to bring only the relevant raw data back to

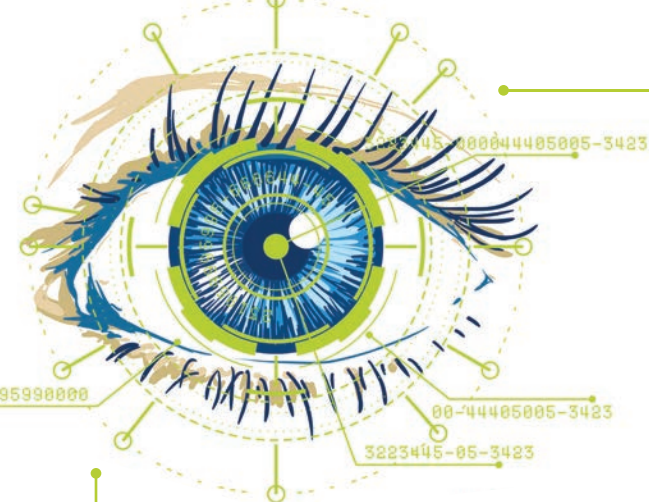
the customer. That’s what makes fog computing so compelling, it’s about decision-making at the ground level. Our VAR customers value our flexible solution because it can be used as easily in vehicle tracking or water meter usage as it can in smart cities and farms.”

Glynn provides M2M Evolution magazine with a specific example of where fog computing might come into play. Say there’s a street with sensors for waste management, parking, and other purposes, on one street. Those sensors might connect over Wi-Fi to a router, and that router is their connection to the Internet. Fog computing sits in the router and makes local decisions about sensors, and sensors can talk to one another. A city Davra is working with in Europe has lots of underground rivers, which makes the streets icy when it gets cold, he says. So when the temperature drops and humidity is at a certain level, sensors know it, and the system sends an alert to the city council to deploy a truck to put sand or salt on the street.

Glynn says Davra has similar systems in place with railway companies in Europe, which are using sensors to keep tabs on their signaling systems. If sensors deliver information that the rails have reached an unacceptable temperature, too high a level of vibration, or a collection of such factors, that indicate something needs to be fixed, he says, the Cisco routing system can make those conclusions and take steps to have them addressed.

“People need to appreciate the value of that local intelligence,” says Glynn. “Local intelligence is key.” **M2M**





Vroom Vroom

Telematics Motoring Toward Mass Market Adoption

Telematics used to be a term the telephone companies used to describe applications involving any equipment that was outfitted with connectivity capabilities. The favorite example was a connected soda pop machine that could tell a remotely located computer when it needed to be restocked with, say, Dr. Pepper. Today, however, the term telematics is used to describe various applications in the connected vehicle space. And, as it turns out, this newer variety of telematics is even more effervescent.

The Road to Mass Adoption

Most car manufacturers now offer telematics in at least their high-end models, and there are 15 million to 16 million connected cars on the road in the U.S. today, says Dominique Bonte of ABI Research. That's not even 10 percent penetration, he adds, which means telematics has a good long runway ahead of it.

Telematics is expected to race down that runway in the next few years, during which time Bonte says all the major vehicle manufacturers are likely to expand connected car features across their product lines. In five years, he predicts, almost every vehicle shipping in the U.S. will be a connected car.

"So we are on the verge of telematics becoming a mainstream service," he says.

General Motors popularized telematics years ago with the introduction of its OnStar service, which calls emergency services if motorists are in a wreck, they need roadside assistance, or their vehicle is stolen. Since then, virtually all the other vehicle brands have jumped on the telematics bandwagon, and that bandwagon now also includes in-car applications that can help drivers reach their destination, find parking, enjoy streamed music, and participate in

social networking in a slightly modified (usually involving voice control) way, notes Bonte. Vehicles can also now have their own onboard Wi-Fi hotspots, which can support four to five passengers now that higher-bandwidth, 4G cellular networks are widespread, he adds.

We're also beginning to see telematics being leveraged for much more sophisticated applications, Bonte explains.

One example of this is to provide vehicles with over-the-air software updates to address potential safety issues. Tesla has been a pioneer on this front, says Bonte.

Telematics, Tesla & OTA

Remember a few months ago when reports surfaced that some Tesla cars were catching fire? Instead of doing a recall, Bonte tells M2M Evolution magazine, Tesla provided an over-the-air update to the vehicles via the cellular network. The update involved setting a trigger in the vehicles that increases suspension settings when the cars go out on the freeway, according to Bonte.

Most car manufacturers would be reluctant to do an over-the-air update for that kind of thing, he adds. In the current environment of millions of cars being recalled, he says, most would probably rather be more conservative. But Tesla is showing that over-the-air updates are an option that can help prevent, or at least address, safety issues, he says.

Tesla is also leveraging over-the-air software updates for maintenance purposes, and advertising that it's doing so to its customers, Bonte says. An acquaintance of Bonte who has a Tesla mentioned recently that the engine light on his car light up, and before he got a chance to do anything he got a call from Tesla, which told him not to be concerned and that it would address it immediately with an over-the-air software update. That's the kind of thing that builds customer loyalty, says Bonte.

"That's the kind of amazing service level" companies can deliver using tools like over-the-air updates, he adds.

It's a little like what happens when you have an issue with a smartphone, he continues. If there's something wrong, the user is prompted to do a software upgrade. Someone is monitoring what's going on with the smartphone, and if there's a problem someone will fix it.

However, Tesla is unique in its willingness to use over-the-air updates to address important safety issues, Bonte adds.

“You’re dealing with a car, which is a more critical device than a phone.”

V2V Communications for Safety

Another important development related to telematics and driver safety is the U.S. Department of Transportation’s Vehicle-to-Vehicle Communications for Safety effort.

V2V enables connected vehicles to talk to one another, sharing such information as their location, speed, and risk to other vehicles in the area, so motorists and their cars can take steps to avoid crashes.

“The vision for V2V is that eventually, each vehicle on the roadway (inclusive of automobiles, trucks, buses, motor coaches, and motorcycles) will be able to communicate with other vehicles and that this rich set of data and communications will support a new generation of active safety applications and safety systems,” according to the USDOT Research and Innovative Technology Administration website. “V2V communications will enable active safety systems that can assist drivers in preventing 76 percent of the crashes on the roadway, thereby reducing fatalities and injuries that occur each year.”

The USDOT in 2012 began research on how to use vehicle-to-vehicle communications to lessen the likelihood of crashes and generally make road travel safer. That included the August 2012 launch of a pilot test in which about 3,000 vehicles were outfitted with V2V technology for a road test.

The V2V effort appears poised to result in some legislation in the not too distant future, according to Bonte of ABI Research and Mike Coletta, senior director of automotive sales at Telit, which in April closed its acquisition of ATOP and then formed the Telit Automotive Solutions business unit. The USDOT’s National Highway Traffic Safety Administration has been promising for years to make a decision on a V2V mandate in the U.S. before the end of 2013, but didn’t make good on those promises, Bonte wrote in a Feb. 4 ABI

Research blog. However, on Feb. 3 the NHTSA announced it would soon start work on a regulatory proposal requiring V2V devices in new vehicles in a future year. While M2M Evolution couldn’t find any recent developments on this front, some reports from earlier this year indicate that we can expect a mandate on V2V before early 2017.

The government has also been doing research on and discussing the possibility of regulations related to what’s known as V2I, which standards for vehicle to infrastructure, adds Telit’s Coletta. V2I describes a scenario in which both vehicles and road-related infrastructure such as toll and traffic signal systems are equipped with sensors that enable them to communicate. The USDOT Research and

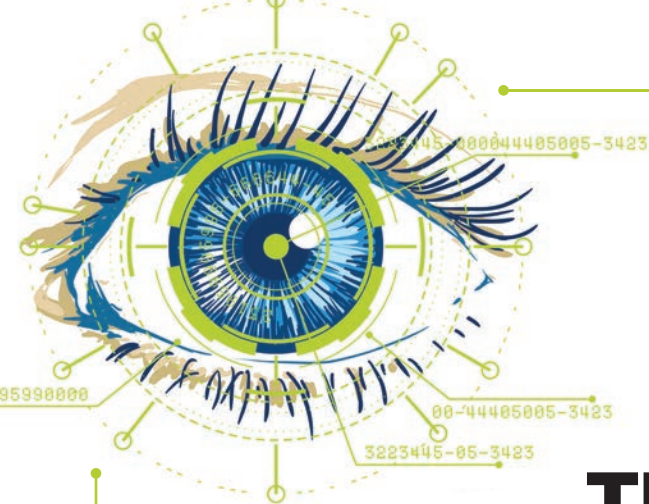
innovative Technology Administration believes V2I could resolve an additional 12 percent of crash types not addressed by V2V, according to the agency’s website.

“One particularly important advance is the ability for traffic signal systems to communicate

the signal phase and timing information to the vehicle in support of delivering active safety advisories and warnings to drivers,” according to the RITA website. “Early implementation of the SPAT application can enable near-term benefits from V2I communications in the form of reduced crashes, which in turn demonstrate benefits that can help accelerate deployment.” **M2M**

V2I allows vehicles and road-related infrastructure to communicate.





The Care & Feeding of

M2M sensors are used to gather data about equipment and products like food and medicine all over the world in an effort to ensure those assets are secure, unspoiled, and working properly. But who's keeping tabs on the health and wellness of the M2M sensors themselves? If you have or are considering implementing an M2M solution, this is one of the questions for which you probably should have the answer.

"In typical cellular communications like those for consumers, customer care is about billing and rate plan questions, and that's basically it," says Raj Kanaya, chief marketing officer at Aeris Communications, an M2M service provider. "If there's an issue with your service, you just go to a place where there is a service. And if there's an issue with the application, you just reboot your phone."

Of course, M2M devices are not paired to individuals, so they can't take such steps to fix things, and they may be deployed miles away from mankind, so it's a very different paradigm. Individual M2M-enabled devices tend to create much lower revenue than do smartphones and tablets, but can have much higher customer care costs.

That said, it's important to have the tools to have visibility into both devices and various network layers, so you can discover where M2M problems are originating, says Kanaya. Otherwise, he says, you could spend hours on a call just for a single M2M device, which probably does not drive much in the way of revenue.

"We find a lot of problems are not related to the network but related to the device and the firmware," he says. "And we help the customer debug that even though that is not our problem."

It's important to have visibility so you can discover where M2M problems are originating.

Aeris can do that by resetting the device so it reregisters on the network, he explains. And if a device in a particular geography has an issue, he adds, Aeris can look to see if other devices in that area are working or not to help discern the root cause. The company also can see also other information about how devices are communicating from a signaling perspective, and if something is amiss

on that front, he adds. The company also provides a portal through which its customers can get visibility into their own devices, and the ability to prompt them to reregister on the network.

The company plans to expand its initiatives around M2M customer care and maintenance in short order, adds Kanaya. That will include engaging the community to create better support through crowdsourcing.

"Taking the complexity out of M2M is an important aspect to accelerating service adoption," says Godfrey Chua, directing analyst, M2M and IoT at Infonetics Research. "Heightened attention to and innovative approaches to customer service and support as well as the development of cutting-edge management tools is a critical aspect of making this happen."

Dan Murphy, vice president of marketing at M2M platform provider Axeda, says that while

M2M | Keeping the Sensors Healthy

first generation M2M devices typically required field service technicians to do initial turn up and configuration, the newer generation of solutions are more sophisticated, which means less work for those who deploy M2M.

Most next-generation M2M devices, he says, have the ability to check in with a control center and report they are healthy, and many can be updated over the air, so those that operate them don't have to send a technician out to do the job.

Maybe so, but John Canosa, chief strategist at ThingWorx, says organizations that are looking at deploying M2M using a SaaS model should keep in mind that if their SaaS provider changes its REST API, they may have to modify their devices. That, he adds, can be very expensive, and may not even be possible, especially if there are certification and regulatory requirements involved.

"Being able to control change is very important for a company that has a large deployment," he says. **M2M**



M2M Platforms

The machine-to-machine platform space has been on a rollercoaster ride since its inception a few years back. The market started small, ramped up quickly as an array of organizations moved into this space, consolidated some due to mergers and acquisitions, and now is revving up again as new and existing players bring next-generation M2M solutions to market.





How They Are Evolving, and Accelerating Time-to-Market

In and Out

Ovum analyst Mike Sapien says that in his mind the definition of an M2M platform has morphed, and the M2M platform provider market place has expanded and bifurcated.

Sapien says he used to think of an M2M platform as the system required to deliver M2M applications. However, today Sapien sees the M2M platform as the M2M back office, meaning whatever has to happen behind the scenes to make M2M work relies on the platform.

Meanwhile, he says, the M2M platform space has expanded beyond the traditional, or first generation, platform providers, to also include a new breed of M2M platform players. The former group, he says, includes such companies as Axeda, ILS/Telit, KORE Telematics, Numerex, and the service providers, some of which use these vendors' platforms and some of which have built their own. The newer group, says Sapien, includes such companies as ThingWorx and Xively.

Fast Forward

What separates companies like ThingWorx and Xively from the pack, according to Sapien, is that they have introduced quicker, smaller, and more agile – although incomplete – development platforms, which they are offering directly to enterprise customers, as opposed to via the service providers.

Xively, Sapien says, was able to leverage its internal technology and menu-based approach to build its M2M platform. Xively's parent company is LogMeln, a company perhaps best known for offering services through which its technical staff remotely access and repair customers' PCs, adds Sapien. LogMeln already has a global IP network it uses to support those services, he says, so Xively can layer on its M2M solutions to that network.

The companies continue to add to their M2M arsenal, as LogMeln in May announced the acquisition of Ionia Corp., a system integrator that specializes in connected solutions. LogMeln in a press release says the deal is part of its strategy to help early customers of its Xively Cloud Services platform to expedite the introduction of their connected offerings. (Xively did not respond to M2M Evolution's request for an interview.)

ThingWorx also falls under the next-generation M2M platform umbrella, according to Sapien. But just what constitutes an M2M platform is a loaded question, says John Canosa, chief strategist at ThingWorx, which was acquired late last year by PTC.

Some companies in the M2M market place have applications or applications suites, add APIs to them, and call them an M2M platform, explains Canosa, who says that isn't a platform. A platform of any type needs to have been designed from the ground up to be a platform, he adds, meaning it's extensible by people outside of the organization that developed the platform. A platform, he adds, must provide end-to-end functionality; support connectivity; allow for data collection, business rules, storage, and scalability; and allow developers to build applications on top of it quickly and easily.

"The highlight of the ThingWorx platform itself is we enable companies to build connected applications 10 times faster than using traditional development tools," says Canosa. "That has been validated by our customers."

It should also be noted that AT&T, in addition to leveraging the Axeda M2M platform, also has a next-generation M2M platform called M2X. (For more on AT&T's approach to M2M, see this issue's cover story.)

And Erik Kling, vice president of business development for Vodafone US, tells M2M Evolution that its homegrown Global Data Service Platform offers one of the largest sets of APIs possible and allows for local instances, an important differentiator.

"When it comes to speed to market I think we are already relatively quick," he adds.

Divide and Conquer

The ThingWorx platform also has the ability to do federated deployment, which makes the company's solution unique, adds Canosa. That means ThingWorx customers can run

its server in the cloud, on premises, or run a version of the server on a device. The cool thing about that, explains Canosa, is you then can have a number of servers running that can collaborate with one other. And that can enable organizations to more easily address regulatory requirements across different regions. For example, if there's a rule that data coming from a certain type of medical device in Germany needs to stay within that country, the meshed solution can keep that particular app local, while enabling the organization to manage its total M2M solution globally.

The ThingWorx platform also features matrix multi-tenancy, which enables users of the solution to expose M2M information to different partners and groups related to or within their organizations, and set policies for who gets to visibility into what data.

ThingWorx recently came out with release 5.0 of its platform, which offers productivity improvements for developers and the application builder. That includes new support for localization, which is very important when you're dealing with global rollouts, Canosa says, explaining that means you don't have to spend hours translating documents, but

The Role That Open Source Can Play in M2M

Leveraging open source software can deliver significant returns for engineering efforts, and machine-to-machine initiatives are no exception. That's the word from Olivier Beaujard, vice president of market development at Sierra Wireless, whose M2M devices and cloud services are in use in 80 networks globally.



By Paula Bernier

Open source gives OEMs access to validated, tested software; to standard, proven APIs; and to a huge knowledge database and community, he says. It also allows OEMs to avoid proprietary software and vendor lock in, to establish a development environment that supports multiple languages, and to customize code with no

restrictions, he adds. All that can help drive innovation, he said, and in the process accelerate the advancement of the M2M and Internet of Things industry.


The adoption of open source technology such as Linux paired with cloud technology, he adds, further reduces risk and complexity to OEMs, which as a result can more easily manage and scale their M2M solutions.

That's important because software is now the most critical component of embedded development, accounting for the majority of end product value, and

more than 50 percent of product development costs, according to Chris Rommel, executive vice president of VDC Research. Yet, he adds, software development efforts are typically 30 to 40 percent behind schedule, and that problem is poised to become

The adoption of open source technology such as Linux paired with cloud technology reduces risk and complexity to OEMs, which as a result can more easily manage and scale their M2M solutions.

even worse as the number of lines in embedded software efforts grows over time. As a result, Rommel suggests that engineering organizations need to change how they plan and manage embedded systems design.



instead can do it on the fly as you're building applications. This release also includes product and configuration management improvements, including new tools that make it easier to integrate with developers' favorite version control/source code control systems.

The company's customers, which number around 100, fall into three areas: connected industries, which includes people who own factories, and oil rigs and platforms; users of connected sensors, such as organizations with smart agriculture, smart city, and smart infrastructure deployments; and smart connected product providers, or OEMs that sell connected medical equipment, support M2M connectivity on large equipment and vehicles, and the like. OnFarm is among ThingWorx's customers; the company integrates data such as soil moisture and weather information from different agriculture-related devices to enable farmers to better determine where to irrigate, for example.

Big Time

Getting back to the earlier point about M2M platform marketplace expansion, Dan Murphy, vice president of marketing at Axeda, says that there are new platforms popping up all the

time, and many of them are focused on time to market.

Axeda has a developer experience that addresses expedited time to market as well, Murphy adds.

But some of the new "quick and dirty" platforms are low-end, hacker and maker solutions, says Murphy, that won't enable their users to go commercial and scale.

Meanwhile, he says, Axeda offers an M2M platform that addresses device connectivity; can scale, secure, manage, and organize data, and put it into a web model for consumption; and can be used to build applications. This solution, he continues, is deployed on all seven continents and today connects 1.5 million devices. In fact, he says, Network World recently published a list of the most powerful companies in the Internet of Things market, and Axeda was the only non-billion-dollar company on the list. **M2M**

Development

Rommel says engineering groups may want to consider calling on third-party entities to provide them with reusable software platforms so that they can save time and money, focus their resources on differentiation, and get their solutions up and running more quickly – especially in the case of M2M, a new area in which there's a short supply of experts.

M2M is creating new product and business model opportunities, he adds, but things are moving quickly, and organizations as a result have to future-proof their solutions. Third-party and open source solutions can help them jump start development and lower their risk in the process. **M2M**

Dell's Boomi M2M Play

By Paula Bernier

Dell, which like LogMeIn is a company with roots in the PC space, is now pushing the use of its Boomi platform for M2M applications. The move is part of Dell's strategy to become more of a software solutions provider, Michael Morton, CTO of Dell Boomi, tells M2M Evolution magazine.

Dell Boomi, based on technology the company got via its 2010 acquisition of Boomi, is a solution that allows customers to integrate their business content from sources that may reside on premises, as well as data from sources that may originate or terminate in the cloud, Morton explains, adding that Boomi is a single instance, multitenant solution.

When developers use Dell Boomi to connect to endpoints and their data, Morton adds, they log into the same location over the Internet to build, deploy, and manage these solutions. There's only one instance in the whole world, he emphasizes, which enables Boomi to harvest metadata from user interactions and leverage crowdsourcing to add further value to the platform.

Dell Boomi has 17 million error messages logged in the platform from customers using it, so it uses those to identify the common problems causing these errors. It shares that knowledge with customers via a new offering called Boomi Resolve, a dynamic resource that can help users solve common errors more quickly. Accessible through a tab on the Boomi AtomSphere interface, Boomi Resolve lists possible solutions in order of relevancy and includes links to articles on those topics. While Boomi is initially being used as a platform to move analytics to CRM solutions, Boomi also can be used to support back office operations relative to M2M, says Morton. **M2M**

By Tom Gregor

M2M in Action

How One Company is Leveraging M2M to Let the Credit-Challenged Buy Cars

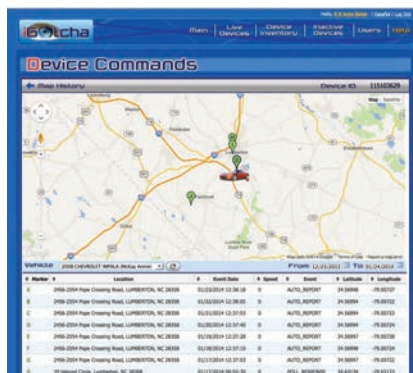
CallPass leverages GPS technology to provide customers with around-the-clock access to real-time vehicle location information. It has more than 8,000 customers, including dealerships and financial organizations using hundreds of thousands of QUICK GPS tracking devices. Inside every QUICK device is a Racowireless SIM card communicating with the iGotcha platform, tracking the location of the vehicle and keeping an accurate history.

The CallPass iGotcha GPS platform enables consumers with sub-standard credit to obtain financing to purchase automobiles while at the same time protecting lenders and dealers by providing the technology to track, manage, protect and recover financed vehicles through precise advanced GPS location capabilities. The buyers are aware of the QUICK tracking device, having approved the GPS technology as part of the loan agreement, allowing the lender to track the vehicle.

The Racowireless SIM card, inserted into the CallPass QUICK Device and plugged into the on-board diagnostic port, captures information from the vehicle computer and delivers that information back to iGotcha, available for whenever the financial institution might need it. For instance, if a payment is especially late, a dealer or lender can pull up the car's location through iGotcha and find out exactly where it is at that moment in time. This helps reduce costs and complexity if the decision is made to recover the asset after steps are taken to contact the customer to inquire about payment. The Racowireless SIM card gives CallPass extensive visibility into the iGotcha system and helps the company determine if there's a communication problem with specific vehicles.

"iGotcha locates a vehicle usually within 15 to 20 seconds but if after 30

seconds, the application doesn't find it, we have dedicated service reps working with Racowireless, which can pinpoint the issue, find the last known location, send a ping or send a reset," said CallPass President Jason Ashton. "Omega is a great tool that saves time, solves challenges and simplifies the process."



Racowireless Omega Management Suite provides a complete view into the Racowireless network, provides real-time reporting, SIM provisioning and management, usage alerts, online billing, and more.

If necessary, iGotcha's ignition interruption technology can remotely disable a vehicle's engine, blocking the driver from starting the car so the finance company can take appropriate steps to ensure collection costs are minimized. Recovery costs financial institutions greatly in terms of money and resource-

es so the ability to pinpoint a vehicle's whereabouts in order to contact the borrower for an update on payment before taking costly steps to take possession is invaluable.

"One point that needs to be highlighted is security. The privacy of both the lender and the borrower are protected through the technology," said Ashton. "Racowireless creates the VPN tunnel on the SIM card, permitting only the lender to connect with vehicle information, ensuring data security. It helps the lender increase recovery rates while helping consumers secure a vehicle loan who may not otherwise be able."

CallPass says it uses the highest rated antennas and GPS modules, and doesn't cut corners on hardware, software or technology partners.

"While price is never the only reason to choose a vendor, every competitive business is looking to lower internal costs while scaling and we're no different, especially with the tremendous growth we've experienced recently," said Ashton. "Racowireless allowed us to scale quickly and efficiently without any hiccups. We continue to work with them for their professionalism, ease of use, and the quality of their technology."

Racowireless is also the supporting two other offerings from CallPass, including its GPS-based location and tracking service for consumers called PAL, or Plug-in Anytime Location, as well as CallPass M2M Solutions, the company's fleet management service for heavy equipment, container, commercial mobile, and trailer tracking. **M2M**

Tom Gregor is vice president of product development at Racowireless (www.racowireless.com).



TireStamp Chooses Telit

Telit Wireless Solutions technology is being used in TireStamp's TPMS 2.0-certified Tire Pressure Monitoring Systems. The TireStamp solution communicates with many tire pressure sensors on the market to provide real-time monitoring of tire pressure and temperature across vehicle types, tire brands, and location. That's important to fleet owners given that tires represent the second highest operating cost of running a fleet, second only to fuel.

Telefônica Vivo Selects Ericsson

Ericsson will be the prime integrator for the smart parking and smart lighting in the Águas de São Pedro digital city project in São Paulo, Brazil. It will integrate the smart parking and smart lighting for this project, which involves the deployment of a solution to enable the public energy system to remotely control and monitor the energy consumption of each light point, switching lighting on and off where necessary. Remote monitoring will report faults and allow for remote maintenance.

Gauging the M2M Oil and Gas Boom

Berg Insight says that at the end of 2013, the number of devices with cellular or satellite connectivity that had been deployed for oil and gas applications globally reached 423,000 installations. The sector is growing at a compound annual growth rate of 21.4 percent, with a 2018 forecast of installed units to be 1.12 million. By 2018 the cellular installations will command the majority of the units, accounting for 871,000, while satellite installations will account for the remaining 244,000.

M2M From the Carrier Angle

Market research firm Infonetics Research's new M2M Strategies: Global Service Provider Survey indicates that more than half of the service providers surveyed have a sizeable M2M business, providing at least 1 million M2M connections to customers, and that the automotive/transport/logistics and utility segments together account for nearly half of all M2M connections. "Service provider focus and prioritization of the M2M segment has been a relatively recent phenomenon, but as our latest M2M service provider survey shows, M2M is now scaling to be a significant business for a good number of providers around the world," notes Godfrey Chua, directing analyst for M2M and The Internet of Things at Infonetics Research.

Amazon Opens Wearables Store

Online retailing giant Amazon earlier this year opened the vir-

tual doors of a new wearable technology store. There, shoppers can get assistance with which products are the best match for their needs, compare products, and place orders.

Smart Agriculture Picks Orange

Orange Business Services is delivering managed machine-to-machine connectivity services to Dacom, a company that sells ICT and sensor solutions to arable farms around the world. The managed M2M solution from Orange Business Services will enable Dacom to connect tens of thousands of devices for its agricultural customers in more than 30 countries around the globe.

ORBCOMM Serves Government

ORBCOMM Inc. recently announced it will offer M2M solutions to government customers under Corp Ten's General Services Administration schedule. A long-time ORBCOMM partner, Corp Ten offers integrated GPS tracking and information management solutions for the federal government. ORBCOMM provides Automatic Identification System data services for vessel tracking and to improve maritime safety to government and commercial customers worldwide.

Southwest Introduces Mobile Boarding Passes

Mobile boarding passes are now available for Southwest Airlines customers traveling throughout the United States. Customers can use their smartphones or other electronic devices to get through security checkpoints and to board their aircraft.

Thuraya, ViaSat Partner

Satellite services companies Thuraya Telecommunications Company and ViaSat Inc. have signed a partnership agreement to develop and launch a dedicated M2M platform. The companies note that M2M will be a key growth engine for satellite services in the next few years, and that together they have a vision for a faster and more secure offering to address the higher-end requirements of the energy, enterprise and military sectors. Thuraya is a leader in the mobile satellite services sector, serving the land mobile and maritime markets with its network, which covers Europe, the Middle East, Africa, Asia and Australia. ViaSat technology uses satellite bandwidth more efficiently to lower the cost of ownership and enable advanced features for M2M applications, including multicast and improved network security. Through extensive experience in serving U.S. government customers with secure and rugged satellite-based global services, the company has created a new waveform optimized for M2M. **M2M**



The Fog Computing Hot List

When you think of it, the concept of fog computing is very logical. Anyone who has been around IT has seen the trends go from centralized to distributed in a variety of ways, from mainframes to personal computers, from cluster to Hadoop, etc. So the concept of a fog, though maybe not the most market friendly term, helps to bring the concept of the cloud to something that is nearby.

Much of cloud computing these days revolves around data storage, but the benefits for the data information comes in the processing and the ability to rectify issues quickly and easily. Enabling the data stream to be surveyed and analyzed locally can be essential for some processes. Other characteristics that warrant the use of fog computing are the density of the endpoints delivering the information as well as the support for mobility.

In looking at fog computing in the context of Internet of Things applications, we see certain vertical markets are inclined to take advantage of these systems already. The Industrial Internet is one place where manufacturing production has to be closely monitored and decisions driven to the right part of the organization. This brings up another value of fog computing in that the systems are not designed to be specific to a discipline within the organization but can span across domains. Additionally, fog computing extends beyond the cloud world of servers and services, and includes endpoints, edge routers, and switches.

Fog computing brings together the concept of real-time analytics with a lot of hybrid cloud computing concepts. And while not everybody is referring to this convergence of concepts as fog, many tech companies are delivering and/or discussing strategies and offerings along these lines. IBM refers to streams and specifically to analytics in its InfoSphere Streams platform. Intel talks in terms of Predictive Analytics. And NetApps discusses hybrid cloud solutions.

The bottom line is the pendulum is moving back toward the center, which should mean that a well-organized team can optimize the network based on its needs. In fact, we are already seeing adoption of the concept by companies trying to deliver new services that take advantage of the subscriber's existing assets. The best example of this is from Symform (www.symform.com), which is bundling cloud solutions with the ability for clients to access spare desktops and other devices with free storage.

As Paula Bernier's article on fog computing in this issue points out, Cisco is aligning its ecosystem and Internet of Everything strategy with fog computing initiatives. And, like most discussions around M2M solutions, there is no shortage of opportunity, only of focus and strategy. Companies like Bombardier, Emerson, and others are also working the fog angle.

Here's a sampling of the companies pushing fog or fog-like solutions and strategies.

Accenture (<http://bit.ly/AnalyzeloTinRealtime>)
Accenture says of its Accenture Analytics solution: "The ability to gain insights from your data is critical – it lets you make faster and smarter decisions as you tackle your most complex business issues. With experience across every industry, we can help you turn insights into action, and action into tangible results. That's high performance, delivered."

Alstom (<http://bit.ly/BuysideGridAnalytics>)
Alstom, meanwhile, is promoting its e-terraDRBi-



zNet solution. “e-terraDRBizNet incorporates dynamic resource modeling, DR capacity forecasting, optimized dispatch, real-time resource tracking, and state-of-the-art performance evaluation techniques. e-terraDRBizNet integrates and automates the exchange of demand response-related data and events across the utility including linking customer information system, meter data management, weather feeds, multiple load management control systems, SCADA, settlements, Advanced Metering Infrastructure, and telephony systems.”

Cisco (<http://bit.ly/FogComputingBeforeandAfter>) As discussed above and in Bernier’s article in this issue, Cisco is a strong force behind the fog movement. “Fog computing can enable a new breed of aggregated applications and services, such as smart energy distribution. This is where energy load-balancing applications run on network edge devices that automatically switch to alternative energies like solar and wind, based on energy demand, availability, and the lowest price.... This development puts applications closer to where IoE creates actionable data. As a result, it will be much easier to manage the colossal amount of data projected in a hyper-connected

world. Adoption of fog computing will also accelerate innovation in ways never seen before. This includes self-learning, self-organizing, and self-healing applications for massively distributed industrial networks.”

Cloudera (<http://bit.ly/FogComputingwithHadoop>) Cloudera’s website says: “Cloudera Enterprise helps you become information-driven by leveraging the best of the open source community with the enterprise capabilities you need to succeed with Apache Hadoop in your organization. Designed specifically for mission-critical environments, Cloudera Enterprise includes CDH, the world’s most popular open source Hadoop-based platform, as well as advanced system management and data management tools plus dedicated support and community advocacy from our world-class team of Hadoop developers and experts. Cloudera is your partner on the path to big data.”

Darva Networks (<http://bit.ly/TheIoTofFogFactor>) Another company featured in Bernier’s article on fog computing is Darva Networks and its RuBAN solution. “Our RuBAN platform is a customer premises- or cloud-based, simple to use application enablement platform that takes critical



data from the network and any connected devices or sensors and publishes it through our IoT open API, making it easy to build and run Internet of Things applications.”

IBM (<http://bit.ly/StreamsofIoTData>)

No discussion of data could be complete without a nod to Big Blue. As the company’s website states, IBM “InfoSphere Streams is an advanced analytic platform that allows user-developed applications to quickly ingest, analyze and correlate information as it arrives from thousands of real-time sources. The solution can handle very high data throughput rates, up to millions of events or messages per second.”

Intel (<http://bit.ly/PredictiveIoTAnalytics>)

Here’s what Intel is talking about that dovetails with the general idea of fog. “Intel Intelligent Gateways Connectivity is critical to generating intelligence, but how do you get valuable data off of legacy equipment securely, and without replacing all existing infrastructure? Intelligent gateways are critical to extending legacy systems and connecting them to next-generation intelligent infrastructure. The technology equips you to make the most of the business opportunities enabled by the Internet of Things – and the valuable data it generates.

Itron (<http://bit.ly/AggregateIoTtorightpoint>)

Itron is another company that’s address client needs for faster use of data. “The Itron Analytics solution encompasses products and services designed to turn data – spanning multiple commodities and applications – into faster, more informed, and increasingly automated decision making. By looking across your advanced metering systems to aggregate diverse data sets and combine them with GIS, customer information and other databases, we give you the tools to manage, interpret, and act on large and complex real-time data. Enhanced visibility into system operations helps you create new and meaningful value throughout your organization, from operations and planning, to collections and customer service.”

MQTT (<http://www.mqtt.org>)

MQTT, a machine-to-machine connectivity protocol, also ties into some of the ideas floated around fog computing. “It was designed as an extremely lightweight publish/subscribe messaging

transport. It is useful for connections with remote locations where a small code footprint is required and/or network bandwidth is at a premium. For example, it has been used in sensors communicating to a broker via satellite link, over occasional dial-up connections with health care providers, and in a range of home automation and small device scenarios. It is also ideal for mobile applications because of its small size, low power usage, minimized data packets, and efficient distribution of information to one or many receivers”

NetApp (<http://bit.ly/FogComputing101>)

Another to consider is NetApp FAS8000 Series Unified Scale-out Storage for the Enterprise. “Simplified management and proven integration with cloud providers let you deploy the FAS8000 in your data center and in a hybrid cloud with confidence. Nondisruptive operations simplify long-term scaling and improve uptime by facilitating hardware repair, tech refreshes, and other updates without planned downtime.”

Oracle (<http://bit.ly/StreamsofNetworkIoTData>)

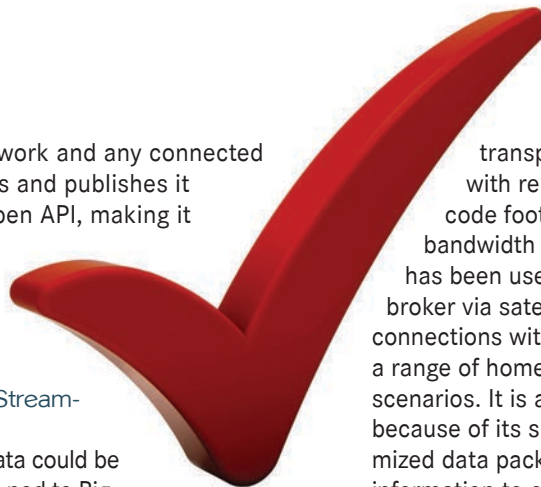
The smart edge is a theme Oracle is discussing related to Oracle Event Processing for Oracle Java Embedded, which “harvests real-time business Insights from edge devices. Take robust, real-time functionality closer to edge devices, reducing latency to enable faster critical decision making. Leverage remote operation for more effective use of network resources, and make dynamic online application updates.”

Rockwell (<http://bit.ly/IndustrialIoTAnalytics>)

Rockwell Automation FactoryTalk Production-Centre, meanwhile, “offers a unique solution set that integrates quality management and business analytics with paperless shop floor and repair execution. This integrated solution improves operational efficiencies while ensuring regulatory compliance and the highest levels of quality.”

The nature of technology is one of constant transition, so the network configuration has to be dynamic as we adopt more things that use the Internet. So it’s logical that the management of these systems is going to be distributed. That said, the term fog computing may be apt to describe the amount of confusion we may experience as we bring our own devices to IoT. **M2M**

Carl Ford is CEO and executive vice president of content development at Crossfire Media (www.xfiremedia.com).





by Paula Bernier

BI and Social Machines

Business intelligence and social machines are the focus of this issue's Roundup.

Roundups are buyer's guide-style articles that M2M Evolution magazine added to its editorial lineup this year.

Here are the submissions we received for this issue's Roundup on business intelligence and social machine solutions in the M2M space.

SiSense www.sisense.com

SiSense enables non-technical business users to easily join, analyze and visualize growing data sets from a multitude of structured and unstructured data sources. Powered by its unique In-Chip and Elasticube technologies, SiSense delivers unmatched performance, agility, and value. The company has hundreds of customers in 49 countries, including global brands like Target and Samsung. SiSense 5 enables non-technical business users to analyze data quickly on a platform built to handle thousands of users and queries (where other solutions slow down severely or crash); share stunning interactive dashboards with colleagues; keep abreast of updates to dashboards via new e-mail dashboard delivery; work from any computer or mobile device; and quickly calculate statistical functions such as standard deviation and median over large data sets. Features include the ability to join multiple data sources in a proprietary centralized database; fully browser-based environment for developing dashboards; responsive design; powerful drill-down features providing easy access to granular data; and simple dashboard sharing.

ThingWorx www.thingworx.com

ThingWorx, a PTC business, provides the first platform designed to efficiently build and run the applications of today's connected world. ThingWorx's model-based design and search-based intelligence simplifies application development efforts by minimizing cost, and risk while accelerating time to value. The ThingWorx platform combines the key functionality of Web 2.0, search, and social collaboration, and applies it to the world of things, including connected products, machines, sensors, systems, and

industrial equipment. Applications built using ThingWorx incorporate advanced machine intelligence, analytics, and social information from connected things. Businesses use the ThingWorx platform to rapidly deliver innovative applications and connected solutions across markets ranging from manufacturing, energy, and food, to M2M remote monitoring and service, as well as in emerging Internet of Things applications, including smart cities, smart grid, agriculture, and transportation.

TriCore Solutions www.tricoresolutions.com



TriCore helps customers draw real-time and valuable insights from the growing volumes of data in their organization. TriCore's Business Analytics service offerings include application functional support that provides support for both the functions of the application in use and the business processes that those functions represent such as mobile BI. It offers application database support including database tuning, schema, and application support with lifecycle management; hosting infrastructure that is robust, scalable, and employs the latest in security and reliability including hardware, networking, OS, storage, backups, and security; and consulting services delivered with deep technology for implementations, upgrades, customizations and business process expertise. Mobile BI is one of the delivery mechanisms for what TriCore builds. Users can get texts, e-mails or access content via any mobile device. Mobile device data is also becoming more and more used in real-time location BI applications. These services are all backed by the TriCore Trusted Support through TriCore's global support team that is empowered to serve and support your business 24x7x365 with complete transparency at all levels without surprises or hidden costs. **M2M**



California Dreamin'

The term learning your ABCs has had a definite change in meaning over the years in IT. Where IT used to be, no one ever got fired for choosing IBM. But it turned into a Cisco world as they emulated terminals and everything else to migrate to the Internet. The term ABC came to mean "Anyone But Cisco" in the late 1990s; however, it's rare that Cisco faces much competition these days. And Cisco, like so many other companies, is a product of California.

When friends tell me that the federal government had nothing to do with their companies' growth, I wonder if they realize how much of the computer industry came out of the cold war and the need for precision. However histories rarely start at the origin but are snapshots in time, and in California's case, the rise of venture capital investment started in the mid 1990s. Venture capital is an industry that California leads, and with the weather and the skilled labor force, the migration is pretty easy to understand.

California represents 20 percent of the U.S. economy, and California does put its money where its people are with more than \$5 billion invested by Venture Capital last year, which is more than 50 percent the U.S. investment. In addition to California's history of leadership, the general trend until a few years ago was for the many VCs to leave their locations and place their bets on Californian ventures. So not only was there little help for the state, but money was exiting in favor of California.

Many states are now trying to learn from California to bring jobs back to their regions. Some are doing better than others. A few states have made deals with major California firms that brought in server farms. Many times this featured tax incentives on the land and provided very little employment opportunity. While politicians can claim this is a win-win, I think the overall impact is minimal.

A better goal is to deliver on venture capital and to build up resources internally that set the stage for investment. However, this requires planning and long-term objectives. In New York City, the Economic Development Corporation had been part of former Mayor Bloomberg's effort to expand a high tech community. Running contests via its eGov initiative, the city featured a variety of local companies. However, the correlation between the contest and venture capitalists was non-existent.

The signs of hope I see are when economic development teams work on

delivering angel opportunities specifically to their state. In Chicago, we see Chicago Ventures and other homegrown organizations looking to enable the entrepreneurial spirit and deliver a talented team that is resident to the area. Likewise, we see in Washington, D.C., the 1776 building up the same workforce and entrepreneurial framework.

While California will always dominate, by in large we are seeing progression in the level of investment in the other states, and that may indicate a growth in their ability to execute. A key ingredient for states to remember is to protect their existing base and not to get caught up in the hype. In New Jersey, the state would only want to hear about hot trend opportunities. So it got caught up in green tech, when monies for biotech probably would have been a better choice.

The amazing thing about being in the M2M space is there is not an industry that I can think of that cannot benefit from better connectivity and more sensors to make better decisions. What this means is that M2M should be part of any venture evolution strategy.

My hope is that monies will begin to flow beyond bright shiny objects and me-too solutions, and to systems that match the needs in the market place that can benefit from the rich technologies associated with M2M. **M2M**

Carl Ford is CEO and executive vice president of content development at Crossfire Media (www.xfiremedia.com).

VENTURE CAPITAL BY STATE

	2,009	2,010	2,011	2,012	2,013
California	10,349,413,200	12,012,774,000	15,175,225,100	14,420,381,100	14,793,195,900
Texas	678,222,400	1,079,370,300	1,617,453,800	954,205,100	1,333,079,100
Georgia	1,032,037,500	1,101,183,800	1,192,739,400	801,636,700	1,289,313,400
NY	1,749,145,500	1,873,829,400	2,867,650,800	2,360,390,300	3,110,656,600
NE	2,603,748,300	2,612,394,600	3,348,796,700	3,546,017,000	3,360,042,500

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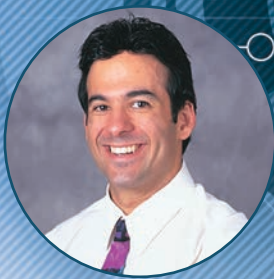
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by Rich Tehrani

Everything We Know About Disruption is Wrong

People in the tech space generally accept the Innovator's Dilemma written by Clayton M. Christensen as fact – companies need to either disrupt or be disrupted. Jill Lepore, writing for The New Yorker Magazine, questions much of what is “accepted wisdom” or as Al Gore might call it, “settled science” in a well-researched and written piece debunking much of what techies have believed for decades.

Lepore's argument is that the book uses handpicked case studies, which aren't necessarily cut and dried in terms of their outcomes. Moreover, the innovators aren't always more successful than the incumbents, as you can see from this passage below:

In fact, Seagate Technology was not felled by disruption. Between 1989 and 1990, its sales doubled, reaching \$2.4 billion, “more than all of its U.S. competitors combined,” according to an industry report. In 1997, the year Christensen published “The Innovator's Dilemma,” Seagate was the largest company in the disk-drive industry, reporting revenues of \$9 billion. Last year, Seagate shipped its two-billionth disk drive. Most of the entrant firms celebrated by Christensen as triumphant disrupters, on the other hand, no longer exist, their success having been in some cases brief and in others illusory.

She continues:

As striking as the disruption in the disk-drive industry seemed in the nineteen-eighties, more striking, from the vantage of history, are the continuities. Christensen argues that incumbents in the disk-drive industry were regularly destroyed by newcomers. But today, after much consolidation, the divisions that dominate the industry are divisions that led the market in the nineteen-eighties. (In some instances, what shifted was their ownership: I.B.M. sold its hard-disk division to Hitachi, which

later sold its division to Western Digital.) In the longer term, victory in the disk-drive industry appears to have gone to the manufacturers that were good at incremental improvements, whether or not they were the first to market the disruptive new format. Companies that were quick to release a new product but not skilled at tinkering have tended to flame out.

Another subject of the book, Bucyrus was a victim of disruption – did indeed enter Chapter 11 protection but emerged some years later as an entity that was sold for nearly \$9 billion.

The point is, companies can indeed come back from a disruptive influence. Apple is a great example.

Google seems to be involved in every industry we can imagine: cars, robotics, satellites, fiber, etc. because – you guessed it – it is afraid to be disrupted by new entrants.

Amazon recently launched its Fire Phone with 3D technology and the ability to scan and buy virtually limitless products

because it fears disruption from Google, Apple, and app developers. It included its famous Mayday help button, powered by WebRTC, making this technology available beyond just the company's tablets.

VoIP disrupted telecom. It doesn't mean that it killed the established players (some of course are gone), but it did give

major advantages to new companies like Cisco.

Still, new disruptive technologies can help kill off incumbents if they don't adapt properly. The good news for incumbents – whether they play in the machine-to-machine arena, in VoIP, or unified communications – is that most startups fail, and moreover that incumbents can adapt, restructure and thrive. Think the second tenure of Steve Jobs at Apple – or IBM.

The point is, you need to embrace change and innovation and not be afraid to cannibalize existing businesses as you get into news ones. And if this is what you take away from this article and disruption in general, I think we'll all be in good shape. **M2M**

You need to embrace change and innovation and not be afraid to cannibalize existing businesses as you get into news ones.

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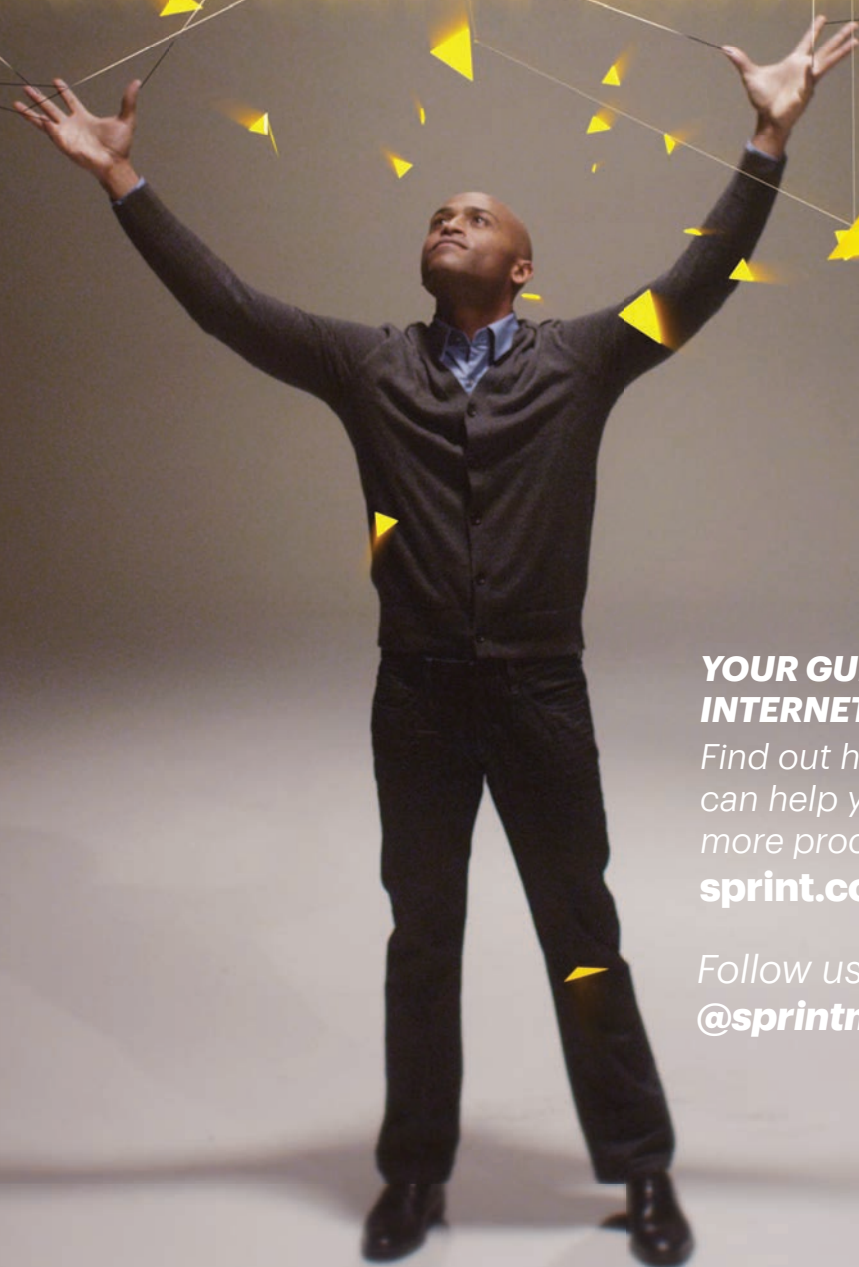
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