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Look Who's Talking:
The M2M Landscape

By Jesse Cryderman

The latest Visual Networking Index from Cisco predicts that for the first time in history, mobile connections will outnumber people this year. With a current worldwide population of roughly 7 billion, that's a mountain of phones. But increasingly, it's not a human being at the end of the line: in eight years, nearly 20 percent of all cellular connections will be occupied by machines. Cellular connectivity of the M2M variety is going into everything from traffic lights to energy meters to billboards, representing a massive growth opportunity for agile service providers and vendors. "And by "massive growth opportunity, I mean "goldmine"." Last October, the GSMA predicted M2M communications revenue growing to $1.2 trillion by 2020. Yes, that's Trillion, with a "T."

Although it's an understandably hot topic, given these projections, machine-to-machine (M2M) communication is nothing new. Telematics systems, like OnStar, have been a part of our cultural fabric for more than a decade. However, it wasn't until late 2009/early 2010 that industry heavyweights AT&T, Verizon (nPhase), Jasper Wireless, Vodafone, and others launched large-scale initiatives (coinciding with price reductions for key components), that M2M really took off down its current path.

Admittedly many M2M connections are made over Wi-Fi or through a wired connection; while M2M devices will make up the bulk of the projected 24 billion connected devices that will exist by 2020, "most will connect with short-range tech, like Wi-Fi," says Machina Research.

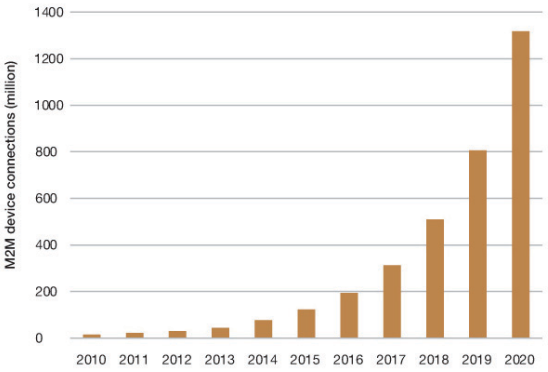
In this article, we will specifically look at the market surrounding cellular M2M connections. What does the landscape look like, and what are the most promising verticals? How are CSPs cashing in on the M2M explosion? What opportunities are blossoming?

Market Size

Machina Research released a detailed report of the M2M market space in concert with the GSMA in October of last year. Some key data points in that report include:

- Deployed M2M devices will grow from 2 billion in 2011 to 12 billion in 2020.
- M2M devices will outnumber traditionally connected devices by 2020.
- Of the 12 billion M2M devices in 2020, 2.3 billion will connect with cellular networking.

Similar research performed by other analyst firms supports these predictions, and forecasts the classic hockey stick growth curve, as you can see in Fig. 1.



Source: Analysys Mason, 2011 (Figure 1)

Despite the rapid growth and revenue opportunities, the market is very different from traditional mobile data services market, as you can see below in figure 2.

Characteristic	M2M services	Traditional mobile data services
Devices	• Temperature sensors • Smart meters • GPS chips • Active and passive RFID tags	• Smartphones • Laptops • Tablets
Device connections	Hundreds of millions of connected devices	Millions of connected devices
Device certification	Thousands of devices	Fewer than 100 devices
Average revenue per user (ARPU)	• $3 per device per month average • Many ARPUs (e.g., smart grid, RFID asset tracking) may be less than $1 per device per month	$40 to $50 per month per device
Solutions	• Custom developed • Vertically focused • Solutions are tightly integrated into core business processes	• Standards-based devices • Horizontal focus • Address the needs of a broad range of users
Device replacement cycle	Extremely long device replacement cycle (five to 10 years or more)	• 12- to 18-month replacement cycle for smartphones • Three years for laptops
Purchasing decision-makers	Multiple decision-makers across many roles in the organizations (e.g., CIO, field service, supply chain, fleet manager, product development, etc.)	• Telecom executive • IT executives • Line-of-business workers • Consumers

56893 Source: Forrester Research, Inc.

Source: Forrester Research, Inc., Nov. 2011 (Figure 2)

In eight years, nearly 20% of all cellular connections will be M2M.

Four Cellular-Driven Verticals

Eventually, self-monitoring washing machines will phone home to request more soap, and connect with monitoring systems at the water company to deliver efficiency reports. Today, however, CSPs have directed their M2M efforts in four areas, which are a bit less glamorous, but arguably more important.

- System Monitoring/Telemetry: This includes smart meters and other devices equipped with sensors that measure and report usage, functionality, and environmental data. AT&T provides the connectivity for 13 million smart meters, and in Quebec, Canada, Rogers connects Hydro Quebec's 3.8 million smart meters with roughly 600 smart meter collectors.
- Asset Tracking: One of the largest verticals at present (and one of the earliest M2M adopters), asset tracking enables monitoring and tracing of rental cars, truck fleets, and valuable equipment, such as expensive machines on lease. It's also been implemented by insurance companies like Progressive, whose devices monitor driving habits in order to create accurate personalized pricing models.
- Digital Signage and Advertising: Dynamic pricing, dynamic advertising, and digital kiosks are a rapidly growing business, and companies like Verizon have moved quickly to partner with terrestrial advertising companies to provide M2M connectivity.
- Telematics: There is some overlap with asset tracking, but telematics represents a distinct group of solutions. Telematics solutions include OnStar, John Deere (dynamic in-field farming solutions), and diagnostic solutions like the Ford Focus Electric (connectivity supplied by AT&T). The oldest form of M2M, telematics systems perform critical functions; in fact, spectrum interference with deployed telematics systems prompted the FCC to block LightSquared's $14-billion LTE network buildout.

Network Needs

Today, the bulk of M2M applications are serviced by 2G connections, and often rely on simple, low-cost SMS messaging. For instance, grid sensors, RFID tags, and smart meters only need to communicate kilobytes of information. Health and wellness monitors and security applications require more bandwidth, in the megabyte range, and as M2M solutions move forward, bandwidth requirements will increase. In fact, Compass Intelligence predicts that in just three years, "more than 40 percent of M2M connections in the U.S. could be running on 3G, 3.5G, or 4G networks."

To learn more about the network needs surrounding M2M, I turned to the CSP with the most experience in this field, and the greatest installed M2M base, AT&T. Bruce Thompson, Senior Product Marketing Manager, M2M, AT&T Business Solutions, explained the advantages and disadvantages of different network technologies for M2M. "Until recently, the answer was 2G GPRS/EDGE technology. This made sense; for the majority of M2M applications, 2G services have provided ample bandwidth, latency, and data speeds. Globally, GPRS networks have also achieved the most extensive coverage and offer the lowest module cost. But today, there are compelling reasons to add 3G UMTS/HSPA technologies for connected devices."

What are some of these reasons? Thompson elaborated: "Modern 3G UMTS/HSPA technologies are also five to more than ten times as spectrum-

efficient as GPRS, while providing far superior speed. This is vital not just for carriers managing capacity and growing demand, but also for companies deploying many devices. 2G technology was not designed to support the large-scale, high density M2M applications now being deployed."

Thompson went on to point out that the device replacement cycle (as illustrated earlier in Fig. 2) is much longer in M2M—sometimes ten years or longer. Customers are wary of deploying thousands of devices that might not be supported in the long-term. "For devices expected to operate in the field for the long term, 3G or even 4G is the clear choice today," added Thompson.

Recent research by Forrester supports this perspective. In a Nov. 2011 whitepaper, analyst Michele Pelino wrote, "Many of today's M2M apps are adequately supported by lower speed 2G networks. However, upgraded 3G and 4G networks provide new options to support M2M services requiring high-quality video content, which is particularly relevant to healthcare and video surveillance applications."

Market Overview

Currently, AT&T, Telenor, and Verizon have the most mature businesses in the M2M space, according to an exhaustive market study performed by Machina Research. This is based largely on the CSPs' currently installed M2M base. Following close behind in terms of installations are Vodafone, China Mobile, and Telefonica.

However, success is not just about who has the largest installed base of M2M connections. As the dynamics rapidly change in the coming years, other factors will come into play. Machina Research published a M2M Benchmarking study in January that looked at M2M opportunities for each carrier based on six "Ps": Pedigree, Platform, Place, Partnerships, Process, and People. The results were surprising.

Study author Matt Hatton said, "Machina Research rates Vodafone as the CSP with the best potential to exploit the massive opportunities presented by machine-to-machine. In particular its global scale gives it a substantial competitive differentiator. While I wouldn't say they were streets ahead of the competition, Vodafone was our clear winner. However, the race for second spot was very hotly contested between AT&T, Deutsche Telekom, Orange, Telefonica, Telenor and Verizon, with little to choose between them."

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Opportunities

If the telecommunications industry has learned anything from the past, it should know that building a pipe is not enough. M2M connectivity revenues alone will not be enough to offset declines in traditional revenue. As you can see in Figure 3, connectivity revenue alone does not represent the pot at the end of the rainbow.

Source: Forrester Research, Inc., 2011 (Figure 3)

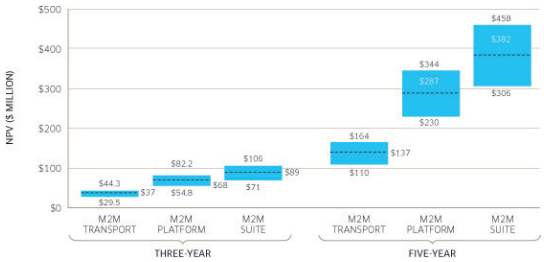
Categories	Average monthly connectivity revenue per device
Transportation/fleet management	$3.00-$10.00
Retail and finance/ kiosk applications	$1.00-$6.00
Manufacturing/ asset management	$4.00-$7.00
Utilities/energy demand management	$0.50-$1.00
Healthcare/health monitoring	$5.00-$8.00
Security/video surveillance	$5.00-$11.00
Consumer services/ appliance control	$0.50-$2.00

Scott Swartz, CEO and founder of MetraTech, argues that developing a M2M service platform is paramount. "CSPs have long been aware that connectivity is a commodity. To differentiate they

must have a M2M service platform that provides a rich set of APIs, an ecosystem and an in-house cloud that enables customers to build applications. That platform can easily leverage their existing strengths: high reliability, SMS, location-based services, presence capabilities, application-specific quality of service (QoS) and seamless device management."

While transport revenues will certainly increase, the greatest opportunities will be in M2M platforms and suites, as you can see in Figure 4.

Source: Alcatel-Lucent (Figure 4)



Partnerships, as they have in other areas, will also prove key to maximizing M2M opportunities. In a recent Alcatel-Lucent article, authors Rob Parkes and Marc Weinstein spoke of the importance of the partner ecosystem. "One of the big challenges will be to build a vibrant partner ecosystem capable of developing and delivering service concepts that work across industries, markets and borders. The M2M industry is evolving rapidly, and its many players are still working out how to contribute and split effort and revenue. Service providers' ability to build and manage partnerships will help drive their success."

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In terms of promising verticals in the near-term, Bruce Thompson at AT&T sees mHealth as a top contender. "Hospitals, doctors and insurance providers are beginning to turn to M2M solutions for remote patient monitoring, yet many still remain in the early stages of adoption." Verizon has also been spending heavily on mHealth initiatives.

Long-term, the opportunities become more interesting. "M2M turns objects into services and changes how things can be sold," says Scott Swartz. "CSPs should focus on verticals which require these value-added services because they are very sticky and provide a way to build value and differentiation. These M2M partners and customers will be enterprises and will require a monetization approach in which complex, multiparty, B2B contracts can be fluidly negotiated."