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When Machines Talk to Machines:

M2M deployment can make your business systems smarter

White Paper

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Overview

Machine-to-Machine (M2M) technology is poised to reshape every aspect of the business landscape: operational efficiency, quality control, decision-making, relationships with customers, and transactional opportunities are enabled and enhanced by M2M applications. Access to real-time, actionable data can make organizations smarter and more nimble and allow them to better manage resources, protect assets, deploy intelligent e-business applications, and quickly respond to rapidly changing conditions. The M2M market is fueling innovation and improving performance in the retail, finance, healthcare, construction, and transportation industries, to name just a few. And thanks to the growing ubiquity of reliable, wireless Internet connectivity, M2M networks are functional anywhere—regardless of space constraints or traditional connectivity challenges—and are reliable day in and day out, with little or no management.

M2M refers to direct communications between machines that function, interact, and share information without any special configuration or other setup requirements. With a countless (and rapidly growing) array of devices communicating with other devices across the Internet, the Internet is no longer simply a network of computers but rather what's commonly referred to as the "Internet of Things."

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These devices, which have easily surpassed a billion worldwide and are expected to be at least one-third of all connected devices by 2015, include point of sale (POS) systems, video surveillance, smart meters, digital signs and kiosks, ATMs, and medical monitoring devices.

Kevin Ashton, credited with originally coining the term "Internet of Things," noted that, "If we had computers that knew everything there was to know about things —using data they gathered without any help from us—we would be able to track and count everything, and greatly reduce waste, loss, and cost. We would know when things needed replacing, repairing, or recalling, and whether they were fresh or past their best."

This paper will explore the rapid emergence of M2M technologies, the factors that are driving the rapid adoption of M2M, potential implementation challenges and key considerations, and the key areas in which businesses and organizations can take advantage of M2M to make better and more effective decisions more rapidly.

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A Brief History of M2M

Widespread wireless coverage continues to drive the rapidly increasing numbers of devices that connect to available networks. In the late 1990s, General Motors rolled out OnStar, the in-car communications system—one of the first major, consumer-facing, wireless broadband machine-to-machine technologies. 2009 marked the beginning of the modern M2M surge with the notable partnership between AT&T and Jasper Wireless to jointly develop M2M devices. 2010 brought additional technology partnerships, notably the announcement from Vodafone, Verizon Wireless and nPhase (a joint partnership of Qualcomm and Verizon) of their strategic alliance to provide global M2M solutions. In 2011, Ford Motor Company teamed with AT&T to wirelessly connect the Ford Focus Electric, allowing vehicle owners to remotely send and receive data and commands related to their car.

The Business Case for M2M

As companies continue their quest to innovate in order to address new competitors, new business models, and pressures to maximize productivity and profits, the implementation of an emerging technology can pose practical challenges. Taking data and purposefully integrating it into enterprise systems—the basic function of M2M—has the potential to transform the construction, manufacturing, healthcare, transportation and retail industries. Yet, in order to justify the deployment of M2M, there must be a real business case that defines how the application will support the end user.

It is one thing to be connected to your customer or to have unlimited access to customer data, and quite another to convert that data into rich customer insights that enhance the consumer relationship.

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The promise of M2M is that with the right intelligence, delivered in real time and used appropriately, services can be offered and tailored to customers in ways that were never before possible. Resources can be monitored and utilized more efficiently. Operational costs can be reduced. Paired with smart systems, M2M can even use data to automatically trigger and carry out decisions that serve the business's objectives, often times even faster and more efficiently than employees could. It is important to move strategically when incorporating M2M and by defining and quantifying the desired ROI, following industry best practices, and incorporating realistic metrics, decision makers can establish a compelling business case for M2M.

The State of the Technology

M2M technology most certainly has arrived. Cellular mobile broadband networks now deliver reliable, affordable, secure Internet access all over the globe. With the advent of 3G and 4G networks, the enterprise can access a consistent, high-bandwidth connection, but without the on-site network requirements, set-up, or ongoing maintenance of traditional infrastructure.

While the collective global electricity grid serves approximately 80% of the world's population, the wireless "grid" now already reaches 85% of the world's population—and that reach continues to expand.

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With those increasing numbers, the delays associated with maintaining bandwidth are no longer an issue.

This spells major opportunities to connect with customers, clients and users. Any event or gathering can offer ATM services, kiosks can be placed anywhere there is a cell signal on an independent network, construction sites can stream video surveillance, retailers can display intelligent signage (including streamed video) to communicate instantly with customers, and public transportation agencies can provide wireless Internet connections for commuters.

Presently, 3G uses a combination of wireless voice and data services. 4G is approximately 10 times faster than 3G and is either based on 4G LTE (Long Term Evolution) or WiMax, with 4G LTE quickly becoming the standard. This technology will allow businesses to have unprecedented interactivity with consumers, ushering in a vast new array of services.

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By obsoleting the need to set up a Wi-Fi network or pull cables for an Ethernet LAN-based network, the cost of the technology has dropped. With easier deployments and maintenance, the enterprise reduces IT and component maintenance costs. With devices getting smaller by the day, it is now feasible to embed network connectivity into almost any customer application.

Trends

Currently M2M's growth has been seen in various vertical markets, but full maturation will come when the technology—networks, devices, architecture and processes—is horizontal. The industry is buzzing with the magnitude of possibilities, with estimations in the trillions, based on the number of potential connected devices, whether machines or mobile phones. Several figures from Cisco's Visual Networking Index about the technology's potential have been widely cited:

- Wireless traffic will exceed traffic from wired devices by 2015.

- The number of Internet connected devices will double the number of people on the planet by 2015. More than half of those will connect wirelessly.

- The average mobile network connection speed will grow at a compound annual growth rate of 56 percent, and will exceed 2.9 Mbps in 2016.

- Globally, M2M traffic will grow 22-fold from 2011 to 2016, a compound annual growth rate of 86 percent.

- There will be over 10 billion mobile connected devices in 2016.

- Mobile network connection speeds will increase 9-fold by 2016.

Wireless and cellular networks have worked tirelessly at covering more area, yet wireless voice revenues are falling. Understanding the simple truth that the predominant use for wireless is no longer the phone call, network providers are now focusing on M2M applications as they garner higher revenue margins and lower customer churn.

M2M Practical Applications: Industry Examples

Retail

M2M is particularly pervasive in the Point of Sale (POS) and kiosk settings, where retail establishments deliver touch-screen, interactive shopping experiences for consumers. Using powerful, reliable, and cost-effective 4G technology, a mobile retail shop (or "pop-up" store) can be deployed in a matter of minutes requiring nothing more than a standard power outlet and a wireless router with 4G connectivity. M2M is increasingly providing the means for optimized digital signage solutions, enabling interactive and dynamic displays.

While often used to manage inventory, logistics and asset protection, the future of M2M enables retailers to deliver customized products and services directly to customers in real time. Retailers can look to a not-so-distant future when store employees are alerted just as a customer, who is a member of their loyalty program, enters the store and is immediately engaged with customized deals or special products based on buying history or other customer data.

Healthcare

From congestive heart failure patients in Havasu to diabetics in Dallas, M2M technology has already been deployed to improve patient care and reduce healthcare costs. Connected devices can monitor, analyze, and diagnose patients on the road or in the home, allowing physicians to continue to watch vitals after the patient has been discharged. With real-time, actionable data, healthcare professionals can make accurate and timely recommendations and decisions, from wherever they are.

Transportation

From fleet tracking to traffic control, M2M is improving transportation safety, security and reliability. Tracking driver habits—from company vans to school buses—can save money and decrease traffic related incidents, while connecting fleets can increase delivery efficiencies and enhance in-field communication. M2M technology is also enabling toll-road handling and user-based charging on roadways. Even first responders are saving time, money, and lives by employing M2M solutions in emergency vehicles.

Challenges

M2M is diverse and offers broad solutions, but is prone to a certain degree of chaos in its rapid evolution. The Telecommunications Industry Association is attempting to create a global set of standards at the service layer, as discussions about open API versus standardization continue. Balance and commitment among the verticals will continue to be challenging until standardization issues are addressed. Key organizations in the US, Europe and around the world are working toward standards that support every M2M participant.

Security is a major challenge in implementing and maintaining M2M operations. In a retail environment, an unsecured kiosk could increase the risks of network break-ins or hacking. With so many partners involved in building the M2M ecosystem, security and end-user trust is vital.

The development, deployment, and management of M2M applications over the cellular network can also pose challenges. The M2M software market has two key platforms currently: connected device platforms (CDP) and application enabled platforms (AEP).

CDPs tend to be cost effective, whereas AEPs are quickly deployed and offer granular remote device management.

Experts anticipate future challenges regarding IPv6 (the next level of the Internet Protocol addressing system); consumer resistance to higher price points; and consumer concerns regarding privacy, safety, and security.

Keys to Success

Connectivity: When it comes to M2M, connectivity is king—without Internet access, M2M ceases to work. Given this, the modem is the fundamental pillar of any M2M application. Reliable Internet can be established using mobile broadband, but failover routers that access another wired or wireless connection can be deployed to prevent downtime. 4G is very secure, highly reliable, flexible and scalable; therefore, it is looked upon as the future of M2M.

Durability: Ruggedized or semi-ruggedized routers that can withstand the elements and temperatures are often required, as many applications are deployed outdoors.

Security: Devices that can securely connect to a corporate network are important. WiFi and non-WiFi versions of routers are available to support different markets. In addition, some routers offer network segmentation so that a single router could support a private network for transactions and PCI compliance while simultaneously allowing customers to access a public Wi-Fi network.
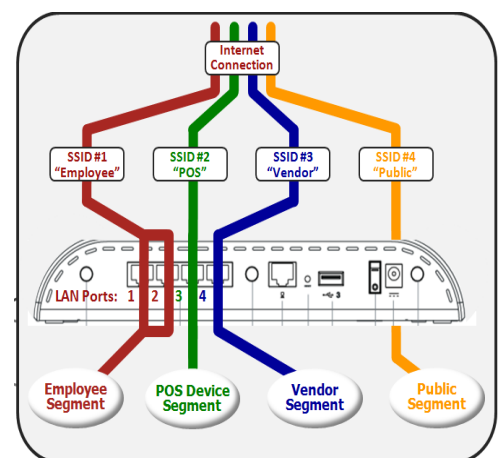
Mobility: This is key for certain verticals like transportation. Devices need to be able to stay connected on the move and, in some cases, have GPS capabilities.

Scalability: Remote management and monitoring of devices in the field is key to ensuring scalability. Remote management ensures that applications are online, up-to-date with the latest firmware, and can be configured appropriately. The ability to troubleshoot and fix problems remotely saves time and money protecting the thin margins that are often part of M2M application business models. Remote management software, as well as pooling data plans, can also help prevent costly overage charges in data usage.

Granularity: This will be important in defining success, as only actionable intelligence —real-time data that has depth and meaning to support rapid responses—will yield true end-user results. Data can be rendered useless if not dealt with immediately or delivered via the right channels (wireless phones, web, or social media) and a resilient network infrastructure is required.

Partnerships: Given the numerous, not-so-obvious pitfalls of a do-it-yourself approach, successful M2M operations will hinge on finding the right partnerships. A professional, experienced "partner ecosystem," or portfolio of partners, is usually required, as few organizations can plan, deploy, manage and scale M2M entirely on their own. Management tools following a successful M2M deployment should also be an important consideration.

ROI: Understanding the organization's ROI objectives—both tangible (i.e. direct cost savings) and intangible (i.e. improved customer experience) should be identified.

Time to deployment will be essential in measuring ROI, as mobile connectivity solutions can significantly accelerate the establishment of a revenue stream (versus waiting for the deployment of wired lines to conduct transactions). Success metrics will vary by organization, as enterprise needs are unique and likely to change.

CradlePoint M2M Technology

The CradlePoint COR Series, which has become a "go-to" solution in the M2M space, was designed specifically to meet the space constraints and connectivity challenges of the M2M market. With its compact size, ruggedized metal case, and embedded dual-mode 4G/3G connectivity, the CradlePoint COR IBR600 Series provides a flexible, reliable, and secure solution that is ideal for high-availability, portable or fixed M2M applications.

The CradlePoint ARC MBR1400 Series provides an easy-to-install, one-box solution for wired primary connections (4 Ethernet ports) and 4G/3G wireless in new network installations, temporary locations, or for M2M applications where an alternate network, off the main corporate network, is desired. The router can be partitioned to create multiple networks, both public (customer WiFi) and private (POS devices, 3rd party applications, employee laptops, etc.), to simplify PCI compliance.

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Both the COR and ARC series solutions provide robust Modem Health Management (MHM) to self-monitor and maximize modem uptime. Large deployments of these devices can be managed using CradlePoint's WiPipe Central Remote Management Software to monitor, configure, and upgrade geographically-dispersed systems without requiring on-site technical resources.

Highlights:

- Multiple-network interoperability: CradlePoint offers M2M networking that works with any carrier's 3G/4G network, without any special configuration or other set-up requirements.
- 4G scalability: CradlePoint supports 4G, and 4G supports more simultaneous connections than today's 3G networks, enabling carriers to better offer constant Internet connectivity for M2M applications.

CradlePoint Benefits

At CradlePoint, we believe in keeping it simple and scalable—the two keys to low-cost, long-term M2M reliability. We offer off-the-shelf simplicity, with ready-to-work solutions that eliminate the costs and hassles of developing M2M technology solutions in house. CradlePoint provides the ability to easily set up an M2M network anywhere—regardless of space constraints or other connectivity challenges—and to keep it running reliably day in and day out, with little or no effort. With support for over 350 modems on more than 70 different carriers, we define excellence in connectivity.

To learn more, visit CradlePoint.com or call 855.813.3385.