orange™ Business Services

Syntec informatique

Fing

White paper
Machine To Machine
stakes and prospects

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preface

Communication between machines opens up impressive scope for innovation, and Europe has the opportunity to lead this revolution.

Although a recent development, Machine To Machine (M2M) technology is now sufficiently mature that large numbers of companies are confident enough in its potential to launch their own projects; projects that include innovation in services and practices, business process optimisation and compliance with developing regulations.

Machine To Machine is therefore becoming a major factor in the ability of market players to compete.
That is why we wanted to begin this white paper by taking stock of the current position, challenges and practices of M2M by drawing on a number of practical real-life examples.

We also believed it necessary to look forward to what the future may hold for this exciting growth area.

This white paper marks our first step in a joint initiative that aims to raise companies' awareness to the benefits of Machine To Machine technologies, encourage the emergence of an "ecosystem" of supplementary players and put in place the right conditions for the trouble-free adoption of these technologies: change management, resource control and respect for individuals.

We hope that reading this white paper will persuade will to join with us in our ambition to make the Machine To Machine movement a driving force for sustainable growth in Europe.

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executive summary

The jury is no longer out on the prospective role of machine-to-machine (M2M) technology in the enterprise. Early adopters have completed their pilots and built their ROI models. Network operators and systems integrators are working more closely together than ever to deliver standards-based platforms, replacing complexity of mobile integration with freedom to focus on the business imperative.

M2M links information and communication technologies (ICT) with intelligent and communication-enabled devices so they can interact with the information systems of organisations or companies without human intervention.

The use of M2M technology is particularly well-suited to interaction with a large number of remote, and possibly mobile, devices, usually acting as the interface with an end-user. For example, a car driver, a remotely monitored patient or a consumer at a supermarket checkout. M2M makes it easier to manage devices such as these, despite the fact that there are so many of them. It also enables businesses and organisations to develop new services.

According to IDATE[1], the M2M market was worth 20 billion worldwide in 2005 and will exceed 220 billion in 2010, reflecting an annual growth rate of over 50%. ABI Research predicts that there will be 100 billion communication-enabled devices worldwide by 2010. Over 13 billion of these will be in Europe, and most will be based on RFID technology.

The first M2M applications focused on automatic alarm systems. However, the current uses of M2M technology range far beyond safety. Today, M2M solutions enable a number of key business processes including surveillance, fleet management and logistics.

Indeed, the most widespread use of M2M is by companies in the transport and services industry, where M2M is harnessed to enable route optimisation and product traceability within the logistics chain. M2M is also used to improve the real-time scheduling and optimisation of on-site technician repair and maintenance work. Other applications include remote meter reading.

Recent pilot projects reveal M2M is also gaining traction in a number of new vertical sectors such as health care, where M2M allows remote patient monitoring, and in logistics, where M2M improves package tracking and the distribution of goods from a central distribution centre.

M2M solutions based on innovations in RFID (radio frequency identification) are also impacting the marketplace. These ID tags contain a computer chip, which allows them to store data, such as origin, content and shipper, and a minuscule antenna that lets the chip communicate this information via a wireless network. Combine this capability with global positioning system (GPS) and companies have increased abilities to track and trace goods around the globe.

Increasingly, M2M solutions based on RFID are providing retailers with real-time visibility into their inventory. As a result, store managers can see automatically which items are stocked, which items they need to order, and how effectively certain items are selling. Additionally, they can track the contents of individual shopping trolleys, a capability that allows them to target consumers with advertisements and offers that match consumers' buying habits.

[1] Machine To Machine: Strong Growth in Wireless Machine To Machine and the impact of RFID - IDATE - (01/06/2005).

Another new application is emerging in the insurance industry in which M2M enables new services such as "pay-as-you-drive" car insurance offers. Here, M2M can enable insurance companies real-time visibility into driver behaviour; insight that allows insurers to offer premiums based on actual vehicle use; and reward responsible drivers who obey traffic rules and speed limits.

Against this backdrop, M2M has emerged as a primary growth market for mobile network operators and service providers. M2M technology provides operators with a new and lucrative business opportunity and a chance to get more mileage out of their existing telecoms infrastructures by offering communications and connectivity solutions to companies looking to improve business processes.

The implementation of M2M solutions requires the deployment of large numbers of communication-enabled modules with network access. While these modules are in frequent communication with other machines and the companies that monitor them, the actual volume of network traffic is relatively disparate. In light of this, communications companies are well advised to review their financial models to have adapted pricing to their communications and subscriptions.

This white paper will examine the market outlook for M2M and investigate current usage of M2M in a variety of industry sectors. It will also present a number of case studies across verticals to demonstrate the business benefits of M2M.

M2M addresses business needs

M2M is the convergence of three technology families: intelligent devices linked by communication networks to an IT centre able of making decisions. Combined with the standardisation of fixed and mobile communication devices, falling communication costs, improvements in network performance and the availability of service platforms capable of managing a multitude of devices – such technology advances have transformed how M2M is implemented. This has resulted in the ability to allow businesses to radically rethink business processes and the kind of services they offer.

Indeed, the core value proposition of any M2M project is seamless communication between the component parts and the integration of disparate technologies including mobile, short-range communications such as Bluetooth and Wi-Fi, as well as back-end office tasks related to service and support.

In this white paper we have strongly suggested M2M project managers therefore draw upon the know-how and innovation resources of telecommunications providers.

In addition, prior to undertaking an M2M project, managers should create a checklist of key questions including:

> Which interoperability and compatibility standards must adopted and adhered to in order to ensure seamless and robust connectivity of the various telecoms, IT and electronics components? An absence of backward compatibility in any of these areas, for example, can create serious issues and require more support and development costs.

> How precisely should the M2M projects be implemented and by whom? A pragmatic, structured and gradual approach is critical. More importantly, the option of a change in management – and the impact on the direction and progress of the M2M project – must be carefully considered.

> What are the required skills sets necessary to operate and oversee the M2M project once it is operational? A live M2M project brings together a plethora of complex and connected hardware and software that the client may not have the time, manpower or money to run properly. In this case, outsourcing IT support or hosting the solution at the telecommunications providers' premises may be an option.

M2M technologies and solutions are core to the capabilities of companies operating in the following vertical industries:

> Building automation - Comfort (temperature adjustment, air-conditioning, etc.), entry control (badge readers, turnstiles, entrance lobbies, electrically operated locks, controlled emergency exits) and security (intruder detection and fire detection).

> Fleet Management - Transport (vehicle tracking), logistics (delivery tracking) and insurance (pay-as-you-drive).

> Monitoring : Also referred to as telemetry, these applications simultaneously deliver remote maintenance, preventive services and data feedback. They are used predominantly in the energy industries (electricity, gas, etc.), the industrial-equipment sector (office equipment such as photocopiers, and equipment for heavy industry, such as programmable logic controllers) and even in health care (home monitoring of patients, hospital equipment).

> Remote payment - Automated pay-on-use, as is the case at some motorway tolls and for public transport users. The robust authentication and transaction security delivered by standard encryption systems can be combined with RFID chips and wireless communication networks to build secure remote payment solutions requiring no contact or intervention on the part of the user.

> Remote surveillance - The ability to trigger an alarm automatically in order to prompt on-site attendance. The maturity of communication technologies (GSM, 3G, Edge, ADSL, Wi-Fi and RFID) and the widespread availability of tiny sensors are enabling the delivery of innovative solutions.

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> Supply chain management - Managing stock in real time, updating inventories at one or more sites, tracking packages through the supply chain and tracing sensitive items likely to be hijacked or stolen : All these applications offer easily measurable return on investment. The entry of major integration and information systems players, and the progress of standardisation should encourage the emergence of these applications.

M2M can also be applied to improve environmental protection, allowing companies and government authorities real-time and remote monitoring of resource use.

Other uses of M2M technology can be seen in the systems used to provide early warning of natural catastrophes through, for example, remote monitoring of river levels or remote surveillance of seismic activity.

improved environmental controls and emergency measures

M2M technology is well-suited to the management of large systems over great distances that require high numbers of frequent measurements.

measuring environmental quality

Sensors distributed at key points in major urban areas draw accurate real-time maps of pollution levels and transmit that information to the relevant specialist services. In the future, these sensors could alert people at risk from such pollution, or even control road speed signs.

monitoring the risk of natural disasters

Networks of many hundreds of sensors in seismically active areas and along rivers subject to flooding provide a continual analysis of the situation, and can alert the relevant authorities of impending disaster in record time. An American company is developing plans to air-drop thousands of sensors in the form of “intelligent dust” over fire-prone forests. These sensors will measure temperature and humidity, detect smoke, analyze the situation in its entirety and, in these often isolated areas, relay the alarm from chip to chip until it reaches a bridge connected to traditional mobile networks.

growth with less pollution?

In other areas, M2M technology can contribute to sustainable development by controlling watering and the use of chemical products in agriculture, managing distributed power generation facilities (wind generators, solar panels, etc.) and measuring machine power outputs. On the other hand, we should bear in mind that chips aren’t biodegradable and themselves consume power.

business benefits

The key business benefits of M2M include:

> Productivity: A printer manufacturer implemented an M2M solution for remotely monitoring its products to predict when toner replacements are needed and to detect breakdowns. The savings made in terms of customer support and operational costs have paid for the associated infrastructure.

> Innovation: Insurance companies can now offer premiums on the basis of the distances actually travelled by drivers, whilst motorway operators can offer automatic remote payment systems that allow them to build personal relationships with their customers (rates tailored to customer profile, journeys made and professional status).

> Compliance: M2M also offers significant scope for ensuring that business processes comply with regulatory requirements, because it enables detailed analysis of the time spent at each stage of a process, as well as the responsibilities of all those involved.

A successful M2M implementation must also address an array of business issues and the demands of a varied and growing ecosystem of partners, enablers and stakeholders. This ecosystem is described in more detail on page seven.

business considerations for M2M implementation

Before embarking on an M2M project, companies involved must be clear about the business benefits and the costs from several viewpoints:

The first consideration is project profitability. To this end, management must identify the benefits for all those involved up and down the value chain. An M2M project may therefore be justified in terms of its quantitative gains and, in some cases, by the contribution it makes to improve the reputation, service and quality of innovation of the companies involved.

> Questions to consider at this stage include: What is the value proposition? What competitive advantage does it deliver? Is there a match between the company and the M2M services its seeks to offer? How will the M2M solution enable the company to achieve its business objectives?

Secondly, M2M must also deliver a positive impact on the client organisation and all partner organisations – including telecoms companies, IT integrators and hardware/software vendors. Each party must be clear about the strategy and the deliverables at each stage of the project. Therefore communication among companies and between companies and their stakeholders is essential. After all, the aim of each M2M project must be to improve the client's business processes by providing the tools and techniques to take control of the client's machines. The partnership strategy is therefore a decisive factor, particularly in terms of delivering long-term customer service.

> Questions to consider include: Which business model should be introduced for each application? Will this model be financially beneficial for all those involved? What is the overall profitability generated by the model?

Finally, M2M implementations must pay special consideration to individual privacy rights and the governmental laws that apply. As M2M technology can identify and trace individuals - as well as the products they consume - there is naturally a growing concern that this data could be misused. Again, communication at each stage of the project can dispel these fears. [The importance of establishing clear communication channels with stakeholders is discussed in depth on page 18.

> Questions to consider include: What role will public authorities play in the choices to be made? How acceptable is this project to end-users, companies and prime contractors? Is this a national project or a European venture? What is the legal framework surrounding the use of M2M applications? Which solutions can ensure the safety of users and equipment and create trust in the services offered?

M2M is a fast-growing market – and adoption of the above practices will ensure that companies reap the benefits of M2M technology investment.

Moving forward, increased standardisation, the widespread availability of improved communication technologies, the introduction of even smaller embedded devices and improved power management will create new demand for M2M and boost demand for innovative technologies and techniques that harness M2M to optimise key business processes.

M2M's proven track record

M2M already delivers impressive business benefits across a range of industry sectors.

> In 2002, France Telecom R&D launched an experimental project called Gluconet in partnership with the University Teaching Hospitals of Grenoble and Toulouse; a project designed to manage diabetic patients remotely. Patient glycaemia data is read daily using a specialist instrument and transmitted automatically via a mobile phone to a management centre that doctors can access over the Internet. They then send any medical advice that may be necessary to the patient by SMS or voice messaging. The result is that the need for direct consultation is picked up early, and both the patient and doctor are aware of any complications in good time.

> In 2003, the German company Metro and the U.S. Stop & Shop chain experimented with an electronic supermarket trolley whose in-built computer was linked over a wireless network to a central system. The trolley can detect the products selected by the consumer, and the data is used to automate restocking, payment and customer loyalty systems.

> At the end of 2004, six European car manufacturers launched an R&D project to transform the use of communications in cars. For example, a vehicle encountering an accident or poor weather conditions on a stretch of road will automatically alert vehicles behind, while transmitting an emergency message to the traffic police.

> Since January 1, 2005, heavy-goods vehicles have had to pay tolls on German motorways. Vehicles fitted with a GPS system will provide real-time tracking, allowing toll charges to be deducted automatically from the transport company's account.

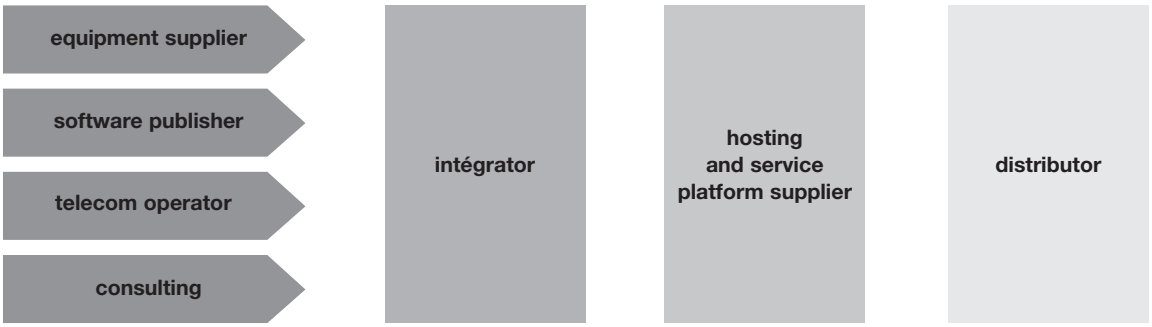
the value of M2M and the value chain

It is clear that implementing an M2M project requires project managers to orchestrate contributions made by a growing number of players. Chief among these are equipment and component suppliers, telecoms operators and software providers.

An “integrator” (whether this is a service company specialising in outsourcing, a telecoms operator or a service platform provider) can offer companies an undeniable advantage in this respect by acting as a single point of contact capable of looking after all aspects of an M2M project.

matching capabilities and responsibilities

A successful M2M project requires the interplay of the following technologies and services:



> Equipment supplier: manufactures and maintains the intelligent communication-enabled devices. The equipment supplier also supplies all the components required to integrate these devices into solutions, including programming interfaces and/or a bridge, as defined in the global M2M architecture.

> Software publisher: includes middleware and M2M application publishers. A range of suppliers may be considered in order to select the solution that best matches the company’s functional requirements and budget. ASP solutions are also an option.

> Telecoms operator: provides the connection to remote devices and offers operation and administration services for the network, and even the devices themselves. The telecoms operator plays a key role in the overall M2M solution.

> Consulting: helps give a full evaluation of the challenges and feasibility of an M2M project from the beginning. Consultancies can also identify those areas in which the company can draw most value from an M2M solution, such as its impact on organisational structures and information systems. They can also assist a company selecting the other players in this value chain.

> Integrator: takes responsibility for integrating all the components of the solution. The integrator may also be an IT services company, an outsourcing specialist, a telecoms operator or an equipment supplier.

> Hosting and service platform supplier: hosts and operates the solution. In some instances, this supplier may also supply a ready-to-run application and M2M service in ASP mode.

> Distributor: markets and deploys devices and the M2M solution to client companies. The distribution network becomes increasingly important where large numbers of devices are involved and are distributed over a wide geographical area.

Each of these players controls one part of the value chain and each may be engaged separately by a company involved in M2M implementation. Major projects require tight cooperation and collaboration among all companies involved. In particular, a close relationship between the client company and the systems integrator, capable of taking charge of the entire implementation, is recommended.

However, there is likely to be some overlap among some M2M players and their responsibilities. Project managers should therefore carefully construct the partnerships, paying special attention to both the strategic evaluation and the selection of players for the integration phase.

understanding the Ecosystem

The M2M ecosystem contains a multitude of players offering a very diverse range of skills and approaches.

We can see the increasing emergence and involvement of major players (software publishers, consultancies, software houses, solution builders, component producers, as well as mobile telecoms operators).
Their involvement – and the overall growth of demand for M2M solutions will drive:

> the increasing production capacity needed to manufacture embedded devices;

> the standardisation of technologies, facilitating interoperability with existing systems and independence from solution developers and builders;

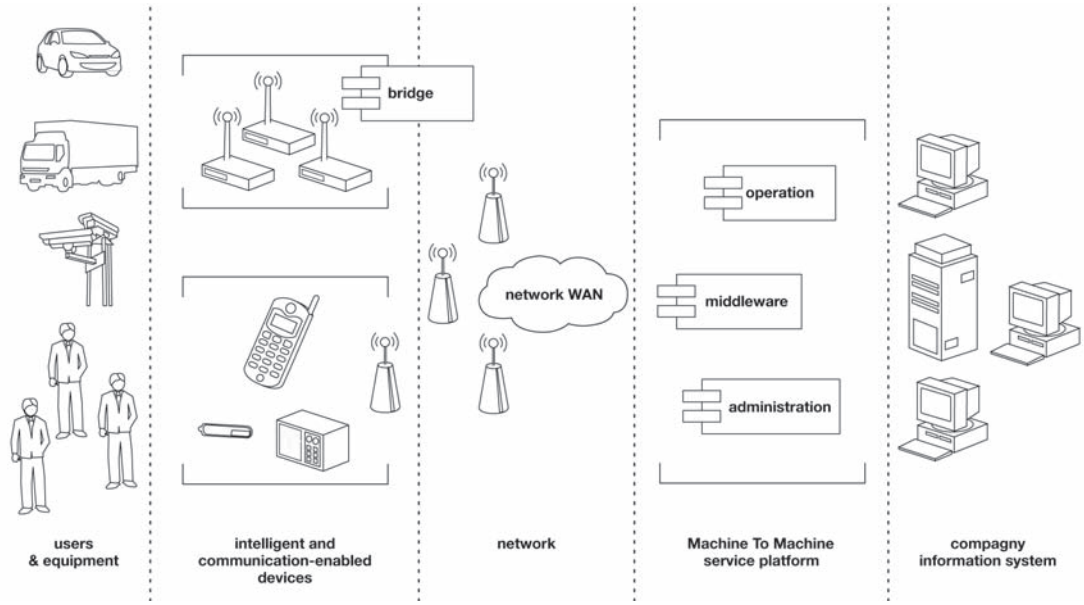
> the integration of the entire value chain to create a credible M2M economy.

The commitment of major ICT players is making the mass-market reach of M2M a reality. Leading software publishers are also closely involved, with products specific to mobility, M2M and RFID solutions.

Indeed, major manufacturers of modules and embedded devices have focused advanced R&D programmes on this market segment with the aim of driving down costs and miniaturising devices. We forecast their involvement in this highly competitive market will result in price reductions approaching 20% per year for such equipment.

technology and the role of enablers

architecture Machine To Machine



Source : Sopra Group - MR

At their core, M2M solutions combine the three main components:

> Communication-enabled modules and devices: These include wireless modules, embedded sensors and smart RFID tags. These sensors and actuators may be built in to special machines, as is the case with industrial programmable logic controllers, photocopiers with GSM modules, or industrial robots. They could also be PDAs or smartphones fitted with suitable communication modules.

> Networks: These include fixed and wireless communications networks. Connectivity is not only essential; it is also affordable as the advance of the TCP/IP protocol used by the Internet and widespread availability of broadband deliver voice and data traffic cheaply and efficiently.

> Software: The adoption of packaged applications (ERP, CRM, SCM) allows companies visibility of key business processes. More importantly, the rise of standards such as XML and Web Services facilitate the exchange of data between applications, enabling companies to collect and distribute data according to their business rules. The advance of other standards, such as Java, Microsoft Windows and open standards such as Linux allow companies to develop and deploy truly integrated solutions that blur the barriers of technologies and those between the company and its partners, suppliers and customers.

connectivity solutions

Essentially, all M2M solutions enable machines to "talk" to each other and to the people who control them by using wireless communications networks. The choice of the communications technology depends on several factors such as network range, frequency use and the underlying business model of the M2M platform.

The first – and most familiar – is wide-area cellular communications technologies such as GSM and WCDMA. These technologies offer voice services and some data access with global roaming.

The second cluster includes non-cellular wireless technologies such as Wireless Local Area Network (WLAN). WLAN supports high-speed data traffic over short distances of between 30 to 100 meters. It is a radio range perfect for machines operating within a Wi-Fi hotspot.

The third is a mix of proximity technologies including Bluetooth, a short-range transmission technology, and NFC (Near-Field Communication), which enables touch-based interaction for mobile devices. When an NFC-equipped device comes in a close contact with a NFC tag it can read the content contained in the tag and initiate a transaction.

There is also increasing interest and excitement about emerging wireless technologies such as ZigBee, WiMAX and various other short-range transmission technologies that have yet to be standardised.

Given the growing number and importance of a variety of wireless access technologies (WAN) – and the advance of TCP/IP (whose standards enable more secure connectivity and access) – connecting all devices in a unified network is a mammoth task. Furthermore, managing the devices and the technologies that make up the network can be even more difficult. We therefore advise M2M project managers to employ the services of a network operator, who can draw on internal expertise, support, infrastructures and network administration resources to manage and supervise the entire system from end to end.

creating pervasive M2M networks

> Progress in communications technology encourages the proliferation of networked devices, which, in M2M systems, can be as varied and numerous as their methods of installation.

> Devices may be passive or dormant: such as today's RFIDs that use radio frequency and a radio reader. Or, active and able to communicate spontaneously, provided they have the appropriate power source.

> Devices will be varied: as communication modules become smaller, cheaper and more autonomous, they will proliferate and combine with components such as sensors to enable machines to "feel" and "interact" more closely with their environment.

> Incorporated into domestic white goods and brown goods and even lamps or joinery, they will make consumer goods easily interconnectable. In industry, they will make it easier for robots to work together, as is already the case in the car, textile and steelmaking industries.

> Once they are very small, or even microscopic ("smart dust," MEMS, etc.), the devices could become distributed in a medium and be self-organising to provide "coverage."

> When more closely integrated and smaller, the devices will open the way to new interfaces with humans, such as soft interfaces and ubiquitous intelligence. Alternatively, they may confirm their status as machines in the form of robots, of the kind we see in Japan today. Then again, they could remain totally invisible and "lumped together," like a network of communicating sensors embedded in the concrete of a civil engineering construction.

The mass of such devices operating within a given space may increase the complexity of connecting them to a single access point. However where service quality standards are high and large numbers of devices need to be connected, networks of machines will also grow in complexity on the basis of scope (local/remote), topology (star/mesh) and dynamic status (static/Ad-Hoc). The connectivity of these networks is crucial and must be expertly managed.

when machines talk to machines

Future M2M systems will comprise a network of devices exchanging data on their own initiative as part of an autonomous process. They will also be able to adapt to their immediate environment, whether domestic or business. Those "machines" capable of being networked as part of M2M systems will therefore become increasingly diverse in nature, to the point where they may be grouped into a number of classes:

> "identifiers", like RFIDs, which give devices or machines a name and, where necessary, an address;

> sensors, whose primary function is to gather data about their environment;

> actuators, which enable the system to interact with its environment or change its status;

> transmitters (bridges), which relay the data collected;

> processors, which process the data gathered.

These classes are not mutually exclusive, and, in practice, one machine will perform multiple roles simultaneously.

M2M drives positive results and performance

This section will highlight the benefits delivered by M2M, the success factors and the lessons learned. The following case studies are based on insights and interviews gathered from a variety of sources, including the companies involved.

The company case histories given in this white paper demonstrate the importance of setting and focusing on precise targets right from the start of the project. These targets have been identified as:

> to reduce the costs of one or more players in the value chain;

> to improve end-customer satisfaction and corporate image;

> to gain competitive advantage through innovation.

The pockets of value within business processes are not always where they are thought to be at the outset. A strong partnership structure is therefore needed to identify these areas and share them advisably. For example, Aéroports de Paris has supplied its service free of charge to taxi operators, having financed it from the corporate image and customer satisfaction improvements delivered.

It is still rather too early to assess the return on investment for M2M projects. However, preliminary estimates indicate a period of six to 18 months.

case studies

In the case studies that follow, the financial models and expectations are also perfectly matched to the business. Costs have been carefully calculated and met by those players who profit from the tangible benefits delivered by the M2M project. It is therefore not unusual to find that all or part of the costs involved are passed on to the end-customer (as is this case with Konica Minolta). So, when the targets are clear and there are real benefits for the players involved, then project profitability is ensured.

Securitas
wireless network-based remote surveillance system

background

With a presence in over 20 countries, Securitas AB focuses on four core businesses: remote surveillance, electronic security, cash transport and banking logistics.

Securitas has introduced M2M technology into its home intruder and smoke detection systems. The adopted solution involves linking the alarm system and its associated cameras to a GPRS or GSM network in order to transmit still or video images in real time to the Securitas control centre and the customer, who can view the images on an Internet-connected PC or even a mobile phone. The customer can then discuss the situation with Securitas to decide whether attendance is required.

benefits

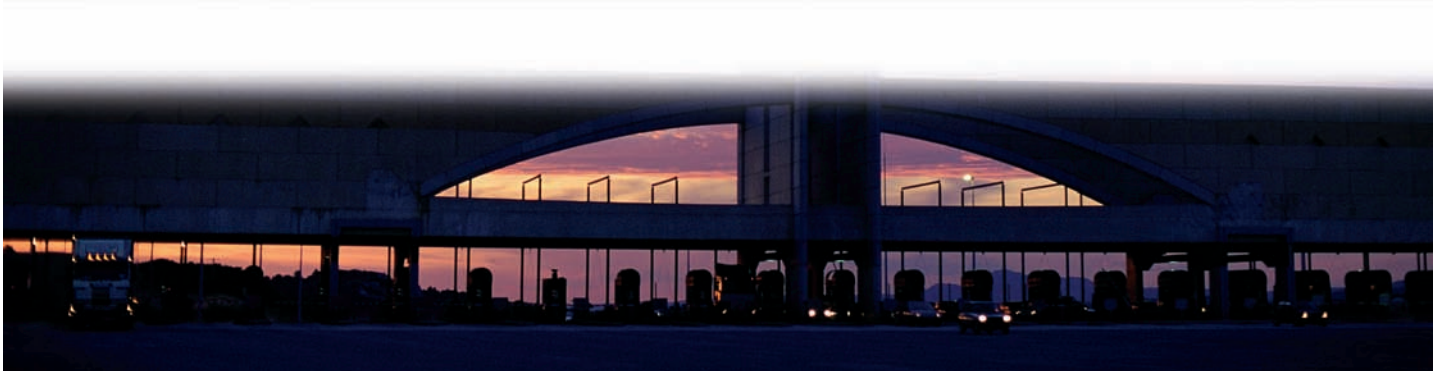
Initially, Securitas wanted to offer this kind of service by connecting its remote surveillance equipment to fixed telephone lines. By connecting via the mobile phone network, Securitas was able to reduce its installation costs by 15%. The ability to analyse the images transmitted following an alarm also allowed Securitas to optimise on-site attendance by its security staff.

This reduces additional cost for the end-customer, since the savings made by Securitas and the added value delivered to customers in terms of ease of deployment and service response times go a long way to offsetting the additional equipment and network costs.

success factors

Securitas has been able to make productivity gains by eliminating needless on-site attendance (as a result of false alarms, etc.) and by involving customers in its decision-making process.

Since its service must operate 24/7, Securitas has chosen to rely on a partner for its telecoms network needs, rather than develop its own network. The Orange Connect M2M solution delivers the required quality of service and all the tools needed to operate and monitor (GPRS/GSM) network consumption.



Cofiroute
automatic road toll payment system

background

VINCI Group subsidiary Cofiroute is a private operator holding concessions to operate some 985 toll-payable kilometres of France's motorway system, including the A10, A11, A28, A71, A81 and A85 (soon to be joined by the A19 between Artenay and Courtenay) and the underground loop of the A80 around Paris. Its expertise has also won Cofiroute international contracts to run other toll routes in the USA, Great Britain, Germany, Greece and Chile.

Cofiroute has introduced a new toll payment system designed to improve traffic flow and safety at the same time as delivering a high level of transaction data availability, integrity and confidentiality. It works by offering users a badge, which, once applied to the windscreen, records the vehicle's entry to, and exit from, the motorway. Users are then invoiced monthly and can access a subscriber's area on the Cofiroute Web site to view their invoices and a log of the journeys made. CS Communication & Systèmes is the company responsible for redesigning the entire Cofiroute Payment and Remote Payment System.

benefits

The project has delivered several benefits, allowing Cofiroute to improve traffic flow and reduce operating costs. It has also given the company a much better understanding of its customers, who have to subscribe to the Liber-T remote toll payment service and provide an invoicing address in order to obtain a badge.

Cofiroute can also offer personalised services tailored to the profile of individual users, their geographic location and the types of journeys they make. For example, Cofiroute markets a special student option that offers reductions of up to 60% off the normal rate. There are also discounts up to 80% on certain journeys, like the Transloire option offered to residents of Orléans and its surrounding region, as well as commuting and weekend options.

success factors

As well as the convenience offered by the system, and the time saved by not having to stop at toll booths, customers enjoy an extensive range of discounts depending on their profiles and journey patterns. They can also view their journey logs and account status online at any time.

Aéroports de Paris
fleet management of taxis at Paris-Charles de Gaulle Airport

background

Aéroports de Paris has deployed a service that optimises the flow of taxis through terminals 1 and 3 of Paris-Charles de Gaulle Airport. Developed in conjunction with Steria and supported by the Aéroports de Paris-Telecom infrastructure, the project has proved enormously successful for the company.

On average, 30% of the 15,200 taxis in Paris are within the perimeter of Paris-Charles de Gaulle Airport at any given time. This causes many problems for passengers, for taxi operators and for Aéroports de Paris, with passengers waiting more than 15 minutes for a taxi, taxis waiting over 200 minutes for passengers and taxi spaces near ranks and terminal entrances being rare and expensive.

In terms of logistics, the solution was to create a taxi waiting area in a large car park within two kilometres of the terminals, and a buffer zone near the passenger pick-up point.

Taxis are also fitted with RFID badges (like those used for remote toll payment) so that vehicles can be detected automatically at the entrances and exits of parking areas and pick-up areas. A software application counts the number of taxis in the various areas, shows drivers waiting times on electronic displays and advises them either to move from the waiting area to the buffer zone as passenger numbers rise, or to return to Paris if waiting times are too long.

benefits

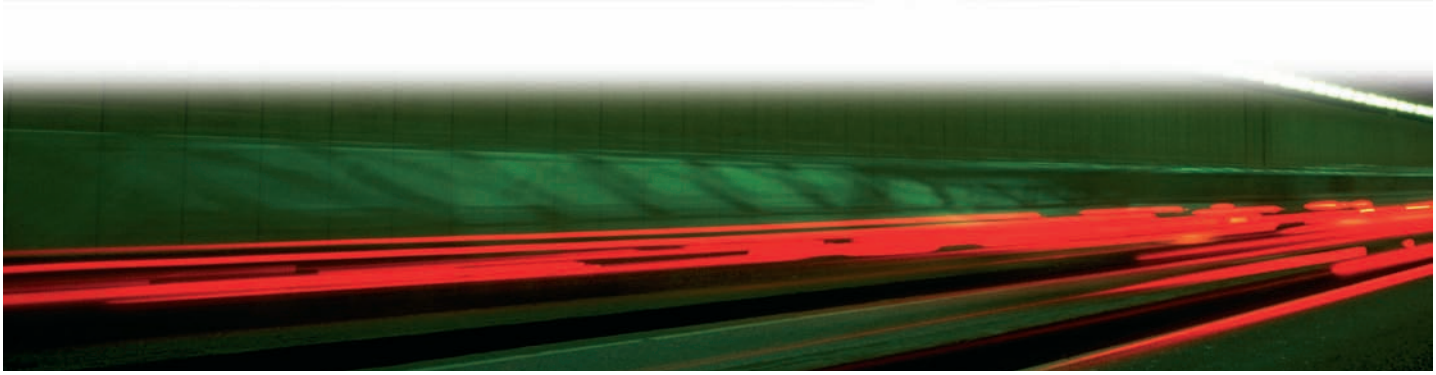
The contribution made by the M2M project for Aéroports de Paris is undeniable:

> improved management of the areas surrounding the terminals, enabling them to be used for other, more profitable purposes;

> much happier taxi drivers, who now have washrooms, a restaurant, a bar and a rest room in the taxi waiting area;

> shorter taxi waiting times of under 90 minutes;

> shorter passenger waiting times of under two minutes on average.



Where taxis are likely to be waiting for more than 100 minutes, drivers are advised to return to Paris, which means there are more taxis available in the capital. Furthermore, fraud has been reduced, since non-Parisian taxis arriving at the airport are turned away immediately because they do not display the appropriate badge.

This system also provides Aéroports de Paris with precise statistics on waiting times, which has enabled the creation of a system to manage taxi movements around the airport.

success factors

The multitude of players and technologies required for this project persuaded Aéroports de Paris to work with an integrator called Steria, whose principal role was to coordinate the equipment and transmission system suppliers, and develop the software.

To ensure that the solution was welcomed and adopted by taxi drivers, Aéroports de Paris put in place a communication and change support policy, under which drivers' representatives were involved at every project stage. A recent survey revealed that 70% of taxi drivers are happy with the solution as implemented.

The innovative nature of the project has encouraged Aéroports de Paris and Steria to adopt an iterative approach to implementation built on the test cycles and short prototyping times needed to ensure the reliability of the solution, and to refine the functional specifications (taxi tracking rules, calculations of estimated journey times between zones, etc).

For Aéroports de Paris, the profitability of the project lies in increasing the market share of Paris-Charles de Gaulle Airport by improving passenger satisfaction and operating the areas around the terminals more profitably.

Aéroports de Paris and Steria are now planning to apply the experience they've gained by offering similar services to other companies, such as SNCF railway stations and other airports worldwide.

Konica Minolta
maintenance of corporate photocopiers and printers

background

Konica Minolta manufactures and markets corporate photocopier and printing systems. In order to maintain its machines and renew consumables when needed, Konica Minolta has, for some years now, been fitting its larger photocopiers with modules capable of communicating with a remote management centre over a fixed telephone line. First installed over 10 years ago, the system required a phone socket to be provided near the equipment.

Since then, products have become multifunctional (printer/fax/copier), so Konica Minolta took the decision to fit its products with GSM mobile connectivity, rather than fixed phone line connections. The falling cost of modules and wireless communications has made it possible to build these technologies into a much wider range of products.

Called Archange, this new service is offered with (B&W and colour) machines capable of producing at least 22 pages per minute. Such machines account for over 50% of those supplied, but now users no longer need to phone for help if a machine malfunctions or needs toner, or even to report copy meter readings. The remote system means that new supplies are prepared automatically for shipment to customers. The new system was installed on all compatible machines supplied in 2005, at the rate of 500 per month. In fact, the installation rate for the new range has already risen to 1,500 per month.

Konica Minolta now plans to equip over 50,000 printing systems in France with the Orange Connect M2M solution and Siemens TC45 wireless modules.

benefits

One of the largest benefits is the rise in customer satisfaction levels resulting from improved service quality, continuity of operation and shorter repair and replenishment lead times.

The project has also helped Konica Minolta to optimise its customer support procedures. The automatic call generates an attendance request that results in a technician being sent immediately to the location concerned, and an order being sent directly to the warehouse so that the relevant parts or consumables can be dispatched quickly.

Lastly, the system is also used to generate analyses and statistics on equipment use, breakdowns and reliability issues, resulting in improved management of the installed base of equipment on customer premises.

success factors

Implementing such a system has had a significant impact in human terms because customer support processes have had to be redesigned to reduce human involvement. One example is the way that product shipping orders are now sent directly to the warehouse.

This move has had an impact on customer support staff and maintenance technicians. Initially, this involved introducing an operator-controlled delivery request approvals procedure, designed to check call validity and product delivery addresses. Full automation will follow once the entire chain is fully reliable. Support was also given to maintenance technicians to help them adopt the new procedures and avoid taking a negative view of the fact that the system is capable of interacting with their photocopiers. They then attended training and awareness courses, and have since been allocated to tasks delivering a higher level of added value.

Similarly, resellers have also received training and awareness sessions explaining the added value that this solution can deliver to end users.

The solution was financed partly by raising the price of equipment to end customers, and partly by reducing internal maintenance costs.

the learning curve

Given the complexity of these emergent technologies and the diversity of the players making up M2M, it is critical to select a partner from the outset that has an expert overview of the value chain; is able to control a major part of it; and has proven skills in the technologies to be implemented.

All the M2M projects described in this white paper began with a technology pilot phase to measure project feasibility, provide a controlled environment in which to test the links between the players in the value chain and assess the benefits perceived by each. This chapter looks in more detail at the technological benefits to be gained from a well-executed approach to M2M implementation.

The pilot phase of M2M is critical to success and provides all players an opportunity to identify and address key business issues. The pilot phase provides all parties a forum in which to:

> Select and perfect the technology components such as:

- the communication technologies;
- the types of actuators and sensors required to meet data integrity requirements;
- the information systems and software necessary to deliver on the M2M value proposition.

> Address technology complexity with an aim to create overarching standards and strategies – and even reuse existing technologies as building blocks to expedite the project.

> Test all components, systems and aspects of the project. These include:

- the rise in the number of transactions, the number of machines connected and the volume of data transmitted;
- the response times and component response elements;
- system reliability.

We believe reliability is crucial and project managers should consider every type of backup and bypass solution (including manual ones) to address every possible failure scenario. In addition, M2M solutions should be future-proof and designed from the ground up to scale with customer requirements and accommodate growth in the number of devices managed.

the bright future for M2M

Several factors are coming together to create a buoyant market for M2M technologies and solutions. ABI Research predicts that there will be 100 billion communication-enabled devices worldwide by 2010. Over 13 billion of these will be in Europe, and most will be based on RFID technology.

This chapter identifies the individual drivers and their likely impact on the greater M2M industry.

device miniaturisation

When it comes to servers and PCs, the gains obtained as a result of Moore's Law have usually been applied to making machines more powerful rather than smaller, but with M2M, miniaturisation may prove more crucial than processing power.

Acting as the interface between the M2M system and its environment, sensors and actuators constitute one area in which we can expect to see some major developments.

These components will benefit from MEMS (Micro-ElectroMechanical Systems) technologies, which, by building mechanical devices directly onto a chip, enable the creation of very small sensors (e.g., load, pressure, acceleration, swing) and actuators (for pumps and motors). Furthermore, they can be manufactured at a cost similar to traditional integrated circuits and are equally reliable.

Combining electronic and electromechanical devices on the same chip will lead to real "single-chip systems." Looking further ahead, these could be superseded by nanotechnologies.

improvements in communication

The development of the mobile networks vital for carrying data over long distances is already well under way. EDGE is now improving GSM/GPRS transmission performance and we can look forward to HSDPA and HSUPA doing the same for 3G/UMTS networks – bringing them up to performance levels comparable with today's ADSL links.

Wireless local network technologies, especially Wi-Fi, should continue to develop and will deliver higher bandwidth, increased range and better security. New variants will be marketed for specific applications (e.g. 802.11p for cars). WiMAX will enable the introduction of high-bandwidth bridges between relatively distant devices.

Short-range wireless networks will also deliver many advances. In addition to Bluetooth, which is now very widely available, UWB (Ultra-Wide Band) and ZigBee technologies are paving the way for communication modules that consume considerably fewer resources.

Wired technologies (e.g., ethernet over the electrical system of an industrial or residential building or IP over fibre optics) will also be used increasingly by M2M technologies.

Networks will need to be structured into hierarchies to optimise communication: in the extreme, miniaturised modules will enable devices to communicate over short distances (using very little power) with their neighbours; or with bridges whose power supplies enable them to transmit over longer distances.

improvements in energy efficiency

Machines will become more energy-efficient as a result both of advances in semiconductors and transmission techniques, and will be optimised to use less power and run with fewer processor cycles.

Power sources for machines will also be improved. In the short and medium terms, businesses can look forward to a doubling in battery performance (Li-Ion and Li-Po technologies, followed by Li-S), and in the medium and long term, fuel cells.

Applications requiring very low power levels may be run on alternative energy sources, such as photovoltaic micro-cells and piezoelectric transducers.

The aim here is to arrive as quickly as possible at the stage where machines are autonomous for months or years, rather than days or weeks.

unlimited opportunities

The technology trends discussed in this white paper and those currently being developed in research laboratories are converging toward a shared vision of pervasive computing and networks with the potential of capturing, processing and exchanging available information freely at any point in system, very much as electricity is distributed today.

In fact, the number of machine-to-machine interactions will very rapidly exceed the number between humans via networks, or between humans and machines.

the vision of ubiquitous intelligence

The issue of ubiquitous intelligence is one of today's priorities for European technology R&D. What it means is "embedding the technologies of the information society in the very fabric of that society. Computers and networks are integrated into the everyday environment and replace the user at the centre."

> "Ubiquitous intelligence enables the service of the information society to be made available to everyone, everywhere, through a variety of paths. Individuals will be surrounded by easy-to-use interfaces embedded in every kind of object, and by an everyday environment that is able to recognise them and respond to them fluidly or even invisibly."
>
> European Commission
> Sixth Framework Programme for R&D

In Japan a number of research programmes have been implemented. Chief among them is "U-Japan" (U for ubiquitous), which replaced the more traditional "e-Japan" programme in 2004.

According to the Minister for Internal Affairs and Communication, the challenge is to build a society in which "information and communication technologies touch on every aspect of life, and in which everyone and every object can be connected to any other at any time and anywhere."

It is also about ensuring Japan's global leadership in future technologies and services and responding to the associated social challenges of an increasingly aging population, urban congestion, pollution and the perceived need for security.

The Japanese approach looks forward to person-to-person (P2P), person-to-object (P2O) and object-to-object (O2O) communications as a continuum. Rather than ubiquitous computing, it is ubiquitous networking upon which the Japanese vision is built, but with the individual as the central focus.

M2M impacts society

M2M affects a much wider world than simply the internal business processes of companies. Networked chips are to be found not only in a growing number of today's everyday appliances, urban facilities and vehicles, but also in 95,000 trees in Paris and alongside motorways.

And M2M applications are limited only by our imagination – as the following examples demonstrate.

cars with drivers... and without

Today's cars contain dozens of chips, which are often networked and designed to measure parameters, in order to provide driver information, relay commands and react in the event of danger. By learning to communicate with the outside world, they will gradually transform the very nature of the "driving experience."

Safety: vehicle-to-vehicle communication aims to prevent accidents by monitoring safe distances between vehicles or their approach to road junctions. Cars may also able to communicate with the road infrastructure, which could notify drivers of a collision, project road signs and warnings onto the windscreen or detect excessive speed. Damaged or stolen vehicles will be able to alert an assistance centre unaided.

Are we moving toward driverless vehicles? The IMARA project run by INRIA (The French National Institute for Research in Computer Science and Control) is working on driver support systems extending all the way through to total automation. The project initiatives aim to improve safety, minimise energy consumption and pollution and improve traffic flow. The experimental directions are very diverse and range from small urban cars for communal use to sections of road (beginning with motorways and then extended to urban routes) dedicated to automatic driving. Here, vehicles would automatically set their own speed in relation to that of others, and fully automated "cybercars" would be summoned and left wherever required.

"The main applications of M2M technology in cars will involve safety and driver support. In addition to delivering precise location of damaged vehicles, it also extends the driver's range by exchanging data with nearby vehicles and the road infrastructure. Standardisation is clearly key to these applications and their deployment. Then there is the issue of funding sources, particularly for infrastructure investment, and there are also issues of responsibility to be addressed."

Gérard Ségarra
Research Representative to the Technologies and Systems Division of Renault

wired cities

Urban areas are populated with sensors: counters, infrastructure management systems (e.g., water, gas, electricity, roads) and remote surveillance (eg; air-quality measurement).

M2M technology is already able to simplify gathering and analysis of the large volumes of data that these systems generate, automate a part of their management and involve control centres and maintenance teams only when really required.

Urban travel: M2M technology brings with it new opportunities, from automated urban toll collection (London) to the provision of bicycles (Vélo'v in Lyon), bus traffic regulation and providing passengers with waiting time information and even ticketing.

"U-cities" (ubiquitous cities): 60 kilometres from the South Korean capital of Seoul, New Songdo City is being built on land reclaimed from the sea and will be home to 6,500 families and 30,000 jobs by 2014. In this hypermodern metropolis, sensors, networks, computers and other digital devices are integral to the urban infrastructure itself. Every citizen will have an RFID "key" that will let them use public transport, pay for car parking, see a film, use a public computer or even provide medical data in the event of accident. Screens set into pavement surfaces will display contextual information or advertising messages. Other ideas under consideration include smart waste bins that will credit the accounts of citizens who comply with recycling rules, and ground surfaces that can detect when an older or frail person has a fall.

> "The aim is not to transform the home into a 'fully automatic' building. The intelligent, networked house should provide its occupants with the atmosphere and comfort they expect through simple, structured and reliable operation. It's all about improving user comfort by relieving them of tasks that are repetitive, but which they will continue to control."
>
> Olivier Leberre
> Marketing Director France at Legrand

delivering better home care

The health-care system is under constant pressure from the rising demand imposed (mainly) by an aging population, limited resources and the increased burden of personal responsibility placed on medical staff. M2M technology is contributing to the quest for solutions in many areas of the system. These include:

> Home care: designed to limit the length of hospitalisation and enable the elderly to live at home, medical supervision systems measure patients' health parameters before informing or alerting the medical practitioners responsible for their care. A prime example of this is the Gluconet experiment run by Roche Laboratories and France Telecom.

> The right treatment at the right time: RFID chips inserted into medication packaging can monitor how patients are keeping to their treatment regime. Used in conjunction with home monitoring, they enable fine-adjustment of dosage. Eventually, biochips inserted into the capsules swallowed by patients will ensure that only the required quantities of active agents are released into the body.

> Robot nurse: more preoccupied than most with the aging of its population, Japan is experimenting with many types of "robot companions," designed to assist pensioners. Wakamaru, the small, friendly anthropoid robot designed by Mitsubishi, will help complete selected daily tasks, hold simple conversations, and remind its owner when it is time to eat or take their medication. It will also detect when someone falls over and call for assistance.

hurdles on the horizon

Communications are central to the M2M concept, so standardisation is a cornerstone of M2M. Without it, the profusion of proprietary “standards” could fragment the market and hold back its growth. This section will examine the potential technical and societal obstacles to the widespread use of M2M technologies and solutions.

potential obstacles to M2M

The proliferation of communication-enabled devices and the resulting growth in “shared intelligence” will lead to greater systems complexity. This must be concealed by suitable protocols, interfaces and middleware, and will also be accompanied by tools to manage device lifecycles, as well as to identify and track them within the information system.

Additionally, the dissemination of communication-enabled devices will raise trust-related questions. So issues such as security, confidentiality, reliability and service quality must be addressed effectively and the resulting safeguards demonstrated.

One question for two experts: what are the obstacles to expansion of the M2M market ?

“

> Data processing: the volume of data generated by machines will increase at a completely unprecedented rate, accompanied by new constraints, particularly real-time processing.

> The diversity of disparate machines, interfaces and data formats.

> The administration of solutions: to be accepted by customers, we must demonstrate our ability to reconfigure systems easily and, for the future, automatically integrate contextual changes in their operation.

”

Vincent Delahaye
Senior IT Architect at IBM France

“

> Basic component production technologies: the aim is to achieve higher wireless communication frequencies at the same time as consuming less power.

> The networking of machines: for example, the asymmetry of flows within a network of intelligent sensors still poses problems that we have yet to fully resolve.

> The absence of standards.

”

Vincent Delahaye
Senior IT Architect at IBM France

the human factor

Every M2M application involves human beings, and so M2M project managers must actively seek their involvement. Users, decision-makers, operators and technicians. The success of M2M ultimately rests on the trust each stakeholder has in the devices and processes with which they are presented.

This level of trust depends on a variety of factors including:

> system reliability and security;

> transparency of operation;

> clear-cut outline of responsibilities and procedures in case of a system failure;

> flexibility to “disengage” from the system when privacy concerns take precedent.

“As with its older brother, the “Machine Internet” will have a profound effect on systems architecture and business processes. The change is already happening, but we can’t yet measure how far it may extend. From the ISD viewpoint, deployment, supervision, administration and traffic are the core issues. As with any large-scale project, the deployment of M2M must be carefully considered. And it is very important to remember that although we are talking about machines at the beginning of the process, in the end its users are people”

Bernard Liscia
Director of Strategy at Atos Origin

M2M2H: Machine To Machine To Human

Companies must listen attentively to these concerns and take them on board. We recommend the following plan of action.

> Give users control over M2M systems

- Explain and document application operating rules and methods.
- Offer explicit user interfaces that allow system operation parameters to be adjusted and malfunctions to be managed.
- Ensure that the operating rules allow for the system to be deactivated at will.

> Adopt a proactive attitude to privacy

- Identify which items of personal data are really necessary to collect (and how they should be collected), whether this data concerns customers, employees or subcontractors.
- Store personal data for the shortest possible time, or make it anonymous.
- Inform individuals about why the data is being collected; seek explicit consent where appropriate.

> Manage the associated risks

- Stress: the system may make people feel as if they are under unnecessary surveillance, are the subject of constant attention or that their private and relaxation time is threatened;
- Abdication of responsibility: this is linked to the feeling that the system does everything and that vigilance is no longer necessary.

The fact that these risks exist means that in-depth consideration must be given to the content of the jobs involved and the rules to be followed by the company and its employees.

conclusion

Throughout these pages, we have seen that the M2M concept opens up immense opportunities in terms of technology and business practice, both in the corporate world and in our daily lives.

The combination of electronics, IT and telecoms, all of which are changing fast and have been converging for several years, are now capable of meeting the needs and aspirations of people, and fulfilling the end-to-end productivity needs and strategies of companies.

Whether the objective is to create value, rationalise business processes or comply with regulations, communication between machines will deliver innovative, profitable and sometimes unexpected results.

Make no mistake, the major challenges posed by M2M technology are being defined and are continuing to crystallise in terms of solutions, players and value creation.

Committing to a M2M project at this time is a way of preparing for the future. This is because the challenges that will soon confront companies and their employees may find a completely new kind of response and previously unsuspected areas of value generation in the “Machine To Machine” concept.

Furthermore, communication between machines could deliver greater comfort and well-being to individuals in their daily lives, in business, and at home. Although much has been said in this white paper about communications between machines, the most important aspect of all is dialogue between people.

It is quite clear that M2M technology will become increasingly mainstream, showing up in a variety of levels across a number of vertical industries. The outcome is likely to be truly transformational. At the same time, the inevitable advance of M2M will create project managers with a new and distinct set of capabilities.

Project managers must be adept at identifying the technology and methodology required at each step of an M2M project. More importantly, they must be masters at orchestrating the abilities of their technology partners and telecoms integrators to deliver the necessary results. Finally, M2M project managers must engage in dialogue with stakeholders to build trust and maintain the current momentum of M2M.

Put simply, just as managers network technologies to enable seamless connectivity and the successful completion of an M2M project, so must they also connect their partners, suppliers and customers in a network that unleashes innovation, delivers business value and enables superior performance.

The growth of M2M will be both inevitable and relentless. Wherever there is a need for monitoring, controlling, displaying or transacting remotely, M2M delivers clear cost and time benefits to the companies prepared to embrace it.

appendices

legal information

As soon as they enable identification of an employee or customer (even indirectly) and make it possible to obtain data about them, M2M applications must comply with a number of legal obligations. Avoid breaking the law, avoid the misuse of data and retain a sense of proportion: these are the issues to which we must apply concepts such as employment code “proportionality,” “loyalty” and “transparency” where they are used in companies, and “privacy,” “change of purpose,” “informed consent,” “deactivation” and “right to erase data” where they affect our everyday lives as
citizens.

What is required is a pragmatic approach applied on a case-by-case basis. The following paragraphs illustrate the kind of points that should be addressed before implementing a M2M application:

Preliminary consultation: the labour-management committee must always be consulted if the solution envisaged enables control over the work done by your employees and/or constitutes a new business technology with consequences for their working conditions.

CNIL declaration: in principle, the company must declare data processing operations to the CNIL (the French data protection agency) and obtain an official acknowledgement that this declaration has been received before processing any named data. In some cases, authorisation may be required (e.g.: for file linking).

Indirect identification: where it is possible to identify a person from a device associated with a machine or vehicle (e.g. a SIM card contained in a unit installed in a fleet vehicle), the company is bound by the same legal constraints governing personal data protection as if the devices were directly associated with the person (e.g. identification of an employee’s mobile phone).

Geolocation: employees must always be informed by the company that a geolocation device has been installed, the type of location data processed, the purposes of the data processing concerned, the length of time that data will be held and any transfer of it to a third party. Employees must also be informed of their rights to view data concerning them.

Data retention: a mechanism for erasing data and/or deactivating RFID tags must be provided.

Security: the company has a legal obligation to maintain security of customer data. This obligation also applies where the company hosts this data with an external supplier. The company is then obliged to impose organisational, logical and physical security measures on its supplier to ensure that the hosted data is protected.

glossary

ASP – Application Solution Provider

Online application solutions: i.e. connecting customers and the servers that host the application solution used by these customers.

Home automation

Automating the commands and controls that govern functions within a house or other residence.

Edge (Enhanced Data rates for GSM Evolution)

Mobile phone transmission mode that delivers greater functionality and bandwidth than GSM and GPRS; sometimes referred to as Enhanced GPRS.

EPC (Electronic Product Code)

Coding standard used for the RFID tags developed by the research laboratory, AutoID center.

Geolocation

The ability of a communication system to determine the terrestrial coordinates of a terminal location.
This localisation may be based on a satellite system (GPS, Galileo, etc.) or the terrestrial mobile communications network.

Building automation

Automation of the commands and controls used to manage an office building. Also referred to as home automation for companies.

Ubiquitous intelligenc

The concept that describes an environment in which devices, places and people inter-communicate in a natural and intuitive manner, and within which each device is able to “understand” the specific characteristics of the other elements, adapt to suit the context and respond appropriately to its needs.

IP (Internet Protocol and IPV6 – Internet Protocol Version 6)

The protocol used for data transmission over the Internet, based on the routing (forwarding) of data packets called datagrams containing an end-to-end IP address via the nodes of a mesh network. The enhancements delivered by Version 6 include a much more sophisticated addressing capability (128-bit addresses instead of 32-bit).

Machine To Machine

The association of IT and communication technologies with intelligent communication-enabled devices, where the aim is to enable the latter to interact with the information systems of organisations or companies, but without human intervention.

MEMS (Micro Electro Mechanical Systems)

Technologies that combine semiconductor micro-electronics with micro-machining technology to create entire systems on a single chip. These systems include mechanical components (sensors or actuators) and processing and/or communication capabilities.

Monitoring

Surveillance or remote surveillance, usually associated with the triggering of an alarm where a threshold is crossed, or with an auxiliary mechanism designed to return the measured value to the recommended value.

Nanotechnologies

Technologies developed on the nanometric scale (usually between 0.1 and 100 nm). A nanometre is one millionth of a millimetre.

Pervasive Computing or Ubiquitous Computing

Pervasive computing or Ubiquitous computing (ubicomp, or sometimes ubiqcomp) refers to computer-based data processing dispersed in the environment, as opposed to processing on standalone computers.

RFID (Radio Frequency IDentification)

An identification technique that relies on the storage and remote interrogation of RFID tags or transponders. A tag is any small device that can be attached to, or incorporated into, an object, a place, a person or an animal. An RFID tag has antennas to receive and respond to requests from an RFID transceiver.

Telemetry

Remote measuring technologies.

UWB UltraWide Band

A localised radio communication technology delivering very high bandwidth using very short wave transmissions over a very broad band of frequencies. UWB has a low power requirement and does not interfere with other existing systems.

ZigBee

ZigBee is a set of communication protocol specifications using high-performance, low-power digital radio frequency transmissions for personal wireless networks. The ZigBee protocol enables application interoperability by specifying the interfaces necessary for the various parties involved to work together. The aim is to deliver greater simplicity and lower cost than other local network standards.

Business Services

Orange Business Services is a global provider of communications services to businesses and organizations and a leader in the integration of mobile, fixed and IP technologies. Part of the France Telecom Group, it offers voice, data and mobile services as well as IT expertise to help transform business processes and improve productivity. Orange Business Services is present in 166 countries and serves customers in 220.
www.orange-business.com

Syntec informatique

The Chambre Professionnelle des SSII (the French trade association representing software houses and software publishers) represents 500 member groups and companies, which together represent over 85% of total industry revenue and employees (200,000 employees and revenue of 19 billion from companies with 10 employees or more).

The Chambre Professionnelle also contributes to keeping the entire IT community up-to-date with industry figures and trends, as well as representing it to other bodies and public authorities.

Syntec informatique defends and promotes the collective professional interests of its members and addresses the ethical, financial, international, legal, employment and technical issues arising from their business activities.
www.syntec-informatique.fr

The mission of Fing is to identify, stimulate and promote innovation in Information Technology services and practices, and in communication. As a collective and open organisation, Fing is simultaneously a network, a forum for discussion and the encouragement of new ideas, a representative body, a monitoring organisation and a partner for those who research, innovate, create, experiment and act as entrepreneurs.
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