

2013, a Further Year of Revolution in the M2M Business

Guenter I. Klas
Jan 09, 2013

The 1 minute takeaway

The M2M industry keeps growing. It has enormous potential in connecting all types of devices to value-adding applications and services. In the end, we will approach the vision of the Internet of Things. Still, deployment of end-to-end solutions is relatively complex, with a number of different players in the M2M ecosystem involved. Today, the chain ranges from M2M chipset vendors, wireless module and terminal vendors to communication service providers, service enablement platform and application enablement platform providers to companies putting focus on enterprise application integration. Many solutions have silo character for good reasons. Typical forecasts for M2M developments in 2013 mention of course Big Data, M2M data analytics, new types of middleware and also a bigger role of embedded SIMs. I believe that in 2013 we may witness developments in three particular areas: First, new strategies being developed by communication service providers to improve their position in the M2M value chain; second, the emergence of open standards challenging the safe harbours which several vendors are currently enjoying; and third, the responses of communication service providers to technical advances made by vendors on software level both on the device/module side and on the server/enterprise application integration side. Because the value chain is much fragmented today and profitability appears to be an issue here and there, industry consolidation appears likely though it's not going to be straightforward.

Tags: M2M, Service Enablement Platform, Application Enablement Platform, Enterprise Application Integration, Wireless Modules, Sierra Wireless, Telit, Digi, Gemalto, Sensorlogic, Axeda, ILS Technology, Eurotech, Kontron, u-blox, Cinterion, Netcomm Wireless, Jasper Wireless

Introduction

The Machine-to-Machine industry is on its way to revolutionise the world. Every year, we are getting closer to the Internet of Things. The commercial potential is enormous. There will be more "machines" and "things" connected to controlling and managing applications than PCs and cellular phones combined. The forecasts for 2015-20 go into the double-digit billions of devices. The promises from M2M for "M2M consumers" are very interesting as they are often related to cost savings, particularly Opex, and better customer service. Where are we today and what's next?

Where M2M has left us in 2012

M2M applications appear limitless. It is just a matter of the question: What do you want to improve? Applications are as fancy as monitoring dairy cows, observing patients' blood pressure, remotely reading smart water and gas meters, tracking goods on their journeys around the globe, monitoring the temperature in refrigerated freight trailers, the inventory level in vending machines and similar stuff.

Many different pieces are required to realise a good M2M application. A growing industry with many participants is eager to fill the space. Let's look at one M2M application for the fleet management of a hypothetical logistics company **MyLogFirm** (yes, they also serve the logging industry).

A small piece of equipment is attached to the vehicle bus of vans and trucks. That's a **smart M2M device**, which in turn is connected to an **asset**, the vehicle. That smart device is produced by some niche market player, say **SmartDeviceCompany**. The device collects information from the vehicle's on-board computer (e.g. statistics about driving, mileage) and vehicle peripherals like tyre pressure sensors and vehicle load weight sensors. The same device, via a short-range wireless interface, collects information from a wireless electronic logbook (these days in tablet format), which drivers use to report information about customer visits, about customer satisfaction and about maintenance actions they have undertaken related to the vehicle (e.g. jet-washing or sandblasting the trailer...).

The smart device is in essence a custom software application deployed on a **wireless M2M module** (as e.g. from Sierra Wireless [1] or Telit [2]). The wireless M2M module interfaces with a **GPS chip** (e.g. from Sierra Wireless or u-blox [3]), so it is able to determine the exact geographic location of the vehicle. The wireless M2M module communicates via 2G, 3G and 4G (LTE) **cellular networks** with a **M2M application enablement platform AEP** (e.g. as from Axeda [4] or ILS Technology [5]). MyLogFirm have done a deal with an operator (or an operator alliance) which gives them a single tariff for cellular M2M communication across Europe (MyLogFirm don't drive their trucks across the Atlantic or to the Far East). To manage the **SIM cards** in the smart device, monitor cellular network usage and impacts on costs, MyLogFirm use a graphical web interface offered by their preferred network operator.

The wireless modules (in the smart devices inside the vehicles of the fleet) can all be remotely managed by **device management systems** typically offered by the vendors of the wireless modules (e.g. Sierra Wireless AirVantage [6]). The modules can be refreshed with new firmware, they can be configured for particular network access (e.g. Wifi, 2G, 3G, including network access policies, ...) and technical issues can be remotely diagnosed. The wireless modules ship the more interesting application-level data (from the vehicles' on-board computer, sensors and logbook) to the application enablement platform. Such platforms are provided e.g. by Gemalto (Sensorlogic) [7], Axeda [8], ILS Technology [9] or Eurotech [10]. M2M service enablement platforms tend to grow more sophisticated and the line to application enablement platforms is getting more blurred.

Our SmartDeviceCompany has partnered with a software company **SmartFleetMgmt** who have produced a custom fleet management application that resides in the Cloud of the company running the application enablement platform. This application is the main "brain" of the fleet management. However, it makes use of the **application framework** made available through the application enablement platform. The platform is the hard worker underneath the core fleet management software and offers lots of building blocks and functions to reuse and customise.

For example, we want to get a notification when a truck is parked for more than 1 hour between 8am and 6pm next to a pub (possibly the driver then went to have a few unauthorised beers). For this we use the scripting interface of the AEP and program in a high-level programming language, using the smart device's GPS module, a geo-fence feature, access to an online pub directory and access to a smartphone's accelerometer: IF (truck in state 'parked' AND truck within 50 meters of pub location AND truck parking duration exceeds 1 hour AND accelerometer on driver's phone indicates shaky movements) THEN send alarm ELSE do nothing.

SmartFleetMgmt has built a very comprehensive M2M application now hosted on the AEP Cloud of the AEP provider, and this in a very short time-frame. It was made possible by a **software development kit (SDK)** offered by the AEP provider. Equally SmartFleetMgmt had to work with SmartDeviceCompany to deploy the application-specific software code directly in the wireless M2M module in the smart device. Again, this job was made easy through the possibility of **high-level programming** (e.g. in C, C++, Python or Java) of the part of the application that has to reside on the wireless module itself. Moreover, to control the attached GPS chip, to gather data from the vehicle on-board computer, to read the tyre pressure sensors and the weight sensors and finally to communicate with the electronic logbook in tablet form, the guys could make use of pre-manufactured software libraries which were made available by the wireless module vendor (e.g. the Location Library for Sierra Wireless OpenAT). Done & dusted. Low cost production, reusable software building blocks and short time-to-market.

The customer of the whole thing, **MyLogFirm** had a further idea: They wanted to get the customer feedback and satisfaction data which is collected by vehicle drivers, directly into their customer relationship management system (CRM, e.g. from Salesforce.com). This amounts to an integration of the AEP with an **enterprise application**. To the delight of SmartFleetMgmt, the application enablement platform provider had a pre-manufactured solution for this already in place: An interface from their Cloud-based system to the system of Salesforce.com. The solution made use of an **integration queue**, i.e. the Salesforce.com system could subscribe to events that happened in the AEP. Such events, like the arrival of a driver's new customer feedback report, would then trigger a workflow in the CRM system (e.g. schedule a call to a disgruntled client). Such enterprise integration is already under way and solutions from Axeda and ILS Technology are decent examples. Apart from message queues, **RESTful web interfaces** are another useful way to achieve such integration.

What's coming next in 2013?

In 2013, the development of M2M solutions will continue at a high pace. The more there is pressure on vertical industries like Logistics, Healthcare, Industrial, Consumer Electronics etc. in a post-financial and sovereign debt crises world to reduce costs and a to outsmart competitors through differentiation, the more innovative M2M solutions will enter the market.

Several parties have made interesting forecasts about what might happen in 2013. You find them under the "top n predictions" with n being typically 10 or 5.

Some of the predictions made for 2012 have not materialised yet but may do so in 2013, e.g. "further restructuring in the module/chipset market" as predicted by Machina Research for 2012. For me it seems that some of the wireless module vendors may get under pressure from major system on chip vendors who integrate all and everything in a single chip. Generally, I tend to agree with the new prediction of more M&A [11].

For 2013, Jürgen Hase from Deutsche Telekom for instance predicts more **big data and real-time analytics** on the basis of data points gathered from all sorts of machines and M2M endpoints [12]. I agree that this has enormous potential once the outcomes of such analytics can fruitfully drive business processes. The other point I agree with is the possible rise of new kinds of **middleware** (he mentions the software-assisted setting up of heterogeneous sensor networks for industrial monitoring). This is a gap today and we aren't there yet.

Fresh from the press also the M2M predictions in m2mNow.biz from Jan 4, 2013 [13]. I want to highlight the prediction made by Matt Hatton, director of Machina Research about the rise of **programmable SIMs/eUICCs** (embedded Universal Integrated Circuit Card). This of course relates to remote SIM management. The idea is to replace the detachable SIM by a chip soldered on the printed circuit board of a M2M device. Such a new SIM could be remotely activated, would permit the remote management of operator credentials on the card and enable re-provisioning of alternative operators during the card's lifespan. I like to add another aspect: For communication service providers (CSPs), an end-to-end M2M architecture has traditionally had two typical endpoints: a M2M service enablement platform on the server side and the SIM card on the device side. But CSPs are keen to expand in the value chain, going where some vendors have trail blazed the path into the jungle. These are specifically the vendors of service enablement and application enablement platforms. They run their services as SaaS or PaaS. Typically their cloud-based software has a device-side logical software access point in form of a smart client, smart agent, client plug-in, connector software, bundle or device library. Not in form of a carrier's SIM. Should the carriers follow the system strategies of vendors (in their endeavour to move up the value chain), they may have to think about such software access ramps to cloud-based M2M services, the ramps residing in M2M terminals/modules and chipsets which the carriers today don't control. Might the new embedded SIMs be reworked to host such software access ramps? 2013 will tell.

As far as forecasts are concerned, what is most interesting depends on who you are: a user of M2M (like MyLogFirm, or CocaCola, Ford, Tesco etc.)? A chipset vendor (like Intel for System on Chip, Texas Instruments for micro controller units, u-blox for GPS chips,...)? A wireless module manufacture (like Sierra Wireless, Telit, Cinterion [14], ...)? A M2M terminal vendor (like Sierra Wireless, Telit, Netcomm Wireless [15] etc.)? A M2M gateway vendor (like Kontron [16] etc.)? A mobile network operator with an own M2M platform (like Vodafone)? A carrier with an outsourced basic M2M platform for connectivity and SIM management? A service provider that offers exactly such outsourced services to carriers (like Jasper Wireless [17])? A provider of a M2M service delivery platform that handles device management and event processing (like Gemalto's Sensorlogic)? A provider of a full-fledged M2M application enablement platform that can interface with enterprise applications like SAP, Oracle, Siebel, Salesforce.com (like Axeda, ILS Technology, or maybe Eurotech ...)? A system integrator that takes chipsets, wireless modules and some application software and nails the bits and pieces all together for a customized client solution (see the partners of all the wireless module and chipset vendors)? Or an enterprise software company (like SAP, Oracle, etc.) interested in enhancing their cloud-based software for integration with the M2M world? All these companies may predict what they actually innovate on and strategically want to make happen. Several of these players are going to find themselves in stronger competition.

Three particular predictions

1001 forecasts are possible and many will be spot on and correct, as so many developments will happen anyway in parallel. However, I like to highlight 3 points:

1. **New strategies:** Communication Service Providers (CSPs) will move up the value chain and explore all sorts of ways to do so. They will go beyond providing the data paths for M2M data, managing global roaming and data tariffs for M2M. They can expand right and left on the value chain: to the left getting more traction with *software endpoints* in M2M terminals/wireless modules through whatever means. To the right with expanding into M2M service delivery (thereby entering the space of the M2M service delivery platform vendors) and expanding into M2M application enablement (thereby entering the space of the AEP vendors and confronting them with business model challenges). Apart from that, CSPs can move into M2M object brokering, data analytics specifically for their traditional enterprise customers and M2M turnkey solutions for certain more specialist vertical markets.
2. **Emergence of open standards:** Today's silo solutions may be broken up with the advent of more open standards. Several of today's solutions have ivory tower and silo character (e.g. you manage a Sierra Wireless device with Sierra Wireless AirVantage system in the cloud, or your M2M device can speak to the Axeda application enablement platform exclusively via the Axeda Wireless Protocol once you have an Axeda software client (agent) working on your M2M device; equally to speak to the Eurotech Everyware device cloud you need their device client on the M2M device). That's natural and has purpose. For a M2M wireless module vendor, it is a small step to also offer the remote management including firmware update. And, most (if not all?) M2M application enablement platforms require a corresponding software endpoint on the M2M device/terminal/module side. As standardisation is lagging behind (though it will make progress in OMA for light-weight M2M device management and in oneM2M on overall M2M system architecture), the only way out so far has been to craft proprietary end-to-end solutions (as most vendors have done). That leaves a messy picture for some players like the carriers/communication service providers. Many of them will welcome open standards, which will break the monopoly of silo solutions and make M2M solutions become engineered in a more plug'n play fashion (e.g. a wireless module of vendor A becomes remotely manageable by a cloud-based software of vendor B).

3. **Acting on the small revolutions:** Carriers will also become more acutely aware and alert of the paths already trodden by the different M2M vendors and M2M solution providers. As long as carriers could focus on wireless connectivity management, SIM card logistics, management and global roaming as well as M2M data tariffs and billing, they didn't have to look at the small revolutions that have already taken place on the device side and the application side.

On the device side this includes the progress made on system architectures of chipsets and modules, the enabling of high-level programming languages with high-level APIs to specialty functions like location, networking (ZigBee, Bluetooth), the introduction of reusable software building blocks (see e.g. the software libraries of Sierra Wireless for C [18], of Telit for Linux [19]) and the APIs to cloud-based M2M software using cloud connectors (e.g. iDigi Connector [20]). On top of this, vendors have started to lay the foundations for M2M developer communities. When moving up the value chain, are the CSPs going to follow the trodden paths? If so, what does all of above mean for them? Catching up, partnering, or M&A? Or will there be new strategic paths developed and opened up?

On the platform side, the small revolutions that are related to enterprise application integration (as driven e.g. by Axeda [21], ILS Technology [22], Eurotech [23], Sierra Wireless [24], Sensorlogic [25]) can be expected to get more traction, at least for markets where the likes of SAP, Oracle, Siebel, Salesforce.com are well established. A company that appears to take enterprise integration more serious is Axeda [26], [27], [28].

How to share the revenue?

Of course, right at the end of the chain, within companies' business processes (say e.g. CocaCola or GM), the fruits of the M2M revolution can only be harvested when all other components of the chain are somehow put in place *economically and reliably*. From the M2M chipset to the ... to the ... to the platform to the message queue to the enterprise application.

The potential 2013 global revenue from M2M end "consumers" (those who in the end use the M2M applications) will be capped by two factors: achievable value add and cost savings. For example health care institutions will spend some of their anyway extremely tight budget on M2M patient monitoring only if it adds new value or helps to cut costs related to patient care. An industrial equipment manufacturer will make their equipment products M2M capable when it helps to reduce maintenance and warranty expense.

Once we assume this can be achieved, this final revenue is flowing down the chain and contributing to the top line of all the many players involved in this industry. The more players participate, the faster that finite cash flow is drying up. **Profitability** will be an issue. In this regard, I agree with the prediction made by John Horn from RACO Wireless, that "industry consolidation will be prominent" to improve scope and scale [13]. The question is how it is going to happen, as buying into negative profit margin may not be attractive or acquiring a VC-funded or privately held company may not even be possible in the short-term. Concerning profitability of companies some figures are shown in below table.

Company		Market Cap (m)	Revenue (m)	Operating Cash Flow (m)	Profit Margin
Digi International (DGII, Nasdaq)	\$	253	190 (ttm)	15.13 (ttm)	4%
Telit (TCM.L,	\$	104	177 2)	15.37 2)	0.88% 1)

LSE)					
u-blox (UBXN, SW)	CHF	256	125 2)	18.60 2)	13.2%
Sierra Wireless (SWIR, Nasdaq)	\$	246	627 (ttm)	45.12 (ttm)	-0.98%
Eurotech SpA (ETH.MI)	€	43	92 (ttm)	2.48 (ttm)	-6.77%
Gemalto NV (GTO.PA) (Sensorlogic, Cinterion)	€	5,860	2,110 (ttm)	261.21 (ttm)	8.27%
Kontron AG (KBC.DE)	€	258	566 (ttm)	59.57 (ttm)	-0.53%
ILS Technology (owned by Park-Ohio)					
Axeda (privately held)					

9 Jan 2013, Data from Yahoo/Capital IQ except 1) advfn.com. 2): 2011. ttm: trailing 12 months

Finally, pictures say more than words. A worthwhile graphical depiction of what Axeda calls a maturity model (stages of the M2M evolution) is shown at [29]. Level 6+ is where the industry will try to move.

References

1. <http://www.sierrawireless.com/>
2. <http://www.telit.com/>
3. <http://www.u-blox.com/>
4. <http://www.axeda.com/>
5. <http://www.ilstechnology.com/>
6. <http://www.sierrawireless.com/productsandservices/AirVantage>
7. <http://www.sensorlogic.com/>
8. <http://www.axeda.com/products/platform>
9. <http://www.ilstechnology.com/platforms/devicewise>
10. <http://www.eurotech.com/en/products/software+services>
11. <http://www.machinaresearch.com/10predictions.html>
12. <http://www.manufacturingdigital.com/technology/top-five-machine-to-machine-predictions-for-2013>
13. <http://www.m2mnow.biz/2013/01/04/9483-predictions-for-2013-in-m2m-smart-cities-connected-devices-and-nfc/>
14. <http://www.cinterion.com/>
15. <http://www.netcommwireless.com/>
16. <http://uk.kontron.com/>
17. <http://www.jasperwireless.com/>
18. http://www.sierrawireless.com/en/productsandservices/AirPrime/Application_Framework/Libraries.aspx
19. <http://www.telit.com/en/products/programming/linux/linux-libraries.php>
20. <http://www.idigi.com/idigiconnector/>
21. <http://www.axeda.com/products/platform/m2m-integration-framework>

22. <http://www.ilstechnology.com/platforms/devicewise/device-to-application>
23. <http://www.eurotech.com/en/products/software+services/everyware+cloud+m2m+platform/m2m+how+it+works>
24. http://www.sierrawireless.com/en/productsandservices/AirVantage/Enterprise_Platform.aspx
25. <http://www.sensorlogic.com/m2m-cloud-platform/advanced-architecture/application-services.html>
26. <http://www.axeda.com/node/1082> on integration with Salesforce.com
27. <http://www.axeda.com/sap> on integration with SAP
28. <http://www.axeda.com/community/partners/enterprise-applications/sap> on integration with SAP
29. <http://www.axeda.com/about>