The „horizontalization” of the machine to machine (M2M) world and how to market it

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Abstract - Today, many small, medium and big companies develop „vertical” M2M applications on their own. This leads to redundant functionalities in each application and doesn’t give the opportunity to open functions to a bigger market. A „horizontalization” of such applications and disposal in a „marketplace” will open new possibilities and markets even for small companies. This paper will highlight the M2M application/device world today and its challenges, the principles of „horizontalization” and its benefits and what Nokia Siemens Network (NSN) is doing in this area.

I. INTRODUCTION

The M2M [1] market is growing significantly. According to Harbor Research the total global M2M market value forecast is 280 B € in 2013, with an average growth rate of 33%. The M2M market grows steadily resulting in CAGR (Compound Annual Growth Rate) of 20 to 40%, depending on the actual segment. Figure 1 illustrates the overall M2M service market forecast by Industry segment.

This, however, bears a couple of disadvantages in itself:

1) Basic functionality re-development:
Basic functions like the business integration capabilities, data collection and storage, remote object management and the smart object communication have to be developed and integrated for each M2M application separately and the re-use effect is rather limited. This results in a longer, more expensive development of applications and/or devices and the time to market is significantly higher.

Last, an M2M connection layer, which is not optimized for data transmission, might result in unnecessary data traffic, which might cause additional costs and/or result in network capacity problems.

2) M2M application – device connection:
Due to the fact that M2M applications are mainly developed with one type of device (which might come from a 3rd party), the risk occurs that failing to continue with the respective device(s) will result in a redevelopment/integration of parts of the application. Relying on proprietary interfaces might result in loss of solutions. Additionally, application 1 will only access data from the devices, which have been directly integrated to them; there is no possibility to feed data from devices, which are used by application 2 (and might be of interest for application 1, too).

3) Marketing possibilities:
With creating M2M applications/devices in a vertical mode, the possibilities of marketing them over a “Marketplace” seem to be limited: there is no possibility to rely on standardized platforms/interfaces, which makes selling of M2M solutions as easy as e.g. selling apps over Android.

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Figure 2 shows the overall approach to develop M2M applications/devices today.

The majority of developing companies in the M2M sector rely on a “vertical” approach with M2M development; means, from top (applications) over basic functionalities (integration, remote control, data collection,…) down to smart devices integration, all functionalities are taken care of by single vendors (end-to-end supply). Many of the basic functionalities are developed for each and every application again and the synergy effect is rather low.
II. M2M APPLICATION DEVELOPMENT “TOMORROW”

The key components of M2M application/device development “tomorrow” is shown in Figure 3 [2].

In the near future, the development of new M2M applications and devices will change significantly: With the standardization of interfaces towards the application layer and the device layer, basic functionalities can and will be taken by bigger platforms (possibly in a “cloud”) to separate applications from devices and benefit from synergies of basic functionalities [3]. It means, when developing M2M applications/devices, companies can “rely” on basic functions like business integration capabilities, data collection and storage, remote object management and the smart object communication to be taken care of by this kind of platforms.

This does in fact bring a number of benefits for the respective companies:

1) Reuse of basic functionality:
Basic functions like the business integration capabilities, data collection and storage, remote object management and the smart object communication are being located on the horizontal platform and both M2M applications and devices can “rely” on them, without need to integrate them into the application or the device as such. This makes the development of applications and devices much simpler and more reliable, as the functions mentioned are easier to be taken care of in a common platform. This results in cheaper, shorter development of applications and or devices and the time to market is significantly lower.

An M2M platform can deal with the connection layer in an optimized way, which can save on network capacity.

2) Standardized interfaces to applications and devices
As a result of standardized interfaces to M2M applications and devices [4][5], an application developer can choose from a variety of different devices for his solution. This results in a form of independence from vendors of devices, as one can be relatively easily replaced by another.

Additionally, one application can relatively easily get data from different type of devices, which might also serve another application (cross-usage).

3) Marketing possibilities
Having a big horizontal platform to host applications and devices, it can be used as a kind of marketplace to sell them.

Similar to e.g. Android, different application and device development companies can use the marketplace to sell via it. A potential developer toolkit might even make it easy to bring ideas to life, even without being into software development.

4) Testing against predefined solutions
In order not to be bound to develop and test devices and applications always in “pairs”, a predefined set of sandbox functionalities will enable companies to test devices without caring about applications and vice-versa. This requires the accessibility of both applications and devices and also a detailed description of how to use and how to administrate the sandbox mode.
III. THE NOKIA SIEMENS NETWORK M2M PLATFORM

NSN created its own M2M platform “Cumulocity”(Figure 4), which contains all the necessary functions as described in Section II [6].

**NSN’s Solution: Cumulocity**

Cumulocity is a horizontal M2M application platform. Basing M2M applications on Cumulocity gives many out-of-the-box features, saving development-, engineering- and testing time.

The application platform part contains a comprehensive set of tools for managing meters and sensors, collecting and validating data and providing it to enterprises back-office applications. Using Complicity’s Software Development Kit (SDK), it is easy for companies to integrate new M2M devices and develop new applications. It serves as a horizontal M2M product; companies can use it for applications and devices from different M2M domains like telematics, energy, utility, and vending. Additionally, Cumulocity helps companies by decoupling devices from applications, allowing them to develop devices for various applications or develop an application for various devices.

Cumulocity has been designed for cloud-based environments: it provides software as a service (SaaS). It is multi-tenant, allowing companies to use single application deployment to serve multiple enterprises. It is based on elastic cloud technology and Big Data principles, ensuring that application scales to the required transaction and data requirements.

For application developers, Cumulocity simplifies the implementation of M2M services by hiding the complexity to communicate with diverse device types, each having its own data model, protocol and transport mechanisms. The platform provides ready-made components for rapid development of applications. Cumulocity provides data storage for inventory, measurements, event, alarm, and audit log data. Its Complex Event Process (CEP) engine allows easy processing of real-time M2M traffic and rapid implementation of M2M business logic. Using the remote control functionality, devices can be reliably reconfigured and maintained. All this functionality is available via REST web service interfaces [7] and web user interface components based on the latest AJAX technology.

For device developers, Cumulocity makes it easy to cloud enable device: make device data and controls available for applications with minimal effort. Install Cumulocity’s software agent and connect it to sensors and controls. Afterwards you can remotely control your device from the internet or develop additional server-side business logic for it.

Towards the application side, the platform offers access to the multi functions, which are implemented and necessary for proper functionality.

These are:

- Business Integration Capabilities – interfaces towards the end user’s eco system
- Remote Object Management – remote control of the devices incl. firmware updates
- Data collection and processing – device user data collection and storage (even for years)
- Service Creation and Management – multi tenant able for different companies to create their own M2M applications
- Ecosystem Management and Device Catalogue – integration into an operator’s eco system and providing a catalogue of proven devices to be used for new applications

Towards the device side, the offered functionalities are the same; means, device developers are also benefitting from the horizontal platform and its functionalities, similar to application developers.

Being located in a cloud, it can be operated without own HW / SW for an M2M developer.

The platform can be integrated into an existing environment such as billing, fraud management or customer care of a CSP.

M2M application- and device developing companies can benefit from all the bespoken items in Section II.

There are test-devices for application- and test applications for device-development available and the scalability of a cloud based solution offers low entry costs [8][9].

Another big advantage –especially for small development companies– is the possibility to use Cumulocity as “Marketplace” to position own developed devices and/or M2M applications for global sale.

Similar to what is known as e.g. Android Marketplace, companies can add, advertise and sell their products via a large international platform, which allows different kinds
of new business models for mere device-, mere application- or end-to-end solution selling.

Small companies with smart ideas get a channel in this way to reach new customers without investing heavily into sales force.

IV. CONCLUSION

The M2M business is just at its start. It will influence all our lives in future. The way M2M applications are being developed today will differ significantly from the one tomorrow. NSN has developed its own M2M platform “Cumulocity”, which allows both application- and device developing companies to benefit from a horizontal development approach.

REFERENCES