ISSN 1868-9558

m2m Journal

20

December 2013

The future of M2M & IoT – Visions for 2020 (hier nur Auszug Seiten 16-17)

www.m2m-alliance.de

The Impact of M2M solutions on the agricultural industry and other sectors

Of all the sectors the agricultural segment has the potential to become the role model for other industries how to drive innovations based on M2M (machine-to-machine) mobile technologies. It includes almost every challenge an M2M solution has to cope with.

The agricultural sector is characterized by heterogeneous machinery on farms, diverse and always changing process partners in the harvesting process, high operational costs for machinery and often low mobile network coverage. The structure and the magnitude of obstacles of M2M in the agricultural sector seem much more demanding than in other industries. Nevertheless or because of the challenges almost all the manufacturers and vendors are determined to find solutions – together. They are open concerning vendor independent portals and they are even willing to set up a common standard for agricultural machines in M2M.

There are many sector-neutral approaches claiming to connect, run and manage different machines but in order to optimize complex processes in heterogeneous process networks for example in the harvesting scenario specific data is needed. Therefore the verticalisation of M2M communication technologies with a standard for agricultural machines is inevitable. Based on the underlying standard the M2M-Teledesk platform addresses and resolves the issues described above. The system (http://m2m-teledesk.de) is developed by CLAAS Harvesters, VIVAI Software and the University of Applied Sciences Dortmund.

The importance of vertical standards in M2M Mobile technologies on the example of agriculture

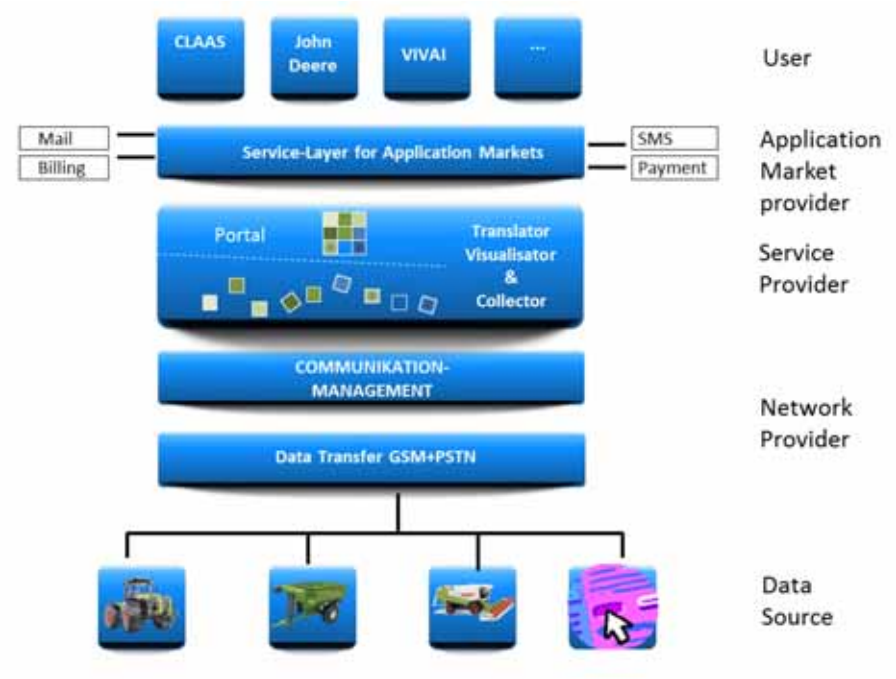
Most of the existing M2M solutions are neither aligned to the needs of the agricultural sector nor can these systems synchronize and optimize heterogeneous process chains with many different machines and manufacturers in order to gain maximum efficiency gains. Inefficiencies in agricultural harvesting processes very often arise from idle times, e.g. when harvesters have to stop working because there is no transport vehicle that can load up the crop. These inefficiencies of the logistic chain may cause high, but avoidable costs which may run for example up to 1.000 Euro per hour machinery costs for a harvester. Today most of the suppliers concentrate on single machine efficiency which does not produce the same magnitude of cost reductions.

In order to enable the communication between different participants for example in harvesting processes it is inevitable to develop a unified standard for the sector, in this case agriculture.

To overcome the problems arising from incompatibilities regarding the different vendors over 150 agricultural manufacturers have already once committed themselves to a unique standard namely the ISO-Bus through the AEF (Agricultural Engineering Foundation) which was set up for this purpose. The chances are high to repeat this great success with a M2M-standard with the new installed working group. The standard will encompass very specific parameters like the moisture level of the harvest goods or the capacity level of the grain tank auger which indicates where and how fast the transporter has to arrive at the harvester. The peculiarities in each sector are the reason why general standards and systems "won't do the job".

But there are limits to the openness towards the standard by the manufacturers. It is very important to them to protect some of their business data and process-know-how as a competitive advantage. Therefore a smart encapsulation, aggregation and translation architecture must be part of the system design. In order to gain acceptance and still benefit from the standard a small number of the business-critical parameters will not be directly transferred to the M2M Teledesk platform. The translation- and aggregation process will remain at the manufacturers. All data of the machine buses in manufacturer specific languages will be translated into a standardized data format used in the system.

As the agricultural machines are used for many years it is important to provide a retrofit solution with a box providing only a subset of possible data as only a smaller number of sensors are available.



The design of the M2M system

The M2M teledesk system

An important goal of the M2M-Teledesk project is the standardization of interfaces and protocols. But M2M-Teledesk is also the vendor-independent platform for manufacturers, owners and operators of agricultural equipment, who can register machines of different types and manufacturers in order to optimize the processes, control the machines and analyze the process and condition data. Due to the open architecture it is also possible to include data from existing vendor specific portals.

The collected data can be accessed via a vendor independent internet portal which serves as a monitoring, control and management desk for the heterogeneous machines.

The M2M-Teledesk project includes the following components:

- *Security solutions – as an example it prevents that a machine that does not belong to the process chain any more can still access the data of the logistic chain of the harvesting process from the day before.*
- *Communication manager which decides which data transfer protocol (GSM, LTE, WLAN, NFC) should be used and which data should be transferred.*
- *A data storage where the process and the condition data of the machines will be collected*
- *A meta level portal layer where the data is processed and visualized. It is important that at this level all the machine data is in a uniform format. With a user friendly GUI it is possible for the vendors and manufacturers to access the information that will be used for the different applications. It also includes a security module in order to protect the data from unauthorized access.*
- *A service layer for the application market where the data that will be used in the application of the various branded application markets can billed.*

With all these prerequisites of M2M Teledesk applications can be built and sold by manufactures, vendors and other parties in their own branded markets.

New business models and value networks

M2M Teledesk supports the manufacturers on their way to become a customer centric and service oriented supplier. For many that means a paradigm shift from a hardware vendor to a service provider. But in the near future service will be the unique selling proposition towards manufacturers from the emerging countries. M2M can help to improve the services level but also to create completely new services there were not possible without this technology.

For example with "pay-per-use insurance/leasing" or leasing companies are able to bill for usage patterns instead of time. Substantial success criteria for new business models are to meet the necessary integration of business partners and distributed components. New "Anything as a Service" models will define value networks and necessary trade-offs between several actors – as well as between competitors.

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m2m™ alliance

Profile:

The M2M Alliance is the largest association for the machine-to-machine sector. It is an open organisation with members representing the entire M2M value chain. The M2M Alliance currently has more than 70 members for whom it offers a forum for ideas exchange amongst industry experts and on behalf of whom it acts as the public spokesperson. Proactive communication and networking is the heart of the M2M Alliance, both between members and with external organisations. The non-profit organisation publishes the M2M Journal, as well as its own e-mail newsletter and websites in English and German. www.m2m-alliance.de