Efficient Transparency in Meat Supply Chains with IT-Standards: EPCIS based Tracking & Tracing for Business Partners, Consumers and Authorities

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Abstract: How can the future agri-food business be made more efficient, transparent and safe? This article on a new MIP meat transparency system describes a future system aiming for an efficient transparency in meat supply chains with IT-standards. The shape of the new system will be highlighted on the background of preliminary ICT solutions and the recent developments in the FIspace project. The core of the supply chain wide transparency is built upon the EPCIS standard from GS1 which enables transparency in the cloud for all stakeholders. Not only the prerequisites but also the benefits from using such a standardized solution are explained for the different user groups. The article closes with an outlook to the further improvements and the expanded usage with new funding by the EU.

1 Introduction

After recalls in case of food alerts many companies in Europe invested in transparent processes, often with very individual solutions while a comparable transparency system for whole supply chains where transparency information passes from one organisation to the next still lacks. To provide a supply chain wide transparency system it is obligatory to manage consecutive links between the different intermediary goods – starting at the primary production on farms. Currently the European regulation No 178/2002 requires supply chain transparency systems, at best relying on unique identified product objects. Such an accurate transparency system would also meet the increasing demands of the authorities and of the consumers. The business case for the companies thereby consists of minimizing recall costs and loss of consumer trust. One major prerequisite is the application of existing state-of-the-art IT technologies along the whole supply chain – particularly technologies for data capturing as well as for data exchange. Interoperability via standards is the key to cooperation here [Ka00], [Ka01], [Sc03]. This paper will

outline briefly how with the help of the GS1 EPCIS all stakeholders of meat chains can benefit from transparency data about packaged beef in the cloud. But also consumers and authorities have to be integrated into the flow to get detailed product information using mobile devices and/ or web-based services. The Standards from GS1 guarantee business oriented software solutions to be implemented also for SME.

2 MIP – a supply chain wide transparency system for meat

For consumers, regulators and meat supply chain participants the "MIP Trial" (Meat Information on Provenance – MIP) aims at ensuring to have accurate information about where a meat product is originated (production farm), processed and distributed. With implementing EPCIS in the MIP trial all partners of the supply chain on the one hand will be able to communicate and retrieve product related information – upstream and downstream – very fast, secure and on a very granular level. On the other hand they can decide who has access to the data and to what extent [Sc03].

2.1 Shape of the new system

The SmartAgriFood project during FI-PPP phase 1 presented a conceptual prototype of a transparency system (TTAM). It was based on a one-step-back and one-step forward principle – but it was slow, imprecise and inefficient. In the follow up MIP trial the aim now is about the realization of full transparency for the whole meat supply chain. The MIP Trial transparency system is an EPCIS based (Electronic Product Code Information Services) information sharing service which provides access and collection of quality data on demand – fast, standard based, trustworthy, easy to use, easy to implement and inexpensive for bi-directional tracking & tracing [Sc03]. Each time an EPC identifier is captured, an event is generated containing fine-granular visibility data encompassing four dimensions (see Figure 1): what (uniquely identified objects), where (business location and read point), when (time of event) and why (disposition and business process) [Ep02]. The events are stored in decentralized databases (EPCIS repositories). An EPCIS repository has a capture interface for storing, as well as a query interface for retrieving event data. The transfer of data through the capturing interface is realized via HTTP. The query interface uses various message protocols which are able to use authentication and authorization.

What (SGTIN)	Where (GLN)	When	Why
urn:epc:id:sgtin:4000001.011629.2	Dockdoor1, Vendor1	12-12-2013 09:00:00	Goods receiving

Figure 1: EPCIS data.

While EPCIS is used to exchange dynamic data (and events are stored in repositories), static data (i.e. product, location and partner master data) is exchanged separately and is stored in a static data repository (such as an ERP or warehouse management system).

Briefly the MIP trial follows the cooperative approach of < Identify – Capture – Share > with global standards (Figure 2) of the GS1 community when implementing the EPCIS.
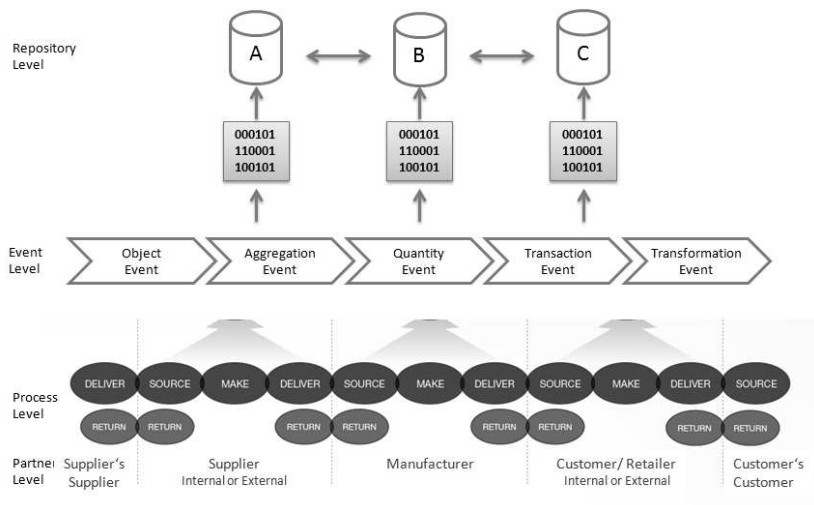
Figure 2: EPCIS along the supply chain.

2.2 EPCIS standard and transparency in the cloud

The use of modern Auto-ID technologies (e. g. barcode or RFID) allows data capturing without manual interaction. The Electronic Product Code (EPC) clearly and uniquely describes individual business objects such as products, locations and transactions. The EPCIS standard provides a wide range of instruments to efficiently control business processes. The overall genuine added-value derives especially from the linkage of the technology with existing application systems – e. g. with ERP-, supply chain-, product-, controlling-, tracking & tracing or quality management systems, which all require detailed information. Main advantages of EPCIS are that data fields and attributes are already standardized [Ep02] and that a concerted basic vocabulary allows unequivocal interpretation of EPCIS event data worldwide. A Core Business Vocabulary (CBV) offers a cross sector catalogue of typical business processes (e. g. goods receipt, commissioning), states/ conditions (e. g. available, sold) and business documents (e.g. dispatch advice, order). In that way EPCIS is used as a standardized, electronic directory, like a cloud solution for the capturing, querying and interchanging of electronic (business event) data.

In 2014 there will be an additional identifier to create dynamic data batchwise: identification on level of objects: GTIN + Lot. At the same time GS1 will also announce a new type of EPCIS event: the transformation event. This is needed when a composition or a decomposition of an object (or of several) is irreversible, while the different former „generations" of the objects stay reproducible. Small software units, to be created, will allow the easy upload of event data in the EPCIS repository, their query and analysis on demand. Meanwhile the MIP trial defines the different levels of access to the transparency information, e.g.: public, restricted, special authorization and for scientific research or analysis, registration and authorization will be provided by the FIspace platform.

3 Future steps together with EU funding

The EC has the goal to expand the usage of new systems created in the FI-PPP phases 1 and 2. For improvements of tools and the getting into action of their users several opportunities exist for companies to cooperate in phase 2. In phase 3 (2014-2016) additional projects are funded by the EC to roll out what was tested in phase 2 trials. The call closes in December 2013. New partners should pick up ideas of the practitioners like e. g. provision of accurate food quality information, online monitoring of transport conditions or separation of safe from unsafe products including a proactive exception reporting. Moreover from 2014 institutions like regional developers and authorities for technology transfer will take part in the actions of phase 3 project of FI-PPP.

4 Conclusion and discussion

New developments within the FI-PPP will enforce the usage of future internet technologies as well as of IT standards in the agricultural and in the food industry. Focusing on risk and crisis management, it becomes much more complex and decision-making will be more difficult. The MIP trial and its new transparency system will assist communication between business partners, consumers and government. Taken into account that ICTs are drivers for organizational and technical innovations, such investments have to be calculated on the background of their return. The FIspace project expects that notably SME will take up this trend and turn this step into the future with "smart environments" into their benefit.

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