FIspace: Flowers & Plants Trial

Capturing and storing ambient data during transport

The plants and flowers supply chain is a good example for the need of ambient data on every step of the supply chain. The way from the grower to the consumer comprises several steps. Still consumers want to have fresh and high quality flowers. A quality management capturing and documenting ambient data like humidity, temperature or luminosity can help to monitor storage and transport condition and avoid deterioration or spoilage of the plants and flowers and thus help to save resources.

This implies the data must be captured, stored semantically consistent and communicated via standardised interfaces. To meet these requirements a showcase based on EPCIS and implemented on a small single board computer ("Raspberry Pi") was developed. This computer provides several communication interfaces to establish connection between the physical and the digital world.
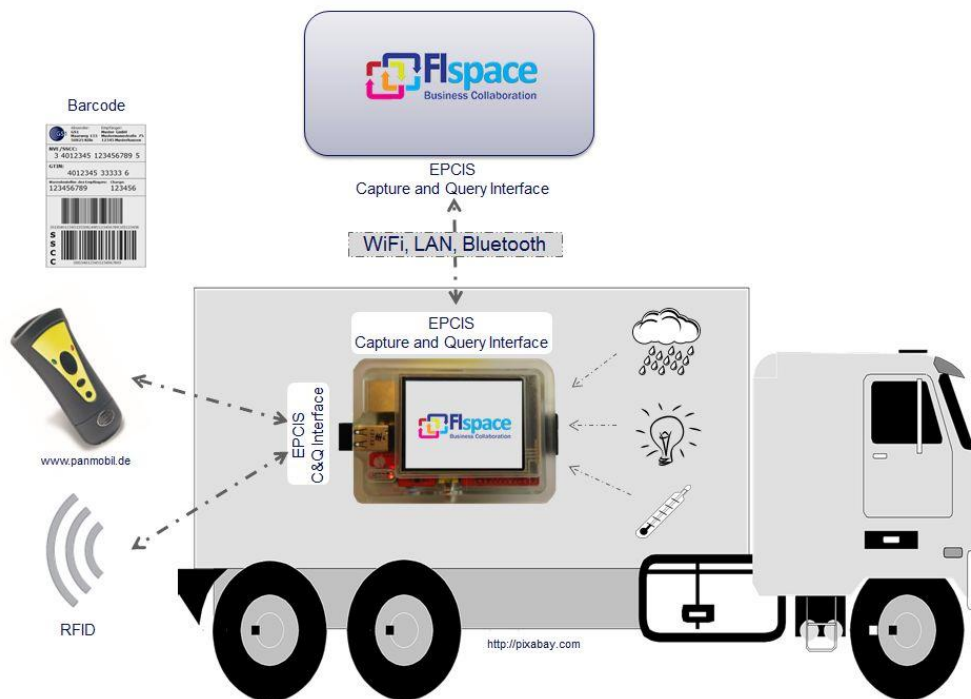

Figure 1: Showcase systematic IT structure

Sabine Kläser | klaeser@gs1-germany.de
Roman Winter | winter@gs1-germany.de

Fine granular data

In the scenario sensors capturing temperature, humidity and luminosity were attached to the Raspberry Pi in order to document these quality determining data during transport. The computer also allows for decoding barcodes or RFID tags through a reader connected via Bluetooth. This allows for the linkage between the captured data and the product ID (GTIN) or the ID of the logistic unit (SSCC) or the RTI (GRAI). The documented data can be shared in FI based systems like FIspace and checked against the optimal data, either by a person or by means of an automated alert system.

In case the conditions do not meet the requirements of the flowers and plants, the lorry driver can be informed and he can act accordingly. During loading and unloading processes the SSCC should be decoded and condition data should be communicated through the system.

These fine granular data captured during transport and storage allows for ex post data analysis e.g.: on the transport duration, external impacts and the quality of the products. To guarantee semantic interoperability of this cross-company communication it is based on GS1 Standards: Event data structures are EPCIS compliant and the capture and query interfaces for interactions with EPCIS repositories are standardised as well.
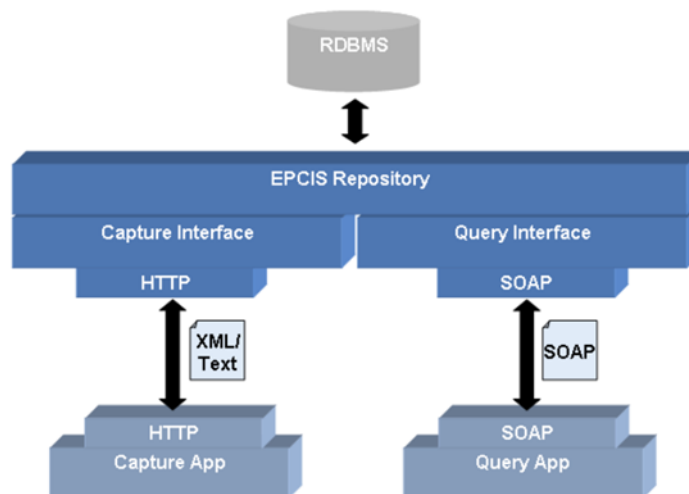

Figure 2: Overview on Fosstrak EPCIS System

Sabine Kläser | klaeser@gs1-germany.de
Roman Winter | winter@gs1-germany.de

Communicating via XML

Moreover the events are communicated via XML as also defined in EPCIS. This allows for the combination of numerous technologies and application systems such as ERP, Supply Chain Management or Warehouse Management systems. Events like the transport of flowers or temperature measurement are captured according to the four dimensions "what, when, where and why?" and documented in an EPCIS repository. For data transfer the EPCIS repository uses HTTP in the capture interface. The query interface exploits SOAP, XML via AS2 and XML via HTTP(S). The free of charge EPCIS Fosstrak System and three sensors and a touch display were installed on the Raspberry Pi (see Figure **Fehler! Verweisquelle konnte nicht gefunden werden.**1).

In all, the combination of the Raspberry Pi accompanying the products during transport and capturing ambient data and reporting the real-time data to a system via standardised interfaces and in a standardised semantic allows for low-cost quality monitoring of plants and products and can add to less quality decrease in the domain.
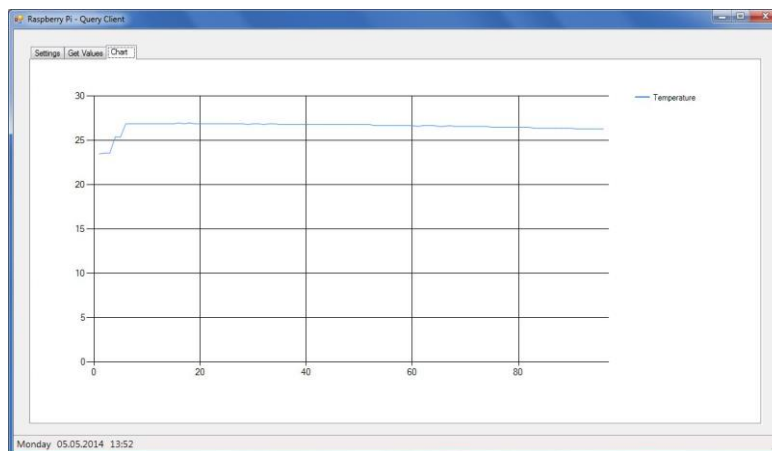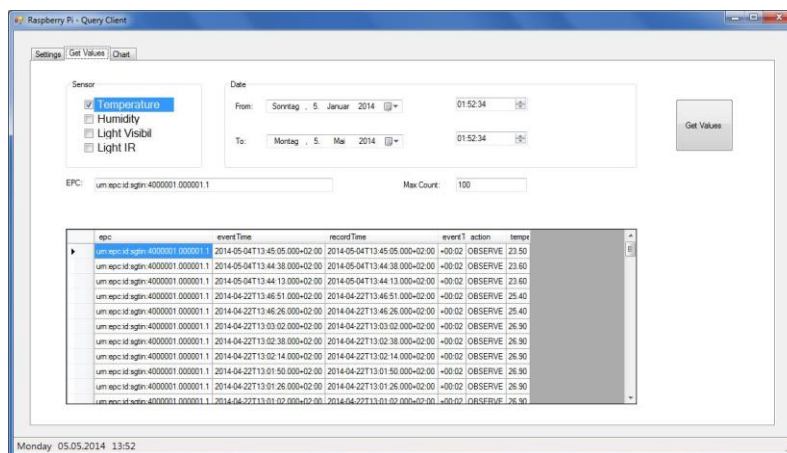

Figure 3,4: Clients with temperature, humidity and luminosity