Managing complexity in Smart Spraying

Aims and background

The Smart Spraying Pilot targeted to investigate and demonstrate the requirements for Future Internet technologies from the point of view of Precision Agriculture and beyond. Precision spraying was chosen as an example case since it is an information intensive task, and is sensitive with regard to weather circumstances, timing, correct chemical dosing, food safety and environmental impacts. Well controlled precision spraying task with optimal timing and spraying setups is a complex and demanding task for a farmer. Extra challenge is to cope with the suddenly changed situations like change in weather or machine breakdown during the spraying. When contracting spraying, the challenge is also to serve optimally customer farm's business targets and act correctly in sometimes unfamiliar fields.

Figure 1: Precision Spraying in a potato field.

The scope of the pilot was to tackle the complexity related to precision spraying operation management and diversity of farms with different business goals and resource. The challenge is:
- Firstly, to create and provide farm/customer specific assisting services available for fluent task planning and execution, and
- Secondly, to enable the employment of the assisting services in an organized and user friendly way by the farmer or contractor, especially during the mobile work.

The aim is that the results are applicable also to all other farming tasks, their management and execution support.

Results and applications

During the project we specified and developed using user-centric approach a Service Framework solution which allows:
- Registering of different farm machinery, devices and sensors to farmer's use via Global Customer Platform
- Providing third party services to provide their applications in a Marketplace,
- Providing farm machinery, devices and sensors as services to possible customers in a Marketplace
- Registering of different third party services to farmers use via Global Customer Platform
- Separation of farm data from applications so that farm data can be used by all application
- The farmer to purchase services in the Marketplace, and register and take them in use via Global Customer Platform
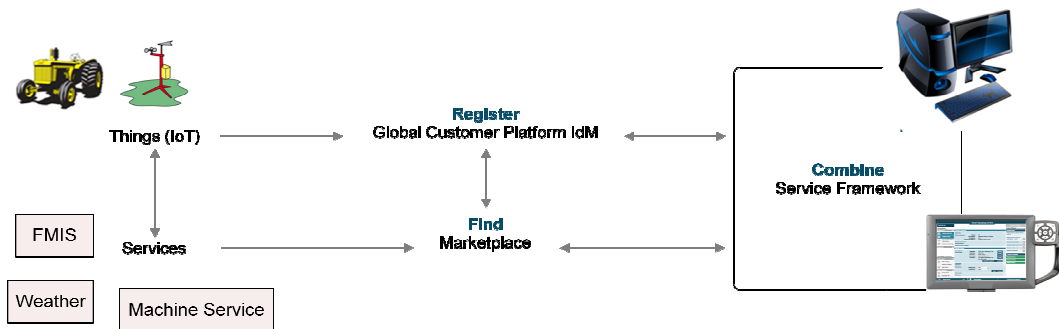
Figure 2: Service Framework for organizing assisting third party services in a usable manner.

From a technical point of view, the Service Framework employs SOA architecture, Internet of Things technologies and FI-WARE Global Customer Platform and Marketplace Generic Enablers. Usability is improved by third party service User Interface exchange and embedding which gives impression of operating only one application.
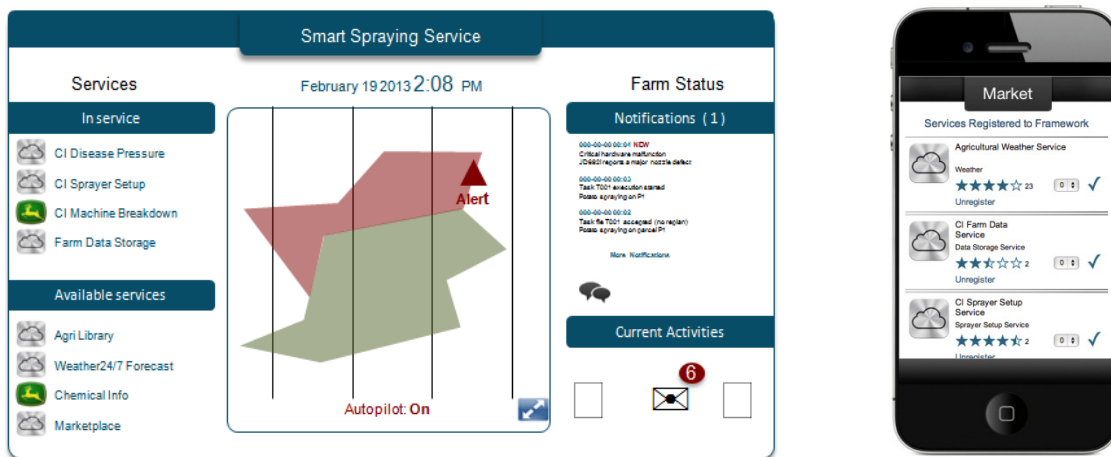

Figure3: Task controller and smart phone User Interfaces with embedded third party services.

Significance and benefits

The proposed solution enables tailored farm management system service where farmer has freedom to choose the most suitable service bundle and easily change the service provider. Global Customer Platform and Marketplace integration enables easy providing and purchasing of services and registering and taking them in use anywhere and anytime. In sudden or hazardous work situations, farmer is able to purchase and register services on-line to receive location and context aware assistance in real-time, e.g. to avoid environmental emissions. The system takes care of the complexity of inter-connecting several sub-services on behalf of the user, and the automatic information exchange between loose coupled services enables fluent information and work flow. Usability is improved by third party service User Interface exchange and embedding which gives impression of operating only one application.

Videos available at: http://www.youtube.com/user/mttcroptech

Contractor   Breakdown

More information:
Egon Schulz (egon.schulz@huawei.com)   **Liisa Pesonen (liisa.pesonen@mtt.fi)**

www.smartagrifood.eu