



FRESHINDEX NEWS

FRESHINDEX IT SYSTEMS – HIGH LEVEL “HALF TIME” REPORT AND OUTLOOK

The first phase of the FreshIndex research project focused on food modelling and simulation models to predict freshness of packed meat. The predictions are based on the temperature profile along the supply chain and hygiene factors on production time. Furthermore we had a close look at track and trace related questions and how to access or generate all the required data. For all those subdomains the consortium found possible solutions and verified them with software spikes and/or test series. Therefore, we proved that FreshIndex or its vision is feasible in principle.

In the next phase of the project we have to bring all the created pieces together and prove that we can handle the dependencies between those pieces efficiently. We will also verify the system to be created within a 2-month field test with real world data. This will not only verify our models and assumptions but will additionally identify possible gaps in the automation of providing the FreshIndex continuous throughout the food supply chain. During the validation phase we plan to bridge those gaps manually. The following paragraphs will give a short high-level overview of the IT components required for the next phases. Some of the components are already available while some others will still provide challenges for the team.

The FreshIndex Calculation Service

...takes an existing FreshIndex, the article type, hygiene data and a temperature profile as input and predicts a new, updated FreshIndex. Depending on the article type different food and prediction models may be used for the required simulation and calculation steps.

The FreshIndex Data Lake

...stores logistic data (e.g. for track and trace), sensor data (i.e. temperature), product data and hygiene data to “feed” the FreshIndex Calculation Service and offers services to efficiently determine or select which data slices are required for a particular calculation. Those services get more complex if the data is only available on coarse-grained units like article type (GTIN), article type with lot information (LGTIN). If the data is available for fine-grained units like shipping units (SSCC) or even uniquely identifiable articles (SGTIN) the services are much less complex but imply bigger data volumes. Also serialized article data is typically not available in food supply chains.

The FreshIndex EPCIS Interface Layer

...is used as standard integration layer for data stored in in the FreshIndex Data Lake. In typical supply chains data is gathered and stored in different IT systems in various formats. Within FreshIndex we can't integrate all possibly different data providers. With EPCIS an event-based standard exists to exchange supply chain related data.

The Virtual Supply Chain (VSC)

...is a configurable simulator for food supply chains. It covers producers, distribution centres, chain stores and transports between those supply chain participants. For the FreshIndex project the VSC has three main goals. First the VSC supports uniquely identifiable articles and therefore decrease complexity in other software components. We are just able to start simple and consider “real world supply chains” progressively. Secondly the VSC is able to generate a huge amount of test data. With this data we can evaluate scalability and performance characteristics of the system architecture. Thirdly the VSC supports exceptional situations like defect sensors or high temperature which enables us to also have a look at “non-happy” use cases.

The VSC EPCIS adaptor

...is used to integrate VSC data into the FreshIndex Data Lake. Several versions are planned. One version should aggregate serialized data and generate EPCIS events similar (type/details of information, time delay) to the “real systems” used for the validation phase. Another version might emphasise the event-based ideas behind EPCIS, providing more detailed information and therefore could support possible near time uses case for stock management and quality assurance. We are excited to see how far we can investigate and explore this within the scope of the current research project.

For the validation phase several IT systems have to be integrated. In general logistic data is already exchanged between the participants. We “only” have to access the exchanged messages and transform them into EPCIS events. As a constraint some details required for FreshIndex are not available in the current messages. They have to be entered manually or could possibly be derived from events generated by temperature sensors.

We will not be able to access temperature data in the validation phase directly from the IT systems of the various supply chain participants. Temperature sensors with Bluetooth Low Energy (BLE) will be distributed to the participants and they have to add them to palettes. If a sensor is added to a palette the sensor ID has to be assigned to the SSCC of the palette. We also place sensor gateways with GSM modules along the supply chain. Mainly the gateways are placed at the receiving department and outgoing department. If sensors are within the BLE range of the gateways sensor data is exchanged. From the first and last events of a sensor at a particular gateway logistic events may be derived.

Contact:

Achim Baier

Geschäftsführer

arconsis GmbH

achim.baier@arconsis.com

Martina Holzhauer

Marketing & Communications

arconsis GmbH

martina.holzhauer@arconsis.com