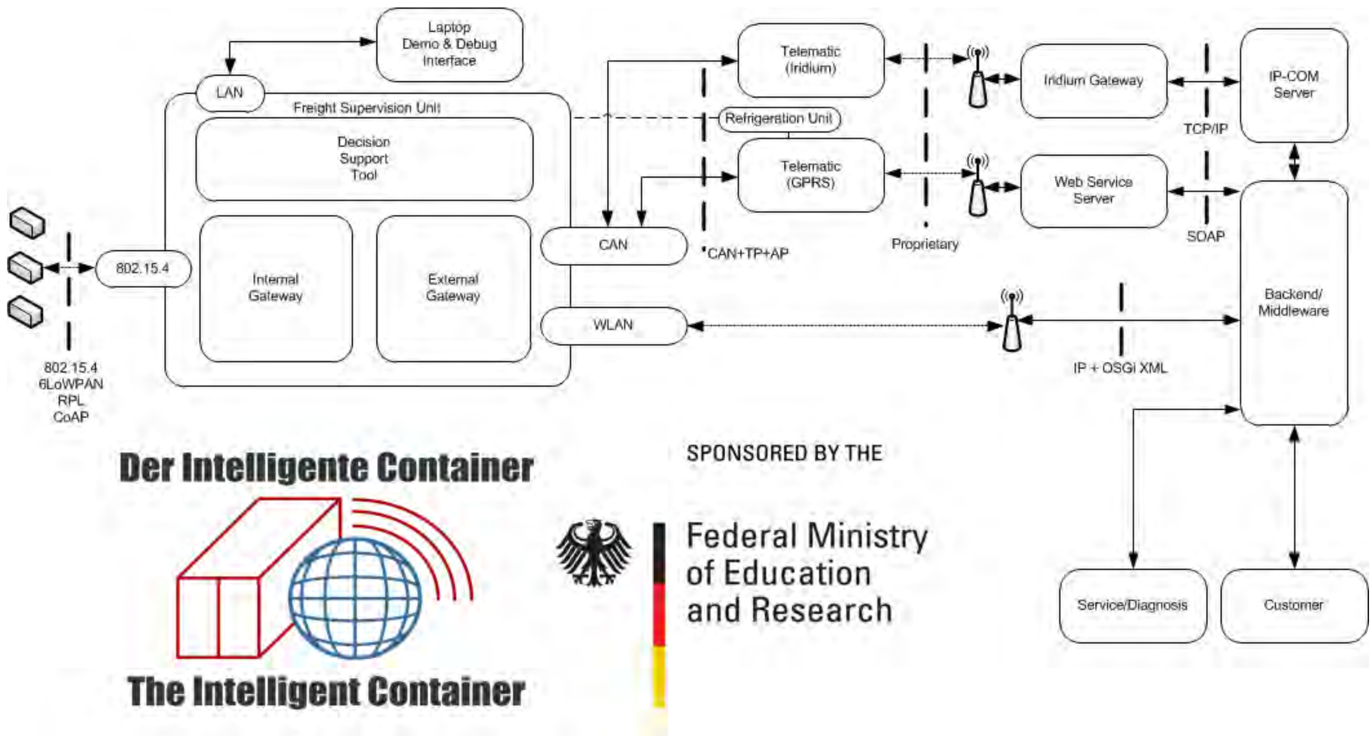
Logistic optimisation with next generation intelligent container



Project overview

Millions of tons of food are wasted due to inappropriate transport conditions. A large share of these losses can be avoided if deviations from the optimal conditions are detected as soon as possible. In particular, the temperature can show large variations inside a truck or cargo container.

The Intelligent Container (www.intelligentcontainer.com), a research project funded by the German Federal Ministry of Education and Research, developed in cooperation between the University Bremen and several industrial partners, provides better supervision and control of food transports by combining M2M and new software technologies.

Freight supervision unit and its applications

Wireless sensors are packed inside pallets with bananas or other commodities to detect spatial temperature deviations. The freight supervision unit gathers and processes the data from this network. At the same time it acts as a bridge between the internal communication network (Wireless Sensor Network) and external communication networks such as the Iridium satellite system or GSM. The capabilities of the intelligent container were demonstrated in ocean transports of bananas and road transports of meat.Because external communication links might not be available temporarily or simply too expensive on ocean transports, the container is also equipped with a platform for local decision making, including algorithms to evaluate the effect of temperature deviations on the quality of the food product. The algorithms are not static; they have to be adapted to different commodities and to the requirements of the logistical chain at hand.

This demand was solved by using the mBS, an OSGi (www.osgi.org) software framework provided by ProSyst. OSGi allows installing and updating software components without interrupting the execution of other components, even if there are dependencies between them. For example, even though a component to supervise the transport conditions for a certain fruit is already running, a new controller software for the air flaps, to *provide best atmospheric conditions, can be installed over the external M2M network. A plug-in for the Eclipse IDE enables the installation with only a few mouse clicks. This can be done remotely, independent of the container.*

ProSyst developed a CAN OSGi implementation on top of SocketCAN (developer.berlios.de/projects/socketcan/), which migrates CAN J1939 messages and ISO-TP messages to Java objects. This enables apps inside the OSGi Framework to receive and send messages and react on these on a per-event base.

Several OSGi bundles have been developed for the Intelligent Container; among them are bundles to collect the sensed data from wireless low-power sensors, either using proprietary or standardised protocols. The standardised protocols supported are 6LoWPAN, RPL and CoAP of the Internet Engineering Task Force which allow for web-like communication with resource constrained devices. CoAP is especially interesting for M2M since it is currently being integrated into the M2M standards of the European Telecommunication Standards Institute (ETSI) and Open Mobile Alliance (OMA).

Summary

Field tests have shown that the wireless monitoring of freight in transport, the analysis of the sensor data inside the container, and the resolution of emergency situations for the freight inside the container or via emergency messages to the backend, are enhancing the quality of the transportation of the goods. Especially for organic freight, the Intelligent Container increases the efficiency of the transportation and the quality of the delivered goods.

Contact
Dr.-Ing. Reiner Jedermann
Research Associate
University of Bremen
Institute for Microsensors, -actors and -systems (IMSAS)
rjedermann@imsas.uni-bremen.de
www.imsas.uni-bremen.de

Dipl.-Ing. Markus Becker
University of Bremen
TZI - Center for Computing Technologies
Communication Networks
mab@comnets.uni-bremen.de
www.comnets.uni-bremen.de

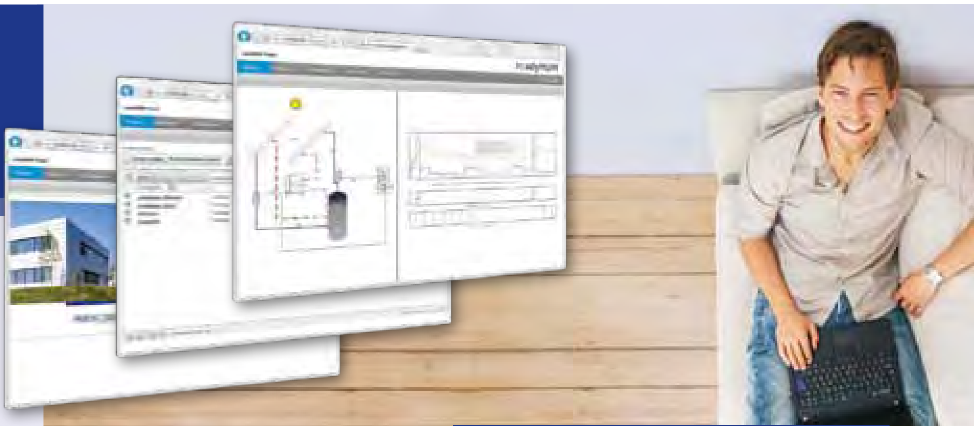
Fabian Pursche
Technical Consultant
ProSyst Software GmbH
f.pursche@prosyst.com
www.prosyst.com

readyM2M – OUT-OF-THE-BOX-LÖSUNG FÜR DEN EINSTIEG IN DIE WELT DER M2M-KOMMUNIKATION

UNTERSCHIEDLICHE NUTZUNGSOPTIONEN:

- **Basic**: Einfacher Zugriff auf den Web-Server der readyM2M Gateways
- **Connect**: Zugriff auf readyM2M Gateways über Drittanwendungen (bspw. SCADA) oder übergeordnete Prozesse (bspw. CRM, ERP)
- **Condition Monitoring**: Konsolidiertes Management von Anlagen- und Maschinenbeständen

M2M Plattform | **Kommunikation** | Gateways



Condition Monitoring im readyM2M-Portal

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STANDARDISIERT. SICHER. FLEXIBEL.

+49.(0)2131.7949-0
office@avantgar.de
www.avantgar.de
www.readym2m.de

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