GS1 Industry & Standards Event 2019
9-13 September 2019 – Lisbon, Portugal

Transforming business together

Session: Sensors and GS1 Standards
Time: 9 September, 13:30-15:30

Who may attend: Everyone!

Session Leads: Enzo Blonk | Kevin Stark
Anti-trust caution

- GS1 operates under the GS1 anti-trust caution. Strict compliance with anti-trust laws is and always has been the policy of GS1.
- The best way to avoid problems is to remember that the purpose of the group is to enhance the ability of all industry members to compete more efficiently.
- This means:
  - **There shall be no discussion of prices, allocation of customers, or products, boycotts, refusals to deal, or market share.**
  - If any participant believes the group is drifting toward impermissible discussion, the topic shall be tabled until the opinion of counsel can be obtained.
- The full anti-trust caution is available via the link below, if you would like to read it in its entirety: [http://www.gs1.org/gs1-anti-trust-caution](http://www.gs1.org/gs1-anti-trust-caution).
WiFi internet access

- Select network “Sheraton Lisboa” and connect
- Password: GS1events
Sensors!

• Why are we having this conversation?

• Sensors are everywhere...and will only continue to proliferate.

• How many sensors do you think are in a typical smartphone?
  - iPhone XS (https://www.apple.com/iphone-xs/specs/):
    • Face ID
    • Barometer
    • Three-axis gyro
    • Accelerometer
    • Proximity sensor
    • Ambient light sensor
    • Plus... audio (mic), imagers (camera), touch? etc.
What is a sensor?

• A Sensor is an element or device that provides information about the physical environment, such as temperature, humidity, light, vibration, gas concentration, pressure, and so on.

• However, sensors are increasingly being embedded into more complex systems, so that “sensors” can also refer to a variety of configurations, including modules that incorporate multiple sensors types as well as on-board power, electronics to process the sense information, and even on-board communication in order to interact with other connected sensors.
Where else are we having this discussion?

- Construction (Monday)
- Traceability (Monday)
- Fresh Foods (Tuesday)
- EPCIS & CBV 2.0 (Tuesday/Wednesday)
- Solution Providers (Wednesday)
- GS1 in Rail (Wednesday)
- Innovation Interest Group (Thursday)
Goals for today...

- Bring the conversation forward
- Hear about use cases
- Ask industry experts what they think
  - What is missing?
  - Where can standards help?
  - What more can GS1 do to support these efforts?

- High-level (and deep-dive)
- Get ready for your questions!
Meet your panelists

- Alex Hille, Migros
- Andy Kennedy, IFT
- Geir Vevle, RFID Solutions
- Holger Strietholt, SBB
- Nicolas Gourgues, Traxens
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Sensors and GS1 Standards

Alexander Hille, Migros
9 September 2019
Migros, some facts and figures

- Largest retailer in Switzerland
- Over 2 million Cooperative Members
- Sales of over CHF 25 billion
- 10 Cooperatives
- About 600 sales locations
- 30 Migros Industry companies
- Biggest private employer in Switzerland (over 100,000 employees)
Quality checks for fruits and vegetables

Use Case

► Key Driver: Marketing Purchase. Process Excellence, reduce of food waste, increase supply chain speed
► Sensor information:
  ► Sugar content in °Brix
  ► Acidity in Gramm / liter
  ► Consistency in kg/ cm²

Key Learnings / Outcome

► We are now in a very early phase of the project. We started to collect first sensor information via EPCIS (Migros-Extensions)
► Our goal short term: To know automatically how the quality develops between deliveries in a short term
► ...mid term: Share quality data with our suppliers
► ...vision: Know in nearly real-time how quality develops over the supply chain and link with other data (weather, farm data, etc.)
Comments

• What is missing?
  - GS1 membership in fruits and vegetables
  - Know-How about GS1-Standards at companies in countries of origin (e.g. IT, FR, ESP)
  - Convenient and smart tools to support use of GS1-Keys: e.g. free of charge central service to convert identifiers (URN-Notation is challenging if you need to use keys from other partners)

• Where can standards help?
  - To adapt the solution and for a wide spread. That’s why we engage in the EPCIS 2.0 MSWG

• What more can GS1 do to support your efforts?
  - More awareness for GS1 standards in fruits and vegetables, especially in countries of origin
  - Provide mentioned tools (central service for ID-converting, also technical)
  - Think about easier ways to use the GS1-system for small farms?
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Andrew Kennedy, IFT – Global Food Traceability Center
9 September 2019
IFT – Global Food Traceability Center

• Our Vision
To become the global resource and authoritative voice on food traceability.

• Our Mission
To serve all aspects of the global food system by generating knowledge that addresses informational gaps while delivering applied research, objective advice, and practical expertise about food product traceability and data collaboration for private benefit and public good.

• Locations
Chicago and Washington, D.C.

• Our Work
IFT led the FDA FSMA traceability pilot in 2012 and co-convenes the Global Dialogue on Seafood Traceability with the World Wildlife Fund for Nature.
Food Cold Chain Monitoring Using IoT Devices

Use Case

► Key Driver: Exploring Use of IoT Temperature Sensors in Cold Chain
► Options Considered: Fixed, Loggers, Wifi and Broadband Network
► Sensor information:
  ► ClimaTrack ThemData™ WiFi Fixed Temp Sensors
  ► zLogg Z1 USB PC Logger Temperature
  ► LocusTraxx Go Cellular Location and Temperature
  ► Sensitech TempTale GEO Cellular Location and Temperature
  ► Sensitech TempTale4 USB Data Logger

Key Learnings / Outcome

► Important to have both fixed and mobile sensors;
► Primary ROI was the evaluation of a process for evaluation and improvement rather than exception handling;
► IoT Sensors currently use proprietary identify/capture/share process which makes interoperability difficult.
Example Temperature Chart from 4 IoT Devices

Upper Control Limit = 40°F
Fixed Temp Sensors in Warehouse Dock and Cold Storage

Upper Control Limit = 40°F
Analysis of Combined Results with Traceability Data

- **Temp Spikes on Dock**
- **V1 Ship From Food Plant**
- **Truck Temperature**
- **Higher Average Temp In Storage Than on Truck**
- **Dock Temp Range**
- **Storage Temp Range**
- **V2 Receive at Warehouse**
- **V3 Receive at Restaurant**
• Machine Learning Could be used to “Learn” a Supply Chain by Temp Changes, Visibility Events and Geo-fences.
  - Evaluate process and communicate corrective actions.
• IoT Devices need to leverage GS1 Standards for
  - **Identify** (GIAI for devices, Geofence for locations);
  - **Capture** (Barcode, WiFi, Cellular, Next generation IoT Networks);
  - **Share** (EPCIS Event Visibility).
• GS1 Can Help by:
  - Encouraging Device Makers and Network Owners to Join GS1;
  - Interface with Other Standards Bodies on this (IEEE, W3, ISO, etc);
  - Communicate Need for Interoperability;
  - Develop Certification Program for IoT Devices.
Contact Information

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Geir Velve, RFID Solutions
9 September 2019
RFID Solutions

• 7 people company
  - Company is management owned.
  - Management has more than 60 years of RFID experience
• Specialized in only working with serialized technologies
• Solutions provider
  - Supply Chain Visibility
  - Process automation using data capture
• Consulting
  - Narrob Band IOT devices
  - RFID & IOT technology
  - Digitalisation Strategy
Challenge!!
Use Case

► Key Driver:
  ► automation of documentation processes
  ► Safety

► Digitalisation of cables

► Sensor information:
  ► Main product only contain only RFID
  ► Extended versions detect temperature every 5 meter every 5 minutes and current flow.
Use Case

► Key Driver:
  ▶ automation of documentation processes
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► Digitalisation of cables

► Sensor information:
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Comments

• What is missing?
  - Ecosystem of interoperable sensors.
    • Some promising platforms might succeed
      - Bluetooth (BLE/5.1/++) is currently the most promising.
  
• Where can standards help?
  - Active technology has a lot to learn from the standardization of UHF.
  - Standards enables an ecosystem of products.
  - I would really like EPCIS to succeed, but it’s been a tough road.

• What more can GS1 do to support your efforts?
  - What about enabling a independent marketplace of supply chain information?
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Sensors and GS1 Standards

[Holger Strietholt, SBB AG Passanger/ Operations - Fleet Engineering]
9 September 2019
SBB AG Passenger in Brief.

About SBB AG Passenger:
- Switzerland’s biggest railway operator, with 1.25 million passenger per day
- About 5’000 vehicles operate about 11’000 train services daily

SBB AG Passenger’s division “Operations” offers:
- Fleet procurement
- Light and heavy maintenance, vehicle refits
- Component overhaul and repair
- Train operations (incl. train preparation, locomotive drivers, technical helpdesk)
- Customers: SBB AG Passenger, SBB AG Cargo, RAAlpine, Deutsche Bahn, SNCF, ÖBB, ...
Utilisation of field device intelligence for holistic business optimization - creation of an open rail diagnostic data network.

Data of **existing already “intelligent”** but singular acting **field devices if combined** can provide **highly relevant** information for **business-steering** and **optimization**:

- The cooling capacity of air condition unit no. 3 is below average.
- "I’m one of 30 locomotives Europe-wide with compressor performance problems”
- Door 2 has been manipulated on open track.
- After wheel reprofiling 40mm wear reserve is left.
- The roundness of wheel “5 left” starts decreasing.
- "Me too!"
Utilisation of field device intelligence for holistic business optimization - creation of an open rail diagnostic data network.

**Use Case**

- Creation of an **EPCIS based, open transfer spec for rail diagnostic events** from/to various sources/sinks including related **sensor values** - **instead of using** (component) **supplier specific** remote diagnostic systems
- **Consolidation** of **several** by then **singular data streams** and data structures into **one big data pool**, equipped with **data analytics and alerting functionality**
- **This setup allows us**
  - **Holistic rail asset health assessments & monitoring**
  - **Complete and detailed overview** of all relevant **operational states and maintenance interventions** in the past
  - **Condition based and predictive maintenance alerting**

**Key Learnings / Outcome**

- **It’s complex, but it’s possible** (a typical modern trainset can handover about 5’000 different operational status and error messages (event types), each enriched with typically 20-40 different sensor values
- The **integration** of **different train types** as well as of first **wayside diagnostic installations** is **ongoing, several more will follow**
- Compared to the employment of proprietary, supplier specific remote diagnostic products, **savings up to 70%** and a **significant added business value** can be achieved
• **CBV 2.0** as currently drafted will offer a **good framework also for quite complex implementations in industry asset operations** and monitoring context

• Due to a **to date non-existing exchange standard for technical and operational asset related events**, **EPCIS could close a gap** for the whole sector

• The two scenarios **“event handling with attached sensor data” vs. “IoT device data streaming”** have to be **kept clearly separated** (-> transfer of information vs. transfer of data) – **EPCIS is only** the mean of choice **for the first** of those two!
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Sensors and GS1 Standards

Nicolas Gourgues, TRAXENS
9 September 2019
• Traxens is a French private company founded in 2012, which holds multiple essential patents.

• We gather, consolidates, enriches, and transforms asset data into actionable insight and knowledge:
  - Our internet-of-big-things solution uses breakthrough technology to provide the most comprehensive, precise, and timely data for managing assets in transit anywhere in the world.

• We forecast to deploy 150k units of Smart containers for next 18 months.
STANDARDISATION

• Integration of IoT based information into established standards:
  - Business Requirement, Data model, Messages exchange, APIs
  - UN CEFACT, GS1, Openshipping, DCSA...
→ A real interest from all stakeholders to collaborate for interoperability, customer insurance, and trade improvement

• From 2017, TRAXENS is leading the Smart Containers project within UN CEFACT, in collaboration with GS1 representative.
Fast lanes for cross-border agencies

Use Case

- Cross-border agencies could base their risks assessment on real data, even before arrival, which can help to reduce custom delays
- Smart Container is able to inform about trip historic, cargo loading and delivery places, and alert on unexpected door opening detection or stops, and can also inform on ETA and deviation, Temperature or Humidity change, and routing point passed
- Sensor information:
  - Temperature and humidity sensor (hourly reading)
  - Accelerometer (measures motion and vibration during shipping)
  - Door opening sensor

Key Learnings / Outcome

- This use case enables to speed-up operational clearance, reduce unexpected delays, improve data quality/visibility and increase reliability of time schedule.
- There is benefit also for the cross-border agencies to have more efficient operations.
- There is a clear financial interest by improving the process and reducing time for all: carrier, forwarder, cargo owner, and cross-border agencies.
- All of these sensor information are used all along the smart container journey to improve each leg.

CUSTOM CLEARANCE

Improvement: inspection predictability

Reduction: inspection occurrence, inspection delays
• Today there is no way defined for digital exchange of smart data from the field to governmental agencies...

• The aim of each standardization organization is to consolidate a homogenous scheme, by collaborating and considering the interoperability of each system is a key factor to improve all smart container journey steps
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Thank you!

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