GS1 – Initiatives and Innovation

RAIN RFID Alliance Meeting
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Agenda

• A few words about GS1
• GS1 Initiatives
  - GS1 Digital link
  - Verified by GS1
  - RAIN RFID and EPCIS software tools
• Examples of EPC-enabled RAIN RFID
• Conclusion
GS1 – the global language of business

GS1 is a global standards organization

- Neutral and not-for-profit
- User-driven and governed
- Global and local
- Inclusive and collaborative
Who we are, who we serve

- **112 local Member Organisations**
- **1.5 million companies** use GS1 standards
- **100 million products** carry GS1 barcodes
- **6 billion GS1 barcodes** are scanned every day
GS1 standards framework

**Identify**

- **Globally unique identification keys**
  - Companies, Products, Locations, Providers, Assets, Logistics, Documents, Services, Shipments, ...

**Capture**

- **Automatic data capture**
  - Barcodes and EPC-enabled RFID

**Share**

- **Exchange of accurate business information**
  - Master Data, Transactional Data, Traceability & Event Data and Digital Content
GS1 standards framework: Identify

- **Item identifier** = **GTIN**
  - Global Trade Item Number

- **Logistics unit identifier** = **SSCC**
  - Serial Shipping Container Code

- **Location identifier** = **GLN**
  - Global Location Number

- **Service relation identifier** = **GSRN**
  - Global Service Relation Number

…and there are more …
GS1 standards framework: Capture

- EAN/UPC
- GS1 Composite Component
- GS1 DataMatrix
- GS1-128
- QR Code

The Global Language of Business
GS1 Innovation: GS1 Digital Link

Today there is no seamless, non-proprietary way for brands, retailers and healthcare suppliers to communicate with consumers via a barcode or RFID scan.

GS1 proposed standard is “simply” a web address with a GS1 key in it, e.g:  

https://example.com/gtin/09507000009060
The GS1 Digital Link standard works with all kinds of data carriers:

- All one- and two-dimensional barcodes (construction of the Digital Link by an app for barcodes that do not contain a URL/web link)
- RAIN RFID tag (e.g., EPC-enabled RFID)
- Other technologies
Example: Patient Information Leaflet

App tells resolver the language on the phone
GS1 Innovation: GS1 Digital Link

Example: retailer app for product recall

(01)05400141130812(3103)000500(10)08153365

Product recall!
Verified by GS1: a new service based on Registry platform

Verified by GS1 is a global solution that enables Retailers and Marketplaces to verify the identity of a product by querying the GS1 Registry Platform.
GS1 Initiatives: Software Tools

GS1 acquired Ken Traub’s tools and updated versions of these tools will be released Q3 2019

EPCIS Workbench (Visibility Workbench)
- Decode and validate the contents of an EPCIS data file
- Create new EPCIS events or edit an existing file
- Send EPCIS events to an EPCIS repository for capture
- Query an EPCIS repository for events

RAIN RFID Encoder/decoder
- EPC, User Memory, TID
- Free web-based tool
- Software library for end-user or OEM
- Based on TDS 1.11
GS1 Initiatives: Software Tools

EPC and User Memory encoderdecoder

GS1 Key or other identifier — as used in bar codes
GTIN + serial (AI 01 + AI 21) (01) 80614141123458 (21) 6789

GS1 Company Prefix Length 7 digits

EPC Pure Identity URI (urn:epc:id:...) — as used in EPCIS
urn:epc:id:gtin:0614141.812345.6789

EPC Tag URI (urn:epc:tag:...) — as used in RFID middleware
urn:epc:tag:gtin:96:3.0614141.812345.6789

RFID Tag EPC Memory Bank Contents (hexadecimal) — starting at bit 20h
3074257bf7194e40000001a85

EPC Control Information
Tag Size 96 bits Filter Value 3 - reserved

Input Data
AI 01 - GTIN 12345678901234 Remove
AI 11 - PROD DATE 010101 Remove
AI 3920 - PRICE 100 Remove
Add a data element

Advanced Options
Time to encode: 0.418 milliseconds

Encoded data (hexadecimal)
893E817288121674E79C5FE404EEA32400

The Global Language of Business
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Examples of RAIN RFID
Tire identification and data-sharing

Market need
• Today: Identify and authenticate every tire to meet government and/or consumer demand
• Tomorrow: use RFID as a sensor (pressure, temperature, mechanical stress)

Issues
• No RFID-friendly way to embed tag in a tire today
• Data-sharing amongst many stakeholders

GS1 contribution
• SGTIN for tire identification offers traceability, etc.
• EPCIS for data-sharing
• Application Identifiers for user-memory data encoding
Examples of RAIN RFID
Retail stores—moving beyond inventory accuracy

Market need

- Would like more information than a simple inventory, e.g. the item is misplaced, was tried on but never sold, RFID-for-EAS, etc.

Issues

- EAS
- Reader interferences
- Human exposure
- Tag stacking

GS1 contribution

- Gen2v2 sessions improves efficiency of anti-theft systems
- SGTIN
- EPCIS
Why standards-based RFID is important

- Easy identification of the technology
- Taking into account privacy and security concerns (for better social acceptance)
- Backward-compatibility with existing deployments
- Costs can be shared among stakeholders
- Enable interoperability and accurate data sharing across the global supply chain (many stakeholders)
GS1 and Universities

GS1 collaborates with laboratories and universities for:

- Research and innovation
- Testing
- Education
- Antenna design
- Signal processing
- Microelectronics
- Energy harvesting

Institutions:

- MASSACHUSETTS INSTITUTE OF TECHNOLOGY
- UNIVERSITY OF ST. GALLEN
- UNIVERSITY OF CAMBRIDGE
- KOREA ADVANCED INST. OF SCIENCE AND TECHNOLOGY
- FUDAN UNIVERSITY
- KEIO UNIVERSITY
- AUBURN UNIVERSITY
- RFID LAB
GS1 and the RAIN RFID Alliance

- The RAIN RFID Alliance has become the main community of UHF RFID technology and solutions companies

- GS1 has a large community of end users that leverage standards-based technology

Collectively, we plan to bring our communities closer together to leverage our strengths and to be more valuable to industry
Conclusion

RAIN RFID is one of the key technology enablers for GS1 standards deployment

- Identification
- Authentication
- Localisation
- Sensing

For better:
- Traceability
- Data sharing

...and the winner is...

Industries and Consumers
Contact information

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Thank You!