T03 - Serialization
Best Practices in Reducing Risk and Achieving Business Agility
Agenda

What is Serialization

Why Serialize

The Future of Serialization - Connected Enterprise

Serialization Implementation Challenges & Solutions

Why Rockwell Automation®
What is Serialization?

Serialization is the application of unique serial numbers to packages.
Aggregation is linking all the package level serial numbers in Parent/Child data relationships.

Unit Dose  →  Carton  →  Case  →  Pallet

- 8305254961
- 4693602591 - 8305254961
- 1112131415 - 4693602591 - 8305254961
- 6016768 - 1112131415 - 4693602591 - 8305254961
Holistic Serialization Solution

Supply Chain

Level 5
Consumer Authentication (Brand Loyalty)

Mobile APP

Covectra EPCIS Cloud Repository

EPCIS

Supply Chain

Level 4
MES

ERP

Level 3
Site Controller

Backend

FT Production Center

PMC

Line Controller

Mobile Client

PEC

Level 2
PLC

Ethernet/IP

Level 1
Primary Packaging Aggregation Workstation

Case Packaging Aggregation Workstation

Palletizer Packaging Aggregation Workstation

Level 0
OEMs
Agenda

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Why Rockwell Automation®
## Why Serialize?

### Global Serialization Regulation

<table>
<thead>
<tr>
<th>Country</th>
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<th>Tamper Ex.</th>
<th>Other Req’s</th>
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### Why Serialize?

#### Global Regulatory Update – cont’d

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</table>
Serialization of Infant Formula for China

- A $32B global business with Asia representing 53% of the market

- 2008 contamination of Chinese infant formula results:
  - Increased government regulation of the industry
  - Sharp increase in demand of western product
  - Series of draft guidelines and regulations published in 2014 on infant formula production, including traceability requirements

- Unofficial reports that Chinese government will require each primary package of infant formula to be serialized starting in Jan 2015

- Chinese supply chain partners willing to support track & trace implementation
### Why Serialize?

<table>
<thead>
<tr>
<th>Business Category</th>
<th>Business Benefit</th>
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<tr>
<td>Consumer Safety/Brand Protection</td>
<td>▪ Regulatory compliance</td>
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<td></td>
<td>▪ Product adulteration &amp; diversion control</td>
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<tr>
<td>Customer Service &amp; Returns Processing</td>
<td>▪ Authenticate transactions</td>
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<tr>
<td></td>
<td>▪ Improve chargeback payment accuracy</td>
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<tr>
<td>Supply Chain Recalls</td>
<td>▪ Increase recall accuracy</td>
</tr>
<tr>
<td></td>
<td>▪ Reduce product recall size</td>
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<tr>
<td>Supply Chain Optimization</td>
<td>▪ Improve forecasting</td>
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<td></td>
<td>▪ Optimize inventory</td>
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<td></td>
<td>▪ Improve supply chain planning</td>
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<tr>
<td>Brand Loyalty Programs</td>
<td>▪ Drive customer specific target marketing programs</td>
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<tr>
<td>Business Optimization – Connected Enterprise</td>
<td>▪ Share data across departments</td>
</tr>
<tr>
<td></td>
<td>▪ Sales, Marketing, Finance, Operations, Supply Chain, etc.</td>
</tr>
</tbody>
</table>
Agenda

What is Serialization

Why Serialize

The Future of Serialization - Connected Enterprise

Serialization Implementation Challenges & Solutions

Why Rockwell Automation®
All manufacturers will serialize their products within 10 years.

Business benefits - a common data source for:
- Real time product consumption & demographic data
- Customer buying behavior information
- Brand protection, brand loyalty, compliance...

Big Data” from manufactured products will optimize businesses by serving as a common thread across their connected enterprise
  - Various departments will use the common data for their specific needs

In the “Internet of Everything” world, a company’s serialization data, when used to optimize the way a business operates, will become one of its most valuable assets.
Agenda

- What is Serialization
- Why Serialize
- The Future of Serialization - Connected Enterprise
- Serialization Implementation Challenges & Solutions
- Why Rockwell Automation®
Level 0 and Level 1 Challenges:Serialized Packaging Lines With Aggregation

Serialization Level 1 Aggregation Workstations

- **Blister Packing**
  - Print & Verify
- **Cartoning**
  - Print & Verify
- **Bundling**
  - Inspect, Confirm Print & Verify
- **Case Packing**
  - Inspect Print & Verify
- **Palletizing**
  - Inspect Print & Verify

Serialization Level 0 (OEM Machines, Printers & Vision Systems)
Printing Expertise Required

- Thermal Ink Jet HP
- Laser
- Drop on Demand
- Thermal Transfer
- Continuous Ink Jet
- Hybrid – Flexo / Digital
- Inks – Solvent, UV, Water-based, Security
- Substrates – Paper, Foil, PVC, Tyvek Metal, Direct part marking
Vision Expertise Required

- Gray Scale & Color
- 3D Imaging, Line Scanners
- OCR / OCV
- Part Features
- Barcode Grading (ANSI Standards)
- Integration into HMI Packages
- High Speed Applications
  - High Speed Web Inspection
  - 2D Matrix Code Grading @ 400 PPM

Tablet Inspection

Laser Engraved Metal

TIJ Printed Carton with Serialized Data
The Solution: Commercial Off-The Shelf Technology

- Open Serialization platform to interface with existing packaging equipment
- PLC/PAC controllers for data management at Level 0 & Level 1
- Open Network & Communication Standards (EtherNet/IP)
- PLC/PAC Software in standard IEC 61131-3 programming languages
- Modular, Reusable & Scalable Solution
EPCIS: Electronic Product Code Information Services to enable disparate applications to leverage EPC data via EPC-related data sharing, both within and across enterprises.

Serialization-relevant data is widely distributed over different Automation and Information Systems at different ISA-95 levels.
Serialization Data Management Challenges

- Data exchange?
- Data consistency?
- Data redundancy?
- Data ownership?
  - Who is the master?
- Scalability?
  - How to manage additional lines?
  - Additional countries?
  - Additional formats?
  - Additional regulations
  - Additional…?
The Solution - Data Convergence

Delivering the right data to the right place at the right time!
Site Controller Database Challenges

- How to integrate different external level 3/4 MES / ERP / EPCIS systems?
  - Do you have to customize for every external system?
  - Are you able to extend and adapt quickly?

- How to seamlessly integrate with level 0/1/2 Systems and equipment?
  - Can you cope with high speed real-time Serialization systems?

- Can your site controller cope with the diversity of products, formats, country requirements, pack. line types… ?

- Is your site controller CFR 21 Part 11 compliant?

- Is your site controller pre-validated according to GAMP 5?
Integration with Level 4 (Overview)
The Solution:
Open architecture

- J2EE – proven technology for mission-critical enterprise applications
  - Security and stability
  - Scalability without limits
- Service Oriented Architecture (SOA)
  - Feature rich business layer
  - Supports rich and thin (HTML) clients
- Variety of supported software
  - Operating Systems
  - Databases
- Multi-tier data model
- Application development framework

- J2EE Strengths
  - High data volumes, high throughput
  - Many users accessing data concurrently
  - Complex business logic
  - Scalability
The Solution:
ISA-88 aligned data model

- Well structured data, ISA-88 and -95 aligned:
  - Consistent
  - Reusable
  - Scalable
  - No redundancies
Level 5 – Supply Chain Challenges: Data Accessibility, Management & Security

AuthentiTrack® Cloud Server

Product Flow
Data Flow

Consumers
Los Angeles
Chicago
RDCs
Manufacturing
Miami

Chicago

Miami

Consumers
Los Angeles
Chicago
RDCs
Manufacturing

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Forward / Reverse Logistic Challenges

**Forward Logistics**
1. Distribution Center
2. Retailer
3. Customer

**Reverse Logistics**
1. Customer Not Satisfied
2. Faulty Order
3. Overstock
4. End of Life
5. Recalls
The Solution

- EPCIS Certified Serial Number Generation & Event Repository (AuthentiTrack® Cloud)
  - Layered applications provide a holistic brand integrity solution – interfaces to the brand owner, supply chain partners and customers.
  - Central Storage location for serialized data – commissioned, decommissioned, event data
  - Serial Number Generation Management - prevent duplication across enterprise (multiple sites)
  - Central communication hub for supply chain partners using EPCIS connector
  - Mobile Applications Connectivity – consumer product authentication (iPhone, iPad, Droid)

- Cloud Data Center Services & Security
  - Compliance with SOC2 / SOC3 & ISO/IEC27001:2005 for security, routine backup, disaster recovery

- Modular & Scalable Distribution Solution Model for Levels 1 – 3
  - Scalable Site Server and Network Architecture
  - Modular Supply Chain Rework Stations – Disaggregate/Re-aggregate, Decommissioning, etc.
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Serialization Implementation Challenges & Solutions

Why Rockwell Automation®
Why Rockwell Automation®?

• Turnkey Serialization solution – unique ability to provide all the key components of a complete serialization solution
  • EPCIS certified Cloud-based serial number generation, management and event repository
  • Expertise in Level 3 – 4 integration (serialization site server to MES & ERP systems)
  • Packaging line serialization solution for all package types using open architecture
  • Supply chain applications to provide business benefits with a Return on Investment

• Modular, reusable and scalable solutions

• Solution built with commercial-off-the-shelf (COTS) products and software

• Proven technology and integration expertise with ERP & MES applications

• Capability to provide internal and external supply chain tracking

• Stable, global partner with global delivery and global support capabilities
Global Support Centers

Vancouver, Canada (Back-Up/Disaster Recovery)

Cleveland, United States

Milton Keynes, UK

Haan-Gruiten, Germany

Shanghai, China

Singapore

Melbourne, Australia

São Paolo, Brazil

Global Technical Telephone Support Centers

Trained resources for deployment in 80 countries

Real-time response: 24/7/365
On-site Services with a Local Address

**North America**
- 280 Field Engineers
- 206 Tech Support Engineers
- 780 Project Mgrs./Engineers
- 390 Additional Tech Resources

**Europe, Middle East & Africa**
- 165 Field Engineers
- 40 Tech Support Engineers
- 930 Project Mgrs./Engineers
- 277 Additional Tech Resources

**Latin America**
- 80 Field Engineers
- 19 Tech Support Engineers
- 250 Project Mgrs./Engineers
- 77 Additional Tech Resources

**Asia Pacific**
- 105 Field Engineers
- 31 Tech Support Engineers
- 600 Project Mgrs./Engineers
- 233 Additional Tech Resources

*Average 13+ years automation experience operating locally in 80+ countries helping you to install, operate, and maintain*