



Defining Today's
Technology Standards;
Empowering Tomorrow's
Solutions.



Make • IT • Wright 20 HACKATHON 23

Training Session #1
Date: January 19, 2023

by AIM North America

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AIM North America is proud to be the industry association and authority on barcode, RFID, RTLS and mobile computing, and is on the cutting edge of development in these areas. Our members have a long history of working together to provide a collaborative global influence on emerging technologies and innovation.

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Session 1 Agenda

5:30 – 6:00	Networking / Dinner
6:00 – 6:15	Welcome / Overview / TY Sponsors
6:15 – 6:35	Role of Standards
6:35 – 6:45	Break
6:45 – 7:15	Identification / Capture standards – barcodes and RFID
7:15 – 7:45	GS1 Digital Link Scan4Transport
7:45 – 8:00	Wrap-Up / Q&A

Speaker

Matt Kijowski



**WRIGHT STATE
UNIVERSITY**

Cyber Systems Program Manager

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Supply Chain Digital Transformation Hackathon

1 NO POVERTY



2 NO HUNGER



3 GOOD HEALTH



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 RENEWABLE ENERGY



8 GOOD JOBS AND ECONOMIC GROWTH



Wright State University and AIM North America welcome interdisciplinary teams of students to **tackle the challenges of building resilient supply chains.**

During the hackathon...

- You get the opportunity to apply your skills to real-world challenges.
- You will be surrounded by industry experts. You will get a better understanding how innovation in supply chains can lead to more sustainable production patterns.
- Broaden your network and learn from other industry experts and entrepreneurs how easy it can be to become a changemaker.

This Hackathon will focus on two industry segments (Food, and Healthcare) that were disrupted by the pandemic. You will work to develop solutions to one of the following challenges, training will be provided.

9 INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE AND JUSTICE



17 PARTNERSHIPS FOR THE GOALS



THE GLOBAL GOALS
For Sustainable Development



Thank You Sponsors



WRIGHT STATE
UNIVERSITY



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Training Session #1 – The Role of Standards
Date: January 19, 2023

by AIM North America

Speaker

Shawn Minehart

NOVEXX»
SOLUTIONS

Sales Director North America

Shawn.Minehart@novexx.com



Role Of Standards In The Supply Chain



[VIEW ALL 1 IMAGES](#)

\$24.98
\$49.99*

★★★★★ (0)

Size: L



[Which Size Fits Me?](#)



Ship To Me

Available



Free Store Pickup

Curbside & In-Store

In Stock at

BEAVERCREEK [Change Store](#)

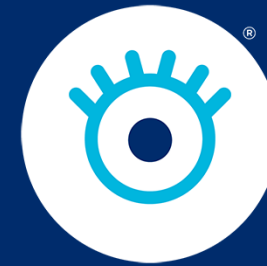
Curbside & In-Store Pickup Available. [Details](#)

Available at 3 nearby stores within 100 miles.

- Did you ever think about the supply chain before 2020?
- Working behind the scenes
- Amazon
- UPS/FedEx
- Farm to table
- Common language required

The Global Language Of Business

GS1 Standards make it possible to **identify**, **capture**, and **share** information automatically and accurately about products, business locations, and more. This way anyone who wants that information can understand it, no matter who or where they are.



Identify



Capture



Share

Lack Of Standards in Daily Life is Inefficient and Annoying



In Healthcare, It Is Inefficient And Dangerous

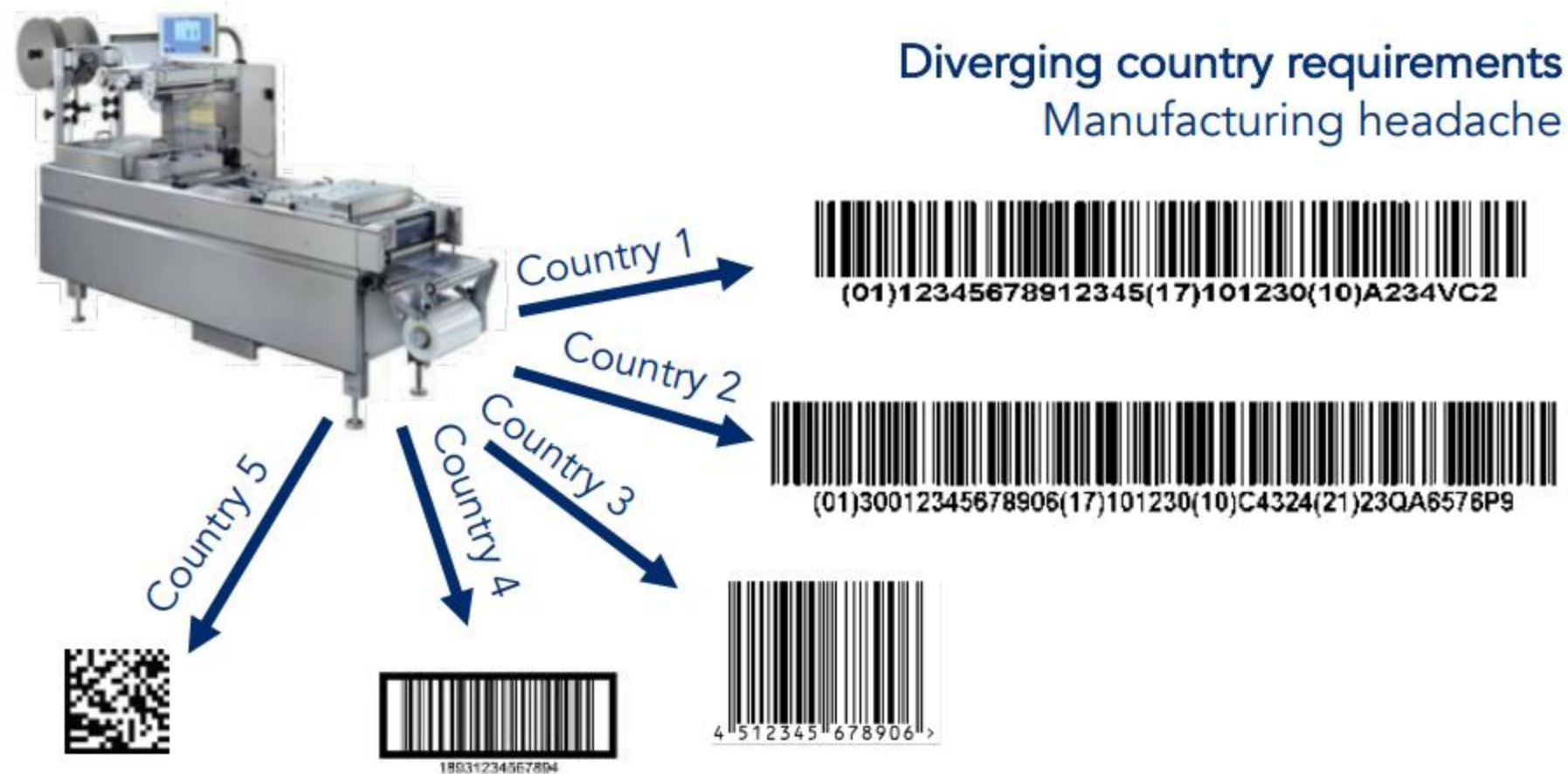


- **Multiple barcodes on one package:** Which one to scan?
- **Different types of barcodes:**
- Inconsistent, incompatible
- **No barcode:**
- Need to barcode, repackage, relabel

We Operate In A Global Environment



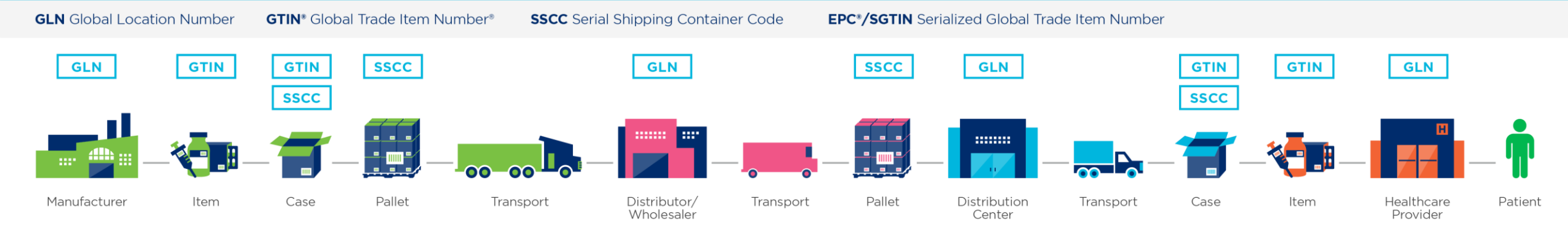
Need For Global Standards In Healthcare



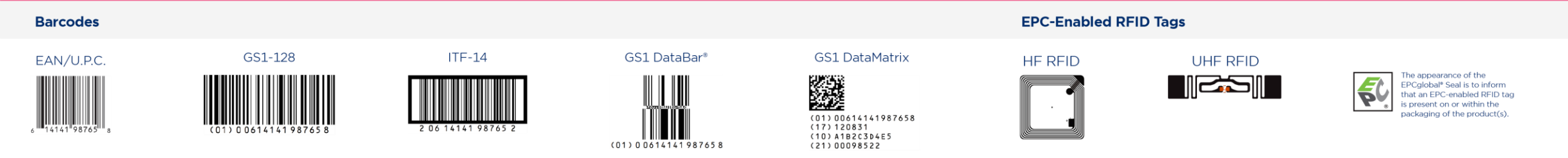


GS1 Standards In Healthcare

Identify: GS1 Identification Numbers



Capture: GS1 Data Carriers



Share: GS1 Data Exchange



GS1 Standards Across The Entire Supply Chain



Improved production planning, packaging, and supply processes

Simplification and accuracy improvement in warehousing, distribution, and logistics processes

Automatic verification in dispensing and administration processes, which reduces medical errors

- More accurate and efficient supply chain management
- Enabling traceability and authentication (counterfeiting, product recalls, etc.)
- Enabling regulatory compliance
- **Improving patient safety and supply chain efficiency!**



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Training Session #1 - Identification / Capture standards
– barcodes and RFID

Date: January 19, 2023
by **AIM North America**

Speakers



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*If applicable

The identification of everything makes anything possible



GS1 Identifiers Quick Reference

 	Trade items (products and services)	Global Trade Item Number® (GTIN®)
 	Locations & trading partners	Global Location Number (GLN)
	Logistics units	Serial Shipping Container Code (SSCC)
	Individual asset	Global Individual Asset Identifier (GIAI)
	Returnable assets	Global Returnable Asset Identifier (GRAI)
	Service relationships	Global Service Relation Number (GSRN)
 	Digital and physical documents	Global Document Trade Identifier (GDTI)



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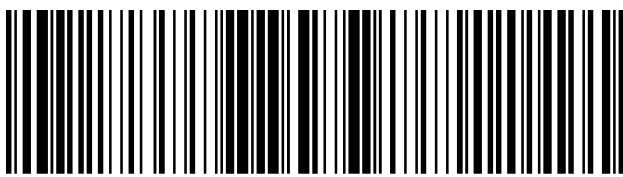


Identifying who, what, where, and so on only goes for far.

A good solution needs the **right identification elements** that are integrated with **appropriate technologies** to enable all systems and stakeholders to **get the information they need to act**.



The Wider World of Automatic Identification and Data Capture (AIDC)



(01) 1 0614141 99999 3 (10) ABC123

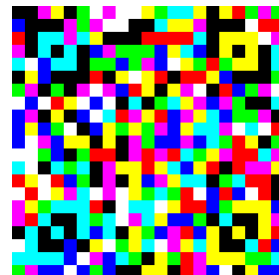


2 06 14141 00044 3



6 14141 98765 8

Linear Barcodes



JAB Code



(01) 2 0887511 00734 6

2D Barcodes



Mag Stripe



Active RFID Tag



Passive RFID Tags



Smart Dust



DNA Tags



Retinal Scan and
Fingerprint



Bio Molecular Tags



Optical Character
Recognition

Digital
Watermarking



GS1 Application Identifier Overview

DISCLAIMER – Sorry, “AI” does not mean artificial intelligence here

Purpose: The GS1 Application Identifiers (AIs) are used so systems can automatically process information from the data carrier and ‘know’ what to do with it.

GS1 Application Identifiers define the length, acceptable characters, data format, and other factors needed to leverage the encoded information at scale – examples to come.



Common GS1 Application Identifiers

Recommend this resource: <https://ref.gs1.org/tools/gs1-barcode-syntax-resource/>

AI#	Name	Format	Regex	Require Delimiter? (FNC1)
00	Serial Shipping Container Code (SSCC)	N2+N18	<code>^00(\d{18})\$</code>	N
01	Global Trade Item Number (GTIN)	N2+N14	<code>^01(\d{14})\$</code>	N
10	Batch/Lot Number	N2+X..20	<code>^10([\x21-\x22\x25-\x2F\x30-\x39\x3A-\x3F\x41-\x5A\x5F\x61-\x7A]{0,20})\$</code>	Y
17	Expiration Date (YYMMDD)	N2+N6	<code>^17(\d{6})\$</code>	N
21	Serial Number	N2+X..20	<code>^21([\x21-\x22\x25-\x2F\x30-\x39\x3A-\x3F\x41-\x5A\x5F\x61-\x7A]{0,20})\$</code>	Y

...180+ more



GS1 Application Identifier Example

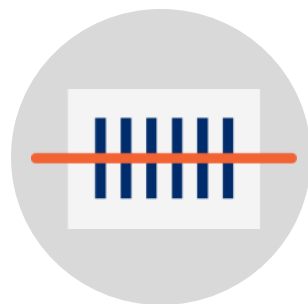


GS1 AI for GTIN

GS1 AI for Batch/Lot Number

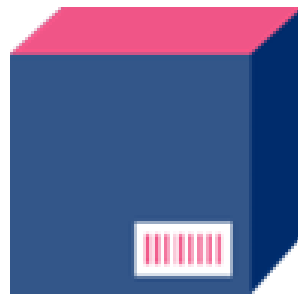


GS1 Identifier Syntaxes



Plain

Contains only the primary identifier (GTIN)



GS1 element string

Can contain the primary identifier **plus attribute data**



GS1 Digital Link URI

Can contain the primary identifier **plus attribute data in a web compatible format**



Global Trade Item Number (GTIN): 00614141999996

Expiration Date: 31 December 2030 = 301231

Batch/Lot Number: PX8L



(01)00614141999996
(17)301231
(10)PX8L



Plain

614141999996

GS1 element string

(01)00614141999996
(17)301231
(10)PX8L

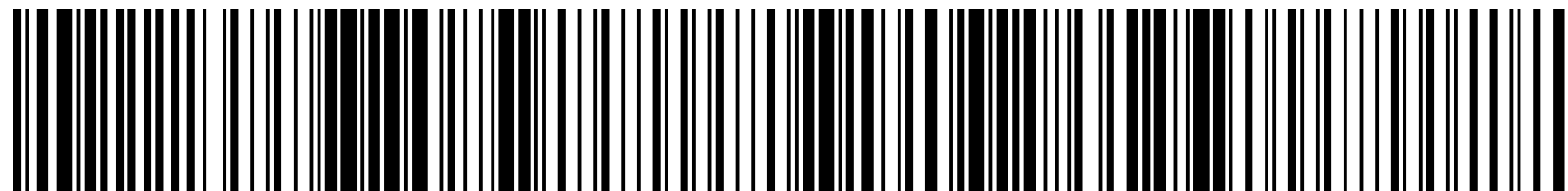
GS1 Digital Link URI

[https://example.com
/01/00614141999996
/10/PX8L
?17=301231](https://example.com/01/00614141999996/10/PX8L?17=301231)

**These barcodes are being used for example purposes. Syntaxes may be used in other barcode types*

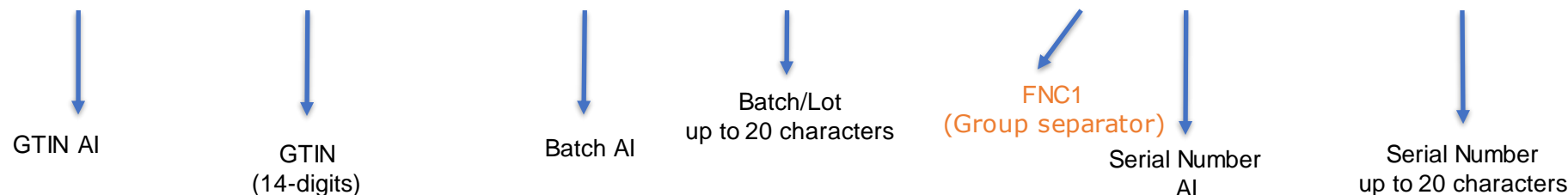


Data Capture

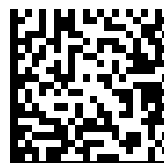


(01) 0 0614141 99999 6 (10) ABCDEF123456 (21) 654321FEDCBA

010061414199999610ABCDEF123456<GS>21654321FEDCBA

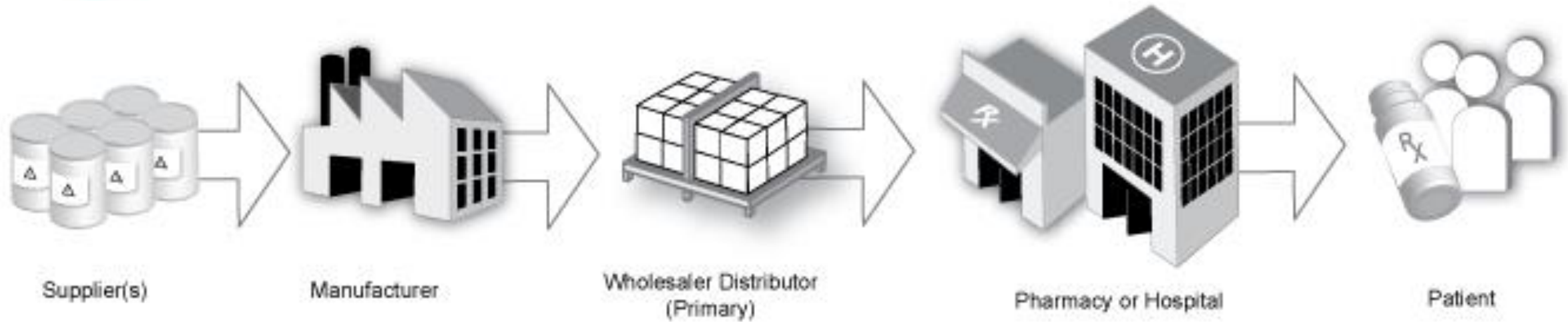


or



(01)00614141999996
(10)ABCDEF123456
(21)654321FEDCBA

Where (and what) data is captured in the Supply Chain



Quality Management System — Source materials, ID, Batch, Serial, Dates

Chain of Custody ID, Batch, Serial, Dates

Logistics and Inventory ID, Batch, Serial, Dates, Quantity



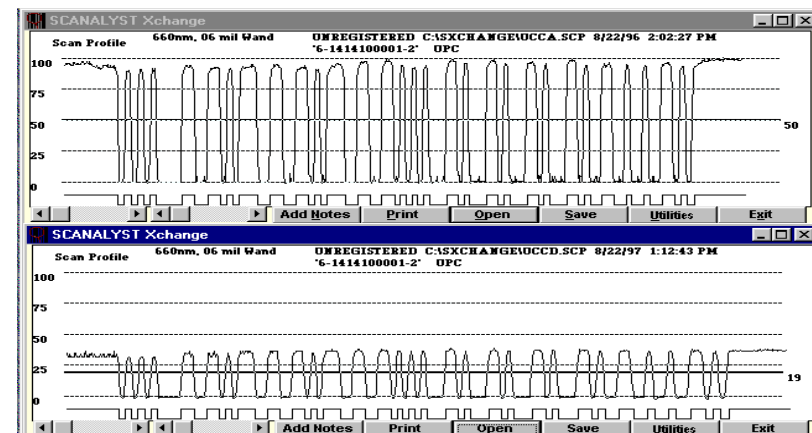
Data Capture Considerations

- **Parse** content – based on that AI's format
- **Compare** content to expected data i.e. expiry date is in the future – actually!!
- **Alerts** – Product is Expired, recalled, not in database
- **Route** data and product appropriately i.e. quarantine
- **Grouping** – aggregation – increment the count for identical products or capture all data for unique manifests
- **Save** as complete message string or DB record with fields or Both
- **SSCC and EDI** – shipping - build the manifest or Receiving - verify the shipment integrity

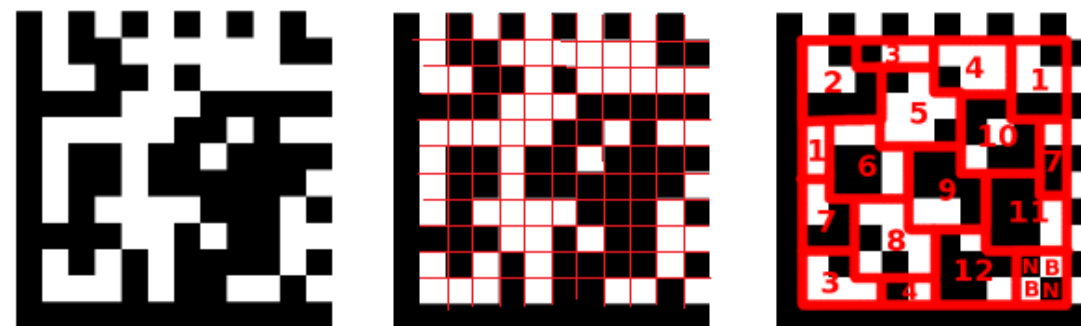


Decode and Scanner Categories

Linear – laser or CCD Line Array creates a narrow beam of light
 Generates an analog reflectivity scan profile
 Converts to digital and
 Then looks up predefined patterns
 Only works on linear barcodes



Matrix – Imagers, digital camera, machine vision, cell phone camera
 Take a full picture of barcode area
 Decode the image of the barcode
Needs the full matrix to decode
 Linear, matrix barcodes
 Some watermarks



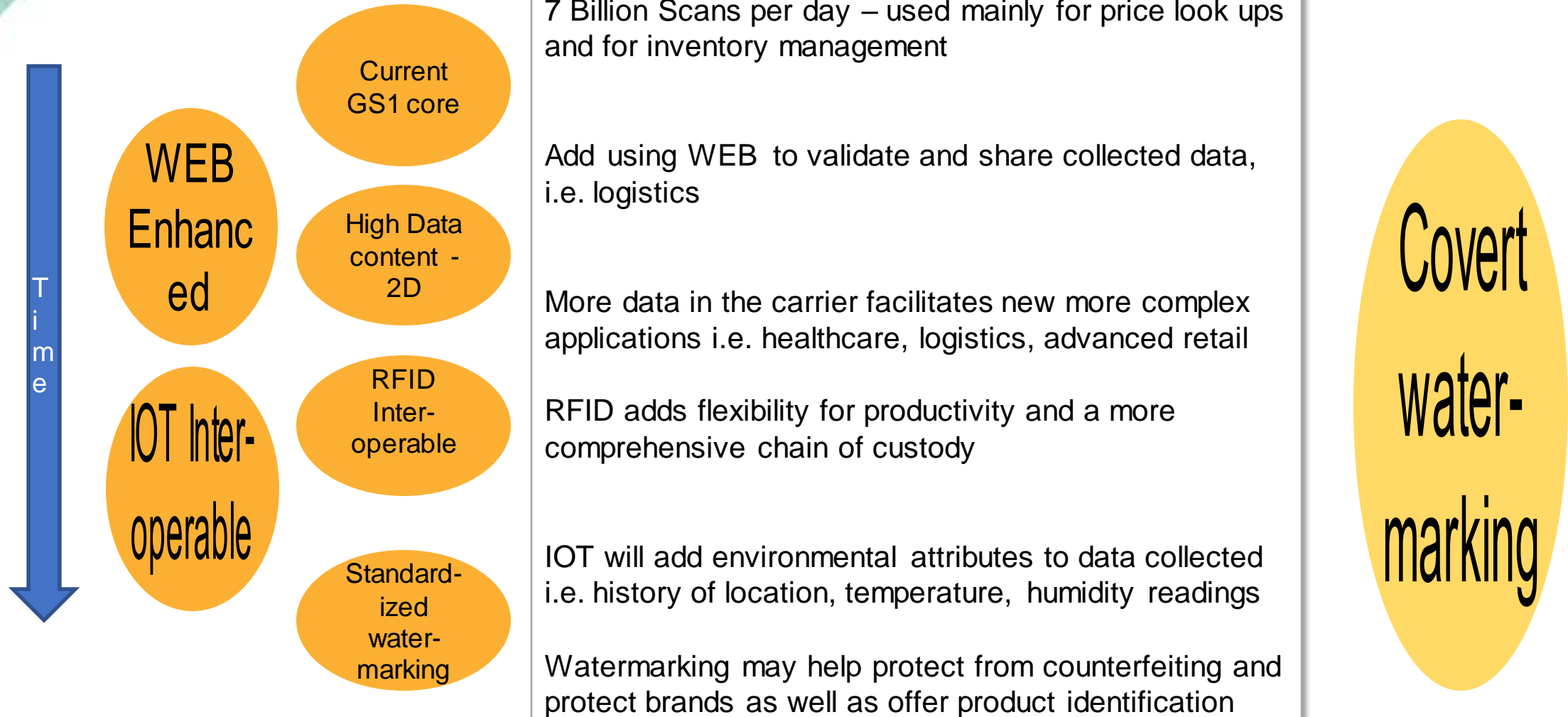


RFID

- UHF characteristics
 - No line of sight required – read multiple unit boxes in a carton
 - Distance can vary – inches to 20'
 - Antenna array suggested – reflections cause voids
 - Some engineering and testing involved
 - Adds some cost per tag/product – barcode is considered to be 'Free'
- Interoperability with barcode
 - Can add a lot of value at distribution points with manifest lookup
 - Improves productivity at distribution points
 - Can improve chain of custody integrity – UDI, DSCSA, others
- EPCIS 2
 - New – standardizes RFID integration into the GS1 world
 - Will also create a doorway for IOT sensor data integration
 - Will help make integrated systems more the norm
- More in Session 2



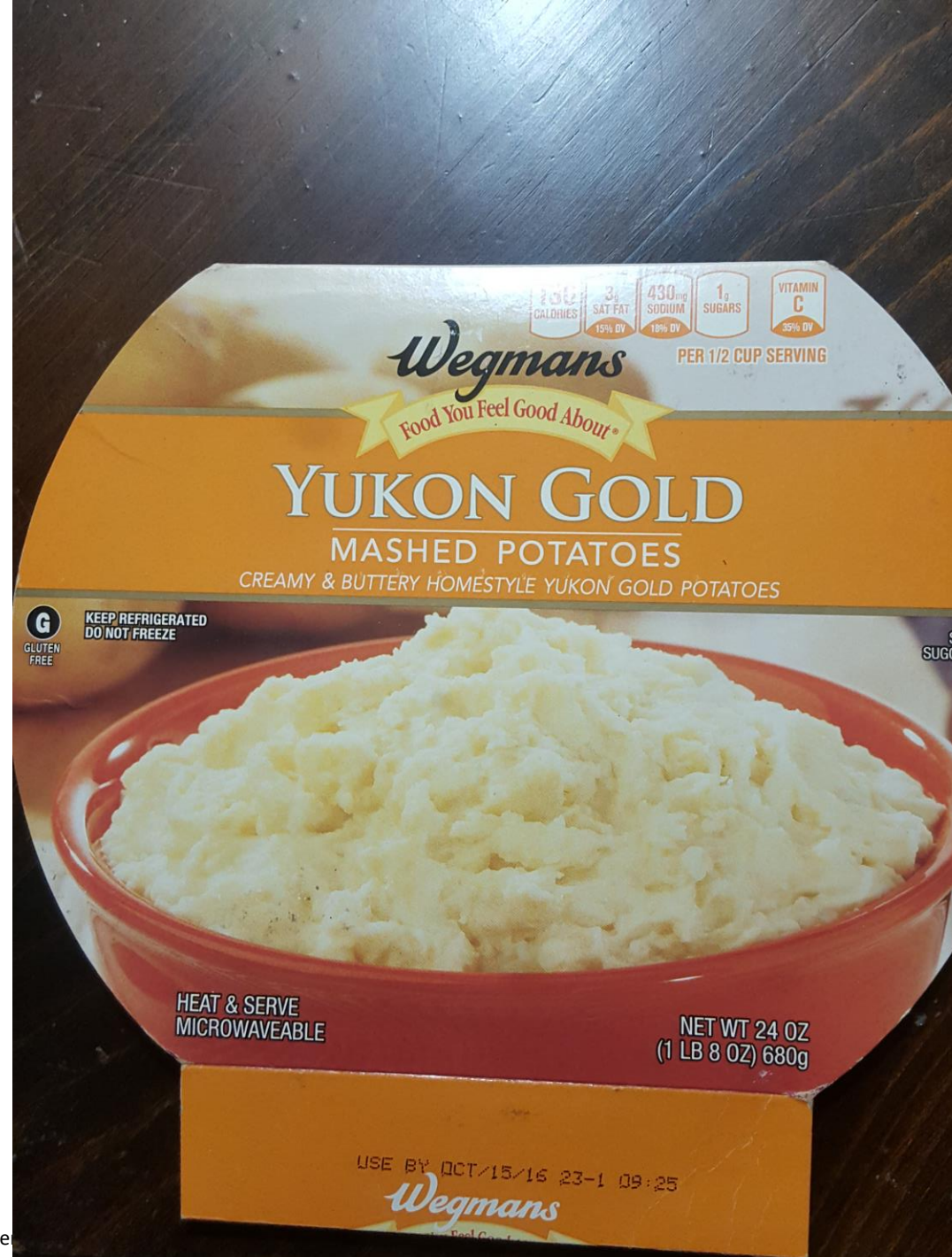
What is next?



Copyr



Watermark Example





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GS1 Digital Link Disclaimer

GS1 US recommends that any organization developing an implementation designed to be in conformance with the GS1 Digital Link Specification should consult with their own counsel to determine the compliance of such an implementation with any relevant intellectual property or other rights of third parties.

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Training Session #1 - GS1 Digital Link Scan4Transport
Date: January 19, 2023

by AIM North America

Speaker



Elizabeth Sinclair



Director, Strategic Alliances

esinclair@seagullscientific.com



The future of barcoding

Every product could be:

1. Self describing
2. Its own media channel, personalised to a consumer
3. Its own authoritative source of information

Every scan could:

1. Tell you when and where it was scanned
2. Whether the scan was by a known customer (and if so who)
3. What else they scanned

One barcode could:

1. Do everything, everywhere
2. Support B2B and B2C functions
3. Remove the need to aggregate multiple sources of data

GS1 Digital Link

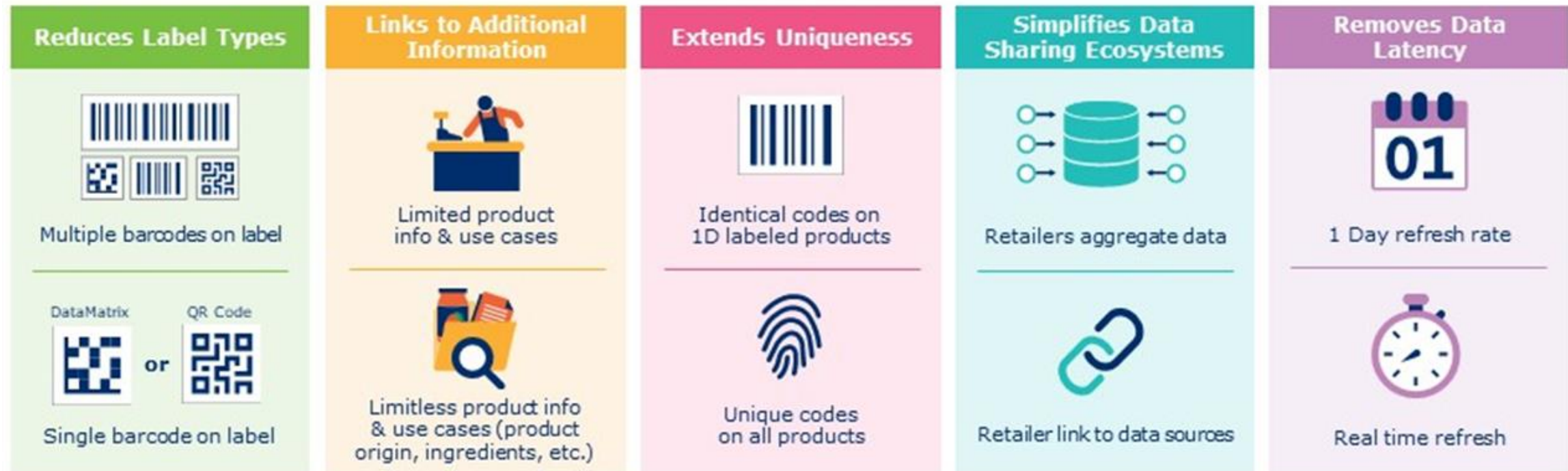


- A solution that “web-enables” barcodes
- A barcode that contains a URL
- Follows similar standards as the existing GS1 barcodes



GS1 Digital Link: Potential value

GS1 Digital Link has the opportunity to help transform current labeling into an **efficient, empowering platform for retailers & consumers** that can enable limitless linked information, improve data latency, and more.



Decoding GS1 Digital Link



Redirects
to a web
address

<https://dalgiardino.com/01/09506000134369/10/123456/21/192837?17=191031>

↑
The protocol
(i.e., secure
HTTP)

↑
A domain
chosen by the
brand or service
provider

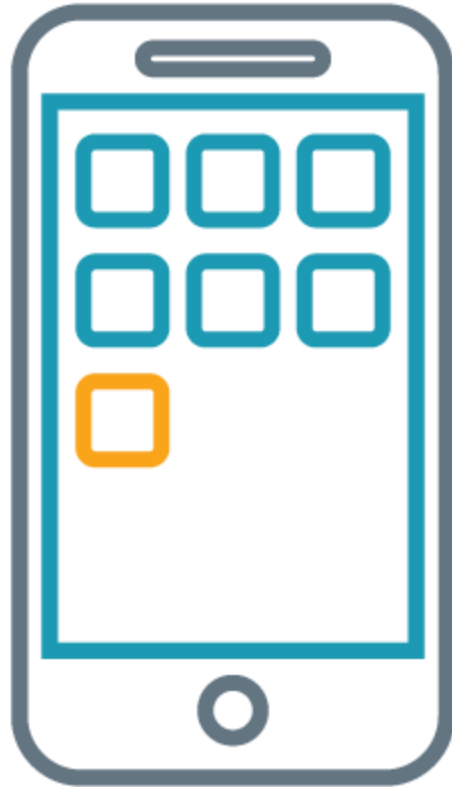
↑
The GTIN identifying
a product

↑
The batch/lot
number

↑
The serial
number
(identifying
an item or
thing)

↑
The
expiration
date

Why now?



- Smart phones are everywhere
- Consumers: the “Thin Interface”
- New ways of thinking about labeling

Brands and Digital Link



- Social media? It's The Wild West.
- Be the source of truth
- Build trust
- Influence pre-purchase decision
- Corporate social responsibility
- Encourage repeat purchases
- Give consumers what they want



The Digital Link-enabled supply chain



- Communicate safety and handling data
- Enable the Circular Economy
- Capture chain of custody
- Traceability
- Product, pricing and marketing information



Scan4Transport

GS1

Australia

☒ Data Matrix

☐ QR Code

Transport Company

GS1 Transport

Service Code Description

STANDARD

SSCC

☒ SSCC in full

SSCC

0931234500000001

☐ SSCC in parts

Company Prefix

Serial Reference

Ext. Digit

0

93123450

00000002

Ship to

Company

GS1 Melbourne Office

Contact

Michiel Ruighaver

Tel

0412830095

Address Line 1

Nexus Business Park

Address Line 2

8 Nexus Court

Suburb

MULGRAVE

Locality

Melbourne

Region

VIC

Postal Code

3170

Country

Australia

Return to

Company

GS1 Sydney Office

Contact

Tony Repaci

Tel

0296952200

Address Line 1

Lakes Business Park

Address Line 2

2-4 Lord St

Suburb

Botany

Locality

Sydney

Region

NSW

Postal Code

2019

Country

Australia

URI Stem

https://id.gs1.org

GINC

9312345C001

GSIN

93123450000009992

Routing Code

MEL

Ship to GLN

931234500001

Ship for GLN

931234500002

☒ Dangerous goods

☒ Authority to leave

☒ Signature required

☒ Release Date

Friday, 22 July 2022

Delivery not before

☒ Date

July 25, 2022

Enter Time

9:00 AM

Delivery not after

☒ Date

July 29, 2022

Enter Time

5:00 PM

Delivery instructions

This is a Certification Test

Dimensions

Width

0.2

Length

0.1

Height

0.3

Volume

0.6

Weight

7

Item

1

of

1

Scan4Transport

SERVICE	STANDARD
GINC	9312345C001
GSIN	93123450000009992
SHIP TO GLOBAL LOCATION NUMBER	9312345000012
SHIP FORWARD GLOBAL LOCATION NUMBER	9312345000029
TRANSPORT COMPANY	GS1 Transport
ROUTE	MEL
DELIVERY TO	GS1 Melbourne Office Attn: Michiel Ruighaver Nexus Business Park 8 Nexus Court MULGRAVE Melbourne VIC 3170 AU Australia PH (041) 2 830 09 5
DELIVERY FROM	GS1 Sydney Office Attn: Tony Repaci Lakes Business Park 2-4 Lord St Botany Sydney NSW 2019 AU Australia PH (029) 6 952 20 0
DELIVERY INSTRUCTIONS	Release Date: 22-Jul-2022 Not delivery before: 25-Jul-2022 09:00 Not delivery after: 29-Jul-2022 17:00 This is a Certification Test
<div><div>A.T.L</div><div>SIG REQUIRED</div><div><div>WIDTH</div><div>0.20m</div></div><div><div>LENGTH</div><div>0.10m</div></div><div><div>HEIGHT</div><div>0.30m</div></div><div><div>WEIGHT</div><div>7.000Kg</div></div><div><div>ITEM</div><div>1 of 1</div></div><div><div>VOLUME</div><div>0.60m³</div></div></div>	
<div><div>SSCC</div><div></div><div>(00) 0 9312345 000000001 2</div></div>	

Contact Us



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Questions & Comments





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Next Training Session: January 26th

- 5:30 – 5:45 Networking / Dinner
- 5:45 – 5:55 Welcome / Overview / TY Sponsors
- 5:55 – 6:30 TSC Printronix Thermal Printers....
- 6:30 – 6:40 Break
- 6:40 - 7:00 NOVEXX Printers....
- 7:00 – 7:10 Encoding / Decoding RFID Tags TDS 2.0
- 7:10 – 7:25 RFID readers / Barcode readers
- 7:25 – 8:00 EPCIS Work Bench and Free EPICS Client Repository PLUS Examples
- 8:00 – 8:15 Wrap-Up / Q&A



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THANK YOU!
