The Global Language of Business

Linkage of GS1 coding to UNECE Language

Example of livestock/meat traceability using IoT

Jim Bracken
Sustainability Durector, GS1 Global Office
August 2016

Information is not Power,
Sharing Information is the Real Power

The Global Language of Business

Agenda

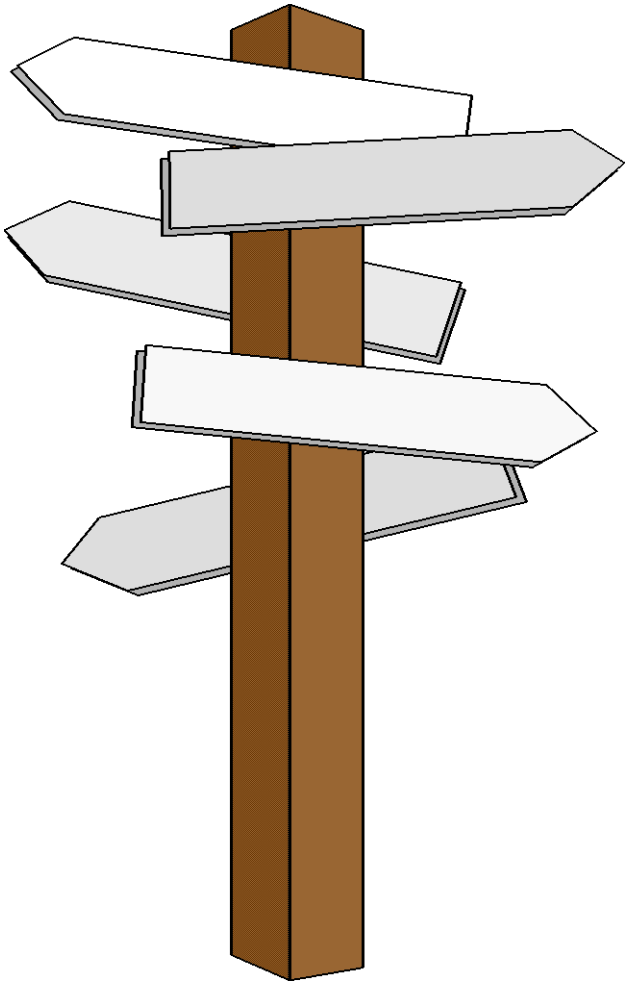
About UNECE's traceability messaging standards

How the GS1 coding and standards fit - Identify, Capture, Share

EPCIS, a GS1 open standard

EPCIS pilot - tracking and tracing of livestock from farm to fork

Questions



UN/CEFACT International Trade and Business Domain: Agriculture

UNECE's Traceability Messaging Standards

UN/CEFACT has been developing standards for Animal and Animal Product Traceability Data Exchange

- Animal Traceability Data Exchange published in November 15
- Animal Product Traceability Data Exchange is in progress

The published document describes traceability processes for live animals, groups of animals and fish during transport within a country or across borders.

For the purpose of these documents, the definition of traceability is: 'Traceability is retrieving information about the origin and history of an animal, a group of animals or animal products.'

UN/CEFACT International Trade and Business Domain: Agriculture

UNECE's Traceability Messaging Standards

Traceability information should give an answer on the What, When Where and Why if questions are asked about a (group of) animal(s) or an animal related event.

Traceability issues can be defined at 3 levels:

1. Identify the responsible business partners for the particular tracking and tracing questions for the specified animal(s) or group of animals.
2. Questions about animals, locations, transports and responsible parties.
3. Questions about breeding, animal holding processes and events, health and sanitary issues, medications.

UN/CEFACT International Trade and Business Domain: Agriculture

UNECE's Traceability Messaging Standards

UN/CEFACT's Animal Traceability Data Exchange uses GS1's EPCIS standards/ISO 19987 (EPCIS) to provide the basis of Level 0 traceability - where a specific party needs T&T information about an animal, a group of animals, a transport, a location or the responsible party

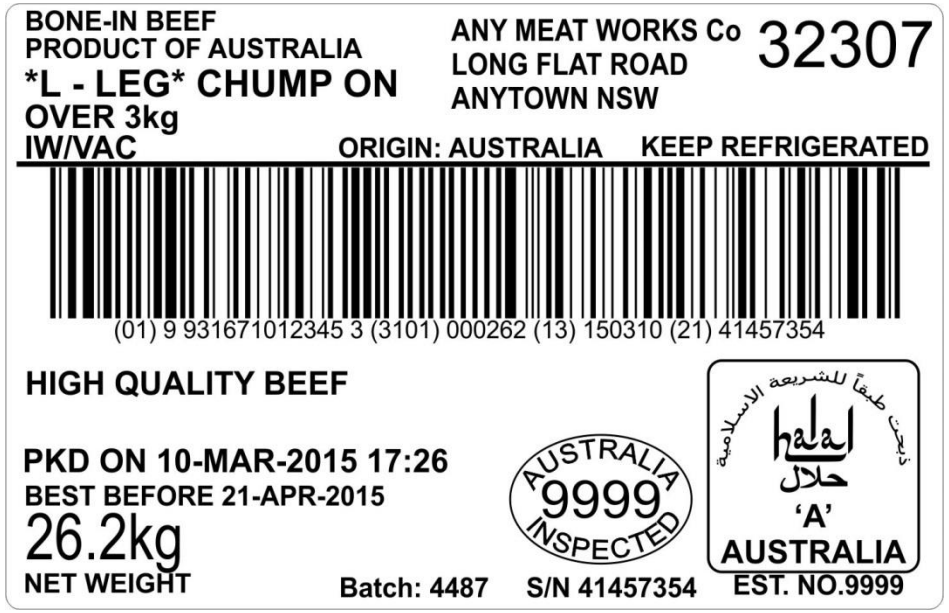
GS1 and Meat Product Traceability

GS1's coding is already widely used for Animal Product Traceability in the downstream supply chains for animal products both for labelling and traceability purposes.

GS1 standardized labels facilitate the day to day supply chain operations and traceability at the traded item as shown in the following examples:

Example GS1 compliant carton/case label

Trade item beef carton/Case label example – EU importing compliant



Example GS1 compliant carton/case label

Trade item beef carton/Case label example – US importing compliant

Linkage of GS1 coding to UNECE Language

Upstream traceability/visibility in the livestock sector

Whilst it has always been possible to apply GS1 standards in the upstream supply chain this is only now beginning to happen.

The business case for doing so is as follows:

1. Improved supply chain visibility from farm to fork
2. Improved food safety through supply chain transparency
3. Improved sustainability of livestock and meat production
4. Improved recall management in the event of a crisis

Linkage of GS1 Standards & Coding to UNECE Language

How do GS1 Standards/Solutions link to UNECE Language?

To explain how this works in practice I will give a brief presentation on a New Zealand pilot covering the export of venison meat to a German retailer.

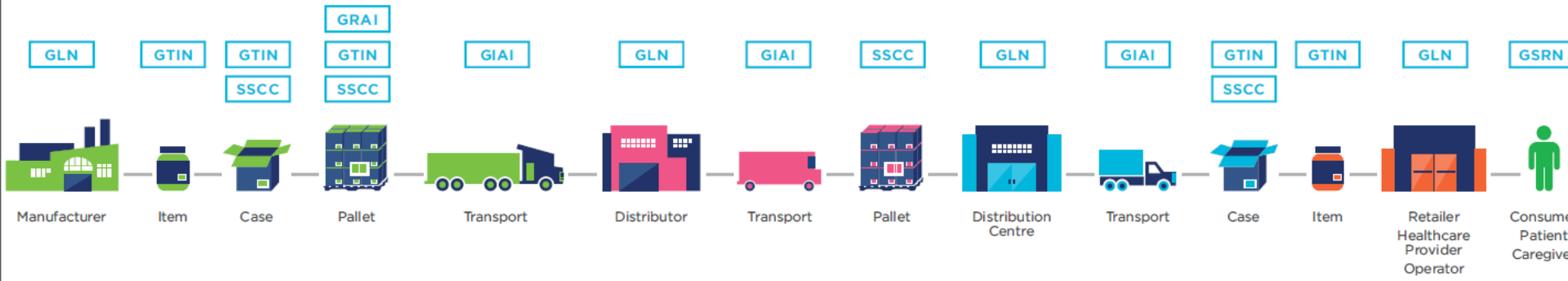
Before doing so, I need to provide you with a brief overview of the GS1 System of Standards and in particular the Electronic Product Code Information System (EPCIS)

- Approved as **ISO/IEC 19987** in July 2015

GS1 Identify Capture Share

Identify: GS1 Standards for Identification

GLN Global Location Number **GTIN** Global Trade Item Number **SSCC** Serial Shipping Container Code **GRAI** Global Returnable Asset Identifier **GIAI** Global Individual Asset Identifier **GSRN** Global Service Relation Number



Capture: GS1 Standards for Barcodes & EPC/RFID

GS1 Barcodes

EAN/UPC

GS1-128

ITF-14

GS1 DataBar

GS1 DataMatrix

GS1 QR Code

GS1 Composite Barcode

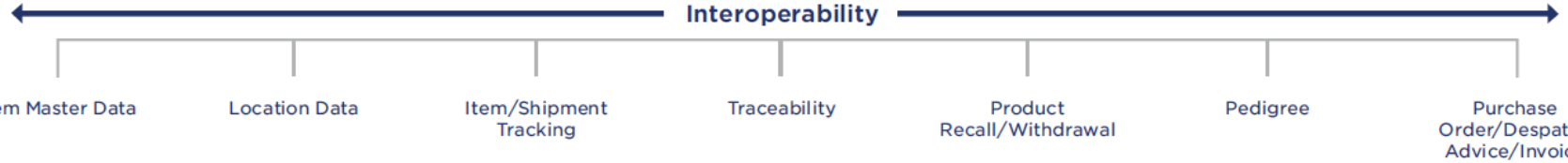
GS1 EPC/RFID

EPC HF Gen 2

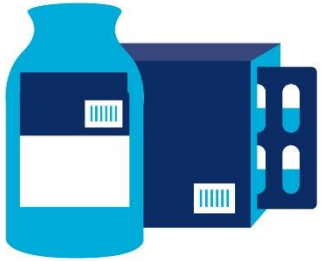
EPC UHF Gen 2

Share: GS1 Standards for Data Exchange

Master Data Global Data Synchronisation Network (GDSN) **Transactional Data** eCom (EDI) **Event Data** EPC Information Services (EPCIS)



Four dimensions of an EPCIS event



WHAT objects are the subject of event?

Individual objects (SGTIN) or groupings (GTIN + Lot/batch)

WHEN did this event take place?

Date, time, time zone

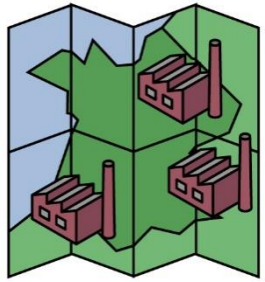
WHERE did this event take place?

GLN of physical location & object's subsequent whereabouts

WHY did this event take place?

Business step, Disposition, Source/Destination info

EPCIS enables supply chain visibility

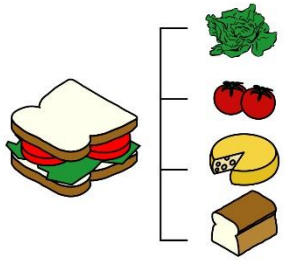


- **Tracking**
  Where are the animals I shipped?
- **Tracing**
  Where did this batch of animals come from?
- **Chain of Custody (CoC) / Chain of Ownership (CoO)**
  Which parties had custody of these animals?
- **Recall**
  Where were meat products produced on 14 April shipped to?

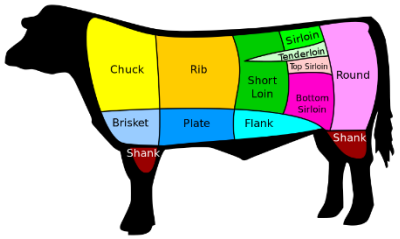
EPCIS event types
Transformation Event

(new in EPCIS 1.1)

- One or more objects are an input into a process
- This process irreversibly changes input object(s)
- Output has a new identity and characteristics
- Many to one
  - *Lettuce, tomatoes, cheese, bread -> sandwich*



- One to many
  - *Cow -> sides / cuts of beef*

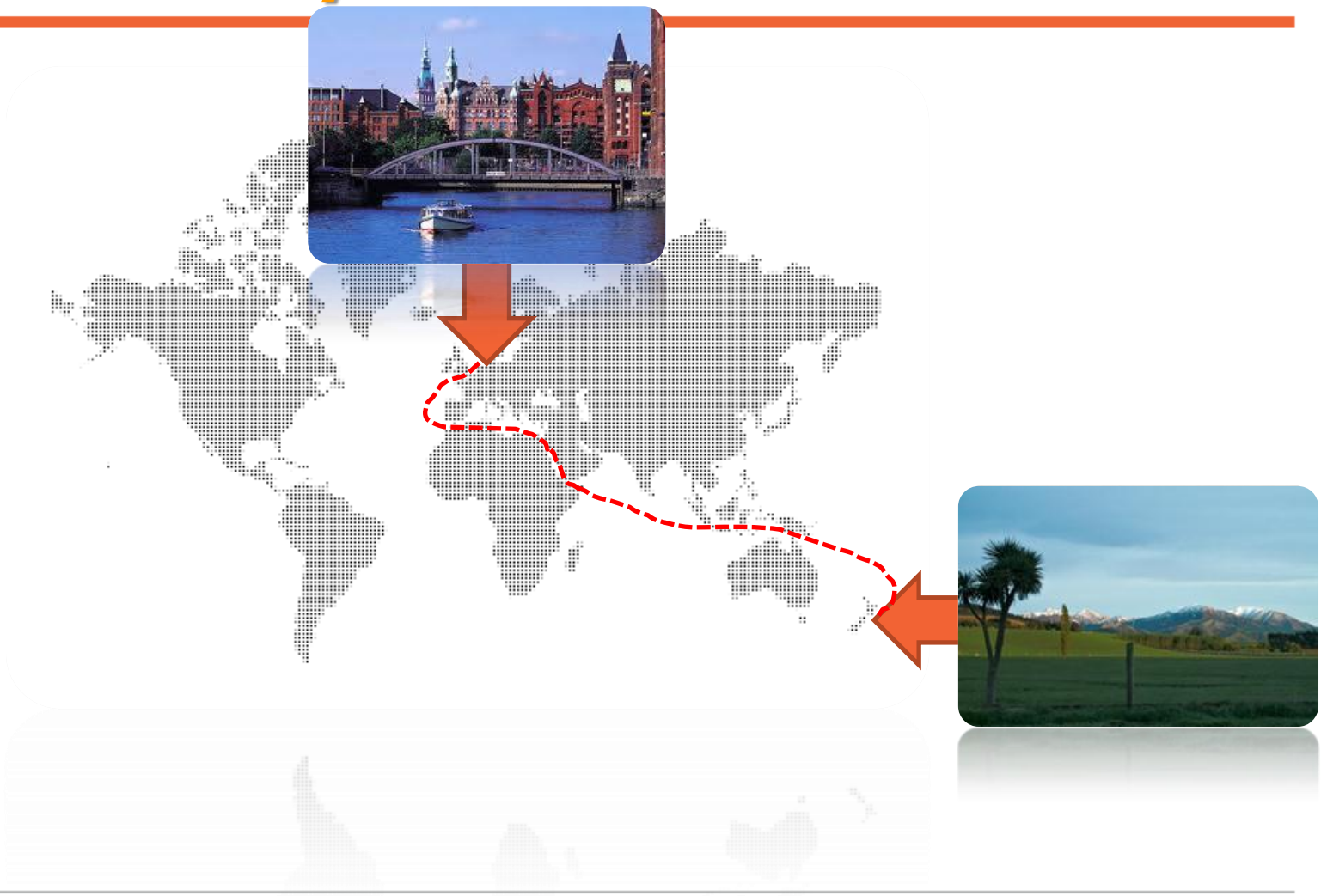


- Many to many
  - *Multiple cuts of beef -> multiple packages of ground beef*

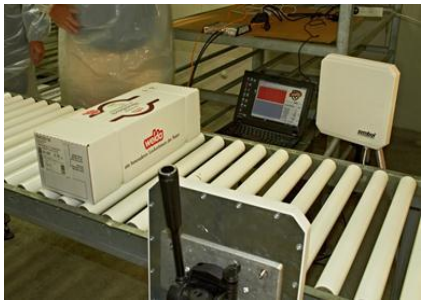
New Zealand Pathfinder RFID Group

An EPCIS RFID pilot - tracking and tracing of livestock from farm to fork

From Geraldine NZ to Hamburg Germany




Downlands Deer




courtesy of Tracient Technologies


courtesy of Tracient Technologies

9421900217.003.107374210

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9421900217.003.107374210


STEAKFLEISCH 1990
GEKUEHLT LAGERN
KEEP CHILLED
85-281 9.01 kg
GAME MEAT
PRODUCT OF
NEW ZEALAND
HIRSCH
PRODUKT VON
NEUSEELAND


Carton label
Deer RFID trials - Carton label
EPC
URN

Loading and scanning of cartons

EPC Event Details

Event Time	16/10/2012 11:54:38 +1300
Timezone Offset	+13:00
Event Type	ObjectEvent
Action	ADD
EPC	urn:epc:id:sgtin:9421900217.003.1073742106 urn:epc:id:sgtin:9421900217.003.1073742107 urn:epc:id:sgtin:9421900217.003.1073742109 urn:epc:id:sgtin:9421900217.003.1073742110 urn:epc:id:sgtin:9421900217.003.1073742111 urn:epc:id:sgtin:9421900217.003.1073742112 urn:epc:id:sgtin:9421900217.003.1073742113 urn:epc:id:sgtin:9421900217.003.1073742114 urn:epc:id:sgtin:9421900217.003.1073742115 urn:epc:id:sgtin:9421900217.003.1073742116 urn:epc:id:sgtin:9421900217.003.1073742117 urn:epc:id:sgtin:9421900217.003.1073742118 urn:epc:id:sgtin:9421900217.003.1073742119 urn:epc:id:sgtin:9421900217.003.1073742120 urn:epc:id:sgtin:9421900217.003.1073742121 urn:epc:id:sgtin:9421900217.003.1073742122 urn:epc:id:sgtin:9421900217.003.1073742123 urn:epc:id:sgtin:9421900217.003.1073742124 urn:epc:id:sgtin:9421900217.003.1073742126 urn:epc:id:sgtin:9421900217.003.1073742127
BizStep	urn:epcglobal:cbv:bizstep:commissioning
Disposition	urn:epcglobal:cbv:disp:active
BizLocation	urn:epc:id:sgln:942900.009772.ON_FARM
Read Point	urn:epc:id:sgln:942900.009772.DEER_CRUSH

When

What

Why

Where

EPC Event Details

Event Time	12/12/2012 01:58:34 +1300
Timezone Offset	+01:00
Event Type	ObjectEvent
Action	DELETE
EPC	urn:epc:id:sgtin:94130000.01420.11 urn:epc:id:sgtin:94130000.01420.18 urn:epc:id:sgtin:94130000.01420.2 urn:epc:id:sgtin:94130000.01420.22 urn:epc:id:sgtin:94130000.01420.23
BizStep	urn:epcglobal:cbv:bizstep:receiving
Disposition	urn:epcglobal:sellable_accessible
BizLocation	urn:epc:id:sgln:4023339.00000.IN_STORE
Read Point	urn:epc:id:sgln:4023339.00000.RECEIVING_BAY

When

What

Why

Where

They combined RFID technologies


Tampoi
J5
Johor Bahru
Pasir
Gudang
Gelang
Patah
E3
Johor Strait
Tekong
Island
Jurong
Island
Singapore
Singapore
Strait


RECORD
courtesy of Tracient Technologies


https://www.xsensesystem.com/sc
Inbox - gary.hartley@gs1nz.or...
Shipment Report Of Pallet
Google
Search
Share
More
Gary Hartley
Company: GS1 User: Gary Hartley
Xsense®
Intelligent Cold Chain Solutions
English
Pallet
Shipment
Warehouse
Technical
Help
What's new?
Logout
Pallet Data >> GS1-142018
Shipment General Info
Shipment: GS1 MAERSK JUBAIL V255N
Pallet ID: GS1-142018
Sensor ID: 393092
Produce Item: Meat
Variety: Chilled Meat
Zoom 3h 6h 12h Max
25/10/2012 10:36 - 16/11/2012 6:19 (GMT+12)
Sun Oct 28
Sun Nov 4
Sun Nov 11
Temperature, °C
RH, [%]
Time Stamp (GMT+12)


EPC
RED

Thank you and questions

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GS1® - The global language of business

Additional Slides

EPCIS event dimensions
"WHEN"

- **Date of event**
  example: 2016-02-19
- **Time of event**
  example: 16:56:00
- **Time zone in effect**
  example: UTC +05:45

(that's 13:11 in Brussels, UTC +01:00)

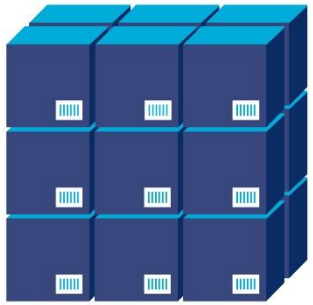
EPCIS event dimensions
"WHAT"

- Specifies what objects participated in the event
- Can be physical or digital objects
- EPCIS allows for two kinds of object identification:
  - Instance-level

    each identifier is unique to a single object

  - Class-level

    multiple objects carry the same identifier



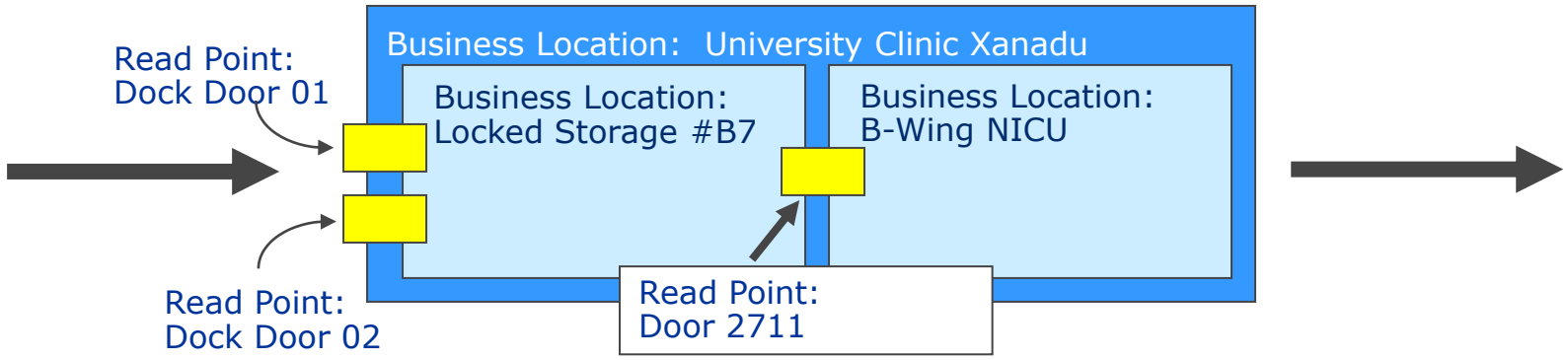
EPCIS event dimensions
"WHERE"

- **Read Point**

  specific place where an event took place, identified by GLN

- **Business Location**

  whereabouts of the object after the event, identified by GLN



*Read Points are often **doors**.*

*Business Locations are often **rooms**.*

EPCIS event dimensions
"WHY"

Business Step

- Business process context of event
  example: Commissioning, Packing, Shipping, Unpacking

Disposition

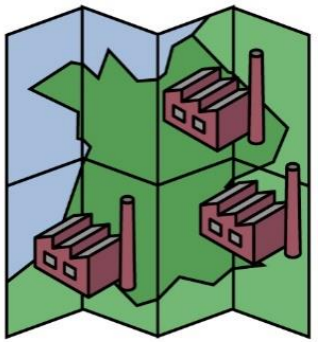
- Status of object subsequent to event
  example: active, in_transit, sold, expired, recalled

Business Transaction

- Link to transaction information

Source/Destination

- Transfer of ownership or possession



The “WHY” dimension of EPCIS events
Business Steps

- accepting
- arriving
- assembling
- collecting
- commissioning
- consigning
- creating_class_instance
- cycle_counting
- decommissioning
- departing
- destroying
- encoding
- disassembling
- entering_exiting
- holding
- inspecting
- installing
- killing
- loading
- other
- packing
- picking
- receiving
- removing
- repackaging
- repairing
- replacing
- reserving
- retail_selling
- shipping
- staging_outbound
- stock_taking
- stocking
- storing
- transporting
- unloading
- unpacking

example:

```
<bizStep>urn:epcglobal:cbv:bizstep:shipping</bizStep>
```

The “WHY” dimension of EPCIS events
Dispositions

- active
- container_closed
- destroyed
- encoded
- inactive
- in_progress
- in_transit
- non_sellable_**expired**
- non_sellable_**damaged**
- non_sellable_**disposed**
- non_sellable_**no_pedigree_match**
- non_sellable_other
- non_sellable_recalled
- reserved
- returned
- sellable_accesible
- sellable_not_accessible
- retail_sold
- stolen
- unknown

example: `<disposition>urn:epcglobal:cbv:disp:damaged</disposition>`

The "WHY" dimension of EPCIS events
Business Transaction Types

- Purchase Order
- Purchase Order Confirmation
- Bill of Lading
- Invoice
- Return Merchandise Authorization
- Pedigree
- Despatch Advice
- Receiving Advice
- **Production Order** ***(new in EPCIS v 1.1)***

example:

```
<bizTransaction type="urn:epcglobal:cbv:btt:po">
urn:epc:id:gdti:0614141.06012.1234</bizTransaction>
```

The “WHY” dimension of EPCIS events
Source / Destination Types

- **owning party** (SGLN)
- **possessing party** (SGLN)
- **location** (SGLN)

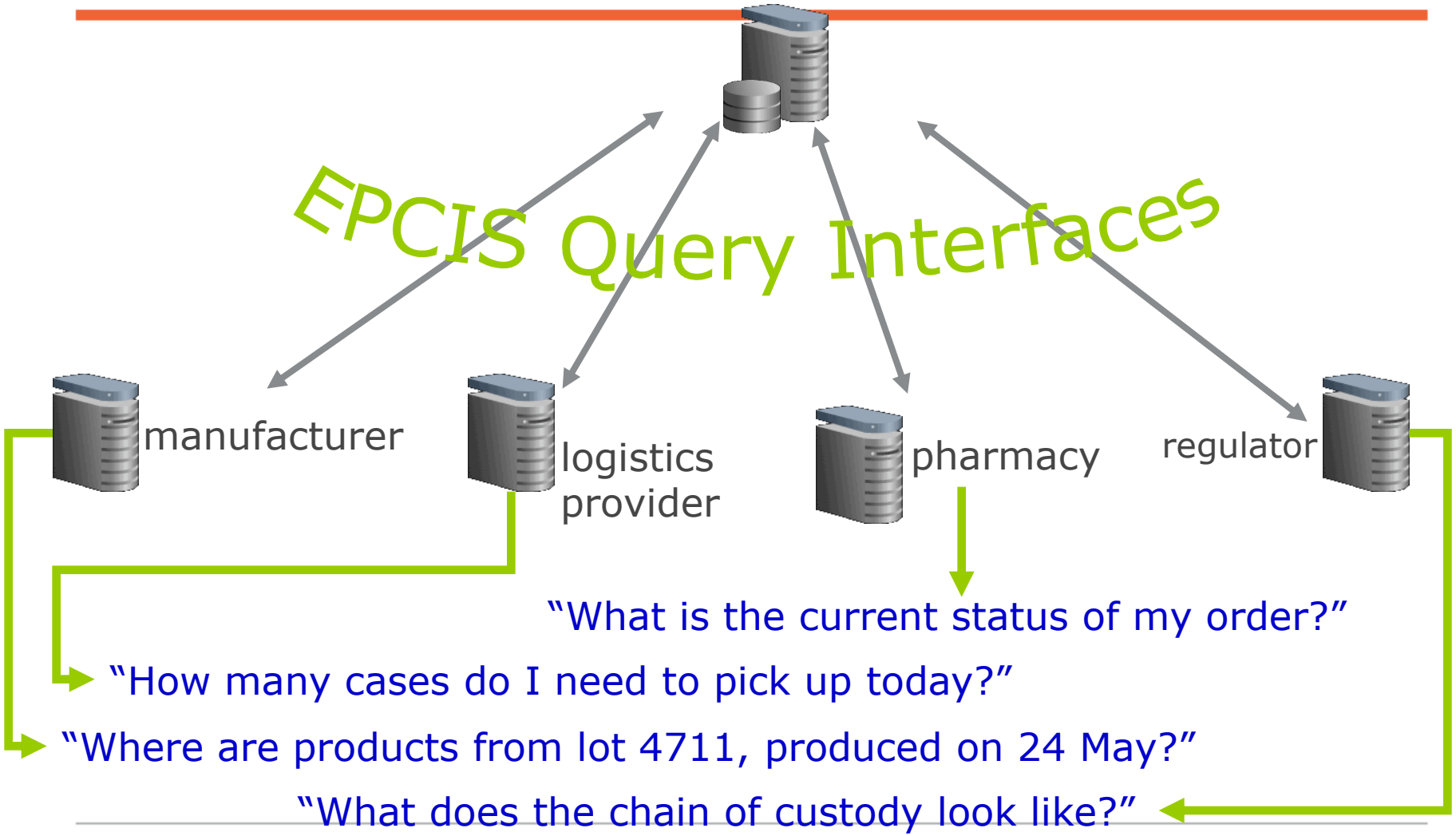
In a multi-step business transfer, some or all EPCIS events may include Source and Destination, and the information will be the same for all events in a given transfer.

example:

```
<destination type="urn:epcglobal:cbv:sdt:owning_party">
    urn:epc:id:sgln:0614141.00001.0</destination>
<destination type="urn:epcglobal:cbv:sdt:location">
    urn:epc:id:sgln:0614141.00777.0</destination>
```

Querying EPCIS

Leveraging the EPCIS Query Interfaces



EPCIS Query Interfaces

EPCIS Query Control Interface

- provides two modes of interaction:
  - In **"on-demand"** mode, a client makes a request and receives a response immediately
  - In **"standing request"** or mode, a client establishes a **subscription** for a periodic query.

EPCIS Query Callback Interface

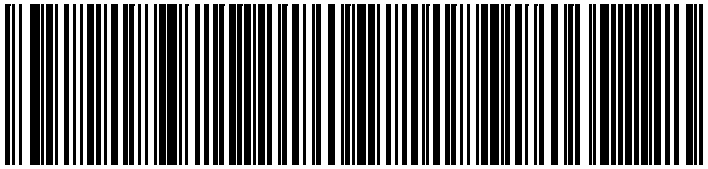
- "pushes" results each time a periodic query is executed
- can also be used to deliver information in real-time, immediately upon capture, **bypassing** the intermediate repository

EPCIS supporting material and tools

Barcode / EPCIS interoperability

Interoperability requires special attention when…

- Translating data **from barcode or EDI to EPCIS** or RFID tag



urn:epc:id:sgtin:4012345.012345.123456789123

GCP Length Table published online in April 2016

http://www.gs1.org/gcp-length

- Machine-readable file to determine length of GS1 Company Prefix
- Will simplify use of EPCIS in conjunction with pharmaceutical products that are serialized and barcoded with GS1 DataMatrix

EPCIS implementation guides and application standards

- EPCIS for Rail Vehicle Visibility Applications (2015)
  http://www.gs1.org/sites/default/files/docs/epc/GS1_EPCIS_Rail_Standard.pdf

- GS1 Healthcare US Implementation Guideline (evolving)

  Applying GS1 standards to US pharmaceuticals for DSCSA
  www.GS1US.org/RxGuideline

- Brazilian Medicine Traceability using GS1 EPCIS – Implementation Guideline (2015)
  www.gs1br.org/educacao-e-pratica/MateriaisTecnicos/Support%20Guide%20for%20Codification%20of%20Medicines.pdf

- **EPCIS & CBV Implementation Guideline** (2015)
  http://www.gs1.org/docs/epc/EPCIS_Guideline.pdf

EPCIS marketing collateral: flyers

- *GS1 EPCIS* (2012)
  Enabling visibility with real time information on supply chain events
- Enabling visibility from source to shelves (2014)
  http://www.gs1.org/docs/epcis/gs1_epcis_source_to_shelves.pdf
- *Visibility from catch to customer* (2014)
  http://www.gs1.org/docs/retail/GS1_Metro_traceability_sustainability_case_study.pdf
- Healthcare supply chain integrity (2014)
  http://www.gs1.org/docs/healthcare/EPCIS_Healthcare.pdf

EPCIS event types

Object Event

- Observation of (or assertion about) object(s)

Aggregation Event

- Association between containing/contained objects

Transaction Event

- Association of object(s) to business transaction(s)

Transformation Event *(new in EPCIS 1.1)*

- Object(s) consumed as inputs, produced as outputs

Clearing up misconceptions on EPCIS

EPCIS is . . .

- a complex technical standard in GS1's "Share" layer
- an open ISO standard
- an enabler for commercial traceability solutions & services
- data-carrier-neutral, suited to GS1 DataMatrix barcodes

EPCIS is not . . .

- a product or service for sale by GS1
- an out-of the box solution
- a standalone answer to visibility issues

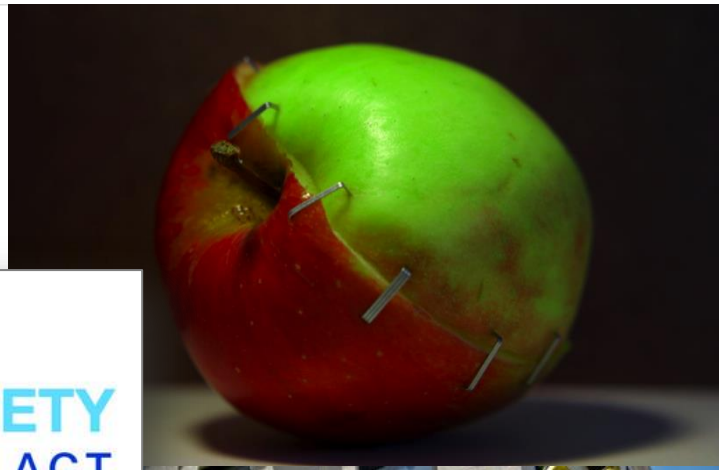
- GS1's portfolio is greater than the sum of individual parts
- Serialization and event-based traceability will fundamentally change how a supply chain works... EPCIS will support this

GSMP Lunch & Learn – EPCIS Food Traceability

March 16, 2015
Jersey City, New Jersey

Andrew Kennedy
President, FoodLogiQ

Business Drivers



FDA FOOD SAFETY
MODERNIZATION ACT

Challenge #1: Identifying products of different sizes, shapes, weights, volumes

Challenge #2: Capturing events involving comingled commodities

Success Story: Whole Foods Market

Identify

Location GLNs

GS1-128 Barcode

- GTIN
- Lot

Capture & Share

Field Inputs

Growing Practices

Harvest Events

Pack Events

Shipments

Receipts

Transformations

Success Story: Chipotle Mexican Grill, Visual Whole Chain Traceability

Tracking Events

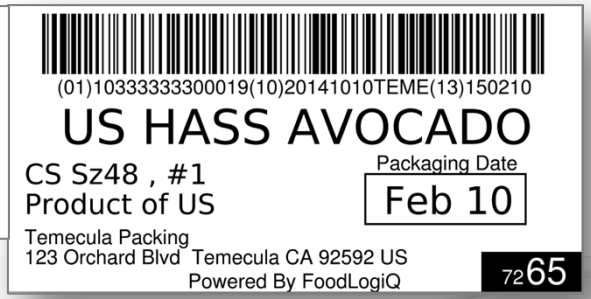
Shipment Detail | Add To Withdrawal | Trace Back | Trace Forward

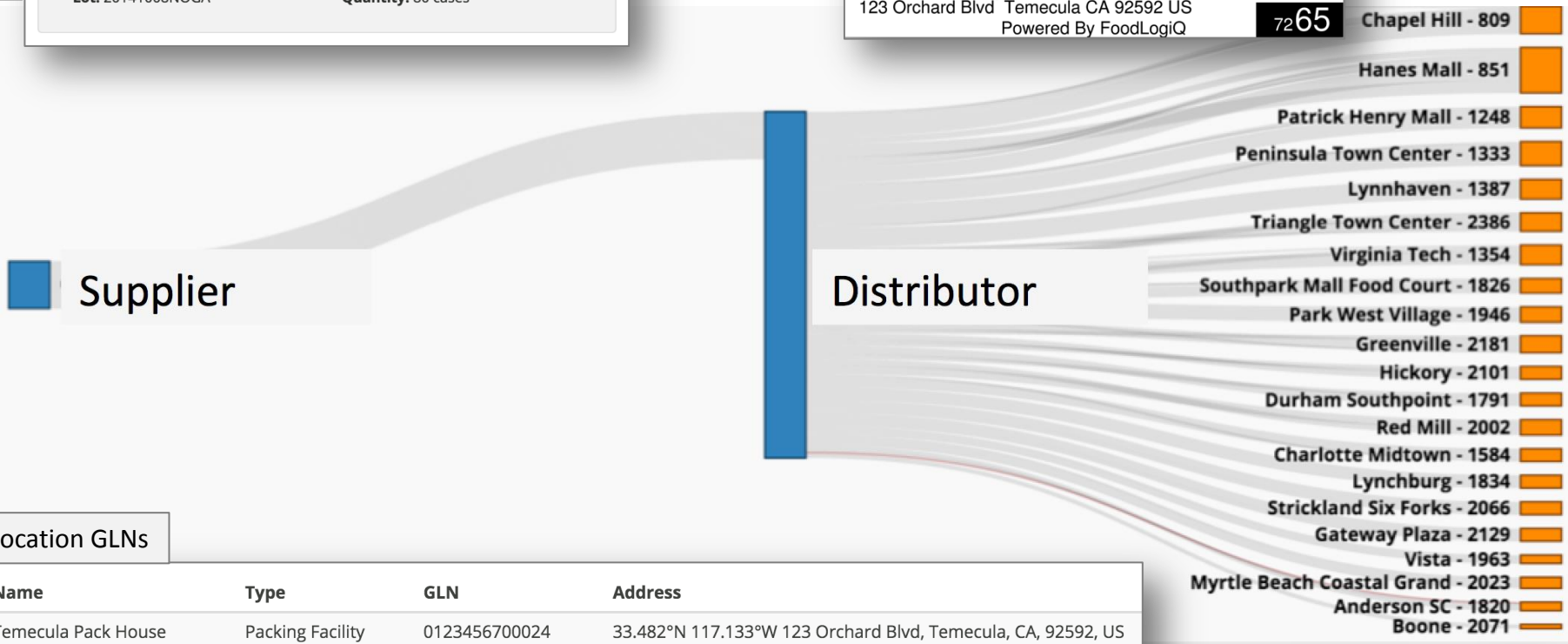
Source: Nogales Pack House
Destination: Perfect Ontario DC
SSCC: 012345670000000183
Date: 10/14/14 3:00 AM

Contents

Name: MX Hass Avocado Sz 48
GTIN: 10123456700045
Lot: 20141008NOGA
Quantity: 80 cases

Product Labels





Location GLNs

Name	Type	GLN	Address
Temecula Pack House	Packing Facility	0123456700024	33.482°N 117.133°W 123 Orchard Blvd, Temecula, CA, 92592, US

Connecting the World's Food Supply Chain

Thank You!

Andrew Kennedy
President
2655 Meridian Parkway
Durham, NC 27713
Mobile: +1.919.280.1024
akennedy@foodlogiq.com

For additional information, visit www.foodlogiq.com