![GS1 Thailand logo]

Thailand
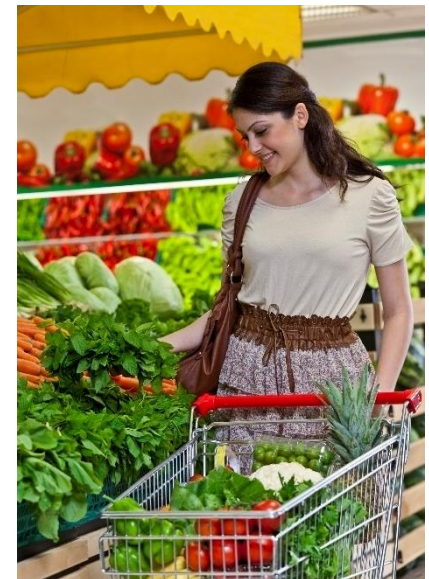
The Global Language of Business

Challenges in food cold chain management: Global Standard and Traceability 4.0 - Barcode, RFID, IoT

ASEAN Warehouse 2018

GS1 Thailand, The Federation of Thai Industries
11 October 2018

Contents

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❖ **Traceability regulations or recommendations in Thailand**

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❖ **Traceability case in the real world:**

   "Japanese sake traceability"

❖ **GS1 Thailand Services: e-Catalog,**

   SmartBar application and Commercial service

Introduction to GS1 Standards and Traceability 4.0

A retail business:

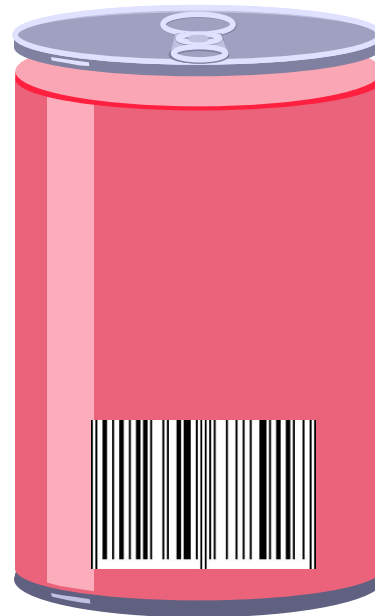# Modern trade Era

Modern Trade with internal barcode

Internal Barcode

Point of Sale

(POS)

Modern Trade with internal barcode

Modern Trade with internal barcode

Supplier 1 — 123456

Supplier 2 — 123456

RETAILER ? ? ?

Supplier 3 — 123456

Supplier 4 — 123456

Different products with the same product number

When the barcode is not standard

Global Standard Barcode = Trade Agreement

Brand owner

Retailer

Global Standard Barcode

GS1 Organization

Uniform Code Council

UPC: Universal Product Code

America/Canada

European Article Number

EAN: European Article Numbering System

Europe/Asia

1990

The first of Global Standard

Not-for-profit

120 GS1 Member Organizations (MO)

150 countries served

Close to two million user companies

2,500 people helping us

GS1 Thailand

1988: **TANC (Thai Article Numbering Council)**

สถาบันรหัสแท่งไทย

1993: **EAN Thailand Institute**

สถาบันรหัสสากล

2005: **GS1 THAILAND**

สถาบันรหัสสากล

2018 – The 30th Anniversary
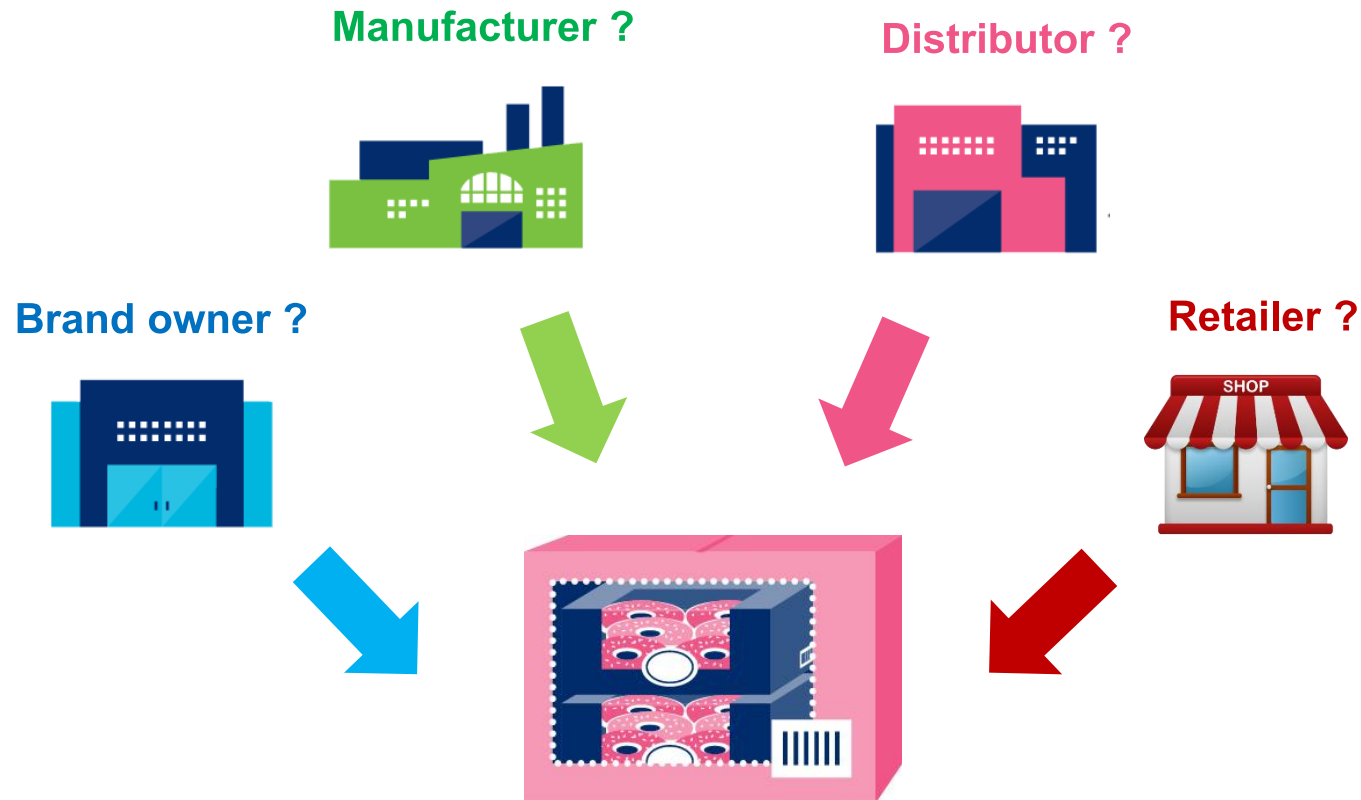
GS1 Thailand

Our **vision** is a world where goods and related information move efficiently and securely for the benefit of businesses and people's lives
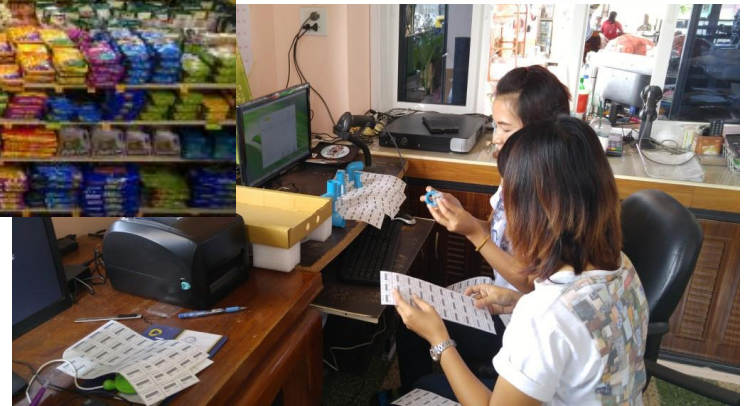
Our **mission** is to be the neutral leader enabling communities to develop and implement open global standards

We act as **a registry to issue GS1 Identity Numbers** and **EPC Identity Numbers** to members.

Who should apply for product barcode?

Manufacturer ?

Distributor ?

Brand owner ?

Retailer ?

GS1 Thailand

Who should apply for product barcode?

Manufacturer — Item — Case — Pallet — Transport — Distributor — Transport — Pallet — Distribution Centre — Transport — Case — Item — Retailer — Consumer

Do you know GS1 Barcode?

1974

Over 6 billion transactions a day!

GS1 System of Standards

GS1 System of Standards

Selecting the right barcode

Trade item that will be scanned at Point of Sale (Retail)

GTIN-12 / UPC-A
GTIN-13 / EAN-13

8 858888 000016

Barcode for outer case /carton (Wholesale)

GTIN-14 / ITF-14

18858888000013

Barcode for Logistics unit

SSCC: AI(00) / GS1-128

(00)353912345678910118

Barcode with variable information (Traceability/Visibility)

AI(10), (21) / GS1-128
GS1 DataMatrix

(01)08851234500017(10)ABC123 (17)151209

GTIN: (01)08851234500017
BATCH/LOT: (10)ABC123
EXPIRY: (17)151209

Barcode for PR

URL website / QR Code

www.fb.com/gs1thailand

GS1 Thailand

GS1 System of Standards

Barcode for retail product

GTIN-13 / EAN-13

GTIN-13 Identification Number												
GS1 Country Prefix			Company Number					Item Reference				C
8	8	5	8	8	8	8	0	0	0	0	1	6

8 858888 000016

GS1 Thailand
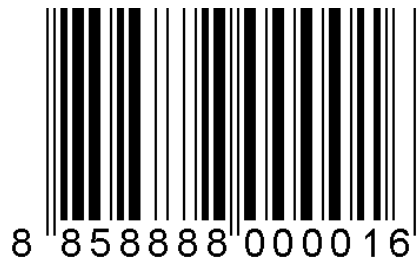
GS1 System of Standards

Barcode for wholesale product

GTIN-14 / ITF-14

GTIN-14 Identification Number												
Indicator	GTIN-13 Identification Number											
	GS1 Country Prefix			Company Number					Item Reference			C
1	**8**	**8**	**5**	**1**	**7**	**2**	**7**	**0**	**0**	**0**	**9**	**0**

18 851727 00009 0

GS1 System of Standards

Barcode for Traceability

Application Identifiers (AIs) / GS1-128, GS1 DataMatrix

AI	Data field	AI	DATA	DATA TITLE
00	Serial Shipping Container Code	N2	N18	SSCC
01	GTIN of Trade Item	N2	N14	GTIN
10	Batch or Lot Number	N2	X..20	BATCH/LOT
17	Expiration Date (YYMMDD)	N2	N6	USE BY or EXPIRY
21	Serial Number	N2	X..20	SERIAL

* N: numeric digit, X: Alphanumeric digit

GS1-128

GS1 Data Matrix

(01)8851234500017 (17)151209 (10)ABC123

GTIN   **Expiry date**   **Batch/Lot**

GTIN(01):   03453120000011
EXPIRY(17):   2009-11-25 (yyyy-mm-dd)
BATCH/LOT(10): ABCD1234

(01) 08699546010011
(21) 583053774154
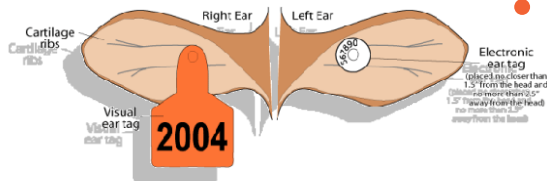(17) 151228
(10) TRT08E3
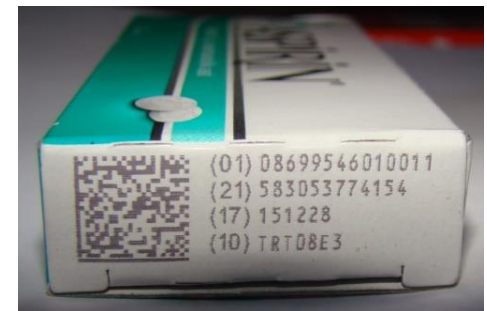
GS1 System of Standards

RFID (Radio Frequency Identification)

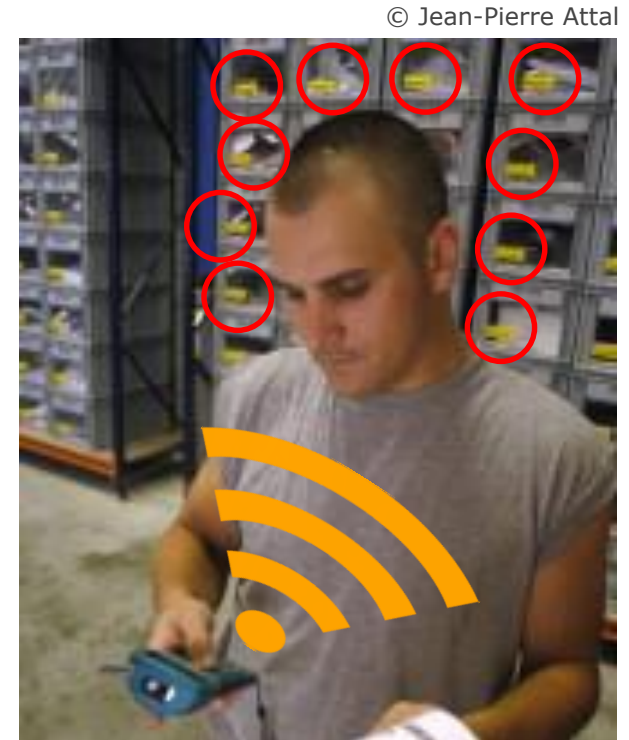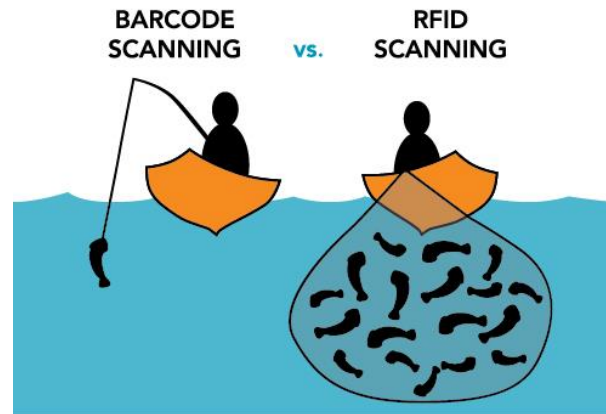**Four main 'globally established' frequencies on which RFID operates:**

- **Low Frequency (LF): 125 - 132 kHz**

- **High Frequency (HF): 13.56 MHz**

- **Ultra High Frequency (UHF): 850 - 950 MHz**

- **Microwave .2.4 GHz**

Thailand: 920-925 MHz

GS1 System of Standards

Barcode vs RFID

© Jean-Pierre Attal

© Jean-Pierre Attal

Scanning Bar Codes

Scanning EPC Tags

GS1 System of Standards

VDO: EPC/RFID technology for Stock taking in Norway

GS1 System of Standards

RFID | Tag Environment

Metal

Reflection

Absorption

Liquid

GS1 System of Standards

Animal identification

Laundry Management

Race Timing

Brand Protection

Retail Inventory

Logistics/Security

Asset Management

Cross Border

Source : Impinj

Do you know the Internet of Things (IoT) ?
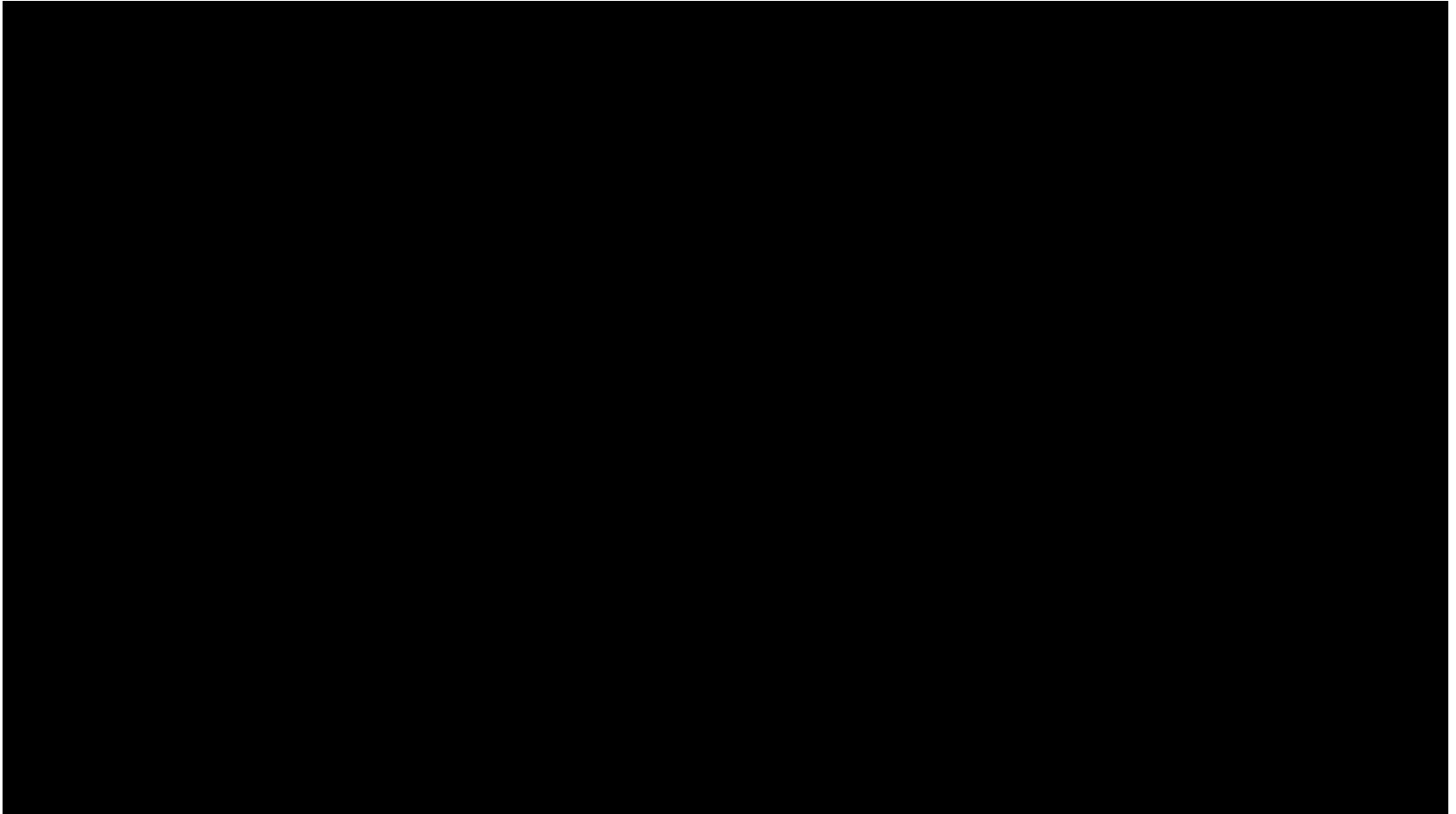
Internet of Thing: IoT - Definition

IoT is a vision, not a technology

The IoT is not any single, specific new technology. It is a framework for integrating digital technologies associated with identification, sensing and data management.

Web of Things

Internet of Everything

Cloud of Things

Web of Goods

Cyber Physical Systems (CPS)

Industry 4.0

Smart Manufacturing

Digital Industry

Digital Manufacturing

Machine to Machine Communications (M2M)

Automation

Made in China 2025

Source: GS1 AISBL - GS1 and the Internet of Things

Internet of Thing: IoT - Technologies

IoT Sensor types

Machine Vision / Optical Ambient Light

Position / Presence / Proximity

Acceleration / Tilt

Motion / Velocity / Displacement

Electric / Magnetic

Temperature

Leaks / Levels

Humidity / Moisture

Force / Load / Torque Strain / Pressure

Acoustic / Sound / Vibration

Flow

Chemical / Gas

Source: www.postscapes.com

Internet of Thing: IoT - Technologies

Wi-Fi

Internet of Thing: IoT - Technologies

LoRaWAN

Source: www.microchip.com
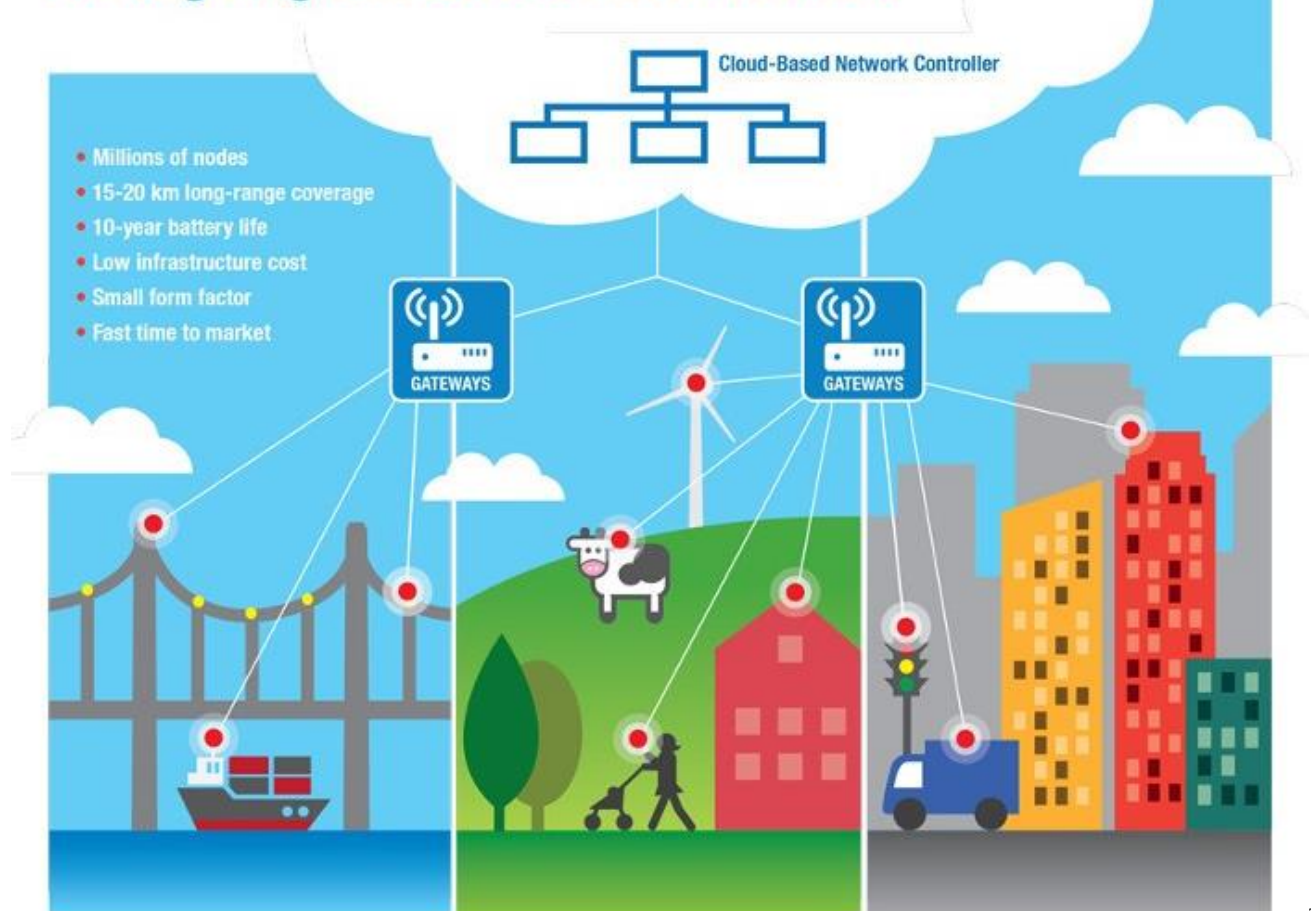
Internet of Thing: IoT - Technologies

Radio Frequency Identification (RFID)

Source: www.impaxafrica.com
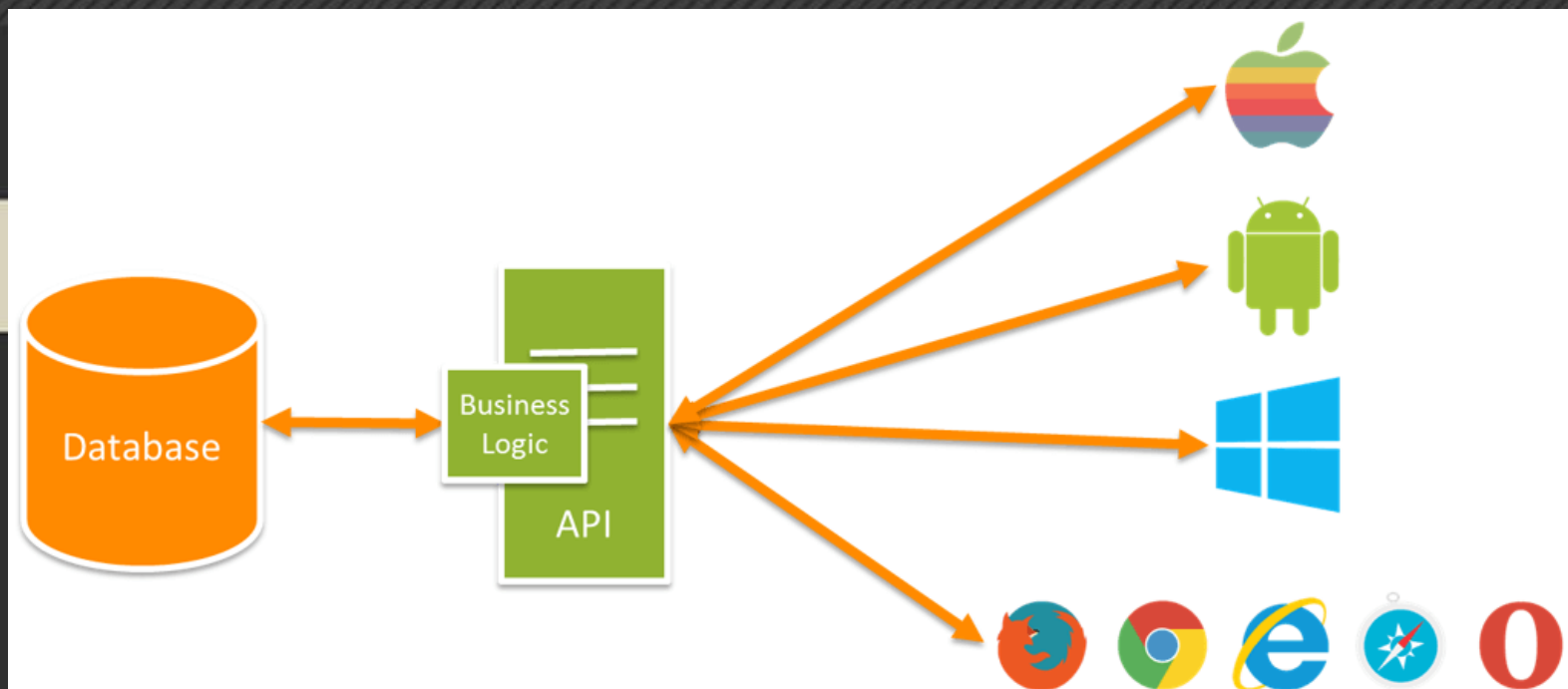
Internet of Thing: IoT - Technologies

The API
Application Programming Interface

API Definition

An application program interface that provides a developer with programmatic access to a proprietary software application. A software intermediary that makes it possible for application programs to interact with each other and share data. [1]

Internet of Thing: IoT - Technologies

Internet of Thing: IoT - Technologies

ARTIFICIAL INTELLIGENCE
Early artificial intelligence stirs excitement.

MACHINE LEARNING
Machine learning begins to flourish.

DEEP LEARNING
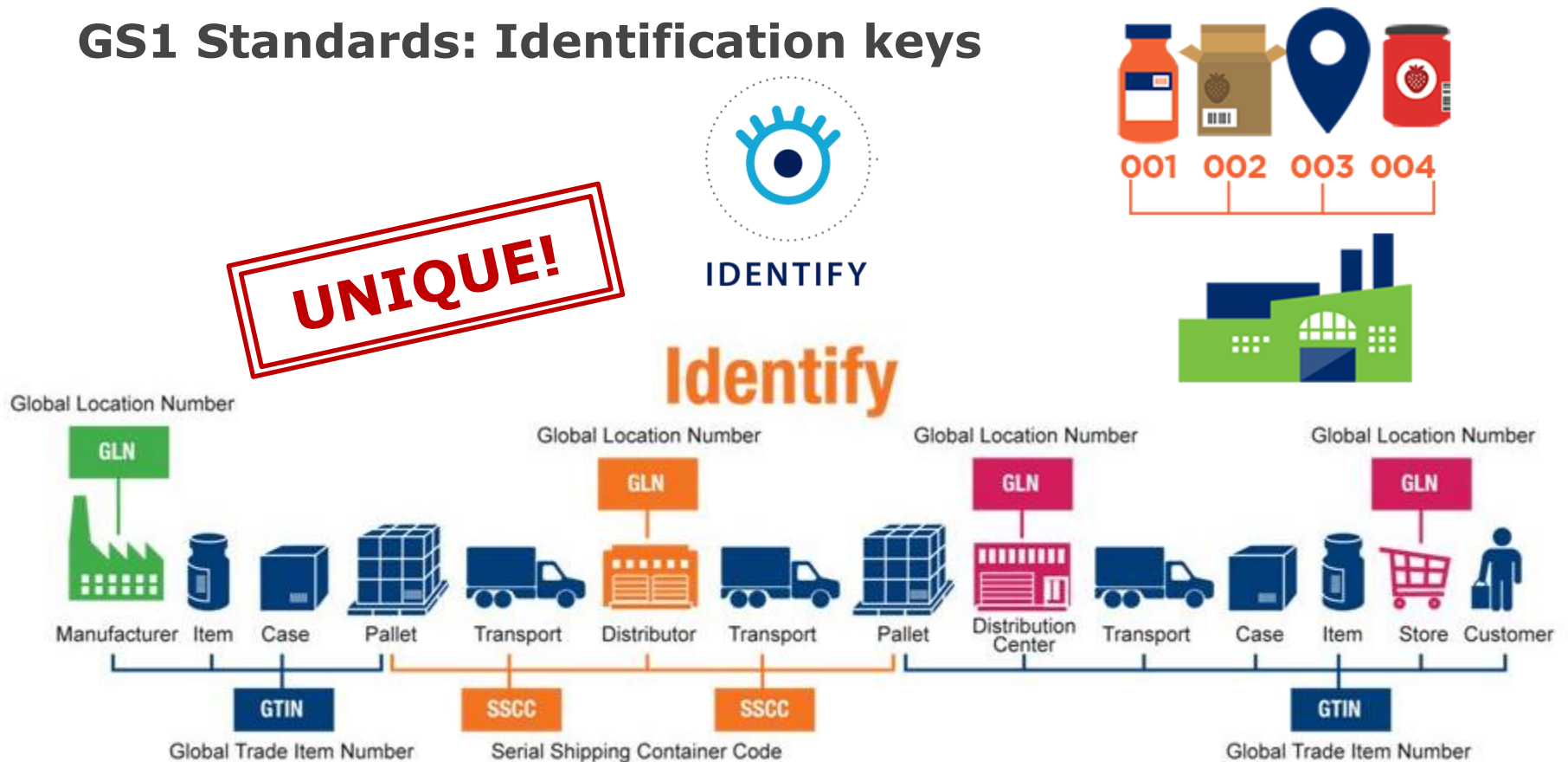Deep learning breakthroughs drive AI boom.

1950's 1960's 1970's 1980's 1990's 2000's 2010's

Since an early flush of optimism in the 1950's, smaller subsets of artificial intelligence - first machine learning, then deep learning, a subset of machine learning - have created ever larger disruptions.

Internet of Thing: IoT - Technologies
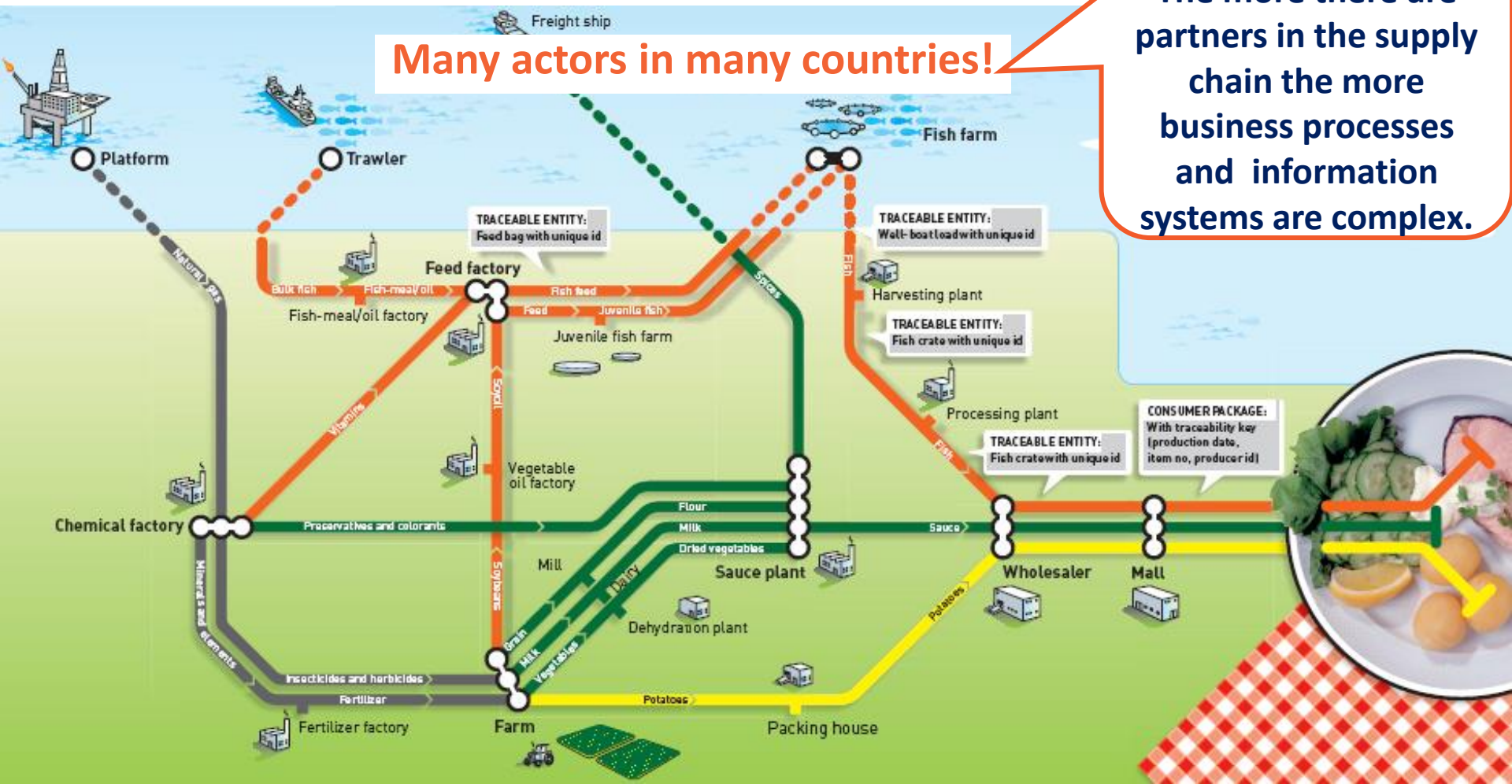
GS1 Standards: Identification keys

What is Traceability?

World Scenario

Many actors in many countries!

The more there are partners in the supply chain the more business processes and information systems are complex.

What is Traceability?

Crisis and Impacts

Off-quality CO_2 that affect the taste and odor and fungicide in dirty cans


1999: Soft Drink, Belgium & EU

- **5 months to recover the sales**
- **249 cases of illnesses in Belgium**
- ***Recall* of 15 million cans and bottles**
- **Crisis cost $200 million in expenses and lost profit**

2008: Milk Powder, China

- **Milk powder tainted with the industrial chemical melamine.**
- **13,000 babies affected**
- **More than 80% of the sick were toddlers under two.**
- **Products from 22 companies have been *recalled* for melamine contamination.**

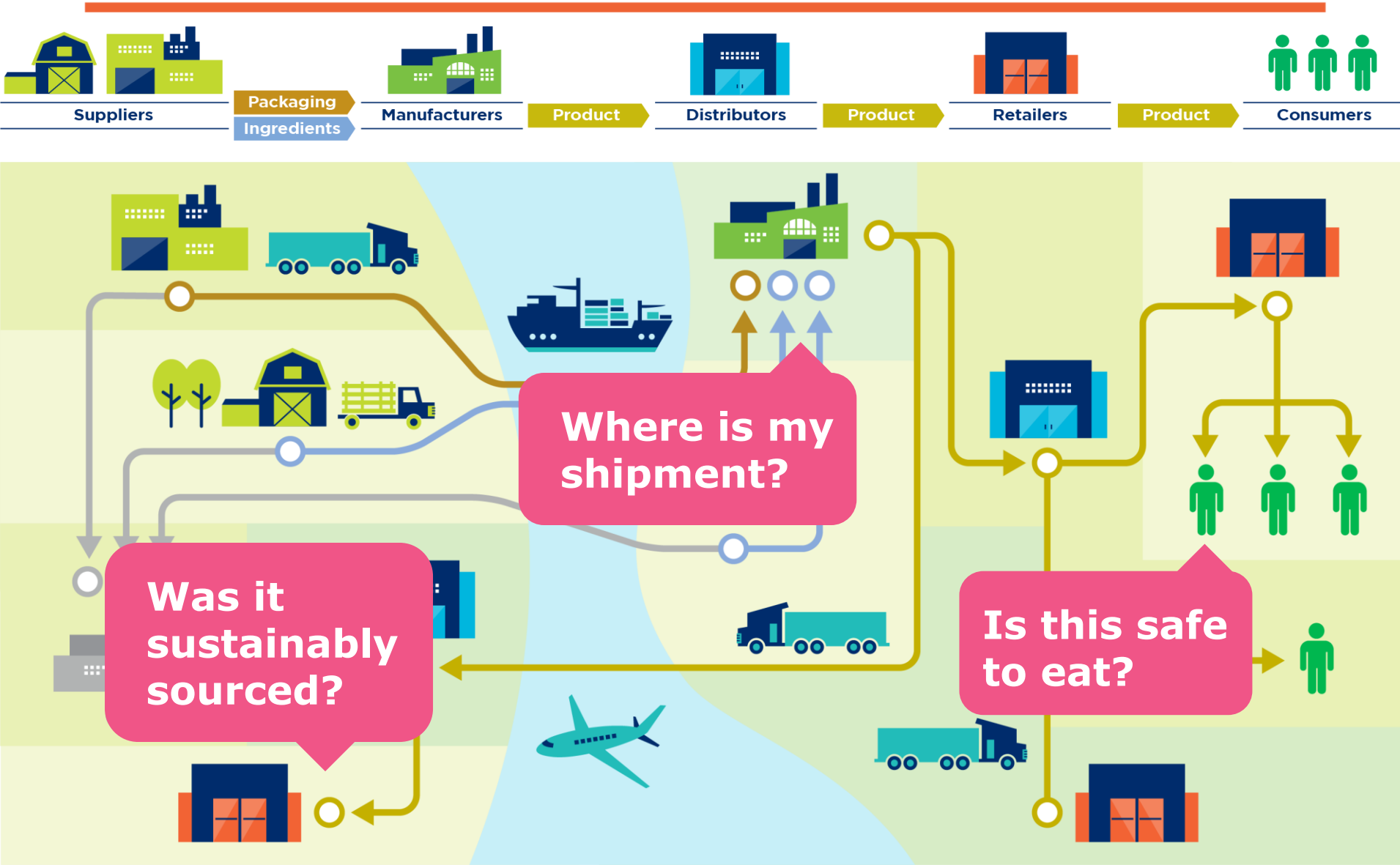GS1 Thailand

What is Traceability?
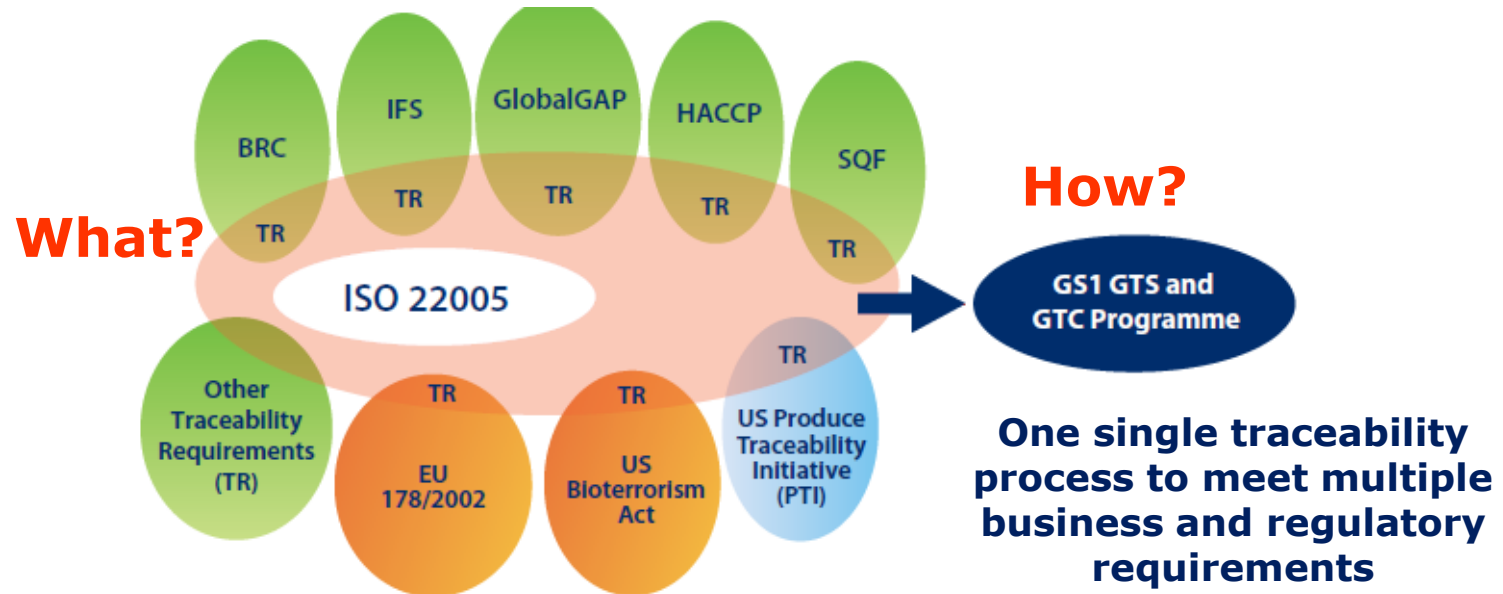
GS1 Traceability: Definition

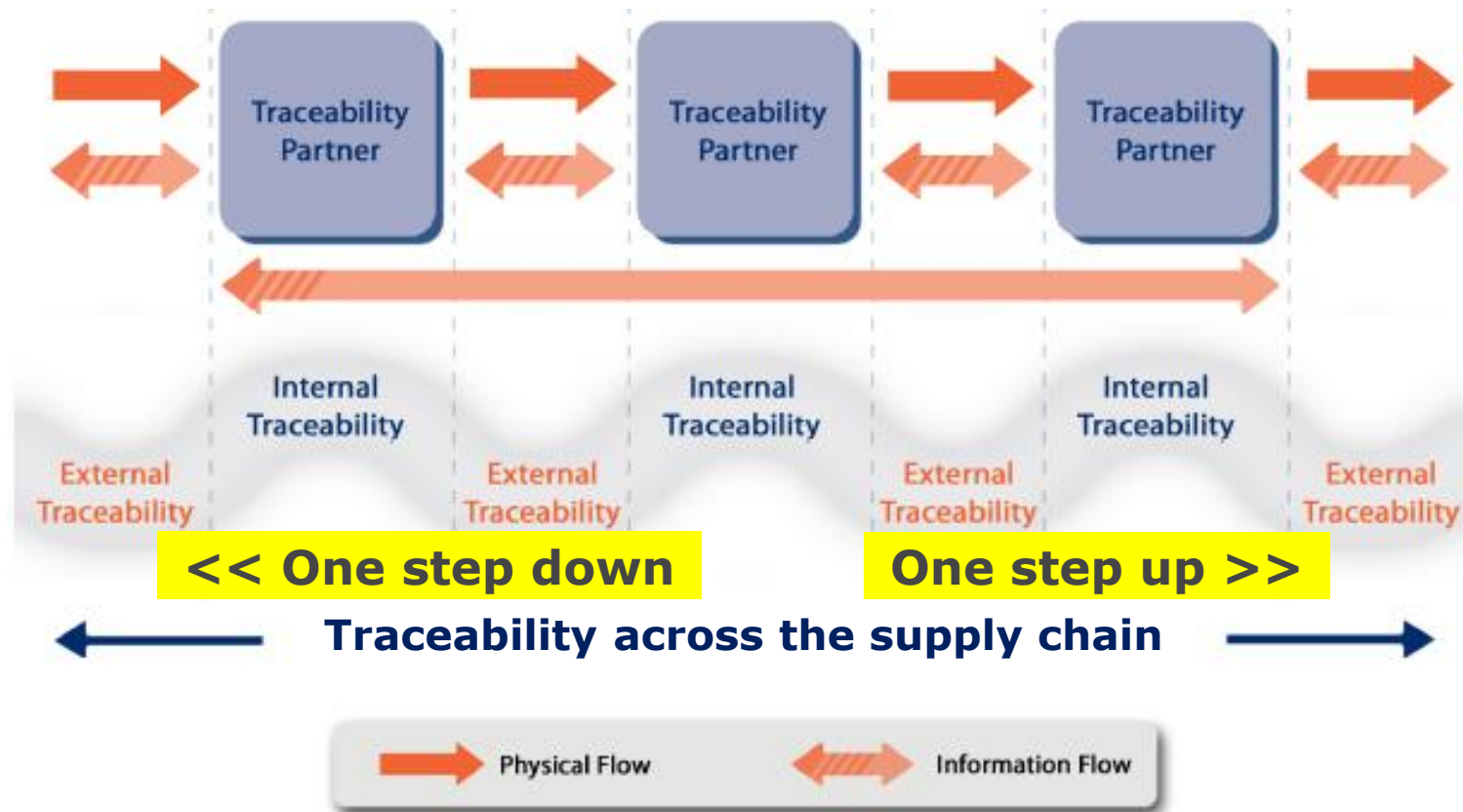**"Traceability is the ability to identify the past or current location of an item, as well as to know the item's history"**
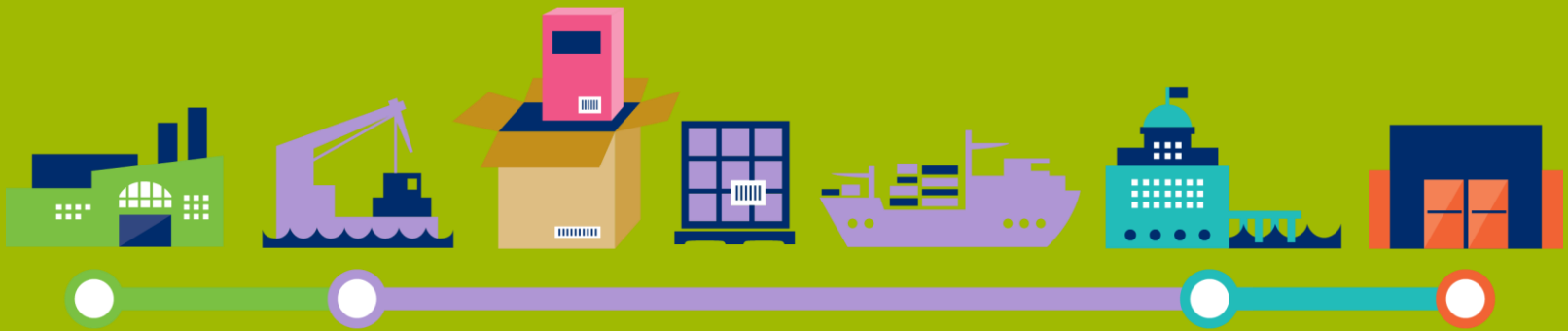
Trust starts with traceability.
Connect the dots with GS1 standards.
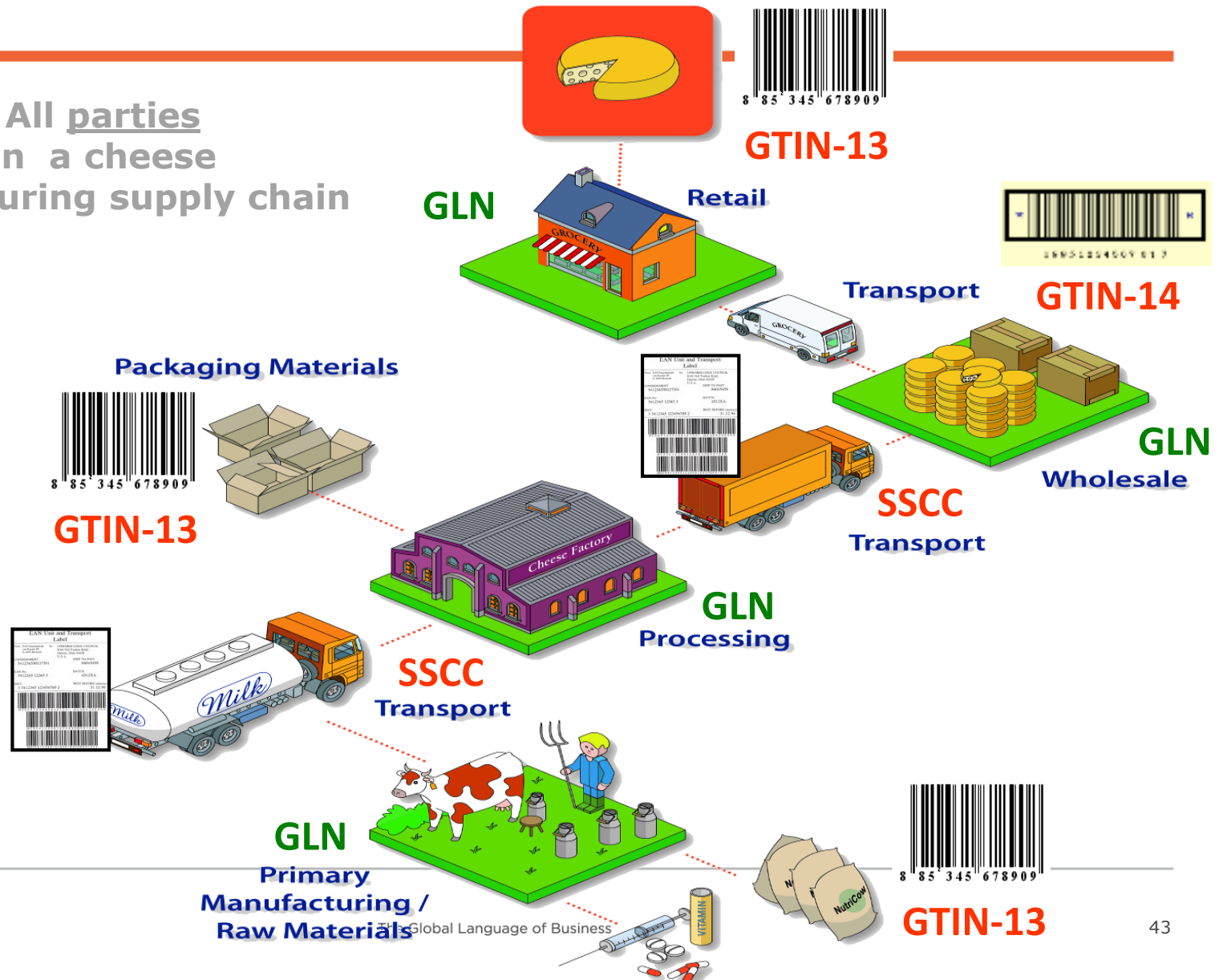
What is Traceability?

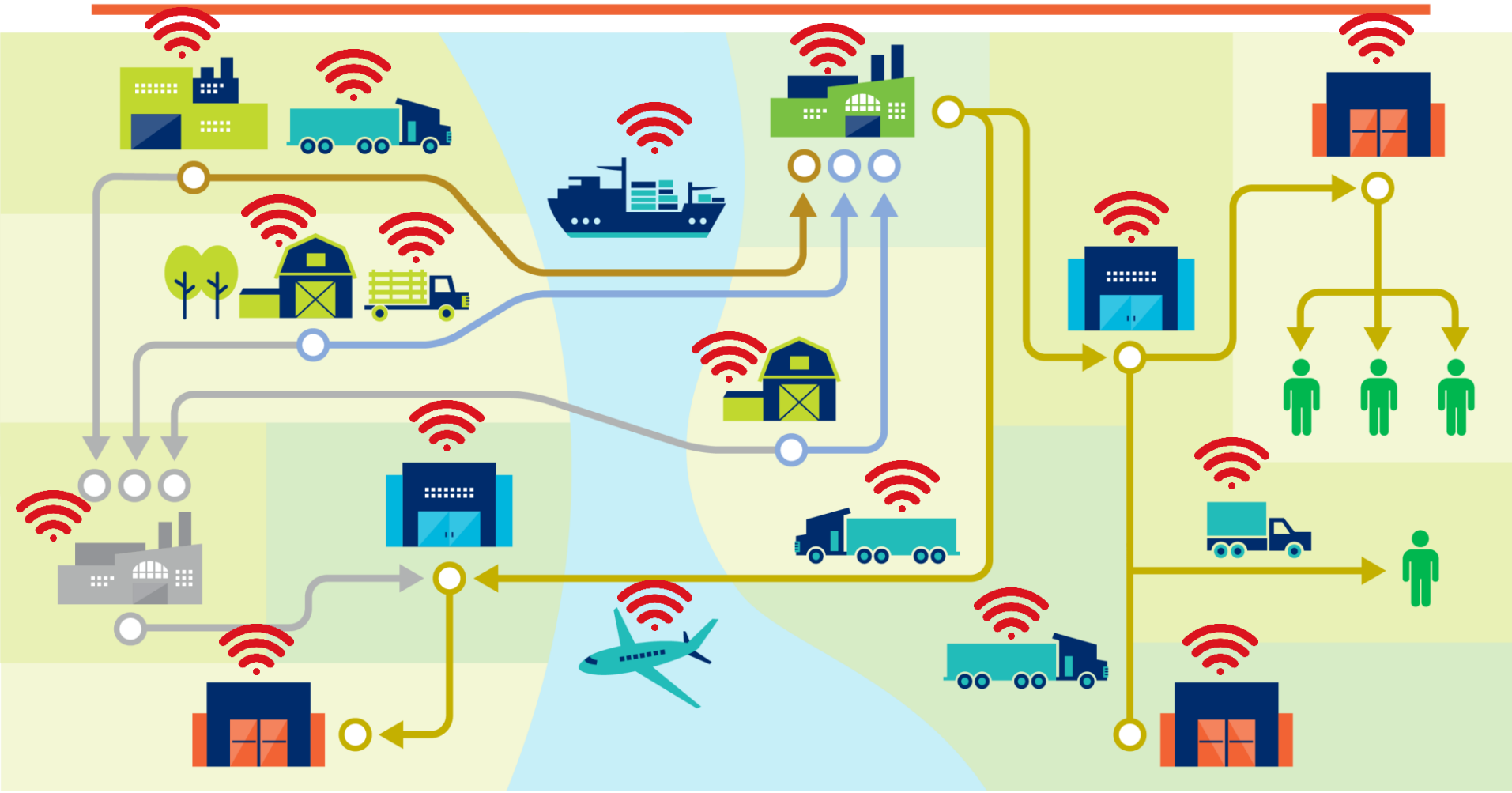# What is Traceability?

One step up and one step down principle

What is Traceability?

Example: All <u>parties</u> involved in a cheese manufacturing supply chain
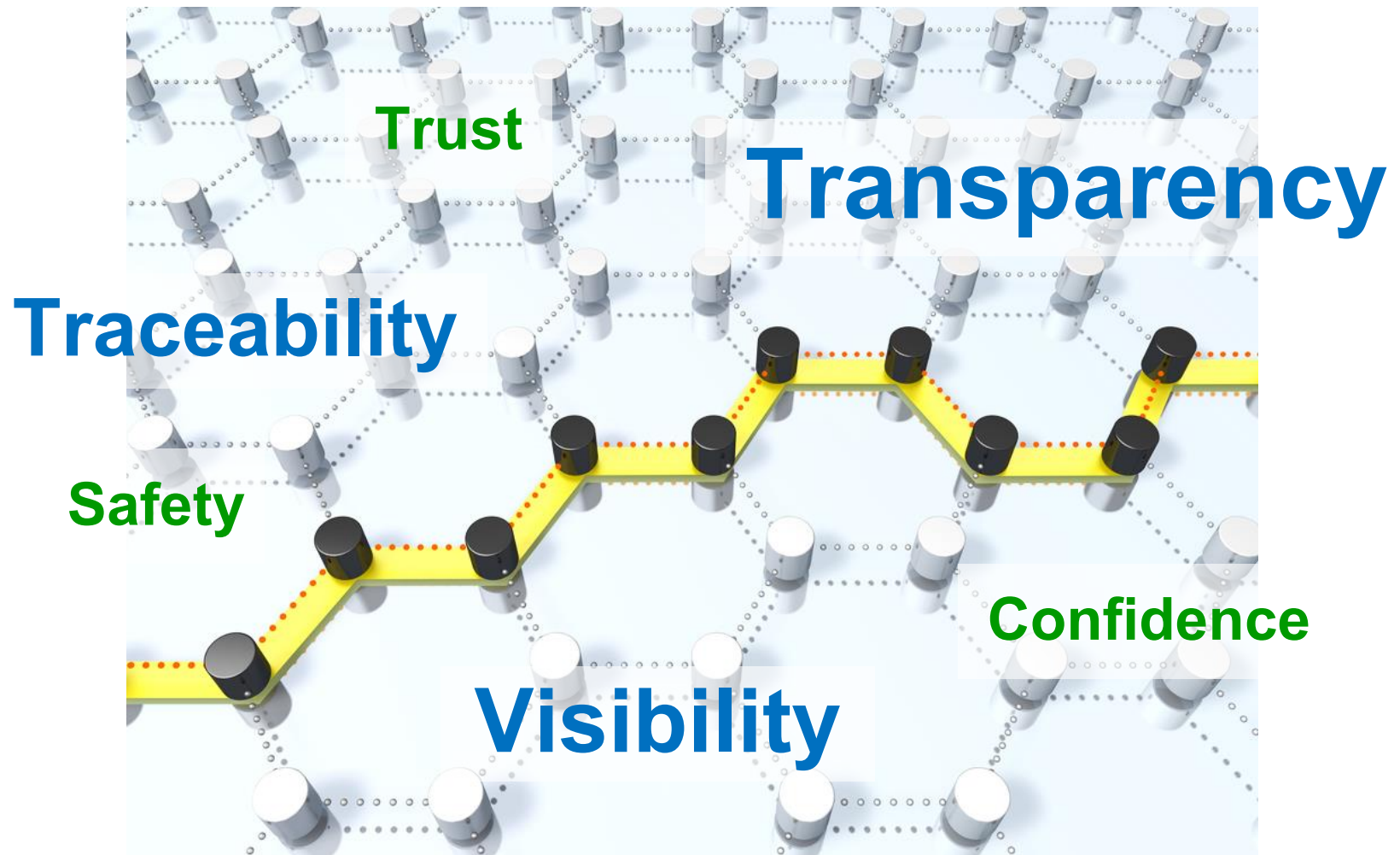
GTIN-13

GLN — Retail

GTIN-14

Transport

Packaging Materials

GTIN-13

SSCC — Transport

GLN — Wholesale

GLN — Processing

SSCC — Transport

GLN — Primary Manufacturing / Raw Materials

GTIN-13

The Global Language of Business

GS1 Thailand

Traceability 4.0

Traceability 4.0

Trust

Transparency

Traceability

Safety

Confidence

Visibility

Source: https://applicature.com

Traceability regulations or recommendations in Thailand

Traceability in Thailand

- **TAS 9028-2008**: Principle for traceability/product tracing as a tool within an agricultural commodity and food inspection and certification system") was launched by ACFS (The National Bureau of Agricultural Commodity and Food Standards, under the Ministry of Agriculture and Cooperatives)

- This **STANDARD** is used as guidance for **authority** concerned to utilize the design and application of traceability/product tracing for agricultural commodities and food. It also supports the **protection of consumers against hazards** from consuming agricultural products and food as well as to facilitate the trade on the basis of accurate product description

- Updated version: TAS 9028-2014

Source: www.acfs.go.th/eng/general_standard.php?pageid=1

Traceability in Thailand

- **TAS 9028-2008**

3.2 DESIGN

3.2.1   The traceability/product tracing tool may apply to all or specified stages of the food chain (from production to distribution), as appropriate to the objectives of the agricultural commodities and food inspection and certification system.

3.2.2   The traceability/product tracing tool should be able to identify at any specified stage of the food chain (from production to distribution) from where the food came (one step back) and to where the food went (one step forward), as appropriate to the objectives of the agricultural commodities and food inspection and certification system.

3.2.3   The objectives, scope and related procedures of an agricultural commodities and food inspection and certification system that includes a traceability/product tracing tool should be transparent and made available to competent authorities of the exporting country upon request.

3.3 APPLICATION

3.3.1   It should not be more trade restrictive than necessary.

3.3.2   It should be practical, technically feasible and economically viable within an agricultural commodities and food inspection and certification system.

3.3.3   In deciding whether and how to apply the traceability/product tracing tool, in the context of an agricultural commodities and food inspection and certification system the competent authority should take account of the assessed food safety risks and/or the characteristics of the potential deceptive marketing practices being addressed.

3.3.4   It should be able to be implemented when and as appropriate on a case by case basis.

Source: www.acfs.go.th/eng/general_standard.php?pageid=1

Traceability in Thailand

- Current developments (2013): No. 365 Displaying of the term "Premium" on food labels

Clause 1 In this notification,

"Premium" means quality or standard or outstanding properties which are superior to foods in the same type.

"Agricultural products" means products from agriculture, fishery, animal culture or forestry.

Clause 2 Food labeled "Premium" must be approved by the Food and Drug Administration (Thai FDA).

Clause 3 Food labeled "Premium" on the label must comply with the following terms and conditions:

(1) Quality and standards shall comply with the relevant notification of the Ministry of Public Health.

(2) Meet the international standards or equivalent on conformity and certified processing system, from raw materials through to the finished product, including traceability.

(3) Manufactured from raw material production site and food manufacturing facilities as follows:

(3.1) Raw material production site

(3.1.1) With respect to the place of producing raw materials which are agricultural products, it must be assessed by a government agency or an agency acknowledged by the government authority for Good Agriculture Practice: GAP or

Source: http://food.fda.moph.go.th

Traceability in Thailand

- Current developments (2013): No. 366 Displaying of the term "Premium" on labels of Pasteurized cows' milk and Pasteurized full fat cows' milk

> Clause 2. Displaying of "Premium" on labels of Pasteurized cows' milk and Pasteurized full fat cows' milk shall comply with the following criteria and conditions:
>
> (1) Quality and standards shall be complied with the Notification of the Ministry of Public Health; Re: Cows' Milk.
>
> (2) Compliance with the international standards or equivalent on conformity and certified processing system, from raw materials through to the finished product, including traceability.
>
> (3) Manufacturing from raw milk production site and raw milk collecting facilities and Pasteurized cows' milk and Pasteurized full fat cows' milk production establishments as follows:
>
> (3.1) Raw milk production site shall be certified by a government agency or an agency acknowledged by the government authority for Good Agriculture Practice (GAP) or Guidelines for the Production, Processing, Labeling and Marketing of Organically Produced Foods or other equivalent standards.

Source: http://food.fda.moph.go.th

Increasing request for traceability

- **Regulations or trading partner requirements in many countries**
- **Driven by the need to increase patient safety, prevent counterfeit product entering the market**
- **For shared, enhanced supply chain control**
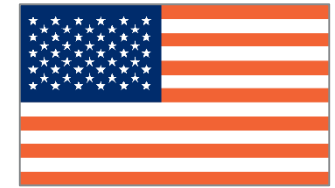
Argentina	European Union	South Korea	Turkey	United States

- **Argentina - 2015: Traceability System for Medical Devices**
- **EU - 2011, 2016: Falsified Medicine Directive (FMD)**
- **South Korea - 2012, 2013, 2015: Batch variable / Serialisation**
- **Turkey - 2010: Track & Trace (Reimbursement Fraud, Traceability)**
- **USA - 2015, 2017, 2023: Drug Supply Chain Security Act (DSCSA)**

Challenges in food cold chain management

Challenges in food cold chain management

How you choose a carrier

? On-time service
? Reliable transportation equipment
? Compliant protocols
? Knowledgeable drivers and dispatchers

Source: www.oceasoft.com, www.livemint.com

Challenges in food cold chain management

How you manage cold chain information

21 CFR Part 11

During your inspections, review the following factors:
- ✓ Sanitation
- ✓ Pest control
- ✓ Standard operating procedures (SOPs)
- ✓ Temperature
- ✓ Security

Source: www.oceasoft.com

Challenges in food cold chain management

How you meet cold chain regulations

Increasing number of products requiring temperature control ('cold chain')

3/4 OF BIOLOGICAL DRUGS

10-15% SMALL MOLECULES

ALL VACCINES

BIOLOGICAL SAMPLES & DIAGNOSTICS TOOLS

Source: www.oceasoft.com/, www.parexel.com

GS1 Thailand

Challenges in food cold chain management

Source: www.oceasoft.com, www.libelium.com, www.greenbiz.com

Challenges in food cold chain management

How you deliver goods

Source: www.oceasoft.com,

Traceability case in the real world "Japanese sake traceability"

Visibility is urgent matters

Infusion problems

Vermin

Someone mixed the poison

Quality Issues

Genuine or not

Unknown product's root

Food traceability is highly required.

Food traceability is KEY

Customers want Secure, Safe and Good delicious food.

What is transportation visibility

What product are are reached to the point, with when, where and why data.
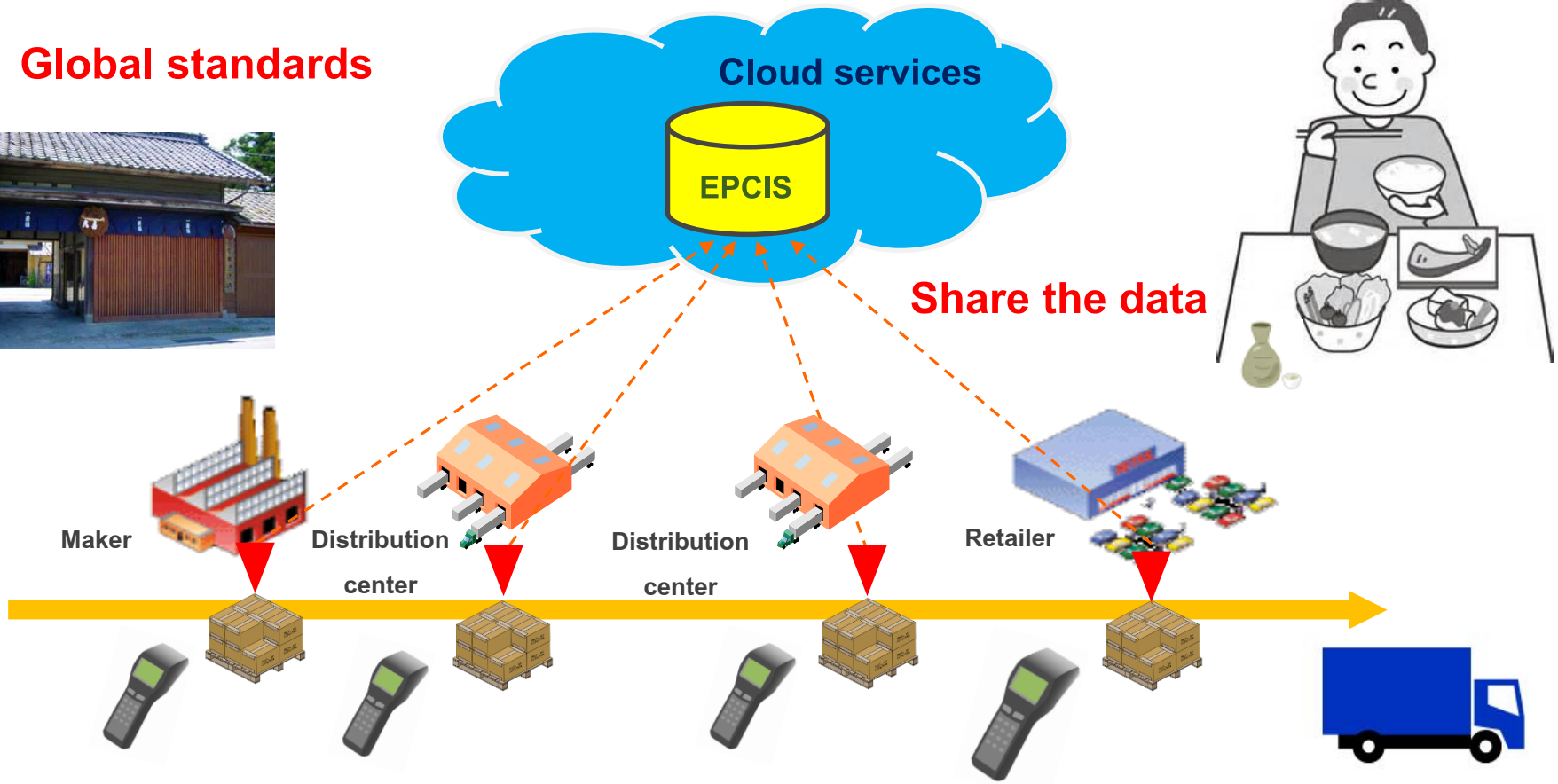
Sake traceability system
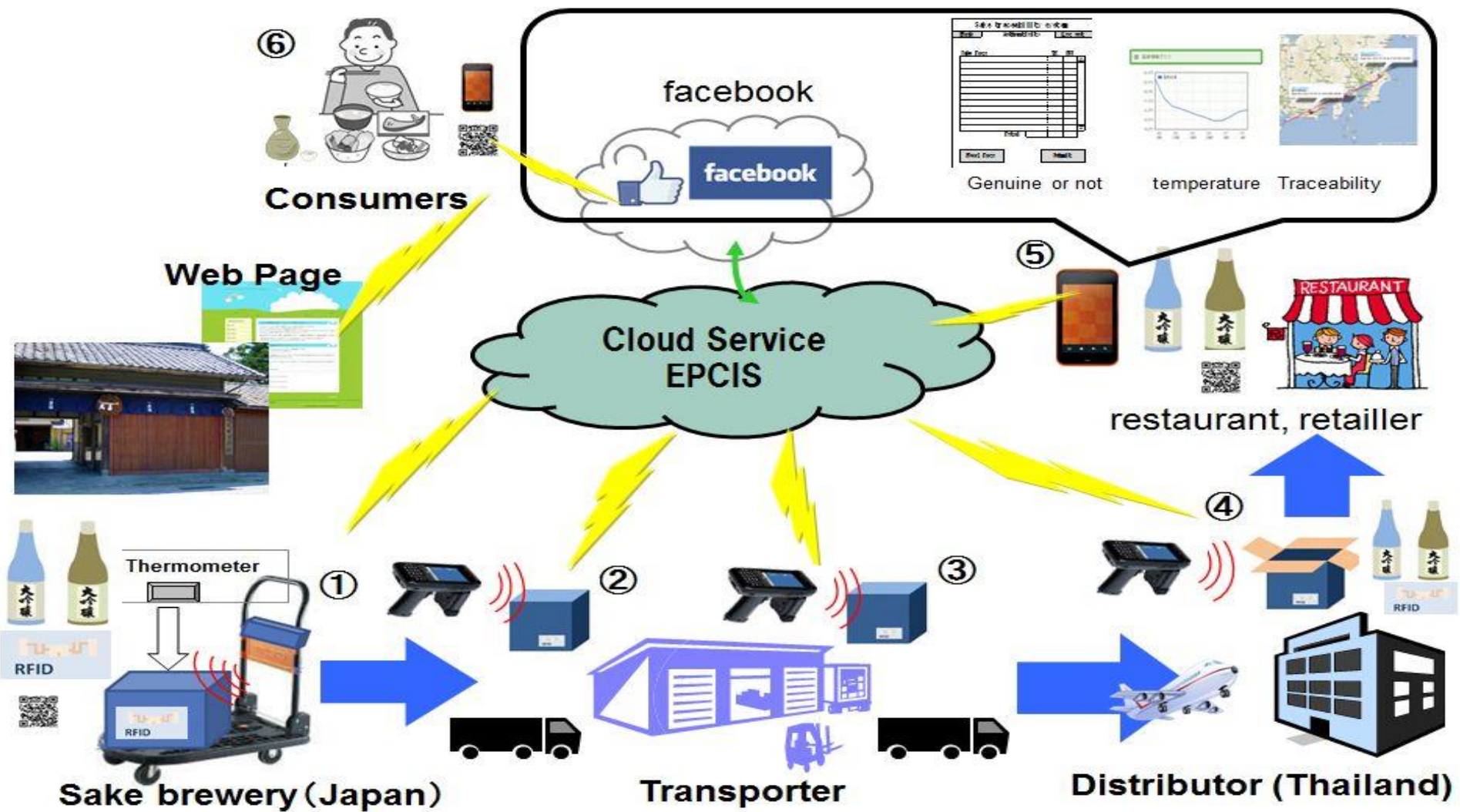
Sake Brewery

Shata Shuzo Co., Ltd.

Masuda Shuzo Co., Ltd.

RFID + RFID → **Packed** → **Read RFID** → **Preparation** → **Shipped**

↑ **Thermometer**
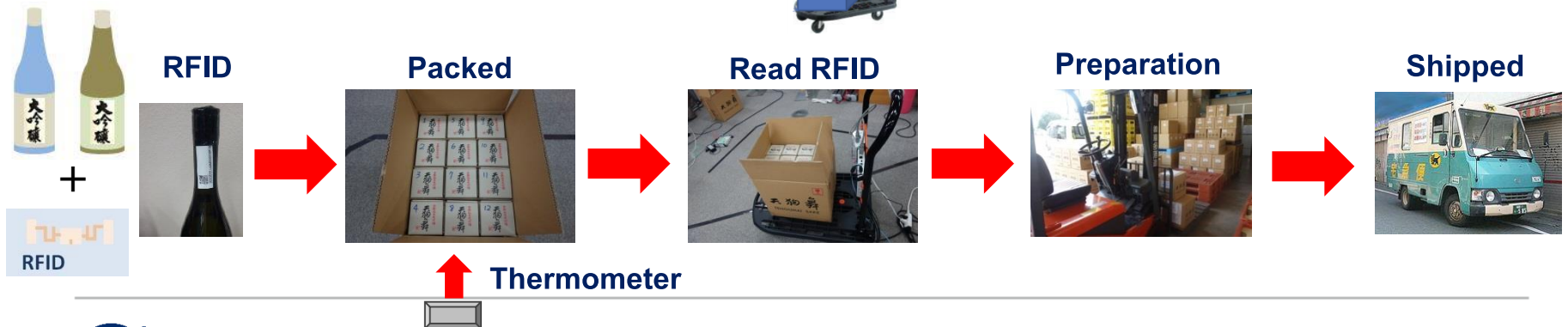
Sake Reader (IT armed hand cart)

"IT armed hand cart"
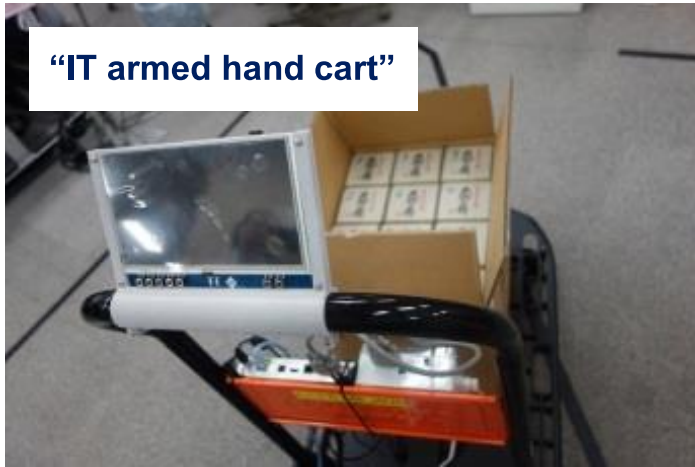
Sake Reader
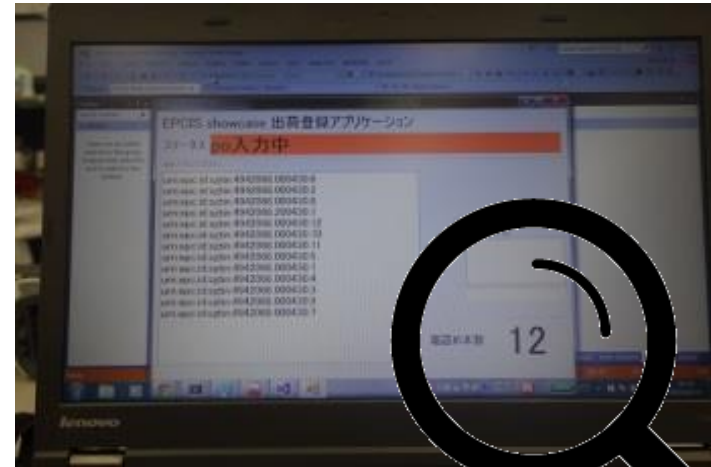
Reading results
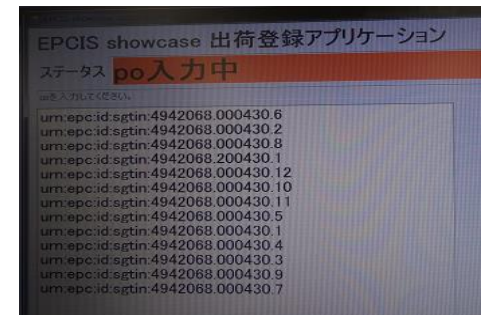
Transporter (Narita airport warehouse)

Warehouse

Arriving

Stocking

Cut the tag intentionally

Read tags

Shipment

Distributor (Thailand Sake Agent)

Arrival

Warehouse

Receiving

Reading Tags
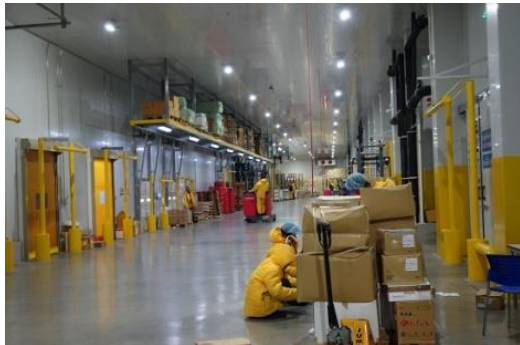
Restaurant & Retail store

Restaurant

Retail Shop

Sake page

Temperature

QR code

facebook

GS1 Thailand

Restaurants (Sake information)

Identify particular bottle

Sales points

Temperature

QR code

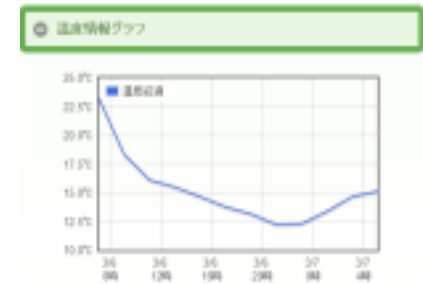**RFID & QR code identify**

particular bottle from serial #
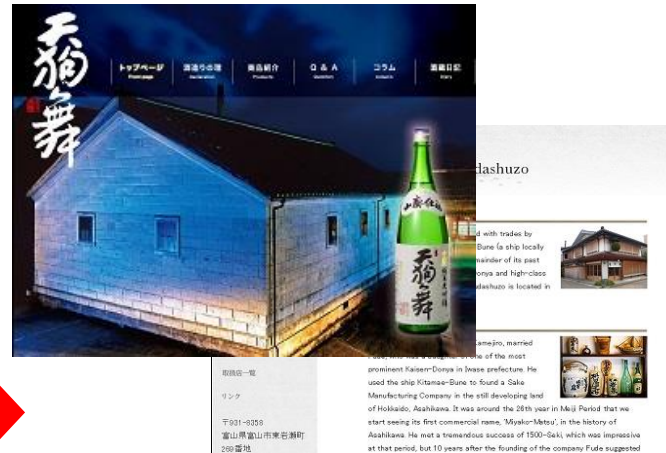
Particular bottle's data

Traceability

Production date

Lot number

Serial number

Recipe

Consumer (Facebook)

Feedback opinions
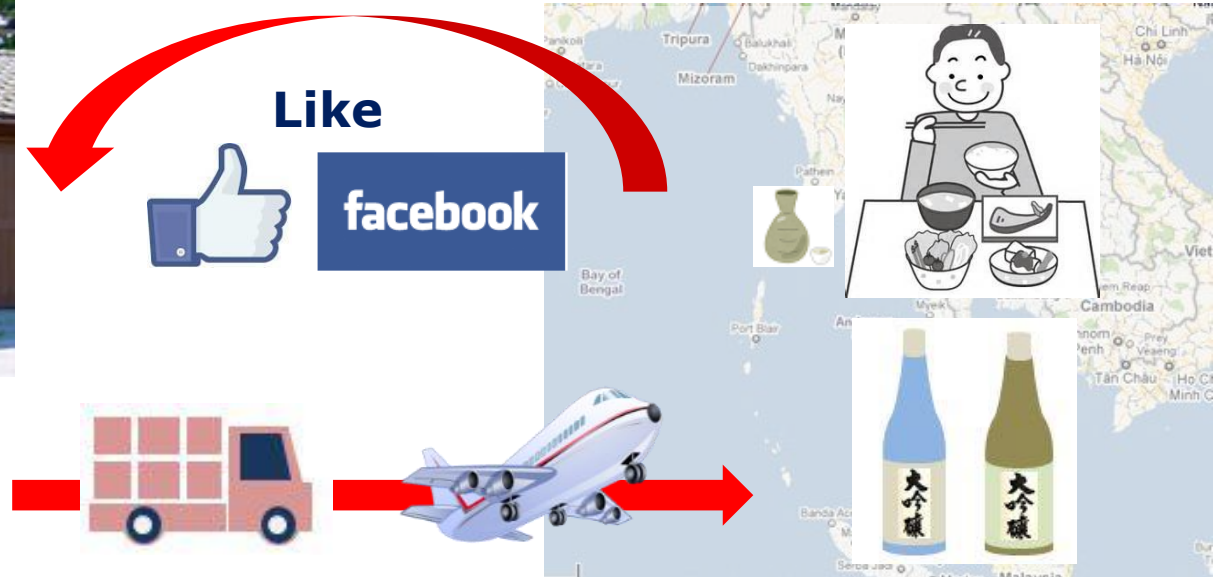
Like

Like

facebook **I really love this Japanese Sake, especially this is best match for beef.**
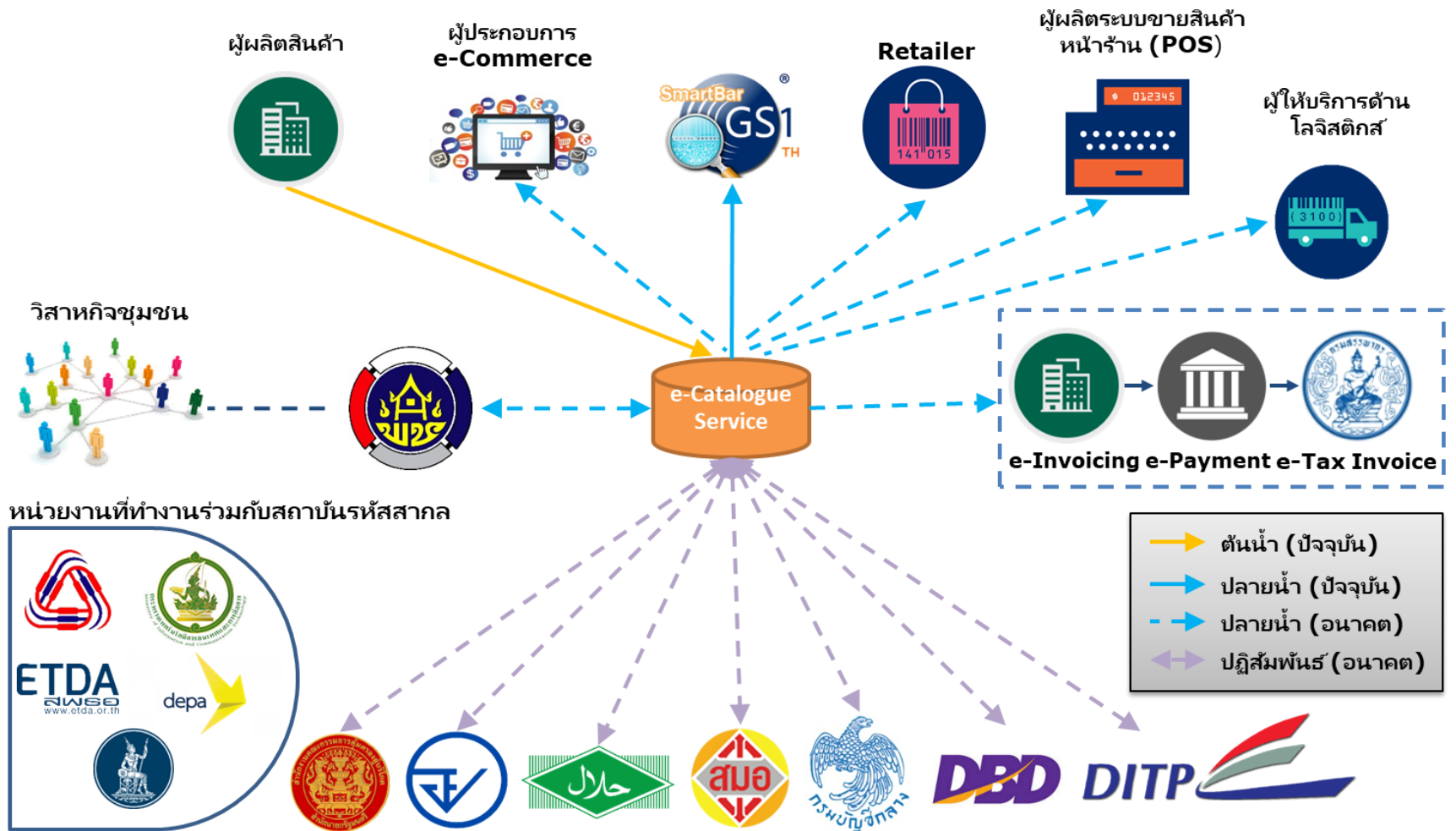
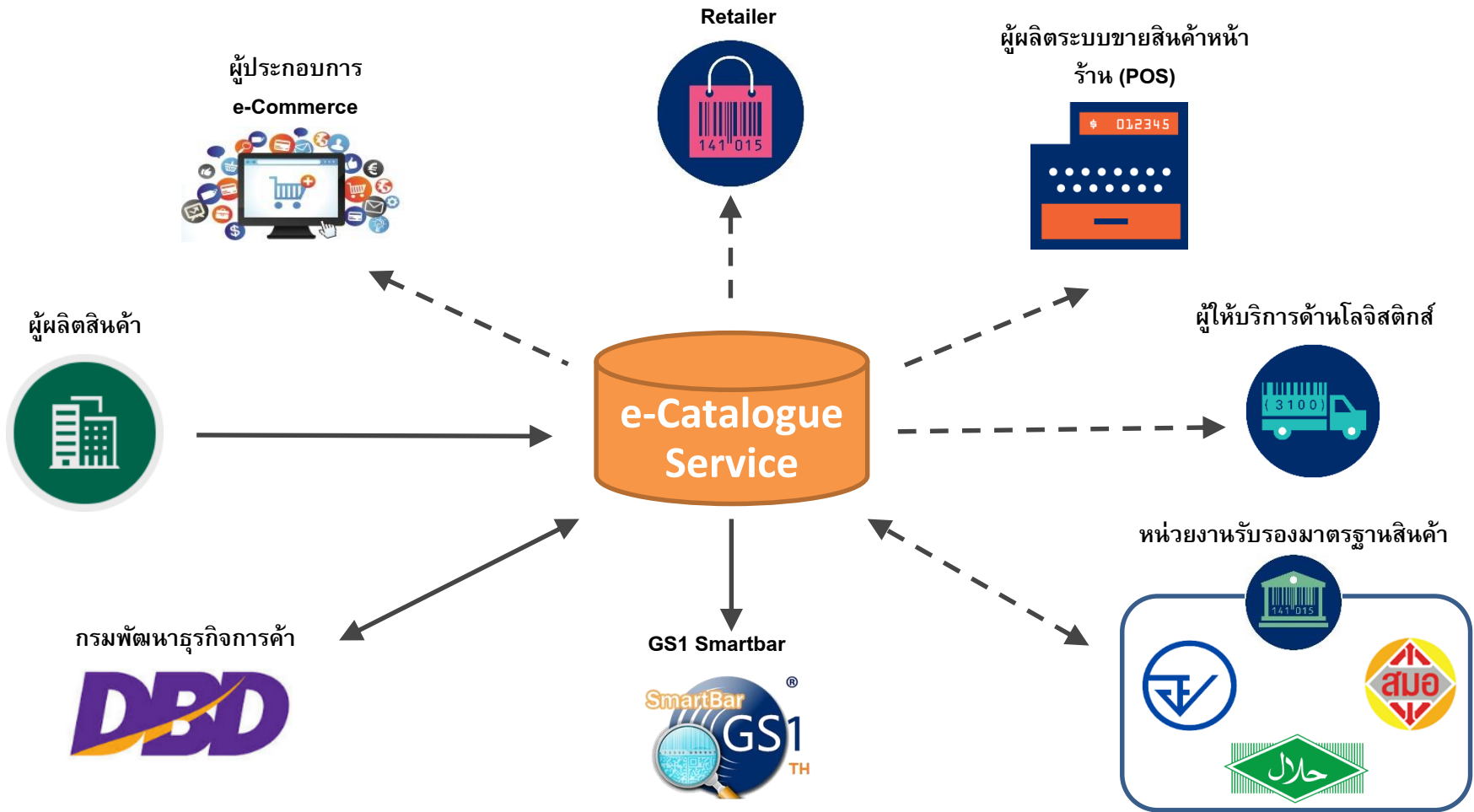# Collaborations with

GS1 Thailand

SCS trading

GS1 Thailand Services: e-Catalog, SmartBar application and Commercial service

e-Catalog Service: Final

e-Catalog Service: Phase I

SmartBar Application

Free Download

"Download - Scan – Check"

Food and Drug Administration
13-1-03938-1-0001

Coca Cola
GTIN :
8851959132012

โค้ก...คอโค้ก คอเดียวกัน โค้ก...ต้องโค้กซิ

Short description:
Ingredient:
Website: http://www.thainamthip.co.th
Catalogue price: ฿ 0

Thai Numthip Ltd.
GLN : 8851959999998

Business type: Beverages/Food
Country: THAILAND
Website: http://www.thainamthip.co.th/

Commercial services

Alliance Platinum — PLANET

Alliance Gold — ESS SYNTECH

Alliance Silver — i-Sprint, ABSS

Alliance Associate — MM&NN, ZinCode, QUADEL, HARN, Smart Identify, IdentifyRFID, mutrack

Contact

GS1 Thailand, The Federation of Thai Industries

Queen Sirikit National Convention Centre Zone C, 3rd Fl.,

60 New Rachadapisek Road,

Klongtoey, 10110 Bangkok, Thailand.

Tel: 02-345-1193-8, 1208

Fax: 662-345-1217-8

Email: info@gs1thailand.org

Website: www.gs1thailand.org, www.rfid.or.th

Facebook: gs1thailand, rfid.thailand

Q&A

Thank you