



PROTECTING AUSTRALIA

# The Australian Guide to Implementing Food Traceability

A P R I L 2 0 2 1





# Australian Guide to **Implementing Food Traceability**

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and Overview



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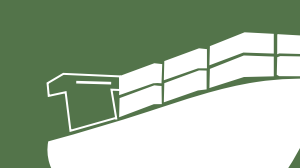
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M O D U L E   O N E :

# Introduction

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## Opening message

The ability to verify the safety and product claims, the provenance of food and the chain of custody along the supply chain, is critical to the confidence of consumers in Australia and globally. Visibility in our supply chains is important to industry for many reasons, but first and foremost is the wellbeing of Australian consumers. It's why Deakin University's Centre for Supply Chain and Logistics Food Traceability Laboratory was formed, and why developing this Guide for Australia's food supply chains was a priority project.

As our supply chains become longer and more complex — crossing multiple countries and involving multiple intermediaries — end-to-end visibility of product and events has become a “must have” capability. The COVID 19 pandemic shone a spotlight on the vulnerability of our supply chains, and whenever there's a biosecurity threat or a food safety recall, we are reminded of how important it is to be able to quickly locate a product's path rather than piece together information from individual businesses. The Australian Guide for Implementing Food Traceability (AGIFT) will ensure speed and accuracy when it comes to addressing customer queries, verifying product claims, processing product recalls and maintaining product integrity.

AGIFT will benefit growers, producers, processors, manufacturers, wholesalers, freight transport suppliers, retailers, food service, importers and exporters of food. It will assist them with the flow of information between businesses and help fulfil regulatory compliance, it will enhance their capacity to address product counterfeiting, and it will help them meet market requirements and claim the premium associated with Australia's high quality food products and integrity frameworks.

The Australian Government has provided a high-level framework for traceability and industry research and development bodies are working to explore how this can be achieved. There is no shortage of technology and information system applications available to support this journey for food businesses, but the missing link is to know what events to record, what data to collect, and what to share with others in the product supply chain in order to create visibility. Knowing how to achieve interoperability between business systems so data can flow is at the heart of supply chain visibility and AGIFT explains how this can be achieved at a pace and with a focus that can match business priorities.

We wish to thank the many individuals, companies and industry bodies who have contributed to the development of AGIFT. We are committed to follow this generic Guide with a series of product-specific guides for industry, testing them in real supply chains and delivering knowledge to grow industry capability in Australia.

We trust that industry will find AGIFT a useful resource as they work to achieve end-to-end supply chain traceability.

**Antony Boll**

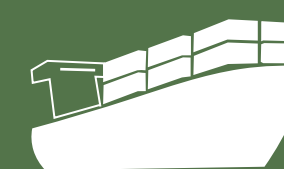
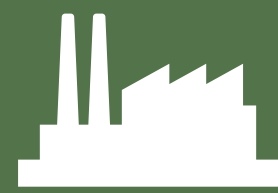
Chair  
Deakin CSCL Food Traceability Lab

**Dr Hermione Parsons**

Industry Professor, Director  
Deakin University Centre for Supply Chain & Logistics

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## Purpose of the Guide

Australian food businesses have a reputation for producing safe, quality food. These businesses put in place measures and systems that enable them to comply with a range of requirements covering food safety, biosecurity, food labelling, food transport as well as industry codes and buyer specifications.

Mandatory “one back: one forward” recording of the product details provides information on who sold or handled the product prior to arrival at a business and who the business is supplying next. Heightened concern about health and the environmental and social impact of food production is driving a demand for more information — end consumers, enterprise to enterprise (E2E) buyers wishing to verify product claims now demand more information about the product and the circumstances of its production, formation and distribution.

The Australian Implementing Food Traceability Guide provides a user-friendly “how to” for tackling traceability across a complete food supply chain. It means that partners working together to supply Australian food will be able to achieve end-to-end traceability at a pace and in priority processes and events along the chain that all agree are important to business success.

The aim of standardising what information is required and how that data is used to identify, capture and share traceable events, is to enable disparate enterprise systems to “talk” to each other with the minimum cost and maximum value capture.

The designers of the *Australian Guide for Implementing Food Traceability* have adopted the following principles. The Guide:

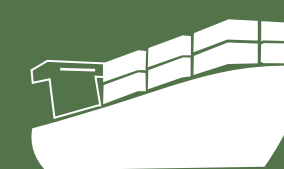
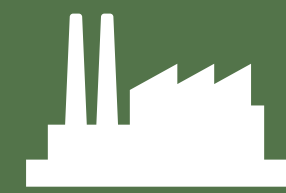
- is generic — it works for all food supply chains; product-specific and value stream guides are to follow
- is designed to work with varying scale of enterprise
- is based on existing systems and technologies but also allows for the emergence of new technologies, networks and systems; it is technology-agnostic
- is designed to structure information so that data your business needs to share can flow through your supply chain seamlessly; interoperability is key
- is standards-based, using GS1 global data standards and other international standards adopted by industry; most are already ISO accredited.

The Guide has been deliberately structured in the form of modules chosen to cover common events and transactions in food supply chains.

Each module covers the typical participants, their roles, the Critical Tracking Events (CTEs) and Key Data Elements (KDEs) for traceability.

Each module includes regulatory requirements that are associated with traceability and required record keeping.

Importantly, the Guide also addresses protection of your data and best practices in cybersecurity.







## Who can use this Guide?

The Australian Guide to Implementing Food Traceability has been developed to assist all businesses engaged in Australia’s food supply chains and their networks of software and technology providers.

The Guide’s scope spans activities from farm inputs, raw materials used in food production and manufacturing, food processing and packaging, storage, distribution, transport, retail, food service, import and export of food and end consumer information.

Some of the types of businesses this Guide has been prepared for are:

- Farm chemical suppliers
- Fertiliser companies
- Fodder and hay suppliers
- Livestock carriers
- Water cartage operators
- Farm infrastructure and equipment suppliers
- Veterinary suppliers
- Primary producers
- Fishermen
- Food processors
- Abattoirs
- Pack houses
- Saleyards
- Wholesalers
- Ingredient suppliers
- Packaging suppliers
- Food manufacturers
- Food safety technicians
- Quality assurance personnel
- Storage facilities
- Exporters
- Importers
- Transport operators
- Cargo Terminal Operators
- Shipping and air lines
- Warehouse operators
- Pallet suppliers
- Container yards
- IT companies
- Food retailers
- Food service

## Tracking and tracing at the supply chain level

Food Standards Australia New Zealand (FSANZ) defines traceability as “*the ability to track any food through all stages of production, processing and distribution (including importation and at retail). Traceability should mean that movements can be traced one step backwards and one step forward at any point in the supply chain. For food processing businesses, traceability should extend to being able to identify the source of all food inputs such as raw materials, additives, other ingredients, and packaging.*”<sup>1</sup>

Traceability is the ability to follow the movement of a product through stages of production, processing and distribution (ISO 2007).<sup>2</sup> It is the systematic ability to trace the path of food ingredients and/or finished products throughout their entire lifecycle, using previously captured and stored records. These records catalogue **key data elements (KDEs) at critical tracking events (CTEs)**.<sup>3</sup>

Traceability may be achieved along a supply chain by combining the one-up/one-down information from individual businesses. However, it may not constitute a visibility capability for that particular supply chain. The data may be required to be held for regulatory purposes but not necessarily shared with other businesses in the chain to create visibility of the product.

Gaining visibility along the entire supply chain can improve speed and accuracy of food recalls by having a complete set of information on where the product has been, who has handled the product, unique identification of the product (what) and when it was produced, transformed, aggregated and disaggregated as it is physically moved along the supply chain.

The ability to trace a product at the supply chain level creates further benefits beyond faster and more accurate product recalls. It can support market access, improve efficiencies in the flow of product and support product claims associated with brand value, such as provenance, sustainability or organic.

1. FSANZ Food Traceability 2017 <https://www.foodstandards.gov.au/industry/safetystandards/traceability>  
2. <http://www.agriculture.gov.au/market-access-trade/traceability-project#what-is-traceability>  
3. Global Food Traceability Centre <https://www.ift.org/global-food-traceability-center/about-gftc>





What are Critical Tracking Events (CTEs) and Key Data Elements (KDEs)?

A **Critical Tracking Event (CTE)** is any occurrence involving an item at a specific location and time associated with collection and storage of data useful for associating the item (or related items) to the specific occurrence at a later time and is determined to be necessary for identifying the actual path of an item through the supply chain.

The concept of Critical Tracking Events in an agrifood supply chain allows unique traceability data to remain separate from proprietary commercial data. For each node, aggregation, de-aggregation, transfer and transformation of the product it will cover:

- A unique location — the “Where”
- Unique identification of the parties involved — the “Who”
- A unique item identification — the “What”
- A time and date stamp — the “When”

“The CTE approach is a bottom-up approach that is inherently secure in terms of data ownership, data access and proprietary information protection. The CTE approach recognizes that each operator knows their own operations best and provides complete latitude as to how to collect CTE traceability data. The CTE approach shifts focus from the food product itself to the events that manipulate the product in the supply chain.

As each operator handles a food product (harvests, creates, receives, mingles, aggregates, palletises, depalletises, relocates, ships, etc.) its actions are viewed as events that occur at specific locations, dates and times. Some of these events are critical to the ultimate traceability of the product. Therefore, those events are deemed to be “critical tracking events.” Since a CTE is essential to ultimately tracking the item in the supply chain, CTE traceability requires a commitment from operators to collect, store and make retrievable, CTE data from every CTE within their operation.

Implementation of CTE traceability does not interfere with any existing business processes. However, CTEs require a commitment by operators to collect, store and make available for retrieval a minimal set of data that is inherently secure through abstraction, separation and restricted accessibility. Operators can choose the most appropriate manner to collect data from manual entry to sophisticated automated scanners. Once CTE data are captured and available for query, investigators will no longer need to stop at each node in the supply chain in order to learn where to go next. CTE based traceability promises to greatly accelerate the rate of trace back investigations as well as the precision and speed of recalls.”

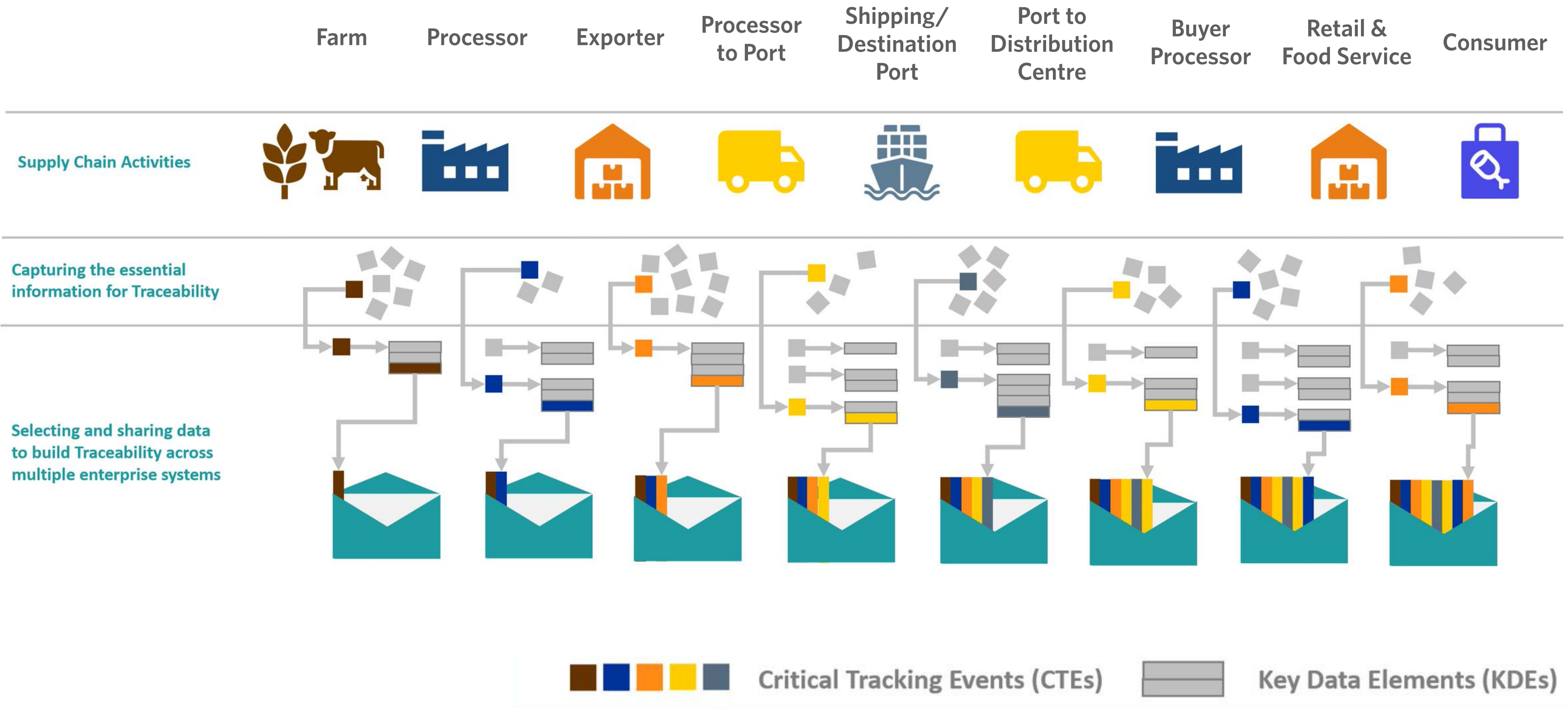
— ISO 22000 Resource Center, Traceability in food supply chains: Critical Tracking Events, 2014

A **Key Data Element (KDE)** is a data input required to successfully trace a product and/or its ingredients through all relevant CTEs. In terms of data content, these can be categorised into three distinct areas

- Master data relates to locations, businesses, products (input materials, outputs) and their associated attribute data such as addresses, functions, descriptions, packaging configurations etc. These details will be stored in product master data files and retrieved each time a traceable item is scanned or looked up for ordering, or a location referenced.
- Transaction data that consist of trade transactions, triggering or confirming the execution of a function within a business process. Transaction data is usually captured and stored in internal systems.
- Visibility event data that captures the movement of a product through the supply chain detailing when and where a specific event occurred. Visibility data is usually made accessible across the whole supply chain. It makes it possible to track and trace goods with live data along the process.



IMPLEMENTING FOOD SUPPLY CHAIN LEVEL TRACEABILITY



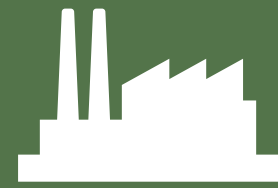
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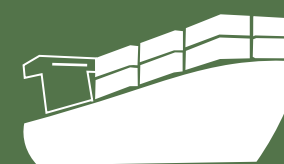
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How does the Guide work?

This guide is generic. That is, it is designed with all food products in mind. It describes how to create supply chain traceability through using data standards for interoperability. Further guides will be product-specific or based on a value stream associated with product claims such as sustainable production, ethical sourcing, Halal, organic etc.

We've taken a modular approach. The Guide is developed in modules, enabling businesses along a food supply chain to focus on achieving traceability within their area of responsibility, understanding what data is needed to complete supply chain level traceability. Supply chain partners can select a module related to priorities in their business strategy or where they wish to improve traceability in their supply chain, e.g. Export or Freight Transport. Collaboration is the basis of supply chain level traceability, so partners working together will need to consider their resources and commitment to working through the modules to build the full capability.

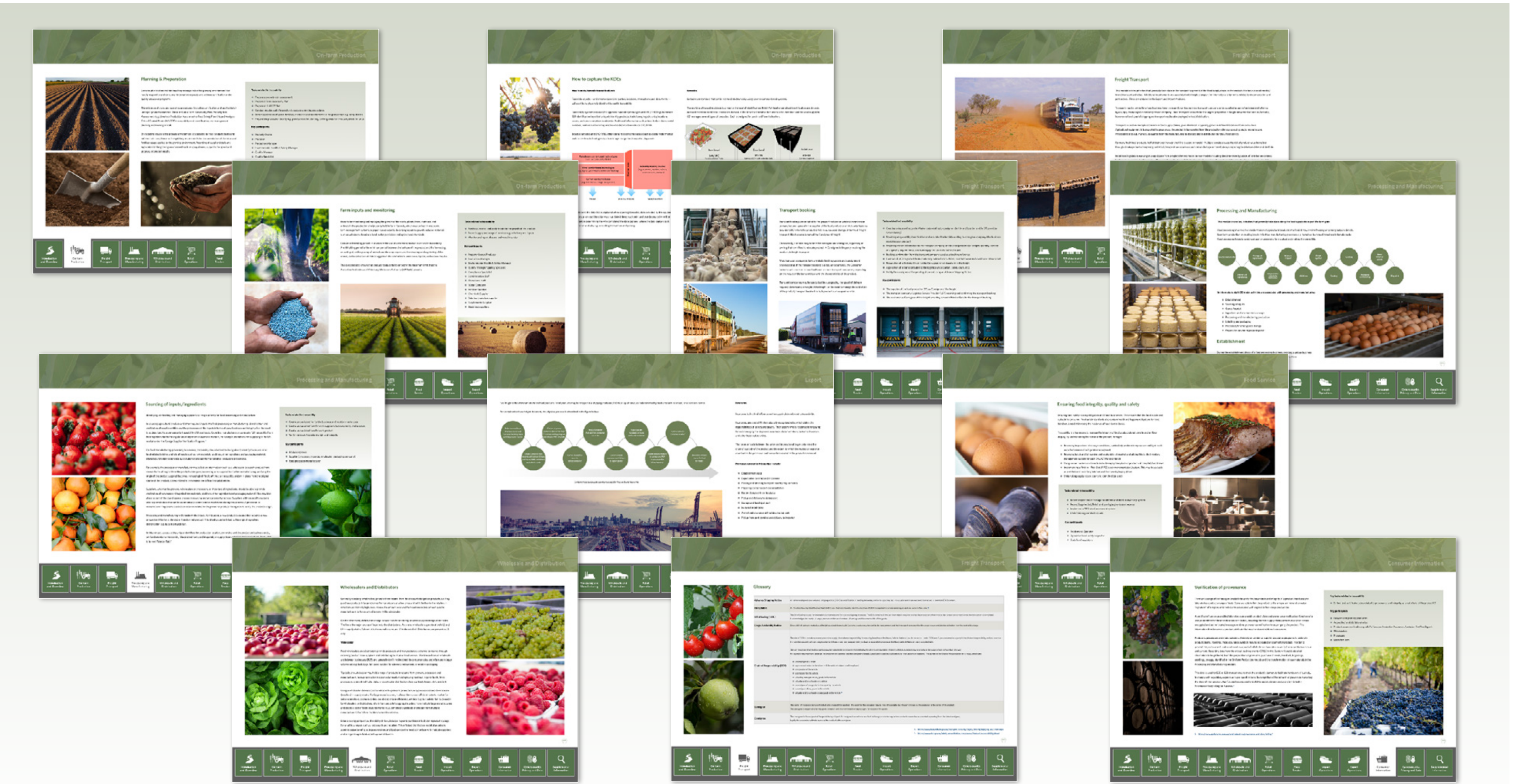
The modules cover:

- On-farm production
  - Freight transport
  - Processing and manufacturing
  - Wholesale and distribution
  - Retail
- Food Service
  - Import
  - Export
  - Consumer information
  - Cybersecurity, privacy and data sharing

In each module, you will find a description of the key processes and events that relate to supply chain level traceability. Within each of these processes, we identify tracking events that are considered critical, or that are required by regulators, related to traceability. For each critical tracking event, we then indicate what data points are relevant to be stored within enterprise systems and then separately, shared with supply chain partners.

For each of these sharable data, we show how to capture the data and how to format the data to standards that allow flow between systems of permissioned supply chain partners safely.

Each module contains useful links so you can quickly check regulatory requirements or the detail of a particular data standard for your solution provider or in-house IT team.



This Guide is presented as a series of modules, for easy navigation by topic area.

Focusing on the interoperability between technologies and IT systems

You may be dealing with a range of technologies being used across the food supply chains your business interacts with, from suppliers of inputs, government and industry platforms, customer ordering and delivery systems, in addition to operational systems and messaging in your own enterprise. Regardless of the technology or software used, the Traceability Guides focus on the data you will need to collect and share.

We have a Solution Provider Reference Group experienced in food traceability advising us on how current and emerging technologies and software will use the data standards and framework. We are not developing a platform or software. Our interest is in the interoperability between systems through using common language for data.

GS1 is the global data standards body for supply chains. GS1 Australia is collaborating in this program to provide data standards for these guides. The standards are already used in Australian and international food supply chains to form the basis of interoperability. The GS1 supply chain standards are accredited as International Standards Organisation (ISO) standards.



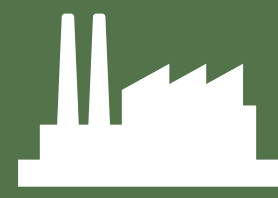
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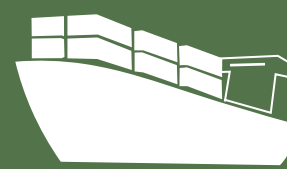
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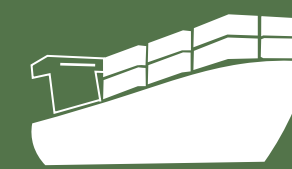
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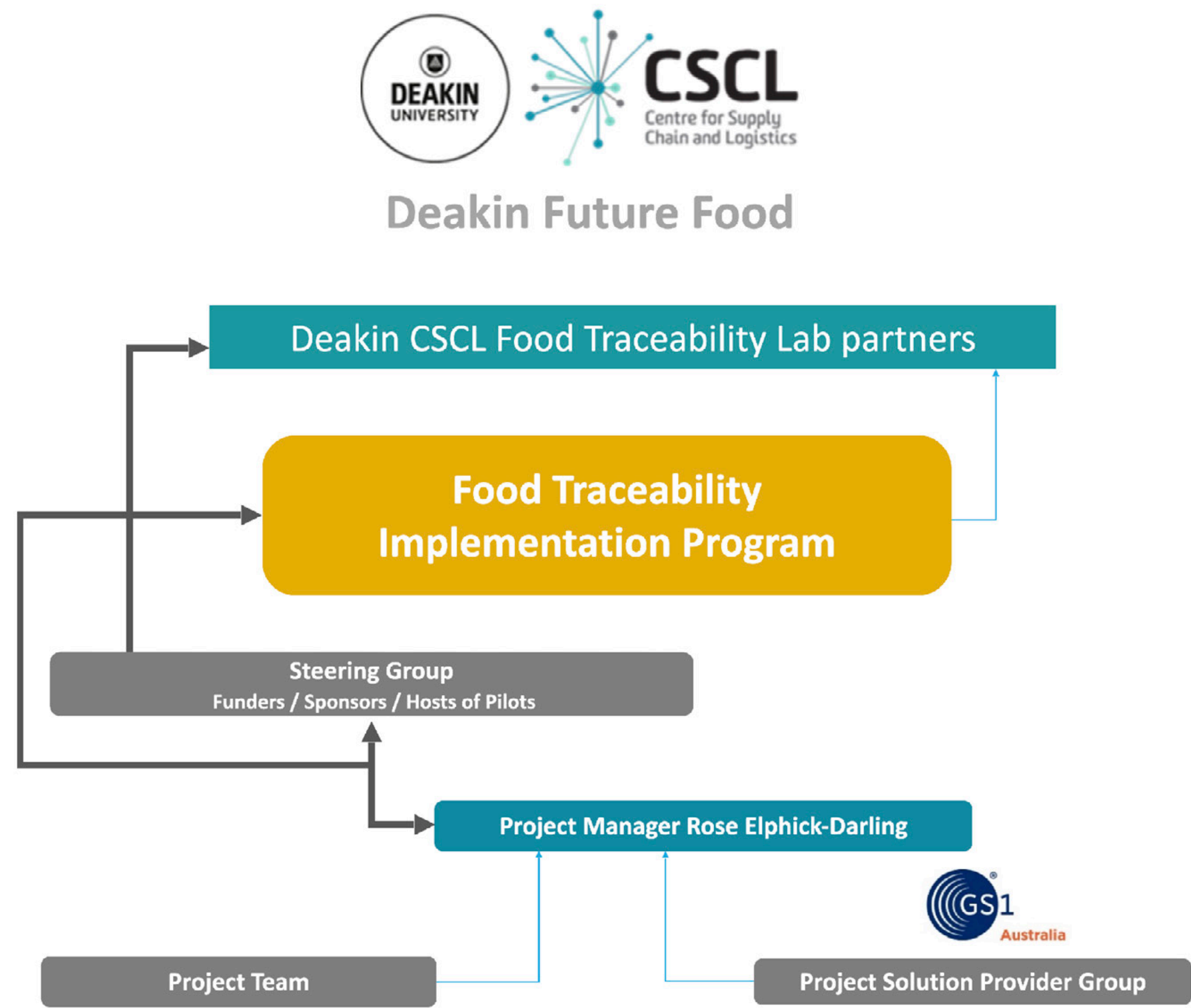




## The Deakin Food Traceability Laboratory partnership

The *Australian Guide to Implementing Food Traceability* and the Implementing Food Traceability Program is an initiative of the Deakin University Food Traceability Lab.

This Lab is a partnership of industry, government and academia developed and convened by the Centre for Supply Chain and Logistics (CSCL), dedicated to improving Australian food supply chains and tackling issues that require partnership.



Deakin CSCL Food Traceability Laboratory members include:

- Mr Tony Boll, current Chair, formerly Chief Executive Officer, DHL Global; Supply Chain Advisor
- Ms Lyn O'Connell, Deputy Secretary, Department of Agriculture - former Chair
- Ms Rose Elphick-Darling, Research Fellow, Centre for Supply Chain and Logistics (CSCL), Deakin University
- Mr Geoffrey Annison, Deputy Chief Executive, Australian Food & Grocery Council
- Dr David Cusack, Manager, Food Standards and Programs, NSW DPI Biosecurity and Food Safety
- Ms Maria Palazzolo, Chief Executive Officer, GS1 Australia
- Mr Greg Picker, Executive Director, Australian Food Cold Chain Council
- Dr Mirjana Prica, Managing Director, Food Innovation Australia (FIAL)
- Ms Jo Quigley, Chief Operating Officer, National Livestock Identification System (NLIS), Meat & Livestock Australia
- Mr Patrick Walsh, Chief Executive Officer, Craig Mostyn Group
- Mr Ram Akella, Business Partner Technology, Woolworths Food Group
- Mr Andrew Redman, Chief Technical Officer, Perfection Fresh Australia
- Mr Francesco Oliveri, Head of ICT, Perfection Fresh Australia
- Dr Hermione Parsons, Industry Professor and Director, CSCL, Deakin University
- Prof Douglas Creighton, Deputy Director, Institute for Intelligent Systems Research & Innovation (IISRI), Deakin University

The Steering Committee members overseeing the preparation of the *Guide* and Implementing Food Traceability program are:

- Ms Irene Sobotta, Integrity Systems Company
- Mr Ram Akella, Woolworths Group
- Mr Marcel Sieira, GS1 Australia
- Dr Hermione Parsons, Centre for Supply Chain and Logistics, Deakin University



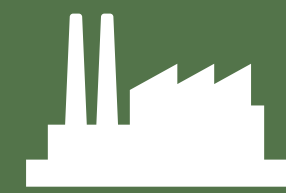
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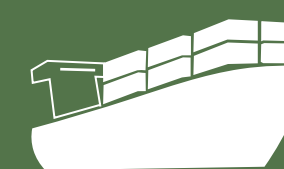
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M O D U L E   T W O :

# On-farm Production

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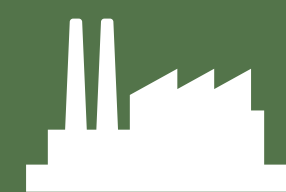
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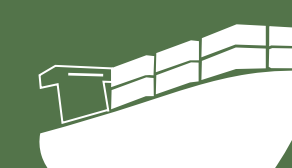
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## On-farm Production

This module covers activities that generally take place on the production site or farm.  
In this module, nine (9) processes and activities are associated with on-farm production:



### Establishment

The establishment of unique identifiers for production location, its ownership and the production business entity are fundamental to traceability. These identifiers provide the common link across the participants in the full supply chain and are collectively referred to as “Master Data” due to their frequency of use.

Master data relates to locations, businesses, products (input materials, outputs) and their associated attribute data such as addresses, functions, descriptions, packaging configurations, etc. These details will be stored in product master data files and retrieved each time a traceable item is scanned or looked up for ordering etc, or a location is referenced.

Regulators often mandate Establishment data. It can be required for local, state or national government responsibilities, such as ensuring the property can be located in the circumstance of a biosecurity threat such as a disease outbreak, or that on-farm facilities are fit for purpose and maintain safe food systems.

Primary producers benefit from being able to identify sites where products are grown, in order to gain a better assessment of productivity, such as matching the site to inputs and yields. Being able to distinguish specific growing sites such as vineyards, greenhouses or orchards, can support provenance values and telling the story of the product to end consumers.

#### Tasks related to traceability

- Register the property with the State Agency to obtain a Property Identification Code (PIC)
- Apply for a Global Location Number (GLN) for the whole property or specific grow sites
- Collate GPS coordinates for property, boundaries or grow sites
- Register or license on-farm facilities used for packing or processing.

#### Key participants

- Property Owner
- Farm Manager, who may be leasing land for production
- Property Identification Code (PIC) Issuing Agency in each state (see [Useful Links](#) section in this module)
- Global Location Number (GLN) Issuing Agency – in this case GS1 Australia
- Food Safety agency
- Department of Agriculture, Water and the Environment (AWE) for on-farm premises for export products.



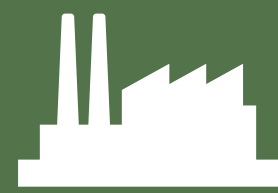
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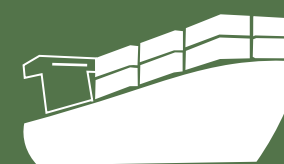
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## Planning & Preparation

Growers able to demonstrate how they manage risk in the growing environment can readily respond to end consumer information requests and achieve certification under quality assurance programs.

The existence of plans and operating procedures (including certification and audit details) underpin product assurance. These include a Farm Biosecurity Plan, Property Risk Assessment (e.g. Livestock Production Assurance) or Food Safety Plan (Hazard Analysis Critical Control Points (HACCP)) to enable hazard identification, risk management planning and training of staff.

By recording inputs to the growing environment, it's possible to trace product claims and authenticate compliance with regulatory requirements for documentation of chemical and fertiliser usage applied to the growing environment. Recording of supplier details and application to the growing environment such as spray diaries, supports the speed and accuracy of product recalls.



### Tasks related to traceability

- Prepare a property risk assessment
- Prepare a Farm Biosecurity Plan
- Prepare an HACCP Plan
- Conduct regular audit/inspection to update operating procedures
- Record application of water, fertiliser, chemicals and supplements to the grow area/s e.g. spray diaries
- Prepare the production facility e.g. grow tunnels for planting, birthing areas for livestock, sheds for birds

### Key participants

- Property Owner
- Producer
- Production Manager
- Environmental Health & Safety Manager
- Quality Manager
- Quality Specialist
- Compliance Specialist
- Materials Manager
- Materials Specialist
- Administrative Staff
- Operations Staff
- Risk Auditor
- Risk Inspector
- Farm Biosecurity Auditor
- Farm Biosecurity Inspector
- Soil Auditor
- Soil Inspector
- Natural Resource Management Agency
- Environmental Protection Agency
- Biosecurity Agency



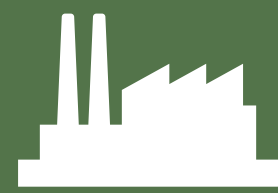
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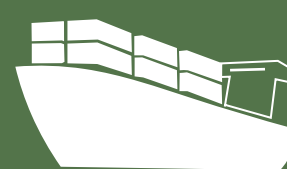
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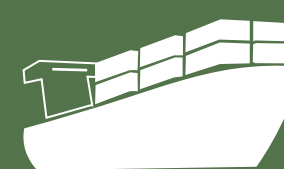
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## Planting and Birth

Identification of an agricultural product from sowing, planting and birth creates a unique identity that can be associated with the origin location. It can move with the product along the food supply chain, allowing it to be tracked at various points, including when it is further transformed through to consumption.

This process provides identification of animals born or brought to the farm and identification of variety, quantity and date of planting for plants/seeds/grains.

Where it is unrealistic for individual products to be uniquely identified, batch numbers or tray/pot, shed, pond identification may be required. Once planting out occurs, the product batch can be associated with specific rows in grow sites.

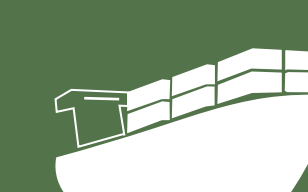


### Tasks related to traceability

- Identification of livestock born on or brought to the farm
- Identification of source, variety, quantity and date of planting for plants/seeds/grains
- Identification of individual animals, pens, ponds, where aquatic animals are introduced/located

### Key participants

- Property Owner
- Producer
- Production Manager
- State biosecurity agency
- Industry identification program/platform e.g. National Livestock Identification System







Farm inputs and monitoring

Records for monitoring and managing the growth of the seeds, plants, trees, rootstock and animals in the production site/property held in Farm Records, which may be kept in electronic farm management systems or paper-based records. Recording inputs to growth includes materials such as veterinary chemicals, feed, water, pesticides and agricultural chemicals.

Data on withholding periods in relation to the use of a chemical product is critical to traceability. A withholding period is the minimum period between the last use of the product and the harvesting or cutting of, or the grazing of animals on, the crop or pasture, the shearing or slaughtering of the animal, or the collection of milk or eggs from the animal for human consumption, as the case may be.

This is recorded to ensure that product residues fall to or below the maximum limit that the Australian Pesticides and Veterinary Medicines Authority (APVMA) permits.



Tasks related to traceability

- Purchase, receive and apply inputs to the growth of the product
- Record supply and usage of services e.g. veterinary and inputs
- Monitor and report disease and weed incursion

Key participants

- Property Owner/Producer
- Production Manager
- Environmental Health & Safety Manager
- Quality Manager/Quality Specialist
- Compliance Specialist
- Administrative Staff
- Operations Staff
- Water Company
- Fertiliser Supplier
- Chemicals Supplier
- Veterinary services supplier
- Supplements Supplier
- Stockfeed suppliers



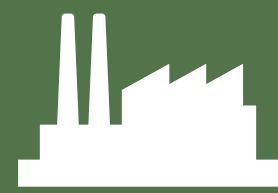
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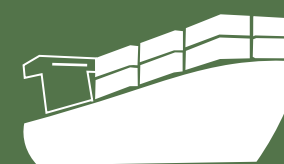
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Food Service



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Export Operations



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## Harvesting

Harvesting involves amassing the mature product once it has reached specified standards for sale. Growers wishing to record yields from specific grow sites e.g. orchards, vineyards, individual paddocks or rows, may wish to relate that yield to regimes applied or variety planted. Recording the harvest yield from each grow site, which in turn is linked to the planting records enables this level of internal traceability.

For some products, individual identification is already enabled through tagging and readers. For other products, identification may be via tubs, bins, or trays linking grow sites, harvested product and these containers. For bulk products such as grains and pulses, harvesters will generally record the yield and GPS coordinates of the site.



### Tasks related to traceability

- Harvest plant or wild catch
- Select livestock for sale
- Undertake sampling of product for origin verification and product integrity testing
- Relocate the product to on-farm harvest agglomeration site e.g. yards, packing sheds, bunkers, silos
- Record harvest labour

### Key participants

- Property Owner
- Producer
- Production Manager
- Production Engineer
- Quality Manager
- Administrative Staff
- Operations Staff - permanent and casual harvest workers
- Bird/stock handlers



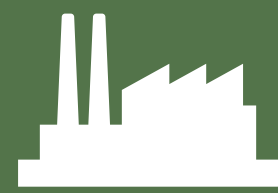
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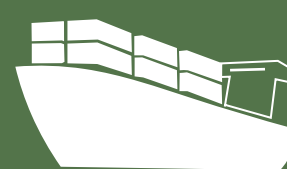
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## Post-harvest handling

Activities included in post-harvest handling are inspection, grading, cleaning and preparation/ packing of the product, initial processing and on-farm storage, preparation of the product for off-farm processing or storage and preparation for transport loading and distribution.

### Tasks related to traceability

- Inspect and grade the product to specification
- Record harvested product quantity, type and quality
- Clean, trim, weigh, count and pack product into sales item packs, punnets, trays, cartons or larger units for wholesale/processing
- Chill to required temperature
- Load onto storage or transport assets e.g. on-farm silos, sheds, pallets, tubs, bins, trucks
- Record post-harvest handling personnel

### Key participants

- Property Owner
- Producer
- Production Manager
- Administrative Staff
- Operations Staff



## On-farm storage

This process involves storage of the product in on-farm facilities e.g. silo, cool store, packing shed, barrel room on farm. On-farm storage applications can enable record keeping for each storage facility, to record product quantity, variety, paddock source and product monitoring actions such as fumigation, aeration cooling or drying of the product.

Monitoring of temperature, CO2 levels, pests located and treatments may also be required. Monitoring product may also involve recording weight and count of product to compare with harvested volumes.

### Tasks related to traceability

- Tasks related to traceability
- Put away in on-farm storage
- Record the time and date, location of storage
- Take samples from each harvest lot prior to product co-mingling from different sources
- Record best-before/use-by/expiry dates on product batches or product lots
- Weigh and count to monitor product

### Key participants

- Property Owner
- Producer
- Production Manager
- Environmental Health & Safety Manager
- Quality Manager
- Quality Specialist
- Compliance Specialist
- Administrative Staff
- Operations Staff
- Stock/bird handling staff



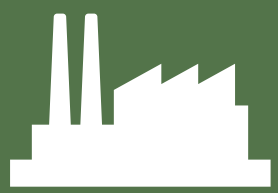
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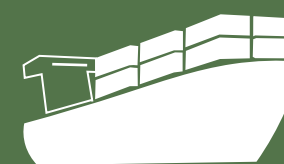
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## End of life

This process involves disposal or dispatch of by-product and product waste, deceased or diseased animals or plants. While product is generally disposed of on-site, there may be a need to remove deceased or diseased product off-site.

### Tasks related to traceability

- Record details of product disposal on-farm e.g. void NLIS tag
- Complete Animal Health Declarations
- Arrange transport or removal to approved disposal/waste facilities.
- Disposal site notifies receipt of product as required.

### Key participants

- |   |  |
|---|--|
| ● Property Owner                        | ● Operations Staff   |
| ● Producer                              | ● Stock handling staff                                     |
| ● Environmental Health & Safety Manager | ● Transport contractor                                     |
| ● Administrative Staff                  | ● Knackery, rendering plant or licensed landfill operation |



## Dispatch of product

Product dispatch is usually triggered by a sales contract. Dispatch from the property may also be relocation of livestock for further maturation e.g. backgrounding, feedlot or transport to a sale venue e.g. wholesale market, sales yard.

### Tasks related to traceability

- Receive Purchase Order from buyer
- Confirm product availability in inventory
- Validate Purchase Order
- Create Sales Order
- Create picking list
- Assess whether animals are fit to load
- Pick order
- Pack product
- Label product (item, punnet, tray, pallet, tub, animal)
- Complete outbound documentation e.g. product inspection and health declarations e.g. phytosanitary certificate, Vendor Declarations, Fit to Load assessment
- Complete transport documentation e.g. Advance Shipping Notice, Transport Instruction, Delivery Order, Bill of Lading, Consignment Note
- Record outbound product in inventory balance
- Move product to load out area
- Load product (If loading a shipping container, affix seal and record seal number on Bill of Lading)

### Key participants

- |  |                                   |
|--|-----------------------------------|
| ● Origin and Destination Property Owners | ● Inspection and compliance staff |
| ● Producer                               | ● Customer                        |
| ● Production Manager                     | ● Buyer                           |
| ● Administrative Staff                   | ● Transport Company               |
| ● Operations Staff                       | ● Driver                          |



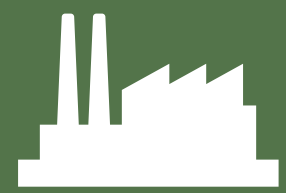
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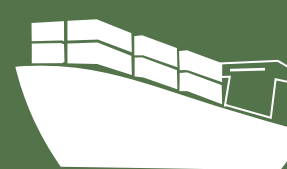
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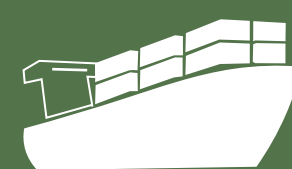
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Critical Tracking Events (CTEs)

For each of the identified on-farm production activities, critical tracking events (CTEs) establish identity and enable traceability and compliance with traceability-related regulation. CTEs are events that relate to the identity, movement and transformation of the food product.

	On-farm activity	CTE code	Critical Tracking Events (CTEs)
1	Establishment	OFP CTE 1 OFP CTE 2 OFP CTE 3	Property identification Link provenance verification Registration of premises
2	Planning and Preparation	OFP CTE 4 OFP CTE 5 OFP CTE 6	Property Risk Assessment Property Biosecurity Plan Food Safety Plan
3	Farm inputs and monitoring	OFP CTE 7.1 OFP CTE 7.2 OFP CTE 8.1 OFP CTE 8.2 OFP CTE 9.1 OFP CTE 9.2 OFP CTE 9.3	Water Receipt Water usage Fertiliser receipt Fertiliser application Chemicals receipt Chemicals application Feed records
4	Product sowing, planting, birth, stocking	OFP CTE 10.1 OFP CTE 10.2	Seed/animal receipt Product sowing, planting, birth, stocking
5	Growth	OFP CTE 11.1 OFP CTE 11.2	Monitoring growth Equipment maintenance/cleaning
6	Harvest	OFP CTE 12	Product harvested/selected
7	Post-harvest handling	OFP CTE 13.1 OFP CTE 13.2 OFP CTE 13.3	Product inspected and graded/weight/count Product washed/weight/count Product packed and labelled on-farm
8	On-farm storage	OFP CTE 14.1 OFP CTE 14.2 OFP CTE 14.3	Product storage location Product received/weighed and counted Product monitored in storage
9	Product end of life	OFP CTE 15.1 OFP CTE 15.2	Waste/by-product removal Animal disposal — identification and notification
10	Dispatch – product prepared to leave property	OFP CTE 16 OFP CTE 17 OFP CTE 18	Inspection and clearance by authorised officer Prepare shipping documentation Product dispatched



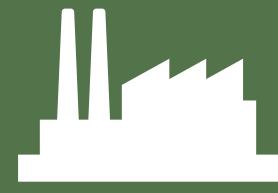
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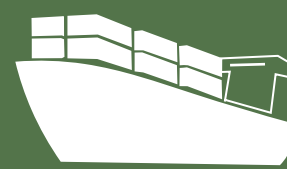
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Key Data Elements (KDEs)

Key Data Elements (KDEs) ensure that captured and recorded data can be interpreted and used as relevant and required by all supply chain partners. Key Data Elements define Who, What, When, Where and Why for each Critical Tracking Event.

CTE code	Critical Tracking Events	Key data Inputs and Outputs																											
OFP CTE 1	Property Identification	<p><b>Property Identification Code (PIC)</b></p> <p>The PIC is a unique 8-digit code issued by State authorities, developed for biosecurity traceability.</p> <p>While it is the mandated property ID for livestock production properties and some vineyards and nut trees, it is effective for all farm property identification.</p> <ul style="list-style-type: none"><li>● Prepare a property risk assessment</li><li>● Prepare a Farm Biosecurity Plan</li><li>● Prepare an HACCP Plan</li><li>● Conduct regular audit/inspection to update operating procedures</li><li>● Record application of water, fertiliser, chemicals and supplements to the grow area/s e.g. spray diaries</li><li>● Prepare the production facility e.g. grow tunnels for planting, birthing areas for livestock, sheds for birds</li></ul> <p><b>Global Location Number (GLN)</b></p> <p>The Global Location Number (GLN) is used to identify locations and legal entities. This unique identifier is comprised of a GS1 Company Prefix, Location Reference, and Check Digit.</p> <p>GLNs are used to identify parties to business transactions; functional groups within a company; or real, physical “places” that might ship, receive, process, or hold the product. Examples include orchards, growing tunnels or hothouses, vineyards, and cropping areas. The GLN number can be used in combination with the PIC. Note: GLN assignment can also be completed by the Farm/Grower based on their existing GS1 membership and allocated number range. In such cases, record of allocated GLNs will need to be shared accordingly for traceability and trading purposes.</p>																											
OFP CTE 2	Link provenance information	<p><b>Global Positioning System Geocoding</b></p> <p>An additional means to identify the overall property or to geocode specific sites is the use of GPS coordinates, e.g. geotagging of property satellite imagery.</p> <p>GPS geocode data may be recorded as an attribute of the Global Location Number.</p> <p><b>Location provenance trace/terroir analyses</b> e.g. regional soil analysis</p> <p>Soil minerals may be tested and associated with growing regions as a supporting provenance verification.</p> <p><b>Key Data Element examples/guidance:</b></p> <table><tr><th colspan="2">Request for PIC number</th><th colspan="2">Request for GLN</th></tr><tr><td><b>Who</b></td><td>Farm/Grower, Issuing Agency</td><td><b>Who</b></td><td>Farm/Grower, Issuing Agency</td></tr><tr><td><b>What</b></td><td>Property, Address Details</td><td><b>What</b></td><td>Property/Field/Area/Legal entity</td></tr><tr><td><b>When</b></td><td>Date/Time of Registration and Issuance of the PIC</td><td><b>When</b></td><td>Date/Time of issuance of Global Location Number (GLN)</td></tr><tr><td><b>Where</b></td><td>Issuing Agency</td><td><b>Where</b></td><td>Issuing Agency</td></tr><tr><td><b>Why</b></td><td>Registration of property with state agency</td><td><b>Why</b></td><td>Physical Location setup and identification</td></tr></table> <p><b>Information to be shared to a traceability platform :</b></p> <ul style="list-style-type: none"><li>● Property Identification Code (PIC)</li><li>● Global Location Number (GLN)</li><li>● Geocode data — standalone or incorporated into Global Location Number</li><li>● Location analyses/provenance record code</li></ul>				Request for PIC number		Request for GLN		<b>Who</b>	Farm/Grower, Issuing Agency	<b>Who</b>	Farm/Grower, Issuing Agency	<b>What</b>	Property, Address Details	<b>What</b>	Property/Field/Area/Legal entity	<b>When</b>	Date/Time of Registration and Issuance of the PIC	<b>When</b>	Date/Time of issuance of Global Location Number (GLN)	<b>Where</b>	Issuing Agency	<b>Where</b>	Issuing Agency	<b>Why</b>	Registration of property with state agency	<b>Why</b>	Physical Location setup and identification
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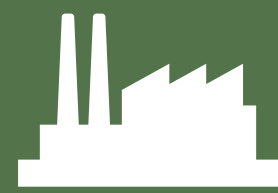
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
OFP CTE3	Registration of facilities	<p><b>Export Registered Establishment Number:</b></p> <p>Where exporting from on-farm packing or processing facilities, the Department of Agriculture, Water &amp; the Environment (DAWE) (Commonwealth) requires export premises to be registered and in some cases, licensed, for export. The purpose of registering an establishment is to ensure that:</p> <ul style="list-style-type: none"><li>the facilities available are fit for the purpose of preparing, handling, storing and/or inspecting product for export</li><li>appropriate hygiene and the necessary measures to produce the goods according to trade description and other requirements applicable to a given commodity are maintained</li><li>the goods comply with importing country requirements.</li></ul> <p><b>The application for registration must include:</b></p> <ul style="list-style-type: none"><li>the name of the occupier (must be a legal entity). An occupier may nominate one or more registered business names to be approved as an alternate trading name. A registered business name is not a legal entity and it is not acceptable as the name of the occupier of an establishment</li><li>the business address of the occupier and the physical location of the premises</li><li>the particulars of proposed export operations to be conducted in the establishment and other operations likely to affect the export operations</li><li>any other information required in the particular case by the relevant Export Control Order.</li></ul> <p>A copy of the certificate of registration must be prominently displayed at the establishment.</p> <p><b>The certificate must contain:</b></p> <ul style="list-style-type: none"><li>the name and address of the occupier</li><li>the ACN and ABN number of the occupier</li><li>the alternate trading names (if applicable) of the occupier</li><li>the number allocated to the export registered establishment</li><li>the limited period for which the establishment is registered (if applicable)</li><li>the export registered operations for the establishment</li><li>the eligible country listing for the establishment which has been registered</li><li>persons who manage and control the registered establishment</li><li>conditions of registration if any.</li></ul> <p><b>Key Data Element examples/guidance:</b></p> <table><tr><th colspan="2">Export Establishment Registration</th></tr><tr><td><b>Who</b></td><td>Farm/Grower Export Establishment Agency (DAWE)</td></tr><tr><td><b>What</b></td><td>Facility/location associated with export supply chain</td></tr><tr><td><b>When</b></td><td>Date/Time of request</td></tr><tr><td><b>Where</b></td><td>Dept of Agriculture, Water &amp; the Environment (Commonwealth)</td></tr><tr><td><b>Why</b></td><td>Export registration Export Registration Establishment Number</td></tr></table>	Export Establishment Registration		<b>Who</b>	Farm/Grower Export Establishment Agency (DAWE)	<b>What</b>	Facility/location associated with export supply chain	<b>When</b>	Date/Time of request	<b>Where</b>	Dept of Agriculture, Water & the Environment (Commonwealth)	<b>Why</b>	Export registration Export Registration Establishment Number
Export Establishment Registration														
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<b>Where</b>	Dept of Agriculture, Water & the Environment (Commonwealth)													
<b>Why</b>	Export registration Export Registration Establishment Number													

CTE code	Critical Tracking Events	Key data Inputs and Outputs
		<p><b>Business Licence and food safety program</b></p> <p>Each state and territory have food safety and business licensing requirements for primary producers in seafood, dairy, meat and meat products, eggs and seed sprouts.</p> <p>For example, in order to conduct commercial production as a dairy, the producer must obtain a licence. To be eligible for this licence to operate a dairy farm and sell dairy product, a producer is required to:</p> <ul style="list-style-type: none"><li>submit a completed licence application form</li><li>nominate an approved Food Safety Program</li><li>pay any required application and licence fees in full</li><li>comply with the Food Standards Code</li><li>possess necessary skills and competencies.</li></ul> <p><b>Identification of on-farm storage facilities</b></p> <p>On-farm post-harvest storage facilities such as silos may be used for short or long-term storage of the product. Linking the product to the unique identification of these storage sites can assist in tracing where a product may have been contaminated, avoiding all storage units needing to be tested.</p> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>Export Registered Establishment Number</li><li>Business Licence Number issued by state agencies</li><li>Global Location Number (GLN) of premises and facilities</li><li>Geocode data — standalone or incorporated into Global Location Number</li></ul>



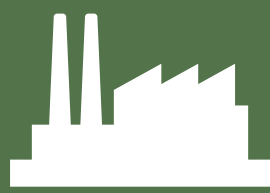
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
OFP CTE4	Property Risk Assessment	<p>A property risk assessment identifies sites where potential for soil or water contamination are located and details how these are being managed.</p> <p>Data elements held in Farm Management System/Farm Records</p> <ul style="list-style-type: none"><li>● Property Risk Assessment - Property Owner ID:<ul style="list-style-type: none"><li>● Producer ID</li><li>● Business/Company ID</li><li>● Property Risk Management Plan (including map identifying risk)</li><li>● Property Risk Training record</li><li>● Property Risks Inspection and Audit date and report</li></ul></li><li>● Property Soil Assessment - Property Owner ID:<ul style="list-style-type: none"><li>● Producer ID</li><li>● Business/Company ID</li><li>● Property Soil Inspection date and report</li></ul></li></ul> <table><tr><th colspan="2">Property Risk assessment</th></tr><tr><td>Who</td><td>Farm/Grower Risk Assessment Agency</td></tr><tr><td>What</td><td>Property/location being assessed</td></tr><tr><td>When</td><td>Date/Time of property risk assessment</td></tr><tr><td>Where</td><td>Property</td></tr><tr><td>Why</td><td>Property Risk Assessment Soil Risk assessment</td></tr></table> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Risk Assessment Document Code</li><li>● Date Risk Assessment completed</li></ul>	Property Risk assessment		Who	Farm/Grower Risk Assessment Agency	What	Property/location being assessed	When	Date/Time of property risk assessment	Where	Property	Why	Property Risk Assessment Soil Risk assessment
Property Risk assessment														
Who	Farm/Grower Risk Assessment Agency													
What	Property/location being assessed													
When	Date/Time of property risk assessment													
Where	Property													
Why	Property Risk Assessment Soil Risk assessment													
OFP CTE5	Property Biosecurity Plan	<p>A biosecurity plan is a document (or range of documents) that outlines all of the biosecurity activities property owners work through to reduce the risks of pest and disease entry or spread.</p> <p>Data elements held in the Property Biosecurity Plan - Property Owner ID:</p> <ul style="list-style-type: none"><li>● Producer ID</li><li>● Business/Company ID</li><li>● Property Biosecurity Inspections and Audit date and report</li><li>● Property Biosecurity Training records</li><li>● Property Biosecurity Certification</li></ul> <p>Key Data Element example/guidance:</p>												

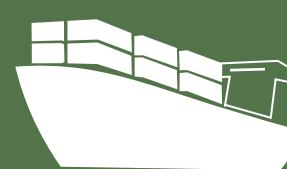
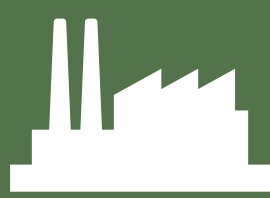
CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<table><tr><th colspan="2">Biosecurity Assessment</th></tr><tr><td>Who</td><td>Grower Biosecurity Assessor</td></tr><tr><td>What</td><td>Property being assessed</td></tr><tr><td>When</td><td>Date/Time of property biosecurity risk assessment</td></tr><tr><td>Where</td><td>Property</td></tr><tr><td>Why</td><td>Farm Biosecurity Assurance</td></tr></table> <p>Key Data Elements to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Farm Biosecurity Plan document code</li><li>● Date Biosecurity Report completed</li></ul>	Biosecurity Assessment		Who	Grower Biosecurity Assessor	What	Property being assessed	When	Date/Time of property biosecurity risk assessment	Where	Property	Why	Farm Biosecurity Assurance
Biosecurity Assessment														
Who	Grower Biosecurity Assessor													
What	Property being assessed													
When	Date/Time of property biosecurity risk assessment													
Where	Property													
Why	Farm Biosecurity Assurance													
OFP CTE6	Food Safety Plan	For farms that store or undertake on-farm processing e.g. grain, dairies, eggs, sprouts, seafood, game there is a need to prepare a Food Safety Plan and institute a Food Safety Program which is regularly audited by state and local government agencies.												
OFP CTE7.1 OFP CTE7.2	Farm Inputs Water receipt Water application	<p>Farm water has a number of sources — irrigation supplied through an irrigation scheme entity; dams; surface water in streams and rivers; water transported into the production site; underground water accessed through bores and general rainfall absorption. Water license holders are required to record water usage.</p> <p>Data elements held on farm management systems/farm water records:</p> <ul style="list-style-type: none"><li>● Water received</li><li>● Water source e.g. rainfall records — date and mms</li><li>● Date received and applied</li></ul> <p>Water applied:</p> <ul style="list-style-type: none"><li>● Amount used — mm/hectare</li><li>● Area watered — hectares</li><li>● Total water consumption — megalitres</li></ul> <p>Key Data Element example/guidance:</p> <table><tr><th colspan="2">Water receipt</th></tr><tr><td>Who</td><td>Supplier of Water Farm/Grower</td></tr><tr><td>What</td><td>Water</td></tr><tr><td>When</td><td>Date/Time of delivery</td></tr><tr><td>Where</td><td>Specific Receipt location</td></tr><tr><td>Why</td><td>Receipt of water References: Farm PO number, Supplier Delivery Note</td></tr></table>	Water receipt		Who	Supplier of Water Farm/Grower	What	Water	When	Date/Time of delivery	Where	Specific Receipt location	Why	Receipt of water References: Farm PO number, Supplier Delivery Note
Water receipt														
Who	Supplier of Water Farm/Grower													
What	Water													
When	Date/Time of delivery													
Where	Specific Receipt location													
Why	Receipt of water References: Farm PO number, Supplier Delivery Note													





CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<table><tr><th colspan="2">Water application</th></tr><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Water consumed, quantity</td></tr><tr><td>When</td><td>Date/Time of water application</td></tr><tr><td>Where</td><td>Property/location where water applied</td></tr><tr><td>Why</td><td>Consumption of water References: Consumption record number</td></tr></table> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Water receipt date, quantity, supplier ID</li><li>● Water consumption per hectare — annual</li></ul>	Water application		Who	Farm/Grower	What	Water consumed, quantity	When	Date/Time of water application	Where	Property/location where water applied	Why	Consumption of water References: Consumption record number
Water application														
Who	Farm/Grower													
What	Water consumed, quantity													
When	Date/Time of water application													
Where	Property/location where water applied													
Why	Consumption of water References: Consumption record number													
OFP CT8.1	Farm inputs  Fertiliser receipt	Fertiliser records  Fertiliser receipt <ul style="list-style-type: none"><li>● date received</li><li>● supplier ID</li><li>● product ID</li><li>● batch #</li><li>● expiry date</li></ul>												
OFP CTE8.2	Fertiliser application	Fertiliser application: <ul style="list-style-type: none"><li>● application date</li><li>● purpose and application rate</li></ul> <p>Key Data Element examples/guidance:</p> <table><tr><th colspan="2">Fertiliser receipt</th></tr><tr><td>Who</td><td>Supplier of Fertiliser Farm/Grower</td></tr><tr><td>What</td><td>Fertiliser – Product ID, Batch, Production date, quantity received</td></tr><tr><td>When</td><td>Date/Time of fertiliser receipt</td></tr><tr><td>Where</td><td>Specific Receipt location</td></tr><tr><td>Why</td><td>Receipt Goods References: Farm PO number, Supplier Delivery Note</td></tr></table>	Fertiliser receipt		Who	Supplier of Fertiliser Farm/Grower	What	Fertiliser – Product ID, Batch, Production date, quantity received	When	Date/Time of fertiliser receipt	Where	Specific Receipt location	Why	Receipt Goods References: Farm PO number, Supplier Delivery Note
Fertiliser receipt														
Who	Supplier of Fertiliser Farm/Grower													
What	Fertiliser – Product ID, Batch, Production date, quantity received													
When	Date/Time of fertiliser receipt													
Where	Specific Receipt location													
Why	Receipt Goods References: Farm PO number, Supplier Delivery Note													

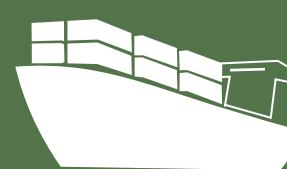
CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<table><tr><th colspan="2">Fertiliser application</th></tr><tr><td>Who</td><td>Farm/Grower Fertiliser applicator (if outsourced)</td></tr><tr><td>What</td><td>Fertiliser – Product ID, Batch, Production date, quantity used, other</td></tr><tr><td>When</td><td>Date/Time of fertiliser usage</td></tr><tr><td>Where</td><td>Property/Field where fertiliser applied</td></tr><tr><td>Why</td><td>Application of Fertiliser Usage record number/farm ID record/spray diary</td></tr></table> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>Fertiliser ID, Batch Number, Receipt Date, qty, supplier Fertiliser ID, Batch Number, Usage data, qty</li></ul>	Fertiliser application		Who	Farm/Grower Fertiliser applicator (if outsourced)	What	Fertiliser – Product ID, Batch, Production date, quantity used, other	When	Date/Time of fertiliser usage	Where	Property/Field where fertiliser applied	Why	Application of Fertiliser Usage record number/farm ID record/spray diary
Fertiliser application														
Who	Farm/Grower Fertiliser applicator (if outsourced)													
What	Fertiliser – Product ID, Batch, Production date, quantity used, other													
When	Date/Time of fertiliser usage													
Where	Property/Field where fertiliser applied													
Why	Application of Fertiliser Usage record number/farm ID record/spray diary													
OFF CTE9.1	Farm inputs  Chemical receipt	<p>By law, a person who uses an agricultural or veterinary chemical product must ensure that their chemical use is recorded.</p> <p>Data elements held in farm management systems/farm records:</p> <ul style="list-style-type: none"><li>Date received</li><li>Supplier ID containing company name, contact and location</li><li>Product ID</li><li>Batch and lot #</li><li>Expiry date</li></ul>												
OFF CTE9.2	Chemical application	<ul style="list-style-type: none"><li>Date of applications</li><li>Application rate</li><li>Withholding period commencement and completion dates</li></ul> <p>Key Data Element examples/guidance:</p> <table><tr><th colspan="2">Chemical receipt</th></tr><tr><td>Who</td><td>Supplier of Chemicals Farm/Grower</td></tr><tr><td>What</td><td>Chemical – Product Identifier, Batch number, Serial Number (if applicable) Production Date, quantity delivered</td></tr><tr><td>When</td><td>Date/Time of delivery</td></tr><tr><td>Where</td><td>Specific Receipt location</td></tr><tr><td>Why</td><td>Receipt Goods References: Farm PO number, Supplier Delivery Note,</td></tr></table>	Chemical receipt		Who	Supplier of Chemicals Farm/Grower	What	Chemical – Product Identifier, Batch number, Serial Number (if applicable) Production Date, quantity delivered	When	Date/Time of delivery	Where	Specific Receipt location	Why	Receipt Goods References: Farm PO number, Supplier Delivery Note,
Chemical receipt														
Who	Supplier of Chemicals Farm/Grower													
What	Chemical – Product Identifier, Batch number, Serial Number (if applicable) Production Date, quantity delivered													
When	Date/Time of delivery													
Where	Specific Receipt location													
Why	Receipt Goods References: Farm PO number, Supplier Delivery Note,													





CTE code	Critical Tracking Events	Key data Inputs and Outputs												
OFP CTE9.3	Feed records	<table><tr><th colspan="2">Chemical application</th></tr><tr><td>Who</td><td>Farm/Grower If applied to specific animal, then Animal Identification</td></tr><tr><td>What</td><td>Chemical – Product Identifier, Batch number, Serial number (if applicable) Production Date, quantity used</td></tr><tr><td>When</td><td>Date/Time of chemical usage</td></tr><tr><td>Where</td><td>Property/Location where chemical used</td></tr><tr><td>Why</td><td>Chemical usage Transaction records</td></tr></table> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Chemicals received, batch, qty, supplier</li><li>● Farm chemicals application record document code</li><li>● Veterinary chemicals application record document code</li></ul>	Chemical application		Who	Farm/Grower If applied to specific animal, then Animal Identification	What	Chemical – Product Identifier, Batch number, Serial number (if applicable) Production Date, quantity used	When	Date/Time of chemical usage	Where	Property/Location where chemical used	Why	Chemical usage Transaction records
Chemical application														
Who	Farm/Grower If applied to specific animal, then Animal Identification													
What	Chemical – Product Identifier, Batch number, Serial number (if applicable) Production Date, quantity used													
When	Date/Time of chemical usage													
Where	Property/Location where chemical used													
Why	Chemical usage Transaction records													
OFP CTE10.1	Product sowing, planting, birth, stocking  Seed, fingerling, plant, animal receipt	<ul style="list-style-type: none"><li>● Supplier ID and location</li><li>● Batch, lot or item level ID</li><li>● Quantity and variety/breed</li><li>● Animal Health Declaration</li><li>● Date of arrival/receipt</li></ul> <p>Unique identification code (e.g. NLIS tag number; Floy tags; plant tag number; seed batch number; ear notch, slap brand tattoo number, internal microchip transponder device, VIA tags, natural markings)</p>												
OFP CTE10.2	Unique identification of animal/plant or punnet/tray of plants	<ul style="list-style-type: none"><li>● Seed batch # plus unique identifier-</li><li>● Commodity name/AHECC code</li><li>● Date/time of sowing or birth</li><li>● Variety/breed</li><li>● Sex</li><li>● Quantity</li><li>● Seed/fingerling batch number</li></ul> <table><tr><th colspan="2">Planting/sowing/birthing</th></tr><tr><td>Who</td><td>Farm/Grower Contract Labour</td></tr><tr><td>What</td><td>Product planted, batch number, quantity</td></tr><tr><td>When</td><td>Date/Time of plantation</td></tr><tr><td>Where</td><td>Planting location</td></tr><tr><td>Why</td><td>Planting/Sowing References: Farm Records, labour records</td></tr></table> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Product unique identification code</li><li>● Product batch number, quantity, planting date</li></ul>	Planting/sowing/birthing		Who	Farm/Grower Contract Labour	What	Product planted, batch number, quantity	When	Date/Time of plantation	Where	Planting location	Why	Planting/Sowing References: Farm Records, labour records
Planting/sowing/birthing														
Who	Farm/Grower Contract Labour													
What	Product planted, batch number, quantity													
When	Date/Time of plantation													
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Why	Planting/Sowing References: Farm Records, labour records													

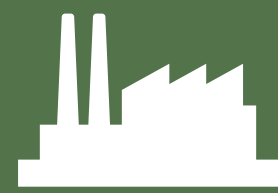
CTE code	Critical Tracking Events	Key data Inputs and Outputs												
OFP CTE11.1	Growth period													
	Tests and growth monitoring	<table><tr><th colspan="2">Monitoring Growth</th></tr><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Product planted, batch number, quantity, weight</td></tr><tr><td>When</td><td>Date/Time of observation</td></tr><tr><td>Where</td><td>Location</td></tr><tr><td>Why</td><td>Observation/Monitoring growth References: Farm Records</td></tr></table> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Testing Date, Test record number, type of test conducted</li><li>● Observation data e.g. temperature, water quality, weight and size</li></ul>	Monitoring Growth		Who	Farm/Grower	What	Product planted, batch number, quantity, weight	When	Date/Time of observation	Where	Location	Why	Observation/Monitoring growth References: Farm Records
Monitoring Growth														
Who	Farm/Grower													
What	Product planted, batch number, quantity, weight													
When	Date/Time of observation													
Where	Location													
Why	Observation/Monitoring growth References: Farm Records													
OFP CTE11.2	Equipment cleaning and maintenance	<p>Mandatory requirement to record substances used in cleaning equipment Cleaning and sanitising programs should encompass transport equipment used in the field or packing house and between the field and packing house; containers or bins used for transfer or storage of fruit at any stage of the operations; the packing shed, including floors, walls, drains, door and window screens; cool rooms and storage rooms; air conditioning units; staff facilities (toilets, lunch rooms, etc); packing lines including bin tippers, conveyors, tanks and water flumes, dryers, grading belts/cups/chutes; storage areas.</p>												
OFP CTE11.3	Feed	<table><tr><th colspan="2">Equipment Cleaning/Maintenance</th></tr><tr><td>Who</td><td>Farm/Grower Contractor</td></tr><tr><td>What</td><td>Equipment ID, cleaning agents used, batch number, qty</td></tr><tr><td>When</td><td>Date/Time cleaning/maintenance</td></tr><tr><td>Where</td><td>Equipment Location</td></tr><tr><td>Why</td><td>Equipment Maintenance/Cleaning References: Farm Records, log book</td></tr></table> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Cleaning date, chemical used, batch and quantity</li></ul> <p>Farm records will contain records of introduced feed for animals and plants e.g. hay, feed pellets, grain, compost</p> <ul style="list-style-type: none"><li>● Location of on-farm storage</li><li>● Feed type and quantity</li><li>● Date of receipt</li><li>● Amount fed x product ID</li></ul> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Feed records available/record code</li></ul>	Equipment Cleaning/Maintenance		Who	Farm/Grower Contractor	What	Equipment ID, cleaning agents used, batch number, qty	When	Date/Time cleaning/maintenance	Where	Equipment Location	Why	Equipment Maintenance/Cleaning References: Farm Records, log book
	Equipment Cleaning/Maintenance													
Who	Farm/Grower Contractor													
What	Equipment ID, cleaning agents used, batch number, qty													
When	Date/Time cleaning/maintenance													
Where	Equipment Location													
Why	Equipment Maintenance/Cleaning References: Farm Records, log book													





CTE code	Critical Tracking Events	Key data Inputs and Outputs										
OFP CTE12	Product selected/harvest	<div>Harvest:<ul style="list-style-type: none"><li>● Harvest date and time</li><li>● Grow site ID</li><li>● Product ID/Tag</li><li>● Product commodity name and variety</li><li>● Product yield quantity/weight</li><li>● Harvest crew name and ID number</li></ul></div> <div><div>Harvesting</div><table><tr><td>Who</td><td>Farm/Grower Harvester/picker/contract labour</td></tr><tr><td>What</td><td>Product harvested, batch number, quantity</td></tr><tr><td>When</td><td>Date/Time of harvest</td></tr><tr><td>Where</td><td>Harvest location</td></tr><tr><td>Why</td><td>Harvesting References: Farm records contract labour IDs/visa status</td></tr></table></div> <div>Key data elements to be shared to a traceability platform:<ul style="list-style-type: none"><li>● Harvest date</li><li>● Product ID, Batch, Quantity, location</li></ul></div>	Who	Farm/Grower Harvester/picker/contract labour	What	Product harvested, batch number, quantity	When	Date/Time of harvest	Where	Harvest location	Why	Harvesting References: Farm records contract labour IDs/visa status
Who	Farm/Grower Harvester/picker/contract labour											
What	Product harvested, batch number, quantity											
When	Date/Time of harvest											
Where	Harvest location											
Why	Harvesting References: Farm records contract labour IDs/visa status											
OFP CTE13.1	Post-harvest handling Product inspection, grading	<div>For product inspection/grading on-farm/in-field/on vessel:<ul style="list-style-type: none"><li>● Tray/tub ID</li><li>● Pallet ID</li><li>● Product ID</li><li>● Quality grading per batch</li><li>● Weight and count</li></ul></div>										
OFP CTE13.2	Product washing	<div>Farm and pack house records:<ul style="list-style-type: none"><li>● Water source and treatment regime</li><li>● Chemicals and sanitisers used in wash</li><li>● Chemical supplier ID and location</li><li>● Chemical application rate</li><li>● Water test results</li><li>● Product packaging — date of receival; lot number</li></ul></div> <div><div>Packing</div><table><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Product planted, batch number, quantity</td></tr><tr><td>When</td><td>Date/Time of packing</td></tr><tr><td>Where</td><td>Inspection/sorting location</td></tr><tr><td>Why</td><td>Inspection and grading</td></tr></table></div> <div>Key data elements to be shared to a traceability platform:<ul style="list-style-type: none"><li>● Harvest date</li><li>● Product ID, Batch, Quantity, location</li></ul></div>	Who	Farm/Grower	What	Product planted, batch number, quantity	When	Date/Time of packing	Where	Inspection/sorting location	Why	Inspection and grading
Who	Farm/Grower											
What	Product planted, batch number, quantity											
When	Date/Time of packing											
Where	Inspection/sorting location											
Why	Inspection and grading											

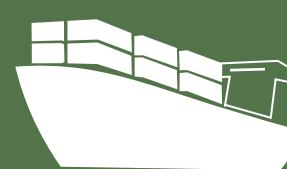
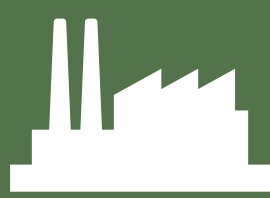
CTE code	Critical Tracking Events	Key data Inputs and Outputs										
OFP CTE13.3	Post-harvest handling											
	Product Packed and labelled	<div>Where product is packed on-farm:</div> <div><div><div>● date packed</div><div>● Lot #</div><div>● Farm ID</div></div><div><div>● premises licence #</div><div>● country of origin</div><div>● weight and count</div></div></div> <div><div>Packing</div><table><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Product packed, batch number, quantity</td></tr><tr><td>When</td><td>Date/Time of packing</td></tr><tr><td>Where</td><td>Planting location</td></tr><tr><td>Why</td><td>Packing References: Supplier Delivery Note, Pallet ID</td></tr></table></div> <div>Key data elements to be shared to a traceability platform :</div> <div><div>● Product label if packed on-farm</div><div>● Pallet ID</div><div>● Product QR code — product consumer information</div><div>● Link to farm business website/test certificates/provenance verification</div></div>	Who	Farm/Grower	What	Product packed, batch number, quantity	When	Date/Time of packing	Where	Planting location	Why	Packing References: Supplier Delivery Note, Pallet ID
	Who	Farm/Grower										
What	Product packed, batch number, quantity											
When	Date/Time of packing											
Where	Planting location											
Why	Packing References: Supplier Delivery Note, Pallet ID											
OFP CTE14.1	On-farm storage											
	Site of on-farm storage	<div><div>● On-farm storage site location ID – (also see OFP CTE2)</div><div>● Inventory location in storage</div><div>● Record of pest management, fumigation used</div></div>										
	Product received at on-farm storage	<div><div>● Time and date stamp on product arrival at storage</div><div>● Product ID – tag #; lot #</div><div>● Product Variety</div><div>● Product Quantity received e.g. weight, units</div></div>										
OFP CTE14.3	Inventory and facility monitoring	<div><div>● As required:</div><div><div>● Temperature Records</div><div>● Humidity Records</div><div>● Product sample results</div><div>● Product salvage</div></div></div>										





CTE code	Critical Tracking Events	Key data Inputs and Outputs										
		<div>Move product to storage</div> <table><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Product packed, batch number, quantity, pallet ID</td></tr><tr><td>When</td><td>Date/Time of movement to storage</td></tr><tr><td>Where</td><td>Storage location</td></tr><tr><td>Why</td><td>Packing References: Farm Work Order number, Pallet ID</td></tr></table>	Who	Farm/Grower	What	Product packed, batch number, quantity, pallet ID	When	Date/Time of movement to storage	Where	Storage location	Why	Packing References: Farm Work Order number, Pallet ID
		Who	Farm/Grower									
		What	Product packed, batch number, quantity, pallet ID									
		When	Date/Time of movement to storage									
		Where	Storage location									
		Why	Packing References: Farm Work Order number, Pallet ID									
		<div>Receipt into/dispatch from on-site storage</div> <table><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Product packed, batch number, pallet ID, weight, count</td></tr><tr><td>When</td><td>Date/Time of storage</td></tr><tr><td>Where</td><td>Storage location</td></tr><tr><td>Why</td><td>Receipt Goods to storage location References: Farm Purchase Order number, Supplier Delivery Note, Pallet ID</td></tr></table>	Who	Farm/Grower	What	Product packed, batch number, pallet ID, weight, count	When	Date/Time of storage	Where	Storage location	Why	Receipt Goods to storage location References: Farm Purchase Order number, Supplier Delivery Note, Pallet ID
		Who	Farm/Grower									
		What	Product packed, batch number, pallet ID, weight, count									
		When	Date/Time of storage									
		Where	Storage location									
		Why	Receipt Goods to storage location References: Farm Purchase Order number, Supplier Delivery Note, Pallet ID									
		<div>Monitoring product inventory</div> <table><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Product packed, batch number, pallet ID, qty</td></tr><tr><td>When</td><td>Date/Time of observation</td></tr><tr><td>Where</td><td>Storage location</td></tr><tr><td>Why</td><td>Observation event (temp, humidity, testing) References:</td></tr></table>	Who	Farm/Grower	What	Product packed, batch number, pallet ID, qty	When	Date/Time of observation	Where	Storage location	Why	Observation event (temp, humidity, testing) References:
		Who	Farm/Grower									
		What	Product packed, batch number, pallet ID, qty									
		When	Date/Time of observation									
		Where	Storage location									
		Why	Observation event (temp, humidity, testing) References:									
		Key data elements to be shared to a traceability platform:										
		<ul style="list-style-type: none"><li>● On-farm storage site location ID</li><li>● Time and date stamp on product arrival/dispatch at storage</li><li>● Outbound shipment date and time stamp</li><li>● Product ID - tag #; lot #</li><li>● Product Variety</li><li>● Product Quantity received e.g. weight, units</li></ul>										

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
OFP CTE15.1	Product end-of-life													
	Waste/by-product removal	<ul style="list-style-type: none"><li>● Off-farm disposal carrier ID</li><li>● waste facility receival ID</li><li>● time and date of product leaving the farm</li><li>● time and date of product received at waste facility — product ID and quantity</li></ul> <table><tr><th colspan="2">Product Disposal</th></tr><tr><td>Who</td><td>Farm/Grower Disposal Company Receiving Company</td></tr><tr><td>What</td><td>Product disposed, batch number, quantity</td></tr><tr><td>When</td><td>Date/Time of disposal</td></tr><tr><td>Where</td><td>Location</td></tr><tr><td>Why</td><td>Disposal References: Off-farm disposal carrier ID Receiving ID</td></tr></table> <p>Key data elements to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Off-farm disposal carrier ID</li><li>● waste facility receival ID</li><li>● time and date of product leaving the farm</li><li>● time and date of product received at waste facility</li><li>● product ID and quantity</li></ul>	Product Disposal		Who	Farm/Grower Disposal Company Receiving Company	What	Product disposed, batch number, quantity	When	Date/Time of disposal	Where	Location	Why	Disposal References: Off-farm disposal carrier ID Receiving ID
Product Disposal														
Who	Farm/Grower Disposal Company Receiving Company													
What	Product disposed, batch number, quantity													
When	Date/Time of disposal													
Where	Location													
Why	Disposal References: Off-farm disposal carrier ID Receiving ID													
OFP CTE15.2	Animal disposal — identification and notification	<p>On-farm disposal recorded e.g. removal and voiding of ID tag</p> <p>Key data elements to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Animal ID e.g. NLIS tag number</li><li>● Property PIC number</li><li>● Date of death/disposal</li></ul> <table><tr><th colspan="2">Animal Disposal</th></tr><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Animal disposed ID (NLIS), quantity, serial number</td></tr><tr><td>When</td><td>Date/Time of disposal</td></tr><tr><td>Where</td><td>Location</td></tr><tr><td>Why</td><td>Disposal References: Disposal Permit Number, waybill number, PIC</td></tr></table>	Animal Disposal		Who	Farm/Grower	What	Animal disposed ID (NLIS), quantity, serial number	When	Date/Time of disposal	Where	Location	Why	Disposal References: Disposal Permit Number, waybill number, PIC
Animal Disposal														
Who	Farm/Grower													
What	Animal disposed ID (NLIS), quantity, serial number													
When	Date/Time of disposal													
Where	Location													
Why	Disposal References: Disposal Permit Number, waybill number, PIC													





CTE code	Critical Tracking Events	Key data Inputs and Outputs
		<p><b>Off-farm disposal</b></p> <p>A national vendor declaration and waybill (NVD/eNVD), a transported stock statement (TSS), or a permit issued by an inspector is required. The vendor must as a minimum provide the following information on the NVD or TSS:</p> <ul style="list-style-type: none"><li>Property identification code (PIC) of the property where the journey commenced. This is pre-printed on the NVD and should be written on a TSS.</li><li>Number and description (breed, sex, type) of the stock.</li><li>Date of movement</li><li>Knackeries must report dead animals within 7 days of disposal.</li></ul> <p><b>Key data elements to be shared to a traceability platform:</b></p> <ul style="list-style-type: none"><li>Animal ID e.g. tag number</li><li>Property PIC number</li><li>Date of death/disposal</li></ul>
OFP CTE16	<p>Preparation for product dispatch from the property</p> <p>Inspection and clearance by authorised officer</p>	<p><b>Biosecurity</b></p> <p>For plants being exported direct from the farm, an inspection will need to be booked. <a href="https://www.agriculture.gov.au/export/controlled-goods/plants-plant-products/ao/request-for-plant-exports-inspection-appointment">https://www.agriculture.gov.au/export/controlled-goods/plants-plant-products/ao/request-for-plant-exports-inspection-appointment</a></p> <p><b>For plant products being moved interstate:</b></p> <ul style="list-style-type: none"><li>Plant quarantine entry conditions apply to the movement of plant goods, including fruit, vegetables, nursery stock, flowers, plants, and seeds. You can either get a government inspector to certify that your goods to be moved within or across state or territory borders meet specified quarantine conditions. To do this, contact your local state or territory quarantine regulator.</li><li>Alternatively, you can accredit your business under the Interstate Certification Assurance (ICA) Scheme to certify that your goods to be moved within or across state or territory borders meet specified quarantine conditions.</li><li>Some industry certification schemes cover specific commodities e.g. nursery products</li></ul> <p><b>For restricted plant goods moving across state borders-</b></p> <ul style="list-style-type: none"><li>Plant Health Certificate</li><li>Plant Health Assurance Certificate</li><li>Biosecure HACCP Biosecurity Certificate</li><li>Click here to go to the Certification page.</li><li>Click here to go to the Industry Certification Schemes page. <a href="https://www.interstatequarantine.org.au/producers/interstate-certification-assurance/">https://www.interstatequarantine.org.au/producers/interstate-certification-assurance/</a></li></ul> <p><b>Animal health and welfare</b></p> <p>Before animals leave the farm, an inspection should be completed in accordance with the National Cattle Health Declaration; PigPass NVD; LPA Preparation for Dispatch of Livestock; Fit to Load assessment: <a href="https://www.integritysystems.com.au/on-farm-assurance/preparation-for-dispatch-of-livestock/">https://www.integritysystems.com.au/on-farm-assurance/preparation-for-dispatch-of-livestock/</a> <a href="https://publications.mla.com.au/login/GetDocViewer/11-11287.pdf">https://publications.mla.com.au/login/GetDocViewer/11-11287.pdf</a></p>

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<p><b>Food safety</b></p> <p>The FSANZ Food Safety Code sets a standard for all primary producers to maintain traceability systems and to produce food that is safe for consumption. The food Standards Code is enforced by state and territory agencies. <a href="https://www.foodstandards.gov.au/foodsafety/standards/Pages/Primary-Production-and-Processing-(PPP)-Standards-(Chapter-4).aspx">https://www.foodstandards.gov.au/foodsafety/standards/Pages/Primary-Production-and-Processing-(PPP)-Standards-(Chapter-4).aspx</a></p> <table><tr><th colspan="2">Inspection and clearance</th></tr><tr><td>Who</td><td>Farm/Grower Biosecurity agency/quarantine regulator</td></tr><tr><td>What</td><td>Product to be inspected, batch number, serial number, quantity</td></tr><tr><td>When</td><td>Date/Time of assessment</td></tr><tr><td>Where</td><td>Storage location</td></tr><tr><td>Why</td><td>Biosecurity assessment Animal Health Assessment Food Safety Assessment References: Inspection certificate number, Animal Health Declaration number, e-National vendor declaration number</td></tr></table> <p>Key data elements to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Inspection certificate # for the consignment</li><li>● Animal Health Declaration Number</li><li>● e-National Vendor Declaration number</li></ul>	Inspection and clearance		Who	Farm/Grower Biosecurity agency/quarantine regulator	What	Product to be inspected, batch number, serial number, quantity	When	Date/Time of assessment	Where	Storage location	Why	Biosecurity assessment Animal Health Assessment Food Safety Assessment References: Inspection certificate number, Animal Health Declaration number, e-National vendor declaration number
Inspection and clearance														
Who	Farm/Grower Biosecurity agency/quarantine regulator													
What	Product to be inspected, batch number, serial number, quantity													
When	Date/Time of assessment													
Where	Storage location													
Why	Biosecurity assessment Animal Health Assessment Food Safety Assessment References: Inspection certificate number, Animal Health Declaration number, e-National vendor declaration number													
OFP CTE17	Prepare shipping documentation	<p>For Commodity Vendor Declaration e.g. grains, hay:</p> <ul style="list-style-type: none"><li>● Variety</li><li>● Chemical treatment</li><li>● Residue status</li><li>● Genetic modification status</li></ul> <p>For electronic National Vendor Declaration and Waybill</p> <p><a href="https://www.integritysystems.com.au/on-farm-assurance/national-vendor-declaration-nvd/nvd-0720-changes/">https://www.integritysystems.com.au/on-farm-assurance/national-vendor-declaration-nvd/nvd-0720-changes/</a></p> <ul style="list-style-type: none"><li>● Owner name</li><li>● Owner address</li><li>● Property PIC</li><li>● Destination PIC</li><li>● NLIS tag #s of consigned animals</li></ul> <p>Buyers will ask for a National Animal Health Declaration to accompany the National Vendor Declaration and Waybill.</p> <p><a href="https://www.farmbiosecurity.com.au/toolkit/declarations-and-statements/">https://www.farmbiosecurity.com.au/toolkit/declarations-and-statements/</a></p> <ul style="list-style-type: none"><li>● PIC from which animal is moving</li><li>● E-NVD and Waybill # for the consignment</li><li>● Number of animals in the consignment</li><li>● Name of person completing the declaration</li><li>● Date of completing the declaration</li></ul>												



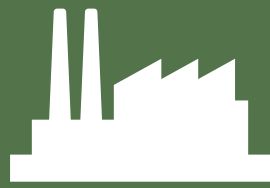
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CTE code	Critical Tracking Events	Key data Inputs and Outputs										
		<div><div>Advance Shipping Notice (ASN)</div><div>Some fresh product is sent direct to retail from the farm. The ASN contains a full record of all relevant details of the consignment including products, quantities and SSCC numbers attached to the load. ASNs are typically sent from a supplier to a retailer (who use the ASN to expedite receipt) but can also be used at other points of the chain e.g. between two of a supplier’s facilities, or between a distribution centre or retail outlet.</div><div>Consignment note</div><div>For producers who may ship direct to consumers a consignment note instructs the transport company on the pickup and delivery details and the items contained in the delivery.</div><div><ul style="list-style-type: none"><li>● Consignor ID</li><li>● Consignee ID</li><li>● Consignee address</li><li>● Item quantity, transport unit (carton, pallet) mass, weight.</li></ul></div><div><div>Delivery creation</div><table><tr><td>Who</td><td>Farm/Grower</td></tr><tr><td>What</td><td>Product, batch number, serial number, quantity, PO number</td></tr><tr><td>When</td><td>Date/Time of delivery creation</td></tr><tr><td>Where</td><td>Dispatch location</td></tr><tr><td>Why</td><td>Delivery preparation References: Order Number, Picking slips, farm records</td></tr></table></div><div>Key data elements to be shared to a traceability platform</div><div><ul style="list-style-type: none"><li>● Sale e-invoice #</li><li>● Advance Shipping Notice #</li><li>● Signed consignment note #</li><li>● e-NVD # or CVD #</li><li>● Sanitary and Phytosanitary certificates (exports)</li><li>● National Animal Health Declaration #</li></ul></div></div>	Who	Farm/Grower	What	Product, batch number, serial number, quantity, PO number	When	Date/Time of delivery creation	Where	Dispatch location	Why	Delivery preparation References: Order Number, Picking slips, farm records
Who	Farm/Grower											
What	Product, batch number, serial number, quantity, PO number											
When	Date/Time of delivery creation											
Where	Dispatch location											
Why	Delivery preparation References: Order Number, Picking slips, farm records											
OFF CTE18	Product Dispatched	<div><div>Product leaves the farm/vessel</div><div><div>Product dispatch</div><table><tr><td>Who</td><td>Farm/Grower Transport Company</td></tr><tr><td>What</td><td>Product dispatched, batch number, serial number, quantity, pallet ID’s Consignment note number, packing number</td></tr><tr><td>When</td><td>Date/Time of dispatch</td></tr><tr><td>Where</td><td>Dispatch location</td></tr><tr><td>Why</td><td>Dispatch Reference: Consignment Number, Bill of Lading</td></tr></table></div></div>	Who	Farm/Grower Transport Company	What	Product dispatched, batch number, serial number, quantity, pallet ID’s Consignment note number, packing number	When	Date/Time of dispatch	Where	Dispatch location	Why	Dispatch Reference: Consignment Number, Bill of Lading
Who	Farm/Grower Transport Company											
What	Product dispatched, batch number, serial number, quantity, pallet ID’s Consignment note number, packing number											
When	Date/Time of dispatch											
Where	Dispatch location											
Why	Dispatch Reference: Consignment Number, Bill of Lading											



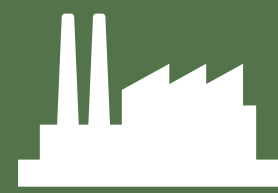
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## Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

### Foundational Elements

#### Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred. GLNs supplement Property Identification Codes (PICs) and are recognised globally in supply chain identification.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a store location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location in the world.



#### Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product’s packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

#### Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.



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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/Format	Further information
Location	Farm location, Field location	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Date of registration, Date of planting, Date of harvest Date of processing	Year-Month-Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Input materials such as Chemicals, Fertilisers, Seeds Outputs such as harvested grains, fruits, vegetables Animal	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li>• <a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li>• <a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch, Serial Number, Production Date		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number etc. can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers: <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)</a>
Logistics Units	Shipment of Grain, Pallet of fertiliser	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>



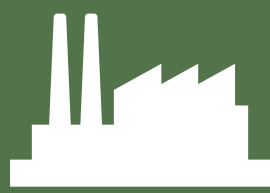
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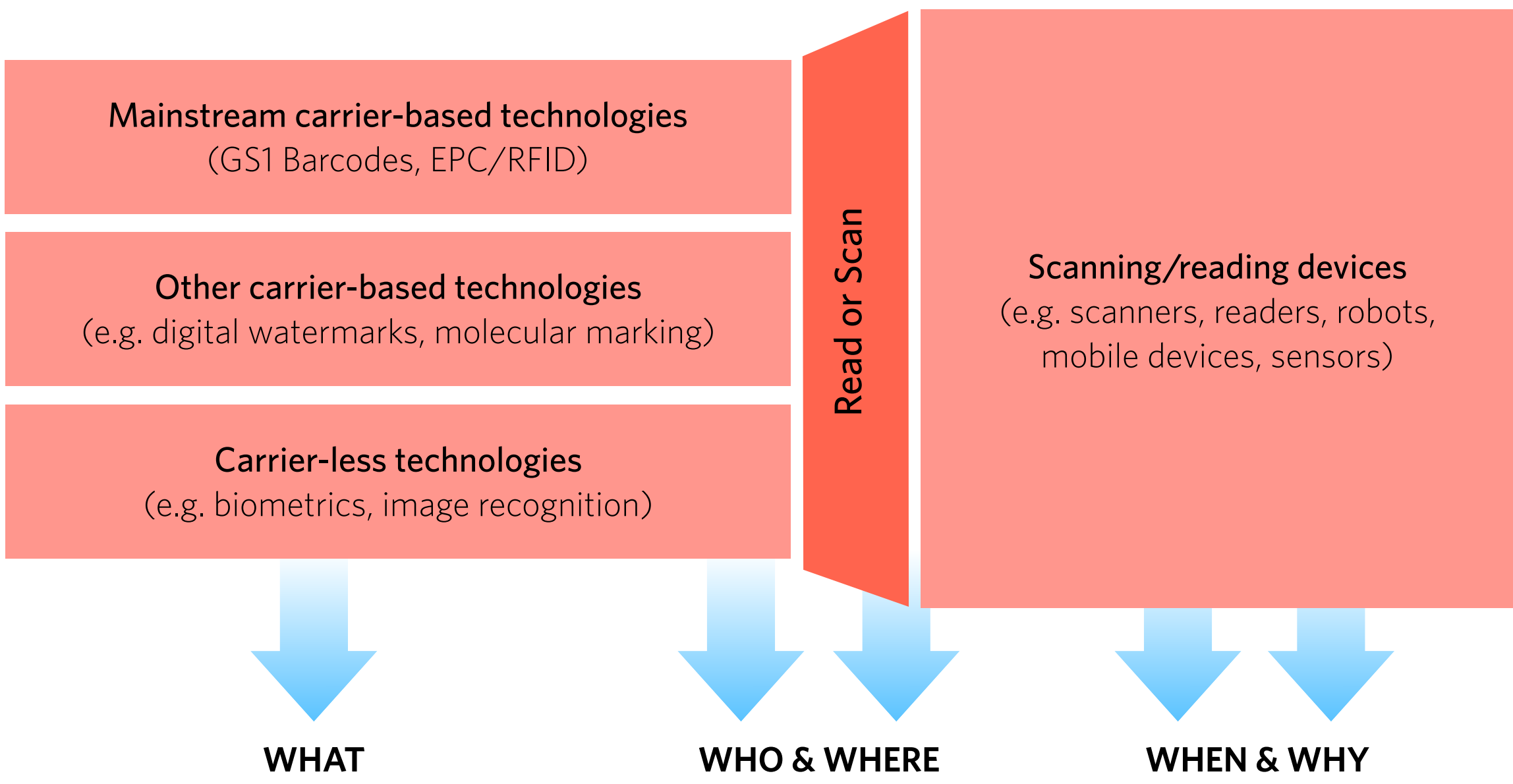
How to capture the KDEs

How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

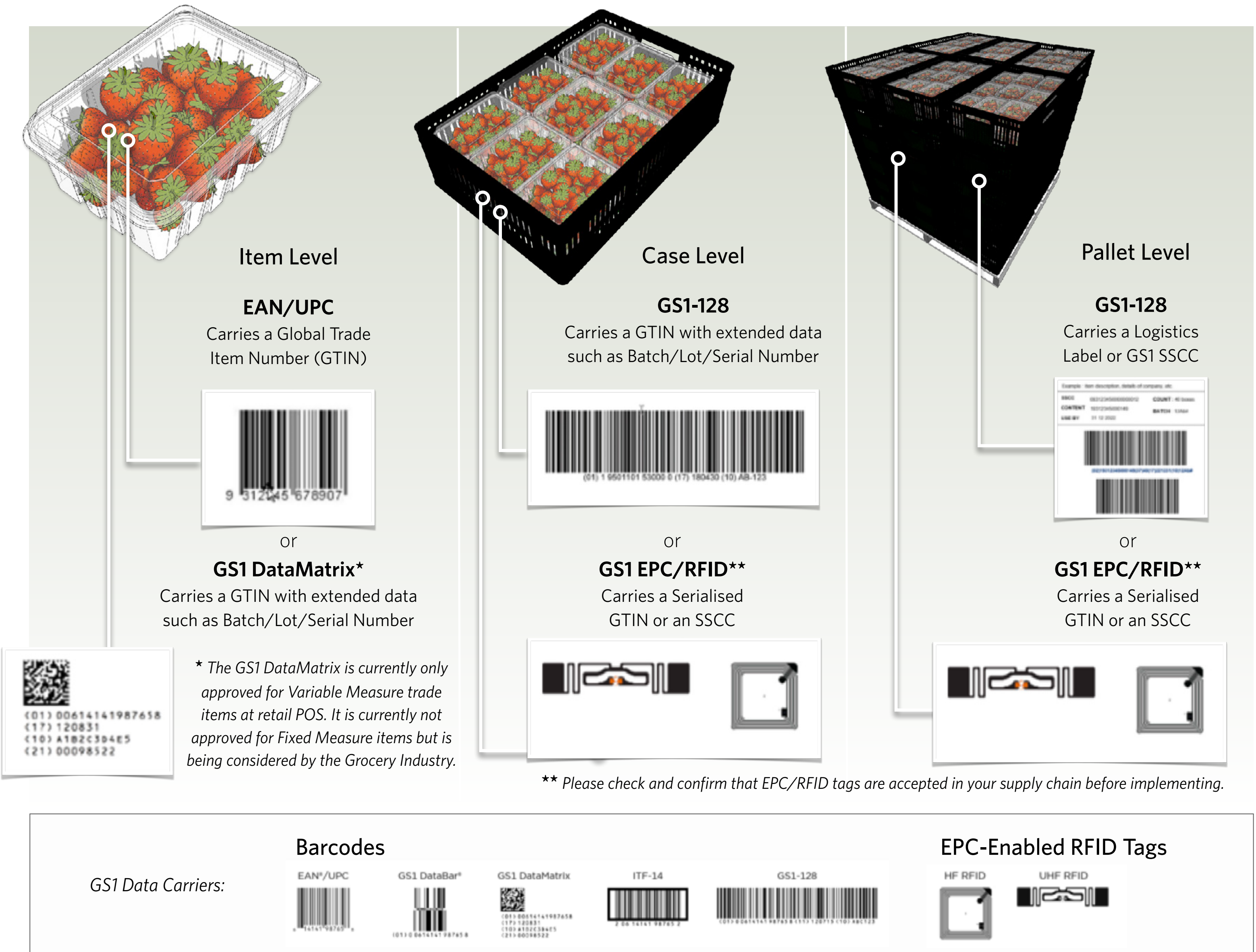


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

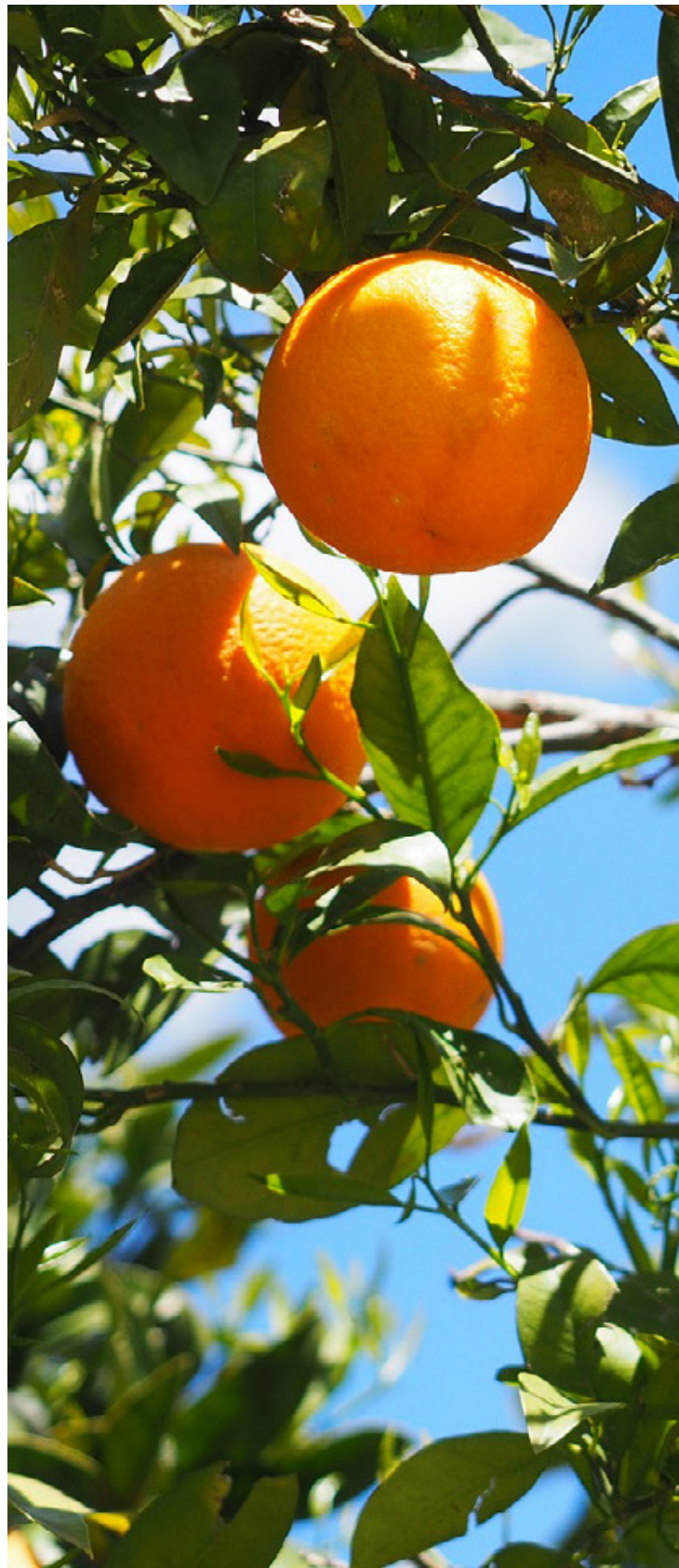
Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.







Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc. The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number



GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number



GS1-128 Barcode capturing GTIN and Batch/Lot number



GS1 Logistics Label



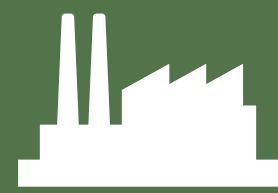
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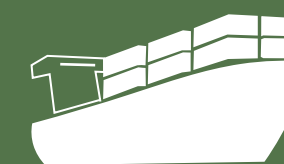
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## How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

Usually the first step will be scanning of inputs, livestock etc upon receipt. For barcodes, this is often done using handheld devices. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are harvesting, storing, picking, packing, shipping, transporting, selling.

Often a combination of fixed mounted scanners or readers and hand-held devices will be applied to capture the critical tracking events. The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.







Useful Links

Food Safety

Food Safety Australia and New Zealand Food Standards for Primary Production and Processing. Chapters 3 and 4 of the Food Safety Standards.  
[https://www.foodstandards.gov.au/foodsafety/standards/Pages/Primary-Production-and-Processing-\(PPP\)-Standards-\(Chapter-4\).aspx](https://www.foodstandards.gov.au/foodsafety/standards/Pages/Primary-Production-and-Processing-(PPP)-Standards-(Chapter-4).aspx)  
<https://www2.health.vic.gov.au/public-health/food-safety/food-businesses/water-supply-safety-for-food-preparation>  
<https://www.dairysafe.vic.gov.au/licensees/starting-a-dairy-business/farmers>  
[https://www.foodauthority.nsw.gov.au/sites/default/files/\\_Documents/scienceandtechnical/plant\\_product\\_risk\\_assessment\\_review\\_2019.pdf](https://www.foodauthority.nsw.gov.au/sites/default/files/_Documents/scienceandtechnical/plant_product_risk_assessment_review_2019.pdf)  
[https://www.pir.sa.gov.au/biosecurity/food\\_safety](https://www.pir.sa.gov.au/biosecurity/food_safety)  
<https://www.health.qld.gov.au/public-health/industry-environment/food-safety/regulation/act-standards>

Biosecurity

Farm biosecurity for plants and animals. Toolkit and resources to manage farm biosecurity  
<https://www.farmbiosecurity.com.au/>  
<https://www.dpi.nsw.gov.au/biosecurity/your-role-in-biosecurity/primary-producers>  
<https://www.pir.sa.gov.au/biosecurity>  
<https://www.daf.qld.gov.au/business-priorities/biosecurity>  
<https://www.farmbiosecurity.com.au/crops/grains/grain-storage-options/>

Farm records

Water usage - <https://dpiwte.tas.gov.au/Documents/Making%20the%20most%20of%20your%20water%20factsheet%203.pdf>

Livestock Production Assurance

<https://www.mla.com.au/globalassets/mla-corporate/meat-safety-and-traceability/documents/livestock-production-assurance/record-keeping/22763-lpa-farm>

Property Identification Codes

<https://www.mla.com.au/meat-safety-and-traceability/red-meat-integrity-system/about-the-national-livestock-identification-system-2015/nlis-contacts/>

Global Location Number Application

<https://www.gs1au.org/>

Licensing and registration

<https://ablis.business.gov.au/service/vic/dairy-farmer-licence/24472>  
<https://www.primesafe.vic.gov.au/licensing/seafood/>  
[https://www.pir.sa.gov.au/biosecurity/food\\_safety/seed\\_sprouts](https://www.pir.sa.gov.au/biosecurity/food_safety/seed_sprouts)



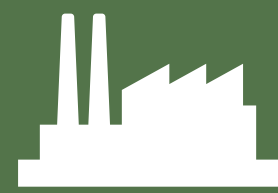
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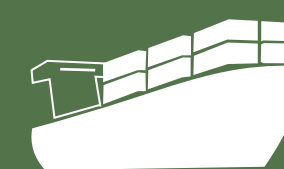
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Glossary

AHECC code	Australian Harmonised Export Commodity Classification (AHECC) is designed for use by exporters, customs brokers and freight forwarders in the classification of goods when providing export declarations
CVD/eCVD	Commodity Vendor Declaration
EPC	An Electronic Product Code (EPC) is a universal identifier that gives a unique identity to a specific physical object. This identity is designed to be unique among all physical objects and all categories of physical objects in the world, for all time
HACCP	Hazard Analysis Critical Control Point
LPA	Livestock Production Assurance
NLIS	The National Livestock Identification System (NLIS) is Australia's system for the identification and traceability of cattle, sheep and goats.
NVD/eNVD/mNVD	National Vendor Declaration (now in electronic and mobile forms)
PIC	Property Identification Code
Primary Producer	<p>A Primary Producer is an individual, partnership, trust or company operating a primary production business if they undertake plant or animal cultivation, fishing or pearling; and/or tree farming or felling.</p> <p>Plant and animal cultivation includes:</p> <ul style="list-style-type: none"><li>● cultivating or propagating plants, fungi or their products or parts (including seeds, spores, bulbs and similar things) in any physical environment</li><li>● maintaining animals for the purpose of selling them or their bodily produce, including natural increase</li><li>● manufacturing dairy produce from raw material that you produced</li></ul> <p>Fishing and pearling includes conducting operations relating directly to:</p> <ul style="list-style-type: none"><li>● taking or catching fish, turtles, dugong, bêche-de-mer, crustaceans or aquatic molluscs</li><li>● taking or culturing pearls or pearl shell. <sup>1</sup></li></ul>

1. Australian Taxation Office



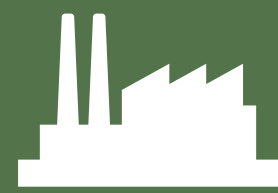
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M O D U L E   T H R E E :

# Freight Transport

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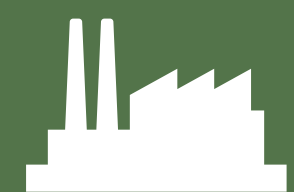
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## Freight Transport

This module covers activities that generally take place in the transport segments of the food supply chain. In this module, the focus is on domestic/ inland transport activities. Additional requirements are associated with freight transport for international shipments, related to documentation and port access. These are detailed in the Export and Import modules.

Transport may be owned by a food business (own transport), contracted via a transport company, or be supplied as part of an integrated offering by a supply chain/logistics service provider company. Road transport accounts for the largest proportion of freight movement of food in Australia, however rail and coastal shipping are transport modes also deployed in food distribution.

Transport is used on multiple occasions in food supply chains, given that food is typically grown in different locations from consumers. Agricultural equipment is transported to grow areas; the product is transported from the production site to processing and/or manufacture, wholesaling sites e.g. markets, saleyards; from the manufacturing to storage; and in distribution to retail/food service.

For many fresh food products, half of their post-harvest shelf life is spent in transit.<sup>1</sup> Multiple transits elevate the risk of product value being lost through shrinkage due to tampering, lost stock, temperature incursions and carton damage in transit, delays impacting best-before dates and shelf life.

Retail food logistics is evolving at a rapid pace from a replenishment model, to new models including direct-to-store bypasses of distribution centres; fresh produce centres dealing solely with perishables; direct supply to food service bypassing wholesale; and the growth of home delivery direct to consumer. All require tailored freight transport solutions. Supplier standards can mandate the transport company to be able to trace all vehicles and trailers used to deliver and collect product and the location of the vehicle in transit.

In this module, eight processes and activities are associated with freight transport in general. An additional element related to intermodal and multimodal freight transport indicates variations related to these operations that relate to traceability.

- Transport booking
- Pick up
- In transit
- Cross-docking
- Delivery
- Returns and Salvage
- Transport Asset/load unit traceability
- Intermodal and multimodal operations

1. PMA-ANZ State of the Industry 2020 <https://www.pma.com/>



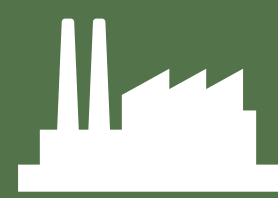
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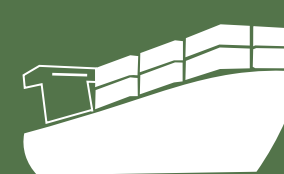
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## Transport booking

Transport bookings are initiated by the grower/producer or wholesaler/processor or manufacturer, generally the supplier of the food product or a third-party logistics provider (3PL) where the product is held in outsourced storage. In terms of freight transport, this business is named the Consignor of freight.

Occasionally, a retailer may be both the consignor and consignee, organising or owning their own fleet to relocate product. A Consignee is the party receiving the product via freight transport.

Most transport companies have a website booking system and consignment tracking portal. If the transport booking is a regular occurrence, the Consignor business will create an account with one or more transport companies, depending on the nature of the transport task and the characteristics of the product.

Transport companies may be specialised in a geography, the speed of delivery required, dimensions or weight of the freight, or the need to manage the cold chain of the product, transport livestock or bulk product such as grain or milk.



### Tasks related to traceability

- Creating unique and accurate Master data relating to consignor identity and location and/or 3PL provider (warehousing)
- Providing unique entity identification and accurate Master data relating to consignee company (the business receiving your product)
- Providing correct information to the transport company on the consignment size, weight, quantity, content and specific requirements, to ensure equipment is matched to the task
- Booking confirmation from the transport company, used as a tracking reference.
- Creation of a Consignment Note containing detailed instructions, contract terms and conditions of transport
- Preparation of a Delivery Order for the Consignee which travels with the freight
- Application of a Transport Label to the logistics units (carton, pallet, drum, etc)
- Notify the consignee of the pending shipment using an Advance Shipping Notice.

### Key participants

- The supplier of the food product or 3PL as Consignor of the freight
- The transport company/Logistics Service Provider (LSP) receiving and confirming the transport booking
- The customer as Consignee of the freight providing accurate Master Data for the transport booking







## Pick Up

Based on a transport booking confirmation and Delivery Order being issued by the Consignor, the transport company will arrive to pick up the freight at the scheduled time. Some larger consignors have “gate in” records and may record the vehicle registration on arrival.

### Tasks related to traceability

- Vehicle arrives (Gate In)
- Signed Consignment Note provided to the driver
- Vendor Declarations (CVD; NVD) signed and handed to the driver
- Weight Declaration checked to ensure Mass limits are not exceeded (e.g. COR Container Weight Declaration, grain harvest management scheme) from weigh-bridge
- Animal Fit to Load requirements completed
- Scan or record product unit label (items, cartons, pallets etc) to verify loaded product, including date and time
- Transport leaves (Gate Out).

### Key participants

- Consignor
- Transport Company
- Logistics Service Provider
- Driver



## In Transit

The ability to track goods in transit is important to the consignor and consignee so both can track the transit time and efficiently plan for the inbound receipt of the product. Transport companies often have the ability to track the vehicle in transit, providing location data on the shipment to the customer by associating the vehicle location with the transport booking number.

An alternative means to transmit location and product monitoring data is via on-board devices placed with the shipment that are able to transmit data in transit. Telemetry, or remote sensing data, is transmitted via telecommunication networks and enables monitoring of on-board systems and locations e.g. telemetry transmissions. These technologies enable tracking of the vehicle mass, distance and location and monitoring of the condition of the freight in terms of temperature, vibration, in real or near-time, depending on the quality of the telecommunications network.

Many smaller volume consignors/shippers use an application programming interface (API) supplied by their Logistics Service Provider or Freight Transport company, which enables data related to the shipment to automatically integrate with enterprise systems, providing in-transit visibility of the shipment for nominated supply chain parties.

Transport status messages relate to delays, disruptions, incidents and events taking place in the transit of the product, enabling the Consignor and Consignee to take responsive actions. For some transport tasks, depot stopovers or staging of transport can mean a change of equipment, and transfer of load units e.g. pallets or cartons from one vehicle to another. Some transport depots offering “milk run” style pickups from small less-than-truckload (LTL) shippers such as small producers will provide short term storage prior to assembling a full truckload for a longer transit to market.

### Tasks related to traceability

- Location of product in transit e.g. transport company customer portal or push message
- Notification of delays or disruptions or estimated time of arrival
- Short term storage at transport depot e.g. LTL shipments

### Key participants

- Transport company
- Driver
- Consignor



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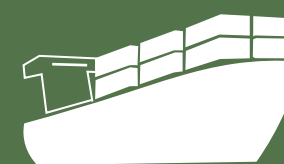
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## Cross-docking

Cross docking involves the transfer of load units from one vehicle to another. Typically this may be product from linehaul interstate transits that are transferred to smaller vehicle for urban delivery.

These load units carrying the product are otherwise undisturbed i.e. they remain intact. The Wholesale and Distribution Module covers cross-docking operations where products are combined or broken down for reconfiguration and further transport. The distinguishing factor is that the stock is not put away in storage. It is transferred from an inbound to an outbound dock, thus the term cross-docking.

### Tasks related to traceability

- Scan of the off-loaded unit transport labels to transport company system and supplier enterprise system
- Scan of re-loaded transport labels
- Truck registration recorded with transport labels loaded on trailer
- Entry and exit time and date stamp recorded for inbound and outbound vehicles by truck registration number
- Driver ID recorded for inbound and outbound vehicles

### Key participants

- Transport company
- Depot Manager
- Load planner
- Driver

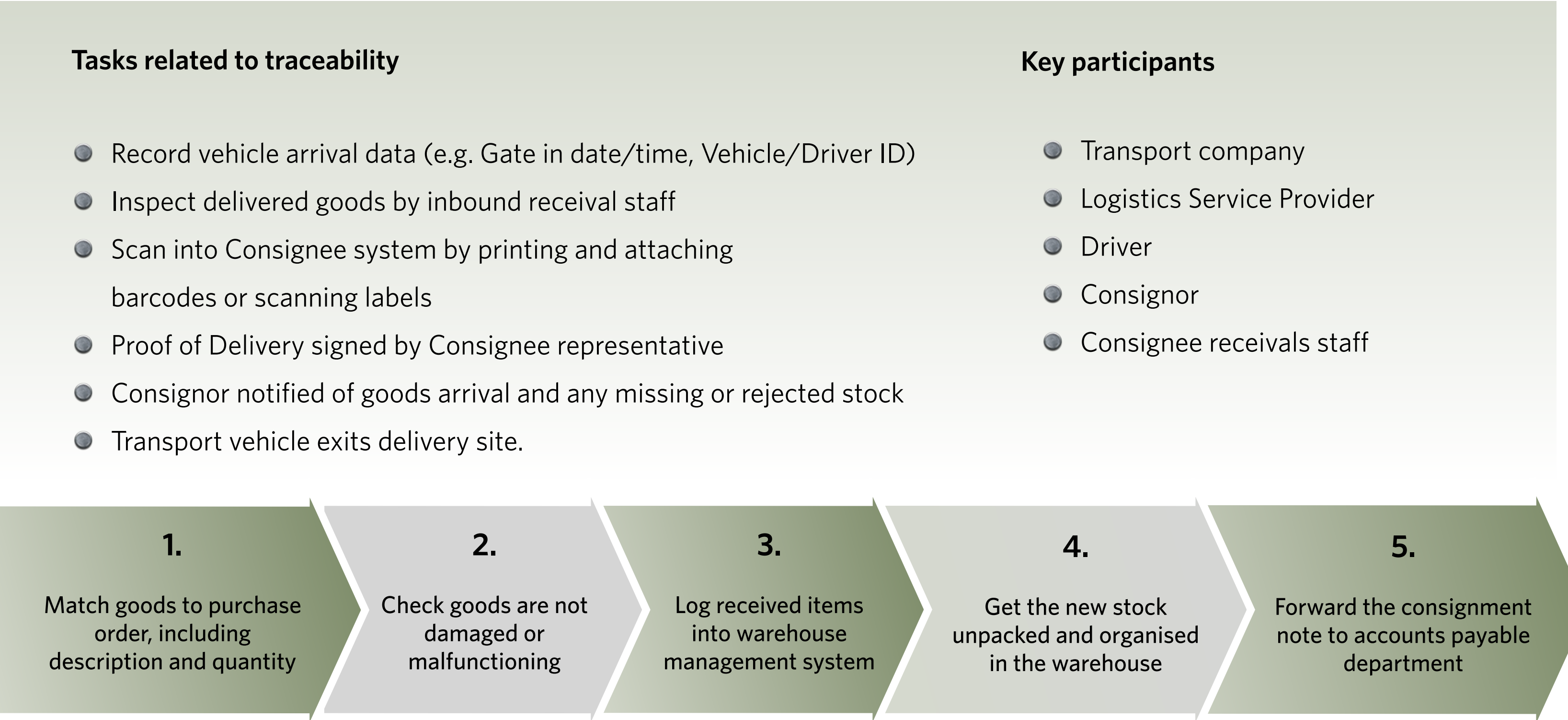
## Delivery

The processes related to delivery of food products are initiated by the transport company booking an appointment to deliver the goods with the Consignee. This is essential in the case of large retailer distribution centres where product from multiple suppliers are received and large volumes of goods are despatched daily. Booking and adhering to delivery windows is a key process for transport companies.

Gate arrival is a means to record a specific vehicle registration and the turnaround time for the vehicle on site. The vehicle will be directed to a dock or to a marshalling area to await entry to a loading dock, where receival activities take place. At the receival dock, retailer staff will scan the transport labels and reconcile the consignment against the Delivery Order and Advance Shipping Notice. Any damaged goods will be set aside, and any missing cartons or pallets will be recorded. Depending on the arrangement with the transport company, these goods may be returned to the supplier via the same truck.

In relation to food deliveries, specific recommendations from FSANZ relate to inspection of the packaging for leakage, damage or pest infestation, correct temperature at arrival and that the use-by date is not expired. Often retailers will reject the consignment if sufficient shelf life is unable to be achieved, resulting in lost value.

Once inspection is completed, a Proof of Delivery or NVD/CVD/Waybill is signed by the receival staff and the vehicle exits the site, with Gate Out recorded by a gatehouse or security system. The transport company will then submit an invoice to the Consignor.



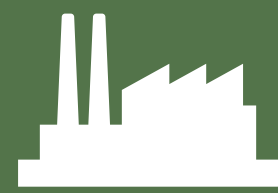
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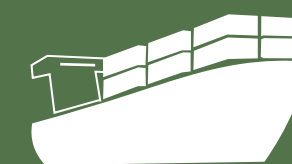
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## Returns and salvage

Suppliers and their 3PL warehouses or LSP may require the transport company to return freight/stock that has been rejected at the consignee receival. Rejection of part or all of a consignment at delivery can have a significant impact on transport scheduling.

The transport company may also be tasked with collection of salvage stock, which may have been accepted at receival but is found unable to be sold or has been removed from the retailer shelves or production plant due to expiry or damage.

Traceability of returns and salvage is usually based on the policies and standard operating procedures agreed between suppliers and customers. Suppliers need to develop and adhere to procedures for recording damaged cartons/packs and product returns for disposal. Traceability audits will highlight the need for returns to be recorded.

Scenarios in relation to transport of the returns may be:

- The truckload is rejected prior to unloading. The driver must return the consignment to the consignor. The product is not scanned or unloaded.
- Part of the consignment is rejected at receival. The consignee will scan the cartons or pallets and notify the consignor. The transport company returns the rejected units on the same vehicle.
- The consignment is received, scanned and unloaded. Rejected units are notified to the consignor and return via a different vehicle.

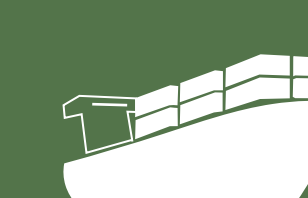


### Tasks related to traceability

- The consignee (receiver) notifies the consignor (supplier) of missing and damaged stock units that have been rejected, or that the entire truckload has been rejected
- The consignor instructs the transport company to return or dispose of stock units
- The returned stock is scanned at unloading
- The disposition of returned stock is decided and recorded on the consignor system
- The transport company issues an invoice recording disposal or return of stock units.

### Key participants

- Transport company
- Logistics Service Provider (LSP)
- Driver
- Consignor (supplier of product or their 3PL/LSP)
- Consignee receivals staff







## Transport asset/load unit traceability

Load units are transport assets or equipment used to contain or unitise freight. They increase the efficiency of logistics by enabling transport equipment such as forklifts to carry and stack multiple cartons or individual items for storage or distribution.

Common load units are pallets, bins, tubs, bags, bulk liquid tanks, dry bulk containers, shipping containers, trays. They do not include packaging.

Traceability of load units can improve utilisation and avert high costs associated with loss of equipment and detention charges.

It is likely that the rollout of 5G telecommunications networks will see a proliferation of sensor equipment integrated into load units to support traceability of product and associated transport equipment, helping to track and manage these assets.



Credit: Perfection Fresh

### Tasks related to traceability

- Assign a unique identifier to the transport asset
- For pooled assets such as pallets, ensure pallet transfer authority is signed at consignee receipt
- Scan load unit barcodes/identifiers on inbound and outbound loading or apply IoT devices using active RFID or Bluetooth for pallet tracking (particularly useful in closed loop supply chains)

### Key participants

- Transport company
- Load unit leasing company
- Receipt at consignee
- Consignor or 3PL supplier



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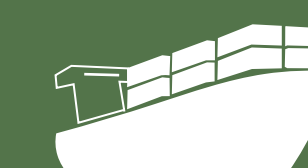
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Intermodal and multimodal freight transport

Intermodal freight terminals are the points within the domestic supply chains where load units are transferred between different modes of transport: rail, road, sea and air.

Intermodal terminals play a key role in permitting the most appropriate mode of transport to be used for different elements of the transport task, combining the flexibility of road operations with the linehaul efficiency of rail transport and the ability of sea transport to extend the transport chain beyond the geographical limits of the Australian continent.

The participants in the intermodal supply chain include rail transport providers, road transport providers, terminal operators both import/export and domestic, freight forwarders and shipping/air lines. <sup>2</sup>

If a transport task is undertaken using multiple modes but without opening the container then it is called intermodal. The freight remains under the control of one LSP who arranges different modes under one main contract with the Consignor/supplier of product. If the container is opened and the goods transferred to another transport mode, it is termed multimodal freight. It may be arranged through coordination of multiple transport contracts by the Consignor.

Australia uses different transport modes to move food products, including rail (rail shuttle, inter-capital, port rail); coastal shipping; domestic and international airfreight (dedicated freight and passenger underbelly services). A combination of modes of transport is effective in managing long distance transits e.g. Perth-Sydney, or for freight accumulated in production zones and destined for export ports. Coastal shipping is effective for heavy or bulk food products that are less time-sensitive or regularly replenish food manufacturing e.g. malt, oil or grains.

Airfreight is an effective solution for high value, time-sensitive products. Within an intermodal hub distribution centre, pallets may be unloaded, and goods re-configured for a specific destination or to optimise space on specialised transport equipment. Traceability of the product is usually based on the container or pallet identification however use of multiple modes may require tracking at a load unit level if the product is reconfigured for different transport modes.

The four most critical data points for a tracking system to report are accurate, to-the-minute GPS-based location status, whether the container is loaded or empty, whether the door is open or closed, and for some products, the ability to send an alert if temperature and humidity fall outside of normal ranges. <sup>3</sup>

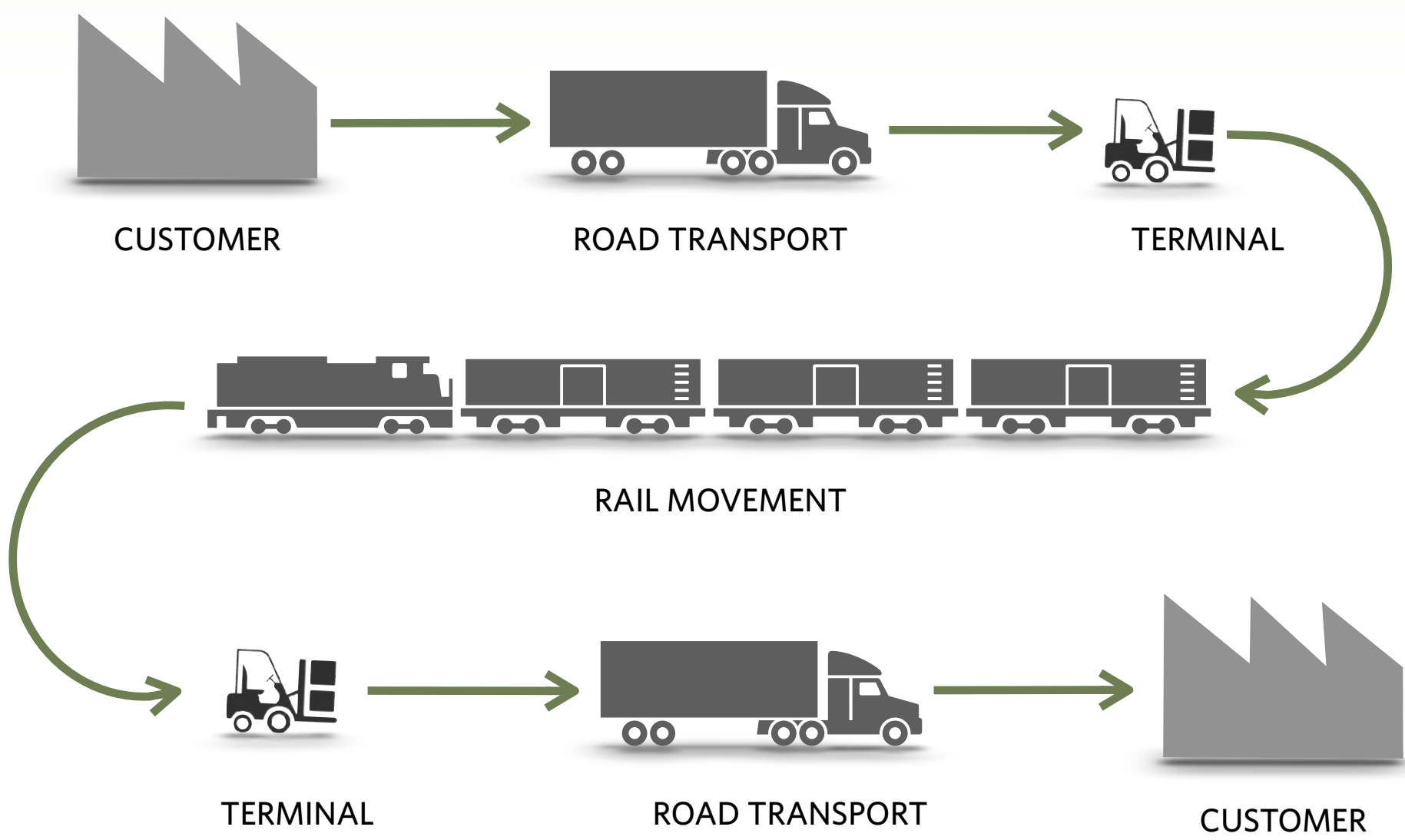
2. <https://www.qtlc.com.au/freight-sectors/intermodal/>  
3. <https://www.ttnews.com/articles/internet-things-arrives-intermodal>

Tasks related to traceability

- Location of the container or load unit in transit
- Arrival and departure of road freight vehicles at intermodal hubs
- Cross-docking between modes
- Load unit reconfiguration e.g. re-palletisation — re-labelling pallets and load units

Key participants

- Transport company/companies (road, rail, shipping, airline)
- Consignor
- LSP/3PL supplier
- Intermodal terminal operator (rail, air, sea)
- Port Manager
- Domestic freight forwarder



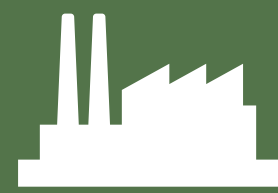
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## Coastal Shipping variations

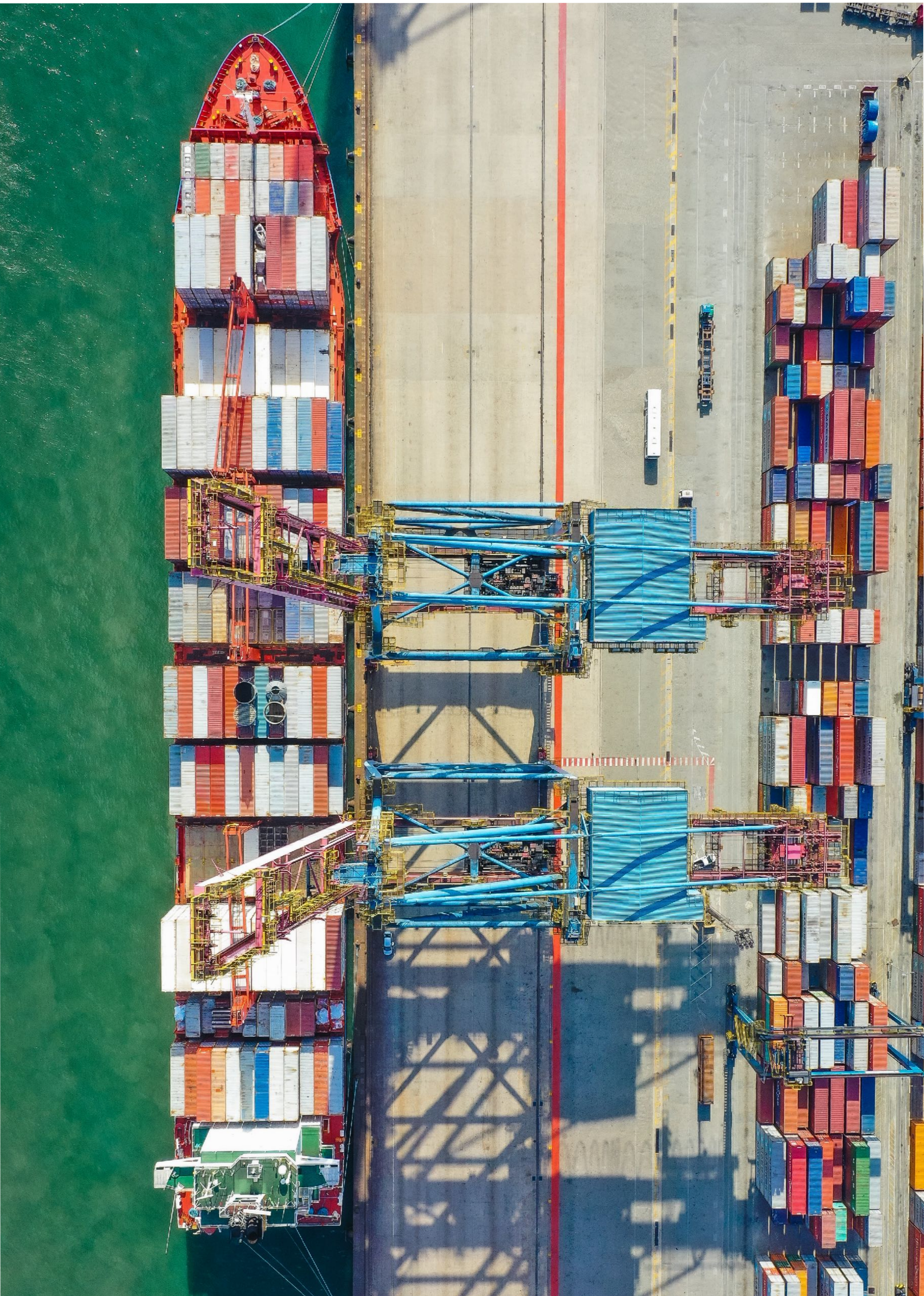
Coastal shipping requires some different procedures and documentation to surface transport. Coastal shipping consignments can be co-mingled with international cargoes as the product is transferred to/from road or rail transport via sea port terminals.

### Tasks related to traceability

- Consignor prepares Bill of Lading required by shipping line
- Shipping line prepares manifest for loading
- Shipping line issues Ship arrival notice sent to LSP nominee
- Discharge of load unit from vessel to CTO
- Cargo Availability Notice sent by CTO to LSP, consignee
- Transport company books access to collect from CTO
- Transport company uses Delivery Order to verify access to cargo
- Transport company picks up load unit/container and exits port gate
- Transport company delivers to Consignee
- POD signed by consignee

### Key participants

- Consignor
- Shipping line
- Cargo Terminal Operator
- Transport company
- Consignee
- Freight Forwarder
- Logistics Service Provider



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Critical Tracking Events (CTEs)

Critical Tracking Events (CTEs) are events that occur to the product (the traceable object) during its lifecycle and associates the identity, movement and transformation of the food product with locations and participants. The critical tracking events (CTEs) for each of the identified freight transport activities are summarised as follows:

Area	Freight transport activity	CTE code	Critical Tracking Events (CTEs)
Establishment	Establish identities and locations	FT CTE1A	<ul style="list-style-type: none"><li>● Consignor and 3PL identity and location</li><li>● Consignee identity and location</li></ul>
Establishment	Transport Company licences, permits and registrations	FT CTE1B	<ul style="list-style-type: none"><li>● Transport Company licences and registrations e.g. Food Transport Business Licence is required to carry eggs, dairy, meat, plant products, seafood</li><li>● Shipping lines must have a Coastal Trading Licence</li><li>● Transport access permits, as required</li><li>● Mass Management schemes registration</li><li>● Vehicle registrations (including trailer/wagon ID)</li><li>● Driver Identification and evidence of site inductions/security card</li><li>● Safe Food Accreditation</li></ul>
Booking, preparation	<ul style="list-style-type: none"><li>● Transport Booking Confirmation from the transport company, used as a tracking reference</li><li>● Consignor/shipper prepares Consignment Note/eNVD/CVD/Waybill</li><li>● Preparation of a Delivery Order for the Consignee which travels with the freight</li><li>● Affix a Transport Label to the product carton and pallet</li><li>● Notify the consignee of the pending shipment using an Advance Shipping Notice.</li></ul>	FT CTE2	<ul style="list-style-type: none"><li>● Booking and preparing for transport</li><li>● Receive Transport Booking Number (shipment tracking reference)</li><li>● Prepare Consignment Note/ eNVD/CVD/ Waybill</li><li>● Prepare Delivery Order</li><li>● Affix Transport Labels</li><li>● Send Advance Shipping Notice to the Consignee</li></ul>
Pick up	<ul style="list-style-type: none"><li>● Vehicle arrives (Gate In timestamp recorded)</li><li>● Signed Consignment Note provided to the driver</li><li>● Vendor Declarations (CVD; NVD) signed and handed to the driver</li><li>● COR compliance check re load restraint, mass management, driver fatigue (Consignor risk); Fit to Load assessment</li><li>● Scan load unit label (items, cartons, pallets etc) to verify loaded product, including date and time</li><li>● Transport leaves</li></ul>	FT CTE3	<ul style="list-style-type: none"><li>● Gate arrival of transport</li><li>● Vehicle registration recorded</li><li>● Driver ID and induction/security access card validated</li><li>● Consignment Note signed (online or handed to driver)</li><li>● Vendor Declarations entered on system or hard copy signed by Consignor</li><li>● COR compliance checks completed and entered in consignor system</li><li>● Scan and load product</li></ul>
Departure	Truck Departs	FT CTE4	<ul style="list-style-type: none"><li>● Transport leaves consignor site and Gate Out data recorded</li></ul>
In Transit Monitoring	<ul style="list-style-type: none"><li>● Location of product in transit e.g. transport company customer portal or push message</li><li>● Notification of delays or disruptions or estimated time of arrival</li></ul>	FT CTE5	<ul style="list-style-type: none"><li>● GPS tracking coordinates recorded</li><li>● Transport status message issued</li></ul>



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Area	Freight transport activity	CTE code	Critical Tracking Events (CTEs)
Cross-docking	<b>FCL/FTL cross-docking</b> <ul style="list-style-type: none"><li>● Scan load unit into depot Transport Management System as received. A Dock allocation will be issued for container/load unit</li><li>● A Load Planner will allocate each load unit to the vehicle, wagon, and vessel slot.</li><li>● The load unit ID is re-scanned at loading.</li><li>● All load units are reconciled to vehicles prior to transit.</li></ul>	<b>FT CTE7A</b> <b>FT CTE7B</b>	<ul style="list-style-type: none"><li>● Scan the container/load unit number before unloading</li><li>● Re-scan the container/load unit number at re-loading to vehicle, rail wagon, vessel</li></ul>
	<b>LCL/LTL cross-docking</b> <ul style="list-style-type: none"><li>● Scan of the off-loaded load unit transport labels to transport company system</li><li>● Allocation of load units to Bays</li><li>● Load units may be reconfigured with product from multiple inbound loads for one destination or to make up a full container load</li><li>● Load units are re-labelled with new transport labels</li><li>● Units are re-loaded and transport labels scanned with new container/skid/wagon number/truck registration assignment</li><li>● Gate In and Gate Out process recorded</li></ul>	<b>FT CTE8A</b> <b>FT CTE8B</b> <b>FT CTE8C</b> <b>FTE CTE9</b>	
Delivery	<ul style="list-style-type: none"><li>● Gate in process at Consignee premises</li><li>● Goods scanned into Consignee system</li><li>● Proof of Delivery signed by Consignee representative</li><li>● Consignor notified of goods arrival and any missing or rejected stock</li><li>● Transport vehicle exits delivery site</li></ul>	<b>FT CTE10</b>	<ul style="list-style-type: none"><li>● Gate in process completed</li><li>● Load units received recorded in WMS/ERP system</li><li>● Proof of Delivery completed</li><li>● Goods received notified to supplier ERP</li><li>● Gate out process completed Transport vehicle exits delivery site</li></ul>
Returns and salvage	<ul style="list-style-type: none"><li>● The consignor instructs the transport company to return or dispose of stock units</li><li>● The returned stock is scanned at unloading</li></ul>	<b>FT CTE11</b>	<ul style="list-style-type: none"><li>● Consignor instructs transport company to return/dispose of rejected stock</li><li>● Returned load units scanned at unloading</li></ul>
Transport Asset/Load	<b>Assign an identity to each transport asset</b> <ul style="list-style-type: none"><li>● For pooled assets such as pallets, ensure pallet transfer authority is signed at consignee receipt</li><li>● Scan load unit barcodes on inbound and outbound loading or apply IoT devices using active RFID or Bluetooth for load unit tracking (particularly useful in closed loop supply chains)</li></ul>	<b>FT CTE12A</b> <b>FT CTE12B</b>	<ul style="list-style-type: none"><li>● Create Load Unit</li><li>● Apply scannable unique ID</li><li>● Pallet transfer authority signed by consignee or consignor</li><li>● Scan load units prior to unloading and when re-loading on transport vehicles</li></ul>



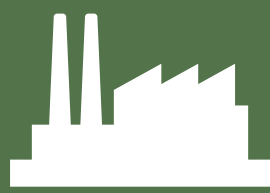
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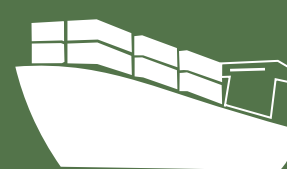
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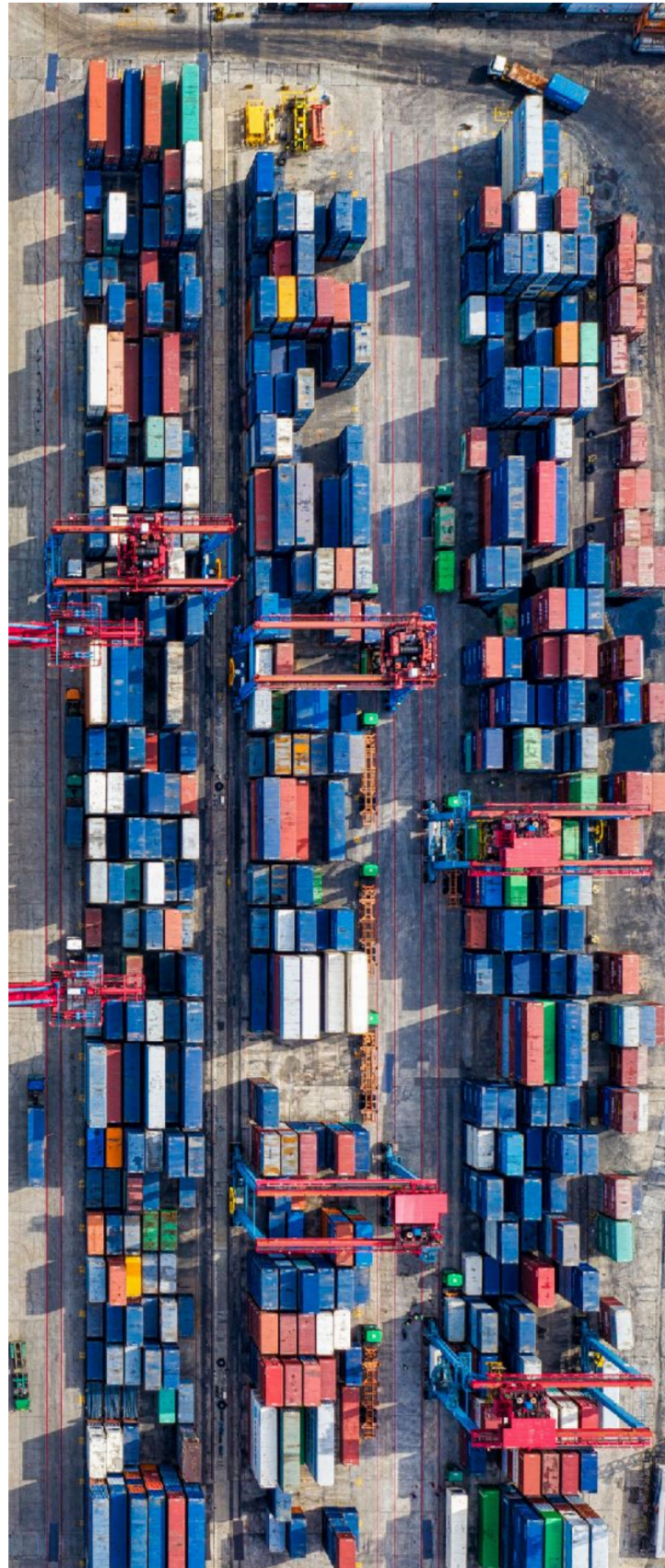


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Area	Freight transport activity	CTE code	Critical Tracking Events (CTEs)
Intermodal and multimodal	<ul style="list-style-type: none"><li>● Location of the container or load unit in transit</li><li>● Arrival and departure of road freight vehicles at intermodal hubs</li><li>● Recording load units allocated to each rail wagon/container on consist/vessel via new transport labels</li></ul>	<div>FT CTE13</div> <div>FT CTE14</div> <div>FT CTE15</div>	<ul style="list-style-type: none"><li>● GPS tracking</li><li>● Gate In and Gate Out records</li><li>● Transport company</li><li>● Loading bay, transport vehicle, wagon allocation via new transport labels</li></ul>
Coastal shipping	<ul style="list-style-type: none"><li>● Consignor prepares Bill of lading required by shipping line</li><li>● Shipping line prepares manifest for loading</li><li>● Shipping line issues Ship arrival notice sent to LSP nominee</li><li>● Discharge of load unit from vessel to CTO</li><li>● Cargo Availability Notice sent by CTO to LSP, consignee</li><li>● Transport company books access to collect from CTO</li><li>● Transport company uses Delivery Order to verify access to cargo</li><li>● Transport company picks up load unit/container and exits port gate</li></ul>	<div>FT CTE16A</div> <div>FT CTE16B</div>	<ul style="list-style-type: none"><li>● Bill of Lading received by Shipping Line</li><li>● Ship Arrival Notice</li><li>● Cargo Availability Notice</li><li>● Loaded truck/train exits port</li></ul>
Delivery	<ul style="list-style-type: none"><li>● Transport company delivers to consignee</li><li>● POD signed by consignee</li></ul>	<div>FT CTE17</div>	<ul style="list-style-type: none"><li>● Final delivery to customer</li><li>● POD signed by Consignee</li></ul>



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Key Data Elements (KDEs)

Key Data Elements (KDE) ensure that captured and recorded data can be interpreted and used as relevant and required by all supply chain partners. Key Data Elements define Who, What, When, Where and Why for each Critical Tracking Event identified above. Additionally, Links (or Linking KDEs) identify transaction references, business document types and business activities to be captured, recorded and kept.

CTE code	Critical Tracking Events	Key data Inputs and Outputs													
FT CTE1A	Establish identities and locations for consignor and consignee	<p><b>Global Location Number (GLN)</b></p> <p>The Global Location Number (GLN) is used to identify locations and legal entities. This unique identifier is comprised of a GS1 Company Prefix, Location Reference, and Check Digit. GLNs are used to identify parties to business transactions; functional groups within a company; or real, physical “places” that might ship, receive, process, or hold the product.</p>	<table><tr><th colspan="2">GLN Creation</th></tr><tr><td><b>Who</b></td><td>Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency</td></tr><tr><td><b>What</b></td><td>Freight location</td></tr><tr><td><b>When</b></td><td>Date/Time of GLN Issuance</td></tr><tr><td><b>Where</b></td><td>Issuing Agency</td></tr><tr><td><b>Why</b></td><td>Request for GLNs</td></tr></table>	GLN Creation		<b>Who</b>	Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency	<b>What</b>	Freight location	<b>When</b>	Date/Time of GLN Issuance	<b>Where</b>	Issuing Agency	<b>Why</b>	Request for GLNs
		GLN Creation													
<b>Who</b>	Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency														
<b>What</b>	Freight location														
<b>When</b>	Date/Time of GLN Issuance														
<b>Where</b>	Issuing Agency														
<b>Why</b>	Request for GLNs														
		<p><b>Export Registered Establishment Number</b></p> <p>The certificate must contain:</p> <ul style="list-style-type: none"><li>the name and address of the occupier</li><li>the ACN and ABN number of the occupier</li><li>the alternate trading names (if applicable) of the occupier</li><li>the number allocated to the export registered establishment</li><li>the limited period for which the establishment is registered (if applicable)</li><li>the export registered operations for the establishment</li><li>the eligible country listing for the establishment which has been registered</li><li>persons who manage and control the registered establishment</li><li>conditions of registration if any.</li></ul>	<table><tr><th colspan="2">Export establishment number request</th></tr><tr><td><b>Who</b></td><td>Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency</td></tr><tr><td><b>What</b></td><td>Organisation</td></tr><tr><td><b>When</b></td><td>Date/Time of Export certificate issuance</td></tr><tr><td><b>Where</b></td><td>Issuing Agency</td></tr><tr><td><b>Why</b></td><td>Request for Export Establishment number</td></tr></table>	Export establishment number request		<b>Who</b>	Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency	<b>What</b>	Organisation	<b>When</b>	Date/Time of Export certificate issuance	<b>Where</b>	Issuing Agency	<b>Why</b>	Request for Export Establishment number
Export establishment number request															
<b>Who</b>	Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency														
<b>What</b>	Organisation														
<b>When</b>	Date/Time of Export certificate issuance														
<b>Where</b>	Issuing Agency														
<b>Why</b>	Request for Export Establishment number														
FT CTE1B	Transport Company licences, permits and registrations	<p><b>Food Transport Business Licence and food safety program</b></p> <p>The Global Location Number (GLN) is used to identify locations and legal entities. This unique identifier is comprised of a GS1 Company Prefix, Location Reference, and Check Digit. GLNs are used to identify parties to business transactions; functional groups within a company; or real, physical “places” that might ship, receive, process, or hold the product.</p>	<table><tr><th colspan="2">Food Transport Licence</th></tr><tr><td><b>Who</b></td><td>Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency</td></tr><tr><td><b>What</b></td><td>Organisation</td></tr><tr><td><b>When</b></td><td>Date/Time of Licence issuance</td></tr><tr><td><b>Where</b></td><td>Issuing Agency</td></tr><tr><td><b>Why</b></td><td>Request for Food Transport Licence</td></tr></table>	Food Transport Licence		<b>Who</b>	Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency	<b>What</b>	Organisation	<b>When</b>	Date/Time of Licence issuance	<b>Where</b>	Issuing Agency	<b>Why</b>	Request for Food Transport Licence
		Food Transport Licence													
<b>Who</b>	Logistics Service Provider ID - GLN Transport Company ID – GLN Issuing Agency														
<b>What</b>	Organisation														
<b>When</b>	Date/Time of Licence issuance														
<b>Where</b>	Issuing Agency														
<b>Why</b>	Request for Food Transport Licence														
		<p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>Global Location Number (GLN)</li><li>Export registered establishment number</li><li>Food Transport Business Licence Number</li></ul>													



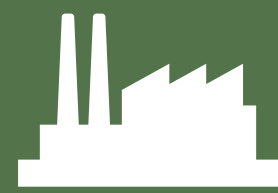
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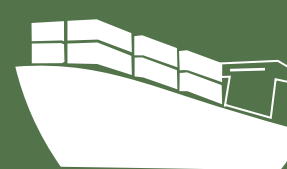
Wholesale and Distribution



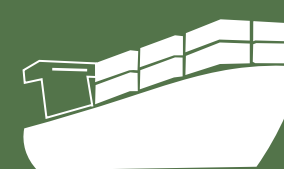
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CTE code	Critical Tracking Events	Key data Inputs and Outputs
FL CTE2  Booking and Preparation for Transport	Receive Transport Booking number	<ul style="list-style-type: none"><li>● Transport Booking reference number (used for consignor tracking of shipment)</li></ul>
	Prepare Consignment Note/eNVD/CVD/Way bill	<ul style="list-style-type: none"><li>● Consignor name and address</li><li>● Consignee name and address</li><li>● Description of goods</li><li>● Quantity, weight, dimensions of product</li><li>● Declaration by consignor</li><li>● Signed by transport company/LSP</li></ul>
	Prepare Delivery Order	<p>On company letterhead</p> <ul style="list-style-type: none"><li>● “Ship to” identity and location</li><li>● Mode of transport</li><li>● Special needs for the shipment e.g. temperature</li><li>● When to release the shipment</li><li>● Shipment has been paid for</li></ul> <p>Information shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Delivery Order number</li></ul>
	Affix Transport Labels	<p>Labels on load units</p> <ul style="list-style-type: none"><li>● Company name of consignor</li><li>● Address</li><li>● Product description</li><li>● Count</li><li>● Content</li><li>● Batch/Lot number</li><li>● Use by date</li><li>● Net weight</li><li>● Serialised Shipping Container Code (SSCC)</li></ul>
	Send Advance Shipping Notice	<p>Labels on load units</p> <ul style="list-style-type: none"><li>● Consignor/supplier identity description</li><li>● Contact person at supplier</li><li>● Shipment date and time</li><li>● Transport company identification and booking reference number</li><li>● Special handling instructions</li><li>● Item level list including item description, quantity and purchase order number</li><li>● Number and type of units e.g. cartons</li><li>● Packing List Reference number</li><li>● “Ship to” consignee identity and location</li><li>● Gross weight of shipment (including packaging)</li></ul>

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
	Gate arrival	<ul style="list-style-type: none"><li>● Vehicle registration number</li><li>● Driver identification</li><li>● Driver site induction/access card valid</li><li>● Time and date stamp</li></ul> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Arrival</th></tr><tr><td>Who</td><td>Consignee ID - GLN Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of vehicle arrival</td></tr><tr><td>Where</td><td>Arrival Gate Location ID - GLN</td></tr><tr><td>Why</td><td>Pick Up Links: Gate Arrival record</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Date and time stamp</li><li>● ASN Number</li><li>● Consignment Note Number</li></ul>	Arrival		Who	Consignee ID - GLN Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Vehicle ID - GIAI	When	Date/Time of vehicle arrival	Where	Arrival Gate Location ID - GLN	Why	Pick Up Links: Gate Arrival record
Arrival														
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What	Vehicle ID - GIAI													
When	Date/Time of vehicle arrival													
Where	Arrival Gate Location ID - GLN													
Why	Pick Up Links: Gate Arrival record													
FT CTE3	Pickup													
	Consignment Note signed	<p>Consignor name and address</p> <ul style="list-style-type: none"><li>● Consignee name and address</li><li>● Description of goods</li><li>● Quantity, weight, dimensions of product</li><li>● Declaration by consignor</li><li>● Signed by transport company/LSP</li><li>● Consignment Note Number</li></ul>												
	Declarations entered on relevant platforms or hard copy signed by Consignor	<p>e-National Vendor Declaration</p> <ul style="list-style-type: none"><li>● PIC of consignor and consignee</li><li>● Number, breed and description of animals</li><li>● NLIS tag numbers</li></ul>												



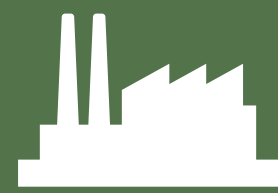
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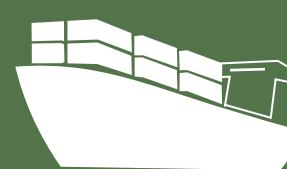
Wholesale and Distribution



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Food Service



Import Operations



Export Operations



Consumer Information



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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
	<div>Product declarations completed</div> <div>Chain of Responsibility (COR) checks completed</div> <div>Scan and load product</div> <div>Transport leaves and Gate Out process completed</div>	<div>Commodity Vendor Declaration<ul style="list-style-type: none"><li>Variety</li><li>Chemical treatment</li><li>Residue status</li><li>Genetic modification status</li></ul></div> <div>Animal Health Declaration/Interstate Certification Assurance/Plant Health Declarations <a href="https://www.nhvr.gov.au/files/201703-0484-cor-check-list.pdf">https://www.nhvr.gov.au/files/201703-0484-cor-check-list.pdf</a> <a href="https://coradviser.com.au/article/loaders-and-drivers-cor-compliance-is-hinged-on-their-final-checks/">https://coradviser.com.au/article/loaders-and-drivers-cor-compliance-is-hinged-on-their-final-checks/</a></div> <div><ul style="list-style-type: none"><li>Mass</li><li>Dimension</li><li>Load restraint</li></ul></div> <div>Key Data Element examples/guidance<table><tr><th colspan="2">Departure</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Departure</td></tr><tr><td>Where</td><td>Gate Out Location ID - GLN</td></tr><tr><td>Why</td><td>Transport Vehicle Departure Links: Gate out record</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>COR compliance check completed</li><li>Date and time stamp</li><li>Vehicle registration</li><li>Gate out date and time</li><li>eNVD number</li><li>CVD number</li><li>ICA certification number</li><li>SSCC</li><li>Date/Time of Departure</li></ul></div>	Departure		Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Departure	Where	Gate Out Location ID - GLN	Why	Transport Vehicle Departure Links: Gate out record
Departure														
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN													
What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of Departure													
Where	Gate Out Location ID - GLN													
Why	Transport Vehicle Departure Links: Gate out record													

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE5	In transit	<ul style="list-style-type: none"><li>● Date and time</li><li>● Location coordinates</li><li>● Estimated and actual time of departure</li><li>● Estimated and actual time of arrival</li><li>● Location and route ID</li><li>● Time of loading and unloading</li><li>● Vehicle and trailer/wagon/vessel type and capacity</li><li>● Transport asset ID e.g. pallet/container/skel</li><li>● Reason for delay</li></ul> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">In Transit GPS Tracking/Transport status</th></tr><tr><td>Who</td><td>Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of GPS transmission</td></tr><tr><td>Where</td><td>Location and route ID - GLN</td></tr><tr><td>Why</td><td>In Transit GPS tracking, Transport status Links: GSP Tracking data, Transport Status Message</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● GPS coordinates at regular timestamped intervals</li><li>● Actual departure and arrival time</li><li>● Reason for delay and actions that may impact traceability</li><li>● (consider decoupling equipment; transfer to another vehicle etc)</li></ul>	In Transit GPS Tracking/Transport status		Who	Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of GPS transmission	Where	Location and route ID - GLN	Why	In Transit GPS tracking, Transport status Links: GSP Tracking data, Transport Status Message
	In Transit GPS Tracking/Transport status													
	Who		Transport Company ID - GLN Driver ID - GSRN											
What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of GPS transmission													
Where	Location and route ID - GLN													
Why	In Transit GPS tracking, Transport status Links: GSP Tracking data, Transport Status Message													
	GPS vehicle/container tracking													
	Transport Status message issued and response													
FT CTE7A	Cross docking	<p>Company name of consignor</p> <ul style="list-style-type: none"><li>● Address</li><li>● Product description</li><li>● Count</li><li>● Content</li><li>● Batch/Lot number</li><li>● Use by date</li><li>● Net weight</li><li>● Serialised Shipping Container Code (SSCC)</li></ul>												
	For FCL/FTL shipments													
	Scan load unit/container before unloading													



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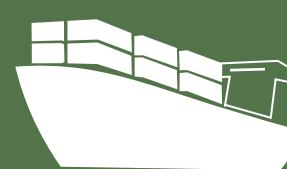
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CTE code	Critical Tracking Events	Key data Inputs and Outputs										
		<div>Key Data Element examples/guidance</div> <div><div>Unloading</div><table><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Unloading</td></tr><tr><td>Where</td><td>Warehouse Location ID - GLN</td></tr><tr><td>Why</td><td>Unloading Links: Unloading record</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>SSCC unload from vehicle</li></ul></div>	Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Unloading	Where	Warehouse Location ID - GLN	Why	Unloading Links: Unloading record
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN											
What	Consignment ID - SSCC Vehicle ID - GIAI											
When	Date/Time of Unloading											
Where	Warehouse Location ID - GLN											
Why	Unloading Links: Unloading record											
FT CTE7B	Re-scan load unit/container at loading	<div><ul style="list-style-type: none"><li>Company name of consignor</li><li>Address</li><li>Product description</li><li>Count</li><li>Content</li><li>Batch/Lot number</li><li>Use by date</li><li>Net weight</li><li>Serialised Shipping Container Code (SSCC)</li></ul></div> <div>Key Data Element examples/guidance</div> <div><div>Loading</div><table><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Loading</td></tr><tr><td>Where</td><td>Warehouse Location ID - GLN</td></tr><tr><td>Why</td><td>Loading Links: Load / Vehicle Reconciliation Loaded units record</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>SSCC re-loaded</li><li>Vehicle registration associated with re-loaded SSCC</li></ul></div>	Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Loading	Where	Warehouse Location ID - GLN	Why	Loading Links: Load / Vehicle Reconciliation Loaded units record
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN											
What	Consignment ID - SSCC Vehicle ID - GIAI											
When	Date/Time of Loading											
Where	Warehouse Location ID - GLN											
Why	Loading Links: Load / Vehicle Reconciliation Loaded units record											

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE8A	For LTL/LCL shipments	<ul style="list-style-type: none"><li>● The load unit ID is re-scanned at loading.</li><li>● All load units are reconciled to vehicles prior to transit.</li></ul>												
	Load unit is scanned at re-loading and reconciled to vehicle/wagon/vessel	<p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Loading</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Loading</td></tr><tr><td>Where</td><td>Warehouse Location ID - GLN</td></tr><tr><td>Why</td><td>Loading Links: Loaded units record</td></tr></table>	Loading		Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Loading	Where	Warehouse Location ID - GLN	Why	Loading Links: Loaded units record
Loading														
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN													
What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of Loading													
Where	Warehouse Location ID - GLN													
Why	Loading Links: Loaded units record													
FT CTE8B	Load unit/container scanned prior to unloading	<ul style="list-style-type: none"><li>● Company name of consignor</li><li>● Address</li><li>● Product description</li><li>● Count</li><li>● Content</li><li>● Batch/Lot number</li><li>● Use by date</li><li>● Net weight</li><li>● Serialised Shipping Container Code (SSCC)</li></ul> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Loading</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Loading</td></tr><tr><td>Where</td><td>Warehouse Location ID - GLN</td></tr><tr><td>Why</td><td>Loading Links: Loaded units record</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● SSCC unloaded</li></ul>	Loading		Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Loading	Where	Warehouse Location ID - GLN	Why	Loading Links: Loaded units record
Loading														
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN													
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Where	Warehouse Location ID - GLN													
Why	Loading Links: Loaded units record													



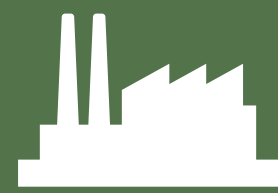
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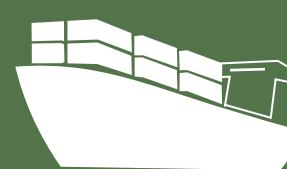
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE8C	New transport label affixed, allocated to wagon/ vehicle/vessel and re-scanned	<div>New transport label<ul style="list-style-type: none"><li>● Company name of consignor</li><li>● Address</li><li>● Product description</li><li>● Count</li><li>● Content</li><li>● Batch/Lot number</li><li>● Use by date</li><li>● Net weight</li><li>● Serialised Shipping Container Code (SSCC)</li></ul></div> <div>Key Data Element examples/guidance<table><tr><th colspan="2">Transport Label Allocation</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Consignor ID - GLN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vessel ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Departure</td></tr><tr><td>Where</td><td>Location ID - GLN</td></tr><tr><td>Why</td><td>Transport Label Allocation Links: Transport Label Allocation record</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● SSCC associated with new transport label</li></ul></div>	Transport Label Allocation		Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Consignor ID - GLN	What	Consignment ID - SSCC Vessel ID - GIAI	When	Date/Time of Departure	Where	Location ID - GLN	Why	Transport Label Allocation Links: Transport Label Allocation record
Transport Label Allocation														
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Consignor ID - GLN													
What	Consignment ID - SSCC Vessel ID - GIAI													
When	Date/Time of Departure													
Where	Location ID - GLN													
Why	Transport Label Allocation Links: Transport Label Allocation record													
FT CTE9	Gate In and Gate Out process recorded	<div><ul style="list-style-type: none"><li>● Date and time stamp</li><li>● Vehicle registration</li><li>● Driver ID</li></ul></div> <div>Key Data Element examples/guidance<table><tr><th colspan="2">Gate Out</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Consignor ID - GLN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vessel ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Departure</td></tr><tr><td>Where</td><td>Gate In/Gate Out Location ID - GLN</td></tr><tr><td>Why</td><td>Arrival/Departure Links: Gate-in/Gate Out records</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Gate out date and timestamp</li></ul></div>	Gate Out		Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Consignor ID - GLN	What	Consignment ID - SSCC Vessel ID - GIAI	When	Date/Time of Departure	Where	Gate In/Gate Out Location ID - GLN	Why	Arrival/Departure Links: Gate-in/Gate Out records
Gate Out														
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Consignor ID - GLN													
What	Consignment ID - SSCC Vessel ID - GIAI													
When	Date/Time of Departure													
Where	Gate In/Gate Out Location ID - GLN													
Why	Arrival/Departure Links: Gate-in/Gate Out records													

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE10	<div>Delivery</div> <div>Gate in process</div> <div>Load units scanned and recorded in WMS/ERP system</div> <div>Proof of Delivery completed</div> <div>Goods received notified to supplier ERP</div> <div>Gate out process completed</div>	<div><ul style="list-style-type: none"><li>● Vehicle registration</li><li>● Driver ID</li><li>● Driver site induction/access card number</li><li>● Date and time</li><li>● Transport label from load unit scan</li><li>● Date delivered</li><li>● Job number (transport company)</li><li>● Invoice number (credit)</li><li>● Freight paid by</li><li>● Collected from location</li><li>● Delivered to location</li><li>● Number of load units or items</li><li>● Contact name and number of consignor</li><li>● Terms &amp; Conditions acceptance</li><li>● Signature of consignee</li></ul></div> <div>Usually EDI message listing:<ul style="list-style-type: none"><li>● All or a portion was received</li><li>● Discrepancy between content received and purchase order</li><li>● Damaged items</li><li>● Missing stock items</li><li>● Date and time stamp</li><li>● Vehicle registration</li></ul></div> <div>Key Data Element examples/guidance<table><tr><th colspan="2">Goods Receiving</th></tr><tr><td>Who</td><td>Consignee ID - GLN Logistics Service Provider ID - GLN</td></tr><tr><td>What</td><td>Consignment ID - SSCC</td></tr><tr><td>When</td><td>Date/Time of EDI message issued</td></tr><tr><td>Where</td><td>Destination Location ID - GLN</td></tr><tr><td>Why</td><td>Goods received Links: Goods received record</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Gate in date and timestamp</li><li>● SSCC of inbound product</li><li>● POD Number</li><li>● SSCC of cartons or pallets of missing or damaged stock</li><li>● Gate out date and timestamp</li></ul></div>	Goods Receiving		Who	Consignee ID - GLN Logistics Service Provider ID - GLN	What	Consignment ID - SSCC	When	Date/Time of EDI message issued	Where	Destination Location ID - GLN	Why	Goods received Links: Goods received record
Goods Receiving														
Who	Consignee ID - GLN Logistics Service Provider ID - GLN													
What	Consignment ID - SSCC													
When	Date/Time of EDI message issued													
Where	Destination Location ID - GLN													
Why	Goods received Links: Goods received record													



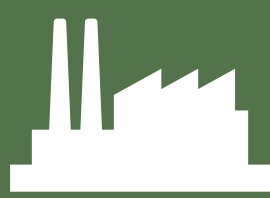
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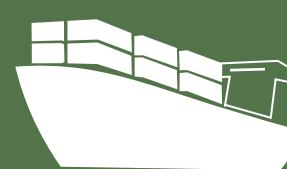
Wholesale and Distribution



Retail Operations



Food Service



Import Operations



Export Operations



Consumer Information



Cybersecurity, Data & Privacy



Supplemental Information



CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE11	Returns and salvage	<ul style="list-style-type: none"><li>● Transport label scan at loading</li><li>● Transport label scan at un-loading</li></ul>												
	Consignor instructs transport company to return/ dispose of rejected stock	Key Data Element examples/guidance												
	Returned load units scanned at unloading	<table><tr><th colspan="2">Unloading</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Return unloading</td></tr><tr><td>Where</td><td>Destination Location ID - GLN</td></tr><tr><td>Why</td><td>Return Links: Unloading record</td></tr></table>	Unloading		Who	Logistics Service Provider ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Return unloading	Where	Destination Location ID - GLN	Why	Return Links: Unloading record
Unloading														
Who	Logistics Service Provider ID - GLN Driver ID - GSRN													
What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of Return unloading													
Where	Destination Location ID - GLN													
Why	Return Links: Unloading record													
		Information to be shared to a traceability platform <ul style="list-style-type: none"><li>● SSCC of returned or disposed goods</li></ul>												
FT CTE12A	Transport asset/load unit traceability	Create load unit <ul style="list-style-type: none"><li>● SSCC number</li></ul>												
	Apply scannable unique ID	Aggregating load units - Pooled pallet movement docket <ul style="list-style-type: none"><li>● Consignor ID</li><li>● Consignee ID</li><li>● Delivery date/transfer of equipment date</li><li>● Receival authorisation</li><li>● Equipment ID</li><li>● Number of pallets</li><li>● Type of pallets</li><li>● Driver signature</li><li>● Customer signature</li></ul>												
	Pallet transfer authority signed by consignee or consignor	Key Data Element examples/guidance												
		<table><tr><th colspan="2">Create Load Unit</th></tr><tr><td>Who</td><td>Consignor ID - GLN Logistics Service Provider - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Returns loading</td></tr><tr><td>Where</td><td>Consignor Location ID - GLN</td></tr><tr><td>Why</td><td>Create Load Unit Links: Consignment Record</td></tr></table>	Create Load Unit		Who	Consignor ID - GLN Logistics Service Provider - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Returns loading	Where	Consignor Location ID - GLN	Why	Create Load Unit Links: Consignment Record
Create Load Unit														
Who	Consignor ID - GLN Logistics Service Provider - GLN Driver ID - GSRN													
What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of Returns loading													
Where	Consignor Location ID - GLN													
Why	Create Load Unit Links: Consignment Record													
		Information to be shared to a traceability platform <ul style="list-style-type: none"><li>● SSCC of pallets</li></ul>												

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE12B	Scan load units prior to unloading and when re-loading on transport vehicles	<div>Scan pallet SSCC at loading and unloading</div> <div>Key Data Element examples/guidance:</div> <table><tr><th colspan="2">Unloading and Loading</th></tr><tr><td>Who</td><td>Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Unloading/Loading</td></tr><tr><td>Where</td><td>Unloading/Loading Location ID - GLN</td></tr><tr><td>Why</td><td>Unloading/Loading Links: Unloading/Loading records</td></tr></table>	Unloading and Loading		Who	Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Unloading/Loading	Where	Unloading/Loading Location ID - GLN	Why	Unloading/Loading Links: Unloading/Loading records
Unloading and Loading														
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What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of Unloading/Loading													
Where	Unloading/Loading Location ID - GLN													
Why	Unloading/Loading Links: Unloading/Loading records													
FT CTE13	<div>Intermodal and multimodal transport</div> <div>GPS tracking</div>	<div><ul style="list-style-type: none"><li>GPS coordinates longitude and latitude</li><li>Time and time zone</li></ul></div> <div>Key Data Element examples/guidance</div> <table><tr><th colspan="2">GPS Tracking</th></tr><tr><td>Who</td><td>Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of GPS transmission</td></tr><tr><td>Where</td><td>Location and route ID - GLN</td></tr><tr><td>Why</td><td>In Transit GPS tracking Links: GPS Tracking data</td></tr></table>	GPS Tracking		Who	Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of GPS transmission	Where	Location and route ID - GLN	Why	In Transit GPS tracking Links: GPS Tracking data
GPS Tracking														
Who	Transport Company ID - GLN Driver ID - GSRN													
What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of GPS transmission													
Where	Location and route ID - GLN													
Why	In Transit GPS tracking Links: GPS Tracking data													
FT CTE14	<div>Gate In and Gate Out record</div> <div>For containers: UN standard message for Gate In:Gate Out of containers can be <a href="http://www.stylusstudio.com/edifact/D97A/CODECO.htm">accessed here:</a> <a href="http://www.stylusstudio.com/edifact/D97A/CODECO.htm">www.stylusstudio.com/edifact/D97A/CODECO.htm</a></div>	<div><ul style="list-style-type: none"><li>Entry and exit gate arrival/departure date and time</li><li>Vehicle registration number</li><li>Driver ID</li><li>Driver site induction</li><li>Security card number verification (ASIC/MSIC)</li></ul></div> <div>Key Data Element examples/guidance</div> <table><tr><th colspan="2">Arrival / Departure</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Arrival / Departure</td></tr><tr><td>Where</td><td>Gate in/Gate Out Location ID - GLN</td></tr><tr><td>Why</td><td>Arrival / Departure</td></tr></table>	Arrival / Departure		Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Vehicle ID - GIAI	When	Date/Time of Arrival / Departure	Where	Gate in/Gate Out Location ID - GLN	Why	Arrival / Departure
Arrival / Departure														
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN													
What	Consignment ID - SSCC Vehicle ID - GIAI													
When	Date/Time of Arrival / Departure													
Where	Gate in/Gate Out Location ID - GLN													
Why	Arrival / Departure													



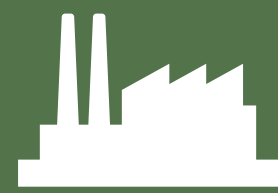
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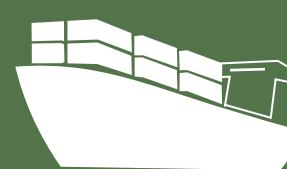
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE15	Transport company	<ul style="list-style-type: none"><li>Recording load units allocated to each rail wagon/container on consist/vessel via new transport labels — new transport label scanned</li></ul> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Loading</th></tr><tr><td>Who</td><td>Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Container ID - GSIN Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Loading</td></tr><tr><td>Where</td><td>Location and route ID - GLN</td></tr><tr><td>Why</td><td>Loading Links: Loading records</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>GPS tracking data</li><li>Gate In and Gate Out date and time</li><li>SSCC associated with new transport label and vehicle</li></ul> <p>For containers: UN standard message for Gate In/Gate Out of containers can be accessed here: <a href="http://www.stylusstudio.com/edifact/D97A/CODECO.htm">www.stylusstudio.com/edifact/D97A/CODECO.htm</a></p>	Loading		Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN	What	Consignment ID - SSCC Container ID - GSIN Vehicle ID - GIAI	When	Date/Time of Loading	Where	Location and route ID - GLN	Why	Loading Links: Loading records
	Loading													
Who	Logistics Service Provider ID - GLN Transport Company ID - GLN Driver ID - GSRN													
What	Consignment ID - SSCC Container ID - GSIN Vehicle ID - GIAI													
When	Date/Time of Loading													
Where	Location and route ID - GLN													
Why	Loading Links: Loading records													
	Loading bay, transport vehicle, wagon allocation													
FT CTE16A	Coastal shipping	<ul style="list-style-type: none"><li>Cargo description</li><li>Consignor ID</li><li>Vessel the cargo is being transported on</li><li>Shipping line</li><li>Bill of Lading number</li><li>Freight forwarder</li><li>Consignee</li><li>Notify party (usually the freight forwarder of LSP)</li></ul> <p>Message to nominated parties of:</p> <ul style="list-style-type: none"><li>Shipment reference number</li><li>Container number</li><li>Vessel name</li><li>Shipping line number</li><li>Estimated time of arrival</li></ul> <p>Message to nominated parties (consignee, transport company, LSP). Advice on Bill of Lading/Notice that freight is paid and container is released ready for collection</p>												
	Planning													
	Bill of Lading signed by shipping line													
	Ship Arrival Notice													
	Cargo Availability Notice													

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FT CTE16B	Loaded truck/train exits port	<div>Gate out record</div> <ul style="list-style-type: none"><li>● Vehicle registration</li><li>● Date and time</li><li>● Container number</li></ul> <div>Key Data Element examples/guidance</div> <table><tr><th colspan="2">Transport Departure</th></tr><tr><td>Who</td><td>Port ID - GLN Driver ID - GSRN</td></tr><tr><td>What</td><td>Container ID - GSIN Vehicle ID - GIAI</td></tr><tr><td>When</td><td>Date/Time of Departure</td></tr><tr><td>Where</td><td>Port Location ID - GLN</td></tr><tr><td>Why</td><td>Transport Departure Links: Transport Status message Gate Out record</td></tr></table>	Transport Departure		Who	Port ID - GLN Driver ID - GSRN	What	Container ID - GSIN Vehicle ID - GIAI	When	Date/Time of Departure	Where	Port Location ID - GLN	Why	Transport Departure Links: Transport Status message Gate Out record
Transport Departure														
Who	Port ID - GLN Driver ID - GSRN													
What	Container ID - GSIN Vehicle ID - GIAI													
When	Date/Time of Departure													
Where	Port Location ID - GLN													
Why	Transport Departure Links: Transport Status message Gate Out record													
FT CTE17	<div>Delivery</div> <div>POD signed by Consignee</div>	<ul style="list-style-type: none"><li>● Date delivered</li><li>● Job number (transport company)</li><li>● Invoice number (credit)</li><li>● Freight paid by</li><li>● Collected from location</li><li>● Delivered to location</li><li>● Number of load units or items</li><li>● Contact name and number of consignor</li><li>● Terms &amp; Conditions acceptance</li><li>● Signature of consignee</li></ul> <div>Key Data Element examples/guidance</div> <table><tr><th colspan="2">Delivery</th></tr><tr><td>Who</td><td>Consignee ID - GLN Receivals Staff ID - GSRN Driver ID - GSRN</td></tr><tr><td>What</td><td>Consignment ID - SSCC Number of load units or items</td></tr><tr><td>When</td><td>Date/Time POD signed</td></tr><tr><td>Where</td><td>Destination Location ID - GLN</td></tr><tr><td>Why</td><td>Proof of delivery</td></tr></table> <div>Information to be shared to a traceability platform</div> <ul style="list-style-type: none"><li>● BOL number</li><li>● Port Gate Out date and time</li><li>● Signed POD number</li></ul>	Delivery		Who	Consignee ID - GLN Receivals Staff ID - GSRN Driver ID - GSRN	What	Consignment ID - SSCC Number of load units or items	When	Date/Time POD signed	Where	Destination Location ID - GLN	Why	Proof of delivery
Delivery														
Who	Consignee ID - GLN Receivals Staff ID - GSRN Driver ID - GSRN													
What	Consignment ID - SSCC Number of load units or items													
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Where	Destination Location ID - GLN													
Why	Proof of delivery													



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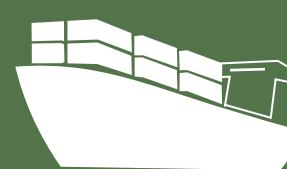
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## Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

### Foundational Elements

#### Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a store location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location in the world.



#### Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product's packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

#### Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.



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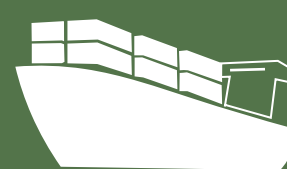
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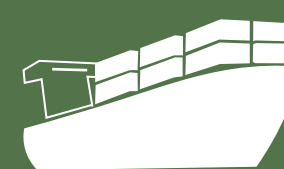
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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/ Format	Further information
Location	Food Processor, Dispatch Dock, Transport Company, Logistics Services Provider, Drop point, Storage	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Use-by Date, Date of transport booking, Date of pickup, Date of dispatch Date of goods delivery, Date of goods receipt	Year-Month-Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Outputs such as finished goods, packaged or processed goods	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li>• <a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li>• <a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch, Serial Number, Production Date		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number etc. can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers: <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)</a>
Logistics Units	Crate or Box of finished Goods, Pallet of Finished Goods	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>
Weights & Measures	Variable count of items. Count of items on a logistics unit. Total weight of pallet in NET Kilos. Total Length of goods delivered in Metres. Total volume of goods delivered in Cubic Metres	Must be accompanied with a GTIN	Varying	Variable measure trade items use GS1 Application Identifier data fields that contains the quantity or dimension of a variable measure trade item. It also denotes the unit of measure. These element strings are used to complete the identification of a variable measure trade item. They contain information such as the weight, size, volume, or dimension of a variable measure trade item
Assets	Returnable assets like IBC, crate, pallet Individual assets like transport vehicle, trailer, vessel, transport equipment etc	Global Returnable Asset Identifier (GRAI)	0 + AN20	Can be identified as an asset type only or an optional serial number can be added to distinguish individual assets <a href="https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file</a>
		Global Individual Asset Identifier (GIAI)	AN30	
Document Identifiers	Food transport Business licence, Vendor declarations, transport messages	Global Document Type Identifier (GDTI)	AN30	Can be encoded in a barcode or printed directly on the document. Companies can use the GDTI as a method of identification and registration of documents and related events. <a href="https://www.gs1.org/docs/idkeys/GS1_GDTI_Executive_Summary.pdf">https://www.gs1.org/docs/idkeys/GS1_GDTI_Executive_Summary.pdf</a>
Service provider and recipient relationships	Driver ID, Consignee receivals staff	Global Service Relationship Number (GSRN)	N18	Service providers and service clients can be individuals or businesses. The GSRN can identify either a recipient or a provider of the organisation's services, and often both roles need to be captured or recorded simultaneously. <a href="https://www.gs1.org/docs/idkeys/GS1_GSRN_Executive_Summary.pdf">https://www.gs1.org/docs/idkeys/GS1_GSRN_Executive_Summary.pdf</a>



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## Asset Identification

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g. a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g. a Intermediate Bulk Container), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned. Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.



### Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate. The GS1 System identification of a returnable asset, the Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned.

This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.



### Global Individual Asset Identifiers (GIAI) – AI (8004)

An individual asset is considered a physical entity made up of any characteristics. The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records.

Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used. This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.



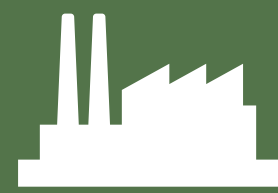
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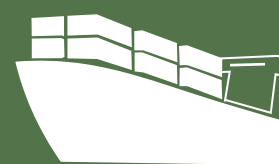
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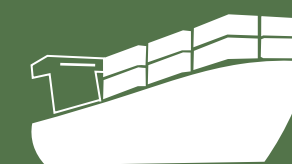
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**Global Document Type Identifier (GDTI) - AI (253)**

The Global Document Type Identifier can be used by companies to identify documents, including the class or type of each document. In cases where companies require identification of individual documents, an optional alphanumeric serial number can be included in the GDTI.

The GDTI can be encoded in a barcode or printed directly on the document. Companies can use the GDTI as a method of identification and registration of documents and related events.

Some examples of document types that may be identified using a GDTI include:

- Land registration papers identifying the property
- Vendor Declarations
- Food Transport Business Licence Number
- Proof of shipment forms
- Enhanced driver’s licences
- Internal invoices

**Global Service Relation Number (GSRN) - AI (8017) & AI (8018)**

The Global Service Relation Number can be used by services organisations to identify their relationships with individual service providers (such as doctors who work for a hospital) and individual service clients (such as the metering points of an electricity company, or the loyalty account members of a retailer).

The GSRN can identify either a recipient or a provider of the organisation’s services, and often both of these roles need to be captured or recorded simultaneously. Therefore, the GS1 System allows users to distinguish between the two roles.

The GSRN can be encoded in a barcode or EPC/RFID tag; for example, in a badge or wristband or on a metering point.

AI (8017) is used to identify the service relationship between the organisation offering the service and the Service Provider.

AI (8018) is used to identify the service relationship between the organisation offering the service and the Service Recipient.



Credit: Perfection Fresh



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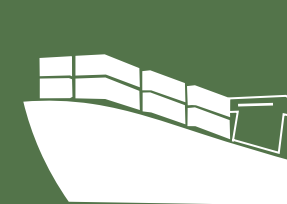
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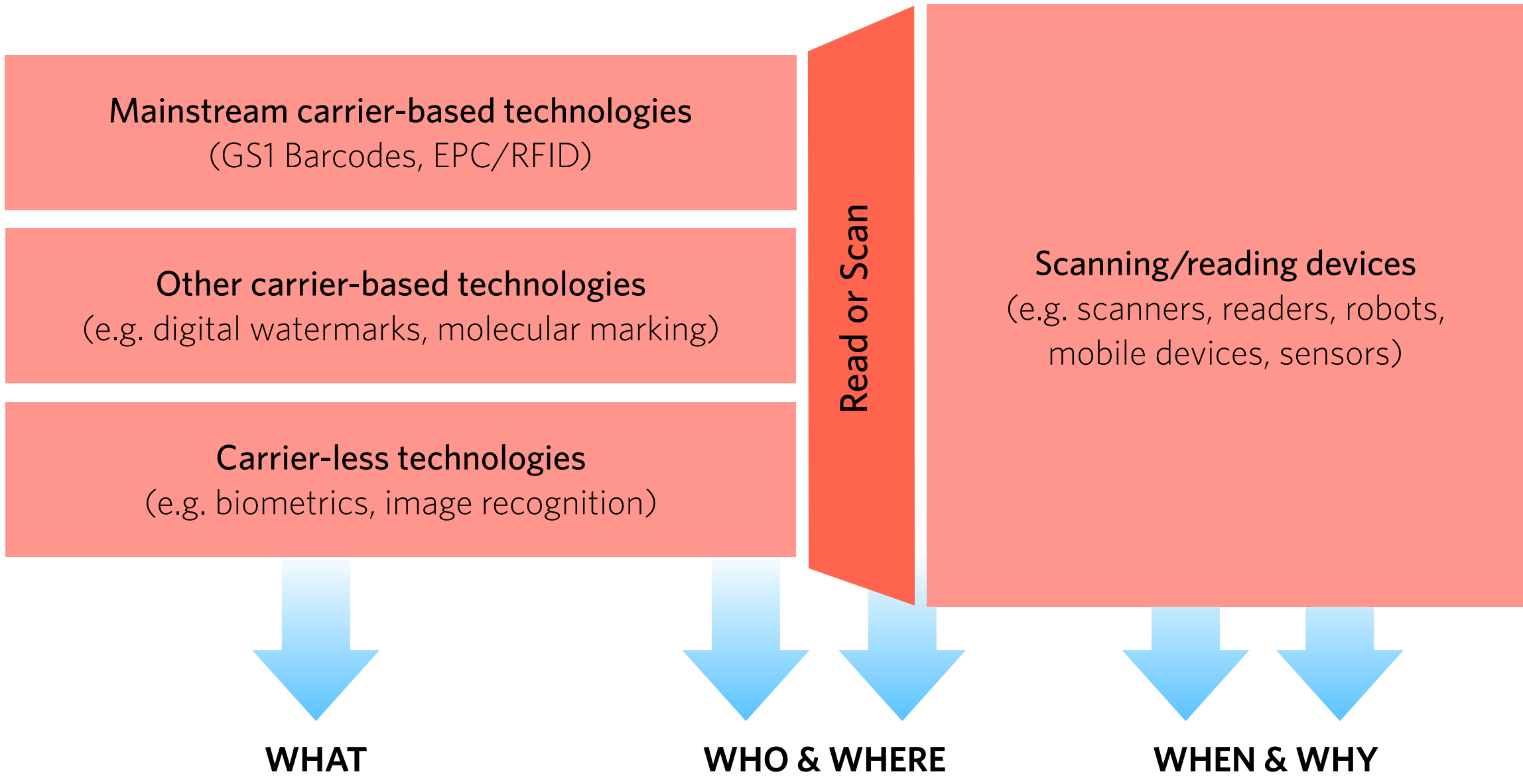
How to capture the KDEs

How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

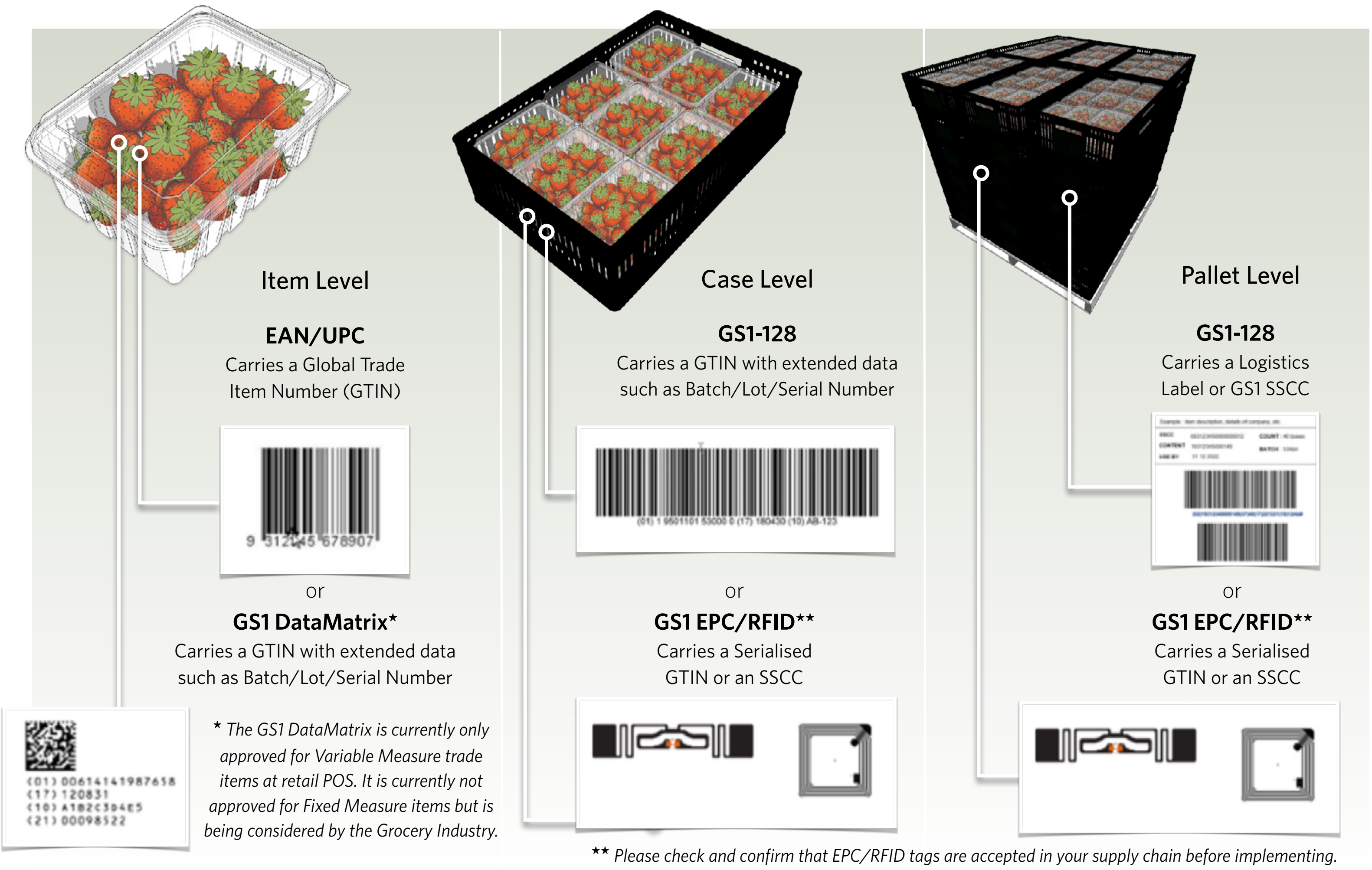


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.







Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc. The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

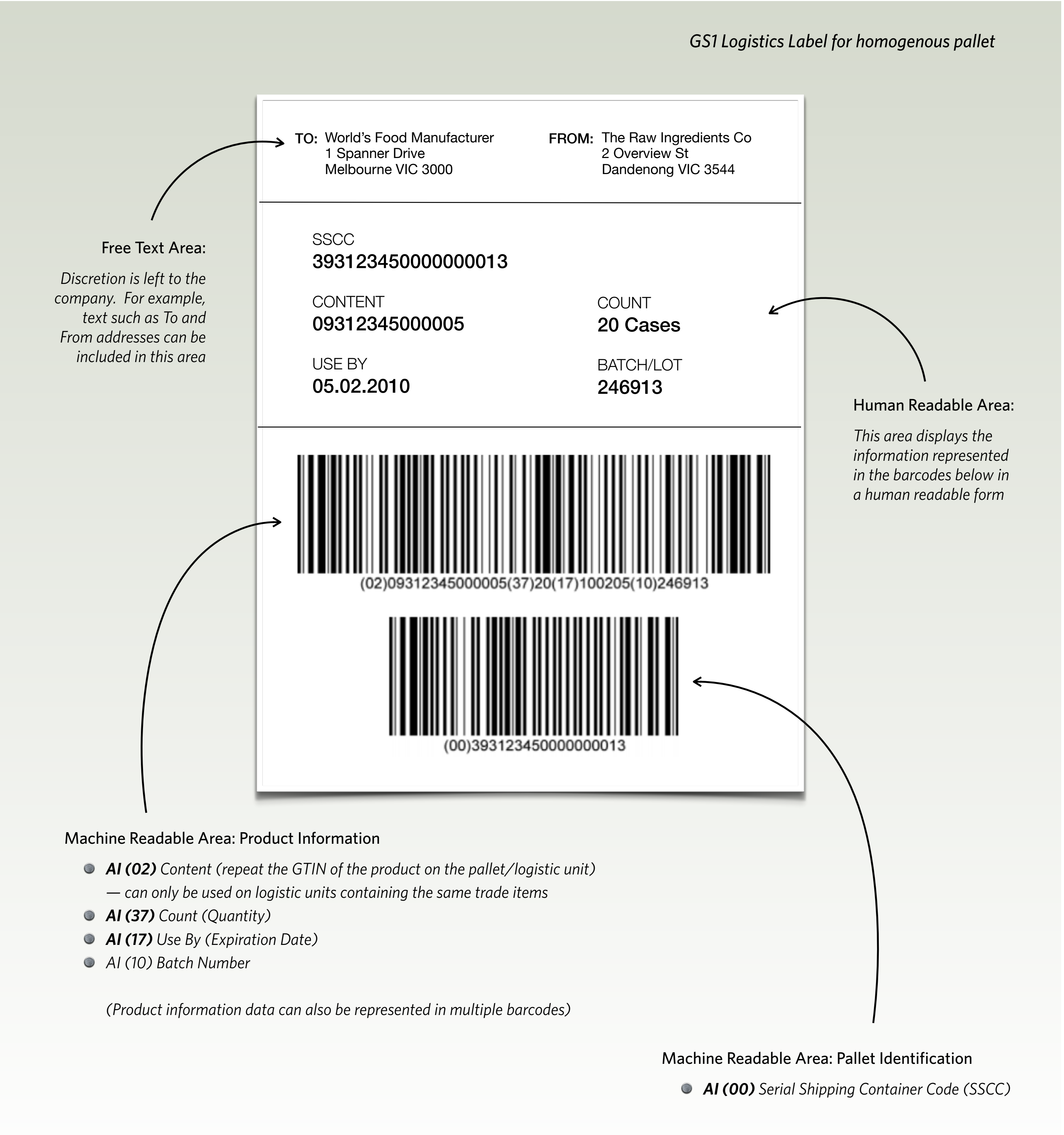
For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number



GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number



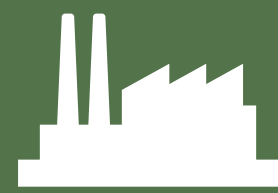
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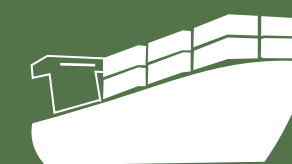
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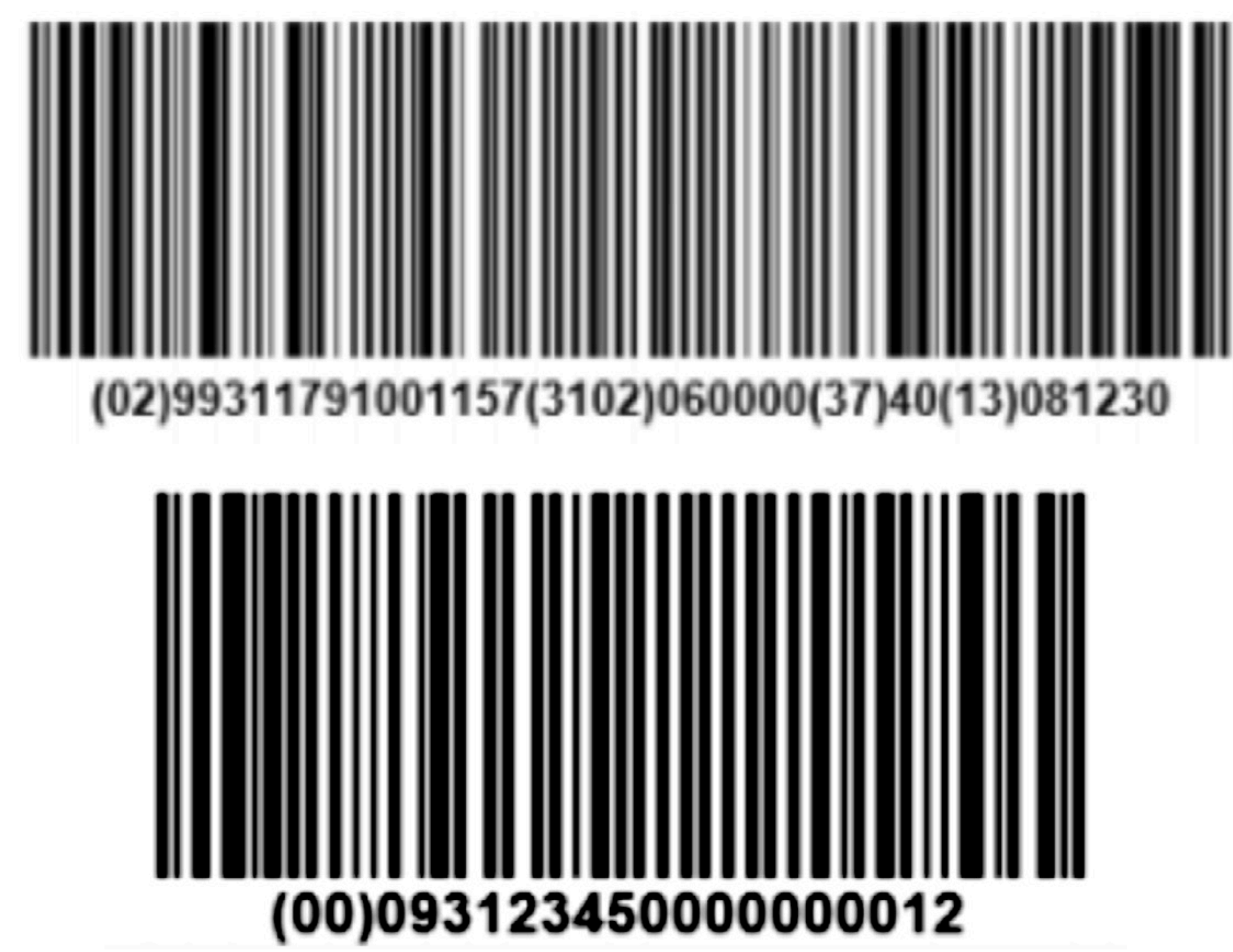
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FREE INFORMATION

Example: Beef Topside 600kg, details of company

**SSCC** 093123450000000012    **Prod Date** 3012/2008  
**CONTENT** 99311781001157    **Count** 40 boxes **WEIGHT** 600kg



GS1 Logistics Label homogenous logistics unit containing variable weight products



Global Returnable Asset Identifier, AI (8003), represented in a GS1-128 Barcode



Global Individual Asset Identifier, AI (8004), represented in a GS1-128 Barcode



Global Document Type Identifier, AI (253), represented in a GS1-128 barcode in a Freight Forwarding form



Global Document Type Identifier, AI (8017), represented in a GS1 barcode for staff identification



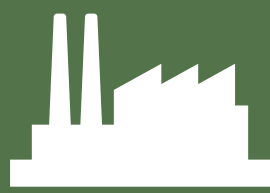
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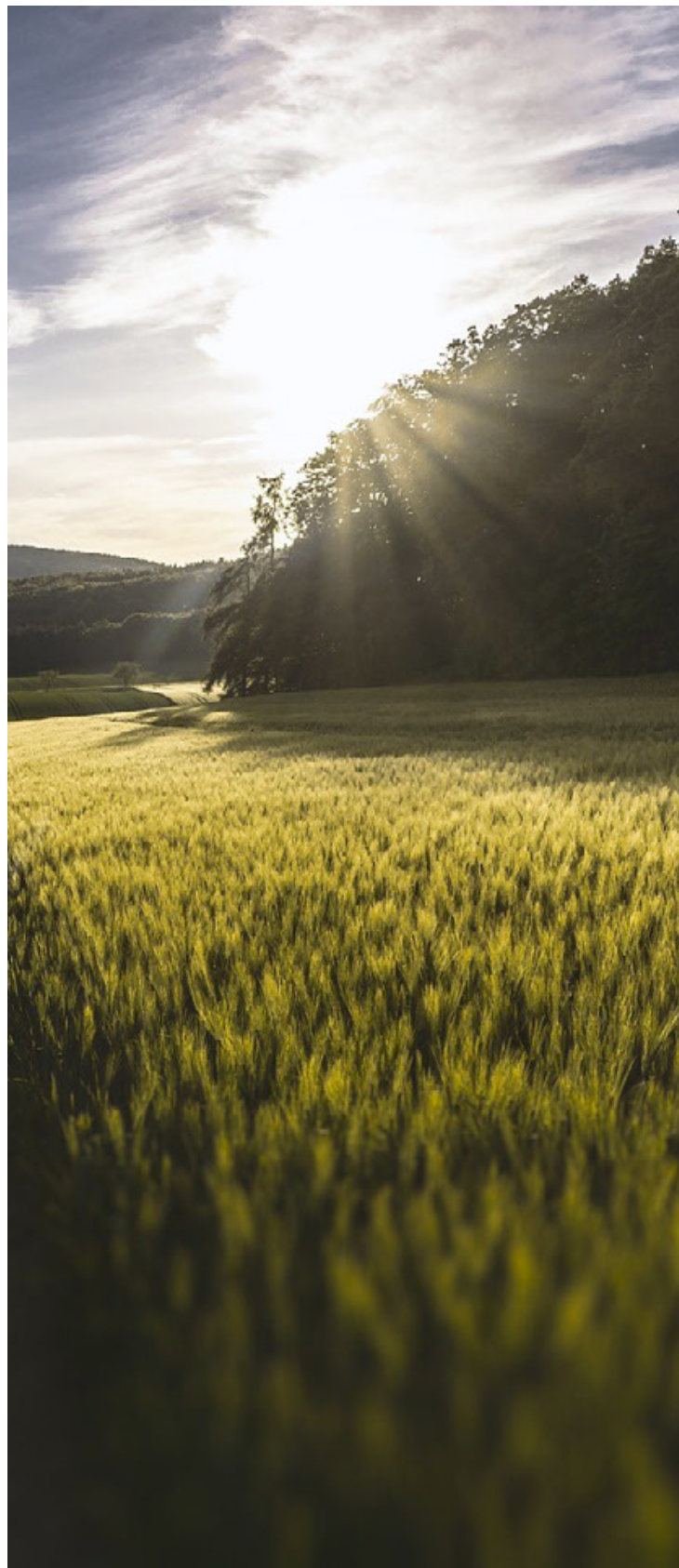


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## How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing. In addition to product scanning, logistics labels can also be scanned to capture vital traceability data as logistics units (pallets, parcels, grouping of products) move through the supply chain.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

Usually the first step will be scanning of inputs, livestock etc upon receipt. For barcodes, this is often done using handheld devices. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are harvesting, storing, picking, packing, shipping, transporting, selling.

Often a combination of fixed mounted scanners or readers and hand-held devices will be applied to capture the critical tracking events. The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.



### Useful Links

#### Food Safety

- <https://www.primesafe.vic.gov.au/>
- <https://www.service.nsw.gov.au/guide/start-road-freight-transport-business-nsw>
- <https://ablis.business.gov.au/service/vic/meat-and-seafood-transport-vehicle-licence/24559>
- <https://www.safefood.qld.gov.au/food-business/accreditation/transporter/>

#### Vehicle and driver licensing and regulation

- National Heavy Vehicle Regulator <https://www.nhvr.gov.au/>
- <https://info.australia.gov.au/information-and-services/transport-and-regional/roads-and-road-transport/authorities>

#### Chain of Responsibility

- <https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility>

#### Bulk Liquid transport and storage

- <https://www.epa.vic.gov.au/-/media/epa/files/publications/1698.pdf>

#### Transport asset/load unit traceability

- <https://austlogistics.com.au/wp-content/uploads/2014/08/ALC-Guideline>

#### Plant and animal biosecurity certification for interstate transport

- <https://www.interstatequarantine.org.au/producers/interstate-certification>

#### List of Abbreviations:

3PL	Third Party Logistics
CVD	Commodity Vendor Declaration
NVD	National Vendor Declaration
eNVD	Electronic National Vendor Declaration
LTL	Less than truckload
FSANZ	Food Standards Australia New Zealand
FCL	Full Container Load
FTL	Full Truck Load



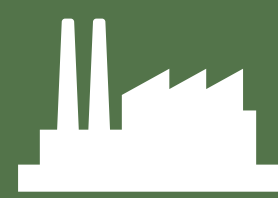
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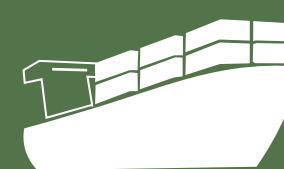
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Advance Shipping Notice	An advance ship notice or advance shipping notice (ASN) is a notification of pending deliveries, similar to a packing list. It is usually sent in an electronic format and is common EDI document.
ASIC/MSIC	An Aviation Security Identification Card (ASIC) and Maritime Security Identification Card (MISC) is required for drivers entering air and sea ports in Australia. <sup>4</sup>
Bill of Lading (BOL)	The Bill of Lading is used for international shipments and for coastal shipping processes. The BOL contains all the pertinent details required to ship the product and then invoice the transaction correctly once the transaction is completed. It acknowledges the receipt of cargo, provides evidence of contract of carriage and documents title of the goods.
Cargo Availability Notice	Once a Bill of Lading is marked as all freight paid and cleared with Customs, a notice may be sent to the consignment and their transport company that the cargo is now available for collection from the port of discharge.
Chain of Responsibility (COR)	<p>The aim of COR is to make sure everyone in the supply chain shares responsibility for ensuring breaches of the Heavy Vehicle National Law do not occur. Under COR laws if you are named as a party in the chain of responsibility and you exercise (or have the capability of exercising) control or influence over any transport task, you have a responsibility to ensure the Heavy Vehicle National Law is complied with.</p> <p>The law recognises that multiple parties may be responsible for offences committed by the drivers and operators of heavy vehicles. A person may be a party in the supply chain in more than one way. For example they may have duties as the employer, the operator and the consignor of goods. Legal liability applies to all parties for their actions or inactions. The parties in the Chain of Responsibility for a heavy vehicle are:</p> <ul style="list-style-type: none"><li>● an employer of a driver</li><li>● a prime contractor for the driver — if the vehicle's driver is self-employed</li><li>● an operator of the vehicle</li><li>● a scheduler for the vehicle</li><li>● a loading manager for any goods in the vehicle</li><li>● a loader and/or unloader of a vehicle</li><li>● a consignor of any goods for transport by the vehicle</li><li>● a consignee of any goods in the vehicle</li><li>● a loader and/or unloader of any goods in the vehicle. <sup>5</sup></li></ul>
Consignor	<p>The owner of the goods being contracted to be shipped/transported. The agent for the consignor may be their 3PL operator but the party known as the consignor is the owner of the product.</p> <p>The consignor is responsible for the goods in transit until the nominated consignee signs for receipt of the goods.</p>
Consignee	The consignee is the recipient of the goods being shipped. A consignee is a customer or client. Although products may be transported to a warehouse operated separately from the listed consignee, legally the responsible ultimate owner of the product is the consignee.

4. <https://www.homeaffairs.gov.au/transport-security/Pages/identity/applying-asic-msic.aspx>  
5. <https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility/about>





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Consignment Note	The consignment note is a key document used in transporting freight within domestic supply and in the landside logistics of import and export. The goods are deemed to be “on consignment” until they reach the consignee. The document is prepared by the consignor and countersigned by the transport carrier as a proof of receipt of the consignment for delivery at the destination.
Container Weight Declaration (CWD)	<p>A CWD is a written declaration of the weight of a container and its contents. It may be either in hard copy or electronic form, or a placard attached to the freight container. It may consist of one or more documents in different formats — for example, documents may be in the form of a sheet of paper, an email, on an electronic device, or in otherwise electronic form — but in any case, it must be able to be produced in its entirety, to an authorised officer, upon request.</p> <p>Although there is no specific form for a CWD, it must include the following information:</p> <ul style="list-style-type: none"><li>● weight of the container including its contents</li><li>● container number and other details necessary to identify the container</li><li>● name and residential address or business name and address in Australia of the responsible entity for the freight container</li><li>● date of declaration.</li></ul>
Delivery Order	<p>A document from the Consignor of the freight which orders the release of the cargo to another party. This permits the delivery direct to a warehouse or depot, as organised with the Consignee.</p> <p>This enables the Consignor to order pick up of product from a 3PL warehouse in order to deliver to the party named in the Delivery Order.</p>
FSANZ	Food Standards Australia New Zealand (FSANZ) is a statutory authority in the Australian Government Health portfolio. FSANZ develops food standards for Australia and New Zealand. The Code is enforced by state and territory departments, agencies and local councils in Australia and the Australian Department of Agriculture and Water Resources for food imported into Australia.
Load Unit	<p>The Principle of Unit Load states that, “it is quicker and more economical to move a lot of items at a time rather to move each one of them individually”.</p> <p>In other words, this principle suggested that the larger the load handled, the lower the cost per unit handled. Packages loaded on a pallet, in a crate or any other way that enables them to be handled at one time as a unit is described as a load unit. Load units may be pallets, tubs, barrels, shipping or intermodal containers, tanks, cages or unit load devices (airfreight).</p>
Logistics Service Provider (LSP)	Logistics refers to the overall process of managing how resources are acquired, stored, and transported to their final destination. There are three major activities in logistics — inbound, outbound and reverse logistics. A logistics service provider is responsible for outsourced logistics activities, generally contracted to a product supplier or retail customer. The LSP provides a broader range of services as compared with freight transport.
LTL/LCL shipment and FTL/FCL shipment	<p>LTL stands for “less-than-a-truckload”; LCL stands for “less than a container full” shipment, which can require load de/consolidation to achieve cost-effective freight transport.</p> <p>FTL stands for “full truckload” and FCL for “full container load”.</p>



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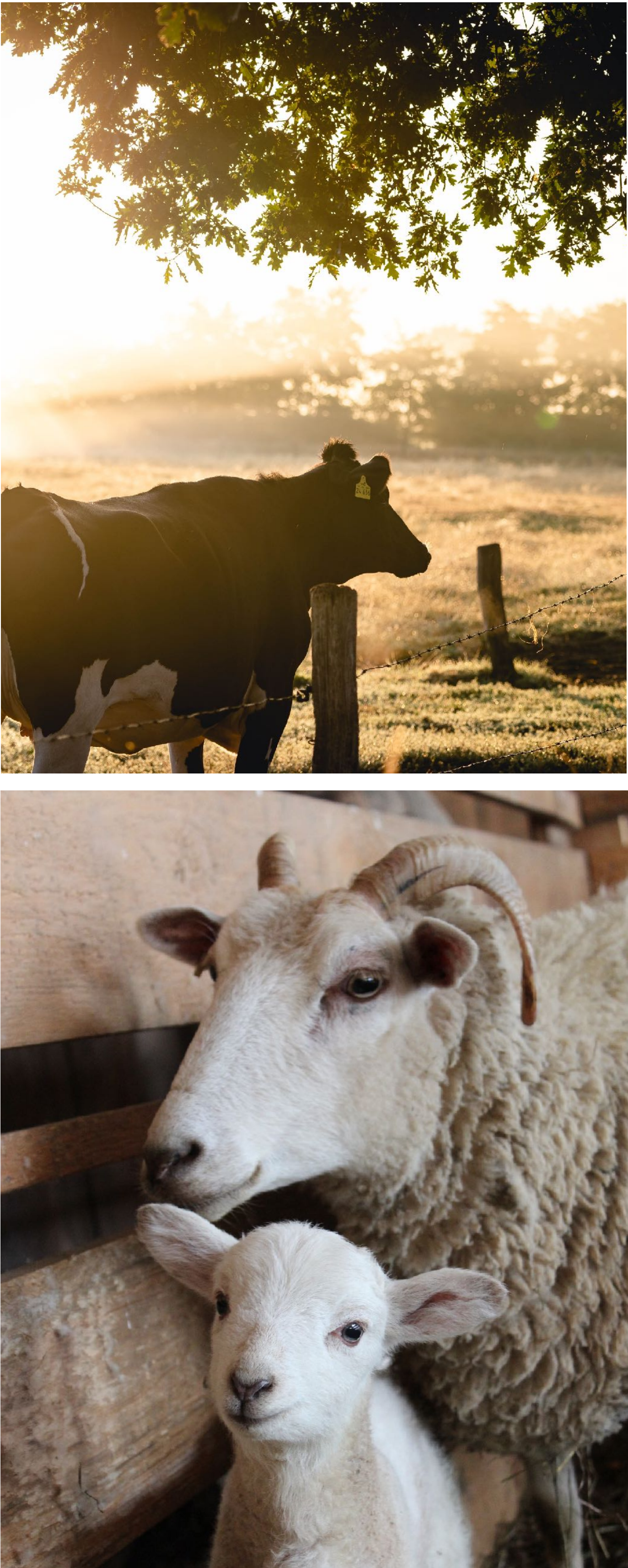


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Order Confirmation	A legally binding commitment to deliver specified good on specified terms. This enables the buyer to plan for receipt of these goods and if unconfirmed, to look to alternative suppliers.
Proof of Delivery (POD)	A commercial document used by the Consignee or their Logistics Service Provider to notify the Consignor of the receipt and acceptance of a delivery. A signed POD enables the Transport Company to raise an invoice.
Purchase Order	A commercial document issued by a buyer to a supplier. This is a legally binding offer to buy product in return for payment. The terms and conditions for delivery and payment are detailed in this document, which also details the product quantity, price, terms and conditions, product quality specifications.
Ship Arrival Notice	A notice is sent from a shipping line, freight forwarder to advise nominated parties e.g. consignee, transport company of the arrival of the vessel and container at the discharge port. This enables the consignee and their transport company to make a vehicle booking to collect the cargo when it is cleared.
Third Party Logistics (3PL)	Outsourcing of distribution, warehousing or fulfilment. In food logistics, a 3PL may operate storage for multiple food suppliers or retailers, often specialising in cold chain management, a specific product, or distribution at a national, metropolitan or regional level. 3PL warehouses may assemble products for promotions, prepare in-store product displays. Through their warehouse management system they monitor inventory and interact with customers to manage inventory, assembling orders and preparing for dispatch. A proportion of 3PL suppliers also offer distribution and delivery services.
Time and Date Stamp	<div>Time and Date Stamp format:</div> <div><div><div>2021-03-15T01:00+09:00 Load Truck 1 2021-03-15T02:00+09:00 Loading End 2021-03-15T04:00+09:00 Load Truck 2</div><div>Processor</div></div><div>→</div><div><div>2021-03-15T00:30+09:00 Arrive at X 2021-03-15T01:00+09:00 Loading Start 2021-03-15T02:00+09:00 Loading End 2021-03-15T03:00+09:00 Depart X</div><div>Freight Transport</div></div><div>→</div><div><div>2021-03-15T11:00+09:00 Arrival Truck 1 2021-03-15T12:00+09:00 Unload Truck 1 2021-03-15T12:30+09:00 Depart Truck 2</div><div>Retail and Food Service</div></div></div>
Vendor Declarations	Vendor declarations relate to regulatory requirements associated with biosecurity, traceability and safety. They can include electronic National Vendor Declarations for movement of livestock, Commodity Vendor Declarations for movement of fodder or grains, Container Weight Declaration for mass management.




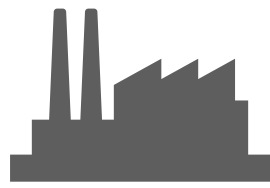











M O D U L E   F O U R :

# Processing and Manufacturing

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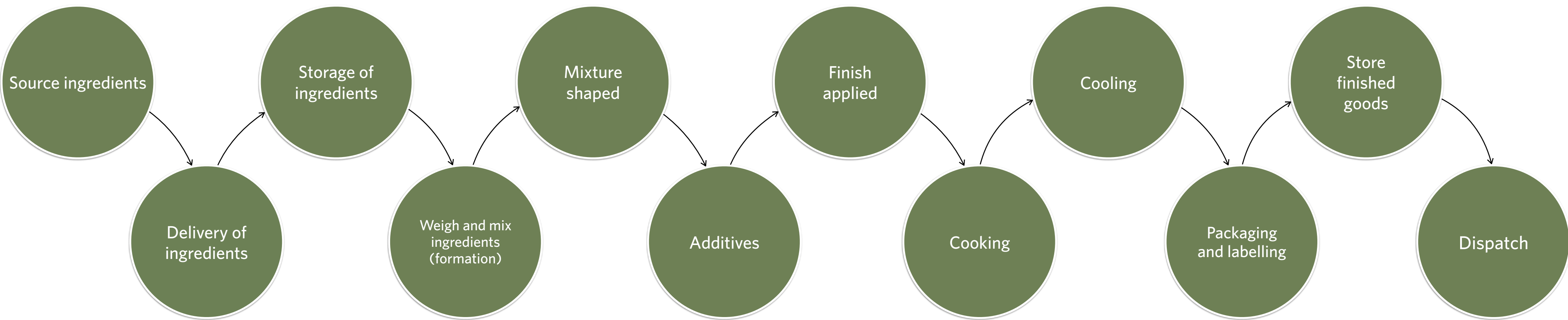




## Processing and Manufacturing

This module covers key activities that generally take place along the food supply chain post the farm gate.

Food processing involves the transformation of agricultural products into food. It may involve freezing or canning outputs directly from farm production or creating inputs to further manufacturing processes e.g. tomatoes to canned tomatoes to tomato paste. Food processing helps to avoid wastage by preserving farm output and making it more edible.



In this module, eight (8) major activities are associated with processing and manufacturing:

- Establishment
- Sourcing of inputs
- Goods Receipt
- Ingredient and raw materials storage
- Processing and manufacturing production
- Labelling and packaging
- Processed/finished goods storage
- Prepare for outbound goods dispatch

## Establishment

During the establishment phase of a food processing business, creating a unique business entity and location identifier will support traceability along the supply chain



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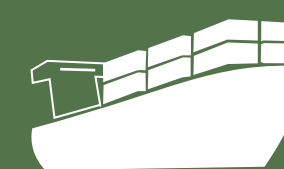
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Sourcing of inputs/ingredients

Identifying, contracting and managing suppliers is a major activity for food processing and manufacture.

In sourcing agricultural produce and other required inputs into food processing or manufacturing, identification and verification of supplier entities and the provenance of the inputs in terms of grow locations and integrity (i.e. the input is as described) is a pre-cursor to traceability of those inputs. Exporting manufacturers may require full traceability from their suppliers due to the regulation of importers in overseas markets, for example, manufacturers supplying to the US market under the Foreign Supplier Verification Program.<sup>1</sup>

For food manufacturing/processing businesses, traceability should extend to being able to identify the source of all food-related batches and lots of inputs such as raw materials, additives, other ingredients and packaging material. Manufacturers may experience substitution of product from alternative producers or locations.

For example, the processor or manufacturer may select an intermediary such as a wholesaler to supply product from several farms of origin. Once the product undergoes processing, or is supplied for further manufacturing, verifying the origin of the product supplied becomes increasingly difficult. Without a traceability system in place from the original source of the product, claims related to provenance are difficult to substantiate.

Suppliers, who may be growers, wholesalers or processors, or importers of ingredients, should be able to provide verification of provenance of supplied raw materials, additives, other ingredients and packaging material. This may take place as part of the due diligence process in sourcing and procurement practices. Suppliers with traceability systems able to provide data that can be automatically shared can be established during this process. A processor or manufacturer may create a selection criterion related to the grower or producer being able to verify the product’s origin.

Processing and manufacturing will transform the inputs. At this point, a new product is created that requires a new unique identifier for a blended or transformed product. This identity can be linked to the original ingredient identification e.g. nuts in a muesli bar.

In this context, access to the unique identifiers for production location, ownership and the production business entity, are fundamental to traceability. These identifiers used frequently in supply chain activities and transactions, form what is termed ‘Master Data’.

Tasks related to traceability

- Create unique identifier for the business and location master data
- Create unique identifiers for each supplier’s business entity and location
- Create unique identifiers for each product
- Verify the input/ingredient origin and integrity

Key participants

- Producer/grower
- Supplier (processor, importer, wholesaler, packaging company)
- Food processor/manufacturer



1. US Food Safety Modernisation Act Foreign Supplier Verification Program  
<https://www.fda.gov/food/food-safety-modernization-act-fsma/>



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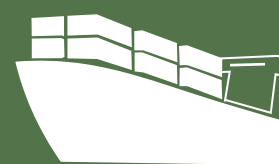
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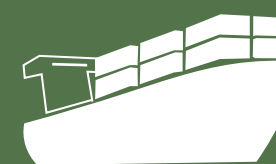
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Receipt of inputs

Processors and manufacturers activate this process through placing an order with the supplier. A Purchase Order (including standard, blanket, call-off) will typically contain details of:

- Purchase Order Number
  - Supplier ID
  - Supplier Contact Details
  - Supplier Location - Buyer ID
  - Buyer Contact Details
  - Buyer Location
  - Buyer delivery location
  - Product Identifier
- Product Name/Description
  - Quantity
  - Unit Type
  - Unit Price
  - Total Cost
  - Purchaser Order Placement Date
  - Customer Order Delivery Date
  - Shipping Terms and Conditions

By using unique identifiers from the Purchase Order formation, the Processor or Manufacturer can create traceability for inputs and outputs that will remain intact for the duration of the product journey.

The Processor or Manufacturer will create a Customer Order once product, quantity, variety, delivery terms and price have been agreed. Often the Processor or Manufacturer will have a term contract to supply, or the product has been grown or made to order. The chain of custody passes to the processor or manufacturer on receipt of the product.

FSANZ provides the following advice in relation to receipt of food, which is regulated in each state or territory:

“If an enforcement officer asks you to do so, you must be able to provide the officer with information on the suppliers of any food on your premises and what that food is. You need this information in case food on your premises is found to be unsafe or contaminated in some way and has to be returned to the supplier or destroyed.

Although most, if not all of the food you buy will be labelled with the name of the product and the name and address of the manufacturer, importer or packager of the food, you may also have unpackaged or unlabelled food on your premises and will need other ways of proving what this food is and where it came from. You might do so using your supplier invoices, or you might keep some other record of your suppliers and what you buy from them and the food you have on your premises. You must not accept food unless you can identify it and trace it back to its supplier.”<sup>2</sup>

Delivery Documentation

Delivery documentation that accompanies a supplier delivery is a requirement by most sites receiving a delivery. This delivery documentation should include relevant traceability information for the product(s) being delivered. Delivery documentation may also include returnable asset identification where it is critical to track such items e.g. Fresh produce crates, palletcons, Intermediate Bulk Containers (IBCs).

Tasks related to traceability

- Delivery Notification (Delivery Note or Electronic Advance Shipping Notice received by processor/manufacturer)
- Product is delivered and unloaded from transport at nominated receipt location e.g. loading dock
- Product is inspected (contamination; identification; temperature) and accepted (or rejected/returned) to suppliers with reason recorded (may occur at putaway)
- Inbound product is matched to purchase order and over/under/missing stock notified to supplier
- Proof of Delivery signed
- Delivery is receipted into inventory management system (spreadsheets, Warehouse Management System (WMS), Enterprise Resource Planning (ERP) or Production system). Critical Traceability information is recorded at this point (Batch Number, Production Date, Expiry date etc)

Key participants

- Supplier
- Processor/Manufacturer – goods receipt staff
- Processor/Manufacturer quality inspection staff
- Transport company and driver

2. [FSANZ Chapter 3, Food Standards Code](#)



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Storage of inbound product

Product may be transferred to the processor/manufacturer’s own pallets or bins for storage. Inbound products may arrive in returnable assets. These might be an intermediate bulk container (IBC) or a drum. Like pallets, these assets are important to identify so their custody and return can be recorded.

The product, which may be in bulk bags or containers, is associated with a storage location in the inbound storage area. This may require a new identifier being introduced that associates the product received with the inventory location and potentially the storage pallet, bin or container.

Tasks related to traceability

- Product transferred to internal storage asset e.g. pallet or bin
- Product put away ready to be called forward to production floor
- Returnable asset identification

Key participants

- Processor/Manufacturer receivals staff
- Storage staff



Labelling and packaging

Labels

Food manufacturers use an array of ingredients ranging from sugar and brine to syrup. The food label is required to contain a range of information. Highlighted items relate to traceability:

- Name of the food
- Unique identifier for food
- Manufactured date and use by date
- Provide lot identification:
  - Description of the ingredient or ingredient listing
  - Description of allergens
  - Instructions for storage and preparation
- Country of origin information
  - Warning and advisory statements
  - Relevant nutritional information
  - Information about weights and measures (volume and quantity)
- Name and address of the processor or manufacturer.

For manufacturers creating finished goods (consumer-ready), the allocation of a new unique identifier for the finished item or product unit is needed. This identifier, known as a global trade item number (GTIN) is most readily applied in the labelling of the product.

Packaging

All packaging that is in contact with any food must be not contaminate the food it contains Packaging components such as paper, adhesives, barrier film or print ink may come into direct contact with the foodstuff and potentially contaminate the product.

Traceability of packaging materials supply involves recording the serial numbers on each lot of packaging materials supplied to the Processor or Manufacturer.

Packaging of cartons for unitising the product items e.g. a carton of 12 bottles of pasta sauce, require

identification, so that the product can be protected in distribution. Carton labelling requirements are regulated by Industry, Innovation and Science Australia: <https://www.industry.gov.au/data-and-publications/guide-to-the-sale-of-pre-packaged-goods/labelling-requirements>

For traceability once the product is secured within a carton, the processor or manufacturer will allocate a serialised shipping identifier to the carton, as well the lot/batch number, date of production and the identity and location of the processing/manufacturer plant. The name of the food product and its use-by date enable storage systems to monitor inventory and food integrity.



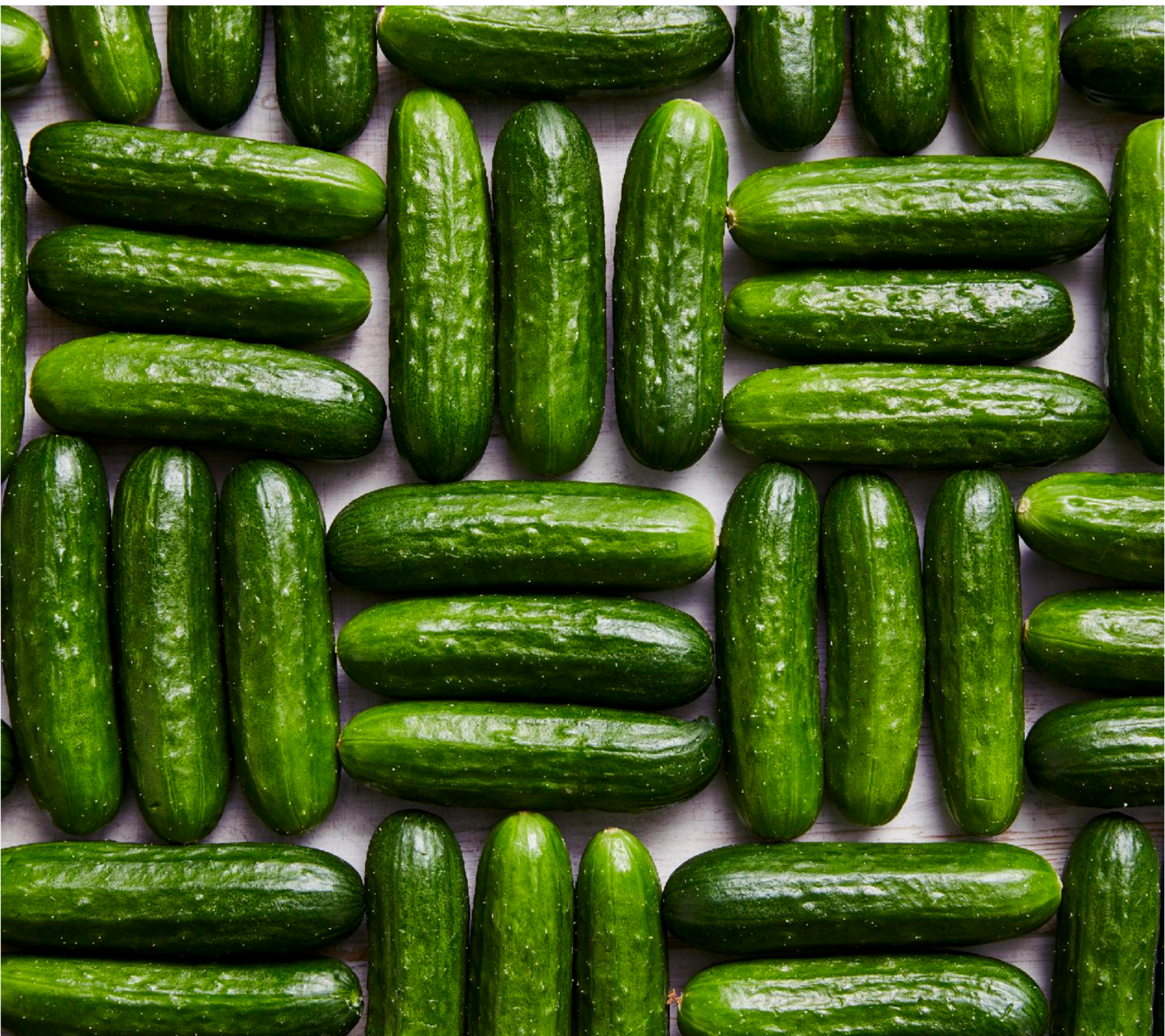
Tasks related to traceability

- Record supplier, date, lot number identifiers on packaging of inbound product/ingredients
- Affix compliant label to item and include product GTIN code
- Pack into cartons with compliant labelling
- Affix serialised shipping code to identify individual cartons

Key participants

- Processor/manufacturer





## Record keeping for traceability

The key requirement in traceability audit is for the processor/manufacture to be able to demonstrate it can track product. In many audit standards, the manufacturer may be asked to perform a traceability exercise during the audit. This puts the responsibility for demonstrating an established traceability system on the manufacturer. The processor or manufacturer is required to demonstrate that it can account for the whereabouts of all of a particular product, ingredient or packaging material.

In an onsite traceability exercise, the auditor will select a finished product, and the supplier will be required to produce records of the disposition of the product and the source of the ingredients and packaging used to produce it.

The records for a traceability test may include the following:

- Ingredients used, including quantities and unique identifier
- Packaging used, including quantities and unique identifier
- Identification and tracking of returnable assets
- Finished product lot identification and quantity produced
- Quantities of waste produced
- Location and quantities of product within the manufacturer’s control and quantities shipped to individual recipients.

### Tasks related to traceability

- Recording of all input materials into the processing or manufacturing process including batch related information
- Recording of production quantities, product, batch, production line
- Recording of waste materials
- Return of un-used materials (if appropriate)

### Key participants

- Processor or manufacturer
- Supplier of returnable assets



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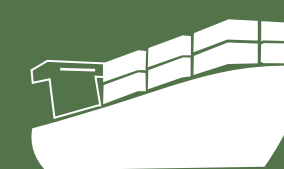
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Critical Tracking Events (CTEs)

For each of the identified processing and manufacturing activities, critical tracking events (CTEs) establish identity and enable traceability and compliance with traceability-related regulation are summarised as follows. Critical Tracking Events (CTEs) are events that relate to the identity, movement and transformation of the food product.

Freight transport activity	CTE code	Critical Tracking Events (CTEs)
Establish master data identification of processor/manufacturer	PM CTE1	Apply for Global Location Number Food processor/manufacturer licence issued Export Establishment Number received
Sourcing	PM CTE2	Identifying the input supplier and/or grower and location
	PM CTE3	Verifying the integrity of the input e.g. test results for chemical residues
Goods Receipt	PM CTE4	Input product unloaded and product inspected. Batch code, best-before/use-by dates recorded.
	PM CTE5	Proof of Delivery signed Goods receipt entered into inventory management system (spreadsheet, Warehouse Management System (WMS), Enterprise Resource Planning (ERP) or Production system etc)
Input/ingredient storage	PM CTE6	Input/ingredient transferred to internal storage asset e.g. pallet or bin
		Input/ingredient put away ready to be called forward to production floor Storage location identified
Processing/Manufacturing Picking stock for production Product processing or manufacturing Recording processing Product inspection	PM CTE7	Production records to include production date, quantity produced, product, batch number, best before or use by date
	PM CTE8	Inspection of processed/manufactured product
Labelling and packing	PM CTE9	Apply unique identifier and compliant product, pack, carton labels
Processed/finished goods storage	PM CTE10	Processed goods moved to interim storage location
Prepare for outbound goods dispatch Pick and Packing Notify consignee Shipping instructions Pickup of product	PM CTE11	Outbound product picked and scanned for customer order
	PM CTE12	Product loaded to pallet or container for outbound distribution or off-site/3PL storage
	PM CTE13	Advance Shipping Notice sent to customer
	PM CTE14	Delivery Order signed Product Dispatched



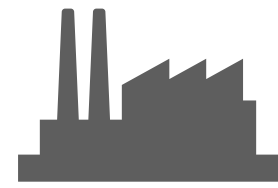
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Key Data Elements

Key Data Elements (KDE) ensure that captured and recorded data can be interpreted and used as relevant and required by all supply chain partners. Key Data Elements define Who, What, When, Where and Why for each Critical Tracking Event identified above.

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
PM CTE1	Establish master data identification of processor/manufacturer	<b>Global Location Number</b>  The Global Location Number (GLN) is used to identify locations and legal entities. This unique identifier is comprised of a GS1 Company Prefix, Location Reference, and Check Digit.  GLNs are used to identify parties to business transactions; functional groups within a company; or real, physical “places” that might ship, receive, process, or hold the product.												
		<table><tr><th colspan="2">Request for GLN</th></tr><tr><td>Who</td><td>Processor Issuing Agency</td></tr><tr><td>What</td><td>Processing Facility</td></tr><tr><td>When</td><td>Date/Time of issuance of Global Location Number (GLN)</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Identification of Processing Facility</td></tr></table>	Request for GLN		Who	Processor Issuing Agency	What	Processing Facility	When	Date/Time of issuance of Global Location Number (GLN)	Where	Issuing Agency	Why	Identification of Processing Facility
		Request for GLN												
		Who	Processor Issuing Agency											
		What	Processing Facility											
When	Date/Time of issuance of Global Location Number (GLN)													
Where	Issuing Agency													
Why	Identification of Processing Facility													
<b>Food Licence Number</b>  This licence number is issued by local government														
<table><tr><th colspan="2">Request for Food Licence Number</th></tr><tr><td>Who</td><td>Processor Issuing Agency</td></tr><tr><td>What</td><td>Processing Facility</td></tr><tr><td>When</td><td>Date/Time of request/issuance</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Food Licence request</td></tr></table>	Request for Food Licence Number		Who	Processor Issuing Agency	What	Processing Facility	When	Date/Time of request/issuance	Where	Issuing Agency	Why	Food Licence request		
Request for Food Licence Number														
Who	Processor Issuing Agency													
What	Processing Facility													
When	Date/Time of request/issuance													
Where	Issuing Agency													
Why	Food Licence request													

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
		<div><div>Food Export Establishment Licence Number</div><div>A copy of the certificate of registration must be prominently displayed at the establishment. The certificate must contain:</div><div><ul style="list-style-type: none"><li>the name and address of the occupier</li><li>the ACN and ABN number of the occupier</li><li>the alternate trading names (if applicable) of the occupier</li><li>the number allocated to the export registered establishment</li><li>the limited period for which the establishment is registered (if applicable)</li><li>the export registered operations for the establishment</li><li>the eligible country listing for the establishment which has been registered</li><li>persons who manage and control the registered establishment</li><li>conditions of registration if any.</li></ul></div><div><div>Request for Food Export Establishment Licence Number</div><table><tr><td>Who</td><td>Processor Issuing Agency</td></tr><tr><td>What</td><td>Processing Facility</td></tr><tr><td>When</td><td>Date/Time of request/issuance</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Food Export Establishment Licence request</td></tr></table></div><div><div>Information to be shared to a traceability platform:</div><div><ul style="list-style-type: none"><li>Global Location Number (GLN)</li><li>Export Establishment number</li><li>Food business registration number</li></ul></div></div></div>	Who	Processor Issuing Agency	What	Processing Facility	When	Date/Time of request/issuance	Where	Issuing Agency	Why	Food Export Establishment Licence request
Who	Processor Issuing Agency											
What	Processing Facility											
When	Date/Time of request/issuance											
Where	Issuing Agency											
Why	Food Export Establishment Licence request											



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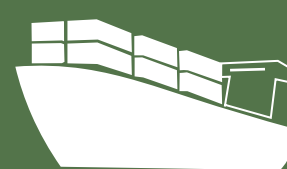
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
	Sourcing													
PM CTE2	Identifying the input supplier and/or grower	Global Location Number of supplier and grower/s of ingredients												
PM CTE3	Verifying the integrity of the input/ingredient	Analytical verification of integrity e.g. test results  Information to share to a traceability platform: <ul style="list-style-type: none"><li>● Master data identifiers of grower entity and location, input supplier entity and location and processor/manufacturer entity and location</li><li>● Document code for provenance, integrity verification</li><li>● Product identifiers and associated master data</li></ul>												
	Inbound ingredients													
PM CTE4	Input product unloaded, product inspected and best-before/use-by dates recorded	Record of stock received <ul style="list-style-type: none"><li>● date received</li><li>● Purchase order number</li><li>● Delivery note number</li><li>● supplier ID</li><li>● product ID</li><li>● batch #</li><li>● expiry date</li><li>● quantity delivered</li></ul>												
PM CTE5	Proof of Delivery signed	POD number  Key Data Element examples/guidance: <table><tr><th colspan="2">Goods Receipt</th></tr><tr><td>Who</td><td>Processor, Supplier, Transport provider</td></tr><tr><td>What</td><td>Product delivered, qty, batch, Purchase Order number, supplier</td></tr><tr><td>When</td><td>Date/Time of receipt</td></tr><tr><td>Where</td><td>Processor receiving location</td></tr><tr><td>Why</td><td>Goods Receipt</td></tr></table>  Information to be shared to a traceability platform: <ul style="list-style-type: none"><li>● Product Received</li><li>● Quantity</li><li>● Batch, Expiry Date, Production Date</li><li>● unique pallet or logistics unit identifier</li><li>● Supplier of product</li><li>● Date of physical receipt</li></ul>	Goods Receipt		Who	Processor, Supplier, Transport provider	What	Product delivered, qty, batch, Purchase Order number, supplier	When	Date/Time of receipt	Where	Processor receiving location	Why	Goods Receipt
Goods Receipt														
Who	Processor, Supplier, Transport provider													
What	Product delivered, qty, batch, Purchase Order number, supplier													
When	Date/Time of receipt													
Where	Processor receiving location													
Why	Goods Receipt													

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
	Delivery inspection	<table><tr><th colspan="2">Delivery inspection</th></tr><tr><td>Who</td><td>Processor, Supplier, Inspector ID</td></tr><tr><td>What</td><td>Product delivered, quantity, batch, Purchase Order Number, Delivery Order number, supplier of goods</td></tr><tr><td>When</td><td>Date/Time of inspection Date/time of receipt</td></tr><tr><td>Where</td><td>Processor receiving location</td></tr><tr><td>Why</td><td>Inspection of goods</td></tr></table> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Product inspected</li><li>● Inspection record number</li><li>● Inspection results, quality status,</li><li>● Date of inspection</li><li>● POD number</li></ul>	Delivery inspection		Who	Processor, Supplier, Inspector ID	What	Product delivered, quantity, batch, Purchase Order Number, Delivery Order number, supplier of goods	When	Date/Time of inspection Date/time of receipt	Where	Processor receiving location	Why	Inspection of goods
Delivery inspection														
Who	Processor, Supplier, Inspector ID													
What	Product delivered, quantity, batch, Purchase Order Number, Delivery Order number, supplier of goods													
When	Date/Time of inspection Date/time of receipt													
Where	Processor receiving location													
Why	Inspection of goods													
PM CTE6	Inventory Management  Put away	<p>Stock is moved from the receiving area to its designated storage location. Part of this process may involve transferring the product onto pallets or internal assets prior to put away.</p> <p>Input Information:</p> <ul style="list-style-type: none"><li>● Product ID</li><li>● Quantity</li><li>● Batch number</li><li>● Expiry date</li><li>● Date of transfer</li><li>● Pallet ID</li><li>● Storage asset identifier</li></ul> <p>Key Data Element examples/guidance:</p> <table><tr><th colspan="2">Stock Put Away</th></tr><tr><td>Who</td><td>Processor warehouse personnel</td></tr><tr><td>What</td><td>Product, quantity, batch, storage asset identifier</td></tr><tr><td>When</td><td>Date/Time of put away</td></tr><tr><td>Where</td><td>Put away/Storage location</td></tr><tr><td>Why</td><td>Stock put away</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Product ID</li><li>● Put away location</li><li>● Quantity</li><li>● Batch number</li><li>● Date of put away</li><li>● Storage location identifier</li></ul>	Stock Put Away		Who	Processor warehouse personnel	What	Product, quantity, batch, storage asset identifier	When	Date/Time of put away	Where	Put away/Storage location	Why	Stock put away
Stock Put Away														
Who	Processor warehouse personnel													
What	Product, quantity, batch, storage asset identifier													
When	Date/Time of put away													
Where	Put away/Storage location													
Why	Stock put away													



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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
PM CTE7	<b>Inventory Management</b>	<div><div><ul style="list-style-type: none"><li>● Production order number/reference</li><li>● Manufacturer/processor location</li><li>● Product ID</li><li>● Batch number</li></ul></div><div><ul style="list-style-type: none"><li>● Quantity required</li><li>● Pick location</li><li>● Pick date</li></ul></div></div>												
	Picking stock for processing/manufacturing	<div>Key Data Element examples/guidance:</div> <div><table><tr><th colspan="2">Picking stock for processing</th></tr><tr><td>Who</td><td>Processor</td></tr><tr><td>What</td><td>Production Order, Product required, quantity picked, batch</td></tr><tr><td>When</td><td>Date/Time of pick</td></tr><tr><td>Where</td><td>Stock storage location Processing location</td></tr><tr><td>Why</td><td>Picking of stock for processing</td></tr></table></div>	Picking stock for processing		Who	Processor	What	Production Order, Product required, quantity picked, batch	When	Date/Time of pick	Where	Stock storage location Processing location	Why	Picking of stock for processing
	Picking stock for processing													
	Who	Processor												
	What	Production Order, Product required, quantity picked, batch												
When	Date/Time of pick													
Where	Stock storage location Processing location													
Why	Picking of stock for processing													
		<div>Information to be shared to a traceability platform (on request):</div> <div><ul style="list-style-type: none"><li>● Production Order Number</li><li>● Product picked</li><li>● Actual picked Quantity, Batch number</li><li>● Pick location</li><li>● Processing location</li></ul></div>												
PM CTE8	<b>Processing</b>	<div>Production refers to both processing of raw materials and manufacturing processes:</div> <div><ul style="list-style-type: none"><li>● Production Order number/reference</li><li>● Product ID of input materials</li><li>● Input product quantity</li><li>● Input product batch number</li><li>● Product ID of output material</li><li>● Quantity of product</li><li>● Batch number</li><li>● Data of processing</li><li>● Location of processing</li><li>● Waste input and output product IDs and quantities</li></ul></div>												
	Production records	<div>Key Data Element examples/guidance</div> <div><table><tr><th colspan="2">Processing</th></tr><tr><td>Who</td><td>Processor</td></tr><tr><td>What</td><td>Input product(s), qty, batch Output product, qty, batch</td></tr><tr><td>When</td><td>Date/Time of processing</td></tr><tr><td>Where</td><td>Processing location</td></tr><tr><td>Why</td><td>Processing (Transformation)</td></tr></table></div>	Processing		Who	Processor	What	Input product(s), qty, batch Output product, qty, batch	When	Date/Time of processing	Where	Processing location	Why	Processing (Transformation)
	Processing													
	Who	Processor												
	What	Input product(s), qty, batch Output product, qty, batch												
When	Date/Time of processing													
Where	Processing location													
Why	Processing (Transformation)													

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<p>Information to be shared to a traceability platform (as requested):</p> <ul style="list-style-type: none"><li>● Production Order Number</li><li>● Input product(s), quantity, batch number</li><li>● Output product, quantity, batch number</li><li>● Processing/manufacture date</li><li>● Waste materials (product id, batch, quantity for both input and output products)</li></ul>												
PM CTE9	Product Inspection	<p>Product inspection may occur during processing or post-processing.</p> <p>Input information:</p> <div><div><ul style="list-style-type: none"><li>● Production order number</li><li>● Date of production</li><li>● Date of inspection</li><li>● Product id</li></ul></div><div><ul style="list-style-type: none"><li>● Batch number</li><li>● Inspection record number</li><li>● Type of inspection</li></ul></div></div> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Product inspection</th></tr><tr><td>Who</td><td>Processor, QA Department</td></tr><tr><td>What</td><td>Production order number, Output product id, quantity, batch number, inspection number</td></tr><tr><td>When</td><td>Date/Time of inspection</td></tr><tr><td>Where</td><td>Processing facility, production line</td></tr><tr><td>Why</td><td>Inspection of goods</td></tr></table> <p>Information to be shared to a traceability platform</p> <div><div><ul style="list-style-type: none"><li>● Production Order Number</li><li>● Output product Quantity</li><li>● Batch number</li></ul></div><div><ul style="list-style-type: none"><li>● Date of production</li><li>● Quality status</li><li>● Inspection record</li></ul></div></div>	Product inspection		Who	Processor, QA Department	What	Production order number, Output product id, quantity, batch number, inspection number	When	Date/Time of inspection	Where	Processing facility, production line	Why	Inspection of goods
Product inspection														
Who	Processor, QA Department													
What	Production order number, Output product id, quantity, batch number, inspection number													
When	Date/Time of inspection													
Where	Processing facility, production line													
Why	Inspection of goods													
PM CTE9	Labelling and packaging	<p>Affix a unique identifier (GTIN) -</p> <ul style="list-style-type: none"><li>● GTIN code</li></ul> <p>Label elements for traceability</p> <ul style="list-style-type: none"><li>● Name of the food</li><li>● Unique identifier for food</li><li>● Manufactured date and use by date</li><li>● Provide lot identification</li><li>● Country of origin information</li><li>● Name and address of the processor or manufacturer</li></ul> <p>Labelling of carton/unitised product packs</p> <ul style="list-style-type: none"><li>● Unique identifier (SSCC) linking carton to GTINs within</li><li>● Batch/lot number</li><li>● Processor/manufacturer name and address in readable format</li><li>● Use-by date</li></ul>												



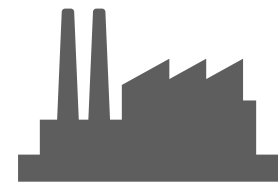
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
PM CTE10	Processed/finished goods moved to interim storage location	<p>Processed product is transferred from the processing area to a specified storage location.</p> <p>Input Information</p> <ul style="list-style-type: none"><li>● Product ID</li><li>● Quantity to transfer</li><li>● Batch #</li><li>● Date of transfer</li></ul> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Product storage/put away</th></tr><tr><td>Who</td><td>Processor</td></tr><tr><td>What</td><td>Product ID, quantity, batch #</td></tr><tr><td>When</td><td>Date/Time of transfer</td></tr><tr><td>Where</td><td>Storage location</td></tr><tr><td>Why</td><td>Stock transfer</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Product ID</li><li>● Quantity</li><li>● Batch number</li><li>● Storage location</li><li>● Date of transfer</li></ul>	Product storage/put away		Who	Processor	What	Product ID, quantity, batch #	When	Date/Time of transfer	Where	Storage location	Why	Stock transfer
Product storage/put away														
Who	Processor													
What	Product ID, quantity, batch #													
When	Date/Time of transfer													
Where	Storage location													
Why	Stock transfer													
PM CTE11	Dispatch - Picking	<ul style="list-style-type: none"><li>● Customer order number</li><li>● Picking slip number (or equivalent)</li><li>● Product ordered</li><li>● Quantity</li><li>● Batch number</li><li>● Pick location</li><li>● Load preparation</li></ul> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Delivery Inspection</th></tr><tr><td>Who</td><td>Processor</td></tr><tr><td>What</td><td>Customer Order Number, Pick list number, Product required, quantity, batch</td></tr><tr><td>When</td><td>Date/Time of pick</td></tr><tr><td>Where</td><td>Processor receiving location</td></tr><tr><td>Why</td><td>Picking</td></tr></table>	Delivery Inspection		Who	Processor	What	Customer Order Number, Pick list number, Product required, quantity, batch	When	Date/Time of pick	Where	Processor receiving location	Why	Picking
Delivery Inspection														
Who	Processor													
What	Customer Order Number, Pick list number, Product required, quantity, batch													
When	Date/Time of pick													
Where	Processor receiving location													
Why	Picking													

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Customer Order Number</li><li>● Product ID</li><li>● Actual Quantity picked</li><li>● Batch number</li><li>● Date of pick</li><li>● Location of pick</li><li>● Delivery Order</li><li>● Advance Shipping Notice</li></ul>												
PM CTE12	Dispatch - product leaves premises	<ul style="list-style-type: none"><li>● - Customer Order number</li><li>- Delivery Order number</li><li>- Product ID, Batch #, quantity - Dispatch date</li><li>- Customer</li><li>- Deliver to location</li><li>- Dispatch location</li><li>- Transport provider</li></ul> <p>Key Data Element examples/guidance</p> <table><tr><th colspan="2">Delivery Inspection</th></tr><tr><td>Who</td><td>Processor – Outwards goods Transport Company</td></tr><tr><td>What</td><td>Dispatch Number, Product dispatched, qty, batch, Dispatch vehicle details</td></tr><tr><td>When</td><td>Date/Time of dispatch</td></tr><tr><td>Where</td><td>Processor dispatch location</td></tr><tr><td>Why</td><td>Dispatch of goods</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Customer Order Number</li><li>● Consignment note number</li><li>● Despatch Number</li><li>● Product ID</li><li>● Actual Quantity shipped, Batch number</li><li>● Date of Dispatch</li><li>● Transport Company</li></ul> <p>(see <a href="#">Freight Transport Module</a> for further detail on Dispatch processes)</p>	Delivery Inspection		Who	Processor – Outwards goods Transport Company	What	Dispatch Number, Product dispatched, qty, batch, Dispatch vehicle details	When	Date/Time of dispatch	Where	Processor dispatch location	Why	Dispatch of goods
Delivery Inspection														
Who	Processor – Outwards goods Transport Company													
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Where	Processor dispatch location													
Why	Dispatch of goods													



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Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

Foundational Elements

Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a store location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location in the world.



Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product’s packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, quantity etc are all considered separate variations and thus require separate GTINs. Each level of packaging should be numbered (and barcoded) separately to all other levels.

Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.



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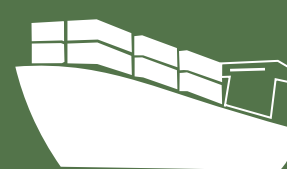
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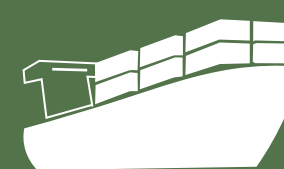
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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/Format	Further information
Location	Manufacturing Plant, Finished Goods, Location, Dispatch Dock	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Production Date and/or Time, Use By date, Best Before Date, Pack Date	Year-Month-Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Input materials such as raw ingredients and packaging, Outputs such as finished goods, packaged or processed goods	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li><a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li><a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch/Lot code, Serial Number		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number etc. can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers: <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)</a>
Logistics Units	Pallet of Finished Goods, Crate or Box of finished Goods	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>
Weights & Measures	Variable count of items. Count of items on a logistics unit. Total weight of pallet in NET Kilos. Total Length of goods delivered in Metres. Total volume of goods delivered in Cubic Metres	Must be accompanied with a GTIN	Varying	Variable measure trade items use GS1 Application Identifier data fields that contains the quantity or dimension of a variable measure trade item. It also denotes the unit of measure. These element strings are used to complete the identification of a variable measure trade item. They contain information such as the weight, size, volume, or dimension of a variable measure trade item. Section 3.6 <a href="http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications">http://www.gs1.org/barcodes-epcrfid-id-keys/gs1-general-specifications</a>
Assets	Returnable assets like IBC, crate, pallet Individual assets like transport vehicle, trailer, vessel, transport equipment etc	Global Returnable Asset Identifier (GRAI)	O + AN20	Can be identified as an asset type only or an optional serial number can be added to distinguish individual assets <a href="https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file</a>
		Global Individual Asset Identifier (GIAI)	AN30	



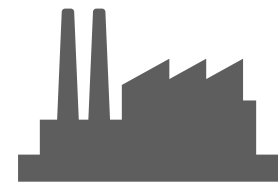
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## Asset Identification

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g. a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g. a Intermediate Bulk Container), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned. Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.



Credit: Perfection Fresh

### Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate. The GS1 System identification of a returnable asset, the Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned. This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.



Credit: Perfection Fresh

### Global Individual Asset Identifiers (GIAI) – AI (8004)

An individual asset is considered a physical entity made up of any characteristics. The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records.

Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used. This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.



Credit: Perfection Fresh



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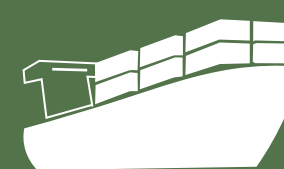
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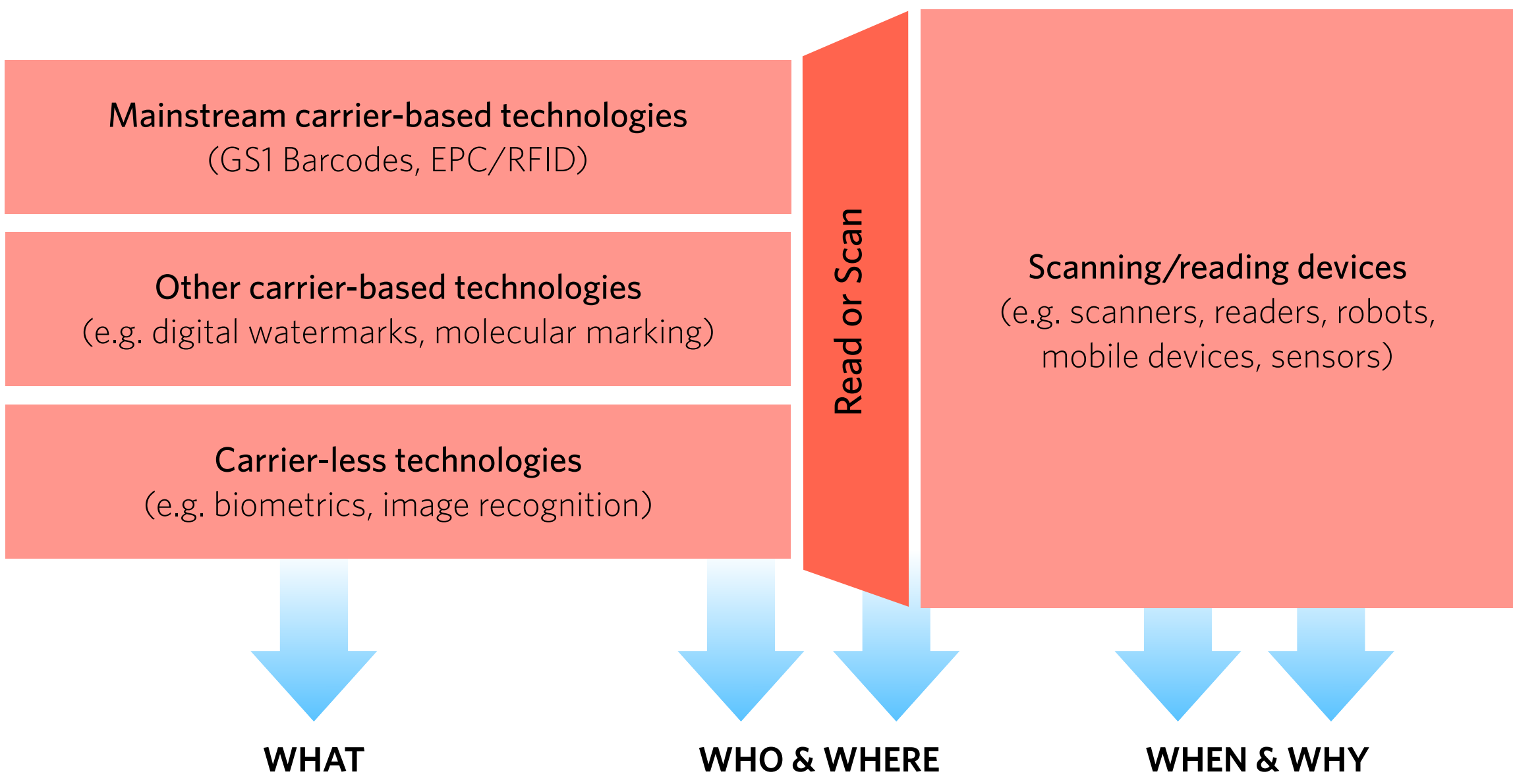
How to capture the KDEs

How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

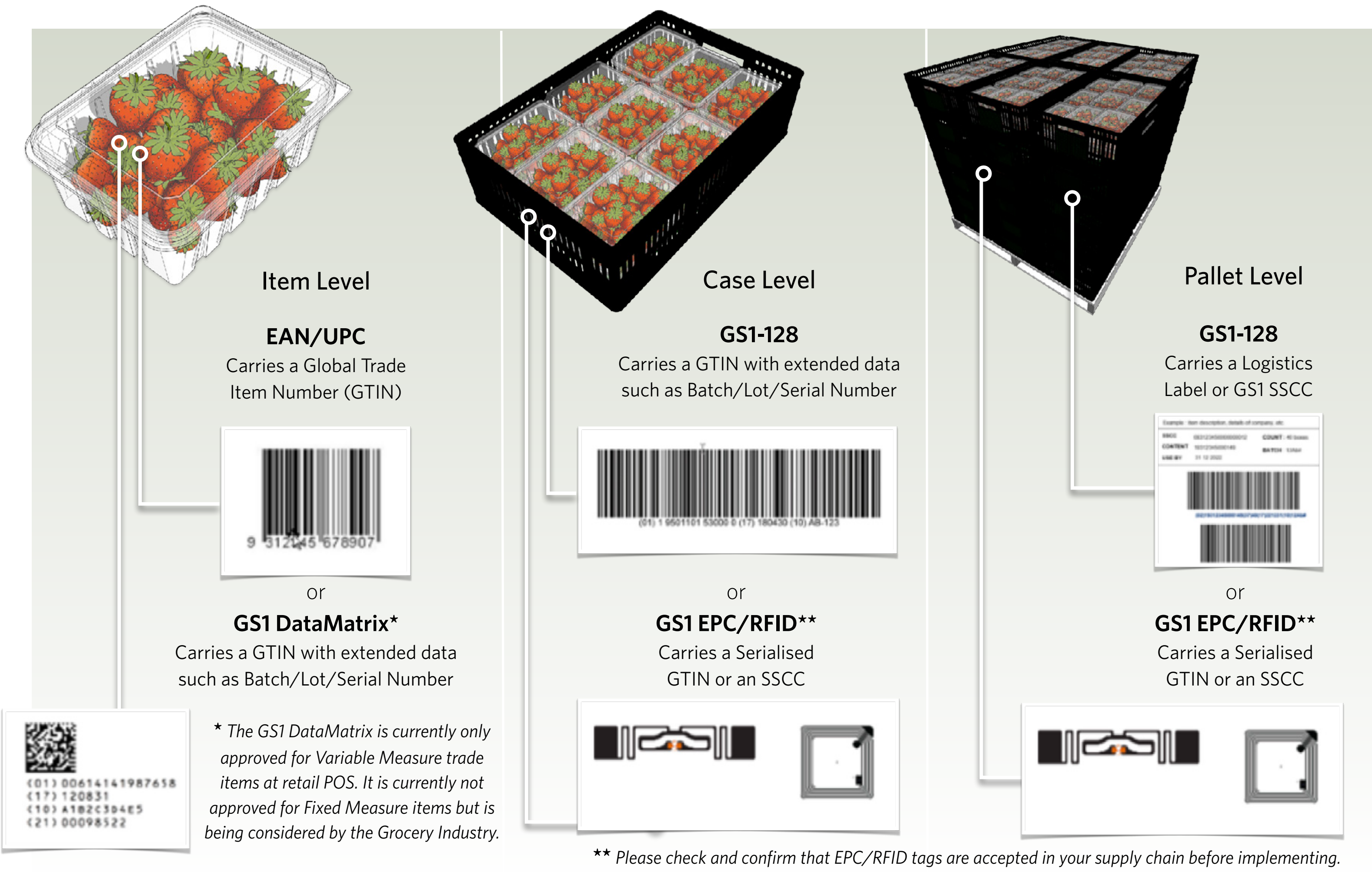


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.







Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc. The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

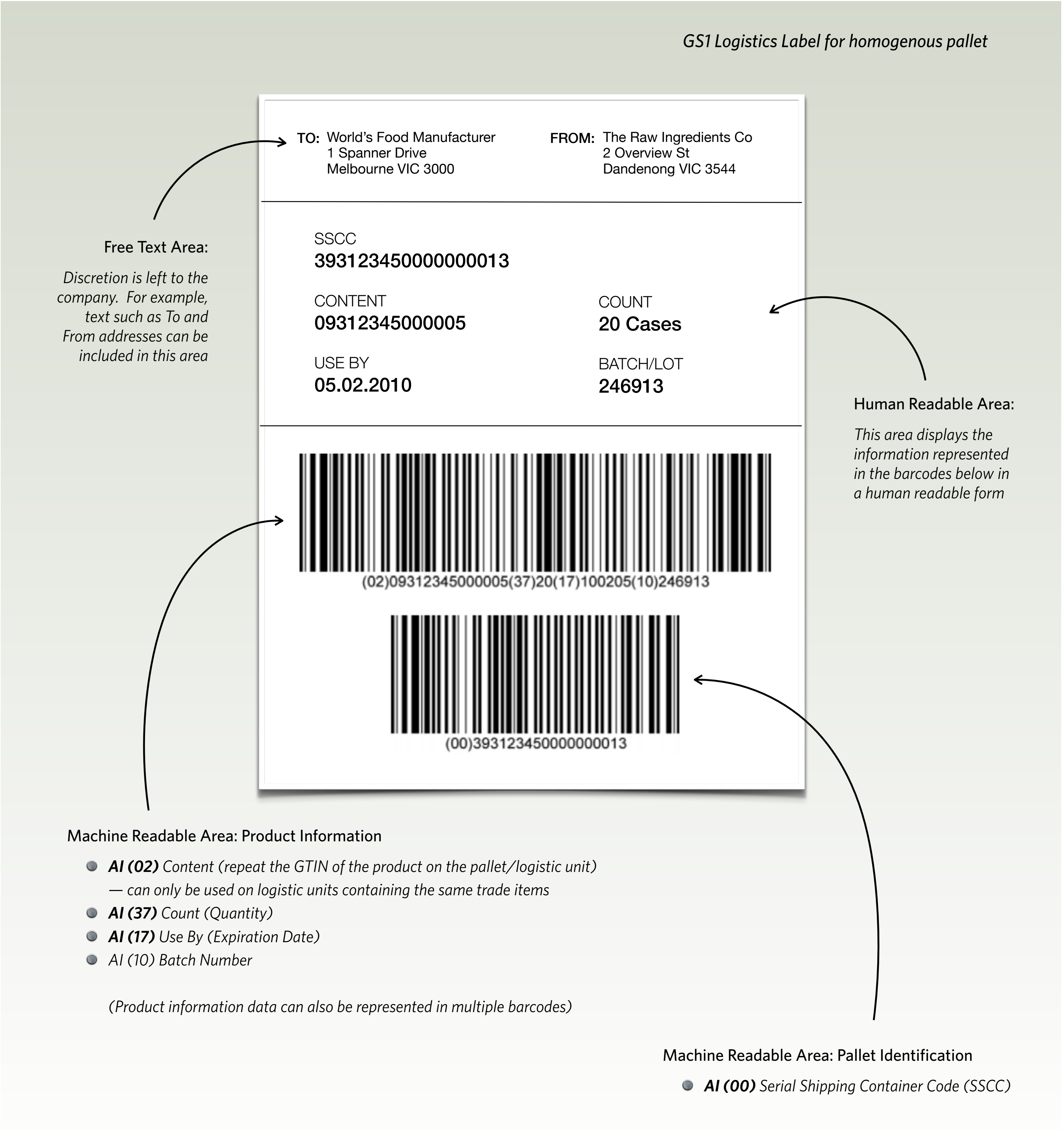
For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number



GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number



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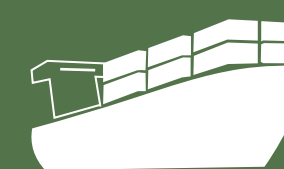
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FREE INFORMATION

Example: Beef Topside 600kg, details of company

SSCC 093123450000000012

Prod Date 3012/2008

CONTENT 99311781001157

Count 40 boxes

WEIGHT 600kg



(02)99311791001157(3102)060000(37)40(13)081230



(00)093123450000000012

GS1 Logistics Label homogenous logistics unit containing variable weight products

FROM  
GS1 GO  
Avenue Louise 326  
1050 Brussels

BE85250

TO  
GS1 GO Princeton Office  
1009 Lenox Drive

SPECIAL ORDER

1TE.00

0007

To be delivered : ECT VVD - X020399

GSIN

950110100000000001

SSCC

095011011234567896



(402) 950110100000000001



(00) 0 9501101 123456789 6

GS1 Logistics Label homogenous logistics unit containing GSIN reference



(8003) 093123450012480001

Global Returnable Asset Identifier, AI (8003),  
represented in a GS1-128 Barcode



(8004)93123450000000001

Global Individual Asset Identifier, AI (8004),  
represented in a GS1-128 Barcode





How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item/case/input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing. In addition to product scanning, logistics labels can also be scanned to capture vital traceability data as logistics units (pallets, parcels, grouping of products) move through the supply chain.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

Usually the first step will be scanning of inputs, livestock etc upon receipt. For barcodes this is often done using handheld devices. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are harvesting, storing, picking, packing, shipping, transporting, selling.

Often a combination of fixed mounted scanners or readers and hand-held devices will be applied to capture the critical tracking events. The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.



Useful Links

Food Safety  
FSANZ <https://www.foodstandards.gov.au/Pages/faq.aspx>  
Australian Institute of Food Safety <https://www.foodsafety.com.au/>

- Food business regulation and licensing
- ACT <https://health.act.gov.au/businesses/food-safety-regulation>
  - NSW <http://www.foodauthority.nsw.gov.au>
  - NT [http://www.health.nt.gov.au/Environmental\\_Health/Food\\_Safety/index.aspx](http://www.health.nt.gov.au/Environmental_Health/Food_Safety/index.aspx)
  - QLD <http://www.health.qld.gov.au/foodsafety/>
  - SA <http://www.health.sa.gov.au>
  - VIC <http://www.health.vic.gov.au/foodsafety/>
  - WA [https://ww2.health.wa.gov.au/Articles/S\\_T/Thinking-about-starting-a-food-manufacturing-business](https://ww2.health.wa.gov.au/Articles/S_T/Thinking-about-starting-a-food-manufacturing-business)
  - TAS <https://www.dhhs.tas.gov.au/>

Product labelling  
NMI Weights and Measures  
<https://business.gov.au/Products-and-services/Product-labelling/Australian-Trade-measurement-laws>  
ACCC Country of Origin Food Labelling [https://www.accc.gov.au/system/files/Country%20of%20Origin%20food%20%20labelling%20Guide\\_March%202019.pdf](https://www.accc.gov.au/system/files/Country%20of%20Origin%20food%20%20labelling%20Guide_March%202019.pdf)  
Food Standards Code labelling  
<https://www.foodstandards.gov.au/industry/labelling/pages/default.aspx>  
Carton labelling requirements are regulated by Industry, Innovation and Science Australia  
<https://www.industry.gov.au/data-and-publications/guide-to-the-sale-of-pre-packaged-goods/labelling-requirements>





Glossary

Advance Shipping Notice (ASN)	An advance ship notice or advanceshippingnotice (ASN) is a notification of pending deliveries, similar to a packing list. It is usually sent in an electronic format and is a common Electronic Data Interchange document.
Batch	A batch is a group of food items processed or manufactured during a finite time period, with a start and completion time set for the process. In food production this might relate to product grouped for maturation over a set period, or one stage of production. Other forms of production are item by item, mass or flow production, or continuous production.
Customer Order	A customer order is a commercial document issued by the customer/buyer of the goods/materials to the supplier/producer. The customer order details the products type, the quantity and the price. It enables the supplier to prepare the order for shipping and to track sales.
Delivery Note	A delivery note is a document sent with a shipment of goods that describes the goods and the quantities being delivered. It is issued to the transport provider delivering the goods, and a copy is supplied to the consignee/ receiver/customer on delivery. The delivery note is signed by the receiver as proof that the goods have arrived in full. This time-stamped Delivery Note then becomes a Proof of Delivery for the Transport company and a record to attach to the Invoice for the Supplier.
Export Establishment	<p>An export establishment is a premise that produces edible and /or inedible prescribed goods for export.</p> <p>Prescribed goods for export must be prepared, stored, handled and/or presented for inspection at a registered establishment under the following legislation:</p> <div><div><ul style="list-style-type: none"><li>● Export Control Act 1982</li><li>● Export Control (Meat &amp; Meat Products) Orders 2005</li><li>● Export Control (Prescribed Goods - General) Orders 2005</li><li>● Export Control (Hay and Straw) Orders 2005</li><li>● Export Control (Milk and Milk Products) Orders 2005</li><li>● Export Control (Plants and Plant Products) Orders 2005</li></ul></div><div><ul style="list-style-type: none"><li>● Export Control (Eggs and Egg Products) Orders 2005</li><li>● Export Control (Fish and Fish Products) Orders 2005</li><li>● Export Control (Wild Game Meat and Wild Game Meat Products) Orders 2010</li><li>● Export Control (Poultry Meat and Poultry Meat Products) Orders 2010</li><li>● Export Control (Rabbit and Ratite Meat) Orders 1985</li><li>● Export Control (Fees) Orders 2001</li></ul></div></div>
Enterprise resource planning (ERP)	ERP is the ability to deliver an integrated suite of business applications. ERP tools share a common process and data model, covering broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain.
Intermediate bulk container (IBC)	An intermediate bulk container or IBC is a reusable container used for the transport and storage of liquids, fluids and chemicals. The word ‘intermediate’ relates to the volume of IBCs, being between that of drums and tanks. There are three common sizes: 250 litre, 500 litre and 1,000 litre capacity.
Lot	<p>A lot is an amount of a food that the manufacturer or producer identifies as having been prepared, or from which foods have been packaged or otherwise separated for sale, under essentially the same conditions, for example:</p> <div><div>a. from a particular preparation or packing unit; and</div><div>b. during a particular time ordinarily not exceeding 24 hours.</div></div> <p>The lot identification (which could be a number or other information) is used to track a product in the event of a recall and needs to be able to identify where the food was packed or prepared.</p>
Pallecon	Pallecon is a direct abbreviation of the term ‘palletised container’, and has become a regular synonym for the more generic term intermediate bulk container or IBC.
Purchase Order (PO)	A commercial document issued by a buyer to a supplier. This is a legally binding offer to buy product in return for payment. The terms and conditions for delivery and payment are detailed in this document, which also details the product quantity, price, terms and conditions, product quality and delivery date.



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M O D U L E   F I V E :

# Wholesale and Distribution

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## Wholesalers and Distributors

Generally speaking, wholesalers generate their income from the discount charged on products, i.e. they purchase products in large volumes from producers at a low price and sell it further to the retailers in small lots at relatively high price. Hence, the amount received from customers less amount paid to manufacturers is the source of income to the wholesaler.

On the other hand, distributors charge service fees for rendering services as a percentage of net sales. The fee is the major source of income to the distributors. As a rule, wholesalers operate at both L2 and L3 in supply chains (where L4 is the manufacturer, and L1 is the retailer). Distributors are present as L3 only.

### Wholesaler

Food wholesalers and distributors provide producers and manufacturers a channel to market through receiving product from suppliers and distributing to retail or food service. The transactions in wholesale are between businesses (B2B) and generally don't involve direct to consumer sales and often are in larger volume lots e.g. bulk bags, full cases suitable for caterers, restaurants, or retail re-packaging.

Typically, the wholesaler may hold a range of products in volume from growers, processors and manufacturers, or may specialise in a particular product category e.g. seafood, organic foods, fresh produce, nuts and dried fruits, dairy, or a particular distribution class e.g. fresh, frozen, chill, ambient.

Using a wholesaler delivers cost benefits both upstream (manufacturers/processors) and downstream (retailers) in supply chains. For large manufacturers, it allows them a cost efficient route to market for sales to smaller customers as they are able to ship in efficient quantities (e.g. full pallets, full truckloads) to wholesalers or distributors, who in turn are able to aggregate orders from multiple large manufacturers and create a cost efficient route to market (e.g. combined truckloads of product from multiple manufacturers) from their facilities to smaller retailers.

From a pricing perspective, the ability of the wholesale buyer to purchase in bulk can represent savings for small businesses such as restaurants and retailers. This efficient distribution model also unlocks administrative benefits as it saves retailers and food service the need to interface with multiple suppliers and in organising individual pick up and deliveries.



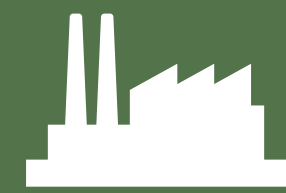
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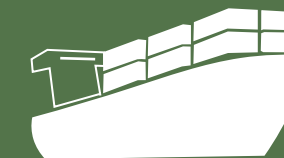
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Distributor

A food distributor may act as an agent for a food manufacturer, selling the product to retailers or food service operators. Distributors may work directly between food manufacturers and retailers; with wholesalers supplying retail and food service; or directly servicing institutions such as hospitals or schools.

Distribution Centres

Distribution centres may be directly operated by a manufacturer, distributor, wholesaler, or retailer, or supplied by an outsourced third-party logistics company (3PL). Products come into warehousing for short or longer-term storage, to be grouped according to destination. Distribution centres may break down pallets of the product to re-group them for a retail outlet or a specific delivery geography. They may cross-dock the freight for this purpose without breaking down the load unit, transferring a truckload of pallets to outbound vehicles for different destinations. Products from other sources can be also loaded on the same vehicle.

The workflow and tasks of a full-service distribution centre commence when goods are received from a source and end when goods are received by the customer business. Returned products may re-enter the wholesaler/distribution centre or be directed to a specialised section/facility.

Distribution Centres rely on warehouse management systems (WMS) to keep control of the overall distribution process occurring within the four walls of the facility, as well as transportation management systems (TMS) to direct inbound and outbound products.

Distribution centres may be operated by a retailer or wholesaler or supplied by an outsourced 3rd party logistics company. Products come into warehousing for short- or longer-term storage, to be grouped according to destination. Distribution centres may break down pallets of the product to re-group them for a retail outlet or a specific delivery geography. They may cross-dock the freight for this purpose without breaking down the load unit, transferring a truckload of pallets to outbound vehicles for different destinations. Products from other sources can be also loaded on the same vehicle.

The workflow and tasks of a full-service distribution centre commence when goods are received from a source and end when goods are received by the customer business. Returned products may re-enter the wholesaler/distribution centre or be directed to a specialised section/facility.

The traceability challenge is to maintain the identity and location of product as it is received, unpacked, stored, then picked and packed for outbound delivery. Co-mingling of product and shrinkage due to damage or error are a risk in wholesaling and distribution activities.

Processes covered in this module include:

- Establishing identities
- Inbound product receipt at wholesaler or distribution centre
- Storage of the product
- Sale of the product
- Distribution to food operators



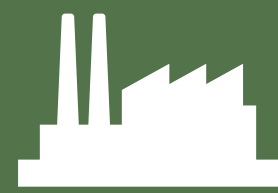
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Establishing identities

Creation of unique identifiers for suppliers, the wholesaler and distribution centre, as well as customers will enable accurate information relating to the chain of custody of the product and enhance track and trace processes. Recording this data in the context of a sale and subsequent movement of the product can accelerate the speed of locating product and accounting for shrinkage in this segment of the supply chain.

Identifiers may be recorded as a Property Identification Code (if goods are supplied directly from producer); a Food Business Licence number; or a readable business name and address on the item or carton label. However, a Global Location Number incorporates information on the business entity and location which can be used as a unique code to locate the business.

Identification of products at item level, batch or lot level, carton level and subsequently at load unit level is critical to traceability in wholesale and distribution centre operations as the product may be broken down or consolidated up to any of these levels during processes such as cross-docking, put away in storage, picking and packing and assembling customer orders for dispatch.

Attributes can be associated with the product using these identifiers, to support inventory management (e.g. best-before, expiry date, temperature) and in expediting delivery to customers (specific instructions, dock number, open hours).



Tasks related to traceability

- Creation of unique identities for the business and supply chain partners e.g. suppliers and customers and their locations
- Creation of unique identifiers for the products traded or handled
- Creation of unique identifiers for the load units that contain the product
- Completion of food safety regulation and licensing

Key participants

- Wholesaler
- Suppliers (growers, processors, manufacturers)
- Property identification issuing organisation
- B2B/E2E Customers
- Food Authorities – state and local government



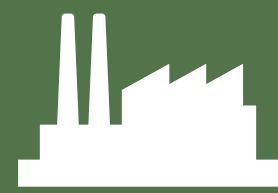
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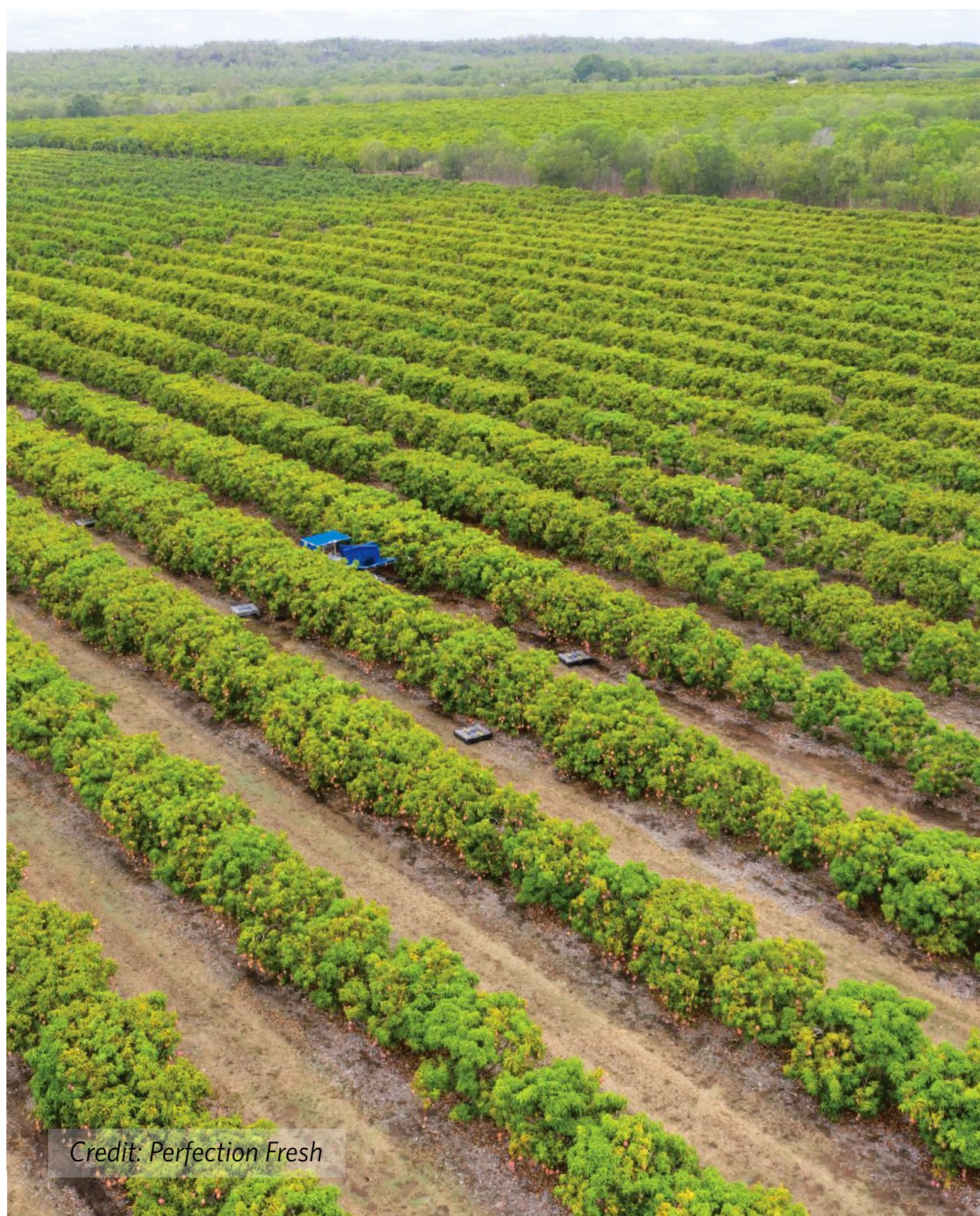


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## Inbound product receipt at wholesaler or distribution centre

Most wholesalers and distribution centres receive product loaded on a load unit such as a pallet. Each load unit is affixed a logistics label that contains information relating to the load in both human readable form and barcoded. Each load unit is typically scanned by the Transport Company prior to unloading capturing key traceability information (product, batch/lot number, best before date, quantity).

Warehouse/DC staff need to conduct an inspection which confirms the use-by or best before dates are consistent with shelf life specifications; the product is undamaged in its packaging; spills or contamination by pests have not occurred; and the products as listed in the Delivery Documentation tally.

Once the inspection is complete, receipt staff will unload the consignment and sign a Proof of Delivery, effectively proving the receipt of the goods.

Once unloaded, the inbound product is entered in the Inventory Management System as received product and is then moved to an allocated bay for re-loading for outward dispatch (cross-docking) or put away in an allocated slot in the warehouse/distribution centre, where the systems are updated. Some organisations may have implemented Warehouse Management Systems (WMS) to manage the movement of stock.

Food storage is generally divided into temperature levels — ambient, chilled and frozen.



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### Tasks related to traceability

- Inspect inbound product — reject or accept all or part of consignment
- Sign Proof of Delivery
- Notify supplier of Purchase Order reconciliation with Supplier Invoice
- Enter goods receipt into Inventory systems. Best practice is to scan product barcode/identifier into warehouse management system
- Record use-by/product expiry date
- Allocate to identified storage slot, bay or floor grid area
- Customer re-packs rejected stock and re-labels if new packaging is used
- Supplier organises returns of rejected stock

### Key participants

- Receival staff
- Transport driver
- Warehouse operations staff
- Accounts staff



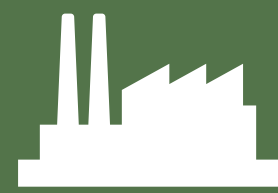
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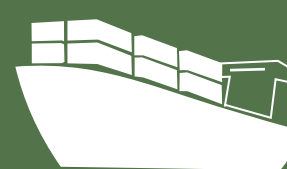
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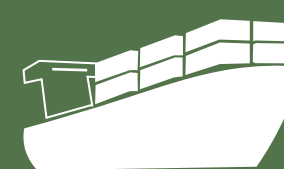
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## Storage of the product

Food product warehouse management systems manage multiple needs, such as:

- Inventory management — including First In: First Out (FIFO) or First Expiry First Out (FEFO), rotation of product
- Visibility of stock down to Bin location by batch number
- Stock counts
- Provide visibility of stock levels for customers and sales agents — often across several storage sites
- Order fulfilment
- Labelling of stock
- Shipment tracking of in-transit goods
- Returns monitoring
- Security and food safety
- Temperature, humidity requirements

Wholesalers and Distribution Centres carry multiple stock keeping units (SKUs) and for those managing e-commerce operations, multiple item-level stock items.



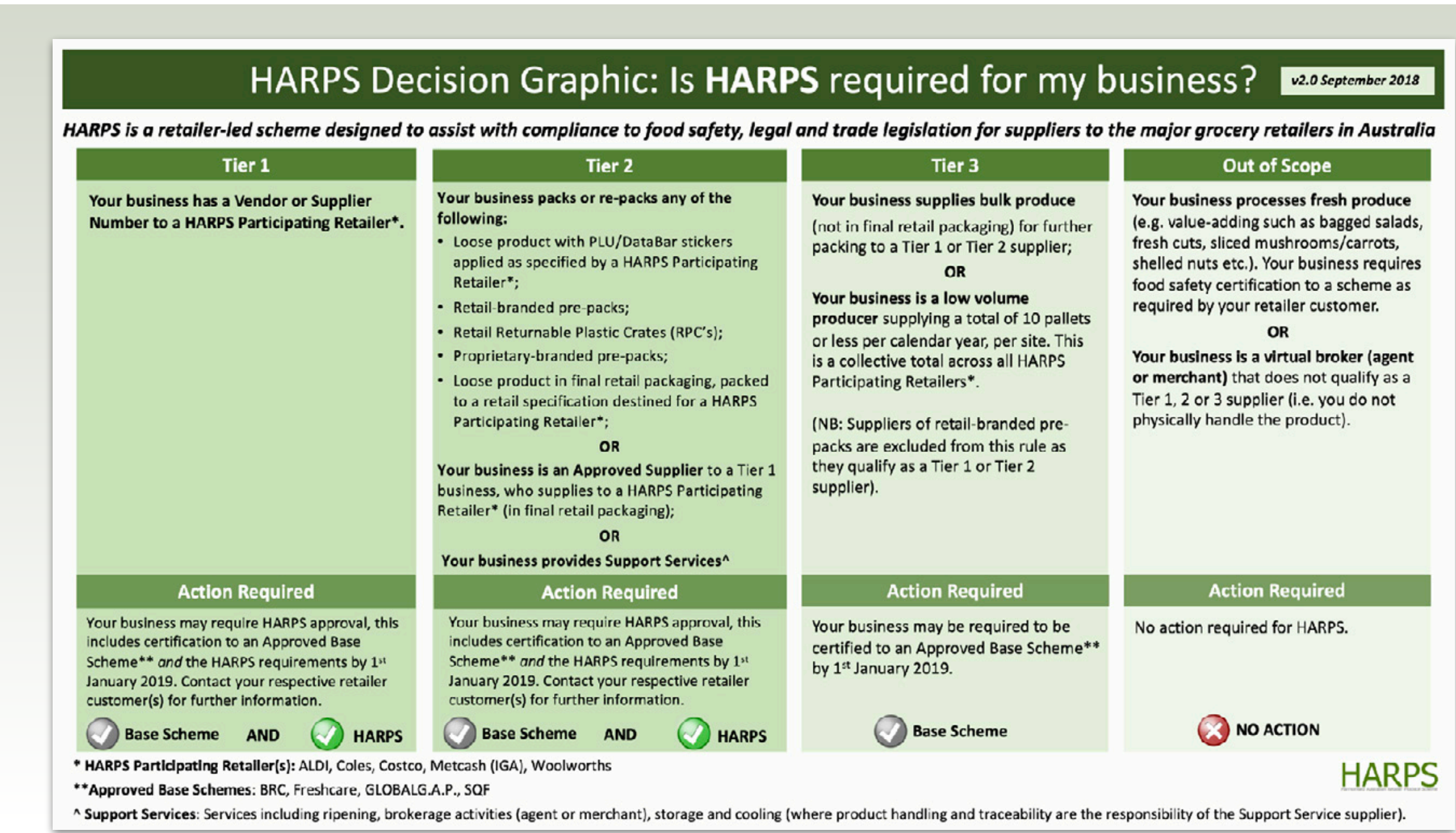
Different methods and technologies are used for tracking product in storage, including

- Barcode scanning and scanning of associated storage location
- Voice pick systems to manage order fulfilment
- Active RFID tags to track product movement within the storage facility
- Spreadsheets.

### Quality control and inspection of stock

The quality assurance (QA) staff perform periodic checks of random samples of stock to ensure their condition meets a certain required standard. Products are checked throughout the warehouse racking, goods in and returned stock phases. The QA inspection may also involve cycle counts to find missing stock.

Quality control requirements are often associated with retailer standards or industry standards specific to the type of food being inspected. For traceability, records of stock withdrawn as a result of inspections should be recorded in the warehouse inventory management system.



HARPS food safety compliance scheme decision graphic

### Providing visibility for customers and sales agents

Availability of stock is made visible for customers’ Order Management Systems through integration with the Wholesaler or Distribution Centre Warehouse Management System.

Tasks related to traceability	Key participants
<ul style="list-style-type: none"><li>● Location of stock by item, batch, carton and pallet</li><li>● Count of stock keeping units (SKUs)</li><li>● Visibility of stock levels to customers and suppliers</li><li>● Quality Assurance inspection</li><li>● Recording of stock shrinkage in storage</li><li>● Returns monitoring</li><li>● Food safety compliance e.g. HARPS, Global GAP, Freshcare, GFSI, HACCP</li><li>● Monitoring of storage conditions e.g. temperature, humidity</li></ul>	<ul style="list-style-type: none"><li>● Warehouse operational staff</li><li>● Suppliers</li><li>● Customers</li><li>● Quality Assurance inspectors and auditors</li><li>● Food safety auditors</li><li>● Customer auditors</li></ul>

Continuous data logging from calibrated sensors is the preferred approach for cold storage. In less critical, short term or smaller business operations, monitoring must be sufficiently frequent to detect trends, and in particular malfunctions, in temperature control. At a minimum, temperature readings must be twice daily.

<https://www.afgc.org.au/wp-content/uploads/2019/07/Australian-Cold-Chain-Guidelines-2017.pdf>



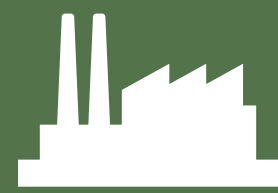
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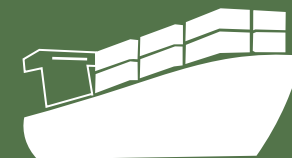
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## Sale and dispatch of the product

Product sales for Wholesalers commences with a Customer Purchase Order, or Customer Account Orders for replenishment of stock levels at food operators. This activates the Order Acknowledgement and Order Confirmation detailing the specified goods to be delivered and terms of the sale. An Order Confirmation is dependent on the wholesaler ensuring the stock is available, highlighting the value of visibility of stock levels and locations.

The Customer Order is then initiated and a packing (or picking) list is created to ensure the right products and quantities are picked and assembled for packing for outbound delivery. As products are picked, they are scanned according to the packing list. Some products are required to be packed into store-ready displays or require additional labelling for sales promotion. This is completed and product is re-packaged prior to palletising.

In the packing area the product is scanned as it is loaded to a transport asset load unit such as a pallet or tub. At this stage the product identification is now associated with this load unit. The pallet is shrink wrapped and a transport label affixed, which now associates each item or carton to the load unit and transport management system (vehicle registration, transport booking reference, delivery order and consignment note).

An Advance Shipping Notice is prepared for the customer and issued. This allows the customer to prepare for the inbound stock.

The product is now ready for delivery and a Delivery Order is prepared for the Transport Company, detailing the consignment instructions.

A Consignment Note is prepared to facilitate handover of the outbound shipment to the transport company.

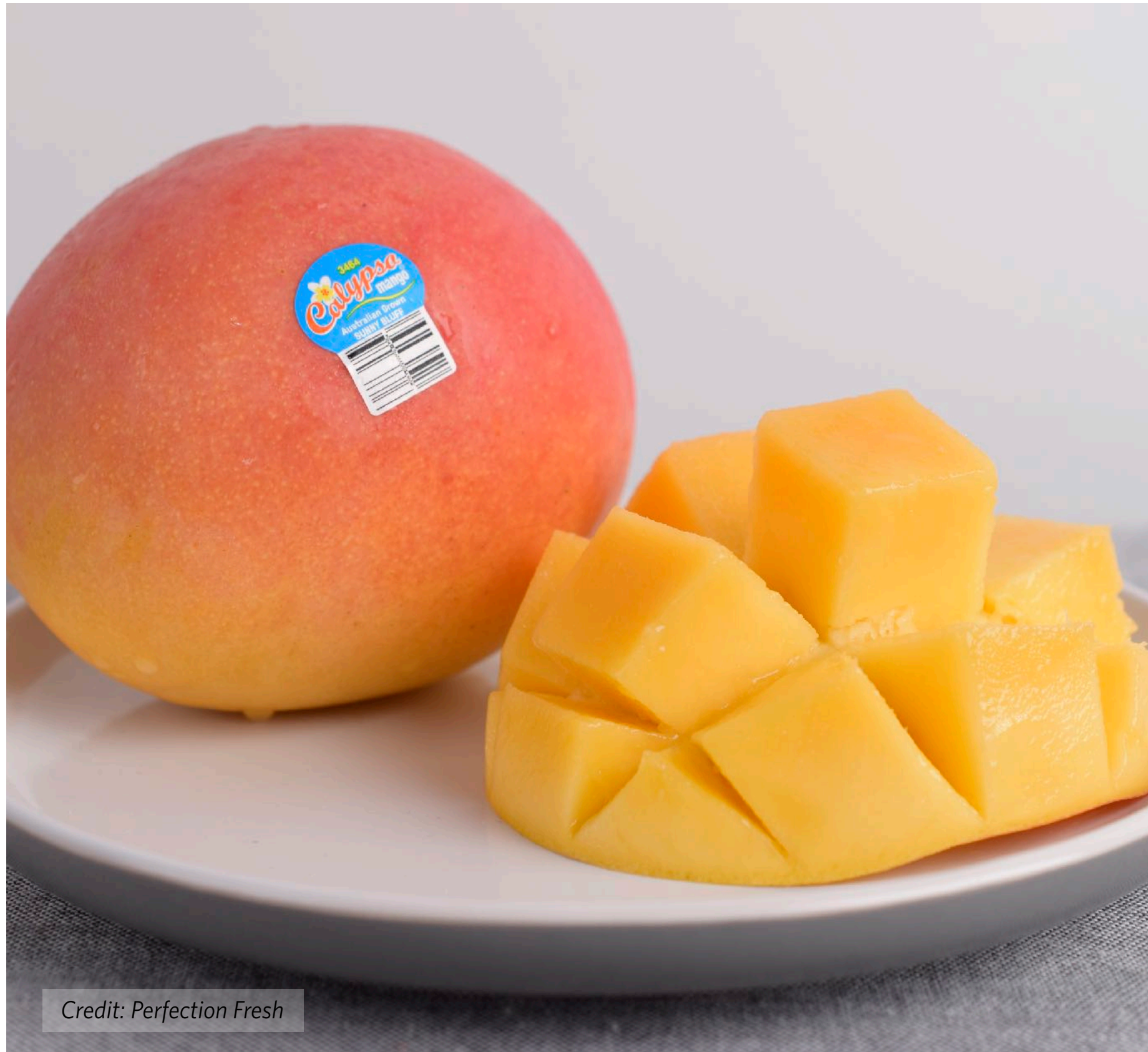
An Invoice is then issued to the Customer requesting payment for the goods. Account credits are made for damaged, missing or returned stock. In some cases, the invoice is raised once the goods have been received by the customer and a delivery confirmation (Receipt Advice) is sent back.

### Tasks related to traceability

- Receipt of Purchase Order from customer
- Product Picked and packed and linked to a logistics unit
- Advance Shipping Notice issued to customer
- Customer Invoice issued
- Transport Management System booking reference assigned.

### Key participants

- Sales representatives and agents
- Warehouse operational staff
- Wholesaler administrative staff
- Customers
- Transport suppliers



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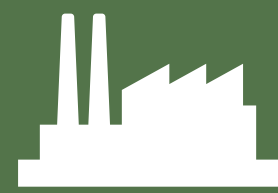
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## Delivery to food operators

For wholesalers and distribution centres, the Proof of Delivery message indicates that the delivery has been received by the Customer.

The Customer will communicate any under or over delivered stock, damaged or missing stock against their Purchase Order and notify the Wholesaler within a specified timeframe so the under/over stock can be included in the next order.

Arrangements for return of damaged or rejected stock are made as per sale terms and conditions.

Returned stock will either be disposed of or re-enter the inventory of the wholesaler once its disposition is determined.

Recording this stock and its re-entry or disposal will be required for traceability audit.

The complexity around handling returns mandates the following rules:

- When customers return goods, they should seek, and be given Return Management Authorisation, which outlines what is being returned and why.
- All returns must be traceable, to their order, document and invoice
- Companies must have a pre-determined returns process that delineates what is to be done with the goods once received back into the warehouse, e.g. return to stock, repair, destroy, discard, recycle, return to manufacturer etc
- All credits must be system-recorded together with reasons why the goods are returned.
- Inventory must be updated where goods are returned to stock, or held for further action.

### Tasks related to traceability

- Proof of Delivery received
- Reconciling Purchase Order with Invoice
- Stock returns management

### Key participants

- Transport Company
- Customer
- Warehouse operations staff



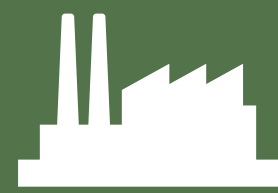
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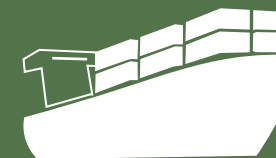
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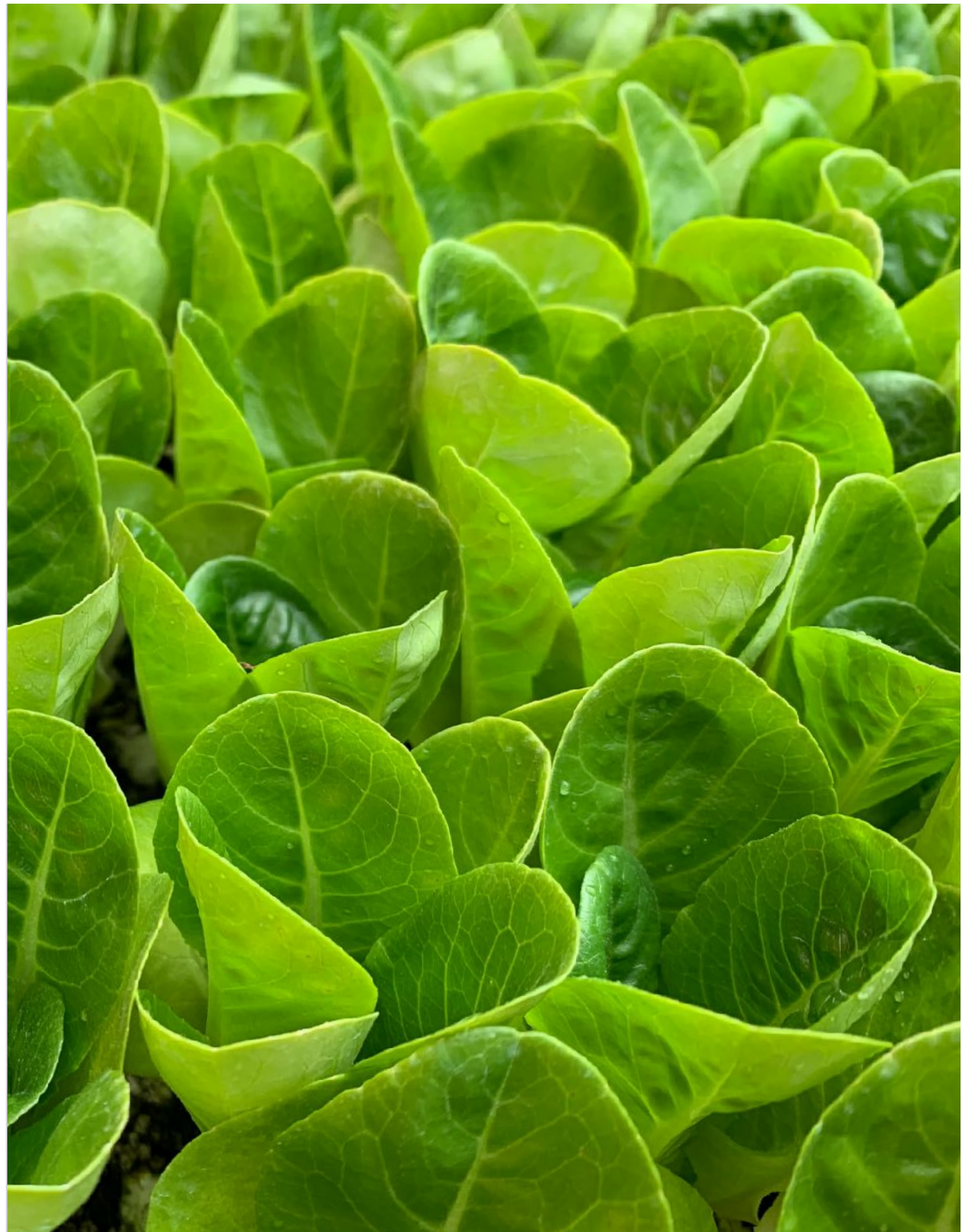


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## Critical Tracking Events (CTEs)

For each of the identified freight transport activities, critical tracking events (CTEs) establish identity and enable traceability and compliance with traceability-related regulation are summarised in the following table. It should be noted that while regulators often identify standard CTEs, in many cases, supply chain actors may choose to track additional events occurring within their supply chain to create a more robust picture of their supply chain. Critical Tracking Events (CTEs) are events that relate to the identity, movement and transformation of the food product.

Wholesale and distribution activity	CTE code	Critical Tracking Events (CTEs)
Establishment of unique identifiers	WD CTE1A	Creation of unique identities for the business and supply chain partners; products traded or handled
Licensing and food safety program establishment	WD CTE1B	Registration of food premises and food safety plan enacted
Receival from suppliers <ul style="list-style-type: none"><li>● Sign Proof of Delivery</li><li>● Notify supplier of Purchase Order reconciliation with Supplier Invoice</li><li>● Scan product barcode/identifier into warehouse management system</li><li>● Record use-by/product expiry date</li><li>● Allocate to identified storage slot, bay or floor grid area</li></ul>	WD CTE2	Receipt of Product completed and recorded in inventory systems: <ul style="list-style-type: none"><li>● POD signed</li><li>● Supplier notified of missing stock; under/over stock; damaged stock and returns</li><li>● Inbound product scanned into Wholesaler/DC Warehouse Management System</li><li>● FIFO Use-by/expiry dates recorded for batches, cartons, pallets of product</li><li>● Storage location allocated for product</li></ul>
Inspection <ul style="list-style-type: none"><li>● Inspect inbound product — reject of accept all or part of consignment</li><li>● Quality Assurance inspection</li><li>● And Food safety compliance</li></ul>	WD CTE3	Inspection can occur at time of receipt, or once stock putaway has been completed
Storage <ul style="list-style-type: none"><li>● Product moved from receiving area to warehouse location</li></ul>	WD CTE 4	Putaway stock in Warehouse storage location
Monitor <ul style="list-style-type: none"><li>● Count of stock keeping units (SKUs)</li><li>● Visibility of stock levels to customers and suppliers</li><li>● Recording of stock shrinkage in storage</li><li>● Monitoring of storage conditions e.g. temperature, humidity, pest inspections and treatment</li></ul>	WD CTE5	Includes activities related to the Monitoring include the following: <ul style="list-style-type: none"><li>● Inventory level reports by batch and use-by/expiry dates</li><li>● Monitoring of storage conditions e.g. temperature, humidity, pest inspections and treatments</li><li>● Stock shrinkage records</li><li>● Storage condition monitoring</li></ul>



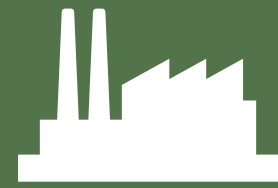
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<p><b>Delivery preparation</b></p> <ul style="list-style-type: none"><li>● Customer Purchase Order or on-line order received</li><li>● Order Acknowledgement sent to customer</li><li>● Stock availability checked and Order Confirmation sent to customer confirming terms of the order</li><li>● Customer Order created and packing list prepared</li><li>● Product picked from storage</li><li>● Product packed for outbound transport</li><li>● Transport booking made and Delivery Order and Consignment Note/Bill of Lading prepared</li></ul>	<p>WD CTE6</p>	<p><b>Activities related to the creation of an order ready for dispatch. Activities include:</b></p> <ul style="list-style-type: none"><li>● Receipt of Purchase Order from customer</li><li>● Generation of pick list</li><li>● Stock picked (specific batch and date information recorded)</li><li>● Transport Management System booking reference assigned</li><li>● Order prepared for delivery</li></ul>
<p><b>Delivery to Customer</b></p> <ul style="list-style-type: none"><li>● ASN issued to Customer</li><li>● An Invoice is sent to the Customer</li><li>● Proof of Delivery received from Transport Company</li><li>● Reconciling Purchase Order with Invoice and ASN to identify over/under/missing/reject stock</li></ul>	<p>WD CTE7</p>	<p><b>Delivery of Goods to supplier. Activities include:</b></p> <ul style="list-style-type: none"><li>● Advance Shipping Notice sent to Customer</li><li>● Advance Shipping Notice received by customer</li><li>● Customer Invoice issued</li><li>● POD from Transport Company</li><li>● Reconciliation of PO with Customer Invoice and ASN – detailing variances</li></ul>
<p><b>Returns Management</b></p> <ul style="list-style-type: none"><li>● Customer re-packs rejected stock and re-labels if new packaging is used</li><li>● Supplier organises return of rejected stock Scan returned product SSCC at receipt</li><li>● Determine disposition and re-enter usable stock to inventory</li><li>● Return impaired stock to supplier or repair on-site</li><li>● Record stock prior to disposal</li></ul>	<p>WD CTE8</p>	<ul style="list-style-type: none"><li>● Rejected stock re-packed and re-labelled with item or batch number recorded</li><li>● Product scanned at return to wholesaler warehouse of DC</li><li>● Scan returned product against Customer ASN/Returns Notice/Returns Authorisation Notice</li><li>● Re-enter stock in WMS inventory</li><li>● Record returns to supplier and scan prior to loading on transport</li><li>● Enter stock ID prior to disposal</li></ul>



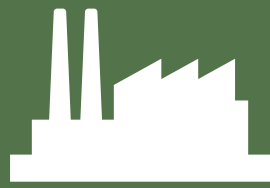
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Key Data Elements

CTE code	Critical Tracking Events	Key Data Elements																								
WD CTE1A	Creation of unique identities for the business and supply chain partners; products traded or handled; load units that contain the product	<ul style="list-style-type: none"><li>● Global Location Number</li><li>● PIC code (growers)</li><li>● Food Export Establishment number</li><li>● Food Premises Licence number</li></ul>																								
WD CTE1B	Registration of food premises and food safety plan enacted	<table><tr><th colspan="2">Request for GLN</th></tr><tr><td>Who</td><td>Distributor/Wholesaler Issuing Agency</td></tr><tr><td>What</td><td>Site Locations</td></tr><tr><td>When</td><td>Date/Time of issuance of Global Location Number (GLN)</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Physical Location set up and identification</td></tr></table> <table><tr><th colspan="2">Request for Food License</th></tr><tr><td>Who</td><td>Distributor/Wholesaler/Issuing Agency</td></tr><tr><td>What</td><td>Site Locations/organisation</td></tr><tr><td>When</td><td>Date/Time of issuance of License</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Registration of business for Food export</td></tr></table> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Global Location Number</li><li>● PIC code (growers)</li><li>● Food Export Establishment number</li><li>● Food Premises Licence number</li></ul>	Request for GLN		Who	Distributor/Wholesaler Issuing Agency	What	Site Locations	When	Date/Time of issuance of Global Location Number (GLN)	Where	Issuing Agency	Why	Physical Location set up and identification	Request for Food License		Who	Distributor/Wholesaler/Issuing Agency	What	Site Locations/organisation	When	Date/Time of issuance of License	Where	Issuing Agency	Why	Registration of business for Food export
Request for GLN																										
Who	Distributor/Wholesaler Issuing Agency																									
What	Site Locations																									
When	Date/Time of issuance of Global Location Number (GLN)																									
Where	Issuing Agency																									
Why	Physical Location set up and identification																									
Request for Food License																										
Who	Distributor/Wholesaler/Issuing Agency																									
What	Site Locations/organisation																									
When	Date/Time of issuance of License																									
Where	Issuing Agency																									
Why	Registration of business for Food export																									

CTE code	Critical Tracking Events	Key Data Elements												
WD CTE2	Inbound product receipted into Wholesaler/DC Warehouse Management System	<p>Usually EDI messaging between Supplier and Customer ERPs:</p> <ul style="list-style-type: none"><li>● Supplier/Vendor ID</li><li>● Supplier GLN</li><li>● Purchase Order Number</li><li>● Logistics/Pallet ID</li><li>● Product ID</li><li>● Batch/Use-By or Best-Before date</li><li>● Quantity</li><li>● Date due for delivery and invoice payment</li><li>● Invoice number</li><li>● Code for rejection — under/over; missing; damaged; QA fail</li></ul> <table><tr><th colspan="2">Goods Receipt</th></tr><tr><td>Who</td><td>Distributor/Wholesaler/Issuing Agency</td></tr><tr><td>What</td><td>PO, Delivery Note, Logistics/Pallet ID, Product ID, Quantity, Batch, Date Information</td></tr><tr><td>When</td><td>Date/Time of Receipt</td></tr><tr><td>Where</td><td>Receipt location</td></tr><tr><td>Why</td><td>Receipt of product</td></tr></table> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Purchase Order Number</li><li>● POD number</li><li>● Product ID</li><li>● Use-by/expiry dates</li><li>● Goods receipt number</li><li>● Purchase Order</li><li>● Quantity Received</li><li>● Date Received</li></ul>	Goods Receipt		Who	Distributor/Wholesaler/Issuing Agency	What	PO, Delivery Note, Logistics/Pallet ID, Product ID, Quantity, Batch, Date Information	When	Date/Time of Receipt	Where	Receipt location	Why	Receipt of product
	Goods Receipt													
	Who		Distributor/Wholesaler/Issuing Agency											
	What		PO, Delivery Note, Logistics/Pallet ID, Product ID, Quantity, Batch, Date Information											
When	Date/Time of Receipt													
Where	Receipt location													
Why	Receipt of product													
	Signed Proof of Delivery													
	Record FIFO for lot/batch, cartons, pallets of product													
	Supplier notified of missing stock; under/over stock; damaged stock and returns – PO-DO-Invoice 3-way reconciliation													



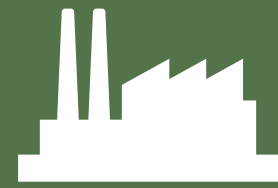
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Key Data Elements

CTE code	Critical Tracking Events	Key Data Elements												
WD CTE3	<b>Inspection</b> At goods receipt and during inventory management	<ul style="list-style-type: none"><li>● Supplier/Vendor ID</li><li>● Purchase Order Number</li><li>● Logistics/Pallet ID</li><li>● Product ID</li><li>● Quantity</li><li>● Batch Number</li><li>● Code for rejection — under/over; missing; damaged; QA fail</li></ul>												
		<table><tr><th colspan="2">Goods Inspection</th></tr><tr><td><b>Who</b></td><td>Distributor/Wholesaler Issuing Agency</td></tr><tr><td><b>What</b></td><td>Purchase Order, Delivery Note, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information</td></tr><tr><td><b>When</b></td><td>Date/Time of Inspection</td></tr><tr><td><b>Where</b></td><td>Inspection location</td></tr><tr><td><b>Why</b></td><td>Inspection</td></tr></table>	Goods Inspection		<b>Who</b>	Distributor/Wholesaler Issuing Agency	<b>What</b>	Purchase Order, Delivery Note, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information	<b>When</b>	Date/Time of Inspection	<b>Where</b>	Inspection location	<b>Why</b>	Inspection
		Goods Inspection												
		<b>Who</b>	Distributor/Wholesaler Issuing Agency											
<b>What</b>	Purchase Order, Delivery Note, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information													
<b>When</b>	Date/Time of Inspection													
<b>Where</b>	Inspection location													
<b>Why</b>	Inspection													
		<b>Information to be shared to a traceability platform:</b> <ul style="list-style-type: none"><li>● Inspection Result</li><li>● Product ID</li><li>● Quantity</li><li>● Batch ID</li><li>● Use-by/expiry dates</li></ul>												

CTE code	Critical Tracking Events	Key Data Elements												
WD CTE4	Storage  Product Put Away into storage location	Information required <ul style="list-style-type: none"><li>● Storage slot barcode identified on ERP/WMS system</li><li>● Product barcode scan/identifier recorded at putaway</li></ul> <table><tr><th colspan="2">Put Away</th></tr><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID</td></tr><tr><td>When</td><td>Date/Time of Put away</td></tr><tr><td>Where</td><td>Receipt location</td></tr><tr><td>Why</td><td>Stock Put away (movement)</td></tr></table> <b>Information to be shared to a traceability platform</b> <ul style="list-style-type: none"><li>● Product ID</li><li>● Product quantity/SKUs in storage inventory</li><li>● Product use-by; expiry dates</li></ul>	Put Away		Who	Distributor/Wholesaler	What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID	When	Date/Time of Put away	Where	Receipt location	Why	Stock Put away (movement)
		Put Away												
Who	Distributor/Wholesaler													
What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID													
When	Date/Time of Put away													
Where	Receipt location													
Why	Stock Put away (movement)													
WD CTE5	Monitoring  Inventory visibility for customer order management	Inventory level reports by <ul style="list-style-type: none"><li>● Batch/SKU number</li><li>● use-by/expiry dates</li></ul> <table><tr><th colspan="2">Monitoring</th></tr><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID</td></tr><tr><td>When</td><td>Date/Time of Monitoring</td></tr><tr><td>Where</td><td>Product Location</td></tr><tr><td>Why</td><td>Monitoring, stock shrinkage</td></tr></table> <b>Information to be shared to a traceability platform</b> <ul style="list-style-type: none"><li>● Inventory level reports</li></ul>	Monitoring		Who	Distributor/Wholesaler	What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID	When	Date/Time of Monitoring	Where	Product Location	Why	Monitoring, stock shrinkage
Monitoring														
Who	Distributor/Wholesaler													
What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID													
When	Date/Time of Monitoring													
Where	Product Location													
Why	Monitoring, stock shrinkage													



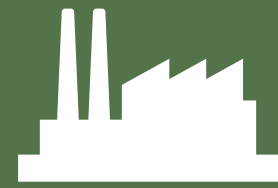
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Key Data Elements

CTE code	Critical Tracking Events	Key Data Elements										
WD CTE5	Stock shrinkage records	<div><div><ul style="list-style-type: none"><li>● Batch and item level ID (GTIN, SSCC, Lot/batch number)</li><li>● Quantity</li><li>● Supplier ID</li><li>● Date recorded</li><li>● Accounted value</li></ul></div><div><div>Monitoring/Stock shrinkage</div><table><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID</td></tr><tr><td>When</td><td>Date/Time of Monitoring</td></tr><tr><td>Where</td><td>Product Location</td></tr><tr><td>Why</td><td>Monitoring, stock shrinkage</td></tr></table></div><div>Information to be shared to a traceability platform</div><div>Shrinkage record:<ul style="list-style-type: none"><li>● Product ID</li><li>● Batch and item level ID (GTIN, SSCC, Lot/batch number)</li><li>● Quantity lost</li><li>● Supplier ID</li><li>● Date recorded</li></ul></div></div>	Who	Distributor/Wholesaler	What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID	When	Date/Time of Monitoring	Where	Product Location	Why	Monitoring, stock shrinkage
Who	Distributor/Wholesaler											
What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID											
When	Date/Time of Monitoring											
Where	Product Location											
Why	Monitoring, stock shrinkage											
WD CTE5	Storage condition monitoring	<div>Temperature control</div> <div>Temperature records twice daily:<ul style="list-style-type: none"><li>● Date and time of inspection</li><li>● Recorded temperature degree Celsius</li><li>● Corrective actions</li><li>● Name</li><li>● QA supervisor initials</li></ul></div> <div><div>Monitoring/Temperature</div><table><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID, Temperature reading</td></tr><tr><td>When</td><td>Date/Time of Monitoring</td></tr><tr><td>Where</td><td>Product Location</td></tr><tr><td>Why</td><td>Monitoring, temperature</td></tr></table></div>	Who	Distributor/Wholesaler	What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID, Temperature reading	When	Date/Time of Monitoring	Where	Product Location	Why	Monitoring, temperature
Who	Distributor/Wholesaler											
What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID, Temperature reading											
When	Date/Time of Monitoring											
Where	Product Location											
Why	Monitoring, temperature											

CTE code	Critical Tracking Events	Key Data Elements												
WD CTE5	Storage condition monitoring <i>(continued)</i>	<div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Date and time</li><li>● Recorded temperature degree Celsius</li><li>● Location or temperature reading</li><li>● Product ID</li><li>● Batch</li></ul></div> <div>Pest incursion and treatment:<ul style="list-style-type: none"><li>● Date and time of inspection</li><li>● Date and time of treatment</li><li>● Supplier ID of chemical/product used</li><li>● Product name, batch number and expiry date</li><li>● Rate of application</li><li>● Pest Controller ID</li></ul></div> <div>Pest Management Program</div> <div>Pests covered • Frequency of service • Area of service • Time of service • Response times • Warranties</div> <div>• Agreed reporting • Method of treatment • Pest Management Program • Pest monitoring plan • Resource plan • Schedule of conditions • External notification of treatments</div> <div>Pest Controller Report</div> <div>Client Name • Site Address • Date of Service • Technician’s Name • location control applied • Formulations/catching device installed in station at time of service • Pest activity • Type of Pest activity (e.g. droppings, gnawing) • Formulation(s) used • Formulation amount recorded • Pest Management Program improvement recommendations • Any other legislative requirements</div> <div><table><tr><th colspan="2">Monitoring/Pest Control</th></tr><tr><td>Who</td><td>Distributor/Wholesaler/Pest Controller</td></tr><tr><td>What</td><td>Service Type, Chemicals used, Pest control report</td></tr><tr><td>When</td><td>Date/Time of Pest Control</td></tr><tr><td>Where</td><td>Warehouse location</td></tr><tr><td>Why</td><td>Monitoring, Pest Control</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Pest Controller Report</li><li>● Date of inspection and treatment</li></ul></div>	Monitoring/Pest Control		Who	Distributor/Wholesaler/Pest Controller	What	Service Type, Chemicals used, Pest control report	When	Date/Time of Pest Control	Where	Warehouse location	Why	Monitoring, Pest Control
Monitoring/Pest Control														
Who	Distributor/Wholesaler/Pest Controller													
What	Service Type, Chemicals used, Pest control report													
When	Date/Time of Pest Control													
Where	Warehouse location													
Why	Monitoring, Pest Control													



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Key Data Elements

CTE code	Critical Tracking Events	Key Data Elements												
WD CTE6	Picking (order processing)	<b>Inbound Purchase Order:</b> <ul style="list-style-type: none"><li>● Customer name and location</li><li>● Seller name and location</li><li>● Product quantity</li><li>● Product price</li><li>● Terms and conditions of sale</li><li>● Product quality specifications</li><li>● Delivery terms and conditions</li><li>● Payment terms and conditions</li></ul> <table><tr><th colspan="2">Picking</th></tr><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information</td></tr><tr><td>When</td><td>Date/Time of pick</td></tr><tr><td>Where</td><td>Pick location</td></tr><tr><td>Why</td><td>Picking stock</td></tr></table> <b>Information to be shared to a traceability platform:</b> <ul style="list-style-type: none"><li>● Purchase Order number</li><li>● Product ID</li><li>● Batch/Use by/Best before dates</li><li>● Quantity picked</li><li>● Bin/Storage location</li><li>● Date of pick</li></ul>	Picking		Who	Distributor/Wholesaler	What	Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information	When	Date/Time of pick	Where	Pick location	Why	Picking stock
	Picking													
Who	Distributor/Wholesaler													
What	Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information													
When	Date/Time of pick													
Where	Pick location													
Why	Picking stock													
	Receipt of Purchase Order from Customer													

CTE code	Critical Tracking Events	Key Data Elements												
WD CTE7	Delivery to Customer	<ul style="list-style-type: none"><li>● Booking Reference/Tracking number</li><li>● POD/Receiving Advice</li><li>● Date and time delivered</li><li>● Job number</li><li>● Invoice number</li><li>● Freight paid by</li><li>● Collected from location</li><li>● Delivered to location</li><li>● Number of load units/pallets/cartons</li><li>● Contact name</li><li>● Contact number</li><li>● Acceptance of terms and conditions</li><li>● Signature</li><li>● ASN number</li><li>● Supplier invoice number</li><li>● Item/lot/batch code</li><li>● Quantity missing/under/over supplied or rejected</li><li>● Manufacturer ID</li><li>● Date received</li></ul>												
	Transport Management System booking													
	POD from Transport company													
	ASN received by Customer													
	Invoice issued to Customer													
	Reconciliation of PO: Invoice: ASN and list variations in message to Wholesaler/DC													
		<table><tr><th colspan="2">Dispatch</th></tr><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Customer Purchase Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number</td></tr><tr><td>When</td><td>Date/Time of Dispatch</td></tr><tr><td>Where</td><td>Dispatch location</td></tr><tr><td>Why</td><td>Dispatch of product</td></tr></table>	Dispatch		Who	Distributor/Wholesaler	What	Customer Purchase Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number	When	Date/Time of Dispatch	Where	Dispatch location	Why	Dispatch of product
Dispatch														
Who	Distributor/Wholesaler													
What	Customer Purchase Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number													
When	Date/Time of Dispatch													
Where	Dispatch location													
Why	Dispatch of product													
		<p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Customer Order Number</li><li>● Dispatch/ASN number</li><li>● Shipment Identifier</li><li>● Product ID</li><li>● Batch number</li><li>● Quantity picked</li><li>● Dispatch location</li><li>● Dispatch date</li><li>● Receiving location</li><li>● Customer details</li></ul>												



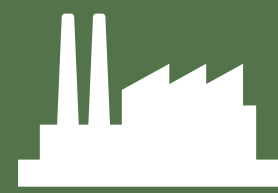
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Key Data Elements

CTE code	Critical Tracking Events	Key Data Elements												
WD CTE8	<b>Returns management</b>	<ul style="list-style-type: none"><li>● Item/batch/lot code</li><li>● Date returned</li><li>● Product ID/barcode</li><li>● Quantity</li><li>● Load unit SSCC</li><li>● Ship from</li><li>● Ship to</li><li>● Return Merchandise Authorisation number affixed to item/carton</li><li>● RMA number</li><li>● ASN/Delivery Order/RMA number</li><li>● GTIN/SSCC numbers</li><li>● New SSCC pallet/tub number</li><li>● New transport label printed and affixed</li><li>● Purchase Order No</li><li>● Shipment number</li></ul> <table><tr><th colspan="2">Returns</th></tr><tr><td><b>Who</b></td><td>Distributor/Wholesaler/Transport provider</td></tr><tr><td><b>What</b></td><td>Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information, RMA Number, Logistics ID (SSCC)</td></tr><tr><td><b>When</b></td><td>Date/Time of Return</td></tr><tr><td><b>Where</b></td><td>Pick location</td></tr><tr><td><b>Why</b></td><td>Stock Return</td></tr></table> <p><b>Information to be shared on Traceability platform:</b></p> <ul style="list-style-type: none"><li>● Information to be shared on Traceability platform</li><li>● Return Identification</li><li>● Product ID, Batch and quantity returned</li><li>● Returned Date</li><li>● Reason for return</li><li>● Logistics unit identifier</li></ul>	Returns		<b>Who</b>	Distributor/Wholesaler/Transport provider	<b>What</b>	Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information, RMA Number, Logistics ID (SSCC)	<b>When</b>	Date/Time of Return	<b>Where</b>	Pick location	<b>Why</b>	Stock Return
	Returns													
	<b>Who</b>		Distributor/Wholesaler/Transport provider											
	<b>What</b>		Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information, RMA Number, Logistics ID (SSCC)											
	<b>When</b>		Date/Time of Return											
	<b>Where</b>		Pick location											
	<b>Why</b>		Stock Return											
	Rejected stock re-packed and re-labelled with item or batch number recorded													
	Scan returned product and check against Customer Invoice/ASN/Returns Notice													
	Re-enter usable stock in WMS inventory													
	Record returns to supplier on RMA – scan product ID and RMA number prior to loading on transport													
	Enter stock ID in Inventory system/WMS prior to disposal													
	Product scanned at return to wholesaler warehouse of DC													



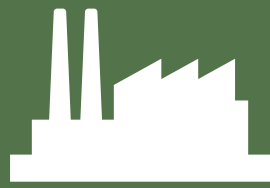
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Application of GS1 global data standards

Adoption of global data standards enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain. The use of global standards has become increasingly critical in recent years with the advent of increased customisation (which adds additional actors to supply chains) and the general globalisation of supply chain models and processes.

A single language is critical to ensure interoperability and effective traceability. The following data standards have been defined and included to support the list of CTE’s and KDE’s listed in this module.

Location Identification

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners.

Within this module, the GLN can be used to identify both a functional entity (like accounts receivable or a bill back department) and a physical entity (like a distributor’s loading dock). GLNs can also be used to identify a legal entity (like a parent corporation or subsidiary).

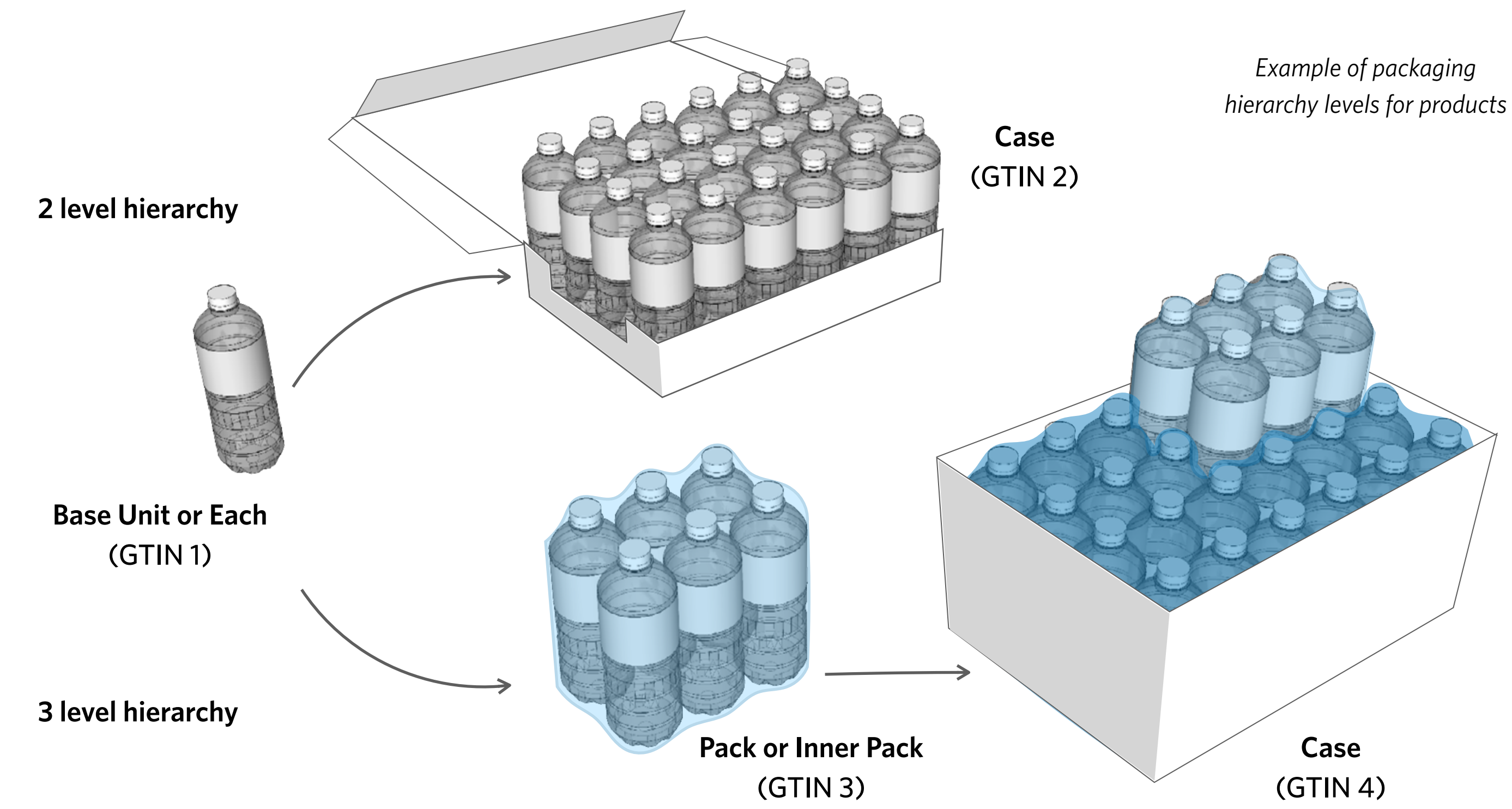
The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location within the world.



Product Identification (GTIN)

The Global Trade Identification Number (GTIN) is used to identify loose or pre-packed trade items, products, input materials, outputs, at any stage of the supply chain up to the end consumer. Unique product identification applies to not only products, but also their packaging configuration

Whilst most products travel through the supply chain at Case level, these “Cases” may be broken down by the Wholesaler/Distributor and delivered as either Innners or Base Units.



Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. This information is provided both in shared documentation as well as encoded into physical barcodes to enable accurate data capture via scanning devices at Critical Tracking events.

Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.





## Asset Identification

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g. a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g. a Intermediate Bulk Container), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned. Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.



### Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate. The GS1 System identification of a returnable asset, the Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned. This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.



### Global Individual Asset Identifiers (GIAI) – AI (8004)

An individual asset is considered a physical entity made up of any characteristics. The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records.

Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used. This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.



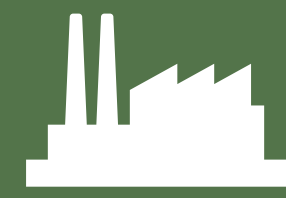
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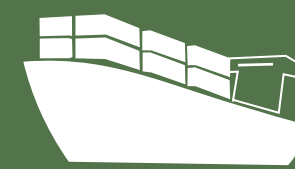
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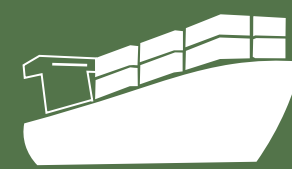
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Logistics Units (SSCC)

The Serial Shipping Container Code can be used by companies to identify a logistic unit, which can be any combination of trade items packaged together for storage and/or transport purposes; for example a case, pallet or parcel.

The SSCC is a crucial key for traceability, since it uniquely identifies each distributed logistic unit and its content.

- The SSCC enables companies to track each logistic unit for efficient order and transport management.
- The SSCC can be encoded in a barcode or EPC/RFID tag, ensuring the logistic unit can be accurately and easily identified as it travels between trading partners, anywhere in the world.
- When SSCC data is shared electronically via EDI or EPCIS, this enables companies to share information about the status of logistic units in transit, and reliably link it to related transport information such as shipment details.
- The SSCC enables companies to link to additional information about the logistic unit. This information can be communicated via a Despatch Advice or Advanced Shipping Notice (ASN) prior to the logistic unit’s arrival. Upon receipt the SSCC will be scanned, providing the required information to speed up the receipt of goods as well as the subsequent invoicing process.

The SSCC is fully compatible with ISO/IEC 15459 — Part 1: Unique identifiers for transport units. This is often referred to as the ISO licence plate and is a prerequisite for tracking and tracing logistic units in many international supply chains.

Global Identification Number for Consignment (GINC)

The Global Identification Number for Consignment can be used by companies to identify a consignment comprised of one or more logistic units that are intended to be transported together

Logistic units in a particular shipment may be associated with different GINCs during various transport stages; for example, when the shipment gets consolidated with other shipments during its journey and de-consolidated again before it reaches the consignee.

The GINC allows freight forwarders and transport providers to keep track of the logistic units being transported together.

- The GINC is typically used by freight forwarders to instruct transport providers; for example, on a Master Airway Bill (MAWB) or a Master Bill of Lading (MBL).
- The GINC can be encoded in a barcode or as text on a MAWB / MBL, or in addition to the Serial Shipping Container Code (SSCC), on a logistics label.
- The GINC can be electronically used in transport instruction and transport status messages between freight forwarder and transport provider.



Global Shipment Identification Number (GSIN)

The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together.

The logistic units keep the same GSIN during all transport stages, from origin to final destination. The GSIN identifies the logical grouping of one or several logistic units, each identified with a separate Serial Shipping Container Code (SSCC).

- The GSIN can be encoded by the shipper in a barcode or as text on a House Way Bill, or in addition to the SSCC, on a logistics label.
- The GSIN can be electronically used by a company in transport instruction and transport status messages between freight forwarder and transport provider, and also as a reference in the Despatch Advice.

The GSIN is fully compatible with ISO/IEC 15459 — Part 8: Grouping of Transport Units. The GSIN also meets the requirements for a Unique Consignment Reference (UCR) according to the World Customs Organisation.



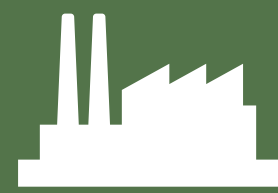
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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/ Format	Further information
Location	Manufacturing Plant, Finished Goods, Location, Dispatch Dock	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Production Date and/or Time, Use By date, Best Before Date, Pack Date	Year-Month-Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Input materials such as raw ingredients and packaging, Outputs such as finished goods, packaged or processed goods	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li><a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li><a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch/Lot code, Serial Number		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number etc. can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers:  <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)</a>
Logistics Units	Pallet of packaged product, crate or box of finished goods	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>
Assets	Returnable assets i.e. IBC or individual assets i.e. a crate	Global Returnable Asset Identifier (GRAI)	0 + AN20	Can be identified as an asset type only or an optional serial number can be added to distinguish individual assets <a href="https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file</a>
		Global Individual Asset Identifier (GIAI)	AN30	
Consignment	Grouping of logistics units assigned by the transport company	GINC	N30	The Global Identification Number for Consignment can be used by companies to identify a consignment comprised of one or more logistic units that are intended to be transported together. <a href="https://www.gs1.org/standards/id-keys/global-identification-number-consignment-ginc">https://www.gs1.org/standards/id-keys/global-identification-number-consignment-ginc</a>
Shipment	Grouping of logistics units	GSIN	N17	The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together. <a href="https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin">https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin</a>



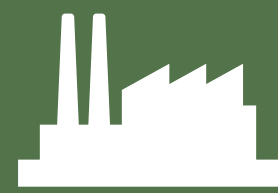
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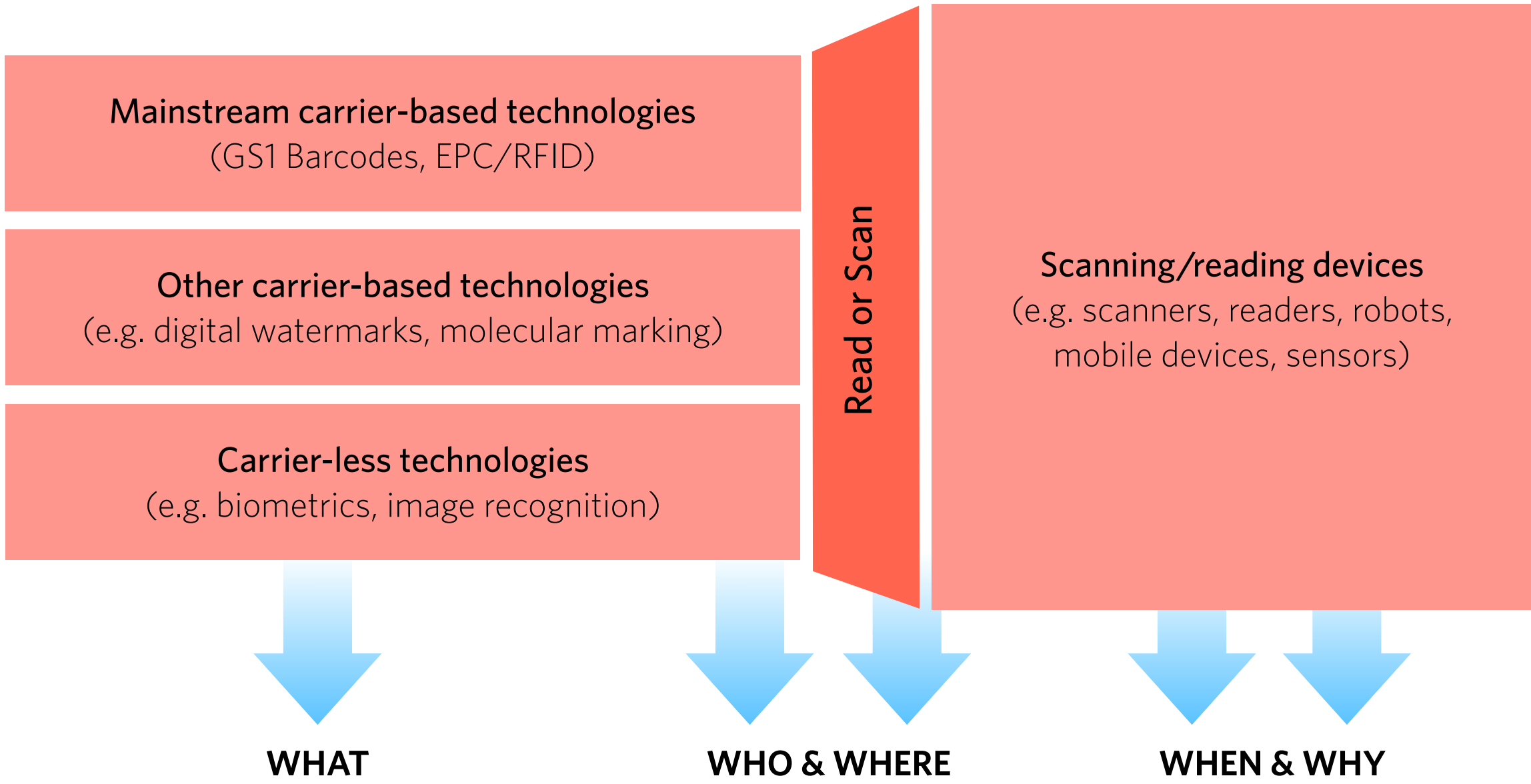
How to capture the KDEs

How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

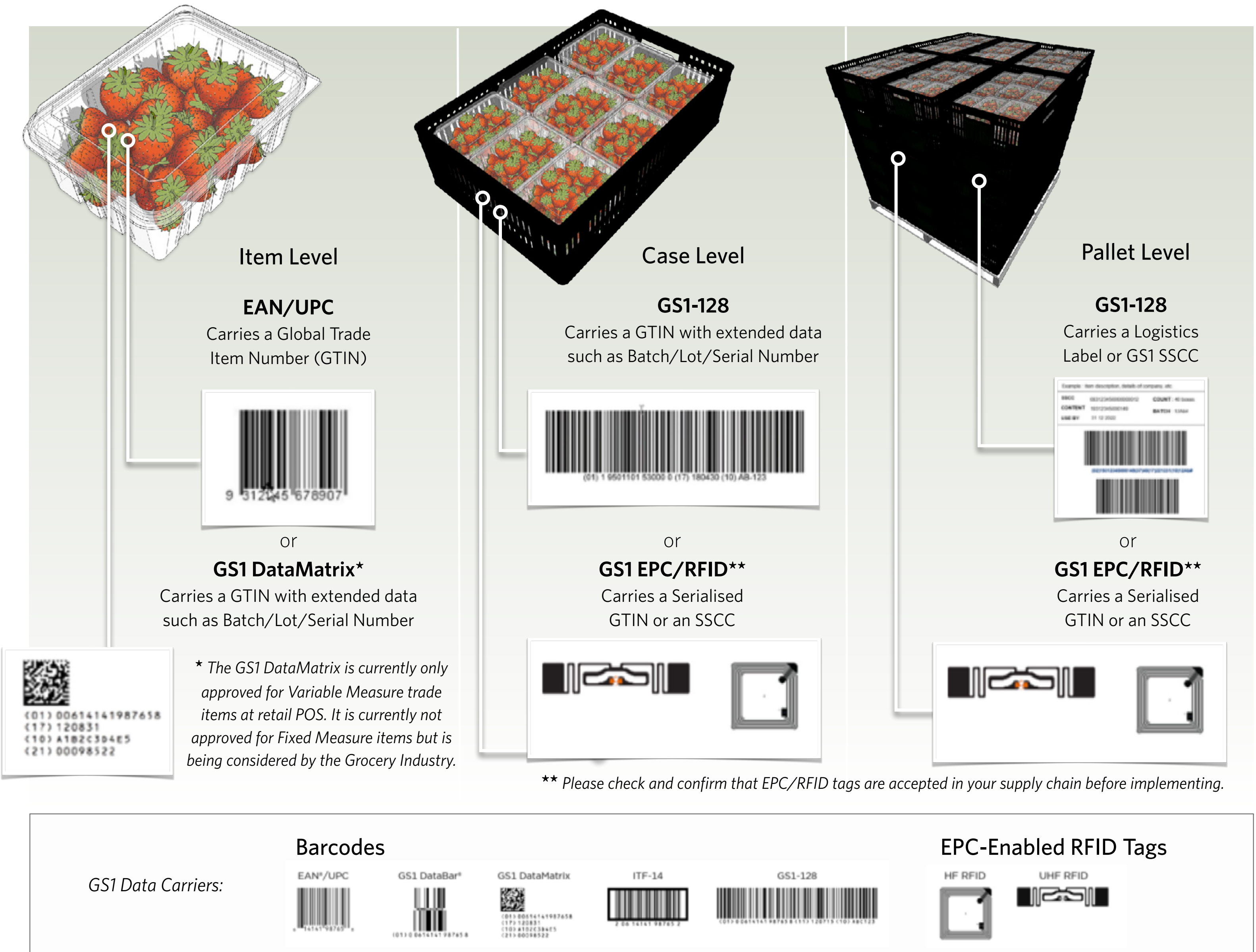


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

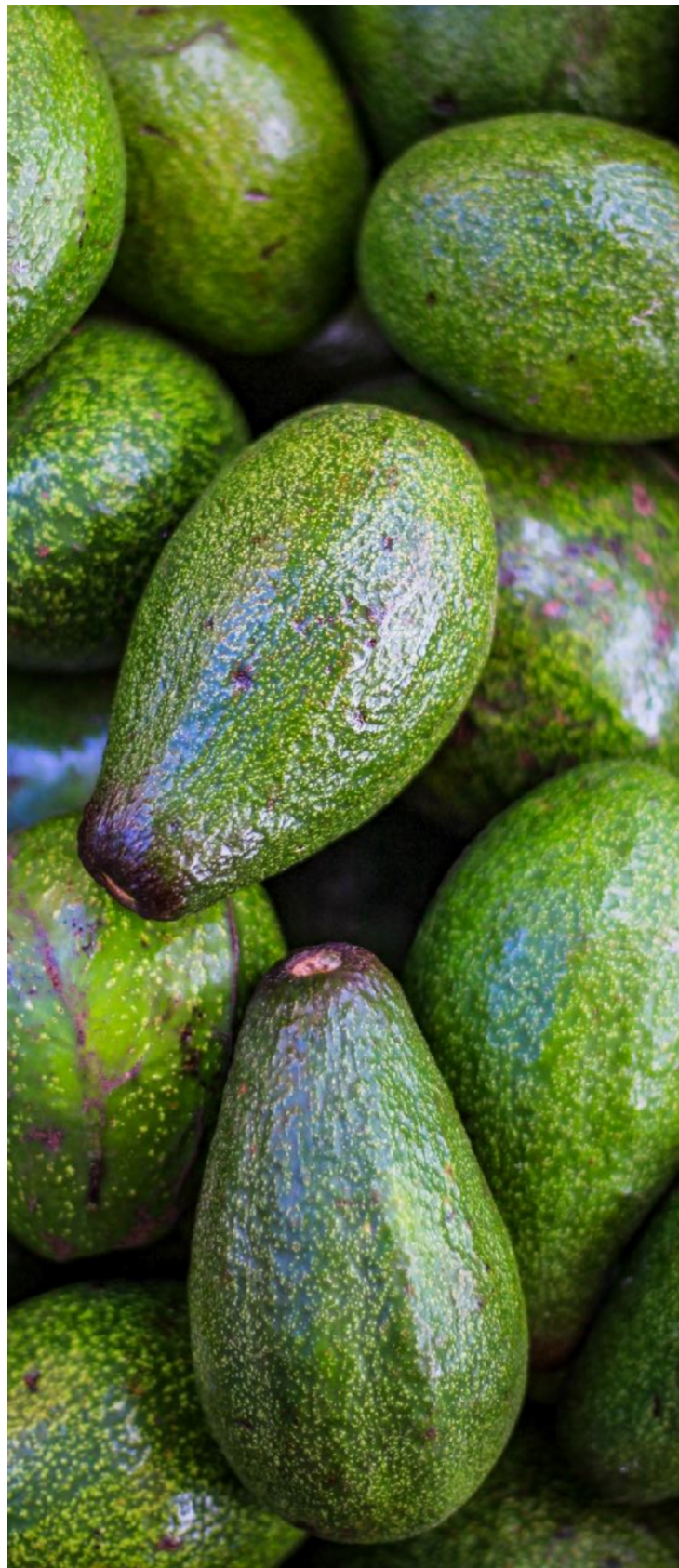
Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.







Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc. The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

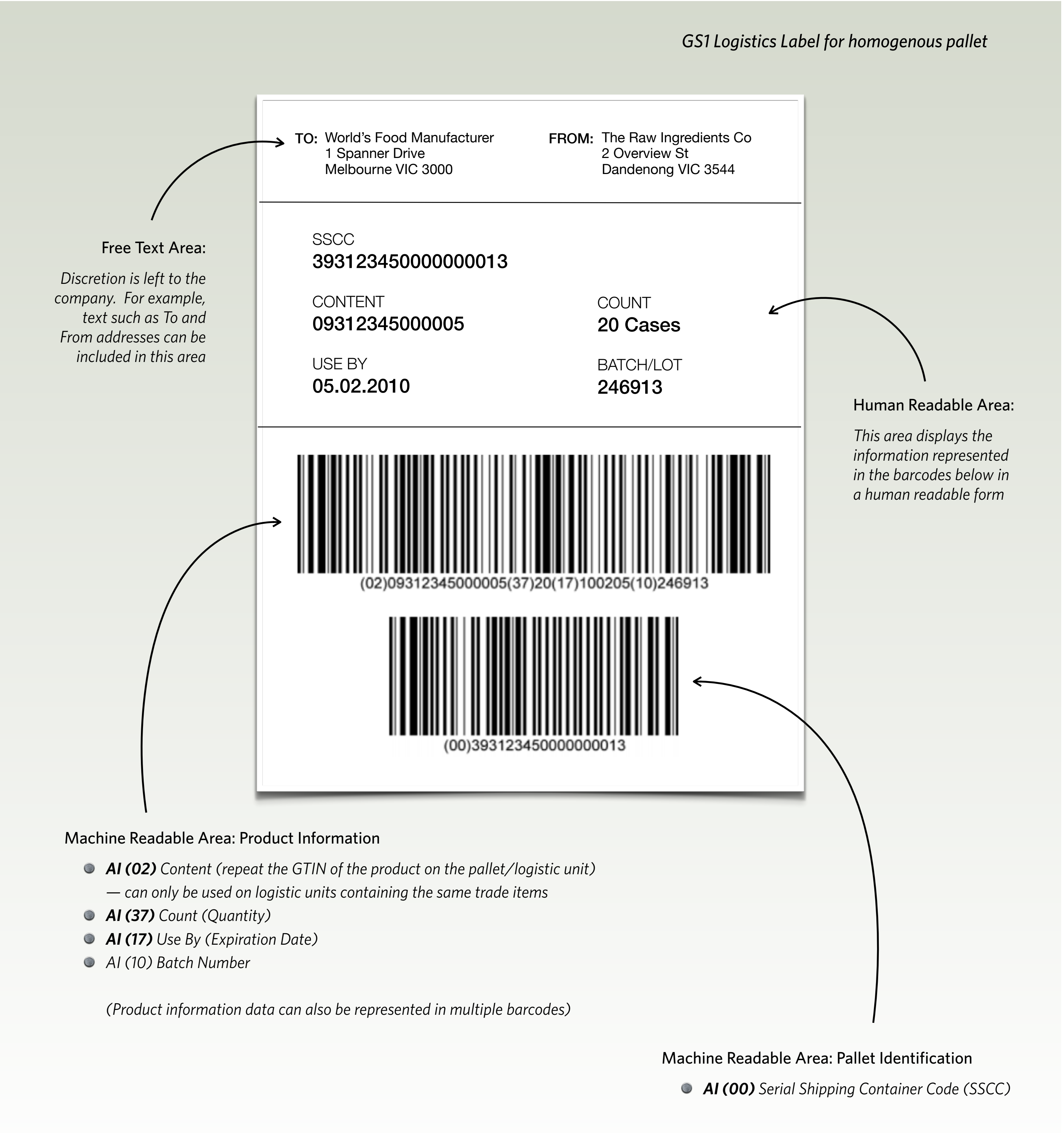
For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GSI-128 barcode capturing GTIN, Use By Date and Batch/Lot number



GSI-128 barcode capturing GTIN, Production Date and Batch/Lot number





FREE INFORMATION

Example: Beef Topside 600kg, details of company

SSCC 093123450000000012

Prod Date 3012/2008

CONTENT 99311781001157

Count 40 boxes

WEIGHT 600kg



(02)99311791001157(3102)060000(37)40(13)081230



(00)093123450000000012

GS1 Logistics Label homogenous logistics unit containing variable weight products

FROM  
GS1 GO  
Avenue Louise 326  
1050 Brussels

BE85250

TO

GS1 GO Princeton Office  
1009 Lenox Drive

SPECIAL ORDER

1TE.00

0007

To be delivered : ECT VVD - X020399

GSIN

950110100000000001

SSCC

095011011234567896



(402) 950110100000000001



(00) 0 9501101 123456789 6

GS1 Logistics Label homogenous logistics unit containing GSIN reference



(8003) 093123450012480001

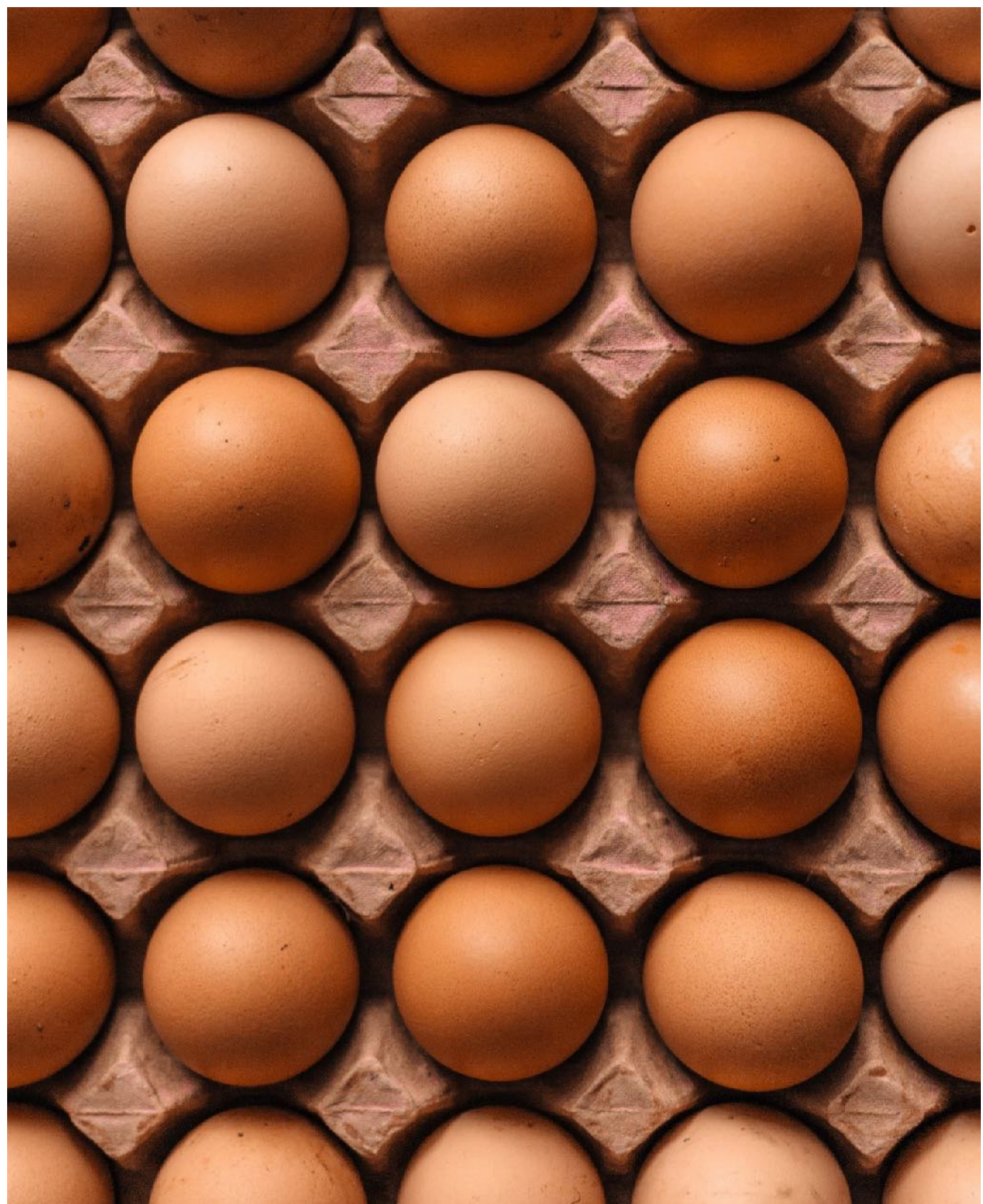
Global Returnable Asset Identifier, AI (8003),  
represented in a GS1-128 Barcode



(8004)93123450000000001

Global Individual Asset Identifier, AI (8004),  
represented in a GS1-128 Barcode





## How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the warehouse; as it is shipped out of the warehouse; and as it is received at a processing facility or abattoir or as it is opened for further processing.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

The Critical Tracking Events highlight key events that require data capture and provide guidance on what information needs to be captured. Traceability data, if correctly encoded in Barcodes will be picked up by scanners with systems storing the relevant data captured for future data sharing and use. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are putaway, picking, inspecting packing, shipping, transporting, selling. Often a combination of fixed mounted scanners or readers and handheld devices will be applied to capture the critical tracking events.

The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.



### Useful Links

Food Safety in transport and distribution:

- <https://www.foodsafety.com.au/laws-requirements/food-sectors/transport-distribution>
- [https://www.foodstandards.gov.au/publications/Documents/Safe%20Food%20Australia/FSANZ%20Safe%20Food%20Australia\\_WEB.pdf](https://www.foodstandards.gov.au/publications/Documents/Safe%20Food%20Australia/FSANZ%20Safe%20Food%20Australia_WEB.pdf)
- <https://www.freshcare.com.au/wp-content/uploads/Freshcare-Food-Safety-Quality-Supply-Chain-Edition-1-Standard-1.pdf>
- <https://ablis.business.gov.au/service/ag/australian-code-of-good-wholesaling-practice-for-medicines-in-schedules-2-3-4-and-8/31304>
- <https://www.afgc.org.au/wp-content/uploads/2019/07/Australian-Cold-Chain-Guidelines-2017.pdf>
- <https://afccc.org.au/current-standards.html>
- [https://www.aepma.com.au/FileDownload/667/CoP\\_Pest\\_Management\\_in\\_the\\_Food\\_Industry-1st\\_Edition\\_pdf](https://www.aepma.com.au/FileDownload/667/CoP_Pest_Management_in_the_Food_Industry-1st_Edition_pdf)

Australian Food Cold Chain Council (AFCCC) Cold Food Codes:

<https://afccc.org.au/cold-food-codes.html>

Minimising shrinkage:

<http://www.tradingpartnerforum.com.au/publications/2016/4/18/loss-prevention.html>



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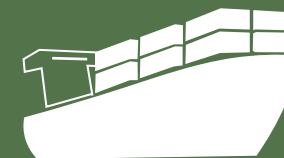
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Glossary

<b>Advance Shipping Notice (ASN)</b>	An advance ship notice or advanceshipping notice (ASN) is a notification of pending deliveries, similar to a packing list. It is usually sent in an electronic format and is a common EDI document.
<b>B2B/E2E</b>	Business-to-Business and Exchange-to-Exchange describes the IT system and business transactions between trading partners in a supply chain. In E2E transactions of data it is presumed these are automated processes.
<b>Consignment Note</b>	The consignment note is a key document used in transporting freight within domestic supply and in the landside logistics of import and export. The goods are deemed to be “on consignment” until they reach the consignee. The document is prepared by the consignor and countersigned by the transport carrier as a proof of receipt of the consignment for delivery at the destination.
<b>Cross dock</b>	An area within a warehouse or distribution centre where inbound goods are sorted and re-loaded on transport without storage. Bays in a cross-dock are temporary holding locations for goods prior to re-loading.
<b>Delivery Order (DO)</b>	A document from the Consignor of the freight which orders the release of the cargo to another party. This permits the delivery direct to a warehouse or depot, as organised with the Consignee. This enables the Consignor to order pick up of product from a 3PL warehouse in order to deliver to the party named in the Delivery Order.
<b>First in: First out (FI-FO)</b>	FO-FO is a stock rotation mechanism based on recording the best-before/use-by/expiry date of food product received into a warehouse management system, to ensure food product is not overlooked and wasted due to expiry of these dates.
<b>Inventory Management</b>	Inventory is goods in raw form, bulk or packaged ready for sale. Management of inventory in the wholesale and distribution phase involves tracking and controlling this stock, generally in its finished product condition, ready for sale and delivery to food business operators.
<b>Load Unit</b>	The Principle of Unit Load states that, “it is quicker and economical to move a lot of items at a time rather to move each one of them individually”. In other words this principle suggested that, the larger the load handled, the lower the cost per unit handled. Packages loaded on a pallet, in a crate or any other way that enables them to be handled at one time as a unit is described as a load unit. Load units may be pallets, tubs, barrels, shipping or intermodal containers, tanks, cages or unit load devices (airfreight).
<b>Order Acknowledgment</b>	An Order Acknowledgment is a commercial document/electronic message issued by the Wholesaler or Distribution Centre acknowledging receipt of the Purchase Order.





Order Confirmation	A legally binding commitment to deliver specified good on specified terms. This enables the buyer to plan for receipt of these goods and if unconfirmed, to look to alternative suppliers.
Order Management System	An order management system (OMS) is a tool that records all the sales and purchase order details of a business on a single platform.
Proof of Delivery (POD)	A commercial document used by the Consignee or their Logistics Service Provider to notify the Consignor of the receipt and acceptance of a delivery. A signed POD enables the Transport Company to raise an invoice.
Purchase Order (PO)	A commercial document issued by a buyer to a supplier. This is a legally binding offer to buy product in return for payment. The terms and conditions for delivery and payment are detailed in this document, which also details the product quantity, price, terms and conditions, product quality specifications.
Quality Assurance (QA)	<p>In the context of food distribution and storage, QA involves compliance with regulatory requirements (based on Food Safety standards) and the specifications of industry and customer standards. Some QA standards and certification programs are:</p> <ul style="list-style-type: none"><li>● <b>Freshcare</b> Freshcare is an industry owned, not-for-profit on-farm assurance program, established and maintained to service the Australian fresh produce industry. Freshcare is currently the largest Australian on-farm assurance program for fresh produce; proudly providing on-farm food safety &amp; quality and environmental certification services to over 5000 members nationally.</li><li>● <b>Global G.A.P</b> Global G.A.P is a not-for-profit organisation with a crucial objective: safe, sustainable agricultural production worldwide. We set voluntary standards for the certification of agricultural products around the globe — and more and more producers, suppliers and buyers are harmonising their certification standards to match.</li><li>● <b>GFSI</b> The Global Food Safety Initiative (GFSI) is a business-driven initiative for the continuous improvement of food safety management systems to ensure confidence in the delivery of safe food to consumers worldwide. GFSI provides a platform for collaboration between some of the world's leading food safety experts from retailer, manufacturer and food service companies, service providers associated with the food supply chain, international organisations, academia and government.</li><li>● <b>HARPS</b> The Harmonised Australian Retailer Produce Scheme (HARPS) is a retailer-led scheme designed to assist with compliance to food safety, legal and trade legislation for suppliers to the major grocery retailers in Australia, by harmonising certification requirements for the major retailers in Australia.</li><li>● <b>SQF</b> SQF is recognised by retailers and food-service providers around the world who require a rigorous, credible food safety management system. The SQF Program is recognised by the Global Food Safety Initiative (GFSI) and links primary production certification to food manufacturing, distribution and agent/broker management certification.</li></ul>
Return Merchandise Authorisation (RMA) or Returns Authorisation Notice (RAN)	A form used commonly in e-commerce to facilitate the return of product. The RMA details the reason for return of the product and enables execution of the agreed returns policy between the wholesaler and food business operator.





Shrinkage	Shrinkage of product in wholesale and distribution refers to the loss of stock and its value due to administrative errors, product deterioration and damage (e.g. packaging, contamination), theft or fraud.
Stock Keeping Unit (SKU)	<div><p>Retailers use SKUs to identify products placed on sale to consumers. They are distinct to each retailer and designed for internal purposes. In connected Point of Sale and Inventory Management Systems, retailers may choose to track product based on their SKUs. Use of SKU number in traceability is limited at a supply chain level in comparison to a Universal Product Code (UPC) barcode symbol.</p><div><div><div>SKU</div><div>ZG011AQA</div><div>Unique for each retailer</div><div>Alphanumeric</div><div>Varies in length</div></div><div>VS</div><div><div>UPC</div><div></div><div>Consistent across retailers</div><div>Numeric only</div><div>Always 12 digits</div></div></div></div>
Transport Management System (TMS)	A TMS enables a wholesaler or distributor to coordinate movement of product from one location to another, including procurement of transport services, planning of inbound and outbound delivery route, transport mode and timelines, product tracking in transport processes and transport invoice control.
Warehouse Management System (WMS)	<div><p>A warehouse management system is a software solution to manage and optimise inventory and supply chain operations in a distribution centre. Typical functions of a WMS include:</p><ul style="list-style-type: none"><li>● Receiving products</li><li>● Tracking stock</li><li>● Efficient storage</li><li>● Picking and packing product for delivery</li><li>● Dispatch of goods</li><li>● Returns management</li><li>● Messaging between suppliers and customers</li></ul></div>



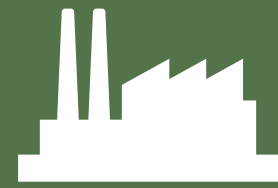
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# Retail



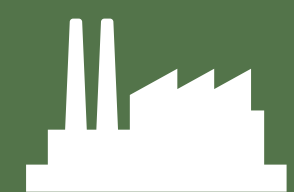
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## Food Retail

This module covers key activities that generally take place along a retail business supply chain where food (fresh and/or processed) is sold to customers and usually to be consumed elsewhere.

Retail businesses may include supermarkets; grocers, butchers, bakers and delis; convenience stores; service stations; food takeaways; market stalls; and caterers.

In this module, nine (9) major activities are associated with processing and manufacturing:

- Establishing Master data
- Sourcing of product suppliers
- Auditing suppliers for traceability and food safety
- Inventory management in 3rd Party Logistics warehousing and Retail Distribution Centres
- Receipt of food product
- Storage of inbound product
- Ensuring food integrity, quality and safety
- Point of Sale data capture
- Product returns and store salvage



## Establishing master data

Regulatory agencies may mandate establishment activities for food retail businesses. This can be required for local, state or national government responsibilities, such as ensuring the entity can be located in the circumstance of a food safety or health risk-related disease outbreak or food recall.

Councils classify every food premises within their municipal districts. Classification is determined by the food safety risk of the premises. The registering Council will determine the classification of the premises. All food retail businesses need to apply for a licence and registration with their local Council. This licence is annual.

In addition to having a food business licence number, creating a unique identification and location reference for the retail business will enable food logistics and traceability of inbound shipments to be undertaken efficiently. This is effective for food retailers with multiple outlets, enabling each to have a unique identifier for use in distribution. Traceability can be created through establishing the identity of items supplied, suppliers and businesses handling inbound product. Assets used to store and move product can also be identified and correlated with the product and locations.

### Tasks related to traceability

- Allocate a Global Location Number (GLN) (entity and location) to each retailer distribution centre, warehouse and retail outlet
- Ensure Logistics Service Providers such as 3PL (third party logistics) storage are identified
- Request GLN of suppliers
- Create identification of own transport assets such as store-ready pallets, trays
- Ensure unique identification of each item sold.

### Key participants

- Retailer
- Logistics service provider/3PL
- Suppliers to retail



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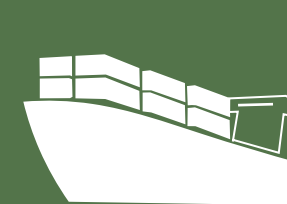
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## Sourcing of product suppliers

Identifying, contracting and managing product suppliers is a major activity for food retail businesses. Sourcing involves:

- Establishing the requirements for products
- Defining the sourcing strategy to follow
- Sourcing potential suppliers from local and overseas markets
- Identifying desired suppliers based on requirements
- Evaluating possible suppliers
- Negotiating contract specifications
- Reviewing contracts to ensure compliance with standards and policies
- Signing the contract based on supplier/vendor agreements
- Managing the supplier

In sourcing agricultural produce into retail food businesses, identification and verification of supplier entities and the origin of the produce in terms of grow locations may be mandated by the retailer. It assists to tell the story of the product to consumers and supports product recall.

For food retail businesses, traceability should extend to being able to identify the source of all food products including fresh produce, processed food products and other inputs such as packaging material.

Food retail businesses may experience sourcing of the same type of a product from many producers or locations. For example, a food retail business may select an intermediary such as a wholesaler to supply product from several farms of origin. Once the product is collected from different farms, verifying the origin of the product supplied becomes increasingly challenging. Without a traceability system in place from the original source of the farm produce, claims related to provenance are difficult to authenticate and substantiate.

Product suppliers, who may be growers or food processors, should be able to provide verification of provenance of supplied raw produce and the components of the processed farm produce (including additives, other ingredients and packaging material). This may take place as part of the due diligence process in sourcing and procurement practices. Product suppliers with traceability systems will be able to provide data that can be automatically shared and can be established during this process.

## Auditing suppliers for traceability and food safety

A traceability system should be audited at a minimum frequency of 12 monthly across the groups of products handled. Where multiple product groups exist, the traceability audit may cover one group annually on a rolling basis. Once a traceability exercise is completed, records of the audit showing all steps should be maintained and corrective actions applied as required.

The key requirement in traceability audit is for the food supplier and retailer to be able to track a product forward and trace the product backward (minimum one up, one down). In many audit standards, the supplier will perform a traceability exercise. This generally places the burden of demonstrating an established traceability system on the supplier.

In an onsite traceability exercise, the auditor will select a finished product, and the retailer and suppliers will need to produce records of the disposition of the product and the source of the product and packaging used for the product and complete the exercise within a specified time.

Typically, two years minimum retention is required by auditors and for the purpose of being able to rely on a due diligence defence with food safety regulators domestically (and internationally in case of exports).

The documentation for a traceability test should include the following:

- Product lot identification including quantities
- Packaging used and unique identifier
- Quantities of waste products for disposal as waste
- Location and quantities of product within the food retailer’s control and quantities sold/shipped to individual consumers including on-line consumers.

### Tasks related to traceability

- Create establishment master data for the fresh food producer/supplier and processor/manufacture of food products
- Create unique identifiers for product suppliers
- Verifying the product (and any relevant other input/ingredient) origin and integrity
- Conduct process mapping of the product flow from point of origin to consumer
- Undertake regular supplier audit

### Key participants

- Producer/grower
- Supplier (processor, wholesaler, packaging company)
- Food processor/manufacture
- Retailer
- 3PL Operator (if applicable)
- Distributor (if applicable)



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Receipt of food products

Buying product for retail is initiated by the retailer submitting a Purchase Order. The Purchase Order becomes a fundamental traceability tool alongside the Customer Invoice for retailers and their suppliers to reconcile what products were received. Order Acknowledgement and Order Confirmation by the supplier then allows the retailer to plan for receipt of stock. An Advance Shipping Notice or Delivery Order or Transfer (if stock is from the retailers’ own storage) provide the Retailer with details of the goods, delivery date and the number of load units being shipped. This enables loading dock/receival staff to prepare for the goods, storage space to be arranged and shelf space planning to be undertaken for the inbound product.

The suppliers of fresh food and processed food products to major supermarkets will need to meet mandatory packaging and barcoding requirements defined in supplier guides. Failure to do so can cause major handling issues, processing and delivery delays and may result in orders being rejected. There can be significant variation in Requirements from retailer to retailer. As example, some retailers require a very high percentage of product received to be in Shelf Ready Packaging as it reduces store labour requirements as well as reducing corrugated cardboard

The fresh food supplier, food processor and manufacturer will create a Customer Order once product, quantity, variety, delivery terms and price have been agreed with the Food Retail business. Often the supplier will have a term contract to supply, or the fresh product has been grown to order.

The chain of custody passes to the food retail business on receipt of the product or in the case of backhaul /customer pick up at the time the truck is finished loading at the supplier’s distribution facility.

Store receipt can be line by line (carton by carton) or ‘Receipt In Full’. Upon receipt, the store system received against the purchase order (PO) or Transfer for the articles and quantities and this is then recorded in the Store inventory.

FSANZ (see FSANZ Chapter 3, Food Standards Code) provides the following advice in relation to receipt of food:

*“If an enforcement officer asks you to do so, you must be able to provide the officer with information on the suppliers of any food on your premises and what that food is. You need this information in case food on your premises is found to be unsafe or contaminated in some way and has to be returned to the supplier or destroyed.*

*Although most, if not all of the food you buy will be labelled with the name of the product and the name and address of the manufacturer, importer or packager of the food, you may also have unpackaged or unlabelled food on your premises and will need other ways of proving what this food is and where it came from. You might do so using your supplier invoices, or you might keep some other record of your suppliers and what you buy from them and the food you have on your premises.*

*You must not accept food unless you can identify it and trace it back to its supplier.”*

This requires that the Supplier maintains a system of traceability with the ability to trace products whether they are fresh food products, finished or processed products, or packaging material.

Inventory records for vehicles that transport products enable those products to be tracked from loading to delivery and include tracking the movement of trailers/vehicles.

A Returns Policy and Procedures agreed between the Retailer, Supplier, 3PL, Distribution Centre and Transport Company will outline all procedures to ensure traceability of damaged packs and of any products returned to stock or for disposal.

Tasks related to traceability

- Advance Shipping Notice received by food retailer
- Product is delivered with Delivery Order correlated to the ASN (advanced shipping notice).
- Product is unloaded from transport at receipt dock.
- Product is inspected (contamination; identification; temperature) and accepted/rejected/returned to suppliers with reason recorded.
- Inbound product is matched to purchase order and over/under/missing stock notified to supplier.
- Proof of Delivery signed.
- Received product is scanned/entered into the retailer Enterprise Resource Planning (ERP) or inventory system.
- Supplier Invoice is reconciled with Purchase Order/ASN/and transport documentation, such as Delivery Order and Proof of Delivery.

Key participants

- Supplier of product
- Food retailer – goods receipt staff and accounts
- Transport company and driver
- Food safety inspector
- Retailer Quality Assurance inspector



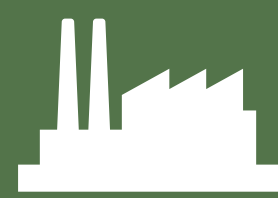
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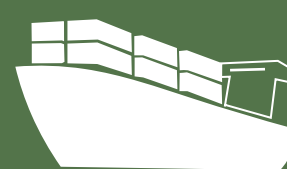
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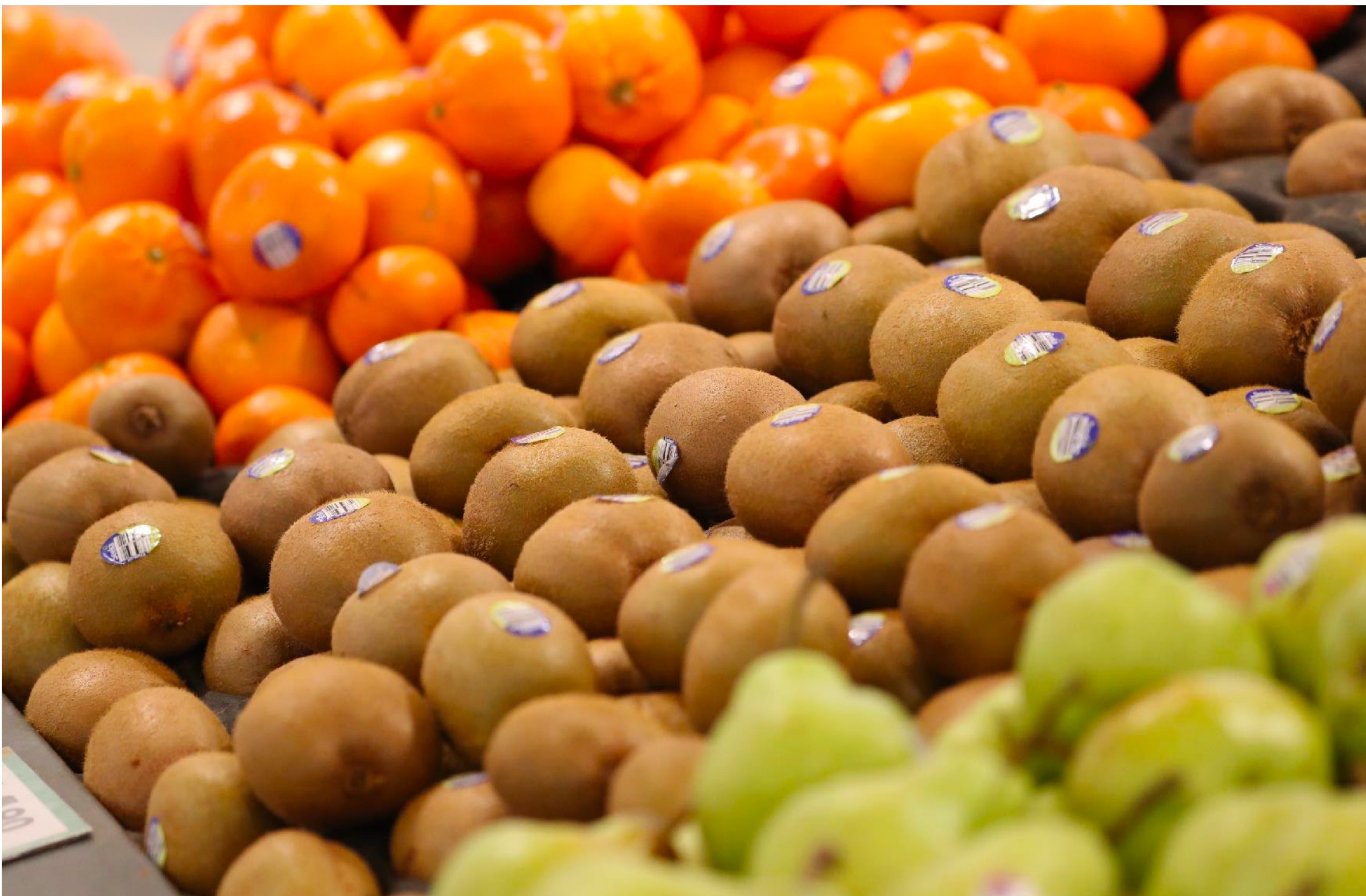


### Storage of inbound product

Fresh food product and/or processed food products may be transferred to the food retailer’s own pallets or bins for storage. The product, which may be in bulk bags, loose in tubs or crates or enclosed in cartons is associated with a storage location in the inbound storage area.

Some retailers have their own stock identifiers such as Stock Keeping Units (SKUs) to identify product and associate it with their internal record keeping, order management system and stock location in store. They may use a SKU reference to order product from their regular suppliers. Use of a SKU as a single identifier is problematic in supply chain level traceability, as partners along the supply chain may not have access to internal product codes.

Retailers may also “portion pack” foods bought on a wholesale basis or in larger lots or in cases where the smaller stores require less than case quantities of generally slower moving inventory. For traceability, retailers rely on labelling each pack with information linking the sold product to supplied product information, including product identity, supplier identity, lot code, date received and consumer information such as use-by date, storage conditions, allergens etc.



**Tasks related to traceability**

- Position in storage identified and allocated
- Product transferred to internal storage asset e.g. pallet or bin
- Product put away ready to be called forward to retail sales floor
- Product best before, expiry dates recorded e.g. Julian date <sup>1</sup>

**Key participants**

- Supplier of product
- Food retailer — goods receipt staff and accounts
- Transport company and driver
- Food safety inspector
- Retailer Quality Assurance inspector



1. A Julian Date is a traceability date that appears on a food product as a 4-digit code, in the absence of Before or Use By information. The first number indicates the year and the remaining numbers indicate the day in the calendar, e.g. a Julian Date of 6273 assigns 6 for year 2016 and 273 for 30 September.



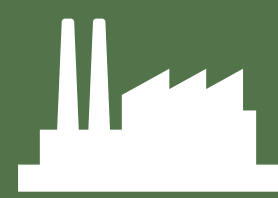
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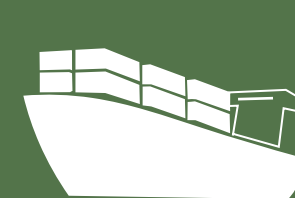
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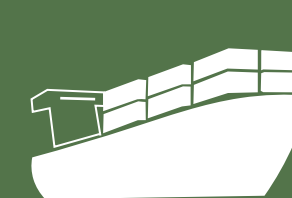
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### Ensuring food integrity, quality and safety

Ensuring food safety is a key obligation of all food businesses including retailers. This ensures that the food is safe and suitable to consume. Food safety standards also contain health and hygiene obligations for food handlers, aimed at lowering the incidence of food-borne illness.

Traceability is a key means to manage the integrity of food product stored on-site and on floor display, by understanding the status of the product in the in-store inventory system, through:

- Recording inspections of storage conditions, particularly ambient temperature and light levels and effectiveness of refrigeration equipment
- Recording batch and lot number and expiry date at receipt and adding this to the retail inventory management system for each SKU/GTIN/lot or batch
- Using colour markers on items to indicate expiry time/date of products at item or lot/batch level
- Implementing a First-In – First Out (FIFO) stock movement plan/system. This may be as basic as a whiteboard recording batches and their expiry dates
- Undertaking regular stock counts to identify older stock.

Retailers may use a range of display and service formats including temperature-controlled display cabinets, shelves of finished goods at ambient temperature, or displays of unpackaged items such as bakery goods or fresh produce in store-ready pallets, bins or racks.

Product may have an identifier affixed as a barcoded label or sticker or it may have arrived in a break bulk format without item level identification.

Ensuring all product has labelling, display and consumer-available information regarding use-before and expiry dates for the item/lot can be critical to the speed and accuracy of product recall. This enables a lot, batch or expiry date to guide removal of product, rather than an entire display being removed.

#### Tasks related to traceability

- Record Quality Assurance inspections of storage conditions and stock in inventory system
- Record Lot/Batch and expiry date at receipt
- Implement a FI-FO stock movement system
- Undertake regular stock counts

#### Key participants

- Food retailer
- QA and food safety inspectors
- QA Auditors
- State level food retail regulators and health authorities



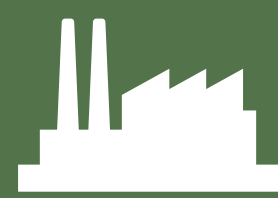
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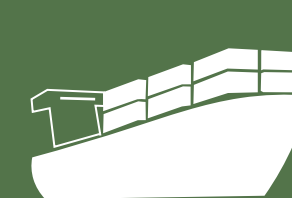
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## Point of Sale data capture

Point of Sale (POS) is generally defined as a location where a product can be purchased by a consumer. This can be referred to as a retail checkout where barcode symbols are normally scanned via a POS scanning device.

A key ingredient for food traceability is relevant data associated with a physical product. That is one that is uniquely identified and can be linked to supporting business process. In this context the Global Trade Item Number (GTIN) is the most commonly implemented GS1 Standard. It is encoded in the universal product code (UPC) barcode for point-of-sale scanning and checkout systems.

Point of sale is a dynamic environment in which a product may be withdrawn from the inventory system or reduced for sale. Active barcodes can adapt quickly to these variations to align with POS variations. In the case of most modern retailers, it is the aggregation of inventory that is sold at retail at all stores (through POS capture) that triggers automatic replenishment from supplier to the retailer's warehouse. Recording GTINs at point of sale and linking the sale with the customer loyalty card enables tailored offers to be made, as well as providing evidence of the product in a food safety recall.

In the case of a biosecurity or health and safety breach detected at a retail business, records and other documentary evidence relied upon at the point of sale to establish a product's country of origin is key evidence for regulators and health authorities. This will help regulators and health authorities to rapidly and accurately trace a food product or ingredient through the supply chain to the originating source, as well as trace from the source forward. <sup>2</sup>

Clause 11 of Standard 3.2.2 – Food Safety Practices and General Requirements specifies:

- "A food business must ensure that food for disposal is held and kept separate until it is —*
- a) destroyed or otherwise used or disposed of so that it cannot be used for human consumption;*
  - b) returned to its supplier;*
  - c) further processed in a way that ensures its safety and suitability; or*
  - d) ascertained to be safe and suitable.*

*A food business must clearly identify any food that is held and kept separate as returned food, recalled food, or food that is or may not be safe or suitable, as the case may be."*

This means that recalled food must be held, separated and identified from other food until it is either destroyed, used for purposes other than human consumption (e.g. animal feed), returned to its supplier, or further processed or otherwise determined to be safe and suitable. <sup>3</sup>

### Tasks related to traceability

- Recording the product identity via the POS system capable of amending inventory levels automatically
- Notifying nominated supply chain partners of product sale status

### Key participants

- Food retailing company — store staff
- Food safety regulators
- End consumers



2. GS1 (2013), Traceability FAQ for Retailers, July <https://www.fmi.org/docs/default-source/food-safety/>
3. <https://www.foodstandards.gov.au/publications/Documents/FSANZFoodRecallProtocol-2014.docx>



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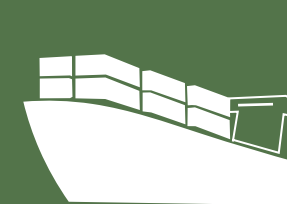
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### Product returns and store salvage

Product returns result from overstock product supplied, damaged stock unloaded at the receival dock or stock that does not have the required shelf life prior to expiry as specified by the retailer (although in each case the approval for returns is predicated by previously negotiated agreements between suppliers and retailer). Product returns are a subset of a broader discipline within supply chains entitled reverse logistics.

Traceability of this rejected stock can be achieved through a Returns Policy with suppliers and a Standard Operating Procedure (SOP) which staff can enact. Some retailers have Returns Centres or a 3PL dedicated to managing returns. On-line retailing can present a challenge as it entails high rates of returned items.

Store salvage is the merchandise that retailers are unable to sell in their own stores. For example, many food items from canned vegetables and salad dressings to fresh fruits and deli meats, are removed from shelves if they are approaching their expiration dates or because they are no longer at their peak quality, and hence stores consider them unfit for sale.

In order to dispose of these items, retailers are likely to take several steps:

- sell a pallet or truckload for only a small portion of the actual cost. If something is salvage, it is sold as-is
- depending on the condition of the product, the retailer may return the product to the supplier or DC
- also, depending on the quality of the product, retailers may participate in food donation programs, organic composting and recycling initiatives
- simply dispose of the product through processes agreed to between the supplier and retailer in manner that meets the guidelines of regulatory bodies



**Tasks related to traceability**

- identification of products returned to the retailer by consumers
- identification of products returned by the retailer to supplier or DC/Returns Centre

**Key participants**

- Retailer
- Consumer
- Product supplier
- Distribution Centre (DC), Returns Centre, 3PL Returns warehouse.



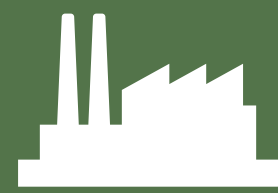
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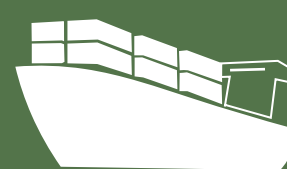
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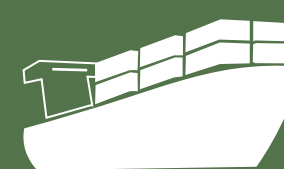
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Critical Tracking Events (CTEs)

For each of the identified food retail business (FRB) activities, critical tracking events (CTEs) which establish identity and enable traceability and compliance with traceability-related regulation are summarised in the following table. It should be noted that while regulators often identify standard CTEs, in many cases, supply chain actors may choose to track additional events occurring within their supply chain to create a more robust picture of their supply chain. Critical Tracking Events (CTEs) are events that relate to the identity, movement and transformation of the food product.

Food Retail business (FRB) activity	CTE code	Critical Tracking Events (CTEs)
Establish master data identification of food retailer	FRB CTE1A	Apply for Global Location Number Food retailer licence issued Establishment Registration for Food Retailer Number received
Establish master data for suppliers	FRB CTE1B	Creating establishment master data for the fresh food producer/supplier and processor/manufacture of food products
Auditing suppliers for traceability	FRB CTE2	Verifying the product (and any relevant other input/ingredient) origin and integrity and ability to track product
Inventory management in 3PL warehousing and Retail Distribution Centres Stock receival	FRB CTE3	Stock inspection — record rejected and accepted stock Sign Proof of Delivery Provide Inventory Reports to Retailer/visibility of stock in storage
Stock Putaway/Inventory Management	FRB CTE4	Enter SSCC scan/record into inventory (WMS) Record use-by/expiry date for FI-FO management
Picking stock for dispatch	FRB CTE5	Stock picked for dispatch to Store
Dispatch product to Store	FRB CTE6	Product leaves Warehouse and is dispatched to Store
Receipt of food products at retail outlet Record/scan stock into receival area Record use-by/expiry date Reconcile against Purchase Order/Delivery Order/Supplier Invoice Enter received stock into store inventory system	FRB CTE7	Stock delivered to Store Proof of Delivery signed Record and notify variations to supplier Received product is scanned/entered into the retailer Enterprise Resource Planning (ERP) or inventory system
Storage of inbound product Position in storage identified and allocated Product transferred to internal storage asset e.g. pallet or bin Product put away ready to be called forward to retail sales floor	FRB CTE8	Location and storage asset ID for inbound product recorded





Food Retail business (FRB) activity	CTE code	Critical Tracking Events (CTEs)
Ensuring food integrity, quality and safety <ul style="list-style-type: none"><li>● QA inspection</li></ul>	FRB CTE9	<ul style="list-style-type: none"><li>● Record Quality Assurance inspections of storage conditions and stock in inventory system</li></ul>
Monitor stock in store <ul style="list-style-type: none"><li>● Record Lot/Batch and expiry date at receipt</li><li>● Implement a FI-FO stock movement system</li><li>● Re-labelling for store display and SKU allocation</li><li>● Undertake regular stock counts</li></ul>	FRB CTE10	<ul style="list-style-type: none"><li>● FIFO stock control</li><li>● GTIN of individual item or carton GTIN/SKU/Lot number</li><li>● Receipt date</li><li>● Supplier</li><li>● Use-by date</li></ul>
Point of sale (POS) data capture	FRB CTE11	<ul style="list-style-type: none"><li>● Recording the product identity via the POS system capable of amending inventory levels automatically</li><li>● Notifying nominated supply chain partners of product sale status from POS device</li></ul>
Product returns and store salvage	FRB CTE 12	<ul style="list-style-type: none"><li>● Identification of products returned to the retailer by consumers</li><li>● Identification of products returned by the retailer to supplier or DC</li></ul>



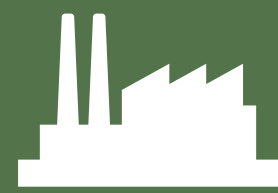
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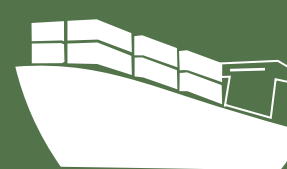
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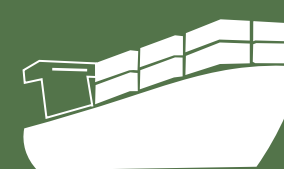
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Key Data Elements

Key Data Elements (KDE) ensure that captured and recorded data can be interpreted and used as relevant and required by all supply chain partners. Key Data Elements define Who, What, When, Where and Why for each Critical Tracking Event identified above.

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FRB CTE1A	Establish master data identification of food retailer	<div>Global Location Number</div> <div>The Global Location Number (GLN) is used to identify locations and legal entities. This unique identifier is comprised of a GS1 Company Prefix, Location Reference, and Check Digit. GLNs are used to identify parties to business transactions; functional groups within a company; or real, physical “places” that might ship, receive, process, or hold the product.</div> <div><table><tr><th colspan="2">Request for GLN</th></tr><tr><td>Who</td><td>Retailer Issuing Agency</td></tr><tr><td>What</td><td>Retailer, location, business entity</td></tr><tr><td>When</td><td>Date/Time of Issuance</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Requirement for Global location numbers, establishment</td></tr></table></div>	Request for GLN		Who	Retailer Issuing Agency	What	Retailer, location, business entity	When	Date/Time of Issuance	Where	Issuing Agency	Why	Requirement for Global location numbers, establishment
Request for GLN														
Who	Retailer Issuing Agency													
What	Retailer, location, business entity													
When	Date/Time of Issuance													
Where	Issuing Agency													
Why	Requirement for Global location numbers, establishment													
FRB CTE1B	Establish master data of suppliers	<div>Food Licence Number</div> <div>This licence number is issued by local government.</div> <div><table><tr><th colspan="2">Request for Food Licence Number</th></tr><tr><td>Who</td><td>Retailer Issuing Agency</td></tr><tr><td>What</td><td>Retailer business entity</td></tr><tr><td>When</td><td>Date/Time of Issuance</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Food Licence</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Global Location Number (GLN)</li><li>● Food business registration number</li></ul></div>	Request for Food Licence Number		Who	Retailer Issuing Agency	What	Retailer business entity	When	Date/Time of Issuance	Where	Issuing Agency	Why	Food Licence
Request for Food Licence Number														
Who	Retailer Issuing Agency													
What	Retailer business entity													
When	Date/Time of Issuance													
Where	Issuing Agency													
Why	Food Licence													
FRB CTE2	Verifying the product (and any relevant other input/ingredient) origin and integrity and ability to track product	<div>Supplier Traceability Audit<ul style="list-style-type: none"><li>● Ingredient source record keeping</li><li>● Trial traceability exercise result</li><li>● Date of audit</li><li>● Auditor ID</li></ul></div> <div>Relevant manufacturer declarations and test certificates</div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Test Certificate/Manufacturer Declaration number and date</li></ul></div>												

CTE code	Critical Tracking Events	Key data Inputs and Outputs											
FRB CTE3	Inventory management in 3PL warehousing and Retail Distribution Centres	<ul style="list-style-type: none"><li>● Unique identifier on product and container scanned/recorded into receival system</li><li>● Under/over, damaged, missing, expiring stock recorded against Delivery Order and original retailer Purchase Order (EDI message)</li><li>● Proof of Delivery number</li><li>● Pallet/bin/container SSCC</li><li>● Carton ID if load unit unpacked</li><li>● Item level Lot or Batch number</li><li>● GTIN</li><li>● SKU number</li><li>● Date received</li><li>● Storage slot location (if using a fixed location system)</li><li>● Product ID</li><li>● Product supplier name</li><li>● Lot/batch number</li><li>● Use by/Expiry date</li><li>● Date of report</li><li>● Stock reference (SKU, GTIN)</li><li>● Description</li><li>● Location</li><li>● Quantity</li><li>● Reorder level</li><li>● Value</li><li>● Daily stock in/stock out count</li></ul>											
	Stock receiptal												
	Stock inspection, record rejected and accepted stock												
	Sign POD												
	Inventory management — enter/scan product into Inventory/Warehouse Management System												
	Record use-by/expiry date for FI-FO management												
	Provide inventory reports to Retailer/visibility of stock in storage	<table><tr><th colspan="2">Goods Receipt</th></tr><tr><td>Who</td><td>Distributor/Wholesaler Issuing Agency</td></tr><tr><td>What</td><td>Purchase Order, Delivery Note, Logistics/Pallet ID, Product ID, Quantity, Batch, Date Information</td></tr><tr><td>When</td><td>Date/Time of Receipt</td></tr><tr><td>Where</td><td>Receipt location</td></tr><tr><td>Why</td><td>Receipt of product</td></tr></table>	Goods Receipt		Who	Distributor/Wholesaler Issuing Agency	What	Purchase Order, Delivery Note, Logistics/Pallet ID, Product ID, Quantity, Batch, Date Information	When	Date/Time of Receipt	Where	Receipt location	Why
Goods Receipt													
Who	Distributor/Wholesaler Issuing Agency												
What	Purchase Order, Delivery Note, Logistics/Pallet ID, Product ID, Quantity, Batch, Date Information												
When	Date/Time of Receipt												
Where	Receipt location												
Why	Receipt of product												
	<p>Information to be shared to a traceability platform</p> <div><ul style="list-style-type: none"><li>● Supplier ID</li><li>● POD number</li><li>● Lot/batch number and expiry date</li><li>● Returned stock reconciliation report message</li><li>● Inventory report (dated)</li></ul></div>												



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CTE code	Critical Tracking Events	Key data Inputs and Outputs										
FRB CTE4	Stock Putaway	<div><div><ul style="list-style-type: none"><li>● Pallet/bin/container SSCC</li><li>● Quantity</li><li>● Carton ID if load unit unpacked</li><li>● Item level Lot or Batch number</li></ul><ul style="list-style-type: none"><li>● GTIN</li><li>● SKU number</li><li>● Date and time of putaway</li><li>● Storage slot location (if using a fixed location system)</li></ul></div><div><div>Put Away</div><table><tr><td>Who</td><td>Retail Distribution</td></tr><tr><td>What</td><td>Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID, Location (Bin)</td></tr><tr><td>When</td><td>Date/Time of Put away</td></tr><tr><td>Where</td><td>Warehouse bin location</td></tr><tr><td>Why</td><td>Stock Put away (movement)</td></tr></table></div><div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Logistics Pallet ID (SSCC)</li><li>● Warehouse Bin Location</li><li>● Product ID</li><li>● Batch</li><li>● Quantity</li><li>● Date of put away</li><li>● POD number</li></ul></div></div>	Who	Retail Distribution	What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID, Location (Bin)	When	Date/Time of Put away	Where	Warehouse bin location	Why	Stock Put away (movement)
Who	Retail Distribution											
What	Product ID, Quantity, Batch, Date Information, Logistics/Pallet ID, Location (Bin)											
When	Date/Time of Put away											
Where	Warehouse bin location											
Why	Stock Put away (movement)											
FRB CTE5	Picking stock for Store	<div><div><ul style="list-style-type: none"><li>● Store Order Number</li><li>● Product ID</li><li>● Quantity</li><li>● Store Location</li></ul></div><div><div>Picking</div><table><tr><td>Who</td><td>Retail Distribution</td></tr><tr><td>What</td><td>Store Order, Picking list number, Product ID, Quantity, Batch, Date Information, Logistics Unit number (SSCC)</td></tr><tr><td>When</td><td>Date/Time of pick</td></tr><tr><td>Where</td><td>Pick location</td></tr><tr><td>Why</td><td>Picking stock</td></tr></table></div><div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Logistics Pallet ID</li><li>● Warehouse Bin Location</li><li>● Product ID</li><li>● Quantity Picked</li><li>● Batch number</li><li>● Date of Pick</li></ul></div></div>	Who	Retail Distribution	What	Store Order, Picking list number, Product ID, Quantity, Batch, Date Information, Logistics Unit number (SSCC)	When	Date/Time of pick	Where	Pick location	Why	Picking stock
Who	Retail Distribution											
What	Store Order, Picking list number, Product ID, Quantity, Batch, Date Information, Logistics Unit number (SSCC)											
When	Date/Time of pick											
Where	Pick location											
Why	Picking stock											

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
FRB CTE6	Dispatch to Store	<div><div><ul style="list-style-type: none"><li>● Logistics Pallet ID</li><li>● Warehouse Bin Location</li><li>● Product ID</li><li>● Quantity Picked</li></ul></div><div><ul style="list-style-type: none"><li>● Batch Number</li><li>● Store ID</li><li>● Transport Provider</li><li>● Delivery Note</li></ul></div></div> <div><div>Dispatch to store</div><table><tr><td>Who</td><td>Retail Distribution</td></tr><tr><td>What</td><td>Store Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number</td></tr><tr><td>When</td><td>Date/Time of Despatch</td></tr><tr><td>Where</td><td>Dispatch location</td></tr><tr><td>Why</td><td>Dispatch of product</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Store ID</li><li>● Store Order Number</li><li>● Logistics/Pallet ID</li><li>● Product ID</li><li>● Batch</li><li>● Quantity</li><li>● Date of Dispatch</li><li>● Shipment Number</li></ul></div>	Who	Retail Distribution	What	Store Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number	When	Date/Time of Despatch	Where	Dispatch location	Why	Dispatch of product
		Who	Retail Distribution									
What	Store Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number											
When	Date/Time of Despatch											
Where	Dispatch location											
Why	Dispatch of product											
FRB CTE7	<div>Receipt of food products at retail outlet</div> <div>Record/scan barcodes on stock at receival area, recording Lot/batch use-by and expiry dates</div> <div>Sign POD</div> <div>Reconcile against Purchase Order/Delivery Order/Supplier Invoice</div> <div>Received product entered into store inventory system</div> <div>Storage of inbound product</div> <div>Location of inbound product in storage area</div> <div>FIFO stock control</div>	<div><div><ul style="list-style-type: none"><li>● Product ID (SKU + GTIN)</li><li>● Lot/batch number</li></ul></div><div><ul style="list-style-type: none"><li>● Use-by/expiry date for each lot</li><li>● POD number for delivery</li></ul></div></div> <div>Rejected/missing stock identified and recorded<ul style="list-style-type: none"><li>● Supplier ID</li><li>● Lot/batch numbers</li><li>● Reason for rejection</li><li>● Record variations x SKU/GTIN, lot number and supplier ID</li></ul></div> <div><div>Receipt at Store</div><table><tr><td>Who</td><td>Transport Provider Store ID</td></tr><tr><td>What</td><td>Store Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number</td></tr><tr><td>When</td><td>Date/Time of Dispatch</td></tr><tr><td>Where</td><td>Dispatch location</td></tr><tr><td>Why</td><td>Dispatch of product</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Delivery Note</li><li>● Store Order</li><li>● Logistics/Pallet ID</li><li>● Product ID</li><li>● Batch</li><li>● Quantity</li><li>● Date of receipt</li></ul></div>	Who	Transport Provider Store ID	What	Store Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number	When	Date/Time of Dispatch	Where	Dispatch location	Why	Dispatch of product
		Who	Transport Provider Store ID									
What	Store Order, Delivery Note, ASN number, Logistics/Pallet ID (SSCC) Product ID, Quantity, Batch, Date Information, Shipment number											
When	Date/Time of Dispatch											
Where	Dispatch location											
Why	Dispatch of product											



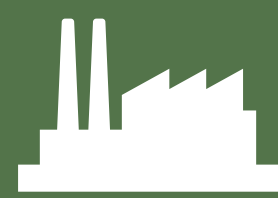
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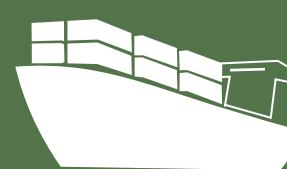
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FRB CTE8	QA Inspection	<div><div><ul style="list-style-type: none"><li>● Product ID</li><li>● Batch</li><li>● Location</li></ul></div><div><ul style="list-style-type: none"><li>● Quantity</li><li>● Date of inspection</li></ul></div></div> <table><tr><th colspan="2">Inspection</th></tr><tr><td>Who</td><td>Product Inspectors</td></tr><tr><td>What</td><td>Product ID, Quantity, Batch, Date Information</td></tr><tr><td>When</td><td>Date/Time of Despatch</td></tr><tr><td>Where</td><td>Store Location</td></tr><tr><td>Why</td><td>Inspection</td></tr></table> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Product ID</li><li>● Batch</li><li>● Location</li><li>● Quantity</li><li>● Date of inspection</li><li>● Logistics Pallet ID</li><li>● Store location</li></ul></div>	Inspection		Who	Product Inspectors	What	Product ID, Quantity, Batch, Date Information	When	Date/Time of Despatch	Where	Store Location	Why	Inspection
	Inspection													
Who	Product Inspectors													
What	Product ID, Quantity, Batch, Date Information													
When	Date/Time of Despatch													
Where	Store Location													
Why	Inspection													
FRB CTE9	Point of sale (POS) data capture	<div><ul style="list-style-type: none"><li>● Unique identifier indicating batch and lot affixed with compliant product information</li><li>● Name of the food</li><li>● Manufactured date and use by date</li><li>● Product lot identification</li><li>● Description of the ingredient or ingredient listing</li><li>● Description of allergens</li><li>● Instructions for storage and preparation</li><li>● Country of origin information</li><li>● Warning and advisory statements</li><li>● Relevant nutritional information</li><li>● Information about weights and measures (volume and quantity)</li><li>● Name and address of the food processor or manufacturer.</li></ul></div> <table><tr><th colspan="2">Point of Sale</th></tr><tr><td>Who</td><td>Retail store</td></tr><tr><td>What</td><td>Product ID, Date Information, Quantity</td></tr><tr><td>When</td><td>Date/Time of Sale</td></tr><tr><td>Where</td><td>Store Location</td></tr><tr><td>Why</td><td>Sales</td></tr></table> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Product ID</li><li>● Quantity Sold</li><li>● Batch (if captured at POS)</li><li>● Use by/best before (if captured at POS)</li><li>● Store ID</li></ul></div>	Point of Sale		Who	Retail store	What	Product ID, Date Information, Quantity	When	Date/Time of Sale	Where	Store Location	Why	Sales
Point of Sale														
Who	Retail store													
What	Product ID, Date Information, Quantity													
When	Date/Time of Sale													
Where	Store Location													
Why	Sales													
	Stock inspection, record rejected and accepted stock													
	Quality Assurance (QA) and food safety inspection (FSI) inspection and audit													

CTE code	Critical Tracking Events	Key data Inputs and Outputs											
FRB CTE10	Product returns and store salvage	<ul style="list-style-type: none"><li>● Product unique identifier (GTIN, SKU code, item or article number)</li><li>● Sales Receipt number</li><li>● Disposition – return to supplier, destruction, salvage</li><li>● Tracking of returns?</li><li>● Record/scan of product prior to loading on pallet/tub for return to DC or direct to supplier</li><li>● Delivery Order number</li></ul>											
	Identification of products returned to the retailer by consumers												
	Identification of products returned by the retailer to supplier or DC	<table><tr><th colspan="2">Product Returns</th></tr><tr><td>Who</td><td>Retail store</td></tr><tr><td>What</td><td>Product ID, Batch, Date Information, Logistics unit/pallet ID, Quantity</td></tr><tr><td>When</td><td>Date/Time of Return</td></tr><tr><td>Where</td><td>Store Location</td></tr><tr><td>Why</td><td>Product return/reason for return</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Product ID</li><li>● Quantity Returned</li><li>● Batch</li><li>● Store ID</li><li>● Reason for return</li></ul>	Product Returns		Who	Retail store	What	Product ID, Batch, Date Information, Logistics unit/pallet ID, Quantity	When	Date/Time of Return	Where	Store Location	Why
Product Returns													
Who	Retail store												
What	Product ID, Batch, Date Information, Logistics unit/pallet ID, Quantity												
When	Date/Time of Return												
Where	Store Location												
Why	Product return/reason for return												



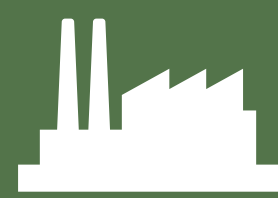
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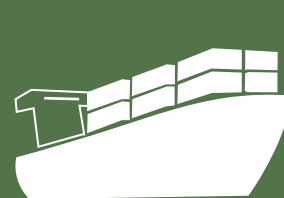
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Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

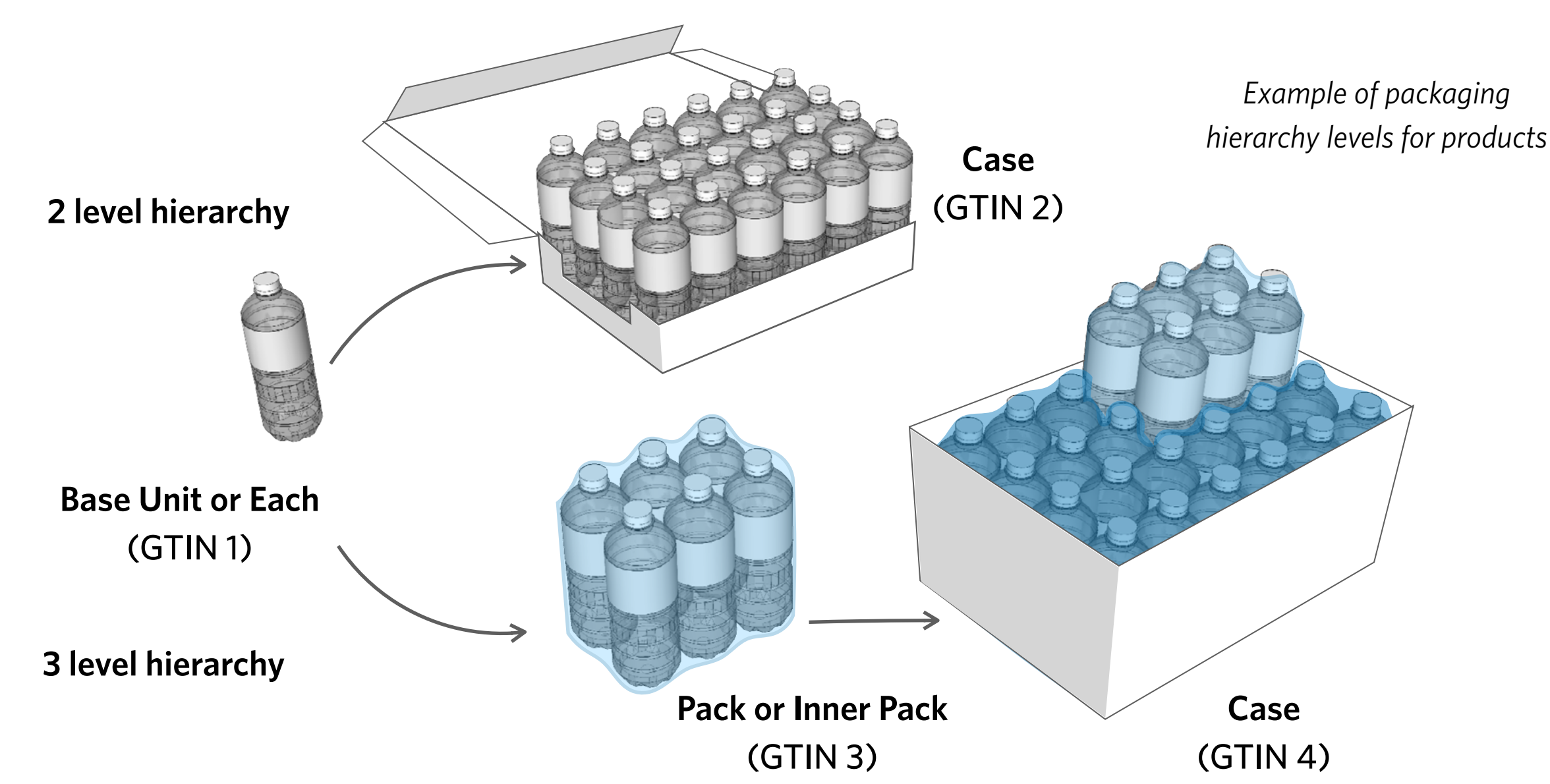
Foundational Elements

Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a store location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location in the world.



Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product’s packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, quantity etc are all considered separate variations and thus require separate GTINs. Each level of packaging should be numbered (and barcoded) separately to all other levels.

Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.





Logistics Units (SSCC)

The Serial Shipping Container Code (SSCC) can be used by companies to identify a logistic unit, which can be any combination of trade items packaged together for storage and/or transport purposes; for example a case, pallet or parcel.

The SSCC is a crucial key for traceability, since it uniquely identifies each distributed logistic unit and its content.

- The SSCC enables companies to track each logistic unit for efficient order and transport management.
- The SSCC can be encoded in a barcode or EPC/RFID tag, ensuring the logistic unit can be accurately and easily identified as it travels between trading partners, anywhere in the world.
- When SSCC data is shared electronically via EDI or EPCIS, this enables companies to share information about the status of logistic units in transit, and reliably link it to related transport information such as shipment details.
- The SSCC enables companies to link to additional information about the logistic unit. This information can be communicated via a Despatch Advice or Advanced Shipping Notice (ASN) prior to the logistic unit's arrival. Upon receipt the SSCC will be scanned, providing the required information to speed up the receipt of goods as well as the subsequent invoicing process.



The SSCC is fully compatible with ISO/IEC 15459 — Part 1: Unique identifiers for transport units. This is often referred to as the ISO licence plate and is a prerequisite for tracking and tracing logistic units in many international supply chains.



Global Shipment Identification Number (GSIN)

The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together.

The logistic units keep the same GSIN during all transport stages, from origin to final destination. The GSIN identifies the logical grouping of one or several logistic units, each identified with a separate Serial Shipping Container Code (SSCC).

- The GSIN can be encoded by the shipper in a barcode or as text on a House Way Bill, or in addition to the SSCC, on a logistics label.
- The GSIN can be electronically used by a company in transport instruction and transport status messages between freight forwarder and transport provider, and also as a reference in the Despatch Advice.

The GSIN is fully compatible with ISO/IEC 15459 — Part 8: Grouping of Transport Units. The GSIN also meets the requirements for a Unique Consignment Reference (UCR) according to the World Customs Organisation.



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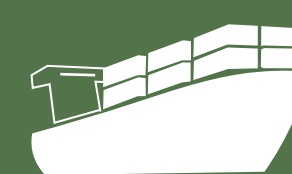
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## Asset Identification

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g. a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g. a Intermediate Bulk Container), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned. Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.



### Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate. The GS1 System identification of a returnable asset, the Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned. This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.



### Global Individual Asset Identifiers (GIAI) – AI (8004)

An individual asset is considered a physical entity made up of any characteristics. The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records.

Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used. This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.



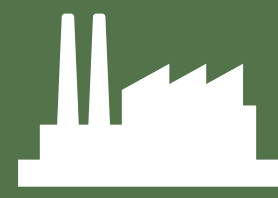
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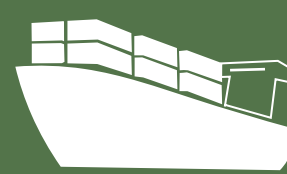
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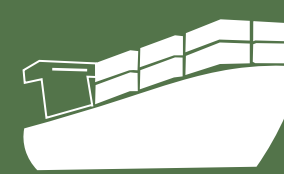
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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/ Format	Further information
Location	Manufacturing Plant, Finished Goods, Location, Dispatch Dock	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Production Date and/or Time, Use By date, Best Before Date, Pack Date	Year-Month-Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Input materials such as raw ingredients and packaging, Outputs such as finished goods, packaged or processed goods	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li>● <a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li>● <a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch/Lot code, Serial Number		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number, etc., can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers: <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)</a>
Logistics Units	Pallet of Finished Goods, Crate or Box of finished Goods	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>
Assets	Returnable assets Ie: IBC or individual assets Ie: A crate	Global Returnable Asset Identifier (GRAI)	0 + AN20	Can be identified as an asset type only or an optional serial number can be added to distinguish individual assets <a href="https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file</a>
		Global Individual Asset Identifier (GIAI)	AN30	
Shipment	Grouping of logistics units	GSIN	N17	The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together. <a href="https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin">https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin</a>



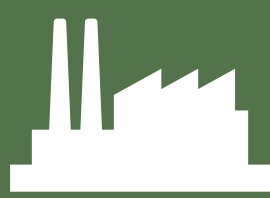
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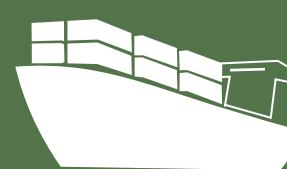
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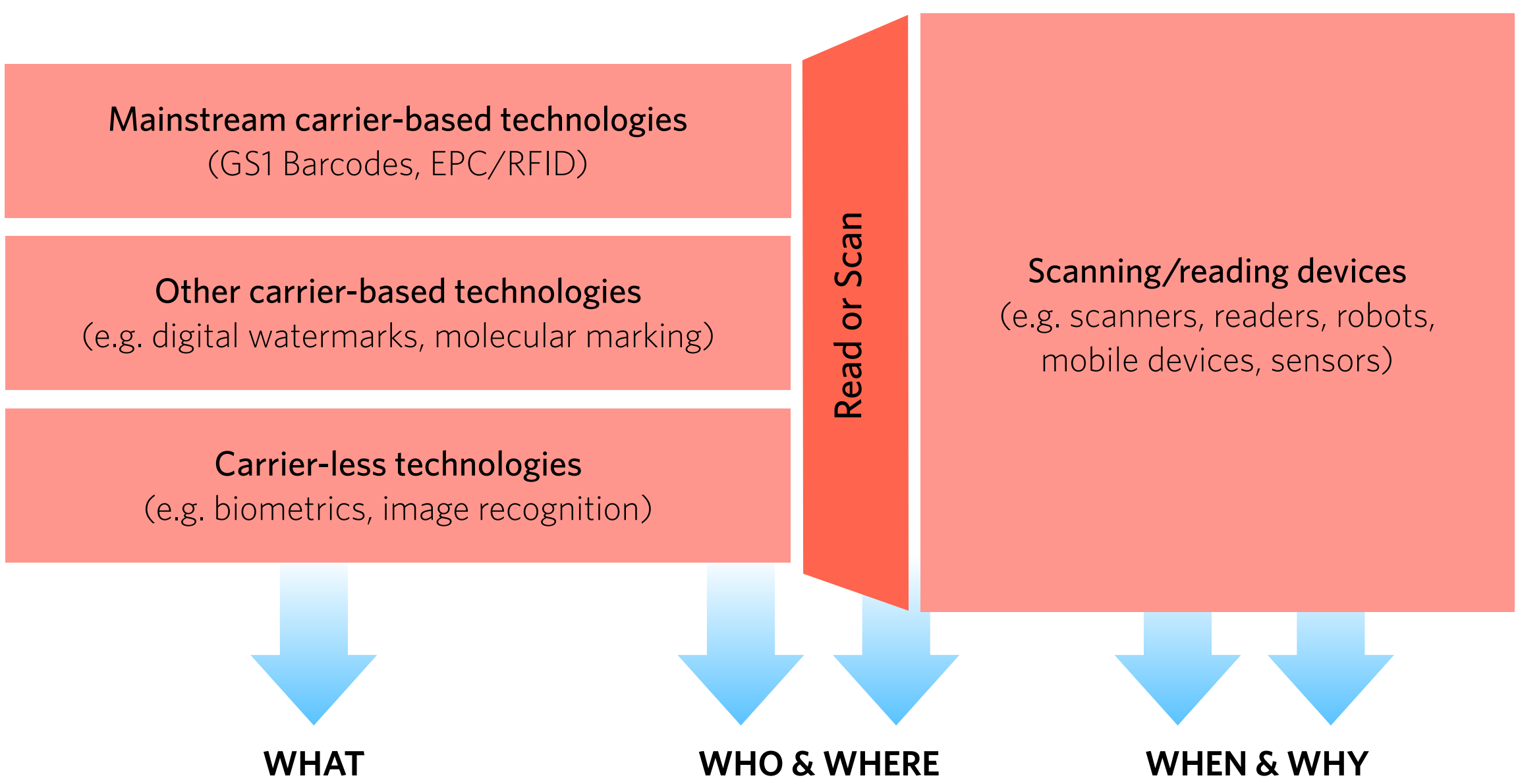
## How to capture the KDEs

### How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

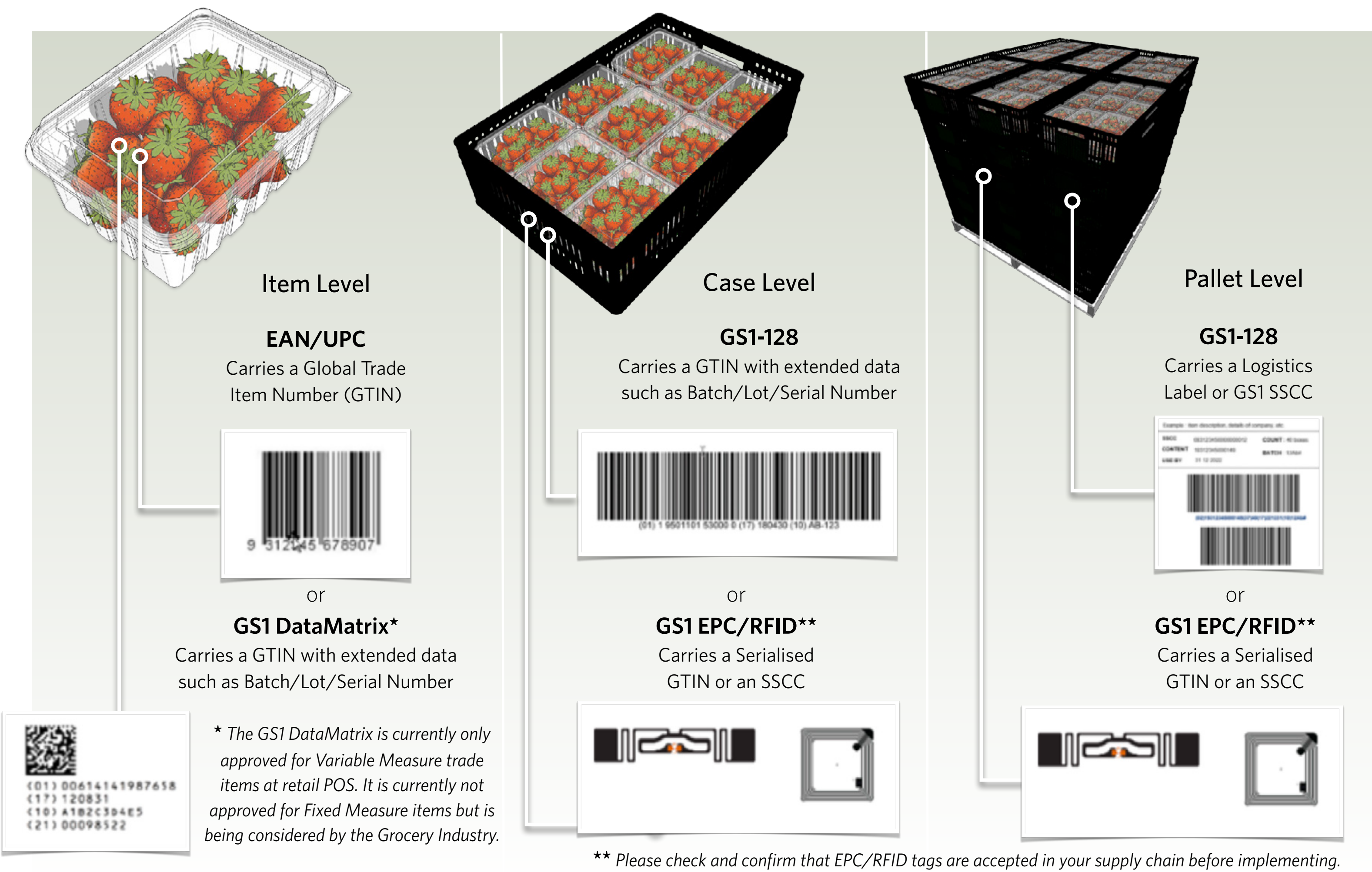


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

### Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.



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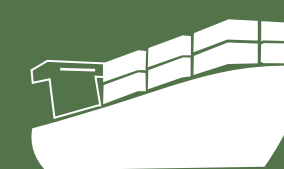
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Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc.  
The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number

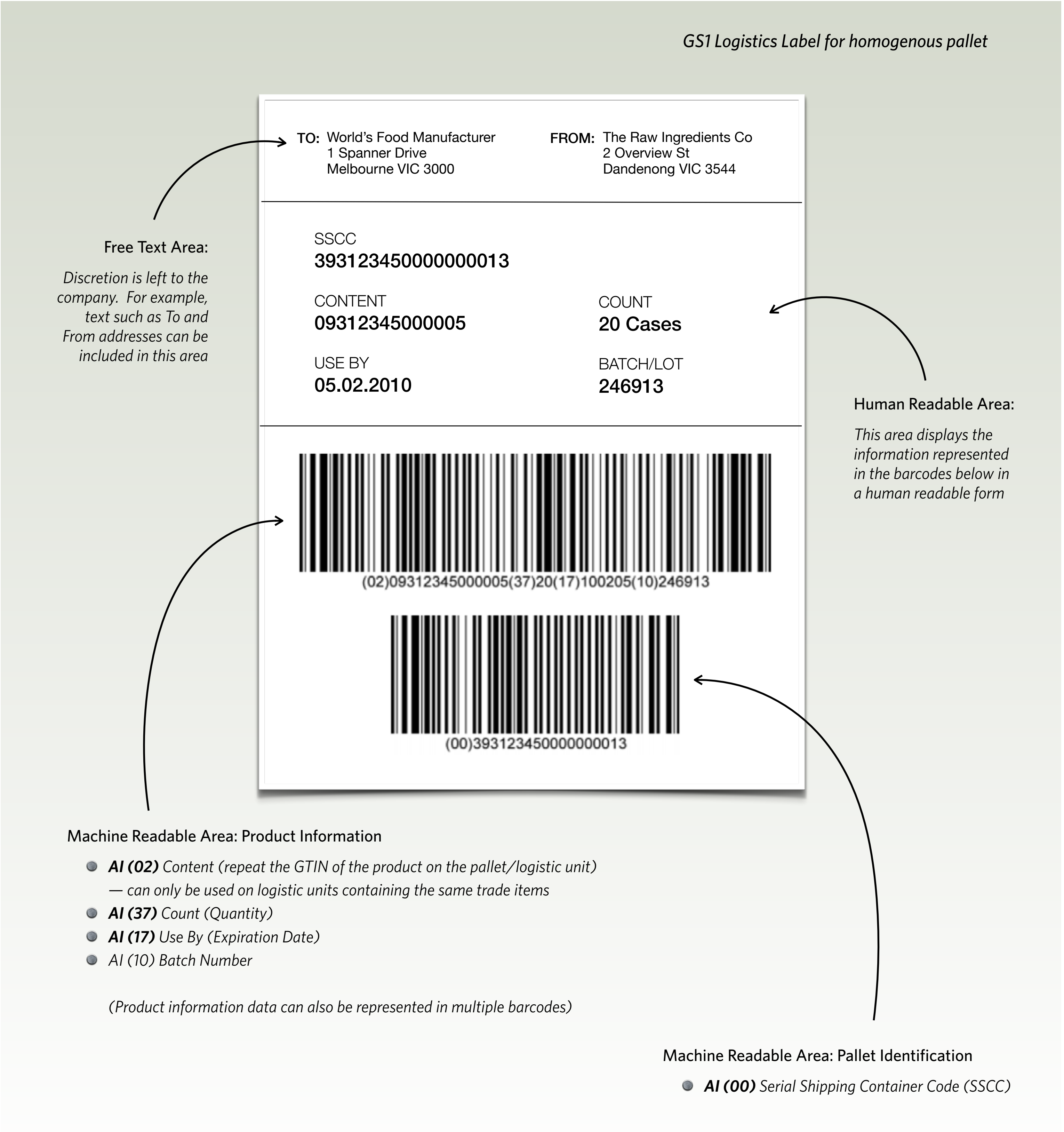


GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number

The use of the GS1 DataMatrix at point of sale is also under consideration for future use as it can encode additional traceability information.  
These barcodes require an imaging scanner to decode the information..



GS1 DataMatrix





FREE INFORMATION

Example: Beef Topside 600kg, details of company

**SSCC** 093123450000000012 **Prod Date** 3012/2008  
**CONTENT** 99311781001157 **Count** 40 boxes **WEIGHT** 600kg



GS1 Logistics Label homogenous logistics unit containing variable weight products

FROM  
GS1 GO  
Avenue Louise 326  
1050 Brussels

BE85250

TO

GS1 GO Princeton Office  
1009 Lenox Drive

SPECIAL ORDER

1TE.00

0007

To be delivered : ECT VVD - X020399

GSIN

950110100000000001

SSCC

095011011234567896

A standard 1D barcode representing the GSIN (950110100000000001).

A standard 1D barcode representing the SSCC (095011011234567896).

GS1 Logistics Label homogenous logistics unit containing GSIN reference



Global Returnable Asset Identifier, AI (8003),  
represented in a GS1-128 Barcode



Global Individual Asset Identifier, AI (8004),  
represented in a GS1-128 Barcode



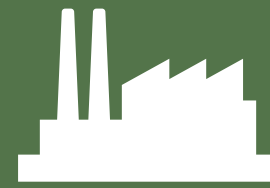
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## How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing. In addition to product scanning, logistics labels can also be scanned to capture vital traceability data as logistics units (pallets, parcels, grouping of products) move through the supply chain.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

Usually the first step will be scanning of inputs, livestock etc upon receipt. For barcodes this is often done using handheld devices. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are harvesting, storing, picking, packing, shipping, transporting, selling.

Often a combination of fixed mounted scanners or readers and hand-held devices will be applied to capture the critical tracking events. The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.

Range of scanners which can read liner, 2D and RFID barcodes



### Useful Links

#### Food Safety

FSANZ <https://www.foodstandards.gov.au/Pages/faq.aspx>

Australian Institute of Food Safety <https://www.foodsafety.com.au/>

#### Food business licensing

<https://www.foodstandards.gov.au/about/foodenforcementcontacts/Pages/default.aspx>

#### Food business classifications

Each state and territory in Australia have different classifications for food businesses. The classification of a food business relates to the licenses required. To determine the classification of a food business, see the following links:

NSW - <http://www.foodauthority.nsw.gov.au>

ACT - <https://health.act.gov.au/businesses/food-safety-regulation>

VIC - <http://www.health.vic.gov.au/foodsafety/>

QLD - <http://www.health.qld.gov.au/foodsafety/>

SA - <http://www.health.sa.gov.au>

WA - <http://www.public.health.wa.gov.au/2/1061/2/food.pm>

NT - [http://www.health.nt.gov.au/Environmental\\_Health/Food\\_Safety/index.aspx](http://www.health.nt.gov.au/Environmental_Health/Food_Safety/index.aspx) TAS - <https://www.dhhs.tas.gov.au/>

#### Retailer Supplier Standards

[Coles Supply Standards](#)

[Metcash Supply Standards](#)

[Woolworths Supply Standards](#)

[Aldi Supplier Information](#)



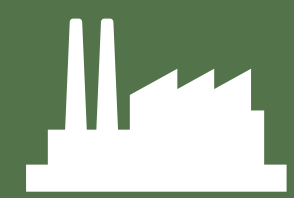
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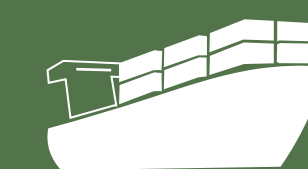
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Glossary

ASN	An advance ship notice or advanceshippingnotice (ASN) is a notification of pending deliveries, similar to a packing list. It is usually sent in an electronic format and is a common EDI document.
CAO	Computer-Assisted Ordering is a tool combining retail sales data and forecast demand, in order to automate retail replenishment
DC	A Distribution Centre (DC) is a short term storage site to assemble products for retail outlet orders
DO	Delivery Order. A document from the Consignor of the freight which orders the release of the cargo to another party. This permits the delivery direct to a warehouse or depot, as organised with the Consignee. This enables the Consignor to order pick up of product from a 3PL warehouse in order to deliver to the party named in the Delivery Order.
ERP	Enterprise Resource Planning systems integrate the main business functions of a company, including accounts, supply chain, manufacturing, human resources, operations and reporting
FI-FO	First-in, First out inventory management costs inventory on the basis of the length of time the stock has been on hand.
Lot	<p>A lot is an amount of a food that the manufacturer or producer identifies as having been prepared, or from which foods have been packaged or otherwise separated for sale, under essentially the same conditions, for example:</p> <ul style="list-style-type: none"><li>a. from a particular preparation or packing unit; and</li><li>b. during a particular time ordinarily not exceeding 24 hours.</li></ul> <p>The lot identification (which could be a number or other information) is used to track a product in the event of a recall and needs to be able to identify where the food was packed or prepared.</p>
PO	Purchase Order. A commercial document issued by a buyer to a supplier. This is a legally binding offer to buy product in return for payment. The terms and conditions for delivery and payment are detailed in this document, which also details the product quantity, price, terms and conditions, product quality specifications.
POS	Point of Sale
Shelf-ready packaging	The Australian Food and Grocery Council has guidelines for shelf-ready packaging — see: <a href="https://www.afgc.org.au/industry-resources/trading-partner-forum-resources/shelf-ready-packaging-srp-and-merchandising">https://www.afgc.org.au/industry-resources/trading-partner-forum-resources/shelf-ready-packaging-srp-and-merchandising</a>
SKU	Stock Keeping Unit
UPC	Universal Product Code



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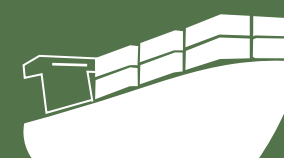
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M O D U L E   S E V E N :

# Food Service

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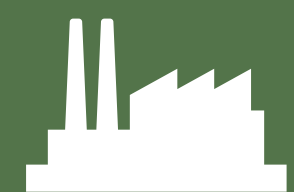
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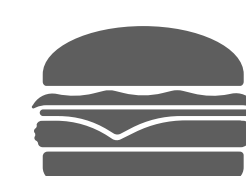
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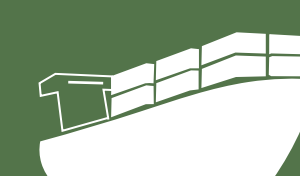
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## Food Service

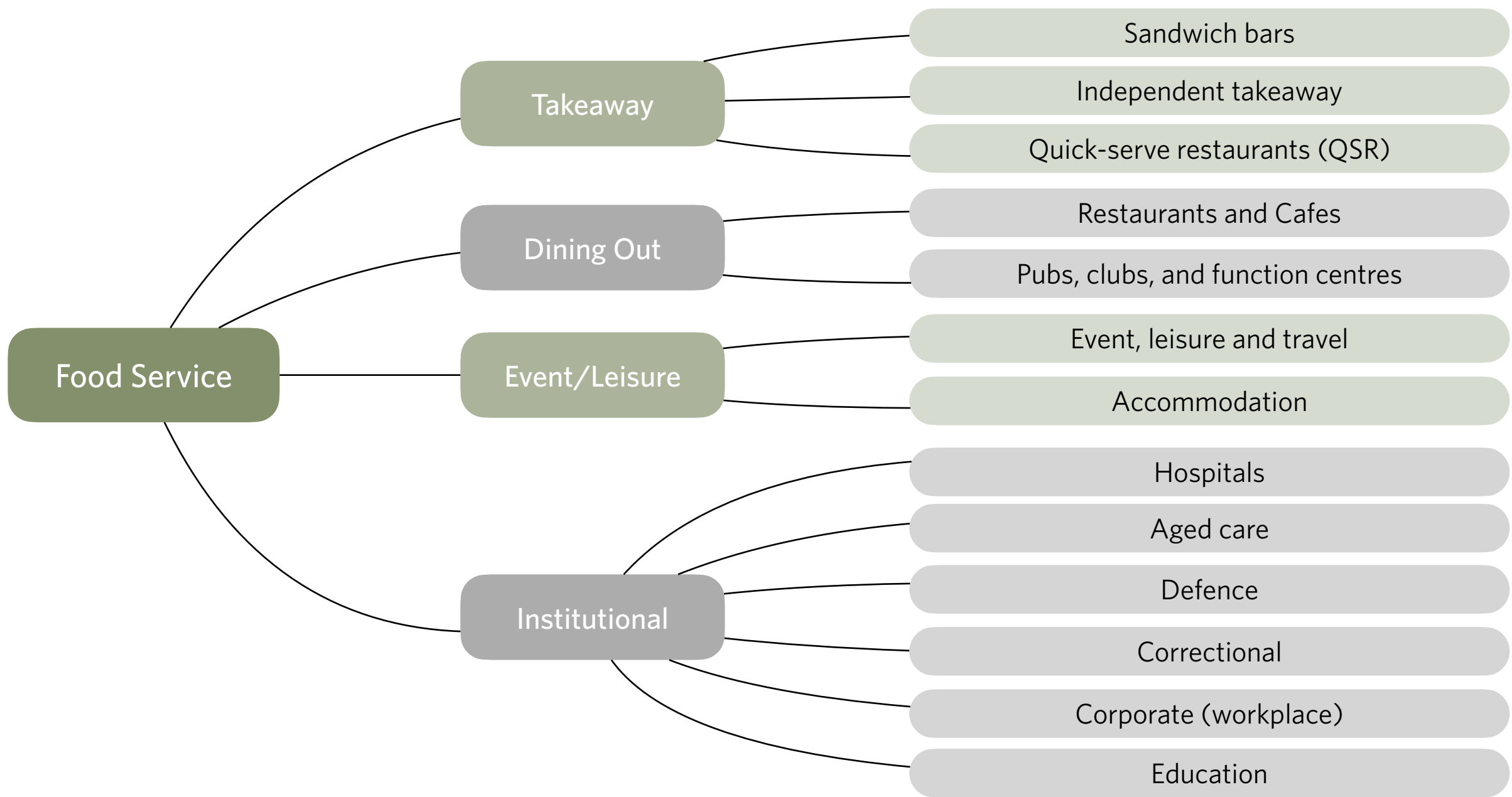
This module covers key activities that generally take place along in a foodservice setting.

From a foodservice perspective, traceability means the ability of foodservice partners to quickly verify the history, location, and usage of product, resulting from coordinated efforts of trading partners to collect and maintain product information that supports batch/lot or serial number visibility of the product’s movement through the distribution channel.

The foodservice industry encompasses all of the activities, services, and business functions involved in preparing and serving food to people eating away from home. This includes all types of restaurants from fine dining to fast food. It also includes institutional food operations at locations such as schools and hospitals, as well as other specialty vendors such as food truck operators and catering businesses.

In this module, processes/activities are associated with foodservice operations:

- Establishment
- Ordering food supplies
- Receiving of product
- On-site storage
- Maintaining traceability once bulk packs are opened
- Ensuring food integrity, quality and safety



## Establishing master data

Local councils and state authorities administering food safety regulations are involved in licensing food premises and allocating a current licence number to each foodservice business.

In addition to obtaining this registration and licence, creating a unique identification and location reference for the foodservice business will enable food logistics and traceability of inbound and outbound shipments to be undertaken efficiently. This is effective for food services with multiple outlets, enabling each to have a unique identifier for use in distribution.

Traceability can be created through establishing the identity of items supplied, as well as suppliers and businesses handling inbound product. Assets used to store and move product can also be identified and correlated with the product and locations.

### Tasks related to traceability

- Allocate a Global Location Number (GLN) (entity and location) to each warehouse and foodservice outlet
- Ensure Logistics Service Providers such as 3PL (third party logistics) storage are identified
- Request GLN of suppliers
- Create identification of own transport assets such as pallets, trays, tubs
- Ensure unique identification of each item sold

### Key participants

- Foodservice operator
- Logistics service provider/3PL
- Suppliers to foodservice



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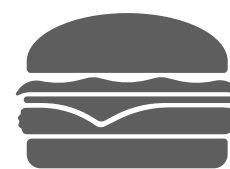
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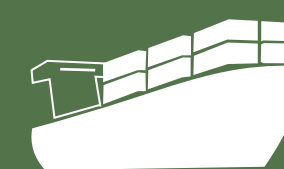
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## Sourcing of product suppliers

Identifying, contracting and managing product suppliers is a major activity for food retail businesses.

Sourcing involves:

- Establishing the requirements for products
- Defining the sourcing strategy to follow
- Sourcing potential suppliers from local and overseas markets
- Identifying desired suppliers based on requirements
- Evaluating possible suppliers
- Negotiating contract specifications
- Reviewing contracts to ensure compliance with standards and policies
- Conduct appropriate Know Your Customer (KYC) validations and checks such as Politically Exposed Persons (PEP); Sanctions Screening; Tax ID; International Bank Account Number (IBAN) Verification <sup>1</sup>
- Develop and agree to appropriate service agreements and performance metrics
- Signing the contract
- Managing the supplier



In sourcing agricultural produce into Foodservice businesses, identification and verification of supplier entities and the origin of the produce in terms of grow locations may be mandated by the supplier contract. This also supports the Foodservice Operator to tell the story of the product to consumers and in product recall.

For Foodservice Operators, traceability should extend to being able to identify the source of all food products including fresh produce, processed food products and other inputs such as packaging material.

Foodservice businesses may source the same category of product from multiple producers or locations. For example, a Foodservice Operator may select an intermediary such as a wholesaler to supply product from several farms of origin. Once the product is collected from different farms, verifying the origin of the product supplied becomes increasingly challenging. Without a traceability system in place from the original source of the farm produce, claims related to provenance are difficult to authenticate and substantiate.

Product suppliers, who may be growers or food processors, should be able to provide verification of provenance of supplied raw produce and the components of the processed farm produce (including additives, other ingredients and packaging material). This may take place as part of the due diligence process in sourcing and procurement practices. Product suppliers with traceability systems will be able to provide data that can be automatically shared and can be established during this process.



1. <https://www.austrac.gov.au/business/how-comply-and-report-guidance-and-resources/customer-identification-and-verification/customer-identification-know-your-customer-kyc>; <https://iban.com.au/>; <https://www.austrac.gov.au/business/how-comply-and-report-guidance-and-resources/customer-identification-and-verification/politically-exposed-persons-peps>



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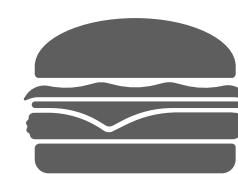
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## Auditing suppliers for traceability and food safety

The key requirement in a traceability audit is for the Foodservice Operator to be able to link the unique identifiers of the food products to the origin / provenance of the product. Relevant record keeping is an essential part of the mandatory food safety plan requirements for food businesses throughout Australia. Failure to keep proper records to demonstrate adherence to a food safety plan can be a criminal offence.

Typically, two years minimum retention is required by auditors and for the purpose of being able to rely on a due diligence defence with food safety regulators.

The documentation for a traceability test (and food safety) should include the following:

- Products lot identification including quantities
- Packaging used and unique identifier
- Quantities of waste products for disposal as waste
- Location and quantities of product within the Foodservice Operator’s control and quantities sold/shipped to individual consumers including on-line consumers.
- Proper records and logs with the times and temperatures to which goods have been subjected in order to make appropriate decisions regarding food safety.

It is important to verify periodically that supplier bar codes contain correct and complete product information. For example, one operator regularly selects a sample of 20-30 products, asking distributor partners to send product dimensions, weights, and case pictures. These data are compared against product records, assessing attributes such as:

- Does the GTIN match what is in the vendor contract?
- Do measurements (e.g., cube, weight) match what is in the contract?
- Does the GTIN have a batch lot, production date, or a use by or harvest date, (depending on product category)?
- Is the barcode image scannable?

The information gathered from these audits can be used to generate supplier scorecards and to facilitate traceability conversations between operators and suppliers. <sup>2</sup>

### Tasks related to traceability

- Create master data for suppliers — food, cleaning products, packaging
- Verify the product (and any relevant other input/ingredient) origin and integrity
- Complete supplier audit

### Key participants

- Producer/grower
- Supplier (processor, wholesaler, packaging company)
- Food processor/manufacturer
- Food authorities
- Foodservice Operator



2. Building Traceability in Foodservice Supply Chains <https://www.supplychainscene.org/sites/default/files/inlinefiles/>



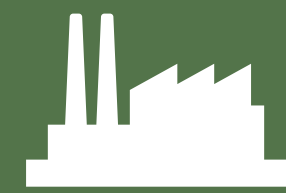
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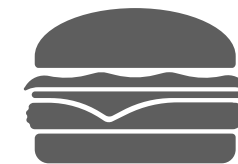
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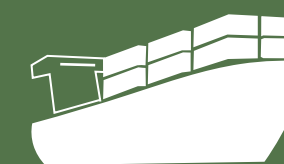
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## Receipt of food products from supplier/3PL warehouse

Buying product for foodservice is initiated by the Foodservice Operator submitting a Purchase Order. The Purchase Order becomes a fundamental traceability tool alongside the Customer Invoice for Foodservice Operators and their suppliers to reconcile what products were received. Order Acknowledgement and Order Confirmation by the supplier then allows the Foodservice Operator to plan for receipt of stock.

An Advance Shipping Notice and Delivery Order provides the Foodservice Operator with details of the goods, delivery date and the number of load units being shipped. This enables loading dock/receival staff to prepare for the goods, storage space to be arranged and shelf space planning for the inbound product. The supplier will create a Customer Order once product, quantity, variety, delivery terms and price have been agreed with the Foodservice Operator.

FSANZ (see FSANZ Chapter 3, Food Standards Code) provides the following advice in relation to receipt of food:

*“If an enforcement officer asks you to do so, you must be able to provide the officer with information on the suppliers of any food on your premises and what that food is. You need this information in case food on your premises is found to be unsafe or contaminated in some way and has to be returned to the supplier or destroyed.*

*Although most, if not all of the food you buy will be labelled with the name of the product and the name and address of the manufacturer, importer or packager of the food, you may also have unpackaged or unlabelled food on your premises and will need other ways of proving what this food is and where it came from. You might do so using your supplier invoices, or you might keep some other record of your suppliers and what you buy from them and the food you have on your premises. You must not accept food unless you can identify it and trace it back to its supplier.”*

This requires that the Supplier maintains a system of traceability with the ability to trace products whether they are fresh food products, finished or processed products, or packaging material.

The Transport Company making food deliveries will record the transport booking reference and the Consignment Note related to the delivery and attach the Delivery Order for the Foodservice Operator receiving the goods.

A Returns Policy and Procedures agreed between the Foodservice Operator and Suppliers outlines all procedures for returned stock to enable traceability of damaged packs and of any products returned to stock or for disposal.

### Tasks related to traceability

- Advance Shipping Notice received by foodservice operator
- Product is delivered with Delivery Order correlated to the ASN (advance shipping notice).
- Product is unloaded from transport at receipt dock
- Product is inspected (contamination; identification; temperature) and accepted/rejected/returned to suppliers with reason recorded (as per returns policy and procedures)
- Inbound product is matched to purchase/customer order and over/under/missing stock notified to supplier
- Proof of Delivery signed
- Received product is scanned/recorded in the Foodservice Operator Enterprise Resource Planning (ERP) or inventory system
- Supplier Invoice is reconciled with Purchase/Customer Order/ASN/and transport documentation, such as Delivery Order and Proof of Delivery

### Key participants

- Supplier of product
- Foodservice Operator – receipt staff and Accounts
- Transport company and driver
- Food safety inspector



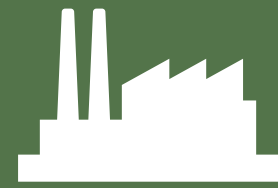
Introduction  
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Production



Freight  
Transport



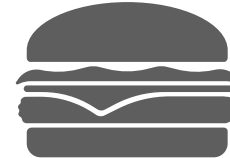
Processing and  
Manufacturing



Wholesale and  
Distribution



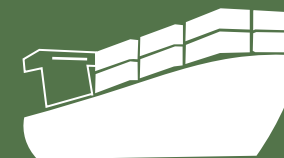
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Cybersecurity,  
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## On-site storage of inbound product

Fresh food product and/or processed food products may be transferred to the Foodservice Operator’s own storage pallets/tubs/containers. The product, which may be in bulk bags, loose in tubs or crates or enclosed in cartons is recorded with a storage location.

**Tasks related to traceability**

- Position in storage identified and allocated
- Product transferred to internal storage asset e.g. pallet, bin, tub
- Product put away ready to be called forward to food preparation area
- Product identifiers, supplier and best before, expiry dates recorded

**Key participants**

- Foodservice Operator – goods receipt staff and accounts
- Transport company and driver
- Food safety/QA inspector



## Maintaining traceability once bulk packs are opened

Tracking by lot and batch numbers is the most effective means to undertake a recall in food preparation.

This means being able to record the lot or batch number of a product supplied and in turn of foods prepared. Records of the supplier, the lot/batch number and the use-by date related to the bulk/caterer’s pack and on portions used for food preparation, allows recall to be limited to that specific batch or lot prepared within a fixed timespan.

An enterprise system enabled to scan this data allows association of the food served with the product supplied. Scanning and recording the batch/lot number and ID of supplier on portions before placing in cool rooms and refrigerators can link food served with the bulk/caterer packs as supplied.

As a recipe is being prepared, record the ingredient batch/lot number, the name of the ingredient, the brand name, the date received, and the quantity used in the recipe. Once the production of the recipe is completed, create and record your own batch codes for the end consumer reference.

This batch code and a use-by date becomes a reference for consumers of catering at an event or restaurant diners. If more than once bulk pack is used in a foodservice production, both batch numbers need to be recorded and labelled on the serve.

**Tasks related to traceability**

- Record lot/batch number and use-by date from supplier on portions before food preparation
- Record ingredient batch/lot number, the name of the ingredient, the brand name, the date received, and the quantity used in the recipe
- Place batch number and use-by date on each serve for end-consumer reference
- Record which location/event/outlet the batch is delivered to (own transport or see Freight Transport module)

**Key participants**

- Foodservice Operator food preparation and production staff





### Ensuring food integrity, quality and safety

Ensuring food safety is a key obligation of all food businesses. This ensures that the food is safe and suitable to consume. Food safety standards also contain health and hygiene obligations for food handlers, aimed at lowering the incidence of food-borne illness.

Traceability is a key means to manage the integrity of food product stored on-site and on floor display, by understanding the status of the product, through:

- Recording inspections of storage conditions, particularly ambient temperature and light levels and effectiveness of refrigeration equipment
- Recording batch and lot number and expiry date at receipt and adding this to the inventory management system for each SKU/GTIN/lot or batch
- Using colour markers on items to indicate expiry time/date of products at item/lot/batch level
- Implementing a First-In - First Out (FIFO) stock movement plan/system. This may be as basic as a whiteboard recording batches and their use-by/expiry dates
- Undertaking regular stock counts to identify older stock

**Tasks related to traceability**

- Record inspections of storage conditions and stock in inventory system
- Record Supplier, Lot/Batch and use-by/expiry date at receipt
- Implement a FIFO stock movement system
- Undertake regular stock counts

**Key participants**

- Foodservice Operator
- Appointed food safety inspector
- State level regulators



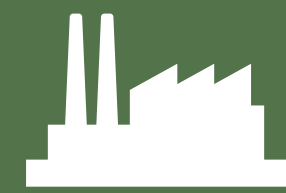
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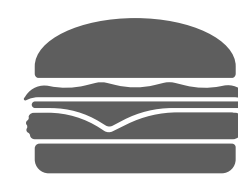
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Critical Tracking Events (CTEs)

For each of the identified foodservice activities, critical tracking events (CTEs) which establish identity and enable traceability and compliance with traceability-related regulation are summarised as follows:  
CTEs are events that relate to the identity, movement and transformation of the food product.

Food Service activity	CTE code	Critical Tracking Events (CTEs)
Establish master data for the foodservice business, including assets and packed food portions	FS CTE1	Apply for Global Location Number Food operator licence issued Unique ID for assets e.g. tubs, vehicles ID for outbound food portions
Establish master data for suppliers	FS CTE2	Create master data for suppliers of food, cleaning products, packaging
Auditing suppliers for traceability and provenance Verify the product (and any relevant other input/ingredient) origin and integrity Complete supplier audit	FS CTE3	Verify the product (and any relevant other input/ingredient) origin and integrity and supplier’s ability to track product from origin
Inventory management	FS CTE4A	Provide Inventory Reports to Foodservice Operator for visibility of inventory in storage
Order Receipt and Picking <ul style="list-style-type: none"><li>Customer Order processing</li><li>Order received</li><li>Stock availability confirmed</li><li>Packing list prepared</li><li>Order picked and packed</li><li>Advance Shipping Notice sent to Foodservice Operator</li></ul>	FS CTE4B	Foodservice Operator lodges order Foodservice Operator receives ASN
Order Dispatch Dispatch <ul style="list-style-type: none"><li>Delivery Order prepared</li><li>Transport booked</li><li>Stock relocated to outbound area and loaded onto load unit</li><li>Consignment Note prepared</li><li>Product loaded</li><li>Gate out time, date, vehicle registration</li></ul>	FS CTE5	Order Dispatched
Receipt of food products at Foodservice Operator <ul style="list-style-type: none"><li>Record/scan stock into receival area</li><li>Record use-by/expiry date</li><li>Reconcile against Purchase Order/Delivery Order/Supplier Invoice</li><li>Enter received stock into inventory system recording supplier, lot number and use-by date</li></ul>	FS CTE6	Product Received and receipted into inventory management systems <ul style="list-style-type: none"><li>Proof of Delivery signed</li><li>Record and notify variations to supplier</li><li>Received product is scanned/entered into the Foodservice Enterprise Resource Planning (ERP) or inventory system</li></ul>



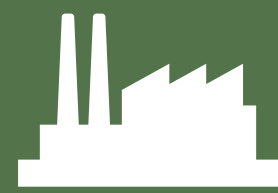
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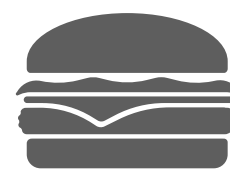
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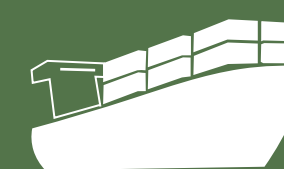
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Food Service activity	CTE code	Critical Tracking Events (CTEs)
<b>On-site storage of inbound product</b> Position in storage identified and allocated Product transferred to internal storage asset e.g. pallet or bin Product put away ready to be called forward to retail sales floor	FS CTE7	Stock put away into storage <ul style="list-style-type: none"><li>Product internal storage unit ID and location recorded</li></ul>
<b>Maintaining traceability once bulk packs are opened</b>  Record lot/batch number and use-by date from supplier on portions before food preparation  Record ingredient batch/lot number, the name of the ingredient, the brand name, the date received, and the quantity used in the recipe  Place batch number and use-by date on each serve for end-consumer reference  Record which location/event/outlet the batch is delivered to (own transport or see Freight Transport module)	FS CTE8  FS CTE9  FS CTE10  FS CTE11	Product Re-packing <ul style="list-style-type: none"><li>Record supplier, lot and use-by date on portions from bulk packs</li></ul> Product Usage <ul style="list-style-type: none"><li>Record lot details and quantity used in recipe</li></ul> Delivery <ul style="list-style-type: none"><li>Label serves of newly produced meal portions for end consumer reference</li><li>Record delivery location for each batch number</li></ul>
<b>Ensuring food integrity, quality and safety</b>  Record food safety/QA inspections of storage  Record each supplier Lot/Batch and expiry date at receipt and enter into inventory system  Implement a FIFO stock movement system Undertake regular stock counts	FS CTE12  See FS CTE6	Record inspections of storage conditions  Record each supplier Lot/Batch and expiry date at receipt and enter into inventory system



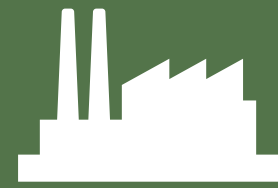
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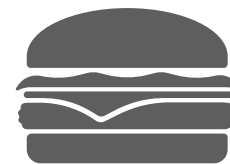
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Key Data Elements

Key Data Elements (KDE) ensure that captured and recorded data can be interpreted and used as relevant and required by all supply chain partners. Key Data Elements define Who, What, When, Where and Why for each Critical Tracking Event identified above.

CTE code	Critical Tracking Events	Key data Inputs and Outputs																				
FS CTE1	Apply for Global Location Number	<div><div>Global Location Number</div><div>The Global Location Number (GLN) is used to identify locations and legal entities. This unique identifier is comprised of a GS1 Company Prefix, Location Reference, and Check Digit.</div><div>GLNs are used to identify parties to business transactions; functional groups within a company; or real, physical “places” that might ship, receive, process, or hold the product.</div><div><div>Request for GLN</div><table><tr><td>Who</td><td>Foodservice Operator Issuing Agency</td></tr><tr><td>What</td><td>Foodservice organisation</td></tr><tr><td>When</td><td>Date/Time of issuance</td></tr><tr><td>Where</td><td>Issuing agency</td></tr><tr><td>Why</td><td>Requirement for GLN</td></tr></table></div><div><div>Food Licence Number</div><div><div><div>This licence number is issued by local government</div></div></div><div><div>Food Licence Number</div><table><tr><td>Who</td><td>Foodservice operator</td></tr><tr><td>What</td><td>Foodservice organisation</td></tr><tr><td>When</td><td>Date/Time of issuance</td></tr><tr><td>Where</td><td>Issuing agency</td></tr><tr><td>Why</td><td>Food business registration</td></tr></table></div><div><div>Information to be shared to a traceability platform</div><div><div>Global Location Number (GLN)</div><div>Food business registration number and currency</div></div></div></div></div>	Who	Foodservice Operator Issuing Agency	What	Foodservice organisation	When	Date/Time of issuance	Where	Issuing agency	Why	Requirement for GLN	Who	Foodservice operator	What	Foodservice organisation	When	Date/Time of issuance	Where	Issuing agency	Why	Food business registration
Who	Foodservice Operator Issuing Agency																					
What	Foodservice organisation																					
When	Date/Time of issuance																					
Where	Issuing agency																					
Why	Requirement for GLN																					
Who	Foodservice operator																					
What	Foodservice organisation																					
When	Date/Time of issuance																					
Where	Issuing agency																					
Why	Food business registration																					

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
FS CTE2	Establish master data of suppliers	<div><div><div><div></div><div>Supplier GLN</div></div><div><div></div><div>Supplier Food Licence Number</div></div><div><div></div><div>Grower Property Identification Code (PIC) for direct-from-farm deliveries</div></div></div><div><div>Supplier Master Data</div><table><tr><td>Who</td><td>Foodservice operator Food Supplier</td></tr><tr><td>What</td><td>Supplier Products, Locations</td></tr><tr><td>When</td><td>New product or new supplier engagement</td></tr><tr><td>Where</td><td>Foodservice operator</td></tr><tr><td>Why</td><td>Master Data Set-up</td></tr></table></div></div>	Who	Foodservice operator Food Supplier	What	Supplier Products, Locations	When	New product or new supplier engagement	Where	Foodservice operator	Why	Master Data Set-up
Who	Foodservice operator Food Supplier											
What	Supplier Products, Locations											
When	New product or new supplier engagement											
Where	Foodservice operator											
Why	Master Data Set-up											
FS CTE3	Verify the product (and any relevant other input/ingredient) origin and integrity and ability to track product	<div><div><div>Supplier Traceability Audit</div><div><div><div></div><div>Ingredient source record keeping</div></div><div><div></div><div>Date of audit</div></div><div><div></div><div>Auditor ID</div></div><div><div></div><div>Relevant manufacturer declarations and test certificates verifying product source and integrity</div></div></div><div><div>Traceability Audit</div><table><tr><td>Who</td><td>Traceability Auditor Supplier</td></tr><tr><td>What</td><td>Supplier Traceability and food safety management systems</td></tr><tr><td>When</td><td>Date/Time of Audit</td></tr><tr><td>Where</td><td>Supplier</td></tr><tr><td>Why</td><td>Food Safety Audit</td></tr></table></div><div><div>Information to be shared to a traceability platform</div><div><div><div></div><div>Date of audit</div></div><div><div></div><div>Auditor ID</div></div><div><div></div><div>Test Certificate/Manufacturer Declaration number and date</div></div></div></div></div></div>	Who	Traceability Auditor Supplier	What	Supplier Traceability and food safety management systems	When	Date/Time of Audit	Where	Supplier	Why	Food Safety Audit
Who	Traceability Auditor Supplier											
What	Supplier Traceability and food safety management systems											
When	Date/Time of Audit											
Where	Supplier											
Why	Food Safety Audit											



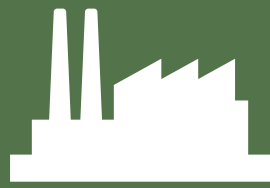
Introduction and Overview



On-farm Production



Freight Transport



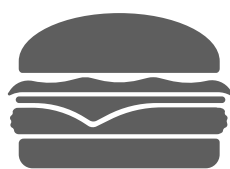
Processing and Manufacturing



Wholesale and Distribution



Retail Operations



Food Service



Import Operations



Export Operations



Consumer Information



Cybersecurity, Data & Privacy



Supplemental Information



CTE code	Critical Tracking Events	Key data Inputs and Outputs											
FS CTE4A	Provide inventory reports to Foodservice Operator for visibility of inventory in storage	<b>Quantity</b> <ul style="list-style-type: none"><li>● Current stock on hand by GTIN, SKU, SSCC</li><li>● Stock shrinkage</li><li>● Date</li><li>● Stock reference (SKU, GTIN)</li><li>● Description</li><li>● Location</li><li>● Quantity</li><li>● Reorder level</li></ul>											
	Order Receipt and Picking												
FS CTE4	Foodservice Operator lodges Customer Order	<b>Customer Order</b> <ul style="list-style-type: none"><li>● Date</li><li>● Foodservice Operator ID and location (GLN)</li><li>● Product GTIN/SKU/SSCC identifier</li><li>● Quantity and unit (carton, drum etc)</li><li>● Date required</li><li>● Delivery instructions e.g. opening hours, dock location)</li></ul>											
	Food service Operator receives ASN	<b>ASN</b> <ul style="list-style-type: none"><li>● GTIN/SKU/SSCC to be shipped</li><li>● Value</li><li>● Daily stock in/stock out count</li></ul> <b>Information to be shared to a traceability platform</b> <ul style="list-style-type: none"><li>● Inventory report (dated)</li><li>● Customer order number</li><li>● Date of Pick</li><li>● Product picked</li><li>● Batch number</li><li>● Use By/Best Before dates</li><li>● Logistics unit number (SSCC)</li><li>● ASN number</li></ul> <table><tr><th colspan="2">Inventory Update</th></tr><tr><td>Who</td><td>Foodservice Operator, Customer</td></tr><tr><td>What</td><td>Product ID, Inventory Levels, Quantity, Batch, Date Information</td></tr><tr><td>When</td><td>Date/Time of pick</td></tr><tr><td>Where</td><td>Foodservice warehouse</td></tr><tr><td>Why</td><td>Inventory update</td></tr></table>	Inventory Update		Who	Foodservice Operator, Customer	What	Product ID, Inventory Levels, Quantity, Batch, Date Information	When	Date/Time of pick	Where	Foodservice warehouse	Why
Inventory Update													
Who	Foodservice Operator, Customer												
What	Product ID, Inventory Levels, Quantity, Batch, Date Information												
When	Date/Time of pick												
Where	Foodservice warehouse												
Why	Inventory update												

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<table><tr><th colspan="2">Picking</th></tr><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information, Logistics unit number,</td></tr><tr><td>When</td><td>Date/Time of pick</td></tr><tr><td>Where</td><td>Pick location</td></tr><tr><td>Why</td><td>Picking stock</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Inventory report (dated)</li><li>● Customer order number</li><li>● Date of Pick</li><li>● Product picked</li><li>● Batch number</li><li>● Use By/Best Before dates</li><li>● Logistics unit number (SSCC)</li><li>● ASN number</li></ul>	Picking		Who	Distributor/Wholesaler	What	Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information, Logistics unit number,	When	Date/Time of pick	Where	Pick location	Why	Picking stock
Picking														
Who	Distributor/Wholesaler													
What	Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information, Logistics unit number,													
When	Date/Time of pick													
Where	Pick location													
Why	Picking stock													
FS CTE5	Order Despatch	<ul style="list-style-type: none"><li>● Customer Order Number</li><li>● Product</li><li>● Qty</li><li>● Batch</li><li>● Use By/Best Before dates</li><li>● Date of despatch</li></ul> <table><tr><th colspan="2">Picking</th></tr><tr><td>Who</td><td>Distributor/Wholesaler</td></tr><tr><td>What</td><td>Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information</td></tr><tr><td>When</td><td>Date/Time of pick</td></tr><tr><td>Where</td><td>Pick location</td></tr><tr><td>Why</td><td>Picking stock</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Customer order number</li><li>● ASN</li><li>● Logistics Unit numbers (SSCC)</li></ul>	Picking		Who	Distributor/Wholesaler	What	Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information	When	Date/Time of pick	Where	Pick location	Why	Picking stock
Picking														
Who	Distributor/Wholesaler													
What	Customer Purchase Order, Picking list number, Product ID, Quantity, Batch, Date Information													
When	Date/Time of pick													
Where	Pick location													
Why	Picking stock													



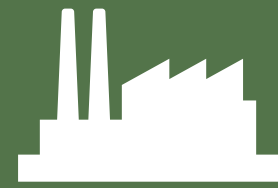
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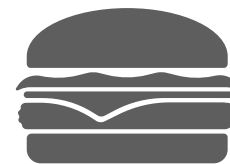
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CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FS CTE6	Receipt of food products at Foodservice Operator	<p><b>Proof of Delivery</b></p> <ul style="list-style-type: none"><li>● Delivery date</li><li>● Number of units — pallets, cartons, drums</li><li>● Delivery ID</li><li>● Name and signature of receiver</li></ul> <p><b>EDI message for rejected/missing stock</b></p> <ul style="list-style-type: none"><li>● Record variations x SKU/GTIN, lot number and supplier ID</li><li>● Product ID (SKU + GTIN)</li><li>● Lot/batch number</li><li>● Use-by/expiry date for each lot</li></ul> <table><tr><th colspan="2">Receipt</th></tr><tr><td><b>Who</b></td><td>Foodservice operator</td></tr><tr><td><b>What</b></td><td>Order Number, ASN, Logistics unit ID, Product ID, Quantity, Batch, Use By/Best before Date Information</td></tr><tr><td><b>When</b></td><td>Date/Time of Receipt</td></tr><tr><td><b>Where</b></td><td>Receipt location</td></tr><tr><td><b>Why</b></td><td>Receipting</td></tr></table> <p><b>Information to be shared to a traceability platform</b></p> <ul style="list-style-type: none"><li>● POD number</li><li>● Receipt ID</li><li>● Product ID</li><li>● Actual quantity receipted</li><li>● Batch</li><li>● Use by/Best before date</li><li>● Date/Time of receipt</li></ul>	Receipt		<b>Who</b>	Foodservice operator	<b>What</b>	Order Number, ASN, Logistics unit ID, Product ID, Quantity, Batch, Use By/Best before Date Information	<b>When</b>	Date/Time of Receipt	<b>Where</b>	Receipt location	<b>Why</b>	Receipting
	Receipt													
	<b>Who</b>		Foodservice operator											
	<b>What</b>		Order Number, ASN, Logistics unit ID, Product ID, Quantity, Batch, Use By/Best before Date Information											
<b>When</b>	Date/Time of Receipt													
<b>Where</b>	Receipt location													
<b>Why</b>	Receipting													
	Sign Proof of Delivery													
	Record and notify variations to warehouse/DC or supplier													
	Received product entered into store inventory system													
FS CTE7	Storage of inbound product	<ul style="list-style-type: none"><li>● Storage unit ID</li><li>● Location in storage</li></ul> <table><tr><th colspan="2">Put Away</th></tr><tr><td><b>Who</b></td><td>Foodservice operator</td></tr><tr><td><b>What</b></td><td>Product ID, Quantity, Batch, Date Information, logistics unit id</td></tr><tr><td><b>When</b></td><td>Date/Time of put away</td></tr><tr><td><b>Where</b></td><td>Put away location</td></tr><tr><td><b>Why</b></td><td>Stock put away</td></tr></table>	Put Away		<b>Who</b>	Foodservice operator	<b>What</b>	Product ID, Quantity, Batch, Date Information, logistics unit id	<b>When</b>	Date/Time of put away	<b>Where</b>	Put away location	<b>Why</b>	Stock put away
	Put Away													
	<b>Who</b>		Foodservice operator											
	<b>What</b>		Product ID, Quantity, Batch, Date Information, logistics unit id											
<b>When</b>	Date/Time of put away													
<b>Where</b>	Put away location													
<b>Why</b>	Stock put away													
	Product internal storage unit ID and located recorded													

CTE code	Critical Tracking Events	Key data Inputs and Outputs											
FS CTE8	Opened bulk packs – Product Repack	<ul style="list-style-type: none"><li>● Supplier</li><li>● Lot number</li><li>● Use-by date</li></ul>											
	Record supplier, lot and use-by on portions of product from bulk packs	<table><tr><th colspan="2">Product Re-pack</th></tr><tr><td>Who</td><td>Foodservice Operator</td></tr><tr><td>What</td><td>Initial Product ID, Quantity, Batch, Date Information, re-packaged product ID, quantity, batch number</td></tr><tr><td>When</td><td>Date/Time of re-pack</td></tr><tr><td>Where</td><td>Repacking location</td></tr><tr><td>Why</td><td>Re-pack</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Lot numbers used in food preparation</li><li>● Supplier of each lot</li><li>● Batch number of outbound meals</li><li>● Bulk Product ID</li><li>● Re-packaged product id</li><li>● Quantity repacked</li><li>● Date of re-pack</li></ul>	Product Re-pack		Who	Foodservice Operator	What	Initial Product ID, Quantity, Batch, Date Information, re-packaged product ID, quantity, batch number	When	Date/Time of re-pack	Where	Repacking location	Why
Product Re-pack													
Who	Foodservice Operator												
What	Initial Product ID, Quantity, Batch, Date Information, re-packaged product ID, quantity, batch number												
When	Date/Time of re-pack												
Where	Repacking location												
Why	Re-pack												
FS CTE9	Record lot details and quantity used in recipe/production	<ul style="list-style-type: none"><li>● Product ID (brand and supplier)</li><li>● Lot number</li><li>● Quantity used</li><li>● Date</li></ul>											
		<table><tr><th colspan="2">Product Usage</th></tr><tr><td>Who</td><td>Foodservice operator</td></tr><tr><td>What</td><td>Product ID, Quantity used, Batch, Date Information</td></tr><tr><td>When</td><td>Date/Time of usage</td></tr><tr><td>Where</td><td>Usage location</td></tr><tr><td>Why</td><td>Usage</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Product ID</li><li>● Lot numbers used in food preparation</li><li>● Quantity</li><li>● Date of usage</li></ul>	Product Usage		Who	Foodservice operator	What	Product ID, Quantity used, Batch, Date Information	When	Date/Time of usage	Where	Usage location	Why
Product Usage													
Who	Foodservice operator												
What	Product ID, Quantity used, Batch, Date Information												
When	Date/Time of usage												
Where	Usage location												
Why	Usage												



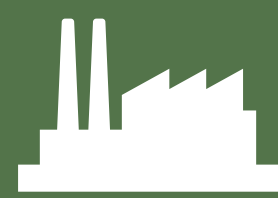
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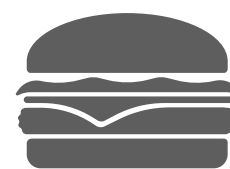
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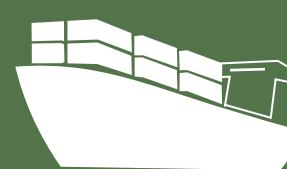
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CTE code	Critical Tracking Events	Key data Inputs and Outputs										
FS CTE10	New product creation	<ul style="list-style-type: none"><li>● Batch code</li><li>● Use-by date</li><li>● Product ID</li></ul>										
	Label serves of newly produced meal portions for end consumer reference	<div><div>Product Creation</div><table><tr><td>Who</td><td>Foodservice operator</td></tr><tr><td>What</td><td>Product ID, Quantity used, Batch, Date Information, Ingredients (product id's batch numbers, quantities)</td></tr><tr><td>When</td><td>Date/Time of creation</td></tr><tr><td>Where</td><td>creation location</td></tr><tr><td>Why</td><td>Product Creation (transformation)</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● New Product ID</li><li>● Quantity produced (portions)</li><li>● Batch number</li><li>● Best Before/Use by dates</li><li>● Date of creation</li></ul></div>	Who	Foodservice operator	What	Product ID, Quantity used, Batch, Date Information, Ingredients (product id's batch numbers, quantities)	When	Date/Time of creation	Where	creation location	Why	Product Creation (transformation)
Who	Foodservice operator											
What	Product ID, Quantity used, Batch, Date Information, Ingredients (product id's batch numbers, quantities)											
When	Date/Time of creation											
Where	creation location											
Why	Product Creation (transformation)											
FS CTE11	Record delivery location for each batch number	<ul style="list-style-type: none"><li>● Delivery location ID</li><li>● Batch number</li><li>● Quantity delivered</li><li>● Delivery date</li></ul> <div><div>Product Delivery</div><table><tr><td>Who</td><td>Foodservice operator</td></tr><tr><td>What</td><td>Product ID, Quantity, Batch, Date Information, Ingredients (product id's batch numbers, quantities)</td></tr><tr><td>When</td><td>Date/Time of delivery</td></tr><tr><td>Where</td><td>Delivery Location</td></tr><tr><td>Why</td><td>Delivery</td></tr></table></div> <div>Information to be shared to a traceability platform<ul style="list-style-type: none"><li>● Product Delivered</li><li>● Delivery location</li><li>● Quantity delivered</li><li>● Batch number</li><li>● Date of delivery</li></ul></div>	Who	Foodservice operator	What	Product ID, Quantity, Batch, Date Information, Ingredients (product id's batch numbers, quantities)	When	Date/Time of delivery	Where	Delivery Location	Why	Delivery
Who	Foodservice operator											
What	Product ID, Quantity, Batch, Date Information, Ingredients (product id's batch numbers, quantities)											
When	Date/Time of delivery											
Where	Delivery Location											
Why	Delivery											

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
FS CTE15	Food integrity, safety													
	Record food safety/QA inspections	<ul style="list-style-type: none"><li>● Inspection date</li><li>● Inspection record code</li></ul>												
		<table><tr><th colspan="2">Food Safety Inspection</th></tr><tr><td>Who</td><td>Food Safety Auditor Foodservice operator</td></tr><tr><td>What</td><td>Product ID, Quantity used, Batch, Date Information, Ingredients (product id's batch numbers, quantities)</td></tr><tr><td>When</td><td>Date/Time of inspection</td></tr><tr><td>Where</td><td>inspection location</td></tr><tr><td>Why</td><td>Product inspection</td></tr></table>	Food Safety Inspection		Who	Food Safety Auditor Foodservice operator	What	Product ID, Quantity used, Batch, Date Information, Ingredients (product id's batch numbers, quantities)	When	Date/Time of inspection	Where	inspection location	Why	Product inspection
	Food Safety Inspection													
	Who	Food Safety Auditor Foodservice operator												
What	Product ID, Quantity used, Batch, Date Information, Ingredients (product id's batch numbers, quantities)													
When	Date/Time of inspection													
Where	inspection location													
Why	Product inspection													
		Information to be shared to a traceability platform												
		<ul style="list-style-type: none"><li>● Inspection date</li><li>● Inspection record code</li><li>● Inspected product ID, batch number</li></ul>												



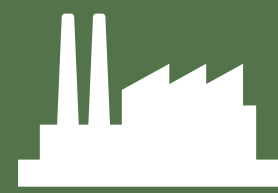
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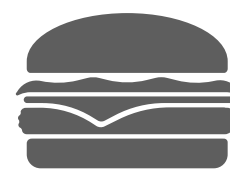
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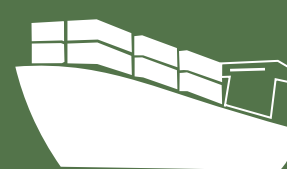
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## Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

### Foundational Elements

#### Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a store location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location in the world.



#### Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product's packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, quantity etc are all considered separate variations and thus require separate GTINs. Each level of packaging should be numbered (and barcoded) separately to all other levels.

#### Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.



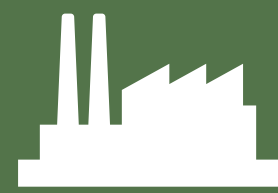
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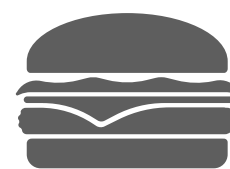
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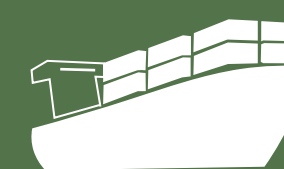
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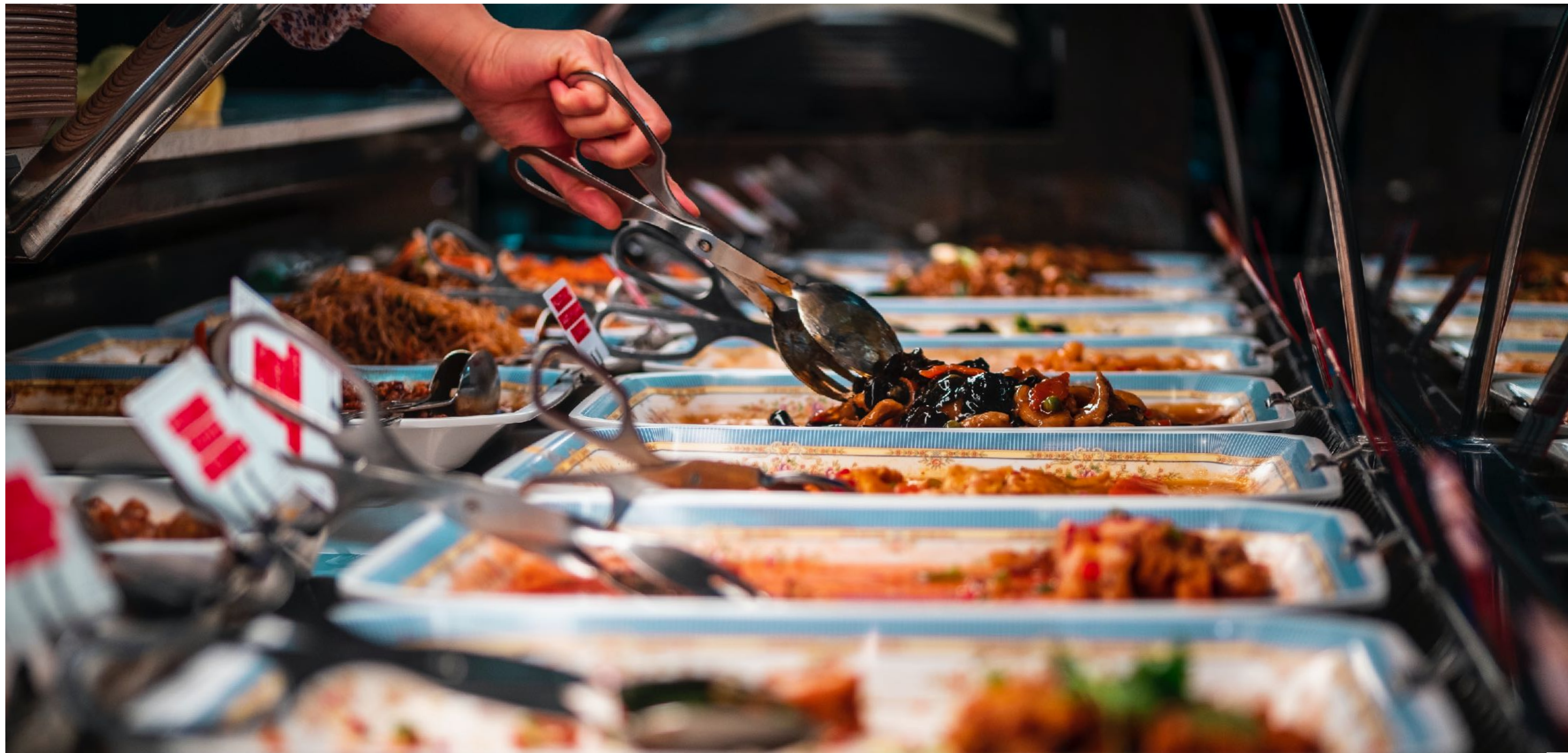
Logistics Units (SSCC)

The Serial Shipping Container Code can be used by companies to identify a logistic unit, which can be any combination of trade items packaged together for storage and/or transport purposes; for example a case, pallet or parcel.

The SSCC is a crucial key for traceability, since it uniquely identifies each distributed logistic unit and its content.

- The SSCC enables companies to track each logistic unit for efficient order and transport management.
- The SSCC can be encoded in a barcode or EPC/RFID tag, ensuring the logistic unit can be accurately and easily identified as it travels between trading partners, anywhere in the world.
- When SSCC data is shared electronically via EDI or EPCIS, this enables companies to share information about the status of logistic units in transit, and reliably link it to related transport information such as shipment details.
- The SSCC enables companies to link to additional information about the logistic unit. This information can be communicated via a Despatch Advice or Advanced Shipping Notice (ASN) prior to the logistic unit’s arrival. Upon receipt the SSCC will be scanned, providing the required information to speed up the receipt of goods as well as the subsequent invoicing process.

The SSCC is fully compatible with ISO/IEC 15459 — Part 1: Unique identifiers for transport units. This is often referred to as the ISO licence plate and is a prerequisite for tracking and tracing logistic units in many international supply chains.



Global Shipment Identification Number (GSIN)

The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together.

The logistic units keep the same GSIN during all transport stages, from origin to final destination. The GSIN identifies the logical grouping of one or several logistic units, each identified with a separate Serial Shipping Container Code (SSCC).

- The GSIN can be encoded by the shipper in a barcode or as text on a House Way Bill, or in addition to the SSCC, on a logistics label.
- The GSIN can be electronically used by a company in transport instruction and transport status messages between freight forwarder and transport provider, and also as a reference in the Despatch Advice.

The GSIN is fully compatible with ISO/IEC 15459 — Part 8: Grouping of Transport Units. The GSIN also meets the requirements for a Unique Consignment Reference (UCR) according to the World Customs Organisation.



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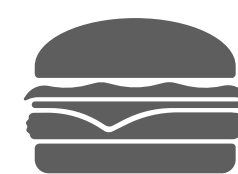
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## Asset Identification

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g. a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g. a Intermediate Bulk Container), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned. Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.

### Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate. The GS1 System identification of a returnable asset, the Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned. This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.

### Global Individual Asset Identifiers (GIAI) – AI (8004)

An individual asset is considered a physical entity made up of any characteristics. The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records.

Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used. This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.



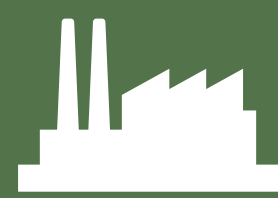
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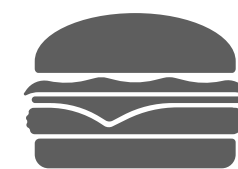
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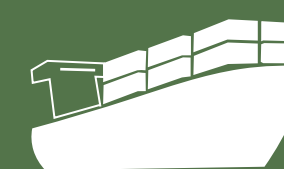
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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/ Format	Further information
Location	Manufacturing Plant, Finished Goods, Location, Dispatch Dock	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Production Date and/or Time, Use By date, Best Before Date, Pack Date	Year- Month- Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Input materials such as raw ingredients and packaging, Outputs such as finished goods, packaged or processed goods	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li>• <a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li>• <a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch/Lot code, Serial Number		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number etc. can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers: <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)</a>
Logistics Units	Pallet of packaged product	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>
Returnable Asset	CHEP pallet	AI (8003)	N29	The Returnable Asset Identifier is especially suitable for the management of reusable transport items, transport equipment, and tools. It can identify these returnable assets by type and if needed also individually for tracking and sorting purposes <a href="https://www.gs1.org/standards/id-keys/grai">https://www.gs1.org/standards/id-keys/grai</a>



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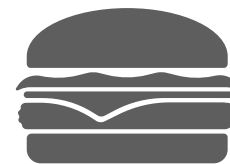
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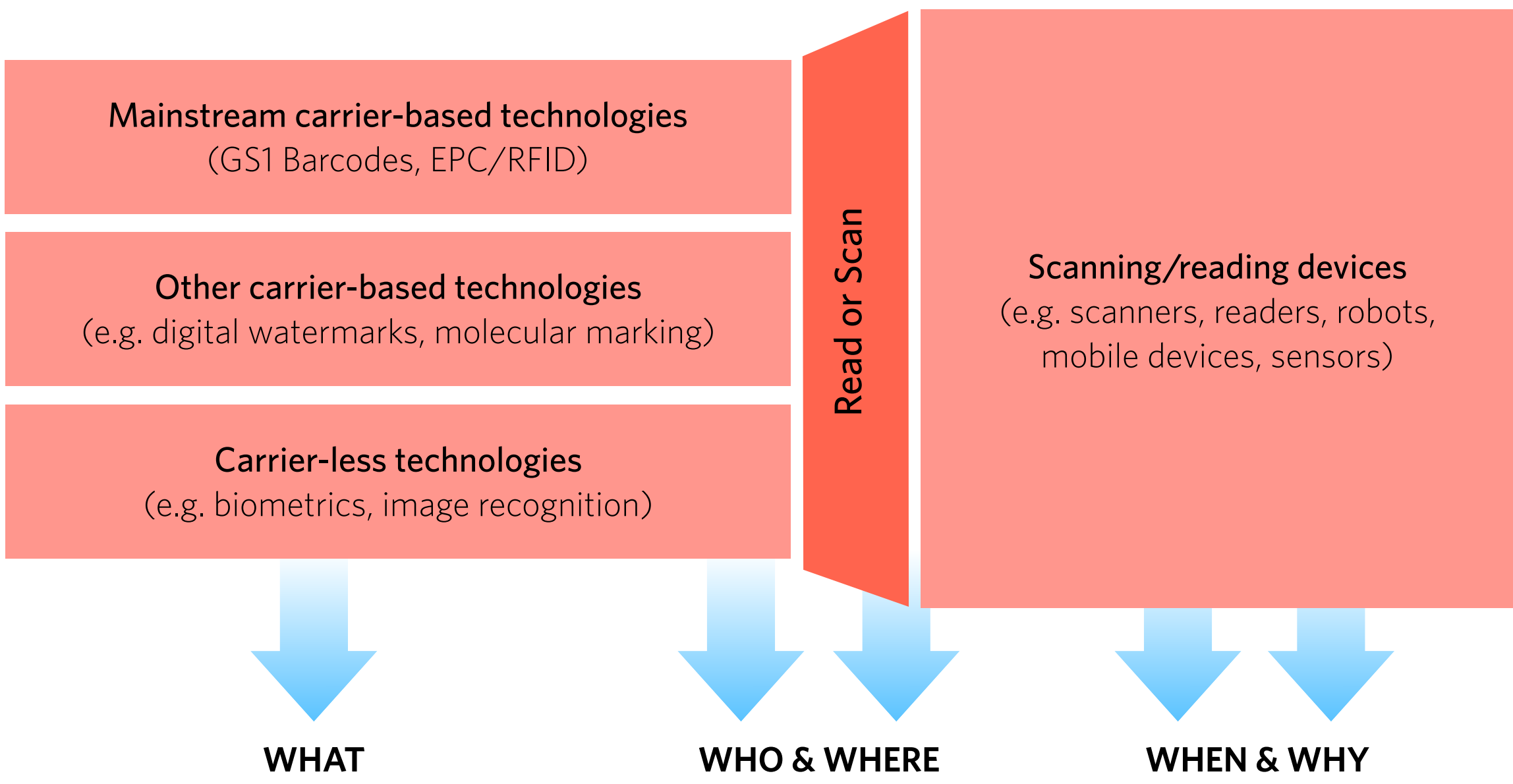
How to capture the KDEs

How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

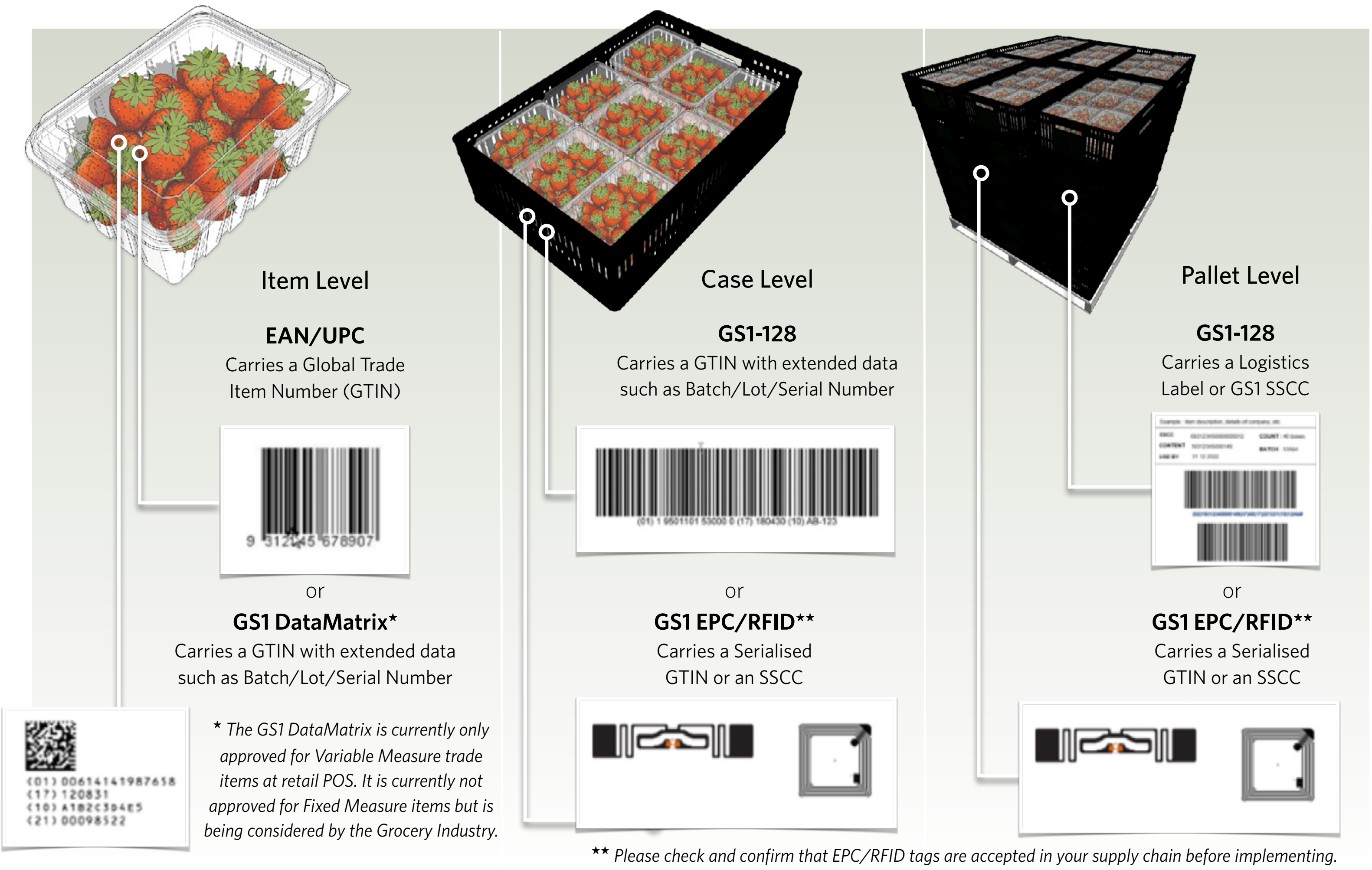


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.







Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc. The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number

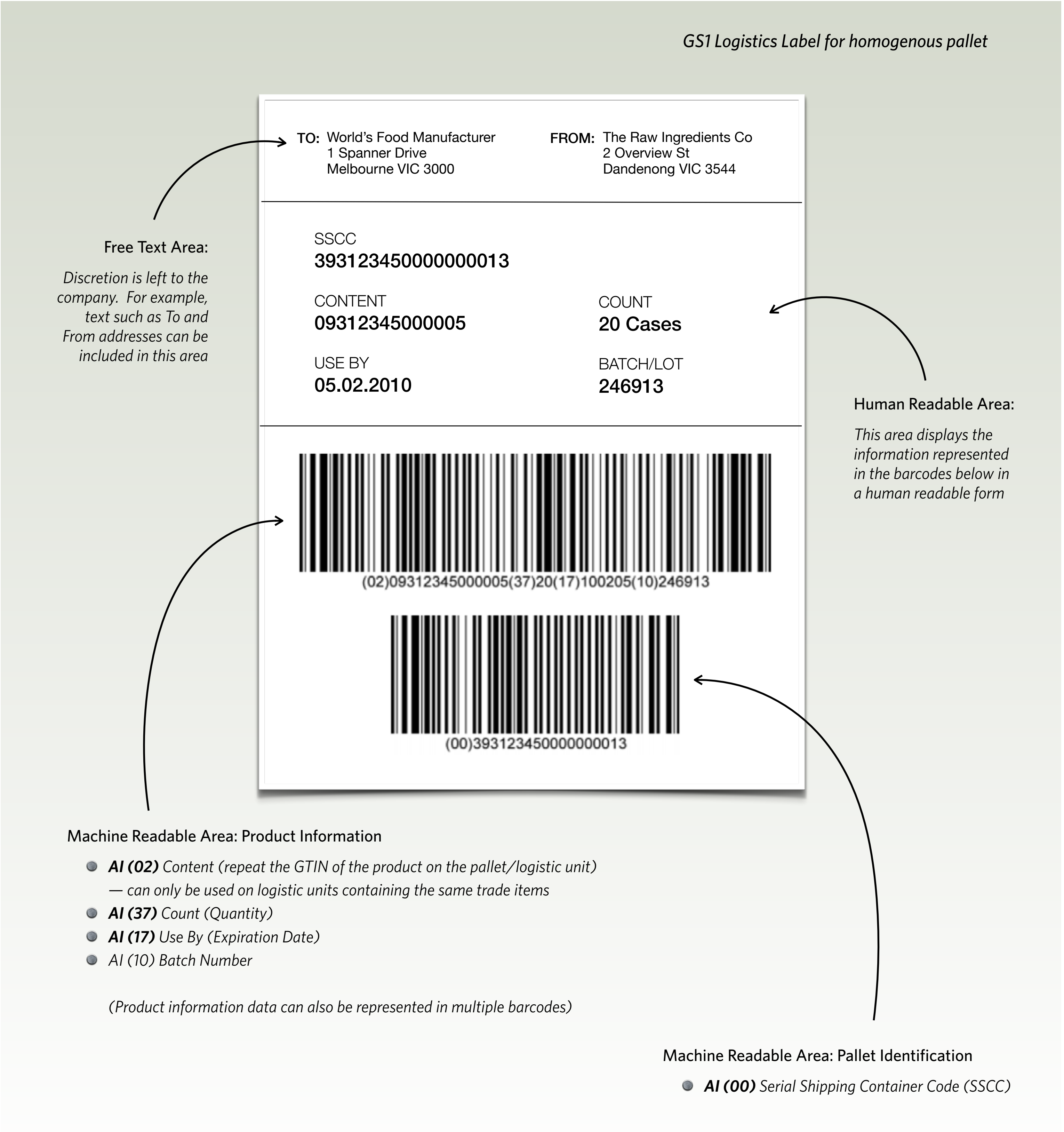


GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number

The use of the GS1 DataMatrix at point of sale is also under consideration for future use as it can encode additional traceability information. These barcodes require an imaging scanner to decode the information.



GS1 DataMatrix



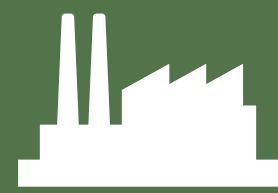
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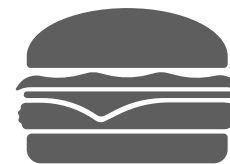
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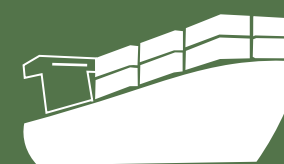
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FREE INFORMATION

Example: Beef Topside 600kg, details of company

**SSCC** 093123450000000012 **Prod Date** 3012/2008  
**CONTENT** 99311781001157 **Count** 40 boxes **WEIGHT** 600kg



GS1 Logistics Label homogenous logistics unit containing variable weight products

FROM  
GS1 GO  
Avenue Louise 326  
1050 Brussels

BE85250

TO  
GS1 GO Princeton Office  
1009 Lenox Drive

SPECIAL ORDER

1TE.00

0007

To be delivered : ECT VVD - X020399

GSIN

950110100000000001

SSCC

095011011234567896

A standard 1D barcode representing the GSIN (950110100000000001).

A standard 1D barcode representing the GSIN (950110100000000001).

GS1 Logistics Label homogenous logistics unit containing GSIN reference



Global Returnable Asset Identifier, AI (8003),  
represented in a GS1-128 Barcode



Global Individual Asset Identifier, AI (8004),  
represented in a GS1-128 Barcode



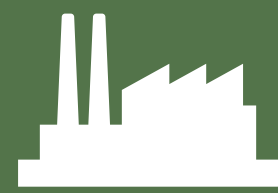
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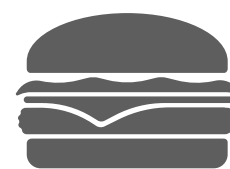
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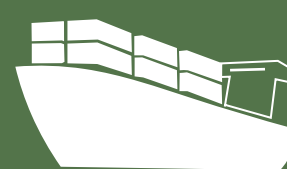
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How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing. In addition to product scanning, logistics labels can also be scanned to capture vital traceability data as logistics units (pallets, parcels, grouping of products) move through the supply chain.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

Usually the first step will be scanning of inputs, livestock etc upon receipt. For barcodes this is often done using handheld devices. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are harvesting, storing, picking, packing, shipping, transporting, selling.

Often a combination of fixed mounted scanners or readers and hand-held devices will be applied to capture the critical tracking events. The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.



Range of scanners which can read liner, 2D and RFID barcodes

Useful Links

Food Safety  
FSANZ <https://www.foodstandards.gov.au/Pages/faq.aspx>  
Australian Institute of Food Safety <https://www.foodsafety.com.au/>

Food business licensing  
<https://www.foodstandards.gov.au/about/foodenforcementcontacts/Pages/default.aspx>

Food business classifications  
Each state and territory in Australia have different classifications for food businesses. The classification of a food business relates to the licenses required. To determine the classification of a food business, see the following links:  
NSW - <http://www.foodauthority.nsw.gov.au>  
ACT - <https://health.act.gov.au/businesses/food-safety-regulation>  
VIC - <http://www.health.vic.gov.au/foodsafety/>  
QLD - <http://www.health.qld.gov.au/foodsafety/>  
SA - <http://www.health.sa.gov.au>  
WA - <http://www.public.health.wa.gov.au/2/1061/2/food.pm>  
NT - [http://www.health.nt.gov.au/Environmental\\_Health/Food\\_Safety/index.aspx](http://www.health.nt.gov.au/Environmental_Health/Food_Safety/index.aspx)  
TAS - <https://www.dhhs.tas.gov.au/>



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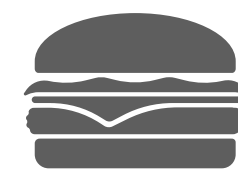
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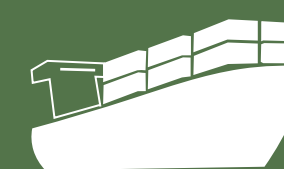
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Glossary

<b>Advance Shipping Notice (ASN)</b>	AN advance ship notice or advance shipping notice (ASN) is a notification of pending deliveries, similar to a packing list. It is usually sent in an electronic format and is a common EDI document.
<b>B2B/E2E</b>	Business-to-Business and Exchange-to-Exchange describes the IT system and business transactions between trading partners in a supply chain. In E2E transactions of data it is presumed these are automated processes.
<b>Delivery Order (DO)</b>	A document from the Consignor of the freight which orders the release of the cargo to another party. This permits the delivery direct to a warehouse or depot, as organised with the Consignee. This enables the Consignor to order pick up of product from a 3PL warehouse in order to deliver to the party named in the Delivery Order.
<b>First in: First out (FIFO)</b>	FOFO is a stock rotation mechanism based on recording the best-before/use-by/expiry date of food product received into a warehouse management system, to ensure food product is not overlooked and wasted due to expiry of these dates.
<b>Lot</b>	<p>A lot is an amount of a food that the manufacturer or producer identifies as having been prepared, or from which foods have been packaged or otherwise separated for sale, under essentially the same conditions, for example:</p> <ul style="list-style-type: none"><li>● from a particular preparation or packing unit; and</li><li>● during a particular time ordinarily not exceeding 24 hours.</li></ul> <p>The lot identification (which could be a number or other information) is used to track a product in the event of a recall and needs to be able to identify where the food was packed or prepared.</p>
<b>Order Acknowledgment</b>	An Order Acknowledgment is a commercial document/electronic message issued by the Wholesaler or Distribution Centre acknowledging receipt of the Purchase Order.
<b>Order Confirmation</b>	A legally binding commitment to deliver specified goods on specified terms. This enables the buyer to plan for receipt of these goods and if unconfirmed, to look to alternative suppliers.
<b>Proof of Delivery (POD)</b>	Consignor of the receipt and acceptance of a delivery. A signed POD enables the Transport Company to raise an invoice.
<b>Purchase Order (PO)</b>	A commercial document issued by a buyer to a supplier. This is a legally binding offer to buy product in return for payment. The terms and conditions for delivery and payment are detailed in this document, which also details the product quantity, price, terms and conditions, product quality specifications.
<b>3rd /Third Party Logistics (3PL)</b>	Outsourcing of distribution, warehousing or fulfilment. In food logistics, a 3PL may operate storage for multiple food suppliers or retailers, often specialising in cold chain management, a specific product, or distribution at a national, metropolitan or regional level. 3PL warehouses may assemble products for promotions, prepare in-store product displays. Through their warehouse management system, they monitor inventory and interact with customers to manage inventory, assembling orders and preparing for dispatch. A proportion of 3PL suppliers also offer distribution and delivery services.



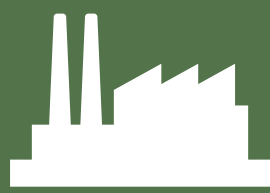
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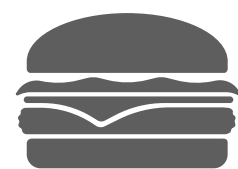
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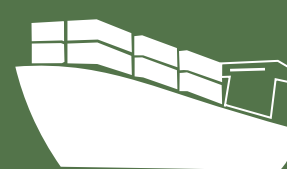
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M O D U L E   E I G H T :

# Import



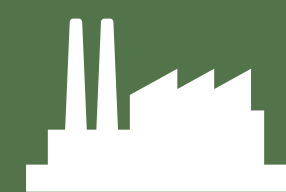
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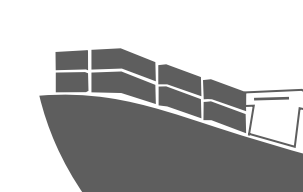
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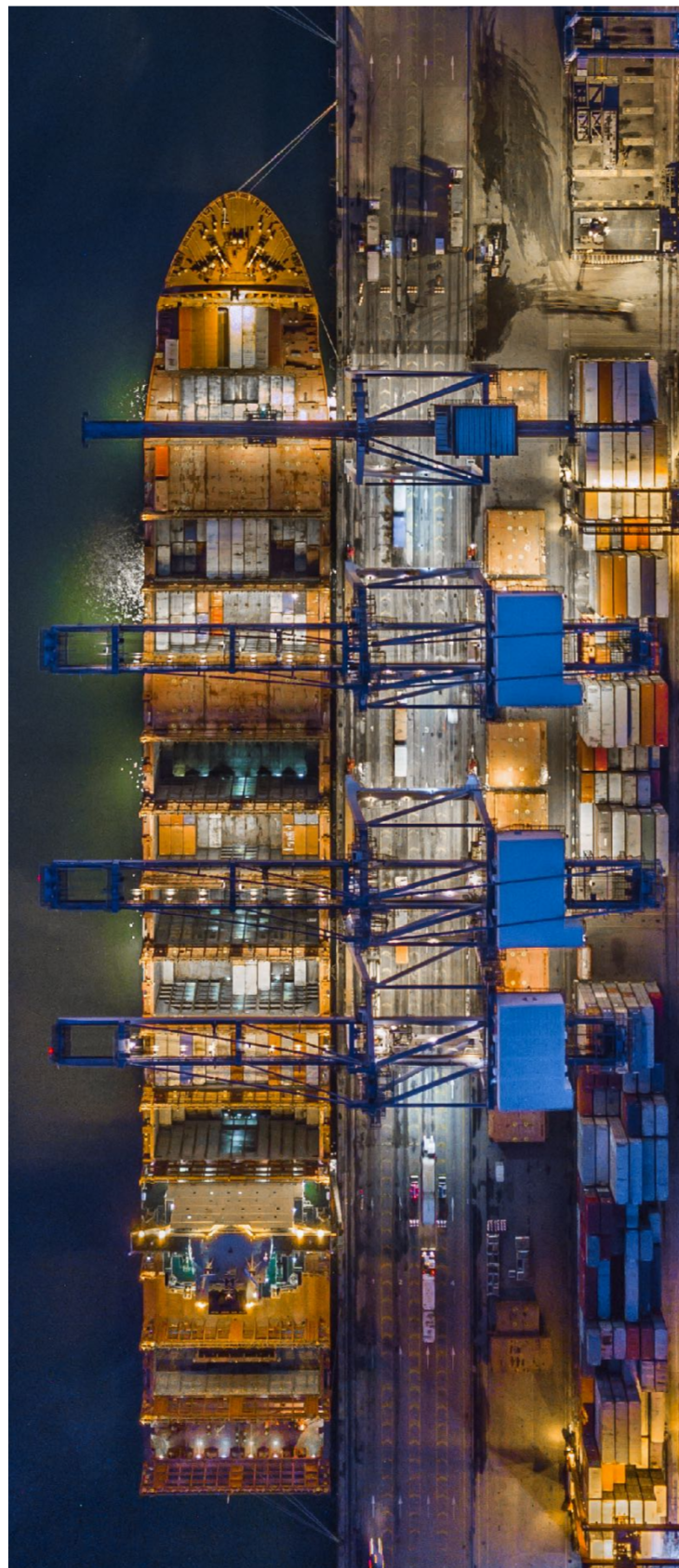
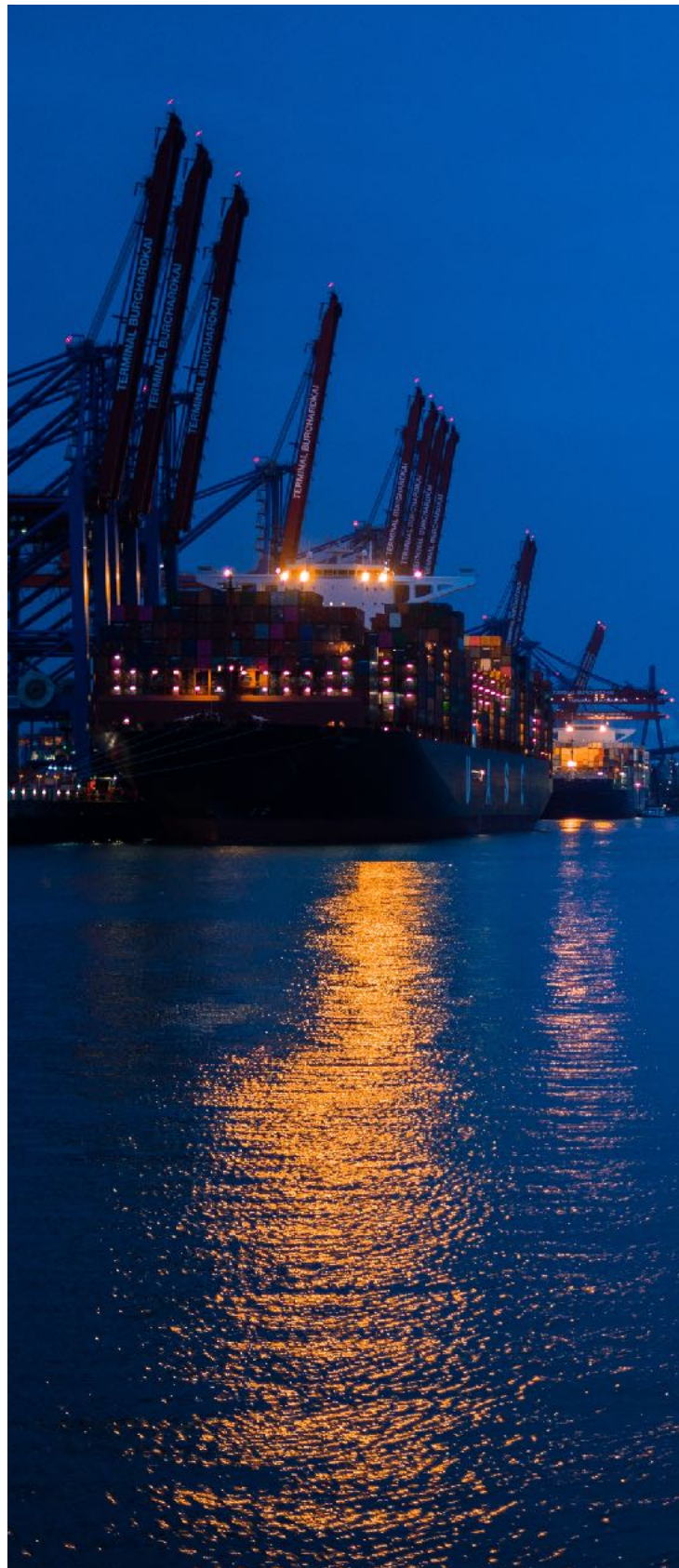


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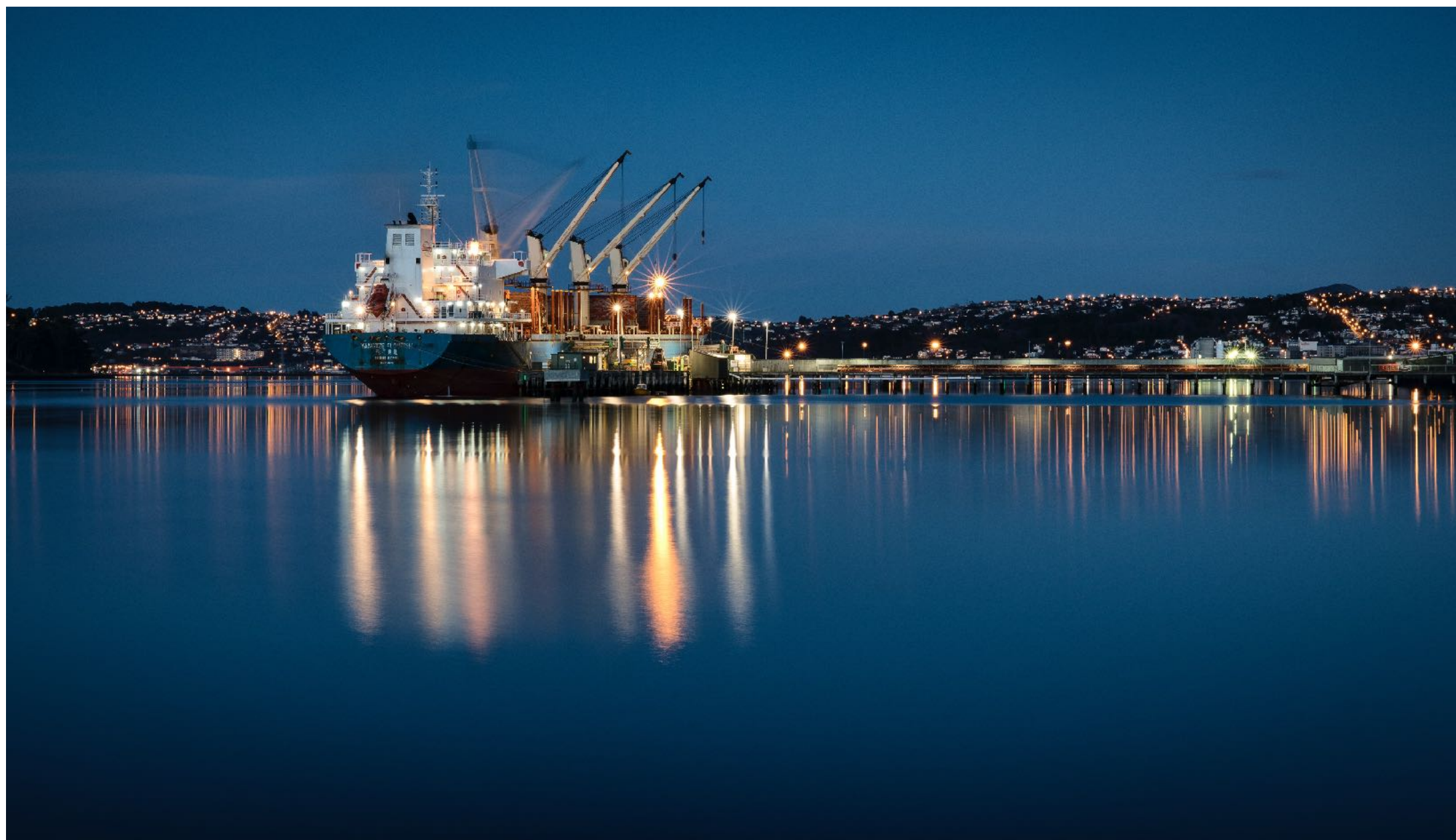
According to the World Bank, as of 2019, 7.3% of food consumed in Australia is imported. Australia is a net importer in six categories: seafood; processed fruit and vegetables; soft drink, cordials and syrup; confectionery; bakery products and oils and fats.

Food importation in Australia is dominated by small and medium-sized enterprises (SMEs), most being food wholesalers (47%); food manufacturers (16%) and food retailers (14%).<sup>1</sup>

Processes covered in this module include:

- Establishment data for Australian food importer and overseas suppliers
- Mandated food safety traceability requirements for Importers
- Tracing product origin and composition through offshore suppliers
- Arrival and clearance at final discharge port
- Re/labelling of imported food products to meet Australian standards

It is important to note that once an imported food product has received border clearance, all domestic food regulations apply. If the imported food is for retail sale, the Importer is required to register as a food business.



## Establishment data

### Create master data for trading partners and locations

Sourcing of product for import usually requires the creation of master data for grower, manufacturer and exporter in the country of origin of the product as well as for the Australian importer and key nodes in the supply chain. This will enable unique identification of the entities and locations engaged in the product’s journey, including packing houses, distribution centres or warehouses the product moves through.

For many jurisdictions, registration of the food grower, manufacturer and exporter are required by responsible authorities.

### Create master data for the Food Importer

Master data relates to unique identifiers for the business entity and business location. The creation of unique identifiers enables the business and trading partners to have consistency and interoperability between systems.

*“Master data is the consistent and uniform set of identifiers and extended attributes that describes the core entities of the enterprise including customers, prospects, citizens, suppliers, sites, hierarchies and chart of accounts.”<sup>2</sup>*

### Business licences and notifications

If a food Importer sells product for retail, the business must register with the local Council. If the Importer sells wholesale products, they must notify the state food authority. For some products, a licence will be required.

### Tasks related to traceability

- Create master data for Importer and key supply chain partner entities and locations
- Registration/notification of Food Business

### Key participants

- Producer/grower, wholesaler or manufacturer directly exporting
- Export company supplier (non-producer/manufacturer)
- Importer
- State and local authorities managing food safety and business registrations
- Issuing body for Global Location Numbers

1. Commonwealth of Australia, 2016, Imported Food Reforms Decision Regulation Impact Statement Department of Agriculture, Water & Environment.  
2. Gartner <https://www.gartner.com/en/information-technology/glossary/master-data-management-mdm>



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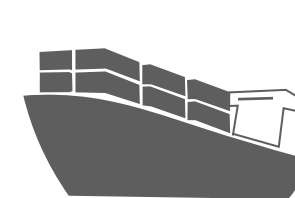
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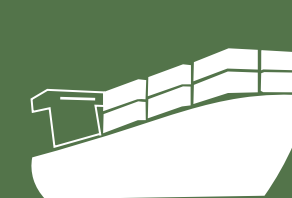
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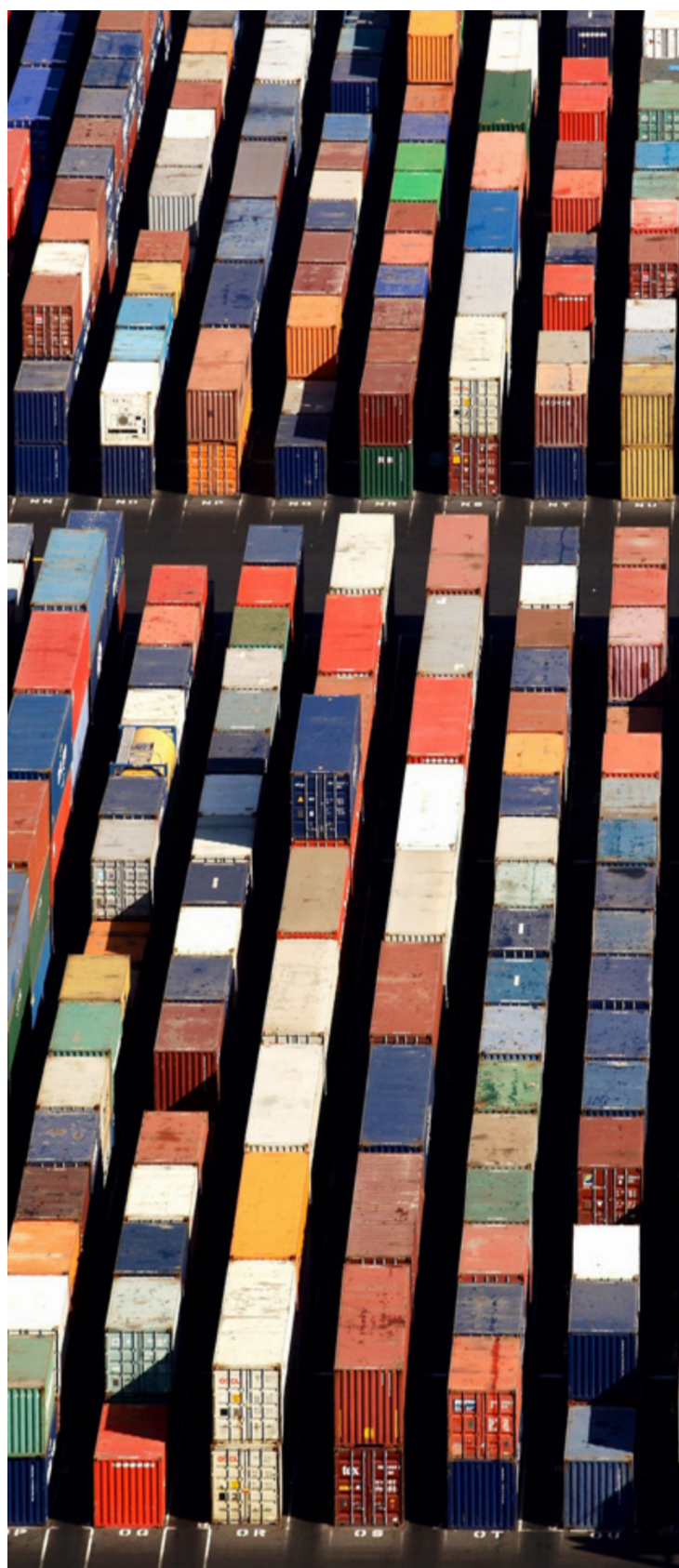


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## Mandated Food Safety Traceability requirements for importers

Food safety requirements apply to Food Importers and Wholesalers as follows:

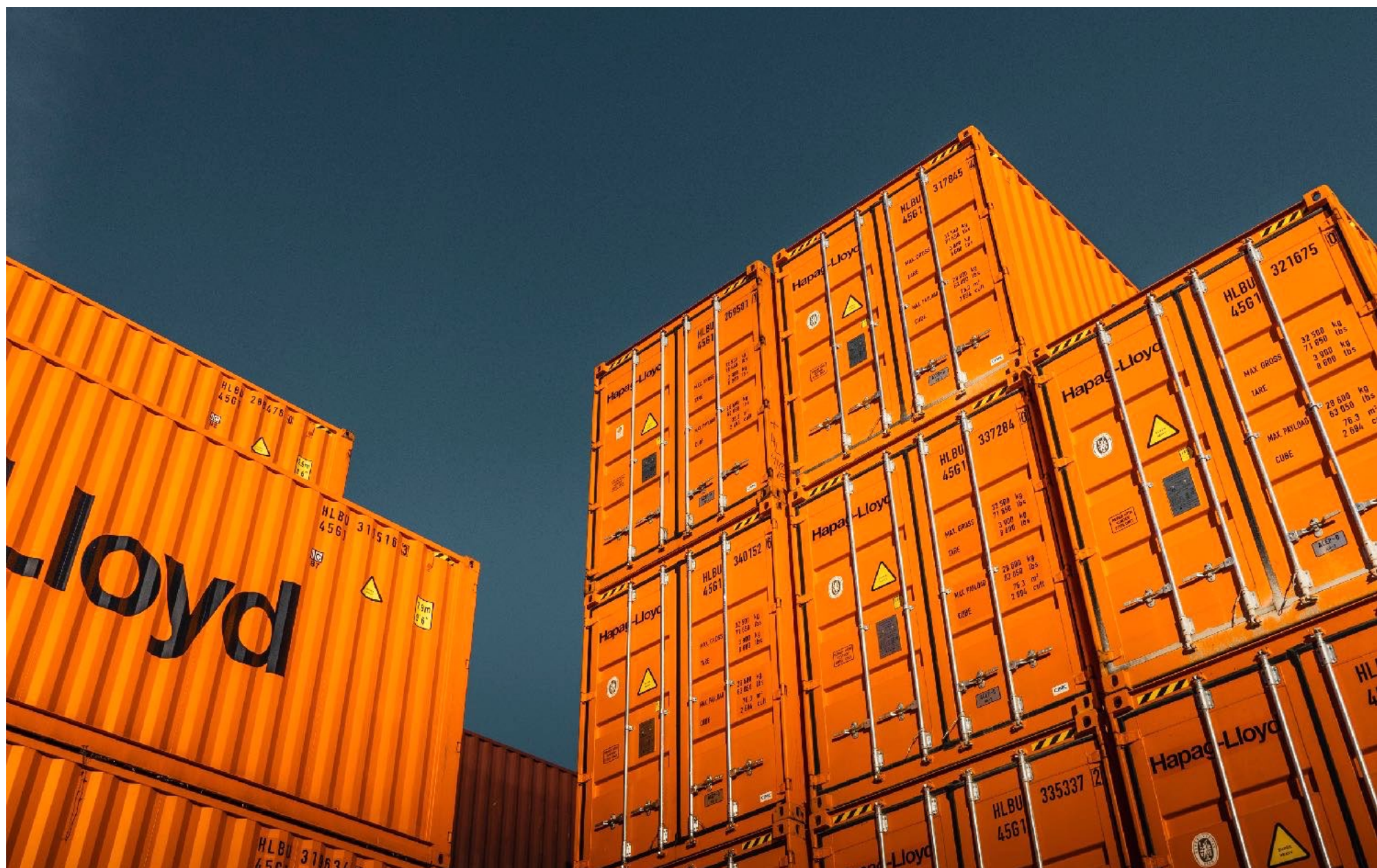
### Food receipt

In relation to food receipt, a food business must be able to provide information about what food, it has on the premises and where it came from.

A food business must provide, to the reasonable satisfaction of an authorised officer upon request, the following information relating to food on the food premises:

- the name and business address in Australia of the vendor, manufacturer or packer or, in the case of food imported into Australia, the name and business address in Australia of the importer; and
- the prescribed name or, if there is no prescribed name, an appropriate designation of the food.

This means that a food business must not receive a food unless it is able to identify the name of the food and the name of the supplier.



### Food recall

A food business engaged in the wholesale supply, manufacture or importation of food must have a system, set out in a written document, to ensure it can recall unsafe food. The system should include records covering:

- production records
- what products are manufactured or supplied
- volume or quantity of products manufactured or supplied
- batch or lot identification (or other markings)
- where products are distributed
- any other relevant production records.

This information should be readily accessible in order to know what, how much and from where product needs to be recalled.



### Tasks related to traceability

- Record the identity of the food or ingredient and the identity of the supplier
- Document a Recall System for the business which compiles the identity and location of customers and the identity, date, volume, batch or lot of product sold.

### Key participants

- Importer
- Distribution agent
- Customer (purchase orders and sales receipts)
- Food safety inspector
- Food safety auditor



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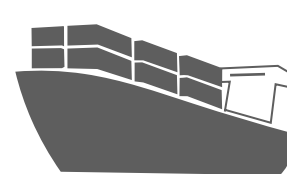
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### Tracing product origin and composition through offshore suppliers

Depending on the capacity of the grower of source ingredients, a minimum of lot number identification of the product from the farm can be traced.<sup>3</sup> The lot number and Sales Receipt issued from the Processor or Wholesaler to the Grower can then be identified as the product becomes an input to processing or manufacturing.

See On-Farm Production and Processing and Manufacturing Modules for Critical Tracking Events and Key Data Elements for growers, pack houses and processing/manufacturing traceability.

Methods to establish and verify product origin and authenticity relate to analytical sampling, test certificates and auditing of the grower or supplier.

**Tasks related to traceability**

- Request proof of origin/provenance documentation from the supplier
- Undertake a traceability audit of suppliers to identify product origin and inputs to product manufacturing
- Document the Supplier policies and SOPs for traceability, recall and sourcing
- Record lot/batch numbers of incoming product.

**Key participants**

- Grower
- Wholesaler/Agent
- Supplier
- Importer



3. FAO Traceability Guide <http://www.fao.org/3/i7665en/I7665EN.pdf>





## Arrival and clearance at final destination port

A series of documents are required to enable the physical movement of the product from the vessel or aircraft on arrival in Australia. These include:

- Bill of Lading/Air Waybill
- Commercial invoice
- Packing list
- Packing Declaration (packing materials)
- Certificate of Origin
- Fumigation Certificate
- Import Delivery Order.

These documents record dates, times, authorisation signatures associated with the event-based movement of the product and support traceability through the import process. The Air Waybill and Bill of Lading contain detailed descriptions of the product, including supplier lot and batch numbers on each carton.

The Air Waybill and Ocean Bill of Lading are critical documents that detail the shipment. Until the airline or shipping line authorises these documents to be handed over to the party nominated by the shipper (Exporter or their Freight Forwarder/Importer or their Freight Forwarder) the cargo remains in the custody of the carrier.

For ocean shipping, generally 24 hours’ notice is required from the ship’s Master that the vessel is arriving in port in order to prepare for biosecurity inspection. On arrival at the port of discharge/destination, the nominated party on the Bill of Lading (Customs Broker, Importer) is notified of the discharge of the container and once clearance is completed, the availability of the container for collection.

Biosecurity inspection may be required. This may be undertaken at the port of discharge, or once the container is transported to a facility that is licensed for inspection.

The Incoterms of the transaction between Exporter and Importer determine the responsibility for port clearance and subsequent delivery to the Importer.

Arrangements will be made via the Exporter (often via an International Freight Forwarder and their international partnering Customs Broker) to hire a Transport Company to collect the container from the terminal and deliver at the instruction of the Importer to a nominated warehouse/DC.

Shipping lines may arrange the transport delivery (carrier haulage) or the Exporter or Importer may take this responsibility (merchant haulage).

An electronic Import Delivery Order which the Airline/Shipping Line issues as per the Bill of Lading/Airway Bill enables the container to be loaded on the transport and leave the terminal. “Gate Out” date and time stamp at the port terminal are recorded.

On leaving the port, tracking of the transfer to the Importer premises or Distribution Centre is typically undertaken using a Transport Booking reference issued by the Transport Company, or via GPS tracking.

In Australia, staging of containers is common, with the container being held at a transport depot overnight before being delivered to the Importer.

On arrival at the delivery destination, a Proof of Delivery by the Transport Company is signed by the Importer. The Importer will then check and remove the container seal (with IFIS inspector present as required), examine the goods as listed on the Bill of Lading/Airway Bill, packing list and commercial invoice and advise the Exporter of any variances.

### Tasks related to traceability

- As per Bill of Lading, Shipping Line/Exporter/Importer or Forwarder will book transport to collect the container from the port terminal
- An Import Delivery Order will enable the transport (road or rail) to clear the terminal
- The CTO records “gate out” details
- Proof of Delivery is signed by the Importer/DC
- Goods delivered are inspected and scanned/recorded in Importer goods receipt system/Warehouse Management System.

### Key participants

- Airline/shipping line
- Transport Company
- International Freight Forwarder and Customs Broker
- CTO
- Australian Border Force/Customs
- Department of Agriculture, Water, Environment (IFIS inspection)



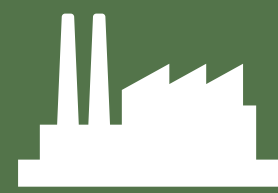
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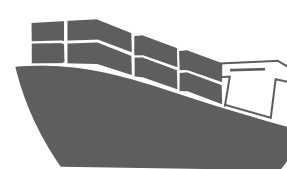
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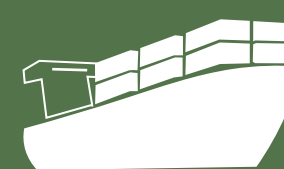
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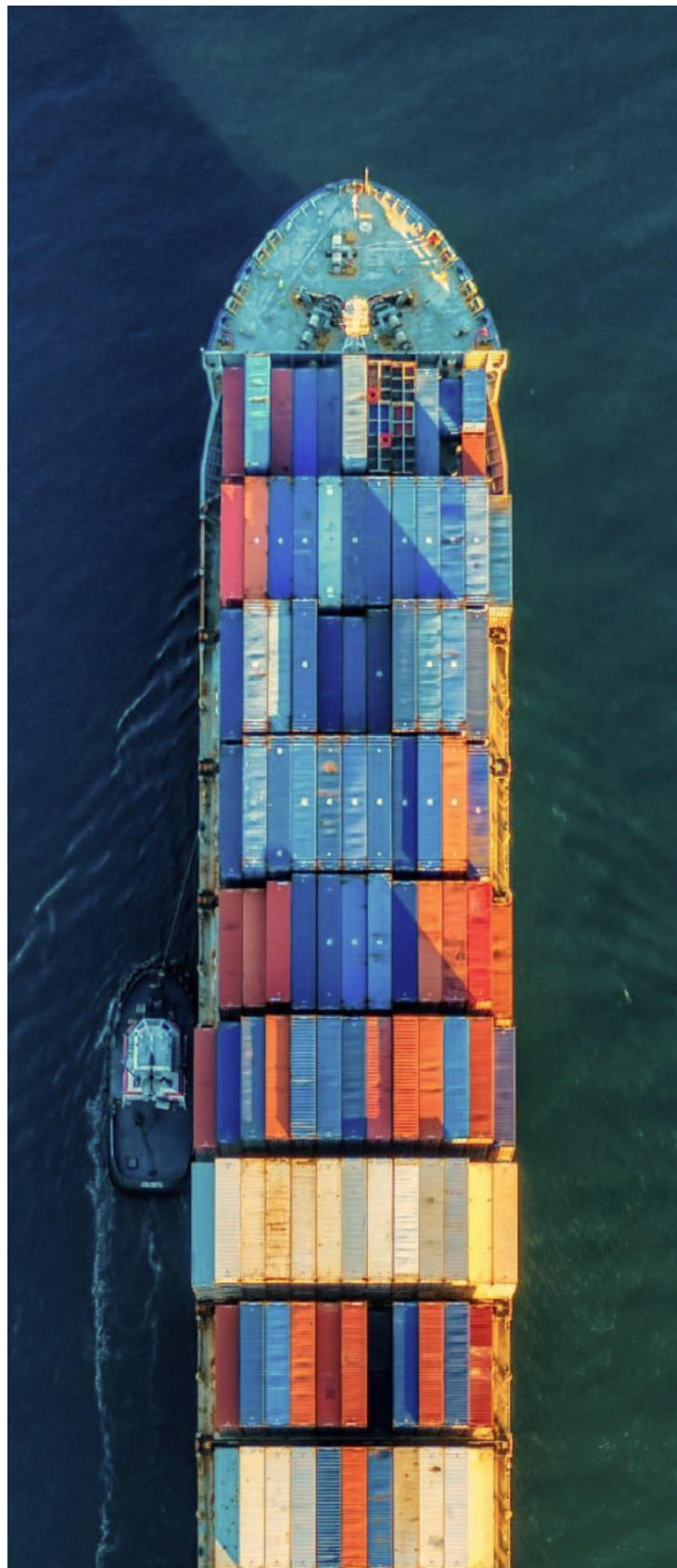
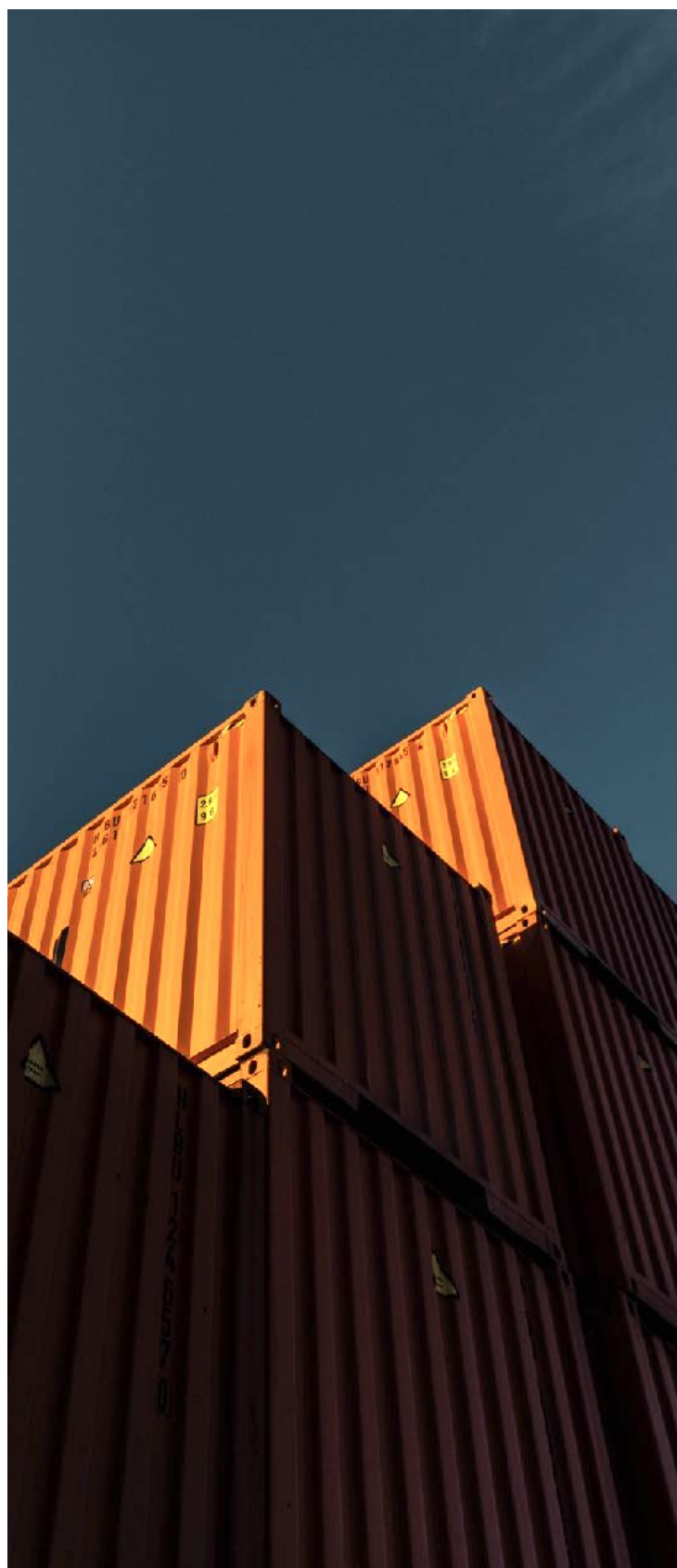


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## Border Clearance regulation

Regulation at Australian borders relates to:

- Biosecurity control preventing the introduction and/or spread of harmful organisms to animals and plants in order to minimise the risk of transmission of infectious disease.
- Food Safety control and inspection to ensure imported food complies with Australian food safety standards
- Food Import Declaration to ensure the goods are not prohibited for importation and the correct taxes and duties are paid

### Biosecurity and Food Safety

As with domestic food distribution, all importers are required to provide documents on request, demonstrating the traceability of imported food, one step forward and one step backward along the food supply chain.

The Australian Department of Agriculture, Water and Environment (DAWE) is responsible for biosecurity risk and food safety of imported foods. It will confirm whether the product to be imported is able to be brought into Australia and under what conditions.

The Biosecurity Import Conditions System (BICON) on-line site identifies whether the product is permitted, is subject to conditions, requires supporting documents or needs an Import Permit.

Food is classified by Food Safety Australia New Zealand (FSANZ) as being a Risk Food with a medium to high risk or microbial or chemical hazard; a Surveillance Food with a low risk; or a Compliance Agreement Food for regular importers who have qualified for this scheme.

Depending on the classification of the food to be imported, an Import Permit may be required. Addition documentation that may be required includes:

- Health Certificate
- Phytosanitary certificate
- Manufacturers Declarations
- Import Declaration
- Lot code listings with best-before dates.

Inspections of food take place at the premises of the Importer or a warehouse area that has an arranged agreement with DAWE. <sup>4</sup>

Food importers, or the owner of the food at the time of importation, must keep the following information in relation to the food being imported:

- a name or description of the food sufficient to indicate its true nature
- batch or lot identification for the food
- name of the person, business name, street address and telephone number or email address of the producer of the food
- name of the person, business name, street address and telephone number or email address of customers that have received the food
- the date the food was received and the date when it was dispatched to customers
- the volume or quantity of the food involved in each transaction.

Records may be kept in a manual or electronic system but must be kept for five years. <sup>5</sup>

### Customs

All food importers are required to complete a Full Import Declaration (FID) on the Australian Border Force (Customs) Integrated Cargo System site. This declaration relates to the value of the cargo, to ensure all taxes and duties are paid.

#### Tasks related to traceability

- Maintain information to comply with the traceability requirements of state and Commonwealth legislation

#### Key participants

- Importer
- Distributor
- State food safety authorities
- DAWE Imported Food Inspection Service (IFIS) inspector

4. <https://www.agriculture.gov.au/import/arrival/clearance-inspection>

5. DAWE Imported Food Notice INF18-19



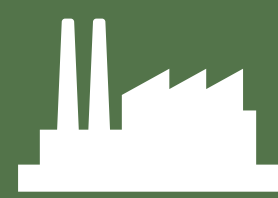
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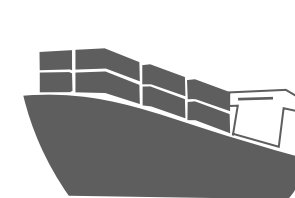
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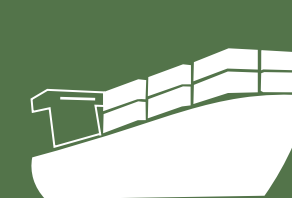
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## Re/labelling of imported food products to meet Australian standards

Importers should contact all suppliers, or put systems in place, to ensure that the labelling on their food products comply with the Code prior to importing food products or ensure that labelling is compliant prior to inspection. The Imported Food Control Act 1992 provides for the labelling of food products to be amended after importation and before inspection by the department. <sup>6</sup>

If the imported product does not comply with Australian food labelling standards, the Importer may need to re-label the product.

Key information required on the label relates to:

- Best-before/use-by dates — the product may have an expiry or BBE date which is not compliant
- Country of Origin
- Nutritional information
- Ingredients.

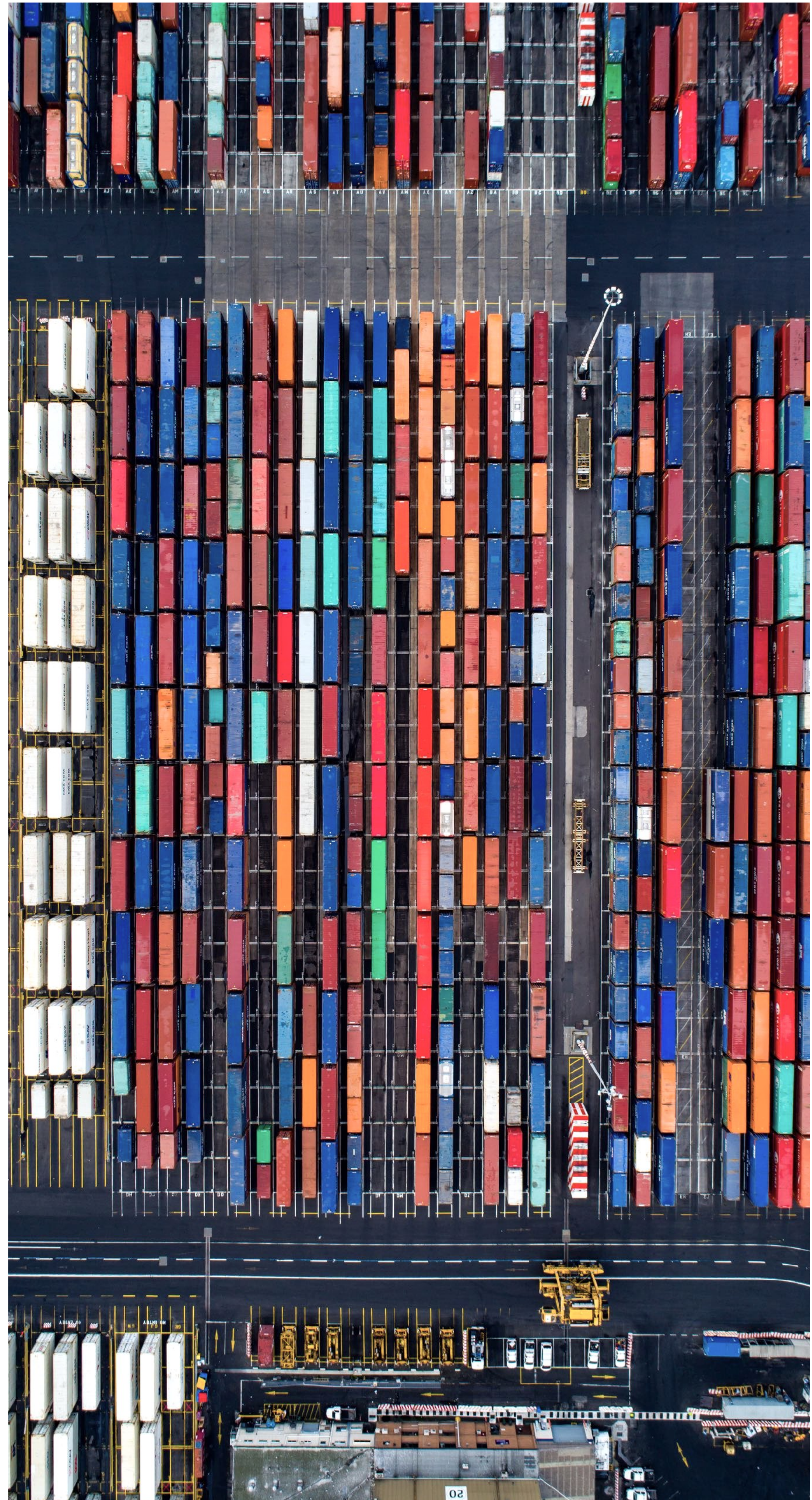
For product requiring re-labelling prior to IFIS inspection, there is an opportunity to ensure the items are allocated a unique identifier on the label, to establish traceability in distribution within Australia.

### Tasks related to traceability

- Include unique identifier on re-labelled products prior to distribution

### Key participants

- Importer
- Labelling supplier



6. <https://www.agriculture.gov.au/import/goods/food/notices/ifn-01-17>



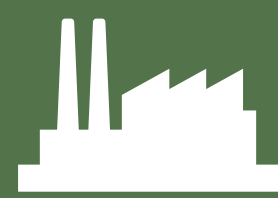
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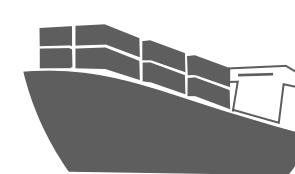
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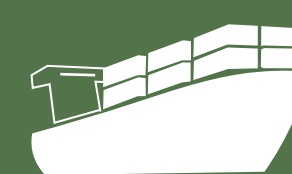
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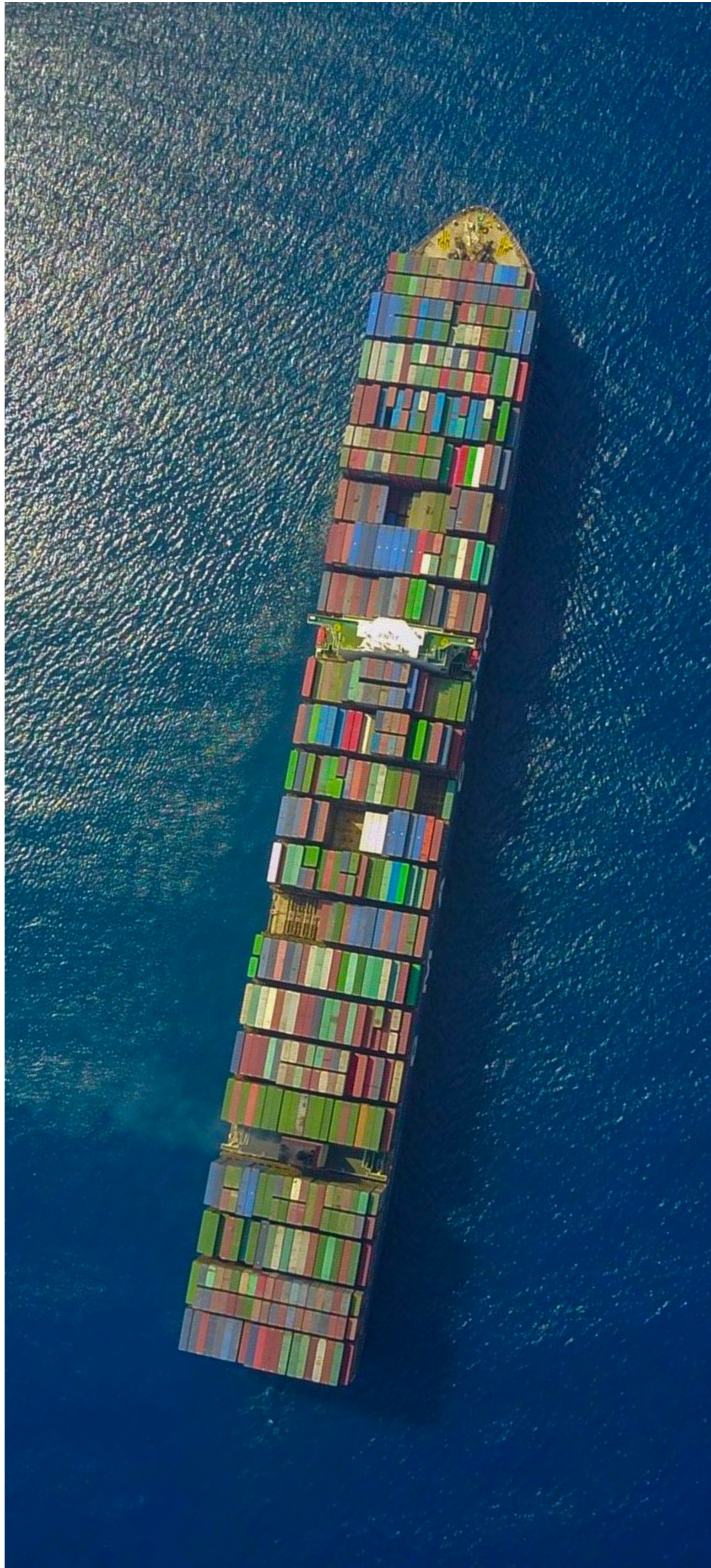


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## Critical Tracking Events (CTEs)

For each of the identified Import activities, critical tracking events (CTEs) establish identity and enable traceability and compliance with traceability-related regulation.

Critical Tracking Events (CTEs) relate to the identity, movement and transformation of the food product.

Freight transport activity	CTE code	Critical Tracking Events (CTEs)
<b>Establishment data</b> Creation of Master data for Supplier and Wholesaler, Grower Creation of Importer master data Registration and Notification of Food Business and Premises	IM CTE1A IM CTE1B	Create master data for key supply chain partner identities and locations Obtain import permit as required Food premises licence/notification
<b>Mandated Food Safety Traceability requirements for importers</b> Record the identity of the food or ingredient and the identity of the supplier Document a Recall System for the business which compiles the identity and location of customers and the identity, date, volume, batch or lot of product sold.	IM CTE2 IM CTE3	Create Traceability Record system for food imports Create a Product Recall system
<b>Tracing product origin and composition through offshore suppliers</b> Request proof of origin/provenance documentation from the supplier Undertake a traceability audit of suppliers to identify product origin and inputs to product manufacturing Document Supplier policies and SOPs for traceability, recall and sourcing	IM CTE4	Proof of Origin/provenance documentation of sourced product
<b>Vessel Arrives at Port</b>	IM CTE 5	Vessel arrives at Destination port
<b>Arrival and clearance at final destination port</b> As per Bill of Lading, Shipping Line/Exporter/Importer or Forwarder will book transport to collect the container from the port terminal An Import Delivery Order will enable the transport (road or rail) to clear the terminal	IM CTE 6	Product transferred from Vessel to Importer Transporter
<b>Border Clearance regulation</b> Maintain information to comply with the traceability requirements of state and Commonwealth legislation	IM CTE7	Maintain records for mandated traceability
<b>Product departs Port</b> The CTO records “gate out” details	IM CTE8	Gate Out from port notified to Importer
<b>Product arrives at Importer Warehouse</b> Proof of Delivery is signed by the Importer/DC Goods delivered are inspected and scanned/recorded in Importer goods receival system/Warehouse Management System	IM CTE9	Proof of Delivery signed by Importer Goods receival completed
<b>Re/labelling of imported food products to meet Australian standards</b> Include unique identifier on re-labelled products prior to distribution	IM CTE10	Apply unique identifier on re-labelled product prior to domestic distribution



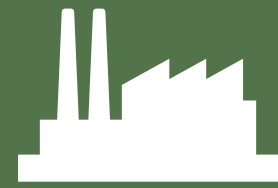
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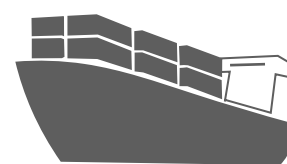
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Key Data Elements

CTE code	Critical Tracking Events	Key data Inputs and Outputs																				
IM CTE1A IM CTE1B	<p>Create master data for key supply chain partner identities and locations</p> <p>Obtain export licence for premises/ establishment/s</p>	<div><ul style="list-style-type: none"><li>● Global Location Number</li><li>● Import Licence number</li><li>● Food Premises Licence/Notification certificate number</li></ul></div> <div><div>Request for GLN</div><table><tr><td>Who</td><td>Importer Issuing Agency</td></tr><tr><td>What</td><td>Importer, location, business entity</td></tr><tr><td>When</td><td>Date/Time of Issuance</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Requirement for Global location numbers, establishment</td></tr></table></div> <div><div>Request for Food Licence Number</div><table><tr><td>Who</td><td>Importer, Issuing Agency</td></tr><tr><td>What</td><td>Importer business entity</td></tr><tr><td>When</td><td>Date/Time of Issuance</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Food Licence</td></tr></table></div> <div><p>Information to be shared to a traceability platform</p><ul style="list-style-type: none"><li>● Global Location Number</li><li>● Food Import Licence number</li><li>● Food Premises Licence/Notification certificate number</li></ul></div>	Who	Importer Issuing Agency	What	Importer, location, business entity	When	Date/Time of Issuance	Where	Issuing Agency	Why	Requirement for Global location numbers, establishment	Who	Importer, Issuing Agency	What	Importer business entity	When	Date/Time of Issuance	Where	Issuing Agency	Why	Food Licence
Who	Importer Issuing Agency																					
What	Importer, location, business entity																					
When	Date/Time of Issuance																					
Where	Issuing Agency																					
Why	Requirement for Global location numbers, establishment																					
Who	Importer, Issuing Agency																					
What	Importer business entity																					
When	Date/Time of Issuance																					
Where	Issuing Agency																					
Why	Food Licence																					

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
IM CTE2	Create Traceability Record system for food imports	<div>Traceability system data fields</div> <ul style="list-style-type: none"><li>a name or description of the food sufficient to indicate its true nature</li><li>batch or lot identification for the food</li><li>name of the person, business name, street address and telephone number or email address of the producer of the food</li><li>name of the person, business name, street address and telephone number or email address of customers that have received the food</li><li>the date the food was received and the date when it was dispatched to customers</li><li>the volume or quantity of the food involved in each transaction.</li></ul> <div>Traceability System set-up</div> <table><tr><td>Who</td><td>Importer</td></tr><tr><td>What</td><td>Traceability system</td></tr><tr><td>When</td><td>Date/Time of creation</td></tr><tr><td>Where</td><td>Importer</td></tr><tr><td>Why</td><td>Traceability system and compliance requirements</td></tr></table>	Who	Importer	What	Traceability system	When	Date/Time of creation	Where	Importer	Why	Traceability system and compliance requirements
Who	Importer											
What	Traceability system											
When	Date/Time of creation											
Where	Importer											
Why	Traceability system and compliance requirements											
IM CTE3	Create a Product Recall system	<div>Food Recall Plan and procedures</div> <ul style="list-style-type: none"><li>internal procedures and staff responsibilities for conducting a recall</li><li>contact details and procedures for notification (e.g. FSANZ and home state, distributors, wholesalers, retailers and consumers)</li><li>distribution and other records that will help identify and retrieve the recalled food</li><li>procedures for food retrieval and assessing any returned product.</li></ul> <div>Recall System set-up</div> <table><tr><td>Who</td><td>Importer</td></tr><tr><td>What</td><td>Recall system and processes</td></tr><tr><td>When</td><td>Date/Time of creation</td></tr><tr><td>Where</td><td>Importer</td></tr><tr><td>Why</td><td>Recall and compliance requirements</td></tr></table> <div>Information to be shared to a traceability platform</div> <ul style="list-style-type: none"><li>Product Recall procedures</li><li>Traceability records on request</li></ul>	Who	Importer	What	Recall system and processes	When	Date/Time of creation	Where	Importer	Why	Recall and compliance requirements
Who	Importer											
What	Recall system and processes											
When	Date/Time of creation											
Where	Importer											
Why	Recall and compliance requirements											



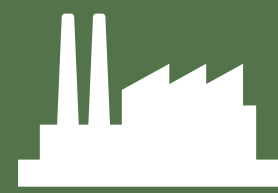
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Freight  
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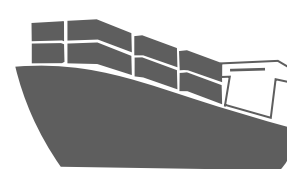
Wholesale and  
Distribution



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Key Data Elements

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
IM CTE4	Proof of Origin/provenance documentation of sourced product	<div><div><ul style="list-style-type: none"><li>● GLN of grower</li><li>● Sales receipt recording sale to Wholesaler</li><li>● Provenance/Analytical Verification Certificate</li></ul></div><div><div>Request for GLN</div><table><tr><td>Who</td><td>Importer Supplier</td></tr><tr><td>What</td><td>Product ID, Provenance, proof of origin</td></tr><tr><td>When</td><td>Date/Time of issuance</td></tr><tr><td>Where</td><td>Importer</td></tr><tr><td>Why</td><td>Proof of Origin, Provenance</td></tr></table></div></div>	Who	Importer Supplier	What	Product ID, Provenance, proof of origin	When	Date/Time of issuance	Where	Importer	Why	Proof of Origin, Provenance
Who	Importer Supplier											
What	Product ID, Provenance, proof of origin											
When	Date/Time of issuance											
Where	Importer											
Why	Proof of Origin, Provenance											
IM CTE5	Vessel Arrives at Port	<div><div><ul style="list-style-type: none"><li>● Vessel ID</li><li>● Bill of Lading</li><li>● Port Location</li><li>● Shipment ID</li><li>● Date of Arrival</li><li>● Container ID</li><li>● Customer Order Number</li></ul></div><div><div>Vessel Arrives</div><table><tr><td>Who</td><td>Vessel ID Issuing Agency</td></tr><tr><td>What</td><td>Vessel ID, Bill of Lading, Shipment ID</td></tr><tr><td>When</td><td>Date/Time of Receipt</td></tr><tr><td>Where</td><td>Receipt location</td></tr><tr><td>Why</td><td>Receipt of product</td></tr></table></div><div>Information to be shared to a traceability platform:<ul style="list-style-type: none"><li>● Vessel ID</li><li>● Bill of Lading</li><li>● Product ID</li><li>● Batch</li><li>● Quantity</li><li>● Container ID</li></ul></div></div>	Who	Vessel ID Issuing Agency	What	Vessel ID, Bill of Lading, Shipment ID	When	Date/Time of Receipt	Where	Receipt location	Why	Receipt of product
Who	Vessel ID Issuing Agency											
What	Vessel ID, Bill of Lading, Shipment ID											
When	Date/Time of Receipt											
Where	Receipt location											
Why	Receipt of product											

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
IM CTE 6	Border Clearance	<ul style="list-style-type: none"><li>● Vessel ID</li><li>● Bill of Lading</li><li>● Port Location</li><li>● Shipment ID</li><li>● Date of Arrival</li><li>● Container ID</li><li>● Customer Order Number</li></ul>										
		<div><div>Border Clearance</div><table><tr><td>Who</td><td>Importer Customs Agency</td></tr><tr><td>What</td><td>Vessel ID, Bill of Lading, Shipment ID</td></tr><tr><td>When</td><td>Date/Time of Clearance</td></tr><tr><td>Where</td><td>Product location at time of Clearance</td></tr><tr><td>Why</td><td>Border Clearance</td></tr></table></div>	Who	Importer Customs Agency	What	Vessel ID, Bill of Lading, Shipment ID	When	Date/Time of Clearance	Where	Product location at time of Clearance	Why	Border Clearance
		Who	Importer Customs Agency									
		What	Vessel ID, Bill of Lading, Shipment ID									
		When	Date/Time of Clearance									
Where	Product location at time of Clearance											
Why	Border Clearance											



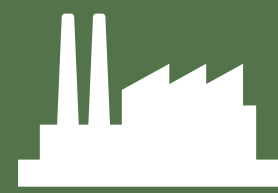
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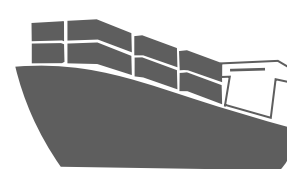
Wholesale and Distribution



Retail Operations



Food Service



Import Operations



Export Operations



Consumer Information



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Supplemental Information



Key Data Elements

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
IM CTE 7	Goods transferred from Vessel to Importer Transportation	<ul style="list-style-type: none"><li>● Container ID</li><li>● Shipment number</li><li>● Product ID</li><li>● Border Clearance status</li><li>● Batch</li><li>● Quantity</li><li>● Transport ID</li></ul>										
		<div><div>Goods Transfer</div><table><tr><td>Who</td><td>Vessel ID Transport ID Port ID</td></tr><tr><td>What</td><td>Vessel ID, Bill of Lading, Shipment ID</td></tr><tr><td>When</td><td>Date/Time of Transfer</td></tr><tr><td>Where</td><td>Port</td></tr><tr><td>Why</td><td>Transfer from Vessel</td></tr></table></div>	Who	Vessel ID Transport ID Port ID	What	Vessel ID, Bill of Lading, Shipment ID	When	Date/Time of Transfer	Where	Port	Why	Transfer from Vessel
		Who	Vessel ID Transport ID Port ID									
What	Vessel ID, Bill of Lading, Shipment ID											
When	Date/Time of Transfer											
Where	Port											
Why	Transfer from Vessel											
		<div>Information to be shared to a traceability platform</div> <ul style="list-style-type: none"><li>● Transport ID</li><li>● Shipment number</li><li>● Product ID</li><li>● Batch</li><li>● Quantity</li><li>● Container ID</li><li>● Border Clearance Documentation</li><li>● Date of Border clearance</li></ul>										

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
IM CTE8	Goods depart Port	<ul style="list-style-type: none"><li>● Transport ID</li><li>● Shipment number</li><li>● Product ID</li><li>● Batch</li><li>● Quantity</li><li>● Container ID</li><li>● Border Clearance Documentation</li><li>● Import delivery number</li><li>● Date and Time</li></ul>										
	Gate Out from port notified to Importer	<div><div>Product departs Port</div><table><tr><td>Who</td><td>Transporter ID Port</td></tr><tr><td>What</td><td>Vessel ID, Bill of Lading, Shipment ID</td></tr><tr><td>When</td><td>Date/Time of Departure from Port</td></tr><tr><td>Where</td><td>Port Location</td></tr><tr><td>Why</td><td>Departure from Port</td></tr></table></div>	Who	Transporter ID Port	What	Vessel ID, Bill of Lading, Shipment ID	When	Date/Time of Departure from Port	Where	Port Location	Why	Departure from Port
	Who	Transporter ID Port										
What	Vessel ID, Bill of Lading, Shipment ID											
When	Date/Time of Departure from Port											
Where	Port Location											
Why	Departure from Port											
		<div>Information to be shared to a traceability platform</div> <ul style="list-style-type: none"><li>● Transport ID</li><li>● Shipment number</li><li>● Product ID</li><li>● Batch</li></ul>										



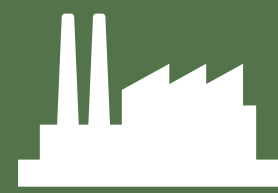
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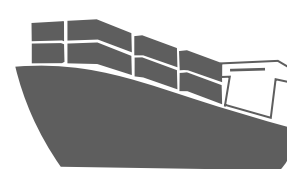
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Operations



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Key Data Elements

CTE code	Critical Tracking Events	Key data Inputs and Outputs											
IM CTE9	Product arrives and receipted at Importer	<ul style="list-style-type: none"><li>● Date and time</li><li>● Job number</li><li>● Freight paid by</li><li>● Collected from</li><li>● Delivered to</li><li>● ECN (or if de-consolidated) number of pallets or cartons</li><li>● Contact</li><li>● Phone</li><li>● Acceptance of terms and conditions</li><li>● Signature</li><li>● Receival data and time</li><li>● Supplier ID and location</li><li>● Lot/Batch number and use-by date</li><li>● Item description</li><li>● Quantity</li><li>● Units</li><li>● Load unit SSCC</li><li>● Product requirements (temperature, humidity)</li><li>● Proof of Delivery</li></ul>											
	Proof of Delivery signed by Importer												
	Goods receipt completed	<table><tr><th colspan="2">Receipt at Importer DC</th></tr><tr><td>Who</td><td>Transporter ID Importer ID</td></tr><tr><td>What</td><td>Container ID, Bill of Lading, Shipment ID, Logistics units, Product ID, Quantity, Batch</td></tr><tr><td>When</td><td>Date/Time of Receipt</td></tr><tr><td>Where</td><td>Receipt location</td></tr><tr><td>Why</td><td>Receipt of product/container</td></tr></table> <p>Information to be shared to a traceability platform</p> <ul style="list-style-type: none"><li>● Proof of Delivery number</li><li>● Shipment ID</li><li>● Container ID</li><li>● Product ID</li><li>● Quantity received</li><li>● Batch</li><li>● Date of Receipt</li><li>● Import Delivery Order/Air Waybill/BOL/Purchase Order reconciliation</li></ul>	Receipt at Importer DC		Who	Transporter ID Importer ID	What	Container ID, Bill of Lading, Shipment ID, Logistics units, Product ID, Quantity, Batch	When	Date/Time of Receipt	Where	Receipt location	Why
Receipt at Importer DC													
Who	Transporter ID Importer ID												
What	Container ID, Bill of Lading, Shipment ID, Logistics units, Product ID, Quantity, Batch												
When	Date/Time of Receipt												
Where	Receipt location												
Why	Receipt of product/container												

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
	Maintain records for mandated traceability	<p>Maintain records for 5 years of:</p> <ul style="list-style-type: none"><li>● a name or description of the food sufficient to indicate its true nature</li><li>● batch or lot identification for the food</li><li>● name of the person, business name, street address and telephone number or email address of the producer of the food</li><li>● name of the person, business name, street address and telephone number or email address of customers that have received the food</li><li>● the date the food was received and the date when it was dispatched to customers</li><li>● The volume or quantity of the food involved in each transition</li></ul> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● As requested</li></ul>												
IM CTE10	Apply unique identifier on re-labelled product prior to domestic distribution	<ul style="list-style-type: none"><li>● GTIN</li><li>● Batch</li><li>● Quantity</li><li>● Use By/Best Before date</li></ul> <table><tr><th colspan="2">Product re-labelling for local marker</th></tr><tr><td>Who</td><td>Importer ID</td></tr><tr><td>What</td><td>Product ID original, Product ID new, Batch, Use By/Best Before, Quantity</td></tr><tr><td>When</td><td>Date/Time of re-labelling</td></tr><tr><td>Where</td><td>Warehouse</td></tr><tr><td>Why</td><td>Re-labelling</td></tr></table> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● New GTIN of product</li><li>● Batch</li><li>● Use by/Best Before date</li><li>● Quantity</li><li>● Location</li></ul>	Product re-labelling for local marker		Who	Importer ID	What	Product ID original, Product ID new, Batch, Use By/Best Before, Quantity	When	Date/Time of re-labelling	Where	Warehouse	Why	Re-labelling
Product re-labelling for local marker														
Who	Importer ID													
What	Product ID original, Product ID new, Batch, Use By/Best Before, Quantity													
When	Date/Time of re-labelling													
Where	Warehouse													
Why	Re-labelling													



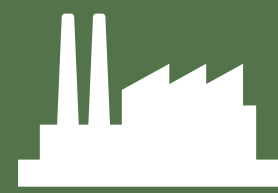
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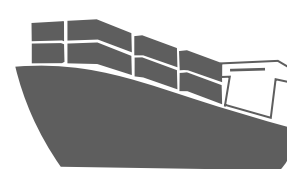
Wholesale and  
Distribution



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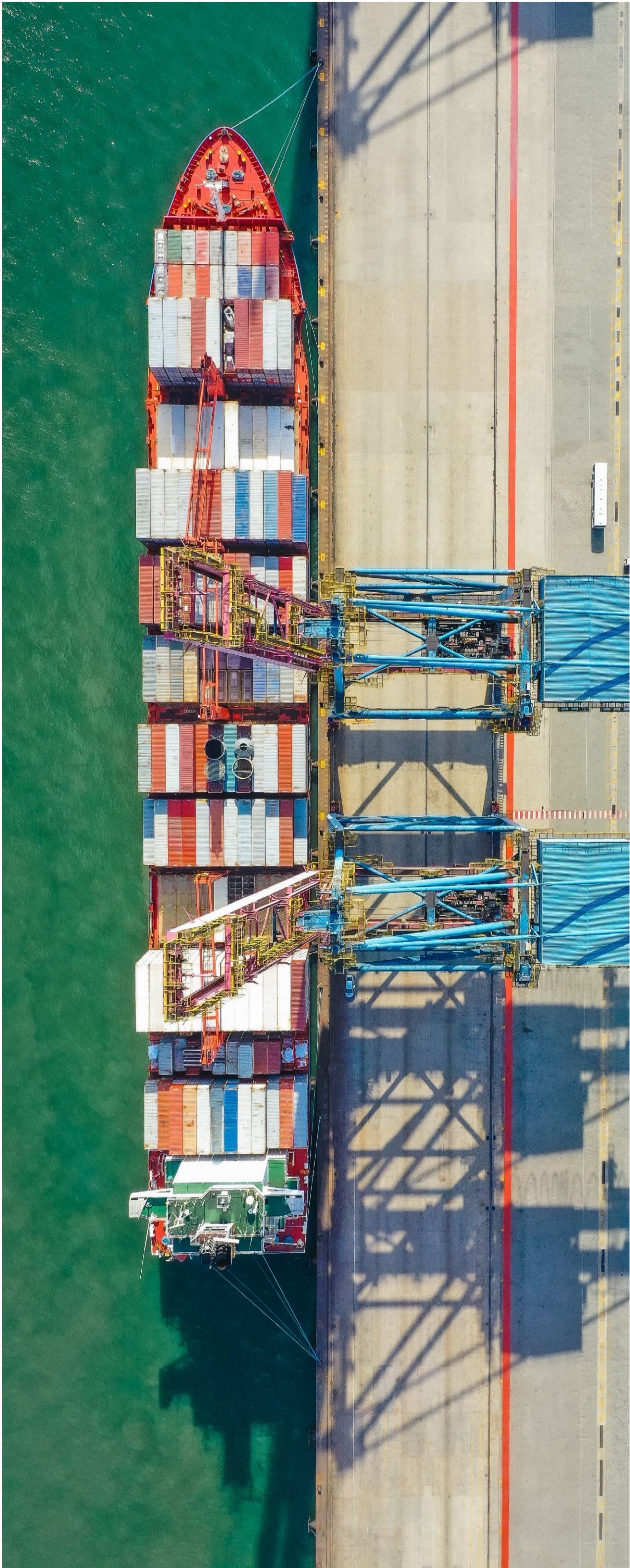


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## Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

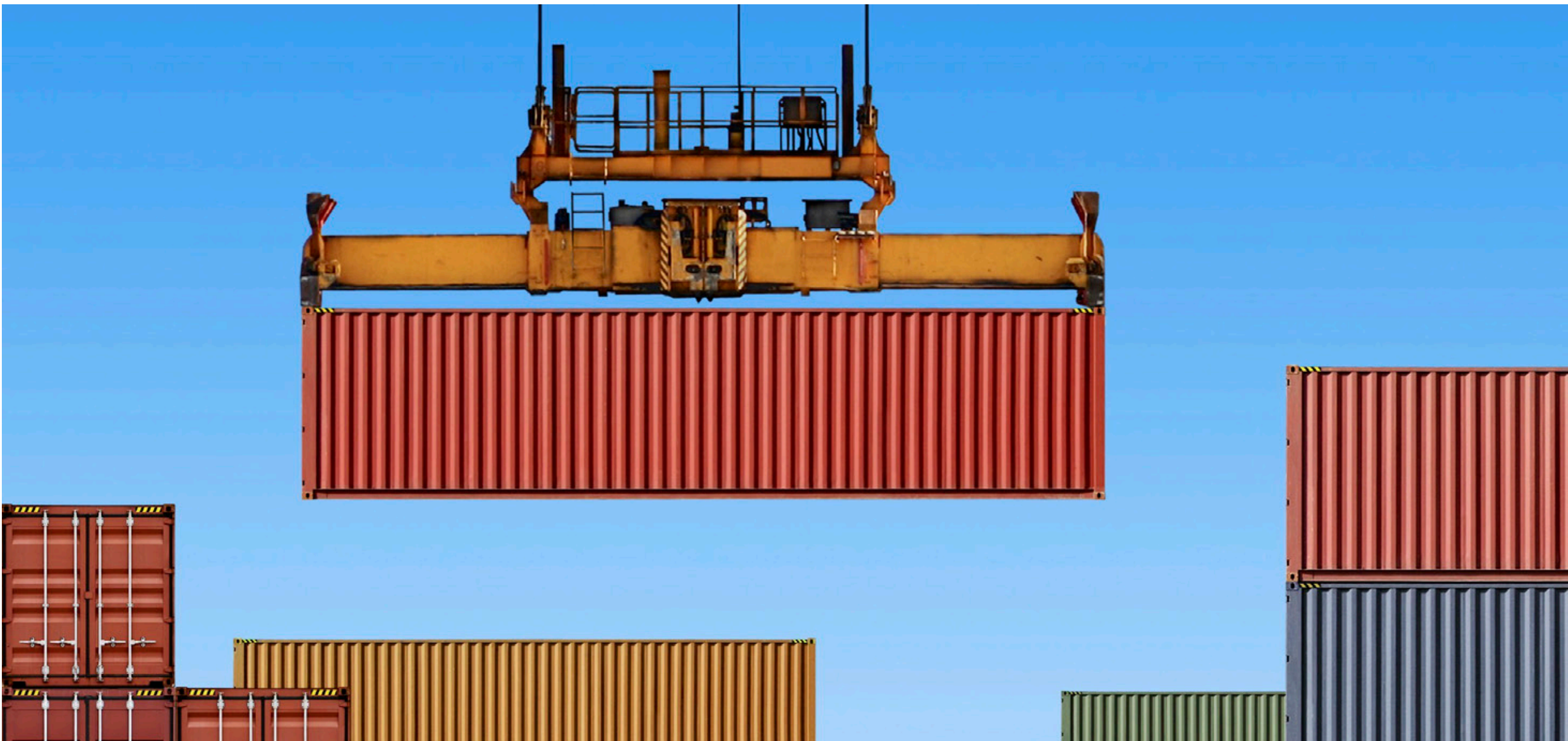
### Foundational Elements

#### Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a store location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location in the world.



#### Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product's packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, quantity etc are all considered separate variations and thus require separate GTINs. Each level of packaging should be numbered (and barcoded) separately to all other levels.

#### Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.



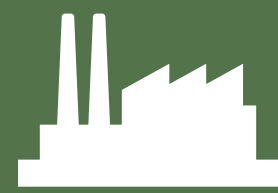
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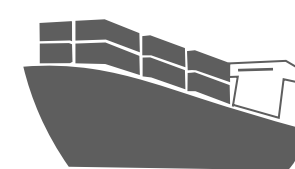
Wholesale and  
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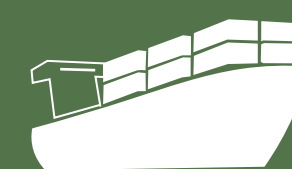
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Operations



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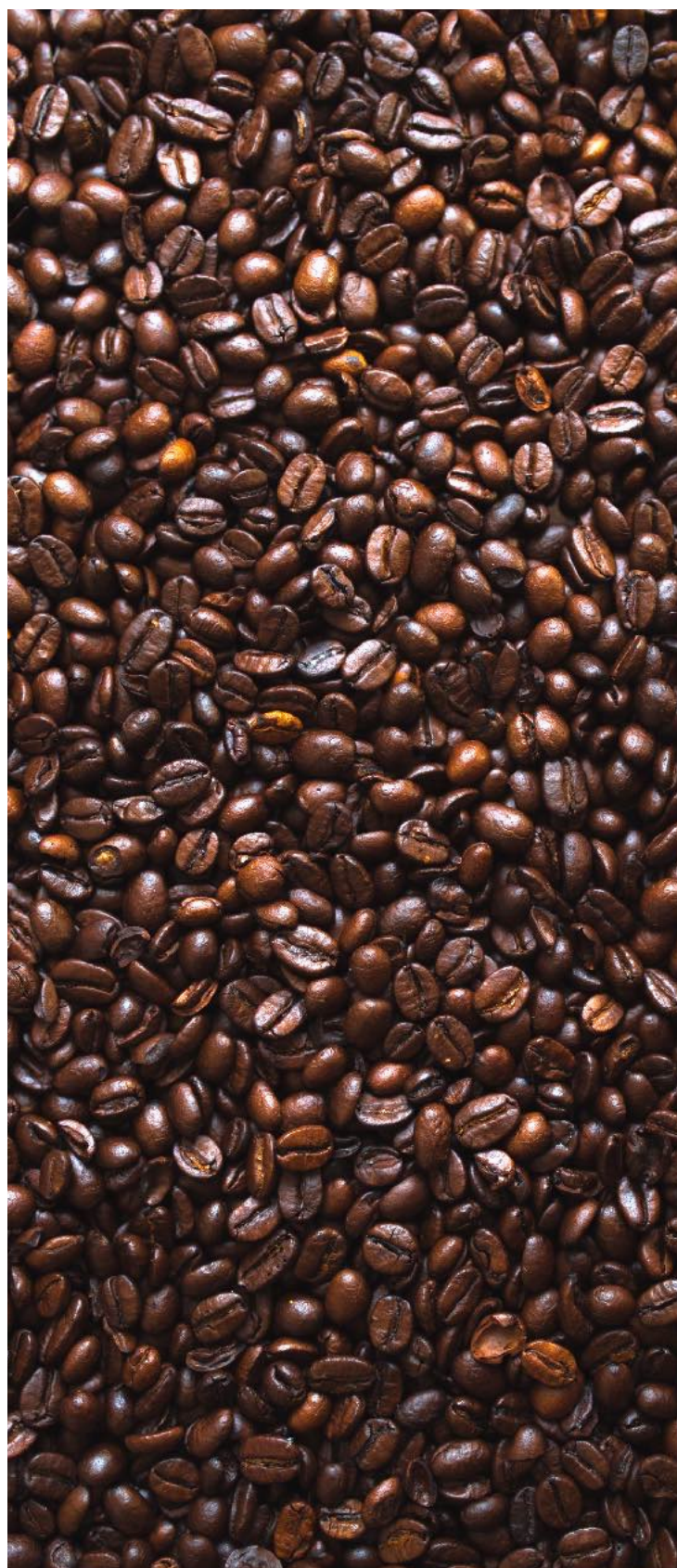


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## Asset Identification

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g. a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g. a Intermediate Bulk Container), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned. Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.

### Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate. The GS1 System identification of a returnable asset, the Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned. This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.

### Global Individual Asset Identifiers (GIAI) – AI (8004)

An individual asset is considered a physical entity made up of any characteristics. The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records.

Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used. This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.

Note: Whilst GS1 Asset Identifiers can be used to identify returnable assets such as Shipping Containers, it is recognised that globally accepted identifiers can also be used e.g. BIC code



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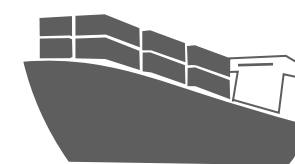
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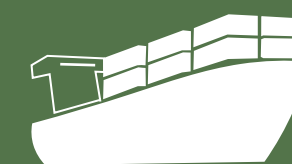
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Logistics Units (SSCC)

The Serial Shipping Container Code can be used by companies to identify a logistic unit, which can be any combination of trade items packaged together for storage and/or transport purposes; for example a case, pallet or parcel.

The SSCC is a crucial key for traceability, since it uniquely identifies each distributed logistic unit and its content.

- The SSCC enables companies to track each logistic unit for efficient order and transport management.
- The SSCC can be encoded in a barcode or EPC/RFID tag, ensuring the logistic unit can be accurately and easily identified as it travels between trading partners, anywhere in the world.
- When SSCC data is shared electronically via EDI or EPCIS, this enables companies to share information about the status of logistic units in transit, and reliably link it to related transport information such as shipment details.
- The SSCC enables companies to link to additional information about the logistic unit. This information can be communicated via a Despatch Advice or Advanced Shipping Notice (ASN) prior to the logistic unit’s arrival. Upon receipt the SSCC will be scanned, providing the required information to speed up the receipt of goods as well as the subsequent invoicing process.

The SSCC is fully compatible with ISO/IEC 15459 — Part 1: Unique identifiers for transport units. This is often referred to as the ISO licence plate and is a prerequisite for tracking and tracing logistic units in many international supply chains.

Global Identification Number for Consignment (GINC)

The Global Identification Number for Consignment can be used by companies to identify a consignment comprised of one or more logistic units that are intended to be transported together

Logistic units in a particular shipment may be associated with different GINCs during various transport stages; for example, when the shipment gets consolidated with other shipments during its journey and de-consolidated again before it reaches the consignee.

The GINC allows freight forwarders and transport providers to keep track of the logistic units being transported together.

- The GINC is typically used by freight forwarders to instruct transport providers; for example, on a Master Airway Bill (MAWB) or a Master Bill of Lading (MBL).
- The GINC can be encoded in a barcode or as text on a MAWB / MBL, or in addition to the Serial Shipping Container Code (SSCC), on a logistics label.
- The GINC can be electronically used in transport instruction and transport status messages between freight forwarder and transport provider.



Global Shipment Identification Number (GSIN)

The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together.

The logistic units keep the same GSIN during all transport stages, from origin to final destination. The GSIN identifies the logical grouping of one or several logistic units, each identified with a separate Serial Shipping Container Code (SSCC).

- The GSIN can be encoded by the shipper in a barcode or as text on a House Way Bill, or in addition to the SSCC, on a logistics label.
- The GSIN can be electronically used by a company in transport instruction and transport status messages between freight forwarder and transport provider, and also as a reference in the Despatch Advice.

The GSIN is fully compatible with ISO/IEC 15459 — Part 8: Grouping of Transport Units. The GSIN also meets the requirements for a Unique Consignment Reference (UCR) according to the World Customs Organisation.



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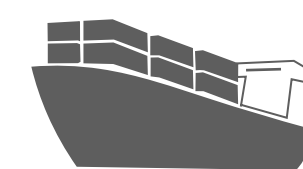
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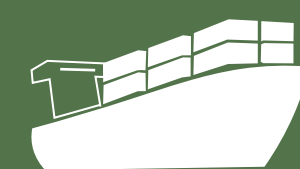
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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/ Format	Further information
Location	Manufacturing Plant, Finished Goods, Location, Dispatch Dock	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Production Date and/or Time, Use By date, Best Before Date, Pack Date	Year- Month- Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Input materials such as raw ingredients and packaging, Outputs such as finished goods, packaged or processed goods	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li><a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li><a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch/Lot code, Serial Number		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number, etc., can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers: <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-(ais)</a>
Logistics Units	Pallet of packaged product, crate or box of finished goods	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>
Assets	Returnable assets i.e. IBC or individual assets i.e. a crate	Global Returnable Asset Identifier (GRAI)	0 + AN20	Can be identified as an asset type only or an optional serial number can be added to distinguish individual assets <a href="https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file</a>
		Global Individual Asset Identifier (GIAI)	AN30	
Consignment	Grouping of logistics units assigned by the transport company	GINC	N30	The Global Identification Number for Consignment can be used by companies to identify a consignment comprised of one or more logistic units that are intended to be transported together. <a href="https://www.gs1.org/standards/id-keys/global-identification-number-consignment-ginc">https://www.gs1.org/standards/id-keys/global-identification-number-consignment-ginc</a>
Shipment	Grouping of logistics units	GSIN	N17	The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together. <a href="https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin">https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin</a>



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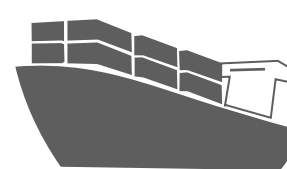
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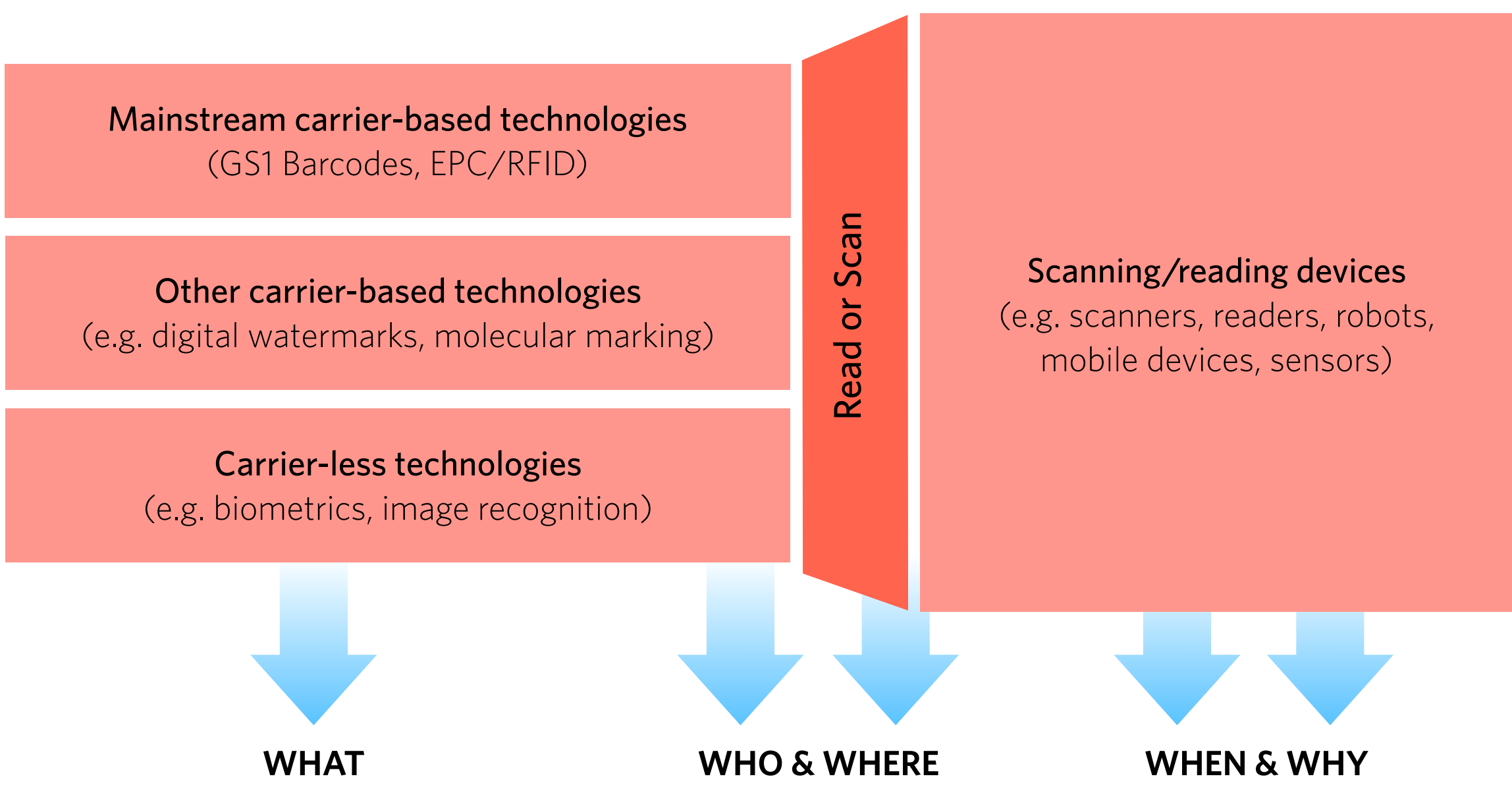
How to capture the KDEs

How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

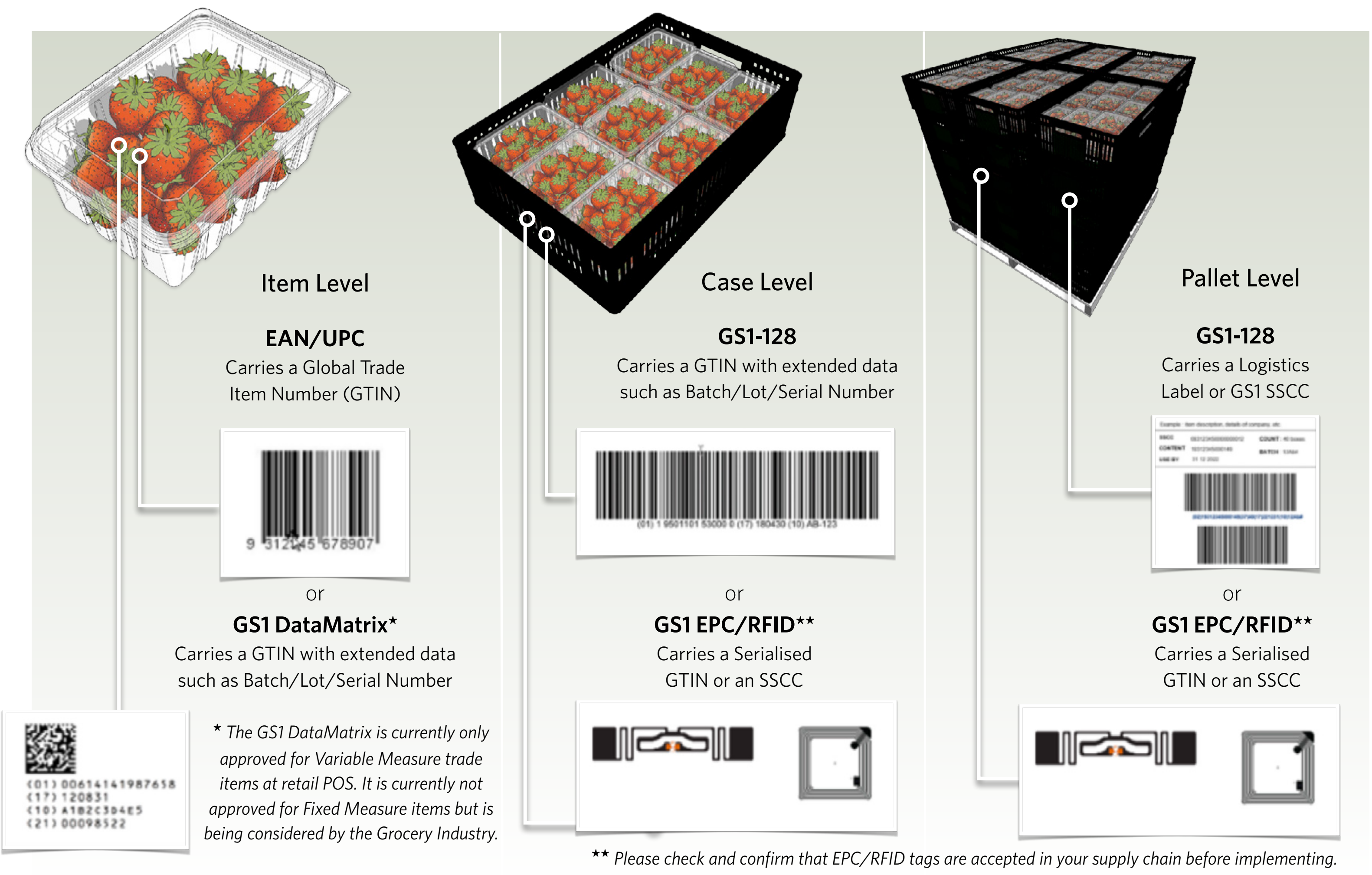


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.







Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc.  
The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number

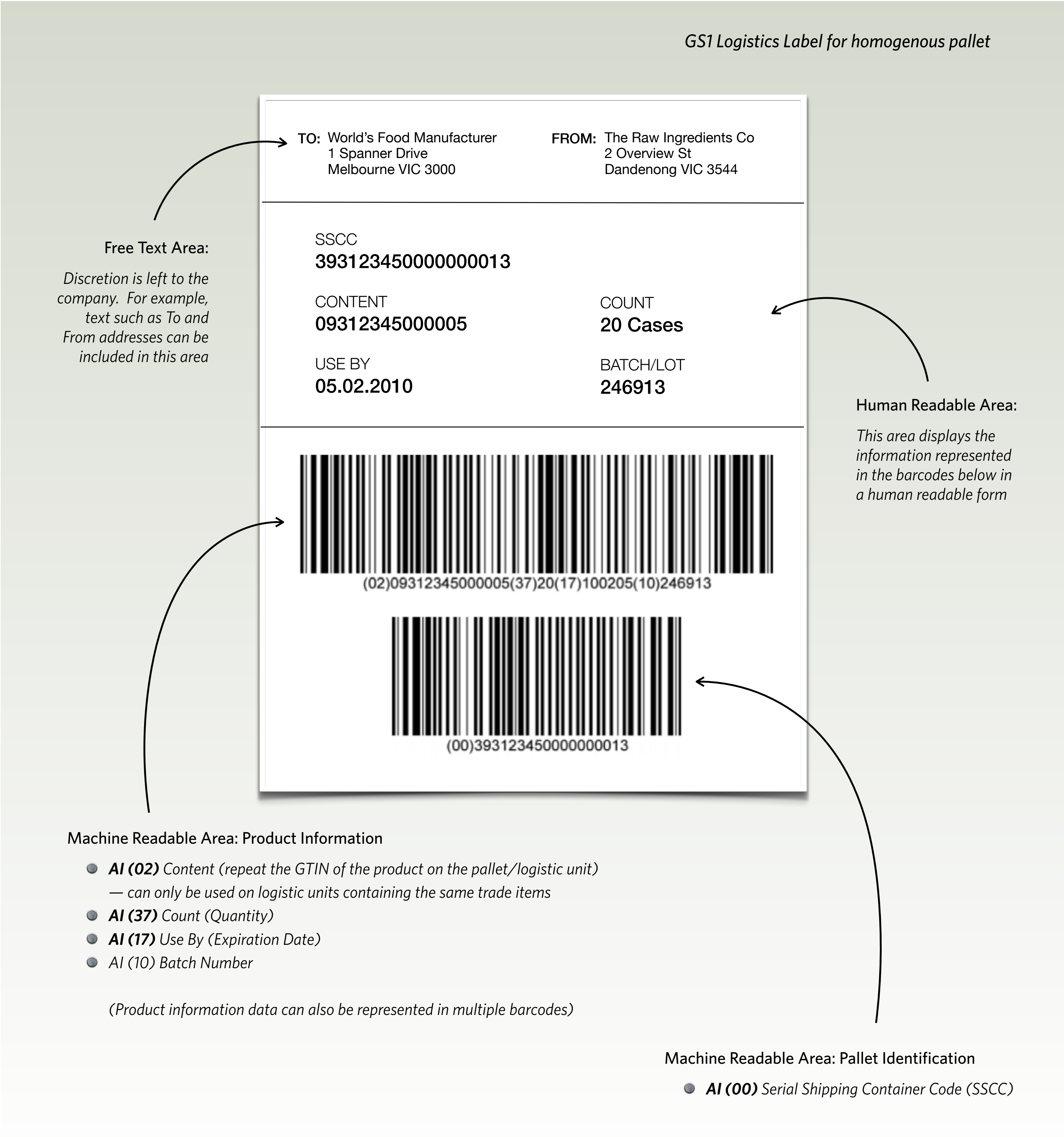


GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number

The use of the GS1 DataMatrix at point of sale is also under consideration for future use as it can encode additional traceability information.  
These barcodes require an imaging scanner to decode the information.



GS1 DataMatrix





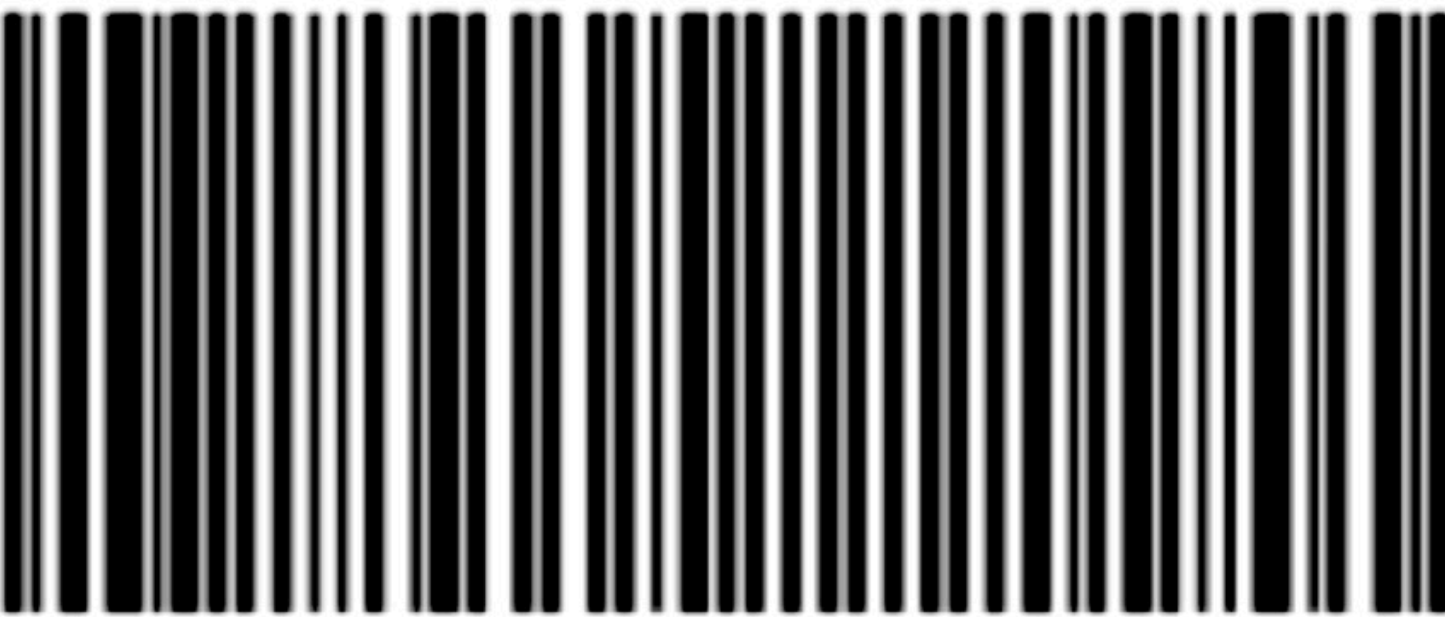
FREE INFORMATION

Example: Beef Topside 600kg, details of company

**SSCC** 093123450000000012 **Prod Date** 3012/2008  
**CONTENT** 99311781001157 **Count** 40 boxes **WEIGHT** 600kg



(02)99311791001157(3102)060000(37)40(13)081230



(00)093123450000000012

GS1 Logistics Label homogenous logistics unit containing variable weight products

FROM  
GS1 GO  
Avenue Louise 326  
1050 Brussels

BE85250

TO  
**GS1 GO Princeton Office**  
**1009 Lenox Drive**

**SPECIAL ORDER**

**1TE.00**

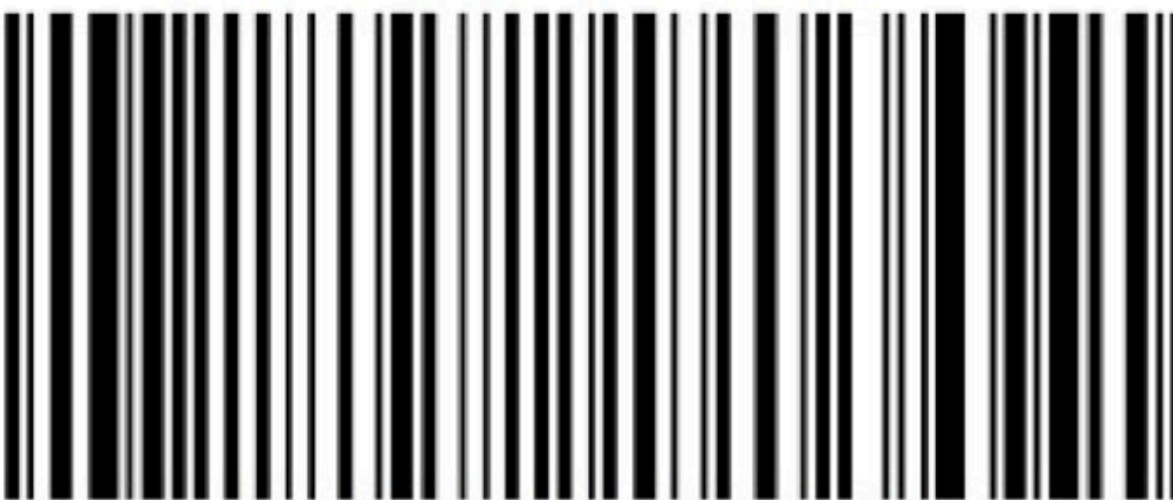
0007 To be delivered : ECT VVD - X020399

GSIN  
**950110100000000001**

SSCC  
**095011011234567896**



(402) 950110100000000001



(00) 0 9501101 123456789 6

GS1 Logistics Label homogenous logistics unit containing GSIN reference



(8003) 093123450012480001

Global Returnable Asset Identifier, AI (8003),  
represented in a GS1-128 Barcode



(8004)93123450000000001

Global Individual Asset Identifier, AI (8004),  
represented in a GS1-128 Barcode



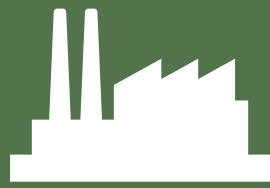
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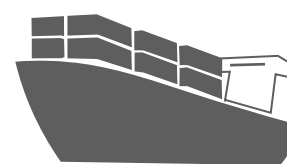
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## How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing. In addition to product scanning, logistics labels can also be scanned to capture vital traceability data as logistics units (pallets, parcels, grouping of products) move through the supply chain.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

The Critical Tracking Events highlight key events that require data capture and provide guidance on what information needs to be captured. Traceability data, if correctly encoded in Barcodes will be picked up by scanners with systems storing the relevant data captured for future data sharing and use. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are putaway, picking, inspecting packing, shipping, transporting, selling. Often a combination of fixed mounted scanners or readers and handheld devices will be applied to capture the critical tracking events.

The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.



Range of scanners which can read  
liner, 2D and RFID barcodes

### Useful Links

#### Labelling of imported food

<https://www.agriculture.gov.au/import/goods/food/notices/ifn-01-17>

#### Food safety standards of imported foods

<https://www.foodstandards.gov.au/consumer/importedfoods/Pages/default.aspx>

#### Imported Food Inspection

<https://www.agriculture.gov.au/import/goods/food/inspection-compliance/inspection-scheme>

#### Food import business

<https://www.foodauthority.nsw.gov.au/retail/importers>

#### Food Recall Plan and procedures

<https://www.foodstandards.gov.au/industry/foodrecalls/recalltemplates/pages/default.aspx>



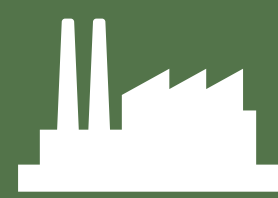
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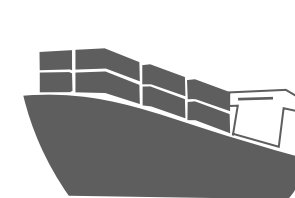
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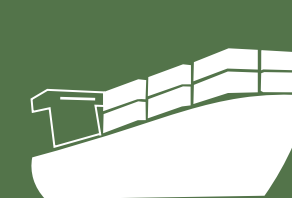
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<b>Air Waybill and Ocean Bill of Lading</b>	<p>The Air Waybill (AWB) is a critical air cargo document that constitutes the contract of carriage between the “shipper” and the “carrier” (airline). The Electronic Air Waybill Resolution 672 (MeA) removes the requirement for a paper AWB. There is therefore no longer a need to print, handle or archive the paper, largely simplifying the air cargo process. (IATA)</p> <p>An ocean bill of lading (OBOL, BOL, BL) is a document required for the transportation of goods overseas across international waters. The contract is legal and outlines the type, quantity, and destination of goods being carried. The shipper and carrier sign the ocean bill of lading upon shipment, and the receiver signs the document upon receipt. (Investpedia)</p>
<b>BICON</b>	<p>Australian Biosecurity Import Conditions (BICON) houses the Australian Government’s Biosecurity import conditions database for more than 20,000 plants, animals, minerals and biological products.</p>
<b>Customs Broker</b>	<p>The Customs Act 1901 (Customs Act) provides that only the owner of goods or a customs broker licensed by the Comptroller-General of Customs for the Department of Home Affairs (the Department) can submit an import declaration to enter goods for home consumption in connection with the importation of those goods.</p> <p>Customs Brokers also check all clearance documentation to ensure it’s correct and can provide advice on the best way to obtain clearance of your goods into and out of Australia.</p> <p>A licensed Customs broker can lodge Customs entries in all states of Australia, and can clear cargo by air, sea, and post.</p>
<b>Cargo Terminal Operator (CTO)</b>	<p>Air CTOs undertake a wide range of activities. They may be an airline in their own right or act on behalf of other airlines. CTOs are responsible for the carriage or arranging the carriage of the cargo, the discharge of cargo from the aircraft, the release of the cargo and arranging to move it according to contractual obligations and operational requirements. (ABF)</p> <p>Sea port CTOs manage terminal operations and load/unload vessels, oversee short term storage of cargoes, monitor security and transport access to the terminal.</p>
<b>Freight Forwarder</b>	<p>The freight forwarder is a business specialising in international trade and transport. A Freight Forwarder manages shipping documents, freight rates, customs clearance, packing, insurance, road transport and delivery of cargo to its intended destination.</p>
<b>Full Import Declaration (FID)</b>	<p>Customs brokers and importers must complete FIDs for imported food. FIDs are lodged through the Department of Home Affairs' Integrated Cargo System (ICS). For more information <a href="https://www.agriculture.gov.au/import/goods/food/lodge/fid">https://www.agriculture.gov.au/import/goods/food/lodge/fid</a></p>
<b>Import Delivery Order/ Electronic Import Delivery Order</b>	<p>An Import Delivery Order is provided by the Importer/Forwarder to the carrier (shipping line/airline) to release cargo to a third party (Transport Company) for delivery to the Importer. Until this is received, the cargo cannot be released to the transport to collect from the Cargo Terminal Operator. For this process to be automated for containerised cargo, see <a href="https://www.1-stop.biz/operations/electronic-import-delivery-order-eido/">https://www.1-stop.biz/operations/electronic-import-delivery-order-eido/</a></p>
<b>Incoterms</b>	<p>The Incoterms® rules are the world’s essential terms of trade for the sale of goods. Whether you are filing a purchase order, packaging and labelling a shipment for freight transport, or preparing a certificate of origin at a port, the Incoterms® rules are there to guide you. The Incoterms® rules provide specific guidance to individuals participating in the import and export of global trade on a daily basis. <a href="https://iccwbo.org/resources-for-business/incoterms-rules/incoterms-2020/">https://iccwbo.org/resources-for-business/incoterms-rules/incoterms-2020/</a></p>
<b>Proof of Delivery (POD)</b>	<p>A commercial document used by the Consignee or their Logistics Service Provider to notify the Consignor of the receipt and acceptance of a delivery.</p> <p>A signed POD enables the Transport Company to raise an invoice.</p>



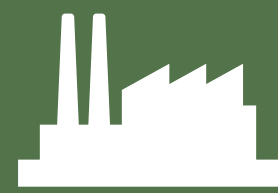
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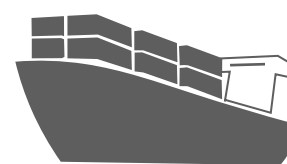
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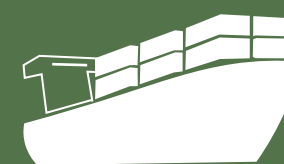
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# Export



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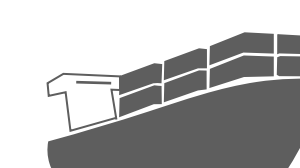
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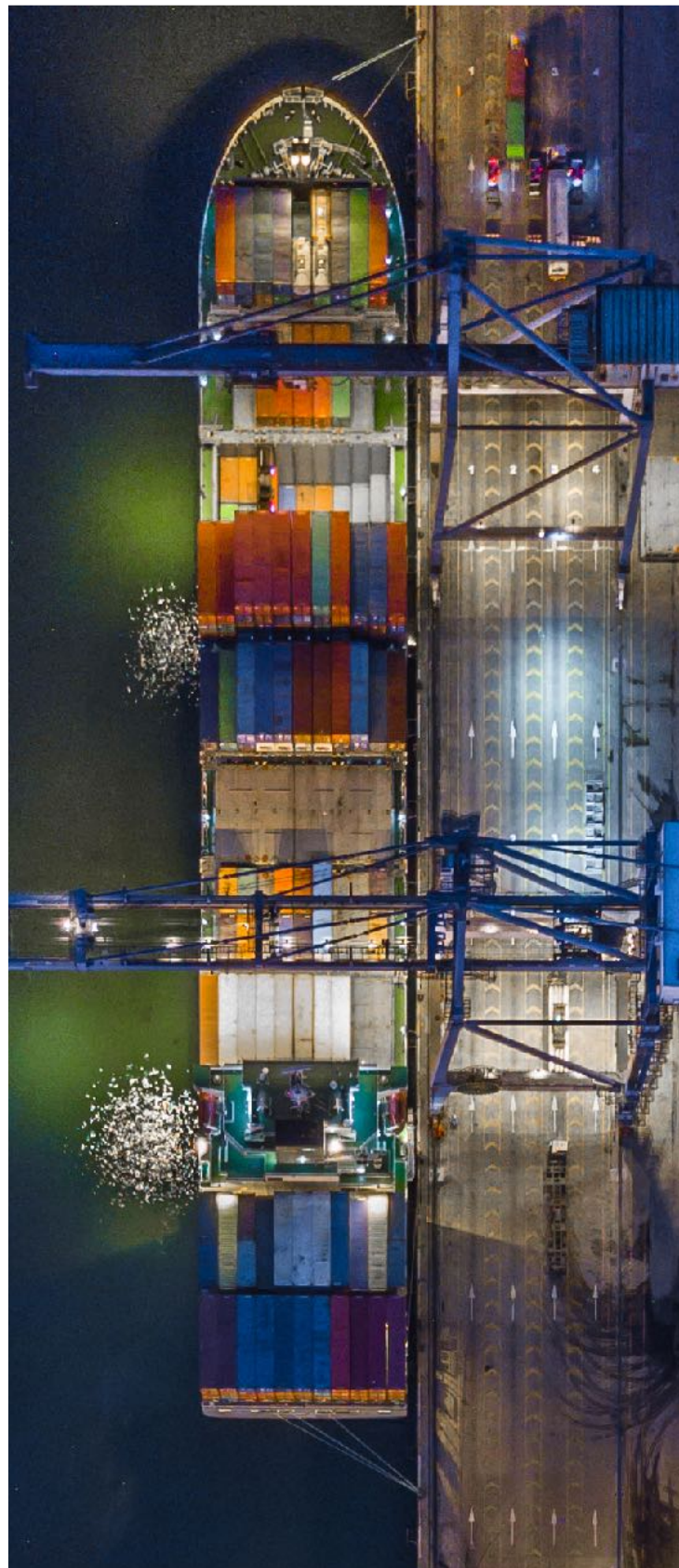


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## Export

Australia is a net exporter of food. Exports account for around two thirds of food produced domestically. Australia has a target of \$100 billion p.a. value of food exports by 2030.<sup>1</sup>

### Prescribed or Non-prescribed exports?

Food export products can be grouped into two groups — prescribed and non-prescribed. A prescribed product is one listed in Australia’s Export Control Act 1982 and Export Control (Consequential Amendments and Transitional Provisions) Act 2020. The new Export Control Act and Rules come into force in March 2021. These rules are controlled by the Department of Agriculture, Water and the Environment (AWE).

- Dairy products (milk and milk products)
- Eggs and egg products
- Fish and fish products
  - aquatic vertebrates and aquatic invertebrates, excluding mammals and birds
  - products containing fish
- Live animals
  - livestock
  - animals other than livestock (zoo animals, cats, dogs and other companion animals)
  - reproductive material
- Meat and meat products
  - edible meat, offal and meat products derived from farmed cows, bison, buffalo, camels, goats, deer, sheep, pigs, horse and donkeys
  - wild game meat derived from any non-farmed vertebrate animal, including a mammal, bird or reptile (excluding fish) killed in the field
  - rabbit and ratite (emu, ostrich) meat
  - poultry meat
- Organic and biodynamic produce
- Plants and plant products
  - cut flowers and fresh and dried foliage o
  - fresh fruit and vegetables
  - grains and seeds
  - hay and straw
  - processed plant products
  - timber, logs and woodchips.

Food products exempt from this regulation are fish oil for manufacturing or pharmaceutical purposes; tallow, gelatine and gelatine products, or meat products containing less than 5% mass of meat.

A non-prescribed product is defined as a highly processed food or wine which does not represent a high biosecurity or food safety risk. These products are not controlled by AWE, although they may be subject to requirements by the importing country.

The Australian Government is improving Australia’s agricultural export legislation. This is one of the initiatives being implemented to modernise the systems which support the export of Australian agricultural goods.

The new legislation will consolidate and streamline existing export-related requirements. It will continue to ensure:

- exported goods meet importing country requirements
- compliance with government and relevant industry standards
- traceability through the exports supply chain where required
- the integrity of goods and the accuracy of applied trade descriptions and official marks.

Proposals for new Export Control Rules can be viewed at:  
<https://www.agriculture.gov.au/market-access-trade/improving-export-legislation>

1. [https://nff.org.au/wp-content/uploads/2020/02/NFF\\_Roadmap\\_2030\\_FINAL.pdf](https://nff.org.au/wp-content/uploads/2020/02/NFF_Roadmap_2030_FINAL.pdf)



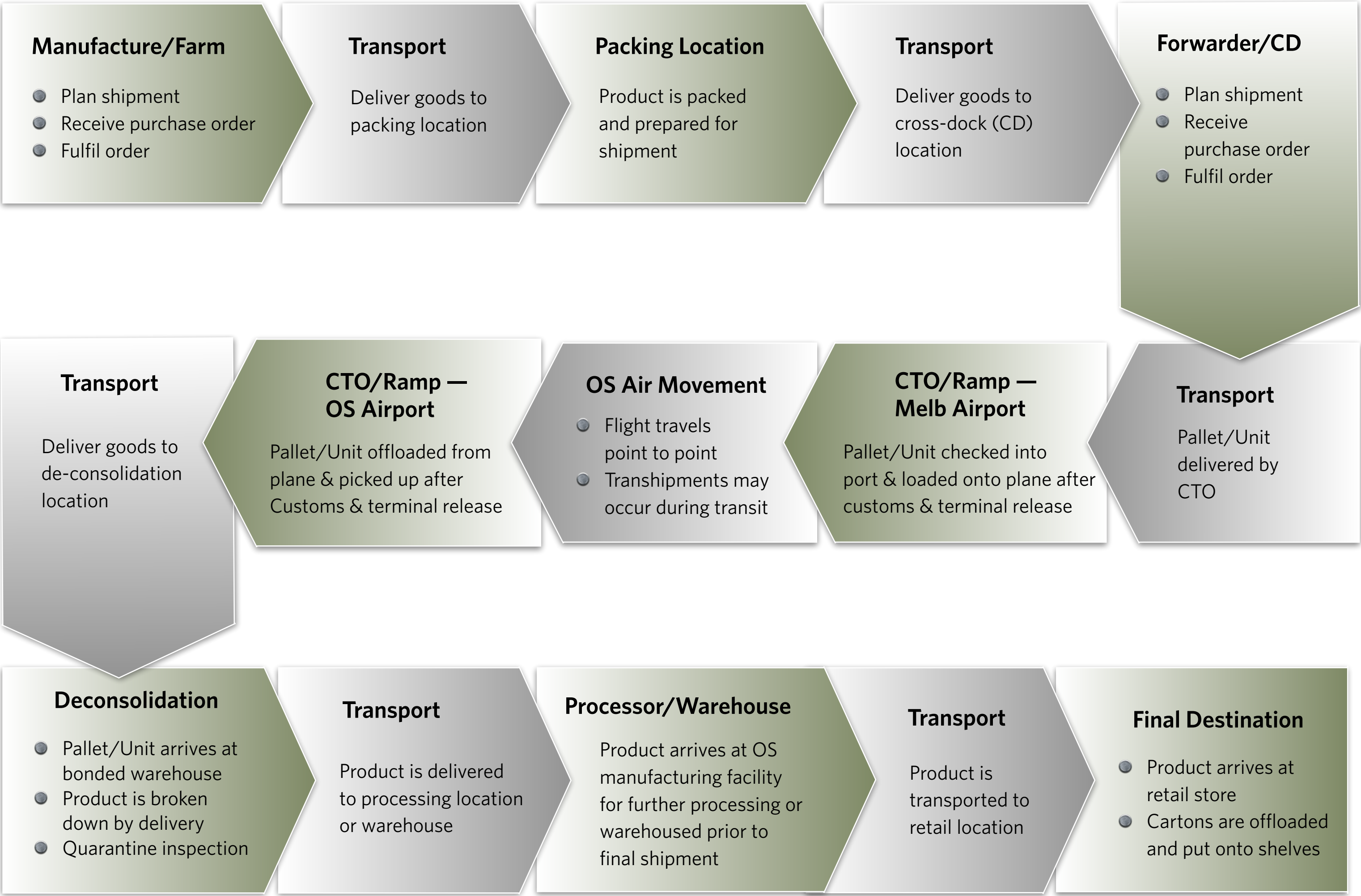
Air or Sea shipment?

Export processes tend to be strongly influenced by the mode of transport — air or sea freight — used for international carriage of freight.

Exports of high value fresh and manufactured products are commonly freight-favoured to airfreight, based on the availability of underbelly space in passenger aircraft. Pre-COVID, 80% of airfreight exports from Australia have been via passenger aircraft.

Air exports of food products normally make up around 12% of total Australian airfreight. They include vegetables, live animals, prepared foodstuffs and liquor, and animal and vegetable oils. The most prevalent airfreight foods are seafood and meat.

In terms of the physical movement from the farm or manufacturer, a typical airfreight export process is described as follows:



Indicative airfreight process

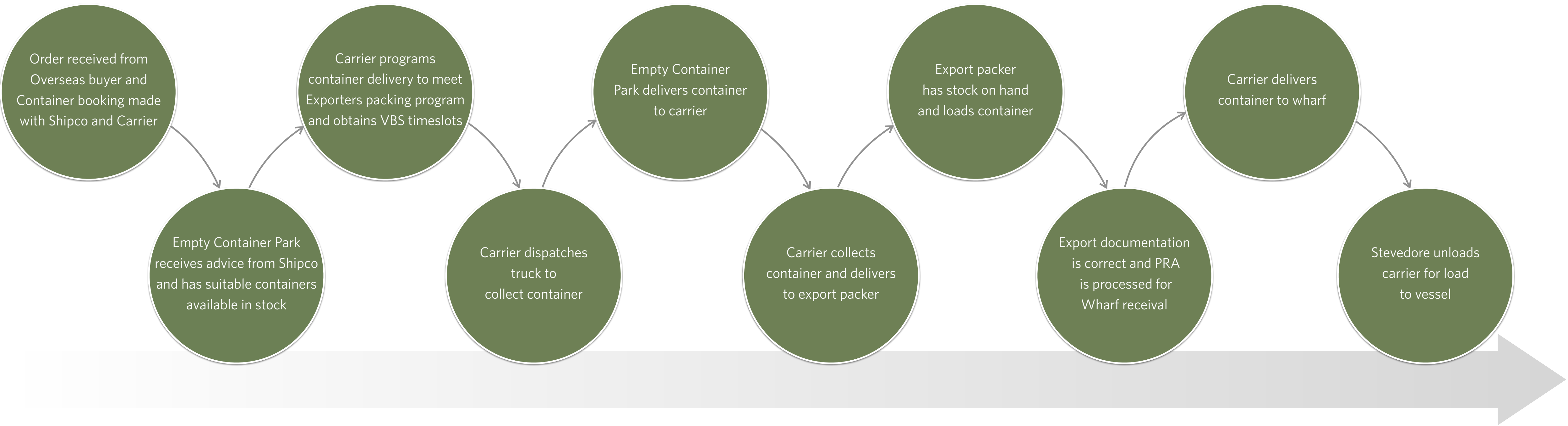
For the product to execute the physical movement, transactions and interactions with multiple players must occur.

Supply Chain Participant/ Booking Initiator	Manufacture/Farm	Transport to Forwarder	Forwarder — Cross-dock	Transport to CTO — Process Documentation	CTO — Receive and Prepare for flight	Ramp — Transport to Plane Cargo Hold	Flight	Australian Border Force	Biosecurity	Shipping Equipment	Ramp — Transport from Plane Cargo Hold	CTO — Receive from flight and dispatch	Transport to Cross-dock	Customs Broker Cross-dock	Transport to Importer	Importer	Overseas Customs	Overseas Quarantine
Manufacture/Farm		●	●				●			●								
Exporter/Trader	●	●	●				●	●		●								
Forwarder — Cross-dock		●		●			●	●	●	●								
CTO				●		●		●	●		●							
Airline					●			●			●	●						
Overseas CTO																	●	●
Customs Broker								●					●		●	●	●	●
Importer								●						●	●		●	●



Sea freight is the dominant mode for food products. Food products may be shipped in a shipping container, ISO bulk liquid tanks, as bulk commodity products such as wheat, or a livestock carrier.

For containerised sea freight shipment, the physical process is described in the figure below:



Containerised sea freight export processes for Free on Board Incoterms



Incoterms

Incoterms is the third influence on the supply chain relevant to traceability.

Incoterms, are a set of 11 internationally recognised rules which define the responsibilities of sellers and buyers. They specify who is responsible for paying for and managing the shipment, insurance, documentation, customs clearance, and other logistical activities.

The terms of trade between the seller and international buyer determine the chain of custody of the product and the extent to which the Australian exporter coordinates the processes and transaction related to the product movement.

Processes covered in this module include:

- Establishment data
- Export sales contract and Incoterms
- Packing and labelling to export country requirements
- Preparing correct export documentation
- Border clearance from Australia
- Pickup and delivery to air/sea port
- Storage and loading at port
- In-transit monitoring
- Arrival and clearance at final destination port
- Pickup from port terminal and delivery to importer





## Establishment data

### Create master data for trading partners and locations

Creation of master data for exporter, importer and key nodes in the supply chain will enable unique identification of the entities and locations engaged in the product’s journey.

### Obtain an export licence or permit if required

For prescribed goods, the premises need to be approved for export (Export Registration Form EX026).

Prescribed food products can only be transported from one approved establishment to another under regulatory control before export and traceability is required for such products before they reach the port or airport for export.

- Determine whether your product is non-prescribed  
<https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/biosecurity/export/non-prescribed-goods/exporting-non-prescribed-goods-determining-non-prescribed-good.pdf>
- Determine whether the country you wish to export to has prescribed requirements e.g. licensing of premises, audits, inspections, traceability-specific requirements  
<https://www.agriculture.gov.au/export/micor>
- Become export listed  
<https://www.agriculture.gov.au/export/controlled-goods/non-prescribed-goods/export-listed-establishments>
- Check if country quotas apply to your export product and apply for a quota certificate.  
<https://www.agriculture.gov.au/export/from-australia/quota>

### Tasks related to traceability

- Create master data for key supply chain partner identifies and locations
- Obtain export licence for premises/establishments

### Key participants

- Producer or manufacturer directly exporting
- Export company (non-producer/manufacturer)
- AWE



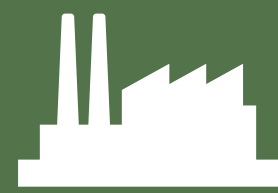
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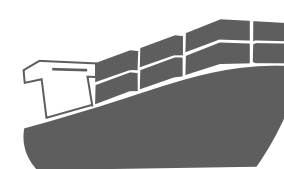
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## Export Sales Contract and Incoterms

Concluding an export sales contract is the activity that commences the process of exporting goods. The Terms of Trade determine the point at which the responsibility for the product transfers between the Exporter and Importer

- Importer or country distribution agent requests quote from supplier
- Supplier provides pro forma invoice(quote)
- Agreement on terms of trade and price prepared in sales contract
- Purchase Order received from the customer confirming quote/pro forma invoice
- Order Confirmation issued to Importer/buyer
- Customer Order created

### Tasks related to traceability

- Purchase Order received
- Customer Order created by Exporter/Supplier

### Key participants

- Exporter
- Exporter supplier (e.g. meat processing plant)
- Importer/Buyer



## Packing and labelling to export country requirements

Packing and labelling needs to be compliant with the country of destination. Every country has their own labelling requirements for food and beverage products.

Australia also has labelling guidelines for exported products, especially around ‘country of origin’ and ‘Australian made’ claims. Australian labelling standards do not apply for "export-only" products.

### Tasks related to traceability

- Create picking/packing list
- Pick items for Customer Order
- Determine labelling and packaging requirements for destination country
- Determine cold chain management requirements
- Create labels for item, carton and pallet

### Key participants

- Food product supplier
- Food export company/Wholesaler
- Department of Agriculture, Water and Environment



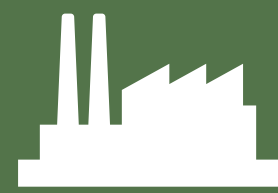
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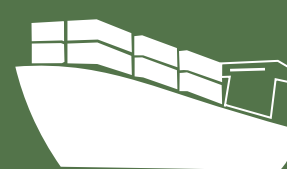
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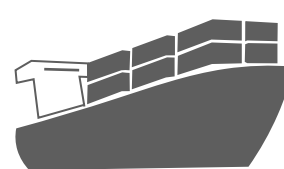
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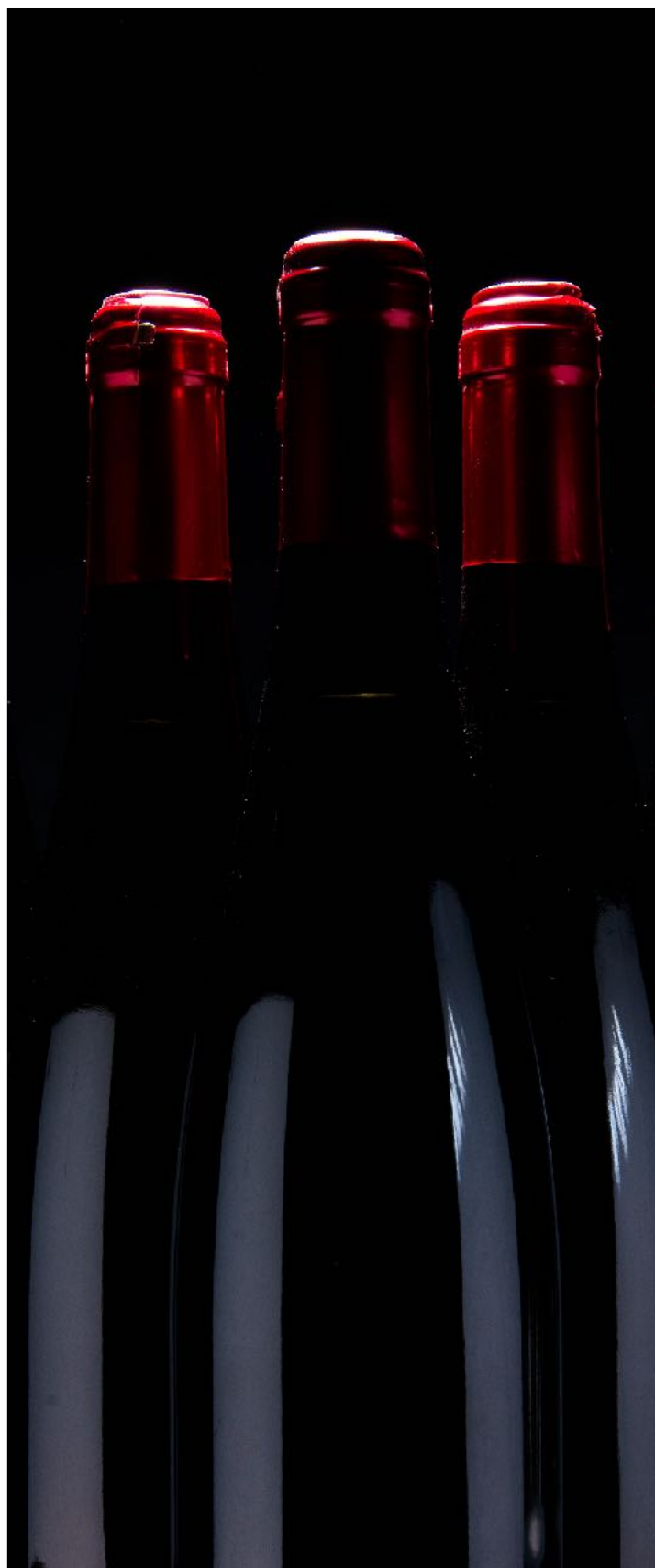


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### Correct export documentation

There are four important documents required prior to the goods commencing their journey. These are the Commercial Invoice, the Packing List, the Certificate of Origin and the Bill of Lading. For some food products, additional certificates and export licence requirements can form part of the export documentation e.g. phytosanitary certificate, manufacturer’s declarations.

Documentation must include evidence of current export permits as required by the Commonwealth Export Control Act (2020), and export certificates as required by importing country authorities. For example, Free Trade Agreements (FTAs) with Thailand, South Korea, China and New Zealand require Country of Origin Certificates to be certified by the relevant Chamber of Commerce based in Australia, in order for importers to claim reduced tariffs and duties associated with the FTAs. <sup>2</sup>

For countries requiring traceability from source, Exporters need to document their policies and standard operating procedures (SOPs) for traceability, recall and sourcing. An example of such requirements is the US Food and Drug Administration Foreign Supplier Verification Program. <sup>3</sup>

Tasks related to traceability

- Ensure completion of accurate documentation for shipment
  - Commercial Invoice
  - Packing List
  - Bill of Lading
  - Country of Origin Certificate as required
  - Manufacturer Declarations required by MICORe.g. lab reports, treatment records
    - <https://micor.agriculture.gov.au/Pages/default.aspx>
  - Transfer Certificate (if product is stored off-site/indirect transfer to port terminal)
- Document the Supplier policies and SOPs for traceability, recall and sourcing.

Key participants

- Food exporter
- International Freight Forwarder
- Food Supplier
- Chambers of Commerce

### Border clearance - Australia

Unless specifically exempt, goods may not be loaded on a ship or aircraft for export unless they have been entered for export in the Customs and Border Protection Integrated Cargo System (ICS) and Customs has given approval to export. Exporters will require an Export Declaration Number from Australian Border Force (Customs).

For Exporters of prescribed agricultural product such as dairy, eggs, grains, horticulture, meat, seafood, exporters use the NEXDOC platform to generate the correct documentation. NEXDOC platform is linked to the Australian Customs Single Electronic Window (SEW), which generates border clearance approvals and electronic documents. Exporters registered with NEXDOC can use this window to generate their Customs clearance documentation.

The Request for Permit (RFP) is provided by the exporter in the NEXDOC system. it’s It describes product, when and where it was processed, its overseas destination, and other details such as consignor, consignee and transport company. RFPs contain equivalent information to that being provided to a department officer in a Notice of Intention to Export (EX28 or EX222). Once validated in the system, NEXDOC will generate an Export Permit and if required, a Health Certificate or Meat Export Certificate.

Tasks related to traceability

- Receive Export Declaration Number
- Receive Export Permit

Key participants

- Food exporter
- Food Supplier
- International Freight Forwarder
- Department of Agriculture, Water & the Environment (NEXDOC)
- Australian Border Force - Customs



2. <https://www.austrade.gov.au/contact/faqs/what-is-a-certificate-of-origin>  
3. <https://www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-foreign-supplier-verification-programs-fsvp-importers-food-humans-and-animals>



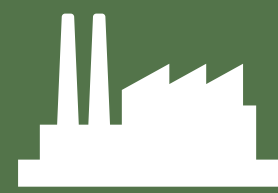
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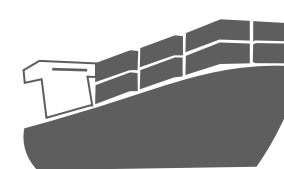
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Pickup and delivery to port terminal

In order to transfer the goods for shipment, the Exporter or their International Freight Forwarder will prepare bookings to manage the chain of custody of the shipment. An Air Waybill or Bill of Lading are key documents that facilitate the shipment. In order to prove the goods have transited via export-listed establishments (a traceability requirement for some import countries) a Transfer Certificate is required.

Product may be shipped in bulk, break bulk or containerised in a range of transport assets, including refrigerated load units. It may be transported via more than one transport mode to reach the load port. The product Supplier or Distribution Centre/3PL will be instructed by the Exporter to prepare for and complete the pickup and delivery of the product from their premises for transit to the air/sea port terminal in a Consignment Note issued to the Transport Company and the Bill of Lading/Airway Bill issued to the Exporter by the air/shipping line, termed the Carrier.

For containerised product, goods specified in the packing list are picked and packed (often loaded onto a pallet) and a Transport Label affixed. The transport label contains details of the date of pickup required, the “ship from” and “ship to” details, equipment capacity required, transport company name and ID number, and a unique Serialised Shipping Container Code (SSCC) on the load unit. Once loaded into a container, the goods are now identified by the Export Container Number, which is visible on the outside surface of the container. For Full Container Load (FCL) shipments, the container is sealed prior to leaving the Exporter/Supplier DC facility. A container seal number is issued by Australian Border Force (Customs).

For less-than-container-load (LCL) shipments, the container seal is placed on the container by the freight consolidator, who may be an international forwarding company or a wholesale exporter.

Australian sea port cargo terminal operators (CTOs) use a pre-receival advice (PRA) to notify of incoming containers. This PRA number enables the CTO to issue a Vehicle Booking Slot to the terminal to the Transport Company delivering the container. The 1-Stop system notifies the International Freight Forwarder/Exporter when the PRA is accepted, the date and time the container is “gated-in” and when the container is loaded on the vessel. <sup>4</sup>

For break bulk product, unique identifiers for lots or individual product are required to maintain traceability of the physical product e.g. livestock.

For bulk shipments such as grains, individual lots delivered to grain storage can be traced. Each silo is a single or combination of individual supplier lots of grain. However, in an export operation, rail wagonloads or grain trailer loads are merged into bunkers at port storage facilities for conveyor loading. The only links in terms of traceability in a bulk shipment is to retain meticulous records of the original lots as they are merged and moved. Tracer grains can be introduced to a lot shipment; however this may be cost-prohibitive.

Tasks related to traceability

- Transfer Certificate completed for interim transits between export establishments
- Export Container Number for the shipment advised by the shipping line
- Container seal secured and recorded
- PRA accepted by CTO
- Port cargo terminal operator gate-in recorded
- Bulk terminal notices

Key participants

- Shipping line
- International Freight Forwarder
- Exporter
- Supplier/packer
- Transport company
- Terminal operator/CTO



Tracers for insertion into grain can be marked with an information-carrying code such as a bar code

4. 1-Stop Comtrac system <https://www.1-stop.biz/tracking/comtrac/>





## In-transit monitoring

Location of a shipment is commonly supplied by the shipping line/airline in transit. This is particularly relevant where a transhipment is required. The international carrier is required to ensure goods are kept in a condition which is according to specifications whilst in transit, so for temperature or humidity-sensitive products, regular monitoring is vital to the shelf life of the product in the importing country.

Monitoring may rely on use of GPS trackers, RFID data loggers/IoT sensor technologies, smart containers with their own sensors and communications devices, data aggregators of shipping movements, or the long established Partlow chart on reefer containers. Telecommunications infrastructure may impact the ability to transmit at sea and in flight in real time.

Most airlines and shipping lines are able to advise location, which is generally accessible from the carrier’s customer portal. International Freight Forwarders may also have tracking and condition reporting available to shippers.

**Tasks related to traceability**

- Location coordinates
- Condition of the goods real-near-time reporting

**Key participants**

- Airline or shipping line
- Data aggregators
- Technology suppliers
- International freight forwarder
- Exporter

## Arrival and clearance at final destination port

For ocean shipping, generally 24 hours’ notice is required from the ship’s Master or Agent that the vessel is arriving in port, in order to prepare for biosecurity inspection.

On arrival at the port of discharge/final destination, the nominated party on the Bill of Lading (Customs Broker, Importer) is notified of the discharge of the container and once clearance is completed, the availability of the container for collection.

Biosecurity inspection may be required. This may be undertaken at the port of discharge, or once the container is transported to a facility that is licensed for inspection.

**Documentation for import clearance includes:**

- Commercial invoice
- Bill of Lading
- Packing list
- Certificate of Origin
- Certificates related to the product type
- Tax and Duties Paid.



## Pickup from port terminal and delivery to importer

The Incoterms of the transaction between Exporter and Importer determine the responsibility for port clearance and subsequent delivery to the Importer.

Arrangements will be made via the Exporter (often via an International Freight Forwarder and their international partnering Customs Broker) to hire a Transport Company to collect the container from the terminal and deliver at the instruction of the Importer to a nominated warehouse/DC. Shipping lines may arrange the transport delivery (carrier haulage) or the Exporter or Importer may take this responsibility (merchant haulage).

An electronic Import Delivery Order which the Airline/Shipping Line issues as per the Bill of Lading/Air Waybill enables the container/unitised load device to be loaded on the transport and leave the terminal. “Gate Out” date and time stamp at the port terminal are recorded.

On leaving the port, tracking of the transfer to the Importer premises or Distribution Centre is typically undertaken using a Transport Booking reference issued by the Transport Company, or via GPS tracking.

On arrival at the delivery destination, a Proof of Delivery by the Transport Company is signed by the Importer. The Importer will then check and remove the container seal at the instruction of a Biosecurity inspector, examine the goods as listed on the Bill of Lading/Airway Bill, packing list and commercial invoice and advise the Exporter of any variances.

**Tasks related to traceability**

- As per Bill of Lading, Shipping Line/Exporter/Importer or Forwarder will book transport to collect the container from the port terminal
- An Import Delivery Order will enable the transport (road or rail) to clear the terminal
- The CTO records “gate out” details
- Proof of Delivery is signed by the Importer/DC
- Goods delivered are inspected and scanned/recorded in Importer goods receipt system/Warehouse Management system.



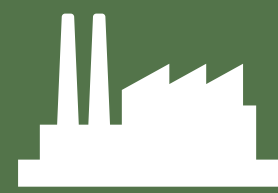
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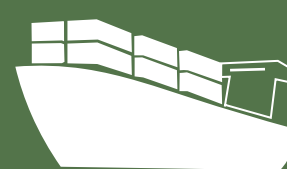
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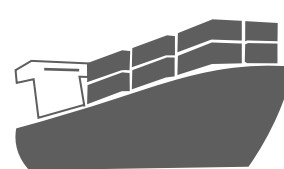
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## Critical Tracking Events (CTEs)

For each of the identified freight transport activities, critical tracking events (CTEs) establish identity and enable traceability and compliance with traceability-related regulation are summarised as follows:  
Critical Tracking Events (CTEs) are events that relate to the identity, movement and transformation of the food product.

Export activity	CTE code	Critical Tracking Events (CTEs)
Establishment data Creation of Master data Licensing and food export premises and business	EX CTE1A EX CTE1B	Create master data for key supply chain partner identities and locations Obtain export licence for premises/establishment/s
Export Order Preparation	EX CTE 2	Order preparation. This involves the activities listed below
Contract of Sale Purchase Order received from buyer/importer with Incoterms Purchase Order Confirmation sent to buyer Customer Order created by Exporter		
Picking, labelling and packing to import country requirements <ul style="list-style-type: none"><li>Create picking list</li><li>Pick items for Customer Order</li><li>Determine labelling and packaging requirements for destination country</li><li>Determine cold chain management requirements</li></ul>		Create and affix labels for item, carton and pallet
Correct Export documentation <ul style="list-style-type: none"><li>Prepare shipping documents</li><li>Prepare Supplier policies and SOPs for traceability, recall and sourcing to Import country regulatory requirements</li></ul>		Ensure completion of accurate documentation for shipment <ul style="list-style-type: none"><li>Commercial Invoice</li><li>Packing List</li><li>Bill of Lading/Airway Bill</li><li>Country of Origin Certificate as required</li><li>Manufacturer Declarations required by MCoR e.g. lab reports, treatment records</li><li>Transfer Certificate (if product is stored off-site/indirect transfer to port terminal)</li><li>Document the Supplier policies and SOPs for traceability, recall and sourcing</li></ul>
Border clearance – Australia	EX CTE 3	Receive Export Declaration Number Receive Export Permit



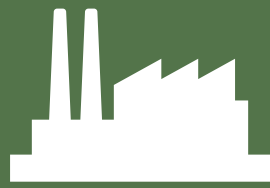
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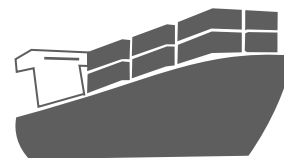
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Export activity	CTE code	Critical Tracking Events (CTEs)
<b>Pickup and delivery to port terminal</b> PUD of empty container from container park nominated by shipping line for packing Packing of container by Exporter/supplier/processor/DC For LCL shipments, pickup and delivery to a consolidator for packing Transport to port booked — booking reference number issued for tracking Pre-Receiptal Advice accepted by CTO	EX CTE4	Product departs warehouse location to port Record Export Container Number (ECN) Container seal placed and number recorded on Bill of Lading PRA acceptance message received by Exporter/Forwarder Gate-In details recorded Notice to Exporter/Forwarder that container is loaded on the vessel
<b>Receipt at port terminal</b> Gate-In at port terminal	EX CTE5	Product Received at port terminal
<b>Delivery loaded on vessel</b> Container loaded on vessel	EX CTE6	Delivery unloaded from transportation unit and transferred to the vessel
<b>In-transit monitoring</b>	EX CTE7	Monitoring of containers/product whilst in transit In-transit location coordinates Condition of the goods real-near-time reporting (as required)
<b>Vessel departs port terminal</b>	EX CTE8	Vessel departs the port terminal
<b>Arrival at final destination port and clearance procedures</b> Importer/Customs Broker submits all documents for port clearance All taxes and duties paid Container Status Advice or Underbond Approval from Customs to CTO/consignee/Importer	EX CTE9	Vessel arrives at destination port Container Status Advice/Underbond Approval received
<b>Pickup from port terminal and delivery to importer</b> <ul style="list-style-type: none"><li>As per Bill of Lading, Shipping Line/Exporter/Importer or Forwarder will book transport to collect the container from the port terminal</li><li>An Import Delivery Order will enable the transport (road or rail) to receive custody of the goods and clear the terminal</li><li>Original Bill of Lading accompanies cargo to Importer</li><li>The CTO records “gate out” details</li><li>Proof of Delivery is signed by the Importer/DC once goods unloaded and received</li><li>Goods received, inspected and reconciled.</li></ul>	EX CTE10	Product transferred from vessel and picked up from port by importer Import Delivery Order Cargo leaves final destination port Cargo delivered to Importer



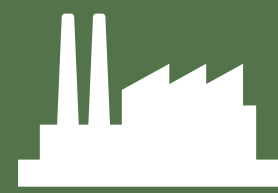
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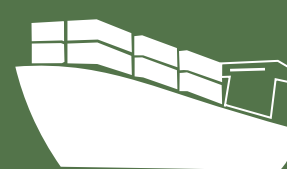
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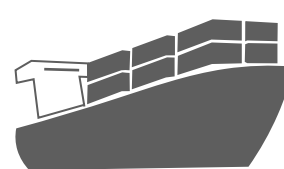
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Key Data Elements

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
EX CTE1A	Create master data for key supply chain partner identities and locations	<ul style="list-style-type: none"><li>● Global Location Number</li><li>● Asset SSCC number</li><li>● PIC code (growers)</li></ul> <div><div>Request for GLN</div><table><tr><td>Who</td><td>Exporter Issuing Agency</td></tr><tr><td>What</td><td>Exporter company, location, business entity</td></tr><tr><td>When</td><td>Date/Time of issuance</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Requirement for Global location numbers</td></tr></table></div>	Who	Exporter Issuing Agency	What	Exporter company, location, business entity	When	Date/Time of issuance	Where	Issuing Agency	Why	Requirement for Global location numbers
Who	Exporter Issuing Agency											
What	Exporter company, location, business entity											
When	Date/Time of issuance											
Where	Issuing Agency											
Why	Requirement for Global location numbers											
EX CTE1B	Obtain export licence for premises/ establishment/s	<ul style="list-style-type: none"><li>● Food Export Establishment number</li><li>● Food Premises Licence number</li></ul> <div><div>Export Establishment licence</div><table><tr><td>Who</td><td>Exporter Issuing Agency</td></tr><tr><td>What</td><td>Exporter company, location, business entity</td></tr><tr><td>When</td><td>Date/Time of Issuance, Expiry date</td></tr><tr><td>Where</td><td>Issuing Agency</td></tr><tr><td>Why</td><td>Export Establishment Licence</td></tr></table></div> <div>Information to be shared to a traceability platform</div> <ul style="list-style-type: none"><li>● Global Location Number</li><li>● PIC code (growers)</li><li>● Food Export Establishment number</li><li>● Food Premises Licence number</li><li>● Food License expiry date</li></ul>	Who	Exporter Issuing Agency	What	Exporter company, location, business entity	When	Date/Time of Issuance, Expiry date	Where	Issuing Agency	Why	Export Establishment Licence
Who	Exporter Issuing Agency											
What	Exporter company, location, business entity											
When	Date/Time of Issuance, Expiry date											
Where	Issuing Agency											
Why	Export Establishment Licence											

CTE code	Critical Tracking Events	Key data Inputs and Outputs
EX CTE2	<div>Export Preparation</div> <ul style="list-style-type: none"><li>● Purchase Order received</li><li>● Customer Order and picking list created</li><li>● Create and affix labels for item, lot, carton and pallet</li></ul>	<div>Purchase Order data</div> <ul style="list-style-type: none"><li>● Supplier ID</li><li>● Supplier Contact Details</li><li>● Supplier Location</li><li>● Buyer ID</li><li>● Buyer Contact Details</li><li>● Buyer Location</li><li>● Product Name/Description</li><li>● Quantity</li><li>● Unit Type</li><li>● Unit Price</li><li>● Total Cost</li><li>● Purchaser Order Placement Date - Customer Order Delivery Date</li><li>● Shipping Terms (Incoterms code)</li></ul> <div>Customer Order data</div> <ul style="list-style-type: none"><li>● Date</li><li>● Customer Name/ID</li><li>● Product Code</li><li>● Pack size</li><li>● Description</li><li>● Quantity</li><li>● Units</li><li>● Price</li></ul> <p>Unique identifiers assigned and labels attached (GTIN barcodes, SSCC identifiers etc)</p>



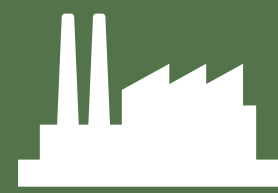
Introduction and Overview



On-farm Production



Freight Transport



Processing and Manufacturing



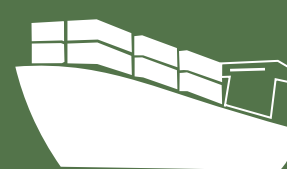
Wholesale and Distribution



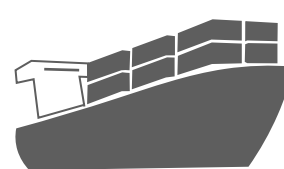
Retail Operations



Food Service



Import Operations



Export Operations



Consumer Information



Cybersecurity, Data & Privacy



Supplemental Information



CTE code	Critical Tracking Events	Key data Inputs and Outputs
EX CTE2  (continued)	<ul style="list-style-type: none"><li>● Ensure completion of accurate documentation for shipment:<ul style="list-style-type: none"><li>● Commercial Invoice</li><li>● Packing List</li><li>● Bill of Lading/Airway Bill</li><li>● Country of Origin</li><li>● Certificate as required</li><li>● Manufacturer Declarations required by MCoR e.g. lab reports, treatment records</li><li>● Transfer Certificate (if product is stored off-site/indirect transfer to port terminal)</li></ul></li></ul>   	

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
		<p>The information related to traceability covered in a policy or SOP may vary according to each country requirement — check MCoR <a href="https://www.agriculture.gov.au/export/micor">https://www.agriculture.gov.au/export/micor</a></p> <p>As an example Australia requires:</p> <ul style="list-style-type: none"><li>● a name or description of the food sufficient to indicate its true nature</li><li>● batch or lot identification for the food</li><li>● name of the person, business name, street address and telephone number or email address of the producer of the food</li><li>● name of the person, business name, street address and telephone number or email address of customers that have received the food</li><li>● the date the food was received and the date when it was dispatched to customers</li><li>● the volume or quantity of the food involved in each transaction.</li></ul> <p>Information to be shared to a traceability platform:</p> <ul style="list-style-type: none"><li>● Supplier policy number codes — traceability; recall; sourcing</li></ul>												
EX CTE3	Border Clearance - Australia  Receive Export Declaration Number  Receive Export Permit	<ul style="list-style-type: none"><li>● Export Declaration Number</li><li>● Export Permit Number</li></ul> <p>Export Certificates from the NEXDOC system that are issued on paper. Users can scan the QR code to see an overview of the certificate. They can use it to confirm details such as:</p> <ul style="list-style-type: none"><li>● certificate number</li><li>● product types</li><li>● current certificate state</li><li>● exporter</li><li>● consignee</li><li>● departure date</li></ul> <table><tr><th colspan="2">Export Order Preparation</th></tr><tr><td>Who</td><td>Exporter, Customer</td></tr><tr><td>What</td><td>Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID</td></tr><tr><td>When</td><td>Date/Time of customs/border release</td></tr><tr><td>Where</td><td>Warehouse or Port</td></tr><tr><td>Why</td><td>Border Clearance</td></tr></table> <p>Information to be shared to a traceability platform:</p> <div><ul style="list-style-type: none"><li>● Export Declaration Number</li><li>● Export Permit Number</li><li>● Bill of Lading</li><li>● Product ID</li><li>● Batch</li></ul><ul style="list-style-type: none"><li>● Quantity</li><li>● Customer</li><li>● Exporter ID</li><li>● Carrier ID</li><li>● BIC Code</li></ul></div>	Export Order Preparation		Who	Exporter, Customer	What	Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID	When	Date/Time of customs/border release	Where	Warehouse or Port	Why	Border Clearance
Export Order Preparation														
Who	Exporter, Customer													
What	Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID													
When	Date/Time of customs/border release													
Where	Warehouse or Port													
Why	Border Clearance													



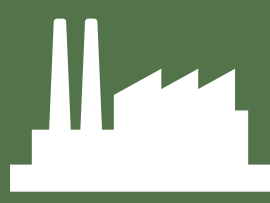
Introduction  
and Overview



On-farm  
Production



Freight  
Transport



Processing and  
Manufacturing



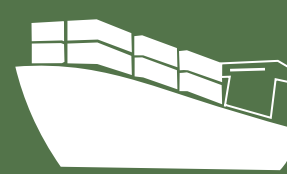
Wholesale and  
Distribution



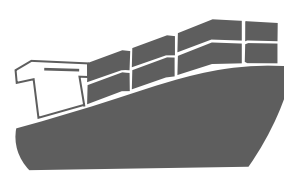
Retail  
Operations



Food  
Service



Import  
Operations



Export  
Operations



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Supplemental  
Information



CTE code	Critical Tracking Events	Key data Inputs and Outputs												
EX CTE4	<p>Pickup and delivery to port</p> <p>Record Export Container Number (ECN)</p> <p>Container seal placed and number recorded on Bill of Lading</p> <p>PRA acceptance message received by Exporter/Forwarder</p> <p>Gate-In details recorded</p> <p>Notice to Exporter/Forwarder that container is loaded on the vessel</p>	<ul style="list-style-type: none"><li>● Export Container Number (ECN)<ul style="list-style-type: none"><li>○ BIC code (owner prefix) + equipment identifier + serial number + check digit</li></ul></li><li>● Container seal number — a unique ID</li><li>● PRA acceptance</li><li>● Gate-In details</li><li>● EDI message</li></ul> <table><tr><th colspan="2">Delivery to Port</th></tr><tr><td>Who</td><td>Exporter Transport Company</td></tr><tr><td>What</td><td>Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID, Carrier ID</td></tr><tr><td>When</td><td>Date/Time of delivery</td></tr><tr><td>Where</td><td>Warehouse despatch location</td></tr><tr><td>Why</td><td>Delivery to Port</td></tr></table> <p>Information shared to a traceability platform</p> <ul style="list-style-type: none"><li>● ECN</li><li>● PRA acceptance message – EDI</li><li>● Gate-in details from CTO</li><li>● Container loaded EDI message</li></ul>	Delivery to Port		Who	Exporter Transport Company	What	Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID, Carrier ID	When	Date/Time of delivery	Where	Warehouse despatch location	Why	Delivery to Port
		Delivery to Port												
Who	Exporter Transport Company													
What	Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID, Carrier ID													
When	Date/Time of delivery													
Where	Warehouse despatch location													
Why	Delivery to Port													
EX CTE5	Receipt at Port	<ul style="list-style-type: none"><li>● Export Declaration Number</li><li>● Export Permit Number</li><li>● Bill of Lading</li><li>● Product ID</li><li>● Batch</li><li>● Quantity</li><li>● Customer</li><li>● Exporter ID</li><li>● Carrier ID</li><li>● BIC Code</li></ul> <table><tr><th colspan="2">Delivery to Port</th></tr><tr><td>Who</td><td>Transport Company Port/Terminal</td></tr><tr><td>What</td><td>Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID, Carrier ID, BIC Code, Export Declaration Number</td></tr><tr><td>When</td><td>Date/Time of receipt</td></tr><tr><td>Where</td><td>Port/Terminal Location</td></tr><tr><td>Why</td><td>Receipt at Port</td></tr></table>	Delivery to Port		Who	Transport Company Port/Terminal	What	Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID, Carrier ID, BIC Code, Export Declaration Number	When	Date/Time of receipt	Where	Port/Terminal Location	Why	Receipt at Port
Delivery to Port														
Who	Transport Company Port/Terminal													
What	Product ID, Batch, Quantity Export Order number, Logistics Unit ID (SSCC), Container Number, Transfer Certificate, Bill of Lading, Shipment ID, Carrier ID, BIC Code, Export Declaration Number													
When	Date/Time of receipt													
Where	Port/Terminal Location													
Why	Receipt at Port													

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
		<div>Information shared to a traceability platform:</div> <div><div><div></div>Receipt Record</div><div><div></div>Receipt Date</div></div> <div><div><div></div>BIC Number</div><div><div></div>Shipment ID</div></div> <div><div><div></div>Bill of Lading</div><div><div></div>Port ID</div></div>										
EX CTE6	Goods loaded onto Vessel	<div><div><div></div>BIC Number</div><div><div></div>Bill of Lading</div><div><div></div>Vessel ID</div><div><div></div>Shipment ID</div></div> <div><div>Delivery to Port</div><table><tr><td>Who</td><td>Port/Terminal</td></tr><tr><td>What</td><td>BIC Number, Vessel ID, Bill of Lading</td></tr><tr><td>When</td><td>Date/Time of transfer</td></tr><tr><td>Where</td><td>Port/Terminal Location</td></tr><tr><td>Why</td><td>Transfer to Vessel</td></tr></table></div> <div>Information shared to a traceability platform:</div> <div><div><div></div>Vessel Number</div><div><div></div>Location</div><div><div></div>Date of Transfer</div><div><div></div>Container ID</div><div><div></div>Bill of Lading</div></div>	Who	Port/Terminal	What	BIC Number, Vessel ID, Bill of Lading	When	Date/Time of transfer	Where	Port/Terminal Location	Why	Transfer to Vessel
Who	Port/Terminal											
What	BIC Number, Vessel ID, Bill of Lading											
When	Date/Time of transfer											
Where	Port/Terminal Location											
Why	Transfer to Vessel											
EX CTE7	Vessel Departs	<div><div><div></div>BIC Number</div><div><div></div>Bill of Lading</div><div><div></div>Vessel ID</div><div><div></div>Shipment ID</div></div> <div><div>Vessel Departs</div><table><tr><td>Who</td><td>Port/Terminal Vessel ID</td></tr><tr><td>What</td><td>BIC Number, Vessel ID, Bill of Lading, Destination</td></tr><tr><td>When</td><td>Date/Time of departure</td></tr><tr><td>Where</td><td>Port/Terminal Location</td></tr><tr><td>Why</td><td>Vessel departs port</td></tr></table></div> <div>Information shared to a traceability platform:</div> <div><div><div></div>Vessel ID</div><div><div></div>Date of Departure</div></div>	Who	Port/Terminal Vessel ID	What	BIC Number, Vessel ID, Bill of Lading, Destination	When	Date/Time of departure	Where	Port/Terminal Location	Why	Vessel departs port
Who	Port/Terminal Vessel ID											
What	BIC Number, Vessel ID, Bill of Lading, Destination											
When	Date/Time of departure											
Where	Port/Terminal Location											
Why	Vessel departs port											



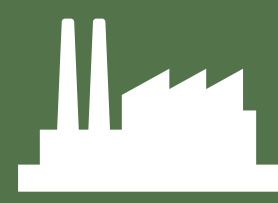
Introduction and Overview



On-farm Production



Freight Transport



Processing and Manufacturing



Wholesale and Distribution



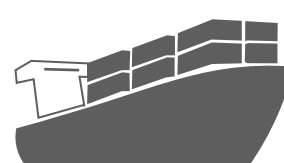
Retail Operations



Food Service



Import Operations



Export Operations



Consumer Information



Cybersecurity, Data & Privacy



Supplemental Information



CTE code	Critical Tracking Events	Key data Inputs and Outputs
EX CTE8	<b>In-transit (air and sea)</b>	<ul style="list-style-type: none"><li>● GPS coordinates</li><li>● Temperature (Degree Celsius in container or product)</li><li>● Humidity (RH)</li></ul>
	<b>In-transit location coordinates</b>	
	<b>Condition of the goods real-near-time reporting (as required)</b>	
EX CTE9	<b>Arrival at final destination port and clearance procedures</b>	<ul style="list-style-type: none"><li>● Container Status Advice/Underbond Approval</li><li>● Vessel ID</li></ul>
	<b>Container Status Advice/Underbond Approval message</b>	

CTE code	Critical Tracking Events	Key data Inputs and Outputs											
EX CTE10	Delivery to Importer	<div>Electronic Import Delivery Order (EIDO)</div> <div><div><div><div></div><div>Date and time</div></div><div><div></div><div>Container location</div></div></div><div><div><div></div><div>Consignee</div></div><div><div></div><div>Container Status</div></div></div><div><div><div></div><div>Discharge voyage and vessel numbers</div></div><div><div></div><div>Signature of issuing officer (shipping line)</div></div></div><div><div><div></div><div>Arrival date</div></div><div><div></div><div>Date and time of signing</div></div></div><div><div><div></div><div>Bill of Lading number</div></div><div><div></div><div>Transport Company</div></div></div><div><div><div></div><div>Container number (ECN)</div></div><div><div></div><div>Driver signature</div></div></div><div><div><div></div><div>Container type</div></div><div><div></div><div>Container inspection report</div></div></div><div><div><div></div><div>Seal number</div></div><div><div></div><div>Date and time of signing</div></div></div><div><div><div></div><div>Gross weight</div></div><div><div></div><div>EIDO pin number</div></div></div><div><div><div></div><div>Port of Load/Discharge/Final Discharge</div></div></div></div> <div>Gate out</div> <div><div><div></div><div>Date and time</div></div><div><div></div><div>Vehicle registration</div></div><div><div></div><div>ECN</div></div></div> <div>Proof of Delivery EDI 861/EDIFACT Receiving Advice</div> <div><div><div><div></div><div>Date and time</div></div><div><div></div><div>ECN (or if de-consolidated) number of pallets or cartons</div></div></div><div><div><div></div><div>Job number</div></div><div><div></div><div>Contact</div></div></div><div><div><div></div><div>Freight paid by</div></div><div><div></div><div>Phone</div></div></div><div><div><div></div><div>Collected from</div></div><div><div></div><div>Acceptance of terms and conditions</div></div></div><div><div><div></div><div>Delivered to</div></div><div><div></div><div>Signature</div></div></div></div> <div>Final Delivery</div> <table><tr><td>Who</td><td>Port/Terminal Vessel ID</td></tr><tr><td>What</td><td>BIC Number, Vessel ID, Bill of Lading, Destination</td></tr><tr><td>When</td><td>Date/Time of departure</td></tr><tr><td>Where</td><td>Port/Terminal Location</td></tr><tr><td>Why</td><td>Vessel departs port</td></tr></table> <div>Information to be shared to a traceability platform</div> <div><div><div></div><div>EIDO number</div></div><div><div></div><div>Original Customer Order number</div></div><div><div></div><div>Gate out message</div></div><div><div></div><div>Proof of Delivery number</div></div></div>	Who	Port/Terminal Vessel ID	What	BIC Number, Vessel ID, Bill of Lading, Destination	When	Date/Time of departure	Where	Port/Terminal Location	Why	Vessel departs port	Import Delivery Order
	Who		Port/Terminal Vessel ID										
	What		BIC Number, Vessel ID, Bill of Lading, Destination										
	When		Date/Time of departure										
	Where		Port/Terminal Location										
Why	Vessel departs port												
	Cargo leaves final destination port												
	Cargo delivered to Importer												



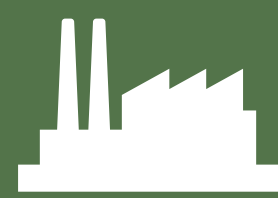
Introduction and Overview



On-farm Production



Freight Transport



Processing and Manufacturing



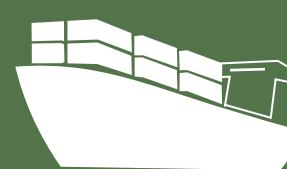
Wholesale and Distribution



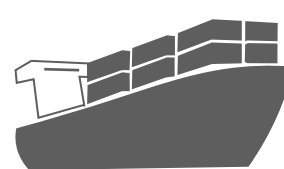
Retail Operations



Food Service



Import Operations



Export Operations



Consumer Information

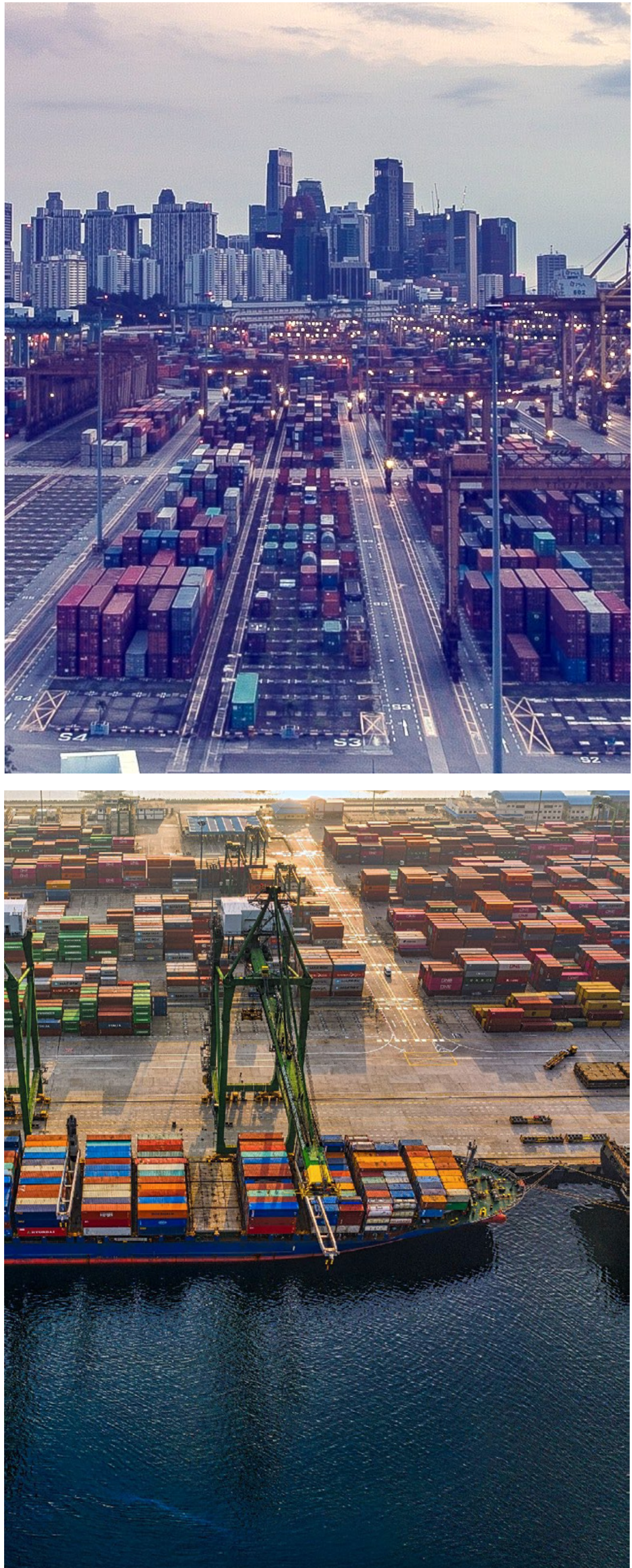


Cybersecurity, Data & Privacy



Supplemental Information





## Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

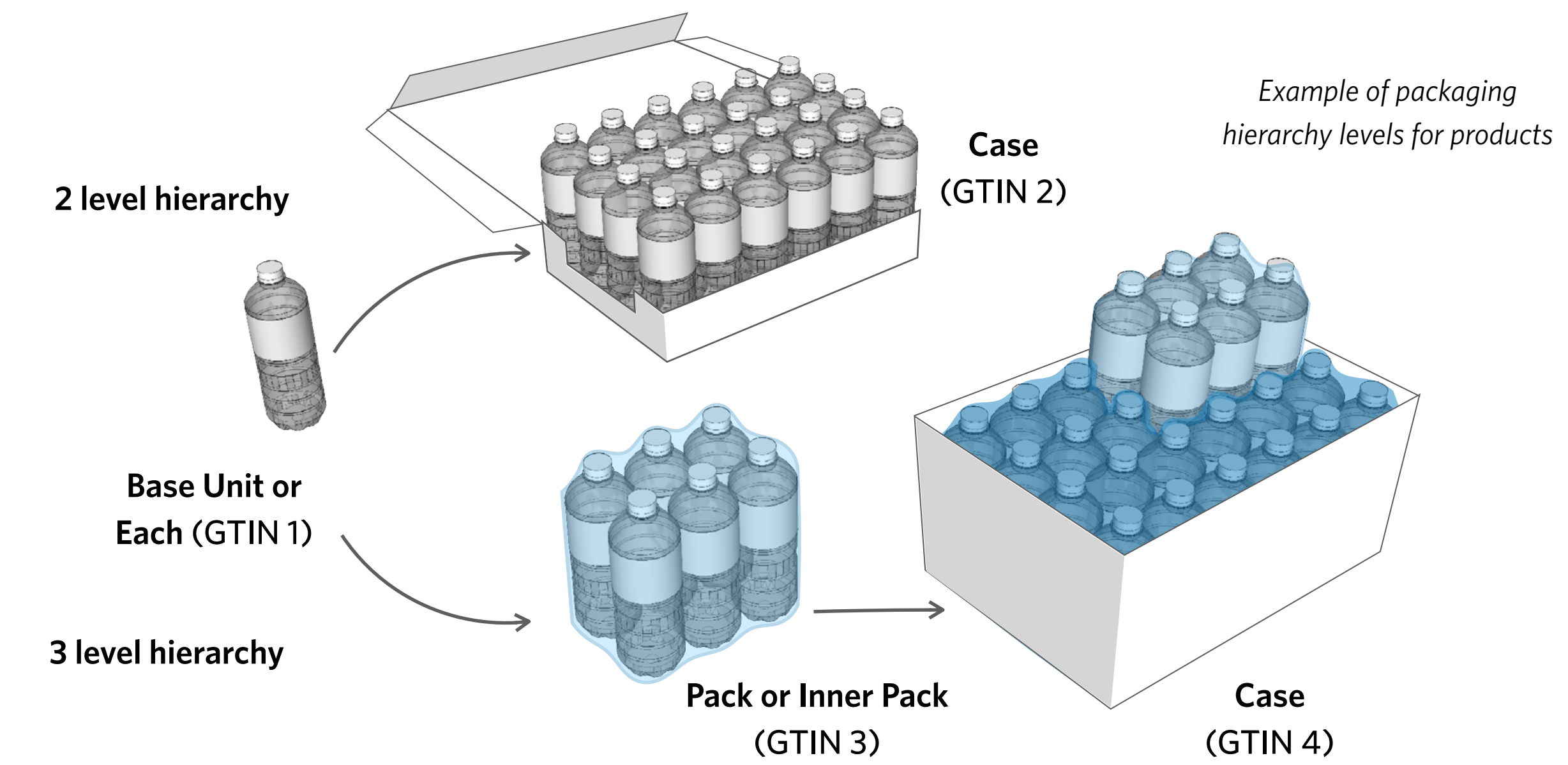
The following data standards have been defined and included to support the list of CTE’s and KDE’s listed in this module.

### Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a distributor location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location within the world.



### Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product’s packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, quantity etc are all considered separate variations and thus require separate GTINs. Each level of packaging should be numbered (and barcoded) separately to all other levels.

### Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.



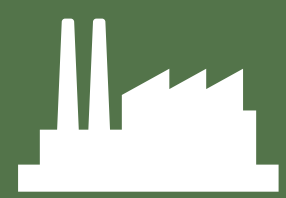
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Wholesale and  
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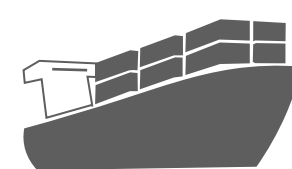
Retail  
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Food  
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Import  
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Export  
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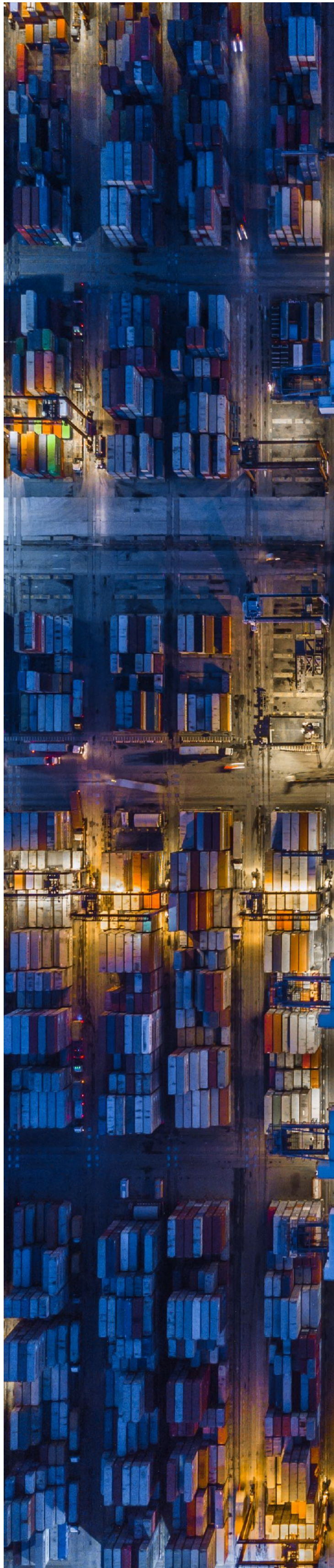


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## Asset Identification

The GS1 System provides a method for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item.

Asset Identifiers may be used for simple applications, such as the location and use of a given fixed asset (e.g., a personal computer), or for complex applications such as recording the characteristics of a returnable asset (e.g., a Intermediate Bulk Container), its movements, its life-cycle history and any relevant data for accounting purposes.

GS1 System asset identifiers can be used to identify any fixed assets of a Company. It is left to the discretion of the issuer to determine whether the Global Returnable Asset Identifier (GRAI), AI (8003), or Global Individual Asset Identifier (GIAI), AI (8004), is more suitable for the application concerned. Asset identifiers must not be used for any other purpose and must remain unique for a period well beyond the lifetime of the relevant records.



### Global Returnable Asset Identifier (GRAI) – AI (8003)

A Returnable asset is a reusable package or transport equipment of a certain value, such as a beer keg, a gas cylinder, a plastic pallet, or a crate.

The GS1 System identification of a returnable asset, The Global Returnable Asset Identifier (GRAI), enables tracking as well as recording of all relevant data.

A typical application using a GRAI is in tracking returnable beer kegs. The owner of the beer keg applies a barcode carrying a GRAI to the keg using a permanent marking technique. This barcode is scanned whenever the keg is supplied full to a customer and scanned again when it is returned. This scanning operation allows the beer keg owner to automatically capture the life-cycle history of a given keg and to operate a deposit system, if desired.

### Global Individual Asset Identifiers (GIAI) – AI (8004)

An individual asset is considered a physical entity made up of any characteristics. The Global Individual Asset Identifier (GIAI) identifies a physical entity as an asset. It must not be used for other purposes and must be unique for a period well beyond the lifetime of the relevant asset records.

Whether the assigned GIAI may remain with the physical item when changing hands depends on the business application. If it remains with the physical item, then it must never be re-used. This element string might, for example, be used to record the life-cycle history of a wine vat or barrel. By symbol marking the GIAI, using AI (8004), on a given vat, or barrel, wine manufacturers are able to automatically update their inventory database and track assets from acquisition until retirement.

Note: Whilst GS1 Asset Identifiers can be used to identify returnable assets such as Shipping Containers, it is recognised that globally accepted identifiers can also be used e.g. BIC code



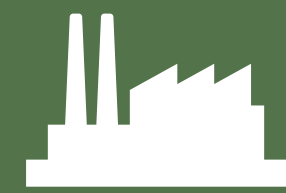
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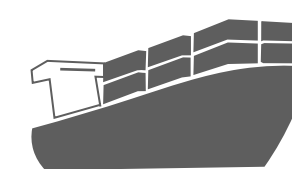
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Export  
Operations



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Information

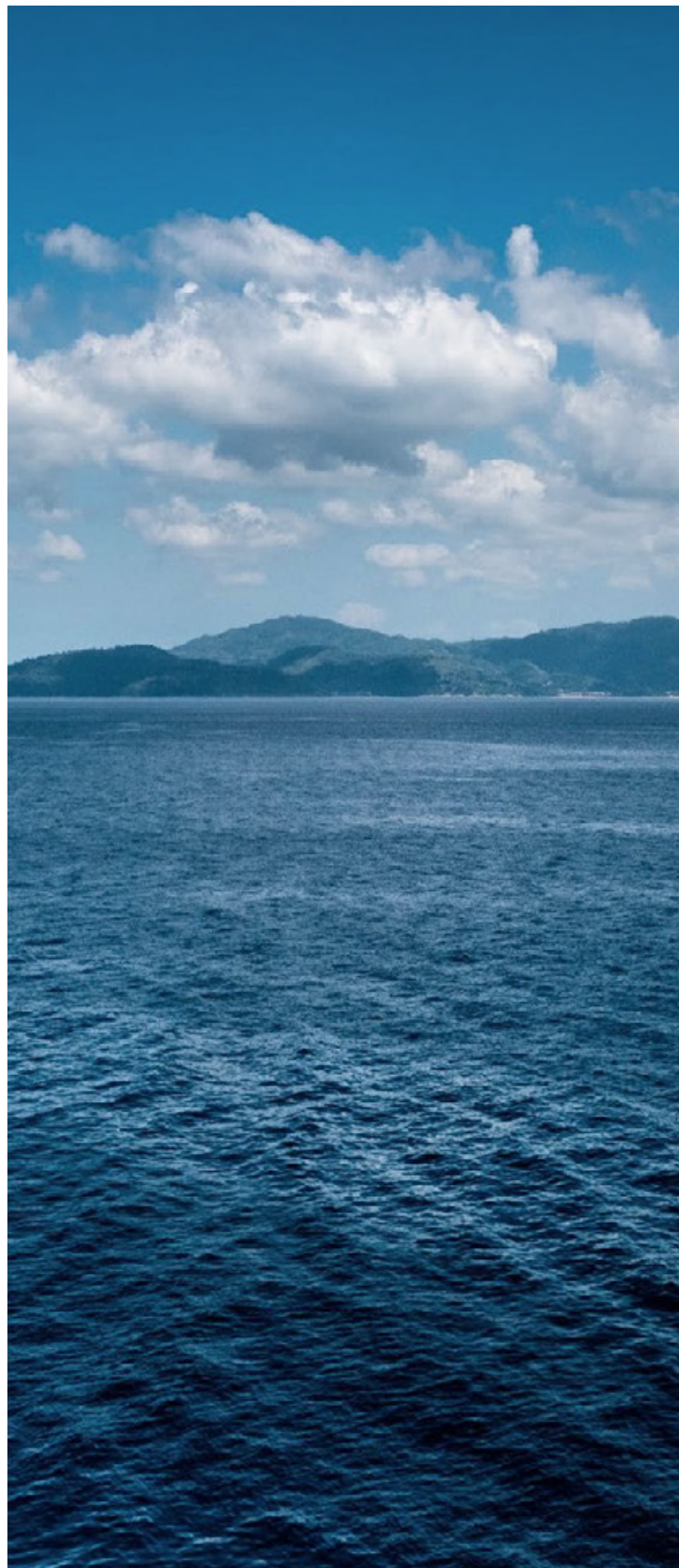


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Logistics Units (SSCC)

The Serial Shipping Container Code can be used by companies to identify a logistic unit, which can be any combination of trade items packaged together for storage and/or transport purposes; for example a case, pallet or parcel.

The SSCC is a crucial key for traceability, since it uniquely identifies each distributed logistic unit and its content.

- The SSCC enables companies to track each logistic unit for efficient order and transport management.
- The SSCC can be encoded in a barcode or EPC/RFID tag, ensuring the logistic unit can be accurately and easily identified as it travels between trading partners, anywhere in the world.
- When SSCC data is shared electronically via EDI or EPCIS, this enables companies to share information about the status of logistic units in transit, and reliably link it to related transport information such as shipment details.
- The SSCC enables companies to link to additional information about the logistic unit. This information can be communicated via a Despatch Advice or Advanced Shipping Notice (ASN) prior to the logistic unit’s arrival. Upon receipt the SSCC will be scanned, providing the required information to speed up the receipt of goods as well as the subsequent invoicing process.

The SSCC is fully compatible with ISO/IEC 15459 — Part 1: Unique identifiers for transport units. This is often referred to as the ISO licence plate and is a prerequisite for tracking and tracing logistic units in many international supply chains.

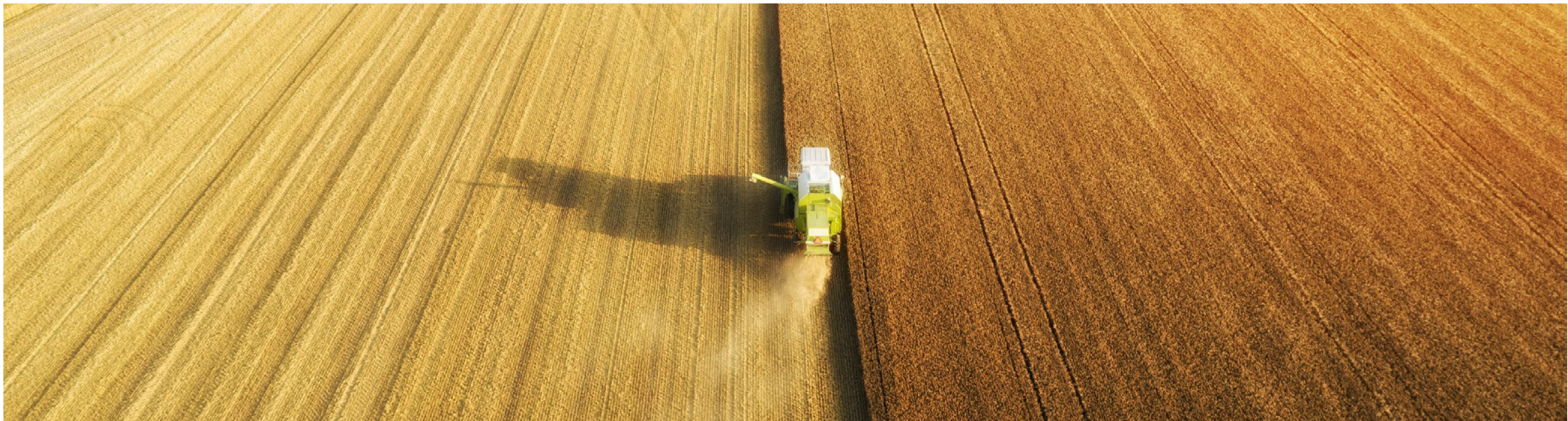
Global Identification Number for Consignment (GINC)

The Global Identification Number for Consignment can be used by companies to identify a consignment comprised of one or more logistic units that are intended to be transported together.

Logistic units in a particular shipment may be associated with different GINCs during various transport stages; for example, when the shipment gets consolidated with other shipments during its journey and de-consolidated again before it reaches the consignee.

The GINC allows freight forwarders and transport providers to keep track of the logistic units being transported together.

- The GINC is typically used by freight forwarders to instruct transport providers; for example, on a Master Airway Bill (MAWB) or a Master Bill of Lading (MBL).
- The GINC can be encoded in a barcode or as text on a MAWB / MBL, or in addition to the Serial Shipping Container Code (SSCC), on a logistics label.
- The GINC can be electronically used in transport instruction and transport status messages between freight forwarder and transport provider.



Global Shipment Identification Number (GSIN)

The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together.

The logistic units keep the same GSIN during all transport stages, from origin to final destination. The GSIN identifies the logical grouping of one or several logistic units, each identified with a separate Serial Shipping Container Code (SSCC).

- The GSIN can be encoded by the shipper in a barcode or as text on a House Way Bill, or in addition to the SSCC, on a logistics label.
- The GSIN can be electronically used by a company in transport instruction and transport status messages between freight forwarder and transport provider, and also as a reference in the Despatch Advice.

The GSIN is fully compatible with ISO/IEC 15459 — Part 8: Grouping of Transport Units. The GSIN also meets the requirements for a Unique Consignment Reference (UCR) according to the World Customs Organisation.



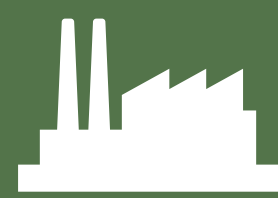
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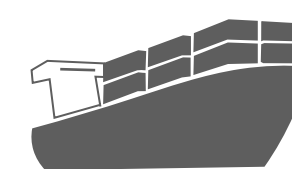
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Data standards that apply to key data elements and shared information are identified in this section:

Data Element	Examples	Valid Values	Data Type/ Format	Further information
Location	Manufacturing Plant, Finished Goods, Location, Dispatch Dock	Global Location Number (GLN)	N13	Further information on Global Location Numbers (GLN), their structure, use, creation can be found here: <a href="https://www.gs1.org/standards/id-keys/gln">https://www.gs1.org/standards/id-keys/gln</a>
Date/Time	Production Date and/or Time, Use By date, Best Before Date, Pack Date	Year- Month- Date	YYMMDD	Whilst human readable date formats can vary e.g. 21 December 2020, December 21 2020, the structure of the date format to be encoded into systems and barcodes requires a consistent approach. The globally adopted standard for date recording is YYMMDD
Product Identifiers	Input materials such as raw ingredients and packaging, Outputs such as finished goods, packaged or processed goods	Global Trade Item Number (GTIN)	N14	Unique product identification of all traceable objects is a foundational element of any traceability system. Information on how to allocate a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/">https://www.gs1.org/1/gtinrules/en/</a> Information on when to change a GTIN: <a href="https://www.gs1.org/1/gtinrules/en/decision-support">https://www.gs1.org/1/gtinrules/en/decision-support</a> Information on how to allocate a GTIN to a variable weight or variable measure trade item: <ul style="list-style-type: none"><li><a href="https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file">https://www.gs1au.org/download/GS1au-fact-sheet-variable-measure-non-retail.pdf/file</a> (for VM non-retail items) and</li><li><a href="https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-variable-measure-retail.pdf/file</a> (for VM retail POS items)</li></ul>
Traceability Attributes	Batch/Lot code, Serial Number		AN20	Traceability Attributes, such as Batch or Lot Number or Serial Number, etc., can be encoded into barcodes along with the Global Trade Item number enabling capture information along the supply chain. Also referred to as Application Identifiers, each has its own unique identifier and format. List of Application Identifiers: <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-ais">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-application-identifiers-ais</a>
Logistics Units	Pallet of packaged product, crate or box of finished goods	Serial Shipping Container Code (SSCC)	N18	Logistic unit is an item of any composition established for transport and/or storage which needs to be managed through the supply chain. Logistic units take many forms, a single box containing a limited number of products, a pallet of multiple products, or an intermodal container containing multiple pallets. <a href="https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits">https://www.gs1au.org/resources/standards-and-guidelines/identification-numbers/types-of-gs1-id-keys#LogisticsUnits</a>
Assets	Returnable assets i.e. IBC or individual assets i.e. a crate	Global Returnable Asset Identifier (GRAI)	O + AN20	Can be identified as an asset type only or an optional serial number can be added to distinguish individual assets <a href="https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file">https://www.gs1au.org/download/gs1au-fact-sheet-identification-of-assets.pdf/file</a>
		Global Individual Asset Identifier (GIAI)	AN30	
Consignment	Grouping of logistics units assigned by the transport company	GINC	N30	The Global Identification Number for Consignment can be used by companies to identify a consignment comprised of one or more logistic units that are intended to be transported together. <a href="https://www.gs1.org/standards/id-keys/global-identification-number-consignment-ginc">https://www.gs1.org/standards/id-keys/global-identification-number-consignment-ginc</a>
Shipment	Grouping of logistics units	GSIN	N17	The Global Shipment Identification Number (GSIN) is a number assigned by a seller and shipper of goods to identify a shipment comprised of one or more logistic units that are intended to be delivered together. <a href="https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin">https://www.gs1.org/standards/id-keys/global-shipment-identification-number-gsin</a>



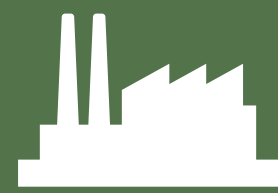
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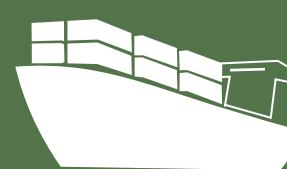
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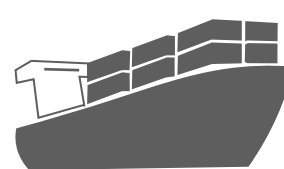
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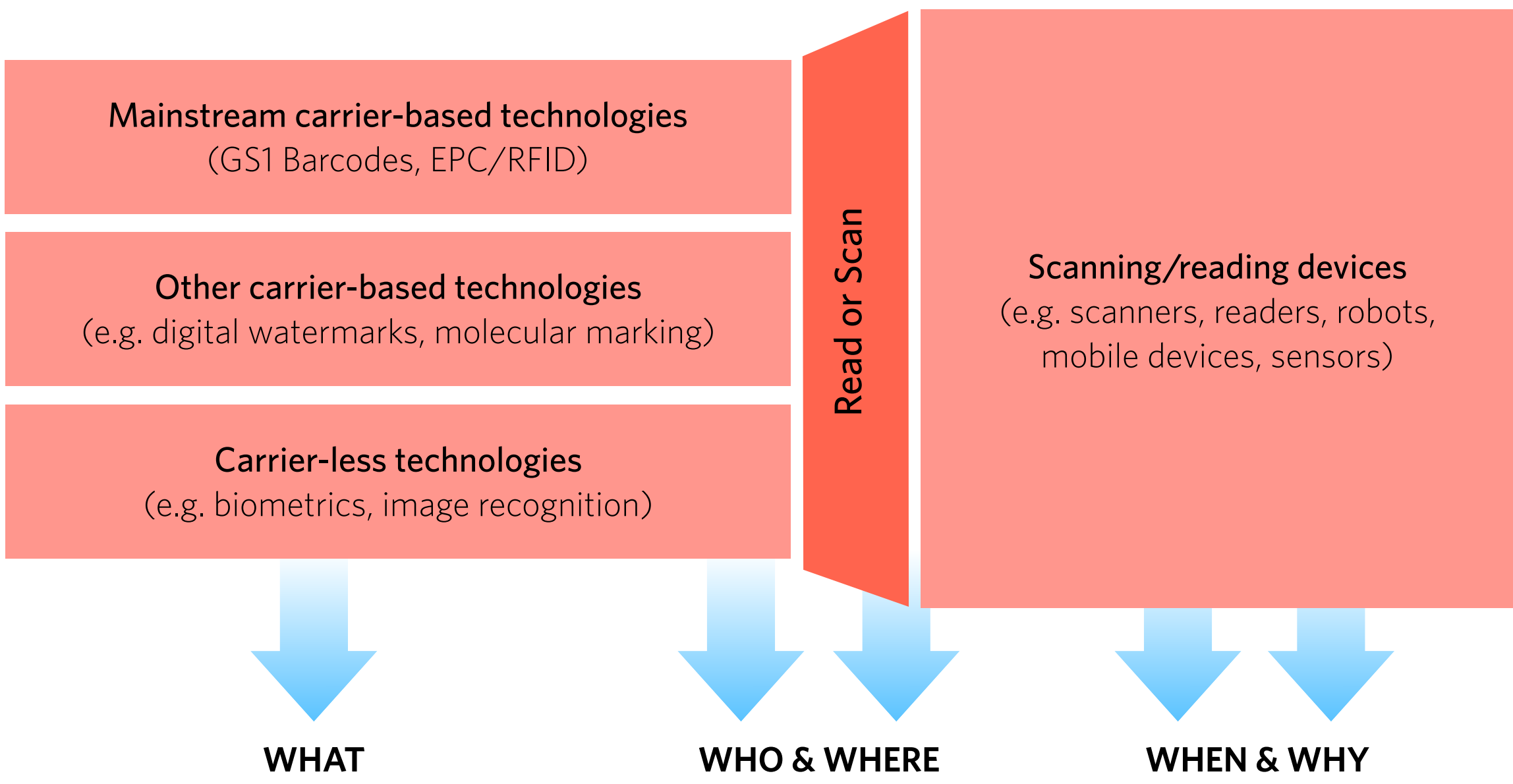
How to capture the KDEs

How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

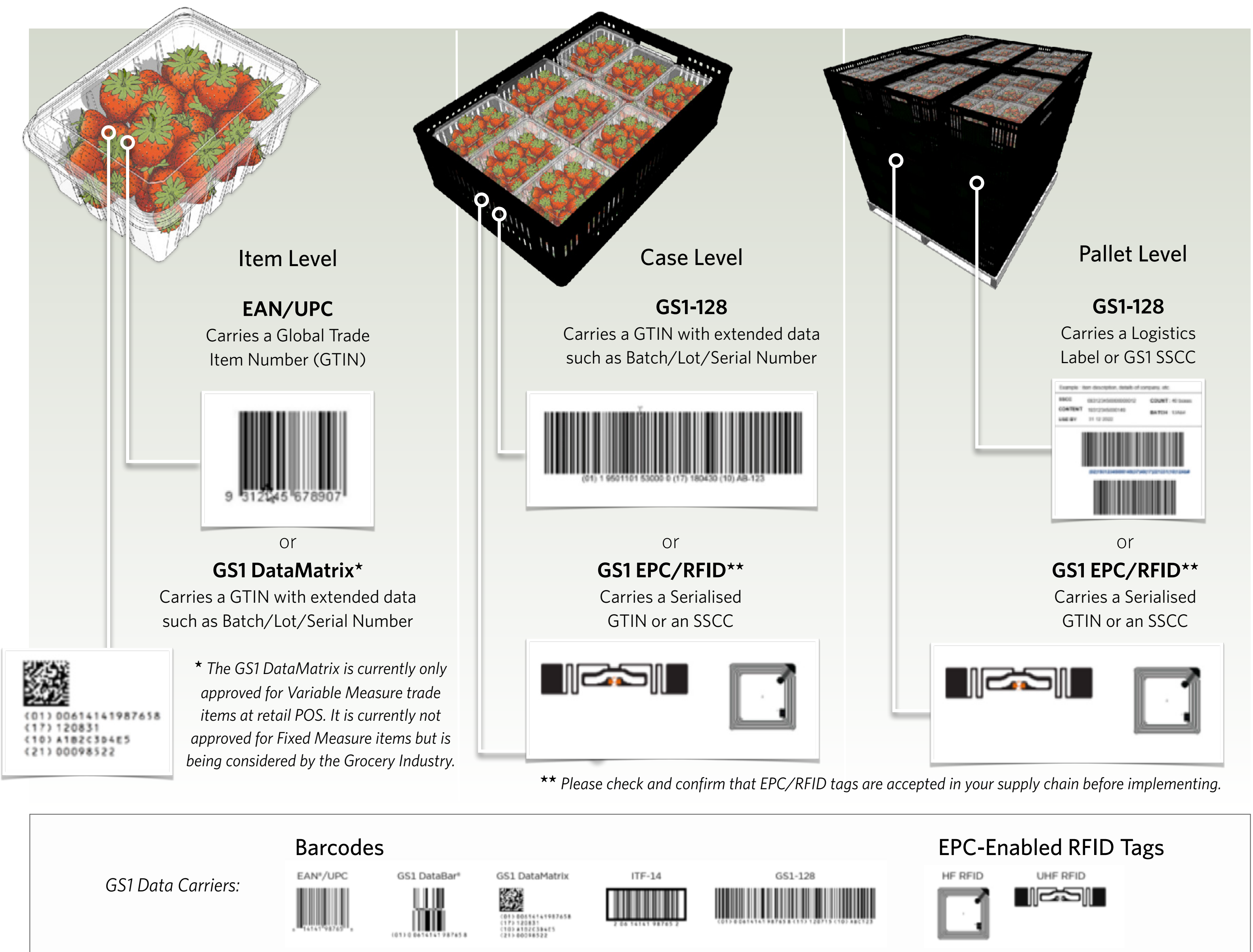


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

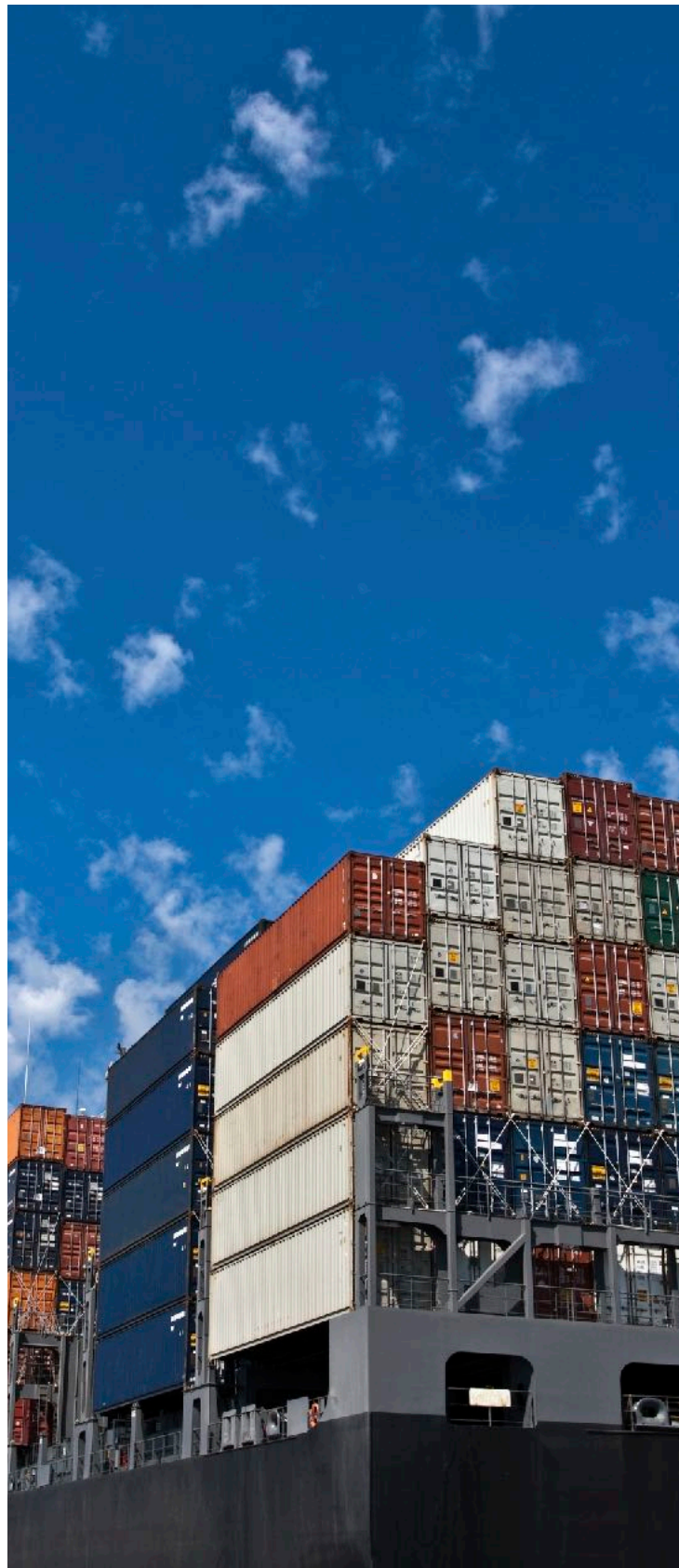
Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.







Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc.  
The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number

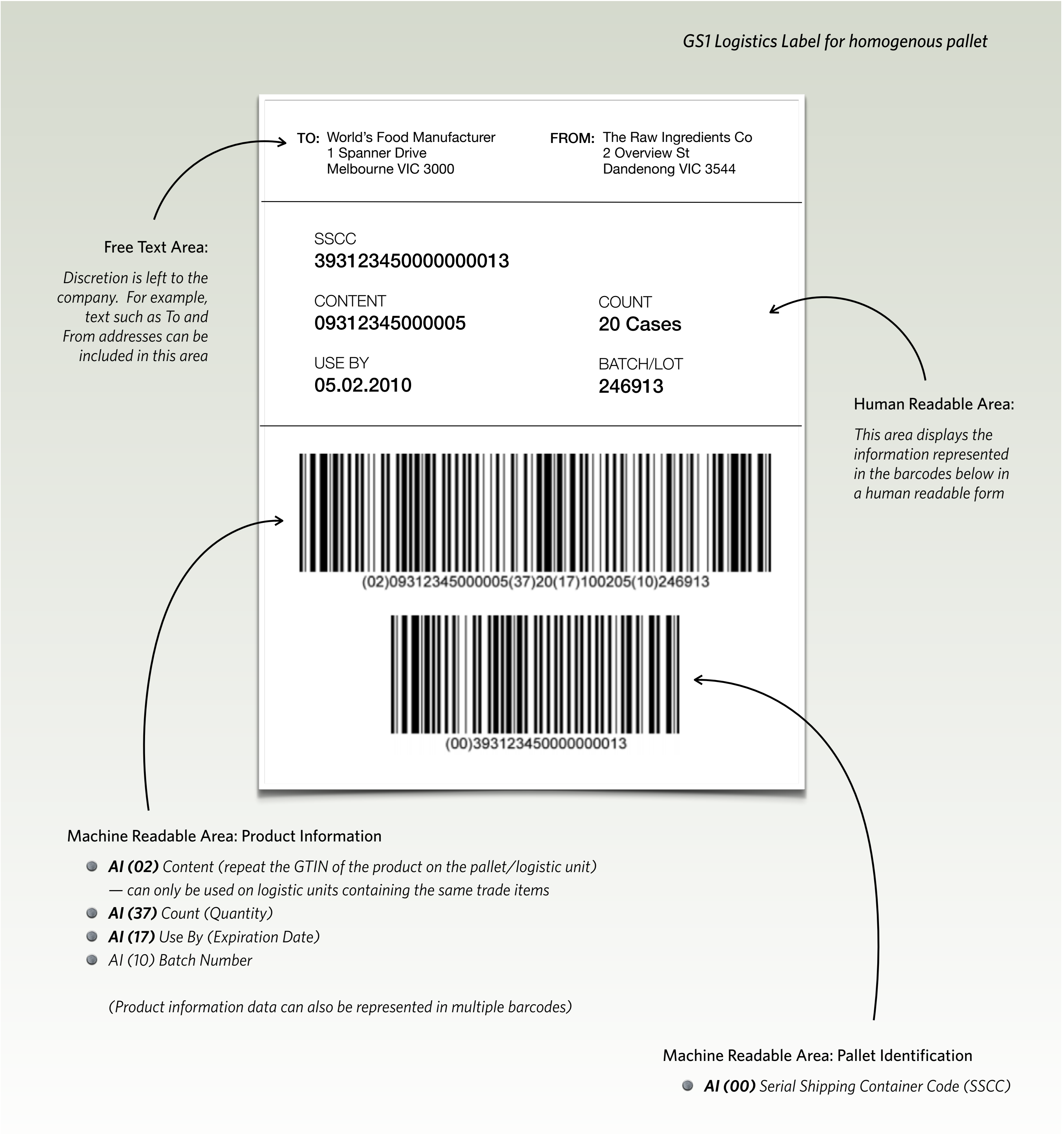


GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number

The use of the GS1 DataMatrix at point of sale is also under consideration for future use as it can encode additional traceability information.  
These barcodes require an imaging scanner to decode the information.



GS1 DataMatrix



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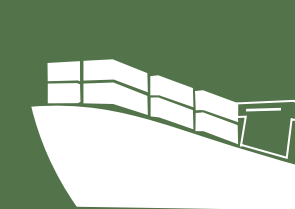
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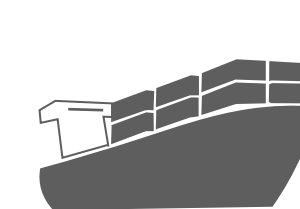
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FREE INFORMATION

Example: Beef Topside 600kg, details of company

**SSCC** 093123450000000012 **Prod Date** 3012/2008  
**CONTENT** 99311781001157 **Count** 40 boxes **WEIGHT** 600kg



GS1 Logistics Label homogenous logistics unit containing variable weight products

FROM  
GS1 GO  
Avenue Louise 326  
1050 Brussels

BE85250

TO  
GS1 GO Princeton Office  
1009 Lenox Drive

SPECIAL ORDER

1TE.00

0007

To be delivered : ECT VVD - X020399

GSIN

950110100000000001

SSCC

095011011234567896

A standard 1D barcode representing the GSIN (950110100000000001).

A standard 1D barcode representing the SSCC (095011011234567896).

GS1 Logistics Label homogenous logistics unit containing GSIN reference



Global Returnable Asset Identifier, AI (8003),  
represented in a GS1-128 Barcode



Global Individual Asset Identifier, AI (8004),  
represented in a GS1-128 Barcode



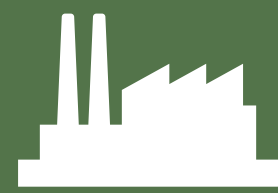
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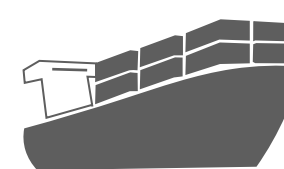
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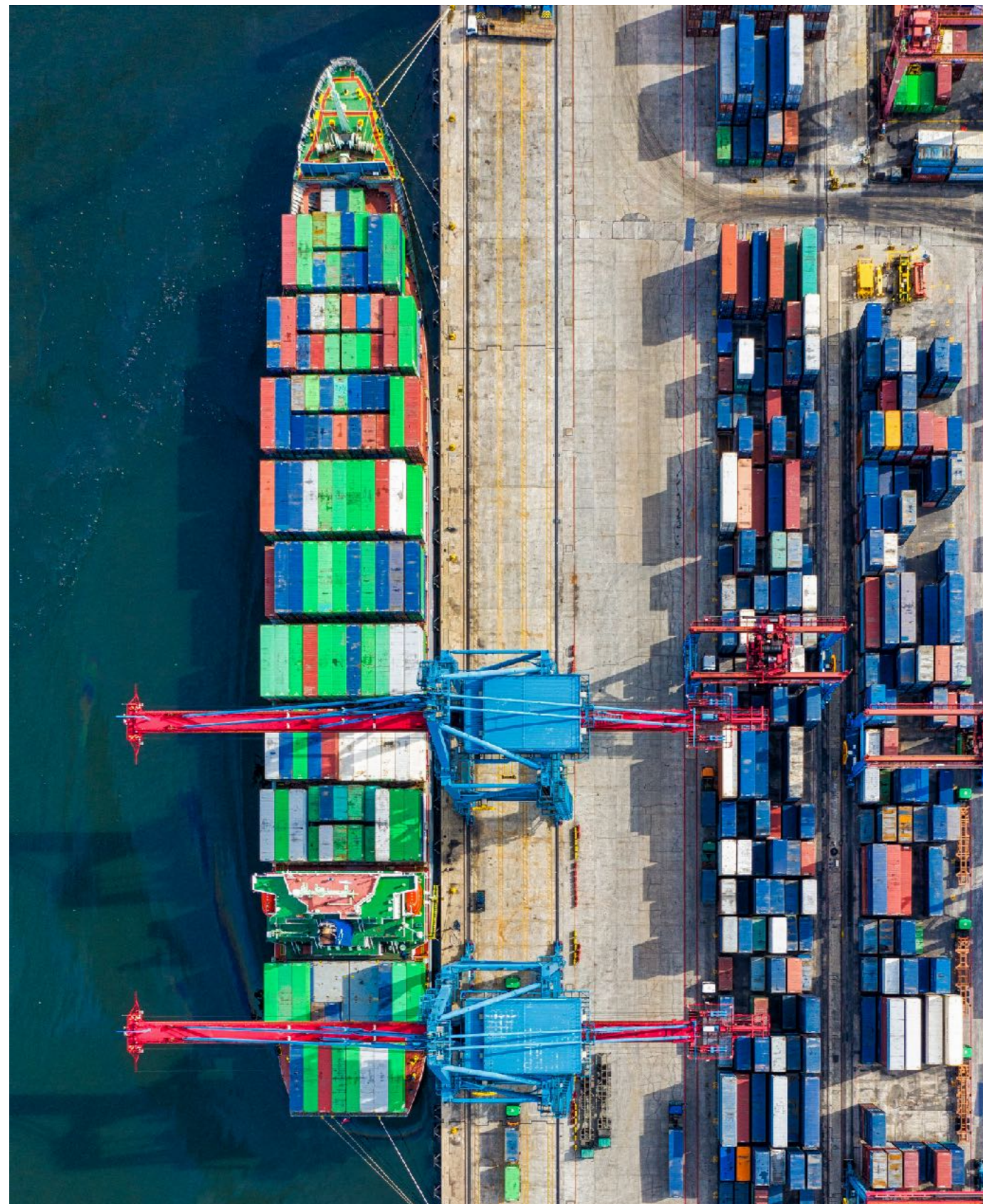
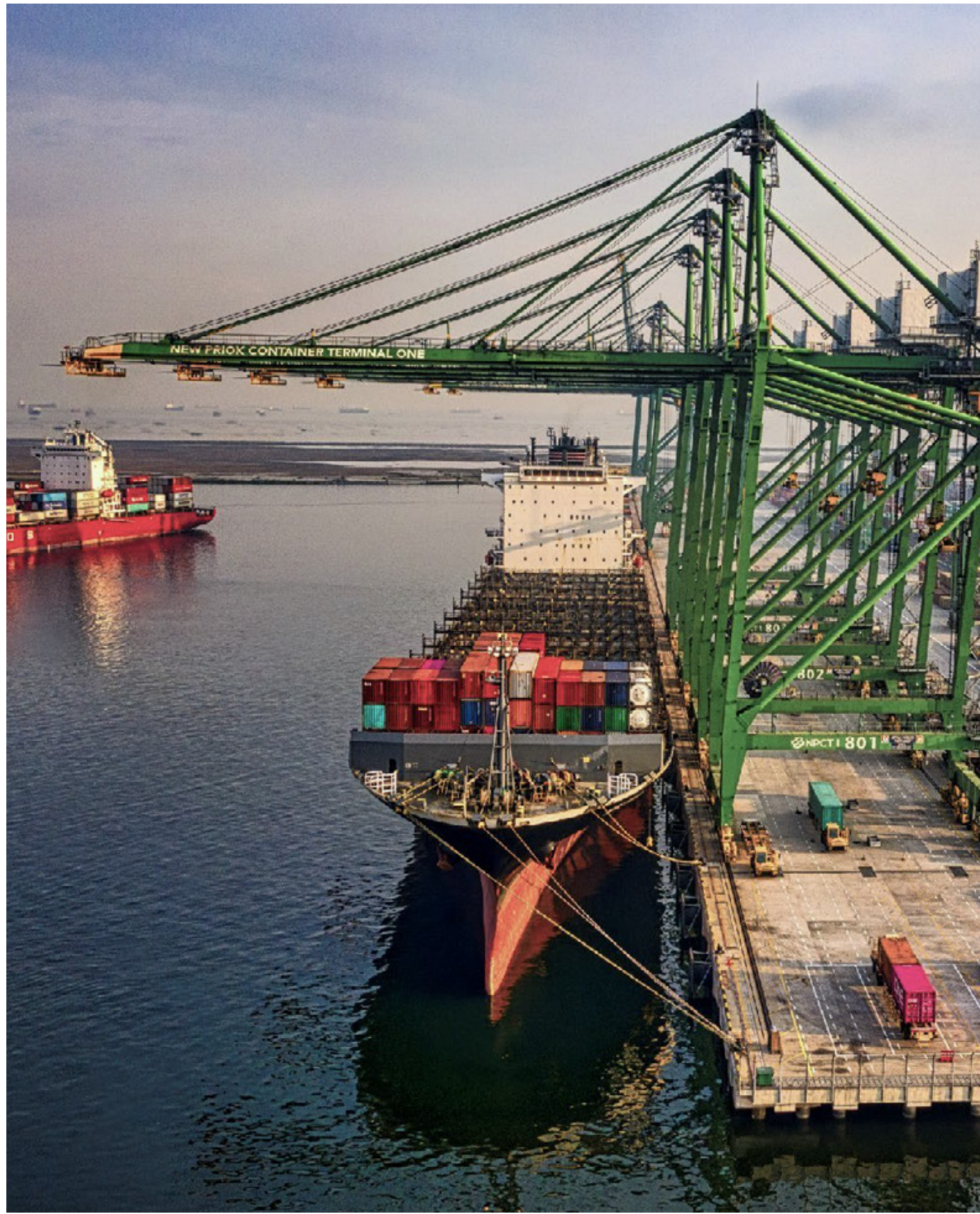


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## How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method). Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing. In addition to product scanning, logistics labels can also be scanned to capture vital traceability data as logistics units (pallets, parcels, grouping of products) move through the supply chain.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

The Critical Tracking Events highlight key events that require data capture and provide guidance on what information needs to be captured. Traceability data, if correctly encoded in Barcodes will be picked up by scanners with systems storing the relevant data captured for future data sharing and use.

For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are putaway, picking, inspecting packing, shipping, transporting, selling. Often a combination of fixed mounted scanners or readers and handheld devices will be applied to capture the critical tracking events.

The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost.



Range of scanners which can read liner, 2D and RFID barcodes

### Useful Links

Export Rules  
<https://www.agriculture.gov.au/market-access-trade/improving-export-legislation>

Export premises  
<https://www.agriculture.gov.au/export/from-australia>

Business licensing and permits  
<https://www.foodstandards.gov.au/about/foodenforcementcontacts/Pages/default.aspx>

Incoterms 2020  
<https://www.abf.gov.au/help-and-support-subsite/FactSheets/incoterms-2020-reference-guide.pdf>

Border regulation  
<https://www.abf.gov.au/importing-exporting-and-manufacturing/exporting/how-to-export>

MICoR  
<https://www.agriculture.gov.au/export/micor>

International Freight Forwarders  
<https://www.ifcbaa.com/>



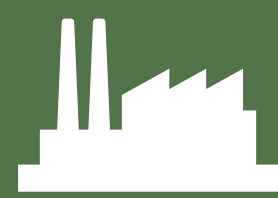
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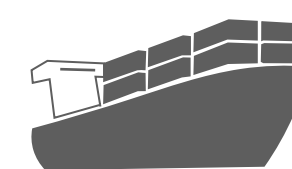
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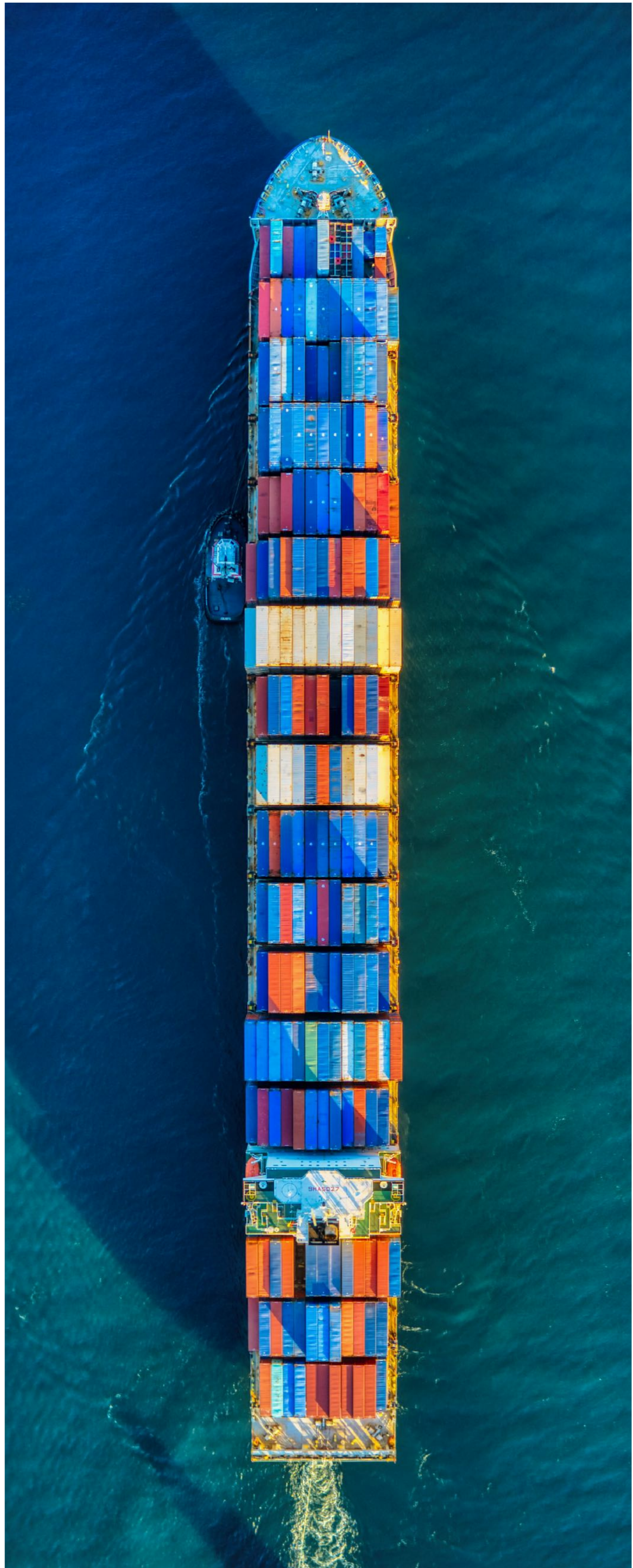


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## Glossary

Air waybill (AWB)	An AWB is a document that controls the routing of an exporter's cargo while it is in the hands of the air carrier or a consolidator. It is a contract for carriage; however, it cannot be negotiated.
Bill of Lading (BL/BOL)	<p>Although the term historically related only to carriage by sea, a bill of lading may today be used for any type of carriage of goods.</p> <p>The bill of lading is a legally binding document that provides the carrier and shipper with all of the necessary details to accurately process a shipment. It has three main functions. First, it is a document of title to the goods described in the bill of lading. Secondly, it is a receipt for the shipped products. Finally, the bill of lading represents the agreed terms and conditions for the transportation of the goods.</p>
Certificate of Origin (CO)	<p>The Certificate of Origin (CO) is a document to certify the place of growth, production or manufacture of goods. It is required when exporting to specific countries, when requested by the consignee for customs clearance, or when it is stipulated in a letter of credit. The CO identifies goods and contains an express certification by a government authority, or other empowered body, that the goods in question originate in a specific country. Many overseas importers insist upon a CO when dealing with Australian exporters.</p> <p>Although obtaining a CO is straightforward, it's important that specific procedures are followed:</p> <ul style="list-style-type: none"><li>● You must include an Exporters Information Form Update. This form has to be completed and forwarded to the appropriate issuing body (see below for a list), together with a list of signatories authorised to sign the certificates on behalf of your company.</li><li>● Evidence of origin (ie. copies of the invoice, a bill of lading, a letter of credit, or a statutory declaration) must be supplied prior to stamping.</li><li>● Exporters must provide a copy of the documents being stamped for Chamber records.</li><li>● Before submission for authentication, the exporter must sign all export documents on the bottom left-hand side under the exporter's declaration.</li><li>● Importantly, Certificate of Australian Origin forms can't be used for any other origin, other than Australian.</li><li>● Certificates of Origin must always be typed. <sup>5</sup></li></ul> <p>A list of Certificate of Origin providers:</p> <ul style="list-style-type: none"><li>● Ai Group issue certificates nationally</li><li>● VIC: Victorian Chamber of Commerce</li><li>● NSW: NSW Business Chamber</li><li>● SA: Business SA</li><li>● QLD: Chamber of Commerce &amp; Industry Queensland</li><li>● ACT: ACT &amp; Region Chamber of Commerce &amp; Industry</li><li>● Canberra Business Chamber issues Certificates of Origin</li><li>● WA: Chamber of Commerce &amp; Industry Western Australia</li><li>● NT: Chamber NT</li><li>● TAS: Tasmanian Chamber of Commerce and Industry</li><li>● AACCI Australia Arab Chamber of Commerce &amp; Industry</li></ul>



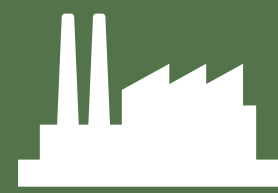
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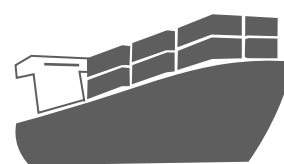
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Cargo Terminal Operator (CTO)	Air Cargo Terminal Operators and Sea Port Cargo Terminal Operators (stevedores) manage the interface between air and shipping lines, landside logistics and border agencies. They load and unload aircraft and vessels, load and unload rail, road and conveyor-delivered cargoes, provide security and a range of terminal services.
Export Declaration Number (EDN)	<p>An Export Declaration Number is a nine-digit number issued through NEXDOC or Customs SEW system, which is based on an exporter declaring details of goods to be shipped. It is used in the exporting and importing process for</p> <ul style="list-style-type: none"><li>● Identification of individual export consignments included in one consolidated consignment</li><li>● Acknowledgement of an exported consignment in an outward manifest</li><li>● Notification of release or return of the goods from or to a warehouse</li><li>● Notification of release or removal of goods from a wharf or airport</li></ul>
Pre-Receipt Advice (PRA)	Exporter provides details about the cargoes/containers to be shipped and the CTO responds with cargo acceptance. Only then, the goods are dispatched to the terminal for loading into the aircraft/vessel.
Proof of Delivery (POD)	Consignor of the receipt and acceptance of a delivery. A signed POD enables the Transport Company to raise an invoice.
Purchase Order (PO)	A commercial document issued by a buyer to a supplier. This is a legally binding offer to buy product in return for payment. The terms and conditions for delivery and payment are detailed in this document, which also details the product quantity, price, terms and conditions, product quality.



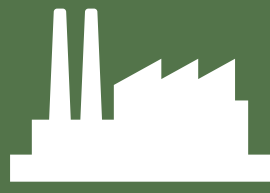
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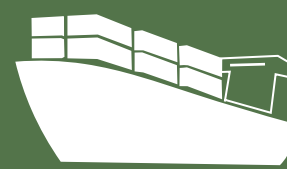
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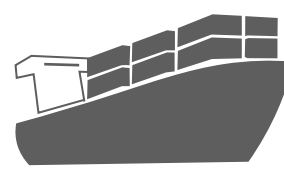
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# Consumer Information

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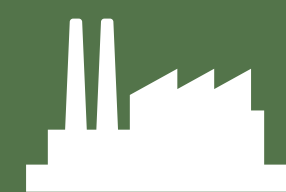
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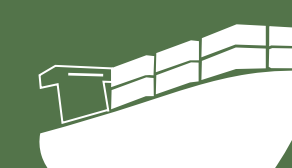
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## Consumer Information

The Center for Food Integrity defines transparency as “... *the rational offering of honest information that has the emotional appeal of inviting confidence and authentic connection*”  
[www.foodintegrity.org/wp-content/uploads/2018/03/Transparency-Report-FINAL.pdf](http://www.foodintegrity.org/wp-content/uploads/2018/03/Transparency-Report-FINAL.pdf)

Using this definition, transparency can be viewed as more of an individual company's choice rather than a supply chain-wide decision to reveal information. Some components of traceability may be incorporated into a transparency commitment by a company, such as disclosing suppliers. Conversely, a product can be robustly and digitally traceable without the company providing that information to their customers.<sup>1</sup>

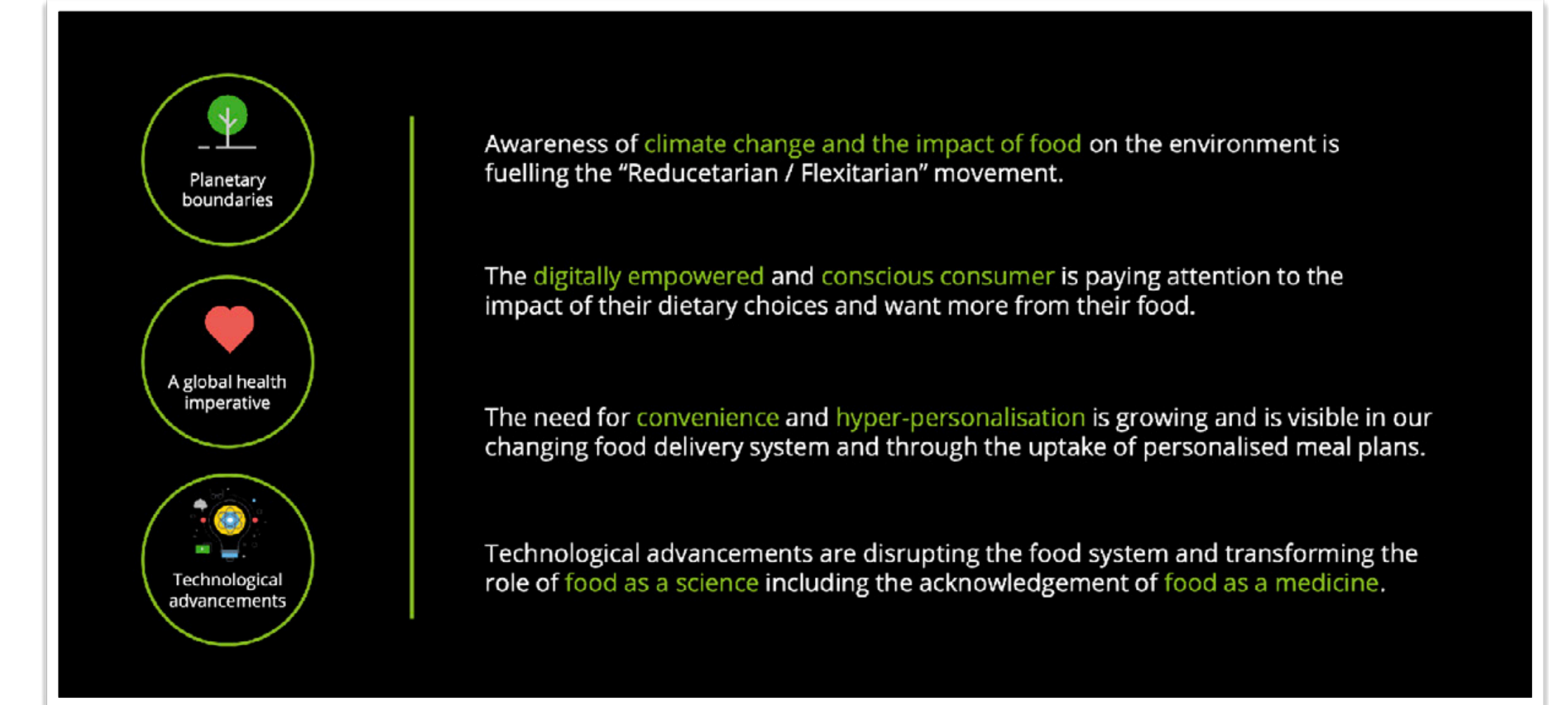
This module covers key activities related to the sale of the product to the end consumer, often from supermarkets, markets and convenience stores. The consumer makes a decision to purchase the product based on a range of information from price, product appearance, claims, certifications, content/ingredients, labelling design and nutritional value. Where the product cannot be clearly viewed, the label and packaging become critical to consumer information.

Australian consumers benefit from high standards in food production and labelling of food products. Additionally, Australian consumers may seek information on the circumstances of the food production and whether the product conforms to their values, ethical choices and specific personal nutritional needs.

It is important to note that having traceability does not equate with provenance. Provenance is the ability to verify that the product is as stated and from an origin as claimed. The traceability data framework should be able to share provenance verification with supply chain partners and potentially consumers, however it does not create provenance verification. In this module, processes/activities were identified to support consumer information and link with traceability:

- Identification of the product at origin
- Verification of provenance
- Smart Labelling and product information
- Feedback from consumers

1. <https://www.ift.org/news-and-publications/blog/2019/april/traceability-and-transparency-do-you-know-where-your-seafood-comes-from>
2. <https://www2.deloitte.com/content/dam/Deloitte/au/Documents/consumer-industrial-products/deloitte-au-cip-future-of-food-key-trends-170320.pdf>



Source: Deloitte [The Future of Food 2020](#)<sup>2</sup>



Credit: Perfection Fresh



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Production



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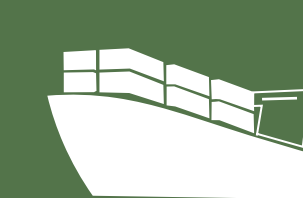
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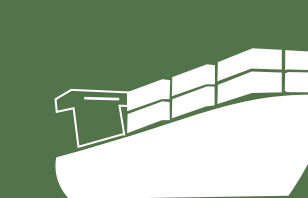
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## Identification of the product at origin

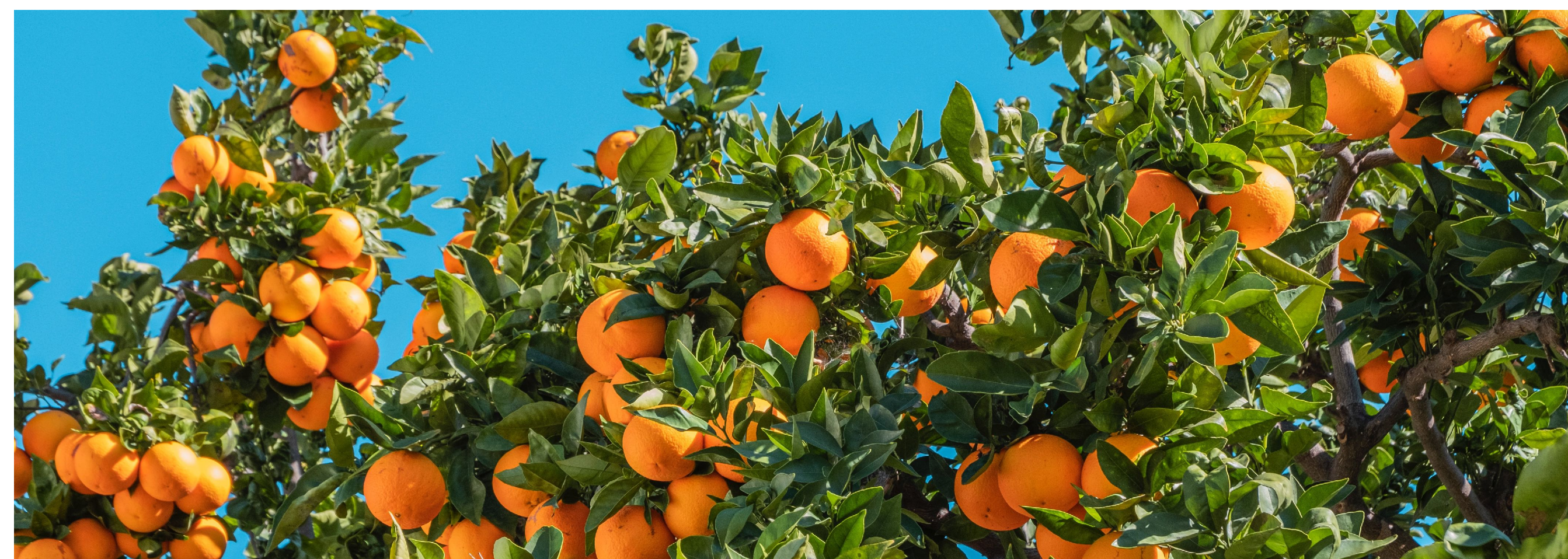
Providing a unique identifier for the origin of the product, the specific grow site, such as a vineyard, orchid, planting row or shed, can be achieved using a global location number or GLN. This can be encoded in the product label. Similarly, processors and manufacturers can record this origin code from their supplier and link this with the inputs or ingredients for the product they create. In the case of livestock, the GLN and the state-issued Property Identification Code (PIC) has been used as a basis of identifying the grower entity and the property location.

For those receiving bulk products, use of a unique lot number can be used alongside the grower GLN to identify the sources of co-mingled product in a silo/bunker/bin.

These activities are a means to link provenance to the traceability data model described in the Implementing Food Traceability Guide.

There are multiple technologies available to capture data on the product origin and conditions of production, including Blockchain, Internet of Things (IoT), Radio Frequency Identification (RFID), Quick Response (QR) codes and Barcodes. In addition, there are software-based technologies that are able to capture the varied digital signals created when a critical tracking event (CTE) occurs in a device-agnostic manner, and from this create a holistic picture of the journey of the product. In the case of serialisation, this can be done at a very granular (sell unit) level.

Combining suitable technologies and symbologies with the critical tracking events and key data elements and using global data standards, the entire supply chain can be made transparent, expanding the potential for consumer information.

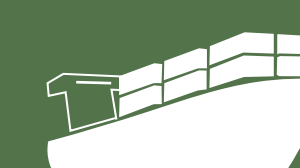
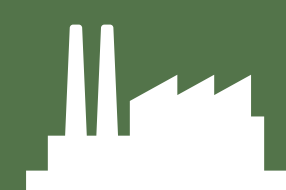


### Key tasks related to traceability

- Use GLN and PIC codes to identify the entity and location of origin of the product or ingredient
- To identify the source of bulk product, use lot level identification combined with grower GLN/PIC

### Key participants

- Growers and primary producers
- State PIC issuing bodies
- GLN issuing organisation
- Wholesalers
- Processors
- Manufacturers







## Verification of provenance

There are a range of technologies available to verify the provenance and integrity of a product. Food analysis laboratories conduct a range of tests. Some are able to link the product to the unique soil mineral or water “signature” of a region, or to test claims associated with organic or free-range production.

A certificate from an accredited laboratory can provide product claim and provenance verification. Creation of a unique identifier for these verification certificates, providing them to supply chain partners in a cyber-secure, encrypted and authenticated message, enables provenance verification to accompany the product. This information then becomes a product attribute that may be shared with end consumers.

Producers, processors and manufacturers often rely on vendor or supplier assurance programs to underpin product claims. However, these assurance symbols may be replicated on counterfeit product. In order to prevent this, a document code contained as a product attribute in a barcode can verify the accreditation is true and current. Recording data from the critical tracking events (CTEs) in this Guide will enable detailed information to be gathered, from the preparation of grow sites, purchase of seeds, livestock, fingerlings, seedlings, or eggs, identified in the On-farm Production module and the transformation of raw materials in the Processing and Manufacturing module.

This data is used for E2E or B2B transactions, to track the product’s journey, to facilitate handovers of custody, to comply with regulatory regimes or buyer specifications. In recognition of the interest of growers in marketing the story of their product, AgriFutures has prepared a toolkit to assist primary producers in this task – Provenance Storytelling for Success. <sup>1</sup>



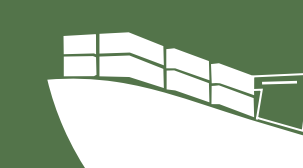
1. <https://www.agrifutures.com.au/rural-industries/provenance-and-story-telling/>

### Key tasks related to traceability

- Embed test certificate codes related to provenance and integrity as an attribute of the product ID

### Key participants

- Growers and primary producers
- Accredited analytic laboratories
- Product assurance bodies e.g. *MLA's Livestock Production Assurance, Australian Certified Organic*
- Wholesalers
- Processors
- Manufacturers







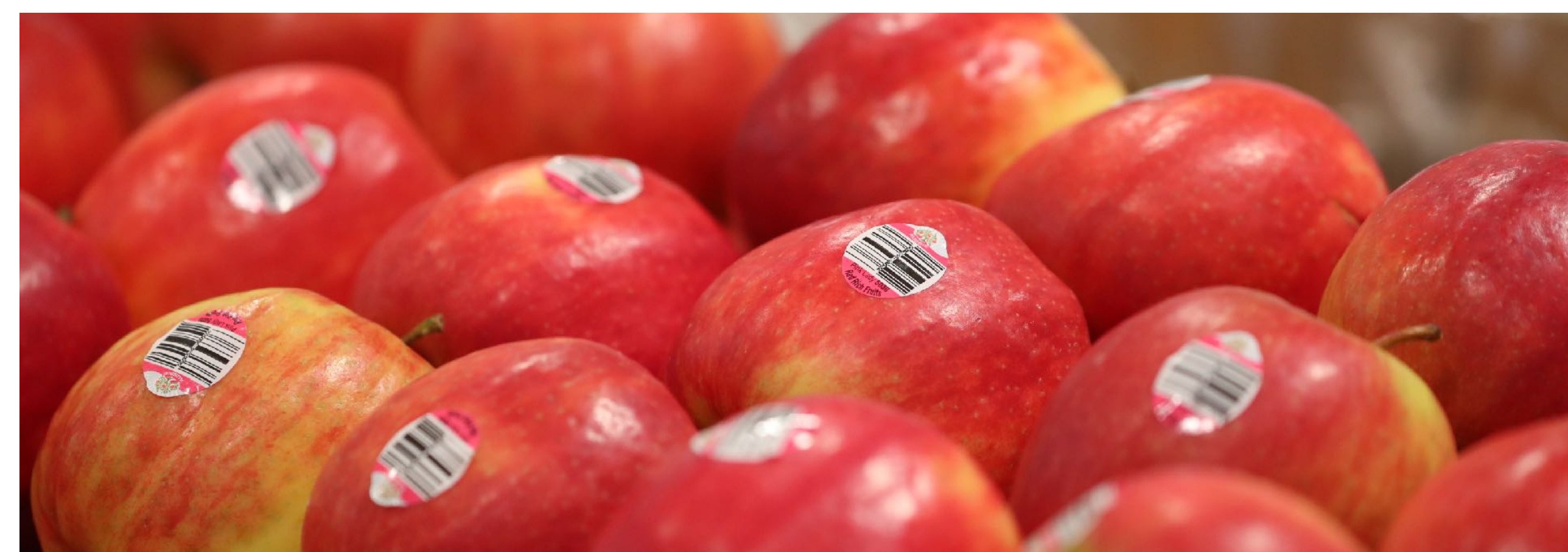
## Smart labelling and product information

Requirements for food labelling are described by FSANZ and cover a variety of foods and circumstances, such as product labelling for E2E sales versus B2C sales. The Australian Government also has requirements for country of origin labelling, weights and measures and Australian product content.<sup>1</sup>

Despite large amounts of information being encoded on product packaging and item labels, there are opportunities for brand owners to provide additional product information for consumers through use of smart labels. These labels use QR codes, sensors, microchips to enable information to be generated from the brand owner of the product to the consumer.

Smart labels have a dual purpose in providing consumer information and in traceability of the product; they can indicate deterioration of the product, as they change colour or blister, detecting oxygen and bacteria levels. This helps to notify consumers and avert food waste. For high value items such as liquor, smart labels containing an IoT sensor using Near Field Communication/5G can enable anti-tampering and tracking in transit. These embedded devices can detect changes in temperature and humidity via packaging and labels, while the product is in transit or storage. They will also indicate any tampering with the bottle.

Consumers can use a specific Application (App), scan a QR code or digital barcode on the product to access product information held by the brand owner/manufacturer or grower; to search via the Web; or conduct a product search on a registry of brands and products to gain additional information via smart phone, tablet or desktop.



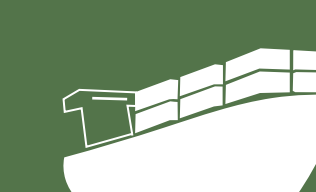
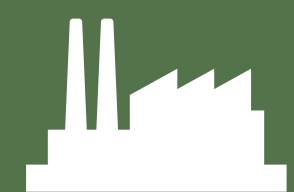
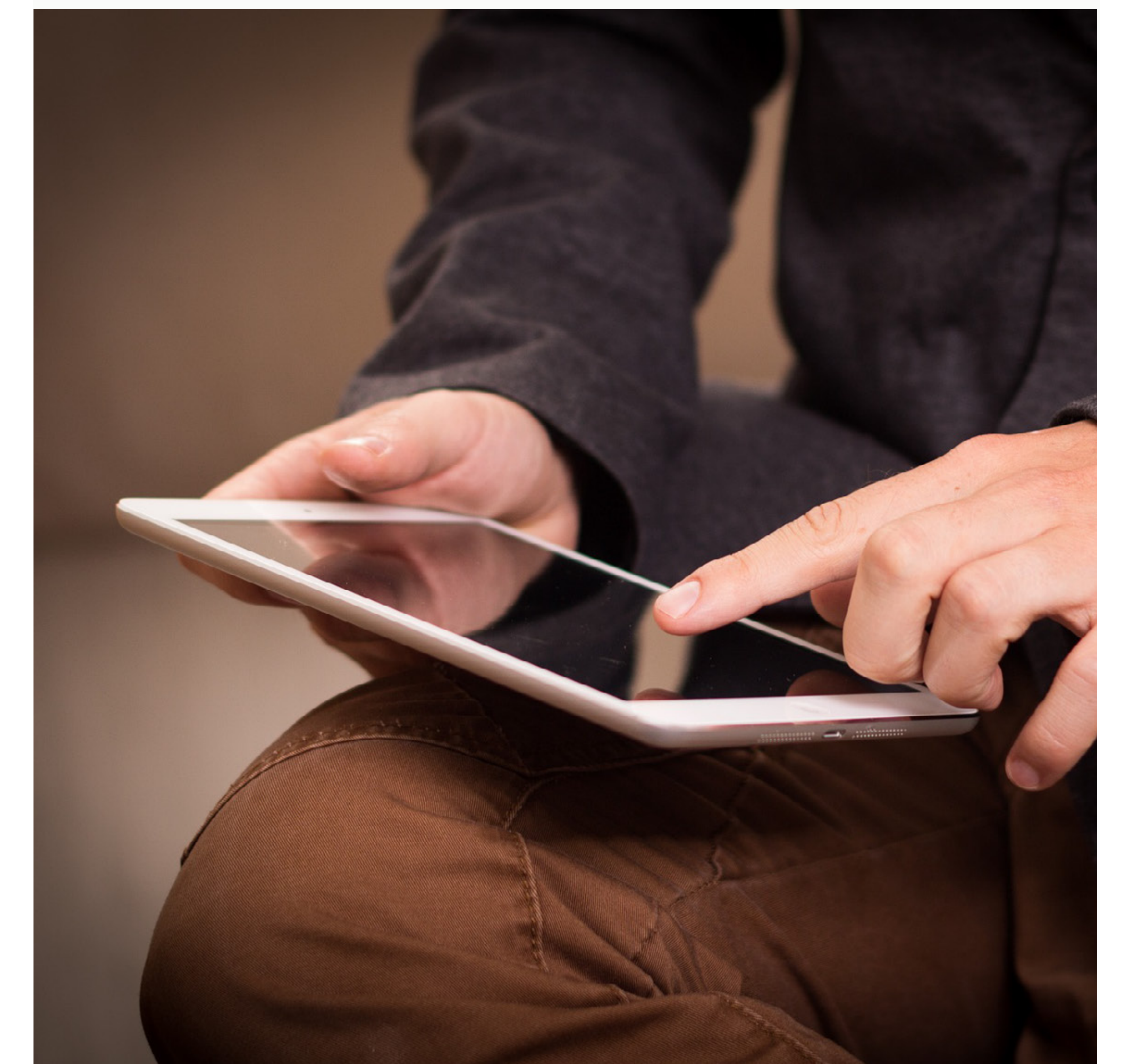
1. <https://www.business.gov.au/products-and-services/product-labelling>

### Key tasks related to traceability

- Ensure compliant labelling on packaging and product item
- Determine the business case for smart label application to the product as a dual consumer information and traceability tool

### Key participants

- Grower/primary producer
- Manufacturer
- Solution provider







Credit: Perfection Fresh



Credit: Perfection Fresh

## Feedback from consumers

Traceability is focused on monitoring the flow of the product to the consumer and the requirement to conduct product recall from the consumer back to the source of the threat in the circumstance of a food safety incident. Food safety must be the first priority, however, as consumers seek to engage with the upstream food supply chain beyond the food retailer or foodservice operator, the opportunity for feedback from consumers has expanded.

Point of Sale (POS) devices are able to capture large volumes of consumer data regarding preferences, sales volumes and consumer ratings of products. The use of QR codes also supports the opportunity for brand owners to gain valuable feedback. Customer loyalty schemes are also a tool to gather feedback on products. This capability is in addition to the use of social media as a feedback tool and is able to use the system interoperability created through use of product identification, business entity identification and the event history of the product created through the traceability data model, to transmit consumer feedback to upstream partners.

Many small and medium enterprises (SMEs) who are growers, producers and manufacturers find consumer insights cost-prohibitive to purchase and therefore miss out on valuable feedback. Use of the traceability data model can enable the receipt of consumer insights via system interoperability.

### Key tasks related to traceability

- Determine with consumer-facing partners what consumer insights can be integrated in the traceability data model for the product

### Key participants

- Food retailers
- Foodservice Operators
- Growers and primary producers
- Solution Providers
- Food manufacturers
- Wholesalers and Distributors

1. <https://www.business.gov.au/products-and-services/product-labelling>

## Critical Tracking Events

For each of the identified consumer information activities, Critical Tracking Events (CTEs) establish identity and enable traceability and compliance with traceability-related regulation. CTEs in this module relate to the transparency of the food product supply chain and supply of consumer information and consumer feedback.

	On-farm activity	CTE code	Critical Tracking Events (CTEs)
1	Identification of the product origin	CI CTE1 CI CTE2	Use GLN and PIC codes to identify the entity and location of origin of the product or ingredient  To identify the source of bulk product, use lot level identification combined with grower GLN/PIC
2	Verification of provenance	CI CTE3	Embed test certificate codes related to provenance and integrity as an attribute of the product ID
3	Smart Labelling and product information	CI CTE4	Ensure compliant labelling on packaging and product item  Determine the business case for smart label application to the product as a dual consumer information and traceability tool
4	Feedback from consumers	CI CTE5	Determine with consumer-facing partners what consumer insights can be integrated in the traceability data model for the product



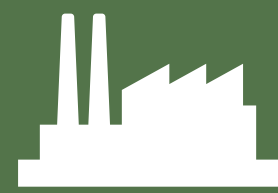
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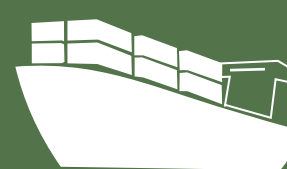
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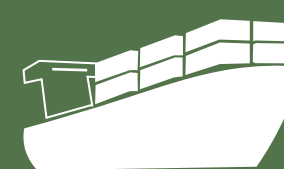
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Key Data Elements

Key Data Elements (KDEs) ensure that captured and recorded data can be interpreted and used as relevant and required by all supply chain partners. Key Data Elements define Who, What, When, Where and Why for each Critical Tracking Event.

CTE code	Critical Tracking Events	Key data Inputs and Outputs										
CI CTE1	Use GLN and PIC codes to identify the entity and location of origin of the product or ingredient	<div><div><div></div><div>Global Location Number</div></div><div><div></div><div>Property Identification Code</div></div></div> <div><div>Country of Origin</div><table><tr><td>Who</td><td>Producer, Processor, Retailer, Foodservice operator</td></tr><tr><td>What</td><td>Product ID, Batch, Date, Origin of product, GLN or PIC of origin</td></tr><tr><td>When</td><td>Date/Time of processing or transformation</td></tr><tr><td>Where</td><td>Processing, repacking</td></tr><tr><td>Why</td><td>Identify product origin</td></tr></table></div>	Who	Producer, Processor, Retailer, Foodservice operator	What	Product ID, Batch, Date, Origin of product, GLN or PIC of origin	When	Date/Time of processing or transformation	Where	Processing, repacking	Why	Identify product origin
Who	Producer, Processor, Retailer, Foodservice operator											
What	Product ID, Batch, Date, Origin of product, GLN or PIC of origin											
When	Date/Time of processing or transformation											
Where	Processing, repacking											
Why	Identify product origin											
CI CTE2	To identify the source of bulk product, use lot level identification combined with grower GLN/PIC	<div><div><div></div><div>Lot number</div></div><div><div></div><div>GLN</div></div><div><div></div><div>PIC</div></div></div> <div><div>Bulk product store</div><table><tr><td>Who</td><td>Processor, Producer, Retailer, Food Service operator</td></tr><tr><td>What</td><td>Product ID, Batch, Date Information, GLN/PIC location of bulk product source</td></tr><tr><td>When</td><td>Date/Time of usage</td></tr><tr><td>Where</td><td>Date/Time of processing or transformation</td></tr><tr><td>Why</td><td>Identify product origin</td></tr></table></div>	Who	Processor, Producer, Retailer, Food Service operator	What	Product ID, Batch, Date Information, GLN/PIC location of bulk product source	When	Date/Time of usage	Where	Date/Time of processing or transformation	Why	Identify product origin
Who	Processor, Producer, Retailer, Food Service operator											
What	Product ID, Batch, Date Information, GLN/PIC location of bulk product source											
When	Date/Time of usage											
Where	Date/Time of processing or transformation											
Why	Identify product origin											
CI CTE3	Embed test certificate codes related to provenance and integrity as an attribute of the product ID	<div><div>Test Certificate Links</div><table><tr><td>Who</td><td>Processor, Producer, Retailer, Food Service operator</td></tr><tr><td>What</td><td>Product ID, Batch, Test Certificate number, Quantity</td></tr><tr><td>When</td><td>Date/Time of Testing</td></tr><tr><td>Where</td><td>Location of testing</td></tr><tr><td>Why</td><td>Linking Test Certificate to product/batch</td></tr></table></div>	Who	Processor, Producer, Retailer, Food Service operator	What	Product ID, Batch, Test Certificate number, Quantity	When	Date/Time of Testing	Where	Location of testing	Why	Linking Test Certificate to product/batch
Who	Processor, Producer, Retailer, Food Service operator											
What	Product ID, Batch, Test Certificate number, Quantity											
When	Date/Time of Testing											
Where	Location of testing											
Why	Linking Test Certificate to product/batch											

CTE code	Critical Tracking Events	Key data Inputs and Outputs												
CI CTE4	Ensure compliant labelling on packaging and product item	<div>Product Labelling:</div> <ul style="list-style-type: none"><li>● Use by Date/Best Before Date - Lot Identification</li><li>● Batch Identification</li><li>● Name of Processor</li><li>● Storage Instructions</li><li>● Cooking Instructions</li><li>● Contact Details</li><li>● Country of Origin</li><li>● Food Description</li><li>● List of Ingredients</li><li>● Percentage of Ingredients</li><li>● List of Allergens</li></ul> <table><tr><th colspan="2">Product labelling</th></tr><tr><td>Who</td><td>Producer, Processor, Retailer, Foodservice operator</td></tr><tr><td>What</td><td>Product ID, Batch, Date information, Quantity</td></tr><tr><td>When</td><td>Date/Time of labelling</td></tr><tr><td>Where</td><td>Labelling location</td></tr><tr><td>Why</td><td>Product labelling</td></tr></table>	Product labelling		Who	Producer, Processor, Retailer, Foodservice operator	What	Product ID, Batch, Date information, Quantity	When	Date/Time of labelling	Where	Labelling location	Why	Product labelling
Product labelling														
Who	Producer, Processor, Retailer, Foodservice operator													
What	Product ID, Batch, Date information, Quantity													
When	Date/Time of labelling													
Where	Labelling location													
Why	Product labelling													
CI CTE5	Determine with consumer-facing partners what consumer insights can be integrated in the traceability data model for the product	<ul style="list-style-type: none"><li>● Consumer insights as agreed for specific product supply chain</li></ul>												



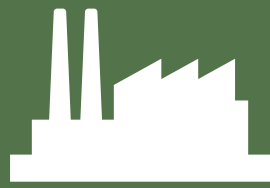
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Application of GS1 global data standards

Adoption of global data standards and data driven collaboration enables data sharing between businesses through using common formats. These formats allow a business to identify participants, locations, products, processes and events in the supply chain.

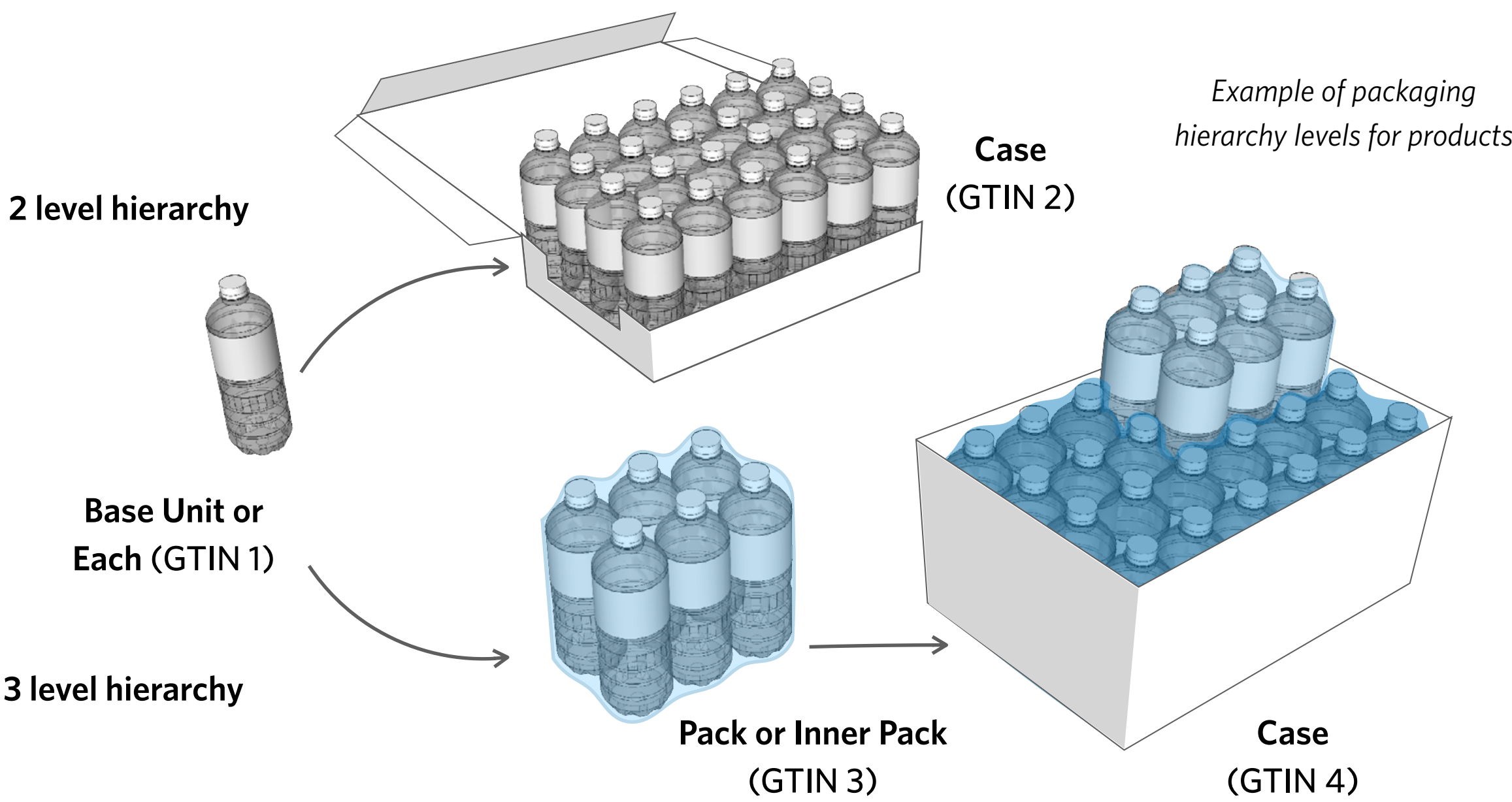
Foundational Elements

Location Identification (GLN)

The unique identification of locations is a critical component of traceability systems and is used to identify where specific transactions and events have occurred.

The Global Location Number (GLN) is the globally unique GS1 Identification Number for locations and supply chain partners. The GLN can be used to identify a functional entity (like accounts receivable or a bill back department), a physical entity (like a store location, shipping dock), or a legal entity (like a parent corporation or subsidiary).

The attributes defined for each GLN [e.g., name, address, location type (e.g., ship to, bill to, deliver to, etc.)] help users to assure that each GLN is specific to one unique location within the world.



Product Identification (GTIN)

The Global Trade Identification Number (GTIN) can be used to identify loose or pre-packed trade items, input materials, outputs, at any stage of the supply chain up to the end consumer.

In order to ensure traceability along the entire supply chain, the GTIN should be allocated as early as possible. The brand owner is normally responsible for the allocation of the GTIN. In case of non-branded items (which is typical, for example, in fisheries), the GTIN is assigned by the party which brings the product into the market; this can be the producer/processor or wholesaler.

When retailers, distributors, or operators ask suppliers for own-label products, they (the retailers, etc.) are the brand owner and are therefore responsible for identifying that product in the supply chain. The best practice is to identify these own-label items using the Global Trade Item Number (GTIN). In these cases, the retailers, distributors, or operators will provide the GTIN to use on the product’s packaging.

If a company further processes and packages a product in the supply chain, such as the case with store-processed product, then that company becomes the manufacturer and is responsible for assigning a GTIN and traceability attributes. This may be achieved using a combination of human readable and scannable product information. This information should also be stored for future retrieval if necessary.

A separate GTIN must be assigned to every different variation of a product. Size, style, grade, colour, quantity etc are all considered separate variations and thus require separate GTINs. Each level of packaging should be numbered (and barcoded) separately to all other levels.

Batch/lot and serial identification

The minimum requirements for traceability rely upon a combination of the GTIN and batch/lot number and/or serial number. Note: If both the batch/lot number and serial number are present, as sometimes happens, the batch/lot number takes precedence in case of a recall.



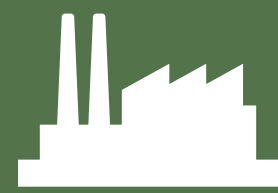
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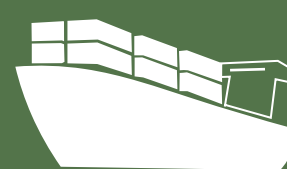
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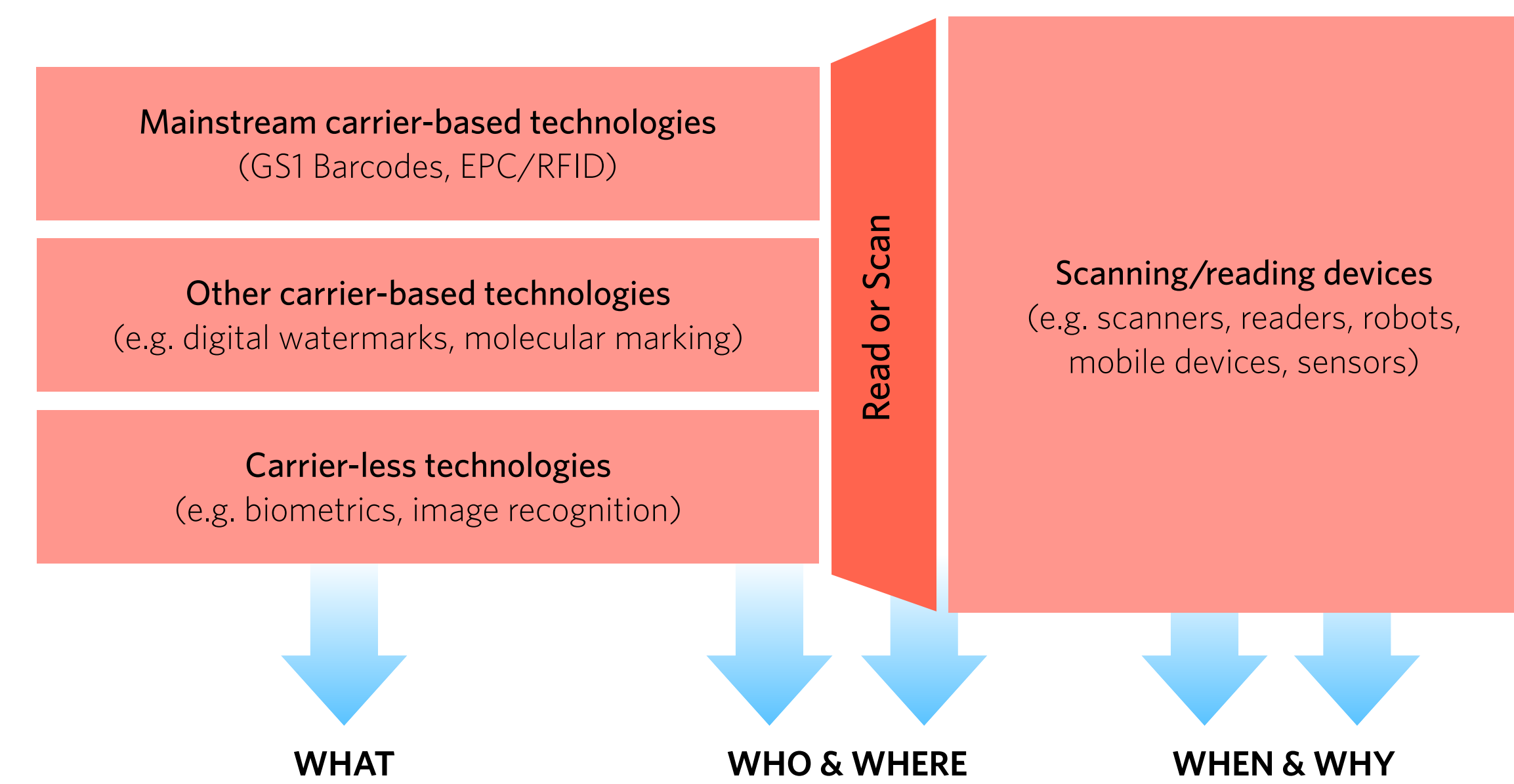
## How to capture the KDEs

### How to mark/barcode traceable objects

Traceable objects —and in some cases also parties, locations, transactions and documents — will need to be physically identified to enable traceability.

Traceability systems can use GS1-approved barcode symbologies and EPC/RFID tags to encode GS1 identification keys that uniquely identify products, trade items, logistic units, locations, assets, and service relations worldwide. Additional information such as best-before-dates, serial numbers, and lot numbers may also be encoded into barcodes or EPC/RFID.

Besides barcodes and EPC/RFID, other carrier-based technologies (such as digital watermarks) and carrier-less technologies (such as image recognition) may also play a role.

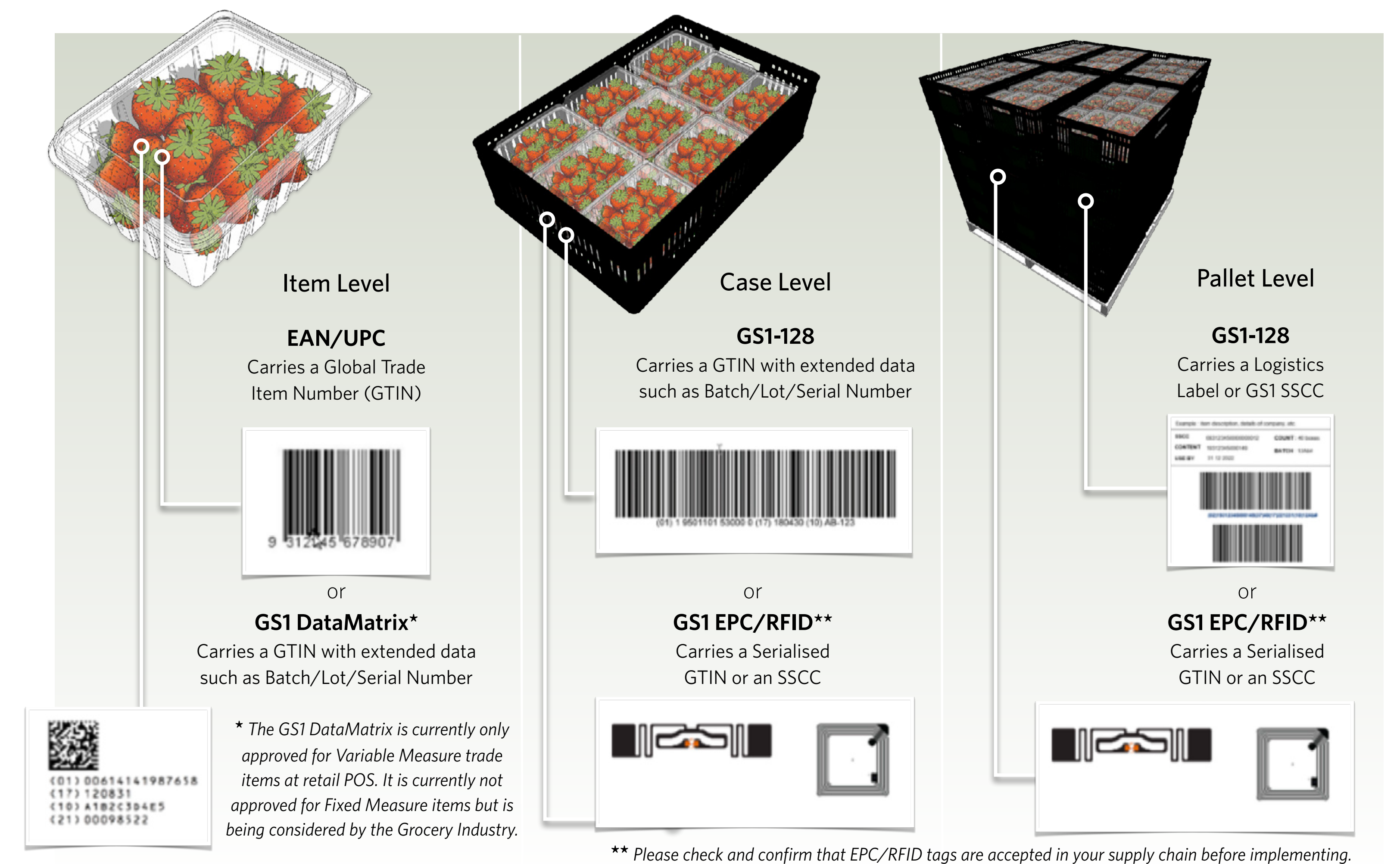


In addition to the data that is captured when scanning barcodes, data provided by the equipment used to scan or read the data —such as date & time, read-point and user (operator)— will be important in determining the who completed the data capture , where the data capture took place, when and why e.g. receipting transaction and picking.

### Barcodes

Barcodes are symbols that can be scanned electronically using laser or camera-based systems.

The marking of traceable objects is driven by the level of identification. Batch/lot-level or serialised identification are dynamic data and therefore need to be printed on-demand at the time the traceable item needs to be identified and the label is applied. GS1 manages several types of barcodes. Each is designed for use in a different situation.



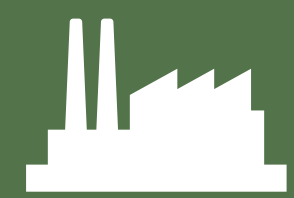
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Besides the batch/lot ID and/or serial ID these may also include the pack date, best before date, weights, etc.  
The proper linkage of the barcode, the related data and the produced instances of the trade item, is a key aspect.

For logistic units the barcodes have always been based on the SSCC, which is a serialised identifier. This means that logistics labels will be printed when the goods are packaged, and that the link between data and label will be secured that way.



GS1-128 barcode capturing GTIN, Use By Date and Batch/Lot number

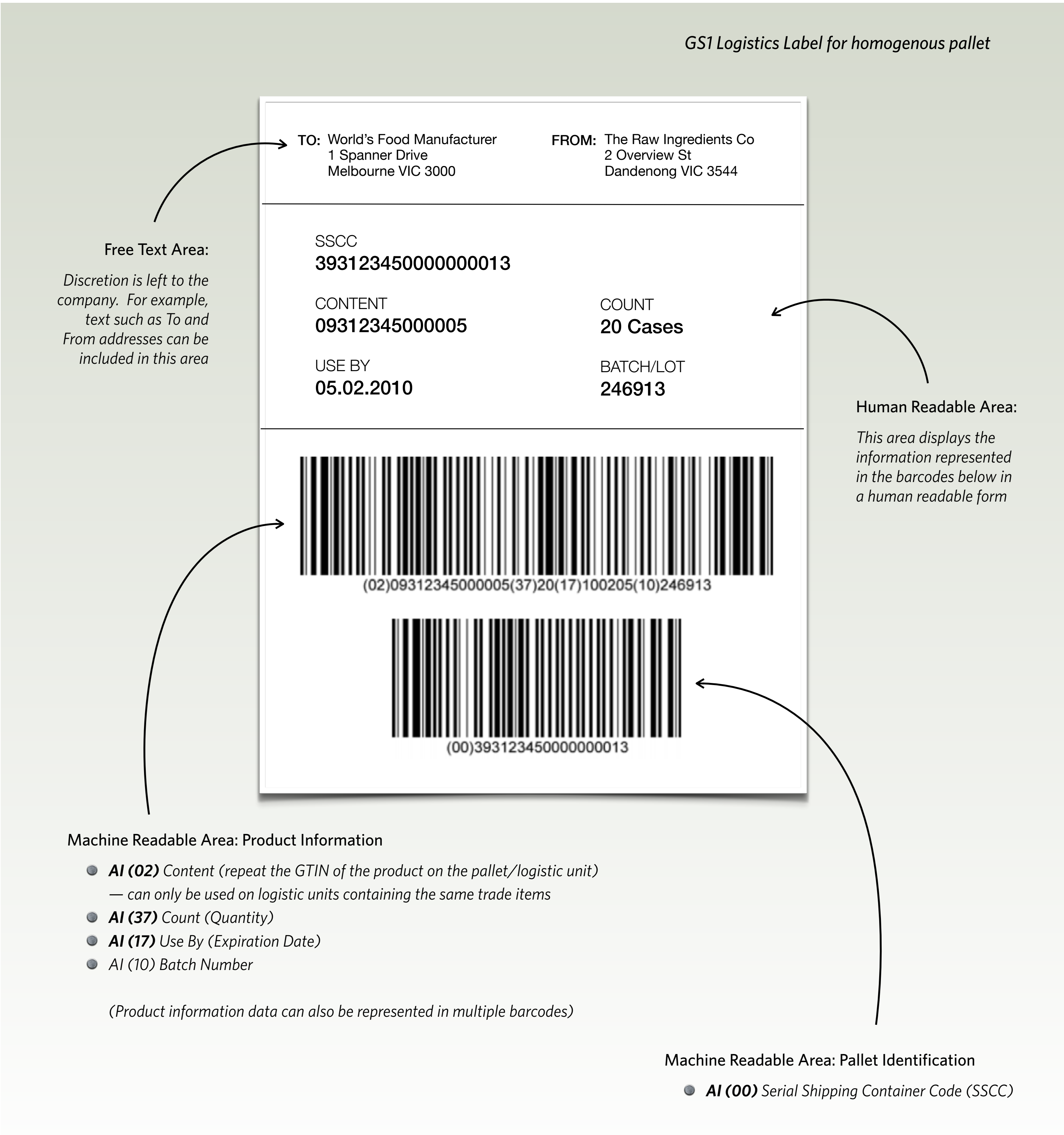


GS1-128 barcode capturing GTIN, Production Date and Batch/Lot number

The use of the GS1 DataMatrix at point of sale is also under consideration for future use as it can encode additional traceability information.  
These barcodes require an imaging scanner to decode the information.



GS1 DataMatrix



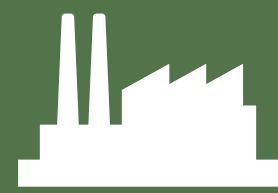
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## How to capture data/events

An important principle is the separation of data content from the way the data is exchanged (the communication method).

Best practices for maintaining traceability is to capture ‘all agreed to traceable information’ and store it within their systems by scanning the information directly from the trade item / case / input barcodes.

Scanning enables data to be captured, stored, and retrieved without the need to visually review the human readable information and manually key that information into systems. This typically involves the use of a scanning device, usually a barcode scanner.

Product can be scanned for Critical Tracking Events e.g. as it enters the pack-house; as it is shipped out of the pack-house; as it is received at a processing facility or abattoir or as it is opened for further processing.

In addition to product scanning, logistics labels can also be scanned to capture vital traceability data as logistics units (pallets, parcels, grouping of products) move through the supply chain.

More and more suppliers, processors, distributors and wholesalers are putting processes in place to collect and store at least the minimum product information required to support traceability.

When it comes to capturing the data, the main questions are:

- Which process steps need to be captured?
- What is the most cost-effective way to capture the data?

Usually the first step will be scanning of inputs, livestock etc upon receipt. For barcodes this is often done using handheld devices. For EPC/RFID tags, fixed readers can be used. Other process steps where data will be captured are harvesting, storing, picking, packing, shipping, transporting, selling.

Often a combination of fixed mounted scanners or readers and hand-held devices will be applied to capture the critical tracking events.

The emergence of mobile devices deserves a special mention here, since it increases the availability of scanning capability (making scanning as pervasive as the barcode) and so may make it feasible to record additional events at limited additional cost. Increasingly, supply chains are finding the greatest value coming from the integration of these critical tracking event (CTE) instances from across supply chain actors as it creates a level of transparency that enables new collaboration and new value creation.



### Useful Links

Food testing laboratories  
<https://www.nata.com.au/component/phocadownload/category/115-industry-guides>

Provenance and story telling  
 AgriFutures toolkit  
<https://www.agrifutures.com.au/rural-industries/provenance-and-story-telling/>

Food labelling  
 NMI Weights and Measures  
<https://business.gov.au/Products-and-services/Product-labelling/Australian-Trade-measurement-laws>

ACCC Country of Origin Food Labelling [https://www.accc.gov.au/system/files/Country%20of%20Origin%20food%20%20labelling%20Guide\\_March%202019.pdf](https://www.accc.gov.au/system/files/Country%20of%20Origin%20food%20%20labelling%20Guide_March%202019.pdf)

Food Standards Code labelling  
<https://www.foodstandards.gov.au/industry/labelling/pages/default.aspx>



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Glossary

B2B	Business to Business transactions
B2C	Business to Consumer transactions
E2E	Exchange to Exchange transactions
IoT	Internet of Things. A description for a range of devices that can connect with each other and the Internet without human intervention.
Point of Sale (POS)	POS devices are evolved from cash registers and cover a range of cloud-connected or stand-alone enterprise systems for recording sales, managing inventory and enhanced customer engagement e.g. loyalty programs/customer preferences.
QR code	A Quick Response code is a machine-readable code consisting of an array of black and white squares, typically used for storing URLs or other information for reading by the camera on a smartphone. It can store 7,000 characters.
Small and medium enterprise (SME)	<p>The Australian Bureau of Statistics (ABS) uses the number of persons employed:</p> <ul style="list-style-type: none"><li>● a micro-business employs between 0-4 persons</li><li>● a small business, between 5-19 persons</li><li>● a medium business, between 20 and 199 persons; and</li><li>● a large business employing 200 or more persons</li></ul> <p>Various Commonwealth agencies define SMEs differently, however it is recognised that SMEs make up around 98 percent of Australian businesses.</p>
Smart labels	<p>Smart labels include QR codes, Electronic Article Surveillance (EAS) tags and specially configured RFID tags. Smart labels are created by combining three technologies: plain text, radio code and optical character recognition. Smart labels are divided into chip labels, printable labels and electronic labels.</p> <p>Smart labels such as data-embedded barcodes (GS1-128), QR codes, RFID tags, enable a much larger amount of information to be provided to consumers. <a href="https://www.clearmark.uk/resources/news/smart-labels-in-the-food-industry-applications-and-benefits">https://www.clearmark.uk/resources/news/smart-labels-in-the-food-industry-applications-and-benefits</a></p> <p>SmartLabel: Consumer Brands Association and Food &amp; Consumer Products of Canada <a href="http://www.smartlabel.org/">http://www.smartlabel.org/</a></p>



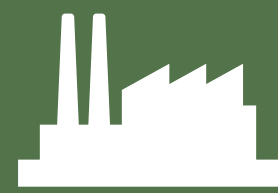
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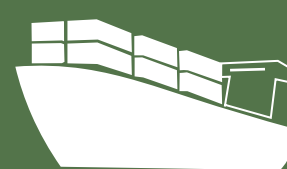
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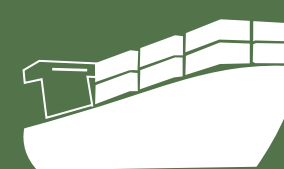
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M O D U L E   E L E V E N :

# Cybersecurity, Data Sharing and Privacy

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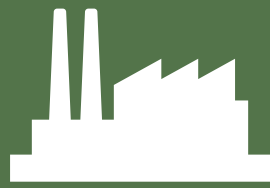
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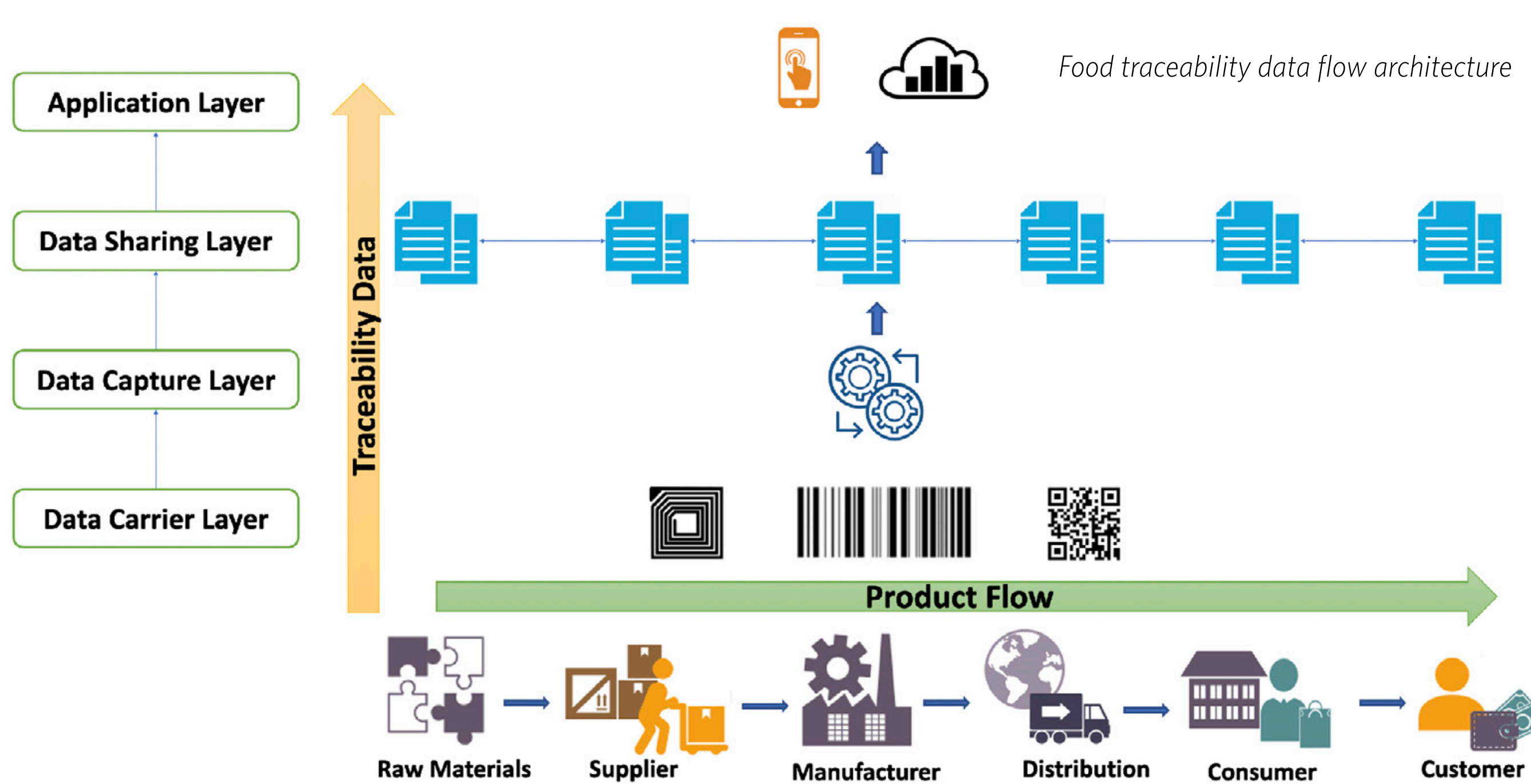
## Cybersecurity, Data Sharing and Privacy

Global supply chains are becoming increasingly dependent upon digital technologies. Understanding, evaluating, and mitigating the cyber risks impacting supply chain’s critical business activities and trading data is thus of increasing importance.

This module puts forward a comprehensive list of security concerns, threats, and mitigation strategies for constituents of a supply chain (e.g., trade companies, service providers, etc.) to discuss and analyse when developing their overall security posture. In that pursuit, we present a generic architecture of traceability that is divided into four main layers, namely data carrier, data capture, data sharing, and application layers.

We present a description of the core elements (or technologies) of each layer and outline threats and mitigation strategies based on the STRIDE threat model. STRIDE is widely used for analysing systems for different vulnerabilities and their potential countermeasures. We also outline some best practice principles for managing cyber-risks in supply chains and for ensuring privacy of data shared amongst the trade partners.

*Disclaimer: This is not a risk assessment report, hence mitigation strategies and threats described herein are neither ranked nor sorted in terms of their impact, severity or risk to a given organisation. This module is intended to be used as a generic guide for business owners to determine the best security controls available to their organisations.*



## Introduction

Digital technologies are being increasingly adopted in modern supply chains. This brings many benefits such as ease of data sharing amongst the trade partners, access of product related data whenever needed and end-to-end traceability of products. It also helps end-users to have product specific data and make more informed decisions when purchasing a product. However, the interconnection of trade partners using digital technologies brings cyber threats to the spotlight, with the potential to leak business data, disrupt business operations, and provoke financial, intellectual and reputation losses.

Understanding and analysing those threats is the goal of this report. To accomplish this, we present a generic data flow architecture for supply chains that is comprised of four layers (see adjacent diagram), and then identify the assets associated with each layer. For ease of exposition and analysis, we adopt the STRIDE threat model to present potential mitigation strategies against common threats, such as spoofing, tampering, repudiation, information disclosure, denial of service, and elevation of privileges.

The adjacent diagram shows a four layered food traceability data flow architecture, which comprises the data carrier layer, data capture layer, data sharing and application layer.

The data carrier layer is comprised of means (e.g., barcodes, RFID (Radio Frequency Identification) tags, IoT (Internet of Things) devices) used to carry information (e.g., identification keys) related to products and other entities within the supply chain).

The data carrier layer carries product-related information using the various identifiers. Components that enable capturing the product data from physical identifiers form the data capture layer. Examples of these components include data readers and middleware applications.

The data sharing layer is responsible for the manipulation and exchange of product identifying information and system events amongst the stakeholders. This layer allows different partners to create, exchange and store events related to the movement of products . For example, when a product undergoes a transformation, such as splitting or joining, an event is created and shared for end-to-end traceability.

Finally, the application layer comprises software systems that access traceability data to provide services.



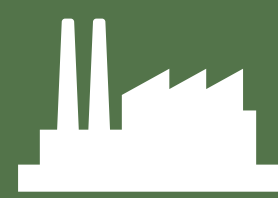
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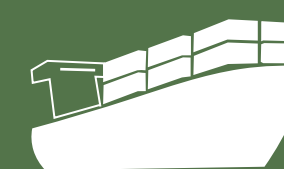
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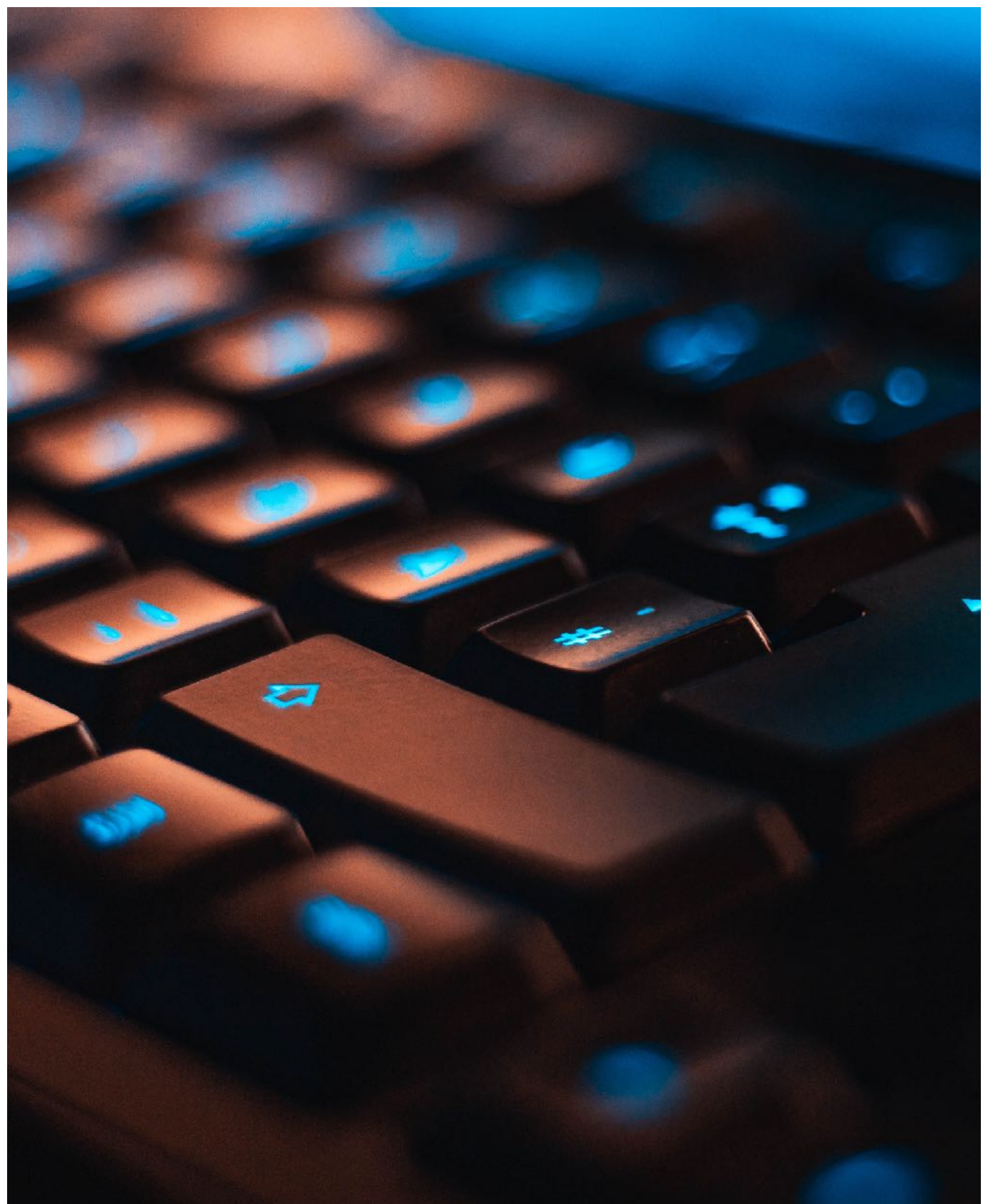


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## STRIDE threat model

The mitigation strategies presented in this report are based on Microsoft’s STRIDE threat model. Although other threat models exist, such as Open Web Application Security Project (OSWAP), Process for Attack simulation and Threat modelling (PASTA), and Operationally Critical Threat, Asset and Vulnerability Evaluation (OCTAVE), the STRIDE model was chosen due to its simplicity and the broad categories of threats it covers.

The six major threats considered in STRIDE are the following.

- **Spoofing** - aims to subvert the authentication mechanism of the system by using fake or cloned credentials.
- **Tampering** - targets the various components of the system where the ICT components and data stored in them are tampered with.
- **Repudiation** - targets the system’s vulnerability in logging and tracing activities to prevent detection and identification of malicious activities.
- **Information Disclosure** - aims to access unauthorised information from the system and disclose it to unauthorised parties.
- **Denial of Service** - disrupts system operation and service availability.
- **Elevation of Privileges** - allows users to increase their level of access to the system resources without authorisation.

The next four sections in this document are dedicated to an analysis of aforementioned threats within each of the layers comprising the food traceability data flow architecture.

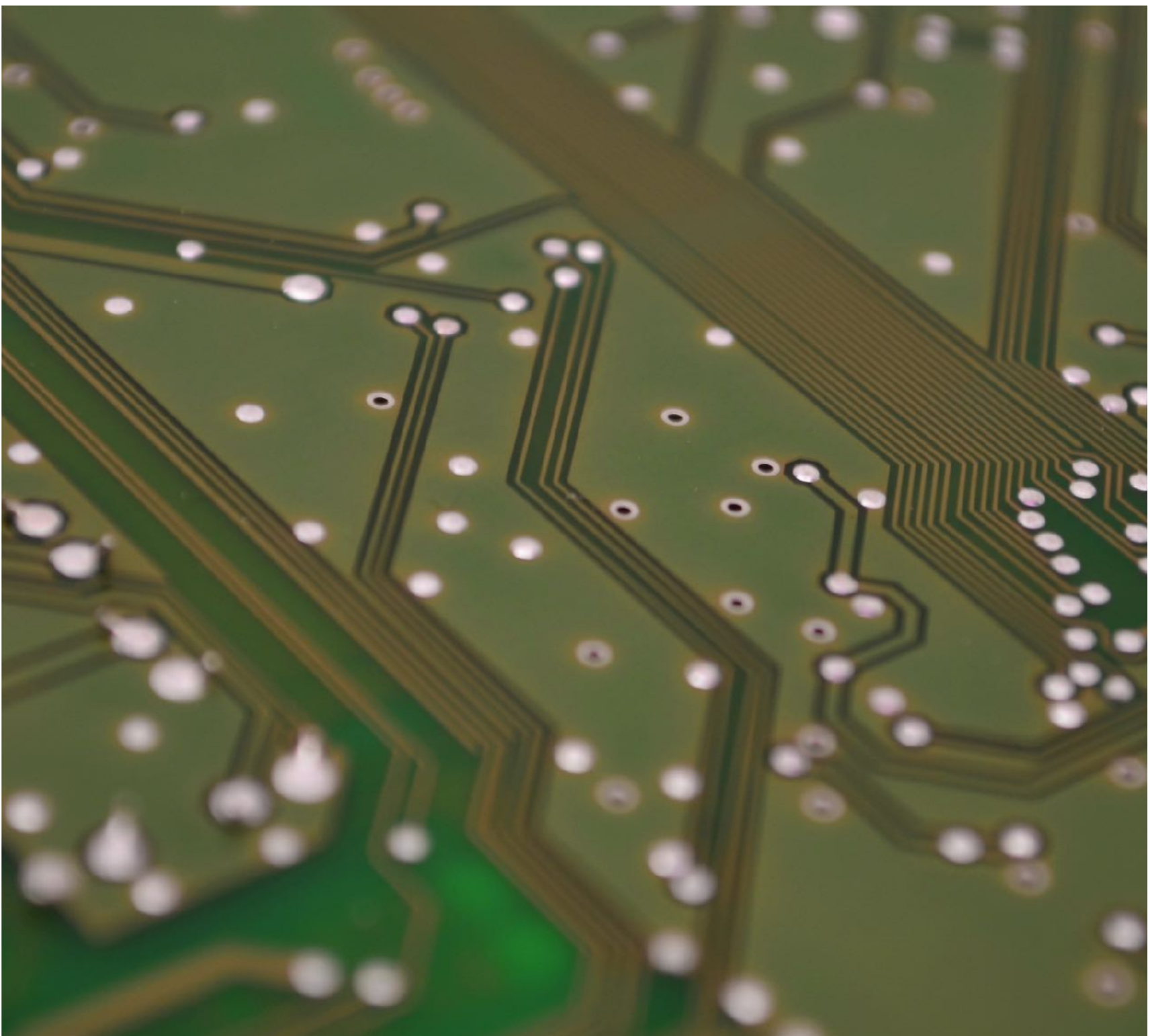
The analysis identifies the assets an organisation may want to protect, main threats to those assets, and potential mitigation strategies.

## 1.1 Data Carrier Layer

This layer focuses on the identification and description of various assets that carry the product data and are physically attached to the assets to track and monitor the product locations and conditions. Table 1 shows the three main asset types in the data carrier layer that contain product information and/or monitor products in the food supply chain.

Assets	Descriptions
Barcodes	Barcodes capture various product related information such as Global Location Number (GLN) and Global Trade Item Number (GTIN)
RFID tags	Hardware RFID tags used to store the EPC
IoT devices	Hardware sensor devices used to monitor and track products and packages

Table 1: Assets in Data Carrier Layer



1. <https://www.arxiv-vanity.com/papers/2001.06203/>  
2. <https://arxiv.org/pdf/2003.09316.pdf>  
3. <https://patents.google.com/patent/US20120308003A1/en>



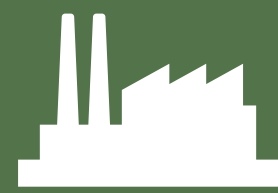
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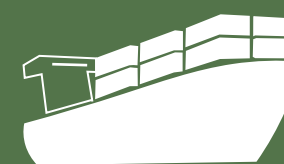
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## 1.2 STRIDE Analysis of Data Carrier Layer

### 1.2.1 Barcodes

Threat	Threat Description	Potential Mitigation
Spoofing	Copying/printing legitimate barcodes to spoof the product identities and insert fake goods or legitimise fake products in supply chains	Possible anti-copying and anti-cloning methods can be used — e.g., special printing material, physical unclonable functions (PUF), digital watermarking and use of high-density black and white blocks for preventing illegal copying of barcodes. However this can increase the cost of implementation. <sup>1, 2</sup>
Tampering	Preventing access to traceability information by manipulating barcodes. Embedding harmful commands within barcodes to be executed by barcode readers. Attaching counterfeit barcodes to products with the purpose of manipulating prices and traceability information.	Use of tamper-resistant and durable materials for making the barcode labels with additional security of voiding tampered labels is suggested to prevent tampering attacks. Similarly, tamper detection for barcodes (i.e., QR codes) can be implemented to integrate the digital signature of a barcode content in the error correcting area by leveraging stenographic techniques. <sup>3</sup>
Repudiation	Preventing unauthorised operations from being traced and attributed to the malicious user.	Repudiation attacks are difficult to defend as barcodes are non-electronic and any logging of actions (e.g., modifications) is not possible.
Information Disclosure	Lack or weak encryption can result in easy access to encoded information.	Use of security enhanced barcodes such as Secret-function-equipped QR codes (SQRC) that carry an additional confidential information that may be accessible through a purpose-built scanner with the correct cryptographic key. <sup>4</sup>
Denial of Service (DoS)	Disable or hijack host device through malicious embedded codes leading to buffer overflow.	Use of tamper-proof materials for printing barcodes to prevent any damage to barcodes which may lead to DoS attacks. Use of limit on the data that is being read to block any potential buffer-overflow attack.
Elevation of privileges	Performing unprivileged actions by embedding malicious commands in barcodes (e.g., targeting database systems by embedding SQL statement) <sup>5</sup>	Incorporate security features in scanners or host device to block the execution of malicious commands or loading of malicious URL – e.g., incorporation of threat signature library as indicated in <sup>6</sup> .

1. <https://www.arxiv-vanity.com/papers/2001.06203/>
2. <https://arxiv.org/pdf/2003.09316.pdf>
3. <https://patents.google.com/patent/US20120308003A1/en>
4. <https://delivr.com/faq/1468/what-is-sqrc>
5. [https://link.springer.com/chapter/10.1007/978-3-319-07620-1\\_8](https://link.springer.com/chapter/10.1007/978-3-319-07620-1_8)
6. <https://patentimages.storage.googleapis.com/ab/c0/e1/3ecadc2c85d83d/US9262633.pdf>



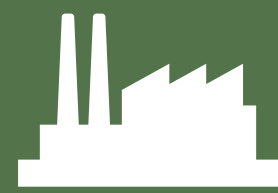
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1.2.2 RFID tags

Threat	Threat Description	Potential Mitigation
Spoofing	Detaching tags from products and attaching to fake products (Tag Snatching).	Use tamper evident and tamper alarm RFID tags that alerts if tags are detached from an expensive item and are unusable after their removal. <sup>7</sup>
	Creating replica of tags through reverse engineering (Tag counterfeiting).	Use of anti-counterfeiting techniques such as physical unclonable functions, chip-less RFID tags <sup>8</sup> , and distance bounding protocol that utilize broadcast and collisions to find the cloned tags. <sup>9</sup>
	Reading data from cheap items, uploading to other tags and attaching to expensive items.	Allow only authorized physical access to the RFID tags.
Tampering	Inserting malicious information to cause harm to tag readers and systems connected to it (e.g., virus <sup>10</sup> ).	Use RFID authentication protocol and malicious tag data detection techniques in the RFID middleware.
	Physical tampering, modifying tag memory or unauthorised tag killing.	
Repudiation	Tampering tag data without logging the manipulation performed.	Allocate sufficient memory to log/track all manipulations on tag data
Information Disclosure	Revealing tag data related to traceability that are not protected by encryption and authentication mechanism.	Use mutual Reader/Tag authentication and encryption to protect against the unauthorised access to the stored information. Use shielded enclosures to protect against any unauthorised access to tag data outside the legitimate access area.
	Killing of tags to make them unusable.	Enable Reader/tag authentication so that kill command may not be issued by a malicious reader or it may not manipulate data such that it leads to DoS attacks. Allocate sufficient memory to kill passwords so that they are hard to brute force.
Denial of Service (DoS)	Manipulation of tag data to arbitrary values unrecognisable to backend system.	Use strict access control mechanisms to manipulate the tag data.
Elevation of privileges	Installing malware on RFID tags to steal information or gain unauthorised access to the system.	Security features in reader/middleware to detect the presence of malicious viruses and malware in tag memory, such as memory attestation.

7. <https://www.atlasrfidstore.com/rfid-insider/tamper-evident-rfid-tags>

8. <https://minerva-access.unimelb.edu.au/bitstream/handle/11343/225601/jsan-08-00037.pdf?sequence=9>

9. <https://www.sciencedirect.com/science/article/pii/S157087051300173X>

10. [https://cdn.intechopen.com/pdfs/6177/InTech-Rfid\\_technology\\_security\\_vulnerabilities\\_and\\_countermeasures.pdf](https://cdn.intechopen.com/pdfs/6177/InTech-Rfid_technology_security_vulnerabilities_and_countermeasures.pdf)



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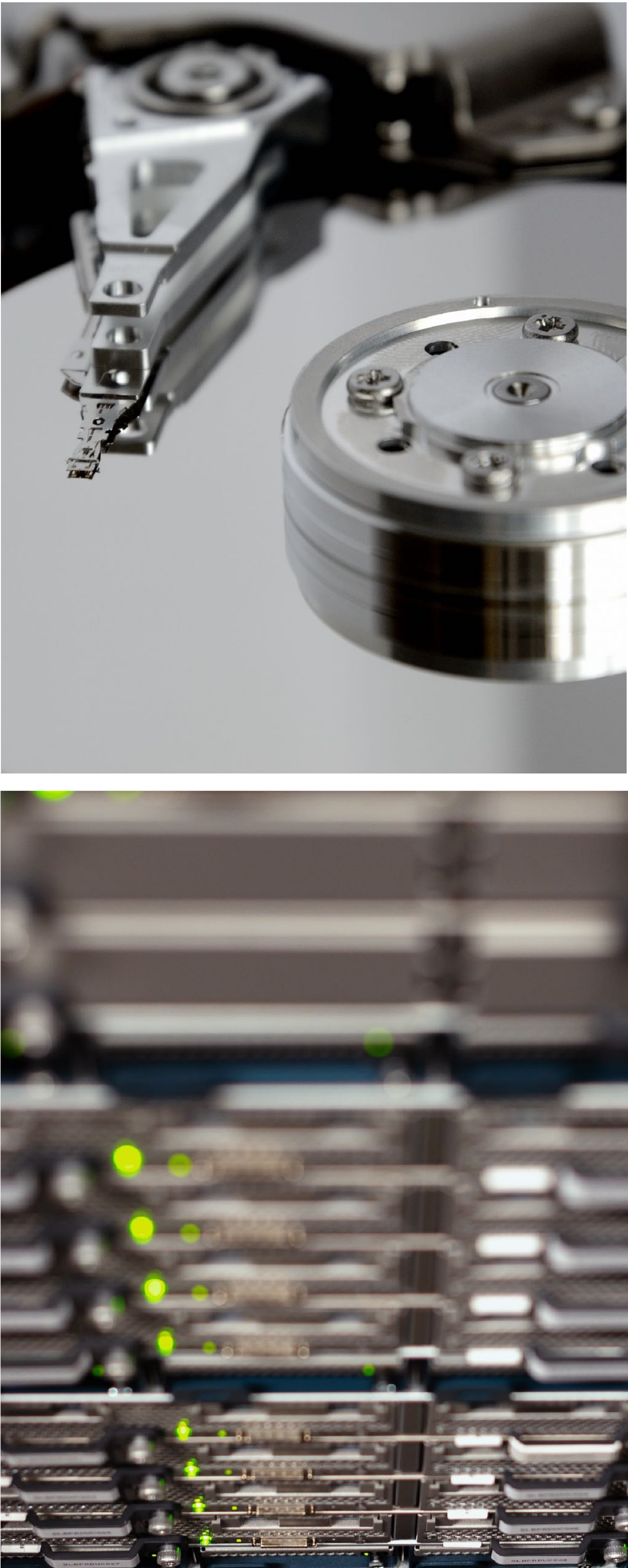


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1.2.3. IoT Devices

Threat	Threat Description	Potential Mitigation
Spoofing	Impersonating the device credentials to connect to supply chain IoT Network.	Use authentication mechanisms that rely on unclonable information — e.g., device-characteristics-based mutual authentication between the communicating devices.
	Use cloned IoT devices to bypass authentication mechanism and access the important data or feed incorrect data.	Use multi-factor authentication to counter any potential compromise of credentials. Use of strong credentials and regular updates of device's access passwords.
Tampering	Installing malware on IoT devices to access traceability data.	Encrypt and digitally sign the firmware binaries to preserve their confidentiality and integrity. <sup>11</sup>
	Tampering IoT firmware.	Enforce a secure boot process to prevent from modifying/replacing back doored firmware. <sup>12</sup> Mutually authenticate the device firmware and cloud update pool using PKI. <sup>13</sup> Do not hardcode encryption key in firmware as reverse engineering may reveal it, and an attacker may use it to tamper the memory content <sup>14</sup> as per his needs. For example, it may allow an attacker to modify passwords, replace certificates, and download back doored versions of the firmware. <sup>15</sup> Protect IoT devices from an unauthorised physical access that may allow the installation of malicious software. <sup>16</sup> Only allow the administrator to manipulate critical information, such as geo-coordinates (after verifying the multi-factors of authentication). Regular security patching of IoT firmware to prevent vulnerabilities.
Repudiation	Denying of unauthorised actions by erasing IoT device logs and memory contents.	Use cloud locations to store critical event logs on IoT devices to trace actions on it. Enforce strong authentication mechanisms prior to deleting logs or IoT traceability data.
Information Disclosure	Reverse engineering to extract digital certificates, performing side-channel attacks	Encrypt all stored data on IoT devices, and do not hardcode keys in firmware. Use light weight encryption techniques on IoT devices.
Denial of Service (DoS)	Denial of traceability service by physically damaging or disabling the IoT device used for traceability.	Protect against the unauthorised physical access to IoT devices to avoid any damage to these devices that may lead to DoS attacks.
	Sending unnecessary communication requests to battery operated devices to drain their batteries and disable device. <sup>17</sup>	Detect and prevent anomalous communication with the IoT device.
Elevation of privileges	Gaining unauthorised access to the IoT firmware and executing unauthorised commands to impact the traceability.	Protect against the unauthorised access to firmware by encrypting the binaries. <sup>18</sup> Detect and disable malicious or compromised IoT devices. Enable strong access control and disable unnecessary services running on IoT devices.

11. <https://www.infosys.com/services/cyber-security/documents/firmware-security.pdf>  
12. <https://www.infosys.com/services/cyber-security/documents/firmware-security.pdf>  
13. <https://www.infosys.com/services/cyber-security/documents/firmware-security.pdf>  
14. <https://blog.securityinnovation.com/making-iot-safer-how-to-reverse-engineer-devices>

15. <https://www.infosys.com/services/cyber-security/documents/firmware-security.pdf>  
16. <https://www.trendmicro.com/vinfo/us/security/news/internet-of-things/the-iot-attack-surface-threats>  
17. <https://ieeexplore.ieee.org/stamp/>  
18. <https://www.infosys.com/services/cyber-security/documents/firmware-security.pdf>



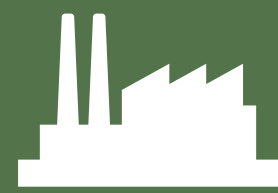
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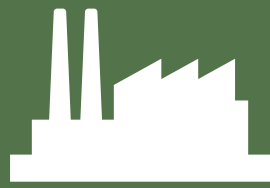




### 1.3 Data Capture Layer

Data capture layer focuses on assets and interfaces that facilitates the capturing of product data encoded in carriers attached to the product, and its subsequent conversion to a format that is suitable for different applications and storage in repositories. Following are the assets related to data capture layer:

Assets	Descriptions
Barcode printers and Scanners	Devices used for printing several types of barcodes, and scanners used to read the data encoded in a barcode attached to a product.
Barcode Reader Application (Host system)	Barcode host system application used to decode and act on the data read from barcodes
Tag writers/Readers	Devices used for writing data into tag memory, and readers used for reading data from the tags.
RFID Air Interfaces	<p>The air interfaces provide a common Radio Frequency (RF) operating range and a standard communication protocol to facilitate the tag and reader to communicate. The readers identify the tags and access the stored data using the air interfaces. Two air interface standards are discussed below:</p> <ul style="list-style-type: none"><li>UHF Gen2 Air Interface - The latest UHF Gen2 standard proposed by GS1 is the Gen2 V2.0 which defines an operating range of 860 – 960 MHz UHF range.</li><li>HF Air Interface - A protocol operating at 13.56 MHz frequency defining the requirements of a RFID Tag and reader specifying the passive-backscatter, Interrogator-talks-first (ITF) for RFID communication.</li></ul>
RFID Software Interfaces	<p>These interfaces form the middleware between the RFID tags and the applications that access RFID data and help in transforming the RFID stored data into format required by the upper layer applications. These interfaces include:</p> <ul style="list-style-type: none"><li>Low level Reader protocol (LLRP) - Defines the control and delivery of raw tag reads from Readers to the Filtering &amp; Collection role.</li><li>Application-Level Event (ALE) - Defines the control and delivery of filtered and collected tag read data from Filtering &amp; Collection role to the EPCIS Capturing Application role.</li></ul> <p>This is one of the critical components of the RFID system as it sits between the RFID readers and the ERP (Enterprise Resource Planning) tools.</p>







## 1.4 Security Requirements, Threat Mitigation Techniques for the Data Capture Layer

### 1.4.1. Barcode Scanner/Writer/Reader Application

Threat	Threat Description	Potential Mitigation
Spoofing	Impersonating authorised scanners to scan barcode data	Authentication must be enabled between the barcode scanners and the host computer system so that unauthorised scanners cannot be attached to the host system
Tampering	Tampering with Software/Firmware of barcode scanners. Remotely controlling the host computer using backdoors in reader applications.	Access to firmware should be restricted to authorised individuals using strong authentication techniques The firmware updates need to be digitally signed and encrypted to prevent tampering of scanner software. <sup>19</sup> Wi-Fi connected handheld barcode scanners need to be physically secured from unauthorised usage and prevent tampering.
Repudiation	Denying malicious actions by clearing logs of scanner events and reader software application	Logging needs to be enabled and secured at all the scanner devices and reader applications to enable tracking of events in the supply chain.
Information Disclosure	Compromising scanners/host applications and reveal traceability information. Eavesdropping on Wi-Fi connected handheld scanners to disclose scanning data.	Communication between the scanners and host applications need to be secured. Access to data stored on the host system needs to be protected with strong authentication mechanisms. Especially handheld barcode scanners need to encrypt the communication between scanner application and the backend systems.
Denial of Service (DoS)	Jamming attacks or sending unnecessary Bluetooth messages to wireless scanners. <sup>20</sup>	Implementing anti-jamming techniques and using secure Bluetooth communication using fingerprinting techniques. <sup>21,22</sup> Communication mechanisms used by wireless handheld barcode scanners need to be secured and patched to prevent DoS attacks. <sup>23</sup>
Elevation of privileges	Launching attacks on connected components of the supply chain system.	Host systems should contain access control levels to prevent reader applications from having privileged access to other parts of the system and isolate compromised host systems from affecting other parts of the supply chain.

19. <https://www.designnews.com/7-tips-securing-embedded-system>  
20. [https://www.cvedetails.com/vulnerability-list/vendor\\_id-26/product\\_id-1079/Microsoft-Windows-Ce.html](https://www.cvedetails.com/vulnerability-list/vendor_id-26/product_id-1079/Microsoft-Windows-Ce.html)  
21. <https://patentimages.storage.googleapis.com/ab/c0/e1/3ecadc2c85d83d/US9262633.pdf>  
22. [https://ieeexplore.ieee.org/abstract/document/7726252?casa\\_token=xKnPvG](https://ieeexplore.ieee.org/abstract/document/7726252?casa_token=xKnPvG)  
23. <https://www.cvedetails.com/cve/CVE-2008-4609/>





1.4.2 RFID Reader/Scanner/Air Interface

Threat	Threat Description	Potential Mitigation
Spoofing	Extracting or modifying product information using unauthorised readers/writer to read/write RFID tags. Feeding incorrect traceability data using previously recorded communication between reader and tag.	<ul style="list-style-type: none"><li>● Use reader/writer authentication before allowing them read data from a tag or write data to a tag’s memory.</li><li>● Use timestamps, counters, and challenge response cryptography to protect against the replay attack. <sup>24</sup></li></ul>
Tampering	Modifying traceability data by tampering or reverse engineer the readers/writer firmware. Tampering tag data using unauthorised RFID tag writers.	<ul style="list-style-type: none"><li>● Encrypt and digitally sign the firmware updates to protect against the unauthorised firmware update. <sup>25</sup></li><li>● Enable writer/tag authentication so that malicious writer cannot tamper the tag data.</li></ul>
Repudiation	Causing repudiation by exploiting the limited memory and logging capability on tags	<ul style="list-style-type: none"><li>● Enable a secure logging at all readers/writer for tracking all actions conducted with these devices.</li></ul>
Information Disclosure	Eavesdropping to listen to unencrypted communications between the reader and the tag. Launching Side channel attacks to analyse the memory access and power fluctuations to extract authentication keys or steal information. Launching MiTM (Man in the Middle) attacks that divert communications to malicious devices and steal information.	<ul style="list-style-type: none"><li>● Encrypt the communication between tag and reader to protect against the eavesdropping.</li><li>● Use the RFID authentication protocol that are resistant to MiTM attacks <sup>26</sup></li><li>● Filter the power signal or delay the computation randomly to make power analysis difficult <sup>27</sup></li></ul>
Denial of Service (DoS)	Killing tags using malicious writers causing DoS. Launching Jamming attacks blocking the communication between tag and reader.	<ul style="list-style-type: none"><li>● Use mutual authentication such that attacker cannot launch desynchronisation <sup>28</sup> attacks and kill command attacks.</li><li>● Use external noise/radio shielded enclosure to protect against the RF jamming attack <sup>29</sup>.</li></ul>
Elevation of privileges	Performing unprivileged actions using compromised readers/writer on connected applications.	<ul style="list-style-type: none"><li>● Built security features in reader so that malicious data stored in the tags that can potentially compromise the reader be detected (e.g., check for buffer overflow if appropriate).</li><li>● Reader/Writer firmware be protected against the unauthorised update.</li></ul>



24. <https://link.springer.com/article/10.1007/s10796-009-9210-z>  
25. <https://www.designnews.com/7-tips-securing-embedded-system>  
26. [https://link.springer.com/chapter/10.1007/978-3-319-23802-9\\_6](https://link.springer.com/chapter/10.1007/978-3-319-23802-9_6)  
27. [https://cdn.intechopen.com/pdfs/6177/InTech- Rfid\\_technology\\_security\\_vulnerabilities\\_and\\_countermeasures.pdf](https://cdn.intechopen.com/pdfs/6177/InTech- Rfid_technology_security_vulnerabilities_and_countermeasures.pdf)  
28. <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5623669>  
29. [https://cdn.intechopen.com/pdfs/6177/InTech- Rfid\\_technology\\_security\\_vulnerabilities\\_and\\_countermeasures.pdf](https://cdn.intechopen.com/pdfs/6177/InTech- Rfid_technology_security_vulnerabilities_and_countermeasures.pdf)



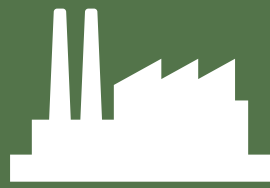
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Freight  
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Manufacturing



Wholesale and  
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Import  
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Export  
Operations



Consumer  
Information

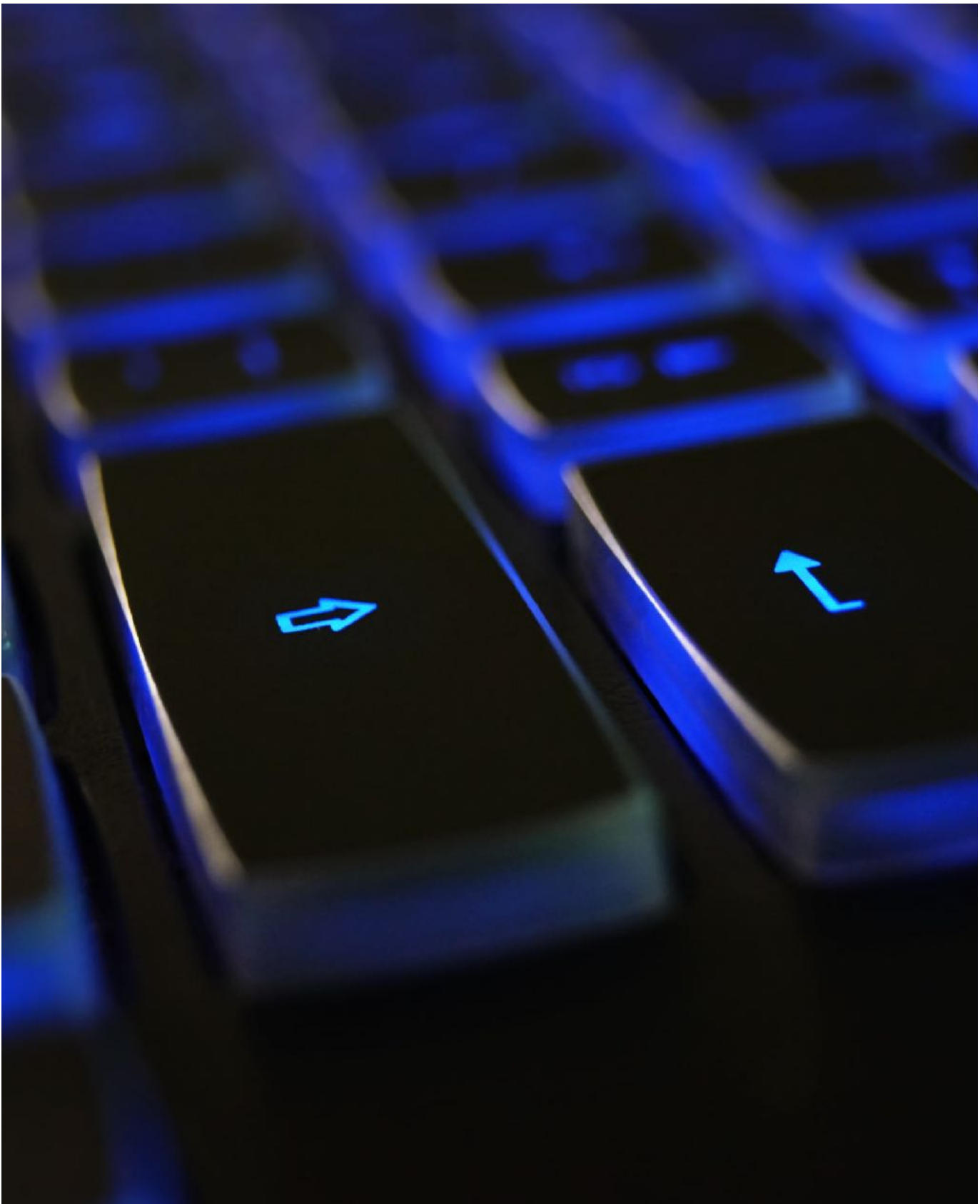


Cybersecurity,  
Data & Privacy



Supplemental  
Information





1.4.3 RFID Middleware

Threat	Threat Description	Potential Mitigation
Spoofing	<ul style="list-style-type: none"><li>● Connecting to RFID middleware applications as LLRP lacks authentication mechanism using spoofed RFID reader identities.</li><li>● Replaying previously captured communication from the reader device and gain unauthorised access to middleware application.</li></ul>	<ul style="list-style-type: none"><li>● Mutual authentication between readers and ALE middleware.</li><li>● Use sequence numbers and timestamps to protect against the replay attacks <sup>30</sup> between reader and client.</li></ul>
Tampering	<ul style="list-style-type: none"><li>● Middleware applications with back-doors and unauthorised code-tampering LLRP protocol communication</li></ul>	<ul style="list-style-type: none"><li>● Use of encryption in LLRP communication as well as the middleware to protect against the eavesdropping between a reader and ALE.</li></ul>
Repudiation	<ul style="list-style-type: none"><li>● Denying unauthorised access by deleting logs and associated traces.</li></ul>	<ul style="list-style-type: none"><li>● Enable activity logs in middleware and ensure that deleting logs is not possible.</li></ul>
Information Disclosure	<ul style="list-style-type: none"><li>● Eavesdropping unencrypted LLRP communications</li><li>● MiTM attacks diverting reader and middleware communications to malicious nodes.</li></ul>	<ul style="list-style-type: none"><li>● Use of encryption to protect against the eavesdropping between a reader and filtering and collection role.</li><li>● Use authentication such that MiTM attacks are blocked.</li></ul>
Denial of Service (DoS)	<ul style="list-style-type: none"><li>● Disabling middleware applications by inserting malicious values in the reader protocol causing buffer overflow attacks.</li><li>● Corrupting the ALE interface with malicious reader values.</li></ul>	<ul style="list-style-type: none"><li>● Use programming languages that offer bound checking to protect against the buffer overflow. <sup>31</sup></li><li>● Allow only authenticated reader’s data in proper format to flow through ALE interface.</li><li>● Use load-balanced ALE middleware to prevent availability issues due to flooding attacks.</li></ul>
Elevation of privileges	<ul style="list-style-type: none"><li>● Compromising ALE interface to gain unauthorised access and launching cross-site scripting or SQL injection attacks.</li><li>● Exploiting the weakness in input data validation mechanism to launch SQL injection attacks using malicious characters or values stored on RFID tags.</li><li>● Gaining unauthorised access to the system to reveal traceability information using stolen accounts and credentials to bypass the RBAC access control policies.</li></ul>	<ul style="list-style-type: none"><li>● Build a security features in readers and middleware that accepts data only in pre-defined format to protect against the code injections.</li><li>● Protect against the buffer overflow that may lead to elevated privileges. <sup>32</sup></li><li>● Incorporate a layer on top of middleware component that helps controlling the collection done by clients (i.e., capture application). <sup>33</sup></li></ul>

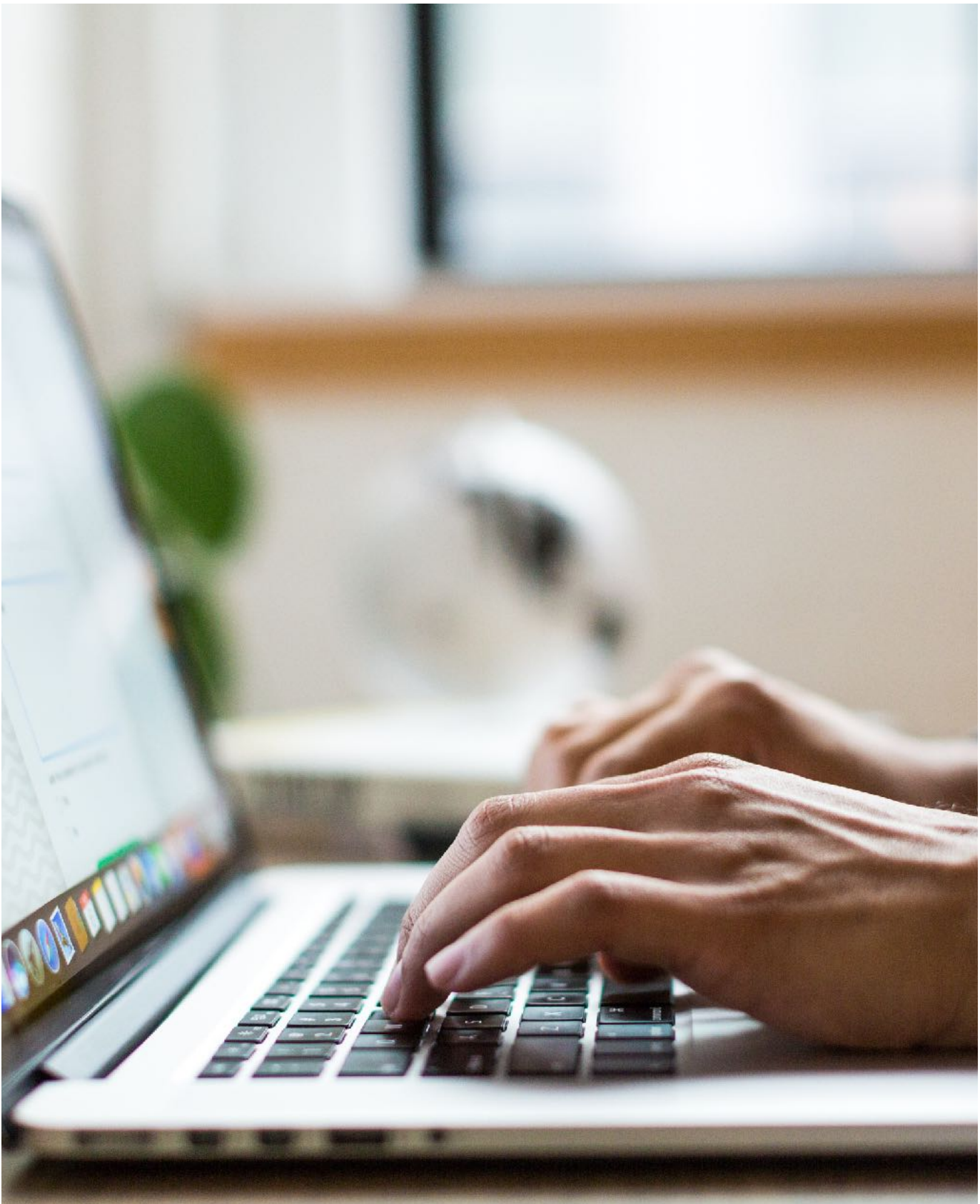
30. <https://www.inderscienceonline.com/doi/pdf/10.1504/IJWGS.2017.083386>

31. <https://www.veracode.com/security/buffer-overflow>

32. <https://www.veracode.com/security/buffer-overflow>

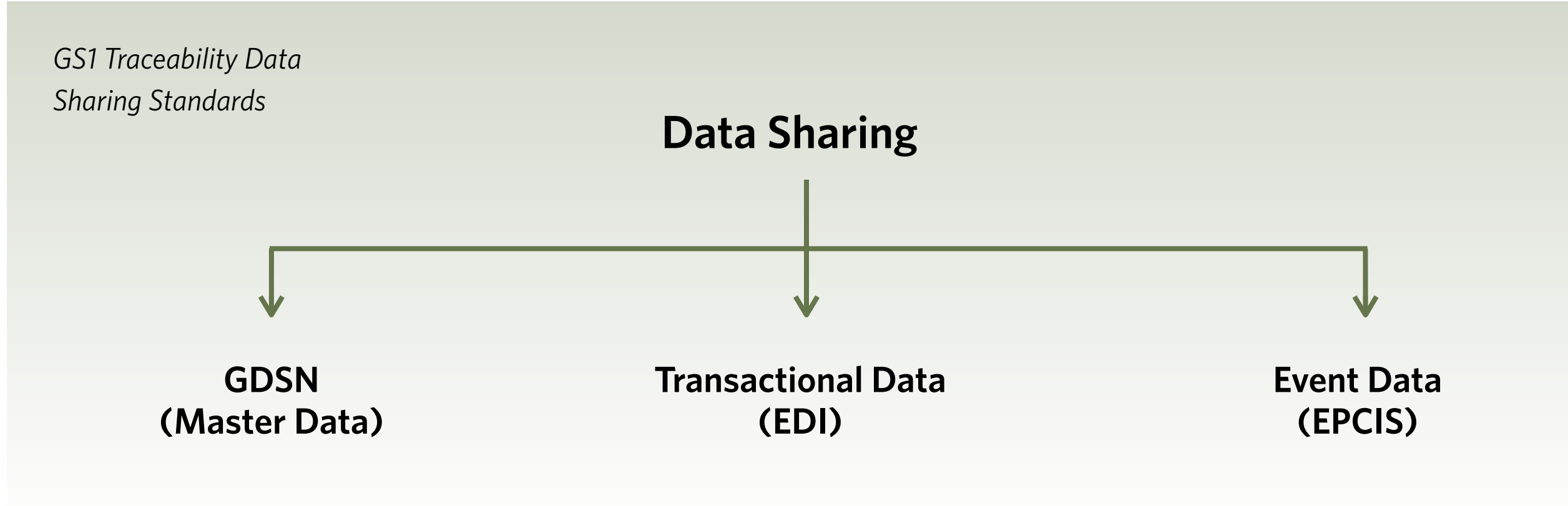
33. <https://link.springer.com/article/10.1007/s11280-015-0325-5>





## 1.5 Data Sharing Layer

To support traceability of products, GS1 provides global traceability standards which support the identification, capturing and sharing of traceability data such as the master data, transactional data and the event data related to the products. GS1 defines three different standards for data exchange amongst the trading partners within the supply chain. These include Global Data Synchronisation Network (GDSN – used for sharing Master Data), Electronic Product Code Information Services (EPCIS – used for sharing Visible-Event Data), and Electronic Data Interchange (EDI – used for sharing Transactional Data) as highlighted in the diagram below. These are complemented by GS1’s registries that enable products to be identified with a high degree of certainty, and the resolver service that allows items to be linked to any number of related external resources.



- **Master Data** - refers to data that is shared by one trading partner with many others and contains the description of attributes of real-world entities identified by GS1 ID keys. Examples include trade items and physical locations.
- **Transactional Data** - refers to execution of a business process function such as a supply contract, custom processing, order placement, and final settlement using the GS1 identification keys.
- **Visibility-Event Data** - refers to details of physical activity of products (or other assets) identified by keys within the supply chain, detailing where and why products are at a time within and across the organisations.

Assets in this layer include the following:

Assets	Descriptions
GDSN Data Pools	The data pools contain the product information (product catalog and product prices) which is shared among the trading partners. The data pools can be either maintained by a third-party or can be deployed internally by the trading partner.
GDSN Registry	The GS1 global registry is a directory of registered parties and products which also federates between data pools. It also serves as the pointer for data pools with respect to the master data of products and parties.
EPCIS Capture Interface	With this interface, visibility event data in accordance with EPCIS data model is delivered from capturing applications to a receiver (e.g., persistent repository of EPCIS data).
EPCIS Repository	A persistent store of visibility event data, comprising all EPCIS events generated internally within the organisation and received from other trading partners, and makes them available to be used by the EPCIS Accessing Application.
EPCIS Query Interface	With this interface, EPCIS event data may be requested by and delivered to a business application or a trading partner.
AS2	Communication protocol used for GDSN synchronisation and sharing EPCIS event data with trade partners.
Global registries	‘Thin’ registries, that is, registries of basic brand-authorised facts about items that are identified using GS1 keys. These provide an important reference against which more detailed data can be checked.
Resolver services	Based on the GS1 Digital Link standard, resolvers provide a means to connect identified items to EPCIS repositories and other traceability information, master data, promotional data, usage information and instruction manuals, information for patients and clinicians, and more.



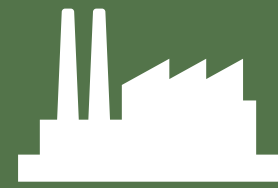
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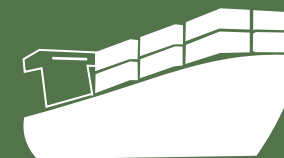
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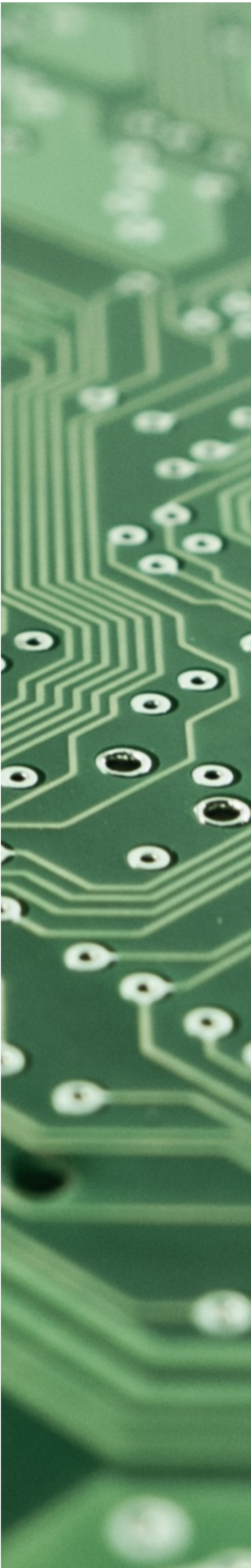
## 1.6 STRIDE Analysis of Data Sharing Layer

### 1.6.1 GDSN Data Pools/ EPCIS Repositories

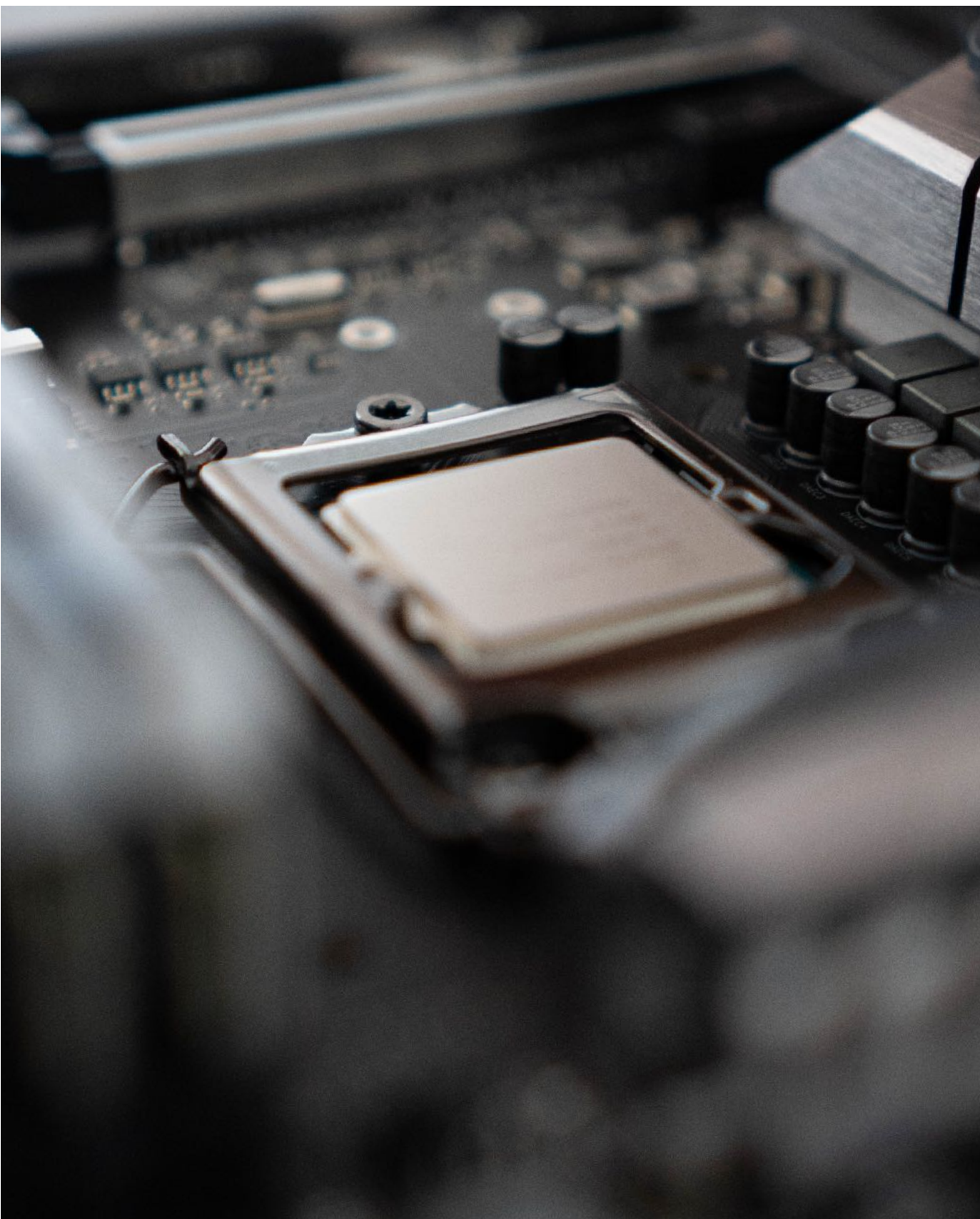
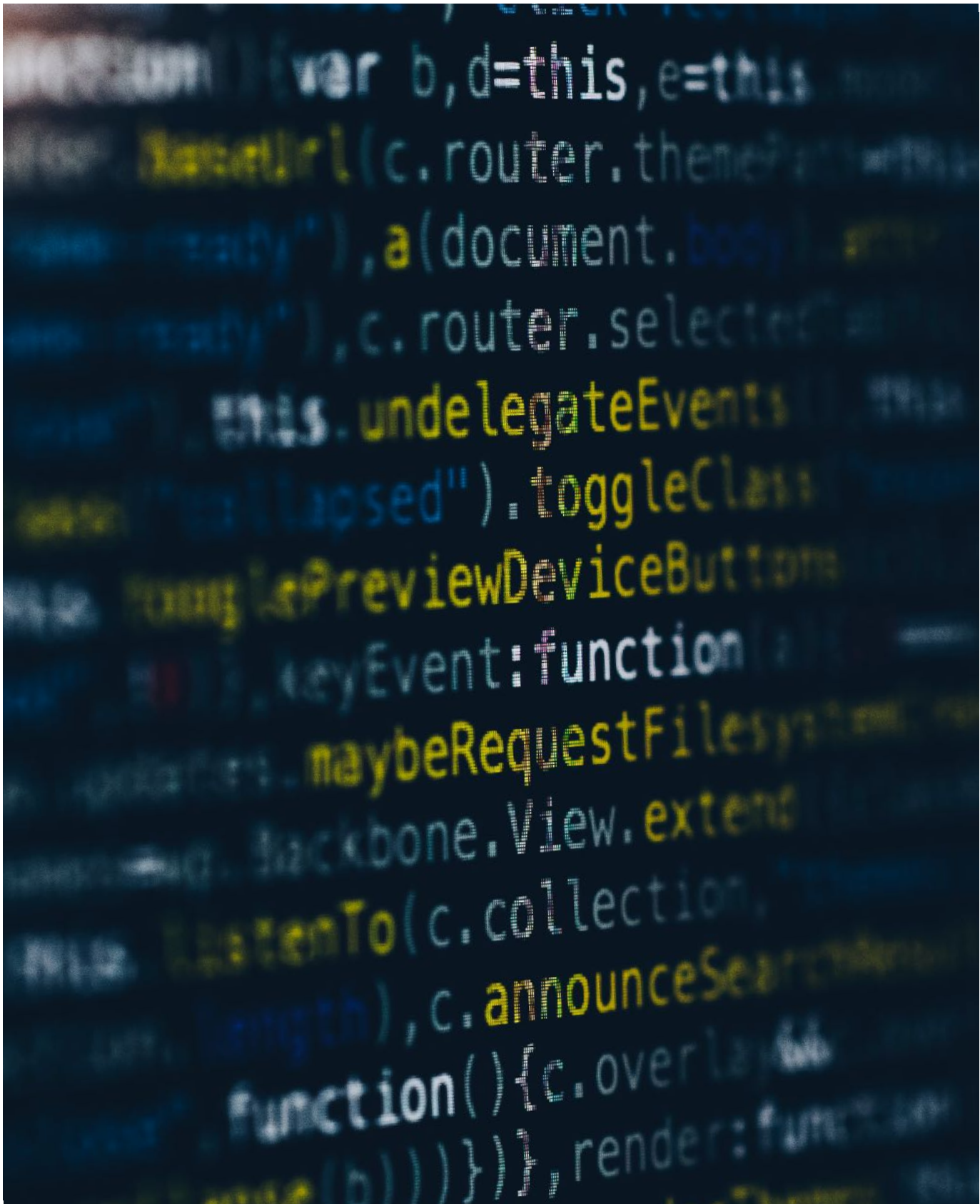
Threat	Threat Description	Potential Mitigation
Spoofing	<ul style="list-style-type: none"><li>● Accessing sensitive product data in GDSN data pools or GS1 global registry using stolen or spoofed credentials.</li></ul>	<ul style="list-style-type: none"><li>● Enable strong authentication (e.g., multi-factor authentication) prior to giving access to critical data stored in GDSN data pools.</li></ul>
Tampering	<ul style="list-style-type: none"><li>● Middleware applications with back-doors and unauthorised code-tampering LLRP protocol communication.</li></ul>	<ul style="list-style-type: none"><li>● Allow only authorised individuals to make changes to product related information after verifying their identity.</li></ul>
Repudiation	<ul style="list-style-type: none"><li>● Denying unauthorised actions either due to Improper logging or logs being removed by adversaries.</li></ul>	<ul style="list-style-type: none"><li>● Enable secure logging both on GDSN data pools and EPCIS repositories.</li></ul>
Information Disclosure	<ul style="list-style-type: none"><li>● Leaking sensitive traceability data from EPCIS repositories using SQL injection attacks or by transacting with malware infected repositories.</li></ul>	<ul style="list-style-type: none"><li>● Ensure that correct data is being shared only with authorised partners.</li><li>● Enable protection against virus and malware.</li><li>● Accept data only in pre-defined format to protect against any malicious data fed to EPCIS repositories.</li></ul>
Denial of Service (DoS)	<ul style="list-style-type: none"><li>● Denying service to legitimate users by using malicious XML files, or oversized XML documents.</li></ul>	<ul style="list-style-type: none"><li>● Protect against several types of XML attacks as mentioned in <sup>34</sup>.</li></ul>
Elevation of privileges	<ul style="list-style-type: none"><li>● Gaining unprivileged access to registries and data pool services</li><li>● Gaining unprivileged access to EPCIS event data stored in EPCIS repositories (e.g., stolen access token).</li><li>● Enabling unauthorised access to EPCIS repositories using malicious payload in AS2 (e.g., malware) or data from RFID tags.</li></ul>	<ul style="list-style-type: none"><li>● Ensure that access tokens for EPCIS event data is shared with correct partners</li><li>● Allow data pool access only to authorised partners.</li><li>● Protect against malicious XML payloads that may lead to unauthorised data retrieval as indicated in <sup>35</sup>.</li></ul>

34. <https://www.opswat.com/blog/depth-look-xml-document-attack-vectors>

35. <https://www.opswat.com/blog/depth-look-xml-document-attack-vectors>





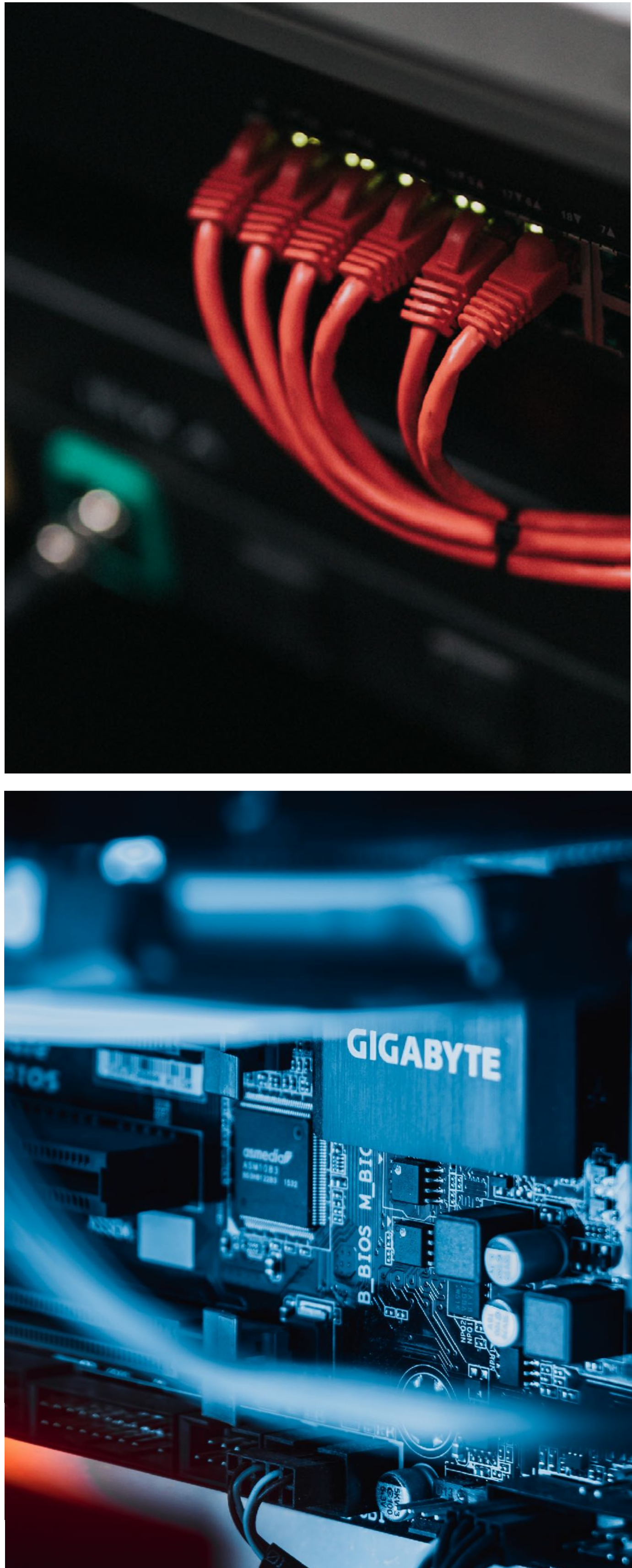


1.6.2 EPCIS Capture/Query Interface

Threat	Threat Description	Potential Mitigation
Spoofing	Feeding corrupted data to EPCIS repositories using spoofed middleware credentials or due to lack of mutual authentication between a middleware and repository.	<ul style="list-style-type: none"><li>● Enable mutual authentication between capture application, accessing application, repositories, and repository and trade partners.</li></ul>
Tampering	Tampering data in EPCIS repositories by exploiting the vulnerabilities in EPCIS capturing application.	<ul style="list-style-type: none"><li>● Accept data only from authenticated readers/trade partner in proper format so that capture/query interfaces are not corrupted.</li><li>● Allow only authorised individuals to makes changes to data stored in EPCIS repositories or GDSN data pools.</li></ul>
Repudiation	Denying malicious actions due to Improper logging or logs being removed by adversaries.	<ul style="list-style-type: none"><li>● Enable activity logging.</li></ul>
Information Disclosure	<ul style="list-style-type: none"><li>● Gaining unauthorised access to traceability data due to lack of encryption between capture application, repositories, and trade partners.</li><li>● Disclosing sensitive information by exploiting the lack of mutual authentication between capturing application and EPCIS repositories.</li></ul>	<ul style="list-style-type: none"><li>● Encrypt the communication between middleware, accessing application, repositories, and repository and trade partners.</li></ul>
Denial of Service (DoS)	Denying service to legitimate users by corrupting capture and query interface by sending malicious data from reader or from trade partners	<ul style="list-style-type: none"><li>● Accept data only in pre-defined form from data carriers to alleviate the chances of corrupting EPCIS capture interface that can lead to DoS.</li></ul>
Elevation of privileges	Gaining unprivileged access to EPCIS repositories by conducting SQL injection attack.	<ul style="list-style-type: none"><li>● Enable mutual authentication between capture application and repositories so that malicious readers cannot feed data to repositories.</li><li>● Accept data only in pre-defined form from data carriers and trade partner so that capture and query interfaces be corrupted leading to elevated privileges of an attacker.</li><li>● An EPCIS service should be incorporated to conduct proper redaction to alleviate the unauthorised access to data (redaction refers to denying a data request or restricting the amount of data requested by a trade partner). <sup>36</sup></li></ul>

36. [https://www.gs1.org/docs/epc/EPCIS\\_Guideline.pdf](https://www.gs1.org/docs/epc/EPCIS_Guideline.pdf)"[https://www.gs1.org/docs/epc/EPCIS\\_Guideline.pdf](https://www.gs1.org/docs/epc/EPCIS_Guideline.pdf)





1.6.3. AS2 Communication Servers

Threat	Threat Description	Potential Mitigation
Spoofing	Spoofing credentials of legitimate users and access trade data using stolen digital certificates and bypassing AS2 authentication.	<ul style="list-style-type: none"><li>Keep digital certificates in secure locations such as on an encrypted device and hardware security module.</li><li>Keep the OS and antivirus up to date and avoid running any suspicious program.</li></ul>
Tampering	Tampering traceability data by modifying AS2 communication parameters or the AS2 payload.	<ul style="list-style-type: none"><li>Use strong hash algorithms so that collision attacks are not possible and any attempt to tamper the sent data be detected (e.g., SHA-2 instead of SHA-1 which is recommended AS2 transport communication guidelines available on GS1 official website <sup>37</sup>).</li></ul>
Repudiation	Denying malicious actions on AS2 servers by removing traces of adversarial actions or targeting weak AS2 server software that do not log connections and activities performed	<ul style="list-style-type: none"><li>Enable secure logging of all operations.</li></ul>
Information Disclosure	Disclosing sensitive data by launching attacks such as DNS cache poisoning or using stolen digital certificates to get access to the EDI data sent over AS2 protocol.  Revealing private keys or AS2 service credentials in public domain.	<ul style="list-style-type: none"><li>Ensure that digital certificates are kept in secure locations.</li><li>Use strong public-private keys for asymmetric encryption; for example, consider using 2048 bits keys instead of 1024 bits</li><li>Recommended AS2 transport communication guidelines available on GS1 official website.</li><li>Weak keys are likely to be compromised as demonstrated in <sup>38</sup></li><li>Protect against MiTM attacks through DNS poisoning by enabling DNSSEC. <sup>39</sup></li></ul>
Denial of Service (DoS)	Denying service to legitimate users by launching Application layer DoS attacks targeting AS2 protocol such as flooding of authentication requests to the AS2 servers.	<ul style="list-style-type: none"><li>Prevent HTTP/S flooding attacks by incorporating techniques such as traffic profiling, computational challenges, firewall, and constant monitoring of threats. <sup>40</sup></li></ul>
Elevation of privileges	Gaining unprivileged access to the AS2 servers by sending malicious AS2 payload (e.g., malware infected Excel files, or XML payloads).	<ul style="list-style-type: none"><li>Check for malicious payloads such as XML injects attacks as mentioned in <sup>41</sup>.</li></ul>

37. <https://www.gs1.org/sites/default/files/docs/epc/EPCIS-Standard-1.2-r-2016-09-29.pdf>

38. <https://arxiv.org/abs/1905.09749>

39. <https://www.icann.org/resources/pages/dnssec-what-is-it-why-important-2019-03-05-en>

40. <https://www.netscout.com/what-is-ddos/http-flood-attacks>

41. <https://www.opswat.com/blog/depth-look-xml-document-attack-vectors>



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### 1.7 Application Layer

The application layer is the uppermost layer in the data flow architecture where end-user applications access traceability data to perform various tasks.

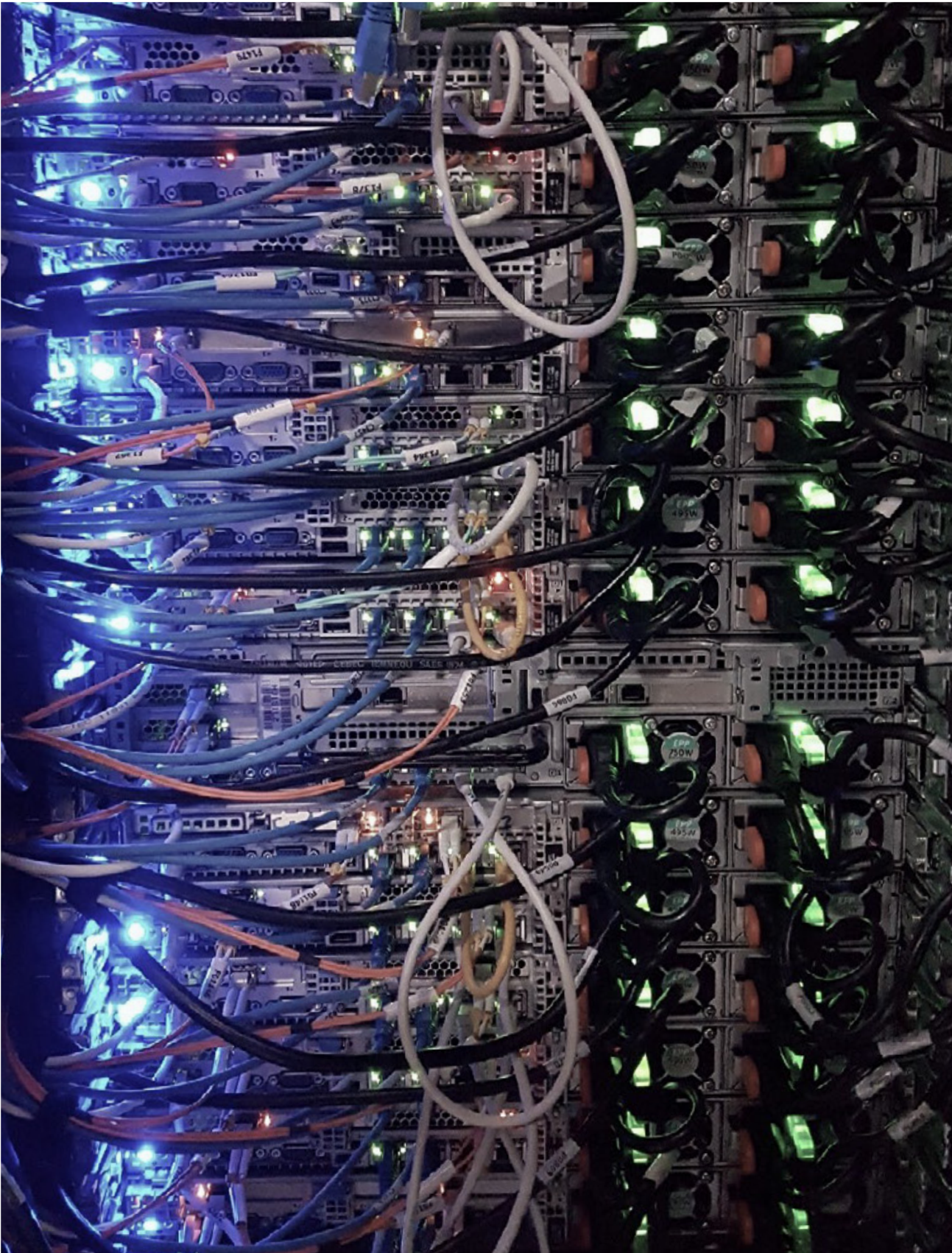
Traceability data is accessed by various end-user applications such as Enterprise Resource Planning (ERP) tools, Supply Chain Management (SCM), audit applications, consumer applications, monitoring and analytics tools. <sup>45, 46</sup>

These applications accessing traceability data can be broadly categorised into business to business (B2B), business to government (B2G) and business to customer (B2C). Due to complex interrelationship between food producers, supply chains, consumers, financial institutions and government organisations, weakness, or vulnerabilities in any one domain can lead to cyber security risks to the entire food traceability system. <sup>48</sup>

Assets		Descriptions
B2B	ERP, SCM	Various ERP systems of manufactures to supply chain traders access traceability data for inventory management, order management, shipping, transportation, and financial transactions related to food products. <sup>49</sup> SCM systems are used to manage the flow of products from source to destination. <sup>50</sup>
	Traceability/ Supply Chain Analytics	Such applications are used in the supply chain industry to use traceability data for conducting exploratory analysis.
	Audit Applications	These applications are primarily used for ascertaining the compliance of traceability standards and regulations.
B2C	Consumer Application	These applications enable consumers to access the information related to the products they purchase in terms of the origins for food products.

45. [https://origintrail.io/storage/documents/overview\\_document-english\(Jan%209\).pdf](https://origintrail.io/storage/documents/overview_document-english(Jan%209).pdf)  
46. <https://www.gs1.org/standards/gs1-global-traceability-standard#B-Data-management-responsibilities>  
48. <https://patentimages.storage.googleapis.com/0e/44/f7/f5b2ae9f14e55d/US20180197129A1.pdf>  
49. <https://www.gs1.org/standards/gs1-global-traceability-standard#3-Traceability-data-and-traceability-systems+3-4-Traceability-systems>  
50. <http://www.iict.bas.bg/pecr/2020/72/3-pp-29-40.pdf>





1.8. Security Requirement and Threat Mitigation Techniques for Application Layer

1.8.1 B2B Applications

Threat	Threat Description	Potential Mitigation
Spoofing	Accessing ERP/SCM systems using compromised credentials.	<ul style="list-style-type: none"><li>● Protect ERM/SCM systems with strong authentication mechanisms such as 2FA (2 Factor Authentication).<sup>51</sup></li></ul>
Tampering	Weak access control measures exploited by internal user for tampering data.	<ul style="list-style-type: none"><li>● Enable anti-virus/malware protection to alleviate chances of any tampering to B2B applications.</li><li>● Allow only authorized individuals to modify the traceability data using access control measures.</li></ul>
Repudiation	Denying malicious actions by deleting logs and associated traces.	<ul style="list-style-type: none"><li>● Enable secure logging of all operations.</li></ul>
Information Disclosure	<ul style="list-style-type: none"><li>● Lack of strong authentication</li><li>● Lack of fine-grained access control</li><li>● XSS or SQL injection attacks</li><li>● Insecure communication between B2B applications</li></ul>	<ul style="list-style-type: none"><li>● Protect all communication with encryption to alleviate chances of any unauthorised access to data.</li><li>● Enable robust authentication and enable fine-grained access control.</li><li>● Use privacy preserving techniques such as differential privacy for protecting personal data if any.</li></ul>
Denial of Service (DoS)	<ul style="list-style-type: none"><li>● Disrupting ERP/SCM services by using ransomware.</li><li>● Exploiting vulnerabilities in the ERP/SCM software to disable the software.</li></ul>	<ul style="list-style-type: none"><li>● Train staff on ransomware and how they impact system.<sup>52</sup></li><li>● Scan systems regularly with state-of-the-art anti-virus software.</li></ul>
Elevation of privileges	<ul style="list-style-type: none"><li>● Internal users circumventing weak application authorisation controls.</li><li>● An ERP/SCM server impacted by virus or malware.</li><li>● An adversary exploiting known soft-ware vulnerabilities.</li></ul>	<ul style="list-style-type: none"><li>● Enable fine grained access control.</li><li>● Protect against virus/malwares.</li><li>● Update software as soon as they are made available to patch any known security vulnerabilities.</li></ul>

51. <http://www.iict.bas.bg/pecr/2020/72/3-pp-29-40.pdf>  
52. <https://solutionsreview.com/enterprise-resource-planning/how-to-keep-your-erp-data-safe-from-ransomware/>



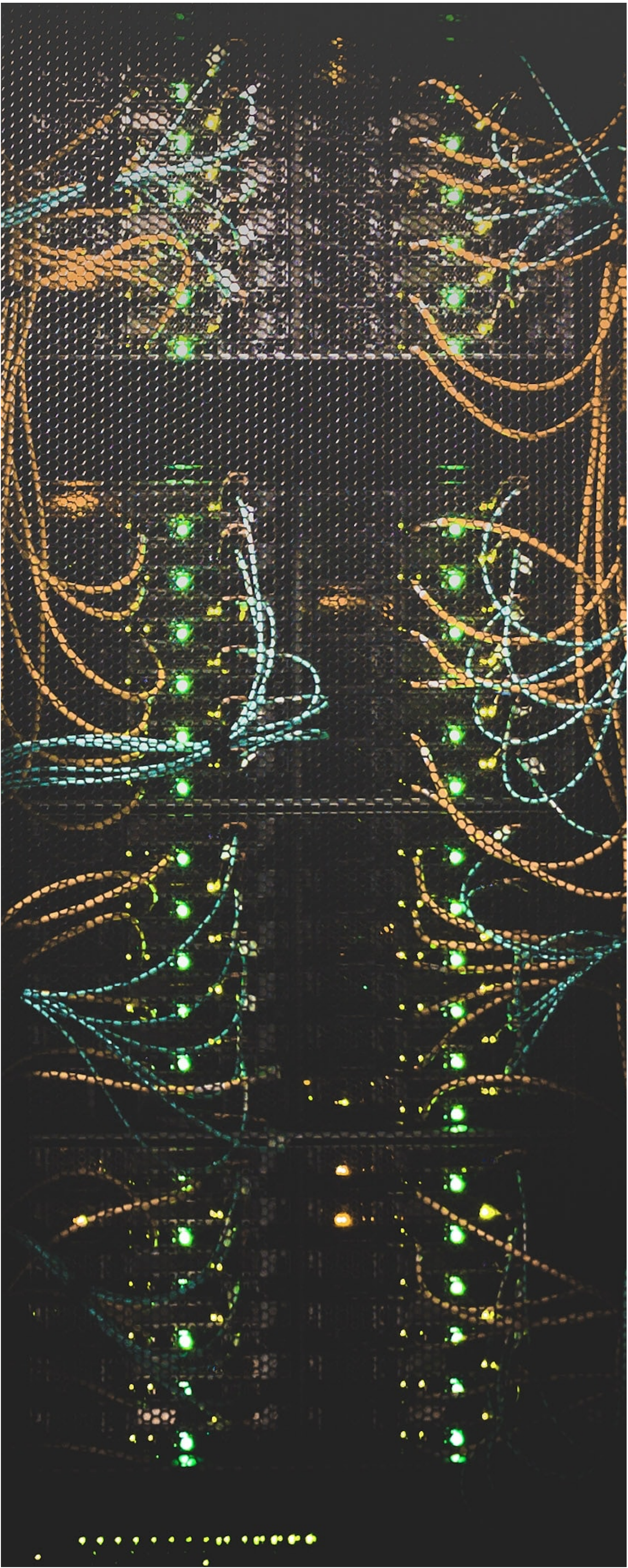


1.8.2 B2C Applications

Threat	Threat Description	Potential Mitigation
Spoofing	Accessing traceability data using stolen client credentials or forged client identities.	<ul style="list-style-type: none"><li>● Enable multi-factor authentication to protect against any potential subversion of first factor of authentication.</li></ul>
Tampering	Tampering client and backend consumer facing applications or traceability data (e.g., Leaving a backdoor or inserting a malware)	<ul style="list-style-type: none"><li>● Allow only authorised individuals to modify traceability data.</li><li>● Protect against malware.</li></ul>
Repudiation	Denying malicious actions due to insufficient logging capabilities or adversary’s ability to delete logs on client applications and the backend servers.	<ul style="list-style-type: none"><li>● Enable secure logging of all operations.</li></ul>
Information Disclosure	Adversaries targeting insecure communication between client applications and the backend servers.	<ul style="list-style-type: none"><li>● Encrypt communication with backend server.</li></ul>
Denial of Service (DoS)	Adversaries launching spamming or DoS attacks by sending unnecessary requests (i.e sending large number of digital link queries to resolver service) to the backend servers to exhaust re-sources.	<ul style="list-style-type: none"><li>● Incorporate a reliable DoS detection and mitigation solution as indicated in <sup>53</sup>.</li></ul>
Elevation of privileges	Adversaries using compromised client applications or backend servers to launch attacks.	<ul style="list-style-type: none"><li>● Update client application and server software regularly to fix any know security vulnerabilities.</li><li>● Regularly scan system for virus/malware</li></ul>

53. <http://phoenixnap.com/blog/prevent-ddos-attacks>





## Best Practice Guide for Managing Cyber Risks in Supply Chains

Managing cyber security risks in a supply chain system which involves various stakeholders and those that span multiple countries with different regulations is a challenging task. Nevertheless, risk can be effectively managed by following industry best practices that can be used by organisations to better plan, prepare and act during cyber security incidents. The best practice presented in this section is provided as a guide for supply chain stakeholders to plan their security strategies and aid their preparation in securing the traceability systems.

Research <sup>54</sup> suggests several best practice approaches for managing cyber risks in supply chains. To identify the best practices for managing cyber risks in supply chains, authors interviewed 30 senior executives who manage complex global supply chains and several solution providers.

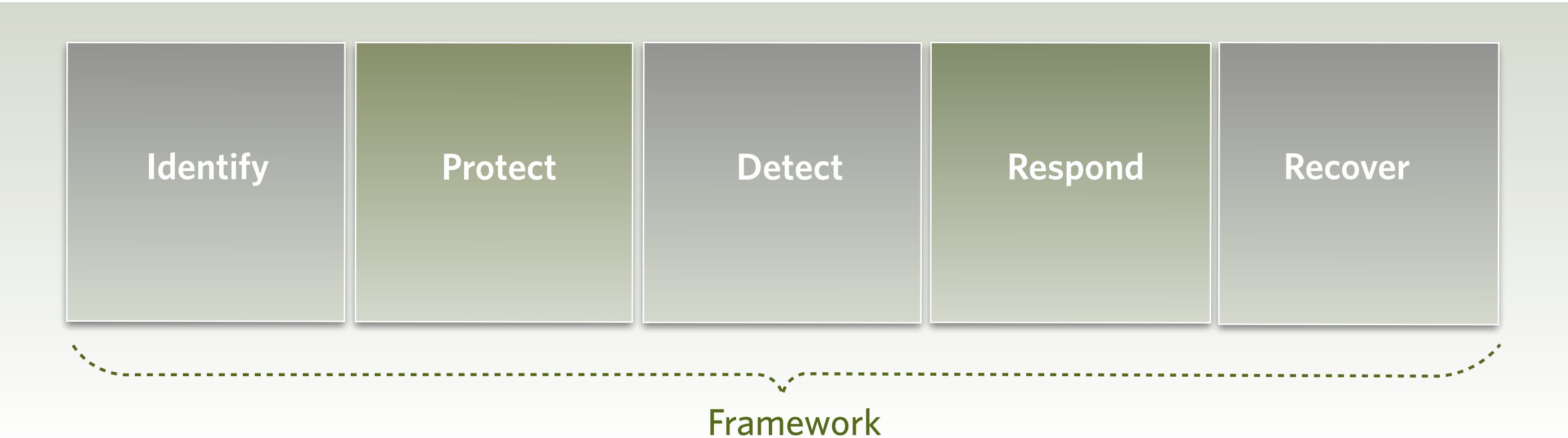
The suggested best practice includes:

- **Catalogue and Map Process**

Cataloguing the cyber inventory may be considered as a first step towards understanding cyber risks. Mapping of supply chain (i.e., cataloging hardware and software) nodes gives visibility into people and processes that leverage IT systems and current defence mechanisms (e.g., firewall). This knowledge can help in devising effective risk protection mechanism. Organisations should first identify all the assets or use the assets described under each traceability architecture layer that needs to be secured from cyber threats. Consequently, the mitigation steps provided for each identified threat should be considered when securing the supply chain network.

- **Clear Cyber Strategy**

An effective and clear cyber risk management strategy should be in place to counter any threats. For example, one of the possible approaches that may serve as a basis for developing comprehensive cyber strategy is the NIST Framework shown below. **Identify** in adjacent figure refers to the organisational understanding of potential cyber threats to different systems, assets, data, and capabilities. **Protect** refers to organisational approach to defend against different perceived threats. **Detect** refers to organisational ability to identify the occurrence of any cyber incident. **Respond** refers to a set mechanism in place to act against a particular cyber incident. **Recover** refers to the mechanism that may help in resuming the services and capabilities impacted by a particular cyber incident.



- **Identify Critical Systems**

As a part of cyber risk management, organisations may identify the critical systems that hold important business data and place a robust mechanism to protect such systems. Aggressive cyber risk management strategy for such systems may be incorporated. For example, this may include, unplugging such system from the Internet, have qualified personnel to manage those systems, incorporate multi-factor authentication, and mandate software updates immediately when they are available

- **End-to-End Integration**

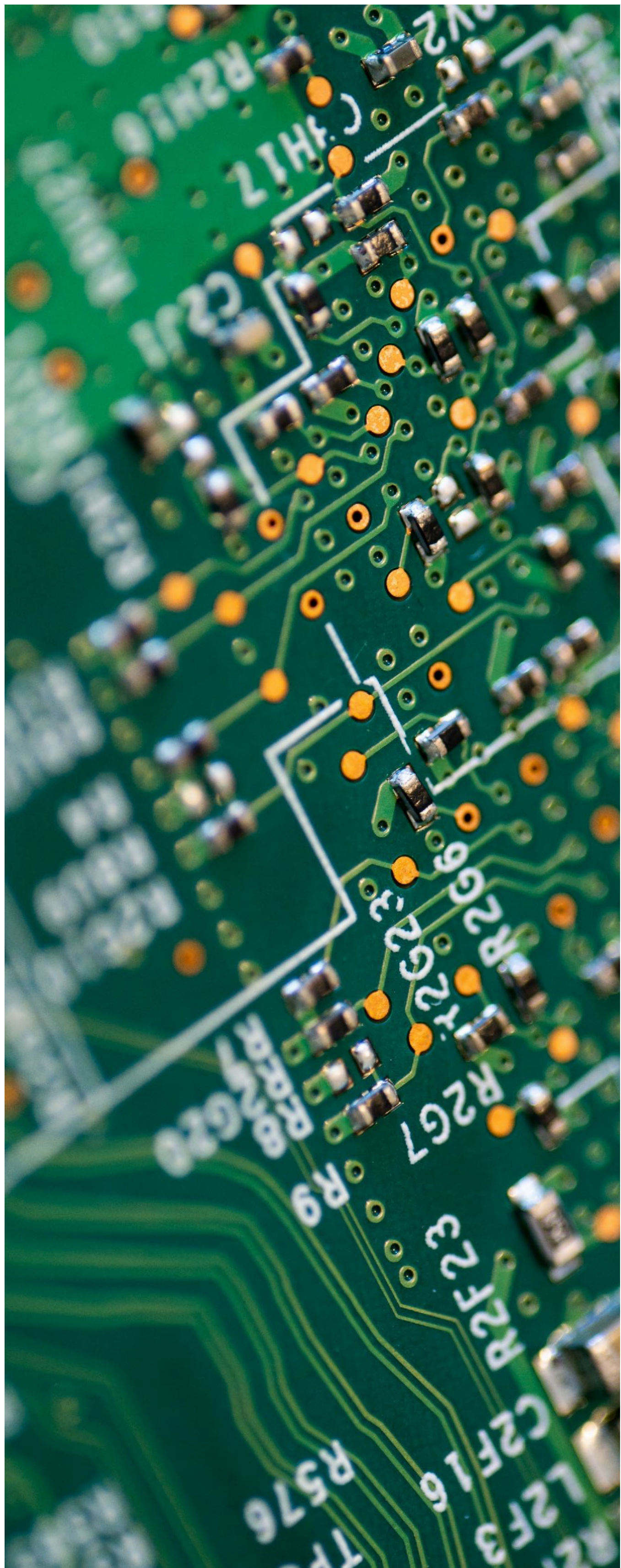
Instead of treating cyber strategy as an isolated operation within the four walls of an organisation, it must be extended to end-to-end supply chain by collaborating with trade partners (thorough strategic principles such as collaboration, integration, and synchronisation).

- **State-of-the-art Defence Systems**

Organisations must adopt the latest defence mechanisms such as firewalls, endpoint security, and IDS. Ensure that software is updated regularly to patch any known vulnerability that can lead to data breaches, critical systems are installed with latest anti-virus/anti-malware and updated regularly to protect against virus/malware<sup>55</sup> and incorporate IDS for detecting any potential cyber-attacks.

54. <https://haslam.utk.edu/sites/default/files/2020-04-Cybersecurity.pdf>  
55. <https://security.berkeley.edu/resources/best-practices-how-to-articles/top-10-secure-computing-tips>





● **Wise Use of Contemporary Technologies**

Businesses now-a-days are heavily reliant upon artificial intelligence and machine learning for analysing the enormous amount of data to provide insights to the business leaders. Similarly, they are often used within the cyber strategy — e.g., in intrusion detection system. However, these technologies open a whole new vector of cyber threats, that may be considered and mitigated accordingly.

● **Continuous Training and Awareness**

Often, a misconception in organisations is that the cyber incidents are the responsibilities of IT people. However, this is not the case, as effective strategy needs awareness amongst the entire workforces.

Ongoing training on regular basis must be conducted to effectively prepare against the potential cyber-attacks. The trainings and awareness can also prove to be pivotal against the insider misuses. For example, not all cyber risks come from cyber attackers. Often, they are associated with personnel within the company’s supply chain, with no adversarial motives. For example, an accidental sharing of sensitive business information with someone can lead to sophisticated social engineering or phishing attacks. Appropriate employee training and awareness can help mitigating such insider misuses.

● **Cybersecurity Information Sharing**

Most supply chains partners are SMEs which are often targeted due to their weaker cyber security posture, making them a weak link in the supply chain system.<sup>56</sup> One of the means to mitigate cyber security risks in a heterogenous supply chain IT systems is by sharing information and intelligence related to cybersecurity threats the organisations face. <sup>57</sup> This information sharing can be done directly between trading partners or using a trusted third-party.

● **Manage security of IoT devices and CPS systems**

As automated supply chains heavily rely on IoT devices and CPS systems; it is essential that organisations have effective strategies to manage and establish security policies to safeguard devices and the data stored in them. As traditional security tools cannot be implemented on constrained devices, it is essential to use IoT specific measures that can play a critical role in securing the access and communication to these devices, such as light-weight authentication protocols <sup>58</sup> and encryption schemes suited to IoT devices.<sup>59</sup> Physical security of all the devices used within the supply chains is also an important aspect that needs to be considered.

● **Security Compliance**

In a supply chain, trading partners should ensure that they and their peers are security compliant to established standards such as NIST, ISO27001, PCI, or HIPPA etc. This can be leveraged by organisations to create a strong security posture and increases trust among the trading partners.

● **Incident response**

An incident response plan should be developed by supply chain organisations to create an action plan in the event of cyber security breach. This allows supply chain trading partners to quickly resolve cyber security issues and restore normalcy in the supply chains.

● **Insider Threats**

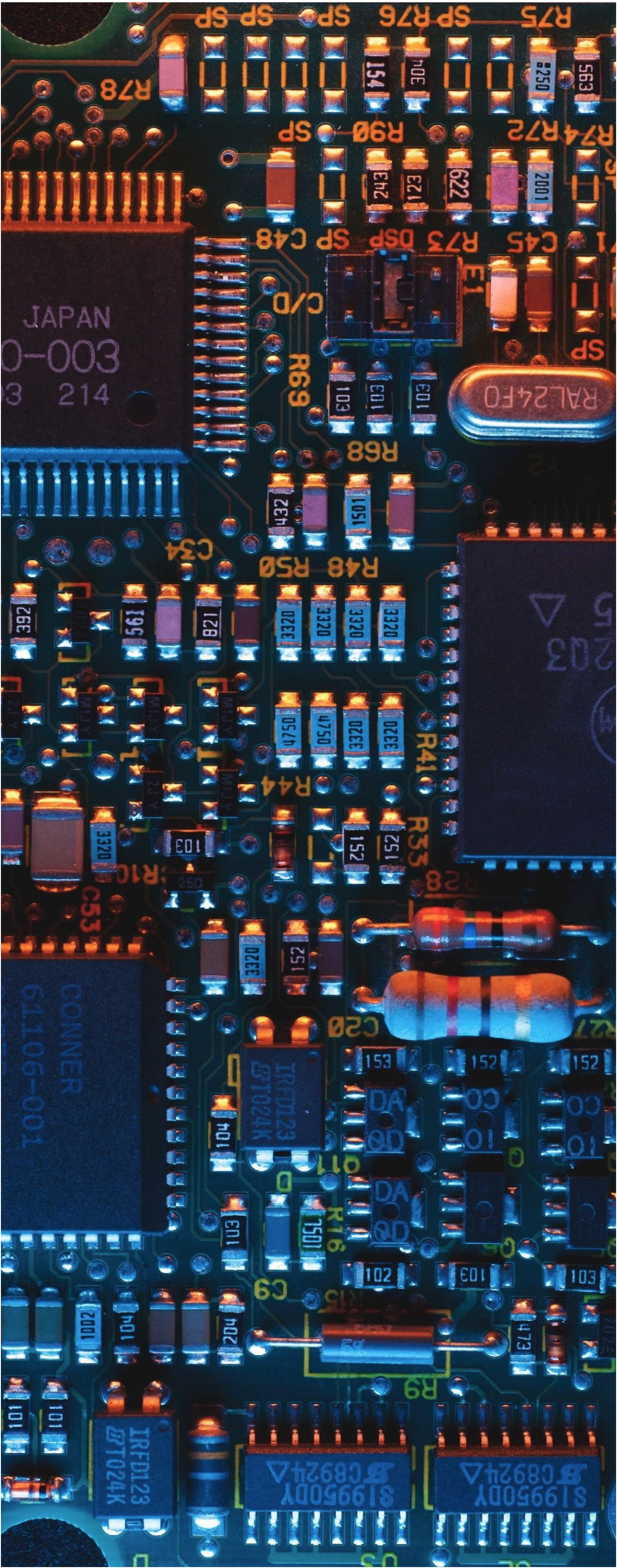
Immediately terminate the system access to any employee leaving the organisation under any circumstances (e.g., fired).<sup>60</sup> A disgruntled employee with access to company resources can pose serious threats to the business

● **Data Back up**

Back up your data regularly as in case of a cyber-incidents erasing all the data from the systems may be needed. <sup>61</sup>

56. <https://bura.brunel.ac.uk/bitstream/2438/9977/1/Fulltext.pdf>  
57. <https://bura.brunel.ac.uk/bitstream/2438/9977/1/Fulltext.pdf>  
58. <https://arxiv.org/abs/2010.05144>  
59. <https://link.springer.com/article/10.1007/s12652-017-0494-4>  
60. <https://www.pcmag.com/news/10-cybersecurity-steps-your-small-business-should-take-right-now>  
61. <https://security.berkeley.edu/resources/best-practices-how-to-articles/top-10-secure-computing-tips>





## Best Practice Guide for Ensuring Privacy of Shared Data

When analysing the data sharing layer, we highlighted various threats and mitigation strategies that were worth considering. Certainly, with multi-party supply chains data is shared with many trading partners, raising data confidentiality and privacy concerns <sup>62</sup> with implications on the business confidentiality agreement. <sup>63</sup>

In view of this, companies must not only emphasise on what information can be shared and with whom it can be shared, but they also need to ensure that their own confidential data and the data shared by other trade partners remains secure. To ensure this, the following recommendations can be helpful:

- **Data Protection**

Always encrypt data be it in rest or in transit. <sup>64</sup> Especially the use of Secure Multi-Party Computation (MPC) is recommended for securing data between several trading partners. <sup>65</sup> This necessitates that all the trading partners update their security mechanisms and adopt the same security standards as their counterparts.

- **Anonymisation**

Incorporate privacy-preserving publication techniques, such as k-anonymity and differential privacy, when making personal information available to stakeholders or to the public. In this case it is paramount important to test and evaluate the inherent utility vs privacy trade-off resulting from the application of these techniques

- **Multi-party secure computation**

Consider multi-party secure computation protocols tailored to supply chain data-sharing needs, combining inputs by different entities in a privacy-preserving manner.

- **Identity Establishment Prior to Data Access**

Enable multi-factor authentication on systems that hold important data. In addition, make sure that the system access of an employee leaving the organisation is terminated immediately to alleviate the data breach threats posed by the disgruntled employee. <sup>66</sup> Furthermore, consider using continuous authentication for enabling the periodic identity establishment beyond the entry-points.

- **Data Release**

Ensure fine-grained role-based and time-bound access control <sup>67, 68</sup> such that unauthorised individuals cannot access important confidential data

- **Principle of least privilege**

Enforce the principle of least privilege on traceability system models, ensuring that traceability and provenance data are accessible to authorised parties only.

- **Decentralisation**

De-centralised data sharing techniques such as blockchains provide a secure network to share data with added security of immutability, resilience to cryptographic attacks and updated only with peer consensus. <sup>69</sup> The use of such technologies can allow supply chain partners to share data related to traceability in a transparent way

- **Data Cleanrooms**

Sharing sensitive product information among peers for demonstrating the competitive advantage over others is a challenging task. Solutions such as data cleanrooms and digital marketplaces have been suggested as means to securely share such sensitive information. <sup>70, 71</sup> These methods can enhance the quality of the shared data and introduce transparency among the supply chain peers which are essential for competitive intelligence. An example of digital cleanroom was setup by A.T. Kearney for a fast-food chain where the sensitive information was shared among the trading partners, allowing them to optimise their supply chains. <sup>72</sup>

62. <https://www.sciencedirect.com/science/article/pii/S0925527317302050>  
63. <https://www.sciencedirect.com/science/article/pii/S0925527317302050>  
64. <https://www.ironmountain.com/resources/general-articles/d/data-privacy-best-practices-for-organizations>  
65. <https://www.emerald.com/insight/content/doi/10.1108/SCM-01-2018-0003/full/html>  
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67. <https://www.pmc.gov.au/sites/default/files/publications/data-sharing-principles-best-practice-guide-15-mar-2019.pdf>  
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71. <https://ieeexplore.ieee.org/document/9105913>  
72. <https://www.smartdatacollective.com/share-data-safely-across-supply-chain/>



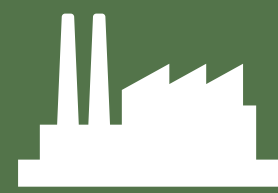
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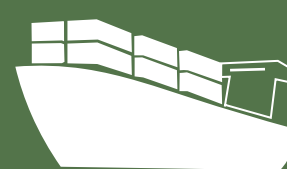
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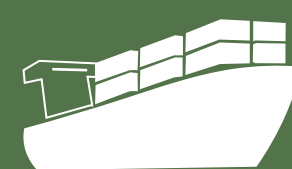
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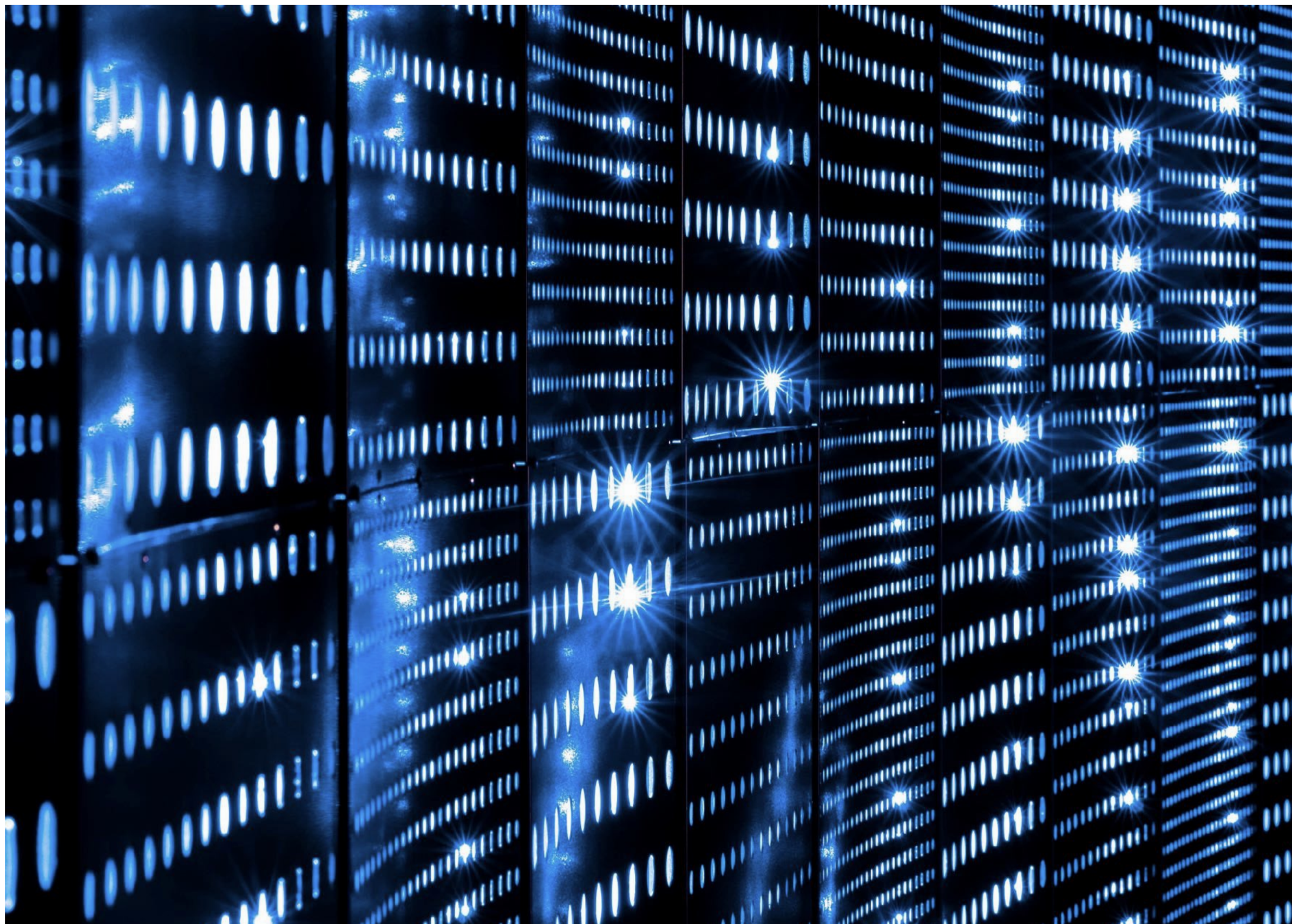


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- **Audit**

Always log the requests made to access critical data and conduct regular audit on those logs.
- **Secure Data Storage**

Store critical data on secure locations with proper protections (i.e., authentication and access control). Destroy any data that is not used anymore and maintain its record.
- **Avoid Credentials Sharing**

Ensure that employees are not sharing login credentials for accessing important resources.
- **System Security Settings**

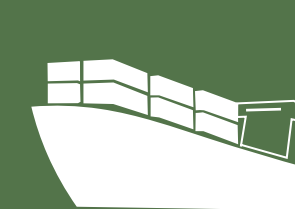
Allow only authorised individuals to change approved security settings on critical systems.<sup>73</sup>
- **Unauthorised Data Sharing**

Ensure that data is not being shared with unauthorised persons.
- **Protection of Work Areas**

Ensure that work area is only accessible to authorised individuals.
- **Report Cyber Incidents**

Immediately report any cyber incidents to all involved trade partners so that any corrective measures can be taken to avoid any subsequent damages.

73. <https://www.pmc.gov.au/sites/default/files/publications/data-sharing-principles-best-practice-guide-15-mar-2019.pdf>







Glossary

IoT:	Internet of Things
DoS:	Denial of Service
XML:	Extensible Markup Language
SQL:	Structured Query Language
AS2:	Applicability Statement 2
MiTM:	Man in the Middle attack
RBAC:	Role based access control
NIST:	National Institute of Standards and Technology
IDS:	Intrusion Detection System
CPS:	Cyber Physical Systems







M O D U L E   T W E L V E :

# Supplemental Information

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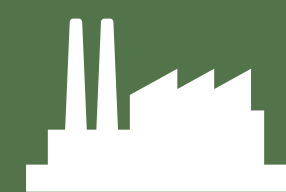
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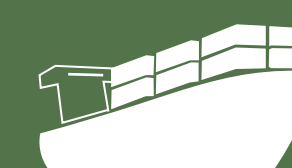
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- Roger McCracken, Managing Director, Foods Connected — <https://foodsconnected.com>

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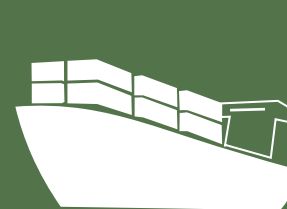
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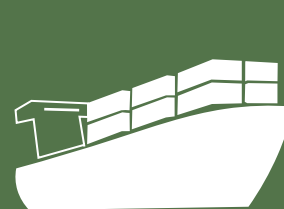
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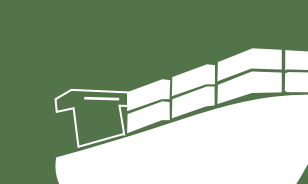
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