GS1 in Europe

Supply Chain Management for Fresh Fruit and Vegetables

Integrated Guideline Part 1:

Introduction

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GS1 in Europe

GS1 in Europe is a collaboration of 46 GS1 member organisations and leads the creation and implementation of harmonised, user-driven solutions for improving the supply and demand chain of European companies. Further information on GS1 in Europe and the activities in the area of fruit and vegetables can be obtained from www.gs1.eu

Frug I Com (Foundation Platform Fresh Chain Information)

Frug I Com is a unique collaboration of the Dutch Potato, Fruit and Vegetable Supply Chain. The ultimate goal is to establish electronic exchange of information between the participants in the Potato, Fruit and Vegetable Supply Chain by means of uniform labelling using electronic messages. Working with information standards allows Fruit and Vegetable Supply Chain companies to make optimum use of the information available in the supply chain and to apply it to order processing, tracing of products, optimising logistics and quality improvement. The result? A faster and more efficient supply chain which is less error-prone. Further information see www.frugicom.nl

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1. Introduction

1.1. Purpose and Scope of this Document

Within European fruit and vegetable trade relationships, traders and retailers have encountered divergences in identifying fruit and vegetable products as a result of the use of different product identification and the use of different information exchange approaches from one country to another and equally diverging business practices. These companies have asked GS1 in Europe to improve the integration of the GS1 Fresh Food Solutions and to develop a comprehensive integrated Implementation Guide including GS1-Standards for Identification, Barcoding, Master Data Management and Electronic Communication to harmonise the way of dealing with fruit and vegetable products.

As trade of fresh fruit and vegetables is a global business, the intention is to build recommendations that are globally applicable and are built on global GS1 standards. Additionally in Europe the same legislation applies in a large number of countries that need to be taken into account.

Supply chain management (SCM) is the management of a network of interconnected business involved in the ultimate provision of product and service packages required by end customers. Supply Chain Management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption. SCM is a business process that enables trading partners to follow products as they move from field through to retail store or food service operator. Each trade partner must be able to identify the direct source (supplier) and direct recipient (customer) of the product.

Each organization in the fruit and vegetable chain – in his role as a provoker of product information - is responsible to inform their trade partners as transparent as possible.

The first priority of SCM is to protect the consumer through faster and more precise identification and product information. This is especially critical if the product must be withdrawn from the supply chain.

This document serves as a best practice guide to implementing product identification and digital information exchange based on GS1 global standards for supply chain management. These standards were developed by industry to optimize business practices across supply chains world-wide.

The current edition of this implementation guideline is focusing on Location Identification, Product Identification, as well as Barcodes & Labelling and Master Data Exchange as this is crucial for all subsequent steps in the supply chain. The guideline will expand in the future according to the roadmap developed by the GS1 in Europe expert group for fruit and vegetables in order to give guidance on the implementation of GS1 standards in this sector including processes, electronic communication and Tracking & Tracing.

1.2. What is the scope of this guideline?

- The guideline is focused on fresh fruit and vegetables for human consumption. Processed food is out of scope as different regulations apply.
- The supply in the fruit and vegetable sector is considered as a whole.
- The process scenarios in the fresh fruit and vegetable supply chain include:

  Normal Business (Business Weeks), Call off order Business, Auction Business and Seasonal Events

1.3. Why an Integrated Implementation Guide?

Regarding the set-up of this guideline the following points were taken into account as a need is seen for guiding business partners.

- Pre-defined characteristics of an item vary strongly from product to product.
- Different parts of the supply chain have different requirements.
  - Producer
  - Packer, Fruit Trade Industry
  - Wholesale
  - Retail (Point of Sale)
- Differing knowledge of market participants

1.4. The Approach to the Integrated Guide

While developing the current guideline the expert group based the recommendations on the relevant legal framework i.e.

- EC Commission Regulations and
- UNECE Standards FFV (Fresh Fruits Vegetables) and DDP (Dry and Dried Produce)

  as well as current business practices in Europe.

Regarding the covered products the implementation guide focuses on:

- Pre-packaged produce
- Loose produce / produce in protective packaging
- Trade Packages
- Logistic Units

1.5. Parts of the Integrated Guideline

The Integrated Guideline "Supply Chain Management for Fresh Fruit and Vegetables" is a series of recommendation based on GS1 Standards and Global Fresh Food Recommendations of GS1. The Integrated Guideline consists of different parts and which will be published subsequently, starting with GLN Usage and GTIN Allocation.

The following parts are available or planned:

- **Part 1: Introduction (this document)**
- **Part 2: Location Identification with GLN**
- **Part 3: Product Identification with GTIN**
- **Part 4: Barcodes & Labelling (planned for 2014/15)**
- **Part 5: Master Data & GDSN (planned for 2014/15, draft for pilots available)**

Further parts will, according to the roadmap, focus on EDI & Processes and Traceability.

1.6. Benefits

The following benefits apply, when efficient supply chain management based on GS1 Standards is implemented:

- Optimizing logistics processes
- Enabling electronic reading at point of sale, when being received at warehouses, or at any other point where it is required in business processes
- Provides migration towards GTIN and removes need for supplier and customer bilateral agreements for product identification
- Brand identification via unique identification to support improved Category Management e.g. improved inventory management / reduced shrinkage)
- Enabling traceability along the whole supply chain (from grower to Point-of-Sale)
- Usage the new labelling technologies
- Automatic Markdown at POS (subject to local regulations)
- Improved Quality Control at shelf (e.g. best-before-date / sell-by-date encoded and checked at Point-of-Sale)
- Improved Product Replenishment and Reduced out of stocks
- Improved Pricing Accuracy at Point-of-Sale (e.g. organic vs. non-organic)
- Enables standard manufactured issued coupon use for Fresh Foods at POS
- Usage of electronic communication and replacing manual processes
- Usage of existing standards for master data management and GDSN

1.7. Who can use this Document?

This is a practical guide that is intended for those responsible for implementing GS1 Standards in their company's operations and supply chain. The document provides a guide for fresh produce growers, packers, exporters/importers, and distributors as well as their customers and suppliers. Individual organisations may perform any combinations of these roles.

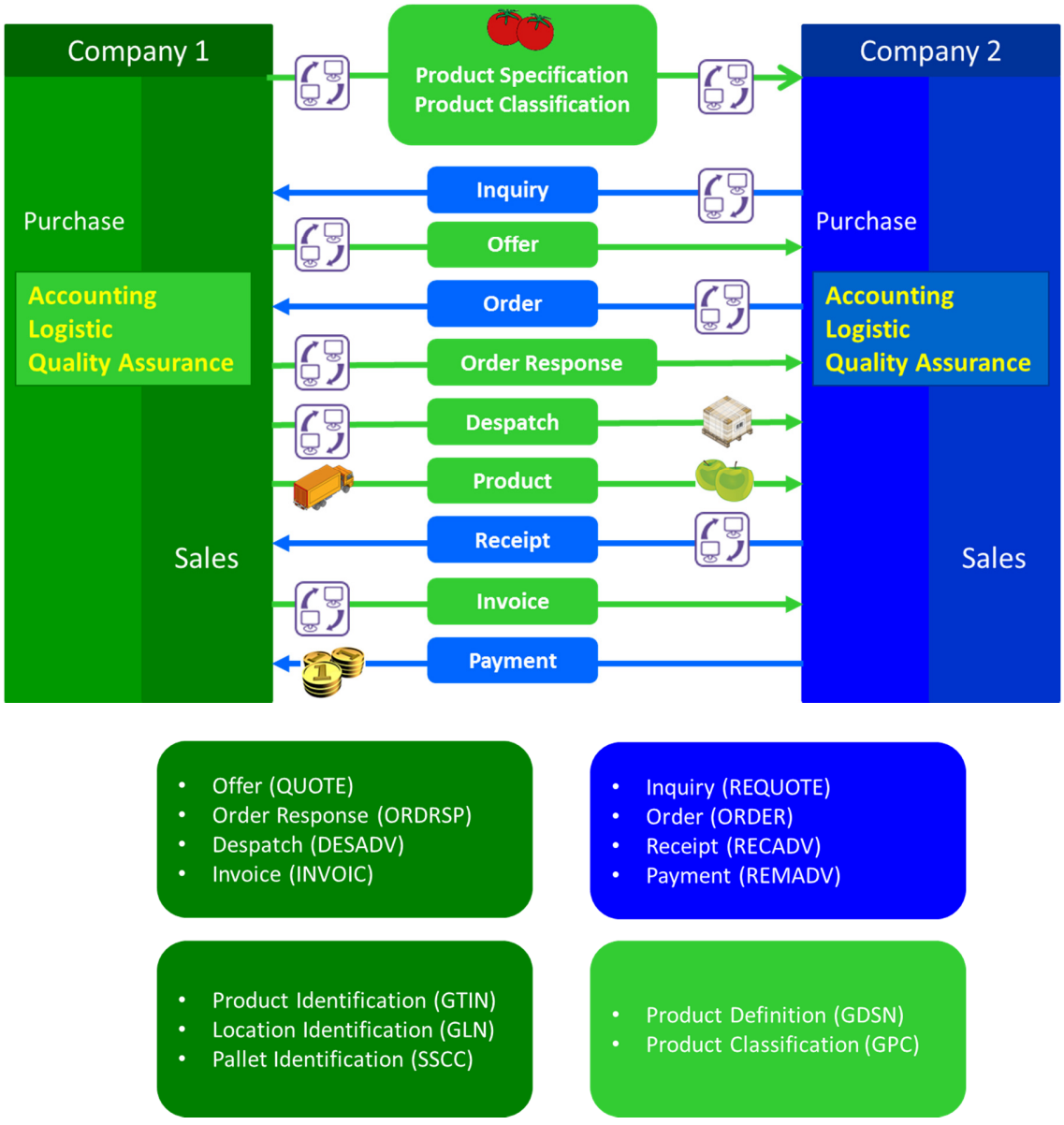
Table 1-1
Typical Roles in the Fresh Produce Supply Chain

Role	Typical Activities	Alias / Examples
Primary Role (in scope)		
Grower	Grow, Harvest, Store, Sell, Ship	Producer
Packer	Aggregate, Pack, Sell, Ship	Agricultural Cooperative / Pack House/ Producer/ Source / Re-packer
Trader	Store, Sell, Ship	Distributer/ Trader / Retail or Foodservice / Distribution Centre / Supplier/ Import and Export Warehouses / Wholesale / Terminal Markets / Auction / Wholesaler/ Broker or Dealer / Agricultural Cooperative
Retailer	Store, Sell to Consumer	Retailer, eTailer
Secondary (outside of scope)		
Third Party Logistics Service Provider	Transport, Store	Truck / Rail / Ship / Air
Supplier of Packing Material		Suppliers of packing material (crates, bags, boxes, labels, bins, clamshells, etc.)
Supplier of farm inputs		Suppliers of crop protection means, artificial manure, energy, etc.
Supplier of seed / plants		Suppliers of seeds and plants
Regulatory Organisations		Customs, Inspection Agencies, etc.

2. Information Flow

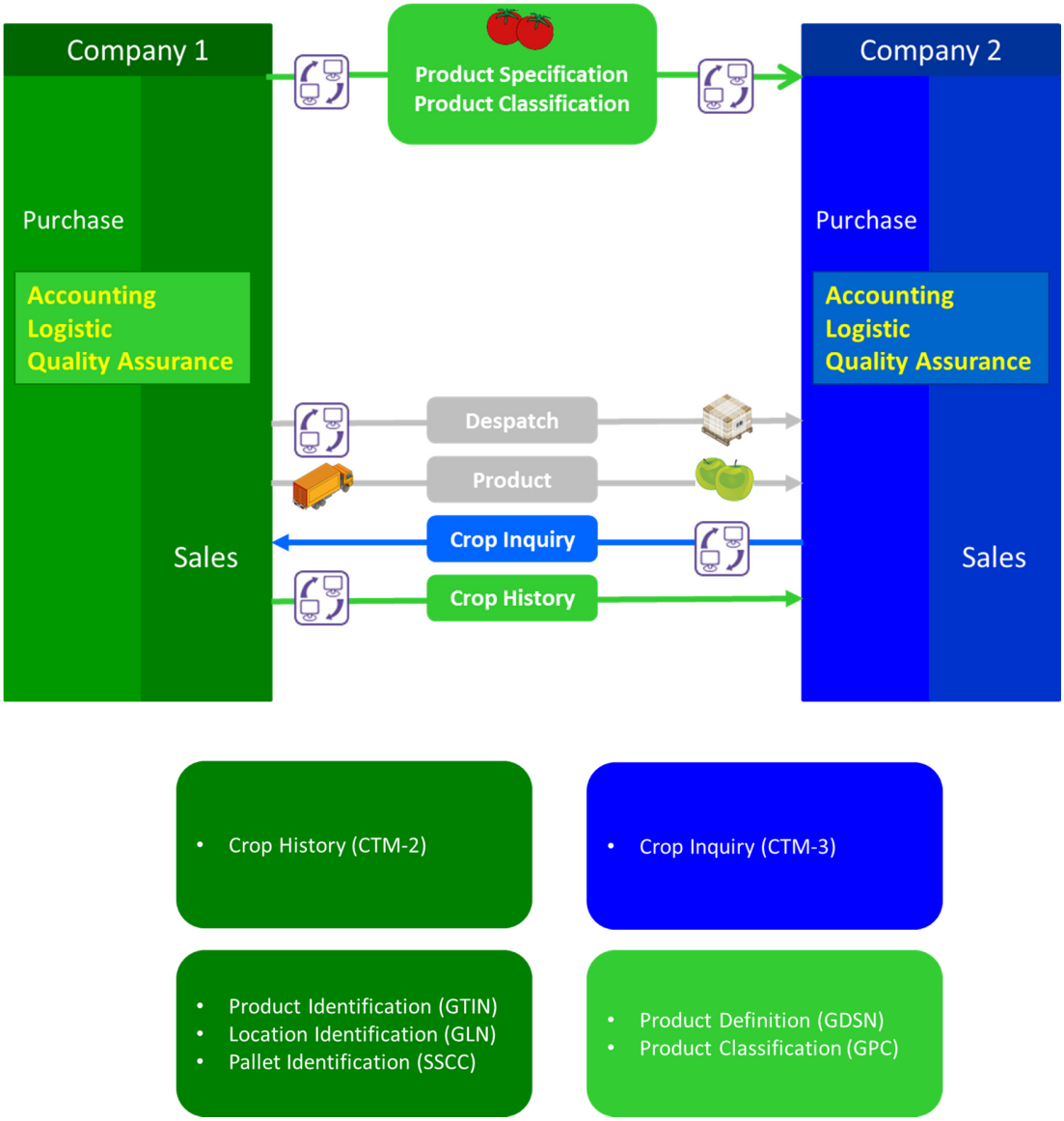
Within the scope of this guideline, the whole supply in the fruit and vegetable sector is considered. The table below shows the whole supply chain scenario. The figure below shows the information exchanged by trading partners for supply chain processes.

Figure 2-2a: Information Flow in the F&V Supply Chain
(source: FrugICom)



Additionally it may be necessary to exchange further information in the process, e.g. crop information. The figure below shows the relevant scenario.

Figure 2-2b: Crop Information Flow
(source: Frug I Com)



It is desirable to more efficiently cope with the exchange of crop data of fruit and vegetable products, and thereby better facilitate the commercial process. Differences in the information requested by chain parties lead to additional costs in the chain, which could be avoided with a standardised process. Furthermore, provision of this information often involves manual work that is performed twice because information is needed at various stages of the supply chain processes. A standardised process can provide a solution here too.

3. Key Definitions and Basic Principles

3.1. Consumer Packages

The identification numbers for consumer products are often used for identification of the item at the Point-of-Sale (POS). If an identification number is a PLU (means manual typing at POS) or the consumer package has a GTIN which is translated into a barcode (means scanning is possible), the consumer package can be billed at the POS.

There is a difference between pre-packed and unpacked articles. A pre-packed consumer product has always a GTIN identification number encoded in a barcode to make it possible to scan this article at the point of sale.

Unpacked (or loose products) are consumer products without any packaging, e.g. single fruits in a crate or carton. They are sold to consumers by each or by weight. Although the supplier may have assigned a separate identification number (GTIN) to a loose product and labelled it, in most cases, these loose consumer units have no label and the retailer itself arranges the sale to the consumer; e.g. a PLU is assigned by the retailer or the consumer sticks a retailer internal label on the article after he has weighed the article.

Therefore consumer units which are not labelled are handled as retailer internal process and out-of-scope. Apart from this, there are also consumer packages which have a package protecting the product only but no label. They can be sold by each or by weight according to internal retailer processes and are also out of scope.

- **Consumer Pre-package:** a labelled product package that is intended for an ultimate consumption. For retail this item will be scanned at the point of sale

- **Loose produce (unpacked):** fruit and vegetables which are delivered to the store in boxes or cases, and have to be weighed or counted at the POS

- **Consumer Package** an unlabelled product package that protects the fruit article (e.g. strawberry, blackberry, etc.)

3.2. Trade Packages

Trade products consist of one or more outer packaging of consumer products. If an item can be ordered either per pallet, per pallet layer, per package or by each there are as many as different GTINs assigned to each ordered item. Trade units have usually fixed weight or count, only exceptionally there are traded as variable measure.

- **Trade Package:** an article that contains one or more consumer packages and served as a unit in order and delivery processes; this is the ordered item

- **Variable Measure Trade Package:** a product package which is priced based on his weight

3.3. Logistic Units

A logistic unit is an item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with an SSCC and is usually composed of the same trade units, but also mixed logistic units are possible or the logistic unit itself is a trade unit.

- **Logistic Unit:** a transport package of any composition established for transport and/or storage that needs to be managed through the supply chain

3.4. The Different Manifestations of an Article

An article has different manifestations; they depend on the position in the chain. Each position in the chain has its own requirements regarding identification.

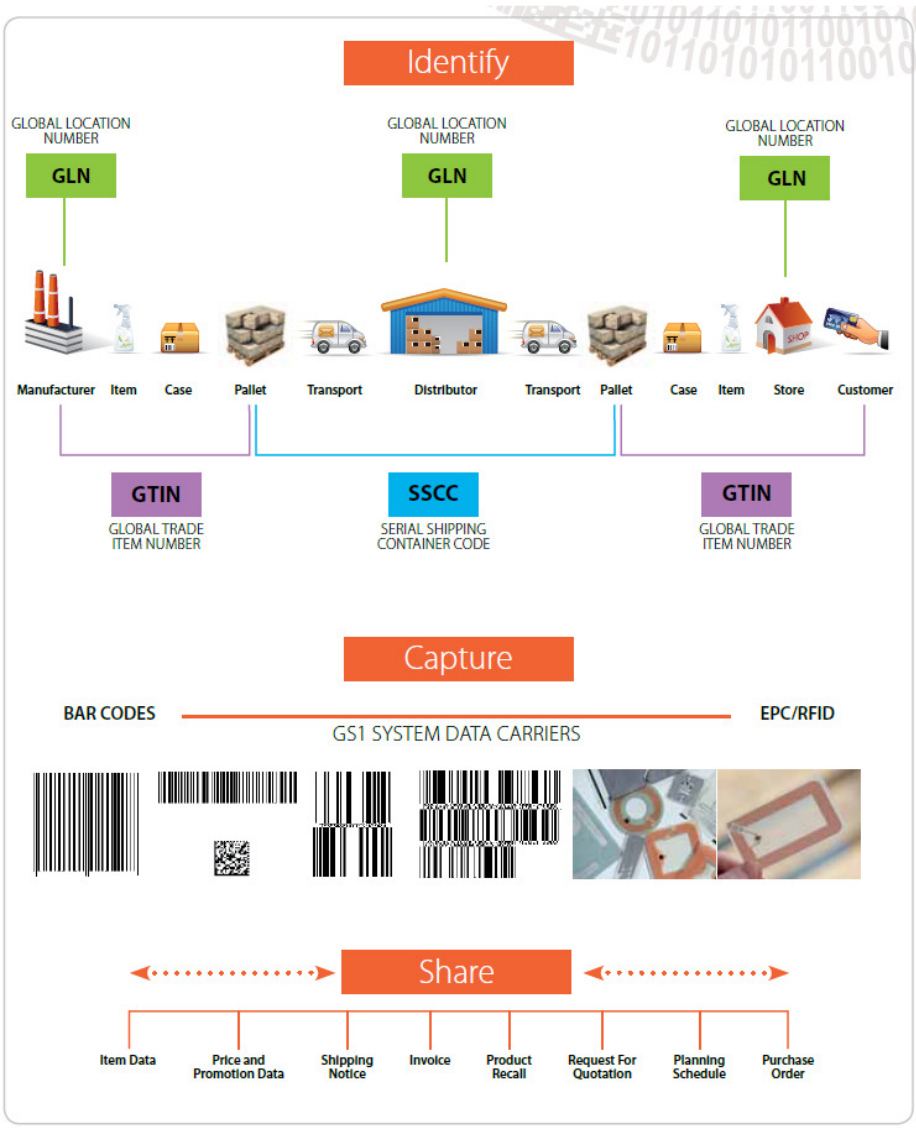
When synchronizing item data between supplier and customer the hierarchical relationship between the basic article, the consumer product and trade item (secondary packaging) should be indicated.

4. The GS1 System of Standards

The GS1 System of Standards is a flexible architecture that ensures maximum efficiency. It is built around and upon two main elements: GS1 Automatic Identification Standards and GS1 Communication Standards. The GS1 System has been designed to ensure that all of the elements are compatible and interoperable with each other. As a result, they can be deployed in ways that meet very specific customer needs – and at the same time are compatible with future process changes in the supply chain, or new additions to the GS1 Standards family.

Figure 4-1: Elements of the GS1 System

(source: GS1)



4.1. GS1 Identification Keys

The GS1 identification system provides the world a globally unique and unambiguous identification system through the GS1 Identification Keys. All GS1 standards shall incorporate at least one of the GS1 Identification Keys as mandatory identifiers.

The most important and widely used GS1 Identification Keys are:

- Global Trade Item Number (GTIN)

  The GTIN (Global Trade Identification Number, formerly EAN) helps to identify uniquely products, selling units, trading units and services. The GTIN enables companies to capture product data automatically for example by barcode scan – from harvest to point-of-sale.

- Global Location Number (GLN)
  This number gives you the possibility to identify the location or address of any trade partner: e.g. a Grower, a Greenhouse the Package Station, a Supplier, a Retailer, a Warehouse, etc.

- Serial Shipping Container Code (SSCC)
  This number gives you the possibility to identify a logistic unit e.g. a pallet, a container, etc.

The GS1 ID Keys are complemented by the GS1 Application Identifiers (or GS1 AIs). GS1 AIs act like a code list of generic and simple data fields for use in multi-sector and international supply chain applications. Each GS1 AI consists of two or more digits and provides the definition, format and structure of the data field encoded in a GS1 Data Carrier. For example, a GS1 AI exists for each GS1 ID Key, allowing it to be encoded in GS1 BarCodes or EPC/RFID tags. Another example are AIs for Lot No. or Pack date.

Furthermore GS1 Keys provide the basis for electronic data interchange (EDI) between suppliers and retailers. From product ordering by electronic systems to reliable identification in warehouse and availability on the shelf of the retail store: trading partners can optimize their bilateral trading processes regardless of restrictions of sector or country.

4.2. GS1 Data Carriers

GS1 has an entire portfolio of Data Carriers: different kinds of media that can hold GS1 ID Keys and attribute data. The same content can, in fact, be encoded onto different kinds of carriers, depending on what use will be made of it. The most common data carriers in the fruit and vegetable sector are:

- **EAN/UPC Barcode**

  If a company wants to put a barcode on a trade item that can be scanned at any retail point of sale anywhere in the world, they need an EAN/UPC barcode. The GS1 EAN/UPC barcode is the longest-established and most widely used GS1 Data Carrier. It is an indispensable product-marking method that is found on virtually every consumer product in the world. It encodes the GTIN.

- **GS1-128**

  In the logistics area, the GS1-128 Data Carrier is the relevant standard. GS1-128 barcodes can carry all GS1 ID Keys, as well as variable information like serial numbers, expiration dates, and measures. The GS1-128 bar code has taken on considerably greater importance in recent years, owing to the increasing requirements of more stringent product traceability. GS1-128 barcodes are used on transport labels on logistic units as well as for case labels on trade units in the fruit and vegetable sector. GS1-128 can encode the GTIN and additional data.

- **GS1 DataBar**

  The GS1 DataBar symbols can carry more information and identify smaller items than EAN/UPC barcodes can and can be also scanned at retail point of sale. As a result, GS1 DataBar enables GTIN identification for fresh variable measure and hard-to-mark products like loose fruit and vegetables. GS1 DataBar can encode the GTIN and additional data.

- **EPC/RFID**

  EPC/RFID tags use Radio-Frequency Identification technology to encode GS1 ID Keys in the GS1 Electronic Product Code (EPC).

EPC/RFID Tags

4.3. GS1 Communication Standards

GS1 Communication Standards are another key element of the GS1 System of Standards. GS1 Communication Standards enable master data sharing between trading partners in the supply chain and treat transactional data and visibility data. The main elements are:

- **Master Data Sharing with GS1 Global Data Synchronisation Network (GDSN)**

  The GDSN is built around the GS1 Global Registry, GDSN-certified Data Pools, the GS1 Data Quality Framework and GS1 Global Product Classification, which, when combined, provide a powerful environment for secure and continuous synchronisation of accurate data.

  Additionally, GS1 uses the Global Product Classification (GPC) to ensure products are classified correctly and uniformly, a system that gives buyers and sellers a common language for grouping products in the same way, everywhere in the world. GPC structures also apply in the (pre-) ordering process for fruit and vegetables.

- **Transactional Data with EANCOM**

  GS1 EANCOM® is a GS1 eCom Communication standard based on UN/EDIFACT (United Nations Electronic Data Interchange for Administration, Commerce and Transport), which is a set of internationally agreed-upon standards, directories and guidelines for the electronic interchange of data. The GS1 EANCOM standard covers the functions required to effect a complete trade transaction:

  - messages which enable the trade transaction to take place, e.g. price catalogue, purchase order, invoice, etcetera
  - messages used to instruct transport services to move the goods messages used in settlement of the trade transactions through the banking system

- **Transactional Data with GS1 XML**

  GS1 XML is another GS1 eCom Communication standard. It provides a standardised and predictable structure for electronic business messages, enabling business partners to communicate business data rapidly, efficiently and accurately, irrespective of their internal hardware or software types.

- **Visibility Data with EPCIS**

  EPCIS is an interface standard for exchanging event related information. It answers four powerful questions for any GS1 ID Key: What? Where? When? Why? It can provide visibility into object events, aggregation events, quantity events, and/or transaction events. EPCIS is the bridge between the physical world and business information systems.

  More information on EPCIS can be found at http://www.gs1.org/EPCIS

4.4. The IFPS Identification System

In addition to the GS1 System, the International Federation for Produce Standards (IFPS), a coalition of fruit and vegetable associations from the around the globe, joined together in 2001 to pursue the task of introducing a global standard for the use of international Price Look-Up (PLU) numbers. They can be used in addition to the GS1 Barcodes for manual processing at POS.

PLU codes have been used by supermarkets since 1990 to make check-out and inventory control easier, faster and more accurate. PLU codes are used to identify bulk produce (and related items such as nuts and herbs).

The most widely used and known IFPS PLU's are:

- Global PLU Code

  A code approved and assigned by the IFPS Board for use in any country utilizing the IFPS PLU

- Restricted Use PLU codes

  A code approved and assigned by the IFPS Board for produce either
  a) restricted FOR use only in one country or group of countries
  b) restricted FROM use in one specific country or group of countries

- Retailer Assigned PLU codes

  A code approved and assigned by an individual retailer for use in their retail outlets only. Retailer Assigned codes are part of the master list of PLU codes which can be utilized in the IFPS PLU scheme.

5. Glossary

Term	Definition
Actor	An actor is a role that a user plays with respect to a system.
Application Identifier (AI)	The field of two or more digits at the beginning of an Element String that uniquely defines its format and meaning.
Batch/Lot Number	The batch or lot number associates a trade item with information the manufacturer considers relevant for traceability of the item. The data may refer to the trade item itself or to items contained in it.
Consumer Unit	The package size of a product or products agreed by trading partners as the size sold at the retail point of sale.
Data Carrier	A means to represent data in a machine readable form; used to enable automatic reading of the Element Strings.
External Traceability	External Traceability takes place when instances of a Traceable Item are physically handed over from one Traceability partner (Traceable Item source) to another Traceability partner (Traceable Item recipient).
GLN (Global Location Number)	The GS1 Identification Key used to identify physical locations or legal entities. The key comprises a GS1 Company Prefix, Location Reference, and Check Digit.
GTIN (Global Trade Item Number)	The GS1 Identification Key used to identify trade items. The key comprises a GS1 Company Prefix followed by an Item Reference Number and a Check Digit.
GRAI	Global Returnable Asset Identifier.
GS1 System	The specifications, standards, and guidelines administered by GS1.
Identification	Refer to GLN and GTIN
IFPS	International Federation of Produce Standards, is composed of national produce associations from around the globe
Internal Process	A series of actions, changes or function(s) within an organisation or an organisation that brings about a result.
Internal Traceability	Internal Traceability takes place when a Traceability partner receives one or several instances of traceable items as inputs that are subjected to internal processes, before one or several instances of traceable items are output.
Location	A place where a traceable item is or could be located [ISO/CD 22519]. A place of production, handling, storage and/or sale.
Logistic Unit	An item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with an SSCC.
Master Data	Within the context of Data Synchronisation, any data that is applicable across multiple business transactions. Master Data describes each Item or Party involved in Supply Chain Processes. A Global Trade Item Number (GTIN) or a Global Location Number (GLN) uniquely identifies each data set. Master Data can be divided into neutral and relationship dependent data.

Term	Definition
Party	A Party (or) Location is any legal or physical entity involved at any point in any supply chain and upon which there is a need to retrieve pre-defined information. A Party is uniquely identified by a Global Location Number (GLN).
PLU Code	Price Look-Up (PLU) numbers. They can be used in addition to the GS1 Barcodes for manual processing at POS. Global PLU codes are assigned by IFPS.
Process	In a GS1 context this refers to a business process. This is a series of actions, or functions that transform an input into an output to assist in meeting an organisation's objectives. Inputs and outputs may be data, physical entities or a mixture of both, examples being order to cash, collaborative planning, warehouse management and cross-docking.
Product Description	GS1 Global definition: A piece of information reflecting a characteristic related to an identification number [e.g., an expiration date or a product description related to a GTIN.
Serial Shipping Container Code (SSCC)	The GS1 Identification Key used to identify logistics units. The key comprises an Extension digit, GS1 Company Prefix, Serial Reference, and Check Digit.
Share	Act of exchanging information about an entity or traceable item with another Trading Partner.
Shipment	A grouping of logistics and transport units assembled and identified by the seller (sender) of the goods travelling under one despatch advice and/or Bill of Lading to one customer (recipient).
Shipment Reference Number	The reference number assigned to a shipment.
Traceability	[ISO 9001: 2000] Traceability is the ability to trace the history, application or location of that which is under consideration.
Traceability Data	Any information about the history, application or location of a traceable item, either Master Data or Transactional Data.
Traceable Item	A physical object that may or may not be a trade item, where there may be a need to retrieve information about its history, application, or location. The level at which the traceable item is defined is dependent on the industry and degree of control required (for example within a product packaging or logistical hierarchy). It could be tracked, traced, recalled or withdrawn. It could exist in multiple locations at the same time (for example, if identified at the trade item and batch level). A traceable item may be related to another traceable item. It is the choice of the Traceability Partner which identification level (e.g. GTIN or Lot/Batch or serial level) to use for the traceable item. See also definition for process.
Trade Item	Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in any supply chain.
Trading Partner	Any Supply Chain Partner that has a direct impact on the flow of goods through the supply chain. Examples include Third Party Logistics Provider, Manufacturer, Retailer, and Grower.
Transporter	The Traceability Partner that receives, carries, and delivers one or more traceable items from one point to another without transforming the traceable item(s). Typically only has possession, custody, or control of a traceable item, but may have ownership.