GENCOD EAN FRANCE

TRACEABILITY IN THE SUPPLY CHAIN

From strategy to practice

Index

INTRODUCTION

A guide to concerted traceability

This guide is intended to act as a **common reference document** for the implementation of a traceability system between partners in a supply chain. It enables the various parties to:

- understand the principles and elements of a traceability system;
- analyse the issues and limits of the traceability system within a given context;
- understand the various applicable tools;
- evaluate the status of a traceability system;
- implement a traceability project.

The viewpoint adopted concerns the supply chain as a whole, rather than any particular individual partner. The guide therefore focuses on the parameters that affect **the traceability of physical flows between several distinct partners**, i.e. on the interfaces rather than the internal traceability procedures specific to each company, and therefore strictly reliant on its transformation processes.

The guide positions itself in an **open environment** between independent partners, where a common language and standards are required.

All economic partners involved in distribution, and more generally speaking, **all sectors faced with the problem of tracing physical products** in a supply chain, are concerned. This guide deals with the traceability of raw materials and packaging, right through to the distribution of end products. It particularly applies to the agri-food industries.

This guide is aimed at partners operating in supply chains, service providers concerned by traceability, together with the various partners likely to be involved in traceability systems.

This guide was put together at the request of, and with the assistance of suppliers and distributors, for all partners involved in supply chains.

In particular, all of the concepts have been developed with the help of Gencod-EAN France members, who shared their expertise within the framework of the traceability working group. The recommendations produced are the result of the consensus achieved in an atmosphere of mutual understanding and a search for solutions applicable to all types of companies concerned with a common issue.

Depending on his objective, the reader may directly consult the appropriate chapters:

- as the basis of general reflection, see Chapters 2 and 3;
- to provide guidance for a research phase, see Chapters 3 and 4;
- to implement a traceability project, see Chapter 4;
- to analyse a traceability system, see Chapter 3 and paragraph 4.4.

Furthermore, this guide is a complement to other documents or services proposed to members of Gencod EAN France.

Definitions

This document is not intended to provide new definitions for certain terms where these already exist. Instead, it aims to create a synthesis of existing definitions, and to take the usual language into consideration, or to further explain certain terms with a practical objective.

Traceability

Traceability was defined in 1987 by the standard **NF EN ISO 8402** as:
"the ability to retrace the history, use or location of an entity by the means of recorded identification".

By ‘entity’, we mean:
- an activity or process;
- a product;
- an organisation or a person.

In the case of a product, the term "traceability" may refer to:
- the origin of materials and parts;
- the history of processes applied to the product;
- the distribution and placement of the product after delivery.

From the point of view of the user, traceability may be defined as **following-up products in both a qualitative and quantitative manner within space and time**.

From an information management point of view, implementing a traceability system within a supply chain involves **systematically associating a flow of information with a physical flow.** The objective is to be able to obtain pre-defined information concerning batches or groups of products (also pre-defined) at any given moment, using one or more key identifiers.

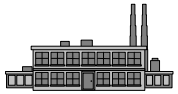
Notes:
While the expression ‘traceability’ has been used for a number of years, the term itself did not appear in French-language dictionaries until the year 2000.

The terms "bottom-up and top-down", "upstream and downstream", "product and logistic" traceability, etc., are simply different ways of describing either a part of a traceability system or its objective.

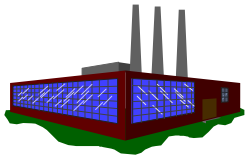
(see Diagram next page)

Associating a flow of information with the physical flow of products

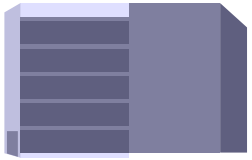
Farmer



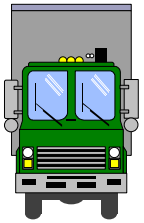
Upstream supplier



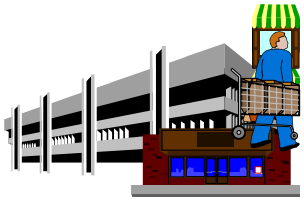
Supplier



Warehouse



Carrier



Distribution plate forme

Point of sale

FLOW OF INFORMATION

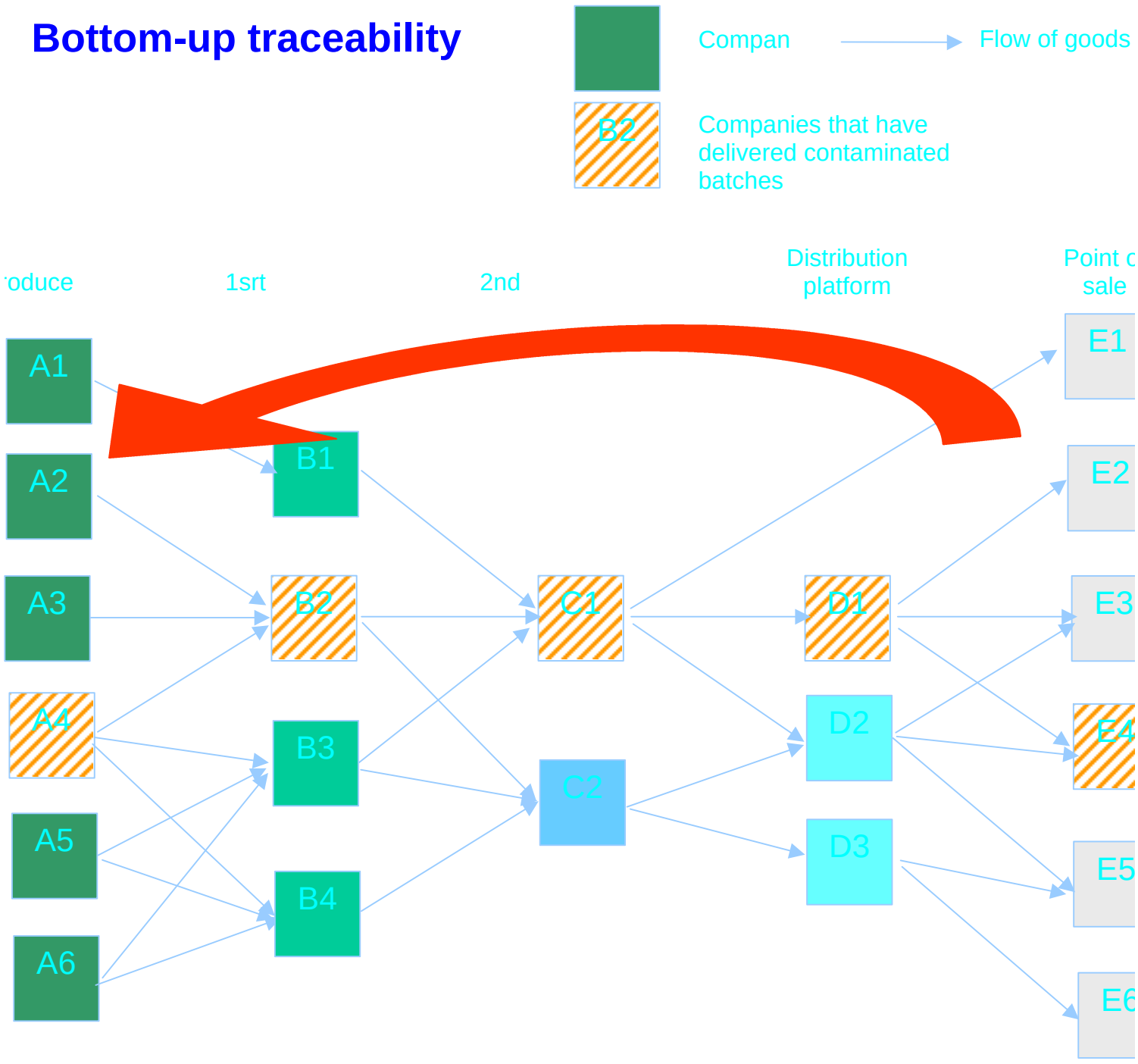
FLOW OF PRODUCTS

Bottom-up traceability and top-down traceability

These two concepts play an essential role in traceability.

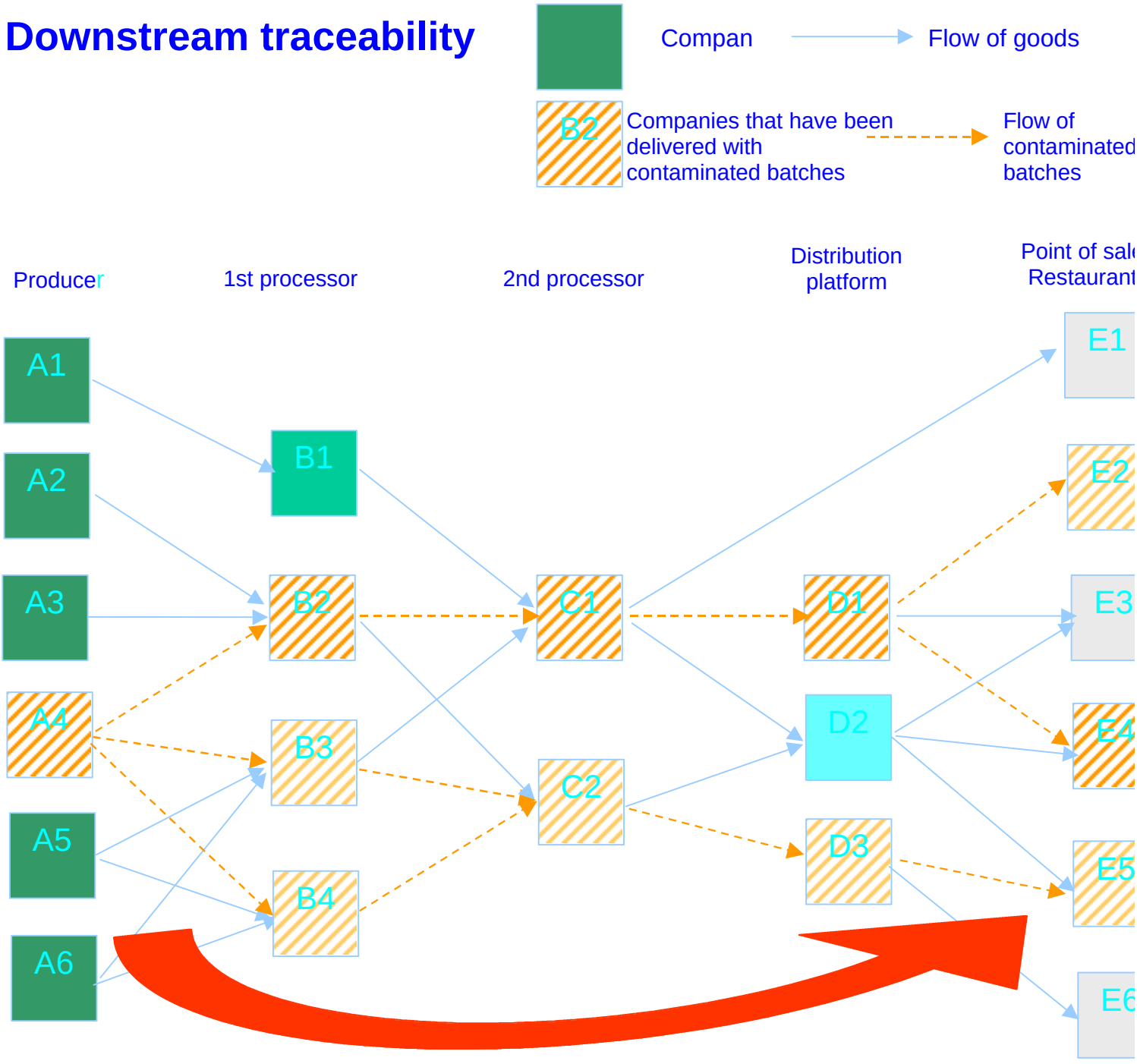
Bottom-up traceability is the capacity for locating products, from any point of the supply chain, using one or more given criteria. It is notably used in the event of product recalls or withdrawals.

Bottom-up traceability



Top-down traceability is the capacity for finding the origin and characteristics of a product, from any point of the supply chain, using one or more given criteria.
It is notably used for finding the cause of a quality problem.

Downstream traceability



In the definitions indicated above:

- The products may be end products destined for the consumer, primary processed products, raw materials, etc.
- The given criteria may be a raw material or packaging batch number, an end product batch number, serial shipping container code (SSCC), delivery time, etc.
- The location may be a storage site, a shipment platform, a distributor's platform, point of sale, recycling site, etc.
- The origin and characteristics may be the suppliers, raw material batch numbers, manufacturing chain, manufacturing order, carrier number, phytosanitary process, quality control analysis results, storage location, etc.

Upstream, downstream and internal traceability

If bottom-up and top-down traceability are confirmed concepts used for describing the direction of the traceability across the entire chain, upstream and downstream traceability correspond to the point of view of a supply chain partner. This partner is usually a company or a processing site.

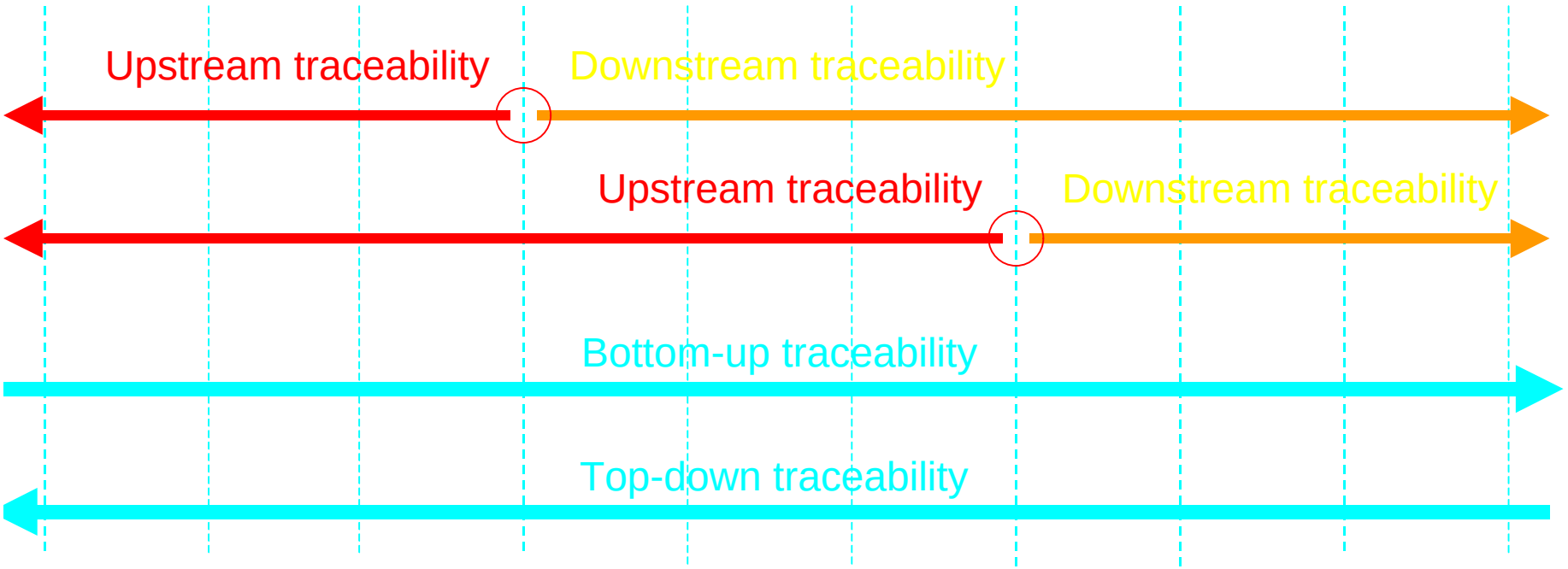
Upstream traceability describes the procedures and tools implemented in order to locate an event that has already occurred before the partner concerned has become legally or physically responsible for the products.

Downstream traceability describes the procedure and tools implemented in order to locate an event that has occurred after the transfer of property or after the physical transfer of products from the partner to a third party.

Internal traceability describes the traceability implemented throughout the processing or transformation undertaken by the partner to his products. **Internal traceability takes place independent of commercial partners.**

Bottom up / Top down Upstream / downstream

Supplier of raw materials | Logistics service provider | Carrier | Industriel | Logistics service provider | Carrier | Distribution platform | Point of sale | Consumer | Recycling



Product traceability and logistical traceability

Product traceability describes the qualitative follow-up of products. It essentially relies on correct record-keeping and the thoroughness of information concerning the product. A manufacturer notably uses it to find the causes of a quality fault, either:

- upstream, if the incident could have occurred at his suppliers' premises;
- or downstream, if the incident could have occurred during shipping, for example.

This is the "tracing" aspect of "tracking and tracing". Product traceability is essentially based on the characteristics of consumer units.

Note: The term "data traceability" may be employed to describe the link between the documentary information and the products. (cf. ACTIA guide).

Logistical traceability describes the quantitative follow-up of products. It essentially relies on correct record-keeping insofar as concerns the links between successive products within the chain. It makes it possible to locate the products, and to determine the destinations and origins.
It is notably used for product recalls and withdrawals, or to find out the origin of the product.

This is the "tracking" aspect of "tracking and tracing". Logistical traceability is essentially based on the geographical positioning of logistical units.

Note: Within a given scope, logistical traceability can be perfect, while product traceability can prove deficient. The opposite is also true for internal traceability. However, across the chain as a whole, logistical traceability is indispensable for obtaining true product traceability.

Total traceability (?) and constant traceability

The term "total traceability", when employed, must be used with extreme prudence. It must always be qualified by a description of the elements making up the traceability system, notably the scope, the data recorded and the system performance (cf. Part 3). This term resembles an intended objective rather than a real situation.

However, some people use this term when all of the partners concerned manage the original links between what they receive and what they deliver very carefully. This involves separating batches within the framework of an off-line manufacturing process. (cf. ACTIA guide). In this case, it may be applied to logistical traceability. The term "total traceability" will not be used in the rest of this document.

On the other hand, the concept of "constant traceability" is occasionally applied in the event of an on-line manufacturing process, where the traceability is conducted using a monitoring system based on hours/minutes of events, with expanded links between consecutive batches.

1 TRACEABILITY: THE NEW STRATEGIC ELEMENT IN SUPPLY CHAINS

1.1 Structural factors

1.1.1 The current situation: widespread concern

Food crises now have a definite influence on consumption, the economy and laws.

Consumers are afraid of being poisoned by the food they eat. They no longer know where their food comes from, or even what they are eating. Fear of confusion can sometimes influence their purchasing acts.
The European Commission has launched a programme called «from the farm to the plate», and foresees the creation of a European food safety agency, together with new laws concerning food traceability.
Market equilibrium is occasionally threatened by a risk of "national retrenchment", comparable to the phenomenon that has already occurred with the beef market.
Furthermore, in numerous sectors such as equipment and leisure, a huge number of technical standards have been introduced with the aim of increasing safety for consumers.

From now on, traceability would appear to be an unavoidable solution for everyone, but is the idea of traceability completely new? We seem to be going back to the future. Since the dawning of time, Nature has been tracing everything around us using a DNA marker. At the end of the day, isn't traceability simply a way of memorising events that are likely to be forgotten or overlooked?

Background to a foreseeable loss of confidence

- **1984**: the consumer code is updated, obliging manufacturers to indicate their name and address, or that of the packager in the case of pre-packaged food stuffs. Food stuff labelling becomes obligatory in France (Act No. 84-1147 of 7 December 1984).
- **1985**: *the contaminated blood case begins*.
- **1987**: ISO 9000 and traceability. The ISO 8402 standard concerning quality assurance defines traceability for the first time.
- **1991**: modification to the Act of 7.12.84: obligatory indication of the manufacturing batch number on food products
- **1996**: *start of the BSE crisis (Bovine Spongiform Encephalopathy)*
- **1997**: start of the review concerning the Codex Alimentarius, involving the biotechnologies and safety of food stuffs.
- **21 April 1997**: European regulation CE 820/97, which establishes an identification, recording and labelling system for bovines.
- **March 1999**: *a brand of camembert cheese experiences a 70% drop in sales following the detection of Listeria, while a second examination reveals that the level of Listeria is below statutory danger levels.*
- **May 1999**: *chicken dioxin crisis*.
- **June 1999**: *a soft drink manufacturer recalls 5 millions bottles throughout the world*

- **July 1999**: article 364 b of the new Rural Code announces the possible generalisation of the traceability concept in French law
- **January 2000**: David Byrne, the European Commissioner for health and the protection of consumers, presents the white paper concerning the European Community's overall food safety strategy.
- **January 2000**: *Listeria is discovered in batches of rillettes (a company is wrongly accused by the media*).
- **January 2000**: the USA signs an agreement on "biosecurity" which recognises the right of countries to object to the import of GMOs according to «the principle of precaution».
- **10 April 2000**: the obligation to include the phrase «made using genetically modified corn or soya» on the packaging of products containing more than 1% of genetically-modified corn or soya.
- **July 2000**: new European regulations 1760/2000 and 1825/2000, which repeal regulation No. 820/97 concerning the labelling of bovines.
- **November 2000***: new «mad cow» crisis, 40% fall in bovine meat consumption in France*
- **February 2001**: *a car manufacturer recalls vehicles twice in one month.*
- **March 2001**: *foot-and-mouth epidemic.*

1.1.2 The safety imperative

As a result of improved control of public health, health risks are now more visible, but they have also become more unacceptable.

Successive crises have focused the attention of the media and consumers on the supply chains. However, aside from the context of socio-economic pressure, traceability seems to find its place as an extension of the principle of precaution. In our developed countries, where health safety is no longer linked to ensuring the availability of sufficiently nutritional foods, traceability is emerging as a basic yet logical step forward.

1.1.3 Globalisation and the diversity of supply chains

Firstly, with the globalisation of the economy, supply chains have been extended. An ever increasing number of partners are involved: equally varied in terms of size and structure. Distribution circuits have diversified (shopping centres, small grocery stores, Internet, etc.). This supply chain complexity increases the impact in the event of a "quality incident ".

Secondly, this growing number of independent links increases the risk of information being lost, or a rupture in the information chain. Data input operations concerning the same data at different stages, and occasionally difficult interfaces between physical flows and documents multiply the risks of errors occurring. They require the use of standards for exchanging information in an automatic way.

Thirdly, tight flow production, the development of transports and logistical techniques such as CR (Continuous Replenishment) or CPFR (Collaborative Planning Forecasting Replenishment) contribute to shortening the time between manufacturing and marketing. Being able to recall the maximum number of products before they reach the consumer requires increasingly reliable and reactive procedures.

1.1.4 Mass production and proximity loss

Industrialisation and mass production have broken the links between the manufacturer and the end customer. The way in which consumers perceive production methods at present is more usually based on a romantic countryside ideal than on real production techniques.

This loss of proximity has been a major catalyst for the development of consumer uneasiness, in parallel with the re-examination of certain technological developments in the manufacturing process (meat meal, hormone-treated meats, genetically engineered organisms, etc.).

1.1.5 The complexity of the offer

The broadening of product ranges and the development of increasingly processed products have created more and more complex links between products and raw materials. For example, these offer developments make it increasingly difficult to trace all of the products made from the same raw material.

1.1.6 Developments in consumer behaviour

The consumer wants to be reassured. Amidst the surrounding media frenzy and with the revelation of certain production practices, the globalisation of the economy, crises, concern for the protection of the environment and the sensitivity towards social practices in certain exporting countries, the consumer asks for information and the proof to support it. The numerous labels created over the past few years represent a way of communicating with the consumer, without providing him with excessively technical details that could be misinterpreted.

Furthermore, the consumer no longer tolerates differences in quality. While research into the best value for money has always existed, today's consumer does not hesitate to react to even the smallest defects. All of the major brands have created customer service hotlines in order to deal with these complaints.

1.1.7 An increasingly regulated environment

Whether on a national, European or international level, the commercial and industrial environment is subjected to a constantly growing number of laws, regulations and standards. Company managers risk increasingly severe civil and penal sanctions in the event of a health problem.

1.2 Essential issues

1.2.1 Quality control

Traceability is a **quality management** tool. It is part of an approach incorporating progress and thoroughness. When a defective product slips through quality controls, traceability

makes it possible to trace the cause of the malfunction and to take the necessary corrective action.

In more general terms, a traceability system helps to control the product and everything having a bearing on its quality both upstream and downstream. This may involve the product itself, its packaging (label, secondary packaging, etc.), the information associated with it (conformity with what is marked on the product, user manual update) or its distribution.

Within the scope of **quality assurance** measures, traceability is governed by a contract or a set of regulations.

The development project concerning ISO 9000 standards in March 1999 mentioned traceability in the following way:
"7.5.2. Identification and traceability
The organisation should take steps to identify the status of the product/service insofar as concerns the required measurement and verification activities and should, where necessary, identify the product and/or service using the appropriate means throughout the process. This should apply to all parties involved in the product and/or service where their interaction has a bearing on the conformity to requirements.

When traceability is a requirement, the organisation should control and record the unique identity of the product and/or service."

Traceability is necessary for any **product certification** (appellation d'origine contrôlée, regional label, label rouge, etc.). Certifying organisations should verify the correct application of characteristics required for certification or the label, using information recorded by the manufacturer. This obligation for supplying results implies an obligation of resources.

Example: Traceability is an essential element in AgriConfiance® certification and the good agricultural practice protocol of the EUREP GAP.

Note:
The primary issue is not to improve the level of product quality - this is defined by the specification sheet -but to control it.

1.2.2 Ensuring consumer safety and optimising product recalls

Faced with the illusion of zero risk, traceability has appeared as one of the solutions enabling the consumer to be guaranteed an improved level of safety.

Traceability systems make it possible to **conduct targeted recalls**, in shorter time-scales and at lower cost. The rapid localisation of incriminated product batches allows the manufacturer to contact the stores or other product handlers directly. Withdrawing them before they appear on the shelves, or at least stopping sales, helps to limit the impact, from both a health safety and commercial perspective.

Note: Product recalls should not be limited to serious incidents. Traceability may also be regularly employed for minor defects (poorly affixed labels, which damage the brand image, competition coupons where each one is erroneously a winner, less than ideal taste of a batch of bottles of a certain vintage after a few years, etc.).

In terms of public health, generalised traceability in a given sector can **help the health authorities to determine the causes of a problem** and to reduce its spread. Traceability may also be requested for securing the supply chains of dangerous products.

1.2.3 Controlling logistical flows

Traceability helps the overall control of logistical flows.

In fact, the logistical chain is currently governed by the flow of information. Reduced stocks mean **competitive advantage,** and tracing the circulation of products (logistical traceability) is vital in order to reduce stocks, to manage tight flows, and to move towards real-time monitoring and anticipation.

For the suppliers, an **improved knowledge of markets and logistical circuits** makes it possible to highlight over-long supplies in a chain or parallel distribution circuits (those circuits not desired by a supplier).

Furthermore, logistics appears to be the favourite territory of **financial profits** when it comes to implementing a traceability system. Logistical unit monitoring tools (identification, labelling, communications, etc.) are in fact part of process rationalisation. They can also be used for improving the effective control of product shipping and stock management, to simplify receptions or even be used in SRM or CPFR.

Logistical traceability tools are in fact the tools and standards of Supply Chain Management in general. Traceability has not therefore revolutionised logistical practices. Moreover, it is used for accelerating the implementation of existing logistical tools and techniques, to optimise supply chain management.

Cf. Startrac case study

1.2.4 Respecting the regulations

According to the new Rural Code, a State Council decree may henceforth define the list of products or commodities before being traced. (cf. appendix 8.1)

At present, only those sectors concerning pharmaceutics, bovine meat and products containing GEOs are explicitly subject to traceability obligations. However, **these legal obligations** could be rapidly extended to other sectors, and notably to all agri-food industries.

What will be the sectors concerned by legal traceability obligations in the future?

We need to "*generalise traceability to include all sectors".* Lionel Jospin, Estates-General on Food, Paris, 13 December 2000.

Proposed ruling of the European Parliament and the Council on Food Hygiene and Safety, Document No. 500PC0438(01): *"The proposal concerning hygiene introduces certain principles that should make it possible to improve tracing, among which:*
[…]

the obligation for companies operating in the food sector to guarantee the existence of suitable procedures for withdrawing food stuffs from the market should they represent a risk to the health of consumers, and to hold an appropriate register enabling the identification of the supplier of the ingredients and food stuffs used for their operation.
The complexity of the food chain and the occasionally extreme multiplicity of ingredients constituting food stuffs may require more detailed regulations in order to ensure suitable tracing, both upstream and downstream of the place of manufacture."

Generally speaking, traceability may, in the event of a problem, contribute to providing a better understanding of the various partners involved, and as a result **make it easier to determine the scope of responsibility**.

In fact, if a product provokes a serious problem, the first consequence is that it implies the responsibility of one or more partners concerned in the following terms:

- commercial (immediate market sanctions);
- civil (Act No. 98-389 of 19 May 1998 concerning the liability for defective products, cf. appendix);
- penal (distribution of dangerous products posing a risk of bodily insecurity to persons)

Furthermore, traceability plays a part in improving transparency and may **help the chains to combat some types of fraud.** The verification of the authenticity of information provided is therefore fundamentally important, and must be organised to match the traceability system.

A centralised database could be created in order to control the logistical flows with regard to the volume of goods produced. In this case, the confidentiality of information supplied by all the companies to the central database, and the administration of the latter become essential elements.

Cf. Tracerbio case study

1.2.5 Benefiting from a commercial advantage or protecting a brand image

While most manufacturers currently regard traceability as a constraint, many may soon be using it as a way to promote the specific qualities of their products.

Traceability has become a **selling point**. It is closely linked with the consumer's information needs. Traceability reassures, and can therefore provide added value to a product, and become a marketing component. Furthermore, the year 2001 has seen the introduction of the term 'traceability' into a television advertising campaign aimed at the general public.

Traceability is a differentiation argument, and a competitive advantage insofar as distributors are concerned. It is sometimes regarded as an **obligation** for avoiding de-referencing.

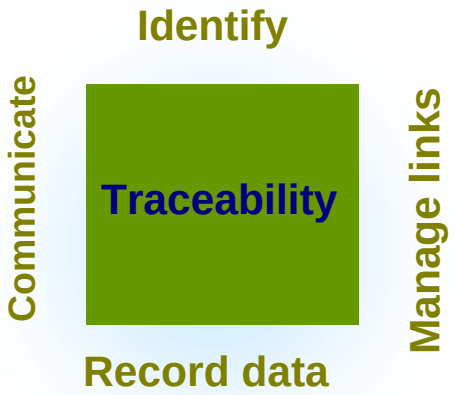
Tracing right through to the consumer, whenever possible, enables **customer services departments** to implement individually-tailored commercial operations, such as proposing other services to a mobile telephone purchaser, or offering him a new subscription to start as his previous one ends. (Naturally, in all of these cases, only the product is monitored, and not the consumer himself.)

Furthermore, implementing a system to enable the fast recall of defective products, or to demonstrate the control of a quality problem by quickly discovering its cause, can help to

avoid or limit damage to a brand image. However, media accusations always travel faster than denials. A traceability system represents a valuable instrument in this race against time.

1.3 Principles and options

1.3.1 The four main principles



These four principles are inextricably linked to traceability. If one of them is not applied, the company concerned falls short of the scope of traceability, or is responsible for the rupture in the information chain.

Identify the products

The aim is to monitor products throughout their transformation process. To achieve this, the traced information is attached to manufacturing batches or logistic units, which have undergone the same transformation and therefore have identical traceable characteristics. Traced entities are therefore manufacturing batches and/or logistic units.

Traceability management means monitoring each manufacturing batch and each logistic unit.

As a result, each product batch should be marked with a unique identifier. Each time the batch is processed or transformed, it should be accorded a new identifier. This may involve batches of raw materials, packaging and end products, together with storage or logistic units.

Note: Depending on their activity, each partner has a different way of monitoring the flow and processing of the products:

- the manufacturer traces the batches resulting from the production or transformation (manufacturing, packaging, intermediate batches, etc.) and the logistic units;
- the logistics service provider (the shipper or distributor) generally only traces the logistic units or any possible storage units.

Manage the links

It is imperative that the links between the batches and logistic units resulting from the transformation process are recorded.

This may concern links:

- between manufacturing batches;
- between manufacturing batches and logistic units;
- between logistic units

Traceability management means recording the successive links between manufacturing batches and logistic units in the supply chain.

Within a company, the control of all of these links and accurate store accounting alone make it possible to make connections between what has been received and what has been produced and/or shipped (and vice versa).

If one of the partners in the chain fails to manage these links in either an upstream or downstream sense, the resulting situation is known as **a rupture in (or loss of) traceability.**

Record the data

As well as the links, some predefined data is traced during the transformation process.

This traced data covers variable elements in the transformation process (depending on the season, production line, time of manufacture, etc.). This information may be directly relayed to the batch or product group identifiers, or linked to the manufacturing order number, the time or any other information that allows a link to be created with corresponding product batches.

Traceability management means predefining the information to be recorded during the manufacturing process, and throughout the entire supply chain.

Providing information is not the same as tracing: marking a production method, the category or composition of a product (informing consumers that a product contains ground nut oil, for example) is not strictly speaking what we would call traceability. In general, this is stable information based on the product's specifications. However, traceability systems can be implemented to support the accuracy of this information.

Communicate

To ensure the continuity of the information flow, each partner should pass on the traced batch or product group identifiers to the next partner in the production chain, enabling the latter to apply basic traceability principles in turn. These key identifiers are sometimes complemented by additional information.

Traceability management means associating a flow of information with the physical flow of products.

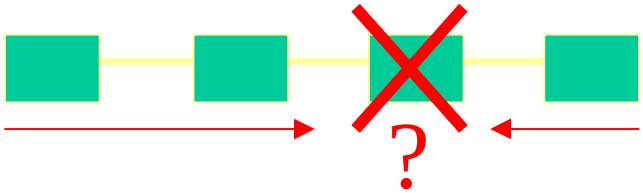
The link between the flow of information and the physical flow is assured by referring to the identifiers of both types of flow: shipment advice number, container serial code, shipment number, etc.

1.3.2 This changeover requires a collaborative environment

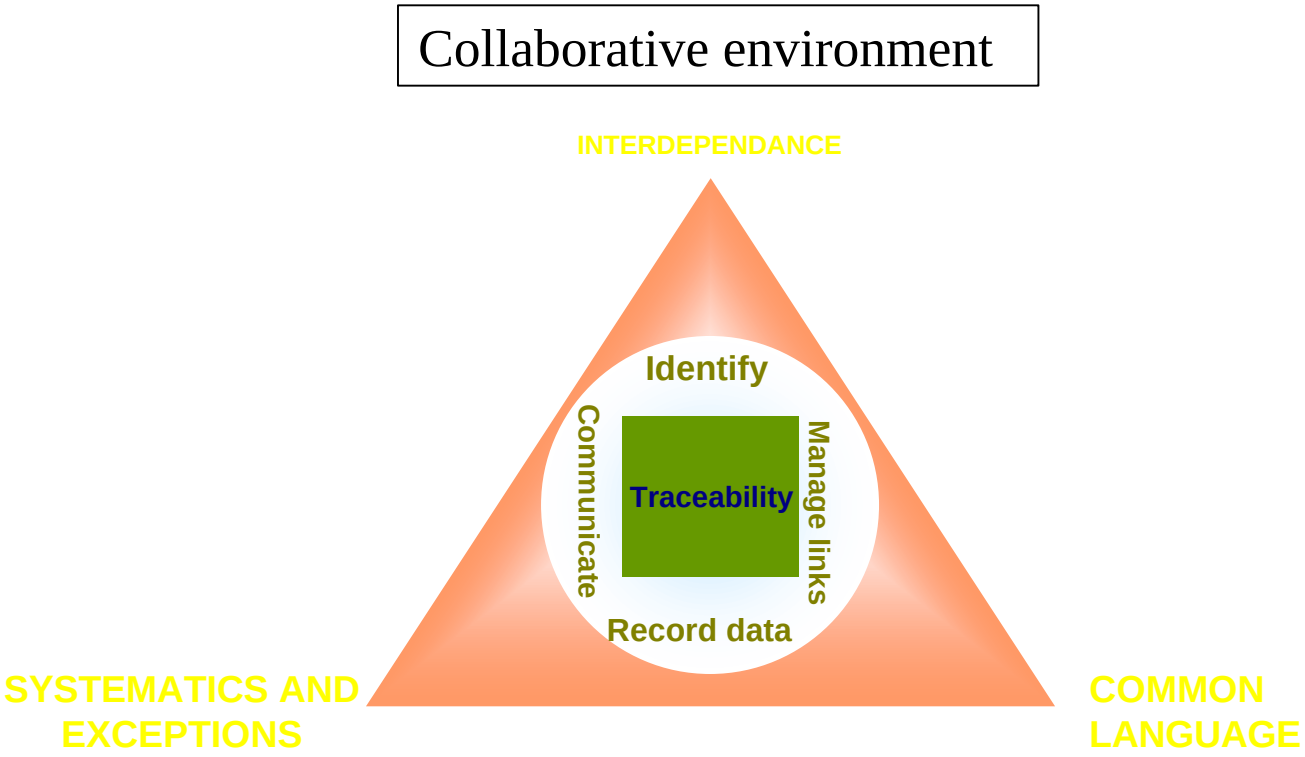
Responsibility and interdependence

At each link in the product supply chain, the person legally liable for the goods or the order giver) is responsible for the traceability of the product. He defines the level of traceability via the internal specifications sheet, or specifications applicable to the service providers.

The traceability of the weakest link determines the traceability of the entire supply chain.



However, the consumer does not distinguish the responsible party. In the event of a media-publicised crisis, consumers may even avoid similar products from other brands. Insofar as concerns individual companies, one of the problems with traceability involves being aware of, or acting on, its direct partners (n-1 and n+1) and indirect partners (n-2 and n+2 for example).



A common language

The traceability system is put together link by link. This requires key identifiers that are clearly understandable and unique between all of the partners involved in the chain. The traced information must have the same significance for all of them, whether it is included in a specification or passed on with each shipment. Any information likely to be interchanged must therefore be done so using a common language.

Shared identification and communication standards guarantee the reliability of traceability between independent partners.

Because of the automation of the system, they reduce costs while increasing traceability efficiency.

Systematics and exceptions

The principle of traceability does not involve knowing all of the pre-defined information at any given moment and from every single partner involved, but it means being able to find the information required at any given time.

Traceability is a permanent tool for occasional use.

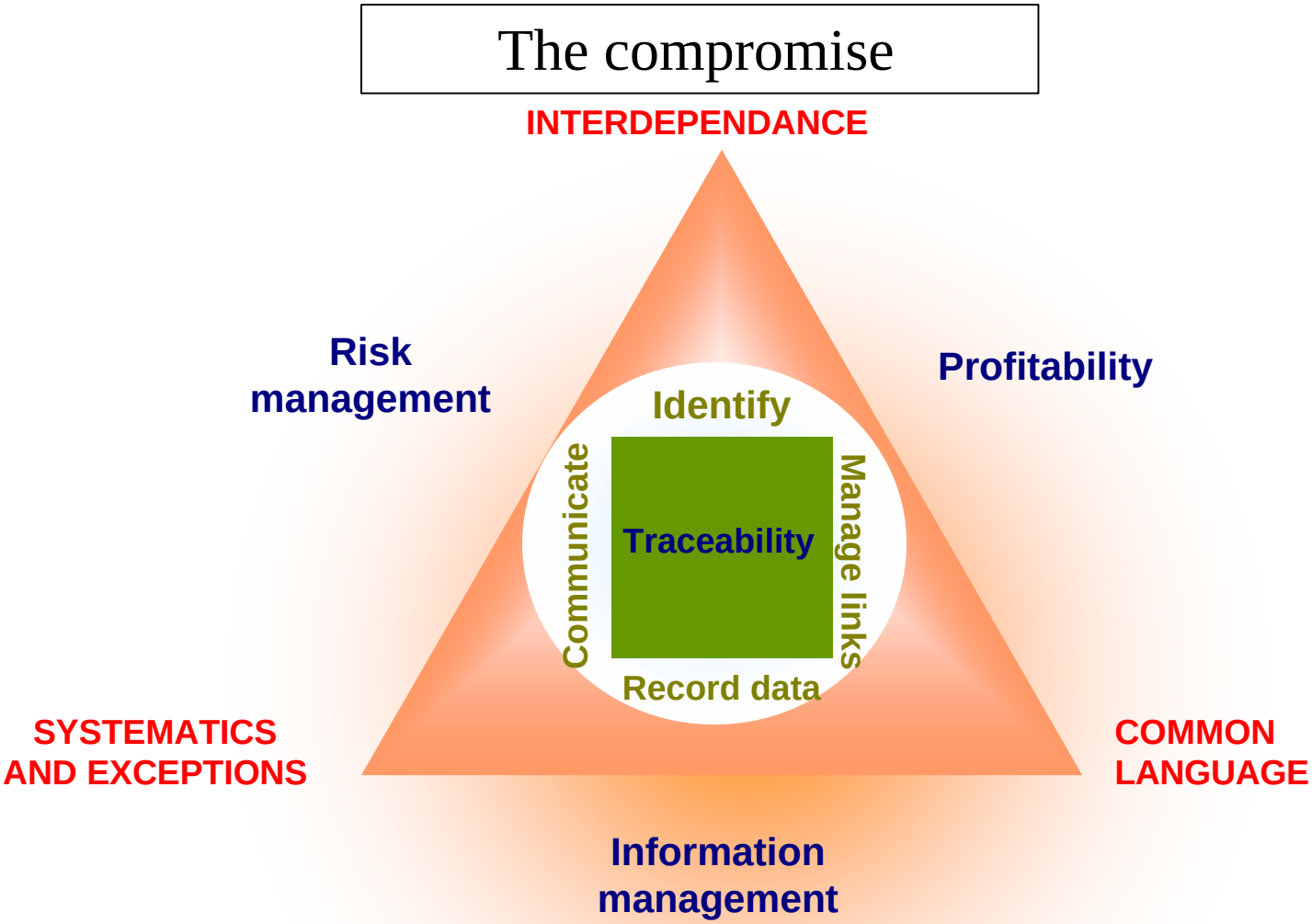
Each partner stores the information that concerns his phase. Should the need arise, partner n contacts partner n-1 or n+1 to obtain the desired information. If necessary, the latter directly contacts his commercial partners in turn, to move up or down the chain.

Note: collective industry approaches may result in the implementation of a shared database, with input from all of the partners concerned. This makes it possible to obtain statistical information, overall monitoring of production within the sector, or serve to help combat fraud, for example. This information pooling is therefore an extension of the use of a traceability system.

1.3.3 The compromise between risk management, profitability and information management

Risk management

A risk assessment should always be conducted prior to defining traceability requirements. In fact, the choice of a company traceability system depends on its risk management.



Consequently, traceability may accompany or position itself within the continuity of a failure modes analysis system (AMDEC) or hazard analysis critical control points (HACCP). The analysis of critical points goes a long way to defining the elements to be traced. It also governs the choice of tools according to their reliability.

Choosing a traceability system means managing risks.

Profitability

Certain benefits (concerning the improvement of logistical management, for example) or some investments in equipment (labelling machines, software, etc.) may naturally be evaluated, but the impact of a traceability system is difficult to estimate, notably in terms of organisation or image.

The benefits cannot be calculated according to objectives reached featuring a traceability component. They may be inter-linked with several projects such as SRM or product accreditation. Within the framework of regulatory, contractual or security constraints, for example, a return on investment needs not be directly linked to the traceability operation. However implementing a traceability system provides additional advantages such as process rationalisation or improved activity visibility.

The costs are generally shared between the departments concerned, and fall under the category of medium- or long-term investment policies. They concern the gap between the existing situation and set objectives.

Selecting a traceability system means choosing a tool that is adapted to your objectives.

Note: traceability tools are not usually specifically reserved for traceability itself. Some are already used by companies for other reasons. This is the case with the Serial Shipping Container Code (SSCC) and the EAN-UCC logistic label, used for logistics or measuring equipment for quality controls. In frequent cases, some traceability information already exists internally, but it is the links between the various data and the archiving resources, concerning information research and/or communication that should be improved or completed.

Information management

The company should select the information it wishes to trace at each product phase, together with what information is to be passed on to the consumer. In this way, the company makes a commitment concerning its capacity to reply to a request for information. Obviously, this choice has as much a direct impact on its computer system's architecture and tools as it does on the production process. This may also require a development of the company's or sector's culture (moving on from an oral culture towards a systematic documentation of practices, sharing certain kinds of information, etc.).

Selecting a traceability system means defining your computer system's dialogue capacity.

1.3.4 Ensuring that traceability does not become another myth…

As with total quality in the past, traceability is not the perfect solution to all of the challenges facing companies today.

Despite its qualities, traceability is simply a tool intended to be used for predetermined objectives, and subject to the laws of profitability, commercial practices and the unpredictable. It can only be considered as one of several element designed to restore consumer confidence, improve security, control quality, combat fraud or manage complex logistical chains.

Nor is traceability an additional company system**. It is integrated into systems that already exist**. Traceability therefore complements quality management tools, production, logistics or the computer system.

Being aware of the limits of traceability can only help us to use it in a more effective way, in areas where it is basically synonymous with global progress.

2 DESCRIPTION OF A TRACEABILITY SYSTEM

Whatever its field of application, a traceability system can be characterised by 5 essential components: the scope, traced elements, common language, the organisation and the computer system. The criteria and performances are added to these elements.

Needs	SCOPE These elements are relatively stable. An initial analysis may be conducted by the chain.	• Context • Objectives
Needs / Means	TRACED ITEMS These may develop over time according to objectives. A shared minimum may be decided by each sector, but the choice of traced items depends on company risk management.	• Scope • Products • Links • Recorded information • Archiving period
Means	STANDARDS EAN-UCC standards are the common language in traceability. Their use defines a major part of the system's performance.	• Identification of products and companies • Automatic monitoring of physical flows • Interchange of electronic data
	ORGANISATION Each company is responsible for its own organisation. It is directly linked to the computer system.	• Responsibilities • Procedures • Information interchange scenarios
	INFORMATION SYSTEM Each company is responsible for the configuration of its computer system. The tools may be more or less automated depending on the volumes and frequency of information interchange.	• Information acquisition • Information transmission • Information management
Assessment	PERFORMANCES These are the key indicators demonstrating the traceability system's degree of integration. They must be analysed for each product.	• Reliability • Speed • Accuracy • Coherence

These parameters should be analysed by each company in the supply chain. However, they have an impact on the overall performance of the traceability system throughout the entire chain.

The analysis can be done:

- either by each company;
- or collectively, within the framework of a chain-wide approach.

2.1 Scope

2.1.1 Context

Legal constraints, inter-professional agreements, a particular media scenario, and requests from consumers or customers dictate the scope of the traceability operation.

All the partners operating in the chain need to be identified, as do all those likely to influence eventual regulations.

Diagram

2.1.2 Objectives

Each company or professional chain has its own objectives concerning a traceability programme.

Here are a few examples non-hierarchical objectives for which a traceability system could be implemented, together with the management resources and possible complementary tools:

Issues	Traceability objectives	Management resources and complementary tools
Quality	• verify or control allegations concerning the origin and background of a product (for product attestation or preserving a chain's identity, for example) • reveal the cause of quality fluctuations and to implement corrective actions • identify batches (defective goods, for example) • monitor and optimise a production process	• quality controls • internal and upstream specifications • analysis methods for risks and failure modes • system of attestation by third party organisations
Health & safety	• carry out product withdrawals and recalls in a fast and precise manner • facilitate the identification and monitoring of long term accidental effects after products have been launched	• database per chain
Logistics	• rationalise the processes linked to logistical flows • optimise stock management and storage conditions • monitor shipments and deliveries in real-time • control product forwarding and be reactive should incidents occur • be aware of unspecified losses • be aware of parallel distribution circuits	• logistic and shipping service providers specifications

Legal matters	• respect regulations • help to define responsibilities • help to combat fraud by monitoring volumes and flows of manufactured and sold goods • help to control labelling	• system of control by third party organisations • systematic sampling • database per chain
Marketing/ commercial	• protect a brand image • recreate proximity between the consumer and the manufacturer • provide end users with more detailed product characteristics • recall equipment from customers for verification • improve customer services (real-time monitoring, after-sales service, etc.)	• Crisis management unit

The objectives notably define the types of requests required by the internal computer system technical specification.

2.2 Traced items

2.2.1 Scope

The scope defines the limits of the traceability system.

It is governed by upstream and downstream ruptures in supply chain links.

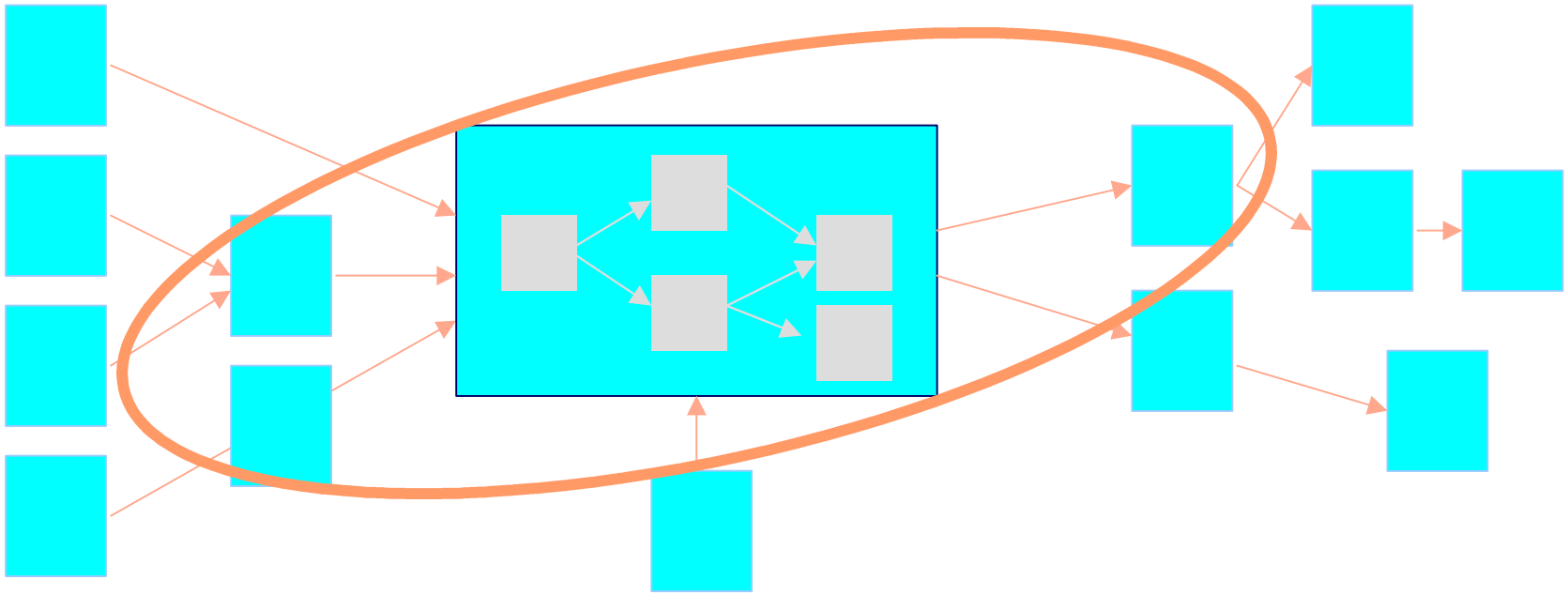
For a company, the scope corresponds to the choices made regarding:
- entities and parameters to be traced internally (products concerned, raw materials used, storage environment conditions, etc.);
- information that the company wishes to be able to find either upstream or downstream (animal feeds, raw material manufacturing conditions, temperature during shipment, etc.);
- the partners concerned (among the suppliers, customers, etc.).

To achieve this, the following elements should be analysed:
- internal rupture points due to the manufacturing process (identify the types of actions carried out and the entities concerned);
- external rupture points (i.e. mainly the various consecutive partners in the chain).

As soon as the scope desired exceeds the bounds of the company structure, a joint approach with the company's partners should be initiated. Traceability may then become an element in the specifications for suppliers, logistical service providers or transport companies, either through archiving constraints or the use of standards.

Example: the scope of the traceability imposed on the bovine industry by the European regulation 1760/2000 covers the entire chain, from the birth of the animal through to the point of sale.

Scope of a traceability system



UPSTREAM
Raw material suppliers,
Packaging suppliesr, carriers...

INTERNAL
Storage - production line

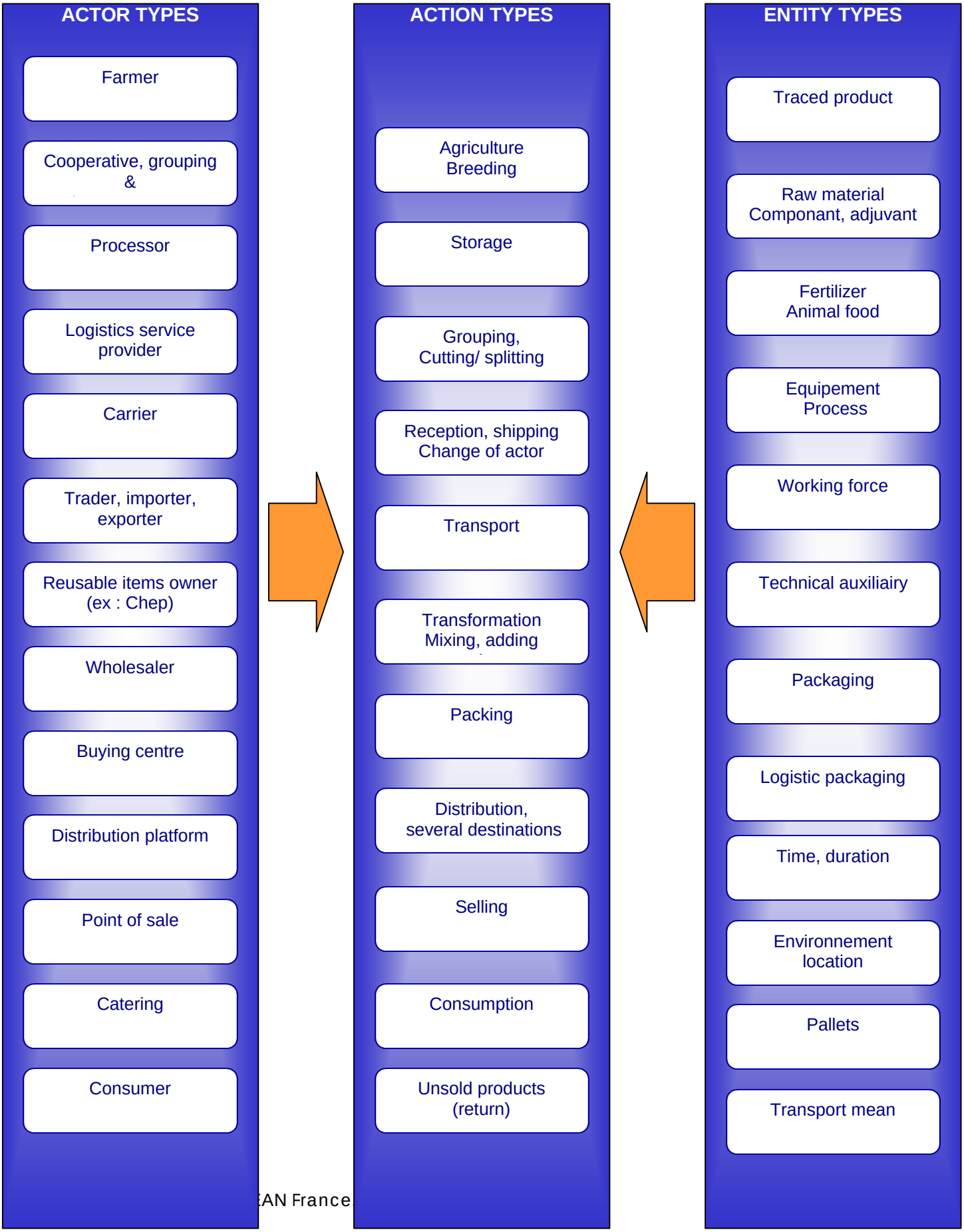
CUSTOMERS
All partners, logistic providers, distributors, manufacturer, Caterers...

Notes:
In the absence of consultation, and given the interdependence between each link in the chain, there may be a gap between the scope each individual partner is aiming for and the traceability system's true scope.

Break points in the chain go a long way to defining the complexity of the traceability system.

If traceability through to the end buyer may technically be envisaged for products bearing a serial number and giving rise to an invoice (car, television, refrigerator, etc.) or possibly for purchases made over the Internet, it is more difficult to implement under current conditions for a large number of products, and raises ethical questions. Recording information directly linked to an end consumer is subject to the authorisation of the CNIL (Commission Nationale de l'Informatique et des Libertés / French Commission for Data Protection). Furthermore, the end buyer is not always the actual end user (gift, meal with guests, etc.). This puts into perspective the usefulness of tracing a product through to its end buyer when recalling it in the event of a non-conformity.

Actors, actions and entities typology



2.2.2 Products

Products are monitored by manufacturing batch and logistic unit. Their size and homogeneity define the traceability precision at each stage of the supply chain.

Manufacturing batches

The manufacturing batch is the pivot point between the manufacturer's upstream and downstream supply chain. By definition (cf. Consumer Code), it unites products that have undergone the same transformation. The information to be traced concerning this transformation process may consequently be attached to the products in question.

The most critical criteria, i.e. those which, should they vary, would be most likely to alter the quality of the manufactured product, should (where possible) form part of the manufacturing batch definition.

The main criteria concerned by the definition of the manufacturing batch are generally as follows:

- the date / period of production or the transformation process;
- the country;
- the factory;
- the production line;
- the packaging line;
- the team;
- the raw material batches;
- ...

Example: a batch may represent a few minutes of one day's production, a vat of x litres, etc.

Insofar as concerns fruit and vegetables, the NFV03200 standard defines the batch as "the quantity of product –which– at the time it is controlled shows identical characteristics in terms of species, variety, calibre, packaging, brand and origin".

The manufacturing batch is identified by a manufacturing batch number. It may only be considered as representative and unique if it is attached to the product code. The manufacturer is generally responsible for deciding the finesse of the batch, the batch number content and its allocation.

Insofar as concerns food products, the regulations specify:

Consumer Code, article R 112-5 ("labelling" Act n°48.1147 of 7 December 1984, from the Journal Officiel de la République Française, modified by Order No. 91.17 of 19 February 1991):
"*the labelling must contain an indication of the manufacturing batch number. By manufacturing batch number, we mean a set of sales items of food stuffs that have been produced, manufactured or packaged under practically identical circumstances."*
Circular of 16/09/91: *"The time, place and manufacturing process unit represents the essential criteria in defining the batch. Naturally, only food stuffs of the same nature may be grouped together in the same batch."*

Article R112-27 (Order No. 98-879 of 29 September 1998, art. 14 Journal Officiel of 2 October 1998):
"Before being marketed, food stuffs, whether they are pre-packed or not, must be accompanied by an indicator making it possible to identify the manufacturing batch to which they belong.
The manufacturing batch indicator is defined by, applied by, and is the responsibility of the producer, the manufacture or packager of the food stuff, or by the first vendor established within the European Community territory."

In practice:

For products subject to Expiry dates or Best Before Dates which may be used as batch numbers when their details correspond to the required definition of the batch (some products with a life span exceeding 1 year may have expiry dates specified by month or year, which would not qualify as adequate precision for batch sizes).

Printing constraints imply relatively short numbers or codes.

Notes:
The serial number may be considered as a special type of batch number where the manufacturing batch does only comprises a single unit.

Insofar as concerns multipacks, when a manufacturing batch number is allocated to a multipack (to trace the product consolidation stage), the manufacturing batch numbers of the various products representing the multipack must remain visible.

Logistic units

A logistic unit describes a unit put together for transportation and/or storage, which needs to be controlled throughout the supply chain.

These logistic units may be considered as batches when they unite products that undergo the same manipulations during loading, transportation, storage, etc.

When logistic units are not intended to be exchanged with other partners (e.g. stock units existing between the manufacturing stage and preparation for shipment), they may be identified by internal codes. However, monitoring logistic units ensures traceability at each point of exchange between two partners. Logistic units should be identified in a standardised way using a SSCC. (Standardised Shipping Container Code) (cf. 3.3.2.). The record of destinations is attached to this. Of course, the same SSCC may also be used as an internal code for identifying stock units.

2.2.3 Links

Three types of links are recorded in order to monitor the products throughout their transformation processes and shipment.

Links between manufacturing batches
The recording of links between manufacturing batches particularly concerns raw materials, and the corresponding packaging and end products. The precision of the links between manufacturing units is determined by the manufacturing process and batch definition.

If the manufacturing process is discontinuous, these links may be strictly precise. For example, the manufacturing batch corresponds to the weight, mixture, vat or "cooking level".

If the manufacturing process is continuous, the links are broadened since there is no separation between batches. They are managed using the date / time / minute of manufacture. The manufacturing sequence makes it possible to create the link between the component batch numbers. A safety margin is used.

When consecutive raw material batches are stored in a single container, without passing through zero levels, the links are also considered to be broadened. A safety margin should be allowed for in the event of product recalls.

The links between all of the intermediate batches should be recorded. The complexity of a production process and the automation of production tools therefore determine the complexity and reliability of the traceability system.

Links between manufacturing batches and logistic units

Their complexity depends on the type of logistic units employed: heterogeneous logistic units, multi-batches / multi-dates, non-standard, etc.

In certain cases, logistic units are not assembled directly as they leave the manufacturing chain. The links between intermediate storage units and logistic units must therefore be recorded. They are of the same type as the links between two logistic units.

Links between logistic units

The complexity of links between received and expedited logistic units depends on logistical practices: allotment, picking, etc. The management and precision of these links governs the knowledge of the product's destination. They can be controlled using site management.

Whenever assembling logistic units, the partner must ensure the links between received logistic units and those put together for shipment.

2.2.4 Recorded data

The data recorded at each stage of the transformation process is selected according to the company's objective (notably in terms of regulations) or the potential impact of this data on the quality of the product.

Examples:
- manufacturing dates and places;
- production line/chain;
- production team;
- storage site;
- storage temperature;
- phytosanitary processes;
- results of analyses and measurements;
- ...

The data is directly attached to the batch or product group being monitored (via a manufacturing batch number, stock unit or logistic unit identifier), or attached to the time or order of manufacture, for example, which subsequently enables a link to be made with the batch number.

In the specification description, each item of recorded data represents:
- either a search criteria;
- or descriptive information likely to be sought in the event of a search.

Search examples: internal search concerning the history of a pallet, from its SSCC (storage place, storage temperature, loading time, etc.), search for phytosanitary processes carried out from a certain date, correlation analysis on the production line and the results of this analysis, etc.

The data may be:
- clearly marked;
- indicated by automatic identification (bar codes, RFID);
- indicated by EDI.

Of the information traced internally by each consecutive partner throughout the chain, the **indicated data** on the products represents the visible part of the traceability system. This information is marked on the traced entities in a manner visible to the naked eye, and possibly in a format suitable for automatic identification (bar codes, radio frequency labels, etc.).

In any event, manufacturing batch and logistic unit identification represents the minimum in labelling requirements.

The **data to be communicated** may be transferred to subsequent partners in the chain automatically, without being marked on the products, using a means of electronic data interchange and featuring the identification references of the various physical entities. (cf.3.3.3.).

In parallel to the transfer of products, the following data is systematically passed on to the next partner in the product's development chain:
- commercial information required for product delivery (delivery note and shipment advice information);
- trade item and logistic unit identifiers;
- any relevant legal information;
- any other relevant traceability information defined either by the sector or by both parties.

In the event of a jointly-managed database, it is important to specify the level of confidentiality of each data item.

All of the information exchanged between independent partners implicates a prior agreement between the parties concerning the content, description and format. Data needs to be standardised when exchanges are made automatically and involve more than two partners. These exchanges represent a common dictionary of intercommunicated information.

2.2.5 Duration of data archiving

Unless specific regulations, contractual obligations or recommendations exist, each partner decides the duration of his data archiving.

The archive duration should logically always be longer than the life of the product.

The following factors should be taken into consideration:
- specific legal constraints concerning the sector;
- the period during which DGCCRF (French Consumer Protection Agency) controls may be made;
- the life of finished products in the case of raw material;
- data use;
- the period during which the consumer has the legal right to make a claim.

Subject to specific sector norms, the recommended archiving periods are as follows:

Type of product	**Recommended archiving period**
Product with Expiry date	Period longer than the time between manufacture and the Expiry date
Product with Best Before date or without Expiry date	Period longer than the time between manufacture and the Best Before date
Product without expiry date	Period longer than the average estimated life span of the product.

In some chains, for example, the archiving period is 6 months longer than the expiry date, following the recommendations of the DGCCRF (French Consumer Protection Agency) .

For upstream suppliers:
- either the archiving period is recommended for the sector as a whole, or is subject to regulations;
- or the archiving period is defined in the customer's specifications;
- or the supplier defines the archiving period himself, according to the Expiry date / Best Before date of the end products.

Note:
Insofar as concerns raw materials, it is recommended that the archiving period is defined according to the end product, using the raw material with the longest life span. In fact, it would seem difficult to imagine differentiating the length of the archiving period according to the corresponding end products.

Note:
The volume of archived information can grow very quickly, and requires a substantial archiving capacity. For cosmetics, alcohol and spirits, for example, the archiving period can last several years.

2.3 Standards

2.3.1 The role of the EAN·UCC system

Given the diversity of the partners and supply chains, it is vitally important that manufacturers, companies, importers/exporters, wholesalers, logistical service providers, transport companies and distributors work together to develop technologies and standards enabling continuity in within the traceability system, "from the paddock to the plate". Achieving this requires a global approach to the supply chain. The use of international and multi-sectoral standards integrating all of the companies' information interchange requirements is the essential element for successful traceability.

The key for developing commercial processes and effective traceability systems at the lowest possible cost therefore involves responding to consumer needs and legal constraints by using the same common language. EAN•UCC standards are the common language used for traceability purposes.

Using EAN•UCC standards improves communication between buyers, vendors and third party organisations responsible for controlling products and entities. The standards represent a standardised identification and communication system that makes it possible to overcome the limits of code systems or languages specific to an individual company, sector or country. In fact, when specific languages are used, product supply and traceability becomes more expensive as it has to respond to the different identification and communication requirements of each importing country or each individual company.

The EAN•UCC system offers identification tools on an international scale, with no ambiguity insofar as concerns a product, service or place. The EAN•UCC codes may be represented by bar codes. These enable the automatic identification of products using a scanner, and avoid the need to re-input traceability information. These codes are also used for Electronic Data Interchange.

The result of consultation between suppliers and distributors, EAN•UCC standards are controlled by the EAN International association and national EAN organisations around the world, in association with UCC in the USA and Canada. They are used by a million companies in nearly one hundred countries. These standards are adapted to companies of every size and operating in all economic sectors.

Note:
EAN128 labelling is, for example, recommended by the United Nations Economic Commission for Europe (UN/ECE) within the framework of meat quality criteria standardisation.

Why do traceability standards exist?

- to ensure the continuity of the traceability between the various supply chain partners, on an international level;
- to strengthen the reliability of the traceability system;
- to control logistical flows, product withdrawals and recalls;
- to reduce transaction costs;
- to enable tool interoperability and technological independence with regard to a given

service provider;
- to be reactive when faced with commercial opportunities by allowing for systems that are directly compatible with new commercial partners, and by economising through 'made-to-measure' products or services;
- to exploit existing company identification and communication systems.

EAN•UCC standards form the basic foundations of traceability. Created by the companies concerned themselves to optimise their information and goods exchanges, they are the direct reflection of their needs and commercial practices in all kinds of supply chains, from the simplest to the most complex. In this way, they now provide adapted solutions for traceability problems, and the constraints of companies operating traceability systems.

Standards provide solutions to traceability principles

Apply the four key traceability principles	
Identify	• international and multi-sectoral identifiers for the products and their packaging, logistic units, raw materials, phytosanitary products, etc.
Control the links	• management of hierarchies between trade items (consumer units and their multipacks) • easier management of links between primary and secondary logistic units • links between physical and information flows are ensured by using the same identifiers and data dictionary.
Record the information	• codification of traceability information • codification of partners and sites • traceability information attached to product identifiers
Communicate	• automatic identification, currently via bar codes, and via RFID in the future Electronic Data Interchange: EDI, web EDI, Internet
…by actively managing constraints	
Risk management	• information interchange reliability thanks to the accuracy of the information content and the reliability of interchange methods
Profitability	• automation of data exchanges • uniform data processing with the various partners involved • choice and compatibility of market tools (not made-to-measure)
Information management	• insignificant identifiers making it possible to attach all the desired traceability information in a flexible way, while optimising the volume of information and system durability.
…and making collaboration the basis of development for each company.	
Responsibility and interdependence	• the brand owner is responsible for product codification. The creator of the logistic unit is responsible for the codification of logistic units. However, all of these codes follow a common structure and common regulations. They are unique and understandable on an international level.
Common language	• EAN-UCC standards are the common traceability language, recognised internationally and in all sectors.

Systematics and exceptions	• data exchange scenarios allow for managing regular supply flows and the application of good logistical practices. They notably make it possible to operate SRM or CPFR. Furthermore, the SSCC is used for making fast and targeted product recalls or withdrawals.

2.3.2 Product and company identification

EAN-UCC codification standards allow the identification of a company's consumer units, logistic units and sites. They make it possible to answer questions such as "What? Where? Who? When? and How?" in both the upstream and downstream directions between various chains.

The codification of products and companies is the crucial and obligatory first step when putting together a traceability system. All additional information, such as batch numbers, expiry dates and registration numbers always forms part of the EAN identification codes of the item or company.

Identification of a trade item

Examples of questions	Applicable EAN-UCC standard	Examples of attached information
• What is the product to be traced or recalled? • What raw materials, phytosanitary products, food stuffs, packaging, etc. are used? • Insofar as concerns the manufacturing process, what are the tools and manufacturing aids used? • What types of logistic units are received, stored and shipped? • … See also: entity typologies	GTIN (Global Trade Item Number) International Item Code containing 8, 12, 13 or 14 numbers	• description • supplier • brand owner • composition • characteristics • manufacturing process • label • product content (GTIN of the row below) • dimensions • weight • handling instructions • …

A trade item describes a unit for which pre-defined information needs to be accessed, where the price may be set, and the item may be ordered or billed during commercial exchanges at any point throughout the supply chain).
Consumer units and logistic units are trade items.
E.g.: a bottle of water, a carton of boxes of biscuits, a pallet of fertiliser, etc.

Identification of a manufacturing batch

Examples of questions	Applicable EAN-UCC standard	Examples of attached information

• Which product batches are concerned by the quality variation? • Which batches are to be recalled? • Which were the raw material batches used? • …	GTIN + batch number	• date / time of production and packaging • consumption expiry date • production line • temperature at the time of the transformation process • sample number • results of analysis • …

The GTIN + manufacturing batch number' pair should be unique.

There is no international standard for the identification of a manufacturing batch. This is allocated by the producer, manufacturer or packager. Consequently, and in order to ensure the uniqueness of the batch identification, the batch number should be unambiguous for the same product reference (GTIN) in all of the supplier's factories should several production sites exist.

The owner of the product brand is responsible for the unambiguous nature of the batch number. Batch by batch, product by product, he ensures the uniqueness of each batch number.

In comparison to the manufacturer, who has an obligation in terms of resources, the brand owner has an obligation to provide results in terms of tracing back the history and origin of products.

Note: when there are several suppliers for one single GTIN
(distributor brands and out-sourcing)

In the case of distributor brands, or more generally, when several companies manufacture the same product (by the same product we mean the same EAN code), the manufacturers ensuring the uniqueness of the batch number at their individual sites does not suffice. In fact, there is a risk of two manufacturers using the same batch number at any given time. This risk, although probably slight (the initial condition would be that both suppliers use the same batch number structure), cannot be overlooked.

Notably in this particular case, the distributor that owns the commercial brand name is responsible for the non-ambiguity of the batch number for each EAN code. The fact of allocating a batch number that allows a unique identity for the EAN code could form part of the specifications. The brand manager could also decide to recall products from both manufacturers in the event of any ambiguity.

The packager's identification could be the solution for distinguishing products with the same batch number, originating from two different suppliers.

Identification of logistic units

Examples of questions	Applicable EAN-UCC standard	Examples of attached information
• Which logistic units were delivered to which platform at which date? • Which pallets contain the incriminating manufacturing batches? • Which pallets need to be recalled? • …	SSCC (Serial Shipping Container Code) 18-number code ISO standard "Licence plate"	• type of logistic unit (GTIN) • content • supplier • transport company • delivery date • storage location and temperature • quantity of cartons removed from or added to the pallet (picking, replacement of a carton on a pallet, etc.) • transportation conditions • movements (dates and times of removal from stocks, loading, etc.) • shipping advice number • delivery note number • …

The SSCC is the key to logistical traceability. It makes it possible to trace each shipped, transported, received and manipulated unit. It also ensures the link between the physical flow of goods and the flow of information by EDI

Archiving period

Within the framework of the traceability system, the SSCC follows the general archiving duration recommendations (cf. 3.2.5), i.e. it must be unique and archived for a period exceeding the life span of the product, while for purely logistical applications a year's archiving may be considered as adequate.

Note: managing links between raw materials and end products

- where a manufacturing batch of raw materials is divided up between several logistic units: the logistic units SSCC is a more precise identification than the raw material batch numbers. In this case, the solution involving creating the link between this SSCC and the end product's batch number would be sufficient and more accurate than creating the link with the raw material's manufacturing batch number. This solution would also result in a reduction in the volume of information to be recorded.

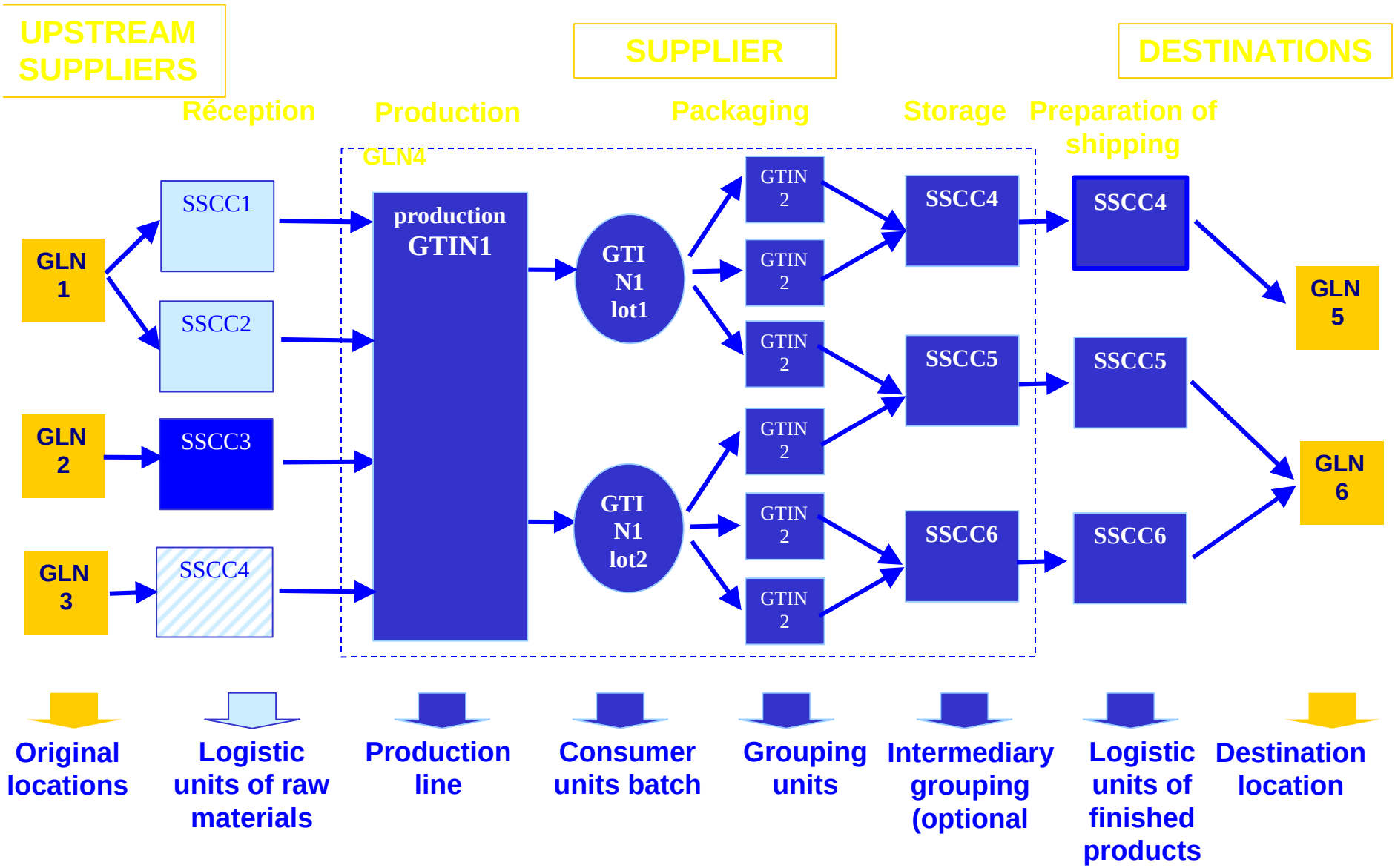
- if the raw material manufacturing batches are smaller than the logistic units they are shipped in, the raw material batch numbers are therefore more accurate than the SSCC in terms of bottom-up traceability. Management of the link between the raw material batch numbers and the end product batch numbers is therefore recommended (furthermore, the SSCC is still used for logistic purposes). The raw material batch number and GTIN may be shown by bar codes affixed to the logistic units.

Cf. Guide to Logistical Applications

Identification of companies, physical places and functional entities

Examples of questions	Applicable EAN-UCC standard	Examples of attached information
• Where were the products manufactured? • Which site stored the product? • Where were the products delivered? • Who is the manufacturer? • Who is the product brand owner? • Who imported the products? • Who are the distributors to whom the incriminating product batches were delivered? • Who ordered the product? • Who is the transporter? • Who are the suppliers of the raw material batches used?	GLN (Global Location Number) 13-number international code	• country • geographical address • postal address and other details • sanitary certification number • certification code • SIREN, SIRET • packager code • contact name • position • …

Identification Standards for Manufacturer :
homogenuous logistic units case



Identification standards for distribution platform homogenuous logistics units, cross docking and picking cases

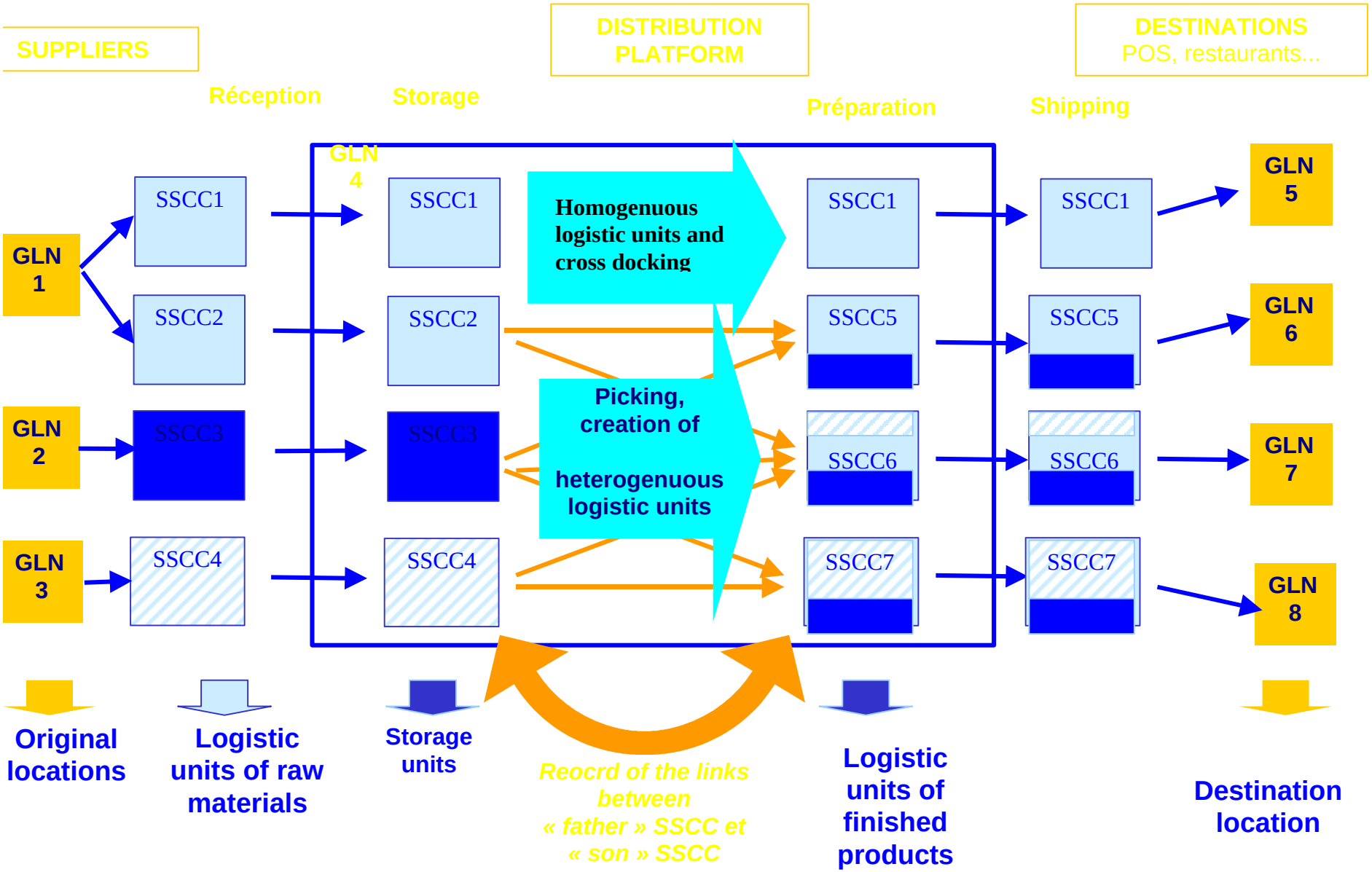


Illustration to be added: example of an EAN13, GLN and SSCC structure

Cf. Global Location Number Manual

Codification of information to be traced

In order to enable electronic data management, and to transfer the information via bar codes, EDI messages, or possible radio frequency labelling in the future, a common dictionary of complementary traceability information to be exchanged between suppliers, distributors and third party organisations is essential.

The major part of this information is common to all sectors. This comprises UCC/EAN 128 data identifiers and EANCOM® message data. (see 'Application Identifier / AI list' in appendix, and message profiles)

However, some chains depend on new and specific needs. In this case, after consultation between chain partners in working groups within EAN International and/or the national EAN organisation, the data is standardised and coded.

2.3.3 Automatic physical flow monitoring

Automatic identification standards make the input of pre-defined and coded information easier and more reliable. This currently concerns bar codes.

Bar codes	Application	Data symbolised	Comments
EAN 13 UPC 12 EAN 8	Automatic identification of a trade item at the point of sale	• GTIN	Enables automatic access to all the information attached to the GTIN, depending on the information transferred throughout the chain.
ITF-14	Automatic identification of a trade item for monitoring it throughout the logistic chain, excluding the point of sale	• GTIN	Extremely well adapted for carton labelling.
UCC/EAN-128	Automatic identification of a trade item for monitoring it throughout the logistic chain Automatic input of traceability information	• GTIN • Batch number • SSCC serial number • GLN • Best Before Date/Expiry date • Manufacturing date • Country of origin • Packaging date • Sanitary certification number	In these types of bar codes, the application identifiers (AI) are codes that identify the subsequent data in a unique way. They allow this symbology to be used for all of the necessary traceability information. Cf. appendix 8.4

		• … (all of the data to be marked for traceability purposes)	

Illustration to be added (from the GUM) with consumer unit, carton and pallets with the respective symbologies.

Note:
The RSS (Reduced Space Symbology) density, the new EAN-UCC standard for bar codes, makes it possible to symbolise a wide range of information in a limited space. Some of the first RSS applications probably concern traceability.
The norms and standards for radio frequency labels (RFID) are currently being defined on an international level. In the long term, RFID will enable standard uses.

The EAN·UCC logistic label

The logistic label is the most visible part of a traceability system. Its use is the prior requisite to product traceability in a logistic chain.

The logistic label is actually the SSCC support. The latter is the only obligatory information included in UCC/EAN 128 bar codes on the label, as it makes it possible to identify the physical entity to be monitored in a unique way, and to create the link with a shipping advice EDI message.

In a technological environment without electronic data interchange, the logistic label is the support for all the traceability information associated with the logistic unit.
In a technological environment with generalised electronic data interchange, the shipping advice message may communicate all of the necessary traceability information without this data also being marked via bar codes on the logistic label. In this case, the SSCC alone is all that is required.

The configuration of the logistic label reflects the supply chain process. It contains three types of information in three distinct parts which may be printed in clear, or in UCC/EAN 128 bar codes, at different times:

Part	**Information**
Shipment	Information known at the time of shipment: • destination postcodes • shipment advice number • information concerning the transport company • …
Customer	General information known at the time the order was received • GLN of the order-giver • order number • …

Product	General information known at the time of manufacture: • SSCC (obligatory) • GTIN of the marked product or content • dates (Best Before Date, Expiry date, manufacturing date) • batch number • …

Cf.: example of a label to be added to the appendix

Note:
The following recommendations are applicable for marking dates and batch numbers for heterogeneous pallets:

Heterogeneous pallets	Logistic label	EDI message Shipment advice
Mono-product, multi-batches or multi-dates	Mark the least favourable Expiry date / Best Before Date Do not mark the batch numbers	Communicate the detailed information concerning batch numbers and dates
Multi-products	Do not mark the batch numbers or dates	Communicate the detailed information concerning batch numbers and dates

Cf. Guide to EAN•UCC standards logistical applications

2.3.4 Electronic Data Interchange

The communication standards of electronic data interchange allow reliable and fast data transmission between partners. This involves standardised electronic data interchanges (EDI), either with value-added networks using the EANCOM® language, or via the INTERNET using the XML language.

Cf. § computer system

The EANCOM language

The EANCOM® language is a subsystem of the EDIFACT (Electronic Data Interchange For Administration, Commerce and Transport) language, developed under the auspices of the United Nations.

Among the 45 messages included in EANCOM® language, some may be particularly used within the framework of a traceability system. **The shipment advice message is the most important message to implement in traceability.**

Examples of EANCOM messages associated with traceability

NAME OF EANCOM® MESSAGE	FUNCTION
DESADV Shipping notice	**To provide information concerning the goods shipped or ready for shipment in the accepted conditions.** Examples of information provided: • delivery date; • mode and means of transport; • SSCC; • quantity; • level of packaging and item details; • batch numbers; • production date; • Best Before Date, Expiry date; • country of origin;

	• …
PRODAT Product information	To send the description of items from a technical and functional point of view Example of information provided: • item identifier(s); • characteristics of the item; • technical information; • handling information; • …
RECADV Receiving notice	Receipt of delivery
IFTSTA Transportation status	To trace back information concerning the execution of a transport order at any point of the transport chain
INVRPT Inventory status	To indicate the status of stocks
RETINS Return goods order	To provide information on the way in which goods are to be returned

XML language

XML (eXtensible Markup Langage) is the language destined to replace HTML on the World Wide Web. The standardisation of this technology is still relatively recent, but it appears to be a flexible and open technology for EDI.

Compared to EANCOM®, it offers the following advantages:
- perfect adaptability to Internet technologies;
- improved capabilities for responding to the needs of real-time interchanges;
- a capacity for processing all kinds of data content;
- the support of all of the leading computer industry partners
- a lower implementation cost for small- and medium-sized companies when compared to EDI with a Value-Added Network (VAN).

The disadvantages mainly concern the following points:
- the size of XML files, which are 4 to 6 times bigger than EANCOM® files;
- the lack of security over the Internet.

Shipment advice messages were among the first messages available in XML.

2.4 Organisation

2.4.1 Responsibility assignment

The responsibility for traceability is borne by all departments within the company concerned. Each department manager (logistics, quality, production, etc.) assures a part of the traceability system. Therefore there is not necessarily an appointed traceability manager as such. However, a person may be chosen to ensure traceability co-ordination and monitoring. Notably, the quality manager may be chosen for this role.

In any event, traceability should be a collective objective.

2.4.2 Procedures

Drafting procedures involves the detailed description of the task allocation. The procedures could have a bearing on:

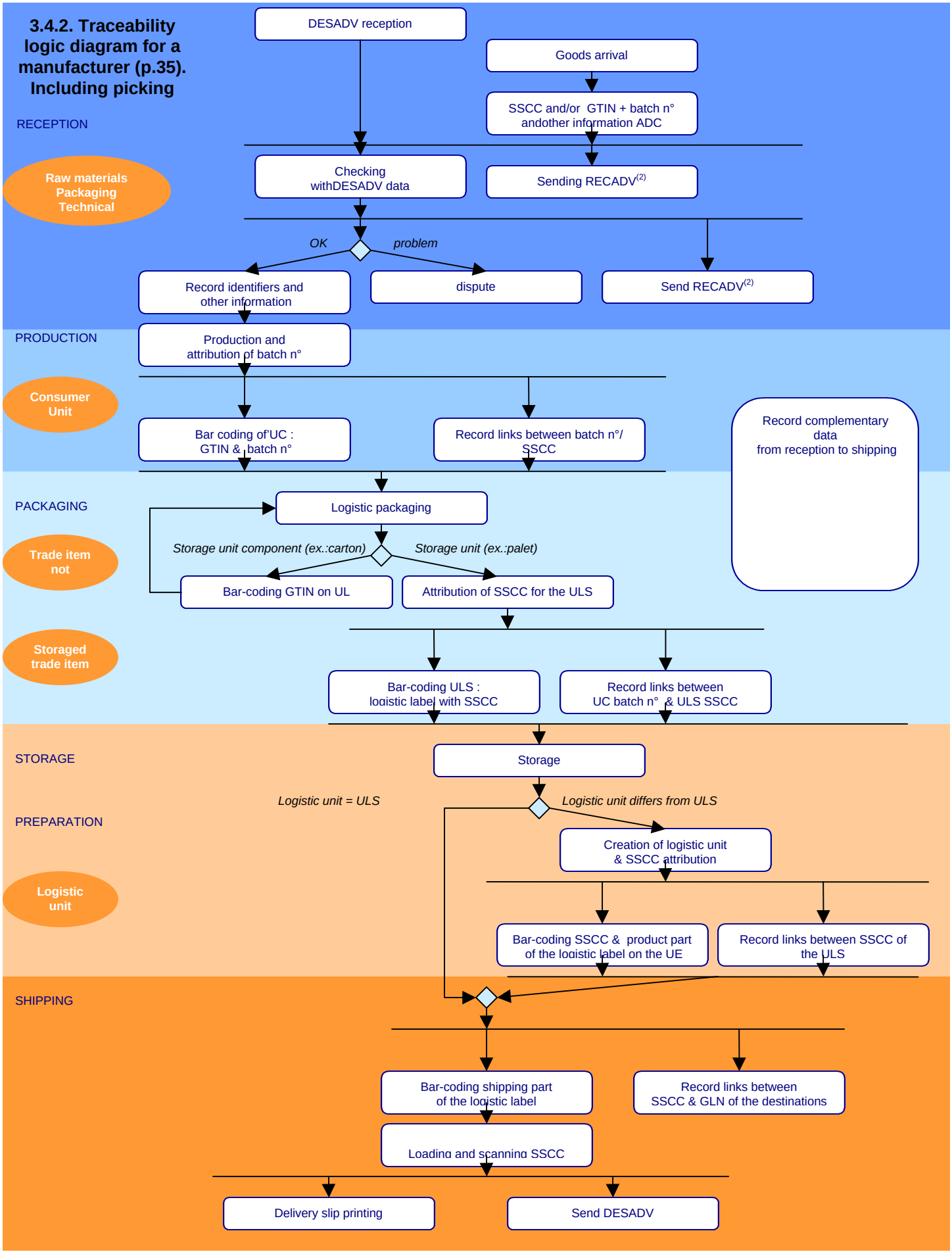
- operations (such as incident and end of batch management);
- tests (exercises, frequencies, etc.);
- research (search allocation, clearance, etc.);
- system monitoring;
- …

For a distribution platform; the procedure is similar but does not feature a manufacturing stage.

A traceability system's operating procedures define the actions to be undertaken at each stage of the transformation process. They describe the following elements, for example:

Stage	• Operator • Tools	• Traced product • Batch or logistic unit identifier • Link with previous stage	• Recorded data • Archiving support • Archiving period	• Marked information • Type of marking (clear print, bar codes)	• Information provided • Means of communication (logistic label, EDI, etc.) • Consignee(s) • Confidentiality

3.4.2. Traceability logic diagram for a manufacturer (p.35). Including picking



Examples of incidents:
Carton to be replaced, EAN 128 label poorly affixed or unreadable, pallet fallen from shipping dock, pallet damaged then reconstituted, etc.

Search examples:
To trace back a pallet's history: enter the SSCC that identifies the pallet.

To trace back the destinations of end products from a raw material manufacturing batch:
1. search for the end product manufacturing batch number (GTIN) from the raw material batch number;
2. search for the SSCC of logistic units from these manufacturing batches;
3. search for the destinations (GLN) of the SSCC of these logistic units.

A description of the operating modes (trigger element, description of the action, end of the action) may be carried out for all the types of actions (receipt of goods, traceability system management, etc.). It may be used for operator training and future system evaluations.

2.4.3 Information exchange scenarios between companies

Systematic exchanges

The systematic exchange scenario corresponds to the acquisition of data. The flow of information may appear in paper (delivery note) or electronic (EDI messages, e-mail, etc.) form. In both cases, the link between the information and the goods is ensured by referring to the identifiers of delivered batches (manufacturing batches and/or logistic units).

It is particularly important that the information exchange scenarios are defined when they are performed using EDI.

Systematic exchanges may be more or less complex depending on the possible intervention of logistical service providers or the management of allotted orders, for example.

With EDI, the messages containing traceability information are messages that are already used in logistical management. This particularly involves messages (shipping notices) and RECADV (receiving notice) in EDIFACT/EANCOM® language.
Cf. 3.3.4

Cf. "Logistic applications of EAN-UCC standards", implementing EDI, EANCOM CD-ROM, appendix: "Table of logistic messages".

Product recalls and withdrawals

In the event of a "quality incident", the problem may be detected at various levels and links of the supply chain: by the consumer, by the distributor, during quality controls at the manufacturer's site, or by an upstream supplier. The exchanges follow the major stages indicated below:

1: detection of a quality problem;
2: transmission of the information concerning the detected problem;
3: determination of the causes and/or information on the suppliers concerned;

4: localisation and immobilisation of the batches concerned, either in stock, transit or already delivered;
5: immobilisation of any other batches affected by the same quality problem, and corrective action.

Stages 3 and 4 may be carried out either in parallel or in reverse order.

Cf. Appendix: "Recalling goods", extract from the Logistic Guide.

The localisation and immobilisation of products is done using the SSCC. Batch numbers are used downstream where the pallets have already been divided up.

In general, the logistical service provider informs the manufacturer of the physical situation of the products to be recalled. The manufacturer passes on the information, and notifies the distribution platforms concerned, for example.

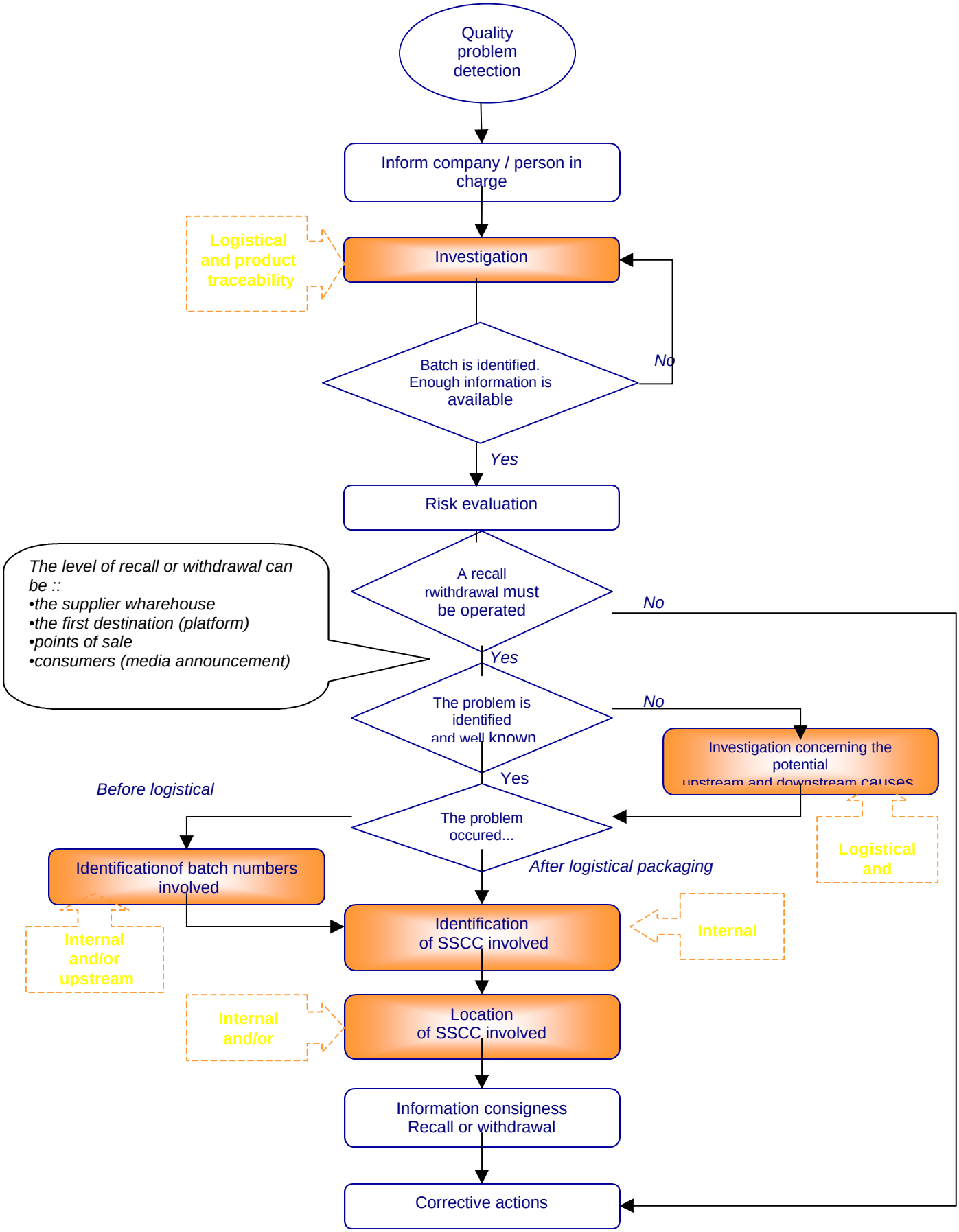
If the problem has been brought to light by a consumer, or if the products have already been sold, the product recall should be publicised in the media if the fault justifies such action.

Diagram: "using the traceability system for product recalls and withdrawals."

Note: if the manufacturer is incapable of ensuring the recall of his products, the public authorities supersede him.

In practice:
It is preferable that the supplier provides the identification (batch number or SSCC) of the products which are directly incriminated, even if he undertakes a broader recall than the particular products concerned. There are therefore two levels of recall:

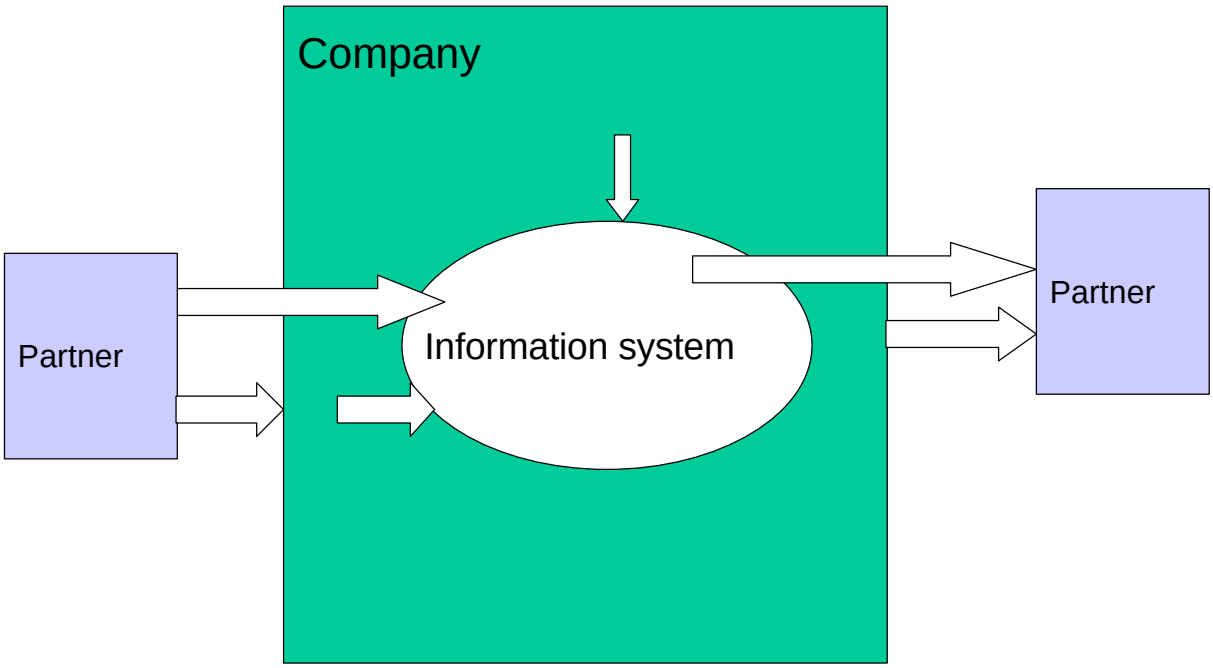
- products directly incriminated;
- products recalled or immobilised as a safety measure.


Quality problem detection
Inform company / person in charge
Logistical and product traceability
Investigation
Batch is identified. Enough information is available
No
Yes
Risk evaluation
The level of recall or withdrawal can be ::
•the supplier wharehouse
•the first destination (platform)
•points of sale
•consumers (media announcement)
A recall rwithdrawal must be operated
No
Yes
The problem is identified and well known
No
Investigation concerning the potential upstream and downstream causes
Logistical and
Yes
Before logistical
The problem occured...
After logistical packaging
Identificationof batch numbers involved
Internal and/or upstream
Identification of SSCC involved
Internal
Internal and/or
Location of SSCC involved
Information consigness Recall or withdrawal
Corrective actions

2.5 Information system

This part of the document provides a description of the information system required for implementing a traceability system, and a presentation of the main tools employed. However, we should point out that for traceability managers who are not computer specialists, the deciding factor in the success of their project depends on the specification, i.e. the expression of needs, as presented in the first part of the document.

2.5.1 Description of flows



The information system should assure three distinct functions:

- acquisition of information;
- transmission of information;
- information management.

Acquisition of information

Any traceability system is based on the collection of information enabling it to describe and be aware of all of the parameters ensuring the various types of traceability. The data collected can be provided by a partner (supplier, transporter, testing laboratory, etc.), result from product manipulations carried out by the company (production team, cooking time, etc.) or calculated (product composition, date, etc.).

Transmission of information

In order to ensure traceability continuity, the traceability system should allow for the transmission of the relevant information to other supply chain partners. This information can be data transmitted in report form (test reports, shipment advice notes) or enable the identification of products (batch numbers, SSCC, etc.). This information may also be made available via an on-line consultation system (Internet, Minitel, etc.).

Information management

In order for the company to be able to respond to any traceability information request from its customers (suppliers or consumers) the traceability system should make it possible to consult the collected data by using selective search tools. It should also ensure information archiving (the duration of which notably depends on the nature of the traced products and legal constraints).

2.5.2 The various tools

This presentation of tools used for traceability purposes is not exhaustive. It describes the most frequently used tools currently available, and their characteristics. It also covers the main applications of the different tools, and their selection criteria.
The tools may be divided into three families:

- information acquisition tools: they enable the collection of information required for traceability purposes;
- information transmission tools: they make it possible to communicate the necessary information to supply chain partners, to ensure traceability continuity;
- management tools: they allow the exploitation of traceability information.

Insofar as concerns the information acquisition and transmission tools, the company cannot decide unilaterally the solutions to be implemented concerning the exchange of information with its partners. Using standardised solutions makes the deployment of a traceability system far easier.

Acquisition and transmission of information

Only the interface tools for exchanges between companies are presented. The internal information acquisition tools are too specific to the production systems themselves to be listed.

Desynchronised information exchange tool

The most frequently used tools are presented in detail. Other tools exist, providing solutions to particular needs such as OCR, etc.

Integrated EDI

Integrated EDI enables the acquisition and transmission of information between partners equipped with information systems. It makes it possible to exchange large volumes and complex data. It is particularly adapted to frequent exchanges. The information should be structured to allow automated exchanges. Standards are available for the main types of information exchanged between companies. EDI guarantees the security of acquired information, both in terms of the identification of the information source and the reliability of the data. It allows the information to be made available quickly.
However, implementing EDI requires significant investment, both in financial and human

terms. It also involves setting up maintenance procedures and tool-user training.

Integrated EDI	Advantages	Automated solution Integration into the Information System (Structured data) Management of a large and complex volume Secure inputting and guaranteed authentication Information quickly made available Electronic data processing
	Disadvantages	Equipment required by both partners Training and support for users Maintenance infrastructure Implementation costs and time required

EFI (Electronic Form Interchange)

With its small-scale computer equipment and simple implementation, EFI makes it possible to exchange information in electronic form. For a small investment, it therefore makes it possible to quickly implement electronic exchanges. The maintenance of this type of tool is simple. It is an excellent preparation for implementing integrated EDI. However, it does not allow automated procedure exchanges with partners. Furthermore, the volume of information exchanged and the complexity of the data remain limited. If fact, the data needs to be re-collected either manually or in a semi-automatic way in order to integrate the information into an information system. using this type of tool in expanded flow situations requires the implementation of well-defined procedures.

EFI	Advantages	Simplicity of implementation Low implementation costs and short time scales Low maintenance Preparation for integrated EDI Low impact on organisation
	Disadvantages	Limited volume and complexity of information Re-collection required for integration into the information system Manual information processing The time taken to make the information available depends on the procedures Little automation

E-mail

Even though e-mails are mainly intended for information exchanges between individuals, they may be used in traceability systems for information acquisition purposes. The simplicity of implementation and the flexibility of use make it possible to recommend electronic exchanges using this tool. It does however have several limits, either in terms of security, as the identification of partners and the monitoring of messages are not guaranteed, or in terms of information structuring, as the partners are obliged to establish the rules of exchange prior to starting. While exchanging e-mails and the interrogation of the information systems remains manual, this method represents a first step towards EDI.
However, this tool is well-adapted to occasional information exchanges, with generally fairly unstructured information.

E-mail	Advantages	Flexibility Simple implementation
	Disadvantages	Intended for information exchanges between individuals, rather than systems Poor level of security (message traceability) Uncertain reliability (identification) Not automated Dialogue required prior to the exchange in order to define the information structure

Physical electronic data supports (CD-ROM, Diskette, etc.)

Exchanging information using physical supports such as diskettes or tapes enables the reliable integration of the data into information systems. It makes it possible to manage complex and, depending on the supports used, large volumes of information. However, this type of exchange is not suitable for real-time processes.
It requires discussion with partners in order to define the data format and the choice of support to be used, together with the exchange procedures (frequencies, etc.). The implementation and operational costs particularly depend on the type of support used.

Physical electronic data supports (CD-ROM, Diskette, etc.)	Advantages	Security (identification, information integrity) Integration into the Information System (structured data) Management of complex information
	Disadvantages	Bilateral dialogue required regarding the information structure Implementation and operational costs need to be considered Time required to make the information available (real-time operations are not possible)

Clear information input (paper label, information on the product)

Exchanging ‘paper’ documents currently remains the most frequently-used solution for transferring information. In order to use it in the case of a traceability system, procedures must be defined to ensure the security and reliability of the information. While its implementation may require only a small investment, this method can prove costly in operational terms. The time taken to acquire the information remains significant, and the volume and complexity of the information is therefore limited. Difficulties in reading or interpreting the information may also adversely affect the traceability system. This method is a highly flexible solution, but the procedures should be clearly defined so as to avoid obstructing the operation of the traceability.

Input	Advantages	Flexibility Small investment
	Disadvantages	Difficult to ensure security and reliability Long acquisition time Limited volume and complexity High operating costs

Summary

The following table compares the principal tools with regard to the main criteria:

Volume: quantity of information exchanged
Frequency: frequency of information exchanged
Complexity: complexity of information exchanged
Structured data: allows the transfer of structured information for automatic processing purposes
Time to make information available: the time between the transfer and processing of the information by the addressee
Automatism: allows the automation of information exchanges (emission and reception)
Reliability/security: reliability and security of data and the exchanges themselves
Computing: requires the implementation of information systems
Implementation: scale of implementation work
Organisation / personnel: impact on the organisation and competence of the personnel involved
Maintenance: complexity of tool maintenance
Investment: cost of implementing the solution
Operating costs: costs associated with the maintenance of the tool during use

		Integrated EDI	EFI	E-mail	Electronic supports	Input
Functions	Volume	+	0	-	+/-	-
	Frequency	+	0	0	-	-
	Complexity	+	-	-	+/-	-
	Structured data	+	+	-	+	-
	Time to make information available	+	0	0	-	-
	Automatism	+	-	-	-	-
	Reliability / security	+	0	-	0	0
Use Constraints	Computing	Yes	Low level	Low level	Yes	Depends
	Implementation	Complex	Low level	Low level	Variable	Low level
	Organisation / personnel	Complex	Low level	Low level	Variable	Low level
	Maintenance	Complex	Low level	Variable	Variable	Low level
	Investment	High level	Low level	Low level	Variable	Low level
	Operating costs	Medium level	Low level	Low level	Medium level	High level

+ = well-adapted tool /
- = poorly-adapted tool
0 = tool may be employed
+/- = depends on the type of tool

Information exchange and identification tools associated with the goods or process

The most frequently used tools are presented in detail. Other types of tools exist that make it possible to respond to particular needs. These tools include sensors, voice recognition tools, etc.

Bar codes

The automatic input of information using bar codes facilitates the implementation of real-time applications. It ensures the reliability of the inputted data, but bar code technology and its

acquisition process limits the volume of information. It is well-suited to inputting repetitive information such as the identification of received products.

Implementing a bar code system requires numerous parameters to be taken into consideration: firstly, the relative fragility of the information support and the life span of the data must be analysed according to the environment, as must the reading procedures. Secondly, a critical mass must be reached for marking the information. Lastly, the personnel must receive specific training focusing on the tool and its associated procedures during the hand-over stage. While the bar code system represents a major investment, this solution offers the advantages of standardised systems which are therefore easy to use when sharing information with partners.
See the chapter on EAN standards.

Bar code	Advantages	Allows real-time applications Input reliability Adapted to repetitive inputting Information integration Standardised tools Easy to use Fast
	Disadvantages	Reading environment constraints Cannot be used on some supports Personnel training and guidance Critical mass for marking the information Investment level Computer equipment required Limited volume of information Support fragility / readability

Radio-frequency labelling (RFID)

The automatic input of information using RFID labels allows the implementation of real-time applications. It guarantees the reliability of the information inputted, but limits the volume of data. It is well-suited to inputting repetitive information such as received products.
When implementing RFID, numerous parameters need to be taken into consideration. Firstly, the reading (and possibly the writing) processes need to be studied according to the operational environment. Secondly, a critical mass must be reached for marking the information. Lastly, the personnel involved should received guidance during the tool hand-over stage, with training specifically covering the tool and its associated procedures. As the level of investment is fairly high, this solution makes it possible to cover applications where bar codes cannot provide adequate solutions. For the time being, no truly standardised solutions exist, which limits the use of this technology for open applications.
Work is currently in progress to achieve EAN standardisation. This will make it possible to obtain RFID solutions that are compatible (insofar as concerns data) with existing bar code standards.

RFID label	Advantages	Allows inputting and updating of information Security Adapted to real-time applications Input reliability Adapted to repetitive inputting Information integration Flexible positioning Long life span
	Disadvantages	Non-standardised solutions Investment costs Personnel training and support Maintenance Limited volume of information Computer equipment required Critical mass for marking the information Cannot be used on certain supports Reading environment constraints

Clear information input (paper label, information on the product)

The input of information in clear on the products, or the visual identification of products by employees is currently the most frequently-used method of recuperating information. In the case of a traceability system, this approach requires the definition of procedures aimed at ensuring the security and reliability of the information. Difficulties in reading or interpreting the information can also penalise the traceability system. Its implementation, which requires only a small investment, can prove costly in operating terms. As the time required to acquire the information remains significant, the volume and complexity of this information is limited. This is a highly flexible solution, but procedures must be clearly defined in order to avoid hindering the traceability system.

Information in clear (paper documents, labels)	Advantages	Small investment Flexibility
	Disadvantages	Difficult to ensure security and reliability Operating costs Acquisition time Limited volume and complexity

Summary

The following table compares the main tools with regard to the main criteria:

Volume: quantity of information exchanged
Frequency: frequency of information exchanges
Complexity: complexity of information exchanged
Structured data: allows the transfer of structured information for automatic processing purposes
Time to make information available: the time between the transfer and processing of the information by the addressee
Automatism: allows the automation of information exchanges (emission and reception)
Reliability/security: reliability and security of data and the exchanges themselves
Computing: requires the implementation of information systems
Implementation: scale of implementation work

Organisation / personnel: impact on the organisation and competence of the personnel involved
Maintenance: complexity of tool maintenance
Investment: cost of implementing the solution
Operating costs: costs associated with the maintenance of the tool during use

		Bar code	RFID label	In-clear information
Functions	Volume	-	-	-
	Frequency	+	+	-
	Complexity	0	0	-
	Structured data	+	+	-
	Time to make information available	Real-time	Real-time	-
	Automatism	+	+	-
	Reliability / security	+	+	0
Use constraints	Computing	Yes	Yes	Depends
	Implementation	Complex	Complex	Simple
	Organisation / personnel	Complex	Complex	Simple
	Maintenance	Complex	Complex	Simple
	Investment	High level	High level	Low level
	Operating costs	Low level	Low level	High level
	Standards	Yes	No	No

+ = well-adapted tool /
- = poorly-adapted tool
0 = tool may be employed
+/- = depends on the type of tool

Information management

The three principal functions of a management system insofar as concerns traceability are:
- archiving;
- information searches and requests;
- analysis.

Archiving	**Searches & requests**	**Analysis**
The speed with which information can be accessed is an important criteria in the choice of data management tool.	Three levels of data need to be distinguished for the purposes of database organisation: • the key traceability identifiers (GTIN, batch number, SSCC, suppliers' and customers' GLN, etc.)	Analysing the correlation between production actions and results of the "quality variation" type may be combined with other functions defined by each company and exceeding the challenges of traceability (e.g. statistical

	• Other search criteria (date of delivery, temperature levels, etc.) • Qualitative or quantitative data for description purposes only	follow-up of performance).

Traceability information may be stored in a computer system or managed in paper form. Insofar as concerns the latter, it should be noted that the volume and complexity of such information remain somewhat limited and it makes heavy work of data searches and handling.

The data handled is that described in the preceding chapters (cf. "items to be traced")

Note: The specifications constitute the determining factor enabling the required computer tools to be installed. Cf. "implementation".

2.6 Performance

2.6.1 Reliability

The reliability of the traceability system is synonymous with its capacity to retrieve the information required without any risk of error. For every product and at every stage of its transformation process, overall reliability is determined by the reliability of the tools, procedures and information sources used.

Reliability is a critical factor in the performance of a traceability system. Indeed, if, for example, the procedures for recording links between logistic units and consignees are manual, an input error can lead to the failure to recall a product that has been identified as presenting a serious risk. This may then call into question the cost efficiency and even the usefulness of the system.

Other important factors are the ease of access and of use of the information.

2.6.2 Rapidity

The rapidity criteria apply in particular to information request procedures and tools used for locating products or any other type of information search concerning the traceability system.

In particular, rapidity depends on the information management tools used and their automation. Even if one has good traceability in theory, a traceability system may prove to be totally ineffective in practice because, for example, a manual archiving system is used for too great a volume of information accumulated over the course of several years.

2.6.3 Precision

The precision of bottom-up and top-down traceability is determined by the size of successive batches and the type of origin links recorded.

The size of successive manufacturing batches, together with the number and the complexity of transformation stages in a sector have a direct impact on the time needed to determine the origin of a quality variation, on the quantity of finished products concerned by any possible quality problem, and also on costs in the event of product withdrawal or recall.

2.6.4 Coherence

The coherence of a system can be seen firstly insofar as concerns how well-suited it is to requirements. The profitability of a traceability system depends mainly on the relevance of the information traced and on the suitability of the means set in place in relation to the volume of information processed and the criticality of such information. The data traced should correspond to both customer requests and internal requests.

The system should also integrate the capacity to be upgraded, to integrate new functions and extend the perimeters of traceability or of the data traced. Coherence thus assures the durability of the system thanks to the use of standards, the compatibility of successive information systems, for example, and their degree of flexibility and adaptability to the environment.

The system's coherence can also be seen in the comparison between traceability implemented by the company and that implemented by its partners. It also takes into account the dialogue between the partners: this should ensure good understanding between the different trades and partners involved in the processing of the product.

2.6.5 Risks and critical points

The risks involved in a traceability system are as follows:
- rupture in traceability;
- loss of information without a rupture in traceability;
- inaccurate information;
- loss of precision;
- performance level below the critical threshold for the system to be operational
- etc.;

The reasons for rupture notably include the following:
- unrecorded links between successive production batches and logistic units;
- information exists but is not linked to batch numbers and logistic units;
- use of proprietary systems (no standards);
- manual input and "paper" archiving;
- procedures are not conformed to or are not precise enough;
- personnel's lack of awareness or training;
- lack of automation;
- lack of analysis or overall monitoring of the traceability system
- etc.

In general, the critical points are located at every point at which there is a change of partner and operation. cf. Action typology §3.2.1.
Every operation presents a risk of traceability rupture, a risk entailed if the link between

successive batches or logistic units is not recorded. The table below does not repeat the risk of traceability rupture, except where such risk is specifically large and therefore deserves to be stressed.

Risks involved in traceability by type of operation

Operation	Risks	Responses
Production, breeding	• loss of information regarding the conditions of production or breeding; • errors in manual inputting;	• keeping documentary records and archiving; • sector collaboration to define and codify the information to be recorded;
Storage	• loss of information regarding storage conditions and possible spoilage;	• site management and recording storage parameters; • recording re-assemblies in the event of spoilage (replacing a box in a pallet, for example);
Product consolidation or division	• loss of precision • reliability of the links	• use homogenous manufacturing batches; • reduce the size of batches or multipacks; • identify batches and multipacks in detail (carton in the case of picking); • automatic input
Reception, shipment, change of partner	• rupture de traceability linked to discontinuity in product identification; • inputting error in the case of manual procedures used for the re-inputting of information;	• use EAN-UCC standards for the identification of products and partners, automatic bar code identification and Electronic Data Interchange; • suppliers' and transporter's specifications including use of standards;
Transport	• loss of information concerning transport conditions; • breakdown in traceability in the event of successive partner changes when products are consolidated and divided;	• record the conditions during transport and localisation on a continuous basis (in real-time if possible); • use the Sender's section of the EAN-UCC logistics label
Transformation, mixing, adding products	• loss of precision • risk of error when inputting data manually; • rupture in traceability in the event of an incident;	• separate batches; • drawing up and conforming to detailed procedures, automation; • supplier specifications; • adapt the manufacturing process to suit the size of incoming batches; • keeping documentary records and archiving;

Packaging	• loss of accuracy concerning the links of origin and information (heterogeneous logistic units as batch numbers or dates, different production dates to the date of packaging for example).	• Homogeneous logistic units or highly detailed marking (batch no. or SSCC in bar codes on the smallest homogeneous unit) • mark the most unfavourable date but send a detailed notice of delivery message; • mark the information clearly on the product (in-clear labelling); • security margin in the event of product recall;
Distribution, widespread destinations	• loss of traceability linked to widespread destinations;	• keep a record of the links between SSCC and GLN destinations; • send a delivery notice with SSCC by EDI at the time of loading; • use Receipt of delivery;
Consumption	• loss of traceability, greater risk involved if the purchaser is not the end customer; • poor or improper use of the product;	• labelling, in-clear information on the packaging
Return of unsold goods	• See consolidation and division.	• Detailed identification (batch); • keep a record of all movements.

Performances may be different for different products and production stages depending on the systems implemented.

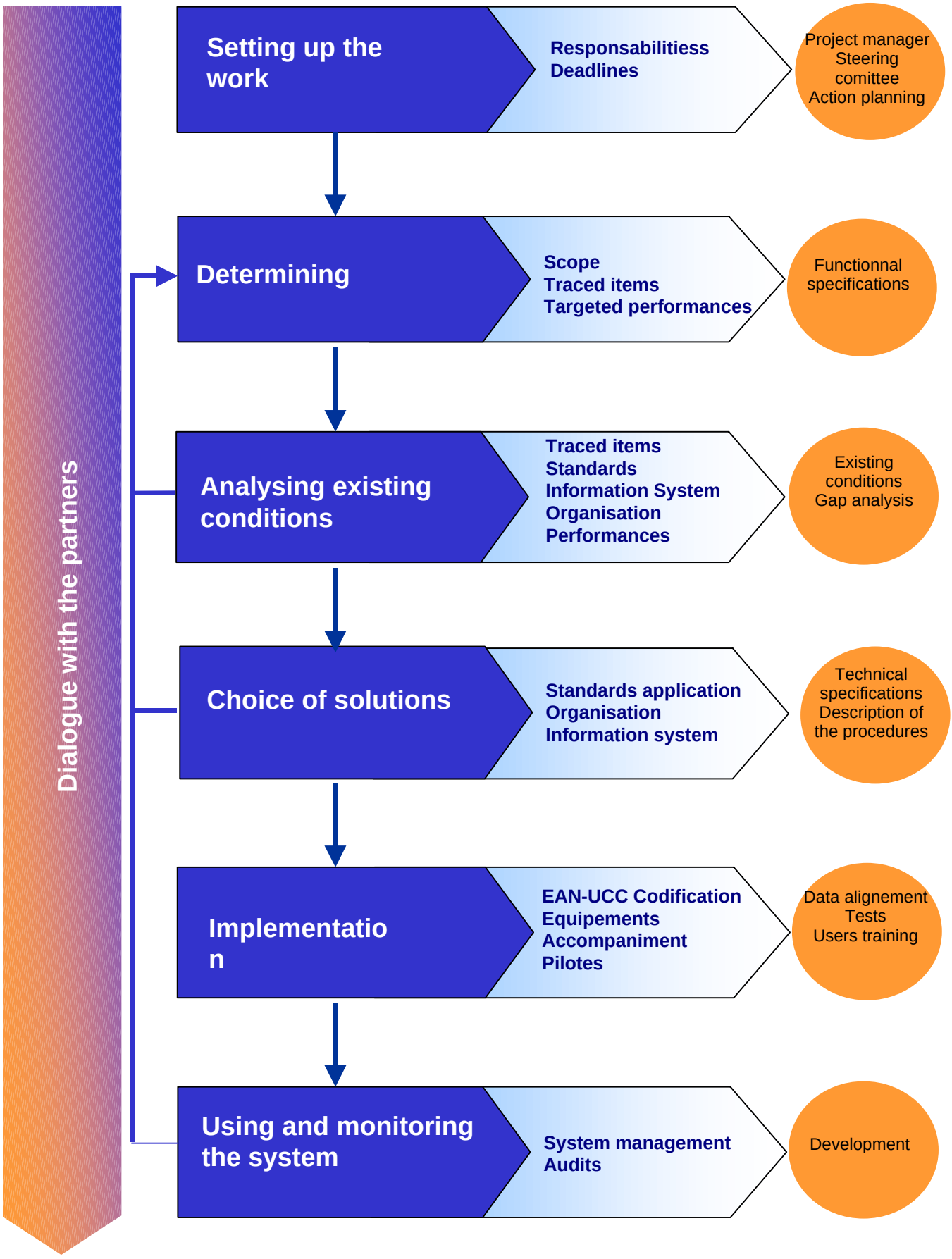
3. IMPLEMENTING A TRACEABILITY SYSTEM

This chapter does not deal with matters concerning general project management.

3.1 General methodology

This methodology applies once the decision to adopt a traceability procedure has been approved. However, undertaking a needs assessment and analysis of the existing conditions may have a retroactive effect on the approaches and schedules initially defined.

The framework, the elements traced, the tools, organisation and performances refer to Chapter 3 "Description of a traceability system".


Dialogue with the partners
Setting up the work
Responsabilitiess
Deadlines
Project manager
Steering comittee
Action planning
Determining
Scope
Traced items
Targeted performances
Functionnal specifications
Analysing existing conditions
Traced items
Standards
Information System
Organisation
Performances
Existing conditions
Gap analysis
Choice of solutions
Standards application
Organisation
Information system
Technical specifications
Description of the procedures
Implementation
EAN-UCC Codification
Equipements
Accompaniment
Pilotes
Data alignement
Tests
Users training
Using and monitoring the system
System management
Audits
Development

3.1.1 Dialogue with the partners

Dialogue with the partners does not constitute a stage as such. Such dialogue ought, in fact, to be maintained throughout the project. It may even serve as the catalyst for the project if the demand comes from a customer.
The analysis of existing conditions and needs, the choice of data communication solutions (tools and scenario), together with the choice of pilot schemes are partly and notably dependent on the partners.

3.1.2 Setting up the work structure

Any traceability procedure must be supported by Management.

Traceability is in fact a transversal problematic. Production, logistics, quality, the sales department, human resources, finances, etc. – all the company's departments are involved in the challenges and in setting up a system. Therefore, it cannot be an isolated initiative within the company but must be integrated within an overall programme.

3.1.3 Determining needs

Of course, traceability does not mean tracing everything that can possibly be traced, but rather what is useful and necessary.

Depending on its constraints, goals and risk analysis, a company may perfectly well chose (or accept, depending on the situation of its suppliers) to limit the perimeters of its traceability system.

The company's needs assessment allows the following points in particular to be defined:
- the departments which are most concerned within the company;
- the priorities of the traceability system (upstream, internal, downstream and the products concerned);
- related complementary tools.

The conclusions of the needs assessment forms the operational or user specifications (see questions grid in section 4.2 for further details). It can be planned along the lines of the description of a traceability system:

Example of an operational specifications plan

Framework
- Context (constraints, partners, etc.)
- Goals (security, rationalisation of logistics flows, marketing, etc.)

Items to be traced
- Scope (products concerned, modelling the internal and external rupture points, upstream limits, downstream limits)
- Products (composition of manufacturing batches, size of successive manufacturing

batches or of logistic units, etc.)
- Links (links between manufacturing batches and logistic units, strict or broad links, etc.)
- Data recorded (at every stage, with their use and types of information request, confidentiality, etc.)
- Length of time data should be kept in archives (for each type of data)

Target performances
- *Reliability (of the information, the tools and procedures, etc.)*
- *Rapidity (of information requests)*
- *Precision (of the system per product)*
- *Coherence*

3.1.4 Analysing existing conditions

Analysing existing conditions may entail a review of operational specifications or may even, on occasion, precede the determination of needs. However, this should not influence the needs but rather the implementation schedule.

The analysis grid shown in section 4.4 defines the criteria required for assessing the maturity of the traceability system within a company. Nonetheless, the assessment remains dependent upon the accurate definition of goals and needs.

Overall, it is a matter of separating the links of the chain and checking to see whether they communicate effectively with each other and how long this takes, for example.

3.1.5 Choice of solutions

Developing the technical part of the specifications and describing the procedures may be carried out in parallel. Indeed, the tools chosen should be adapted to the organisation and vice versa.

In general, the description of how the traceability system will be organised cannot be completed in isolation from the other issues at stake, since it has to be integrated into the company's existing procedures.

Elements of the organisation of the traceability system which need to be incorporated into the company's existing procedures and documents

Division of responsibility
Responsibility for co-ordination, responsibility for implementation, distribution of tasks

Procedures
Description of operations and tools for each stage, operational modes, etc.

Information interchange scenarios
EDI messages used, product recalls

Example of a technical specifications plan

Technical functions
Technical translation of the operational specifications, description of sort data, of descriptive

data and codification standards, etc.

Technical constraints and performances
Reliability, rapidity, upgradeability, volume of information to be processed, archive duration , frequency of information exchanges, environment, human resources, etc.

Hardware configuration
Interface tools: readers, printers, etc.
Interfaces: production software, EDI work station, etc.

Practical advice:

Traceability implies recording data all along the production chain. To do this, it is necessary to have available a certain amount of equipment for marking, reading and/or data capture and prepare, in the information system, a space that allows you to send, process if necessary and return such information.

In particular, there are several types of equipment required for use of EAN standards:
- Printing / labelling equipment;
- bar code scanning equipment;
- portable input equipment.

Printing and marking equipment
The most important station is located at the end of the manufacturing chain at the time of SSCC marking. This is the stage at which the link must be made between the SSCC and all the information related to the manufacturing process (batch number, manufacturing chain number, date of manufacturing, raw material batch number, etc.). A second labelling station is usually located in the dispatch department where the shipping label will be affixed. This is where the link between the SSCC and the consignee should be made. It is often useful to set up a labelling station at the raw materials reception point, if all the goods are not identified using EAN standard markings.

The following points should be taken into consideration when choosing printers:
- direct marking or use of labels;
- size of labels;
- number of labels to be printed per day;
- conditions of use (you should take into account environmental conditions such as the temperature in the printing area, the fact that this is may be a dusty or damp area, the label or marking support, etc.)

Scanning equipment
The scanning stations are located at various points in the company:
- at the raw materials reception point where the company must record the SSCCs or GTIN and batch numbers received;
- at the beginning of the manufacturing process where the batch numbers of the raw materials used in manufacturing the end products must be recorded;
- at the end of the manufacturing process in order to read the SSCCs and record the location of storage units;
- in the shipping bay where the logistic units SSCCs must be recorded and included on the

shipment advice note.

Other scanning stations may be set up at various points in the company in order to carry out checks whenever the merchandise is moved.

Depending on how they will be used, the company may choose either fixed or portable scanning devices. **Fixed scanning equipment** is recommended particularly if the production process is fixed or includes mandatory stages, and if the marking positioning is stable. These devices may be:

- scanners;
- CCD cameras

There are several technologies available for **portable scanning devices** (or portable input devices):

- bar code scanner pen;
- douchette;
- scan gun;
- CCD scanning gun.

Research into the applications of use will serve to determine the most judicious choice. For general application, it may be useful to invest in one or several technologies.

3.1.6 Implementation

The implementation plan may be spread over several years depending on the existing system, the goals, priorities, the investment policies and the possible impact on the manufacturing process.

It would seem logical to first ensure internal traceability. Although the SSCC is now used upstream for logistical reasons, placing SSCCs on pallets alone is not sufficient for the requirements of traceability. What is needed is to control the internal links (links between manufacturing batches and the SSCC, links between the SSCC and the consignees).

Example of how to divide up the tasks involved in an implementation plan

Support
Communication, training for users before deployment, drawing up user documents, etc.

Choice of pilot schemes

Codification, aligning data with partners
Managing hierarchies

Installing equipment
Scanning equipment, labelling machines, EDI station, software packages, etc. This stage may take a long time, do not underestimate the time required

Testing and correcting the system
Internally and with the partners

Setting up the crisis unit
Contacts, internal procedures and partners' quality control procedures, etc.

3.1.7 Using and monitoring the system

As for any system, **regular expert reports are recommended** to check that the system developed does not go off course, either at the level of conforming to procedures or in the use of tools. Such reports may, for example, be effected every 6 months by a third party. The AMDEC method may be used in order to analyse the possible modes of rupture, their seriousness and to implement preventative measures.

Tests and crisis simulations should be carried out on a regular basis.

(In particular, see 3.6.5. "risks involved in traceability by type of operation".)
The critical thresholds concerning the reliability of recorded information, of the procedures and of the tools should be mentioned. Internal corrective action and subsequent action taken in collaboration with service providers or suppliers can then be taken.
Should restructuring or changes in the information system occur, for example, re-testing the traceability system is strongly recommended.

As well as creating initial objectives**, the traceability system may be valorised to the full** by using it for applications that are not priorities, but that do not require further heavy investment in terms of tools.
Examples:

- providing traceability training for sales representatives (where the initial demand was mainly internal or customer-based);
- using the collected information for producing statistics and improving production (choice of raw materials, team training, etc.);
- managing stock rotation among customers for an improved service;
- using logistical traceability for recalling products with minor defects, but which could damage the brand image (minor manufacturing or packaging defect);
- identifying parallel distribution circuits
- …

(see also 3.1.2 "Objectives")

Furthermore, the traceability system evolves according to the development of the context.

3.2 Questions concerning specifications

At this stage of the project, the fundamental question is no longer "to trace or not to trace?", but rather **"what to trace and how to trace it?".**

The following questions are not exhaustive. They are intended to serve as a reflection guide for companies wishing to integrate a traceability system into their specifications. They follow the order of the plan shown in 4.1.3 and 4.1.5. They echo the traceability system description shown in chapter 3.

FRAMEWORK	
context	
1. Do applicable regulations exist or are they currently being drafted?	

2. Do applicable inter-professional agreements exist, or are they currently being drafted?	
3. Do applicable standards exist, or are they currently being drafted?	
4. Do applicable industry recommendations or fair practice guides exist, or are they currently being drafted?	
5. Are consumers requesters?	
6. Are some of my customers requesters?	
7. Does traceability offer a competitive advantage for my company?	
8. Is traceability a requirement for being referenced by some customers?	
9. Are some of my company's departments requesters?	
10. Have some of my service providers already expressed their interest in the system?	
11. Does my company have brands with a notoriety that needs to be protected?	
12. Could some of my company's products represent serious risks in the event of a quality defect?	
13. Have incidents already occurred in my company's operating sector?	
14. Has a crisis that has received significant media coverage already occurred in my company's operating sector?	
15. Does my company have aspects that are known to be fragile?	
Comments concerning questions 1 to 15: the greater the number of positive answers, the greater the need for traceability for the company in the given chain. This analysis notably reflects the urgency and the reliability of the traceability system to be implemented, and the resources to be deployed.	
16. Who are the institutional partners involved, or with an influence of traceability within my chain?	
17. Who is the source of the initiative? Is this an internal or external initiative (customer, chain, regulatory, etc.)?	
18. What is the traceability status of my suppliers? My service providers? My customers? My competitors?	
19. What are their needs?	
20. What are their projects in terms of traceability?	
Objectives	
21. What are the traceability objectives within my company? (cf. objectives chart)	
22. What are the priorities?	
23. What are the deadlines?	
(questions to be expanded upon according to the objectives)	
TRACED ELEMENTS	
Scope	
24. Which projects are concerned by the traceability project?	
For each of these products:	
25. For internal traceability: what are the various stages of the internal process? What are the rupture points? What are the incoming and outgoing products at each stage of the process? What information needs to be recorded?	

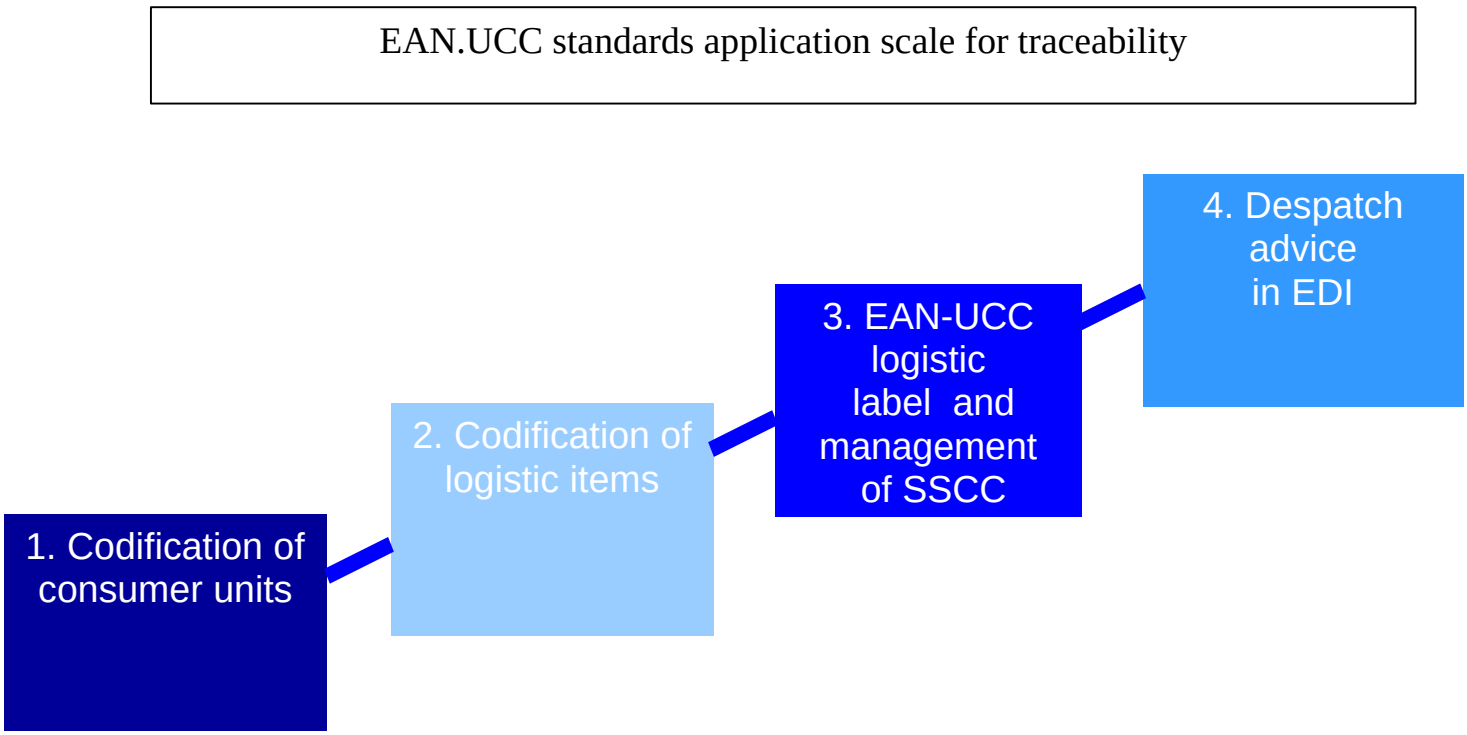
26. Is upstream traceability required? If so, which raw materials are concerned? Which technical materials? Which packaging? For each of these elements: what are the various stages (production, transformation, manipulation, storage, transport, etc.) and partners involved upstream? What are the incoming and outgoing products? Up to which point do I wish to know the origin and background of products?	
27. Is downstream traceability required? If so, for which chains/destinations? For each of these destinations: what are the various downstream stages? Up to which point do I wish to trace the routing and localisation of products?	
The rest of the analysis is carried out according to the company's objectives, for each type of product and at each stage within the scope of the traceability system.	
Products	
28. Which criteria should be included in the definition of manufacturing batches? What should be the size of the batches? Should the batches be separated?	
29. How are the batches identified?	
30. What types of logistic units are used? How are they identified?	
Links	
31. What is the type of link (absolute or expanded)? If it is expanded, what is the safety margin to be envisaged? How are the links between the preceding and subsequent batches made (direct links between manufacturing batches/GTIN or SSCC, time/minutes, manufacturing sequence, spot number, shipping code, etc.)	
32. Is picking done? In this case, do we wish to trace the links between the primary and secondary pallets?	
Recorded information	
33. Is certain information attached to received product batches (packing date, origin, etc.) that I would like to receive each time a delivery arrives? If so, which information?	
34. What information / data needs to be recorded (data received from a partner, measurement information, manufacturing or manipulation information, incidents, etc.)? For what reason?	
35. What is this information attached to in order to be linked to the batches (batch number + GTIN, time, manufacturing sequence, shipping code, etc.)?	
36. Of this data, which information do I need to pass on to another transformation stage? Is it essential that this information is marked in clear on the products, or can it be communicated electronically? Who are the consignees?	
37. What are the intended types of searches? What information is likely to be sought? From what initial information?	
38. Archiving periods	
39. Does the product have an Expiry Date or Best Before Date? What is its maximum or average estimated life span, according to each case?	
40. Do legal constraints exist concerning the archiving duration certain	

data? Do industry recommendations exist?	
41. For each item of traced information, what is the subsequent archiving period according to its use or constraints?	
TARGET PERFORMANCES	
42. What is the maximum amount of time for undertaking each of the searches?	
43. What is the maximum number of suppliers to be involved when tracing a batch upstream (first supplier within the upstream scope of the traceability system)? (to be calculated according to the batch sizes and the types of links)	
44. What is the maximum number of downstream customers or products that must respectively be consignees or originate from this batch?	
45. What are the measurable reliability levels of the system? What are the critical levels?	
EAN-UCC STANDARDS	
46. When and by whom are the codes attributed?	
47. What tools do my partners use?	
48. Which tools would I like to use with them in order to exchange information (EAN 128 labels, EDI, etc.)? Upstream and downstream?	
ORGANISATION	
Division of responsibilities	
49. What are the responsibilities of the department concerned by traceability? Who is in charge of traceability co-ordination and monitoring?	
Procedures	
50. At each stage of the product transformation process: what is the action to be taken? For each action: how is this carried out? Using which tools? How is the action initiated? When can it be considered as completed?	
51. What are the types of search? Who will be able to conduct the searches?	
52. Does confidential internal information exist? Insofar as concerns external relations?	
53. Which people or positions will be involved in the collection of information? In the transmission of data? What is their level of training? What is their capacity to adapt?	
54. How should incidents be managed (carton to be replaced on a pallet, etc.)? Unsold items?	
55. How should batch-ends be managed?	
56. How are the tests and exercises organised?	
57. How regularly? Who is responsible?	
Scenario	
58. Do messages adapted to my sector exist?	
59. What are the message profiles to be used?	
60. If EDI is used, what are the information interchange scenarios? Which language is used?	

61. How is the crisis unit organised? In the event of an incident, what is the recall procedure arranged with my partners? Who are my contacts with the partners?	
62. Where will the products be stored in the event of a recall?	
INFORMATION SYSTEM	
63. What are the standards for communicating data by EAN 128 and/or according to EDI requirements?	
64. What should be the response rapidity for each of the envisaged searches?	
65. What is the working environment?	
66. What are the estimated volumes and frequencies of the information to be archived?	
67. What are the estimated volumes and frequencies of the information to be communicated?	
68. What is the criticality of this information? Does an information transmission reliability level need to be specified?	
69. What are the interface tools (scanners, printers, etc.)? How many are required?	
70. Which interfaces should be allowed for (software package, EDI station, etc.)?	
71. What are the archiving supports?	

3.3 EAN-UCC standards application scale for traceability

The progressive use of EAN-UCC standards can be set out in four distinct stages. Insofar as the company is concerned, each one corresponds to a level of 'traceability maturity' in the interfaces with its partners.



Stage 1: Codification of consumer units

- Consumer units codified with GTIN
- Logistic items non-codified

The internal traceability may be effective, but the risks of errors in information interchanges between companies are significantly high. There is a serious risk of a rupture occurring in interfaces with partners.

Stage 2: Codification of logistic items

- Consumer units codified with GTIN
- Logistic items codified with GTIN
- Logistic units are marked with EAN 128 labels and identified by a SSCC, but this is not integrated: there is no record of links between the manufacturing batches and the SSCCs, nor between the SSCCs and the destinations' GLNs.

The company may respond to a customer's request concerning EAN 128 labelling of pallets, but logistical traceability will not be truly guaranteed.

Stage 3: Management of SSCCs for logistic units

- Consumer units codified with GTINs
- Logistic items codified with GTINs
- Logistic units marked with EAN 128 labels and identified by a SSCC
- Links between manufacturing batches and SSCCs are therefore represented by the links between the SSCC and GLN of the recorded destinations

The company's downstream traceability is therefore assured. As a result, manufacturing batch consignees may be traced. The company enjoys a rationalisation of its logistic processes.

Stage 4: Sending a "Shipment advice" message by EDI

- Consumer units codified with GTINs
- Logistic items codified with GTINs
- Logistic units marked with EAN 128 labels and identified by a SSCC
- Links between manufacturing batches and SSCCs are recorded
- A DESADV (shipping notice) message is sent, integrating the SSCCs for 80% of volumes

This stage relies on the technological maturity of the company's customers. At this stage, the company enjoys an optimisation of the costs of the system implemented for downstream traceability. The traceability system will have been a factor in development.

3.4 A traceability system's analytical grid

This analytical grid is shown in 'check list' form. It presents an idea of the application level of the company's traceability system. It may be used:

- during the evaluation of a traceability system;
- within the framework of a traceability system implementation project. With a view to preparing the action plan, it analyses the gap between the current situation and specific needs.

NA: not applicable
UK: unknown

TRACED ELEMENTS	Yes/No/ NA/ UK	Action to be anticipated
Scope		
1. I have defined the products (trade items, raw materials and technical materials) that I wish to trace both upstream and downstream, according to a risk analysis, quality objectives, customer requests, the regulations in force and any other possible issues.		
2. An analysis of internal company rupture points has been done.		
3. An analysis of rupture points in the supply chain has been carried out either by the industry or by the company.		
4. I am aware of the limits of upstream traceability concerning my products for all the raw materials and with all of my suppliers.		
5. I am aware of the limits of downstream traceability concerning my products for all the raw materials and for each downstream partner and customer.		
6. The limits of upstream traceability correspond to my company's choice or to an acceptable risk.		
7. The limits of downstream traceability correspond to my company's choice or to an acceptable risk.		
8. Unsold items are traced.		
9. Recycling is traced.		
Products		
10. I am aware of the homogeneity and size of the manufacturing batches.		
11. The homogeneity and size of the manufacturing batches is suitable for my company's choices in terms of traceability.		
12. I know the composition of the logistic units.		
13. The logistic units composition is suited to my company's traceability requirements.		
14. All the intermediary and end products have batch numbers.		

Links		
15. All the links between the successive entities traced during the transformation process are controlled and recorded.		
16. I know whether these links are "absolute" or "expanded".		
17. I know the suppliers of raw materials for a given end product batch.		
18. I know the consignees of the end products resulting from a given batch of raw material.		
19. I know how many suppliers and raw material batches I can trace back in the event of a problem with an end product batch, for all traced elements.		
20. I know how many end products are involved, and the number of customers concerned, in the event of a problem with a raw material batch or any traced item involved.		
21. The accuracy of the upstream and downstream traceability system corresponds to my company's choice, or to acceptable risks.		
Recorded information		
22. An internal analysis of critical points has been conducted (using the HACCP principles, or another applicable method, standard No. 9343).		
23. The information regarded as critical, which could affect the quality of the product, either adding value or of a compulsory nature according to the law, has been listed.		
24. All the critical information is recorded.		
25. All critical information is linked to manufacturing batch numbers, manufacturing orders, time indicators, logistic units or any other information making it possible to create a link with the manufacturing batches.		
26. All incidents regarded as critical are recorded.		
27. All the incidents are linked to manufacturing batch numbers, manufacturing orders, time indicators, logistic units or any other information making it possible to create a link with the manufacturing batches.		
28. The links between physical and information flows are ensured by key identifiers (SSCCs in shipping notices, message identifiers, receiving notices, etc.)		
Archiving period		
29. The Expiry Date or Best Before Date of all the raw materials is shorter than the Expiry Date or Best Before Date of the corresponding end products;		
30. The archiving period for batch numbers, SSCCs and traced data meets statutory, commercial and internal requirements.		
31. In any event, the archiving period is always longer than the time between manufacturing and the Expiry or Best Before Date + 6 months, or the estimated average life span of the product when no Expiry Date exists.		
32. The 'batch number + GTIN' pairing remains unique for the		

desired archiving period.		
33. The SSCCs remain unique for the desired archiving period.		
EAN-UCC STANDARDS		
34. All the products (Consumer units, raw materials, etc.) are codified according to EAN-UCC standards.		
35. All the logistic items are codified according to EAN-UCC standards.		
36. The logistic items are marked with EAN 13, ITF14 or EAN 128 according to the standards.		
37. All the logistic units are identified by a SSCC with an EAN 128 label that conforms with the standards.		
38. The main sites are identified by an EAN 13 global location number (GLN).		
39. The 'batch number + GTIN' pairing is unique.		
40. The raw materials and utilised items to be traced are codified according to EAN-UCC (UC and UL) standards.		
41. Received raw material logistic units are identified by a SSCC with an EAN 128 label that conforms to the standards (or otherwise by a different method).		
42. The quality of my EAN 128 labels is high.		
43. The EAN 128 labels are correctly affixed.		
44. The EAN 128 labels are read before shipment.		
45. An EAN 128 re-labelling system exists in the event of poor quality printing, that ensures that traceability is not lost.		
46. There is a high reading rate of my EAN labels when they arrive at the customer's site, following transport and storage.		
47. "Shipping notice" messages integrating the SSCC are sent to end product consignees in EDI form (DESADV).		
48. "Shipping notice" messages integrating the SSCC are sent to end product consignees in Web EDI form.		
49. "Shipping notice" messages are received by suppliers in EDI or Web EDI form.		
50. "Receiving notice" messages are received by consignees in EDI or Web EDI form.		
51. "Receiving notice" messages are sent to suppliers by EDI.		
52. "Receiving notice" messages are sent to suppliers by Web EDI.		
53. My company is adequately equipped with labelling machines for shipments, and scanners for receiving goods.		
ORGANISATION		
Division of responsibilities and tasks		
54. The company has one or more traceability managers.		
55. The traceability manager may intervene in company operations according to his objectives.		
56. All of the departments concerned by traceability have been identified and are familiar with the traceability system.		

57. All the operators concerned by traceability have been identified (forklift truck operators, stock-keepers, etc.)		
58. All the operators concerned have been familiarised with the traceability system, and trained if necessary.		
Operating and testing procedures		
59. All the operating procedures are noted in written form and put into practice for each item of traced information.		
60. Emergency procedures are defined for each item of traced information.		
61. An EAN 128 re-labelling system exists in the event of an incident or poor quality printing, that ensures that traceability is not lost.		
62. Testing procedures have been defined.		
63. Tests are conducted on a regular basis.		
64. Emergency procedures have been defined (contacts, storage site in the event of product recall, etc.) and tested.		
Information interchange scenarios between companies		
65. Regular exchange scenarios have been defined. (order, shipping notice, receipt of shipping notice, etc.).		
66. Information exchange scenarios in the event of a crisis or exceptional search have been defined. (product recalls).		
PERFORMANCES		
67. I have defined all my target performance levels.		
Reliability		
68. The automation of input, management and information communication tools is geared to the volume and frequency of the information exchanges, and is compatible with the level of risk. The percentage of estimated errors is known and accepted.		
69. The information received is accurate (confidence in the nominator, checked by a third party, reliable measurement tools, etc.) .		
70. The necessary tools have been implemented in the process.		
71. Data transmission is of a good standard.		
72. Information accessibility has been defined and is of a good standard.		
73. The SSCC is read in order to be communicated in the DESADV or by Web EDI.		
Rapidity		
74. The speed of procedures concerning information searches, information transmission and product recalls has been tested with the various partners. It is known and accepted.		
Coherence		
75. Industry-wide consultation with chain partners has taken place or is currently underway.		

76. I am sure that the same words are understood in the same way by the various users.		
77. The status of upstream and downstream traceability is known and accepted.		
78. Everything that is traced corresponds to the requirements of consumers, customers, regulations, and contributes added value to production or risk management.		
79. The automation of tools and procedures is in line with the volume of products and information being managed.		
80. The equipment installed is used for a critical mass of products or information.		
81. Process rationalisation has accompanied the implementation of the traceability system.		
82. All the applicable standards are used and make it possible to use the system with the largest number of partners possible in the medium term.		
83. The information system hardware can be adapted to new functions.		

Example of measurable performance criteria

Within the framework of the scope of the traceability system defined by my company, for each type of product and ultimately at each stage:

CRITERIA	**Answer**
Reliability	
1. I am x % sure of being able to find the destination of an end product batch.	
2. I am x % sure of being able to find the product batches employed in the manufacture of an end product batch.	
3. I am x % sure of finding the information I am looking for.	
4. X % of the company's consumer units are codified according to EAN-UCC standards.	
5. X % of the company's logistic items are codified according EAN-UCC standards.	
6. X % of logistic units are identified by a SSCC and marked with EAN128 labels.	
7. An EDI shipping advice note is sent for X % of shipments.	
Rapidity	
8. I am able to find the destination of a manufacturing batch in x (time).	
9. I am able to find the origin and characteristics of a manufacturing batch in x (time).	
10. I can find the destination of a SSCC in x (time).	
11. I can find the origin and characteristics of a SSCC in x (time).	
Accuracy	
12. How far back, in terms of the number of suppliers and raw material batches or other utilised items, can tracing be done in order to determine the origin of an end product?	
13. Inversely, in how many end products or end product batches are traces of a raw material batch or another given utilised item likely to be found?	

…	
Needs-solutions analysis	
14. I use x% of searches defined in the traceability system.	
15. X% of the information I look for may be found using searches defined in the system.	
16. I use the equipment installed at a level of x%.	
Coherence	
17. In the case of existing industry recommendations, my company's traceability system applies: • less than is recommended • exactly what is recommended • more than is recommended	
18. On the EAN•UCC standards application scale for traceability, making a distinction between upstream and downstream partners, in terms of number and turnover: • X% of my partners are at the same application level; • X% of my partners have a similar application level (slightly higher or lower level); • X% of my partners have a significantly different application level.	
19. The scheduled life span of my equipment is x (time). (per tool)	

4. CONCLUSION

In our mass society - mass production, mass information, Megalopolis, multinational companies, traceability responds through singular or group identification.

In the apology of acceleration - acceleration of information exchanges - media acceleration, acceleration of the physical flows of both goods and people, traceability responds through memory.

On the complexity of the world socio-economic context - complexity of supply chains, media internationalisation, geopolitical and environmental interdependence, traceability responds through proximity, through a link with the origin, the link between items and between acts.

Is traceability therefore a symptom of the end of the reign of quantity? Or is it the sign of the maturity and sense of responsibility of organisations and individuals in our society?

Is it a fashion, the luxury of rich countries, in their insane race against BSE and towards the eternal myth of zero fault? Or a necessity for controlling real health risks?

It will be the consumers, companies and law-makers who will decide. In any event, there is still much left to do. We are only at the beginning of a fundamental movement in supply chains.

Research and conceptualisation work has only just begun. Where are the traceability gurus? Where are the reference books?

Implementation in the field is also on the move. Driven by consumer demand and by legal pressure, traceability is gaining ground in every sector.

The need for a common language between everyone involved in supply chains here exceeds the technological and economic stakes. Consultation and standards have therefore capital roles to play in the continuity of information flows. Gencod-EAN France and EAN International will be present to accompany companies and industries wishing to resume this Ariadne’s thread and spin this other "web", although a concrete one this time.

5. CASE STUDIES

TRACERBIO
The organic cereals and oil and protein seed crop system (SETRAB)

TRACERBIO is a centralised and secure database, accessible via the Internet. This tool was created by the SETRAB (Syndicat européen des transformateurs et préparateurs des produits de l'agriculture biologique) in partnership with the ONIC and ONIOL (National cereal and oil and protein seed crop inter-professional offices), Unigrains, French quality control bodies and Ecocert, together with FNAB, Bio convergence and the AGENA 3000 hardware firm. This system falls within the category of industry traceability.

Framework

Context:
- Highly controlled market (regulation 2092/91 and CC REPAB-F specifications) and subject to controls by control agencies authorised by the Public Authorities
- National and loss-making offer: in 1997, the Ministry of Agriculture and Fishing initiated a partial catch-up phase in response to the accumulated delays of the past 10 years in terms of organic productions

Objectives:
- To guarantee the organic origin of industry products, also applicable in the case of products originating from intermediary countries
- To have more precise goods accounting and prevent fraud
- Harmonise the controls conducted by the various agencies
- Meet the traceability requirements provided in the regulations (CC REPAB-F of 28.8.2000) and the rules of use traceability requirements of the AB (Organic) trademark

Traced elements

Scope:

For the pilot phase, the perimeter extends from the producer to the primary processor. The operator in question could be:
- The farmer
- The collector-storer (or the producer storer)
- The wholesaler (or wholesaler storer)
- The distributor

Products:
- The products are followed up by the production batch number attributed to each movement of goods: harvest, delivery, storage

Links:
- The link between operators is ensured via their identification number (EAN standard) at each connection to the system
- The link between goods movements is managed by Tracerbio by the automatic attribution of unique batch numbers.

Recorded data:
- Master data (name, address of operators, name of their certification body, etc.)
- Variable data: quantity of goods received/dispatched
  organic quality of products or in conversion of products
  identity of transport companies
  vehicle registration No.
  batch No. attributed by the system, etc.

Archiving period:
Unrestricted memorisation in the Tracerbio database
Transmission of history to the control agencies

Standards

- The EN global location code has 13 numbers (GLN) which identify, in a unique manner and without ambiguity, each operator throughout the chain

Organisation

Responsibilities:
- The control agencies ensure operator referencing

- Each operator is responsible for the input of information
- The SETRAB and the partners ensure system coherence and data confidentiality

Procedures:
- Each operator connects to and accesses functions specific to their activity
- The operator fills in the production, storage, etc. data
- Periodic operating tests (product recalls, alerts management, etc.)
- Security testing (intrusion, system violation)
- Issuing of alerts for operators and certification bodies

Information system

Information exchange means:
- Database input and storage of data is done via the Internet
- Information interchange between operators is also done in paper format (delivery note, etc.)

Equipment:
- Database centralised and managed by a third party organisation
- Computer with Internet access for equipped operators
- Input of information by collection agencies for operators not equipped with computer equipment

Performance

- possibility for certification bodies to block and downgrade batches
- transparency (according to the rights allocated to each type of user) and rapidity of access to information

possibility for certification bodies to issue certificates per sales batch on the basis of delivery notes issued by the system

SOLINEST

The exclusive partner of brands like Freedent, Ricola, Frisk, Fisherman's Friend, Tetley, etc., SOLINEST has been involved in the development of the brands it distributes for the last 30 years. Today, it boasts a 1.316 billion franc turnover and a workforce of more than 300 employees.

Framework

Context:
- The setting up of a 15,000 m2 logistics site in Mulhouse
- the overhaul of the entire logistics process, including traceability, SRM and the progressive setting up of the ECR

Objectives:
- Ensure reliable procurement while factoring in the new traceability requirement
- Deployment of SRM with the Carrefour group, Casino, Système U, Comptoirs Modernes, etc.
- Allow for both enhanced productivity and reliability
- Reassure the customer

Traced elements

Scope:
- All acceptance, warehousing, preparation (including picking and co-packing) and shipment operations
- Handing over to the carrier (pilot project with the TFE)

Products:
- Logistic items
- Intermediate storage units
- Logistic units (homogeneous and mixed)

Links:
- Links between primary and secondary logistic items

Recorded data:
- All movements are traced
- Best Before Date, batch No., quantity, temperatures, etc.
- Transfer times

Archiving period:
For now, everything is saved, as from system implementation, but this data will be the focus of a subsequent study.

Standards

- GTIN for logistic items
- SSCC for non-standard logistic items and logistic units
- UCC/EAN 128 logistic label (product part)
- Logistic label transport part in project phase with TFE

- EDI messages in EANCOM/EDIFACT: order (ORDERS), invoice (INVOIC), sales report (SLSRPT) and shortly shipping notices (DESADV)

Organisation

Responsibilities:
- Logistics and quality department for the co-ordination and implementation of traceability
- Sales administration for the validation and transmission of orders to the warehouse

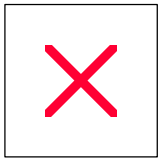
Procedures:
- 50% of procurements are made by SRM (shared replenishment management)
- Identification of pallets as from their acceptance by an EAN 128-marked SSCC
- For each movement, the forklift truck operator enters information on the radio terminal
- The information is transmitted in real time to the warehousing software that manages pallet traffic
- For heterogeneous pallets, the system prints a new EAN 128 label that takes into account the original pallet number of each product
- The lorry loading plan is managed by the system with the lorry number, the loading order number, the destination, etc.

Information system

- ERP for commercial applications and interfacing with the logistic site
- Warehousing software package for the warehouse part
- Radio terminals to ensure the input and transmission of information to the warehousing package
- EDI station
- 80% of orders received in EDI on ERP, transferred 5 times per day per batch on the warehouse software package, and which generates order preparation statements

Performance

- Reduction of stocks through control of flow and better sales forecasts
- Possibility of making selective returns very quickly
- Productivity gains (40% increase in T/O in 3 years, with constant staff numbers)
- Reduced number of preparation errors
- Increase in the quality of service (with an index of 99.5% instead of 98.5%)
- Reduced delivery times from D+7 to D+1 or D+2, depending on the distance
- Extension of time frame (5am - 9pm) and creation of a second work team



LAITERIE SAINT DENIS DE L'HOTEL
40, grande rue
45550 Saint Denis de l'Hôtel

Formed in 1948, the Laiterie Saint Denis de l'Hotel is specialised in the production and aseptic or refrigerated packaging of liquids for consumption (milk, fruit juice, iced tea, diverse creams, soups, wine, soy milk and diverse flavoured beverages). It has a turnover of 800 MF with a daily production of 1,200,000 packagings. There are an average of 300 employees.

Framework

Context:
- Very fragile nature of products
- Food safety context
- national regulations, IPJF and IPLC standards

Objectives:
- Establish products through quality
- Localise defective products and intercede in a more selective manner
- Implement traceability through to distributor warehouses

Traced elements

Scope:

- All raw materials
- All production, storage and shipment operations

Products:
- Manufacturing batches (day of the month, time, minute, etc.)
- Intermediate storage units
- Logistic units (homogeneous and mixed)

Links:
- Information concerning the products and process (continuous) are recorded with an internal codification
- The SSCC ensures the link with internal codification

Recorded data:
- Production (Preparation time, racking line, manufacturing number, the hour, the minute, the number of the carton and the machine)
- Shipment (Due delivery date, product reference and production batch No.)

Archiving period:
According to the product expiry date or best before date

Standards

- SSCC
- EAN/UCC logistic label
- GLN (global location number)
- Messages EDI: shipping notices (DESADV), order (ORDERS), etc.

Organisation

Responsibilities:
- Logistic centre (integrating sales administration, procurements, planning, scheduling, logistics with loading orders, shipment, etc.)
- Production department (laboratory, etc.)

Procedures:
- 40% of volumes are handled by SRM (downstream with Carrefour and upstream with Otor and Tetra Pak)
- EDI orders with 70% of suppliers
- Orders are then forwarded to scheduling, planning and to the charter service
- Each carton is output from the machine with an internal codification
- At the end of production, the sealed pallets are identified and divided up according to destination (customer delivery or incoming stock)
- Identification of the content of each pallet, with the use of a pallet file (expiry date, receipt and traceability elements)
- When preparing an order, the robot controls the expiry date and product reference
- During shipment, the pallets receive EAN/UCC logistic labels established based on the link with the internal codification

Information system

- With SRM, dairy product producers now are aware of the next 4 weeks' requirements, allowing them to plan production
- Order propositions and their processing through to scheduling are managed by specific Siemens-Nixdorf application software
- EDI station
- Use of the EAN/UCC logistic label with shipping notice for 50% of volumes

Performance

- Significant reduction of stocks through better sales forecasts
- Greater responsiveness
- Possibility of ensuring faster and more selective product recalls

CARREFOUR (STAR-TRAC)

With a 1999 turnover (constant scope) of 33,952 million Euros and over 50 billion Euros by integrating Promodès, more than 9,000 stores in 25 countries spread out over three zones (Europe, Asia, Americas), Carrefour is Europe's leading distributor, and second largest world-wide behind the American giant Wal Mart.

Framework

- Context: Installation of warehousing software for all Carrefour logistics service suppliers for supplying the logistic management centre
- Definition of a common and sole project for the group
- Food safety context

Objectives:
- Guarantee customer consumers the follow-up of products throughout the supply chain
- Be immediately aware of where (when and how) a logistic item can be found on the basis of a SSCC code transmitted by a manufacturer and delivered to a Carrefour warehouse
- Optimise and rationalise the physical flow of goods and information with a view to reducing the time it takes to unload, control, store and prepare in warehouses, reducing manual entries (a source of error) and reducing disputes, etc.
- Ensure continuity in the traceability chain, from supplier through to end consumer

Traced elements

Scope:
- Dry food and brewery (stored flows)
- All acceptance, warehousing, preparation and shipment operations

Products:
- Logistic items
- Intermediate storage units
- Logistic units (homogeneous and mixed)

Links:
- Links between primary and secondary logistic items through the intermediary of SSCC

Recorded data:
- All movements
- Best Before Date, batch No., quantity, etc.

Standards

- GTIN for logistic items
- SSCC for non-standard logistic items and logistic units
- EAN/UCC logistic label
- EDI messages: shipping notice (DESADV), order (ORDERS), receiving notice (RECADV), etc.

Organisation

Responsibilities:
- Logistics department
- Supply service

Procedure:
- Automatic integration, by optical scanning, of pallets identified by the supplier EAN/UCC label (possibly completed by a shipping notice EDI message)
- For unlabelled pallets, Carrefour prints EAN/UCC labels on its products on behalf of the supplier
- Homogenous pallet shipment with the original SSCC or allocation of a new SSCC for heterogeneous pallets

Information system

- EDI station for upstream data acquisition (shipping notice)
- Warehousing software package for the warehouse part
- Radio terminals to ensure the entry and transmission of information to the warehousing package

Performance

- Application of procedures throughout the chain (from acceptance to store delivery) with a guarantee of complying, to an even greater extent, with the Best Before Date
- Productivity gains (transition from quantitative receiving to qualitative management)
- Possibility of quicker and more selective product recalls

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7. APPENDICES

7.1 Extracts from the new Rural Code

Article 364 b of the new Rural Code (inserted by the Act No. 99-574 of 9 July 1999 art. 91 Journal Officiel of 10 July 1999):
"*Plant life, including seeds, pest control products for agricultural use and related products, fertilizing material and cultivation supports composed either wholly or in part of genetically modified organisms disseminated in the environment or made available on the market, are subject to close surveillance by agents responsible for the protection of exploitable plant life, through laws and regulations applicable to these products.*
(…)
The implementation of this surveillance should make it possible to identify and monitor the possible appearance of unintentional effects on agricultural or natural ecosystems, notably the effects on plant pest populations, wild flora and fauna, aquatic habitats and soils, together with microbial populations, including viruses.
(…)
The traceability of products should be assured by either monitoring or analysing the products concerned."

Article 100 (Act No. 99-574 of 9 July concerning agriculture, the following article is inserted after article L.214-1 of the Consumer Code):

Art. 214-1-1. – *"**A Council of State order establishes the list of products or commodities for which traceability should be assured**. It specifies the obligations of producers and distributors who are held responsible for establishing and up-dating procedures concerning the recording of information and the identification of products or product batches. These procedures make it possible to know the origin of these products and batches, together with their production and distribution conditions. The administrative authority specifies, for each product or commodity, the production and marketing stages for which traceability should be assured, together with the resources to be implemented according to the size of the companies concerned."*

7.2 Extracts from the Act concerning liability for defective products

Extracts from Act No. 98-389 of 19 May 1998 concerning liability for defective products, book III of the French Code Civil:
"Art. 1386-1 – The producer is responsible for the damage caused by a defect in his product, whether or not he is linked to the victim by a contract."
"Art. 1386-4. – A product is considered to be defective when it does not offer the safety that could normally be expected of it.
When making an assessment of the safety that could normally be expected of a product, all circumstances should be taken into consideration, particularly the presentation of the product, the use it could reasonably be expected to fulfil, and the time of its release onto the market.
A product cannot be considered defective by the simple fact that another, more advanced product, has been subsequently released onto the market."
"Art. 1386-8. – In the event of damage caused by the defect of one product incorporated into another, the producer of the component part and the producer who has undertaken the incorporation are jointly liable."
"Art. 1386-10. – The producer may be liable for the defect, even when the product has been manufactured according to trade practices or existing standards, or where it has been subject to administrative authorisation."
"Art. 1386-11. – The producer is wholly liable unless he can prove:
1°. That he did not release the product onto the market;
2° That, given the circumstances, there are reasons to believe that the defect having caused the damage did not exist at the time he released the product onto the market, or that this defect occurred afterwards;
3° That the product was not intended for sale, or any other form of distribution;
4° That scientific and technical knowledge at the time the product was released onto the market did not allow the detection of the defect;
5° Or that the defect is due to the product's conformity with compulsory legal constraints or regulations.
Nor is the producer of the component part liable if he establishes that the defect is caused by the design of the product into which this part has been incorporated, or by the instructions given by the producer of this product."
"Art. 1386-15. – The clauses that aim to avoid or limit liability for defective products are forbidden and deemed to be unwritten.
However, insofar as concerns damage caused to goods that are not used by the victim principally for his personal use or consumption, the clauses stipulated between professionals are considered valid."

7.3 Recalling goods

(extract from the EAN-UCC standards logistical applications guide)

7.4 Extract from the list of UCC/EAN 128 data identifiers

Identifier	Description	Format
00	Serial Shipping Container Code (SSCC)	n2+n18
01	Item GTIN	n2+n14
02	GTIN of the item contained	n2+n14
10	Manufacturing batch number	n2+an..20
11	Manufacturing date (DDMMYY)	n2+n6
12	Due date	n2+n6
13	Packing date (DDMMYY)	n2+n6
15	Minimum validity date (DDMMYY)	n2+n6
17	Maximum validity date (DDMMYY)	n2+n6
20	Product derivative	n2+n2
21	Serial number (unformatted)	n2+an..20
22	HIBCC Health sector	n2+an..29
23n	Batch number (interim use)	n3+n..19
240	Complementary product identification	n3+an..30
241	Customer item code	n3+an..30
250	Secondary serial number (unformatted)	n3+an..30
251	Reference of a source entity	n3+an..30
30	Unitary quantity	n2+n..8
31nn to 36nn	Measurements	n4+n6
337	Kilos per square metre	n4+n6
37	Quantity of trade items contained in the logistic unit (LU)	n2+n..8
390n	Amount due (local currency)	n4+n..15
391n	Amount due (with currency code)	n4+n3+n..15
392n	Amount due (local currency) variable weight	n4+n..15
393n	Amount due (with currency code) variable weight	n4+n3+n..15
400	Purchaser’s order number	n3+an..30
401	Shipping code	n3+an..30
402	Supplier’s shipping code	n3+n17
403	Routing code	n3+an..30
410	Delivery location (Deliver to)	n3+n13
411	Invoicing location (Invoice to)	n3+n13
412	Supplier’s location (supplied by)	n3+n13
413	Final destination location	n3+n13
414	GLN	n3+n13

415	GLN of invoiced by	n3+n13
420	Delivery location (deliver to), postcode	n3+an..20
421	Delivery location (deliver to), ISO country code + postcode	n3+n3+an..9
422	Product country of origin	n3+n3
423	Country of initial transformation process(es)	n3+n..15
424	Country of transformation	n3+n3
425	Country of disassembly	n3+n3
426	Country covering the entire transformation chain	n3+n3
703n	Operator certification number with country code	n4+n3+an..27
8001	Product in rolled form	n4+n14
8002	Electronic serial number for mobile cellular telephone	n4+an..30
8003	EAN code and serial number of returnable item (GRAI)	n4+n14+an..16
8004	Identification of an individual UCC / EAN item	n4+an..30
8005	Price per measured unit	n4+n6
8006	Item component	n4+n14+n2+n2
8007	International bank account number	n4+an..30
8018	Identification of the beneficiary of a service provided	n4+n18
8020	Payment slip number	n4+n..25
8100	UCC system coupon code	n4+n1+n5
8101	UCC system coupon code	n4+n1+n5+n4
8102	UCC system coupon code	n4+n1+n1
90	Internal use or bilateral agreement	n2+an..30
91-99	Internal applications	n2+an..30

7.5 Example of a logistic label

Extract from the Logistical guide

8. GLOSSARY

AGRI CONFIANCE®

Agri Confiance® is a specific Quality Assurance programme, adapted to agricultural production organisations. It unites the producers and agricultural cooperatives in a joint progress approach and a reciprocal agreement on quality control and respect for the environment.

ALLOTMENT

A consistent procurement process for suppliers to deliver products grouped together in separate batches, destined for different final locations (generally shops), to a single site (warehouse or platform). This supply method is initiated by a single order known as an 'allotment order', or by several orders (one per final delivery point) to deliver to the same place at the same time.

AMDEC (Analysis of Failure Modes, their Effects and their Criticality)

A technique based on the examination of possible causes of failure for elements of a system, leading to the effects of this system. This method may be applied to a product, a procedure or production method.

CODEX ALIMENTARIUS

Inter-governmental body of the FAO (United Nations Food and Agriculture Organisation) and the WHO (World Health Organisation) charged with developing standards, use codes and food directives in the interests of protecting consumers' health and to improve the loyalty of commercial food practices.

CPFR (Collaborative Planning Forecasting and Replenishment)

Shared replenishment application, which may appear in a variety of forms, but which consists of a common distributor - manufacturer approach regarding sales forecasts and delivery. Depending on the agreements between the partners, an order proposal exchange may then take place. This method requires substantial co-operation between the partners involved, insofar as concerns forecasts, supply methods and the management of promotions or the introduction of new products.

Expiry Date

Final date for consumption (eat/use before…).

Best Before Date

Final date for optimal use (best before…).

ECR (Efficient Consumer Response)

The ECR is an Industry-Commerce strategy in which suppliers and distributors work together to provide a higher level of satisfaction among end consumers. The objective of the ECR is to build a reactive system based on the needs of the final consumer, to increase consumer satisfaction and reduce costs. The two axes of this system are a quality exchange of information based on the principle of zero paper, and an unbroken flow of goods. This, when applied from the manufacturing chain through to the retail checkout, should reduce ruptures, losses and all the negative points in the relations

between commercial partners, from production through to the end sale (see also the site www.ecr-europe.com).

EDI (Electronic Data Interchange)

The exchange of structured data via tele-transmission from computer to computer, using standardised formats.

EUREP (Euro-retailer Produce Working Group)

The EUREP is a working group which brings together the 15 major European supermarket chains. Its objective is to promote, encourage and define GAP (Good Agricultural Practice) criteria.

GLN (GLOBAL LOCATION NUMBER)

The GLN is a 13-number code which identifies the company or any company service that is involved in one or more functions concerned in a commercial transaction.

SRM (Shared Replenishment Management)

This method of replenishment falls within the scope of ECR techniques. Using information concerning the stocks and/or sales submitted by the distributor, the manufacturer calculates the needs and sends an order proposal which is in turn confirmed or declined by the distributor. This may take a variety of forms: Co-Managed Inventory (CMI) or Vendor-Managed Inventory (VMI).

GTIN (Global Trade Item Number)

The GTIN is the unique identifier for a consumer unit throughout the world, comprising 14 positions. When EAN 8, UCC-12, EAN 13 and EAN 14 codifications are included in a 14 position structure, they become GTINs.

HACCP (Hazard Analysis Critical Control Point)

This method makes it possible to:

- identify and analyse the dangers associated with the various stages of a food stuff's production process;
- identify the resources necessary for their control;
- ensure that these resources are implemented in an effective and efficient manner;

This is a well-organised and systematic approach, which makes it possible to put together, implement or improve the assurance of food product safety.

Manufacturing batch

The manufacturing batch is a consolidation of sale units of a commodity that has been produced, manufactured and/or packed under virtually identical circumstances.

SSCC (Serial Shipping Container Code)

International 18-number code, with a structure defined by EAN International, making it possible to identify each container or package in a unique way. Symbolised by EAN128 on the container and shown on the shipping advice note, this code makes it possible to ensure the logistical traceability of products.

TRADE ITEM

Any unit (item, product or service) for which predefined information needs to be found, where the price may be set, and which may be ordered or invoiced for commercial exchange purposes at any point in the supply chain.

CONSUMER UNIT

An item that may be sold to a consumer as a single unit. It can represent basic items, multipacks and promotion items. A consumer unit is usually identified by an EAN8, EAN13 or UPC, completed according to GENCOD standards by the VA code (promotional variant).

INTERMEDIATE STORAGE UNIT

A consolidation of consumer units carried out at the end of the manufacturing process to satisfy storage requirements, which can be identified by a SSCC.

LOGISTIC UNIT

A transportable and non-divisible entity assembled for transport and/or storage, which needs to be controlled throughout the supply chain.

LOGISTIC ITEM

Standard consolidation of basic items (generally consumer units)

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