

UN/CEFACT Standard on Traceability of Animals and Fish

Within the United Nations, the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) is the focal point for the development of trade facilitation recommendations and standards for electronic business. UN/CEFACT is an intergovernmental body of the United Nations Economic Commission for Europe (UNECE) which provides the Secretariat. UN/CEFACT standards are developed by international experts from Governments and the private sector. Many large standard setting organizations participate in the work of UN/CEFACT, inter alia WCO, IATA, FIATA GS1 and IMO. UN/CEFACT standards development is coordinated through a high level Memorandum of Understanding among the “big four” standard setting organizations ISO, ITU, IEC and UNECE.

UN/CEFACT establishes specialised expert groups for the development of sectorial standards. The UN/CEFACT standard for *Traceability of Animals and Fish*¹ is being developed by the agriculture expert group within UN/CEFACT. The main partners in the development of this standard are international experts from France, Canada, the Netherlands, EU and GS1 who work for the public and private sector. These experts are connected on the national level with relevant business partners in this field like Animal Registration Offices, Farm Service Providers, transporters, traders, slaughter houses and meat processors.

Tracking and tracing questions can come up on a regular basis in product information for trade, processing industries and consumers. The tracking and tracing questions can also come up on the basis of information required to assess conformance with regulations, standards and certification schemes, to control the quality and safety of the produce or the efficiency of the supply chain transaction.

The objective of the project on animal and fish traceability is to standardize the processes of data registration and exchange relating to all events involved in trade in individual animals, groups of animals and animal products to provide traceability of the agriculture supply chain both for regulatory and commercial purposes.

The standard helps to agree internationally on the track and trace data structures and semantics that are exchanged in the track and trace systems. Electronic data exchange makes it possible to retrieve this information very quickly by the different stakeholders.

The UN/CEFACT traceability standard is based on ISO/IEC 19987 which itself is based on the GS1 Electronic Product Code Information Service (EPCIS) standard. This standard is widely used in international trade and in the retail industry and low cost implementation solutions are available. UN/CEFACT extends this standard by adapting the data definitions to its Core Component Library² which provides connectivity between information required for track and trace and the information that is exchanged between the partners to manage the trade transaction through exchange of documents and messages.

¹ UN/CEFACT Project P1015

² UN/CEFACT CCL (ISO 15000)

Components of the UN/CEFACT traceability standard for Animals and Fish

The UN/CEFACT tractability standard provides three main components:

1. Description of the parties and main business processes involved in Track and Trace

The development of the standard messages starts with the question of a Tracking and Tracing Party: a person or organisation that has a question on the origin and history of a specific animal, group of animals or animal product. The tracking and tracing party can either be a private party (business, consumer, etc.) or a government body. The standard then describes the main business processes (use case diagram) in which parties engage to establish track and trace.

2. Description of data structures

The UN/CEFACT standard then describes the main information objects that are recorded and exchanged for track and trace.

A track and trace event includes information relating to

- Animals involved
- Responsible parties
- Locations
- Transports

These data structures are described using the data descriptions of the UN/CEFACT Core Component Library (CCL). This library is an assembly of cross sectorial and internationally agreed descriptions of information objects used to manage international trade transactions. The advantage of using this library is the possibility to reuse general supply chain information (information on the parties, product and transport description, documents and certificates used, etc.) in the track and trace system.

The information stored for track and trace is structured in three layers depending on the depth of information required of the purpose. Layer 0 is mandatory and required to retrieve the information on the events that are traced. Layer 1 and 2 are optional and record information that is needed for the specific track and trace system. The standard leaves implementers with a very high degree of freedom to decide which information should be recorded.



3. Description of electronic trace and trace messages

The description of data structures for track and trace information is translated into XML syntax using a UN/CEFACT standard. XML is a widely used standard for information exchange between computerised systems. The XML description (XML schema) is then used for the exchange of XML standardised track and trace messages between the parties.

Information in the whole supply chain is most often registered per step. Business partners register where their inputs come from and where their output goes to. The key information permits to collect (when mandatory) this information in the whole chain.

Storage and retrieval of information in track and trace systems

The UN/CEFACT tracability standard covers the data structures for track and trace. Information storage and retrieval requires services that are not part the standard. This infrastructure needs to be provided through external service providers. However, certain aspects of data management such as security and confidentiality of information and ownership of data relate both to standards and best practice as well as to data services. Therefore we provide here a short introduction into data management for track and trace.

The registration of events is done in **global searchable repositories**, which can be queried. **Accessing applications** query these repositories to return key information on the supply chain events.

On the basis of the track and trace information obtained it is also possible to search further to collect additional information according to the type of problem to be solved or question to be answered. For example this can be data on health status, diseases, treatments, drugs, feed, water, related animals, etc. This data can be stored in the repository itself or retrieved from the information systems of the actors in the supply chain.

There are two methods for the transmission of a track and trace event. The **Pull** method requires a query of an (authorized) party to the repository. The repository will then deliver information on the track and trace event. If the **Push** is used it is the repository that will transmit the information to the stakeholder system when it registers a predefined event. Both methods have their specific use case scenarios. Generally, the Push method is used if there is a recurring, predictable need for transfer of Track and Trace information. The Pull method is used when transfer is needed unpredictably.

Sharing of Data Across the Supply Chain

International trade transactions require collaboration of many different government agencies and private sector operators. In agri-food supply chains 30 and more independent stakeholders may participate. Many of these stakeholders have no direct business relationship. As track and trace records information from many of the participating stakeholders the access, security and confidentiality of this information is crucial. This poses the question on the **Choreography**, i.e. how information will move from one trading partner to the other. There are three models to organise Choreography³:

- Centralised Choreography: All events are stored in a central repository
- Distributed Pull Choreography: Each party captures track and trace data in its own repository. If another party needs information on the supply chain events it must locate all other parties and query their repositories.
- Distributed Push Choreography: Each party records the events in their own repository. But rather than waiting for another party to query the information it will also send the event information to all other parties in the supply chain who are likely to need this data.

Issues to be solved in the implementation of a standards-based tracing solution

For the implementation of the standard on track and trace there are still some issues to be solved. A trusted party has to be found for the registration of the key events and repositories. This is sensitive information which businesses do not want to publish in public. Confidentiality and trust are necessary preconditions for full registration of such data. This trusted party has to make sure that only authorized parties can access these data. Transparency can only be obtained with permission of the owners of the data.

Another issue is the software investments to be made. A business case can only be made when either consumers pay more for their food or by making the steps in the chain more efficient and profitable. The question is whether consumers are willing to pay voluntarily a bit more for their meat in exchange for extra information on the origin and history of the animal(s) it comes from.

³ See EPCIS and CVB Implementation Guideline, GS1, http://www.gs1.org/docs/epc/EPCIS_Guideline.pdf

Current state and next steps in the development of the UN/CEFACT tracing standard

The UN/CEFACT traceability standard is work in progress. The standard will be continuously enhanced and extended over the coming years.

Currently the CEFACT traceability standard covers

- Livestock supply chain from birth to death, i.e. the slaughter house.
- Fish supply chain from catch to first selling

Future projects planned:

1. Traceability Phase 2 (ongoing) which will cover the complete supply chain including food processing and the retailer and consumer processes.
2. Track and Trace for CITES controlled species (started) to allow track and trace for better regulatory compliance
3. Development of implementation guide for the Traceability standard including best practice for information sharing