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UN/CEFACT recommendations and standards

UN/CEFACT standard on traceability of animals and fish

Submitted by the secretariat

Summary

This document provides an overview of the UN/CEFACT standard on traceability of animals and fish. The standard helps to create international agreement on track and trace data structures and semantics to be exchanged in track and trace systems. Electronic data exchange makes it possible for different stakeholders to retrieve this information very quickly. The UN/CEFACT traceability standard is a work in progress and will be enhanced and extended over the coming years.

This document is presented to the Plenary for information.*

* This document is submitted in line with the Programme of work of the UN/CEFACT for 2015-2016
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I. Introduction

1. 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 Memorandum of Understanding among the “big four” standard setting organizations: International Electrotechnical Commission (IEC), International Organization for Standardization (ISO), International Telecommunication Union (ITU) and UNECE.

2. UN/CEFACT has specialised expert groups (Domains) for the development of sectorial standards. The UN/CEFACT standard for traceability of animals and fish¹ is developed by the Agriculture Domain within UN/CEFACT. The main partners in the development of this standard are international private and public sector experts from France, Canada, the Netherlands, the European Union (EU) and GS1. These experts are connected at the national level with relevant business partners in this field, such as animal registration offices, farm service providers, transporters, traders, slaughter houses and meat processors.

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

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

5. The standard helps to create international agreement on track and trace data structures and semantics that are exchanged in the track and trace systems. Electronic data exchange makes it possible for the different stakeholders to retrieve this information very quickly.

6. The UN/CEFACT traceability standard is aligned with 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 Library,² which provides connectivity between information required for tracking and tracing and the information that is exchanged between partners to manage trade transactions through the exchange of documents and messages.

¹ UN/CEFACT Project P1015

² UN/CEFACT CCL (ISO 15000)

II. Components of the UN/CEFACT traceability standard for animals and fish

7. The UN/CEFACT traceability standard has three main components:

A. Description of the parties and main business processes involved in track and trace:

8. The development of the required standard messages starts with the description of a Tracking and Tracing Party. This is a person or organization 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 tracking and tracing.

B. Description of data structures

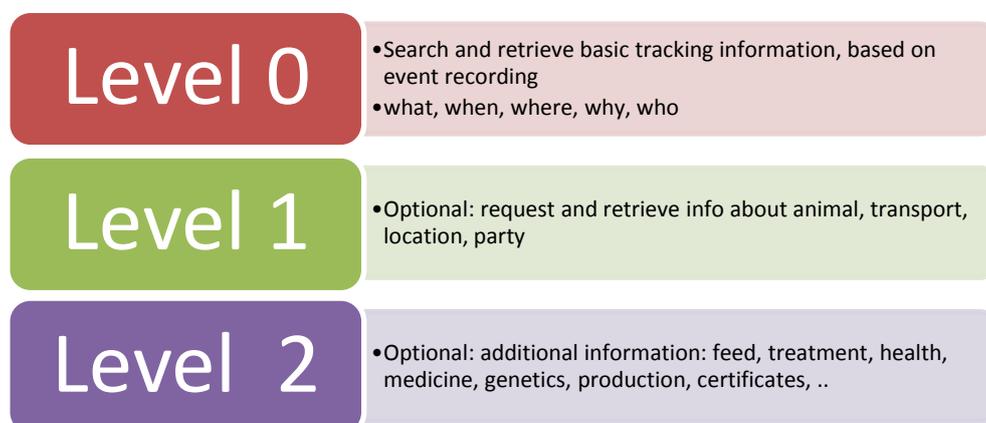
9. The UN/CEFACT standard then describes the main information objects that are encoded and exchanged for tracking and tracing.

10. A track and trace event includes information relating to:

- Animals or fish involved
- Responsible parties
- Locations
- Transportation

11. These data structures are described using data descriptions from 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) in the track and trace system.

12. The information stored for track and trace is structured in three layers depending on the depth of information required to support the objective of a track and trace operation. 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 exchanged.



C. Description of electronic track and trace messages

13. 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.

III. Storage and retrieval of information in track and trace systems

14. The UN/CEFACT traceability standard covers the data structures for track and trace. Information storage and retrieval requires services are not part of the standard. Rather, this infrastructure is 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 in Sections III and IV a short introduction into data management for track and trace while noting that the methods described are not part of the UN/CEFACT standard.

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

16. 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.

17. There are two methods for the transmission of track and trace events. 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** method 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 uses. 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 the need of data transfer is unpredictable.

IV. Sharing of data across the supply chain

18. International trade transactions require collaboration between many different government agencies and private sector operators. In agri-food supply chains, 30 or more independent stakeholders may participate. Many of these stakeholders have no direct business relationships. As track and trace events record 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 for such Choreography:³

- **Centralised Choreography:** All events are stored in a central repository.

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

- **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 need this data.

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

19. For the implementation of a standard on tracking and tracing of animals and fish, there are some issues to be solved. A trusted party has to be found for the registration of the key events and repositories. This data is sensitive information which businesses do not want to make publicly available. Confidentiality and trust are necessary preconditions for full registration of such data. The chosen trusted party has to make sure that only authorized parties can access these data. Information can be shared (and transparency achieved) only with the permission of the owners of the data.

20. There is increased interest by governments in the implementation of tracking and tracing solutions with the participation of government agencies and private sector companies. Before setting up such an initiative, all stakeholders need to agree on important project management issues, such as the objectives of the project, responsibilities and collaboration of parties, access to information and confidentiality, liability, project phases, key performance indicators, standards, governance structure, transparency of project management and implementation and funding. These issues should be addressed in a systematic planning process in the initial (planning) phase of the project and recorded in a master plan. Failure to clarify these issues in the initial planning stage of a project is likely to have severe consequences during implementation. The situation is further complicated if the solution includes cross-country supply chains and information exchange between government agencies from different countries, as it will touch upon multiple issues related to cross-border information exchange. Currently, no guidance or best practice is available to plan and manage cross-border track and trace projects that include regulatory agencies. In this context, the 66th CITES Standing Committee endorsed a decision⁴ to work with UN/CEFACT to describe a governance model for CITES traceability projects. It is noted that many UN/CEFACT recommendations such as the suite of Single Window Recommendations (UNECE Recommendations 33 to 36) and UNECE Recommendation 40 on Consultation Approaches are highly relevant in this context.

21. 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. The issue of sharing of costs and benefits of track and trace systems becomes more complex when regulatory bodies participate in and benefit from them.

⁴ <https://cites.org/sites/default/files/eng/com/sc/66/ExSum/E-SC66-Sum-04.pdf>

VI. Current state and next steps in the development of the UN/CEFACT tracing standards

22. The UN/CEFACT set of traceability standards is work in progress. The standards will be enhanced and extended over the coming years.
 23. Currently, the UN/CEFACT traceability standards covers the:
 - Livestock supply chain from birth to death, i.e. to the slaughter house.
 - Fish supply chain from catch to the first buyer.
 24. Future projects planned in the development of the UN/CEFACT standards:
 - Traceability Phase 2 (ongoing) which will cover the complete supply chain including food processing and the retailer and consumer processes.
 - Track and trace for CITES controlled species (started) to allow track and trace for better regulatory compliance.
 - Development of an implementation guide for the traceability standard, including best practices for information sharing.
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