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UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

UNITED NATIONS CENTRE FOR TRADE FACILITATION
AND ELECTRONIC BUSINESS (UN/CEFACT)

**BUSINESS REQUIREMENTS SPECIFICATION**

**(BRS)**

# Traceability and Transparency in the Textile and Leather Sector, Part 1: High-Level Process and Data Model

FINAL DRAFT AFTER PUBLIC REVIEW

**Approved: UN/CEFACT Bureau on 15 February 2021**

**Version: 1.0**

# TABLE OF CONTENTS

## Revision history

| Version | Release | Date | Comment |
|---|---|---|---|
| 0.1 | Internal draft | 2020-September-03 | ODP3: Initial |
| 0.2 | Internal draft | 2020-September-23 | OPD4: Internal Review Workshop Sept. 2020 |
| 0.3 | Internal draft | 2020-October-20 | ODP4: Updated BIE list: Logistics Package, Logistics Transport Equipment, IOT Sensor Events, BIE overview, Minor updates of figures. Deleted: Code Lists (decided on implementation level), Generic versus Specific |
| 0.4 | Internal draft | 2020-October-23 | ODP4: Added BIE List: Animal Batch, Additional Product Species Information, Production Waste Material, Production Waste Material Component, Production Waste Recovery Disposal Process |
| 0.5 | Public Review | 2020-October-26 | ODP5: Public Review version |
| 1.0 | First Version | 2021-February | ODP6: Project Exit |

# 1 Introduction

The UN/CEFACT project "Enhancing Traceability and Transparency for Sustainable Value Chains in the Garment and Footwear Sector" has developed a recommendation, guidelines and electronic business standards on traceability and transparency for sustainable value chains in the textile and leather sector in support of more responsible production and consumption patterns, in line with the relevant Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda for Sustainable Developement.[1]

The UN/CEFACT Textile & Leather Process and Data Model supports business processes to improve traceability and sustainability in the garment and footwear sector. All necessary traceability and sustainability information entities have been tied to the key information entities of the traceability framework. Through this framework, the sector is able to indicate its own specific information exchange requirements while complying with the overall relevant process and data structures. The data model can be applied by countries, regions or industries, and can be integrated into the software solutions of traders, agents, banks, customs and other governmental authorities, among others.

The Textile & Leather Process and Data Model is specifically focused on addressing the negative health, social and environmental impacts of textile and leather operations. It reuses parts of existing UN/CEFACT electronic standards for animal and plant traceability (and their by-products) and the eCrop standard for the electronic exchange of data related to the cultivation of crops. These data exchange standards form a valuable basis for use within the textile and leather sector, but require slight adjustments in order to fully meet their specific requirements, and to capture sustainability performance. The project will therefore create a specific business requirements specification (BRS) and specific core component business document assemblies (CCBDA XML messages) in addition to this document.


**Figure 1-1 Relevant data domains and aspects**

The UN/CEFACT Textile & Leather Process and Data Model is a data model based on the proposed UN/CEFACT Sustainable Development & Circular Economy Reference Data Model (SDCE RDM) which is itself based on the UN/CEFACT Buy-Ship-Pay Reference Data Model (BSP RDM). Ultimately, every reference data model has the UN/CEFACT Core Component Library (UN/CCL) as its origin, directly or indirectly, and each forms the basis for constructing business data exchange

[1] https://sdgs.un.org/2030agenda.

structure(s), following the methodology in the *UN/CEFACT Core Components Business Document Assembly (CCBDA) Technical Specification*.

This document, the *Business Requirements Specification for Traceability and Transparency in the Textile and Leather Sector, Part 1: High-Level Process and Data Model*, provides a view of the business requirements necessary to support business and regulatory processes, involved business areas, actors, and key business information entities.

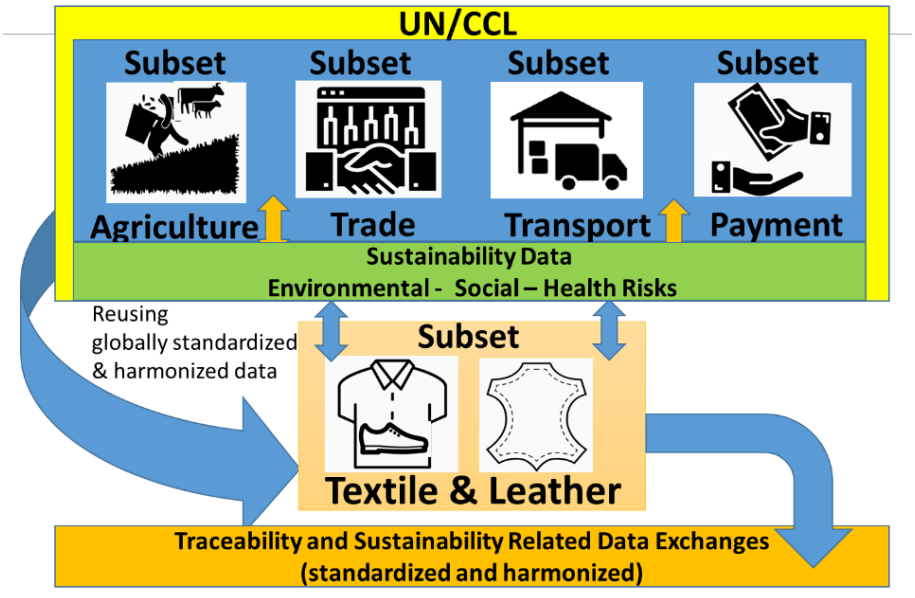



**Figure 1-2 Concept of the Textile & Leather Process and Data Model**

The UN/CEFACT generic approach and design of information entities make them reusable and interoperable. Harmonization is one of the pillars of the UN/CEFACT semantic standards. With harmonization often comes greater simplicity, which makes it possible to avoid the creation of new/different information entities having the same semantic meaning.

# 2 Objective

Part 1 of this business requirements specification (BRS) provides a data model of standardized business information entities (BIEs) and a view of the business processes for sustainable trade in the textile and leather sector. Furthermore, this document describes the respective roles of value chain partners as they establish business relationships.

Part 2 of this BRS provides the use cases and needed CCBDA[2] data structures for exchanging information (i.e. business transactions) between business partners and other relevant partners with the support of their respective information systems or shared systems.

Detailed information on BIEs used within the textile and leather sector is published on the UNECE-UN/CEFACT website, on the "Streamlined presentation of UN/CEFACT standards" webpage.[3] All BIEs used come from the United Nations Core Component Library (UNCCL).

# 3 Audience

The audience of this document is all users who are interested in the information model supporting the traceability and sustainability goals of the textile and leather value chains.

[2] For more information on the Core Components Business Data Assembly (CCBDA), see https://unece.org/sites/default/files/2021-01/MessageConstructionGuidelines_CCBDA-v1.0.pdf.
[3] See https://unece.org/trade/uncefact/mainstandards.

# 4 Reference documents

Knowledge and application of the following documents is crucial for the development of information entities specified in this document.

- UNECE, *Business Process Analysis for Sustainability and Circularity in Textile Value Chains* (forthcoming, 2021).
- UNECE, *Business Process Analysis for Sustainability and Circularity in Leather Value Chains* (forthcoming, 2021).
- UNECE, *Accelerating action for a sustainable and circular garment and footwear industry: which role for transparency and traceability of value chains?* Policy paper (2020).
- UNECE, *TEXTILE4SDG12: Transparency in Textile Value Chains in Relation to the Environmental, Social and Human Health Impacts of Parts, Components and Production Processes* (ECE/TRADE/439).
- UNECE, *Traceability for Sustainable Trade: A Framework to Design Traceability Systems for Cross Border Trade* (ECE/Trade/429).
- European Union, eBiz 4.0: the new step of the eBiz initiative.[4]
- ISO/IEC 19987:2017 Information Technology – EPC Information Services (EPCIS) Standard.[5]
- UN/CEFACT *White Paper on Reference Data Model* (Draft, v1.0.0.2).
- UN/CEFACT *Reference Data Model (RDM) Guideline* (Draft, v1.0.0.2).
- UN/CEFACT Core Component Library 21A (forthcoming).
- UN/CEFACT Techniques and Methodologies Group (TMG), UN/CEFACT Modelling Methodology (UMM): UMM Foundation Module v. 2.0 (2011-04-01).
- UN/CEFACT, *Component Technical Specification Technical Corrigendum*, V. 2.01 (Corr. 1) (12 February 2007)
- UN/CEFACT *Core Components Business Document Assembly Technical Specification* (CCBDA) version 1.0 27 (June, 2012).
- UN/CEFACT *Business Requirements Specification for Traceability and Transparency in the Textile and Leather Sector, Part 2: Use Cases and CCBDA Data Structures* (2021).

## 4.1 Status of this document

This document has been developed in accordance with the UN/CEFACT Open Development Process[6] and has been approved for publication by the UN/CEFACT Bureau.

## 4.2 Document context

This high-level document (blue box) describes the business requirements for the Textile & Leather Process and Data Model. New business requirement specifications will be derived to serve particular requirements such as the exchange of information regarding traceability or sustainability. On the basis of a BRS, the CCBDA data structures (message models) are built. These message data models are built using a so-called uniform structure, the master message structure.

[4] https://ebiz-tcf.eu/.
[5] The name EPCIS reflects the origins of this effort in the development of the Electronic Product Code (EPC). It should be noted, however, that EPCIS does not require the use of EPCs, nor radio-frequency identification (RFID) data carriers, and as of EPCIS 1.2 does not even require instance-level identification (for which the EPC was originally designed).
[6] See ECE/TRADE/C/CEFACT/2016/17. Avaialble at https://unece.org/trade/uncefact/policiesprocedures-and-termsreference.

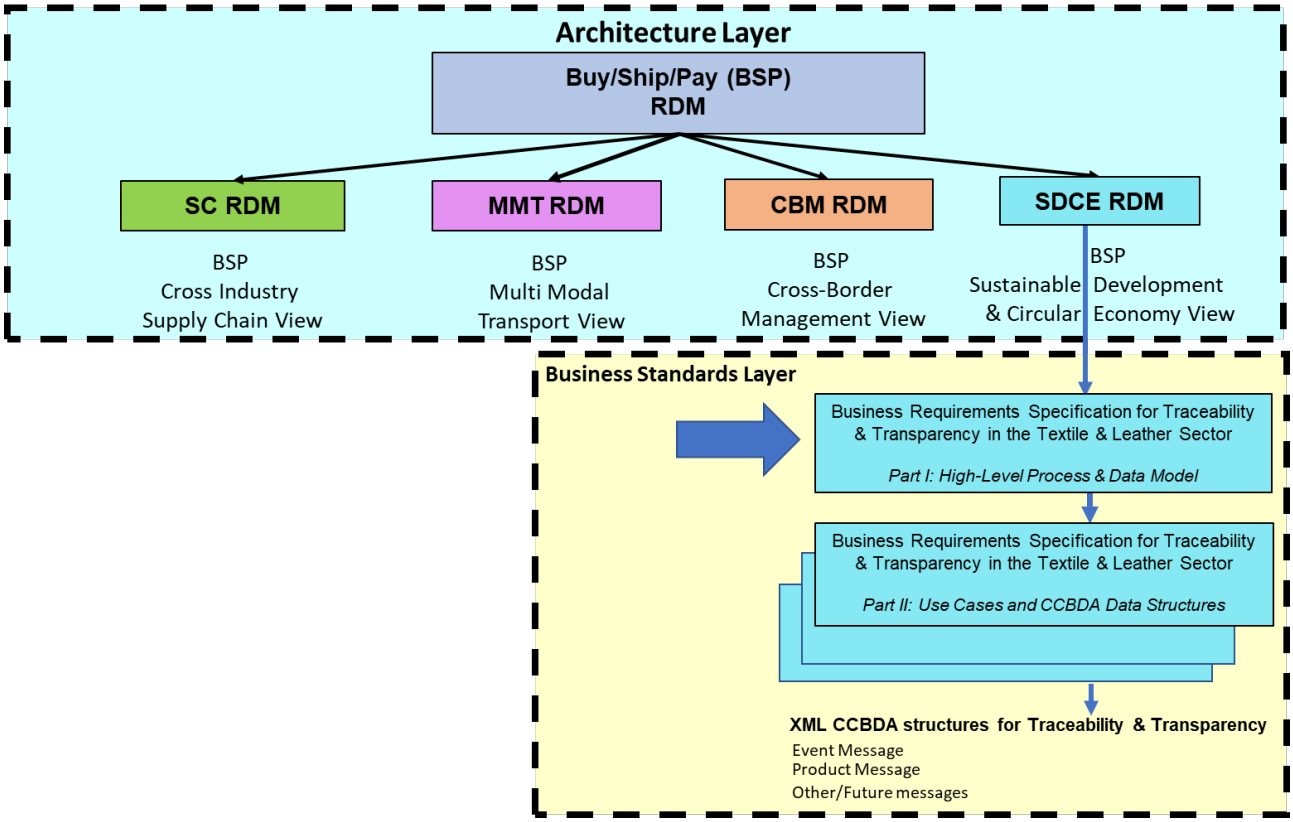



**Figure 4-1 Document context**

# 5 Business requirements view

## 5.1 Business domain view

This section describes the extent and limits of the *high-level* business processes within the textile and leather supply chain being described in this document. The *specific* processes and use cases including the exchange of messages and their content will be described in separate BRS documents. This document focuses on the data requirements related to the high-level processes. The collection of data identified for the Textile and Leather Process and Data Model will cover the data needs of the processes supporting traceability and transparency for sustainable trade.

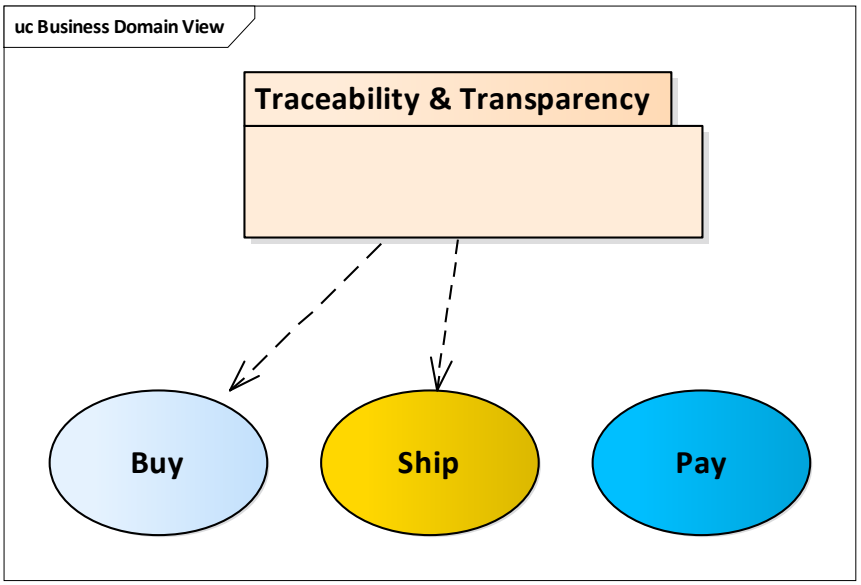



**Figure 5-1 Domain view**

**Table 5-1 Context categories**

| Context categories | Description and values |
|---|---|
| Business Process | Asset traceability |
| Product Classification | Raw materials, products, product batches |
| Industry Classification | Textile and leather |
| Geopolitical | Global |
| Official Constraint | European regulations<br>National regulation<br>Local applicable regulation |
| Business Process Role | Information Partners, Transformation Partner, Product Guardian, Validation / Verification Bodies, Other Suppliers / Service Providers |
| Supporting Role | Farmer, Breeder, Finishing Provider, Slaughterhouse, Tanner, Recycler, Agent / Trader, Customer, Consumer, Supplier, Subcontractor, Inspector, Certifier, Laboratory Party, Manufacturer, Warehouser, Transporter, Brand Owner / Retailer, Exporter, Importer, Carrier, Freight Forwarder, Customs Import Agent, Customs Transit Agent, Customs Export Agent, Raw Fibre Treatment Provider, Spinner, Weaver, Finishing Provider, Waste Disposal Provider, ID Provider, Effluent Treatment Party, Traceability System Requestor, Traceability / Transparency Information Requestor, Repository Party. |
| System Capabilities | Agreed level of security to protect data integrity<br>Network of connected databases and repositories<br>System of authorizations and keys for retrieving traceability and transparency information by requesting parties |

## 5.2 Generic traceability use case

The purpose of the generic traceability use case diagram is to illustrate the principal processes for establishing traceability, which are applicable across different products – i.e. the model should be good for cotton, synthetic fibres, wool, viscose, leather, etc. The traceability use case diagram is presented below at a high-level. More detailed information for each generic process are available in the documents *Business Process Analysis for Sustainability and Circularity in Leather Value Chains* and *Business Process Analysis for Sustainability and Circularity in Textile Value Chains*.[7] As currently drawn, there are seven kinds of generic value chain partner roles (some of which may be fulfilled by the same organization). It is the responsibility of the transformation value chain partners to ensure that output products have IDs which can be linked to the IDs of input products. The same applies in those cases where products are aggregated or disaggregated for logistical purposes. The link between the output product, input products and logistics units should be recorded.

[7] Available at https://unece.org/trade/traceability-sustainable-garment-and-footwear.

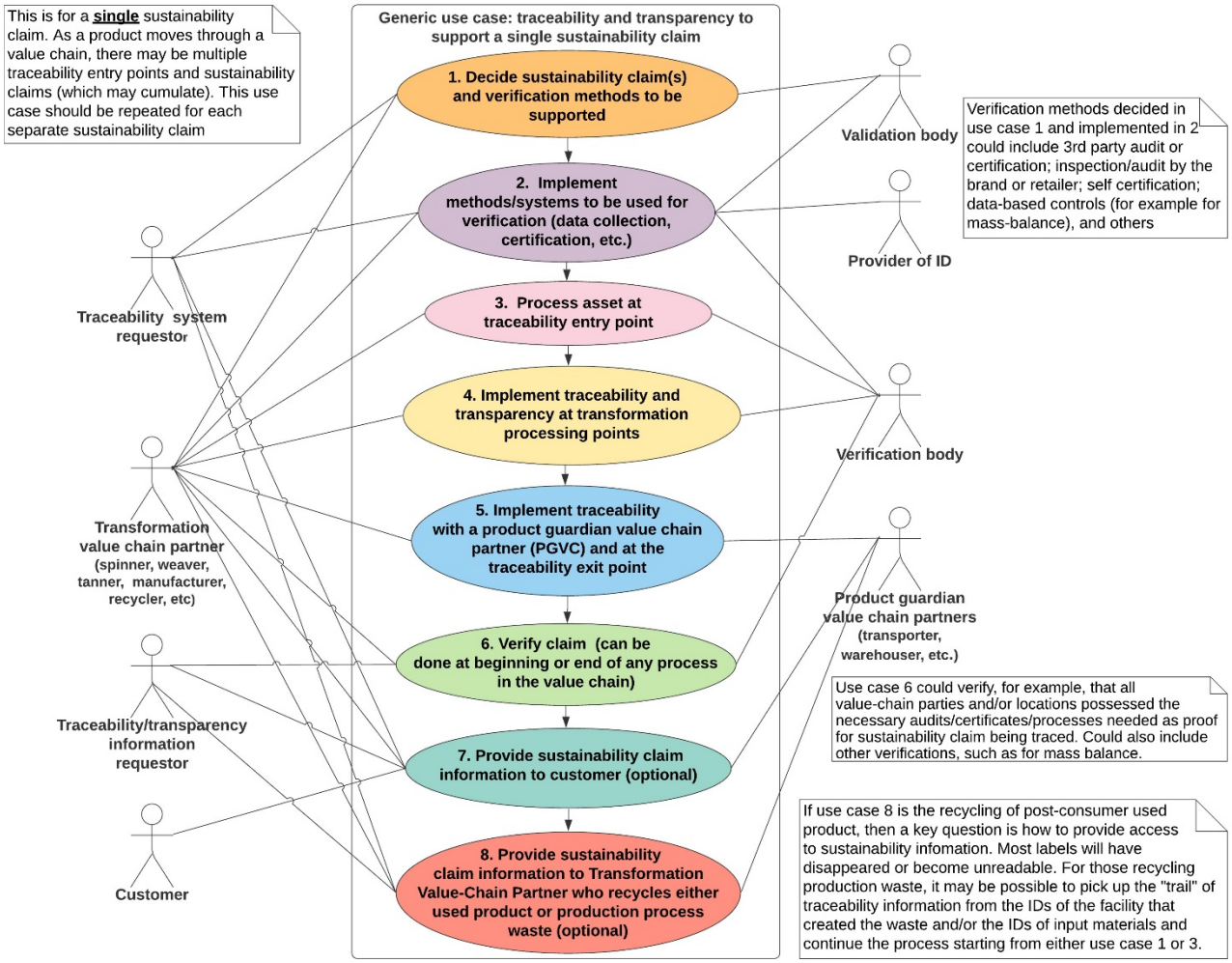



**Figure 5-2 Generic traceability use case diagram**

## 5.3 Business partner view

The diagram below shows the business partners within the textile and leather value chain in a grouped manner.

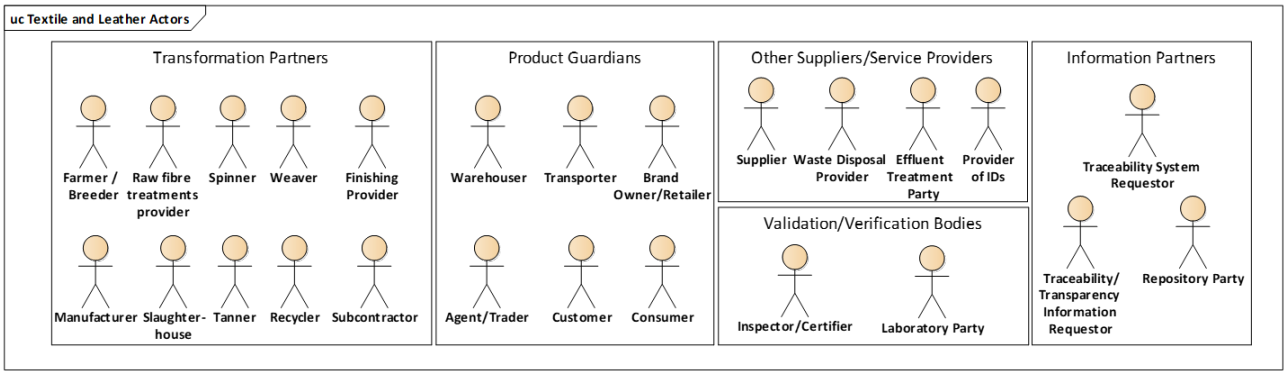



**Figure 5-3 Business partners in the textile and leather sector**

**Table 5-2 Business partners in the textile and leather sector**

| Nr. | Partner | Description |
|---|---|---|
| 1 | Agent | A person or company who has been legally empowered to act on behalf of another person or an entity. |
| 2 | Brand Owner | A person or company who sells any commodity under a registered brand label. |
| 3 | Consumer | A person who purchases goods and services for personal use. |
| 4 | Customer | A person or company who buys goods or services from a company. |

| Nr. | Partner | Description |
|---|---|---|
| 5 | Finishing Provider | A person or company whose trade is the dyeing, bleaching, washing or other treatment of fabrics to improve their appearance or performance |
| 6 | Effluent Treatment Party | A person, company or body having a role in effluent treatment, meaning cleaning industrial effluents, contaminated water from rivers and lakes, and so on in order to reuse the water for additional purposes. Along such lines, water is reutilized and sustained. |
| 7 | Farmer | A person or company engaged in agriculture business, field crop growing, cattle rearing for the meat or other productions (hides, milk, egg, wool, etc), breeders, raisers, finishers etc. |
| 8 | Inspector/Certifier | A person or company who inspects something, such as a product, process, or organization, to ensure that it complies with requirements or regulations. |
| 9 | Laboratory Party | A person, company, or body having a role in laboratory observations. |
| 10 | Manufacturer | A person or company which makes products from raw materials or intermediary products in order to make a profit. |
| 11 | Raw Fibre Treatments Provider (e.g. Ginner) | A person or company who operates raw material equipment (e.g. a ginner using a machine which separates the seeds and hulls from the cotton fibre, a flax fibre pre-processor, a hemp fibre pre-processor etc.). |
| 12 | Recycler | A person or company who recycles or uses machines to recycle. |
| 13 | Retailer | A person or company that sells goods to the public in relatively small quantities for use or consumption rather than for resale. |
| 14 | Slaughterer | A person or company (slaughterhouse) who slaughters animals, most often to provide food for humans, but also for the skins (hides). |
| 15 | Spinner | A person or company occupied in making thread by spinning. |
| 16 | Subcontractor | A person or company that signs a contract to perform part or all of the obligations of another's contract. |
| 17 | Supplier | A person or company that provides something needed such as feed, equipment, materials, intermediary and finished products, chemicals or a service etc. |
| 18 | Tanner | A tanner processes skins of animals. Tanning hide into leather involves a process which permanently alters the protein structure of skin, making it more durable and less susceptible to decomposition, and also possibly colouring it. |
| 19 | Traceability System Requestor | This actor requests that a traceability process be implemented. This could be any down-stream value chain partner that wants to make a “claim” to its clients. Therefore, it could be the Spinner, Weaver, Manufacturer, or a Brand Owner/Retailer. |
| 20 | Traceability/ Transparency Information Requestor | A person, organization or authority needing traceability and transparency information about product(s) for their sustainability statement(s) (claims) regarding environmental, health, human rights and socioeconomic impacts. If the products being traced are regulated, the data could also be used to verify compliance and enforce laws. |
| 21 | Trader | A person or company who buys and sells goods. |
| 22 | Transporter | A person or company involved throughout the value chain for the transportation of animals, products etc. Transportation also involves the delivery of materials such as chemicals and other supplies. |
| 23 | Warehouser | A person or company who stores goods that will be sold or distributed later. |
| 24 | Waste Disposal Provider | A person, company or body having a role in waste disposal; the collection, processing or deposition of the waste materials of human society. The waste disposal provider may also perform the role of recycler. |
| 25 | Weaver | A person or company who weaves fabric. |
| 26 | Wholesaler | A person or company that sells goods in large quantities at low prices, typically to retailers. |

## 5.4 Business requirements list

The business requirements list below includes traceability, sustainability and other requirements. These business requirements apply to the Textile and Leather Process and Data Model for the purpose

of deriving data exchange structures (so-called CCBDA based messages) from this data model. The business requirements of the data exchange structures will be specified within separate BRS documents.

**Table 5-3 Business requirements list**

| Nr. | Subject | Business requirement statement |
|---|---|---|
| A.1 | Flexible and inclusive | Different layers of complexity should allow small and medium-sized enterprises around the globe to use the Textile and Leather Process and Data Model. Many of the data elements and associated information should be optional to allow for "upscaling" to support the growth of a company or to adhere to a stricter set of rules. |
| A.2 | Traceability | Tracing involves the movement of an asset forward and backward through specified stages of the extended supply chain. Traceability for the textile and leather sector is more; it is a method to substantiate a claim or statement relating to a product, service or business process based on available information. Tracing must support "chain of custody" models. It should provide the answers to where the assets are at a given time and why, especially across organizations. |
| A.3 | Visibility | Knowing in an instant which companies, products and processes the whole supply chain comprises, how they relate to each other and how they perform, especially on sustainability. |
| A.4 | Shareability | Visibility and transparency are obtained through shareability of data, although each business partner must be able to decide whether or not to share possibly sensitive data such as sustainability inspection results. |
| A.5 | Transparency | Information is made available to all elements of the value chain in a standardized way, which allows for common understanding, accessibility, clarity and comparison.[8] |
| A.6 | Sustainability | The manufacturing, marketing and use of garment, footwear and accessories, and their parts and components, taking into account the environmental, health, human rights and socioeconomic impacts, and their continuous improvement through all stages of the product's life cycle.[9] Sustainability information also includes information about animal welfare and, where appropriate, measures to prevent the use of endangered species or illegally traded animals. See also Table 5-4 Sustainability matrix. |
| A.7 | Verification of claims | A sustainability-related claim (assertion, statement) is linked to a relevant standard, which can be different for various countries. A standard may be part of a compliance policy. The standard refers to metrics (goals or performances) which can have parameters and tolerances. |
| A.8 | Inventory lists | Exchange of chemical inventory lists (CIL stock levels/ZDHC) is used to prove chemical management performance. They are also used to exchange other materials, hides, fabrics, garment stock levels in order to optimize production and minimize waste. |
| A.9 | Unique identifiers | The use of globally unique identifiers, in order to make traceable assets easy findable and to avoid ambiguity, inconsistency and mismatches (unique identifiers are important for production facilities, production units, products, product batches, serialized products, locations, parties, logistic units, shipments, consignments and consignment items). |
| A.10 | Process certificates | A process certificate can be specified for a production unit, transport movement, production facility, chemical treatment, crop protection treatment, finishing treatment, sustainability characteristic, party, waste material recovery disposal process, transportation waste recovery disposal process, and obtained due to an inspection. |
| A.11 | Product certificates | A product certificate can be specified for a product, material, chemical, production unit, production facility, sustainability characteristic, toxicological hazardous material, party, transportation waste material and transportation waste material component, and it can be specified that the certificate was obtained due to an inspection. |
| A.12 | Organization certificates | An organization certificate can be specified for a production unit, a production facility, a production process, a party, a transport movement, a sustainability characteristic, and it can be specified that the certificate was obtained due to an inspection. |
| A.13 | Inspection events | Inspections can be executed for a party (e.g. manufacturer), a location (e.g. warehouse, crop plot), a production facility, production process, a product, a product batch or a transport movement. Inspections can be targeted on sustainability characteristics (aspects). |

[8] DAI Europe, *A Background Analysis on Transparency and Traceability in the Garment Value Chain* (European Commission, 2017).
[9] UNECE, *Accelerating action for a sustainable and circular garment and footwear industry: which role for transparency and traceability of value chains?* Policy paper (2020).

| Nr. | Subject | Business requirement statement |
|---|---|---|
| A.14 | Inspection results | Inspection results can be indicated as characteristics, along with applicable standards, methods, instructions, notes and/or attachments. The inspection results may include laboratory results as well. These results may include corrective, preventive or other actions and may lead to obtaining certificates and claims (assertions). |
| A.15 | Product segregation, mass balance, book and claim (assertion) | Product segregation means an aggregated flow of products that were produced according to the same sustainability standard and kept strictly separated from other products. Where product segregation is difficult or nearly impossible to achieve (e.g. for certified and non-certified commodities such as cotton, green electricity) other methods can be used. In these instances, mass balance or book and claim systems can be used. |
| A.16 | Consumption information | These are records of inputs/outputs in order to compare predefined and actual consumption of materials and resources (including energy consumption and water use), product or product batches. |
| A.17 | Recycling | It should be possible to exchange the recycling aspects of products and packaging, including whether or not products should be regarded as waste or recyclable items. The process for waste material recovery and the presence of recycled material can be specified in percentage or weight. |
| A.18 | Product information, including sustainability information | Colour and size are important characteristics within the textile and leather sector. The following information entities are relevant: colour, size, colour/size range, colour samples, colour method, colour parameter, print method, print parameter, product collection, faults, fault tolerance, quality level, quality parameter, function, print, gender, section (e.g. selvedge), end user group, product group, classification, CITES, animal & plant species, biologically based, variants, piece indicator, life-cycle stage, technical characteristics, packaging, markings, packaging instructions, product labels, individual product (serialized), sustainability characteristics and so on. |
| A.19 | Used materials | Material type, material characteristics, used chemicals, applied treatments (including for crop protection), toxicological hazardous material, production and waste materials, materials for colouring and printing, recycled materials in products and/or packaging (in percentage or weights) and material components. |
| A.20 | Production process information | Process information for production machines and/or devices will be used frequently. Inputs/outputs of these machines/devices and related resources (including production materials, energy and water), products, product batches, production cycle and operational and requested parameters are exchangeable. The sustainability characteristics of the production process can be specified, along with a sustainability claim (assertion), certificates and so on. |
| A.21 | Transport and related sustainability information | Transport movement consists of delivery information, consignment and consignment item information, cargo details, transport events, transport route, transport services, $CO^2$ emissions, transport means $CO^2$ emissions, transportation waste recovery disposal process, and other data such as sustainability characteristics and certificates. In addition, it can include details for logistics units such as packaging, labels, packaging instructions and returnable asset instructions. |
| A.22 | Transaction references | This can include the type of transaction, the related trade line items for specifying products, product batches and materials (including substitutes and substituted items). |
| A.23 | Agricultural products information | Information about agricultural products and animals should be included, such as agricultural zone area, crop plot, field crop, crop produce, crop produce batch, certificate, characteristics, crop production process, agricultural application, animal, animal species etc. |

## 5.5 Business entity view

The conceptual data model for traceability and transparency in textile and leather value chains is a structured business view of the key information entities required to support business processes and record business events for sustainable trade. For effective traceability, it is necessary to record data about the five Ws (who, what, when, where, why (includes how)) for value chain events. Traceability is established by value chain partners storing this information, and retrieving it from a common place such as an electronic product code information system (EPCIS) database, a blockchain or a cloud

application. Once assets are traceable, it is possible to retrieve additional, relevant information, for example, about sustainability.

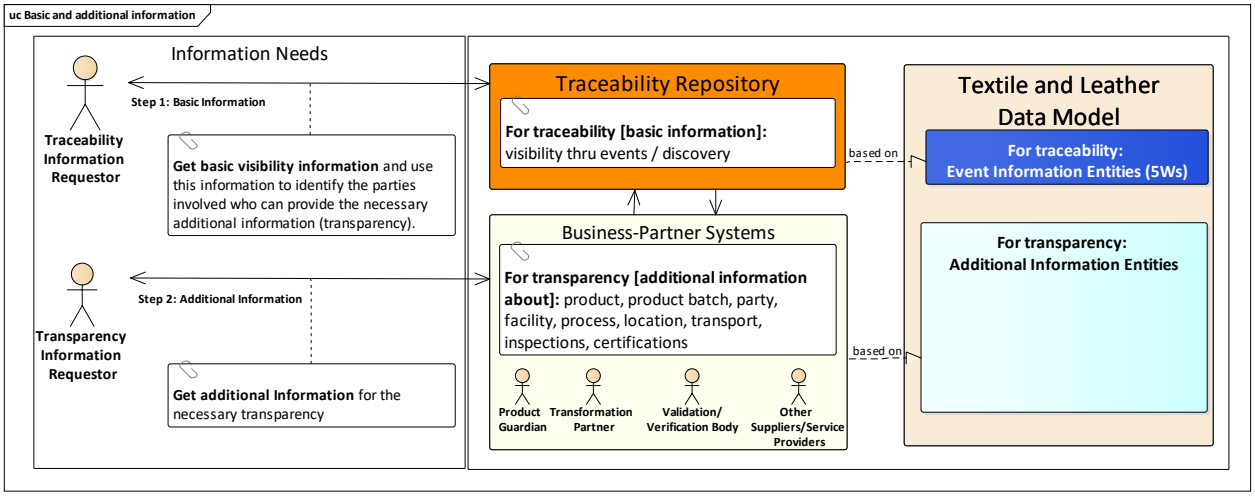



**Figure 5-4 Information needs and resources**

The key traceability information entities are listed in the diagram below.

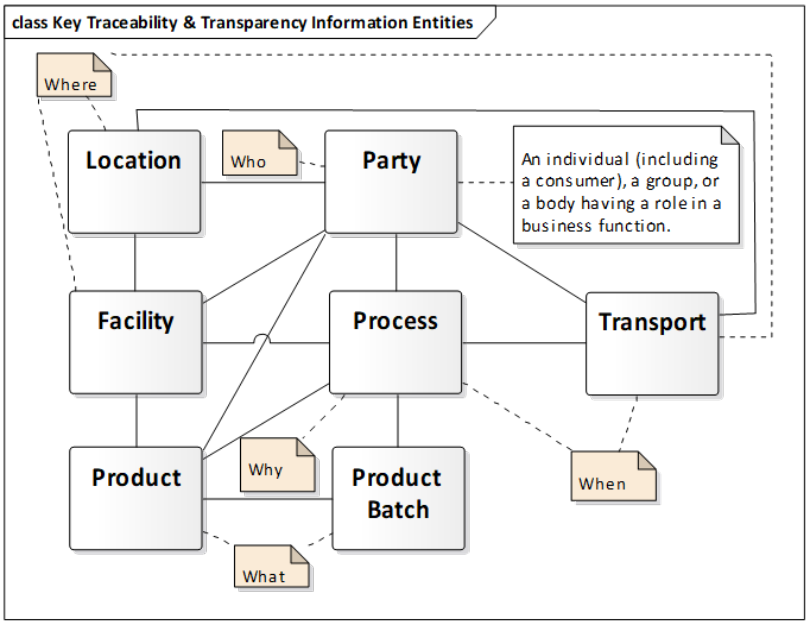



**Figure 5-5 Key Traceability Information Entities Canonical Data Model**

## 5.6 Layers of complexity

The information entities in the Textile & Leather Process and Data Model should support the different layers of complexity (see below). Supporting different layers of complexity allows for inclusion of small and medium-sized enterprises and developing countries in the traceability system, which increases political acceptance. It ensures that traceability technology matches the capabilities of the stakeholders. It is open for "upscaling", i.e. small stakeholders gradually increasing their capacity so they can adhere to stricter sets of rules in the traceability system. For the design of the key information entities, different aspects of complexity (mentioned below) are taken into account.

- Basic information
  - The use of optional elements, references and codes is recommended.
  - The granularity of the information depends on the demands of a business partner (producer, trader, regulator, retailer or consumer). For some business partners a reference to a certificate, inspection report or traceable asset may be sufficient. Others

may need more of the detailed information behind these references. The focus will be on achievable minimum levels of data.

- Detailed information
  - Business partners, such as a regulator or auditor, may require more detailed information (e.g. related to sustainability) in order to verify certificates or assertions (claims). Key performance indicators (KPIs) may be requested on a frequent basis by auditors and other relevant business partners. In addition, results of inspections, the standard evaluation methods and procedures used, and reference values, etc. may be requested.
  - Traceability information relies on "event information". Recorded event data provides vital traceability information on the five Ws (who, what, when, where, why). Registration and retrieval of event information permits the creation of an overview of the whole value chain. This may include individual product and batch histories.
- Supporting different technologies
  - The information entities have been designed to be technology and syntax independent. As a result, they can be used with modern technological solutions such as blockchain technology, EPCIS and application programming interfaces (APIs) and with the latest technologies for the identification of relevant objects.

## 5.7 Sustainability information

Sustainability information should be collected and analysed on a wide range of sustainability-related factors, including energy consumption, resource use, CO2 emissions, and supply chain performance. In the past, measuring sustainability has sometimes focused on environmental and resource-related factors such as materials and energy consumption, water use and pollution levels. Other factors can also affect sustainability performance, including respect for human and labour rights as well as operational data (e.g. employee headcount and salaries, hours of operation, production levels and facility productivity). Sustainability-related data can be regarded as a characteristic of a product, an organization/facility or a process. Some examples are shown in the figure and tables below.

### 5.7.1 Sustainability information entities

The figure below shows a number of information entities related to sustainability residing in the data model.

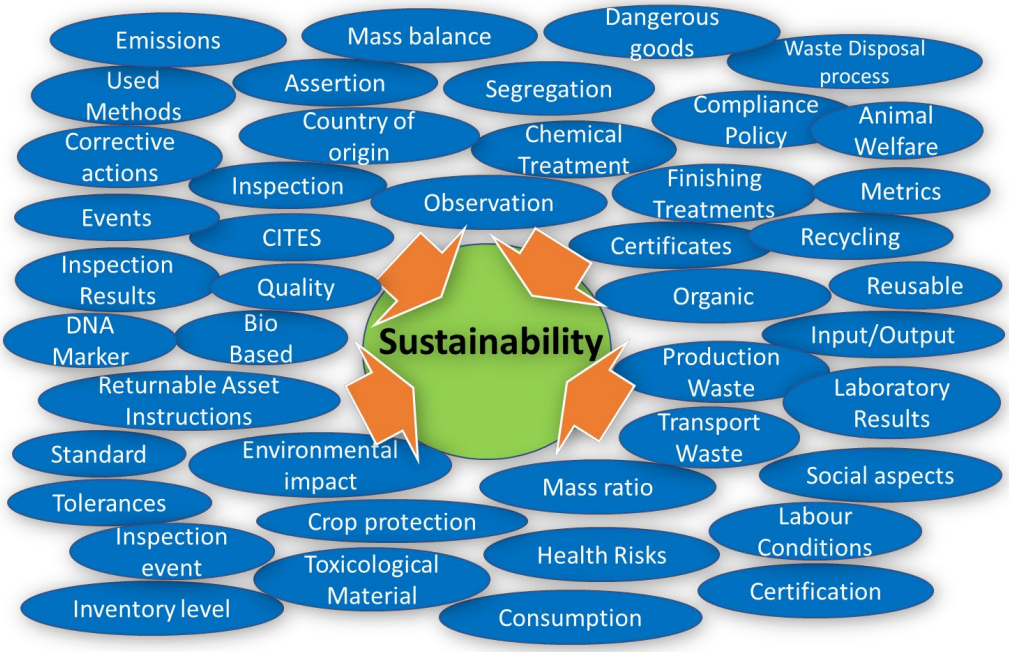



**Figure 5-6 Sustainability-related data**

### 5.7.2 Sustainability matrix

The table below contains examples of sustainable aspects for products, processes, and organizations/facilities.

**Table 5-4 Sustainability matrix**

| Product-related information | Process-related information | Facility-related information | Transport-related information |
|---|---|---|---|
| **Origin**:<br>- Country and/or region and/or other origin criteria<br><br>**Composition**:<br>- Materials components<br>- Product components<br><br>**Technical specifications**:<br>- Materials specifications<br>- Product specifications<br><br>**Product identification (IDs)**:<br>- Individual product/material<br>- Product/material batch<br>- Product/material trade unit<br><br>**Quality**:<br>- Characteristics<br>- Inspections<br>- Certificates/audit reports (product/materials)<br><br>**Other management information**:<br>- Cost(s)<br>- Sales data<br>- Surplus or damaged materials/product<br><br>**Sustainability**:<br>*See table below on sustainability data* | **Process inputs and outputs:**<br>- Input volumes/weights<br>- Output volumes/weights<br><br>**Process events occurrence:**<br>- Data<br>- Time<br><br>**Process identification (IDs):**<br>- Process (product) inputs<br>- Process (product) outputs<br>- Type of process<br>- Equipment (machine)<br>- Machine operator<br><br>**Sustainability:**<br>*See table below on sustainability data* | **Economic operator details:**<br>- Supplier<br>- Manufacturer<br>- Subcontractor<br><br>**Facility's value chain activity** (spinning, tanning, etc.)<br><br>**Location:**<br>- Main production unit(s)<br>- Subordinate production unit(s)<br>- Address<br>- Physical coordinates<br><br>**Facility & economic operator identification (IDs):**<br>- Economic operator<br>- Main facility<br>- Subordinate facility<br><br>**Sustainability:**<br>*See table below on sustainability data* | **Economic operator details:**<br>- Transport or freight forwarding company<br>- Owner/operator of the means of transport<br><br>**Location:**<br>- For picking up logistics units<br>- For delivering logistics units<br><br>**Transportation (IDs):**<br>- Logistics units<br>- Conveyance means (truck, railcar, ship, container if applicable)<br><br>**Sustainability:**<br>*See table below on sustainability data* |

| **Sustainability-related information**[10] | | |
|---|---|---|
| Environment-related information | Human rights and labour-related information | Health and safety-related information |
| Hazardous chemicals | Child labour | Unsafe workplaces and work practices |
| Pesticide and fertilizer use | Forced/compulsory labour | Inadequate personal protective equipment (PPE) |
| Water use | Trade unions and collective bargaining rights | |

[10] For more information, see the following: OECD, *Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector* (2018); the ITC Standards Map; the UNEP report, *Sustainability and Circularity in the Textile Value Chain: Global Stocktaking* (2020); the SA8000® Standard by Social Accountability International (SAI); the Sustainable Apparel Coalition; the Global Reporting Initiative (GRI) global standards for sustainability reporting; the Global Fashion Agenda and Boston Consulting Group, *Pulse of the Fashion Industry R*eport (2018); UNECE, *Accelerating action for a sustainable and circular garment and footwear industry: which role for transparency and traceability of value chains?* Policy paper (2020).

| | | |
|---|---|---|
| Water pollution and wastewater management | Discrimination (women and minorities) | Ethics-related information |
| Waste production and management | Sexual harassment | Bribery and corruption |
| End-of-life:<br>- Durability<br>- Recyclability<br>- Reusability | Exploitation of home workers | Land rights and community welfare |
| Air pollution | Working conditions:<br>- Wages<br>- Working times<br>- Contracts (with workers and/or subcontractors)<br>- Temporary employment | Animal welfare |
| Greenhouse Gas (GHG) emissions:<br>- Direct GHG emissions<br>- Transport CO2 emissions | Recruitment practices | |
| Energy consumption | Lack of social security | |
| Soil degradation | | |
| Deforestation | | |
| Biodiversity and ecosystem depletion | | |

| **Sustainability certificates or inspection reports** |
|---|
| Certificate type |
| Certificate ID |
| Issue and expiry dates |
| Issuing agency ID (optional: name and address) |
| Standards certified/inspected for |
| Claim, and if claim is approved or not |
| Additional data (may include copy of actual certificate or inspection report) |

### 5.7.3 Structuring sustainability information

Certificates and characteristics, such as "product certificates" and "product characteristics" are vital information entities within the Textile and Leather Data Model. Their attributes are shown in the figure below. Commonly, not all attributes will be exchanged in a message. The use case will determine which ones will be used. The use of certificates and characteristics will create flexibility. On the other hand, it introduces the need for using code lists to express the type of certificate or characteristic.

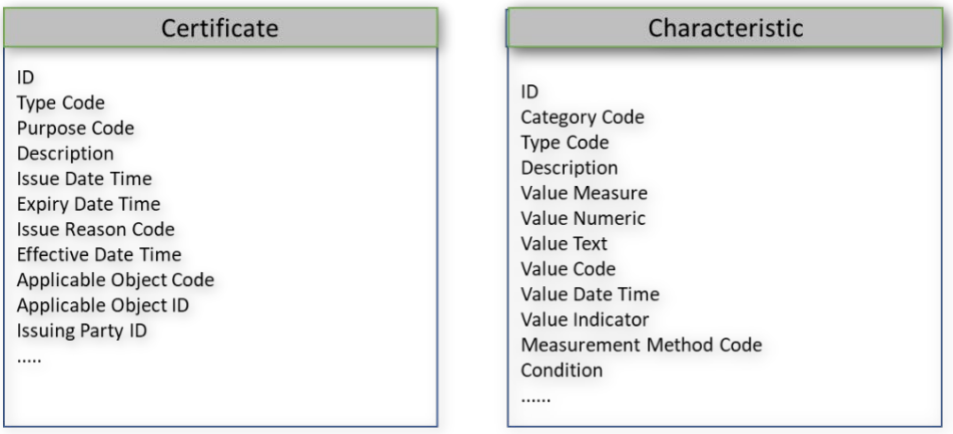



**Figure 5-7 Structured sustainability data**

Sustainability aspects have been structured into certificate and characteristic information entities. The example below specifies different sustainability certificates, accompanied with sustainability characteristics.

**Product certificate**
A product certificate may be specified for a material (such as toxicological hazardous materials, transportation waste materials, chemicals) or products and product batches. In addition, a product certificate can be specified on the level of an organization (party), production facility, production unit and obtained due to the result of an inspection.

**Process certificate**
A process certificate may be specified for a production process, a chemical treatment, a finishing treatment, a crop protection treatment, a waste disposal process and a transport movement. In addition, a process certificate can be specified on the level of an organization (party), production facility, production unit and obtained due to the result of an inspection.

**Organization certificate**
An organization certificate may be specified for an organization (party), production facility, production unit, production process, transport movement and obtained due to the result of an inspection.

Below, the key traceability entities are listed with their associated sustainability information.


**Figure 5-8 Key traceability entities and sustainability information**

### 5.7.4 Characteristics, parameters and tolerances

To avoid numerous information entities which are "similar but different", the following three generic information entities are used extensively throughout the Textile and Leather Data Model. This allows codes to be used to distinguish between, for example, different characteristics.

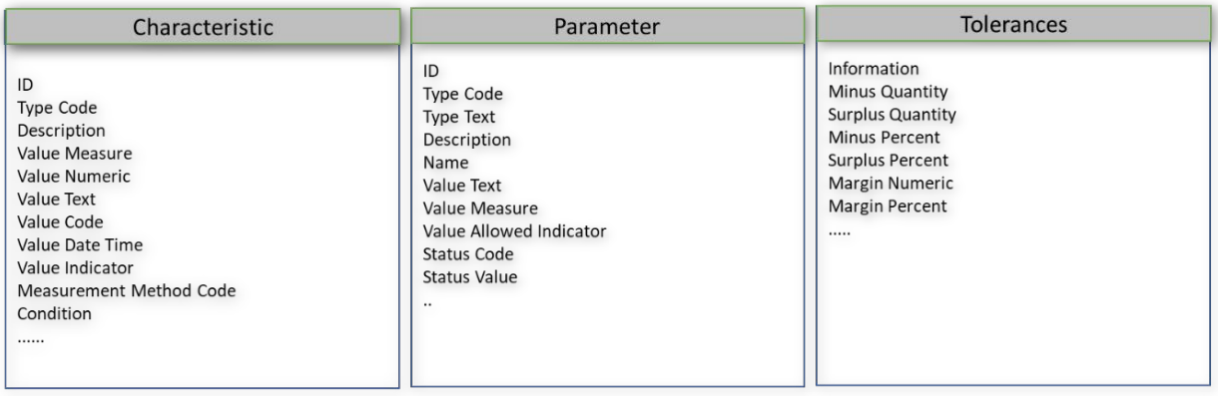



**Figure 5-9 Characteristics, parameters and tolerances**

Within the Textile & Leather Process and Data Model, the key information entities may have different characteristics, e.g. *product* characteristics, *sustainability* characteristics, *technical* characteristics. In general, a characteristic has a type and value, either coded or as text. For the textile and leather sector, in addition to *sustainability* characteristics, *product* and *technical* characteristics are important too. The technical characteristics could be divided into different categories such as colour fastness, construction, dimension stability. In other words, a category and type code (e.g. colour fastness) will provide the semantics for a technical characteristic. An optional parameter may limit the scope of the characteristic. A tolerance may be expressed for a characteristic value and/or parameter value.

As an example, the table below shows the colour fastness characteristic for dry cleaning at 40 degrees with a 5% minus deviation tolerance (i.e. colour fastness of 65-70%).

**Table 5-5 Example of a technical characteristic**

| Characteristic | | Parameter | | Tolerance | |
|---|---|---|---|---|---|
| Category | Colour Fastness | | | | |
| Type | Dry Cleaning | Type | Temperature | Type | Deviation |
| Value | 70% | Value | 40 Degrees | Minus % | 5 |

## 5.8 Traceability

Traceability is the ability to trace the movement of an asset forward and backward through specified stages of the extended supply chain. Visibility data provides details about traceable assets regarding where they are in time and why, and especially *across* organizations.

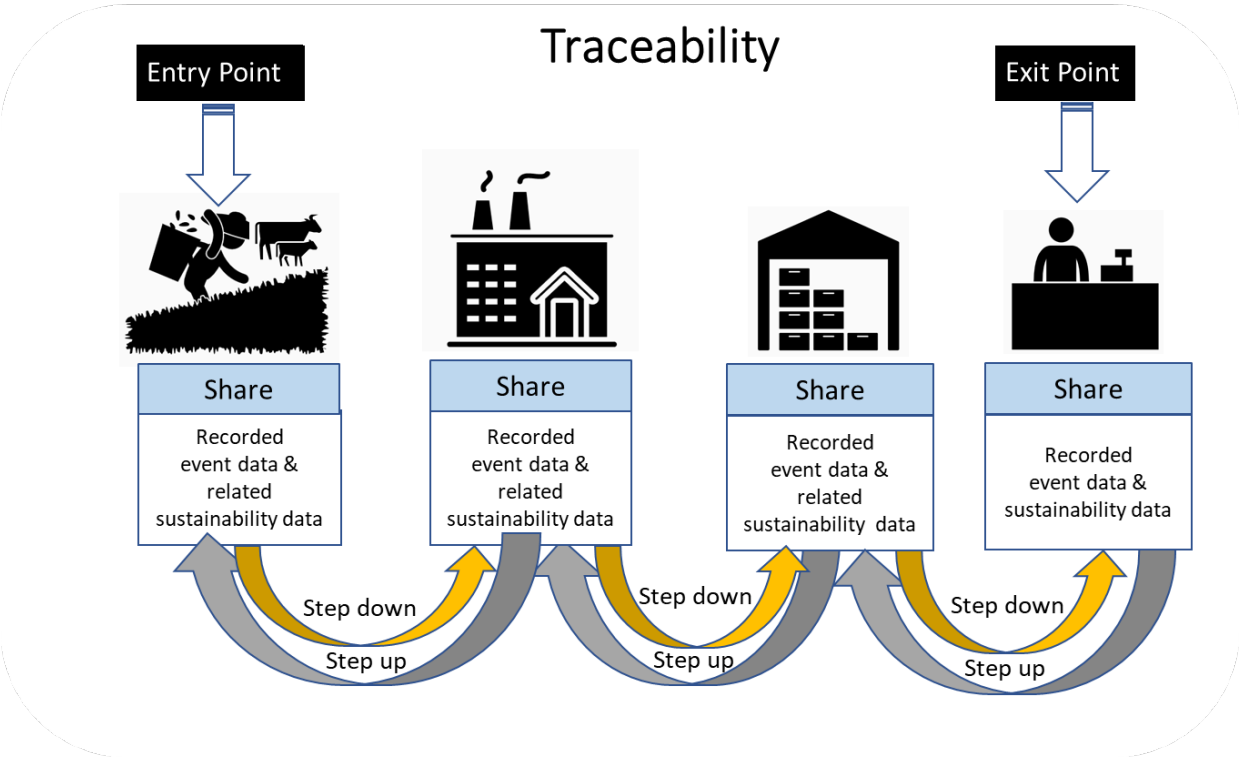



**Figure 5-10 Traceability across organizations in the value chain**

## 5.9 Traceable assets

A traceable asset may be a material, a product/product batch, either at a class level (i.e. by type) or an instance level (individual, serialized). During the transformation process, it is essential to record the identifiers of the *inputs* and *outputs*. In other words, to identify which materials or products are the inputs to the product-batch outputs from a process. A traceability system is primarily based on product identification and segregation.

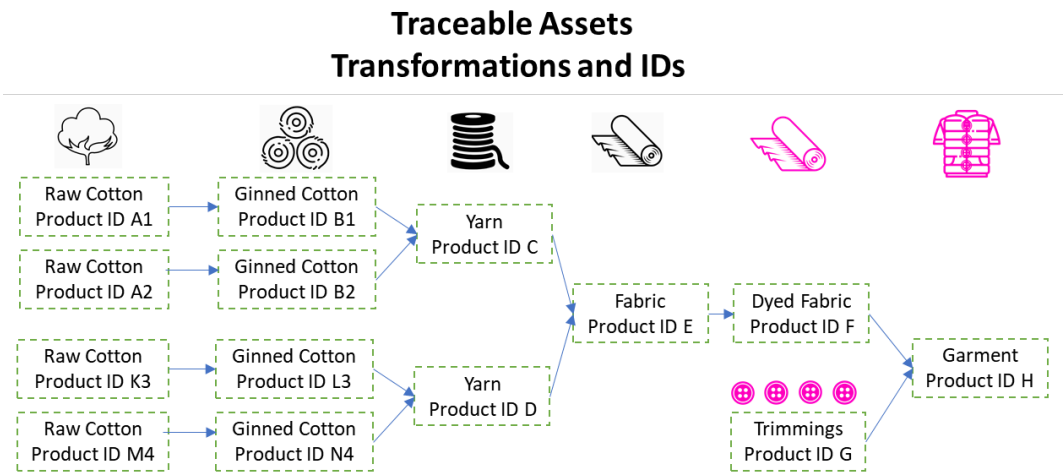



**Figure 5-11 Traceable assets and IDs**

In addition, the link between traceable assets and the logistics unit(s) which contain them is important. Traceable assets may be aggregated or disaggregated due to logistics processes such as placing products into (or taking them out) of logistics units, as well as combining and separating the logistics units themselves (for example putting a pallet logistics unit inside of a container logistics unit). The term "traceable asset" will be used to denote any item such as an object, a product or other traded item, or a service that needs to be tracked across the supply chain. Traceable assets and their logistics units make use of unique identifiers.


**Figure 5-12 Examples of logistic units**

The focus of the traceability framework is to trace the asset whether it is packed into a logistic unit or not. The information entities found within the Textile & Leather Process and Data Model are reusable within the context of other technologies such as EPCIS[11], blockchain technology or APIs.

## 5.10 Unique identifiers (ISO/IEC 15459)

ISO/IEC 15459 (part 3) specifies a unique, non-significant, identifier (UID) for products and/or items, represented in a barcode label or other media attached to or incorporated into an item. The UID will start with a string of characters representing the issuing agency code, assigned to the issuing agency by a registration authority. There are different agencies which issue UIDs. One of them is GS1.[12] Different industries, including textile, retail and transport are using GS1 standards for identification of shipments, trade items (products or individual products) and logistic units. This standard allows business partners to keep their internal coding systems. But, when applicable, these business partners need to transform their internal identifiers into these unique identifiers when sending or receiving

[11] The UN/CEFACT event-based information entities are aligned with the ISO/IEC 19987 specifications, published by the ISO/IEC JTC1/SC31. These specifications fit with the ISO 18000-63 specifications for the traceability information system, repository and network structures.
[12] GS1 (Global Standards 1) is an international standards organization with member bodies in more than 100 countries worldwide.

data from their business partners. In principle, their internal identifier will get an agency code and company code in front and a check digit at the end. In some way comparable to the transformation of a local bank's account number to an international bank account number (IBAN). The ISO/IEC standard enables automatic data collection via barcode formats and different kinds of labels and electronic product codes such as RFID and QR labels and allows users to share information via traceability systems.

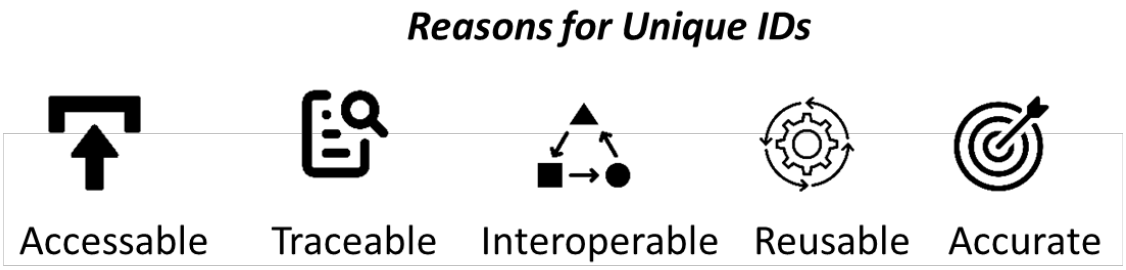



**Figure 5-13 Reasons for unique identifiers**

Unique identifiers can be assigned at the following levels:

- Product type level — *materials, products/components*
- Product batch/lot level — *group of products*
- Product instance level — *instances of products, product batches*
- Logistics units level — *transport equipment – container, pallet etc.*
- Shipment level — *shipments*
- Consignment level — *consignments*
- Party level — *organization, company, facility etc.*
- Location level — *production unit, warehouse, crop plot*

## 5.11 Code lists

The Textile & Leather Process and Data Model reuses existing standardized and harmonized code lists as much as possible. A number of code lists are created by the UNECE, ISO, eBiz and others. These code lists can be linked to a data element or used as a reference. Within message implementation guidelines, the use of specific code lists for individual data elements will be described.

## 5.12 Product segregation

In advanced supply chains it is possible to implement a traceability system based on product identification and segregation. This requires a high level of organization in the supply chain, i.e. assets need to be tagged, traced, and the information made available in electronic format. "Product segregation" is the preferred model for traceability systems and can be implemented both for bulk commodities and for identity preservation.

The objective is as follows:

- Products produced according to the same sustainability standard are strictly separated from other products.
- Bulk commodity, which is certified, is strictly separated from non-certified materials but is allowed to be mixed with certified materials from different producers.
- Identity preservation requires segregation of the certified material from the non-certified materials throughout the supply chain with no mixing of materials from different producers. This is needed in order to provide traceability all the way back from the final consumer to a specific source (for example a farm).

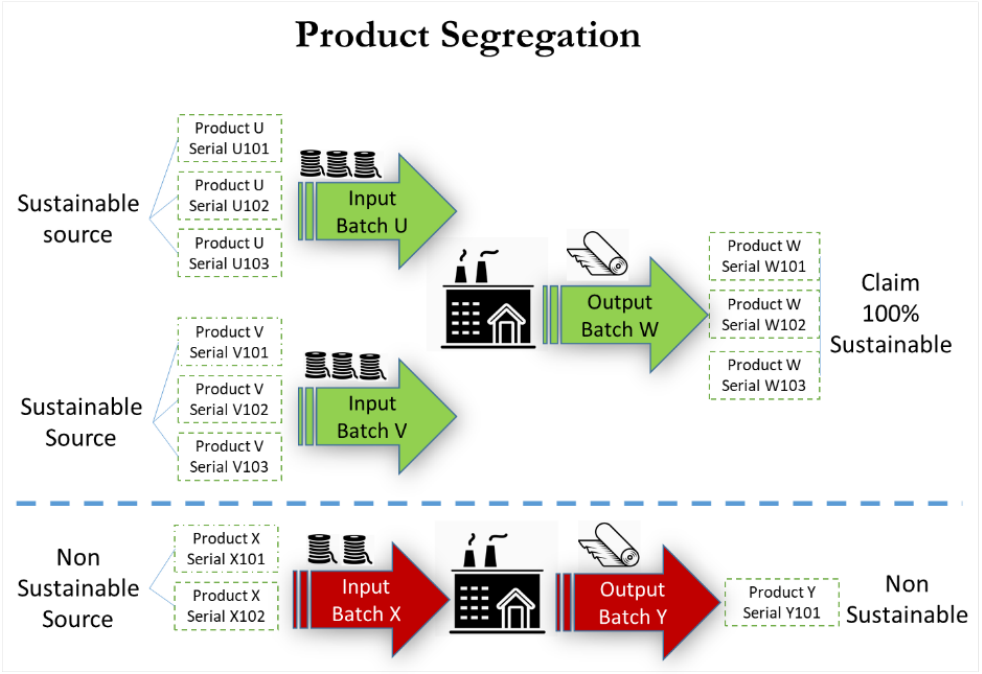



**Figure 5-14 Segregation of products and raw materials**

A product segregation approach requires a well-defined process and administration. If not, then assets with different sustainability characteristics risk being accidentally (or even deliberately) processed and merged together, thus defeating the objective of product separation and making sustainability claims untrustworthy. Where product segregation is difficult or nearly impossible to achieve, e.g. for certified and non-certified commodities such as cotton and green electricity, other methods can be used. In these instances, “mass balance” or “book and claim” (assertion) models can be used. However, even implementing a mass balance model or a book and claim (assertion) model requires stringent technical and organizational requirements.

## 5.13 Mass balance

It is not always feasible to segregate sustainable and non-sustainable products and materials from the perspective of efficiency and/or production processes. In the mass balance model sustainable and non-sustainable sources are mixed. As these assets move through the supply chain an exact account is kept about their volume/weight ratios. The purpose is to guarantee that the amount of sustainable content claimed is equal to the amount of sustainable products or materials used. Like the product segregation model, implementing a mass balance model requires well-defined process and administration.

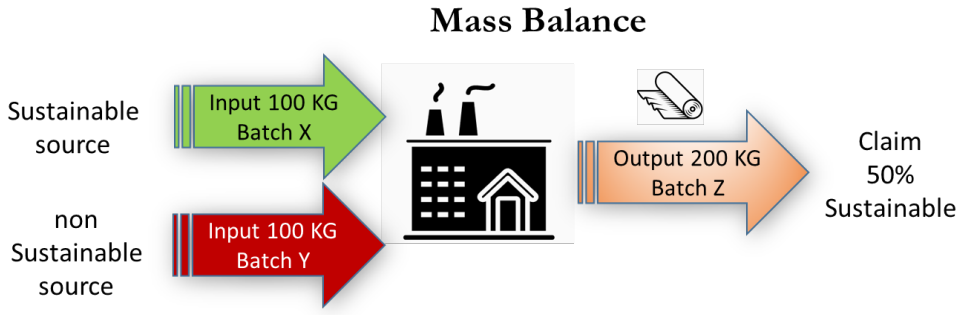



**Figure 5-15 Mass balance**

## 5.14 Book and claim (assertion)

If both product segregation and mass balance models are impossible to implement, a book and claim model can be applied. Where sustainable and non-sustainable sources are mixed without tracking their relative volumes, the right to claim sustainable sourcing is traded in the form of sustainability certificates. A central authority monitors the sustainability claims by brand owners and retailers and compares these with the volumes/weights specified on certificates issued and traded. In the figure below, a sustainability certificate is traded in order to claim a 50% sustainable product. This model is commonly used for commodities such as green electricity.

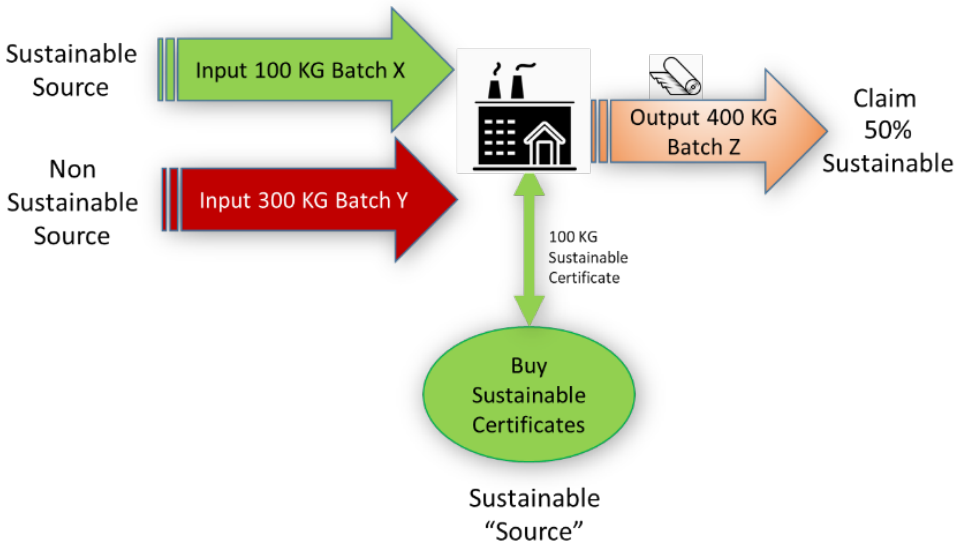



**Figure 5-16 Book and claim (assertion)**

Under the book and claim model there is no physical relationship between the amount of sustainable inputs included in a product and the amount of sustainable content that is claimed. Instead, the producer of the goods purchases sustainability certificates to cover the difference between the amount of actual sustainable input in the product and the amount that the producer wants to claim. These certificates are then used to reward farmers who produce an equivalent amount of sustainable inputs (which will be used to produce other products).

This is shown in the illustration above where a production plant receives inputs, of which 25% (100 kilos) have been sustainably created. Because the producer wants to claim that 50% of their product is sustainable, they purchase (book) certificates for another 25% (i.e. another 100 kilos). The money paid for the certificates is then paid to a farmer who proves that he has created 100 kilos of sustainable inputs (for use in other products). This creates a financial incentive for producers to make sustainable inputs and sell them at prices that are competitive vis-a-vis non-sustainable inputs.

## 5.15 Visibility

The Textile & Leather Process and Data Model supports traceability and transparency. Each business partner in the value chain needs to record and store, in a common data source, the key data answering the five Ws (who, what, when, where, why). This establishes traceability. At the same time that they collect and register data on the five Ws, business partners need to store, in their own database, associated sustainability information (for example product test results or facility inspection reports).

Then, when sustainability information is needed, the traceability information allows the transparency information requestor to identify who has the needed sustainability information and then request it directly from the relevant business partner – who, in this context, has control over access to this more detailed information.

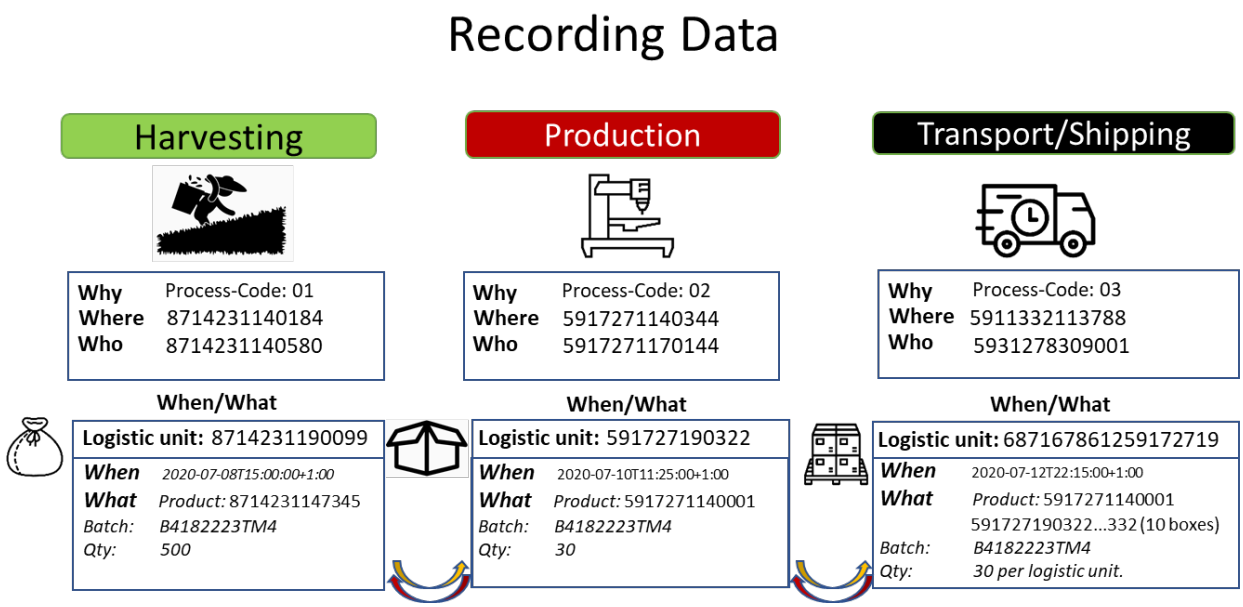



**Figure 5-17 Event recording**

### 5.15.1 Sharing data

The information about significant events and sustainability should be exchangeable between business partners and regulators within the value chain in different ways.

These exchanges will need to accommodate both document-equivalent and business-process-driven data snippets and should differentiate between them. Examples of some of the technical solutions for both types of exchanges are listed below:

- Traditional electronic data interchange (EDI) such as UN/EDIFACT[13] and United Nations XML schemas
- Process-driven data exchange structures (CCBDA data structures, documents and snippets of documents)
- Electronic product code information system (EPCIS - ISO/IEC 19987)
- Blockchain technology (i.e. Distributed Ledger Technology – DLT)
- Application programming interface (API)

Traditional EDI is fundamentally based on a computer-to-computer interchange of strictly formatted messages that represent documents. EDI implies a sequence of messages between two parties, either of whom may serve as originator or recipient.

From the Textile and Leather Process & Data Model different business documents (messages) can be derived to serve a particular purpose, such as the exchange of data regarding an inspection and sustainability. A vast number of supply chain and transport-related messages have been already created by UN/CEFACT, such as for the Supply Chain Reference Data Model (SCRDM) for despatching, receiving, ordering, invoicing, forecasting etc. and the Multi Modal Transport Reference Data Model (MMT RDM) for logistics, transporting, declaring consignments etc.

Within a separate Textile and Leather BRS, the necessary use cases and data exchange structures (CCBDA-based messages) will be described.

Today, new requirements have emerged for data exchanges. The reasons are often the need for instant, trustworthy, shareable and/or light-weight information. As a result, it is fair to assume that, in the

[13] United Nations rules for Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT).

future, hybrid forms of document-oriented information exchange and fragmented, on-demand, information will exist.

#### 5.15.1.1 Process-driven data exchange structures (CCBDA data structures, documents and snippets of documents)

The exchange of information is moving away from a document-based approach towards a process-driven approach where only the information needed for a process to continue is exchanged. This is because, very often, the trading-partner applications need to process only a part of the information found in a standard message. A message is a container for information exchanged between trading partners and is structured according to a standard (rules) for a business data exchange structure. It is this structure that allows for the automated identification of a message's information contents. The UN/CEFACT CCBDA (Core Component Business Document Assembly) methodology specification supports both approaches. It can be employed wherever business information is being shared or exchanged among and between enterprises, governmental agencies and/or other organizations. The specification is developed to identify how to construct a message for use within a particular business process. A message can be a complete document, such as an invoice, or a mini document (a snippet) as a result of a query.

#### 5.15.1.2 Electronic product code information system (EPCIS)

As there are different options for achieving traceability and transparency, the key issue is how to share the information and how to retrieve information backward and forward within the supply chain instantly and effectively. Forwarding or retrieving information from one step forward or backward in the supply chain (the traditional way) is an option, but it does not always work when the information is more than one step away and is not very efficient for getting an overview across organizations and across supply chain stages. The EPCIS standard, incorporated in the Textile and Leather Process & Data Model, consists of a few event information entities that are stored for exchange in a shared traceability repository by all business partners for instant sharing. This provides an overview across organizations within the supply chain. Additional information, such as that contributing to more transparency may be exchanged using traditional EDI or using another technology such as an API.

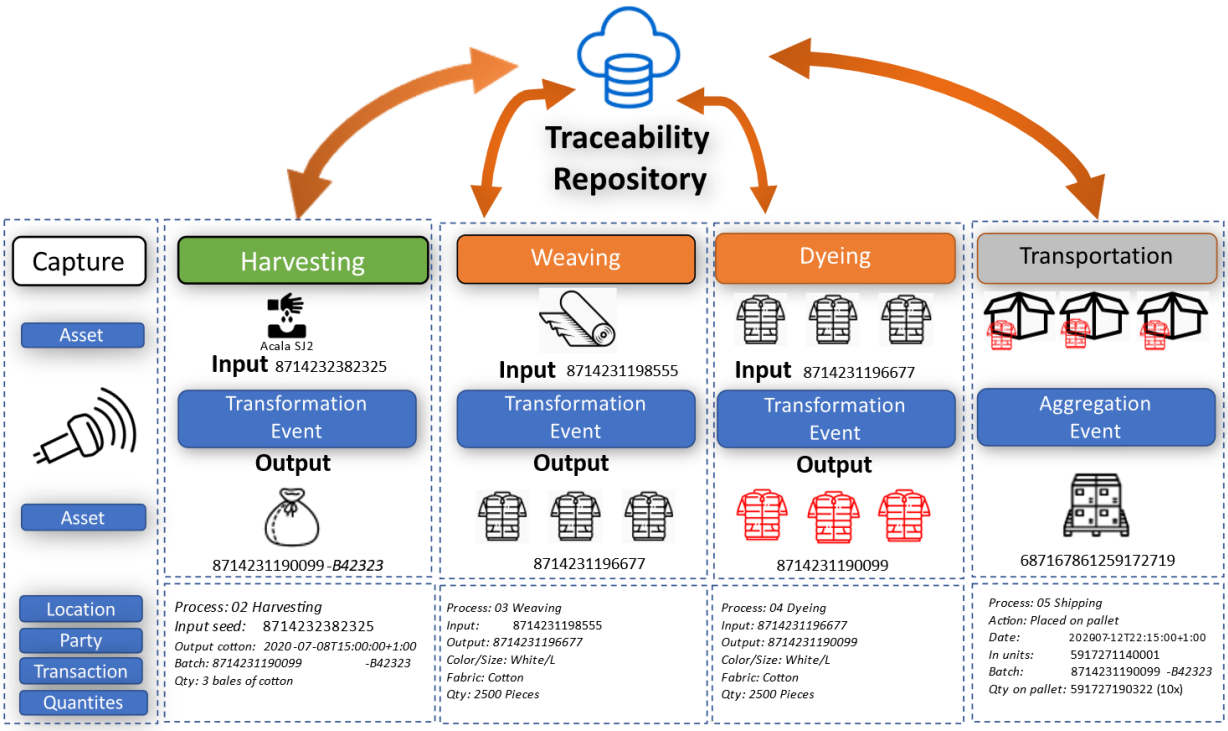



**Figure 5-18 A repository for traceability, visibility and sharing**

It is important for a traceability solution to be able to identify the relevant processes, and within them relevant events (activities), and then to arrange to capture and record event data. A chain of custody/ownership can be created by tracing all business partners that had physical possession of the asset. By this, it becomes possible to validate the origin and pedigree of an asset.

#### 5.15.1.3 Blockchain technololgy

Blockchains provide a distributed ledger that registers transactions in a highly trustworthy, time-ordered manner. In simple words, they provide proof that transactions that have happened and that the data have not been altered. Like the EPCIS solution, events are captured and recorded. Retrieving and verifying data is most often done using pointers to off-chain data, and cryptographic hashes providing proof of data content (i.e. digital fingerprint).

Traceability systems/applications can be connected to blockchains using a layer-based approach in order to create highly trustworthy proof of the existence and content of selected information. In addition, in combination with enterprise identity management, blockchains can certify the provenance of information and, therefore, be a powerful tool for making traceability more trustworthy.

There are many different public and private implementations of blockchain technology, each with different characteristics. The public versions use open-source code and are considered by many, for technical reasons, to be the most trustworthy.

#### 5.15.1.4 Application programming interface (API)

An API is a set of functions that allows applications to access data and to interact with external software components, operating systems, or microservices. Standards organizations such as UN/CEFACT and others have provided global leadership in electronic data interchange (EDI) standards for many decades through high quality outputs such as UN/EDIFACT and XML Schema. The vast majority of electronic international trade transactions today are implemented using these EDI standards. The rise of web platforms that exchange data via APIs presents a new paradigm for business-to-business data exchange. APIs are seen as more effective than traditional EDI.

The UN/CCL and reference data models are currently published in CSV, XML, PDF or HTML formats. UN/CEFACT is currently defining the naming and design rules for consistent publishing of reference data models and code lists as JSON-LD[14] vocabularies. This will make UN/CEFACT semantics accessible to and consumable by web developers. APIs are not the solution for sharing data regarding traceability and transparency, but they can complement a traceability system to support the retrieval of supporting sustainability data.

For all data-sharing solutions to support traceability and visibility, standardized data structures (CCBDA data models) and standardized business data exchange structures are important.

[14] JSON-LD stands for JavaScript Object Notation for Linked Data and is about structured data, which makes the exchange of data more organized on the web.

# 6 Business choreography view

The processes and activities within textile and leather value chains are documented in detail within separate published documents.[15]

## 6.1 Textile value chain

For the production of textiles, the fibres used can be grouped into four main categories:

- Natural plant fibres
- Natural animal-based fibres
- Man-made cellulose-based fibres
- Man-made synthetic fibres

Once the fibre has been harvested or produced, yarn production starts by spinning the fibres into a yarn (fibres used for non-woven fabric[16] are the exception). The core of textile manufacturing is fabric production. Fabrics can be created in many ways, such as weaving, knitting or the production of non-woven fabrics. Various treatment processes can be carried out on fibres, yarns or fabrics. Dyeing, printing and other finishing processes can be done in-house or by subcontractors and take place during a number of other processes, for example before or after spinning, after weaving, or during or after garment production. Finishing is the process of adding special technical characteristics to the finished fabric. When the fabric has the desired colour and properties, it is manufactured into finished products such as sweaters, jeans, shoes or other specialty items like carpets, furniture or car seats. This process includes activities such as cutting, sewing and the addition of buttons and zippers, etc.

The following use case diagram for the textile value chain has been separated into parts 1 and 2 in order to improve its readability. They show the flow of processes within the textile value chain and the participating actors.

The oval descriptions running down the centre of the diagram list **the major processes**. Not all processes will necessarily occur in the sequence shown. In particular, process 5 (product design and prototyping) may occur earlier and process 3 (finishing processes i.e. dying, printing, bleaching, washing and other finishing), occurs multiple times, before, during and after other processes.

- Running down the left-hand side of these process ovals are **the actors who initiate processes**.
- The actors that run down the right-hand side are the **other suppliers/service providers** that undertake processes initiated by the actors on the left.

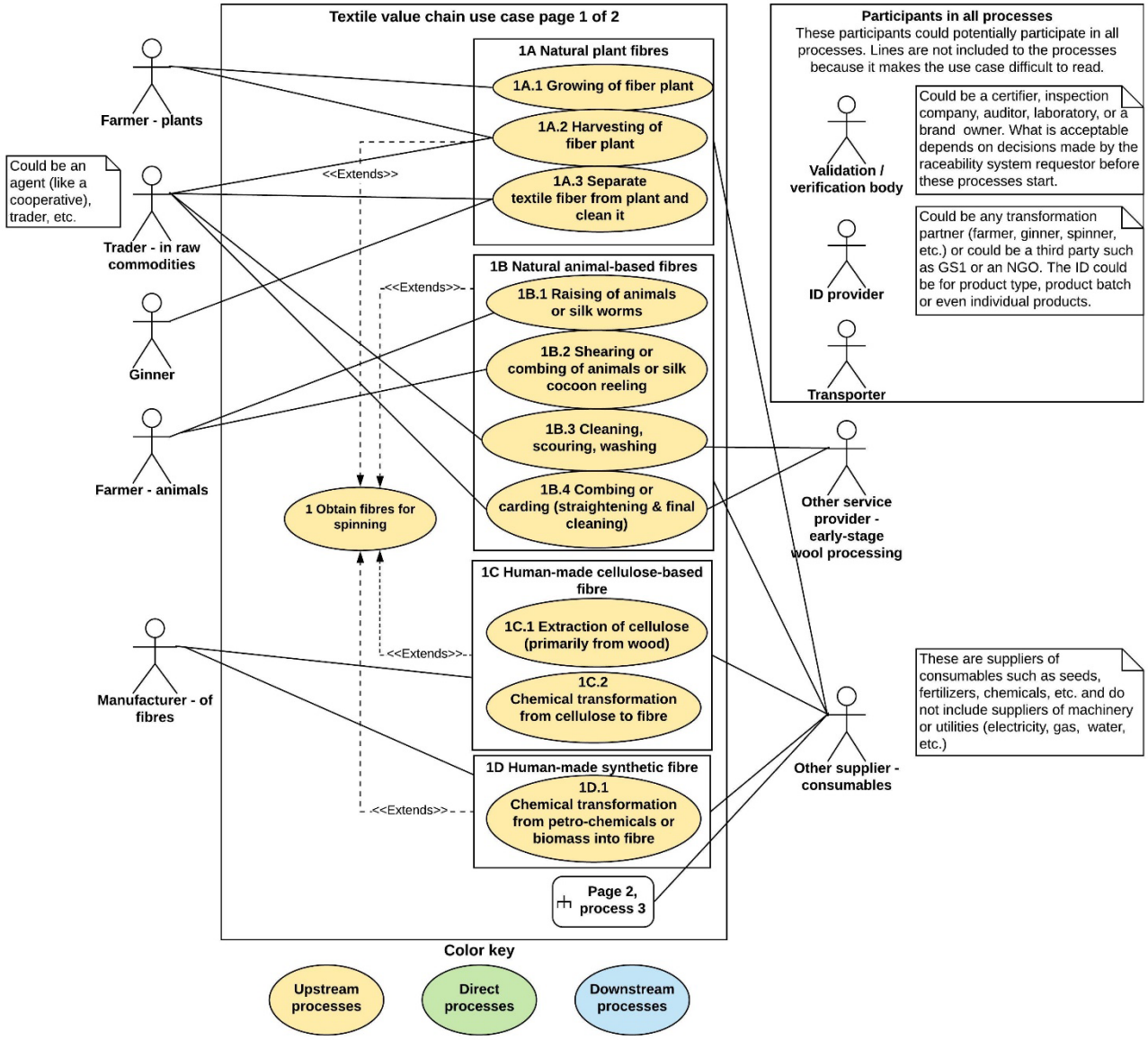
Occasionally, an actor participates on both sides, although they are only shown on one side. For example, an early-stage wool processer might call upon a finishing subcontractor. In addition, there are some actors who can, but do not always, participate in all of the processes, such as the logistics service provider (transporter). To simplify the diagrams, those actors that could participate in all processes have been placed in a separate box in the upper right-hand corner.

[15] UNECE, *Business Process Analysis for Sustainability and Circularity in Textile Value Chains* (2021) and UNECE, *Business Process Analysis for Sustainability and Circularity in Leather Value Chains* (2021). Both documents are available at https://unece.org/trade/traceability-sustainable-garment-and-footwear.

[16] "Non-woven fabrics are broadly defined as sheet or web structures bonded together by entangling fibre or filaments (and by perforating films) mechanically, thermally, or chemically. They are flat, porous sheets that are made directly from separate fibres or from molten plastic or plastic film. They are not made by weaving or knitting and do not require converting the fibres to yarn." "About nonwovens", INDA, available at https://www.inda.org/about-nonwovens/ (accessed 5 March 2021).

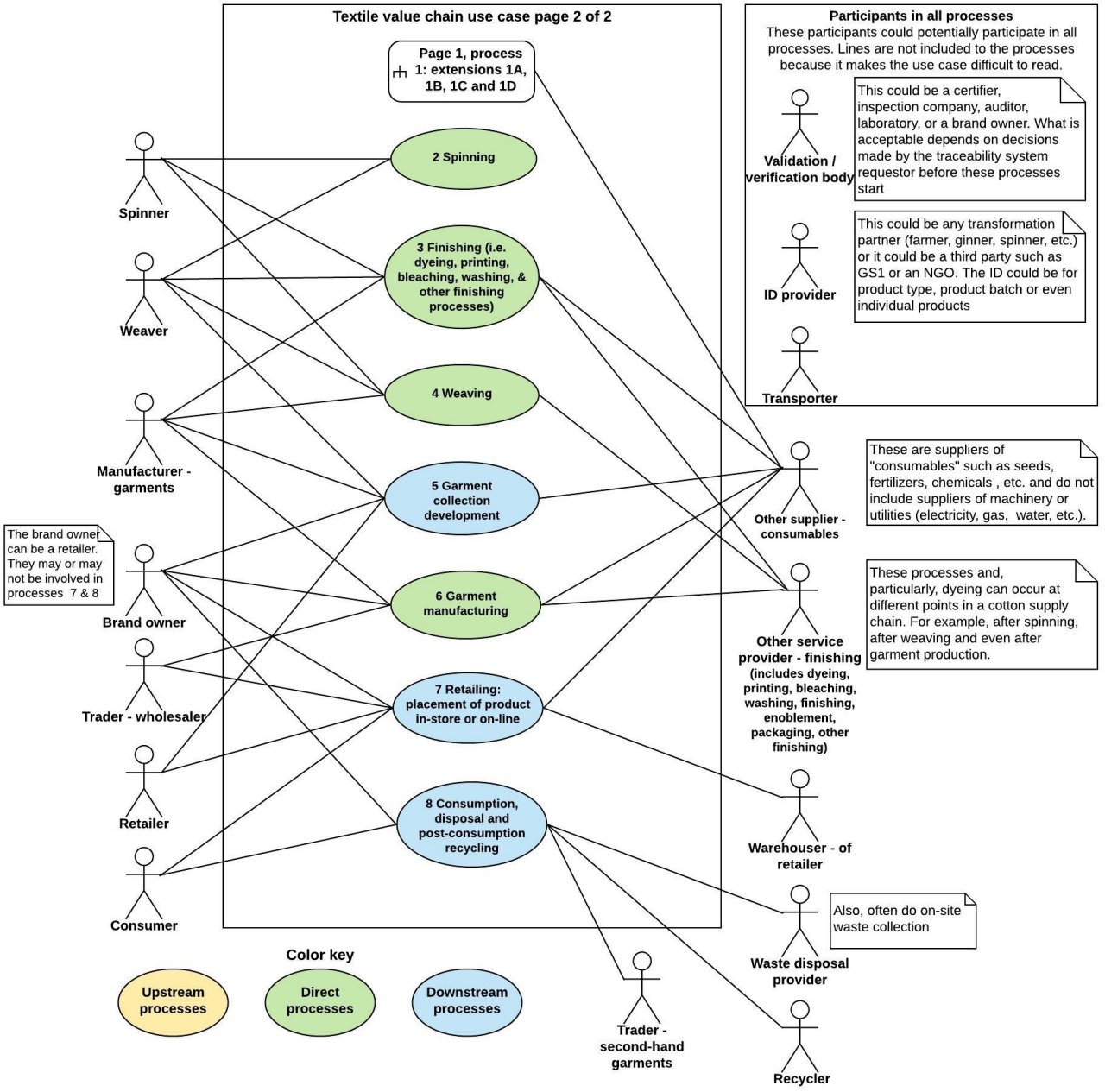
### 6.1.1 Use case: Fibre production

This use case diagram shows the various processes that are needed to obtain fibre for either spinning or the production of non-woven fabrics. These are very different depending upon which of the four sources of fibres (listed above) is being used.




### 6.1.2 Use case: From spinning to recycling

This second diagram shows the processes from spinning through post-consumer disposal and recycling – these being all similar, regardless of the fibre source.




## 6.2 Leather value chain

A brief overview of the processes and actors within the leather value chain are provided with two use case diagrams showing two types of identified value chains:

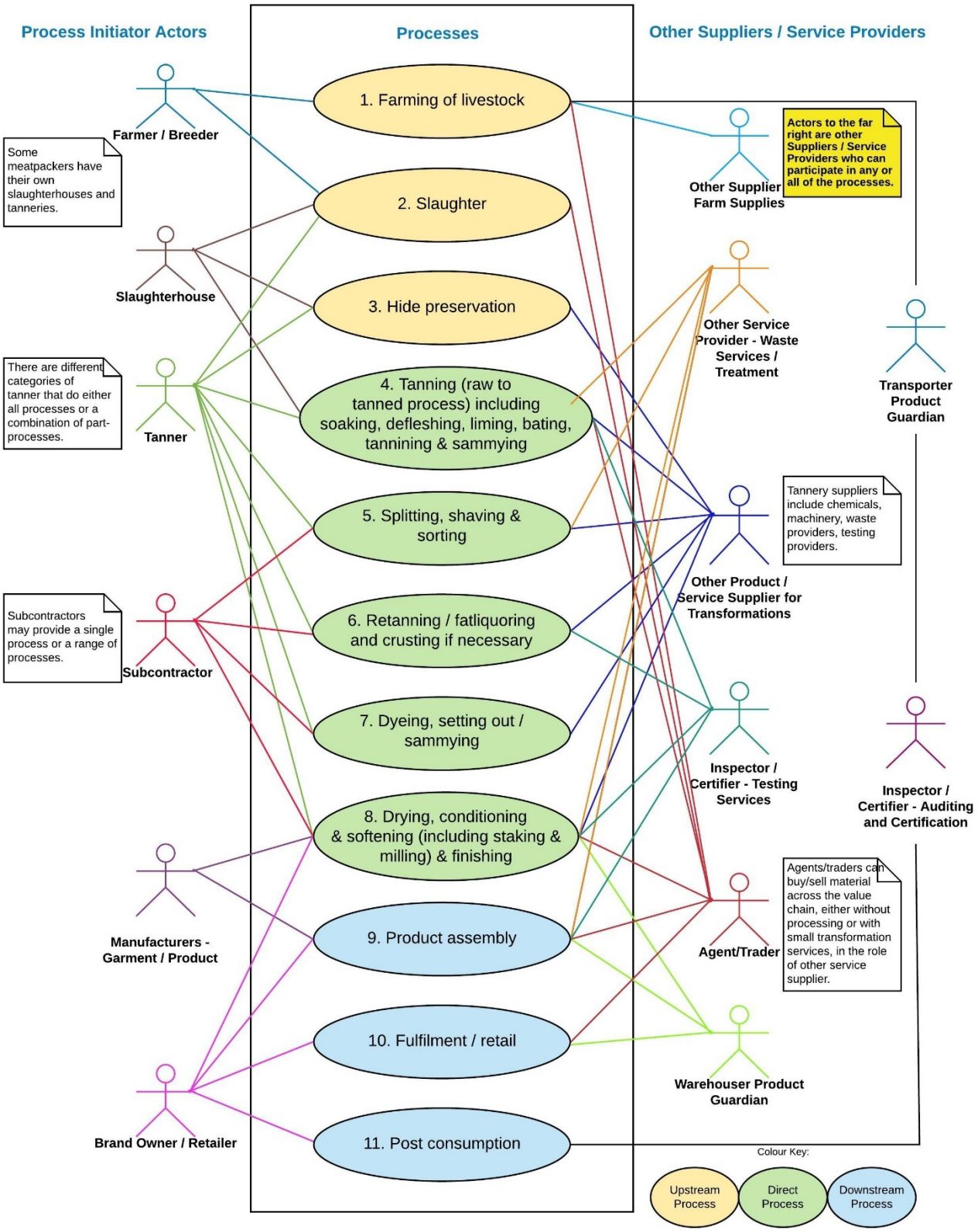
- A complex value chain (livestock leathers)
  - The leather value chain for livestock hides and skins can be complex because leather manufacturers (tanneries) can perform different sets of production processes. Some tanneries perform the entire transformation process from the raw hide/skin through to the finished material, while others will only perform a part of the process. This results in a range of "supporting" actors that may vary from one value chain to another, even for the same product.
- A controlled value chain (exotic leathers)
  - Value chains for products such as exotic skins are more likely to be managed from farm to product. For example, some luxury brand owners may own the farms, slaughtering facilities and tanneries for exotic leather production. Due to the increased consumer sensitivity and regulatory requirements when manufacturing leather from exotics, luxury

brand owners are under stronger pressure to provide clearer mapping of value chains and tighter control. However, it should be recognized that good value chain mapping is also demonstrated by tanneries working with livestock hides/skins.

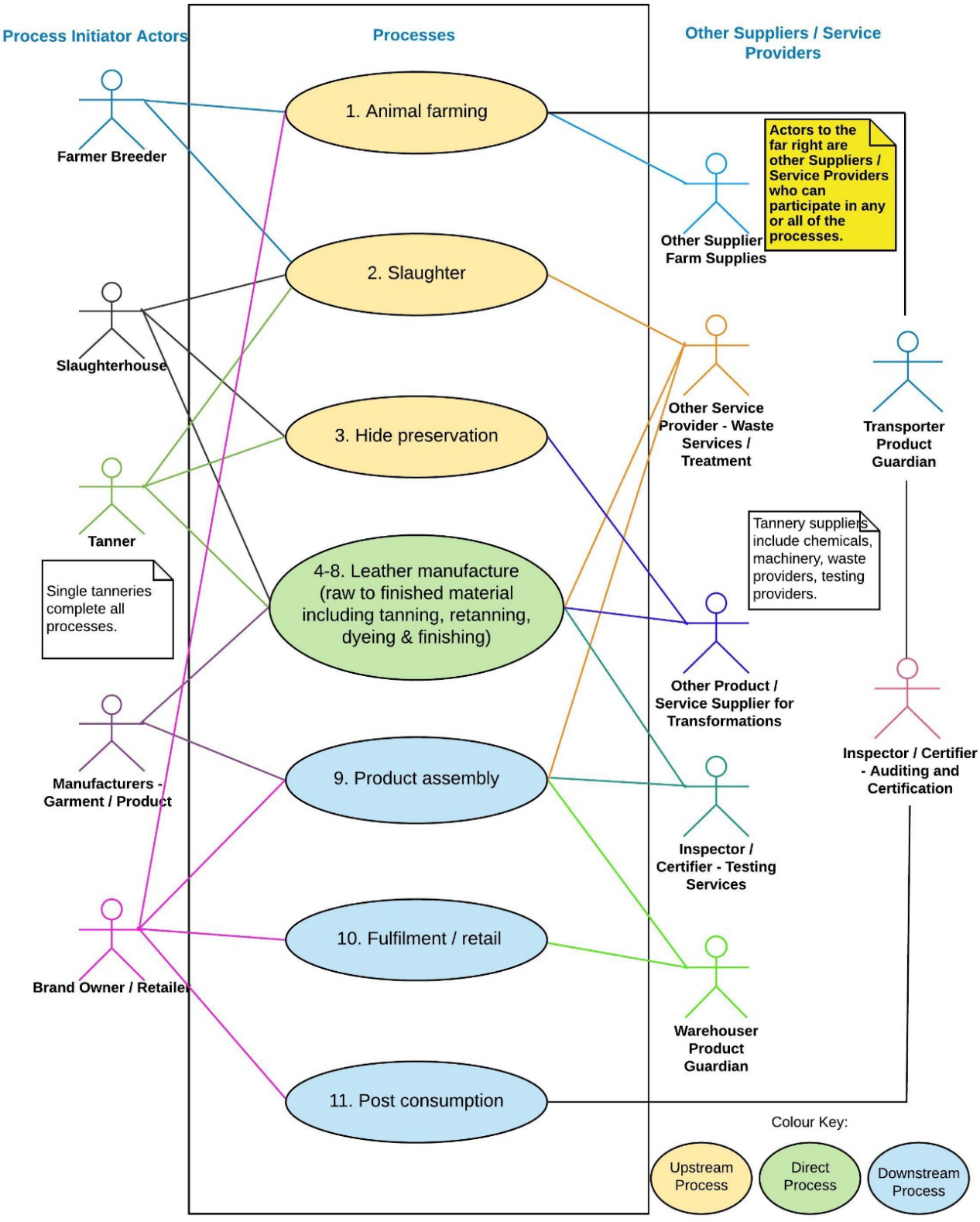
The following use case diagrams show the processes within the leather value chains. The oval descriptions running down the centre of the diagram list the major processes.

- The left-hand side shows the actors who initiate processes.
- The right-hand side shows the other suppliers/service providers who undertake processes initiated by the actors on the left.
- Some actors participate on both sides, but are only shown on one (with an explanatory note).

### 6.2.1 Use case: Complex leather value chain (livestock leathers)



### 6.2.2 Use case: Controlled leather value chain (exotic leathers)



Note:

- Not all processes will necessarily occur in the sequence shown, and some processes may occur more than once. This is an illustrative example, given the various value chain models within the leather sector. The process groupings in this example show where transfers of ownership or production could possibly take place (but not always).
- **Upstream processes** are those that relate to raw material production (e.g. farming, slaughter and preservation).
- **Direct processes** are those that are directly under the control and influence of the tanners/leather manufacturers (i.e. the physical transformation activities from raw hides/skins to finished leather).
- **Downstream processes** are those that are conducted post-leather manufacture (e.g. product manufacturing, product sale, etc.).

# 7 Business information view

## 7.1 Canonical data models

In this chapter the canonical models (simplified models[17]) for the key information entities of a traceability system are described. Not all information entities are listed in the diagrams for clarity reasons. More details can be found on the UNECE-UN/CEFACT web page "Streamlined presentation of UN/CEFACT standards".[18]

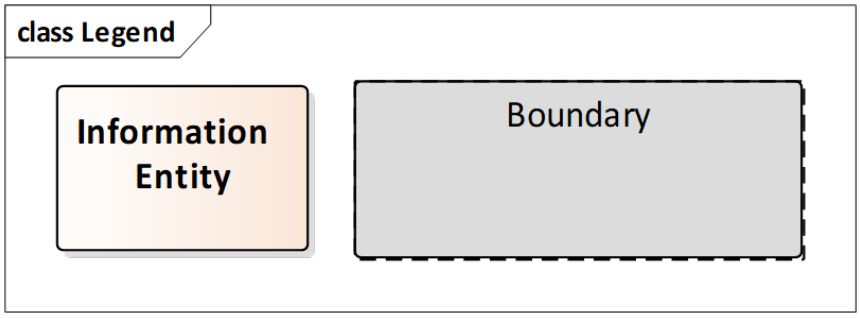
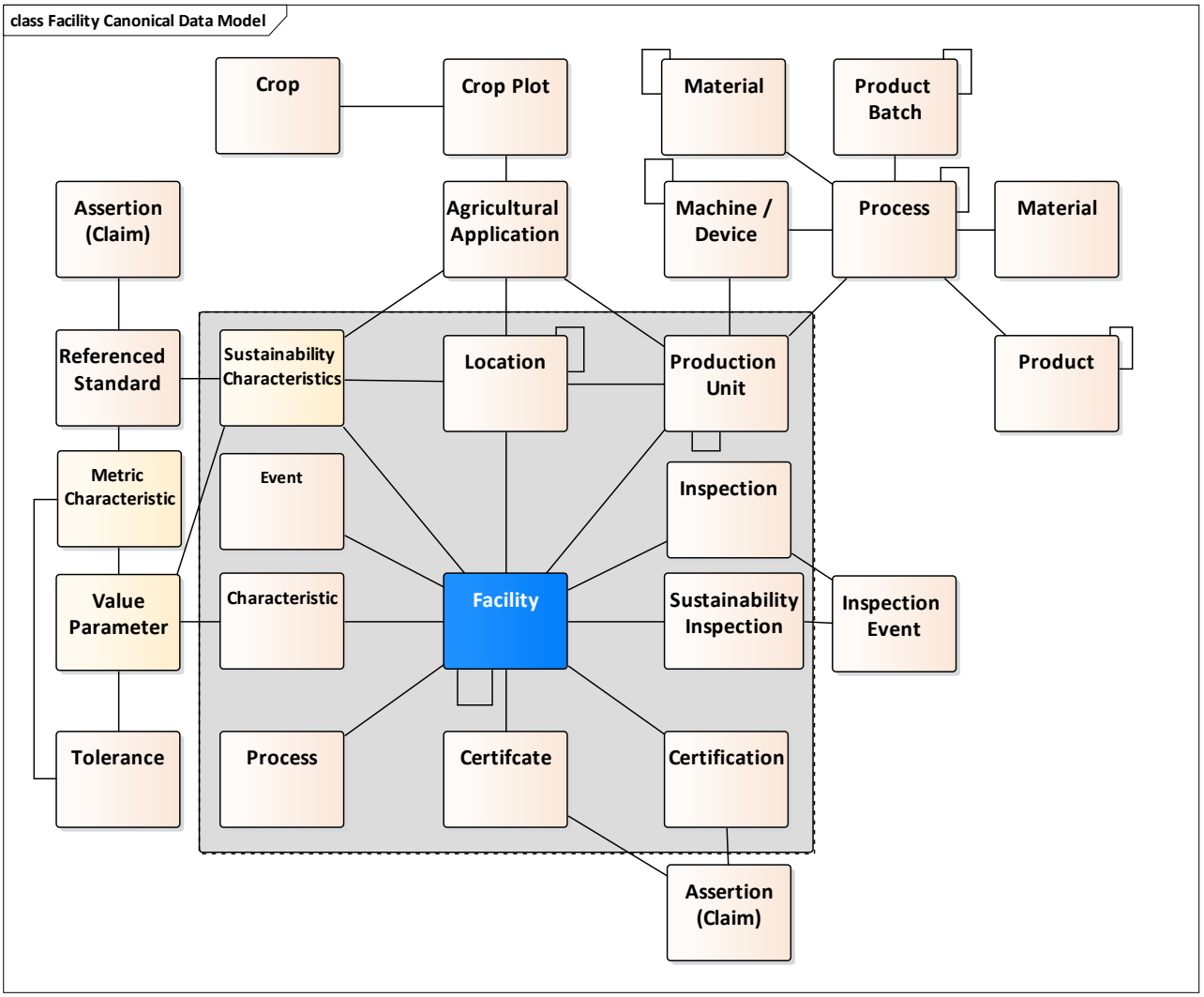



**Figure 7-1 Diagram legend**

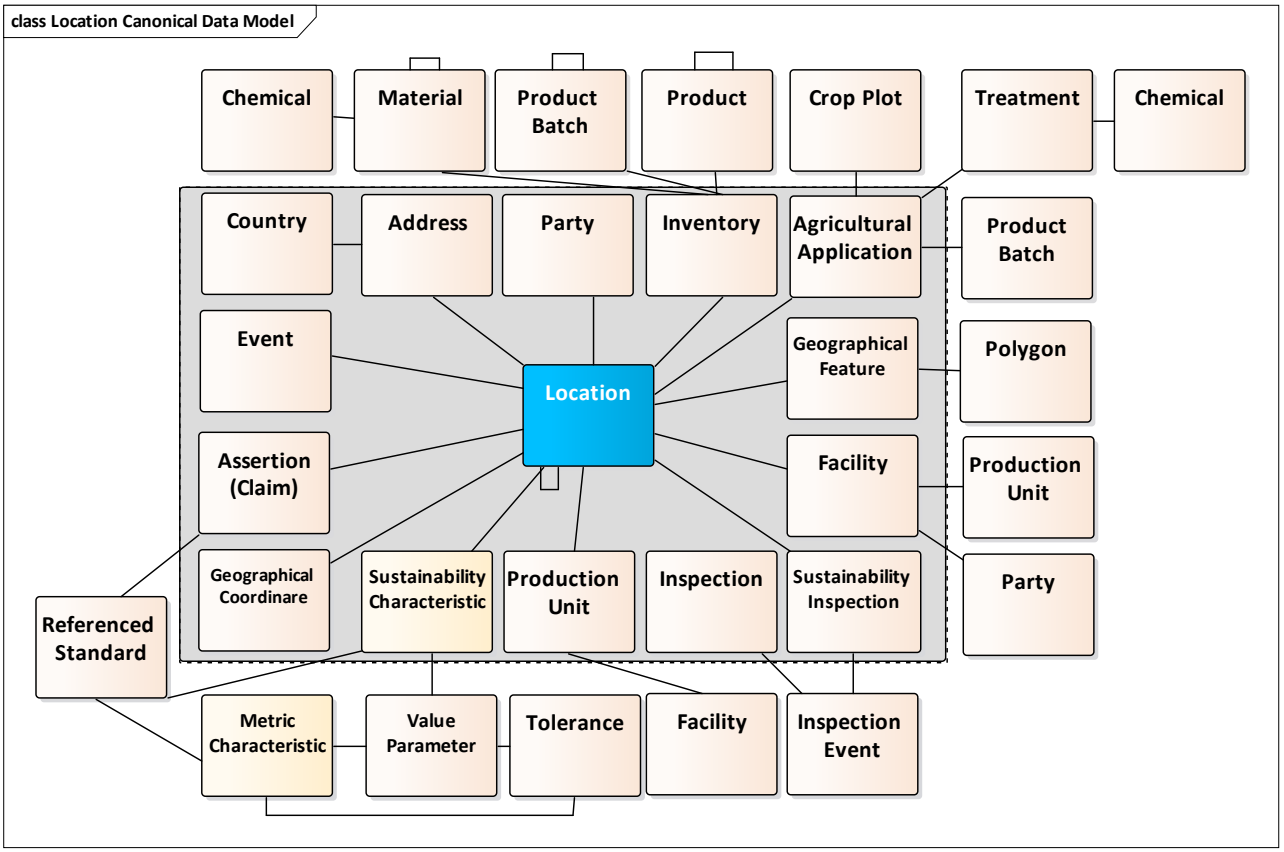
The objective of the boundary within the diagrams is to emphasize the directly related information entities of the canonical data model entity. Not all information entities related to those *directly related* information entities have been presented in the diagrams because of the number of associations that exist. All associations of an entity are also listed on the web page "Streamlined presentation of UN/CEFACT standards".

[17] The canonical data models in this document aim to present information entities and relationships in the simplest possible form in order to integrate processes across various systems and databases. Therefore the technical names (dictionary entry names) for the information entities used in subsection 7.5 and in UNCCL commonly differ.
[18] This will be available as of June 2021 at https://unece.org/trade/uncefact/mainstandards and prior to that from the UNECE-UN/CEFACT secretariat.

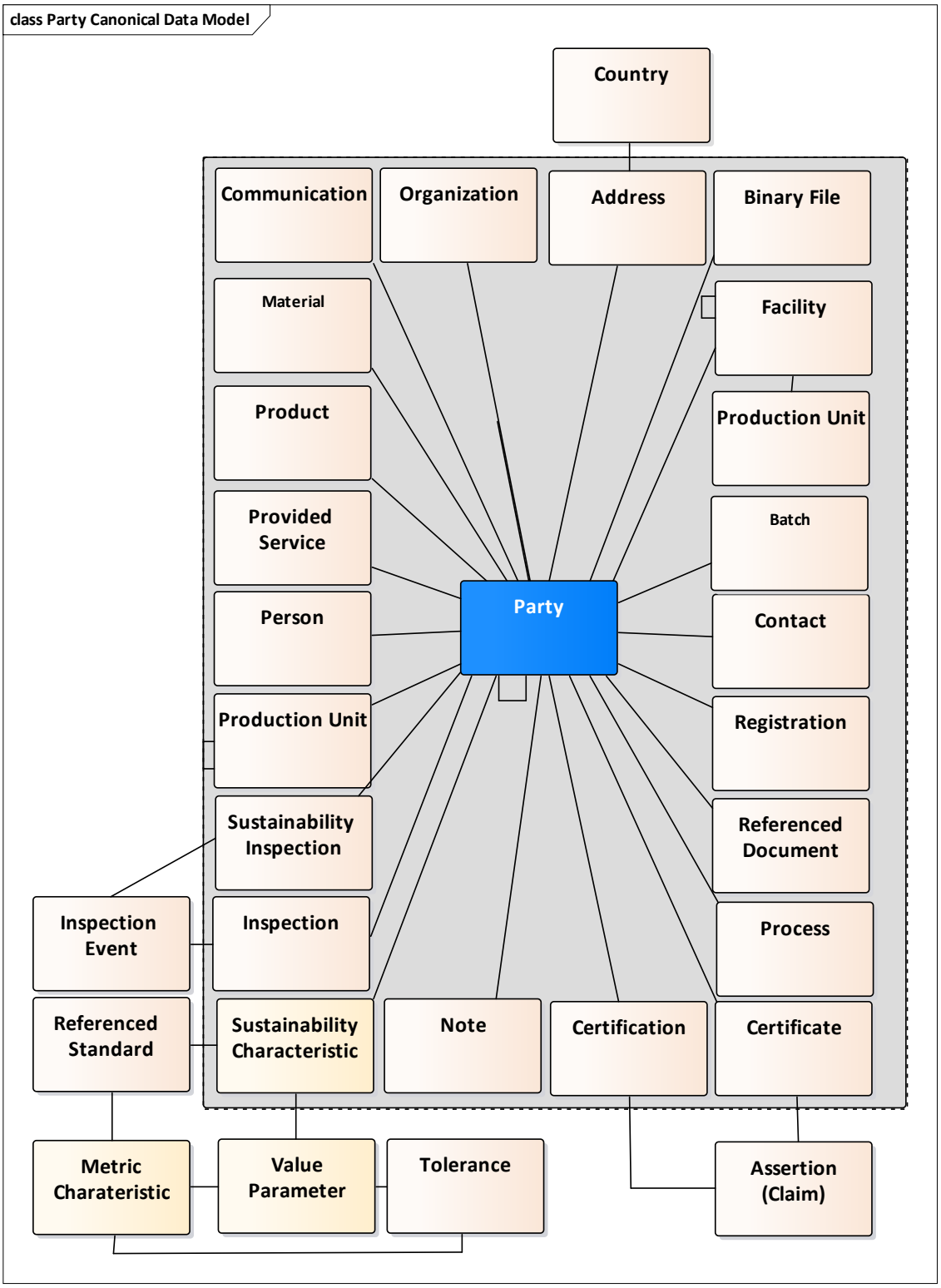
### 7.1.1 Facility Canonical Data Model



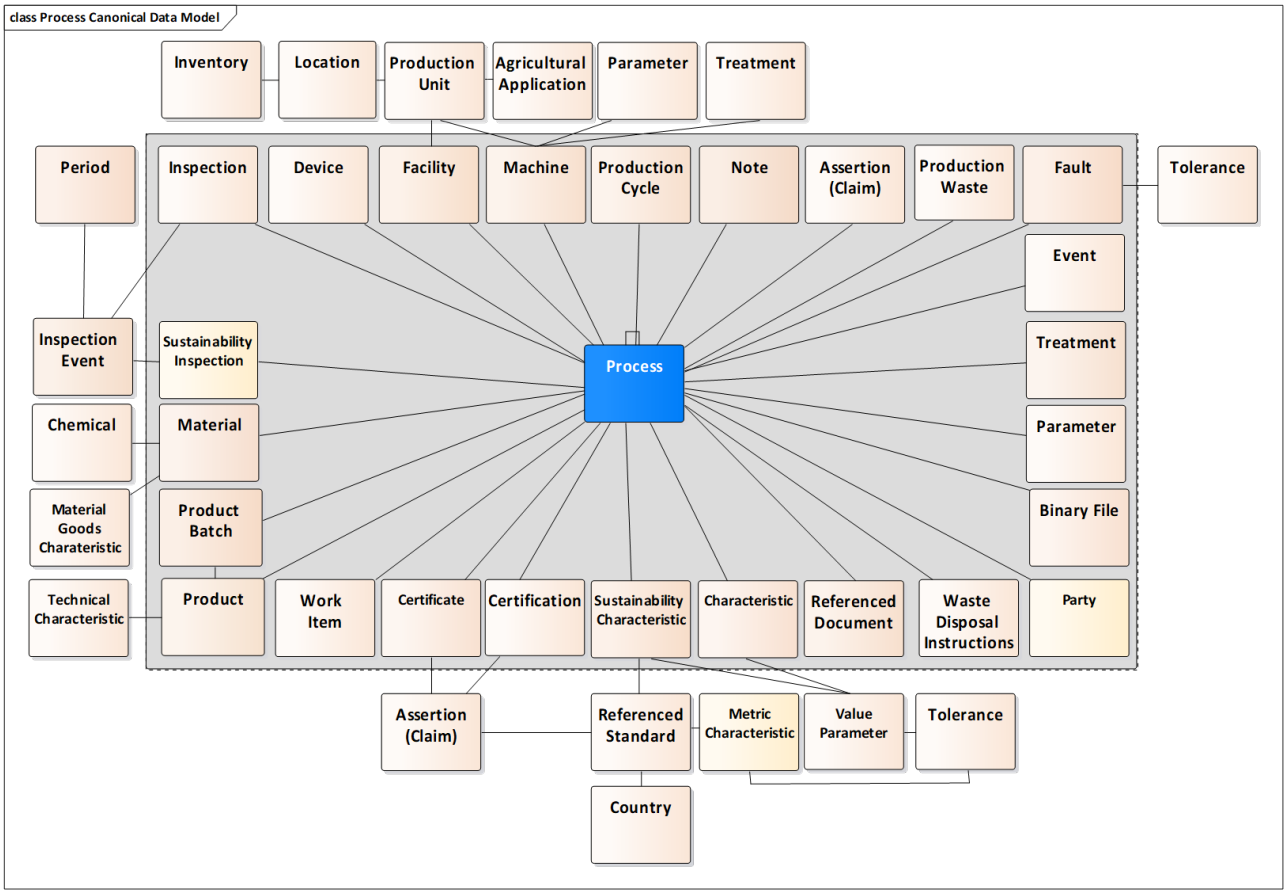
### 7.1.2 Location Canonical Data Model



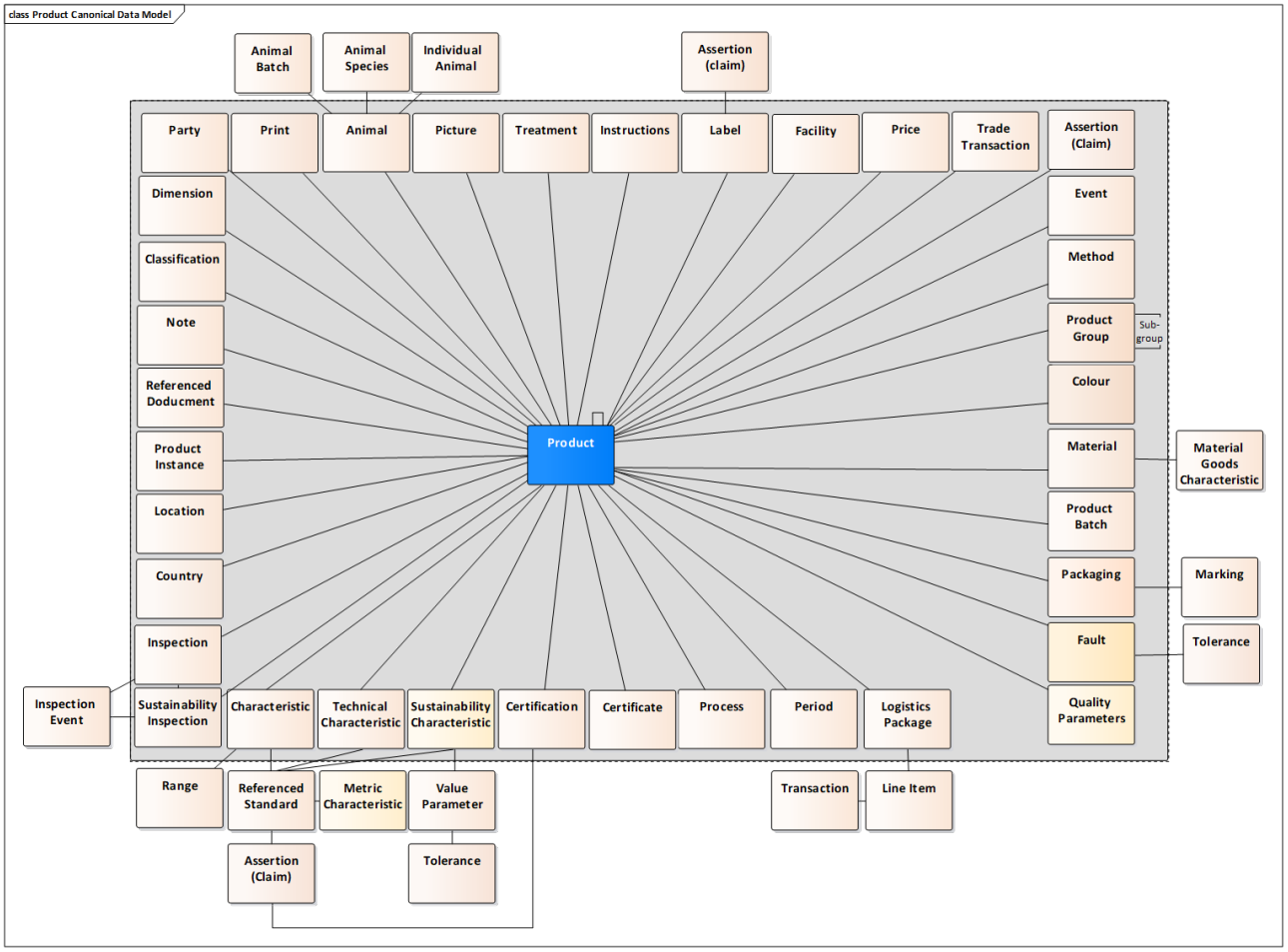
### 7.1.3 Party Canonical Data Model



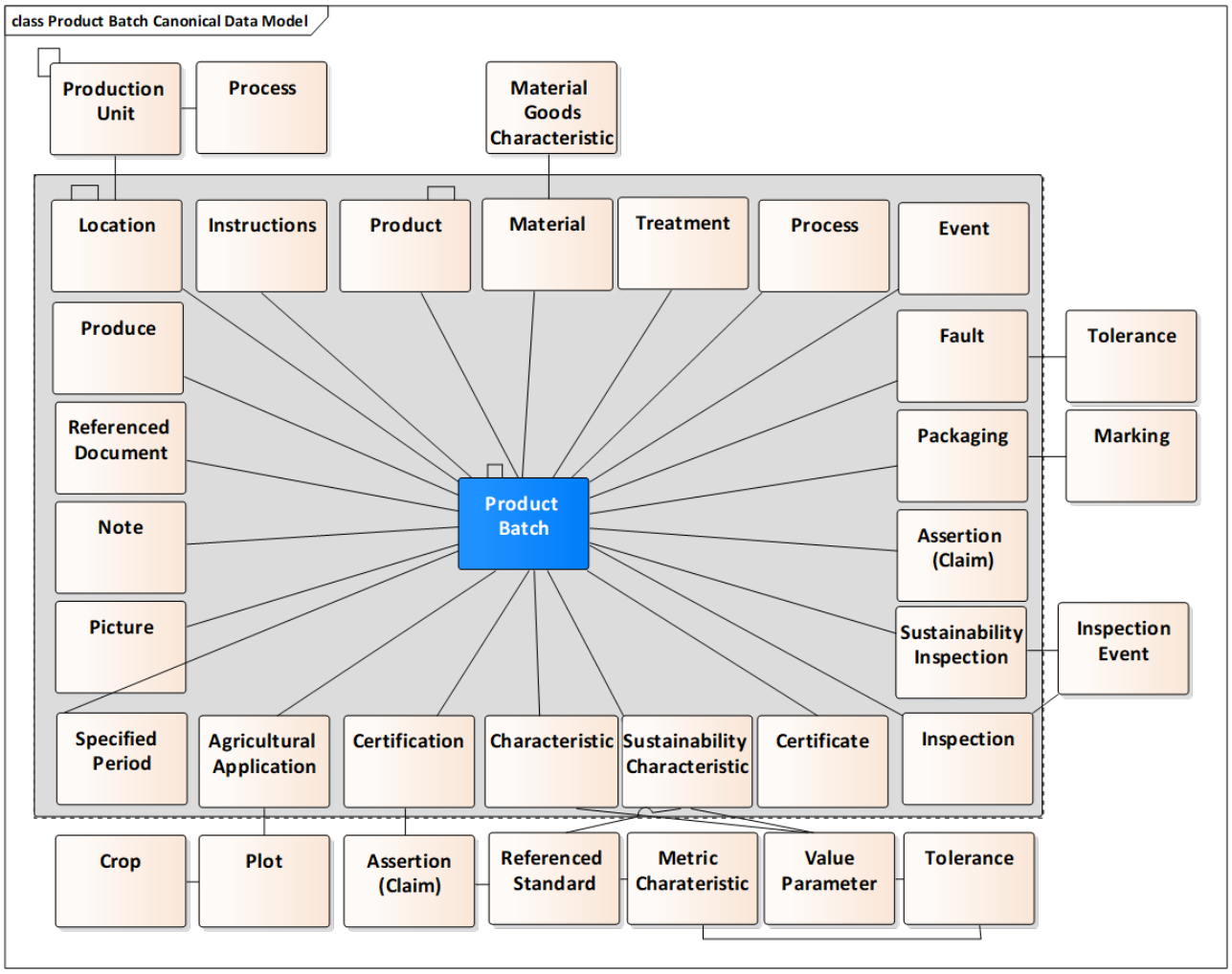
### 7.1.4 Process Canonical Data Model



## 7.1.5 Product Canonical Data Model

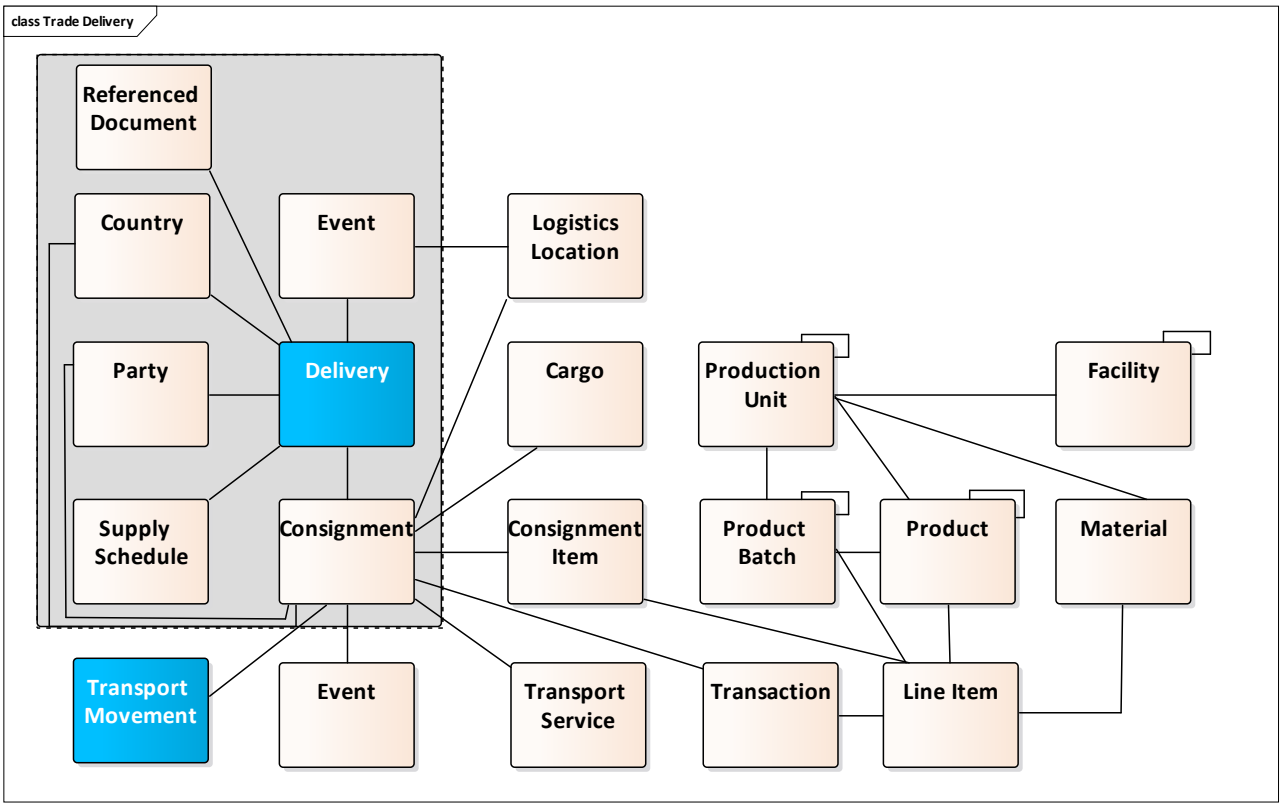


### 7.1.6 Product Batch Canonical Data Model

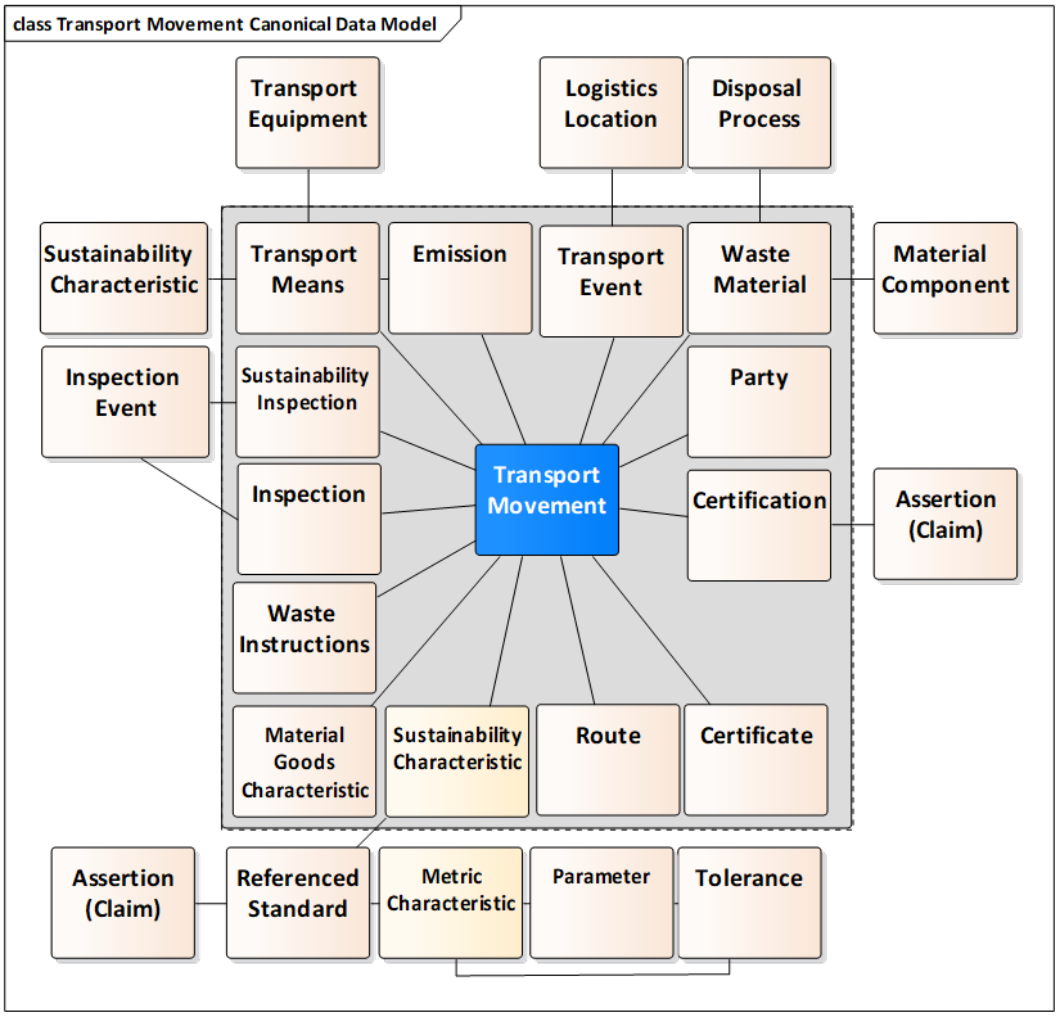


## 7.1.7 Transport Canonical Data Model

### 7.1.7.1 Delivery



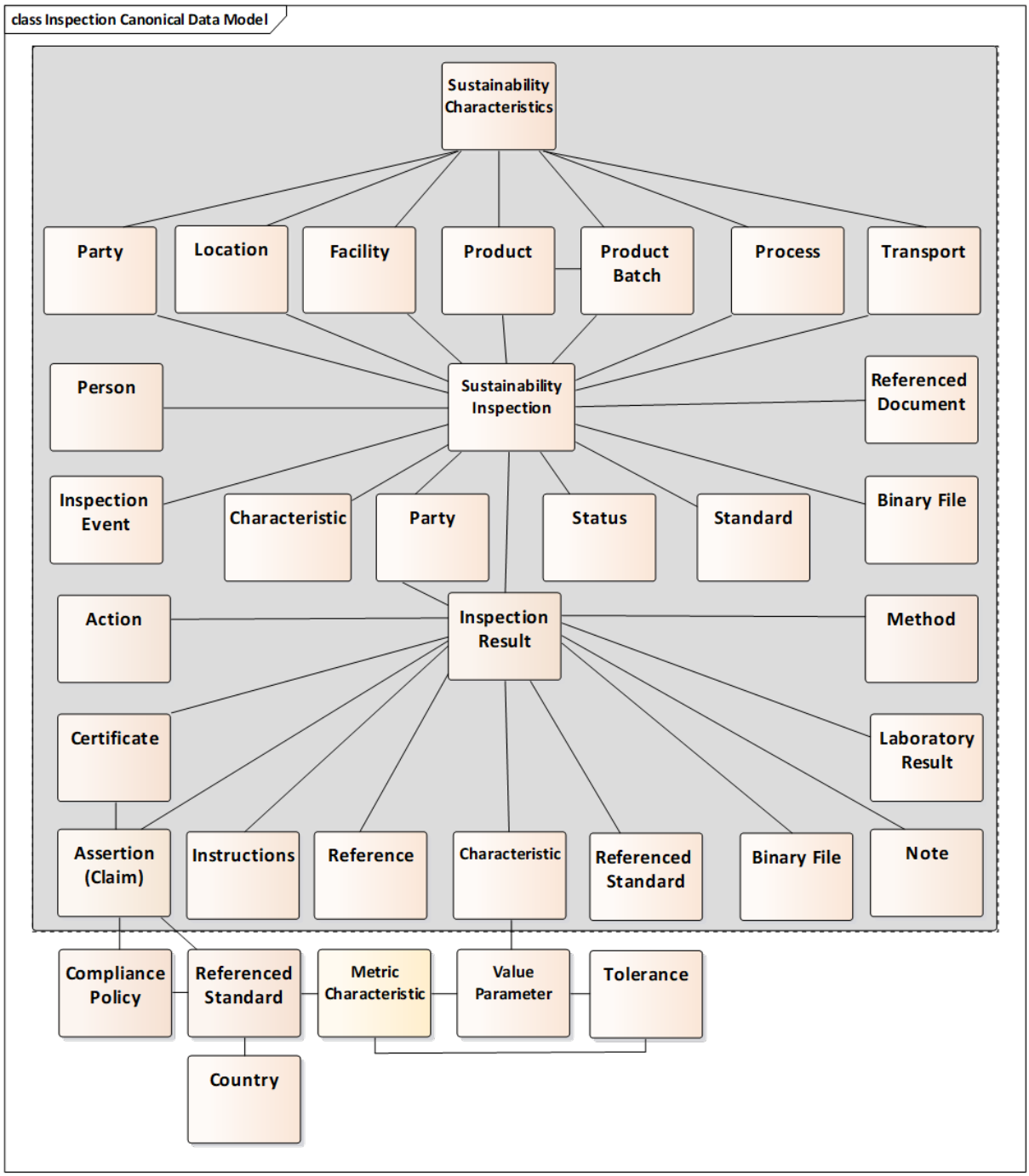
### 7.1.7.2 Transport movement



## 7.2 Sustainability Inspection Canonical Data Model

The sustainability inspection canonical data model relates to sustainable aspects, standards, compliance policies etc. The list below summarizes the information within this model. This part of the reference data model could be used for deriving messages related to inspections.

- **Inspection event(s)**
  - Can take place for a party, location (e.g. crop plot, warehouse), facility, product, product batch, process or transport (movement)
- **Inspection**
  - Party, person, event, method, instructions, note, or event
- **Inspection result**
  - Corrective and/or preventive actions or other actions
  - Obtained certificate(s)
  - Obtained assertion (Claim)
  - Inspection result characteristics
  - Used method(s)
  - Reference(s)
  - Referenced standard
  - Attachment(s) (binary files), notes
  - Interpretation inspection result applicable parameter
  - Laboratory observation result
    - Observation result characteristics
    - Interpretation observation result parameter


class Inspection Canonical Data Model
Sustainability Characteristics
Party
Location
Facility
Product
Product Batch
Process
Transport
Person
Sustainability Inspection
Referenced Document
Inspection Event
Characteristic
Party
Status
Standard
Binary File
Action
Inspection Result
Method
Certificate
Laboratory Result
Assertion (Claim)
Instructions
Reference
Characteristic
Referenced Standard
Binary File
Note
Compliance Policy
Referenced Standard
Metric Characteristic
Value Parameter
Tolerance
Country

## 7.3 Traceability Event Data Model

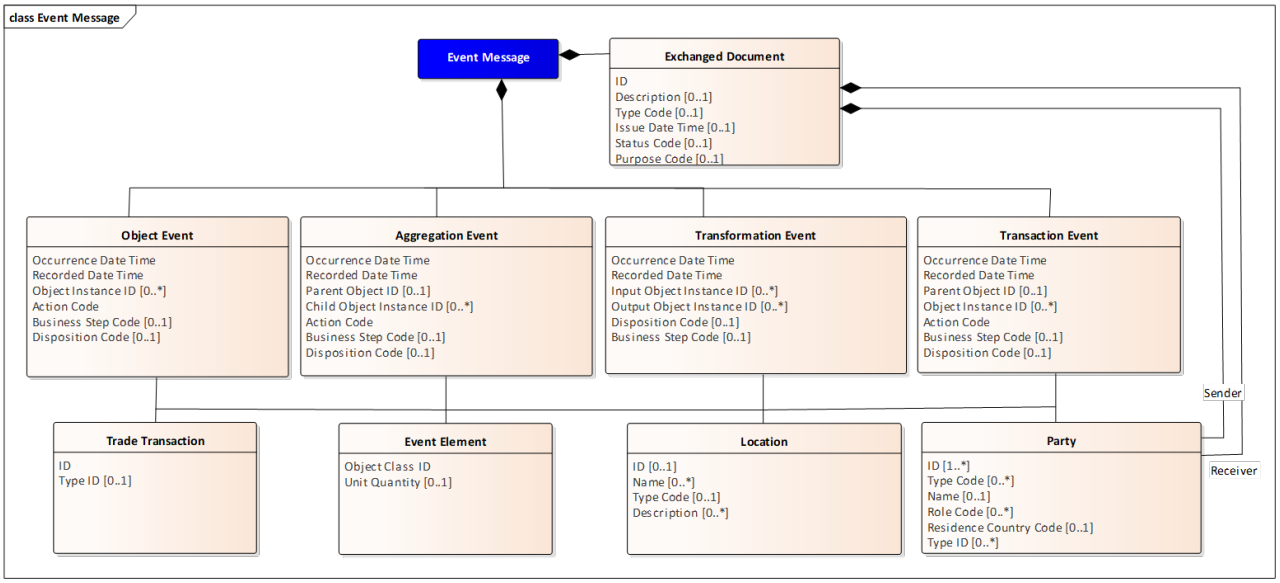



**Figure 7-2 UN/CEFACT Traceability Event Data Model**

## 7.4 Master message structure

| Master message structure | | | | |
|---|---|---|---|---|
| **Type** | **Name** | **Definition** | **Min\ Occurs** | **Max Occurs** |
| **Root** | Exchanged Document Context | The set of context parameters specified for use of this master message assembly | 0 | 1 |
| **Root** | Exchanged Document | A collection of data that is exchanged between two or more parties in written, printed or electronic form | 1 | 1 |
| **Root** | Object Event | Object-event details | 0 | unbounded |
| **Root** | Aggregation Event | Aggregation-event details | 0 | unbounded |
| **Root** | Transaction Event | Transaction-event details | 0 | unbounded |
| **Root** | Transformation Event | Transformation-event details | 0 | unbounded |
| **Root** | Party | Party details | 0 | unbounded |
| **Root** | Animal/Animal Batch | Animal/animal-batch details | 0 | unbounded |
| **Root** | Product/Product Batch | Product/product-batch details | 0 | unbounded |
| **Root** | Production Facility | Production-facility details | 0 | unbounded |
| **Root** | Location | Location details | 0 | unbounded |
| **Root** | Production Process | Production-process details | 0 | unbounded |
| **Root** | Trade Transaction | Trade-transaction details | 0 | unbounded |
| **Root** | Trade Delivery | Trade-delivery details | 0 | unbounded |
| **Root** | Consignment | Consignment details | 0 | unbounded |

## 7.5 CCBDA business information entities (overview)

The tables below contain an overview of all information entities included in the Textile and Leather CCBDA Data Model related to the following areas:

- Sustainability
- Product
- Agriculture
- Transport
- Events

- Production
- Generic

### 7.5.1 Sustainability-related business information entities

| Sustainability | | |
|---|---|---|
| Animal Certification | Laboratory Observation Reference | Referenced Standard |
| Calculated Emission | Material Goods Characteristic | Returnable Asset Instructions |
| Chemical Treatment | Waste Material Recovery Disposal Process | Sample Observation Result |
| Compliance Policy | Metric Characteristic | Sample Observation Result Characteristic |
| Conformance Certificate | Observation Objective Parameter | Specified Action |
| Corrective Action | Organization Certificate | Specified Inspection |
| Crop Protection Treatment | Organization Certification | Specified Inspection Result |
| Disposal Instructions | Organization Characteristic | Specified Material |
| Distinct Chemical | Preventive Action | Specified Method |
| Ingredient Range Measurement | Process Certificate | Specified Parameter |
| Inspection Event | Process Certification | Specified Range |
| Inspection Instructions | Process Characteristic | Specified Tolerance |
| Inspection Note | Process Work Item | Supply Chain Inventory |
| Inspection Person | Product Batch Certificate | Supply Chain Schedule |
| Inspection Reference | Product Batch Certification | Sustainability Assertion |
| Inspection Result Characteristic | Product Batch Characteristic | Sustainability Characteristic |
| Inspection Status | Product Certificate | Sustainability Inspection |
| Laboratory Observation Analysis Method | Product Characteristic | Toxicological Hazardous Material |
| Laboratory Observation Contact | Product Finishing Treatment | Trade Product Certification |
| Laboratory Observation Instructions | Production Waste Component | Transportation Waste Component |
| Laboratory Observation Note | Production Waste Material | Transportation Waste Material |
| Laboratory Observation Party | Production Waste Recovery Disposal Process | Transportation Waste Recovery Disposal Process |

### 7.5.2 Product, agriculture, and transport-related business information entities

| Product | Agriculture | Transport |
|---|---|---|
| Product Batch | Agricultural Application | Logistics Label |
| Product Batch Instance | Agricultural Certificate | Logistics Location |
| Product Classification | Agricultural Characteristic | Logistics Package |
| Product Colour | Agricultural Zone Area | Logistics Shipping Marks |
| Product Label | Animal Batch | Logistics Transport Equipment |
| Product Print | Animal Certificate | Logistics Transport Means |
| Referenced Product | Crop Plot | Logistics Transport Movement |
| Supply Chain Trade Line Item | Crop Produce | Packaging Instructions |
| Supply Chain Trade Transaction | Crop Produce Batch | Packaging Marking |
| Technical Characteristic | Crop Production Process | Referenced Location |
| Trade Product | Field Crop | Supply Chain Consignment |
| Trade Product Group | Individual Animal | Supply Chain Consignment Item |
| Trade Product Instance | Species Animal | Supply Chain Packaging |
| Trade Transaction | Species Product | Transport Cargo |
| Trade Delivery (shipment) | Animal | Transport Route |
| | | Transport Service |

### 7.5.3 Event and product-related business information entities

| Event (Traceability) | Production |
|---|---|
| Supply Chain Event | Facility Production Unit |
| Transport Event | Production Cycle |
| Exchanged Document | Production Device |
| Object Event | Production Facility |
| Transformation Event | Production Machine |
| Aggregation Event | Production Process |
| Transaction Event | Specified Fault |
| Party | |
| Location | |
| Trade Transaction | |
| Event Element | |

### 7.5.4 Generic business information entities

| Generic | | |
|---|---|---|
| Binary File | Photographic Picture | Geographical Coordinate |
| Communication | Referenced Document | Geographical Feature |
| Contact Person | Spatial Dimensions | Geographical Object Characteristic |
| Document Context Parameter | Specified Period | Specified Direct Position |
| Exchanged Document | Tax Registration | Specified Linear Ring |
| Exchanged Document Context | Trade Address | Specified Polygon |
| Government Registration | Trade Contact | |
| Legal Organization | Trade Country | |
| Legal Registration | Trade Party | |
| Note | | |

# 8 Definition of terms

The table below contains definitions for the terms and abbreviations used in this document, which have not been explained in detail in the text.

| Terms/abbreviation | Definition |
|---|---|
| Buy-Ship-Pay RDM | The Buy-Ship-Pay Reference Data Model (BSP-RDM), in combination with the UN/CEFACT International Supply Chain Reference Model (ISCRM), provides a generic reference data model and a framework within which one can accommodate the requirements of (a) cross-border supply chain trade-related transactions, including needs within the government domain for their own specific information exchanges and (b) transport-related processes involved in the cross-border supply chain. This reference data model covers the involved business areas at a high-level, the main parties, and the information involved. |
| Canonical data model | A data model which is a subset of another. |
| Chain of custody | In legal contexts, the chain of custody is the chronological documentation or paper trail that records the sequence of custody, control, transfer, analysis, and disposition of physical or electronic evidence. |
| CITES | The Convention on International Trade in Endangered Species of Wild Fauna and Flora is an international agreement between governments to ensure that international trade in specimens of wild animals and plants does not threaten their survival |
| eBiz | eBiz is the European public-private initiative pursuing the use and greater interoperability of digital communication across the fashion industry supply chain. |
| GS1 | Global Standards One |
| ISO | International Standards Organization |
| JSON | JavaScript Object Notation (JSON) is a lightweight data-interchange format. |
| JSON-LD | JSON-LD stands for JavaScript Object Notation for Linked Data, which consists of multi-dimensional arrays (list of attribute-value pairs). |
| Logistics unit | A logistics unit or package is a self-contained wrapping or container within which goods can be contained for logistics purposes, such as a box or a barrel which can be filled, partially filled, or empty. |
| Product batch | An identified group of not individually identified products or the quantity of anything made in one operation or lot. |
| RFID | Radio-frequency identification uses electromagnetic fields to automatically identify and track tags attached to objects. |
| Sustainability claim/assertion | A statement by a company that its products or services can meet its customers' needs without compromising the ability of future generations to meet their own needs. |
| Traceability system | In this document, this refers to all of the practical processes, procedures and technology needed to create a functional traceability system. It does not refer to the surrounding ecosystem with its policies, incentives, promotion, etc. A traceability system, together with its surrounding ecosystem, forms a traceability framework. Relevant data components include party, transport facility, location, facility, process, product type, product batch. |
| Traceable asset | This is the physical product as a whole or its definite component, or its traded unit that is to be traced/tracked. Within the garment and footwear sector it is "any item (for example an object, a product or other traded item or a service) that needs to be tracked along a supply chain."[19] It can also be thought of as the unit that one wants to trace or record information about in a traceability system. In a garment or footwear value chain it can refer to any manufacturing batch or logistic (packaging) unit of raw materials, intermediary or finished products. In order to track a traceable asset, it needs to be given an identifier. This is most commonly a |

[19] UNECE, *Traceability for Sustainable Trade: A Framework to design Traceability Systems for Cross-Border Trade* (New York and Geneva, 2016) (ECE/TRADE/429).

| Terms/abbreviation | Definition |
|---|---|
| | numeric or alphanumeric code which, either on its own or together with other relevant codes (for example for locations), allow for the tracking of the traceable asset at any point of time and/or back to its origin. |
| UN/CEFACT | United Nations Centre for Trade Facilitation and Electronic Business. |
| UNECE | United Nations Economic Commission for Europe |
| Use case diagram | "A use case diagram … depicts two types of elements: one representing the business roles [actors] and the other representing the business processes [use cases] … An actor in a use case diagram interacts with a use case … [and] … makes an impact on the functionality that you want to model … A use case in a use case diagram is a visual representation of a distinct business functionality in a system."[20] Use case diagrams were originally defined as part of UML[21], the Unified Modelling Language, which is a standardized modelling language. |
| Vertical approach | Creating business information entities for a particular domain, which often cannot be used by other domains. |
| XML | Extensible Markup Language (XML) is a markup language much like HTML. XML was designed to store and transport data. |
| XML schema | An XML schema describes the structure of an XML document. |

[20] Adapted from "Elements of a Use Case Diagram", Penn State College of Earth and Mineral Sciences webpage, https://www.e-education.psu.edu/geog468/l8_p4.html (accessed 7 March 2021).
[21] For more information on UML see https://www.omg.org/spec/UML/About-UML/ (accessed 7 March 2021).