Document summary

<table>
<thead>
<tr>
<th>Document</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Document title</td>
<td>fTRACE - System Guide</td>
</tr>
<tr>
<td>Current document version</td>
<td>2.6</td>
</tr>
<tr>
<td>Document description</td>
<td>Description of the fTRACE system and its requirements for food product tracing by consumers, business partners and other stakeholders using modern devices such as smartphones</td>
</tr>
</tbody>
</table>

Authors

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elisabeth Kikidis</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Frank Kuhlmann</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Carsten Mohr</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Patrik Rothe</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Tim Sadowski</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Angela Schillings-Schmitz</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Ralph Tröger</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Holger Wahl</td>
<td>GS1 Germany GmbH</td>
</tr>
<tr>
<td>Mark Zwingmann</td>
<td>GS1 Germany GmbH</td>
</tr>
</tbody>
</table>
# Table of Contents

## 1. Introduction

1.1 What is fTRACE?  .............................................................. 5
1.2 Beginnings and future perspectives  .................................. 5
1.3 Necessary steps to system participation and roll-out ............. 6
1.4 General system requirements  ........................................... 6
   1.4.1 QUALITY MANAGEMENT SYSTEM  ................................ 6
   1.4.2 FTRACE SYSTEM PARTNERSHIP THROUGH TO THE RAW MATERIAL SUPPLIERS  .................................................. 6
   1.4.3 CONTRACTUAL BASIS  ............................................. 7
   1.4.4 USE OF GLOBALLY UNIQUE GS1 IDENTIFIERS (GLN, GTIN) ............................................................ 7

## 2. fTRACE Traceability Concept

2.1 Data Model  ........................................................................... 8
2.2 Advantages of this approach for the supply chain parties: ......... 8
2.3 Event based Traceability  .................................................... 10
2.4 Pure Product Traceability  .................................................. 11
2.5 Chain of Ownership Traceability  ....................................... 12

## 3. System Architecture

3.1 System Overview and advantages  ...................................... 13
3.2 Data Capture  ................................................................. 13
   3.2.1 DATA CAPTURE OF MASTER DATA  ............................ 13
   • COMPANY / USER MASTER DATA  .................................. 13
   • PRODUCT MASTER DATA  ............................................ 13
   • ACCESS RIGHTS & RULES  ........................................... 14
   • VALIDATION RULES  .................................................. 14
   3.2.2 DATA CAPTURE OF DYNAMIC DATA  .......................... 15
   • EVENT DATA SUBMISSION VIA BROWSER INTERFACE .......... 15
   • EVENT DATA SUBMISSION VIA EPCIS-COMPLIANT MESSAGES TO A SERVLET 15
   • MAINTAINING AN IN-HOUSE EPCIS REPOSITORY FOR EVENT DATA PROVISION 15
3.3 Product coding  ............................................................... 15
   3.3.1 CODING TECHNIQUES WITHIN A PURE B2C ENVIRONMENT (DATA MATRIX OR QR-CODE) .................................. 15
   • DIRECT LINK TO DYNAMIC DATA  .................................. 16
   • STATIC LINK TO PRODUCT DATA  .................................... 16
   • REPRESENTATION OF THE DATA IN THE TWO-DIMENSIONAL CODE  .................................................. 16
   • HUMAN-READABLE REPRESENTATION AND FTRACE LOGO  ............................................................ 17
   3.3.2 CODING TECHNIQUES WITHIN A B2B2C ENVIRONMENT (GS1-128 OR GS1 DATABAR) .................................. 18
   • EXAMPLE FOR GS1-128 CODING OF GTIN AND LOT  .................................................. 18
   • EXAMPLE FOR GS1 DATABAR EXPANDED CODING OF GTIN AND LOT  .................................................. 18
3.4 Data Access  .......................................................................... 19
   3.4.1 B2C DATA ACCESS  .................................................... 19
   • SMARTPHONE APPLICATIONS  ....................................... 19
   • INTERNET BROWSER  .................................................... 20
   • WHITE LABEL SOLUTION  ............................................. 20
   3.4.2 B2B DATA ACCESS  .................................................... 21
   • DATA VIEW  .............................................................. 21
   • DOWNLOAD  .............................................................. 22

## 4. EPCIS message structure

4.1 XML structure  ............................................................... 23
   4.1.1 ROOT ELEMENTS  .................................................... 23
5. **FTRACE AUDITING PROGRAM**

5.1 **INTRODUCTION** ........................................... 34
   5.1.1 CONTRACTUAL CONDITIONS / TESTING ORGANISATIONS .................. 34
   5.1.2 COMPONENTS OF THE FTRACE AUDITING PROGRAM ......................... 34

5.2 **IMPLEMENTATION GUIDELINES** ................................ 35
   5.2.1 DETERMINING AUDIT DURATION ............................................. 35
   5.2.2 CRITERIA FOR EVALUATING THE AUDIT FINDINGS ........................ 36
   5.2.3 DECISION ON THE FTRACE CONFIRMATION OF CONFORMITY ............. 37
   5.2.4 DEADLINES AND VALIDITY OF FTRACE AUDITS, REPORTS AND CONFIRMATIONS .................................................. 37
   5.2.5 APPEALS PROCEDURE ......................................................... 37

5.3 **FTRACE REQUIREMENTS CATALOGUE** ...................... 37
   5.3.1 GENERAL FTRACE REQUIREMENTS ....................................... 37
   5.3.2 FTRACE REQUIREMENTS FOR TRACEABILITY ............................ 39
   5.3.3 FTRACE REQUIREMENTS FOR DATA HANDLING AND DELIVERY ........... 42

5.4 **REVIEW OF DATA SECURITY** .................................. 42

6. **DESCRIPTION OF THE FTRACE BRANDING** .............. 43

6.1 **THE TRADEMARKED NAME** .................................. 43

6.2 **THE TRADEMARKED LOGO** .................................. 43
   6.2.1 CMYK COLOUR SPECIFICATIONS .................................. 44
   6.2.2 RGB COLOUR SPECIFICATIONS .................................. 45
   6.2.3 COLOUR SPECIFICATION IN OTHER COLOUR SYSTEMS .................. 46
   6.2.4 TYPOGRAPHY AND PROPORTIONS .................................. 48

7. **LIST OF ABBREVIATIONS** .................................. 49

8. **LIST OF REFERENCES/RESOURCES** ....................... 50

9. **ANNEX** ......................................................... 51

9.1 **USE OF GLN, GTIN, AND SSCC** ............................ 51
   9.1.1 GS1 COMPANY PREFIX .............................................. 51
   9.1.2 GLN FORMAT ......................................................... 51
   9.1.3 GTIN FORMAT ......................................................... 51
   9.1.4 SSCC FORMAT ......................................................... 51
   9.1.5 GLN, SSCC AND GTIN CHECK DIGIT CALCULATION ...................... 52
   9.1.6 SUPPORTED FORMAT OF THE BATCH/LOT OR SERIAL NUMBER AS USED IN CONJUNCTION WITH GTINS ........................................... 53

9.2 **CONVERTING GLN, GTIN AND SSCC INTO THE EPC FORMAT** .... 53

9.3 **TEMPLATE FOR EXCHANGING COMPANY/USER MASTER DATA** ....... 54

9.4 **TEMPLATE FOR EXCHANGING PRODUCT MASTER DATA** .......... 55

9.5 **TEMPLATE FOR EXCHANGING PRODUCT MARKETING DATA** ........ 56
1. Introduction

1.1 What is fTRACE?

fTRACE is an traceability platform developed by GS1 Germany for tracing food and non-food products, as well as for giving additional information about the product, its origin and production history. The information can be obtained by either scanning a barcode or two-dimensional code using a smartphone or other reading device, or by entering the data into the www.ftrace.com website from a computer.

GS1 Germany provides a smartphone app for B2C purposes. This app enables consumers to scan a two-dimensional barcode on a product package. Encoded in the two-dimensional barcode is a URL containing, e. g. the GTIN and the batch number of the specific product. The app interprets this information, processes them and sends a query to the fTRACE server. The fTRACE server returns the traceability data and the app presents it to the customer.

Alternatively, the consumer can get the same information by entering the human-readable fTRACE code on the packaging directly on the www.ftrace.com website.

fTRACE provides information directly at the point of sale making it the perfect tool for winning the trust of consumers.

fTRACE is a neutrally driven platform on the basis of GS1 standards and decentralized data management thus offering

- a convenient, scalable system to fulfill the legal traceability requirements whichs
- covers both B2B as well as B2C requirements
- integrate each supply chain party on his specific technical performance level in an optimized way (e. g. SME’s via easy to use web interfaces).

Today this service – originally focussed on the information requirements of consumers – covers Business-to-Consumers (B2C), Business-to-Business (B2B) as well as Business-to-Government (B2G) traceability needs.

Participants at various different stages of the supply chain are involved in the fTRACE system to ensure that the product information is made available according to a specific set of criteria and in a controlled way.

Thanks to the involvement of partners at different stages of the supply chain and the use of a standardised, monitored set of criteria for the individual pieces of information, the end result should be transparency for the consumer and a positive effect in terms of product marketing.

1.2 Beginnings and future perspectives

The development of fTRACE started in 2011 to meet practical needs. At the time, the initial focus was on the raw and processed meat products sector. The system was designed from the outset as an open and extensible solution for other product segments of the food industry.

fTRACE was integrated into the product portfolio of GS1 Germany GmbH in March 2012. This represented an important step towards safeguarding the service and ensuring its continued development by a neutral entity in terms of suppliers, industry and trade, and enhancing the application through the integration of GS1’s tried-and-tested identification and data transmission standards.

The aim of the latest developments is to make fTRACE available as a cross-sector tool for other fresh food segments, such as fruit and vegetables, fish or dairy products. fTRACE is also being rolled out beyond the borders of Germany as a European and eventually global information tool.
catering to consumers’ needs.

1.3 Necessary steps to system participation and roll-out

1. Internal review of the contract documents and information about the data needed, data exchange formats and other fTRACE requirements
2. Internal clarification as to whether the current production processes, the system of batch creation/batch allocation of the final products up to goods inwards for the information to be submitted, as well as the internal procedures for data capture and product coding are capable of providing the information required by fTRACE
3. Internal clarification as to whether the raw materials’ suppliers and prior stages are (or should become by their own) fTRACE system partners
4. Agreement on the configuration of fTRACE output media, barcode option and data capture option with GS1 Germany
5. Determination of company’s internal adjustments, resources and time frames that may be required
6. Signing the fTRACE contract
7. Testing / onboarding phase (recommended)
8. Connection to the system by fTRACE team in collaboration with in-house IT department

1.4 General system requirements

1.4.1 QUALITY MANAGEMENT SYSTEM

To be eligible as an fTRACE system partner, you need to have a certified system for quality management and food safety with an up-to-date, valid certificate. The relevant certificates must be submitted to GS1 Germany along with the participation agreement and presented on an annual basis thereafter. GS1 Germany considers the following GFSI-recognised certification standards to be adequate and acceptable:

- IFS
- BRC
- FSSC 22000
- Other standards following evaluation and approval by GS1 Germany

1.4.2 FTRACE SYSTEM PARTNERSHIP THROUGH TO THE RAW MATERIAL SUPPLIERS

In order to submit information about raw material and semi-finished product suppliers, they must themselves be fTRACE system partners. The partner has to ensure this before entering product information into the fTRACE system. This also applies if alternative raw material suppliers or semi-finished product suppliers are used at a later date. You can find out which raw material suppliers are already fTRACE system partners at www.ftrace.com.

Subsequently, a list of exceptions for specific production stages of different sectors:

- Raw and processed meat products sector: primary production (farming) is excluded
- Fish and aquaculture product: primary production (fisherman, farming) is recommended, technical requirements are given by the fTRACE System

1.4.3 CONTRACTUAL BASIS

The fTRACE system involves participants at various different levels of the supply chain so that product information can be provided within a carefully monitored process and according to a specific set of criteria. Participation in the system requires a signed contract between the market operator as data supplier and GS1 Germany as the operator of the fTRACE platform.

Contract documents can be requested from the fTRACE Team.

1.4.4 USE OF GLOBALLY UNIQUE GS1 IDENTIFIERS (GLN, GTIN)

Within fTRACE the globally unique identification schemes of the GS1 system are the fundamental basis of communication and a prerequisite for each system partner.

For the identification of any supply chain party the GS1 Global Location Number (GLN) is used. For the identification of any item, regardless if it’s raw, semi-finished or finished product, the Global Trade Item Number (GTIN) is used. The following figure shows the impact of the GS1 identification schemes for fTRACE.
2. fTRACE Traceability Concept

2.1 Data Model

The underlying traceability concept is based on a decentralized approach in which fTRACE provides one database within a network of data pools. This concept enables companies with low ICT infrastructure to store information in the fTRACE database and to also incorporate companies with a more sophisticated ICT and knowhow, e.g. with an own EPCIS system.

2.2 Advantages of this approach for the supply chain parties:

1. Compliance with the statutory minimum requirements for traceability

fTRACE enables the statutory minimum requirements with regard to traceability to be implemented and maintained in accordance with the applicable product category-specific legal provisions. It simultaneously allows each party to uphold its responsibility for its stages of the supply chain. fTRACE consolidates the individual stages and information using standardised identifiers and technologies; from the producers or suppliers of raw materials through the various production and processing stages up to the distribution of the goods.

2. Reducing costly bilateral communication

A data supplier can grant direct reading rights to his data to downstream or upstream partners. This eliminates the costly separate reporting of the legally required traceability data in favour of centrally storing data, so that the data can be made available to all relevant bodies. The data suppliers can individually set these reading rights according to the various roles of the parties along the value chain.

3. Better communication of business practices to consumers and supply chain partners

Besides fulfilling the statutory "minimum requirements", fTRACE offers raw material suppliers, manufacturers and parent brands room for more transparency and for the provision of information concerning the business’s performance. For instance, it can be used to highlight relevant aspects of the corporate culture, principles of the purchasing policy and quality
philosophy, sustainability awareness and measures, regional sourcing concepts etc. It also offers the possibility of using pictures or videos of the production facilities to help the business transition from being an "anonymous" supplier to becoming viewed as a trusted partner by the consumer.

4. Making consumers and supply chain partners more aware of product-specific features

fTRACE offers manufacturers and brand owners more space to provide further information about product-specific features. This may involve such things as highlighting a product’s special quality characteristics (or also seals of approval) or providing additional information about the harvesting, production and maturation processes of a product. Among other things, this can include information on allergens, processing and hygiene recommendations, aspects of animal welfare for products of animal origin and even recipe suggestions.

5. Trusted Source of Data: reliable data sources guaranteed

The number of Internet and smartphone applications intended to satisfy the consumer’s increasing demand for information is on the rise. The information they provide on a product is, however, often compiled in an unfiltered manner from disparate Internet sources and is often of dubious quality. In contrast, fTRACE is based solely and exclusively on data that are provided and authorised by the owners of the respective process in the value chain. This means that only trustworthy and reliable data sources are used.

6. Data delivery: Simple and cost effective to implement

fTRACE provides small and medium-sized enterprises with easy-to-use, future-proof web-based interfaces for entering data. Larger companies benefit from the ability to deliver data automatically or to store it on their own servers and use standardised interfaces for its retrieval. Since fTRACE is a web-based application, no additional software needs to be installed.

fTRACE’s special network architecture eliminates redundant data along the value chain, reduces complexity and lowers costs. Integration with leading business software systems is straightforward too. fTRACE experts can provide assistance to ensure the quick and smooth implementation of the system.

7. Data access: Fast retrieval and clear presentation of information

fTRACE’s efficient, scalable architecture provides a cross-company, global view of product units and their individual histories. What's more, the recorded data can be accessed over the Internet by all those involved (depending on the access rights set by the data provider), from anywhere in the world. Suitable output channels, such as modern smartphone apps for consumers, are already available. The data are graphically represented in an easily comprehensible format showing various levels of detail. In this way, a producer can view all upstream and downstream traceability events concerning his product batch (depending on the access rights granted). This allows him to quickly ascertain whether his production batches are affected, in the event that a specific product is recalled. fTRACE assists the supply chain partner in quickly attending to consumer safety issues, protecting the reputation of his company and avoiding risk.

8. Realising competitive advantages by getting a head start

fTRACE partners benefit from becoming early adopters as they increase their proficiency with regard to traceability requirements and the implementation of suitable technical solutions. Doing so underscores their competence in the eyes of existing and potential business partners and gives them an edge over competitors.

9. Shared usage throughout the value chain reduces costs for everyone involved

fTRACE is designed as a neutral platform for all the partners involved in a value chain. When an industry sector opts for a standardised solution, such as fTRACE, it obviates the need for customer-specific, proprietary solutions that inevitably require manufacturers and their suppliers having to build numerous customised data interfaces. fTRACE makes it possible for everyone involved to benefit from all the features the system has to offer at any time and at relatively little cost for the individual companies (cost effectiveness through standardisation).
10. Investment security

fTRACE is based on global GS1 standards and cutting edge platform-independent technology. The platform is operated and developed by the independent, not-for-profit organisation, GS1 Germany, and supported by the local GS1 country organisations. This guarantees a solution that is future-proof, standards-based and that takes into account the interests of all the partners along the value chain.

2.3 Event based Traceability

fTRACE is based on event data which is created in the process of carrying out business processes. When looking at the supply chain different kinds of traceability relevant events happen. With fTRACE and on the basis of the global and open GS1 interface standard EPC Information Services (EPCIS), business partners can record and disseminate events throughout their value chain. Each EPCIS event message contains information about four “dimensions”:

- **what** (e.g. GTIN + Lot)
- **when** (e.g. date and time)
- **where** (e.g. business location)
- **why** (e.g. business context)

![Event based Traceability Diagram](image)

The end result is a continuous series of events that make it possible to track and trace goods throughout the process at any time.

Example: When was the fish caught and in which area? When have which animals been slaughtered and by whom? What raw material lots have been used to produce a finished product lot?

This also allows for retrospective analyses that can reveal opportunities for optimisation.

The basic event types that are of interest in fresh products value chains like meat, fish, fruits & vegetables can be divided into 4 categories:

1. Raw Material Harvesting (e.g. fishing, aqua-culturing, farming, harvesting, slaughtering),
2. Sending/Receiving,
3. Transforming (e.g. processing, preserving),
4. Packing/Unpacking.

## 2.4 Pure Product Traceability

The Pure Product Traceability enables to determine the chain of production from the initial raw material harvesting up to the final product lot and vice-versa. The Pure Product Traceability allows answering to such typical questions like

- When, where and how has the fish been caught or the cow been slaughtered?
- Where/by whom has the raw material been processed?
- Which ingredients does the product consist of?

For Pure Product Traceability two kinds of events should be provided: the initial raw material harvesting event and all transformation events this raw material undergoes up to the final product.

This enables the tracking and tracing of the product history with all ingredients.

![Figure: upstream tracing](image1)

![Figure: downstream tracking](image2)
2.5 Chain of Ownership Traceability

In addition to the Pure Product Traceability the Chain of Ownership Traceability enables to provide the physical flow of goods including all changes of ownership / custody as long as the process owners are fTRACE partners and provide the process events. This approach allows answering additional questions like

- How does the whole Supply Chain look like?
- Where is a lot located right now?
- Which products have been shipped to me yesterday?

In order to perform Chain of Ownership Traceability more events need to be stored in the database.

For fTRACE and to fulfil legal requirements it is at the moment not required to perform Chain of Ownership Traceability.
3. System Architecture

3.1 System Overview and advantages

Within fTRACE three domains have to be distinguished:

- **Data Capture**
  Components responsible for collecting data and transfer that data into the fTRACE system, e.g. company master data, product master data

- **Product Coding**
  Data Carrier in combination with the encoded GS1 key, e.g. DataMatrix and GTIN / Lot

- **Data Access (or Data request)**
  Components responsible for making fTRACE data accessible according to the access rights, e.g. B2C Data Access

3.2 Data Capture

For the capturing of data different types have to be taken into consideration:

- Company Master Data
- Product Master Data
- Access Rights & Rules
- Validation rules
- Event data

3.2.1 DATA CAPTURE OF MASTER DATA

- **COMPANY / USER MASTER DATA**
  The master data for companies and users mainly consist of GLNs (Global Location Numbers) address data, contact details and system access details (including user & password management). For the capture of those kind of information an easy-to-use word or excel template has to be filled out and e-mailed to the fTRACE team before starting to exchange product related data (Please see annex 9.3 for more details).

- **PRODUCT MASTER DATA**
  The master data for products mainly consist of
  
  - generic item information like GTINs (Global Trade Item Numbers), unit of measure, raw/semi-finished/finished product, assortment, brand owner
  - assortment specific data like e.g. species, production method
  - marketing data for describing e.g. the quality philosophy of the company, the production method and details, recipes, photos and videos etc.

  For the capture of the first two information sets assortment specific excel templates can be used and emailed to the fTRACE team before starting to exchange batch related (dynamic) data (please see annex 9.4 for more details).

  For the capture of the marketing data a word template (product profile) has to be used. Product profiles must be completed by the system partner, and all external elements (videos and pictures) attached to the document as a separate file. To ensure timely activation, GS1 Germany
must be supplied with the product profiles at least two weeks prior to the product in question being distributed.

Changes to the product profiles can be made within a two-week period if:

1. the changes do not involve a complete change of the original version,
2. they are submitted at least 3 days prior to distribution (not including weekends).

Every system partner receives regular previews of the article’s web page during this time. These must be approved in writing by the system partners before “going live” (please see annex 9.5 for more details).

- **ACCESS RIGHTS & RULES**

The master data for access rights and rules are quite important and control which part of the dynamic data are accessible by whom. The capture of this master data is directly typed in by the user. A company should select therefore one of its users to the “Access Right Manager”. He or she can record the access rights per traceability event by either allowing all data to be accessed by a specific role (or company) or allowing only a subset of data to be accessed by a specific role (or company). Roles are for example predecessors in the supply chain, successors in the supply chain, brand owners, consumers…

The capture of access rights & rules data is executed under http://ftrace.com/cms by choosing the menu item “Rights”. (Access is only permitted with B2B user credentials) Please see below two examples of different rules:

Left side: Access rights for all predecessors valid for fishing event data of the company with the GCP (Global Company Prefix, Part of the GLN).

Right side: Access rights for third parties, e.g. authorities, retailers, brand owners

- **VALIDATION RULES**

The master data for validation rules are mainly defined centrally within fTRACE according to the sense, regulatory definitions and/or common understanding of an attribute or set of attributes. As an example the options for indicating a country (e.g. country of origin) are clearly defined by a code list (the ISO country codes). With regard to mandatory and optional attributes there exists a recommended definition for each assortment mainly based on the legal requirements. This definition can be customized if e.g. a branch agrees on more detailed traceability documentation.
3.2.2 DATA CAPTURE OF DYNAMIC DATA

Dynamic data are mainly lot based data which change from one lot to the other. The capturing of dynamic data is done by entering and/or submitting the relevant traceability events. As already explained in chapter 2 the combination of relevant traceability events is mainly influenced by the degree of traceability which should be achieved. The fTRACE service offers three alternatives for making those event data available.

- Event data submission via Browser interface to the fTRACE EPCIS
- Event data submission via EPCIS-compliant messages to the fTRACE EPCIS
- Maintaining an in-house EPCIS repository for fTRACE Event data

EVENT DATA SUBMISSION VIA BROWSER INTERFACE

This kind of data capturing is suitable for companies with no or limited ICT infrastructure and rather low data volumes. It just requires a terminal device (tablet computer, laptop, etc.) with an internet connection.

Note: A manual for the Data Entry Website is provided in the respective domain-specific amendments to this system guide.

EVENT DATA SUBMISSION VIA EPCIS-COMPLIANT MESSAGES TO A SERVLET

This kind of data capturing is appropriate for companies with medium to high data volumes and their own ERP system with corresponding ICT infrastructure.

Note: Along with sector-specific accompanying documents, this system guide provides all required information (syntax, data elements, interfaces, etc.) to enable organisations transmitting their data that way. What is more, it gives advice as to testing the interface.

MAINTAINING AN IN-HOUSE EPCIS REPOSITORY FOR EVENT DATA PROVISION

This kind of data provision is suitable for high data volumes and where there is an EPCIS-compliant ICT infrastructure (EPCIS server). The owner has to ensure a high level of availability of data as well as the appropriate access rights for the fTRACE system.

3.3 Product coding

The access key to the encoded events is a so called Electronic Product Code (EPC). Within fish, meat and fruit & vegetable the EPC consists of the GTIN and Lot. In order to encode this data set in a way that it can be read by the relevant parties and their available reading devices different coding techniques are to be used. In general the GS1 Application Identifier Approach is applied which means that each the GTIN and Lot are announced through a clearly defined signifier (Application Identifier). A third parameter, the Uniform Resource Locator (URL), has to be encoded in case that common smartphone readers should be able to decode the barcode or two-dimensional code.

3.3.1 CODING TECHNIQUES WITHIN A PURE B2C ENVIRONMENT (DATA MATRIX OR QR-CODE)

Within a pure B2C environment the data has to be made available for end consumers in a way that only little efforts have to be undertaken by end consumers in order to get access to the data.
Therefore widely used two-dimensional codes like data matrix or QR codes are the first choice to encode the URL, GTIN and – if possible – lot/batch on the end consumer unit.

As today’s two-dimensional reader apps are not yet able to decode a standardized GS1 data structure fTRACE supports as well a non-GS1-compliant data format as a migration solution. At least the Application Identifiers for GTIN and lot have to be used.

**DIRECT LINK TO DYNAMIC DATA**

The encoded data structure which leads directly to the traceability data of a product has to consist of:

- GTIN (application identifier 01), assigned by the brand owner
- Lot number (application identifier 10), specified by the system partner (maximum 20 alphanumeric characters)
- The complete structure of the fTRACE URL with GTIN + LOT:
  
  http://www.ftrace.com/?01=01234567890123&10=123456xxxx
  
  If a white label solution of the brand owner is active the URL will differ in the first segment “.ftrace.com/”. White label solutions are explained in chapter 3.4.1.

**Examples:**

Smoked gammon sausage: GTIN ⇒ 01=04012345123456 Lot ⇒10=L12345678L
Pork chop, untreated, 5 portions: GTIN ⇒ 01=04212399524524 Lot ⇒10=LS20130930

**STATIC LINK TO PRODUCT DATA**

If the nature of the packaging or the packaging production process does not allow the depiction of live, dynamic barcodes on the packaging labels (i.e. barcodes that are unique to each batch), such as deep-frozen bagged items, bottled or canned goods, it is possible to print a static data matrix code on an fTRACE product.

In this case, the two-dimensional code can already be factored into the packaging layout and pre-printed, as it will always include the same article-specific information (GTIN). On scanning a code using a smartphone, the user receives all article-related information for the item in question, as well as a further option to manually enter a lot number. This must be printed on the packaging in human-readable form (common practice is to use inkjet technology for this). To make it easier to find, a picture of the product with the human-readable lot code surrounded by a border can be integrated into the fTRACE static data and made directly available after scanning the static 2D-Code, along with the option and request to enter the lot code manually. After entering the lot number, the consumer will have access to all static and dynamic B2C information.

The encoded structure of the data has to consist of:

- GTIN (application identifier 01), assigned by the brand owner
- The complete structure of the fTRACE URL with GTIN:
  
  http://www.ftrace.com/?01=01234567890123
  
  If a white label solution of the brand owner is active the URL will differ in the first segment “.ftrace.com/”. White label solutions are explained in chapter 3.4.1.

**REPRESENTATION OF THE DATA IN THE TWO-DIMENSIONAL CODE**

The URL must be represented in a Data Matrix Code (or QR Code) that – in case of a direct link to the data - typically has a matrix size of 26 (rows) x 26 (columns) with a data area comprising 24 (rows) x 24 (columns). The matrix size can differ according to the structure and length of the lot.
The current recommendation for code size is between 0.6 and 0.75 % (assuming a nominal module size of 1 mm in which each cell would be 1 mm wide by 1 mm high). This results in an overall width and height for the fTRACE code of between 15mm and 20mm (plus a quiet zone around the matrix of at least 2 mm). The optimal module size within this range depends heavily on the print resolution that is used.

Choosing a magnification factor smaller than 0.6 has a significant impact on the legibility of the code for older models of smartphone, as the performance of their cameras is not as good. While camera or image scanners are certainly able to resolve much smaller codes, the recognition technology integrated in the smartphones cannot. It is also important that a consumer is able to locate the symbol quickly.

- **HUMAN-READABLE REPRESENTATION AND FTRACE LOGO**

In order to assure that the fTRACE service can be used, even if no barcode reader is available, it is recommended that the fTRACE ID (consisting of GTIN and lot) is printed above the code in a human-readable format (separated from the code by at least 2-3 cell heights). The following should be taken into account with respect to the content. GTIN and batch has to be printed above the 2D barcode, the application identifiers must each be indicated in parentheses before the content. The fTRACE logo must be depicted above the human-readable text and the data matrix or QR-code.

Examples:

Content of the barcode: http://www.ftrace.com/?01=04260278110016&10=kut999

Human-readable text below the data matrix “www.ftrace.com”:

Human-readable text above the data matrix: (01)GTIN (10)LOT
3.3.2 CODING TECHNIQUES WITHIN A B2B2C ENVIRONMENT (GS1-128 OR GS1 DATABAR)

Within a B2B environment normally the data or access key has to be made available for the business partner who utilizes professional scanning devices such as warehouse scanners or point-of-sale scanners. Therefore widely used one-dimensional codes like GS1-128 (for the encoding of data on logistic units such as boxes, cartons, and transport units) or GS1 DataBar expanded or expanded stacked (for the encoding of data on units passing the point-of-sale). In both cases at least the Application Identifiers for GTIN and Lot have to be used. In case of variable measure products an Application Identifier for the variable dimension (like 330x for the encoding of the net weight) has to be added for the receiving or selling process. As no URL is encoded this information has to be added by the reading device if access to traceability data is required.

The encoded structure of the data has to consist of:

- GTIN (application identifier 01) of the product in question
- Lot number (application identifier 10) of the lot in question

The complete structure of the fTRACE data with GTIN + LOT:

(01)04260278110016(10)kut999

The brackets around the Application Identifier should only be shown in the human readable and not be encoded in the barcode data string.

- **Example for GS1-128 coding of GTIN and Lot**

As an example for the encoding of the GTIN “4260278110016” and Lot “kut999” please see the following GS1-128 barcode:

![GS1-128 Barcode](image)

More information about the GS1-128 can be found in the GS1 General Specifications (http://www.gs1.org/genspecs).

- **Example for GS1 DataBar Expanded coding of GTIN and Lot**

As an example for the encoding of the GTIN “4260278110016” and Lot “kut999” please see the following GS1 DataBar Expanded (left side) and Expanded stacked (right side) barcode:
More information about the GS1 DataBar can be found in the GS1 General Specifications (http://www.gs1.org/genspecs).

### 3.4 Data Access

Data Access is granted for each target group within its appropriate medium. In general the B2C and the B2B output environments have to be distinguished.

#### 3.4.1 B2C DATA ACCESS

The consumer can get access to the data by either scanning a barcode or two-dimensional code using a smartphone or by entering the data into the www.ftrace.com website from a computer.

- **Smartphone Applications**

  GS1 Germany has developed a smartphone app for this purpose with which the consumer can scan the fTRACE code on the sales packaging. A connection is then automatically established with the fTRACE database and the consumer is shown all pertinent information about the product and lot.

  If the fTRACE code is a Data Matrix Code or QR-Code as described in chapter 3.3.1 any smartphone reader app capable of decoding Data Matrix and/or QR-Code can be used to get access to the fTRACE data. As most of the current smartphone pre-installations contain already a two-dimensional barcode reader this reader app independency is a big advantage. The consumer does not need to install a reader app before starting to scan a code. Please find below some examples of an fTRACE smartphone layout...
• **Internet Browser**

Alternatively, the consumer can get the same information by entering the human-readable fTRACE code (GTIN and Lot) on the packaging directly on the www.ftrace.com website. The layout of the data is optimized for the screen resolution usually available for stationary devices.

• **White Label Solution**

Brand owners can also decide to integrate the fTRACE service within their webpage and mobile sites. The content of the fTRACE data will still be the same but the layout can be customized to
the corporate design of the brand owner. By doing so the brand owner has to ask their suppliers to integrate another URL in the encoded data string. This means: Instead of encoding

http://www.ftrace.com/?01=04260278110016&10=kut999

the brandowner URL would have to be encoded like

http://www.brandowner-url.com/?01=04260278110016&10=kut999

If you are interested in a white label solution please contact the fTRACE team in order to get more information about this special service.

3.4.2 B2B DATA ACCESS

Apart from consumers an important target group for traceability data are the business partners along the supply chain. The legal requirements regarding traceability data are still increasing for them. They do not only have to provide data for their own process but also be able to monitor information about upstream and downstream processes upon legal request.

By choosing a GTIN and Lot as a basis for a traceability request, fTRACE provides a graphical output as well as a file-download containing the relevant traceability information, respectively events.

- **Data View**

The URL for accessing data for business partners is http://dataview.ftrace.com . A requesting party needs to be registered with user and password in order to get a successful login to the system. Once he is logged in he can choose a product / lot combination and the traceability tree is shown. When clicking on one event the event details are shown. If the event owner has not granted the necessary access rights for the role of the requester or the requesting company as a third party a message occurs stating that there are no access rights granted. If only limited details are granted to the requester than those are shown and the not-permitted attributes are left out.
Download

What is valid for the data view service applies as well for the download service. Access to the service is restricted to registered fTRACE users. Once a user is logged in he can choose a product lot combination and then download the events of the traceability tree. If one or all event owners have not granted the necessary access rights for the role of the requester or the requesting company as a third party the download event file contains no or only limited details.
4. EPCIS message structure

4.1 XML structure

4.1.1 ROOT ELEMENTS

Every EPCIS XML starts with the root element "epcis:EPCISDocument" including, e.g. the XML namespaces.

Integrated within the EPCISDocument is the "EPCISBody", which in turn contains the EventList.

(Depiction of an EPCIS XML with closed EventList)

```
<?xml version="1.0"?>
  - <EPCISBody>
    - <EventList>
      </EPCISBody>
  </epcis:EPCISDocument>
```

4.1.2 EPCIS EVENT TYPES

The EventList section can include different EPCIS event types depending on the nature of process to be captured:

(a) **ObjectEvents** are used in case of observations, for instance to capture fishing, harvesting, slaughtering, shipping or receiving processes.

(Depiction of an EPCIS XML with closed ObjectEvent)

```
<?xml version="1.0"?>
  - <EPCISBody>
    - <EventList>
      + <ObjectEvent>
      </EventList>
  </EPCISBody>
</epcis:EPCISDocument>
```

(b) **TransformationEvents** are used to capture processes such as cutting, processing, preserving, etc., in other words, when one or more inputs are consumed in order to make one to several outputs. **Please note**: as a TransformationEvent has been just introduced in EPCIS version 1.1, it is embedded in "extension" tags.

(Depiction of an EPCIS XML with closed TransformationEvent)

```
<?xml version="1.0"?>
  - <EPCISBody>
    - <EventList>
      - <extension>
        + <TransformationEvent>
      </extension>
    </EventList>
  </EPCISBody>
</epcis:EPCISDocument>
```

(c) **AggregationEvents** are used to capture packing and unpacking processes, i.e. each time child identifiers are associated or disassociated from a parent identifier.
(a) **TransactionEvents** are used to associate or disassociate object identifiers with business transactions such as an invoice or a despatch advice. For the time being, this event type is not required in fTRACE.

### 4.2 ObjectEvent

The **ObjectEvent** complies with the EPCIS 1.1 specification and – depending on the nature of the process to be captured – makes use of the EPCIS standard extension mechanism to accommodate class-level identification (i.e. GTIN and GTIN + batch/lot) in the quantityList element (see the following illustration), to indicate source and/or destination, as well as to include Instance/Lot Master Data (ILMD).

**Please note:** for a detailed description of how the respective messages have to be populated (for instance, to capture fishing, slaughtering, or receiving processes), please refer to the industry-specific amendments to this system manual.

**Table of elements and sections for “ObjectEvent”:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Type / possible values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eventTime</td>
<td>DateTime</td>
<td>Specifies when this event took place. It is later interpreted as, e.g. the date and time of fishing, processing, slaughtering, receiving, etc.</td>
</tr>
<tr>
<td>eventTimeZoneOffset</td>
<td>String</td>
<td>Time zone offset</td>
</tr>
<tr>
<td>epcList</td>
<td>List&lt;EPC&gt;</td>
<td>Applies only in case of serialised identifiers. Even if there are none, this field has to be part of the XML structure. Use closed tag: “&lt;epcList/&gt;”</td>
</tr>
<tr>
<td>epcList – epc</td>
<td>SGTIN EPC, SSCC EPC</td>
<td>Can occur n times in “epcList”</td>
</tr>
</tbody>
</table>

```xml
<root>
  <EventList>
    <AggregationEvent/>
  </EventList>
</root>
```
<table>
<thead>
<tr>
<th><strong>action</strong></th>
<th>Action</th>
<th>Relationship to the lifecycle of the identifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bizStep</strong></td>
<td>urn:epcglobal:cbv:bizstep:&lt;bizStep&gt;</td>
<td>As defined in the industry-specific amendments of the fTRACE system manual</td>
</tr>
<tr>
<td></td>
<td>e.g.: urn:epcglobal:cbv:bizstep:commissioning</td>
<td></td>
</tr>
<tr>
<td><strong>readPoint</strong></td>
<td>ReadPointID</td>
<td>Specific place where the event was captured (e.g., hall section, machine)</td>
</tr>
<tr>
<td><strong>readPoint – id</strong></td>
<td>SGLN EPC</td>
<td>Note: If there is no GLN extension, the &lt;optional serial number&gt; component is set to “0”</td>
</tr>
<tr>
<td></td>
<td>urn:epc:id:sgln:&lt;GS1 Company Prefix&gt;.&lt;location reference&gt;.&lt;optional serial number&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e.g.: urn:epc:id:sgln:4000001.00005.0</td>
<td></td>
</tr>
<tr>
<td><strong>bizLocation</strong></td>
<td>BusinessLocationID</td>
<td>Location where the objects are assumed to be following the event (e.g., a warehouse or processing plant)</td>
</tr>
<tr>
<td><strong>bizLocation – id</strong></td>
<td>SGLN EPC</td>
<td>Note: If there is no GLN extension, the &lt;optional serial number&gt; component is set to “0”</td>
</tr>
<tr>
<td></td>
<td>urn:epc:id:sgln:&lt;GS1 Company Prefix&gt;.&lt;location reference&gt;.&lt;optional serial number&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e.g.: urn:epc:id:sgln:4000001.00001.0</td>
<td></td>
</tr>
<tr>
<td><strong>bizTransactionList</strong></td>
<td>List&lt;bizTransaction&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>bizTransactionList – bizTransaction</strong></td>
<td>BusinessTransactionTypeID (urn:epcglobal:cbv:btt:&lt;btt type&gt;) + BusinessTransactionID (urn:epcglobal:cbv:bt:&lt;GLN&gt;:transID)</td>
<td>Apart from despatch advices (desadv), it is also possible, e.g. to associate an event with an invoice (inv) or purchase order (po) reference</td>
</tr>
<tr>
<td></td>
<td>e.g.: &lt;bizTransaction type=&quot;urn:epcglobal:cbv:btt:desadv&quot;&gt; urn:epcglobal:cbv:bt:4012345123456:4711 &lt;/bizTransaction&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>extension</strong></td>
<td>Extension section</td>
<td></td>
</tr>
<tr>
<td><strong>extension – quantityList</strong></td>
<td>List&lt;QuantityElement&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>quantityList – quantityElement</strong></td>
<td>Section for epcClass, quantity, and uom</td>
<td>Can occur n times in &quot;quantityList&quot;</td>
</tr>
<tr>
<td><strong>quantityElement – epcClass</strong></td>
<td>GTIN + batch/lot</td>
<td>Unique ID of a product/ product batch</td>
</tr>
<tr>
<td></td>
<td>urn:epc:class:lgtin:&lt;GS1 Company Prefix&gt;.&lt;Item reference&gt;.&lt;batch number&gt;</td>
<td></td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>quantityElement – quantity</td>
<td>Float</td>
<td>Total number, weight, volume, length, or space</td>
</tr>
<tr>
<td>quantityElement – uom</td>
<td>UOM according to the UN/CEFACT recommendation No. 20 (&quot;Codes for unit of measure used in international trade&quot;), e.g. “KGM”</td>
<td>Note: if the unit of measure field is omitted, the quantity is interpreted as a positive integer value indicating a number of instances (15 pigs, e.g.)</td>
</tr>
<tr>
<td>extension – sourceList</td>
<td>List&lt;Source&gt;</td>
<td></td>
</tr>
<tr>
<td>sourceList – source</td>
<td>SourceDestTypeID (urn:epcglobal:cbv:sdt:&lt;source/destination type&gt;) + SourceDestID (SGLN EPC)</td>
<td>Means to express which party has previously owned/possessed goods or at which location they have been prior to this</td>
</tr>
<tr>
<td>extension – destinationList</td>
<td>List&lt;Destination&gt;</td>
<td></td>
</tr>
<tr>
<td>destinationList – destination</td>
<td>SourceDestTypeID (urn:epcglobal:cbv:sdt:&lt;source/destination type&gt;) + SourceDestID (SGLN EPC)</td>
<td>Means to express which party is expected to own/possess goods next or at which location they are expected afterwards</td>
</tr>
<tr>
<td>extension – ilmd</td>
<td>Section to accommodate Instance/Lot Master Data, i.e. data describing a specific instance or batch/lot of products indicated in the epcList or quantityList</td>
<td></td>
</tr>
<tr>
<td>ilmd – attribute</td>
<td>ILMD attributes according to the industry-specific amendments of the fTRACE system manual</td>
<td></td>
</tr>
</tbody>
</table>

_(Depiction of an EPCIS ObjectEvent with quantityList)_
4.3 TransformationEvent

The TransformationEvent complies with the EPCIS 1.1 specification and is used to express the transformation of one to several inputs into one to several outputs. Similar to the ObjectEvent, it also can accommodate Instance/Lot Master Data (ILMD) attributes, which in this case are related to the identifiers populating the outputEPCList and/or outputQuantityList. As it was just introduced in EPCIS 1.1, the entire event structure is embedded in standard extension tags.

Please note: for a detailed description of how the respective messages have to be populated (for instance, to capture processing, cutting, or preserving processes), please refer to the industry-specific amendments to this system manual.
Table of elements and sections for "TransformationEvent":

<table>
<thead>
<tr>
<th>Element</th>
<th>Type / possible values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eventTime</td>
<td>DateTime</td>
<td>Specifies when this event took place. It is later interpreted as the processing, cutting or preserving date</td>
</tr>
<tr>
<td>eventTimeZoneOffset</td>
<td>String</td>
<td>Time zone offset</td>
</tr>
<tr>
<td>inputEPCList</td>
<td>List&lt;EPC&gt;</td>
<td>Applies only in case of serialised identifiers</td>
</tr>
<tr>
<td>inputEPCList – epc</td>
<td>SGTIN EPC</td>
<td>Can occur n times in &quot;inputEPCList&quot;</td>
</tr>
<tr>
<td></td>
<td>urn:epc:id:sgtin:&lt;GS1 Company Prefix&gt;.&lt;item reference&gt;.&lt;serial number&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e.g.: urn:epc:id:sgtin:4000001.088888.12</td>
<td></td>
</tr>
<tr>
<td>inputQuantityList</td>
<td>List&lt;QuantityElement&gt;</td>
<td>Can occur n times in &quot;inputQuantityList&quot;</td>
</tr>
<tr>
<td>inputQuantityList – quantityElement</td>
<td>Section for epcClass, quantity, and uom</td>
<td></td>
</tr>
<tr>
<td>quantityElement – epcClass</td>
<td>GTIN + batch/lot</td>
<td>Unique ID of a product/product batch</td>
</tr>
<tr>
<td></td>
<td>urn:epc:class:lgtin:&lt;GS1 Company Prefix&gt;.&lt;Item reference&gt;.&lt;batch number&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e.g.: urn:epc:class:lgtin:4012345.011111.9988</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GTIN only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e.g.: urn:epc:idpat:sgtin:4012345.011111.*</td>
<td></td>
</tr>
<tr>
<td>quantityElement – quantity</td>
<td>Float</td>
<td>Total number, weight, volume, length, or space</td>
</tr>
<tr>
<td>quantityElement – uom</td>
<td>UOM according to the UN/CEFACT recommendation No. 20 (&quot;Codes for unit of measure used in international trade&quot;), e.g. &quot;KGM&quot;</td>
<td>Note: if the unit of measure field is omitted, the quantity is interpreted as a positive integer value indicating a number of instances (15 pigs, e.g.)</td>
</tr>
<tr>
<td>outputEPCList</td>
<td>See above (inputEPCList)</td>
<td></td>
</tr>
<tr>
<td>outputEPCList – epc</td>
<td>See above (epc)</td>
<td></td>
</tr>
<tr>
<td>outputQuantityList</td>
<td>See above (inputQuantityList)</td>
<td></td>
</tr>
<tr>
<td>outputQuantityList – quantityElement</td>
<td>See above (quantityElement)</td>
<td></td>
</tr>
<tr>
<td>quantityElement – epcClass</td>
<td>See above (epcClass)</td>
<td></td>
</tr>
<tr>
<td>quantityElement – quantity</td>
<td>quantityElement - uom</td>
<td>transformationID</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>See above (quantity)</td>
<td>See above (uom)</td>
<td>TransformationID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GLN-based URI</td>
</tr>
</tbody>
</table>
indicated in the epcList or quantityList

**Ilmd – attribute**  
ILMD attributes according to the industry-specific amendments of the iTRACE system manual  
e.g.: `<fT:bestBeforeDate>2016-12-08</fT:bestBeforeDate>`

(Description of an EPCIS TransformationEvent with two inputs and one output as well as one ILMD attribute)

```xml
<?xml version="1.0"?>
  <EPCISBody>
    <EventList>
      <TransformationEvent>
        <eventTime>2014-06-21T14:58:56.591Z</eventTime>
        <eventTimeZoneOffset>+02:00</eventTimeZoneOffset>
        <inputQuantityList>
          <quantityElement>
            <epcClass>urn:epc:global:epc:id:012345.011111.XYZ1223</epcClass>
            <quantity>600</quantity>
            <uom>KGM</uom>
          </quantityElement>
          <quantityElement>
            <epcClass>urn:epc:global:epc:id:012345.011111.XYZ1225</epcClass>
            <quantity>600</quantity>
            <uom>KGM</uom>
          </quantityElement>
        </inputQuantityList>
        <outputQuantityList>
          <quantityElement>
            <epcClass>urn:epc:global:epc:id:012345.021111.XYZ5555</epcClass>
            <quantity>8000</quantity>
            <uom></uom>
          </quantityElement>
        </outputQuantityList>
        <bizStep>urn:epcglobal:cbv:bizstep:transforming</bizStep>
        <readPoint>
          <id>urn:epc:id:sgln:4054738.99901.1</id>
          <readPoint>
            <ilmd>
              <fT:bestBeforeDate>2014-08-10</fT:bestBeforeDate>
              <ilmd>
            </ilmd>
          </readPoint>
        </readPoint>
      </TransformationEvent>
    </EventList>
  </EPCISBody>
</epcis:EPCISDocument>
```

### 4.4 AggregationEvent

AggregationEvents are used to capture packing and unpacking processes, i.e. each time child identifiers are associated or disassociated from a parent identifier.

The AggregationEvent complies with the EPCIS 1.1 specification and makes use of the EPCIS standard extension mechanism to accommodate class-level identification (i.e. GTIN and GTIN + batch/lot) in the quantityList element.

**Table of elements and sections for “AggregationEvent”:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Type / possible values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>eventTime</td>
<td>DateTime</td>
<td>Specifies when this event took place. It is later interpreted as,</td>
</tr>
<tr>
<td><strong>eventTimeZoneOffset</strong></td>
<td>String</td>
<td>e.g. the date and time of packing/unpacking, e.g.</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------</td>
<td>-------------------------------------------------</td>
</tr>
</tbody>
</table>
| **parentID** | SSCC EPC  
urn:epc:id:sscc:<GS1 Company Prefix>.<serial reference>  
e.g.: urn:epc:id:sscc:4000001.7777777777  
SGTIN EPC  
urn:epc:id:sgtin:<GS1 Company Prefix>.<item reference>.<serial number>  
e.g.: urn:epc:id:sgtin:4000001.088888.1223 | Time zone offset  
Can occur just once |
| **childEPCs** | List<EPC> | Applies only in case of serialised identifiers. Even if there are none, this field has to be part of the XML structure (“<childEPCs/>”) |
| **childEPCs – epc** | See above (parentID) | Can occur n times in "childEPCs" |
| **childQuantityList** | List<QuantityElement> | |
| **childQuantityList – quantityElement** | Section for epcClass, quantity, and uom | Can occur n times in "inputQuantityList" |
| **quantityElement – epcClass** | GTIN + batch/lot  
urn:epc:class:lgtin:<GS1 Company Prefix>.<Item reference>.<batch number>  
e.g.: urn:epc:class:lgtin:4012345.011111.9988  
GTIN only  
e.g.: urn:epc:idpat:sgtin:4012345.011111.* | Unique ID of a product/ product batch |
| **quantityElement – quantity** | Float | Total number, weight, volume, length, or space |
| **quantityElement – uom** | UOM according to the UN/CEFACT recommendation No. 20 (“Codes for unit of measure used in international trade”), e.g. "KGM" | Note: if the unit of measure field is omitted, the quantity is interpreted as a positive integer value indicating a number of instances (15 pigs, e.g.) |
| **action** | Action | Relationship to the |
| **bizStep** | urn:epcglobal:cbv:bizstep:<bizStep>  
* e.g.: urn:epcglobal:cbv:bizstep:packing | As defined in the industry-specific amendments of the fTRACE system manual | lifecycle of the identifiers |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>readPoint</strong></td>
<td>ReadPointID</td>
<td>Specific place where the event was captured (e.g., hall section, machine)</td>
<td></td>
</tr>
</tbody>
</table>
| **readPoint – id** | SGLN EPC  
* urn:epc:id:sgln:<GS1 Company Prefix>.<location reference>.<optional serial number>  
* e.g.: urn:epc:id:sgln:4000001.00005.0 | Note: If there is no GLN extension, the <optional serial number> component is set to “0” |  |
| **bizLocation** | BusinessLocationID | Location where the objects are assumed to be following the event (e.g., a warehouse or processing plant) |  |
| **bizLocation – id** | SGLN EPC  
* urn:epc:id:sgln:<GS1 Company Prefix>.<location reference>.<optional serial number>  
* e.g.: urn:epc:id:sgln:4000001.00001.0 | Note: If there is no GLN extension, the <optional serial number> component is set to “0” |  |
| **bizTransactionList** | List<bizTransaction> | Apart from despatch advices (desadv), it is also possible, e.g. to associate an event with an invoice (inv) or purchase order (po) reference |  |
| **bizTransactionList – bizTransaction** | BusinessTransactionTypeID  
* (urn:epcglobal:cbv:btt:<btt type>) + BusinessTransactionID  
* (urn:epcglobal:cbv:bt:<GLN>:transID)  
* e.g.: <bizTransaction type="urn:epcglobal:cbv:btt:desadv">  
* urn:epcglobal:cbv:bt:4012345123456:4711</bizTransaction> |  |
The fTRACE system partners are provided with a set of XSD files enabling them to validate EPCIS XML messages if they want to deliver data automatically via web service. The XSDs formally describe the elements of the EPCIS event messages. Thus, it is for example possible to validate the occurrence of mandatory fields or the usage of the correct data types. However, please consider that the XSD should only be used supportively, as it for instance cannot validate dependencies between elements or semantics. As a consequence, it might be the case that an EPCIS event message is validated by the XSD file but rejected by the fTRACE web service. The respective XSD files are provided by GS1 Germany.

4.5 EPCIS/fTRACE XSD

The fTRACE system partners are provided with a set of XSD files enabling them to validate EPCIS XML messages if they want to deliver data automatically via web service. The XSDs formally describe the elements of the EPCIS event messages. Thus, it is for example possible to validate the occurrence of mandatory fields or the usage of the correct data types. However, please consider that the XSD should only be used supportively, as it for instance cannot validate dependencies between elements or semantics. As a consequence, it might be the case that an EPCIS event message is validated by the XSD file but rejected by the fTRACE web service. The respective XSD files are provided by GS1 Germany.
5. fTRACE auditing program

5.1 Introduction

Data integrity and completeness transferred to and stored in the fTRACE system is an essential requirement for the quality of the traceability solution. To the benefit of all parties involved, a high-level data quality has to be ensured. Therefore, applicable audit criteria have been developed. Regular and random audits, accomplished by an independent auditor shall ensure the high-quality data. GS1 Germany, as the operator of the fTRACE system, recommends conducting an audit once a year. Deviating terms may be pronounced by the fTRACE advisory board. However, audit intervals shall not exceed 3 years. What is more, every fTRACE partner vouches for the integrity of the data.

5.1.1 CONTRACTUAL CONDITIONS / TESTING ORGANISATIONS

Use of the fTRACE system is subject to the contractual agreement between the fTRACE user and GS1 Germany.

fTRACE trademarks may only be used by system partners who undergo an audit to verify compliance with the fTRACE requirements and/or have been authorised to use them by GS1 Germany.

The controls (audits) may be carried out by GS1 Germany itself or by a certification body commissioned by GS1 Germany according to the auditing guidelines outlined below.

Alternatively, a system partner may instruct, at his own cost, a certification body approved by GS1 Germany to perform the audit of the fTRACE requirements according to the auditing guidelines below.

5.1.2 COMPONENTS OF THE FTRACE AUDITING PROGRAM

The fTRACE auditing program consists of two components: the implementation regulations and the fTRACE requirements. These in turn are divided into the general fTRACE requirements, the special fTRACE requirements pertaining to traceability and the fTRACE requirements for the processing and submission of fTRACE data.

The objective of the fTRACE auditing program is to issue an fTRACE declaration of conformity.
5.2 Implementation guidelines

5.2.1 DETERMINING AUDIT DURATION

- Raw and processed products sector:

The duration of the audit generally varies according to the size and complexity of the fTRACE partners' product spectrum. The following can be used as a guide to the minimum duration that can be expected:

<table>
<thead>
<tr>
<th>Size of the facility</th>
<th>Base time involved (hours)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On-site audit</td>
<td>Preparation and follow up</td>
</tr>
<tr>
<td>Up to 100 employees (full-time equivalent)</td>
<td>3 h</td>
<td>2 h</td>
</tr>
<tr>
<td>100-300 employees (full-time equivalent)</td>
<td>4 h</td>
<td>2.5 h</td>
</tr>
<tr>
<td>Over 300 employees (full-time equivalent)</td>
<td>5 h</td>
<td>3 h</td>
</tr>
</tbody>
</table>

The base value applies to one of the following activities/product groups (note: the audit will take longer when more than one value-added step is involved):

**Example:**
Abattoir and cutting facility with 200 eligible employees that additionally produces pre-packaged fresh meat and pre-packaged convenience meat:

4 hours for the audit itself plus 1 hour for two further product groups on site and 2.5 hours of preparation and follow-up work making a total of 7.5 hours.

Prior to performing the audit, the actual time required can only be estimated on the basis of existing data. The audit duration will vary according to the actual situation on site.
## 5.2.2 CRITERIA FOR EVALUATING THE AUDIT FINDINGS

Each of the criteria in the requirements catalogue will be assessed according to the following system:

<table>
<thead>
<tr>
<th>Short form</th>
<th>Assessment</th>
<th>Definition</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fulfilled</td>
<td>Requirements met in full</td>
<td>fTRACE declaration of conformity can be issued</td>
</tr>
<tr>
<td>V</td>
<td>Room for improvement (notes)</td>
<td>Considerations for optimising the fTRACE system in line with the corresponding standard requirement</td>
<td>fTRACE declaration of conformity can be issued. Additional recommendations or notes on how the company can implement the suggestions</td>
</tr>
<tr>
<td>A</td>
<td>Deviation (isolated finding)</td>
<td>Requirements for standards are not fully met in isolated cases. This does not mean, however, that products are being marketed whose traceability is unclear or insufficient within the meaning of the fTRACE requirements or with uncertain fTRACE status.</td>
<td>Before the decision to grant/renew the confirmation of conformity, the planned corrective measures must be communicated to the lead auditor within 14 days. He then evaluates the corrective measures and confirms whether he accepts them. Implementation of the corrective measures is checked during the next audit.</td>
</tr>
<tr>
<td>N</td>
<td>Non-compliance</td>
<td>Failure to meet the requirements for standards or incomplete fulfilment of a particular criterion with the assumption that products are being marketed with unclear traceability or uncertain fTRACE status.</td>
<td>Corrective measures must be effectively implemented before the decision to grant/renew the confirmation of conformity. The causes of the shortcomings listed must be analysed and the specified corrective measures implemented and their effectiveness verified. The auditor normally performs an on-site post-audit to confirm that this is the case, insofar as it is not possible to do so based on the evidence submitted.</td>
</tr>
<tr>
<td>Major</td>
<td>Critical non-compliance</td>
<td>Failure to meet the requirements for standards or incomplete fulfilment of a particular criterion with the result that products are being marketed with unclear traceability or uncertain fTRACE status.</td>
<td>Only of significance for repeat audits. A critical non-compliance leads to immediate suspension of the fTRACE confirmation of compliance. The inspection body informs GS1 Germany of the suspension immediately. Closure/resolution of the critical non-compliance always happens during an on-site follow-up check of the criteria in question.</td>
</tr>
</tbody>
</table>
5.2.3 DECISION ON THE FTRACE CONFIRMATION OF CONFORMITY

The auditor issues a provisional recommendation to grant the confirmation of conformity with the fTRACE requirements with his audit report after checking and evaluating the action plans submitted by the company (regarding the findings) or proof of implementation of the corrective measures (for non-compliance issues). The decision is made by the certification board (a competent person independent of the audit).

Before a positive fTRACE confirmation of compliance is issued, plans of action for all findings and proofs of the corrective measures for all deviations must be submitted and confirmed by the auditor.

5.2.4 DEADLINES AND VALIDITY OF FTRACE AUDITS, REPORTS AND CONFIRMATIONS

The fTRACE confirmation of compliance is valid for one year from date of issue. The annual follow-up audits should be scheduled so that there is no gap in validity between successive confirmations.

5.2.5 APPEALS PROCEDURE

The system partner can appeal against decisions to issue or not to issue fTRACE confirmations of conformity with GS1 Germany or the testing organisation. If disputes cannot be resolved between the contracting parties, the complaint may be submitted for a decision to the fTRACE Advisory Board. The final decision on whether a participant receives permission to the use the fTRACE trademark rests with GS1 Germany.

5.3 fTRACE requirements catalogue

5.3.1 GENERAL FTRACE REQUIREMENTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Requirement on the part of the fTRACE system partner</th>
<th>Explanation of the check as part of the audit</th>
<th>Description/mandatory entries to be made by the auditor in the audit report</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>There is a valid contract between the fTRACE system partner and GS1 Germany.</td>
<td>Inspection of the contract (date)</td>
<td>Date of contract</td>
</tr>
<tr>
<td>A-2</td>
<td>The system partner has a valid <strong>EU license</strong></td>
<td>Inspection of the license certificate (where required by law)</td>
<td>Date, authority, content/scope of license</td>
</tr>
<tr>
<td>A-3</td>
<td>The company has a <strong>certified QM system</strong> that satisfies the traceability and food safety requirements (see also page 6 of the System Guide)</td>
<td>The certificate is current and valid.</td>
<td>Which relevant certificates are present, scope, validity period, result (such as IFS version &amp; level if applicable)</td>
</tr>
<tr>
<td>A-4</td>
<td><strong>The fTRACE system enjoys unqualified, positive support by the company management.</strong></td>
<td>Anchored in the quality policy</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>A-5</td>
<td><strong>The fTRACE system is fully established in the company.</strong></td>
<td>The company has integrated the fTRACE requirements into its QM/QA system.</td>
<td>Description</td>
</tr>
<tr>
<td>A-6</td>
<td>The company's management has appointed an <strong>fTRACE officer</strong></td>
<td>Current, written proof of the appointment</td>
<td>Surname, first name, function, date of appointment (e.g., separate appointment or part of the job description)</td>
</tr>
<tr>
<td>A-7</td>
<td><strong>The fTRACE officer</strong> is shown in the organisation chart**</td>
<td>Inspection of the organisation chart</td>
<td>Description of where the fTRACE office is located in the organisation chart, date of the organisation chart</td>
</tr>
<tr>
<td>A-8</td>
<td><strong>The fTRACE officer</strong> is established in the company**</td>
<td></td>
<td>Description</td>
</tr>
<tr>
<td>A-9</td>
<td>The company management ensures that employees with direct control over how the fTRACE system is used in the company are aware of their <strong>responsibilities</strong> in this regard and the mechanisms for monitoring the effectiveness of their actions work properly.</td>
<td>This includes procedure documentation and work instructions, Interviewing staff during tours of inspection</td>
<td>Description</td>
</tr>
<tr>
<td>A-10</td>
<td>There are corresponding <strong>job/function descriptions</strong> for these employees**</td>
<td>Inspection of documents</td>
<td>Date, name and job function of the employee(s)</td>
</tr>
<tr>
<td>A-11</td>
<td><strong>Appropriate training courses</strong> are held on an annual basis on joining the system, as well as when staff are recruited to perform a relevant function or when there is a change in responsibilities.**</td>
<td>fTRACE system in general, job-related training</td>
<td>Date, training topics, information on training status</td>
</tr>
<tr>
<td>A-12</td>
<td>The company ensures that all <strong>raw material suppliers</strong> for fTRACE products are themselves <strong>fTRACE system partners</strong> (see the remarks on page 9 of the System Guide)</td>
<td>Inspection of the corresponding documentation/correspondence. For companies with multiple production facilities, the supplying production facility must be an fTRACE system partner. The same applies to supplementary purchases!</td>
<td>Description</td>
</tr>
<tr>
<td>A-13</td>
<td>The company has a <strong>complete, current schedule of all fTRACE raw material suppliers/facilities</strong></td>
<td></td>
<td>Date, company/facility</td>
</tr>
<tr>
<td>A-13</td>
<td>The raw material used for the produced fTRACE article is sourced solely from <strong>fTRACE-approved businesses/production facilities</strong> (excluding livestock)</td>
<td>e.g. Procedure documentation, fTRACE tracking and tracing, inspect production records, employee survey, etc.</td>
<td>Description of the arrangements the company has made for this and how they are verified during the audit</td>
</tr>
<tr>
<td>A-15</td>
<td><strong>fTRACE article list:</strong> There is a complete, current list of all product groups/items that are manufactured in accordance with fTRACE requirements or are marketed under the fTRACE brand, including the respective raw material suppliers.</td>
<td>Comparison of the article schedule with the products and records on site and with the information available from fTRACE</td>
<td>Date, product group designations, number of products per product group</td>
</tr>
</tbody>
</table>

### 5.3.2 fTRACE REQUIREMENTS FOR TRACEABILITY

<table>
<thead>
<tr>
<th>No.</th>
<th>Requirement on the part of the fTRACE system partner</th>
<th>Explanation of the check as part of the audit</th>
<th>Description/mandatory entries to be made by the auditor in the audit report</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-1</td>
<td><strong>fTRACE traceability:</strong> There is up-to-date, <strong>complete documentation of the traceability system</strong> as well as a <strong>flow chart that makes allowance for the fTRACE requirements</strong> for every product group. The description reflects the depth of information for each product/product group mandated by fTRACE and/or indicated to the customer.</td>
<td>Checking the system description for plausibility, taking into account the fTRACE requirements based on a review of the documentation for all dynamic data. Analysis of the implementation during the tour of inspection</td>
<td>Name and date, document Description</td>
</tr>
</tbody>
</table>
| R-2 | The **traceability documentation** includes full and complete information about the lot numbers of processed raw materials for each raw material supplier, up to and including the farms (fatteners), fisheries, etc., for each batch of final product. 
It is possible to further reference the ID number of the individual animals where necessary. (meat) 
Supplemental purchases are separately indicated as such (abattoir/cutting, fisheries facility and, if necessary, supplier). | Random sampling of each product group in which fTRACE articles are produced, up to and including the authorised fTRACE raw material supplier, is performed to verify implementation and compliance of the facility. The samples for each product group are selected by the auditor in the final product warehouse. | Description of which products were audited (the article audited, batch, best before date, duration [time from start to all information being available] and conclusion must be specified in the audit report) |
|---|---|---|---|
| R-3 | Limiting the **lot size**: 
To ensure traceability analogous with the FTRACE system, the size of the created batches must be limited (small lot sizes) so that it is possible to allocate them to the respective raw material supplier. 
The batch size chosen for the product group in question must be in compliance with the corresponding fTRACE requirements for all dynamic data. | Checking and evaluating batch creation, as well as its operational implementation during the tour of inspection with regard to all dynamic data. | Description |
| R-4 | **Rework:** 
Rework is fully documented in the traceability system. 
In compliance with the fTRACE requirements it is entered as a specific batch of raw material for the following batch. | Auditing the procedure documentation, production records including during the tour of inspection. | Description |
| R-5 | **Traceability test (internal):** 
The traceability of the fTRACE products is verified internally by the company at least once per year per product group. There is a report on this including an evaluation. 
The test includes a quantity statement as well as a check to ensure that the dynamic data is a factually accurate and complete representation commensurate with the depth of information for each product group/product. | The internal test report is examined with respect to its plausibility and completeness during the audit (taking into account the insights gained during the audit). | Date of test, substance and outcome |
### R-6 General stock check:
At least once per year, the company creates a general stock balance of all fTRACE-labelled final products and raw materials for each product group.
Deciding on a suitable time frame for the evaluation and quantity unit is left at the discretion of the company.

Checking the stock balance of the company for plausibility and assessing the balance statement for the selected random sample(s)

### R-7 Marking and identifiability:
Each lot must at all times and throughout all processing steps be uniquely identifiable and recognisable as being part of the fTRACE flow of goods by means of physical labelling and, if necessary, electronic tagging.

The plausibility of the data entered into the ERP system/at paper-based registration points is checked during the audit.
The labelling along the flow of goods is checked as well as the demarcation of the fTRACE goods stream from other goods streams

### R-8 Different article numbers and article/material master data are stored in the ERP system for similar conventional goods and fTRACE goods.

### R-9 Label archiving:
A label is archived each day for every fTRACE product produced. The labels must be kept for at least two years longer than the best before date or use by date of the products.

**Verification method**
- Photo of suitable quality
- Electronic imaging system for automatic verification of the barcode quality
- Verification by the employees using a scanner (four-eyes principle) including documentation.

**Inspection of the archiving system**

### R-10 The documented access prevention and release procedure is also compliant with the fTRACE system requirements.
### 5.3.3 FTRACE REQUIREMENTS FOR DATA HANDLING AND DELIVERY

<table>
<thead>
<tr>
<th>No.</th>
<th>Requirement on the part of the fTRACE system partner</th>
<th>Explanation/check performed during audit</th>
<th>Description/mandatory entries to be made by the auditor</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-1</td>
<td>The company performs suitable, regular tests to ensure that only fTRACE products are delivered whereby the data matrix on the label – is printed in its entirety and can be read without error, and – contains the correct parameters</td>
<td>At least daily, and with each product change</td>
<td>Description of the method</td>
</tr>
<tr>
<td>D-2</td>
<td>The company has introduced measures that prevent the dynamic/batch-related data from being manipulated. Corrections to batch-related data that may be required are only carried out by authorised employees and are documented.</td>
<td>Authorised employee, e.g. the fTRACE officer The documentation includes at least: – Date of alteration – Reason for alteration – Content of alteration – Name of employee</td>
<td></td>
</tr>
<tr>
<td>D-3</td>
<td><strong>Data transfer:</strong> All data required in the fTRACE system are transferred to the fTRACE database in a timely manner prior to the goods being received by the customer.</td>
<td>Examination of the method and plausibility of the data transmission.</td>
<td>Description of how this is being ensured</td>
</tr>
<tr>
<td>D-4</td>
<td><strong>Data retention period:</strong> The fTRACE data is stored for two years longer than the best before date or use by date of the products.</td>
<td>Inspection of the computerised data archive or the paper-based records.</td>
<td>Storage duration</td>
</tr>
</tbody>
</table>

### 5.4 Review of data security

Usually, the fTRACE system partner transfers all necessary data to the fTRACE system in the way stipulated in the participation agreement. This allows GS1 Germany or a designated service provider to continuously check the quality of the transferred data.
6. Description of the fTRACE branding

GS1 Germany has created/acquired and patented branding pertaining to the name “fTRACE”, as well as for the marking of product packaging. These labels/logos are described below.

The partner shall be entitled, following approval by GS1 Germany in each case, to apply the label to this item and make reference to the fTRACE system by using this label on his own promotional materials or website.

The right to use the label is granted on a revocable, non-transferable and non-exclusive basis. Moreover, the labels may only be used in conjunction with those articles that have been entered into the fTRACE system following approval from GS1 Germany.

When using the labels, the partner is obliged to adhere to the design rules specified below and avoid confusion of any sort that may arise through the use of the labels.

6.1 The trademarked name

The following brand names are registered as trademarks with the German patent and trademark office:

fTRACE
fTRACE: One click - and you're in the know
fTRACE: All the info with just one click.

GS1 Germany must always be provided with a packaging design specimen for the purpose of inspection and approval of the fTRACE-related information prior to distribution of a product.

6.2 The trademarked logo

The following specifications must be observed with regard to the fTRACE logos when they are used by the system partner in his own documents (print media, product flyers, website, etc.):
6.2.1 CMYK COLOUR SPECIFICATIONS
6.2.2 RGB COLOUR SPECIFICATIONS

- **Red**: R 148, G 59, B 35
- **Green**: R 73, G 74, B 75
- **Black**: R 26, G 26, B 27
- **Gray**: R 167, G 169, B 170
- **White**: R 255, G 255, B 255
6.2.3 COLOUR SPECIFICATION IN OTHER COLOUR SYSTEMS

Colour specifications

Pantone 167
Pantone Cool Gray 10

Pantone 181
Black
White

Pantone Cool Gray 9
Pantone Black
White
Colour specifications

fTRACE

RAL 3019
RAL 7024

fTRACE

RAL 3019
RAL 9017
White

fTRACE

RAL 7040
RAL 9017

fTRACE

RAL 7040
RAL 9017
White
6.2.4 TYPOGRAPHY AND PROPORTIONS

Typography

Used font: Consolas (Lucas de Groot, 2005 for Microsoft).

\[
\begin{array}{ll}
abcdefgijklmnopqrstuvwxyz & 1234567890 \\
ABCDEFGHIJKLMNOPQRSTUVWXYZ & !"#$%&/()=?`^\-
\end{array}
\]

The proportions of the logos must be strictly adhered to.
7. List of abbreviations

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>Application Identifier</td>
</tr>
<tr>
<td>B2B</td>
<td>Business-to-Business</td>
</tr>
<tr>
<td>B2C</td>
<td>Business-to-Consumer</td>
</tr>
<tr>
<td>B2G</td>
<td>Business-to-Government</td>
</tr>
<tr>
<td>CMYK</td>
<td>Cyan, Magenta, Yellow, Key (color model)</td>
</tr>
<tr>
<td>EPC</td>
<td>Electronic Product Code</td>
</tr>
<tr>
<td>EPCIS</td>
<td>EPC Information Services</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
</tr>
<tr>
<td>GCP</td>
<td>Global Company Prefix</td>
</tr>
<tr>
<td>GFSI</td>
<td>Global Food Safety Initiative</td>
</tr>
<tr>
<td>GLN</td>
<td>Global Location Number</td>
</tr>
<tr>
<td>GTIN</td>
<td>Global Trade Item Number</td>
</tr>
<tr>
<td>IGTIN</td>
<td>Identifier for GTIN + batch/lot</td>
</tr>
<tr>
<td>ILMD</td>
<td>Instance/Lot Master Data</td>
</tr>
<tr>
<td>POS</td>
<td>Point of Sales</td>
</tr>
<tr>
<td>QR</td>
<td>Quick Response</td>
</tr>
<tr>
<td>RFID</td>
<td>Radio Frequency Identification</td>
</tr>
<tr>
<td>RGB</td>
<td>Red, Green, Blue (color model)</td>
</tr>
<tr>
<td>SGTIN</td>
<td>Serialised Global Trade Item Number</td>
</tr>
<tr>
<td>SSCC</td>
<td>Serial Shipping Container Code</td>
</tr>
<tr>
<td>UOM</td>
<td>Unit of measure</td>
</tr>
<tr>
<td>URI</td>
<td>Uniform Resource Identifier</td>
</tr>
<tr>
<td>URL</td>
<td>Uniform Resource Locator</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible Markup Language</td>
</tr>
<tr>
<td>XSD</td>
<td>XML Schema Definition</td>
</tr>
</tbody>
</table>
8. List of references/resources

Check Digit Calculator: http://www.gs1.org/barcodes/support/check_digit_calculator
EPCIS Standard, v. 1.1: http://www.gs1.org/gsmp/kc/epcglobal/epcis
Tag Data Standard, v. 1.9: http://www.gs1.org/gsmp/kc/epcglobal/tds/
W3C: http://www.w3.org/Consortium/mission
9. Annex

9.1 Use of GLN, GTIN, and SSCC

9.1.1 GS1 COMPANY PREFIX
The Global Location Number with integrated GS1 Company Prefix assigned by a GS1 Member Organisation can be used for more than just the standardised identification of a company or company division. For instance, it is also the basis for participating in the Global Trade Item Number system (GTIN) as well as the Serial Shipping Container Code (SSCC) system. Depending on the required number capacity, a new participant can choose the length of the GCP.

9.1.2 GLN FORMAT
The basic format of the 13-digit Global Location Number is depicted in the following figure:

![GLN Diagram](image)

The conversion of a GLN into the EPC format SGLN is discussed in section 9.2.

9.1.3 GTIN FORMAT
The basic format of the Global Trade Item Number (GTIN), formerly called the EAN, is shown in the accompanying image.

Companies generally use GTIN-13 to identify trading units, but the native format of the GTIN is 14 digits in length, i.e. there is a “zero” in the 14th position from the right.

![GTIN Diagram](image)

The conversion of a GTIN into the EPC format SGTIN is discussed further in section 9.2.

9.1.4 SSCC FORMAT
The serial shipping container code is a purely numeric data element. It has 18 digits and is constructed as shown below.

![SSCC Diagram](image)
The conversion of an SSCC into the EPC format SSCC is discussed further in section 9.2.

9.1.5 GLN, SSCC AND GTIN CHECK DIGIT CALCULATION

The method shown here is for determining the check digit. First, the 12 digits before the check digit are alternately multiplied from back to front by the values 3 and 1. The results (products) are then added together (product sum) and divided by 10. The remainder is then subtracted from 10 to give the check digit.

If you want to verify that the check digit (and therefore a particular number) is correct, you must weigh the final digit, i.e. check digit, with "1" and repeat the entire calculation. If the number has been correctly determined, the remainder will always be zero (see above example). If the result is not zero, there is an error.

Verifying the check digit:

The check digit calculation for GTIN and SSCC works similar.

A web-based supportive tool for calculating the check digits of GLNs, GTINs, and SSCCs can be found under the following link: [http://www.gs1.org/barcodes/support/check_digit_calculator](http://www.gs1.org/barcodes/support/check_digit_calculator)
9.1.6 SUPPORTED FORMAT OF THE BATCH/LOT OR SERIAL NUMBER AS USED IN CONJUNCTION WITH GTINS

The GS1 General Specifications allow the full ASCII character set for batch/lot numbers (AI 10) and serial numbers (AI 21) to be used to further qualify a GTIN. However, fTRACE is subject to some restrictions concerning the character set, as the batch/lot or serial number becomes a part of the URL in the fTRACE B2C application. As an example, the usage of a slash ("/"") within a batch/lot number would deny the resolution of a URL. As a consequence, only the following characters are allowed to construct a product batch/lot or serial number:

- Numbers (0 ... 9)
- Upper-case letters (A ... Z)
- Lower-case letters (a ... z)
- Hyphen (-)
- Underscore (_)
- Tilde (~)
- Colon (:)
- Semicolon (;)

9.2 Converting GLN, GTIN and SSCC into the EPC format

In order to submit GS1 identifiers such as GLN, GTIN (together with a batch or serial number) or SSCC using EPCIS, they must be in a URI notation. The latter is displayed in the form of a URN (e.g. "urn:epc:id:sgln:4012345.11111.0")

The conversion of each of the three GS1 identifiers GLN, GTIN, GTIN + batch/lot (or serial number) and SSCC is illustrated using an example below. The "EPC Converter" service (available at www.gs1-germany.de) is used for this purpose and is free for GS1 Complete customers. The individual steps are explained in detail in the GS1 Tag Data Standard (available for download at http://www.gs1.org/gsmp/kc/epcglobal/tds/)

Example 1: Converting the GLN "4012345222227" into an SGLN EPC:

Example 2: Converting the GTIN "04012345333336" and serial number "1234" into an SGTIN EPC:
Example 3: Converting the GTIN "0401234533336" and batch number "AB44" to an LGTIN EPC class: see example 2 with the following difference: Instead of urn:epc:id:sgtin:" use the prefix "urn:epc:class:lgtin:".
Illustration: urn:epc:class:lgtin:4012345.033333.AB44

Example 4: Converting the GTIN "0401234533336" to an SGTIN pattern EPC class: see example 2 with the following difference: Instead of urn:epc:id:sgtin:" use the prefix "urn:epc:idpat:sgtin" and replace the serial number with an asterisk ("*").

Example 5: Converting the SSCC "040123458888888887" into an SSCC EPC:

9.3 Template for exchanging Company/User Master Data
The template for exchanging Company Master Data is a word- or excel-based file with the following kind of information:
For fTRACE Users within a company the following data have to be made available to the system:

The template for capturing company/user master data is send to the system company during the onboarding process.

**9.4 Template for exchanging Product Master Data**

The template for exchanging Product Master Data is an excel-based file with the following kind of information:

Assortment Specific (example):
The template for capturing product master data is send to the system company during the onboarding process.

### 9.5 Template for exchanging Product Marketing Data

The template for exchanging Product Marketing Data is a word-based file with the following kind of information:
The template for capturing marketing data is send to the system company during the onboarding process.