

Global Dialogue on Seafood Traceability

GDST 1.0 Implementation Metrics Rubric

March 2021

Purpose: Based on the [Core Normative Standards](#), this set of indicators and metrics gives a quantitative framework for companies to assess their progress towards implementing the [GDST Standards and Guidelines for Interoperable Seafood Traceability Systems, Version 1.0](#). The indicators are a combination of normative standard adherence and analytical capabilities. In order to achieve the use cases of GDST 1.0, a company not only needs to collect the Basic Universal List (BUL) of Key Data Elements (KDEs) at Critical Tracking Events (CTEs), but they also need to be able to digitally send and receive KDEs and CTEs in a file format called Electronic Product Code Information Services (EPCIS), an XML-based supply chain visibility standard. Additionally, physical supply chain processes need to be utilizing GDST 1.0 standard identification methods at pertinent CTEs. This tool should provide a point of reference in which to orient a company's implementation roadmap.

Use: This tool is meant to use for internal benchmarking purposes. It can also be used in conjunction with brand standards among a supplier base. Adherence to this checklist does NOT constitute "GDST compliance," but by meeting these indicators companies should be able to expect interoperability with their supply chain partners, global uniqueness on a batch/lot level, and have the capability to use KDEs for analyses relevant to catch legality and food safety.

Intended End Users: The implementation indicators will be most helpful for medium to large enterprises in processing, distribution, and retail of seafood. It may also have application to large, vertically integrated companies who harvest or farm seafood. However, any company that works with seafood products and their distribution could find utility in this tool.

How to Use this Document: The indicators are split into two main segments: 1) [roadmap](#) indicators for preparation in launching GDST 1.0 implementation and 2) implementation indicators and metrics to monitor and assess progress towards end-to-end utilization of GDST 1.0 across product lines and among a company's supplier base. The table at the end of the document categorizes which implementation stage a company is at based on their periodic rubric measurements. Scoring intends to measure how far along a company is on their implementation curve rather than grading a company's sustainability or traceability practices.

Below is a list of resources referenced in the rubric as well as other background documents.

Resource	Description
Guide to the GDST 1.0 Materials	Overview of GDST 1.0 packet contents + “How to use these documents”
Executive Summary	A two-page description of GDST 1.0
Core Normative Standards	The GDST 1.0 standards
Basic Universal List of KDEs (spreadsheet)	E-spreadsheet of Appendices to <i>Core Normative Standards</i>
Explanatory Materials	Non-technical background and introductory materials
Technical Implementation Guidance	Additional technical materials to facilitate implementation
Rapid Initial Assessment (RIA)	Completing the RIA is the first step to understanding your company’s readiness for GDST 1.0 implementation. It helps you assess your company’s current traceability technology and practices, and (in a preliminary way) those of your supply chain partners.
Supplier Assessment Survey (SAS)	The SAS tool helps determine the readiness of your suppliers to capture the required GDST Key Data Elements (KDEs) and to transmit the data to you in GDST-compliant digital formats. Like the RIA, the SAS is a survey instrument, but this time it is filled out by your suppliers themselves—your company distributes it to your suppliers and your company receives the responses (with or without assistance from the GDST Secretariat, per your choice). The SAS gives your company a detailed look at traceability practices within your supply chains, and also helps educate your suppliers about GDST 1.0.
IT Conversion Mapping Tool	The GDST Secretariat has also developed an online tool to assist company IT experts (or third-party IT service providers) in concert with other pertinent staff (e.g., supply chain or procurement managers) to understand the technical dimensions of adherence to the GDST 1.0 standard to enable interoperability between supply chain partners. The tool, which is best used in conjunction with the RIA and the SAS, gives a clear picture of how the GDST 1.0 data standards apply to your company’s supply chain contingencies, and gives technical outputs which can guide mapping attributes from internal data systems. The IT Conversion Mapping tool produces a process flow diagram that gives additional insights into current data collection practices within your company and/or your supply chains. Additionally, the tool produces a sample XML file for your IT team or solution provider to use as a basis for its part of the roadmap to IT implementation.

Metric	Description	Unit of Measure / Possible Values	Additional Information
Roadmap Indicators			
Has your company assessed your internal traceability landscape? This can be done through your own process or filling out the Rapid Internal Assessment (RIA).	The RIA is a survey tool developed by the GDST Secretariat to help companies develop a roadmap for implementation of GDST 1.0.	Yes (1) / No (0)	
Has your company surveyed its supplier base for their ability to use GDST 1.0? Your company may use the Supplier Assessment Surveys (SAS) or your own process for the assessment.	The SAS is a simplified version of the RIA to be used to ascertain readiness of your suppliers to provide GDST 1.0 encoded data to your company's data systems.	Percentage of suppliers	
Has your company created a roadmap to implementation?	Using GDST implementation tools, a company should create an implementation roadmap to coordinate internal and external operational initiatives.	Yes (1) / No (0)	
Does your company have an overall traceability plan?	The company should have a central traceability plan which includes all relevant information including defining its scope, practices, and procedures.	Yes (1) / No (0)	May include certification records, regulatory documents, recall plans, and other pertinent documentation.

Has your company drafted a supplier expectations letter?	To be able to have complete GDST pedigree, an expectations letter giving specific instructions to your company's supplier base will help in communicating your company's traceability plan and drive the collection and sharing of GDST KDEs and CTEs in EPCIS.	Yes (1) / No (0)	
Dissemination of supplier expectations letter	The company should distribute the expectations letter to all seafood suppliers and receive company acknowledged receipt.	Percentage of suppliers	
Implementation Indicators			
<i>Supply Chain</i>			
All products have unique identifiers	To ensure traceability, unique identification using GDST guidelines (e.g., GTIN) for all products including outgoing, internal, and those received from suppliers including ingredients. Identification must be a recommended key from section 3.1 of the Core Normative Standards . Item Codes are not considered a valid UID.	Percentage of product lines or total volume	Ensuring Unique Identifiers is critical to conforming to the EPCIS standard. Since GDST follows the EPCIS standard, this means this is a requirement in being GDST compatible.
All internal relevant Critical Tracking Events are being captured	For CTEs your company is responsible for, are these supply chain steps being captured and able to be output to EPCIS?	Yes (1) / No (0)	The IT Conversion Mapping Tool may help with determining CTEs and data collection requirements.

Each location within internal CTEs are uniquely identified	Similar to product identification, locations need to have global uniqueness outlined in the guidelines set forth in 3.1 of the Core Normative Standards .	Percentage of locations	Ensuring Unique Identifiers is critical to conforming to the EPCIS standard. Since GDST follows the EPCIS standard, this means this is a requirement in being GDST compatible.
Are logistical units specific to the batch/lot level physically identified by their unique identifier at receipt?	On the logistical unit relevant to the CTE, there is a physical identifier on the logistical unit (e.g., case label, SSCC) which contains the unique identifier at the point of receipt	Percentage of received logistical units	Physical identifiers can take a variety of methods: GS1 barcodes, RFIDs, QR codes, etc.
Are logistical units specific to the batch/lot level physically identified by their unique identifier at dispatch?	On the logistical unit relevant to the CTE, there is a physical identifier on the logistical unit (e.g., case label, SSCC) which contains the unique identifier at the point of dispatch.	Percentage of outgoing logistical units	Physical identifiers can take a variety of methods: GS1 barcodes, RFIDs, QR codes, etc.
<i>Digitization</i>			
Digitized GDST data management	Are your company's data systems capable of loading / reading data into / from GDST 1.0 Data Format (EPCIS)?	Yes (1) / No (0)	
Percentage of digitized GDST data received	Data that is received and must be manually transcribed results in lots of human errors. Receiving data in the GDST digital format reduces the number of transcribing errors.	Percentage of either product lines or total volume.	
Sending all GDST data in digitized format	Data should be sent in the required Digital GDST EPCIS format.	Yes (1) / No (0)	



<p>Digital integrations with supply chain partners</p>	<p>Supply chain partners send and receive EPCIS messages to/from your company. GDST has a recommended REST API architecture described on the GDST GitHub for API integrations. Other methods are described in the Technical Implementation Guidance.</p>	<p>Percentage of supply chain partners (senders and receivers) able to send/receive GDST EPCIS data.</p>	<p>GDST has a recommended API structure based on OpenAPI. Its code is contained on https://developer.traceability-dialogue.org/open-api/swagger-api/</p>
<p><i>Meeting KDE and Sustainability Objectives</i></p>			
<p>Meeting KDE requirements</p>	<p>GDST has laid out KDE requirements as defined in the Basic Universal List.</p> <p>Depending on if wild or farmed, these lists of KDEs are different.</p>	<p>Percentage by Supplier</p>	
<p>% of Products that have harvest certification</p>	<p>GDST has harvest certification information required when subject to a sustainability standard (e.g., MSC).</p>	<p>Percentage of product lines or total volume</p>	
<p>Traceability Analyses</p>			
<p>All products with valid traceback</p>	<p>All products must have a valid Trace Back. Failure to connect products with their source-products using Transformation events will result in a failed Trace Back.</p> <p>Failure to use Unique Identifiers (UID) on products will result in failed Trace Backs as well.</p>	<p>Percentage of either product lines or total volume</p>	<p>100% of batch/lots having Unique Identifiers is a prerequisite to being able to perform valid tracebacks, especially across multiple supply chain actors.</p>

Time to Perform Trace Back	The time it takes for a company to run a Trace Back given a unique identifier.	Time Span (1 if <24 hours, 0 if >24 hours)	
Can Perform Mass Balance	The ability to perform a mass balance to ensure no product is being used more than exists.	Yes (1) / No (0) / If No, then percentage.	Mass balance may need to account for waste from processing, moisture loss/gain, and other legitimate weight changes.

Evaluation

The stages below indicate your company's progress toward implementation.

Yes/No questions are scored 1/0, respectively. Percentages should be on a scale between 0-1 (i.e., 50% = 0.5).

Indicator Thresholds and Metrics	Score Range	Stage Phase	Interpretation
Roadmap Indicators Met <ul style="list-style-type: none"> - All Yes/No as Yes (1/0) - Percentage of Suppliers >80% 	0-5.6	Scoping	Traceability practices among internal operations and supplier base assessed. Supply chain actors understand roles and responsibilities for rollout. Ready to begin implementation steps.
Implementation Indicators Started (Supply Chain, Digitization, and Meeting KDE/Sustainability Objectives)	5.6-17.6	Launching	Piloting and early implementation among priority supply chains. Scaling across product lines. Use indicators to assess monthly progress toward KPI goals.
Implementation Indicators Met <ul style="list-style-type: none"> - All Yes/No as Yes - Percentages at or above 80% 	17.6-20	Implementing	Above 80% across product lines/volume, companies may consider GDST 1.0 implemented.
Traceability Analyses	N/A	Continuous Improvement	Improving data systems, operational efficiencies, and supplier compliance.

Appendix: Protocols for Supply Chain Indicators

This step-by-step guide expands on specific indicators in the above tables.

All Products have Unique Identifiers

Implementing unique identifiers for GDST is essential to ensuring end-to-end traceability capabilities. In the seafood industry, the usage of global standards in product identity may not be common upstream, especially from catch/farm harvest to secondary processing. Ideally, GS1-based identifiers should be used, especially as volumes increase. GDST has non-GS1 methods of identification as well, however. The configuration of a GDST unique identifier includes a product class along with a linking KDE, a unique number associated with that logistical unit at that particular Critical Tracking Event.

GS1-based Identification

For GS1-based identification, a product instance involves a GTIN plus Lot (or Serial) Number. The goal is to produce unique Electronic Product Codes (EPC). There are two types of EPCs. The first is the Class Level EPC that generally involves a GTIN and a Lot Number, the second is an Instance Level EPC that involves a GTIN and a Serial Number. The main difference between the two is that a class level EPC can exist in two locations at the same time, while an instance level EPC can only exist in a single location at a time.

Note: When using class level EPCs, this is commonly referred to as lot-based traceability and when using instance level EPCs, this is commonly referred to as case level or serialized traceability.

1. Assign GTINs to each Trade Item you manage. A Trade Item is like a blueprint about a product that you produce or trade.
 - a. More information about the GTIN standard can be found [here](#).
 - b. It is highly recommended that a proper GS1 GTIN is used, however, if a Non-GS1 GTIN is used, please follow the guide found at section 3.1 in the [GDST 1.0 Core Normative Standard](#).
2. If you are performing lot-based traceability, then you will be using Class Level EPCs. The most important thing here is that unique lot numbers are used for each batch produced at a production facility. This means that production facilities producing the same trade item need to make sure they are not using the same lot numbers, and that lot numbers are not repeated either between two production facilities or within the same production facility.

3. If you are performing case level traceability, then you will be using Instance Level EPCs. Here, the most important thing is that each case produced is assigned a unique serial number that is never re-used or repeated for another case anywhere else in the world. The combination of the GTIN and Serial Number must be unique for all time.
 - a. When doing case level traceability, it's possible that there is an initial processing event that outputs a large batch of products with a class level EPC. Then a secondary packaging event turns that finished product into a list of instance level EPC cases with serial numbers. This means your traceability will use a combination of lot based and instance-based traceability and must follow the rules for both.

Non GS1-based Identification

For Non-GS1-based identification, a product instance involves an entity identifier (either a URL or UUID) in lieu of a company prefix, class identifier (e.g., SKU), and a Lot (or Serial) Number. The goal is to produce unique product codes. Similar to GS1 identifiers, non GS1 identifiers can be either lot-based or serialized.

Note: When using class level identifiers, this is commonly referred to as lot-based traceability and when using instance level identifiers, this is commonly referred to as case level or serialized traceability.

1. Assign a unique code (SKU, item code, etc.) to each Trade Item you manage. A Trade Item is like a blueprint about a product that you produce or trade.
 - a. More information about the GTIN standard can be found [here](#).
 - b. For Non-GS1 GTIN is usage, please follow the guide found at section 3.1 in the [GDST 1.0 Core Normative Standard](#).
2. If you are performing lot-based traceability, then you will be using Class Level identifiers combined with the batch/lot code. This means that production facilities producing the same trade item need to make sure they are not using the same lot numbers, and that lot numbers are not repeated either between two production facilities or within the same production facility.
3. If you are performing case level traceability, then you will be using Instance Level identifiers. Here, the most important thing is that each case produced is assigned a unique serial number that is never re-used or repeated for another case anywhere else in the world. The combination of the class identifier and Serial Number must be unique for all time.
 - a. When doing case level traceability, it is possible that there is an initial processing event that outputs a large batch of products with a class level identifier. Then a secondary packaging event turns that finished product into a list of instance level cases identifiers (or EPCs) with serial numbers. This means your traceability will use a combination of lot based and instance-based traceability and must follow the rules for both.

All Internal Relevant Critical Tracking Events are being Recorded

To ensure that all relevant CTEs are being recorded, it is important to review the GDST Standard to familiarize yourself with the relevant CTEs. These include:

- Feed Production
- Hatchery
- Farm Harvest
- Fishing
- On-Vessel Processing
- Transshipment
- Offload / Landing
- Receive
 - This event should be recorded any time products are being received at a new location.
- Ship
 - This event should be recorded any time products are leaving their current facility.
- Processing
- Aggregate
- Disaggregate

Any time one of these events occur, it is important that they are recorded in the digital event history for the relevant products. Mainly, CTEs are events when product creation (or commissioning), transformation, or change of ownership occurs. Chain of custody is critical in traceability, so it is important that a CTE is recorded each time this occurs. If a change of ownership occurs during one of the events listed above, then the change of ownership can be recorded inside the event. All events support the ability to record a change of ownership inside the event. If a change of ownership occurs outside of the events listed above, then a simple OBJECT event with no business step can be recorded to represent a change of ownership occurring. For the most part, it is expected for changes of ownership to occur during the receive, ship, offload, or transshipment events.

Each Location within CTEs are Uniquely Identified

Along with product instances being uniquely identified, it is also important that all locations are uniquely identified. In EPCIS and GDST, GLNs are used for uniquely identifying locations inside a CTE. This means that any location where a CTE will be recorded needs to have a GLN. There are two-types of GLNs, GS1 GLN and Non-GS1 GLN. A GS1 GLN can be generated using a GS1 Prefix, some information can be found [here](#). For non-GS1 GLNs, please see section 3.1 in the [GDST 1.0 Core Normative Standard](#).

Are logistical units specific to the batch/lot level physically identified by their unique identifier at receipt?

On the logistical unit relevant to the CTE, there is a physical identifier on the logistical unit (e.g., case label, SSCC) which contains the unique identifier at the point of dispatch.

Meeting KDE Requirements

The [GDST 1.0 Core Normative Standard](#) lays out a list of KDEs required for each CTE.

1. Review the [GDST 1.0 Core Normative Standard](#) sections 2.1 and 2.2 to understand how each KDE required maps to its respective CTE.
2. Review internal processes and determine which CTEs will be recorded.
3. Ensure that each required CTE has it is required KDEs being recorded.
 - a. This also means that proper GTINs, Lot Numbers, and GLNs are being recorded for each event.

Digitized GDST Data Management

This can be accomplished by either developing or purchasing a solution that allows the entry of digital GDST data. In order to meet this requirement, the system must:

1. Be able to allow GDST Digital data to be either imported or manually entered into the system.
2. Be able to receive GDST Digital data in a standardized manner.
3. Be able to send GDST Digital data in a standardized manner.

All Products with valid Traceback

A traceback can be performed by following the guide in section 6.1 in the [GDST Technical Implementation Guidance \(reproduced here\)](#).

Traceback is a common, straightforward use of traceability data, beginning with the traceable object of interest.

1. Query the event repository for all events related to the Object Identifier and location(s) of interest (receipts, shipments, pack, unpack, transformation). If no location is specified, all events at all locations will be examined.
2. Order the events by timestamp and group by terminal destination.
3. From each terminal destination, follow the shipping and receiving (source/destination) and trail back to either the original source (catch or harvest) or the output of a transformation event.
4. From the transformation event, repeat steps 1-3 for each Input Object Identifier.

Can Perform Mass Balance

Mass balance is a computation of inputs and outputs to establish usage quantities to verify legal usage. Using the traceback and traceforward methodologies described above for a particular batch/lot of products, one can compute the quantity of inputs consumed based on its harvest, ship/receive, and transformation events. If one has access to all transformation events related to a specific catch, one can compute the total output produced and verify for reasonableness. From catch to landing, weights are often estimated, with verification of weight occurring at grading or first receipt. During processing and other transformation events, weights can increase or decrease depending on type of processing, other inputs, or moisture content. Knowing critical limits on these types of events is crucial to using mass balancing to determine irregularities in the supply chain.

1. For the Product, find all Fishing, Farm Harvest, and Processing Events in which the Product was an output. Sum the weights for the product from each event and label this the TOTAL OUTPUT WEIGHT.
2. For the Product, find all Farm Harvest and/or Processing Events in which the product was an input. Sum the weights for the product from each event and label this the TOTAL INPUT WEIGHT.
3. In order for the Product to pass a mass balance, the TOTAL INPUT WEIGHT should equal to or less than the TOTAL OUTPUT WEIGHT unless moisture content or other weight can be accounted for.