



GLOBAL DIALOGUE on Seafood Traceability

Standards & Guidelines for Interoperable Seafood Traceability Systems — Core Normative Standards (Version 1.2)

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Document Summary

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This document is part of a packet of interconnected documents and resources that together constitute the full set of the GDST materials. The packet includes:

Document Title	Document Date	Version	Contents
<i>Guide to the GDST Materials</i>	June 2023	v1.2	Overview of GDST packet contents + “How to use these documents”
<i>Executive Summary</i>	June 2023	v1.2	Two-page description of GDST
<i>Core Normative Standards</i>	June 2023	v1.2	Core Normative Standards
<i>Basic Universal List of KDEs (spreadsheet)</i>	June 2023	v1.2	e-spreadsheet of Appendices to <i>Core Normative Standards</i> — part of GDST core standards
<i>Explanatory Materials</i>	June 2023	v1.2	Non-technical background and introductory materials
<i>Technical Implementation Guidance</i>	June 2023	v1.2	Additional technical materials to facilitate implementation

A drafting history of the industry-led inputs into GDST appears in Section 1.3 of the *Explanatory Materials* document.

For online access to the full GDST packet, visit traceability-dialogue.org/gdst-standards-and-materials/

For additional information, please contact the GDST Secretariat at info@traceability-dialogue.org.



Table of Contents

Document Summary	2
Table of Contents	3
Abbreviations and Acronyms	4
GDST Core Normative Standards	5
1. Summary of Requirements for GDST Compliance	5
2. Basic Universal List of KDEs and CTEs	6
2.1. KDEs and CTEs for Wild Caught Seafood	7
Table W1a – BUL-KDEs(wild) Mapped to Critical Tracking Events (CTEs)	7
Table W1b – EPCIS Technical Data for Event Identification	8
Table W2a – Vessel Data (master level)	9
Table W2b – Catch Data (event level).....	11
Table W2c – Transshipment Data (event level)	11
Table W2d – Landing Data (event level)	12
Table W2e – Processing Data (event level)	12
Table W2f – Certifications and Licenses (event level).....	13
Table W2g – Traceable Object Information (event level)	14
Table W2h – Additional Technical Data (event level).....	16
2.2. KDEs and CTEs for Aquaculture	17
Table Aq1a – Aquaculture KDEs Mapped to Critical Tracking Events (CTEs).....	19
Table Aq1b – EPCIS Technical Data for Event Identification	20
Table Aq2a – Location Data (master level)	20
Table Aq2b – Feed Data (event level).....	22
Table Aq2c – Hatchery Data (event level).....	22
Table Aq2d – Farm Data (event level).....	23
Table Aq2e – Processor Data (event level).....	23
Table Aq2f – Certifications and Licenses (event level).....	24
Table Aq2g – Traceable Object Information (event level)	25
Table Aq2h – Technical Data (event level).....	26
2.3. Critical Tracking Events and GS1 “Business Steps”	27
Table C1: GDST CTEs and Accompanying Business Steps.....	28
3. Object and Location Identification Requirements	32
3.1. On The Vessel or Farm	30
Table D1 – Example Identifiers – First Mile	31
3.2. At a Processor or Consumer Packaged Goods (CPG) Company	32
Table D2 – Example Identifiers – Processing.....	32

Abbreviations and Acronyms¹

AIDC	Automated Identification and Data Capture
ALE	Application-Level Events
API	Application Programming Interface
B2B	Business-to-Business
BUL	Basic Universal List
CBV	Core Business Vocabulary (GS1)
CPG	Consumer Packaged Goods
CSR	Corporate Social Responsibility
CTE	Critical Tracking Event
EAN	European Article Number
EDI	Electronic Data Interchange
EPCIS	Electronic Product Code Information Services
ERP	Enterprise Resource Planning software
GDST	Global Dialogue on Seafood Traceability
GTIN	Global Trade Item Number
GTS	Global Traceability Standard
GTS2	Global Traceability Standard 2.0
GUID	Globally Unique Identifier
ILMD	Instance or Lot Master Data
IoT	Internet of Things
ISO	International Organization for Standardization
IUU	Illegal, Unreported, and Unregulated
KDE	Key Data Element
LGTIN	Lot Global Trade Item Number
MES/MRP	Manufacturing Execution Software/ Manufacturing Resource Planning
MSC	Marine Stewardship Council
NFI	National Fisheries Institute
PGLN	Global Location Number
RFID	Radio Frequency ID
SIMP	Seafood Import Monitoring Program
UPC	Universal Product Code
UUID	Universally Unique Identifier
WG1, WG2	Working Groups 1 or 2

¹ This list covers abbreviations and acronyms used in the full packet of GDST materials. Not all appear in every document within that packet

GDST Core Normative Standards

This document presents the Core Normative Standards (“Standards”) of the *GDST Standards & Guidelines for Interoperable Seafood Traceability Systems*. Compliance with GDST, narrowly construed, means compliance with the Standards in this document, except for specific elements labeled “recommended”. These Standards are supplemented by additional technical guidelines and illustrations found in the *GDST Technical Implementation Guidance* document, which are of a less restrictive or normative nature (i.e., are not required for compliance with GDST).

For reasons explained in the *GDST Explanatory Materials*, the Standards are constructed as an elaboration of the GS1 EPCIS standards for event-based traceability. The Standards presented below mainly take the form of tables that contain technical descriptions of Key Data Elements (KDEs), their associated Critical Tracking Events (CTEs), and the formal characteristics (definitions, data formatting options, links to GS1 Core Business Vocabulary, etc.) that must be standardized in the construction of GDST-compliant EPCIS data files to achieve interoperability among diverse traceability systems.

1. Summary of Requirements for GDST Compliance

There are **two fundamental requirements** set by the GDST Standards for interoperable seafood traceability systems:

- (i) **Capture of all GDST KDEs** — For any given company, full compliance requires that the company captures all KDEs on the GDST Basic Universal List of KDEs at all relevant CTEs occurring within their custody. For a supply chain to be fully GDST-compliant, all KDEs must be captured at all relevant CTEs within the supply chain.

Digital Transfer of Data in GDST EPCIS Format — All GDST-compliant businesses must be willing and able to receive and/or transmit between supply chain partners KDEs and related traceability data in digital files compatible with EPCIS (including all relevant master and event data) as described by the Technical Implementation Guidance. NOTE: For a discussion of the practical scope of these requirements, see the *Explanatory Materials* document Section 4.1 (requirement to digitize is limited to external operations) and Section 4.3 (confidentiality of supply chain information).

While the Standard allows flexible approaches to implementing these requirements (see Section 3 of the *Explanatory Materials*), GDST-compliant supply chains must enable—and should be organized to allow—**rapid digital access to all KDEs on the Basic Universal List** for any supply chain actor seeking assurances of the legal origins of their seafood products.

The **remainder of this document** elaborates the normative GDST technical standards in two dimensions:

Section 2 elaborates on the GDST KDEs and their relationship to CTEs, providing formats necessary for documentation in EPCIS format and linking to GS1 EPCIS vocabularies.

Section 3 provides standards for the “object and location identifiers” needed to attach GDST KDE information to specific traceability objects.

2. Basic Universal List of KDEs and CTEs

This section presents the GDST Basic Universal List of KDEs and their correlation to the CTEs at which each KDE should be captured. The GDST Working Group 1 identified these KDEs as essential to address the business cases underlying the GDST mandate, particularly the ability to **establish the legal origin of seafood products**.

The KDEs on the GDST Basic Universal List align with KDEs already defined in EPCIS, so that GDST KDEs mesh well with existing GS1 systems. In some cases, the GDST KDEs overlap heavily with existing GS1 attributes as defined in the GS1 “Core Business Vocabulary” (CBV).² Where required, the EPCIS standard was extended to meet the needs of seafood supply chain processes.

NOTE: Companies or other stakeholders wishing to **add additional KDEs** are free to do so, especially where helpful to create further assurances of legal origin of seafood product. The EPCIS format for event-based traceability easily accommodates the addition of such KDEs. In this way, the GDST Basic Universal List of KDEs should be viewed as a minimum number of data elements, not a limit on companies pursuing continuous improvement or best practices.

The remainder of this document presents **four sets of tables** providing formats and other technical requirements for the creation of GDST-compliant EPCIS data files based on GDST KDE/CTE combinations.

- (i) **Tables W1a and Aq1a** present a simple matrix to associate GDST BUL KDEs with their relevant CTEs, providing a map of supply chain events where KDEs need to be captured. For readers who are not IT or traceability system experts, **these two tables give the most accessible non-technical overview** of the GDST requirements.

Tables W1b and Aq1b continue this simple matrix for the EPCIS “technical data” required to describe essential elements of an EPCIS event. As noted, these two tables are provided for technical purposes and are not considered part of the GDST Basic Universal List of KDEs.

- (ii) **Tables W2a-h and Aq2a-h** provide verbal definitions of the KDEs to give them meaning for a business context and indicate proper data formatting for creation of EPCIS files, including cross-references between GDST KDEs and the GS1 Core Business Vocabulary.
- (iii) **Table C** provides additional technical vocabulary to allow encoding of GDST CTEs in EPCIS format by using EPCIS “business step” identifiers.

² For more information about the GS1 CBV, see <https://www.gs1.org/standards/epcis>.

2.1. KDEs and CTEs for Wild Caught Seafood

Table W1 is a summary list of KDEs for wild-caught products, grouped into different types of data, and correlated with the CTEs at which each KDE must be captured. If a KDE does not have an 'X' under a particular CTE, then it does not make sense, or it is not necessary, for that KDE to be captured at that CTE.

Table W1a – BUL-KDEs(wild) Mapped to Critical Tracking Events (CTEs)

Basic Universal List of Key Data Elements (Wild-capture Products)	CTEs						
	Fishing	On Vessel Processing	Transshipment	Landing	Aggregation/ Disaggregation	Ship/Receive	Processing
VESSEL DATA (master level data)							
Vessel Name	X	X					
Vessel Registration	X	X					
Unique Vessel Identification	X	X					
Public Vessel Registry Hyperlink	X	X					
Vessel Flag	X	X					
Availability of Catch Coordinates	X						
Satellite Vessel Tracking Authority	X						
Transshipment Vessel Name			X				
Transshipment Vessel Unique Vessel ID			X				
Transshipment Vessel Registration			X				
Transshipment Vessel Flag			X				
CATCH DATA							
Catch Area	X						
Fishery Improvement Project	X						
Vessel Trip Dates	X						
Date(s) of Capture	X						
Gear Type	X						
Production Method	X						
TRANSSHIPMENT DATA							
Transshipment Location			X				
Dates of Transshipment			X				
(LANDING DATA)							
Landing Location				X			
Dates of Landing				X			
PROCESSING DATA							
Expiry / Production date		X					X
Product Origin		X					X
CERTIFICATIONS AND LICENSES							
Fishing Authorization	X						

Table W1a continues next page →



Basic Universal List of Key Data Elements (Wild-capture Products)	CTEs						
	Fishing	On Vessel Processing	Transshipment	Landing	Aggregation/ Disaggregation	Ship/Receive	Processing
Harvest Certification ³	X						
Chain of Custody Certification		X	X		X	X	X
Transshipment Authorization			X				
Landing Authorization				X			
Existence of Human Welfare Policy	X	X	X	X			X
Human Welfare Policy Standards	X	X	X	X			X
TRACEABLE OBJECT INFORMATION							
Species	X	X	X	X	X	X	X
Product Form	X	X	X	X	X	X	X
Item / SKU / UPC / GTIN	X	X	X	X	X	X	X
Linking KDE (batch, lot or serial number)	X	X	X	X	X	X	X
Weight or Quantity	X	X	X	X	X	X	X
Unit of Measure	X	X	X	X	X	X	X

Table W1b – EPCIS Technical Data for Event Identification⁴

TECHNICAL DATA							
Event ID	X	X	X	X	X	X	X
Event Date, Time & Time Zone	X	X	X	X	X	X	X
Event Read Point (Geo Location)	X	X	X	X	X	X	X
Product Ownership	X	X	X	X	X	X	X
Information Provider	X	X	X	X	X	X	X

TECHNICAL NOTES:

- (i) The CTEs across the top of these tables are ordered consistently with typical event sequences but may vary from supply chain to supply chain.
- (ii) Traceability regulatory requirements may require or benefit from additional KDEs or EPCIS event information tagged to specific CTEs. For example, SIMP requires the identity of the party first receiving product after harvest—information not specifically included in the GDST Basic Universal List of KDEs (although reproduceable through trace-backs). In such cases (as with other extensions to GDST KDE/CTEs that may be needed for specific applications), these Standards can be augmented to include additional data. This approach can also be used to refine GDST to facilitate interactions

³ Note that while the harvest certification is associated with the fishing event, a harvest certificate may be created at any time before a seafood product enters commerce.

⁴ Table W1b contains additional data types that are components of EPCIS data files required for recording EPCIS events. These are required by GDST in addition to the KDEs mandated by the GDST Basic Universal List but are not considered part of the BUL for purposes of full-chain data sharing.

with certification regimes. The GDST GitHub already includes recommended extensions specifically to facilitate SIMP compliance. In the future, utilizing GitHub’s issue ticket system, users may request and discuss additional KDE/CTE extensions. For more information, see Appendix 2 of the *Technical Implementation Guidance*, which includes a “disposition extension” recommended to cover the “product first entering commerce” event attribute.

Tables W2a-W2h define the KDEs in a business context. Additionally, cross-references are provided between GDST KDEs and GS1 Core Business Vocabulary⁵ attributes to inform proper data formatting. These components are also listed in the Basic Universal List but are presented here in simplified format. NOTE: These tables do not include all components of the KDEs listed in the Basic Universal List. Readers should refer to the Basic Universal List of KDE’s spreadsheet for other important components such as “Authoritative Data Source.”

Table W2a – Vessel Data (master level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Vessel Name	Text	Verbal moniker of a fishing vessel for identifying it visually and on vessel registries.	vesselName	CBV Seafood Attributes
Vessel Registration	Text	Standardized number or identifier for distinguishing vessels registered under the same flag nation.	vesselID	CBV Seafood Attributes
Unique Vessel Identification	Number	Identifier associated with a vessel for the duration of its existence that cannot be re-used by any other vessel. Identifier is displayed as a permanent physical marking on the craft.	imoNumber	GDST Extension International Maritime Organization
Public Vessel Registry Hyperlink	URL	Website address with the public registry that contains the listing of the fishing vessel.	vesselPublicRegistry	GDST Extension
Vessel Flag	Code	Nation with supervision over safety, fishing operations, and catch reporting.	vesselFlagState	ISO 3166

Table W2a continues next page →

Availability of Catch Coordinates	Text	Indicator whether GPS coordinates were collected and are available	gpsAvailability	GDST Extension
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⁵ <https://www.gs1.org/standards/epcis>



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Vessel Satellite Tracking Authority	Text	Indicator of Satellite Vessel Tracking. Authority responsible for the satellite tracking or verification.	satelliteTracking	GDST Extension
Transshipment Vessel Name	Text	Verbal moniker of a transshipment vessel for identifying it visually and on vessel registries.	vesselName	CBV Seafood Attributes
Transshipment Vessel Unique Vessel Identification	Number	Identifier associated with a vessel for the duration of its existence that cannot be re-used by any other vessel. Identifier is displayed as a permanent physical marking on the craft.	imoNumber	GDST Extension International Maritime Organization
Transshipment Vessel Flag	Code	Nation with supervision over safety, transshipment operations, and catch transfer reporting.	vesselFlagState	ISO 3166
Transshipment Vessel Registration	Text	Standardized number or identifier for distinguishing vessels registered under the same flag nation.	vesselID	CBV Seafood Attributes



Table W2b – Catch Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Catch Area	Code	Location(s) where capture of seafood occurred. ⁶	catchArea (repeating)	FAO Catch Area
			economicZone (repeating)	EEZ
			rfmoArea	GDST Extension FAO Fisheries
			subnationalPermit Area	GDST Extension See Developer Documents
Fishery Improvement Project	Text	Publicly listed name of fishery improvement project which the harvest event is subject to.	fisheryImprovementProject	GDST Extension Fishery Progress
Vessel Trip Dates	Date	Calendar start and end dates of a fishing vessel's voyage between the last point the fishing hold was empty, and seafood is discharged.	vesselTripDate	YYYY-MM-DD CBV Info
Date(s) of Capture	Date	Date of seafood capture event(s) during the vessels voyage at sea	EPCIS Event Time	YYYY-MM-DD CBV Info
Gear Type	Code	Equipment used to extract seafood from water for capture.	fishingGearType Code	See Developer Documents
Production Method	Code	Categorization, on the spectrum of wild-capture to captive-culture, of the general seafood harvest method.	productionMethod ForFishAndSeafoodCode	GDD Code List

Table W2c – Transshipment Data (event level)

⁶ List CBV attributes as applicable. At least catchArea required.



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Transshipment Location	Location	Geographic location where seafood is discharged from a fishing vessel to a transshipment vessel.	In-Port: unloadingPort	CBV Info
			At-Sea: Geo Coordinates	CBV Info
Dates of Transshipment	Date	Date on which seafood was discharged from fishing vessel to transshipment vessel.	EPCIS Event Time	YYYY-MM-DD GDST Extension

Table W2d – Landing Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Landing Location	Location	Where seafood was first discharged to land.	In-port: unloadingPort	CBV Info
			Non-port: Geo Coordinates	CBV Info
Dates of Landing	Date	Date on which seafood is discharged to a landing location	EPCIS Event Time	YYYY-MM-DD GDST Extension

Table W2e – Processing Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Expiry / Production date	Date	Expiration date: calendar date indicating the shelf life of a seafood product. Production Date: calendar date of last processing or packaging.	Expiration Date: itemExpirationDate	YYYY-MM-DD CBV Info
			Production Date: EPCIS Event Time	
Product Origin	Code	Country where seafood underwent the last substantial transformation.	countryOfOrigin (repeating)	CBV Info



Table W2f – Certifications and Licenses (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Fishing Authorization	Mixed	Unique number associated with a regulatory document, from the relevant authority, granting permission for wild capture of seafood by a fisher or fishing vessel.	cbvmda:certificationList ⁷	CBV Seafood Attributes
Harvest Certification	Mixed	Name of the harvest standards body that a particular harvested seafood is subject to and the unique identifier associated with the certified entity.	certification	
Chain of Custody Certification	Mixed	Name of chain of custody standards body that a particular harvested seafood is subject to, and the unique identifier associated with the certified entity.	certificationStandard certificationAgency	
Transshipment Authorization	Mixed	Unique number associated with a regulatory document, from the relevant authority, granting permission for discharge of wild capture of seafood from a fishing vessel to a transshipment vessel.	certificationValue certificationIdentification	
Landing Authorization	Mixed	Unique number associated with a regulatory document, from the relevant authority, granting permission for discharge of wild capture of seafood to land by a fisher, fishing vessel or transshipment vessel.	gdst:certificationType /certification /cbvmda:certificationList Or bizTransactionList	

Table W2f continues next page →

⁷ To accommodate a variety of certificate and licensing identification schemas, use the above attributes in combination to name at minimum the issuing body and associated certificate identifier. There may only be an Agency and Identification or there may also be a certifying body or auditor (certificateAgency).



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Human Welfare Policy Standards	Text	Name of internationally recognized standards to which policy on a vessel/trip claims conformity		
Existence of Human Welfare Policy	Text	Indicator of human welfare policies in place on a vessel/trip, answering the question "What kind of human welfare, labor, or anti-slavery policy was in place on this vessel/trip?" If internal policy is subject to a 3rd party audit, select '3P Audit'.	humanWelfarePolicy	GDST Extension

Table W2g – Traceable Object Information (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Species	Code	Scientific (Latin) name of the seafood.	speciesForFisheryStatisticsPurposesCode	FAO Species Code
Product Form	Code	Commercial shorthand reference of the degree of transformation of seafood from its original living form.	tradeItemConditionCode	GS1 Code List
Item / SKU / UPC / GTIN	ID	Identifier of seafood material to distinguish it within a particular facility, company, or globally.	Catch, Ship, Receive, Landing (Object): epcList quantityList EPCClass, Qty, UOM Process (Transform): inputEpcList, inputQuantityList outputEpcList outputQuantityList	EPCIS What Dimension
Linking KDE (batch, lot or serial number)	Lot or Serial #	Identifier associated with physical product marking a particular instance of seafood material	Pack/Unpack (Aggregation): parentID	

Table W2g continues next page →



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
		such as a batch/lot number, serial number, or container number.	epcList or quantityList ID Options: EPC	
Weight or Quantity ⁸	Number	Numerically quantifiable amount of seafood with a standard Unit of Measure.		
Unit of Measure	Code	Standard for measurement of the product		

⁸ See definition. Not individual seafood units (e.g., number of fish), but quantity of standard unit of measure.



Table W2h – Additional Technical Data (event level)⁹

Table W2h continues next page →

⁹ Table W2h contains additional data types that are components of EPCIS data files required for recording EPCIS events. These are required by GDST in addition to the KDEs mandated by the GDST Basic Universal List but are not considered part of the BUL for purposes of full-chain data sharing.



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Event ID	UUID	An identifier for this event as specified by the capturing application, globally unique across all events. The Core Business Vocabulary standard [CBV1.2] specifies the use of a UUID URI for this purpose.	eventID	UUID for Event IDs
Event Date, Time & Time Zone	Date Time Zone	The date and time at which the EPCIS Capturing Applications asserts the event occurred. The time zone offset in effect at the time and place the event occurred, expressed as an offset from UTC.	eventTime eventTimeZoneOffset	ISO-8601 Timestamp
Event Read Point (Geo Location)	Location	The geographic or business location at which the event took place.	readPoint “geo:{lat},{lon}” or GLN	Location CBV Info
Product Ownership	Party	The party who owns the object. For chain of custody during ownership transfer, capture source and destination owning parties.	productOwner Ship/Receive Events: sourceList, destinationList owning_party IDs: PGLN	GDST Extension Source, Destination Documentation
Information Provider	Party	The original party who provided the event information. This is important as the event may be re-shared downstream.	informationProvider IDs: PGLN	Data Dictionary

2.2. KDEs and CTEs for Aquaculture



This section presents the GDST “Basic Universal List” of KDEs identified by GDST Working Group 1 as essential for farmed seafood produced through aquaculture, using the same organization of material as for wild-capture products in the previous section. Here again, the tables are all derived from the Basic Universal List of KDEs accompanying this document, which is an integral part of the Standards.

Table Aq1 lists the CTEs for aquaculture products and indicates which KDEs must be captured at each. Where no ‘X’ appears, it does not make sense, or it is not necessary for that KDE to be captured at that CTE.



Table Aq1a – Aquaculture KDEs Mapped to Critical Tracking Events (CTEs)

Basic Universal List of Key Data Elements (Aquaculture Products)	CTE					
	Feedmill (Transform)	Hatchery (Hatch)	Farm (Harvest)	Processor (Process/Pack)	Aggregation/Disaggregation	Ship/Receive
LOCATION MASTER DATA						
Organization	X	X	X	X	X	X
Location name ¹⁰	X	X	X	X	X	X
Location ID	X	X	X	X	X	X
Location Geo-Coordinates of Address	X	X	X	X	X	X
Location Country	X	X	X	X	X	X
FEED DATA						
Source of protein	X					
HATCHERY DATA						
Harvest date per tank		X				
Source of broodstock		X				
FARM DATA						
Farming method			X			
Date of Harvest			X			
PROCESSOR DATA						
Product Form				X		
Production date				X		
Product Origin				X		
CERTIFICATIONS AND LICENSES						
License ¹¹				X	X	
Harvest Certification	X	X	X	X		
Chain of Custody Certification	X	X	X	X		
Existence of Human Welfare Policy	X	X	X	X		
Human Welfare Policy Standards	X	X	X	X		
TRACEABLE OBJECT INFORMATION						
Species		X	X	X	X	X
Item / SKU / UPC / GTIN	X	X	X	X	X	X
Linking KDE (batch, lot, serial number)	X	X	X	X	X	X
Weight / Quantity	X	X	X	X	X	X
Units of Measure	X	X	X	X	X	X

¹⁰ Location Name includes BUL KDEs A06, A15, and A21.

¹¹ License includes BUL KDE A22 which may span Aggregator or Processor.

Table Aq1b – EPCIS Technical Data for Event Identification¹²

	CTEs					
	Feedmill (Transform)	Hatchery (Hatch)	Farm (Harvest)	Processor (Process/Pack)	Aggregation/ Disaggregation	Ship/Receive
TECHNICAL						
Event ID	X	X	X	X	X	X
Event Date, Time & Time Zone	X	X	X	X	X	X
Event Read Point (Geo Location)	X	X	X	X	X	X
Product Ownership	X	X	X	X	X	X
Information Provider	X	X	X	X	X	X

Tables A2a-A2h define the KDEs in the business context. Additionally, cross-references are provided between GDST KDEs and GS1 Core Business Vocabulary¹³ to inform proper data formatting. These components are also listed in the Basic Universal List but are presented here in simplified format. NOTE: These tables do not include all important components of the KDEs listed in the Basic Universal List. Readers should refer to the Basic Universal List of KDEs spreadsheet for other important components such as “Authoritative Data Source”.

Table Aq2a – Location Data (master level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Organization	ID and Text	Legal entity that owns mill, hatchery, farm, or processor	PGLN	
Location Name	Text	Name of physical location of interest	Location Name	
Location ID	ID	Unique indicator generated by the authorities in the country of operation that gives the facility the license to operate.	Location ID GLN	

Table Aq2a continues next page →

¹² Table Aq1b contains additional data types that are components of EPCIS data files required for recording EPCIS events. These are required by GDST in addition to the KDEs mandated by the GDST Basic Universal List but are not considered part of the BUL for purposes of full-chain data sharing.

¹³ <https://www.gs1.org/standards/epcis>



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Location Geo-Coordinates or Address	Mixed	Geo Coordinates or address of location	streetAddressOne streetAddressTwo city, state, postalCode latitude, longitude	
Location Country	Code	Country code for location	countryCode	

Table Aq2b, starting on the next page, refers to KDEs related to feed inputs on aquaculture farms. The scope of the GDST's mandate did not extend to traceability for non-fish sources of feed. However, to meet the GDST's principal mandate of helping ensure the legality of seafood production, feed that originates with other seafood products should be treated identically to wild-caught seafood harvested for human consumption, and so must follow the requirements of traceability detailed in Section [2.1](#). The KDEs in Table Aq2b provide basic information about feed types and are necessary to determine the type of feed entering aquaculture supply chains, and to identify those feed streams that must be subject to GDST standards for wild-caught products.



Table Aq2b – Feed Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Source of Protein ¹⁴	Text	Source(s) of protein in formulation of feed used (e.g., soy, insects, wild caught fish byproduct, other, etc)	proteinSource	GDST Extension

Table Aq2c – Hatchery Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Harvest date per tank	Date	Date on which fingerlings were transferred to the grow out farm/pond	EPCIS Event Time	CBV Information
Source of broodstock	Text	Broodstock from grow-out farms or taken from the wild. “Domestic” or “Wild Sources”	broodstockSource	GDST Extension

¹⁴ If source of protein has wild-caught origins, traceability of the feed should follow the wild-caught normative requirements and input into the aquaculture traceability pedigree information.



Table Aq2d – Farm Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Farming Method	Code	A combination of type of culture, unit, level of intensity, culture species and scale or size of exploitation as defined by the FAO. “Extensive,” “Semi-Intensive,” “Intensive”	aquacultureMethod	GDST Extension http://www.fao.org/docrep/t8598e/t8598e05.htm
Date of Harvest	Date	Calendar date on which the seafood was harvested from the farm/cultivation area	EPCIS Event Time	CBV Information

Table Aq2e – Processor Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Product Form	Code	Commercial shorthand reference of the degree of transformation of seafood from its original living form.	tradeItemConditionCode	GS1 Code List
Production Date	Date	Calendar date of last processing or packaging.	eventTime of TransformationEvent	EPCIS Transformation Event
Product Origin	Code	Country where seafood underwent the last substantial transformation.	countryOfOrigin (repeating)	CBV Info



Table Aq2f – Certifications and Licenses (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Harvest Certification	Mixed	Name of the harvest standards body that a particular harvested seafood is subject to, and the unique identifier associated with the certified entity.	cbvmda:certificationList ¹⁵ certification certificationStandard	CBV Seafood Attributes
Chain of Custody Certification	Mixed	Name of the chain of custody standards body that a particular harvested seafood is subject to, and the unique identifier associated with the certified entity.	certificationAgency certificationValue certificationIdentification	
License	Mixed	Unique indicator generated by the authorities in the country of operation that gives the aggregator or processor the license to operate.	gdst:certificationType /certification /cbvmda:certificationList	
Human Welfare Policy Standards	Text	Name of internationally recognized human welfare standard(s) to which a facility claims conformity	Or bizTransactionList	

Table Aq2f continues next page →

¹⁵ To accommodate a variety of certificate identification schemas, use the above attributes in combination to name at minimum the issuing body and associated certificate identifier. There may only be an Agency and Identification or there may also be a certifying body or auditor (certificateAgency).



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Existence of Human Welfare Policy	Text	Indicator of human welfare policies in place at a facility, answering the question "What kind of human welfare, labor, or anti-slavery policy was in place at this facility?" (If internal policy subject to 3rd party audit, select '3P Audit'.)	humanWelfarePolicy	GDST Extension

Table Aq2g – Traceable Object Information (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Species	Code	Scientific (latin) name of the seafood.	speciesForFisheryStatistics PurposesCode	FAO Species Code
Item / SKU / UPC / GTIN	ID	Identifier of seafood material to distinguish it within a particular facility, company, or globally.	Catch, Ship, Receive, Landing (Object): epcList quantityList EPCClass, Qty, UOM	EPCIS What Dimension
Linking KDE (batch, lot or serial number)	Lot or Serial #	Identifier associated with physical product marking a particular instance of seafood material such as a batch/lot number, serial number, or container number.	Process (Transform): inputEpcList, inputQuantityList outputEpcList outputQuantityList Pack/Unpack (Aggregation): parentID epcList or quantityList	
Weight or Quantity ¹⁶	Number	Numerically quantifiable amount of		

¹⁶ See definition. Not individual seafood units (e.g., number of fish), but quantity in a standard unit of measure (e.g., kg or metric tons).



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
		seafood with a standard unit of measure.	ID Options:	
Unit of Measure	Code	Standard for measurement of the product	EPC GS1 Example	

Table Aq2h – Technical Data (event level)¹⁷

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Event ID	UUID	An identifier for this event as specified by the capturing application, globally unique across all events. The Core Business Vocabulary standard [CBV1.2] specifies the use of a UUID URI for this purpose.	eventID	UUID for Event IDs
Event Date, Time & Time Zone	Date Time Zone	The date and time at which the EPCIS Capturing Applications asserts the event occurred. The time zone offset in effect at the time and place the event occurred, expressed as an offset from UTC.	eventTime eventTimeZoneOffset	ISO-8601 Timestamp
Event Read Point (Geo Location)	Location	The geographic or business location at which the event took place.	readPoint “geo: {lat}, {lon}” or GLN	Location CBV Info

Aq2h continues next page →

¹⁷ Table Aq2h contains additional data types that are components of EPCIS data files required for recording EPCIS events. GDST requires these in addition to the KDEs mandated by the GDST BUL. They are not considered part of the BUL for purposes of full-chain data sharing.



Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Product Ownership	Party	The party who owns the object. For chain of custody during ownership transfer, capture source and destination owning parties.	productOwner Ship/Receive Events: sourceList, destinationList owning_party IDs: PGLN	GDST Extension Source. Destination Documentation
Information Provider	Party	The original party who provided the event information. This is important as the event may be re-shared downstream.	informationProvider IDs: PGLN	Data Dictionary

2.3. Critical Tracking Events and GS1 “Business Steps”

One step in representing Critical Tracking Events in EPCIS format is encoding the CTEs as so-called “business steps” defined by the GS1 Core Business Vocabulary (CBV). For CTEs downstream from initial processing, these are already well-defined by the existing GS1 CBV. However, for upstream events in the seafood supply chain—especially on vessel or farm events—it is necessary to provide GDST extensions to the EPCIS standard. This is consistent with GS1 EPCIS practice, which looks to industry initiatives such as the GDST to extend the Business Steps vocabulary. Table C1 provides Business Steps for GDST CTEs by adopting existing GS1 CBV definitions or, where necessary, by extending the CBV with new GDST definitions.

The following table define seafood-specific CTEs and show how to document them in EPCIS.

Table C1: GDST CTEs and Accompanying Business Steps

Critical Tracking Event	Description	EPCIS Event Group	EPCIS Action	EPCIS Business Step	EPCIS Disposition	Reference Type
Harvest Events (Fishing, Farm)						
Fishing	Event where wild-caught product for consumption is first captured.	Object	Add	urn:gdst:bizstep:fishingEvent	active	N Outputs
Farm Harvest	Indicates that a mature seafood product ready for consumption has been harvested from an aquaculture facility.	Object OR Transformation	Add	urn:gdst:bizstep:farmHarvest	active	N Inputs M Outputs
Transformation Events (Feedmill, Hatching, Processing, On-Vessel Processing)						
Commingling	Transformation wherein multiple batches/lots are combined into a single batch/lot without substantial product form change. Unlike an aggregation event, this process would be irreversible as well (i.e., the products could not be separated afterwards).	Transformation	Add	urn:gdst:bizstep:commingling	active	N Input and 1 Output
Farm Stock	Addition of immature aquaculture brood for maturation.	Object or Transformation	Add	urn:gdst:bizstep:farmStocking	active	N Inputs M Outputs

Table C1 continues next page →



Critical Tracking Event	Description	EPCIS Event Group	EPCIS Action	EPCIS Business Step	EPCIS Disposition	Reference Type
Hatching	Indicates that an immature seafood product not ready for consumption has been harvested from a hatchery or aquaculture facility. Typically, the harvested immature seafood would then be re-stocked into another pond at the same facility or another facility where it would continue to grow until it reaches maturity. An example is a fingerling / fryling is harvested from a hatchery. The inputs to this event would typically be the broodstock.	Object or Transformation	Add	urn:gdst:bizstep:hatching	active	N Inputs and M outputs
Transformation	Processing step where product change occurs. Includes processing, on-vessel processing.	Transformation	Add	urn:epcglobal:cbv:bizstep:commissioning	active	N Inputs and M Outputs
Packaging	Products are packaged.	Transformation	Add	urn:gdst:bizstep:packaging	active	N Inputs and 1 Output
Aggregation/Disaggregation						
Aggregate	Incorporating child IDs into a parent ID	Aggregation	Add	urn:epcglobal:cbv:bizstep:packing	active	N Input and 1 Output
Disaggregate	Disincorporation of child IDs from parent ID.	Aggregation	Delete	urn:epcglobal:cbv:bizstep:unpacking	inactive	1 Input N Outputs

Critical Tracking Event	Description	EPCIS Event Group	EPCIS Action	EPCIS Business Step	EPCIS Disposition	Reference Type
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Table C1 continues next page →

Transportation Events (Transshipment, Landing, Ship/Receive)						
Landing	A product harvested from the wild is transferred for the first time from a VESSEL to LAND.	Object	Observe	urn:gdst:bizstep:landing	in_progress	N Observe
Receive	Denotes a specific activity within a business process that indicates that an object is being received at a location and is added to the receiver's inventory. The use of receiving is mutually exclusive from the use of arriving and accepting.	Object	Observe	urn:epcglobal:cbv:bizstep:receiving	in_transit	N Observe
Ship	CTE where object is moved to another location especially in change of ownership.	Object	Observe	urn:epcglobal:cbv:bizstep:shipping	in_progress	N Observe
Transshipment	This indicates that products were moved from a VESSEL to another VESSEL prior to the Offload/Landing event.	Object	Observe	urn:gdst:bizstep:transshipment	in_progress	N Observe

**** Although the Farm Stocking business step is listed here, it is not a required event by GDST. We have included it here so that if you wish to model that traceability data, there is a standardized way to model that data.**

**** Events that have an EPCIS Event Group of "Object OR Transformation" means that if no inputs are recorded for that event, then it should**



be an OBJECT type event in EPCIS. EPCIS restricts Transformation events so that any Transformation event must include at least 1 input and 1 output.



3. Object and Location Identification Requirements

Object, entity, and location identifiers are essential components of EPCIS event-based traceability. A traceable object is a physical or digital object whose supply chain path can be determined. The object, entity, and location identifiers below are a combination of GS1 standards and non-GS1 methods.

This Standard requires use of identifiers for certain objects, entities, and locations. It further requires that those identifiers be one of the following types: Universal Unique Identification (UUID), URLs, or GS1 identifiers (e.g., GLNs, GTINs, or LGTINs). The tables below show the recommended optically read identification methods, but the Standard also allows use of RFIDs or IoT devices, if they represent objects with a UUID, URL or GS1 identifier. Identifiers use a URI structure to be compliant with the EPCIS standard. In lieu of a GS1 company prefix, the URL or UUID may serve as the identifier prefix. The fields {prefix}, {serial}, and {lot} in the URI are internally determined by the information provider. For instance, a seafood company may choose to use a solution provider URL as the basis of the identifier, the prefix denoting the seafood company, and the internal {serial} and {lot} numbers of the given product. A seafood company without access to a resolvable URL as the basis for their identifier may instead use a UUID and self-determined prefix, serial, and lot. These allow for the flexibility of using internal identifiers in a globally unique way while retaining a similar EPCIS-compliant structure to utilize linked data.

NOTE: Point-of-sale identifiers are excluded from these standards. Those are covered in detail by other Seafood Traceability Guidance documents from GS1 and trading partners and are not directly tied to supply chain traceability and interoperability.

3.1. On the Vessel or Farm

The following are example identifiers for wild caught and farmed fish, and location identifiers for vessels and farms.

Table D1: Example Identifiers – First Mile

Role	Object, Entity, Location	Usage and Example
Fisherman or Farmer	Fresh Caught or Harvest Seafood URL UUID	Identify catch or harvest with a either a globally unique GS1 GTIN and Lot (LGTIN) based on either a GS1 Company Prefix or a purchased individual GS1 GTIN. If a GS1 Prefix is not available, one may substitute a web URL, or UUID since they are also globally unique. A GS1 GTIN and Lot, along with catch or harvest date are incorporated into a GS1-128 Barcode . A URL or UUID are incorporated into a QR Code . The barcode is applied to a container or is displayed on a mobile device to enable data transfer. Example IDs: <u>URI structure for non-GS1</u> urn:gdst:{URL or UUID};product:lot:class:{Prefix}.{Serial}.{lot}



	<p>GS1 GTIN+Lot</p>	<p><u>UUID example</u> urn:gdst:a2222482-7f96-4d6d-9431-c4e6e3ef4888:product:lot:class:123.456.789</p> <p><u>URL example</u> urn:gdst:example.com:product:lot:class:123.456.789</p> <p><u>GS1 example</u> urn:epc:class:lgtn:0614141.112345.123456 Online Barcode Generator used for examples below: https://barcode.tec-it.com/en</p>
 <p>urn:gdst:example.com:product:lot:class:123.456.789</p>	 <p>urn:gdst:a2222482-7f96-4d6d-9431-c4e6e3ef4888:product:lot:class:123.456.789</p>	 <p>(01)10614141123459(11)170709(10)123456 GS1-128 Barcode (01) Product GTIN (11) Catch/Harvest Date (10) Batch or Lot urn:epc:class:lgtn:0614141.112345.123456</p>
<p>Fisherman or Farmer</p>	<p>Party URL UUID GS1 PGLN</p>	<p>Identify farm or vessel legal <u>owner</u> - also known as a “party”. This can either be purchased from a local GS1 member organization or assigned by a licensed agency such as GLOBALG.A.P. In the case where this is not available, one can apply the same method as for traceable objects above and generate a URL or UUID.</p> <p><u>URI for non-GS1</u> urn:gdst:{URL OR UUID};party:{Prefix}.{Serial}</p> <p><u>UUID example</u> urn:gdst: 7af5bcbe-df79-412d-8603-e536b219bb28:party:0001.1234</p> <p><u>URL example</u> urn:gdst:example.com:party:003.000</p> <p><u>GS1 example</u> urn:epc:id:pglN:0614141.00440.0</p>




 <p>urn:gdst:example.com:party:003.000</p>	 <p>urn:gdst:7af5bcbe-df79-412d-8603-e536b219bb28:party:0001.1234</p>	 <p>(417) 0614141003006</p> <p>GS1-128 Barcode</p> <p>(417) Party GLN</p> <p>urn:epc:id:pgln:0614141.00440.0</p>
<p>Fisherman or Farmer</p>	<p>Location URL UUID GS1 SGLN</p>	<p>Identify vessels, farms and other related <u>facilities</u> or <u>locations</u>. Note that the Party GLN is 0614141.00300.0 and the subordinate vessels and farms are built from the Party GLN using the GLN extension. The ramification of this design is that the farmer or fisherman need only purchase one Party GLN if they do not have a GS1 Company Prefix.</p> <p><u>URI for non-GS1</u></p> <p>urn:gdst:{URL OR UUID};party:{Prefix}.{Serial}</p> <p><u>UUID example</u></p> <p>urn:gdst:4e81c664-77b1-412f-ba59-b92aaf5244eb:party:0001.1234</p> <p><u>URL example</u></p> <p>urn:gdst:example.com:party:003.123456</p> <p><u>GS1 example</u></p> <p>urn:epc:id:sgln:0614141.00300.123456</p>
 <p>urn:gdst:example.com:party:003.123456</p>	 <p>urn:gdst:4e81c664-77b1-412f-ba59-b92aaf5244eb:party:0001.1234</p>	 <p>(414)0614141003006(254)123456</p> <p>GS1-128 Barcode</p> <p>(414) Physical Location GLN</p> <p>(254) GLN Extension</p> <p>urn:epc:id:sgln:0614141.00300.123456</p>






3.2. At a Processor or Consumer Packaged Goods (CPG) Company

The following are example identifiers for both intermediate and finished goods processors who ship products to trading partners. We strongly recommend using GS1 identifiers at this stage as they may be received and handled by organizations with systems based on GS1 Standards. In the event this is not feasible, one may use the URL or URN identifiers shown above. However, this will require communication between trading partners to ensure interoperability.

Table D2: Example Identifiers - Processing

Role	Object, Entity, Location	Usage and Example
Processor & CPG	Processed Seafood Case Label	Identify processed seafood with a globally unique GS1 GTIN and Lot (LGTIN) based on a GS1 Company Prefix . The LGTIN, along with either Packaging Date (preferred) , Best Before Date , Sell by Date , Expiration Date should be incorporated into a GS1-128 Barcode . The barcode label is applied to a container intended for general distribution and logistics (case, carton, plastic bin, etc). Example ID: urn:epc:class:lgtn:0614141.112345.123456 Online Barcode Generator used for examples below: https://barcode.tec-it.com/en
Human Readable Text on General Distribution Case Label <ul style="list-style-type: none"> • Brand Owner/Company Name • Product description • Lot number • Global Trade Item Number (GTIN) • Catch date, Best before date • Sell-by date, Use or freeze by date or • Production date • Net Weight and Serial Number for Variable Weight Cases 		
Barcode Encoded Information on General Distribution Case Label <ul style="list-style-type: none"> • Global Trade Item Number (GTIN) • Lot Number • Date: Catch, Best before, Sell-by, Use-by or Production • Net Weight and Serial Number for Variable Weight Cases  <p>(01)10614141123459(17)190709(10)123456</p>		
Processor & CPG	Logistics Unit (SSCC)	Identify a pallet containing processed seafood cases with a globally unique Serial Shipping Container Code based on a GS1 Company Prefix . The SSCC should be incorporated into a GS1-128 Barcode . The barcode label is applied to a pallet intended for general distribution and logistics. Example ID: urn:epc:id:sscc:0614141.0000392090 Online Barcode Generator used for examples below: https://barcode.tec-it.com/en



<p>Optional Human Readable Text on Pallet Label</p> <ul style="list-style-type: none"> • Global Trade Item Number (GTIN) • Count • Batch/Lot • Catch, Best before, Sell-by, Use-by or Production date (preferred) 		
<p>Required Barcode Encoded and Human Readable Information on Pallet Label</p> <ul style="list-style-type: none"> • Serial Shipping Container Code (SSCC)  <p>(00)006141410003920904</p>		
<p>Processor & CPG</p>	<p>Party</p> <p>GS1 Party GLN</p>	<p>Identify Processor legal <u>owner</u> - also known as a “party”. This can be purchased from a local GS1 member organization. It is strongly encouraged that a GLN is used rather than a URL or UUID because a PGLN can be used to convey ownership in a globally unique way across the supply chain. This is particularly helpful for chain of custody and other IUU data quality assurance needs. Understandably, it may be the case that the vessel owner or operator may not have a GS1 identifier, so the processor may be the first link in the supply chain to collect and share traceability events.</p> <p>urn:epc:id:pglN:0614141.00300.0</p>
 <p>(417)0614141003006</p> <p>GS1-128 Barcode</p> <p>(417) Party GLN</p> <p>urn:epc:id:pglN:0614141.00440.0</p>		
<p>Processor & CPG</p>	<p>Location</p> <p>GS1 Physical Location GLN</p>	<p>Identify manufacturing <u>facilities</u> or other <u>locations</u>. Note that the Party GLN is 0614141.00300.0. The first physical location is indicated by incrementing to the next GLN, 0614141.00301.0 In the vessel or farm example, we used the GLN extension due to cost considerations. In the case of an operator with a GS1 Company Prefix (GCP), this method is not needed because there is no incremental cost for generating GLNs. A company may assign many GLNs based on a single GCP. This simplifies location identification and data sharing with trading partners.</p> <p>urn:epc:id:sglN:0614141.00301.0</p>
 <p>(414)0614141003013</p> <p>GS1-128 Barcode</p> <p>(414) Physical Location GLN</p> <p>urn:epc:id:sglN:0614141.00301.0</p>		