Standards and Guidelines for Interoperable Seafood Traceability Systems –

Core Normative Standards (Version 1.0)

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 GDST 1.0 materials. The packet as of February 10, 2020, includes:

Document Title	Document Date	Version	Contents
Guide to GDST 1.0 Materials	February 2020	v1.0	Overview of GDST 1.0 packet contents and "How to Use These Documents"
Executive Summary	February 2020	v1.0	Two-page description of GDST 1.0
Core Normative Standards	February 2020	v1.0	The GDST 1.0 standards themselves
Basic Universal List of KDEs (spreadsheet)	February 2020	v1.0	E-spreadsheet of appendices to the Core Normative Standards – part of the GDST 1.0 Core Normative Standards
Explanatory Materials	February 2020	v1.0	Nontechnical background and introductory materials
Technical Implementation Guidance	February 2020	v1.0	Additional technical materials to facilitate implementation

A drafting history of the industry-led inputs into GDST 1.0 appears in Section 1.3 of the Explanatory Materials document.

For online access to the full GDST 1.0 packet, visit http://traceability-dialogue.org/core-documents/gdst-1-0-materials/.

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

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Abbreviations and Acronyms[1]

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
GLN	Global Location Number
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
RFID	radio-frequency identification
SIMP	Seafood Import Monitoring Program
UPC	Universal Product Code
UUID	universally unique identifier
WG1, WG2	working group 1, working group 2

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[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 1.0 Core Normative Standards

This document presents the core normative standards of the *GDST Standards and Guidelines for Interoperable Seafood Traceability Systems, Version 1.0*. Compliance with the GDST standards, narrowly construed, means compliance with the normative standards in this document except for specific elements labeled "recommended." These normative standards are supplemented by additional technical guidelines and illustrations found in the *GDST Technical Implementa*tion *Guidance* document, which are of a less restrictive or normative nature (i.e., they are not required for compliance with the GDST standards).

For reasons explained in Section 2.3 of the *GDST Explanatory Materials*, the core normative standards are constructed largely as an elaboration of the GS1 EPCIS standards for event-based traceability. The core GDST standards are presented below mainly in the form of tables that contain technical descriptions of KDEs, their association with specific CTEs, and the formal characteristics (definitions, standard data formatting options, links to GS1 CBV, etc.) that must be standardized in the construction of GDST-compliant EPCIS data files in order 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 with the GDST standards requires that all KDEs on the GDST BUL of KDEs be captured at all relevant CTEs occurring within the custody of that company. For a supply chain to be fully GDST compliant requires that all KDEs be captured at all relevant CTEs within the supply chain.

(ii) **Digital transfer of data in GDST EPCIS format –** The GDST standards require that all GDST-compliant businesses 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 extended by the GDST technical standards in this document.

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 GDST 1.0 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 BUL 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 and the appendices elaborate 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 and the tables in appendices 1 and 2 present the GDST BUL of KDEs and their correlation to the CTEs at which each KDE should be captured. These KDEs were identified by GDST WG1 as essential to address the business cases underlying the GDST mandate, and in particular the ability to establish the legal origin of seafood products.

The KDEs on the GDST BUL align with KDEs already defined in EPCIS so that the GDST KDEs mesh well with existing GS1 systems. In some cases, the GST KDEs overlap heavily with existing GS1 attributes as defined in the GS1 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 the legal origin of seafood products. The EPCIS format for event-based traceability easily accommodates the addition of such KDEs. In this way, the GDST 1.0 BUL of KDEs should be viewed as a minimum, not as a limit on companies pursuing continuous improvement or best practices.

The remainder of this document presents four sets of tables providing formats and other standards required 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 nontechnical overview of the GDST 1.0 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 BUL of KDEs.

(ii) **Tables W2a-h and Aq2a-h** provide verbal definitions of the KDEs to give them meaning for a business context and to indicate proper data formatting for the creation of EPCIS files, including cross-references between GDST KDEs and the GS1 CBV.

(iii) **Table C** provides additional technical vocabulary to allow the encoding of GDST CTEs in EPCIS format by using EPCIS "business step" identifiers.

(iv) **Appendices 1 and 2** provide the full BULs of GDST KDEs for wild-capture and aquaculture products. These tables include important elements of the GDST 1.0 KDE standards, including links to standard data option code lists and identification of authoritative data sources.

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[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 of KDEs (wild) Mapped to CTEs

Basic Universal List of Key Data Elements (Wild-Capture Products)	Catch	On-Vessel Processing	Transshipment	Landing	Aggregation/ Disaggregation	Ship/Receive	Processing
VESSEL DATA (master level)							
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 Date(s)	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

Table W1a continues on next page →

Basic Universal List of Key Data Elements (Wild-Capture Products)	CTEs						
	Catch	On-Vessel Processing	Transshipment	Landing	Aggregation/ Disaggregation	Ship/Receive	Processing
CERTIFICATIONS AND LICENSES							
Fishing Authorization	X						
Harvest Certification	X						
Harvest Certification Chain of Custody		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 Identification[3]

TECHNICAL DATA							
Event ID	X	X	X	X	X	X	X
Event Date, Time, and Time Zone	X	X	X	X	X	X	X
Event Read Point (Geolocation)	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 in an order roughly consistent with events in a typical supply chain, but they 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 BUL of KDEs (although reproducible through tracebacks). In such cases (as with other extensions to GDST KDE/CTEs that may be needed for specific applications), the GDST standards can be augmented to include the additional data

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

needed. This approach can also be used to refine the GDST to facilitate interactions 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* document, which includes a "disposition extension" recommended to cover the "product first entering commerce" event attribute.

Tables W2a-W2h provide verbal definitions of the KDEs to give them meaning for a business context. Additionally, cross-references are provided between GDST KDEs and GS1 CBV[4] attributes to inform proper data formatting. These components are also listed in the BUL in the Annex – an Excel spreadsheet accompanying this document that is an integral part of the normative GDST 1.0 standards – but are presented here in simplified format. NOTE: These tables do not include all components of the KDEs listed in the BUL. Readers should refer to the tables in the Annex 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 reused by any other vessel with a permanent physical marking on the craft.	imoNumber	GDST Extension International Maritime Organization

Table W2a continues on next page →

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4 https://www.gs1.org/standards/epcis

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Public Vessel Registry Hyperlink	URL	Website address of the public registry containing 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
Availability of Catch Coordinates	Text	Indicator whether GPS coordinates were collected and are available.	gpsAvailability	GDST Extension
Vessel Satellite Tracking Authority	Text	Indicator of satellite vessel tracking. Authority responsible for 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 reused by any other vessel with 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

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
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.[5]	catchArea (repeating)	FAO Catch Area
			economicZone (repeating)	EEZ
			rfmoArea	GDST Extension FAO Fisheries
			subnationalPermitArea	GDST Extension
Fishery Improvement Project	Text	Publicly listed name of the fishery improvement project that 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 discharged.	harvestStartDate and harvestEndDate	YYYY-MM-DD CBV Info
Date(s) of Capture	Date	Calendar date(s) when seafood was extracted for capture, irrespective of the fishing vessel's voyage at sea.	harvestStartDate and harvestEndDate	YYYY-MM-DD CBV Info
Gear Type	Code	Equipment used to extract seafood from water for capture.	fishingGearTypeCode	CBV Info Alternative Link
Production Method	Code	Categorization, on the spectrum of wild capture to captive culture, of the general seafood harvest method.	productionMethodForFishAndSeafoodCode	GDD Code List

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[5] List CBV attributes as applicable. At least catchArea required.

Table W2c – Transshipment Data (event level)

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Transshipment Location	Location	Geographic rendezvous 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	Calendar start and end dates of a rendezvous to discharge seafood from a fishing vessel to a transshipment vessel.	transshipStartDate and transshipEndDate	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	Calendar start and end dates when seafood is discharged to a landing location.	landingStartDate and landingEndDate	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	Calendar date associated with a particular instance of a seafood product indicating the key date in its life cycle.	itemExpirationDate	YYYY-MM-DD CBV Info
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 the wild capture of seafood by a fisher or fishing vessel.	cbvmda:certificationList[6]	
Harvest Certification	Mixed	Name of the harvest standards body that a particular harvest seafood is subject to and the unique identifier associated with the certified entity.	certification certificationStandard	
Harvest Certification Chain of Custody	Mixed	Name of the chain of custody standards body that particular harvest seafood is subject to and the unique identifier associated with the certified entity.	certificationAgency certificationValue	
Transshipment Authorization	Mixed	Unique number associated with a regulatory document from the relevant authority, granting permission for the discharge of the wild capture of seafood from a fishing vessel to a transshipment vessel.	certificationIdentification gdst:certificationType	CBV Seafood Attributes
Landing Authorization	Mixed	Unique number associated with a regulatory document from the relevant authority, granting permission for the discharge of the wild capture of seafood to land by a fisher, fishing vessel, or transshipment vessel.	/certification /cbvmda:certificationList Or bizTransactionList	

Table W2f continues on next page →

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[6] To accommodate a variety of certificate and licensing identification schemas, use the attributes above in combination to name at minimum the issuing body and associated certificate identifier. There may be only 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 an internal policy is subject to a third-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

Table W2g continues on next page →

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
Linking KDE (batch, lot, or serial number)	Lot or Serial Number	Identifier associated with a physical product marking a particular instance of seafood material, such as a batch/lot number, serial number, or container number.	Pack/unpack (aggregation): parentID epcList or quantityList ID options: GS1 LGTIN GS1 SGTIN GS1 SSCC URL UUID geofencePolygon[7]	GS1 Example
Weight or Quantity[8]	Number	Numerically quantifiable amount of seafood with a standard unit of measure.		
Unit of Measure	Code	Standard for the measurement of the product.		

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[7] Maximum geofence dimensions up to 1 degree or 60 miles.

[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]

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 CBV standard (CBV 1.2) specifies the use of a UUID URI for this purpose.	eventID	UUID for Event IDs
Event Date, Time, and Time Zone	Date Time Zone	The date and time at which the EPCIS capturing application asserts that 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 Time Stamp
Event Read Point (Geolocation)	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 that 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: GLN, URN, or URL	GDST Extension Source, Destination Documentation
Information Provider	Party	The original party that provided the event information. This is important as the event may be reshared downstream.	informationProvider	Data Dictionary

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

2.2. KDEs and CTEs for Aquaculture

This section presents the GDST BUL of KDEs that have been identified by GDST WG1 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 BUL of KDEs that can be found in the Annex.

In aquaculture processes, life cycle stages are represented as transformation events in EPCIS. Therefore, to account for traceability of feed in aquaculture, these are not separate CTEs but are summary inputs into the transformation inputs. For internal documentation, feeding timings by feed meal lot may be necessary, but for traceability purposes, summarizing feed meal application by batch/lot as inputs in the same transformation CTE is sufficient.

Table Aq1, starting on the next page, lists the KDEs for aquaculture products, indicating at which CTE each KDE must be captured. 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 CTEs

Basic Universal List of Key Data Elements (Aquaculture Products)	CTE					
	Feed Mill (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 Address or Geo Coordinates	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	
Certification	X	X	X	X		
Certification Chain of Custody	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		
Item/SKU/UPC/GTIN	X	X	X	X	X	X
Linking KDE (batch, lot, serial number)	X	X	X	X	X	X
Weight or Quantity	X	X	X	X	X	X
Units of Measure	X	X	X	X	X	X

[10] Location name includes BUL of KDEs A06, A15, and A21.

[11] License includes BUL of KDE A22, which may span aggregator or processor.

Table Aq1b – EPCIS Technical Data for Event Identification[12]

Basic Universal List of Key Data Elements (Aquaculture Products)	CTEs					
	Feed Mill (Transform)	Hatchery (Hatch)	Farm (Harvest)	Processor (Process/Pack)	Aggregation/ Disaggregation	Ship/Receive
TECHNICAL						
Event ID	X	X	X	X	X	X
Event Date, Time, and Time Zone	X	X	X	X	X	X
Event Read Point (Geolocation)	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 below provide verbal definitions of the KDEs to give them meaning for a business context. Additionally, cross-references are provided between GDST KDEs and GS1 CBV[13] to inform proper data formatting. These components are also listed in the BUL in the Annex, but they are presented here in simplified format. NOTE: These tables do not include all important components of the KDEs listed in the BUL. Readers should refer to the tables in the Annex 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 the mill, hatchery, farm, or processor.	Party name and ID GS1 GLN, URL, or UUID	
Location Name	Text	Name of physical location of interest.	Location name	

Table Aq2a continues on next page →

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[12] Table Aq1b contains additional data types that are components of EPCIS data files required for recording EPCIS events. These are required by the GDST in addition to the KDEs mandated by the GDST BUL, but they 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 ID	ID	ID of physical location. of interest.	Location ID GS1 GLN, URL, or UUID	
Location Address or Geo Coordinates	Mixed	Address or geo coordinates 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 into 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 above. 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 the 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	- Wild-caught fish (straight) - Wild-caught fish byproduct - Insects - Soy - Other	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.	harvestStartDate and harvestEndDate	CBV Information
Source of Broodstock	Text	Broodstock from grow-out farms or taken from the wild. "Domestic" or "Wild Sources"	broodstockSource	GDST Extension

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[14] If the source of protein has wild-caught origins, traceability of the feed should follow the wild-caught normative requirements and be 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.	harvestStartDate and harvestEndDate	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 point of processing or packaging.	eventTime of TransformationEvent	EPCIS Transformation Event
Product Country of 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 harvest seafood is subject to and the unique identifier associated with the certified entity.	cbvmda:certificationList[15] certification certificationStandard	
Harvest Certification Chain of Custody	Mixed	Name of the chain of custody standards body that a particular harvest 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	CBV Seafood Attributes
Human Welfare Policy Standards	Text	Name of the internationally recognized standards to which the policy on a vessel/trip claims conformity.	/cbvmda:certificationList Or bizTransactionList	

Table Aq2f continues on next page →

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[15] To accommodate a variety of certificate identification schemas, use the attributes above in combination to name at minimum the issuing body and associated certificate identifier. There may be only 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 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 an internal policy is subject to a third-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.	speciesForFisheryStatisticsPurposesCode	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 Process (transform): inputEpcList, inputQuantityList outputEpcList outputQuantityList Pack/unpack (aggregation): parentID epcList or quantityList ID options:	EPCIS What Dimension
Linking KDE (batch, lot or serial number)	Lot or Serial Number	Identifier associated with a physical product marking a particular instance of seafood material, such as a batch/lot number, serial number, or container number.		
Weight or Quantity[16]	Number	Numerically quantifiable amount of seafood with a		

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

Name	Type	Definition	GS1 CBV Attribute	Link for More Info
		standard unit of measure.	GS1 LGTIN	
Unit of Measure	Code	Standard for measurement of the product.	GS1 SGTIN GS1 SSCC URL UUIDEPC or EPC Class geofencePolygon 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 CBV standard (CBV 1.2) specifies the use of a UUID URI for this purpose.	eventID	UUID for Event IDs
Event Date, Time, and Time Zone	Date Time Zone	The date and time at which the EPCIS capturing application 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 Time Stamp

Table Aq2h continues on next page →

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[17] Table Aq2h 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 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
Event Read Point (Geolocation)	Location	The geographic or business location at which the event took place.	readPoint "geo: {lat}, {lon}" or GLN	[Location CBV Info](Location%20CBV%20Info)
Product Ownership	Party	The party that 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, urn or url	GDST Extension [Source, Destination Documentation](Source%20Destination%20Documentation)
Information Provider	Party	The original party that provided the event information. This is important as the event may be reshared downstream.	informationProvider	[Data Dictionary](Data%20Dictionary)

2.3. CTEs and GS1 "Business Steps"

One step in representing CTEs in EPCIS format is encoding the CTEs as so-called "business steps" defined by the GS1 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 in vessel or farm events – it is necessary to provide the GDST extensions to the EPCIS standard. This is fully 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 defines seafood-specific CTEs and shows how to document them in EPCIS. The business steps are categorized by the CTE columns in the Section 2 matrices.

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 (Catch, Farm)						
Catch	Event where wild-caught product for consumption is first commissioned.	Object	Add	urn:epcglobal:cbv:bizstep:catch	active	N Outputs
Farm Harvest	Event where aquaculture product for consumption is first commissioned.	Object OR Transformation	Add	urn:epcglobal:cbv:bizstep:farmHarvest	active	N Outputs
Transformation Events (Feed Mill, Hatching, Processing, On-Vessel Processing)						
Commingling	Transformation wherein multiple batches/lots are combined into a single batch/lot without substantial product form change.	Transformation	Add	urn:gdst:bizstep:commingling	active	N Input and 1 Output
Farm Stock	Addition of immature aquaculture brood for maturation.	Object	Add	urn:gdst:bizstep:farmStocking	active	N Outputs
Hatching	Life cycle event in aquaculture.	Transformation	Add	urn:gdst:bizstep:hatching	active	N Inputs and M outputs
Transformation	Processing step where product change occurs. Includes processing and on-vessel processing.	Transformation	Add	urn:epcglobal:cbv:bizstep:commissioning	active	N Inputs and M Outputs
Packaging	Products are packaged.	Transformation	Add	urn:gdst:bizsetp:packaging	active	N Inputs and 1 Output

Table C1 continues on next page →

Critical Tracking Event	Description	EPCIS Event Group	EPCIS Action	EPCIS Business Step	EPCIS Disposition	Reference Type
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 a parent ID.	Aggregation	Delete	urn:epcglobal:cbv:bizstep:unpacking	inactive	1 Input N Outputs
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 an object is moved to another location, especially in change of ownership.	Object	Observe	urn:epcglobal:cbv:bizstep:transporting	in_progress	N Observe
Transshipment	This indicates that products were moved from one vessel to another vessel prior to the offload/landing event.	Object	Observe	urn:gdst:bizstep:transshipment	in_progress	N Observe

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 is able to be and needs to be determined. The object, entity, and location identifiers below are a combination of GS1 standards and non-GS1 methods.

GDST 1.0 requires the use of identifiers for certain objects, entities, and locations, and it further requires that those identifiers be one of the following types: UUID, URL, or GS1 identifier (e.g., GLN, GTIN, or Lot GTIN). The tables below show the recommended optically read identification methods, but GDST 1.0 also allows the use of RFIDs or IoT devices as long as they are representing 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 serves 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 its identifier may instead use a UUID and self-determined prefix, serial, and lot. These allow for flexibility of using internal identifiers in a globally unique way while retaining a similar EPCIS-compliant structure that has the ability 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 they 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.

Role	Object, Entity, Location	Usage and Example
Fisher or Farmer	Fresh-Caught or Harvested Seafood	Identify catch or harvest with a either a globally unique GS1 GTIN and 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 LGTIN, along with catch or harvest date, are incorporated into a GS1-128 bar code. A URL or UUID is incorporated into a QR Code. The bar code is applied to a container or is displayed on a mobile device to enable data transfer.
	URL UUID	Example IDs: URI structure for non-GS1:

	GS1 GTIN and Lot	urn:gdst:{URL or UUID}:product:lot:class:{Prefix}.{Serial}.{lot}
		UUID example:
		urn:gdst:a2222482-7f96-4d6d-9431-c4e6e3ef4888:product:lot:class:123.456.789
		URL example:
		urn:gdst:example.com:product:lot:class:123.456.789
		GS1 example:
		urn:epc:class:lgtin:0614141.112345.123456
		Online bar code generator used for examples below: https://bar code.tec-it.com/en

urn:gdst:example.com:product:lot:class:123.456.789	urn:gdst:a2222482-7f96-4d6d-9431-c4e6e3ef4888:product:lot:class:123.456.789	(01)10614141123459(11)170709(10)123456 **GS1-128 Bar code** (01) Product GTIN (11) Catch/harvest date (10) Batch or lot urn:epc:class:lgtin:0614141.112345.123456

Fisher or Farmer	Party URL UUID GS1 PGLN	Identify farm or vessel legal owner, also known as the "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 neither is available, one can apply the same method as for traceable objects above and generate a URL or UUID.
		URI for non-GS1:
		urn:gdst:{URL OR UUID}:party:{Prefix}.{Serial}
		UUID example:
		urn:gdst: 7af5bcbe-df79-412d-8603-e536b219bb28:party:0001.1234
		URL example:

		urn:gdst:example.com:party:003.000 GS1 example: urn:epc:id:pgln:0614141.00440.0
urn:gdst:example.com:party:003.000	urn:gdst: 7af5bcbe-df79-412d-8603-e536b219bb28:party:0001.1234	GS1-128 bar code (417) Party GLN urn:epc:id:pgln:0614141.00440.0
Fisher or Farmer	Location URL UUID GS1 SGLN	Identify vessels, farms, and other related facilities or locations. 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. URI for non-GS1: urn:gdst:{URL OR UUID}:party:{Prefix}.{Serial} UUID example: urn:gdst: 4e81c664-77b1-412f-ba59-b92aaf5244eb:party:0001.1234 URL example: urn:gdst:example.com:party:003.123456 GS1 example: urn:epc:id:sgln:0614141.00300.123456

urn:gdst:example.com:party:003.123456

urn:gdst: 4e81c664-77b1-412f-ba59-b92aaf5244eb:party:0001.1234

(414)0614141003006(254)123456

[GS1-128 bar code](#)

(414) [Physical location GLN](#)

(254) [GLN extension](#)

urn:epc:id:sgln:0614141.00300.123456

3.2. At a Processor or CPG Company

The following are example identifiers for both intermediate and finished goods processors that ship product 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 compatibility.

Role	Object, Entity, Location	Usage and Example
Processor and CPG	[Processed Seafood](#) [Case Label](#)	Identify processed seafood with a globally unique GS1 GTIN and LGTIN based on a [GS1 company prefix](#). The LGTIN, along with either the [packaging date (preferred)](#), [best before date](#), [sell-by date](#), or [expiration date](#), should be incorporated into a [GS1-128 bar code](#). The bar code label is applied to a container (case, carton, plastic bin, etc.) intended for general distribution and logistics. Example ID: urn:epc:class:lgtin:0614141.112345.123456 Online bar code generator used for examples below: [https://bar code.tec-it.com/en](https://barcode.tec-it.com/en)

Human-Readable Text on General Distribution Case Label

- Brand owner/company name
- Product description
- Lot number
- GTIN
- Date: catch, best before, sell by, use or freeze by, or production
- Net weight and serial number for variable-weight cases

Bar Code-Encoded Information on General Distribution Case Label

- GTIN
- Lot number
- Date: catch, best before, sell by, use by, or production
- Net weight and serial number for variable-weight cases

(01)10614141123459(17)190709(10)123456

Processor and 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 bar code. The bar code label is applied to a pallet intended for general distribution and logistics. Example ID: urn:epc:id:sscc:0614141.0000392090 Online bar code generator used for examples below: https://bar code.tec-it.com/en

Optional Human-Readable Text on Pallet Label

- GTIN
- Count
- Batch/lot
- Date: catch, best before, sell by, use by, or production (preferred)

Required Bar Code-Encoded and Human-Readable Information on Pallet Label

- SSCC

(00)006141410003920904

Processor and CPG	Party GS1 Party GLN	Identify processor/legal owner, also known as a "Party." This can be purchased from a local GS1 member organization. It is strongly encouraged that a GLN be 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. urn:epc:id:pgln: 0614141.00300.0

|||||||||||||||||||||||||||||||
(417)0614141003006

[GS1-128 Bar Code](#)

(417) Party GLN

urn:epc:id:pgln:0614141.00440.0

Processor and CPG	Location [GS1 Physical Location GLN](#)	Identify manufacturing <u>facilities</u> or other <u>locations</u>. Note that the Party GLN is 0614141.00**300**.0. The first physical location is indicated by incrementing to the next GLN, 0614141.00**301**.0. In the vessel or farm example, we used the GLN extension because of cost considerations. In the case of an operator with a GS1 company prefix, 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. urn:epc:id:sgln:0614141.00301.0

|||||||||||||||||||||||||||||||
(414)0614141003013

[GS1-128 Bar Code](#)

(414) [Physical Location GLN](#)

urn:epc:id:sgln:0614141.00301.0

– Appendix–
Full Basic Universal List of KDEs for Wild-Caught Products
&
Full Basic Universal List of KDEs for Aquaculture Products

The full BUL of KDEs for wild-caught and aquaculture products, which are an integral part of this document and of the core GDST normative standards are available as Excel spreadsheets at https://traceability-dialogue.org/core-documents/gdst-1-0-materials/.