



The Global Language of Business

Comprehensive Business Vocabulary (CBV) Standard

specifies the structure of vocabularies and specific values for the vocabulary elements to be utilised in conjunction with the GS1 EPCIS standard

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3 Contributors

Name	Company
Christophe Devins	Adents
Roula Karam	Antares Vision
Harald Sundmaeker	ATB Institut für angewandte Systemtechnik Bremen GmbH
Junyu Wang	Auto-ID Labs at Fudan University
Jaewook Byun	Auto-ID Labs at KAIST
Sangtae Kim	Auto-ID Labs at KAIST
Yalew Tolcha	Auto-ID Labs at KAIST
Jeanne Duckett	Avery Dennison RFID
Cyrille Bordier	Axway
Marcus Chang	Axway
Sven Böckelmann	Benelog
Onur Önder	BLG CONTRACT LOGISTICS GmbH & Co. KG
Laura Weingarten	BLG CONTRACT LOGISTICS GmbH & Co. KG
Trond Saure	Bouvet Norge AS
Philip Allgaier	bpcompass GmbH
Steffen Butschbacher	bpcompass GmbH
Maheshwar Lingichetty	Bracket Global
Bhaves Shah	Bevitaz Systems
Hans Peter Scheidt	C & A SCS

Name	Company
Arnaud Kreweras	Carrefour
Robert Celeste	Center for Supply Chain Studies
Jochen Metschke	Ceratizit
Doug Migliori	ControlBEAM Digital Automation / ADC Technologies Group
Ludovic Fargeas	Courbon
Martijn Veerman	Customer Value
David Harper	Delivr Corporation
Mario Mira	Dentsu Aegis Network
Michiel Valee	Dockflow
Philip Heggelund	DuckScape Inc
Jim Springer	EM Microelectronic
Jayson Berryhill	Envisible LLC
Nicolas Becker	European EPC Competence Center GmbH (EECC)
Falk Nieder	European EPC Competence Center GmbH (EECC)
Sebastian Schmittner	European EPC Competence Center GmbH (EECC)
Georg Schwering	European EPC Competence Center GmbH (EECC)
Dominique Guinard	EVERYTHING
Joël Vogt	EVERYTHING
Beth Davis	FoodLogiQ
Julie McGill	FoodLogiQ



Name	Company
Kevin Capatch	Geisinger Health System (GHS)
Chris Roberts	GlaxoSmithKline
Gianluca Fazio	GS1 Argentina
Catherine Koetz	GS1 Australia
Bonnie Ryan	GS1 Australia
Sue Schmid	GS1 Australia
Marcel Sieira	GS1 Australia
Stephan Wijnker	GS1 Australia
Eugen Sehorz	GS1 Austria
Luiz Costa	GS1 Brasil
Flavia Costa	GS1 Brasil
Kevin Dean	GS1 Canada
Nicole Golestani	GS1 Canada
Zubair Nazir	GS1 Canada
Connie Wong	GS1 Canada
Yi Ding	GS1 China
jia jianhua	GS1 China
Yan Luo	GS1 China
Yi Wang	GS1 China
zhang wm	GS1 China



Name	Company
XinMin Wu	GS1 China
Ruoyun Yan	GS1 China
James Perng	GS1 Chinese Taipei
James Perng	GS1 Chinese Taipei
Luis Paniagua	GS1 Costa Rica
Jesper Kervin Franke	GS1 Denmark
Petri Leppänen	GS1 Finland
Adrien Molines	GS1 France
Nicolas Pauvre	GS1 France
Mayra Castellanos	GS1 Germany
David Hintzen	GS1 Germany
Sandra Hohenecker	GS1 Germany
Ralph Troeger	GS1 Germany
Roman Winter	GS1 Germany
Henri Barthel	GS1 Global Office
Rosalie Clemens	GS1 Global Office
Nadi (Scott) Gray	GS1 Global Office
Eileen Harpell	GS1 Global Office
Nora Kaci	GS1 Global Office
Timothy Marsh	GS1 Global Office



Name	Company
Gena Morgan	GS1 Global Office
Neil Piper	GS1 Global Office
Craig Alan Repec	GS1 Global Office
Greg Rowe	GS1 Global Office
John Ryu	GS1 Global Office
Kevin Stark	GS1 Global Office
Claude Tetelin	GS1 Global Office
Elena Tomanovich	GS1 Global Office
Jaco Voorspuij	GS1 Global Office
Grace Yang	GS1 Global Office
Benedict Chan	GS1 Hong Kong, China
Chris Lai	GS1 Hong Kong, China
Wai Shing Lai	GS1 Hong Kong, China
wayne Luk	GS1 Hong Kong, China
Zsolt Bocsi	GS1 Hungary
Krisztina Vatai	GS1 Hungary
Mahdi Barati	GS1 Iran
Tim Daly	GS1 Ireland
Alec Tubridy	GS1 Ireland
Emanuela Casalini	GS1 Italy



Name	Company
Giada Necci	GS1 Italy
Linda Vezzani	GS1 Italy
Koji Asano	GS1 Japan
Yoshihiko Iwasaki	GS1 Japan
Kazuna Kimura	GS1 Japan
Noriyuki Mama	GS1 Japan
Yuki Sato	GS1 Japan
Rocio Rivera	GS1 Mexico
Ben Ensink	GS1 Netherlands
Sarina Pielaat	GS1 Netherlands
Reinier Prenger	GS1 Netherlands
Gabriel Sobrino	GS1 Netherlands
Jan Westerkamp	GS1 Netherlands
Gary Hartley	GS1 New Zealand
Klaudiusz Borowiak	GS1 Poland
Zbigniew Rusinek	GS1 Poland
Pedro Lima	GS1 Portugal
Alexey Krotkov	GS1 Russia
Olga Soboleva	GS1 Russia
Alvin Goh	GS1 Singapore



Name	Company
Ferran Domenech Fuste	GS1 Spain
Mats Bjorkqvist	GS1 Sweden
Fredrik Holmström	GS1 Sweden
Heinz Graf	GS1 Switzerland
Raphael Pfarrer	GS1 Switzerland
Shawn Chen	GS1 Thailand
Rami Habbal	GS1 UAE
Sophie Fuller	GS1 UK
Jason Hale	GS1 UK
Neil Aeschliman	GS1 US
Hussam El-Leithy	GS1 US
James Lynch	GS1 US
Melanie Nuce	GS1 US
Vivian Underwood	GS1 US
Alice Nguyen	GS1 Vietnam
Natham Barry	IBM (US)
Gokul Kandiraju	IBM (US)
Roman Vaculin	IBM (US)
Sylvia Rubio Alegren	ICA Sverige AB
Megan Brewster	Impinj, Inc

Name	Company
Patrick Chanez	INEXTO SA
Thomas Burke	Institute of Food Technologists
Sebastian Bartkowiak	Institute of Logistics and Warehousing
Masatoshi Nomachi	Japan Pallet Rental Corporation
Scott Pugh	Jennason LLC
Rosemary Hampton	Johnson & Johnson
Rajendra Kulkarni	Johnson & Johnson
April Anne Sese	Johnson & Johnson
Sean Lockhead	Lockhead Consulting Group LLC
Ted Osinski	MET Laboratories
Alexander Hille	Migros-Genossenschafts-Bund
Marc Inderbitzin	Migros-Genossenschafts-Bund
Mark Harrison	Milecastle Media Limited
Upender Solanki	Movilitas Consulting AG
Oliver Erlenkämper	Movilizer GmbH
Endre Lazar	Movilizer GmbH
Mario Mira	Movilizer GmbH
Danny Haak	Nedap
Vera Feuerstein	Nestlé
Jason Geyen	Optel Group

Name	Company
Michael Natale	Pfizer
Richard Graves	Phy
Matt Glassman	rfXcel Corporation
Graham Stanley	rfXcel Corporation
Jürgen Engelhardt	Robert Bosch GmbH
John Fredrik Reimers	Robert Bosch GmbH
Nikolaos Servos	Robert Bosch GmbH
Jan Reichert	SAP SE
Thomas Rumbach	SAP SE
Marc Damhösl	Schweizerische Bundesbahnen SBB
Dominik Halbeisen	Schweizerische Bundesbahnen SBB
Rémy Höhener	Schweizerische Bundesbahnen SBB
Holger Strietholt	Schweizerische Bundesbahnen SBB
John Walker	Semaku
Vladimir Alexiev	Sirma AI (Ontotext)
Vladimir Dzalbo	Smartrac Technology Germany GmbH
Shreenidhi Bharadwajj	Syndigo
Tony Zhang	Syndigo
Joseph Lipari	Systech International
Octavio Rodriguez	Systech International

Name	Company
Maik Bollmacher	T-Systems International GmbH
Martin Herold	T-Systems International GmbH
Tobias Michelchen	T-Systems International GmbH
Carsten Baumhögger	tabya GmbH
Tobias Müller	tabya GmbH
Gergely Köves	TE-FOOD International GmbH
Eric Moore	Testo
Melissa Banning	TraceLink
Elizabeth Waldorf	TraceLink
Evan Fernando	Tyson
Jay Crowley	US Data Management, LLC (USDM)
Bharat Reddy Vaka	Vaka Consulting Inc
Rob Magee	Vantage Consulting Group
Jussi Numminen	wirepas

5 Log of Changes

Release	Date of Change	Changed By	Summary of Change
1.0	Oct 2010		Initial release
1.1	March 2014		<p>A new standard vocabulary for EPCIS source/destination type is added.</p> <p>Templates for new user vocabularies for EPCIS source/destination identifier, EPCIS transformation identifier, and object classes are added.</p> <p>New business step, disposition, and business transaction type values are added. The definitions of existing values are also clarified.</p> <p>Disposition values non_sellable_expired, non_sellable_damaged, non_sellable_disposed, non_sellable_no_pedigree_match, and non_sellable_recalled defined in CBV 1.0 are deprecated in favour of new disposition values expired, damaged, disposed, no_pedigree_match, and recalled introduced in CBV 1.1.</p> <p>RFC5870-compliant geocoordinate URIs are now permitted as location identifiers.</p> <p>The introductory material is revised to align with the GS1 System Architecture.</p>
1.2	Sep 2016		<p>CBV 1.2 is fully backward compatible with CBV 1.1 and 1.0.</p> <p>CBV 1.2 includes these new or enhanced features:</p> <p>A new standard vocabulary for EPCIS error declaration reason identifiers is added.</p> <p>The URI structure for EPCIS event identifiers is specified.</p> <p>New business step values dispensing and voidShipping added.</p> <p>New disposition values dispensed and partially_dispensed added.</p> <p>A new section for trade item master data attributes is added, and the section on location and party master data attributes is expanded.</p>
1.2.1	May 2017		Consistency issue corrected in a non-normative example.
1.2.2	Oct 2017		Typographical error " <i>TransacationEvent</i> " corrected

2.0	October 2021		<p>Major release CBV 2.0 in conjunction with EPCIS 2.0, including:</p> <ul style="list-style-type: none"> Renaming of "Core Business Vocabulary" to "Comprehensive Business Vocabulary" Support for GS1 Web Vocabulary, URI semantic equivalence by means of owl:sameAs relationships New "How" event dimension Overview of EPCIS event "dimensions" with cross references to relevant sections in EPCIS & CBV New Persistent Disposition indicates non-transient business state of an object Use of new prefix 952 in all examples New business step values: sampling, sensor_reporting, Clarified definitions of business step values: commissioning, encoding, inspecting, removing New disposition values: available, completeness_verified, completeness_inferred, conformant, container_open, mismatch_instance, mismatch_class, mismatch_quantity, needs replacement, non_conformant, unavailable Clarified definition and example of disposition value in_progress, recommending omission Deprecated disposition value: no_pedigree_match New business transaction types cert, testprd, testres, upevt Clarified definition of business transaction type poc to make it clear that Purchase Order Confirmation is also used to represent Sales Order Sensor measurement types now supported Clarification of HTTPS URLs as a recommended approach alongside HTTP URLs Introduced support for constrained set of GS1 Digital Link URIs supported alongside generic HTTP URLs for identification of object instance, class, location, business transaction, source/destination, and transformation Clarification preference for PGLN to identify owning and possessing parties Introduction of Hash URI as business transaction identifier Introduction of EPCIS Event Hash ID as an event Identifier Introduction of chemical substance identifiers Introduction of microorganism identifiers Restriction of date types to specific subset of W3C primitive datatypes Extended support for QNames to express master data attributes Incorporation of additions published previously as CBVCNs 17-339 (Tax ID), 18-108 (Fish Attributes) Inclusion of certification attributes in Certification List additionalTradeItemId now as additionalTradeItemIDList Deprecation of latitude and longitude from location/party master data Addition of geoLocation and geoFence to location/party master data Addition of AdditionalPartyIDList Move of example event data to external artefacts Introduction of https://ns.gs1.org/cbv namespace, to underpin CBV 2.0 support for Linked Data
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1 Introduction – Comprehensive Business Vocabulary

This GS1 standard defines the Comprehensive Business Vocabulary (CBV). The goal of this standard is to specify various vocabulary elements and their values for use in conjunction with the EPCIS standard [EPCIS2.0], which defines mechanisms to exchange information both within and across organisation boundaries. The vocabulary identifiers and definitions in this standard will ensure that all parties who exchange EPCIS data using the CBV will have a common understanding of the semantic meaning of that data.

This standard is intended to provide a basic capability that meets the above goal. In particular, this standard is designed to define vocabularies that are *core* to the EPCIS abstract data model and are applicable to a broad set of business scenarios common to many industries that have a desire or requirement to share data. This standard intends to provide a useful set of values and definitions that can be consistently understood by each party in the supply chain.

Additional end user requirements may be addressed by augmenting the vocabulary elements herein with additional vocabulary elements defined for a particular industry or a set of users or a single user. Additional values for the standard vocabulary types defined in this standard may be included in follow-on versions of this standard.

This standard includes identifier syntax and specific vocabulary element values with their definitions for these *Standard Vocabularies*:

- Business step identifiers
- Disposition identifiers
- Business transaction types
- Source/Destination types
- Error reason identifiers
- Sensor measurement types
- Sensor alert types

This standard provides identifier syntax options for these *User Vocabularies*:

- Objects
- Locations
- Business transactions
- Source/Destination identifiers
- Transformation identifiers
- Event identifiers
- Chemical substance identifiers
- Microorganism identifiers



173 This standard provides *Master Data Attributes and Values* for describing Physical Locations including:

- 174 ■ Site Location
- 175 ■ Sub-Site Type
- 176 ■ Sub-Site Attributes
- 177 ■ Sub-Site Detail

178 Additional detailed master data regarding locations (addresses, etc.) are not defined in this standard.

179

180 **2 Relationship to the GS1 System Architecture**

181 The CBV is a companion standard to the EPCIS standard. EPCIS is the standard that defines the technical interfaces for capturing and sharing event
182 data. EPCIS defines a framework data model for event data. The CBV is a GS1 *data standard* that supplements that framework by defining specific data
183 values that may populate the EPCIS data model. As such, the CBV exists in the “Share” group of GS1 standards.

184

185 3 Relationship to EPCIS

186 This section specifies how the CBV standard relates to the EPCIS standard.


187 3.1 EPCIS event structure





188 The EPCIS 2.0 standard [EPCIS2.0] specifies the data elements in an EPCIS event. The following lists these data elements, and indicates where the
189 CBV provides identifiers that may be used as values for those data elements.

- 190 ■ **The “what” dimension** contains (for most event types) one or more unique identifiers for physical or digital objects or classes of physical or
191 digital objects. Identifiers for physical or digital objects are specified in [§ 8.2 \(instance-level\)](#) and [§ 0 \(class-level\)](#). In the case of an EPCIS
192 TransformationEvent, an optional TransformationID may be used to link together multiple events that describe the same transformation.
193 TransformationIDs are included in [§ 0](#).
- 194 ■ **The “when” dimension** reflects the moment in time at which an EPCIS event occurred. Event time is fully specified in the EPCIS standard.
- 195 ■ **The “where” dimension** consists of two identifiers that describe different aspects of where an event occurred:
 - 196 □ **Read Point** (`readPoint`): The location where the EPCIS event took place. In the case of an EPCIS event arising from reading a barcode or
197 RFID tag, the Read Point is often the location where the barcode or RFID tag was read. Identifiers for read points are specified in [§ 0](#).
198 Example: A reader is placed at dock door #3 at the London Distribution Centre (DC). Product passed through the dock door. Read point = <The
199 identifier that stands for London DC Dock Door #3>
 - 200 □ **Business Location** (`bizLocation`): The location where the subject of the event is assumed to be following an EPCIS event, until a new event
201 takes place that indicates otherwise. Identifiers for business locations are specified in [§ 0](#).
202 Example: A product is read through the sales floor transition door at store #123. The product is now sitting on the sales floor. Business location
203 = <The identifier that stands for store #123 Sales Floor>
- 204 ■ **The “why” dimension** provides business process information associated with the event, including the business process step that “triggered” the
205 event's capture:
 - 206 □ **Business Step** (`bizStep`): Denotes a specific activity within a business process. The business step field of an event specifies what business
207 process step was taking place that caused the event to be captured. Identifiers for business steps are specified in [§ 7.1](#).
208 Example: an EPCIS event is generated as a product departs the location identified by the Read Point. Business Step = <The identifier that
209 denotes “shipping”>
 - 210 □ **Disposition** (`disposition`): Denotes the business state of an object. The disposition field of an event specifies the business condition of the
211 subject of the event (the things specified in the “what” dimension), subsequent to the event. The disposition is assumed to hold true until
212 another event indicates a change of disposition. Identifiers for dispositions and persistent dispositions (see below) are specified in [§ 7.2](#).
213 Example: an EPCIS event is generated and afterward the products can be sold as-is and customers can access product for purchase.
214 Disposition = <The identifier that denotes “sellable and accessible”>

- 215 □ **Persistent Disposition** (`persistentDisposition`): Denotes the *persistent* business state of an object. The `persistentDisposition` field of
 216 an event is used to `set` or `unset` the business condition of the subject of the event (the things specified in the “what” dimension), subsequent
 217 to the event. Unlike the disposition, the `persistentDisposition` is not overridden by subsequently set dispositions or persistent dispositions,
 218 and can only be negated or rescinded by being explicitly “unset”. Identifiers for dispositions and persistent dispositions are specified in [§ 7.2](#).
 219 Example: an EPCIS event is generated to infer the presence of children still aggregated to their parent (i.e., not yet unpacked nor physically
 220 scanned). `persistentDisposition` = <The identifier that denotes “completeness inferred”>
 221
- 222 □ **Business Transaction References**: An EPCIS event may refer to one or more business transaction documents. Each such reference consists
 223 of two identifiers:
- 224 - **Business Transaction Type**: Denotes a particular kind of business transaction. *Example: the identifier that denotes “purchase order”.*
 225 Identifiers for business transaction types are specified in [§ 0](#).
 - 226 - **Business Transaction Identifier**: Denotes a specific business transaction document of the type indicated by the Business Transaction
 227 Type.
 228 Example: <The identifier that denotes Example Corp purchase order #123456> Identifiers for business transactions are specified in [§ 0](#).
- 229 □ **Source and Destination References**: An EPCIS event may refer to one or more sources and/or destinations that describe the endpoints of a
 230 business transfer of which the event is a part. Each source or destination reference consists of two identifiers:
- 231 - **Source or Destination Type**: Denotes a particular kind of source or destination. *Example: the identifier that denotes “owning party”.*
 232 Identifiers for source and destination types are specified in [§ 7.4](#).
 - 233 - **Source or Destination Identifier**: Denotes a source or destination of the type indicated by the Business Transaction Type. *Example: <The*
 234 *identifier that denotes Example Corp as an owning party>* Identifiers for sources and destinations are specified in [§ 8.6](#).
- 235 ■ **The “how” dimension** contains the `SensorElementList` of one or more `SensorElements`, which is used to express conditional information about
 236 an object or physical location, as captured by associated sensors. Each `SensorElement` contains:
- 237 - one or more `sensorReport` elements, including one or more attributes that pertain to a specific sensor observation;
 - 238 - an optional `sensorMetadata` element, including one or more meta data attributes that apply to all `sensorReport` elements within the same
 239 Sensor Element.
- 240 The `SensorElement` provides a rich and flexible framework to convey all kind of sensor-based data, from simple physical observations via multi-
 241 dimensional observations to outputs of smart sensor devices. This can include, but is not limited to, information on the concentration of chemical
 242 substances and microorganisms.
 243

244 **3.2 Overview of EPCIS event "dimensions" (non-normative)**

Dimension in EPCIS/CBV 1.x	Categorisation in EPCIS/CBV 2.0		Field	EPCIS section in which the field is defined	CBV section in which its value range is specified
WHAT	Objects in Focus (WHAT) 	I n s t a n c e	epcList	7.4.2 ObjectEvent 7.4.5 TransactionEvent	EPC Tag Data Standard (TDS) § 6, "EPC URI" 8.2 Physical or Digital Objects (Instance)
			parentID	7.4.3 AggregationEvent 7.4.4 TransactionEvent 7.4.6 AssociationEvent	
			childEPCs	7.4.3 AggregationEvent 7.4.6 AssociationEvent	
			inputEPCList	7.4.5 TransformationEvent	
			outputEPCList		
		C l a s s	quantityList	7.4.2 ObjectEvent	EPC Tag Data Standard (TDS) § 8, "URIs for EPC Pure Identity Patterns" 8.3 Physical or Digital Objects (Class)
			childQuantityList	7.4.3 AggregationEvent 7.4.6 AssociationEvent	
			inputQuantityList	7.4.5 TransformationEvent	
			outputQuantityList		

Dimension in EPCIS/CBV 1.x	Categorisation in EPCIS/CBV 2.0	Field	EPCIS section in which the field is defined	CBV section in which its value range is specified
WHEN	Chronology (WHEN) 	eventTime	7.4.1 EPCISEvent	
		eventTimeZoneOffset		
		recordTime	7.4.1 EPCISEvent	
WHERE	Whereabouts (WHERE) 	readPoint	7.4.2 ObjectEvent	8.4 Locations
		bizLocation	7.4.3 AggregationEvent 7.4.4 TransactionEvent 7.4.5 TransactionEvent 7.4.6 AssociationEvent	
n/a	Condition (HOW) 	sensorElementList	7.4.2 ObjectEvent 7.4.3 AggregationEvent 7.4.4 TransactionEvent 7.4.5 TransactionEvent 7.4.6 AssociationEvent	7.6 Sensor Measurement Types 8.9 Chemical substance identifiers 8.10 Microorganism identifiers
WHY	Business Context (WHY) 	bizStep	7.4.2 ObjectEvent	7.1 Business Steps
		bizTransactionList	7.4.3 AggregationEvent 7.4.4 TransactionEvent	8.5 Business Transactions

Dimension in EPCIS/CBV 1.x	Categorisation in EPCIS/CBV 2.0	Field	EPCIS section in which the field is defined	CBV section in which its value range is specified
		disposition	7.4.5 TransactionEvent 7.4.6 AssociationEvent	7.1 Dispositions
		persistentDisposition		7.1 Dispositions
		sourceList		8.6 Source/Destination Identifiers
		destination List		8.6 Source/Destination Identifiers
	Other fields	ilmd	7.3.7 Instance/lot master data (ILMD)	9 Trade Item Master Data
(core field)		action	7.3.2 Action type	
(XformationID)		transformationID	7.4.5 TransformationEvent	8.7 Transformation Identifiers
(core field)		eventID	7.4.1 EPCISEvent	8.8 Event Identifiers
(core field)		errorDeclaration	7.4.1 EPCISEvent	7.5 Error Reason Identifiers 8.8 Event Identifiers

246 3.3 Vocabulary kinds

247 (The material in this section is adapted directly from [EPCIS], [§ 6.2](#).)

248 Vocabularies are used extensively within EPCIS to model conceptual, physical, and digital entities that exist in the real world.

249 Examples of vocabularies defined in the EPCIS standard are business steps, dispositions, location identifiers, physical or digital object identifiers,
250 business transaction type names, and business transaction identifiers. In each case, a vocabulary represents a finite (though open-ended) set of
251 alternatives that may appear in specific fields of events.

252 It is useful to distinguish two kinds of vocabularies, which follow different patterns in the way they are defined and extended over time:

- 253 ■ **Standard Vocabulary:** A Standard Vocabulary is a set of Vocabulary Elements whose definition and meaning must be agreed to in advance by
254 trading partners who will exchange events using the vocabulary.
- 255 ■ **User Vocabulary:** A User Vocabulary is a set of Vocabulary Elements whose definition and meaning are under the control of a single organisation.
- 256 These concepts are explained in more detail below.

257 3.3.1 Standard Vocabulary

258 A Standard Vocabulary is a set of Vocabulary Elements whose definition and meaning must be agreed to in advance by trading partners who will
259 exchange events using the vocabulary. For example, the EPCIS standard defines a vocabulary called "business step," whose elements are identifiers
260 denoting such things as "shipping," "receiving," and so on. One trading partner may generate an event having a business step of "shipping," and
261 another partner receiving that event through a query can interpret it because of a prior agreement as to what "shipping" means.

262 Standard Vocabulary elements tend to be defined by organisations of multiple end users, such as GS1, industry consortia outside GS1, private trading
263 partner groups, and so on. The master data associated with Standard Vocabulary elements, if any master data is defined at all, are defined by those
264 same organisations, and tend to be distributed to users as part of a standard or by some similar means. New vocabulary elements within a given
265 Standard Vocabulary tend to be introduced through a very deliberate and occasional process, such as the ratification of a new version of a standard or
266 through a vote of an industry group.

267 The Standard Vocabularies specified in the CBV are: [business steps \(§ 7.1\)](#), [dispositions \(§ 7.2\)](#), [business transaction types \(§ 0\)](#), [source and](#)
268 [destination types \(§ 7.4\)](#), [error reason identifiers \(§ 7.5\)](#) and **Error! Reference source not found.** The elements and definitions are agreed to by
269 parties prior to exchanging data, and there is general agreement on their meaning.

270 Example: the following are two different ways of expressing a business step identifier, as defined in [§ 7.1](#) :

271 urn:epcglobal:cbv:bizstep:receiving

272 https://ns.gs1.org/cbv/Bizstep-receiving

273 This identifier is defined by the GS1 CBV standard, and its meaning is known and accepted by those who implement the standard. For each of the
274 identifiers defined, equivalent terms and values are also included in the [GS1 Web Vocabulary](#) **[to be formalised and published at**
275 <https://www.gs1.org/voc/>]. **Both URI structures are considered to be semantically equivalent via an owl:sameAs relationship.**

276 While an individual end user organisation acting alone may introduce a new Standard Vocabulary element, such an element would have limited use in a
277 data exchange setting, and would probably only be used within an organisation's four walls. On the other hand, an industry consortium or other group
278 of trading partners may define and agree on standard vocabulary elements beyond those defined by the CBV, and these may be usefully used within
279 that trading group.

280 3.3.2 User Vocabulary

281 A User Vocabulary is a set of Vocabulary Elements whose definition and meaning are under the control of a single organisation. For example, the EPCIS
282 standard defines a vocabulary called "business location," whose elements are identifiers denoting such things as "Acme Corp. Distribution Centre #3."
283 The location identifier and any associated master data is assigned by the user. Acme Corp may generate an event whose business location field
284 contains the identifier that denotes "Acme Corp. Distribution Centre #3," and another partner receiving that event through a query can interpret it
285 either because the partner recognises the identifier as being identical to the identifier received in other events that took place in the same location, or
286 because the partner consults master data attributes associated with the location identifier, or both.

287 Example:

288 urn:epc:id:sgln:9521414.12345.400

289 This identifier is assigned by the End User who has been assigned the GS1 Company Prefix 9521414, and the meaning of the identifier (that is, what
290 location it denotes) is determined exclusively by that end user. Another End User can understand the meaning of this identifier by consulting associated
291 master data.

292 User Vocabulary elements are primarily defined by individual end user organisations acting independently. The master data associated with User
293 Vocabulary elements are typically defined by those same organisations, and are usually distributed to trading partners through the EPCIS Query
294 Interface or other data exchange / data synchronisation mechanisms. New vocabulary elements within a given User Vocabulary are introduced at the
295 sole discretion of an end user, and trading partners must be prepared to respond accordingly.

296 While the CBV does not (and as the discussion above makes clear, cannot) specify particular user vocabulary elements, the CBV does provide syntax
297 templates that are recommended for use by End Users in constructing their own user vocabulary elements. See [§ 8.1](#). The user vocabularies for which
298 templates are specified in this standard are: [physical or digital objects \(§ 8.2 and § 0\)](#), [locations](#) which include both read points and business locations
299 [\(§ 0\)](#), [business transaction identifiers \(§ 0\)](#), [source/destination identifiers \(§ 8.6\)](#), [transformation identifiers \(§ 0\)](#), [event identifiers \(§ 0\)](#), [chemical](#)
300 [substance identifiers \(§ 8.10\)](#) and [microorganism identifiers \(§ 8.11\)](#).

301

302 4 Terminology and typographical conventions

303 Within this standard, the terms SHALL, SHALL NOT, SHOULD, SHOULD NOT, MAY, NEED NOT, CAN, and CANNOT are to be interpreted as specified in §
304 7 ("*Verbal forms for expressions of provisions*") of the ISO/IEC Directives, Part 2, 2018, 8th edition [ISODir2]. When used in this way, these terms will
305 always be shown in ALL CAPS; when these words appear in ordinary typeface they are intended to have their ordinary English meaning.

306 All sections of this document, with the exception of sections 0, 0 and 0 are normative, except where explicitly noted as non-normative.

307 The following typographical conventions are used throughout the document:

308 ■ ALL CAPS type is used for the special terms from [ISODir2] enumerated above.

309 ■ `Monospace` type is used to denote programming language, UML, XML and JSON/JSON-LD identifiers, as well as for the text of XML and
310 JSON/JSON-LD documents.

311 ➤ Placeholders for changes that need to be made to this document prior to its reaching the final stage of approved GS1 standard are prefixed by a
312 rightward-facing arrowhead, as this paragraph is.

313 Links to gs1 online resources whose URL must still be verified prior to publication of this document are highlighted in yellow.

314

5 Compliance and compatibility

The CBV is designed to facilitate interoperability in EPCIS data exchange by providing standard values for vocabulary elements to be included in EPCIS data. The standard recognises that the greatest interoperability is achieved when all data conforms to the standard, and also recognises that individual End Users or groups of trading partners may need to extend the standard in certain situations.

To that end, this standard defines two levels of conformance for EPCIS documents:

- **CBV-Compliant:** An EPCIS document that only uses vocabulary identifiers specified in the CBV in the standard fields of EPCIS events.
- **CBV-Compatible:** An EPCIS document that uses a combination of vocabulary identifiers specified in the CBV and other identifiers that are outside the standard.

An EPCIS document is neither CBV-Compliant nor CBV-Compatible if it wrongly uses identifiers defined in the CBV or if it violates any other rules specified herein.

The formal definition of these terms is specified below.

5.1 CBV Compliant

A "CBV-Compliant Document" is a document that conforms to the schema and other constraints specified in [EPCIS1.2], and which furthermore conforms to all the normative language in this standard that pertains to a "CBV-Compliant Document."

A "CBV-Compliant Application" is any application for which both of the following are true:

- If it operates in a mode where it claims to accept a CBV-Compliant Document as an input, the application SHALL accept any document that is a CBV-Compliant Document according to this standard, and furthermore in processing that input SHALL interpret each CBV identifier according to the meaning specified herein.
- If it operates in a mode where it claims to produce a CBV-Compliant Document as an output, the application SHALL only produce a document that is a CBV-Compliant Document according to this standard, and furthermore in generating that output SHALL only use CBV identifiers to denote their meaning as specified herein.

The following list summarises the requirements for an EPCIS document to be a "CBV-Compliant Document," as specified elsewhere in this standard:

- A CBV-Compliant Document SHALL conform to the schema and other constraints specified in [EPCIS 2.0].
- A CBV-Compliant Document SHALL NOT use any URI beginning with `urn:epcglobal:cbv:` except as specified in this standard.
- Each EPCIS event in a CBV-Compliant Document SHALL include a `bizStep` field. The value of the `bizStep` field SHALL be a URI consisting of one of the following two prefixes:
 - `urn:epcglobal:cbv:bizstep:`
 - `https://ns.gs1.org/cbv/BizStep-`

343 followed by the string specified in the first column of some row of the table in [§ 7.1.3. These two URI structures are considered to be semantically](#)
344 [equivalent via an owl:sameAs relationship.](#)

- 345 ■ A CBV-Compliant Document MAY include a `disposition` field. If the `disposition` field is present, the value of the `disposition` field SHALL be
346 a URI consisting of one of the following two prefixes:

- 347 ■ `urn:epcglobal:cbv:disp:`
- 348 ■ `https://ns.gs1.org/cbv/Disp-`

349 followed by the string specified in the first column of some row of the table in [§ 0. These two URI structures are considered to be semantically](#)
350 [equivalent via an owl:sameAs relationship.](#)

- 351
- 352 ■ A CBV-Compliant Document MAY include a `persistentDisposition` field. If the `persistentDisposition` field is present, the value of the
353 `disposition` field SHALL be a URI consisting of one of the following two prefixes:

- 354 ■ `urn:epcglobal:cbv:disp:`
- 355 ■ `https://ns.gs1.org/cbv/Disp-`

356 followed by the string specified in the first column of some row of the table in [§ 0. These two URI structures are considered to be semantically](#)
357 [equivalent via an owl:sameAs relationship.](#)

- 358
- 359 ■ Each EPCIS event in a CBV-Compliant Document MAY include one or more `bizTransaction` elements. If `bizTransaction` elements are present,
360 each such element MAY include a `type` attribute. If a given `bizTransaction` element includes a `type` attribute, the value of the `type` attribute
361 SHALL be a URI consisting of one of the following two prefixes:

- 362 ■ `urn:epcglobal:cbv:btt:`
- 363 ■ `https://ns.gs1.org/cbv/BTT-`

364 followed by the string specified in the first column of some row of the table in [§ 7.3.3. These two URI structures are considered to be semantically](#)
365 [equivalent via an owl:sameAs relationship.](#)

- 366
- 367 ■ Each EPCIS event in a CBV-Compliant Document MAY include one or more `source` or `destination` elements. The value of the `type` attribute of
368 each such element SHALL be a URI consisting of one of the following two prefixes:

- 369 ■ `urn:epcglobal:cbv:sdt:`
- 370 ■ `https://ns.gs1.org/cbv/SDT-`

followed by the string specified in the first column of some row of the table in [§ 7.4.3. These two URI structures are considered to be semantically equivalent via an owl:sameAs relationship.](#)

- Each EPCIS event in a CBV-Compliant Document MAY include an `ErrorDeclaration` element, and when present, the `ErrorDeclaration` element MAY include a `reason` field. When present in a CBV-Compliant Document, the value of the `reason` field of the `ErrorDeclaration` element SHALL be a URI consisting of one of the following two prefixes:

- `urn:epcglobal:cbv:er:`
- `https://ns.gs1.org/cbv/ER-`

followed by the string specified in the first column of some row of the table in [§ 7.5.3. These two URI structures are considered to be semantically equivalent via an owl:sameAs relationship.](#)

- URIs defined in the EPC Tag Data standard SHALL only be used in a CBV-Compliant Document as specified in [§ 8.1.5.](#)
- A CBV-Compliant document SHALL use one of the URI forms specified in [§ 8.2](#) to populate instance-level identifiers in the “what” dimension of EPCIS events (that is, the `epcList`, `parentID`, `childEPCs`, `inputEPCList`, and `outputEPCList` fields in EPCIS `ObjectEvents`, `AggregationEvents`, `TransactionEvents`, `TransformationEvents` and `AssociationEvents`), for every such field that is not null. A CBV-Compliant document SHOULD use the either the EPC URI form as specified in [§ 8.2.1](#) or the GS1 Digital Link URI form specified in § 8.2.2 unless there is a strong reason to do otherwise.
- A CBV-Compliant document SHALL NOT use an SGLN EPC (`urn:epc:id:sgln:...`) or PGLN (`urn:epc:id:sgln`) as an object identifier.
- A CBV-Compliant document SHALL use one of the URI forms specified in [§ 0](#) to populate class-level identifiers in the “what” dimension of EPCIS events (that is, the `epcClass` fields in all EPCIS event types), for every such field that is not null. A CBV-Compliant document SHOULD use the EPC URI form as specified in [§ 8.3.1](#) or the GS1 Digital Link URI form specified in § 8.3 **Error! Unknown switch argument.** unless there is a strong reason to do otherwise.
- A CBV-Compliant document SHALL use one of the URI forms specified in [§ 0](#) to populate the “where” dimension of EPCIS events (that is, the `readPoint` and `bizLocation` fields in all EPCIS event types), for every such field that is not null. A CBV-Compliant document SHOULD use the EPC URI form as specified in [§ 8.4.1](#) unless there is a strong reason to do otherwise.
- When using an EPC URI as a location identifier ([§ 8.4.1](#)), a CBV-Compliant document SHOULD NOT use EPC schemes other than SGLN (`urn:epc:id:sgln:...`), unless there is a strong reason to do so.
- A CBV-Compliant document SHALL use one of the URI forms specified in [§ 0](#) to populate the business transaction identifier field (that is, the text content of the `bizTransaction` element) of EPCIS events, for every such field that is not null.
- When using an EPC URI as a business transaction identifier, a CBV-Compliant Documents SHOULD NOT use EPC schemes other than GDTI EPCs (`urn:epc:id:gdti:...`) or GSRN EPCs (`urn:epc:id:gsrc:...`), unless there is a strong reason to do so. GDTI EPCs SHOULD only be used as

- 402 business transaction identifiers when they have been assigned to denote a business transaction, rather than a physical document not connected
403 with any business transaction.
- 404 ■ A CBV-Compliant document SHALL use one of the URI forms specified in [§ 8.6](#) to populate a source or destination identifier field (that is, the text
405 content of a `source` or `destination` element), for every such field that is not null. A CBV-Compliant document SHOULD use the EPC URI form as
406 specified in [§ 8.7.1](#) unless there is a strong reason to do otherwise.
 - 407 ■ When using an EPC URI as a source or destination identifier ([§ 8.7.1](#)), a CBV-Compliant document SHOULD NOT use EPC schemes other than SGLN
408 (`urn:epc:id:sgln:...`) or PGLN (`urn:epc:id:pgl:...`), unless there is a strong reason to do so.
 - 409 ■ A CBV-Compliant document SHALL use one of the URI forms specified in [§ 0](#) to populate the transaction identifier field (that is, the text content of
410 the `transformationID` element) of EPCIS `TransformationEvents`, for every such field that is not null.
 - 411 ■ When using an EPC URI as a transformation identifier, a CBV-Compliant Document SHOULD NOT use EPC schemes other than GDTI EPCs
412 (`urn:epc:id:gdti:...`) unless there is a strong reason to do so. GDTI EPCs SHOULD only be used as transformation identifiers when they have
413 been assigned to denote a transformation, rather than a physical document not connected with any transformation.
 - 414 ■ A CBV-Compliant document SHALL use one of the URI forms specified in [§ 0 8.9.1](#) to populate the event identifier field (that is, the text content of
415 the `eventID` element) of an EPCIS event, whenever that field is not null.

416 5.2 CBV compatible

- 417 A “CBV-Compatible Document” is a document that conforms to the schema and other constraints specified in [EPCIS1.2], and which furthermore
418 conforms to all the normative language in this standard that pertains to a “CBV-Compatible Document.”
- 419 A “CBV-Compatible Application” is any application for which both of the following are true:
- 420 ■ If it operates in a mode where it claims to accept a CBV-Compatible Document as an input, the application SHALL accept any document that is a
421 CBV-Compatible Document according to this standard, and furthermore in processing that input SHALL interpret each CBV identifier according to
422 the meaning specified herein.
 - 423 ■ If it operates in a mode where it claims to produce a CBV-Compatible Document as an output, the application SHALL only produce a document that
424 is a CBV-Compatible Document according to this standard, and furthermore in generating that output SHALL only use CBV identifiers to denote
425 their meaning as specified herein.
- 426 The following list summarises the requirements for an EPCIS document to be a “CBV-Compatible Document,” as specified elsewhere in this standard.
- 427 ■ A CBV-Compatible Document SHALL conform to the schema and other constraints specified in [EPCIS2.0].
 - 428 ■ A CBV-Compatible Document SHALL NOT use any URI beginning with `urn:epcglobal:cbv:` except as specified in this standard.
 - 429 ■ URIs defined in the EPC Tag Data standard SHALL only be used in a CBV-Compatible Document as specified in [§ 8.1.5](#).
 - 430 ■ A CBV-Compatible Document SHOULD use the EPC URI form as specified in [§ 8.2.1](#) for each instance-level object identifier unless there is a strong
431 reason to do otherwise.

- 432 ■ A CBV-Compatible Document SHOULD use the EPC URI form as specified in [§ 8.3.1](#) for each class-level object identifier unless there is a strong
433 reason to do otherwise.
- 434 ■ A CBV-Compatible Document SHALL NOT use an SGLN EPC (`urn:epc:id:sgln:...`) or a PGLN (`urn:epc:id:pgl:...`) as an object identifier.
- 435 ■ A CBV-Compatible Document SHOULD use the EPC URI form as specified in [§ 8.4.1](#) for each location identifier unless there is a strong reason to do
436 otherwise.
- 437 ■ When using an EPC URI as a location identifier ([§ 8.4.1](#)), a CBV-Compatible Document SHOULD NOT use EPC schemes other than SGLN
438 (`urn:epc:id:sgln:...`), unless there is a strong reason to do so.
- 439 ■ When using an EPC URI as a business transaction identifier, a CBV-Compatible Document SHOULD NOT use EPC schemes other than GDTI EPCs
440 (`urn:epc:id:gdti:...`) or GSRN EPCs (`urn:epc:id:gsrn:...`), unless there is a strong reason to do so. GDTI EPCs SHOULD only be used as
441 business transaction identifiers when they have been assigned to denote a business transaction, rather than a physical document not connected
442 with any business transaction.
- 443 ■ When using an EPC URI as a source or destination identifier ([§ 8.7.1](#)), a CBV-Compatible document SHOULD NOT use EPC schemes other than
444 SGLN (`urn:epc:id:sgln:...`), unless there is a strong reason to do so.
- 445 ■ When using an EPC URI as a transformation identifier, a CBV-Compatible Document SHOULD NOT use EPC schemes other than GDTI EPCs
446 (`urn:epc:id:gdti:...`) unless there is a strong reason to do so. GDTI EPCs SHOULD only be used as transformation identifiers when they have
447 been assigned to denote a transformation, rather than a physical document not connected with any transformation.
- 448 In general, every CBV-Compliant Document is also a CBV-Compatible Document, though not every CBV-Compatible Document is a CBV-Compliant
449 Document. A CBV-Compatible Document may include an identifier that is compliant with [EPCIS2.0] but which is not permitted for CBV-Compliant
450 Documents, provided that it meets the requirements above. A CBV-Compatible Document may also include an event in which the `bizStep` field is
451 omitted, whereas that field is always required for CBV-Compliant Documents.

452

453 6 Use of Uniform Resource Identifiers (URIs)

454 This section specifies general rules that apply to all uses of URIs in this standard.

455 6.1 URI prefix for Standard Vocabularies in the CBV

456 All URIs for standard vocabulary elements specified in the CBV have one of the following two syntaxes:

- 457 ▪ `urn:epcglobal:cbv:qualifier:payload`
- 458 ▪ `https://ns.gs1.org/cbv/qualifier-payload`

459 where the *qualifier* denotes the type of the vocabulary the vocabulary element belongs to and *payload* the vocabulary element unambiguously
460 identifies an element of the vocabulary.


461 6.2 Limitation on Use of the epcglobal URN prefix

462 The CBV is the only GS1 standard in which URIs beginning with `urn:epcglobal:cbv:` are defined.

463 A CBV-Compliant or CBV-Compatible document SHALL NOT use any URI beginning with `urn:epcglobal:cbv:` or `urn:epc:` except as specified in this
464 standard.

465 Both CBV-Compliant and CBV-Compatible documents MAY contain URIs that do not begin with `urn:epcglobal:cbv:`, provided that the requirements
466 specified elsewhere in this standard are met. These SHALL be used to identify vocabulary elements not defined by the CBV standard. URIs beginning
467 with `urn:epcglobal:` SHALL NOT be used except as specified herein or in another GS1 standard.

468 6.2.1 Example of limitation of use of epcglobal URN prefix (non-normative)

469  Suppose a user needs a new disposition value to stand for “quarantined.” The user may NOT use the following URI:

470 `urn:epcglobal:cbv:disp:quarantined`

471 In this case the particular URI above is NOT part of this standard and therefore may not be used. Instead a URI like the following could be used and
472 considered CBV-Compatible. However, it must be noted that this vocabulary would have limited meaning to supply chain participants receiving this
473 unless a prior understanding had been established.

474 `https://epcis.example.com/disp/quarantined`

475

476 7 Standard Vocabularies

477 This section specifies standard vocabulary elements for four EPCIS standard vocabularies: business steps, dispositions, business transaction types, and
478 source/destination types.

479 7.1 Business steps

480 This section specifies standard identifiers for the EPCIS `BusinessStepID` vocabulary. For each of the identifiers defined, equivalent terms and values
481 are also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) **[to be formalised and published at https://www.gs1.org/voc/]**

482 These identifiers populate the `bizStep` field in an EPCIS event, as specified below.

483 7.1.1 URI structure

484 All business step values specified in this section have one of the following two forms:

- 485 ▪ `urn:epcglobal:cbv:bizstep:payload`
- 486 ▪ `https://ns.gs1.org/cbv/Bizstep-payload`

487 where the *payload* part is a string as specified in the next section. Every payload string defined here contains only lower case letters and the
488 underscore character.

489 Both URI structures are considered to be semantically equivalent via an *owl:sameAs* relationship.

490 7.1.2 Compliant usage

491 Each EPCIS event in a CBV-Compliant Document SHOULD include a `bizStep` field, and the value of the `bizStep` field SHALL be a URI consisting of
492 one of the following two prefixes:

- 493 ▪ `urn:epcglobal:cbv:bizstep:`
- 494 ▪ `https://ns.gs1.org/cbv/Bizstep-`

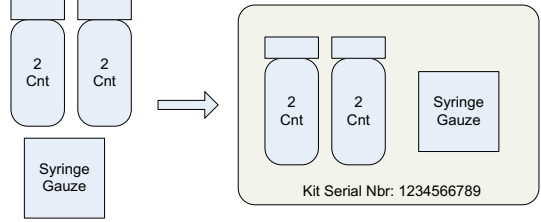
495 followed by the string specified in the first column of some row of the table in § [7.1.3](#) below. The portion following the prefix SHALL be written exactly
496 as specified in the table below, in all lowercase letters (possibly including underscores, as indicated).

497 Each EPCIS event in a CBV-Compatible Document MAY include a `bizStep` field, and the value of the `bizStep` field MAY be a URI as specified above
498 for a CBV-Compliant document, and MAY be any other URI that meets the general requirements specified in [EPCIS1.2], § [6.4](#), except for those URIs
499 which in this standard are forbidden or designated for a different purpose.

500

501

502 7.1.3 Business step values and definitions

Value	Definition	Examples of use (non-exhaustive)
accepting	Denotes a specific activity within a business process where an object changes possession and/or ownership.	<p>Retailer X unloads a pallet on to the receiving dock. The numbers of cases on the pallet are counted. The pallets are disaggregated from the shipping conveyance. The quantity is verified against the delivery document (Freight Bill or Bill of Lading), notating any over, short or damaged product at the time of delivery. Typically this process releases freight payment and completes the contractual agreement with the carrier of delivering the product/assets to a specified location.</p> <p>A parcel carrier drops off five boxes at Distributor Y's DC. A person on the Receiving Dock signs that they accept the five boxes from the parcel carrier.</p> <p>A wholesaler is assigned a lot of fish at a fish auction, verifies the quantity and acknowledges receipt.</p> <p>A manufacturer's fork lift driver scans the IDs of components which have been removed from a consignment warehouse. In doing so, the components are added to the manufacturer's inventory</p>
arriving	Denotes a specific activity within a business process where an object arrives at a location.	Truckload of a shipment arrives into a yard. Shipment has not yet been received or accepted.
assembling	<p>Denotes an activity within a business process whereby one or more objects are combined to create a new finished product.</p> <p>In contrast to transformation, in the output of <i>assembling</i> the original objects are still recognisable and/or the process is reversible; hence, <i>assembling</i> would be used preferably in an Association Event or, alternatively, an Aggregation Event, but not a Transformation Event.</p>	<p>Computer parts (hard drive, battery, RAM) assembled into a consumer ready computer</p> <p>MRO processes involving components added to an assembly comprised of multiple parts.</p> <p>Healthcare kitting: a surgical kit including drug, syringe, and gauze are combined to create a new 'product': a <i>kit</i></p>  <p>Before</p> <p>Kit with Serial Number (New Finished Good)</p>

Value	Definition	Examples of use (non-exhaustive)
collecting	Denotes a specific activity within a business process where an object is picked up and collected for future disposal, recycling or re-used.	An organisation picks up disposed consumer electronics in an end of life state from various different organisations. After the goods are picked up, they typically are brought back and received into a Collection Centre Rented or leased pallets are picked up and brought to a collection centre.
commissioning	<p>Process of associating an instance-level identifier (such as an EPC) with a specific object, or the process of associating a class-level identifier, not previously used, with one or more objects. A tag may have been encoded and applied in this step, or may have been previously encoded.</p> <p><code>commissioning</code> is applied to this association of object and serialised identifier, regardless of industry/sector; it encompasses sector-specific process steps including, but not limited to:</p> <ul style="list-style-type: none"> • catching (of fish) • harvesting (of fruit/vegetable) • picking (of fruit/vegetables) • producing (on an automated line) • slaughtering (of livestock) <p>In the case of a class-level identifier, <code>commissioning</code> differs from <code>creating_class_instance</code> in that <code>commissioning</code> always indicates that this is the first use of the class-level identifier, whereas <code>creating_class_instance</code> does not specify whether the class-level identifier has been used before.</p>	<p>On a packaging line, an encoded EPC is applied to a case and associated to the product.</p> <p>An individual virtual document (e.g. digital coupon, digital voucher, etc.) is assigned an EPC</p> <p>One hundred bottles of a particular batch of pharmaceutical product are produced, those being the first bottles of that batch to be produced.</p> <p>Sides of beef are transformed into individual packaged steaks. This may be an EPCIS 1.2 <code>TransformationEvent</code> if the input sides of beef are also tracked.</p>
consigning	<p>Indicates the overall process of <code>staging_outbound</code>, <code>loading</code>, <code>departing</code>, and <code>accepting</code>. It may be used when more granular process step information is unknown or inaccessible.</p> <p>The use of <code>consigning</code> is mutually exclusive from the use of <code>staging_outbound</code>, <code>loading</code>, <code>departing</code>, and <code>accepting</code>.</p> <p>Note: This business step is similar to <code>shipping</code>, but includes a change of possession and/or ownership at the outbound side.</p>	<p>A wholesaler comes aboard a fishing vessel, selects and buys boxes of fish, and brings them to his premises.</p> <p>A manufacturer retrieves components from a consignment warehouse for use in its assembly line. In the logical second of leaving the consignment warehouse, the components pass into the ownership of the manufacturer.</p> <p>A manufacturer stages products for loading, loads them into a container, the container is sealed, and the container departs. Ownership transfers to the receiver sometime during this overall process. If this is done in a single step, then business step <code>consigning</code> is used.</p>

Value	Definition	Examples of use (non-exhaustive)
creating_class_instance	Denotes a step in a business process where an instance or increased quantity of a class-level identifier is produced. Unlike commissioning, this business step may be repeated for the same class-level identifier.	Water, sugar, and other ingredients are combined to produce a single batch of soda over a single shift on a single production line. This may be an EPCIS 1.2 TransformationEvent if the input ingredients are tracked. Potatoes are sorted by size and quality, washed, and packed into cases of a single lot in a single packaging facility on a single date.
cycle_counting	Process of counting objects within a location in order to obtain an accurate inventory for business needs other than accounting purposes (e.g., replenishment and allocation).	A preselected subset of objects (for instance, all products belonging to a certain brand owner or a specific object class) within a retail store, are counted by a handheld reader. All objects of a specific sub-location (sales floor or a shelf on the sales floor, e.g.) are counted by a handheld reader.
decommissioning	Process of disassociating an instance-level identifier (such as an EPC) with an object. The object may be re-commissioned at some point in the future – however only with a new instance-level identifier.	An eSeal on a reusable container is broken when the container is opened, so that the container is no longer identified by the instance-level identifier that was in the eSeal. A digital coupon or an empties refund voucher is redeemed at retail point-of-sale
departing	Denotes a specific activity within a business process where an object leaves a location on its way to a destination.	Truckload of a shipment departs a yard, typically through a gate and begins transit to another location
destroying	Process of terminating an object. For an instance-level identifier, the object should not be the subject of subsequent events; subsequent events are likely indicative of error (such as a stray read of a tag inside an incinerator). For a class level identifier, quantities are reduced; however, the class-level identifier may still be used in subsequent events (referring to different instances that were not destroyed).	Distributor or Retailer puts empty case in the incinerator or box crusher.
disassembling	Denotes a specific activity within a business process where an object is broken down into separate, uniquely identified component parts.	Before feeding a consumer electronics end of life item (a computer) into recycling operation line, it is necessary to disassemble the parts for the purpose of being recycled or disposed of in an environmentally sound manner. A surgical kit (e.g. 2- 50 count bottles of medication and 1 syringe gauze) is broken down into its separate component parts
dispensing	Denotes a specific activity within a business process where a product is made available in full or part to a consumer.	A pharmacist dispenses a pharmaceutical to fill a specific prescription written by a physician, to a consumer or patient. A deli manager slices a 5 pound package of turkey for sale.

Value	Definition	Examples of use (non-exhaustive)
encoding	Process of writing an instance-level identifier (typically an EPC) to a barcode or RFID tag, where the identifier is not yet associated with an object at this step in the process. Encoding SHOULD only be used in a <code>TransactionEvent</code> .	3rd Party writes tags and returns spool of case tags to Manufacturer
entering_exiting	Denotes a specific activity at the Entrance/Exit door of a facility where customers are either leaving with purchased product or entering with product to be returned to the facility.	Customer leaves the facility of Retailer X with their purchased items through a customer entrance/exit door.
holding	Denotes a specific activity within a business process where an object is segregated for further review.	Retailer X unloads a second pallet on to their receiving dock, and, finding no purchase order for the pallet, moves the pallet to a holding area on the dock Distributor Y obtains a shipment of pharmaceutical product. Distributor Y finds that their supplier cannot provide a complete pedigree. Distributor Y moves the shipment to a quarantine area on their dock. Shipper Z is told by Customs to move a container to a special area until Customs can inspect and clear the container.
inspecting	Process of reviewing objects to address potential physical or documentation defects. In contrast to <i>sampled</i> objects, <i>inspected</i> objects remain viable in the supply chain. <i>Inspecting</i> is non-destructive and typically only checks the plausibility of the product packaging, security devices (e.g. holograms, watermarks, etc.) and integrity of any tamper-evident seals, whereas <i>sampling</i> is always destructive, i.e., makes the sampled product instance no longer viable for sale or onward distribution in the retail/dispensing supply chain),	Manufacturer A pulls 10 bottles from every batch to ensure that the product and pill count in the bottles match expectations Distributor Y checks all returned products to designate them either as saleable or as damaged Regulator R pulls 3 bottles from a shelf to determine if the bottles have a correct pedigree Customs Agent C uses a machine to scan the contents of a shipping container Pallet pool operator Z checks if certain pallets comply with quality standards.
installing	Denotes a specific activity within a business process where an object is put into a composite object (not merely a container). In <i>installing</i> the composite object exists prior to this step, whereas in <i>assembling</i> the composite object is created during the step.	Additional memory chips and a rechargeable battery are installed within a computer A duplexing unit is installed on a laser printer Additional safety equipment is installed within the cabin of an aircraft or vehicle (e.g. fire extinguishers)

Value	Definition	Examples of use (non-exhaustive)
killing	Process of terminating an RFID tag previously associated with an object. The object and its instance-level identifier may continue to exist and be the subject of subsequent events (via a barcode, manual data entry, replacement tag, etc.).	Kill Command is issued to the tag to prevent any further reading of the tag or the information on the tag.
loading	Denotes a specific activity within a business process where an object is loaded into shipping conveyance.	Manufacturer A loads pallets into a container. The pallets are aggregated to the container. Distributor Y loads racks full of totes on to a truck
other	A business step not identified by any of the values listed in the CBV.	"Other" may be used for terms that have yet to be added to the CBV from an industry or a user
packing	Denotes a specific activity within a business process that includes putting objects into a larger container – usually for shipping. Aggregation of one unit to another typically occurs at this point.	12 packs of soda are placed into a case Loose potatoes are placed into a tote.
picking	Denotes a specific activity within a business process that includes the selecting of objects to fill an order.	Distributor Y places three units into a tote to meet the requirements of a purchase order Manufacturer A pulls three pallets from its racks to fulfil a purchase order
receiving	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 <i>receiving</i> is mutually exclusive from the use of <i>arriving</i> and <i>accepting</i> .	Retailer X confirms that the count of cases on the pallet equals the expected count in a purchase order. Retailer X takes the cases into inventory. Typically, this process matches the product to the purchase order for payment to the supplier. A shipment from a manufacturer factory site to manufacturer distribution centre, is matched against the transaction record then added to local inventory.
removing	Denotes a specific activity within a business process where an object is taken out of a composite object. Opposite of <i>installing</i> .	A defective airplane part is taken out of the engine
repackaging	Denotes a specific activity within a business process where an object's packaging configuration is changed.	Distributor Y receives one box full of batteries and another box full of laptops without batteries. Distributor Y ships out new boxes containing one laptop and one battery.
repairing	Denotes a specific activity within a business process where a malfunctioning product is repaired (typically by a post-sales service), without replacing it by a new one.	A computer is brought to a repair centre to fix a problem An airplane part is in maintenance centre to diagnose an issue
replacing	Denotes a specific activity within a business process where an object is substituted or exchanged for another object.	A defective airplane part is replaced by a new part.

Value	Definition	Examples of use (non-exhaustive)
reserving	Process in which a set of instance-level identifiers, not yet commissioned, are provided for use by another party.	Manufacturer provides set of case EPC numbers to a 3rd Party labeller
retail_selling	Denotes a specific activity within a business process at a point-of-sale for the purpose of transferring ownership to a customer in exchange for something of value (currency, credit, etc.).	Retailer X sells a screwdriver to a customer by checking it out through a point-of-sale system.
sampling	<p>Denotes a testing activity within a business process where one or more portions of an object are examined for quality testing, quality inspection, or customs clearance purposes.</p> <p>In contrast to <i>inspected</i> objects, <i>sampled</i> objects are no longer viable in the supply chain.</p> <p>Inspecting is non-destructive and typically only checks the plausibility of the product packaging, security devices (e.g. holograms, watermarks, etc.) and integrity of any tamper-evident seals, whereas <i>sampling</i> is always destructive, i.e., makes the sampled product instance no longer viable for sale or onward distribution in the retail/dispensing supply chain),</p> <p>When a serialised instance undergoes <i>sampling</i>, the subsequent business step SHALL be an end-of-life event (i.e., with action DELETE), to prevent the return of the sampled object (or its identifier) into the supply chain.</p>	<p>Customs authority X removes a pharmaceutical product from a case for quality testing at a customs office.</p> <p>Food laboratory Y pulls a random product sample and checks it for authenticity.</p>
sensor_reporting	<p>Denotes a specific activity within a business process where sensor data, pertaining to the physical properties and condition of an object or location, is returned.</p> <p>If an EPCIS event accommodates sensor data in conjunction with specific business process steps (e.g. <i>sensor observations</i> in the context of a <i>commissioning</i>, <i>packing</i>, or <i>sampling</i>), the business step value describing the process step SHOULD be used. <i>sensor_reporting</i> SHOULD only be used when no other business step is in progress.</p>	<p>Several packages of frozen food are kept in cold storage, with temperature monitoring. An EPCIS event is triggered once a specific, pre-set temperature threshold is reached.</p> <p>A dust-free room is continuously checked for the presence of contaminants. An EPCIS event is captured at regular intervals for documentation purposes.</p> <p>A wine/cheese cellar is continuously checked for humidity and temperature. Each time the door is opened or closed, an EPCIS event is captured, including the range of temperature and humidity values within the period of time since the previously captured <i>commissioning</i> EPCIS event.</p>

Value	Definition	Examples of use (non-exhaustive)
shipping	<p>Indicates the overall process of <code>staging_outbound</code>, <code>loading</code> and <code>departing</code>. It may be used when more granular process step information is unknown or inaccessible. It may indicate a final event from a shipping point.</p> <p>The use of <code>shipping</code> is mutually exclusive from the use of <code>staging_outbound</code>, <code>departing</code>, or <code>loading</code>.</p>	<p>Manufacturer A loads and reads product into the shipping container and closes the door. The product has been read out of the shipping facility. The shipment is immediately picked up and a BOL is associated at this point. (The shipment has left the yard)</p> <p>At Distributor Y, the truck containing racks full of totes pulls away from the shipping dock or staging area.</p> <p>Manufacturer A completes loading product into trailer and seals door. The trailer is ready for pickup. The generation of a Despatch Advice / ASN triggers a "shipping" event.</p> <p>A 3PL picks and tags the product. The product is loaded into a trailer and signed over to a transportation carrier. The 3PL notifies the manufacturer who generates a "shipping" event. NOTE: This would be the case if there were NO departing step at a read point at the gate.</p> <p>Typical Process flow: <code>staging_outbound</code> <code>loading</code> <code>departing</code></p> <p>The above steps assume an organisation's ability and desire to share all steps in the process. If those process steps are not captured, the single business step of <code>shipping</code> would be used.</p>
staging_outbound	Denotes a specific activity within a business process in which an object moves from a facility to an area where it will await transport pick-up.	<p>Container is being closed and will be subsequently loaded onto a vehicle in the yard.</p> <p>Container is being closed and seal is applied, and will be subsequently loaded onto a vehicle in the yard</p> <p>Product has been picked and is now in a staging lane waiting for loading into a container</p>
stock_taking	Process of counting objects within a location following established rules and/or standards to serve as a basis for accounting purposes.	All EPCs in a retail store are read by a handheld reader following a procedure accepted by the organisation's accounting firm.
stocking	Denotes a specific activity within a business process within a location to make an object available to the customer or for order fulfilment within a DC.	<p>Retailer X places cans from a case on to a shelf on the sales floor</p> <p>Dist X moves goods from a storage area to a picking area</p>
storing	Denotes a specific activity within a business process where an object is moved into and out of storage within a location.	<p>Manufacturer A moves a pallet from the receiving area to a rack</p> <p>Retailer X moves a case from the receiving dock to a shelf in the backroom</p>

Value	Definition	Examples of use (non-exhaustive)
transporting	Process of moving an object from one location to another using a vehicle (e.g., a ship, a train, a lorry, an aircraft).	Carrier X conveys 150 sea containers from Hong Kong seaport to Hamburg seaport with a container vessel. A train with 20 goods wagons goes from one train station to another. A lorry moves a swap trailer from a depot to a distribution centre.
unloading	Denotes a specific activity within a business process where an object is unloaded from a shipping conveyance.	Manufacturer A unloads pallets from a shipping conveyance. The pallets are disaggregated from the shipping conveyance. Distributor Y unloads racks full of totes from a truck
unpacking	Denotes a specific activity within a business process that includes removing products (individuals, inners, cases, pallets) from a larger container – usually after receiving or accepting. Disaggregation of one unit from another typically occurs at this point.	12 packs of soda are removed from a case Loose potatoes are taken off from a tote.
void_shipping	Denotes a process of declaring that one or more objects in a prior outbound process (captured in an EPCIS event having business step <i>shipping</i> , <i>departing</i> , or <i>consigning</i>) were not shipped (or departed or consigned) as previously indicated.	A sender cancels a shipment after a prior shipping event. A sender discovers, either by notification from a recipient or on their own, that a shipment they believed occurred and created a shipping event for, did not actually occur. The record is updated to reflect this. A sender discovers that three out of ten items, previously believed as having been shipped, were not included in the shipment. The <i>voidShipping</i> event indicates that those three items were not shipped.

503

504 7.2 Dispositions

505 This section specifies standard identifier values for the EPCIS *DispositionID* vocabulary. For each of the identifiers defined, equivalent terms and
506 values are also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [to be formalised and published at https://www.gs1.org/voc/].

507 These identifiers populate the *disposition* and *persistentDisposition* fields in an EPCIS event, as specified below.

508 7.2.1 URI structure

509 All disposition values specified in this section have one of the following two forms:

- 510 ▪ `urn:epcglobal:cbv:disp:payload`
- 511 ▪ `https://ns.gs1.org/cbv/Disp-payload`

where the *payload* part is a string as specified in the next section. Every payload string defined herein contains only lower case letters and the underscore character.

[Both URI structures are considered to be semantically equivalent via an *owl:sameAs* relationship.](#)

7.2.2 Compliant usage

Each EPCIS event in a CBV-Compliant Document MAY include a *disposition* field. If the *disposition* field is present, the value of the *disposition* field SHALL be a URI consisting of one of the following two prefixes:


- `urn:epcglobal:cbv:disp:`
- `https://ns.gs1.org/cbv/Disp-`



followed by the string specified in the first column of some row of the table below. The portion following the prefix SHALL be written exactly as specified in the table below, in all lowercase letters (possibly including underscores, as indicated).

Each EPCIS event in a CBV-Compatible Document MAY include a *disposition* field, and the value of the *disposition* field MAY be a URI as specified above for a CBV-Compliant document, and MAY be any other URI that meets the general requirements specified in [EPCIS1.2], [§ 6.4](#), except for those URIs which in this standard are forbidden or designated for a different purpose.

527 **7.2.3 Disposition values and definitions**

Value	Definition	Examples of use (non-exhaustive)
active	A commissioned object has just been introduced into the supply chain.	Manufacturer A commissions tags for 10 cases of product. A virtual document has been assigned an EPC Business step: commissioning
available	Object has been returned to service or to the supply chain (e.g., following a successfully completed repairing step).	A mechanical component has been serviced and made available for use.
completeness_verified	Applied as <code>Disposition</code> of an <code>AggregationEvent</code> with action <code>DELETE</code> to and business step <code>unpacking</code> to explicitly indicate the verified integrity of that aggregation when the aggregated children are unpacked from their parent. Applied as <code>persistentDisposition</code> of an <code>ObjectEvent</code> with business step <code>inspecting</code> , if the inspection has verified the presence of each of the aggregated children.	A downstream recipient verifies that the contents of a shipment below the outer packing layer are complete, by means of unpacking and scanning the barcodes or EPC/RFID tags of the contents.
completeness_inferred	Applied as <code>persistentDisposition</code> of an <code>AggregationEvent</code> or <code>ObjectEvent</code> with action <code>OBSERVE</code> to indicate the inferred integrity of that aggregation (without unpacking the aggregated children from the parent) on the basis of aggregation information (e.g., earlier EPCIS packing event data and/or ASN/DESADV) provided by an upstream supplier. Inferred children SHALL be explicitly listed when captured in an <code>AggregationEvent</code> , but SHALL NOT be listed when captured in an <code>ObjectEvent</code> .	A downstream recipient infers that the contents of a shipment below the outer packing layer are complete, as indicated in EPCIS packing and shipping events provided by the upstream supplier.
conformant	Outcome of a successful/passed inspection in an <code>inspecting</code> or <code>repairing</code> step.	A mechanical component has been successfully tested for conformity to safety or performance requirements.
container_closed	Object has been loaded onto a container, the doors have been closed and the shipment sealed.	Container is being closed and will be awaiting pickup in the yard. Container is being closed and electronic seal is applied. Business step (non-exclusive example): staging_outbound

Value	Definition	Examples of use (non-exhaustive)
container_open	A container's doors have been opened; or a seal of a shipment has been broken. This disposition makes no indication as to whether the act of opening was authorised.	Container has been opened in the normal process of unloading, Container has been opened unexpectedly, with no apparent reason.
damaged	Object is impaired in its usefulness and/or reduced in value due to a defect.	Pallet pool operator P notices that a plank of a pallet is broken and records this incident by scanning the EPC of the pallet. Retailer R receives a shipment where the product packages on the pallet have been dented. Business steps: accepting inspecting receiving removing repairing replacing  Note: "damaged" can also apply to non-apparent (physical) damage determined by means of sensor data. For example, product pH has dropped beyond a minimum acceptable threshold for viability.
destroyed	Object has been fully rendered non-usable.	Incinerator Operator B indicates that product and packaging have been incinerated Business step: destroying
dispensed	A full quantity of product is distributed to a consumer.	A pharmacist dispenses a pharmaceutical in a container's totality to fill a specific prescription written by a physician, to a consumer or patient. A deli manager slices the complete contents of a 5 pound package of turkey for sale. NOTE: this disposition reflects the disposition of the original object, not what was dispensed.

Value	Definition	Examples of use (non-exhaustive)
disposed	Object has been returned for disposal.	A package of pharmaceuticals has been picked up by a distributor and will be subsequently destroyed
encoded	An instance-level identifier has been written to a barcode or RFID tag, but not yet commissioned.	3rd Party has written EPCs to tags and returns spool of case tags to Manufacturer Business step: encoding
expired	Object's expiration date is in the past.	Distributor Y indicates that a product is past its expiration date Business step (examples): holding staging_outbound storing
in_progress	Optional disposition for object proceeding through points in the supply chain.	 Note: Omission of disposition is generally recommended instead of "in_progress", which adds little value to event data.
in_transit	Object being shipped between two trading partners.	Shipper Z pulled a container/product out of a manufacturer's yard on to a road Business step: shipping departing
inactive	Decommissioned object that may be reintroduced to the supply chain.	A reusable tag is removed from a reusable transport item. A digital coupon or an empties refund voucher has been redeemed at retail point-of-sale Business step: decommissioning
mismatch_instance	Instance-level identifiers do not correspond to the identifiers that were expected.	Recipient unpacks 10 of expected 10, but SGTINs do not match data communicated via the EPCIS Packing event provided by the supplier.  Note: It is recommended to capture all "mismatch_" dispositions as persistentDisposition.

Value	Definition	Examples of use (non-exhaustive)
mismatch_class	Class-level identifiers do not correspond to the identifiers that were expected.	<p>Recipient unpacks 10 of expected 10, but GTINs do not match data communicated via the EPCIS Packing event provided by the supplier.</p> <p>i Note: It is recommended to capture all "mismatch_" dispositions as persistentDisposition.</p>
mismatch_quantity	Quantity do not correspond to the quantity that was expected.	<p>Recipient unpacks 9 of expected 10 (an 'underage'), or 11 of expected 10 (an 'overage').</p> <p>i Note: It is recommended to capture all "mismatch_" dispositions as persistentDisposition.</p>
needs_replacement	Component(s) or other asset(s) must be replaced to ensure fulfilment of functional requirements.	An assembly component's service duration has exceeded its (theoretical, e.g., per EN 50126) mean time to failure, and is marked as needing replacement.
no_pedigree_match DEPRECATED	In validating the pedigree for the object, no match was found, causing the product to be quarantined for further investigation and disposition.	<p>Distributor Y could not obtain a valid pedigree for a product from its Manufacturer A</p> <p>Business step: holding staging_outbound storing</p>
non_conformant	<p>Outcome of an unsuccessful/failed inspection in an inspecting or repairing step.</p> <p>(non_conformant is the opposite of available).</p>	<p>A mechanical component has been failed conformity testing against safety or performance requirements.</p> <p>If disposition is non_conformant, follow up steps may be used to capture subsequent and/or final disposition. For example, if the non_conformant object is not usable, it might be moved to a separate location for storage. If the object is still installed in an assembly but not function-critical, the assembly might be allowed to continue running until the next repair cycle; alternatively, a disassembly event might follow.</p>

Value	Definition	Examples of use (non-exhaustive)
non_sellable_other	Object cannot be sold to a customer.	<p>A product is not sellable pending further evaluation.</p> <p>A product is not sellable, and one of the other dispositions (expired, recalled, damaged, no_pedigree_match) does not apply.</p> <p>Product has been sold and is awaiting customer pick-up.</p> <p>Business step:</p> <ul style="list-style-type: none"> holding inspecting staging_outbound storing
partially_dispensed	A portion of a product is distributed to a customer, while additional product is retained for subsequent distribution.	<p>A pharmacist dispenses 10 pills from a 100-count bottle to fill a customer prescription.</p> <p>A deli manager slides and packages one pound of a 10 pound ham for customer purchase.</p> <p>NOTE: This disposition reflects the disposition of the original object, not what was dispensed.</p>
recalled	Object is non-sellable because of public safety reasons.	<p>Manufacturer A requested that all Retailers and Distributors return its batteries that could overheat and explode</p> <p>Business step:</p> <ul style="list-style-type: none"> holding staging_outbound storing
reserved	Instance-level identifier has been allocated for a third party.	<p>Distributor receives EPC numbers and can encode tag with the numbers.</p> <p>Business step:</p> <ul style="list-style-type: none"> reserving
retail_sold	Product has been purchased by a customer.	<p>A customer at Retailer X purchased a screwdriver by checking it out through the point of sale system</p> <p>Business step:</p> <ul style="list-style-type: none"> retail_selling

Value	Definition	Examples of use (non-exhaustive)
returned	Object has been sent or brought back for various reasons. It may or may not be sellable.	Product is received at a returns centre from a customer because of an over-shipment, recall, expired product, etc. Product is returned to retail POS by a customer, who no longer wants the product. Business step: receiving holding shipping
sellable_accessible	Product can be sold as is and customer can access product for purchase.	Retailer X puts a case of screwdrivers on to a shelf or display within customer reach Business step: stocking receiving
sellable_not_accessible	Product can be sold as is, but customer cannot access product for purchase.	Retailer X puts a case of screwdrivers on to a shelf in a store backroom Business step: receiving storing loading holding inspecting
stolen	An object has been taken without permission or right.	A pharmaceutical manufacturer completes an investigation of serial numbers that are missing from inventory, and concludes that they have been stolen
unavailable	Object has been removed from service or from the supply chain (e.g., pending repair).	A mechanical component in need of maintenance is taken out of service,
unknown	An object's condition is not known.	

528

529 7.2.3.1 Deprecated Disposition values

530 Earlier CBV versions defined several disposition values that are now deprecated. The following table lists the deprecated dispositions and, where
531 applicable, values which replaced them in later versions of the CBV . Each new value applies to all the situations that the corresponding, deprecated



532 value did, but may also be applied to broader situations excluded by the earlier value's more narrow definition. For example, the disposition `damaged`
533 may now be applied to a returnable asset, which was never considered "sellable" even when it was undamaged.

Deprecated Disposition (deprecated)	New Disposition
<code>non_sellable_expired</code>	<code>expired</code>
<code>non_sellable_damaged</code>	<code>damaged</code>
<code>non_sellable_disposed</code>	<code>disposed</code>
<code>non_sellable_no_pedigree_match</code>	<code>no_pedigree_match</code> (itself DEPRECATED in CBV 2.0)
<code>non_sellable_recalled</code>	<code>recalled</code>
<code>no_pedigree_match</code>	(none)

534

535

536 7.3 Business Transaction Types

537 This section specifies standard identifier values for the EPCIS `BusinessTransactionTypeID` vocabulary. For each of the identifiers defined, equivalent
538 terms and values are also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [**to be formalised and published at https://www.gs1.org/voc/**].

539 These identifiers may be used to populate the `type` attribute of a `bizTransaction` element in an EPCIS event. See [§ 0](#) for details of when these
540 identifiers should be used.

541 7.3.1 URI structure

542 All business transaction type values specified in this section have one of the following two forms:

- 543 ▪ `urn:epcglobal:cbv:btt:payload`
- 544 ▪ `https://ns.gs1.org/cbv/BTT-payload`


545

546 where the *payload* part is a string as specified in the next section. Every payload string defined herein contains only lower case letters and the
547 underscore character.

548 [Both URI structures are considered to be semantically equivalent via an *owl:sameAs* relationship.](#)

549 7.3.2 Compliant usage

550 Each EPCIS event in a CBV-Compliant Document MAY include one or more `bizTransaction` elements. If `bizTransaction` elements are present,
551 each such element MAY include a `type` attribute. If a given `bizTransaction` element includes a `type` attribute, the value of the `type` attribute SHALL
552 be a URI consisting of the prefix `urn:epcglobal:cbv:btt:` followed by the string specified in the first column of some row of the table below. The
553 portion following the prefix SHALL be written exactly as specified in the table below, in all lowercase letters (possibly including underscores, as
554 indicated). See [§ 0](#) for more compliance requirements concerning business transaction types.

555  Examples can be found [in external xml and json artifacts](#).

556 Each EPCIS event in a CBV-Compatible Document MAY include one or more `bizTransaction` elements. If `bizTransaction` elements are present,
557 each such element MAY include a `type` attribute. If a given `bizTransaction` element includes a `type` attribute, the value of the `type` attribute MAY be
558 a URI as specified above for a CBV-Compliant document, and MAY be any other URI that meets the general requirements specified in [EPCIS1.2], [§](#)
559 [6.4](#), except for those URIs which in this standard are forbidden or designated for a different purpose.

560 7.3.3 Business Transaction values and definitions

Business Transaction Types	
Value	Definition
bol	Bill of Lading. A document issued by a carrier to a shipper, listing and acknowledging receipt of goods for transport and specifying terms of delivery
cert	Certificate. A document confirming certain characteristics of an object (e.g. product), person, or organisation, typically issued by a third party.
desadv	Despatch Advice. A document/message by means of which the seller or consignor informs the consignee about the despatch of goods. Also called an "Advanced Shipment Notice," but the value <code>desadv</code> is always used regardless of local nomenclature.
inv	Invoice. A document/message claiming payment for goods or services supplied under conditions agreed by the seller and buyer.
pedigree	Pedigree. A record that traces the ownership or custody and transactions of a product as it moves among various trading partners.
po	Purchase Order. A document/message that specifies details for goods and services ordered under conditions agreed by the seller and buyer.
poc	Purchase Order Confirmation. A document that provides confirmation from an external supplier to the request of a purchaser to deliver a specified quantity of material, or perform a specified service, at a specified price within a specified time. (Sometimes internally referred to as a "Sales Order".)
prodorder	Production Order. An organisation-internal document or message issued by a producer that initiates a manufacturing process of goods.
recadv	Receiving Advice. A document/message that provides the receiver of the shipment the capability to inform the shipper of actual goods received, compared to what was advised as being sent.
rma	Return Merchandise Authorisation. A document issued by the seller that authorises a buyer to return merchandise for credit determination.
testprd	Test Procedure. A document that provides a formal specification of a sequence of instructions for the purpose of verifying one or several criteria.
testres	Test Result. A document that includes the outcome of the execution of a given test procedure.
upevt	Upstream EPCIS Event. Event ID URI(s) of event(s) provided by an upstream supplier, such as packing and shipping events (e.g., as the basis for the inferred completeness of inbound aggregations).

561 7.4 Source/Destination types

562 This section specifies standard identifier values for the EPCIS `SourceDestTypeID` vocabulary. For each of the identifiers defined, equivalent terms and
563 values are also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [to be formalised and published at <https://www.gs1.org/voc/>].

564 These identifiers may be used to populate the `type` attribute of a `source` or `destination` element in an EPCIS event. See [§ 8.6](#) for details of when
565 these identifiers should be used.

566 SGLN EPC or GS1 Digital Link URI indicating the combination of AIs (414) and -- optionally -- (254) -- SHOULD be used to identify the endpoint of a
567 business transfer, where the Source/Destination type is **location**; PGLN EPC or GS1 Digital Link URI indicating AI (417) SHOULD be used where the

568 Source/Destination type is **owning party** or **possessing party**, although an SGLN EPC may be used in migration phases, in the interest of backward
569 compatibility with EPCIS/CBV 1.2 and TDS 1.12.

570

571 7.4.1 URI structure

572 All source/destination type values specified in this section have one of the following two forms:

- 573 ▪ `urn:epcglobal:cbv:sdt:payload`
- 574 ▪ `https://ns.gs1.org/cbv/SDT-payload`

575 where the *payload* part is a string as specified in the next section. Every payload string defined herein contains only lower case letters and the
576 underscore character.


577 Both URI structures are considered to be semantically equivalent via an *owl:sameAs* relationship.

578 7.4.2 Compliant usage

579 Each EPCIS event in a CBV-Compliant Document MAY include one or more `source` and/or `destination` elements. The value of the `type` attribute of
580 the `source` or `destination` element SHALL be a URI consisting of one of the following two prefixes:

- 581 ▪ `urn:epcglobal:cbv:sdt:`
- 582 ▪ `https://ns.gs1.org/cbv/SDT-`

583 followed by the string specified in the first column of some row of the table below. The portion following the prefix SHALL be written exactly as
584 specified in the table in § 7.4.3, in all lowercase letters (possibly including underscores, as indicated). See § 8.6 for more compliance requirements
585 concerning source and destination types.

586  Examples can be found [in external xml and json artifacts.](#)

587 Each EPCIS event in a CBV-Compatible Document MAY include one or more `source` and/or `destination` elements. The value of the `type` attribute of
588 the `source` or `destination` element MAY be a URI as specified above for a CBV-Compliant document, and MAY be any other URI that meets the
589 general requirements specified in [EPCIS], § 6.4, except for those URIs which in this standard are forbidden or designated for a different purpose.

590 7.4.3 Source/Destination Type values and definitions

Source/Destination Types	
Value	Definition

Source/Destination Types	
owning_party	The source or destination identifier denotes the party who owns (or is intended to own) the objects at the originating endpoint or terminating endpoint (respectively) of the business transfer of which this EPCIS event is a part.
possessing_party	The source or destination identifier denotes the party who has (or is intended to have) physical possession of the objects at the originating endpoint or terminating endpoint (respectively) of the business transfer of which this EPCIS event is a part.
location	The source or destination identifier denotes the physical location of the originating endpoint or terminating endpoint (respectively) of the business transfer of which this EPCIS event is a part. When a source of this type is specified on an EPCIS event at the originating endpoint of a business transfer, the source identifier SHOULD be consistent with the Read Point specified in that event. When a destination of this type is specified on an EPCIS event at the terminating endpoint of a business transfer, the destination identifier SHOULD be consistent with the Read Point specified in that event.

591 7.5 Error reason identifiers

592 This section specifies standard identifier values for the EPCIS `ErrorReasonID` vocabulary. Each of the identifiers defined, equivalent terms and values is
593 also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [**to be formalised and published at https://www.gs1.org/voc/**].

594 These identifiers may be used to populate the `reason` attribute of an `errorDeclaration` element in an EPCIS event.

595 7.5.1 URI structure

596 All error reason identifier values specified in this section have one of the following two forms:

- 597 ▪ `urn:epcglobal:cbv:er:payload`
- 598 ▪ `https://ns.gs1.org/cbv/ER-payload`

599 where the *payload* part is a string as specified in the next section. Every payload string defined herein contains only lower case letters and the
600 underscore character.

601 [Both URI structures are considered to be semantically equivalent via an *owl:sameAs* relationship.](#)

602 7.5.2 Compliant usage

603 Each EPCIS event in a CBV-Compliant Document MAY include an `ErrorDeclaration` element, and when present, the `ErrorDeclaration` element
604 MAY include a `reason` field. When present in a CBV-Compliant Document, the value of the `reason` field of the `ErrorDeclaration` element SHALL be a
605 URI consisting of one of the following two prefixes

- 606 ▪ `urn:epcglobal:cbv:er:`
- 607 ▪ `https://ns.gs1.org/cbv/ER-`

608 followed by the string specified in the first column of some row of the table in § 7.5.3. The portion following the prefix SHALL be written exactly as
609 specified in the table below, in all lowercase letters (possibly including underscores, as indicated).

610 Each EPCIS event in a CBV-Compatible Document MAY include an `ErrorDeclaration` element, and when present, the `ErrorDeclaration` element
611 MAY include a `reason` field. When present in a CBV-Compatible Document, the value of the `reason` attribute of the `ErrorDeclaration` element MAY
612 be a URI as specified above for a CBV-Compliant document, and MAY be any other URI that meets the general requirements specified in [EPCIS2.0], §
613 [6.4](#), except for those URIs which in this standard are forbidden or designated for a different purpose.

614 7.5.3 Error reason identifier values and definitions

Error reason identifiers	
Value	Definition
<code>did_not_occur</code>	The prior event is considered erroneous because it did not actually occur. There are no corrective events. (In a CBV-Compliant Document, this error reason SHALL NOT be used in an error declaration that contains one or more corrective event IDs.)
<code>incorrect_data</code>	The prior event is considered erroneous because some or all of the data in the event are incorrect. Subsequent events may provide a correct indication of what actually occurred when the prior event was captured. These events may be linked using the corrective event IDs in the error declaration.

615

616 7.6 Sensor measurement types

617 This section specifies standard values for EPCIS sensor measurement types.

618 For each of the measurement types defined, equivalent terms and values are also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [to be formalised and
619 published at <https://www.gs1.org/voc/>].

620 7.6.1 URI structure

621 A Linked Data code list will be defined in the GS1 Web vocabulary* for measurement types. Within the code list, values will be defined for specific
622 measurable properties, such as Temperature, Pressure, Humidity etc.

623

624 Sensor measurement types SHALL be expressed using either URIs or Compact URI Expressions (CURIEs), as follows:

- 625 • <https://gs1.org/voc/X>
- 626 • `gs1:X`

627 where the *X* part is a string as specified in § 7.6.3, below.

628

629 **For example, <https://gs1.org/voc/Temperature> and the CURIE `gs1:Temperature` are considered equivalent ways of indicating**
630 **that a measurement of temperature is expressed within `sensorReport` as the value of `type` .**

631 For standard values of measurement types (e.g. for physical properties such as temperature, pressure etc.), each such URI or CURIE will resolve to an
632 online definition within the GS1 Web vocabulary.

633 User-defined / vendor-defined values of type are permitted as an alternative where no appropriate value is available within the code list
634 at **<https://gs1.org/voc/MeasurementType>** ; in such situations, a user-defined / vendor-defined value SHALL be expressed as a Web URI or as a
635 CURIE, with an accompanying declaration of how the CURIE prefix maps to a Web URI stem or namespace.

636

637 7.6.2 Compliant usage

638 Each EPCIS event in a CBV-Compliant Document MAY include one or more `sensorElement` elements, which SHALL include one or more `sensorReport`
639 elements and MAY include a `sensorMetadata` element.

640 If expressing a **measurement**, each `sensorReport` element in a CBV-compliant document SHALL use the URI or CURIE form specified in § 7.6.1 to
641 indicate the type of measurement that it is reporting.

7.6.3 Sensor measurement type values and definitions

Sensor measurement types are defined for physical properties that may be sensed and relevant for monitoring the condition of objects. The code list and measurement types are also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [to be formalised and published at <https://www.gs1.org/voc/>].

Measurement type	SI unit	Definition
Absolute humidity	kilogram per cubic metre	The ratio of the mass of water vapour in a sample of moist air to the volume of the sample.
Absorbed_dose	gray	The energy absorbed per unit mass of the patient from the decay of a radionuclide given to a patient for diagnostic or therapeutic purposes.
Absorbed_dose_rate	gray per second	The energy absorbed per unit time per unit mass of the patient from the decay of a radionuclide given to a patient for diagnostic or therapeutic purposes.
Acceleration	metre per second per second	The rate of change of velocity, a vector quantity with magnitude and direction.
Altitude / Elevation	metres	The height above the surface of a defined geoid, typically the World Geodetic System (WGS 84) geoid for measurements from location sensors using satellite technology (e.g. GPS, Glonass, Galileo) , which approximates to the surface of the earth at sea level. Positive values indicate height above the geoid surface. Negative values indicate depth below the geoid surface.
Amount_of_substance	mole	The amount of substance that contains a number of atoms, molecules etc. that is equal to the Avogadro constant.
Angle	degrees, radians, etc.	The inclination of one line or plane to another.
Angular acceleration	radian per second per second	The rate of change of angular velocity with respect to time.
Angular impulse, Angular momentum	newton metre second, kilogram metre squared per second	The integral over time of the torque acting on a body that is free to rotate, resulting in a corresponding change in its angular momentum.
Area	square metre	The amount of two-dimensional space occupied, measured in units of length squared.
Capacitance	farad	The capacitance of an isolated conductor is defined as the ratio of the total charge on it to its electric potential.
Charge	coulomb	Quantity of unbalanced electricity in an object, i.e. excess or deficiency of electrons, resulting in negative or positive electrification, respectively.
Conductance	siemen	The ratio of the current in the conductor to the potential difference between its ends; reciprocal of resistance.
Conductivity	siemen per metre	A measure of how strongly a material conducts electric current. The ratio of the current density to the electric field that causes the current to flow.

Measurement type	SI unit	Definition
Count		A measure of the total quantity of something; the number of individual units present.
Current	ampere	Rate of flow of charge in a substance, whether solid, liquid or gas.
Current density	ampere per square metre	Rate of flow of charge in a substance per unit area perpendicular to the current.
Density	kilogram per cubic metre	The mass of unit volume of a substance.
Dimensionless	parts per million etc.	The dimensionless ratio of a volume of one substance to the volume of solid, liquid or gas in which it is contained.
Dynamic_viscosity	pascal	The value of the tangential force per unit area which is necessary to maintain unit relative velocity between two parallel planes unit distance apart in a fluid.
Effective_dose / Equivalent_dose	sievert	The product of the absorbed dose multiplied by a Q factor (relating to the type of radiation) and a factor relating to all relevant aspects of the body being irradiated, multiplied by the exposure time.
Effective_dose_rate	sievert per second	The product of the absorbed dose multiplied by a Q factor (relating to the type of radiation) and a factor relating to all relevant aspects of the body being irradiated.
Electric_field_intensity	volt per metre = newton / coulomb	The electric force acting on a unit charge. The linear gradient of the electrostatic potential.
Energy	joule	A measure of a the capacity of a system or body to do work.
Exposure	lux second	The product of light intensity and time duration of the exposure.
Force	newton	The rate of change of linear momentum of a body on which a force acts. A force acting on a body which is free to move produces an acceleration in the motion of the body.
Frequency	hertz	The rate of repetition of a periodic oscillation or disturbance; the number of cycles per unit time.
Illuminance	lux = 1 lumen per square metre	The energy in the form of visible radiation reaching a surface per unit area in unit time; the amount of luminous flux per unit area.
Impulse or linear momentum	newton seconds	The impulse is the integral over time of the force acting between two colliding bodies. Linear momentum of a body is the product of its mass and its velocity.
Inductance	henry	The magnitude of the property of an element or circuit to form a magnetic field and store magnetic energy when carrying a current. The property of an electric circuit or component that causes an electromotive force to be generated in it as a result of a change in the current flowing through the circuit (self inductance) or of a change in the current flowing through a neighbouring circuit with which it is magnetically linked (mutual inductance).
Irradiance	watt per square metre	The flux of radiant energy per unit area, especially an area perpendicular to the direction of travel through a medium. A measure of the radiant power per unit area that flows across a surface.
Kinematic_viscosity	square metres per second	The ratio of the viscosity of a liquid to its density.

Measurement type	SI unit	Definition
Latitude	degrees	A geographic coordinate indicating the north/south position of a point on the surface of the Earth, representing an angle relative to the plane of the equator. Positions north of the equator have positive values of latitude, while positions south of the equator have negative values of latitude.
Length	metre	The linear magnitude of any thing, as measured end to end.
Longitude	degrees	Temperature is a measure of the relative hotness or coldness of an object or system; two systems brought into contact will, eventually reach thermal equilibrium (the same temperature) as heat flows from the system with higher temperature to the system with lower temperature.
Luminous_flux	lumen = 1 candela per steradian	A measure of the perceived power of light emitted by a source or received by a surface and irrespective of direction, taking into account the sensitivity of the human eye to different wavelengths of light.
Luminous_intensity	candela	A measure of the light-emitting intensity of a light source, in a specific direction. For a very narrow cone containing the direction, it is the ratio of the luminous flux emitted within that cone to the solid angle of the cone.
Magnetic_flux	weber	A measure of the total magnetic field that passes through a specific area. The surface integral of the product of the permeability of the medium and the magnetic field intensity perpendicular to the surface.
Magnetic_flux_density	tesla = weber per square metre	The product of the magnetic field strength and the permeability of a material.
Magnetic_vector_potential	weber per metre (Joules per ampere metre)	The potential energy per unit element of current (current multiplied by length).
Mass	kilogram	The quantity of matter in a body. Inertial mass is the measure of the inertia of a body; its resistance to acceleration.
Mass_concentration		
Mass_flow_rate	kilogram per second	The mass of fluid that passes per unit of time.
Mass_flux	kilogram per second per square metre	The mass of fluid that passes per unit of time per unit area perpendicular to the flow direction.
Memory_capacity	byte	A measure of the size of a data structure or capacity of a data carrier, typically measured in bits (binary digits), bytes or octets (8 bits) or multiples thereof.
Molar_concentration	mole per cubic metre	The concentration of a solution expressed as the number of moles of dissolved substance per unit volume of solution.
Molar_mass	kilogram per mole	The ratio of the mass of a chemical compound to the amount of substance (atoms or molecules) contained within it, the amount of substance being measured in moles.

Measurement type	SI unit	Definition
Molar_thermodynamic_energy	joule per mole	The ratio of the thermodynamic energy of a chemical compound to the amount of substance (atoms or molecules) contained within it, the amount of substance being measured in moles.
Molar_volume	cubic metre per mole	The volume occupied by a substance per unit amount of substance at a specified temperature and pressure.
Power	watt	The rate of doing work or rate of production, transfer or consumption of energy; the amount of energy transferred or converted per unit time.
Pressure	pascal, newton per square metre	The perpendicular force per unit area acting on a material and tending to change its dimensions.
Radiant_flux	watt	The total power emitted, received or passing in the form of electromagnetic radiation; a measure of electromagnetic energy per unit time.
Radiant_intensity	watt / steradian	The radiant flux per unit solid angle emitted by a point source.
Radioactivity	becquerel	The rate of spontaneous disintegration or decay of certain natural heavy elements, accompanied by alpha-rays, beta-rays or gamma-rays.
Relative humidity	percent	The ratio of the partial pressure of water vapour in an air-water mixture to the saturated vapour pressure of water at a prescribed temperature.
Resistance	ohm	The ratio of the potential difference across an electrical component to the current passing through it. It is a measure of the opposition to the flow of electric charge. The real part of the impedance, characterised by the dissipation of energy as opposed to its storage.
Resistivity	ohm metre	A measure of how strongly a material resists the flow of electric current. The electric field required to achieve unit current density flowing through the material.
Specific_volume	cubic metres per kilogram	The volume of a substance per unit mass. The reciprocal of density.
Speed or Velocity	metre per second	The ratio of the linear distance travelled by a body to the time taken. Speed is a scalar quantity. Velocity is a vector with magnitude and direction.
Surface_density		
Surface_tension		
Temperature	kelvin etc.	A measure of whether two systems are relatively hot or cold with respect to one another; two systems brought into contact will eventually reach thermal equilibrium and reach the same temperature as thermal energy (heat) flows from the system with higher temperature to the system with lower temperature.
Time	second	A dimension that enables distinction between two otherwise identical events that occur at the same point in space. The interval between such events is the basis of time measurement.
Torque	newton metre	The product of a force and its perpendicular distance from a point about which it causes rotation or torsion.

Measurement type	SI unit	Definition
Voltage	volt	The value of an electromotive force or electrostatic potential difference, expressed in volts.
Volume	cubic metre	The amount of three-dimensional space occupied by a body, measured in cubic length units.
Volumetric_flow_rate	cubic metre per second	The volume of fluid that passes per unit of time.
Volumetric_flux	cubic metre per second per square metre	The volume of fluid that passes per unit of time per unit area perpendicular to the flow direction.

646

647 7.7 Sensor alert types

648 This section specifies standard values for EPCIS sensor alert types.

649 Each of the alert types defined is also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [to be formalised and published at https://www.gs1.org/voc/].

650 7.7.1 URI structure

651 A Linked Data code list will be defined in the GS1 Web vocabulary* for alert types. Within the code list, values will be defined for specific alert types,
652 such as Alarm Condition and Error Condition.

653 Sensor alert types SHALL be expressed using either URIs or Compact URI Expressions (CURIEs), as follows:

- 654 • `https://gs1.org/voc/X`
- 655 • `gs1:X`

656 where the *X* part is a string as specified in § 7.7.3, below.

657 For example, `https://gs1.org/voc/ALARM_CONDITION` and the CURIE `gs1:ALARM_CONDITION` are considered equivalent ways of
658 indicating that an alarm alert is expressed within `sensorReport` as the value of `type`.
659

660 Each such URI or CURIE will resolve to an online definition within the GS1 Web vocabulary.

661 7.7.2 Compliant usage

662 Each EPCIS event in a CBV-Compliant Document MAY include one or more `sensorElement` elements, which SHALL include one or more `sensorReport`
663 elements and MAY include a `sensorMetadata` element.

664 If expressing an **alert**, Each `sensorReport` element in a CBV-compliant document SHALL use the URI or CURIE form specified in § 7.6.1 to indicate the
665 type of alert that it is reporting.

666 7.7.3 Sensor alert type values and definitions

667 Sensor alert types are defined for alarms and errors that may be sensed and relevant for monitoring the condition of objects. The code list and defined
668 alert types is also included in the [GS1 Web Vocabulary](https://www.gs1.org/voc/) [to be formalised and published at https://www.gs1.org/voc/].

Alert type	Definition
Alarm_condition	Indicates the reporting of an alarm condition detected by a sensor device Expected value type: xsd:boolean or xsd:anyURI
Error_condition	Indicates the reporting of an error condition detected by a sensor device. Expected value type: xsd:boolean or xsd:anyURI

669

670 7.8 Sensor report component type

671 This section specifies standard identifier values for the `cbv:Comp` vocabulary.

672 These identifiers may be used to populate the `epcis:component` field of a `SensorReport` element in an EPCIS event.

673 7.8.1 URI structure

674 All Component type values specified in this section have one of the following two forms:

- 675 ▪ `urn:epcglobal:cbv:comp:payload`
- 676 ▪ `https://ns.gs1.org/cbv/comp-payload`

677


678 where the *payload* part is a string as specified in the next section. Every payload string defined herein contains only lower case letters and the
679 underscore character.

680 Both URI structures are considered to be semantically equivalent via an *owl:sameAs* relationship.

681 7.8.2 Compliant usage

682 Each EPCIS event in a CBV-Compatible Document MAY include one or more `SensorReport` elements. If `SensorReport` elements are present, each
683 such element MAY include a `Comp` attribute. If a given `SensorReport` element includes a `Comp` attribute, the value of the type attribute MAY be a URI
684 as specified above for a CBV-Compatible document, and MAY be any other URI that meets the general requirements specified in [EPCIS], except for
685 those URIs which in this standard are forbidden or designated for a different purpose.

686

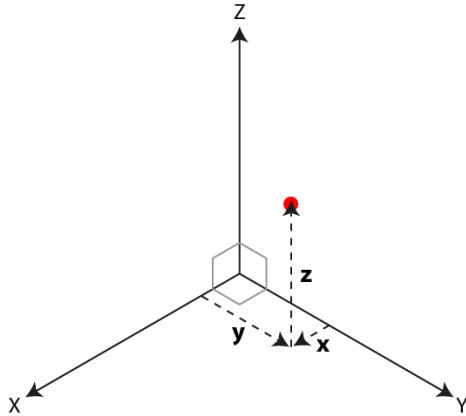
687  Examples can be found [in external xml and json artifacts](#).

7.8.3 Sensor report component types and definitions

Values for component within SensorReport	
Value	Definition
x	Component or projection along the x axis in Cartesian coordinates (X,Y,Z)
y	Component or projection along the y axis in Cartesian coordinates (X,Y,Z)
z	Component or projection along the z axis in Cartesian coordinates (X,Y,Z)
axial_distance	Radial distance from the cylindrical axis in a cylindrical polar coordinate system; the magnitude of the projection of the vector in the plane perpendicular to the cylindrical axis.
azimuth	Angle measured in the XY plane, anticlockwise from the X axis (in cylindrical or spherical polar coordinate systems) to the plane containing the vector and the Z axis.
height	Height parallel to the cylindrical axis in a cylindrical polar coordinate system, above a defined reference origin plane (typically the XY plane)
spherical_radius	Radial distance from the centre of a sphere in a spherical polar coordinate system; the magnitude of the vector
polar_angle	Angle measured from the Z axis to the vector in a spherical polar coordinate system
elevation_angle	Angle measured from the XY plane to the vector in a spherical polar coordinate system
easting	A component or projection along an east-pointing axis in a geographic Cartesian coordinate system
northing	A component or projection along a north-pointing axis in a geographic Cartesian coordinate system
latitude	The angle of elevation from the equatorial plane in a geographic coordinate system
longitude	The angle (measured within the equatorial plane) to the east of the prime meridian in a geographic coordinate system
altitude	The height above a defined surface (such as mean sea level) in a geographic coordinate system
geocoordinate	RFC5870-compliant geographic location URI expressed via the uriValue field

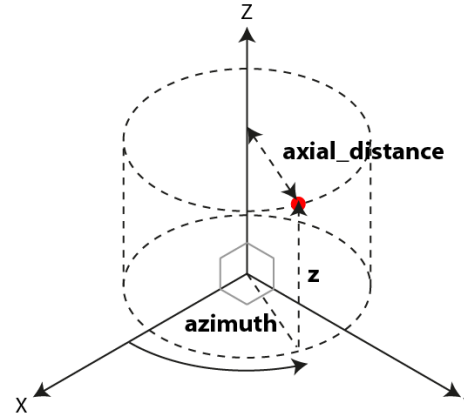
The following diagrams illustrate the relationships between these values of component in Cartesian, cylindrical polar and spherical polar coordinate systems.

Cartesian coordinates (x, y, z)



x = component parallel to X axis
y = component parallel to Y axis
z = component parallel to Z axis

Cylindrical polar coordinates (axial_distance, azimuth, z)



axial_distance = cylindrical radius from z axis
azimuth = angle in XY plane, measured anti-clockwise from the X axis
z = component parallel to Z axis

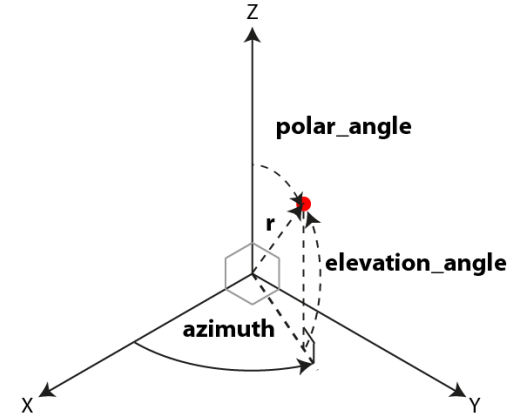
$$x = \text{axial_distance} \cdot \cos(\text{azimuth})$$

$$y = \text{axial_distance} \cdot \sin(\text{azimuth})$$

$$\text{axial_distance} = \sqrt{x \cdot x + y \cdot y}$$

$$\tan(\text{azimuth}) = y / x$$

Spherical polar coordinates (r, azimuth, polar angle) OR (r, azimuth, elevation_angle)



r = spherical radius from origin
azimuth = angle in XY plane, measured anti-clockwise from the X axis
polar_angle = angle from Z axis to radius
elevation_angle = angle from XY plane to radius

$$x = r \cdot \cos(\text{azimuth}) \cdot \sin(\text{polar_angle})$$

$$y = r \cdot \sin(\text{azimuth}) \cdot \sin(\text{polar_angle})$$

$$z = r \cdot \cos(\text{polar_angle})$$

$$z = r \cdot \sin(\text{elevation_angle})$$

$$r = \sqrt{x \cdot x + y \cdot y + z \cdot z}$$

$$\tan(\text{azimuth}) = y / x$$

$$\cos(\text{polar_angle}) = \sin(\text{elevation_angle}) = z / r$$

693

694

8 User vocabularies

This section specifies syntax templates that end users may use to define vocabulary elements for identifiers within EPCIS user vocabularies

- Instance-level objects
- Class-level objects
- Locations (for read points and business locations)
- Business transactions
- Source/Destination
- Transformations
- Events
- Chemical Substances
- Microorganisms

8.1 General considerations and syntax forms

Unlike the standard vocabularies discussed in [§ 0](#), a vocabulary element in a user vocabulary is created by an end user. For example, an end user who creates a new business location such as a new warehouse may create a business location identifier to refer to that location in EPCIS events. The specific identifier string is defined by the End User, and its meaning may be described to trading partners via master data exchange, or via some other mechanism outside of the EPCIS Query Interface.

The EPCIS standard ([§ 6.4](#)) places general constraints on the identifiers that End Users may create for use as user vocabulary elements. Specifically, an identifier must conform to URI syntax, and must either conform to syntax specified in GS1 standards or must belong to a subspace of URI identifiers that is under the control of the end user who assigns them.

The CBV provides additional constraints on the syntax of identifiers for user vocabularies, so that CBV-Compliant documents will use identifiers that have a predictable structure. This in turn makes it easier for trading partners to understand the meaning of such identifiers.

For each user vocabulary considered here, multiple syntax options are provided for user vocabulary in order to provide flexibility for end users to meet their business requirements. Further details about each of these forms are specified in the subsections below.

720 8.1.1 EPC URI

721 An Electronic Product Code “pure identity” URI may be used as a user vocabulary element. EPCs have a structure and meaning that is widely
722 understood. EPCs may also be encoded into data carriers such as RFID tags and barcodes according to GS1 standards.

723 Where an EPC URI is used as a User Vocabulary Element, both CBV-Compliant and CBV-Compatible documents SHALL use an EPC Pure Identity URI,
724 except as noted below. An EPC Pure Identity URI is a URI as specified in [TDS], [§ 6](#) (specifically, a URI matching the grammar production EPC-URI in
725 [TDS, [§ 6.3](#)]). EPC “pure identity” URIs begin with `urn:epc:id:...`.

726 Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS]. In particular, documents
727 SHALL NOT use EPC Tag URIs (`urn:epc:tag:...`), EPC Pure Identity Pattern URIs (`urn:epc:idpat:...`), or EPC Pattern URIs (`urn:epc:pat:...`),
728 except that both CBV-Compliant and CBV-Compatible documents MAY use EPC Pattern URIs for class-level identification of objects as specified in
729 [§ 8.3.1](#). Both CBV-Compliant and CBV-Compatible documents MAY use EPC Raw URIs (`urn:epc:raw:...`) as defined in [TDS], [§ 12](#), provided that the
730 raw value cannot be decoded as an EPC. Both CBV-Compliant and CBV-Compatible documents SHALL NOT use an EPC Raw URI representing EPC
731 memory bank contents that could be successfully decoded into an EPC Pure Identity URI according to [TDS].

733 8.1.2 GS1 Digital Link URI

734 A GS1 Digital Link URI may be used as a user vocabulary element. GS1 Digital Links URIs in EPCIS events **SHALL** have the form normatively specified
735 in the [GS1 Digital Link standard](#) [GS1DL1.1] and **SHALL** be restricted to a **highly constrained set of GS1 Digital Link URIs** corresponding to each
736 of the EPC Pure Identity URI schemes defined in TDS. The **canonical form** of the GS1 Digital Link URI (i.e., based on the domain name `id.gs1.org`) is
737 **recommended but not required**.

739 8.1.3 Private or Industry-wide URN

740 A Uniform Resource Name (URN) of the form `urn:URNNamespace:...` may be used as a user vocabulary element. Doing so requires that the user who
741 creates the vocabulary element be authorised to use the URN namespace that appears following the `urn:` prefix. For example, the End User may
742 register its own URN namespace with the Internet Assigned Numbers Authority (IANA). Alternatively, an industry consortium or other trading group
743 could register a URN namespace, and define a syntax template beginning with this namespace for use by its members in creating vocabulary elements.
744 Because of the difficulty of registering a URN namespace, this method is typically used by trading groups, not individual end users.

746 Where specified in [§ 8.2](#) through [§ 0](#), a CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified
747 below.

748 A Private or Industry-wide URN SHALL have the following form:

749 `urn:URNNamespace:**:qual:Remainder`

750 where the components of this template are as follows:

Template Component	Description
urn:	The characters u, r, n, and : (colon).
<i>URNNamespace</i>	A URN Namespace registered with the Internet Assigned Numbers Authority according to [RFC2141].
:**:	Denotes either a single colon character or any string that conforms to the requirements of [RFC2141] and any syntax rules defined for the registered URN namespace, and which begins and ends with a colon character. In other words, any number of additional subfields may be included between the URN Namespace and the <i>qual</i> component, in order to provide flexibility for URN Namespace owners to administer their namespace.
<i>qual</i> :	An optional qualifier as specified in § 8.2 through § 0, depending on the type of identifier. This component may be omitted.
<i>Remainder</i>	The remainder of the identifier as specified in § 8.2 through § 0.

751

752 In addition, an identifier of this form SHALL be 128 characters or fewer, and SHOULD be 60 characters or fewer.

753 Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign
754 new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.

755

756 8.1.4 HTTP or HTTPS URL

757 A Uniform Resource Locator (URL) of the form `http://Domain/...` or `https://Domain/...` may be used as a user vocabulary element. Doing so requires
758 that the user who creates the vocabulary element be authorised to use the Internet domain name that appears following the `http:` prefix. Often a
759 subdomain of the End User's organisation domain is used; for example, the Example Corporation may choose to use `epcis.example.com` as a domain
760 name for constructing user vocabulary identifiers. Because registering an Internet domain name is relatively easy, this method is quite appropriate for
761 use by individual end users as well as by industry groups.

762 Note that HTTP and HTTPS URLs used as EPCIS user vocabulary elements do not necessarily refer to a web page. They are just identifiers (names)
763 that happen to use the HTTP or HTTPS URI scheme for the sake of convenience.

764 Use of HTTPS is more secure and is therefore recommended as best practice for security reasons. HTTPS URLs should be used in place of HTTP
765 URLs, unless there is a strong reason to do otherwise; EPCIS/CBV 1.x implementations currently using HTTP may continue to do so, but should
766 migrate to HTTPS URLs as soon as is practical for their operations.
767

768 Where specified in § 8.2 through § 0, a CBV-Compliant document or CBV-Compatible document MAY use an HTTP URL.

769 An HTTP URL SHALL have the following form:

770 `http://[Subdomain.]Domain/**/qual/Remainder`
771 or
772 `https://[Subdomain.]Domain/**/qual/Remainder`
773 where the components of this template are as follows:

Template Component	Description
<code>http://</code>	The seven characters <code>h</code> , <code>t</code> , <code>t</code> , <code>p</code> , appended by the character <code>s</code> if a HTTPS URL is used in place of a HTTP URL, <code>:</code> (colon), <code>/</code> (slash), and <code>/</code> (slash)
<code>[Subdomain.]Domain</code>	<p>An Internet Domain name that has been registered with an Internet Domain Name Registrar, optionally preceded by one or more subdomain names.</p> <p>For example, if <code>example.com</code> is a registred Internet Domain Name, then the following are acceptable values for this component:</p> <p><code>example.com</code> <code>epcis.example.com</code> <code>a.rather.verbose.example.com</code></p> <p>Unless there is a reason to do otherwise, <code>epcis.example.com</code> is recommended for most End Users (where the End User substitutes its own company or organisational Domain Name for <code>example.com</code>).</p> <p>Explanation (non-normative): Use of a subdomain dedicated to EPCIS, such as <code>epcis.example.com</code>, helps to avoid the possibility of conflict with other uses of the company or organisational domain name, such as URLs of web pages on the company web site. While HTTP URLs used as identifiers in EPCIS events are not usually intended to be dereferenced via a web browser, it is usually helpful to emphasise this fact by making the URL distinct from the URLs used by the company web site.</p>
<code>/**/</code>	Denotes either a single slash character, or any string that matches the grammar rule <code>path-absolute</code> defined in [RFC3986], § 3.3. In other words, any number of additional path components may be included between the authority component and the <code>obj</code> component, in order to provide flexibility for domain owners to administer their namespace.
<code>qual/</code>	An optional qualifier as specified in § 8.2 through § 0. depending on the type of identifier. This component may be omitted.
<code>Remainder</code>	The remainder of the identifier as specified in § 8.2 through § 0.

774
775 In addition, an identifier of this form SHALL be 128 characters or fewer, and SHOULD be 60 characters or fewer.
776 Identifiers of this form must be assigned by the owner of the Internet domain *Domain*. The owner of the domain may delegate the authority to assign
777 new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.
778 Further details about each of these three forms are specified below.



Non-Normative: Explanation: The reason that several different syntax templates are provided for each user vocabulary is to provide flexibility for end users to meet their business requirements. Use of an EPC is preferred for most end user vocabularies; however, EPC codes are somewhat constrained in syntax (e.g., limitations on character set and number of characters allowed), and may not easily accommodate the construction of identifiers based on codes already in use within legacy business systems. The other forms provide an alternative.

8.1.5 General Considerations for EPC URIs as User Vocabulary Elements

Where an EPC URI is used as a User Vocabulary Element, both CBV-Compliant and CBV-Compatible documents SHALL use an EPC Pure Identity URI, except as noted below. An EPC Pure Identity URI is a URI as specified in [TDS1.9], [§ 6](#) (specifically, a URI matching the grammar production EPC-URI in [TDS1.9], [§ 6.3](#)). EPC “pure identity” URIs begin with `urn:epc:id:...`.

Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS1.9]. In particular, documents SHALL NOT use EPC Tag URIs (`urn:epc:tag:...`), EPC Pure Identity Pattern URIs (`urn:epc:idpat:...`), or EPC Pattern URIs (`urn:epc:pat:...`), except that both CBV-Compliant and CBV-Compatible documents MAY use EPC Pattern URIs for class-level identification of objects as specified in [§ 8.3.1](#). Both CBV-Compliant and CBV-Compatible documents MAY use EPC Raw URIs (`urn:epc:raw:...`) as defined in [TDS1.9], [§ 12](#), provided that the raw value cannot be decoded as an EPC. Both CBV-Compliant and CBV-Compatible documents SHALL NOT use an EPC Raw URI representing EPC memory bank contents that could be successfully decoded into an EPC Pure Identity URI according to [TDS1.9].



Non-Normative: Explanation: [EPCIS1.2] specifies that “When the unique identity [for an instance-level identifier in the “what” dimension] is an Electronic Product Code, the [identifier] SHALL be the “pure identity” URI for the EPC as specified in [TDS1.9], [§ 6](#). Implementations MAY accept URI-formatted identifiers other than EPCs.” The above language clarifies this requirement, and provides more specific references to [TDS1.9]. The above language also extends these restrictions to the use of EPC URIs in other dimensions of EPCIS events beyond the “what” dimension.

8.1.6 General Considerations for Private or Industry-wide URN as User Vocabulary elements

Where specified in [§ 8.2](#) through [0](#), a CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified below.

A Private or Industry-wide URN SHALL have the following form:

`urn:URNNamespace:**:qual:Remainder`

where the components of this template are as follows:

Template Component	Description
<code>urn:</code>	The characters <code>u</code> , <code>r</code> , <code>n</code> , and <code>:</code> (colon).
<code>URNNamespace</code>	A URN Namespace registered with the Internet Assigned Numbers Authority according to [RFC2141].

Template Component	Description
:**:	Denotes either a single colon character or any string that conforms to the requirements of [RFC2141] and any syntax rules defined for the registered URN namespace, and which begins and ends with a colon character. In other words, any number of additional subfields may be included between the URN Namespace and the <i>qual</i> component, in order to provide flexibility for URN Namespace owners to administer their namespace.
<i>qual</i> :	An optional qualifier as specified in Sections 8.2 through 0 , depending on the type of identifier. This component may be omitted.
<i>Remainder</i>	The remainder of the identifier as specified in Sections 8.2 through 0 .

803

804 In addition, an identifier of this form SHALL be 128 characters or fewer, and SHOULD be 60 characters or fewer.

805 Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign
806 new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.

807 8.1.7 General Considerations for HTTP URLs as User Vocabulary elements

808 Where specified in [Sections 8.2](#) through [0](#), a CBV-Compliant document or CBV-Compatible document MAY use an HTTP URL.

809 An HTTP URL SHALL have the following form:

810 `http://[Subdomain.]Domain/**/qual/Remainder`

811 where the components of this template are as follows:

Template Component	Description
<code>http://</code>	The seven characters <i>h</i> , <i>t</i> , <i>t</i> , <i>p</i> , <i>:</i> (colon), <i>/</i> (slash), and <i>/</i> (slash).
<code>[Subdomain.]Domain</code>	<p>An Internet Domain name that has been registered with an Internet Domain Name Registrar, optionally preceded by one or more subdomain names.</p> <p>For example, if <code>example.com</code> is a registered Internet Domain Name, then the following are acceptable values for this component:</p> <pre>example.com epcis.example.com a.rather.verbose.example.com</pre> <p>Unless there is a reason to do otherwise, <code>epcis.example.com</code> is recommended for most End Users (where the End User substitutes its own company or organisational Domain Name for <code>example.com</code>).</p> <p>Explanation (non-normative): Use of a subdomain dedicated to EPCIS, such as <code>epcis.example.com</code>, helps to avoid the possibility of conflict with other uses of the company or organisational domain name, such as URLs of web pages on the company web site. While HTTP URLs used as identifiers in EPCIS events are not usually intended to be dereferenced via a web browser, it is usually helpful to emphasise this fact by making the URL distinct from the URLs used by the company web site.</p>

Template Component	Description
<i>/**/</i>	Denotes either a single slash character, or any string that matches the grammar rule <code>path-absolute</code> defined in [RFC3986], Section 3.3 . In other words, any number of additional path components may be included between the authority component and the <code>obj</code> component, in order to provide flexibility for domain owners to administer their namespace.
<i>qual/</i>	An optional qualifier as specified in Sections 8.2 through 0 , depending on the type of identifier. This component may be omitted.
<i>Remainder</i>	The remainder of the identifier as specified in Sections 8.2 through 0 .

812

813 In addition, an identifier of this form SHALL be 128 characters or fewer, and SHOULD be 60 characters or fewer.

814 Identifiers of this form must be assigned by the owner of the Internet domain *Domain*. The owner of the domain may delegate the authority to assign
815 new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.

816 8.2 Physical or digital objects (Instance-Level Identification)

817 Instance-level identifiers for physical or digital objects populate the “what” dimension of EPCIS events. This includes the `epcList`, `parentID`,
818 `childEPCs`, `inputEPCList` and `outputEPCList` fields in EPCIS `ObjectEvents`, `AggregationEvents`, `TransactionEvents`, `TransformationEvents` and
819 `AssociationEvents`. See [§ 1](#) of [EPCIS] for a further definition of “object” in this sense, also reproduced below.

820 A CBV-Compliant document SHALL use one of the URI forms specified in this section to populate the above fields of EPCIS events, for every such field
821 that is not null. A CBV-Compatible document MAY use one of the URI forms specified in this section, or MAY use any other URI that meets the general
822 requirements specified in [EPCIS2.0], [§ 6.4](#), except for those URIs which in this standard are forbidden or designated for a different purpose.

823 Both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form as specified in [§ 8.2.1](#) or the [GS1 Digital Link URI](#) for specified in
824 [§ GS1 Digital Link URIs](#) for Instance-level identification of objects unless there is a strong reason to do otherwise.

i Non-Normative: Explanation, quoted from [EPCIS2.0]: “Objects” in the context of EPCIS typically refers to physical objects that are identified either at a class or instance level and which are handled in physical handling steps of an overall business process involving one or more organisations. Examples of such physical objects include trade items (products), logistic units, returnable assets, fixed assets, physical documents, etc. “Objects” may also refer to digital objects, also identified at either a class or instance level, which participate in comparable business process steps. Examples of such digital objects include digital trade items (music downloads, electronic books, etc.), digital documents (electronic coupons, etc.), and so forth. Throughout this document the word “object” is used to denote a physical or digital object, identified at a class or instance level, that is the subject of a business process step. [§ 8.2](#) of this CBV standard defines identifier structures for instance-level identification of Objects; [§ 0](#) defines identifier structures for class-level identification of Objects.

8.2.1 EPC URI for Instance-level identification of objects

A CBV-Compliant document or CBV-Compatible document MAY use an EPC Pure Identity URI as specified in § 8.1.5 to populate the `epcList`, `parentID`, and `childEPCs` fields in EPCIS `ObjectEvents`, `AggregationEvents`, `TransactionEvents` and `AssociationEvents`. Both CBV-Compliant and CBV-Compatible documents SHOULD use either this form or the GS1 Digital Link URI form (§ 8.2.2) unless there is a strong reason to do otherwise.

Both CBV-Compliant and CBV-Compatible documents SHALL NOT use an SGLN EPC (`urn:epc:id:sgln:...`) or PGLN EPC (`urn:epc:id:pgln:...`) as an Object identifier.

Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS]; see § 8.1.5 for details.

8.2.2 GS1 Digital Link URIs for Instance-level identification of objects

A CBV-Compliant document or CBV-Compatible document MAY use a GS1 Digital Link URI to populate the `epcList`, `parentID`, and `childEPCs` fields in EPCIS `ObjectEvents`, `AggregationEvents`, `TransactionEvents` and `AssociationEvents`. Both CBV-Compliant and CBV-Compatible documents SHOULD use either this form or the EPC URI form (§ 8.2.1) unless there is a strong reason to do otherwise.

A GS1 Digital Link URI suitable for populating the `epcList`, `parentID`, and `childEPCs` fields of EPCIS events SHALL have the form normatively specified in the [GS1 Digital Link standard](#) [GS1DL1.1] and SHALL be restricted to a **highly constrained set of GS1 Digital Link URIs** corresponding to each of the EPC Pure Identity URI schemes defined in TDS, summarised as follows:

EPC Scheme supported by GS1 Digital Link URI	Corresponding GS1 Application Identifier(s)	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>	GS1 Digital Link URI example prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
SGTIN	(01) + (21)	<code>/ (01) / {gtin} / (21) / {ser}</code>	<code>/01/09524321123459/21/10X8GGUP08</code>
ITIP	(8006) + (21)	<code>8006 / {itip} / 21 / {ser}</code>	<code>/8006/095243211234590102/21/mw133</code>
SSCC	(00)	<code>/00 / {sscc}</code>	<code>/00/395243212345678909</code>
GRAI	(8003)	<code>/8003 / {grai}</code>	<code>/8003/95243218900091234AX01</code>
GIAI	(8004)	<code>/8004 / {giai}</code>	<code>/8004/9524321481cd14225</code>

GSRN	(8018)	/8018/{gsrn}	/8018/952432153123456784
GSRNP	(8017)	/8017/{gsrnp}	/8017/952432160000000039
GDTI	(253)	/253/{gdti}	/253/95243214000170003555480001000
CPI	(8010) + (8011)	/8010/{cpi}/8011/{cpiserial}	/8010/95243215PQ7%2FZ43/8011/12345
SGCN	(255)	/255/{gcn}	/255/952432167890404711
GINC	(401)	/401/{ginc}	/401/9524321xyz47%2F11
GSIN	(402)	/402/{gsin}	/402/95243211234567897
ITIP	(8006) + (21)	/8006/{itip}/21/{ser}	/8006/095243211234590102/21/mw133
UPUI	(01) + (235)	/01/{gtin}/235/{tpx}	/01/09524321543219/235/5vs%2A%29%3Ek85Jp3%2Aj7

The **canonical form** of the GS1 Digital Link URI (i.e., based on the domain name `id.gs1.org`) is **recommended but not required**.



Non-Normative: Example (non-normative):

The following GS1 Element String:

(01) 09524141123455 (21) 4711

would be encoded as a **canonical** GS1 Digital Link URI as follows:

`https://id.gs1.org/01/09524141123455/21/4711`

or as a **non-canonical** GS1 Digital Link URI as follows:

`https://example.com/some/path/info/01/09524141123455/21/4711`

The following GS1 Element Strings:

(01) 09524141123455 (17) 201231 (21) 4711

(01) 09524141123455 (10) S018456 (21) 4711

864

865

866

867

MAY NOT be encoded in this combination as a GS1 Digital Link URI for populating the `epcList`, `parentID`, and `childEPCs` fields of EPCIS events, because neither of these combinations correspond to one of the EPC Pure Identity URI schemes. Instead, each of these two element strings would be encoded as the identical canonical GS1 Digital Link URI equivalent of the SGTIN EPC, as follows:

868

`https://id.gs1.org/01/09524141123455/21/4711`

869

870 8.2.3 Private or Industry-wide URN for Instance-level identification of objects

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872

873

874

A CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified below to populate the `epcList`, `parentID`, and `childEPCs` fields in EPCIS `ObjectEvents`, `AggregationEvents`, and `TransactionEvents`. However, both CBV-Compliant and CBV-Compatible documents SHOULD use either the EPC URI form ([§ 8.2.1](#)) or the GS1 Digital Link URI form ([§ 8.2.2](#)) unless there is a strong reason to do otherwise. See [§ 8.1](#) for general considerations regarding the use of Private or Industry-wide URI identifiers.

875

A Private or Industry-wide URI suitable for populating the `epcList`, `parentID`, and `childEPCs` fields of EPCIS events SHALL have the following form:

876

`urn:URNNamespace:**:obj:Objid`

877

where the components of this template are as follows:

Template Component	Description
<code>urn:URNNamespace:**:</code>	As specified in § 8.1.6 .
<code>obj:</code>	The characters <code>o</code> , <code>b</code> , <code>j</code> , and <code>:</code> (colon).
<code>Objid</code>	An identifier for the object that complies with the requirements of [RFC2141] and any syntax rules defined for the registered URN namespace <code>URNNamespace</code> , and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

878

879

880

881

Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.

8.2.4 HTTP or HTTPS URLs for Instance-level identification of objects

A CBV-Compliant document or CBV-Compatible document MAY use an **HTTP or HTTPS** URL as specified below to populate the `epcList`, `parentID`, and `childEPCs` fields in EPCIS `ObjectEvents`, `AggregationEvents`, and `TransactionEvents`. However, both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form (§ 8.2.1) or the GS1 Digital Link URI form (§ 8.2.2) unless there is a strong reason to do otherwise. See § 8.1 for general considerations regarding the use of HTTP URL identifiers.

An HTTP or HTTPS URL suitable for populating the `epcList`, `parentID`, and `childEPCs` fields of EPCIS events SHALL have the following form:

`http://[Subdomain.]Domain/**/obj/Objid`

where the components of this template are as follows:

Template Component	Description
<code>http://[Subdomain.]Domain/**/</code>	As specified in § 8.1.7.
<code>obj/</code>	The characters <code>o</code> , <code>b</code> , <code>j</code> , and <code>/</code> (slash).
<code>Objid</code>	An identifier for the object that matches the grammar rule <code>segment-nz</code> defined in [RFC3986], and which is unique relative to all other identifiers that begin with the same prefix. Note that <code>Objid</code> may not contain a slash character; only one URI path component SHALL follow the <code>/obj/</code> in a CBV-compliant http-based identifier.

Identifiers of this form must be assigned by the owner of the Internet domain `Domain`. The owner of the domain may delegate the authority to assign new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.



Non-Normative: Examples of correct and incorrect usage:

Correct:

`<epc>http://epcis.example.com/user/vocab/obj/12345.67890</epc>`

Incorrect:

`<epc>http://epcis.example.com/user/vocab/obj/id/12345.67890</epc>`

WRONG

Additional examples can be found in [external xml and json artifacts](#).

8.3 Physical or digital objects (Class-level identification)

Class-level identifiers for physical or digital objects populate the “what” dimension of EPCIS events. This includes the `epcClass`, `quantityList`, `childQuantityList`, `inputQuantityList` and `outputQuantityList` fields within the `quantityElement` structures of EPCIS `ObjectEventsS`, `AggregationEventsS`, `TransactionEventsS`, `TransformationEventsS` and `AssociationEventsS`. See § 1 of [EPCIS] for a further definition of “object” in this sense, also reproduced below.

A CBV-Compliant document SHALL use one of the three URI forms specified in this section to populate the above fields of EPCIS events, for every such field that is not null. A CBV-Compatible document MAY use one of the three URI forms specified in this section, or MAY use any other URI that meets the general requirements specified in [EPCIS1.2], § 6.4, except for those URIs which in this standard are forbidden or designated for a different purpose.

Both CBV-Compliant and CBV-Compatible documents SHOULD use either the EPC URI form, as specified in § 8.3.1, or the GS1 Digital Link URI form, as specified in § 0, unless there is a strong reason to do otherwise.

i Non-Normative: Explanation (non-normative), quoted from [EPCIS2.0]: “Objects” in the context of EPCIS typically refers to physical objects that are identified either at a class or instance level and which are handled in physical handling steps of an overall business process involving one or more organisations. Examples of such physical objects include trade items (products), logistic units, returnable assets, fixed assets, physical documents, etc. “Objects” may also refer to digital objects, also identified at either a class or instance level, which participate in comparable business process steps. Examples of such digital objects include digital trade items (music downloads, electronic books, etc.), digital documents (electronic coupons, etc.), and so forth. Throughout this document the word “object” is used to denote a physical or digital object, identified at a class or instance level, that is the subject of a business process step. § 8.2 of this CBV standard defines identifier structures for instance-level identification of Objects; § 0 defines identifier structures for class-level identification of Objects.

8.3.1 EPC URI for Class-level identification of objects

A CBV-Compliant document or CBV-Compatible document MAY use one of the following URI forms specified in the EPC Tag Data Standard [TDS] to populate the `epcClass` field within the EPCIS `QuantityEvent` (deprecated in EPCIS 1.1) and within the `quantityElement` structures of EPCIS `ObjectEventsS`, `AggregationEventsS`, `TransactionEventsS`, and `TransformationEventsS`:

Identifier Type	URI Form	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
GTIN	<code>urn:epc:idpat:sgtin:CCC.III.*</code>	<code>/ (01) / {gtin}</code>
GTIN+batch/lot	<code>urn:epc:class:lgtn:CCC.III.LLL</code>	<code>/ (01) / {gtin} / (10) / {lot}</code>

Identifier Type	URI Form	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
GRAI (no serial)	<code>urn:epc:idpat:grai:CCC.TTT.*</code>	<code>/8003/{grai}</code>
GDTI (no serial)	<code>urn:epc:idpat:gdti:CCC.TTT.*</code>	<code>/253/{gdti}</code>
GCN (no serial)	<code>urn:epc:idpat:sgcn:CCC.TTT.*</code>	<code>/255/{gcn}</code>
CPI (no serial)	<code>urn:epc:idpat:cpi:CCC.TTT.*</code>	<code>/8010/{cpi}</code>
ITIP (no serial)	<code>urn:epc:idpat:itip:CCC.III.PPP.SSS</code>	<code>/8006/{itip}</code>

where:

- *CCC* is the GS1 Company Prefix portion of an EPC Pure Identity Pattern URI
- *III* is the Indicator + Item Reference portion of an SGTIN EPC Pure Identity Pattern URI, the Indicator + Item Reference portion of an LGTIN EPC Class URI or an ITIP EPC Pure Identity Pattern URI
- *TTT* is the Returnable Asset Type, Document Type, Coupon Reference, or Component/Part Type portion of an EPC Pure Identity Pattern for GRAI, GDTI, SGCN, or CPI, respectively.
- PPP is the Piece portion of an ITIP EPC Pure Identity Pattern URI
- SSS is the Total portion of an ITIP EPC Pure Identity Pattern URI

A CBV-Compliant document or CBV-Compatible document SHALL NOT use any other Pure Identity Pattern URI form specified in [TDS, § 8]. This includes, for example, an SSCC Pure Identity Pattern URI, or an SGTIN Pure Identity Pattern URI with two "*" wildcards.

Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS]; see § 8.1.5 for details.

8.3.1.1 Explanation (non-normative)

TDS defines EPC Pure Identity Pattern URIs as a way to specify a pattern that matches many instance-level EPCs. For example, the EPC Pure Identity Pattern URI `urn:epc:idpat:sgtin:9524141.112345.*` matches any SGTIN URI that begins with `urn:epc:idpat:sgtin:9524141.112345`, for example the specific SGTIN URI `urn:epc:idpat:sgtin:9524141.112345.400`. In the EPCIS Simple Event Query, such a pattern may be used to match EPCIS events whose "what" dimension contains instance-level identifiers that have a specified GTIN and any serial number.



941 The table above specifies the use of EPC Pure Identity Pattern URIs to achieve a second purpose, namely as class-level identifiers for use in the
942 Quantity Element fields of EPCIS events. In this usage, the URI `urn:epc:idpat:sgtin:9524141.112345.*` refers to the object class identified by
943 GTIN 10614141123459.

944 Not all EPC Pure Identity Pattern URIs make sense as class-level identifiers. For example, when `urn:epc:idpat:sgtin:9524141.*.*` is used in an
945 EPCIS query to match instance-level identifiers, it matches all SGTIN identifiers that include GS1 Company Prefix 9524141. This is valid as a matching
946 condition for a query, but there is no corresponding object class and so this is not a valid class-level identifier. A similar argument applies to a URI such
947 as `urn:epc:idpat:sscc:9524141.*`, and the other EPC Pattern URIs not included in the table above.

948

8.3.2 GS1 Digital Link URIs for Class-level identification of objects

A GS1 Digital Link URI suitable for populating the `epcClass` fields of EPCIS events SHALL have the form normatively specified in the [GS1 Digital Link standard](#) [GS1DL1.1] and SHALL be restricted to a **highly constrained set of GS1 Digital Link URIs** corresponding to each of the EPC Pure Identity URI schemes defined in TDS, summarised as follows:

EPC Scheme supported by GS1 Digital Link URI	Corresponding GS1 Application Identifier(s)	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>	GS1 Digital Link URI example prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
SGTIN pattern	(01)	<code>/ (01) / {gtin}</code>	<code>/01/09524321123459</code>
LGTIN	(01) + (10)	<code>/ (01) / {gtin} / (10) / {lot}</code>	<code>/01/09524321123459/10/94519E</code>
GRAI no serial	(8003)	<code>/8003/{grai}</code>	<code>/8003/9524321890009</code>
GDTI no serial	(253)	<code>/253/{gdti}</code>	<code>/253/9524321400017</code>
GCN	(255)	<code>/255/{gcn}</code>	<code>/255/9524321678904</code>
CPI no serial	(8010)	<code>8010</code>	<code>/8010/95243215PQ7%2FZ43/</code>
ITIP no serial	(8006)	<code>/8006/{itip}</code>	<code>/8006/095243211234590102</code>

The **canonical form** of the GS1 Digital Link URI (i.e., based on the domain name `id.gs1.org`) is **recommended but not required**.

8.3.3 Private or Industry-wide URN for Class-level identification of objects

A CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified below to populate the `epcClass` field within the EPCIS `QuantityEvent` (deprecated in EPCIS 1.1) and within the `quantityElement` structures of EPCIS `ObjectEvents`, `AggregationEvents`, `TransactionEvents`, and `TransformationEvents`. However, both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form ([§ 8.3.1](#)) unless there is a strong reason to do otherwise. See [§ 8.1](#) for general considerations regarding the use of Private or Industry-wide URI identifiers.

A Private or Industry-wide URI suitable for populating the `epcClass` field of EPCIS events SHALL have the following form:

`urn:URNNamespace:**:class:ObjClassid`

where the components of this template are as follows:

Template Component	Description
<code>urn:URNNamespace:**:</code>	As specified in § 8.1.6 .
<code>class:</code>	The characters <code>c</code> , <code>l</code> , <code>a</code> , <code>s</code> , <code>s</code> , and <code>:</code> (colon).
<code>ObjClassid</code>	An identifier for the object class that complies with the requirements of [RFC2141] and any syntax rules defined for the registered URN namespace <code>URNNamespace</code> , and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.



Examples can be found in [external xml and json artifacts](#).

8.3.4 HTTP or HTTPS URLs for Class-level identification of objects

A CBV-Compliant document or CBV-Compatible document MAY use an **HTTP or HTTPS** URL as specified below to populate the `epcClass` field within the `EPCIS QuantityEvent` (deprecated in EPCIS 1.1) and within the `quantityElement` structures of `EPCIS ObjectEvents`, `AggregationEvents`, `TransactionEvents`, and `TransformationEvents`. However, both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form ([§ 8.3.1](#)) or GS1 Digital Link URI form (§ 0) unless there is a strong reason to do otherwise. See [§ 8.1](#) for general considerations regarding the use of HTTP URL identifiers.

An HTTP URL suitable for populating the `epcClass` fields of EPCIS events SHALL have one of the following two forms:

A HTTP URL (i.e., all URLs other than GS1 Digital Link URIs defined in § 0) suitable for populating the `epcClass` fields of EPCIS events SHALL have the following form:

`http://[Subdomain.]Domain/**/class/ObjClassid`

where the components of this template are as follows:

Template Component	Description
<code>http://[Subdomain.]Domain/**/</code>	As specified in § 8.1.7 .
<code>class/</code>	The characters <code>c</code> , <code>l</code> , <code>a</code> , <code>s</code> , <code>s</code> , and <code>/</code> (slash).
<code>ObjClassid</code>	An identifier for the object class that matches the grammar rule <code>segment-nz</code> defined in [RFC3986], and which is unique relative to all other identifiers that begin with the same prefix. Note that <code>ObjClassid</code> may not contain a slash character; only one URI path component SHALL follow the <code>/class/</code> in a CBV-compliant http-based identifier.

Identifiers of this form must be assigned by the owner of the Internet domain *Domain*. The owner of the domain may delegate the authority to assign new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.



Non-Normative: Examples of correct and incorrect usage:

Correct:

`<epc>http://epcis.example.com/user/vocab/class/12345.67890</epc>`

Incorrect:

`<epc>http://epcis.example.com/user/vocab/class/id/12345.67890</epc>`

WRONG

Additional examples can be found in [external xml and json artifacts](#).

992 **8.4 Locations**

993 Identifiers for locations populate the “where” dimension of EPCIS events. This includes the `readPoint` and `bizLocation` fields in all EPCIS event
994 types.

995 A CBV-Compliant document SHALL use one of the four URI forms specified in this section to populate the above fields of EPCIS events, for every such
996 field that is not null. A CBV-Compatible document MAY use one of the four URI forms specified in this section, or MAY any other URI that meets the
997 general requirements specified in [EPCIS], [§ 6.4](#), except for those URIs which in this standard are forbidden or designated for a different purpose.

998 Both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form as specified in [§ 8.4.1](#) unless there is a strong reason to do
999 otherwise.

1000 **8.4.1 EPC URI for Location identification**

1001 A CBV-Compliant document or CBV-Compatible document MAY use an EPC Pure Identity URI as specified in [§ 8.1.5](#) to populate the `readPoint` and
1002 `bizLocation` fields in all EPCIS event types. Both CBV-Compliant and CBV-Compatible documents SHOULD use either this form or the GS1 Digital
1003 Link URI form specified in § 0 unless there is a strong reason to do otherwise.

1004 Both CBV-Compliant and CBV-Compatible documents SHOULD NOT use EPC schemes other than SGLN EPCs (`urn:epc:id:sgln:...`) for location
1005 identifiers, unless there is a strong reason to do so.

1006 Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS]; see [§ 8.1.5](#) for details.

1007



1008 8.4.2 GS1 Digital Link URIs for Location identification

1009 A GS1 Digital Link URI suitable for populating the `readPoint` and `businessLocation` fields of EPCIS events SHALL have the form normatively
1010 specified in the [GS1 Digital Link standard](#) [GS1DL] and SHALL be restricted to a **highly constrained set of GS1 Digital Link URIs** corresponding to
1011 each of the EPC Pure Identity URI schemes defined in TDS, summarised as follows:

1012

EPC Scheme supported by GS1 Digital Link URI	Corresponding GS1 Application Identifier(s)	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>	GS1 Digital Link URI example prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
SGLN	(414) + (254)	/414/{gln}/254/{glnx}	/414/9524321123459/254/5678

1013

1014 The **canonical form** of the GS1 Digital Link URI (i.e., based on the domain name `id.gs1.org`) is **recommended but not required**.

1015

1016 8.4.3 Private or Industry-wide URN for Location identification

1017 A CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified below to populate the `readPoint` and
1018 `bizLocation` fields in all EPCIS event types. However, both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form ([§ 8.4.1](#))
1019 unless there is a strong reason to do otherwise. See [§ 8.1](#) for general considerations regarding the use of Private or Industry-wide URI identifiers.

1020 A Private or Industry-wide URI suitable for populating the `readPoint` and `bizLocation` fields in all EPCIS event types SHALL have the following
1021 form:


1022 `urn:URNNamespace:**:loc:Locid`

1023 where the components of this template are as follows:

Template Component	Description
<code>urn:URNNamespace:**:</code>	As specified in § 8.1.6 .
<code>loc:</code>	The characters <code>l</code> , <code>o</code> , <code>c</code> , and <code>:</code> (colon).

Template Component	Description
<i>Locid</i>	An identifier for the location that complies with the requirements of [RFC2141] and any syntax rules defined for the registered URN namespace <i>URNNamespace</i> , and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

1024 Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign
1025 new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.

1026  Examples can be found in external xml and json artifacts.

1027

1028 8.4.4 HTTP or HTTPS URLs for Location identification

1029 A CBV-Compliant document or CBV-Compatible document MAY use an **HTTP or HTTPS** URL as specified below to populate the `readPoint` and
1030 `bizLocation` fields in all EPCIS event types. However, both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form (§ 8.4.1)
1031 or GS1 Digital Link URI form (§ 0) unless there is a strong reason to do otherwise. See § 8.1 for general considerations regarding the use of HTTP URL
1032 identifiers.


1033 An HTTP URL suitable for populating the `readPoint` and `bizLocation` fields in all EPCIS event types SHALL have the following form:

1034 `http://[Subdomain.]Domain/**/loc/Locid`

1035 where the components of this template are as follows:

Template Component	Description
<code>http://[Subdomain.]Domain/**/</code>	As specified in § 8.1.7.
<code>loc/</code>	The characters l, o, c, and / (slash).
<i>Locid</i>	An identifier for the location that matches the grammar rule <code>segment-nz</code> defined in [RFC3986], , and which is unique relative to all other identifiers that begin with the same prefix. Note that Locid may not contain a slash character; only one URI path component SHALL follow the /loc/ in a CBV-compliant http-based identifier.

1036 Identifiers of this form must be assigned by the owner of the Internet domain *Domain*. The owner of the domain may delegate the authority to assign
1037 new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.

1038  **Non-Normative:** Examples of correct and incorrect usage:

1039 Correct:
1040 `<epc>http://epcis.example.com/user/vocab/loc/12345.67890</epc>`
1041

1042 Incorrect:
1043 `<epc>http://epcis.example.com/user/vocab/loc/id/12345.67890</epc>`
1044

WRONG

1045 Additional examples can be found in [external xml and json artifacts](#).
1046
1047

1048 8.4.5 Geographic Location URIs for Location identifiers

1049 A CBV-Compliant document or CBV-Compatible document MAY use a geographic location URI as specified in [RFC5870] to populate the `readPoint`
1050 and `bizLocation` fields in all EPCIS event types. Such identifiers may be used in situations where it is not feasible to assign a unique location
1051 identifier; for example, to indicate the location of a ship on the open ocean. Both CBV-Compliant and CBV-Compatible documents SHOULD use a
1052 location identifier as specified in [§ 8.4.1](#) through [§ 0](#) (with preference given to the EPC URI form as specified in [§ 8.4.1](#) or the GS1 Digital Link URI
1053 form specified in [§ 0](#)) unless a geographic location URI is the only feasible alternative.

1054 The syntax and meaning of geographic location URIs is specified in [RFC5870].

1055 **i** **Non-Normative:** Explanation (non-normative): The simplest form of RFC5870-compliant geographic location URI looks like this:
1056 `geo:22.300,-118.44`
1057 This example denotes the geographic location with latitude 22.300 degrees (north) and longitude 118.44 degrees (west). Other forms of the `geo`
1058 URI allow for the inclusion of altitude, uncertainty radius, and reference coordinate system. Please consult [RFC5870] for details of these and
1059 other considerations that apply to the use of the geographic location URI.

1060

1061 8.5 Business transactions

1062 Identifiers for business transactions populate the “why” dimension of EPCIS events. This includes the `bizTransactionList` field in all EPCIS event
1063 types.

1064 The EPCIS standard provides for a business transaction to be identified by a pair of identifiers, the “business transaction identifier” (hereinafter “BTI”)
1065 that names a particular business transaction, and an optional “business transaction type” (hereinafter “BTT”) that says what kind of business
1066 transaction the identifier denotes (purchase order, invoice, etc.). [§ 0](#) of this standard provides standardised values for BTTs.

1067 URI forms for BTIs are specified below. A CBV-Compliant document SHALL use one of the six URI forms specified in this section to populate the BTI
1068 field (text content of the `bizTransaction` element) of EPCIS events, for every such field that is not null. A CBV-Compatible document MAY use one of
1069 the six URI forms specified in this section, or MAY use any other URI that meets the general requirements specified in [EPCIS2.0], [§ 6.4](#), except for
1070 those URIs which in this standard are forbidden or designated for a different purpose.

1071 A `bizTransaction` element in an EPCIS event includes a BTI and an optional BTT in any of the following three combinations:

- 1072 ■ If the goal is to communicate a business transaction identifier without indicating its type, a BTI is included and the BTT omitted.
- 1073 ■ If the goal is to communicate a business transaction identifier and to indicate its type, and furthermore the type is one of the CBV standard types
1074 specified in [§ 0](#), a BTI is included, and one of the URIs specified in [§ 0](#) is included as the BTT.
- 1075 ■ If the goal is to communicate a business transaction identifier and to indicate its type, and furthermore the type is not one of the CBV standard
1076 types specified in [§ 0](#), the BTI is included, and some URI that does not begin with `urn:epcglobal:cbv:...` is included as the BTT. (This is CBV-
1077 Compatible but not CBV-Compliant.)


1078 8.5.1 EPC URI for Business transaction identifiers

1079 A CBV-Compliant document or CBV-Compatible document MAY use an EPC Pure Identity URI as specified in [§ 8.1.5](#) as a business transaction identifier
1080 in all EPCIS event types.

1081 Both CBV-Compliant and CBV-Compatible documents SHOULD NOT use EPC schemes other than GDTI EPCs (`urn:epc:id:gdti:...`) or GSRN EPCs
1082 (`urn:epc:id:gsrc:...`) for business transaction identifiers, unless there is a strong reason to do so. GDTI EPCs SHOULD only be used as business
1083 transaction identifiers when they have been assigned to denote a business transaction, rather than a physical document not connected with any
1084 business transaction.

1085 Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS]; see [§ 8.1.5](#) for details.

1086 **i Non-Normative:** Explanation (non-normative): One of the intended uses of the Global Document Type Identifier (GDTI) is to identify business
1087 transactions such as invoices, purchase orders, and so on. When a GDTI is used in this way, it is suitable for use as a business transaction
1088 identifier in EPCIS. However, many business information systems use other types of identifiers for business transactions, and so the use of GDTI
1089 is not as strongly recommended as SGLNs are for locations or other types of EPCs are for physical or digital objects. It is also for this reason that
1090 the form in [§ 8.5.2](#) is provided.

1091  Examples can be found in external xml and json artifacts.

1092 8.5.2 GS1 Digital Link URIs for business transaction identification

1093 A GS1 Digital Link URI suitable for use as a business transaction identifier in EPCIS events SHALL have the form normatively specified in the [GS1](#)
1094 [Digital Link standard](#) [GS1DL] and SHALL be restricted to a **highly constrained set of GS1 Digital Link URIs** corresponding to each of the EPC Pure
1095 Identity URI schemes defined in TDS, summarised as follows:

1096

EPC Scheme supported by GS1 Digital Link URI	Corresponding GS1 Application Identifier(s)	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>	GS1 Digital Link URI example prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
GDTI	(253)	/253/{gdti}	/253/95243214000170003555480001000
GSRN	(8018)	/8018/{gsrn}	/8018/952432153123456784

1097

1098 The **canonical form** of the GS1 Digital Link URI (i.e., based on the domain name `id.gs1.org`) is **recommended but not required**.

1099 8.5.3 GLN-based identifier for legacy system business transaction identifiers

1100 A CBV-Compliant document or CBV-Compatible document MAY use a GLN-based identifier as specified below as a business transaction identifier in all
1101 EPCIS event types.


1102 A GLN-based URI suitable for use as a business transaction identifier in all EPCIS event types SHALL have the following form:

1103 `urn:epcglobal:cbv:bt:gln:transID` where the components of this template are as follows:

Template Component	Description
<code>urn:epcglobal:cbv:bt:</code>	The 21 characters <code>u</code> , <code>r</code> , <code>n</code> , <code>...</code> , <code>b</code> , <code>t</code> , and <code>:</code> (colon).
<code>gln:</code>	A 13-digit Global Location Number (GLN) that identifies the business system within which <code>transID</code> is defined, followed by a colon. This is typically a "party GLN" that identifies the organisation responsible for the business transaction identifier, or a division of an organisation that maintains a separate divisional business information system.

Template Component	Description
<i>transID</i>	An identifier for the business transaction that complies with the requirements of [RFC8141] and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

1104 Identifiers of this form must be assigned by the owner of the GLN that is embedded in the identifier. The owner of the GLN may delegate the authority
1105 to assign new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.

1106  Examples can be found in [external xml and json artifacts](#).

1107

1108 8.5.4 Private or Industry-wide URN for business transaction identifiers


1109 A CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified below as a business transaction
1110 identifier in all EPCIS event types.

1111 A private or industry-wide URN suitable for use as a business transaction identifier in all EPCIS event types SHALL have the following form:

1112 `urn:URNNamespace:**:bt:transID` where the components of this template are as follows:

Template Component	Description
<code>urn:URNNamespace:**:</code>	As specified in § 8.1.6 .
<code>bt:</code>	The characters <code>b</code> , <code>t</code> , and <code>:</code> (colon).
<i>transID</i>	An identifier for the business transaction that complies with the requirements of [RFC8141] and any syntax rules defined for the registered URN namespace <i>URNNamespace</i> , and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

1113 Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign
1114 new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.

1115  Examples can be found in [external xml and json artifacts](#).

1116

1117

1118 8.5.5 HTTP or HTTPS URLs for business transaction identifiers

1119 A CBV-Compliant document or CBV-Compatible document MAY use an **HTTP or** HTTPS URL as specified below as a business transaction identifier in all
1120 EPCIS event types.


1121 An HTTP URL suitable for use as a business transaction identifier in all EPCIS event types SHALL have the following form:

1122 [http://\[Subdomain.\]Domain/**/bt/transID](http://[Subdomain.]Domain/**/bt/transID)

1123 where the components of this template are as follows:

Template Component	Description
<code>http://[Subdomain.]Domain/**/</code>	As specified in § 8.1.7 .
<code>bt/</code>	The characters <code>b</code> , <code>t</code> , and <code>/</code> (slash).
<code>transID</code>	An identifier for the business transaction that matches the grammar rule <code>segment-nz</code> defined in [RFC3986], and which is unique relative to all other identifiers that begin with the same prefix. Note that transid may not contain a slash character; only one URI path component SHALL follow the /bt/ in a CBV-compliant http-based identifier.

1124 Identifiers of this form must be assigned by the owner of the Internet domain *Domain*. The owner of the domain may delegate the authority to assign
1125 new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.

1126  **Non-Normative:** Examples of correct and incorrect usage:

1127 Correct:

1128 `<epc>http://epcis.example.com/user/vocab/bt/12345.67890</epc>`

1129

1130 Incorrect:

1131 `<epc>http://epcis.example.com/user/vocab/bt/id/12345.67890</epc>`

1132

WRONG

1133 Additional examples can be found in [external xml and json artifacts](#).

1134

1135

8.6 Hash URI for business transaction identifiers

A CBV-Compliant document or CBV-Compatible document MAY use a URI notation according to [RFC6920] to embed hashed data as specified below as a business transaction identifier in all EPCIS event types.

Note that a hash value by itself is not a viable identifier for business transactions. In this regard, a Hash URI should only be used in situations in which it is necessary to embed the hash value of a given business document, e.g. to validate that a data file has not been tampered with. Both CBV-Compliant and CBV-Compatible documents SHALL insert one of the business transaction IDs as specified in § 8.5.1 to § 0 into the query string of a Hash URI.

A Hash URI suitable for use as a business transaction identifier in all EPCIS event types SHALL have the following form:
`ni://[authority]/hashAlgorithm;hashValue?btid=bturi&mt=mediaType` where the components of this template are as follows:

Template Component	Description
<code>ni://</code>	The characters <code>n</code> , <code>i</code> , <code>:</code> (colon), <code>/</code> (slash) and <code>/</code> (slash) Remark: 'ni' terms the URI scheme name ('Named Information')
<code>[authority]</code>	(Optional) Domain name
<code>/</code>	The character <code>/</code> (slash)
<code>hashAlgorithm</code>	The name of the hash algorithm as specified in the IANA Named Information Hash Algorithm Registry (https://www.iana.org/assignments/named-information/named-information.xhtml)
<code>;</code>	The character <code>;</code> (semicolon)
<code>hashValue</code>	Value of the hash function, which SHALL have a base64url encoding without the character <code>=</code> (equals sign)
<code>?</code>	The character <code>?</code> (question mark) – query parameter separator
<code>btid=</code>	The characters <code>b</code> , <code>t</code> , <code>i</code> , <code>d</code> and <code>=</code> (equals sign)
<code>bturi</code>	Business transaction URI as specified in § 8.5.1 to § 0 of this standard, complying with the requirements of [RFC8141]. Characters that are not permitted to appear in the query string of a URI (see § 3.4 of [RFC3986]), e.g. such as <code>#</code> (number sign), must be percent-encoded using the method defined in § 2.1 of [RFC3986].
<code>&mt=</code>	The characters <code>&</code> (ampersand), <code>m</code> , <code>t</code> and <code>=</code> (equals sign)
<code>mediaType</code>	The media type of the referred document/file (e.g. "application/pdf" or "application/zip") as indexed in https://www.iana.org/assignments/media-types/media-types.xhtml

i Non-Normative: Examples:

Taking the example of hash algorithm SHA-256, a Hash URI looks as follows:

1147 ni:///sha256;9ed1b204ec3f1b37d318ceaeb3f79dfd7d9743234512bc34818b4c736f829876?btid=urn:epc:id:gdti:4012345.11111.987&mt=ap
1148 plication/pdf

1149 In this case, users can verify – with a reasonable level of certainty – that the content of a given document or file, identified with a GDTI EPC URI (here:
1150 "urn:epc:id:gdti:4012345.11111.987"), is authentic. For that purpose, they just need to verify if the hash value of the document identified by the
1151 *bturi* is identical to the *hashValue* included in the Hash URI.

1152 In addition to the example above, the following notation enables online access to the referred file:

1153 ni://api.example.com/sha-256;9ed1b204ec3f1b37d318ceaeb3f79dfd7d9743234512bc348
1154 18b4c736f829876?btid=urn:epc:id:gdti:4012345.11111.987&mt=application/pdf

1155 Following the mapping approach described in § 4 of [RFC6920], the corresponding HTTP(S) URL of the previous Hash URI would appear as follows:

1156 https://api.example.com/.well-known/ni/sha256/9ed1b204ec3f1b37d318ceaeb3f79dfd7
1157 d9743234512bc34818b4c736f829876?btid=urn:epc:id:gdti:4012345.11111.987&mt=application/pdf
1158

1159 **8.7 Source/Destination identifiers**

1160 Identifiers for sources and destinations populate the `source` and `destination` elements in the `sourceList` and `destinationList` (respectively) in
1161 the “why” dimension of EPCIS events.

1162 A CBV-Compliant document SHALL use one of the four URI forms specified in this section to populate the above fields of EPCIS events. A CBV-
1163 Compatible document MAY use one of the four URI forms specified in this section, or MAY use any other URI that meets the general requirements
1164 specified in [EPCIS], § 6.4, except for those URIs which in this standard are forbidden or designated for a different purpose.

1165 Both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form as specified in [§ 8.7.1](#) or GS1 Digital Link URI form specified in §
1166 0unless there is a strong reason to do otherwise.

1167 **8.7.1 EPC URI for Source/Destination identifiers**

1168 A CBV-Compliant document or CBV-Compatible document MAY use an EPC Pure Identity URI as specified in [§ 8.1.5](#) to populate the `source` and
1169 `destination` elements in all EPCIS event types. Both CBV-Compliant and CBV-Compatible documents SHOULD use this form unless there is a strong
1170 reason to do otherwise.

1171 Both CBV-Compliant and CBV-Compatible documents SHOULD NOT use EPC schemes other than SGLN EPCs (`urn:epc:id:sgln:...`) for source and
1172 destination identifiers, unless there is a strong reason to do so.

1173 In particular, SGLNs should be used to identify the endpoints of a business transfer, where the Source/Destination type is location; PGLN the preferred
1174 EPC scheme for identifying the owning party or possessing party, though SGLN may be used in migration phases, in the interest of backward
1175 compatibility with EPCIS/CBV 1.2 and TDS 1.12.

1176 Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS]; see [§ 8.1.5](#) for details.

1177

1178 8.7.2 GS1 Digital Link URIs for Source/Destination identification

1179 A GS1 Digital Link URI suitable for populating the `source` and `destination` fields of EPCIS events SHALL have the form normatively specified in the
1180 [GS1 Digital Link standard](#) [GS1DL1.1] and SHALL be restricted to a **highly constrained set of GS1 Digital Link URIs** corresponding to each of the
1181 EPC Pure Identity URI schemes defined in TDS, summarised as follows:

1182

EPC Scheme supported by GS1 Digital Link URI	Corresponding GS1 Application Identifier(s)	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>	GS1 Digital Link URI example prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
SGLN	(414) + (254)	/414/{gln}/254/{glnx}	/414/9524321123459/254/5678
PGLN	(417)	/417/{pgln}	/417/9524321543211

1183

1184 The **canonical form** of the GS1 Digital Link URI (i.e., based on the domain name `id.gs1.org`) is **recommended but not required**.

1185 8.7.3 Private or Industry-wide URN for Source/Destination identifiers

1186 A CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified below, or a private or industry-wide
1187 URN as specified in § 8.4.3, to populate the `source` and `destination` fields in all EPCIS event types. However, both CBV-Compliant and CBV-
1188 Compatible documents SHOULD use the EPC URI form ([§ 8.7.1](#)) unless there is a strong reason to do otherwise. See § 8.1 for general considerations
1189 regarding the use of Private or Industry-wide URI identifiers.

1190 In addition to the private or industry-wide URN form as specified in § 8.4.3, a Private or Industry-wide URI suitable for populating the `source` and
1191 `destination` fields in all EPCIS event types SHALL have the following form: `urn:URNNamespace:**:sd:Locid` where the components of this
1192 template are as follows:

Template Component	Description
<code>urn:URNNamespace:**:</code>	As specified in § 8.1.6.
<code>sd:</code>	The characters <code>s</code> , <code>d</code> , and <code>:</code> (colon).
<code>Locid</code>	An identifier for the location that complies with the requirements of [RFC8141] and any syntax rules defined for the registered URN namespace <code>URNNamespace</code> , and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.

8.7.4 HTTP or HTTPS URLs for Source/Destination identification

A CBV-Compliant document or CBV-Compatible document MAY use an **HTTP or HTTPS** URL as specified below, or an HTTP URL as specified in § 0, to populate the *source* and *destination* fields in all EPCIS event types. However, both CBV-Compliant and CBV-Compatible documents SHOULD use the EPC URI form (§ 8.7.1) unless there is a strong reason to do otherwise. See § 8.1 for general considerations regarding the use of HTTP URL identifiers.

In addition to the HTTP URL form as specified in § 0, an HTTP URL suitable for populating the *source* and *destination* fields in all EPCIS event types SHALL have the following form:

`http://[Subdomain.]Domain/**/sd/SourceOrDestId`

where the components of this template are as follows:

Template Component	Description
<code>http://[Subdomain.]Domain/**/</code>	As specified in § 8.1.7 .
<code>sd/</code>	The characters <i>s</i> , <i>d</i> , and <i>/</i> (slash).
<code>SourceOrDestId</code>	An identifier for the location that matches the grammar rule <i>segment-nz</i> defined in [RFC3986], and which is unique relative to all other identifiers that begin with the same prefix. Note that SourceOrDestId may not contain a slash character; only one URI path component SHALL follow the /sd/ in a CBV-compliant http-based identifier.

Identifiers of this form must be assigned by the owner of the Internet domain *Domain*. The owner of the domain may delegate the authority to assign new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.



Non-Normative: Examples of correct and incorrect usage:

Correct:

`<epc>http://epcis.example.com/user/vocab/sd/12345.67890</epc>`

Incorrect:

`<epc>http://epcis.example.com/user/vocab/sd/id/12345.67890</epc>`

WRONG

1214 Additional examples can be found in [external xml and json artifacts](#).

1215

1216

1217 8.8 Transformation identifiers

1218 Identifiers for transformations populate the `transformationID` field of EPCIS `TransformationEvents`.

1219 URI forms for transformation identifiers are specified below. A CBV-Compliant document SHALL use one of the five URI forms specified in this section to
1220 populate the `transformationID` field of EPCIS `TransformationEvents`, for every such field that is not null. A CBV-Compatible document MAY use
1221 one of the four URI forms specified in this section, or MAY use any other URI that meets the general requirements specified in [EPCIS], § 6.4, except
1222 for those URIs which in this standard are forbidden or designated for a different purpose.

1223 8.8.1 EPC URI for Transformation identifiers

1224 A CBV-Compliant document or CBV-Compatible document MAY use an EPC Pure Identity URI as specified in [§ 8.1.5](#) to populate the
1225 `transformationID` field of EPCIS `TransformationEvents`.

1226 Both CBV-Compliant and CBV-Compatible documents SHOULD NOT use EPC schemes other than GDTI EPCs (`urn:epc:id:gdti:...`) for
1227 transformation identifiers unless there is a strong reason to do so. GDTI EPCs SHOULD only be used as transformation identifiers when they have been
1228 assigned to denote a transformation, rather than a physical document not connected with any transformation.

1229 Both CBV-Compliant and CBV-Compatible documents SHALL NOT use any of the other URI forms for EPCs defined in [TDS]; see [§ 8.1.5](#) for details.

1230 **i** **Non-Normative:** Explanation: One of the intended uses of the Global Document Type Identifier (GDTI) is to identify business transactions such
1231 as production orders which may be in one-to-one correspondence with transformations. When a GDTI is used in this way, it is suitable for use as
1232 a transformation identifier in EPCIS. However, many business information systems use other types of identifiers for transformations, and so the
1233 use of GDTI is not as strongly recommended as SGLNs are for locations or other types of EPCs are for physical or digital objects. It is also for this
1234 reason that the form in [§ 0](#) is provided.

1235

8.8.2 GS1 Digital Link URIs for Transformation identification

A GS1 Digital Link URI suitable for populating the `transformationID` field of EPCIS events SHALL have the form normatively specified in the [GS1 Digital Link standard](#) [GS1DL1.1] and SHALL be restricted to a **highly constrained set of GS1 Digital Link URIs** corresponding to each of the EPC Pure Identity URI schemes defined in TDS, summarised as follows:

EPC Scheme supported by GS1 Digital Link URI	Corresponding GS1 Application Identifier(s)	GS1 Digital Link URI structure prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>	GS1 Digital Link URI example prefixed by canonical prefix: <code>https://id.gs1.org</code> <i>or</i> non-canonical prefix: <code>https://example.com/some/path/info</code>
GDTI	(253)	/253/{gdti}	/253/9524321400017

The **canonical form** of the GS1 Digital Link URI (i.e., based on the domain name `id.gs1.org`) is **recommended but not required**.

8.8.3 GLN-based Identifier for Legacy System Transformation identifiers

A CBV-Compliant document or CBV-Compatible document MAY use a GLN-based identifier as specified below § [8.1.5](#) to populate the `transformationID` field of EPCIS `TransformationEvents`.

A GLN-based URI SHALL have the following form: `urn:epcglobal:cbv:xform:gln:xformID` where the components of this template are as follows:

Template Component	Description
<code>urn:epcglobal:cbv:xform:</code>	The 24 characters <code>u, r, n, ..., r, m, and :</code> (colon).
<code>gln:</code>	A 13-digit Global Location Number (GLN) that identifies the business system within which <code>xformID</code> is defined, followed by a colon. This is typically a "party GLN" that identifies the organisation responsible for the transformation identifier, or a division of an organisation that maintains a separate divisional business information system.
<code>xformID</code>	An identifier for the transformation that complies with the requirements of [RFC8141] and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

Identifiers of this form must be assigned by the owner of the GLN that is embedded in the identifier. The owner of the GLN may delegate the authority to assign new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.

8.8.4 Private or Industry-wide URN for Transformation identifiers

A CBV-Compliant document or CBV-Compatible document MAY use a private or industry-wide URN as specified below to populate the transformationID field of EPCIS TransformationEvents.

A private or industry-wide URN SHALL have the following form: urn:URNNamespace:**:xform:transID where the components of this template are as follows:

Template Component	Description
urn:URNNamespace:**:	As specified in § 8.1.6 .
xform:	The characters x, f, o, r, m, and : (colon).
xformID	An identifier for the transformation that complies with the requirements of [RFC8141] and any syntax rules defined for the registered URN namespace URNNamespace, and which does not contain a colon character. This identifier must be unique relative to all other identifiers that begin with the same prefix.

Identifiers of this form must be assigned by the owner of the URN Namespace. The owner of the URN Namespace may delegate the authority to assign new identifiers to End Users or other parties, provided that appropriate rules are employed to ensure global uniqueness.

8.8.5 HTTP or HTTPS URLs for Transformation identification

A CBV-Compliant document or CBV-Compatible document MAY use an **HTTP or HTTPS** URL as specified below to populate the `transformationID` field of EPCIS `TransformationEvents`.

An HTTP URL SHALL have the following form:

`http://[Subdomain.]Domain/**/xform/xformID`

where the components of this template are as follows:

Template Component	Description
<code>http://[Subdomain.]Domain/**/</code>	As specified in § 8.1.7.
<code>xform/</code>	The characters <code>x</code> , <code>f</code> , <code>o</code> , <code>r</code> , <code>m</code> , and <code>/</code> (slash).
<code>xformID</code>	An identifier for the transformation that matches the grammar rule <code>segment-nz</code> defined in [RFC3986 and which is unique relative to all other identifiers that begin with the same prefix. Note that <code>xformid</code> may not contain a slash character; only one URI path component SHALL follow the <code>/xform/</code> in a CBV-compliant http-based identifier.

Identifiers of this form must be assigned by the owner of the Internet domain `Domain`. The owner of the domain may delegate the authority to assign new identifiers to other parties, provided that appropriate rules are employed to ensure global uniqueness.



Non-Normative: Examples of correct and incorrect usage:

Correct:

`<epc>http://epcis.example.com/user/vocab/xform/12345.67890</epc>`

Incorrect:

`<epc>http://epcis.example.com/user/vocab/xform/id/12345.67890</epc>`

WRONG

Additional examples can be found in [external xml and json artifacts](#).

1275 8.9 Event identifiers

1276 An event identifier may populate the `eventID` field of an EPCIS event. When an EPCIS event includes an `eventID` field, the identifier in that field
1277 SHALL be globally unique (different from the event identifier in any other EPCIS event created by any party). Note that an EPCIS event is not required
1278 to include an event identifier.

1279 A CBV-Compliant document SHALL use one of the two URI forms specified in § 8.9.1 and § 8.8.2 to populate the `eventID` field of EPCIS events, for
1280 every such field that is not null. A CBV-Compatible document MAY use the URI forms specified in § 8.9.1 and § 8.8.2, or MAY use any other URI that
1281 meets the general requirements specified in [EPCIS], § 6.4, except for those URIs which in this standard are forbidden or designated for a different
1282 purpose.

1283 Non-Normative note:

1284 Applying the EPCIS Event Hash ID as specified in § 8.9.2 has a number of advantages. It enables organisations to (re)calculate the ID of a given
1285 EPCIS event solely based on its intrinsic values and in an independent manner; this could be useful if a capturing application does not populate
1286 the `eventID` field, while an EPCIS server (which may or may not be operated by a third party) does. Additionally, especially in conjunction with
1287 digital signatures and unique timestamps, the EPCIS Event Hash ID enables organisations to store a unique fingerprint of an EPCIS event (e.g.,
1288 for notarisation purposes or integrity validations). It can also be useful for detecting duplicate events, as well as matching error declaration
1289 events with original events (see EPCIS standard, § 7.4.1.4).

1290

1291 8.9.1 Universally Unique Identifier (UUID) URIs for Event identification

1292 If an EPCIS Event Hash ID (see § 8.9.2) is not used, a CBV-Compliant document SHALL and a CBV-Compatible document MAY use a UUID Version 1 or
1293 Version 4 URI as specified in [RFC4122] to populate the `eventID` fields in any EPCIS event where that field is not omitted.

1294  **Non-Normative:** Example:
1295 `<eventID>urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6</eventID>`

1296 8.9.2 EPCIS Event Hash ID

1297 If a UUID Version 1 or 4 (see previous section) is not used, a CBV-Compliant document SHALL and a CBV-Compatible document MAY use an EPCIS
1298 Event Hash ID specified as follows to populate the `eventID` fields in any EPCIS event where that field is not omitted.

1299 The EPCIS Event Hash ID denotes a method to calculate a unique fingerprint of any given EPCIS event based on its intrinsic values. It ensures to arrive
1300 at the same hash value irrespective of an EPCIS event's data binding (be it in XML, JSON/JSON-LD or any future data binding) and how its elements
1301 are ordered.

1302 For hashing strings, well-established algorithms such as SHA-256 are available. The focus of this specification is the canonicalization of a *pre-hash*
1303 *string* representation of an EPCIS event, which can be passed to any standard hashing algorithm.

- 1304 To calculate this pre-hash string, the algorithm requires to extract and concatenate EPCIS event key-value pairs to one string exactly according to the
1305 following set of rules:
- 1306 (1) For all EPCIS event types, data elements SHALL be extracted according to the *canonical property order* specified below.
 - 1307 (2) All elements SHALL be concatenated without separators between successive elements.
 - 1308 (3) If a field contains a value (i.e. is not a parent element), each value SHALL be assigned its key through an equal sign ('=').
 - 1309 (4) Data elements SHALL NOT be added if they are omitted in a given EPCIS event or do not apply.
 - 1310 (5) Whitespace characters at the beginning or end of values SHALL be truncated.
 - 1311 (6) Quantitative values SHALL NOT have trailing zeros. (For example, a quantity of one SHALL be expressed as '1', and SHALL NOT be expressed as
1312 '1.0'; 0.3434 SHALL be expressed as 0.3434, with any trailing zeros truncated.)
 - 1313 (7) Numeric values SHALL be expressed without single quotes.
 - 1314 (8) All timestamps SHALL be expressed in UTC; the zero UTC offset SHALL be expressed with the capital letter 'Z'.
 - 1315 (9) All timestamps SHALL be expressed with millisecond precision. If an EPCIS event lacks the latter, the millisecond field SHALL be zero-filled
1316 (e.g., YYYY-MM-DDTHH:MM:SS.000Z).
 - 1317 (10) Strings SHALL be sorted according to their case-sensitive lexical ordering, considering UTF-8/ASCII code values of each successive character.
 - 1318 (11) All child elements as part of a list (e.g. `epc` in `epcList`, `bizTransaction` in `bizTransactionList`, etc.) SHALL be sequenced according to
1319 their case-sensitive lexical ordering, considering UTF-8/ASCII code values of each successive character.
 - 1320 (12) If a child element of a list itself comprises one or more key-value pairs itself
1321 (e.g. `quantityElement` in `quantityList`, `sensorReport` in `sensorElement`), the latter SHALL be concatenated to a string (similar to the
1322 procedure specified above) and, if they belong to the same level, sequenced according to their case-sensitive lexical ordering, considering UTF-
1323 8/ASCII code values of each successive character.
 - 1324 (13) If an EPCIS field comprises a `type` attribute (e.g. `Business Transaction Type` in `bizTransaction` or `Source/Destination`
1325 `Type` in `source`), the value SHALL be prefixed with the `type` before the alphabetical ordering takes place.
 - 1326 (14) If present, any URN-based standard vocabulary value (starting with `'urn:epcglobal:cbv'`) SHALL be expressed in its corresponding GS1 Web
1327 Vocabulary URI equivalent (starting with `'https://ns.gs1.org/cbv'`). Example: `'urn:epcglobal:cbv:bizstep:receiving' -->`
1328 `'https://ns.gs1.org/cbv/BizStep-receiving'`
 - 1329 (15) If present, EPC URIs (starting with `'urn:epc:id'`), EPC Class URIs (starting with `'urn:epc:class'`) or EPC Pattern URIs (starting with
1330 `'urn:epc:idpat'`) SHALL be converted into the corresponding canonical GS1 Digital Link URI (starting with `'https://id.gs1.org'`). Canonical GS1
1331 Digital Link URIs are specified in [GS1 Digital Link: URI Syntax, release 1.2], § 4.11.
 - 1332 (16) If a GS1 Digital Link URI is present, it SHALL take the form of a constrained canonical GS1 Digital Link URI. Specifically: (I) A custom domain
1333 SHALL be replaced by `'https://id.gs1.org'`. (II) The query string SHALL be stripped off. (III) It SHALL only contain the most fine-granular level of

- 1334 identification, i.e. contain the following GS1 keys/key qualifiers only: 00 / 01 / 01 21 / 01 10 / 01 235 / 253 / 255 / 401 / 402 / 414 / 414 254 /
1335 417 / 8003 / 8004 / 8006 / 8006 21 / 8006 10 / 8010 / 8010 8011 / 8017 / 8018
- 1336 (17) If an EPCIS event comprises ILMD elements, the latter SHALL comprise their key names (full namespace embraced by curly brackets ('{' and
1337 '}') and the respective local name), as well as, if present, the contained value, prefixed by an equal sign ('='). The resulting substrings SHALL be
1338 sorted according to their case-sensitive lexical ordering, considering UTF-8/ASCII code values of each successive character when they are
1339 appended to the pre-hash string.
- 1340 (18) If an EPCIS event comprises user extension elements at event level – irrespective whether they appear at top level or are nested – the latter
1341 SHALL comprise their key names (full namespace embraced by curly brackets ('{' and '}') and the respective local name), as well as, if present,
1342 the contained value, prefixed by an equal sign ('='). The resulting substrings SHALL be sorted according to their case-sensitive lexical ordering,
1343 considering UTF-8/ASCII code values of each successive character when they are appended to the pre-hash string.
- 1344 (19) If an EPCIS event comprises user extension elements as part of an EPCIS standard field with an extension point
1345 (namely readPoint, bizLocation, sensorElement, sensorMetadata, and sensorReport), the top-level user extension element(s) SHALL be prefixed
1346 with the corresponding EPCIS standard field name. Apart from that, it SHALL be added to the pre-hash string similarly as specified in the
1347 previous step.
- 1348 (20) The resulting pre-hash string SHALL be embedded in a 'ni' URI scheme as specified in RFC 6920, as follows:
1349 `ni:/// {digest algorithm}; {digest value}?ver={CBV version}`
1350 i.e. characters 'n', 'i', followed by one colon (':'), three slash characters ('/'), the `digest algorithm`, one semicolon (';'), the `digest value`,
1351 one question mark ('?'), the characters 'v', 'e', 'r', one equal sign ('='), and the version of the EPCIS Event Hash ID algorithm that was used to
1352 generate the pre-hash string, indicated by the `cbv version`.
- 1353 (21) The `digest algorithm` SHALL contain one of the hash name string values as listed in the Named Information Hash Algorithm Registry
1354 (see <https://www.iana.org/assignments/named-information/named-information.xhtml>)
- 1355 (22) The `cbv version` SHALL be indicated as follows: the three characters 'c', 'b', 'v', followed by one or several digits indicating the major release
1356 version, one dot character ('.') and one or more digits indicating the minor release version. In addition, it MAY be appended with one dot
1357 character ('.') and one or more digits indicating a revision of a given CBV standard release, if applicable (i.e. if a revision of the CBV standard
1358 specifies an updated version of the EPCIS Event Hash ID algorithm).
- 1359
- 1360 Canonical property order
- 1361 1. `eventType`
 - 1362 2. `eventTime`
 - 1363 3. `eventTimeZoneOffset`
 - 1364 4. `epcList` – `epc`
 - 1365 5. `parentID`
 - 1366 6. `inputEPCList` – `epc`
 - 1367 7. `childEPCs` – `epc`
 - 1368 8. `quantityList` – `quantityElement` (`epcClass`, `quantity`, `uom`)


```

1369 9. childQuantityList - quantityElement (epcClass, quantity, uom)
1370 10. inputQuantityList - quantityElement (epcClass, quantity, uom)
1371 11. outputEPCList - epc
1372 12. outputQuantityList - quantityElement (epcClass, quantity, uom)
1373 13. action
1374 14. transformationID
1375 15. bizStep
1376 16. disposition
1377 17. readPoint - id
1378 18. bizLocation - id
1379 19. bizTransactionList - bizTransaction (business transaction type, business transaction ID)
1380 20. sourceList - source (source type, source ID)
1381 21. destinationList - destination (destination type, destination ID)
1382 22. sensorElement (
1383     sensorMetadata (time, startTime, endTime, deviceID, deviceMetadata, rawData, dataProcessingMethod, bizRules),
1384     sensorReport (type, deviceID, deviceMetadata, rawData, dataProcessingMethod, time, microorganism, chemicalSubstance, value,
1385     component, stringValue, booleanValue, hexBinaryValue, uriValue, minValue, maxValue, meanValue, sDev, percRank, percValue,
1386     uom)
1387 )
1388 23. ilmd - {ILMD elements}
1389 24. {User extension elements}

```

1390



Example (non-normative):

The EPCIS example in the external artefact results in the following pre-hash string (note: line breaks are displayed for better readability, but are not part of the pre-hash string):

```

eventType=ObjectEvent
eventTime=2007-07-26T21:41:19.000Z
eventTimeZoneOffset=-05:00
epcList
epc=urn:epc:id:sgtin:0614141.181335.234
action=ADD
bizStep=urn:epcglobal:cbv:bizstep:commissioning
disposition=urn:epcglobal:cbv:disp:active
readPoint
id=urn:epc:id:sgln:0614141.00300.1
bizLocation
id=urn:epc:id:sgln:0614141.00300.0
bizTransactionList
bizTransaction=urn:epcglobal:cbv:btt:pourn:epc:id:gdti:0614141.06012.1234

```

Applying SHA-256, the corresponding EPCIS Event Hash ID is:

```
ni:///sha-256;c6407ffcac52ec159528f2b556ba4ac3844c5aa48485c1fd61643
```

e94f0a2d678?ver=CBV2.0



Note that **Error Declaration Events should NOT calculate an EPCIS Event Hash ID**, but instead use the original eventID (i.e., of the erroneous event); if the original (erroneous) event captured no eventID, the corresponding Error Declaration Event should likewise omit the eventID. For this reason, an Event Hash ID cannot serve as a unique fingerprint of an Error Declaration Event; organisations applying the Event Hash ID for notarisation purposes should be aware that it would not protect from tampering with data within the errorDeclaration element.



Limitations on proof of authenticity or authorship

Note that the Event Hash ID algorithm has limited applicability when EPCIS events are redacted (e.g., where shared EPCIS events omit or reduce the granularity of specific fields); see also EPCIS and CBV Implementation Guide, § 6.7). In such a case, the content of a redacted EPCIS event will in no case yield the hash value of the original one.

The Event Hash ID **does not guarantee absolute proof of authenticity or authorship** of an EPCIS event; for example, a man-in-the-middle attack could modify the content of an EPCIS event and re-compute the hash after tampering. In order to prevent tampering, a digital signature scheme leveraging the EPCIS Event Hash ID algorithm may be applied.

8.10 Chemical substance identifiers

A chemical substance identifier may populate the `chemicalSubstance` field of an EPCIS event. When an EPCIS event includes a `chemicalSubstance` field as part of a `sensorReport` element, the identifier in that field must be globally unique.

A CBV-Compliant document SHALL use the InChI URI form specified in § 8.10.1 to populate the `chemicalSubstance` field of EPCIS events, for every such field that is not null. A CBV-Compatible document MAY use any URI that meets the general requirements specified in [EPCIS], [§ 6.4](#), except for those URIs which in this standard are forbidden or designated for a different purpose.

8.10.1 InChI (International Chemical Identifier) Key URI

A CBV-Compliant document or CBV-Compatible document SHOULD use an International Chemical Identifier (InChI) Key URN as specified below to populate the `chemicalSubstance` field of an EPCIS event.

An InCHI Key URI SHALL have the following form:

`https://identifiers.org/inchikey:InChIKey`

where the components of this template are as follows:

1437

Template Component	Description
<code>https://identifiers.org/inchikey:</code>	The 33 characters h, t, t, ..., e, y and : (colon). Note: 'identifiers.org' is a resolving system that enables the referencing of scientific data, so far focussing on the life sciences domain. For more information, see https://docs.identifiers.org/
<code>InChIKey</code>	A 27 character, condensed (i.e. hashed) representation of an International Chemical Identifier (InChI), a non-proprietary identifier for chemical substances, developed by the International Union of Pure and Applied Chemistry (IUPAC). For more information, see https://iupac.org/who-we-are/divisions/division-details/inchi/

1438
1439**Non-Normative:** Example (InChI Key for sucrose):<https://identifiers.org/inchikey:CZMRCDWAGMRECN-UGDNZRGBSA-N>1440 **8.11 Microorganism identifiers**

1441 A microorganism identifier MAY populate the `microorganism` field of an EPCIS event. When an EPCIS event includes a `microorganism` field as part of
 1442 a `sensorReport` element, the identifier in that field SHALL be globally unique.

1443 A CBV-Compliant document SHALL use the URI form specified in § 8.11.1 to populate the `microorganism` field of EPCIS events, for every such field
 1444 that is not null. A CBV-Compatible document MAY use the URI form specified in § 8.11.1, or MAY use any other URI that meets the general
 1445 requirements specified in [EPCIS], [§ 6.4](#), except for those URIs which in this standard are forbidden or designated for a different purpose.

1446 **8.11.1 NCBI Web URI**

1447 A CBV-Compliant document or CBV-Compatible document MAY use a National Center for Biotechnology Information (NCBI) Web URI as specified below
 1448 to populate the `microorganism` field of an EPCIS event.

1449 An NCBI Web URI SHALL have the following form: <https://www.ncbi.nlm.nih.gov/TaxonomyID> where the components of this template are as
 1450 follows:

Template Component	Description
<code>https://www.ncbi.nlm.nih.gov/taxonomy/</code>	The 39 characters h,t,t,p,s, ... o,m,y and / (forward slash).
<code>TaxonomyID</code>	A unique identifier assigned by the National Center for Biotechnology Information (NCBI) for a species. For more information, see https://www.ncbi.nlm.nih.gov/taxonomy

1451
1452**Non-Normative:** Example (containing the taxonomy ID for 'Listeria monocytogenes'):<https://www.ncbi.nlm.nih.gov/taxonomy/1126011>

1453 9 Master data

1454 9.1 Data type restrictions

1455 9.1.1 Dates

1456 All CBV attributes of type "Date" SHALL be restricted to the following subset of W3C primitive datatypes for date formats:

W3C datatype	example	invalid usage example
xsd:date	2019-02-28	2019-02-00
xsd:gYearMonth	2019-02	2019/2
xsd:gYear	2019	19

1457

1458 9.1.2 Master data attribute names

1459 In the master data section of an **EPCIS header**, in an **EPCIS Master Data Document**, and in the response to an **EPCIS Master Data Query**, a
1460 master data attribute MAY be expressed either as a name/value pair or as an XML QName.

1461 Master data attributes in the **ILMD** section of an EPCIS event SHALL be specified as an XML QName

1462 9.1.2.1 Name/value pair

1463 When expressed as a name/value pair, the name of every trade item master data attribute defined in this section consists of the following namespace
1464 identifier:

1465 urn:epcglobal:cbv:mda

1466 followed by a pound sign (#) character, followed by a local name as specified in § [9.2.1](#).

1467 As an exception, the master data attributes `site`, `sst`, `ssa`, and `ssd` use a colon (:) character instead of a pound sign as the separator, for back-
1468 compatibility to CBV 1.1 and earlier.

1469 9.1.2.2 QName

1470 When a master data attribute is expressed as an XML element. its element name is an XML QName whose namespace is the same namespace identifier
1471 specified above and whose local name is the local name as specified in § 9.2.1.

1472

1473 **i** **Non-Normative:** Example: Here is how the attribute `sellByDate` might appear in the EPCIS header, Master Data Document or Master Data
1474 Query response, using a **name/value pair**:

```
1475 <VocabularyElement id="urn:epc:class:lgtn:9524141.012345.L123">
1476   <attribute id="urn:epcglobal:cbv:mda#sellByDate">2016-03-15</attribute>
1477 </VocabularyElement>
```

1478 Here is how the same attribute would appear in the ILMD section of an event, using a **Qname**:

```
1479 <epcis:EPCISDocument xmlns:cbvmda="urn:epcglobal:cbv:mda" ...>
1480   ...
1481   <ObjectEvent>
1482     ...
1483     <QuantityElement>
1484       <epcClass>urn:epc:class:lgtn:9524141.012345.L123</epcClass>
1485     </QuantityElement>
1486     ...
1487     <ilmd>
1488       <cbvmda:sellByDate>2016-03-15</cbvmda:sellByDate>
1489     </ilmd>
1490     ...
1491   </ObjectEvent>
1492   ...
1493 </epcis:EPCISDocument>
```

1494 9.1.3 Certification attributes

1495 Certification details are EITHER:

- 1496 • expressed as a URL in the `certificationInfo` field of the `EPCISEvent` base type, specified in § 7.4.1 ("EPCISEvent") of EPCIS 2.0. If
1497 present, this URL indicates where certification details can be found. Certification details SHOULD ideally be machine-readable and be expressed
1498 using properties within the `gs1:CertificationDetails` class of the GS1 Web Vocabulary

1499 OR:

- 1500 • included as Master Data, as specified in § 9.1.3.1 of CBV.

1501 **9.1.3.1 CertificationList**

1502 The value of type `certificationList` consist of one or more elements named `certification`, which contains the following sub-elements:

Field	Type	Description
<code>gs1:certificationStandard</code>	<code>xsd:string</code>	Name of the certification standard. Example: MSC Chain of Custody Standard
<code>gs1:certificationAgency</code>	<code>xsd:string</code>	Name of the organization issuing the certification standard or other requirement being met. Example: Marine Stewardship Council
<code>gs1:certificationValue</code>	<code>xsd:string</code>	The certification standard value for the certified product, party or location. Example: Quality class 4
<code>gs1:certificationIdentification</code>	<code>xsd:string</code>	A reference (i.e, to a certificate instance) issued to confirm that a product, party or location has passed certification. Example: MSC-C-12345
<code>gs1:issuanceDate</code>	<code>xsd:date</code>	Date of issuance of certification
<code>gs1:auditDate</code>	<code>xsd:date</code>	Date of completion of auditing
<code>gs1:certificationStartDate</code>	<code>xsd:date</code>	First date of certification validity
<code>gs1:certificationEndDate</code>	<code>xsd:date</code>	Final date of certification validity (i.e., thereafter it lapses and would need to be renewed)
<code>gs1:certifies</code>	<code>xsd:anyURI</code>	References the product, party or location being certified.

1503

1504

1505 When a value of type `CertificationList` appears as attribute of a `VocabularyElement`, it takes the form illustrated below.

```
1506 <attribute id="https://gs1.org/cbv/cbvmda:certificationList">
1507   <gs1:CertificationDetails>
1508     <certificationStandard>MSC Chain of Custody Standard</gs1:certificationStandard>
1509     <certificationAgency>Marine Stewardship Council</gs1:certificationAgency>
1510     <certificationValue>4</gs1:certificationValue>
1511     <certificationIdentification>MSC-C-12345</gs1:certificationIdentification>
1512   </gs1:CertificationDetails>
1513 </attribute>
```

1514 When a value of type `CertificationList` appears in an EPCIS event extension, it takes the form illustrated below.

```
1515 <cbvmda:certificationList>
1516   <gs1:CertificationDetails>
1517     <gs1:certificationStandard>MSC Chain of Custody Standard</gs1:certificationStandard>
1518     <gs1:certificationAgency>Marine Stewardship Council</gs1:certificationAgency>
1519     <gs1:certificationValue>4</gs1:certificationValue>
1520     <gs1:certificationIdentification>MSC-C-12345</gs1:certificationIdentification>
1521   </gs1:CertificationDetails>
1522 </cbvmda:certificationList>
```

1523

9.2 Trade item master data

This section specifies master data attributes that may be used to describe a trade item identifier that appears in the “what” dimension of an EPCIS event, including the EPC, Parent ID, and EPC Class fields.

Different trade item identifiers are used at different levels of trade item identification. Each master data attribute defined in the CBV for trade item identifiers specifies one or more of the following three levels of identification to which it is applicable:

Identification Level	Description	Typical Identifier	Identifier use in EPCIS Event
Trade item-level	A master data attribute that applies to all instances of a given trade item. As trade items are usually identified by a GTIN, this is often called “GTIN-level”.	urn:epc:idpat:sgtin:9524141.112345.*	EPC Class
Lot-level	A master data attribute that applies to all instances of a given trade item within a specified batch or lot.	urn:epc:class:lgtin:9524141.112345.L123	EPC Class
Instance-level	A master data attribute that applies to a specific instance of a trade item	urn:epc:id:sgtin:9524141.112345.400	EPC Parent ID

A CBV-Compliant or CBV-Compatible document MAY include any of the master data attributes specified in this section within the master data section of the EPCIS Header, subject to the constraints specified elsewhere in this section. The master data attributes specified in this section may also be used in an EPCIS Master Data Document or in the response to an EPCIS Master Data Query. A CBV-Compliant or CBV-Compatible document MAY include any of the lot-level or instance-level master data attributes specified in this section in the ILMD section of an EPCIS event, but SHOULD NOT include trade item-level attributes in the ILMD section.

When a master data attribute specified in this section is used in the master data section of the EPCIS Header, in an EPCIS Master Data Document, or in the response to an EPCIS Master Data Query, each such attribute applies to the specific identifier cited and also all matching identifiers at a lower level. For example, a master data attribute specified for the trade item-level identifier urn:epc:idpat:sgtin:9524141.112345.* would also apply to lot-level and instance-level identifiers that share the same GTIN. A master data attribute specified for the lot-level identifier urn:epc:class:lgtin:9524141.112345.L123 would also apply to instance-level identifiers that share the same GTIN and lot.

When a master data attribute specified in this section is used in the ILMD section of an EPCIS event, it applies to all identifiers appearing in any EPC or QuantityElement field within that event.

1542 9.2.1 Trade item master data attributes

1543 The tables below specify master data attributes that may be used to describe a trade item identifier.

1544 The meaning of the "Level" column is as follows:

- 1545 ■ **Trade Item:** the master data attribute is a trade item-level attribute as specified in § 8.9.2.
- 1546 ■ **Lot:** the master data attribute is a lot-level attribute as specified in § 8.9.2.
- 1547 ■ **Instance:** the master data attribute is an instance-level attribute as specified in § 8.9.2.
- 1548 ■ **Trade Item or Instance:** the master data attribute is either a trade item-level attribute or an instance-level attribute as specified in § 8.9.2,
- 1549 depending on the trade item. For example, `netWeight` is a trade item-level attribute for a fixed weight product but an instance-level attribute for
- 1550 a variable weight product.
- 1551 ■ **Trade Item or Lot or Instance:** the master data attribute is either a trade item-level attribute or a lot-level attribute or an instance-level
- 1552 attribute as specified in § 8.9.2, depending on the trade item. For example, `countryOfOrigin` may be consistent across all instances of a trade
- 1553 item for a manufactured product, or consistent across all instances in a lot but varying across lots for fish species harvested in lots in varying
- 1554 territorial waters, or varying across all instances for fish species harvested individually in varying territorial waters.

1555 Master data attributes for each level are shown below in separate tables. Master data attributes that may be used at multiple levels are repeated in

1556 more than one table as appropriate. Within each table, attributes are listed alphabetically.

1557 9.2.2 Trade item master data attributes – trade item level

1558 The following attributes may be used to describe a trade item identifier at the trade item (GTIN) level.

1559

Local Name	Type	Description	Level
<code>additionalTradeItemIdentification</code>	list of <AdditionalTradeItemID> (see § 9.2.2.1)	A trade item identifier that is in addition to the GTIN. Example: 12345111111 See § 0	Trade Item
<code>countryOfOrigin</code> (repeating)	Code	Country from which the goods are supplied. The code list for this attribute is the ISO 3166-1 Alpha-2 list of 2-letter country codes; see http://www.iso.org/iso/country_codes Example: UK Note: When multiple countries of origin are included, the dominant country of origin SHALL be included as the first element.	Trade Item or Lot or Instance

Local Name	Type	Description	Level
descriptionShort	String (1–35 characters)	A free form short length description of the trade item that can be used to identify the trade item at point of sale. Example: Acme Red Widgets	Trade Item
dosageFormType	String (1–35 characters)	A dosage form is the physical form of a medication that identifies the form of the pharmaceutical item. Example: PILL	Trade Item
drainedWeight	Measurement (see § 9.2.5)	The weight of the trade item when drained of its liquid. For example 225 "grm", Jar of pickles in vinegar. Applies to defined bricks of GCI Global trade item Classification - Mainly food trade item. Has to be associated with a valid UoM. Example: [see § 9.2.5]	Trade Item or Instance
functionalName	String (1–35 characters)	Describes use of the product or service by the consumer. Should help clarify the product classification associated with the GTIN. Example: Widget	Trade Item
grossWeight	Measurement (see § 9.2.5)	Used to identify the gross weight of the trade item. The gross weight includes all packaging materials of the trade item. At pallet level the trade item-GrossWeight includes the weight of the pallet itself. For example, "200 grm", value - total pounds, total grams, etc. Has to be associated with a valid UOM. Example: [see § 9.2.5]	Trade Item or Instance
manufacturerOfTradeItemPartyName	String (1–200 characters)	Party name information for the manufacturer of the trade item. Example: Acme Corporation	Trade Item
netContentDescription	String (1–500 characters)	Free text describing the amount of the trade item contained by a package, usually as claimed on the label. Example: 253 grams	Trade Item
netWeight	Measurement (see § 9.2.5)	Used to identify the net weight of the trade item. Net weight excludes any packaging materials and applies to all levels but consumer unit level. For consumer unit, Net Content replaces Net Weight (can then be weight, size, volume). Has to be associated with a valid UoM. Example: [see § 9.2.5]	Trade Item or Instance

Local Name	Type	Description	Level
labelDescription	String (1-500 characters)	A literal reproduction of the text featured on a product's label in the same word-by-word order in which it appears on the front of the product's packaging. This may not necessarily match the GTIN description as loaded by the supplier into the GTIN description field in GDSN. Example: Acme Corporation Tiny Red Widgets	Trade Item
preservationTechniqueCode	Code	Code value indicating the preservation technique used to preserve the product from deterioration. The code list for this attribute is defined in GDSN; see http://apps.gs1.org/GDD/Pages/clDetails.aspx?semanticURN=urn:gs1:gdd:cl:PreservationTechniqueTypeCode Example: COLD_SMOKE_CURING	Trade Item
regulatedProductName	String (1-500 characters)	The prescribed, regulated or generic product name or denomination that describes the true nature of the product and is sufficiently precise to distinguish it from other products according to country specific regulation. Example: Epcistra	Trade Item
speciesForFisheryStatisticsPurposesCode	Code	The FAO 3 Alpha code of the species of fish for fish and seafood. This external list can be accessed via: http://www.fao.org/fishery/collection/asfis/en Example: COD	Trade Item
speciesForFisheryStatisticsPurposesName	String (1-500 characters)	The scientific name associated with the <code>speciesForFisheryStatisticsPurposesCode</code> . Example: Gadus morhua	Trade Item
strengthDescription	String (1-500 characters)	Free text describing the strength of the active ingredient(s) of the product Example: 200mg/100mg	Trade Item

Local Name	Type	Description	Level
tradeItemConditionCode	Code	<p>A code depicting the type of preparation that a trade item will have before being sold to the end consumer (e.g. cut for sale, portioned/pieced). This preparation can be done either by the supplier or the retailer or other parties involved. The style of preparation may be determined by either industry standards, the supplier or the retailer.</p> <p>The code list for this attribute is defined in GDSN; see http://apps.gs1.org/GDD/Pages/clDetails.aspx?semanticURN=urn:gs1:gdd:cl:TradeItemConditionCode&release=2 example: GUS</p>	Trade Item
tradeItemDescription	String (1-200 characters)	<p>An understandable and useable description of a trade item using brand and other descriptors. This attribute is filled with as little abbreviation as possible while keeping to a reasonable length. Free form text field, this data element is repeatable for each language used and must be associated with a valid ISO language code. Field length is 178 characters. This should be a meaningful description of the trade item with full spelling to facilitate message processing. Retailers can use this description as the base to fully understand the brand, flavour, scent etc. of the specific GTIN in order to accurately create a product description as needed for their internal systems.</p> <p>Example: GS1 Brand Base Invisible Solid Deodorant AP Stick Spring Breeze</p>	Trade Item
certificationList	List of Certification	Information on certification standards to which the trade item, or the process by which it is manufactured, sourced or supplied complies.	CMD ILMD

1560

1561 9.2.2.1 AdditionalTradeItemIdentification

1562 Each value of type `AdditionalTradeItemIdentification` consists the following sub-elements:

Field	Type	Description
additionalTradeItemID	string	Value of the additional trade item identifier.

Field	Type	Description
additionalTradeItemIDType Code	Code	<p>A code that indicates what type of identifier is used for additionalTradeItemIdentification</p> <p>The code list for this attribute is defined in GDSN; see http://apps.gs1.org/GDD/Pages/ciDetails.aspx?semanticURN=urn:gs1:gdd:cl:AdditionalTradeItemIdentificationTypeCode&release=9</p> <p>Example: US_FDA_NDC</p>

1563 When a value of type AdditionalTradeItemIdentification appears as attribute of a VocabularyElement (in an EPCIS Header), it takes the form
1564 illustrated below:

```
1565 <attribute id="urn:epcglobal:cbv:mda:additionalTradeItemIdentification">
1566   <additionalTradeItemID tradeItemIDTypeCode="BUYER_ASSIGNED">IMP-125</additionalTtradeItemID>
1567   <additionalTradeItemID tradeItemIDTypeCode="SUPPLIER_ASSIGNED">ASD-987</additionalTtradeItemID>
1568 </attribute>
```

1569

1570 When a value of type AdditionalTradeItemIdentification appears in ILMD, it takes the form illustrated below:

```
1571 <ilmd>
1572   <cbvmmda:additionalTradeItemID tradeItemIDTypeCode="BUYER_ASSIGNED">IMP-125</additionalTradeItemID>
1573   <cbvmmda:additionalTradeItemID tradeItemIDTypeCode="SUPPLIER_ASSIGNED">ASD-987</additionalTtradeItemID>
1574 </ilmd>
```

1575

1576 **9.2.3 Trade item master data attributes – lot level**

1577 The following attributes may be used to describe a trade item identifier at the lot level.

1578

Local Name	Type	Description	Level
bestBeforeDate	Date	The date before which the product is best used or consumed. It is a statement about quality. Example: 2017-03-15	Lot
countryOfOrigin (repeating)	Code	[see description in § 9.2.2]	Trade Item or Lot or Instance
countryOfExport (repeating)	Code	Country from which the batch/lot was exported. Note: This is not the same as the country of origin. In the EU this attribute indicates from which third country (outside of European Union) fishery and aquaculture products were exported. The code list for this attribute is the ISO 3166-1 Alpha-2 list of 2-letter country codes; see http://www.iso.org/iso/country_codes Example: UK Note: When multiple countries of export are included, the dominant country of export SHALL be included as the first element.	Trade Item or Lot or Instance
farmList	List of Farm	List of structures describing farm information; see below	Lot
firstFreezeDate	Date	The date of initial freezing, if different from the date of production. Example: 2016-03-15	Lot

Local Name	Type	Description	Level
growingMethodCode	Code	<p>The process through which fresh produce is grown and cultivated.</p> <p>The code list for this attribute is defined in GDSN; see http://apps.gs1.org/GDD/Pages/clDetails.aspx?semanticURN=urn:gs1:gdd:cl:GrowingMethodCode&release=1</p> <p>Example: HYDROPONIC</p>	Lot
harvestEndDate	Date	<p>The date when harvesting ended.</p> <p>Example: 2016-03-15</p>	Lot
harvestStartDate	Date	<p>The date when harvesting started.</p> <p>Example: 2016-03-15</p>	Lot
itemExpirationDate	Date	<p>The date after which the product should not be used or consumed. Its meaning is determined based on the trade item context (e.g., for food, the date will indicate the possibility of a direct health risk resulting from use of the product after the date, for pharmaceutical products, it will indicate the possibility of an indirect health risk resulting from the ineffectiveness of the product after the date). It is often referred to as "use by date" or "maximum durability date."</p> <p>Example: 2016-03-15</p>	Lot
productionMethodForFishAndSeafoodCode	Code	<p>A code specifying how the fish had been grown / cultivated.</p> <p>The code list for this attribute is defined in GS1 EDI; see http://apps.gs1.org/GDD/Pages/clDetails.aspx?semanticURN=urn:gs1:gdd:cl:ProductionMethodForFishAndSeafoodCode&release=1</p> <p>Example: AQUACULTURE</p>	Lot
sellByDate	Date	<p>The date before or on which, the product should be sold.</p> <p>Example: 2017-03-15</p>	Lot

Local Name	Type	Description	Level
storageStateCode	Code	A code depicting that the referred product was previously frozen or not. The code list for this attribute is defined in GS1 EDI; see http://apps.gs1.org/GDD/Pages/clDetails.aspx?semanticURN=urn:gs1:qdd:cl:StorageStateCode&release=1 Example: Previously Frozen	Lot
unloadingPort	UN LOCODE	Port where the goods were unloaded from a seagoing vessel after having been transported by it. The value of this attribute is a user vocabulary maintained by UN/ECE; see http://www.unece.org/cefact/locode/welcome.html Example: DE BRV	Lot
vesselCatchInformationList	List of VesselCatchInformation	List of structures describing vessel catch information; see below	Lot

1579
1580

The value of vesselCatchInformationList consists of one or more elements named vesselCatchInformation, which contains the following subelements:

Field	Type	Description
vesselOperatorGLN	PGLN (preferred) or SGLN	GLN for the vessel operator Example: urn:epc:id:pqln:952414.00001
vesselID	String	Identifier for the vessel Example: DE-X-1234
vesselName	String	Name of the vessel Example: HMS Gena
vesselFlagState	String	The ISO 3166-1 alpha-2 code specifying the state under whose laws the vessel is registered or licensed. Example: UK

Field	Type	Description
catchArea	Code	A code specifying area where the product was caught. The code list for this attribute is defined by the Food and Agriculture Organization of the United Nations (FAO); see http://www.fao.org/fishery/area/search/en Example: 37.2
fishingGearTypeCode	Code	A code specifying the type of gear used in capture of fisheries. The code list for this attribute is defined by the Food and Agriculture Organization of the United Nations (FAO); see ftp://ftp.fao.org/FI/DOCUMENT/cwp/handbook/annex/AnnexM1fishinggear.pdf Example: TM
economicZone (repeating)	Code	Economic zone in which fishery or aquaculture products were caught or cultivated. Note: In the EU this attribute is used to refer to a list of sovereign waters with the following values: ISO 3166-1 alpha-3 code OR XIN International Waters XEU EU Waters XJM Fisheries zone around Jan Mayen XSG Joint area between Senegal and Guinea Bissau XSV Fisheries Protection Zone around Svalbard N/A Not Applicable Examples: Greenland – GRL Iceland – ISL Ireland – XEU Note: When multiple economic zones are included, the dominant economicZone SHALL be included as the first element.

Field	Type	Description
fishConservationReferenceSizeCode	Code	<p>This attribute indicates conservation reference size of a fishery or aquaculture product. It is used upstream in order to avoid that below-size products are not sold through consumer channels.</p> <p>Values: LEGAL BELOW_LEGAL MIXED</p> <p>For products intended for the European market the legal sizes are defined in COUNCIL REGULATION (EC) No 2406/96 of 26 November 1996, common marketing standards for certain fishery products – Annex II.</p> <p>Example: LEGAL</p>

1581

1582

The value of `farmList` consists of one or elements named `farm`, which contains the following subelements:

Field	Type	Description
farmIdentification	String	<p>Identifier for the farm</p> <p>Example: urn:epc:id:sgln:950414.00001.0</p>
farmIdentificationTypeCode	Code	<p>Type of the <code>farmIdentification</code></p> <p>Example: EPC-GLN</p>

1583

The code list for `farmIdentificationTypeCode` is as follows:

Code	Description
EPC-GLN	The identifier is a GS1 Global Location Number (GLN), expressed as an SGLN EPC URI.

1584 9.2.4 Trade item master data attributes – instance-level

1585

The following attributes may be used to describe a trade item identifier at the trade item (GTIN) level.

Local Name	Type	Description	Level
countryOfExport	Country Code	[see description in § 9.2.2]	Trade Item or Lot or Instance

Local Name	Type	Description	Level
countryOfOrigin	Country Code	[see description in § 9.2.2]	Trade Item or Lot or Instance
drainedWeight	Measurement	[see description in § 9.2.2]	Trade Item or Instance
grossWeight	Measurement	[see description in § 9.2.2]	Trade Item or Instance
lotNumber	String (1–20 characters)	A distinctive combination of numbers and/or letters from which the complete history of the manufacture, processing, packaging, coding and distribution of a batch can be determined. Example: ABC123	Instance
netWeight	Measurement	[see description in § 9.2.2]	Trade Item or Instance

1586 9.2.5 Values of type measurement

1587 Each value of type `Measurement` is a structure having the following subelements:

Field	Type	Description
measurement	Decimal	The numerical value of the measurement
measurementUnitCode	Code	The unit of measure for the measurement. The code list for this attribute is UN/ECE Recommendation 20; see http://www.unece.org/cefact/recommendations/rec_index.html

1588 When a value of type `Measurement` appears in ILMD, it takes the form illustrated below. In this example, the attribute is `netWeight` with a value of
1589 3.5 kilograms.

```
1590 <ilmd>
1591   <cbvmdata:netWeight measurementUnitCode="KGM">3.5</cbvmdata:netWeight>
1592 </ilmd>
```

1593 When a value of type `Measurement` appears in an EPCIS Master Data Document, the master data section of an EPCIS document header, or in a
1594 response to an EPCIS Simple Master Data Query, it takes the form illustrated below.

```
1595 <attribute id="urn:epc:cbv:mda:netWeight"><measurement measurementUnitCode="KGM">3.5</measurement></attribute>
```

1596

1597 9.3 Location and party master data

1598 This section specifies master data attributes that may be used to describe a physical location identifier or party identifier. Physical location master data
1599 attributes may be used to describe a location identifier whether the location identifier is used as a EPCIS Read Point, Business Location, Source, or
1600 Destination. Party master data attributes may be used whether the party identifier is used as an EPCIS Source or Destination.

1601 Different physical location identifiers may denote locations at different levels of granularity. The master data attributes defined in the CBV for physical
1602 location identifiers are designed to be used for locations at two different levels of granularity:

1603 **Site:** A physical location where a structure or group of structures (and / or areas) is. Examples of a Site include a distribution centre, a retail store, a
1604 hospital, etc.

1605 **Sub-site:** A specific physical location contained within a site. Examples of a Sub-site include a back room within a retail store, the sales floor of a retail
1606 store, a storage area within a warehouse, and so on.

1607 A CBV-Compliant or CBV-Compatible document MAY include any of the master data attributes specified in this section within the master data section of
1608 the EPCIS Header, subject to the constraints specified elsewhere in this section. The master attributes specified in this section may also be used in an
1609 EPCIS Master Data Document or in the response to an EPCIS Master Data Query. A CBV-Compliant or CBV-Compatible document SHALL NOT include
1610 any of the master data attributes specified in this section in the ILMD section of an EPCIS event.

1611

1612

1613 9.3.1 Location and party master data attributes

1614 The table below specifies master data attributes that may be used to describe a physical location or party identifier.

1615 If a master data attribute indicates "location" in the usage column of the table, then a CBV-Compliant or CBV-Compatible document MAY use that
1616 attribute to describe an identifier that appears in any of the following fields in an EPCIS event:

- 1617 ■ Read point
- 1618 ■ Business location
- 1619 ■ Source, if the source type is `location` as specified in § 7.4
- 1620 ■ Destination, if the destination type is `location` as specified in § 7.4

1621 If a master data attribute indicates "party" in the usage column of the table, then a CBV-Compliant or CBV-Compatible document MAY use that
1622 attribute to describe an identifier that appears in any of the following fields in an EPCIS event:

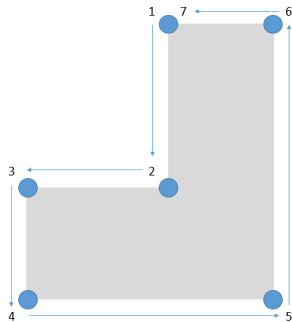
- 1623 ■ Source, if the source type is `owning_party` or `possessing_party` as specified in § 7.4
- 1624 ■ Destination, if the destination type is `owning_party` or `possessing_party` as specified in § 7.4
- 1625 ■ Trade item master data, for attributes that refer to a party and have PGLN (preferred) or SGLN as type, as specified in § 9.


1626 A CBV-Compliant or CBV-Compatible document SHALL NOT use master data attributes to describe an identifier except as permitted above.

Local Name	Type	Description	Usage
site (see note below)	String (1 –128 characters)	<p>Identifies the site in which this location is contained. For a Sub-site location, this is the identifier of the parent location. For a Site location, this is the identifier of the location itself.</p> <p>When the identifier for the location to which this master data attribute applies is an SGLN EPC, the Site Location master data attribute is always the 13-digit GLN implied by the company prefix and location reference components of that SGLN</p>	Location

Local Name	Type	Description	Usage
sst (see note below)	Code List (§ 9.3.2.1)	<p>Sub-Site Type: describes the primary business function of the sub-site location. This master data attribute is only applicable to a sub-site location.</p> <p>This value is expressed as a single numerical code (see code list below); for example, code 201 indicates that the sub-site type is a “back room” as defined below</p>	Location
ssa (see note below)	Code List (§ 9.3.2.2)	<p>Sub-Site Attribute: further qualifies the business function of the sub-site location. This master data attribute is only applicable to a sub-site location.</p> <p>Sub-site attributes are expressed as a comma-separated list of zero or more numerical codes (see code list below). For example, if the sub-site type is 203 (sales area), then sub-site attributes of “404,412” further specifies that this location identifier is a sales area for groceries (attribute 412) that are frozen (attribute 404).</p>	Location
ssd (see note below)	String (1 –128 characters)	<p>Sub-Site Detail: provides additional proprietary information. This master data attribute is only applicable to a sub-site location.</p> <p>For example, instead of sharing that a product is on <i>some</i> shelf in the back room of store 123, a party may wish to communicate the <i>exact</i> shelf in the backroom of store 123, e.g. shelf #4567. The Sub-Site Detail master data attribute provides the identity of the specific shelf; e.g., 4567</p>	Location
name	String	The name of the location or party expressed in text.	Location or Party
streetAddressOne	String	The first free form line of an address. This first part is printed on paper as the first line below the name. For example, the name of the street and the number in the street or the name of a building.	Location or Party
streetAddressTwo	String	The second free form line of an address. This second part is printed on paper as the second line below the name. The second free form line complements the first free form line to locate the party or location.	Location or Party

Local Name	Type	Description	Usage
streetAddressThree	String	The third free form line of an address. This third part is printed on paper as the third line below the name. The third free form line complements the first and second free form lines where necessary.	Location or Party
city	String	Text specifying the name of the city.	Location or Party
state	String	One of the constituent units of a nation having a federal government.	Location or Party
postalCode	String	Text specifying the postal code for an address.	Location or Party
countryCode	String	The ISO 3166-1 alpha-2 code specifying the country for the address.	Location or Party
latitude (DEPRECATED)	Decimal	Latitude of the location, in degrees. Positive numbers are northern latitude; negative numbers are southern latitude. This attribute is deprecated as of CBV 2.0. Instead, a location's geographic coordinates should be expressed with the master data attribute <code>geoLocation</code> .	Location
longitude (DEPRECATED)	Decimal	Longitude of the location, in degrees. Positive numbers are eastern longitude; negative numbers are western longitude.	Location
geoLocation	String	Geo URI as specified in [RFC5870], consisting of the latitude and longitude of a location, in degrees. Optionally, a Geo URI may also include a location's altitude. For example, <code>geo:50.942239,6.898350</code> indicates the geographic position of GS1 Germany's offices.	Location

geoFence	String	<p>Area polygon (geo-fence) as specified in RFC 7946 consisting of an array of longitude-latitude-coordinates, defined according to the following rules:</p> <p>The array SHALL consist of at least 4 individual coordinates.</p> <p>The first coordinate of a given array SHALL be identical to the last one.</p> <p>Each individual coordinate ('[longitude, latitude]') and the area polygon itself SHALL be embedded in square brackets.</p> <p>The array of coordinates SHALL be indicated and processed in sequential order, separated by commas, while following the right-hand rule (i.e., anticlockwise).</p> <p>If there is the need to define a multi-polygon (e.g., a warehouse location that is split in two parts as it is separated by a street), each partial area polygon SHALL be embedded in separate square brackets.</p> <p>If there is a need to define a hole within an area polygon (e.g., if an area within a property pertains to another organisation), the area polygon and the contained hole SHALL be embedded in separate square brackets and the coordinates of the hole SHALL be indicated and processed in sequential order while following the left-hand rule (i.e., clockwise).</p> <p>For example, the geo-fence of GS1 Germany's offices (which has a rectangular floor plan with an adjacent rectangular side wing) would look and be described like this:</p> <div data-bbox="1115 1034 1406 1356">  </div> <div data-bbox="1433 1021 1780 1228"> <pre>[[50.942499,6.898247], [50.942275,6.898292], [50.942263,6.898094], [50.942106,6.898126], [50.942130,6.898526], [50.942512,6.898451], [50.942499,6.898247]]</pre> </div>	Location
----------	--------	---	----------

Local Name	Type	Description	Usage
		<p>Examples for polygons with and without holes as well as for multi-polygons are illustrated by the <code>coordinates</code> arrays in [RFC7946] § A.3 ("Polygons") and § A.6 ("MultiPolygons").</p>  <p>Note: Although Geo URIs used to express <code>geoLocation</code> indicate latitude before longitude, this sequence is reversed by geoFence arrays, which indicate longitude before latitude. The mapping between GeoJSON points and Geo URIs is specified in [RFC7946] § 9 ("Mapping 'geo' URIs").</p> <p>Geo URIs: latitude before longitude geoFence: longitude before latitude</p>	
<code>additionalPartyIdentification</code>	list of <AdditionalPartyID> (see § 9.3.1.1)	<p>A party identifier that is in addition to the GLN.</p> <p>Example: SE 123456789001 (EU VAT Number)</p> <p>See § 0.</p>	Party

1627

1628

1629

Note: for back-compatibility with CBV 1.1 and earlier, the complete name of the attributes `site sst`, `ssa`, and `ssd` are expressed differently; see § 0.

1630 9.3.1.1 AdditionalPartyIdentification

1631 Each value of type AdditionalPartyIdentification consists of the following sub-elements:

Field	Type	Description
additionalPartyID	string	Value of the additional party identifier. Example: SE 123456789001
partyIDTypeCode	Code	Code that defines the type of additional party identifier. The code list for this attribute is defined in GDSN; see http://apps.gs1.org/GDD/Pages/clDetails.aspx?semanticURN=urn:gs1:gdd:cl:AdditionalPartyIdentificationTypeCode Example: EU_VAT_IDENTIFICATION_NUMBER

1632

1633 When a value of type AdditionalPartyIdentification appears as attribute of a VocabularyElement, it takes the form illustrated below.

1634 <attribute id="urn:epcglobal:cbv:mda:additionalPartyID">
1635 <additionalPartyID partyIDTypeCode="EU_VAT_IDENTIFICATION_NUMBER">
1636 SE 123456789001</additionalPartyID>
1637 </attribute>

1638 When a value of type AdditionalPartyIdentification appears in an EPCIS event extension, it takes the form illustrated below.

1639 <ilmd>
1640 <cbvmda:additionalPartyID partyIDTypeCode="EU_VAT_IDENTIFICATION_NUMBER">
1641 SE 123456789001</additionalPartyID>
1642 </ilmd>

1643 9.3.2 Location master data code list values

1644 The following section specifies code list values for sub-site type and sub-site attribute.

1645 9.3.2.1 Sub-Site Type

1646 The value of the Sub-Site Type master data attribute for a location identifier, if present, SHALL be one of the codes in the following table:

Sub-Site Type Master Data Attribute Values		
Code	Short Description	Definition
201	Backroom	An area within a store (all formats - club, etc.) used to hold product until it is purchased or can be moved to the sales floor
202	Storage Area	An area where product is kept within a facility to fulfil future need. Reserve rack or bulk stacking. A location where the product is stored until it is needed in selection aisles making it accessible to the consumer. Reserve slots may contain one or multiple pallet loads, as well as multiple items within them For a retail store Secondary storage area associated with a store (may not be in the physical location) Potential to use this more broadly and add attributes to make distinction where necessary (recalled area, quarantined area, controlled substance, lay-away)
203	Sales Floor	An area within a store (all formats - club, etc.) where product is displayed for customer purchase
207	Returns Area	An area within a facility for holding or consolidating product to be sent back to the supplier, shipper or designated location
208	Production Area	An area within a facility where the conversion of materials and or assembly of components to manufacture goods, products or services takes place.
209	Receiving Area	An area within a facility where incoming merchandise is unloaded and checked for condition and completeness
210	Shipping Area	An area within a facility where outgoing merchandise is checked for condition and completeness and loaded onto a conveyance for transport
211	Sales Floor Transition Area	An area within a store between two physical locations (e.g. Backroom and Sales Floor) - used for a read point only
212	Customer Pick-Up Area	An area designated at a store for customer to take possession of purchased product.
213	Yard	An area outside of the main building used for holding product (e.g. Trailer or container)
214	Container Deck	An area on board a shipping vessel where containers are loaded.
215	Cargo Terminal	An area where cargo may get transferred between carriers. Cargo terminals provide the interface between modes of transportation.
251	Packaging Area	An area within a facility where product is packaged.
252	Picking Area	An area within a facility in which product is picked to fulfil an order.
253	Pharmacy Area	An area within a facility where prescription products are stored, dispensed and/or sold.
299	Undefined	Any sub-site type not identified by any of the listed values

9.3.2.2 Sub-Site Attributes

The value of the Sub-Site Attributes master data attribute for a location identifier SHALL be zero or more of the codes in the following table.

When the value of the Sub-Site Attributes master data attribute is transmitted as a single string (including when the Sub-Site Attributes master data attribute is transmitted using the `EPCISMasterDataDocument` form specified in [EPCIS1.2]), the string SHALL consist of the codes separated by commas with no leading, trailing, or internal whitespace characters, and furthermore the codes SHALL appear in ascending numerical sequence reading from left-to-right.



Non-Normative: Explanation (non-normative): The restriction on ascending numerical sequence guarantees that there is only one way to compose the string for a given set of attributes. This simplifies application processing of this data; e.g., when comparing whether two location identifiers have an identical set of Sub-Site Attributes.

Sub-Site Attribute Master Data Attribute Values		
Code	Short Description	Definition
401	Electronics	A specific area within the store for holding electronic products such as TV's, DVD players, etc.
402	Cold storage	A specific area or room that maintains a temperature above freezing but below ambient room temperature.
403	Shelf	A specified internal location for holding product.
404	Frozen	A specific area or room that maintains a temperature at or below freezing
405	Fresh	A specific area or room that maintains a specified temperature and/or humidity to preserve stored product
406	Promotion	A specific area or room that is used to hold special purchased product.
407	End Cap	A specific internal location on the sales floor, typically at the end of an aisle, for displaying product.
408	Point of Sale	An area in a retail location where sales transactions occur
409	Security	A designated internal location for the purpose of minimising direct access to the product
411	General Mdse	An area where typically - non-food products other than perishable, dry groceries and health and beauty care products that are displayed in stores on standard shelving. Examples include household cleaning products, paper napkins, laundry detergents, and insect repellents
412	Grocery	An area where typically - food products that are displayed in stores on standard shelving. Examples include canned goods, produce, meats.
413	Box Crusher	A Baler used to compact recycled materials (e.g. corrugated boxes, slip sheets and packaging material)
414	Dock / Door	One or more doors where trucks or rail cars are loaded (shipping) or unloaded (receiving). Used to load or unload trailers or vans.
415	Conveyor Belt	A continuous moving strip or surface that is used for transporting single cartons or a load of objects from one place to another

Sub-Site Attribute Master Data Attribute Values		
416	Pallet Wrapper	An area where any automatic or manual method using bands of plastic film applied to product used to encase palletised loads prior to shipment to protect against product damage
417	Fixed Reader	Any fixed read point configuration (reader and antennas) for the purpose of capturing EPC data (e.g. Door way or conveyor read point)
418	Mobile Reader	Any non-fixed (portable) reader configuration (reader and antennas) for the purpose of capturing EPC data (e.g. Hand held or forklift reader)
419	Shelf/Storage	Where the product is stored on the sales floor, not accessible to the customer, until it can be moved, making it accessible to the consumer.
420	Returns	An area within a store or retailer DC for holding or consolidating product to be sent back to the supplier, shipper or designated location.
421	Staging	An area within a DC or Manufacturing Facility which the receiving and shipping docks use to gather and check inbound and outbound loads.
422	Assembly	An area where components are put together into an end product, appropriate to the process concerned.
423	Lay-Away	An area within a store for holding or consolidating customer purchases for final payment and pickup
424	Dispenser	Tablet, caplet or capsule dispensing machine in which bulk product has been placed to be dispensed on a prescription basis.
425	Quarantine	An area at a Manufacturing, Distribution or Retail facility to hold product that may not be suitable for consumption until further inspection
426	Controlled Substance	A caged and locked area in which regulated, controlled substance pharmaceuticals are held while awaiting shipment.
427	Recalled Product	An area in which recalled product is stored pending shipment back to the manufacturer or the manufacturer's designated returns centre for final disposition
428	Quality Control	An area in which any product not meeting quality standards is held pending further evaluation.
429	Printing Room	An area which provides printed labels/tags for the goods/cartons/pallets within a DC or Manf Facility Please note – this supports the process where an EPC tag is encoded off the line and is later commissioned and associated with a particular product.
430	Loading Dock	A parking bay, partly enclosed by a raised platform, at which trucks are loaded and unloaded, e.g. in a warehouse site.
431	Entrance Gate	A point of transport access into a yard or other arriving area.
432	Exit Gate	A point of transport exit from a yard or other departing area.
433	Gate	A point of transport within a facility – not indicated specifically as an entrance or an exit point.

Sub-Site Attribute Master Data Attribute Values		
434	Read Point Verification Spot	A point at which a tagged object's location has been verified by an associated read of a separate fixed location tag. Read Point Verification Spot would be used when there is a business process to capture the current location of an object at rest (typically with a mobile reader).

10 References

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- 1676

11 Contributors to earlier versions

Below is a list of active participants and contributors in the development of earlier CBV versions. This list does not acknowledge those who only monitored the process or those who chose not to have their name listed here. The participants listed below generated emails, attended face-to-face meetings and conference calls that were associated with the development of this standard.

11.1 Contributors to CBV 1.2

Name	Company
Andrew Kennedy, Co-chair	FoodLogiQ
Ralph Troeger, Co-chair	GS1 Germany
Gena Morgan, Facilitator	GS1 Global Office
Ken Traub, Editor	Ken Traub Consulting LLC
Philip Allgaier	bpcompass GmbH
Paul Arguin	r-pac international
Karla Biggs-Gregory	Oracle
Zsolt Bocsi	GS1 Hungary
Jonas Buskenfried	GS1 Sweden
Jaewook Byun	Auto-ID Labs, KAIST
Karolin Catela	GS1 Sweden
Mario Chavez	GS1 Guatemala
Luiz Costa	GS1 Brasil
Deniss Dobrovolskis	GS1 Sweden
Michael Dols	MET Laboratories
Hussam El-Leithy	GS1 US
Jürgen Engelhardt	Robert Bosch GmbH
Heinz Graf	GS1 Switzerland
Danny Haak	Nedap
Tany Hui	GS1 Hong Kong, China
Jianhua Jia	GS1 China

Name	Company
Peter Jonsson	GS1 Sweden
Art Kaufmann	Frequentz LLC
Janice Kite	GS1 Global Office
Jens Kungl	METRO Group
Roar Lorvik	GS1 Norway
Paul Lothian	Tyson
Fargeas Ludovic	Courbon
Noriyuki Mama	GS1 Japan
Kevan McKenzie	McKesson
Reiko Moritani	GS1 Japan
Alice Mukaru	GS1 Sweden
Mauricio Munoz	Axway
Falk Nieder	EECC
Juan Ochoa	GS1 Columbia
Ted Osinski	MET Laboratories
Ben Östman	GS1 Finland
James Perng	GS1 Chinese Taipei
Craig Alan Repec	GS1 Global Office
Chris Roberts	GlaxoSmithKline
Thomas Rumbach	SAP AG
Chuck Sailer	Frequentz
Michael Sarachman	GS1 Global Office
Hans Peter Scheidt	GS1 Germany
Michael Smith	Merck & Co., Inc.
Michele Southall	GS1 US
Peter Spellman	TraceLink

Name	Company
Peter Sturtevant	GS1 US
Hristo Todorov	Axway
Geir Vevle	HRAFN AS
Elizabeth Waldorf	TraceLink
Ruoyun Yan	GS1 China
Tony Zhang	FSE, Inc.
Mike Zupec	Abbvie

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1683 11.2 Contributors to CBV 1.1

Name	Company
Andrew Kennedy	FoodLogiQ (Working group co-chair)
Michele Southall	GS1 US (Working group co-chair)
Gena Morgan	GS1 (Working group facilitator)
Ken Traub	Ken Traub Consulting LLC (Editor)
Craig Alan Repec	GS1 Global Office
Jean-Pierre Allard	Optel Vision
Romain Arnaud	Courbon
Shirley Arsenaault	GS1 Global Office
Koji Asano	GS1 Japan
Karla Biggs-Gregory	Oracle
Havard Bjastad	TraceTracker AS
Stephan Bourguignon	Daimler AG
Bob Bunsey	SPEDE Technologies
Birgit Burmeister	Daimler AG

Name	Company
Jonas Buskenfried	GS1 Sweden
Robert Celeste	GS1 US
Chris Chandler	GS1 US
Lucy Deus	Tracetracker
Hussam El-Leithy	GS1 US
Heinz Graf	GS1 Switzerland
Anders Grangard	GS1 Global
Emmanuel Hadzipetros	TraceLink
Mark Harrison	Auto-ID Labs
Dave Harty	Systech International
Douglas Hill	GS1 Denmark
Robert Hotaling	Supply Insight
John Howells	HDMA
Tany Hui	GS1 Hong Kong
Yoshihiko Iwasaki	GS1 Japan
Art Kaufmann	Frequentz LLC, IBM
John Keogh	GS1 Global Office
Janice Kite	GS1 Global Office
Steinar Kjærnsrød	TraceTracker AS
Jay Kolli	Abbott
Jens Kungl	METRO Group
Sean Lockhead	GS1 Global Office
Paul Lothian	Tyson
Dale Moberg	Axway
Reiko Moritani	GS1 Japan
Mark Morris	Abbott Laboratories Inc.

Name	Company
Marc-Antoine Mouilleron	France Telecom Orange
Alice Mukaru	GS1 Sweden
Falk Neider	IBM Germany
Andrew Osbourne	GS1 UK
Ted Osinski	MET Laboratories
Nicolas Pauvre	GS1 France
Cynthia Poetker	Abbott Laboratories
Venkataramanan Rajaraman	Abbott Laboratories
Craig Alan Repec	GS1 Global Office
Chris Roberts	GlaxoSmithKline
Ian Robertson	Supply Chain RFID Consulting LLC
Dirk Rodgers	Dirk Rodgers Consulting, LLC
Thomas Rumbach	SAP AG
John Ryu	GS1 Global Office
Aravindan Sankaramurthy	Oracle
Michael Sarachman	GS1 Global Office
Udo Scheffer	METRO Group
Frank Schmid	IBM (US)
Michael Smith	Merck & Co., Inc.
Monika Solanki	Aston University
Peter Spellman	TraceLink
Steve Tadevich	McKesson
Petter Thune-Larsen	GS1 Norway
Peter Tomicki	Zimmer, Inc.
Ralph Troeger	GS1 Germany
Jens Vialkowitsch	Robert Bosch GmbH



Name	Company
Geir Vevle	HRAFN
Matthew Warren	Zimmer, Inc.
David Weatherby	GS1 UK
Joachim Wilkens	C & A SCS

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