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Draft

March 2024

CEFACT/___/___

UNITED NATIONS ECONOMIC COMMISSION FOR
EUROPE

UNITED NATIONS CENTRE FOR TRADE FACILITATION
AND ELECTRONIC BUSINESS (UN/CEFACT)

**BUSINESS REQUIREMENTS SPECIFICATION
(BRS)**

**Digital Product Conformity Certificate Exchange
- High Level Process**

Approved: UN/CEFACT Bureau _____

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73 **Document History**

Phase	Status	Date Last Modified
Draft Development	Internal Review Processed	March 24, 2024

74 **Change Log**

Date of Change	Version	Paragraph Changed	Summary of Changes

75 **1.0 Preamble**

76 Unverified product claims provide potentially false assurance for purchasers and regulators.
77 Conformity assessment processes are a key mechanism for providing global product
78 assurance, however, conformity attestations that result from conformity assessment processes
79 are still largely paper-based¹ or in electronic formats (e.g. PDF) which do not cater for easy data
80 processing due to the lack of agreements on commonly used data elements and definitions.
81 This situation is incompatible with regulator-driven digital initiatives, such as those directed
82 towards sustainable trade outcomes. Market incentives for demonstrating sustainability claims
83 may exacerbate the problem, by increasing incentives for falsifying or misusing evidence for
84 such claims.

85 To facilitate efficient, informed processes for product acceptance and to mitigate the
86 shortcomings of paper-based systems, this Business Requirements Specification (BRS)
87 proposes a data structure for the exchange and verification of product conformity information.
88 This is compatible with provisions of the World Trade Organization (WTO) Agreement on
89 Technical Barriers to Trade² (TBT) regarding acceptance within an importing economy of the
90 results of conformity assessment procedures arising in an exporting economy. This BRS also
91 aligns with the International Organization for Standardisation (ISO) Conformity Assessment
92 Committee (CASCO) standards³ and the established global frameworks⁴ operating in
93 accordance with these standards for the facilitation and acceptance of conformity assessment
94 outcomes, especially in the context of cross-border acceptance.

95 The intended audience for this BRS includes policy officials and private sector participants
96 having responsibility for the quality, safety, environmental and social performance of products,
97 the conformity assessment community and the community of solution providers who may be
98 involved in technical implementation.

99 **2.0 Executive Summary**

100 For the products we consume and interact with, testing, inspection and certification provide the
101 basis for market access requirements, especially those related to safety and quality
102 characteristics but, increasingly, a broad range sustainability and social impact characteristics
103 as well. New demands from governments, regulators and users, such as whole-of-life carbon
104 accounting, are placing greater onus on data validation and discovery throughout the supply
105 chain, to improve transparency and accountability.

¹ UN/CEFACT White Paper: Digital Product Conformity Exchange, August 2023

² https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm

³ <https://casco.iso.org/toolbox.html>

⁴ These frameworks include the global mutual recognition processes overseen by the International Accreditation Forum (IAF) [website] and the International Laboratory Accreditation Cooperation (ILAC) [website] as well as regional accreditation group mutual recognition arrangements.

106 Challenges with existing conformity data exchange systems are well established⁵, including:

- 107 ● attestations (e.g. certificates) are subject to revision, yet paper/PDF copies do not
- 108 automatically update themselves;
- 109 ● attestations are vulnerable to false connections being asserted between conformity
- 110 data and the supplied product;
- 111 ● the rigour of some conformity assessment outputs may be open to question, with the
- 112 connection to global recognition not always obvious; and
- 113 ● a single commercially sensitive data point means the entire attestation is removed
- 114 from the pool of available data.

115 To support the transparency of product claims in the context of digital trade, this BRS proposes
116 a data model for encoding key conformity assessment elements to enable automated
117 verification. This can function independently of whether underlying attestation (certificate,
118 report, etc) is digitalised, or even accessible. The data model is flexible enough to deliver
119 comprehensive verification or may be implemented at more modest levels to reflect an evolving
120 pathway toward supply chain digitalisation. A platform-independent mechanism for interoperable
121 data access/exchange is also described, which is based on open standards and consistent with
122 UN/CEFACT recommendations.

123 This BRS provides a vital technical underpinning for digital product passport initiatives and
124 digital trade single windows, while empowering conformity assessment bodies (CABs) to
125 maintain control over the integrity of their data and to address their customer's requirements.

126 **3.0 References**

127 The following resources have been fundamental to the development of this BRS:

- 128 1. ISO/IEC 17000:2020 Conformity assessment - Vocabulary and general principles
- 129 2. UN/CEFACT White Paper: Digital Product Conformity Exchange, August 2023
130 <https://unece.org/trade/documents/2023/10/white-paper-digital-product-conformity-certificate->
131 [exchange](https://unece.org/trade/documents/2023/10/white-paper-digital-product-conformity-certificate-exchange)
- 132 3. UN/CEFACT White Paper: eData Verifiable Credentials for Cross Border Trade
133 <https://unece.org/trade/documents/2023/10/white-paper-edata-verifiable-credentials-cross-border->
134 [trade](https://unece.org/trade/documents/2023/10/white-paper-edata-verifiable-credentials-cross-border-trade)
- 135 4. UN/CEFACT Business Requirements Specification: Traceability and Transparency in the Textile
136 and Leather Sector, Part 2: Use Cases and CCBDA Data Structures, Product Circularity Data
137 Use Case Extension (publication pending)
138 <https://uncefact.unece.org/download/attachments/182976575/ProductCircularityDataUseCase->
139 [v3A-Extension-TL TT BRS Part%20II-UC CCBDA.pdf?api=v2](https://uncefact.unece.org/download/attachments/182976575/ProductCircularityDataUseCase-v3A-Extension-TL TT BRS Part%20II-UC CCBDA.pdf?api=v2)
- 140 5. UN/CEFACT Modelling Methodology v2.0
- 141 6. UN/CEFACT Core Component Library 21A

⁵ UN/CEFACT White Paper: Digital Product Conformity Exchange, August 2023

142 **4.0 Objective**

143 This BRS seeks to outline a basic framework enabling any participant or stakeholder in a
144 product supply chain to access sufficient reliable product conformity information to gain
145 assurance about a product claim. Trusted trade demands a standardised approach for
146 securing reliable assurances regarding the attributes of a product.

147 The framework should be equally applicable for applications involving digital product passports
148 or for the direct sharing of conformity information between supply chain participants. The
149 approach should be suitable for parties operating at various levels of digital maturity.

150 Use of the described data structure by any participating party should be voluntary but there is
151 potential for this to become an important element of future secure digital supply chains.

152 **5.0 Scope**

153 5.1 Non-regulatory context

154
155 This BRS describes access to conformity assessment attestations having relevance to claims
156 that are made about products, especially when moving across borders. Aspects of conformance
157 are not limited to physical attributes and may encompass sustainability measures, for example.
158 Attestations may address conformance with voluntary standards, voluntary certification and/or
159 national/jurisdictional laws and may include statements regarding attributes of products and/or
160 processes and/or organisations having relevance to a product. The BRS does not seek to
161 address all forms of evidence, such as purchase receipts or data captured by production
162 machine sensors, that may be presented as evidence in support of a product claim but is
163 concerned specifically with outputs of product conformity assessment processes.

164
165 The BRS deals with data elements and linkages that can give confidence and utility to
166 conformity attestations. Some aspects considered include: verifiable connections to supplied
167 products (see note); the status of an issued attestation; the authority under which it was issued
168 and digital access to any reported metrics and conformance thresholds. While the BRS does not
169 directly address the reliability of statements supporting product promotion or product
170 descriptions, it would enable interested parties to be equipped with means for substantiating any
171 claims regarding product attributes.

172
173 **Note:** From a conformity assessment perspective, references to 'product' may be taken as having
174 applicability to both tangible and intangible purchases, including services. However, a lack of
175 verifiable identifiers for intangible products makes the application of this BRS more difficult,
176 particularly for services. As work continues to develop in this area, it is possible that pathways for
177 applying this BRS to intangible products, including services, will become clear.

178 5.2 Regulatory Context

179 Where legislative processes exist for establishing product conformity within a jurisdiction, this
180 BRS only seeks to describe the exchange of CAB outputs up until the point in the value chain at
181 which a regulator, or other authority, takes control of product conformity (as applies, for
182 example, in the case of European CE Mark approval). Any further exchange of CAB outputs
183 beyond that point would occur in a manner defined by the legislator. Outside of the defined
184 jurisdiction, this BRS may still have relevance for the purpose of export (that is, to address
185 overseas market requirements). Also, even within the jurisdiction, products may still be subject
186 to voluntary conformity assessment processes that relate to product attributes not covered by
187 legislative approvals and so this BRS may have relevance, for example, to sustainability
188 assessment for products subject to CE Mark approval.

189 **6.0 Business Requirements Elaboration**

190 6.1 Business Requirements List

191 A list of business requirements is provided in Annex 1.

192 6.2 Glossary and Definitions of Business Terms

193 A list of business terms having relevance to this BRS is provided in Annex 2.

194 6.3 Business Requirements View

195 6.3.1 Business Domain View

196 The International Supply Chain Reference Model (ISCRM) covers the set of processes following
197 the recognition of need by a customer for a product or service up until the fulfilment of an order
198 by a supplier and the resulting financial settlement. The product conformity process may be
199 part of Buy (Trade) and Ship (Transport & Logistics) within the supply chain. For example,
200 verifying evidence of product attributes could be executed on request of any party involved in, or
201 considering, purchasing a product (such as exporter, importer, reseller, end-consumer) to meet
202 their due diligence obligations or their own requirements for the product or by any party
203 responsible for checking or enforcing requirements (typically a governmental authority, such as
204 a customs authority or agency tasked with local regulatory approvals pertaining to products).
205

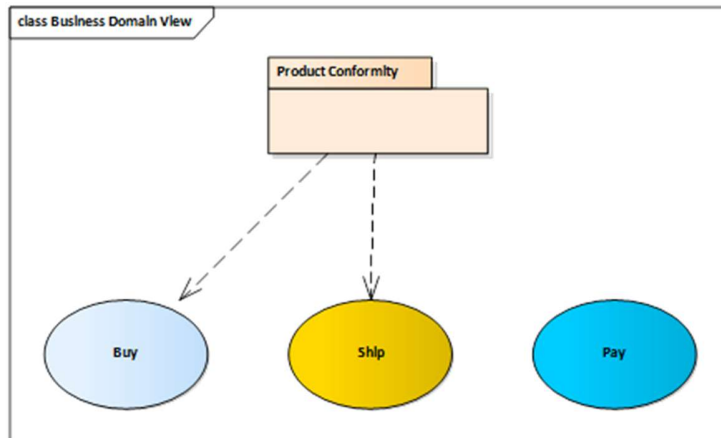


Figure 1 Business domain view

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Categories	Description and Values
Business Process	BUY-SHIP-PAY/ProductConformity
Product Classification	All
Industry Classification	All
Geopolitical	Global
Official Constraint	None
Business Process Role	Requestor: Purchaser (such as Exporter, Importer, Reseller, Procure/specifier, Producer, Manufacturer, End-consumer), Governmental authority (such as Customs authority or Regulatory agency) Responder: Supplier (such as Producer, Manufacturer, Reseller), CAB
Supporting Role	Requestor: Industry associations, Consumer groups Responder: Scheme owners (and other Authorised source for conformity attestations other than CABs)
System Capabilities	No limitations

211
212

Table 1 Context categories

213 Several specific business use cases within the Product Conformity domain view are depicted
214 below. The following abbreviations (see Annex 2 for associated definitions) are used:

- 215 • CAB = Conformity Assessment Body
- 216 • URI = Universal Resource Identifier

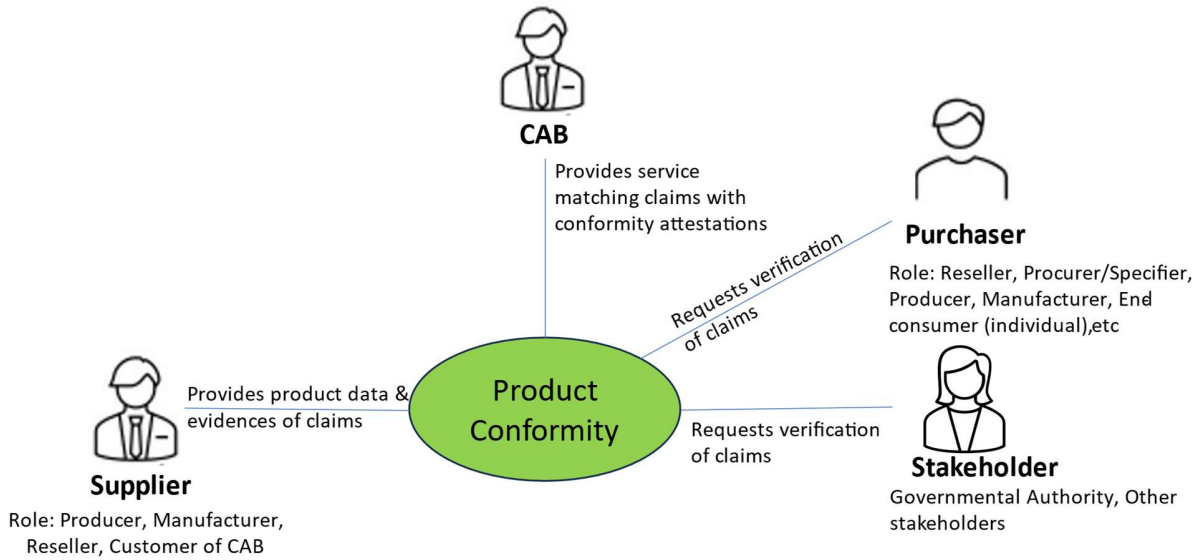
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Use case 1.0 - Product Conformity



221

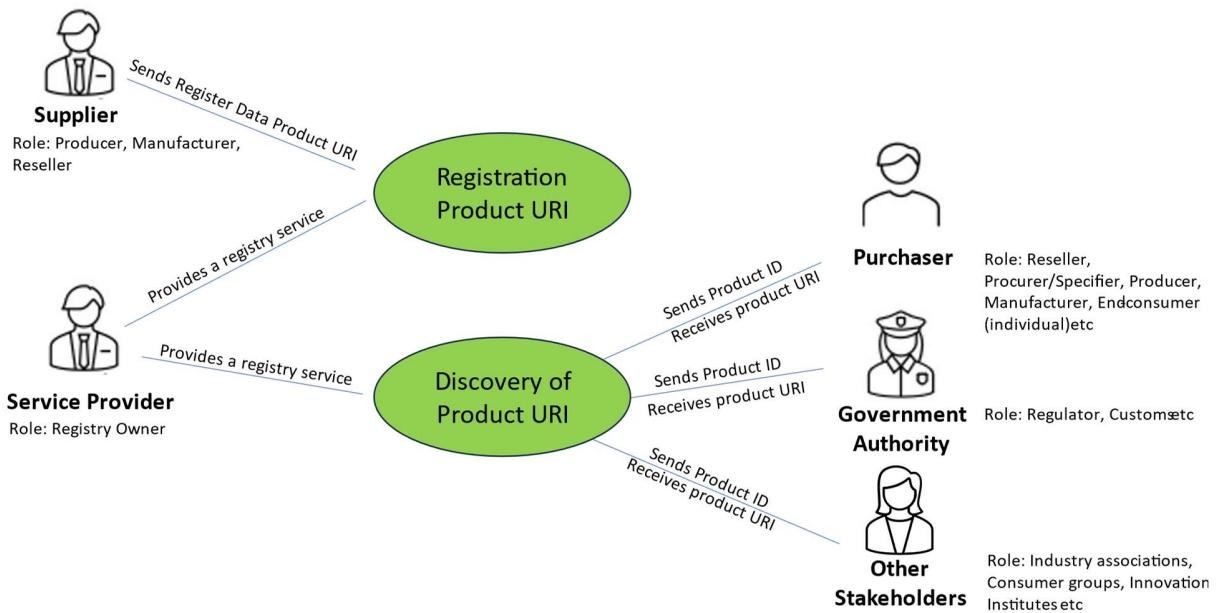
222

Figure 2 Use case 1.0

223

224

Use case 1.1 - Registration & discovery of product URIs



225

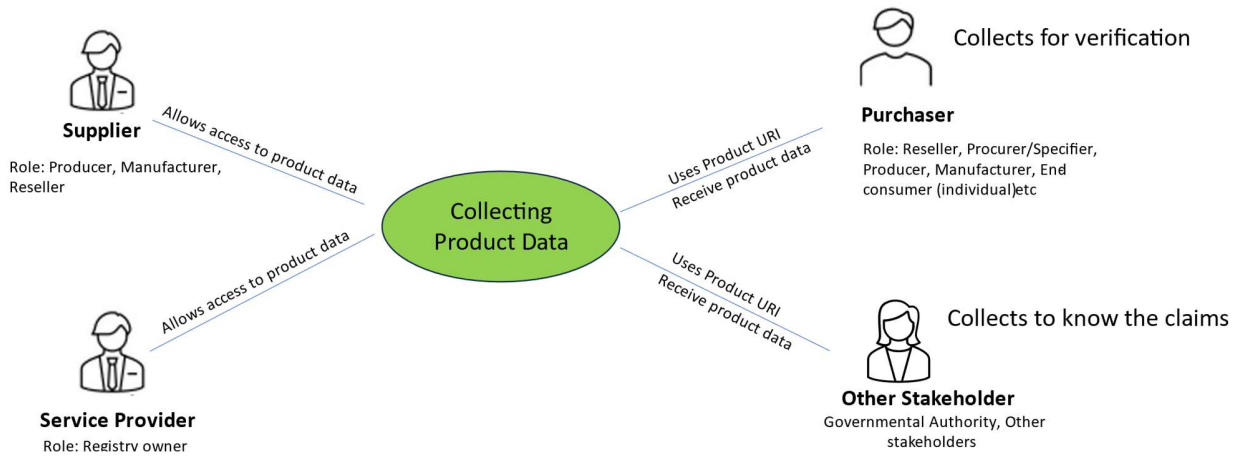
226

Figure 3 Use case 1.1

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228

Use case 1.2 - Collecting product data using a product URI



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230

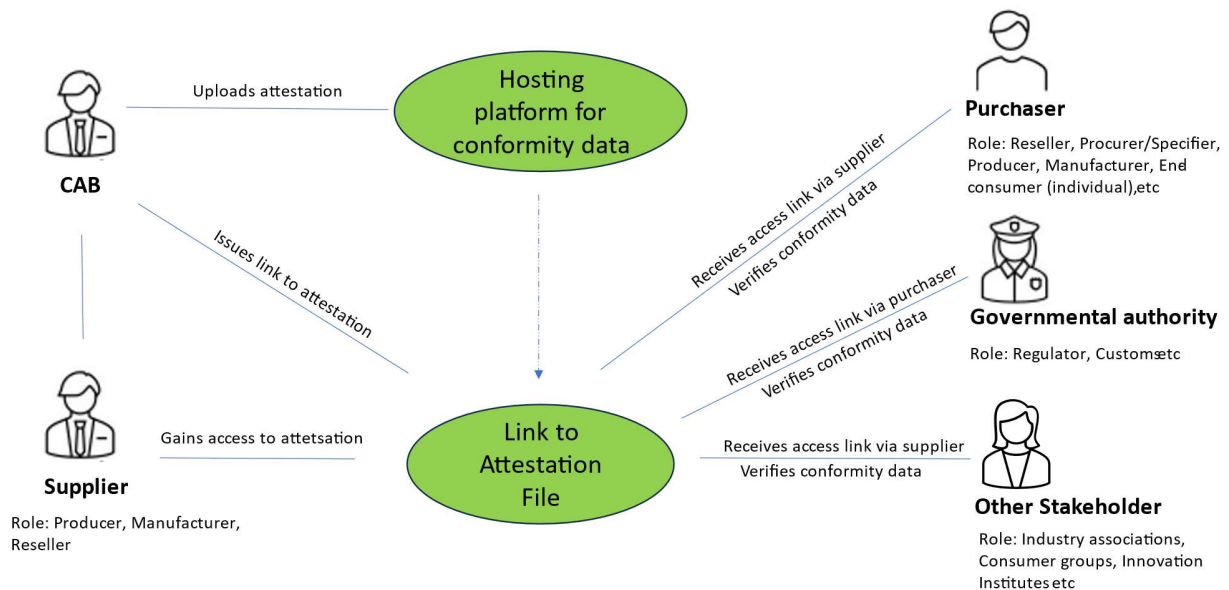
Figure 4 Use case 1.2

231

232

Use Case 1.3 - Transmitting conformity data to purchasers and governmental authorities (no registry involvement)

233



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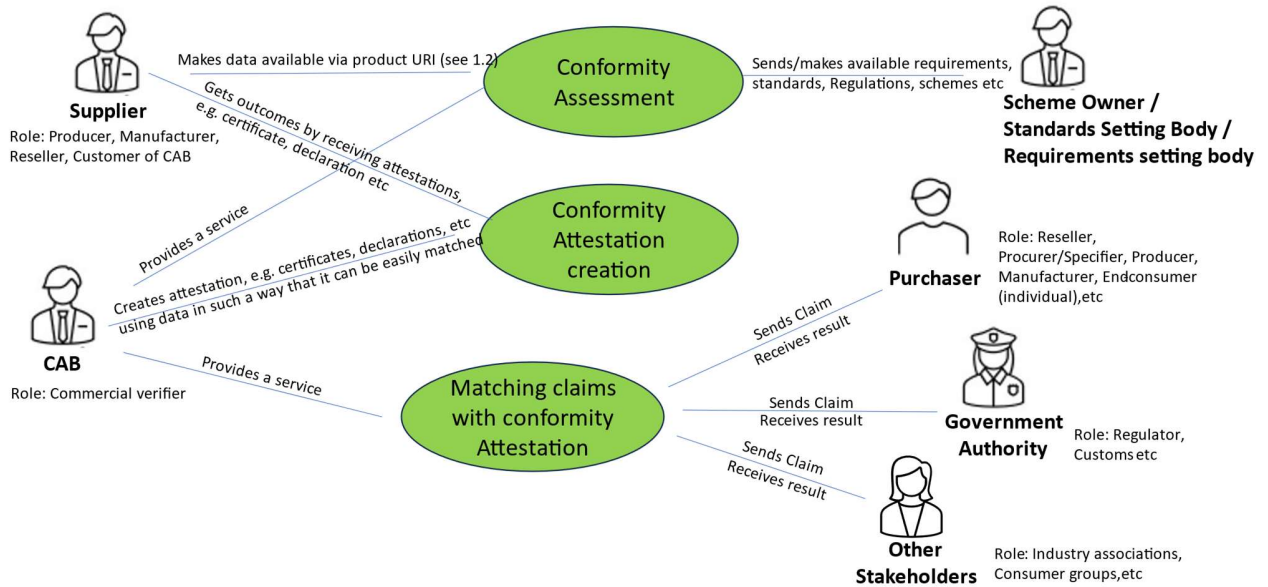
Figure 5 Use Case 1.3

236

237

238

Use Case 1.4 - Matching conformity attestation with claims



239

240

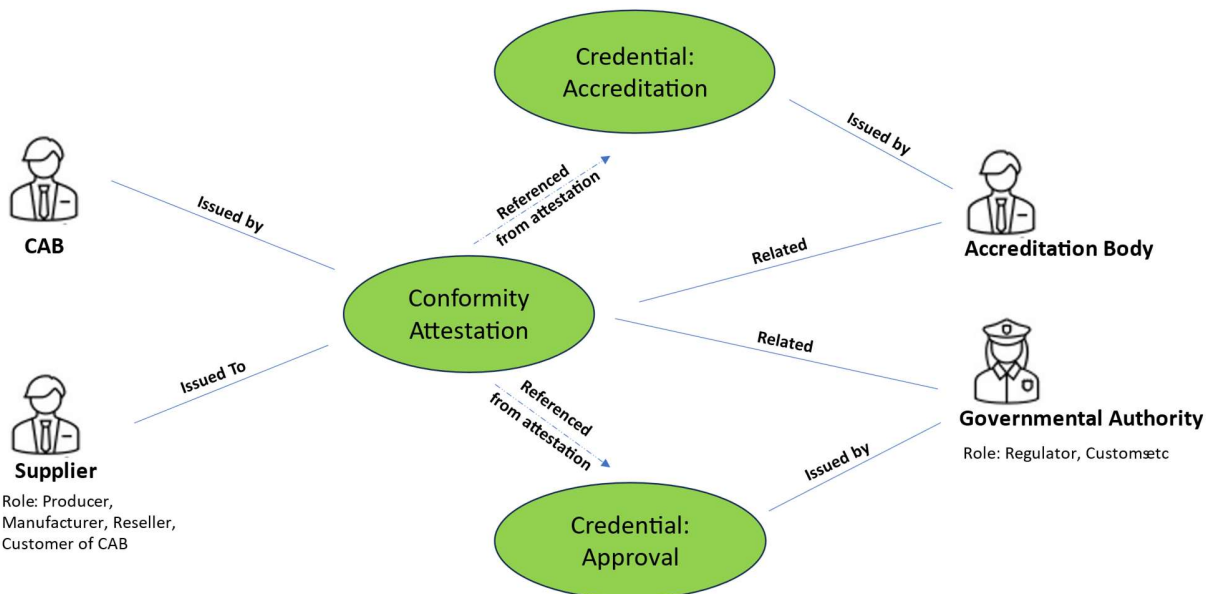
Figure 6 Use Case 1.4

241

Use Case 1.5 - Linking attestations to assurance credentials issued by an Authority

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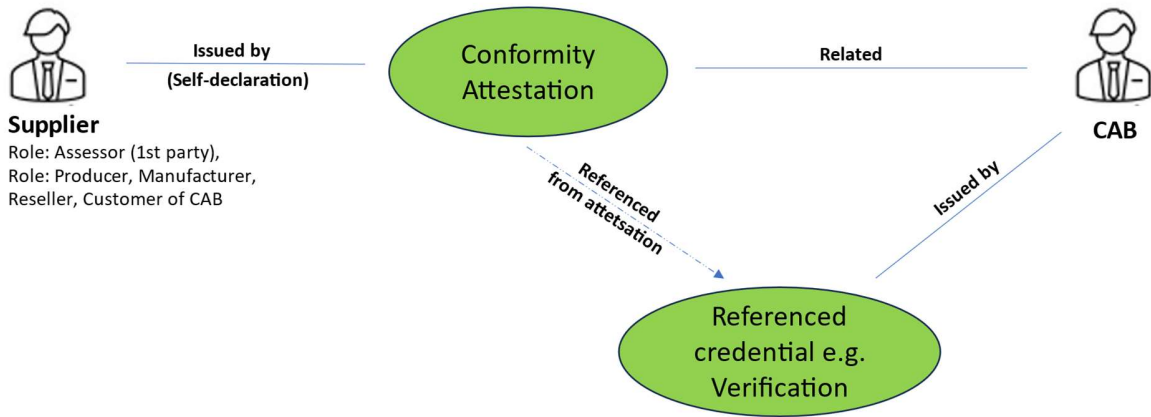
245

246

247

Figure 7 Use Case 1.5

248 **Use Case 1.6 - Linking attestations to assurance credentials issued by a CAB**



249

250

251

Figure 8 Use Case 1.6

252 The above use cases are all supported by the business requirements provided in Annex 1.

253 **6.4 Business Partner View – Participants and Stakeholders**

254 A list of participants and stakeholders in the domain under consideration is provided in Annex 3.

255 This list also includes any specifically defined roles that parties (that is, participants or
256 stakeholders) may fulfil.

257 **6.5 Business Entity View– Entity States, Lifecycle and Conceptual Model**

258 **6.5.1 Entity types**

259 A list of entities and their current or proposed UN/CEFACT Core Component Library (CCL)
260 definitions is provided in Annex 7.

261 **6.5.2 Global context for acceptance of conformity assessment outputs**

262 This BRS addresses the outputs of conformity assessment processes which are presented in
263 the form of attestations relating to product conformity. The conformity assessment activities
264 having relevance to this BRS may pertain to the attributes of a product or may pertain to the
265 attributes of a process, producer, facility, supplier or other body having relevance to a product
266 claim.

267 Conformity assessment is not limited to independent ('third party') assessment activity, although
268 in some circumstances this may be a regulated requirement. Suppliers may perform self-
269 assessments ('first party') or interested parties (such as purchasers) may conduct their own
270 conformity assessments ('second party'). Attestations arising from self-assessment ('first party')

271 are commonly referred to as 'declarations' or 'self-declarations' - these may be presented as
272 evidence to substantiate a product claim and may be acceptable for some purposes.

273 Approaches regarding the acceptance of conformity assessment outputs may vary depending
274 upon the nature and degree of the risk involved in the product(s) and the required level of
275 protection or other relevant public interest. The WTO TBT Agreement⁶ provides a framework for
276 the acceptance in an importing economy of the results of conformity assessment procedures
277 arising in an exporting economy. The basis of acceptance is that the importing economy is
278 satisfied that assurance of conformity with applicable technical regulations or standards is
279 equivalent to that achieved by the importing economy's own procedures (Article 6.1). To
280 achieve satisfactory understanding of the adequate and enduring technical competence of the
281 relevant conformity assessment bodies, the importing economy is required to take into account
282 "verified compliance, for instance through accreditation, with relevant guides or
283 recommendations issued by international standardizing bodies", as an indication of adequate
284 technical competence (Article 6.1.1).

285 This BRS recognises and facilitates a gradation of assurances that are more demanding than
286 the lowest level (self-declaration) and provides a blueprint for varying contexts and use cases.

287 An individual product may have many claimed attributes (these may include conformance with
288 both legislation and voluntary standards) and multiple threads of evidence may be provided in
289 support of any single attribute. As a result, the supporting evidence for any single product may
290 comprise a complex and extensive mix of evidence types. This BRS deals only with conformity
291 assessment outputs (whether first, second or third party) and so does not attempt to address
292 the entire set of possible evidence that might be provided to support claims made about a
293 product.

294 Known challenges⁷ with existing processes for accessing conformity data include:

- 295 ● attestations (e.g. certificates) are subject to revision, yet paper/PDF copies do not
296 automatically update themselves;
- 297 ● attestations are vulnerable to false connections being asserted between conformity
298 data and delivered products;
- 299 ● the rigour of some conformity assessment outputs may be open to question, with the
300 connection to global recognition not always obvious; and
- 301 ● a single commercially sensitive data point means the entire attestation is removed
302 from the pool of available data.

303 6.5.3 Discovery

304 Before an attestation can be verified, it must first be discoverable in a recognizable context. A
305 key concept within this BRS is that trust is gained by processing information elements that are:

⁶ https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm

⁷ UN/CEFACT White Paper: Digital Product Conformity Exchange, August 2023

- 306 ● collected from the source of issuance and
307 ● linked to the product of interest

308 A proposed starting point for considering discovery and verification of attestations is for any
309 attestation to be discoverable through a unique URI, where this is consistent with the
310 confidentiality requirements of the customer of the CAB.

311
312 **Principle 1:** To enable attestations subject to discovery to be uniquely referenced by
313 means of a web link (where this is consistent with the legally entitled confidentiality
314 requirements of the customer of the issuing CAB), a unique authorised source for any
315 given issued attestation must be determined by the issuing CAB. [Annex 1 - Business
316 Requirement B1]

317 Parties that may act as an authorised source for attestations can include scheme owners,
318 accreditation bodies, verification bodies and other parties. Refer Section 7.3 for more detail.

319 For an attestation to have value in substantiating product claims, there must also be a
320 demonstrable link between the attestation and the product of interest. Refer Annex 13 for
321 information on identification systems.

322 **Principle 2:** When undertaking conformity assessment of products, CABs can respond
323 to the increasing use of unique identifiers⁸ for traceability purposes by developing the
324 capacity to capture any available unique and verifiable product identifier(s), if available at
325 the level of resolution appropriate for the type of attestation, and to include such
326 identifier(s) within the issued attestation. [Annex 1 - Business Requirement B3]

327 **Note:** In the case of testing and inspection, a batch or serial number is normally applicable, in
328 addition to the product type identifier. Refer Annex 11 for further insight.

329 Where the link from conformity assessment to a product is indirect, for example, where the
330 object of assessment is an organisational management system or a production facility, unique
331 identifiers still hold relevance. This is because a product claim may depend on a connection
332 that is drawn between an organisation (holding a management system certification, for example)
333 or location (such as a production facility) and the specific desired attributes for a product (such
334 as its sustainability or quality performance).

335 **Principle 3:** When undertaking conformity assessment of organisations and/or locations,
336 CABs can respond to the increasing use of unique identifiers for traceability purposes by
337 developing the capacity for capturing unique and verifiable identifier(s) such as legal
338 entity identifiers or location identifiers, if available, and to include such identifiers within
339 the issued attestation. [Annex 1 - Business Requirement B3]

⁸ UN/CEFACT White Paper Globally Unique Identifiers in Supply Chains – Discoverable, Resolvable, Verifiable (pending publication)

340 Regardless of identifier type, an identifier is only of value where the basis for confidence in the
341 link from the attestation to the object of conformity assessment is made clear. CABs are in the
342 unique position of being able to attest to the circumstances under which the object of conformity
343 assessment has been identified. For example, it may be that the CAB was responsible for
344 scanning a product barcode or may have directly undertaken (or witnessed) the process of
345 product sampling from a defined product batch. On the other hand, if the CAB was supplied with
346 an identifier by the party requesting the conformity assessment, without any separate validation
347 process, then this would represent a lower level of confidence regarding the link between the
348 attestation and the stated object of conformity.

349 **Principle 4:** CABs can ensure a clear basis for confidence regarding any traceability
350 link from the attestation to a specific object of conformity assessment, by confirming that
351 the quoted identifier(s) for the reported object of conformity have been verified by the
352 CAB. [Annex 1 - Business Requirement B3]

353 As products are typically transformed along supply chains, there arises a need for reconciling
354 captured identifiers for 'input' products with the identifiers for 'output' products. While this is
355 likely to be performed at a generic level by CABs during assessment activities, making traceable
356 product-specific connections available to external parties is more challenging and is beyond the
357 scope of this BRS. The United Nations Transparency Protocol⁹ (UNTP) represents a
358 generalised approach for addressing this. Regardless of approach, the product identifiers
359 reported by CABs at any given stage of supply are likely to represent an important part of robust
360 solutions.

361 6.5.4 Nature of attestation

362 The acceptability of an attestation may be informed by such considerations as the type of
363 assessment carried out, as well as indicators of assurance framed in terms of the impartiality of
364 the assessing party as well as any authority (such as an accreditation of the CAB or a
365 verification of the attestation) relevant to a specific attestation.

366 **Principle 5:** Given the wide variety of attestation types and the non-equivalence of the
367 various means of assurance, standardised vocabularies for the type of attestation and
368 assurance descriptors are necessary, so that the issuing CAB may report this
369 information in a digitally accessible manner to support reliable conformity assessment
370 data exchange and verification. [Annex 1 - Business Requirement B8]

371 Example vocabulary structures for these elements are provided in Annex 4.

372 6.5.5 Evidence for assurance over an issued attestation

373 This BRS proposes that CABs provide formal links from issued attestations to any external
374 assurance over the attestation, whether this relates to an independent accreditation, regulatory

⁹ <https://uncefact.github.io/spec-untp/docs/about>

375 approval or (in the case of self-declarations) a verification/validation of the attestation by a CAB.
376 This provides a clear basis for confidence in the issuing party and aligns with WTO TBT¹⁰ Article
377 6 provisions.

378 Regulators in many sectors specify the use of conformity assessment by referring to a set of
379 international standards, known as the CASCO Toolbox¹¹ which includes provision for
380 independent assessment of a CAB, through a process known as accreditation, conveying formal
381 demonstration of competence, impartiality and consistent operations in performing conformity
382 assessment activities. Some certification schemes extend this provision, such as in the
383 European Notified Body system¹², where accreditation is followed by notification and
384 alternatives for accreditation exist. Apart from this, there are myriad standalone forms of
385 regulatory approval in place around the world for bodies carrying out conformity assessment
386 activities.

387 **Principle 6:** To demonstrate the basis for confidence in an attestation, CABs can
388 provide a verifiable link to the source of any authority under which the attestation has
389 been issued, whether that be a regulatory approval, an accreditation by a national or
390 regional accreditation body or other form of assurance. [Annex 1 - Business
391 Requirement B6]

392 6.5.6 Attestation status (entity states)

393 Conformity attestations may be current, expired, suspended or withdrawn/revoked and the
394 manner in which the state of an issued attestation can be determined at any time is important
395 (refer Annex 5 for an entity state diagram).

396 For paper-based attestations that exist in the public domain, it is becoming more common for an
397 issued document to contain a link to the online hosted version, so that status at any time may be
398 determined. However, this concept can break down for documents that are not publicly
399 accessible to begin with or are no longer available, especially on multi-decade timeframes
400 demanded for some regulated products, or as may apply for some circular economy initiatives
401 (such as building product recycling).

402 A persistent digital layer or supporting structure (referencing the hosted attestation) may enable
403 more reliable version control. Persistent data structures of this type may be achieved through
404 various means and, in the case of involvement of third party platforms or use of portable data
405 packets such as verifiable credentials (see 7.4), may last beyond the lifetime of the issuing CAB.

406 **Principle 7:** For attestations subject to digital discovery, a supporting data structure
407 containing a status field and dates of validity (i.e., start, end) will enable discovery of
408 information regarding the status of an attestation, for example, to support activities such

¹⁰ https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm

¹¹ <https://casco.iso.org/toolbox.html>

¹² Decision No 768/2008/EC Article R23 (4) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008D0768#d1e872-89-1>

409 as potential product recycling, even if the original attestation file (i.e., certificate, report,
410 etc) is no longer verifiable for reasons such as certificate expiry or cessation of trading
411 by the issuing CAB. [Annex 1 - Business Requirement B5]

412 Annex 5 provides insight into how entity states may be managed through a supporting data
413 structure.

414 6.5.7 Confidentiality and sensitivity issues

415 Many attestations are not freely available to all parties. Information may be confidential for
416 reasons including commercial sensitivity.

417 **Principle 8** - CABs are the custodians (refer Annex 12) of the attestation data that they
418 issue and so provision is needed to enable CABs to address the legally entitled
419 requirements of their customers regarding data confidentiality and sensitivity. [Annex 1 -
420 Business Requirement A1]

421 Suppression of the underlying paper-based or hybrid document sources (e.g. PDF) may
422 undermine manual verification efforts. Where sharing of attestations is problematic, meta data
423 insight into some less sensitive content (e.g., test thresholds) may represent an acceptable
424 solution. The advantage with this is that a degree of digital verification may be carried out, even
425 if the underlying attestation remains suppressed.

426 In a digital setting, there is also scope for file encryption so that only approved parties (holding
427 decryption keys) may access the data. This BRS makes provision for a range of measures that
428 are supportive of confidentiality:

- 429 1. Potential for encryption of the referenced attestation file (i.e., certificate, report etc),
430 accessed through file hash permission functionality within the data model
- 431 2. Potential for encryption of portions of the underpinning conformity data addressed
432 through division of material into an attestation file and an evidence file having potential
433 for differing permission levels (refer Annex 12 for further detail)
- 434 3. Potential for selective redaction by any party of elements of the data structure supporting
435 the attestation file when exchanged in the form of a digital credential (refer Section 7.4)

436 6.5.8 Verification of product claims based on the content of attestations

437
438 Initiatives such as digital product passports indicate a need for digital access to a range of
439 conformity assessment information, such as whether a product meets specific performance
440 standards. Verification at this level necessarily extends into the *content* of an attestation, not just
441 the data about the nature of the attestation. This includes the possibility for establishing digital
442 connections between identifiers (such as might be contained within a product barcode and
443 recorded within an attestation) and the conformity data which relates to those identifiers.
444

445 In Section 6.5.6, a simple data structure associated with an attestation was proposed in the
446 context of enabling issue status verification. This concept can be further developed to address
447 regulatory, or other, drivers for digital access to specific content within a non-digital certificate.
448

449 While it is unlikely to expect more complex models to be adopted in the immediate term, it is
450 possible that certain industries may move more quickly towards digital exchange of conformity
451 data than others, possibly in response to regulatory drivers.
452

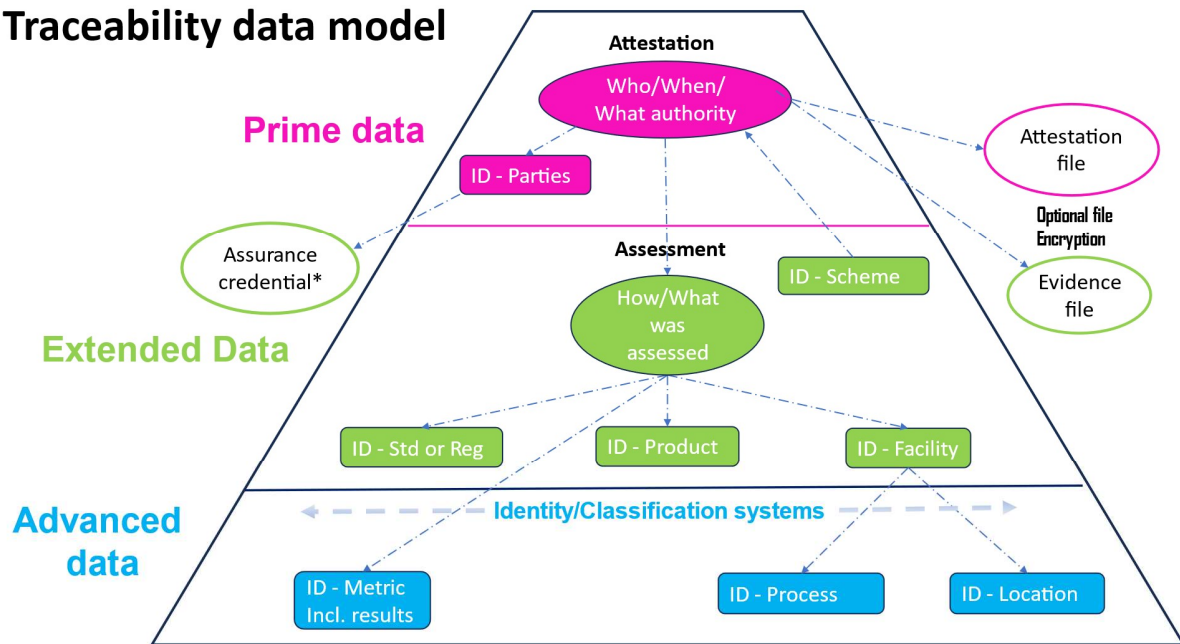
453 Standardisation of machine-readable data elements to support product verification, including
454 increased reliability of sustainability claims, would increase the value of conformity attestations
455 in the context of international trade. However, there are several variables that will affect the
456 complexity of the encoded elements necessary for digital verification. Significant contributions to
457 complexity are listed below:
458

- 459 1. Use of formal identification and/or classification systems (such as data dictionaries) to
460 enable machine-identifiable products, organisations, locations, measurement types and
461 units of measurement.
- 462 2. Machine-readable references to the authority under which the attestation was issued
463 (such as independent accreditation and/or regulatory approval).
- 464 3. Whether outcomes of conformity assessment can be expressed as a simple indicator for
465 conformance ('yes/no')
- 466 4. Whether the outcomes of a conformity assessment apply equally to all listed objects of
467 the assessment (such as products or facilities)
- 468 5. Whether the attestation is confidential in nature and the type of data protection
469 measures desired
- 470 6. Whether details (e.g., numerical values) for product attributes are also required to be
471 machine readable.

472 6.5.9 Conceptual model and UN/CEFACT Modelling Methodology (UMM)

473 A conceptual model of the relationships between element groupings essential to the traceability
474 of conformity data may be represented as follows.

Traceability data model



* Credentials may be issued by Governments, Accreditation Bodies or CABs (verification/validation)

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479 Conceptual model terms for prime data:

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Figure 9 Conceptual model

- **Attestation** (as a data object) refers to the data set within the model that contains the link to the **Attestation file**, which is the original form of the attestation (i.e., certificate, report etc) and which may be in digital, paper-based or hybrid format (it may also be encrypted or otherwise protected from public access). The attestation data object also contains the following meta-data relating to the originally-issued attestation:
 1. Unique identifier
 2. Type of attestation (refer Annex 4)
 3. Identifying URI for the issuing CAB
 4. Status, date of issue and (if applicable) end data for validity of the attestation
 5. Assurance descriptors (refer Annex 4)
- **Party** identifiers will relate to the issuer and recipient of the attestation and may also relate to one or more additional parties providing assurance of any kind over the attestation, such as a regulator, an accreditation body or (in the case of verification/validation) a CAB.

Conceptual model terms for extended & advanced data:

- **Assessment** (as a data object) refers to the data set within the model that references the object(s) of assessment and the assessed requirements. There may be multiple assessments contained in a single instance of the data model.

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- **Scheme** refers to the conformity scheme(s) or program(s) under which the attestation has been issued, where applicable.
 - The objects of the conformity assessment are shown above as **Product, Facility, Process** and **Location** and may each be singular or multiple (that is, a 'one to many' relationship). Within this BRS, 'product' refers to the entity being purchased (which may be a service), whereas 'process' refers to an activity contributing to the creation of the purchased entity.
 - **Std or Reg** is an abbreviation for 'Standard or Regulation' and refers to the specified requirements that the listed objects are assessed against and is intended to encompass a range of types of standards or regulations, each identified as a URI.
 - **Identity/classification systems** refers to the vast range of formal systems that exist for defining identifiers and classification systems relevant to either physical or conceptual objects. These systems can operate at a local industry level, country level or international level and may take various forms, including inter-governmental agreements, lists published by standards bodies and private sector code lists or allocation systems. Further explanation is provided in Annex 13.
 - **Metric** refers to the results (numerical or non-numerical) of an assessment for defined parameters and may call up a specification (which is treated within the data model as a type of Standard) to provide the criterion, against which conformance may be specified.
 - **Assurance credential** reflects a record of assurance related to an attestation and which is issued by a party other than the issuer of the attestation.
 - **Evidence file** is an optional file (or files) for supporting documentation contributing to, or resulting from, the assessment and which may have a different level of confidentiality assigned than the attestation file.

528 It is recognised that identification for the elements described above may be achieved in various

529 ways, at varying levels of specificity, so the intent of the data model is not to prescribe any

530 particular approach to identification. It is also the case that formal identifiers are not currently

531 available for some items on any consistent basis.

532

533 For these reasons, digital discovery of conformity data might be best viewed as a journey. As

534 an initial target, digital discovery would be greatly facilitated through the digital capture of the

535 'prime data' (i.e., meta-data about the attestation itself) as well as identifiers, in some form, for

536 at least the following:

- 537
- 538
- 539
- 540
1. applicable conformity scheme (or program), if applicable
 2. referenced standard(s) and/or regulation(s)
 3. object(s) of conformity assessment

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543

Principle 9: Data elements needed to support verifiability can vary widely depending on the nature, content and sensitivity of the attestation, as well as any legislative or other requirements that may define the verifications which are to be undertaken. Nonetheless,

544 it is possible to define a general set of data elements from which subsets of data may be
545 drawn to suit particular instances. [Annex 1 - Business Requirements: B4, B7, B8]
546

547 A comprehensive structure for delivering the model described above is shown in Annex 6 and is
548 based on the UMM approach to data modelling. A Data Requirements list supporting this model
549 is also provided in Annex 7. To promote flexibility in implementation, almost all of the identified
550 data elements are indicated as being optional.

551
552 Both the UMM representation and the Data Requirements list are expressed using the
553 specialised terms and definitions drawn from the UN/CEFACT Core Component Library (CCL).
554 The expression of this model also harmonises with recent UN/CEFACT modelling¹³ for textile
555 circularity.

556 6.5.10 Verifying the status of entities referenced from the conformity attestation

557 While standards/specifications, regulations, schemes/programs are all subject to
558 revision/withdrawal after issuance of an attestation, it is not the responsibility of the CAB to
559 monitor this in respect of an attestation that has already been issued. Therefore, the onus is on
560 the party accessing the attestation to establish to their own satisfaction that the date of issue
561 recorded by the CAB for any referenced entity is the relevant one for the purpose of the
562 verification being undertaken. There is also potential to automate this process by setting the
563 acceptable issue dates for a given entity as being equal or greater than an allocated value.

564 6.5.11 Technical implementation examples

565 General features of steel and cotton garment supply chains are explored in detail in Annexes 8
566 & 9. The UMM representation of conformity data is illustrated in Annex 10 for various examples
567 of attestation types, selected for relevance to steel supply and cotton garment supply.

568 A further implementation of the model including schema files can be found at the United Nations
569 Transparency Protocol (UNTP) site¹⁴.

570 **7.0 Data exchange considerations**

571 7.1 Electronic access to data

572 The described data model could take a variety of forms, including:

- 573 1. Data directly transmitted between parties in a supply chain
- 574 2. Data accessible from platforms (e.g. product passports) designed to add value to the
575 information

¹³ https://uncefact.unece.org/download/attachments/182976575/ProductCircularityDataUseCase-v3A-Extension-TL_TT_BRS_Part%20II-UC_CCBDA.pdf?api=v2

¹⁴ <https://uncefact.github.io/spec-untp/docs/specification/ConformityCredential>

- 576 3. Data hosted at a web location which may be referenced from an external link
577 4. Any combination of the above

578 Since the data model described within this BRS does not require a specific data standard for
579 exchange, it is flexible enough to be structured to meet the needs of specific platforms, such as
580 digital public infrastructure¹⁵ initiatives.

581 7.2 Non-digital transmittal of attestations

582 Addressing varying levels of digital maturity of supply chain actors is another important
583 consideration.

584
585 **Principal 10:** For attestations that are subject to discovery and where CABs are issuing
586 attestations with a supporting data structure, the inclusion of a data carrier within the
587 referenced attestation file (i.e., certificate, report, etc) pointing to the corresponding
588 digital support structure will enable full verifiability, even in the cases where the
589 attestation has been transmitted as a raw document, without its supporting data
590 structure. [Annex 1 - Business Requirement A2]

591
592 Some CABs may prefer to also include a data carrier on their issued attestation documents that
593 encodes an address linking to their own verification system. This is not in conflict with the
594 intentions of this BRS.

595 7.3 Role of scheme owners and other parties

596 Depending on the type of conformity assessment, use of the data model could represent a
597 complementary process to existing models for hosting conformity data.

598
599 For conformity schemes (or programs) involving attestations that are designed to be publicly
600 accessible, or otherwise subject to discovery, a scheme owner (or a party responsible for a
601 program) may determine that the data model described in this BRS represents a suitable
602 protocol for data discoverability. Adoption of the data model may be relatively straightforward
603 where a scheme owner has sole responsibility for issuance of all attestations.

604
605 Apart from Scheme Owners, there are also other parties (including accreditation bodies, some
606 verifying bodies, and the IAF, which operates the global CertSearch register) that currently act
607 as hosting platforms for conformity attestations that are drawn from multiple sources. The raw
608 data currently being provided to these parties might be used to implement some of the
609 provisions outlined in this BRS, serving a complementary purpose to existing hosting activities.
610 Some CABs may prefer such parties to act on their behalf in implementing these provisions.

¹⁵ https://www.undp.org/sites/g/files/zskgke326/files/2023-08/undp-g20-accelerating-the_sdgs-through-digital-public-infrastructure.pdf

611 7.4 Verifiable credentials

612 To enhance the potential for adoption at global scale, use of a common exchange protocol
613 could reduce the need for mapping arrangements between different platforms, based on
614 Application Programmable Interfaces (APIs) or similar. The World-Wide-Web Consortium¹⁶
615 (W3C) has defined a standard called Verifiable Credentials^{17 18}. The UN has previously
616 assessed this standard and has recommended its use for a variety of cross border trade use
617 cases in a recent White Paper¹⁹.

618
619 A verifiable credential is a portable digital version of everyday credentials like education
620 certificates, permits, licences, registrations, and so on. They are digitally signed by the issuing
621 party and are tamper proof, privacy preserving, revokable, and digitally verifiable. A related
622 W3C standard called Decentralised Identifiers²⁰ (DIDs) provides a mechanism to manage the
623 cryptographic keys used by verifiable credentials and also to link multiple credentials into
624 verifiable ‘trust graphs’. These standards are not tied to any platform provider or software
625 developer and are an open-source development provided through the W3C open web
626 development platform. UN/CEFACT makes available a free, open-source tool (vckit²¹) for the
627 purpose of creating W3C verifiable credentials.

628
629 From the perspective of this project, the W3C verifiable credential property of revocation means
630 that it is instantly revoked everywhere, regardless of how many parties are holding it. The
631 functionality of W3C verifiable credentials is explored in detail on the W3C.org website,
632 including the capacity for selective redaction (see note) of digital elements by any party which
633 enables individual data elements to be suppressed by any party prior to transmission, while the
634 residual content retains verifiability back to its source.

635
636 **Note:** Selective redaction refers to the suppression of specific data elements within a data packet
637 and is different from the whole-of-file (password-type) access protection that is also part of the
638 described data model

639
640 A consistent basis for implementation makes it possible to support interoperable implementation
641 (that is, independent of any platform) in a globally standardised manner. This would enable any
642 supplier of products to choose a service provider, where they may register the link to their
643 product and associated product data (‘product passport’) which, in turn, would contain the
644 necessary links to commence verification of the originating source of the data that is being
645 presented in support of product attributes.

646
647 **Principle 11:** For attestations that are subject to discovery and are issued with a
648 supporting data structure, maximum benefit to society arises from an agreed

¹⁶ <https://www.w3.org/>

¹⁷ <https://www.w3.org/TR/vc-data-model/>

¹⁸ <https://www.w3.org/TR/vc-data-model-2.0/>

¹⁹ <https://unece.org/trade/documents/2023/10/white-paper-edata-verifiable-credentials-cross-border-trade>

²⁰ <https://www.w3.org/TR/did-core/>

²¹ <https://github.com/unecefact/project-vckit-examples>

649 interoperable exchange protocol. UN/CEFACT recommends the use of W3C Verifiable
650 Credentials. [Annex 1 - Business Requirement A1]

651
652 CABs and other relevant organisations are encouraged to consider:
653 a) applying W3C data standards for verifiable credentials whenever issuing
654 conformity attestations in the form of digital credentials, or;
655 b) requesting that the W3C standards be applied when such credentials are issued
656 by an authorised party acting on their behalf (e.g., scheme owner, accreditation
657 body or other hosting party, such as a verifying body).

658 7.5 Credentials issued to CABs

659 The data model has provision for CABs to reference credentials from accreditation bodies
660 and/or regulators. While the onus is on the party accessing the attestation to take note of
661 whether credentials referenced from the attestation credential remain valid, this confirmation
662 can be automated in the case of W3C verifiable credentials (or any other machine-readable
663 credential type).

664 **Principle 12:** To support reliable conformity assessment for the purpose of digital trade,
665 accreditation bodies and government authorities having responsibility for the recognition
666 of competence and/or authority of CABs will be responsible for issuing secure digital
667 credentials containing issue and revocation dates to accredited/approved CABs. [Annex
668 1 - Business Requirements B6]

669 It is acknowledged that that reference to a webpage maintained by the accreditation body or
670 government authority may be a necessary alternative in the short term.

671 **Note:** While it is expected that a credential issued by an accreditation body would list any
672 Schemes covered by the accreditation, there are often further levels of technical detail necessary
673 to fully define the technical scope of accredited coverage. This is recognised in the data model in
674 the form of the 'Referenced Document' entity. While the accreditation technical scope
675 documentation may be amended frequently (in comparison with accreditation credentials), it is
676 conceivable that such documents could still be issued as secure digital credentials, with issue
677 and revocation dates. Irrespective of whether the accreditation body issues such a secondary
678 credential regarding technical coverage, it will always be clear through the reference made to the
679 accreditation credential whether or not the CAB is declaring their attestation to have been issued
680 within the technical scope valid at the time.

681 **8.0 Supply Chain Examples - Building Products and Textile** 682 **Products**

683 Application of the principles outlined in this BRS is explored in respect of two specific supply
684 chain examples:

685 1. Annex 8: Building products – Example of structural steel, from mill to as-built

686 2. Annex 9: Textile products – Example of cotton garments, from harvesting to recycling

687

688 The selected examples reflect divergent regulatory environments, reflecting industrial versus
689 retail environments, while providing opportunity to highlight a range of significant and varied
690 sustainability impacts. The supply chains involved draw upon mining, agricultural and industrial
691 raw materials and reflect diverse, cross-border production chains.

692 **9.0 Conclusion**

693 The proposed data model enables key data elements necessary for verifying product claims to
694 be digitally captured in the form of a supporting structure for non-digital attestations. This
695 approach should provide a vital technical underpinning for digital trade initiatives, including
696 digital product passports and digital trade single windows.

697

698 This approach addresses problems highlighted in section 6.5.2, including revisioning and
699 falsification of claims, while establishing greater levels of transparency and accuracy along
700 supply chains, without compromising information security.

701

702 The proposal for encoding key conformity assessment elements can function independently of
703 whether underlying attestation (certificate, report, etc) is digitalised, or even accessible. This
704 offers a means for addressing the problem of attestations not being accessible in raw form (for
705 reasons of confidentiality), such that even manual verification would not otherwise be possible,
706 but where high level data may be extracted without compromising sensitive information.

707

708 This BRS is not proposing a universal schema for digitalising attestations. Rather, it seeks to
709 address critical short-term and medium-term trade digitalisation needs, while providing a
710 transition pathway towards full digitalisation, on a timeframe that may be more manageable for
711 CABs.

712

713 The data model empowers CABs to maintain control over the integrity of their data and to
714 address their customer's requirements. The model is also flexible enough to enable delivery of
715 comprehensive verification or implementation at more modest levels to reflect an evolving
716 pathway toward supply chain digitalisation.

717

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746 Annex 1 - List of Business Requirements

ID	Business Requirement Statement	Business Transaction Name for this Requirement
A1	Any party may scan a data carrier (such as a barcode) for a product, without prior knowledge of the product supplier's identity or the data platform chosen by the supplier and without using any specific proprietary tool, to access a set of links enabling discovery of attestations that substantiate product attributes claimed by the supplier in a manner consistent with permissions regarding confidentiality and meeting the verifiability criteria detailed in B1 and B2.	Attestation discovery and verification
A2	Where an attestation has been issued in a manner compatible with the provisions of A1, it should also contain a data carrier such that any party in possession of a copy of such an attestation, including in paper or PDF form, may verify the attestation without prior knowledge of the supplier's identity or the data platform chosen by the supplier and without using any specific proprietary tool. While online access to the original attestation may be subject to confidentiality provisions (determined between the CAB and their customer), the embedded data carrier should allow access to information meeting the verifiability criteria detailed in B1 and B2 Note: This can be applicable in the context of participants having limited digital maturity who may wish to capture the analogue form of an attestation and then convey this to other participants.	Standalone attestation verification
B1	Any attestation subject to discovery and verification (A1) must be accessed from, or be verifiable to, an Authorised Source (regardless of whether the referral process provides copies of attestations, in addition to the Authorised source links).	Access from Authorised source
B2	For each attestation subject to discovery (A1), access is available to access the attestation from an Authorised source to achieve the requirements of B3, B4, B5 and, if applicable, B6 and B7.	Verification by User
B3	For each attestation subject to discovery (A1), access will be provided to information that identifies the object of the conformity assessment in a manner unequivocally linked through recognisable identifiers to either the product or the organisation of interest, depending on the type of attestation.	Discovery of the object of conformity assessment
B4	For each attestation subject to discovery (A1), access will be provided to confirm the voluntary standards (and, if applicable, the specification) and/or laws/regulations and/or the applicable	Discovery of conformity assessment undertaken

ID	Business Requirement Statement	Business Transaction Name for this Requirement
	conformity scheme to which the conformity assessment was undertaken and the relation of the CAB to the object of the assessment.	
B5	For each attestation subject to discovery (A1), access will be provided to verify the attestation remains current or, if not, the date on which it ceased to be.	Attestation status discovery
B6	For each attestation subject to discovery (A1), access will be provided to information necessary for establishing the nature of any authority or support for attestation, such as formal recognition by a Governmental authority or an Accreditation Body, discoverable through a digital link to an assurance credential that has been securely issued by the responsible body.	Discovery of assurance credentials
B7	For attestations subject to discovery (A1), an optional advanced pathway is available by which CABs may also provide digital access to any applicable conformance metrics and criteria, facilitating verification of specific performance measures for a product.	Discovery of conformance metrics and criteria
B8	Data elements necessary for verifying attestations as described in B1-B7 are defined within a flexible data model adopted by the CAB, or by an authorised party acting on their behalf.	Attestation data model

747

Table 2 List of Business Requirements

748

749 Annex 2 - List of Business Terms

Business Term	Description
Accreditation	Third-party attestation relating to a conformity assessment body, conveying a formal demonstration of its competence, impartiality and consistent operation in performing specific conformity assessment activities (from ISO/IEC 17000:2020)
Assurance credential	<p>Evidence that an attestation has been issued under some form of authority or other approval. Such evidence may include:</p> <ul style="list-style-type: none"> ● A statement or certificate issued by a governmental authority to a CAB indicating approval for issuing a specific type of attestation, for the purpose of satisfying some regulatory purpose. ● A statement or certificate issued by an accreditation body (see Note) to a CAB which serves to indicate coverage for a particular form of accreditation when linked from a specific attestation. ● In the case of self-declarations, an assurance credential may take the form of evidence of external verification or validation of the attestation undertaken by an independent CAB. <p>Note: For an accreditation body's credential to be effective, it must always be clear under which accreditation coverage (and associated accreditation Rules) a specific attestation has been issued. For this reason, the credential will typically include a unique CAB identifier, issued by the accreditation body, since a CAB may hold accreditation with more than one accreditation body and an accreditation body may also issue multiple identifiers to a single accredited party (reflecting different aspects of capability). The accreditation credential may also incorporate the applicable Accreditation TrustMark (i.e. symbol) of the accreditation body, so that the associated Rules for use (and penalties for misuse) of this symbol will also apply when the credential is referenced from a specific attestation.</p>
Assurance descriptors	Sets of standardised descriptions that indicate categories for the impartiality and authority of the assessing body.
Certification	A third-party attestation related to an object of conformity assessment, with the exception of accreditation (from ISO/IEC 17000:2020)
Conformity assessment ('Assessment')	Demonstration that specified requirements are fulfilled (from ISO/IEC 17000:2020)
Conformity attestation ('Attestation')	A formal document or declaration issued by a manufacturer, supplier, conformity body or responsible party stating that a product, system, or process complies with specific standards, regulations, or requirements.

Business Term	Description
Conformity scheme ('Scheme')	<p>A set of rules and procedures that describes the objects of conformity assessment, identifies the specified requirements and provides the methodology for performing conformity assessment (from ISO/IEC 17000:2020).</p> <p>Note: ISO/IEC 17000 also notes the term 'programme' as an equivalent term to 'scheme' and for the purposes of this BRS, the term conformity scheme is taken to mean either a conformity scheme or a conformity programme.</p>
Declaration	<p>1st party attestation. Also referred to as a self-declaration.</p>
Data model	<p>A visual representation of an information system using text and symbols to represent the data and connections between data elements.</p>
Digital Product Passport	<p>A tool for collecting and sharing data about a product used to demonstrate product attributes, such as sustainability performance.</p> <p>Note: There is a wide variety of potential types of digital product passports and the term, as used in this BRS, may refer to any type.</p>
Digital trade single window	<p>A digital reporting platform which enables the exchange of information between industry and government agencies as may apply, for example, for customs purposes.</p>
Inspection	<p>Examination of an object of conformity assessment and determination of its conformity with detailed requirements or, on the basis of professional judgement, with general requirements (from ISO/IEC 17000:2020).</p>
Multi-lateral recognition (MLA)	<p>In the context of this BRS, the term refers to an international arrangement providing for formal recognition of mutual acceptance of conformity assessment outcomes. Synonym of Mutual recognition arrangement (MRA).</p>
Object of conformity assessment	<p>The entity to which the specified conformity assessment requirements apply.</p>
Process	<p>An activity contributing to the creation of a product.</p>
Product	<p>The result of a process (from ISO IEC 17065:2012).</p> <p>Note: In this BRS it refers to the entity that is being purchased (which may be a service).</p>
Product claim	<p>A statement made by a manufacturer, distributor, or seller about a particular attribute or characteristic of a product (including sustainability attributes), which may be substantiated through conformity assessment.</p>
Product requirement	<p>Specific criteria, conditions, or standards that a product must meet to be considered in conformance with established regulations, specifications, or industry standards.</p>

Business Term	Description
Registry	A platform that provides links to related information.
Testing	Determination of one or more characteristics of an object of conformity assessment according to a procedure (from ISO/IEC 17000:2020). Note: This BRS uses the term 'attributes' in place of characteristics
Universal Resource Identifier (URI)	A unique sequence of characters that identifies an abstract or physical resource, such as resources on a webpage
Validation	Confirmation of the plausibility for a specific intended use or application through the provision of objective evidence that specified requirements have been met (from ISO/IEC 17000:2020).
Verification	Confirmation of the truthfulness through the provision of objective evidence that specified requirements have been fulfilled (from ISO/IEC 17000:2020).

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751
752

Table 3 List of Business Terms

753 Annex 3 - List of parties (participants and stakeholders), including
 754 specific roles that they may fulfil

Party	Type	Description
Accreditation body	Party	Party attesting to the competency of the body responsible for a conformity assessment.
Assessor	Role	Role of carrying out a conformity assessment activity, especially if the party involved would not normally be described as a CAB, such as a supplier carrying out a 1st party assessment of their product.
Authorised source	Role	The provider of access to the attestation that is either a) the CAB that has issued the attestation or b) a party authorised by that CAB issuer to act on their behalf in hosting the attestation or reissuing the attestation in a new form (some other parties, eg, accreditation bodies, scheme owners, may fulfil the role of Authorised source).
Conformity assessment body (CAB)	Party	Party responsible for carrying out a conformity assessment. CABs may also have a Role as Authorised Source
Customer of CAB	Role	Role of placing an order with a CAB to undertake conformity assessment. This role is typically fulfilled by the party to which the attestation is issued (the same party that normally determines the manner of distributing the attestation).
Customs	Role	Role of administering and enforcing customs and related legislation
End-consumer (individual)	Role	Role of purchasing goods for the purpose of consumption (rather than for transforming or reselling)
Governmental authority	Party	Party such as customs or consumer protection that may require access to attestations for legal purposes
Manufacturer	Role	Role of transforming products into different products for sale.
Procurer/specifier	Role	Role of acting on behalf of the purchaser in selecting products that meet product requirements
Producer	Role	Role of making products, including those which may represent raw materials for other parties to transform or consume.
Purchaser	Party	Party that seeks to acquire goods on their own behalf or for another party, for any purpose including re-selling, value adding or consuming. Specific roles for a purchaser party may

Party	Type	Description
		include: reseller, procurer/specifier, manufacturer or end-consumer (individual).
Scheme owner	Party	Party responsible for publishing a conformity scheme
Supplier	Party	Party, such as a manufacturer or reseller, who supplies products. The supplier can also take the role of Customer of CAB, since the supplier may seek evidence to demonstrate the validity of products claims on the basis of conformity assessment.
Registry owner	Party	Party responsible for a registry, such as a product registry of the type used to support digital product passports.
Regulator	Role	The role of making and/or enforcing legislative rules.
Requirements setting body	Party	Party responsible for establishing product conformity requirements, which may be in the form of a specification (voluntary) or a regulation (mandatory)
Reseller	Role	Role of purchasing goods for the purpose of resale. This may include the activity of importers, exporters, wholesalers and retailers/stockists.
Standards setting body	Party	Party responsible for developing, promulgating and maintaining standards that may be specified in product conformity requirements.

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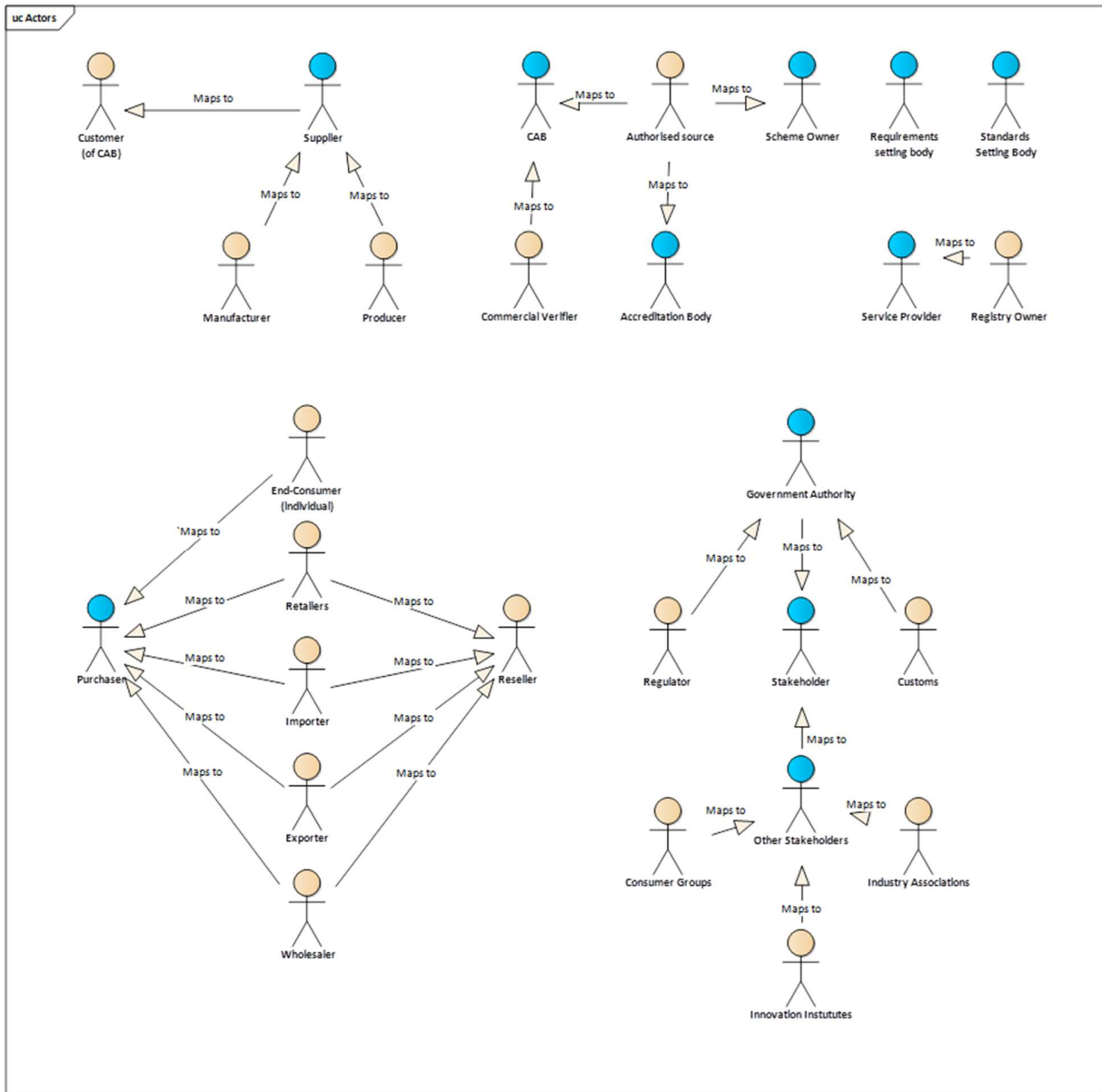
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Table 4 List of parties

The list of actors may also be presented diagrammatically, as follows. Actors shown in blue colour within the list of actors diagram are also used within the use cases in section 6.3.1. Other listed actors can either be mapped to those actors, or do not yet participate in the process of product conformity.



762
763
764
765

Fig 10 List of actors

766 **Annex 4 - Vocabulary for describing the nature of attestations**

767 This appendix provides further detail in relation to matters dealt with in Section 6.5.4.

768 Below is an example vocabulary set for Attestation Type:

Certification
Declaration
Inspection
Testing
Verification
Validation
Calibration (see Note)

769 Table 5 Attestation type

770 **Note:** Calibration represents a major type of conformity assessment activity, although
 771 connection with trade is indirect. In any case, the Digital Calibration Certificate²² (DCC) initiative
 772 [footnote] is well-established and involves full-certificate digital encoding such that further digital
 773 support should not be necessary.

774 Below is an example vocabulary structure for Assurance descriptors:

Assurance Descriptors	Abbreviation
Assurance pertaining to assessor (relation to the object under assessment)	
● self-assessment	Self
● conformity assessment by related body or under commercial contract	Commercial
● conformity assessment by potential purchaser	Buyer
● conformity assessment by industry representative body or membership body	Membership
● conformity assessment by party with unspecified relationship	Unspecified
● 3rd party (independent) conformity assessment	3rdParty

²² <https://www.ptb.de/dcc/>

Assurance Descriptors	Abbreviation
Assurance pertaining to assessment (any authority or support for the assessment process)	
<ul style="list-style-type: none"> conformity assessment delivered under authority granted by national government 	GovtApproval
<ul style="list-style-type: none"> conformity assessment delivered under authority granted by IAF/ILAC signatory body 	GlobalMLA
<ul style="list-style-type: none"> conformity assessment delivered under an independent accreditation 	Accredited
<ul style="list-style-type: none"> conformity assessment externally verified 	Verified
<ul style="list-style-type: none"> conformity assessment externally validated 	Validated
<ul style="list-style-type: none"> conformity assessment claiming no external authority or else unspecified 	Unspecified

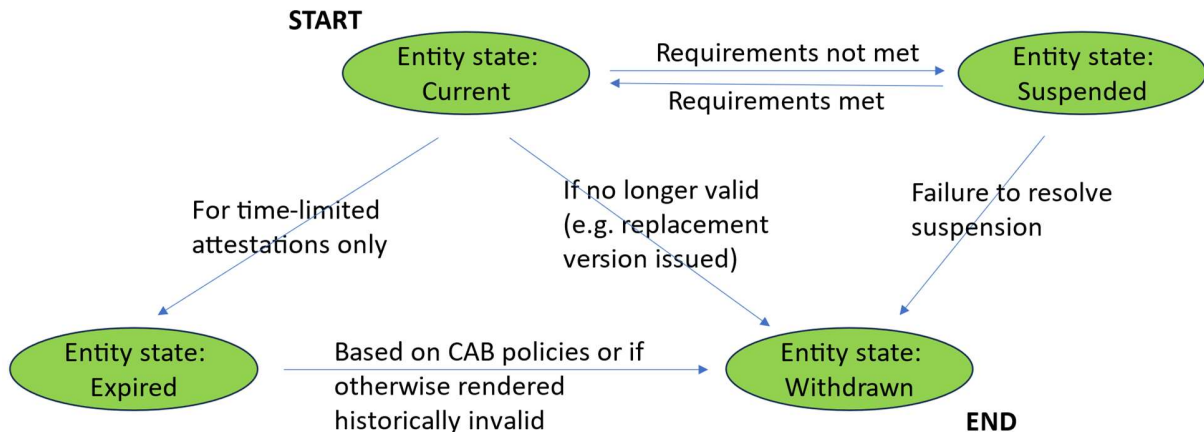
775
776
777

Table 6 Assurance descriptors

778 Annex 5 - Attestation entity lifecycle

779 This appendix provides further detail in relation to matters dealt with in Section 6.5.6.

780 Below is a life cycle diagram for an attestation.



781

782 Figure 11 Attestation entity lifecycle diagram

783 Commentary on managing entity states

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1. Attestations that are current may represent an originally-issued attestation, a revision of a withdrawn attestation, a reissue of an expired attestation or a reactivation of a formerly suspended attestation. It is not critical that these alternative manifestations of a current attestation be digitally differentiated, but relevant information (such as the identity of the previous version which is being replaced) would normally be available at least in human-readable form within the referenced attestation. The ISO 17000-series²³ of conformity standards make specific provision for CABs to provide such detail within attestations.
 2. Should a CAB seek to revise a previously-issued attestation, the earlier version changes status to 'withdrawn' and so a new supporting data structure needs to be created in support of the updated attestation file to ensure the traceability of status dates. The same would apply for reinstatement of a suspended attestation (that is, suspension reversal).
 3. The detailed content of attestations having a status of 'withdrawn' (equivalent to 'revoked') should, in general, not be accessible without special arrangements with the CAB. However, to ensure there is no misunderstanding upon attempts to verify the attestation, a record should remain discoverable that states the attestation is withdrawn and the date on which it ceased to be valid. This remains the case even though the referencing link to the original attestation file (i.e., certificate, report etc) will, in most cases, have been disabled.

²³ <https://casco.iso.org/toolbox.html>

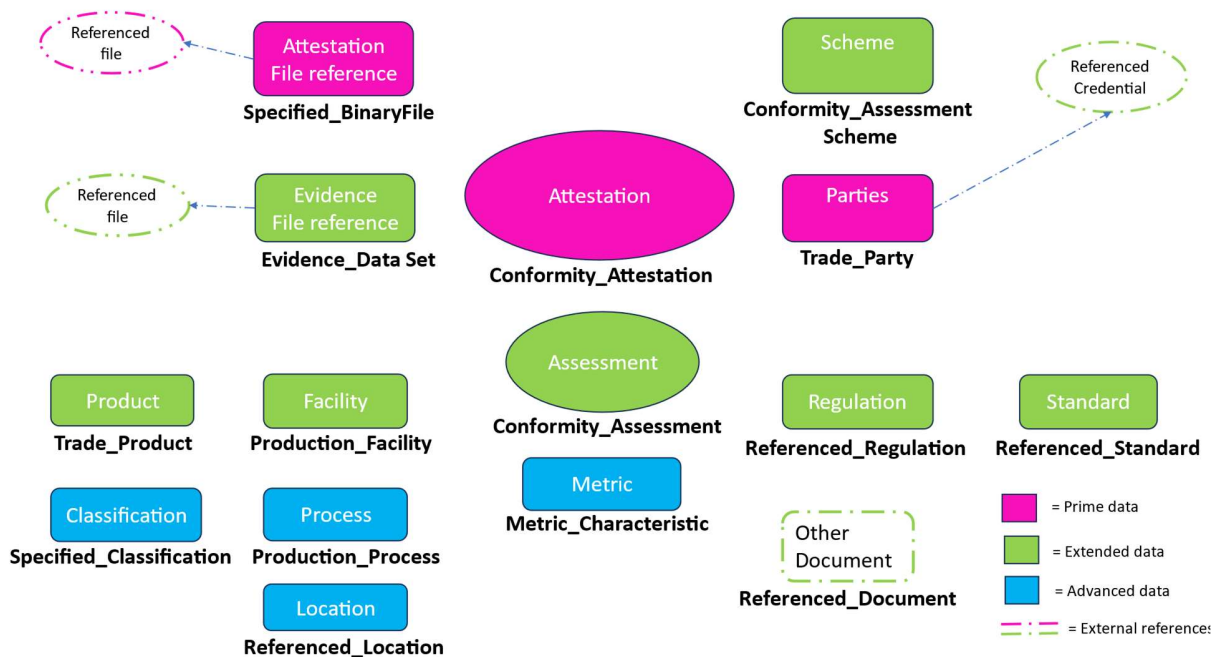
- 803 4. Attestations having expired or suspended status may or may not remain accessible, but
804 the status will be evident from the data structure regardless, serving to differentiate the
805 referenced attestation (certificate, report etc) from a current attestation. Expired or
806 suspended attestations may have relevance to the conformity verification for historically
807 purchased products (subject to historical matching with any expiry or suspension dates
808 listed in the historical attestation) and such verification could still be performed based on
809 the supporting data structure, regardless of whether the attestation itself remains
810 accessible.
- 811 5. If a CAB has ceased trading, without provision for hosted attestations to be carried
812 forward, then access to the attestation files referenced from the described data structure
813 will cease, regardless of the status of the attestations. In this situation, a current product
814 supplier may need to arrange a new conformity assessment, to provide ongoing
815 assurance to would-be purchasers that there exists a CAB that will support conformity
816 claims. However, for goods already sold, prior attestations could still hold relevance and
817 so the associated data structure could ensure that some basic information regarding
818 product conformity remains accessible. This may be sufficient to support the
819 requirements of any future activities, such as product recycling.
- 820 6. For high risk or high value products, it is reasonable to expect that the receiver, or end-
821 user, of the purchased product may have made provision to retain a copy of the full
822 attestation file, as a safeguard against potential loss of information in the future (this may
823 even be a regulatory requirement for some product types).

824

825 **Annex 6 - Conceptual model framed in UN/CEFACT Modelling**
 826 **Methodology**

827
 828 The conceptual model (Section 6.5.9) can be represented using the UMM approach, which
 829 incorporates specialised terms and definitions that are contained in the UNCCL. One of the
 830 features of UNCCL is that a term can be used within different domains to differentiate the
 831 contextual usages of the same term. For brevity, such domain prefixes (such as 'Trade' or
 832 'Production') have generally been omitted within this document but are necessary to formally
 833 define context, in accordance with UMM principles.

834
 835 As a way of introducing a formal UMM representation, the depiction below shows how the
 836 entities from the conceptual model may be mapped to UNCCL terminology.
 837

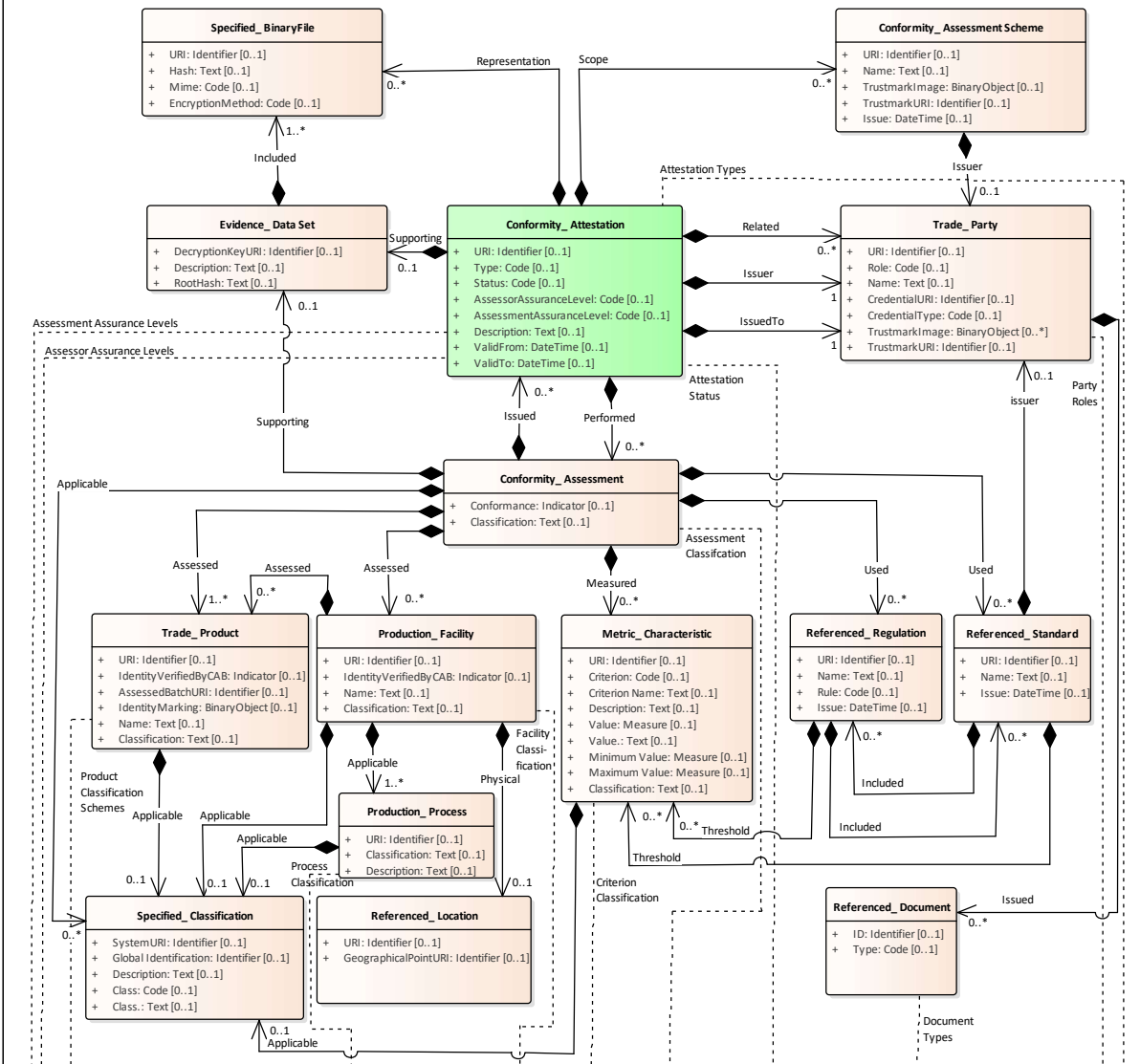


838
 839
 840 Figure 12 Overlay of UMM representation with the language used in conceptual model
 841

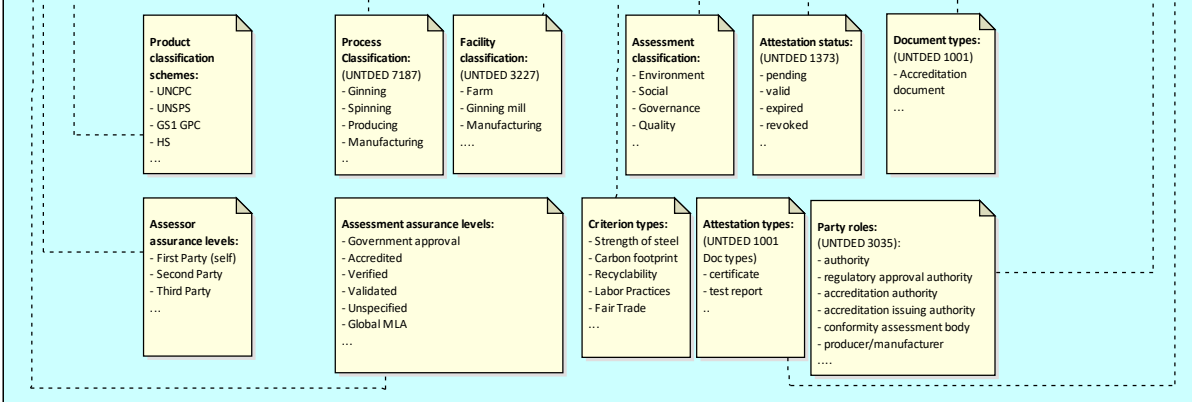
842 On the following page is the UMM. Almost all elements shown in this model are optional.

843
 844 Overpage: Figure 13 UMM representation of the conceptual model
 845

INFORMATION ENTITIES



CLASSIFICATIONS



847 **Annex 7 - Full listing of data requirements for UMM**

848 The following table comprises the Business entities used in the UMM, shown in light blue (with
 849 their current or proposed UNCCL definitions listed) and a list of the data elements (attrib) and
 850 associated entities (assoc) available for each business entity. For each attribute and associated
 851 business entity its cardinality is specified.
 852

Type	Information Entity	Definition	Cardinality
	Conformity Assessment	A systematic process used to determine whether a product, system, service, or process conforms to established standards, regulations, specifications, or other relevant requirements.	
Attrib.	Classification Text	The classification, expressed as text, (e.g. environment, social, governance, quality etc) for this conformity assessment.	0..1
Attrib.	Conformance Indicator	The indication of whether or not conformance is applicable for this conformity assessment.	0..1
Assoc	Used Referenced Standard	The referenced standard used for this conformity assessment.	0..1
Assoc	Used Referenced Regulation	The referenced regulation used for this conformity assessment.	0..1
Assoc	Measured Metric Characteristic	The measured metric characteristic for this conformity assessment.	0..1
Assoc	Assessed Product	The assessed product of this conformity assessment.	0..1
Assoc	Assessed Production Facility	The assessed production facility of this conformity assessment.	0..1
Assoc	Supporting Conformity Evidence	The conformity evidence supporting this conformity assessment.	0..1
Assoc	Issued Conformity attestation	The conformity attestation issued because of this conformity assessment.	0..1
Assoc	Applicable Specified Classification	The classification applicable for this conformity assessment.	0..1
Entity	Conformity Assessment Scheme	A set of rules and procedures that describe the object of conformity assessment, identifies specified requirements and provides the methodology for performing conformity assessment.	
Attrib.	URI identifier	The Uniform Resource Identifier (URI) of this conformity assessment scheme.	0..1
Attrib.	Name Text	The name, expressed as text, of this conformity assessment scheme.	0..1
Attrib.	Trustmark Image BinaryObject	The binary object of the trustmark image for this conformity assessment scheme.	0..1
Attrib.	Trustmark URI Identifier	The Uniform Resource Identifier (URI) of the trustmark for this this conformity assessment scheme.	0..1
Attrib.	Issue Date Time	The date of issuance of this conformity assessment scheme.	0..1

Assoc	Issuer <i>Party</i>	The issuing party of this conformity scheme.	0..1
Entity	Conformity Attestation	A formal document or declaration issued by a manufacturer, supplier, or responsible party stating that a product, system, or process complies with specific standards, regulations, or requirements.	
Attrib.	URI <i>identifier</i>	The Uniform Resource Identifier (URI) of this conformity attestation.	0..1
Attrib.	Type <i>Code</i>	The code specifying the type of document of this conformity attestation.	0..1
Attrib.	Status <i>Code</i>	The code specifying the status (e.g. UN Status codes) of this conformity attestation.	0..1
Attrib.	Assessor Assurance Level <i>Code</i>	The code specifying the level of assurance related to the assessor, such as first party (self), second party, third party for this conformity attestation.	0..1
Attrib.	Assessment Assurance Level <i>Code</i>	The code specifying the level of assurance for the assessment such as accredited, verified, validated of this conformity attestation.	0..1
Attrib.	Description <i>Text</i>	The textual description of this conformity attestation.	0..1
Attrib.	Valid From <i>Date Time</i>	The valid from date of this conformity attestation.	0..1
Attrib.	Valid to <i>Date Time</i>	The expiry date value of this conformity attestation.	0..1
Assoc	Issuer <i>Party</i>	The issuer party of this conformity attestation.	1..1
Assoc	Issued To <i>Party</i>	The party to whom this conformity attestation has been issued.	1..1
Assoc	Scope <i>Conformity Assessment Scheme</i>	The conformity assessment scheme scope of this conformity attestation.	0..*
Assoc	Performed <i>Conformity Assessment</i>	The conformity assessment performed for this conformity attestation.	0..*
Assoc	Supporting <i>Evidence Data Set</i>	The evidence data set supporting this conformity attestation.	0..1
Assoc	Related <i>Party</i>	A party related to this conformity attestation.	0..*
Assoc	Representation <i>Binary File</i>	The binary file representing this conformity attestation.	0..1
Entity	Evidence_ <i>Data Set</i>	The documentation, test results, records, or any other relevant information that serves as the foundation for reasoned judgments, decisions, and conclusions.	
Attrib.	Decryption Key URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of the decryption key of this conformity evidence.	0..1
Attrib.	Root Hash <i>Text</i>	An alphanumeric string generated by a hash function for the root of this conformity evidence.	0..1
Attrib.	Description <i>Text</i>	A textual description of this conformity evidence.	0..1
Assoc	Attached <i>BinaryFile</i>	The binary file attached for this conformity evidence.	1..*
Entity	Metric <i>Characteristic</i>	A prominent attribute or aspect of a metric (a standard of measurement).	
Attrib.	URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of this metric characteristic.	0..1

Attrib.	<i>Criterion Code</i>	The code specifying the criterion, related to the value of this metric characteristic.	0..1
Attrib.	<i>Criterion Name</i>	The name, expressed as text, for the criterion of this metric characteristic.	0..1
Attrib.	<i>Description Text</i>	A textual description of this metric characteristic.	0..1
Attrib.	<i>Value Measure</i>	A measure of a value of this metric characteristic.	0..1
Attrib.	<i>Value Text</i>	The value, expressed as text, of this metric characteristic.	0..1
Attrib.	<i>Minimum Value Measure</i>	A measure of a minimum value for this metric characteristic.	0..1
Attrib.	<i>Maximum Value Measure</i>	A measure of a maximum value of this metric characteristic.	0..1
Attrib.	<i>Classification Text</i>	The classification, expressed as text, for this metric characteristic.	0..1
Assoc	<i>Applicable Specified Classification</i>	The classification applicable for this metric characteristic	0..1
Entity	<i>Production Facility</i>	A man-made physical structure, such as a building, in which something is produced.	
Attrib.	<i>URI Identifier</i>	The Uniform Resource Identifier (URI) of this production facility.	0..1
Attrib.	<i>Identity VerifiedByCAB Indicator</i>	The indication of whether or not the identity of this production facility is verified by a conformity assessment body.	0..1
Attrib.	<i>Name Text</i>	The name, expressed as text, for this production facility.	0..1
Attrib.	<i>Classification Text</i>	The classification (e.g. UN location function codes), expressed as text, for this production facility.	0..1
Assoc	<i>Physical Referenced Location</i>	The physical location referenced for this production facility.	0..1
Assoc	<i>Applicable Production Process</i>	The process applicable for this production facility.	1..*
Assoc	<i>Applicable Specified Classification</i>	The classification applicable for this production facility.	0..1
Assoc	<i>Assessed Trade Product</i>	The product of this production facility that has been assessed.	0..*
Entity	<i>Production_ Process</i>	A naturally occurring or designed sequence of operations or events in order to produce something.	
Attrib.	<i>URI Identifier</i>	The Uniform Resource Identifier (URI) for this production process.	0..1
Attrib.	<i>Classification Text</i>	The classification (e.g. UN process codes) expressed as text for this production process.	0..1
Attrib.	<i>Description Text</i>	A textual description for this classification.	0..1
Attrib.	<i>Applicable Specified Classification</i>	The classification applicable for this production process.	0..1
Entity	<i>Referenced Document</i>	Written, printed or electronic matter that is referenced.	

Attrib.	ID <i>Identifier</i>	The identifier of this referenced document.	0..1
Attrib.	Type <i>Code</i>	The code specifying the type of referenced document.	0..1
Entity	Referenced Location	A reference to a physical location or place.	
Attrib.	URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of this referenced location.	0..1
Attrib.	Geographical Point URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of the geographical point of this referenced location.	0..1
Entity	Referenced Regulation	A principle, rule, or law that is referenced.	
Attrib.	URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of this referenced regulation.	0..1
Attrib.	Name <i>Text</i>	The name, expressed as text, of this referenced regulation.	0..1
Attrib.	Rule <i>Code</i>	The code specifying rule, provision or requirement, of this referenced regulation.	0..1
Attrib.	Issue <i>Date Time</i>	The date of issuance of this referenced regulation.	0..1
Assoc	Threshold <i>Metric Characteristic</i>	The threshold metric characteristic of this referenced regulation.	0..*
Assoc	Included Referenced Standard	The referenced standard included in this referenced regulation.	0..*
Entity	Referenced Standard	A referenced norm or requirement that establishes uniform criteria, methods, processes and practices, such as in engineering or technical areas.	
Attrib.	URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of this referenced standard.	0..1
Attrib.	Name <i>Text</i>	The name, expressed as text, of this referenced standard.	0..1
Attrib.	Issue <i>Date Time</i>	The date of issuance of this referenced standard.	0..1
Assoc	Threshold <i>Metric Characteristic</i>	The threshold metric characteristic of this referenced standard.	0..*
Assoc	Included <i>Referenced Regulation</i>	The referenced regulation included in this referenced standard.	0..*
Assoc	Issuer <i>Party</i>	The issuing party of this referenced standard.	0..1
Entity	Specified BinaryFile	A specified computer file or program stored in a binary format.	
Attrib.	URI <i>identifier</i>	The unique Uniform Resource Identifier (URI) for this specified binary file.	0..1
Attrib.	Hash <i>Text</i>	An alphanumeric string generated by a hash function based on the content of a file.	0..1
Attrib.	Mime <i>Code</i>	The code specifying the Multipurpose Internet Mail Extensions (MIME) type for this specified binary file.	0..1
Attrib.	Encryption Method <i>Code</i>	The code specifying the details of the algorithm and the cryptographic techniques used.	0..1
Entity	Specified Classification	A specified systematic arrangement in classes or categories according to established criteria.	

Attrib.	SystemURI <i>Identifier</i>	The system URI (Uniform Resource Identifier) of this classification.	0..1
Attrib.	Global Identification <i>Identifier</i>	A unique global identifier for this classification.	0..1
Attrib.	Description <i>Text</i>	A textual description for this classification.	0..1
Attrib.	Class <i>Code</i>	The code specifying the class for this classification.	0..1
Attrib.	Class <i>Text</i>	The class, expressed as text, for this classification	0..1
Entity	Trade Party	An individual, a group, or a body having a role in a trade business function.	
Attrib.	URI <i>Identifier</i>	The URI (Uniform Resource Identifier) of this party.	0..1
Attrib.	Role <i>Code</i>	The code specifying the role of this party.	0..1
Attrib.	Name <i>Text</i>	A name, expressed as text, of this party.	0..1
Attrib.	Credential URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of the credential for this party.	0..1
Attrib.	Credential Type <i>Code</i>	The code specifying the type of evidence for the credential, such as VC, web page, DAKKS), of this party.	0..1
Attrib.	Trustmark Image <i>BinaryObject</i>	The binary object of the trustmark image for this party.	0..*
Attrib.	Trustmark URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of the trustmark for this party.	0..1
Assoc	Issued Referenced <i>Document</i>	The referenced document issued by this party.	0..*
Entity	Trade Product	Any tangible output or service produced by human or mechanical effort or by a natural process for trade purposes.	
Attrib.	URI <i>Identifier</i>	The Uniform Resource Identifier (URI) of this product.	0..1
Attrib.	Identity VerifiedByCAB <i>Indicator</i>	The indication of whether or not the identity of this product is verified by a Conformity Assessment Body (CAB).	0..1
Attrib.	Assessed Batch URI <i>Identifier</i>	The Uniform Resource Identifier (URI) for the assessed batch of this product.	0..1
Attrib.	Identity Marking <i>Binary Object</i>	The binary object of the identity marking for this product.	0..1
Attrib.	Name <i>Text</i>	A name, expressed as text, of this product.	0..1
Attrib.	Classification <i>Text</i>	The classification (e.g. UNCPC, GS1 GPC codes), expressed as text, for this product.	0..1
Assoc	Applicable Specified <i>Classification</i>	The classification applicable for this product.	0..1

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Table 7 Data requirements for UMM

855

856 Annex 8 - Building products supply chain example

857 Steel product - from mill to as-built

858

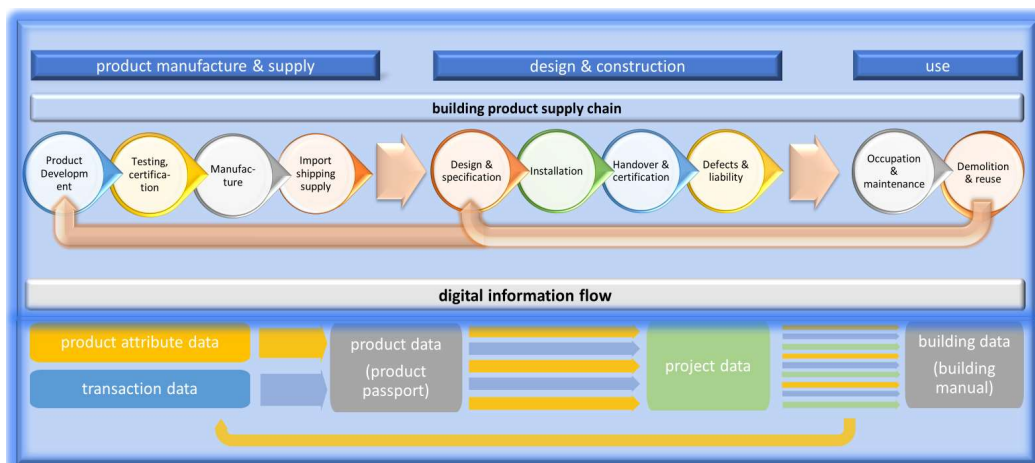
859 1. Building products problem statement:

860 While noting that regulatory practices for building products differ around the world, in
861 some circumstances²⁴ the product specifier (procurer) and the authority having
862 jurisdiction cannot effectively establish the validity and scope of the information
863 submitted to support conformance with national building codes and referenced
864 standards. This is often due to the lack of robust linkages between product supply,
865 conformity attestations and a potential lack of clarity regarding the authority under which
866 conformity attestation was issued. These same circumstances will also impact the
867 effectiveness of emerging sustainability reporting requirements.

868 2. Context for the problem statement

869 The building products supply chain is characterised by the manufacture and supply of products
870 or systems that in many cases, are assembled away from the point of production, by building
871 practitioners who are not necessarily familiar with their physical properties and performance. As
872 this occurs, they are often co-joined with other products in the assembly of a building or
873 structure, which when complete is likely to comprise many thousands of different parts that have
874 moved through a long supply chain and assembled by many different trades people.

875 There are distinct parts to this chain of supply, represented in the diagram below. The first
876 involves the manufacture and supply of a product, which is typically the focus of testing,
877 inspection and certification activity. In theory, this should result in building products that have a
878 form of documentation that attests to its attributes and limitations as a form of 'evidence of
879 suitability.'



880

²⁴ Chapter 8, Building a Safer Future - Independent Review of Building Regulations and Fire Safety: Final Report, May 2018, Dame Judith Hackitt

881 Previous page: Figure 14 Representation of building product data flow

882 Removed from this process, but heavily reliant upon it, are a chain of practitioners involved in
883 the design and construction of buildings and structures. The first of these are responsible for
884 specifying the products to be used for the purpose of whatever is to be constructed, followed by
885 those who will procure the products, those who are responsible for their approval and those who
886 install. Each of these requires visibility of product conformity evidence, that should both proceed
887 and accompany products to site. This should ensure that it can be established that a product is
888 fit for its intended purpose, as well as ensuring that the product being delivered to site is the
889 same as the one that was specified.

890 There is also the need for data to flow through to the operation of a building in order for those
891 who use it to be familiar with on-going performance and need for maintenance, as well as the
892 potential to repurpose or recycle a product at the end of a building or structures useful life.

893 Another important factor for traceability in building supply chains is the increasing use of data
894 dictionaries and data templates for digitalising the exchange of supply chain data. This is
895 explored in more detail in Annex 13. Without suggesting that any classification system is better
896 than another, the data model in this BRS can incorporate any referenced classification systems
897 for products, facilities and measurements.

898

899 3. Relevance of the BRS

900

901 The principles this BRS outlines seeks to ensure that product conformity data for steel product
902 (whether mandated by regulation or operating under voluntary conditions):

- 903 ● is issued by parties whose authority can be ascertained,
- 904 ● demonstrates conformance with recognised standards and laws;
- 905 ● is available digitally in accompaniment with the product;
- 906 ● is accessible by all actors in the supply chain
- 907 ● is capable of being traced at any point.

908 The data model within the BRS, if followed, makes this possible. Some fictitious examples of
909 certificates and reports encoded within the generalised data model, at a level commensurate
910 with the detail typically available in current supply chains, is provided in Annex 10.

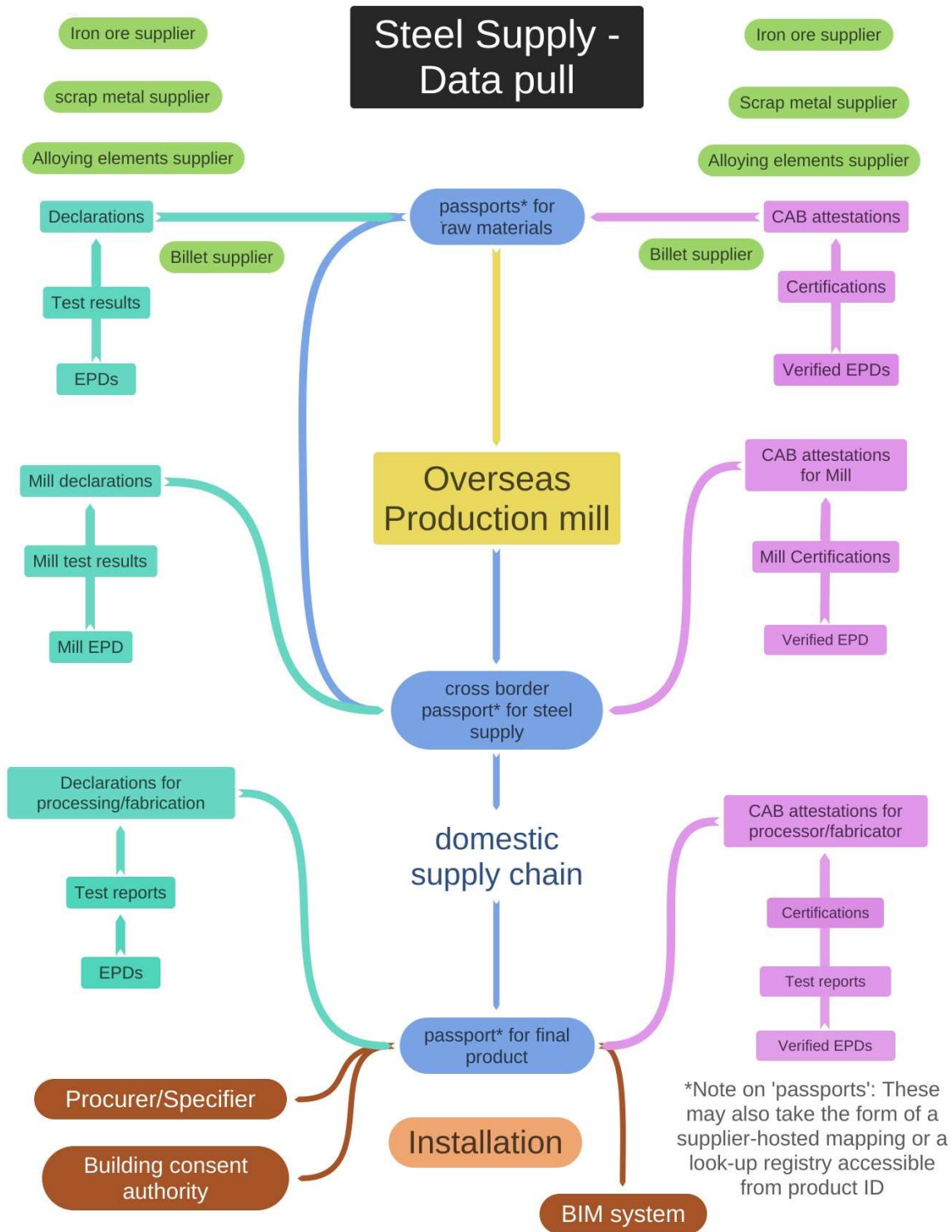
911

912 **Note:** There are cases in some regulatory systems where the authenticity or performance of a
913 building product can be established under a regulatory system without any recognised standards
914 upon which to base formal conformity assessment processes. This can apply to, for example,
915 innovative products reflecting the outcome of an engineered solution for a specific building
916 application. In these circumstances, an attestation (such as an independent engineering
917 evaluation or specification) may still arise in order to demonstrate conformance with the regulated
918 requirements.

919

920 Figure 15 below shows an example of a potential steel supply data pull model, depicting how
921 upstream conformity data (including cross-border) might be accessed using linked data from

922 registries and leveraging principles described within this BRS (note that EPD = Environmental
 923 Product Declaration).
 924



925

926

927 Previous page: Figure 15 Depiction of data pull in a steel supply model

928 **Note:** For a user to be in a position to verify whether an attestation for an input material (subject
929 to a manufacturing transformation) retains a direct relationship to the output product that they
930 have purchased (or are considering purchasing), additional mechanisms are required. While
931 beyond the scope of this BRS, this forms part of the subject matter for the UNTP²⁵ initiative.

932 The product passport concept represents a very useful tool for organising complex and diverse
933 sets of conformity data. However, even without product passports, the data structure described
934 within this BRS means that an individual attestation may still be immediately verified back to its
935 source, including links to the supplied product for which the attestation relates.

936 4. Satisfying the building products problem statement

937 This BRS can be seen to address the potential lack of clarity regarding the authority under
938 which conformity information had been issued. This BRS can also provide an important part of
939 the solution to the lack of robust linkages between conformity information and the product that is
940 delivered. One challenge that currently exists is that unique product identification within the
941 building sector is largely voluntary. However, there are a range of current and emerging
942 regulatory initiatives around the world that are driving improved building product identification
943 and traceability. These include mandatory reporting of environmental criteria for construction
944 products under the European Eco-design for Sustainable Products Directive²⁶ (ESPR).

945 Emerging regulation is likely to mean that product purchasers will increasingly require evidence
946 to demonstrate their due diligence in purchasing decisions, leading to pressure on upstream
947 actors to provide this evidence. By providing a standardised mechanism for connecting the
948 source of the conformity information with products supplied, implementation of this BRS may
949 promote more reliable reporting of product conformity (including aspects of sustainability
950 reporting).

951

952

²⁵ <https://uncefact.github.io/spec-untp/docs/about>

²⁶ https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/sustainable-products/ecodesign-sustainable-products-regulation_en

953 Annex 9 - Textile products supply chain example

954 Cotton garments - from harvesting to recycling

955 1. Textile products problem statement:

956 There is a need to facilitate the availability and authenticity of conformity data, in an
957 interoperable manner, to assist in reducing the complexity in tracking performance and
958 sustainability data for the purposes of demonstrating that product claims are valid. This
959 is necessary for the support of legislative initiatives aimed at driving improved
960 sustainability product circularity within the sector.

961 2. Context for the problem statement

962 Garment supply chains are under significant pressure to improve sustainability practices. The
963 adverse environmental and human health impact of the fashion industry is well documented.^{27 28}
964 The UNECE has produced²⁹ a significant collection of traceability initiatives and tools to support
965 transition to a more sustainable footing, including the launch of the Sustainability Pledge³⁰ for
966 governments, garment and footwear manufacturers and industry stakeholders.

967 The 2022 EU Strategy for Sustainable and Circular Textiles³¹ details a strategy for shifting from
968 'fast fashion' to circular fashion, reflecting commitments made under the 2019 European Green
969 Deal³² and the 2020 Circular Economy Action Plan³³ (CEAP). Digital Product Passport
970 platforms are envisaged as key to facilitating circularity. To support the concept, reliable and
971 sophisticated data is needed to provide transparency, traceability over production and
972 transportation processes, which also take into account regional conditions such as water and
973 infrastructure availability.

974 The conformity and performance information that flows along supply chains is varied. CABs may
975 perform testing or inspection to assess properties such as fibre length, strength, and quality for
976 market grading and value assessment. They may also provide certification for sustainability,
977 environmental and social impacts, resource efficiency and development of circular systems.
978 There are other organisations and platforms that provide chain of custody and input information
979 to brand owners, retailers, consumers and recyclers.

980

²⁷ <https://www.worldbank.org/en/news/feature/2019/09/23/costo-moda-medio-ambiente>

²⁸ <https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics>

²⁹ <https://unece.org/trade/traceability-sustainable-garment-and-footwear>

³⁰ <https://thesustainabilitypledge.org/>

³¹ https://environment.ec.europa.eu/strategy/textiles-strategy_en

³² https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

³³ https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

981 3. Relevance of the BRS

982 The principle this BRS outlines is ensuring that product conformity data for textile products
983 (whether mandated by regulation or operating under voluntary conditions):

- 984 ● is issued by parties whose authority can be ascertained,
- 985 ● demonstrates conformance with recognised standards and laws;
- 986 ● is available digitally in accompaniment with the product;
- 987 ● is accessible by all actors in the supply chain
- 988 ● is capable of being traced at any point.

989 The data model within this BRS, if followed, makes this possible.

990 Some fictitious examples of certificates and reports encoded within the generalised data model,
991 at a level commensurate with the detail typically available within current supply chains, is
992 provided in Annex 10.

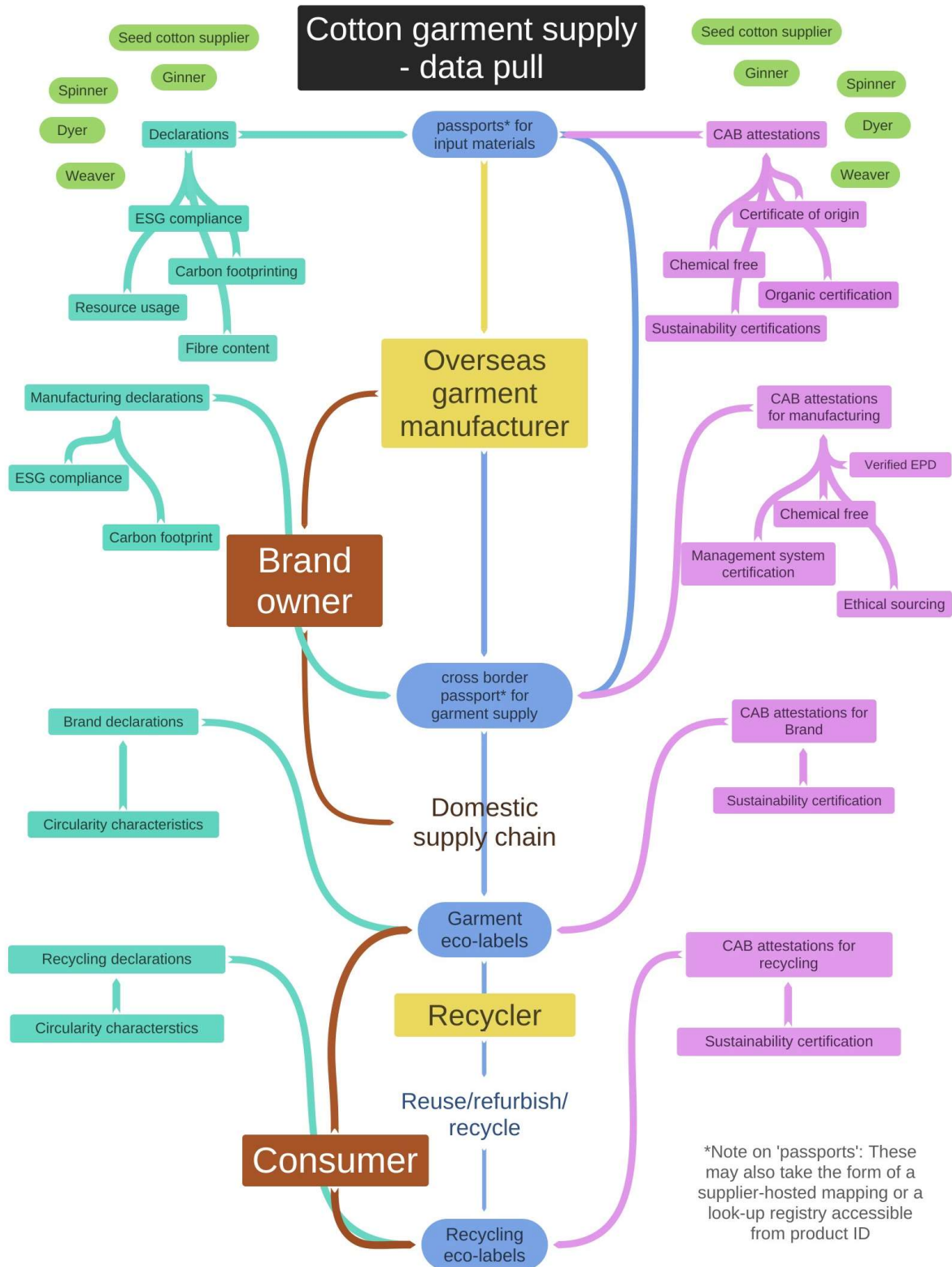
993

994 Figure 16 below shows an example of a potential data pull model for Cotton garments, depicting
995 how access to upstream conformity data (including cross-border) might be accessed using
996 linked data from registries and leveraging principles described within this BRS (note that EPD =
997 Environmental Product Declaration).

998 **Note:** For a user to be in a position to verify that an attestation for an input material (subject to a
999 manufacturing transformation) retains a direct relationship to the output product that has been
1000 purchased, additional mechanisms are required. While beyond the scope of this BRS, this forms
1001 part of the subject matter for the UNTP³⁴ initiative.

1002 Overpage: Figure 16 Depiction of data pull in a textile supply model

³⁴ <https://uncefact.github.io/spec-untp/docs/about>



1003

1004

1005 The product passport concept represents a very useful tool for organising complex and diverse
1006 sets of conformity data. However, even without product passports, the data structure described
1007 within this BRS means that an individual attestation may still be immediately verified back to its
1008 source, including links to the supplied product for which the attestation relates.

1009 4. Satisfying the textile products problem statement

1010 This BRS addresses a key element of the problem statement, namely, the availability and
1011 authenticity of conformity data for tracking textile sustainability data for the purposes of
1012 demonstrating product sustainability outcomes, including circularity outcomes.

1013 This approach also aligns with the outputs of ongoing UN/CEFACT standards development in
1014 relation to product circularity³⁵ for the textile and leather sector.

1015 One challenge that still exists is a high degree of reliance within the global textile industry on
1016 self-reported information, commonly not independently verified or validated. This may reflect
1017 production of items that are often low margin and low value.

1018 Regulation emerging within the textile sector in relation to sustainability performance and
1019 circularity is likely to drive higher assurance levels over conformity information. This is because,
1020 to demonstrate due diligence in their purchasing decisions, corporate purchasers will demand
1021 evidence necessary to meet their regulatory obligations - leading to pressure on upstream
1022 actors to provide this evidence. In a 2021 report³⁶, the UNECE noted that “[the garment and
1023 footwear sector] relies heavily on outsourcing and is typified by a lack of transparency” but went
1024 on to say that this is “slowly improving with the emergence of technology solutions and pressure
1025 from consumer groups, regulators and other stakeholders”.

1026 By enabling the source and nature of conformity information to be digitally verifiable,
1027 implementation of this BRS can provide a part of the machinery needed for capitalising on this
1028 situation, to drive enhanced levels of sustainability assurance.

1029

³⁵ https://uncefact.unece.org/download/attachments/182976575/ProductCircularityDataUseCase-v3A-Extension-TL_TT_BRS_Part%20II-UC_CCBDA.pdf?api=v2

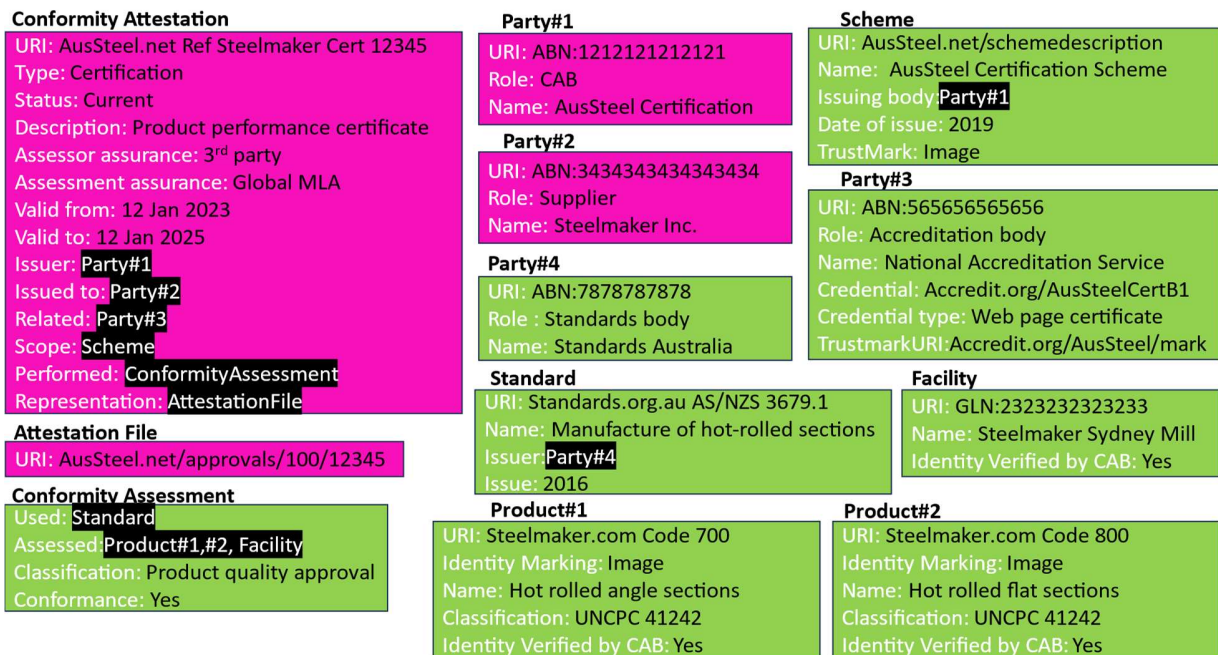
³⁶ https://unece.org/sites/default/files/2021-05/Ecosystem_report-April2021.pdf

1030 **Annex 10 - Steel and Cotton attestation data structure examples**
 1031 **in UMM**

1032
 1033 A range of sample certificates and reports are provided below, encoded at a level
 1034 commensurate with details that are typically available within current supply chains. The colour-
 1035 coding represents prime, expanded and advanced data to reflect the Conceptual model in
 1036 section 6.5.9.

1037
 1038 **Note:** Not all data elements available within the UMM representation appear in the
 1039 examples shown within this Annex. The intention in this annex is merely to provide
 1040 some easily recognisable examples of rendered attestations.
 1041

1042 Below is a fictitious instance of the data model for a third-party product certification relating to
 1043 steel products that is publicly accessible. This example illustrates the linking of an assurance
 1044 credential (in this case for an accreditation) and use of classification systems for identifying
 1045 products and facilities.
 1046



1047
 1048 **Figure 17 UMM representation of a product performance certificate for steel**
 1049

1050 Below is a fictitious instance of the data model for a Mill Test Report that is publicly accessible.
 1051 This example illustrates the use of proprietary standards as well as Metric-related elements (the
 1052 analysis for micro-alloying elements is not shown).
 1053

Conformity Attestation

URI: Steelmaker.com Certificate 12345
Type: Testing
Status: Current
Assessor assurance: Self
Assessment assurance: Unspecified
Description: Mill Test Certificate
Valid from: 1 Feb 2024
Issuer: Party#1
Issued to: Party#1
Performed: ConformityAssessment #1,2,3
Representation: AttestationFile

Attestation File

URI: Steelmaker.com/certs/12345

Party#1

URI: ABN:1212121212121
Role: Supplier
Name: Steelmaker Inc.

Party#2

URI: ABN:34343434343434
Role: Standards body
Name: Standards Australia

Standard #1

URI: standards.org.au AS 1391
Name: Metals -Tensile Testing
Issuer: Party#2
Issue: 2007

Standard #2

URI: standards.org.au AS/NZS 3679.1
Name: Manufacture of hot-rolled sections
Issuer: Party#2
Threshold: Metric#1,#2,#3,#4,#5,#6,#7,#8
Issue: 2006

Standard #3

URI: Standards.org.au AS/NZS 1050.1
Name: Sampling of steel and iron
Issuer: Party#2
Issue: 1996

Product

URI: Steelmaker.com Code 700
Identity Marking: Image
Name: 10mmx65mm square edge flat
Assessed BatchID: 2432374203

Metric#1

Criterion name: AS/NZS 3679
Criterion value: Grade 300
Description: Yield strength
Value: 312 -> Unit of Measure: MPa
Minimum: 300

Metric#2

Criterion name: AS/NZS 3679
Criterion value: Grade 300
Description: Ultimate tensile strength
Value: 520 -> Unit of Measure: MPa
Minimum: 440

Metric#3

Criterion type: AS/NZS 3679
Criterion value: Grade 300
Description: Elongation percentage
Value: 30
Minimum: 22

Conformity Assessment #1

Used: Standard#1, 2
Assessed: Product
Measured: Metric#1, 2, 3
Classification: Mechanical testing
Conformance: Yes

Conformity Assessment #2

Used: Standard#3
Assessed: Product
Classification: Sampling for Chemical testing

Conformity Assessment #3

Used: Standard#2,#4
Assessed: Product
Measured: Metric#4,#5,#6,#7,#8
Classification: Chemical testing
Conformance: Yes

Standard #4

URI: Steelmaker.com Ref Proc 1
Name: Chemical testing Proc 1
Internally used indicator: Yes
Issuer: Party#1
Issue: 2019

Metric#4

Criterion name: AS/NZS 3679
Criterion value: Grade 300
Description: Carbon cast analysis percentage
Value: 0.20
Maximum: 0.25

Metric#5

Criterion name: AS/NZS 3679
Criterion value: Grade 300
Description: Silicon cast analysis percentage
Value: 0.21
Maximum: 0.50

Metric#6

Criterion name: AS/NZS 3679
Criterion value: Grade 300
Description: Manganese cast analysis percentage
Value: 0.83
Maximum: 1.60

Metric#7

Criterion name: AS/NZS 3679
Criterion value: Grade 300
Description: Phosphorus cast analysis percentage
Value: 0.018
Maximum: 0.040

Metric#8

Criterion name: AS/NZS 3679
Criterion value: Grade 300
Description: Sulfur cast analysis percentage
Value: 0.033
Maximum: 0.040

Figure 18 UMM representation of a Mill Test Report for steel

Note: Additional products that might also be tested as part of the same report as shown above would appear as additional conformity assessment items. Also, if a separate conformance indicator is needed for each tested parameter (e.g. at individual element level) then additional conformity assessment items can be added to accommodate this.

Below is a fictitious instance of the data model for an externally-verified declaration for a cotton product that is publicly accessible. This example illustrates how a self-declaration that has been externally verified may be rendered in the data model. Note that only two environmental impact metrics are listed for brevity (the real number might be much larger).

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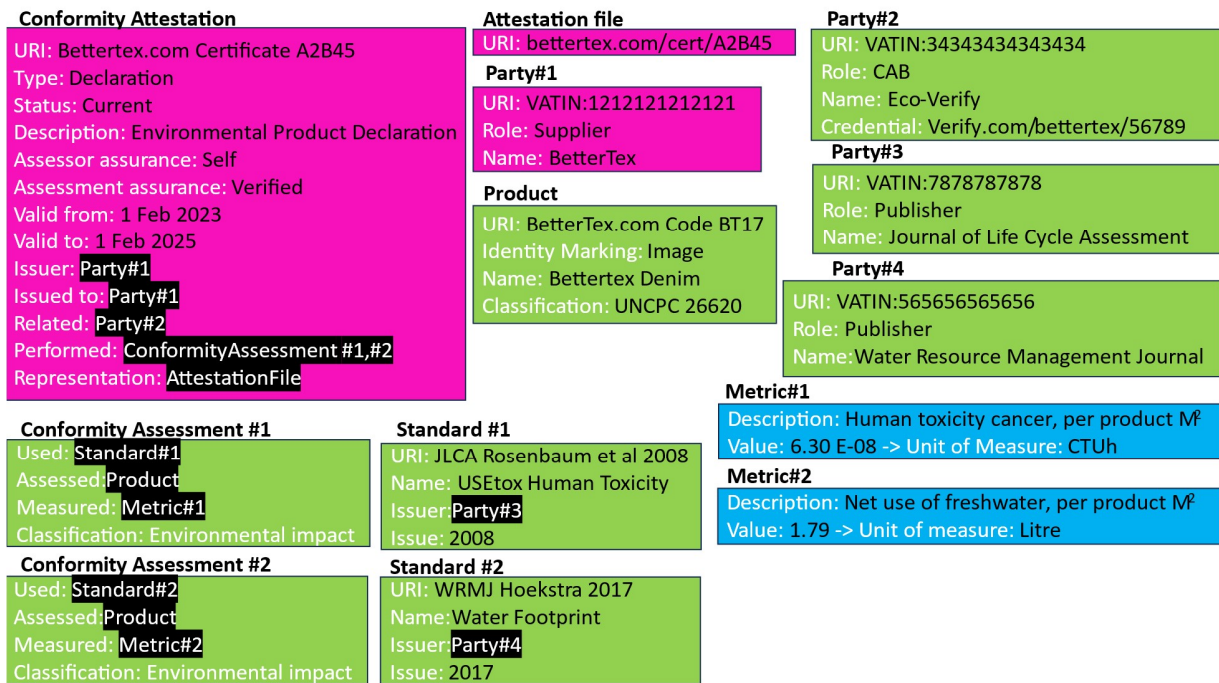
1062

1063

1064

1065

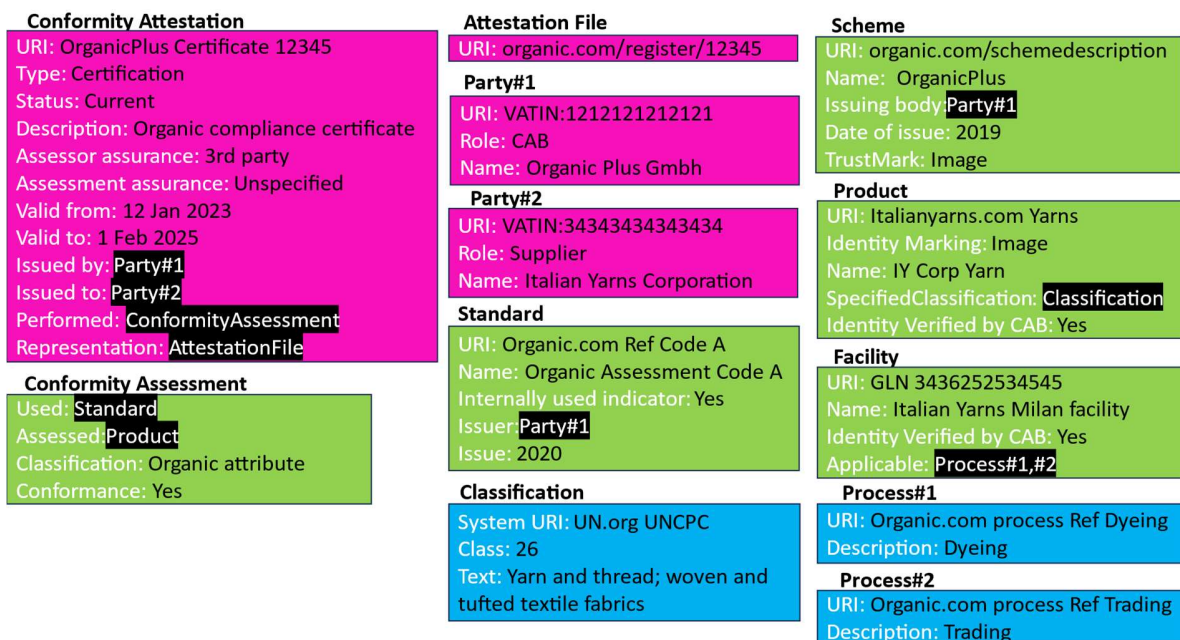
1066



1067

1068 Figure 19 UMM representation of an Environmental Product Declaration for a cotton fabric

1069 Below is a fictitious instance of the data model for an unaccredited 3rd party organic certification
 1070 that is publicly accessible. This example illustrates usage of a formal classification system.



1071

1072 Figure 208 UMM representation for an organic certificate for yarn

1073 Annex 11 - Conformity assessment process considerations

1074 Some conformity assessment types, such as product testing, product inspection and some
1075 elements of product certification, involve directly assessing product attributes. Other conformity
1076 assessment types may involve indirect product assessment, such as verification of a product
1077 claim, validation of a product claim and the certification of an attribute or process for a facility,
1078 producer or supplier.

1079 Regardless of assessment type, objectively reliable conformity assessment processes should
1080 be based on the application of transparent and accessible scheme rules (where a scheme
1081 applies) and the use of standards that have been established through a recognised process to
1082 be reliable and fit for purpose. Failure by a CAB to identify how a conformity assessment has
1083 been undertaken critically weakens the value of the outputs. Hence, the inclusion within both the
1084 conceptual model and associated UMM of identifiers for these particular elements.

1085 Additional considerations below are reflective of the challenges and complexity of conformity
1086 assessment in supply chains:

- 1087 1. Some attributes, such as ethical sourcing, may require analysis across multiple stages of
1088 a supply chain. The reliability of processes for data collection (possibly involving
1089 traceability data platforms that assimilate inputs from different stages of the supply
1090 chain) may impact the effectiveness of the assessment process. The procedures applied
1091 by the CAB in addressing these aspects will be important in lending rigour to the
1092 assessment process.
- 1093 2. For testing and/or inspection of materials/components that are subsequently transformed
1094 by a manufacturing process, the continued relevance of the earlier testing/inspection
1095 results would depend on whether the specific attributes of interest are likely to be altered
1096 during the transformation.
- 1097 3. Testing and inspection of a product may also depend on a product sampling process,
1098 undertaken at a specific point in time and often relating to a specific batch or lot of
1099 product. If a test or inspection result does not reflect the specific batch/lot of interest,
1100 then there should be some other basis for establishing the relevance of a test or
1101 inspection report to the supplied product (for example, ongoing testing for limited product
1102 attributes, production monitoring or other forms of conformity assessment).

1103

1104 Annex 12 - Controlling access to data

1105 Access to product and facility conformity information

1106

1107 1. This BRS describes an arrangement where the party that issues data retains
1108 responsibility for that data. With the exception of data that may be issued as 'portable'
1109 data packets (such as verifiable credentials), all other data remains hosted by the
1110 issuing party (or a party authorised by the issuer to act on their behalf).

1111

1112 2. CABs may be regarded as the custodians of the data which they issue on behalf of their
1113 customers, since the CAB is the only party with the authority to amend or withdraw an
1114 issued attestation. CABs provide their customers (in most cases the product
1115 manufacturer or producer) with access to their own conformity data which may, or may
1116 not, be publicly accessible. Where data is not publicly accessible, it is generally left up
1117 to the customer of the CAB whether to share this data with other parties. The customer
1118 of the CAB could choose to share non-publicly accessible information in a variety of
1119 ways, including processes that involve defined access permissions, possibly involving
1120 sharing of a decryption key. A shared key may be provided directly by the customer of
1121 the CAB or through a third party platform based on accepted rules. The UMM data
1122 model explicitly provides for file-hash access to a referenced attestation file.

1123

1124 3. It is also possible that the 'Evidence file' described in the data model could be used to
1125 carry any sensitive analogue payload that would otherwise be contained within an
1126 attestation. This might be done at the request of a supplier, for example. In this way,
1127 unrestricted access might be provided to the attestation itself, with sensitive information
1128 moved into a separate file which is referenced from the same supporting data structure
1129 but only available to parties that possess a decryption key. The UMM data model
1130 provides for this possibility.

1131

1132 4. Where W3C verifiable credentials are used, there is capacity for selective redaction of
1133 data elements. It is important to note that selective redaction within a W3C verifiable
1134 credential does not apply to data contained within any referenced files (such as the
1135 attestation itself), only to the digital elements of the data structure. Even so, one of the
1136 most common 'sensitive' elements of an attestation is the identity of the original party to
1137 whom the attestation was issued, since parties further downstream in the supply chain
1138 may wish to hide that producer's identity, to obfuscate upstream procurement sources.
1139 The potential for selective redaction of this particular data element could prove useful in
1140 real world supply chains.

1141 Annex 13 - Identity and classification systems

1142 1. General

1143 Unique identifiers for businesses (e.g. tax registration numbers and legal entity identifiers), of
1144 locations (e.g. google pins or cadastral/lot numbers) and of products (e.g. Global Trade Item
1145 Numbers³⁷) are ubiquitous throughout supply chains. Similarly, classification systems that
1146 pertain to a category of objects, rather than being unique to a specific object, play a critical role
1147 in trade (such as the allocation of customs authority procedures to product classes). A
1148 forthcoming UN/CEFACT White Paper³⁸ provides a more detailed treatment of this subject.

1149 Since this BRS deals with not just physical objects (e.g. products, facilities) but also conceptual
1150 objects (e.g. measurements, process types), the types of identity and classification of interest
1151 are wide-ranging. More generally still, there is the overlapping concept of data dictionaries,
1152 which provide comprehensive pre-defined descriptions for data definitions and schema. Just like
1153 a dictionary for the human language, data dictionaries provide the common understanding for all
1154 participants who are establishing data resources, ensuring the data can be exchanged and
1155 translated correctly.

1156 There is a vast range of formal systems (including data dictionaries) for defining identity and
1157 classification systems and these systems can operate at a local industry level, country level or
1158 international level and may take various forms, including inter-governmental agreements, lists
1159 published by standards bodies and private sector code lists or allocation systems.

1160 The purpose of the Classification entity within the conceptual model and associated UMM
1161 representation is to specify the classification system of interest and to stipulate the relevant
1162 values from that nominated system, so that ambiguity can be avoided.

1163 In terms of identifiers that are unique to a specific object, it is desirable that these are
1164 discoverable (for example, by scanning a barcode), globally unique (e.g. by adding a domain
1165 prefix in accordance with ISO/IEC 15459³⁹), resolvable (i.e. given an identifier, there is a
1166 standard way to find more data about the identified thing), and verifiable (i.e. ownership of the
1167 identifier can be verified so that actors cannot make claims about identifiers they don't own).
1168 Identifiers meeting all of these attributes are not always available, particularly for raw materials
1169 or industrial components. Nonetheless, the data model presented in this BRS provides a
1170 framework for capturing such identifiers, noting that these may become more widely available in
1171 response to increasing regulatory demands for improved supply chain traceability.

1172

³⁷ <https://www.gs1.org/standards/id-keys/gtin>

³⁸ UN/CEFACT White Paper Globally Unique Identifiers in Supply Chains – Discoverable, Resolvable, Verifiable (pending publication)

³⁹ ISO/IEC 15459-1:2014 Information technology - Automatic identification and data capture techniques - Unique identification

1173 2. Building and construction

1174

1175 The building and construction sector is one the specific areas explored within this BRS and this
1176 sector has made considerable progress towards codifying identity and classification systems.
1177 ISO 23386⁴⁰ provides a methodology for authoring and maintaining properties within
1178 interconnected data dictionaries used in the construction sector. This is useful since products
1179 can be described differently in various jurisdictions reflecting, for example, the use of different
1180 source standards (e.g., ASTM standards in the United States). Data Dictionaries based on ISO
1181 12006-3⁴¹ can provide translations and a Globally Unique Identifier (GUID) that machines use
1182 for any concept related to the building and construction. In respect of environmental aspects,
1183 Environmental Product Declaration characteristics are also developed in a data dictionary
1184 according to ISO 22057:2022⁴².

1185

1186 A somewhat related concept, also having relevance to this BRS, is the use of data templates,
1187 such as described in ISO 23387⁴³, for construction objects that are used in the life cycle of built
1188 assets and which can serve as a data schema for product information.

1189

⁴⁰ ISO 23386:2020 Building information modelling and other digital processes used in construction - Methodology to describe, author and maintain properties in interconnected data dictionaries

⁴¹ ISO 12006-3:2022 Building construction - Organization of information about construction works Part 3: Framework for object-oriented information

⁴² ISO 22057:2022 Sustainability in buildings and civil engineering works - Data templates for the use of environmental product declarations (EPDs) for construction products in building information modelling (BIM)

⁴³ ISO 23387:2020 Building information modelling (BIM) - Data templates for construction objects used in the life cycle of built assets - Concepts and principles

1190 Annex 14 - The transition to conformity data digitalisation

1191 A transition pathway is necessary on the journey towards full digitalisation of conformity data,
1192 given the formidable complexity arising in trying to encode fine details of conformity data that
1193 are typically presented as unstructured data. While such information can certainly be
1194 represented digitally, the real challenge is whether machines can understand each other when
1195 the information is exchanged.

1196 This BRS focusses on a small set of key data elements considered to be of most value for the
1197 support of digital trade and sustainability initiatives. The data model described within this BRS
1198 is by no means the full data set available from original certificates and so manual verification will
1199 still be warranted in certain circumstances, even with full implementation of the BRS data
1200 model.

1201 With due consideration for the manageability of any digitalisation transition for CABs, an initial
1202 target for digital discovery of product conformity data might simply be the digital capture of the
1203 'prime data' (i.e., meta-data about the attestation itself, refer Section 6.5.9) as well as identifiers
1204 (in some form) for the following:

- 1205 ● applicable conformity scheme (or program), if applicable
- 1206 ● referenced standard(s) and/or regulation(s)
- 1207 ● object(s) of conformity assessment

1208 The BRS data model, which extends well beyond the elements listed immediately above, might
1209 also provide a useful template for parties looking to begin digitally structuring certain elements
1210 within attestations on a journey towards full digital representations. This could be done while
1211 recognising the possibility for artificial intelligence to develop to the point of being able to reliably
1212 interpret even partially structured conformity data on a shorter timeframe than the development
1213 of universal coding systems capable of rendering all conformity assessment data.