Speakers

Koshi Kamigaki (JP)
IEC TC111 /ISO TC207 SC1 JWG16 convenor
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(Invited Researcher, NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY)

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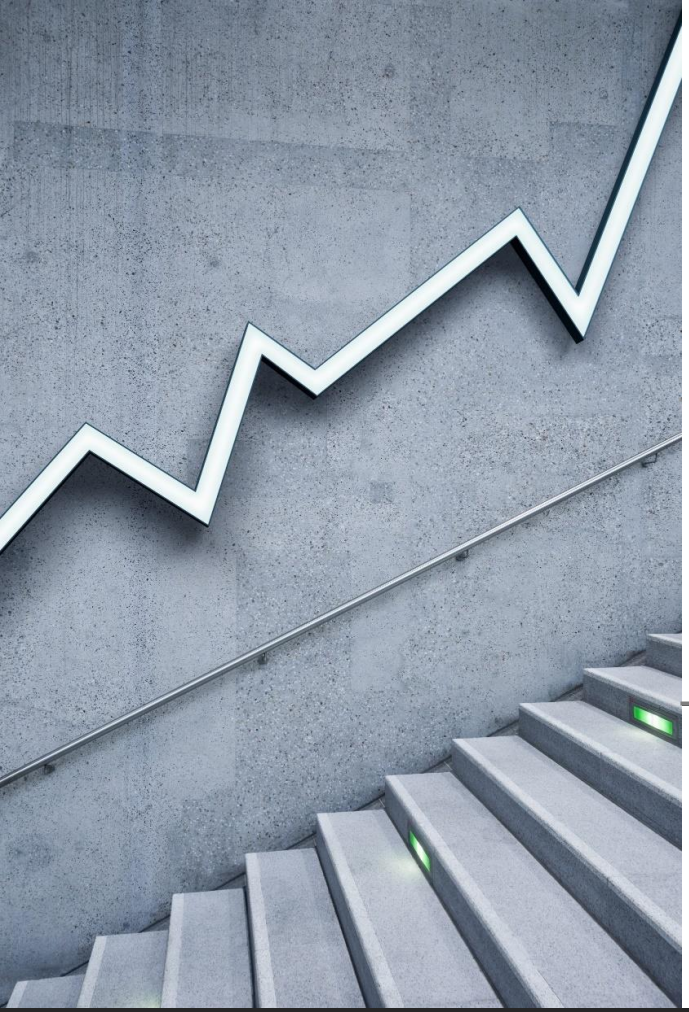
JWG 16 team leader

Principal Consultant,
ECD Compliance

How material declaration of products can support circular economy and digital product passports

Koshi Kamigaki Convenor of ISO TC 207/SC1 - IEC TC 111 / JWG 16 Material Declaration
Walter Jager Co-convenor of IEC TC 111 / SDB 62474 and JWG 16 Team Leader



Agenda

1. Overview of JWG16 and ISO/IEC 82474-1 Material Declaration — Koshi Kamigaki
2. Relationships between DPP in Ecodesign Working Plan and ISO/IEC 82474-1 — Koshi Kamigaki
3. The ISO/IEC 82474-1 Standard and its capabilities — Walter Jager
4. Circularity information through the supply chain — Walter Jager
5. Future activities towards supporting DPP — Koshi Kamigaki
6. *Q & A*

How material declaration of products can support circular economy and digital product passports

1-1. Overview of JWG16

- **Title: ISO/IEC 82474-1** Material declaration - **Part 1: General requirements**
- **Scope:** This standard specifies requirements and guidance for the **content, format, and exchange** relating to material declarations for products and accessories of organizations operating in and supplying to industries within the ISO and IEC scope. It allows organizations to:
  - Assess products against **material and substance requirements**,
  - Use this information in their activities related to the **environmentally conscious design** process and across **all product life cycle phases**, including **material efficiency** and **product circularity considerations**, as well as considerations linked to end-of-life stages such as **waste management** and use of **reusable parts** and **recycled content**

Facts and Figures

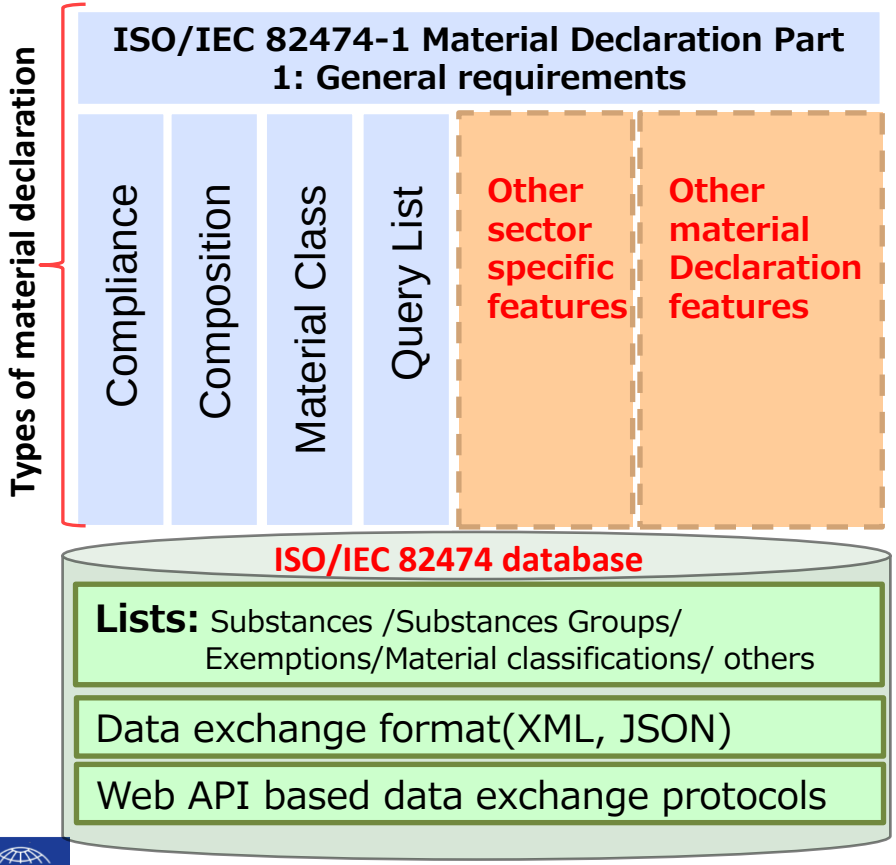
Co-conveners

- Koshi Kamigaki (IEC TC 111) and
- Solange Blaszkowski (ISO TC 207/SC 1)

Memberhip:

- 58 experts from 17 NBs
- 4 liaison: IAEG, FEICA, ISO TC 323, ISO/TC 61/SC 14
- Sectors represented: aviation, chemicals, automotive, paper, information, EEE

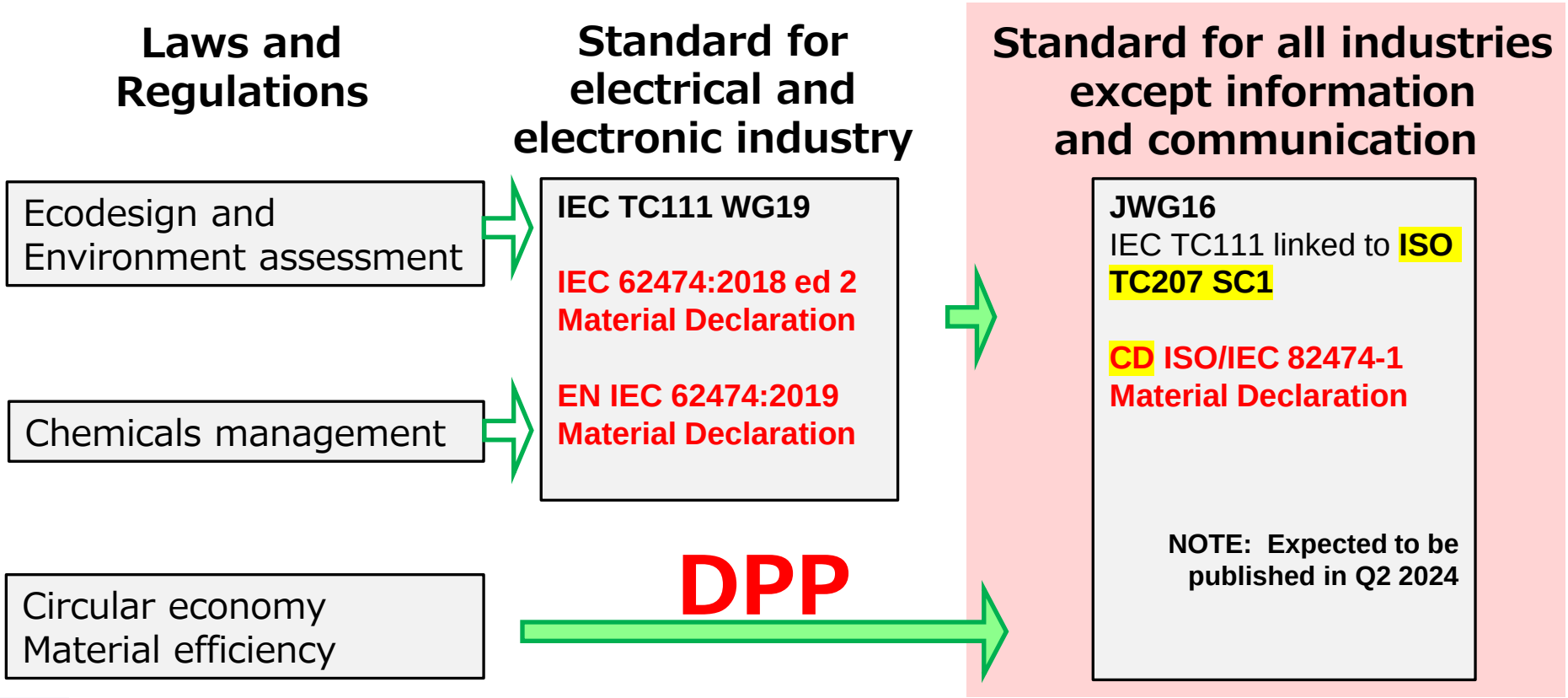
Modular & open architecture

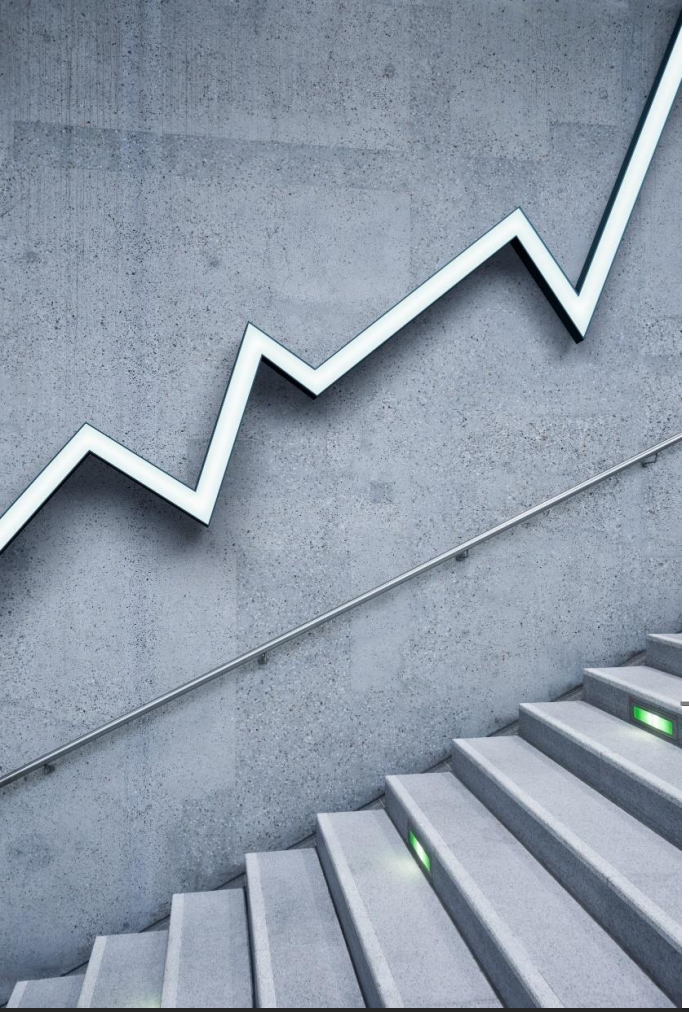


STANDARD INCLUDES;

1. The dual logo standard will cover the **business information** (requester, supplier, product ID…) as the foundation of the architecture.
2. The **four types of material declaration**: Compliance, Composition, Material Classes, and Queries
3. Build a **data exchange format** that supports a variety of reference data
4. **Modular approach** that enables additional **sector-specific features** and **other types of material declaration**

1-2. Overview of ISO/IEC 82474-1 Material Declaration





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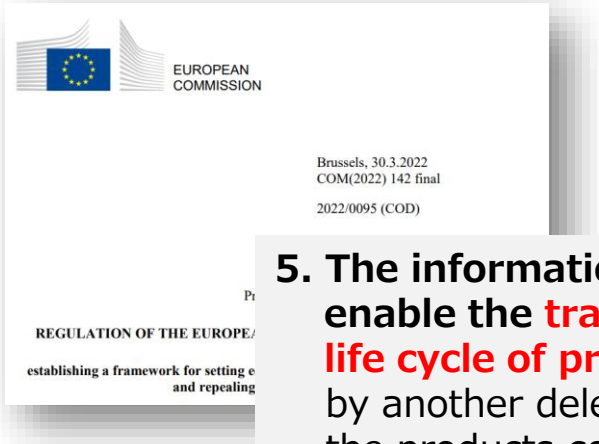
How material declaration of products can support circular economy and digital product passports

2. Relationships between DPP in Ecodesign Working Plan and ISO/IEC 82474-1

establishing a framework for setting **ecodesign requirements** for sustainable products and repealing Directive 2009/125/EC (COM(2022) 142 final)


EUROPEAN COMMISSION

Brussels, 30.3.2022
COM(2022) 142 final

2022/0095 (COD)

Pr

REGULATION OF THE EUROPE

establishing a framework for setting e
and repealing

IEC 62474:2018 & ISO/IEC 82474-1 support those information requirements

Article 7
- Information requirements -

5. The information requirements referred to in paragraph **shall enable the tracking of all substances of concern throughout the life cycle of products**, unless such tracking is already enabled by another delegated act adopted pursuant to Article 4 covering the products concerned, and shall include at least the following:

(a) the **name** of the **substances of concern** present **in the product**;
(b) the **location** of the substances of concern within the product;
(c) the **concentration**, maximum concentration or concentration range of the substances of concern, at the **level of the product**, its **main components**, or **spare parts**;
(d) relevant instructions for the **safe use** of the product;
(e) information relevant for **disassembly**.

2. Relationships between DPP in Ecodesign Working Plan and ISO/IEC 82474-1
On making sustainable products the norm (2022/03/30)

Overview of initiatives in the Circular Economy package

Ecodesign Working Plan 2022-2024

→ Higher energy efficiency and circularity for energy-related products

→ New rules for consumer electronics (smartphones, tablets, solar panels)

- **From EU Directives to EU Regulations**

- **Setting of eco-design requirements and expansion of target products**

➡ By 2030, EU products will be designed to reflect recycling aspects such as durability, energy/resource efficiency, repairability/recyclability, and use of recycled materials.

- **New EU energy label**

➡ Addition of circular aspects such as repairability score

- **Restricting/pro**

➡ Disclosure of infor

the reason for dispos

been reused, remanufactured, recycled, or d energy

ISO/IEC 82474-1 supports those information requirements

- **Digital product passport**

➡ Digitization of information related to product resource circulation and the environment

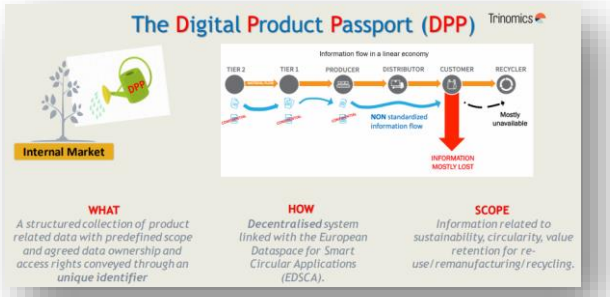
2. Relationships between DPP in Ecodesign Working Plan and ISO/IEC 82474-1

Reference Info ➡Impact Assessment study for the Sustainable Product Initiative

Workshop 3: Digital Product Passport Quoted from Trinomics workshop, 29 April 2021

<NEW CIRCULAR ECONOMY ACTION PLAN>

The Commission intends to address transparency issues to circular economy approaches **by creating a European Dataspace for Smart Circular Applications (EDSCA)** containing data on value chains and product information



Chapter 5

2-1 Data can be **encrypted** where justified and agreed (for example on grounds of intellectual property, commercial sensitivity or privacy).

2-2 Every product receives a **unique identifier** (“birth certificate”) with basic information (e.g. producer, model, date); this is **kept on a centralised registry**.

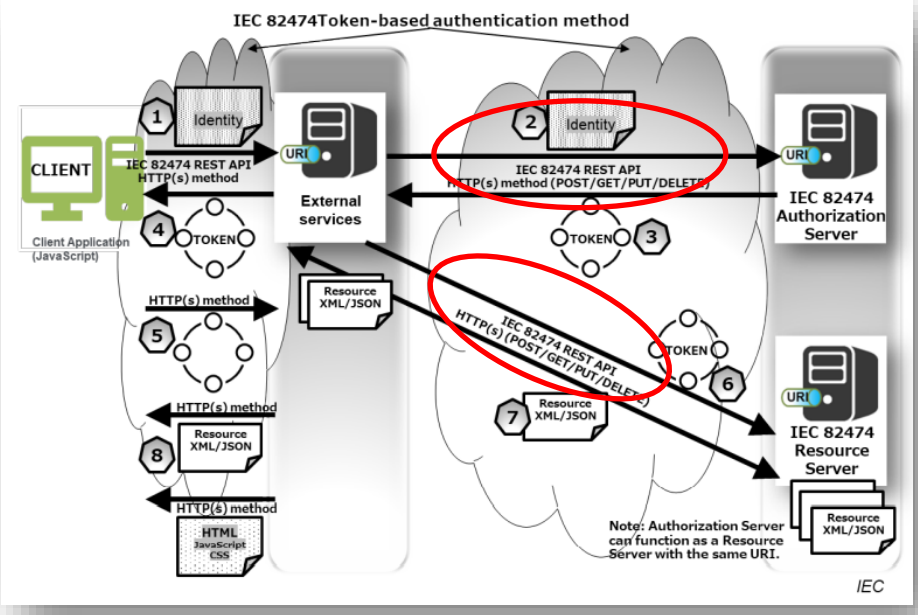
2-3 **Most data can stay in the place of origin**. There is no need to mirror and copy the data in centralised databases. The registries with links to the distributed data can be managed by third trusted partners ensuring reduced cost or administrative burden. One example is the GS1 model.

2-4 An address is created similar to a **URL (Uniform Resource Locator)** for the product. When **combined with a tag** (QR code, RFID, Bluetooth tag) the company, consumer or public authority can connect **directly to access the product’s unique digital profile** with quantitative and qualitative, static and dynamic, standardised and **machine-readable data**.

2-5 Distributed ledger technologies, including **blockchain**, can enable secure or **encrypted decentralised data** where needed and **a dependable information trail**.

2-6 **Agreed standards and protocols** streamline the delivery of the product information and **systems interoperability** based on **common ontologies and classifications**, and agreed protocols.

Data can be encrypted



ISO/IEC 82474 token-based authentication method

B.2.5 IEC 82474 token-based authentication method

The available methods are secured by a bearer token.
The tokens contains as claims encrypted
user Information and a timestamp that indicates when the token expires

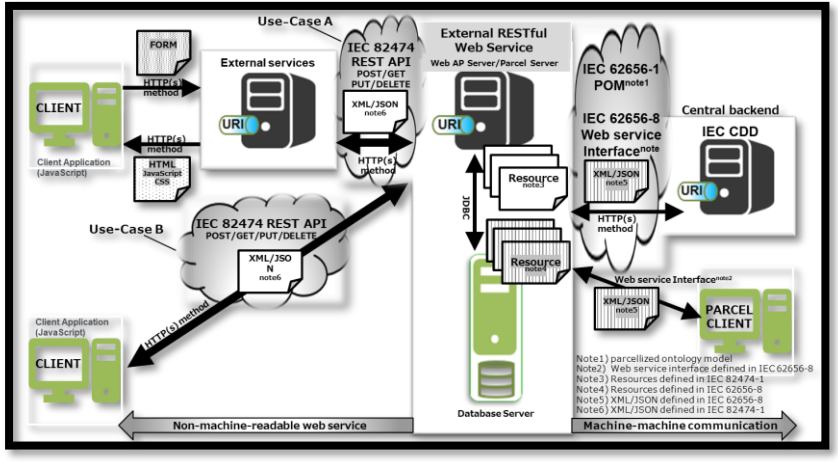
Product information (basic information)

a) The material declaration shall be related to a product or product family

b) The **product shall have an identification** and a mass assigned. In the case of a product family, the identification and mass of each product within the product family shall be specified

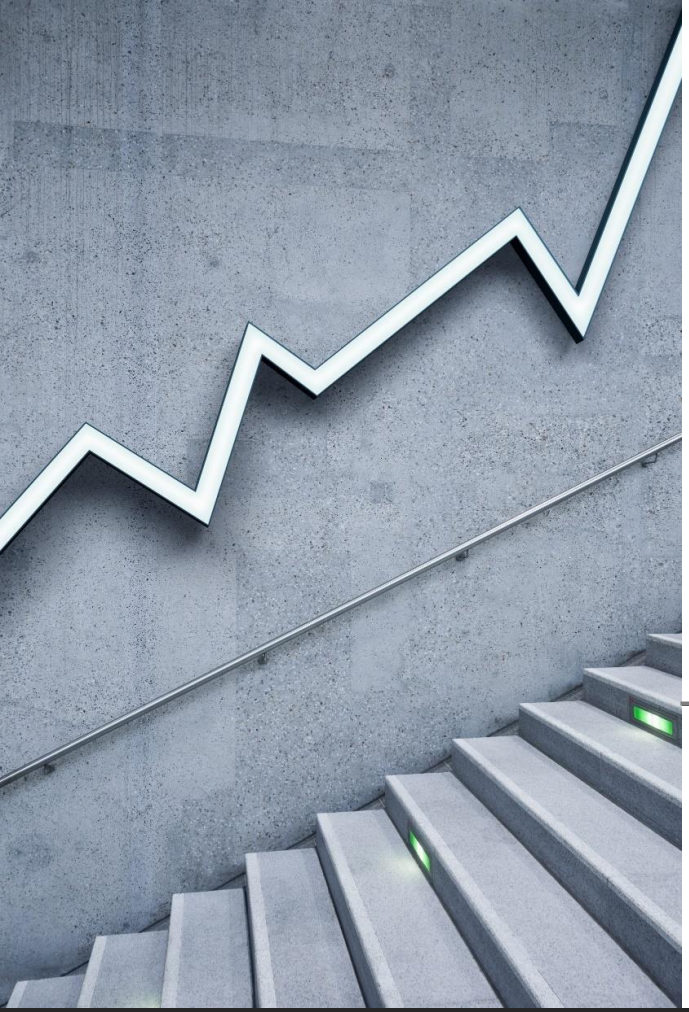
2-3 Most data can stay in the place of origin. There is no need to mirror and copy the data in centralised databases. **The registries with links to the distributed data** can be managed by **third trusted partners** ensuring reduced cost or administrative burden. One example is the GS1 model.

IEC 82474 Web Services can assist the registries with links to the distributed data



IEC 82474 Web Services specifies REST

- Supports Centralized registry/Data distribution.
- Specify REST Services that take SOAP functionality into account.



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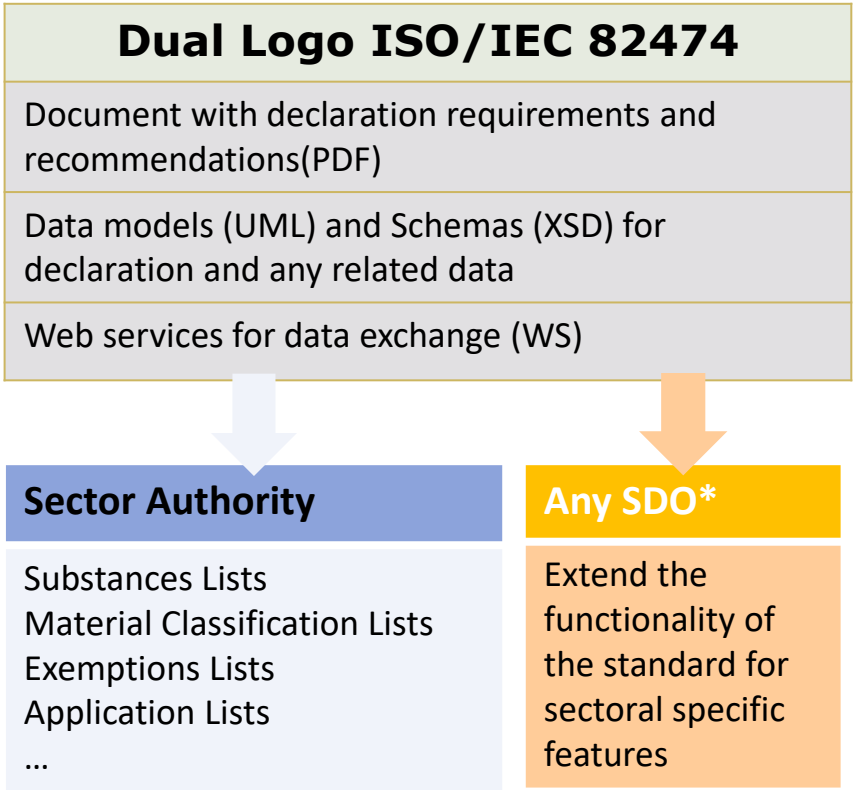
4. The ISO/IEC 82474-1 standard (Material Declaration)

1. The ISO/IEC 82474-1 will **cover most of the needs of all sectors** for reporting information about substances and materials in products, parts or articles
2. The dual logo standard provides **document** (PDF), **data model, schema, developers table** and **web services** (WS).
3. It offers a **modular and extendable architecture** for other standard development organization (SDOs) to complement specific features needed for declaration
4. Specific authority (sectors) can use their own **reference data**



4. ISO/IEC 82474-1 – What's Included?

- ISO/IEC 82474-1 is implemented in two parts
  - ISO/IEC 82474-1 document (Pdf file)
  - Standard in Database (SDB) format containing specifications that need periodic updates

- ISO/IEC 82474-1 document includes:
  - Declaration procedures, general requirements and recommendations
  - Rules for updating the parts of the standard in the SDB

- SDB content includes:
  - Data Exchange Format (DXF) for Material Declaration
  - DXF for Reference Lists (DSL, MCL, exemptions, etc)
  - Web services specification
  - Reference Lists
    - Cross-sector Material Class List (MCL)

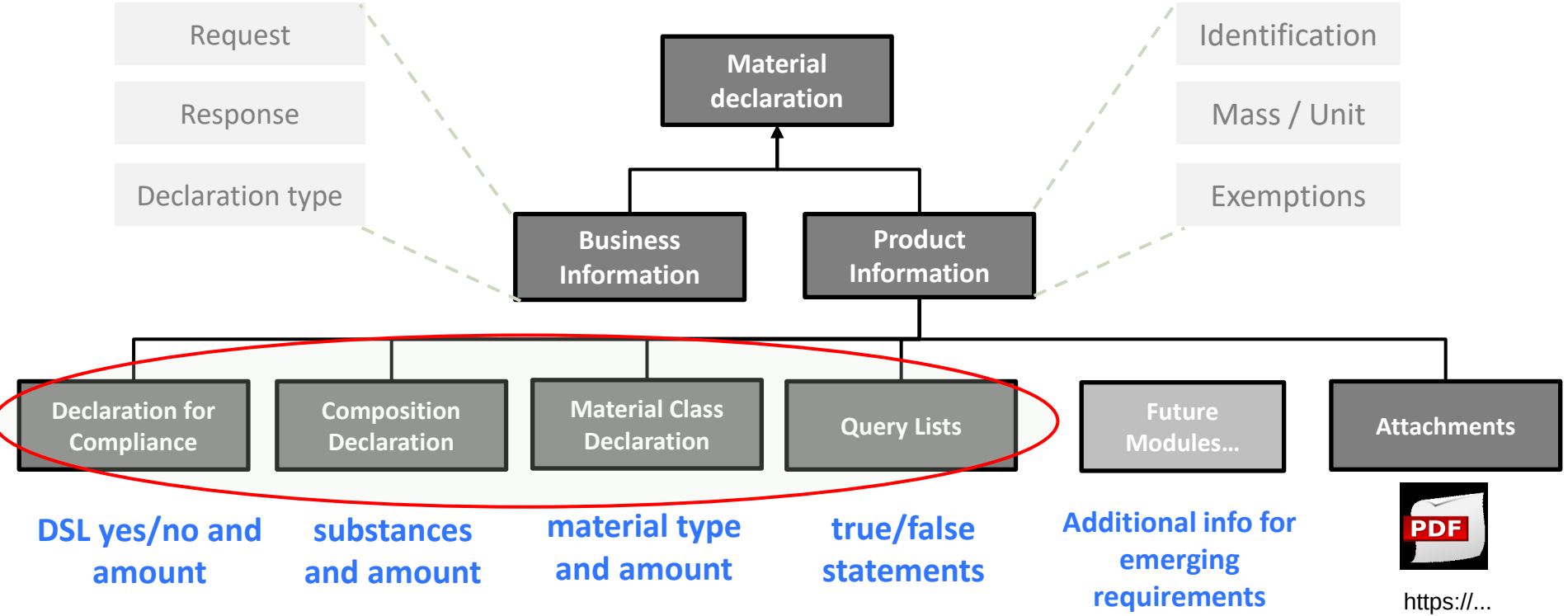
SBD Teams perform periodic updates to the SDB content to meet emerging regulatory and market requirements
(new requirements and modifications can be implemented in less than 3 months).

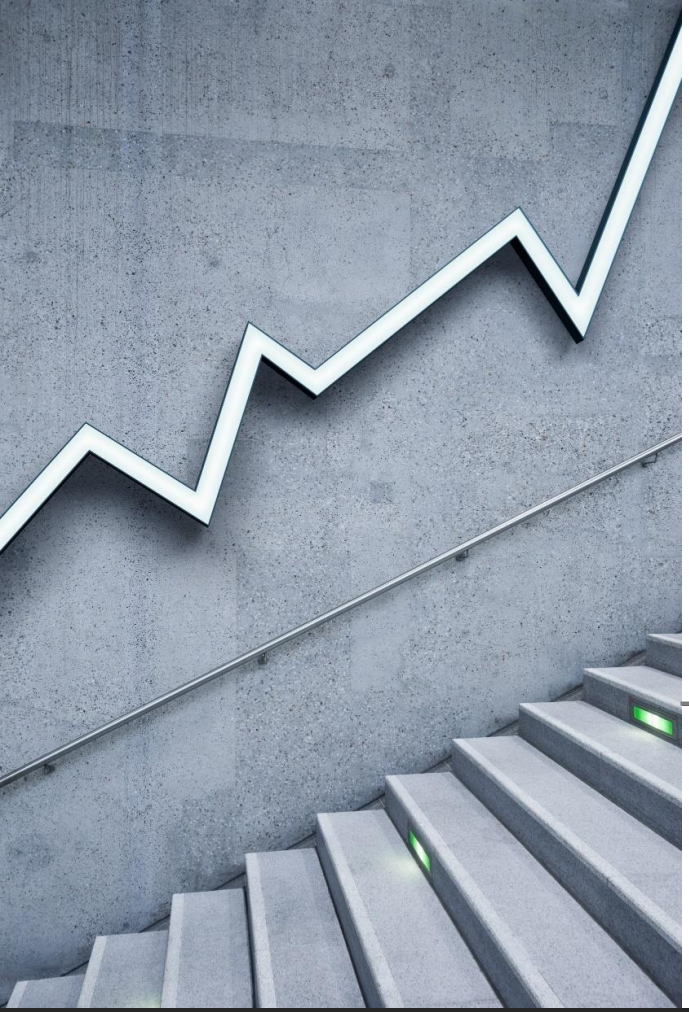
Sector authorities will continue to own and manage sector-specific reference data

- Declarable Substances Lists (DSL), Exemptions Lists, Application Lists, …

Example: IEC 62474 DSL and exemption lists for EEE (managed by SDB 62474)

4. ISO/IEC 82474-1 Declaration Modules





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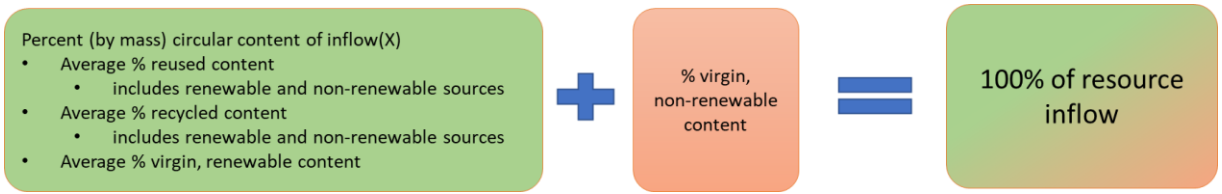
How material declaration of products can support circular economy and digital product passports

5. Circularity information in the supply chain

- To accurately measure and assess the circularity of a product → need information from suppliers
- To determine what supplier information is needed
  - There are a multitude of emerging regulations and systems to measure circularity
  - ISO 59020 (Circular Economy - Measuring and assessing circularity) is pulling these various considerations into a holistic framework and a core set of circularity indicators (under development)
  - Data requirements for these circularity indicators identifies information needed
- Some of the key factors to measure and assess circularity of a product
  - Material circularity and efficiency of resources for manufacturing products
  - Extending product life → retaining resource value at highest level for longer
  - Maintaining highest resource value at product end of life
  - Energy source and intensity
  - Water circularity

5. Circularity information in the supply chain (Resource Inflows)

- Circularity of resource inflows for manufacturing products



- Fraction of an input material resource that is **reused content**
  - Retains higher value than recycling
- Fraction of input resource that is confirmed as **recycled con**tent
  - Uses specification of recycled content in ISO 14021:2016
  - Includes pre-consumer (post-industrial) and post-consumer recycled content
  - Does not include industrial scrap
- Fraction of a material inflow that is **renewable** given specified conditions
  - Biomass that is replenishable and regenerated at a rate equal to or greater than rate of depletion

5. Circularity information from supply chain (Extending product life + Product circularity at end-of-life)

- Extending product life → retaining resource value at highest level
  - Durability → considering reliability and lifetime extensions from performing maintenance, repair, updates, upgrades, and refurbishment as applicable) (includes initial use and reuse)
  - Many durability aspects are determined during design of the finished product, but are influenced by characteristics of supplied materials, parts, and sub-assemblies
    - May need supplier information

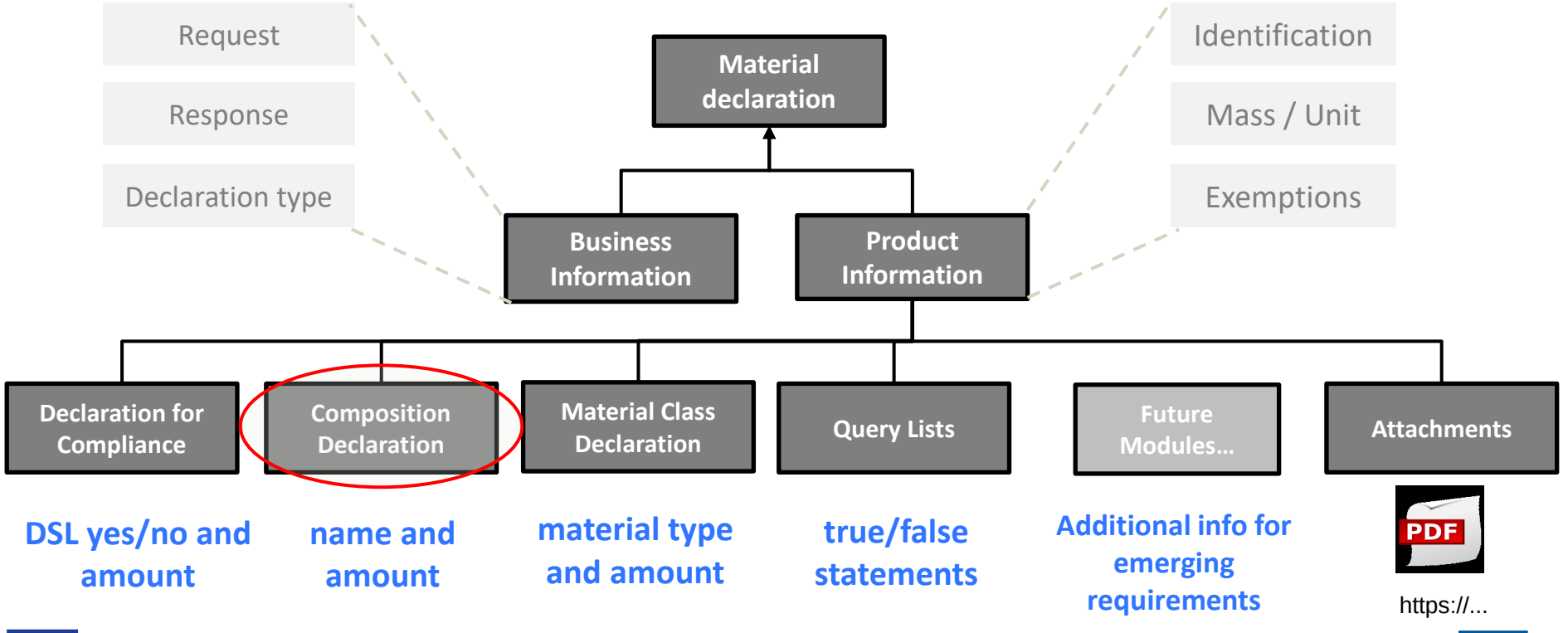
- Product circularity at end-of-life
  - Fraction of content that is reused for manufacturing of new products, repairs, etc.
  - Fraction of materials that are recycled into secondary materials for use in manufacturing new products
  - Fraction of product at end-of-life that is recirculated for safe return to the biosphere (given specified conditions)

5. Circularity information in ISO/IEC 82474-1

- Data fields for circularity information added to ISO/IEC 82474-1 to meet emerging International norms and regulatory requirements.
  - Initial focus is on material inflows - circularity and efficiency
  - Data fields on product durability (extended life) and end-of-life circularity will need to leverage International standards → planning by IEC/TC111

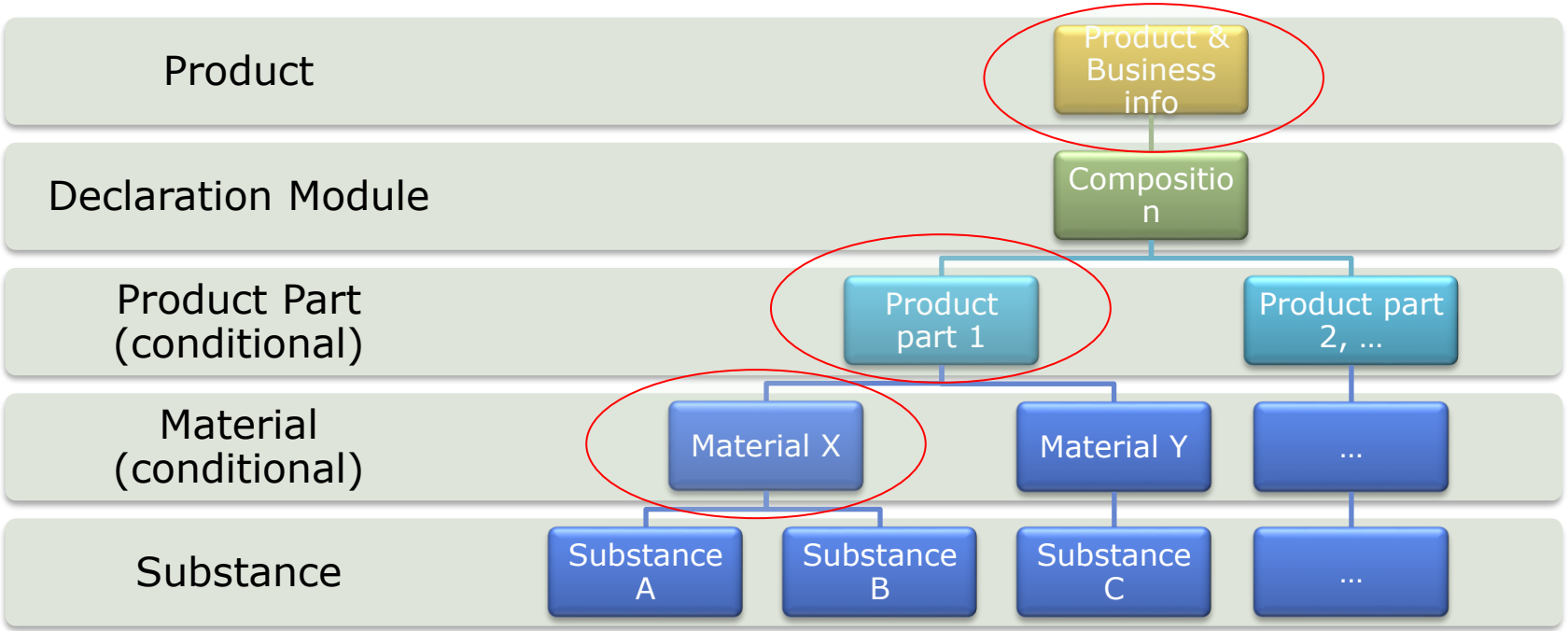
- Support for circularity information is provided in all declaration modules
  - Composition declaration, declaration for compliance, material class declaration, and query list declaration

5. ISO/IEC 82474-1 Declaration Modules



5. Structure of Composition Declaration

Circularity information may be associated with the: Product, Product part, and/or Material

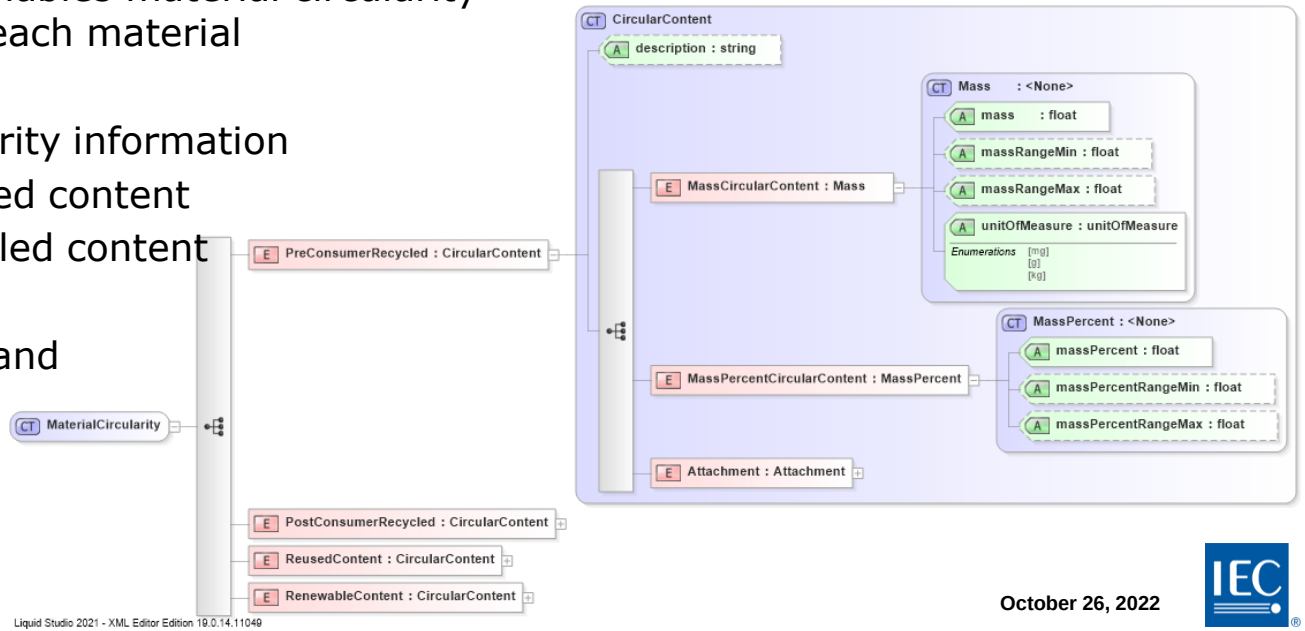


5. Circularity Information about Materials

- ‘Material’ in a composition declaration typically contains information about:
  - material name, mass information, material class/category, material type, material properties and use descriptors

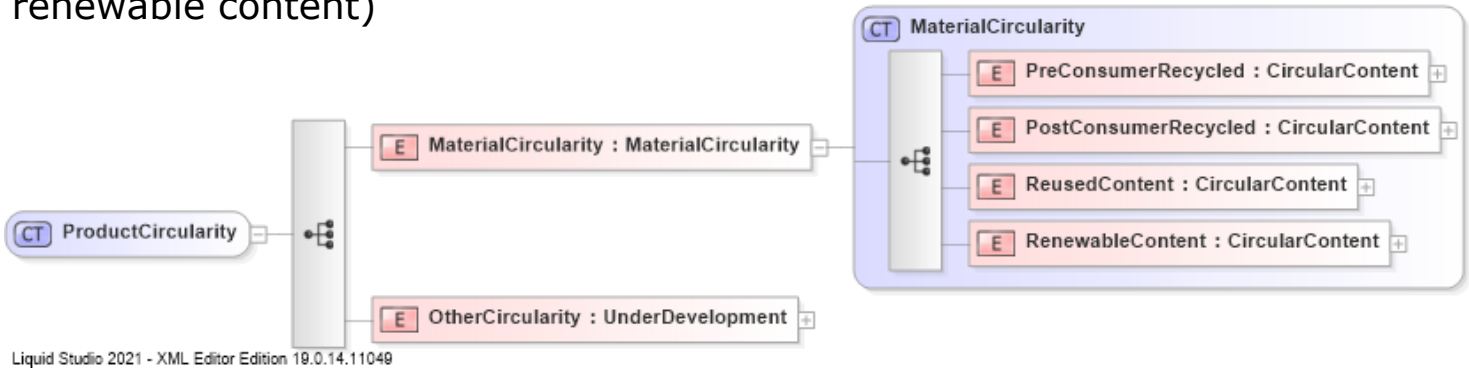
- ISO/IEC 82474-1 also enables material circularity data to be reported for each material

- includes material circularity information
  - Pre-consumer recycled content
  - Post-consumer recycled content
  - Reused content
  - Renewable content, and
  - Attachments for
    - evidence,
    - certifications, etc.



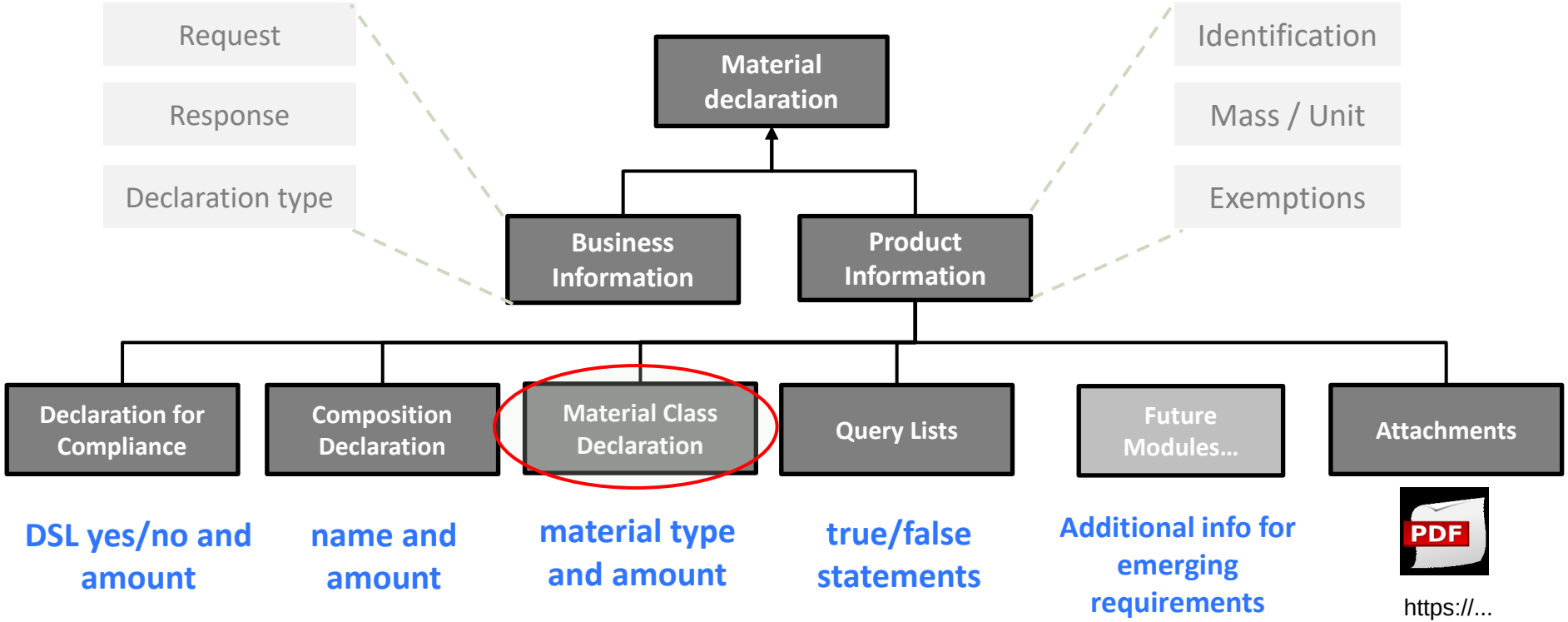
5. Product (Product Part) -> Product Circularity

- Product Circularity data may be reported for the overall product or for specific product parts
  - Includes summary material circularity information (recycled, reused, and renewable content)



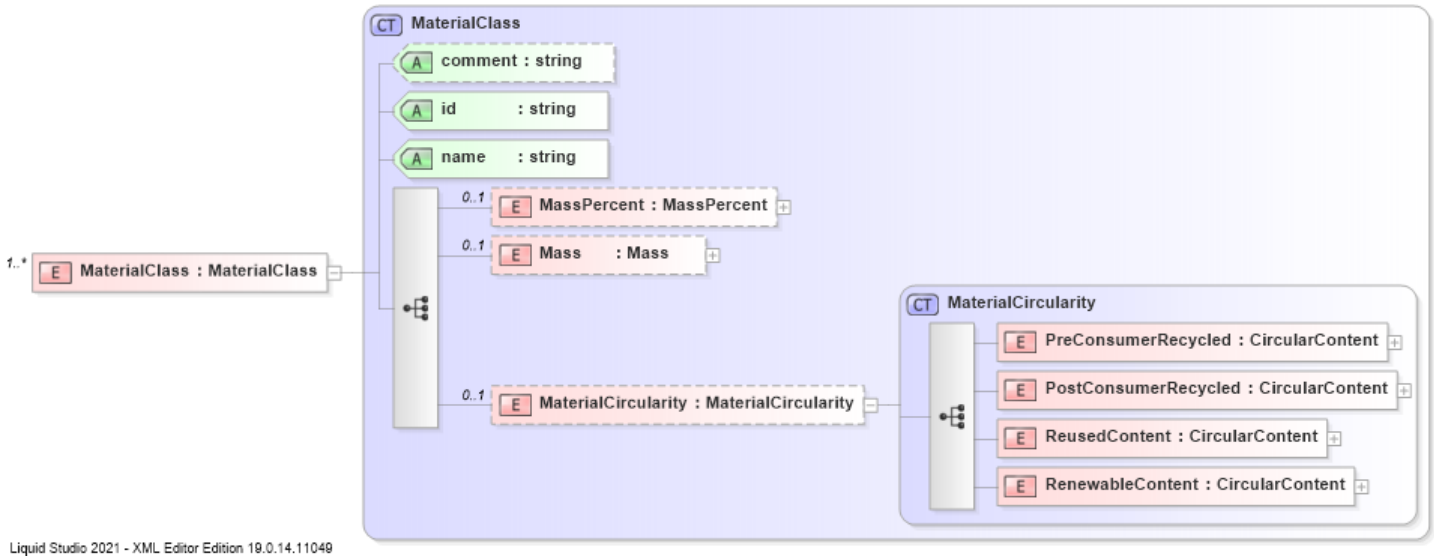
- Other product circularity and environmental information are considered as specific and market needs and standards emerge
  - Examples: examples may include information for carbon footprint, environmental footprint, durability index, etc.

5. ISO/IEC 82474-1 Declaration Modules



5. Material Class Declaration

- Each material class may include circularity information
  - E.g. average percent recycled content of polyethylene plastic



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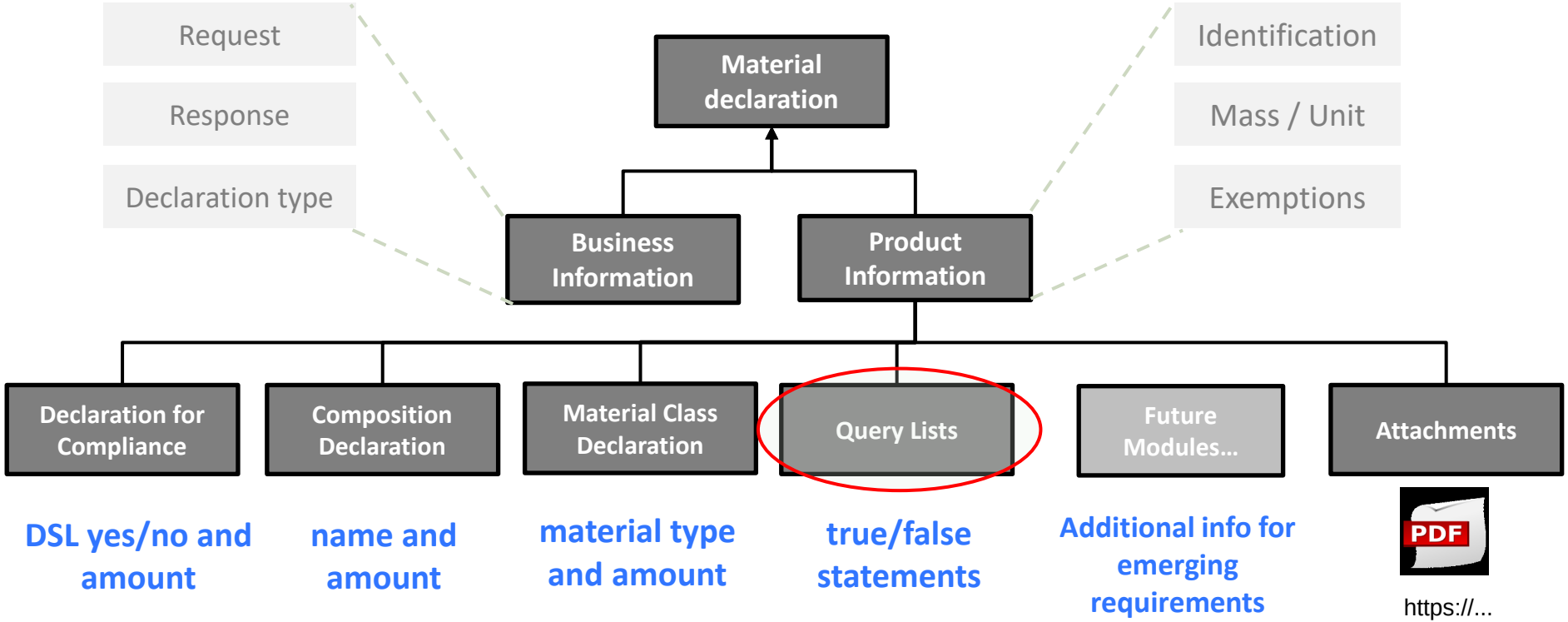


5. ISO/IEC 82474-1 Query List Declaration

- Query List declarations support true/false reporting against pre-defined statements
  - Predefined statements may address circularity characteristics

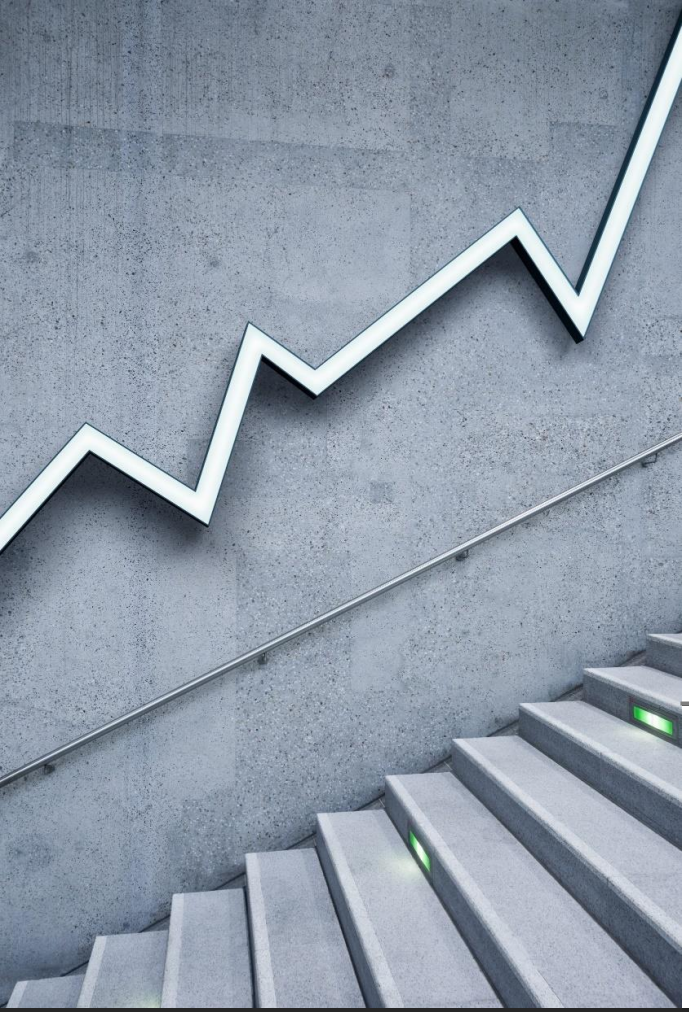
- Examples:
  - Compliance statements for specific regulatory
    - E.g. Product contains nickel that is externally accessible
  - Critical Raw Material (CRM) Statements
    - E.g. mass of cobalt in a battery is between 5g and 25g
  - Product Circularity Data Sheet (PCDS) Statements (ISO 59040)
    - E.g. The product contains >0-10 % post-consumer recycled content by weight

5. Cross-Sector Material Classification List (MCL)

- ISO/IEC 82474-1 (CD) specifies requirements for creating a harmonized, cross-sector Material Classification List
  - To be maintained in the SDB

- Different sectors and regulators are using different and incompatible material classification systems
  - Some material category lists are complex and ambiguous with overlapping material categories
  - Creates unnecessary challenges in complex supply chains

- Requests from manufacturers to harmonize across sectors and globally



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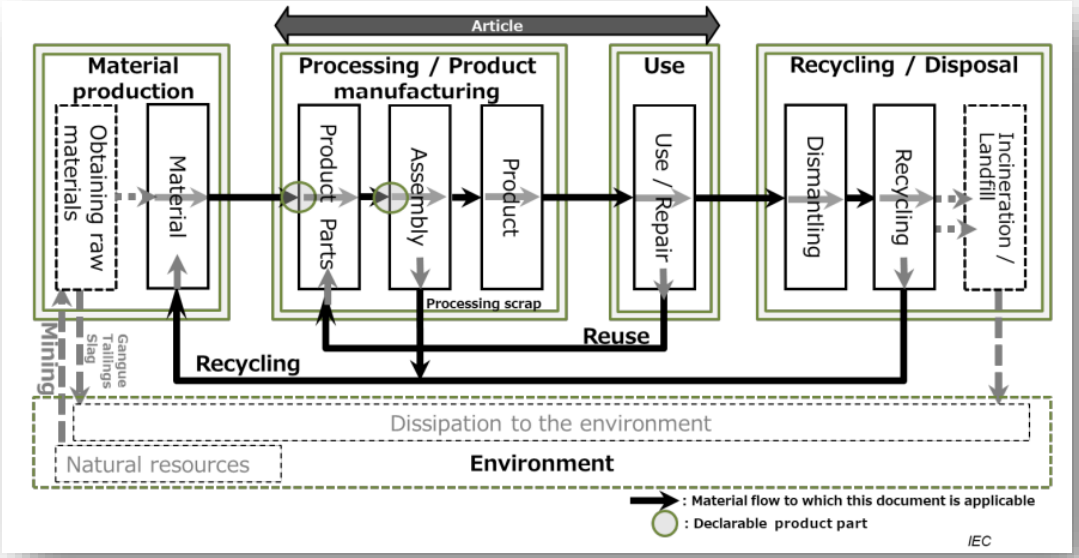
2-5 Distributed ledger technologies, including blockchain, can enable secure or encrypted decentralised data where needed and a dependable information trail.



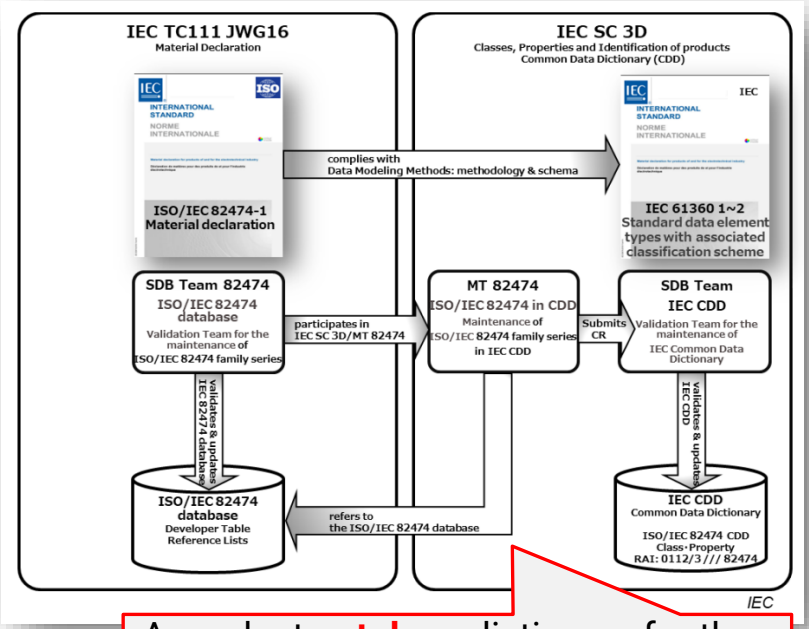
Material flow chart for the material declaration

Distributed ledger technologies, including blockchain

JWG16 **will consider** developing " Material declaration for the distributed ledger technologies (**blockchain**)" for the "material flow" shown in the left figure as an IEC /ISO 82474-1 series standard **in the future**.

2-6 Agreed standards and protocols streamline the delivery of the product information and systems interoperability based on **common ontologies and classifications** and **agreed protocols**.

Systems interoperability based on common ontologies and classifications and agreed protocols



A product **ontology** dictionary for the **material declaration** will be developed in collaboration with SC 3D

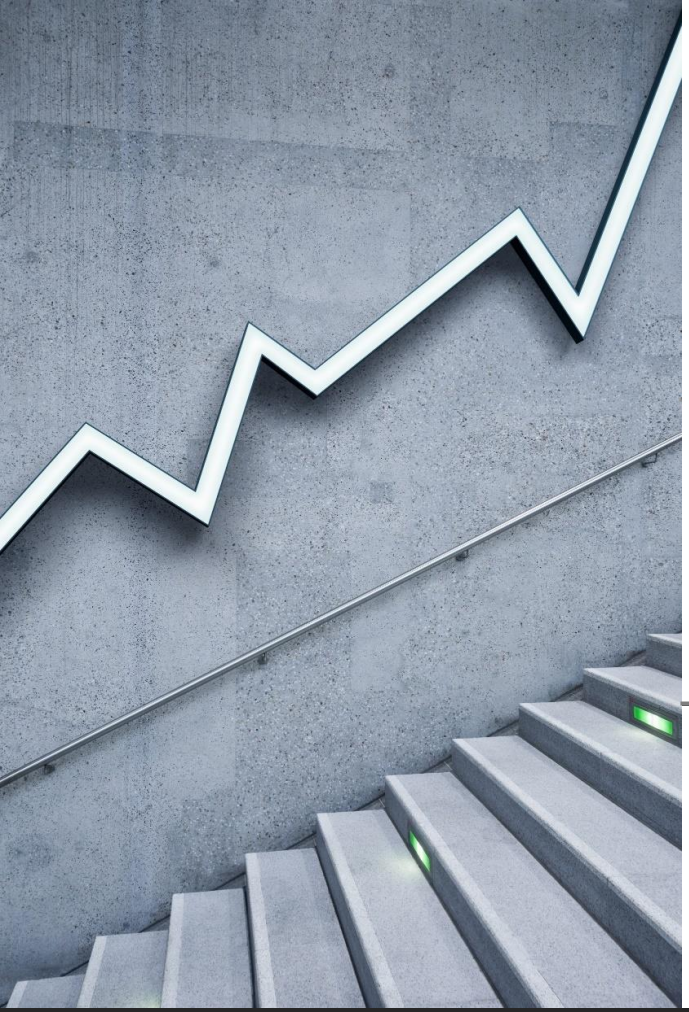
Agreed standards and protocols streamline

ISO/IEC 82474 web service, upon which more sophisticated or suitable user applications on the material declaration can be built:

– ISO/IEC 82474 Authentication service
– ISO/IEC 82474 Up and Download service
– ISO/IEC 82474 Declaration service
– ISO/IEC 82474 Regulation service
– ISO/IEC 82474 Other requirements service

Like other web services in general, **each information exchange service** specified in Annex B(normative) of this document also has means for **handling requests, responses, and exceptions**

2022/10/26



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Thank you for your kind attention

For more Information please contact:

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Walter Jager wjager@ecdcompliance.com

IEC TC111 JWG16 Material Declaration
Linked to ISO TC207/SC1